TOWN OF QUEEN CREEK

STREET LIGHT DESIGN GUIDELINES AND STANDARD DETAILS

NOVEMBER 2019

1 STREET LIGHT DESIGN GUIDELINES

1.1 NEW DEVELOPMENT/PUBLIC STREETS

Street light installation on public streets shall conform to the standards set forth in this document. Electricity costs for street lighting on collector and local roadways in new developments will be provided by a Street Light Improvement District. Electricity costs for street lighting on arterial roadways shall be provided by Town.

Contact the Public Works Department for information on the process for creating a Street Light Improvement District in Town of Queen Creek.

Developers of all residential, commercial, industrial or other types of properties are responsible for the design and installation of street lighting on all streets within and adjacent to their sites. Street light plans shall be prepared and sealed by a licensed electrical engineer registered in the State of Arizona. The street lighting design shall be reviewed and approved by the Town.

1. Street light plans and details shall be included with the improvement plans.
2. All new subdivisions, new roadways, and in-fill projects on existing roadways shall use LED luminaires as specified in this Section unless otherwise approved by the Town Engineer. LED luminaires shall conform to the Town specifications.
3. Street lights shall be fully shielded (full cut-off) in such a manner that light emitted by the fixture, either directly from the lamp or indirectly from the luminaire, is projected below a horizontal plane running through the lowest point on the fixture where light is emitted. External reflectors are not allowed.
4. Spacing of street lights shall be based on the criteria shown in Table 1 below.
    a. For roads that are wider than shown in Table 1 due to deceleration lanes, dual left turn lanes, or landscape islands or other intermittent reasons, the street light spacing shall be reduced by 10-15% in these areas.
    b. For roads of non-standard cross sections, the Town may require photometric calculations.

Table 1: Street Light Spacing for Standard Districts

Street Type	Width FC-FC (ft)	Nominal Lumens	Maximum Spacing (ft)	Spacing Type
Principal Arterial	102’	12,500	95’	Staggered*
Major Arterial	76’	12,500	125’	Staggered*
Major Collector	50’	4,900	125’	Staggered*
Urban Residential Collector	36’	4,900	250’	Single Side
Urban Local	32’	4,900	500’	Single Side

*Staggered spacing is the distance between lights on opposite sides of street.

5. With Town approval, the maximum spacing shown above may be exceeded by 15% when there are extenuating circumstances such as utility conflicts.
6. On local streets, a light shall be located at each intersection, corner, and cul-de-sac, with maximum spacing as shown in Table 1.
7. Local/local, local/collector, and collector/collector intersections shall have at least one street light at the intersection. Arterial/collector, and arterial/local intersections shall have at least 2 street lights at the intersection. At signalized intersections, street light plans shall be coordinated with street lights mounted on traffic signals. Arterial/arterial intersections shall have at least 4 lights at the intersection typically mounted on the signal poles.
8. All new street lighting circuits shall be installed underground and will be owned and maintained by the utility company.
9. The developer shall coordinate all power distribution design and electrical service criteria with the utility company serving the lighting system.
10. The developer shall conform to the latest requirements of the serving utility and pay all fees for design and energization.

1.2 PRIVATE STREETS

The Town of Queen Creek does not require street lights on private streets. If developer chooses to install lights on private streets it must meet the following requirements.

1. Developer is responsible for all costs of design and installation of street light system.
2. Street light plans and details shall be included with the improvement plans.

3. Street lights shall be fully shielded (full cut-off) in such a manner that light emitted by the fixture, either directly from the lamp or indirectly from the luminaire, is projected below a horizontal plane running through the lowest point on the fixture where light is emitted. External reflectors are not allowed.

4. Maximum mounting height of 32 feet.

5. Minimum setback of 2.5’ from back of curb.

6. The developer/HOA is responsible for all maintenance and operations of all private street lighting.

1.3 STREET LIGHT PLAN REQUIREMENTS

Street light plans shall include the following information:

1. Show all proposed and existing curb, utility locations and sizes, easements, right-of-way, lot numbers, and other structural features.

2. Show pole type, luminaire mounting height, luminaire wattage, and lumen output.

3. Show centerline station and offset for all street lights.

4. On cover sheet include a key map showing all streets.

5. Provide a legend on the plans identifying the following items:

    a. Street light types with lumen output

    b. Pull boxes

    c. Conduit

6. Meandering sidewalks shall not conflict with street light poles.

7. Where sidewalk is attached to curb, street lights shall be centered 1’ behind sidewalk. Where sidewalk is detached, the standard setback on arterial streets is 5’ from back of curb, the standard setback on collector and local streets is 4’ from back of curb.

8. If there are utility or other conflicts the setback can be reduced to a minimum of 2.5’ from back of curb.

9. Street light poles shall be a minimum of 6 feet from the edge of a driveway wing.

10. Street light poles shall be a minimum of 6 feet from hydrants.

11. Street light poles shall not be located in the radius of intersections.

12. Street light poles shall be oriented perpendicular to street.

13. All street lights to be located within right-of-way. When necessary due to conflicts, street lights may be in PUE or roadway easement with Town approval.

14. Tops of all pole foundations and pull boxes shall be flush with sidewalk grade unless otherwise noted.

15. Show all existing and proposed water lines and fire hydrants and provide dimensional ties to water lines and fire hydrants where potential conflicts may occur.

16. All future and existing street lights adjacent to and within 300 feet from the first proposed street light must be shown with stationing and dimensional ties to the street centerline.

17. Street lights on lot frontages in residential areas shall be located at property lines whenever possible.

18. All construction phasing must be shown and labeled on the plans.

19. Street light plans will be submitted at a scale no smaller than 50 feet to one inch. Final light pole locations will be shown on the Paving and/or Utility plans.

20. Street light plan submittals will be coordinated through the normal plan approval process and shall be submitted with the civil improvement plans.

21. The approved street light plans shall be submitted to SRP for final design of power distribution for street lights. The developer is responsible for all coordination with SRP.

1.4 STREETLIGHT POLES

1. All poles and mast arms shall be steel construction with dark bronze finish per TOQC Details.

2. Pole heights and arm types to be used on standard local, collector, and Arterial streets shall be per Table 2 below.

Table 2: Pole and Arm Dimensions

Street Type	Mounting Height	Arm
Arterial	32’-0”	12’x8’
Collector	25’-6”	2’
Local	25’-6”	2’

3. All poles shall be foundation mounted.

4. Poles in the Downtown District shall match the style of existing poles in this area.

5. Contractors shall submit technical material specifications on all items listed above for Town review and approval.

1.5 LED LUMINAIRES

LED luminaires shall meet the following specifications.

1. Luminaire Correlated Color Temperature (CCT) shall be 3000K binned per ANSI C78.377-2008.
2. Luminaire shall have typical Color Rendering Index (CRI) ≥ 65.
3. CCT and CRI of luminaire shall be tested and measured in accordance with LM-79.
4. Luminaire shall have the lumen output, and IESNA TM-15 BUG rating per table below. Uplight shall be zero (0) light above 90-degrees.

Table 3: Luminaire Types

Lumen Designation	Nominal Lumens	Max BUG Rating	Replaces HPS
5L	4,900 ±12%	B1-U0-G1	100W
12L	12,500 ±10%	B2-U0-G3	250W

5. Luminaire efficacy shall be a minimum of 100 lumens per watt.
6. Luminaires must be independently tested and comply with IESNA LM79-08 and LM80-08. A copy of all LM79 and LM80 independent test reports shall be provided to the Town upon request.
7. Luminaires shall have discreet LED chips. Chip on board are not allowed.
8. The luminaire shall operate from a nominal 120-277 volt, 60 Hz power source and shall be capable of starting and operating the optic assembly(s) within the limits specified by the LED manufacturer.
9. Luminaire shall have a minimum system power factor of 0.9 tested and specified at 120V input at full power.
10. Luminaire shall have maximum total harmonic distortion (THD) < 20% tested and specified at 120V input at full power.
11. Driver shall have a minimum life rating of 90,000 hours at 25º C.
12. The luminaire shall contain prewired integral drivers and optical assembly that shall provide an asymmetric medium distribution type. Internal labeling shall be in accordance with ANSI standards.

13. Luminaire shall have UL Class 1 power supply units (i.e. drivers) operating in DC constant current mode.

14. Luminaire shall have EMI compliance with FCC 47 CFR Part 15 Class A.

15. The luminaire circuitry shall include surge protection devices (SPD) to withstand high repetition noise transients as a result of utility line switching, nearby lightning strikes, and other interference. Minimum surge protections shall be 10 kV/5 kA per ANSI C136.2 (2015) Enhanced category.

16. Off-state power draw shall be 0 watts (excluding PE or remote-control devices).

17. Electrical cavity shall use only copper wire within the fixture.

18. Terminal block shall be oriented to be lineman friendly within the electrical cavity to allow for easy wiring. Luminaire shall have a minimum 3-lead terminal board mounted within the housing. Terminal board screws shall be of the captive type with wire grips that raise and lower with the terminal screw. Terminals shall be capable of accepting #8 to #14 AWG wire.

19. Cooling shall be done with heat sinks. No fans, pumps, or liquids shall be used.

20. Manufacturer must have a minimum of a 15-year history of designing and manufacturing outdoor luminaires and at least 10 years of LED design history in some form of outdoor application which can include signage, traffic signals or roadway/parking fixtures.

21. A limited system warranty must be provided for the replacement or repair of the luminaire due to any electrical failure (including light source and or power supplies/drivers) for ten (10) years.

22. Warranty shall not be affected by opening the power door and/or accessing the electrical cavity.

23. Luminaire shall meet 3G vibration per ANSI C136.32-2001.

24. Finish shall be corrosion resistant Polyester powder paint capable of surviving the ASTM B117 salt fog environment for a minimum of 500 hours without blistering or peeling.

25. The coating must demonstrate the gloss retention of greater than or equal to 90% for 500 hours QUV test per ASTM G154 UVB-313, 4-hour UV-B 60 degrees Celsius, 4-hour condensation 50 degrees. Dry film thickness of the powder paint shall be a minimum of 2.5 mils thickness. Fixture color shall match the pole color.

26. Finish Color shall be dark bronze unless otherwise approved by engineering department.

27. Luminaire housing and door shall be die-cast aluminum, and shall be UL listed for wet locations.

28. Luminaire shall be UL 1598 listed for operating temperature range of -10º C to +50º C.

29. Lumen maintenance at 50,000 hours and 40°C ambient based on testing per TM-21 shall be 90% or greater. Lumen depreciation data per LM-80 and TM-21 at 40°C ambient shall be available.

30. Luminaire shall have 7-pin locking ANSI C136.41 photocell receptacle.

31. Drivers shall be dimming type with 0-10 volt leads wired to 7-prong photocell receptacle.

32. Heat sink fins shall be incorporated into housing to maximize heat transfer and minimize thermal impacts of environmental conditions such as debris-clogged fins.

33. Slipfitter in the housing shall contain two or four-bolt clamp fastening to mount on 1.66” to 2.375” O.D. horizontal tenons and provide +/- 5 degrees of tilt adjustment.

34. The effective projected area (EPA) shall not exceed 1.2 square feet maximum and 35 lb weight.

35. Luminaire shall have an option for a field installable house side shield from the manufacturer.

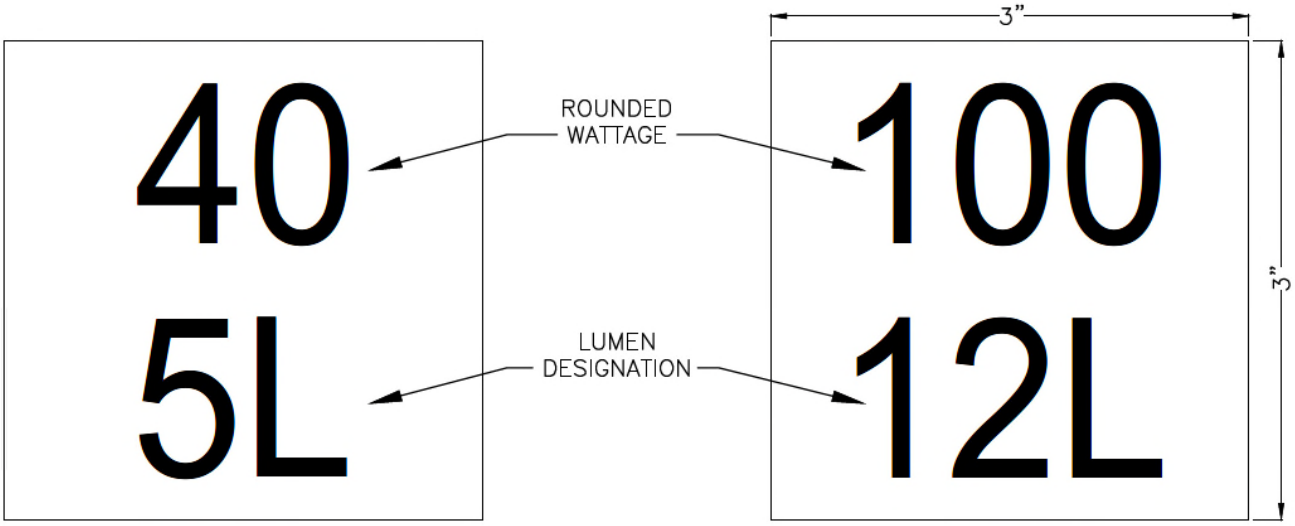
36. Luminaire shall have an external label for field identification.

    a. Label shall meet the physical requirements, dimensions, and font size per ANSI C136.15 (2015): large 3” marker type.

    b. Top row of label shall indicate luminaire wattage rounded to nearest 10 watts per ANSI C136.15 (2015).

    c. Bottom row of label shall indicate Lumen Designation per Table 3.

    d. See example labels below for information to be shown on label:



1.6 PHOTOELECTRIC CONTROL

All photocells for LED luminaires shall be long-life NEMA twist-lock type that meet the following requirements:

1. 15-year rated life with minimum 10 year warranty.
2. Meet surge protection level 10 kV/5 kA per ANSI C136.2 (2015) enhanced category
3. Minimum 510 Joule MOV surge protection component
4. Designed to withstand high in-rush current of LED luminaires
5. ANSI C136.10 compliant
6. Fail mode OFF
7. 2-5 second turn-off delay
8. Voltage range 105-305 VAC, 60 Hz
9. Operating temperature range -40º to 70ºC
10. Load Rating 1800 VA driver or ballast

1.7 APPROVED PRODUCTS

Contact the Town of Queen Creek Engineering department for the current approved products list of for LED luminaires and photocells.

