

GOBIERNO DE PUERTO RICO
JUNTA REGLAMENTADORA DEL SERVICIO PÚBLICO
NEGOCIADO DE ENERGÍA DE PUERTO RICO

NEPR

Received:

Nov 13, 2020

11:13 AM

IN RE: TARIFA PERMANENTE DE LA
AUTORIDAD DE ENERGÍA ELÉCTRICA
DE PUERTO RICO

CASO NÚM.:
NEPR-MI-2020-0001

ASUNTO:
Informe de Reclamaciones y
Reparación de Luminarias

**INFORME DE RECLAMACIONES Y LUMINARIAS Y SOLICITUD DE
DETERMINACIÓN DE CONFIDENCIALIDAD**

AL NEGOCIADO DE ENERGÍA:

COMPARECE la Autoridad de Energía Eléctrica de Puerto Rico (la “Autoridad”), a través de su representación legal, y respetuosamente presenta el siguiente informe en cumplimiento con las órdenes dictadas el 28 de julio, 24 de septiembre y 23 de octubre de 2020 (colectivamente referidas como la “Orden”):

I. INFORME DE RECLAMACIONES

a. Gestiones con compañías de seguro

La Autoridad continúa procesando activamente los reclamos bajo sus pólizas de seguro de propiedad comercial por pérdidas y daños derivados del terremoto del 7 de enero de 2020.

La Autoridad ha proporcionado estimados preliminares por daños a la propiedad por un total de \$82 millones, de los cuales aproximadamente \$39 millones han sido comprometidos (incurridos y contratados) hasta la fecha. Basado en el apoyo y consultoría recibida hasta el día de hoy, los consultores de ingeniería de las aseguradoras han identificado actualmente \$35 millones de los costos de reclamo de daños a la propiedad como indiscutibles, mientras que los restantes \$47 millones se mantienen en discusión. La Autoridad, con la asistencia The Grupo

Claro, coordinó visitas durante el mes de octubre para inspeccionar las facilidades afectadas por el terremoto. La Autoridad continuará proporcionando al equipo de ajustadores la información y los datos necesarios para refinar y validar la reclamación de la Autoridad por daños a la propiedad.

El 26 de agosto de 2020, la Autoridad presentó una reclamación actualizada por gastos adicionales. Con esta presentación se extendió el reclamo hasta de julio de 2020 y, además, se corrigió un problema con la duración de una interrupción de mantenimiento planificado para una de las unidades de Costa Sur. Con estas actualizaciones, la reclamación de gastos adicionales agregados aumentó a \$124.6 millones, antes de la aplicación del deducible de 30 días por el periodo de espera (*waiting period*). El ajustador de las aseguradoras ha comunicado verbalmente que, basándose en el análisis preparado por el contador forense de las aseguradoras, este no disputa que la Autoridad ha demostrado un monto de gastos adicionales de \$40 millones, esto es neto del periodo de espera como deducible. La Autoridad y The Grupo Claro continúan reuniéndose con los ajustadores y contadores forenses de las aseguradoras de manera regular para adelantar en el ajuste de la reclamación de gastos adicionales. Además, se está evaluando la posibilidad de reclamar perdidas de ganancias brutas.

La Autoridad continúa haciendo gestiones para asegurar el pago de \$ 25 millones del adelanto que las aseguradoras acordaron pagar en octubre. El equipo de ajuste de las aseguradoras emitió un informe el 10 de septiembre de 2020 recomendando el pago por adelantado, y después de que las aseguradoras aceptaron la recomendación, el abogado de la Autoridad notificó a los acreedores sobre el pago del seguro complementario el 7 de octubre de 2020. Hasta la fecha, la Autoridad ha cobrado \$ 17.9 millones del anticipo adicional de \$ 25 millones que fue aprobado por las aseguradoras.

Además de adelantar el reclamo de seguro, el equipo de Manejo de Riesgos de la Autoridad continúa participando en reuniones semanales con la Oficina de Gestión de Financiamiento por Desastres de la Autoridad (DFMO) en un esfuerzo por garantizar la coordinación de reclamos a aseguradores y los que se realizan a la Agencia Federal para el Manejo de Emergencias (FEMA) y apoyar en el proceso de desembolso de fondos a los cuales la Autoridad tiene derecho a recibir por las pérdidas causadas por terremoto.

En cumplimiento con la Orden la Autoridad adjunta un reporte con detalles adicionales de comunicaciones entre la Autoridad, los ajustadores y las aseguradoras y, además, una compilación de las comunicaciones y documentos relacionados. Exhibit A.

b. Gestiones con la Agencia Federal para el Manejo de Emergencias

La Autoridad conjunta a Oficina Central de Recuperación, Reconstrucción y Resiliencia (COR3, por sus siglas en inglés) continúa persiguiendo diligentemente los remboslos relacionados al uso de las unidades pico (*peaking units*) luego de los eventos del terremoto. Los fondos ya fueron obligados y la semana pasada se firmó el acuerdo con las deducciones para comenzar el proceso de solicitud de reembolso.

La Autoridad se mantiene en comunicaciones con COR3 con el interés de facilitar la pronta gestión para el rembolso de los fondos. La documentación para la solicitud de reembolso ya fue provista a COR3 y COR3 los certificó como correctos. Ahora resta que COR3 coordine el desembolso de los fondos.

II. SOLICITUD DE CONFIDENCIALIDAD

El Exhibit A adjunto a esta moción incluye varias comunicaciones entre la Autoridad, las compañías de seguros y los ajustadores de las compañías de seguros, relacionadas con los reclamos de seguros realizados por los daños a la Unidad 5 de la Planta Costa Sur y el arrendamiento de generación de emergencia. De conformidad con el Reglamento 8543 del Negociado de Energía de la Junta Reglamentadora del Servicio Público (el “Negociado de Energía”)¹, la Autoridad afirma que las comunicaciones con las aseguradoras y los ajustadores son confidenciales y, por lo tanto, han sido presentadas selladas y así deben permanecer.

Las comunicaciones entre la Autoridad y sus aseguradoras y ajustadores sobre el reclamo del pago por concepto de la cubierta de seguros de la Autoridad por pérdidas relacionadas con el terremoto en la Planta Costa Sur contienen información confidencial sobre los esfuerzos de la Autoridad para negociar y obtener pagos por adelantado de sus aseguradoras mientras las aseguradoras continúan ajustando la pérdida de la Autoridad bajo las pólizas. Estas comunicaciones también contienen interpretaciones sobre el alcance de la cobertura potencial bajo las pólizas de seguros de la Autoridad, solicitudes de información de las aseguradoras sobre la Planta Costa Sur y otras instalaciones de generación en Puerto Rico que puedan ser relevantes para sus determinaciones de cobertura de seguros, y comentarios y sugerencias, sobre las formas en que la Autoridad podría tratar de mitigar sus pérdidas aseguradas bajo las pólizas de seguro de la Autoridad. Las negociaciones de ajuste de reclamos son un proceso iterativo, y las declaraciones de la Autoridad y sus aseguradoras en comunicaciones relacionadas con reclamos por su naturaleza

¹ Negociado de Energía, *Reglamento de Procedimientos Adjudicativos, Avisos de Incumplimiento, Revisión de Tarifas e Investigaciones*, Núm. 8543 (18 de diciembre del 2014) (el “Reglamento 8543”), Sec. 1.15.

no son definitivas. Hacer público este tipo de información en este momento interferiría con la discusión de buena fe y las negociaciones entre la Autoridad y las aseguradoras, resultará en un deterioro del libre intercambio de ideas necesario para un proceso de negociación de reclamos oportuno y productivo y comprometerá la capacidad de la Autoridad para asegurar anticipos de sus aseguradoras que son necesarios para financiar reparaciones y mitigar pérdidas adicionales. Una vez el proceso de reclamación de a las aseguradoras concluya se puede considerar publicar las mismas, por el momento sería perjudicial para la Autoridad y, en consecuencia, para los consumidores.

III. REPRACIÓN DE LUMINARIAS

Según informado y demostrado el mes anterior, los esfuerzos de reparación de luminarias continúan. El cumplimiento con la Orden, se adjunta el reporte de reparación de luminarias actualizado al 10 de noviembre de 2020. Exhibit B. Además, la Autoridad informa las especificaciones de los focos *light emitting diode* (LED) que se están instalando. Exhibit C. Los mismos son de 65W (Exhibit C-1), 100W (Sea turtle friendly) (Exhibit C-2) y 125W (Exhibit C-3).

En la Orden el Negociado de Energía solicitó información sobre el registro de reparación de luminarias en el programa CC&B. CC&B es el sistema de facturación de la Autoridad y, actualmente, las luminarias LED no están identificadas en el mismo. El comienzo de la instalación de las iluminarias LED coincidió con la evaluación de la estructura tarifaria vigente. La Autoridad sometió un costo para las luminarias LED antes de la aprobación tarifaria final del Negociado de Energía, pero no este fue aprobado. El cambio no se ha podido hacer en el sistema. Actualmente

se continúa facturando las luminarias de acuerdo con el inventario de luminarias de sodio y mercurio que la Autoridad ha tenido siempre en CC&B.

IV. CONCLUSIÓN

POR TODO LO CUAL, se solicita respetuosamente al Negociado de Energía anote el cumplimiento de la Autoridad con la Orden, declare que los documentos incluidos en el Exhibit A son confidenciales y los mantenga sellados.

RESPETUOSAMENTE SOMETIDO.

En San Juan, Puerto Rico a 13 de noviembre 2020.

/s Katiuska Bolaños Lugo
Katiuska Bolaños Lugo
kbolanos@diazvaz.law
TSPR 18,888

DÍAZ & VÁZQUEZ LAW FIRM, P.S.C.
290 Jesús T. Piñero Ave.
Oriental Tower, Suite 1105
San Juan, PR 00918
Tel. (787) 395-7133
Fax. (787) 497-9664

Exhibit A

Reporte Confidencial Sobre Gestiones con Aseguradoras y Comunicaciones

[Estos documentos han sido presentados sellados.]

Exhibit B

Reporte de Reparación de Luminarias



Puerto Rico Electric Power Authority

Street Lighting Repairs Progress Status Report

November 10, 2020.

