

SMART STREET LIGHTING PROJECT

TECHNICAL PROVISIONS

Final Dated 2022

by and between

The District of Columbia,

acting by and through the District of Columbia Office of Public-Private Partnerships, for and on behalf of the District of Columbia Department of Transportation

and

Plenary Infrastructure DC LLC, as Developer



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1 GENERAL

(a) These Technical Provisions are comprised of the following documents:

- (i) Sections 1 through 13 of the Technical Provisions
- (ii) The mandatory specifications, standards, manuals and guidelines listed in Appendix 13.2 of the Technical Provisions; and
- (iii) The Design Manual approved by the District.

(b) With regards to the Technical Provisions documents, the order of precedence should be treated as follows:

- (i) In the event of any conflict, ambiguity or inconsistency between any terms or provisions of these documents, the order of precedence, from highest to lowest, shall be as follows:
 - i. Sections 1 through 13 of the Technical Provisions
 - ii. The mandatory specifications, standards, manuals and guidelines listed in Appendix 13.2 of the Technical Provisions; and
 - iii. The Design Manual approved by the District.
- (ii) In the event of any conflict, ambiguity or inconsistency of the provisions within any one of these documents, the more stringent standard will prevail.
- (iii) Additional or supplemental details or requirements in a lower priority document shall be given effect except to the extent they irreconcilably conflict with requirements, provisions and practices contained in the higher priority document.

1.1 Project Description

(a) Existing Street Light Network

The Existing Street Light Network provides illumination in the Public Space for traffic and general public safety, and comprises approximately 77,912 Lighting Fixtures as part of 72,051 Lighting Units¹ generally located along streets, alleys, traffic circles, overpasses, underpasses, and tunnels in the Public Space, on the National Highway System (NHS) and associated ingress and egress, under bridges spanning navigable waterways, or adjacent to the Public Space and illuminating the Public Space, along with supporting infrastructure assets within and outside the Public Space and select overhead, illuminated guide signs. The Existing Street Light Network and other Project Elements are further described in Section 1.4 of the Technical Provisions.

¹ Multiple Fixtures can be affixed to an individual Lighting Unit. The Developer should reference the ArcGIS inventory for accurate counts.

- (b) As part of the Project, the Developer shall perform all Work described in these Technical Provisions. In particular, the Developer shall perform the D&C Work on the Existing Streetlight Network and perform Asset Management Work on the Streetlight Network to meet the Project objectives set forth in Section 1.1 of the Technical Provisions and the Performance Requirements, in accordance with the requirements of the Project Agreement, including these Technical Provisions.
- (c) The Developer shall install the Smart City Improvements. The District will manage the Smart City Improvements installed by the Developer.
- (d) The Project is further described in these Technical Provisions and generally includes, within the Project Limits:
 - (i) Designing and converting the existing non-LED Streetlight Fixtures in the Existing Street Light Network to LED technology, as well as replace or upgrade the existing LED Streetlight Fixtures to meet the requirements of these Technical Provisions, providing for color temperatures and wattage appropriate to their setting, including repairing, renewing, rehabilitating, replacing, and upgrading existing wiring and electrical systems necessary to support the conversion to LED technology;
 - (ii) Designing, procuring, installing, maintaining, upgrading from time to time, managing, monitoring and using a Remote Monitoring and Control System (RMCS) to provide the District with real-time, fully scalable, reliable, accurate, monitoring and control of the Street Light Network that relies on open standards and includes dynamic and environmentally-responsive dimming capability;
 - (iii) Upgrading, repairing or replacing District-owned Lighting Units, District-owned Light Fixtures that may be attached to Poles not owned by the District, and other District-Owned Elements of the Street Light Network where appropriate or required based on their condition and a pre-determined process and criteria for establishing when such assets must be replaced;
 - (iv) Manage, monitor, maintain, renew, and rehabilitate the Streetlight Network and perform any other Work necessary to meet the Performance Requirements;
 - a. This includes bringing all Elements of the Lighting Network to the Minimum Acceptable Condition of Fair (numerical score 3) as described in the Performance Requirements for the Improved and Expanded Network in Appendix 13.1 and maintaining Elements at the Minimum Acceptable Condition for the duration of the Project Term.
 - b. information for Elements, including photos, can be found at the following link:
<https://dcdgis.maps.arcgis.com/apps/webappviewer/index.html?id=cc00ffaf6edc4cf6be6731e2343b209e>
 - (v) Expand the Street Light Network occasionally as requested by the District.
 - (vi) Maintain an accurate Lighting Asset Inventory at all times;

- (vii) Perform Make Safe Work and Administrative Redirect promptly when so requested by the District;
 - (viii) Perform demonstration testing, and commissioning testing to satisfy the District's requirements and demonstrate that the LED Luminaires meet the requirements of these Technical Provisions;
 - (ix) Perform some trimming of trees that may obstruct or impede the proper illuminance of the Luminaires, as defined in Section 10.4.6 of these Technical Provisions; and
 - (x) Installing the Smart City Improvements.
- (e) Any visible Element of the Street Light Network owned by the District and requiring replacement shall be replaced with an LED fixture that reduces light pollution, unless otherwise specified in these Technical Provisions or proposed by the Developer and approved by the District in its sole discretion.
 - (f) Any asset owned by the District or any third party disturbed, damaged, demolished, or otherwise rendered unusable by the Developer in the performance of the Work shall be promptly restored to its original condition or as otherwise specified in these Technical Provisions.
 - (g) The Developer shall perform all Work for the Project in accordance with the Project Agreement (including these Technical Provisions), Good Industry Practice, any Change Order or Directive Letter issued in accordance with the Agreement, Developer's Design Documents, Developer Management Plan, District-Provided Approvals, and other Governmental Approvals. The Developer may incorporate existing physical infrastructure in the design, construction, and/or reconstruction of the assets for the Project, provided that the Work meets the requirements of the Project Agreement.
 - (h) Except in public communications, community engagement, and outreach (for which the District shall be responsible), and in the areas defined in Section 3 of the Technical Provisions, the Developer shall initiate and perform all coordination and communication Work with the District, Utility Owners, all third parties and all Governmental Entities as may be necessary for the execution of the Work in accordance with the Project Agreement and as further specified in the Technical Provisions.
 - (i) The Developer shall support the District in community engagement, public communication and outreach as defined in Section 3 of the Technical Provisions.
 - (j) The Developer shall protect District and third party assets from damages or impacts caused by the Developer's Work. Any existing land, infrastructure, or other physical assets disturbed, impacted, or damaged, during the Work, whether inside or outside a Project Site and remaining in place after such Work is completed, as well as movable assets, shall be repaired, restored, or otherwise replaced by the Developer to its condition before damage as soon as possible, and in any event immediately upon completion of such Work if such land, infrastructure, or assets are located within a Project Site.
 - (k) The Developer shall maintain a warehouse. The warehouse shall be located within the District of Columbia limits.

- (l) Except as expressly provided otherwise, the requirements in the Technical Provisions pertaining to D&C Work performed during the period from NTP3 to Project Final Completion shall also apply to Work for the entire Term.

1.2 Project Objectives

- (a) The Developer shall perform the Work in accordance with these Technical Provisions, including but not limited to the performance requirements listed in the Appendix in Section 13.1, and take all necessary actions, at all times during the Term, to:
 - (i) Provide adequate level of illumination in the Public Space for vehicular, bicycle, and pedestrian traffic and general public safety while limiting light pollution and light trespass;
 - (ii) Ensure the safety of the public and accordingly prioritize Work necessary to ensure the safe travel of motorists, bicyclists, and pedestrians in the Public Space and adjacent private properties, placing the highest priority on Work to remedy imminent risks to public health and safety;
 - (iii) Ensure the safe, clean, functional, and reliable delivery of the Work;
 - (iv) Ensure and verify the quality of the Work;
 - (v) Minimize the risk of damages to, disturbance of, or destruction of property of the District and Third-Party property;
 - (vi) Use Reasonable Efforts to reduce and minimize the energy demands of the Street Light Network during and after the Term;
 - (vii) Minimize disruption to and interference with the normal flow of pedestrian and vehicular traffic;
 - (viii) Minimize inconvenience and disruptions to District residents and businesses who own or occupy premises adjacent to the Project Sites;
 - (ix) Inform and foster understanding and support of Project stakeholders and the public throughout the Term;
 - (x) Respect and contribute to the preservation of the historical, architectural, and aesthetic significance of the District, and in particular the Street Light Network;
 - (xi) Partner, cooperate and collaborate with the District, Pepco, Verizon and other Third Parties who own Elements of the Streetlight Network or real assets on, below, or above the Public Space in achieving the objectives of the Project;
 - (xii) Ensure the proper, long-term functioning and performance of the Street Light Network in accordance with the Performance Requirements;
 - (xiii) Remedy and cure any Noncompliance expeditiously;

- (xiv) Reduce and minimize the lifecycle costs of the Street Light Network during and after the Term;
- (xv) Provide for continuous access to and proper functioning of all the Elements of the Street Light Network to the District;
- (xvi) Monitor, measure, and report accurately and in a timely manner on the Developer performance in fulfilling its obligations in these Technical Provisions; and
- (xvii) Develop innovative solutions in support of the Project objectives and promote innovative uses for the Asset Management Information System (AMIS) and Remote Monitoring and Control System (RMCS).

1.3 Continuity of Operation

- (a) The Street Light Network is essential to the safety and security of the public and shall function as designed to provide the adequate level of illuminance in the Public Space in accordance with these Technical Specifications.
- (b) In situations when Light Fixtures do not provide the adequate level of illuminance, upon request by the District, the Developer shall provide for temporary Street Light Units to provide the equivalent level of illuminance and light quality. The circumstances that may prompt the provision of temporary Street Light Units are as follows:
 - (i) A Lighting Unit has experienced an outage for ten (10) or more calendar days;
 - (ii) Five (5) Lighting Units or an entire block has experienced an outage for five (5) or more calendar days; and
 - (iii) A Lighting Unit has experienced an outage, and the outage is not addressed within the cure period listed in the Performance Requirements set forth in Appendix 13.1 of these Technical Provisions. If the District deems the outage a safety risk, the District may request the Developer to provide for a temporary Street Light Unit.
- (c) It is not expected that Work on the Street Light Network shall affect traffic signals. Regardless, all traffic signals shall remain in operation at all times. The Developer shall not interfere with or disturb the proper functioning of traffic signals unless authorized by the District. In such cases, the Developer shall provide for temporary traffic signals to replace the traffic signals impacted by the Work. The Developer shall be responsible for coordinating the deployment of temporary traffic signals and signal timing adjustments with the District.

1.4 Project Assets

- (a) For the avoidance of doubt, all Elements of the Street Light Network are part of the Project.

1.4.1 Existing Street Light Network

- (a) The Existing Street Light Network is located entirely within the Project Limits, with the exception of a limited number of Lighting Units along streets that extend from the District into Virginia or

Maryland and electrical systems and conduits, which may be located in Virginia or Maryland with power source in Virginia or Maryland.

- (b) The Existing Street Light Network is comprised of the network of Lighting Units located in the Public Space or, in rare occasions, located on private property for the purpose of illuminating the Public Space, along with Light Fixtures that are attached to Utility-owned Poles in the Public Space or to Combination Poles, the Remote Monitoring and Control System, and supporting systems, fixtures, appurtenances, and infrastructure necessary for the proper functioning of such Lighting Units and Light Fixtures.
- (c) Combination Poles are excluded from the Existing Street Light Network. The Developer's responsibilities for Elements on Combination Poles are listed in section 1.4.7(c) of these Technical Provisions.
- (d) The Existing Street Light Network includes all electrical systems necessary for the proper functioning of the Luminaires from the PEPCO power source out as well as District-owned underground conduits, panels, junction boxes, manholes, hand holes, regardless of whether these Street Light Network Elements are marked as District-owned or not.
- (e) The Existing Street Light Network includes all the assets listed in the Existing Lighting Asset Inventory as of the Setting Date.
- (f) The Lighting Units of the Existing Street Light Network are generally located along alleys, streets (including streetlights on traffic signal Combination Poles), highways, pedestrian/bike bridges and trails, overpasses, underpasses, tunnels, bridges as further described in this Section 1.4.1 of the Technical Provisions.
- (g) Lighting Units part of the Existing Street Light Network include high-mast, tunnel and underpass lights, underdeck and navigation lights, overhead, illuminated guide signs, and special lights, such as radio tower lights, Welcome to Washington sign lights, Chinatown lights, and trail lights.
- (h) The Existing Street Light Network includes the Lighting Units located in underpasses, on the undersides of bridges that pass over roadways, and in tunnels within the Project Limits with the exception of the following tunnels that are explicitly excluded from the Project:
 - (i) Mall Tunnel (I-395) structure No. 1142
 - (ii) Air Rights Tunnel (I-395) structure No. 1143
 - (iii) 9th St. Tunnel structure No. 173
 - (iv) 12th St. Tunnel (North) structure No 172 (N tunnel)
 - (v) 12th St. Tunnel (South) structure No 172 (S tunnel)
 - (vi) 23rd Street, N.W. over E Street Expressway structure No. 1208
 - (vii) Massachusetts Avenue, N.W. under Thomas Circle structure No. 99

- (viii) 16th Street, N.W. under Scott Circle structure No. 100
- (ix) Connecticut Avenue, N.W. under Dupont Circle structure No. 101
- (x) K Street, N.W. under Washington Circle structure No. 102
- (xi) Southwest Freeway over 12th Street, S.W. structure No. 1113
- (xii) Southwest Freeway over I-395 Ramp structure No. 1101
- (xiii) Virginia Avenue, N.W. over E Street Expressway structure No. 1209
- (xiv) Virginia Avenue, N.W. over I-66 structure No. 1302
- (xv) 23rd Street N.W. over Virginia Avenue structure No. 10
- (xvi) Pennsylvania Avenue, S.E., over ramp to Southeast Freeway structure No. 1409
- (i) Existing Lighting Asset Inventory: The Lighting Asset Inventory as of April 9, 2021 (the “Existing Luminaire Inventory”) includes 72,051 Lighting Units, including 37,407 District-owned Poles, 28,276 Poles owned by owned by Pepco and 6,368 owned by Verizon, and identifies the following data per Lighting Unit. All assets in the Existing Luminaire Inventory are part of the Existing Streetlight Network and the Project.
- (j) The Developer is responsible for all Elements of the Street Light Network. The District provides reliance on the completeness and accuracy of the Existing Lighting Asset Inventory.
- (k) The most current version of the Lighting Asset Inventory can be viewed in the District’s ArcGIS inventory².

1.4.2 Improved Street Light Network

- (a) The Improved Street Light Network means the Existing Street Light Network after the completion of Street Light Improvements as determined by Project Final Completion, in accordance with the Project Agreement.

1.4.3 Expanded Street Light Network

- (a) The Developer shall be responsible for certain tasks related to expansion of the street light network as specified in Section 32.11 of the Project Agreement, Expansion of the Street Light Network.
- (b) The Developer shall responsible for the various types of expansion Work as specified in Exhibit 10: Street Light Network Expansion Types of the Project Agreement which is reproduced below.

² The District’s ArcGIS inventory can be referenced at the following link:
<https://dcdg.maps.arcgis.com/apps/webappviewer/index.html?id=cc00ffaf6edc4cf6be6731e2343b209e>. The inventory includes various layers that may be applied.

No.	Type of Expansion Work	Expansion Work Allowance (Per Calendar Year)	Maximum Number of Unused Units that may Carry Forward	Maximum Number of Unused Units that may Carry Forward to Final Calendar Year of Term
1.	Developer furnishes and installs Arm and fixture only	25	75 ⁺	38 ⁺
2.	Developer furnishes and installs wood Pole, Arm, and fixture	20	60	30
3.	Developer furnishes and installs metal Pole, Arm, and fixture	5	15	8
4.	Developer connects assets furnished and installed by Developer to the RMCS, including installation of node and gateway (if gateway is necessary) and enablement of backhaul communication	50 (sum of assets furnished per No. 1-3 above)	150	76
5.	Developer provides fixture to IPMD* for modification of existing Lighting Units or new Lighting Units	255	765	383
6.	Developer connects fixture modified by IPMD to RMCS, including installation of node and gateway (if gateway is necessary) and enablement of backhaul communication	255 (sum of fixtures per No. 5 above)	765	383
7.	Developer connects Lighting Units modified or installed by third party to RMCS and enables backhaul communication	205	615	308
8.	Developer provides asset management services for remainder of Term for the net increase in Lighting Units added to Street Light Network as part of Expansion Work	300	900	450

* For example, for such Expansion Work, the maximum quantity that may be undertaken in a given Calendar Year of the Term is 100 (25 + 75), while the maximum quantity that may be undertaken in the final Calendar Year of the Term is 63 (25 + 38). If the District requires Expansion Work in a Calendar Year in excess of such quantity, such Expansion Work

will be a Compensation Event, as further described in Section 38.11(e) (Street Light Network Expansion) of the Project Agreement.

* District of Columbia Infrastructure Project Management Division

- (c) For the avoidance of doubt, connecting Lighting Units to the RMCS entails installation of any necessary hardware such as a node or gateway and enablement of backhaul communication resulting in the Lighting Unit being enabled for control via the RMCS.
- (d) As per section 10.7.7 of these Technical Provisions, the District Streetlight Team will inspect all construction as part of the acceptance process of such assets.
- (e) For the avoidance of doubt, the Developer shall perform Asset Management Work on the Expanded Street Light Network after acceptance.
- (f) In particular, when the Developer attaches new Luminaires to Utility-owned Poles, the Developer shall follow the provisions in the License Agreements, which can be referenced in Exhibit 20 “License Agreements for Pole Attachments” of the Project Agreement.
- (g) The District may also suspend the Developer’s responsibilities for certain Lighting Units or other Street Light Network Elements for a specified period of time. The District will notify the Developer when such assets are removed from the Developer’s responsibility and for what period of time. During this period, the Lighting Unit will not be subject to the performance requirements listed in Appendix 13.1 of these Technical Requirements. The Lighting Units shall be subject to the performance requirements following acceptance by the Developer back into the Street Light Network. The Developer shall be involved in the inspection and acceptance process as described in Section 10 of these Technical Provisions.

1.4.4 Remote Monitoring and Control System

- (a) As part of the Street Light Improvements, the Developer shall design, procure, install, construct, manage, and ,from time to time, update and upgrade, an RMCS to:
 - (i) Provide real-time, remote monitoring and reporting of the performance of the Luminaires in the Street Light Network, in accordance with the Performance Requirements;
 - (ii) For Upright Pedestal and Twin 20 Lighting Units, provide monitoring and reporting if a Pole is falling/fallen. The method shall be for a pole tilt sensor to be installed and programmed to monitor a maximum allowable tilt angle. When this angle is met or exceeded, an alarm shall be sent to the RMCS. Note, as per section 2.3.1 of the ITP, it is to be determined if this functionality will be pursued by the District or not.
 - (iii) Provide real-time, remote control and dimming of the Luminaires in the Street Light Network;
 - (iv) Track and report on a daily basis the energy consumption of the Street Light Network;
 - (v) Provide real-time, remote monitoring and reporting of changes in current;
- (b) The Developer shall design and construct the RMCS in accordance with the Design, Conversion, and Construction Requirements described in Section 7 of these Technical Provisions.

1.4.5 Asset Management Information System

- (a) The Developer shall develop, populate, manage, and use an electronic Asset Management Information System (AMIS) that includes:
 - (i) A database of the Asset Management Work, including references to Lighting Units;
 - (ii) Documents related to Asset Management Work (e.g. user manuals, as-built drawings, etc.);
 - (iii) and a user-customizable Graphic User Interface (GUI).
- (b) The Developer has the option to use the District's work order management system, currently Cityworks.
- (c) Further detail on the requirements for the AMIS and the current work order management system and processes can be referenced in section 10.3 of these Technical Provisions.
- (d) The Developer shall design and construct the AMIS in accordance with the Design, Conversion, and Construction Requirements described in Section 7 of these Technical Provisions.

1.4.6 Smart City Improvements

- (a) As part of the Street Light Improvements, the Developer shall install outdoor Wi-Fi Access Points (WAPs) on Poles. Installation of WAPs will increase accessibility and ease of communications throughout the District. Public Wi-Fi provides for disaster relief communications when cellular telephony infrastructure is overwhelmed by call volume, offers access to education, employment and digital literacy opportunities, and is a vehicle for tourism and District promotion.
- (b) WAPs will operate on the DC Smart City network and will not be connected to the DC government network or the Street Light Network.
- (c) Smart City Improvements responsibilities for both the District and the Developer are outlined in Sections 9.1 and 9.2, respectively.

1.4.7 Division of Ownership and Developer Responsibilities

- (a) The District maintains sole ownership of the Street Light Network. Some Elements of the Street Light Network are affixed to third party-owned Poles. The Developer shall be responsible for determining the ownership of any Element of the Street Light Network before performing Work on such Element and comply with the requirement of the owner of such Element.
 - (i) The ArcGIS asset inventory maintained by the District includes the pole owner for each Lighting Unit.
- (b) Wood Poles may be owned by the District or a Utility Owner. The Developer's responsibility for Asset Management Work is further delineated below, depending on the division of ownership as follows:

Ownership Scenario	Notes	Responsibility
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District-owned pole District-owned secondary power lines, and District-owned arm and Luminaire	Vast majority of District-owned secondary power lines are 120V	Developer shall be responsible for the entire Lighting Unit, with the exception of third party attachments (if any)
Verizon-owned Pole with District-owned secondary power lines, District-owned arm, and District-owned Luminaire.	Vast majority of District-owned secondary power lines are 120V	Developer shall be responsible for the secondary power line and the entire Lighting Unit, with the exception of the Pole and its Foundation.
PEPCO-owned Pole, PEPCO-owned secondary power lines , a PEPCO owned tap, a District-owned arm, District-owned wire and District-owned luminaire	PEPCO-owned secondary power lines are generally 120V to 277V	Developer shall be responsible for the entire Lighting Unit, with the exception of the Pole and its Foundation

- (i) Should other configurations for wood Pole be identified by the Developer, the Developer shall report the precise location and configuration to the District and the District will clarify the Developer's responsibilities in such instances.
- (c) For Combination Poles, in every instance where the Developer discovers through civil work a Combination Pole that is in a shared conduit with traffic signal wires, the Developer shall install a new separate conduit, so that the conduit is no longer shared between the two systems. The District estimates that no more than 150 Poles share a conduit with traffic signal wires. This Work shall be required only for instances where the Developer finds shared conduit. The Developer will not be responsible for proactive search and subsequent Work.
 - (i) The events that may prompt this Work include but are not limited to: Foundation Replacements, Pole Knockdowns, Pole Relocations, and Manhole Repair or replacements.
 - (ii) This Work requires tradesperson from the Traffic Signals Division and the Developer to be present for any disconnects and reconnects. Prior to disconnecting any equipment, the Developer and Traffic Signals technician shall utilize service schedules to identify all equipment to be disconnected. The Developer and Traffic Signals technician shall ensure disconnects are made as intended by the engineer. Subsequently, prior to reconnection, Developer and Traffic Signals technician shall ensure that all changes made and work was performed as engineer intended.
 - (iii) In the event of discovering a shared conduit system on a combo pole, the foundation must be removed and reinstalled with a modern two separate conduit system. In the event of knockdown of a Combination Pole, the Streetlight wire must be made safe and the temporary pole must have identical lighting to what previously existed.

- (iv) The presence of combination equipment may not be obvious at all locations. Several Streetlight poles throughout The District possess communication cables only inside the t-base as a means of traveling through.
 - (v) There are also mid-block Streetlight Poles with attachments including but not limited to flashing school zone signs and deaf pedestrian signs. Note, these flashing school zone signs and deaf pedestrian signs are not the responsibility of the Developer.
 - (vi) For the avoidance of doubt, the Developer shall be responsible for the following Elements on Combination Poles: Lighting Fixture, Arm (with cross arm or crown), Streetlight conduit including wiring and grounding rods, Photocells, RMCS nodes or gateways, shields, and Pole ID tags.
 - (vii) The Traffic Signal Division is responsible for the following elements: Pole, Foundation, Traffic Signal conduits, Signal Head with Arm, Transformer Base (t-base), Clamshell Base, Traffic Signal Cables, Walk Signal, Elephant Ears, Microwave Detectors, Cameras, flashing school zone signs, and deaf pedestrian signs. The Developer is not responsible for these Elements.
- (d) The Street Light Network includes all electrical systems necessary for the proper functioning of the Luminaires from the power source out as well as District-owned underground conduits, panels, junction boxes, manholes, and hand holes.
- (e) Ownership of attachments to Lighting Units is shared among the District and other third parties. Unless it is explicitly stated, the Developer shall not be responsible for the function and maintenance of attachments.

1.5 Project Limits and Project Sites

1.5.1 General

- (a) The Project includes all the Elements of the Existing Street Light Network within the Project Limits. The Project Limits exclude assets under the jurisdiction of the Governmental Entities, political subdivisions of the District listed below. Note, the ArcGIS inventory is the best source for detail on Project Elements.
- (i) National Park Service;
 - (ii) The Architect of the Capitol;
 - (iii) DC Parks and Recreation Department, with the exception of trail lights included in the ArcGIS inventory;
 - (iv) Department of General Services;
 - (v) District of Columbia Housing Authority; and
 - (vi) Foreign embassies.

- (b) The Developer shall not be responsible for Lighting Units owned and operated by third party developers, with the exception of Lighting Units accepted into the Expanded Network.
- (c) Certain Elements of the Existing Street Light Network may be located outside of the Public Space, including the such locations:
- (i) Private property, in the rare occasion; and
 - (ii) The locations in the below table, which are District of Columbia government properties outside of the public right of way. These Lighting Units can be referenced in the ArcGIS inventory. For the avoidance of doubt, Elements in the locations listed in the below table do not require relocation.

Location	Coordinates
Market Inn	38°52'59.3"N 77°00'48.3"W
8th Street Parking	38°52'44.5"N 76°59'42.5"W
South Capitol Bus Lot	38°51'25.3"N 77°00'17.3"W
W Street Yard	38°55'06.8"N 76°58'54.0"W
Farragut Yard	38°57'03.2"N 77°00'00.4"W
G Street Yard	38°52'54.7"N 76°59'11.9"W

- (d) Certain trail lights are located on property not owned by the District. These Lighting Units are included in the ArcGIS inventory and are part of the Existing Street Light Network. The District maintains easements and/or maintenance agreements that allow for Work on these Lighting Units. The Developer shall be responsible for these Lighting Units.
- (e) The Developer shall relocate all District-owned Lighting Units, Luminaires, and other Elements in the Street Light Network that are located on private property and do not have delineated ownership contracts or MOUs with the District from the private property to the Public Space.
- (i) These relocations shall be counted against the expansion Work outlined in Section 1.4.3 of these Technical Provisions and Section 32.11 of the Project Agreement, Expansion of the Street Light Network. Each relocation will be applied to the appropriate expansion type of Work based on the scope of Work required for relocation.
 - (ii) The District will not require the Developer to proactively search for Lighting Units, Luminaires, and other Elements in the Street Light Network located on private property. Relocations will only occur in the rare occurrence that an Element is discovered to be on private property.

1.5.2 Zoning Classification Pertaining to the Street Light Network

- (a) The Developer's Design Work shall be consistent with the expected level of nighttime pedestrian and vehicular traffic and corresponding illumination needs and requirements.
- (b) In the execution of the Work, the Developer shall consider the expected level of nighttime pedestrian and vehicular traffic for the below Zoning Classifications and follow the Maintenance and Protection of Traffic requirements set forth in section 11.
 - (i) Commercial Zone: A Commercial Zone corresponds to a densely developed business area of the District containing land use that attracts a relatively heavy volume of nighttime vehicular traffic or pedestrian traffic, or both, on a frequent basis.
 - (ii) Residential Zone: A Residential Zone correspond to an area that contains a mixture of residential buildings such as single-family homes, townhouses, and small apartment buildings, possibly mixed with small commercial establishments and characterized by low levels of nighttime vehicular and pedestrian traffic.
 - (iii) Intermediate or Mixed Use Zone: An Intermediate Zone or Mixed Use Zone corresponds to an area that may include land use and characteristics of both Residential Zone and Commercial Zone and may include blocks with libraries, community recreation centers, large apartment buildings, industrial buildings, or neighborhood retail stores and is often characterized by moderately heavy nighttime pedestrian activities.

1.5.3 Roadway Classification Pertaining to the Street Light Network

- (a) Roadway Classifications pertaining to the Street Light Network follow the classifications recommended by the Illuminating Engineering Society of North America³ and AASHTO⁴. Please refer to the Appendix in Section 13.5 of the Technical Provisions for the list of Roadway Classifications and their definitions.

1.5.4 Advisory Neighborhood Commission

- (a) Advisory Neighborhood Commission (ANC) is defined as bodies of local government in District of Columbia that consider a wide range of policies and programs affecting their neighborhoods, including traffic, parking, recreation, street improvements, liquor licenses, zoning, economic development, police protection, sanitation and trash collection, and the District's annual budget. The powers of the ANC system are enumerated by the DC Code § 1-207.38.
- (b) The boundaries for the District's Advisory Neighborhood Commissions (ANCs) and Single Member Districts (SMDs), along with the eight Wards, took effect January 1, 2013⁵. It should be expected that the boundaries will be amended every 10 years.

³ American National Standard Practice for Roadway Lighting, ANSI/IES RP-8.1983; Illuminating Engineering Society of North America.

⁴ Roadway Lighting Design Guide, AASHTO, 2018.

⁵ 2013 ANC and SMD Boundaries: <http://www.ancdc.us>

1.5.5 Project Sites and Bundling Principle

- (a) Given the wide geographical distribution of the Lighting Units and other Project Elements, in the delivery of the Conversion Work and Construction Work, the Developer shall identify logical and homogenous groupings of Lighting Units and other connected or adjacent Project Elements to:
- (i) Promote the logical sequencing and efficient and accelerated delivery of the Improved Street Light Network and Smart City Improvements;
 - (ii) Promote economies of scale;
 - (iii) Minimize disruption to and interference with the normal flow of pedestrian and vehicular traffic;
 - (iv) Minimize inconvenience and disruptions to District residents and businesses who own or occupy premises adjacent to Project Sites;
 - (v) Minimize the number of interventions in the same Project Site over a prolonged time period;
 - (vi) Support clear communication to the public and third party coordination, particularly with respect to progress of the Conversion Work, the Smart City Work, and Closures; and
 - (vii) Facilitate the District's efficient management, monitoring, review and oversight of the Developer's Work necessary to deliver such improvements and Developer's compliance with the Project Agreement, and in particular facilitate the District's efficient review of Project Bundle Submittals;

Each such grouping shall be a "Project Bundle."

- (b) With respect to the Street Light Improvements, each Project Bundle shall, at a minimum:
- (i) Group Lighting Units in a single, concentrated geographic locations, forming a single, continuous Project Site;
 - (ii) Group Lighting Units within a single ANC; provided however that if Conversion Work in an ANC needs to be broken down into separate Project Bundles, Conversion Work in such Project Bundles shall be performed sequentially.
 - a. If an ANC's limits or boundaries occur in the middle of a city block, a Project Bundle would be permitted to extend beyond the origin ANC's limits or boundaries to terminate at the end of the city block.
 - b. If an ANC's limits or boundaries are demarcated by a street, where the far side of the street constitutes another ANC, a Project Bundle would be permitted to extend beyond the origin ANC's limits or boundaries to include Lighting Units on the far side of the street.
 - (iii) Include only one, single set of Work Hours;

- (iv) Have independent utility; and
 - (v) Be completed within 14 calendar days.
- (c) With respect to the Smart City Improvements, each Project Bundle shall, at a minimum:
- (i) Group WAPs in a single, concentrated geographic locations, forming a single, continuous Project Site;
 - (ii) Group WAPs within a single ANC; provided however that if Smart City Work in an ANC needs to be broken down into separate Project Bundles, Smart City Work in such Project Bundles shall be performed sequentially.
 - (iii) Include only one, single set of Work Hours;
 - (iv) Have independent utility; and
 - (v) Be completed within 14 calendar days.
- (d) The Developer shall not include Street Light Improvements and Smart City Improvements in the same Project Bundle.
- (i) A Project Bundle that only include Street Light Improvements shall be called a “Street Light Bundle”.
 - (ii) A Project Bundle that only includes Smart City Work shall be called a “Smart City Bundle”.
- (e) For the avoidance of doubt, “independent utility” under Section 1.4.3 (b)(viii) of the Technical Provisions means that once a Project Bundle has achieved Substantial Completion, the District will have the full enjoyment of the Improved Street Light Network or Smart City Improvements included in that Project Bundle.
- (f) Each Project Bundle shall have a unique identification number. The Developer shall develop a numbering system for the Project Bundle that is logical and readily understandable and make reference to the geolocation of the Project Site, including reference to the District’s Ward and ANC. The numbering system for the Project Bundle is subject to the District’s approval, in its sole discretion.
- (g) For further information on Project Bundle Submittals, refer to section 7.2.4 of these Technical Provisions.

1.5.6 Historical, Architectural, and Aesthetic Significance

- (a) The District has well-known, distinctive historical, architectural, and aesthetic characteristics, including national landmarks and monuments as well as the historic neighborhoods and local landmarks.
- (b) In the performance of the Work, the Developer shall respect and contribute to the preservation of the historical, architectural, and aesthetic significance of the District, in particular in performing

Design Work, Conversion Work and Construction Work of the visible Elements of the Street Light Network and Vegetation Management and Tree Trimming.

- (c) If and when objects of historical, architectural, or archeological significance, artifacts are found and/or unearthed in the performance of the Work the Developer shall notify the District promptly, prevent any disturbance of such items and preserve such items. In such events, the Developer shall follow the policies and procedures set forth in the Developer's Historical and Architectural Preservation Plan.
- (d) The Section 106 Consultation for the Citywide Light Emitting Diode (LED) Streetlight Replacement Project can be referenced in Appendix 13.2(f).

1.6 Work Hours and Work Restrictions in the Public Space

- (a) The Developer shall perform all Work in the Public Space with the least possible obstruction, disturbance and inconvenience to the public, and comply with the requirements of Section 10 of these Technical Provisions.
- (b) The Developer shall use Reasonable Efforts to minimize the duration of the Work in the Public Space and complete such Work expeditiously. To the extent the Developer is performing Conversion Work or Construction Work in multiple Project Sites simultaneously and that such Work disturbs pedestrian, bicycle, or vehicular traffic or access to private properties or public buildings, or that such Work takes longer than planned in the schedule or plan approved by the District, the District reserves the right to direct the Developer to demobilize from one or several Project Sites, Make Safe, remove traffic control devices and restore normal traffic flow, and reallocate resources to other Project Sites until Work in such other Project Sites is complete.
- (c) The Developer shall adhere to the requirements stated in Section 11.1: Permitted Closures except:
 - (i) During Holidays or Holiday Weekends;
 - (ii) In response to an Emergency or Incident;
 - (iii) For Permissible Unplanned Maintenance or Make Safe Work;
 - (iv) As a result of an Administrative Redirect; or
 - (v) Otherwise approved by the District.

In such cases, Section 105.11 of the District of Columbia Department of Transportation Standard Specifications for Highways and Structures shall apply.

- (d) Weekend Work.
 - (i) Work under this Agreement performed on Saturdays, Sundays or Holidays, shall be performed at no additional expense to the District.
 - (ii) The Use of all mechanical impact demolition equipment is absolutely prohibited during the Weekend without prior approval from the District.

(e) Holidays

No Work that restricts or interferes with traffic will be allowed from 12 p.m. on the day proceeding through 12 p.m. on the day following a Holiday or Holiday Weekend. The requirements of Section 103.01, Article 17 of the District of Columbia Department of Transportation Standard Specifications for Highways and Structures shall apply to Work performed during Holidays.

The following are Holidays recognized by the District:

- (i) New Year's Day
- (ii) Martin Luther King Jr.'s Birthday
- (iii) Washington's Birthday (Presidents' Day)
- (iv) DC Emancipation Day
- (v) Memorial Day
- (vi) Independence Day
- (vii) Labor Day
- (viii) Indigenous Peoples' Day
- (ix) Veterans Day
- (x) Thanksgiving Day
- (xi) Christmas Day

(f) Special Events

- (i) The Developer shall plan and perform Work in the Public Space so as not to disturb or restrict vehicular and pedestrian traffic flow to and from the venue of any Special Event.
- (ii) The Developer shall identify any major event, such as a sporting event or any combination of events with anticipated combined attendance over 10,000 people and adjust the Closure times in Section 11 of the Technical Provisions accordingly to minimize the impact to traffic. No Closure shall be implemented between two (2) hours before and two (2) hours after the end of a Special Event.

(g) Construction Work

The Developer shall perform work in accordance with the mandatory specifications, standards, manuals and guidelines listed in Appendix 13.2 of the Technical Provisions.

(h) Noise Restrictions

- (i) Developer shall use Reasonable Effort to minimize noise when performing Work in the Public Space, particularly between 9 pm and 7 am.
- (ii) The Developer shall adhere to the District's rules regarding Onroad Engine Idling and Nonroad Diesel Engine Idling.

1.7 Preliminary Work

- (a) The Developer shall perform the Preliminary Work identified in this Section 1.7 of the Technical Provisions in accordance with the requirements of the Project Agreement, including the Technical Provisions.
- (b) The Developer may commence the following Preliminary Work:
 - (i) Development of the Developer Management Plan (DMP) including all components required under Section 2.5 of the Technical Provisions;
 - (ii) Development of the protocols and procedures for Emergency management as required by Section 2.5.7 of the Technical Provisions;
 - (iii) Development of the Project Baseline Schedule as required by Section 2.3.1 of the Technical Provisions;
 - (iv) Development conceptual Transportation Management Plan as required by Section 2.5.12 of the Technical Provisions;
 - (v) Due diligence including inventory, inspection, condition assessment, and surveys necessary for the development of a complete and accurate Lighting Asset Inventory and Conditions Assessment, subject to approval by the District of a conceptual Transportation Management Plan and Project Site specific Traffic Control Plan. Note, the Developer will be provided with a condition report summarizing the results of the condition assessment completed by the District;
 - (vi) Demonstration testing in accordance with Section 8 of the Technical Provisions;
 - (vii) Design Work to be incorporated in the Street Light Improvements Design Manual as noted in section 7.2.1 of these Technical Provisions;
 - (viii) Work to advance the development of the RMCS and AMIS as outlined in section 10 of these Technical Provisions, other than Work in the Public Space; and
 - (ix) Coordination with Utility Owners, but subject to agreed-upon communication protocol with District;
- (c) No other Work shall be authorized.
- (d) Developer shall submit for review and comment or approval as the case may be the Submittals associated with the Preliminary Work in accordance with the Project Agreement.

1.8 Submittals

- (a) The terms and procedures set out in Article 7 of the Project Agreement and in these Technical Provisions shall govern all Submittals required in these Technical Provisions.
- (b) Each update or change to a Submittal previously transmitted to the District shall include the full and complete, updated Submittal along with a copy of such Submittal tracking changes to the prior version transmitted to the District.
- (c) When the Developer provides a Submittal to DDOT for review, comment, approval or consent, as the case may be, that is inaccurate or incomplete, DDOT reserves the right to return the Submittal to the Developer for revision with or without review or comment.

1.9 Demonstration, Testing, and Commissioning

The Developer shall perform Demonstration, Testing, and Commissioning Work in accordance with Section 8 of the Technical Provisions, including the Guidelines, Manuals, Specifications, and Standards in Appendix 13.2, and with the applicable provisions of the Project Agreement.

1.10 Permit to Work in the Public Space

The Developer shall perform all maintenance and protection of traffic Work in accordance with Section 11 of the Technical Provisions, including the Guidelines, Manuals, Specifications, and Standards in Appendix 13.2, and with the Project Agreement.

2 PROJECT MANAGEMENT

The Developer shall administer, coordinate, and manage the execution of the Work described in these Technical Provisions and the Project Agreement in accordance with the requirements in this Section 2 of the Technical Provisions and the applicable provisions of the Project Agreement.

General

- (a) Subject to District review and approval at its sole discretion, the Developer shall prepare, implement, manage, and, as required, update a Project Management Plan (PMP), which shall detail the Developer's organization, staffing, systems, strategies, approaches, procedures, and methods for the administration, coordination and management of the Work in accordance with the Agreement, as further described in Section 2.5 of these Technical Provisions.
- (b) The PMP is a collection of several plans as further described in Table 4 in Section 2.5 of these Technical Provisions. Each part of the PMP shall include details of internal and external auditing procedures. All commitments and requirements contained in the PMP shall be verifiable in accordance with Project Management Body of Knowledge standards.
- (c) The Developer shall maintain a full and complete copy of the Agreement at Developer's Project office in the District during the period from NTP2 until the end of the Term.
- (d) There shall be only one PMP for the Developer and all Developer-Related Entities.
- (e) The Developer shall follow in all respects the provisions of the PMP approved by the District.
- (f) The District reserves the right to audit and monitor the activities described in the PMP to assess Developer performance and assess Noncompliance Points as set forth in the performance requirements shown in appendix 13.1 of these Technical Provisions.

2.1 Developer Personnel and Organization

- (a) Key Personnel, along with their primary functions and duties, periods during which the position need to be filled and minimum qualifications and experience are listed below in Table 1 below. The first seven Key Personnel were qualified as part of the Request for Qualifications (RFQ) process for this Project.
- (b) Key Personnel who are full-time shall be available within 2 hours of District request, either in person or via phone. Key Personnel that are not full-time shall be available within 48 hours of District request.
- (c) Key Personnel shall be designated and engaged by the Developer and approved in writing by the District to perform the following duties and functions described in Table 1 below.

Table 1 – Key Personnel

Personnel shall perform the following duties and functions in compliance with the Project Agreement, Governmental Approvals, applicable Law, the PMP, and the Deign Documents	The position shall be filled during the following periods:	Personnel in this position shall have the following minimum qualifications and experience	Name of Individual as of March 22, 2021 ⁶
1. Project Executive			
<ul style="list-style-type: none"> • take overall responsibility and accountability for the Project • has full and final authority for the Project • ensure that the appropriate level of resources and skills from the Developer are brought to bear to meet the obligations of the Agreement • directly responsible for the all financial matters for the Project and serve as primary point of contact with lenders, equity providers and the District on all financial matters • act as a primary point of contact on all matters on behalf of Developer • available as necessary to engage with the District • must be available and interface with the District on all contractual issues and disputes <p>Note: Project Executive may combine functions and duties with Project Manager.</p>	<ul style="list-style-type: none"> • available as necessary to meet the required duties and functions and engage with the District, at the District's request, during the entire Term 	<ul style="list-style-type: none"> • 10 years overall experience in a senior managerial management position • 5 years of experience in an executive position • experience on at least two long-term concession-type projects involving design, construction, finance, operations, maintenance, and asset management • Master's degree in engineering, management, business administration, law (JD is also applicable), finance, or related field <p>Note: This position was qualified as part of the RFQ process.</p>	Terry Ostrom
2. Project Manager			

⁶ **Note to Proposers:** The individuals listed in this Table 10.1 should be the individuals submitted for these roles in the Developer Proposal.

Personnel shall perform the following duties and functions in compliance with the Project Agreement, Governmental Approvals, applicable Law, the PMP, and the Design Documents	The position shall be filled during the following periods:	Personnel in this position shall have the following minimum qualifications and experience	Name of Individual as of March 22, 2021 ⁶
<ul style="list-style-type: none"> • take full responsibility for the execution and day-to-day management of the Work • take responsibility for the overall control of the production process and resulting Work products • be responsible for quality and schedule of the Work • be responsible for ensuring that all Work complies with the Project Agreement, Governmental Approvals, applicable Law, the PMP and the Design Documents. • Be available as necessary to engage with the District • Be able to be on site within two hours of notice 	<ul style="list-style-type: none"> • full time during the Term 	<ul style="list-style-type: none"> • 10 years overall experience in a senior managerial position • experience on at least two projects that included the design, construction, operations, and asset management of a large street light network, at the District's discretion • experience with utility relocation and coordination on at least two projects of comparable size and complexity, at the District's discretion. • Bachelor's Degree (engineering, management, business administration, finance, or related field preferred) <p>Note: This position was qualified as part of the RFQ process.</p>	Neil Craig
3. Deputy Project Manager			
<ul style="list-style-type: none"> • take full responsibility for the execution of the Work in the absence of the Project Manager 	<ul style="list-style-type: none"> • full time during the Term 	<ul style="list-style-type: none"> • 10 years overall experience in a senior managerial position 	Eric Cox

Personnel shall perform the following duties and functions in compliance with the Project Agreement, Governmental Approvals, applicable Law, the PMP, and the Design Documents	The position shall be filled during the following periods:	Personnel in this position shall have the following minimum qualifications and experience	Name of Individual as of March 22, 2021 ⁶
<ul style="list-style-type: none"> • serve a delegate to and support for the Project Manager for the delivery of the Work • Be able to be on site within two hours of notice 		<ul style="list-style-type: none"> • experience on at least one project that included the design, construction, operations, and asset management of a large street light network, at the District's discretion • experience in coordination with utility coordination and third party coordination • Bachelor's Degree (engineering, management, business administration, finance, or related field preferred) <p>Note: This position was qualified as part of the RFQ process.</p>	
4. Lead Designer			
<ul style="list-style-type: none"> • responsible for all Design Work and quality of the Design Work • responsible for the production, coordination and management of the Design Work and the Design Documents • oversee and directly responsible for all engineering disciplines for the Project 	<ul style="list-style-type: none"> • full time during the D&C Period • thereafter, available discretely as needed for any Work involving Design Work 	<ul style="list-style-type: none"> • a registered Professional Engineer in the District of Columbia • experience on at least two large LED street light network projects, at the District's discretion • experience with design and 	Jared Knight

Personnel shall perform the following duties and functions in compliance with the Project Agreement, Governmental Approvals, applicable Law, the PMP, and the Deign Documents	The position shall be filled during the following periods:	Personnel in this position shall have the following minimum qualifications and experience	Name of Individual as of March 22, 2021 ⁶
<ul style="list-style-type: none"> coordinate Work with Construction Manager, Asset Management Lead, Utility Coordination Manager, Historical and Architectural Manager, and Environmental Compliance Manager 		<p>implementation of at least one RMCS system</p> <ul style="list-style-type: none"> bachelor's degree in a relevant engineering discipline, at the District's discretion <p>Note: This position was qualified as part of the RFQ process</p>	
5. Asset Management Lead			
<ul style="list-style-type: none"> responsible for ensuring that all Asset Management Work complies with the Project Agreement, Governmental Approvals, applicable Law, the PMP, and the Deign Documents responsible for coordination of Developer resources to ensure that the Performance Requirements are met Be able to be on site within two hours of notice 	<ul style="list-style-type: none"> full time for the Term 	<ul style="list-style-type: none"> 10 years of experience in asset management of large street light networks, at the District's discretion Bachelor's degree in engineering, asset management or related field, at the District's discretion <p>Note: This position was qualified as part of the RFQ process.</p>	Larry Wutka
6. Quality Manager			
<ul style="list-style-type: none"> responsible for the quality of the Work, quality management, development and implementation of the quality management system, 	<ul style="list-style-type: none"> full time during the D&C Period thereafter until the end of the Term, available as 	<ul style="list-style-type: none"> 10 years of experience with quality management of large civil, 	Gina Bird

Personnel shall perform the following duties and functions in compliance with the Project Agreement, Governmental Approvals, applicable Law, the PMP, and the Deign Documents	The position shall be filled during the following periods:	Personnel in this position shall have the following minimum qualifications and experience	Name of Individual as of March 22, 2021 ⁶
<p>and the development, maintenance, and update of, and compliance of all Developer personnel with the QMP</p> <ul style="list-style-type: none"> • responsible for coordination and timely completion of quality training in accordance with the Section 2.2.2 of the Technical Requirements • oversight over all quality-related Work and direct supervision over quality control staff • report and coordinate all quality issues directly with the District and the Project Manager • must be a direct report to the Project Manager • must have no Project responsibilities other than quality-related Work per the Project Agreement • must be independent from staff and duties associated with the execution/production of the Work 	<p>necessary to meet the required duties and functions</p>	<p>electrical or mechanical projects</p> <ul style="list-style-type: none"> • experience in a similar position on at least two projects of comparable size and complexity undertaken using ISO 9001, at the District's discretion <p>Note: This position was qualified as part of the RFQ process.</p>	
7. Information Technology Manager (formerly at RFQ: "Lead Technology Designer")			
<ul style="list-style-type: none"> • responsible for design and maintenance of the Project's data, information and reporting systems, and in particular the RMCS and AMIS • responsible for technology upgrades during the Term 	<ul style="list-style-type: none"> • full time during the Term 	<ul style="list-style-type: none"> • 10 years of experience in the design, development, and management of information systems and asset 	<p>Steven Anderson</p>

Personnel shall perform the following duties and functions in compliance with the Project Agreement, Governmental Approvals, applicable Law, the PMP, and the Deign Documents	The position shall be filled during the following periods:	Personnel in this position shall have the following minimum qualifications and experience	Name of Individual as of March 22, 2021 ⁶
<ul style="list-style-type: none"> • coordinate Work with Lead Designer, Construction Manager, Asset Management Lead, and Construction Manager • responsible for advising and providing direct support to the Asset Management Lead, Lead Designer and Project Manager on information technology 		<p>management systems</p> <ul style="list-style-type: none"> • experience with at least two large information management systems project • Bachelor's degree in a relevant discipline, at the District's discretion <p>Note: This position was qualified as part of the RFQ process.</p>	
8. Project Finance Lead			
<ul style="list-style-type: none"> • responsible for and lead all finance-related Work, including the Financial Close process • has defined authority for establishing the Developer's financing plan • report and coordinate the Developer's financing activities directly with the District and the Project Executive • work under the direct supervision of the Project Executive 	<ul style="list-style-type: none"> • available to the project as necessary through Financial Close • thereafter until the end of the Term, time commitment shall be sufficient to carry out her or his required duties 	<ul style="list-style-type: none"> • 15 years of experience in the project financing, at the District's discretion • Master's degree in finance, economics or business administration or related filed, at the District's discretion <p>Note: This position was qualified as part of the RFQ process.</p>	Stuart Marks
9. Construction Manager			

Personnel shall perform the following duties and functions in compliance with the Project Agreement, Governmental Approvals, applicable Law, the PMP, and the Deign Documents	The position shall be filled during the following periods:	Personnel in this position shall have the following minimum qualifications and experience	Name of Individual as of March 22, 2021 ⁶
<ul style="list-style-type: none"> • responsible for all Conversion Work during the D&C Period and for other construction activities after Project Final Completion • responsible for managing and coordinating all construction personnel and administering all construction requirements of the Agreement • coordinate Work with Lead Designer, MOT Manager, Traffic Control Supervisor, Work Zone Traffic Engineering Manager (WZTEM), Utility Coordination Manager, Historical and Architectural Manager, and Environmental Compliance Manager • Be able to be on site within two hours of notice 	<ul style="list-style-type: none"> • full time starting from NTP1 until the end of the D&C Period • thereafter until the end of the Term, time commitment shall be sufficient to carry out required duties 	<ul style="list-style-type: none"> • 15 years of overall professional experience • 5 years of experience as a construction manager, project manager, or equivalent on at least two projects of comparable size and complexity, at the District's discretion • Bachelor's degree 	Chris Kaczkowski

In addition to the Key Personnel listed in Table 1, The Developer shall provide the supervisory personnel shown in Table 2.

Table 2 – Supervisory Personnel

Personnel shall perform the following duties and functions in compliance with the Project Agreement, Governmental Approvals, applicable Law, the PMP, and the Deign Documents	The position shall be filled during the following periods:	Personnel in this position shall have the following minimum qualifications and experience	Name of Individual as of March 22, 2021 ⁷
1. Lead Civil Engineer			
<ul style="list-style-type: none"> responsible for the civil engineering components of the D&C Work work under the direct supervision of the Lead Designer coordinate Work with Lead Designer and Construction Manager 	<ul style="list-style-type: none"> available as necessary to meet the required duties and functions during the Term 	<ul style="list-style-type: none"> a registered Professional Engineer in the District of Columbia, at the time of commercial proposal, licensed to practice as a civil or structural engineer experience on at least one large street light network project, at the District's discretion Bachelor's degree in civil or structural engineering or related field, at the District's discretion <p>Note: This position was qualified as part of the RFQ process.</p>	Jim Long
2. Lead Electrical Engineer			
<ul style="list-style-type: none"> responsible for the electrical engineering components of the D&C Work 	<ul style="list-style-type: none"> available as necessary to meet the 	<ul style="list-style-type: none"> a registered Professional Engineer in the District of 	Ibrahim Balogun

⁷ **Note to Proposers:** The individuals listed in this Table 10.1 should be the individuals submitted for these roles in the Developer Proposal.

Personnel shall perform the following duties and functions in compliance with the Project Agreement, Governmental Approvals, applicable Law, the PMP, and the Design Documents	The position shall be filled during the following periods:	Personnel in this position shall have the following minimum qualifications and experience	Name of Individual as of March 22, 2021 ⁷
<ul style="list-style-type: none"> work under the direct supervision of the Lead Designer coordinate Work with Lead Designer and Construction Manager and Utility Coordination Manager 	required duties and functions during the Term	<p>Columbia, at the time of commercial proposal, licensed to practice as an electrical engineer</p> <ul style="list-style-type: none"> experience on at least one large LED street light network project, at the District's discretion Bachelor's degree in electrical engineering, at the District's discretion <p>Note: This position was qualified as part of the RFQ process.</p>	
3. Public Communication Manager			
<ul style="list-style-type: none"> responsible for all communication Work per Section 3 of the Technical Requirements assist and support the District with communications and outreach regarding the Project, at the District's request and discretion coordinate Work with Project Manager and MOT Manager must report directly to the Project Manager 	<ul style="list-style-type: none"> available as necessary to meet the required duties and functions during the Term 	<ul style="list-style-type: none"> 7 years of overall professional experience 5 years of experience in a public-facing, communication role experience on at least one project of comparable size and complexity, at the District's discretion Bachelor's degree 	Sharon Jackson
4. Work Zone Traffic Engineering Manager (WZTEM)			

Personnel shall perform the following duties and functions in compliance with the Project Agreement, Governmental Approvals, applicable Law, the PMP, and the Deign Documents	The position shall be filled during the following periods:	Personnel in this position shall have the following minimum qualifications and experience	Name of Individual as of March 22, 2021 ⁷
<ul style="list-style-type: none"> Responsible for ensuring that the Design Documents fully comply with the requirements of Section 10 of the Technical Provisions and fully incorporate the needs for construction phasing, Work Zone Safety, and Work Zone traffic control and maintenance of traffic, including (without limitations): <ul style="list-style-type: none"> Detours Construction/Traffic Phasing and TCPs for vehicular, bicycle and pedestrian traffic Closures Temporary plans for lighting, signing and striping signs and seals all traffic-related Design Documents coordinate Work with MOT Manager and Traffic Control Supervisor 	<ul style="list-style-type: none"> available during the D&C Works Term and TCP development available for approval of modifications to the phasing or TCPs through the D&C Works Term thereafter until the end of the Term, time commitment shall be sufficient to carry out her or her required duties 	<ul style="list-style-type: none"> a Professional Engineer registered in the District of Columbia 5 years of recent traffic engineering experience on urban projects in design and/or construction experience designing construction phasing, work zone safety and work zone traffic control Bachelor's degree in engineering fields related to traffic engineering, at the District's discretion 	Peter Clary
6. Arborist			
<ul style="list-style-type: none"> Identify the need for, perform, and manage/supervise any tree trimming 	<ul style="list-style-type: none"> Available to the Project for all Tree Trimming Work as defined in Asset Management Section 10.4.6 	<ul style="list-style-type: none"> District ISA-certification 	Robert Meier
6. Construction Safety Officer			

Personnel shall perform the following duties and functions in compliance with the Project Agreement, Governmental Approvals, applicable Law, the PMP, and the Deign Documents	The position shall be filled during the following periods:	Personnel in this position shall have the following minimum qualifications and experience	Name of Individual as of March 22, 2021 ⁷
<ul style="list-style-type: none"> • Inspect the site to ensure it is a hazard-free environment • Conduct toolbox meetings • Participate in project safety council and lead all efforts to enhance safety • Review and approves all subcontractors' safety plans • Verify that injury logs and reports are completed and submitted to related government agencies • Verify that all tools and equipment are adequate and safe for use • Promote safe practices at the job site. • Enforce safety guidelines • Conduct drills and exercises on how to manage emergency situations • Conduct investigations of all accidents and near-misses • Report to authorities as required or requested • Conduct job hazard analyses • Establish safety standards and policies • Perform emergency response drills 	<ul style="list-style-type: none"> • available as necessary to meet the required duties and functions during the Term 	<ul style="list-style-type: none"> • Bachelor's degree in related environmental engineering, environmental compliance, and/or safety & health field, to include: Public Health, Occupational Safety & Health, Safety Sciences, Health Physics, Industrial Hygiene, or related discipline • 6-8 years of direct safety and health experience • OSHA Construction Safety (OSHA 500, 40 hour & 10hours) training. • Certified in Red Cross First Aid, CPR and BBP. • Experience in hazardous operations is required with a clear and in-depth understanding of OSHA regulatory and requirements. • Direct experience and ability to conduct training in excavation, heavy equipment operations, scaffolding, electrical high voltage safety, working at heights, 	Clint Hammer

Personnel shall perform the following duties and functions in compliance with the Project Agreement, Governmental Approvals, applicable Law, the PMP, and the Deign Documents	The position shall be filled during the following periods:	Personnel in this position shall have the following minimum qualifications and experience	Name of Individual as of March 22, 2021 ⁷
<ul style="list-style-type: none"> • Monitor the safety of all workers and protect them from entering hazardous situations. • Respond to employees' safety concerns • Coordinate registration and removal of hazardous waste • Serve as the link between government agencies and contractors • Receive reports from and respond to orders issued by Department of Labor • Arrange for OSHA mandated testing and/or evaluations of the workplace by external agencies/consultants 		crane work, work in confined spaces, confined space rescue, work zone, traffic management course.	

- (d) The Developer's Key Personnel and other supervisory and professional personnel shall have the necessary education, training, and experience required for the execution of the Work. All of the Developer's Key Personnel and other supervisory personnel shall be approved by the District prior to any Work being undertaken for which they are responsible.
- (e) The Developer shall maintain a competent Project Manager at Project Sites while D&C Work is in progress. Additional supervisory personnel shall be at each Project Site and shall be experienced in the type of Work being performed. Supervisory personnel shall have the full authority to receive instructions from the District and to execute the orders or directions of the District and direct any Developer activity necessary to comply with the Project Agreement.
- (f) Prior to diverting any of the specified Key Personnel for any reason, the Developer shall notify the District at least 30 calendar days in advance and shall submit justification (including proposed substitutions), in sufficient detail to permit evaluation of the impact upon the contract. The Developer shall not reassign these Key Personnel or appoint replacements, without written permission from the District.

- (g) Key Personnel, along with their primary functions and duties, periods during which the position need to be filled and minimum qualifications and experience are listed in Appendix 10 of the Agreement. Key Personnel shall be designated and engaged by the Developer and approved in writing by the District to perform the following duties and functions described in Appendix 10 of the Agreement.
- (h) The Developer shall provide and maintain up to date as part of the Project Management Plan a clear organization structure with clear reporting lines and responsibilities for every aspect of the Project.

2.2 Quality of the Work

2.2.1 General

- (a) The Developer shall be responsible for the quality of all Work. Quality control and quality assurance activities must be performed for all Work during the entire Term.
- (b) The Developer shall develop and implement a quality management system by which the Developer shall ensure the quality of all aspects of the Work and the Project and the compliance with the Project Agreement, Governmental Approvals, applicable Law, the PMP and the Design Documents. The quality management system shall include:
 - (i) Description of the Developer's quality organization, including organization chart, names of staff, description of roles and responsibilities, and contact information;
 - (ii) Quality control procedures to be utilized to verify, check, and review the quality of all Work;
 - (iii) Quality assurance procedures to confirm that the quality control procedures are being followed;
 - (iv) Procedures and responsibilities for verifying that the Work complies with these Technical Provisions;
 - (v) Procedures for the Developer to monitor and report to the District the status of, and close out of, all Nonconforming Work and Noncompliance Events throughout the Term; a
 - (vi) Audit procedures and dissemination of audit results; and
 - (vii) Procedures for incorporating findings from past audits, controls and other verifications to continuously improve the Developer's processes, means and methods for delivering the Work.
- (c) There shall be only one quality management system for all Work performed by the Developer and Developer-Related Entities. Individual quality systems for different Developer-Related Entities shall not be permitted.
- (d) Quality assurance personnel shall report directly to the Quality Manager and the Quality Manager shall report directly to the Project Executive. The Quality Manager shall have oversight responsibility over all personnel performing quality control Work.

- (e) The Quality Management personnel shall comply with the following:
- (i) Be an employee of the Developer, Lead Contractor, Lead Engineering Firm, or Lead Asset Management Contractor.
 - (ii) Have sufficient authority and organizational freedom to prevent and resolve quality problems, and to implement continuous improvement measures.
 - (iii) Have no responsibilities in the production of the Work. Personnel assigned to perform inspection testing or monitoring shall not be those personnel performing or directly supervision the Work being inspected, tested or monitored. Quality control staff shall remain independent of the quality assurance staff.
- (f) The Quality Manager shall report all quality issues directly and simultaneously to the District and the Developer's Project Manager.
- (g) The Quality Manager shall have the authority to stop Work for quality-related issues.
- (h) All Developer personnel shall report to the Quality Manager all quality-related issues immediately upon discovery.
- (i) The Developer's complete quality system, for all Work and each type of Work, respectively, and all quality procedures, processes, tools, means and methods, organization, quality training programs, personnel names, functions, responsibilities, contact information, and qualifications, including all the requirements of Section 2.2 of these Technical Provisions, shall be clearly documented in the Quality Management Plan (QMP).
- (j) The Developer's quality management system and QMP shall be consistent with the requirements of ISO 9001, and shall include a Corrective and Preventative Action Process (CPAP). For avoidance of doubt, the Developer may elect to obtain formal ISO 9001 certification, but is not required to do so. The Developer's quality management system and QMP shall include processes to reflect environmental management that is compliant with ISO 14001 requirements.
- (k) If the Project Elements constructed, fabricated, or installed by the Developer or any materials, supplies and manufactured Elements incorporated into the Work are proven to be defective, nonconforming, noncompliant or otherwise not meeting the quality standards set forth in these Technical Provisions, the Developer shall promptly remedy by removing and replacing such Elements and satisfactorily demonstrating to the Work and Elements are in compliance with these Technical Requirements.

2.2.2 Quality Training Requirements

- (a) All Developer personnel shall be appropriately trained to ensure the quality of the Work.
- (b) The Quality Manager shall have undertaken training in the use and application of quality management system and shall have undertaken training as an ISO 9001 auditor no later than 60 days after the District issues NTP1.
- (c) The following Developer Key Personnel shall have undertaken training in the use and application of quality management system no later than 90 days after the District issues NTP1:

- (i) Project Executive;
 - (ii) Project Manager;
 - (iii) Deputy Project Manager;
 - (iv) Lead Designer;
 - (v) Lead Technology Designer;
 - (vi) Lead Civil Engineer; and
 - (vii) Lead Electrical Engineer
- (d) All other Key Personnel shall have undertaken training in the use and application of quality management system no later than 90 days after the District issues NTP2, and in any event before the first NTP3.
- (e) If at any time any Key Personnel needs to be changed during the Term, the Key Personnel shall have undertaken training in the use and application of quality management system no later than 30 days after District approval for the new personnel.

2.2.3 Quality of the Design Work

- (a) As part of the quality management system, the Developer shall be responsible for the quality of the Design Work throughout the Term and shall document and implement the following procedures, methods, roles, personnel and responsibilities pertaining to the Design Work in the QMP, procedures and responsibilities for:
- (i) Design quality control process to include policy, procedures and specific roles and responsibilities;
 - (ii) Ensuring that all Design Documents shall be independently reviewed, verified for constructability, completeness, clarity, accuracy, and back-checked;
 - (iii) Preparing and checking the plans, drawings, specifications, estimates, calculations, computer application input data, notes, and other submittal items;
 - (iv) Verifying that Design Documents comply with these Technical Provisions, design standards, and design criteria;
 - (v) Submitting Design Documents;
 - (vi) Resolving comments and tracking resolution of District comments and seeking approval as may be required from the District;
 - (vii) Stopping Design Work or elevating a design-quality issue;
 - (viii) Documenting compliance with quality procedures;

- (ix) Distributing Design Documents revisions, including in particular to field personnel; and
- (x) Defining the scope and frequency of review, audits, and verifications of design, calculations, computer input assumptions, and other Design Documents.

2.2.4 Quality of the Conversion Work

2.2.4.1 Developer Responsibilities

- (a) As part of the quality management system, the Developer shall be responsible for the quality of the Conversion Work throughout the Term and shall document and implement the following procedures, methods, roles, personnel and responsibilities pertaining to the Conversion Work in the QMP, procedures and responsibilities for:
 - (i) All construction quality control, including production of materials, manufacturing of Project Elements, placement of such materials and Elements, and integration of Project Elements in the Work;
 - (ii) Inspecting materials, manufactured Elements or equipment at the source of supply, manufacture, and/or fabrication;
 - (iii) Ensuring compliance with Section 7 Design, Conversion, and Construction Requirements and Section 11 Maintenance and Protection of Traffic, of these Technical Provisions;
 - (iv) Ensuring compliance with Section 9 Smart City Improvements;
 - (v) Performing construction inspection, sampling and testing to validate the quality control testing in accordance with the PMP;
 - (vi) Maintaining record of all Developer inspections, including but not limited to, date of inspection, sampling and testing undertaken, and the results of such sampling and testing;
 - (vii) Providing the District with unrestricted entry at all times to any location and facility where Work is conducted, upon reasonable notice from the District;
 - (viii) Providing all Developer quality reports and results of tests and inspections to the District;
 - (ix) Suspending immediately Work pursuant to a District order; and
 - (x) Suspending immediately Work that is not in compliance with the Project Agreement, Governmental Approvals, the PMP, the Design Documents, or applicable Law or otherwise does not conform with the quality standards in these Technical Provisions and best industry practice.

2.2.5 Quality of the Asset Management Work

- (a) As part of the quality management system, the Developer shall be responsible for the quality of the Asset Management Work throughout the Term and shall document and implement the following procedures, methods, roles, personnel and responsibilities pertaining to the Asset Management Work in the QMP, including, including procedures and responsibilities for:

- (i) The Developer's self-monitoring process and to monitor the performance and quality of Developer's Asset Management Work, as well as to verify conformance to procedures, plans and accuracy of monitoring, inspections, and reporting
- (ii) Maintaining record of all Developer inspections, including but not limited to, date of inspection, sampling and testing undertaken, and the results of such sampling and testing;
- (iii) Validating the accuracy of information and results in the Asset Management Monthly Reports, Asset Management Annual Reports and Renewal Work Reports, including the data, times, dates, other information such as Construction Noncompliance Events, Asset Management Noncompliance Events, Noncompliance Points, Deductions, and the supporting calculations;
- (iv) Any other Asset Management Work described in Section 2.2 of these Technical Provisions; and
- (v) Meeting the requirements for Smart City Improvements referenced in section 9.2(h) of these Technical Provisions.

2.2.6 Quality of Materials, Supplies and Manufactured Elements

- (a) As part of the quality management system, the Developer shall be responsible for the quality of the Project materials, supplies and manufactured Elements throughout the Term to assure compliance with the Project Agreement, Governmental Approvals, and applicable Law.
- (b) The developer shall not incorporate in the Work any materials, supplies and manufactured Elements that may be defective, has not been subject to and successfully passed the quality control and quality assurance tests prescribed in the Developer's quality system and QMP. If such materials, supplies and manufactured Elements incorporated into the Work are proven to be defective, nonconforming, or otherwise not meeting the quality standards set forth in these Technical Provisions, the Developer shall remove, dispose and replace them promptly, unless otherwise directed by the District.
- (c) The Developer shall document and implement the following procedures, methods, roles, and responsibilities pertaining to the quality of the Project materials, supplies and manufactured Elements in the QMP, including procedures and responsibilities for:
 - (i) Quality control and quality assurance of all Project materials, supplies and manufactured Elements;
 - (ii) Maintaining a record of all Developer inspections providing conclusive evidence that the Project materials, supplies and manufactured Elements meet the quality requirements in these Technical Provisions, including but not limited to, date of inspection, sampling and testing undertaken, and the results of such sampling and testing. Furthermore, Developer shall meet the requirements set forth in Article 51 of the Project Agreement regarding Records and Audits;
 - (iii) Rectifying root causes of nonconformance or quality defects of Project materials, supplies and manufactured Elements

- (iv) Procedures and responsibilities for facilitating District inspection of manufacturers' factories.
- (v) Facilitating access and inspection as noted in section 8.4 of the Project Agreement regarding Access and Inspection Rights for the District and Other Persons
- (d) The Developer acknowledges that there can be significant lead times for securing some Project materials, supplies and manufactured Elements. The Developer is entirely responsible for sourcing and procuring such Project materials, supplies and manufactured Elements in the time, quantities, and quality required to meet the requirements of this Project.
- (e) Existing Elements that are within the Project Site that are to be removed shall become the property of the Developer and shall be removed and suitably disposed of by Developer in accordance with the Project Agreement, Governmental Approvals, applicable Law, and the PMP.
- (f) The Developer shall maintain adequate property control records for Project materials, supplies and manufactured Elements identified by the District or the Project Agreement to be salvaged. The Developer shall be responsible for the handling, storage, transportation, delivery, removal, and protection of salvaged materials, supplies and manufactured Elements.
- (g) The Developer shall grant full, unrestricted access and make available at all time to the District any part of the Project or facilities where Work is being undertaken that will ultimately be incorporated into the Project, including such locations, facilities and plants where Project materials, supplies and manufactured Elements are sourced, manufactured, and/or fabricated; the Developer shall provide entry to such sites upon reasonable notice from the District and provide assistance to the District for the safe and convenient performance of any audit, test, inspection, or verification.
- (h) With the exception of the Project Elements existing as of the Setting Date and that shall remain part of the Project, unless approved in writing by the District prior to their use, the Developer shall not incorporate in the Work any used, reconditioned, or remanufactured materials, supplies or manufactured Elements, and the Developer shall only incorporate in the Work materials, supplies and manufactured Elements that are new, as further defined below:
 - (i) New, as used in this clause, means composed of previously unused components, whether manufactured from raw material, virgin material, or recycled material, or from materials and by-products generated from, and reused within, an original manufacturing process; provided however that the materials, supplies or manufactured Elements meet the requirements of these Technical Provisions, including but not limited to performance, reliability, and life expectancy.
 - (ii) Reconditioned, as used in this clause, means restored to the original normal operating condition by readjustment and material replacement.
 - (iii) Recovered, as used in this clause, means waste materials and by-products that have been recovered or diverted from solid waste, including post-consumer material, but such term does not include those materials and by-products generated from, and commonly used within, an original manufacturing process.

- (iv) Remanufactured, as used in this clause, means rebuilt to original specifications.
- (i) Certificate of Compliance
 - (i) A Certificate of Compliance shall be furnished prior to the use of any Supplies for which the Project Agreement require such a certificate.
 - (ii) A Certificate of Compliance shall be furnished with each lot of material delivered to the Project and the lot so certified shall be clearly identified in the certificate. The fact that Supplies are used on the basis of a Certificate of Compliance shall not relieve the Developer of responsibility for incorporating Supplies in the Work which conforms to the requirements of the Project Agreement.

2.2.7 Reporting

- (a) The Developer shall submit to the District the results of all internal audits within seven (7) days of undertaking the audit. When the Developer becomes aware of any Nonconforming Work, the Developer shall promptly issue a report of the Nonconforming Work (Nonconforming Work Report), which shall detail any corrective action plan prepared by the Developer. The Developer shall promptly issue a report upon the resolution of the Nonconforming Work (Nonconforming Work Resolution Report), detailing the corrective actions implemented by the Developer.
- (b) The Developer shall prepare a monthly report of the quality reviews, inspections and tests performed, results of such reviews, inspections and tests, and occurrences and resolution of Nonconforming Work discoveries. The Developer shall submit such quality report to the District with each Progress Report during the Construction Period and with the Asset Management Monthly Report following the Construction Period.
- (c) The Developer shall provide the District with a copy of any or all quality records immediately upon the District's request.

2.2.7.1 QMP

- (a) The Developer shall develop and submit to the District for approval a comprehensive Quality Management Plan (QMP) as part of the Project Management Plan.

2.2.8 District's Quality Inspections

- (a) Without relieving the Developer of any of its responsibilities under the Project Agreement, the District reserves the right to perform any quality assurance, quality control, audit, inspection, verification, sampling, or testing to verify the quality of the Work. Without limitations and at the District's sole discretion, the District may:
 - (i) Inspect any location where Project Elements are manufactured or from where materials and supplies for the Project are sourced;
 - (ii) Inspect materials, equipment, or manufacturer Elements at the source of supply, manufacture, and/or fabrication; and
 - (iii) Perform quality assurance testing for applicable Elements.

2.3 Project Schedule Requirements

2.3.1 Project Baseline Schedule

- (a) The Project Baseline Schedule (PBS) shall define the timeframe for completion of the Project and achievement of milestones, and be used for planning and monitoring progress of the Work and identifying and analyzing changes that occur during the D&C Period.
- (b) The PBS shall be used by the Parties for planning and monitoring the progress of the Work. Approved logic changes and approved changes to the Agreement shall be incorporated into the next revision of the PBS.
- (c) The PBS shall divide the Work into schedule activities of reasonable durations with appropriate logic ties to show the Developer's overall approach to the planning, scheduling, sequencing, resource allocation, and execution of the Work. The PBS shall show the detail of all Work required to complete the Street Light Improvements and Smart City Improvements.
- (d) The Developer shall use standard and consistent schedule activity identification numbers, textual descriptions, and codes in all PBS submittals, in a manner acceptable to the District. Each PBS submittal shall be clearly identified. Resubmissions of a PBS shall use the same revision number as the original submission individually identified by a sequential appended letter (a, b, c, etc.), as an identification of a revised version.
- (e) The durations and logical relationships of the schedule activities (and any summary level information) shall be based on the actual duration and relationships anticipated. Each activity shall have a duration of reasonable and appropriate length. All activities shown in the PBS, with the exception of the first and last activities, shall have a minimum of one predecessor and a minimum of one successor activity.
- (f) The PBS shall include all Project milestone and each milestone shall be separately identified, conform to the scheduling requirements set forth in the Agreement and be assigned a "finish no later than" constraint date.
- (g) The PBS shall include a listing of all Submittals as called out in the Agreement. Submittal activity durations shall include specific durations for the reviews by the District, and third parties if applicable, and/or approval of the Developer's Submittals as may be required by the Agreement.
- (h) No unspecified milestones, constraints, float suppression techniques, or use of Schedule Activity durations, logic ties, and/or sequences deemed unreasonable by the District, shall be used in the PBS. Each PBS submittal shall clearly and individually define the progression of the Work within the applicable time frame by using separate Schedule Activities. The Critical Path shall be highlighted in red on all schedules to distinguish critical Schedule Activities from other Schedule Activities and Float shown for all Schedule Activities.
- (i) The PBS shall include all payment dates in accordance with Article 1, Milestone Payments within Exhibit 14: Payment Mechanism of the Project Agreement.

- (j) The Developer shall establish a Work Breakdown Structure (WBS) to provide a consistent framework for Project Schedule development and control for the District's approval. The WBS (and therefore the Project Schedule) shall present activities at three different levels:
- (i) Project level, which encompasses activities applicable to all or large portions of the Project including Project administration and management, most Design Work, Utility Coordination, supply chain and sourcing and manufacturing of Project materials, equipment, and Elements, design, procurement and manufacturing of Smart City Improvements, the RMCS, AMIS, and other Project-wide systems, Asset Management Work during the D&C Period, interfaces with other projects in the District, Governmental Approvals, environmental activities, and public outreach; in addition, the Project level schedule information shall include the same activity types used by the Developer at the activity level, aggregated for the entire Project
 - (ii) Project Bundle level, which encompasses activities applicable to the organization, sequencing and phasing of each Project Bundle and Work in the ANCs, Project Bundle specific permits and approvals, including, but not limited to, parking bans, notification of ANCs, etc.; in addition, the Project Bundle level schedule information shall include the same activity types used by the Developer at the activity level, aggregated for each Project Bundle, respectively;
 - (iii) Activity level, which encompass activities applicable within each Project Bundle, respectively.
 - (iv) For planned Work, the Developer shall notify the ANC via mail and email (info to be provided by DDOT) 45 days prior to start of Work; door hangers will be hung seven (7) days prior to the start of Work, stating Emergency-No Parking; door hanger to provide a range for the duration of the Work not to exceed five (5) days of the duration identified in the PBS; hang Emergency-No Parking sign 72 hours prior to the start of Work. For further information on Emergency-No Parking signs, refer to section 11 of these Technical Provisions.
 - a. Project bundle schedule should reflect the above communications.
 - b. If there is a delay to Work, the Developer shall email ANC and repost the Emergency-No Parking sign.
 - c. The Developer shall propose the door hanger design to DDOT for approval. The door hanger shall include a link to the project website, project info, FAQs, and phone number for additional questions.
 - d. For multi-unit buildings, the Developer shall make a good faith effort to contact the property manager to provide notification of Planned Work. The Developer shall make the following materials available to the property manager: poster providing the same level of detail as shown on door hangers and digital version of poster that may be provided to tenants by the property manager via email. In the event that the Developer's good faith effort to contact the property manager is unsuccessful, the Developer shall deliver poster to the building.

- (k) Each schedule activity shall be mapped to one and only one of the WBS elements. The Developer shall further develop and detail the WBS in accordance with its specific schedule activities and retaining the ability to summarize activities across all three levels of the WBS.
- (l) The schedule activity for each Work component shall indicate the duration, timing, and logical relationship to other Work components, including to schedule activities including predecessors, successors, and other related activities. Schedule activities shall not only be broken down to each Project Bundle but each Project Bundle shall be broken down minimally to Work components (for example, Project Bundle shall be broken down into maintenance and protection of traffic for Closure or detour, details of Work on each Project Element such as electrical system, Pole, Light Fixture, pavement, sidewalks, etc.). All Work shall be broken down to similar manageable Work component, consistently for all Project Bundles. For mobilization and demobilization schedule activities, the Developer shall provide a detailed list of Work items.
- (m) There shall be only one Project Schedule for all Work with all three levels of activities in the WBS rolling up to the Project level as described above. The Project Schedule shall include all major Work activities required to complete the Project, in sufficient detail to monitor and evaluate Preliminary Work and D&C Work progress from NTP1 to Project Final Completion. In addition, the PBS shall indicate the sequence of performing each major activity and the logical dependencies and inter-relationships among the activities.
- (n) The PBS shall use the industry standard Critical Path Method. However, the Developer acknowledges that, given the distributed nature of the Project, Developer can reallocate resources between and among Project Bundles with no or minimum schedule delays. In developing and updating the PBS, the Developer shall therefore take full advantage of the ability to mitigate time delays due to the distributed nature of the Project to realize this intrinsic benefit. The Critical Path for the PBS therefore shall only be considered indicative and resource constraints and milestone constraints shall be the primary determinant for any time impact analysis.
- (o) Float shall not be considered as time for the exclusive use of or benefit of either the District or the Developer but shall be considered as a jointly owned, expiring resource available to the Project and shall not be used to the financial detriment of either party. Any method utilized to sequester Float calculations shall be prohibited. Any schedule, including the Project Baseline Schedule and all updates thereto, showing an early completion date shall show the time between the scheduled completion date and the applicable Milestone Schedule Deadline as "Project Float."
- (p) Resource and cost loading
 - (i) The PBS shall be resourced and cost-loaded in accordance with Table 3, and the Developer shall allocate the total cost throughout the schedule activities in the PBS. Such allocation shall accurately reflect the Developer's cost for each schedule activity and shall not artificially inflate, imbalance, or front-load line items.
 - (ii) The materials, labor, or equipment quantity that the Schedule Activity value will be based upon shall be indicated as a resource and only those resources actually available to the Developer shall be included. Labor-loading of activities may be based upon total number of workers, but, at a minimum upon total number of crews. Major construction equipment to be used by the Developer and Contractors at all tiers in performing Work shall be

assigned to applicable activities. The quantity shall represent the estimated effort in-place for the Schedule Activity value.

(q) Timing of Submittals

- (i) The Developer shall submit its proposed WBS to the District for approval as a condition precedent to NTP1. The Developer may add additional activities to the levels, subject to the District's approval.
- (ii) The Preliminary Project Baseline Schedule (PBS-1) shall be submitted with the Proposal. The Developer shall use PBS-1 as a foundation to prepare a Project Baseline Schedule (PBS) and shall submit a draft of the PBS to the District for review and approval 30 days after NTP1.
- (iii) Thereafter, each revision and update of the PBS shall be numbered as PBS-2, PBS-3, etc. The Developer may submit updates to the PBS between PBS-1 and PBS-2 (which shall be numbered PBS-1a, PBS-1b, etc.) detailing any Preliminary Work, which the Developer wishes to undertake prior to NTP2 (such as field investigations, surveys, preliminary Design Work). The Developer must submit such updates to the District prior to beginning such Work.
- (iv) Approval of PBS-2 shall be a condition precedent to issuance of NTP2. Approval of PBS-3 shall be a condition precedent to issuance of the first NTP-3
- (v) Any update or resubmission to the PBS shall be accompanied by a detailed and comprehensive narrative explaining the changes to the prior version with precise reference to the activities that have been modified, added, or deleted and corresponding rationale, using the Developer's standard and consistent schedule activity identification numbering system.
- (vi) Each PBS shall be submitted a minimum of 14 Days in advance to obtain approval prior to performance of any activity changes to the PBS. The District will review each resubmission of the PBS within 14 Days of submission or resubmission.
- (vii) The Developer shall submit to the District a revised PBS within 14 Days after each Change Order, Relief Event or Compensation Event is executed. All approved Change Orders, Relief Events or Compensation Events shall be incorporated into the originally planned execution of the Work. The District shall confirm in writing the approval of each revised PBS. The approved PBS shall remain in force until a subsequent revised PBS is approved by the District.

(r) Submittal and format requirements

- (i) The Developer shall submit each Project Baseline Schedule (PBS) on full-size (22" x 34") color PDF, along with an electronic version of the schedule in its native format for each submittal.
- (ii) Each PBS shall include a separate narrative report which describes, in general fashion, the Developer's proposed means and methods for the Work, phasing and sequencing of each

Project Bundle respectively, and major components of the Work within each Project Bundle. The schedule narrative shall describe the general sequence of design and construction, the proposed Critical Path of the Project, and all Milestone schedule deadlines, in addition to other schedule narrative requirements presented elsewhere in Section 2.3 of these Technical Provisions.