For a luminaire or photocell to be considered as an approved product documentation showing compliance with all performance, mechanical, and photometric requirements as detailed above shall be provided to the Town. The documentation shall be highlighted and have numbers corresponding to each item in specification Section 1.5 for luminaires or Section 1.6 for photocells. For example, the portion of luminaire cutsheet sheet that shows compliance with 3000K CCT shall be highlighted and have number 1 written next to it.

Contact Town of Queen Creek to acquire examples of the typical photometric calculations that must be provided for the roadway types listed in Table 1.

1.01 GENERAL NOTES:
THE FOLLOWING INFORMATION IS PROVIDED TO EMPHASIZE CRITICAL WORK AND IS INTENDED TO SUPPLEMENT THE SPECIFICATIONS. SHOULD THERE BE A CONFLICT WITH THE SPECIFICATIONS, THIS DOCUMENT SHALL TAKE PRECEDENCE.

THE CONTRACTOR SHALL COMPLY WITH STATE AND TOWN STATUTES, AND MANUFACTURER'S RECOMMENDATIONS.

EQUIPMENT SUBMITTALS SHALL BE NEATLY GROUPED AND ORGANIZED. PERTINENT INFORMATION SHALL BE HIGHLIGHTED, AND THE SPECIFIC PRODUCT SHALL BE IDENTIFIED. ALL SUBMITTALS SHALL BE COMPLETE, AND PRESENTED IN ONE ELECTRONIC PDF PACKAGE. THE SUBMITTAL SHALL INCLUDE A COMPLETE LIST OF THE EQUIPMENT AND MATERIALS, INCLUDING THE MANUFACTURER'S NAME, PRODUCT SPECIFICATION, & CATALOG NUMBERS.

PRIOR TO SUBMITTING A PROPOSAL, THE BIDDER SHALL EXAMINE ALL GENERAL CONSTRUCTION DRAWINGS AND VISIT THE CONSTRUCTION SITE TO BECOME FAMILIAR WITH EXISTING CONDITIONS UNDER WHICH HE WILL OPERATE AND WHICH WILL IN ANY WAY AFFECT THE WORK UNDER THE CONTRACT. NO SUBSEQUENT ALLOWANCE WILL BE MADE IN THIS CONNECTION IN THE BEHALF OF THE CONTRACTOR FOR ANY ERROR OR NEGLIGENCE ON HIS PART.

PRIOR TO ORDERING ANY MATERIALS OR DOING ANY WORK, THE CONTRACTOR SHOULD VERIFY DIMENSIONS AT THE SITE. IMMEDIATELY REPORT DIFFERENCES TO THE ENGINEERING MGR. AND SHOULD NOT PROCEED WITH WORK UNTIL THE ENGINEERING MGR. RENDERS A DECISION. NO EXTRA CHARGES OR COMPENSATION WILL BE ALLOWED FOR DIFFERENCES IN ACTUAL DIMENSIONS AND DIMENSIONS INDICATED ON THE DRAWINGS.

1.01 GENERAL:
THE ELECTRICAL CONTRACTOR SHALL COMPLY WITH ALL LICENSING REQUIREMENTS SET FORTH BY THE STATE REGISTRAR OF CONTRACTORS OFFICE TO PERFORM WORK RELATING TO STREET LIGHT INSTALLATION IN THE TOWN RIGHT-OF-WAY.

ONE PROJECT UNDERGROUND UTILITIES (RIGHT OF WAY) PERMIT AND ONE STREETLIGHT PERMIT FOR EACH STREET LIGHT POLE SHALL BE OBTAINED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

THE OWNER OR CONTRACTOR SHALL PROVIDE THE TOWN WITH THE SRP JOB NUMBER, SRP CONTACT NAME, AND ADDRESS THAT THE LETTER OF AUTHORIZATION SHALL REFERENCE.

1.02 WORKING / "AS BUILT" PLANS:
ACCEPTANCE OF THE COMPLETED IMPROVEMENTS WILL NOT BE GIVEN UNTIL 4 MIL PHOTO MYLAR REPRODUCIBLE "AS BUILT" PLANS HAVE BEEN SUBMITTED TO AND APPROVED BY THE TOWN ENGINEER.

1.03 LIGHT POLES:
FINAL STREET LIGHT LOCATIONS SHALL BE COORDINATED WITH TOWN ENGINEERING INSPECTOR. LIGHT POLES SHALL BE INSTALLED PLUMB, BE ADJUSTED TO PROVIDE PROPER ALIGNMENT TO THE ROADWAY BEING LIGHTED AND BE PROPERLY GROUNDED WHEN THE INSTALLATION IS COMPLETED.

1.04 FOUNDATION:
THE HOLE FOR THE FOUNDATION SHALL BE AUGURED OR HAND DUG, ANY EXCEPTION SHALL BE PRE-APPROVED BY THE TOWN'S STREETLIGHT MANAGEMENT SECTION. ANCHOR BOLTS INSTALLED IN FOUNDATIONS SHALL BE PROVIDED WITH DOUBLE NUTS AND WASHERS. ANCHOR BOLTS WILL BE SET IN PLACE AND SUPPORTED BY THE USE OF A TEMPLATE (SUPPLIED BY THE CONTRACTOR) TO MAINTAIN THE TRUE BOLT CIRCLE BEFORE THE CONCRETE IS POURED.

STREETLIGHT MANAGEMENT SHALL INSPECT THE WORK BEFORE THE CONCRETE IS POURED AND MUST BE CONTACTED 48 HOURS BEFORE THE SCHEDULED POURING. THE TOP OF THE FOUNDATION SHALL BE FLUSH WITH TOP OF SIDEWALK, TROWEL FINISHED AND LEVEL. SURPLUS EXCAVATION SHALL BE LEGALLY DISPOSED OF BY THE CONTRACTOR.

1.05 LUMINAIRES:
LUMINAIRES SHALL BE INSTALLED LEVEL AND INCLUDE A LAMP AND PHOTOCELL. CONTRACTOR SHALL ASSURE THAT THE LUMINAIRES SHALL BE FREE OF DUST, DIRT OR ANYTHING THAT WOULD IMPAIR THE OUTPUT OF THE LIGHT BEFORE LEAVING THE SITE. LUMINAIRES FURNISHED WITH MULTI-TAP BALLASTS SHALL BE REWIRED OR RECONNECTED TO MATCH THE VOLTAGE SUPPLIED BY THE ELECTRIC UTILITY COMPANY.

1.06 WIRING:
WIRING SHALL BE INSTALLED PER UTILITY STANDARDS.

1.07 GROUNDING:
EACH POLE SHALL HAVE A 8' X 5/8" COPPER CLAD GROUND ROD DRIVEN BENEATH PULL BOX. INSTALL #6 BARE COPPER LEAD FROM THE GROUND ROD IN PULL BOX TO LANDING LUG IN STREET LIGHT POLE HAND HOLE.

1.08 PULL BOXES:
EXCAVATION FOR PULL BOXES AND MATERIAL SPECIFICATION SHALL BE PER THE ELECTRIC UTILITY COMPANY STANDARDS.

1.09 TRENCH:
TRENCH SHALL BE INSTALLED PER THE UTILITY COMPANY PLANS AND STANDARDS. THE USE OF A COMMON ELECTRIC UTILITY COMPANY TRENCH IS PERMITTED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO CONTACT THE UTILITY COMPANY FOR COORDINATION OF TRENCHING AND THE INSTALLATION OF CONDUIT.

1.10 CONDUIT:
MAINLINE CONDUIT SHALL BE PER UTILITY COMPANY STANDARDS. CONDUIT FROM PULL BOX TO POLE SHALL BE 1 INCH PVC CONDUIT OR EQUAL. CONDUIT MUST BE UL RATED AND SUITABLE FOR UNDERGROUND USE.

1.11 CONNECTIONS:
CONNECTIONS SHALL BE PER UTILITY STANDARDS.

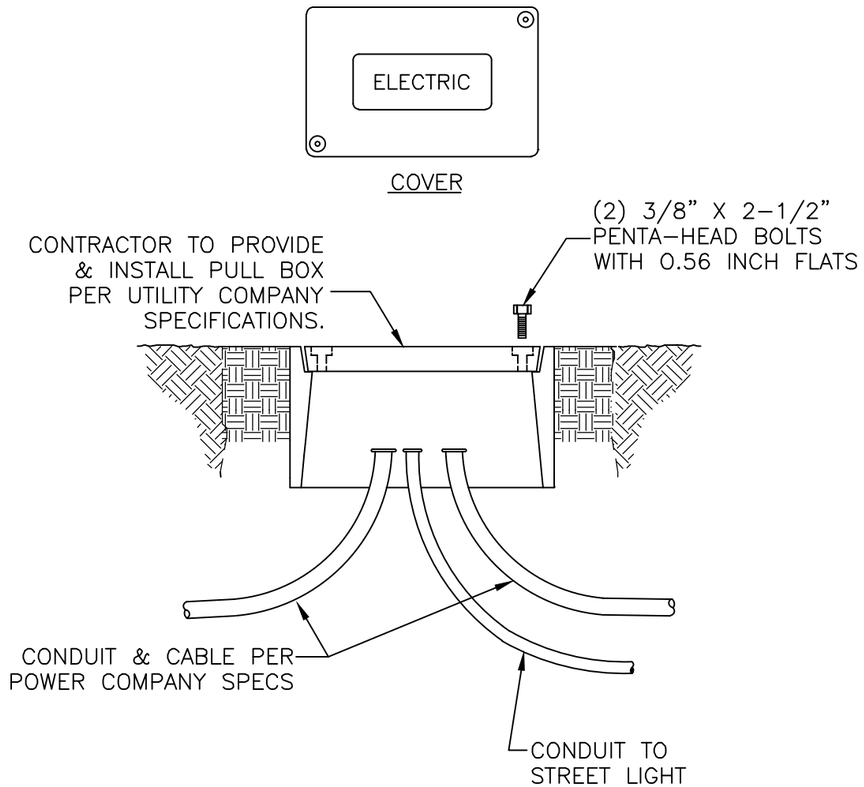
1.12 LIGHT POLE IDENTIFICATION:
THE CONTACTOR SHALL FURNISH AND INSTALL A NUMBER ON EACH LIGHT POLE. STREET LIGHT POLE IDENTIFICATION AND SPECIFICATIONS WILL BE PROVIDED BY THE TOWN.

1.13 RESTORATION:
IT IS THE CONTRACTOR'S RESPONSIBILITY TO RESTORE ALL PROPERTY, LANDSCAPING, PAVING AND DRIVEWAYS THAT ARE DISTURBED DURING STREET LIGHT CONSTRUCTION TO THEIR ORIGINAL CONDITION IN CONFORMANCE WITH "MAG" SPECIFICATION SECTION 107.9.

1.14 PERFORMANCE TEST:
PRIOR TO ACCEPTANCE, THE DEVELOPER SHALL ENERGIZE AND OPERATE THE ENTIRE ROADWAY LIGHTING SYSTEM, FROM SUNSET TO SUNRISE FOR TWO CONSECUTIVE DAYS WITHOUT INTERRUPTION OR FAILURE. IF A LUMINAIRE SHOULD FAIL, IT SHALL BE IMMEDIATELY REPLACED.

1.15 WARRANTY:
THE CONTRACTOR SHALL GUARANTEE ALL WORK FOR A PERIOD OF ONE YEAR FROM THE DATE OF FINAL ACCEPTANCE BY THE ENGINEERING MANAGER, AGAINST IMPERFECT WORKMANSHIP, FAILURE, MALFUNCTION OF MATERIALS AND/OR EQUIPMENT DUE TO FAULTY OR IMPERFECT WORKMANSHIP. THIS GUARANTEE IS TO BE IN WRITING TO THE TOWN AT THE TIME OF ISSUING FINAL ACCEPTANCE. WORK FOUND TO BE DEFECTIVE WITHIN THE WARRANTY PERIOD SHALL BE REPLACED WITHOUT COST TO THE TOWN.

