

City of Milwaukee American Pharoah Battery Energy Storage System

6100-6200 N. 84th Street

Site Plan Review Overlay Zone Project Narrative

August 25, 2023

Black Mountain Energy Storage, and its project partners Westwood civil engineers and Amundsen Davis land use legal counsel, submit this narrative and accompanying plans in support of the Site Plan Review Overlay Zone (SPROZ) approval to construct a Battery Energy Storage System (BESS) in the City of Milwaukee.

Project Location, Property Zoning & Surrounding Uses

The site is at 6100-6200 N. 84th Street between Florist Avenue and Mill Road on the east side of the street. The long-vacant site is approximately 32 acres and is located in the 2nd Aldermanic District.

The site is zoned Single-Family Residential (RS-4) but with a SPROZ overlay designation. The overlay designation requires all design details to be approved by the Plan Commission.

Surrounding uses to the north and west (north of Lynx Ave.) include 4-unit apartment buildings as well as at least one larger, 9-unit apartment building. Industrial uses are to the west (south of Lynx Ave.) primarily zoned IL1 including businesses involving truck and trailer repair, portable toilets, and construction. High-voltage transmission power lines run above the southern portion of the site that abuts the freight line railroad tracks. On the south side of the tracks are other industrial businesses including a metal recycler, plastic recycler, and metal products company. Adjacent to the east is the WE Energies Granville Substation.

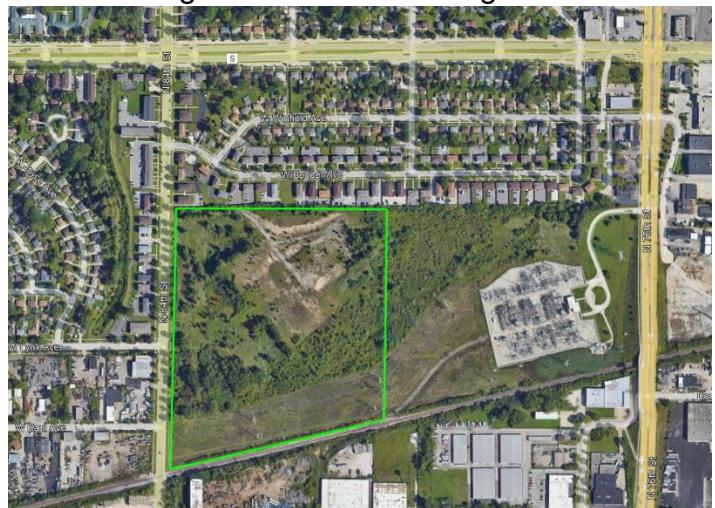


Figure 1 Aerial Exhibit with Project Area

Project Description

Black Mountain Energy Storage will purchase the property to develop and construct a 300-Megawatt BESS. As a private business entity, Black Mountain Energy Storage will develop the facility known as American Pharaoh BESS and as a fully taxable development.

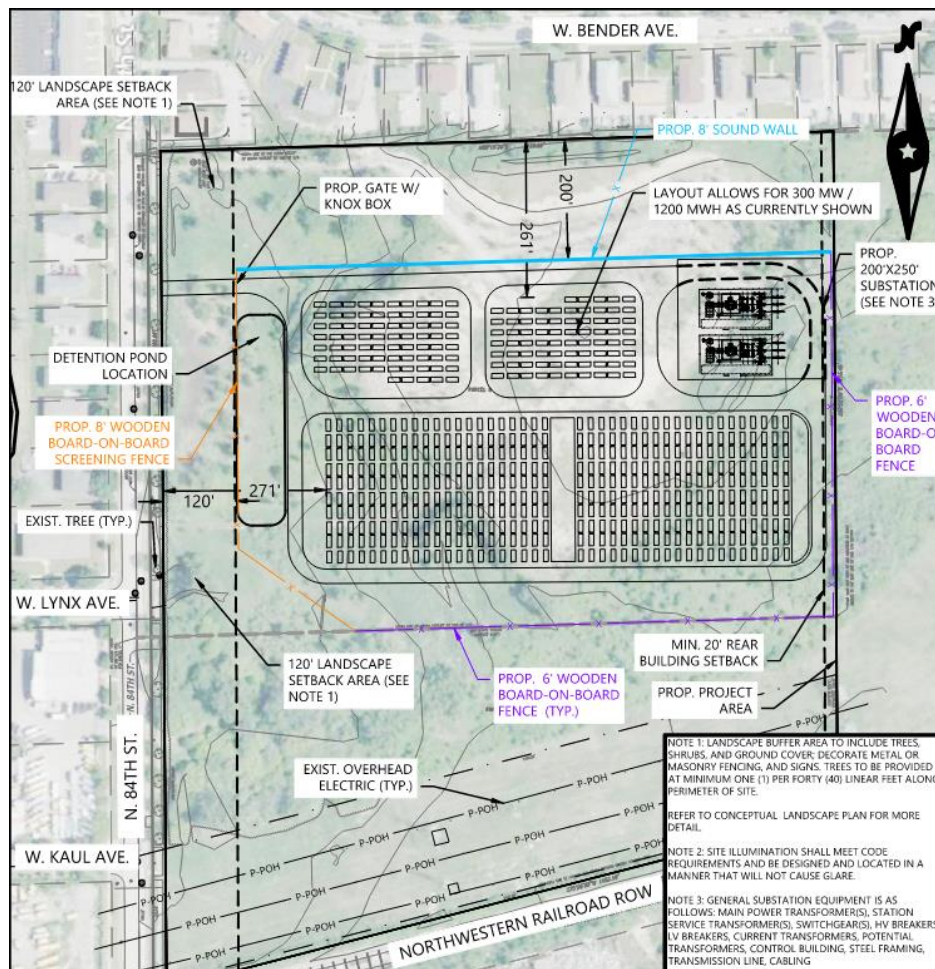


Figure 2 Site Plan Exhibit

The BESS will be a utility scale project intentionally located adjacent to the WE Energies 138 Kilovolt substation. The substation was constructed in the late-1960s and is connected to the high-voltage transmission power lines that run east-west along the freight line railroad tracks on the south portion of both sites.

On-site construction will take 12-14 months and will involve 100-200 construction jobs. Whenever possible, Black Mountain Energy Storage prefers to hire local contractors to construct its facilities and maintain site landscaping. We are committed to achieving a 35% inclusion level for resident/minority/women/small business enterprises with the American Pharaoh BESS.

The project will be a 300-Megawatt facility consisting of three operational elements:

➤ **Site Features-**

- Perimeter landscaping to the north and west with significant greenspace buffer areas;
 - New landscaping will be provided within the first 25' of the buffer area. The existing vegetation will be preserved in the remainder of the landscape buffer to maintain the fullness of the natural buffer.
- Fencing along the entire perimeter.
 - 6' tall wooden board-on-board privacy fencing will be provided on the eastern and southern sides of the development. 8' tall wooden board-on-board privacy fencing will be provided on the western side of the development. An 8' tall sound barrier will be along the northern side of the development unless a wooden fence is appropriate per the sound study see pages 6 and 7 below).
- Stormwater detention.
- Private maintenance access drives through the site.
- Lighting will be provided throughout the site via WiLLsport GTX High Output LED Lighting WS-GT4 Type V Square 30'H for internal light poles and WS-GT4 Type IV 30'H for perimeter light poles (or approved equal). Both fixtures will use the 30' tall x2.38" OD 7 gauge anchor based pole.
 - The lights around the perimeter will have the house side shield as well as a 5 degree tilt installed to limit the amount of light shown towards any neighbors.
 - The WiLLsport lights exceeds the Buy American Act requirements. And the fixtures are manufactured about an hour away from the project location in Fond du Lac, WI where their main facility is located.



Figure 3 Board-on-board fence example



Figure 4 Light pole example from manufacturer

➤ **Site Substation-** a small substation for the BESS will have connectivity to the We Energies Granville Substation and the rest of the transmission grid. General substation equipment is below:

- Main Power Transformer(s)
- Station Service Transformer(s)
- Switchgear(s)
- HV Breakers
- LV Breakers
- Current Transformers
- Potential Transformers
- Control Building
- Steel Framing
- Transmission Line
- Cabling



Figure 5 Constructed Substation Facility

- Please note, the substation equipment will all be below 45' however, final design may require a dead-end structure (final transmission pole that connects to the site) plus a lightning rod to be higher than 45', which may qualify for an exception as stated in Section 295-505-2-h-2-e.

- The substation will be surrounded by an 8' tall chain link fence for security purposes.

➤ **Battery Energy Storage System Units-** approximately 112 metal battery systems will be installed at the site mounted on concrete pads.



Figure 6 Constructed Battery Storage Facility

- The enclosures will not exceed 40 ft in length, 8 ft wide and 8 ft tall.

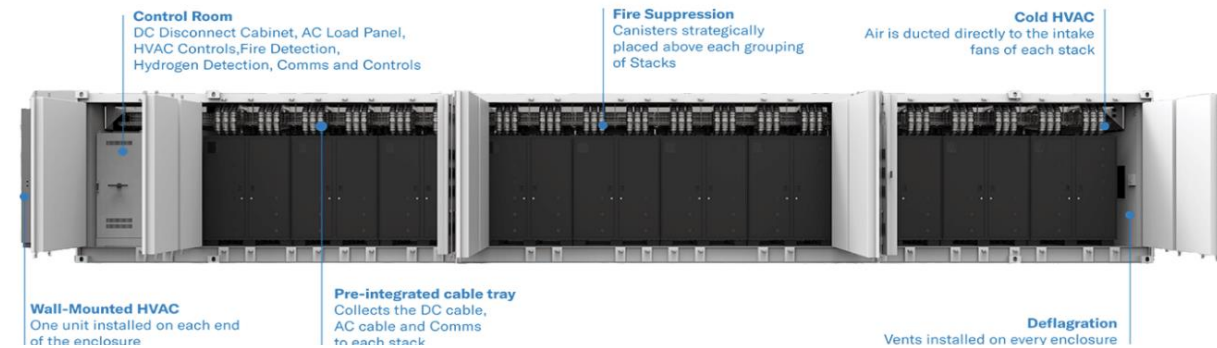


Figure 7 Layout of typical battery storage container

- Each enclosure houses lithium-Ion battery cells and related electrical components and is designed as self-contained operating unit with individual controls, dedicated power supply, HVAC, and emergency control systems.
- Other electrical components (transformers and inverters) will be connected by underground wiring. An enclosure typically provides around 3-5 megawatt hours of energy.
- Daily monitoring of the facility operations will be done remotely on a 24/7 basis. BESS maintenance will consist of 2-3 people a few times per month arriving in pickup trucks. Landscaping maintenance and snow removal will be performed by a local contractor.

Base Zoning & SPROZ Compliance

American Pharoah BESS has been specifically designed to comply with the base RS-4 zoning district and SPROZ requirements. Tables demonstrating our compliance with the SPROZ design guidelines, RS-4 building design standards, and the RS-4 Limited Use standards and screening requirements for the use are included in the Addendum, attached hereto.

Specifically related to the SPROZ guidelines, American Pharoah BESS meets all of the signage, lighting, landscaping buffer, and setback standards. While the site totals approximately 32 acres, only 10 acres will be utilized for the facility. In addition to the design goal to buffer the facility from any adjacent apartments, the existing topography that drops from the north to the south (dropping 20 ft. to the southeast and 35 ft. to the southwest) also guided the site layout. Likewise, whereas the BESS units and the site substation cannot encroach on the high-voltage transmission power lines area and we will preserve the natural wetland areas, the design still allows for perimeter landscaping to the north and west with significant greenspace buffer areas and the installation of opaque privacy screen fencing.

In addition, the project will meet the goals of various City plans including the recently-adopted Climate and Equity Plan which sets a goal for the City of Milwaukee to reduce greenhouse gas emissions 45% below 2018 levels by 2030. Importantly, the BESS will not have any associated emissions nor will it have water or sewer service so it will not contribute any greenhouse gasses or exacerbate sewer overflows. Further, among the ways the City will reach its goal will be to reduce the use of coal and gas plant energy generation. BESS facilities service the same load as the existing coal/gas plants and will reduce the City's reliance on fossil-fuel sources of generation. Additionally, BESS facilities will be needed to enhance grid reliability and balance the system by delivering instantaneous power at times of peak energy demand or when alternative sources of energy production are not able to meet demand (calm wind or overcast days).

Finally, the use will enhance the properties in the neighborhood and the general welfare of the City by retaining the existing, mature natural buffers for screening and by improving grid reliability to help keep the lights on for homes, businesses, and governmental facilities. The low-profile use behind ample screening and buffer areas will not be injurious or a detriment.

Noise Reduction

A noise study is currently underway to determine if additional noise reduction measures are necessary. As depicted on the project plans, an 8' tall sound barrier will be installed along the northern side of the development. The sound barrier will be a Durisol Noise Barrier (or approved equal) in the location depicted on the plans and as shown in Figure 8.



Figure 8 Example of Exterior Sound Barrier Wall

- If determined not to be necessary, an 8' wooden privacy fence will replace the sound barrier in the same location depicted on the plans.
- If deemed necessary by the sound study, an optional addition to the mitigation approach could be the addition of Parklane Mechanical Gravity Barriers (or approved equal) – these walls would be used around select battery enclosures to reduce noise internal to the site.



Figure 9 Example of Interior Sound Barrier Wall

Conclusion

Black Mountain Energy Storage respectfully requests approval for the American Pharoah BESS.

Respectfully Submitted,

Black Mountain Energy Storage

Sam Jackson, Director of Development
Jackson Hughes, Project Developer Manager
Carolyn O'Brien, PE, Director of Permitting and Entitlements

Amundsen Davis LLC

Brian C. Randall, Esq. and Katherine M. Hampel, Esq., Attorneys for Project

Westwood Professional Services, Inc.

Civil Engineers for Project

ADDENDUM

City of Milwaukee American Pharoah Battery Energy Storage System

6100-6200 N. 84th Street

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Site Plan Review Overlay District Design Guidelines for FN 980290

Design Guideline	Design Detail
1. The design of all parking areas shall be consistent with established traffic engineering standards.	Not Applicable/Met
2. All residential uses shall provide a landscape buffer adjacent to industrial districts per Code requirements.	Not Applicable/Met
3. A front setback of at least 120 feet shall be provided adjacent to North 84th Street. This setback area should have landscaping that includes trees, shrubs, and ground cover; decorative metal or masonry fencing, and signs; but as a minimum shall provide trees meeting Code size requirements, planted one per 40 lineal feet and ground cover.	<p>Met: The Site Plan and Landscape Plan show a 120 ft. front setback adjacent to North 84th Street.</p> <p>The front setback area has landscaping that includes trees, shrubs, and ground cover to a depth of 25'. Beyond the 25', the landscape plan notes to save as much existing vegetation as possible.</p> <p>The front setback area has no signs.</p>
4. All parking areas shall have areas devoted to interior landscaping with trees, shrubs, and ground cover.	Not Applicable/Met
5. Each building may have one monument sign with a maximum height of 5 feet.	Not Applicable/Met
6. Site illumination shall meet Code requirements and be designed and	Met: Site illumination meets Code requirements and is designed and located in a manner that will not cause glare.

located in a manner that will not cause glare.	WillSport GTX High Output LED Lighting WS-GT4 Type V Square 30'H for internal light poles and WS-GT4 Type IV 30'H for perimeter light poles (or approved equal) will be used. The lights around the perimeter will have the house side shield installed to limit the amount of light shown towards any neighbors
7. All buildings on the site shall have common architectural elements and physical orientations.	Not Applicable/Met
8. Site access shall not exceed three driveways and must receive all appropriate municipal approvals.	Met: One driveway will be used for site access.
9. All physical improvements and alterations required to meet these guidelines shall be completed within 6 months of the issuance of an occupancy permit.	Met: All physical improvements and alterations will be completed within 6 months of the issuance of an occupancy permit.

Single-Family Residential (RS-4) Design Standards

Principal Building Design Standards (Sec. 295-505-2 Table)

Design Standard	Design Detail
Lot: Lot area, maximum (sq. ft.) – None Lot width, maximum (ft.) – None	Met
Density: Lot coverage, minimum <i>interior</i> lot – None Lot coverage, maximum <i>interior</i> lot – 30%	Met
Height: Height, minimum (ft.) – None Height, maximum (ft.) – 45	Met Containers will be maximum 8' tall. The substation equipment will all be below 45' however, final design may require a dead-end structure (final transmission pole that connects

	to the site) plus lightning rod to be higher than 45'.
Primary Frontage	Met per SPROZ
Side Setback: North or west side setback, minimum (ft.) – 3 South or east side setback, minimum (ft.) – 6 Combined side setback, minimum (ft.) – 12	Met A 200' setback along the northern property line is shown on the site plan.
Rear Setback: Rear setback, minimum (ft.) interior lot – 20 South or east side setback, minimum (ft.) – 6	Met A 20' rear setback is shown on the site plan.

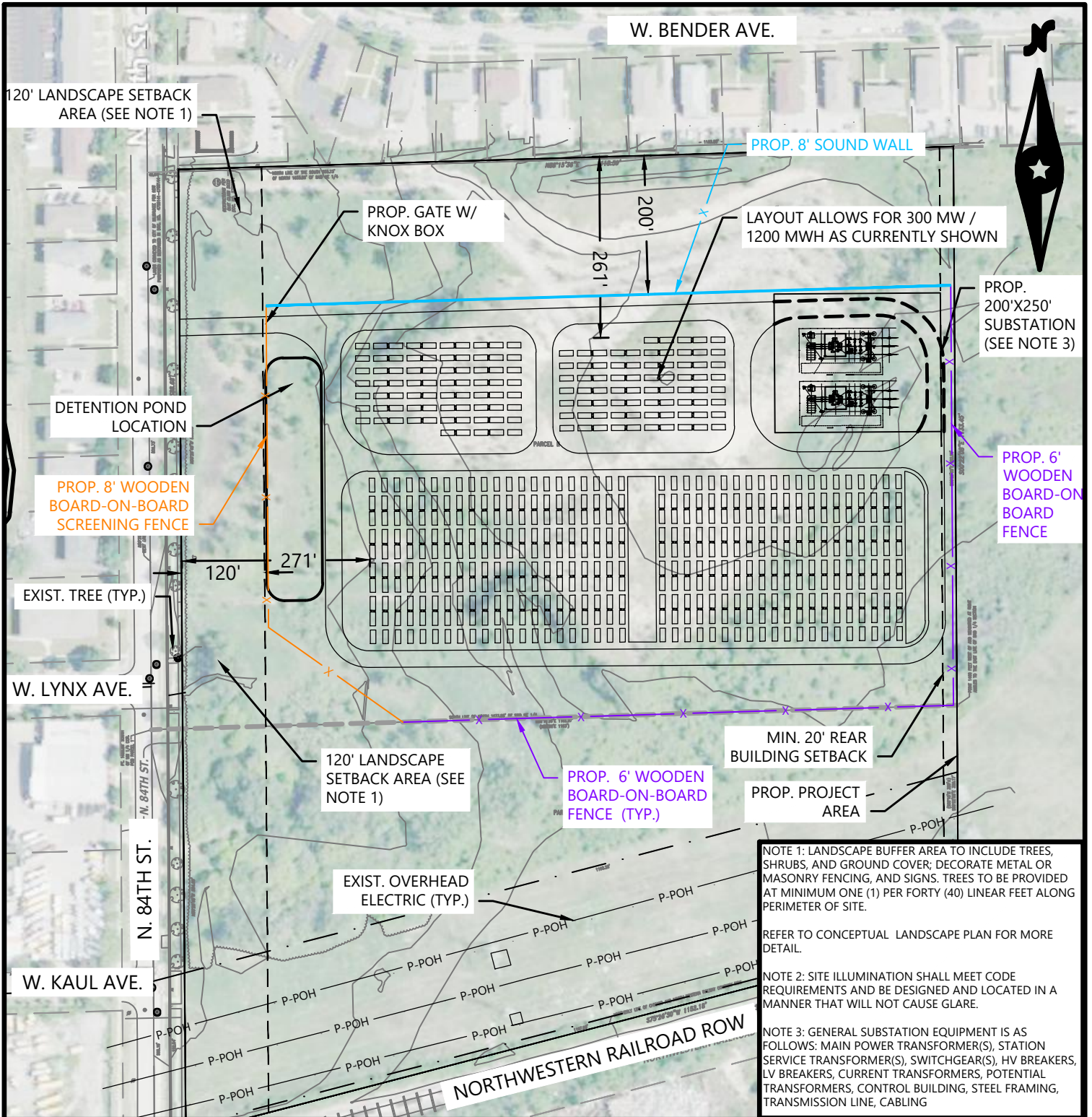
Limited Use Standards for Substation/Distribution Equipment, Outdoor. (Sec. 295-503-2-w)

Limited Use Standard	Design Detail
w-1. All structures associated with the use shall be screened in accordance with s. 295-405-6-c.	Met (per Option B details, described below)
w-2. No structure associated with the use shall be located within 25 feet of a street lot line.	Met

Sec. 295-405-6-c Screening of Outdoor Substation/Distribution Equipment Option B:

Screening Standard	Design Detail
10 ft. minimum width of landscaped area	Met A minimum of 120' landscape buffer is shown on the northern and western sides of the site.
1 tree per 10 linear feet for type and minimum number of plants in landscaped area	Met See table shown on LP-1.
Opaque fence or wall required	Met A minimum 6' opaque wooden fence is shown around the site.
6 ft. minimum height of fence or wall	Met

	<p>A 6' opaque wooden fence is shown around the southern and eastern sides of the site. An 8' opaque wooden fence is shown around the western and northern sides of the site.</p>
<p>100% opacity of portion of fence or wall below 6 ft.</p>	<p>Met</p> <p>The fence is board-on-board wooden and will be 100% opaque.</p>



NOTE 1: LANDSCAPE BUFFER AREA TO INCLUDE TREES, SHRUBS, AND GROUND COVER; DECORATE METAL OR MASONRY FENCING, AND SIGNS. TREES TO BE PROVIDED AT MINIMUM ONE (1) PER FORTY (40) LINEAR FEET ALONG PERIMETER OF SITE.

REFER TO CONCEPTUAL LANDSCAPE PLAN FOR MORE DETAIL.

NOTE 2: SITE ILLUMINATION SHALL MEET CODE REQUIREMENTS AND BE DESIGNED AND LOCATED IN A MANNER THAT WILL NOT CAUSE GLARE.

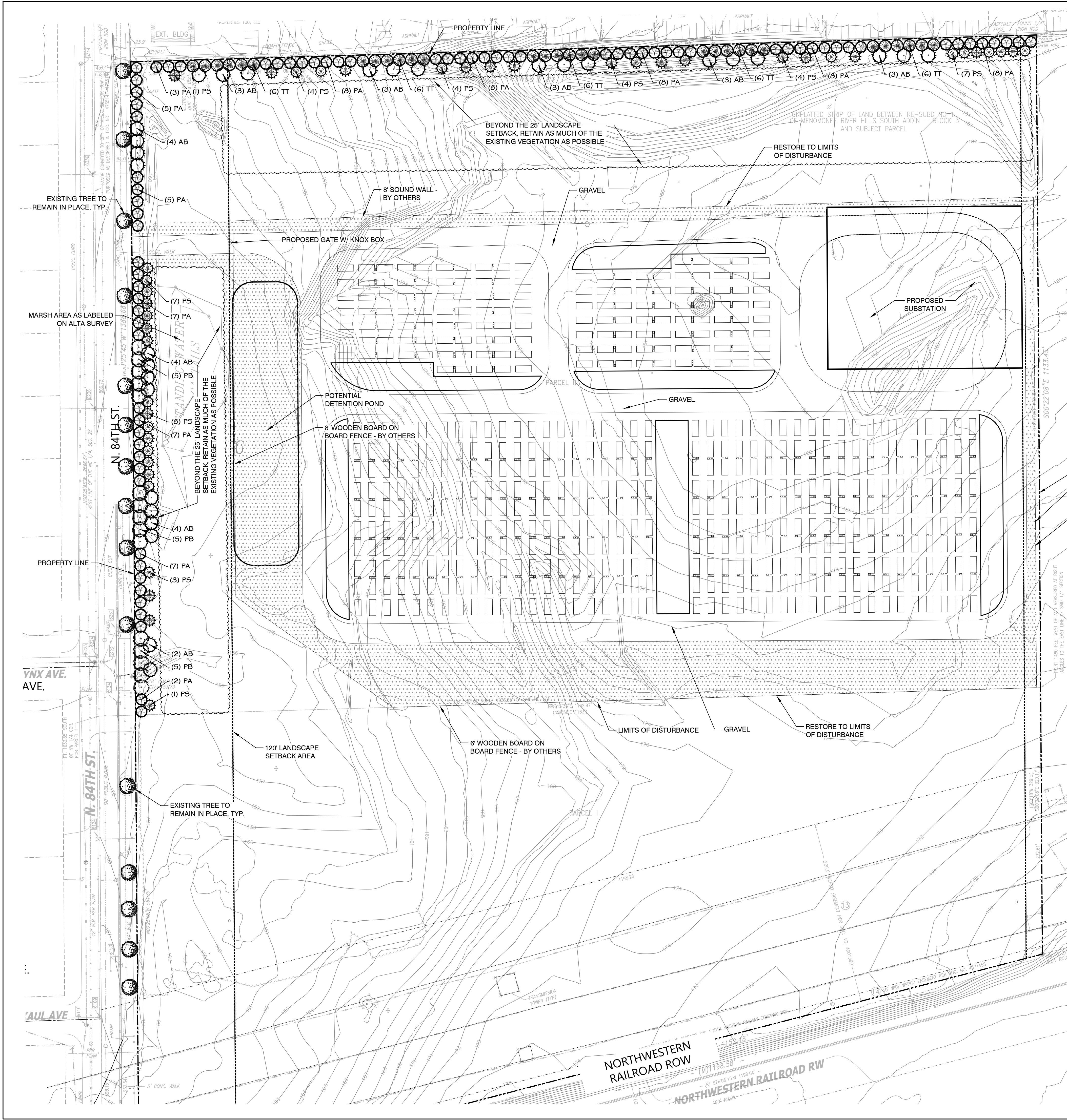
NOTE 3: GENERAL SUBSTATION EQUIPMENT IS AS FOLLOWS: MAIN POWER TRANSFORMER(S), STATION SERVICE TRANSFORMER(S), SWITCHGEAR(S), HV BREAKERS, LV BREAKERS, CURRENT TRANSFORMERS, POTENTIAL TRANSFORMERS, CONTROL BUILDING, STEEL FRAMING, TRANSMISSION LINE, CABLING



AMERICAN PHAROAH BESS
MILWAUKEE COUNTY, WI

CONCEPTUAL SITE PLAN

DATE: 09/08/2023
SCALE: 1"=200'



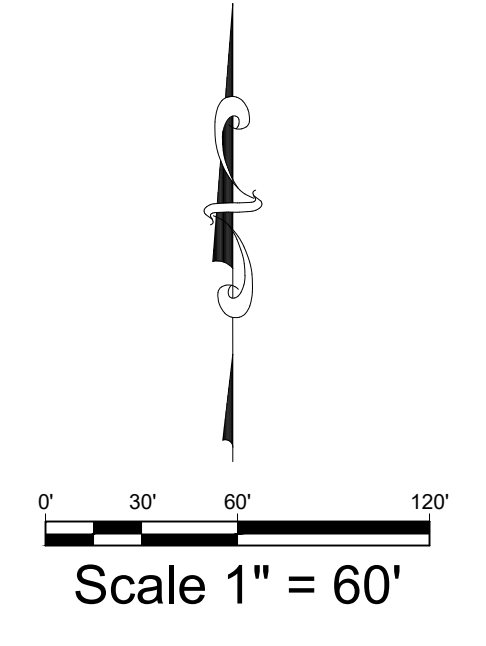
PLANT SCHEDULE

TREES	CODE	QTY	BOTANICAL / COMMON NAME	CAL.	CONT.	SIZE
	AB	29	Abies balsamea Balsam Fir	---	B&B	6' Ht. Min.
	PA	76	Picea abies Norway Spruce	---	B&B	6' Ht. Min.
	PB	15	Picea mariana Black Spruce	---	B&B	6' Ht. Min.
	PS	43	Pinus strobus White Pine	---	Cont.	6' Ht. Min.
	TT	30	Thuja occidentalis 'Techny' Techny Arborvitae	---	B&B	6' Ht. Min.
GROUND COVERS	CODE	QTY	BOTANICAL / COMMON NAME	CONT.	SPACING	SIZE
	PP	121,287 sf	Poa pratensis Kentucky Bluegrass	Hydromulch		

LANDSCAPE CALCULATIONS

SCREENING OF OUTDOOR SUBSTATION/DISTRIBUTION EQUIPMENT OPTION B

MINIMUM WIDTH OF LANDSCAPE AREA	10 FT
LANDSCAPE ARE WIDTH PROVIDED	50 FT ON WEST SIDE 200 FT ON NORTH SIDE
LENGTH OF LANDSCAPE AREA:	
WEST SIDE	806 LF
PLANTS REQUIRED IN LANDSCAPE AREA	81 EVERGREEN TREE OR 2 TALL SHRUBS PER 10 LINEAR FT
PLANTS PROVIDED IN LANDSCAPE AREA	81 EVERGREEN TREES
NORTH SIDE	1,118 LF
PLANTS REQUIRED IN LANDSCAPE AREA	112 EVERGREEN TREE OR 2 TALL SHRUBS PER 10 LINEAR FT
PLANTS PROVIDED IN LANDSCAPE AREA	112 EVERGREEN TREES
FENCE/WALL REQUIRED	OPAQUE FENCE/WALL
FENCE/WALL PROVIDED	OPAQUE 6' FENCE



GENERAL GRADING AND PLANTING NOTES

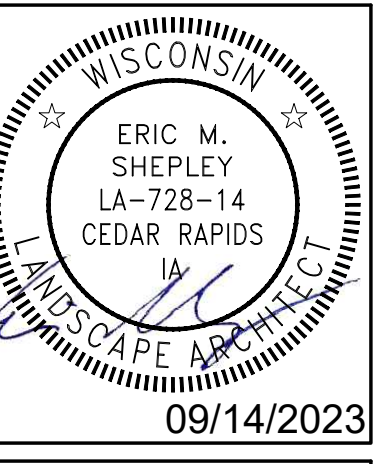
- BY SUBMITTING A PROPOSAL FOR THE LANDSCAPE PLANTING SCOPE OF WORK, THE CONTRACTOR CONFIRMS THAT HE HAS READ, AND WILL COMPLY WITH, THE ASSOCIATED NOTES, SPECIFICATIONS, AND DETAILS WITH THIS PROJECT.
- THE GENERAL CONTRACTOR IS RESPONSIBLE FOR REMOVING ALL EXISTING VEGETATION (EXCEPT WHERE NOTED TO REMAIN).
- IN THE CONTEXT OF THESE PLANS, NOTES, AND SPECIFICATIONS, "FINISH GRADE" REFERS TO THE FINAL ELEVATION OF THE SOIL SURFACE (NOT TOP OF MULCH) AS INDICATED ON THE GRADING PLANS.
 - BEFORE STARTING WORK, THE LANDSCAPE CONTRACTOR SHALL VERIFY THAT THE ROUGH GRADES OF ALL LANDSCAPE AREAS ARE WITHIN +/-0.1' OF FINISH GRADE. SEE SPECIFICATIONS FOR MORE DETAILED INSTRUCTION ON TURF AREA AND PLANTING BED PREPARATION.
 - CONSTRUCT AND MAINTAIN FINISH GRADES AS SHOWN ON GRADING PLANS, AND CONSTRUCT AND MAINTAIN SLOPES AS RECOMMENDED BY THE GEOTECHNICAL REPORT. ALL LANDSCAPE AREAS SHALL HAVE POSITIVE DRAINAGE AWAY FROM STRUCTURES AT THE MINIMUM SLOPE SPECIFIED IN THE REPORT AND ON THE GRADING PLANS, AND AREAS OF POTENTIAL PONDING SHALL BE REGRADED TO BLEND IN WITH THE SURROUNDING GRADES AND ELIMINATE PONDING POTENTIAL.
 - THE LANDSCAPE CONTRACTOR SHALL DETERMINE WHETHER OR NOT THE EXPORT OF ANY SOIL WILL BE NEEDED, TAKING INTO ACCOUNT THE ROUGH GRADE PROVIDED, THE AMOUNT OF SOIL AMENDMENTS TO BE ADDED (BASED ON A SOIL TEST, PER SPECIFICATIONS), AND THE FINISH GRADES TO BE ESTABLISHED.
 - ENSURE THAT THE FINISH GRADE IN SHRUB AREAS IMMEDIATELY ADJACENT TO WALKS AND OTHER WALKING SURFACES, AFTER INSTALLING SOIL AMENDMENTS, IS 3" BELOW THE ADJACENT FINISH SURFACE, IN ORDER TO ALLOW FOR PROPER MULCH DEPTH. TAPER THE SOIL SURFACE TO MEET FINISH GRADE, AS SPECIFIED ON THE GRADING PLANS, AT APPROXIMATELY 18" AWAY FROM THE WALKS.
 - ENSURE THAT THE FINISH GRADE IN TURF AREAS IMMEDIATELY ADJACENT TO WALKS AND OTHER WALKING SURFACES, AFTER INSTALLING SOIL AMENDMENTS, IS 1" BELOW THE FINISH SURFACE OF THE WALKS. TAPER THE SOIL SURFACE TO MEET FINISH GRADE, AS SPECIFIED ON THE GRADING PLANS, AT APPROXIMATELY 18" AWAY FROM THE WALKS.
 - SHOULD ANY CONFLICTS AND/OR DISCREPANCIES ARISE BETWEEN THE GRADING PLANS, GEOTECHNICAL REPORT, THESE NOTES AND PLANS, AND ACTUAL CONDITIONS, THE CONTRACTOR SHALL IMMEDIATELY BRING SUCH ITEMS TO THE ATTENTION OF THE LANDSCAPE ARCHITECT, GENERAL CONTRACTOR, AND OWNER.
- ALL PLANT LOCATIONS ARE DIAGRAMMATIC. ACTUAL LOCATIONS SHALL BE VERIFIED WITH THE LANDSCAPE ARCHITECT OR DESIGNER PRIOR TO PLANTING. THE LANDSCAPE CONTRACTOR SHALL ENSURE THAT ALL REQUIREMENTS OF THE PERMITTING AUTHORITY ARE MET (I.E., MINIMUM PLANT QUANTITIES, PLANTING METHODS, TREE PROTECTION METHODS, ETC.).
 - THE LANDSCAPE CONTRACTOR IS RESPONSIBLE FOR DETERMINING PLANT QUANTITIES; PLANT QUANTITIES SHOWN ON LEGENDS AND CALLOUTS ARE FOR GENERAL INFORMATION ONLY. IN THE EVENT OF A DISCREPANCY BETWEEN THE PLAN AND THE PLANT LEGEND, THE PLANT QUANTITY AS SHOWN ON THE PLAN (FOR INDIVIDUAL SYMBOLS) OR CALLOUT (FOR GROUNDCOVER PATTERNS) SHALL TAKE PRECEDENCE.
 - NO SUBSTITUTIONS OF PLANT MATERIALS SHALL BE ALLOWED WITHOUT THE WRITTEN PERMISSION OF THE LANDSCAPE ARCHITECT AND TOWNSHIP LANDSCAPE ARCHITECT. IF SOME OF THE PLANTS ARE NOT AVAILABLE, THE LANDSCAPE CONTRACTOR SHALL NOTIFY THE LANDSCAPE ARCHITECT IN WRITING (VIA PROPER CHANNELS).
 - THE CONTRACTOR SHALL, AT A MINIMUM, PROVIDE REPRESENTATIVE PHOTOS OF ALL PLANTS PROPOSED FOR THE PROJECT. THE CONTRACTOR SHALL ALLOW THE LANDSCAPE ARCHITECT AND THE OWNER/OWNER'S REPRESENTATIVE TO INSPECT, AND APPROVE OR REJECT, ALL PLANTS DELIVERED TO THE JOBSITE. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS FOR SUBMITTALS.
- THE CONTRACTOR SHALL MAINTAIN THE LANDSCAPE IN A HEALTHY CONDITION FOR 90 DAYS AFTER ACCEPTANCE BY THE OWNER. REFER TO SPECIFICATIONS FOR CONDITIONS OF ACCEPTANCE FOR THE START OF THE MAINTENANCE PERIOD, AND FOR FINAL ACCEPTANCE AT THE END OF THE MAINTENANCE PERIOD.
- SEE SPECIFICATIONS AND DETAILS FOR FURTHER REQUIREMENTS.

ROOT BARRIERS

THE CONTRACTOR SHALL INSTALL ROOT BARRIERS NEAR ALL NEWLY-PLANTED TREES THAT ARE LOCATED WITHIN FIVE (5) FEET OF PAVING OR CURBS. ROOT BARRIERS SHALL BE "CENTURY" OR "DEEP-ROOT" 24" DEEP PANELS (OR EQUAL). BARRIERS SHALL BE LOCATED IMMEDIATELY ADJACENT TO HARDSCAPE. INSTALL PANELS PER MANUFACTURER'S RECOMMENDATIONS. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR USE ROOT BARRIERS OF A TYPE THAT COMPLETELY ENCIRCLE THE ROOTBALL.

MULCHES

AFTER ALL PLANTING IS COMPLETE, CONTRACTOR SHALL INSTALL 3" THICK LAYER OF 1-1/2" SHREDDED WOOD MULCH, NATURAL (UNDYED), IN ALL PLANTING AREAS (EXCEPT FOR TURF AND SEEDED AREAS). CONTRACTOR SHALL SUBMIT SAMPLES OF ALL MULCHES TO LANDSCAPE ARCHITECT AND OWNER FOR APPROVAL PRIOR TO CONSTRUCTION. ABSOLUTELY NO EXPOSED GROUND SHALL BE LEFT SHOWING ANYWHERE ON THE PROJECT AFTER MULCH HAS BEEN INSTALLED (SUBJECT TO THE CONDITIONS AND REQUIREMENTS OF THE "GENERAL GRADING AND PLANTING NOTES" AND SPECIFICATIONS).



Owner
Black Mountain Energy Storage
 1717 W. 6th St., Ste. 295
 Austin, TX 78703

Project Name
American Pharaoh
 City of Milwaukee
 Milwaukee, WI

LANDSCAPE PLANTING

Date	Comment

Project Number	
Date	07/21/2023
Drawn By	EMS
Checked By	EMS/RM

LP-1

PLANTING SPECIFICATIONS

GENERAL

- A. QUALIFICATIONS OF LANDSCAPE CONTRACTOR
- ALL LANDSCAPE WORK SHOWN ON THESE PLANS SHALL BE PERFORMED BY A SINGLE FIRM SPECIALIZING IN LANDSCAPE PLANTING.
 - A LIST OF SUCCESSFULLY COMPLETED PROJECTS OF THIS TYPE, SIZE AND NATURE MAY BE REQUESTED BY THE OWNER FOR FURTHER QUALIFICATION REASONS.
 - THE LANDSCAPE CONTRACTOR SHALL HOLD A VALID CONTRACTOR'S LICENSE ISSUED BY THE APPROPRIATE LOCAL JURISDICTION.
- B. SCOPE OF WORK
- WORK COVERED BY THESE SECTIONS INCLUDES THE FURNISHING AND PAYMENT OF ALL MATERIALS, LABOR, SERVICES, EQUIPMENT, LICENSES, TAXES AND ANY OTHER ITEMS THAT ARE NECESSARY FOR THE EXECUTION, INSTALLATION AND COMPLETION OF ALL WORK SPECIFIED HEREIN AND /OR SHOWN ON THE LANDSCAPE PLANS, NOTES, AND DETAILS.
 - ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE LAWS, CODES AND REGULATIONS RELEVANT TO THE PROJECT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL INSPECTIONS AND PERMITS REQUIRED BY FEDERAL, STATE AND LOCAL AUTHORITIES IN SUPPLY, TRANSPORTATION AND INSTALLATION OF MATERIALS.
 - THE LANDSCAPE CONTRACTOR SHALL VERIFY THE LOCATION OF ALL UNDERGROUND UTILITY LINES (WATER, SEWER, ELECTRICAL, TELEPHONE, GAS, CABLE, TELEVISION, ETC.) PRIOR TO THE START OF ANY WORK.

PRODUCTS

- A. ALL MANUFACTURED PRODUCTS SHALL BE NEW.
- B. CONTAINER AND BALLED-AND-BURLAPPED PLANTS
- FURNISH NURSERY-GROWN PLANTS COMPLYING WITH ANSI Z60.1-2014. PROVIDE WELL-SHAPED, FULLY BRANCHED, HEALTHY, VIGOROUS STOCK FREE OF DISEASE, INSECTS, EGGS, LARVAE, AND DEFECTS SUCH AS KNOTS, SUN SCALD, INJURIES, ABRASIONS, AND DISFIGUREMENT. ALL PLANTS WITHIN A SPECIES SHALL HAVE SIMILAR SIZE, AND SHALL BE OF A FORM TYPICAL FOR THE SPECIES. ALL TREES SHALL BE OBTAINED FROM SOURCES WITHIN 200 MILES OF THE PROJECT SITE, AND WITH SIMILAR CLIMATIC CONDITIONS.
 - ROOT SYSTEMS SHALL BE HEALTHY, DENSELY BRANCHED ROOT SYSTEMS, NON-POT-BOUND, FREE FROM ENCRUING AND/OR GIRDLING ROOTS, AND FREE FROM ANY OTHER ROOT DEFECTS (SUCH AS J-SHAPED ROOTS).
 - TREES MAY BE PLANTED FROM CONTAINERS OR BALLED-AND-BURLAPPED (B&B), UNLESS SPECIFIED ON THE PLANTING LEGEND. BARE-ROOT TREES ARE NOT ACCEPTABLE. ANY PLANT DEEMED UNACCEPTABLE BY THE LANDSCAPE ARCHITECT OR OWNER SHALL BE IMMEDIATELY REMOVED FROM THE SITE AND SHALL BE REPLACED WITH AN ACCEPTABLE PLANT OF LIKE TYPE AND SIZE AT THE CONTRACTOR'S OWN RISK. ANY PLANTS APPEARING TO BE UNHEALTHY, EVEN IF DETERMINED TO STILL BE ALIVE, SHALL NOT BE ACCEPTED. THE LANDSCAPE ARCHITECT AND OWNER SHALL BE THE SOLE JUDGES AS TO THE ACCEPTABILITY OF PLANT MATERIAL.
 - TREES SHALL BE STORED IN FORMAL UNLESS OTHERWISE SPECIFIED. TREES WITH CENTRAL LEADERS WILL NOT BE ACCEPTED IF LEADER IS DAMAGED OR REMOVED. PRUNE ALL DAMAGED TWIGS AFTER PLANTING.
 - CALIPER MEASUREMENTS FOR STANDARD (SINGLE TRUNK) TREES SHALL BE AS FOLLOWS: SIX INCHES ABOVE THE ROOT FLARE FOR TREES UP TO AND INCLUDING FOUR INCHES IN CALIPER, AND TWELVE INCHES ABOVE THE ROOT FLARE FOR TREES EXCEEDING FOUR INCHES IN CALIPER.
 - MULTI-TRUNK TREES SHALL BE MEASURED BY THEIR OVERALL HEIGHT, MEASURED FROM THE TOP OF THE ROOT BALL, WHERE CALIPER MEASUREMENTS ARE USED, THE CALIPER SHALL BE CALCULATED AS ONE-HALF OF THE SUM OF THE CALIPER OF THE THREE LARGEST TRUNKS.
 - ANY TREE OR SHRUB SHOWN TO HAVE EXCESS SOIL PLACED ON TOP OF THE ROOT BALL, SO THAT THE ROOT FLARE HAS BEEN COMPLETELY COVERED, SHALL BE REJECTED.
- C. SOD: PROVIDE WELL-ROOTED SOD OF THE VARIETY NOTED ON THE PLANS. SOD SHALL BE CUT FROM HEALTHY, MATURE TURF WITH SOIL THICKNESS OF 3/4" TO 1". EACH PALLET OF SOD SHALL BE ACCOMPANIED BY A CERTIFICATE FROM SUPPLIER STATING THE COMPOSITION OF THE SOD.
- D. TOPSOIL: SANDY TO CLAY LOAM TOPSOIL, FREE OF STONES LARGER THAN 1/2" INCH, FOREIGN MATTER, PLANTS, ROOTS, AND SEEDS.
- E. COMPOST: WELL-COMPOSTED, STABLE, AND WEED-FREE ORGANIC MATTER, pH RANGE OF 5.5 TO 8, MOISTURE CONTENT 35 TO 55 PERCENT BY WEIGHT, 100 PERCENT PASSING THROUGH 3/4-INCH SIEVE; SOLUBLE SALT CONTENT OF 5 TO 10 DISEGMENT; NOT EXCEEDING 0.5 PERCENT CONTAMINANTS AND FREE OF SUBSTANCES TOXIC TO PLANTINGS, NO MANURE OR ANIMAL-BASED PRODUCTS SHALL BE USED.
- F. FERTILIZER: GRANULAR FERTILIZER CONSISTING OF NITROGEN, PHOSPHORUS, POTASSIUM, AND OTHER NUTRIENTS IN PROPORTIONS, AMOUNTS, AND RELEASE RATES RECOMMENDED IN A SOIL REPORT FROM A QUALIFIED SOIL-TESTING AGENCY (SEE BELOW).
- G. MULCH: SIZE AND TYPE AS INDICATED ON PLANS, FREE FROM DELETERIOUS MATERIALS AND SUITABLE AS A TOP DRESSING OF TREES AND SHRUBS.
- H. TREE STAKING AND GUYING
- STAKES: 6" LONG GREEN METAL T-POSTS.
 - GUY AND TIE WIRE: ASTM A 641, CLASS 1, GALVANIZED-STEEL WIRE, 2-STRAND, TWISTED, 0.106 INCH DIAMETER.
 - STRAP CHAINING GUARD: REINFORCED NYLON OR CANVAS AT LEAST 1-1/2 INCH WIDE, WITH GROMMETS TO PROTECT TREE TRUNKS FROM DAMAGE.
- I. STEEL EDGING: PROFESSIONAL STEEL EDGING, 14 GAUGE THICK X 4 INCHES WIDE, FACTORY PAINTED DARK GREEN. ACCEPTABLE MANUFACTURERS INCLUDE COL-MET OR APPROVED EQUAL.
- J. PRE-EMERGENT HERBICIDES: ANY GRANULAR, NON-STAINING PRE-EMERGENT HERBICIDE THAT IS LABELED FOR THE SPECIFIC ORNAMENTALS OR TURF ON WHICH IT WILL BE UTILIZED. PRE-EMERGENT HERBICIDES SHALL BE APPLIED PER THE MANUFACTURER'S LABELED RATES.

METHODS

- A. SOIL PREPARATION
- BEFORE STARTING WORK, THE LANDSCAPE CONTRACTOR SHALL VERIFY THAT THE GRADE OF ALL LANDSCAPE AREAS ARE WITHIN +0.1' OF FINISH GRADE. THE CONTRACTOR SHALL NOTIFY THE OWNER IMMEDIATELY SHOULD ANY DISCREPANCIES EXIST.
 - SOIL TESTING:
 - AFTER FINISH GRADES HAVE BEEN ESTABLISHED, CONTRACTOR SHALL HAVE SOIL SAMPLES FROM THE PROJECT'S LANDSCAPE AREAS TESTED BY AN ESTABLISHED SOIL TESTING LABORATORY. EACH SAMPLE SUBMITTED TO THE LAB SHALL CONTAIN NO LESS THAN ONE QUANT OF SOIL, TAKEN FROM BETWEEN THE SOIL SURFACE AND 6" DEPTH. IF NO SAMPLE LOCATIONS ARE INDICATED ON THE PLANS, THE CONTRACTOR SHALL TAKE A MINIMUM OF THREE SAMPLES FROM VARIOUS REPRESENTATIVE LOCATIONS FOR TESTING.
 - THE CONTRACTOR SHALL HAVE THE SOIL TESTING LABORATORY PROVIDE RESULTS FOR THE FOLLOWING: SOIL TEXTURAL CLASS, GENERAL SOIL FERTILITY, pH, ORGANIC MATTER CONTENT, SALT (CEC), LIME, SODIUM ADSORPTION RATIO (SAR) AND BORON CONTENT.
 - THE CONTRACTOR SHALL ALSO SUBMIT THE PROJECT'S PLANT LIST TO THE LABORATORY ALONG WITH THE SOIL SAMPLES.
 - THE SOIL REPORT PRODUCED BY THE LABORATORY SHALL CONTAIN RECOMMENDATIONS FOR THE FOLLOWING (AS APPROPRIATE): SEPARATE SOIL PREPARATION AND BACKFILL MIX RECOMMENDATIONS FOR GENERAL ORNAMENTAL PLANTS, XERIC PLANTS, TURF, AND NATIVE SEED, AS WELL AS PRE-PLANT FERTILIZER APPLICATIONS AND RECOMMENDATIONS FOR ANY OTHER SOIL RELATED ISSUES. THE REPORT SHALL ALSO PROVIDE A FERTILIZER PROGRAM FOR THE ESTABLISHMENT PERIOD AND FOR LONG-TERM MAINTENANCE.
 - THE CONTRACTOR SHALL INSTALL SOIL AMENDMENTS AND FERTILIZERS PER THE SOILS REPORT RECOMMENDATIONS. ANY CHANGE IN COST DUE TO THE SOIL REPORT RECOMMENDATIONS, EITHER INCREASE OR DECREASE, SHALL BE SUBMITTED TO THE OWNER WITH THE REPORT.
 - FOR BIDDING PURPOSES ONLY, THE SOIL PREPARATION SHALL CONSIST OF THE FOLLOWING:
 - TURF: INCORPORATE THE FOLLOWING AMENDMENTS INTO THE TOP 8" OF SOIL BY MEANS OF ROTOTILLING AFTER CROSS-RIPPING:
 - NITROGEN STABILIZED ORGANIC AMENDMENT - 4 CU. YDS. PER 1,000 S.F.
 - PREPLANT TURF FERTILIZER (10-20-10 OR SIMILAR, SLOW RELEASE, ORGANIC) - 15 LBS PER 1,000 S.F.
 - "CLAY BUSTER" OR EQUAL - USE MANUFACTURER'S RECOMMENDED RATE.
 - TREES, SHRUBS, AND PERENNIALS: INCORPORATE THE FOLLOWING AMENDMENTS INTO THE TOP 8" OF SOIL BY MEANS OF ROTOTILLING AFTER CROSS-RIPPING:
 - NITROGEN STABILIZED ORGANIC AMENDMENT - 4 CU. YDS. PER 1,000 S.F.
 - 12-12-12 FERTILIZER (OR SIMILAR, ORGANIC, SLOW RELEASE) - 10 LBS. PER CU. YD.
 - "CLAY BUSTER" OR EQUAL - USE MANUFACTURER'S RECOMMENDED RATE.
 - IRON SULPHATE - 2 LBS. PER CU. YD.
- IN THE CONTEXT OF THESE PLANS, NOTES, AND SPECIFICATIONS, "FINISH GRADE" REFERS TO THE FINAL ELEVATION OF THE SOIL SURFACE (NOT TOP OF MULCH) AS INDICATED ON THE GRADING PLANS.
- BEFORE STARTING WORK, THE LANDSCAPE CONTRACTOR SHALL VERIFY THAT THE ROUGH GRADES OF ALL LANDSCAPE AREAS ARE WITHIN +0.1' OF FINISH GRADE. SEE SPECIFICATIONS FOR MORE DETAILED INSTRUCTION ON TURF AREA AND PLANTING BED PREPARATION.
 - CONSTRUCT AND MAINTAIN FINISH GRADES AS SHOWN ON GRADING PLANS, AND CONSTRUCT AND MAINTAIN SLOPES AS RECOMMENDED BY THE GEOTECHNICAL REPORT. ALL LANDSCAPE AREAS SHALL HAVE POSITIVE DRAINAGE AWAY FROM STRUCTURES AT THE MINIMUM SLOPE SPECIFIED IN THE REPORT AND ON THE GRADING PLANS, AND AREAS OF POTENTIAL PONDING SHALL BE REGRADED TO BLEND IN WITH THE SURROUNDING GRADES AND ELIMINATE PONDING POTENTIAL.
 - THE LANDSCAPE CONTRACTOR SHALL DETERMINE WHETHER OR NOT THE EXPORT OF ANY SOIL WILL BE NEEDED, TAKING INTO ACCOUNT THE ROUGH GRADE PROVIDED, THE AMOUNT OF SOIL AMENDMENTS TO BE ADDED (BASED ON A SOIL TEST, PER SPECIFICATIONS), AND THE FINISH GRADES TO BE ESTABLISHED.
 - ENSURE THAT THE FINISH GRADE IN SHRUB AREAS IMMEDIATELY ADJACENT TO WALKS AND OTHER WALKING SURFACES, AFTER INSTALLING SOIL AMENDMENTS, IS 3" BELOW THE ADJACENT FINISH SURFACE, IN ORDER TO ALLOW FOR PROPER MULCH DEPTH. TAPER THE SOIL SURFACE TO MEET FINISH GRADE, AS SPECIFIED ON THE GRADING PLANS, AT APPROXIMATELY 18" AWAY FROM THE WALKS.
 - ENSURE THAT THE FINISH GRADE IN TURF AREAS IMMEDIATELY ADJACENT TO WALKS AND OTHER WALKING SURFACES, AFTER INSTALLING SOIL AMENDMENTS, IS 1" BELOW THE FINISH SURFACE OF THE WALKS. TAPER THE SOIL SURFACE TO MEET FINISH GRADE, AS SPECIFIED ON THE GRADING PLANS, AT APPROXIMATELY 18" AWAY FROM THE WALKS.
 - SHOULD ANY CONFLICTS AND/OR DISCREPANCIES ARISE BETWEEN THE GRADING PLANS, GEOTECHNICAL REPORT, THESE NOTES AND PLANS, AND ACTUAL CONDITIONS, THE CONTRACTOR SHALL IMMEDIATELY BRING SUCH ITEMS TO THE ATTENTION OF THE LANDSCAPE ARCHITECT, GENERAL CONTRACTOR, AND OWNER.
- ONCE SOIL PREPARATION IS COMPLETE, THE LANDSCAPE CONTRACTOR SHALL ENSURE THAT THERE ARE NO DEBRIS, TRASH, OR STONES LARGER THAN 1" REMAINING IN THE TOP 6" OF SOIL.

SUBMITTALS

- THE CONTRACTOR SHALL PROVIDE SUBMITTALS AND SAMPLES, IF REQUIRED, TO THE LANDSCAPE ARCHITECT, AND RECEIVE APPROVAL IN WRITING FOR SUCH SUBMITTALS BEFORE WORK COMMENCES.
- SUBMITTALS SHALL INCLUDE PHOTOS OF PLANTS WITH A RULER OR MEASURING STICK FOR SCALE, PHOTOS OR SAMPLES OF ANY REQUIRED MULCHES, AND SOIL TEST RESULTS AND PREPARATION RECOMMENDATIONS FROM THE TESTING LAB (INCLUDING COMPOST AND FERTILIZER RATES AND TYPES, AND OTHER AMENDMENTS FOR TREES/SHRUB, TURF, AND SEED AREAS AS MAY BE APPROPRIATE).
- SUBMITTALS SHALL ALSO INCLUDE MANUFACTURER CUT SHEETS FOR PLANTING ACCESSORIES SUCH AS TREE STAKES AND TIES, EDGING, AND LANDSCAPE FABRICS (IF ANY).
- WHERE MULTIPLE ITEMS ARE SHOWN ON A PAGE, THE CONTRACTOR SHALL CLEARLY INDICATE THE ITEM BEING CONSIDERED.

GENERAL PLANTING

- REMOVE ALL NURSERY TAGS AND STAKES FROM PLANTS.
- EXCEPT IN AREAS TO BE PLANTED WITH ORNAMENTAL GRASSES, APPLY PRE-EMERGENT HERBICIDES AT THE MANUFACTURER'S RECOMMENDED RATE.
- TRENCHING NEAR EXISTING TREES:
 - CONTRACTOR SHALL NOT DISTURB ROOTS 1-1/2" AND LARGER IN DIAMETER WITHIN THE CRITICAL ROOT ZONE (CRZ) OF ALL TREES, AND SHALL EXCAVATE ALL POSSIBLE ROOTS AND BRANCHES. PRECAUTIONS TO AVOID INJURY TO TREE ROOTS, TRUNKS, AND BRANCHES. THE CRZ IS DEFINED AS A CIRCULAR AREA EXTENDING OUTWARD FROM THE TREE TRUNK, WITH A RADIUS EQUAL TO 1" FOR EVERY 1" OF TRUNK DIAMETER-AT-BREAST-HEIGHT (4.5' ABOVE THE AVERAGE GRADE AT THE TRUNK).
 - ALL EXCAVATION WITHIN THE CRZ SHALL BE PERFORMED USING HAND TOOLS. NO MACHINE EXCAVATION OR TRENCHING OF ANY KIND SHALL BE ALLOWED WITHIN THE CRZ.
 - ALTER ALIGNMENT OF PIPE TO AVOID TREE ROOTS 1-1/2" AND LARGER IN DIAMETER. WHERE TREE ROOTS 1-1/2" AND LARGER IN DIAMETER ARE ENCOUNTERED IN THE FIELD, TUNNEL UNDER SUCH ROOTS. WIRE EXPOSED ROOTS WITH SEVERAL LAYERS OF BURLAP AND KEEP MOIST. CLOSE ALL TRENCHES WITHIN THE CANOPY DRIP LINES WITHIN 24 HOURS.
 - ALL SEVERED ROOTS SHALL BE HAND PRUNED WITH SHARP TOOLS AND ALLOWED TO AIR-DRY. DO NOT USE ANY SORT OF SEALERS OR WOUND PAINTS.

TREE PLANTING

- TREE PLANTING HOLES SHALL BE EXCAVATED TO MINIMUM WIDTH OF TWO TIMES THE WIDTH OF THE ROOTBALL, AND TO A DEPTH EQUAL TO THE DEPTH OF THE ROOTBALL LESS TWO TO FOUR INCHES. SHARPLY THE SIDES AND BOTTOM OF THE HOLE FROM THE SOIL PRIOR TO BACKFILL. SHOULD REMOVE ANY GLAZING THAT MAY HAVE BEEN CAUSED DURING THE EXCAVATION OF THE HOLE.
- FOR CONTAINER AND BOX TREES, TO REMOVE ANY POTENTIALLY GIRDLING ROOTS AND OTHER ROOT DEFECTS, THE CONTRACTOR SHALL SHAVE A 1" LAYER OFF OF THE SIDES AND BOTTOM OF THE ROOTBALL OF ALL TREES JUST BEFORE PLACING INTO THE PLANTING PIT. DO NOT "TEASE" ROOTS OUT FROM THE ROOTBALL.
- INSTALL TREE ON UNDISTURBED SUBGRADE SO THAT THE TOP OF THE ROOTBALL IS TWO TO FOUR INCHES ABOVE THE SURROUNDING GRADE.
- BACKFILL THE TREE HOLE UTILIZING THE EXISTING TOPSOIL FROM ON-SITE. ROCKS LARGER THAN 1" DIA. AND ALL OTHER DEBRIS SHALL BE REMOVED FROM THE SOIL PRIOR TO BACKFILL. SHOULD ADDITIONAL SOIL BE REQUIRED TO ACCOMPLISH THIS TASK, USE STORED TOPSOIL FROM ON-SITE OR IMPORT ADDITIONAL TOPSOIL FROM OFF-SITE AT NO ADDITIONAL COST TO THE OWNER. IMPORTED TOPSOIL SHALL BE OF SIMILAR TEXTURAL CLASS AND COMPOSITION TO THE ON-SITE SOIL.
- TREES SHALL NOT BE STAKED UNLESS LOCAL CONDITIONS (SUCH AS HEAVY WINDS OR SLOPES) REQUIRE STAKES TO KEEP TREES UPRIGHT. SHOULD STAKING BE REQUIRED, THE TOTAL NUMBER OF TREE STAKES SHALL BE LIMITED TO TWO PER TREE. THE LANDSCAPE CONTRACTOR SHALL STRAIGHTEN THE TREE, OR REPLACE IT SHOULD IT BECOME DAMAGED. TREE STAKING SHALL ADHERE TO THE FOLLOWING GUIDELINES:
 - 1"-2" TREES: TWO STAKES PER TREE
 - 2 1/2"-4" TREES: THREE STAKES PER TREE
 - TREES 4" OR GREATER: THREE STAKES PER TREE
 - MULTI-TRUNK TREES: THREE STAKES PER TREE MINIMUM, QUANTITY AND POSITIONS AS NEEDED TO STABILIZE THE TREE
- UPON COMPLETION OF PLANTING, CONSTRUCT AN EARTH WATERING BASIN AROUND THE TREE. COVER THE INTERIOR OF THE TREE RING WITH MULCH (TYPE AND DEPTH PER PLANS).

SHRUB, PERENNIAL, AND GROUND COVER PLANTING

- DIG THE PLANTING HOLES TWICE AS WIDE AND 2" LESS DEEP THAN EACH PLANT'S ROOTBALL. INSTALL THE PLANT IN THE HOLE. BACKFILL AROUND THE PLANT WITH SOIL AMENDED PER SOIL TEST RECOMMENDATIONS.
- WHEN PLANTING IS COMPLETE, INSTALL MULCH (TYPE AND DEPTH PER PLANS) OVER ALL PLANTING BEDS, COVERING THE ENTIRE PLANTING AREA.

SODDING

- SOD VARIETY TO BE AS SPECIFIED ON THE LANDSCAPE PLAN.
- LAY SOD WITHIN 24 HOURS FROM THE TIME OF STRIPPING. DO NOT LAY IF THE GROUND IS FROZEN.
- LAY THE SOD TO FORM A SOLID MASS WITH TIGHTLY FITTED JOINTS. BUTT ENDS AND SIDES OF SOD STRIPS - DO NOT OVERLAP. STAGGER STRIPS TO OFFSET JOINTS IN ADJACENT COURSES.
- ROLL THE SOD TO ENSURE GOOD CONTACT OF THE SOD'S ROOT SYSTEM WITH THE SOIL UNDERNEATH.
- WATER THE SOD THOROUGHLY WITH A FINE SPRAY IMMEDIATELY AFTER PLANTING TO OBTAIN AT LEAST SIX INCHES OF PENETRATION INTO THE SOIL BELOW THE SOD.

MULCH

- INSTALL MULCH TOPDRESSING, TYPE AND DEPTH PER MULCH NOTE, IN ALL PLANTING AREAS AND TREE RINGS.
- DO NOT INSTALL MULCH WITHIN 6" OF TREE ROOT FLARE AND WITHIN 24" OF HABITABLE STRUCTURES, EXCEPT AS MAY BE NOTED ON THESE PLANS. MULCH COVER WITHIN 6" OF CONCRETE WALKS AND CURBS SHALL NOT PROTRUDE ABOVE THE FINISH SURFACE OF THE WALKS AND CURBS. MULCH COVER WITHIN 12" OF WALLS SHALL BE AT LEAST 3" LOWER THAN THE TOP OF WALL.

CLEAN UP

- DURING LANDSCAPE PREPARATION AND PLANTING, KEEP ALL PAVEMENT CLEAN AND ALL WORK AREAS IN A NEAT, ORDERLY CONDITION.
- DISPOSED LEGALLY OF ALL EXCAVATED MATERIALS OFF THE PROJECT SITE.

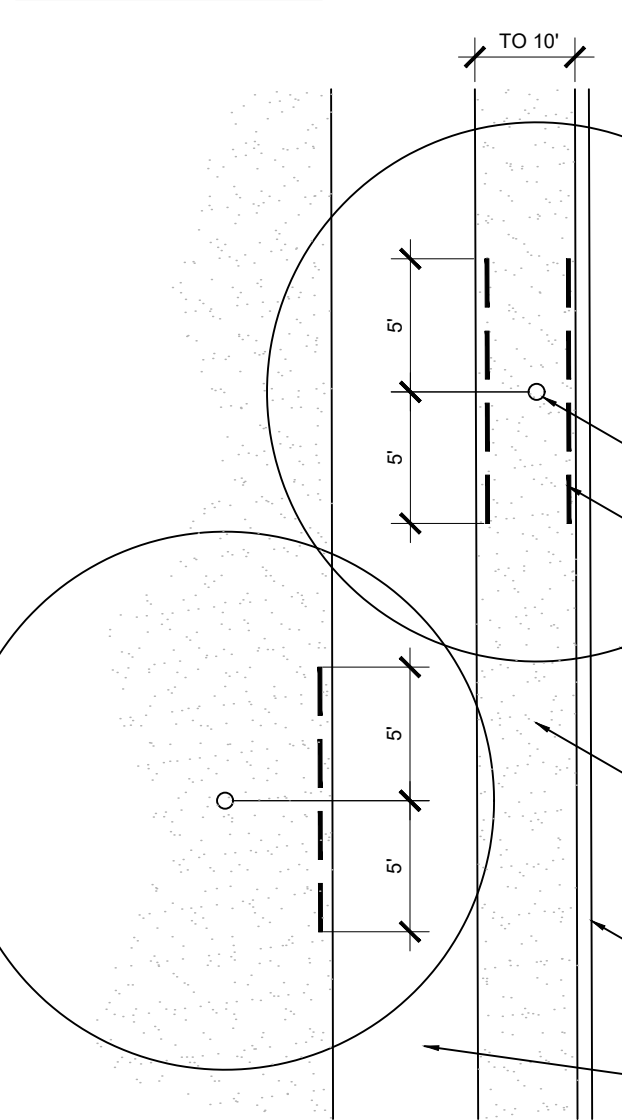
INSPECTION AND ACCEPTANCE

- UPON COMPLETION OF THE WORK, THE LANDSCAPE CONTRACTOR SHALL PROVIDE THE SITE CLEAN, FREE OF DEBRIS AND TRASH, AND SUITABLE FOR USE AS INTENDED. THE LANDSCAPE CONTRACTOR SHALL THEN REQUEST AN INSPECTION BY THE OWNER TO DETERMINE FINAL ACCEPTABILITY.
- WHEN THE INSPECTED PLANTING WORK DOES NOT COMPLY WITH THE CONTRACT DOCUMENTS, THE LANDSCAPE CONTRACTOR SHALL REPLACE AND/OR REPAIR THE REJECTED WORK TO THE OWNER'S SATISFACTION WITHIN 24 HOURS.
- THE LANDSCAPE MAINTENANCE PERIOD WILL NOT COMMENCE UNTIL THE LANDSCAPE WORK HAS BEEN RE-INSPECTED BY THE OWNER AND FOUND TO BE ACCEPTABLE. AT THAT TIME, A WRITTEN NOTICE OF FINAL ACCEPTANCE WILL BE ISSUED BY THE OWNER, AND THE MAINTENANCE AND GUARANTEE PERIODS WILL COMMENCE.

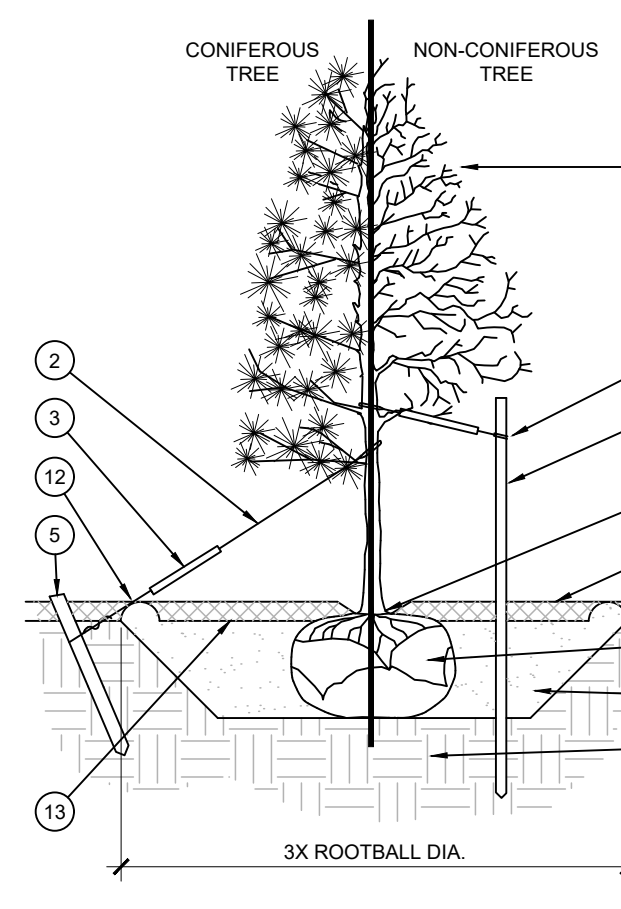
LANDSCAPE MAINTENANCE

- THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR THE MAINTENANCE OF ALL WORK SHOWN ON THESE PLANS FOR 90 DAYS BEYOND FINAL ACCEPTANCE OF ALL LANDSCAPE WORK BY THE OWNER. LANDSCAPE MAINTENANCE SHALL INCLUDE WEEKLY SITE VISITS FOR THE FOLLOWING ACTIONS (AS APPROPRIATE): PROPER PRUNING, RESTAKING OF TREES, RESETTling OF PLANTS THAT HAVE SETTLED, MOWING AND AERATION OF LAWNS, WEEDING, RESEEDING AREAS WHICH HAVE NOT GERMINATED WELL, TREATING FOR INSECTS AND DISEASES, REPLACEMENT OF MULCH, REMOVAL OF LITTER, REPAIRS TO THE IRRIGATION SYSTEM DUE TO FALLTY PARTS AND/OR WORKMANSHIP, AND THE APPROPRIATE WATERING OF ALL PLANTINGS. THE LANDSCAPE CONTRACTOR SHALL MAINTAIN THE IRRIGATION SYSTEM IN PROPER WORKING ORDER, WITH SCHEDULING ADJUSTMENTS BY SEASON TO MAXIMIZE WATER CONSERVATION.
 - SHOULD SEEDING AND/OR SODDED AREAS NOT BE COVERED BY AN AUTOMATIC IRRIGATION SYSTEM, THE LANDSCAPE CONTRACTOR SHALL BE RESPONSIBLE FOR WATERING THESE AREAS AND OBTAINING A FULL, HEALTHY STAND OF PLANTS AT NO ADDITIONAL COST TO THE OWNER.
 - TO ACHIEVE FINAL ACCEPTANCE AT THE END OF THE MAINTENANCE PERIOD, ALL OF THE FOLLOWING CONDITIONS MUST OCCUR:
 - THE LANDSCAPE SHALL SHOW ACTIVE, HEALTHY GROWTH (WITH EXCEPTIONS MADE FOR SEASONAL DORMANCY). ALL PLANTS NOT MEETING THIS CONDITION SHALL BE REJECTED AND REPLACED BY HEALTHY PLANT MATERIAL PRIOR TO FINAL ACCEPTANCE.
 - ALL HARDSCAPE SHALL BE CLEANED PRIOR TO FINAL ACCEPTANCE.
 - SODDED AREAS MUST BE ACTIVELY GROWING AND MUST REACH A MINIMUM HEIGHT OF 1 1/2 INCHES BEFORE FIRST MOWING. HYDROMULCHED AREAS SHALL SHOW ACTIVE, HEALTHY GROWTH. BARE AREAS LARGER THAN TWELVE SQUARE INCHES MUST BE RESEEDED OR RESEEDED (AS APPROPRIATE) PRIOR TO FINAL ACCEPTANCE. ALL SODDED TURF SHALL BE NEATLY MOWED.
- WARRANTY PERIOD, PLANT GUARANTEE AND REPLACEMENTS
- THE LANDSCAPE CONTRACTOR SHALL GUARANTEE ALL TREES, SHRUBS, PERENNIALS, SOD, SEEDING/HYDROMULCHED AREAS, AND IRRIGATION SYSTEMS FOR A PERIOD OF ONE YEAR FROM THE DATE OF THE OWNER'S FINAL ACCEPTANCE (90 DAYS FOR ANNUAL PLANTS). THE CONTRACTOR SHALL REPLACE, AT HIS OWN EXPENSE AND TO THE SATISFACTION OF THE OWNER, ANY PLANTS WHICH DIE IN THAT TIME, OR REPAIR ANY PORTIONS OF THE IRRIGATION SYSTEM WHICH OPERATE IMPROPERLY.
 - AFTER THE INITIAL MAINTENANCE PERIOD AND DURING THE GUARANTEE PERIOD, THE LANDSCAPE CONTRACTOR SHALL ONLY BE RESPONSIBLE FOR REPLACEMENT OF PLANTS WHEN PLANT DEATH CANNOT BE ATTRIBUTED DIRECTLY TO OVERWATERING OR OTHER DAMAGE BY HUMAN ACTIONS.
- PROVIDE A MINIMUM OF (2) COPIES OF RECORD DRAWINGS TO THE OWNER UPON COMPLETION OF WORK. A RECORD DRAWING IS A RECORD OF ALL CHANGES THAT OCCURRED IN THE FIELD AND THAT ARE DOCUMENTED THROUGH CHANGE ORDERS, ADDENDA, OR CONTRACTOR/CONSULTANT DRAWING MARKUPS.

OPEN LANDSCAPE



ROOT BARRIER - PLAN VIEW
SCALE: NOT TO SCALE



TREE PLANTING
SCALE: NOT TO SCALE

- TYPICAL WALKWAY OR PAVING
- TREE TRUNK
- LINEAR ROOT BARRIER MATERIAL. SEE PLANTING NOTES FOR TYPE AND MANUFACTURER. INSTALL PER MANUFACTURER'S SPECIFICATIONS.
- TREE CANOPY
- TYPICAL PLANTING AREA
- TYPICAL CURB AND GUTTER

NOTES:

- INSTALL ROOT BARRIERS NEAR ALL NEWLY-PLANTED TREES THAT ARE LOCATED WITHIN FIVE (5) FEET OF PAVING OR CURBS.
- BARRIERS SHALL BE LOCATED IMMEDIATELY ADJACENT TO HARDSCAPE. UNDER NO CIRCUMSTANCES SHALL THE CONTRACTOR USE ROOT BARRIERS OF A TYPE THAT COMPLETELY ENCLOSE THE ROOTBALL.

- TREE CANOPY.
- CINCH-TIES (2\"/>

NOTES:

- SCARIFY SIDES OF PLANTING PIT PRIOR TO SETTING TREE.
- REMOVE EXCESS SOIL APPLIED ON TOP OF THE ROOTBALL THAT COVERS THE ROOT FLARE. THE PLANTING HOLE DEPTH SHALL BE SUCH THAT THE ROOTBALL RESTS ON UNDISTURBED SOIL, AND THE ROOT FLARE IS 2-4\"/>

EVERGREEN DESIGN GROUP
(800) 680-6630
15455 Dallas Pkwy., Ste 600
Addison, TX 75001
www.EvergreenDesignGroup.com

ERIC M. SHEPLEY
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CEDAR RAPIDS
LANDSCAPE ARCHITECT
09/14/2023

Black Mountain Energy Storage
1717 W. 6th St., Ste. 285
Austin, TX 78703

American Pharaoh
City of Milwaukee
Milwaukee, WI

LANDSCAPE DETAILS & SPECIFICATIONS

Date	Comment

Project Number
Date 07/21/2023
Drawn By EMS
Checked By EMS/RM

LP-2

American Pharaoh Bess

Milwaukee, WI

09/12/2023

Job Number: 988293

Prepared by: CO

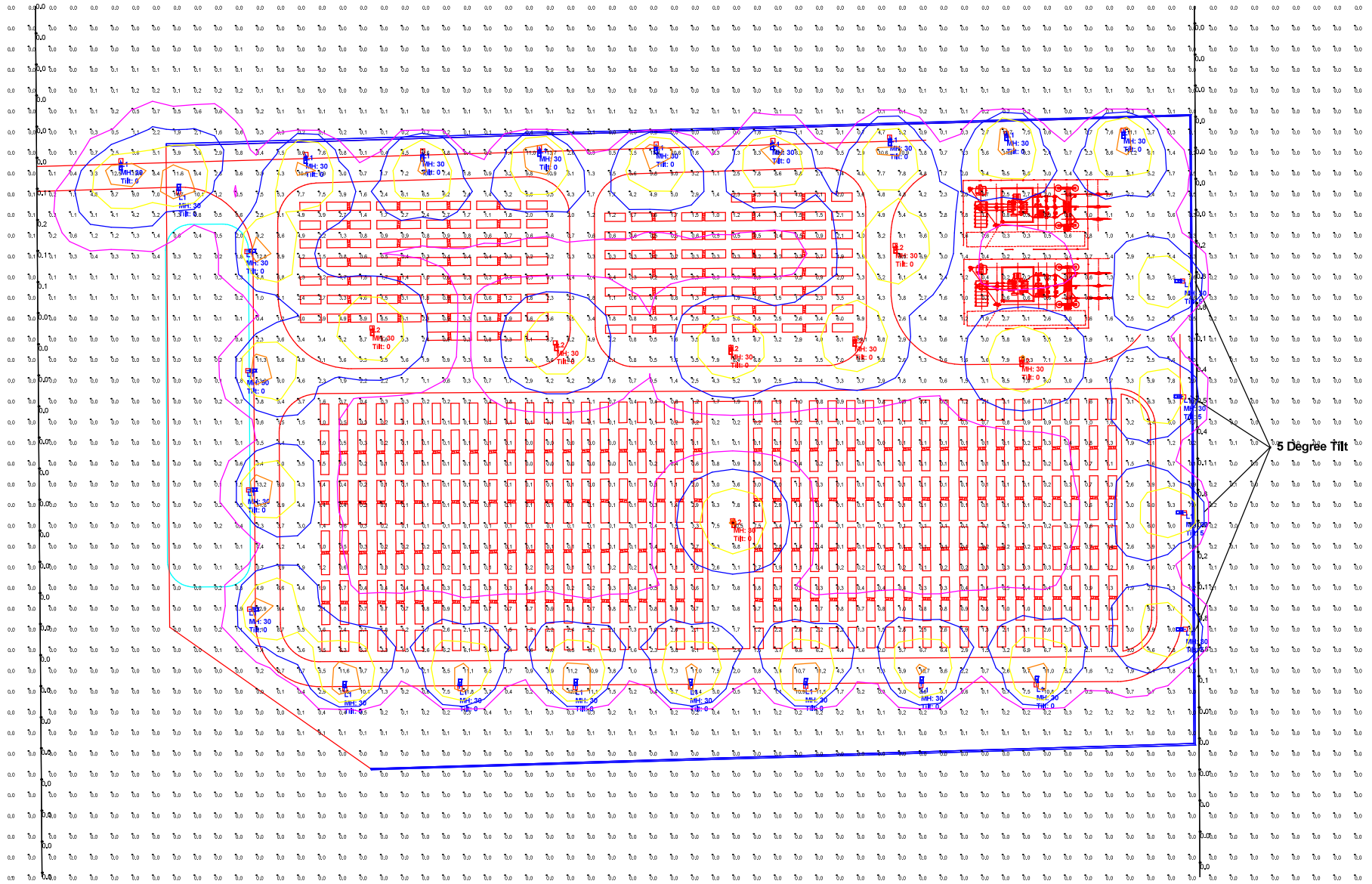
NOTES

Powered by Wisconsin Lighting Lab, Inc.



*Luminaire testing data is based on Illuminating Engineering Society (IES) standards under simulated and laboratory conditions. This design is based on information supplied by others, and individual field measurements may vary from computer-simulated calculations due to variables like (but not limited to) variation in electrical voltage, environmental conditions and other variable field characteristics. Typical field foot candle measurements may vary +/- 10%. For sports lighting, field measurements should be taken in accordance with IESNA RP-6-15. Conformance to facility and local codes is the responsibility of the owner and their representatives. This layout may not meet CA Title 24 and/or other local energy codes. If specific compliance is required, those details must be provided to your factory design representative.

**Satisfactory performance and safe use of LED sports lighting fixtures is dependent upon light poles, brackets, anchorage and other structural components being of adequate design and condition. The total combined Effective Projected Area (EPA) and weight of all fixtures, brackets and attachments mounting to a light pole cannot exceed the EPA and weight rating for a specified pole. For sports lighting retrofit applications, it is the customer's responsibility to have a qualified inspector and/or engineer confirm the structural adequacy of the existing light poles assemblies. We are happy to quote new light poles and brackets if you have concerns about your existing materials.

Photometric



Fixture Schedule

Symbol	Qty	Label	LLF	Lum. Watts	Lum. Lumens
	25	WS-GT4-350-50-xx-4-HSS	0.950	349	41186
	7	WS-GT4-350-50-xx-5W	0.950	349	54094

Calculation Summary

Label	CalcType	Units	Avg	Max	Min	Avg/Min	Max/Min
Area of Scope (3' ABG)	Illuminance	Fc	0.64	14.7	0.0	N.A.	N.A.
Property Line (3' ABG)	Illuminance	Fc	0.05	0.9	0.0	N.A.	N.A.

WillSport® PRODUCT FAMILY

Proudly engineered and manufactured in Wisconsin, USA – our WillSport® family of LED sports lighting systems combines 50 years of manufacturing expertise, premium components, top-notch midwestern workmanship, and cutting-edge lighting and controls technology. From hometown ball fields to professional sports complexes to infrastructure and transportation applications, WillSport® series products are precision-engineered to deliver premium lighting, power management, and entertainment – all while backed by Will's unmatched design, engineering, and project support capabilities.

- Output options over 80,000 lumens
- Field-replaceable surge suppression module



- Custom mounts, adapters, and accessories available from USA fab shop

- Proprietary heat sink design with thermally isolated LED modules resulting in calculated L70 LED life over 200,000 hours

- Recessed light engine design with zero uplight rating (U0) at 0° fixture tilt

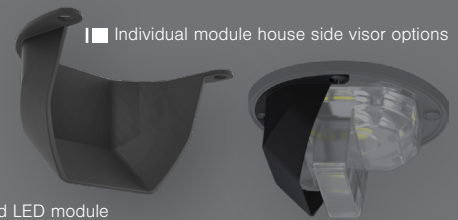
- Easy driver and LED module access for technology upgrades and maintenance

- Premium high-efficiency Chip-on-Board (COB) LEDs wired and bonded directly to circuit board to deliver compact lumen density and added reliability

- True Amber and Phosphor Converted (PC) Amber premium LED chip options

- Wireless and onboard control options including motion, photo, dimming, daylight harvesting, zones, and schedules

- Aluminum chassis construction and rugged build quality



- Individual module house side visor options

High-Output LED Lighting

WillSport® GTX



WILL WISCONSIN LIGHTING LAB®

WiLLsport® GTX HIGH-OUTPUT LED LIGHTING



Catalog # _____

Project _____

Comments _____



Highlights

- Designed, engineered, and manufactured in Wisconsin, USA from premium domestic and imported components
- PPG® Commercial Performance Coatings custom color matching of RAL codes and architectural colors
- IES files, photometric reports, and lighting simulations available from factory design team
- Output options over 80,000 lumens
- Proprietary heat sink design with thermally isolated LED modules resulting in calculated L70 LED life over 200,000 hours
- Easy driver and LED module access for technology upgrades and maintenance

Applications

- Airports, high-mast, and infrastructure lighting
- Large parking lots and automotive dealerships
- General high-output flood and area lighting
- Shipping yards and container loading areas
- High-output security and perimeter lighting
- Outdoor sports facilities including tennis courts
- Amber and turtle applications

Construction & Finish

- Rugged aluminum chassis with excellent heat/impact resistance and hinged electrical access
- Architectural grade powder coat enclosure and black anodized heat sink
- High-grade stainless steel hardware for superior strength and corrosion resistance
- Driver components are fully encased in potting material for moisture and vibration resistance

Compliance & Warranty

- ETL Certification for UL STD 1598 & CSA STD C22.2 # 250.0 for wet locations
- Meets Buy American Act requirements
- Standard 5-year limited warranty with extended factory warranties available
- Turtle and wildlife compliance options (consult factory)

Light Engine & Electrical

- Premium high-efficiency Chip-on-Board (COB) LEDs wired and bonded directly to circuit board to deliver compact lumen density and added reliability
- Self-sealing optical assembly constructed of optical-grade silicone with 93% typical lighting transmittance
- -40°C to +45°C ambient operating temperature
- Standard AC input voltage of 120-277V 50/60 Hz; up to 480V available
- Isolated 0-10V dim-to-off with standby power ≤ 0.5W (standard) and PWM/Timer dimmable (optional)
- Power factor of 0.90 min
- Total harmonic distortion of 20% max
- Drivers include integral input Surge Protection of Differential Mode 6kV, Common Mode 10kV per EN 61000-4-5
- Field-replaceable thermally protected secondary 20kA surge suppression
- Always-on auxiliary power: 12VDC, 200mA
- Local specifying engineer recommended for product selection and local compliance
- Licensed electrician required for installation

Control Options

- Integral passive infrared Bluetooth® sensor for motion, photo, dimming, and daylight harvesting control
- Synapse® wireless system for large-scale control of zones, dimming, schedules, and sensors
- DMX control options available from factory

Light Poles & Arms

- WiLL offers one of the most comprehensive light pole, bracket, and arm catalogs in the industry
- Aluminum, steel, fiberglass, and concrete materials
- Straight, tapered, and decorative designs
- Custom fabrication, finishing, and accessories available
- Dedicated light pole application support team

EPA Chart




Base Model	0° Tilt	15° Tilt	30° Tilt	45° Tilt	60° Tilt	75° Tilt	90° Tilt
WS-GT2	0.7	0.87	1.25	1.59	1.92	2.18	2.76
WS-GT4	0.9	1	1.58	2.05	2.48	2.8	3.54
WS-GT6	1.2	1.2	2	2.6	3.1	3.5	4.4

Specifications & Typical Lumen Output (WHITE LED)

Base Model	Weight (lb)	System Watts (W)	Engine Qty	Drive Current (A)	Distribution	3000K, 70 CRI					4000K, 70 CRI					5000K, 70 CRI					5700K, 80 CRI				
						Lumens	B	U	G	lm/W	Lumens	B	U	G	lm/W	Lumens	B	U	G	lm/W	Lumens	B	U	G	lm/W
WS-GT2-120	25	116	2	1.1	2 = Type II	18,189	3	0	3	157	18,525	3	0	3	160	18,862	3	0	3	163	17,830	3	0	3	154
					3 = Type III	18,389	3	0	3	159	18,729	3	0	3	162	19,069	3	0	3	164	18,026	3	0	3	155
					4 = Type IV	18,589	3	0	3	160	18,932	3	0	3	163	19,277	3	0	3	166	18,222	3	0	3	157
					5W = 150° Type V Square	18,789	5	0	5	162	19,136	5	0	5	165	19,484	5	0	5	168	18,417	5	0	5	159
					5M = 100° Type V Flood	18,589	5	0	2	160	18,932	5	0	2	163	19,277	5	0	2	166	18,221	5	0	2	157
					70 = 70° Type V Flood	19,389	5	0	1	167	19,747	5	0	1	170	20,106	5	0	1	173	19,005	5	0	1	164
					45 = 45° Medium Spot	18,189	5	0	1	157	18,525	5	0	1	160	18,862	5	0	1	163	17,829	5	0	1	154
5N = 25° Narrow Spot	18,989	5	0	3	164	19,340	5	0	3	167	19,691	5	0	3	170	18,613	5	0	3	161					
WS-GT2-175	25	175	2	1.62	2 = Type II	25,428	4	0	4	145	25,898	4	0	4	148	26,368	4	0	4	151	24,925	3	0	3	142
					3 = Type III	25,707	4	0	4	147	26,183	4	0	4	150	26,658	4	0	4	152	25,199	4	0	4	144
					4 = Type IV	25,987	4	0	4	149	26,467	4	0	4	151	26,948	4	0	4	154	25,473	3	0	3	146
					5W = 150° Type V Square	26,266	5	0	5	150	26,752	5	0	5	153	27,237	5	0	5	156	25,747	5	0	5	147
					5M = 100° Type V Flood	25,987	5	0	2	149	26,467	5	0	2	151	26,947	5	0	2	154	25,473	5	0	2	146
					70 = 70° Type V Flood	27,104	5	0	1	155	27,606	5	0	1	158	28,106	5	0	1	161	26,569	5	0	1	152
					45 = 45° Medium Spot	25,428	5	0	1	145	25,898	5	0	1	148	26,368	5	0	1	151	24,925	5	0	1	142
5N = 25° Narrow Spot	26,545	5	0	3	152	27,037	5	0	3	155	27,527	5	0	3	157	26,021	5	0	3	149					
WS-GT4-255	33	254	4	1.1	2 = Type II	39,182	4	0	4	154	39,907	4	0	4	157	40,631	4	0	4	160	38,408	4	0	4	151
					3 = Type III	39,613	4	0	4	156	40,346	4	0	4	159	41,077	4	0	4	162	38,830	4	0	4	153
					4 = Type IV	40,043	4	0	4	158	40,784	4	0	4	161	41,524	4	0	4	164	39,252	4	0	4	155
					5W = 150° Type V Square	40,474	5	0	5	159	41,222	5	0	5	162	41,971	5	0	5	165	39,674	5	0	5	156
					5M = 100° Type V Flood	40,043	5	0	2	158	40,783	5	0	2	161	41,525	5	0	2	164	39,252	5	0	2	155
					70 = 70° Type V Flood	41,766	5	0	1	164	42,538	5	0	1	168	43,311	5	0	1	171	40,940	5	0	1	161
					45 = 45° Medium Spot	39,182	5	0	1	154	39,906	5	0	1	157	40,632	5	0	1	160	38,408	5	0	1	151
5N = 25° Narrow Spot	40,905	5	0	3	161	41,661	5	0	3	164	42,418	5	0	3	167	40,096	5	0	3	158					
WS-GT4-350	33	349	4	1.62	2 = Type II	50,500	5	0	5	145	51,434	5	0	5	147	52,368	5	0	5	150	49,502	4	0	4	142
					3 = Type III	51,055	5	0	5	146	51,999	5	0	5	149	52,943	5	0	5	152	50,046	5	0	5	143
					4 = Type IV	51,610	4	0	5	148	52,564	4	0	5	151	53,519	4	0	5	153	50,590	4	0	5	145
					5W = 150° Type V Square	52,165	5	0	5	150	53,130	5	0	5	152	54,094	5	0	5	155	51,134	5	0	5	147
					5M = 100° Type V Flood	51,610	5	0	2	148	52,565	5	0	2	151	53,519	5	0	2	153	50,590	5	0	2	145
					70 = 70° Type V Flood	53,830	5	0	1	154	54,826	5	0	1	157	55,820	5	0	1	160	52,766	5	0	1	151
					45 = 45° Medium Spot	50,500	5	0	1	145	51,434	5	0	1	147	52,368	5	0	1	150	49,502	5	0	1	142
5N = 25° Narrow Spot	52,720	5	0	3	151	53,695	5	0	3	154	54,669	5	0	3	157	51,678	5	0	3	148					
WS-GT6-415	40	414	6	1.3	2 = Type II	64,929	5	0	5	157	66,129	5	0	5	160	67,330	5	0	5	163	63,645	5	0	5	154
					3 = Type III	65,643	5	0	5	159	66,856	5	0	5	162	68,070	5	0	5	164	64,344	5	0	5	155
					4 = Type IV	66,356	5	0	5	160	67,582	5	0	5	163	68,810	5	0	5	166	65,044	5	0	5	157
					5W = 150° Type V Square	64,929	5	0	5	157	66,129	5	0	5	160	67,330	5	0	5	163	63,645	5	0	5	154
					5M = 100° Type V Flood	64,238	5	0	2	155	65,426	5	0	2	158	66,614	5	0	2	161	62,968	5	0	2	152
					70 = 70° Type V Flood	67,001	5	0	1	162	68,240	5	0	1	165	69,479	5	0	1	168	65,676	5	0	1	159
					45 = 45° Medium Spot	62,857	5	0	1	152	64,019	5	0	1	155	65,181	5	0	1	157	61,614	5	0	1	149
5N = 25° Narrow Spot	65,620	5	0	3	159	66,833	5	0	3	161	68,046	5	0	3	164	64,322	5	0	3	155					
WS-GT6-530	40	528	6	1.62	2 = Type II	77,697	5	0	5	147	79,134	5	0	5	150	80,571	5	0	5	153	76,161	5	0	5	144
					3 = Type III	78,551	5	0	5	149	80,004	5	0	5	152	81,456	5	0	5	154	76,998	5	0	5	146
					4 = Type IV	79,405	5	0	5	150	80,873	5	0	5	153	82,342	5	0	5	156	77,835	5	0	5	147
					5W = 150° Type V Square	77,697	5	0	5	147	79,134	5	0	5	150	80,571	5	0	5	153	76,161	5	0	5	144
					5M = 100° Type V Flood	76,870	5	0	2	146	78,292	5	0	2	148	79,714	5	0	2	151	75,351	5	0	2	143
					70 = 70° Type V Flood	80,177	5	0	1	152	81,660	5	0	1	155	83,142	5	0	1	158	78,592	5	0	1	149
					45 = 45° Medium Spot	75,217	5	0	1	143	76,608	5	0	1	145	78,000	5	0	1	148	73,730	5	0	1	140
5N = 25° Narrow Spot	78,524	5	0	3	149	79,976	5	0	3	152	81,428	5	0	3	154	76,971	5	0	3	146					

Note: Typical lumen values are based on photometric tests performed in accordance with ANSI/IES LM-79-19. Actual performance may differ resulting from optical configuration, color temp and CRI, glare management, owner environment, and application.
 Note: Data based on 25°C ambient operating temperature.
 Note: BUG ratings are calculated with fixture tilt set to 0°.

Specifications & Typical Lumen Output (AMBER LED)

Base Model	Weight (lb)	System Watts (W)	Engine Qty	Drive Current (A)	LED Source	Lumens
 WS-GT2-CW60-TA	25	59.1	2	0.3	True Amber (593 nm)	2,742
WS-GT2-CW110-PCA	25	107	2	0.333	Phosphor Converted Amber (590 nm)	7,842
 WS-GT4-CW120-TA	33	118.1	4	0.3	True Amber (593 nm)	5,484
WS-GT4-CW215-PCA	33	213	4	0.333	Phosphor Converted Amber (590 nm)	15,684
 WS-GT6-CW180-TA	40	177.2	6	0.3	True Amber (593 nm)	8,226
WS-GT6-CW320-PCA	40	320	6	0.333	Phosphor Converted Amber (590 nm)	23,526

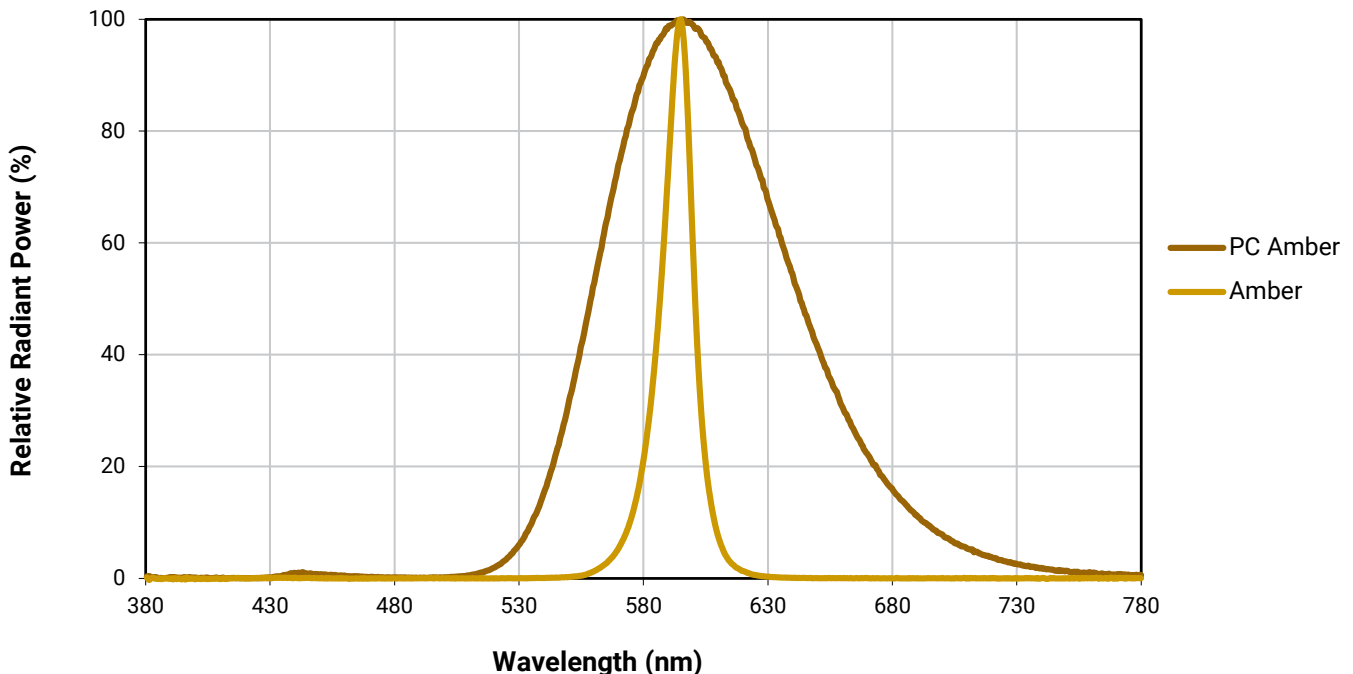
Lumen Multiplier & Maintenance (WHITE LED)

Ambient Temperature	Lumen Multiplier	TM-21 Lumen Maintenance (50,000 Hours)						Calculated L90 (hrs)						Calculated L70 (hrs)							
		120W	175W	255W	350W	415W	530W	120W	175W	255W	350W	415W	530W	120W	175W	255W	350W	415W	530W		
0°C / 32°F	1.04	92.20	92.20	92.20	92.20	92.20	92.20	64,000	64,000	64,000	64,000	64,000	64,000	64,000	64,000	220,000	220,000	220,000	220,000	220,000	220,000
10°C / 50°F	1.02	92.20	92.20	92.20	92.20	92.20	92.20	64,000	64,000	64,000	64,000	64,000	64,000	64,000	64,000	220,000	220,000	220,000	220,000	220,000	220,000
25° C / 77°F	1.00	92.20	92.20	92.20	92.20	92.20	91.27	64,000	64,000	64,000	64,000	64,000	58,000	220,000	220,000	220,000	220,000	220,000	220,000	193,000	193,000
30° C / 86°F	0.99	92.20	92.20	92.20	91.27	92.20	90.14	64,000	64,000	64,000	58,000	64,000	51,000	220,000	220,000	220,000	220,000	193,000	220,000	170,000	170,000
35° C / 95°F	0.98	92.20	91.27	92.20	90.14	92.20	88.90	64,000	58,000	64,000	51,000	64,000	45,000	220,000	193,000	220,000	170,000	220,000	150,000	150,000	
40° C / 104°F	0.97	92.20	90.14	92.20	88.90	91.27	87.67	64,000	51,000	64,000	45,000	58,000	40,000	220,000	170,000	220,000	150,000	193,000	134,000	134,000	
45° C / 113°F	0.97	92.20	88.90	91.27	87.67	90.14	N/A	64,000	45,000	58,000	40,000	51,000	N/A	220,000	150,000	193,000	134,000	170,000	N/A	N/A	

Note: Values calculated according to IESNA TM-21-11 methodology.

Voltage	Current (A)					
	120W	175W	255W	350W	415W	530W
Input Current @ 120V (A)	1.00	1.50	2.10	2.90	3.80	4.40
Input Current @ 208V (A)	0.60	0.80	1.20	1.70	2.20	2.50
Input Current @ 240V (A)	0.50	0.70	1.10	1.50	1.90	2.20
Input Current @ 277V (A)	0.40	0.60	0.90	1.30	1.60	1.90
Input Current @ 347V (A)	0.30	0.50	0.70	1.00	1.30	1.50
Input Current @ 480V (A)	0.20	0.40	0.50	0.70	0.90	1.10

LED Chip Wavelengths

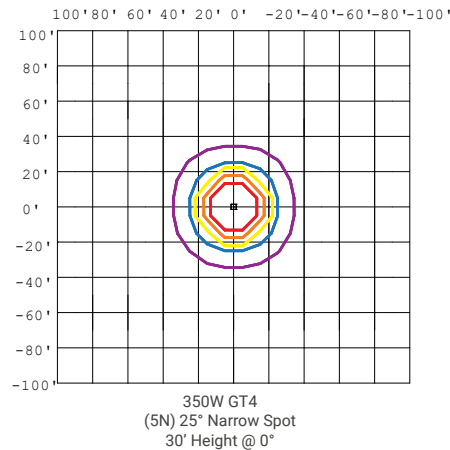
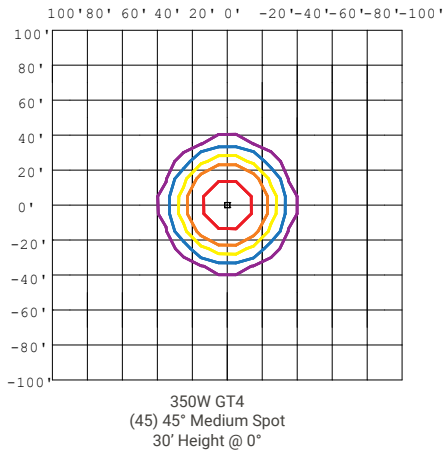
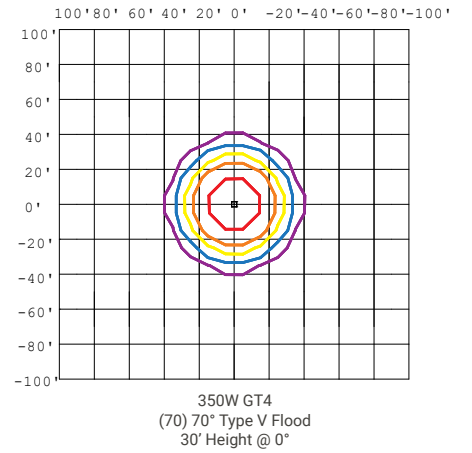
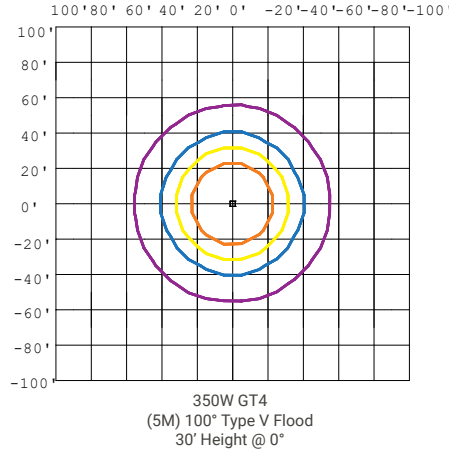
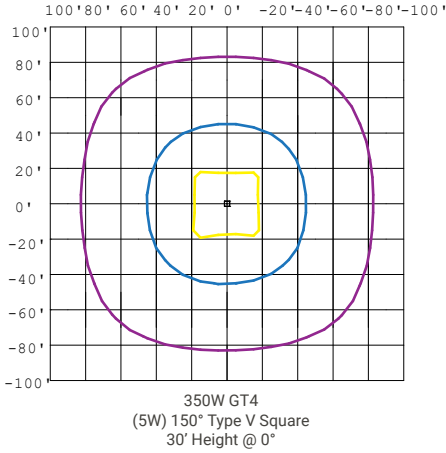
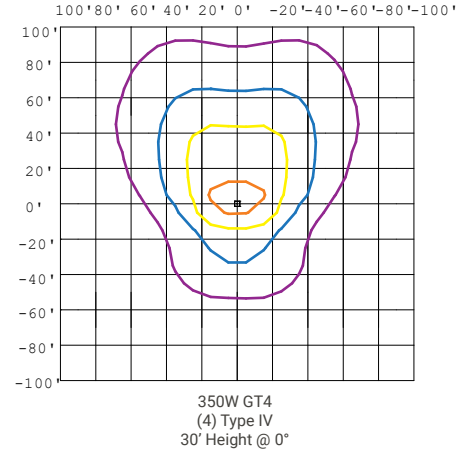
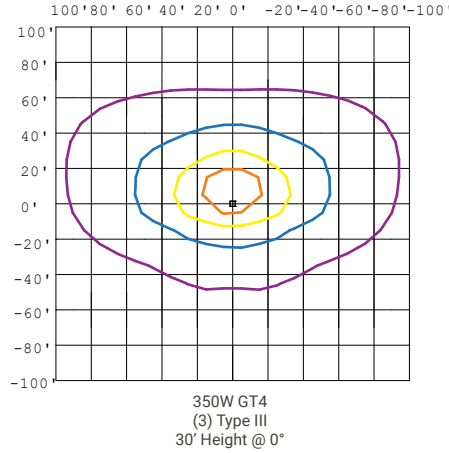
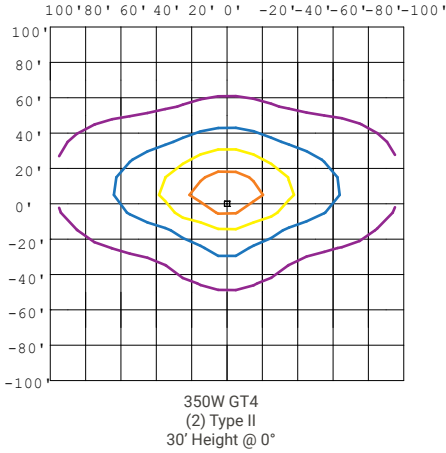


Photometric Diagrams

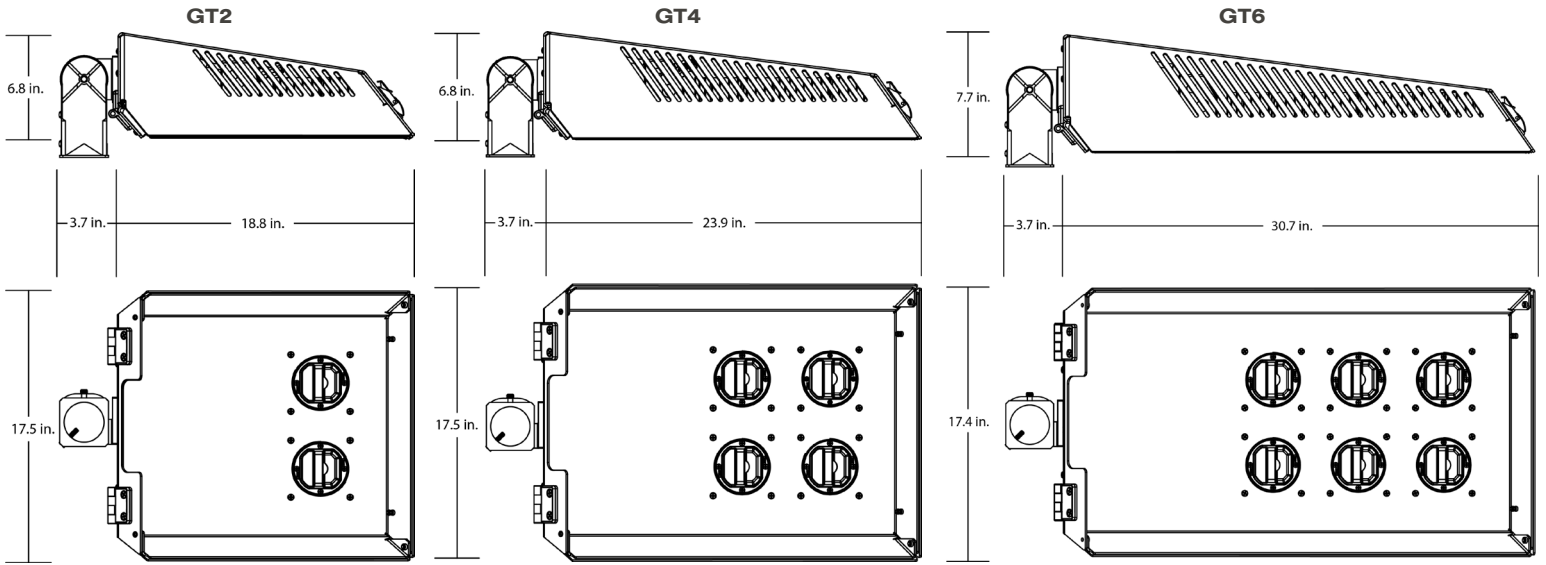
LEGEND

- 0.5 fc
- 2.0 fc
- 5.0 fc
- 10 fc
- 25 fc

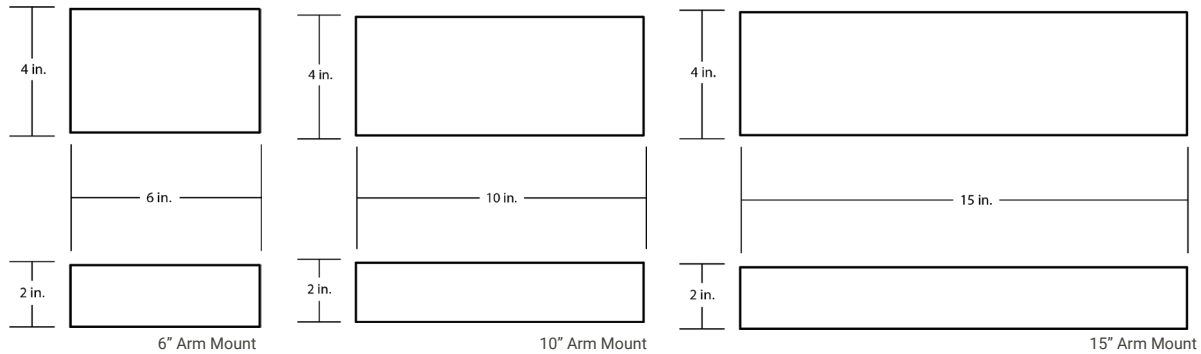
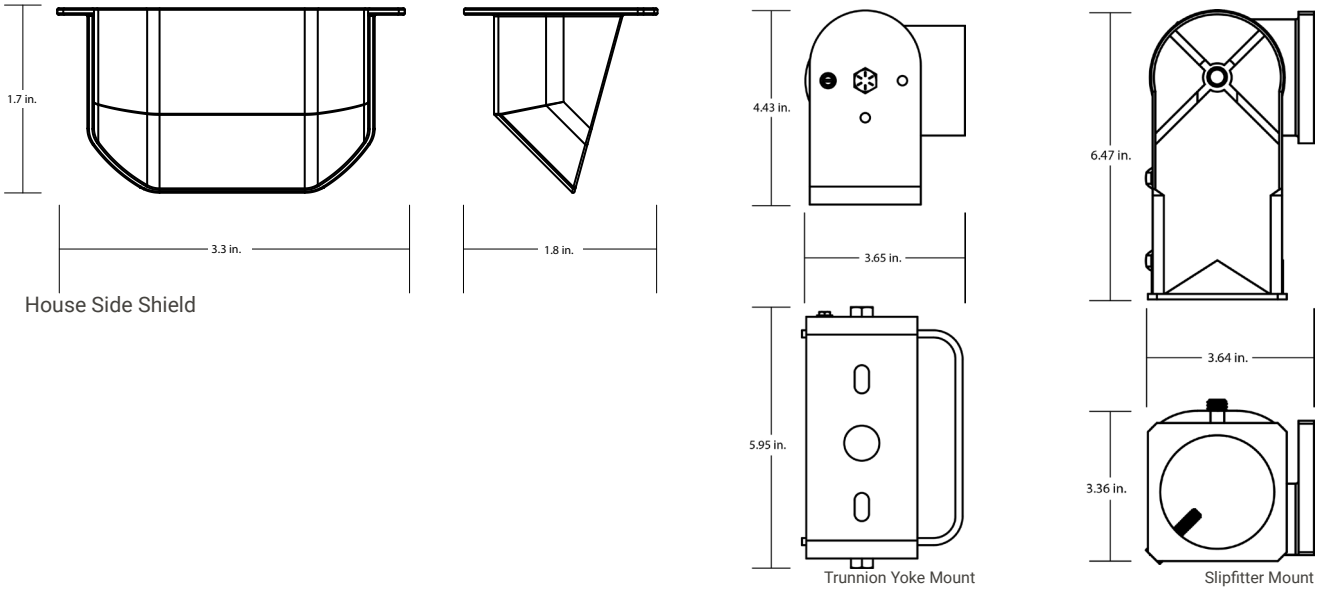
Simulated per IESNA LM-63-1995



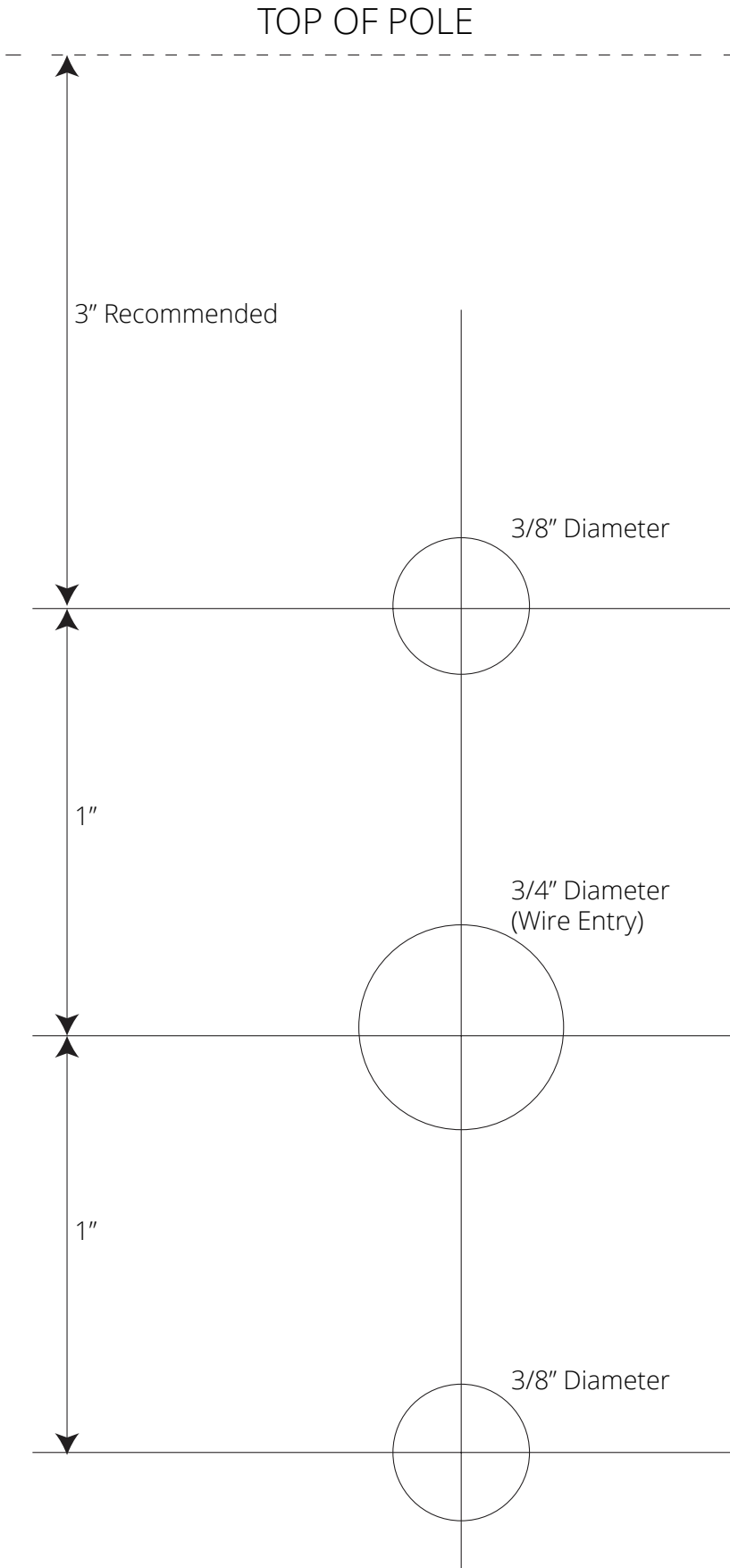
Dimensional Diagrams



Note: Fixture diagrams shown with Slipfitter mount.



■ **6" & 10" Arm Drill Pattern (Dimensions Not To Scale)**



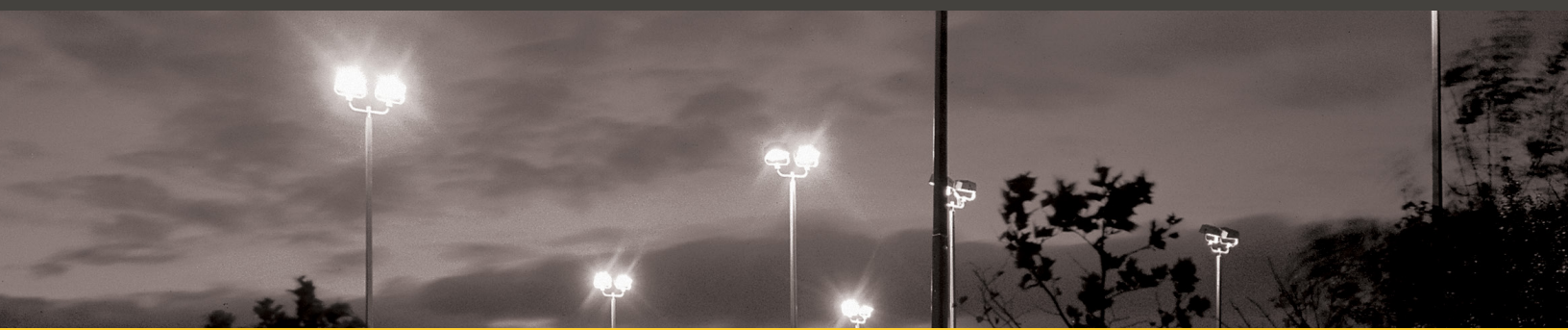
NAFCO® SSSA SQUARE STRAIGHT STEEL ANCHOR BASE LIGHT POLES



Catalog # _____

Project _____

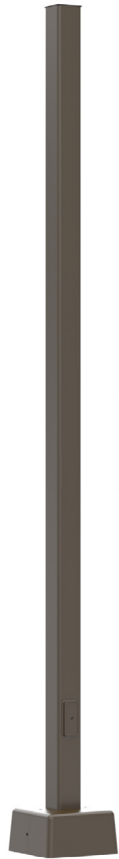
Comments _____



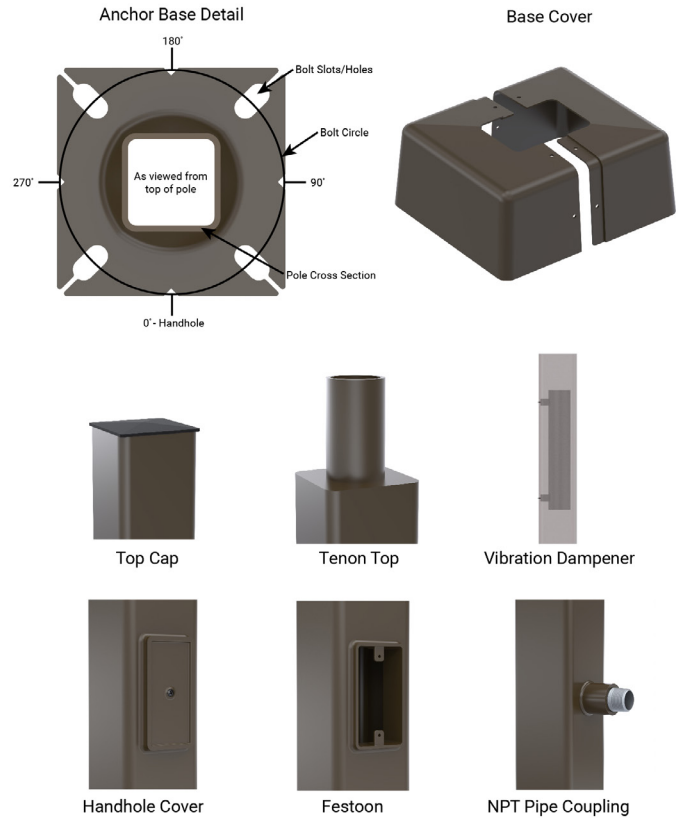
Proudly engineered and manufactured in the American Midwest – our NAFCO® family of professional-grade light pole products combines 50+ years of manufacturing expertise and top-notch Midwestern workmanship. Like all WILL products, NAFCO® poles come supported by our unmatched design, engineering, and project support capabilities.

Specifications

- Pole Shaft** - The pole shaft is fabricated from hot rolled welded steel tubing of one-piece construction with a minimum yield strength of 55 KSI.
- Pole Top** - Pole is provided with either a tenon top or drilled for a fixture mounting. A removable pole cap is provided for drilled poles. Consult the luminaire manufacturer for correct tenon size or drill pattern. Other pole top options include pole cap only (PC) or plain top (PL) which is typical when the pole diameter matches the necessary slip fit dimensions.
- Handhole** – A reinforced 2.50" x 5.00" handhole with grounding provision is provided at 1'-6" from the base end of the pole assembly. Each handhole includes an easy to install, self-contained handhole cover assembly. All pole assemblies are provided with a rectangular handhole. Dimensions are nominal.
- Base Cover** – A two-piece full base cover fabricated from ABS plastic is provided with each pole assembly. Additional base cover options in steel and aluminum materials are available upon request.
- Anchor Bolts** - Anchor bolts conform to ASTM F1554 Grade 55 and are provided with two hex nuts and two flat washers. Bolts have an "L" bend on one end and are galvanized a minimum of 12" on the threaded end.
- Hardware** - All structural fasteners are galvanized high strength carbon steel. All non-structural fasteners are galvanized or zinc-plated carbon steel or stainless steel.
- Finish** - Standard finishes are either Galvanized (GV) or Finish Painted (FP). Additional finish options including Finish Paint over Galvanizing (FPGV) available upon request.
- Design Criteria** - Standard EPA (Effective Projected Area) and weight values are based around standard commercial criteria (with 1.3 second gust factor), AASHTO standards, and 2017 Florida Building Code (FBC). Specific light pole design standards are available from factory. Satisfactory performance of light poles is dependent upon the pole being properly attached to a supporting foundation of adequate design.



Nominal Mounting Height



EPA Loading Guide (Commercial Design Criteria)

Base Model	80mph w/ 1.3 Gust		90mph w/ 1.3 Gust		100mph w/ 1.3 Gust		110mph w/ 1.3 Gust		120mph w/ 1.3 Gust		130mph w/ 1.3 Gust		140mph w/ 1.3 Gust	
	Max EPA (sq ft)	Max Weight (lb)	Max EPA (sq ft)	Max Weight (lb)	Max EPA (sq ft)	Max Weight (lb)	Max EPA (sq ft)	Max Weight (lb)	Max EPA (sq ft)	Max Weight (lb)	Max EPA (sq ft)	Max Weight (lb)	Max EPA (sq ft)	Max Weight (lb)
VS-SSSA-10-4040-11-AB-FP	30.6	765	23.8	595	18.9	473	15	375	12.2	305	10	250	8.4	210
VS-SSSA-12-4040-11-AB-FP	24.4	610	18.8	470	14.8	370	11.5	288	9.3	233	7.5	188	6.2	155
VS-SSSA-14-4040-11-AB-FP	19.9	498	15.1	378	11.7	293	9.1	228	7.1	180	5.6	140	4.4	110
VS-SSSA-15-4040-11-AB-FP	15.9	398	11.8	295	8.9	223	6.8	170	5.2	130	3.9	98	2.9	73
VS-SSSA-16-4040-11-AB-FP	15.9	398	11.8	295	8.9	223	6.8	170	5.2	130	3.9	98	2.9	73
VS-SSSA-18-4040-11-AB-FP	12.6	315	9.2	230	6.7	168	5	125	3.6	90	2.4	60	1.3	33
VS-SSSA-20-4040-11-AB-FP	9.6	240	6.7	167	4.5	150	3.5	88	2	50	0.8	20	N/A	N/A
VS-SSSA-20-4040-07-AB-FP	15.8	240	12.7	167	9	150	7.6	190	5.8	145	4.5	113	3.4	85
VS-SSSA-20-5050-11-AB-FP	17.7	443	12.7	343	9.4	235	7	175	5	125	3.5	88	2.2	55
VS-SSSA-20-5050-07-AB-FP	28.1	703	21.4	535	16.2	405	12.3	308	9.5	235	7.3	183	5.6	140
VS-SSSA-25-4040-11-AB-FP	4.8	150	2.6	100	1	50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VS-SSSA-25-4040-07-AB-FP	10.8	270	7.7	188	5.4	135	3.9	100	2.6	65	1.6	40	0.8	20
VS-SSSA-25-5050-11-AB-FP	9.8	245	6.3	157	3.7	150	2.5	63	0.7	18	N/A	N/A	N/A	N/A
VS-SSSA-25-5050-07-AB-FP	18.5	463	13.3	333	9.5	238	6.6	165	4.5	113	2.9	75	1.4	35
VS-SSSA-30-4040-07-AB-FP	6.7	168	4.4	110	2.6	65	1.4	35	0.4	10	N/A	N/A	N/A	N/A
VS-SSSA-30-5050-11-AB-FP	4.7	150	2	50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VS-SSSA-30-5050-07-AB-FP	10.7	267	6.7	167	3.9	100	2.5	63	0.3	10	N/A	N/A	N/A	N/A
VS-SSSA-30-6060-07-AB-FP	19	475	13.2	330	9	225	6	150	3.6	90	1.3	33	N/A	N/A
VS-SSSA-35-5050-07-AB-FP	5.9	150	2.5	100	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VS-SSSA-35-6060-07-AB-FP	12.4	310	7.6	190	4.2	105	1.2	30	N/A	N/A	N/A	N/A	N/A	N/A
VS-SSSA-40-6060-07-AB-FP	7.2	180	3	75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

- The total combined EPA and weight of all fixtures, brackets, and other attachments mounting to a light pole cannot exceed the EPA and weight rating for a specified pole.
- Standard EPA (Effective Projected Area) and weight values are based around standard commercial criteria (with 1.3 second gust factor) and AASHTO standards. **Specific light pole design standards are available from factory.**
- Custom products, configurations, options, and accessories available from factory.
- Satisfactory performance of light poles is dependent upon the structure being properly attached to a supporting foundation of adequate design.

*+ indicates a vibration dampener is standard.

EPA Loading Guide (2017 Florida Building Code)

Base Model	110mph FBC		120mph FBC		130mph FBC		140mph FBC		150mph FBC		160mph FBC		170mph FBC		180mph FBC	
	Max EPA (sq ft)	Max Weight (lb)	Max EPA (sq ft)	Max Weight (lb)	Max EPA (sq ft)	Max Weight (lb)	Max EPA (sq ft)	Max Weight (lb)	Max EPA (sq ft)	Max Weight (lb)	Max EPA (sq ft)	Max Weight (lb)	Max EPA (sq ft)	Max Weight (lb)	Max EPA (sq ft)	Max Weight (lb)
VS-SSSA-10-4040-11-AB-FP	25.5	638	21.5	538	18	450	15	375	13	225	11.5	188	10	250	8.5	213
VS-SSSA-12-4040-11-AB-FP	18	450	15	375	12.5	313	10.5	263	9	225	7.5	188	6.5	163	5.5	11
VS-SSSA-14-4040-11-AB-FP	15	375	12.5	313	10	250	8.5	213	7	175	5.5	138	4.5	113	3.5	88
VS-SSSA-15-4040-11-AB-FP	15	375	12.5	313	10	250	8.5	213	7	175	5.5	138	4.5	113	3.5	88
VS-SSSA-16-4040-11-AB-FP	12	300	9.5	238	8	200	6.5	163	5	125	4	100	3	75	2	50
VS-SSSA-18-4040-11-AB-FP	10	250	8	100	6	150	4.5	113	3.5	88	2.5	63	1.5	38	1	25
VS-SSSA-20-4040-11-AB-FP	8	200	6	150	4.5	113	3	75	2	50	1	25	N/A	N/A	N/A	N/A
VS-SSSA-20-4040-07-AB-FP	12	300	9.5	238	7.5	188	5.5	138	4.5	113	3	75	2	50	1.5	38
VS-SSSA-20-5050-11-AB-FP	W/t Ratio Exceeded															
VS-SSSA-20-5050-07-AB-FP	16.5	413	13	325	10	250	7.5	188	6	150	4	100	3	75	2	50
VS-SSSA-25-4040-11-AB-FP	4.5	113	3	75	1.5	38	0.5	13	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VS-SSSA-25-4040-07-AB-FP	7	175	5	125	3	75	2	50	0.5	13	N/A	N/A	N/A	N/A	N/A	N/A
VS-SSSA-25-5050-11-AB-FP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VS-SSSA-25-5050-07-AB-FP	10.5	163	7.5	88	5	125	3	75	1	25	N/A	N/A	N/A	N/A	N/A	N/A
VS-SSSA-30-4040-07-AB-FP	3	75	1	25	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VS-SSSA-30-5050-11-AB-FP	W/t Ratio Exceeded															
VS-SSSA-30-5050-07-AB-FP	4	100	2	50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VS-SSSA-30-6060-07-AB-FP	15	375	11.5	288	8	200	5	125	2.5	63	1	25	N/A	N/A	N/A	N/A
VS-SSSA-35-5050-07-AB-FP	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VS-SSSA-35-6060-07-AB-FP	8	200	5	125	2	50	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
VS-SSSA-40-6060-07-AB-FP	3	75	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

- The total combined EPA and weight of all fixtures, brackets, and other attachments mounting to a light pole cannot exceed the EPA and weight rating for a specified pole.
- Standard EPA (Effective Projected Area) and weight values are based around Ultimate Wind Speed, Risk Category II, Exposure Category C. Specific light pole design standards are available from factory. Above data is based around the load centroid being at 2.5' above the pole top and with 2.0' eccentricity. Weight of horizontally eccentric load is capped at 100lb, all remaining weight mounted 2.5' above top of the pole.
- Custom products, configurations, options, and accessories available from factory.
- Satisfactory performance of light poles is dependent upon the structure being properly attached to a supporting foundation of adequate design.

*+ indicates a vibration dampener is standard.

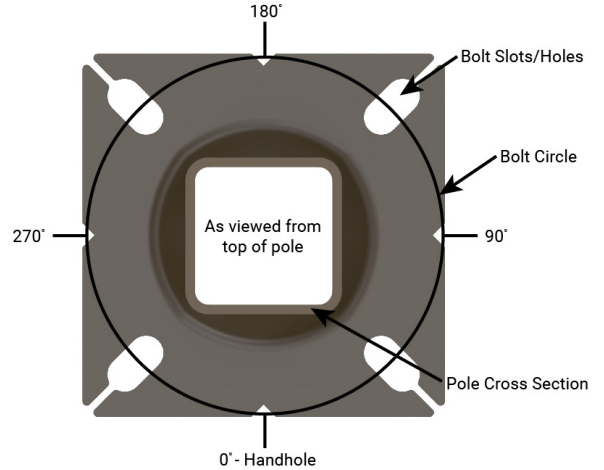
Designation & Dimensional Information

Base Model	Pole Dimensions					Base Plate		Anchor Bolts	
	Nominal Mounting Height	Top Sq (in)	Base Sq (in)	Wall Thick (ga)	Structural Weight (lb)	Bolt Circle Diameter (in)	Sq (in) x Thick (in)	Dia x Length x Hook (in)	Projection (in)
VS-SSSA-10-4040-11-AB-FP	10'-0"	4	4	11	75	8.0 - 9.0	8.25 x 0.75	0.75 x 17.00 x 3.00	3.25 - 3.75
VS-SSSA-12-4040-11-AB-FP	12'-0"	4	4	11	90	8.0 - 9.0	8.25 x 0.75	0.75 x 17.00 x 3.00	3.25 - 3.75
VS-SSSA-14-4040-11-AB-FP	14'-0"	4	4	11	100	8.0 - 9.0	8.25 x 0.75	0.75 x 17.00 x 3.00	3.25 - 3.75
VS-SSSA-15-4040-11-AB-FP	15'-0"	4	4	11	110	8.0 - 9.0	8.25 x 0.75	0.75 x 17.00 x 3.00	3.25 - 3.75
VS-SSSA-16-4040-11-AB-FP	16'-0"	4	4	11	115	8.0 - 9.0	8.25 x 0.75	0.75 x 17.00 x 3.00	3.25 - 3.75
VS-SSSA-18-4040-11-AB-FP	18'-0"	4	4	11	125	8.0 - 9.0	8.25 x 0.75	0.75 x 17.00 x 3.00	3.25 - 3.75
VS-SSSA-20-4040-11-AB-FP	20'-0"	4	4	11	140	8.0 - 9.0	8.25 x 0.75	0.75 x 17.00 x 3.00	3.25 - 3.75
VS-SSSA-20-4040-07-AB-FP	20'-0"	4	4	7	200	8.0 - 9.0	8.25 x 0.875	0.75 x 17.00 x 3.00	3.38 - 3.88
VS-SSSA-20-5050-11-AB-FP	20'-0"	5	5	11	185	10.0 - 12.0	11 x 1	0.75 x 17.00 x 3.00	3.5 - 4
VS-SSSA-20-5050-07-AB-FP	20'-0"	5	5	7	265	10.0 - 12.0	11 x 1	0.75 x 17.00 x 3.00	3.5 - 4
VS-SSSA-25-4040-11-AB-FP	25'-0"	4	4	11	170	8.0 - 9.0	8.25 x 0.75	0.75 x 17.00 x 3.00	3.25 - 3.75
VS-SSSA-25-4040-07-AB-FP	25'-0"	4	4	7	245	8.0 - 9.0	8.25 x 0.875	0.75 x 17.00 x 3.00	3.38 - 3.88
VS-SSSA-25-5050-11-AB-FP	25'-0"	5	5	11	225	10.0 - 12.0	11 x 1	0.75 x 17.00 x 3.00	3.5 - 4
VS-SSSA-25-5050-07-AB-FP	25'-0"	5	5	7	360	10.0 - 12.0	11 x 1	0.75 x 17.00 x 3.00	3.5 - 4
VS-SSSA-30-4040-07-AB-FP	30'-0"	4	4	7	291	8.0 - 9.0	8.25 x 0.875	0.75 x 17.00 x 3.00	3.38 - 3.88
VS-SSSA-30-5050-11-AB-FP	30'-0"	5	5	11	265	10.0 - 12.0	11 x 1	0.75 x 17.00 x 3.00	3.5 - 4
VS-SSSA-30-5050-07-AB-FP	30'-0"	5	5	7	380	10.0 - 12.0	11 x 1	0.75 x 17.00 x 3.00	3.5 - 4
VS-SSSA-30-6060-07-AB-FP	30'-0"	6	6	7	520	11.0 - 13.0	12.5 x 1	1.00 x 36.00 x 4.00	4 - 4.5
VS-SSSA-35-5050-07-AB-FP	35'-0"	5	5	7	440	10.0 - 12.0	11 x 1	0.75 x 17.00 x 3.00	3.5 - 4
VS-SSSA-35-6060-07-AB-FP	35'-0"	6	6	7	540	11.0 - 13.0	12.5 x 1	1.00 x 36.00 x 4.00	4 - 4.5
VS-SSSA-40-6060-07-AB-FP	40'-0"	6	6	7	605	11.0 - 13.0	12.5 x 1	1.00 x 36.00 x 4.00	4 - 4.5

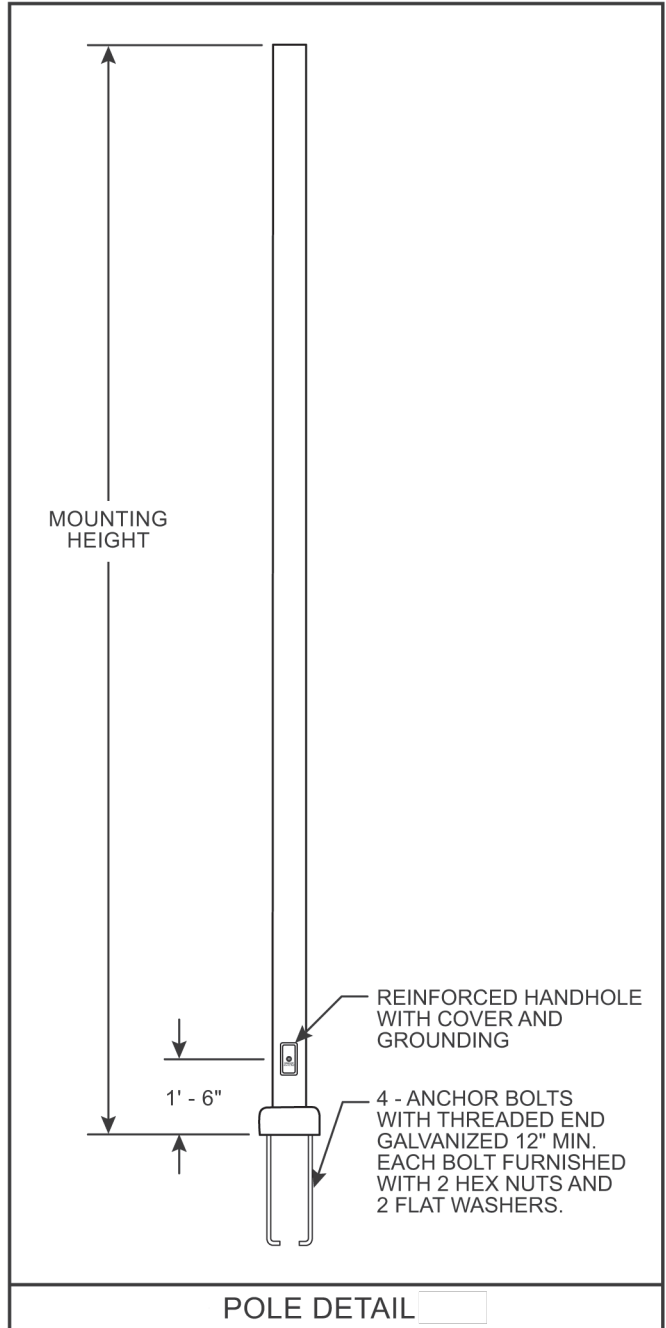
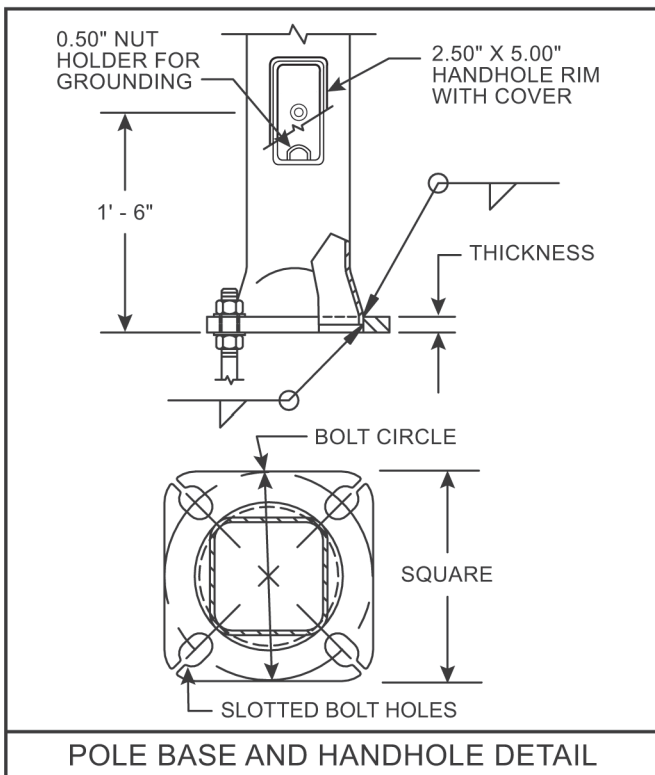
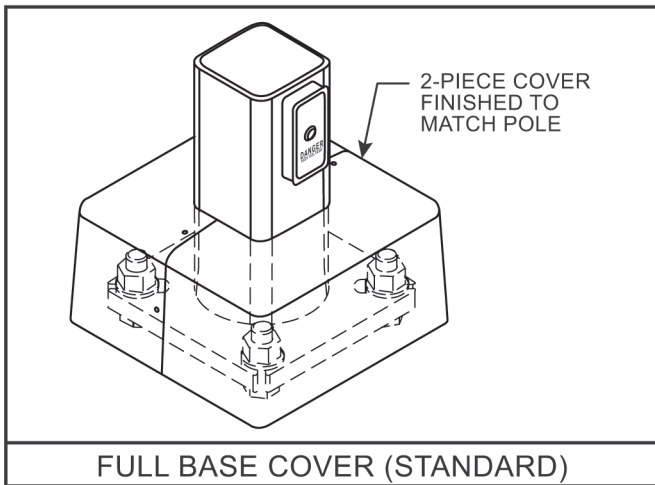
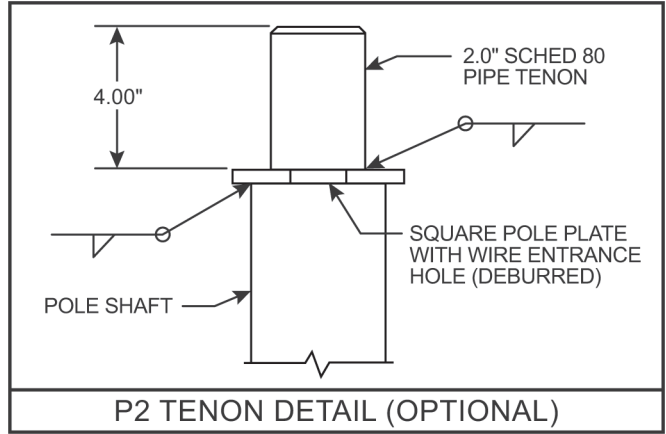
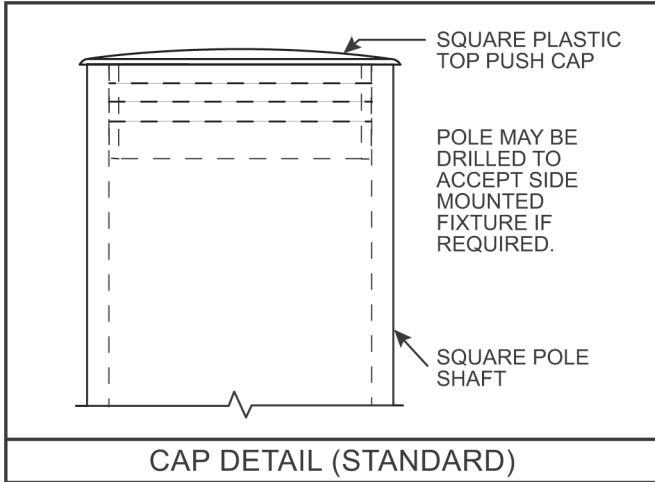
1. The total combined EPA and weight of all fixtures, brackets, and other attachments mounting to a light pole cannot exceed the EPA and weight rating for a specified pole.
2. Custom products, configurations, options, and accessories available from factory.
3. Satisfactory performance of light poles is dependent upon the structure being properly attached to a supporting foundation of adequate design.

*+ indicates a vibration dampener is standard.

Anchor Base Detail



■ Dimensional Diagrams



Ordering Information

Ex: VS-SSSA-20-4040-11-AB-FP-MB-D2-FST

Product Family	Design	Length	Base OD	Top OD	Thickness	Anchor Bolts	Finish Type	Painted Color	Fixture Mounting
VS = NAFCO®	SSSA = Square Straight Steel Anchor Base	10-40 = 10-40'	40 = 4"	40 = 4"	11 = 11ga	AB = Includes Anchor Bolts	GV = Galvanized Only (No Paint)	DB = Dark Bronze (Standard)	PC = Cap Only, No Side Drilling
		C = Custom	50 = 5"	50 = 5"	7 = 7ga	LAB = Less Anchor Bolts	FP = Finish Painted	MB = Medium Bronze (Standard)	PL = Open Top, No Cap or Side Drilling
			60 = 6"	60 = 6"	C = Custom	C = Custom	FPGV = Finished Painted Over Galvanizing	BK = Black (Standard)	D1 = Drill Single
			C = Custom	C = Custom			C = Custom	WH = White (Standard)	D2 = Drill 2@180
								LG = Light Gray	D4 = Drill 4@90
								SG = Slate Gray	D5 = Drill 2@90
								DG = Dark Green	D6 = Drill 3@90
								SL = Silver	P1 = 4" OD x 5" Long Tenon
								RAL = Custom RAL Match	P2 = 2.38" OD x 4" Long Tenon
								C = Custom	P3 = 3.50" OD x 6" Long Tenon
									P4 = 4" OD x 6" Long Tenon
									P5 = 2.88" OD x 4" Long Tenon
									P6 = 2.88" OD x 5" Long Tenon
									P7 = 2.38" OD x 5" Long Tenon
									PQ = 2.38" OD x 12" Long Tenon
									PD = 3" OD x 3" Long Tenon
									P9 = Custom Size Tenon

Options & Accessories (Add as Suffix)		
Option	Option	Accessories
SPL = Special Cut Length (Please Specify)	ULHH = UL Compliant Hand Hole	STAMP = Engineering Services, Signed & Sealed Calcs
BCSPCL = Special Base Plate to Match Existing Bolt Circle (May Add to Production Lead Time, May Require Special Base Cover)	NECHH = NEC 410.30 Compliant Hand Hole & Cover	STAMP/CA = Engineering Services, CA Signed & Sealed Calcs
VDA = Internal Vibration Dampener, Factory Installed	EHH = Additional Hand Hole Opening w/ Cover Assembly (Specify Pole Height & Orientation)	PRE075 = Pre-Ship Anchor Bolts - 0.75" x 17" x 3"
VDF = Internal Vibration Dampener, Field Installable	FST = Festoon Provision, Electrical by Others (Specify Pole Height & Orientation)	PRE100 = Pre-Ship Anchor Bolts - 1.0" x 36" x 4"
FBCP = ABS Plastic Full Base Cover	CPL = NPT Pipe Coupling (Specify Pole Height, Orientation, & NPT Size)	
FBCS = Steel Full Base Cover		
PXDX = Side Drill + Tenon w/ Additional Hand Hole (Specify Tenon OD & Length)		

1. See previous pages for base model configurations. Consult factory or your sales rep for deviations from base models.
2. Please consult factory or your sales representative to verify options and accessories will work with your light pole part number.
3. Custom products, configurations, options, and accessories available from factory.