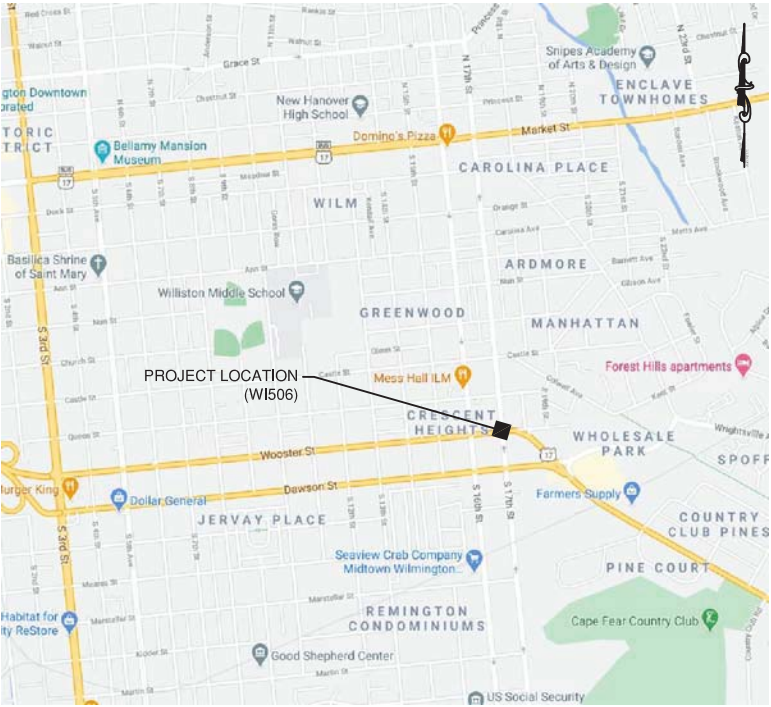


GOVERNING SPECIFICATIONS:
THE MOST CURRENT EDITION OF NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION "STANDARD SPECIFICATIONS" AND
"SUPPLEMENTAL SPECIFICATIONS AND RECURRING SPECIAL
PROVISIONS" HEREIN SHALL GOVERN. WHERE APPLICABLE.

WILMINGTON, NORTH CAROLINA

PROJECT PLANS FOR THE CONSTRUCTION OF
RED LIGHT PHOTO ENFORCEMENT PROGRAM
AT THE INTERSECTION OF
US 17 / 76 WB (WOOSTER ST) AT
SR 1217 (S. 17TH ST)

VICINITY MAP



(EXTRACTED FROM GOOGLE MAPS)

SHEET INDEX

SHEET NO.	SITE ID	DESCRIPTION
1	WI506	COVER SHEET
2		WESTBOUND PLAN
3		STANDARD DETAILS
4		ALUMINUM REAR POLE DETAILS - 1
5		ALUMINUM REAR POLE DETAILS - 2
6-9		ECP HELICAL ANCHOR FOUNDATION TYPE DETAILS 1-4
10		REINFORCED CONCRETE DRILLED SHAFT FOUNDATION
11		MOT PLAN

G.C.:



**VERRA
MOBILITY**

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ENGINEER OF RECORD:
ESSAM TAWFIK ALI MANSOUR, P.E.
REG. # 050958

COVER SHEET

US 17 / 76 WB (WOOSTER ST) AT
SR 1217 (S. 17TH ST)
WILMINGTON, NC

REV.	DATE	DESCRIPTION	PREP. BY	REV. BY	APP. BY	REMARKS
0	3-15-21	1ST PERMITTING SUBMITTAL	GB	ET	ET	AN UPGRADED / RELOCATED SITE
1	3-25-21	2ND PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER CITY COMMENTS
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4	4-27-21	5TH PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER NCDOT COMMENTS

JOB NUMBER

1259

SITE ID(S)
WI506

SHEET
NUMBER

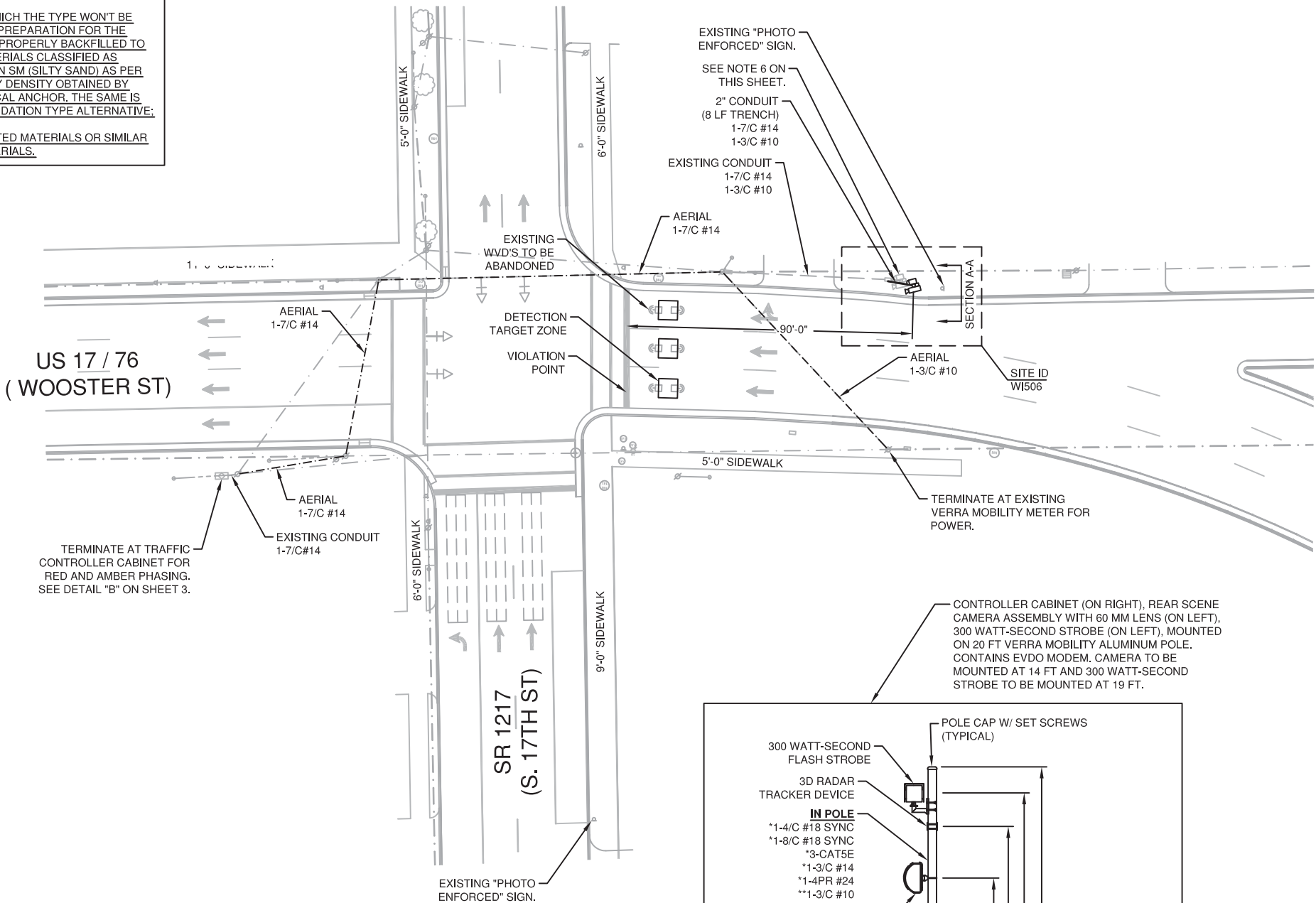
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OF 11 SHEETS

RED LIGHT PHOTO ENFORCEMENT PROGRAM

PARTICULAR NOTES:

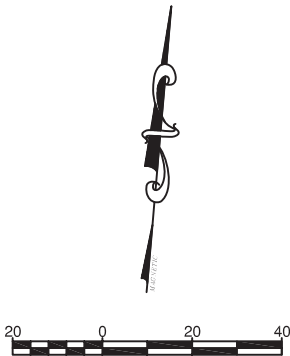
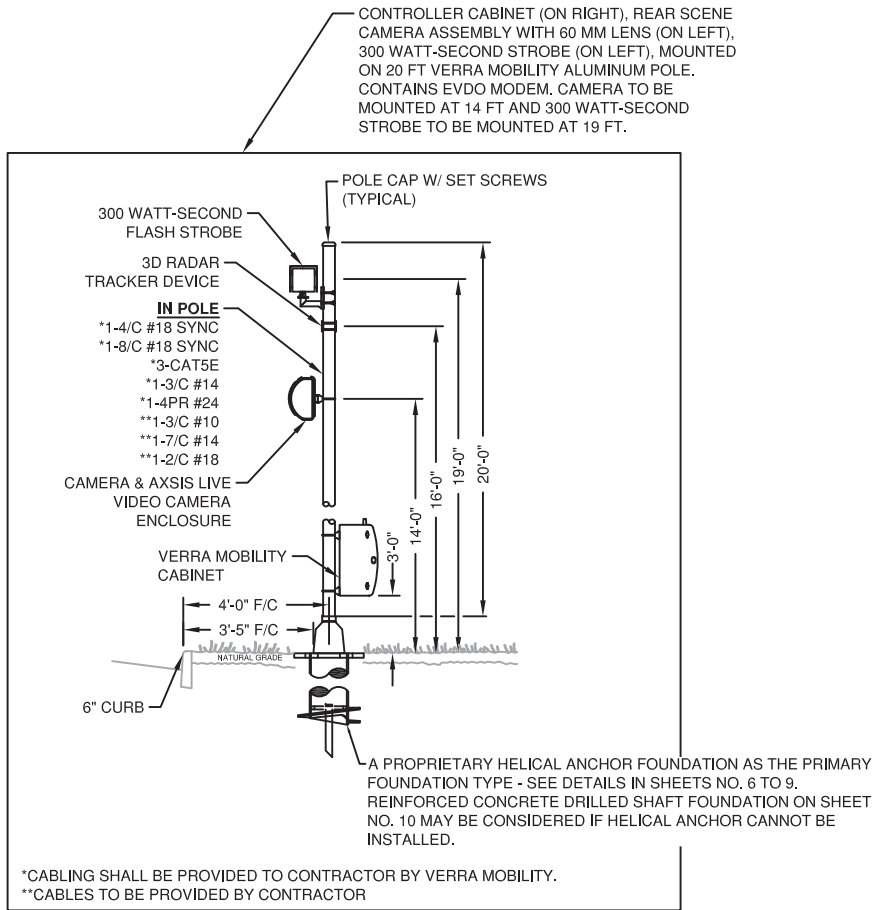
1. THE EXISTING POLE AND FOUNDATION ARE EXPECTED TO BE REMOVED/UN-INSTALLED PRIOR TO STARTING ANY OF THE NEW SITE CONSTRUCTION ACTIVITIES.
2. UPON THE REMOVAL OF THE EXISTING FOUNDATION (BELOW GRADE) OF WHICH THE TYPE WON'T BE IDENTIFIED/KNOWN TILL THE TIME OF THE REMOVAL/DEMOLITION AND AS A PREPARATION FOR THE HELICAL ANCHOR INSTALLATION, THE RESULTING EXCAVATION SHOULD BE PROPERLY BACKFILLED TO THE GROUND LEVEL INTO LAYERS 6" THICK EACH WITH SUITABLE SOIL MATERIALS CLASSIFIED AS (ML-SM) - NOT FINER THAN ML (SANDY SILT) AND NOT MORE GRANULAR THAN SM (SILTY SAND) AS PER THE USCS - AND WELL COMPACTED TO AT LEAST 95% OF THE MAXIMUM DRY DENSITY OBTAINED BY MODIFIED PROCTOR ASTM D 698 PRIOR TO THE INSTALLATION OF THE HELICAL ANCHOR. THE SAME IS TO BE APPLIED/IMPLEMENTED IN CASE OF JUSTIFIABLY UTILIZING THE FOUNDATION TYPE ALTERNATIVE: REINFORCED CONCRETE DRILLED SHAFT AS THE FOUNDATION.
3. DEBRIS, BOULDERS, HIGHLY PLASTIC SOILS, BRICKS, ORGANIC/CONTAMINATED MATERIALS OR SIMILAR ARE GENERALLY CONSIDERED UNSUITABLE FOR USE AS BACKFILLING MATERIALS.