- (iii) The Project title and data date shall be displayed on all schedules, charts and diagrams. A legend shall be provided on all schedules, charts and diagrams which indicates the various symbols used and their meanings. Electronic versions shall likewise be uniquely identifiable by filename.
- (iv) Additional Submittal and format requirements are presented for the Project Status Schedule Update in Section 2.2.3 of the Technical Provisions.

Table 3: Schedule Level of Detail Requirements

WBS Level	Detail	PBS-1	PBS-2	PBS-3+
Project Level	Durations and Logic	Yes	Yes	Yes
	Cost Loading	Yes	Yes	Yes
	Resource Loading	No	Yes	Yes
Bundle Level	Durations and Logic	Yes	Yes	Yes
	Cost Loading	No	within 90 days of NTP2	Yes
	Resource Loading	No		Yes
Activity Level	Durations and Logic	Yes	Yes	6 month look-head at the first NTP3; all information within 60 days of first NTP3
	Cost Loading	No	No	
	Resource Loading	No	No	

2.3.2 Weekly Schedule Updates

- (a) At least 24 hours before the appointed time of the weekly D&C meeting required in Section 2.4.1, the Developer shall submit by email to the District:
- (i) A “look ahead” planning schedule showing the items of Work planned for the next two (2) weeks, which shall meet the requirements of the PBS; and
 - (ii) A memo documenting the activities conducted for the previous week period and reconciliation to the prior week’s “look ahead” planning schedule. The format and information to be presented shall be per the District’s direction but shall include at a minimum summary information per ANC, Project Bundle, and street, and include status of Work (e.g. underway, completed). In addition, the Developer shall note any other issues or concerns related to proper conduct of the project and/or work activities.

2.3.3 Monthly Project Status Schedule Updates

- (a) The Developer shall include Project Status Schedule Updates in the Monthly Progress Reports with a PBS data date at the end of the month and submitted to the District no later than the fifth day of each month following the Commercial Closing Date. The Project Status Schedule Updates shall be submitted, if applicable, until Project Final Completion.
- (b) The Project Status Schedule Updates shall accurately reflect the current status of the Project including all activities completed as of the data date of the current PBS, recovery schedules, schedule revisions due to Relief Events, approved Change Orders, the Developer’s detailed schedule for completing the Work and all information and reporting required for the Project Schedule. At a minimum, the monthly Project Status Schedule Update(s) shall include the following current Work data:
- (i) Detailed resource-loaded schedule of activities that clearly identify the Critical Path;

- (ii) Monthly Performance Report;
 - (iii) Actual start and finish dates of Work, physical percent complete, and days remaining for Work in progress.
- (c) The date for use in calculating the Project Status Schedule Update shall be the first day of the following month. The Project Status Schedule Update shall accurately reflect updated progress as of the Commercial Close of the updated PBS, forecast finish for in-progress schedule activities and reforecast early dates and late dates for remaining schedule activities and shall indicate the overall physically complete percent of the D&C Work. If any actual dates are changed or corrected in any following month, a narrative must be included providing explanation of the change.
- (d) Time-scaled network diagrams shall be submitted, on at least a monthly basis, on 22" X 34" sheets in PDF, using a scale that yields readable plots. The network diagrams shall be organized consistent with the Project WBS. Project activities shall be linked by logic ties and shown on their early dates. The Critical Path shall be highlighted and Float, where applicable, shown for all Project activities.
- (e) The monthly Project Status Schedule Update(s) shall include additional, separate, filtered lists of Project activities and Work components included in the Project Schedule to create the following reports, which the Developer shall modify upon the District request:
- (i) Coordinating with and accomplishing Work associated with Utilities;
 - (ii) Bar chart schedule sorted by Project Bundle and by ANC indicating the physical status of all activities as of date of the update;
 - (iii) Graphical report; which compares the Developer's progress to planned progress by Project Bundle and Work components in the WBS;
 - (iv) Design Document submittals for the forthcoming period;
 - (v) Tabular report listing all activities with ten (10) Days or less Float and the Developer's plan for reallocating resources to avoid schedule delay taking full advantage of the ability to mitigate time delays due to the distributed nature of the Project;
 - (vi) Sixty-day (60) look ahead report on all the District and Governmental Approvals required;
 - (vii) Ninety-day (90) look ahead bar chart schedule sorted by WBS and activity early start dates;
 - (viii) Critical items graphical report for each Critical Path sorted by activity early start date and the Developer's plan for reallocating resources to avoid schedule delay taking full advantage of the ability to mitigate time delays due to the distributed nature of the Project;
 - (ix) Time-scaled critical path network plot indicating the status of all activities as of the date of the update; and

- (x) Coordination with the District regarding potential impacts to other District projects.
- (f) The reports shall be accompanied by a narrative progress report describing the status of the Project in detail including progress made that period; plans for the forthcoming period; all potential delays and problems along with and the Developer's plan for reallocating resources to avoid schedule delay taking full advantage of the ability to mitigate time delays due to the distributed nature of the Project; their estimated effect on the Project Baseline Schedule and overall completion, and whether on, ahead of or behind schedule.
- (g) The District will review the monthly Project Status Schedule Update(s) for consistency with the Developer's WBS and the current approved Project Baseline Schedule and for conformance with the Agreement. The Developer shall correct any deficiencies and resubmit its monthly Project Status Schedule Update(s) within five days of notice from the District. The District will notify the Developer of corrections required within 10 days of receipt of the Project Status Schedule Update(s).
- (h) The District will use these updates to manage its activities to be responsive to the Developer's Project Baseline Schedule, to analyze payment requests, and to measure the Developer's performance with respect to its plan for accomplishing the Work.
- (i) The Developer shall submit the Project Status Schedule Update on sheets no larger than 22" X 34" in color PDF along with an electronic version of the schedule in its native format and a full-size color paper copy. Software settings shall not be changed or modified, for any schedule submissions, without prior District approval.
- (j) The Developer shall submit a Monthly Performance Report as described in Exhibit 15 of the Project Agreement.

2.3.4 Monthly Progress Report

- (a) Each month, beginning with the first full month after the Commercial Closing Date, the Developer shall submit to the District the Monthly Progress Report. The Developer shall submit the Monthly Progress Report, including the corresponding Project Status Schedule Update as required by Section 2.3.3 of the Technical Provisions, no later than the 5th day of each month following the Commercial Closing Date. An electronic copy of the entire Monthly Progress Report shall be submitted to the District.
- (b) If requested by the District, the Developer shall make all corrections to the monthly progress report and resubmit within five days.
- (c) The Monthly Progress Report shall contain a narrative, which shall include at a minimum the following items:
 - (i) Describe progress for each Project Bundle, each ANC and the Project as a whole, including all phases of Work; Identify start date and completion dates on major areas of Work; Group the information based on the WBS;

- (ii) Include the monthly quality report, as required in Section 2.2.7 of these Technical Provisions, and summarize QA/QC findings of activities reviewed, findings and resolutions;
- (iii) List any Change Order that were identified or executed during the period from the submission of the previous month's progress report to the submission of the current progress report; Include their status;
- (iv) Identify any Relief Events or Compensation Events that were accepted during the period from the submission of the previous month's progress report to the submission of the current progress report;
- (v) The aggregate Noncompliance Points accrued under Exhibit 14: Payment Mechanism of the Project Agreement;
- (vi) Identify schedule activities planned for the upcoming period;
- (vii) Identify problems and issues that arose during the period from the submission of the previous month's progress report to the submission of the current progress report, mitigation actions taken by the Developer, issues that remain to be resolved and mitigation actions planned by the Developer to resolve them and expected date of such resolution;
- (viii) Summarize resolution of problems/issues raised in previous progress reports or resolved during the period from the submission of the previous month's progress report to the submission of the current progress report;
- (ix) Identify expected delays and Critical Path issues and proposed resolution, taking full advantage of the ability to mitigate time delays due to the distributed nature of the Project;
- (x) Provide a report on the Milestone Schedule Deadlines showing the schedule dates for the immediate prior month and current month; A narrative is required to explain why the dates have changed for variances greater than thirty (30) Days;
- (xi) Identify requested and/or required District actions for the next month;
- (xii) Provide digital progress photographs that accurately depict Project progress and issues as outlined in the progress report narrative;
- (xiii) Project Status Schedule Updates as described above; and
- (xiv) Potential impact of any ongoing Time Impact Analysis, pending approval from the District, pursuant to Section 2.3.6 of the Technical Requirements.

2.3.5 As-Built Schedule

- (a) At Substantial Completion of each Project Bundle, the Developer shall submit the Project Status Schedule Update identified as the "As-Built Schedule." The "As-Built Schedule" shall reflect the

exact manner in which the Work up to Substantial Completion for each Project Bundle and described by the Project Documents was actually performed (including start and completion dates, schedule activities, actual durations, sequences and logic).

- (b) The Developer shall update the ArcGIS inventory to reference the corresponding “As-Built Schedule” for each converted Lighting Unit.
- (c) The “As-Built Schedule” shall be signed and certified by the Developer’s Project Manager and the Developer’s scheduler as being a true record of when the Work was actually performed. The “As-Built Schedule” that the District determines is both correct and complete is a requirement for Substantial Completion of the Project Bundles.
- (d) At Project Final Completion, the Developer shall submit the Project Status Schedule Update identified as the “As-Built Project Schedule” presenting the same information as above at the Project level.

2.3.6 Time Impact Analysis

- (a) The Developer shall submit to the District a written Time Impact Analysis (TIA), as defined in Article 28: Compensation Events of the Project Agreement.
- (b) Each TIA submitted by the Developer shall consist of the following steps or elements:
 - (i) Establish the status of the Project before the impact by using the most recent schedule update that has the closest data date prior to the event for TIA, or as adjusted by mutual agreement;
 - (ii) Identify the impact event, estimate duration of the impact, determine appropriate logic, and insert the impact of the activity or fragments of activities into the schedule; and
 - (iii) Demonstrate any resulting impacts through layouts generated from the scheduling software. Filter activities to show added or modified activities and activities impacted from changes. Note any other changes made to the schedule including modifications to the calendars or constraints.

However, this is provided that any TIA shall conclusively demonstrate that the Developer has used Best Effort to mitigate time impact and fully taken advantage of the ability to mitigate time delays due to the distributed nature of the Project.

- (c) The Developer shall submit the following with each TIA Submittal:
 - (i) A narrative report that:
 - a. Identifies the schedule update(s) used for analysis;
 - b. Describes the procedures used to analyze schedule impacts, including: additions, deletions, or modification to schedule activities and or fragments of activities; modifications to the calendars or constraints; and modifications to relationships;
 - c. Describes the impact or potential impact by comparing work prior to the impact and work affected or predicted to be affected after the impact;

- d. Describes mitigation efforts taken to date fully incorporating the ability to mitigate time delays due to the distributed nature of the Project; and
 - e. Describes potential resolutions to mitigate or avoid impact or recover from the impact.
- (ii) Schedule layouts in PDF. Filter activities to clearly show impacted activities and affects to the Critical Path. Multiple layouts may be required to adequately demonstrate the impact to the Critical Path. At a minimum, provide a layout demonstrating associated activities prior to the impact and a layout demonstrating associated activities after the impact is inserted and the schedule is progressed.
 - (iii) One electronic copy of the impacted PBS; and
 - (iv) Other information or documentation pertinent to the analysis.
- (d) The Developer shall not incorporate TIA activities into the Project Schedule Update and subsequent PBS unless and until such TIA has been approved by the District.

2.3.7 Recovery Schedule

- (a) If, from a Project portfolio approach, the Work is delayed on any Critical Path item for a period which exceeds the greater of either thirty days in the aggregate or that number of days in the aggregate equal to five percent of the days remaining until Project Final Completion, the next Project Status Schedule Update shall include a recovery schedule demonstrating the proposed plan to regain lost Project schedule progress and to achieve Project Final Completion by the specified date.

2.4 Meetings

- (a) During the course of the project, the Developer shall be required to attend project meetings, both regularly scheduled meetings, and meetings on special topics. The Developer shall prepare meeting/briefing minutes to be stored electronically by the Developer for documentation purposes and available for District review upon request. The Developer shall attend periodic meetings with District personnel and other agencies as required for resolution of design, construction, Asset Management, and/or handback issues. These meetings may include but are not limited to:
 - (i) Partnering meetings;
 - (ii) District technical issue resolution meetings;
 - (iii) Design workshops;
 - (iv) Resource agency coordination;
 - (v) Local government agency coordination;
 - (vi) Scoping meetings;
 - (vii) Monthly progress meetings;

- (viii) Utility meetings;
 - (ix) Public information meetings.
- (b) The Developer shall schedule all meetings, develop all meeting agendas and attend all meetings, as required by the Project Agreement or as otherwise requested by the District. The Developer shall submit a Meeting Notice to the District not less than three (3) days prior to the associated meeting. The Developer's Meeting Notice shall include description of the purpose or purposes for which the meeting is called. The Developer shall invite the District and other attendees, as determined by the District, to all Project related meetings. At least 24 hours prior to each meeting, Developer shall submit Meeting Schedules and Agendas to invitees.
- (c) The Developer is responsible for recording meeting notes and action items during each meeting. Following conclusion of the meeting, the Developer shall distribute the meeting notes and action items to the District and other attendees within 2 days of the associated meeting.

2.4.1 D&C Meetings

- (a) Commencing at NTP1 and until Project Final Completion, the Developer shall meet with the District at a minimum on a biweekly basis and, prior to each progress meeting, provide a look ahead of the activities to be completed during the upcoming two weeks including details of planned traffic management measures and lane Closures. The Developer shall be ready to discuss Progress Reports in accordance with Section 2 of the Technical Provisions or any other topic as required by the District. The Developer and other appropriate Developer-Related Entities as may be requested by the District shall attend such meetings.
- (b) Before the Developer begins Construction Work, the District will call a preconstruction meeting to review construction and Asset Management aspects of the Project. The Developer and other appropriate Developer-Related Entities shall attend this meeting, along with the District and other involved parties and stakeholders as deemed necessary.
- (c) Between NTP2 and Final Completion, the District maintains the right to increase the frequency of meetings.

2.4.2 Asset Management Meetings

- (a) Commencing at NTP1 and until the end of the Term, Developer shall meet with the District as required below:
- (b) The Developer and Asset Management Contractor shall have biweekly meetings with the District to discuss the Asset Management Work. The items to be discussed shall include, but not be limited to:
- (i) Asset Management Work for the previous two weeks including Incidents/Emergencies and Incident Response coordination, Closures and Permitted Closures;
 - (ii) Noncompliance Events, Closures, Nonconforming Work, and assessment of Noncompliance Points and Deductions, and any other pertinent information related to payment adjustments and Noncompliance Points calculation per the Project Agreement;

- (iii) Anticipated Asset Management Work for the next two weeks, including but not limited to Planned Maintenance, Renewal Work and Permitted Closures;
 - (iv) Required coordination with Pepco, Verizon, and other third parties; and
 - (v) Any safety and traffic operations issues or requests on the Project.
- (c) The District may request a meeting at any time to discuss Asset Management Work-related issues, accidents and other Asset Management aspects of the Project. Developer shall be required to actively participate in such and any other meetings as directed by the District and shall be required to prepare meeting minutes and submit them to the District for review. The Developer shall conduct Incident debriefings to review lessons learned and best practices.

2.5 Project Management Plan

- (a) The Developer shall develop and submit the Project Management Plan (PMP) to the District for approval in accordance with the requirements of the Project Agreement. The PMP shall provide details of the means and methods by which the Developer will achieve the performance set forth in the Project Agreement and Project's objectives. The Developer shall implement, manage, and operate and, as required, update the PMP as the Developer or the District determine is necessary to comply with the requirements of the Project Agreement and Good Industry Practice. The PMP shall include all of the following:

Table 4: Project Management Plan Contents

Chapter Title	Technical Provision That Defines the Chapter Requirements
Administration	
Management and Staffing Plan	2.5.3
Document and Data Management Plan	2.5.6
Communications	
Public Information and Communications Plan	2.5.5
Environmental	
Emergency Management and Disaster Recovery Plan (EMDRP)	2.5.7
Hazardous Material Operations, Safety, and Health Plan	2.5.8
Comprehensive Environmental Protection Plan	2.5.11
Design, Construction, and Asset Management	
Conversion Work Plan	2.5.1

Quality Management Plan <ul style="list-style-type: none"> • Design Quality Management Plan (DQMP) • Construction Quality Management Plan (CQMP) 	2.5.4
Transportation Management Plan	2.5.12, 11.2
Historical and Architectural Preservation Plan	2.5.13
Asset Management Work Plan	2.5.14, 10.8
Utility Work and Coordination Plan	2.5.15, 6.1

- (i) Approach, procedures and methods for the management of the remote monitoring and control system to meet the requirements set forth in Section 10 of the Technical Provisions;
 - (ii) All plans and processes required by the Project Agreement to be included in the PMP; and
 - (iii) All other plans and processes for the PMP to satisfy all FHWA requirements.
- (b) The Developer shall submit the PMP to the District and obtain approval from the District within 90 days of NTP1. If the Developer does not obtain approval from the District on the PMP within 90 days of NTP1, the Developer shall stop any Work except the Baseline Project Schedule and the PMP until it obtains such approval.
- (c) The Developer shall monitor and improve the effectiveness of its PMP and update it as necessary to address comments made by the District. The PMP shall be updated whenever any of the following conditions exist:
- (i) A plan or procedure no longer adequately addresses the matters it was originally intended to address;
 - (ii) A plan or procedure does not conform with the Agreement;
 - (iii) An audit by the Developer or by the District identifies a need for an update to the PMP;
 - (iv) A plan or procedure no longer represents current or appropriate practice;
 - (v) Organizational structure changes;
 - (vi) The Developer is undertaking or is about to undertake activities that are not covered within a current plan;
 - (vii) Scope changes; or
 - (viii) After acceptance by the District of any remediation plan

- (d) Where one part of the PMP requires to be updated all of the PMP shall be updated and resubmitted for approval unless the District agrees in its sole discretion to accept an update to an individual component of the PMP. Updates to the PMP shall be submitted to the District as both clean and redline versions to facilitate the District's review of the revised PMP.
- (e) The Developer shall develop and submit the PMP to the District for approval. The Developer shall submit to the District for approval digital copies of the PMP for each of the following Submittals:
 - (i) Draft PMP consistent with the PMP submitted as part of the Proposal or the Commercial and Financial Close PMP (as applicable); and
 - (ii) Final PMP; and
 - (iii) Annual PMP updates.
- (f) The Developer shall manage the Project in full compliance with the procedures and standards outlined in the PMP Plan and in the Project Agreement.

2.5.1 Conversion Work Plan

(a) Project Approach

- (i) The Developer shall provide a description of the overall approach to the Project including references to Project phases and Construction of the Street Light Network from the Existing Street Light Network to the Improved Street Light Network. This section is intended to serve as a link between the team structure description, the Project Schedule, and the project approach,
- (ii) The Developer shall provide a description of its overall approach to the Project that identifies which Contractors and individuals will have responsibilities related to the delivery of each major part of the D&C Works. The approach should describe the anticipated sequence of work, show the roles of anticipated suppliers and contractors within each major part of the Schedule, and show the personnel and Contractors responsible for delivery of the D&C Works and performance of Asset Management Works.
- (iii) The Developer shall clearly differentiate between the D&C Term and Asset Management Term when describing management activities and address changes in the management of the Project after Project Final Completion.

(b) General

As part of the Project Management Plan, the Developer shall develop and implement a Conversion Work Plan that shall describe, for the Streetlight Improvements and Smart City Improvements, respectively:

- (i) The approach, processes, procedures, means and methods the Developer will use to deliver the Street Light Improvements and Smart City Improvements given the geographical distribution and multi-asset nature of the Project;
- (ii) How the Developer will bundle and sequence the Street Light Improvements and Smart City Improvements in accordance with Section 1.5.5 of the Technical Provisions;

- (iii) The schedule for the Conversion Work in accordance with the schedule requirements in Section 2.3 of the Technical Provisions;
- (iv) The testing, commissioning, and acceptance protocols that the Developer will use to confirm that the Light Improvements comply with the design requirements of these Technical Provisions and meet the Performance Requirements;
- (v) The testing, commissioning, and acceptance protocols that the Developer will use to confirm that the Smart City Improvements comply with the Smart City Specifications;
- (vi) The completion thresholds to assist the District in verifying that the conditions precedent to Substantial Completion have been met;
- (vii) The Developer's resources management plan and schedule, including Developer-staff, contractors, and equipment, necessary to demonstrate that the Developer will meet the Project Schedule;
- (viii) How quality management requirements of Section 2.2 of the Technical Provisions are incorporated into the Conversion Work; and
- (ix) The Developer's sourcing and procurement processes for materials and manufactured products;

(c) Content

The Conversion Work Plan shall describe how the Developer will sequence and deliver the Street Light Improvements and Smart City Improvements in accordance with the bundling principle set forth in Section 1.5.5 of the Technical Provisions and shall:

- (i) Lay out the method and criteria for identifying Project Bundles;
- (ii) Provide in tabular format and map in ArcGIS all the Project Bundles for the delivery of the Street Light Improvements and Smart City Improvements, showing the limits of each Project Site, and linking this ArcGIS map to the Asset Inventory;
- (iii) Include a schedule showing the sequencing of all the Project Bundles and clearly identifying the scheduled dates for each NTP3, completion of D&C Work, Substantial Completion, and other relevant milestones respecting each Project Bundle, with duration from NTP3 to Completion of D&C Work of each Project Bundle not to exceed 14 days;
- (iv) Demonstrate that the Developer has the appropriate resources to deliver the Work in all the Project Sites where Work occurs in parallel and that the duration for such Work is as short as possible;
- (v) Identify the Traffic Control Plan applicable to each Project Bundle;
- (vi) Identify the schedule of Closures for each Project Bundle;

- (vii) Identify the Work Hours and Work Restrictions applicable to each Project Bundle set forth in Section 1.6 of the Technical Provisions and other applicable Project Limits set forth in Section 1.5 of the Technical Provisions.
- (viii) Identify separate, standalone Project Bundles for areas of historical and architectural significance;
- (ix) Specify the Advisory Neighborhood Commission(s) (ANC) and Single Member District(s) (SMD) included in each Project Bundle;
- (x) Prioritizes areas with greater needs and areas where Conversion Work has the greatest, positive impact on the public and the District; and
- (xi) Promote the equitable progress in the delivery of Street Light Improvements and Smart City Improvements among the Wards of the District and provide for the Developer to deliver Conversion Work in the Public Space in three Wards out of eight at any given time during the Conversion Period.
- (xii) Be consistent in every respect with the Project Management Plan and the Project Schedule.

(d) Timing of Submittal

- (i) During the development of the Conversion Work Plan, the Developer shall collaborate with the District and the Developer and the District will mutually agree upon the method and criteria for developing Project Bundles in accordance with this Section 1.5.5 of the Technical Provisions;
- (ii) The Developer shall submit the Conversion Work Plan 60 days before the scheduled date of the first NTP3;
- (iii) The Conversion Work Plan, in draft, final form, and any update thereof, is a Non-Discretionary Submittal; provided however that the method and criteria for identifying Project Bundles and the grouping of Lighting Units into the Project Bundles shall be submitted to the District separately and at least 15 days prior to the submittal of the Conversion Work Plan for the District approval in its sole discretion;
- (iv) Approval of the Conversion Work Plan is a Condition Precedent to the first NTP3.
- (v) The Developer shall keep up-to-date and submit to the District updated Conversion Work Plan to reflect changes to the Lighting Asset Inventory and changes to the Project Schedule. Any changes to the Conversion Work Plan shall be incorporated in the Monthly Performance Reports, as described in Exhibit 17 of the Project Agreement.

2.5.2 Management & Staffing Plan

- (a) As part of the PMP, the Developer shall prepare, implement, manage, operate, and, as required, update a Management & Staffing Plan in accordance with this Section 2.5.3 of the Technical Provisions. The Management & Staffing Plan shall:

- (i) Present organizational charts identifying Key Personnel, supervisory personnel and other appropriate discipline leadership personnel, with well-defined roles that respond to the requirements of the Agreement, including for Design Work, Construction Work, Asset Management Work and Handback Work, respectively, and show clear lines of responsibility.
 - (ii) Include a detailed narrative describing the reporting structure, roles, responsibilities, authority, qualifications and experience of each member of the Developer team;
 - (iii) Include a detailed narrative describing how the various organizations within the Developer and Developer-Related Entities will be interlinked and managed
 - (iv) Provide details of the management structure and management systems that shall be used to deliver the Design Work, Construction Work, Asset Management Work and Handback Work and achieve the whole life cost and schedule commitments of the Developer
 - (v) Include details of the interface protocols and systems Developer shall utilize to report to and interact with the District, Third Parties, and the public.
- (b) The Developer shall provide a directory showing all Key Personnel, supervisory personnel and other appropriate discipline leadership personnel identified by function within 21 Calendar Day of NTP1. The directory shall be updated throughout the course of the Project to remain current. The directory shall be submitted in electronic format and shall include the following information for each person listed:
- (i) Project title
 - (ii) Area of responsibility
 - (iii) Email address
 - (iv) Mobile telephone number
 - (v) Office information
 - (vi) Location/address
 - (vii) Main office telephone number

2.5.3 Quality Management Plan

- (a) As part of the PMP, the Developer shall develop and implement a comprehensive Quality Management Plan (QMP) to ensure compliance with the Project Documents and meet the requirements set forth in Section 2.2 of the Technical Provisions, and to ensure the quality of all aspects of the Project and the Work, using a single quality management system, which covers all the activities of the Developer and the Developer-Related Entities.
- (b) The QMP shall contain a complete description of the quality policies and objectives that the Developer shall implement throughout its organization and in the execution of the Work.

The policy shall demonstrate Developer's commitment to implement and continually improve the quality management system for the Work.

- (c) The QMP shall be consistent with the preliminary QMP submitted with the Proposal and expand on the quality control procedures to verify, check, and review the quality of all Work and quality assurance procedures to confirm that the quality control procedures are being followed. The QMP is subject to the District's Approval at the District's sole discretion. Additionally, it shall be compliant with all referenced laws, manuals and publications and shall be a part of the Project Management Plan.
- (d) The QMP shall contain detailed procedures for Developer's quality control and quality assurance activities for the Project in accordance with the Project Documents. The Developer's quality process shall ensure that all Project Elements and each Project Bundle shall achieve the required level of quality throughout the Term and incorporate planned and systematic verifications and audits. The Developer shall conduct all quality control, quality assurance and performance verification in accordance with the QMP and the requirements of the Project Documents. The QMP shall be consistent with ISO 9001 and ISO 14001 standards for quality and environmental management systems.
- (e) The Developer shall revise its QMP when:
 - (i) Its own quality management organization detects a systemic or fundamental Nonconforming Work
 - (ii) Its own quality management organization detects a systemic issue with the manner the Work is inspected or tested; or
 - (iii) When the District advises the Developer of such a problem.
- (f) The QMP shall, at a minimum:
 - (i) Clearly outline the roles, rights, and responsibilities of the District and the Developer and the requirements of these Technical Provisions;
 - (ii) Include procedures to report, the status of, and the closeout of, all Nonconforming Work and Noncompliance Events throughout the Term. The QMP shall also include procedures for investigations and surveys undertaken by the Developer as part of the monitoring process; and
 - (iii) Encompass all Project Assets, Project Bundles, and all Work performed by the Developer and all Developer-Related Entities.
 - (iv) Describe the quality control procedures to be utilized to control, verify, check, and review the quality of all Work. In addition, the QMP shall include quality assurance procedures to confirm that the quality control procedures are being properly followed. The Developer shall describe how quality control procedures and quality assurance procedures are to be documented and by whom to verify that the required procedures are followed.

- (v) Contain detailed descriptions of the inspection and test plans, including the timing and frequency of testing, which Developer shall use to meet quality control and quality assurance requirements of the Work.
 - (vi) Set out how Developer shall make available all quality records to the District for review immediately upon request.
- (g) The Developer shall regularly maintain the QMP to contain current versions of the following information:
 - (i) The organizational chart that identifies all quality management personnel, their roles, authorities and line reporting relationships.
 - (ii) Description of the roles and responsibilities of all quality management personnel and those who have the authority to stop Work.
 - (iii) Identification of testing agencies, including information on each agency's capability to provide the specific services required for the Work, certifications held, equipment and location of laboratories for products produced both on and off the Project Site.
 - (iv) Resumes and certification for all quality management personnel.
- (h) The Quality Management personnel shall meet the requirements set forth in section 2.2.1 (e) of these Technical Requirements.
- (i) The Developer shall comply with the following:
 - (i) Determine the necessary competence and qualifications for all personnel performing Work affecting quality and ensure they are competent on the basis of appropriate education, training, skills, experience, and certifications.
 - (ii) Provide training to all personnel performing Work affecting quality to ensure they understand the relevance and importance of their activities, the expectations and requirements of their Work, and their specific roles and responsibilities.
 - (iii) Provide training, where necessary, to achieve necessary competence.
 - (iv) Maintain records of education, training, certifications, skills, and experience.
- (j) The QMP shall be revised when it is evident that Noncompliance with the Project Agreement and/or the PMP is not being properly identified, recorded, and corrected. Until the revised QMP is approved by DDOT, Developer will cease, at Developer's expense, all Work covered by the revised plan except for safety and environmental activities.
- (k) The QMP shall set out Developer's approach and schedule for internal audits. Developer shall undertake internal audits of Developer's and all Developer-Related Entities implementation and compliance with the PMP and Project Agreement at least once every three months from the date the PMP is approved by DDOT until Project Final Completion. Thereafter Developer shall undertake internal audits of Developer's and all Developer-Related Entities' implementation and

compliance with the PMP and Project Agreement at least once every six months until the end of Term. These audit requirements are the minimum that will be accepted by DDOT in the QMP. If DDOT through oversight of the quality management system determines that Developer audits are not ensuring compliance with the PMP and/or Project Agreement, DDOT shall have the right to require the audit frequency be increased to a minimum of once every two weeks from approval of the PMP until Final Completion and to a minimum of once a month from Final Completion to end of Term.

2.5.3.1 Design Quality Management Plan (DQMP)

- (a) The Developer shall prepare and submit to the District for review and approval a Design Quality Management Plan (DQMP) that describes its policies, procedures, and staffing to manage the quality of Design Work in accordance with the requirements of this Section 2.5.4.1.
- (b) The DQMP shall describe and include at a minimum the following general requirements:
 - (i) The quality control and quality review procedures for professional services products to ensure that appropriate quality requirements are specified and included in the professional services product and to control deviations from such requirements.
 - (ii) Specific quality control and quality review procedures, including all required forms and checklists, shall be specified for preparing, verifying and checking all professional services products to ensure that they are independently checked and back-checked in accordance with generally accepted engineering practices and the requirements of the Project Documents.
 - (iii) The designer and checker shall be clearly identified on the face of all final design documents. The DQMP shall also include specific procedures for verifying the professional services product along with any computer programs being used for such purposes. Design Documents shall be sealed, signed and dated by the Professional Engineer in responsible charge for that item, element, or phase of the Work.
 - (iv) Procedures shall be described for coordinating Design Work performed by different individuals or firms working in the same area, in adjacent areas, or on related tasks to ensure that conflicts, omissions or misalignments do not occur between drawings or between the drawings and the specifications. This shall also include the coordination of the review, approval, release, distribution and revision of documents involving such parties.
 - (v) Procedures shall: (i) ensure that Developer is familiar with all the provisions of the Project Documents concerning their respective responsibilities; (ii) provide for the education, training and certification, as appropriate, of personnel performing activities affecting or assessing the quality of the Work to assure that such personnel achieve and maintain reasonable proficiency; and (iii) ensure that the Work is performed according to the DQMP, generally accepted engineering practices and the Project Documents.
 - (vi) Procedures shall be established for meeting documentation requirements; the filing of design criteria, reports and notes, calculations, plans, specifications, schematics and supporting materials needed during the final design; and the specific responsibilities of personnel to satisfy these requirements. All Design Documents shall be maintained,

organized and indexed by the Developer and copies made available to the District upon request.

- (vii) Procedures and schedules shall be established for the Design Quality Control Manager (DQCM) to perform audits of the quality control procedures of the firms involved in the design of the Project under the DQMP; the dissemination of audit results and the addressing of audit findings.

2.5.3.2 Construction Quality Management Plan (CQMP)

- (a) The Developer shall prepare and submit to the District for review and approval a Construction Quality Management Plan (CQMP) that describes its policies, procedures, and staffing to manage the quality of Construction Work in accordance with the requirements of this Section 2.5.4.2.
- (b) The CQMP shall describe and include at a minimum the following general requirements:
 - (i) Methods and procedures that clearly define the distinction/authority/responsibility for the administration of Developer's CQMP.
 - (ii) Methods and procedures for performing daily field inspection of Construction Work and preparing a daily QC report to document the inspection performed. Include procedures for inspecting, checking, testing and documenting the Construction Work.
 - (iii) Methods and procedures to be utilized by the Developer to obtain active participation of the work force in quality control operations to achieve a quality Project; reporting forms to be used by the responsible quality control personnel shall be included.
 - (iv) A construction quality control organization and staffing plan. The period of time that the quality control staff member will be present on the site shall be shown, resumes of the Key Personnel shall be included, and the experience/knowledge/skill levels of the quality control support staff shall be provided in a matrix format to the District.
 - (v) Procedures for inspecting, checking, and documenting the Construction Work. Inspection, examinations and measurements shall be performed for each operation of the Construction Work to assure quality. The description of inspections should contain descriptions of the timing and frequency of all required testing. Additionally, a program for coordination of all inspection and testing with the inspections and tests of Governmental Entities and Utility Owners shall be included.
 - (vi) Procedures to ensure that all activities affecting the quality of the Construction Work are accomplished using appropriate equipment for the task being performed.
 - (vii) Procedures to ensure that the education, training, and certification of personnel performing CQMP activities are achieved and maintained and that all Construction Work is performed in accordance with the approved designs, plans, and specifications.
 - (viii) Documents specify that all activities undertaken by or on behalf of the Developer affecting the quality of the Work shall be prescribed and accomplished by documented instructions,

procedures, and appropriate drawings. Such instructions, procedures and drawings shall include quantitative and qualitative criteria to be used to determine compliance.

- (ix) Procedures for identification and control of materials, equipment, and Project Elements. These procedures shall be consistent with Good Industry Practice to ensure that identification of the Element is maintained by appropriate means, on the Element, whenever possible, to ensure that the identification is part of the Project records traceable to the material, equipment, or Element, as necessary, throughout fabrication (onsite and offsite), erection, installation and use of the material, equipment, or Element.
- (x) Measures to ensure that tools, gauges, instruments, and other measuring and testing devices used in activities affecting quality are properly maintained, controlled, calibrated, certified and adjusted at specified periods to maintain accuracy within industry standards.
- (xi) Procedures to indicate, by the use of markings such as stamps, tags, labels, routing cards, or other suitable means, the status of inspections and tests performed upon individual items of the Construction Work.
- (xii) A comprehensive system of planned and periodic audits of Developer's CQMP to determine adherence to and the effectiveness of the CQMP. Audits should be performed in accordance with the written procedures or checklists. Audit results shall be documented, reviewed, and acted upon by Developer. Follow-up action, including re-audit of deficient areas following corrective action, shall be taken.
- (xiii) The requirements and methods for controlling documents. Developer's document control system shall be compatible with the District's and in compliance with the Technical Provisions.
- (xiv) The form and distribution of certificates of compliance.
- (xv) In order to inspect the Construction Work and to perform independent quality assurance inspection, verification, sampling, testing and audit for compliance with the Project Documents, the Developer will provide to the District unrestricted entry at all times to such parts of the Project and facilities that concern the manufacture, fabrication (onsite and offsite), production, or testing. Performance by the District of such quality assurance, inspection, verification, sampling, testing and audit does not relieve Developer of any of its responsibility under the Project Documents and in particular its responsibility for the quality of the Construction Work.
- (xvi) Procedures for achieving substantial completion for each Project Bundle and Project Final Completion, including procedures to certify to the District that all Construction Work meets all acceptance criteria.

2.5.4 Public Information and Communication Plan

- (a) As part of the PMP, the Developer shall develop, implement, manage, operate, and, as required, update a Public Information and Communication Plan in accordance with Section 3.5 of the Technical Provisions.

2.5.5 Document and Data Management Plan

- (a) As part of the PMP, the Developer shall prepare, implement, manage, operate, and, as required, update a Document and Data Management Plan (DPMP). The DPMP shall set out the Developer's Document Management System for maintaining all records and documents associated with the Project. The Developer shall establish and maintain an electronic document control system to store, catalog, and promptly and conveniently retrieve all Project-related documents.
- (b) The Developer shall incorporate into the Document Management System any District data management system, which the District may require, and shall train the Developer personnel to operate any such data management system.
- (c) Developer's Document Management System shall be used by the Developer and all Developer-Related Entities. The Developer's Document Management System shall:
 - (i) Use data systems, software, standards, procedures, and formats compatible with those employed by the District and acceptable to the District and implement any new operating practices required as a result of the District's amendments to any such data systems, software, standards, procedures, and formats;
 - (ii) Provide for the secure transfer of data to the District;
 - (iii) Provide a mechanism for the electronic transfer of all data along with the associated portable document format (PDF) images for uploading into an Electronic Document Management System (EDMS) employed by the District;
 - (iv) Provide the District with procedures and software for accessing Developer's Document Management System and all Project-related documents as a component of Developer's obligations under Article 9 of the Project Agreement as well as the Developer's compliance with such system; and
 - (v) Provide the District staff with training in all systems used by the Developer.
- (d) All Project-related documents shall be electronically searchable and legible. In the DPMP, the Developer shall describe:
 - (i) Methods by which all Project-related documents shall be uniquely coded, stored and retrieved. The retrieval system shall allow for prompt, convenient retrieval of any Project-related document in a user friendly format;
 - (ii) The routing, filing, control and retrieval methods for all documents;
 - (iii) Methods to facilitate fast and convenient sharing of data including procedures and software for accessing all Project-related documents; and
 - (iv) Methods for production, checking, storage and retrieval of all documents and data that shall support records required to be submitted by the Developer to the District under the Project Agreement or any other Project-related records that the District requires.

- (e) To allow for disaster recovery, the Developer shall store all Project-related data and documents in a manner consistent with the Developer's EMDRP. The Developer shall retain such records until five years after the end of the Term. During such period, when requested by the District, the Developer shall provide the District with copies of such records. The Developer shall develop and implement a plan that enables back-up recovery of all Project Information if a server error occurs in the document management system and ensures that Project Information is at all times secure and retrievable for the District upon request until five years after the end of the Term.
- (f) Unless otherwise directed by the District, the Developer shall meet the requirements of Article 53 of the Project Agreement regarding confidentiality of Information.
- (g) Unless otherwise directed by the District, or indicated in the Contract Documents, retention of Project-related documents and records shall comply with the regulatory requirements for record retention (49 CFR 18.42). All Project-related documents and records shall be provided to the District at the end of the Term. Furthermore, the Developer shall retain such Project-related documents, records and data until five years after the end of the Term. During such period, when required by the District, the Developer shall provide the District copies of such records. As part of the PMP, the Developer shall establish, implement, populate, manage, maintain, and, as required, update a DPMP, per the requirements of this Section.

2.5.6 Emergency Management and Disaster Recovery Plan

- (a) As part of the PMP, the Developer shall prepare, implement, manage, operate, and, as required, update an Emergency Management and Disaster Recovery Plan (EMDRP). The EMDRP shall set out the Developer's systems and procedures for limiting disruption to the operation of the Project and protecting documents and data in case of disaster, and promptly restore operation of the Project post-disaster.
- (b) The Developer's EMDRP shall:
 - (i) Identify relevant systems and their level of criticality to continuing operation of the Project;
 - (ii) Categorize the different types of data according to their criticality;
 - (iii) Identify the levels of redundancy, security, verification and any other precautions required to protect and restore critical systems;
 - (iv) Describe the level of redundancy/backups required for each type of data including, but not limited to:
 - (a) Frequency/schedule;
 - (b) Retention periods;
 - (c) Location;
 - (d) Verification;
 - (e) Levels of physical and electronic security; and

- (v) Identify potential disaster and major hazards to the Project and Developer's actions and procedures in response to each to restore Project operation after such event.
- (c) Developer shall provide District staff with training in the relevant disaster recovery procedures and systems utilized by the Developer.
- (d) The Developer shall submit and keep updated at all times the telephone numbers and names of personnel designated to be contacted in cases of Emergencies, including at a minimum the Emergency Supervisor and the Hazardous Materials Manager, along with a description of the Project locations to the District and all other local law enforcement agencies.
- (e) The personnel designated to meet the functions of the Emergency Supervisor and the Hazardous Materials Manager shall be available at or near any Project Site where Conversion Work or Construction Work takes place, on a 24/7 basis from NTP3 until Project Final Completion.

2.5.7 Hazardous Material Operations, Safety and Health Plan

- (a) The Developer shall be responsible for remediation of lead paint on Poles and asbestos in Lighting Units.
- (b) Detail on the Developer's responsibilities for remediation of lead paint on Poles and asbestos in Lighting Units can be found in Section 10.6.5 of these Technical Provisions.
- (c) The Developer shall follow the guidelines on Hazardous Materials set forth in section 13 of the Project Agreement.
- (d) The Developer shall comply with District standards and requirements as stipulated in the District of Columbia Department of Transportation Standard Specifications for Highways and Structures. The Developer shall adhere to District publication requirements for in-kind replacements.
- (e) The Developer shall be responsible for the safety of its personnel and of the general public affected by the Project.
- (f) As a part of the PMP, the Developer shall prepare, implement, manage, operate, and, as required, update a Hazardous Material Operations, Safety and Health Plan (HMOSHP) that complies with all applicable Law and Good Industry Practice. The plan shall cover all aspects of the Work and shall include details of the training to be provided by Developer, relevant District personnel, and third parties required by their duties to visit the Project or facilities to be used in connection with the Work and Project including, but not limited to, facilities for the production of materials or equipment.
- (g) The plan shall fully describe the Developer's policies, plans, training programs, Work site controls, and Incident Response plans to ensure the health and safety of personnel involved in the Project and the general public affected by the Project during the Term.
- (h) Developer's HMOSHP shall address the management of hazardous material as required per the Requirements set forth in Appendix 13.1 of the Technical Provisions as well as those requirements outlined in section 10 of the Technical Provisions.

- (i) All Developer personnel involved with Conversion Work and Construction Work shall be appropriately trained in the handling and containment of Hazardous Material and in occupational health and safety rules and processes identified in the HMOSHP.
- (j) All Developer personnel handling Hazardous Material shall have appropriate certifications.

2.5.8 Waste Management Plan

- (a) The Developer shall prepare a Waste Management Plan (WMP) for the safe handling, storage, treatment and/or disposal of Hazardous Materials, hazardous waste, non-hazardous waste, contaminated soil and clean fill whether encountered or brought onto the Project Site by a third party, or otherwise, during the Term to ensure a safe working environment for personnel and visitors. The Developer shall submit the final Waste Management Plan to the District for approval within thirty Days of NTP1; approval of the WMP by the District shall be a condition of NTP2.
- (b) The Waste Management Plan shall include procedures compliant with all Applicable Laws and include, at a minimum:
 - (i) For all chemicals to be used on the Project, the Developer shall keep and update Safety Data Sheets (SDS), per Occupational Safety and Health Administration (OSHA) requirements, for the Term.
 - (ii) Designated individuals responsible for implementation of the plan,
 - (iii) Procedures for identifying and documenting potential contaminated sites which might impact Project development,
 - (iv) Procedures for mitigation of known contaminated sites anticipated to impact construction,
 - (v) Procedures for mitigation of unanticipated contaminated sites encountered during construction,
 - (vi) Procedures for mitigation of contamination during Work,
 - (vii) Procedures for developing a detailed Spill Response Plan for the Term,
 - (viii) Process for training personnel for responding to and mitigating Incidents involving contamination or waste
 - (ix) Provisions for appropriate storage and disposal of all waste encountered or disposed of on the Project for the Term; and
 - (x) Identification and contact information for designated responsible individuals.
- (c) The WMP shall include provisions for making all on-site workers aware of and able to recognize the potential Hazardous Materials to which they may be exposed, limiting Project Site workers' and the surrounding public's exposure to Hazardous Materials and providing all necessary personal protection equipment to protect workers from exposure. The WMP shall require the Developer to provide any personnel who visit the Project with the appropriate personal protection equipment.

- (d) The WMP shall require that all Developer personnel handling Hazardous Materials be trained and certified at least to the minimum requirements established under the current guidelines of OSHA 1910.120.
- (e) Further, the WMP shall include procedures for ensuring that all applicable certifications, licenses, authorizations and Governmental Approvals for Developer personnel handling Hazardous Materials are current and valid through the duration of the Work.

2.5.9 Investigative Work Plans and Site Investigation Reports

- (a) If wastes or contamination are encountered within the Project Site, the Developer shall prepare an investigative work plan (IWP) that addresses the methods, techniques, and analytical testing requirements to adequately characterize the extent of the contaminated media (soil and/or groundwater) potentially impacting the Project. The Developer shall locate and assess the likely source of contamination.
- (b) A Professional Engineer and other qualified professionals, as needed, shall prepare the IWP and other necessary reports in accordance with Applicable Laws and District guidance.
- (c) Upon satisfactorily completing the investigative work, the Developer shall summarize the findings within a Site Investigation Report (SIR) and make recommendations regarding potential response actions necessary for Project development. The Developer shall take Hazardous Materials contamination and all waste management considerations into account during all subsequent phases of Project development, including additional properties negotiation and acquisition, property management, design, and construction.
- (d) The SIR shall address the characterization of the impacted area; sampling efforts and findings; opportunities to avoid the contamination by adjusting the design; level of response action warranted if the contamination cannot be avoided; feasibility of initiating response actions prior to construction; pursuit of cost-reimbursement from responsible parties; and the need for completing response actions concurrent with construction and nature of any special specifications and provisions necessary for incorporation into the Project.
- (e) The Developer may initiate a preventative or corrective action after District review and approval of the Site Investigation Report from appropriate Federal or State agencies.

2.5.10 Comprehensive Environmental Protection Plan (CEPP)

- (a) As part of the PMP, the Developer shall develop, implement, manage, operate, and, as required, update a Comprehensive Environmental Protection Plan in accordance with section 4 of these Technical Provisions.

2.5.11 Transportation Management Plan

- (a) As part of the PMP, the Developer shall develop, implement, manage, operate, and, as required, update a Transportation Management Plan in accordance with Section 11.2 of the Technical Provisions.

2.5.12 Historical and Architectural Preservation Plan

- (a) As part of the PMP, the Developer shall develop, implement, manage, operate, and, as required, update a Historical and Architectural Preservation Plan in accordance with the historic and architectural preservation requirements set forth by the Federal Highway Administration, State Historic Preservation Act, National Capital Planning Commission, and Commission of Fine Arts. The
- (b) The Section 106 Consultation for the Citywide Light Emitting Diode (LED) Streetlight Replacement Project can be referenced in Appendix 13.2(f).

2.5.13 Asset Management Plan

- (a) As part of the PMP, the Developer shall develop, implement, manage, operate, and, as required, update an Asset Management Plan to meet the requirements set forth in Section 10.8 of the Technical Provisions.

2.5.14 Utility Work and Coordination Plan

- (a) As part of the PMP, the Developer shall develop, implement, manage, operate, and, as required, update a Utility Work and Coordination Plan that identifies the effect of the Work on agreements the District has with third parties and the Developer's plans to coordinate the Work with all affected third parties, whether the District has explicit agreements with such third parties or not, in accordance with Section 5 of the Technical Provisions.

2.6 Deliverables

- (a) The Developer shall submit at a minimum the following Submittals to the District in accordance with Section 2 of the Technical Provisions:
 - (i) Project Baseline Schedule for approval no later than 30 days after NTP1 (and if resubmitted, approved no later than 90 days after NTP1);
 - (ii) Project Baseline Schedule narrative report for approval as part of the Project Baseline Schedule;
 - (iii) updated Project Baseline Schedule (PBS-2) for approval within 14 days of NTP2;
 - (iv) updated Project Baseline Schedule (PBS-3) for approval within 14 days of NTP3;
 - (v) Revised Project Baseline Schedule for approval within 14 days of each Change Order, Relief Event or Compensation Event;
 - (vi) Monthly Project Status Schedule Updates for review and comment no later than the fifth day of each month following the Commercial Closing Date as part of the monthly Progress Report;
 - (vii) Project Status Schedule updates narrative report for review and comment as part of the Monthly Project Status Schedule Updates;
 - (viii) Time-scaled network diagram for review on at least a monthly basis as part of any Project Status Schedule Updates;

- (ix) Narrative report for review and comment as part of the Project Baseline Schedule Updates;
- (x) Monthly Progress Report for review and comment no later than the fifth day of each month following the Commercial Closing Date;
- (xi) As-Built Schedule for approval at Substantial Completion of each Project Bundle;
- (xii) As-Built Project Schedule for approval at Project Final Completion;
- (xiii) Recovery Schedule for approval as part of the Project Status Schedule Updates when Work is delayed on any Critical Path item for a period exceeding the greater of either 30 days in the aggregate or that number of days in the aggregate equal to five percent of the days remaining until Project Final Completion;
- (xiv) Time Impact Analysis (TIA) narrative report and schedule layouts for District approval, as defined in Exhibit 1 of the Project Agreement;
- (xv) PMP for approval within 90 days of NTP1;
- (xvi) Conversion Work Plan as part of the PMP within 60 days before the scheduled date of the first NTP3;
- (xvii) Method and criteria for identifying Project Bundles and the grouping of Lighting Units into Project Bundles for review at least 15 days prior to submittal of the Conversion Work Plan;
- (xviii) Investigative Work Plan (IWP) for review if waste or contamination is encountered within the Project Site;
- (xix) Site Investigation Report (SIR) for review upon satisfactory completion of the investigative work if waste or contamination is encountered within the Project Site;
- (xx) internal audits every three months after PMP approval and results within seven days;
- (xxi) Nonconforming Work reports upon issuance and upon resolution with corrective action plan or corrective action;
- (xxii) Monthly quality report of the quality reviews, inspections and tests performed, results of such reviews, inspections and tests, and occurrence and resolution of Nonconforming Work discoveries, to be submitted with each Monthly Progress Report during the Construction Period and with the Asset Management Monthly Report following the Construction Periods;
- (xxiii) Copy of any or all quality reports immediately upon the District's request;
- (xxiv) WBS for approval as a condition precedent to NTP1;
- (xxv) Weekly planning schedule (two-week look ahead) no later than 24 hours before the weekly D&C meeting;
- (xxvi) Weekly memo of the previous week's activity and reconciliation to the prior week's look ahead planning schedule no later than 24 hours before the weekly D&C meeting;

- (xxvii) Land survey records and reports for review and comment within 60 days of survey;
 - (xxviii) Utility Work Plan for review and comment 45 days prior to commencing Utility Adjustment Plans;
 - (xxix) Monthly look ahead of the activities, including details of planned traffic management measures and lane Closures, prior to each monthly progress meeting after NPT1;
 - (xxx) Meeting Notice to the District no less than three days prior to any meetings required by the Project Agreement or otherwise requested by the District;
 - (xxxi) Meeting schedules and agendas to all meeting invitees at least 24 hours prior to the meeting required by the Project Agreement or otherwise requested by the District;
 - (xxxii) Meeting minutes for review and comment commencing within three days following any meeting required by the Project Agreement or otherwise requested by the District;
 - (xxxiii) Certificate of Compliance prior to the use of any materials;
 - (xxxiv) Draft As-Built Records Plans for review and comment within 90 days of Substantial Completion of each Project Bundle;
 - (xxxv) Amended As-Built Records Plans for review and comment within 45 days of Project Final Completion;
 - (xxxvi) Emergency contact name and telephone numbers prior to NTP2;
 - (xxxvii) Corrected names and telephone numbers of Emergency contacts within seven days of change;
 - (xxxviii) Directory of all Key Personnel, supervisory personnel, and other appropriate discipline leadership personnel within 21 calendar days of NTP1;and
 - (xxxix) Notification and justification (including proposed substitutions) of any changes to Key Personnel within 30 calendar days prior to diverting Key Personnel;
- (b) Under no circumstances is this list of Submittals to be construed as exhaustive and the Developer shall be solely responsible for meeting any and all Submittal requirements of the Technical Provisions and the Project Agreement.

3 PUBLIC INFORMATION AND COMMUNICATION

The Developer shall administer, coordinate, and manage Public Information and Communication in accordance with this Section 3 of the Technical Provisions and the applicable provisions of the Project Agreement.

3.1 General

- (a) The District will be the primary party in charge of media relations, public outreach, and communication.
- (b) The Developer shall assist with all public information, communities and public outreach, media relations and Project marketing Work in accordance with the requirements of this Section 3 of the Technical Provisions and the Project Agreement.
- (c) The Developer shall keep all information it obtains relating to any employee or customer of the District in absolute confidence and shall not use it in connection with any other matters, nor shall the Developer disclose the information to any other person, firm, or corporation, in accordance with the District and Federal laws governing the confidentiality of records.

3.1.1 Stakeholder Outreach

- (a) The Developer shall undertake the Work to ensure the Developer builds and maintains an effective working relationship with all stakeholders in the Project. The Developer shall establish procedures to assure that stakeholders are provided thorough and accurate information about the Project in a timely manner. The Developer shall:
 - (i) Maintain a comprehensive stakeholder database to track and manage stakeholder communication;
 - (ii) Develop and implement a proactive program of stakeholder engagement to brief local stakeholders on the Project's progress, features and benefits;
 - (iii) Afford stakeholders the opportunity to provide feedback to Project planning and development, including through the streetlight advisory panel and ANC meetings;
 - (iv) Develop tailored marketing and communication material for relevant stakeholder groups;
 - (v) Establish ongoing mechanisms for stakeholder information and feedback during the Project's operational phase, including communications surrounding enforcement technologies and strategies; and
 - (vi) Establish partnerships with local groups and organizations where there is mutual benefit in supporting the Project.

3.1.2 Interface and Liaison with District

- (a) The Developer shall provide a public Communication Manager to implement the requirements of the public Information and Communication Plan. The public Communication Manager shall assist the District with communications, public outreach, media relations, public information, third party and stakeholder communication and marketing. The Developer shall include public

information and communication protocols for coordination between the Developer and the District, third party stakeholders and the general public including the public in the PICP. These protocols shall detail:

- (i) Public outreach – processes and responsibility for public outreach materials, communication and information sharing with the surrounding public and potential users of the facility;
 - (ii) Stakeholder relations – processes and responsibility for briefing and/or providing information to parties identified by the Developer that have an interest in the Project. The Developer shall also include any stakeholders identified to the Developer by the District;
 - (iii) Procedure for District review of information required by public Information Plan and Communication Plan;
 - (iv) Incident and Emergency management - processes and responsibility for managing communication with surrounding emergency management and recovery operations and authorities;
 - (v) Media – processes for providing information to the District for media relations and response to comments on particular aspects or phases of the Project; and
 - (vi) Marketing - process and responsibility for marketing facility.
- (b) The Developer shall provide a representative for all meetings related to the Project to which community groups have been invited.
- (c) The Developer shall submit all communications and marketing strategies to the District for approval at least 45 days before implementation of such strategies except as otherwise provided in the public Information and Communication Plan and the Technical Provisions. The Developer shall provide the District with advance copies of all communications materials for their approval at least 45 days prior to dissemination. Communication in response to an Incident or Emergency shall be submitted by the Developer to the District for approval in accordance with the approved public Information and Communication Plan.
- (d) The Developer shall not use the District's logos and brands on any communication without the prior written approval of the District. The Project 'brand' material shall be submitted to the District for approval no less than 45 days prior to the initial use.

3.2 Public Information

- (a) The Developer shall undertake the Work to provide the public with information about the Project: The Developer shall:
- (i) Attend and provide updates at the streetlight advisory panel
 - (ii) Post information on streetlight Poles within the respective ANCs 30 days prior to planned Work

- (iii) As per section 2.3.1(j)(iv) of these Technical Provisions, hang door hangers and, for multi-tenant buildings, provide materials to property managers.
- (iv) Send notices to ANCs 45 days prior to planned Work.
- (v) Coordinate with the District to develop a project webpage hosted by the District. For the avoidance of doubt, the Developer shall be responsible for providing information and coordination.
- (vi) Provide information to motorists and stakeholders to facilitate the maintenance of traffic (MOT) during ongoing maintenance activities. This will include:
 - i. Packaging of all MOT information, such as anticipated delays and lane Closures on a regular basis, to facilitate communication to the media, stakeholders and the broader community; and
 - ii. Communicate with residents and property owners impacted by MOT activities.
- (vii) Inform motorists and the broader community about expected traffic changes and/or delays.

3.3 Media Relations

- (a) The Developer shall act in the best interests of the Project, the public and motorists in assisting the District to build and maintain relationships with the media. The public Communication Manager shall put processes in place to ensure compliance with the Project Agreements and close coordination with the District on media outreach activities, issues and responses and promote consistency with the public Information and Communication Plan. Developer shall:
 - (i) Include in public Information and Communication Plan media protocols governing responsibilities and reporting in relation to contact with the media, including guidelines for information sharing, policies to promote consistent messages, and procedures specific to managing emergencies and Incidents;
 - (ii) Proactively build and maintain relationships with local media;
 - (iii) Provide relevant Project information and press releases to the media in a timely fashion after approval is obtained from the District;
 - (iv) Monitor all media coverage of the Project; and
 - (v) Provide copies of all press releases or other media materials, to the District for approval in advance of distribution in accordance with the public Information and Communication Plan and this Section 3.3 of the Technical Provisions.

3.3.1 Project Website

- (a) The Developer shall coordinate with the District to develop a project webpage or webpages to be hosted by the District that reflects the current status of the Project and shall be accessible for the general public starting 30 days before NTP2 through the Term. The Developer shall provide webpage copy to the District for review and comment a minimum of 45 days prior to posting new

information except in Emergency situations or to accommodate the communication of live traffic conditions to the public. The webpages shall at a minimum contain a graphical Project overview and description, contact information, plan of Work for the coming months, overall Project Schedule (on a quarterly level at a minimum), frequently asked questions and responses, and updated Project photos. The webpages shall reflect Best Industry Practices and be at a minimum, updated weekly throughout the duration of the Construction Period.

- (b) No less than 120 days prior to Substantial Completion of the first Project Bundle and for the remainder of the Term, the webpages shall include information in accordance with the Developer's public Education and Awareness Program, up-to-date information on Closures and detours, and other information as required by the Project Agreements.

3.3.2 Social Media

- (a) The Developer may use new media, such as Twitter and Facebook among others, to distribute information and provide updates at least at the same frequency as the Project website is updated. If the Developer uses new media, the Developer shall include the procedure for coordination of communication with the District in the Public Information and Communication Plan, per Section 3.5 of the Technical Provisions. The Developer shall follow District records retention and IT security policies and Laws.

3.4 Project Marketing

3.4.1 Project Branding

- (a) The Developer shall develop and provide to the District for approval communication templates for the Project including but not limited to templates for written communication, presentations and other handout materials that shall be part of the uniform Project 'brand.'

3.4.2 Marketing Activities

- (a) The Developer shall design communication, marketing and public outreach activities to respond to the issues, attitudes and attributes of the communities and market segments relevant to the Project.
- (b) The Developer shall not assume that the District will perform any portion of the Work and the District does not commit to perform any portion of the Work required by this Section 3 of the Technical Provisions.

3.5 Public Information and Communication Plan

- (a) The Developer shall maintain an open dialogue with the communities immediately surrounding the Project with the objective of building a long-term relationship based on trust and respect.
- (b) The Developer shall develop and implement a public Information and Communication Plan consistent with this Section 3 of the Technical Provisions. The Developer's Public Information and Communication Plan will form the basis for all communication activities during the Term. The Public Information and Communication Plan shall:

- (i) Provide an effective framework for communication between the Developer and stakeholders;
 - (ii) Effectively engage the community in the design, construction and operation of the Project;
 - (iii) Build a strong and enduring relationship with stakeholders and the community within the Project catchments over the life of the Project;
 - (iv) Develop a strong and enduring brand relationship between the community, Project drivers and the owners and operators of the Project;
 - (v) Maximize public awareness of the benefits of the Project;
 - (vi) Make use of current media, such as social media, and a Project website.
- (c) The Developer's public Information and Communication Plan shall provide a detailed outline of communication tools and strategies to be employed during each phase of the Project development, delivery, and operation, including the matters listed above. The plan shall also include the development of a crisis communications plan and procedures, addressing coordination with the District and responsiveness to the media as well as provide the public with a point of contact and a telephone number for questions and concerns during the Project.
- (d) The Developer shall update the public Information and Communication Plan annually and submit such plan to the District for approval no less than thirty days prior to the anniversary of the approval of the approved public Information and Communication Plan.

3.6 Deliverables

- (a) The Developer shall submit at a minimum the following Submittals to the District in accordance with this Section 2 of the Technical Provisions:
- (i) Protocols and procedures for public outreach, stakeholder relations, Emergency management, media, and marketing for review and comment within 90 days after NTP1;
 - (ii) All communications and marketing strategies for approval at least 45 days before implementation of such strategies;
 - (iii) All communications materials for approval at least 45 days, or as otherwise approved, prior to dissemination;
 - (iv) Updated public Information and Communication Plan annually for review and comment 45 days prior to Plan anniversary;
 - (v) Webpage copy for review and comment a minimum of 45 days prior to posting; and
 - (vi) Project "brand" material for approval 45 days prior to the initial use.

- (b) Under no circumstances is this list of Submittals to be construed as exhaustive and the Developer shall be solely responsible for meeting any and all Submittal requirements of the Technical Provisions and the Project Agreements.

4 ENVIRONMENTAL MANAGEMENT

The Developer shall perform all environmental compliance, protection, mitigation, and management Work in accordance with this Section 4 of the Technical Provisions and with the applicable provisions of the Project Agreement.

4.1 General

- (a) The Developer shall adhere to the mandatory specifications, standards, manuals and guidelines listed in Appendix 13.2 of the Technical Provisions;
- (b) In the case that Work requires storm water pollution prevention, the Developer shall adhere to the mandatory specifications, standards, manuals and guidelines listed in Appendix 13.2 of the Technical Provisions;
- (c) The Developer shall comply with the NEPA Document as stated in section 10.5 of the Project agreement; and
- (d) The Developer shall adhere to requirements related to Hazardous Materials as stated in these Technical Provisions and section 13 of the Project Agreement.

5 THIRD PARTY AGREEMENTS AND COORDINATION

The Developer shall coordinate all Work related to third party coordination in accordance with this Section 5 of the Technical Provisions and with the applicable provisions of the Project Agreement.

5.1 General

- (a) The Developer also shall coordinate with other right-of-way owners, utilities, and others that may be affected by the Developer's Work, including Pepco, Verizon, DC Water, and Washington Gas.
- (b) The Developer shall be responsible for obtaining all necessary authorizations and otherwise coordinating with the National Park Service (NPS) or other affected government agency, local utilities, communications companies, businesses, or residents, or any other public or private entity on whose systems or property its work under this contract may have an impact.
- (c) The Developer shall perform all third party coordination Work in accordance with the requirements of this Section 5 of the Technical Provisions and the Project Agreement. The District currently has agreements with third parties that may affect the Developer's Work.
- (d) The Developer shall coordinate the Work with all affected third parties, whether the District has explicit agreements with such third parties or not.
- (e) For any component of Work, which potentially or actually impacts the assets of any Governmental Entity or third party entity, the Developer's Work shall conform to the design and construction requirements of such entity.

5.2 Existing Third Party Agreements

- (a) The District currently has agreements with third parties ,including Pepco and Verizon, that may affect the Developer's Work. The Developer's Work shall comply with the terms of such third party agreements. In particular, the Developer's Design Documents for the Project shall comply with the terms of the third party agreements.
- (b) Before initiating communications with third parties with whom the District has third party agreements, as may be necessary to perform the Work, the Developer shall seek and obtain approval from the District with respect to communication protocol with such third parties. The District will approve the Developer's communication protocol with such third parties within 7 days of the Developer's request.
- (c) In accordance with the District's approval of such communication protocol, the Developer shall contact each third party with whom the District has third party agreements, provide information regarding the proposed Work as may be required for coordination with such third party regarding the impact of the Work on the terms of their agreement with the District. The Developer shall provide the District 5 days' notice of meetings with third parties related to such agreements.
- (d) In accordance with the District's approval of communication protocol, the Developer shall initiate third party reviews of the Developer's Design Documents, plans, processes, procedures and methodologies whether for permanent Work and the Developer shall incorporate and make

such amendments to such designs, plans, processes, procedures, and methodologies as required to address third party comments.

- (i) A summary of the current protocols with Pepco and the District and its agent can be referenced in Appendix 13.12.
- (e) When the Developer provides the District with Submittals, the Developer shall include with each Design Document Submittal a report identifying the impact of the Work on third parties under each third party agreement. The report shall include details of the impact, the mitigation and the terms and conditions in the third party agreement covering the Work proposed by the Developer including any financial implications and arrangements. The report shall also include copies of any correspondence between the Developer and the third party including minutes of any meetings between the Developer and the third party. This Submittal shall be in addition to the Submittal requirements elsewhere in the Technical Provisions. If the Developer's design affects the terms of existing agreements with third parties, the District may, at the District's sole discretion, enter into revised agreements with the third parties as necessary to effect the change.

5.3 Small Cell

- (a) In accordance with FCC regulations, the District allows permitting of Small Cell infrastructure (Small Cell) devices on select streetlights owned by the District. Like other utilities, Federal law allows Small Cell infrastructure equipment in the public right of way. The Developer is not responsible for Small Cell equipment and shall not perform any Work on Small Cell equipment. In the instance that the Work performed by the Developer will impact Small Cells, the District will coordinate directly with the impacted cellular providers, infrastructure providers, or other relevant impacted third parties. For more details related to the District's requirements and specifications for the placement and design of Small Cell infrastructure within the public right of way, as well as details related to the permitting of Small Cell infrastructure, please refer to the District's Small Cell Design Guidelines ([Volume III](#)) Answers to Small Cell frequently asked questions can be found on the District's [website](#).
- (b) There are currently three small cell providers actively pursuing attachments to DDOT Lighting Units. When attaching small cell equipment, small cell providers are required to replace the Pole with a stronger gauge steel Pole and larger Foundation to improve structural integrity. In the event that a Pole with small cell equipment falls down, either of the following outcomes may occur:
 - (i) If the small cell provider intends to keep their small cell equipment attached to the Pole at that location, the small cell provider is required to replace the Pole and is responsible for the cost.
 - (ii) If the small cell provider does not intend to reattach their small cell equipment, the Developer shall replace the Pole and Foundation, if necessary, with a DDOT standard Pole and Foundation. The occurrence shall be treated as a Knockdown.
- (c) In August 2020, the three small cell providers provided the below estimates of installations on metal Pole Lighting Units.

Year	Verizon	ATT	Crown Castle	Total
2020	200	150	150	500
2021	520	150	150	820
2022	280	150	150	580
2023	25	150	375	550
2024	25	150	375	550
2025	25	100	375	500
2026	25	100	375	500
2027	25	100	438	563
2028	25	100	437	562
2029	25	100	438	563
2030	25	100	437	562
2031	25	100	438	563
2032	25	100	437	562
2033	25	100	438	563
2034	25	100	437	562
Totals (2020-2034)	1,300	1,750	5,450	8,500

- (d) After installation of the small cell unit, the Developer shall reconnect the Lighting Unit to the RMCS. For avoidance of doubt, the Lighting Unit RMCS node shall be reconnected to the RMCS and backhaul communication enabled.
- (e) The Developer shall be responsible for inspection and acceptance of Lighting Units back into the Street Light Network in accordance with sections 10.10.1 and 10.10.2 of these Technical Provisions. Note the following considerations regarding the inspection and acceptance process:
 - (i) The Developer is responsible for inspecting the Lighting Units affixed with small cells at the expense of the small cell provider.
 - (ii) Inspection Work shall not be a part of the base contract. Any inspection Work shall be subject to a District Change with the small cell provider funding the Work.
 - (iii) Developer shall submit unit pricing for the cost of an inspection of a single Lighting Unit affixed with a small cell as per Form 11 of the ITP. For the avoidance of doubt, in this circumstance, each visit to inspect an affected Lighting Unit constitutes an inspection. This unit pricing will not be considered as part of the evaluation and will be subject to later agreement by the District via the change order process.
- (f) The District will share the designs for Poles that will bear small cell attachments once they are made available.
- (g) The District continues to update its requirements and specifications for the Small Cell infrastructure program. If additional updates are made to the District's Small Cell Design Guidelines or to any relevant policies, guidelines, or documents otherwise related to Small Cells,

the District will notify the Developer of these changes and will provide these documents to the Developer for reference.

5.4 Third Party Coordination – Parties excluding Pepco and Verizon

- (a) When there is no existing third party agreement and the Work potentially or actually impacts the assets of any Governmental Entity or third party entity, the Developer shall inform the District as soon as such potential or actual impacts are known to the Developer.
- (b) The Developer shall coordinate with third parties, including other utility owners, as necessary to perform Work.

5.5 Deliverables

- (i) The Developer shall submit at a minimum the following Submittals to the District in accordance with this Section 5 of the Technical Provisions:
 - (i) Plans identifying the effect of the Work on agreements the District has with the third parties for review and comment with plans as specified in Section 5 of the Technical Provisions;
- (ii) Under no circumstances is this list of Submittals to be construed as exhaustive and the Developer shall be solely responsible for meeting any and all Submittal requirements of the Technical Provisions and the Project Agreements.

6 PEPCO, VERIZON, AND DOMINION ENERGY WORK AND COORDINATION

The Developer shall perform all Work necessary to effect Utility Adjustment and coordinate with appropriate Utility Owners for all Utility Adjustments in accordance with the requirements of this Section 6 of the Technical Provisions and with the applicable provisions of the Project Agreement.

6.1 Required Items in Utility Assemblies

(a) Each Utility Assembly shall include the following:

- (i) Transmittal that briefly explains the need for the Adjustment(s) requesting approval and detailing any unique characteristics or information pertaining to the subject Utility Adjustment;
- (ii) Utility Adjustment Plans to include all necessary information requested by the affected utility in the format requested by the affected utility.

6.2 General

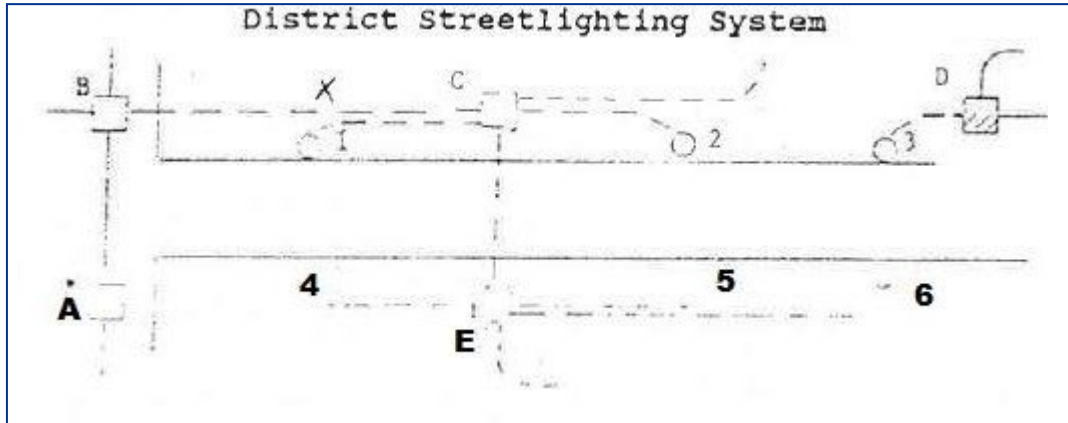
- (a) The Developer shall coordinate all necessary Utility Adjustments using established District processes and procedures whenever possible with regard to the administration of all utility related Work, including the exhibits referenced in this of the Technical Provisions, as may be amended or modified by the District, in its sole discretion. In some instances, the Developer will perform the Utility Adjustment Work, and in other instances, the Developer will manage Elements of the Utility Adjustment process, as described in further detail in this Section 6 of the Technical Provisions.
- (b) The Developer shall submit a Utility Work Plan complying with Section 2.5.15 of the Technical Provisions to the District for review and comment 30 days prior to commencing any Utility Adjustment. The Utility Work Plan shall establish the Developer's procedures and processes for adjusting utilities including coordination with Utility Owners and administration of all the Work associated with the Utility Adjustments. The Developer shall undertake all Utility Adjustment Work in accordance with the Utility Work Plan.
- (c) The Developer shall consider the Pole Ownership guidelines, as described in section 6.3, in performing Utility Adjustment Work.
- (d) A summary of the current protocols between Pepco and the District can be referenced in Appendix 13.12.

6.3 Ownership

- (a) When Pepco sold the streetlights, each light was connected to the nearest manhole for power. Maintaining these lights relied on entering Pepco manholes. DDOT started installing DDOT owned streetlight manholes around 2000. This was done under IPMD new construction projects, streetlight standalone projects as well as 3rd party developer initiated projects.
- (b) DDOT currently owns some of the manholes (feeding 5-10% of the lights), but Pepco has the vast majority of the manholes providing power to DC lights. Regarding the ownership of the cable: Pepco owns the manhole, main feeder and the tap to the streetlight cable. Details of the division

of ownership between the District and Pepco related to underground and overhead supplies are detailed in the 1978 agreement, found in the Appendix in Section 13.12 of the Technical Provisions.

6.3.1 Installation of a New Streetlight- General

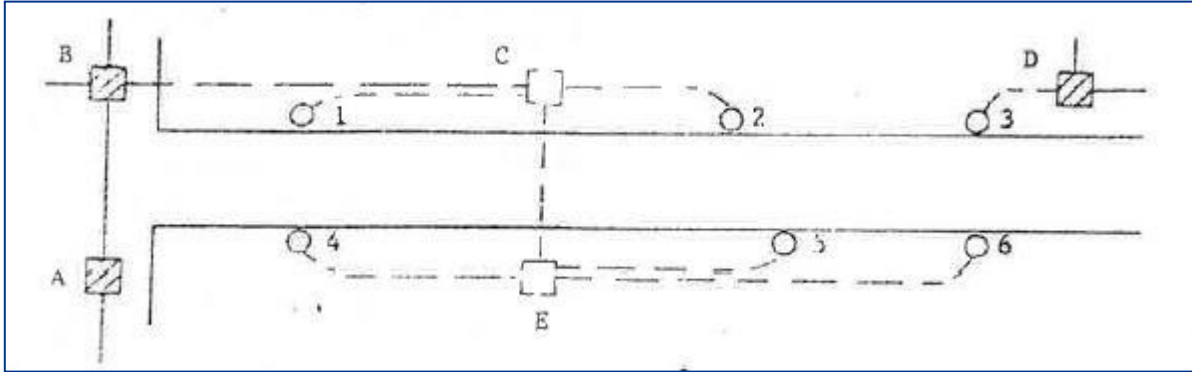


(a) Pepco Ownership

Under the conditions shown above, Pepco will own and maintain the following items:

- (i) **Manholes:** A, B, C, D and E. (A, B and D are existing manholes.) The size of the new manholes will be determined by Pepco.
- (ii) **Posts:** Streetlight posts 1, 2, 3, 4, 5, 6 (furnished by D.C.)
- (iii) **Streetlight Equipment:** All street light equipment is furnished and owned by D.C. (Luminaires, photo cells, ballasts, etc.)
- (iv) **Paving:** D.C. is responsible for the cost and installation of permanent resurfacing of cuts between 1-C, 2-C, 3-D, 4-E, 5-E, and 6-E.
- (v) **Cost:** D.C. is responsible for construction and maintenance costs for all of the items it owns including cable, conduit, foundation repairs and resurfacing.

6.3.2 Installation of a New Streetlight- Alleyways



(a) Pepco Ownership

Under the conditions shown above, Pepco will own and maintain the following items:

- (i) **Manholes:** A, B, and D.
- (ii) **Conduit:** A, B.
- (iii) **Posts:** Streetlight posts 1, 2, 3, 4, 5, 6 (furnished by D.C.)
- (iv) **Cables:** Primary and secondary cables between A and B, primary and secondary cables feeding into D.
- (v) **Transformers:** At A, B and D.
- (vi) **Switches:** At A, B and D.
- (vii) **Fuses:** At A, B and D.
- (viii) **Splices and Terminations:** Primary and secondary splices and terminations at A, B and D that are not dedicated to streetlight uses.

6.3.3 Dominion Energy considerations

- (a) While the vast majority of Street Light Units draw power from Pepco, Lighting Units on Key Bridge draw power from Dominion Energy.
- (b) The Developer shall coordinate with Dominion Energy as appropriate in order to conduct Work on Lighting Units on Key Bridge and ensure the proper function of Lighting Units on Key Bridge.

6.4 Utility Adjustment Work

- (c) With respect to wires, the Developer shall perform Utility Work, which generally includes:
 - (i) Repairing or replacing wire from the light to T-base;

- (ii) Repairing or replacing wire from the T-base to the manhole only when the wire is in a separate conduit than the traffic signal wires;
 - (iii) installing a separate conduit so that the wires no longer share conduit if Street Light Network wires are in the same conduit as traffic signal wires; and
 - (iv) Repairing or replacing the base door and access panel.
- (d) With respect to broken conduits, the Developer shall perform the following Utility Work:
- (i) Evaluating the extent of damage to the conduit;
 - (ii) Repairing the broken conduit with approved conduit making an approved electrical connection at both ends of the break; and
 - (iii) Replacing the conduit completely.
- (e) The Developer shall provide the District with a written notice as soon as a problem has been reported within the limits of a series circuit.

6.5 Utility Inventory

- (a) As the Developer encounters manholes through its Work, the Developer shall inventory manholes, including the GIS coordinates, and add to the ArcGIS asset inventory.

6.6 No-Current Coordination Requirements

- (a) Detail on the current protocols between Pepco and the District can be referenced in Appendix 13.12.
- (b) For situations in which there is no current to the streetlight(s), if the feed source to the affected lights on an included segment is beyond the defined project limits, it is still the responsibility of the Developer for this Project to make needed repairs. The Developer shall coordinate with the agency(s) responsible for the area before making the repairs.
- (c) For situations where there is no current at the pole and the feed source is in a Pepco manhole, the contractor shall coordinate with Pepco for repair (coordination with Pepco is not needed for manholes belonging to the District). The Developer shall account for fees associated with this Work as described in the Project Agreement.
- (d) Any information provided on inventory quantities and condition is for guidance only, and does not limit quantities of work or responsibility under the contract.
- (e) The Developer shall notify Pepco and Verizon if one of their Poles is leaning enough to pose a danger. The Developer shall also notify the District. Fixing the leaning Pole shall be the responsibility of the Pole owner, Pepco or Verizon.

6.7 Underground Damage Prevention

- (a) The Developer shall follow all applicable laws and regulations.

- (b) The Developer is required to protect underground utilities from damage that may be caused by activities conducted under this contract. The Developer is responsible for restitution of damage to public utilities in the Public Space. The Developer is responsible for determining what is underground. Reasonable precautions include, but are not limited to:
- (i) Contacting “Miss Utility” at an appropriate time before proceeding with excavation or demolition work;
 - (ii) Providing “Miss Utility” sufficient time to mark the location of underground utilities prior to commencing excavation or demolition activities;
 - (iii) Coordinating with PEPCO, Verizon, Washington Gas, DDOT, and others who may operate underground facilities; and
 - (iv) Ensuring that all Developer personnel performing excavation or demolition activities understand the requirements for underground damage prevention and have adequate training (certificate required) regarding underground damage prevention.
- (c) The below telephone numbers are provided for informational purposes only and may change. In addition to contacting Miss Utility, the Developer shall also contact the appropriate entities from the table:

<u>NAME</u>	<u>TELEPHONE NUMBER</u>	<u>FACILITIES</u>
Miss Utility for Wash. Gas and Light Co, Verizon, Pepco, AT&T	800-257-7777	Gas lines, telephone, electrical and communications conduits and cables
DC Water and Sewer Authority	202-673-6600 202-612-3400	Water mains and sewers
Washington Gas	800-428-5364	Gas lines
DDOT	202-698-3600	Fire alarm electrical systems
DDOT	202-671-1360	Street lighting inspection
DDOT	202-698-3600	Traffic signal systems & signal shop
GSA	472-9252,3&4	Steam piping, steam tunnel and Condenser water conduits

- (d) The contractor shall note that coordination with utilities may include payment, at the Developer’s expense, for access to utility property.

6.8 Utility Analysis and Utility Adjustment

- (a) The Developer shall initiate early coordination and meet with the Utility Owners with regard to all utilities affected by the Work. The Developer shall work to give Utility Owners an understanding of how and where the Project may affect their utility facilities. Using information obtained from Utility Owners, and otherwise as necessary, the Developer shall identify and verify location of all utilities, identify the utility type and corresponding Utility Owner. For all identified utilities, the Developer shall work with the Utility Owners to make an initial determination of whether 1) the utility is in conflict with other Project Work, and needs to be relocated, 2) the utility is not in conflict with other Project Work and can remain in place but requiring Protection in Place, or 3) the utility is not in conflict with other Project Work and can remain in place without requiring Protection in Place. Service connections are addressed separately in Section 1.1 of the Technical Provisions.
- (b) For all utilities requiring relocation, the Developer shall conduct the following Utility Adjustment processes:
 - (i) Conduct the Utility Analysis and Preliminary Routing (UAPR) processes listed in Section 6.7 of the Technical Provisions and make all required Submittals to the District;

6.9 Utility Work and Coordination Plan

- (a) The Developer shall submit a Utility Work and Coordination Plan in accordance with Section 6 of the Technical Provisions and the District of Columbia Department of Transportation Standard Specifications for Highways and Structures. The Plan shall set forth the Developer's general plan to coordinate all Utility Adjustment Work for the Project and include the following requirements:
 - (i) A description of the Developer's plan to identify and locate utilities;
 - (ii) A description of the Developer's plan to coordinate activities with each Utility Owner;
 - (iii) A description of the Developer's plan to coordinate activities with the Utility Owners on unknown or newly discovered utilities; and
 - (iv) A description of how the Developer shall either relocate or replace all affected utilities.

6.10 Deliverables

- (a) The Developer shall submit the following Submittals to the District in accordance with this Section 6 of the Technical Provisions:
 - (i) Utility Work and Coordination Plan for review and comment 30 Days prior to commencing Utility Adjustment Work;
 - (ii) Utility Assemblies for review and comment 45 days prior to Adjustment;
 - (iii) Evidence of Utility compensable Interest for approval 45 days prior to Adjustment;

- (iv) Letter regarding Utilities that can remain without Protection in Place prior to Construction Work at the location of such Utilities;
 - (v) Final Utility Analysis & Preliminary Routing Report for review and comment prior to submission of the Utility Assembly;
 - (vi) Utility Service Connections Plans for approval prior to utility service connection installation;
 - (vii) As-Built Record Plans of all Utility Adjustment Work performed by the Developer and/or Utility Owner within 30 days of completion of the Utility Adjustment;
- (a) Under no circumstances is this list of Submittals to be construed as exhaustive and The Developer shall be solely responsible for meeting any and all Submittal requirements of the Technical Provisions and the Project Agreements.