- [Program Special Report - Full Version](#) → 01.1
- [Program Special Report - No Scope](#) → 01.2
- [Contractor's Overall Progress](#) → 02
- [Contractor's Performance](#) → 03
- [Contractor's Invoiced Status](#) → 04



STREET LIGHTING | EXECUTIVE VISIBILITY TOOL

Report Date (AST Local Time)

11/11/2020 4:35:01 AM

Latest Refresh (AST Local Time)

11/10/2020 12:16:36 PM



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Inventory

489K

Assigned

376K

Approved to Work

308K

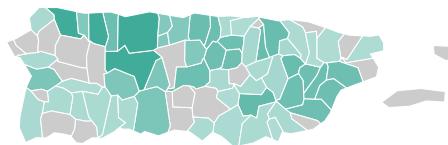
Repairs Required

292K

Repaired

242K

WORKED BY CONTRACTORS:

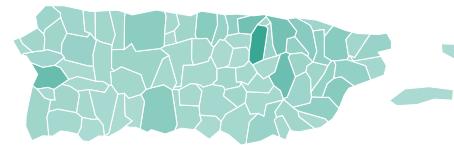


24.4%
(From Total Inventory)
119,426
Approved to Work*

59.4%
(From Assessments Done)
102,992
Repairs Required

81.1%
(From Total Required)
82,568
Repairs Completed
Inspections Passed = 96.9%

WORKED BY T&D: (ZONE CERTIFIED BY DISTRICT, T&D)

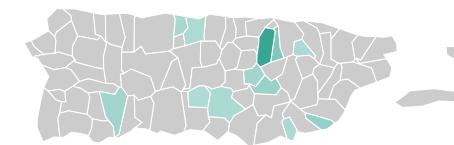


36.7%
(From Total Inventory)
179,691
Approved to Work

100.0%
(From Total Approved)
179,691
Repairs Required

83.6%
(From Total Required)
150,285
Repairs Completed

ISSUED TO MUNICIPALITIES (MOUs): (ZONE CERTIFIED BY DISTRICT, T&D)

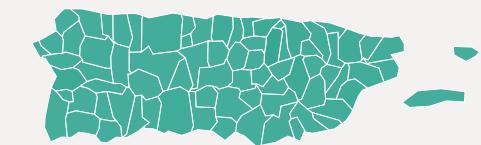


1.9%
(From Total Inventory)
9,172
Amount Issued

100.0%
(From Total Approved)
9,172
Amount Issued

100.0%
(From Total Required)
9,172
Amount Issued

TOTAL WORK (CONTRACTORS + T&D + MOU):



63.0%
(From Total Inventory)
308,289
Total Approved to Work (All)

94.7%
(From Total Approved)
291,855
Repairs Required (All)

82.9%
(From Total Required)
242,025
Total Repaired (All)

*Approved to Work amt. is adjusted as Assessments are completed.

Budget Analysis (Contractors)

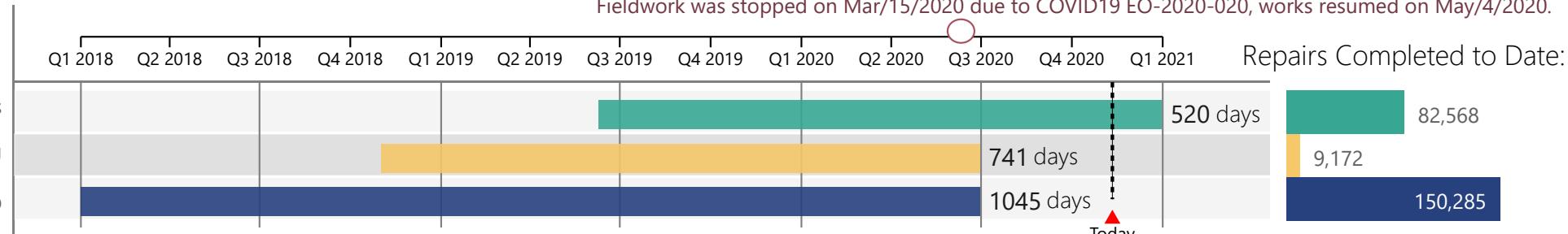
Time Elapsed

90.9%
Work Performed (Estimated \$)

77.3%

Timeline Analysis (All)

Fieldwork was stopped on Mar/15/2020 due to COVID19 EO-2020-020, works resumed on May/4/2020.





STREET LIGHTING | EXECUTIVE VISIBILITY TOOL

Report Date (AST Local Time)

11/11/2020 4:35:01 AM

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Inventory



Assigned



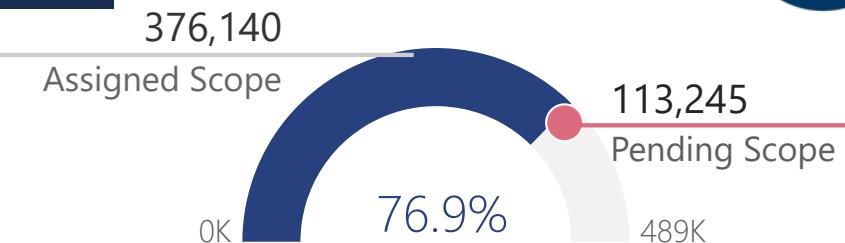
Approved to Work



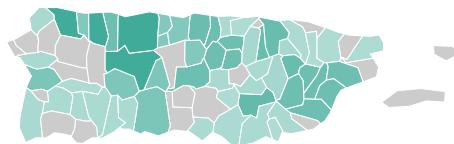
Repairs Required



Repaired



WORKED BY CONTRACTORS:

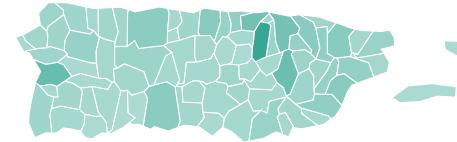


24.4%
(From Total Inventory)
119,426
Approved to Work*

59.4%
(From Assessments Done)
102,992
Repairs Required

81.1%
(From Total Required)
82,568
Repairs Completed
Inspections Passed = 96.9%

WORKED BY T&D: (ZONE CERTIFIED BY DISTRICT, T&D)

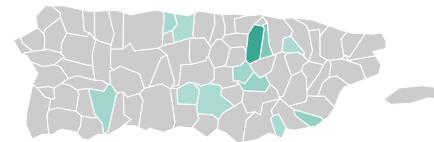


36.7%
(From Total Inventory)
179,691
Approved to Work

100.0%
(From Total Approved)
179,691
Repairs Required

83.6%
(From Total Required)
150,285
Repairs Completed

ISSUED TO MUNICIPALITIES (MOUs): (ZONE CERTIFIED BY DISTRICT, T&D)

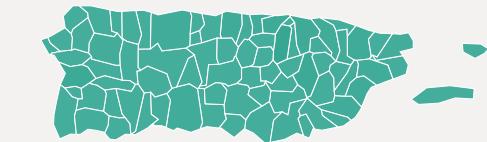


1.9%
(From Total Inventory)
9,172
Amount Issued

100.0%
(From Total Approved)
9,172
Amount Issued

100.0%
(From Total Required)
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Amount Issued

TOTAL WORK (CONTRACTORS + T&D + MOU):



63.0%
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308,289
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291,855
Repairs Required (All)

82.9%
(From Total Required)
242,025
Total Repaired (All)

*Approved to Work amt. is adjusted as Assessments are completed.

Budget Analysis (Contractors)

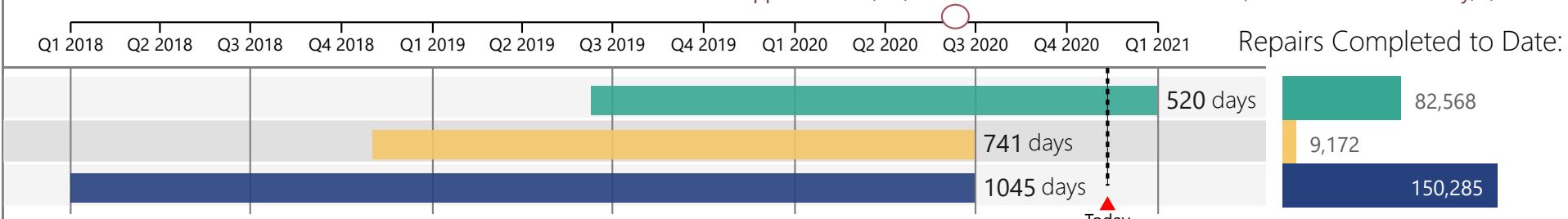
Time Elapsed

90.9%
Work Performed (Estimated \$)

77.3%

Timeline Analysis (All)

Fieldwork was stopped on Mar/15/2020 due to COVID19 EO-2020-020, works resumed on May/4/2020.



STREET LIGHTING | CONTRACTOR's WORKFLOW & PROGRESS BY PHASE

Report Date (AST Local Time)

11/11/2020 4:35:01 AM

Latest Refresh (AST Local Time)

11/10/2020 12:16:36 PM

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Inventory

Count of Luminaires (FIDs) in ArcGIS ESRI inventory.

489,385 + 10898 SIDs

Total Inventory

Scope of Work

Count of FIDs or SIDs included on a defined Work Zone (includes Work Zones Assigned to AEE).

43.2%
(From Inventory)

211,601

Within a Workzone

Assigned to Contractors

Count of FIDs or SIDs assigned to a specific Contractor (NOT including Work Zones Assigned to AEE).

89.6%
(From SOW)

187,356

Assigned to Contractors

Special Calculation*

119,426

Approved to Work*

(=Assigned - No Work Required)

Assessment

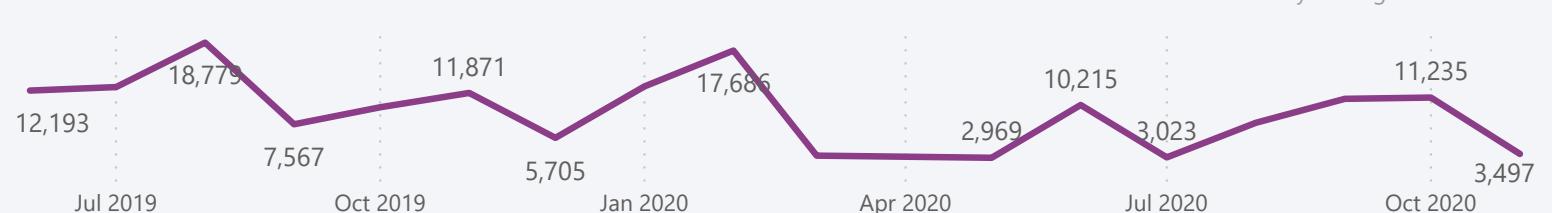
Initial site visit to assess FID condition. Additional Luminaires recorded at this stage as SIDs.

81.9%
(From Assigned)

173,238

Assesment Done

Luminaires Assesed by Damage Assesment Date



Assessment Results

The Assessment determines if the FID or SID needs repairs (Work Needed = Yes).

59.4%
(From Assessments)

102,987

Work Needed

70,251

No Repairs Reqd.

After Assessments are Done by Contractors, the Inspector Approved the Work to be Performed.

7,434

Not Apprvd. by Inspector

96,866

Apprvd to Work by Inspector

0

Apprvd. by Inspector

Repairs Status

81.1%
(From Work Needed)

83,532

Total Repairs Completed

Repairs can be completed by contractor, even if Not Approved by Inspector to Work; they are shown here as "Completed from Not Apprvd."

1,557
Completed from Not Apprvd.

81,975

From Apprvd. by Inspector

76,292

Inspections Passed

5,243

Inspections Failed

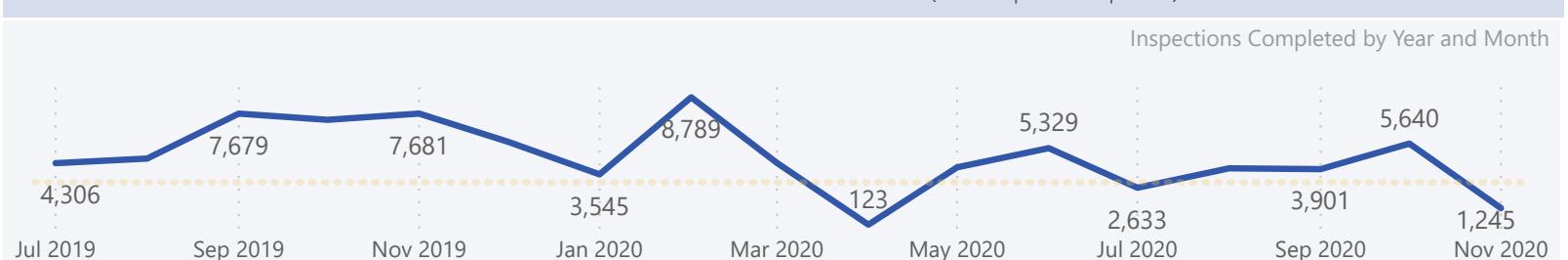
57.6%

Final Inspection

98.7%
(From Repairs Completed.)