LEGEND	
	UNDERGROUND CONDUIT (TRENCH)
	DIRECTIONAL BORE
	REAR MONITOR CAMERA ON VERRA MOBILITY POLE
	DETECTION TARGET ZONE
	17" x 30" PULL/JUNCTION BOX
	PHOTO ENFORCEMENT SIGN
	EXISTING SCHOOL ZONE FLASHING BEACON
	VERRA MOBILITY METER POLE
	VERRA MOBILITY METER PEDESTAL
	EXISTING UNDERGROUND CONDUIT
	EXISTING STREET LIGHT
	EXISTING FIRE HYDRANT
	EXISTING SIGNAL HEAD
	EXISTING MANHOLE
	EXISTING PULL/JUNCTION BOX
	EXISTING TRAFFIC CONTROLLER
	EXISTING METER PEDESTAL
	EXISTING WOOD POLE
	EXISTING CONCRETE POLE
	EXISTING SIGN

NOTES:

1. IT IS OUR UNDERSTANDING THAT THE POLES ARE DESIGNED AND CHECKED BY THE SPECIALIZED MANUFACTURER.
2. FOR TECHNICAL CONSIDERATIONS OF EACH OF THE FOUNDATION TYPES, REFER TO RELEVANT SHEET/S IN THE SET PRESENTED HEREIN.
3. SUBCONTRACTOR/S SHALL VERIFY THE LOCATION OF ALL CONFLICTING UNDERGROUND UTILITIES PRIOR TO DIRECTIONAL DRILL AND MAINTAIN 2' CLEARANCE.
4. REFER TO SHEET 3 TO 5 FOR THE POLE AND STANDARD DETAILS.
5. SHEETS NO. 6 TO 9 SHOULD BE READ AND INTERPRETED IN CONJUNCTION / INTEGRATION WITH ONE ANOTHER.
6. EXISTING VERRA MOBILITY POLE, EQUIPMENT, AND FOUNDATION TO BE COMPLETELY REMOVED. SITE RESTORATION AND BACKFILLING AS PER NCDOT REQUIREMENTS. ALSO REFER TO THE PARTICULAR NOTES IN THIS SHEET.
7. DURING CONSTRUCTION AND PER THE CITY REQUIREMENTS, SUBCONTRACTOR/S SHOULD DULY CONSIDER AND ASSURE THAT THE PHOTO ENFORCEMENT SIGNS ARE LOCATED/INSTALLED ON ALL APPROACHES TO THE REFERENCE INTERSECTION AT DISTANCES COMPLYING WITH THE APPLICABLE LAWS.
8. VM CERTIFIED ELECTRICAL SUBCONTRACTOR/S SHOULD REVIEW AND VERIFY ALL RELEVANT ELECTRICAL RELATED INFO/DETAILS/SECTIONS/PLANS/EXISTING CONDUITS/WIRING/TRENCHING/TAPING/.....ETC. AND ASSURE UTILIZING THE UPDATED LOCAL APPLICABLE CODE IN THE PROJECT JURISDICTION ALONG WITH MEETING THE MINIMUM REQUIREMENTS OF THE UPDATED NATIONAL ELECTRIC CODE (NEC). THE SAME IS TO BE APPLIED TO ALL CONSTRUCTION ACTIVITIES INVOLVED.



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WESTBOUND PLAN

US 17 / 76 WB (WOOSTER ST) AT
SR 1217 (S. 17TH ST)
WILMINGTON, NC

REV.	DATE	DEDSCRIPTION	PREP. BY	REV. BY	APP. BY	REMARKS
0	3-15-21	1ST PERMITTING SUBMITTAL	GB	ET	ET	AN UPGRADED / RELOCATED SITE
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JOB NUMBER

1259

SITE ID(S)
W1506

SHEET
NUMBER

2

OF 11 SHEETS

1. SEPARATE RIGHT-OF-WAY PERMITS ARE REQUIRED FOR WORK WITHIN PUBLIC AGENCY RIGHT-OF-WAY. CONTRACTOR SHALL BE RESPONSIBLE FOR SUBMITTING APPLICATION PERMITS & FEE'S, AND COMPLY WITH ALL PUBLIC REQUIREMENTS.
2. UTILITY LOCATIONS SHOWN ON PLANS ARE APPROXIMATE BASED ON AVAILABLE INFORMATION. CONTRACTOR SHALL BE RESPONSIBLE TO CONTACT DESIGNATED AGENCY TO LOCATE ALL UNDERGROUND UTILITIES 48 HOURS PRIOR TO COMMENCEMENT OF CONSTRUCTION.
3. CONTRACTOR SHALL BE RESPONSIBLE TO APPLY AND OBTAIN AN APPROVED TRAFFIC CONTROL PLAN IN ACCORDANCE WITH MUTCD AND LOCAL STANDARDS AS REQUIRED.
4. CONTRACTOR SHALL BE RESPONSIBLE TO RESTORE ALL DISTURBED AREAS TO ORIGINAL CONDITION TO AGENCY SATISFACTION AT NO ADDITIONAL COMPENSATION.
5. CONTRACTOR SHALL TERMINATE ALL POWER CIRCUITS INTO VERRA MOBILITY CABINET.
6. INSTALL INLINE 30 AMP FUSE INSIDE HAND HOLE ON VERRA MOBILITY CAMERA POLES.
7. INSTALL FOUNDATION POLE AND GROUNDING WIRE FOR VERRA MOBILITY EQUIPMENT. SEE LOCATIONS IN DRAWINGS AND POLE FOUNDATION DETAIL.
8. ALL PULL/JUNCTION BOXES OF THE REQUIRED SIZE AND TYPE AND CONDUITS SHALL CONFORM TO LOCAL AGENCY/ AUTHORITY STANDARDS.
9. AS SPECIFIED AND APPLICABLE, SCHEDULE 80 PVC CONDUIT TO BE BORED UNDER ROADWAY - 36" COVER MINIMUM. SEE SIZES AND LOCATION IN DRAWINGS.
10. THE CONTRACTOR SHALL HAVE A LEVEL II IMSA CERTIFIED TECHNICIAN / ELECTRICIAN ON-SITE AT ALL TIMES DURING CONSTRUCTION. CONDUCTOR SPLICES AND TERMINATIONS SHALL BE MADE BY A QUALIFIED JOURNEYMAN ELECTRICIAN, WHO HAS SUCCESSFULLY COMPLETED A RECOGNIZED FOUR (4) YEAR APPRENTICESHIP PROGRAM UNDER THE DIRECT SUPERVISION OF A JOURNEYMAN ELECTRICIAN.
11. TERMINATE RED & AMBER PHASE WIRES TO AGENCIES RED & AMBER PHASE CONDUCTORS IN THE NEAREST TRAFFIC CONTROLLER CABINET. SEE CONDUCTOR RED & AMBER PHASE CONNECTION DETAIL. CONTRACTOR SHALL CONTACT THE DOT TRAFFIC SIGNAL SUPERVISOR AND CITY POLICE DEPARTMENT FOR ON-SITE ASSISTANCE WITH RED & AMBER PHASE ISOLATION CONNECTION. ALLOW 24 HOURS ADVANCE NOTICE BEFORE CONNECTION.
12. ALL WORK SHALL CONFORM TO ALL APPLICABLE ELECTRICAL CODES EXCEPT WHEN DOT/AUTHORITY STANDARDS SUPERSEDE.
13. CONTRACTOR SHALL TRIM EXISTING TREES TO IMPROVE LINE OF SIGHT NEEDED. CONTRACTOR SHALL NOTIFY THE AGENCIES AND OBTAIN APPROVAL PRIOR TO TRIMMING.
14. AT LOCATIONS WHERE EXISTING ENFORCEMENT EQUIPMENT MAY EXIST, CONTRACTOR SHALL COORDINATE WITH THE OWNER AND VERRA MOBILITY PROJECT MANAGER FOR REMOVAL & SALVAGE.
15. CONNECT POLE TO SOLID BARE BOND GROUND & GROUNDING ROD (OR COIL 25' OF NO. 6 BARE COPPER) IN POLE FOUNDATION & TO SYSTEM GROUND BONDED BACK TO VERRA MOBILITY CABINET.
16. CONTRACTOR SHALL PLACE THE POLES / FOUNDATIONS IN A LOCATION TO MAINTAIN A 5' CLEAR SPACE FROM THE OVERHEAD POWER LINES, UNLESS SPECIFIED OTHERWISE IN LOCAL STANDARDS AND REQUIREMENTS.
17. CONTRACTOR TO LABEL EACH END OF ALL CABLE RUNS.
18. CONTRACTOR TO INSTALL AND LEAVE IN PLACE NYLON DRAW STRING IN ALL CONDUIT RUNS.
19. ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE DOT SPECIFICATIONS UNLESS OTHERWISE HEREIN.
20. AS NEEDED AND APPLICABLE, SIGN POST, HARDWARE, AND INSTALLATION SHALL BE IN ACCORDANCE WITH THE LATEST EDITION OF THE STATE DOT STANDARDS.
21. IT IS OUR UNDERSTANDING THAT THE POLES ARE DESIGNED AND CHECKED BY THE SPECIALIZED MANUFACTURER.
22. VM CERTIFIED ELECTRICAL SUBCONTRACTOR/S SHOULD REVIEW AND VERIFY ALL RELEVANT ELECTRICAL RELATED INFO/DETAILS/SECTIONS/PLANS/EXISTING CONDUITS/WIRING/TRENCHING/TAPING/.....ETC. AND ASSURE UTILIZING THE UPDATED LOCAL APPLICABLE CODE IN THE PROJECT JURISDICTION ALONG WITH MEETING THE MINIMUM REQUIREMENTS OF THE UPDATED NATIONAL ELECTRIC CODE (NEC). THE SAME IS TO BE APPLIED TO ALL CONSTRUCTION ACTIVITIES INVOLVED.