7 DESIGN, CONVERSION AND CONSTRUCTION REQUIREMENTS

The Developer shall execute the D&C Work in accordance with this Section 7 of the Technical Provisions, including the Guidelines, Manuals, Specifications, and Standards in Appendix 13.2 and Part C of the Project Agreement.

7.1 General

- (a) Where compatible for use for the Project, the Developer shall specify the District of Columbia Department of Transportation Standard Specifications for Highways and Structures and special provisions by direct reference to the applicable passage(s) or item.
- (b) Direct reference to the District of Columbia Department of Transportation Standard Specifications for Highways and Structures that provide options for materials, placement or processes must be supplemented by text that clearly delineates which options or values must be used.
- (c) Where compatible for use for the Project, the Developer shall specify The District of Columbia Lighting Fixture Specifications, September 2020 by direct reference to the applicable passage(s) or item.
- (d) Direct reference to the specify The District of Columbia Lighting Fixture Specifications, September 2020 that provide options for materials, placement or processes must be supplemented by text that clearly delineates which options or values must be used.
- (e) Any DDOT Standard plan sheets selected for use on the Project must be individually designated for such use through the responsible Professional Engineer's seal.
- (f) The Developer shall bring all Elements of the Lighting Network to the Minimum Acceptable Condition of Fair (numerical score 3) as described in the Performance Requirements for the Improved and Expanded Network in Appendix 13.1 and maintaining Elements at the Minimum Acceptable Condition for the duration of the Project Term.
 - a. Condition information for Elements, including photos, can be found at the following link:
<https://dcgis.maps.arcgis.com/apps/webappviewer/index.html?id=cc00ffaf6edc4cf6be6731e2343b209e>
- (g) Any Element of the Street Light Network requiring replacement shall be replaced in kind.
- (h) With the exception of the Project Elements existing as of the Setting Date and that shall remain part of the Project, unless approved in writing by the District prior to their use, the Developer shall not incorporate in the Street Light Network any used, reconditioned, or remanufactured materials, supplies or manufactured Elements, and the Developer shall only incorporate in the Work materials, supplies and manufactured Elements that are new, per Section 2.2.6.h of the Technical Provisions. The Developer shall submit cut sheets and manufacturer information for all Elements and Materials in the Project as part of the Project Design Submittal.
- (i) The Developer shall certify that all Elements and Materials in the Project Design Submittal follow these Technical Provisions, and the District Guidelines, Manuals, Specifications, and Standards.
- (j) The Developer shall submit Work Plans for Construction Bundles.

- (k) The Developer shall submit Redesign Design Submittals for Redesign Work, subject to District approval.

7.2 Design Documents

- (a) All Design Documents shall be prepared by or under the direct supervision of the Lead Design Firm in accordance with Good Industry Practice. All Design Documents shall be signed and sealed by Professional Engineers who are registered in the District of Columbia, in good standing, and in accordance with the Key Personnel requirements of the Project Agreement.
- (b) All Design Documents shall be developed and submitted in accordance with the Project Agreement, including these Technical Provisions, and the Project Management Plan, and in a format acceptable to the District and compatible with the District's systems and software.
- (c) All Design Documents submitted to the District shall include a certification by a Professional Engineer from the Lead Design Firm certifying that the Design Document complies with the Project Agreement, including these Technical Provisions, and the Project Management Plan. Such certification and the seal of the Professional Engineer shall be placed on the front page of the Design Document.
- (d) All Design Documents submitted after NTP2 shall be submitted to the District either as part of Developer's Design Manual (and updates thereof) or as part of the Developer's Project Bundle Submittals, for the District review, comment, approval or consent, as applicable.
- (e) The Developer shall utilize the following materials for development of the Design Documents:
 - (i) Specify The District of Columbia Lighting Fixture Specifications, September 2020
 - (ii) DDOT Standard Drawings, latest standard applies, which includes drawings for elements of the Existing Street Light Network.
 - (iii) District of Columbia Department of Transportation Design and Engineering Manual, latest standard applies.
- (f) Developer shall ensure that all draft, revised and final Submittals are accurate, complete, and in a form and level of detail that satisfies the District. These submittals include all supporting information necessary for or required by the District to conduct its full review. The Developer shall provide the District with electronic files with all Design Documents in a format acceptable to DDOT.
- (g) Submittals submitted to the District between NTP1 and NTP2 are Design Documents.
- (h) All Project Elements shown or referenced in Design Documents shall clearly display the unique identifier number in accordance with the Asset Inventory.

7.2.1 Street Light Improvements Design Manual

(a) General

The intent of the Design Manual is to provide a formal opportunity for DDOT and other Project stakeholders to review and comment upon the Developer's standard, prototypical designs and applicable design criteria for each Lighting Unit type before commencement of the Streetlight Improvements. The District does not require Design Documents for each individual Lighting Unit.

Rather, the Design Manual shall provide the standard, prototypical design information for each Element of the Street Light Improvements in their standard configuration and combination.

(b) Content for D&C Work

The Design Manual shall provide the standard design information for each type of Elements of the Streetlight Network known at the time of submittal and subject to D&C Work, including at a minimum:

- (i) ArcGIS database (or layer) linked to the Asset Inventory of Streetlight Improvements planned to achieve Project Final Completion, including geolocation of the Lighting Units and associated Work types,
- (ii) Developer's standard drawing plans fully describing the standard layout, illumination design, architectural design, and structural design for each type of Lighting Units and Elements thereof and linked to the ArcGIS database (or layer);
- (iii) The standard engineering specifications the Developer will use to ensure that the criteria established under the Design Requirements and the Technical Provisions are met;
- (iv) Engineering calculations and analyses for the planned Streetlight Improvements demonstrating how any of the Design Requirements will be met;
- (v) Prototypical, standard designs for each Lighting Unit type specifying the products, materials, equipment and/or systems to be used (including manufacturers' product specification sheets), and the applicable design criteria to be met;
- (vi) Manufacturers cut sheets and supporting manufacturer design information and specifications;
- (vii) Comprehensive list of products and materials to be utilized for the Street Light Improvements and Smart City Improvements and associated specifications; and
- (viii) Manufacturer(s)' details and contact information

(c) Content for AM Work

- (i) In addition to the content in Section 7.2, the Design Manual shall also include a comprehensive list and description for all materials to be used for AM Work and associated manufacturers details and contact information.

(d) Timing of Design Manual Submittal

- (i) The Design Manual, in draft, final form, and any update thereof, is a Non-Discretionary Submittal.
- (ii) The Developer is to begin development of the design Work to be incorporated in the Design Manual as part of Preliminary Work;
- (iii) Approval of the Design Manual is a condition precedent to issuance of the first NTP3

- (iv) The Design Manual shall be submitted in draft form at least 90 days before the scheduled date of the first NTP3 and in final form at least 30 days before the scheduled date of the first NTP3 per the Project Baseline Schedule.
- (v) The Developer shall update Design Manual as necessary to reflect new Element types as the Developer updates the Lighting Asset Inventory or as new Element types are added to the Streetlight Network, or otherwise as reasonably requested by the District. Each update of the Design Manual shall include the full and complete Design Manual along with a copy tracking changes to the prior version.

(e) Organization

The Design Manual shall contain two parts, one including the relevant content in Section 7 for D&C Work and one including the relevant content of Section 10 for Asset Management Work. For each part, the Design Manual shall be organized by type of Lighting Units and type of Elements following the same categorization as the Lighting Asset Inventory, and as may be reasonably requested by the District.

7.2.2 RMCS and AMIS Design Submittals

(a) General

The intent of the RMCS and AMIS design submittals are to provide the District with details related to overall general system layouts, configurations, interconnection of system programs, mapping of programs, data flow, report structures, control point monitoring and maintenance status and processes, and any other software/hardware details with the RMCS and AMIS design.

(b) Content for D&C Work

Submittals for the AMIS and RMCS include:

- (i) General system architecture, layout, and configuration.
- (ii) Hierarchy of software platform, application and data flow, and reporting structure (including cloud-based information and storage).
- (iii) System configuration for interconnection of various programs under the AMIS, including the RMCS, City Works, and ArcGIS.
- (iv) Layouts and locations for street light control nodes, gateways, WAPs, etc.
- (v) Manufacturer(s)' cut sheets and supporting manufacturer design information and specifications;
- (vi) Comprehensive list of products and materials to be utilized for the Street Light Improvements and Smart City Improvements and associated specifications.

(c) Timing of Design Submittal

A formal opportunity for DDOT and other Project stakeholders to review and comment upon the Developer's standard, prototypical designs and applicable design criteria related to the RMCS and AMIS design before commencement of the Streetlight Improvements is required. Because of this, RMCS and AMIS design submittal shall be submitted with the Design Manual so that the standard,

prototypical design information for each Element of the Street Light Improvements package can be reviewed in their standard configuration and combination.

(d) Organization

- (e) The RMCS and AMIS design submittals shall be part of the contents of the Design Manual, specifically a part of the contents of the D&C section.

7.2.3 Energy Management Submittals

(a) General

The Developer shall design, procure, install Fixtures, and dim Fixtures as appropriate to meet the lighting requirements described in section 7.3.1 of these Technical Provisions. The Developer shall propose dimming as part of the initial submittal to the District. Ultimately, the District will decide and control the dimming of Fixtures. If desired, the Developer can propose any recommended adjustments to dimming to the District for consideration.

(b) Content for D&C Work

- (i) The Developer shall provide projections of the monthly energy costs (including target energy usage in kWh and price), as developed for the Financial Model submitted to the District prior to Commercial and Financial Close, including the following information:
 - a. Monthly energy usage table for the following twelve months (reported in kW-hours) showing the calculated energy usage and the products, equipment and system assumptions used in the calculations;
 - b. Detailed schedule for the hours of operation and locations as provided by the District, rated wattage of Luminaires at operational levels, and any methods, scheduling or power management tools that will be employed to achieve the reported power usage; and
 - c. All assumptions used to generate the energy cost data reported in the Financial Model.

Timing of Design Submittal

- (i) No later than 30 days after submitting the Street Light Improvements Design Manual, the Developer shall submit projections of the monthly energy costs.
- (ii) The Developer shall update such projections every 3 months, on the first of the month following the initial Submittal to:
 - a. Reflect actual energy usage and costs over the preceding periods;
 - b. Revise the projections, if necessary; and
 - c. Explain and reconcile differences between the prior forecast and the actual data and between the prior forecast and the revised forecast.

(c) Organization

- (i) All data must be sufficiently detailed to provide a clear picture of the nature and magnitude of energy costs that can be reasonably expected in each month for the following twelve

months, and must clearly correlate to the data reported in the Financial Model. From such data, the Developer shall provide the quarterly energy reduction targets (in kWh).

7.2.4 Project Bundle Submittals

(a) General

The intent of the Project Bundle Submittals is to provide the District with the opportunity to review, comment and approve the Developer's detailed plan for the on-site delivery of Conversion Work or Construction Work as may be applicable, for a specific Project Bundle and a specific Project Site before commencement of such Work. The Project Bundle Submittal demonstrates the Conversion Work or Construction Work for a specific Project Bundle and specific Project Site meet the requirements of the Technical Provisions, Project Management Plan, Conversion Work Plan, and Project Schedule. Project Bundle Submittals shall be organized in a logical and consistent manner for each Project Site or as may be reasonably requested by the District.

(b) Content

Project Bundle Submittals shall provide the information necessary to demonstrate that the Developer's plan for the Conversion Work or Construction Work as may be applicable, for a specific Project Bundle and a specific Project Site meets the requirements of the Technical Provisions, the Project Management Plan and in particular the Conversion Work Plan, and the Project Schedule, including at a minimum:

- (i) The unique identification number of the Project Bundle in accordance with Section 1.5.5(f) of these Technical Provisions displayed on the cover page and on every page of the Submittal;
- (ii) The Developer's description of the Conversion Work or Construction Work at the Project Site in alignment with the Conversion Work Plan and Project Schedule at the Project Bundle level in Sections 2.5.1 and 2.3 of the Technical Provisions, respectively, to include a narrative, a map of the Project Site identifying its outer limits of the Project Site, location and type of the Lighting Units, type of Work to be performed within the Project Site;
- (iii) A checklist, evidence and certification from the Developer that the Developer has met all the Conditions Precedents to NTP3 per Section 16.3 of the Agreement respecting commencement of Work in the Public Space for such Project Bundle in such Project Site;
- (iv) Evidence the requirements of Section 3 of the Technical Provisions and the Developer's Public Information and Communication Plan prior to commencement of Work at a Project Site have been met, including in particular that proper notices to the public have been posted;
- (v) All appropriate Design Submittals respecting the Project Bundle including references to the appropriate sections of the Design Manual, manufacturer cut sheet and detailed equipment specifications], drawing plans showing temporary and permanent repairs of all surface cuts, with supporting design calculation, and materials information;
- (vi) Summary of results and supporting evidence and data documenting the Design Work performed by the Developer;

- (vii) For any Project Site where Developer requires to perform Construction Work, Developer shall provide a narrative accompanied by pictures, schematics, and other supporting data to explain the rationale for such Construction Work, along with the products of the Developer's Design Work in accordance with the District of Columbia Department of Transportation Standard Specifications for Highways and Structures and other applicable Guidelines, Manuals, Specifications, and Standards in Appendix 13.2;
 - (viii) A schedule for the Conversion Work or Construction Work at the Project Site, in accordance with Section 2.3 of the Technical Provisions, and showing at a minimum dates of notices sent to the public, NTP3, commencement of the Work at the Project Site, the scheduled date for Substantial Completion, and start and stop dates for major activities at the Project Site between NTP3 and Project Final Completion;
 - (ix) Evidence the requirements of Section 11 of the Technical Provisions and the Developer's Transportation Management Plan prior to commencement of Work at a Project Site have been met;
 - (x) Site-specific Traffic Control Plan in accordance with Section 11.3 of the Technical Provisions to describe the traffic control interventions, tactics, means, and methods respecting the Work to be performed at the Project Site and the Developer's Transportation Management Plan in accordance with Section 11.2 of the Technical Provisions to describe the coordinated transportation management strategies to address all traffic configuration and situations that can be reasonably anticipated in the execution of the Work in the Public Space;
 - (xi) The schedule of Closures for the Project Site and in the surrounding Public Space;
 - (xii) Streetlight drawing plans at a scale of between 1" = 20' and 1"=100 as applicable to show the Elements subject to Construction Work including at a minimum the Poles, dedicated conduit duct banks, feeder conduits, cables, and manholes. The set of drawing plans shall include the following:
 - a. Drawing plans showing location and layout of the Lighting Units and conduits carrying the power feed to these Lighting Units, and showing conduit size and wire gauge, from the Lighting Unit to the PEPCO power feds;
 - b. Single wiring diagram from source to Light Fixture, showing the tie-in to the existing PEPCO feeder manholes for distribution.
 - c. Voltage drop calculation demonstrating that the voltage drop does not exceed three percent, when such drop may be reasonably expected given the type of Work, in accordance to Good Industry Practice;
 - d. Summary sheets indicating installation information for each Lighting Unit, including pole locations, conduit, cables and proposed PEPCO power feds;
- (c) Timing of Project Bundle Submittals
- (i) Each Project Bundle Submittal is a Non-Discretionary Submittal
 - (ii) Approval of a Project Bundle Submittal during the Conversion Period is a condition precedent to issuance of the NTP3 respecting that Project Bundle and that Project Site.

- (iii) Approval of a Project Bundle Submittal after the Developer has achieved Substantial Completion is a condition precedent to commencement of Construction Work respecting that Project Bundle and that Project Site.
- (iv) A Project Bundle Submittal shall be submitted for approval by the District at least 14 days before issuance of the corresponding NTP3 during the Conversion Period, or 14 days prior to the scheduled commencement of the Construction Work after the Developer has achieved Substantial Completion.

(d) Organization

The Developer shall propose a standardized format and organization for the Project Bundle Submittals for the District's approval in its sole discretion. Such Project Bundle Submittals shall be organized in a logical and consistent manner for each Project Site respectively, and as may be reasonably requested by the District.

7.2.5 As-Built Drawings

- (a) All As-Built Submittals submitted to the District shall include a certification by a Professional Engineer from the Lead Design Firm certifying that the As-Built Submittals complies with the Project Agreement, including these Technical Provisions, the Project Management Plan, and the Developer's Design Documents. Such certification and the seal of the Professional Engineer shall be placed on the front page of the As-Built Submittal.
- (b) The Developer shall keep current at all times and update the As-Built Drawings to reflect the then-current as-built conditions, including after any Conversion Work, Construction Work, or Asset Management Work performed in the Public Space.
- (c) As-Built Drawings related to Expansion Units and/or related to conduit Work shall be logged in the ArcGIS asset inventory.

7.3 Design Requirements

7.3.1 Lighting Requirements

- (a) The Developer shall design, procure, and install the Street Light Improvements so all Light Fixtures of the Street Light Network meet following requirements set forth in Table 5 unless otherwise approved by the District.

Table 5: LED Color Temperature and Lumen Requirements

		Cobrahead		Teardrop		Post top		Twin-20	
Application	Road Class	CCT	Delivered Lumens	CCT	Delivered Lumens	CCT	Delivered Lumens	CCT	Delivered Lumens ⁸
Interstate/Other Freeways	Commercial	3000K	19000	3000K	16000	3000K	10000	3000K	20000
	Intermediate	3000K	19000	3000K	16000	3000K	10000	3000K	20000
	Residential	3000K	N/A	3000K	N/A	3000K	N/A	3000K	N/A
Principal Arterials	Commercial	3000K	19000	3000K	16000	3000K	10000	3000K	20000
	Intermediate	3000K	19000	3000K	16000	3000K	10000	3000K	20000

⁸ Total of both fixtures on asset

		Cobrahead		Teardrop		Post top		Twin-20	
Application	Road Class	CCT	Delivered Lumens	CCT	Delivered Lumens	CCT	Delivered Lumens	CCT	Delivered Lumens ⁸
	Residential	2700K	10800	2700K	9200	2700K	8000	2700K	16000
Minor Arterials	Commercial	3000K	19000	3000K	16000	3000K	10000	3000K	20000
	Intermediate	3000K	10800	3000K	14000	3000K	8000	3000K	16000
	Residential	2700K	10800	2700K	14000	2700K	6000	2700K	12000
Collectors	Commercial	2700K	19000	2700K	14000	2700K	6000	2700K	12000
	Intermediate	2700K	10800	2700K	14000	2700K	6000	2700K	12000
	Residential	2700K	7300	2700K	9200	2700K	6000	2700K	12000
Local	Commercial	2700K	10800	2700K	14000	2700K	6000	2700K	12000
	Intermediate	2700K	7300	2700K	9200	2700K	3840	2700K	7680
	Residential	2700K	5400	2700K	5428	2700K	3840	2700K	7680
Alley	Commercial	2700K	7300	2700K	7360	2700K	N/A	2700K	N/A
	Intermediate	2700K	5400	2700K	5428	2700K	N/A	2700K	N/A
	Residential	2700K	3348	2700K	3312	2700K	N/A	2700K	N/A
Trail Lights	N/A	N/A	N/A	N/A	N/A	2700K	3300	N/A	N/A

- (b) As per section 7.2.3 Energy Management Submittals, the Developer may choose to set the dimming of Fixtures as appropriate to meet the lighting requirements set forth by the District.
- (c) The Developer shall ensure that each individual Fixture can be dimmed through the RMCS as described in Section 10 of these Technical Provisions.
- (d) For Washington Globe Fixtures, the Developer shall meet the following requirements:
 - (i) Refrain from use of full cap shielding; and
 - (ii) Achieve an aesthetic such that the full silhouette of the illuminated Washington globe can be appreciated with the least amount of uplight necessary.
 - a. The expected uplight target is a maximum of ten percent (10%) of the total lumen emitted by the Fixture. However, the District reserves the right to adjust the uplight target in order to achieve the required aesthetic.
 - b. Note, the reduction in uplight may be derived from the placement of diodes and/or tinting in the top of the globe lens. Ultimately, the Developer shall be responsible for the technology and/or methodology to meet the required aesthetic.
- (e) In addition to Washington Globe Fixtures, the Developer shall reduce light trespass for all Fixtures.
- (f) For L'Enfant Special Street Lighting Units, the Developer shall have the option to install one controller per lighting circuit if the Developer deems this the best option considering the functional and aesthetic requirements.

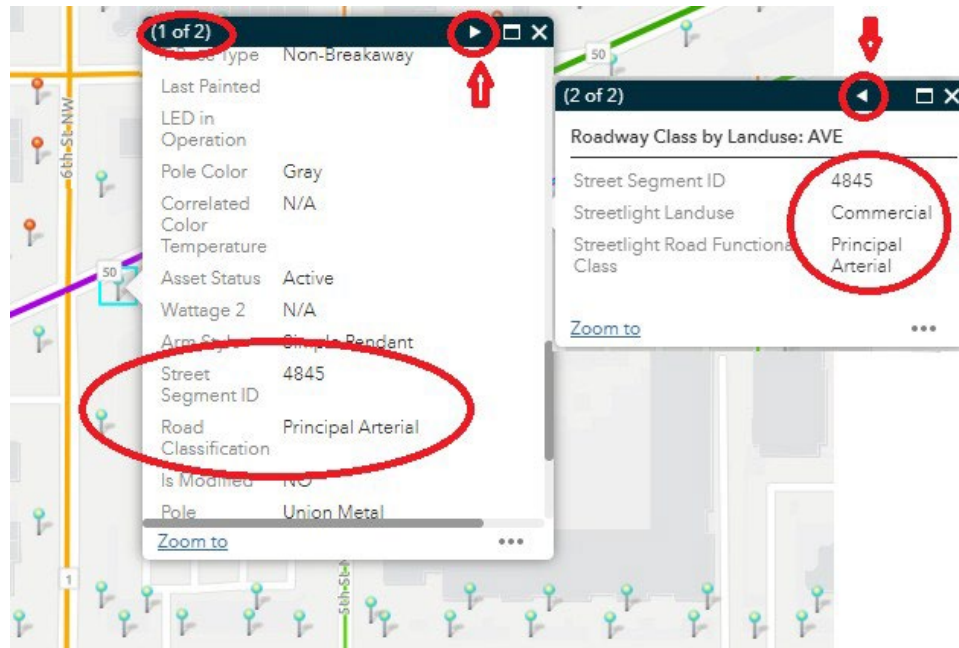
- (g) The Developer shall ensure that each individual Fixture can be shielded, if deemed necessary by the District.
- (h) For Fixtures with existing shields, as identified in the condition assessment, Conversion Work shall include replacement of Fixture and shield in the same position.
- (i) The Developer shall complete design work for Lighting Units at the following locations and meet the following requirements:

Location	Requirements	
Below Whitehurst Freeway	5 fc minimum; 2,700K	<ul style="list-style-type: none"> This project is a retrofit onto the existing I-beam. The fixtures must meet the minimum standards found in the specifications spreadsheet for wallpacks. The wallpacks do not necessarily need to be reattached in the same place or angle. New brackets may be necessary to affix wallpacks. DDOT will allow multiple wallpacks per RMCS node, if necessary.
Below L'Enfant Plaza	17 fc minimum; 3,000K	<ul style="list-style-type: none"> This project should use as much existing conduit as possible and attach to the ceiling structure within the tunnel. Note, this area is prone to water retention. These fixtures must meet the minimum standards for wallpacks found in the specifications spreadsheet, even if not using wallpacks style fixtures. The Developer may use as few RMCS nodes as they see fit.
Atop L'Enfant Plaza	6 fc minimum; 2,700K	<ul style="list-style-type: none"> This project is a retrofit of the L'enfant fixtures. These fixtures must meet the minimum standards for upright lights found in the specifications spreadsheet. DDOT will allow the five fixtures found on the pole to be controlled by one RMCS.

- (j) Additional detail on lighting requirements can be referenced in The District of Columbia Lighting Fixture Specifications, September 2020.

(k) A GIS layer of the functional road classifications (Residential, Commercial, and Intermediate) can be accessed [online through the District's ArcGIS site](#). Following are notes for navigating the site:

- (i) By clicking on any Lighting Unit, one can view its attributes. Scroll down to find the 'Street Segment ID & Functional Class'. Then upper right corner, clicking arrow will change the window to display road classification (also referred to as land use) information.



- (ii) Note, if only one window is open, then click the street next to Lighting Unit to display road classification/land use status.

(l) To date, some LED conversion Work was completed or will be completed at the expected start of the Project Term. The Developer shall refer to the ArcGIS inventory where Lighting Units in which LED Luminaire Conversion is complete can be referenced. These Luminaires will be excluded from the initial LED Conversion Work. For the avoidance of doubt, the other Elements of the affected Lighting Units are subject to Conversion Work.

(m) Each Lighting Unit will be equipped with a cut-off switch that allows for all small cell equipment to be turned off temporarily to allow for Work to be performed safely.

7.3.2 RMCS Requirements

- (a) As part of the Conversion Work, the Developer shall design, procure, and install an RMC System with full dimming, control, and monitoring capabilities for every Light Fixture in the Existing Network. The RMCS shall be fully integrated with the AMIS.
- (b) The developer shall equip design, procure, and install the same RMCS System additional or replacement Light Fixture

7.4 Construction Requirements

7.4.1 General

- (a) Unless otherwise directed by the District, the Developer shall perform restoration activities in all public or private areas that have been damaged or disturbed by Work. The Developer has a general obligation to restore pavement, sidewalk, path, or any other area in public spaces or private property that has been damaged or disturbed by the Work to the specifications, standards, manuals and guidelines listed in Appendix 13.2 of these Technical Provisions.

7.4.2 Safety

- (a) Adhere to the safety requirements specified in the Safety Plan portion of the Asset Management Plan.
- (b) Ensure the safety of all employees working in the Public Space in regards to threats of violence from members of the public. The Developer is encouraged to contact the Metropolitan Police Department (MPD) if the safety of its personnel or the public is deemed to be in jeopardy. MPD officers can be made available to escort Developer personnel to ensure a safe working environment.

7.5 Material and Construction Requirements

7.5.1 General

- (a) Unless otherwise noted in this RFP, the Developer shall be responsible for furnishing all proposed material associated with the Improved District Street Light Network. The Developer shall be responsible for submitting to the District Streetlight Team catalogue cuts and/or samples of all materials to be furnished for street lighting work. Procurement of all such materials by the Developer may not begin until written approval is obtained from the District.
- (b) All materials and equipment used in the performance of the work shall meet requirements as specified herein and requirements of the District of Columbia Department of Transportation Standard Specifications for Highways and Structures.
- (c) Where compatible for use in the Developer's D&C Construction Documents, the Developer's Lead Lighting Design Engineer may specify the District of Columbia Department of Transportation Standard Specifications for Highways and Structures and special provisions by direct reference to the applicable passage(s) or item. Direct references to the District of Columbia Department of Transportation Standard Specifications for Highways and Structures that provide options for materials, placement or processes must be supplemented by text that clearly delineates which options or values must be used. When a specific District of Columbia Department of Transportation Standard Specification is directly referenced for use, the reference will be construed to mean that the Method of Measurement and Basis of Payment sections of such Standard Specification are hereby deleted unless otherwise stated.
- (d) The Improved Street Light Network must conform to the National Electrical Code unless criteria that are more stringent are required under the Project Agreement or the specifications, standards, manuals and guidelines listed in Appendix 13.2 of these Technical Provisions.

7.5.2 Installation Requirements for the Street Light Network Elements

- (a) The Developer shall install Elements in accordance with the requirements set forth in these Technical Provisions and the specifications, standards, manuals and guidelines listed in Appendix 13.2 of the Technical Provisions.

7.5.3 Supplies and Material Not Covered by Material Specifications

- (a) The Developer shall submit three (3) catalogue cuts along with (1) sample for all parts and supplies that are proposed for use as part of this contract which are not covered by the Material Specifications.
- (b) The Engineer will return one copy of the catalogue cut approved to the Developer before any material is ordered.
- (c) The sample will remain with the Engineer during the life of the contract.
- (d) Should the Developer wish to make changes in the type or brand of material used, he shall submit catalogue cuts and samples for approval as called for in this section prior to starting to use the material in the performance of the Project.

7.5.4 Inspection of Supplies and Materials

- (a) The requirements set forth in Section K.5.2.2 of the Technical Requirements for Inspection of Supplies will apply to the D&C Term.

7.5.5 Restriction Against Use of Used, Reconditioned and Remanufactured Materials

(a) Definitions

- (i) New, as used in this section, means composed of previously unused components, whether manufactured from virgin material, from recovered material in the form of raw material, or from materials and by-products generated from, and reused within, an original manufacturing process, provided that the materials meet the requirements of this Agreement, including but not limited to performance, reliability, and life expectancy.
- (ii) Reconditioned, as used in this section, means restored to the original normal operating condition by readjustment and material replacement.
- (iii) Recovered Material, as used in this section, means waste materials and by-products that have been recovered or diverted from solid waste, including post-consumer material, but such term does not include those material and by-products generated from, and commonly used within, an original manufacturing process.
- (iv) Remanufactured, as used in this section, means rebuilt to original specifications.
- (v) The Developer shall reuse the globe for the L'Enfant Special Street Lighting Units after replacement of the Luminaire. The globe shall be cleaned and inspected. Globes that are damaged shall be replaced with new globes of identical appearance and performance characteristics.

- (b) Unless this Agreement requires virgin material or supplies composed or manufactured from virgin material, the Developer shall provide supplies that are new, as defined in this section.

- (c) A proposal to provide used, reconditioned, or remanufactured supplies (or supplies that are designed or developed subsequent to the date of this Agreement that the Developer wishes to substitute for equivalents specified herein) shall include a detailed description of such supplies, and shall be submitted to the Contracting Officer and District Streetlight Team in writing for written approval prior to actual use.
- (d) Used, reconditioned or remanufactured supplies shall not be used in the performance of this Agreement unless the Contracting Officer has granted his or her prior written approval for their use.

7.5.6 Salvaged Materials

- (a) The District shall retain ownership of all salvageable materials removed from the Project Site. The Developer shall be responsible for storage of all salvaged materials. All other materials removed from the Project Site shall be disposed of properly by the Developer.
- (b) There is no requirement to salvage materials. It is up to the Developer's discretion to decide what, if any, materials should be salvaged.

7.6 Roadways and Sidewalks

- (a) The Developer shall design and construct all roadway and sidewalk Elements in accordance with the Mandatory Specifications, Standards, Manuals, and Guidance listed in Appendix 13.2 of these Technical Provisions and any related requirements set forth in the Project Agreements.
- (b) The Developer shall permanently repair any sidewalks and roadways cut by the Developer as instructed in section 7.4.1 of these Technical Provisions.
- (c) In the case that repairing "no-current" problems on a bridge requires cutting the bridge deck to access the conduit, the Developer shall be qualified to cut structural bridge decks and shall obtain prior written approval from and coordinate all cuts with the DDOT Street and Bridge Maintenance Division. If it is not possible to access or fix the conduit, the Developer shall be responsible for adding a new means of supplying power to the lights.
- (d) The Developer shall permanently repair, in accordance with the District's regulations on utility cut repairs, any sidewalks and roadways cut by the Developer in performing work under this contract.
- (e) At the Developer's request, the District Representative will assist the Developer to identify the limits of pavement restoration in accordance with the Technical Provisions and on a site-by-site basis.

7.7 Site Requirements

- (a) The Developer shall design and construct all roadway Elements in accordance with the District of Columbia Department of Transportation Standard Specifications for Highways and Structures.
- (b) The Developer shall follow the Maintenance and Protection of Traffic requirements set forth in Section 11 of these Technical Provisions.

7.8 Site Investigation

- (a) The Developer acknowledges that it has taken steps reasonably necessary to ascertain the nature and location of the Work, and that it has investigated and satisfied itself as to the general and local conditions which can affect the Work or its cost, including but not limited to:
 - (i) Conditions bearing upon transportation, disposal, handling, and storage of materials
 - (ii) The availability of labor, water, electric, power and roads
 - (iii) Uncertainties of weather, river stages, tides or similar physical conditions at the site
 - (iv) The conformation and conditions of the ground
 - (v) The character of equipment and facilities needed prior to and during the performance of the Work
 - (vi) All conditions related to site access, utilities coordination, and District requirements.
- (b) The Developer shall conduct an independent assessment to determine the character, quality and quantity of surface and subsurface materials or obstacles to be encountered through inspection of the site. Any failure of the Developer to take the actions described and acknowledged in this paragraph shall not relieve the Developer from responsibility for estimating properly the difficulty and cost of successfully performing the Work or for proceeding to successfully perform the Work without additional expense to the District.

7.9 Work and Storage Space

- (a) The Developer shall be fully responsible for seeking necessary space for storage and undergoing all required negotiations with the owner of the property to secure its use and for restoring the area to its original condition and to the satisfaction of the District.

7.10 Demolition and Removal

- (a) The Developer shall design and construct all roadway Elements in accordance with the District of Columbia Department of Transportation Standard Specification for Highways and Structures Section 205, Structure Excavation and Demolition, when demolishing, removing, or disposing of materials from the Project.

7.11 Erosion and Sediment Control

- (a) The Developer shall provide erosion and sediment control when any work disturbs soil, drainage patterns, or vegetation. Such control must meet the requirements of District of Columbia Department of Transportation Standard Specification for Highways and Structures Section 618, Erosion and Sediment Control.

7.12 Stockpile

- (a) The Developer shall place barricades and warning signs at stockpiles to warn motorists of a hazard. All material stockpiles shall not be located within the clear zone of any traveled lane, unless positive protection is provided.

7.13 Final Clean-Up

- (a) The Developer shall clear and remove from the site all surplus and discarded materials and debris of every kind and leave the entire Project Site in a smooth and neat condition, prior to the final inspection.

7.14 Deliverables

- (a) The Developer shall prepare the following Design Submittals for the District's review and approval and implement as a condition precedent for NTP2. The Design Submittals shall include the following items for the D&C Work:
 - (i) Design Manual, subject to the approval of the District.

8 DEMONSTRATION, TESTING, AND COMMISSIONING

The Developer shall perform Demonstration, Testing, and Commissioning Work in accordance with this Section 8 of the Technical Provisions, including the Guidelines, Manuals, Specifications, and Standards in Appendix 13.2, and with the applicable provisions of the Project Agreement.

8.1 General

- (a) The Developer shall define Demonstration, Testing, and Commissioning Plans (or Plans) for Lighting Units and Systems, specifically the AMIS and the RMCS. Plans shall be developed for assets introduced at any time throughout the Project Term. No Luminaire, Lighting Fixture, or RMCS component shall be installed without a defined Plan and execution of said Plan. The Developer shall assure the District that the street lighting system performance achieves operation and performance requirements as set out in these Technical Provisions, including the Guidelines, Manuals, Specifications, and Standards in Appendix 13.2, and with the applicable provisions of the Project Agreement. The Demonstration, Testing, and Commissioning shall be accomplished through a process of design, field verification, and documentation, in accordance with the general standards and guidelines of the Illuminating Engineering Society (IES) DG-29-11 Guideline for the Commissioning Process Applied to Lighting and Control Systems or similar technical standard approved by the District.
- (b) The Developer shall meet the Comprehensive Demonstration requirements as noted in Section 2.2(k) and Exhibit 7 of the Project Agreement.
- (c) The Commissioning processes and Independent Verification and Validation (IV&V) processes shall be conducted by independent Contractors at the expense of the Developer. The Contractors may be the same or different. In selecting an IV&V contractor or contractors, the Developer shall follow the same process for retaining an Independent Engineer described in section 5.3 of the Project Agreement.

8.1.1 Approach

- (a) The Developer shall submit in its project proposal a severable Demonstration, Testing, and Commissioning Approach document that utilizes site specific data and factors needed to achieve performance requirements in accordance with the Technical Provisions and the Project Agreement. The Developer shall:
 - (i) Provide a plan for the implementation of the processes, including the initial scope of systems to be demonstrated, tested, and commissioned for the project.
 - (ii) Ensure that the design and operational intent are clearly documented.
 - (iii) Provide a design review focusing on system performance, maintainability, and adherence to AMIS and RMCS performance requirements for the streetlight network.
 - (iv) Ensure that Commissioning for the construction phase is adequately reflected in the design documents.
 - (v) Define the members of the commissioning team and their roles and responsibilities (as best as possible at that time of submitting the Developer Commissioning Approach).

8.1.2 Plan

(a) After the District reviews and accepts the design and construction package, the Developer shall provide a Demonstration, Testing, and Commissioning Plan to the District for acceptance that finalizes the Approach and addresses each component and system with specific steps that will be taken during the demonstration, testing, and commissioning process. The Developer shall conduct a thorough and systematic performance test of each element and total system of the installed AMIS, RMCS, and its components (nodes, etc.). In regard to specific field procedures, the Developer will follow a Commissioning Test Procedure that includes:

- (i) Pre-functional Testing (PFT) – The Developer shall validate individual equipment/component readiness to work in conjunction with the associated system as a whole. PFTs shall augment and be combined with manufacturer start-up checklists. The Developer must successfully complete the PFTs for each component of a given system prior to formal Functional Performance Testing (FPT) of equipment and subsystems of the given system as a whole. This includes all associated control system ‘point-to-point’ checkouts and controller startup reports. Completion and acceptance of the PFTs will then allow the Developer to ensure that the overall installation reflects the requirements of the plans, specifications, and manufacturer’s installation manuals.
- (ii) Functional Performance Testing (FPT) – The Developer shall evaluate and test equipment/component or system performance under operating conditions for compliance with the project documents (design/installation drawings and diagrams, equipment/system specifications, Sequence of Operations (SOOs) and specifications including changes during construction, etc.). Detailed FPTs created and submitted by the Developer shall present dynamic testing procedures for equipment and systems under full operation. The Developer shall adhere to the created testing plans and run systems through all of the reviewed and approved (by the District) performance tests. All available existing 3rd party asset systems and/or operating systems shall be utilized to the best of the Developer’s ability to assist in verifying and documenting the FPTs of the equipment and systems

The Developer shall provide advance written notice to the District of the scheduled test(s). The District shall have the right to designate representatives to be present at any or all such tests including representatives of the manufacturers of the equipment. The Developer shall demonstrate that- equipment/systems installed comply with the requirements of the project documents including maintaining illumination standards (when applicable). The Developer shall correct or adjust all deficiencies in the operation of the equipment/systems and report these deficiencies on an on-going basis during the entire Commissioning process of the equipment and systems. Progress reporting will be subject to change based on requirements outlined by the District and/or the ability of the Developer to consistently meet performance standards expected by the District.

- (iii) Report – The Developer shall submit to the District a detailed Commissioning Report documenting the equipment/system affect upon performance requirements in accordance with the Commissioning Plan. At a minimum, the report shall demonstrate through measurement that individual components and the system as a whole are operating and performing in accordance with the terms of these Technical Provisions and the Project Agreement. This shall include, but will not be limited to, equipment start-up and manufacturer’s checklists, PFT checklists, complete FPT results, reported deficiencies during the commissioning process, all resolutions to deficiencies (with detailed tracking and

reporting sheets), management, and training manuals, and all other documentation developed during the Demonstration, Testing, and Commissioning phase of the project that has demonstrated proper performance of the project as originally designed and intended.

- (b) The District may perform its own testing of Lighting Units and Systems independently or in conjunction with the Developer commissioning agents or authorities.

8.2 Lighting Units

- (a) The Developer shall define a Demonstration, Testing, and Commissioning Program (or Programs) for Lighting Units. The Program shall meet the timing and procedural requirements listed in Section 8.1 and demonstrate performance to the criteria listed in Section 8.1.
- (b) The District may perform its own testing of Lighting Units and systems. This includes (but is not limited to) LED Luminaire performance and the testing described in sub-section 8.3.3.b.xv.

8.2.1 Timing

- (a) In accordance with Exhibit 7 of the Project Agreement regarding Comprehensive Demonstration Protocol, the Developer shall make Luminaires available for demonstration and testing prior to Commercial Close.
- (b) The Developer shall complete its commissioning process and the District shall approve all final commissioning reports and documents prior to the conclusion of the Conversion Period.
- (c) Lighting Units introduced after Financial Close are subject to their own rounds of Demonstration, Testing, and Commissioning Plans. Timing is at the District's discretion.

8.2.2 Procedures

- (a) The Developer shall document procedures for demonstration, testing, and commissioning of all systems. Lighting control nodes shall be fully commissioned for a minimum of 10% of the specified 'Bundle' of lighting units within each Ward.
- (b) The Developer may be asked to conduct demonstration and testing at its warehouse at a time and date agreed upon by the District before field demonstration and testing takes place.

8.2.3 Criteria

- (a) The Developer shall prove through commissioning that the specified 10% sample of Lighting Units in a Ward's 'Bundle' meet the requirements of the Technical Provisions and perform as described in the Design Documents.
- (b) The Developer shall define functional testing processes to evaluate if a Lighting Unit can meet the requirements of the Technical Provisions in the District's operating environment. Process and procedural documents shall be submitted to the District 14 days prior to any scheduling of commissioning activities.
- (c) The Developer shall define commissioning processes to test installed Lighting Units for field performance in accordance with these Technical Provisions. Process and procedural documents shall be submitted to the district 14 days prior to any scheduling of commissioning activities.

8.3 Systems

- (a) The Developer shall define a Systems Development Plan for demonstration, testing, and commissioning Systems, specifically the AMIS and RMCS to present to the District. The program shall meet the timing and procedural requirements listed in Section 8.2 and demonstrate performance to the criteria listed in Section 8.2.

8.3.1 Timing

- (a) The Developer shall provide a functional simulation of the AMIS prior to Commercial Close.
- (b) The Developer shall provide a functional simulation of the RMCS prior to Commercial Close.
- (c) Testing and Commissioning shall occur, may be witnessed (at the District's discretion), and must be accepted by the District before a Project Bundle can be considered substantially complete.
- (d) The Developer shall meet the requirements for continuous performance set forth in Part 3 – Project Final Completion Conditions section 2(b) of the Project Agreement.
- (e) If a replacement software-related system is to be implemented, the software-related system shall be subject to its own rounds of Demonstration, Testing, and Commissioning Plans. Timing is at the District's discretion.

8.3.2 Procedures

- (a) The Developer shall document procedures for the demonstration, testing, and commissioning of Systems.
- (b) Demonstration, testing, and commissioning procedures shall meet the criteria listed in Section 8.2.3.
- (c) The Developer shall demonstrate Systems, specifically the AMIS and RMCS, at a District office, which will be specified by the District.
- (d) At the time of demonstration, the Developer shall make all AMIS and RMCS documents, including but not limited to manuals, instructions, and specifications, available to the District for review.

8.3.3 Criteria

- (a) Regarding the AMIS, the Developer shall:
 - (i) Demonstrate that the AMIS meets both the Functional and Technical Requirements set forth in these Technical Provisions and in Appendix 13.9;
 - (ii) Demonstrate that the AMIS will be functioning at the onset of NTP2;
 - (iii) Demonstrate the ability of the Systems to export or import data, including how the AMIS will interface with the District's ArcGIS inventory;
 - (iv) Demonstrate the historical data available for asset management, past alarms, node attributes (e.g., power, voltage, failures), alarms, etc. The Developer shall compare which data may only be available in real-time versus which are historically available;
 - (v) Demonstrate how users will be able to access help and support, whether through on-screen navigation or through central help pages. The Developer shall demonstrate, if applicable, any feedback that users may be able to provide through the application;
 - (vi) Describe the technology architecture (application, web services, middleware, and database) and discuss the location of the application (on-premises or cloud). The Developer

shall describe the network connectivity required for the operation of the application to specified reliability performance standards;

- (vii) Describe methods for how third-party software can be integrated with the AMIS and the level of integration that is available. Examples include 311, 911, and District work order management systems, currently Cityworks. The Developer shall describe the Systems' capacity for integrating with third-party reporting solutions and third-party GIS software. The Developer shall describe the protocols that can be used to integrate with the AMIS;
 - (viii) Describe the disaster recovery/backup plan, including how the system can continue to run when there are critical failures in the primary technology architecture;
 - (ix) Describe the process for Systems updates and upgrading, including how the AMIS will roll-out updates, patches, or new features for any compatible clients (thick-client, browser, mobile apps). The Developer shall describe any downtime requirements during this process;
 - (x) Define a testing program to evaluate if the AMIS can meet the requirements of these Technical Provisions at the scale required for the Existing, Improved, and Expanded Street Light Networks;
 - (xi) Test that the AMIS provides the interoperability with the District's Lighting Asset Inventory set forth in these Technical Provisions and the Technical Requirements in Appendix 13.9; and
 - (xii) Define a commissioning program to test that the production environment AMIS performs as set forth in these Technical Provisions and the Technical Requirements in Appendix 13.9.
- (b) Regarding the RMCS, the Developer shall:
- (i) Demonstrate that the RMCS meets the requirements set forth in these Technical Provisions and the Technical Requirements in Appendix 13.9;
 - (ii) Demonstrate that the RMCS will be functioning by the end of the Conversion Period;
 - (iii) Demonstrate how the RMCS can control each node, including on/off, brightness, and any other items specified in the Technical Provisions and the Technical Requirements in Appendix 13.9;
 - (iv) Demonstrate the ability to control both individual nodes and a district/group of nodes;
 - (v) Describe how nodes can be grouped into districts and how districts can be grouped;
 - (vi) Demonstrate scheduling actions for the nodes, including how to edit scheduling and demonstrating simple and advanced scheduling options;
 - (vii) Demonstrate the reporting/business intelligence capabilities of the RMCS, such as the real-time (automatic refresh rate in accordance with industry standards) and historical reporting of outages, issues, electricity consumption, voltage, current, , etc. The Developer shall describe how reports can be created, saved, or shared. The Developer shall show canned reports and demonstrate custom reporting capabilities;
 - (viii) Demonstrate how alerts appear and notifications can be disseminated through the RMCS. The Developer shall show how alerts can be configured by the user and how simple and complex alarms that can be configured in the software. The Developer shall demonstrate

how automated alerts (e.g., application, email) can be configured, viewed, and triggered. The Developer shall describe the exporting of any alarms, failures, etc.;

- (ix) Demonstrate administrator access/user access control, including how new users are created, provisioned, and user access controls are implemented. The Developer shall describe any ability to create user groups and access rights management for those groups. The Developer shall describe any ability to maintain a user profile;
- (x) Demonstrate how users will be able to access help and support, whether through on-screen navigation or through central help pages. The Developer shall demonstrate, if applicable, any feedback that users may be able to provide through the application.
- (xi) Describe the technology architecture (application, web services, middleware, and database) and discuss the location of the application (on-premises or cloud). The Developer shall describe the network connectivity required for the operation of the application to specified reliability performance standards;
- (xii) Describe the disaster recovery/backup plan, including how the system can continue to run when there are critical failures in the primary technology architecture;
- (xiii) Describe the process for system updates and upgrading, including how the RMCS will roll-out updates, patches, or new features for any compatible clients (thick-client, browser, mobile apps). The Developer shall describe any downtime requirements during this process;
- (xiv) Define a testing program to evaluate if the RMCS can meet the requirements of the Technical Provisions at the scale required for the Existing, Improved, and Expanded Street Light Network; and
- (xv) Define a commissioning program to test that the live RMCS performs as set forth in the Technical Provisions and the Technical Requirements in Appendix 13.9. The Developer shall use the below sample test script as a minimum standard for Pre-Functional Checks (PFCs) and Functional Performance Tests (FPTs) of the RMCS Nodes and/or Gateways and perform these checks and tests for a minimum 10% of a Ward's "Bundle" of Control Nodes that control Lighting Units (It is understood that nodes communicating via cellular network that do not require Gateways will not be required to undergo the minimum PFT and FPT described below for a system Gateway. However, all gateways and nodes communicating/connecting through gateways are subject to the minimum tests below). Any and all gateways that are installed and utilized as part of the streetlight control network shall be commissioned:

1. Gateways

- a. Gateways are installed per manufacturers specifications, installation, and start-up guides. Connection of continuous power to Gateway is verified.

- i. Installation and Start-up

1. Gateways are physically installed on poles/mast.

- a. Validation through RMCS and AMIS with District sign-off.

2. Continuous power is connected to the Gateway with appropriate overcurrent protection.

- a. Validation through RMCS and AMIS with District sign-off.
 - 3. Gateway serial number, model number, and MAC address are captured by photograph into the RMCS and AMIS.
 - a. Validation through RMCS and AMIS with District sign-off.
 - 4. GPS location data (within 2.5 meters) of the unit is captured in the RMCS and AMIS.
 - a. Validation through RMCS and AMIS with District sign-off.
- ii. Gateway Initiation and Operation
 - 1. Gateway is recognized within the RMCS
 - a. Access to RMCS and viewing of Gateway Reporting.
 - b. Run test reports produced by RMCS
 - 2. GPS location of the Gateway is 'aligned' to the GPS location shown within the RMCS and AMIS.
 - a. Validation through RMCS and AMIS with District sign-off.
 - 3. Installed control nodes are recognized through the Gateway.
 - a. RMCS confirms reporting of control nodes.

2. Control Nodes

- a. Installation and Start-Up
 - i. Control node is physically installed on roadway and high mast fixtures.
 - 1. Validation through RMCS and AMIS with District sign-off.
 - ii. Control node cycles the fixture through the system validation program.
 - 1. Validation through RMCS and AMIS with District sign-off.
 - iii. GPS location data (within 2.5 meters) of the pole/mast upon which the fixture is mounted is captured in the RMCS and AMIS.
 - 1. Validation through RMCS and AMIS with District sign-off.
 - iv. Fixture Type and Model # is captured in the RMCS and AMIS.

1. Validation through RMCS and AMIS with District sign-off.
- v. Node MAC address number is captured in the RMCS and AMIS.
 1. Validation through RMCS and AMIS with District sign-off.
- b. Control Node Initiation and Operation
 - i. Node is recognized within the RMCS.
 1. Access to RMCS and viewing of Node.
 2. Run test report from the RMCS.
 - ii. GPS location data (within 2.5 meters) of the pole/mast upon which the fixture is mounted is captured in the RMCS and AMIS.
 1. Validation through RMCS and AMIS with District sign-off.
 - iii. Installed control nodes are recognized through the Gateway with data being captured in the RMCS, including:
 1. Voltage
 2. Current Node and Fixture light ON or Node light OFF
 3. Power Factor
 4. Power Node and Fixture light ON or Node light OFF
 5. Energy
 6. Light Status ON/OFF
 7. DIM (% of Full Power) % Driver Signal
 8. Temperature
 9. Run test report from the RMCS.
 - iv. Measured operating wattage, with system ON, matches expected installed fixture + node wattage.
 1. Run test report from the RMCS.
- c. Luminaire DIM Initiation and Operation
 - i. Installed fixture control nodes are recognized through the Gateway with data being captured in the RMCS system, including:
 1. Voltage

2. Current Node and Fixture light ON or Node light OFF
 3. Power Factor
 4. Power Node and Fixture light ON or Node light OFF
 5. Energy
 6. Light Status ON/OFF
 7. DIM (% of Full Power) % Driver Signal
 8. Temperature
 9. Run test report from the RMCS.
- ii. Measured operating wattage, with system ON and DIM %, matches expected installed fixture + node wattage.
 1. Run test report from the RMCS.
- d. Control Node Schedule
 - i. Verify correct fixture operating schedule in RMCS.
 - ii. Field witness fixture ON/OFF per correct RMCS schedule.
 - e. Alarms, Alerts, and Notifications
 - i. General alarms, alerts, and notifications pushed and displayed at RMCS and AMIS.
 - ii. Gateway failure; Control Node failure.
 - iii. Gateway disconnection; Control Node disconnection.
 - iv. Abnormal operating conditions (high internal temperature, etc.).
 - v. Restore original default operating modes (after disconnection event, etc.)

8.4 Roles and Responsibilities

(a) The minimum commissioning roles and responsibilities shall be as follows:

- (i) Commissioning Provider (CP) – coordinates processes, develops testing/commissioning plans, directs and documents performance testing.
- (ii) Project Manager (PM) – Facilitates and supports the commissioning process and provided approvals of commissioning documents and field work.
- (iii) General Contractor (GC) – Facilitates the commissioning process and ensures that sub-contractors perform responsibilities. Integrates commissioning into the construction process and schedule. Subject to the sole discretion of the District, the Developer shall select the General Contractor.

- (iv) IV&V Contractor – Facilitates the Independent Verification and Validation (IV&V) process. This Contractor may be the same or different than the General Contractor. Both Contractors are subject to the sole discretion of the District.
- (v) Sub-contractors (SC) – Assist with demonstration of correct system performance.
- (vi) Architect/Engineer (A/E) – Perform construction observation, approve O&M manuals, and assist in system deficiency resolutions.
- (vii) Manufacturer (MFR) – Equipment manufacturers and vendors that provide documentation to facilitate the commissioning work and perform contractor start-up.
- (viii) District (DDOT) – Participate and support tasks related to equipment/design submittal reviews, test script development, commissioning field activities, deficiency resolutions, and commissioning and O&M report reviews.

8.5 Independent Verification and Validation of Systems

- (a) The Developer shall establish a Program for Independent Verification and Validation (IV&V), the “IV&V Program” for all software or systems-related requirements of the Project, specifically the AMIS and RMCS. Subject to the sole discretion of the District, the Developer shall select an Independent Contractor to establish and execute the IV&V Program. The IV&V Program Contractor may be the same or different from the General Contractor, but must be approved by the District.

8.5.1 Program Objectives

- (a) The IV&V Contractor will conduct independent, goal-based validation and verification analysis to ascertain goodness of product for the AMIS and RMCS. Validation-related analysis will allow the IV&V Contractor to evaluate Project development artifacts to ensure that the right behaviors have been defined in the artifacts. The right behaviors are those that adequately describe what the software-related systems are supposed to do, what the software-related systems are not supposed to do, and what the software-related systems are supposed to do under adverse conditions.
- (b) The validation-related analysis will strive to ensure that the AMIS and RMCS perform to the District’s needs under operational conditions.
- (c) Verification-related analysis will allow the IV&V Contractor to determine whether the products of each development phase fulfill the requirements or conditions imposed by a previous development phase.
- (d) The IV&V Program approach will consist of validation- and verification-related analysis. Validation and verification are described further below, including the artifacts generally required for specific analysis objectives.

8.5.2 Validation

- (a) Specific analysis that the IV&V Contractor performs includes requirements validation and test design validation. To perform this analysis, the IV&V Contractor typically needs to acquire the following Project artifacts: operational concept documentation, system and software requirement documents and interface requirements documents (IRDs) at various levels of the requirements hierarchy, interface control documents (ICDs), requirements traceability-related data, safety-related data (hazard analysis, critical items listing, etc.), and test plans and test cases at various levels of the testing hierarchy.

- (b) For the IV&V efforts, the IV&V Contractor anticipates that the artifacts such as those defined in Table 6 are necessary to support validation-related analysis. Typical outputs of validation-related analysis include requirements validation analysis reports, test design validation analysis reports, observations, issues, and risks.

Table 6 - Project Targeted Validation Artifacts

Artifact Name	Need/Applicable Analysis
AMIS Functional Requirements	Reference Model Development
RMCS Functional Requirements	Reference Model Development
AMIS Technical Requirements	Reference Model Development
RMCS Technical Requirements	Reference Model Development
System Test Plan	Test Design Validation
System Test Cases	Test Design Validation
Integration Test Plans	Test Design Validation
Integration Test Cases	Test Design Validation
Traceability-related data (showing traceability from requirements to test cases)	Test Design Validation

8.5.3 Verification

- (a) Specific analyses that the IV&V Contractor performs include architecture, design, and implementation analyses. To perform these analyses, the IV&V Contractor typically needs to acquire the following Project artifacts: architecture description documentation/data, design documentation and associated models, design review materials, source code, test results (at various levels), and traceability-related data.
- (b) For IV&V efforts, the IV&V Contractor anticipates that the artifacts defined in Table 7 are necessary to support verification analysis. Typical outputs of verification-related analysis include software architecture analysis reports, software design verification analysis reports, implementation analysis reports, observations, issues, and risks.

Table 7: Project Targeted Verification Artifacts

Artifact Name	Need/Applicable Analysis
Architecture Description Documentation/Architecture Diagrams/Data	Verify Software Architecture
Software Design Documentation	Verify Software Architecture, Verify Software Design
Software Design Models	Verify Software Design
Source Code	Verify Implementation

Artifact Name	Need/Applicable Analysis
Software Build delivery/release packages/Version Description documentation/data	Verify Implementation
Test results (at varying levels including build level, integration level and system level)	Verify requirements implementation
Discrepancy reports from test activities	Verify requirements implementation
Traceability related data (showing traceability from requirements to design – to code to test)	Verify Software Design, Verify Requirements Implementation

8.5.4 Roles, Responsibilities and Interfaces

- The IV&V Independent Contractor functions technically, managerially, and financially independent of the Project.
- Roles and responsibilities can be described in terms of personnel within the Independent Contractor's IV&V Program, Developer personnel, and District Personnel. The subsections below describe these roles and responsibilities.
- Analysis Reports: Over the course of the IV&V Program, the IV&V Contractor may generate analysis reports that document the results of the analyses performed. These reports will typically describe what the IV&V Contractor analyzed (Project artifacts), a high-level description of the process/approach and tools used (if applicable), and associated results. The IV&V Contractor will forward the analysis reports to the District and the Developer as defined in Table 8.

Table 8: IV&V Analysis Reports

Product Name	Recipients	Delivery Date / Updates
Software Requirements Analysis Reports	District Liaison & Developer Liaison	60 days after baselined software requirements provided to IV&V
Software Design Analysis Reports	District Liaison & Developer Liaison	60 days after baselined software design is provided to IV&V
Software Build Analysis Reports	District Liaison & Developer Liaison	60 days after build content/artifacts are provided to IV&V
Software Test Analysis Reports	District Liaison & Developer Liaison	60 days after Test artifacts provided to IV&V

8.5.5 Observations

- An observation is a type of output from an IV&V analysis task and represents a potential limitation identified within a development artifact that is informally communicated to the District and the Developer. Observations may be used when sufficient information is not available to support a concrete issue, available data and/or understanding may be insufficient to fully assess the

limitation and thus the impact/severity of the limitation is unclear. Observations function more as questions rather than confirmed limitations.

- (b) **Observation Resolution Path:** The District and the Developer will each review the observation data as provided by the IV&V Contractor and collectively disposition the observation. Applicable dispositions include: (a) the observation is withdrawn, (b) the observation is a legitimate limitation and is turned into an issue, or (c) the observation is a legitimate limitation and is turned into a risk.

8.5.6 Issues

- (a) An issue is a type of output from an IV&V analysis task. An issue represents a limitation identified within a development artifact that is formally communicated to the District and the Developer. Issue(s) have a documented impact and are assigned a severity rating between 1 (highest severity) and 5 (lowest severity) as defined in Table A below. Issues of severity rating 1-3 require a formal disposition/response by the Developer and must be verified to have been addressed prior to the end of the Conversion period. Issues of severity rating 4 or 5 may be reviewed by the District but may not receive a formal response/resolution from the Developer.

Table 9: Issue Severity Rating and Description (730-2014 - IEEE Standard for Software Quality Assurance Processes)

Severity	Description
1	Prevent the accomplishment of an essential capability. Jeopardize safety, security, or other requirement designated critical.
2	Adversely affect the accomplishment of an essential capability and no other work-around solution is known. Adversely affect technical, or schedule risks to the project or life cycle support of the system, and no work-around solution is known.
3	Adversely affect the accomplishment of an essential capability, but a work-around or solution is known. Adversely affect technical or schedule risks to the project or life cycle support of the system, but a work-around solution is known.
4	Result in user/operator inconvenience but does not affect a required operational or mission essential capability. Result in inconvenience for development or maintenance personnel but does not affect the accomplishment of these responsibilities.
5	Any other effect

- (b) **Issue Resolution Path:** The District and the Developer will review the issue data as provided by the IV&V Contractor. If the District deems that the issue is legitimate, the Developer will propose a solution. If the proposed solution is deemed satisfactory by the IV&V Contractor and the District, the issue will be put in a “To Be Verified” state. Subsequent to the proposed solution being made, the Developer will notify the IV&V Contractor and the District that the corrective action has been made and will provide the appropriate evidence (e.g., updated development artifacts, etc.) to the IV&V Contractor for verification and subsequent closure of the issue. If verification of the corrective action cannot be completed, the IV&V Contractor will request additional feedback/data from the Developer.

- (i) If there is a dispute at any time in the issue resolution process, the issue may be placed in an “In Dispute” state, at which time the District, the Developer, and IV&V Contractor can continue dialogue on the issue. Subsequent to these discussions, the issue may be withdrawn, placed in the “Project Accepts Risk” state, or it may be reverted to the “To Be Verified” state.
- (ii) If the Developer contends that the limitation described in the issue is not legitimate, the Developer will provide appropriate data and/or explanation to support this conclusion. The IV&V Contractor will review and consider this data and if the IV&V Contractor, the District, and the Developer are in agreement, the issue will be withdrawn. If the IV&V Contractor is not in agreement, additional dialogue and discussion between the Developer, the IV&V Contractor, and the District may be required and an appropriate course of action will be determined.

8.5.7 Risks

- (a) By conducting IV&V analysis, simple routine awareness, and/or interactions over the course of the lifecycle, the IV&V Contractor may become aware of circumstances or data points that represent a potential undesirable event for the Project. The IV&V Contractor will document such items as risks and will formally communicate these risks to the District and the Developer.
- (b) The IV&V Contractor will assess all risks based on the likelihood and consequence of the undesired event. The IV&V Contractor may also provide recommendations to eliminate, reduce, or mitigate the risks.
- (c) The IV&V Contractor will coordinate all risks with the Developer prior to formal submission to the District. To facilitate the submission of risks, the IV&V Contractor may request access to the Project’s Risk Management System (RMS) or repository, and the IV&V Contractor and the Developer Liaison will work together to determine the appropriate level of access (e.g., read-only, write, none) to the RMS/repository.
- (d) Typically, Projects retain residual risks throughout the lifecycle. As such, the IV&V Contractor may choose to assess the Project’s residual risks. At minimum, and as required by the District, the IV&V Contractor will evaluate residual risk data as provided by the Developer. The IV&V Contractor will communicate their stance with regards to such residual risk data to the District.
- (e) ***Risk Resolution Path:*** The Developer and the District will review risks as provided by the IV&V PM. If the Developer agrees with the nature of the risk, they may choose to take ownership of the risk. Subsequently, the Developer will document/capture the risk and associated mitigation plan(s) in the Project’s RMS. It is expected that the Developer actively manages, tracks, and mitigates such risk. The IV&V Contractor will monitor the progress or lack thereof of these activities until the risk is closed. This monitoring may be performed independently or via the Developer providing status data to the IV&V Contractor. If the IV&V Contractor determines that the risk is not being actively managed, the IV&V Contractor will discuss this with the Developer Liaison and the District Liaison and determine an appropriate course of action.

If the Developer decides not to accept, mitigate, and manage a risk, the Developer will provide appropriate data and/or explanation to support this conclusion. The IV&V Contractor will review/consider this data and if the IV&V Contractor is in agreement, they will withdraw the risk. If the IV&V Contractor is not in agreement, additional dialogue/discussion between the Developer, IV&V Contractor, and the District may be required, and an appropriate course of action will be determined.

8.5.8 Item Tracking/Monitoring and Escalation

- (a) All data such as observations, issues, and risks are recorded and provided to the Developer and the District as they are identified and/or as per an agreed-to schedule. The IV&V Contractor will evaluate Developer feedback/response to this data and update the status of this data in terms of tracking towards closure/resolution in the appropriate data repository. In addition, this “goodness of product” data will be documented in other IV&V products including but not limited to lifecycle review presentations, analysis reports and recurring/ad hoc status reports as applicable.
- (b) Given the reporting data mentioned above, any areas of disagreement regarding this data that cannot be resolved between the IV&V Contractor and the Developer within an appropriate period, the IV&V PM will elevate the issue to the District. The IV&V PM will ensure that the Developer is aware that the issue is being elevated. The final level of resolution will be with District at its sole discretion.

8.5.9 Communication and Reporting Methods

- (a) Communications and reporting methods between the IV&V Contractor, the Developer, and the District occur in both formal and informal fashion. Formal communication and reporting methods include delivery/receipt of IV&V analysis reports and associated technical data, IV&V briefings at lifecycle reviews and associated forums, and dialogue between the IV&V Contractor, the Developer, and the District regarding scope, priorities, access to resources, etc. consistent with the data in this plan. Informal communications and reporting methods include recurring teleconferences and meetings between the IV&V Contractor and Liaisons, requests for and provision of development artifacts, technical discussion on IV&V analysis results and dialogue/exchange of relevant data to facilitate resolution of IV&V observations, issues and risks.

8.5.10 Review Presentations

- (a) The IV&V PM will provide IV&V status data and associated results/conclusions of the IV&V efforts at various Project lifecycle/milestone reviews. The IV&V Contractor will communicate and coordinate the overall message/content of the presentation with the Developer prior to the actual review by the District.

9 SMART CITY IMPROVEMENTS

The Developer shall execute the Smart City Improvement Work in accordance with this Section 9 of the Technical Provisions, including the Guidelines, Manuals, Specifications, and Standards in Appendix 13.2, and with the applicable provisions of the Project Agreement.

9.1 The District's Responsibilities

- (a) The District will coordinate with the Developer on the planning and execution of WAPs installation.
 - (i) The District will provide to the Developer a list of 239 Poles on which WAPs are to be installed, which can be referenced in Appendix 13.4, and a KMZ file of Pole locations.
 - (ii) The District will design the Wi-Fi network.
 - (iii) The District reserves the right to change installation locations if there are Developer deployment delays.
- (b) The District will provide the Developer with the following materials:
 - (i) Procurement specifications on the WAP model and warranty and the related GPS node, which can be referenced in Appendix 13.3.5, WAP Model and Warranty Specifications of the Smart City Specifications.
 - (ii) Smart City Specifications for mounting and connecting WAPs, which can be referenced in Appendix 13.3.3.
 - (iii) Pole-specific WAP Site Information form, in an MS Excel-based spreadsheet, including:
 - a. Lighting Unit Pole address, intersection (if applicable), and latitude/longitude
 - b. Pole type, owner, and Pole ID
 - c. WAP type: root or mesh
- (c) The District will inspect each WAP for proper installation and functionality in accordance with Section 9.3: Smart City Improvements Acceptance.

9.2 Developer's Responsibilities

- (a) As part of the Project, the Developer shall procure and install 239 WAPs.
 - (i) The Developer shall procure WAPs in accordance with the WAP Model and Warranty Specifications in Appendix 13.3.5.
- (b) The Developer shall not start Work in the Public Space on a Smart City Bundle prior to NTP3 and prior to the approval by the District of a TCP respecting that Smart City Bundle.
 - (i) The Developer shall notify OCTO when a TCP is submitted to the District for review.

- (ii) The Developer shall notify OCTO when a submittal is made in TOPS for Emergency-No Parking signs.
- (c) For WAPs to be installed on Pepco or Verizon-owned Poles, should Pepco or Verizon require structural analysis or design Work, the Developer shall complete the required structural analysis or design Work. The following considerations apply:
 - (i) This structural analysis or design Work shall be subject to a District Change as described in Section 32.12(c) of the Project Agreement.
 - (ii) For the avoidance of doubt, the Developer shall not include the cost of this Work in the base bid. The Developer will be compensated via District Change.
- (d) The Developer shall complete the Smart City Improvements including the conditions precedent to Substantial Completion of Smart City Bundles listed in section 12.2 of the Project Agreement.
- (e) The Developer shall provide all necessary materials to install WAPs in accordance with the Smart City Specifications in Appendix 13.3.2.
- (f) When the District submits a Service Request to the Developer regarding an issue with a WAP installation not meeting acceptance criteria, the Developer shall respond in accordance with the standards for Service Requests listed in Section 10 and the performance requirements listed in Appendix 13.1.
- (g) The Developer shall install the WAPs listed in Appendix 13.4 in accordance with the Smart City Specifications in Appendix 13.3 including:
 - (i) Prior to installation, the Developer shall paint each WAP to the pole color or as instructed by the District. WAP/Pole color and paint specifications are included in the Smart City Specifications. For example, WAPs affixed to wood Poles are to be gray.
 - (ii) The Developer shall mount the WAP on the Pole, according to the appropriate Pole type.
 - (iii) The Developer shall connect one end of the grounding cable to the WAP and the other end to the grounding source. In most cases, if not all, the Pole will have an existing ground. If no ground is found, then the Developer shall add a ground.
 - (iv) The Developer shall connect the WAP to the fiber network (root WAPs only).
 - i. For underground root WAPs, the Developer shall be responsible for fiber connection to the handhole. The District will install fiber from the handhole to the splice point in their network.
 - ii. For root WAPs that will be aerially-fed, The District will make the fiber connection. A handhole is not required.
 - (v) The Developer shall connect the WAP to electrical power.
 - (vi) The Developer shall connect the GPS antenna to the WAP.
 - (vii) The Developer shall seal the installation.

- (viii) The Developer shall follow the District of Columbia Department of Transportation Standard Specifications for Highways and Structures. For avoidance of doubt, the Developer shall not perform v-cutting on Foundations.

(h) The Developer shall document the installation by taking the following actions:

- (i) The Developer shall communicate the installation status of a Smart City Bundle within 14 days of issuance and every 7 days thereafter until completion of the Smart City Bundle.
- (ii) The Developer shall confirm electrical connection by observing if the power ON light is illuminated green.
- (iii) The Developer shall alert the District of unsuccessful installations and indicate the issue (i.e. electrical, environmental, or physical) if known.
- (iv) The Developer shall take one close-up photograph showing the WAP cable sealing on the pole.
- (v) The Developer shall take one close-up photograph showing the grounding cable connection, either on pole or grounding bar in Handhole.
- (vi) The Developer shall take one photograph of the Handhole from outside if power originates from the handhole.
- (vii) The Developer shall take three color photographs of the WAP installation: at 0 degrees (straight-on), 120 degrees (left-rear), and 240 degrees (right-rear) from 20' to 40' from the pole. The WAP must be clearly visible. Photos shall meet the following specifications:
 - i. Must be able to zoom in on photos
 - ii. Filters or enhancements shall not be used
 - iii. Photos must be at least 2048 x 1536 resolution
 - iv. Photos must be in .JPG or PNG image formats
- (viii) The Developer shall enter the following information in the WAP Site Information form:
 - i. WAP serial number
 - ii. MAC Address
 - iii. Power ON status
 - iv. WAP installation height from ground
 - v. Drill hole height from ground
 - vi. Date of completion

- (ix) The Developer shall complete the WAP Site Information form and make the form available to the District for view and download via a web portal hosted by the Developer.
- (x) Within 14 days of completing installation of a Smart City Bundle, the Developer shall complete the WAP Site Information forms and photos and notify the District that they are available for view and download.
- (xi) If the District deems a WAP installation was not performed in accordance with the Smart City Specifications, the District will request remedy actions as described in section 9.2.e, and the Developer shall resolve the issue within 14 days.
- (xii) If a WAP installation issue is not resolvable within two months, the Developer shall complete the WAP Site Installation form with an explanation of the issue(s) in the Notes field and notify the District.

(i) Asset Management Work

- (i) Except in the failure of the signal feeding into the WAP, which shall be the responsibility of the District, the Developer is responsible for the proper connection of power and grounding for all WAPs and Developer-installed fiber for underground root WAPs.
- (ii) The Developer shall maintain WAP installations in accordance with the Performance Requirements in Appendix 13.1.

9.3 Smart City Improvements Acceptance

- (a) A completed WAP installation includes a WAP installed according to the Smart City Specifications listed in Appendix 13.3 and powered on, as indicated by the Power ON light being illuminated green.
- (b) The District will inspect a Smart City Bundle for proper installation and functionality within 14 days of vendor notification of completion of a Smart City Bundle.

10 ASSET MANAGEMENT

The Developer shall perform Asset Management Work in accordance with this Section 10 of the Technical Provisions, including the Guidelines, Manuals, Specifications, and Standards in Appendix 13.2, and with the applicable provisions of the Project Agreement.

10.1 General Requirements

- (a) The Developer shall perform Asset Management Work, or AM Work, on the Streetlight Network to manage, monitor, maintain, renew, and rehabilitate the Streetlight Network in accordance with these Technical Provisions. This includes any and all Work and activities necessary to:
 - (i) achieve, maintain, monitor and report on the Performance Requirements in Table Appendix-1, Table Appendix-2, and Table Appendix-3 in Appendix 13-1;
 - (ii) Make Safe Work, including all activities deemed necessary by the District, to ensure the safety of the general public and users of the transportation facilities, minimize the risk of damage, disturbance, or destruction of District property and Third-Party property, including the removal of obscene graffiti; and
 - (iii) support Vegetation Management and Tree Trimming Work as described in Section 10.4.6 of these Technical Provisions; and
- (b) When performing AM Work the Developer shall:
 - (i) Minimize delay and inconvenience to the general public and users of the transportation facilities in accordance with Section 1 of these Technical Provisions; and
 - (ii) Ensure and verify the quality of AM Work performed.
- (c) The Developer shall perform Asset Management Work on:
 - (i) The Existing Street Light Network from the NTP3 until the end of the Term; and
 - (ii) The Improved Street Light Network and the Expanded Street Light Network from the time of improved or expanded Lighting Unit installation until the end of the Term.
- (d) Asset Management Work shall be performed in accordance with the requirements of this Section 10 of these Technical Provisions and the Performance Requirements in Table Appendix-1, Table Appendix-2, and Table Appendix-3. These Performance Requirements shall apply to Asset Management Work on the:
 - (i) Existing Street Light Network within 90 days following NTP3 in accordance with Table Appendix-1;
 - (ii) Improved Street Light Network upon Substantial Completion of a Project Bundle in accordance with Table Appendix-2 and Table Appendix-3;

- (iii) Upon acceptance of Lighting Units in the Expanded Street Light Network in accordance with Table Appendix-2 and Table Appendix-3.
- (e) The Developer shall be responsible for maintaining Elements at the Minimum Acceptable Condition as described in Table Appendix-2 in Appendices Section 13.1 for the entirety of the Project Term.
 - (i) For the avoidance of doubt, an Element's condition corresponds to the lowest rating level in which one or more criteria are met.
 - a. For example, Anchor Bolts in which 1 of 4 anchor bolts for a T-base to foundation connection are not fully engaged, are misaligned, or are undersized would be considered Poor.
- (f) The Developer shall be responsible for all Asset Management Work on the Street Light Network, with the exception of the following, which shall be the responsibility of the District:
 - (i) Specifically excluded Lighting Units as detailed in Section 1 of these Technical Provisions;
 - (ii) Lighting Units that are outside the Project Limits and are owned and maintained by the National Park Service, the Architect of the Capitol, the DC Parks and Recreation Department, the Department of General Services, and the District of Columbia Housing Authority
- (g) The District, or its agent(s), may perform Condition Assessments at any time at its sole discretion. The District may periodically perform quality assurance reviews by inspecting AM Work recently completed by the Developer. In addition, the District may perform field reviews of completed AM Work for quality and completeness.

10.1.1 Self-Monitoring and Self-Reporting Requirements

- (a) The Developer shall establish a self-monitoring and self-reporting program in order to ensure a safe and reliable Street Light Network and manage the Lighting Units with the main objectives of maximizing public safety, reducing energy demands, and minimizing disruptions.
- (b) Lighting Units shall be monitored and managed 24 hours per day, seven days per week. In particular, the Developer shall provide Make Safe Work 24 hours per day, seven days per week for all activities identified by the District as necessary to Make Safe. The Developer shall provide the appropriate staff levels for these hours of operation and be available to assume these responsibilities from the NTP3 through the end of the Term.
- (c) The Developer shall perform any and all activities necessary for Make Safe Work, District Direct Requests, and Administrative Redirect from the NTP3. Prior to Conversion Work Completion, the Developer shall respond to requests for Field Evaluations and perform any AM Work to bring the Lighting Units assessed as part of the Field Evaluations into compliance with the Performance Requirements in Table Appendix-1. Upon Substantial Completion of a Project Bundle, the Developer shall maintain the Lighting Units of the associated Project Bundle in accordance with the Performance Requirements in Table Appendix-2 and Table Appendix-3.
- (d) The Developer shall interface with the District's work order management system, currently Cityworks, to facilitate self-monitoring and self-reporting.

- (e) The Developer shall equip all its vehicles operating in the Public Space with transmitting devices and an Automatic Vehicle Location (AVL) system shall be a feature of the AMIS, as described in the AMIS Functional Requirements listed in Appendix 13.9.

10.1.2 Interim AVL Tracking System

- (a) As stated in section 10.1.1(d), all vehicles operating in the Public Space shall be equipped with transmitting devices and tracked using an AVL system.
- (b) Until the AMIS system is operational, the Developer shall furnish an AVL system that meets the following requirements:
 - (i) Provide ability to view real-time Automatic Vehicle Location (AVL) of work vehicles in a geographic presentation. Location shall be recorded at increments of 15 minutes or less.
 - (ii) AVL should include name of employee(s) assigned to vehicle.
 - (iii) Store historical work vehicle location data based on AVL records for minimum of 72 hours.
- (c) The AVL system shall include both a Developer and District-facing interface and operability

10.1.3 Developer Asset Management Support Facilities

- (d) The Developer shall maintain adequate support facilities to perform Asset Management Work, such as office space and storage space for the Developer's equipment and spare parts.
- (e) The Developer shall provide the District with the location and contact information for all Asset Management Support Facilities as part of the Asset Management Plan.
- (f) The Developer shall make its support facilities available for inspection by the District upon twenty-four (24) hours' notice.

10.2 Performance Requirements

- (a) Further, the Developer shall be required to assess, report on, prepare response plans for, and respond to any Incident, Emergency, or Severe Weather Event with appropriately qualified staff, equipment and support personnel required to meet the minimum Performance Requirements, as detailed in Table Appendix-1, Table Appendix-2, or Table Appendix-3 and if needed, correct a failure to meet such minimum Performance Requirements within the applicable Cure Period.
- (b) The Cure Periods shown in Table Appendix-1, Table Appendix-2, and Table Appendix-3 will begin in accordance with Part F of the Project Agreement. Noncompliance Points and Deductions will be assessed for Noncompliance in accordance with Tables in Appendix 13.1 and Exhibit 14 of the Agreement.
 - (i) Bridge navigation and underdeck Light Fixtures shall be installed and managed in compliance with the requirements of United States Code of Federal Regulations Part 118 - "Bridge Lighting and Other Signals. Navigation and underdeck Light Fixtures shall be configured to the RMCS.

Constant illumination of Navigation Lights is paramount as the lack of illumination can trigger significant penalties from the USCG and create a significant danger.

10.2.1 Asset Management Noncompliance Events

- (a) The Developer shall provide all necessary Work, including Asset Management Work, to achieve or exceed the Performance Requirements in Table Appenix-2 and Table Appendix-3 of these Technical Provisions. The Developer shall be solely responsible for the quality of the Asset Management Work. With respect to references to the District's publications in Appendix 13.2 of the Technical Provisions requiring specific types of Work, the Developer shall follow the intent of such publications to achieve the specified outcome but shall have discretion as to the use of means and methods.
- (b) The Developer shall record Noncompliance Events in the Asset Management Information System (AMIS) using a mobile device immediately upon discovery of a Noncompliance Event. There is no Cure Period for delayed notification.
- (c) Subject to any applicable Cure Period, the Developer shall accrue Noncompliance Points for Noncompliance Events as per Table Appendix-1, Table Appendix-2, and Table Appendix-3 in Appendix 13.1 of these Technical Provisions and in accordance with Part F of the Project Agreement.
- (d) Noncompliance Events shall result from the failure to meet the minimum Performance Requirements set forth in Table Appendix-1, Table Appendix-2, or Table Appendix-3 for all Work. In the event of recurring Asset Management Noncompliance Events, the District may schedule a meeting with the Developer, at the Developer's expense, to discuss the reason for Noncompliance and action required to mitigate future occurrences of the Noncompliance.

10.2.2 Noncompliance Priority Classification and Cure

- (a) The Developer shall identify and classify all Noncompliance Events according to the Noncompliance priority classification defined in this Section 10.2.2 of these Technical Provisions. The Developer shall classify each Noncompliance Event as either a "Priority 0 Hazard Mitigation" Event, a "Priority 1 Temporary Cure" Event, or a "Priority 1 Permanent Cure and Restoration" Event.
- (b) The Developer shall immediately notify the District via phone call and auto-generation of an email alert from the AMIS of any "Priority 0 Hazard Mitigation" Event when the Developer discovers such events. When the Developer is the first to discover a "Priority 0 Hazard Mitigation" Event, the Developer shall, immediately upon discovery, respond to such "Priority 0 Hazard Mitigation" Event by deploying appropriate resources to mitigate the hazard and ensure the safety of the general public.
- (c) When the District is the first to become aware of a "Priority 0 Hazard Mitigation" Event, the District will immediately notify the Developer via phone call and auto-generation of an email alert from the AMIS. In such cases, within two (2) hours of the District's notification, the Developer shall deploy its resources to mitigate the hazard and ensure the safety of the general public.

- (d) In either case, the Developer shall then cure “Priority 0 Hazard Mitigation” Event so that hazards to the general public are eliminated within the Cure Periods identified in the column entitled “Priority 0 Hazard Mitigation” in Table Appendix-1, Table Appendix-2, and Table Appendix-3.
- (e) The Developer shall permanently cure “Priority 1 Permanent Cure and Restoration” Events within the Cure Periods identified in the column entitled “Priority 1 Permanent Cure and Restoration” in Table Appendix-1, Table Appendix-2, and Table Appendix-3. When permanent cures cannot practically be implemented within the Cure Periods identified in the column entitled “Priority 1 Temporary Cure” in Table Appendix-1, Table Appendix-2, and Table Appendix-3 then temporary remedies may be implemented.
- (f) The Developer shall permanently cure Priority 1 Noncompliance Events within the Cure Periods identified in the column entitled “Priority 1 Permanent Cure and Restoration” in Table Appendix-1, Table Appendix-2, or Table Appendix-3.
- (g) The Developer may submit a written request to extend the Cure Periods for Priority 1 Temporary Cure and Priority 1 Permanent Cure and Restoration in Table Appendix-1, Table Appendix-2, or Table Appendix-3 to the District. The District reserves the right, in its sole discretion, to deem if such cure cannot be completed in a timely manner due to events outside of the Developer’s control.
- (h) The District reserves the right, in its sole discretion, to require modification of the classification of any Noncompliance Event. When Noncompliance Events are identified by the District, the District will classify the Noncompliance Events according to the Noncompliance Event priority classification defined in this Section 10.2.2 of these Technical Provisions.
- (i) The Cure Periods stated in Table Appendix-1, Table Appendix-2, or Table Appendix-3 of these Technical Provisions under each of the above headings shall be deemed to start upon the date and time the Developer first obtained knowledge of, or first reasonably should have known of the Noncompliance Event. For the avoidance of doubt, the Developer shall be deemed to first obtain knowledge of the Noncompliance Event no later than the date and time of delivery of a Service Request to the Developer. The Developer shall investigate reports and complaints on the condition of the Project received from all sources. The Developer shall record response times, asset management records, all relevant inspections and actions taken in respect of Noncompliance Event in the AMIS, including temporary measures and repairs as per the requirements of Section 10.3 of these Technical Provisions.
- (j) If extended periods of cold temperatures or severe winter conditions outside of the ordinary weather patterns of the District of Columbia pursuant to weather records of the National Oceanic and Atmospheric Administration make it impossible for the Developer to cure a Noncompliance Event within the applicable Cure Period, the Developer shall request an extension of the Cure Period and justify the weather conditions preventing such cure, and the District will extend the Cure Period at its discretion. Such approval shall not be withheld unreasonably.