81,534

Inspections Completed



Total Invoiced

As of:
11/10/2020

57.6%

\$36,893,189
Total Invoiced

\$64.00M
Contracted Amount

Contract Expenditures

Contracted

\$64.00M

Invoiced

\$36.89M

Processed

\$31.63M

Authorized

\$29.28M

Paid

\$27.11M
Contracts

9

STREET LIGHTING | REPAIRS PROGRESS BY CONTRACTOR

Report Date (AST Local Time)

11/11/2020 9:38:17 AM

Latest Refresh (AST Local Time)

11/10/2020 12:16:36 PM



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CONTRACTORS:

Total Assigned: 187,356

PROGRESS FROM REQUIRED:

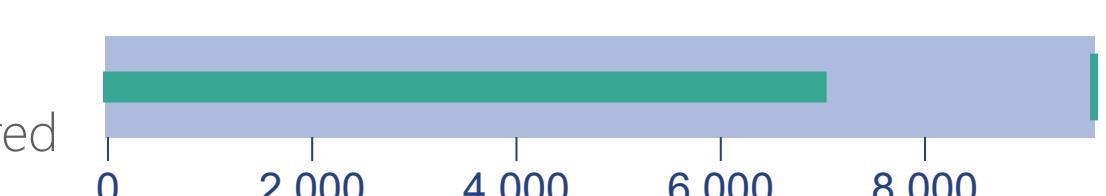
Total Required (FIDs+SIDs): 102,989

BETA

17,607 Assigned

9,718

Repairs Required

REPAIRS COMPLETED:

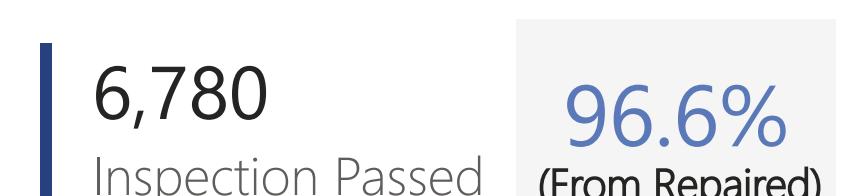
Total Repaired: 82,568

7,028
(From Required)REPAIRED & INSPECTED PER MONTH:

As per Final Inspection Date

INSPECTION PASSED:

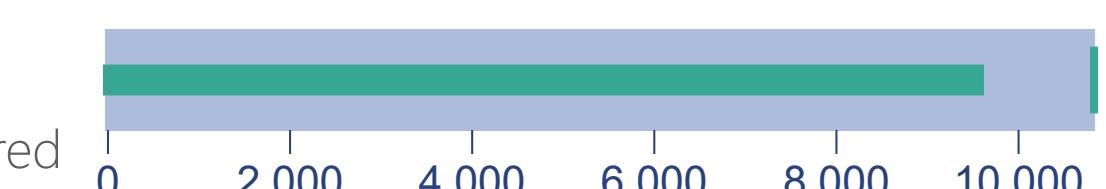
Total Passed: 76,292

6,780
Inspection Passed96.6%
(From Repaired)**BLDM**

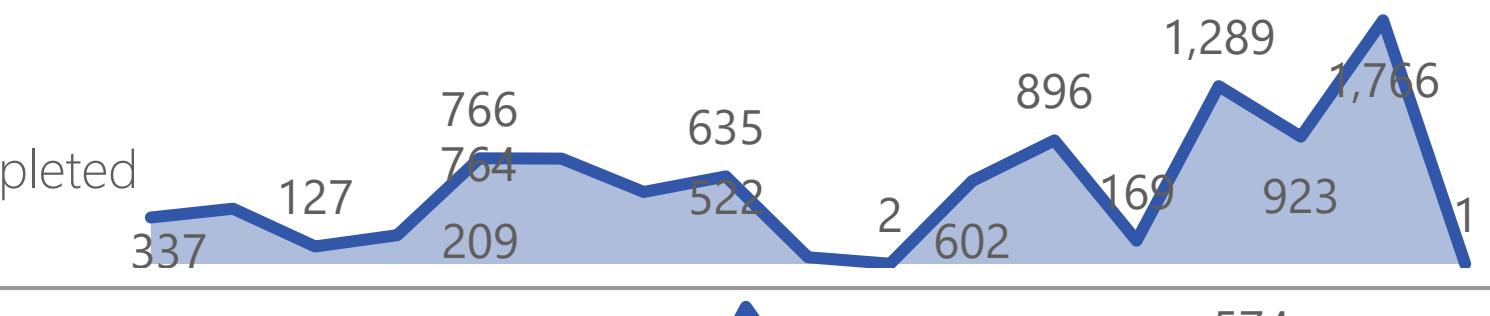
18,087 Assigned

10,886

Repairs Required



88.0%

9,552
Repairs Completed8,889
Inspection Passed

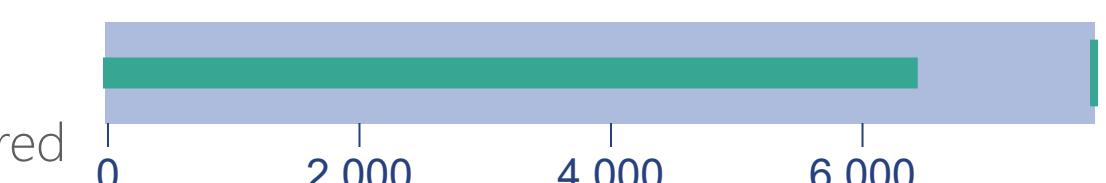
93.1%

BONNEVILLE

18,876 Assigned

7,937

Repairs Required



82.5%

6,529
Repairs Completed6,077
Inspection Passed

94.6%

DESIGN BUILD

19,713 Assigned

10,747

Repairs Required



78.9%

8,468
Repairs Completed7,888
Inspection Passed

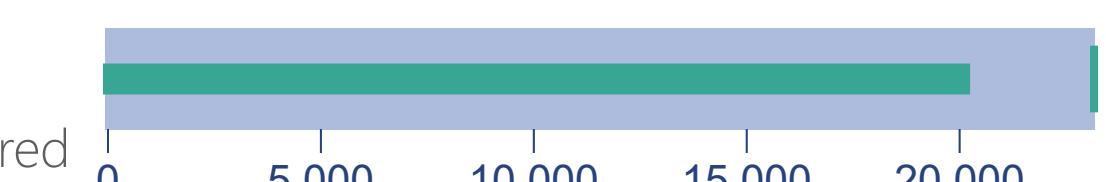
93.2%

LORD

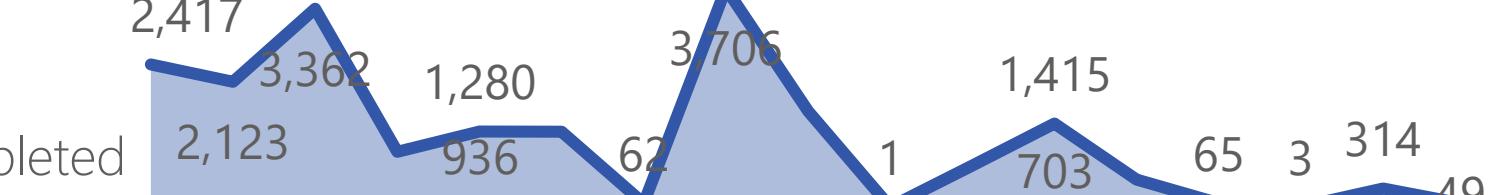
37,580 Assigned

23,266

Repairs Required



89.0%

20,194
Repairs Completed19,019
Inspection Passed

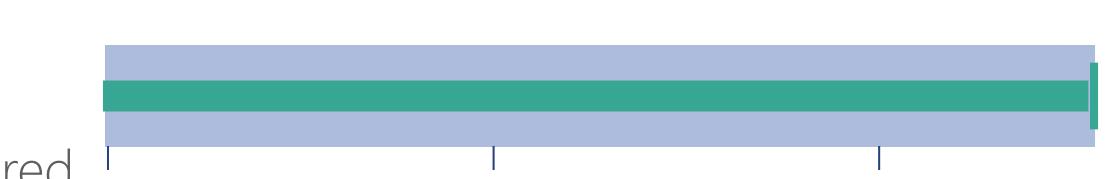
94.7%

MASTEC

20,415 Assigned

13,087

Repairs Required



91.6%

11,691
Repairs Completed9,515
Inspection Passed

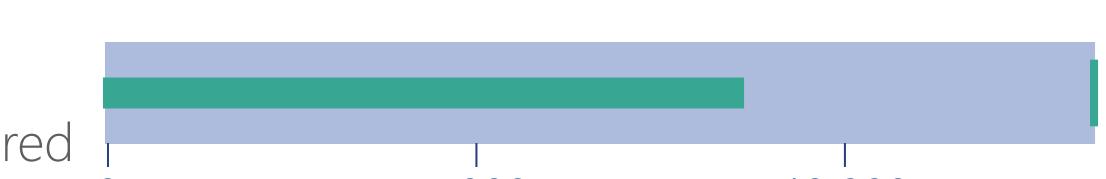
86.4%

MASTER LINK

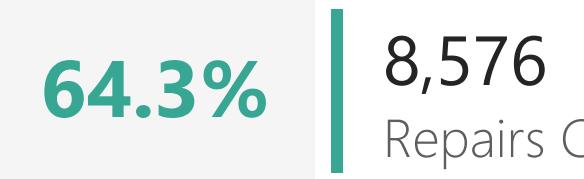
24,621 Assigned

13,473

Repairs Required



64.3%

8,576
Repairs Completed8,032
Inspection Passed

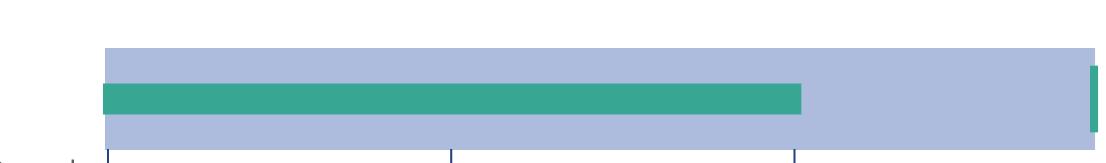
94.2%

REYES

15,356 Assigned

5,779

Repairs Required



70.0%

4,032
Repairs Completed3,851
Inspection Passed

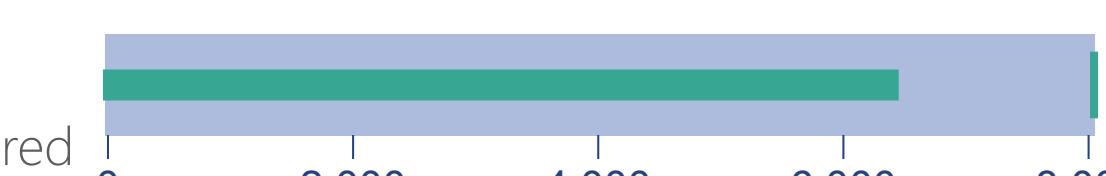
95.6%

ROMAN

15,101 Assigned

8,094

Repairs Required



80.3%





STREET LIGHTING PROJECT - CONTRACTOR'S INVOICED STATUS

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Report Date (AST Local Time)