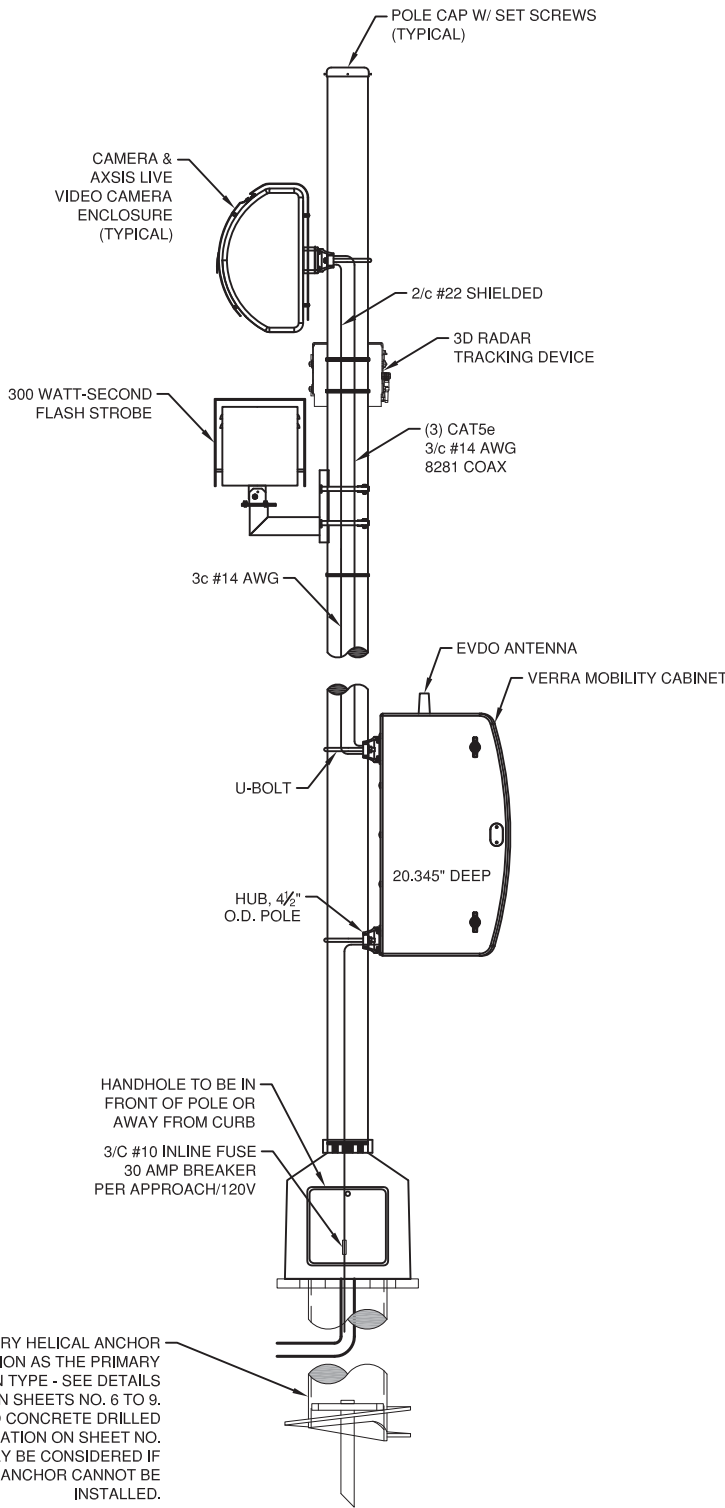
NOTE:

1.IT IS OUR UNDERSTANDING THE POLES ARE DESIGNED AND CHECKED BY THE SPECIALIZED MANUFACTURER.

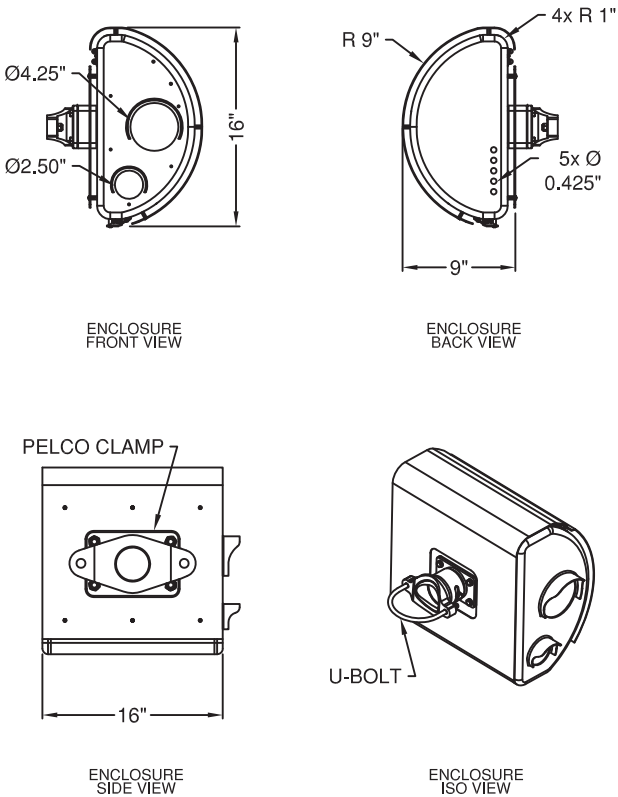
REAR CAMERA POLE

(SITE SPECIFIC ARRANGEMENT SHOWN ON SHEET 2)

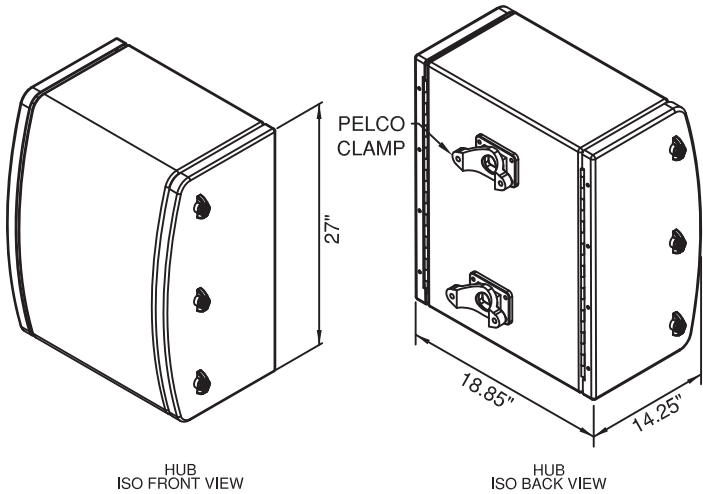
20' - 4.5" O.D. SCHEDULE 80
(6061 T6 ALUMINUM)



CAMERA & VIDEO CAMERA ENCLOSURE



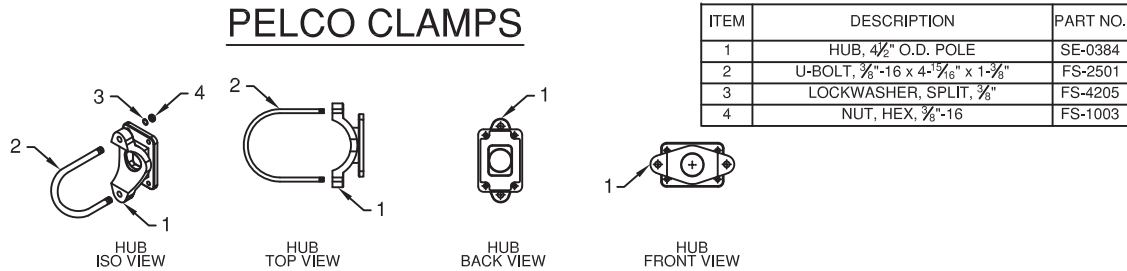
VERRA MOBILITY CABINET



NOTES:

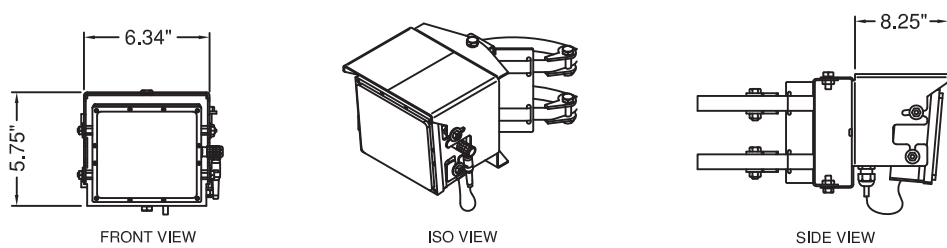
1. CABINET TO BE ROTATED PARALLEL TO CURB.
2. ORIENT (AIM) RADAR TOWARDS THE MIDDLE OF THE TOTAL NUMBER OF LANES ON THE FRONT SIDE OF THE POLE.
3. LOCATE POLE PER PLAN.

PELCO CLAMPS

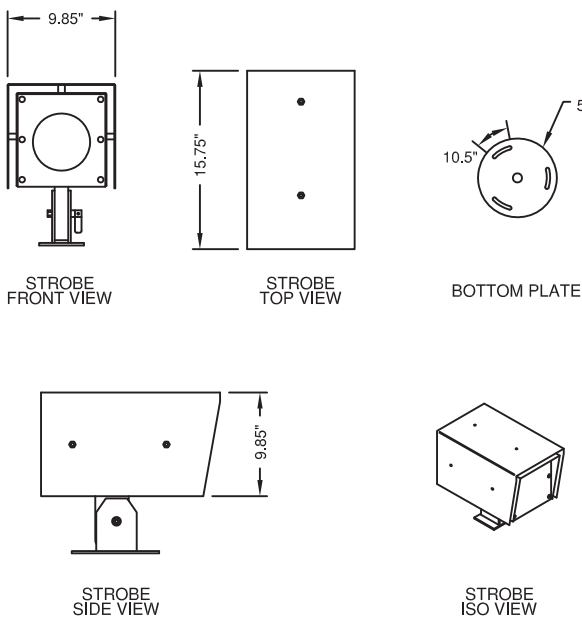


ITEM	DESCRIPTION	PART NO.
1	HUB, 4 1/2" O.D. POLE	SE-0384
2	U-BOLT, 3/8"-16 x 4-1 5/8" x 1-3/8"	FS-2501
3	LOCKWASHER, SPLIT, 3/8"	FS-4205
4	NUT, HEX, 3/8"-16	FS-1003

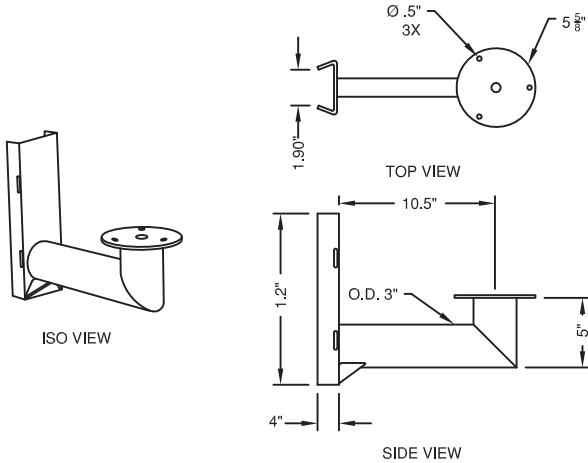
RADAR



FLASH STROBE



STROBE MOUNT



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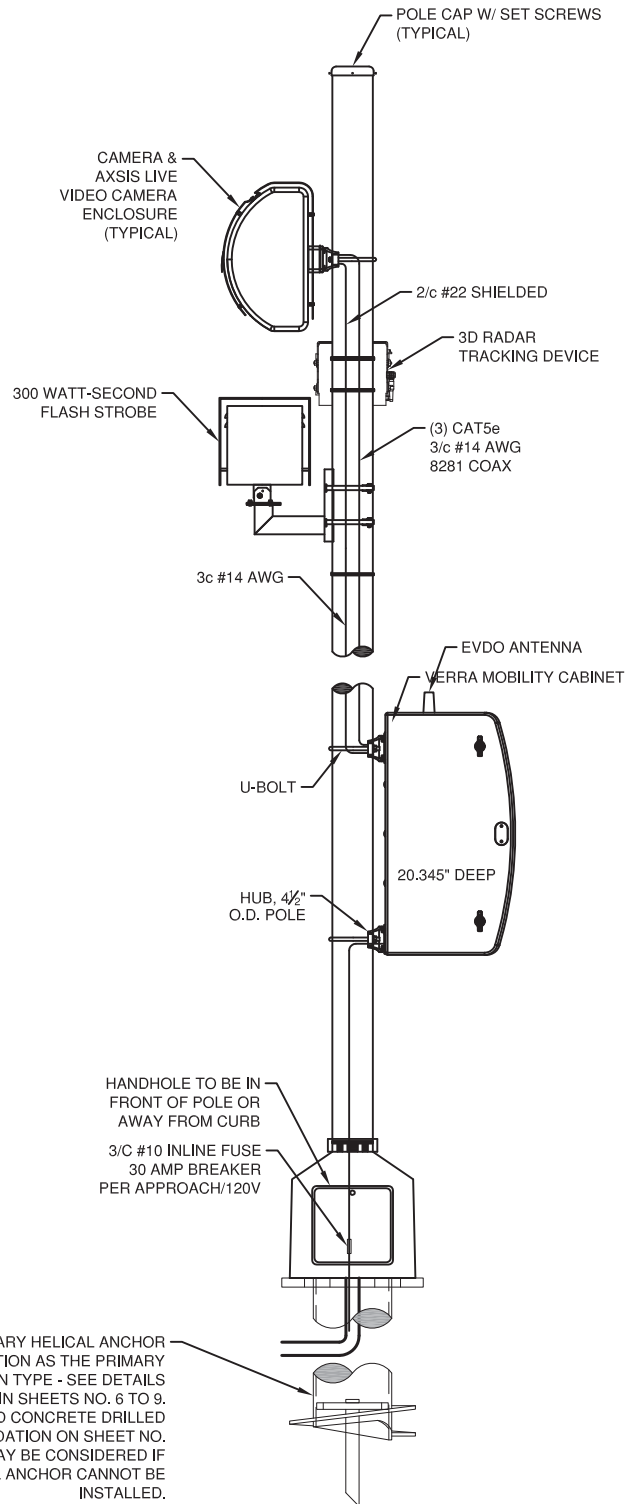
ALUMINUM REAR POLE DETAILS - 1