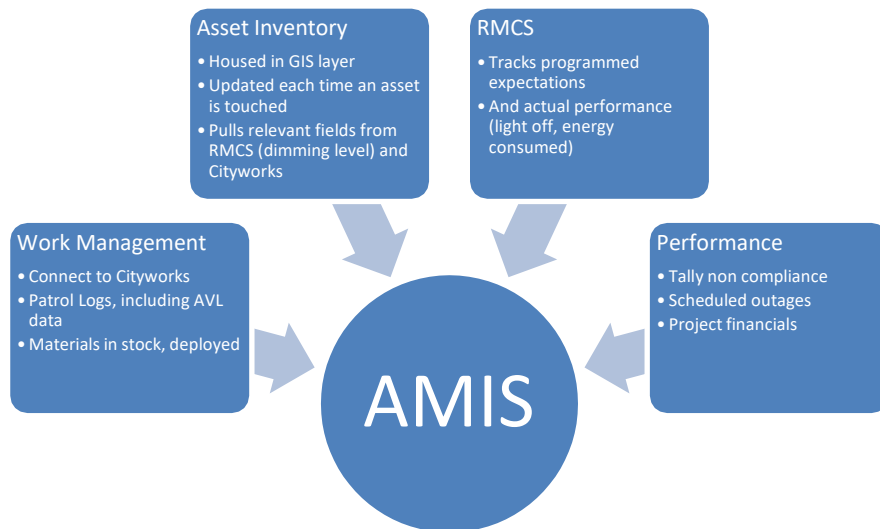
10.2.3 Tracking and Reporting Noncompliance Events

- (a) The Developer shall record and track accruals of all Noncompliance Points in the AMIS in accordance with Section 22 of the Project Agreement and the Performance Requirements listed in Appendix 13.1 of these Technical Provisions.
- (b) Tracking and recording Noncompliance Points shall be made available to the District through a dashboard submitted to the District by the Developer for approval 60 days prior to NTP3. The Developer shall design the dashboards to update in real-time and contain, at a minimum, the following information:
 - (i) Accrual of Noncompliance Points by Noncompliance Event on a daily, weekly, monthly, quarterly, and year-to-date basis; and
 - (ii) Light Fixture available or unavailable status as reported by the RMCS.
- (c) In order to support its quality assurance reviews and reporting, monitoring, and tracking Noncompliance Events and Noncompliance Points, the Developer shall develop a mobile application or mobile version of a website with the capability to provide real-time, or near real-time, read and write access to the AMIS.

10.3 Asset Management Information System

- (a) The Developer shall develop, populate, manage, and use an electronic Asset Management Information System (AMIS) that includes:
 - (i) A database of the Asset Management Work, including references to Lighting Units ;
 - (ii) Documents related to Asset Management Work (e.g. user manuals, as-built drawings, etc.); and
 - (iii) A user-customizable Graphic User Interface (GUI).

The below diagram is an illustration of the universe of data that the AMIS shall collect and organize.



- (b) The AMIS must be secure, searchable, and web accessible. The GUI shall be an interface to the AMIS database and related data sources (i.e. District's Lighting Asset Inventory and District work order management system, which are currently in ArcGIS and Cityworks, respectively) wherein users can interactively create and download queries, check statuses, and remotely control Lighting Units and track Noncompliance Events. The GUI shall include both a Developer/District-facing interface and operability, as well as a more limited public-facing interface and operability. The public-facing interface is intended to provide the public with updates about planned construction, maintenance, Planned Outages, and other information which concerns the public.
- (c) The AMIS shall link to the District's Lighting Asset Inventory, which is currently housed in an ArcGIS database. The Developer shall be granted read/write access to the District's Lighting Asset Inventory. The Developer shall be responsible for maintaining the Lighting Asset Inventory including Element condition changes and updates, clearly marked and timestamped.
- (d) The AMIS shall have a link (refresh rate in accordance with industry standards) to the District's work order management system, which at current is Cityworks 7, to exchange information with the District's work order management system.
- (e) The AMIS shall log all project data, with no rewrite or deletion of data. Thus, at the completion of the term, a complete record of data, from inception of the AMIS, shall be transferred to the District or its Agent.
- (i) The AMIS shall capture and store the status (on/off) of an individual light from the inception of the AMIS until transfer to the District or its Agent.
- (f) The District and the Developer shall enjoy Joint Governance of the AMIS, and the District must agree to any data adjustments.
- (g) The AMIS shall provide work order management capabilities that track individual work order history, installation dates, and other Lighting Unit data in an effort to identify trends and perform preventative maintenance to keep the Street Light Network operating in accordance with the Performance Requirements in Table Appendix-1, Table Appendix-2, or Table Appendix-3.

- (h) The Developer shall provide an AMIS that is consistent with ISO or NIST standards or to standards proposed by the Developer and subject to approval by the District.
- (i) The Developer shall update and upgrade its AMIS to ensure it is consistent with ISO and NIST standards or to standards proposed by the Developer and subject to approval by the District. Updates and upgrades shall be made in a timely manner, including but not limited to ensuring AMIS is current with security packages.
- (j) At a minimum, the AMIS shall fulfill the functional requirements organized into the following categories as detailed in Appendix 13.9 of these Technical Provisions:
 - (i) General Features
 - (ii) Technology
 - (iii) Graphical User Interface (GUI) / Dashboards
 - (iv) GIS System Capabilities
 - (v) Asset Inventory Tracking
 - (vi) Lighting Remote Monitoring and Control Data
 - (vii) Work Order System
 - (viii) Preventive Maintenance Capabilities
 - (ix) Handheld (Mobile) Devices
 - (x) Non-Compliance Tracking
 - (xi) Reporting
 - (xii) Notifications and Alerts
 - (xiii) Automatic Vehicle Location (AVL)
- (k) Training and technical support for the AMIS shall be provided by the Developer. At a minimum, this training and technical support shall:
 - (i) Provide help-desk availability Monday-Friday, during normal business hours from 07:00 to 16:00 for the District;
 - (ii) Provide training for the District, in the District, on operations of the AMIS, how to use the GUI/dashboard, how to run reports, and on other features of the system;
 - (iii) Provide user manuals for GUI/Dashboard and report generation;
 - (iv) Provide support during development of the AMIS as well as throughout the project Term; and
 - (v) Provide future software releases and updates to all applications.

- (l) The format and specifications of the Asset Management Information System (“AMIS”), including the Noncompliance tracking and reporting process, shall be submitted to the District by the Developer for approval 60 days prior to NTP2.
- (m) The AMIS shall be functioning at the onset of NTP2.
- (n) The Developer shall comply with the Technical Requirements for the AMIS in Appendix 13.9.2.
- (o) In the event that a power failure causes disruption of the AMIS and/or RMCS, the Developer shall be allowed a period not to exceed ten (10) minutes for backup power to be engaged and for the AMIS and/or RMCS to be restored.
- (p) According to the Handback requirements in Section 12.2 of these Technical Provisions, at the end of the Term, the Developer shall transfer to the District all software, hardware, backoffice equipment, field equipment, inventory, read/write access, and intellectual property as described in Section 52.2(a) (Intellectual Property License to the District) of the Project Agreement.

10.3.1 Remote Monitoring and Control System (RMCS)

- (a) The Developer shall be responsible for the design, installation, start-up, commissioning, management, and hand-off of a fully functional Remote Monitoring Control System (RMCS) capable of controlling and monitoring all Light Fixtures in the District’s Street Light Network as specified in the following subsections.

10.3.2 System Description

- (a) The core functionality of the system shall provide the capability of remotely monitoring and controlling Light Fixtures.
- (b) The RMCS shall, at a minimum, consist of a set of three interacting component tiers:
 - (i) Field devices (i.e. RMCS nodes and RMCS gateways, if used);
 - (ii) Backhaul communication network which will feed information to; and
 - (iii) The AMIS as per Section 10.3 of these Technical Provisions.
- (c) The RMCS shall use open standards (i.e. TCP/IP, Http, XML), open application programming interfaces (API), must be fully scalable, highly-reliable as stipulated in the Performance Requirements in Appendix 13.1, and responsive.
- (d) As per Section 10.3 of these Technical Provisions, the AMIS shall include a web-accessible user interface that monitors and controls the Light Fixtures and addresses Light Fixture asset queries (e.g., energy consumption report, Luminaire status, dimming control and schedule of one or group(s) of Luminaires, Luminaire malfunction notification, etc.) without the need to install specific software. All data is owned by and must be available to the District through open Application Programming Interfaces (APIs) in real-time.

- (e) The District and the Developer shall enjoy Joint Governance of the RMCS, and the District must agree to any data adjustments.
- (f) Developer shall supply the District with software and mobile applications for up to 15 District staff. Software and applications provided to the District shall allow the same monitoring capabilities as the Developer. The Developer shall provide the District the same control capabilities as the Developer. The District may decide to limit the capabilities of its staff/users at its discretion.
 - (i) The Developer may limit the District's system administration capabilities as appropriate. However, the system administration limitations shall not interfere with the District's monitoring and control capabilities.
- (g) In addition to the access provided by the Developer in the above section 10.3.2(f), the Developer shall provide read-only access to an unlimited amount of District staff/users.
- (h) The system must allow for setting a time schedule for lights to be on/off.
 - (i) Photocells are required for Light Fixtures and shall serve as a backup on/off function, with primary on/off function being controlled centrally.
 - (i) The system shall log all performance data, with no rewrite or deletion of data. Thus, at the completion of the term, a complete record of performance data, from inception of the RMCS, shall be transferred to the District or its Agent.
- (j) The RMCS shall incorporate Lighting Units for which there are existing remote monitoring and control systems into the RMCS provided as a part of this Project, including Lighting Units in the Mount Pleasant neighborhood and Highway Lighting Units previously converted to LEDs.
 - (i) The RMCS shall replace any existing remote monitoring and control systems in the District, including nodes and gateways.
 - (ii) The Mount Pleasant neighborhood is outfitted with an RMCS system. However, the system is no longer supported as the company who developed the system is no longer in operation. For avoidance of doubt, this system shall be replaced with the Developer's RMCS system, including nodes and gateways.
- (k) Lighting Units added as part of the Expanded Street Light Network shall be incorporated into the RMCS.

10.3.3 RMCS Specifications

- (a) Concurrent with the submission of the format of the Asset Management Information System ("AMIS"), the specifications of the Remote Monitoring and Control System ("RMCS") shall be submitted to the District by the Developer for approval 60 days prior to NTP3.

10.3.4 System Size and Scalability

- (a) The RMCS shall be capable of performing all functions and meeting all requirements described herein for all Lighting Units in the Street Light Network.

10.3.5 RMCS Nodes

- (a) RMCS Nodes, at a minimum, shall refer to the networked light nodes installed in/on a Light Fixture that follow purchase, installation, start-up, and commissioning and function together to remotely control and monitor the Luminaires.
- (b) At a minimum the RMCS Nodes shall fulfill the Functional Requirements in Appendix 13.9.3 of these Technical Provisions.
- (c) The RMCS Nodes shall comply with the Technical Requirements in Appendix 13.9.4 of these Technical Provisions.
- (d) Lighting Units added as part of the Expanded Street Light Network shall be outfitted with RMCS nodes to allow for incorporation into the RMCS.

10.3.6 RMCS Gateways (where installed/utilized)

- (a) RMCS Gateways shall refer to devices which may serve as a central connection point for other nodes where required. Supplemental gateways are not required for the RMCS.
- (b) At a minimum the RMCS Gateways shall fulfill the Functional Requirements in Appendix 13.9 of these Technical Provisions.
- (c) The RMCS Gateways shall comply with the Technical Requirements in Appendix 13.9 of these Technical Provisions.
- (d) The Developer shall not affix RMCS Gateways to certain Lighting Units. The Lighting Units within the Network that shall not be outfitted with RMCS Gateways can be referenced as follows:
 - (i) By applying the Historic layer, L'Enfant boundary, and Shipstead-Luce boundary in the ArcGIS inventory;
 - (ii) Verizon-owned Poles; and
 - (iii) Washington Globe and Twin 20 Lighting Units are not eligible for RMCS Gateways.
- (e) Lighting Units added as part of the Expanded Street Light Network shall be outfitted with RMCS Gateways, as needed, to allow for incorporation into the RMCS.

10.3.7 RMCS Backhaul Communications

- (a) The RMCS Backhaul Communications network refers to the means through which information contained at the nodes is conveyed to the AMIS.
- (b) The backhaul communications network shall:
 - (i) Securely transmit data from the nodes (AES-128 encryption, minimum); and
 - (ii) Consist of both Ethernet, Wi-Fi and cellular connectivity options. The AMIS shall be capable of integrating nodes/gateways connecting via Ethernet or cellular into the same system.

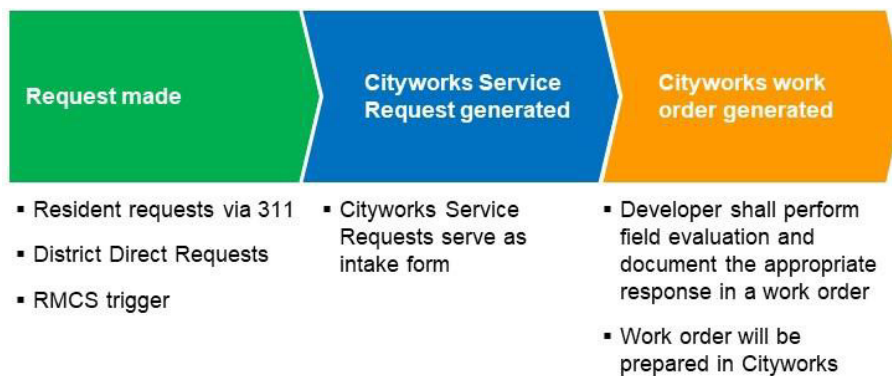
- (c) Note, the District's preference is for cellular connectivity. However, cellular backhaul communications may not be a functional solution in certain areas of the District. In those situations, it is expected that a different technology than cellular will need to be applied.

10.3.8 Lighting Remote Monitoring and Control Data

- (a) The Developer shall integrate the lighting remote monitoring and control data and capabilities into the Asset Management Information System (AMIS) as per Section 10.3 of these Technical Provisions.

10.3.9 Data Management Flow

- (a) Following is the process for which various parties can generate requests which prompts generation of a Service Request and a subsequent Work Order.



- (b) Requests to address lighting Elements can come from a number of sources, including residents, DDOT, the RMCS, or through District Direct Requests.
- (i) Resident requests can be submitted via 311 or through DDOT's call center.
- (ii) DDOT can initiate a service request if they become aware of an issue.
- (iii) District Direct Requests are types of requests that can originate from sources such as Ward or other community requests, results of field inspections conducted by District personnel or Third Parties, etc.;
- (iv) The RMCS or AMIS can automatically generate Service Requests based on certain triggers such as change in the status of a Light Fixture, indication of pole lean or knockdown (should the District decide to select tilt sensor technology), communication failure, etc.; and
- (v) The District's work order management system shall be able to push Service Requests directly to the Developer's AMIS.
- (c) Upon generation of a Service Request, the Developer shall perform a Field Evaluation as per Section 10.7.9 of these Technical Provisions and determine the appropriate course of action in the form of a Work Order.

- (d) After Work is completed, the Developer shall close the Work Order and corresponding Service request.
- (e) Information gathered through the course of Work shall be handled as follows:
 - (i) In instances where there is a change in Lighting Unit and/or Element condition as the result of a Field Evaluation then the Developer shall update the condition information in the District's ArcGIS asset inventory as directed by the District.
 - (ii) Data collected as part of Field Evaluations shall feed into Daily Reports, Weekly Reports, and the Lighting Asset Inventory as necessary, and shall also result in updates to the tracking, monitoring, and recording of Noncompliance Events and associated Noncompliance Points tracking.
 - (iii) In the case that a Service Request was the result of a 311 submission, the Developer shall provide a summary resolution of the Service Request. The resolution summary will be provided back to the customer who submitted the Service Request via the 311 system. If further communication is required, the Developer shall interact through the corresponding Ward representative.
 - (iv) If an issue included in the Daily Report is found to be a non-Street Light issue, the Developer shall forward the issue to the District. The District will forward these issues to the appropriate party.
- (f) District Direct Requests shall apply to the Existing Network, the Improved Network, and the Expanded Network.
- (g) The Developer may employ its own additional work management system, which may push and/or pull from Cityworks. However, the Developer's system may not replace the District's work order management system.

10.3.10 Service Requests

- (a) Service Requests are intake forms developed in the District's work order management system, currently Cityworks 7, to capture requests from various sources and prompt a Field Evaluation.
- (b) The essential data to be captured a Service Request are: status, predefined response comments, and photos.
- (c) The Developer shall manage Service Requests through the District's work order management system.
- (d) A Service Request will be considered open until the Developer formally closes it in the work order management system.

10.3.11 Work Orders

- (a) Work Orders are the appropriate tasks and/or assignments attributed to a Service Request and subsequent Field Evaluation.

- (b) The Developer shall maintain Work Orders in the District's work order management system, currently Cityworks 7, including but not limited to the following data: status, location of work, pole ID tag(s), task(s) to be completed, comment describing work completed and ongoing work, and photos.
- (c) A Work Order will be considered open until the Developer formally closes it in the work order management system.

10.4 Routine Asset Management Activities

The Developer shall perform all necessary Work to fulfill the requirements of Section 10 of these Technical Provisions including but not limited to the Work required in this Section 10.4.

10.4.1 Pole Identification Tag

- (a) The Developer shall furnish, prepare, and install Pole Identification Tags for all poles within the Street Light Network. Pole Identification Tags shall fulfill minimum District requirements and consist of horizontal black/yellow Pole Identification Tags with a unique alpha-numeric ID sequence. The Developer shall identify pole ownership. If there is no existing tag, the Developer shall contact the District to confirm the ownership of the pole.
- (b) The Developer shall request new alpha-numeric ID sequences for new poles prior to acceptance into the Street Light Network and inclusion within the Lighting Asset Inventory, or for existing poles that do not have alpha-numeric ID sequences. The District will provide the Developer with new alpha-numeric ID sequences. The Developer shall record the alpha-numeric ID sequence as part of the information recorded by the Developer within the Lighting Asset Inventory.
- (c) The Developer shall install the Pole Identification Tags such that the orientation of the tag is visible from the roadway and can be inventoried from a vehicle on the street. The Developer shall install the Pole Identification Tags with a Polyethylene Hot Stamped EZ Tag.
- (d) The Developer may elect to use additional means of unique Pole identification, such as RFID tags, that exceed the District's minimum requirements.

10.4.2 Painting

- (a) The Developer shall repaint Elements and/or Lighting Units in accordance with District publications. Paint colors shall comply with all District standards and requirements of the District of Columbia Department of Transportation Standard Specifications for Highways and Structures, including Historic District color requirements. The Developer shall submit all proposed paint colors and materials to the District for approval as per the Design Work submittal process in Section 7 of these Technical Provisions.
- (b) When repainting lead paints, the Developer shall comply with District standards and requirements as stipulated in the District of Columbia Department of Transportation Standard Specifications for Highways and Structures. The Developer shall adhere to District publication requirements for in-kind replacements. At a minimum, the Developer shall:
 - (i) Perform traffic control functions;

- (ii) Close work area to pedestrian and/or vehicular traffic;
- (iii) Abate lead paint;
- (iv) Clean Elements of the Lighting Units, including T-bases, poles, and arms;
- (v) Wear protective gear;
- (vi) Remove and store lead paint;
- (vii) Dispose of lead paint at an accredited drop-off location; and
- (viii) Request District Department of Energy & Environment final inspection.

10.4.3 Cleaning

- (a) The Developer shall clean Elements and Lighting Units in order to meet the Performance Requirements set forth in Table Appendix-1 and Table Appendix-2.
- (b) For the avoidance of doubt, the Developer shall adhere here to the workmanship standards stipulated in the District of Columbia Department of Transportation Standard Specifications for Highways and Structures and any other applicable District publications.

10.4.4 Shield Installation and Alignment

- (a) The Developer shall follow the instructions for shielding described in section 7.3.1 of these Technical Provisions.
- (b) In response to Service Requests related to the installation or alignment of shielding of Light Fixtures, the Developer shall perform a Field Evaluation.
- (c) In cases when the Developer believes that installing shielding or adjusting alignment is not required, the Developer shall notify the District in writing of the reasoning for not installing shielding and include the following items:
 - (i) Description of the situation and considerations of the request;
 - (ii) Thorough nighttime photos of the requested Lighting Unit(s) and surrounding area; and
 - (iii) Explanation and justification for not installing shield or adjusting alignment.
- (d) The District will then review the information submitted by the Developer and approve or deny the Developer's request to not install shielding or adjust alignment.

10.4.5 Anchor Bolts

- (a) Anchor bolts that are visible and not covered shall be routinely monitored to ensure top nuts are fully engaged to base plates and other surfaces, and to ensure that anchor bolts are visibly plum. Anchor bolts shall be visibly free of surface rust and section loss of the exposed portion(s) of threaded rods.

10.4.6 Vegetation Management and Tree Trimming

- (a) The Developer shall not remove vegetation unless absolutely necessary.
- (b) As part of the Design Phase, the Developer shall coordinate with the District's Urban Forestry Division (UFD) and come to a written agreement on Vegetation Management, Tree Trimming, and Use of herbicides/pesticides activities. The Developer shall adhere to this agreement or be considered noncompliant per the Performance Requirements listed in Appendix 13.1 of these Technical Provisions.
- (c) With respect to vegetation management within the Project Limits, the Developer shall be responsible for the following Asset Management Work:
 - (i) Removing undesirable vegetation growing directly on a Lighting Unit;
 - (ii) Removing vegetation obstructing access to Element(s) of a Lighting Unit in an Alley or along a Freeway and/or Expressway in order to perform Work;
 - (iii) Trimming private trees that encroach public space or other vegetation obstructing a Light Fixture to provide proper illuminance and performance of that Light Fixture, District-owned powerline clearance for Streetlight assets, and vegetation/shrubbery clearance (vines, bushes, etc.). Trimming shall commence only after approval from the District's Urban Forestry Division. The Developer shall not be penalized for delays relating to approval from the District's Urban Forestry Division; and
 - (iv) Replacing trees damaged during Work.
- (d) The Developer shall not plant a tree within 15' of a Lighting Unit
- (e) The Developer shall furnish all labor, material and equipment necessary to clear and trim trees of any size in the vicinity of Lighting Units for the purpose of preventing obstruction of Light Fixtures.
- (f) The Developer shall have an arborist ISA-certified in the District to identify the need for, perform, and manage/supervise any tree trimming. The Developer shall retain an Arborist for all Tree Trimming Work under this Section 10.4.6.
- (g) For the avoidance of doubt, the Developer shall not use herbicides or pesticides without the prior written approval of the UFD.
- (h) The Developer shall issue Service Requests to the UFD for street tree issues and/or emergency recovery work through the District's 311 system.
- (i) The Developer shall provide notice to the UFD of de-energized lines and tag such lines.
- (j) The Developer shall notify Homeowners via door hanger for all planned work related to vegetation management and tree trimming.
- (k) The Developer shall adhere to the following pruning, trimming, clearing, and removing standards:

- (i) ANSI Z133 Safety Standards;
- (ii) ANSI A300 Methods;
- (iii) Developer shall perform Work to the maximum extent practical;
- (iv) Developer shall not utilize herbicides/pesticides without the prior written approval of the District's Urban Forestry Division, as per Section 10.4.6 (i);
- (v) Developer shall not perform Tree Topping;
- (vi) Developer shall remove all debris generated the site and discard of such debris; and
- (vii) During emergency recovery performed by Third Parties, the Developer shall provide safe working conditions during de-energizing and re-energizing power.

10.4.7 Maintenance Repairs from Service Requests and Work Orders

- (a) The Developer shall be responsible for responding to any and all Service Requests or Work Orders pertaining to the assets and shall perform all necessary maintenance repairs on the assets in response to Service Requests and Work Orders, or as otherwise directed by the District.
- (b) The Developer shall ensure timely and effective response to Service Requests by conducting a field investigation of the asset within 24 hours of receipt of the Service Request, in accordance with the Performance Requirements in Appendix 13.1 of the Technical Provisions.
- (c) Following the field investigation, the Developer shall generate a Work Order in the District's work order management system, currently Cityworks 7, for any maintenance or repair Work to be performed. The Developer shall prepare the Work Order in accordance with the requirements specified in Section 10.3.11 of the Technical Provisions.
- (d) The Developer shall be responsible for performing all Work identified in the Work Order pertaining to the assets and shall close out the Work Order upon completion of the Work.

10.4.8 High Mast Lifting Mechanisms

- (a) The Developer shall be responsible for all systems and components related to the lifting and lowering mechanisms for high mast lighting and ensure that these systems are functioning as designed. This includes (but is not limited to) mounting frames and rings, latch systems and components, guide rods and arm rollers, Winch assemblies, hoist cables, junction boxes, and all electrical systems and components related to lift/lower mechanisms.

10.5 Planned Outages

- (a) The Developer shall obtain District approval for all Planned Outages and Permitted Closures.
- (b) Planned Outages include the interruption of power to a Lighting Unit, series of Lighting Units, and/or RMCS for the purpose of Routine Asset Management Activities, Asset Management Work, or any other required activities.

- (c) The Developer shall minimize the duration of Planned Outages and Closures.
- (d) Planned Outages shall be submitted to the District no later than 48 hours prior to performing Work. Submissions of Planned Outages shall include at a minimum the expected dates, locations, times, and durations of the Planned Outages.
- (e) The schedule of Asset Management Work, including Routine Asset Management Activities, shall describe all of the Asset Management Work and Routine Asset Management Activities for the given period and shall include, at a minimum, the expected dates, Lighting Units, times, durations of each Planned Asset Management activity, and impact on traffic, including any proposed Closures. The schedule of Planned Asset Management Work shall include a contingency plan to expedite traffic flow or reopening of closed lanes in the event of a traffic queue greater than twenty (20) minutes.
- (f) The schedule of Planned Asset Management Work, and any changes thereof, shall be developed in cooperation with the District and other Government Entities or Third Parties impacted by such proposed Closures to minimize the impact on traffic and avoid the scheduling of proposed Closures during local events.
- (g) The Developer shall consider the impact on traffic for any scheduled Planned Asset Management Work so as to minimize traffic queuing. The Developer shall schedule Planned Asset Management Work requiring Closures expected to last more than six (6) hours (including Routine Asset Management Activities and Renewal Work) only when a traffic analysis performed by the Developer indicates that traffic queuing will be minimized.
- (h) When traffic queuing greater than twenty (20) minutes occurs during the execution of Planned Asset Management Work, the Work shall be discontinued immediately and may resume when traffic queuing has ceased or shall be rescheduled at a later time.
- (i) When changes occur in the Developer's schedule of Asset Management Work (including changes in the Renewal Work Schedule) for which a Closure is required, the Developer shall request and obtain the approval from the District at least fourteen (14) days before undertaking the Work that requires such Closure. Such requirement does not apply to Work in response to Incidents, Severe Weather Events, or Emergencies.
- (j) When acting in response to an Incident, Emergency, Severe Weather Event, or to cure a Priority 0 Hazard Mitigation, the Developer shall notify the District immediately of any Closures.

10.6 Response Following Emergency, Incident, and Severe Weather Event

- (a) This section covers the Developer's responsibilities following the instance of Emergency, Incident, Severe Weather Event, and related circumstances described in sections 10.6.1 through 10.6.8.
- (b) In the event that responding to the circumstances described in section 10.6 require redirecting resources away from Work to cure noncompliance events, the Developer may be granted additional time to perform the Work to cure noncompliance. The District and the Developer shall coordinate and agree on the additional time to be granted to cure noncompliance.

10.6.1 Incident

- (a) An Incident is an unplanned or forecasted event that adversely impacts Lighting Unit and/or Element condition and/or traffic conditions posing a safety hazard to the general public, Developer personnel, and/or District staff. In the event of an Incident, the Developer shall notify the District no later than an hour from identification of an Incident. The Developer shall be required to respond promptly to assess the affected area(s) and coordinate with the District to establish time frames for repairs.
 - (i) In the event that the Developer encounters a knocked down pole, the Developer shall contact MPD to acquire a report.
 - (ii) If no report exists, the Developer shall request in writing that MPD produce a report.
 - (iii) After steps i and ii have been completed, the Developer will have fulfilled its duty to pursue an MPD report.
 - (iv) For reference, the District's process for responding to pole knockdowns is described in Appendix 13.11.
- (b) Developer shall Make Safe as deemed necessary by the District to remedy all hazardous conditions in accordance with these Technical Provisions, and in particular the Performance Requirements in Table Appendix-1, Table Appendix-2, or Table Appendix-3.
- (c) No later than 24 hours after the identification of an Incident, the Developer shall provide the District with a preliminary damage report of all Elements impacted by the Incident. This report shall include, but not be limited to, an individual analysis of the site or sites affected by the Incident with the following information:
 - (i) Location, date, and time of Incident;
 - (ii) Cause and description of damage including damages to Elements (Third Party information, if applicable);
 - (iii) Description of failure or issue and system impacts;
 - (iv) Description of site conditions supported by photo documentation (digital only);
 - (v) List of damaged Elements with damage assessment; and
 - (vi) Traffic impact.
- (d) Following the damage report, the Developer shall detail the work required to return all impacted Elements to Fair (or numerical score of 3) or better condition in an Incident Response Plan, which shall be delivered to the District in the time frame determined by the District depending on the severity of the Incident. The Developer shall coordinate the Response Plan with the District to establish agreed-upon time frames for the Developer to conduct all necessary repairs.

10.6.2 Severe Weather

- (a) The Developer shall proactively deploy resources to minimize outages and safety hazards in advance of forecasted inclement weather and Severe Weather Events. No later than 24 hours following the conclusion of a Severe Weather Event, the Developer shall commence visual inspections and damage assessments as usual and customary usage of trade safety practice allows and provide the District with a detailed damage report of all Elements impacted by the Severe Weather Event. This report shall include, but not be limited to, an individual analysis of the site or sites affected by the Severe Weather Event with the following information:
 - (i) Date and time of Severe Weather Event;
 - (ii) Cause and description of damage including damages to Elements (third party information, if applicable);
 - (iii) Description of failure or issue and system impacts;
 - (iv) Description of site conditions supported by photo documentation (digital only);
 - (v) List of damaged Elements with damage assessment; and
 - (vi) Traffic impact.
- (b) In the event that the impact of an occurrence of a Severe Weather Event, is so extensive that the affected site(s) extend beyond one Ward, a high-level damage report shall be made available within 24 hours after the conclusion of the event. This report shall include an analysis of the site(s) affected with the following information:
 - (i) Date and time of Severe Weather Event;
 - (ii) Status report, including cause and description of damage;
 - (iii) Description of failure or issue and system impacts;
 - (iv) Summary of damaged Elements, including type and number; and
 - (v) Traffic impact.
- (c) Following the damage report, the Developer shall detail the work required to return all impacted Elements to Fair (or numerical score of 3) or better condition in a Severe Weather Event Response Plan, which shall be delivered to the District in the time frame determined by the District depending on the severity of the Severe Weather Event. The Developer shall coordinate the Response Plan with the District to establish agreed-upon time frames for the Developer to conduct all necessary repairs to restore service as soon as reasonably practical at the District's approval.
- (d) Following a Severe Weather Event, the District may request that the Developer further assess the Elements impacted by the Severe Weather Event or conduct supplemental reporting to meet District, Federal, or other Governmental Entity requirements. The Developer is required to

complete any reporting requested by the District to meet the Performance Requirements in Table Appendix-1, Table Appendix-2, and Table Appendix-3. The District will notify the Developer of any supplemental reporting requirements and will coordinate with the Developer to identify required reporting information and the time frames to complete any reporting.

10.6.3 Emergencies

- (a) No later than 24 hours following service of notice under Section 50.2(a) (Notice to the Developer) of the Project Agreement or upon the occurrence of an Emergency, the Developer shall commence visual inspections and damage assessments as usual and customary usage of trade safety practice allows and provide the District with a detailed damage report of all Elements impacted by the Emergency. This report shall include all Elements impacted by the Emergency and shall include, but not be limited to, an individual analysis of the site or sites affected with the following information:
 - (i) Date and time of Emergency event;
 - (ii) Cause and description of damage including damages to the assets of the Project (third party information, if applicable);
 - (iii) Description of failure or issue and system impacts;
 - (iv) Description of site conditions supported by photo documentation (digital only);
 - (v) List of damaged Elements with damage assessment; and
 - (vi) Traffic impact.
- (b) In the event that the impact of an occurrence of an Emergency, natural or otherwise, is so extensive that the affected site(s) extend beyond one Ward, a high-level damage report shall be made available within 24 hours after the occurrence of the event. This report shall include an analysis of the site(s) affected with the following information:
 - (i) Date and time of Severe Weather Event;
 - (ii) Status report, including cause and description of damage;
 - (iii) Description of failure or issue and system impacts;
 - (iv) Summary of damaged Elements, including type and number; and
 - (v) Traffic impact.
- (c) Following the damage report, the Developer shall detail the work required to return all impacted Elements to Fair (or numerical score of 3) or better condition in an Emergency Response Plan, which shall be delivered to the District in the time frame determined by the District depending on the severity of the Emergency. The Developer shall coordinate the Response Plan with the District to establish agreed-upon time frames for the Developer to conduct all necessary repairs to restore service as soon as reasonably practical at the District's approval.

10.6.4 Special Events

- (a) The Developer shall have a plan for emergency preparedness for Holidays, weather events, and Special Events. Developer personnel shall be stationed strategically around the city in order to respond to requests (e.g., on both sides of the Mall).
 - (i) The District will instruct the Developer personnel to be stationed within secure area or outside secure area, which will be defined by the District depending on the Event;
 - (ii) Events that require staging within the District or within specific neighborhood(s) include those with expected or actual Crowd size of greater than 250,000 people; and
 - (iii) The Developer shall plan to account for closure of main streets leading to the District or to event location(s) such as closed tunnels, bridges, major streets, etc. and natural disasters that may prevent contractor from responding to emergencies within a reasonable time frame.
 - (iv) Prior to an event, the District may instruct the Developer to conduct activities to prepare for the event. The Work may include but is not limited to tightening anchor bolts.

10.6.5 Hazardous Materials

- (a) The Developer shall respond to any Hazardous Material event that originates within the Project Site and take remedial actions as per the Performance Requirements set forth in Table Appendix-1, Table Appendix-2, or Table Appendix-3 of these Technical Provisions.
- (b) Expected instances of a discovery of Hazardous Material events not caused by Developer release include, without limitation:
 - (i) Discovery of motor oil or other hazardous liquid or foreign object(s) in a manhole during or following the Developer's Work in a manhole.
 - (ii) Discovery of lead paint on Poles.
 - (iii) Discovery of asbestos on Lighting Units.
- (c) The Developer shall follow the requirements set forth in Article 13 of the Project Agreement regarding responding to Hazardous Materials events.
- (d) To prepare for a Hazardous Material event, the Developer shall provide all qualified staff with the appropriate levels of training, certification, and equipment necessary to mitigate impacts of environmental contamination.
- (e) The Developer shall manage all cleanup operations and perform any monitoring of the affected area(s) in accordance with all Laws and Governmental Approvals.
- (f) Upon the Release of Hazardous Materials, the Developer shall:
 - (i) Respond promptly to assess the affected area(s);

- (ii) Contain and mitigate the contamination;
 - (iii) Clean-up the affected area(s); and
 - (iv) Inform the District.
- (g) The Developer shall further develop and implement a comprehensive plan for the long-term cleanup and monitoring of any Hazardous Materials as needed. This plan shall be submitted to District for review and comment.

10.6.6 Stray Voltage

- (a) Stray Voltage presents immediate danger to life and safety. When conducting an Inspection or Condition Assessment, the Developer shall perform detection tests of Stray Voltage and promptly remedy detected Stray Voltage through Make Safe Work.
- (b) The Developer shall use the proper equipment to test for Stray Voltage as part of Condition Assessments, identify the source of the Stray Voltage, perform any and all necessary Make Safe Work deemed necessary by the District, and work with appropriate Third Parties to permanently cure the source of the Stray Voltage.
- (c) There shall be no occurrences of Stray Voltage within or originating from the Street Light Network.
- (d) Typical causes of Stray Voltage may include:
 - (i) Poorly-insulated or uninsulated wires contacting a Pole;
 - (ii) Broken underground conduit with water creating a path to sidewalk area;
 - (iii) Metal fence posts driven through a conduit; and
 - (iv) Exposed abandoned wire in the ground.

10.6.7 Administrative Redirect

- (a) In certain circumstances, the District may require the Developer redirect any existing or planned Work or perform additional Work. Examples of these circumstances include but are not limited to: routine Work on Streetlight Elements that the District wishes to prioritize, a sporting event, Inauguration, or any combination of events with anticipated combined attendance over 10,000 people, Work required under direction from elected officials, or Work pertaining to Lighting Units that are under the jurisdiction of the National Park Service, the Architect of the Capitol, the DC Parks and Recreation Department, Department of General Services, the District of Columbia Housing Authority, or other Third Parties.

This Work is known as “Administrative Redirect.” In such instances, the Developer shall be responsible for performing any Work required under Administrative Redirect:

- (i) For assets inside the project scope, there are no limits to Administrative Redirect, including but not limited to bolt tightening, shielding, and Special Events.
 - (ii) For assets outside the Project Limits, the Developer is responsible for no more than 25 Administrative Redirect requests per year outside the Project Limits. The Developer shall perform a Field Evaluation and then perform Make Safe Work and any other Work as directed by the District.
 - (iii) The District may deem certain Administrative Redirect Work as High Priority, such as Work that may result from the direction of elected officials. Per Table Appendix-1 and Table Appendix-2 located in the Appendices, the mitigation, cure, restoration, and intervals of recurrence shall remain the same for all Administrative Redirect Work. However, the penalties for noncompliance are heightened for Administrative Redirect deemed High Priority.
- (b) The Developer shall execute any request for Administrative Redirect promptly and prioritize such request above any other Work that is not otherwise Make Safe Work.

10.6.8 Theft

- (a) The Developer is responsible for the integrity of the Street Light Network, in particular the repair/restoration of Lighting Units in response to theft. In the event of theft of a Lighting Unit and/or elements of a Lighting Unit, the Developer shall restore the Lighting Unit to its condition prior to the act.

10.7 Inventory Activities

10.7.1 Lighting Asset Inventory

The Existing Lighting Asset Inventory includes 72,051 Lighting Units, including 37,407 District-Owned Poles, 28,276 Poles owned by owned by Pepco and 6,368 owned by Verizon.

The Developer shall coordinate with the District to configure the District's Lighting Asset Inventory to do the following:

- (i) Track individual and grouped asset activities and history, including service requests, work orders, inspections, repairs, replacement, refurbishment, maintenance, upgrades, etc.
- (ii) Track Element-specific product and equipment data, location, including manufacturer, model, serial, number, date of manufacture, and Pole Identification Tag.
- (iii) Furnish, install, and maintain Pole Identification Tags for each pole and track in Lighting Asset Inventory.
- (iv) Track as-built drawings, product literature, and any other documentation provided with a Lighting Unit and associated Element(s) materials and attach it to one or many Lighting Unit(s) in the Lighting Asset Inventory.

- (v) Provide ability to upload photos and relate them to specific Lighting Unit(s) and/or Element(s), including photos of deficiencies, inspections and before/after work order photos.
- (a) Upon Substantial Completion of a Project Bundle, the Developer shall update its Lighting Asset Inventory and provide the District with updates to the Lighting Asset Inventory, including recording the condition and attaching photographs of the Lighting Unit Elements.
- (b) Data encompassed in items i through v in the above list shall be stored in the Developer's AMIS and shall be available to be referenced by query. The Developer shall include certain key information in the District's asset inventory, currently housed in ArcGIS, such as descriptive information of Lighting Unit, last service request, most recent photos, and latest condition information. As part of the Design phase of Work, the Developer shall coordinate with the District to determine the appropriate fields to populate in the asset inventory.

10.8 Condition Assessment Activities

The Developer shall perform an Element-level Condition Assessment to commence at the beginning of Year 8 of the Project Term. Recording and reporting on Condition Assessments shall be Element-based, include a geotag, and be stored in the ArcGIS Lighting Asset Inventory. Condition Assessments may also be conducted as part of Field Evaluations. The following Elements, as applicable, will be inspected and rated for all Lighting Units within the Project Limits.

- (a) Foundations – This Element includes foundation(s) that are constructed of concrete, reinforced concrete, or steel. Inspectors should assign ratings based on the overall condition of the foundation and its ability to function properly. The condition of grout pads, if present, shall also be included in this element.
- (b) Anchor Bolts – This Element includes anchor bolts, anchor nuts, leveling nuts, and washers connecting the light pole or transformer base to the foundation.
- (c) Transformer Base (T-Base) – This Element includes the transformer base, t-base cover, and bolts, washers and nuts connecting the light pole to the transformer base.
- (d) Poles – This Element includes the vertical posts, handhole covers, and caps for the posts. This Element may be painted, unpainted, or galvanized; steel, aluminum, cast iron, fiberglass or wood.
- (e) Arms – This Element includes the arm or Luminaire support and connection between the arm and pole.
- (f) Luminaires – This Element includes Luminaires and all associated electrical components, lamps, Luminaire controls, and mounting/connection to the pole or arm.
- (g) Electrical Wires – This Element includes wires that are visible inside Handholes and T-bases.

For non-District-owned Elements, the Developer shall coordinate Asset Management Work with Utility Owners per Section 6 of these Technical Provisions.

10.8.1 Condition Rating Scale

The Condition Rating Scales listed in Appendix 13.10 of these Technical Provisions are to be applied at the Element-level. The following considerations apply:

- (a) The detailed rating scales are illustrative in nature and are intended to provide guidance in terms of commonly found deficiencies and how they should be rated.
- (b) The guidance is not intended to be all encompassing, as other deficiencies may be discovered in the field, nor is the guidance intended to overrule the inspector's judgment of a deficiency.
- (c) According to the detailed guidance in Appendix 13.10 of these Technical Provisions, the inspector's engineering judgment should be used when assigning ratings, recommendations, and deficiency correction priorities.

As such, the qualifications and training of the inspectors is of paramount importance and is further detailed in the following subsections.

10.8.2 Timing of Condition Assessment

A Condition Assessments shall be performed according to the following parameters:

- (a) A full Condition Assessment of each Element of the Network shall commence at the beginning of Year 8 of the Project Term and shall be completed within 365 days.
- (b) The Developer shall meet U.S. Coast Guard requirements for inspection of marine Lighting Units as specified in the United States Code of Federal Regulations Part 118 - "Bridge Lighting and Other Signals".

10.8.3 Condition Assessment Planning, Training and General Procedures

- (a) The Developer shall conduct training for inspectors who will perform Condition Assessments to ensure inspectors have a common understanding of the Condition Rating Scale in order to consistently and uniformly perform Condition Assessments. Training shall include but is not limited to a classroom training session and field observations. The Developer shall coordinate inspector training with the District and allow District staff to attend all training sessions at their discretion.
- (b) While performing Condition Assessments, inspectors shall conduct visual inspections of each Element from the ground. Binoculars shall be used to assess Elements that cannot be easily seen from ground level (e.g., arms and Luminaires at 30 feet and above). Digital photographs can also be used to inspect Elements not easily seen from the ground. When needed, bolt covers and t-base/pole skirt access door covers shall be removed to allow for visual inspection of anchor bolts. Covers shall be re-installed at the end of each Condition Assessment.

10.8.4 Condition Assessment Personnel Qualifications

Asset Management personnel shall meet the standards outlined in Section 10.8.4 of these Technical Provisions. The qualifications for personnel involved in performing Condition Assessments on Lighting Units are as follows:

- (a) Condition Assessment Program Manager: The Condition Assessment Program Manager is in charge of the overall scheduling, quality assurance, and inventory data management associated with the Condition Assessments. The Condition Assessment Program Manager shall meet the following minimum qualifications:
 - (i) Registered Professional Engineer in the District of Columbia with a minimum of 10 years of experience in ancillary highway structure inspections in a responsible capacity; and

- (ii) Successfully completed a FHWA approved Ancillary Highway Structures Inspection and Maintenance Course within the past 5 years.
- (b) Condition Assessment Team Leader: The Condition Assessment Team Leader sets the task schedules, organizes maintenance of traffic, lane closures and parking restrictions as necessary, and is in charge of the Condition Assessment team while in the field. The Condition Assessment Team Leader shall have successfully completed the FHWA approved Ancillary Highway Structures Inspection and Maintenance Course within the past 5 years. Additionally, the Inspection Team Leader shall meet one of the following minimum qualifications:
 - (i) Have five (5) years of experience in ancillary highway structure inspections in a responsible capacity; OR
 - (ii) Have National Certification in Engineering Technologies (NICET) Level III or IV certification in Structure Inspection; OR
 - (iii) Have all of the following:
 - a. A bachelor's degree in engineering from a college or university accredited by or determined as substantially equivalent by the Accreditation Board for Engineering and Technology; and
 - b. Have successfully passed the National Council of Examiners for Engineering and Surveying Fundamentals of Engineering Exam; and
 - c. Two (2) years of experience in ancillary highway structure inspection.
- (c) Condition Assessment Team Member: The Condition Assessment Team Member is responsible for supporting the Team Leader in organizing and performing inspections.
- (d) For personnel required to have successfully completed the FHWA approved Ancillary Highway Structures Inspection and Maintenance Course, successful completion of this course is required every five (5) years.
- (e) All inspection personnel required to climb or work in an aerial lift shall have successfully completed an OSHA-approved "Fall Protection" course/class, which fulfils the requirements of OSHA 1926.503.
- (f) All inspection personnel should be able to physically perform the work.

10.8.5 Condition Assessment Team Member's Judgement

- (a) The Condition Assessment Team Member is responsible for performing a thorough and detailed inspection of each and every Element using formal training and the guidance provided herein. The Condition Assessment Team Member is responsible for using sound engineering judgment and experience in determining specific details or factors that could affect the structural integrity of Elements or the traveling public. Examples of this include assigning the condition ratings for each Element, assigning repair recommendations, and assigning priorities for those recommendations.

10.8.6 Condition Assessment Safety

- (a) Safety of the Condition Assessment Team Members and the traveling public is paramount when performing daytime and nighttime condition assessments of Elements. As such, the Condition Assessment Team Member shall, as part of the planning and preparation process, perform a job safety analysis in order to identify the typical safety hazards and mitigate risk for both the

Condition Assessment team and the traveling public. It should be noted that special conditions could arise during the Condition Assessment that were not identified as part of the safety analysis. Should a hazardous safety condition arise during the Condition Assessment that was not anticipated or expected, the Condition Assessment operation shall be halted until the hazardous safety condition is addressed. If the hazardous condition cannot be addressed on site, the Condition Assessment operation shall be postponed until said hazardous condition is or can be addressed.

- (b) The following general safety policies are provided to assist Condition Assessment personnel in mitigating risk during Condition Assessments:
 - (i) Condition Assessment Team Members and other personnel shall wear, at a minimum, high visibility safety apparel that meet FHWA and District requirements. As necessary, other safety equipment such as hard hats, safety shoes, safety glasses and gloves should be used.
 - (ii) All overhead Condition Assessment activities shall be limited to areas over travel lanes that are closed to traffic.
 - (iii) Maintenance of Traffic (MOT) procedures shall be in accordance with the Technical Requirements.
 - (iv) Vehicles shall be located as far off the travel lane as possible when performing shoulder or median work.
 - (v) Vehicles shall be equipped with high intensity rotating, oscillating, or flashing strobe lights.
 - (vi) The Condition Assessment Team Member shall consider all wiring, conduits, junction boxes, and all other components of the lighting system to be energized and operational. The Condition Assessment Team Member shall follow all District and OSHA guidance for working around and near electrical hazards.
 - (vii) Condition Assessment operations shall not be conducted in inclement weather unless deemed necessary due to an observable emergency condition. Should Condition Assessment operations be underway on a specific structure at the time of inclement weather, the operations may continue until the Condition Assessment is completed or roadway conditions become hazardous to the traveling public. In both cases, the operation shall be terminated until the inclement weather passes from the area.
 - (viii) When nighttime Condition Assessments are required, the Condition Assessment Team Members must take steps to ensure adequate illumination of the Condition Assessment surfaces and visibility of the Condition Assessment Team Members. Consideration shall be given to placement and movement of the lights to properly illuminate all areas of the Lighting Unit being inspected to eliminate shadows and provide the best possible visual inspection conditions. Lights must be positioned so that they will not be a distraction to or impair oncoming motorists or pedestrians.

10.8.7 Condition Assessment of Non-District-Owned Elements

- (a) During Condition Assessments, the Developer may encounter non-District-owned elements which affect a Lighting Unit. If the non-District-owned Element is in a state that negatively affects or may negatively affect the function of a Lighting Unit, the Developer shall alert the District of the issue. For example, if a Lighting Unit is attached to a non-District-owned structure,

and the structure appears to be leaning and/or is in danger of falling, the Developer shall alert the District of the danger.

10.8.8 Access and Maintenance of Traffic Requirements

- (a) Maintenance of Traffic, including shoulder and lane closures, may be required for inspection of Lighting Units. Maintenance of traffic shall be planned and conducted in accordance with Section 11 of these Technical Provisions.
- (b) When planning the inspection of Lighting Units, the Condition Assessment Team Leader should review previous Condition Assessment data (once available) and locations of the Lighting Units to determine if special access requirements exist that require maintenance of traffic or special equipment. Special equipment, including, but not limited to, bucket trucks, snoopers, or a man lift/scissor lift, may be required to perform the inspection of certain Lighting Units. Examples of Lighting Units that may require special access equipment for inspection include underpass lights, navigation lights, and overhead sign structure lights.

10.8.9 Elements Not Visible for Condition Assessment

- (a) When an Element is not visible for Condition Assessment (e.g., a completely buried foundation or t-base cannot be accessed, etc.), the Developer shall prepare a plan to maintain the Element in a state of minimum acceptable condition according to the Performance Requirements in Table Appendix-1, Table Appendix-2, or Table Appendix-3 of these Technical Provisions and then perform a Condition Assessment on any Elements that were previously inaccessible.

10.8.10 Pre-Condition Assessment Procedures

- (a) A pre-condition assessment review of information should be conducted prior to any Lighting Unit Condition Assessment. All historical records should be located and reviewed, such as as-built drawings, prior Condition Assessment reports, shop fabrication drawings, and previous notes on traffic control. Condition Assessment orientation and nomenclature should be established prior to performing the Condition Assessment. Nomenclature for Lighting Unit orientation is typically related to the direction of roadway travel.
- (b) The Condition Assessment Team Members should ensure that they have all basic tools and equipment needed to perform the Condition Assessment, which may include the following: standard personal protective equipment (safety vest, hard hat, steel toe shoes, etc.); gloves; safety glasses; flashlight; handheld device with GPS and AMIS system access (iPad or similar); camera; shovel; mason hammer; level; plum bob; tape measure; folding ruler; calipers; socket set; drill bits; wrenches; screw drivers; drill; spotting scope/binoculars; pliers; voltage tester; WD-40; Electrical tape; box cutter; and, first aid kit.

10.9 Attachments

- (a) The Developer shall identify, photograph, and record the presence of Attachments on Elements of the Street Light Network during all Condition Assessments, according to the requirements of these Technical Provisions. Attachments may be connected to Elements of the Street Light Network that are owned by the District, other government entities, utility companies, or private entities.
 - (i) Examples of attachments to Elements of the Street Light Network include traffic signals, pedestrian signals, CCTV cameras, traffic sensors, display screens, beacons, mirrors,

speed cameras, speed meters, solar panels, microwave detectors, parking occupancy sensors, emergency vehicle sensors, smart vehicle detectors, video vehicular detection cameras, PEPCO radio transmitters, MPD CCTV cameras, police radio transmitters, speed information detectors, shot spotter sensors, weather stations, short haul antennas for wireless Ethernet bridges, Wi-Fi access points, proximity sensors, video notes, sensitivity sensor pods, DC Water data collector units, small cell antennas and related equipment, and other unknown objects.

- (b) For the betterment of safety and security within the District, MPD and DDOT are partnered on multiple projects involving Street Light Assets in the public space, including installation of MPD CCTV cameras on Poles. The Developer shall meet the following requirements related to MPD CCTV cameras:
- (i) During the D&C Period, the District will provide the bidder with a list of Poles that include MPD CCTV cameras. The Developer shall reconnect MPD CCTV cameras per the instructions provided by the District.
 - (ii) For the Improved Network and Expanded Network, or following the D&C Period through completion of the Project Term, MPD will provide MPD CCTV cameras to the Developer. The Developer shall install MPD CCTV cameras per the instructions provided by the District.
 - (iii) Reconnection and installation Work performed for items i and ii above shall be performed by a licensed journeyman electrician.
 - (iv) All Work and materials used must be in accordance with the District of Columbia Department of Transportation Standard Specifications for Highways and Structures and NEC.
 - (v) Before commencing reconnection or installation Work, the Developer shall verify that Poles are in suitable condition for attachments, including ensuring Poles are not leaning, broken or otherwise damaged. The Developer shall verify there are secondary Street Light cables present.
 - (vi) For attaching MPD CCTV cameras to wood Poles, the Developer shall attach camera equipment onto wood pole using steel banding straps. Use the appropriate number of straps to accommodate the equipment weight. Install two #10 AMG copper cables from the equipment connection point to the existing wood pole secondary point. The cables shall be covered and securely fastened to the pole using 2inch PVC U-guard. Connect to the secondary cables by opening/removing the existing split bolt, inserting new cables, and closing/ reattaching split bolt. This applies to the hot and neutral. The third cable shall be one #8 stranded bare copper cable. This shall be connected to the existing earth grounding system via a split bolt connector on the wood pole.
 - (vii) For attaching MPD CCTV cameras to metal Poles, the Developer shall attach camera equipment onto metal pole using the same steel banding straps and use the appropriate number of straps to accommodate the equipment weight. Drill a $\frac{3}{4}$ inch hole through the metal pole to accommodate the use of an outdoor waterproof GFCI receptacle (Hole shall be patched with a watertight duct seal). There shall be a continuous cable run from the receptacle to the manhole connection point. Connect the two #10 cables AMG cable to the secondary cables inside the manhole using metal barrel compression connectors.

The #8 grounding cables from the receptacle shall be connected to the existing ground rod inside the pole foundation. Lastly, at the receptacle connection point, the camera equipment cables shall be fixed with a plugin connector to accommodate the receptacle.

- (viii) For clarification, DDOT will pay Pepco for energy used by Street Light assets. MPD is responsible for establishing a separate agreement with Pepco for energy consumed by MPD CCTV cameras.
- (ix) The Developer shall meet the requirements included in section 32.12 of the Project Agreement.
- (c) The Developer shall identify, photograph, and record the presence of attachments on Elements of the Street Light Network during all Condition Assessments, according to the requirements of these Technical Provisions.
- (d) The Developer shall identify the owner of the attachment, and when possible, shall photograph and record any labels that identify possible attachment ownership.
- (e) When Work is performed that affects an attachment, the Developer is responsible for notifying any identified attachment owner. The Developer shall photograph the attachment before it is removed. In the case that the Developer is responsible for reinstalling the attachment, the Developer shall photograph the attachment after it is re-installed.
- (f) The Developer is responsible for removing, storing, installing a temporary replacement, taking down the temporary replacement, and re-installing District-owned attachments according to District guidelines and standards.
- (g) For attachments that are signs, the Developer is responsible for notifying the District Streetlight Team to inspect District-owned signs after they have been re-installed.
- (h) The Developer is responsible for removing and storing attachments that are not District-owned throughout the Project Term. The attachment owner is responsible for collecting and re-installing attachments that are not District-owned.
- (i) The Developer may be responsible for removing attachments through District Direct Requests. The Developer may be responsible for storing attachments through District Direct Requests throughout the Project Term. The Developer may be responsible for disposing of attachments.
- (j) The Developer shall be responsible for meeting the requirements pertaining to small cells listed in section 5.3, 10.10.1, and 10.10.2 of these Technical Provisions.
- (k) During the Work performed by small cell providers described in Section 5.3 of these Technical Provisions, specific Lighting Units will be temporarily removed from the Street Light Network. During this period, the Lighting Unit will not be subject to the performance requirements listed in Appendix 13.1 of these Technical Requirements. The Lighting Units shall be subject to the performance requirements following acceptance by the Developer back into the Street Light Network.

10.10 Inspections

- (a) Three types of inspections are to be conducted during the Project Term.
 - (i) Field inspections
 - (ii) Construction Inspections
 - (iii) Final Inspections
- (b) Inspections are performed on in-service Lighting Units as part of Field Evaluations and shall consist of:
 - (i) Verification of all basic Lighting Unit data;
 - (ii) Assessment of all Elements; and
 - (iii) Inspect all Elements for changes from previously-recorded data. Historical Condition Assessment data shall be available on-site for reference.

10.10.1 Final Inspection

- (a) These inspections are to be performed as part of acceptance of Lighting Units into the Street Light Network.
- (b) The Developer shall prepare an acceptance procedure, including testing procedures, and perform Condition Assessments of the Luminaires and Lighting Units built in the Public Space by the District or its agent and third parties that shall become part of the Expanded Street Light Network.
- (c) Third Parties responsible for the addition of Luminaires and Lighting Units to the Street Light Network are responsible for adhering to all District policies, guidelines, and requirements, including those specified in these Technical Provisions.
- (d) For Infrastructure Project Management Division (IPMD) “Streetscape Projects” where Lighting Units are replaced, the IPMD contractor is responsible for adhering to all District publications, policies, guidelines, and requirements, including those specified in these Technical Provisions for the Term.
- (e) The Developer is responsible for providing the IPMD contractor with Luminaires and RMCS nodes for Lighting Units that shall become part of the Expanded Street Light Network.
 - (i) The Developer shall coordinate with the District or its agent on the type and quantities of Luminaires to be provided.
 - (ii) The Developer is responsible for providing the Luminaires and RMCS nodes at a location within the District and to be determined by the District.
 - (iii) The Developer shall coordinate with the District on the timing of the handover.
 - (iv) The Developer shall include the costs of Luminaires and RMCS nodes in its base bid price and follow the requirements for submitting Luminaire and RMCS nodes unit costs in Form 11 of the ITP.

- (f) The Developer shall be responsible for installing RMCS gateways and nodes and connecting these Lighting Units to the RMCS. The Developer and the District will coordinate on the appropriate timing for installation.
- (g) The Developer shall evaluate and review Luminaires and Lighting Units that are to be added into the Street Light Network by Third Parties and IPMD to confirm that they adhere to all applicable policies, guidelines, and requirements.
- (h) The Developer shall prepare an acceptance procedure, including testing procedures, and perform Condition Assessments of the Luminaires and Lighting Units modified by small cell providers to include small cell attachments. During the Work performed by small cell providers described in Section 5.3 of these Technical Provisions, these Lighting Units will be temporarily removed from the Street Light Network, at no additional cost to the Developer. After the Work to attach a small cell is complete, the Developer shall be responsible, in coordination with the District Streetlight Team, for inspection and acceptance of these Lighting Units back into the Street Light Network.
 - (i) The Developer shall engage with the small cell providers as necessary to facilitate acceptance of Lighting Units back into the Street Light Network.
 - (ii) The expectation is that the Lighting Units will be accepted back into the Lighting Network at the same condition or better at which they were removed.
 - (iii) For further detail on small cells, reference section 5.3 of these Technical Provisions.
- (i) The Developer shall notify the District 14 days prior to its planned final acceptance testing and Condition Assessment of Luminaires and Lighting Units to be added into the Street Light Network.
 - (i) The District performs its own diligence including inspection of the Luminaires and Lighting Units as part of its own acceptance process.
 - (ii) The Developer and the District shall conduct joint acceptance testing and Condition assessment procedures of such Luminaires and Lighting Units.
- (j) The District is solely responsible for accepting Luminaires and Lighting Units into the Street Light Network.
- (k) Upon acceptance of Lighting Units into the Expanded Street Light Network, the Third Party or IPMD contractor shall provide a two-year warranty, as per District publications.
- (l) The Developer shall store any equipment replaced as part of an IPMD project. The Developer shall have the option to reuse the equipment, including but not limited to RMCS nodes and gateways, if the equipment is certified refurbished and adheres to all applicable policies, guidelines, and requirements.

10.10.2 Construction Inspection

- (a) Construction Inspections will predate Final Inspections and involves the inspection of third-party construction Work on the Streetlight Network. These circumstances include: IPMD projects, small cell attachment, and Network Expansion.

- (b) The intent of construction inspections is to verify the various stages of construction and various Elements to ensure proper installation.

10.10.3 Field Inspection

- (a) Within twelve (12) hours of receipt of a Service Request the Developer shall perform an investigation of field conditions related to relevant Lighting Units and other, connected or adjacent Project Elements to:
 - (i) Assess the Project Site to ensure safety of the Developer and the general public;
 - (ii) Determine if a revised Condition Assessment of Elements is warranted. If warranted, follow the requirements in section 10.10(b) and sections 10.9.4 through 10.9.11 of these Technical Provisions.
 - (iii) Update the Lighting Asset Inventory and Element Condition Ratings in the AMIS as needed;
 - (iv) Review the Service Request after the Field Evaluation is complete;
 - (v) Ensure that the Service Request is not duplicative of another Service Request or Work Order;
 - (vi) Determine if a Work Order should be created;
 - (vii) If a Work Order is not created, close the Service Request and log the resolution in the AMIS; and
 - (viii) Where applicable assign a Service Request and/or a Work Order to a classified Noncompliance Event.
- (b) Each review of field conditions after receipt of a Service Request is a "Field Inspection."
- (c) As each review shall include the Lighting Unit and other, connected or adjacent Project Elements, any observations of Noncompliance Events shall be documented and communicated to the District.
- (d) The format of the Field Inspections shall be submitted to the District by the Developer for approval 60 days prior to NTP2. The Developer shall prepare the Field Evaluations in electronic format.

10.11 Asset Management Plan

- (a) The International Standard for Asset Management – Management Systems – ISO-55001:2014 should serve as a reference document for the Developer. This standard establishes the core requirements for good practice approaches to managing infrastructure assets. It does not specifically set out the asset management activity requirements for assets, but rather sets out the requirements that an organization should use to determine the most appropriate lifecycle activities to meet its obligations – service, safety, financial etc.
- (b) The Developer shall document its asset management practices in order to:
 - (i) Demonstrate its asset management practices are and remain suitable and effective for delivering the performance, service and asset conditions set out in these Technical Provisions;
 - (ii) Ensure its asset management practices have been developed with consideration of good industry practice; and

- (iii) Demonstrate that its asset management practices are consistent with the International Standard for Asset Management - Management Systems - ISO-55001:2014.
- (c) The Developer shall submit an Asset Management Plan to the District for approval in accordance with this Section 10.11 of these Technical Provisions. The Developer shall submit to the District for approval electronic copies of the Asset Management Plan for each of the following Submittals:
 - (i) Draft Asset Management Plan;
 - (ii) Final Asset Management Plan; and
 - (iii) Annual Asset Management Plan updates.
- (d) The Developer shall manage the Project in full compliance with the procedures and standards outlined in the Asset Management Plan and in the performance requirements listed in Appendix 13.1.
- (e) The Asset Management Plan shall also include Condition Assessment procedures. These procedures should detail and explain how the Developer will provide inspect, test, and perform Condition Assessments on Lighting Units and supporting lighting infrastructure.
- (f) The Developer shall develop and implement an Asset Management Plan, which shall initially address Asset Management, to be updated during the last annual update cycle that is at least 45 days prior to the end of the Term.
- (g) The Developer shall submit the draft Asset Management Plan to the District for review and approval within 120 days of NTP1. The Developer shall submit the final Asset Management Plan to the District for review and approval 90 days prior to NTP2. The Asset Management Plan shall be completed in accordance with the requirements set forth in this Section 10.8 of the Technical Provisions. 45 days prior to the beginning of each Fiscal Year after NTP3, the Developer shall update the Asset Management Plan and submit it to the District for review and approval. Each update of the Asset Management Plan shall include changes to operating protocols, agreements and interactions with other entities, and indicate revised operating requirements for equipment.
- (h) The Asset Management Plan for all Asset Management Work shall include, at the minimum, the following:
 - (i) Lighting Asset Inventory with location and clear description of all Project Elements, including Lighting Units, Elements, and equipment, within and outside the Project Site to be managed by the Developer;
 - (ii) Description of the Developer's approach to the Lighting Asset Inventory, Inspections and Condition Assessments, and Asset Management Work;
 - (iii) A staff organization chart and staffing plan including all key personnel, other Developer personnel, positions, qualifications, training and certification processes, Work locations, Work hours, and contact details required for the Asset Management Work;
 - (iv) The Asset Management Manual for the Asset Management Work;

- (v) The Developer's self-monitoring and self-reporting processes, including a list of the procedures to be used for all activities associated with the Asset Management Work, including Emergency Response and Incident Response requirements;
- (vi) Method of tracking, reporting and calculating Noncompliance Points, Deductions, Planned Outages, and Permitted Closures;
- (vii) Description of the Developer's approach to quality management, quality assurance, and quality control;
- (viii) Description of the Developer's approach to safety and security for the Asset Management Work;
- (ix) Description of the Developer's approach and assumptions for the Renewal Work and equipment/vehicle replacement, including life cycles and Renewal Work Schedule;
- (x) Description of the Developer's approach to coordinate with the District for all inspection processes;
- (xi) Description of the Developer's approach to obtaining all Governmental Approvals required for the Asset Management Work including any revision, modification, amendment, supplement, renewal or extension thereof;
- (xii) Description of the Developer's approach to Emergency Response, and Incident Response, including coordination with relevant Third Parties;
- (xiii) A list with addresses and phone numbers for all the facilities that will be used by the Developer, including any off-site storage or maintenance facilities;
- (xiv) A list of vehicles, tools, spare parts and Incident Response and other major equipment furnished by the Developer to support the Asset Management Work;
- (xv) Vegetation Management Plan;
- (xvi) The Asset Management Work activities planned for next 12 months, on a monthly basis; and
- (xvii) Guidelines and procedures for the efficient, coordinated, and consistent implementation of the Safety Plan, Traffic Incident Management Plan, Traffic Management Plan, Emergency Response Plan, and any other plan required for the performance of the Asset Management Work.

10.11.1 Annual Asset Management Plan Updates

- (a) At a minimum, annual review and updates to the Asset Management Plan shall include:
 - (i) An updated Lighting Asset Inventory including description, location, age and current condition;

- (ii) Analysis of historic and current performance trends;
 - (iii) Estimated useful life and projected residual life by Lighting Unit;
 - (iv) Asset management approaches that demonstrate an efficient and economic whole life cost approach to decisions regarding the balance between Condition Assessment, Routine Asset Management Activities, renewal, replacement and enhancement of Elements to ensure they meet the operational, performance and residual life requirements of the Elements regardless of when in the Term such decisions are to be made;
 - (v) Policy for asset preservation including implementation of Routine Asset Management Activity regimes;
 - (vi) Planned Routine Asset Management Activity program to be performed on the Elements through the Term including forecasts of work volumes derived from the asset management approaches;
 - (vii) Planned Renewal Work including forecasts of work volumes derived from the asset management approaches;
 - (viii) Specific details related to service interruptions and Planned Outages necessary for performing planned Asset Management Work, Renewal Work or replacement;
 - (ix) Register of asset-related risks – including risks associated with asset failure, likelihood of occurrence and magnitude of impact – along with mitigation/treatment strategies;
- (b) Annual Asset Management Plan Updates shall be submitted to the District for approval within 45 days prior to the beginning of each Fiscal Year after NTP3.

10.11.2 Renewal Requirements

- (a) The Developer shall perform Renewal Work to maintain compliance with all Performance Requirements. The Developer shall perform Renewal Work required to meet the performance requirements listed in Appendix 13.1, Governmental Approvals, and all applicable Laws. The Developer shall use the Renewal Work Schedule, as updated from time to time, for scheduling and performing Renewal Work.
- (b) The Developer shall produce the following plans and reports related to Renewal Work performed by the Developer. The Developer shall develop and implement a five-year Renewal Work Plan to the District within 45 days prior to the Substantial Completion Date of the final Street Light Bundle. The Renewal Work Plan shall be completed in accordance with the requirements set forth in this Section 10.11 of the Technical Provisions. Within 45 days of the beginning of each Fiscal Year after the Substantial Completion Date of the final Street Light Bundle, the Developer shall update the Renewal Work Plan and submit it to the District for approval.
- (c) The Renewal Work Plan shall include the following, at a minimum:
 - (i) Renewal Work Schedule of rehabilitation works to be conducted over the following five (5)

- years including anticipated timing of each planned Work on an annual basis;
- (ii) Quality System for all Renewal Work contained within the Renewal Work Schedule;
 - (iii) Results of the Conditions Assessments that have been used to develop the Renewal Work Plan; and
 - (iv) Planned approach to each Renewal Work project including quality management, quality control and quality assurance.
- (d) The Renewal Work Schedule shall set forth, by Element:
- (i) the estimated useful life;
 - (ii) the estimated remaining useful life;
 - (iii) a brief description of the type of Renewal Work anticipated to be performed at the end of the Element's useful life; and
 - (iv) A schedule of anticipated Permitted Closures and Work windows for the performance of the Renewal Work covered by the Renewal Work Schedule during the upcoming five (5) years.
- (e) Beginning from the first Substantial Completion of a Project Bundle, the Developer shall deliver the Renewal Work Report, including any as-built record plans, to the District, no later than 45 days after the end of the prior Fiscal Year for review and comment. The Renewal Work Report shall be completed in accordance with the requirements set forth in this Section 10.11 of the Technical Provisions. The Renewal Work Report shall, at minimum, include the following:
- (i) Summary of the preceding year's completed Renewal Work performed, including the location, the type of Work performed for each Element listed on the Renewal Work Schedule and any other component, including the dates of commencement and completion and the final cost (for both the specific task and for all Renewal Work performed during the Calendar Year);
 - (ii) As-built record plans;
 - (iii) Any updated Lighting Asset Inventory data as a result of the Renewal Work; and
 - (iv) A list of any Work which was included in the previous year's Renewal Work Schedule, but was not conducted and an explanation of why the Developer did not conduct this Renewal Work.

10.11.3 Mandatory Spare Parts

- (a) The Developer shall determine the spare parts required to meet its maintenance and renewal obligations required to keep Elements in accordance with the performance requirements listed in Appendix 13.1 and manage inventories accordingly.
- (b) The Developer shall make Luminaires and RMCS nodes available on an annual basis for IPMD projects as per section 10.7.7 of these Technical Provisions.

- (c) The Developer shall be responsible for installing RMCS nodes and gateways as per section 10.7.7 of these Technical Provisions.

10.11.4 Organization and Staffing – Qualifications of Personnel

- (a) Developer shall ensure that Developer's Asset Management personnel comply with the requirements in this Section 10.11.4. The following list of qualifications is not exhaustive. All personnel must be properly qualified for the duties that they are performing and must be adequately supervised.
 - (i) The Asset Management Lead must comply with the qualification requirements of Section 2.1 of these Technical Provisions;
 - (ii) Asset Management Team Members working on traffic, lighting, and other electrical systems must have the relevant International Municipal Signal Association and/or American Traffic Safety Services Association certifications.
- (b) The Developer shall ensure all persons engaged in Asset Management Work shall exercise sound judgment in carrying out their duties and conduct themselves in such a manner that will reflect favorably upon District. The District also reserves the right to require removal of any person engaged in Asset Management Work from the Project who cannot perform his or her duties or who damages the reputation of the District. The Developer shall ensure that all persons engaged in Asset Management Work shall:
 - (i) Wear clean and neat uniforms; and
 - (ii) Carry a government-issued photo ID and a Developer-issued picture ID.

10.11.5 Safety Plan

- (a) The Developer shall perform all Asset Management Work in a manner that ensures the safety of the public and Developer personnel, District employees, and the Public in accordance with all applicable Laws and Safety Standards. As part of the Asset Management Plan, the Developer shall develop a Safety Plan that includes staff training, safety procedures, and protocols to address the hazardous conditions associated with the Asset Management Work. The Safety Plan shall address the Developer's approach to meeting all the requirements set forth below and shall be included in the Safety Plan section of the Asset Management Plan for review and approval. The Developer shall:
 - (i) Ensure the safety of all its personnel and shall maintain the safety required and provide safety equipment and procedures for the protection of employees and the public throughout the area(s) of the applicable Project Site;
 - (ii) Ensure that all equipment used shall be maintained in a safe and efficient manner in accordance with all Laws, safety organizations, regulations and guidelines pertaining to providing the required services; and
 - (iii) Follow all safety requirements outlined in the National Electric Safety Code (NESC) and the Occupational Safety and Health Administration (OSHA).

- (iv) In the event of a pandemic, such as COVID-19, ensure that all its personnel take the proper considerations including but not limited to: use of face masks and gloves, hand sanitizer is made available to personnel, and the number of individuals is limited to no more than two per truck.
- (v) In the event that Work is required near overhead streetcar catenary lines, take adequate precautions to avoid high voltage catenary wires.
- (vi) In the event that Work is required near small cell attachments, take adequate precautions to ensure that no Work is conducted near an active small cell, as close contact with a small cell attachment risks exposure to potentially harmful levels of radiation.
- (vii) Ensure the safety of all employees working in the Public Space in regards to threats of violence from members of the public. The Developer is encouraged to contact the Metropolitan Police Department (MPD) if the safety of its personnel or the public is deemed to be in jeopardy.
- (viii) Ensure all personnel adhere to the Maintenance of Traffic requirements in section 11 of these Technical Provisions, including but not limited to those provisions developed as part of the Transportation Management Plan and Traffic Control Plans.

10.11.6 Quality Management Plan

- (a) Quality terminology, unless defined or modified elsewhere in the Agreement, has the meanings in ISO 9001. Terms used in ISO 9001 include the following meanings:
 - (i) Organization: Developer's organization, including any affiliates and subcontractors;
 - (ii) Customers: the users of the roadways (i.e., general public), the District, and stakeholders; and
 - (iii) Product: the Project Work.
- (b) Developer shall prepare the Quality Management Plan (QMP) that must include procedures for interdisciplinary quality reviews and coordination. Developer shall submit the Quality Management Plan General Requirements, as described below in this section to the District for approval in the District's good faith discretion and obtain such approval prior to NTP2.
- (c) Developer shall document and regularly maintain the QMP, so that it contains current versions of the following information:
 - (i) Resumes for all quality management personnel, including information on certifications held;
 - (ii) The organizational chart that identifies all quality management personnel, and their roles, authorities, and line reporting relationships;
 - (iii) Description of the roles and responsibilities of all quality management personnel and those who have the authority to stop Work;

- (iv) Procedures for ensuring independence of quality staff and procedures for assuring their authority to effect changes in the event of Developer's failure to comply with the Agreement; and
 - (v) Identification of any required testing organizations, including information on each organization's capability to provide the specific services required for the Work.
- (d) The QMP must contain a complete description of the quality policies and objectives that Developer shall implement throughout its organization. The policy must demonstrate the commitment of Developer's senior management to implement and continually improve the quality management system for the Work.
- (e) The QMP must address the following topics as they relate to the Asset Management Work:
- (i) Administration and document control;
 - (ii) Inspections;
 - (iii) Condition Assessments;
 - (iv) Routine Asset Management Activities; and
 - (v) Work performed during or as a result of Incidents, Severe Weather Events, and/or Emergencies.
- (f) Concurrent with the Asset Management Plan Submittal, the Developer shall submit the QMP to the District for approval in the District's good faith discretion.

10.11.7 Asset Management Manual

- (a) The Developer shall develop and submit, as part of the Asset Management Plan, a detailed Asset Management Manual based on the Asset Management Work. This Asset Management Manual shall include information regarding the procedures for Asset Management.
- (b) The Asset Management Manual shall be used by the Developer and shall be updated in accordance with the requirements set forth in this Section 10 of the Technical Provisions to indicate the Asset Management requirements for the Lighting Units, Elements, Developer equipment, and Developer systems as they are revised, upgraded and/or replaced. The Asset Management Manual shall be complete and include, at a minimum, the following requirements:
 - (i) A list of asset management procedures and protocols, including a schedule of routine Asset Management Activities and their required frequency;
 - (ii) A contact list of the various entities and agencies that the Developer will require coordination with for the Asset Management Work, including their contact information (contact person, address, e-mail address, telephone numbers, website address);
 - (iii) A contact list of the Developer's key personnel who will be coordinating with the District and other various entities and agencies, including their contact information (contact person,

- address, e-mail address, telephone numbers, website address);
- (iv) Operating protocols, agreements and interactions with other entities such as the District, agencies, emergency responders, police, fire and any other similar Governmental Entities;
 - (v) Copies of all operations forms and checklists and associated procedures for monitoring and evaluation, including Noncompliance Event logs, logs of Planned Outages, logs of Permitted Closures, including Permitted Closures and Unavailability Events;
 - (vi) Policies and procedures for handling personal injury or public safety concerns;
 - (vii) Steps and procedures for managing traffic during Asset Management Work, Planned Outages, Permitted Closures, and Third Party events, including coordination with Third Parties for such events;
 - (viii) Established procedures for external communications;
 - (ix) Approach and procedures to response, remediation, and clean-up efforts associated with Incidents, and in particular traffic Incidents, fuel spills, Hazardous Materials or other contamination causing events;
 - (x) A logical system breakdown of all Lighting Units, Elements, and data systems, including facilities equipment and systems and the levels of maintenance to be provided by the Developer's staff;
 - (xi) List of the Project's major software-related systems and equipment manufacturers/vendors, including their contact information (contact person, address, telephone numbers, website address and e-mail address);
 - (xii) List of Contractors used to perform any maintenance services and the identification of the services expected to be provided; routine and preventative maintenance tasks and the required frequencies;
 - (xiii) Diagnostic procedures for equipment and systems;
 - (xiv) Spare parts inventory procedures for all Lighting Units, Elements, and RMCS components;
 - (xv) Systems, software and equipment manufacturer's Asset Management Manuals;
 - (xvi) Copies of all as-built drawings that detail the components of the Asset Management Work to be provided and the physical limits or boundaries of the Asset Management Work, including wiring diagrams, schematic drawings, logic block diagrams, assembly and disassembly drawings clearly identifying the components;
 - (xvii) Copies of all Field Evaluation forms, Condition Assessment checklists, etc.;
 - (xviii) Copies of Asset Management Daily Report Formats, Asset Management Weekly Report Formats, Asset Management Monthly Report Formats, Asset Management Annual Report Formats; and

(xix) Data Management Flow processes per Section 10.3 of these Technical Provisions that describe how data is processed in the AMIS.

- (c) Standard service manuals for commercially available equipment and products shall be acceptable as part of the Asset Management Manual only if the equipment provided is standard off-the-shelf equipment without any custom features or functions. Custom equipment and systems shall have custom Asset Management Manuals that include detailed information that addresses the custom features of the equipment provided and shall include drawings. The non-applicable portions of standard manuals shall be neatly encircled and cross hatched to clearly indicate that these sections are not applicable.

10.12 Planning and Reporting Requirements

10.12.1 Asset Management Schedule

- (a) The Developer shall prepare an Asset Management Schedule on a monthly and annual basis in accordance with the requirements set forth in this Section 10 of the Technical Provisions. The Asset Management Schedules shall describe all of the Planned Outages for the given period and shall include at a minimum the expected dates, locations, times, durations of all Asset Management Work, Routine Asset Management Activities, and expected impacts on traffic, including any Permitted Closures.

10.12.2 Asset Management Daily Reports

- (a) From NTP3, the Developer shall deliver Asset Management Daily Reports to the District for review and comment no later than 07:00 each day. The format of the Asset Management Daily Report shall be submitted to the District by the Developer for approval 60 days prior to NTP3. The Developer shall prepare the Asset Management Daily Reports in electronic format and each report shall contain at a minimum the following information:
 - (i) A summary of the Conversion Work and Asset Management Work activities for the upcoming day;
 - (ii) A summary of the Conversion Work and Asset Management Work performed and completed for the previous day and confirmation that the Developer performed all Conversion Work and Asset Management Work in accordance with these Technical Provisions;
 - (iii) A summary of the Conversion Work and Asset Management Work that was not completed for the day, including the reasons for the incompleteness of the Conversion Work and Asset Management Work and a summary of deferred days for each deferred item;
 - (iv) Summary of the Routine Asset Management Activities performed for the previous day beyond the Asset Management Work activities for that month;
 - (v) Detailed results of Asset Management Work and other Work that was performed during the day;
 - (vi) Summary of Street Light Network performance;

- (vii) Details on all instances of Noncompliance Events, describing at a minimum: the corresponding name and ID number per Table Appendix-1, Table Appendix-2, or Table Appendix-3, the commencement time, duration, entity who identified the event first, details regarding the cure of Noncompliance Events including the steps taken and the time it took to cure, applicable Cure Period, the status of the event as of the end of the month, Noncompliance Points if any associated with each event, and the changes (if any) made to the Asset Management Plan based upon the events;
- (viii) Summary of Noncompliance Points accrued by the Developer for the past day and total balance for the past week, month, quarter, 365 days and 1095 days;
- (ix) Summary of Deductions assessed pursuant to Exhibit 14 of the Project Agreement and any backup calculations associated with the determination of such Deductions;
- (x) Summary of Planned Outages and Permitted Closures for the past day including details describing the location and duration;
- (xi) A summary of the status of the Project for the day identifying all Planned Outages and explaining as applicable for each Planned Outages whether it is a Noncompliance Event or a Permitted Closure;
- (xii) Operator event log data including all operator actions and event details for traffic and systems events, Incidents, Severe Weather Events, Emergencies and the details of the Developer's Responses including response time data, response records, etc.;
- (xiii) Developer's Response logs including a time based report of all actions and activities performed by the Developer; and
- (xiv) Detailed results of all inspections, assessments and testing activities, including the related procedures, forms, etc.