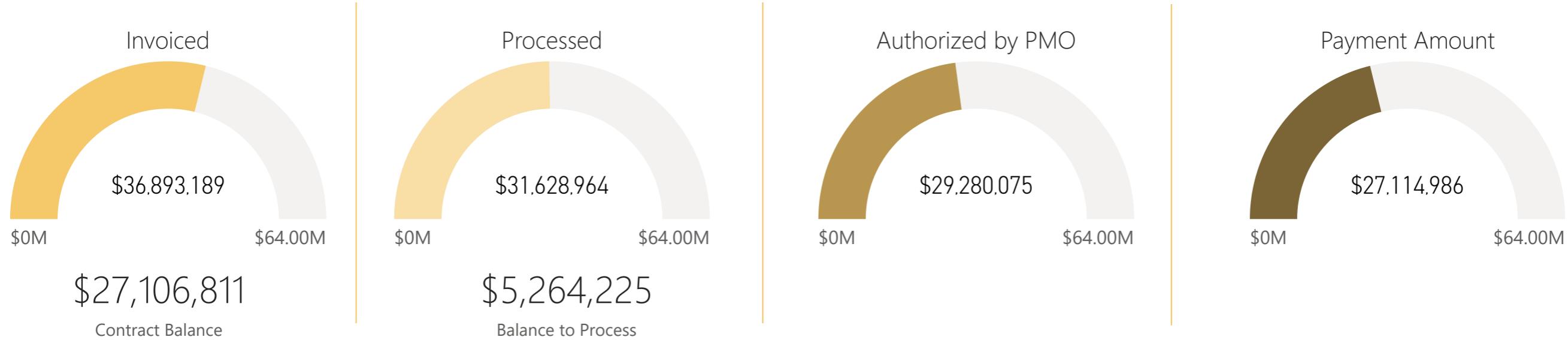
11/11/2020 4:35:01 AM

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11/10/2020 12:16:36 PM



empowered by | acumenian



DETAIL BY CONTRACTOR

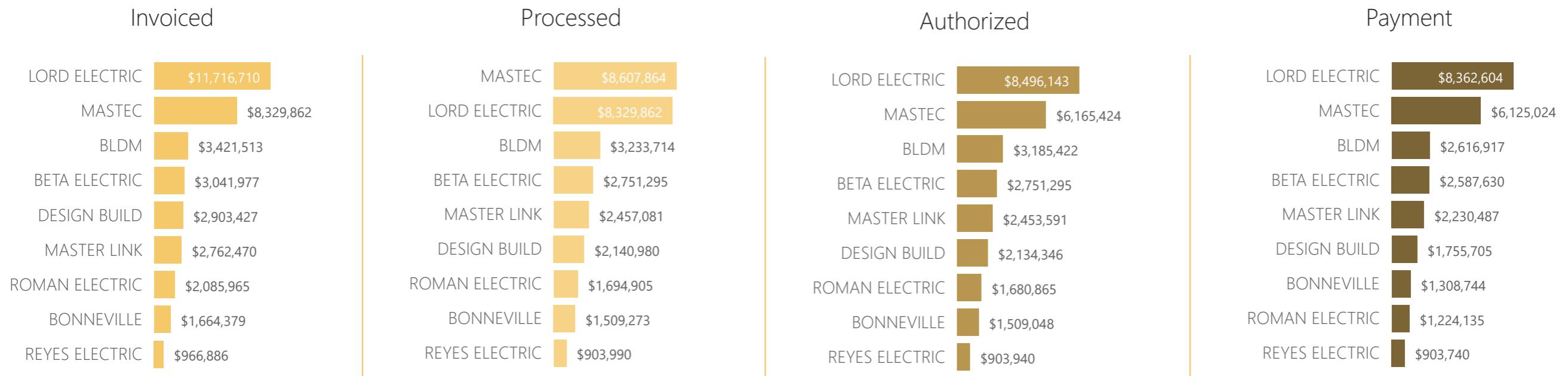


Exhibit C

Especificaciones de focos LED

Exhibit C-1

Focos LED de 65W

PUERTO RICO ELECTRIC POWER AUTHORITY
MATERIALS MANAGEMENT INFORMATION SYSTEM
CODIFIED MATERIAL SPECIFICATION

| | |
|---|-----------------------------|
| ACTION CODE: A | CODE NUMBER: LED 65W |
| SHORT DESCRIPTION: LED LUMINAIRE - 65W MAXIMUM 120-240V, 60 HZ (REPLACEMENT OF 100W HPS) | |
| TYPE CODE: PD | |
| ACTION CODES | TYPE CODES |
| A = Add | ED = Engr. Description |
| C = Change | ID = Inspection Description |
| D = Delete | PD = Purchase Description |
| 001 SPECIFIC NAME: | |
| 002 LUMINAIRE, ROADWAY LIGHTING LED, 65W MAXIMUM, 120-240V, 60 HZ. | |
| 003 **** | |
| 004 BASIC USE: | |
| 005 OUTDOOR ROADWAY LIGHTING. | |
| 006 SPECIAL REQUIREMENTS: | |
| 007 IN ORDER FOR THE LUMINAIRE TO BE APPROVED, MANUFACTURERS SHALL PROVIDE | |
| 008 THE FOLLOWING: | |
| 009 - LUMINAIRE PHOTOMETRIC TEST REPORT PER IES LM-79 AND LM-80, | |
| 010 INCLUDING: | |
| 011 1. NAME OF INDEPENDENT TEST LABORATORY: TEST LABORATORY SHALL HOLD | |
| 012 NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM FOR THE | |
| 013 IES LM-79 PROCEDURE. | |
| 014 2. REPORT NUMBER | |
| 015 3. DATE | |
| 016 4. PHOTOMETRY | |
| 017 5. COLORIMETRY | |
| 018 6. LM-80 AND TM 21 ENERGY STAR TESTS REPORT (6000 HOURS MINIMUM). | |
| 019 - DOCUMENTATION SUPPORTING CLAIMS OF EXPECTED L70 USEFUL LIFE FOR | |
| 020 PREPA SPECIFICATIONS AND FINAL VERSION OF LM-80 AND TM21 USING | |
| 021 EITHER OPTION: COMPONENT PERFORMANCE OR LUMINAIRE PERFORMANCE. | |
| 022 - COMPUTER MODELING OF FIXTURE LIGHT DISTRIBUTION | |

PUERTO RICO ELECTRIC POWER AUTHORITY
MATERIALS SPECIFICATION-CONTINUATION SHEET

CODE NUMBER: LED 65W

PAGE 2 OF 7

LINE

- 023 RP-08 TABLE III. POINT-BY-POINT
- 024 PHOTOMETRIC ANALYSIS OF MAINTAINED LIGHT LEVEL SHALL BE SUBMITTED
- 025 USING LLF = 1
- 026 - SAMPLE FIXTURE FOR LAB TEST AND FIELD TRIAL REVIEW AND EVALUATION.
- 027 MANUFACTURING FACILITY SHOULD COMPLY WITH THE FOLLOWING:
- 028 - ISO 9001 QUALITY MANAGEMENT SYSTEMS (SUBMIT COPY OF CERTIFICATE).
- 029 - RESTRICTION OF HAZARDOUS SUBSTANCES (ROHS) CERTIFICATION BY IPC
- 030 (ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES) FOR THE LIGHT
- 031 ENGINE MANUFACTURING FACILITY (SUBMIT COPIES OF CERTIFICATES).
- 032 - ELECTROSTATIC DISCHARGE (ESD) FLOORING THROUGHOUT PRODUCTION AREA
- 033 OF THE LIGHT ENGINE MANUFACTURING FACILITY AND POWER SUPPLY
- 034 MANUFACTURING FACILITY (SUBMIT PHOTOGRAPHS OF PRODUCTION FLOOR IN
- 035 BOTH FACILITIES), ARE REQUIRED. IF THE COMPANY HAS OTHER ESD
- 036 PROTECTION MEASURE, IT MUST PROVIDE INFORMATION CORRESPONDINGLY.
- 037 - NITROGEN MUST BE PLUMBED INTO SOLDERING PROCESSES TO IMPROVE
- 038 QUALITY YIELD (SUBMIT PHOTOGRAPHS OF NITROGEN TANK IN POWER SUPPLY
- 039 AND LIGHT ENGINE MANUFACTURING FACILITIES).
- 040 - LEDs SHALL BE STORED IN MOISTURE-PROOF CABINETS PRIOR TO PRODUCTION
- 041 (SUBMIT PHOTOGRAPHS OF CABINETS IN THE LIGHT ENGINE MANUFACTURING
- 042 FACILITIES). IF LED IS MOISTURE-PROOF AND HAVE NO NEED TO BE
- 043 STORED IN THE SPECIAL CABINETS, MANUFACTURER MUST SUBMIT INFORMA-
- 044 TION AND TESTS TO PROVE THIS.
- 045 - MINIMUM OF FIVE (5) YEARS OF EXPERIENCE IN MANUFACTURING LED-BASED
- 046 LIGHTING PRODUCTS.
- 047 QUANTITY:
- 048 ONE UNIT, PROPERLY LABELED FOR TESTING AND/OR ANALYSIS. DESCRIPTIVE
- 049 AND TECHNICAL LITERATURE SHALL BE SUPPLIED. AWARDS WILL BE MADE FOR
- 050 PRODUCTS THAT HAVE BEEN TESTED AND/OR APPROVED BY PREPA BEFORE THE

PUERTO RICO ELECTRIC POWER AUTHORITY
MATERIALS SPECIFICATION-CONTINUATION SHEET

CODE NUMBER: LED 65W

PAGE 3 OF 7

LINE

051 BID OPENS.

052 ****

053 MARKINGS:

054 CONTAINER SHALL BE MARKED OUTSIDE WITH PREPA'S PURCHASE ORDER AND CODE

055 NUMBER. THE LUMINAIRE MUST BE MARKED WITH MANUFACTURING DATE INSIDE

056 THE POWER MODULE WITH PREPA'S CODE NUMBER IMPRESSED INSIDE LUMINAIRE.

057 THE LETTERS "AEE" AND WATTAGE (65W) (MINIMUM OF 2.5 INCHES) MUST BE

058 STAMPED ON THE HOUSING SO THAT IT CAN BE READ WHEN IT IS INSTALLED FROM

059 THE STREET OR SIDEWALK.

060 ****

061 NUMBER OF PIECES PER PACKAGE: ONE (1) UNIT PER BOX.

062 ****

063 ACCEPTANCE CRITERIA:

064 THIS PRODUCT REQUIRES QUALIFICATION. LATEST APPLICABLE CODES, STANDARDS
065 AND OTHER REGULATIONS, INCLUDING THE FOLLOWING:

066 1-IESNA LM-79-08 APPROVED METHOD FOR THE ELECTRICAL AND PHOTOMETRIC

067 MEASUREMENTS OF SOLID-STATE LIGHTING PRODUCTS. LM-79 REPORTS

068 SHALL BE PROVIDED BY THE NATIONAL VOLUNTARY LABORATORY ACCREDI-

069 TATION PROGRAM (NVLAP), ACCREDITED TEST FACILITY AND TESTED IN

070 ACCORDANCE WITH LM-79-08.

071 2-IESNA LM-80-08 (RECOMMENDED) APPROVED METHOD FOR MEASURING LUMEN
072 MAINTENANCE OF LED LIGHTING SOURCES.