US 17 / 76 WB (WOOSTER ST) AT
SR 1217 (S. 17TH ST)
WILMINGTON, NC

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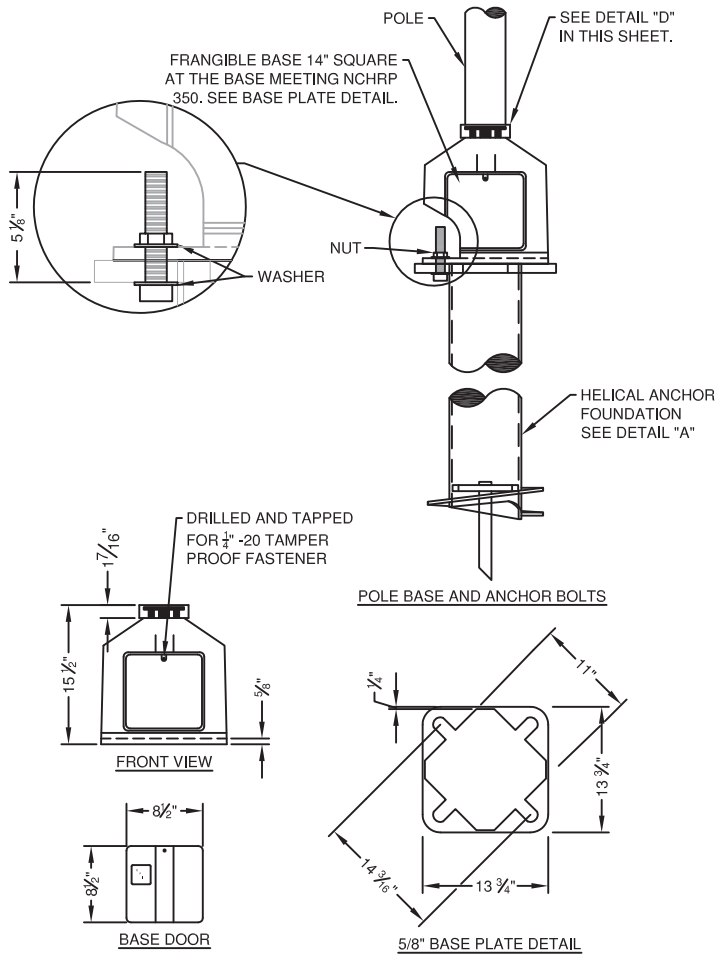
JOB NUMBER
1259
SITE ID(S)
W1506

SHEET
NUMBER
4
OF 11 SHEETS

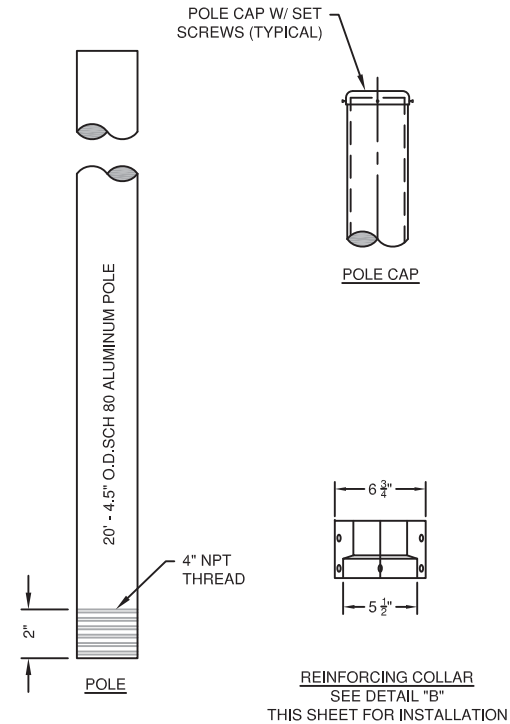


DETAIL "A"
REAR CAMERA POLE
(SITE SPECIFIC ARRANGEMENT SHOWN ON SHEET 2)

20' - 4.5" O.D. SCHEDULE 80
(6061 T6 ALUMINUM)



DETAIL "B"
POLE BASE DETAIL



DETAIL "C"
POLE DETAIL

ALUMINUM POLE DESIGN NOTES:

1. DESIGN CRITERIA:

LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (LRFDLTS-1) AND APPLICABLE STRUCTURES MANUAL.

2. DESIGN WIND SPEED: 150 MPH

3. SEE SHEET NO. 4 FOR EQUIPMENT DATA.

4. RED PHASE CAMERA WILL BE INSTALLED ONLY IF OTHER MEANS OF RED PHASE DETECTION CAN NOT BE ACHIEVED. THE STRUCTURAL CALCULATIONS ASSUMED WORST CASE SCENARIO AS SHOWN ON DETAIL "A" OF 20' POLE TUBE LENGTH.

5. IT IS OUR UNDERSTANDING THAT THE POLES ARE DESIGNED AND CHECKED BY THE SPECIALIZED MANUFACTURER.

ALUMINUM POLE NOTES:

1. POLE SHALL BE ALUMINUM ASSOCIATION ALLOY 6061-T6.
2. ALUMINUM WELDING RODS SHALL MEET THE REQUIREMENTS OF ALUMINUM ASSOCIATION ALLOY NO. 5556 FILLER WIRE.
3. WELDING SHALL BE IN ACCORDANCE WITH THE AWS STRUCTURAL WELDING CODE - ALUMINUM.
4. LOCATE HANDHOLE ON SIDEWALK SIDE OF POLE UNLESS OTHERWISE DIRECTED.
5. CAPS: ASTM B209
6. STAINLESS STEEL SCREWS: AISI TYPE 316

POLE DATA

POLE TUBE			POLE BASE			ANCHOR BOLT	
POLE O.D.	LENGTH	WALL THK	SQUARE	BOLT CIRCLE	THK	DIA	THREAD LENGTH
4 1/2"	15' 20' 25'	4/28"	13 3/4"	14 3/16"	5/8"	1"	5 1/8"

G.C.:



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ALUMINUM REAR POLE DETAILS - 2

**US 17 / 76 WB (WOOSTER ST) AT
SR 1217 (S. 17TH ST)
WILMINGTON, NC**

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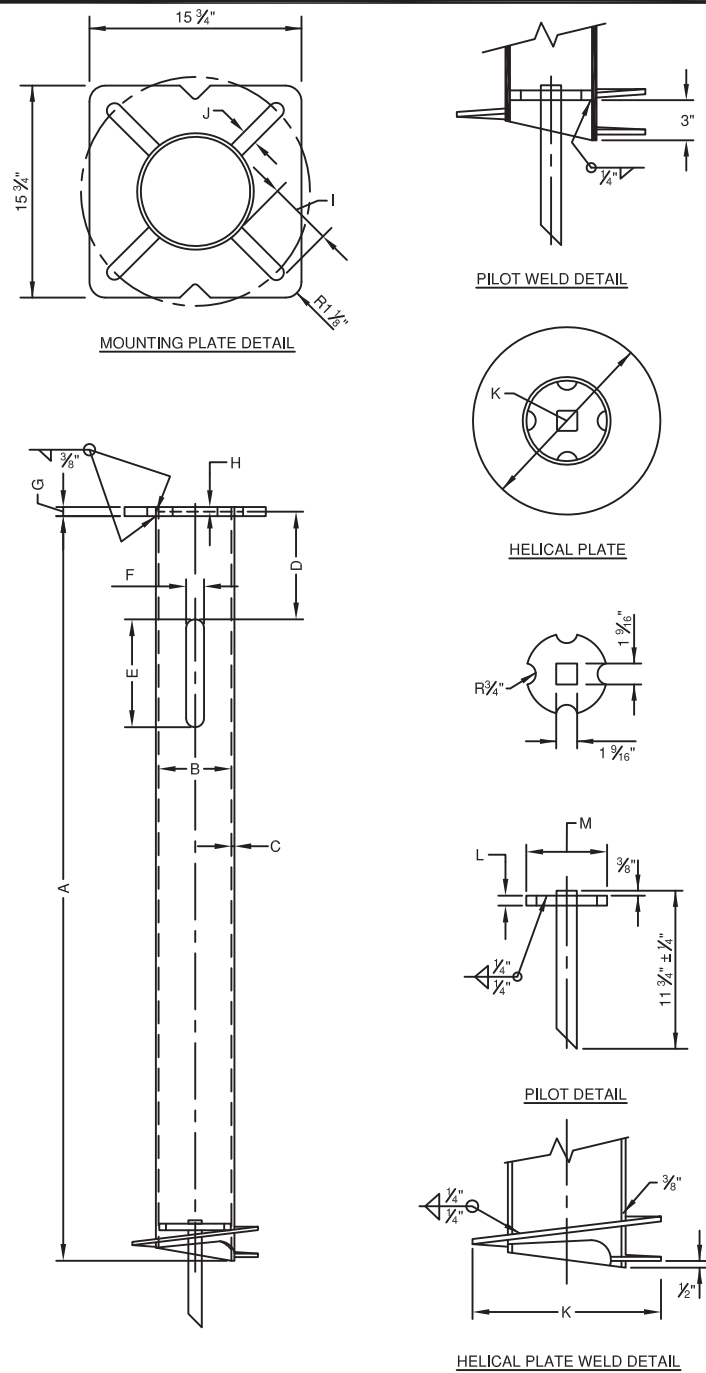
JOB NUMBER