10.12.3 Asset Management Weekly Reports

- (a) From NTP3, the Developer shall deliver Asset Management Weekly Reports to the District for review and comment no later than Monday by 15:00 each week. The format of the Asset Management Weekly Report shall be submitted to the District by the Developer for approval 60 days prior to NTP3. The Developer shall prepare the weekly reports in electronic format and each report shall contain at a minimum the following information:
 - (i) A summary of the Asset Management Work activities, including Planned Outages, for the upcoming week;
 - (ii) A summary of the Asset Management Work performed and completed for the previous week and confirmation that the Developer performed all Asset Management Work in accordance with the Project Documents;
 - (iii) A summary of the Asset Management Work that was not completed for the week, including the reasons for the incompleteness of the Asset Management Work and a summary of deferred days for each deferred item;

- (iv) Summary of the Routine Asset Management Activities per Section 10.4 of these Technical Provisions performed for the previous week beyond the Asset Management Work activities for that month;
- (v) Detailed results of Asset Management Work and other Work that was performed during the week;
- (vi) Details on all instances Noncompliance Events, describing at a minimum: the corresponding name and ID number per Table Appendix-1, Table Appendix-2, or Table Appendix-3, the commencement time, duration, entity who identified the event first, details regarding the cure of such Noncompliance Events including the steps taken and the time it took to cure, applicable Cure Period, the status of the event as of the end of the month, Noncompliance Points if any associated with each event, and the changes (if any) made to the Asset Management Plan based upon the events;
- (vii) Summary of Noncompliance Points accrued by the Developer for the past week and total balance for the past month, 365 days and 1095 days;
- (viii) Summary of Deductions assessed pursuant to Exhibit 14 of the Agreement and any backup calculations associated with the determination of such Deductions;
- (ix) Summary of Planned Outages and Permitted Closures for the past week including details describing the location and duration;
- (x) A summary of the status of the Project for the week identifying all Closures and explaining as applicable for each Closure whether it is a Noncompliance Event or a Permitted Closure;
- (xi) Operator event log data including all operator actions and event details for traffic and systems events, security Incidents, weather Incidents, and the details of the Developer's Incident Response including response time data, response records, etc.;
- (xii) Developer's Incident, Severe Weather, and Emergency Response logs including a time based report of all actions and activities performed by the Developer; and
- (xiii) Proposed updates to the Lighting Asset Inventory including changes to Lighting Unit and Element condition.

10.12.4 Asset Management Monthly Reports

- (a) From NTP3, the Developer shall deliver the Asset Management Monthly Report to the District for review and comment no later than the 15th day of each month. The format of the Asset Management Monthly Report shall be submitted to the District by the Developer for approval 60 days prior to NTP3. The Developer shall prepare the monthly reports in electronic format and each report shall contain at a minimum the following information:
 - (i) A summary of the Asset Management Work activities for the upcoming month;
 - (ii) A summary of the Asset Management Work performed and completed for the previous month and confirmation that the Developer performed all Asset Management Work in

accordance with these Technical Provisions;

- (iii) A summary of the Asset Management Work that was not completed for the month, including the reasons for the incompleteness of the Asset Management Work and a summary of deferred days for each deferred item;
- (iv) Summary of the Routine Asset Management Activities performed for the previous month beyond the Asset Management Work activities for that month;
- (v) Detailed results of Asset Management Work and Routine Asset Management Activities that were performed during the month;
- (vi) Details on all instances of Noncompliance Events, describing at a minimum: the corresponding name and ID number per Table Appendix-1, Table Appendix-2, or Table Appendix-3, the commencement time, duration, entity who identified the event first, details regarding the cure of such Noncompliance Events including the steps taken and the time it took to cure, applicable Cure Period, the status of the event as of the end of the month, Noncompliance Points if any associated with each event, and the changes (if any) made to the Asset Management Plan based upon the events;
- (vii) Summary of Noncompliance Points accrued by the Developer for the past month and total balance for the past 365 days and 1,095 days;
- (viii) Summary of Deductions assessed pursuant to Sections 22 and 23 of the Project Agreement and any backup calculations associated with the determination of such Deductions;
- (ix) Summary of Planned Outages and Permitted Closures for the past month including details describing the location and duration;
- (x) A summary of the status of the Project for the month identifying all Closures and explaining as applicable for each Closure whether it is a Noncompliance Event or a Permitted Closures;
- (xi) Operator event log data including all operator actions and event details for traffic and systems events, Incidents, Severe Weather Events, Emergencies and the details of the Developer's Response including response time data, response records, etc.;
- (xii) Developer's Response logs including a time-based report of all actions and activities performed by the Developer; and
- (xiii) Detailed results of all inspections, assessments and testing activities, including the related procedures, forms, etc.

10.12.5 Asset Management Annual Reports

- (a) On an annual basis, the Developer shall create a consolidated Asset Management Annual Report. The Asset Management Annual Report shall summarize all of the activities associated with Asset Management Work for the year, including the Routine Asset Management Activities performed

for the year, and confirmation that the Developer performed all Asset Management Work in compliance with these Technical Provisions.

- (b) From NTP3, the Developer shall deliver the Asset Management Annual Report to the District no later than the 30th day of each Fiscal Year for review and comment. The Asset Management Annual Report shall be completed in accordance with the requirements set forth in this Section 10 of the Technical Provisions. The Developer's Asset Management Annual Report shall contain the following information:
 - (i) A summary of all Asset Management Monthly Reports from the preceding year;
 - (ii) Statement of all adjustments to the Asset Management Monthly Reports from the preceding year (if any);
 - (iii) Reconciliation of Deductions incurred during the year, including any adjustments, shown as amounts rounded to the nearest dollar. The reconciliation shall include all calculations and any backup information associated with such update; and
 - (iv) A summary of the information requested by the District (corrected if necessary), by month during the preceding year (if any).
- (c) The Developer shall meet the minimum Performance Requirements set forth in Table Appendix-1, Table Appendix-2, and Table Appendix-3 of the Technical Provisions from the NTP3 to the end of the Term. Failure to meet these minimum Performance Requirements shall result in Noncompliance Events.
- (d) The Developer shall develop and detail in the Asset Management Plan the approach to be used in order to achieve the minimum Performance Requirements as detailed in Table 10-1 and Table 10-2 of the Technical Provisions and implement this approach.

10.13 Submittals

- (a) The Developer shall submit at a minimum the following Submittals to the District in accordance with this Section 10 of these Technical Provisions:
 - (i) Draft Asset Management Plan for approval no later than 120 days after NTP1;
 - (ii) Final Asset Management Plan for approval no later than 90 days prior to anticipated receipt of the first NTP3;
 - (iii) Annual Asset Management Plan Updates for approval within 45 days prior to the beginning of each Fiscal Year after NTP3;
 - (iv) Asset Management Monthly Report Format for approval 60 days prior to NTP3;
 - (v) Asset Management Monthly Report for review and comment by the 15th day of each month beginning at NTP3;

- (vi) Asset Management Annual Report for review and comment no later than the 30th day of each Fiscal Year beginning at NTP3;
 - (vii) Asset Management Weekly Report Format for approval 60 days prior to NTP3;
 - (viii) Asset Management Weekly Report for review and comment by 15:00 on Monday each week beginning at NTP3;
 - (ix) Asset Management Daily Report Format for approval 60 days prior to NTP2;
 - (x) Asset Management Daily Report for review and comment by 07:00 of each day beginning at NTP3;
 - (xi) Renewal Work Plan for approval no later than 45 days prior to Substantial Completion of the final Street Light Bundle or Annual Renewal Work Plan Updates for approval no later than 45 days prior to beginning of Fiscal Year after Substantial Completion of the final Street Light Bundle;
 - (xii) Renewal Work Report for review and comment no later than 45 days after the end of each Fiscal Year beginning at Substantial Completion of the Final Street Light Bundle;
 - (xiii) Damage report within 24 hours after Emergency;
 - (xiv) Field Evaluation forms upon completion of Field Evaluations;
 - (xv) Work Orders upon opening and closing of Work Orders;
 - (xvi) Asset Management Daily Reports for approval at the end of each Day; and
 - (xvii) Asset Management Weekly Reports for approval at the end of each Week.
- (b) Under no circumstances is this list of Submittals to be construed as exhaustive and the Developer shall be solely responsible for meeting any and all Submittal requirements of the Technical Provisions.

11 MAINTENANCE AND PROTECTION OF TRAFFIC

The Developer shall perform all maintenance and protection of traffic Work in accordance with this Section 11 of the Technical Provisions, including the Guidelines, Manuals, Specifications, and Standards in Appendix 13.2, and with the Project Agreement. The standards are subject to change and include:

- (a) District's Transportation Online Permitting System (TOPS)
- (b) District of Columbia Department of Transportation Work Zone Safety and Mobility Policy
- (c) The District's Temporary Traffic Control Manual
- (d) Federal Highway Administration Work Zone Safety and Mobility Rule
- (e) National Cooperative Highway Research Program Report 498 – Illumination Guidelines for Nighttime Highway Work
- (f) Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD)
- (g) The District's General Traffic Control Plan Submittal Guidelines
- (h) The District's Maintenance of Traffic TCP Inspection Criteria
- (i) The District's Work Zone Management Manual
- (j) District of Columbia Department of Transportation Design & Engineering Manual
- (k) District of Columbia Department of Transportation Standard Specifications for Highways and Structures

Planning and work conducted in the Public Space shall be performed in the spirit of the District's goal of Vision Zero. The goal of Vision Zero is to eliminate all transportation-related fatalities and serious injuries on District streets by the year 2024, using a holistic set of tools that incorporates the disciplines of engineering, evaluation, law-enforcement, and education.

11.1 Permitted Closures

- (a) Any Closure that is not a Permitted Closure shall result in an Unavailability Event.
- (b) Any Closure arising as a direct result of:
 - (i) A Compensation Event;
 - (ii) Conversion Work within a Project Site with a TCP respecting that Project Site, which has been approved by the District;
 - (iii) Planned Maintenance or response to a Planned Outage for which the District has approved the Closure;
 - (iv) Subject to Section 11.1.c below, an Emergency or an Incident; or

(v) Permissible Unplanned Maintenance;

Shall be deemed to be a **“Permitted Closure”** for which the District will not have the right to assess any Noncompliance Event; provided that the Developer is using its Reasonable Efforts to:

- a. Mitigate the impact of the relevant Closure;
 - b. Reopen the affected portion(s) of the roadway or sidewalk within or adjacent to a Project Site as quickly as possible to traffic;
 - c. Minimize the impact of the Developer’s activities to pedestrian and vehicular traffic flow during such Closure: and
 - d. In respect of any Emergency or Incident, respond to the Emergency or Incident in accordance with any relevant requirements of the Project Agreement.
- (c) A Closure arising as a direct result of an Emergency or an Incident shall only be deemed to be a Permitted Closure to the extent that it does not arise as the direct result of:
- a. Any breach of a Project Agreement caused by the Developer;
 - b. Any wilful misconduct or negligent act or omission of the Developer; or
 - c. Any risk that the Developer is required to insure against pursuant to the terms of the Project Agreement.
- (d) The Developer shall request and obtain approval for all Closures in accordance with DDOT’s Memoranda on Traffic Control Plan (TCP) Submittal Guidelines and Traffic Control Plan (TCP) Inspection Criteria. A Closure that is not approved by the District shall not be a Permitted Closure.
- (e) The Developer shall utilize the District’s Transportation Online Permitting System (TOPS), for acquiring the necessary Emergency-No Parking signs.
- (f) The Developer shall only submit Traffic Control Plans (TCPs) and the District will only approve TCPs that plan for Closures during the times denoted as ‘Work Allowed’ in the table below. Planned Work is only allowed during the times denoted as ‘Work Allowed’ in the below table and during the hours between the AM and PM Rush Hours (9:30AM to 4:00PM).

Table X: Prohibited Work Times

Road Applications	Work Type	AM Rush Hour Closures 7:00AM - 9:30AM	PM Rush Hour Closures 4:00PM - 6:30PM	Permitted Night Work 6:31PM - 6:59AM
Freeways & Expressways,	Construction Work	No Work	No Work	Work Allowed
	Conversion Work	No Work	No Work	Work Allowed
	Other Maintenance	No Work	No Work	Work Allowed
Other Principle Arterials, Minor	Construction Work	No Work	No Work	No Work
	Conversion Work	No Work	No Work	Work Allowed

Road Applications	Work Type	AM Rush Hour Closures 7:00AM - 9:30AM	PM Rush Hour Closures 4:00PM - 6:30PM	Permitted Night Work 6:31PM - 6:59AM
Arterials and Collectors.	Other Maintenance	No Work	No Work	Work Allowed
Local Roads	Construction Work	No Work	No Work	No Work
	Conversion Work	Work Allowed	Work Allowed	Work Allowed
	Other Maintenance	Work Allowed	Work Allowed	Work Allowed
Alleyways	Construction Work	No Work	No Work	No Work
	Conversion Work	Work Allowed	Work Allowed	Work Allowed
	Other Maintenance	Work Allowed	Work Allowed	Work Allowed
Pedestrian Paths and Bike lanes	Construction Work	No Work	No Work	No Work
	Conversion Work	No Work	No Work	Work Allowed
	Other Maintenance	No Work	No Work	Work Allowed

In addition to the prohibitions listed in Table X, the Developer shall account for the following prohibitions around Holidays:

- (i) Day preceding the Holiday: No Work after 12:00 p.m.
- (ii) Day of the Holiday: No Work
- (iii) Day after the Holiday: Work may resume at 12:00 p.m.

(g) Access Ramps to Interstate Highways

- (i) The Developer shall not be permitted to close access ramps to Interstate Highways without prior approval from the District. At no time shall two consecutive on-ramps (ingress) or off-ramps (egress) be closed without prior approval from the District.

(h) Driveways

- (i) The Developer shall not close, block, or restrict the use of any driveway and pedestrian access to any private property, either a residence or a place of business, or a public building. For businesses with multiple driveways, Closure of a driveway may be permitted only if such Closure is included in a TCP approved by the District and the Developer has notified the property owners and tenants ten days in advance of driveway restrictions affecting their properties. The Developer shall coordinate with affected property owners and tenants on each driveway Closure and maintain record of such coordination and notifications.

(i) Bicycle Lanes and Cycle Tracks

- (i) During the Conversion period and for the remainder of the Project Term, the Developer may close Bicycle Lanes or Cycle Tracks for a period not to exceed one hour. The Developer shall

not close more than one block at a time. The Developer shall use a traffic control device instructing cyclists to dismount their bicycle and walk it through the work zone.

(j) Sidewalks

- (i) The Developer shall ensure that pedestrians have continuous access to and through Project Sites at all times. The Developer shall not close, block, or restrict the use of sidewalks on both sides of a street or roadway at the same time.
- (k) If the District determines in its sole discretion that the hours for Permitted Closure in Section 10.1.f of the Technical Provisions adversely affect traffic, causing queues that exceed the thresholds contained in the DDOT Work Zone Safety and Mobility Policy, the District may adjust such hours accordingly. The District will notify the Developer in writing of any change in such hours.
- (l) For any time other than that listed in Section 11.1(f) of the Technical Provisions, the Developer may schedule Work in a Project Site provided that:
 - (i) The Developer shall make reasonable efforts to close only one traffic lane at a time on any given portion of roadway when performing such Work; and
 - (ii) To the extent that such Work involves Closures, the Developer shall implement and execute such Closures in accordance the requirements in this Section 11 of the Technical Provisions.
- (m) Notwithstanding the foregoing, in the event that any traffic lane is the subject of a Permitted Closure, and a Closure that is not a Permitted Closure occurs in the traffic lanes remaining in service, then the traffic lanes subject to the Permitted Closure also shall be deemed to be subject to a Closure, which is not a Permitted Closure.
- (n) Sections 104.02(A) and 104.02 (C)(4) of the District of Columbia Department of Transportation Standard Specifications for Highways and Structures apply to Closures. The District reserves the right not to approve a request for Closure and modify the time period for Permitted Closures identified in Section 11.1 of the Technical Provisions, and the schedule of Closures is subject to the District's sole or reasonable discretion.

11.2 Transportation Management Plan

11.2.1 General Requirements

- (a) The Developer shall develop, implement, update and maintain a Transportation Management Plan (TMP) laying out a set of coordinated transportation management strategies and describing how such strategies shall be used to achieve the overall requirements and objectives set forth in Section 11 of these Technical Provisions.
- (b) The TMP shall further present the Developer's organization and personnel with MOT managerial responsibility, as well as the standard, prototypical procedures, means and methods to address all traffic configuration and situations that can reasonably be anticipated in the execution of the Work in the Public Space, for all types of Work.

- (c) Specific interventions, tactics, means and methods respecting the Work to be performed at a specific Project Site shall be described in the Traffic Control Plan (TCP) for that Project Site, per the requirements set forth in Section 11.3 of the Technical Provisions.
- (d) The TMP shall be applicable and cover all Work in the Public Space and all traffic situations that can reasonably be anticipated.
- (e) The TMP shall comply with the requirements of this Section 11.2 of the Technical Provisions, the District Work Zone Safety and Mobility Policy, the District's Temporary Traffic Control Manual, and the mandatory standards listed in Appendix 13.2.

11.2.2 Timing of TMP Submittal

- (a) The TMP, in draft, final form, and any update thereof, is a Discretionary Submittal.
- (b) The TMP shall be submitted in draft form at least 90 days before the scheduled date of the first NTP3 and in final form at least 30 days before the scheduled date of the first NTP3 per the Project Baseline Schedule. The TMPs shall be signed and sealed by a Professional Engineer.
- (c) Approval by the District of the TMP is a condition precedent to the issuance of the first NTP3.
- (d) Following the approval of the initial TMP by the District, the Developer shall update and submit for approval by the District all subsequent proposed changes to the TMP. The Developer may update and submit to the District the updated TMP at any time. The Developer shall submit a TMP to the District for approval at least once per year regardless of whether the Developer proposes any change.
 - (i) When submitting any update(s) to the TMP, the Developer shall submit a clean version of the document and a version of the document with tracked changes.

11.2.3 Content of the TMP

(a) Overview

The TMP content must follow the guidelines in the FHWA Work Zone Safety and Mobility Rule and the District's Work Zone Safety and Mobility Policy and must include at a minimum the following sections, in that order:

- (i) Table content;
- (ii) Organization, roles, and responsibilities;
- (iii) Description of Work types requiring maintenance and protection of traffic;
- (iv) Description of existing-conditions;
- (v) Project Site / work zone impacts assessment ;
- (vi) Transportation management strategies;
- (vii) All Typical Applications that the Developer intends to use for Work in the Public Space

(viii) Monitoring and reporting requirements; and

(ix) Traffic Incident Management Plan (TIMP).

Typical Applications (TAs) created by the Developer for expected repeated use in performing work can be submitted for review and approval as part of the TMP, or can be submitted through the TCP process described in Section 11.3 of the Technical Provisions and added to the TMP, if approved.

(b) Organization, Roles and Responsibilities

As part of the TMP, the Developer shall provide an organizational chart with clear lines of accountability and reporting and shall identify, assign, and provide descriptions of the qualifications and duties along with contact information of personnel with traffic control responsibilities, including the following:

- (i) Developing, implementing, and managing the TMP and TCPs in close coordination with the District; ensure that all traffic-control personnel receive adequate training and comply with the requirements of the TMP, TCPs, and this Section 11 of the Technical Provisions; monitoring, evaluating and reporting on the effectiveness of the TMP and TCPs; establishing and maintaining current a list of emergency contacts, updating as necessary, and ensuring all traffic-control personnel are familiar with the list (“the MOT Manager”).
- (ii) Implementing specific tasks recommended by the TMP and TCPs (“the MOT Implementation Task Leaders”).
- (iii) Monitoring and evaluating Project Sites to ensure that the Developer complies with the TMP and TCPs. These personnel are to report to the MOT Manager and to the District (“the MOT Monitors”);
- (iv) Fulfilling the duties of the Traffic Safety Officer (TSO) as defined in Section 612(B)(1) of the District of Columbia Department of Transportation Standard Specifications for Highways and Structures.

(c) Existing Conditions

As part of the TMP, the Developer shall document existing, prototypical vehicular and non-vehicular traffic conditions in and around Project Sites, including traffic volumes and patterns, safety concerns, emergency access requirements, special considerations, third party access concerns, public transportation, schools, hospitals, among others. The Developer shall also provide procedures for documenting existing traffic conditions respecting each Project Site and incorporate findings into the TCP respecting such Project Site.

(d) Project Site / Work Zone Impacts Assessment

As part of the TMP, the Developer shall perform and present the results of a qualitative and quantitative assessments of the potential impacts of the Work in the Public Space that provide the rationale for the Project Site / work zone transportation management strategies in the TMP.

Such analyses shall be updated for the specific conditions at each Project Site as part of the TCP respecting such Project Site. Such analyses include:

- (i) The qualitative assessment shall include a discussion of how Work in a Project Site is expected to impact its vicinity, including traffic, safety and pedestrian/bicyclists. It shall include an overview of the Project Bundles and how the Bundles were developed to minimize work zone impacts.

The Project Site analysis shall include coordination with other projects in the vicinity. If another existing project abuts the Project Site, the Developer shall factor the other project(s) into the TCP and coordinate with the other project. If another project in the vicinity begins after Work has commenced in the Project Site, the Developer shall coordinate and cooperate with the other project. However, the other project is required to account for Developer's presence in its own TCP.

- (ii) Quantitative analyses shall be provided to identify and quantify expected traffic delays and queues, if any, and durations and length of such delays.

(e) Transportation Management Strategies

The Developer shall identify the Project Site/work zone impact management strategies that will be used for each typical Project Site and traffic condition. These strategies shall include traffic control strategies, public information strategies, and traffic operational strategies. The Developer shall indicate how each strategy is anticipated to address Traffic and safety concerns. The TMP shall include the following items for all geographic areas that may be impacted by Work in the Public Space:

- (i) Description of anticipated traffic management situations based on the Developer's analysis of existing conditions in per Section 11.2.3(b) of the Technical Provisions;
- (ii) Procedures to minimize traffic disruption and efficiently maintain and control Traffic;
- (iii) Procedures to maintain access to private property, businesses, public buildings and for emergency services and other service providers;
- (iv) Procedures to comply with all District and federal ordinances;
- (v) Procedures to identify, incorporate the needs of, and minimize traffic impact to hospitals, emergency service providers, public transit operators, Utility Owners, Governmental Entities, the District, schools, business owners and their customers, and local residents;
- (vi) Procedures for addressing Special Events and other community events, including procedures to research, identify and reflect the needs of Special Events and other community events in each TCP;
- (vii) Procedures to coordinate the TMP with other construction projects in the District and maintenance activities conducted by the District, per Section 11.2.3(b);
- (viii) Procedures for starting and ending detours, Closures and other traffic pattern

modifications;

- (ix) Procedures for notifying the District and other applicable Governmental Entities of detours, Closures and other traffic pattern modifications, and implementing and maintaining those modifications;
- (x) Procedures to communicate TMP and TCP information to Development Entity's public information personnel and notify the public of detours, Closures and other traffic pattern modifications, in accordance with the requirements of Section 3 (Public Information and Communications);
- (xi) Procedures for signing in and around Project Sites;
- (xii) Procedures for placing, maintaining, and removing traffic control devices;
- (xiii) Procedures for verifying that the traffic control devices and MOT protocols used matches what is shown in the approved TCPs.
- (xiv) Procedures to incorporate the requirements of and facilitate the District's snow and ice operations and other District maintenance procedures into the TCPs;
- (xv) Procedures to determine detour routes, haul routes and/or delivery routes and for obtaining approval from the District for all proposed detour routes;
- (xvi) Procedures for mobilization and demobilization of Work in Project Sites;
- (xvii) Procedures for verifying twice daily that all Work in the Public Space is in accordance with the approved TMP and the relevant, approved TCPs and for verifying the effectiveness of the TMP and TCPs by collecting traffic data (such as travel time, delay, speeds, Incidents, accidents, among others) as needed.
- (xviii) Procedures to coordinate with the District or its agent for any operating signal that may be impacted by the Work or detour routes to ensure efficient and continuous traffic signal operations, ensure temporary system compatibility, establish responsibilities for temporary signal installation, maintenance, operation and removal, and coordinate traffic signal timing;
- (xix) Procedures for monitoring, evaluating and verifying the quality, efficacy and safety of the TMP and any TCP, including means, methods and frequency of inspection and maintenance of all traffic control devices, response times to correct, modify, or implement changes to traffic control measures, and procedures to revise the TMP and TCPs to remedy;
- (xx) Procedures for evaluation and identification of measurable limits for the repair and replacement of traffic-control devices, including pavement markings;
- (xxi) Procedures and processes for the safe ingress and egress of the Developer's vehicles in Project Sites, and in particular those Project Sites located on or near the Interstate Highway;
- (xxii) Procedures for re-opening a Closure promptly in the event of equipment breakdown, shortage of materials, lack of production materials, or other production failure, or when it

becomes necessary to re-open the Closure to address traffic congestion;

- (xxiii) Provisions to provide continuous access to established truck routes, Hazardous Material (HazMat) routes, transit routes, and school bus routes and/or to provide suitable detour routes, including obtaining any approval required by the appropriate Governmental Entities and the District for such uses;
- (xxiv) Descriptions communications protocols with the Districts and contact methods, personnel responsible, and response times for the Developer to respond to any Incident, Emergency, and Noncompliance with the requirements of the TMP or the TCP respecting a Project Site at all times (i.e. 24 hours per day, 7 days per week), during working hours and off-hours;
- (xxv) Specific measures to manage traffic during inclement weather; and
- (xxvi) Procedures for night Work to incorporate the District's safety and work zone light system requirements as specified in the Temporary Traffic Control Manual, the MUTCD, and NCHRP Report 498 – Illumination Guidelines for Nighttime Highway Work.

(f) Typical Applications

As described in Section 11.3.5 Typical Applications (TAs) for Temporary Traffic Control Zones, the TMP shall include:

- (i) Procedures for the development of the Traffic Control Plans (TCPs) respecting each Project Site;
- (ii) Prototypical TCPs for anticipated traffic management situations, including descriptions of traffic phasing to accommodate staging and phasing of Work in the Public Space;
- (iii) Procedures for obtaining the District's approval of TCPs and for obtaining approvals for working in the Public Space; and
- (iv) Procedures to accommodate the needs of and prevent delays to adjacent and concurrent projects in the TCPs.

(g) Traffic Incident Management Plan (TIMP)

As part of the TMP, the Developer shall develop a comprehensive Traffic Incident Management Plan (TIMP) and identify traffic management strategies and procedures to prevent, when possible, respond to, manage, and mitigate the impact of for Incident and Emergency. The TIMP shall:

- (i) Identify and describe how each strategy is anticipated to address vehicular and non-vehicular traffic and safety concerns;
- (i) Identify methods for Incident detection and verification, communications and coordination with first responders, response, site management, clearance, and motorist information.

- (ii) Identify and provide for the incorporation of design elements to aid Incident prevention and management, including turn-around for emergency vehicles, emergency access points, and incident investigation;
- (iii) Identify procedures for communications and coordination with the District's Traffic Systems Management Center (TSMC). In addition, if any local agencies in the Project area have adopted Incident Management Guidelines, the Project Developer shall be responsible for coordinating with local policies and procedures.
- (iv) Include specific time limits for the detection, verification, and classification of Incidents, as well as for the dissemination of information about the Incidents;
- (v) Provide a mechanism to review and capture lessons learned from Incident and modify the TIMP to reflect such lessons learned; and
- (vi) Reflect proposed Work phasing for each Project Site.

(h) Monitoring and Reporting Requirements

In addition to any monitoring and reporting provision listed in Section 10 of the Technical Provisions, the Developer shall coordinate with the District and define in the TMP the procedures, content, and frequencies for monitoring and reporting to the District on the effectiveness of the TMPs and TCPs and any other traffic-related impact of the Work conducted in the Project Sites.

At the minimum, the Developer shall report to the District field observations, crash data analyses, and other pertinent operational information within 2 hours for safety-related information and within 24 hours otherwise.

(i) TMP Updates

The TMP shall be updated at the following times:

- (i) The Developer shall update the TMP annually.
- (ii) The Developer shall update the TMP and submit for approval by the District any time a material change is made.
- (iii) When the Developer produces new TAs, the TMP shall be updated to include the new TAs and submitted to the District for approval. New TAs can be submitted at will.

11.3 Traffic Control Plans

- (a) The primary function of Traffic Control Plans is to present the tactical plans for ensuring safe and efficient movement of Traffic through and/or around Project Sites and to protect workers, properties, and equipment.

11.3.1 General Requirements

- (a) The Developer shall not perform any Work requiring a Closure in the Public Space without an approved TCP.
- (b) TCP submissions shall meet the standards outlined in the District's General Traffic Control Plan (TCP) Submittal Guidelines.
- (c) Each Project Bundle shall include at least one or more TCPs.
- (d) Except as noted in Section 11 of these Technical Provisions, the Developer shall develop and implement a Traffic Control Plan (TCP) for each Project Bundle and for each Project Site where the Developer will perform Work in the Public Space requiring the implementation of traffic control measures, following the District's General Traffic Control Plan Submittal Guidelines, Maintenance of Traffic TCP Inspection Criteria, Work Zone Management Manual, Temporary Traffic Control Manual, and the FHWA MUTCD.
- (e) The TCPs for each Project Bundle shall show the Developer's proposed staging of Work in the Public Space, proposed traffic control devices consistent with the TMP timing of such Work, and application of traffic control devices consistent with the Project Schedule.
- (f) The TCPs shall be prepared under the direction and direct supervision of the Developer's WZTEM and stamped by the WZTEM.
- (g) The Developer shall coordinate the development of the TCPs with the District and with appropriate Governmental Entities.
- (h) The Developer shall be responsible for obtaining all necessary approvals and agreements to implement the TCPs, including Fire and Police department approvals. **Fire and Police Departments** for all affected jurisdictions, including non-District departments, are included.
- (i) All signs, flagger, spotters and other traffic-control devices shall be shown on the TCPs. If flagging is to be performed during hours of darkness, the TCPs shall require the appropriate illumination and safety procedures for flagging station(s) and personnel as specified in the Temporary Traffic Control Manual, the MUTCD, and NCHRP Report 498 – Illumination Guidelines for Nighttime Highway Work.
- (j) The Developer is solely responsible for the safe implementation of the TCPs and for providing copies of the TCPs to the TSO and any Developer staff with traffic control responsibilities. A copy of the TCP for each Project Site shall be available on the Project Site to the Developer's staff and to the District at all time when Work is performed in or in the vicinity of that Project Site.
- (k) Each TCP shall comply with the requirements of this Section 11 of the Technical Provisions, the District Work Zone Safety and Mobility Policy, the District's Temporary Traffic Control Manual, and the mandatory standards listed in Appendix 13.2.

11.3.2 Emergency-No Parking Signs

- (a) The Developer shall submit requests for Emergency No-Parking signs through the District's Transportation Online Permitting System (TOPS).
- (b) Requests shall be submitted as part of the Project Bundle submittal.

- (c) The Developer shall allow for up to 14 days for review.
- (d) The Developer shall not be assessed an application fee for TOPS submittals.
- (e) The TCP shall clearly identify any impact on parking and include reference Emergency No Parking Sign.

11.3.3 Timing of TCP Submittals

- (a) All TCPs, in draft, final form, and any update thereof, are Non-Discretionary Submittals.
- (b) A TCP respecting a given Project Site shall be submitted to the District for review and comment in concurrence with the timing for the Project Bundle submittal described in Section 7.2.5 of the Technical Provisions, at least 14 days before issuance of the corresponding NTP3 during the Conversion Period, or 14 days prior to the scheduled commencement of the Construction Work after the Developer has achieved Substantial Project Completion, in accordance with .
- (c) Approval by the District of the TCP respecting a given Project Bundle is a condition precedent to the issuance of the NTP3 for that Project Bundle.

11.3.4 Content of TCPs

- (a) Each TCP submission shall meet the requirements and standards set forth in the General Traffic Control Plan (TCP) Submittal Guidelines.
- (b) Each TCP shall meet or exceed both the District of Columbia Department of Transportation Temporary Traffic Control Manual and the Federal Highway Administration MUTCD requirements and contain, at a minimum, the content required in the District of Columbia Department of Transportation Design and Engineering Manual and the District of Columbia Department of Transportation Standard Specifications for Highways and Structures.
- (c) The Developer shall use Typical Applications for traffic control whenever possible and appropriate to assist in developing site-specific TCPs. The Developer shall prepare documentation and data to justify all proposed Closures, detour routes, change or reduction in normal traffic flows and proposed modification to traffic signal timing.

11.3.5 Typical Applications (TAs) for Temporary Traffic Control Zones

- (a) Project bundles requiring mobile, short-duration, or moderate duration Temporary Traffic Control Zones as defined below and in the DDOT Temporary Traffic Control Manual and FHWA MUTCD are eligible for Typical Applications (TAs).

The Developer shall produce TAs to be submitted to the District as part of the TMP. The Typical Applications publicly available on the District Department of Transportation's website (ddot.dc.gov/page/utility-work-zone-traffic-control-plan-tcp-typicals) do not meet current codes and standards and shall not be used as-is for the Project. The Developer may refer to such TAs as Reference Information Document only in the definition of the Developer's own TAs.

- (b) The District reserves the right to use the TAs developed by the Developer and approved by the District for any other purpose, related or unrelated to the Project.

- (c) Only mobile, short-duration, and moderate duration Temporary Traffic Control Zones are eligible for application of TAs.
 - (i) Mobile – work that occupies a location for 5 minutes or less
 - (ii) Short-duration – work that occupies a location between 6 and 15 minutes.
 - (iii) Moderate-duration – work that occupies a location between 16 and 60 minutes
- (d) Work requiring traffic control zones with a duration greater than one hour are not eligible for use of TAs.
- (e) A separate TA shall be submitted for an intersection, as a block ends at an intersection.
- (f) TCP submissions which utilize TAs shall meet the submittal requirements and standards outlined in the General Traffic Control Plan Submittal Guidelines.
- (g) Notwithstanding the foregoing, the District reserves the right to require a Project Site-specific TCP at its sole discretion. If typical applications are used, they shall be self-contained (i.e., single or multiple sheets) and clearly identified to allow the Developer to specify its use by call-out (with minor modifications, as needed).
- (h) Content and Format of Typical Applications
 - (i) The Developer shall be able to use the same TA for different Project Sites and Work type.
 - (ii) A TA shall present similar information and in a similar format as the Typical Applications publicly available on the District Department of Transportation's website (ddot.dc.gov/page/utility-work-zone-traffic-control-plan-tcp-typicals)
 - (iii) A TA shall show all the existing conditions in the immediate vicinity of the work, as well as labeling the roadways and showing a north directional arrow. When flaggers are deployed at work zones, they must be certified and have electronic communication.

Additionally, depending on the functional classifications of the affected roadways, the deployment of all the temporary traffic control devices and signage shown on the TA may be required. Failure to do so may result in a Noncompliance Event.
 - (iv) The TAs shall have the District logo in the northeast corner of the document but no other logo or brand mark.

12 HANDBACK

The Developer shall execute all Handback Work in accordance with this Section 12 of the Technical Provisions, including the Guidelines, Manuals, Specifications, and Standards listed in Appendix 13.2, and with Section 19 of the Project Agreement.

General

- (a) Each Element of the Project shall meet the minimum Performance Requirements set forth in Tables Appendix-2 and Appendix-3 of these Technical Provisions as of the Handback Date. For the avoidance of doubt, each Element shall meet minimum the Condition Rating set forth in Table Appendix-2 of these Technical Provisions and the condition rating process set forth in Section 10.8 of these Technical Provisions.
- (b) Before the end of the Term, the Developer shall repair, replace, overhaul, refurbish or rehabilitate, as appropriate, any Element that:
 - (i) Does not meet the Performance Requirements; or
 - (ii) Cannot be reasonably maintained by the District to continue to perform within the specified Performance Requirements after the end of the Term.
- (c) The Developer shall coordinate all aspects of the development of the Handback Work Plan with the District, and coordinate all aspect of the execution of the Asset Management Work performed during the Handback Period as planned in the Handback Work Plan and as approved by the District including any independent Condition Rating Assessments, inspection, validation, and testing of the Project Elements and acceptance of the Elements as of or before the Handback Date, as approved by the District in its sole discretion.
- (d) The Developer shall deliver all Work identified in the Handback Work Plan in accordance with these Technical Provisions.
- (e) When the Handback Work Plan is instituted, the Handback Work Plan shall take precedence over the Renewal Work Plan.

12.1 Final Condition Assessment to be conducted by Independent Engineer

- (a) A final handback condition assessment shall be conducted in accordance with section 19.2 of the Project Agreement.
- (b) The Independent Engineer shall complete a full condition assessment of the entire asset inventory within eight months of commencement of the contract. 25% of assets shall be assessed every two months resulting in a full assessment at eight months.
- (c) A report of condition assessment results shall be provided to the District every two months for each quarter of the asset inventory until results for the full inventory are provided. The results shall be made available within three weeks of completing the assessment of each group of assets.

- (d) A full and final condition assessment report shall be provided to the District within four weeks of completing the full condition assessment.
- (e) The Independent Engineer shall calculate the Handback Reserve Amount based on the results of its condition assessment. The Independent Engineer shall produce the first Handback Reserve Amount as part of its first compilation of condition assessment results as referenced in section 12.1(g). The Independent Engineer shall then make subsequent updates to the Reserve Amount as part of each of its three following condition assessment reports. Finally, the full Handback Reserve Amount shall be calculated and submitted as part of the full and final condition assessment report referenced in section 12.1(h).
- (f) The District will approve all payment(s) to the Independent Engineer.
- (g) The Developer shall provide a training manual which shall include standard operating procedures for using the condition assessment results. The District maintains sole discretion to approve the training manual.
- (h) The Independent Engineer shall conduct condition assessments according to the standards listed in section 10 of these Technical Provisions and using the condition rating scales listed in Appendix 13.10.
- (i) The Developer shall coordinate training sessions with the Independent Engineer and the District to correlate understanding of condition rating scales. Training materials shall be provided to the District for approval prior to the training sessions. The trainings shall follow a process similar to that listed in Section 10.7.12 of these Technical Provisions and shall include a classroom training session and field observations. The District shall be coordinated with and allowed to attend all training sessions. Choosing to attend training sessions or not is at the District's discretion.

12.2 Handback Work Plan

- (a) No later than 60 days after the Independent Engineer submits the final condition assessment report, the Developer shall develop and submit a Handback Work Plan to the District for approval.
- (b) When the Handback Work Plan is instituted, the Handback Work Plan shall take precedence over the Renewal Work Plan.
- (c) The Handback Work Plan shall cover the Handback Period which shall begin at the submittal of the Handback Work Plan and last until the completion of Handback Work.
- (d) The Handback Work Plan shall include, at a minimum, the following:
 - (i) Coverage of all the Elements of the Project, without limitations;
 - (ii) The results of the Independent Engineer's condition assessment;
 - (iii) A fully updated Lighting Asset Inventory with information no older than the onset of the Independent Engineer's condition assessment;
 - (iv) The Developer's approach to ensure that all Elements of the Project meet the Performance Requirements in the tables included in Appendix 13.1 at the time of Handback.

- (v) Program and schedule of Asset Management Work during the Handback Period necessary to ensure that the requirements Tables Appendix-2 and Appendix-3 of these Technical Provisions are met as of the as of the Handback Date;
 - (vi) Plan and schedule for a phased transition of the Asset Management Work responsibilities from the Developer to the District or its Agent;
 - (vii) Training and Transition Plan respecting the requirements of Section 12.4 of these Technical Provisions;
 - (viii) Transfer to the District of all software, hardware, backoffice equipment, field equipment, inventory, and read/write access owned by the Developer and related to the intellectual property as described in Section 52.2(a) (Intellectual Property License to the District) of the Project Agreement;
 - (ix) Procedures for transferring to the District all Project Documents, spare parts and associated inventory data;
 - (x) Without limitations to the District's rights to perform independent audit and verifications, procedures for the Developer and the District to conduct joint condition rating assessments and testing or for the District to arrange for an Independent Engineer to conduct condition rating assessments or testing to verify that the Elements meet the Performance Requirements set forth in Tables Appendix-2 and Appendix-3 of these Technical Provisions;
 - (xi) Procedure for the District's acceptance of the Project Elements on or before the Handback Date, as approved by the District in its sole discretion;
 - (xii) Procedures that will be used to verify and demonstrate to the District that all Project Elements function as specified; that they comply with the applicable codes and standards set forth in the Technical Provisions; and that they meet Performance Requirements in Tables Appendix-2 and Appendix-3 of these Technical Provisions
 - (xiii) Procedures and data necessary to support the Obligations on Termination of Section 49 of the Project Agreement; and
 - (xiv) Detailed cost forecasts and cost loaded schedule for the Work during the Handback Period required to meet the requirements of this Section 12 of these Technical Provisions and supporting the calculation of the Handback Renewal Amount.
- (e) The Handback Work Plan shall include any areas that are under remedial Work. The Developer shall retain all remediation responsibility (and liability) until such time that the Developer submits to the District a full description of the remedial Work and the results of such Work, and receives from the District acceptable documentation indicating that the Developer has complied with all directives and fulfilled and completed their remediation obligations as directed by the District or Governmental Entity with jurisdiction.
- (f) The Developer shall update the approved Handback Work Plan every 60 days and submit the updated plan for the District's approval. Such updates shall include progress report on the Asset Management Work covered by the Handback Work Plan, as built information, actual costs, actual schedule, and schedule to completion.

12.3 Continuity of Service

- (a) The Developer recognizes that maintaining the lighting performance of the Streetlight Network is paramount to the safety and security objectives of the District and that the proper functioning of the Streetlight Network cannot be interrupted at any point during the Term and that, upon contract expiration or termination, a successor, either the District Government, a contractor, or another Developer, at the District's option, may continue to provide these services. To that end, the Developer agrees to:
 - (i) Plan and provide for phase-out, phase-in (transition) training;
 - (ii) Fulfill the requirements for Transition Plans described in section 49.2 of the Project Agreement; and
 - (iii) Exercise its good faith efforts and cooperation to effect an orderly and efficient transition of responsibility for the Asset Management Work to the District or its Agent assuming such responsibilities after the Developer.

12.4 Training and Transition

- (a) A Training and Transition Plan shall be included in the Handback Work Plan.
- (b) The Training and Transition Plan shall:
 - (i) Present the details of the Developer's training program, including the training workshops per Section 10.7.12 of these Technical provisions, and training manuals for District staff on all aspects of the Asset Management Work;
 - (ii) Include all manuals and procedures for the performance of the Asset Management Work, clearly identifying the manuals and procedures respecting the AMIS and RMCS. AMIS and RMCS manuals shall reflect all updates made to systems throughout the term; and
 - (iii) Present how the Developer will work with the District to ensure a seamless transfer of Asset Management Work responsibilities and safe traffic operations back to the District.
- (c) At least six months prior to the Handback Date, the Developer shall conduct a series of comprehensive, in-person Asset Management training workshops in the District Department of Transportation's offices, or other location at the District's discretion, for the District's staff, which shall cover in sufficient detail all aspects and functions of Asset Management Work, including the AMIS and RMCS. The training workshops shall include, at a minimum, a review of certain Project records as well as all Asset Management Manuals, AMIS and RMCS procedures, instructions, manuals, and other plans and procedures. The complete curriculum for this training session shall be contained in the Training and Transition Plan component of the Handback Work Plan.
- (d) At the end of the Term, the Developer shall hand back to the District a fully updated Lighting Asset Inventory, including the Condition Rating Assessment data captured during the Independent Engineer's condition assessment and any subsequent condition updates gathered by the Developer through its Handback Work.

12.5 Early Termination

- (a) The Developer shall be responsible for the Obligations on Termination outlined in section 49 of the Project Agreement.
- (b) In the event of Early Termination, the Developer shall follow the instructions for transition plans outlined in section 49.2 and the instructions for Relinquishment and Possession of the Project outlined in section 49.3 of the Project Agreement.

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13 APPENDICES

13.1 Performance Requirements

Table Appendix-1: Performance Requirements for the Existing Network

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Safety								
Make Safe Work	Remediate safety hazards to the Public	1.1	Arrive at the scene to address Make Safe Work requests by the District, per <u>Section 10</u> of the Technical Provisions within the Hazard Mitigation period	5 per event of Noncompliance	2 hours	N/A	N/A	2 hours
Administrative Redirect	Remediate or conduct Administrative Redirect work as directed by the District	1.2	Respond to District Administrative Redirect requests as directed per <u>Section 10</u> of the Technical Provisions within the Hazard Mitigation period	3 per event of Noncompliance	4 hours	N/A	N/A	8 hours

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Administrative Redirect – High Priority	Remediate or conduct Administrative Redirect work deemed High Priority as directed by the District.	1.3	Respond to District Administrative Redirect requests deemed High Priority as directed per <u>Section 10</u> of the Technical Provisions within the Hazard Mitigation period	5 per event of Noncompliance	4 hours	N/A	N/A	8 hours
Lighting Performance (* see additional detail below table)								
Lighting Units, with current	Respond to outages and restore operation and functionality	1.4	In the event that Lighting Units are inoperable and not functioning, the Developer shall restore operation and functionality within the Cure and Restoration period. This excludes Planned Outages and no current situations. No current situations are covered in items 1.5 and 1.6.	1 point per additional Lighting Unit beyond 5 accrued during a billing quarter	N/A	N/A	5 days	24 hours
Lighting Units, no current	Respond to no current situations to restore operation and functionality	1.5	In the event that Lighting Units are inoperable and not functioning as a result of a no	1 point per additional Lighting Unit out beyond 1 accrued during a billing quarter	N/A	N/A	15 days	48 hours

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
			current situation, the Developer shall restore operation and functionality within the Cure and Restoration period. This excludes Planned Outages and no current with cut situations. No current with cut situations are covered in item 1.6.					
Lighting Units, no current with cut	Respond to no current with cut situations to restore operation and functionality	1.6	In the event that Lighting Units are inoperable and not functioning as a result of a no current with cut situation, the Developer shall restore operation and functionality within the Cure and Restoration period. This excludes Planned Outages.	1 point per additional Lighting Unit out beyond 1 accrued during a billing quarter	N/A	N/A	30 days	48 hours
Lighting Units, Consecutive	Continually monitor and maintain illumination to ensure full functionality of consecutive Lighting Units	1.7	Upon receipt of notification of 3 or more consecutive inoperable Lighting Units, the Developer shall	For each instance accrued beyond 5 in a billing quarter, the following points will be applied: 3 + 1	N/A	N/A	72 hours *Daily work until fixed	24 hours *Daily work until fixed

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
			<p>repair the Lighting Unit within the defined Cure and Restoration period.</p> <p>Lighting Units with Planned Outages are excluded.</p> <p>If a single Light Fixture on a Lighting Unit with several Light Fixtures is inoperable and not functioning as designed, then that Lighting Unit shall be deemed inoperable.</p>	points per additional consecutive Lighting Units beyond 5				
Marine Navigation Lighting	Continually monitor and maintain marine navigation illumination to ensure full functionality and compliance with Coast Guard regulations	1.8	Upon receipt of notification that a marine navigation Light Fixture(s) are not operable, excluding Planned Outages, the Developer shall repair the Light Fixture(s) within the defined cure periods.	5 points per bridge navigation and underdeck Lighting Fixture	4 hours *Daily work until fixed	24 hours *Daily work until fixed	5 days *Daily work until fixed	5 days *Daily work until fixed

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Welcome to Washington and Chinatown Archway Lighting	Continually monitor and maintain Welcome to Washington and Chinatown Archway illumination to ensure full functionality	1.9	<p>Upon receipt of notification that a Welcome to Washington and Chinatown Archway Lighting Fixtures are not operable, excluding Planned Outages, the Developer shall repair the Light Fixture(s) within the defined Cure and Restoration period.</p> <p>Welcome to Washington and Chinatown Lighting Fixtures with Planned Outages are excluded.</p>	1 point per Welcome to Washington or Chinatown Archway Lighting Fixture	N/A	N/A	5 days	24 hours
Tunnel and Underpass Lighting	Continually monitor and maintain tunnel and underpass illumination to ensure full functionality	1.10	<p>Upon receipt of notification that a Tunnel or Underpass Lighting Fixture(s) are inoperable Light Fixture(s), the Developer shall repair the Light Fixture(s) within the defined Cure and Restoration period.</p> <p>Lighting Fixtures with approved</p>	1 point per additional Tunnel and Underpass Lighting Unit beyond 5 accrued during a billing quarter	N/A	N/A	72 hours	24 hours

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
			Planned Outages are excluded.					
Overhead Guide Sign Lighting	Continually monitor and maintain overhead guide sign illumination to ensure full functionality	1.11	<p>Upon receipt of notification that Overhead Guide Sign Lighting Fixtures are inoperable Light Fixture(s), the Developer shall repair the Light Fixture(s) within the defined Cure and Restoration period.</p> <p>Lighting Fixtures with Planned Outages are excluded.</p>	1 point for each instance when more than 1 Fixture on an overhead guide sign Lighting Unit are inoperable and not repaired within the Cure and Restoration period	N/A	N/A	5 days	24 hours
Asset Condition								
Minimum Acceptable Condition, Foundation	Ensure Foundations are maintained at a minimum acceptable level of condition, with the exception of Foundations scheduled to be addressed as part of the Conversion and Construction Work	1.12	If a Foundation is found to present a safety hazard or has a condition rating 0 (Emergency), the Developer shall remediate the Element within the cure period.	1 point per Foundation below the minimum acceptable condition threshold	4 hours	N/A	30 days †	48 hours
Minimum Acceptable Condition, Access	Ensure Access Holes, T-Bases, and Wiring	1.13	If an Access Hole, T-Base or Wiring	1 point per Element below the	4 hours	N/A	72 hours †	24 hours

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Holes, T-Bases, and Exposed Wiring	are maintained at a minimum acceptable level of condition, with the exception of assets scheduled to be addressed as part of the Conversion and Construction Work		presents a safety hazard or has a condition rating 0 (Emergency) or Wiring is exposed, the Developer shall remediate the Element within the cure period.	minimum acceptable condition threshold				
Minimum Acceptable Condition, additional Elements	Ensure remaining Elements not covered in items 2.12 and 2.13 are maintained at a minimum acceptable level of condition, with the exception of Foundations scheduled to be addressed as part of the Conversion and Construction Work	1.14	If a Project Element not listed in item 1.10 and 1.11 has a condition rating 0 (Emergency), the Developer shall remediate the Element within the cure period.	0.25 per Element with aesthetic issue (elephant ears, ID tags, pole caps, and painting) -or- 1 point per Element causing safety issue	4 hours	N/A	15 days †	72 hours
Tree Trimming and Vegetation Control								
Tree Trimming	Keep Lighting Units in Alleys or along Freeways and Expressways free of obstruction from tree branches and limbs	1.15	The Developer shall remove vegetation obstructing access to Element(s) of a Lighting Unit in an Alley or along a Freeway or Expressway per <u>Section 10</u> of the Technical	1 per event of Noncompliance	N/A	N/A	5 days	5 days

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
			Provisions within the Cure and Restoration period.					
Vegetation Control	Keep Lighting Units free of unwanted vegetation	1.16	Lighting Units identified as having unwanted vegetation, such as vegetation on poles, excluding grass surrounding the base of Lighting Units located in parks and recreation areas, shall be addressed within the Cure and Restoration period.	1 point per additional Lighting Unit beyond 5 accrued during a billing quarter	N/A	N/A	5 days	5 days
Appearance								
Lighting Asset Appearance	Continually monitor and maintain Project Site conditions to ensure Project Elements are free of graffiti	1.17	Maintain all Lighting Units that the Developer has come in contact with or that the Developer has been notified of	0.5 points per event of Noncompliance beyond the first	N/A	N/A	7 days	7 days

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
			free of graffiti, unapproved decorations, and/or damages resulting from acts of vandalism. Upon receipt of notification of graffiti, the Developer shall take a photo of the Lighting Unit, record it, and make repairs within the Cure and Restoration period.					
Emergency and Incident Response								
Emergency, Incident, and Severe Weather Events Damage Inspections and Assessment	Visual inspections, damage assessments report	1.18	Developer shall conduct visual inspections and damage assessments and provide the District with a Damage Report within the Cure and Restoration period (24 hours) after the occurrence of a Severe Weather Event, Emergency or Incident as per <u>Section 10.6</u> of the	2 per event of Noncompliance	N/A	N/A	24 hours	24 Hours

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
			Technical Provisions.					
Severe Weather, Emergency, or Incident Repairs	Repairs of Project Elements after Severe Weather, Emergency, or Incident Events	1.19	Coordinate with the District and conduct repairs to the Project Elements as agreed to within the Severe Weather, Emergency, or Incident Response Plan following a Severe Weather Event, Emergency, or Incident per <u>Section 10</u> of the Technical Provisions.	4 per event of Noncompliance	N/A	N/A	To be defined as per the Severe Weather, Emergency, or Incident Response Plan	To be defined as per the Severe Weather, Emergency, or Incident Response Plan
Response to District, Patron, and Other Service Requests								
Documenting Service Requests	Utilize the District's uniform work order management system to respond to and document customer complaints and Service Requests along with their resolutions	1.20	Document and maintain Service Requests in the District's work order management system from notification through resolution, as per <u>Section 10</u> of the Technical Provisions	2 per event of Noncompliance	N/A	N/A	2 hours	24 hours

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Response to Service Requests	Respond to customer complaints and Service Requests in a timely and efficient manner	1.21	Respond to Service Requests originating from the District's work order management system and conduct field investigations or inspections as per <u>Section 10</u> of the Technical Provisions within the Cure and Restoration period.	2 per event of Noncompliance	N/A	N/A	24 hours, Monday through Friday, concluding at 17:00 Friday. Saturday/ Sunday: items must be addressed by Midnight Monday	24 hours
Environmental Preservation								
Hazardous Materials Releases by the Developer	Ensure diligent clean-up process and avoidance of unsafe situations and damage to Elements	1.22	A Hazardous Materials release by the Developer is an event of Noncompliance. In the event of a Hazardous Materials release by the Developer, the Developer shall notify the District and provide clean-up processes following fuel spills or release of Hazardous Materials per <u>Section 10</u> of	5 per event of Noncompliance	24 hours	24 hours	N/A	12 hours

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
			Technical Provisions. When evaluating clean-up activities, follow District publications as applicable.					
Hazardous Materials Discovery, Non-Developer Release	Ensure diligent clean-up process and avoidance of unsafe situations and damage to Elements	1.23	Notify the District of any discovery of Hazardous Materials during Work and follow clean-up processes per <u>Section 10</u> of the Technical Provisions.	5 per event of Noncompliance	24 hours	24 hours	N/A	12 hours
Habitat Preservation	Continually monitor and maintain Project Site conditions to promote habitats of Endangered Species	1.24	No Work shall disturb or alter the habitat or threaten the life of any Endangered Species.	5 per event of Noncompliance	24 hours	N/A	N/A	N/A
Lighting Asset Inventory and IT Systems								
Lighting Asset Inventory and Tagging	Ensure that Elements are appropriately recorded and tracked in the Lighting Asset Inventory	1.25	The Lighting Asset Inventory is complete and accurate in accordance with <u>Section 1.7 and 10</u> of the Technical Provisions.	1 per Lighting Unit	N/A	N/A	7 days	7 days

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
			Previously untagged Lighting Units and Lighting Units not previously recorded in Inventory discovered through work shall be tagged and added and tracked in inventory within the Cure and Restoration period.					
Asset Management Information System (AMIS)	Ensure that asset condition and work performed are tracked and recorded in the Asset Management Information System	1.26	Maintain a comprehensive database in the Asset Management Information System that records condition, defects, and work history for Elements within Lighting Units, ensuring that work performed is recorded against Elements per <u>Section 10</u> of the Technical Provisions. In the event that a discrepancy is discovered, address the issue within the Cure and Restoration period.	1 per Lighting Unit	N/A	N/A	24 hours	24 hours

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Automatic Vehicle Location (AVL) System	Continually monitor and maintain the AVL System to ensure full functionality until the System is integrated with the Asset Management Information System	1.27	AVL System uptime shall be at least 99% per month, excluding approved Planned Outages, as measured by a monthly average as determined by the number of minutes the AVL System is inoperable per month divided by the total number of minutes per month excluding approved Planned Outages.	1 per event of Noncompliance	N/A	N/A	N/A	N/A
Wireless Access Points (WAPs)								
WAPs Properly Affixed	Continually monitor and maintain WAPs to be affixed in proper position on Poles and waterproofed and sealed to specifications	1.28	Upon receipt of notification of an improperly affixed WAP or a defect in waterproofing or seal, the Developer shall reaffix the WAP or fix the waterproofing or seal and address any damage within the defined Cure and Restoration periods.	1 per WAP	N/A	72 hours	7 days	7 days

PERFORMANCE REQUIREMENTS: EXISTING NETWORK								
			ALL Elements					
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Maintenance of WAPs Connections	Maintain WAPs fiber cable, grounding, power, and GPS connections	1.29	Upon receipt of notification of loss of a WAP fiber cable, power, ground, or GPS connection, the Developer shall reestablish the connection within the defined Cure and Restoration periods.	1 per WAP	N/A	72 hours	7 days	7 days
Traffic Control Plans	Maintain traffic in accordance with the Traffic Control Plan	1.30	Comply with the requirements for Traffic Control Plans in accordance with <u>Section 11</u> (Maintenance and Protection of Traffic) of the Technical Provisions.	3 per event of noncompliance	N/A	N/A	N/A	N/A *Work shall not restart in the area corresponding to the Traffic Control Plan until noncompliance is rectified

*The below detail is provided for further clarity on Lighting Performance Requirements items 1.4 to 1.6.

If an existing light is found or reported out and it has current flowing to it, the Developer has five days to repair the light. If, during a billing quarter, five lights are not repaired within the five days, no points are assessed. However, once a sixth light is not repaired in time,

a point will be assessed. An additional point will be applied every 24 hours until the light is repaired. This is true for the sixth late light repair until the nth, within the billing quarter.

The Developer will need to determine the cause of the outage during their inspection and appropriately categorize as one of the three categories: Light Out with Current, Light Out with No Current, or Light Out with No Current with Cut. For those outages where there is no current, the Developer has 15 days from the moment a Service Request and/or Work Order was initiated. If the Developer finds no current and need to make any cut to the sidewalk or roadway to make a repair, the Developer has 30 days to address the issue. In both cases, the Developer is allowed to let one outage go late within the billing quarter without penalty. The second light in each category that goes late is assessed one point. An additional point will be applied every 48 hours until the issue is addressed.

† For items 1.12 through 1.14, the Priority 1 Permanent Cure and Restoration requirement will be waived if the Element is scheduled to be addressed in a Project Bundle set for completion within six weeks from the time the issue was initiated as a Service Request and/or Work Order.

Table Appendix-2: Performance Requirements for the Improved Network and Expanded Network

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Safety								
Make Safe Work	Remediate safety hazards to the Public	2.1	Arrive at the scene to address Make Safe Work requests by the District, per <u>Section 10</u> of the Technical Provisions within the Hazard Mitigation period.	5 per event of Noncompliance	2 hours	N/A	N/A	2 hours
Administrative Redirect	Remediate or conduct Administrative Redirect work as directed by the District	2.2	Respond to District Administrative Redirect requests as directed per <u>Section 10</u> of the Technical Provisions within the Hazard Mitigation period.	3 per event of Noncompliance	4 hours	N/A	N/A	8 hours
Administrative Redirect – High Priority	Remediate or conduct Administrative Redirect work deemed High Priority as directed by the District for items on behalf of other governmental organizations	2.3	Respond to District Administrative Redirect requests deemed High Priority as directed per <u>Section 10</u> of the Technical Provisions within the Hazard Mitigation period.	5 per event of Noncompliance	4 hours	N/A	N/A	8 hours
Lighting Performance as Reported on a Routine Basis by the RMCS (* see additional detail below table)								

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Lighting Units, with current	Respond to outages and restore operation and functionality	2.4	<p>In the event that Lighting Units are inoperable and not functioning, the Developer shall restore operation and functionality within the Cure and Restoration period.</p> <p>This excludes Planned Outages and no current situations. No current situations are covered in items 1.5 and 1.6.</p>	1 point per additional Lighting Unit beyond 5 accrued during a billing quarter	N/A	N/A	72 hours	24 hours

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Lighting Units, no current	Respond to no current situations to restore operation and functionality	2.5	<p>In the event that Lighting Units are inoperable and not functioning as a result of a no current situation, the Developer shall restore operation and functionality within the Cure and Restoration period.</p> <p>This excludes Planned Outages and no current with cut situations. No current with cut situations are covered in item 1.6.</p>	1 point per additional Lighting Unit out beyond 1 accrued during a billing quarter	N/A	N/A	15 days	48 hours
Lighting Units, no current with cut	Respond to no current with cut situations to restore operation and functionality	2.6	<p>In the event that Lighting Units are inoperable and not functioning as a result of a no current with cut situation, the Developer shall restore operation and functionality within the Cure and Restoration period.</p> <p>This excludes Planned Outages.</p>	1 point per additional Lighting Unit out beyond 1 accrued during a billing quarter	N/A	N/A	30 days	48 hours

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Lighting Units, Consecutive	Continually monitor and maintain illumination to ensure full functionality of consecutive Lighting Units	2.7	<p>Upon receipt of notification of 3 or more consecutive inoperable Lighting Units, the Developer shall repair the Lighting Unit within the defined Cure and Restoration period.</p> <p>Lighting Units with Planned Outages are excluded.</p> <p>If a single Light Fixture on a Lighting Unit with several Light Fixtures is inoperable and not functioning as designed, then that Lighting Unit shall be deemed inoperable.</p>	For each instance accrued beyond 5 in a billing quarter, the following points will be applied: 3 + 1 points per additional consecutive Lighting Units beyond 5	N/A	N/A	72 hours *Daily work until fixed	24 hours *Daily work until fixed
Marine Navigation Lighting	Continually monitor and maintain marine navigation illumination to ensure full functionality and compliance with Coast Guard regulations	2.8	Upon receipt of notification that a marine navigation Light Fixture(s) are not operable, excluding Planned Outages, the Developer shall repair the Light Fixture(s) within the defined cure periods.	5 points per bridge navigation and underdeck Lighting Fixture	4 hours *Daily work until fixed	24 hours *Daily work until fixed	5 days *Daily work until fixed	5 days *Daily work until fixed

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Welcome to Washington and Chinatown Archway Lighting	Continually monitor and maintain Welcome to Washington and Chinatown Archway illumination to ensure full functionality	2.9	<p>Upon receipt of notification that a Welcome to Washington and Chinatown Archway Lighting Fixtures are not operable, excluding Planned Outages, the Developer shall repair the Light Fixture(s) within the defined Cure and Restoration period.</p> <p>Welcome to Washington and Chinatown Lighting Fixtures with Planned Outages are excluded.</p>	1 point per Welcome to Washington or Chinatown Archway Lighting Fixture	N/A	N/A	72 hours	24 hours

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Tunnel and Underpass Lighting	Continually monitor and maintain tunnel and underpass illumination to ensure full functionality	2.10	<p>Upon receipt of notification that a Tunnel or Underpass Lighting Fixture(s) are inoperable Light Fixture(s), the Developer shall repair the Light Fixture(s) within the defined Cure and Restoration period.</p> <p>Lighting Fixtures with approved Planned Outages are excluded.</p>	1 point per additional Tunnel and Underpass Lighting Unit beyond 5 accrued during a billing quarter	N/A	N/A	72 hours	24 hours
Overhead Guide Sign Lighting	Continually monitor and maintain overhead guide sign illumination to ensure full functionality	2.11	<p>Upon receipt of notification that Overhead Guide Sign Lighting Fixtures are inoperable Light Fixture(s), the Developer shall repair the Light Fixture(s) within the defined Cure and Restoration period.</p> <p>Lighting Fixtures with Planned Outages are excluded.</p>	1 point for each instance when more than 1 Fixture on an overhead guide sign Lighting Unit are inoperable and not repaired within the Cure and Restoration period	N/A	N/A	72 hours	24 hours

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Asset Condition								
Minimum Acceptable Condition, Foundation	Ensure Foundations are maintained at a minimum acceptable level of condition	2.12	<p>A Foundation found to be below condition rating 3 (Fair) by the District, resident, or other third party excepting the Developer shall result in a Noncompliance Event. The Developer shall remediate the issue within the Cure and Restoration period.</p> <p>If the Developer discovers a Foundation has a condition rating below 3 (Fair), the Developer shall remediate the Element within the Cure and Restoration period.</p>	<p>1 point per Foundation below the minimum acceptable condition threshold</p> <p>or</p> <p>1 point per Foundation below the minimum acceptable condition threshold discovered by the Developer and not remediated within the Cure and Restoration period</p>	N/A	N/A	30 days	48 hours

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Minimum Acceptable Condition, Access Holes, T-Bases, and Exposed Wiring	Ensure Access Holes, T-Bases, and Wiring are maintained at a minimum acceptable level of condition	2.13	<p>An Access Hole, T-Base, or Wiring found to be below condition rating 3 (Fair) by the District, resident, or other third party excepting the Developer shall result in a Noncompliance Event. The Developer shall remediate the issue within the Cure and Restoration period.</p> <p>If the Developer discovers an Access Hole, T-Base or Wiring has a condition rating below 3 (Fair), the Developer shall remediate the Element within the Cure and Restoration period.</p>	<p>1 point per Element below the minimum acceptable condition threshold</p> <p>or</p> <p>1 point per Element below the minimum acceptable condition threshold discovered by the Developer and not remediated within the Cure and Restoration period</p>	N/A	N/A	72 hours	24 hours

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Minimum Acceptable Condition, additional Elements	Ensure remaining Elements not covered in items 2.12 and 2.13 are maintained at a minimum acceptable level of condition	2.14	<p>A Project Element not listed in item 2.12 and 2.13 found to be below condition rating 3 (Fair) by the District, resident, or other third party excepting the Developer shall result in a Noncompliance Event. The Developer shall remediate the issue within the Cure and Restoration period.</p> <p>If the Developer discovers a Project Element not listed in item 2.12 and 2.13 has a condition rating below 3 (Fair), the Developer shall remediate the Element within the Cure and Restoration period.</p>	<p>1 point per Element below the minimum acceptable condition threshold</p> <p>or</p> <p>1 point per Element below the minimum acceptable condition threshold discovered by the Developer and not remediated within the Cure and Restoration period</p>	N/A	N/A	15 days	72 hours
Tree Trimming and Vegetation Control								

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Tree Trimming	Keep Lighting Units in Alleys or along Freeways and Expressways free of obstruction from tree branches and limbs	2.15	The Developer shall remove vegetation obstructing access to Element(s) of a Lighting Unit in an Alley or along a Freeway or Expressway per Section 10 of the Technical Provisions within the Cure and Restoration period.	1 per event of Noncompliance	N/A	N/A	5 days	5 days
Vegetation Control	Keep Lighting Units free of unwanted vegetation	2.16	Lighting Units identified as having unwanted vegetation, such as vegetation on poles, excluding grass surrounding the base of Lighting Units located in parks and recreation areas, shall be addressed within the Cure and Restoration period.	1 point per additional Lighting Unit beyond 5 accrued during a billing quarter	N/A	N/A	5 days	5 days
Appearance								

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Continually monitor and maintain Project Site conditions to ensure Elements are free of graffiti	Continually monitor and maintain Project Site conditions to ensure Project Elements are free of graffiti	2.17	Maintain all Lighting Units that the Developer has come in contact with or that the Developer has been notified of free of graffiti, unapproved decorations, and/or damages resulting from acts of vandalism. Upon receipt of notification of graffiti, the Developer shall take a photo of the Lighting Unit, record it, and make repairs within the Cure and Restoration period.	0.5 points per event of Noncompliance beyond the first	N/A	N/A	7 days	7 days
Emergency and Incident Response								

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Emergency, Incident, and Severe Weather Events Damage Inspections and Assessments	Visual inspections, damage assessments report	2.18	Developer shall conduct visual inspections and damage assessments and provide the District with a Damage Report within 24 hours after the occurrence of a Severe Weather Event, Emergency or Incident as per <u>Section 10.6</u> of the Technical Provisions.	2 per event of Noncompliance	N/A	N/A	24 hours	24 Hours
Severe Weather, Emergency, or Incident Repairs	Repairs of Project Elements after Severe Weather, Emergency, or Incident Events	2.19	Coordinate with the District and conduct repairs to the Project Elements as agreed to within the Severe Weather, Emergency, or Incident Response Plan following a Severe Weather Event, Emergency, or Incident per <u>Section 10</u> of the Technical Provisions.	4 per event of Noncompliance	N/A	N/A	To be defined as per the Severe Weather, Emergency, or Incident Response Plan	To be defined as per the Severe Weather, Emergency, or Incident Response Plan
Response to District, Patron, and Other Service Requests								

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Documenting Service Requests	Utilize the District's uniform work order management system to respond to and document customer complaints and Service Requests along with their resolutions	2.20	Document and maintain Service Requests in the District's work order management system from notification through resolution, as per <u>Section 10</u> of the Technical Provisions	2 per event of Noncompliance	N/A	N/A	2 hours	24 hours
Response to Service Requests	Respond to customer complaints and Service Requests in a timely and efficient manner	2.21	Respond to Service Requests originating from the District's work order management system and conduct field investigations or inspections, as per <u>Section 10</u> of the Technical Provisions within the Cure and Restoration period.	2 per event of Noncompliance	N/A	N/A	24 hours, Monday through Friday, concluding at 17:00 Friday. Saturday/ Sunday: items must be addressed by Midnight Monday	24 hours
Environmental Preservation								

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Fuel Spills / Hazardous Materials Releases by the Developer	Ensure diligent clean-up process and avoidance of unsafe situations and damage to Elements	2.22	A Hazardous Materials release by the Developer is an event of Noncompliance. In the event of a Hazardous Materials release by the Developer, the Developer shall notify the District and provide clean-up processes following fuel spills or release of Hazardous Materials per <u>Section 10</u> of the Technical Provisions. When evaluating clean-up activities, follow District publications as applicable.	5 per event of Noncompliance	24 hours	24 hours	N/A	12 hours
Hazardous Materials Discovery, Non-Developer Release	Ensure diligent clean-up process and avoidance of unsafe situations and damage to Elements	2.23	Notify the District of any discovery of Hazardous Materials during Work and follow clean-up processes per <u>Section 10</u> of the Technical Provisions.	5 per event of Noncompliance	24 hours	24 hours	N/A	12 hours

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Habitat Preservation	Continually monitor and maintain Project Site conditions to promote habitats of Endangered Species	2.24	No Work shall disturb or alter the habitat or threaten the life of any Endangered Species.	5 per event of Noncompliance	24 hours	N/A	N/A	N/A
Lighting Asset Inventory and Tagging	Ensure that Elements are appropriately recorded and tracked in the Lighting Asset Inventory	2.25	The Lighting Asset Inventory is complete and accurate in accordance with <u>Section 1.7 and 10</u> of the Technical Provisions. Previously untagged Lighting Units and Lighting Units not previously recorded in Inventory discovered through work shall be tagged and added and tracked in inventory within the Cure and Restoration period.	1 per Lighting Unit	N/A	N/A	7 days	7 days

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Asset Management Information System (AMIS)	Ensure that asset condition and work performed are tracked and recorded in the Asset Management Information System	2.26	Maintain a comprehensive database in the Asset Management Information System that records condition, defects, and work history for Elements within Lighting Units, ensuring that work performed is recorded against Elements per Section 10 of the Technical Provisions within the Cure and Restoration period.	1 per Lighting Unit	N/A	N/A	24 hours	24 hours
Wireless Access Points (WAPs)								
WAPs Properly Affixed	Continually monitor and maintain WAPs to be affixed in proper position on Poles and waterproofed and sealed to specifications	2.27	Upon receipt of notification of an improperly affixed WAP or a defect in waterproofing or seal, the Developer shall reaffix the WAP or fix the waterproofing or seal and address any damage within the Cure and Restoration period.	1 per WAP	N/A	72 hours	7 days	7 days

PERFORMANCE REQUIREMENTS: IMPROVED NETWORK AND EXPANDED NETWORK								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
Maintenance of WAPs Connections	Maintain WAPs fiber cable, grounding, power, and GPS connections	2.28	Upon receipt of notification of loss of a WAP fiber cable, power, ground, or GPS connection, the Developer shall reestablish the connection within the Cure and Restoration period.	1 per WAP	N/A	72 hours	7 days	7 days
Traffic Control Plans	Maintain traffic in accordance with the Traffic Control Plan	2.29	Comply with the requirements for Traffic Control Plans in accordance with <u>Section 11</u> (Maintenance and Protection of Traffic) of the Technical Provisions.	3 per event of noncompliance	N/A	N/A	N/A	N/A *Work shall not restart in the area corresponding to the Traffic Control Plan until noncompliance is rectified

*The below detail is provided for further clarity on Lighting Performance Requirements items 2.4 to 2.6.

If an existing light is found or reported out and it has current flowing to it, the Developer has 72 hours to repair the light. If, during a billing quarter, five lights are not repaired within the 72 hours, no points are assessed. However, once a sixth light is not repaired in time, a point will be assessed. An additional point will be applied every 24 hours until the light is repaired. This is true for the sixth late light repair until the nth, within the billing quarter.

The Developer will need to determine the cause of the outage during their inspection and appropriately categorize as one of the three categories: Light Out with Current, Light Out with No Current, or Light Out with No Current with Cut. For those outages where there is no current, the Developer has 15 days from the moment Service Request and/or Work Order was initiated. If the developer finds no current and needs to make any cut to the sidewalk or roadway to make a repair, the Developer has 30 days to address the issue. In both cases, the Developer is allowed to let one outage go late within the billing quarter without penalty. The second light in each category that goes late is assessed one point. An additional point will be applied every 48 hours until the issue is addressed.

Table Appendix-3: Performance Requirements for the Improved Network and Expanded Network: AMIS & RMCS

PERFORMANCE REQUIREMENTS: AMIS & RMCS								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Element or Work Category	Description	ID	Minimum Performance Requirements	Noncompliance Points	Priority 0 Hazard Mitigation	Priority 1 Temporary Cure	Priority 1 Permanent Cure and Restoration	Interval of Recurrence for Permanent Cure
AMIS, General	Continually monitor and maintain the AMIS to ensure full functionality	3.1	AMIS shall be fully functional with the exception of Planned Outages. Any Unplanned Outage is an event of noncompliance.	8 per event of Noncompliance	N/A	N/A	N/A	N/A
AMIS, Unplanned Outage Remedial Plan	Provide an AMIS Unplanned Outage Remedial Plan to address any Unplanned Outage of the AMIS	3.2	Provide to the District for approval an AMIS Unplanned Outage Remedial Plan to remediate any Unplanned Outage within the Cure and Restoration Period.	5 per event of Noncompliance	N/A	N/A	24 hours	24 hours

PERFORMANCE REQUIREMENTS: AMIS & RMCS								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
AMIS, Unplanned Outage Remedial Activities	Remediate any Unplanned Outage of the AMIS to ensure functionality	3.3	Complete all activities to remediate any Unplanned Outage of the AMIS within the agreed upon cure period and per the AMIS Unplanned Outage Remedial Plan in accordance with <u>Section 10 and Appendix 13.9</u> of the Technical Provisions.	5 per event of Noncompliance	N/A	N/A	To be defined per the AMIS Unplanned Outage Remedial Plan	To be defined per the AMIS Unplanned Outage Remedial Plan
AMIS Project Dashboard	Ensure the Project dashboard is continually monitored and maintained to promote accuracy	3.4	The project dashboard shall fulfill specifications as per <u>Section 10 and Appendix 13.9</u> of the Technical Provisions. Each failure to adhere to project dashboard specifications is an event of Noncompliance.	3 per failure event	N/A	N/A	5 days	24 hours
RMCS, Accuracy	Continually monitor and maintain the RMCS to ensure accuracy in its functionality	3.5	The RMCS shall accurately indicate the status of Light Fixtures in real time as verified by visual inspections, excluding approved Planned Outages. Each inaccurate RMCS node indication of Light Fixture status not remediated within the defined cure period is an event of Noncompliance.	1 per RMCS node that does not accurately reflect Light Fixture status	N/A	N/A	3 days	24 hours

PERFORMANCE REQUIREMENTS: AMIS & RMCS								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
RMCS, General	Respond to outages associated with RMCS Elements	3.6	In the event that RCMS Elements are inoperable and not functioning as designed per <u>Section 10 and Appendix 13.9</u> of the Technical Provisions, the Developer shall provide to the District for approval an RMCS Unplanned Outage Remedial Plan to remediate any Unplanned Outage within the Cure and Restoration Period.	2 per event of Non-compliance. 2 points added for every 24-hour period for which remediation plan is not in place.	N/A	24 hours	3 days	24 hours
Remote Monitoring Control System (RMCS)	Ensure that the Remote Monitoring Control System (RMCS) is performing as intended	3.7	Maintain the RMCS data collection and exchange of information with the AMIS and other applicable databases according to the IT System technical specifications per <u>Section 10 and Appendix 13.9</u> of the Technical Provisions. Each failure to adhere to RMCS specifications is an event of Noncompliance.	4 per event of Noncompliance	N/A	24 hours	5 days	3 days

PERFORMANCE REQUIREMENTS: AMIS & RMCS								
				ALL Elements				
					Cure Periods and Interval of Recurrence			
Remote Monitoring and Control System (RMCS) Elements, Consecutive	Monitor and maintain the RMCS to ensure full functionality of consecutive Elements	3.8	<p>RMCS Elements on no more than 3 consecutive Lighting Units are inoperable and not functioning as designed per <u>Section 10 and Appendix 13.9</u> of the Technical Provisions, excluding Planned Outages, as measured by a daily (05:00 to 05:00 the following day) count.</p> <p>If a single RMCS Node on a Lighting Unit with several RMCS Nodes is inoperable and not functioning as designed, then that Lighting Unit shall be deemed inoperable.</p>	<p>For each instance accrued beyond 5 in a billing quarter, the following points will be applied: 3 + 1 points per additional consecutive Lighting Unit out beyond 3</p>	N/A	24 hours	3 days	24 hours
Planned Outage Scheduling								
IT System Scheduled Maintenance	Reduce Planned Outages of the AMIS and RMCS during normal business hours to the extent practical	3.10	<p>Planned Outages of the AMIS and RMCS shall not occur without approval by the District as per <u>Section 10 and Appendix 13.9</u> of the Technical Provisions. Any Planned Outage that occurs without prior approval by the District is an event of noncompliance.</p>	5 per event of Noncompliance	N/A	N/A	N/A	N/A

13.2 Mandatory Specifications, Standards, Manuals and Guidelines

- (a) This Appendix contains a non-exclusive list of specifications, standards, manuals and guidelines that the Developer shall use in the performance of the Work. The Parties shall disregard any requirement pertaining to payments in the documents listed herein.
- (b) The Developer shall verify and use the latest version of the appropriate specifications, standards, manuals and guidelines for the Work.
- (c) In the event of ambiguities or conflicts between or among the specifications, standards, manuals and guidelines listed in (e) below or between such documents and the Technical Provisions, the more stringent requirements shall apply as determined by the District in its sole discretion.
- (d) All materials used for the Project, which previously would have to meet the requirements of NCHRP 350, shall now meet the requirements of the AASHTO Manual for Assessing Safety Hardware (MASH), unless otherwise specified.
- (e) The Developer shall meet or exceed the requirements and criteria in the appropriate specifications, standards, manuals and guidelines, including the following documents:
 - (i) District of Columbia Lighting Fixture Specifications, September 2020
 - (ii) District of Columbia Department of Transportation Standard Specifications for Highways and Structures, latest standard applies
 - (iii) District of Columbia Department of Transportation Design and Engineering Manual, latest standard applies
 - (iv) Federal Highway Administration Manual on Uniform Traffic Control Devices (MUTCD)
 - (v) Federal Highway Administration Standard Highway Signs and Markings (English Version)
 - (vi) D.C. Temporary Traffic Control Manual, latest standard applies
 - (vii) DDOT Work Zone Safety and Mobility Policy, latest standard applies
 - (viii) DDOT Utility Work Zone Traffic Control Plan (TCP) Typical, latest standard applies
 - (ix) DDOT Pedestrian Safety and Work Zone Standards – Covered and Open Walkways
 - (x) DDOT Guidelines for Traffic Control in Work Zones (Work Zone Pocket Guide)
 - (xi) DDOT Memoranda on Traffic Control Plan Submittal Guidelines, 11th Edition, October 26, latest standard applies
 - (xii) DDOT Traffic Control Plan (TCP) Inspection Criteria
 - (xiii) DDOT Construction Management Manual, latest standard applies
 - (xiv) DDOT MicroStation V8 CAD Standards Manual

- (xv) DDOT Standard Drawings, latest standard applies
 - (xvi) FHWA Work Zone Safety and Mobility Rule
 - (xvii) FHWA Work Zone Safety and Mobility Rule, Implementing the Rule on Work Zone Safety and Mobility
 - (xviii) FHWA Work Zone Safety and Mobility Rule, Developing and Implementing Transportation Management Plans for Work Zones
 - (xix) FHWA Work Zone Safety and Mobility Rule, Work Zone public Information and Outreach Strategies
 - (xx) FHWA Work Zone Safety and Mobility Rule, Work Zone Impacts Assessment: An Approach to Assess and Manage Work Zone Safety and Mobility Impacts of Road Projects
 - (xxi) FHWA Traffic Analysis Toolbox Volume III: Guidelines for Applying Traffic Microsimulation Modelling Software
 - (xxii) FHWA Traffic Monitoring Guide
 - (xxiii) National Cooperative Highway Research Project (NCHRP) Report 350
 - (xxiv) ADA Standards for Accessible Design
 - (xxv) American Traffic Safety Services Association (ATSSA) Quality Guidelines for Temporary Traffic Control Devices and Features, latest standard applies
 - (xxvi) AASHTO Roadside Design Guide
 - (xxvii) AASHTO A Policy on Geometric Design of Highways and Streets
 - (xxviii) AASHTO Guide for the Planning, Design, and Operation of Pedestrian Facilities
 - (xxix) AASHTO Manual for Assessing Safety Hardware (MASH)
 - (xxx) AASHTO Guide for the Development of Bicycle Facilities
 - (xxxi) WMATA/JDAC Adjacent Construction Project Manual
- (f) The Section 106 Consultation for the Citywide Light Emitting Diode (LED) Streetlight Replacement Project can be referenced below:



June 22, 2020

Mr. Michael Hicks
U.S. Department of Transportation
Federal Highway Administration
District of Columbia Division
1200 New Jersey Avenue, SE
Washington, DC 20006

RE: Section 106 Consultation for the Citywide Light Emitting Diode (LED) Streetlight Replacement Project
[Federal Aid Project No. 2016 (059)] aka "Smart Lighting" Project

Dear Mr. Hicks:

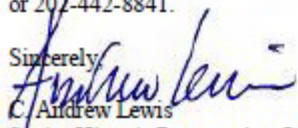
The District of Columbia State Historic Preservation Officer (SHPO) has reviewed FHWA's most recent letter regarding the above-referenced undertaking and is writing to provide additional comments in accordance with Section 106 of the National Historic Preservation Act and its implementing regulations, 36 CFR Part 800.