073 3-LUMINAIRE DRIVER AND SURGE ARRESTER SHALL BE LISTED AT UL.

074 4-LUMINAIRE MUST BE LISTED ON LIGHTING FACTS DEPARTMENT OF ENERGY
075 (DOE) (WWW.LIGHTINGFACTS.COM) ; OR QUALIFIED AT DESIGNLIGHTS

076 CONSORTIUM (DLC).

077 5-COMPLY WITH TITLE 47 CFR PART 15 CLASS A FOR INTERFERENCE.

078 ****

PUERTO RICO ELECTRIC POWER AUTHORITY
MATERIALS SPECIFICATION-CONTINUATION SHEET

CODE NUMBER: LED 65W

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LINE

079 DESCRIPTION:

080 LIGHT EMITTING DIODE-LED (LUMINARIE 100W HPS REPLACEMENT) 65W, 120-240

081 VOLTS, 60HZ. THE LUMINAIRE SHALL MEET THE FOLLOWING SPECIFICATIONS:

082 - CORRELATED COLOR TEMPERATURE (CCT); 3000°K

083 TABLE 1. ALLOWANCE NOMINAL CCT

| 084 | Manufacturer-Rated Nominal CCT (°K) | Allowed CCT from LM-79 Report Measured CCT (°K) |
|-----|--|---|
| | 3000 | 2750 TO 3220 |

085 IF NOMINAL CCT SPECIFIED IS NOT LISTED IN TABLE 1, MEASURED CCT SHALL
086 BE AS PER THE CRITERIA FOR $\pm 250^{\circ}\text{K}$ DEVIATIONS.

087 - COLOR RENDERING INDEX (CRI): MINIMUM OF 65.

088 - INITIAL LUMENS: 4000 MINIMUM

089 - LED DRIVER OPERATING CURRENT: 280 mA MAXIMUM OF 1A

090 - POWER FACTOR: GREATER THAN OR EQUAL (\geq) TO 0.90

091 - OPERATING TEMPERATURE: -20°C (-4°F) TO 40°C (104°F), WITH
092 OPERATING JUNCTION TEMPERATURE OF LED TO NOT EXCEED

093 75% OF MAXIMUM RATED JUNCTION TEMPERATURE FOR THE LED

094 DURING OPERATION AT 30°C AMBIENT TEMPERATURE.

095 - LUMINAIRE EFFICACY: GREATER THAN OR EQUAL TO (\geq) 70 LM/W.

096 - LIGHT DISTRIBUTION: TYPE II OR TYPE III AS USER SPECIFIES.

097 - BUG RATINGS: B3 (MAXIMUM) - U1 (MAXIMUM) - G3 (MAXIMUM) AND UPLIGHT
098 UL & UH=0 (FULL CUTOFF). INTERNATIONAL DARK SKY ASSOCIATION (IDA)

099 APPROVED SEAL.

100 THE LUMINAIRE SHALL CONSIST OF THE FOLLOWING:

101 - HOUSING: DIE-CAST ALUMINUM HOUSING. INCORPORATES A HEAT SINK

102 DIRECTLY INTO THE UNIT ENSURING MAXIMUM HEAT TRANSFER, LONG LED

103 LIFE AND A REDUCED EPA (NOT TO EXCEED 1.1 SQUARE FOOT). MEETS

PUERTO RICO ELECTRIC POWER AUTHORITY
MATERIALS SPECIFICATION-CONTINUATION SHEET

CODE NUMBER: LED 65W

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LINE

- 104 ANSI 3G VIBRATION STANDARDS. ALL HARDWARE SHALL BE CORROSION
105 RESISTANT. THE FIXTURE OPTICAL CAVITY SHALL BE IP-65 PER
106 ANSI C136.25, ELECTRICAL CAVITY OR ELECTRICAL COMPONENTS
107 SHALL BE A MINUMUN OF IP-54 AND LENSES SHALL BE MADE OF UV
108 RESISTANCE ACRYLIC, POLYCARBONATE OR GLASS. POWER OPENING SHALL
109 BE AT THE BOTTOM OF THE LUMINAIRE WITH SLIP FITTER THAT SHALL
110 SECURE THE LUMINARIE TO AND IN ALINGMENT WITH 1 1/4 TO 2 INCHES
111 PIPE BRACKET.
112 - TRANSIENT PROTECTION: TRANSIENT VOLTAGE AND SURGE SUPPRESSION
113 CAPABILITY THAT MEET OR EXCEEDS THE REQUIREMENTS OF ANSI/IEEE
114 C62.41-2002 LOCATION CATEGORY C LOW EXPOSURE.
115 - SURGE PROTECTION IF UTILIZED: SHALL RESET AUTOMATICALLY, FAIL
116 OPEN TO PROTECT LUMINAIRE, FIELD REPLACEABLE AND SHALL CONFORM
117 TO UL 1449.
118 - LED DRIVER: DRIVER SHALL BE A HIGH RELIABILITY SYSTEM WITH
119 DESIGN FEATURES AND COMPONENT SET THAT PROVIDES FOR A 20 YEARS
120 LIFE EXPECTANCY. ELECTROLYTIC CAPACITORS USED IN THE POWER SUPPLY
121 DRIVER MUST BE AIRCRAFT QUALITY OR BETTER. POWER SUPPLIES SHALL
122 BE TESTED FOR MEAN TIME BETWEEN FAILURE (MTBF) BY AN INDEPENDENT
123 LABORATORY TO MIL-HDBK-217F METHOD-STANDARDS AND RESULTS SHALL
124 EXCEED 300,000 HOURS AT 25°C (77°F) DESIGNED WITH 0-10V DIMMING
125 CAPABILITY
126 - ELECTRICAL: CLASS "A" SOUND RATING. 120-240 VOLTAGE AVAILABLE
127 WITH UNIVERSAL ELECTRONIC DRIVER. DRIVER POWER FACTOR IS GREATER
128 THAN (>) 90% AND TOTAL HARMONIC DISTORTION (THD) LESS THAN (<) 20%
129 FOR FULL LOAD.
130 - OFF-STATE POWER: LUMINAIRES SHALL NOT DRAW POWER IN THE OFF
131 STATE.

PUERTO RICO ELECTRIC POWER AUTHORITY
MATERIALS SPECIFICATION-CONTINUATION SHEET

CODE NUMBER: LED 65W

PAGE 6 OF 7

LINE

- 132 - EXCEPTION: LUMINAIRES WITH INTEGRAL OCCUPANCY, MOTION,
- 133 PHOTOCONTROLS OR INDIVIDUALLY ADDRESSABLE FIXTURES WITH
- 134 EXTERNAL CONTROL AND INTELLIGENCE SHALL NOT EXCEED 0.5 WATTS
- 135 WHEN IN THE OFF STATE.
- 136 - FINISH: CORROSION RESISTANT POLYESTER POWDER PAINTED, MINIMUM 2.0
- 137 MIL. THICKNESS INCLUDING THE INTERNAL PART OF THE LUMINAIRE. THE
- 138 STANDARD COLOR MUST BE GRAY.
- 139 - FIXTURE WEIGHT: SHALL BE LESS THAN(<) 30 LB.
- 140 - SALT FOG TEST: LUMINARIE COMPONENTS AND APPLIED FINISHES SHALL
- 141 MEET THE 1000 HOUR SALT TEST AS PER ASTM B117 STANDARD.
- 142 - CONTROL RECEPTACLE: SHALL BE TWIST LOCK TYPE 7-PIN COOPER-NICKEL
- 143 CONTACTS SHALL CONFORM REQUIREMENTS DETAILED IN ANSI C136.41.
- 144 - SYSTEM RATED LIFE (70% LUMEN MAINTENANCE): LED MODULE(S) /
- 145 ARRAY(S) SHALL DELIVER AT LEAST 70% OF INITIAL LUMENS, WHEN
- 146 INSTALLED FOR A MINIMUM OF 80,000 HOURS AT AN AMBIENT TEMPERATURE
- 147 OF 30°C (86°F) AT OPERATING DRIVER CURRENT.
- 148 - COST ANALYSIS: LUMINAIRES SHALL PAST THROUGH LIFE CYCLE COST
- 149 ANALYSIS WHEN THE BID OPENS, $EC = P + 4.34 * l * CE * \frac{(1 + i)^n - 1}{i(1 + i)^n}$
- 150 1. EVALUATED PRICE = EC
- 151 2. QUOTED PRICE OF LUMINAIRE = P
- 152 3. LUMINAIRE CONSUMED WATTAGE = l
- 153 4. AVERAGE ENERGY COSTS = CE = 0.25
- 154 5. INTEREST RATE = I = 10%
- 155 6. YEAR PERIODS = n = 15 YEARS
- 156 - METRIC CONVERSIONS AS PER LATEST ASTM
- 157 WARRANTY:
- 158 A LIMITED TEN (10) YEARS SYSTEM WARRANTY SHALL BE PROVIDED FOR THE
- 159 REPLACEMENT OR REPAIR OF THE LUMINAIRE DUE TO ANY ELECTRICAL FAILURE

PUERTO RICO ELECTRIC POWER AUTHORITY
MATERIALS SPECIFICATION-CONTINUATION SHEET

CODE NUMBER: LED 65W

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LINE

- 160 (INCLUDING LIGHT SOURCE, SURGE ARRESTER AND POWER SUPPLIES/DRIVERS)
- 161 AND SHALL BE EVALUATED ON PUERTO RICO BEFORE ANY ACTION TO TAKE.
- 162 • IF THERE HAS BEEN GREATER THAN 10% OF INOPERABLE COMPONENTS
- 163 OF THE TOTAL NUMBER OF LED DURING THE TEN (10) YEARS.
- 164 • TEN (10) YEAR ON-SITE REPLACEMENT WARRANTY COVERING MATERIAL
- 165 AND FIXTURE FINISH. FINISH WARRANTY SHALL INCLUDE WARRANTY
- 166 AGAINST FAILURE OR SUBSTANTIAL DERTERIORATION SUCH A
- 167 BLISTERING, CRAKING OR PEELING.
- 168 WARRANTY PERIOD SHALL BEGIN ON DATE OF POSSESSION. THE SUPPLIER
- 169 WILL PROVIDE PREPA WITH APPROPRIATE SIGNED WARRANTY CERTIFICATES.
- 170 ***
- 171 ***
- 172 ***
- 173 ***
- 174 ***
- 175 ***
- 176 ***
- 177 INSPECTION:
- 178 THE ACCEPTANCE OF ANY MATERIAL OR EQUIPMENT SHALL NOT, RELIEVE THE
- 179 VENDOR FROM HIS RESPONSIBILITY TO MEET ALL THE REQUIREMENTS OF THIS
- 180 SPECIFICATION, AND IT SHALL NOT PREVENT SUBSEQUENT REJECTION IF SUCH
- 181 MATERIAL IS FOUND TO BE DEFECTIVE LATER.
- 182 REVISION NO. 4
- 183 PREPARED BY: RICARDO SÁNCHEZ SANTIAGO *Ricardo Sanchez Santiago* 09/2016
- 184 SUBMITTED BY: HUMBERTO CAMPÁN COLÓN *Humberto Campan Colon* 9/12/16
- 185 RECOMMENDED BY: CARLOS J. LAUREANO RIVERA *Carlos Laureano Rivera* 19/Feb. 2016
- 186 APPROVED BY: CARLOS J. LAUREANO RIVERA *Carlos Laureano Rivera* 19/Feb. 2016
- 187 DATE:

Exhibit C-2

Focos LED de 100W (Sea Turtle Friendly)

PUERTO RICO ELECTRIC POWER AUTHORITY
MATERIALS MANAGEMENT INFORMATION SYSTEM
CODIFIED MATERIAL SPECIFICATION

| | |
|--|-----------------------------|
| ACTION CODE: A | CODE NUMBER:AMBER LED 100W |
| SHORT DESCRIPTION: AMBER LED LUMINAIRE - 100W MAXIMUM 120-240V, 60 HZ (SEA TURTLE LIGHTING) | |
| TYPE CODE: PD | |
| ACTION CODES | TYPE CODES |
| A = Add | ED = Engr. Description |
| C = Change | ID = Inspection Description |
| D = Delete | PD = Purchase Description |
| 001 SPECIFIC NAME: | |
| 002 LUMINAIRE, ROADWAY LIGHTING AMBER LED, 100W MAXIMUM, 120-240V, 60 HZ. | |
| 003 *** | |
| 004 BASIC USE: | |
| 005 FOR USE IN AREAS WITHIN CLOSE PROXIMITY TO SEA TURTLE HABITATS. | |
| 006 *** | |
| 007 SPECIAL REQUIREMENTS: | |
| 008 IN ORDER FOR THE LUMINAIRE TO BE APPROVED, MANUFACTURERS SHALL PROVIDE | |
| 009 THE FOLLOWING: | |
| 010 - LUMINAIRE PHOTOMETRIC TEST REPORT PER IES LM-79 AND LM-80 | |
| 011 - SAMPLE FIXTURE FOR LAB TEST AND FIELD TRIAL REVIEW AND EVALUATION. | |
| 012 MANUFACTURING FACILITY SHOULD COMPLY WITH THE FOLLOWING: | |
| 013 - ISO 9001 QUALITY MANAGEMENT SYSTEMS (SUBMIT COPY OF CERTIFICATE). | |
| 014 - RESTRICTION OF HAZARDOUS SUBSTANCES (ROHS) CERTIFICATION BY IPC | |
| 015 (ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES) FOR THE LIGHT | |
| 016 ENGINE MANUFACTURING FACILITY. | |
| 017 *** | |
| 018 QUANTITY: | |
| 019 ONE UNIT, PROPERLY LABELED FOR TESTING AND/OR ANALYSIS. DESCRIPTIVE AND | |
| 020 TECHNICAL LITERATURE SHALL BE SUPPLIED. AWARDS WILL BE MADE FOR | |
| 021 PRODUCTS THAT HAVE BEEN TESTED AND/OR APPROVED BY PREPA BEFORE THE BID | |
| 022 OPENS. | |

PUERTO RICO ELECTRIC POWER AUTHORITY
MATERIALS SPECIFICATION-CONTINUATION SHEET

CODE NUMBER: AMBER LED 100W

PAGE 2 OF 6

LINE

023 MARKINGS:

024 CONTAINER SHALL BE MARKED OUTSIDE WITH PREPA'S PURCHASE ORDER, CODE
025 NUMBER. THE LUMINAIRE MUST BE MARKED WITH MANUFACTURING DATE INSIDE THE
026 POWER MODULE AND SHOULD HAVE PREPA CODE NUMBER IMPRESSED ON LUMINAIRE
027 MATERIAL INSIDE LUMINAIRE. THE LETTERS "AEE" AND LUMINAIRE WATTAGE 100W
028 (MINIMUM OF 2.5 INCHES) MUST BE STAMPED ON THE HOUSING SO THAT
029 IT CAN BE READ FROM THE GROUND. LUMINARIE BOX SHALL BE IDENTIFIED WITH
030 LETTERS "TURTLE FRIENDLY" (MINIMUM OF 2.5 INCHES).

031 ***

032 NUMBER OF PIECES PER PACKAGE: ONE (1) UNIT PER BOX.

033 ***

034 ACCEPTANCE CRITERIA:

035 THIS PRODUCT REQUIRES QUALIFICATION. LATEST APPLICABLE CODES, STANDARDS
036 AND OTHER REGULATIONS, INCLUDING THE FOLLOWING:

037 1-IESNA LM-79-08 APPROVED METHOD FOR THE ELECTRICAL AND PHOTOMETRIC
038 MEASUREMENTS OF SOLID-STATE LIGHTING PRODUCTS. LM-79 REPORTS
039 SHALL BE PROVIDED BY THE NATIONAL VOLUNTARY LABORATORY ACCREDI-
040 TATION PROGRAM (NVLAP), ACCREDITED TEST FACILITY AND TESTED IN
041 ACCORDANCE WITH LM-79-08.

042 2-IESNA LM-80-08 (RECOMMENDED) APPROVED METHOD FOR MEASURING LUMEN
043 MAINTENANCE OF LED LIGHTING SOURCES.

044 3-LUMINAIRE DRIVER AND SURGE ARRESTER SHALL BE LISTED AT UL.

045 4-COMPLY WITH TITLE 47 CFR PART 15 CLASS A FOR INTERFERENCE.

046 ***

047 DESCRIPTION:

048 LIGHT EMITTING DIODE-AMBER LED 100W, 120-240 VOLTS, 60 HZ.

049 THE LUMINAIRE SHALL MEET THE FOLLOWING SPECIFICATIONS:

050 TABLE 1. ALLOWANCE NOMINAL WAVELENGTH

PUERTO RICO ELECTRIC POWER AUTHORITY
MATERIALS SPECIFICATION-CONTINUATION SHEET

CODE NUMBER: AMBER LED 100W

PAGE 3 OF 6

LINE

| 051 | Allowed wavelengths |
|-----|---------------------|
| | 580-640 nm |

- 052 - INITIAL LUMENS: 1500 MINIMUM
- 053 - LED DRIVER OPERATING CURRENT: 280 mA MAXIMUM OF 1A
- 054 - POWER FACTOR: GREATER THAN OR EQUAL (\geq) TO 0.90
- 055 - OPERATING TEMPERATURE: -20°C (-4°F) TO 40°C (104°F), WITH
- 056 - LUMINAIRE EFFICACY: GREATER THAN OR EQUAL TO (\geq) 15 LM/W.
- 057 - LIGHT DISTRIBUTION: TYPE II OR TYPE III AS USER SPECIFIES.
- 058 - BUG RATINGS: B3 (MAXIMUM) - U1 (MAXIMUM) - G3 (MAXIMUM) AND UPLIGHT
- 059 UL & UH=0 (FULL CUTOFF).
- 060 THE LUMINAIRE SHALL CONSIST OF THE FOLLOWING:
- 061 - HOUSING: DIE-CAST ALUMINUM HOUSING. INCORPORATES A HEAT SINK
- 062 DIRECTLY INTO THE UNIT ENSURING MAXIMUM HEAT TRANSFER, LONG LED
- 063 LIFE AND A REDUCED EPA (NOT TO EXCEED 1.1 SQUARE FOOT). MEETS
- 064 ANSI 3G VIBRATION STANDARDS. ALL HARDWARE SHALL BE CORROSION
- 065 RESISTANT. THE FIXTURE OPTICAL CAVITY SHALL BE IP 65 PER
- 066 ANSI C136.25, ELECTRICAL CAVITY OR ELECTRICAL COMPONENTS
- 067 SHALL BE A MINUMUN OF IP-54 AND LENSES SHALL BE MADE OF
- 068 UV RESISTANCE ACRYLIC, POLYCARBONATE OR GLASS. POWER OPENING
- 069 SHALL BE AT THE BOTTOM OF THE LUMINAIRE WITH SLIP FITTER THAT
- 070 SHALL SECURE THE LUMINARIE TO AND IN ALIGMENT WITH 1-1/4 TO 2
- 071 INCHES PIPE BRACKET.
- 072 - TRANSIENT PROTECTION: TRANSIENT VOLTAGE AND SURGE SUPPRESSION
- 073 CAPABILITY THAT MEET OR EXCEEDS THE REQUIREMENTS OF ANSI/IEEE
- 074 C62.41-2002 LOCATION CATEGORY C LOW EXPOSURE.
- 075 - SURGE PROTECTION IF UTILIZED: SHALL RESET AUTOMATICALLY, FAIL
- 076 OPEN TO PROTECT LUMINAIRE, FIELD REPLACEABLE AND SHALL CONFORM
- 077 TO UL 1449.

PUERTO RICO ELECTRIC POWER AUTHORITY
MATERIALS SPECIFICATION-CONTINUATION SHEET

CODE NUMBER: AMBER LED 100W

PAGE 4 OF 6

LINE

- 078 - LED DRIVER: DRIVER SHALL BE A HIGH RELIABILITY SYSTEM WITH
079 DESIGN FEATURES AND COMPONENT SET THAT PROVIDES FOR A 20 YEARS
080 LIFE EXPECTANCY. ELECTROLYTIC CAPACITORS USED IN THE POWER SUPPLY
081 DRIVER SHALL BE AIRCRAFT QUALITY OR BETTER. POWER SUPPLIES SHALL
082 BE TESTED FOR MEAN TIME BETWEEN FAILURE (MTBF) BY AN INDEPENDENT
083 LABORATORY TO MIL-HDBK-217F METHOD-STANDARDS AND RESULTS SHALL
084 EXCEED 300,000 HOURS AT 25°C (77°F) DESIGNED WITH 0-10V DIMMING
085 CAPABILITY
- 086 - ELECTRICAL: CLASS "A" SOUND RATING. 120-240 VOLTAGE AVAILABLE
087 WITH UNIVERSAL ELECTRONIC DRIVER. DRIVER POWER FACTOR IS GREATER
088 THAN (>) 90% AND TOTAL HARMONIC DISTORTION (THD) LESS THAN (<) 20%
089 FOR FULL LOAD.
- 090 - OFF-STATE POWER: LUMINAIRES SHALL NOT DRAW POWER IN THE OFF
091 STATE.
- 092 - EXCEPTION: LUMINAIRES WITH INTEGRAL OCCUPANCY, MOTION,
093 PHOTOCOMMANDS OR INDIVIDUALLY ADDRESSABLE FIXTURES WITH
094 EXTERNAL CONTROL AND INTELLIGENCE SHALL NOT EXCEED 0.5 WATTS
095 WHEN IN THE OFF STATE.
- 096 - FINISH: CORROSION RESISTANT POLYESTER POWDER PAINTED, MINIMUM 2.0
097 MIL. THICKNESS INCLUDING THE INTERNAL PART OF THE LUMINAIRE. THE
098 STANDARD COLOR MUST BE GRAY.
- 099 - FIXTURE WEIGHT: SHALL BE LESS THAN (<) 30 LB.
- 100 - SALT FOG TEST: LUMINARIE COMPONENTS AND APPLIED FINISHES SHALL
101 MEET THE 1000 HOUR SALT TEST AS PER ASTM B117 STANDARD.
- 102 - CONTROL RECEPTACLE: SHALL BE TWIST LOCK TYPE 7-PIN COOPER-NICKEL
103 CONTACTS. SHALL CONFORM REQUIREMENTS DETAILED IN ANSI C136.41
- 104 - SYSTEM RATED LIFE (70% LUMEN MAINTENANCE): LED MODULE(S) /
105 ARRAY(S) SHALL DELIVER AT LEAST 70% OF INITIAL LUMENS, WHEN