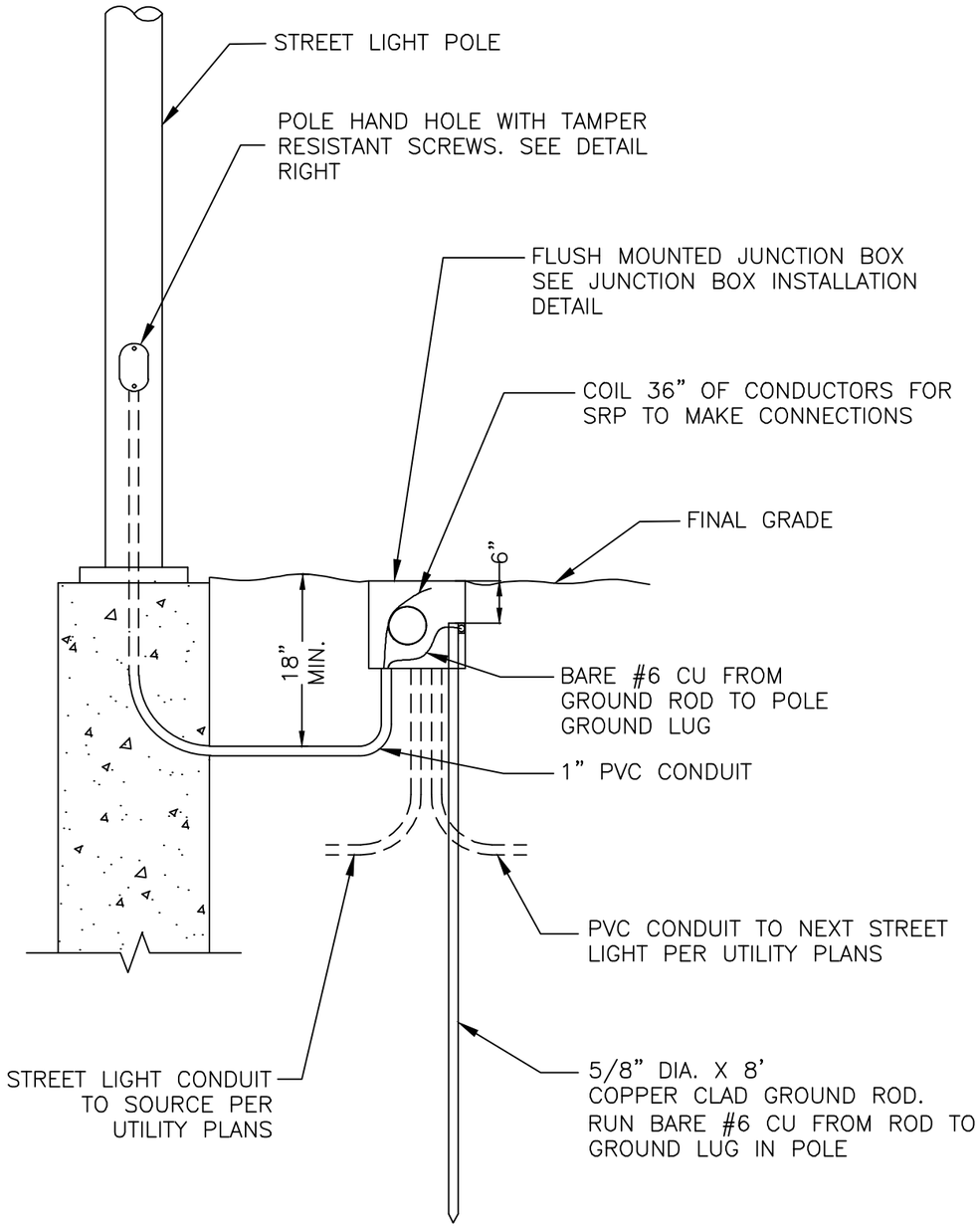
TOWN OF QUEEN CREEK STANDARD DETAIL	STREET LIGHT GENERAL NOTES	LT-1

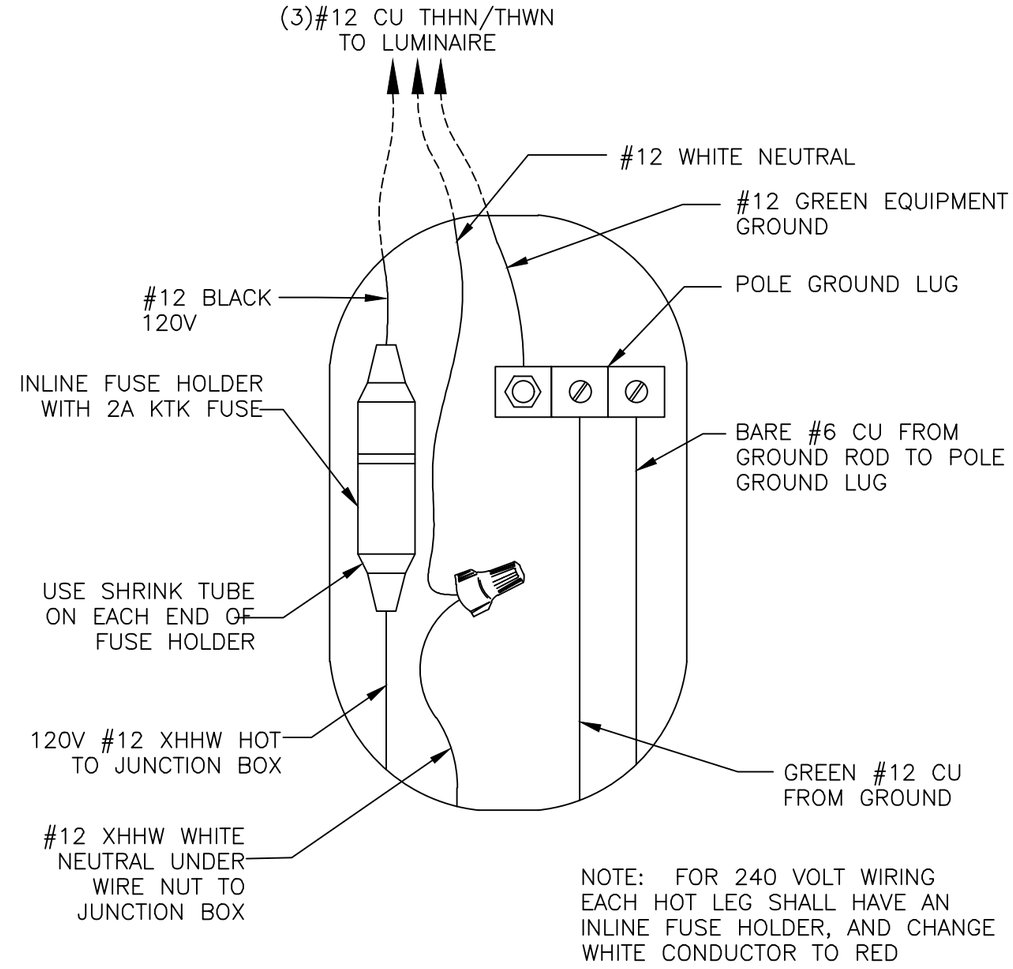


NOTES:

1. PULL BOXES ARE TO BE INSTALLED FLUSH WITH SIDEWALK. IF NO SIDEWALK, SET 1" ABOVE TOP OF CURB.
2. AFTER PULL BOX IS SET, BACKFILL WITH EXCAVATED MATERIAL AND THOROUGHLY COMPACT.
3. WHERE PULL BOXES ARE INSTALLED IN CONCRETE AREAS, 1/2" PRE-MOLDED EXPANSION JOINT SHALL BE INSTALLED AROUND PULL BOX.
4. CONDUCTORS SHALL HAVE A MINIMUM OF 36" SLACK FROM CONDUIT AND BELL.
5. PULL BOXES SHALL BE INSTALLED OUTSIDE OF CONCRETED AREAS, PEDESTRIAN TRAILS, AND VEHICULAR TRAFFIC AREAS.

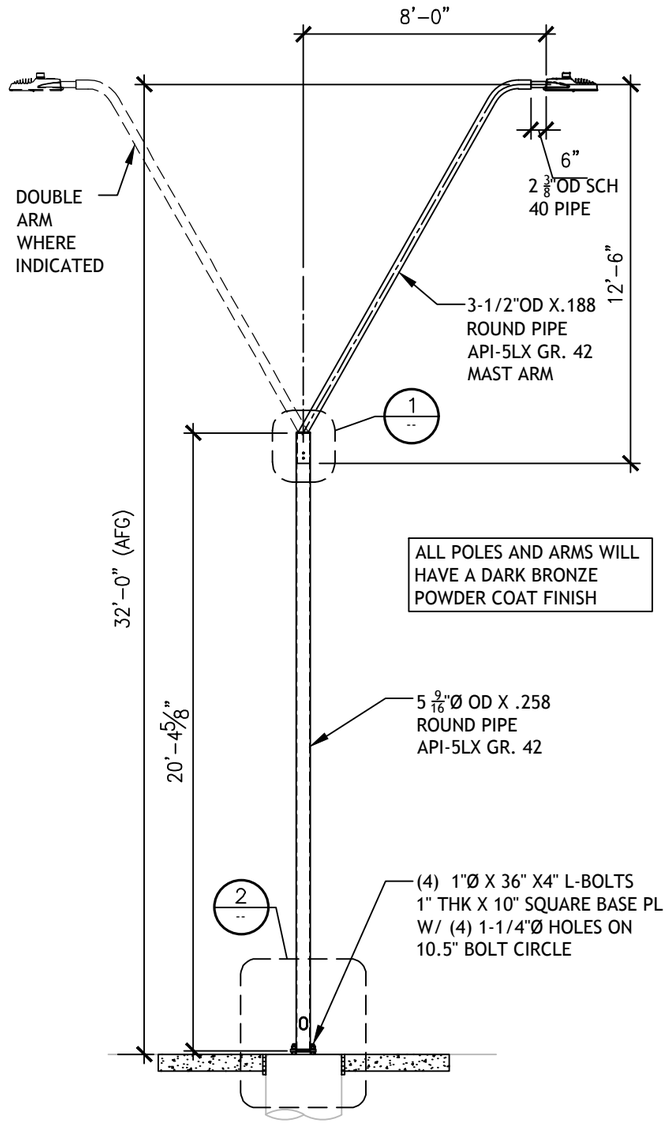
TOWN OF QUEEN CREEK STANDARD DETAIL	STREET LIGHT PULL BOX	LT-2



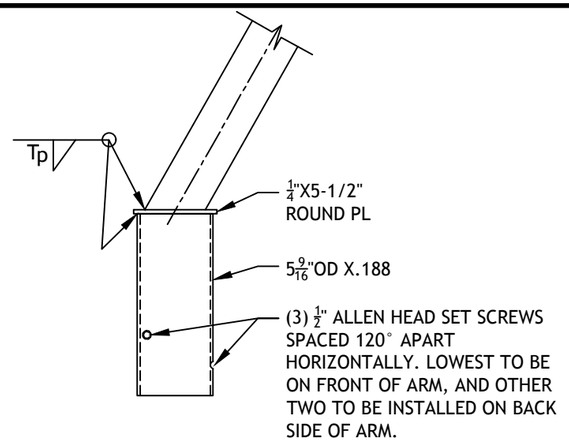


POLE HAND HOLE FUSING AND GROUNDING DETAIL

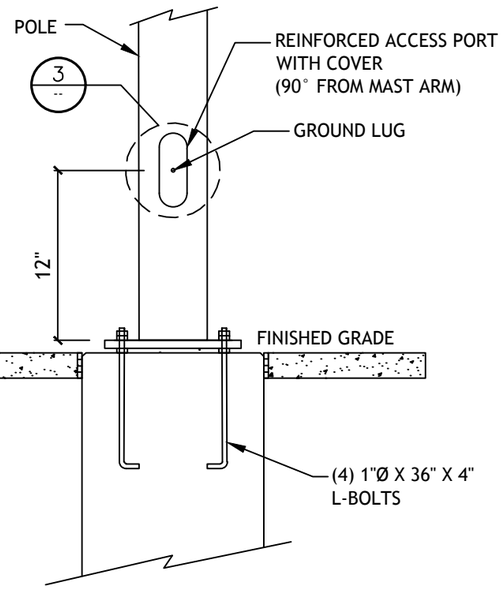
TOWN OF QUEEN CREEK STANDARD DETAIL	GROUNDING & FUSING DETAIL	LT-3



ALL POLES AND ARMS WILL HAVE A DARK BRONZE POWDER COAT FINISH



1 - ARM ATTACHMENT

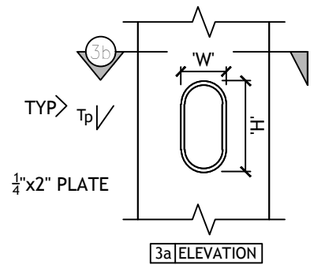


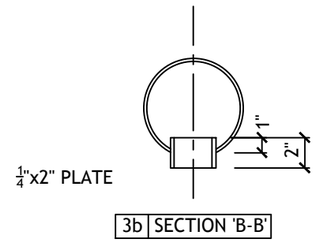
2 - BASE DETAIL

HAND HOLE SIZE		
LABEL	'W'	'H'
3"x5"	3"	5"

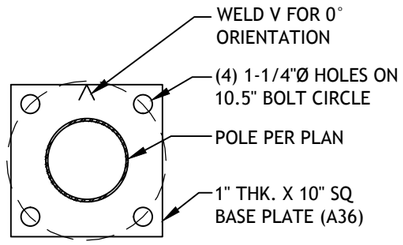
ALL PORTS (HAND HOLES) SHALL HAVE A COVER

T_P = THICKNESS OF POLE



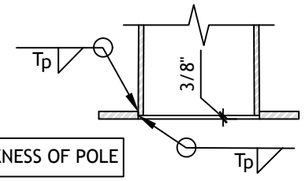


3 - HAND HOLE



BASE PLATE SHALL BE POWDER COATED.