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SITE ID(S)
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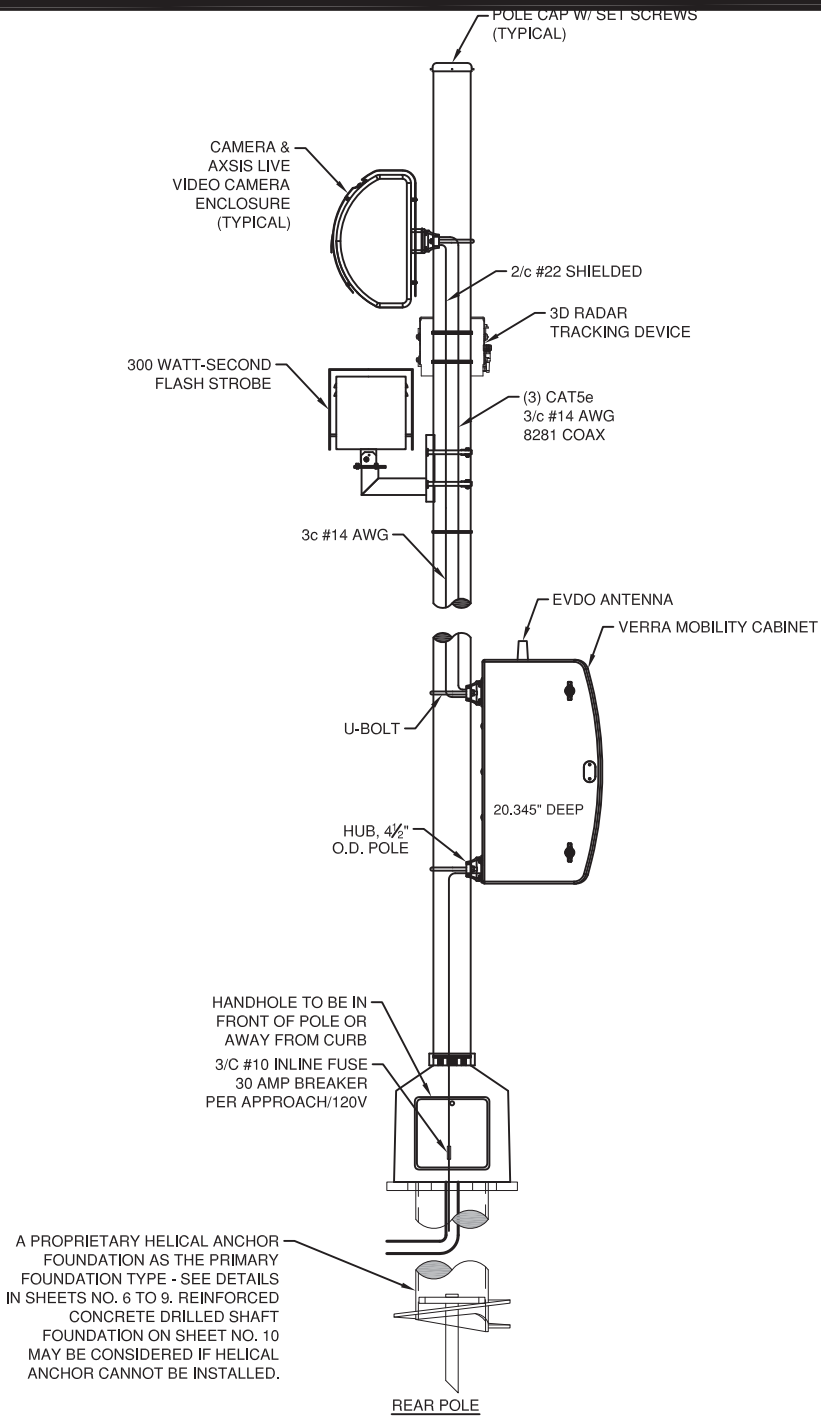
SHEET
NUMBER

5

OF 11 SHEETS

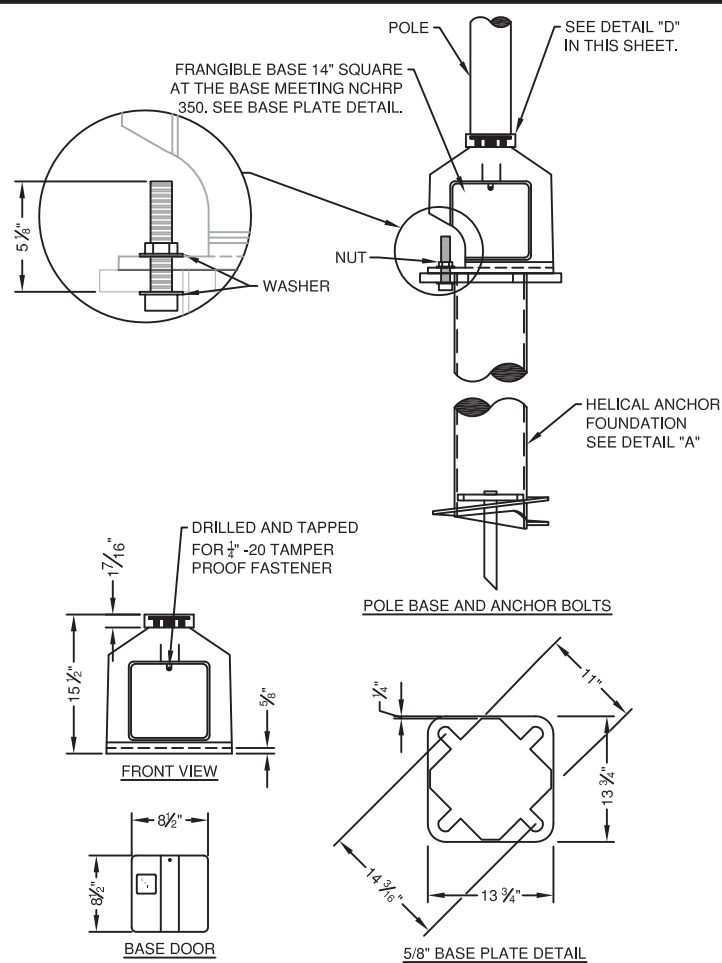


DETAIL "A"
DRILLED ANCHOR FOUNDATION DETAIL



DETAIL "B"
TYPICAL ALUMINUM POLE DETAIL

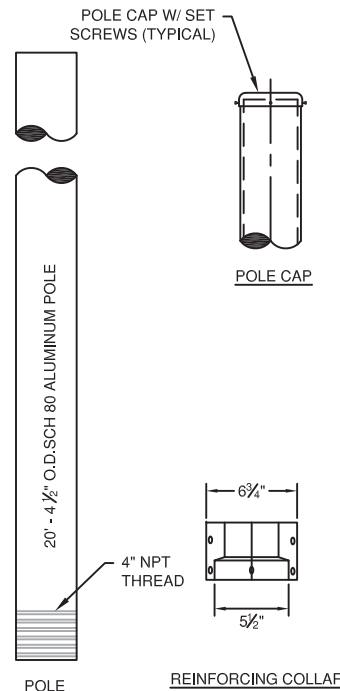
(SITE SPECIFIC ARRANGEMENT SHOWN ON SHEET 2)



DETAIL "C"
POLE BASE DETAIL

GENERAL NOTES:

- DESIGN SHALL BE IN ACCORDANCE WITH 2009 (5TH) EDITION AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINARIES AND TRAFFIC SIGNALS AND INTERIMS.
- POLE MATERIAL SHALL BE SCHEDULE 80 ALUMINUM POLE FABRICATED USING 6061-T6 ALUMINUM ALLOY, THREADED ONE END NPT CUT TO LENGTH.
- ALL NUTS, BOLTS, WASHERS AND THREADED BARS/STUDS SHALL BE GALVANIZED PER F2329-05.
- UNLESS OTHERWISE NOTED ON THE PLANS, LOCATE HANDHOLE 180 DEGREES FROM CURB & GUTTER (FACING SIDEWALK).
- PROVIDE NUT AND WASHER WITH EACH BOLT.
- THREADS OF BOLTS SHALL BE COATED WITH PIPE JOINT COMPOUND PRIOR TO INSTALLATION OF UPPER NUTS WHEN ERECTING POLE. AFTER POLE IS PLUMBED AND IN PERMANENT ALIGNMENT, THE EXPOSED THREADS OF PAINTED BOLTS SHALL BE CLEANED AND AN ADDITIONAL COATING OF ZINC-RICH PAINT APPLIED TO SEAL THE BOLT THREAD-NUT JOINT.
- HELICAL PLATE SHALL BE HOT DIP GALVANIZED PER ASTM A123 GRADE 100 KSI.
- SQUARE BAR PILOT SHALL BE PER ASTM A576.
- SHEETS 6 TO 9 SHOULD NOT BE SEPARATELY READ OR/AND INTERPRETED BUT TOGETHER IN CONJUNCTION WITH ONE ANOTHER.
- WHEN SOFT COHESIVE CLAY SOILS (OR SIMILAR) ARE ENCOUNTERED AT THE POLE LOCATION, ECP 10' LONG HELICAL ANCHOR(PRODUCT NO. LPS-863-12-14) IS TO BE USED.
- THE 10' LONG HELICAL ANCHOR IS GENERALLY RECOMMENDED TO BE USED FOR THIS SITE UNLESS PROVEN AND VERIFIED OTHERWISE TO UTILIZE THE 7' LONG ONE.



DETAIL "D"
POLE DETAIL

DRILLED HELICAL ANCHOR FOUNDATION DATA

S*	POLE HEIGHT	ANCHOR SHAFT			HAND HOLE			MOUNTING PLATE				HELICAL PLATE	PILOT DETAIL	
		A	B	C	D	E	F	G	H	I	J	K	L	M
≤ 150 MPH	20'	84"	8 5/8"	1/4"	12"	12"	2 1/2"	1"	1/2"	4 3/4"	1 1/8"	14"	3/4"	8"
	20'	120"	8 5/8"											

SEE SHEET NO. 9

* S - DESIGN WIND SPEED

POLE DATA

POLE TUBE		POLE BASE			ANCHOR BOLT		
POLE O.D.	LENGTH	WALL THK	SQUARE	BOLT CIRCLE	THK	DIA	THREAD LENGTH
4 1/2"	15' 20' 25'	4/128"	13 3/4"	14 3/16"	5/8"	1"	5 1/8"

SEE NOTE 10
IN THIS SHEET

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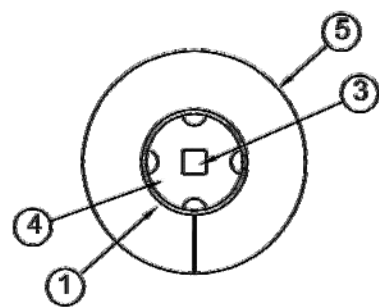
ENGINEER OF RECORD:
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ECP HELICAL ANCHOR FOUNDATION -1
US 17 / 76 WB (WOOSTER ST) AT
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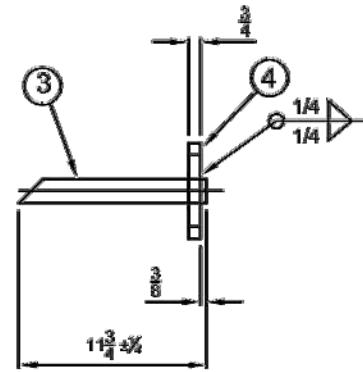
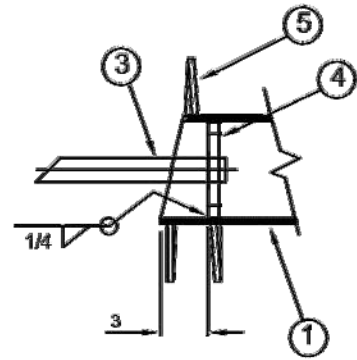
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2	4-6-21	3RD PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER CITY COMMENTS
3	4-12-21	4TH PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER CITY COMMENTS
4	4-27-21	5TH PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER NCDOT COMMENTS

JOB NUMBER
1259
SITE ID(S)
W1506

SHEET
NUMBER
6
OF 11 SHEETS

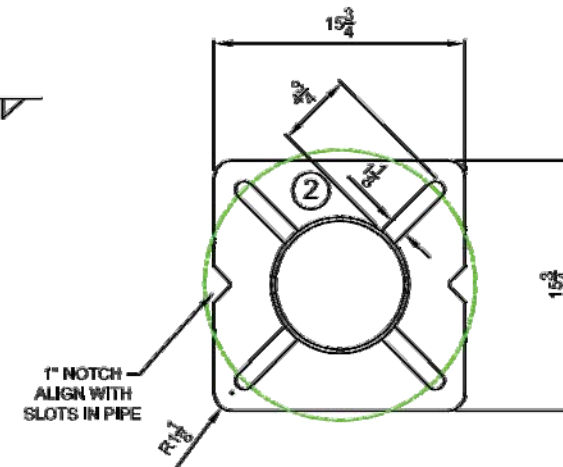
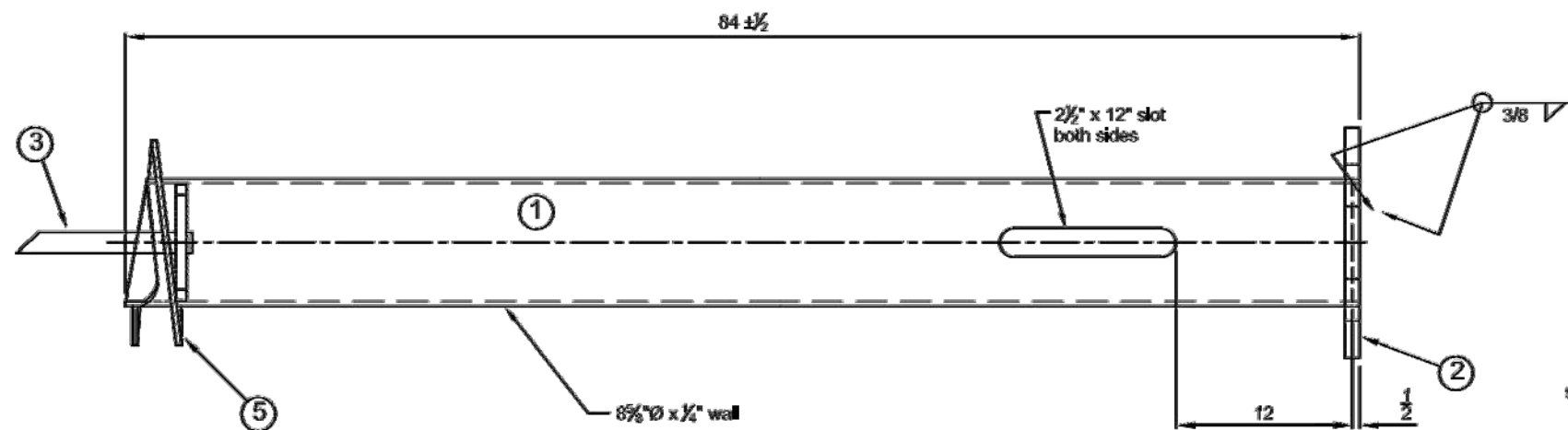
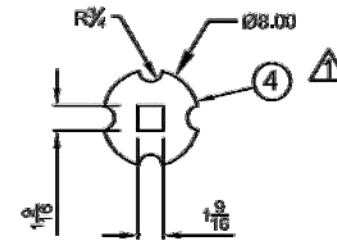


PILOT WELD DETAIL

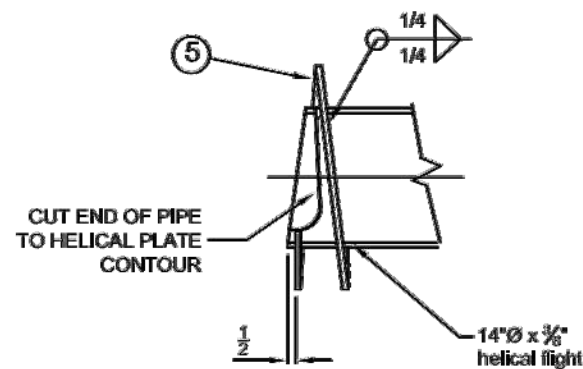


PILOT DETAIL

ATS P/N: 4200-0042
MFG. P/N: LPS-863-84-14




MOUNTING PLATE
DETAIL



HELICAL PLATE
WELD DETAIL

HOT DIP GALVANIZE ASTM A123 GR 100

ITEM	QTY.	DESCRIPTION	Earth Contact Products, L.L.C. 15612 S. Keeler Terr. Olathe, KS. 66062 Phone : (913) 393-0007 Fax : (913) 393-0008		
1	1	8 5/8" Ø x 1/4" Wall Tube x 7'-0"		Description : Lighting Standard Foundation 8 5/8" Ø x 7' long	Part Number: LPS-863-84-14
2	1	15 3/4" x 15 3/4" x 1" Plate			
3	1	1 1/2" Square Bar x 11 3/4" - ASTM A576			
4	1	8" Ø x 1" HR Plate			
5	1	14" Ø x 3/8" Helical Plate- TA-863-14			
			Drawn: DJC	DATE: 02/06/07	

ECP HELICAL ANCHOR (7 FT LONG & 8-5/8" DIAMETER) FOUNDATION DETAILS
(RECEIVED FROM ECP)

NOTE:
SHEETS 6 TO 9 SHOULD NOT BE SEPARATELY READ
OR/AND INTERPRETED BUT TOGETHER IN
CONJUNCTION WITH ONE ANOTHER.

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ENGINEER OF RECORD:
ESSAM TAWFIK ALI MANSOUR, P.E.
REG. # 050958

ECP HELICAL ANCHOR FOUNDATION -2
US 17 / 76 WB (WOOSTER ST) AT
SR 1217 (S. 17TH ST)
WILMINGTON, NC

REV.	DATE	DESCRIPTION	PREP. BY	REV. BY	APP. BY	REMARKS
0	3-15-21	1ST PERMITTING SUBMITTAL	GB	ET	ET	AN UPGRADED / RELOCATED SITE
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2	4-6-21	3RD PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER CITY COMMENTS
3	4-12-21	4TH PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER CITY COMMENTS
4	4-27-21	5TH PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER NCDOT COMMENTS

JOB NUMBER
1259
SITE ID(S)
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SHEET
NUMBER
7
OF 11 SHEETS

ECP LIGHT POLE FOUNDATION INSTALLATION PROCEDURE

- 1-866-327-0007
fb.com/getecp
twitter.com/getecp
getecp.com

General Considerations:

- Always inspect adapters, drive tool assembly and anchor for damage or contamination
- Be sure all equipment and accessories are available before starting installation procedures
- Verify that no below ground or above ground utilities are in a place that interferes with planned installation of Helical Anchors
- Verify minimum installing torque requirement
- Verify that installation torque record form is available
- Use moderate crowd (downward pressure) on anchor during installation
- Control installation rotation speed between 20 rpm and 25 rpm
- Always maintain proper alignment between torque motor / drive tool assembly and anchor during installation
- Goal: Advance 3" per revolution to match the helix pitch

Before a light pole foundation can be installed, the installation equipment must be outfitted with the appropriate tooling. The Kelly bar hex adapter is directly attached to the equipments output shaft by a single bolt. The universal driving tool assembly that adapts to the foundation anchor is securely bolted to the Kelly bar hex adapter.

- Attach the driving tool assembly to the light pole foundation base plate utilizing two of the bolts provided with the foundation anchor.
- Raise the foundation anchor upright, with the universal drive tool assembly attached, and the universal drive tool foundation assembly to the Kelly bar.
- Raise the Kelly bar until the foundation swings free of the ground. Maneuver the Kelly bar until the point of the foundation anchor is over the predetermined installation location.

- Lower the Kelly bar until the point of the foundation anchor is forced into the ground and the helical flight is flush with the ground surface.

Earth Contact Products • 15612 South Keeler Terrace Olathe, KS 66062

- 1-866-327-0007
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- Utilize a magnetic level to plumb the foundation anchor by checking the shaft on two sides at 90° from each other.

- Apply downward pressure on the foundation anchor and rotate it in the clockwise direction.

- When the helical flight has penetrated approximately 1' in to the ground, re-plumb the foundation anchor as suggested in step 5.

- Continue to install the foundation anchor, applying downward pressure and correcting the Kelly bar's orientation so the foundation embeds itself in one smooth continuous motion. A groundman can be of assistance in keeping the foundation anchor plumb during installation.

- When the base plate of the foundation anchor is 1 to 2 inches above grade, stop the installation equipment. Remove the Kelly bar adapter and the installation tool.

- Attach the streetlight to the foundation with the appropriate hardware. (Please note that if the cableway is below grade, especially in sand, the soil may spill into the foundation cavity causing settlement around the base plate. As a preventative measure, the cableway may be blocked with filter cloth or the cavity filled with sand after installing the conduits.) Back fill and tamp trench.

**Installation Torque NOT To Exceed 40,000 FT. LBS. **

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ECP GENERAL INSTALLATION GUIDELINES
(RECEIVED FROM ECP)

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ENGINEER OF RECORD:
ESSAM TAWFIK ALI MANSOUR, P.E.
REG. # 050958

ECP HELICAL ANCHOR FOUNDATION - 3
US 17 / 76 WB (WOOSTER ST) AT
SR 1217 (S. 17TH ST)
WILMINGTON, NC

REV.	DATE	DESCRIPTION	PREP. BY	REV. BY	APP. BY	REMARKS
0	3-15-21	1ST PERMITTING SUBMITTAL	GB	ET	ET	AN UPGRADED / RELOCATED SITE
1	3-25-21	2ND PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER CITY COMMENTS
2	4-6-21	3RD PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER CITY COMMENTS
3	4-12-21	4TH PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER CITY COMMENTS
4	4-27-21	5TH PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER NCDOT COMMENTS

JOB NUMBER
1259
SITE ID(S)
W1506

SHEET
NUMBER
8
OF 11 SHEETS

TECHNICAL NOTES:

- The Proprietary Helical Anchor foundation type presented in the plans have been designed (and supplied by Earth Contact Products, LLC; ECP - www.earthcontactproducts.com) based on considerations/criteria of minimum geotechnical/shear strength parameters of $\phi = 30$ degrees, $c = 500$ psf, and no ground water within the anchor length (corresponds to values equivalent/correlated to minimum SPT > 4 - as to be satisfactorily verified by Construction/Helical Anchor Installation Subcontractor/Vendor) for the subsurface conditions underlying the proposed site & following ultimate/factored controlling structural reactions at the single-system pole bottom fixed base connection for design wind speed not exceeding 150 mph:
 - Axial Force/Compression = 450 lb for Aluminum Pole & 628 lb for Steel Pole
 - Flexural Moment = 8,371 lb.ft
 - Torsional Moment = 326 lb.ft
 - Shear Force = 895 lb
- Helical Foundations Type shall not be used when rock layers, large cobbles, or/and sinkholes/cavities are encountered above the seating depth - to be verified as needed by the Construction/Helical Anchor Installation Subcontractor/Vendor.
- The 7 ft long and 8-5/8" diameter Helical Anchor Foundations also should not be used when soils of low shear strength parameters (values equivalent/correlated to

- SPT < 5) are encountered on site to be verified as needed by the Construction/Helical Anchor Installation Subcontractor/Vendor.
- ECP's general installation guidelines for the LPS product line are presented in this sheet and should be duly and relevantly considered and followed as needed by Construction/Helical Anchor Installation Subcontractor/Vendor.
- The maximum torque indicated at the end of the installation guidelines is based on the proposed/selected 7 ft long and 8-5/8" diameter Helical Anchor - If the anchor/shaft diameter changes, ECP should be consulted as the torque value may change as well.
- As applicable, It is the full responsibility of the Construction/Helical Anchor Installation Subcontractor/Vendor to take any necessary actions/measures, prior to or/and during construction to technically verify the geo parameters considered by ECP in their design and submit the verification report/documentation to VM representat and EOR.
- Should minimum geotechnical/shear strength parameters are not satisfactorily met, the Construction/Helical Anchor Installation Subcontractor/Vendor should timely notify notify VM representative and EOR to contact ECP for any required modifications or adjustment.
- Sheets 6 to 9 should not be separately read or/and interpreted but together in conjunction/integration with one another.

ECP Foundation Standard Selection Guide

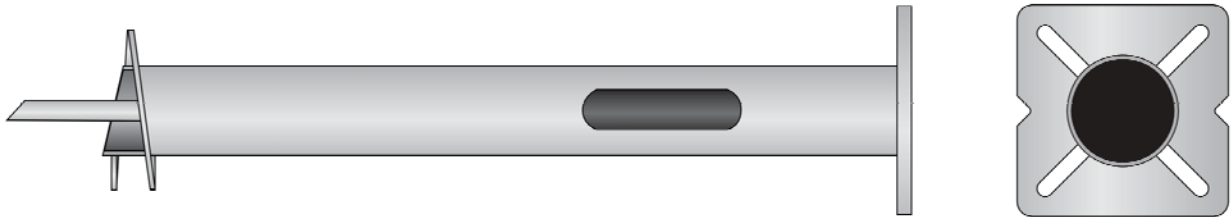
DESIGN LATERAL LOAD	DESIGN OVERTURNING MOMENT	RECOMMENDED HELICAL FOUNDATION
500-1,000 lb.	<10,500 ft-lb.	6-5/8" Dia x 7' Long
1,000-1,200 lb.	<21,000 ft-lb.	8-5/8" Dia x 7' Long
1,200-1,500 lb.	<37,000 ft-lb.	10-3/4" Dia x 7' Long

- The table above requires a minimum soil strength of $N = 5$. This recommendation is valid for both cohesive and cohesionless soils.
- For sites with soil $N = 2$ to 4 in the upper 5', ECP recommends increasing the foundation standard length from 7' to 10' in order to achieve the tabulated capacities.
- For sites that have blow counts over $N = 15$, 5' standard lengths may be selected to reduce the torque required to fully install the shaft.

ECP HELICAL ANCHOR FOUNDATION STANDARD SELECTION GUIDE
(RECEIVED FROM ECP)



LPS-863-120-14 -- Light Pole Foundation



Product Specifications	
Product Type	Lighting Foundation
Foundation Diameter	8.63" (219.2 mm)
Foundation Length	120" (3048 mm)
Base Plate Shape	Square
Bolt Hole Type	Slotted
Bolt Circle/ Slot Dimensions	11" (279 mm) - 17" (432 mm)
Number of Bolt Holes/ Slots	4 Slots
Hardware Included	No
Bolt Type	Hex Bolt
Nuts	Yes
Retaining Washer	Yes
Base Plate Thickness	1" (25.4 mm)
Base Plate Dimensions	15.75" (400 mm) x 15.75" (400 mm)
Center Hole Dimension	8.687" (220.7 mm)
Helix Diameter	14" (356 mm)
Coating	Hot-Dip Galvanized
Standard Package	1
Standard Package Unit	Each
Weight/Ea.	290 lbs

GENERALLY RECOMMENDED FOR THIS SITE UNLESS PROVEN AND VERIFIED OTHERWISE TO UTILIZE THE 7' LONG ONE.

Notes

Lighting Foundation 8.63" Diameter x 120" Long

- NOTE:
1. SHEETS 6 TO 9 SHOULD NOT BE SEPARATELY READ OR / AND INTERPRETED BUT TOGETHER IN CONJUCTION / INTEGRATION WITH ONE ANOTHER.
 2. INSTALLATION TORQUE NOT TO EXCEED 40,000 LBS.

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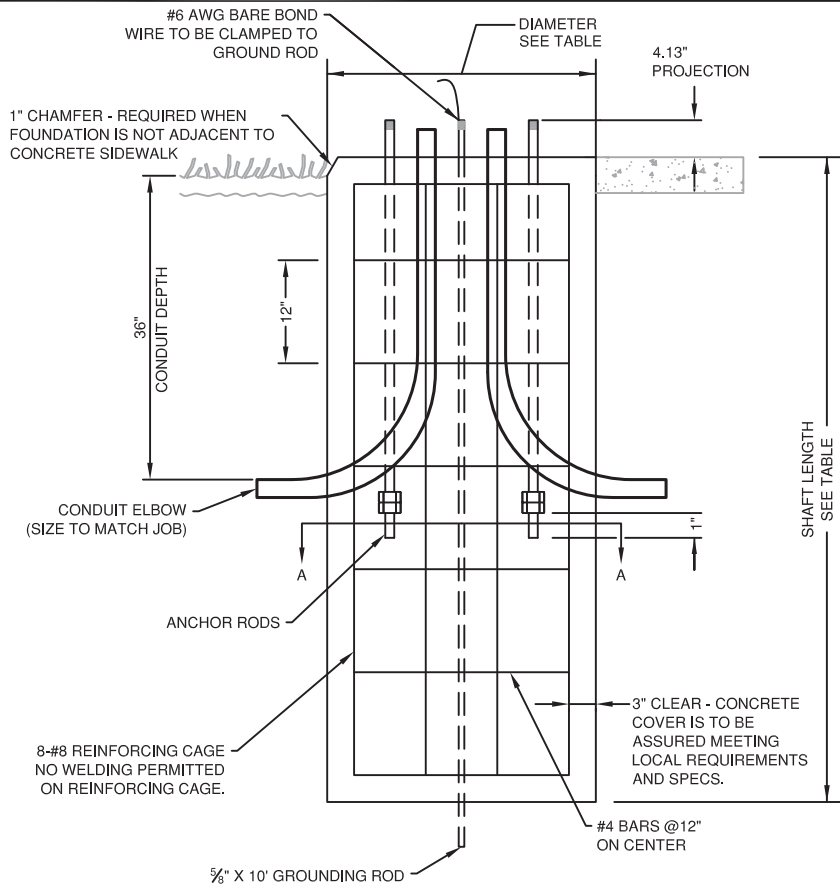
ENGINEER OF RECORD:
ESSAM TAWFIK ALI MANSOUR, P.E.
REG. # 050958

ECP HELICAL ANCHOR FOUNDATION - 4
US 17 / 76 WB (WOOSTER ST) AT
SR 1217 (S. 17TH ST)
WILMINGTON, NC

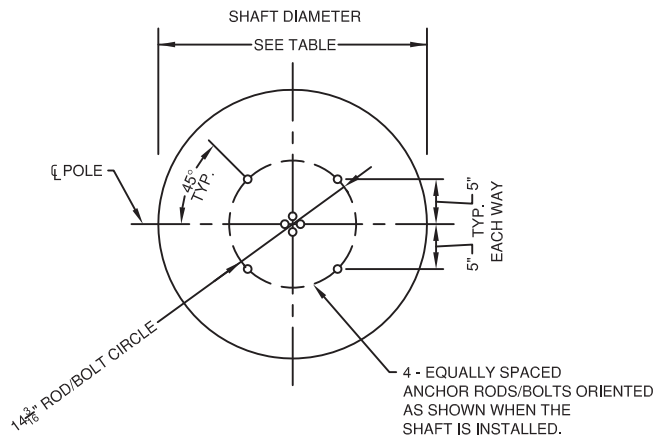
REV.	DATE	DESCRIPTION	PREP. BY	REV. BY	APP. BY	REMARKS
0	3-15-21	1ST PERMITTING SUBMITTAL	GB	ET	ET	AN UPGRADED / RELOCATED SITE
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2	4-6-21	3RD PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER CITY COMMENTS
3	4-12-21	4TH PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER CITY COMMENTS
4	4-27-21	5TH PERMITTING SUBMITTAL	SM	ET	ET	REVISED PER NCDOT COMMENTS

JOB NUMBER
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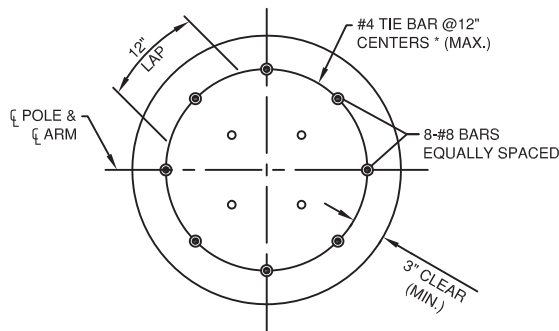
SHEET
NUMBER
9
OF 11 SHEETS



DETAIL "A"
REINFORCED CONCRETE (R.C.) DRILLED SHAFT
FOUNDATION DETAIL



TOP VIEW



SECTION A-A

FOUNDATION DESIGN NOTES:

- DESIGN CRITERIA:
 - LRFD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS (LRFDLT-1) AND APPLICABLE STRUCTURES MANUAL.
- DESIGN WIND SPEED: 150 MPH
- THE FOLLOWING SOIL PROPERTIES WERE ASSUMED FOR THE FOUNDATION DESIGN. IF THE ENCOUNTERED SOIL CONDITIONS DO NOT MEET THESE ASSUMED SOIL PARAMETERS, THEN A SPECIAL FOUNDATION MUST BE DESIGNED.
 - SOIL TYPE: COHESIONLESS
 - GROUNDWATER TABLE: AT GROUND SURFACE OR LOWER
 - SOIL EFFECTIVE UNIT WEIGHT: 50 PCF MINIMUM
 - INTERNAL ANGLE OF FRICTION (ϕ): 30 DEGREES MINIMUM
 - $N_{spt} \geq 15$ (OR EQUIVALENT)
- TENTATIVE DESIGN LOADING AND EQUIPMENT DATA CONFIGURATIONS CONSIDERED IN THE DRILLED SHAFT DESIGN ARE THE SAME PRESENTED IN SHEET NO. 8 AND USED IN THE DESIGN OF THE SPREAD FOOTING FOUNDATION TYPE.

FOUNDATION NOTES:

- CONCRETE: PORTLAND CEMENT (PC) CLASS I WITH A MINIMUM 28-DAY COMPRESSIVE STRENGTH OF 3,000 PSI.
- REINFORCING STEEL: ASTM A615, GRADE 60.
- ANCHOR RODS/BOLTS:
 - RODS/BOLTS: ASTM F1554, GRADE 55
 - NUTS: ASTM A563
 - WASHERS: ASTM F436
 - GALVANIZE ALL ITEMS IN ACCORDANCE WITH ASTM F2329.
- FOR PRECAST REINFORCED CONCRETE SHAFT FOUNDATIONS IF USED, FILL THE VOID AROUND THE FOUNDATION WITH FLOWABLE FILL OR CLEAN SANDS USING HYDRAULIC METHODS TO A LEVEL 6 INCHES BELOW GRADE.
- AFTER THE POLE IS SET IN FINAL POSITION AND ALIGNMENT, APPLY A COAT OF ZINC-RICH PAINT TO THE ANCHOR ROD THREADS AND NUTS TO SEAL THE JOINT BETWEEN THE NUT AND ANCHOR ROD.
- WHERE FOUNDATION ABUTS THE SIDEWALK, THE TOP OF THE FOUNDATION SHALL BE LEVEL WITH THE SIDEWALK. FOR ALL OTHER CASES, THE TOP OF THE FOUNDATION SHALL NOT BE MORE THAN 3 INCHES ABOVE GRADE.

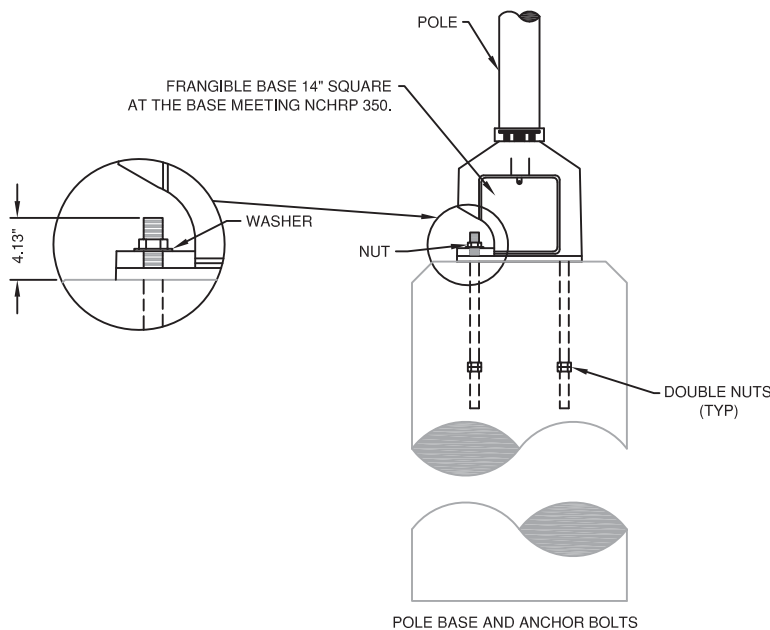
REINFORCED CONCRETE DRILLED SHAFT DATA:

POLE TYPE	POLE HEIGHT	DIAMETER	DEPTH	BOLT CIRCLE (B.C.)	FOUNDATION REINFORCEMENT		ANCHOR RODS/BOLTS		
					VERTICAL	HORIZONTAL	DIA	LENGTH	THREAD LENGTH (TOP)
REAR POLE ASSEMBLY	20'	2'-6"	7'-0"	14 $\frac{3}{16}$ "	8 - NO .8	NO. 4 @ 12" C-C	1.00"	42.00"	6"

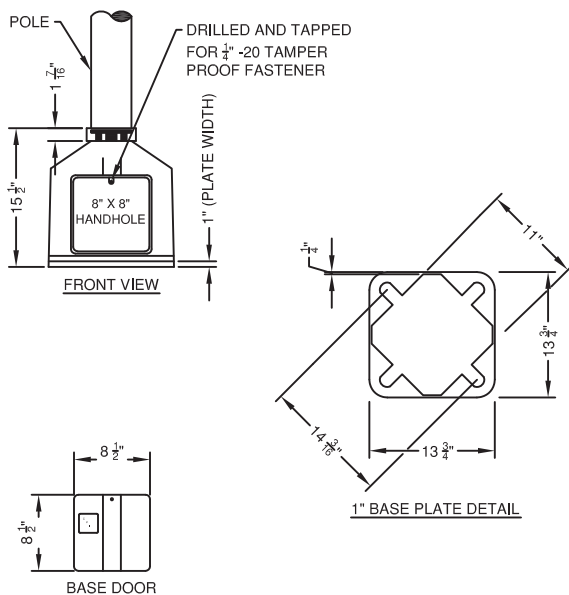
- REFER TO SHEETS NO. 4 & 5 FOR THE POLE DETAILS

TECHNICAL CONSIDERATIONS:

- THE R.C. DRILLED SHAFT FOUNDATION TYPE DESIGN PRESENTED IN THE PLANS HAVE BEEN DESIGNED, BY A PROFESSIONAL ENGINEER UNDER A SEPARATE AGREEMENT, BASED ON TENTATIVE CONSIDERATIONS/CRITERIA OF STRUCTURAL LOADING CONDITIONS ON THE POLE (150 MPH DESIGN WIND SPEED) AND GEOTECHNICAL/SHEAR STRENGTH PARAMETERS (SATURATED SAND $\phi = 30$ DEGREES & $N_{spt} \geq 15$ BLOWS) FOR THE SUBSURFACE CONDITIONS UNDERLYING THE PROPOSED SITE.
- IT IS THE FULL RESPONSIBILITY OF THE CONSTRUCTION SUBCONTRACTOR/VENDOR TO TAKE ANY NECESSARY ACTIONS/MEASURES, PRIOR TO OR/AND DURING CONSTRUCTION TO TECHNICALLY VERIFY OR MODIFY THE DESIGN PRESENTED IN THE PLANS AND SUBMIT A PROFESSIONAL VERIFICATION REPORT/DOCUMENTATION TO VM/EOR REPRESENTATIVE FOR REVIEW AND RECORD.
- ANY EXISTING UNCONTROLLED FILL, DEBRIS, BOULDERS, HIGHLY PLASTIC SOILS, BRICKS, TOP SOILS, ORGANIC/CONTAMINATED MATERIALS OR SIMILAR, IF ENCOUNTERED IN THE ZONES OF INFLUENCES, ARE GENERALLY CONSIDERED UNSUITABLE FOR SUBGRADE MATERIALS FOR THE FOUNDATIONS PRESENTED IN THE PLANS, UNLESS TECHNICALLY VERIFIED AND DOCUMENTED OTHERWISE, AND REPORTED TO VM/EOR REPRESENTATIVE FOR REVIEW AND RECORD.



DETAIL "B"
POLE BASE DETAIL



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ENGINEER OF RECORD:
ESSAM TAWFIK ALI MANSOUR, P.E.
REG. # 050958

**REINFORCED CONCRETE
DRILLED SHAFT FOUNDATION**
US 17 / 76 WB (WOOSTER ST) AT
SR 1217 (S. 17TH ST)
WILMINGTON, NC

REV.	DATE	DESCRIPTION	PREP. BY	REV. BY	APP. BY	REMARKS
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JOB NUMBER
1259
SITE ID(S)
W1506

SHEET
NUMBER
10
OF 11 SHEETS







DISTANCE BETWEEN SIGNS			
SPEED LIMIT	SPACING (FT.)		
	A	B	C
40 MPH OR LESS	200	200	200
45 MPH	350	350	350
50 MPH	500	500	500
*55 MPH OR GREATER	2640	1640	1000

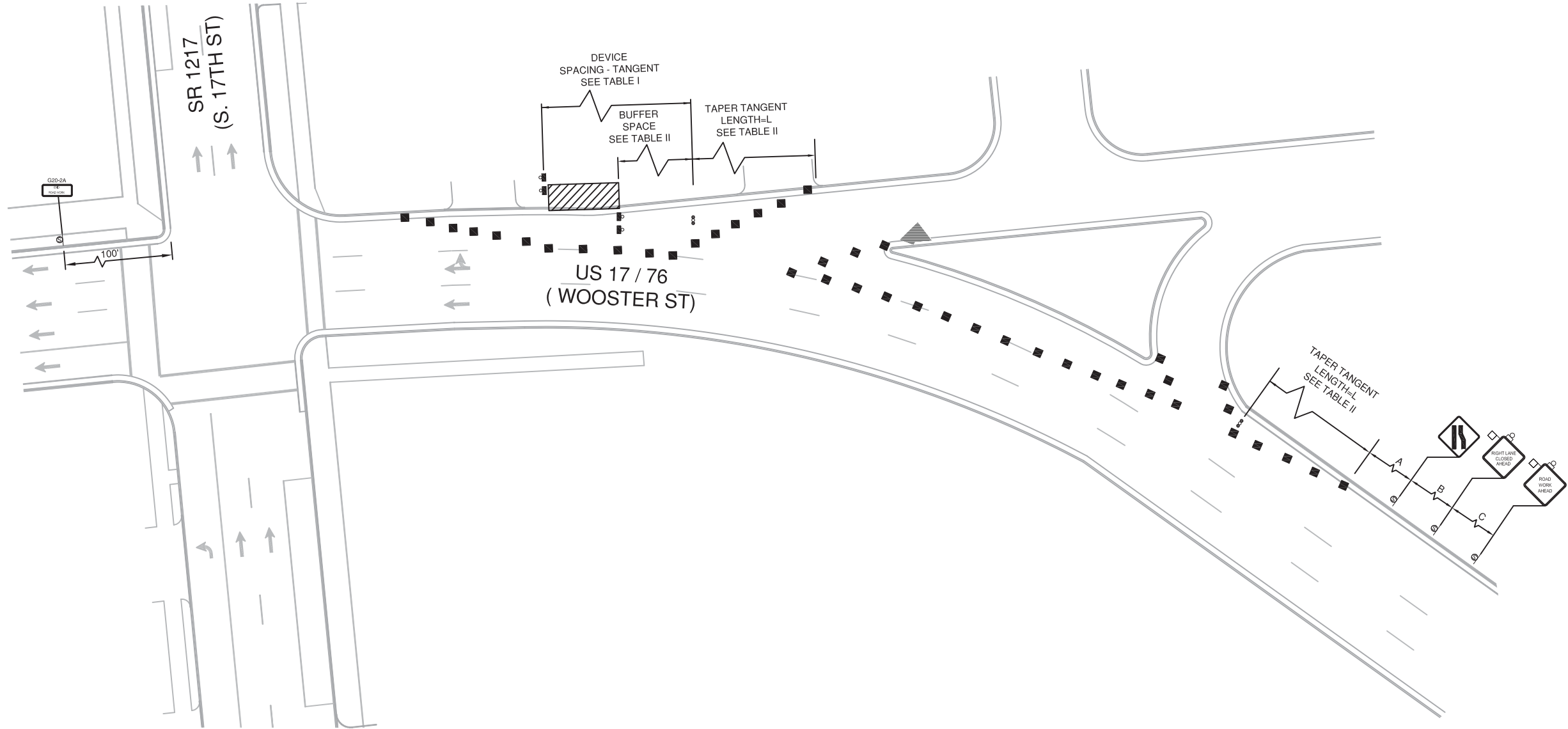
* THE ROAD WORK 1 MILE SIGN MAY BE USED AS AN ALTERNATE TO THE ROAD WORK AHEAD SIGN AND THE RIGHT LANE CLOSED 1/2 MILE SIGN MAY BE USED AS AN ALTERNATE TO THE RIGHT LANE CLOSED AHEAD SIGN.

TABLE I DEVICE SPACING				
SPEED LIMIT	MAX. DISTANCE BETWEEN DEVICES (FT.)			
	CONES OR TUBULAR MARKERS		TYPE I OR TYPE II BARRICADES OR VERTICAL PANEL DRUMS	
	TAPER	TANGENT	TAPER	TANGENT
25MPH	25	50	25	50
30 MPH TO 45 MPH	25	50	30	50
50 MPH TO 70 MPH	25	50	50	100

TABLE II BUFFER SPACE AND TAPER LENGTH			
SPEED LIMIT	BUFFER SPACE (FT.)	TAPER LENGTH (12 FT. LATERAL TRANSITION)	
		L (FT.)	NOTES (MERGE)
25	155	125	L=WS ² /60
30	200	180	
35	250	245	
40	305	320	
45	360	540	L=WS
50	425	600	
55	495	660	
60	570	720	
65	645	780	
70	730	840	

LEGEND

- TYPE I, TYPE II OR TYPE III BARRICADE OR VERTICAL PANEL OR DRUM (WITH FLASHING LIGHT)
- WORK ZONE SIGNS
- CHANNELIZING DEVICE
- SIGN WITH 18" X 18" (MIN.) ORANGE FLAG AND TYPE B LIGHT
- ADVANCED WARNING ARROW PANEL
- WORK AREA



NOTES:

- THE MOT PLAN PRESENTED IN THE SHEET IS CONCEPTUAL IN NATURE AND, AS NEEDED AND APPLICABLE, IS TO BE ADJUSTED BY VM'S JURISDICTION/DOT APPROVED SUBCONTRACTOR/S FOR THE MOT SERVICES TO REFLECT THE ACTUAL CONDITIONS/CONSTRAINTS AND RELEVANT WORKZONE TAPER AT THE TIME OF THE CONSTRUCTION, ASSURING SATISFACTORILY MEETING THE RELEVANT REQUIREMENTS OF FHWA/DOT.
- ALL SIGN DIMENSIONS TO COMPLY WITH MUTCD REQUIREMENTS.

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MOT PLAN
US 17 / 76 WB (WOOSTER ST) AT
SR 1217 (S. 17TH ST)
WILMINGTON, NC

REV.	DATE	DESCRIPTION	PREP. BY	REV. BY	APP. BY	REMARKS
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SHEET
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