PUERTO RICO ELECTRIC POWER AUTHORITY
MATERIALS SPECIFICATION-CONTINUATION SHEET

CODE NUMBER: AMBER LED 100W

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LINE

- 106 INSTALLES FOR A MINIMUM OF 80,0000 HOURS AT AN ENVIROMENT OF 30°C
- 107 (86°F) AT OPERATING DRIVER CURRENT.
- 108 - COST ANALYSIS: LUMINAIRES SHALL PAST THROUGH LIFE CYCLE COST
- 109 ANALYSIS WHEN THE BID OPENS, $EC = P + 4.34 * l * CE * \frac{(1 + i)^n - 1}{i(1 + i)^n}$
- 110 1. EVALUATED PRICE = EC
- 111 2. QUOTED PRIZE OF LUMINAIRE = P
- 112 3. LUMINAIRE CONSUMED WATTAGE = l
- 113 4. AVERAGE ENERGY COSTS = CE = 0.25
- 114 5. INTEREST RATE = I = 10%
- 115 6. YEAR PERIODS = n = 15 YEARS
- 116 - METRIC CONVERSIONS AS PER LATEST ASTM
- 117 ***
- 118 ***
- 119 WARRANTY:
- 120 A LIMITED FIVE (5) YEARS SYSTEM WARRANTY SHALL BE PROVIDED FOR THE
- 121 REPLACEMENT OR REPAIR OF THE LUMINAIRE DUE TO ANY ELECTRICAL FAILURE
- 122 (INCLUDING LIGHT SOURCE AND OR POWER SUPPLIES/DRIVERS) AND SHALL BE
- 123 EVALUATED ON PUERTO RICO BEFORE ANY ACTION TO TAKE.
- 124 • IF THERE HAS BEEN GREATER THAN 10% OF INOPERABLE COMPONENTS
- 125 OF THE TOTAL NUMBER OF LED DURING FIVE (5) YEARS.
- 126 • PROVIDE A WRITTEN FIVE YEARS REPLACEMENT MATERIAL WARRANTY
- 127 FOR DEFECTIVE OR NON-STARTING LED SOURCE ASSEMBLIES.
- 128 • PROVIDE A FIVE YEARS REPLACEMENT MATERIAL WARRANTY ON ALL DRIVERS
- 129 (POWER SUPPLIES OR SURGE ARRESTERS).
- 130 • WARRANTY PERIOD SHALL BEGIN ON DATE OF POSSESSION. THE SUPPLIER
- 131 WILL PROVIDE PREPA WITH APPROPRIATE SIGNED WARRANTY CERTIFICATES.
- 132 ***
- 133 ***

PUERTO RICO ELECTRIC POWER AUTHORITY
MATERIALS SPECIFICATION-CONTINUATION SHEET

CODE NUMBER: AMBER LED 100W

PAGE 6 OF 6

LINE

134 INSPECTION:

135 THE ACCEPTANCE OF ANY MATERIAL OR EQUIPMENT SHALL NOT, RELIEVE THE
136 VENDOR FROM HIS RESPONSIBILITY TO MEET ALL THE REQUIREMENTS OF THIS
137 SPECIFICATION, AND IT SHALL NOT PREVENT SUBSEQUENT REJECTION IF SUCH
138 MATERIAL IS FOUND TO BE DEFECTIVE LATER.

139 ***

140 ***

141 ***

142 ***

143 ***

144 ***

145 REVISION NO. 0

146 PREPARED BY: RICARDO SÁNCHEZ SANTIAGO

147 SUBMITTED BY: HUMBERTO CAMPÁN COLÓN

148 RECOMMENDED BY: CARLOS J. LAUREANO RIVERA

149 APPROVED BY: CARLOS J. LAUREANO RIVERA

150 DATE:

Ricardo Sanchez Santiago 9/16/16
Humberto Campan Colon 19/11/16
Carlos Laureano Rivera 12/16/2016
Carlos Laureano Rivera 12/16/2016

Exhibit C-3

Focos LED de 125W

PUERTO RICO ELECTRIC POWER AUTHORITY
MATERIALS MANAGEMENT INFORMATION SYSTEM
CODIFIED MATERIAL SPECIFICATION

| | |
|--|-----------------------------|
| ACTION CODE: A | CODE NUMBER: LED 125W |
| SHORT DESCRIPTION: LED LUMINAIRE - 125W MAXIMUM 120-240V, 60 HZ (REPLACEMENT OF 200W HPS) | |
| TYPE CODE: PD | |
| ACTION CODES | TYPE CODES |
| A = Add | ED = Engr. Description |
| C = Change | ID = Inspection Description |
| D = Delete | PD = Purchase Description |
| 001 SPECIFIC NAME: | |
| 002 LUMINAIRE, ROADWAY LIGHTING LED, 125W MAXIMUM, 120-240V, 60 HZ. | |
| 003 **** | |
| 004 BASIC USE: | |
| 005 OUTDOOR ROADWAY LIGHTING. | |
| 006 SPECIAL REQUIREMENTS: | |
| 007 IN ORDER FOR THE LUMINAIRE TO BE APPROVED, MANUFACTURERS SHALL PROVIDE | |
| 008 THE FOLLOWING: | |
| 009 - LUMINAIRE PHOTOMETRIC TEST REPORT PER IES LM-79 AND LM-80, | |
| 010 INCLUDING: | |
| 011 1. NAME OF INDEPENDENT TEST LABORATORY: TEST LABORATORY SHALL HOLD | |
| 012 NATIONAL VOLUNTARY LABORATORY ACCREDITATION PROGRAM FOR THE | |
| 013 IES LM-79 PROCEDURE. | |
| 014 2. REPORT NUMBER | |
| 015 3. DATE | |
| 016 4. PHOTOMETRY | |
| 017 5. COLORIMETRY | |
| 018 6. LM-80 AND TM 21 ENERGY STAR TESTS REPORTS (6000 HOURS MINIMUM). | |
| 019 - DOCUMENTATION SUPPORTING CLAIMS OF EXPECTED L70 USEFUL LIFE FOR | |
| 020 PREPA SPECIFICATIONS AND FINAL VERSION OF LM-80 AND TM21 USING | |
| 021 EITHER OPTION: COMPONENT PERFORMANCE OR LUMINAIRE PERFORMANCE. | |
| 022 - COMPUTER MODELING OF FIXTURE LIGHT DISTRIBUTION | |

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- 023 RP-08 TABLE III. POINT-BY-POINT
- 024 PHOTOMETRIC ANALYSIS OF MAINTAINED LIGHT LEVEL SHALL BE SUBMITTED
- 025 USING LLF = 1
- 026 - SAMPLE FIXTURE FOR LAB TEST AND FIELD TRIAL REVIEW AND EVALUATION
- 027 MANUFACTURING FACILITY SHOULD COMPLY WITH THE FOLLOWING:
- 028 - ISO 9001 QUALITY MANAGEMENT SYSTEMS (SUBMIT COPY OF CERTIFICATE).
- 029 - RESTRICTION OF HAZARDOUS SUBSTANCES (ROHS) CERTIFICATION BY IPC
- 030 (ASSOCIATION CONNECTING ELECTRONICS INDUSTRIES) FOR THE LIGHT
- 031 ENGINE MANUFACTURING FACILITY (SUBMIT COPIES OF CERTIFICATES).
- 032 - ELECTROSTATIC DISCHARGE (ESD) FLOORING THROUGHOUT PRODUCTION AREA
- 033 OF THE LIGHT ENGINE MANUFACTURING FACILITY AND POWER SUPPLY
- 034 MANUFACTURING FACILITY (SUBMIT PHOTOGRAPHS OF PRODUCTION FLOOR IN
- 035 BOTH FACILITIES), ARE REQUIRED. IF THE COMPANY HAS OTHER ESD PRO-
- 036 TECTION MEASURE, IT MUST PROVIDE INFORMATION CORRESPONDINGLY.
- 037 - NITROGEN MUST BE PLUMBED INTO SOLDERING PROCESSES TO IMPROVE
- 038 QUALITY YIELD (SUBMIT PHOTOGRAPHS OF NITROGEN TANK IN POWER SUPPLY
- 039 AND LIGHT ENGINE MANUFACTURING FACILITIES).
- 040 - LEDs MUST BE STORED IN MOISTURE-PROOF CABINETS PRIOR TO PRODUCTION
- 041 (SUBMIT PHOTOGRAPHS OF CABINETS IN THE LIGHT ENGINE MANUFACTURING
- 042 FACILITIES). IF LED IS MOISTURE-PROOF AND HAVE NO NEED TO BE
- 043 STORED IN THE SPECIAL CABINETS, MANUFACTURER MUST SUBMIT INFORMA-
- 044 TION AND TESTS TO PROVE THIS.
- 045 - MINIMUM OF FIVE (5) YEARS OF EXPERIENCE IN MANUFACTURING LED-BASED
- 046 LIGHTING PRODUCTS.
- 047 QUANTITY:
- 048 ONE UNIT, PROPERLY LABELED FOR TESTING AND/OR ANALYSIS. DESCRIPTIVE
- 049 AND TECHNICAL LITERATURE SHALL BE SUPPLIED. AWARDS WILL BE MADE FOR
- 050 PRODUCTS THAT HAVE BEEN TESTED AND/OR APPROVED BY PREPA BEFORE THE

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051 BID OPENS.

052 ****

053 MARKINGS:

054 CONTAINER SHALL BE MARKED OUTSIDE WITH PREPA'S PURCHASE ORDER AND CODE
055 NUMBER. THE LUMINAIRE MUST BE MARKED WITH MANUFACTURING DATE INSIDE
056 THE POWER MODULE WITH PREPA'S CODE NUMBER IMPRESSED INSIDE LUMINAIRE.
057 THE LETTERS "AEE" AND WATTAGE (125W) (MINIMUM OF 2.5 INCHES) MUST BE
058 STAMPED ON THE HOUSING SO THAT IT CAN BE READ WHEN IT IS INSTALLED FROM
059 THE STREET OR SIDEWALK.

060 ****

061 NUMBER OF PIECES PER PACKAGE: ONE (1) UNIT PER BOX.

062 ****

063 ACCEPTANCE CRITERIA:

064 THIS PRODUCT REQUIRES QUALIFICATION. LATEST APPLICABLE CODES, STANDARDS
065 AND OTHER REGULATIONS, INCLUDING THE FOLLOWING:

066 1-IESNA LM-79-08 APPROVED METHOD FOR THE ELECTRICAL AND PHOTOMETRIC
067 MEASUREMENTS OF SOLID-STATE LIGHTING PRODUCTS. LM-79 REPORTS
068 SHALL BE PROVIDED BY THE NATIONAL VOLUNTARY LABORATORY ACCREDI-
069 TATION PROGRAM (NVLAP), ACCREDITED TEST FACILITY AND TESTED IN
070 ACCORDANCE WITH LM-79-08.