4 - BASE PLATE



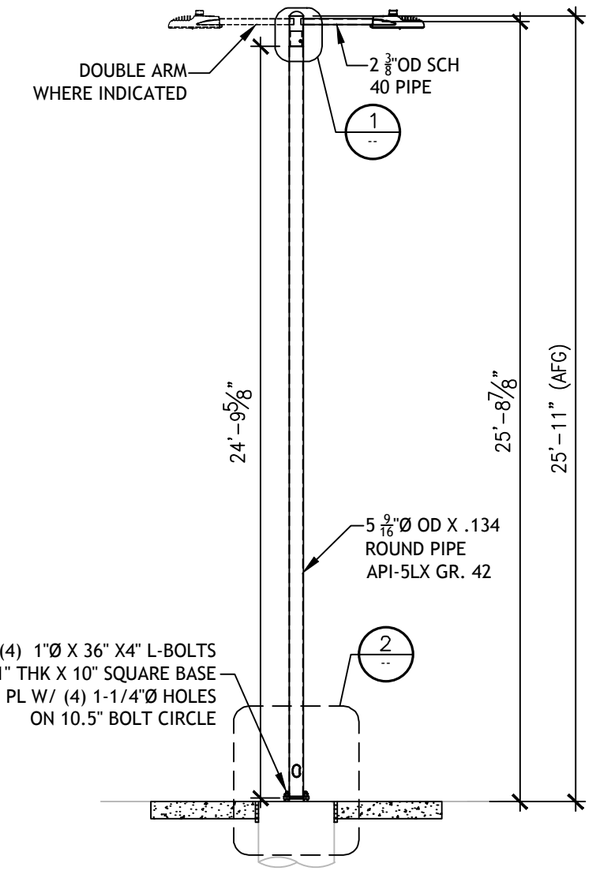
T_P = THICKNESS OF POLE

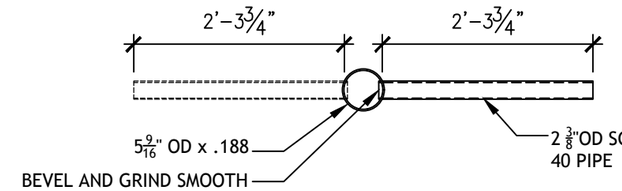
5 - POLE TO BASE PLATE WELD

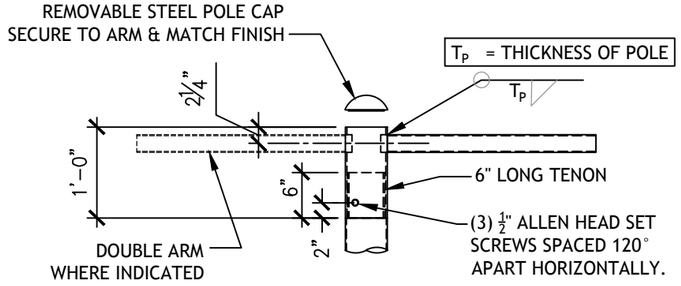
GENERAL NOTES:

1. ALL STEEL SHALL MEET THE REQUIREMENTS OF THE "STANDARD SPECIFICATIONS FOR STRUCTURAL STEEL" ASTM A36, UNLESS OTHERWISE NOTED ON THE STRUCTURAL PLANS OR BELOW.
2. ALL ROUND STEEL PIPE SHALL MEET THE REQUIREMENTS OF API–5LX GR.42.
3. ALL WELDED CONNECTIONS SHALL CONFORM TO THE LATEST VERSION OF THE AMERICAN WELDING SOCIETY AWS D1.1 CODE (LATEST EDITION). ALL WELD ELECTRODES OR WIRE SHALL AT A MINIMUM CONFORM TO E70 ELECTRODES (70 KSI YIELD).
4. ALL ANCHOR BOLTS SHALL BE HOT–DIPPED GALVANIZED (HDG) IN ACCORDANCE WITH THE ASTM A153 STANDARD.
5. THE HANDHOLE CONSISTS OF A 3" X 5" OVAL REINFORCED FRAME WITH 16 GAUGE COVER, STEEL ATTACHMENT BAR, AND ¼" SCREW. A GROUNDING LUG IS INSTALLED INSIDE THE POLE SHAFT OPPOSITE THE HANDHOLE OPENING. THE HANDHOLE IS WELDED IN THE POLE SHAFT AND LOCATED AT 12" ABOVE THE BASE.
6. AFTER FABRICATION, THE POLE IS SAND BLASTED TO A NEAR WHITE FINISH, AFTER SANDBLASTING, THE POLE SHALL BE POWDER COATED. APPLY POLYESTER POWDER ELECTROSTATICALLY AND CURED TO A MINIMUM 2.5 MIL. THICKNESS

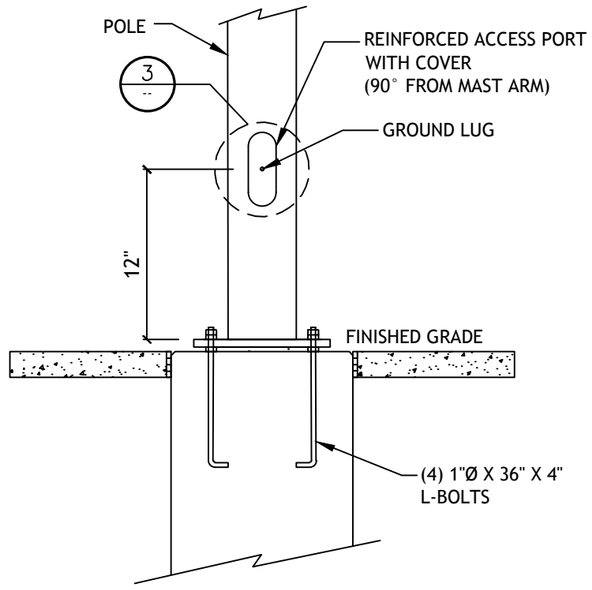
TOWN OF QUEEN CREEK STANDARD DETAIL	ARTERIAL STREET LIGHT POLE	LT-4







1 - ARM ATTACHMENT

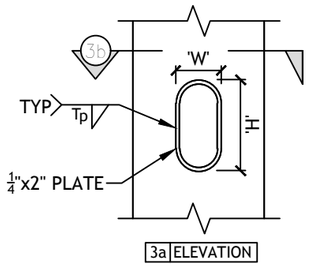


2 - BASE DETAIL

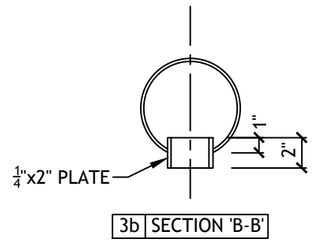
HAND HOLE SIZE		
LABEL	'W'	'H'
3"x5"	3"	5"

ALL PORTS (HAND HOLES) SHALL HAVE A COVER

T_P = THICKNESS OF POLE

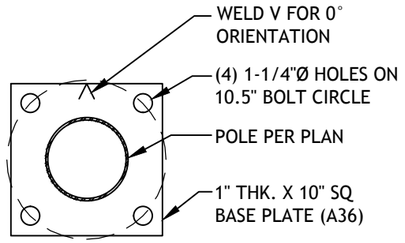


3a ELEVATION



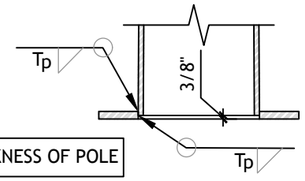
3b SECTION 'B-B'

3 - HAND HOLE



BASE PLATE SHALL BE POWDER COATED.

4 - BASE PLATE



T_P = THICKNESS OF POLE

5 - POLE TO BASE PLATE WELD

GENERAL NOTES:

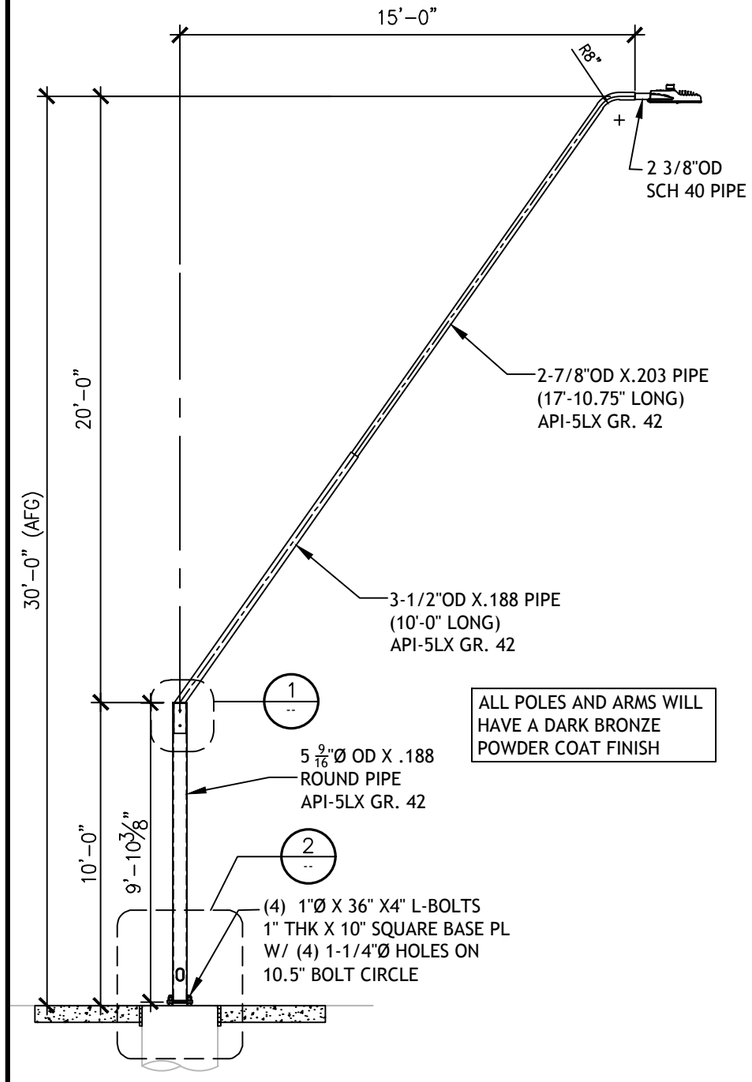
1. ALL STEEL SHALL MEET THE REQUIREMENTS OF THE "STANDARD SPECIFICATIONS FOR STRUCTURAL STEEL" ASTM A36, UNLESS OTHERWISE NOTED ON THE STRUCTURAL PLANS OR BELOW.
2. ALL ROUND STEEL PIPE SHALL MEET THE REQUIREMENTS OF API-5LX GR.42.
3. ALL WELDED CONNECTIONS SHALL CONFORM TO THE LATEST VERSION OF THE AMERICAN WELDING SOCIETY AWS D1.1 CODE (LATEST EDITION). ALL WELD ELECTRODES OR WIRE SHALL AT A MINIMUM CONFORM TO E70 ELECTRODES (70 KSI YIELD).
4. ALL ANCHOR BOLTS SHALL BE HOT-DIPPED GALVANIZED (HDG) IN ACCORDANCE WITH THE ASTM A153 STANDARD.
5. THE HANDHOLE CONSISTS OF A 3" X 5" OVAL REINFORCED FRAME WITH 16 GAUGE COVER, STEEL ATTACHMENT BAR, AND ¼" SCREW. A GROUNDING LUG IS INSTALLED INSIDE THE POLE SHAFT OPPOSITE THE HANDHOLE OPENING. THE HANDHOLE IS WELDED IN THE POLE SHAFT AND LOCATED AT 12" ABOVE THE BASE.
6. AFTER FABRICATION, THE POLE IS SAND BLASTED TO A NEAR WHITE FINISH, AFTER SANDBLASTING, THE POLE SHALL BE POWDER COATED. APPLY POLYESTER POWDER ELECTROSTATICALLY AND CURED TO A MINIMUM 2.5 MIL. THICKNESS

TOWN OF QUEEN CREEK STANDARD DETAIL

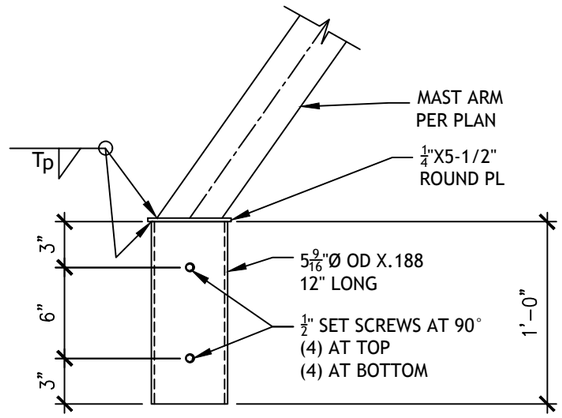
COLLECTOR/RESIDENTIAL STREET LIGHT POLE

LT-5

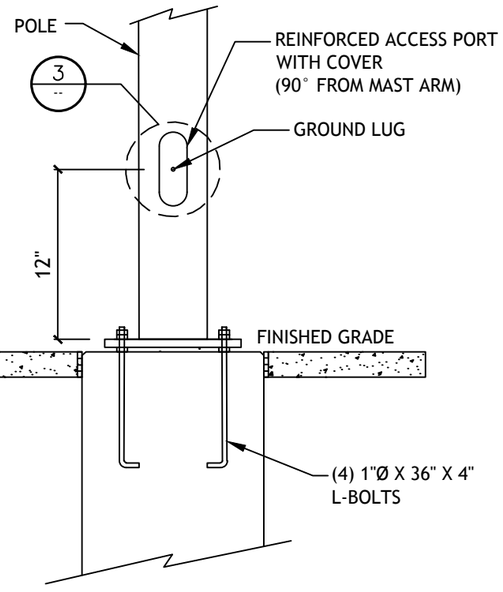
THIS POLE SHALL ONLY BE USED WHERE THERE ARE CONFLICTS WITH OVERHEAD ELECTRIC LINES. POLE SHALL BE SETBACK 3.5' MINIMUM FROM BACK OF CURB.



ALL POLES AND ARMS WILL HAVE A DARK BRONZE POWDER COAT FINISH



1 - ARM ATTACHMENT

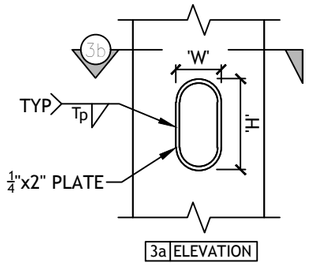


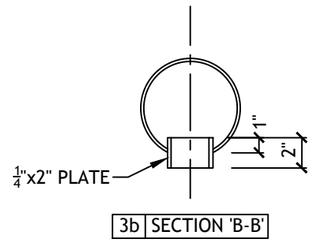
2 - BASE DETAIL

HAND HOLE SIZE		
LABEL	'W'	'H'
3"x5"	3"	5"

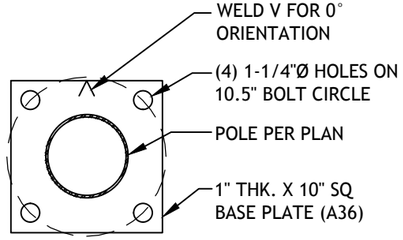
ALL PORTS (HAND HOLES) SHALL HAVE A COVER

T_P = THICKNESS OF POLE



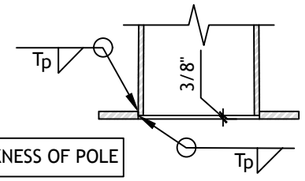


3 - HAND HOLE



BASE PLATE SHALL BE POWDER COATED.

4 - BASE PLATE



T_P = THICKNESS OF POLE

5 - POLE TO BASE PLATE WELD

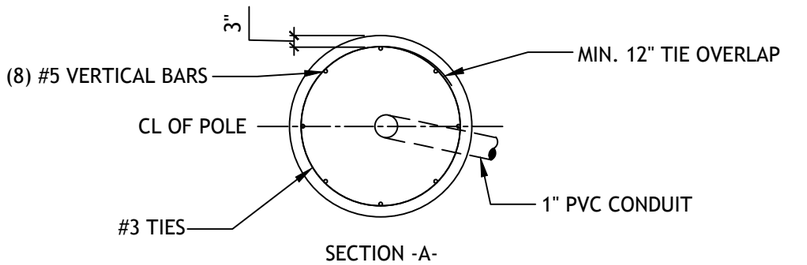
GENERAL NOTES:

1. ALL STEEL SHALL MEET THE REQUIREMENTS OF THE "STANDARD SPECIFICATIONS FOR STRUCTURAL STEEL" ASTM A36, UNLESS OTHERWISE NOTED ON THE STRUCTURAL PLANS OR BELOW.
2. ALL ROUND STEEL PIPE SHALL MEET THE REQUIREMENTS OF API–5LX GR.42.
3. ALL WELDED CONNECTIONS SHALL CONFORM TO THE LATEST VERSION OF THE AMERICAN WELDING SOCIETY AWS D1.1 CODE (LATEST EDITION). ALL WELD ELECTRODES OR WIRE SHALL AT A MINIMUM CONFORM TO E70 ELECTRODES (70 KSI YIELD).
4. ALL ANCHOR BOLTS SHALL BE HOT–DIPPED GALVANIZED (HDG) IN ACCORDANCE WITH THE ASTM A153 STANDARD.
5. THE HANDHOLE CONSISTS OF A 3" X 5" OVAL REINFORCED FRAME WITH 16 GAUGE COVER, STEEL ATTACHMENT BAR, AND ¼" SCREW. A GROUNDING LUG IS INSTALLED INSIDE THE POLE SHAFT OPPOSITE THE HANDHOLE OPENING. THE HANDHOLE IS WELDED IN THE POLE SHAFT AND LOCATED AT 12" ABOVE THE BASE.
6. AFTER FABRICATION, THE POLE IS SAND BLASTED TO A NEAR WHITE FINISH, AFTER SANDBLASTING, THE POLE SHALL BE POWDER COATED. APPLY POLYESTER POWDER ELECTROSTATICALLY AND CURED TO A MINIMUM 2.5 MIL. THICKNESS

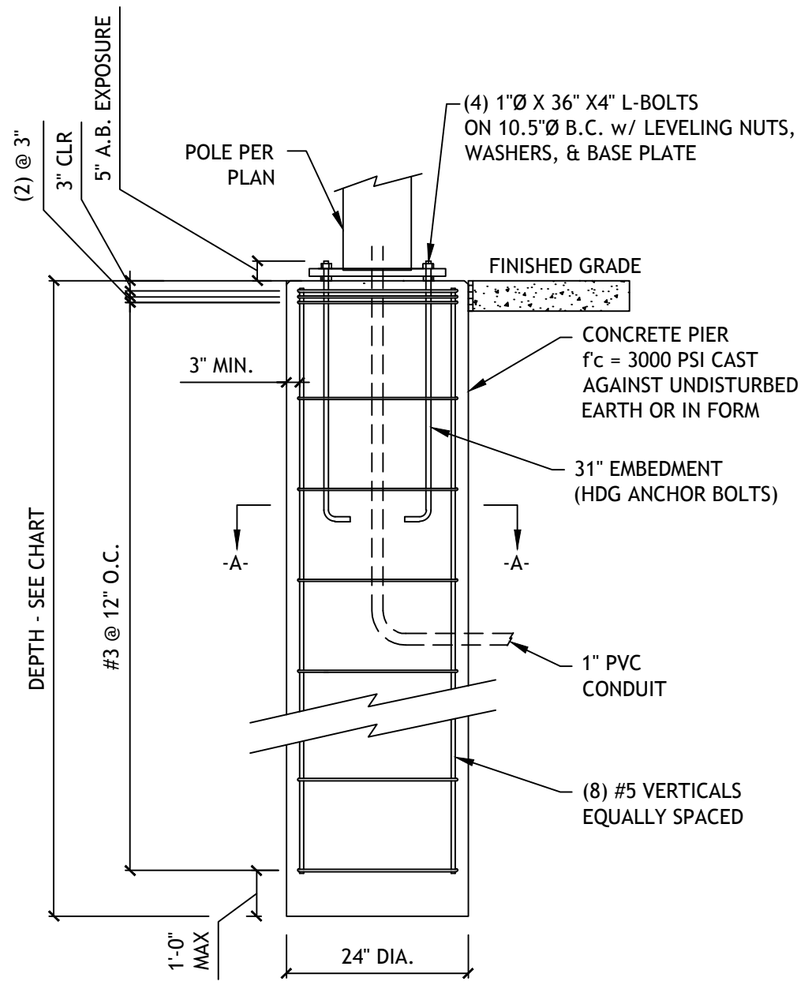
TOWN OF QUEEN CREEK STANDARD DETAIL

ANGLE ARM STREET LIGHT POLE

LT-6



SECTION -A-



FOUNDATION DEPTH	
ARTERIAL	7'-0"
COLLECTOR/RESIDENTIAL	6'-0"
ANGLE ARM	6'-0"

FOUNDATION NOTES:

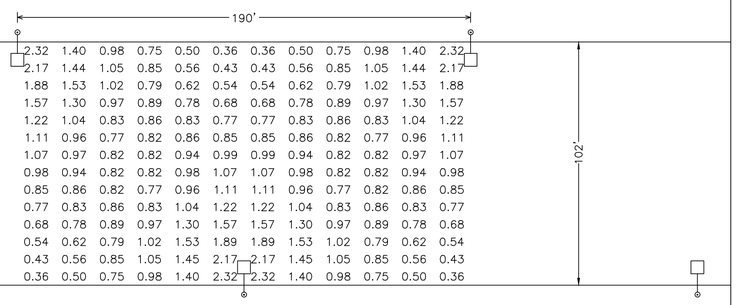
1. TOP OF FOUNDATION SHALL BE FLUSH WITH SIDEWALK.
   IF THERE IS NO SIDEWALK, TOP OF FOUNDATION SHALL BE 1" ABOVE CURB.
   IF NO CURB OR SIDEWALK, TOP OF FOUNDATION SHALL BE 3" ABOVE FINISHED GRADE.
2. FOUNDATION DESIGN PER IBC 2015 Table 1806.2 – Material Class 5
3. ALL CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS. ALL CONCRETE WORK SHALL CONFORM TO LATEST EDITION ACI 318, "BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE". FOUNDATION CONSTRUCTION SHALL CONFORM TO ACI 336, "STANDARD SPECIFICATIONS FOR THE CONSTRUCTION OF DRILLED PIERS.
4. REINFORCING STEEL SHALL CONFORM TO: ASTM A–615, GRADE 60

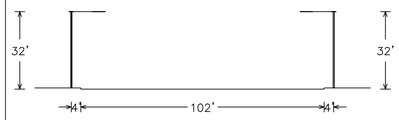
TOWN OF QUEEN CREEK STANDARD DETAIL	STREET LIGHT FOUNDATION	LT-7

EXAMPLE CALCULATIONS

PRINCIPAL ARCHITECTURAL

PHOTOMETRIC DESIGN CRITERIA
- 7 LANE ROADWAY
- APPROXIMATE GRID SPACING 15.8'X7.2'
- AVERAGE GREATER THAN 0.9 FC
- AVG/MIN LESS THAN 4.0





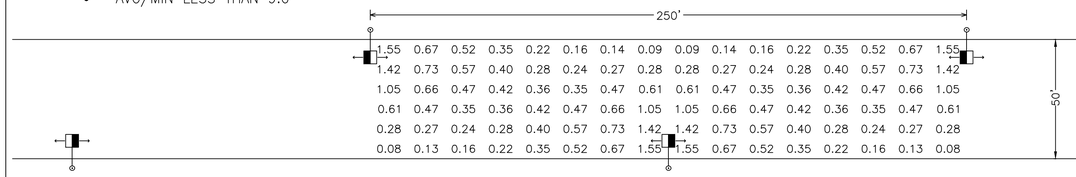
12,500 LUMEN LED
TYPE III DISTRIBUTION
12' X 8' ARM
candela file 'ERLH_13C330_____.IES'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 111
mounting height= 32 ft
number locations= 7, number luminaires= 7
kw all locations= 0.8

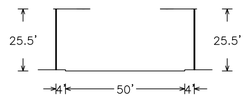
Roadway Grid
168 points at z=0, sp 15.833ft by 7.286ft
HORIZONTAL FOOTCANDLES

Average	1.00
Maximum	2.32
Minimum	0.36
Avg:Min	2.77
Max:Min	6.44
Coef Var	0.41
UnifGrad	1.66

MAJOR COLLECTOR

PHOTOMETRIC DESIGN CRITERIA
- 3 LANE ROADWAY
- APPROXIMATE GRID SPACING 15.6'X8.3'
- AVERAGE GREATER THAN 0.4 FC
- AVG/MIN LESS THAN 9.0





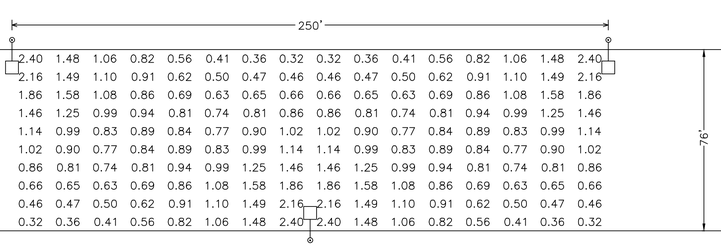
4,900 LUMEN LED
TYPE II DISTRIBUTION
2' ARM
candela file 'ERL1_05B330_____-120-277V.IES'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 39
mounting height= 25.5 ft
number locations= 5, number luminaires= 5
kw all locations= 0.2

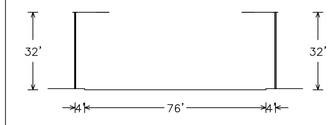
Roadway Grid
96 points at z=0, sp 15.625ft by 8.333ft
HORIZONTAL FOOTCANDLES

Average	0.51
Maximum	1.55
Minimum	0.08
Avg:Min	6.39
Max:Min	19.38
Coef Var	0.71
UnifGrad	2.31

MAJOR ARTERIAL

PHOTOMETRIC DESIGN CRITERIA
- 5 LANE ROADWAY
- APPROXIMATE GRID SPACING 15.6'X7.5'
- AVERAGE GREATER THAN 0.9 FC
- AVG/MIN LESS THAN 5.5





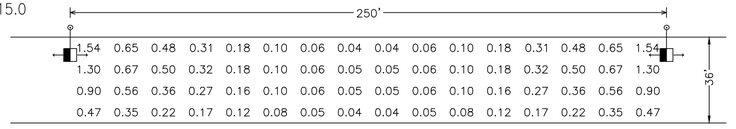
12,500 LUMEN LED
TYPE III DISTRIBUTION
12' X 8' ARM
candela file 'ERLH_13C330_____.IES'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 111
mounting height= 32 ft
number locations= 7, number luminaires= 7
kw all locations= 0.8

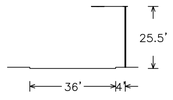
Roadway Grid
160 points at z=0, sp 15.625ft by 7.6ft
HORIZONTAL FOOTCANDLES

Average	0.96
Maximum	2.40
Minimum	0.32
Avg:Min	3.00
Max:Min	7.50
Coef Var	0.47
UnifGrad	1.62

RESIDENTIAL COLLECTOR

PHOTOMETRIC DESIGN CRITERIA
- 2 LANE ROADWAY
- APPROXIMATE GRID SPACING 15.6'X9'
- AVERAGE GREATER THAN 0.3 FC
- AVG/MIN LESS THAN 15.0





4,900 LUMEN LED
TYPE II DISTRIBUTION
2' ARM
candela file 'ERL1_05B330_____-120-277V.IES'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 39
mounting height= 25.5 ft
number locations= 2, number luminaires= 2
kw all locations= 0.1

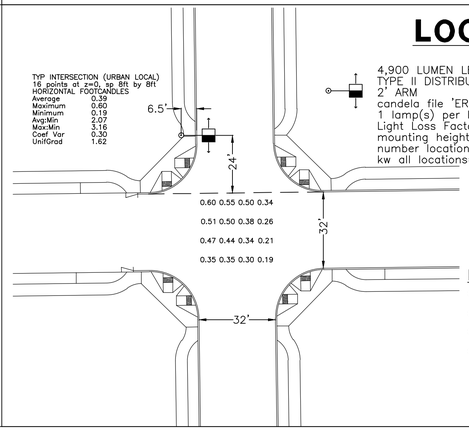
Roadway Grid
64 points at z=0, sp 15.625ft by 9ft
HORIZONTAL FOOTCANDLES

Average	0.33
Maximum	1.54
Minimum	0.04
Avg:Min	8.20
Max:Min	38.50
Coef Var	1.09
UnifGrad	2.37

GENERAL CRITERIA

- ALL CALCULATIONS SHALL BE AT THE SPACING AND OFFETS SHOWN FOR EACH ROADWAY TYPE
- USE MOUNTING HEIGHT ARM LENGTH SHOWN FOR EACH ROADWAY TYPE
- LIGHT LOSS FACTOR SHALL BE 0.9
- LUMEN OUTPUT & DISTRIBUTION TYPE FOR BOTH ARTERIAL ROADWAY CALCULATIONS SHALL BE THE SAME
- LUMEN OUTPUT & DISTRIBUTION TYPE FOR BOTH COLLECTOR CALCULATIONS AND LOCAL INTERSECTION CALCULATION SHALL BE THE SAME

LOCAL INTERSECTION



4,900 LUMEN LED
TYPE II DISTRIBUTION
2' ARM
candela file 'ERL1_05B330_____-120-277V.IES'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 39
mounting height= 25.5 ft
number locations= 3, number luminaires= 3
kw all locations= 0.1

PHOTOMETRIC DESIGN CRITERIA
- 16 POINTS CENTERED IN INTERSECTION
- GRID SPACING 8'X8'
- AVERAGE GREATER THAN 0.4 FC
- AVG/MIN LESS THAN 4.0

WRIGHT engineering corporation
ELECTRICAL ENGINEERING AND DESIGN
165 EAST CHILTON DRIVE • CHANDLER, ARIZONA 85225
PHONE 480.497.5829 • FAX 480.497.5807

PHOTOMETRIC CALCULATION SHEET. FOR INFORMATION ONLY.

Registered Professional Engineer Certificate No. 46691 ADAM M. BOWERS Date Signed 6-18-19 Arizona U.S.A. Expires 9-30-19

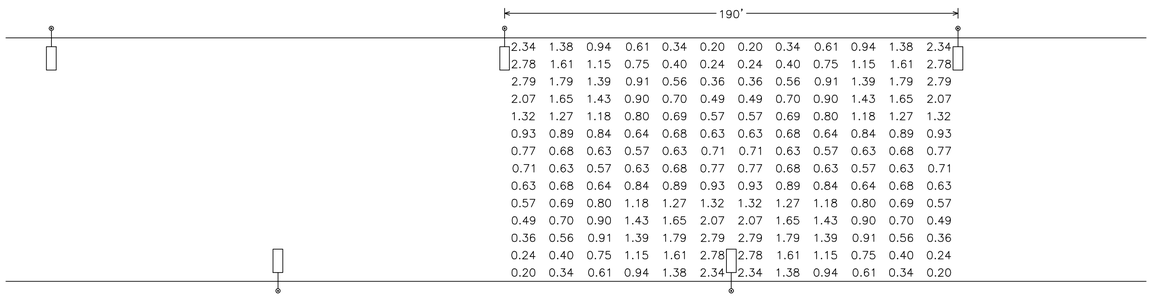
PROJECT NAME:
TOWN OF QUEEN CREEK
STREET LIGHT STANDARDS
EXAMPLE PHOTOMETRICS

WRIGHT ENG. PROJECT NO: **18249**

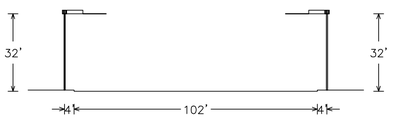
DESIGN BY: AMB

H:\2018\18249-Queen Creek Street Light Standards\Photometrics\18249-TYPICALS.dwg

PRINCIPAL ARTERIAL



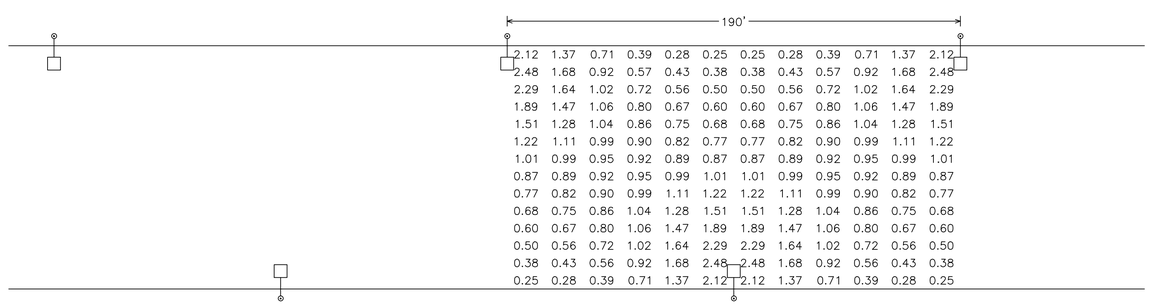
HPS BASELINE



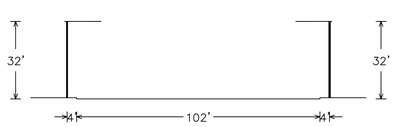
250W HPS Shoebox
Type III Distribution
12'X8' Mast Arm
candela file 'GE453713.IES'
1 lamp(s) per luminaire, 28000 initial lumens per lamp
Light Loss Factor = 0.700, watts per luminaire = 305
mounting height= 32 ft
number locations= 7, number luminaires= 7
kw all locations= 2.1

Roadway Grid
168 points at z=0, sp 15.833ft by 7.286ft
HORIZONTAL FOOTCANDLES

Average	1.00
Maximum	2.79
Minimum	0.20
Avg:Min	5.02
Max:Min	13.95
Coef Var	0.62
UnifGrad	1.88



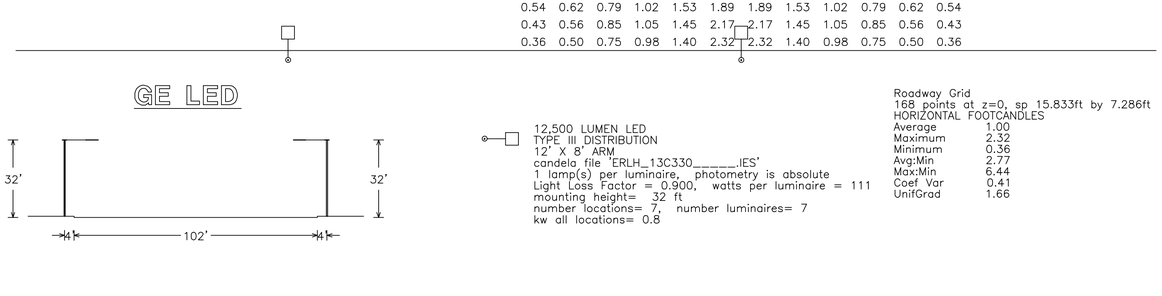
PHILLIPS LED



12,500 LUMEN LED
TYPE III DISTRIBUTION
12' X 8' ARM
candela file 'RFM-108W48LED3K-G2-R3S.ies'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 106
mounting height= 32 ft
number locations= 7, number luminaires= 7
kw all locations= 0.7

Roadway Grid
168 points at z=0, sp 15.833ft by 7.286ft
HORIZONTAL FOOTCANDLES

Average	1.01
Maximum	2.48
Minimum	0.25
Avg:Min	4.03
Max:Min	9.92
Coef Var	0.51
UnifGrad	1.93

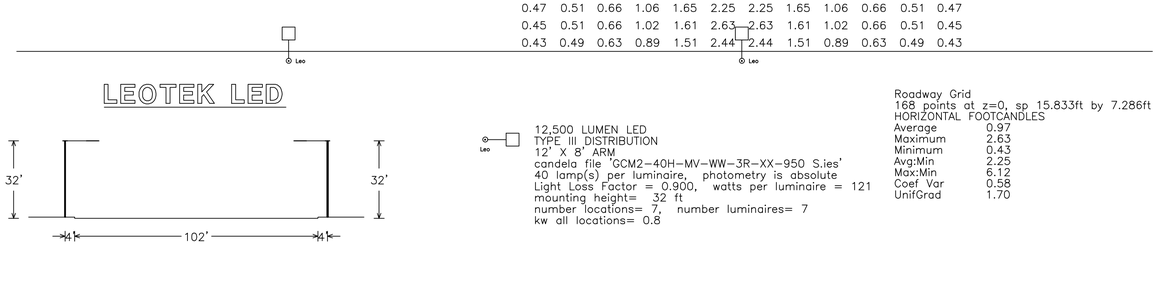


GE LED

12,500 LUMEN LED
TYPE III DISTRIBUTION
12' X 8' ARM
candela file 'ERLH_13C330_____.IES'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 111
mounting height= 32 ft
number locations= 7, number luminaires= 7
kw all locations= 0.8

Roadway Grid
168 points at z=0, sp 15.833ft by 7.286ft
HORIZONTAL FOOTCANDLES

Average	1.00
Maximum	2.32
Minimum	0.36
Avg:Min	2.77
Max:Min	6.44
Coef Var	0.41
UnifGrad	1.66



LEOTEK LED

12,500 LUMEN LED
TYPE III DISTRIBUTION
12' X 8' ARM
candela file 'GCM2-40H-MV-WW-3R-XX-950 S.ies'
40 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 121
mounting height= 32 ft
number locations= 7, number luminaires= 7
kw all locations= 0.8

Roadway Grid
168 points at z=0, sp 15.833ft by 7.286ft
HORIZONTAL FOOTCANDLES

Average	0.97
Maximum	2.63
Minimum	0.43
Avg:Min	2.25
Max:Min	6.12
Coef Var	0.58
UnifGrad	1.70

WRIGHT engineering corporation
ELECTRICAL ENGINEERING AND DESIGN
165 EAST CHILTON DRIVE • CHANDLER, ARIZONA 85225
PHONE 480.497.5829 • FAX 480.497.5807

PHOTOMETRIC CALCULATION SHEET. FOR INFORMATION ONLY.

Registered Professional Engineer (Electrical) Certificate No. 46691 ADAM M. BOWERS Date Signed 6-18-19 Arizona U.S.A. Expires 6-30-19

PROJECT NAME:
TOWN OF QUEEN CREEK
STREET LIGHT STANDARDS
TYPICAL PHOTOMETRICS

WRIGHT ENG.
PROJECT NO: **18249**

DESIGN BY: AMB

PH-1

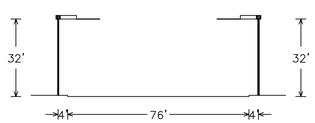
H:\2018\18249-Queen Creek Street Light Standards\Photometrics\18249-TYPICALS.dwg

MAJOR ARTERIAL

250'

2.39	1.44	0.99	0.64	0.37	0.22	0.16	0.14	0.14	0.16	0.22	0.37	0.64	0.99	1.44	2.39
2.84	1.70	1.25	0.83	0.45	0.27	0.21	0.19	0.19	0.21	0.27	0.45	0.83	1.25	1.70	2.84
2.77	1.88	1.55	1.04	0.66	0.44	0.31	0.28	0.28	0.31	0.44	0.66	1.04	1.55	1.88	2.77
1.92	1.68	1.59	1.07	0.83	0.67	0.49	0.43	0.43	0.49	0.67	0.83	1.07	1.59	1.68	1.92
1.12	1.20	1.31	1.04	0.93	0.94	0.77	0.69	0.69	0.77	0.94	0.93	1.04	1.31	1.20	1.12
0.69	0.77	0.94	0.93	1.04	1.31	1.20	1.12	1.12	1.20	1.31	1.04	0.93	0.94	0.77	0.69
0.43	0.49	0.67	0.83	1.07	1.59	1.68	1.92	1.92	1.68	1.59	1.07	0.83	0.67	0.49	0.43
0.28	0.31	0.44	0.66	1.04	1.55	1.88	2.77	2.77	1.88	1.55	1.04	0.66	0.44	0.31	0.28
0.19	0.21	0.27	0.45	0.83	1.25	1.70	2.84	2.84	1.70	1.25	0.83	0.45	0.27	0.21	0.19
0.14	0.16	0.22	0.37	0.64	0.99	1.44	2.39	2.39	1.44	0.99	0.64	0.37	0.22	0.16	0.14

HPS BASELINE



250W HPS Shoebox
Type III Distribution
12'X8' Mast Arm
candela file 'GE453713.IES'
1 lamp(s) per luminaire, 28000 initial lumens per lamp
Light Loss Factor = 0.700, watts per luminaire = 305
mounting height= 32 ft
number locations= 7, number luminaires= 7
kw all locations= 2.1

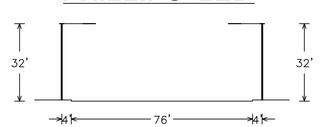
Roadway Grid
160 points at z=0, sp 15.625ft by 7.6ft
HORIZONTAL FOOTCANDLES

Average	0.99
Maximum	2.84
Minimum	0.14
Avg:Min	7.09
Max:Min	20.29
Coef Var	0.70
UnifGrad	1.84

250'

2.19	1.45	0.80	0.52	0.44	0.43	0.42	0.40	0.40	0.42	0.43	0.44	0.52	0.80	1.45	2.19
2.51	1.75	1.02	0.68	0.57	0.54	0.53	0.50	0.50	0.53	0.54	0.57	0.68	1.02	1.75	2.51
2.25	1.65	1.08	0.77	0.66	0.64	0.64	0.62	0.62	0.64	0.64	0.66	0.77	1.08	1.65	2.25
1.78	1.40	1.03	0.81	0.73	0.73	0.76	0.78	0.78	0.76	0.73	0.73	0.81	1.03	1.40	1.78
1.34	1.14	0.93	0.80	0.78	0.83	0.93	1.01	1.01	0.93	0.83	0.78	0.80	0.93	1.14	1.34
1.01	0.93	0.83	0.78	0.80	0.93	1.14	1.34	1.34	1.14	0.93	0.80	0.78	0.83	0.93	1.01
0.78	0.76	0.73	0.73	0.81	1.03	1.40	1.78	1.78	1.40	1.03	0.81	0.73	0.73	0.76	0.78
0.62	0.64	0.64	0.66	0.77	1.08	1.65	2.25	2.25	1.65	1.08	0.77	0.66	0.64	0.64	0.62
0.50	0.53	0.54	0.57	0.68	1.02	1.75	2.51	2.51	1.75	1.02	0.68	0.57	0.54	0.53	0.50
0.40	0.42	0.43	0.44	0.52	0.80	1.45	2.19	2.19	1.45	0.80	0.52	0.44	0.43	0.42	0.40

PHILLIPS LED



12,500 LUMEN LED
TYPE III DISTRIBUTION
12' X 8' ARM
candela file 'RFM-108W48LED3K-G2-R3S.ies'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 106
mounting height= 32 ft
number locations= 7, number luminaires= 7
kw all locations= 0.7

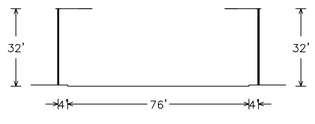
Roadway Grid
160 points at z=0, sp 15.625ft by 7.6ft
HORIZONTAL FOOTCANDLES

Average	0.97
Maximum	2.51
Minimum	0.40
Avg:Min	2.43
Max:Min	6.28
Coef Var	0.54
UnifGrad	1.81

250'

2.40	1.48	1.06	0.82	0.56	0.41	0.36	0.32	0.32	0.36	0.41	0.56	0.82	1.06	1.48	2.40
2.16	1.49	1.10	0.91	0.62	0.50	0.47	0.46	0.46	0.47	0.50	0.62	0.91	1.10	1.49	2.16
1.86	1.58	1.08	0.86	0.69	0.63	0.65	0.66	0.66	0.65	0.63	0.69	0.86	1.08	1.58	1.86
1.46	1.25	0.99	0.94	0.81	0.74	0.81	0.86	0.86	0.81	0.74	0.81	0.94	0.99	1.25	1.46
1.14	0.99	0.83	0.89	0.84	0.77	0.90	1.02	1.02	0.90	0.77	0.84	0.89	0.83	0.99	1.14
1.02	0.90	0.77	0.84	0.89	0.83	0.99	1.14	1.14	0.99	0.83	0.89	0.84	0.77	0.90	1.02
0.86	0.81	0.74	0.81	0.94	0.99	1.25	1.46	1.46	1.25	0.99	0.94	0.81	0.74	0.81	0.86
0.66	0.65	0.63	0.69	0.86	1.08	1.58	1.86	1.86	1.58	1.08	0.86	0.69	0.63	0.65	0.66
0.46	0.47	0.50	0.62	0.91	1.10	1.49	2.16	2.16	1.49	1.10	0.91	0.62	0.50	0.47	0.46
0.32	0.36	0.41	0.56	0.82	1.06	1.48	2.40	2.40	1.48	1.06	0.82	0.56	0.41	0.36	0.32

GE LED



12,500 LUMEN LED
TYPE III DISTRIBUTION
12' X 8' ARM
candela file 'ERLH_13C330_____.IES'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 111
mounting height= 32 ft
number locations= 7, number luminaires= 7
kw all locations= 0.8

Roadway Grid
160 points at z=0, sp 15.625ft by 7.6ft
HORIZONTAL FOOTCANDLES

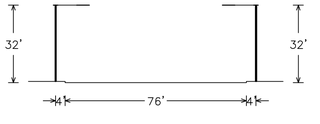
Average	0.96
Maximum	2.40
Minimum	0.32
Avg:Min	3.00
Max:Min	7.50
Coef Var	0.47
UnifGrad	1.62

250'

Leo Leo

2.48	1.56	0.94	0.66	0.50	0.36	0.25	0.18	0.18	0.25	0.36	0.50	0.66	0.94	1.56	2.48
2.64	1.66	1.09	0.72	0.54	0.40	0.30	0.23	0.23	0.30	0.40	0.54	0.72	1.09	1.66	2.64
2.21	1.70	1.16	0.78	0.62	0.49	0.38	0.31	0.31	0.38	0.49	0.62	0.78	1.16	1.70	2.21
1.74	1.64	1.23	0.86	0.76	0.72	0.60	0.52	0.52	0.60	0.72	0.76	0.86	1.23	1.64	1.74
1.33	1.40	1.22	0.89	0.84	1.02	1.03	0.88	0.88	1.03	1.02	0.84	0.89	1.22	1.40	1.33
0.88	1.03	1.02	0.84	0.89	1.22	1.40	1.33	1.33	1.40	1.22	0.89	0.84	1.02	1.03	0.88
0.52	0.60	0.72	0.76	0.86	1.23	1.64	1.74	1.74	1.64	1.23	0.86	0.76	0.72	0.60	0.52
0.31	0.38	0.49	0.62	0.78	1.16	1.70	2.21	2.21	1.70	1.16	0.78	0.62	0.49	0.38	0.31
0.23	0.30	0.40	0.54	0.72	1.09	1.66	2.64	2.64	1.66	1.09	0.72	0.54	0.40	0.30	0.23
0.18	0.25	0.36	0.50	0.66	0.94	1.56	2.48	2.48	1.56	0.94	0.66	0.50	0.36	0.25	0.18

LEOTEK LED



12,500 LUMEN LED
TYPE III DISTRIBUTION
12' X 8' ARM
candela file 'GCM2-40H-MV-WW-3R-XX-950 S.ies'
40 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 121
mounting height= 32 ft
number locations= 7, number luminaires= 7
kw all locations= 0.8

Roadway Grid
160 points at z=0, sp 15.625ft by 7.6ft
HORIZONTAL FOOTCANDLES

Average	0.97
Maximum	2.64
Minimum	0.18
Avg:Min	5.39
Max:Min	14.67
Coef Var	0.62
UnifGrad	1.66

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PROJECT NAME:
TOWN OF QUEEN CREEK
STREET LIGHT STANDARDS
TYPICAL PHOTOMETRICS

WRIGHT ENG. PROJECT NO: **18249**

DESIGN BY: AMB **PH-2**

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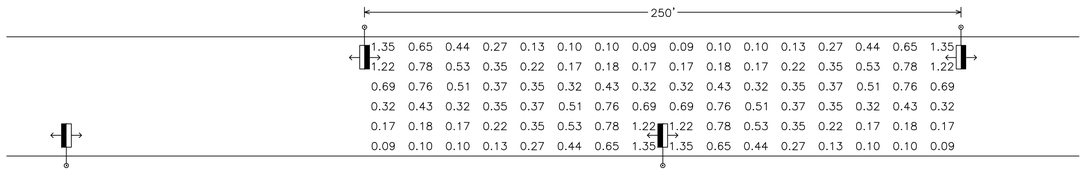
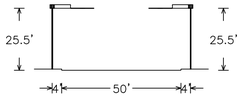
MAJOR COLLECTOR



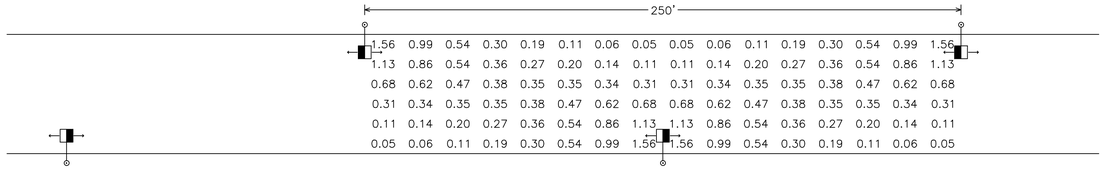
HPS BASELINE



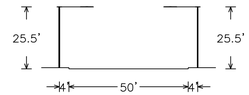
100W HPS Shoebox
Type II Distribution
2' Arm
candela file 'GE453855.IES'
1 lamp(s) per luminaire, 9500 initial lumens per lamp
Light Loss Factor = 0.700, watts per luminaire = 119
mounting height= 25.5 ft
number locations= 5, number luminaires= 5
kw all locations= 0.6

Roadway Grid
96 points at z=0, sp 15.625ft by 8.333ft
HORIZONTAL FOOTCANDLES

Average	0.44
Maximum	1.35
Minimum	0.09
Avg:Min	4.86
Max:Min	15.00
Coef Var	0.75
UnifGrad	2.08



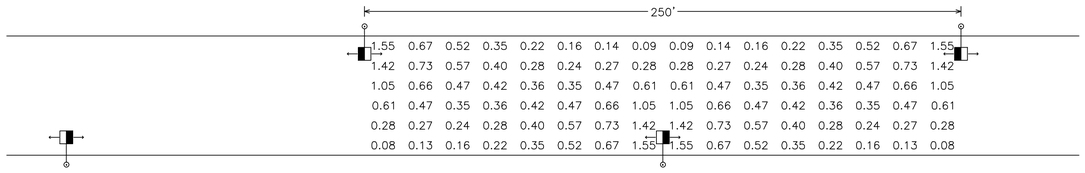
PHILLIPS LED



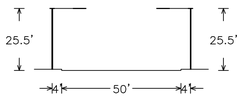
4,900 LUMEN LED
TYPE II DISTRIBUTION
2' ARM
candela file 'RFS-45W12LED3K-G2-R2M.ies'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 45
mounting height= 25.5 ft
number locations= 5, number luminaires= 5
kw all locations= 0.2

Roadway Grid
96 points at z=0, sp 15.625ft by 8.333ft
HORIZONTAL FOOTCANDLES

Average	0.45
Maximum	1.56
Minimum	0.05
Avg:Min	9.09
Max:Min	31.20
Coef Var	0.80
UnifGrad	1.83



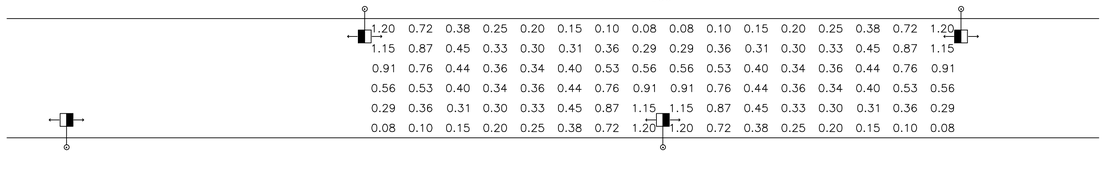
GE LED



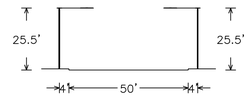
4,900 LUMEN LED
TYPE II DISTRIBUTION
2' ARM
candela file 'ERL1_05B330_____-120-277V.IES'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 39
mounting height= 25.5 ft
number locations= 5, number luminaires= 5
kw all locations= 0.2

Roadway Grid
96 points at z=0, sp 15.625ft by 8.333ft
HORIZONTAL FOOTCANDLES

Average	0.51
Maximum	1.55
Minimum	0.08
Avg:Min	6.39
Max:Min	19.38
Coef Var	0.71
UnifGrad	2.31



LEOTEK LED



4,900 LUMEN LED
TYPE II DISTRIBUTION
2' ARM
candela file 'GCJ1-20H-MV-WW-2R-XX-580 S.ies'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 39
mounting height= 25.5 ft
number locations= 5, number luminaires= 5
kw all locations= 0.2

Roadway Grid
96 points at z=0, sp 15.625ft by 8.333ft
HORIZONTAL FOOTCANDLES

Average	0.48
Maximum	1.20
Minimum	0.08
Avg:Min	5.96
Max:Min	15.00
Coef Var	0.63
UnifGrad	2.12

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PROJECT NAME:
TOWN OF QUEEN CREEK
STREET LIGHT STANDARDS
TYPICAL PHOTOMETRICS

WRIGHT ENG. PROJECT NO: **18249**

DESIGN BY: AMB **PH-3**

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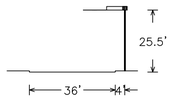
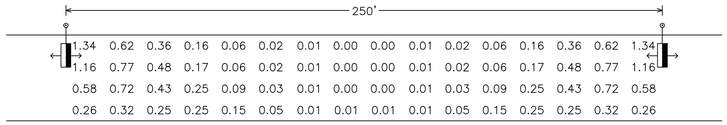
RESIDENTIAL COLLECTOR

HPS BASELINE



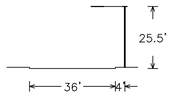
100W HPS Shoebox
Type II Distribution
2' Arm
candela file 'GE453855.IES'
1 lamp(s) per luminaire, 9500 initial lumens per lamp
Light Loss Factor = 0.700, watts per luminaire = 119
mounting height= 25.5 ft
number locations= 2, number luminaires= 2
kw all locations= 0.2



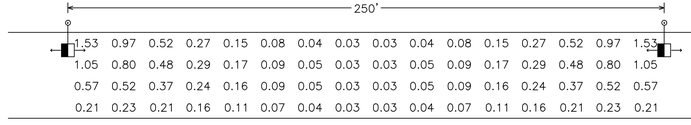
Roadway Grid
64 points at z=0, sp 15.625ft by 9ft
HORIZONTAL FOOTCANDLES

Average	0.27
Maximum	1.34
Minimum	0.00
Avg:Min	N/A
Max:Min	N/A
Coef Var	1.25
UnifGrad	N/A

PHILLIPS LED



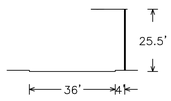
4,900 LUMEN LED
TYPE II DISTRIBUTION
2' ARM
candela file 'RFS-45W12LED3K-G2-R2M.ies'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 45
mounting height= 25.5 ft
number locations= 2, number luminaires= 2
kw all locations= 0.1



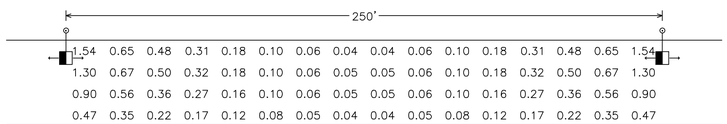
Roadway Grid
64 points at z=0, sp 15.625ft by 9ft
HORIZONTAL FOOTCANDLES

Average	0.30
Maximum	1.53
Minimum	0.03
Avg:Min	10.04
Max:Min	51.00
Coef Var	1.15
UnifGrad	2.00

GE LED



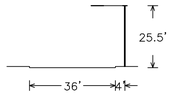
4,900 LUMEN LED
TYPE II DISTRIBUTION
2' ARM
candela file 'ERL1_05B330_____-120-277V.IES'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 39
mounting height= 25.5 ft
number locations= 2, number luminaires= 2
kw all locations= 0.1



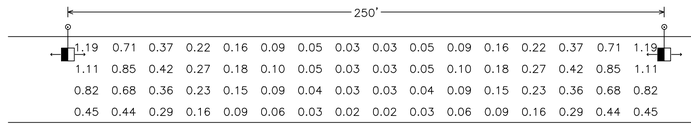
Roadway Grid
64 points at z=0, sp 15.625ft by 9ft
HORIZONTAL FOOTCANDLES

Average	0.33
Maximum	1.54
Minimum	0.04
Avg:Min	8.20
Max:Min	38.50
Coef Var	1.09
UnifGrad	2.37

LEOTEK LED



4,900 LUMEN LED
TYPE II DISTRIBUTION
2' ARM
candela file 'GCJ1-20H-MV-WW-2R-XX-580 S.ies'
1 lamp(s) per luminaire, photometry is absolute
Light Loss Factor = 0.900, watts per luminaire = 39
mounting height= 25.5 ft
number locations= 2, number luminaires= 2
kw all locations= 0.1



Roadway Grid
64 points at z=0, sp 15.625ft by 9ft
HORIZONTAL FOOTCANDLES

Average	0.31
Maximum	1.19
Minimum	0.02
Avg:Min	15.27
Max:Min	59.50
Coef Var	1.05
UnifGrad	2.25

WRIGHT engineering corporation
ELECTRICAL ENGINEERING AND DESIGN
165 EAST CHILTON DRIVE • CHANDLER, ARIZONA 85225
PHONE 480.497.5829 • FAX 480.497.5807

PHOTOMETRIC CALCULATION SHEET. FOR INFORMATION ONLY.

Registered Professional Engineer (Electrical) Certificate No. 46691 ADAM M. BOWERS Date Signed 6-18-19 Arizona U.S.A. Expires 6-30-19

PROJECT NAME:
TOWN OF QUEEN CREEK
STREET LIGHT STANDARDS
TYPICAL PHOTOMETRICS

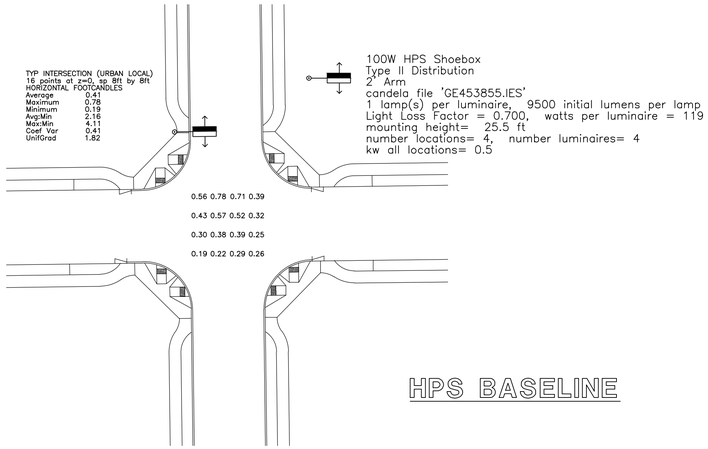
WRIGHT ENG. PROJECT NO: **18249**

DESIGN BY: AMB

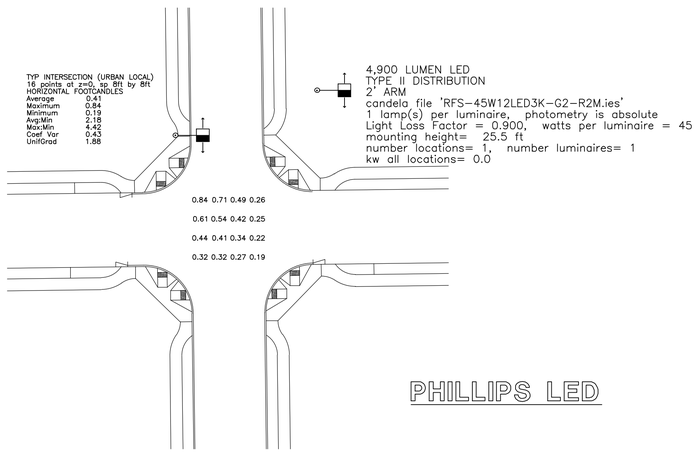
PH-4

H:\2018\18249-Queen Creek Street Light Standards\Photometrics\18249-TYPICALS.dwg

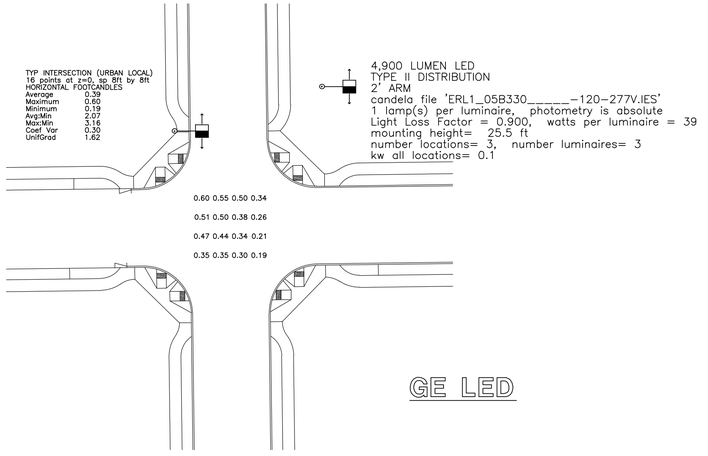
LOCAL INTERSECTION



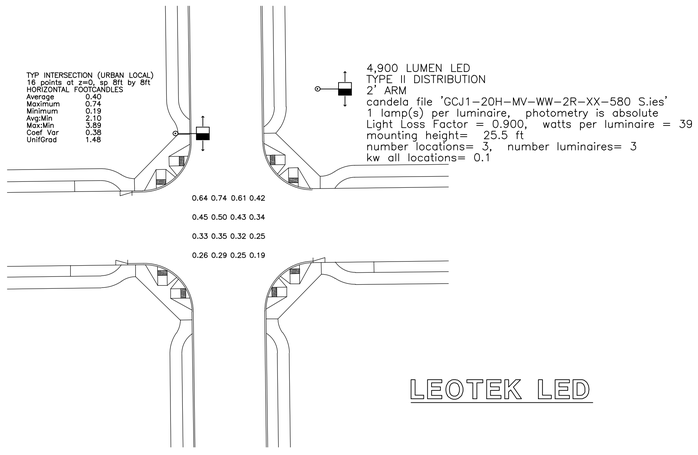
HPS BASELINE



PHILLIPS LED



GE LED



LEOTEK LED

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PHONE 480.497.5829 • FAX 480.497.5807

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PROJECT NAME:
TOWN OF QUEEN CREEK
STREET LIGHT STANDARDS
TYPICAL PHOTOMETRICS

WRIGHT ENG.
PROJECT NO: **18249**

DESIGN BY: AMB **PH-5**

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Architectural HPS-LED Equivalents – Approved Products

Legacy HPS	Nominal Lumens (Designation)	Distr. Type	LED Manufacturer	LED Catalog number	LED Watts	LED Lumens
100W	**4,900 ±12% (5L)**	2	GE	ERL1-0-05-B3-30-A-DKBZ-GLRX-(label)	39W	4900
			Leotek	GCJ1-20H-MV-WW-2R-DB-580-PCR7-CR-BBL-LL-AD	39W	4470
			Philips	RFS-45W12LED3K-G2-R2M-UNV-DMG-RCD7-BR-(label)	45W	4800
250W	**12,500 ±10% (12L)**	3	GE	ERLH-0-13-C3-30-A-DKBZ-GLRX-(label)	111W	12500
			Leotek	GCM2-40H-MV-WW-3R-DB-950-PCR7-CR-BBL-LL-AD	121W	13040
			Philips	RFM-108W48LED3K-G2-R3S-UNV-DMG-RCD7-BR-(label)	106W	12600