Consultation on this project was initiated in May of 2018 and has involved public meetings and interaction with various consulting parties including Advisory Neighborhood Commissions, the National Mall Roads Interagency Working Group (IWG) and others.

The potential concerns raised in our initial letter appear to have been addressed in that we now understand no ground disturbance will be required; wattages and color temperatures within a general range of 75-215 Watts (brightness) and 2700-3000 Kelvin (color temperature) will be used based upon context and remotely dimmed/adjusted, as appropriate; internal shielding will focus light down and minimize light pollution while still allowing 10%-15% illumination of the tops of Washington Globe/Twin Twenties fixtures so the complete shape of the globes will be discernable at night; and existing streetlight fixtures will largely be maintained with only minimal changes anticipated to the design of cobrahead fixtures.

For these reasons, we have determined that implementation of this undertaking will have "no adverse effect" on historic properties provided that any associated change of streetlight fixtures within historic districts will continue to follow DDOT's standard procedures and be limited to Washington Globes and Twin-Twenties rather than cobraheads which are generally not appropriate for historic districts. On a related note, we recommend that FHWA and DDOT continue to work closely with the IWG to determine the appropriate brightness and color temperatures for nationally significant areas such as the Monumental Core since these areas have historically been lit differently than residential and commercial areas to emphasize their national importance and this distinctive lighting could be considered part of their historic character.

If you should have any questions or comments regarding this matter, please contact me at andrew.lewis@dc.gov or 202-442-8841.

Sincerely,

C. Andrew Lewis
Senior Historic Preservation Officer
DC State Historic Preservation Office

18-0463

1100 4th Street, SW, Suite E650, Washington, D.C. 20024 Phone: 202-442-7600, Fax: 202-442-7638

13.3 Smart City Specifications

This exhibit provides the information the District Intelligent Streetlight Project vendor needs to install outdoor Wi-Fi Access Points (WAPs) on streetlights specified by OCTO as per requirements in the DDOT Intelligent Streetlight Project RFP.

13.3.1 References

- (a) District of Columbia Department of Transportation Standard Specifications for Highways and Structures, including but not limited to Section 614: Streetlighting and Miscellaneous Electrical Work and Section 820: Streetlighting and Electrical Materials
- (b) Cisco Wi-Fi access point installation guide for installation and troubleshooting tips: https://www.cisco.com/c/en/us/td/docs/wireless/access_point/1570/installation/guide/1570hig.html

13.3.2 Materials

13.3.2.1 The District shall provide the Developer the materials described in Section 9.1 of the Technical Provisions.

13.3.2.2 The Developer shall provide the following for installation:

- (a) Supplementary materials for installation of WAPs
 - a. WAP transmitter/receiver unit – with serial number identifier
 - b. Bands and plate for attaching to the WAP to the pole
 - c. Power cable - AIR-CORD-R3P-40NA
 - d. Photocell power adapter for street light (as needed when power is fed from the street light and not pole base)
 - e. GPS
- (b) Pull string cable
- (c) Grounding cable – 6-AWG
- (d) Fiber for root WAP (RAP) – Clearfield 2-fiber push cable inside a 10 mm microduct with duplex LC connector on the RAP side.
- (e) 120 VAC, 20-amp breaker housed in a low-profile weatherproof enclosure (as needed when power is fed from the pole base).

Note: WAP will not be powered from the Lighting Fixture.

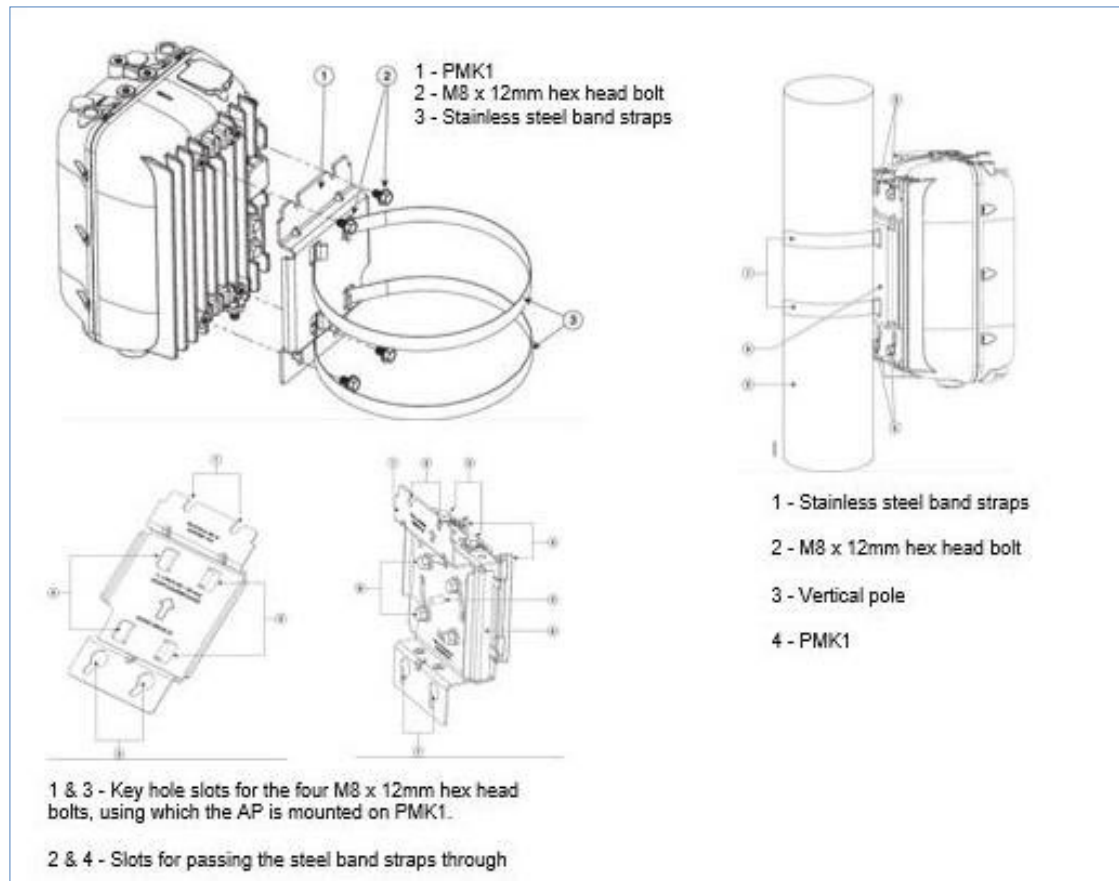
- (f) Sealing and waterproofing materials

13.3.3 Installing Wi-Fi Access Points

The Developer shall:

- (a) Adhere to the District of Columbia Department of Transportation Standard Specifications for Highways and Structures, including but not limited to the following sections:
 - a. 614.26 – Foundation for Streetlight Poles
 - b. 614.30 – Wood Poles
 - c. 614.42 – Ground Rod
 - d. 614.50 – Electrical Receptacle on Streetlight Pole for Seasonal Lighting
 - e. 820.10 – Ground Rods
- (b) Note pole ID and location, WAP serial number and MAC address, and handhole location (if applicable).
- (c) Verify that the power cable is operative using a multi meter test tool.
- (d) Mount the WAP on pole by pole type. See Figure 1.

Figure 1: Mounting the WAP

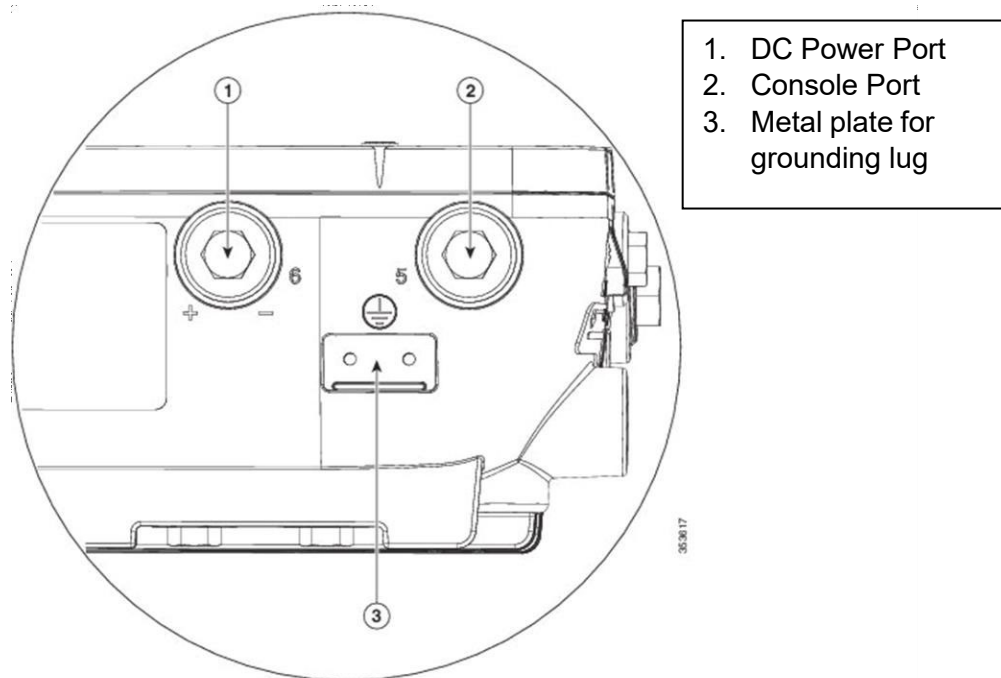


(e) For a metal pole:

- a. Drill a one inch hole at height of 14-19 feet, about 10-12 inches below where the bands holding the WAP will be attached. Place a rubber grommet in it.
- b. For root WAPs only, from the handhole, feed the fiber cable into the pole at the base opening and pull it out the drill hole.
 - i. Leave 25-foot loop of fiber cable in the handhole.
 - ii. Connect to SFP Terminate the fiber endpoint to the SFP port on the WAP base. See Figure 3.
- c. Attach the bands to the pole about 10-12 inches above the drill hole.
- d. Attach the steel plate to the bands.
- e. Slide, fit, and bolt the WAP to the plate in the vertical position, orienting the WAP in the direction specified in the WAP Site Information provided by OCTO.
- f. Feed the grounding cable to the proper ground point.

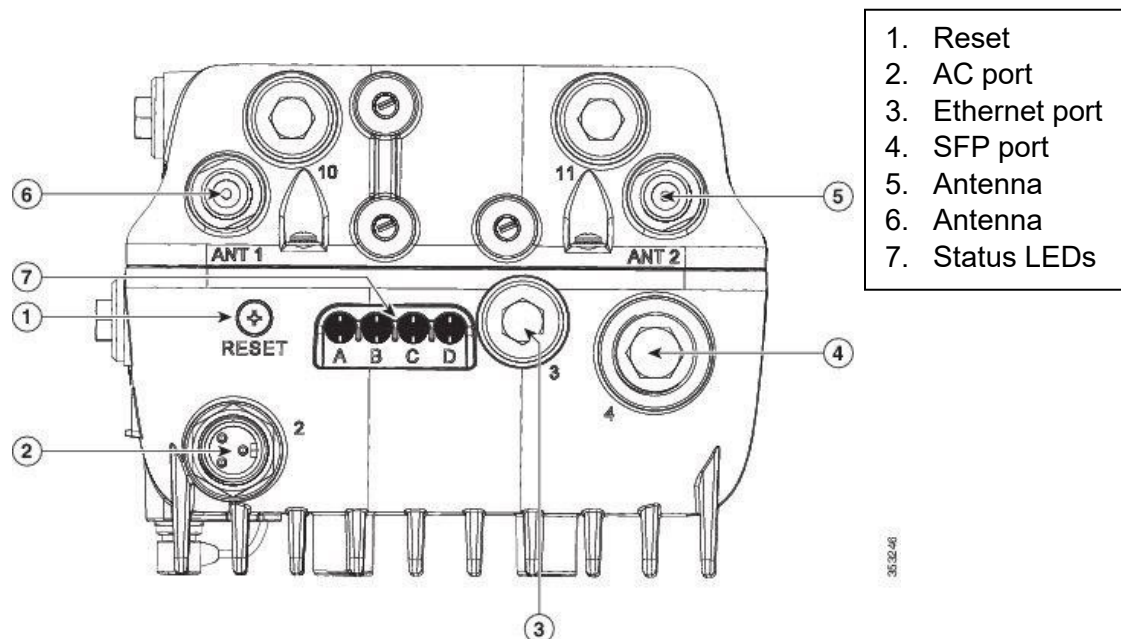
- (f) For a wooden pole:
 - a. Attach the bands to the pole at height of 15-20 feet.
 - b. Attach the steel plate to the bands.
 - c. Slide, fit, and bolt the WAP to the plate in the vertical position, orienting the WAP in the direction specified in the WAP Site Information provided by OCTO.
 - d. Feed the grounding cable to the proper ground point.
- (g) Connect the grounding cable:
 - a. Connect to the grounding point.
 - b. Connect the grounding cable to the WAP as per Figure 2.
 - i. Strip the insulation for the grounding cable as required for the grounding lug.
 - ii. Use the appropriate crimping tool to crimp the bare 6-AWG copper ground wire to the supplied grounding lug.
 - iii. Open the anti-corrosion sealant and apply an adequate amount over the metal surface where the ground strap screw holes are located.
 - 1. Ensure compliance with section 706.17.G.4 – Lubrication of the District of Columbia Department of Transportation Standard Specifications for Highways and Structures.
 - iv. Connect the grounding lug to the WAP grounding screw holes.

Figure 2: Grounding Lug for WAP – Right Side of WAP

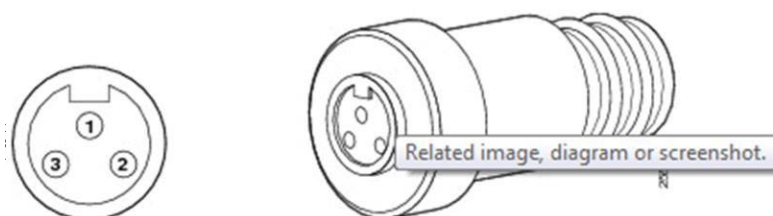


- (h) Connect the WAP to electrical power.
- a. Connect to the AC source:
 - i. If the pole has a pole-top AC connection, connect to it.
 - ii. If the pole does not have a pole-top AC connection, connect the power breaker to the main power feed and connect to the AC source.
 - b. Connect the upper end of the AC power cable to the 3-pronged power connector on the WAP base. Hand tighten the cable connector ring by turning it clockwise. See Figures 3 and 4 for reference.
 - c. Ensure the power LED on the WAP is on by noting if the LED is illuminated green.

Figure 3: WAP Base



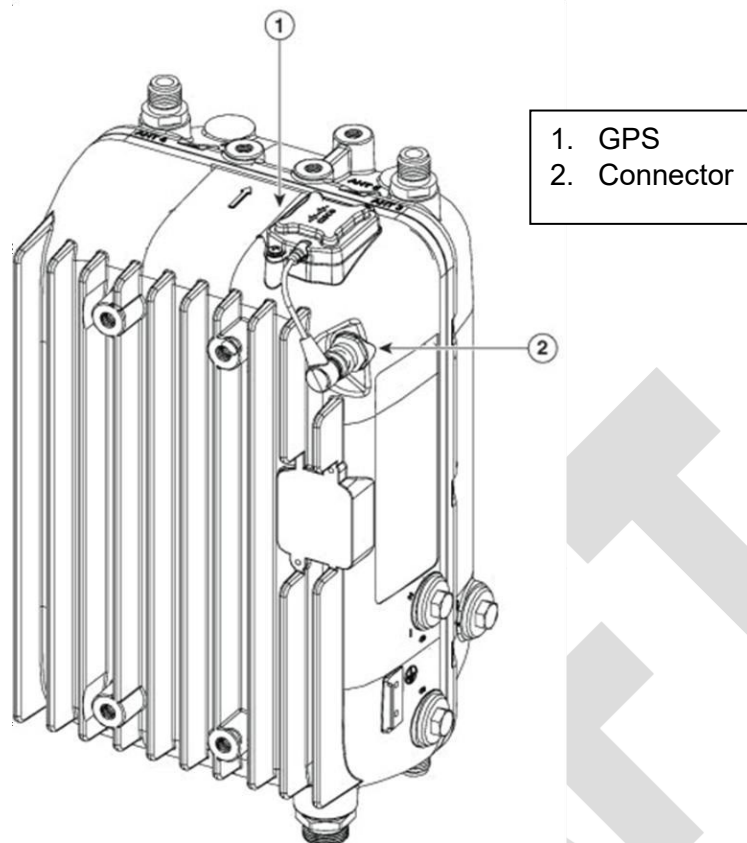
(i) Figure 4: AC Connector Plug Pins



Pin	Description	Conductor Color	Pin	Description	Conductor Color
1	Ground	Green/Yellow	3	Neutral	Blue
2	Live	Brown			

(j) Connect the GPS antenna to the WAP head as per Figure 5.

Figure 5: Installing the GPS Antenna



(k) Seal the installation:

- a. Apply industry standard water protection seal to all openings, leaving no gap.
 - i. Water tight and seal drill hole; use rubber gaskets where possible in addition to seals.
 - ii. Properly seal all joints and connect points.
 - iii. Tape exposed cables with industry standard environment protecting tapes.
 - iv. Protect all AC power plugs and receptacles in the handhole.
- b. Ensure compliance with section 706.17.G.4 – Lubrication of the District of Columbia Department of Transportation Standard Specifications for Highways and Structures.
- c. Color match all sealing materials to pole color. Do not use metallic colors; these can cause attenuation/distortion.

13.3.4 Documenting Installation

The Developer shall document installation as described in Section 9.2 of the Technical Provisions.

13.3.5 WAP Model and Warranty Specifications

- (a) The District has negotiated discounted rates with Cisco for the procurement of the WAPs. The Developer can either procure the Root and Mesh WAPs at the District's negotiated rates or at a lower cost, if possible. However, the WAPs must be purchased through one of the following Cisco certified resellers: N2Grate, Disys, Presidio and NFF.
 - (i) Note, the rates stated are as of 2020, but could change based on market prices at the time of construction.
- (b) WAPs must meet the exact model and warranty specifications outlined in these Technical Provisions.
- (c) As the WAPs will be owned by the District and operated on a Wireless LAN Controller located on the Smart City VRF, the licenses, SmartNet, and hardware must be registered to the District's Office of the Chief Technology Officer (OCTO).

The following are the negotiated rates for the outdoor WAPs:

- (d) Root WAP (RAP) product total estimate: \$7,096.68
- (e) Mesh WAP (MAP) product total estimate: \$5,909.78
- (f) Prices include: WAP, (CMX+DNA) Licenses, SmartNet for 5 Years, Mount, Power Cable, Fiber Connectors, 4 Antenna/WAP, GPS Antenna
- (g) The following provides a detailed cost estimate from Cisco's Bill of Material (BOM):

All Prices Shown in USD

Part Number	Description	Service Duration (Months)	Estimated Lead Time (Days)	Unit List Price	Pricing Term	Qty	Unit Net Price	Disc(%)	Extended Net Price
AIR-DNA	CISCO DNA for Wireless - CHOOSE ONLY QTY 1 HERE	---	3	0.00		239	0.00	0.00	0.00
AIR-DNA-TRK-5Y	CISCO DNA Wireless Term Tracker 5Y	60	N/A	0.00		239	0.00	0.00	0.00
PI-LFAS-AP-T EA	Prime AP Term Licenses	---	6	0.00		239	0.00	0.00	0.00
PI-LFAS-AP-T-5Y	PI Dev Lic for Lifecycle & Assurance Term 5Y	60	N/A	0.00		239	0.00	0.00	0.00
AIR-DNA-E	Wireless Cisco DNA On-Prem Essential, Term Lic	---	3	0.00		239	0.00	0.00	0.00
AIR-DNA-E-5Y	Wireless Cisco DNA On-Prem Essential, 5Y Term Lic	60	N/A	376.31		239	376.31	0.00	89,938.09
AIR-DNA-E-T EA	Wireless Cisco DNA On-Prem Essential, Term, Tracker Lic	---	6	0.00		239	0.00	0.00	0.00
AIR-DNA-E-T-5Y	Wireless Cisco DNA On-Prem Essential, 5Y Term, Tracker Lic	60	N/A	0.00		239	0.00	0.00	0.00
AIR-DNA-NWSTACK-E EA	AIR CISCO DNA Perpetual Network Stack	---	28	0.00		239	0.00	0.00	0.00
IW-6300H-AC-B-K9	Industrial Wireless AP 6300, AC input, HazLoc, B Domain	---	35	6,317.03		239	6,317.03	0.00	1,509,770.17
HZ-PRODUCTS-TERMS	Buyer Acceptance of HazLoc Terms and Conditions	---	56	0.00		239	0.00	0.00	0.00
SWAP6300-MESH-K9	Cisco 6300 Series Unified Mesh Mode Software	---	56	0.00		239	0.00	0.00	0.00
AIR-ANT2547V-N	2.4 GHz 4dBi/5 GHz 7dBi Dual Band Omni Antenna, N connector	---	28	330.15		478	330.15	0.00	157,811.70
IOT-ACCPMK	IW6300 Pole/Wall Mount Kit (dry climates)	---	87	551.93		239	551.93	0.00	131,911.27
IOT-SMART-CITIES	Smart Cities and Communities Solutions; For tracking only.	---	35	0.00		239	0.00	0.00	0.00
IOT-CITIES-INFRA	Connected Communities Infrastructure CCI; For tracking only.	---	35	0.00		239	0.00	0.00	0.00
GLC-LX-SM-RGD=	1000Mbps Single Mode Rugged SFP	---	14	1,132.83		182	1,132.83	0.00	208,175.06
L-MSE-PAK-N	MSE License PAK for CMX 10 and higher	---	3	0.00		239	0.00	0.00	0.00
CON-ECMU-LMSEPALN	SWSS UPGRADES MSE License PAK for	60	N/A	0.00		239	0.00	0.00	0.00
L-AD-LS-1AP-N	1 AP CMX Advanced License for CMX 10 and higher	---	3	225.00		239	225.00	0.00	53,775.00
CON-ECMU-LADLS1PN	SWSS UPGRADES 1 AP CMX Advanced License for CMX 10 and	60	N/A	225.00		239	225.00	0.00	53,775.00

Valid through		Product Total	2,059,443.20
FOB Point	None	Service Total :	53,775.00
Note:		Subscription Total	89,938.09
		Total Price:	2,203,156.29

13.3.6 OCTO Points of Contact

Title	Name	Contact
DC-Net Program Manager	Jack Burbridge	jack.burbridge@dc.gov
Wireless Engineering Team	Syed Bilal Joshua Neitzey	Syed.Bilal@dc.gov Joshua.Neitzey@dc.gov
Warehouse 2900 V Street, NE (9am-4pm)		octo-dcnetwarehouse@dc.gov

13.4 Wireless Access Points

13.4.1 Summary WAPs by ANC

The Developer is required to deploy 239 total Wireless Access Points (WAPs), comprised of 91 Root Access Points (RAPs) and 148 Mesh Access Points (MAPs). ANCs impacted by the Wi-Fi deployment are 7C, 7D, 7F, 8A, 8C, 8D, and 8E. The following table summarizes the number of WAPs the Developer is required to deploy by ANC, specified by Mesh Access Points and Root Access Points.

ANC	DEVICE ROLE	QTY
ANC 7C	MAP	48
ANC 7C	RAP	27
	TOTAL	75
ANC 7D	MAP	29
ANC 7D	RAP	19
	TOTAL	48
ANC 7F	MAP	11
ANC 7F	RAP	6
	TOTAL	17
ANC 8A	MAP	20
ANC 8A	RAP	13
	TOTAL	33
ANC 8C	MAP	19
ANC 8C	RAP	14
	TOTAL	33
ANC 8D	MAP	17
ANC 8D	RAP	11
	TOTAL	28
ANC 8E	MAP	4
ANC 8E	RAP	1
	TOTAL	5
TOTAL		239

13.4.2 Detailed Breakdown of WAPs

The following table provides a detailed breakdown of the number of WAPs the Developer is required to deploy by pole number, ANC, neighborhood, nearby address, device role, pole type, and pole style.

ANC	STREETLIGHT ID	NEARBY ADDRESS	DEVICE ROLE	POLE TYPE	POLE STYLE	NEIGHBORHOOD
ANC 7C	70381DC	5210 HAYES ST NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	70586DC	5216 SHERIFF RD NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	70588DC	SHERIFF RD & 52ND ST NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	70590DC	5161 SHERIFF RD NE	MAP	Wood	Wood Pole	Deanwood

ANC 7C	70593DC	5125 SHERIFF RD NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	70595DC	5095 SHERIFF RD NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	70597DC	5079 SHERIFF RD NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	70600DC	5010 SHERIFF RD NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	70602DC	SHERIFF RD & 50TH PL NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	70604DC	SHERIFF RD & 49TH PL NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	70606DC	4909 SHERIFF RD NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	70608DC	4823 SHERIFF RD NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	70610DC	4809 SHERIFF RD NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	70613DC	4731 SHERIFF RD NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	70615DC	4721 SHERIFF RD NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	70617DC	47TH ST & SHERIFF RD NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	70620DC	SHERIFF RD & 46TH ST NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	70622DC	SHERIFF RD & 45TH PL NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	70625DC	SHERIFF RD & 45TH PL NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	71007DC	603 48TH ST NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	71271DC	5120 NANNIE HELEN BURROUGHS AVE NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	71276DC	5000 NANNIE HELEN BURROUGHS AVE NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	71280DC	50TH ST & NANNIE HELEN BURROUGHS AVE NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	71298DC	4635 NANNIE HELEN BURROUGHS AVE NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	71309DC	NANNIE HELEN BURROUGHS AVE & 44TH ST NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	71559DC	4506 NANNIE HELEN BURROUGHS AVE NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	71561DC	4600 NANNIE HELEN BURROUGHS AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	71912DC	5112 BROOKS ST NE	RAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	71927DC	501 51ST ST NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings

ANC 7C	71930DC	335 51ST ST NE	RAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	71933DC	323 51ST ST NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	71938DC	BANKS PL & 51ST ST NE	RAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	71941DC	50TH ST & BANKS PL NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	71947DC	220 51ST ST NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	71950DC	303 50TH ST NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	71952DC	316 50TH ST NE	RAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	71955DC	401 50TH ST NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	71959DC	584 50TH ST NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	71961DC	616 50TH ST NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	71964DC	49TH PL & NANNIE HELEN BURROUGHS AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	71992DC	FITCH PL & 50TH ST NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	72061DC	631 49TH ST NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	72063DC	635 49TH ST NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	72644DC	5207 NANNIE HELEN BURROUGHS AVE NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	73091DC	53RD ST & CLAY TER NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	73094DC	303 53RD ST NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	73096DC	236 53RD ST NE	RAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	73101DC	53RD ST & BANKS PL NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	73136DC	5310 CLAY TER NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings

ANC 7C	73139DC	5318 CLAY TER NE	RAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	73141DC	5328 CLAY TER NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	73205DC	950 DIVISION AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	73207DC	1217 DIVISION AVE NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	73209DC	945 DIVISION AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	73211DC	902 DIVISION AVE NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	73213DC	848 DIVISION AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	73218DC	DIVISION AVE & HAYES ST NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	73223DC	600 DIVISION AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	73225DC	609 DIVISION AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	73227DC	FOOTE ST & DIVISION AVE NE	RAP	Wood	Wood Pole	Deanwood
ANC 7C	73229DC	500 DIVISION AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	73233DC	DIVISION AVE & EADS ST NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	73235DC	DIVISION AVE & DIX ST NE	RAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	73237DC	302 DIVISION AVE NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	73240DC	258 DIVISION AVE NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	73242DC	242 DIVISION AVE NE	RAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	73244DC	DIVISION AVE & BANKS PL NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	73247DC	200 DIVISION AVE NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	73255DC	CLOUD PL & 53RD ST NE	RAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings

ANC 7C	73257DC	5225 CLOUD PL NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	79647DC	51ST ST & BROOKS ST NE	MAP	Wood	Wood Pole	Lincoln Heights / Richardson Dwellings
ANC 7C	7A203DC	5110 NANNIE HELEN BURROUGHS AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	7A222DC	4801 NANNIE HELEN BURROUGHS AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	7A232DC	NANNIE HELEN BURROUGHS AVE & GAULT PL NE	MAP	Wood	Wood Pole	Deanwood
ANC 7C	7S074DC	GAY ST & DIVISION AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7D	70005DC	QUARLES ST & ANACOSTIA AVE NE	RAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70035DC	PONDS ST & ANACOSTIA AVE NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70043DC	1551 ANACOSTIA AVE NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70046DC	1533 ANACOSTIA AVE NE	RAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70048DC	1519 ANACOSTIA AVE NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70269DC	ANACOSTIA AVE & 40TH ST NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70271DC	4021 ANACOSTIA AVE NE	RAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70273DC	4115 ANACOSTIA AVE NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70276DC	4141 ANACOSTIA AVE NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70278DC	4213 ANACOSTIA AVE NE	RAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70280DC	4307 ANACOSTIA AVE NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70284DC	ANACOSTIA AVE & ORD ST NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70286DC	1400 ANACOSTIA AVE NE	RAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70289DC	ANACOSTIA AVE & POLK ST NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70292DC	1513 ANACOSTIA AVE NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70295DC	ANACOSTIA AVE & DOUGLAS ST NE	RAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	70629DC	4311 SHERIFF RD NE	MAP	Wood	Wood Pole	Deanwood
ANC 7D	71178DC	4251 MINNESOTA AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7D	71181DC	MINNESOTA AVE & SHERIFF RD NE	RAP	Wood	Wood Pole	Deanwood

ANC 7D	71305DC	4500 NANNIE HELEN BURROUGHS AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7D	71314DC	4306 NANNIE HELEN BURROUGHS AVE NE	RAP	Wood	Wood Pole	Deanwood
ANC 7D	71316DC	4313 NANNIE HELEN BURROUGHS AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7D	71320DC	4215 NANNIE HELEN BURROUGHS AVE NE	MAP	Wood	Wood Pole	Deanwood
ANC 7D	71482DC	MINNESOTA AVE & GAULT PL NE	RAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7D	72321DC	4151 MINNESOTA AVE NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7D	72323DC	MINNESOTA AVE & HAYES ST NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7D	72325DC	4181 MINNESOTA AVE NE	RAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7D	72327DC	MINNESOTA AVE & HUNT PL NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7D	72330DC	MINNESOTA AVE & NANNIE HELEN BURROUGHS AVE NE	RAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7D	72332DC	4201 MINNESOTA AVE NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7D	72361DC	3800 HAYES ST NE	RAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	72363DC	HAYES ST & KENILWORTH TER NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	72366DC	3776 HAYES ST NE	RAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	72412DC	3813 JAY ST NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	72414DC	JAY ST & KENILWORTH TER NE	RAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	72416DC	JAY ST & KENILWORTH AVE NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	72446DC	750 KENILWORTH TER NE	RAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	72449DC	700 KENILWORTH TER NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	72453DC	KENILWORTH TER & NANNIE HELEN BURROUGHS AVE NE	RAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7D	73850DC	BENNING RD & CENTRAL AVE NE	RAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7D	73851DC	BENNING RD & 45TH ST NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7D	73854DC	4420 BENNING RD NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7D	73856DC	4400 BENNING RD NE	RAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7D	73858DC	4280 BENNING RD NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.

ANC 7D	73861DC	4254 BENNING RD NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7D	73863DC	4242 BENNING RD NE	RAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7D	73865DC	4228 BENNING RD NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7D	7A370DC	3812 HAYES ST NE	MAP	Wood	Wood Pole	Parkside / Kenilworth
ANC 7F	71401DC	MINNESOTA AVE & BENNING RD NE	RAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7F	71403DC	4021 MINNESOTA AVE NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7F	71406DC	4065 MINNESOTA AVE NE	RAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7F	71408DC	4089 MINNESOTA AVE NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7F	71412DC	MINNESOTA AVE & GRANT ST NE	RAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7F	72465DC	4045 MINNESOTA AVE NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7F	73882DC	3940 BENNING RD NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7F	73890DC	40TH ST & BENNING RD NE	RAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7F	73898DC	3937 MINNESOTA AVE NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7F	73900DC	3921 MINNESOTA AVE NE	RAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7F	73901DC	3901 MINNESOTA AVE NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7F	73969DC	MINNESOTA AVE & BLAINE ST NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7F	74028DC	3813 MINNESOTA AVE NE	RAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7F	74030DC	3830 MINNESOTA AVE NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 7F	74130	3728 MINNESOTA AVE NE	MAP	Steel	PP	Minnesota & Benning Rd.
ANC 7F	74153	3640 MINNESOTA AVE NE	MAP	Steel	PP	Minnesota & Benning Rd.
ANC 7F	7A292DC	3908 BENNING RD NE	MAP	Wood	Wood Pole	Minnesota & Benning Rd.
ANC 8A	79377DC	GOOD HOPE RD & 17TH ST SE	MAP	Wood	Wood Pole	Anacostia
ANC 8A	79378DC	1661 GOOD HOPE RD SE	MAP	Wood	Wood Pole	Anacostia
ANC 8A	79379DC	1805 GOOD HOPE RD SE	RAP	Wood	Wood Pole	Anacostia
ANC 8A	80123	1444 MINNESOTA AVE SE	MAP	Steel	PP	Anacostia

ANC 8A	80124	1430 MINNESOTA AVE SE	RAP	Steel	PP	Anacostia
ANC 8A	80527DC	2010 14TH ST SE	MAP	Wood	Wood Pole	Anacostia
ANC 8A	80534	1900 14TH ST SE	MAP	Steel	PP	Anacostia
ANC 8A	80732DC	U ST & 15TH ST SE	RAP	Wood	Wood Pole	Anacostia
ANC 8A	80780	1916 15TH ST SE	MAP	Steel	PP	Anacostia
ANC 8A	80785DC	2000 15TH ST SE	MAP	Wood	Wood Pole	Anacostia
ANC 8A	80847DC	1416 W ST SE	MAP	Wood	Wood Pole	Anacostia
ANC 8A	80849	W ST & 14TH ST SE	RAP	Steel	PP	Anacostia
ANC 8A	80876	1342 V ST SE	MAP	Steel	PP	Anacostia
ANC 8A	80902DC	1827 GOOD HOPE RD SE	MAP	Wood	Wood Pole	Anacostia
ANC 8A	80907	GOOD HOPE RD & 16TH ST SE	RAP	Steel	PP	Anacostia
ANC 8A	80915DC	1337 GOOD HOPE RD SE	RAP	Wood	Wood Pole	Anacostia
ANC 8A	80916DC	1305 GOOD HOPE RD SE	MAP	Wood	Wood Pole	Anacostia
ANC 8A	80928	1234 GOOD HOPE RD SE	RAP	Steel	PP	Anacostia
ANC 8A	80998	2228 MARTIN LUTHER KING JR AVE SE	MAP	Steel	PP	Anacostia
ANC 8A	80999	MARTIN LUTHER KING JR AVE & PLEASANT ST SE	RAP	Steel	PP	Anacostia
ANC 8A	81000	2210 MARTIN LUTHER KING JR AVE SE	MAP	Steel	PP	Anacostia
ANC 8A	81020	MARTIN LUTHER KING JR AVE & U ST SE	MAP	Steel	PP	Anacostia
ANC 8A	81022	2025 MARTIN LUTHER KING JR AVE SE	MAP	Steel	PP	Anacostia
ANC 8A	81023	2041 MARTIN LUTHER KING JR AVE SE	RAP	Steel	PP	Anacostia
ANC 8A	81024	2100 MARTIN LUTHER KING JR AVE SE	MAP	Steel	PP	Anacostia
ANC 8A	81276DC	HOWARD RD & FIRTH STERLING AVE SE	RAP	Wood	Wood Pole	Anacostia
ANC 8A	81278DC	1101 HOWARD RD SE	MAP	Wood	Wood Pole	Anacostia
ANC 8A	81282DC	MARTIN LUTHER KING JR AVE & HOWARD RD SE	MAP	Wood	Wood Pole	Anacostia
ANC 8A	81699	2320 MARTIN LUTHER KING JR AVE SE	MAP	Steel	PP	Anacostia

ANC 8A	82039	2427 MARTIN LUTHER KING JR AVE SE	MAP	Steel	PP	Anacostia
ANC 8A	82040	2407 MARTIN LUTHER KING JR AVE SE	RAP	Steel	PP	Anacostia
ANC 8A	8L848	MARTIN LUTHER KING JR AVE & GOOD HOPE RD SE	RAP	Steel	PP	Anacostia
ANC 8A	8M028DC	14TH ST & V ST SE	RAP	Wood	Wood Pole	Anacostia
ANC 8C	81373	2500 MARTIN LUTHER KING JR AVE SE	RAP	Steel	PP	Anacostia
ANC 8C	81732DC	2804 MARTIN LUTHER KING JR AVE SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	81734DC	MARTIN LUTHER KING JR AVE & LEBaum ST SE	RAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	81735DC	MARTIN LUTHER KING JR AVE & MELLONST SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	81834DC	234 MALCOLM X AVE SE	RAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	81839DC	MALCOLM X AVE & OAKWOOD ST SE	RAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	81841DC	558 MALCOLM X AVE SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	81846DC	600 MALCOLM X AVE SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	81861DC	638 MILWAUKEE PL SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	81987DC	MALCOLM X AVE & MARTIN LUTHER KING JR AVE SE	RAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	82015DC	MARTIN LUTHER KING JR AVE & SAINT ELIZABETHS ENT DR SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	82016DC	MARTIN LUTHER KING JR AVE & MILWAUKEE PL SE	RAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85017DC	ATLANTIC ST & SOUTH CAPITOL ST SE	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8C	85374DC	PARKLAND PL & MARTIN LUTHER KING JR AVE SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85403DC	3100 RANDLE PL SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85407DC	ALABAMA AVE & 6TH ST SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85410DC	ALABAMA AVE & RANDLE PL SE	RAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85415DC	636 ALABAMA AVE SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85418DC	ALABAMA AVE & 7TH ST SE	RAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85420DC	ALABAMA AVE & 8TH ST SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85422DC	ALABAMA AVE & WHEELER RD SE	RAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths

ANC 8C	85424DC	ALABAMA AVE & 9TH ST SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85435DC	1007 ALABAMA AVE SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85443DC	1103 ALABAMA AVE SE	RAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85445DC	ALABAMA AVE & 12TH ST SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85448DC	1217 ALABAMA AVE SE	RAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85665DC	MARTIN LUTHER KING JR AVE & WACLARK PL SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85668DC	MARTIN LUTHER KING JR AVE & ESTHER PL SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	85675DC	3117 MARTIN LUTHER KING JR AVE SE	RAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	8A555DC	MARTIN LUTHER KING JR AVE & RANDLE PL SE	RAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	8M006	3836 SOUTH CAPITOL ST SE	MAP	Steel	PP	Bellevue / South Capitol
ANC 8C	8M010DC	3200 MARTIN LUTHER KING JR AVE SE	RAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8C	8M059DC	3105 MARTIN LUTHER KING JR AVE SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8D	84599DC	4505 1ST ST SE	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	84602DC	1ST ST & FORRESTER ST SE	RAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	84604DC	4400 1ST ST SE	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	84718DC	6 ELMIRA ST SW	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	84757DC	10 DANBURY ST SE	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	84759DC	4 DANBURY ST SW	RAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	84912DC	4314 SOUTH CAPITOL ST SE	RAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	84915DC	4304 SOUTH CAPITOL ST SE	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	84925DC	4001 SOUTH CAPITOL ST SW	RAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	84927DC	4021 SOUTH CAPITOL ST SW	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	84929DC	4100 SOUTH CAPITOL ST SW	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	84931DC	SOUTH CAPITOL ST & CHESAPEAKE ST SW	RAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	84933DC	4210 SOUTH CAPITOL ST SW	MAP	Wood	Wood Pole	Bellevue / South Capitol

ANC 8D	84944DC	SOUTH CAPITOL ST & FORRESTER ST SW	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	84945DC	4504 SOUTH CAPITOL ST SW	RAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	84999DC	MARTIN LUTHER KING JR AVE & XENIA ST SW	RAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	85003DC	3939 MARTIN LUTHER KING JR AVE SW	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	85005DC	3955 MARTIN LUTHER KING JR AVE SW	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	85007DC	MARTIN LUTHER KING JR AVE & ATLANTIC ST SW	RAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	85009DC	115 ATLANTIC ST SW	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	85014DC	21 ATLANTIC ST SW	RAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	85113DC	3900 SOUTH CAPITOL ST SW	RAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	85886DC	4060 MARTIN LUTHER KING JR AVE SW	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	85905DC	4065 MARTIN LUTHER KING JR AVE SW	RAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	85907DC	4043 MARTIN LUTHER KING JR AVE SW	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	85910DC	4005 MARTIN LUTHER KING JR AVE SW	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	8M001DC	3939 SOUTH CAPITOL ST SW	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8D	8M002DC	3915 SOUTH CAPITOL ST SW	MAP	Wood	Wood Pole	Bellevue / South Capitol
ANC 8E	82735DC	1305 SAVANNAH ST SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8E	82740DC	1345 SAVANNAH ST SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8E	82768DC	ALABAMA AVE & 13TH ST SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8E	82770DC	1331 ALABAMA AVE SE	RAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths
ANC 8E	85450DC	1241 ALABAMA AVE SE	MAP	Wood	Wood Pole	Congress Heights / Saint Elizabeths

13.5 Roadway Classifications

The following classifications are those recommended by the Illuminating Engineering Society of North America⁹ and AASHTO¹⁰.

1. **Freeway:** This is a divided major roadway with full control of access and with no crossing at grade. It applies to toll as well as non-toll roads.
 - a. **Freeway A:** This designates roadways with greater visual complexity and high traffic volumes. This type of freeway is usually found in major metropolitan areas in or near the central core. It operates through much of the early evening hours of darkness at or near design capacity.
 - b. **Freeway B:** This designates all other divided roadways with full control of access where lighting is needed.
2. **Expressway:** A divided major roadway for through traffic with partial control of access and generally at major crossroads with interchanges. Parkways are generally known as expressways for non-commercial traffic within parks and park-like areas.
3. **Major/Principal Arterial:** That part of the roadway system serving as the principal network for through traffic flow. The routes connect important rural highways entering the city and areas of principal traffic generation.
4. **Minor Arterial:** The roadway that provides relatively high speeds and least interference to through traffic flow with little or no access control. It provides direct access to abutting properties, have frequent at-grade intersections, have pedestrian movements along and across the roadway, accommodate bicyclist unless specifically limited and support public transportation.
5. **Collector:** The roadways servicing traffic between major and local roadways. These are roadways used mostly for traffic movements within residential, commercial, and industrial areas.
6. **Local:** The roadways used mainly for direct access to residential, commercial, industrial, or other abutting property. They do not include roadways that carry through traffic. The long local roadways are generally divided into short sections by collector roadway systems.
7. **Alley:** A narrow public ways within a block, which is generally used for vehicular access to the rear of abutting properties.
8. **Sidewalk:** A paved or otherwise improved areas for pedestrian use, located within the public street right-of-way, which also contains roadways for vehicular traffic.
9. **Pedestrian Walkway:** A public facility for pedestrian traffic not necessarily within the right-of-way of a vehicular traffic roadway. They include skywalks (pedestrian overpasses), subwalks

⁹ *American National Standard Practice for Roadway Lighting*, ANSI/IES RP-8.1983; Illuminating Engineering Society of North America.

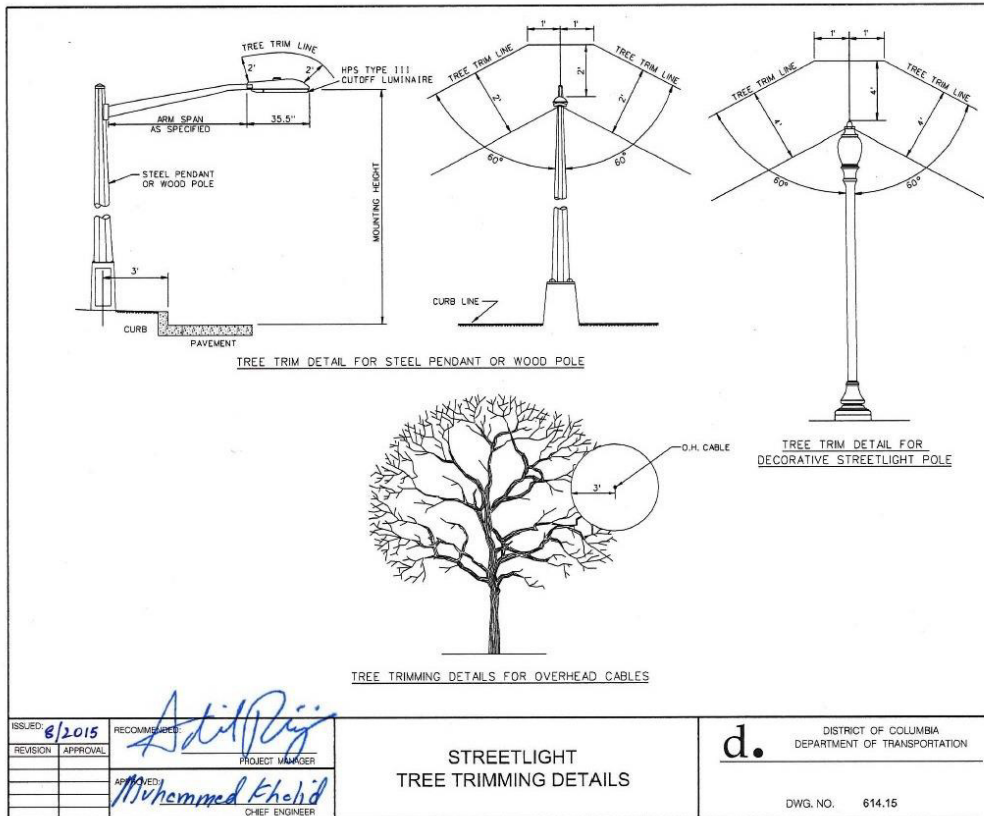
¹⁰ *Roadway Lighting Design Guide*, AASHTO, 2005.

(pedestrian tunnels), walkways giving access to parks or block interiors, and midblock street crossings.

10. **Bicycle lane:** A portion of roadway, or shoulder, or any facility that has been explicitly designated for the use by bicyclists.
11. **Cycle Track:** A bidirectional track for bicycle traffic that is divided from vehicular traffic.

DRAFT

13.6 Tree Trimming



13.7 Pole Ownership

In every instance where the Developer finds a combination pole that is in a shared conduit with traffic signal wires, the Developer shall follow the requirements listed in section 1.4.7(c). The District estimates that no more than 150 poles share a conduit with traffic signal wires.

The Developer shall notify the District 24 hours before commencing Work on a combination pole where Street Light Network wires share a conduit with traffic signal wires and upon completing such Work.

The Developer shall follow the following protocols for wood poles. Wood poles have three ownership scenarios.

- (1) D.C. owned pole, D.C. owned secondary, and a D.C. owned arm and fixture. Under this scenario, the Developer shall be responsible for the pole, arm, luminaire, wire, overhead wires and taps.
- (2) PEPCO or Verizon owned pole with D.C. owned secondary, D.C. owned arm, and D.C. owned luminaire. Under this scenario, the Developer is responsible for the secondary, arm and luminaire.
- (3) PEPCO owned pole, PEPCO owned secondary, a PEPCO owned tap, a D.C. owned arm, D.C. owned wire and D.C. owned luminaire. Under this scenario, the Developer is responsible for the arm, wire and luminaire.

The Developer shall follow the following guidance to determine ownership on a pole-by-pole basis to determine ownership:

For D.C. owned pole wood poles, the only object on the pole is:

- Street lighting equipment
- Cable TV and Street Lighting Equipment

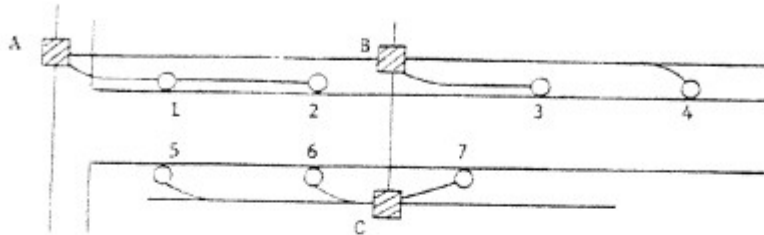
For PEPCO or Verizon owned pole wood poles, the only object on the pole is:

- PEPCO has secondary wires on the pole that feeds other customers.
- PEPCO has primary cables on the wood pole.
- PEPCO has any other equipment on the wood pole.
- Verizon has cables and/or other equipment on the pole.

The following figures present the 1978 Division of Ownership with Pepco. This agreement specifies Pepco versus District ownership and responsibilities for maintaining underground supply and overhead supplies.

1. UNDERGROUND SUPPLY

1.1 DIVISION OF OWNERSHIP IN GENERAL FORM



(Figure 1)

PEPCO OWNERSHIP:

Under the condition shown in Figure 1 PEPCO will own and maintain the following items.

Manholes: A, B, & C

Conduit: A-B & B-C

Cables: Primary and secondary cables between A-B and B-C

Transformers: At A, B & C

Switches: At A, B & C

Fuses: At A, B & C

Splices and Terminations: Primary and secondary splices not associated solely with streetlights and terminations at A, B, & C

Cost: PEPCO is responsible for maintenance cost for all of the above items including cable, conduit repairs and associated resurfacing.

-/-

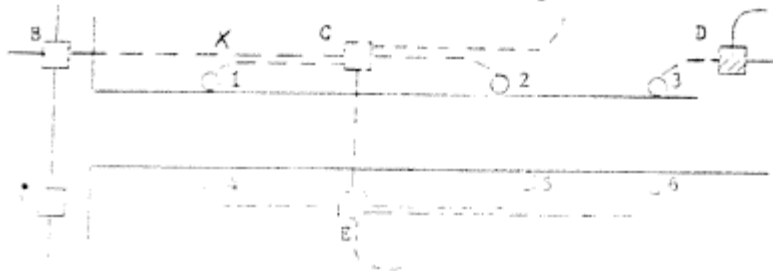
D.C. OWNERSHIP:

Under the condition shown in Figure 1 D.C. will own and maintain the following items.

- Conduit: A-1, 1-2, B-3, B-4, C-5, C-6 and C-7
(Conduit between streetlights No. 4, 5 and 6 and their respective manholes are 1-way ducts and are dedicated to the streetlights)
- Cables: Secondary cables between A-1, 1-2, B-3, B-4, C-5, C-6 & C-7
Secondary cables in streetlight posts
- Splices: Secondary splices associated solely with the streetlights in manholes A, B & C
- Foundations: Streetlight foundations at 1, 2, 3, 4, 5 & 6
- Streetlight Equipment: All streetlight equipment is furnished and owned by D.C. (Luminaires, photo cells, ballasts, posts, etc.)
- Cost: D.C. is responsible for maintenance cost for all of the above items it owns, including cable, conduit, foundation repairs and associated resurfacing.

1.2 INSTALLATION OF A NEW STREETLIGHT(s)

A. System Not Dedicated for the District Streetlighting System



PEPCO OWNERSHIP:

Under the condition shown in Figure 2A PEPCO will own and maintain the following items.

- Manholes: A, B, C, D & E. (A, B, & D are existing manholes.) (The size of the new manholes will be determined by PEPCO.)

Conduit: A-B, B-C & C-E
(No. of cells associated with the conduit line will be determined by PEPCO.)

Trench: B-X & C-E
(Common trench between X-C will be owned by DC)

Cables: Primary cables between B and C
Secondary cables between C and E

Transformers: At A, B, C, D & E

Switches: At A, B, C, D & E

Fuses: At A, B, C, D & E

Splices & Terminations:
Primary and secondary splices & terminations at A, B, C, D & E that are not installed solely for streetlighting purposes.

Paving: PEPCO is responsible for temporary and permanent resurfacing of the cut between B and X. PEPCO is responsible for providing temporary resurfacing of cuts between X-C, 1-C, 2-C, 3-D, 4-E, 5-E & 6-E; however D.C. will be responsible for the cost.

Cost: PEPCO is responsible for construction and maintenance cost for all of the above items, including cable, conduit repairs and resurfacing.

D.C. OWNERSHIP:

Under the condition shown in Figure 2A D.C. will own and maintain the following items.

Conduit: 1-C, 2-C, 3-D, 4-E, 5-E & 6-E
(Conduit typically will be 1-way; however, based on the distance between streetlights and supply point, 2-way conduit could be utilized.)

Trench: X-C, 2-C, 3-D, 4-E, 5-E & 6-E

Cables: Secondary cables between 1-C, 2-C, 3-D, 4-E, 5-E & 6-E
Secondary cables in streetlight posts

Splices: Secondary splices associated solely with the streetlight(s) in manholes C, D & E

Foundations: Streetlight foundations at 1, 2, 3, 4, 5 & 6

-3-

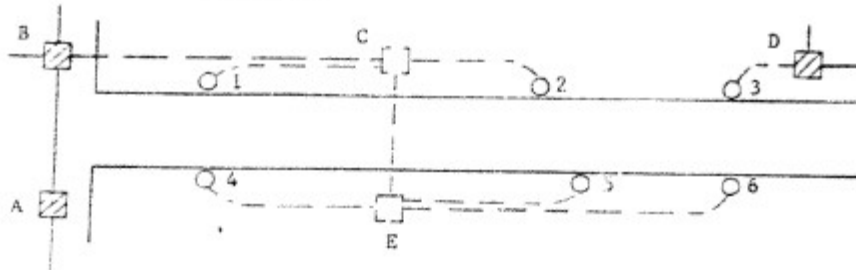
Posts: Streetlight posts at 1, 2, 3, 4, 5 & 6
(Furnished by D.C.)

Streetlight Equipment: All streetlight equipment is furnished and owned by D.C. (Luminaires, photo cells, ballasts, etc.)

Paving: D.C. is responsible for the cost and installation of permanent resurfacing of cuts between 1-C, 2-C, 3-D, 4-E, 5-E & 6-E.

Cost: D.C. is responsible for construction and maintenance cost for all of the items it owns including cable, conduit, foundation repairs and resurfacing.

B. System Dedicated for the District Streetlighting System (typical installations: Alleys & Freeways)



(Figure 2B)

PEPCO OWNERSHIP:

Under the condition shown in Figure 2B PEPCO will own and maintain the following items.

Manholes: A, B & D

Conduit: A-B

Cables: Primary and secondary cables between A & B; primary and secondary cables(s) feeding into D.

Transformers: At A, B & D

Switches: At A, B & D

Fuses: At A, B & D

Splices and Terminations: Primary and secondary splices and terminations at A, B & D that are not dedicated to streetlight use.

Paving: PEPCO is responsible for providing temporary resurfacing of cuts between B-C, 1-C, 2-C, 3-D, 4-E, 5-E and 6-E; however, D.C. will be responsible for the cost.

Cost: PEPCO is responsible for maintenance cost for all of the above items including cable, conduit repairs and associated resurfacing.

D.C. OWNERSHIP:

Under the condition shown in Figure 2B D.C. will own and maintain the following items.

Manholes: C & E

Conduit: B-C, C-E, C-1, C-2, D-3, E-4, E-5 & E-6 (Conduit typically will be 1-way; however, based on the distance between streetlights and supply point, 2-way conduit could be utilized.)

Trench: B-C, C-E, C-1, C-2, D-3, E-4, E-5 & E-6

Cables: Secondary cables between B-C, C-E, C-1, C-2, D-3, E-4, E-5 & E-6
Secondary cables in streetlight posts

Splices: Secondary splices associated with the streetlight(s) in manholes B, C, D & E that are dedicated to streetlight use.

Foundations: Streetlight foundations at 1, 2, 3, 4, 5 & 6

Posts: Streetlight posts at 1, 2, 3, 4, 5 & 6 (Furnished by D.C.)

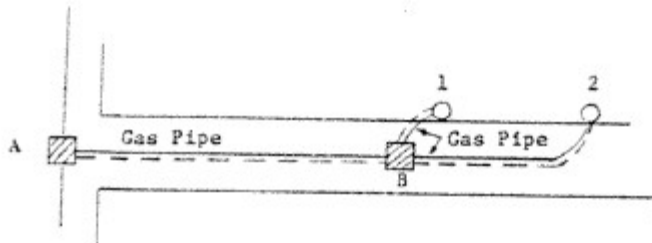
Streetlight Equipment: All streetlight equipment is furnished and owned by D.C. (Luminaires, photo cells, ballasts, etc.)

Paving: D.C. is responsible for the cost of temporary and for cost and installation of permanent resurfacing of cuts between B-C, C-E, C-1, C-2, D-3, E-4, E-5 & E-6.

Cost: D.C. is responsible for construction and maintenance cost for all of the above items it owns including cable, conduit, foundation repairs and resurfacing.

1.3 REPLACEMENT OF GAS PIPE

Gas pipes may be utilized by the District for street-light conduit in the alleys. Obstructed or broken gas pipes are not being repaired; rather they are being replaced by conduit line(s). The applicable portion of the following guidelines should be utilized based on the location of the obstructed or broken gas pipe(s).



(Figure 3)

PEPCO OWNERSHIP:

Under the condition shown in Figure 3, PEPCO will own and maintain the following items.

- Manhole: A (Existing manhole)
- Transformers: At A
- Switches: At A
- Fuses: At A
- Splices: Primary and secondary splices in A not dedicated to streetlight use.
- Paving: PEPCO is responsible for temporary resurfacing of the cut between A-B, 1-B & 2-B; however, D.C. will be responsible for the cost.
- Cost: PEPCO is responsible for construction and maintenance cost for all of the above items including cable, conduit repairs and resurfacing.

D.C. OWNERSHIP:

Under the condition shown in Figure 3 D.C. will own and maintain the following items.

- Manhole: B (Existing manhole)

Conduit: New conduit between A-B, 1-B & 2-B (New conduit will be installed between A-B, 1-B and/or 2-B if the gas pipe is obstructed or broken.) 1-way conduit will be used for gas pipe replacements.

Trench: A-B, 1-B & 2-B (if conduit is constructed)

Cables: Secondary cables between A-B, B-1 & B-2
Secondary cables in streetlight posts

Splices: Secondary splices associated solely with streetlight at A & B

Foundations: Streetlight foundations at 1 and 2

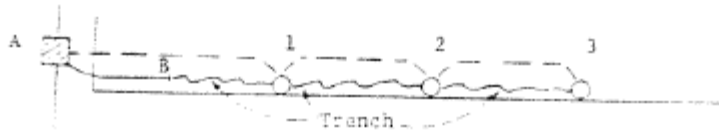
Streetlight Equipment: All streetlight equipment is furnished and owned by D.C. (posts, luminaires, photo cells, etc.)

Paving: D.C. is responsible for the cost and installation of permanent resurfacing of cuts between A-B, 1-B and/or 2-B (Based on the conduit construction)

Cost: D.C. is responsible for construction and maintenance cost of all of the above items it owns including cable, conduit, foundations, repairs and resurfacing.

1.4 REPLACEMENT OF BURIED STREETLIGHT CABLE

The streetlight cable(s) in trench will be replaced and placed in conduit if ordered by the District and under the condition that the streetlight cable has failed in several locations.



(Figure 4)

PEPCO OWNERSHIP:

Under the condition shown in Figure 4 PEPCO will own and maintain the following items.

Manhole: A (existing manhole not dedicated to streetlight use)

Transformers: At A

Switches: At A

Fuses: At A

Splices: Primary and secondary splices at A not dedicated to streetlight use.

Cost: PEPCO is responsible for construction and maintenance cost for all of the above items.

D.C. OWNERSHIP:

Under the condition shown in Figure 4 D.C. will own and maintain the following items.

Conduit: 1-A and/or 1-2 and/or 2-3 (the conduit is constructed on the portions of the circuit as deemed necessary)

Existing A-B (if no conduit constructed between 1 and A)

Trench: 1-B and/or 1-2 and/or 2-3 (based on the conduit to be installed)

Cables: Secondary cables between 1-B-A and/or 1-A, 1-2, 2-3.

Secondary cables in streetlight posts.

Splices: Secondary splices associated solely with streetlights at A.

2. OVERHEAD SUPPLY

2.1 DIVISION OF OWNERSHIP IN GENERAL FORM



(Figure 5)

PEPCO OWNERSHIP:

Under the condition shown in Figure 5 PEPCO will own and maintain the following items.

Wood Poles: At 1, 2 & 3

Cables: Primary and secondary cables between 1-2 and 2-3

Transformers, Switches, Capacitor Banks, Fuses,
Regulators, Etc.: Attached to 1, 2 & 3

Connectors, Insulators, Terminations, or any other
equipment that is not identified as the
District-owned equipment.

Cost: PEPCO is responsible for maintenance
cost for all of the items it owns
including cable, pole repairs and
replacements.

D.C. OWNERSHIP:

Under the condition shown in Figure 5 D.C. will own and
maintain the following items.

Cables: Conductors from the luminaire to the
point of connection to the PEPCO supply
circuits on poles 2 & 3 (streetlight
loops)

Multiple Streetlight Circuit: Supply circuits from
the supply switching device when they
make up a timed multiple circuit

Series Streetlight Circuit: Supply circuits,
including the loop, from the supply
transformer to the luminaire(s)

Splices (Connectors): Connectors at 2 & 3 dedi-
cated to streetlight use.

Streetlight Equipment: All streetlight equipment
is furnished and owned by D.C.

- Streetlight luminaires at 2 & 3
(including lamps, ballasts and photo
cells)

- Mast arms at 2 & 3 (including moun-
ting arms and brackets)

Cost: D.C. is responsible for maintenance cost
for all of the items it owns including
streetlight loop cable and associated
repairs with the streetlight fixtures.

2.2 INSTALLATION OF NEW STREETLIGHTS

2.2.1 A. System Not Dedicated for the District Streetlighting System



(Figure 6A)

PEPCO OWNERSHIP:

Under the condition shown in Figure 6A PEPCO will own and maintain the following items.

Wood Poles: 1, 2, 3 & 4

Cables: Primary conductors between 1-2, 2-3 & 3-4
Extension of secondary cables between 1-2 & 2-3

Transformers, Switches, Capacitor Banks, Fuses, Regulators, Etc.: Attached to 1, 2, 3 & 4

Connectors, Insulators, Terminations or any other equipment that is not identified as District-owned equipment

Cost: PEPCO is responsible for maintenance cost for the items it owns including cable, pole repairs or replacements.

D.C. OWNERSHIP:

Under the condition shown in Figure 6A D.C. will own and maintain the following items.

Cables: Conductors from the luminaire to the point of connection to the PEPCO supply circuits on pole 3 (streetlight loop)

Splices (Connectors): Connector at 3 dedicated to streetlight use

Streetlight Equipment: All streetlight equipment is furnished and owned by D.C. (luminaires, photo cells, ballasts, etc.)

Cost: D.C. is responsible for maintenance cost for all of the above items including streetlight loop cable and associated repairs with streetlight fixtures including the installation cost associated with wood pole at 3.

Tax Gross-up: The proper tax gross-up percentage will be applied to installation cost of wood pole at 3.

2.2.2 B. System Dedicated for the District Streetlighting System



(Figure 6B)

PEPCO OWNERSHIP:

Under the condition shown in Figure 6B PEPCO will own and maintain the following items.

Wood Poles: 1

Cables: Primary and secondary cables attached to 1

Transformers, Switches, Capacitor Banks, Fuses, Regulators, etc.: Attached to 1

Connectors, Insulators, Terminations or any other equipment that is not identified as District-owned equipment.

Cost: PEPCO is responsible for maintenance cost for all of the above items including cable, pole repairs and replacements.

D.C. OWNERSHIP:

Under the condition shown in Figure 6B D.C. will own and maintain the following items.

Wood Poles: 2 & 3 (to be stenciled as "DC OWNED")

13.8 Asset Inventory

This section is provided for informational purposes only. The ArcGIS inventory serves as the best resource for observing the Streetlight Network inventory.

13.8.1 Pole Types

A sampling of pole types include 16st Triple, 3A, 3A Ext, 5A, 716, Aerial, Catenary, Connecticut Twin, High Mast, Howard 5, Klinge Twin, L'Enfant 5, L'Enfant Twin, M19, nonconventional, PP and TW20, Wood,

13.8.2 Washington Upright Poles

This group includes Nos. 716, 16, 18, 13N, 14, 17M, 19M, Twin-20 and State Department Twin-20.

The Washington Upright poles (e.g., Nos. 716, 14, 16, 18, and Twin-20) are used in the historic districts/streets. No. 16 is the most commonly used upright pole; No. 716 is considered to be an inexpensive version of No.16 (\$5000 vs. \$2500). In the Downtown area near Foggy Bottom, No. 18 poles are used. The Twin-20 poles are used in Downtown, in historic districts and several entry points into Washington, DC.

The Nos. 16 and 18 poles use 24-inch bases and 15-inch bolt circles and can accommodate 70-400 Watt lamps. The No. 14 pole, on the other hand, uses a 17-inch base and 10.5-inch bolt circles and can accommodate 70-150 Watt lamps, since it is limited by the size of the casing. 716 poles are steel octaflute with a 9.5 inches bolt circle. AD11 poles, a variation of No. 716 poles, are used for traffic signals.



Figure 6 – Washington Upright Poles

13.8.3 Pendant Post Poles

The Pendant Post poles are installed citywide and can accommodate 70-400 Watt lamps with either single or twin arm(s). The District typically uses Cobrahead type arms and fixtures (although there are limited installations of Teardrop fixtures, another type of Pendant Post implementation). Pendant Post poles have an octaflute type of cross-section.

The most widely used Pendant Post poles are 28 feet –6 inches tall; 38 feet-6 inches tall poles are also used. There are a few high-mast (70 feet-100 feet tall) Pendant Post poles in the City that use 1000 Watt High Pressure Sodium (HPS) lamps.

The 5A Alley post is widely used in alleys.

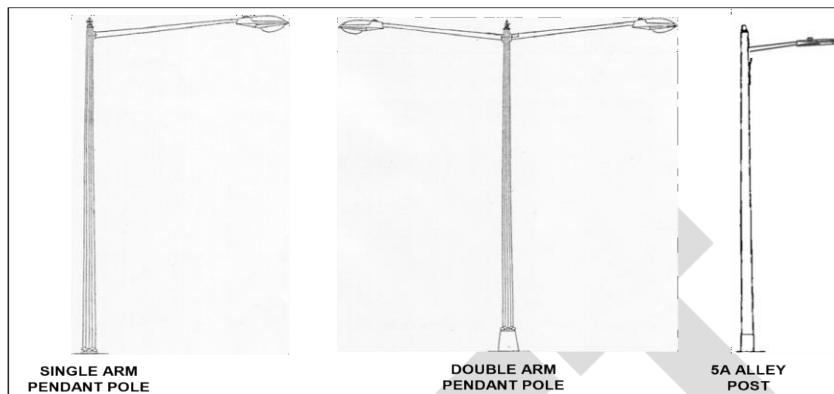
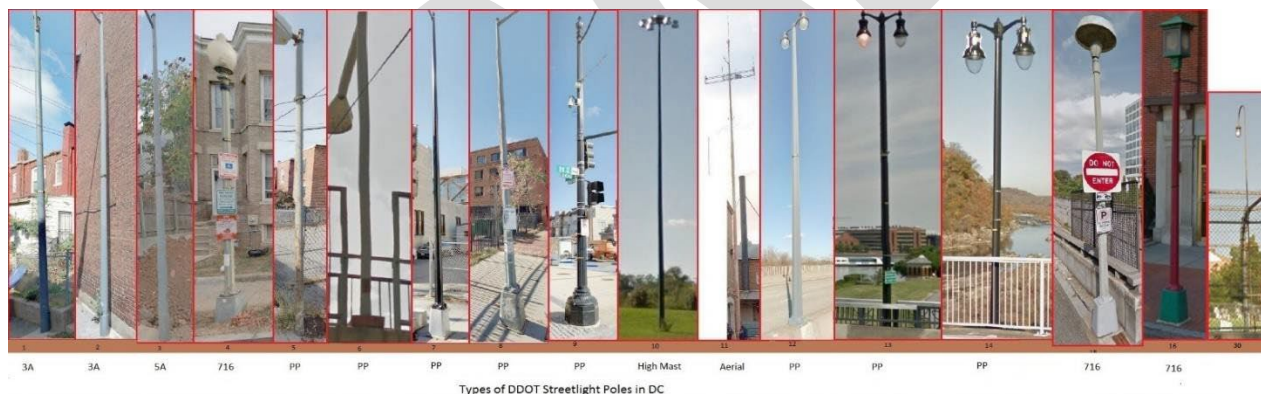


Figure 7 – Washington Family – Pendant Posts and 5A Alley Poles

13.8.4 Summary- All Pole Styles

Please find below a summary picture of all of the Poles used in the District.





40 Foot Pole



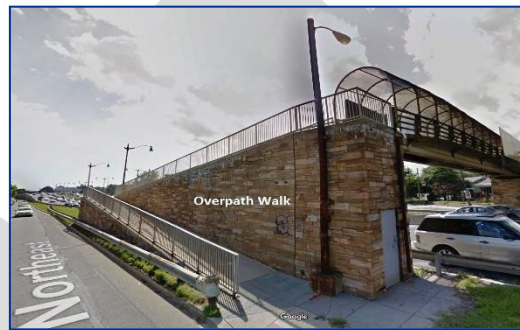
Dupont Circle Walk Path



Wood Pole



Metropolitan Branch Trail



Overpath Walk

13.8.5 Recommended Poles

The Washington Upright poles Nos. 14, 16, 18 and Twin-20 that are recommended in the standards are shown below.



The Pendant poles recommended for the District are Cobrahead, 5A Alley Post and Decorative Teardrop. The Cobrahead and 5A Alley Poles are installed citywide.

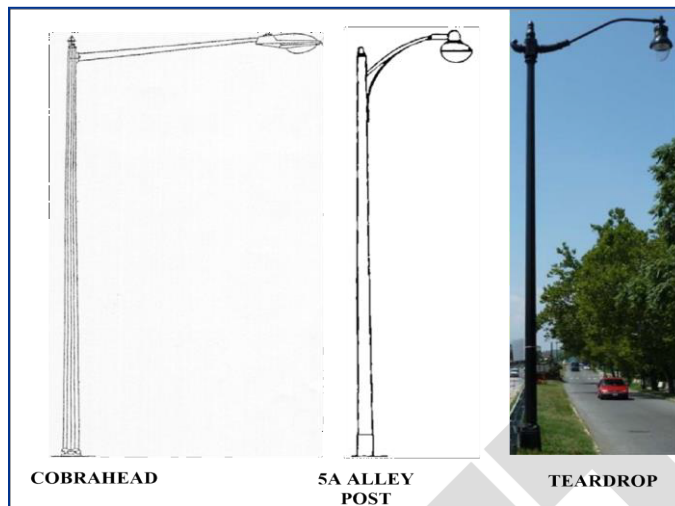


Figure 15 Types of Pendant Poles for Use in DC (Cobrahead, 5A Alley Post and Teardrop)

13.8.6 Pole Composition

The District currently identifies the poles as having the following possible composition: Aluminum, Cast Iron, Composite, Metal, Steel or Wood.

13.8.7 Arms

The District has data on the length of the arms. In addition, the District currently utilizes the following styles of arms:

- decorated (Straight, Wrap, Truss Wrap)
- j-Hook Arm
- regular Alley
- simple old teardrop
- simple pendant
- simple pendant with Guy
- simple teardrop
- simple teardrop with guy
- simple WP
- TR

- truss
- U-Shape
- wood Pole Truss
- WP Arm with Guy
- WP Decorated Scroll
- WP Decorated Scroll with Guy

13.8.8 Globes

The Lighting Network includes various types of globes including but not limited to Washington globes.

Washington globes are only for upright/posttop poles. The Washington globes are made of either glass or plastic. The District previously utilized glass for its Washington globes; however, due to safety concerns with the material, the District discontinued the use of glass. The District has since transitioned from the use of glass to plastic for the globes. Washington globes shall be stippled clear (90% transparent) shatter-proof ultraviolet stable polycarbonate.

Teardrop, cobrahead, and Spring City teardrop globes can be made of glass.

13.8.9 Fixture Styles

The District's asset inventory includes the following styles of fixtures for its Lighting Units:

- Cobrahead Cutoff
- Cobrahead Simi Cutoff
- Posttop
- Teardrop
- Incandescent
- Mushroom
- Spot Light
- Navigation
- Chinatown Luminaire
- Wallpack
- Overhead
- Standard LED
- Old Teardrop
- L'Enfant Globe
- L'Enfant Underdeck

The figures below displays photographs of the various lighting fixture styles within the District, for reference:

















L'Enfant Globe



L'Enfant Underdeck



Figure 16. Lighting Fixture Styles for Use in the District

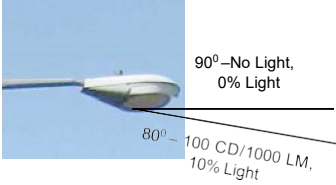
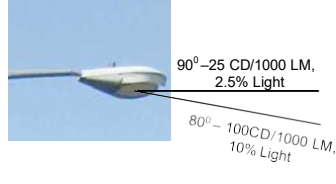
DDOT Streetlight: Fixture Style Reference	
Fixture Style	Photographs
1 - Cobrahead Cutoff	
2 - Cobrahead Simi Cutoff	
3 - Posttop	 
4 - Teardrop	
5 - Incandescent	
6 - Mushroom	
7 - Spot Light	 
8 - Navigation	
9 - Chinatown Luminaire	
10 - Wallpack	
11 - Overhead	
12 - Standard LED	   
13 - Old Teardrop	  


13.8.10 Cutoff Fixtures

It is important to control the distribution of light flux emission above the beam of maximum candlepower. At higher vertical angles, light flux emission generally contributes substantially to increased pavement brightness, but it also contributes greatly to increased disability and discomfort glare⁶. The light flux emission above the beam of maximum candlepower needs to be controlled to achieve balanced performance. The categories of control are presented in Table 9 with some facts, advantages and disadvantages of each option.

⁶ Source: *Roadway Lighting Handbook*, Washington, DC, U.S. Department of Transportation, 1983.

Table 9: Comparison of Cutoff Levels

Options for Cutoff Levels	Facts	Advantages	Disadvantages
Full Cutoff 	<ul style="list-style-type: none"> A luminaire light distribution with zero candela (intensity) at an angle of 90° or above. The candela per 1000 lamp lumens is ≤ 100 (10%) at 80° vertical angle No uplight allowed 	<ul style="list-style-type: none"> Perceived reduction in 'sky glow' Excellent light control at property line Limits spill light Reduces perceived glare 	<ul style="list-style-type: none"> Reduces pole spacing, increases pole and luminaire quantity Least cost effective of all cutoff categories Concentrated down light component results in maximum reflected uplight Decreased uniformity due to higher light levels under pole
Cutoff 	<ul style="list-style-type: none"> A luminaire light distribution where the candela per 1000 lumens is ≤ 25 (2.5%) at an angle of 90° or more. The candela per 1000 lamp lumens does not exceed 100 (10%) at a vertical angle of 80°. 0% to 16% uplight 	<ul style="list-style-type: none"> Small increase in high-angle light compared to full cutoff Good light control at property line Potential for increased pole spacing and lowering overall power consumption when compared to full cutoff 	<ul style="list-style-type: none"> Can allow uplight, a problem where uplight is not desired Light control at property line less than full cutoff Higher amount of reflected light off pavement can contribute to sky glow

<p>Semi-Cutoff</p>  <p>90° – 50CD/1000 LM, 5% Light</p>	<ul style="list-style-type: none"> ▪ A luminaire light distribution where the candela per 1000 lumens is ≤ 50 (5%) at 90° angle or above. ▪ The candela per 1000 lamp lumens ≤ 200 (20%) at 80° vertical angle ▪ 1% to 32% uplight 	<ul style="list-style-type: none"> ▪ Potential for increased pole spacing and lowering overall power consumption when compared to full cutoff ▪ High angle light accents taller surfaces ▪ Less reflected light off pavement than cutoff luminaires ▪ Vertical illumination increases pedestrian security and safety 	<ul style="list-style-type: none"> ▪ Greater potential for direct uplight component than cutoff ▪ Light trespass a concern near residential areas ▪ Increased high angle light compared to cutoff
<p>Non-Cutoff</p>	<ul style="list-style-type: none"> ▪ A luminaire light distribution there is no candela restriction at any angle. ▪ No restriction on uplight 	<ul style="list-style-type: none"> ▪ Potential for increased pole spacing and lowering overall power consumption when compared to full cutoff ▪ Accents taller surfaces ▪ Highest vertical illumination increases pedestrian safety & security ▪ Potential for excellent uniformity ▪ Least amount of reflected light off pavement ▪ ‘Open visual environment’ provides vertical surface visibility 	<ul style="list-style-type: none"> ▪ Greater potential for direct uplight component than cutoff ▪ Least control of uplight ▪ Increased high angle light compared to cutoff

13.8.11 Wattage

The District is currently considering a policy to design streetlights based on a lower wattage, so as to keep an extra cushion for higher level of illumination in future. If needed in future, the lower wattage lamps can be replaced by higher wattages. For example, No. 16 poles should be designed for a maximum

of 250 Watt (while allowed is up to 400att) and No. 14 poles should be designed for a maximum of 100 Watt (while allowed is up to 150 Watt). This will provide the flexibility of using higher wattages in future.

DDOT also discourages using 400 Watt conversion kits in residential areas.

Currently, the District lamp wattage ranges from 24-1000. Specific wattage figures have included the following:

- 24,25, 30, 35,50, 54, 60, 70, 74,75, 92, 100, 110, 120, 135, 150, 15, 189, 200, 215, 250, 270, 295, 400, 405, 1000)

13.9 AMIS and RMCS Functional and Technical Requirements

13.9.1 AMIS/RMCS Functional Requirements

At a minimum the AMIS/RMCS shall:

AMIS/RMCS Minimum Functional Requirements	
ID	Minimum Requirement
General Features	
	Provide intuitive system navigation (e.g., configurable menus, screens, drop down lists, etc.)
	Provide data input supported by drop-down menus or lists with selected options
	Record full audit trail and history throughout all modules, including date, time, who made the change, etc.
	Allow for District-definable rules-based workflow
	Provide a multi-User platform with role-based user access with separate levels of access
	Allow for cloud-based hosting for system and associated data with remote access to all information
Technology	
	Integrate to enterprise applications, including work order management system, currently Cityworks 7, and asset inventory, which is currently held in an ArcGIS database, through Open Application Programming Interfaces (APIs)
	Allow for attaching electronic files (e.g., photos, PDFs, video) to various records and fields throughout the system, including assets, service requests and work orders
	Provide capability to link files to a District document management system and/or network file locations
	Email distribution of reports and approval requests from within the system
Graphical User Interface (GUI) / Dashboard	
	Provide multi-user access with differing tiers of privileges (user groups)
	Support map-view of data and queries with multiple basemapping options (e.g. street grid, topographic, and satellite)
	Provide a web-based front end, compatible with IE, Firefox , Chrome, and Safari.
	Provide an optimized-for-mobile interface for AMIS interaction (either an iOS App or a mobile version of the website)
	Provide a customizable dashboard that the user is directed to upon login, that is capable of: <ul style="list-style-type: none"> • Presenting saved, user-defined queries (e.g., open work orders, recently completed work orders, etc.) • Geographic presentation of user-defined queries (e.g., map of open work orders) • Presenting summary statics, graphical or otherwise, of user-defined queries (e.g., a bar chart for number of work orders generated in the past week, summarizing the number that are open/closed/in-progress/not-started).
	Provide an interactive search and reporting tool
	Provide ability to query data

AMIS/RMCS Minimum Functional Requirements	
ID	Minimum Requirement
	Display network infrastructure and status and allow configuration of monitoring and control devices, including scheduling.
	Provide ability to directly control fixture (On/Off/Dim) or group of fixtures from map view
	Provide ability to view real-time Automatic Vehicle Location (AVL) of work vehicles in a geographic presentation. Location shall be recorded at increments of 15 minutes or less. AVL should include name of employee(s) assigned to vehicle.
	Store historical work vehicle location data based on AVL records for minimum of 72 hours
	Allow for real-time reporting of performance metrics, including overdue Work Orders, Service Requests, light outages, etc. Auto-refresh of streetlight network status and related operational performance data shall be kept in accordance with industry standards.
	Provide ability to export searches and reports to open file formats (e.g., .csv, .xml, etc.)
	Allow for maps to be printed to aid in locating Service Requests and Work Orders
GIS System Capabilities	
	Ensure the GIS data structure is compatible with latest version of ESRI's ArcMap/ArcSDE/ArcGIS Server
	Integrate with 3 rd party GIS systems via API for data push/pull capability (may require some matching and/or verification based on existing GIS data accuracy)
	Provide capability to geolocate Lighting Units and Elements within the Project Limits through both web and mobile interfaces
Asset Inventory Tracking	
	Track individual and grouped asset activities and history, including service requests, work orders, inspections, repairs, replacement, refurbishment, maintenance, upgrades, etc.
	Provide all Lighting Unit and associated Element(s) data fields currently included in the District-hosted Lighting Asset Inventory
	Track Element-specific product and equipment data, location, including manufacturer, model, serial, number, date of manufacture, and Pole Identification Tag
	Furnish, install, and maintain Pole Identification Tags for each pole
	Track as-built drawings, product literature, and any other documentation provided with s Lighting Unit and associated Element(s) materials and attach it to one or many Lighting Unit(s) in the Lighting Asset Inventory
	Provide ability to upload photos and relate them to specific Lighting Unit(s) and/or Element(s), including photos of deficiencies, inspections and before/after work order photos
Lighting Remote Monitoring and Control Data	
	Provide ability to remotely control a minimum of 100,000 RMCS nodes via mesh network, star network, and/or cellular network communication
	Relate individual RMCS nodes to the Lighting Asset Inventory in the AMIS.

AMIS/RMCS Minimum Functional Requirements	
ID	Minimum Requirement
	<p>Provide the capability to store and retrieve Luminaire information from each individual node including (but not limited to):</p> <ul style="list-style-type: none"> • Lamp Status and faults • Photocell feedback and faults (if applicable) • Voltage trips • Node status as it relates to communication, the real-time clock, temperature, and faults. • Power data including (but not limited to): voltage, current, kilowatts (KW), kilowatt-hours (KWH), burn hours, and power factor. • Dim status and dimming % (and/or % of full power).
	Retrieve and stores Luminaire status, energy usage, and node operating temperature at regular intervals (no less than once every 8 hours) from the RMCS field devices as well as their history
	Auto-refresh of streetlight network status and related operational performance data shall be kept in accordance with industry standards.
	Allow for manual on-off control of individual Lighting Unit(s) or groups of Lighting Units
	Allow for programmable dimming based on time and astronomical events (i.e. sunrise/sunset)
	Provide Daily/Weekly/Monthly schedule capability with Individual Events (Special Days)
	Support trimming or fine-tuning of the Luminaire for sunrise and sunset (E.g. starting light at 50% at sunset and ramping to 100% 30 minutes after sunset)
	Offer constant light output to automatically adjust power based on lumen depreciation curve from Luminaire manufacturer
	Provide ability to group Light Fixtures for (On/Off/Dim/Schedule) controls
	Provide ability to report burn hours report per node and per group
	Provide ability to report kWh usage per node and per group
	Ensure accuracy of both the individual control and the system groupings that must report with a degree of accuracy to provide revenue grade billing (0.5%) for the end customer
	Enable adaptive lighting optimization through an adaptive lighting engineering process, of lighting levels and energy consumption for different areas/land uses in the District based on a variety of measured inputs and predicted events
	Provide capability for error reporting and push notification of fallen poles, moved poles, day-burners, outages, or other user-definable queries
Work Order System	
	Interface with the District's work order management system (Cityworks 7 at the time of publication of these Technical Provisions) via the work order management system API to pull information from (e.g. service requests) as well as push information to (e.g. completed inspections, work orders, tasks, etc.) the work order management system
	Update the AMIS whenever a physical Element is constructed, installed, maintained, inspected, modified, renewed, replaced, or removed within two (2) Days of completion of such Work, with the

AMIS/RMCS Minimum Functional Requirements	
ID	Minimum Requirement
	exception of work completed on Fridays. Work completed on Friday must be reflected in the AMIS by 24:00 the next Tuesday.
	Provide ability to generate Service Requests and Work Orders on individual or multiple assets
	Provide ability to generate a Work Order that includes several actions/items, with no limits
	Provide ability to geocode service requests and work orders and see/edit them directly in the AMIS and through a GIS application
	Provide ability to group assets within a category and area in GIS format to help schedule and coordinate maintenance activities
	Track incidents
	Provide capability to search and view Service Requests, Work Orders, and inspections, with and without a map
	Work Order work flow and approval routing.
	Allow for a task library of common maintenance work and instructions
	Provide capability for automatic escalation if response time period is exceeded
	Provide ability to associate a new Service Request to an existing Work Order record
	Provide ability to modify Work Order type
	Allow for no limit on the number of Work Orders that can be open at any time.
	Provide ability to generate Work Orders tied to specific work type when generating Work Orders against an asset is not practical
	<p>Ensure date and timestamp on all stages of the Work Order including:</p> <ul style="list-style-type: none"> • Initiation of Service Request • Receipt of Service Request (if not generated by the Developer) • Initial inspection by the Developer • Generation of Work Order • Completion of Work Order • Closeout inspection documenting completion of work
	Track relationships between service requests and Work Orders
	Generate Work Order status messages
	Allow assignment of Service Requests and Work Orders to individuals or crews
	Assign Work Order priority status with ability to escalate
	Track operating status of the District's work order management system, currently Cityworks, in the event of an outage
	Track the use and location of lane closures needed for street light work
	Provide audit trail capability for work orders and service requests to track user data entry
Preventative Maintenance Capabilities	

AMIS/RMCS Minimum Functional Requirements	
ID	Minimum Requirement
	Provide capability for maintenance triggers and schedules based on parameters such as warranty expiration, usage hours, asset age, expected life, time milestones, etc.
	Generate Work Order with default information from predefined preventative maintenance tasks
	Provide warranty tracking capability and expiration alerts
	Generate condition assessment schedules based on asset types and condition assessment rules
	Store and assign preventive maintenance procedures tied to work type and asset
	Provide ability to view preventative maintenance schedule days, weeks or months in advance
	Track condition of individual Elements, including Luminaire, pole, arm, transformer base, foundation, RMCS node/gateway, etc.
	Provide standardized inspection templates (test results, photos, checklist of inspection activities, free-form notes, etc.)
	Provide inspection/condition assessment information, including but not limited to the following: <ul style="list-style-type: none"> • Inspection history • Inspection notes • Inspection condition rating • Asset performance comparisons with recent inspection data
	Provide asset maintenance history and schedules.
Handheld (Mobile) Devices	
	Provide ability to work on a handheld device in the field on an iOS platform
	Provide for the uploading and synchronization of selected data
	Provide ability to use handheld devices to take and attach photographs to individual records in the field
	Perform searches on records on handheld devices.
	Manage Service Requests and Work Orders on handheld devices in real-time
	Provide ability to enter a new Work Order on the spot
	Synchronize data using wireless networks or cell phone data plans
	Provide ability to conduct Field Evaluations in connected or disconnected mode
Non-Compliance Tracking	
	Calculate Noncompliance points based on the Performance Requirements through any required data inputs including but not limited to: current Light Fixture Remote Monitoring and Control Data, Work Order status, the Lighting Asset Inventory, and any other needed inputs
	Noncompliance events shall include the list of Lighting Units or Elements causing the Noncompliance and any Work Orders, Service Requests, inspections or other work tracking documentation related to those Lighting Units or Elements.
Reporting	

AMIS/RMCS Minimum Functional Requirements	
ID	Minimum Requirement
	Provide real-time, high-speed, remote unrestricted access to all functionalities of the AMIS and project records contained in the AMIS and the ability to download information contained in the AMIS
	Provide the District access to the same data, reports and analyses that the Developer has
	Provide ability to export reports in open file formats including (but not limited to): plain text, csv, xml, pdf and make reports available to the District on a file sharing site
	Search and report on all fields in the database, including user-defined fields, with the ability to organize, summarize, sort and sub-total in a variety of ways
	Provide intuitive ad hoc reports and queries with wild card search and drop-down lists
	Report by date range and multiple combinations of other parameters
	Modify report templates or standards reports and save new format for future use
	Provide access to reports through GUI dashboard display
	Save a query as a report.
	Provide standard reports to demonstrate compliance with obligations of the Agreement and Performance Requirements, including daily, monthly, and annual reports of performance metrics and Noncompliance events as per Sections 10.2 and 10.9 and Appendix 13.1 of these Technical Provisions
	Generate a daily report itemizing work completed today, patrolling completed today, work planned for tomorrow, and patrolling planned for tomorrow
	Provide a preset alerts report
Notifications and Alerts	
	Allow for user-configurable real-time alerts via email and SMS text messaging
	Allow for notifications configured for users or groups of users

13.9.2 AMIS Technical Requirements

At a minimum the AMIS shall:

AMIS Minimum Technical Requirements	
ID	Minimum Requirement
Hosting & Security	
	Fully hosted, including all data storage, within the continental U.S. Cloud enabled for mass data storage.
	The AMIS and RMCS shall be fully functional, with the exception of approved planned outages.
	Minimum 128 AES Encrypted Communications
	Use of persistent cookies or storage of tracking or configuration information is prohibited without prior written authorization from the District.
	Establish incident response procedures as they relate to security items, including a policy for breach notification.
	Provide protection from unauthorized users via security systems, fire walls and any other components or methods necessary to make the system secure.

AMIS Minimum Technical Requirements	
ID	Minimum Requirement
	The servers where the data is stored shall be protected from unauthorized access and security measures shall be in place to protect them from unauthorized physical access.
Disaster Recovery	
	Provide system redundancy and backup server location(s) as part of a disaster recovery plan.
	The Developer shall have daily, off-site backups of all AMIS data. Backups shall be retained for a period of 1 year from their date of creation.
Work Order System	
	Automated information exchange between the AMIS and the District work order management system, currently Cityworks 7, in real-time or near real-time, i.e., no less than once every 5 minutes.
AMIS Architecture	
	<p>Developer shall prepare an AMIS Architecture that includes the following:</p> <ul style="list-style-type: none"> A. AMIS processes and rules; B. AMIS structure in a work breakdown structure; C. Proposed hardware and software technical data; D. Flow charts of the work-flows for notifications and work orders; and E. Other required processes. <p>Concurrent with the Asset Management Plan (AMP) Submittal, Developer shall submit the AMIS Architecture to the District for approval. During the Term, Developer may propose changes to the AMIS Architecture and prepare an updated AMIS Architecture. No later than 20 days prior to implementing the update to the AMIS, Developer shall submit the updated AMIS Architecture to the District for approval.</p>
Intellectual Property Rights	
	Ensure the ability for the District to, at any point, access, use, reproduce, modify, adapt, disclose to, and sublicense the Intellectual Property of the AMIS owned or licensable by the Developer or any Developer-Related Entity.
Data Ownership and Confidentiality	
	Maintain confidentiality of all Information within the AMIS and make all Project Data in the ownership or possession of the Developer or any other Developer-Related Entity available to the District promptly upon request.

13.9.3 RMCS Nodes Functional Requirements

At a minimum the RMCS Nodes shall:

RMCS Node Minimum Functional Requirements		
ID	Specification	Minimum Requirement
	General Control Interface	Digital Addressable Lighting Interface (DALI) control. DALI protocol shall be in compliance with the most recent standards and protocols available and published by the Digital Illumination Interface Alliance (DIIA).
	Dimming	DALI control dimming with range capabilities from 100% down to 10%. DALI protocol shall be in compliance with the most recent standards and protocols available and published by the Digital Illumination Interface Alliance (DIIA).
	Energy Measurement for controller	Controller reports its own energy use (luminaire + node).
	GPS	GPS included, 2.5 meter accuracy or better.
	Tilt Sensor	Tilt sensors must be affixed to Upright Pedestal, Twin 20's, and Washington Globe lighting units owned by District. Sensors must have minimum functionality of programming for detection and notification of a max tilt angle alarm. While not a minimum requirement, tilt sensors may also be affixed to highway lighting units. Note, as per section 2.3.1 of the ITP, it is to be determined if this functionality will be pursued by the District or not.
	Programmable Schedule	Minimum of 1 week schedule stored in node
	Loss of Communication	Light and node functionality shall be independent of wireless network
	Fallback Operations	In the event of communications loss – operational mode shall be user-configurable to 'On', photocell control, or astronomical clock schedule.
	Certification	UL Certification, FCC
	Physical Installation	Both NEMA twistlock (ANSI C136.10 and C136.41) and in-fixture (for pole top fixtures) form factors
	Communication	Wireless – cellular, mesh, and star network topology are all acceptable RMCS communication protocols. Please note that the District would like cellular network communication to be the primary RMCS communication protocol.
	Addressing	IPv-4 Addressable
	Firmware upgrades	Over-the-air (i.e. wireless)
	Auxiliary Functionality	RMCS shall have auxiliary inputs for future expansion (e.g. proximity sensors)
	Warranty	Equipment and all components of Nodes are guaranteed for a minimum of 10 years from the date of installation for repair or replacement of any

RMCS Node Minimum Functional Requirements		
ID	Specification	Minimum Requirement
		component determined to be defective under normal use at no cost to the municipality.

13.9.4 RMCS Nodes Technical Requirements

The RMCS Nodes shall comply with the following:

RMCS Nodes Technical Requirements		
ID	Specification	Minimum Requirement
3.5.1	Voltage input	120-277V AC
3.5.2	Frequency	60 Hz
3.5.3	Wattage	Maximum wattage is 3 W
3.5.4	Operating Temperature Range	Must operate in the range -30 to +55°C
3.5.6	On and Off Control	Integrated relay
3.5.8	Energy Measurement	ANSI C12.20 Class 0.5 metrology (i.e. utility-grade metering with minimum accuracy of 0.5% operating at Power Factor 0.9)
3.5.12	Data logging	Minimum of 1 week of energy use stored in node.
3.5.13	Data transmission and availability	Data pushed to AMIS at least every 8 hours with the ability to enable push alerts for critical events (e.g. fixture outage, sensor knockdown, etc.). Auto-refresh of streetlight network status and related operational performance data shall be kept in accordance with industry standards.
3.5.14	Ingress Protection	IP54 or better
3.5.15	Surge Protection	Minimum 6kV/3kA
3.5.24	Frequency	Comply with one of the following: <ul style="list-style-type: none"> 1. Unlicensed spectrum: <ul style="list-style-type: none"> a. 902-928 MHz, Max Tx Power 1W, BW 250k b. 902-928 MHz, Max Tx Power 0.25W, BW 500k c. 2.4-2.4835 GHz, Max Tx Power 0.125W, 1MHz (BWmin) d. 2.4/2.5 GHz WiFi 2. Any licensed spectrum (cellular allowed)
3.5.25	Security	Minimum 128 AES Encrypted Communication
3.5.28	Command Time	Under 6 Seconds (after any user-required confirmation or authentication)

13.9.5 RMCS Gateways Functional Requirements

At a minimum the RMCS Gateways shall:

RMCS Gateway Minimum Functional Requirements		
ID	Specification	Minimum Requirement
	Scale	Capable of controlling/communicating with at least 1,000 RMCS nodes
	Communication from Gateway to Node	Wireless

	Backhaul Communications	Capable of both ethernet, wifi and cellular connections to AMIS
	Warranty	Equipment and all components of Gateways are guaranteed for a minimum of 10 years from the date of installation for repair or replacement of any component determined to be defective under normal use at no cost to the municipality.

13.9.6 RMCS Gateways Technical Requirements

The RMCS Gateways shall comply with the following:

RMCS Gateway Minimum Technical Requirements		
ID	Specification	Minimum Requirement
3.6.1	System Voltage	120-277V AC
3.6.2	System Frequency	60 Hz
3.6.3	Power Consumption	Max 15W or 1.5 kW total network power.
3.6.4	Operating Temperature	Must operate in range -30 to +55°C
3.6.5	Surge Protection	Minimum 6kV/3kA
3.6.6	Ingress Protection	IP64 or better
3.6.8	Frequency to communicate from Gateway to node	Comply with one of the following: <ol style="list-style-type: none"> 1. Unlicensed spectrum: <ol style="list-style-type: none"> a. 902-928 MHz, Max Tx Power 1W, BW 250k b. 902-928 MHz, Max Tx Power 0.25W, BW 500k c. 2.4-2.4835 GHz, Max Tx Power 0.125W, 1MHz (BWmin) d. 2.4/2.5 GHz WiFi 2. Any licensed spectrum (cellular allowed)
3.6.9	Network Communication	If using unlicensed spectrum either: <ol style="list-style-type: none"> 1. IEEE 802.15.4 (6LoWPAN/FHSS/DSSS) Or 2. 802.11
3.6.10	Security	Minimum 128 AES Encrypted Communication

13.10 Condition Assessment Rating Scale & Procedures

Typical Lighting Units consist of a foundation, pole, arm and luminaire. The Elements of each Lighting Unit will vary in style and material. Typical street light configurations can be found in the District of Columbia Streetlight Policy and Design Guidelines. Material specifications and details can be found in the District of Columbia Department of Transportation Standard Specifications for Highways and Structures and District of Columbia Department of Transportation Standard Drawings.

13.10.1 Condition Ratings Scale

The table on the following page depicts the condition ratings scale used in the 2020 condition assessment and to be used throughout the Project Term to determine Element condition ratings.

Component	Description	Scoring					
		5 (Excellent)	4 (Good)	3 (Fair)	2 (Poor)	1 (Very Poor)	0 (Emergency)
Pole Shaft	Visual inspection for rust, corrosion, cracks, dents, and other signs of that the structural integrity is compromised	No damage/new condition	No rust, corrosion, or damage and slight wear	Moderate wear, some light rust, or corrosion, or damage	Heavy wear, moderate rust, or corrosion, or damage	Heavy rust or corrosion, significant dents, cracks or structural damage	Severely damaged and presents a threat to property and public safety
Brackets and Arms	Visual inspection for rust, corrosion, cracks, condition of any welds, and any signs of metal Fatigue	No damage/new condition	No rust, corrosion, or damage, welds are intact, and slight wear	Moderate wear, some light rust, or corrosion, or damage, welds are intact	Heavy wear, moderate rust, or corrosion, or damage, signs of weld deterioration	Heavy rust or corrosion, significant dent or structural damage, welds are cracked or have broken	Severely damaged and presents a threat to property and public safety
Luminaires	Visual inspection of luminaires and associated fixtures for damage, cracks, and deterioration	No damage/new condition	No damage and slight wear	Moderate wear, some discoloring, minor cosmetic damage, such as pitting	Heavy wear, moderate cosmetic damage, significant cracks, pits, or breakage	Heavy wear, significant cosmetic damage, significant cracks, pits, or breakage	Severely damaged and presents a threat to property and public safety
Glare Shield	Visual inspection of glare shield and for durable attachment, deterioration, and damage.	No damage/new condition	No rust, corrosion, or damage and slight wear/attachment intact	Some light rust, corrosion, or damage and moderate, and attachment intact	Heavy wear, moderate rust, corrosion, or damage, attachment intact	Heavy rust or corrosion, significant dent or structural damage, attachment not intact or missing	Severely damaged and presents a threat to property and public safety
Handhole	Inspection of condition of the handhole for deterioration, and that covers are intact	No damage/new condition	No rust, corrosion, or damage and slight wear/cover intact	Some light rust, corrosion, or damage and moderate wear/cover intact	Heavy wear, moderate rust, corrosion, or damage, cover intact but not sealed	Heavy rust or corrosion, significant dent or structural damage, cover not intact or missing	Severely damaged and presents a threat to property and public safety
T-Base/Base Cover	Visual inspection for rust, corrosion, cracks, dents, and other signs of that the structural integrity is compromised, and of any weld above the base plate	No damage/new condition	No rust, corrosion, or damage, welds are intact, and slight wear	Light rust, corrosion, or damage, welds are intact, and moderate wear	Heavy wear, moderate rust, corrosion, or damage, signs of weld deterioration	Heavy rust or corrosion, significant dent or structural damage, welds are cracked or have broken	Severely damaged and presents a threat to property and public safety
Anchor Bolts	Ensure all anchor bolts are in place, securely tightened, and visually inspected for rust, corrosion, cracks, other damage	All/No damage/new condition	All bolts on and tight, no rust, corrosion, or damage and slight wear	All bolts on and tight, light rust, corrosion, or damage and moderate wear	All bolts on and tight, moderate rust, corrosion, or damage and moderate wear	One or more bolts are missing or loose, heavy rust, corrosion, or damage and severe wear	Severely damaged and presents a threat to property and public safety
Foundation	Visual inspection to assess condition of foundation for cracks, erosion, deterioration, chipping, or other damage	No damage/new condition	No cracks, erosion, or damage and slight wear	Small cracks, chips or damage, start of erosion, moderate wear	Large cracks, chips or damage, or erosion, moderate wear	Missing in whole or in part, extreme wear, pole unaligned with foundation	Severely damaged and presents a threat to property and public safety

13.10.2 Foundations

13.10.2.1 Inspection Procedures and Common Defects

13.10.2.1.1 Erosion/Undermining/Settlement/Drainage

The foundation should be visually assessed for erosion, undermining, settlement and/or drainage deficiencies. The inspection team should inspect and document the following conditions:

- (a) Location of the foundation relative to the immediate area around the foundation.
 - (i) If the top of the foundation is buried less than 12" below grade, remove the dirt/fill until the top of the foundation is exposed. Inspect and document that the pedestal was buried and uncovered for inspection.
 - (ii) If the top of the pedestal is located under a walkway or sidewalk, or buried below grade 12" or more, document the condition and report it to District of Columbia Department of Transportation for further instruction on whether further excavation to uncover the foundation is required.
- (b) Erosion or undermining around the foundation faces. Any areas of undermining should be probed and documented to determine depth and extent.
- (c) Any indications of movement or rotation of the foundation should be measured and documented. Movement or rotation of a foundation could be indicative of an underlying foundation or soil issue.
- (d) Standing water or indications of poor drainage. If standing water is present, note the depth of water measured.
- (e) The foundation is located in a swale or drainage ditch. A foundation located in a swale or drainage ditch could periodically be submerged resulting in corrosion, debris accumulation, or damage of the submerged areas.

13.10.2.2 Concrete Foundations

Concrete is commonly used for foundations. All loose debris and vegetation should be removed. The foundation should be visually and tactilely inspected. The inspection team should inspect and document the following conditions:

- (a) Cracking. All cracking should be documented and special attention should be given to cracks propagating from anchor bolts. Any rust staining present along the cracks should be documented. The cracking could indicate overloading of the bolts or appreciable corrosion on the embedded portions of the anchor bolts.
- (b) Delamination. Sound the pedestal with a hammer to detect locations of delamination. The delaminated areas will give a hollow sound when tapped with a hammer.
- (c) Spalling, Honeycombing, Scaling. All spalling, honeycombing, and scaling should be documented. Any exposed reinforcing should be documented along with any associated section loss.

- (d) Impact damage. Document that impact damage exists and any deficiencies associated with it, which may include any of the above.

13.10.2.3 Grout Pads

All loose debris and vegetation should be removed. The grout pad should be visually and tactilely inspected. The inspection team should inspect and document the following conditions:

- (a) Partial (minor cracking and/or section loss) or full (section loss, heavy cracking, etc.) deterioration of the existing grout pad. Deterioration results in water/moisture retention within the grout pad and possible corrosion of the partially or unexposed anchor bolts. Note the level of deterioration. If the grout pad is deteriorated to the extent that it can be removed easily with hand tools, first verify the existence of leveling nuts, and then remove the grout pad and note that it was removed by the inspector.
- (b) Moisture leaking from the grout pad that indicates moisture/water retention and possible corrosion of the partially exposed or unexposed anchor bolts. The moisture could be leaking from under the grout pad or from cracks and/or areas of section loss in the grout pad. The grout pad should provide means of providing drainage for water inside the pole.
- (c) Document the maximum thickness of each grout pad. The height is representative of the height from bottom of the base plate to the top of the foundation.

FOUNDATIONS

(5)Excellent



(4) Good



(4) Good



(3) Fair

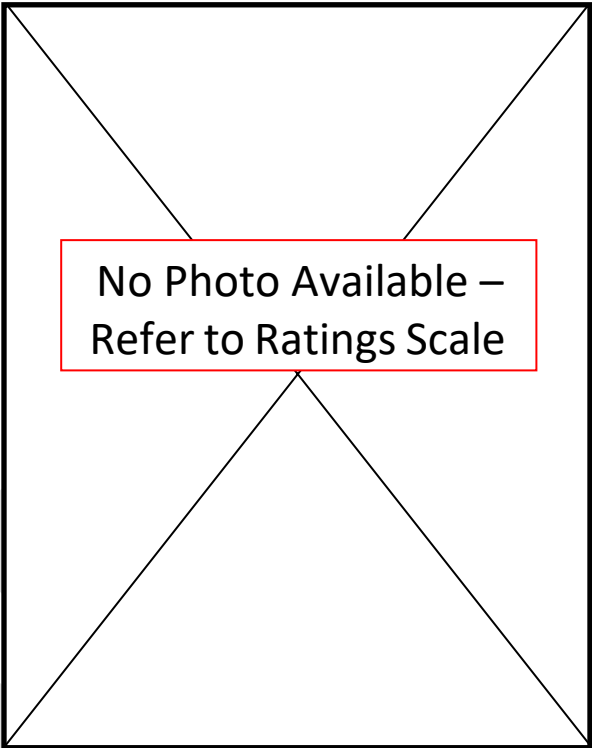


FOUNDATIONS

(2) Poor



(1/0) Very Poor/Emergency



PENDANT POLE - FOUNDATIONS

(5) Excellent



(4) Good



(3) Fair

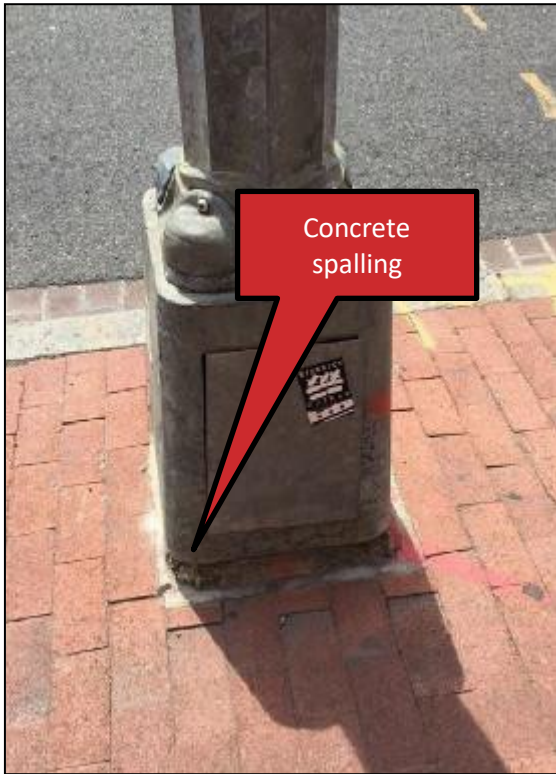


(2) Poor



PENDANT POLE - FOUNDATIONS

(2) Poor



(1) Very Poor



13.10.3 Anchor Bolts

13.10.3.1 Inspection Procedures and Common Defects

All loose debris and vegetation should be removed. If the anchor bolts are covered by bolt covers (“elephant ears”) or with another type of cover, the cover shall be removed for inspection. Any covers that are missing, loose, or have missing or loose hardware shall be noted. Once the inspection of the anchor bolts is completed, the covers shall be re-installed. Anchor bolts, washers, and nuts should be visually and tactilely inspected if accessible (i.e., not obscured by a grout pad). The inspection team should inspect and document the following conditions:

- (a) Document any deviation, excess or missing components from a typical configuration shown in Figure 17. Examples include presence of lock washers, beveled washers, lock or jam nuts, extra washers, or missing nuts and washers.

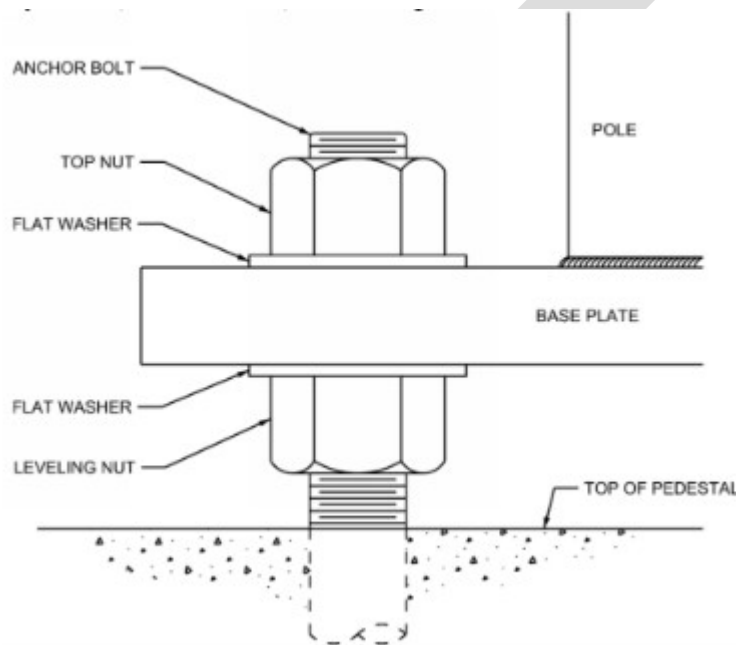


Figure 17 - Typical Anchor Bolt Configuration

- (b) Check the presence of any tack welds or other additional welds on the anchor bolt assemblies. Welding can change the material characteristics and result in loss in bolt strength.
- (c) Corrosion, loss of galvanizing, section loss, etc. of the anchor bolts, washers, and nuts. If section loss is present on the anchor bolts and/or nuts, all rust scale should be removed from the area and calipers should be used to measure the remaining diameter of the anchor bolts or flat-to-flat distance on the nuts.
- (d) Inadequately sized flat washers or missing flat washers should be checked and enlarged or oversized holes should be noted because enlarged holes reduce the bearing area of the top nut and/or leveling nut on the base plate.

- (e) Adequate engagement of the top nut should be checked. Less than 100% engagement of the top nut reduces the ability of the anchor bolt to develop its full load carrying capacity.
- (f) Plumbness of anchor bolts. Out of plumb anchor bolts (slope that exceeds 1:40) could result in increased bending stresses in the anchor bolts. If one or more anchor bolts are visually out of plumb, measure the slopes of the affected bolts as shown in Figure 18.
 - (i) Measure the plumb vertical distance or height, V , of the bolt above the top of concrete.
 - (ii) Measure the horizontal distance, H , from the centerline of the bolt at the top of concrete to the centerline of the bolt at the top of the bolt.
 - (iii) Calculate H/V .

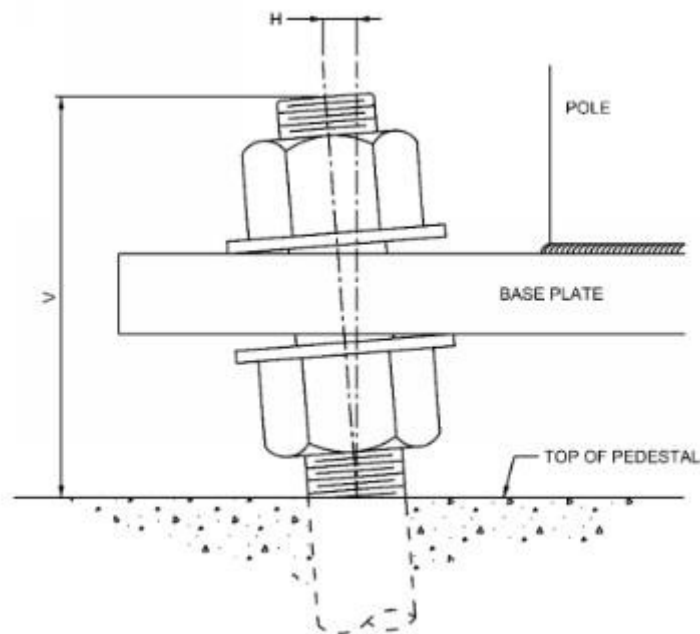


Figure 18 - Measurement Methodology for Out of Plumb Anchor Bolts

- (g) Improperly seated anchor bolt top nuts on the base plate can reduce the bearing area of the nut on the bearing area and consequently reduce the load capacity of the bolts. If the top nuts are not in full contact with the base plate and a gap exists between the bottom of the nut and the top of the base plate at one or more locations, the largest gap for each nut is to be measured and documented. The measurement D is taken from the top of the washer to the bottom of the nut as shown in Figure 19. If a washer does not exist, the measurement, D , shall be taken from the top of the base plate to the bottom of the nut. Measure the bolt diameter " d " and calculate D/d .

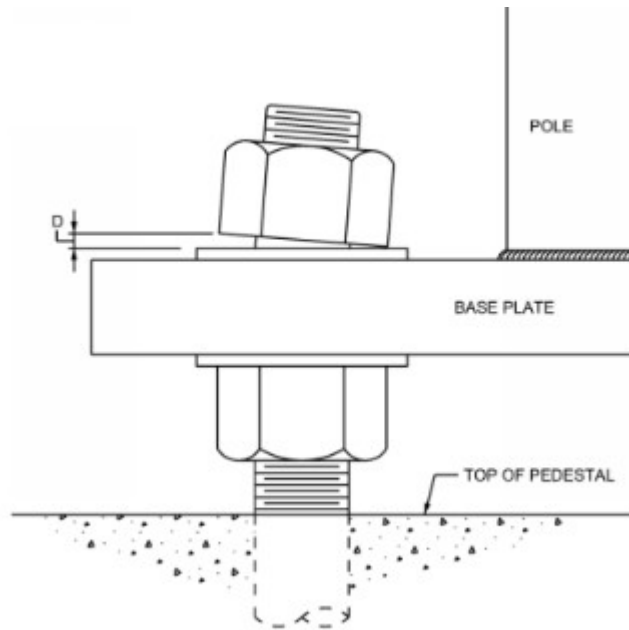


Figure 19 - Measurement Methodology for Improperly Seated Nuts

- (h) Loose or inadequately tightened top nuts and leveling nuts. These two deficient conditions of the nuts are recognized as having a negative impact on the effectiveness and longevity of the anchor bolts, and ultimately, the structure as a whole.
- (i) Distance between the bottom of the base plate and the top of the pedestal, H (refer to Figure 20). Base plates that exceed a clear height above the pedestal of two bolt diameters induce stresses that were not accounted for during design and could reduce the load capacity and fatigue life of the anchor bolts. The maximum measured distance between the bottom of the base plate and the top of the pedestal should be documented for each base plate of a structure as differing heights could affect any recommendations pertaining to lowering of the structure.

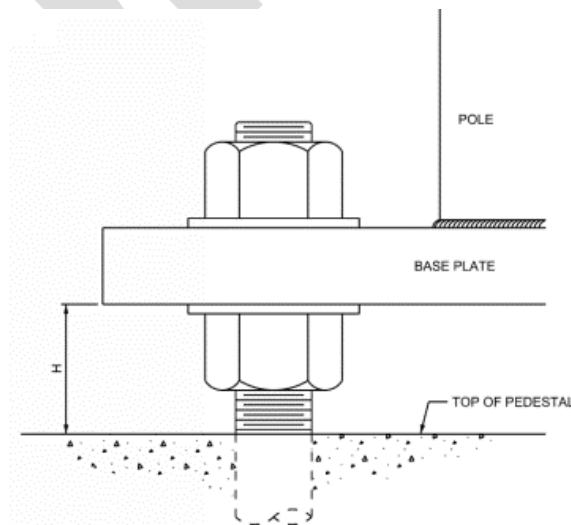


Figure 20 - Measurement Methodology for Improperly Seated Nuts

- (j) Presence of a leveling nut if a grout pad is present. To determine if a leveling nut is present, the inspector can 'probe' the grout pad by using a 1/4" masonry bit to drill a hole in the grout pad. The hole should be drilled toward the anchor rod and in a direction that would intersect a leveling nut, if one is present. The inspector shall take all precautions not to hit the anchor rod and to minimize damage to the leveling nut, if one exists. A measurement taken from the top nut to the outside of the base plate will give the inspector a dimension to be used to minimize damage to the leveling nut or the anchor rod. Whether a leveling nut is present or not the hole in the grout shall be filled with caulk prior to leaving the site. If the grout is deteriorated and in poor condition the inspector may be able to remove a section of grout rather than drill a hole. A structure with a deteriorated grout pad and no leveling nut is a serious condition. The presence of, or lack of, a leveling nut shall be noted in the inspection report.
- (k) Hidden or unobservable cracks within the anchor bolts. Cracks, regardless of size, decrease the load capacity of the bolts and could increase stresses in the surrounding bolts. The top of the bolts should be tapped and sounded with a ball-peen hammer for any hollow sounds that could indicate the presence of a crack.

13.10.3.2 Anchor Bolt Numbering Methodology

Anchor bolt numbering is necessary to accurately define the various defects and deficiencies encountered during the inspection. The numbering is established by standing behind the structure looking at the roadway for the primary direction of travel. In case of multiple directions of travel, the numbering is relative to the northbound or eastbound lanes. When standing behind the structure facing the roadway, the first bolt to the right of the base plate/pole centerline is labeled as Bolt No. 1 and subsequent bolts are numbered consecutively in clockwise direction from Bolt No. 1 as shown in Figure 21.

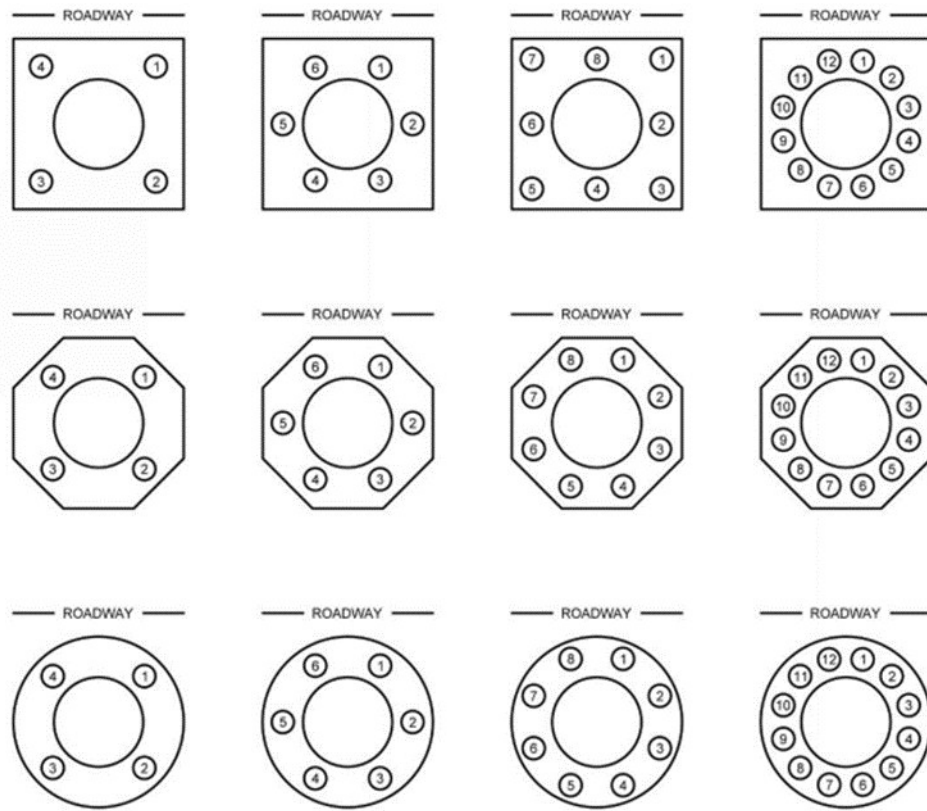


Figure 21 - Anchor Bolt Numbering Methodology

ANCHOR BOLTS - FOUNDATIONS

(5) Excellent



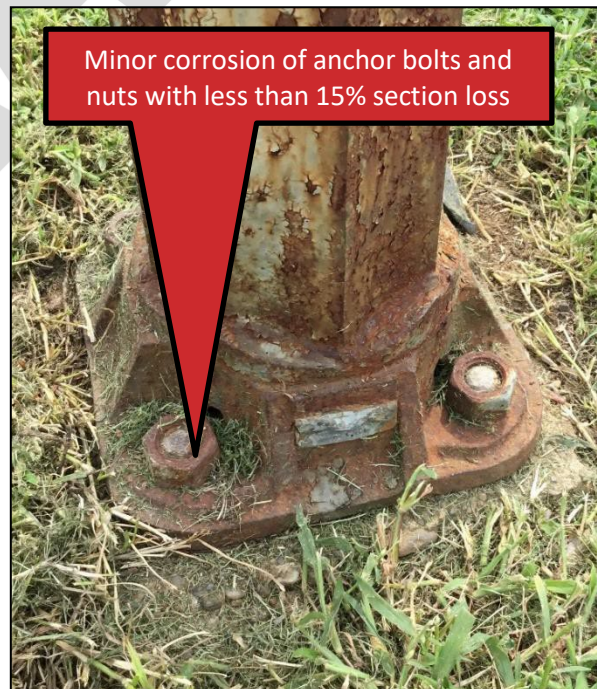
(4) Good



(4) Good

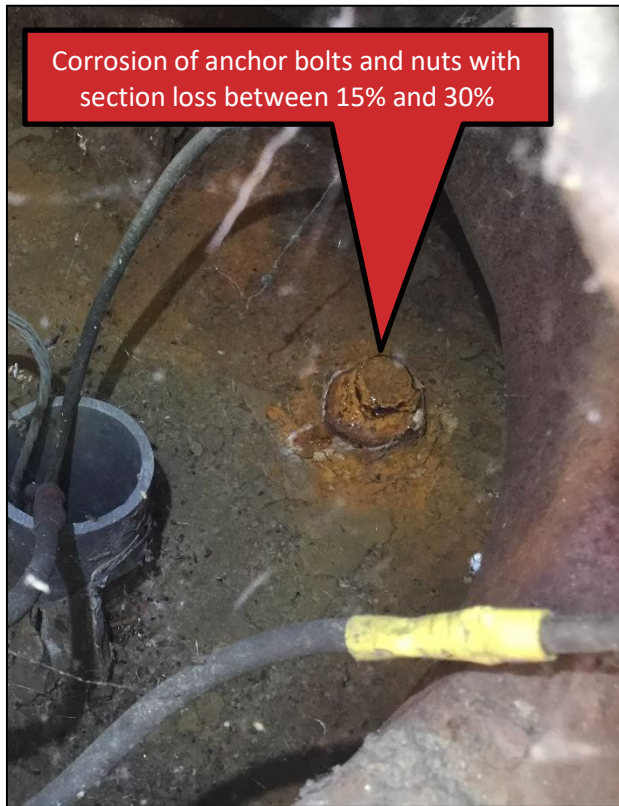


(3) Fair



ANCHOR BOLTS - FOUNDATIONS

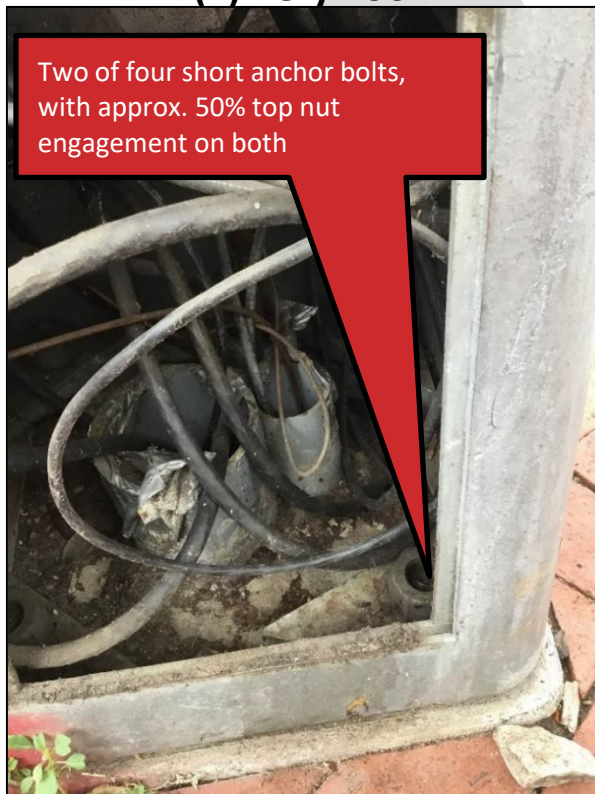
(2) Poor



(2) Poor



(1) Very Poor



13.10.4 Transformer Bases

Transformer bases (T-Bases) are typically located between the pole and the foundation and are typically aluminum or steel. There is a fiberglass type which is typically ornamental only and do not provide any structural support.

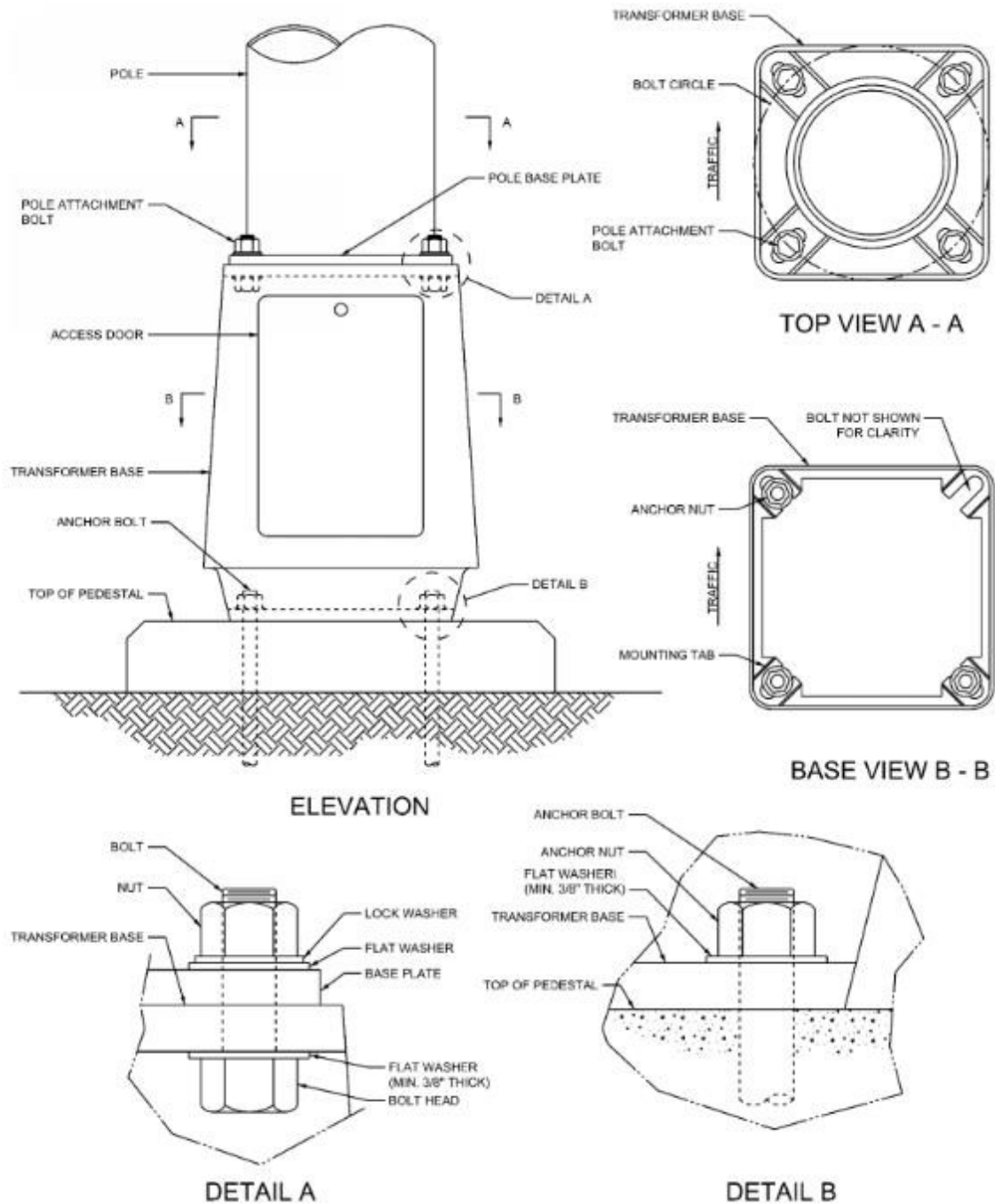


Figure 22 - Typical T-Base Configuration

13.10.4.1 Inspection Procedures and Common Defects:

Transformer bases (T-Bases) are typically located between the pole and the foundation. All loose debris and vegetation should be removed from under and around the transformer base. Transformer bases should be visually and tactilely inspected. The inspection team should inspect and document the following conditions:

- (a) Document any deviation, excess or missing components from a typical configuration (as shown in the DDOT Standard Drawings). Some examples of deviations from the typical configuration may include extra washers or missing nuts and washers.
- (b) Condition of the welded connections. T-bases typically have several welded connections and they shall be inspected thoroughly. The welds should be closely inspected for cracking, especially at points of intersecting welds and incomplete or excessively ground welds, as they create stress risers. The location and size of any weld crack is to be documented. Suspected cracks should be verified by NDT.
- (c) Coating loss (paint or galvanizing), corrosion, section loss, etc. of the transformer base. If section loss is present, all rust scale should be removed from the area and calipers should be used to measure the remaining dimensions of the affected components.
- (d) Condition of the transformer base to base plate bolted connections. There are typically 4 anchor bolts attaching the pole to the top of the T-Base which are coded with "T-Bases". The area around the anchor bolts shall be examined for any signs of distress as this is the location of high stress. The area, specifically the mounting tabs/flanges of T-bases commonly exhibit cracking of the brittle aluminum due to over tightening of the anchor bolts. Bolted connections should be inspected for loose or missing components, under engaged nuts, improperly sized washers, or extra washers. Document percent engagement if less than 100%. Looseness of the bolts should be checked by rocking the pole. If excess movement is observed, the bolts can typically be visually observed as loose. Document that there is excess movement when rocked and document any hardware that was observed to be loose.
- (e) Transformer base access door and condition of inside of transformer base. There is typically a door to access the inside of the T-bases which will need to be opened to look for any defects on the inside of the T-Bases. Any access doors that cannot be opened, closed or are missing shall be noted and appropriate recommendations for remediation noted. The doors shall be inspected for tightness and for missing hardware or missing or loose fasteners. Missing or loose doors allow for water and debris infiltration and animal infestation. After the access door is opened, a visual inspection of the interior portions is required. The inspector shall treat all wiring as energized and recognize the potential for an electrical hazard. If tactile or other inspection methods are necessary inside the T-base, electrically insulated tools/equipment along with personal protective equipment shall be utilized in accordance with OSHA Standards. Look for observable corrosion, damage and/or section loss inside the T-base. Verify that the access door is closed and secured after inspection.
- (f) Debris in and around the transformer base access door. Any debris present within the transformer base shall be removed by the inspection team

- (g) Distortion of the transformer base. Distortion could be indicative of overloading, damage during erection, or improper welding procedures during fabrication.
- (h) Impact damage. Document any observable impact damage, including dents and cracks, that exist and any deficiencies associated with it.

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TRANSFORMER BASES - FOUNDATIONS

(5) Excellent



(4) Good



(3) Fair



(2) Poor



TRANSFORMER BASES - FOUNDATIONS

(2) Poor



(1) Very Poor



13.10.5 Poles

13.10.5.1 Inspection Procedures and Common Defects

Poles should be visually and tactilely inspected. The upper portions of the poles are to be inspected from an aerial lift (bucket or platform) or visually through use of a scope or binoculars. For all pole types, the inspection team should inspect and document the following conditions:

- (a) Out of plumb or leaning vertical supports/poles. Any observable leaning of the poles should be measured and the direction of the lean documented. The measurement can be obtained by lowering a plumb bob from anywhere along the height of the pole within a few inches of the base plate and taking a horizontal measurement, D, from the base of the support to the plumb line as shown in Figure 6. Alternatively, a level may be used for non-tapered poles as shown in Figure 24.

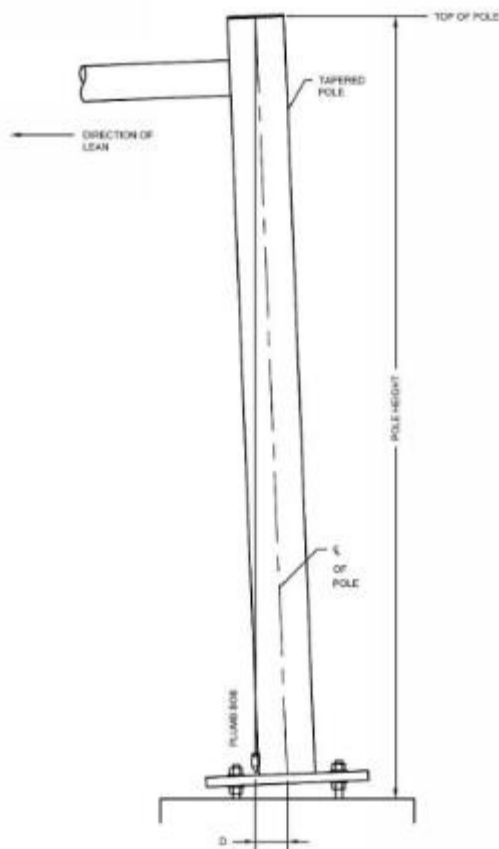


Figure 23 - Measurement Methodology for Leaning or Out of Plumb Tapered Poles

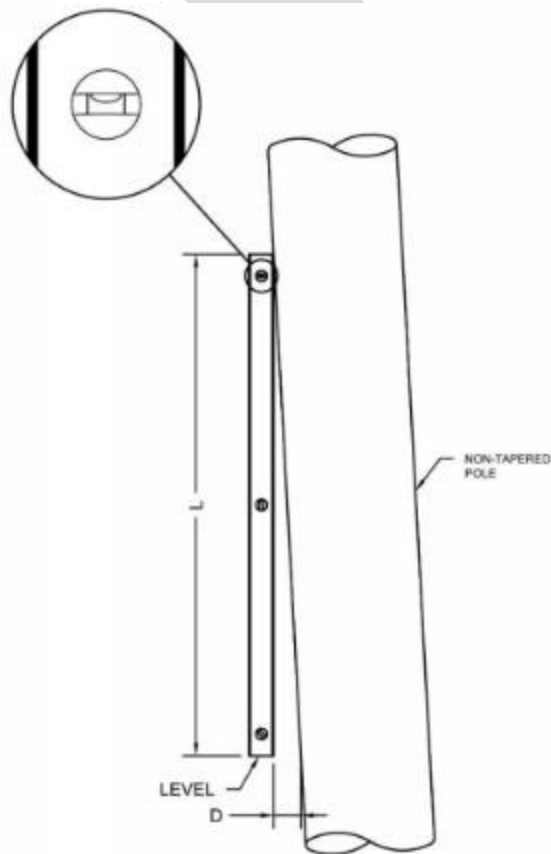


Figure 24 - Measurement Methodology for Leaning or Out of Plumb Non-Tapered Poles

- (b) Bowing of the pole. An observable bowing of the vertical supports could be indicative of an overstress condition, inadequate support size or section, improper fabrication, or damage incurred by vehicle impact, and should be measured and the direction of the bow documented.

- (c) Impact Damage. Document any observable impact damage that exists and any deficiencies associated with it.

13.10.5.2 Metal Poles

For metal poles, the inspection team should inspect and document the following conditions:

- (d) Conditions of, in, and around the hand holes and covers. Handhole access covers should be removed/opened and the interior of the pole examined for moisture, buildup of debris, corrosion on the inside of the pole, and cracks around the hand hole. Verify that the access cover is closed and secured after inspection. Look for any missing screws or bolts used to secure the cover. The inspector shall take extreme caution when inspecting the inside of the pole as the electrical wiring should be considered live.
- (e) Coating loss (paint or galvanizing), corrosion, or section loss.
 - (i) If an area of corrosion is observed outside the pole, the area should be thoroughly cleaned of any rust scale and the amount and extend of section loss should be determined and documented.
 - (ii) If corrosion is observed on the inside of the pole, the outside of the pole should be sounded with a hammer to detect “thin” areas in the pole. An electrically insulated borescope may be used to visually inspect the inside of the pole. The use of a borescope is to be documented.
 - (iii) All metal poles that are either attached to a concrete foundation through anchor bolts or are embedded in the ground shall have D-meter readings taken just above the base weld and 4 ft above the base. The purpose of taking the D-meter readings 4 ft above the base is to use as a baseline to compare against those taken at the base. For section loss exceeding 10% of the total pole thickness, record additional readings in the immediate vicinity to determine extent of section loss. Each of the readings shall be taken at the 12:00, 3:00, 6:00, and 9:00 o’clock positions around the circumference of the pole as shown in Figure 8. D-meter readings can be performed by personnel having no ASNT certification as the testing process and equipment operation requires minimal training. Since a number of conditions can affect the readings such as pitting, pole diameter, pack rust, the testing personnel should be familiar with, or directly supervised by someone who is familiar with D-meter operation. This ensures personnel have the knowledge to handle these situations in the field to prevent erroneous data.

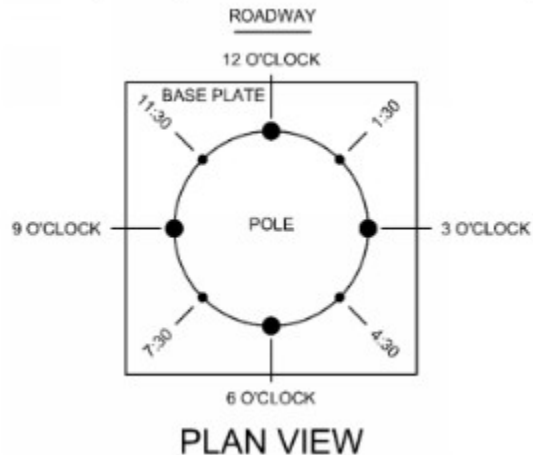


Figure 25 - Measurement Methodology for Pole D-Meter Readings

- (f) Localized areas of distressed painted or coated surfaces such as at connections, attachments pole bases, etc. Cracks or splits in painted surfaces could be indicative of an overstressed section warranting additional investigation and NDT at these areas. This condition could also be a result of weathering or chemical contamination (i.e. deicing salts). The inspection team will need to use sound engineering judgment to determine the possible cause. This may, if warranted based on severity and affected area, involve additional coating evaluation such as adhesion testing or paint sampling for lab work.
- (g) Dents and ruptures. Dents and ruptures in round vertical poles can reduce the load carrying capacity of the pole as they could significantly reduce the cross section of the pole. The depth of the dent or rupture does not affect the rating, as it is a function of the wall thickness that, like material, is highly variable. The depth of the dent should be measured with a ruler; however, getting more complete or accurate information on the depth of the dent could require specialized equipment that is impractical. The dimensions of any dent or rupture, as measured with a ruler, along with descriptions of any tears or punctures within the dent or rupture, should be recorded during the inspection. The following measurements as indicated in Figure 9 should be taken and documented.
 - (i) H: Horizontal measurement of the dent or rupture.
 - (ii) V: Vertical measurement of the dent or rupture.
 - (iii) d: Depth of the dent or rupture at the deepest point of the dent.
 - (iv) C: Circumference of the support, immediately above or below the affected area.
 - (v) D: Distance from top of the base plate to the center/middle of the dent.

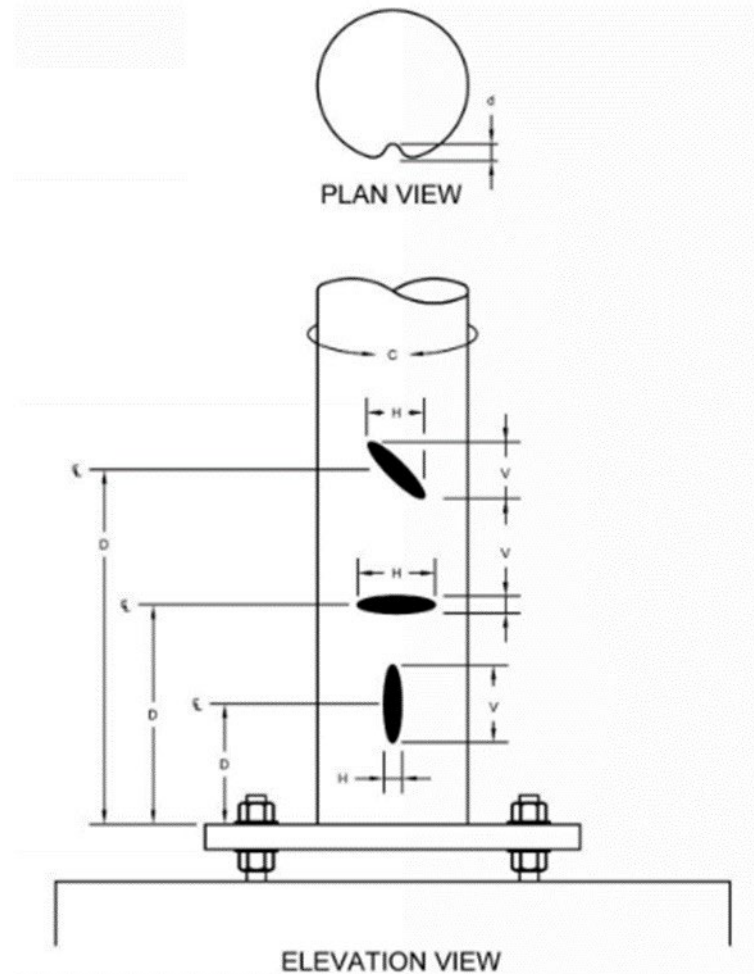


Figure 26 - Measurement Methodology for Dents and Ruptures in Round Poles

- (h) Condition of welded connections. The welds should be closely inspected for cracking, especially at points of intersecting welds and incomplete or excessively ground welds, as they create stress risers. Special attention should be given to the pole to base plate weld due to the high stresses at this location. The location and size of any weld crack is to be documented. Suspected cracks should be verified by NDT.
- (i) Condition of pole caps. Loose or missing caps allow water intrusion and animal infestation and should be documented.
- (j) **High Mast Poles:** For high mast poles, the winch system steel support members should be inspected for loose connections and weld cracks. Slip joints should be examined for pack rust forming between the pole segments due to the tendency for water to be drawn into them by capillary action; vertical cracks emanating from the bottom of the upper pole segment; deformation along the base of the connection; and rust stains. Retainer rings added as a retrofit to the slip joints should be examined for cracks, particularly at the welded joint on the ring. A spotting scope with 50x minimum magnification capabilities shall be used to visually inspect each slip joint. Conditions may dictate that additional spotting scope locations be provided. The spotting scope shall have a camera

attachment so that pictures or video may be taken. The use of drones to inspect the high mast poles and luminaires is strictly prohibited.

13.10.5.3 Wood Poles

For wood poles, the inspection team should inspect and document the following conditions:

- (a) Wood pole decay, checking, splitting, shakes, knots, fire damage or insect damage. All wood poles shall be checked for splits, shakes, or checks, insect infestation, fire damage, and decay. Wood poles should be checked for decay caused by insects, fungus or other means. Some wood poles are treated with creosote and any sawdust at the base of the pole may be a sign of insect infestation. Decay often occurs below the ground line, so the timber pole should be excavated at least 6 inches to allow adequate inspection.

UPRIGHT POLE - POLES

(5) Excellent



(4) Good



(4) Good



(3) Fair

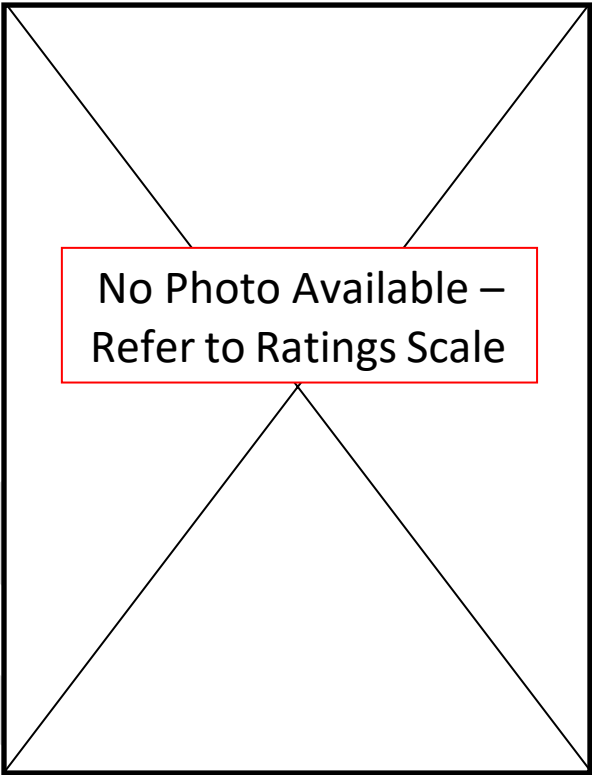


UPRIGHT POLE - POLES

(2) Poor



(1) Very Poor



PENDANT POLE - POLES

(5) Excellent



(4) Good



(3) Fair



(2) Poor



PENDANT POLE - POLES

(1) Very Poor



ALLEY POLE - POLES

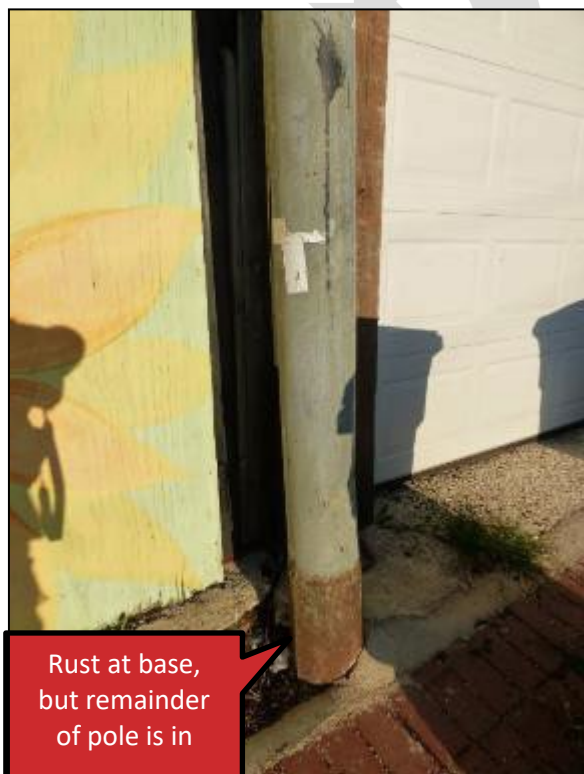
(5) Excellent



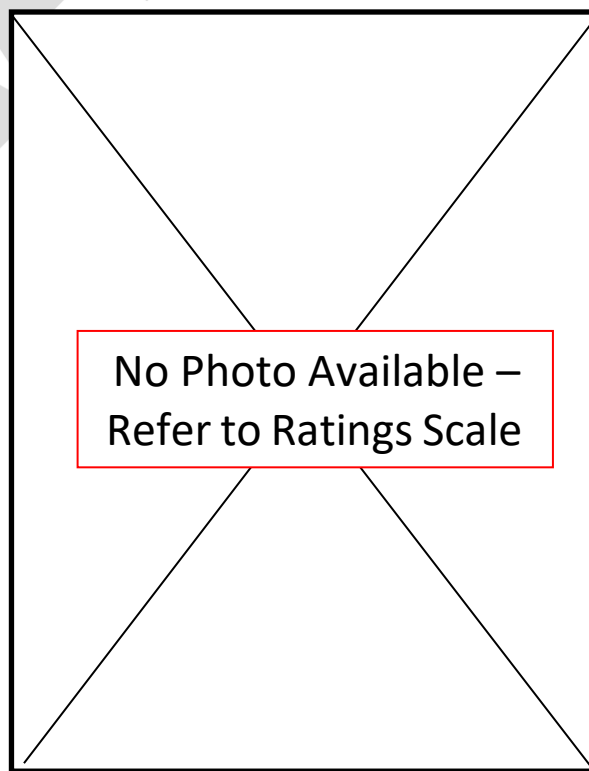
(4) Good



(3) Fair



(2) Poor



ALLEY POLE - POLES

(1) Very Poor



(1) Very Poor

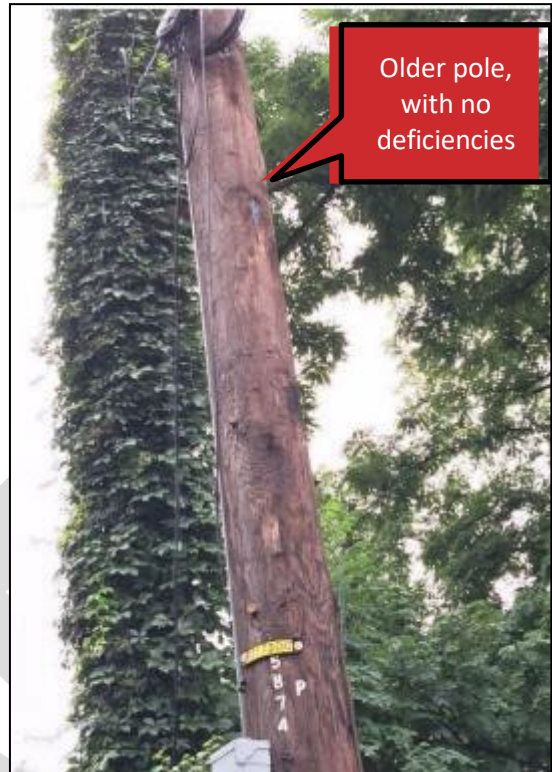


WOOD POLE - POLES

(5) Excellent



(4) Good



(3) Fair

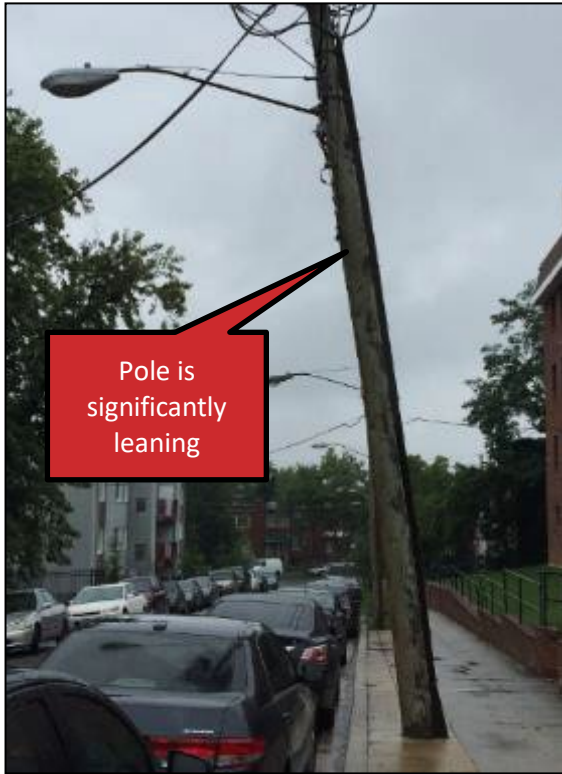


(3) Fair



WOOD POLE - POLES

(2) Poor



(1) Very Poor



13.10.6 Arms

13.10.6.1 Inspection Procedures and Common Defects

Arms and brackets should be visually and tactilely inspected from an aerial lift (bucket or truck) or using a scope or binoculars from ground level. The connection between the arm and pole is included in this Element. The inspection team should inspect and document the following conditions:

- (a) Coating loss (paint or galvanizing), corrosion, or section loss.
 - (i) If an area of corrosion is observed on the outside of the components, the area should be thoroughly cleaned of any rust scale and the amount and extent of section loss should be determined and documented.
 - (ii) If corrosion is suspected on the inside of the components, the outside of the component should be sounded with a hammer to detect “thin” areas. D-meter thickness testing shall be performed to determine the amount and extent of section loss.
- (b) Localized areas of distressed painted or coated surfaces such as at connections, attachments, etc. Cracks or splits in painted surfaces could be indicative of an overstressed section warranting additional investigation and NDT at these areas. This condition could also be a result of weathering or chemical contamination (i.e. deicing salts). The inspection team will need to use sound engineering judgment to determine the possible cause. This may, if warranted based on severity and affected area, involve additional coating evaluation such as adhesion testing or paint sampling for lab work.
- (c) Condition of welded connections. If an aerial lift (bucket or truck) is used to inspect arms, the welds should be closely inspected for cracking, especially at points of intersecting welds and incomplete or excessively ground welds, as they create stress risers. Special attention should be given to the pole to base plate weld due to the high stresses at this location. The location and size of any weld crack is to be documented. Suspected cracks should be verified by NDT.
- (d) Condition of bolted connections. Bolted connections should be inspected for loose or missing components, under engaged nuts, presence of extra washers. Document engagement if less than 100%.
- (e) Condition of set screws. Set screws should be inspected for loose or missing components,
- (f) Corrosion and cracking around any burned or rough cut holes. Burned or rough cut holes are stress risers and special attention should be given to these areas.
- (g) Dents, buckles, or ruptures in the components. These conditions typically occur during erection of the structure but may also be caused by vehicular or debris impact and should be measured and documented. Aluminum arms will often rupture due to the expansion of accumulated water freezing inside the arm.
- (h) Impact damage. Document any observable impact damage that exists and any deficiencies associated with it, which may include any of the above.

- (i) Condition of end caps. Loose or missing caps allow water intrusion and debris accumulation and should be documented.
- (j) High Mast Luminaire Ring: The high mast luminaire ring shall be visually inspected by lowering the ring to the ground using the winch inside the pole. If the ring cannot be lowered at the time of inspection, it should be visually inspected with a high-powered scope. The inspection team should inspect and document the following conditions:
 - (i) Coating loss (paint or galvanizing), corrosion, section loss, etc.
 - (ii) Imbalance or misalignment of the luminaire ring.
 - (iii) Missing damaged or loose components.

PENDANT POLE - ARMS

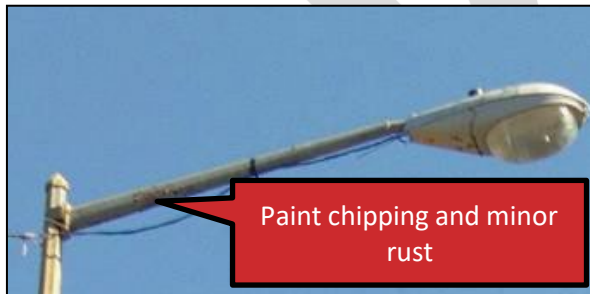
(5) Excellent



(4) Good



(3) Fair

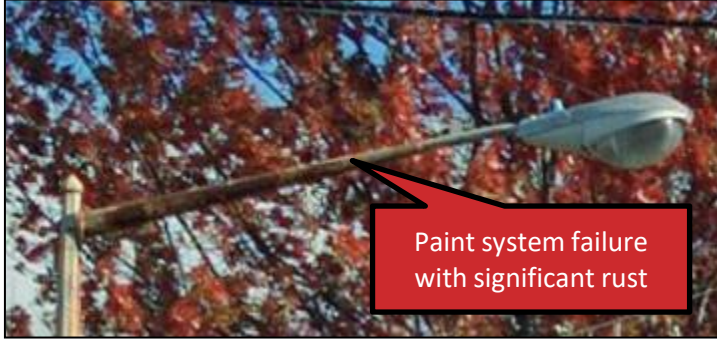


(2) Poor

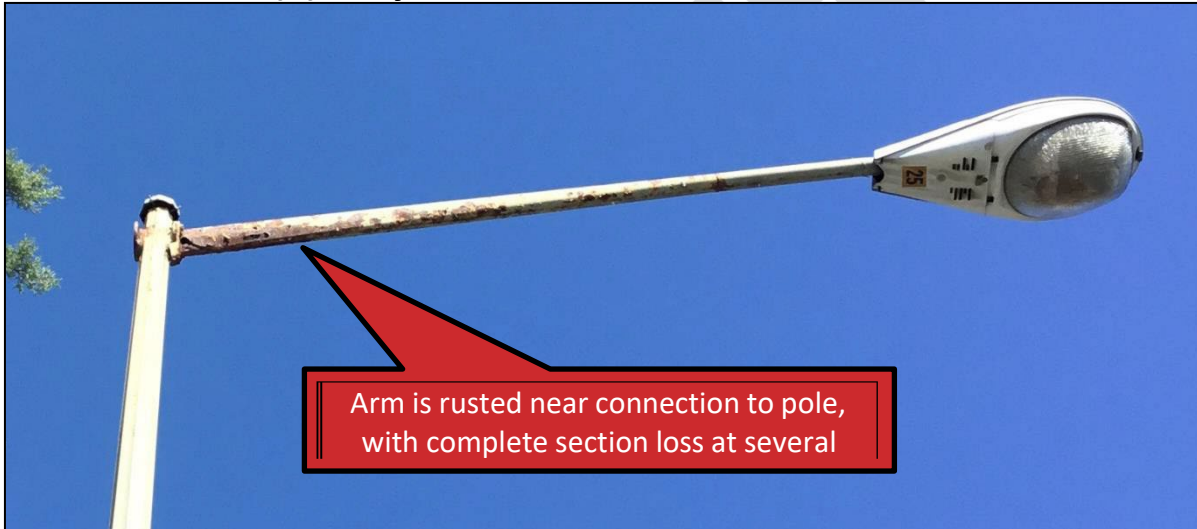


PENDANT POLE - ARMS

(2) Poor

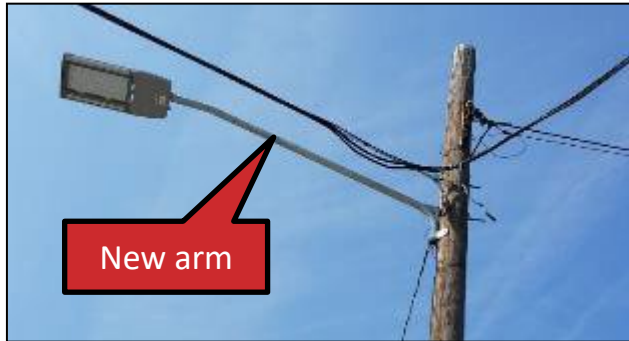


(1) Very Poor



WOOD POLE - ARMS

(5) Excellent



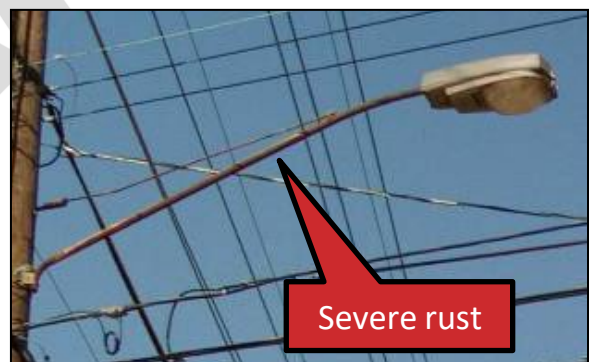
(4) Good



(3) Fair



(2) Poor



WOOD POLE - ARMS

(1) Very Poor



13.10.7 Luminares

13.10.7.1 Inspection Procedures and Common Defects

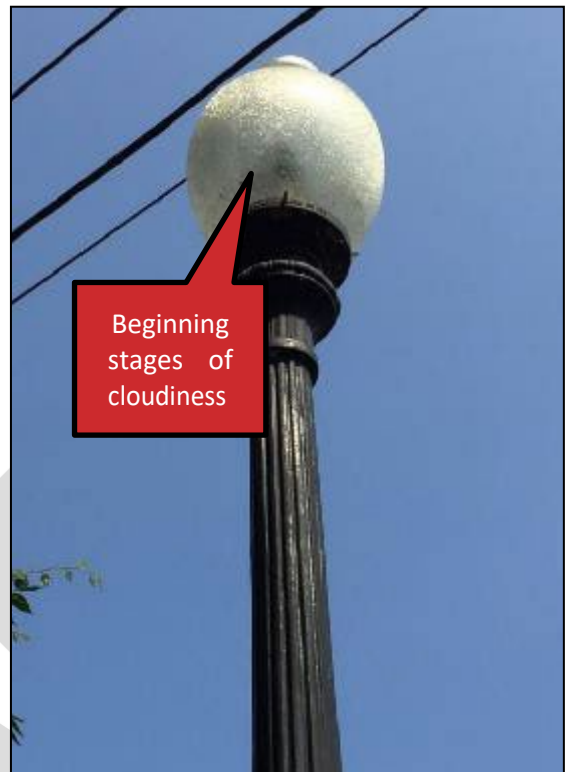
- (a) The luminaire shall be visually and tactilely inspected. The inspector should inspect and document the following conditions:
 - (i) Coating loss (paint or galvanizing), corrosion, section loss, etc.
 - (ii) Luminaire operation (on/off, if nighttime inspection).
 - (iii) Moisture accumulation or water presence.
 - (iv) Lens, hinge, latch, weathering seal, and RMCS node/light sensor components loose, missing, cracked, clouded or damaged.
 - (v) Loose, missing, deformed, or misaligned connection hardware or set screws.
 - (vi) Impact damage. Location and dimensions of impact damage should be documented.
 - (vii) Presence of birds' nests or other debris that impacts luminaire operation.
- (b) For High Mast Poles, Examine the luminaire ring for coating loss/corrosion and section loss. The luminaire ring may be imbalanced or misaligned and the reflector rings may be missing.

UPRIGHT POLE - LUMINAIRES

(5) Excellent



(4) Good



(3) Fair



(2) Poor



UPRIGHT POLE - LUMINAIRES

(2) Poor



(1) Very Poor



PENDENT POLE - LUMINAIRES

(5) Excellent



(4) Good



(3) Fair



(2) Poor



PENDENT POLE - LUMINAIRES

(1) Very Poor

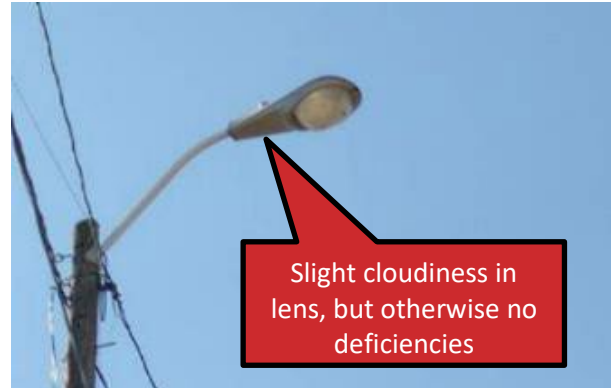


WOOD POLE - LUMINAIRES

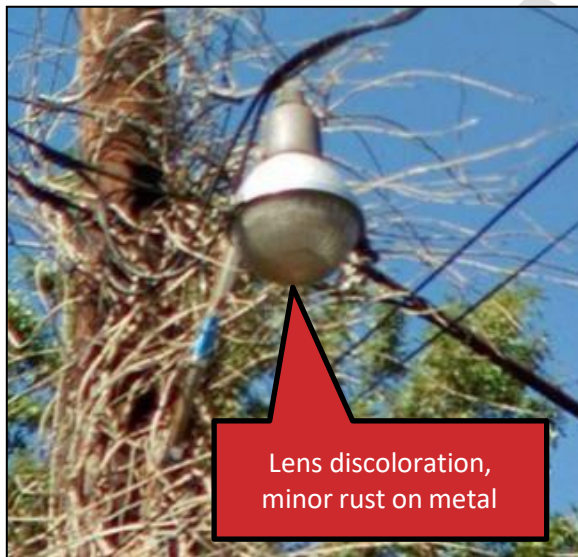
(5) Excellent



(4) Good



(3) Fair



(2) Poor



WOOD POLE - LUMINAIRES

(1) Very Poor



13.10.8 Electrical Wires

The inspector should note the condition of electrical wiring where visible inside the pole or t-base. The wiring should be inspected for missing components, breaks, exposed wiring and corrosion and section loss of connectors and attachments.

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13.11 Incident Responses for Pole Knockdowns

At times, the Developer may be required to assess and/or conduct damage repair Work related to Incident Responses, such as in the event that a pole is knocked down from a traffic crash. The following presents the process for how the District responds to an Incident, using a pole knock-down as an example:

- (a) If a pole is knocked down from a traffic crash, the Metropolitan Police Department (MPD) dispatches an officer(s) to the incident scene to respond to the incident. MPD then files a Public Traffic Packet – Involved Persons report to record the event. The packet includes a traffic crash report, identification of motor vehicles and/or non-motorists involved, crash details, sequence of events, harmful events, witnesses, narrative of the occurrence, diagram of the crash, and details of the vehicle involved, actions and damage, and passengers and occupants.
- (b) If District property is damaged as a result of the incident (e.g., a streetlight pole), MPD reports the damaged property and location to the District DOT Emergency Management. The District will then generate a work order in its Work Management System and contact the Developer to dispatch a technician to assess the damaged property. The dispatched crew assesses the damages and photographs the incident scene and any public or private damaged property. An engineer assesses the damage to any District property and prepares a cost estimate to conduct the repairs.
- (c) The District DOT then notifies the Office of Risk Management’s Tort Liability Division of a potential District Department of Transportation subrogation claim. The claim is assigned a Torts Examiner for investigation and processing. Within 30 business days after review of the submission, the Torts Division will determine whether to pursue the subrogation claim. The District is responsible for submitting all documents that may bear on the validity or amount of the claim to the Tort Liability Division. Such documents include, but are not limited to, the following:
 - (i) Photographs of the incident scene, any public or private damaged property; and/or injuries;
 - (ii) All related medical records and bills if claiming injury;
 - (iii) Repair estimates;
 - (iv) Police reports;
 - (v) Receipts;
 - (vi) proof of expenses;
 - (vii) estimate of repairs;
 - (viii) invoices;
 - (ix) appraisals;
 - (x) District’s work order to conduct repairs, etc.
- (d) In the event that an involved person is charged for the incident, the accused person will receive a summons from MPD. If fault is determined, then the person is responsible for paying a fine to the District for the damaged property.
 - (i) Any resulting fines paid to the District will remain with the District and will not be disbursed to the Developer.

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13.12 Protocol for Pepco Interactions with the District

The following are standard services currently provided by Pepco to the District for the Street Light Network.

13.12.1 Response to Loss of Power to Lighting Units

- (a) Emergency Work: In situations where five (5) or more consecutive streetlights experience a loss of power, Pepco typically provides same day service response to investigate the cause of power loss.
- (b) Non-Emergency work: Pepco will schedule investigation of loss of power to Lighting Units typically within 7-10 days.
 - (i) In Non-Emergency scenarios, the District's agent serving as its Street Light maintenance contractor will troubleshoot the electrical circuits and make the determination that power loss is a result of defective Pepco equipment.
 - (ii) Maintenance contractor shall send a detailed report to Pepco via email and copy the District Streetlight Team. The report shall include a description of problem, testing results, and location of transformer.
 - (iii) Pepco methods of resolution are as follows: replacing transformer fuse, re-splice cables (overhead wood poles or inside manholes), overhead cable replacement, underground cable or conduit replacement, transformer can/manhole replacement, and new redesign for alternative power source. All works described are performed by Pepco with no additional cost to the District or its contractor.

13.12.2 New Power Supply

- (a) Pepco existing power supply becomes obsolete or abandoned: Pepco will require the District to reroute its infrastructure (overhead cables or underground conduits) to Pepco's newly designated power supply location. Pepco will perform the make-ready work (penetration guidance and final connections) at no cost additional cost to the District. Contractor shall be responsible for installing new conduit from streetlight pole to the new Pepco feed point. This circumstance is rare, occurring one to two times per year, historically.
- (b) Knock down of Pepco Poles with District Lighting Units: When Pepco-owned wood Poles with Lighting Units are knocked down, Pepco will remove and dispose of all streetlight Elements, at no additional cost to the District or its contractor. Upon installation of replacement Pole, Pepco will provide make-ready work (spare cables to attach streetlight cables for drawing power) and notify the District when a new Lighting Unit can be affixed.

13.12.3 Pepco Wood Pole Replacement Program

- (a) Pepco is currently in the process of replacing many of its wood Poles throughout the District.
- (b) As Pepco replaces wood Poles throughout the District, parties with assets attached to Pepco Poles must coordinate with Pepco to relocate their assets in a timely manner. This includes the District or its Street Light agent, as well as other third parties such as Verizon, cable providers, etc.
- (c) Each party has thirty (30) calendar days to relocate their asset. For this purpose, the NJUNS data-management system was created to notify each Agency/ Utility in succession of when to transfer their equipment.

13.12.4 Manhole Inspection

- (a) Many Lighting Units are currently being powered directly from Pepco manholes.
- (b) The District or its agent/contractor may enter with qualified licensed electricians.

13.12.5 Requests for Information

- (a) The original Streetlight infrastructure was built by Pepco and acquired by the District in the mid 1980's. During the handoff, Pepco provided outdated blueprint drawings. Oftentimes maintenance troubleshooting teams are unable to locate the power source due to outdated drawings.
- (b) Pepco maintains a geodatabase system with updated information, and , upon request, Pepco will provide information and materials on underground infrastructure.

13.12.6 New Construction Activities for Streetlights

Expanded streetlight network: Any new Lighting Units that requires power must be submitted to Pepco for review and final connection. This requirement applies to any party performing the Construction Work including the Developer, private third-party developers, and District departments.

The submittal process includes the below steps. The submittals are referred to as SLFs.

- (a) Step #1: Create /review the design drawings

There are many variations of drawings acceptable to Pepco, ranging from stamped professional engineer drawings to Google maps that indicate where a pole is located. For each type of submitted drawing, the exact geographic location Pepco power source must be shown, and the Pepco Pole ID number identified. Additionally, specifically define the type and quantity of the Lighting Units being powered.

For new Lighting Units, the Developer is responsible for creating the drawings.

- (b) Step #2: Letter of Transmittal

The transmittal is a cover letter that provides an overview of the request. This indicates the Pepco receiver, date, work site, contact person, SLF#, and entity responsible for payment. The District sends the transmittal to Pepco.

- (c) Step #3: SLF or Scope of Work

The SLF is a scope of work document indicates to Pepco the exact task they are being requested to perform.

Example 1: Install new services from pole #1 to pole #2.

Example 2: Make new overhead connections to Lighting Unit on Pepco Pole # 12345.

For each example, include the details of the payee, such as company name, address, contract person and phone number.

- (d) Step #4: Package and Send

Scope documents including supporting documents (cut sheets, email records, etc.) are submitted via email to the District who will send to the Pepco Design Division, care of Robert Brown. The District stores this data in Cityworks for records keeping purposes.

- (e) Step #5: Inspection

Upon receiving a SLF, Pepco may perform a site inspection. This is to verify the scope of work and ensure all components are capable of supporting the request. Examples: Condition of the wood pole(s) is the correct voltage on the pole to support streetlights. Example#2: The manholes selected have correct voltage, size (physical), and condition to accommodate the request. Furthermore, on rare occasions a follow-up inspection/ site meeting is need with all parties involved. Contractor is expected to coordinate with Pepco and attend all site inspections and meetings.

- (i) Penetration Guide: Once Pepco approves the SLF, a penetration guide or guides is/are issued. A penetration guide is written instructions of how to connect with Pepco infrastructure.

Example: Pepco will indicate on the (physical) manhole, the exact wall to enter and where to enter precisely. ("Install 4EA - 2" PVC conduits south-side) Contractor is responsible for cutting open the manhole wall, installing conduits, and restoring the manhole wall. Contractor will pull new cable from streetlight manhole to Pepco manhole. Cables will be left racked and tagged for Pepco to make final connections. Contractors are prohibited from cutting or disturbing Pepco's cables. Ownership is described as such: Penetrated manhole and existing cables belong to Pepco. The newly installed conduit system and cables belong to DDOT. The precise point of ownership is the splice point for cables and manhole wall for conduit.

- (ii) Make Ready Work, (underground & overhead): In special scenarios (typically signal light connections), Pepco will not make final connection, but will instead perform make-ready work. Often, this is when existing Pepco cables do not have available connection points. Pepco crews will cut their cables and provide a point to make connections.

(f) Step #6: Payment Confirmation

Following the inspection, Pepco will prepare and send an invoice to the designated company. After payment is received, Pepco will schedule work. The District is not usually notified of the date(s) Pepco will perform work. Instead, the District is notified when work is completed.

13.13 District of Columbia Lighting Fixture Specifications, September 2020

Cobrahead

LED Cobrahead	70W HPS Cobrahead	100W HPS Cobrahead	150W HPS Cobrahead	250W HPS Cobrahead	400W HPS Cobrahead
Luminaire Designation:	LED - CH70H	LED - CH100H	LED - CH150H	LED - CH250H	LED - CH400H
Maximum nominal luminaire input power (watts). This value is driven by min LpW and delivered lumens:	30	49	66	98	173
Nominal luminaire input voltage:	Universal 120-277 V	Universal 120-277 V	Universal 120-277 V	Universal 120-277 V	Universal 120-277 V
Operating Frequency Range:	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Minimum Luminaire Life:	100,000+ hours per L70 lumen	100,000+ hours per L70 lumen	100,000+ hours per L70 lumen	100,000+ hours per L70 lumen	100,000+ hours per L70 lumen
Min. Warranty:	At least 10 years from date of installation	At least 10 years from date of installation	At least 10 years from date of installation	At least 10 years from date of installation	At least 10 years from date of installation
Nominal correlated color temperature (CCT):	2700-3000K	2700-3000K	2700-3000K	2700-3000K	2700-3000K
Minimum Color Rendering Index (CRI):	80	80	80	80	80
Max. nominal Backlight-Uplight-Glare (BUG) ratings:	B1-U0-G1	B1-U0-G1	B2-U0-G2	B2-U0-G2	B3-U0-G3
IES Distribution Type:	Type II, Very Short to Short	Type II, Very Short to Short	Type II, III, Very Short to Medium	Type III, Medium	Type III, Medium
Min. Delivered lumens:	3300	5400	7300	10800	19000
Minimum Lumens per Watt	110	110	110	110	110
Luminaire housing finish color:	Custom	Custom	Custom	Custom	Custom
Max. luminaire weight:	16 lbs.	16 lbs.	16 lbs.	26 lbs.	35 lbs.

LED Cobrahead	70W HPS Cobrahead	100W HPS Cobrahead	150W HPS Cobrahead	250W HPS Cobrahead	400W HPS Cobrahead
Mounting method:	Side-arm and fit on NPS up to 2"	Side-arm and fit on NPS up to 2"	Side-arm and fit on NPS up to 2"	Side-arm and fit on NPS up to 2"	Side-arm and fit on NPS up to 2"
Vibration:	ANSI C136.31 for Bridge/Overpass	ANSI C136.31 for Bridge/Overpass	ANSI C136.31 for Bridge/Overpass	ANSI C136.31 for Bridge/Overpass	ANSI C136.31 for Bridge/Overpass
Min. ambient temperature during operation:	-20 °C	-20 °C	-20 °C	-20 °C	-20 °C
Max. ambient temperature during operation:	+40 °C	+40 °C	+40 °C	+40 °C	+40 °C
Electrical Immunity:	10kV/5kA, ANSI C 136.2 Compliant	10kV/5kA, ANSI C 136.2 Compliant	10kV/5kA, ANSI C 136.2 Compliant	10kV/5kA, ANSI C 136.2 Compliant	10kV/5kA, ANSI C 136.2 Compliant
Control Interface:	ANSI C136.41, 7-Pin	ANSI C136.41, 7-Pin	ANSI C136.41, 7-Pin	ANSI C136.41, 7-Pin	ANSI C136.41, 7-Pin
LED Driver	Dimmable, DALI	Dimmable, DALI	Dimmable, DALI	Dimmable, DALI	Dimmable, DALI
LED Power Factor:	At least 0.9	At least 0.9	At least 0.9	At least 0.9	At least 0.9
Min. Ingress Protection:	IP 66	IP 66	IP 66	IP 66	IP 66
Clamping Mechanism:	2 to 4 bolts	2 to 4 bolts	2 to 4 bolts	4 bolts	4 bolts

1. Luminaires shall be UL 1598 listed and satisfy requirements summarized above for each type of luminaire and wattage.
2. The housing shall be equipped with a quick release tool-less entry hinged removable door that opens downward to provide access to electronic components and to a terminal block. The door shall be secured to prevent accidental dropping or disengagement. Pattern Indicator label per ANSI C136.15 and C136.22 shall be attached to the luminaire. The luminaire shall come with a shield house or street side that is easily installed in the field as directed by the Engineer.
3. The electrical components shall be RoHS compliant. The LEDs shall be tested in accordance with IESNA LM 80 guidelines, and in compliance with EPA ENERGY STAR, extrapolations in accordance with IESNA TM 21. The electronic components sensitive to electrostatic discharge (ESD) such as light emitting diodes (LEDs) shall be assembled in compliance with ANSI/ESD S20.20 standards so as to eliminate ESD events that could decrease the useful life of the product. All internal components shall be assembled and pre-wired using modular electrical connections.
4. The luminaires shall be fully assembled and electrically tested prior to shipment from factory.

5. The driver shall be certified in compliance to UL8750 requirement. The current supplying the LEDs shall be reduced by the driver if the driver experiences internal overheating as a protection to the LEDs and the electrical components. Output shall be protected from short circuits, voltage overload and current overload.
6. The optical system shall be composed of high performance optical grade to achieve desired distribution optimized to get maximum spacing, target lumen and a superior lighting uniformity. Performance shall be tested per LM79 and TM15 (IESNA) certifying its photometric performance. The optical system shall be Dark Sky compliant with 0% uplight. The luminaire shall be designed to house a 7-pin photocell receptacle per ANSI C136.41 and will be wired and configured to accept both the typical button type photocell and remote monitoring control node for luminaire.
7. Mechanical design of protruding external surfaces (heat sink fins) shall facilitate hose-down cleaning and discourage debris accumulation. Product shall not use any cooling device with moving parts. External surfaces shall enable natural cleaning and removal of dirt and debris. Luminaire shall start and operate in ambient temperature range specified. Maximum rated case temperature of driver and other internal components shall not be exceeded when luminaire is operated in ambient temperature range specified.
8. The finish application shall be of polyester powder coat paint at least 3 mils/100 microns with ± 1 mils/24 microns of tolerance. The Thermosetting resins shall provide a discoloration resistant finish in accordance with the ASTM D 2244 standard, as well as luster retention in keeping with the ASTM D 523 standard and humidity proof in accordance with the ASTM D2247 standard. The surface treatment shall meet ASTM B117 standard.
9. The connection of the luminaire shall be done using a terminal block connector 600V, 85A for use with #2 14 AWG wires from the primary circuit, located inside the housing.
10. All exposed screws shall be stainless steel with Ceramic primer seal basecoat to reduce seizing of the parts. All seals and sealing devices are made and/or lined with EPDM and/or silicone and/or rubber.
11. Luminaire shall comply with FCC 47 CFR part 15/18. Luminaire shall comply with section 5.2.5 (luminaires rated for outdoor use) of ANSI C82.77 at full input power and across specified voltage range.
12. All exterior hardware and fasteners, wholly or partly exposed, shall be stainless-steel alloy. All internal fasteners shall be stainless-steel or zinc coated steel. All remaining internal hardware shall be stainless steel, aluminum alloy, or zinc coated steel.
13. The light must appear to be a single source (regardless of the number of drivers) to the road users.
14. The fixture manufacturer must be in the business of manufacturing outdoor lighting products for a minimum of ten (10) years.

Warranty: The Contractor shall provide, as a deliverable under this Contract, manufacturer's warranty certificate for these items as follows: 10 year warranty from the date of final acceptance of the installation by the DDOT officer or designated representative to repair or replace luminaires and/or components thereof as well as LEDs and Drivers that fail in materials or workmanship; corrode; leak; or fade, stain, or chalk

due to effects of weather, vibration or solar radiation. In the event of a systemic failure that affects more than 10 percent of the luminaires or their component parts, all materials that are subject to correction shall be repaired or replaced.

*All references to standards and compliance documents for testing, electrical, etc. shall be the most recent published edition of these documents.

Tear Drop

Tear Drop LED	150W HPS Tear Drop	250W HPS Tear Drop	400W HPS Tear Drop
Luminaire Designation:	LED - TD150H	LED - TD250H	LED - TD400H
Maximum nominal luminaire input power (watts). This value is driven by min LpW and delivered lumens:	92	140	160
Nominal luminaire input voltage:	Universal 120-277 V	Universal 120-277 V	Universal 120-277 V
Operating Frequency Range:	50-60 Hz	50-60 Hz	50-60 Hz
Minimum Luminaire Life:	100,000 hours per L70 lumen maintenance @ 25°C.	100,000 hours per L70 lumen maintenance @ 25°C.	100,000 hours per L70 lumen
Min. Warranty:	At least 10 years from date of installation	At least 10 years from date of installation	At least 10 years from date of installation
Nominal correlated color temperature (CCT):	2700-3000K	2700-3000K	2700-3000K
Minimum Color Rendering Index (CRI):	80	80	80
Max. nominal Backlight-Uplight-Glare (BUG) ratings:	B3-U3-G3	B3-U3-G3	B3-U3-G3
IES Distribution Type:	Type II, III or IV, Very Short to Medium	Type II, III or IV, Very Short to Medium	Type II, III or IV, Very Short to Medium
Min. Delivered lumens:	9,200	14000	16000
Minimum Lumens per Watt	100	100	100
Max. Total Upward Lumens (%):	4% of the output lumens	4% of the output lumens	4% of the output lumens

Tear Drop LED	150W HPS Tear Drop	250W HPS Tear Drop	400W HPS Tear Drop
Luminaire Designation:	LED - TD150H	LED - TD250H	LED - TD400H
Luminaire housing finish color:	Custom	Custom	Custom
Max. luminaire weight:	65 lbs.	65 lbs.	65 lbs.
Mounting method:	Side-arm/Pendant and fit on NPS up to 2"	Side-arm/Pendant and fit on NPS up to 2"	Side-arm/Pendant and fit on NPS up to 2"
Vibration:	ANSI C136.31 for Bridge/Overpass	ANSI C136.31 for Bridge/Overpass	ANSI C136.31 for Bridge/Overpass
Min. ambient temperature during operation:	-20 °C	-20 °C	-20 °C
Max. ambient temperature during operation:	+40 °C	+40 °C	+40 °C
Electrical Immunity:	10kV/5kA, ANSI C 136.2 Compliant	10kV/5kA, ANSI C 136.2 Compliant	10kV/5kA, ANSI C 136.2 Compliant
Control Interface:	ANSI C136.41, 7-Pin	ANSI C136.41, 7-Pin	ANSI C136.41, 7-Pin
LED Driver	Dimmable, DALI	Dimmable, DALI	Dimmable, DALI
LED Power Factor:	At least 0.9	At least 0.9	At least 0.9
Min. Ingress Protection:	IP 66	IP 66	IP 66
Luminaire overall diameter:	16 to 18 inches	16 to 18 inches	16 to 18 inches
Luminaire overall height:	45 to 48 inches	46 inches	46 inches

1. Luminaires shall be UL 1598 listed and satisfy the requirements summarized above for each type of luminaire and wattage.
2. The teardrop fixture shall include a rippled acrylic deep dish plastic globe. The deep dish globe shall be molded of rippled acrylic plastic having a minimum thickness of 0.090 inches. The lens shall be secured to the holding ring that is sealed to provide an IP66 Ingress rating. Additionally, a continuous circular gasket rated for 130 °C must hold the globe into place within the cast ring assembly and assist in sealing the fixture. The deep dish globe shall be designed in such a way that the fixture has no more than 4% uplight. At minimum, the teardrop fixture shall look identical to the legacy teardrop luminaire.

3. The luminaire body shall be made of heavy wall cast aluminum and with provisions for heat dissipation. The fixture shall have a holder or plumbizer. The holder shall allow vertical adjustment of the fixture. A level device must be fastened to the horizontal arm by means of 2 u-clamps. A NEMA approved 7-pin twist-lock photocell receptacle per ANSI C136.41 must also be positioned on the top and be sealed to avoid ingress of water, dirt or bugs. The surface treatment shall meet ASTM B117 standard for salt spray testing. The assembly shall indicate visible labels for "STREET SIDE" and "HOUSE SIDE"
4. The optical system shall be composed of high performance LEDs arranged in an array to achieve desired distribution optimized to get maximum spacing, target lumen and a superior lighting uniformity. Performance shall be tested per LM79 and TM15 (IESNA) certifying its photometric performance. The luminaire shall be designed to house a 7-pin photocell receptacle per ANSI C136.41 and will be wired and configured to accept both the typical button type photocell and remote monitoring control node for luminaire.
5. The driver assembly shall be mounted on a heavy duty fabricated galvanized steel mounting bracket to allow complete tool-less maintenance. The driver shall be certified in compliance to UL8750 requirement. The current supplying the LEDs will be reduced by the driver if the driver experiences internal overheating as a protection to the LEDs and the electrical components. Output shall be protected from short circuits, voltage overload and current overload.
6. The LED emitters shall be mounted to circuit boards such that they are in full thermal contact with the heat sink. Product shall not use any cooling device with moving parts.
7. The electrical components shall be RoHS compliant. The LEDs shall be tested in accordance with IESNA LM 80 guidelines, and in compliance with EPA ENERGY STAR, extrapolations in accordance with IESNA TM 21. The electronic components sensitive to electrostatic discharge (ESD) such as light emitting diodes (LEDs) shall be assembled in compliance with ANSI/ESD S20.20 standards so as to eliminate ESD events that could decrease the useful life of the product. All internal components shall be assembled and pre-wired using modular electrical connections.
8. All internal wiring and connections shall be completed so that it will be necessary only to attach the incoming supply connectors to Mate-N-Loc connectors or to a terminal block. Terminal blocks shall be certified to 250V, 70A and consist of three sets of terminals. They shall be rated to 250V and meet NEMA Specifications for Wiring Terminals. Mate-N-Loc shall be certified for 600V operation. Internal wire connectors shall be crimp connector and all wiring components shall be to be CSA certified and/or UL listed.
9. Opening and locking system shall be designed such it allows easy installation glare shield. The fixture shall come with a glare shield that will provide shielding at 0 – 360 degrees. The house side shield shall be easily installed in the field as directed by DDOT Engineer.
10. The fixtures shall also be tested in accordance to Department of Energy (DOE) sanctioned standards to determine the maximum in-situ solder-point or junction-point temperatures of the LED emitters. The report must be available upon request by the Engineer.
11. Luminaire shall comply with FCC 47 CFR part 15/18. Luminaire shall comply with section 5.2.5 (luminaires rated for outdoor use) of ANSI C82.77 at full input power and across specified voltage range.
12. The light must appear to be a single source (regardless of the number of drivers) to the road users.

13. The finish application shall be of polyester powder coat paint at least 3 mils/100 microns with ± 1 mils/24 microns of tolerance. The Thermosetting resins shall provide a discoloration resistant finish in accordance with the ASTM D 2244 standard, as well as luster retention in keeping with the ASTM D 523 standard and humidity proof in accordance with the ASTM D2247 standard. The surface treatment shall meet ASTM B117 standard.

14. All exterior hardware and fasteners, wholly or partly exposed, shall be stainless-steel alloy. All internal fasteners shall be stainless-steel or zinc coated steel. All remaining internal hardware shall be stainless steel, aluminum alloy, or zinc coated steel.

15. The fixture manufacturer must be in the business of manufacturing outdoor lighting products for a minimum of ten (10) years.

16. The luminaires shall be fully assembled and electrically tested prior to shipment from factory.

Warranty: The Contractor shall provide, as a deliverable under this Contract, manufacturer's warranty certificate for these items as follows: 10 year warranty from the date of final acceptance of the installation by the DDOT officer or designated representative to repair or replace luminaires and/or components thereof as well as LEDs and Drivers that fail in materials or workmanship; corrode; leak; or fade, stain, or chalk due to effects of weather, vibration or solar radiation. In the event of a systemic failure that affects more than 10 percent of the luminaires or their component parts, all materials that are subject to correction shall be repaired or replaced.

*All references to standards and compliance documents for testing, electrical, etc. shall be the most recent published edition of these documents.

Post Top

Post Top LED	70W -100W HPS Post Top	150W HPS Post Top	250W HPS Post Top	400W HPS Post Top
Luminaire Designation:	LED - PT70100H	LED - PT150H	LED - PT250H	LED - T400H
Maximum nominal luminaire input power (watts). This value is driven by min LpW and delivered lumens:	40	60	80	100
Nominal luminaire input voltage:	Universal 120-277 V	Universal 120-277 V	Universal 120-277 V	Universal 120-277 V
Operating Frequency Range:	50-60 Hz	50-60 Hz	50-60 Hz	50-60 Hz
Minimum Luminaire Life:	100,000 hours per L70 lumen maintenance @ 25°C.	100,000 hours per L70 lumen maintenance @ 25°C.	100,000 hours per L70 lumen maintenance @ 25°C.	100,000 hours per L70 lumen maintenance @ 25°C.

Post Top LED	70W -100W HPS Post Top	150W HPS Post Top	250W HPS Post Top	400W HPS Post Top
Luminaire Designation:	LED - PT70100H	LED - PT150H	LED - PT250H	LED - T400H
Min. Warranty:	At least 10 years from date of installation	At least 10 years from date of installation	At least 10 years from date of installation	At least 10 years from date of installation
Nominal correlated color temperature (CCT):	2700-3000K	2700-3000K	2700-3000K	2700-3000K
Minimum Color Rendering Index (CRI):	80	80	80	80
Max. nominal Backlight-Uplight-Glare (BUG) ratings:	B2-U3-G3	B2-U3-G3	B2-U3-G3	B3-U3-G3
IES Distribution Type:	Type III Short to Medium	Type III, Short to Medium	Type III, Short to Medium	Type III, Short to Medium
Minimum Lumens per Watt	100	100	100	100
Min. Delivered lumens:	4000	6000	8000	10000
Max. Total Upward Lumens (%):	10% of the output lumens	10% of the output lumens	10% of the output lumens	10% of the output lumens
Luminaire housing finish color:	Custom	Custom	Custom	Custom
Max. luminaire weight:	27 lbs.	27 lbs.	27 lbs.	27 lbs.
Mounting method:	Post-top	Post-top	Post-top	Post-top
Vibration:	ANSI C136.31 for Bridge/Overpass	ANSI C136.31 for Bridge/Overpass	ANSI C136.31 for Bridge/Overpass	ANSI C136.31 for Bridge/Overpass
Min. ambient temperature during operation:	-20 °C	-20 °C	-20 °C	-20 °C
Max. ambient temperature during operation:	+40 °C	+40 °C	+40 °C	+40 °C
Electrical Immunity:	10kV/5kA, ANSI C 136.2 Compliant	10kV/5kA, ANSI C 136.2 Compliant	10kV/5kA, ANSI C 136.2 Compliant	10kV/5kA, ANSI C 136.2 Compliant
Control Interface:	ANSI C136.41, 7-Pin	ANSI C136.41, 7-Pin	ANSI C136.41, 7-Pin	ANSI C136.41, 7-Pin
LED Driver	Dimmable, DALI	Dimmable, DALI	Dimmable, DALI	Dimmable, DALI

Post Top LED	70W -100W HPS Post Top	150W HPS Post Top	250W HPS Post Top	400W HPS Post Top
Luminaire Designation:	LED - PT70100H	LED - PT150H	LED - PT250H	LED - T400H
LED Power Factor:	At least 0.9	At least 0.9	At least 0.9	At least 0.9
Min. Ingress Protection:	IP 66	IP 66	IP 66	IP 66
Globe overall diameter:	14.3 to 17.5 inches	14.3 to 17.5 inches	14.3 to 17.5 inches	14.3 to 17.5 inches
Globe overall base diameter:	7.75 to 9.25 inches	7.75 to 9.25 inches	7.75 to 9.25 inches	7.75 to 9.25 inches
Globe overall height:	22.5 to 28 inches	22.5 to 28 inches	22.5 to 28 inches	22.5 to 28 inches

1. Luminaires shall be UL 1598 listed and satisfy the requirements summarized above for each type of luminaire.
2. The decorative globe shall be molded of rippled acrylic plastic and have a minimum thickness of 0.125 inches. The decorative globe shall be high impact strength; lightweight; excellent light transmission; and UV Stabilized. At minimum, the globe shall look identical to the existing Washington globe.
3. The optical system shall be composed of high performance LEDs arranged in an array to achieve desired distribution optimized to get maximum spacing, target lumen and a superior lighting uniformity. Performance shall be tested per LM79 and TM15 (IESNA) certifying its photometric performance. The luminaire shall be designed to house a 7-pin photocell receptacle per ANSI C136.41 and will be wired and configured to accept both the typical button type photocell and remote monitoring control node for luminaire.
4. The driver assembly shall be mounted on a heavy duty fabricated galvanized steel mounting bracket to allow complete tool-less maintenance. The driver assembly shall be designed such that it fits into all DDOT's standard upright poles (can be found in the standard drawings). The driver shall be certified in compliance to UL8750 requirement. The current supplying the LEDs will be reduced by the driver if the driver experiences internal overheating as a protection to the LEDs and the electrical components. Output shall be protected from short circuits, voltage overload and current overload.
5. The LED emitters shall be mounted to circuit boards such that they are in full thermal contact with the heat sink. Product shall not use any cooling device with moving parts.
6. The electrical components shall be RoHS compliant. The LEDs shall be tested by in accordance with IESNA LM 80 guidelines, and in compliance with EPA ENERGY STAR, extrapolations in accordance with IESNA TM 21. The electronic components sensitive to electrostatic discharge (ESD) such as light emitting diodes (LEDs) shall be assembled in compliance with ANSI/ESD S20.20 standards so as to eliminate ESD events that could decrease the useful life of the product. All internal components shall be assembled and pre-wired using modular electrical connections.

7. All internal wiring and connections shall be completed so that it will be necessary only to attach the incoming supply connectors to Mate-N-Loc connectors or to a terminal block. Terminal blocks shall be certified to 250V, 70A and consist of three sets of terminals. They shall be rated to 250V and meet NEMA Specifications for Wiring Terminals. Mate-N-Loc shall be certified for 600V operation. Internal wire connectors shall be crimp connector and all wiring components shall be CSA certified and/or UL listed.
8. The luminaire assembly (globe, globe ring, driver, LED light engine) shall be secured to the main housing by means of set screws or tool less “twist-lock” opening system maintaining a secure seal between the globe ring and the cast iron casing of the pole. The LED light engine shall be protected from water or dust particle ingress making the fixture suitable for an outdoor environment. The assembly shall indicate visible labels for “STREET SIDE” and “HOUSE SIDE”
9. Opening and locking system shall be designed such it allows easy globe removal, installation of networked outdoor lighting controller, and installation of glare shield. The fixture shall come with a glare house side shield that will provide shielding at 0 – 120 degrees. The house side shield shall be easily installed in the field as directed by DDOT Engineer.
10. The fixtures shall also be tested in accordance to Department of Energy (DOE) sanctioned standards to determine the maximum in-situ solder-point or junction-point temperatures of the LED emitters. The report must be available upon request by the Engineer.
11. Luminaire shall comply with FCC 47 CFR part 15/18. Luminaire shall comply with section 5.2.5 (luminaires rated for outdoor use) of ANSI C82.77 at full input power and across specified voltage range.
12. The light shall appear to be a single source (regardless of the number of drivers) to the road users. The top portion of the globe shall be uniformly illuminated by the upward light component.
13. All exterior hardware and fasteners, wholly or partly exposed, shall be stainless-steel alloy. All internal fasteners shall be stainless-steel or zinc coated steel. All remaining internal hardware shall be stainless steel, aluminum alloy, or zinc coated steel.
14. The finish application shall be of polyester powder coat paint at least 3 mils/100 microns with ± 1 mils/24 microns of tolerance. The Thermosetting resins shall provide a discoloration resistant finish in accordance with the ASTM D 2244 standard, as well as luster retention in keeping with the ASTM D 523 standard and humidity proof in accordance with the ASTM D2247 standard. The surface treatment shall meet ASTM B117 standard.
15. The fixture manufacturer must be in the business of manufacturing outdoor lighting products for a minimum of ten (10) years.
16. The luminaires shall be fully assembled and electrically tested prior to shipment from factory.

Warranty: The Contractor shall provide, as a deliverable under this Contract, manufacturer’s warranty certificate for these items as follows: 10 year warranty from the date of final acceptance of the installation by the DDOT officer or designated representative to repair or replace luminaires and/or components thereof as well as LEDs and Drivers that fail in materials or workmanship; corrode; leak; or fade, stain, or chalk due to effects of weather, vibration or solar radiation. In the event of a systemic failure that affects more than 10 percent of the luminaires or their component parts, all materials that are subject to correction shall be repaired or replaced.

*All references to standards and compliance documents for testing, electrical, etc. shall be the most recent published edition of these documents.

Klinge Valley Trail

Post Top LED	Klinge Valley Trail (KVT)
Maximum nominal luminaire input power (watts). This value is driven by min LpW and delivered lumens:	33
Nominal luminaire input voltage:	Universal 120-277 V
Operating Frequency Range:	50-60 Hz
Minimum Luminaire Life:	100,000 hours per L70 lumen maintenance @ 25°C.
Min. Warranty:	At least 10 years from date of installation
Nominal correlated color temperature (CCT):	2700K †(see below note)
Minimum Color Rendering Index (CRI):	80
Max. nominal Backlight-Uplight-Glare (BUG) ratings:	B1-U0-G1
IES Distribution Type:	Type II
Minimum Lumens per Watt	100
Min. Delivered lumens:	3300
Luminaire housing finish color:	Custom
Max. luminaire weight:	33 lbs.

Post Top LED	Kling Valley Trail (KVT)
Mounting method:	Post Top
Vibration:	ANSI C136.31 for Bridge/Overpass
Min. ambient temperature during operation:	-20 °C
Max. ambient temperature during operation:	+40 °C
Electrical Immunity:	10kV/5kA, ANSI C 136.2 Compliant
Control Interface:	ANSI C136.41, 7-Pin
LED Driver	Dimmable, DALI
LED Power Factor:	At least 0.9
Min. Ingress Protection:	IP 66
Luminaire overall height:	39 inches
Luminaire diameter:	20.125 inches

† Developer may select warmer CCT fixtures for the Kling Valley Trail Lighting Units if those CCTs can perform to the remainder of the specifications.

1. Luminaires shall be UL 1598 listed and satisfy the requirements summarized above for each type of luminaire.
2. The finial shall be 356 aluminum; The hood, guard, and access mechanism shall be A360.1 aluminum alloy and 2.5mm thickness; and all mechanically assembled. At minimum, the post top fixture shall look identical to existing KVT fixture.
3. The optical system shall be composed of high performance LEDs arranged in an array to achieve desired distribution optimized to get maximum spacing, target lumen and a superior lighting uniformity. Performance shall be tested per LM79 and TM15 (IESNA) certifying its photometric performance. The luminaire shall be designed to house a 7-pin photocell receptacle per ANSI C136.41 and will be wired and configured to accept both the typical button type photocell and remote monitoring control node for luminaire.
4. The driver assembly shall be on a unitized removable tray with quick disconnect plug; shall be designed such that it fits into all DDOT's standard upright poles (can be found in the standard drawings). The driver shall be certified in compliance to UL8750 requirement. The current supplying the LEDs will be reduced by the driver if the driver experiences internal overheating as a protection to the LEDs and the electrical components. Output shall be protected from short circuits, voltage overload and current overload.
5. The LED emitters shall be mounted to circuit boards such that they are in full thermal contact with the heat sink. Product shall not use any cooling device with moving parts.

6. The electrical components shall be RoHS compliant. The LEDs shall be tested by in accordance with IESNA LM 80 guidelines, and in compliance with EPA ENERGY STAR, extrapolations in accordance with IESNA TM 21. The electronic components sensitive to electrostatic discharge (ESD) such as light emitting diodes (LEDs) shall be assembled in compliance with ANSI/ESD S20.20 standards so as to eliminate ESD events that could decrease the useful life of the product. All internal components shall be assembled and pre-wired using modular electrical connections.
7. All internal wiring and connections shall be completed so that it will be necessary only to attach the incoming supply connectors to Mate-N-Loc connectors or to a terminal block. Terminal blocks shall be certified to 250V, 70A and consist of three sets of terminals. They shall be rated to 250V and meet NEMA Specifications for Wiring Terminals. Mate-N-Loc shall be certified for 600V operation. Internal wire connectors shall be crimp connector and all wiring components shall be CSA certified and/or UL listed.
8. The luminaire assembly shall be secured to the main housing by means of set screws or tool less “twist-lock” opening system maintaining a secure seal to the iron casing of the pole. The LED light engine shall be protected from water or dust particle ingress making the fixture suitable for an outdoor environment. The assembly shall indicate visible labels for “STREET SIDE” and “HOUSE SIDE”
9. Opening/Access system shall be designed such it allows easy guard/cage/hood removal, installation of networked outdoor lighting controller, and installation of glare shield. The fixture shall come with a glare house side shield that will provide shielding at 0 – 120 degrees. The house side shield shall be easily installed in the field as directed by DDOT Engineer.
10. The fixtures shall also be tested in accordance to Department of Energy (DOE) sanctioned standards to determine the maximum in-situ solder-point or junction-point temperatures of the LED emitters. The report must be available upon request by the Engineer.
11. Luminaire shall comply with FCC 47 CFR part 15/18. Luminaire shall comply with section 5.2.5 (luminaires rated for outdoor use) of ANSI C82.77 at full input power and across specified voltage range.
12. The light shall appear to be a single source (regardless of the number of drivers) to the road users.
13. All exterior hardware and fasteners, wholly or partly exposed, shall be stainless-steel alloy. All internal fasteners shall be stainless-steel or zinc coated steel. All remaining internal hardware shall be stainless steel, aluminum alloy, or zinc coated steel.
14. The fitter shall be made of A360.1 aluminum alloy 2.5mm thickness and terminal block that accepts wires from primary circuit. Shall fit on 4 inch outside diameter by 4 inch long tenon.
15. The finish application shall be of polyester powder coat paint at least 3 mils/100 microns with ± 1 mils/24 microns of tolerance. The Thermosetting resins shall provide a discoloration resistant finish in accordance with the ASTM D 2244 standard, as well as luster retention in keeping with the ASTM D 523 standard and humidity proof in accordance with the ASTM D2247 standard. The surface treatment shall meet ASTM B117 standard.
16. The fixture manufacturer must be in the business of manufacturing outdoor lighting products for a minimum of ten (10) years.
16. The luminaires shall be fully assembled and electrically tested prior to shipment from factory.

Warranty: The Contractor shall provide, as a deliverable under this Contract, manufacturer's warranty certificate for these items as follows: 10 year warranty from the date of final acceptance of the installation by the DDOT officer or designated representative to repair or replace luminaires and/or components thereof as well as LEDs and Drivers that fail in materials or workmanship; corrode; leak; or fade, stain, or chalk due to effects of weather, vibration or solar radiation. In the event of a systemic failure that affects more than 10 percent of the luminaires or their component parts, all materials that are subject to correction shall be repaired or replaced.

*All references to standards and compliance documents for testing, electrical, etc. shall be the most recent published edition of these documents.

Metro Branch Trail

Post Top LED	Metropolitan Branch Trail (MBT)
Maximum nominal luminaire input power (watts). This value is driven by min LpW and delivered lumens:	33
Nominal luminaire input voltage:	Universal 120-277 V
Operating Frequency Range:	50-60 Hz
Minimum Luminaire Life:	100,000 hours per L70 lumen maintenance @ 25°C.
Min. Warranty:	At least 10 years from date of installation
Nominal correlated color temperature (CCT):	2700K †(see below note)
Minimum Color Rendering Index (CRI):	80
Max. nominal Backlight-Uplight-Glare (BUG) ratings:	B1-U0-G1
IES Distribution Type:	Type II
Minimum Lumens per Watt	100
Min. Delivered lumens:	3300
Luminaire housing finish color:	Custom
Max. luminaire weight:	32 lbs.
Mounting method:	Side Pole Crook
Vibration:	ANSI C136.31 for Bridge/Overpass

Post Top LED	Metropolitan Branch Trail (MBT)
Min. ambient temperature during operation:	-20 °C
Max. ambient temperature during operation:	+40 °C
Electrical Immunity:	10kV/5kA, ANSI C 136.2 Compliant
Control Interface:	ANSI C136.41, 7-Pin
LED Driver	Dimmable, DALI
LED Power Factor:	At least 0.9
Min. Ingress Protection:	IP 66
Luminaire overall height:	20 to 25 inches
Luminaire diameter:	25 to 30 inches

† Developer may select warmer CCT fixtures for the Metro Branch Trail Lighting Units if those CCTs can perform to the remainder of the specifications.

1. Luminaires shall be UL 1598 listed and satisfy the requirements summarized above for each type of luminaire.
2. The luminaire shall consist of aluminum alloy 383 housing that acts as enclosure to engine (engine must be affixed to inside of housing); Bottom decorative portion shall be one piece spun aluminum alloy (min thickness .09 in) that is permanently fixed to cast housing; All mechanically assembled. At minimum, the side pole crook fixture shall look identical to existing MBT fixture.
3. The optical system shall be composed of high performance LEDs arranged in an array to achieve desired distribution optimized to get maximum spacing, target lumen and a superior lighting uniformity. Performance shall be tested per LM79 and TM15 (IESNA) certifying its photometric performance. The optical enclosure shall be of borosilicate prismatic glass (with flat lens). The luminaire shall be designed to house a 7-pin photocell receptacle per ANSI C136.41 and will be wired and configured to accept both the typical button type photocell and remote monitoring control node for luminaire.
4. The driver assembly shall be mounted on heavy duty fabricated aluminum bracket to allow for complete tool-less entry. The driver shall be certified in compliance to UL8750 requirement. The current supplying the LEDs will be reduced by the driver if the driver experiences internal overheating as a protection to the LEDs and the electrical components. Output shall be protected from short circuits, voltage overload and current overload.
5. The LED emitters shall be mounted to circuit boards such that they are in full thermal contact with the heat sink. Product shall not use any cooling device with moving parts.

6. The electrical components shall be RoHS compliant. The LEDs shall be tested by in accordance with IESNA LM 80 guidelines, and in compliance with EPA ENERGY STAR, extrapolations in accordance with IESNA TM 21. The electronic components sensitive to electrostatic discharge (ESD) such as light emitting diodes (LEDs) shall be assembled in compliance with ANSI/ESD S20.20 standards so as to eliminate ESD events that could decrease the useful life of the product. All internal components shall be assembled and pre-wired using modular electrical connections.
7. All internal wiring and connections shall be completed so that it will be necessary only to attach the incoming supply connectors to Mate-N-Loc connectors or to a terminal block. Terminal blocks shall be certified to 250V, 70A and consist of three sets of terminals. They shall be rated to 250V and meet NEMA Specifications for Wiring Terminals. Mate-N-Loc shall be certified for 600V operation. Internal wire connectors shall be crimp connector and all wiring components shall be CSA certified and/or UL listed.
8. The luminaire assembly shall be secured to the main housing by means of set screws or tool less “twist-lock” opening system maintaining a secure seal to the iron casing of the pole. The LED light engine shall be protected from water or dust particle ingress making the fixture suitable for an outdoor environment. The assembly shall indicate visible labels for “STREET SIDE” and “HOUSE SIDE”
9. Opening/Access system shall be designed such it allows easy enclosure removal, installation of networked outdoor lighting controller, and installation of glare shield. The fixture shall come with a glare house side shield that will provide shielding at 0 – 120 degrees. The house side shield shall be easily installed in the field as directed by DDOT Engineer.
10. The fixtures shall also be tested in accordance to Department of Energy (DOE) sanctioned standards to determine the maximum in-situ solder-point or junction-point temperatures of the LED emitters. The report must be available upon request by the Engineer.
11. Luminaire shall comply with FCC 47 CFR part 15/18. Luminaire shall comply with section 5.2.5 (luminaires rated for outdoor use) of ANSI C82.77 at full input power and across specified voltage range.
12. The light shall appear to be a single source (regardless of the number of drivers) to the road users.
13. All exterior hardware and fasteners, wholly or partly exposed, shall be stainless-steel alloy. All internal fasteners shall be stainless-steel or zinc coated steel. All remaining internal hardware shall be stainless steel, aluminum alloy, or zinc coated steel.
14. The finish application shall be of polyester powder coat paint at least 3 mils/100 microns with ± 1 mils/24 microns of tolerance. The Thermosetting resins shall provide a discoloration resistant finish in accordance with the ASTM D 2244 standard, as well as luster retention in keeping with the ASTM D 523 standard and humidity proof in accordance with the ASTM D2247 standard. The surface treatment shall meet ASTM B117 standard.
15. The fixture manufacturer must be in the business of manufacturing outdoor lighting products for a minimum of ten (10) years.
16. The luminaires shall be fully assembled and electrically tested prior to shipment from factory.

Warranty: The Contractor shall provide, as a deliverable under this Contract, manufacturer’s warranty certificate for these items as follows: 10 year warranty from the date of final acceptance of the installation by the DDOT officer or designated representative to repair or replace

luminaires and/or components thereof as well as LEDs and Drivers that fail in materials or workmanship; corrode; leak; or fade, stain, or chalk due to effects of weather, vibration or solar radiation. In the event of a systemic failure that affects more than 10 percent of the luminaires or their component parts, all materials that are subject to correction shall be repaired or replaced.

*All references to standards and compliance documents for testing, electrical, etc. shall be the most recent published edition of these documents.

Tunnel / Underpass

Wall Pack LED	Tunnel / Underpass	Tunnel / Underpass	Tunnel / Underpass
Maximum nominal luminaire input power (watts). This value is driven by min LpW and delivered lumens:	78.0	109.1	215.5
Nominal luminaire input voltage:	Universal 120-277 V	Universal 120-277 V	Universal 120-277 V
Operating Frequency Range:	50-60 Hz	50-60 Hz	50-60 Hz
Minimum Luminaire Life:	100,000 hours per L70 lumen maintenance @ 25°C.	100,000 hours per L70 lumen maintenance @ 25°C.	100,000 hours per L70 lumen maintenance @ 25°C.
Min. Warranty:	At least 10 years from date of installation	At least 10 years from date of installation	At least 10 years from date of installation
Nominal correlated color temperature (CCT):	3000K	3000K	3000K
Minimum Color Rendering Index (CRI):	80	80	80
Max. nominal Backlight-Uplight-Glare (BUG) ratings:	B0-U4/5-G5	B0-U4/5-G5	B0-U4/5-G5
IES Distribution Type:	Type IV Very Short to Short	Type IV Very Short to Short	Type IV Very Short to Short
Minimum Lumens per Watt	110	110	110
Min. Delivered lumens:	8585	12000	23700
Luminaire housing finish color:	Custom	Custom	Custom
Max. luminaire weight:	60 lbs.	60 lbs	60 lbs

Wall Pack LED	Tunnel / Underpass	Tunnel / Underpass	Tunnel / Underpass
Mounting method:	Wall-mount; Uni-strut I-beam bracket (overhead signs)	Wall-mount; Uni-strut I-beam bracket (overhead signs)	Wall-mount; Uni-strut I-beam bracket (overhead signs)
Vibration:	ANSI C136.31	ANSI C136.31	ANSI C136.31
Min. ambient temperature during operation:	-20 °C	-20 °C	-20 °C
Max. ambient temperature during operation:	+40 °C	+40 °C	+40 °C
Electrical Immunity:	10kV/5kA, ANSI C 136.2 Compliant	10kV/5kA, ANSI C 136.2 Compliant	10kV/5kA, ANSI C 136.2 Compliant
Control Interface:	ANSI C136.41, 7-Pin	ANSI C136.41, 7-Pin	ANSI C136.41, 7-Pin
LED Driver:	Dimmable, DALI (custom group control)	Dimmable, DALI (custom group control)	Dimmable, DALI (custom group control)
LED Power Factor:	At least 0.9	At least 0.9	At least 0.9
Min. Ingress Protection:	IP 66	IP 66	IP 66
Luminaire overall height:	15 to 20 inches	15 to 20 inches	15 to 20 inches
Luminaire overall length:	20 to 25 inches	20 to 25 inches	20 to 25 inches

1. Luminaires shall be UL 1598 listed and satisfy the requirements summarized above for each type of luminaire.
2. The luminaire shall consist of aluminum alloy A360.1 housing that is completely sealed using a silicone gasket and secured together using stainless steel alloy with zinc plated screws; Luminaire should include alloy type 316 stainless steel mounting plate and not be in contact with luminaire housing body; Minimum of 1 inch bracket clearing behind fixture ; All mechanically assembled.
3. The optical system shall be composed of high performance wall-mount cross beam (WCR) LEDs arranged in an array to achieve desired distribution optimized to get maximum spacing, target lumen and a superior lighting uniformity. Performance shall be tested per LM79 and TM15 (IESNA) certifying its photometric performance. The optical enclosure shall be of borosilicate prismatic glass. The luminaire shall be designed to house a 7-pin photocell receptacle per ANSI C136.41 and will be wired and configured to accept both the typical button type photocell and remote monitoring control node for luminaire (where feasible; group control of tunnel luminaires via a controller on a circuit controlling multiple fixtures will be allowed in specific instances agreed to by DDOT).

4. The driver shall be certified in compliance to UL8750 requirement. The current supplying the LEDs will be reduced by the driver if the driver experiences internal overheating as a protection to the LEDs and the electrical components. Output shall be protected from short circuits, voltage overload and current overload.
5. The LED emitters shall be mounted to circuit boards such that they are in full thermal contact with the heat sink. Product shall not use any cooling device with moving parts.
6. The electrical components shall be RoHS compliant. The LEDs shall be tested by in accordance with IESNA LM 80 guidelines, and in compliance with EPA ENERGY STAR, extrapolations in accordance with IESNA TM 21. The electronic components sensitive to electrostatic discharge (ESD) such as light emitting diodes (LEDs) shall be assembled in compliance with ANSI/ESD S20.20 standards so as to eliminate ESD events that could decrease the useful life of the product. All internal components shall be assembled and pre-wired using modular electrical connections.
7. All internal wiring and connections shall be completed so that it will be necessary only to attach the incoming supply connectors to Mate-N-Loc connectors or to a terminal block. Terminal blocks shall be certified to 250V, 70A and consist of three sets of terminals. They shall be rated to 250V and meet NEMA Specifications for Wiring Terminals. Mate-N-Loc shall be certified for 600V operation. Internal wire connectors shall be crimp connector and all wiring components shall be CSA certified and/or UL listed.
8. The LED light engine shall be protected from water or dust particle ingress making the fixture suitable for an outdoor environment.
9. Shall have stainless steel bolted or latched door closure to disengage top electrical cover for easy luminaire disconnect and access to LED driver and terminal block.
10. The fixtures shall also be tested in accordance to Department of Energy (DOE) sanctioned standards to determine the maximum in-situ solder-point or junction-point temperatures of the LED emitters. The report must be available upon request by the Engineer.
11. Luminaire shall comply with FCC 47 CFR part 15/18. Luminaire shall comply with section 5.2.5 (luminaires rated for outdoor use) of ANSI C82.77 at full input power and across specified voltage range.
12. The light shall appear to be a single source (regardless of the number of drivers) to the road users.
13. All exterior hardware and fasteners, wholly or partly exposed, shall be stainless-steel alloy. All internal fasteners shall be stainless-steel or zinc coated steel. All remaining internal hardware shall be stainless steel, aluminum alloy, or zinc coated steel.
14. The finish application shall be of polyester powder coat paint at least 3 mils/100 microns with ± 1 mils/24 microns of tolerance. The Thermosetting resins shall provide a discoloration resistant finish in accordance with the ASTM D 2244 standard, as well as luster retention in keeping with the ASTM D 523 standard and humidity proof in accordance with the ASTM D2247 standard. The surface treatment shall meet ASTM B117 standard.
15. The fixture manufacturer must be in the business of manufacturing outdoor lighting products for a minimum of ten (10) years.
16. The luminaires shall be fully assembled and electrically tested prior to shipment from factory.

Warranty: The Contractor shall provide, as a deliverable under this Contract, manufacturer's warranty certificate for these items as follows: 10 year warranty from the date of final acceptance of the installation by the DDOT officer or designated representative to repair or replace luminaires and/or components thereof as well as LEDs and Drivers that fail in materials or workmanship; corrode; leak; or fade, stain, or chalk due to effects of weather, vibration or solar radiation. In the event of a systemic failure that affects more than 10 percent of the luminaires or their component parts, all materials that are subject to correction shall be repaired or replaced.

*All references to standards and compliance documents for testing, electrical, etc. shall be the most recent published edition of these documents.

High Mast

High Mast LED	High Mast
Maximum nominal luminaire input power (watts). This value is driven by min LpW and delivered lumens:	400.0
Nominal luminaire input voltage:	Universal 120-277 V
Operating Frequency Range:	50-60 Hz
Minimum Luminaire Life:	100,000 hours per L70 lumen maintenance @ 25°C.
Min. Warranty:	At least 10 years from date of installation
Nominal correlated color temperature (CCT):	3000K
Minimum Color Rendering Index (CRI):	80
Max. nominal Backlight-Uplight-Glare (BUG) ratings:	B3-U0-G3
IES Distribution Type:	Type III Extra Wide
Minimum Lumens per Watt	125
Min. Delivered lumens:	50000
Luminaire housing finish color:	Custom
Max. luminaire weight:	60 lbs.
Mounting method:	Arm Mount adj. up to 2 inch NPS
Vibration:	ANSI C136.31

High Mast LED	High Mast
Min. ambient temperature during operation:	-20 °C
Max. ambient temperature during operation:	+40 °C
Electrical Immunity:	10kV/5kA, ANSI C 136.2 Compliant
Control Interface:	ANSI C136.41, 7-Pin
LED Driver:	Dimmable, DALI
LED Power Factor:	At least 0.9
Min. Ingress Protection:	IP 66
Luminaire overall diameter	20 to 25 inches
Clamping Mechanism:	4 bolts

1. Luminaires shall be UL 1598 listed and satisfy the requirements summarized above for each type of luminaire.
2. The luminaire shall consist of aluminum alloy A380 housing; Arm mount shall have +/- 5 degree vertical adj.; All mechanically assembled.
3. The optical system shall be composed of high performance optical grade to achieve desired distribution optimized to get maximum spacing, target lumen and a superior lighting uniformity. Performance shall be tested per LM79 and TM15 (IESNA) certifying its photometric performance. The luminaire shall be designed to house a 7-pin photocell receptacle per ANSI C136.41 and will be wired and configured to accept both the typical button type photocell and remote monitoring control node for luminaire. The optical system shall be Dark Sky compliant with 0% uplight. The optical enclosure shall be of borosilicate prismatic glass.
4. The driver shall be certified in compliance to UL8750 requirement. The current supplying the LEDs will be reduced by the driver if the driver experiences internal overheating as a protection to the LEDs and the electrical components. Output shall be protected from short circuits, voltage overload and current overload.
5. The LED emitters shall be mounted to circuit boards such that they are in full thermal contact with the heat sink. Product shall not use any cooling device with moving parts.
6. The electrical components shall be RoHS compliant. The LEDs shall be tested by in accordance with IESNA LM 80 guidelines, and in compliance with EPA ENERGY STAR, extrapolations in accordance with IESNA TM 21. The electronic components sensitive to electrostatic discharge (ESD) such as light emitting diodes (LEDs) shall be assembled in compliance with ANSI/ESD S20.20 standards so as to eliminate ESD events that could decrease the useful life of the product. All internal components shall be assembled and pre-wired using modular electrical connections.

7. All internal wiring and connections shall be completed so that it will be necessary only to attach the incoming supply connectors to Mate-N-Loc connectors or to a terminal block. Terminal blocks shall be certified to 250V, 70A and consist of three sets of terminals. They shall be rated to 250V and meet NEMA Specifications for Wiring Terminals. Mate-N-Loc shall be certified for 600V operation. Internal wire connectors shall be crimp connector and all wiring components shall be CSA certified and/or UL listed.
8. The LED light engine shall be protected from water or dust particle ingress making the fixture suitable for an outdoor environment.
9. Opening/access system shall have stainless steel bolted or quick disconnectors to disengage electrical cover for easy luminaire disconnect and access to LED driver and terminal block.
10. The fixtures shall also be tested in accordance to Department of Energy (DOE) sanctioned standards to determine the maximum in-situ solder-point or junction-point temperatures of the LED emitters. The report must be available upon request by the Engineer.
11. Luminaire shall comply with FCC 47 CFR part 15/18. Luminaire shall comply with section 5.2.5 (luminaires rated for outdoor use) of ANSI C82.77 at full input power and across specified voltage range.
12. The light shall appear to be a single source (regardless of the number of drivers) to the road users.
13. All exterior hardware and fasteners, wholly or partly exposed, shall be stainless-steel alloy. All internal fasteners shall be stainless-steel or zinc coated steel. All remaining internal hardware shall be stainless steel, aluminum alloy, or zinc coated steel.
14. The finish application shall be of polyester powder coat paint at least 3 mils/100 microns with ± 1 mils/24 microns of tolerance. The Thermosetting resins shall provide a discoloration resistant finish in accordance with the ASTM D 2244 standard, as well as luster retention in keeping with the ASTM D 523 standard and humidity proof in accordance with the ASTM D2247 standard. The surface treatment shall meet ASTM B117 standard.
15. The fixture manufacturer must be in the business of manufacturing outdoor lighting products for a minimum of ten (10) years.
16. The luminaires shall be fully assembled and electrically tested prior to shipment from factory.

Warranty: The Contractor shall provide, as a deliverable under this Contract, manufacturer's warranty certificate for these items as follows: 10 year warranty from the date of final acceptance of the installation by the DDOT officer or designated representative to repair or replace luminaires and/or components thereof as well as LEDs and Drivers that fail in materials or workmanship; corrode; leak; or fade, stain, or chalk due to effects of weather, vibration or solar radiation. In the event of a systemic failure that affects more than 10 percent of the luminaires or their component parts, all materials that are subject to correction shall be repaired or replaced.

*All references to standards and compliance documents for testing, electrical, etc. shall be the most recent published edition of these documents.

13.14 Definitions

Capitalized terms and acronyms used in the Technical Provisions have the meanings given in this Section (*Definitions*).

“Administrative Redirect” has the meaning set forth in Section 10.6.7 Asset Management of the Technical Provisions.

“Advisory Neighborhood Commission” or **“ANC”** are bodies of local government in District of Columbia that consider a wide range of policies and programs affecting their neighborhoods, including traffic, parking, recreation, street improvements, liquor licenses, zoning, economic development, police protection, sanitation and trash collection, and the District's annual budget. The powers of the ANC system are enumerated by the DC Code § 1-207.38.

“Alley” is a public passageway for vehicles, pedestrians, drainage purposes, or any combination thereof, which connects with a street and which usually affords a means of access to the rear of properties abutting streets or highways.

“Asset Management Information System” or **“AMIS”** has the meaning set forth in Section 10.3 of the Technical Provisions, to include a database of Asset Management Work, Lighting Unit, and Element conditions; documents related to Asset Management Work; and a user-customizable Graphic User Interface (GUI).

“Arm” means a structural attachment to a Pole to which one or more Luminaires are affixed and/or suspended.

“As-Built Drawings” means the Final Design Documents submitted and updated by the Developer to incorporate all changes made in the specifications and working drawings during construction. Requirements for As-Built Drawings are detailed in Section 7.2.6 of the Technical Provisions.

“Asset Management Work” or **“AM Work”** means any and all Work and activities necessary to manage, monitor, maintain, renew, rehabilitate, and expand the Streetlight Network in accordance with the Technical Provisions, including the work and activities necessary to achieve, maintain, monitor and report on the Performance Requirements, Make Safe Work, Tree Trimming Work, and Construction Work.

“Bicycle Lane” is a single defined track for bicycle traffic that is aligned with vehicular traffic.

“Closure” means, in respect of any publicly owned street, roadway, park or sidewalk, or in respect of any public or private access to a private property or publicly-owned building, that all or part of any traffic lane, bus stop, parking area, sidewalk, or pedestrian or bike path is blocked or closed, or that the use thereof is otherwise inhibited for any reason.

“Collector” means the roadways servicing traffic between major and local roadways. These are roadways used mostly for traffic movements within residential, commercial, and industrial areas.

“Color Rendering Index” or CRI is the ability of a light source to reflect the color of illuminated objects with fidelity relative to ideal or natural light sources of the same color temperature. CRI is calculated according to CIE 13.3, which sets forth the CIE Ra method, the commonly used eight-color method.

“Combination Pole” is a Pole which includes District-owned Traffic Signal and Lighting Fixtures.

“Commercial Zone” corresponds to a densely developed business area of the District containing land use that attracts a relatively heavy volume of nighttime vehicular traffic or pedestrian traffic, or both, on a frequent basis.

“Condition Rating” is a value assigned to an Element that corresponds to the Element’s level of deterioration. Condition Ratings are recorded following Condition Assessments and are rated on a Condition Rating Scale, as established in Section 10.7.3 of the Technical Provisions.

“Condition Rating Assessment” is the inspection, recording, and reporting of an Element’s level of deterioration, conducted at specified intervals or as otherwise deemed necessary, per the requirements detailed in Section 10.7 of the Technical Provisions.

“Construction Work” means Conversion Work or Asset Management Work, as applicable, replacing, installing, erecting, relocating a Pole; construction, reconstruction, replacement of existing or new underground conduits; or any other Work involving excavation, cutting, or restoring of pavement or sidewalks in the Public Space.

“Conversion Period” means the period starting on the date of issuance of the first NTP3 and ending at Conversion Work Completion.

“Conversion Work Completion” means the achievement of Final Completion for all the Project Bundles. For the avoidance of doubt, the Project Bundles shall include all the Elements of the Street Light Network necessary for the completion of the D&C Work in accordance with the Technical Provision.

“Conversion Work Completion Date” means the date upon which the Development Entity achieves Conversion Work Completion.

“Conversion Work Plan” has the meaning set forth in Section 2.5.1 of the Technical Provisions.

“Conversion Work” means the Work necessary to convert the Existing Streetlight Network from non-LED street Light Fixtures to LED technology, including repairs and upgrades to existing wiring and electrical systems necessary to support such conversion, and the Work necessary to deliver the Smart City Improvements.

“Cycle Track” is a bidirectional track for bicycle traffic that is divided from vehicular traffic.

“D&C Work” means the Design Work and the Conversion Work necessary to deliver the Improved Street Light Network and Smart City Improvements, or, as applicable, Design Work and Construction Work as may be necessary to deliver Asset Management Work.

“Deductions” means deductions calculated in accordance with Exhibit 14 (Payment Mechanism) of the Project Agreement.

“Design Submittals” means the all Design Documents prepared by the Developer and submitted to the District in accordance with the Project Agreement and as described in Section 7.2 of the Technical Provisions.

“Design Documents” means all drawings (including plans, profiles, cross-sections, notes, elevations, typical sections, details, and diagrams), specifications, reports, studies, working drawings, shop drawings, calculations, electronic files, records, and submittals necessary for, or related to, the design of the Project, as detailed in Section 7.2 of the Technical Provisions.

“Design Manual” or **“Street Light Improvement Design Manual”** has the meaning set forth in Section 7.2.1 of the Technical Provisions.

“Design Work” means all Work related to the design, redesign, engineering or architecture for the Project.

“Discretionary Submittal” means any Submittal that is expressed in this Agreement to be subject to approval or consent of the District in its absolute discretion.

“District Direct Requests” has the meaning set forth in Section 10.3.9(b)iii of the Technical Provisions.

“District of Columbia Department of Transportation Standard Specifications for Highways and Structures” are the standards and specifications for all District Department of Transportation contracts awarded by the Mayor of the District of Columbia, the Council of the District of Columbia, and/or the Contracting Officer and are the standard specifications for all the construction activities and material control within the Public Space of the District of Columbia. The document is colloquially referred to as the Gold Book.

“Element” means an individual physical asset, component, system, or subsystem of the Project.

“Emergency” has the meaning set forth in the Project Agreement and means any unplanned event affecting the Project that:

- a) presents an immediate or imminent risk of:
 - i) death or injury to any individual;
 - ii) damage to a third party’s property or equipment;
 - iii) damage to the Environment; or
 - iv) threat to the long-term integrity of any part of the Project;
- b) results in the declaration of a state of emergency pursuant to District of Columbia or Federal law; or
- c) is recognized or declared by any law enforcement agency or any other Governmental Entity (other than the District and the District-Related Entities) as an Emergency.

“Existing Lighting Asset Inventory” has the meaning set forth in Section 1.4.1 of the Technical Provisions.

“Existing Street Light Network” means the network of District-owned Lighting Units as of the Setting Date located in the Public Space or, from times to times, located on private property for the purpose of illuminating the Public Space, District-owned Light Fixtures that may be attached to Poles or other structures not owned by the District, and District-owned supporting fixtures, appurtenances, and infrastructure necessary for the proper functioning of such Lighting Units and Light Fixtures. The Existing Street Light Network includes, at a minimum, all the assets listed in the Existing Lighting Asset Inventory as of the Setting Date.

“Expanded Street Light Network” means the Lighting Assets in the Public Space not otherwise part of the Existing Street Light Network that may be designed and built by the District, the Developer, or any Third Party after the Setting Date and until the end of the Term to meet the requirements of Section 7 (Design, Conversion, and Construction Requirements) of the Technical Provisions and added to the Project pursuant to the acceptance procedure set forth in Section 10.7.7 of the Technical Provisions.

“Expressway” is a divided major roadway for through traffic with partial control of access and generally at major crossroads with interchanges. Parkways are generally known as expressways for non-commercial traffic within parks and park-like areas.

“Freeway” means a divided major roadway with full control of access and with no crossing at grade. It applies to both toll and non-toll roads.

“Freeway A” designates roadways with greater visual complexity and high traffic volumes. This type of freeway is usually found in major metropolitan areas in or near the central core. It operates through much of the early evening hours of darkness at or near design capacity.

“Freeway B” designates all other divided roadways with full control of access where lighting is needed.

“Handback Period” means the period beginning with the submittal of the Handback Work Plan and last until the completion of Handback Work.

“Handback Date” means the Termination Date at the completion of Year 15 of the term, by when, in accordance with the requirements in Section 12 (Handback) of the Technical Provisions and those set forth in the Project Agreement, the Developer shall transfer to the District all software, hardware, backoffice equipment, field equipment, inventory, and read/write access owned by the Developer and related to the intellectual property as described in Section 52.2(a) (Intellectual Property License to the District) of the Project Agreement required to fully operate the AMIS and RMCS, including access to any and all data in the AMIS.

“Handback Work Plan” has the meaning set forth in Section 12.2 of the Technical Provisions.

“Handhole” is a shallow form of manhole giving access to a top row of ducts in an underground electrical system.

“Holiday” has the meaning set forth in the District of Columbia Department of Transportation Standard Specifications for Highways and Structures.

“Holiday Weekend” means, either:

- i. Friday, Saturday, and Sunday if Friday or Saturday is a Holiday; or
- ii. Saturday, Sunday, and Monday if either Sunday or Monday is a Holiday.

“Improved Street Light Network” means the Existing Street Light Network after completion of the following improvements as determined by Project Final Completion. (i) the conversion of non-LED street Light Fixtures to LED technology, including repairs and upgrades to existing wiring and electrical systems necessary to support the conversion, (ii) the provision of the system for the Remote Monitoring and Control System, as further described in the Technical Requirements, (iii) the provision of the Asset Management Information System, as further described in the Technical Requirements and (iv) maintenance, repair, reconstruction, rehabilitation, restoration, renewal or replacement of any worn-out, obsolete, deficient, damaged or under-performing Element of the Existing Street Light Network necessary to bring such Element to a Fair (numerical score of 3) Condition Rating.

“Incident” means an unplanned or forecasted event that adversely impacts Lighting Unit and/or Element condition and/or traffic conditions, posing a safety hazard to the general public, Developer personnel, and/or District staff.

“Joint Governance” means the dual access and operability of systems, including the AMIS and RMCS.

“Lead Design Firm” means the engineering firm that provides direct supervision over the preparation of all Design Documents for the Project.

“LED” means light-emitting diode, a semiconductor device that emits light when an electric current passes through it.

“Lighting Asset Inventory” means the Geographic Information System map and related data describing the Luminaires in the Street Light Network as further described in Section 1.4.1 of the Technical Provisions. It may also be referred to as the ArcGIS Asset Inventory or more generally as the Asset Inventory.

“Lighting Unit” means the complete assembly consisting of any combination of (i) a Luminaire or Luminaires, (ii) the Luminaires’ mounting system, attachment, hardware, and structural support including Pole, Arm, base, and foundation, (iii) the complete electrical system above and below ground connecting the Luminaire to the power supply from the Luminaire to the PEPCO power source, (iv) the conduits and cabinets housing the electrical system and the access points to the electrical system, or (v) any other asset necessary to provide illumination to the Public Space in accordance with the Performance Requirements.

“Local” means the roadways used mainly for direct access to residential, commercial, industrial, or other abutting property. They do not include roadways that carry through traffic. The long local roadways are generally divided into short sections by collector roadway systems.

“Luminaire” or “Light Fixture” means a complete lighting unit consisting of a lamp or lamps or Light Emitting Diode or Diodes together with the parts designed to distribute the light, to position and protect the lamps or LEDs, including housing and shielding, and to connect the lamps to the power supply and monitoring and control systems, as shown schematically in Appendix 13.8 (Asset Inventory) of the Technical Provisions.

“Major/Principal Arterial” is the part of the roadway system serving as the principal network for through traffic flow. The routes connect important rural highways entering the city and areas of principal traffic generation.

“Make Safe Work” or “Make Safe” means all Work and activities deemed necessary by the District to eliminate known safety hazards, mitigate and control associated risks to the safety of persons and animals, and permanently remedy such hazards and risks.

“Minor Arterial” is the roadway that provides relatively high speeds and least interference to through traffic flow with little or no access control. It provides direct access to abutting properties, has frequent at-grade intersections, has pedestrian movements along and across the roadway, accommodates bicyclists unless specifically limited, and supports public transportation.

“Mixed Use Zone” or Intermediate Zone corresponds to an area that may include land use and characteristics of both a Residential Zone and Commercial Zone and may include blocks with libraries, community recreation centers, large apartment buildings, industrial buildings, or neighborhood retail stores and is often characterized by moderately heavy nighttime pedestrian activities.

“National Highway System” or “NHS” is comprised of the Interstate Highway System and the network of roadways important to the nation’s economy, defense, and mobility.

“Noncompliance Event” means the failure to meet a Technical Requirement or Performance Requirement, as further described in Section 22 of the Project Agreement.

“Non-Discretionary Submittal” means any Submittal that is expressed in this Agreement to be subject to approval or consent of the District, but which is not a Discretionary Submittal.

“NTP1” means a milestone that authorizes the start of Preliminary Work, as further described in Section 16.1 of the Project Agreement

“NTP2” means a milestone that authorizes the start of Design Work, as further described in Section 16.2 of the Project Agreement.

“NTP3” means a milestone that authorizes the start of Conversion Work for a specific Lighting Bundle, as further described in Section 16.3 of the Project Agreement.

“Off-Peak” refers to the following hours of the day, Monday through Sunday:

- i. For Freeways & Expressways, Other Principal Arterials, Minor Arterials, and Collectors:
 - a. 12:00 a.m. – 5:30 a.m.
 - b. 9:30 a.m. – 3:30 p.m.
 - c. 9:30 p.m. – 11:59 p.m.
- ii. For Local Roads, Alleyways, and Pedestrian Paths:
 - a. 12:00 a.m. – 5:30 a.m.
 - b. 9:30 a.m. – 3:30 p.m.
 - c. 6:30 p.m. – 11:59 p.m.

“Peak” refers to the following hours of the day, Monday through Sunday:

- i. For Freeways & Expressways, Other Principal Arterials, Minor Arterials, and Collectors:
 - a. 5:30 a.m. – 9:30 a.m.
 - b. 3:30 p.m. – 9:30 p.m.
- ii. For Local Roads, Alleyways, and Pedestrian Paths:
 - a. 5:30 a.m. – 9:30 a.m.
 - b. 3:30 p.m. – 6:30 p.m.

“Pedestrian Walkway” is a public facility for pedestrian traffic not necessarily within the right-of-way of a vehicular traffic roadway. This includes skywalks (pedestrian overpasses), subwalks (pedestrian tunnels), walkways giving access to parks or block interiors, and midblock street crossings.

“Performance Requirements” means, for each Element of the Street Light Network, during Term, the requirements set forth in the table(s) included in Appendix 13.1 of the Technical Provisions.

“Permissible Unplanned Maintenance” means any activity performed to help maintain the Street Light Network operating in accordance with the Performance Requirements that has not been planned by the Developer in advance of occurrence.

“Permitted Closures” has the meaning set out in Section 11.1 of the Technical Provisions.

“Planned Maintenance” means any activity performed to help maintain the Street Light Network operating in accordance with the Performance Requirements that has been planned by the Developer prior to occurrence and has been approved by the District when requiring a Closure.

“Planned Outage” means the interruption of power to a Lighting Unit or series of Lighting Units within Project Bundle or to the to the Remoter Monitoring and Control System for the purpose of preventive maintenance or other Asset Management Work scheduled in accordance with Section 10.5 of the Technical Provisions.

“Pole Identification Tag” or **“Pole ID Tag”** means, as of the Setting Date, the horizontal black and/or yellow tag with alpha-numeric sequence located on Pole with a unique Pole identifier. After the first NTP3, Pole ID Tag means any unique Pole identifier device physically located on the Pole, which has been approved by the District.

“Pole” means a pole or mast on which any portion of the Street Light Network is affixed, including light fixtures, Luminaires, the luminaire power supply and related mounting hardware. Poles include the foundation.

“Preliminary Work” means:

- (a) any Work that the Development Entity is required to undertake in order to satisfy the conditions precedent listed in Part 2 (Conditions Precedent to NTP2); and

(b) any other Work related to general administrative activities, preparation of the Project Management Plan and Project Baseline Schedule, preliminary Design Work, NEPA activities, investigations (including geotechnical investigations) and surveys, and coordination and planning activities associated with Utility Work.

“Professional Engineer” means an individual who has successfully obtained and actively maintains licensure by a state board of registration and is permitted to provide engineering services directly to the public.

“Project” means (i) the Street Light Improvements, (ii) the Smart City Installations, and (iii) the Asset Management Work of the Street Light Network.

“Project Baseline Schedule” or **“PBS”** means the Project Schedule developed in accordance with Section 2.3 of the Technical Provisions. The PBS is the original, approved timeframe for completing the Project and includes all Work activities required to complete the Project and activities’ sequencing, logical dependencies, and inter-relationships. The PBS is used as a performance measurement to determine whether the Project is completing schedule activities according to the original planned timeline or the extent to which delivery of the Project is deviating from the original plan.

“Project Bundle” has the meaning set forth in Section 1.5.5 of the Technical Provisions and is the logical and homogenous groupings of Lighting Units and other connected or adjacent Project Elements in the delivery of the Conversion Work and Construction Work.

“Project Delay” means a delay in either the start or finish times of one or more of the schedule activities within the Project Baseline Schedule, which, if no corrective actions are made, will result in a later project completion date than the scheduled date, as indicated in the Project Baseline Schedule.

“Project Final Completion” has the meaning set forth in Exhibit 12 of the Project Agreement and means the satisfaction of all Project Final Completion Conditions.

“Project Limits” means the outer limits of all the Project Sites necessary for the performance of the Work, in any case within the geographical limits of the District plus Maryland and Virginia, as the Project dictates.

“Project Schedule” means any of the Project Baseline Schedule, Project Status Schedule Update, O&M Schedule or Renewal Work Schedule being the logic-based critical path schedules of all Work as described in the Technical Provisions, as may be revised and updated in accordance with the Project Agreement. Requirements for the Project Schedule are detailed in Section 2.3 of the Technical Provisions.

“Project Site” means any real property (including estates and interests in real property) necessary for the performance of the Work, including temporary and permanent easements. A Project Site may run under, on or over the Public Space or private property, including the airspace above such property.

“Public Space” means all the publicly owned property between the property lines on a street, as further defined in 24 DCMR § 399.

“R&C Submittal” means any Submittal that is expressed in this Agreement to be subject to the review and comment of the District, but which is not a Discretionary Submittal or a Non-Discretionary Submittal.

“Remote Monitoring and Control System” or **“RMCS”** means the network of field devices, backhaul communication network, and Asset Management Information System (AMIS) that, together, comprise a

system capable of remotely controlling and monitoring all Light Fixtures in the District's Street Light Network. Requirements for the RMCS are detailed in Section 10.3 of the Technical Provisions.

"Redesign Design Submittals for Redesign Work" means the Design Documents developed and submitted to the District for approval related to any Redesign Work, as required in Section 7.1 of the Technical Provisions.

"Renewal Work" means maintenance, repair, reconstruction, rehabilitation, restoration, renewal or replacement of any worn-out, obsolete, deficient, damaged or under-performing Element of the Street Light Network, as applicable that is not Routine Maintenance so that such element does not prematurely deteriorate and remains fully functional.

"Residential Zone" corresponds to an area that contains a mixture of residential buildings, such as single-family homes, townhomes, and small apartment buildings, possibly mixed with small commercial establishments, and characterized by low levels of nighttime vehicular and pedestrian traffic.

"Roadway Classification" is the categorization of roadways based on how the roadway is functioning in the current year, classified according to the categories in Appendix 13.7 of the Technical Provisions.

"Routine Maintenance Work" means all efforts, including any inspection, to monitor and preserve the current condition and performance of the Street Light Network that are routine in nature.

"Schedule Activities" means the individual actions that make up the Project Schedule when sequenced according to their logical dependencies and inter-relationships. Each schedule activity is mapped to one WBS element within the Project and includes the activity's duration, timing, and logical relationship to other Work components, including predecessors, successors, and other related activities, as detailed in Section 2.3 of the Technical Provisions.

"Severe Weather Event" is a dangerous meteorological or hydro-meteorological phenomenon, of varying duration, with risk of causing major damage, serious social disruption and loss of human life, requiring measures for minimizing loss, mitigation, and avoidance, and requiring detailed information about the phenomenon to be distributed as soon as possible to the public and responsible authorities.

"Service Requests" have the meaning set forth in section 10.3.10 of the Technical Provisions.

"Sidewalk" means the portion of the Public Space located between the curb line and the building line intended for the use of pedestrians as further defined in 24 DCMR 399.

"Smart City Bundle" has the meaning set forth in Section 1.5.5.d of the Technical Provisions and consists of a Project Bundle that only includes Smart City Work.

"Smart City Improvements" means the broadband Wi-Fi networking equipment to be affixed to the Poles and connected to the District's Wi-Fi network, as further described in the Technical Provisions.

"Smart City Work" means the Work necessary to install, connect, test and commission the District-provided Wireless Access Points, in accordance with the Technical Provisions.

"Smart City Installations" means the broadband Wi-Fi networking equipment to be affixed to the Poles, as further described in the Technical Requirements.

"Smart City Specifications" means the specifications listed Appendix 13.3 of the Technical Provisions.

"Special Event" means any major event in the District, such as a sporting event, Presidential Inauguration, concert, etc. or combination of events that has an anticipated combined attendance of over 10,000 people.

“Stray Voltage” means uncontained electrical current that may come into contact with objects and energize them or may come into contact with members of the public or animals.

“Street Light Network” means, collectively, (i) the Existing Street Light Network, (ii) the Improved Street Light Network, and (iii) the Expanded Street Light Network.

“Street Light Bundle” has the meaning set forth in Section 1.5.5.d of the Technical Provisions and consists of a Project Bundle that only includes Street Light Improvements.

“Submittal” means any document, work product or other written or electronic product or item required under the Technical Requirements to be delivered or submitted to the District for approval, review, comment or otherwise.

“Substantial Completion” has the meaning set forth in Exhibit 12 of the Project Agreement.

“Systems” means, collectively, the AMIS and the RMCS.

“Traffic” is the pedestrians, bicycles, and vehicles moving in an area or along a street.

“Traffic Control Plan” has the meaning set forth in Section 11.3 of the Technical Provisions and has the primary function to present the tactical plans for ensuring safe and efficient movement of Traffic through and/or around Project Sites to protect workers, properties, and equipment.

“Traffic Incident Management Plan” has the meaning set forth in Section 11.2.3 of the Technical Provisions and is a plan that identifies the traffic management strategies and procedures to prevent, when possible, respond to, manage, and mitigate the impact of Incident and Emergency.

“Traffic Signal” means any highway signal by which traffic (i.e., pedestrians, bicycles, and vehicles) is alternatively directed to stop and permitted to proceed.

“Traffic Systems Management Center” or **“TSMC”** is a 24/7 system managed by the District that gathers and disseminates traffic and emergency information using a network of cameras and other devices.

“Transportation Management Plan” has the meaning set forth in Section 11.2 of the Technical Provisions and is a plan that identifies a set of coordinated transportation management strategies and describes how such strategies shall be used to achieve the overall requirements and objectives set forth in Section 10 (Asset Management) of the Technical Provisions.

“Tree Trimming” Work means the tree management, trimming, and pruning Work performed under the supervision and oversight of an Arborist and in accordance with Section 10.4.6 of the Technical Provisions.

“Typical Application” has the meaning set forth in the District of Columbia Department of Transportation Temporary Traffic Control Manual.

“Unavailability Event” means any Closure that is not a Permitted Closure, as defined in Section 11.1 Permitted Closures of the Technical Provisions.

“Unplanned Outage” means, in relation to the AMIS and RMCS, any unplanned outage of 15 minutes or greater.

“Utility Adjustment” means each relocation (temporary or permanent), abandonment, Protection in Place, removal (of previously abandoned Utilities as well as of newly abandoned Utilities), replacement, reinstallation, or modification of existing Utilities necessary to accommodate construction, conversion, operation, maintenance or use of the Project or the Work.

“Utility Adjustment Work” means all efforts and costs necessary to accomplish the required Utility Adjustments during the D&C Period, including all coordination, design, design review, construction, inspection and maintenance of records, whether provided by the Developer or by the Utility Owners.

“Utility Owner” means the owner or operator of any Utility (including both privately held and publicly held entities, cooperative Utilities, and municipalities and other governmental agencies).

“Work” means the Preliminary Work, Design Work, Conversion Work, Utility Adjustment Work, Asset Management Work, Renewal Work, Handback Work, and all other work, services and obligations required to be furnished, performed, and provided by the Developer under this Agreement.

“Work Breakdown Structure” or “WBS” means a hierarchical decomposition of the total scope of the Work required to deliver the Project into a set of clearly defined, self-contained and deliverable-oriented smaller components to be carried out by the Developer to complete the complete the Street Light Improvements and Smart City Improvements. The WBS shall organize and present activities in three levels as described in Section 2.3.1 of the Technical Provisions.

“Work Orders” have the meaning set forth in section 10.3.11 of the Technical Provisions.

“Work Plan” means a document that includes a description of the approach, processes, procedures, means, and methods the Developer plans to undertake to complete any of the Work within the Project Agreement. The Work Plans may also include the schedule for delivering Work, protocols, completion thresholds, quality management requirements, resourcing plans, etc. The Developer is required to complete a Renewal Work Plan, Handback Work Plan, Utility Work Plan, Conversion Work Plan, and Investigative Work Plan.

“Zone” means either a Commercial Zone, Residential Zone, or Intermediate Zone or Mixed Use Zone as defined in Section 1.5.2 of the Technical Provisions and the below definition of Zoning Classification.

“Zoning Classification” is the categorization of geographic areas within the District based on the expected level of nighttime pedestrian and vehicular traffic. The District uses the following categories: Commercial Zone, Residential Zone, and Intermediate or Mixed Use Zone.