071 2-IESNA LM-80-08 (RECOMMENDED) APPROVED METHOD FOR MEASURING LUMEN
072 MAINTENANCE OF LED LIGHTING SOURCES.

073 3-LUMINAIRE DRIVER AND SURGE ARRESTER SHALL BE LISTED AT UL.

074 4-LUMINAIRE SHALL BE LISTED ON LIGHTING FACTS DEPARTMENT OF ENERGY
075 (DOE) (WWW.LIGHTINGFACTS.COM) ; OR QUALIFIED AT DESIGNLIGHTS
076 CONSORTIUM (DLC).

077 5-COMPLY WITH TITLE 47 CFR PART 15 CLASS A FOR INTERFERENCE.

078 ****

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079 DESCRIPTION:

080 LIGHT EMITTING DIODE-LED (LUMINARIE 200W HPS REPLACEMENT) 125W, 120-240

081 VOLTS, 60HZ. THE LUMINAIRE SHALL MEET THE FOLLOWING SPECIFICATIONS:

082 - CORRELATED COLOR TEMPERATURE (CCT); 3000°K

083 TABLE 1. ALLOWANCE NOMINAL CCT

| 084 | Manufacturer-Rated Nominal CCT (°K) | Allowed CCT from LM-79 Report |
|-----|--|----------------------------------|
| | | Measured CCT (°K) |
| | 3000 | 2750 TO 3220 |

085 IF NOMINAL CCT SPECIFIED IS NOT LISTED IN TABLE 1, MEASURED CCT SHALL

086 BE AS PER THE CRITERIA FOR \pm 250°K DEVIATIONS.

087 - COLOR RENDERING INDEX (CRI): MINIMUM OF 65.

088 - INITIAL LUMENS: 9000 MINIMUM

089 - LED DRIVER OPERATING CURRENT: 280 mA MAXIMUM OF 1A

090 - POWER FACTOR: GREATER THAN OR EQUAL (\geq) TO 0.90

091 - OPERATING TEMPERATURE: -20°C (-4°F) TO 40°C (104°F), WITH

092 OPERATING JUNCTION TEMPERATURE OF LED SHOULD NOT EXCEED

093 75% OF MAXIMUM RATED JUNCTION TEMPERATURE FOR THE LED

094 DURING OPERATION AT 30°C AMBIENT TEMPERATURE.

095 - LUMINAIRE EFFICACY: GREATER THAN OR EQUAL TO (\geq) 70 LM/W.

096 - LIGHT DISTRIBUTION: TYPE II OR TYPE III OR AS USER SPECIFIES.

097 - BUG RATINGS: B3 (MAXIMUM) - U1 (MAXIMUM) - G3 (MAXIMUM) AND UPLIGHT

098 UL & UH=0 (FULL CUTOFF). INTERNATIONAL DARK SKY ASSOCIATION (IDA)

099 APPROVED SEAL.

100 THE LUMINAIRE MUST CONSIST OF THE FOLLOWING:

101 - HOUSING: DIE-CAST ALUMINUM HOUSING. INCORPORATES A HEAT SINK

102 DIRECTLY INTO THE UNIT ENSURING MAXIMUM HEAT TRANSFER, LONG LED

103 LIFE AND A REDUCED EPA (NOT TO EXCEED 1.1 SQUARE FOOT). MEETS

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104 ANSI 3G VIBRATION STANDARDS. ALL HARDWARE SHALL BE CORROSION
105 RESISTANT. THE FIXTURE OPTICAL CAVITY SHALL BE IP-65 PER
106 ANSI C136.25, ELECTRICAL CAVITY OR ELECTRICAL COMPONENTS
107 SHALL BE A MINIMUM OF IP-54 AND LENSES MUST BE MADE OF UV
108 RESISTANCE ACRYLIC, POLYCARBONATE OR GLASS. POWER OPENING SHALL
109 BE AT THE BOTTOM OF THE LUMINAIRE WITH SLIP FITTER THAT SHALL
110 SECURE THE LUMINARIE TO AND IN ALIGNMENT WITH 1 1/4 TO 2 INCHES
111 PIPE BRACKET.
112 - TRANSIENT PROTECTION: TRANSIENT VOLTAGE AND SURGE SUPPRESSION
113 CAPABILITY THAT MEET OR EXCEEDS THE REQUIREMENTS OF ANSI/IEEE
114 C62.41-2002 LOCATION CATEGORY C LOW EXPOSURE.
115 - SURGE PROTECTION IF UTILIZED: SHALL RESET AUTOMATICALLY, FAIL
116 OPEN TO PROTECT LUMINAIRE, FIELD REPLACEABLE AND SHALL CONFORM
117 TO UL 1449.
118 - LED DRIVER: DRIVER SHALL BE A HIGH RELIABILITY SYSTEM WITH
119 DESIGN FEATURES AND COMPONENT SET THAT PROVIDES FOR A 20 YEARS
120 LIFE EXPECTANCY. ELECTROLYTIC CAPACITORS USED IN THE POWER SUPPLY
121 DRIVER MUST BE AIRCRAFT QUALITY OR BETTER. POWER SUPPLIES SHALL
122 BE TESTED FOR MEAN TIME BETWEEN FAILURE (MTBF) BY AN INDEPENDENT
123 LABORATORY TO MIL-HDBK-217F METHOD-STANDARDS AND RESULTS SHALL
124 EXCEED 300,000 HOURS AT 25°C (77°F) DESIGNED WITH 0-10V DIMMING
125 CAPABILITY
126 - ELECTRICAL: CLASS "A" SOUND RATING. 120-240 VOLTAGE AVAILABLE
127 WITH UNIVERSAL ELECTRONIC DRIVER. DRIVER POWER FACTOR IS GREATER
128 THAN (>) 90% AND TOTAL HARMONIC DISTORTION (THD) LESS THAN (<) 20%
129 FOR FULL LOAD.
130 - OFF-STATE POWER: LUMINAIRES SHALL NOT DRAW POWER IN THE OFF
131 STATE.

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- 132 - EXCEPTION: LUMINAIRES WITH INTEGRAL OCCUPANCY, MOTION,
- 133 PHOTOCONTROLS OR INDIVIDUALLY ADDRESSABLE FIXTURES WITH
- 134 EXTERNAL CONTROL AND INTELLIGENCE SHALL NOT EXCEED 0.5 WATTS
- 135 WHEN IN THE OFF STATE.
- 136 - FINISH: CORROSION RESISTANT POLYESTER POWDER PAINTED, MINIMUM 2.0
- 137 MIL. THICKNESS INCLUDING THE INTERNAL PART OF THE LUMINAIRE. THE
- 138 STANDARD COLOR MUST BE GRAY.
- 139 - FIXTURE WEIGHT: SHALL BE LESS THAN (<) 30 LB.
- 140 - SALT FOG TEST: LUMINARIE COMPONENTS AND APPLIED FINISHES SHALL
- 141 MEET THE 1000 HOUR SALT TEST, AS PER ASTM B117 STANDARD.
- 142 - CONTROL RECEPTACLE: SHALL BE TWIST LOCK TYPE 7-PIN COOPER-NICKEL
- 143 CONTACTS SHALL CONFORM REQUIREMENTS DETAILED IN ANSI C136.41.
- 144 - SYSTEM RATED LIFE (70% LUMEN MAINTENANCE) : LED MODULE(S) /
- 145 ARRAY(S) SHALL DELIVER AT LEAST 70% OF INITIAL LUMENS, WHEN
- 146 INSTALLED FOR A MINIMUM OF 80,000 HOURS AT AN AMBIENT TEMPERATURE
- 147 OF 30°C (86°F) AT OPERATING DRIVER CURRENT.
- 148 - COST ANALYSIS: LUMINAIRES SHALL PAST THROUGH LIFE CYCLE COST
- 149 ANALYSIS WHEN THE BID OPENS, $EC = P + 4.34 * l * CE * \frac{(1 + i)^n - 1}{i(1 + i)^n}$
- 150 1. EVALUATED PRICE = EC
- 151 2. QUOTED PRICE OF LUMINAIRE = P
- 152 3. LUMINAIRE CONSUMED WATTAGE = l
- 153 4. AVERAGE ENERGY COSTS = CE = 0.25
- 154 5. INTEREST RATE = i = 10%
- 155 6. YEAR PERIODS = n = 15 YEARS
- 156 - METRIC CONVERSIONS AS PER LATEST ASTM
- 157 WARRANTY:
- 158 A LIMITED TEN (10) YEARS SYSTEM WARRANTY SHALL BE PROVIDED FOR THE
- 159 REPLACEMENT OR REPAIR OF THE LUMINAIRE DUE TO ANY ELECTRICAL FAILURE

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- 160 (INCLUDING LIGHT SOURCE, SURGE ARRESTER AND POWER SUPPLIES/DRIVERS)
- 161 AND SHALL BE EVALUATED ON PUERTO RICO BEFORE ANY ACTION TO TAKE.
- 162 • IF THERE HAS BEEN GREATER THAN 10% OF INOPERABLE COMPONENTS
- 163 OF THE TOTAL NUMBER OF LED DURING THE TEN (10) YEARS.
- 164 • TEN (10) YEAR ON-SITE REPLACEMENT WARRANTY COVERING MATERIAL
- 165 AND FIXTURE FINISH. FINISH WARRANTY SHALL INCLUDE WARRANTY
- 166 AGAINST FAILURE OR SUBSTANTIAL DERTERIORATION SUCH A
- 167 BLISTERING, CRAKING OR PEELING.
- 168 WARRANTY PERIOD SHALL BEGIN ON DATE OF POSSESSION. THE SUPPLIER
- 169 WILL PROVIDE PREPA WITH APPROPRIATE SIGNED WARRANTY CERTIFICATES.
- 170 ***
- 171 ***
- 172 ***
- 173 ***
- 174 ***
- 175 ***
- 176 ***
- 177 INSPECTION:
- 178 THE ACCEPTANCE OF ANY MATERIAL OR EQUIPMENT SHALL NOT, RELIEVE THE
- 179 VENDOR FROM HIS RESPONSIBILITY TO MEET ALL THE REQUIREMENTS OF THIS
- 180 SPECIFICATION, AND IT SHALL NOT PREVENT SUBSEQUENT REJECTION IF SUCH
- 181 MATERIAL IS FOUND TO BE DEFECTIVE LATER.
- 182 REVISION NO. 4
- 183 PREPARED BY: RICARDO SÁNCHEZ SANTIAGO *Ricardo Sanchez Santiago* 09/12/16
- 184 SUBMITTED BY: HUMBERTO CAMPÁN COLÓN *Humberto Campan Colon* 12/19/16
- 185 RECOMMENDED BY: CARLOS J. LAUREANO RIVERA *Carlos Laureano Rivera* 12/19/16
- 186 APPROVED BY: CARLOS J. LAUREANO RIVERA *Carlos Laureano Rivera* 12/19/16
- 187 DATE: