

## Document Release Notice

Document Number:	See Below	Title:	See Below
Current Revision #:	See Below	Type of Change:	<input checked="" type="checkbox"/> ORIG RELEASE <input type="checkbox"/> REVISION <input type="checkbox"/> ARCHIVE <input checked="" type="checkbox"/> OBSOLETE
New Revision #:	See Below	Document Type:	NTTA Standard <span style="float: right;">Choose from Drop Down Menu - left</span>
Date Submitted:	12/31/2009	DRN Number:	10086

**Summary of Proposed Changes:**

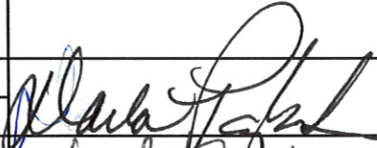
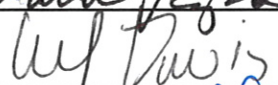

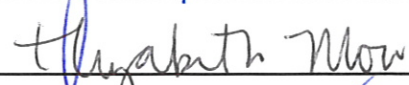
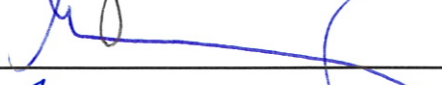
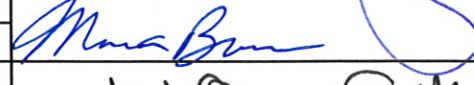

- Include paragraph numbers or other references & attach a copy of the new or revised documents)
- For new documents, indicate "Original Release"

Original Release: NTTA-ESC-001-2009, Electrical Service Center - General Notes.  
 Original Release: NTTA-ESC-002-2009, Electrical Service Center - Type S/E Enclosure.  
 Original Release: NTTA-ESC-003(1)-2009, Electrical Service Center - Type MPE Enclosure.  
 Original Release: NTTA-ESC-003(2)-2009, Electrical Service Center - Type MPE Enclosure.  
 Original Release: NTTA-ESC-003(3)-2009, Electrical Service Center - Type MPE Enclosure.  
 Original Release: NTTA-ESC-004(1)-2009, Electrical Service Center - Type R Enclosure, 100 Amp.  
 Original Release: NTTA-ESC-004(2)-2009, Electrical Service Center - Type R Enclosure, 100 Amp.  
 Original Release: NTTA-ESC-005(1)-2009, Electrical Service Center - Type S Enclosure, 400 Amp.  
 Original Release: NTTA-ESC-005(2)-2009, Electrical Service Center - Type S Enclosure, 400 Amp.  
 Original Release: NTTA-ESC-006(1)-2009, Electrical Service Center - Type MLG Enclosure, 400 Amp.  
 Original Release: NTTA-ESC-006(2)-2009, Electrical Service Center - Type MLG Enclosure, 400 Amp.  
 Obsolete: NTTA-ESC-001-2008, Electrical Service Center - General Notes.  
 Obsolete: NTTA-ESC-002-2008, Electrical Service Center - Type S/E Enclosure.  
 Obsolete: NTTA-ESC-003(1)-2008, Electrical Service Center - Type MPE Enclosure.  
 Obsolete: NTTA-ESC-003(2)-2008, Electrical Service Center - Type MPE Enclosure.

**Reason for New Release / Revision / Obsolescence:**

Electrical Service Center standards have been revised and updated to 2009 standards. The 2008 ESC Standards are obsolete based on changes to the electrical requirements.

**Required Signatures:**

Title:	Printed Name	Signature	Date:
Originator	Gail A. Rodriguez		
Design Manager	Darla Payberah		1-6-2010
	(N/A)		
Deputy Program Manager	Clif Davis		2/19/10
	(Alt - Steve Knobbe)		
Program Manager	Steve Knobbe		3-4-10
	(Alt - Clif Davis)		
Department Director	Elizabeth Mow		3-4-10
	(N/A)		
Assistant Executive Director	Gerry Carrigan		3/9/10
	(Alt - Elizabeth Mow)		
Technical Oversight Leader	Mark Bouma		2-18-10
	(N/A)		
Document Control	Edie Adams		3/11/2010
	(Alt - Omar Faruk)		

- Original Release: NTTA-ESC-001-2009, Electrical Service Center - General Notes. ✓
- Original Release: NTTA-ESC-002-2009, Electrical Service Center - Type S/E Enclosure. ✓
- Original Release: NTTA-ESC-003(1)-2009, Electrical Service Center - Type MPE Enclosure. ✓
- Original Release: NTTA-ESC-003(2)-2009, Electrical Service Center - Type MPE Enclosure. ✓
- Original Release: NTTA-ESC-003(3)-2009, Electrical Service Center - Type MPE Enclosure. ✓
- Original Release: NTTA-ESC-004(1)-2009, Electrical Service Center - Type R Enclosure, 100 Amp. ✓
- Original Release: NTTA-ESC-004(2)-2009, Electrical Service Center - Type R Enclosure, 100 Amp. ✓
- Original Release: NTTA-ESC-005(1)-2009, Electrical Service Center - Type S Enclosure, 400 Amp. ✓
- Original Release: NTTA-ESC-005(2)-2009, Electrical Service Center - Type S Enclosure, 400 Amp. ✓
- Original Release: NTTA-ESC-006(1)-2009, Electrical Service Center - Type MLG Enclosure, 400 Amp. ✓
- Original Release: NTTA-ESC-006(2)-2009, Electrical Service Center - Type MLG Enclosure, 400 Amp. ✓
- Obsolete: NTTA-ESC-001-2008, Electrical Service Center - General Notes. ✓
- Obsolete: NTTA-ESC-002-2008, Electrical Service Center - Type S/E Enclosure. ✓
- Obsolete: NTTA-ESC-003(1)-2008, Electrical Service Center - Type MPE Enclosure. ✓
- Obsolete: NTTA-ESC-003(2)-2008, Electrical Service Center - Type MPE Enclosure. ✓
- Obsolete: NTTA-ESC-003(3)-2008, Electrical Service Center - Type MPE Enclosure. ✓
- Obsolete: NTTA-ESC-004(1)-2008, Electrical Service Center - Type R Enclosure, 100 Amp. ✓
- Obsolete: NTTA-ESC-004(2)-2008, Electrical Service Center - Type R Enclosure, 100 Amp. ✓
- Obsolete: NTTA-ESC-005(1)-2008, Electrical Service Center - Type S Enclosure, 400 Amp. ✓
- Obsolete: NTTA-ESC-005(2)-2008, Electrical Service Center - Type S Enclosure, 400 Amp. ✓
- Obsolete: NTTA-ESC-006(1)-2008, Electrical Service Center - Type MLG Enclosure, 400 Amp. ✓
- Obsolete: NTTA-ESC-006(2)-2008, Electrical Service Center - Type MLG Enclosure, 400 Amp. ✓

**From:** Faruk, Omar  
**Sent:** Thursday, March 11, 2010 3:21 PM  
**To:** Allen, L'Don; Allen, Russell; Alsina, Paul; Amaladas, Aruldass; Amundson, Camille; Anderson, Cindi; Barekman, Joe; Berretz, John; Blaquiere, John; Bloshock, Mark; Bo Cung; Bokaie, Tony; Bolt, Barbara; Bouma, Mark; Branch, Latausha; Britton, Keith; Bruce Dinkheller; Brush, Scott; Campbell, Chris; Carrigan, Gerry; cblank; Chris Brook; Christmas, Ramona; Christopher Bergeron; Clarke, Dave; Claypool, Peter; Colin Blankenship; Davis, Cliff; Davis, John; dchapman; Dennis, Bryan; Ellis, Micki; Estridge, Jason; Farmer, Sue; Faruk, Omar; Federspiel, Troy; Fennell, Joseph; Franko, Donovan; frye@pbworld.com; Garrelts, Jim; ggarrett@hntb.com; Gill, Rocky; Graham, Doyle; Graham, Judy; Greenwade, Lynn; Griffin, James; Hagan, John; Halliday, Stephanie; Hancock, Craig; Hankins, Steve; Harbin, Gabe; Harden, Angela; Heimer, Wallace; Hernandez, Kim; Hicklen, Jerry; Holboke, Marty; Holly Becka; Huff, Eric; Ishmael, Ken; Ivie, Derek; Jackson, Kimberly; jcontreras@mbackercorp.com; Jenkins, Zenette; Jeremy Boswell; jfrye@hntb.com; Kasselmann, Terry; Kastendick, David; kelsey@openchannelsgroup.com; Knobbe, Stephen; Kwast, Aaron; lagraham@hntb.com; Larry Angeli; Latham, Tim; LaTonia Banks; Lehde, Amanda; Lopez, Sam; Lowe, Jason; Lucer, Pawel; Lucido, Tony; Madison, Karen; Mansoor Ahsan; Mark Baker; Matthews, Benjamin; McCombs, Jim; mcraig@halff.com; Michael Batuna; Michael Bauer; Michael Brown; Mow, Elizabeth; Muckle, Chad; Mueller, Gary; Musa, Basel; Negron, Carlos; Parsons, Darla; Pat Ellis; Paul, Adam; Paul, Pamela; Pavloff, Victor; Peloquin, Nancy; Piles, Jeremy; Plummer, Roxane; Pounds, Dave; Reilly, Tim; Reinhardt, Gary; Robbins, Rob; Robinson, Sherrie; Ross, Liza; Sanderfer, Reginald; Scharfenberger, Matt; Selensky, Les; Shahane, Arwind; Shakya, Anil; Shelton, Lori; Shidlofsky, Dana; Smith, Ed; Stokes, JD; Stuart, Jason; Swenson, Michael; Terranova, Paul; Thomas, Lisa; Tilley, Cynthia; Tom Diamond; Towner, Peggy; Wade Strong; Aanicoara@hntb.com; Amanda Lehde; asoliver@hntb.com; bhoney@hntb.com; Bobby Nagel; Bridges, Vicki; bswindell@hdrinc.com; chayes@hntb.com; Chris Hoff; Cole, Athena; Craig Phillips; Daniel Ruth; Danny Luu; Darla Payberah; Darrell Thompson; David Crysop; Debbie Neubert; Dennis Satre; dmann@hntb.com; Doyle Smith; enelsen@hntb.com; Enrique Guillen; Floyd Martinez; gary.reed@urscorp.com; greg.vowels@dannenbaum.com; Helen Tran; Hemphill, Eric; Hoffman, David; Howe, Clayton; Hutchison, Mike; jhoffman@hntb.com; Jim Reiser; Julie Morse; kahughes@hntb.com; Kelly Johnson; Krueger, Martin; Lamb, John; langston@bridgefarmer.com; LDWilson@pbsj.com; Leigh Hornsby; Lilah Ramey; mhannemann@maiengr.com; mmanesh@ltraengineers.com; mmatthews@hntb.com; mscruggs@hntb.com; muzair@hntb.com; Mvassigh@mv-engineering.com; Nina Paruchuri; noelle@vertex-eng.com; nsimon@hntb.com; Ozmer, Rusty; Phillip Hanley; psmith@rtg-texas.com; Rachel Hayden; rajesh.janarthan@aec.com; Ray, Jackie; ReddenL@Pbworld.com; Rick Hammerberg; Scott Pettit; Scott Yates; Shane Wade; shjackson@pbsj.com; singlish@hntb.com; slmccord@hntb.com; Smith, Rodney; smith@SE3.us; Starnater, Eric; Terry Watson; Thomas Hunt; Thomas.Martinez@hdrinc.com; tonya@openchannelsgroup.com; VanBaulen, Guy; vbridges@hntb.com; Waltman, Gerald; wcurtis@hntb.com; Wise, Tina; Woelfel, John; Wood, JC; Youngblood, Sherry

**Subject:** NTTA Standard Document Updates

### The following NTTA Standard Documents have been released:

Document #	Document Title	Originator	DRN#	Changes
NTTA-ESC-001-2009	Electrical Service Center - General Notes.	Darla Payberah	10086	Original Release
NTTA-ESC-002-2009	Electrical Service Center - Type S/E Enclosure.	Darla Payberah	10086	Original Release
NTTA-ESC-003(1-3)-2009	Electrical Service Center - Type MPE Enclosure.	Darla Payberah	10086	Original Release
NTTA-ESC-004(1-2)-2009	Electrical Service Center - Type R Enclosure, 100 Amp.	Darla Payberah	10086	Original Release
NTTA-ESC-005(1-2)-2009	Electrical Service Center - Type S Enclosure, 400 Amp.	Darla Payberah	10086	Original Release
NTTA-ESC-006(1-2)-2009	Electrical Service Center - Type MLG Enclosure, 400 Amp.	Darla Payberah	10086	Original Release
NTTA-ITS-006(1-2)-2009	CCTV Camera Pole Details - Precast Concrete Pole Drilled Shaft Foundation	Darla Payberah	10088	Original Release
RG-002(2)-2008	Ramp Gantry Foundation Details	Darla Payberah	10113	Revised coping and rail shape
RG-002(6)-2008	Ramp Gantry Tube Details	Darla Payberah	10113	Revised shear connectors to allow more room in gantry column for routing conduit
RG-002(8)-2008	Ramp Gantry Armature Assembly	Darla Payberah	10113	Added arm splices for ease of fabrication for hot dip galvanization
MLG-002(2)-2008	Mainlane Gantry Foundation Details	Darla Payberah	10114	Revised coping and rail shape.

MLG-002(8)-2008	Mainlane Gantry Armature Assembly	Darla Payberah	10114	Added arm splices for ease of fabrication for hot dip galvanization
-----------------	-----------------------------------	----------------	-------	---

The above documents are available at the following location:

T:\Standards and Specifications\NTTA Standards\NTTA Standards Current Release\Current Standards

**The following NTTA Standards are now obsolete:**

Document #	Document Title	Originator	DRN#	Changes
NTTA-ESC-001-2008	Electrical Service Center - General Notes.	Darla Payberah	10086	Obsolete
NTTA-ESC-002-2008	Electrical Service Center - Type S/E Enclosure	Darla Payberah	10086	Obsolete
NTTA-ESC-003(1-3)-2008	Electrical Service Center - Type MPE Enclosure	Darla Payberah	10086	Obsolete
NTTA-ESC-004(1-2)-2008	Electrical Service Center - Type R Enclosure, 100 Amp.	Darla Payberah	10086	Obsolete
NTTA-ESC-005(1-2)-2008	Electrical Service Center - Type S Enclosure, 400 Amp.	Darla Payberah	10086	Obsolete
NTTA-ESC-006(1-2)-2008	Electrical Service Center - Type MLG Enclosure, 400 Amp.	Darla Payberah	10086	Obsolete
NTTA-ITS-006(1-2)-2005	40'-0" to 60'-0" CCTV Camera Precast Conc Pole Details	Darla Payberah	10088	Obsolete

**PROPOSED STANDARDS REQUEST**

Design: Project Delivery  Maintenance  ITS

Anticipated Use: System Wide Use  Specific Tollway/Turnpike Use

County: All Project Number: N/A  
City: All Letting: N/A  
Highway: All

Proposed Standard (Title):  
NTTA-ESC-001, Electrical Service Center - General Notes; NTTA-ESC-002, Electrical Service Center - Type S/E Enclosure; NTTA-ESC-003(1-3), Electrical Service Center - Type MPE Enclosure; NTTA-ESC-004(1-2), Electrical Service Center - Type R Enclosure, 100 Amp; NTTA-ESC-005(1-2), - Type S Enclosure, 400 Amp; NTTA-ESC-006(1-2), Electrical Service Center - Type MLG Enclosure, 400 Amp.

Conditions that created the need for the New Standard:

**Implementation of Design Guidelines 2.0**

Is the Proposed Standard similar to a previously approved Standard? Yes  No

If yes, then list most recent **NTTA-ESC-2008 series**  
Standard: \_\_\_\_\_

Give a brief summary of content (if similar to previously approved standard, list changes and provide marked up copy):

**Electrical requirements, lessons learned and Design Guideline 2.0 created a need for new standards**

Submitted by: Gail A. Rodriguez Phone: 972-628-3024 Date: 12-31-09

Created by: Aguirre-Roden Phone: 972-789-9955 Date: 12-31-09

Approved By: \_\_\_\_\_ Date: \_\_\_\_\_

New Standard number  
**NTTA-ESC-001-2009**  
**NTTA-ESC-002-2009**  
**NTTA-ESC-003(1-3)-2009**  
**NTTA-ESC-004(1-2)-2009**  
**NTTA-ESC-005(1-2)-2009**  
**NTTA-ESC-006(1-2)-2009**

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by NTTA for any purpose whatsoever. NTTA assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

12/30/2009 H:\AAI-Proj\1109\3009-15 NTTA STANDARDS Update\ESC\2009\3PH\DGN\Sheet Files\ESC-001(1)-2009.dgn

**GENERAL NOTES:**

**GENERAL:**

1. SEE ILLUMINATION AND I.T.S. PLANS FOR CONDUIT LOCATIONS AND CONDUCTOR SIZES.
2. SEE PLAN SUMMARY TABLES FOR QUANTITIES OF DIFFERENT TYPES OF ELECTRICAL SERVICE CENTER ENCLOSURES.
3. ALL MATERIALS, EQUIPMENT, LABOR, AND INCIDENTALS, WHETHER OR NOT SPECIFICALLY SHOWN ON THE PLANS, WHICH MAY BE NECESSARY FOR A COMPLETE AND PROPER INSTALLATION OF THE ELECTRICAL ENCLOSURE SHALL BE FURNISHED, PERFORMED, AND INSTALLED BY THE CONTRACTOR.
4. ALL MATERIALS SHALL BE NEW AND IN GOOD CONDITION. ALL SERVICE ASSEMBLIES AND ELECTRICAL EQUIPMENT SHALL BE UNDERWRITERS LABORATORIES (UL) LISTED FOR THE INTENDED PURPOSE. THE INSTALLATION SHALL COMPLY WITH APPLICABLE PROVISIONS OF THE NATIONAL ELECTRICAL CODE (NEC) AND THE NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION (NEMA) STANDARDS.
5. FAULTY FABRICATION OR POOR WORKMANSHIP IN ANY MATERIAL, EQUIPMENT, OR INSTALLATION SHALL BE JUSTIFICATION FOR REJECTION.
6. MANUFACTURER'S WARRANTIES OR GUARANTEES SHALL BE UNDER THE AUTHORITY'S NAME. CONTRACTOR SHALL FURNISH THESE WARRANTIES OR GUARANTEES TO THE AUTHORITY UPON THE COMPLETION OF THE INSTALLATIONS.
7. THE ELECTRICAL ENCLOSURES SHALL BE PROTECTED BY FLEXIBLE OR RIGID BARRIER, OR SAFETY BOLLARDS. SEE PLANS FOR INFORMATION.

**SHOP DRAWING SUBMITTALS:**

8. THE CONTRACTOR SHALL INCLUDE PRODUCT SPECIFICATIONS AND CUT SHEETS IN THE SHOP DRAWING SUBMITTALS FOR REVIEW AND APPROVAL. SUBMITTALS SHALL BE LEGIBLE AND THE FURNISHED PRODUCT SHALL BE CLEARLY MARKED ON THE CUT-SHEET.

**FOUNDATIONS:**

9. FOUNDATION SHALL BE IN ACCORDANCE WITH ITEM 656, "FOUNDATION FOR TRAFFIC CONTROL DEVICES".
10. ANCHOR BOLTS SHALL BE ALLOY STEEL OR STAINLESS STEEL AND BE IN ACCORDANCE WITH ITEM 449, "ANCHOR BOLTS".
11. ALL REINFORCING STEEL SHALL BE IN ACCORDANCE WITH ITEM 440, "REINFORCING STEEL", GRADE 60.
12. MAXIMUM DIP OR RISE IN FOUNDATION SHALL NOT EXCEED 1/8 INCH PER FOOT. WHEN PROPERLY INSTALLED, TOP OF SERVICE ENCLOSURE SHALL BE LEVEL FRONT TO BACK AND SIDE TO SIDE WITHIN 1/4 INCH.
13. THE CONTRACTOR SHALL ENSURE THAT FINISHED GRADING PERMITS POSITIVE DRAINAGE AND THAT NO STANDING WATER WILL OCCUR AFTER CONSTRUCTION.

**ENCLOSURES:**

14. ALL EXPOSED ENCLOSURES SHALL BE TYPE 316 STAINLESS STEEL MEETING NEMA 3R SPECIFICATIONS, AND SHALL HAVE TWO (2) MINIMUM HEAVY-DUTY LIFTING EYES ANCHORED INTO THE REINFORCED TOP SERVING AS LIFTING DEVICES.
15. ALL ENCLOSURES INSIDE THE EXPOSED ENCLOSURE SHALL MEET NEMA 1 SPECIFICATIONS.
16. ALL FASTENERS AND MISCELLANEOUS HARDWARE USED IN THE ENCLOSURE SHALL BE STAINLESS STEEL UNLESS OTHERWISE NOTED ON THE PLANS.
17. EACH MAIN ENCLOSURE'S DOOR SHALL HAVE A CONTINUOUS STAINLESS STEEL PIANO HINGE WITH A STAINLESS STEEL PIN, A DOOR STOP, LEVER HANDLE, AND LOCKING MECHANISM WITH A 3/8-INCH MINIMUM HOLE FOR A PADLOCK.
18. THE ENCLOSURE'S DOOR(S) SHALL BE CAPABLE OF OPENING AT LEAST 130 DEGREES WITH ARM(S) OR OTHER APPROVED MEANS TO HOLD THE DOOR(S) OPEN.
19. ENCLOSURES AT EACH SITE SHALL BE KEYED ALIKE. THIS SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
20. ALL ENCLOSURES SHALL BE LABELED WITH TAGS MADE OF LINEN PHENOLIC MATERIAL, GRADE LE. TAGS SHALL BE SECURED WITH FOUR (4) STAINLESS STEEL SCREWS, ONE AT EACH CORNER.
21. THE FOLLOWING INFORMATION SHALL BE INCLUDED ON THE TAG FOR ALL ENCLOSURES UNLESS OTHERWISE NOTED:

- A. "DANGER HIGH VOLTAGE" - COLOR BACKGROUND AND TEXT SIZE SHALL MEET OSHA'S REQUIREMENTS,

21. (CONT.)

- B. ARC FLASH - COLOR BACKGROUND AND TEXT SIZE SHALL MEET OSHA'S REQUIREMENTS. THE WARNING LABEL WILL HAVE THE FOLLOWING TEXT: "DANGER ARC FLASH AND SHOCK HAZARD / APPROPRIATE PPE PROTECTION REQUIRED / FOLLOW ALL SAFETY PROCEDURES AND WEAR PROPER PPE PROTECTION IN ACCORDANCE WITH NFPA 70E. FAILURE TO COMPLY CAN RESULT IN SERIOUS INJURY OR DEATH"
  - C. STREET ADDRESS FOR SERVICE ENTRANCE ENCLOSURE ONLY - 2-INCH BLACK ENGRAVED LETTERING ON YELLOW BACKGROUND,
  - D. ELECTRICAL SERVICE CENTER NAME - 2-INCH BLACK ENGRAVED LETTERING ON YELLOW BACKGROUND,
  - E. ELECTRICAL SERVICE IDENTIFIER (ESI) NUMBER FOR SERVICE ENTRANCE ENCLOSURE ONLY - 1-INCH BLACK ENGRAVED LETTERING ON YELLOW BACKGROUND,
  - F. GLOBAL POSITIONING SYSTEM (GPS) LOCATION - 1-INCH BLACK ENGRAVED LETTERING ON YELLOW BACKGROUND,
22. A 12" X 12" MINIMUM DOCUMENT POCKET, CONSTRUCTED OF METAL, SHALL BE MOUNTED ON THE BACK OF EACH ENCLOSURE'S DOOR. THE CONTRACTOR SHALL PREPARE AND SUBMIT A ONE LINE SCHEMATIC DRAWING UNIQUE TO AN INDIVIDUAL ENCLOSURE. THE APPROVED DRAWING SHALL BE LAMINATED AND PLACED IN THE DOCUMENT POCKET OF THE ENCLOSURE AT THE TIME OF SHIPMENT TO THE JOB SITE.
  23. ALL APPLICABLE WIRING DIAGRAMS AND PLAN SHEET LAYOUTS FOR ALL EQUIPMENT AND BRANCH CIRCUITS SUPPLIED BY THAT ENCLOSURE SHALL ALSO BE LAMINATED AND PLACED IN THE DOCUMENT POCKET PRIOR TO ACCEPTANCE.
  24. ENCLOSURE SHALL INCLUDE A REMOVABLE BACKBOARD PANEL INSTALLED INSIDE THE ENCLOSURE ON COLLAR STUDS OR TAPPED BOSSES.
  25. GROUNDING BUS BAR ASSEMBLY SHALL BE FACTORY PROVIDED, SIZED, AND PERMANENTLY BONDED TO ACCEPT REQUIRED GROUNDING CONDUCTORS UTILIZING PROPERLY SIZED LUGS. GROUNDING BUS BAR KIT SHALL INCLUDE ONE (1) 1/4-INCH THICK COPPER BUS BAR WITH PRE-PUNCHED OR TAPPED HOLES FOR 3/8-INCH BOLTS, AND FOUR (4) 1-INCH STANDOFFS.
  26. ALL CONDUITS AND CONDUCTORS ATTACHED TO AND WITHIN 24 INCHES OF THE ENCLOSURE WILL NOT BE PAID FOR DIRECTLY, BUT SHALL BE SUBSIDIARY TO ITEM 628.
  27. ALL EQUIPMENT USED INSIDE A SPECIFIC TYPE OF ENCLOSURE SHALL BE MANUFACTURED BY THE SAME COMPANY UNLESS OTHERWISE NOTED ON THE PLANS. ENCLOSURE AND ASSOCIATED COMPONENTS SHALL BE PRE-ASSEMBLED AND SHIPPED AS A COMPLETE UNIT.
  28. THE BOTTOM OF ENCLOSURES SHALL BE SEALED WITH BACKER ROD AND UNI-WEATHER SOLVENT BASED SEALANT APPROVED BY THE NTTA.

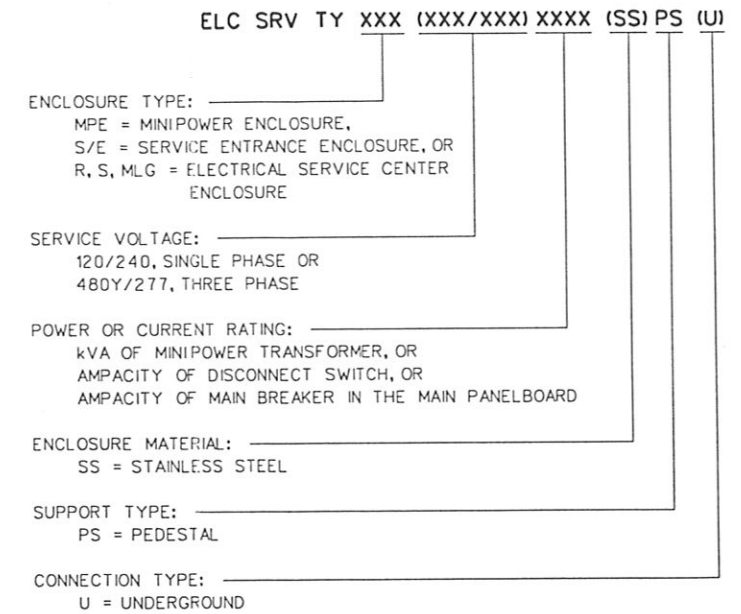
**CONDUITS AND CONDUCTORS:**

29. ALL EXPOSED CONDUITS SHALL BE GALVANIZED RIGID STEEL AND ALL UNDERGROUND CONDUITS SHALL BE PVC SCHEDULE 40 UNLESS OTHERWISE NOTED.
30. STUB-UPS SHALL BE PVC COATED GALVANIZED RIGID STEEL.
31. ALL CONDUIT ELBOWS USED FOR UNDERGROUND INSTALLATION SHALL BE PVC COATED GALVANIZED RIGID STEEL.
32. ALL PVC COATED GALVANIZED RIGID STEEL CONDUITS AND FITTINGS SHALL BE UL LISTED, AND FREE OF BLISTERS, BUBBLES, OR PINHOLES. GALVANIZED RIGID STEEL CONDUITS AND FITTINGS SHALL BE COATED UNIFORMLY AND CONSISTENTLY WITH PVC COATING, 40-MILS THICK ON THE EXTERIOR SURFACE AND URETHANE COATING, 2-MILS THICK ON THE INTERIOR SURFACE AND SHALL BE ETL LABELED. PROVIDE MATERIALS MANUFACTURED BY PLASTI-BOND, PERMA-COTE, KORKAP, OR APPROVED EQUALS.
33. PROVIDE GROUNDING BUSHINGS ON METAL CONDUITS.
34. NO CONDUIT ENTRIES ARE ALLOWED THROUGH THE TOP OF THE ENCLOSURE.
35. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH 5/8-INCH POLYESTER, 1800 LB PULL TAPE.
36. ALL CONDUCTORS SHALL BE XHHW-2 UNLESS OTHERWISE NOTED.
37. UNDERGROUND CONDUITS SHALL BE INSTALLED 24" MINIMUM BELOW FINISHED GRADE.

**GROUNDING:**

38. GROUNDING CONDUCTORS SHALL BE SIZED PER NEC OR AS INDICATED, WHICHEVER IS LARGER.
39. GROUNDING ROD SHALL BE LOCATED INSIDE ALL ENCLOSURES. GROUNDING SHALL CONFORM TO NEC REQUIREMENTS, OR AS INDICATED, WHICHEVER IS MORE STRINGENT.

**EXPLANATION OF ELECTRICAL ENCLOSURE DESCRIPTIVE CODE**



**ABBREVIATIONS:**


- A/C - AIR CONDITIONING UNIT MOUNTING ON THE ENCLOSURE
- A.V.I. - AUTOMATIC VEHICLE IDENTIFICATION
- CCTV - CLOSED CIRCUIT TELEVISION
- DMS - DYNAMIC MESSAGE SIGN
- I.T.S. - INTELLIGENT TRANSPORTATION SYSTEMS
- MDP - MAIN DISTRIBUTION PANELBOARD
- NEC - NATIONAL ELECTRICAL CODE
- NEMA - NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
- NFPA - NATIONAL FIRE PROTECTION ASSOCIATION
- OSHA - OCCUPATIONAL SAFETY AND HEALTH ADMINISTRATION
- PPE - PERSONAL PROTECTIVE EQUIPMENT
- PVC - POLYVINYL CHLORIDE
- GRS - GALVANIZED RIGID STEEL
- TxDOT - TEXAS DEPARTMENT OF TRANSPORTATION

40. CONTRACTOR SHALL PROVIDE RESISTANCE TO GROUND TEST; MAX RESISTANCE SHALL BE NO MORE THAN 25 OHMS. TEST REPORTS SHALL BE INCLUDED IN THE OPERATIONS/MAINTENANCE (O&M) MANUAL, ADDITIONALLY ONE COPY OF THE REPORT WILL BE LAMINATED AND PLACED IN THE EQUIPMENT DOCUMENT POCKET.

**EQUIPMENT ARCH FLASH LABELS:**

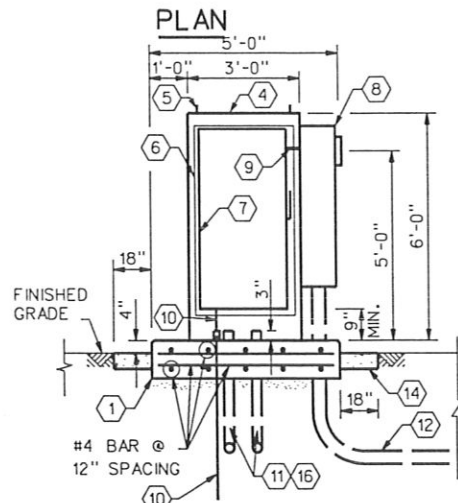
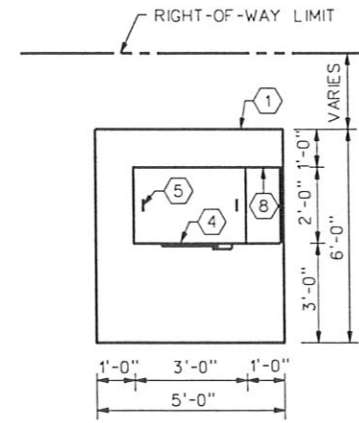
41. CONTRACTOR SHALL ENGAGE A QUALIFIED AGENCY TO PERFORM ARC FLASH HAZARD ANALYSIS STUDY AND INSTALL ASSOCIATED WARNING LABELS FOR ALL ENERGIZED ELECTRICAL EQUIPMENT.

**DRAFT**

NO.	DATE	REVISION	APPROV.
 NORTH TEXAS TOLLWAY AUTHORITY			
<b>ELECTRICAL SERVICE CENTER GENERAL NOTES</b>			
ESC-001(1)-2009			
DRAWN	IEL	DATE 12-30-09	DESIGNED
CHECKED	RW	DATE 12-30-09	SCALE
		DATE 12-30-09	NTS
CONTRACT NO.		SHEET ____ OF ____	

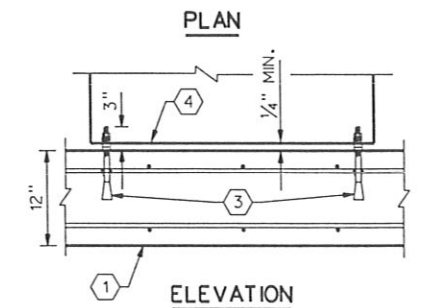
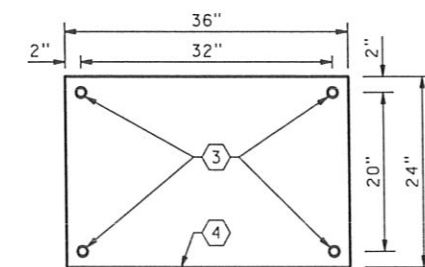
**KEYED NOTES (ELECTRICAL SERVICE CENTER TYPE S/E):**

- 1 12-INCH THICK SERVICE PAD/FOUNDATION.
- 2 6-INCH THICK WALL WHEN TRANSVERSE OR LONGITUDINAL SLOPE IS STEEPER THAN 20:1. THE WALL IS SUBSIDIARY TO ITEM 628.
- 3 STAINLESS STEEL HEX NUT, LOCK WASHER, FLAT WASHER, AND CONCRETE WEDGE ANCHORS. USE 3/4-INCH DIA. CONCRETE WEDGE ANCHORS WITH 6-INCH MINIMUM EMBEDMENT IN THE CONCRETE. TYPICAL.
- 4 ELECTRICAL SERVICE CENTER (ESC) ENCLOSURE TYPE S/E. 72"Hx36"Wx24"D ENCLOSURE, 12 GAUGE, TYPE 316 STAINLESS STEEL, NEMA 3R ENCLOSURE OR BETTER. ENCLOSURE SHALL HAVE A SINGLE-DOOR, DOOR HANDLE, PADLOCK PROVISION, LIFTING DEVICES, AND TWO LOUVER PLATES MOUNTED ON THE DOOR FOR VENTILATION. THE TOP LOUVER PLATE SHALL BE LOCATED 6-INCH FROM THE TOP OF THE DOOR AND THE BOTTOM LOUVER PLATE SHALL BE LOCATED 6-INCH FROM THE BOTTOM OF THE DOOR. EACH LOUVER PLATE ASSEMBLY SHALL HAVE A MINIMUM AREA OF 18"Wx9"H WITH AT LEAST 6 LOUVERS AND A STAINLESS STEEL 18X14 INSECT SCREEN MESH MADE OF 0.011-INCH DIAMETER WIRE. SEE PLANS FOR LOCATION.
- 5 LIFTING DEVICE.
- 6 MOUNTING PANEL OR BACKBOARD PANEL. 62"Hx32"W TYPICAL.
- 7 HEAVY DUTY TYPE SERVICE ENTRANCE RATED DISCONNECT SWITCH, 480 VAC, 3-PHASE, 4-WIRE, NEMA 1 ENCLOSURE, SINGLE THROW FUSIBLE. SEE ILLUMINATION AND/OR I.T.S. PLANS FOR REQUIRED AMPACITY. WHEN AN EMERGENCY GENERATOR IS REQUIRED, A SIGN SHALL BE PLACED PER THE NEC INDICATING KW, VOLTS, PHASE, FUEL TYPE AND LOCATION OF ONSITE EMERGENCY GENERATOR SOURCE.
- 8 480 VAC METERING, 3-PHASE, 4-WIRE. ALL MOUNTING HARDWARE AND INSTALLATION OF THE METERING SHALL BE IN ACCORDANCE WITH UTILITY PROVIDER SPECIFICATIONS. CONTACT UTILITY PROVIDER FOR THE LATEST REQUIREMENTS.
- 9 CONDUCTORS. SIZE VARIES AS SHOWN ON PLANS. PARALLEL 2 X 3/0 AWG MINIMUM.
- 10 GROUNDING SYSTEM SHALL INCLUDE, 3/4" DIA. x 10 LF COPPER-CLAD STEEL GROUND ROD LOCATED INSIDE ENCLOSURE AND GROUNDING CONDUCTOR.
- 11 TWO (2) 3-INCH SCHEDULE 40 PVC CONDUITS AND XHHW-2 CONDUCTORS CONNECTING THE SERVICE ENTRANCE RATED DISCONNECT SWITCH AND THE MAIN DISTRIBUTION PANELBOARD MDP AT THE ELECTRICAL SERVICE CENTER ENCLOSURE. CONDUCTORS IN EACH CONDUIT SHALL BE 3/0 AWG MINIMUM. CONDUITS AND CONDUCTORS SHALL BE INCREASED IN SIZE AS REQUIRED TO ACCOMMODATE VOLTAGE DROP FOR REMOTE ELECTRICAL SERVICE CENTER LOCATION. SEE ILLUMINATION AND/OR I.T.S. PLANS FOR CONDUIT AND CONDUCTORS SIZES, AND LOCATION OF ELECTRICAL SERVICE CENTER ENCLOSURE. CONDUITS AND CONDUCTORS WILL BE PAID FOR IN ACCORDANCE WITH ITEMS 618 AND 620.
- 12 TWO (2) 3-INCH SCHEDULE 40 PVC CONDUITS CONNECTING THE METER AND THE UTILITY SERVICE POINT. CONDUITS WILL BE PAID FOR IN ACCORDANCE WITH ITEM 618. CONDUCTORS MAY BE PROVIDED BY UTILITY PROVIDER. CONTRACTOR SHALL COORDINATE WORK WITH UTILITY PROVIDER. SEE ILLUMINATION AND/OR I.T.S. PLANS FOR LOCATION OF UTILITY SERVICE POINT.
- 13 ELECTRICAL SERVICE CENTER ENCLOSURE. SEE PLANS FOR PROPER TYPE.
- 14 5-INCH THICK CONCRETE RIPRAP/APRON REINFORCED WITH #3 BARS AT 18-INCH ON CENTER EACH WAY. THE RIPRAP/APRON IS SUBSIDIARY TO VARIOUS BID ITEMS.
- 15 TWO (2) 3-INCH SCHEDULE 40 PVC CONDUITS AND XHHW-2 CONDUCTORS CONNECTING THE SERVICE ENTRANCE RATED DISCONNECT SWITCH AND THE MAIN DISTRIBUTION PANELBOARD MDP AT THE ELECTRICAL SERVICE CENTER ENCLOSURE. CONDUCTORS IN EACH CONDUIT SHALL BE 3/0 MINIMUM. CONDUITS AND CONDUCTORS WILL BE SUBSIDIARY TO ITEM 628. SEE ILLUMINATION AND/OR I.T.S. PLANS FOR CONDUIT AND CONDUCTORS SIZES, AND LOCATION OF ELECTRICAL SERVICE CENTER ENCLOSURE.
- 16 AN EMERGENCY GENERATOR IS REQUIRED FOR AN ELECTRICAL SERVICE CENTER (ESC) TYPE MLG. REFER TO THE PLANS FOR LOCATION OF THE AUTOMATIC TRANSFER SWITCH (ATS). TWO (2) 3-INCH SCHEDULE 40 PVC CONDUITS AND XHHW-2 CONDUCTORS CONNECTING THE SERVICE ENTRANCE RATED DISCONNECT SWITCH AND THE ATS SHALL TERMINATE AT THE ATS LOCATION. PROVIDE 10 FEET OF ADDITIONAL XHHW-2 CONDUCTORS COILED AND SECURED AT THE ATS CONDUIT STUB UP LOCATION. GENERATOR AND ATS WILL BE PAID FOR IN ACCORDANCE WITH ITEM 858. CONDUCTORS IN EACH CONDUIT SHALL BE 3/0 MINIMUM. CONDUITS AND CONDUCTORS WILL BE SUBSIDIARY TO ITEM 628 WHEN ESC TYPE S/E ENCLOSURE IS ADJACENT TO ESC TYPE MLG. CONDUITS AND CONDUCTORS WILL BE PAID FOR IN ACCORDANCE WITH ITEM 618 AND 620 WHEN ESC TYPE S/E ENCLOSURE IS REMOTE FROM ESC TYPE MLG. SEE ILLUMINATION AND/OR I.T.S. PLANS FOR CONDUIT AND CONDUCTORS SIZES, AND LOCATION OF ELECTRICAL SERVICE CENTER ENCLOSURE.

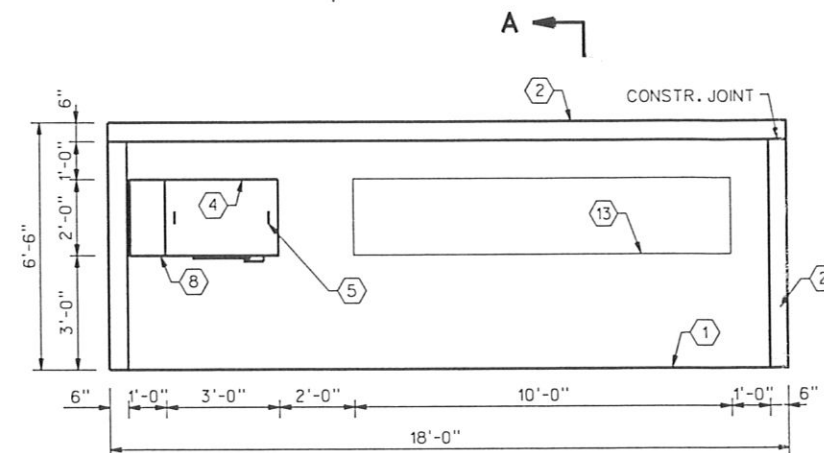
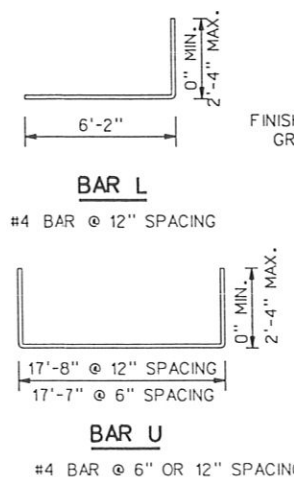


**ELEVATION  
REMOTE SERVICE ENTRANCE  
ENCLOSURE DETAILS**

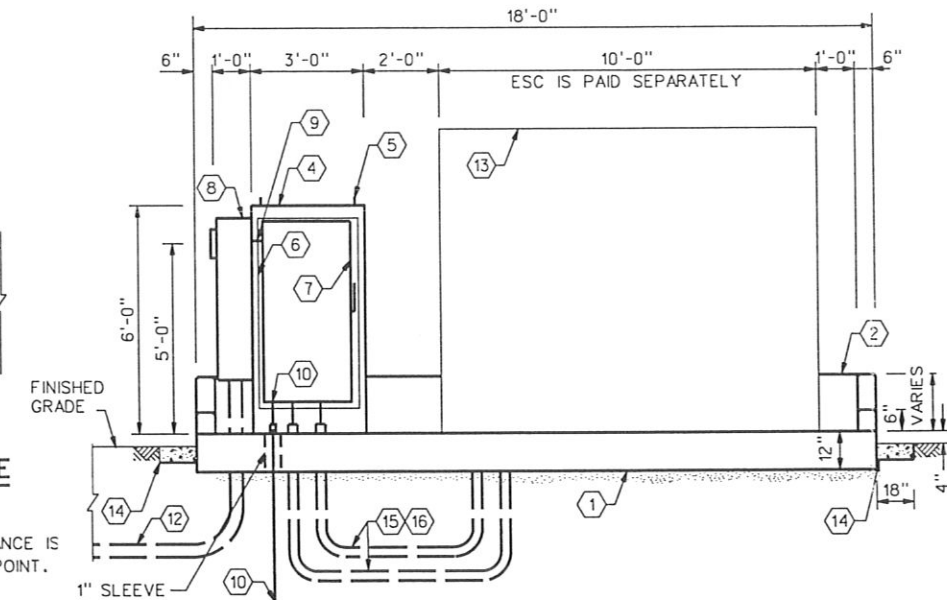
USE THIS DETAIL WHEN THE SERVICE ENTRANCE IS LOCATED NEXT TO THE UTILITY SERVICE POINT.



**ELEVATION  
CONCRETE ANCHORING DETAILS**



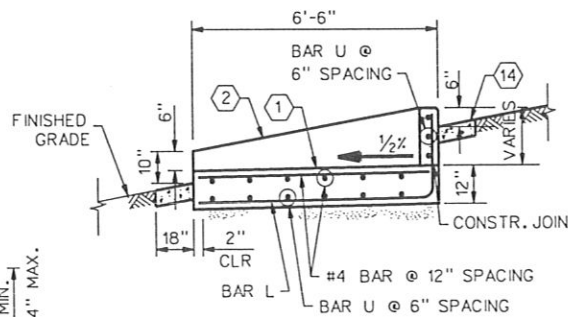
**PLAN A**



**ELEVATION**

**LOCAL SERVICE ENTRANCE ENCLOSURE DETAILS**

USE THIS DETAIL WHEN THE SERVICE ENTRANCE IS LOCATED NEXT TO THE ELECTRICAL SERVICE CENTER ENCLOSURE




**SECTION A-A - BAR DETAILS**

NOTE: ENCLOSURES ARE NOT SHOWN FOR CLARITY

**GENERAL NOTES:**

- 1. TYPE S/E SERVICE ENTRANCE ENCLOSURE WILL BE PAID FOR UNDER ITEM 628 AT THE UNIT PRICE BID FOR: "ELC SRV TY S/E (480)400(AISSIPS(U))".
- 2. TYPE S/E SERVICE ENTRANCE ENCLOSURE WILL BE REQUIRED FOR NEW ELECTRICAL SERVICE CENTER (ESC). THE SERVICE ENTRANCE ENCLOSURE MAY BE LOCATED ADJACENT TO THE ESC OR AT THE REMOTE LOCATION AS SHOWN ON PLANS.
- 3. SEE NTA ESC-001 FOR GENERAL NOTES INFORMATION.
- 4. SEE NTA ESC 004, 005, AND 006 STANDARDS FOR ELECTRICAL SERVICE CENTER DETAILS.
- 5. CONDUITS SHALL BE IN ACCORDANCE WITH ITEM 618.
- 6. CONDUCTORS SHALL BE IN ACCORDANCE WITH ITEM 620.
- 7. SERVICE PAD/FOUNDATION SHALL BE IN ACCORDANCE WITH ITEM 656. PROVIDE CLASS "C" CONCRETE.
- 8. RIPRAP SHALL BE IN ACCORDANCE WITH ITEM 432.
- 9. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
- 10. DO NOT LOCATE THE ELECTRICAL SERVICE CENTER S/E ENCLOSURE IN A FLOW LINE OF A DITCH.
- 11. DO NOT LOCATE THE ELECTRICAL SERVICE CENTER S/E ENCLOSURE IN AN AREA WHERE TRANSVERSE SLOPE IS STEEPER THAN 4:1.
- 12. MINIMUM BAR LAPPING = 1'-6".
- 13. PLACE 2 INCHES (2") MINIMUM SAND BED UNDERNEATH THE ENCLOSURE'S PAD.

**DRAFT**

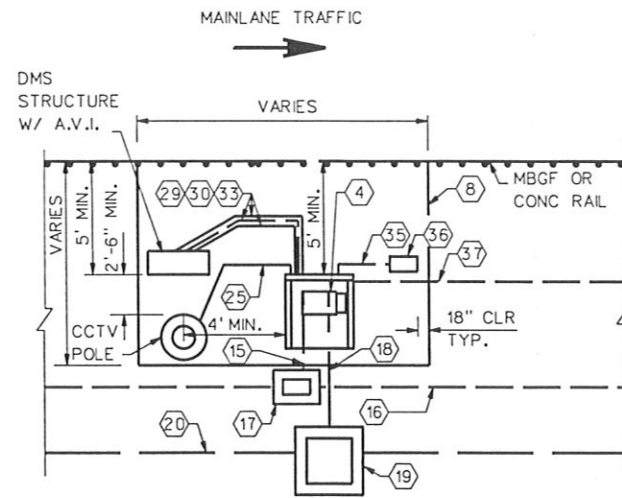
NO.	DATE	REVISION	APPROV.
 NORTH TEXAS TOLLWAY AUTHORITY			
<b>ELECTRICAL SERVICE CENTER TYPE S/E ENCLOSURE</b>			
ESC-002(1)-2009			
DRAWN	IEL	DATE 12-30-09	DESIGNED IEL DATE 12-30-09
CHECKED	RW	DATE 12-30-09	SCALE NTS
CONTRACT NO.		SHEET ___ OF ___	

DISCLAIMER: This standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by NITA for any purpose whatsoever. NITA assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

12/30/2009 H:\AAI-Proj\1109\3009-15 NTA STANDARDS Update\ESC\2009\3PH\Sheet Files\ESC-002(1)-2009.dgn

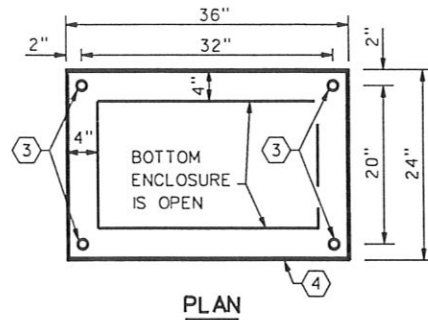
DISCLAIMER  
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by NTA for any purpose, whatsoever. NTA assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

12/30/2009  
H:\AAI-Proj\1109\3009-15 NTA STANDARDS Update\ESC\2009\3PH\DGN\Sheet Files\ESC-003(1)-2009.dgn

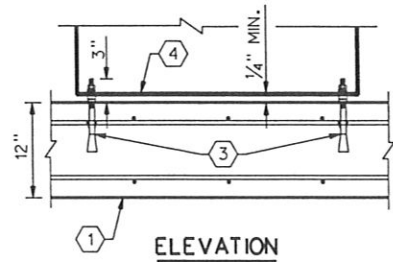


TYPICAL LAYOUT

SEE NTA ESC-003, SHEET 3 OF 3 FOR ADDITIONAL SITE LAYOUTS.

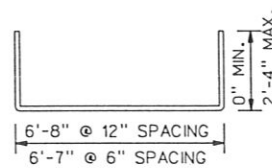


PLAN



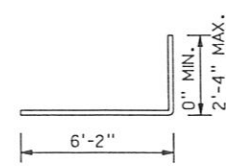
ELEVATION

CONCRETE ANCHORING DETAILS



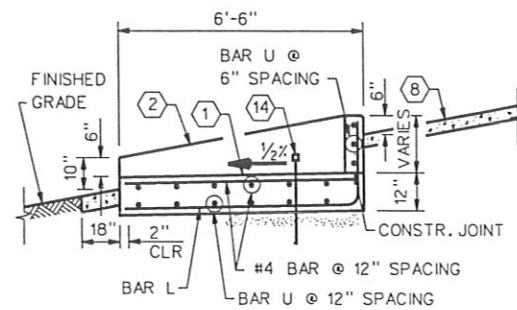
BAR U

#4 BAR @ 6" OR 12" SPACING

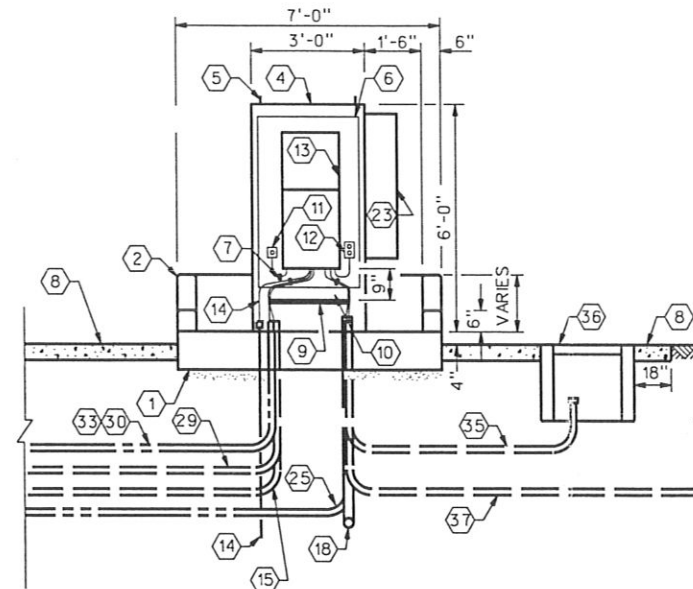


BAR L

#4 BAR @ 12" SPACING

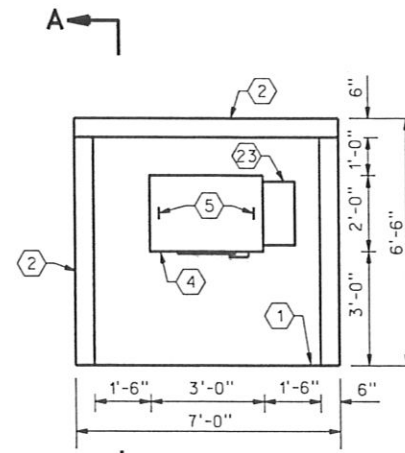


SECTION A-A - BAR DETAILS

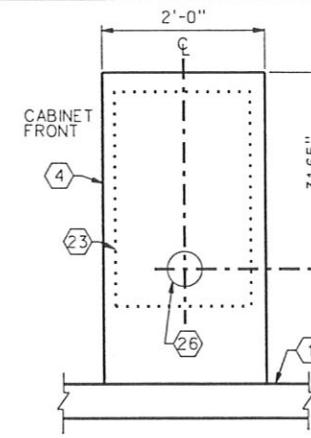


ELEVATION

SEE NTA ESC-003, SHEET 3 OF 3 FOR ADDITIONAL ESC ENCLOSURE CONFIGURATIONS.



PLAN



CCTV ENCLOSURE  
(SIDE VIEW)  
OPENING DETAIL

GENERAL NOTES:

1. TYPE MPE ELECTRICAL SERVICE CENTER ENCLOSURE PROVIDES POWER FOR I.T.S., LANDSCAPING, AND OTHER EQUIPMENT AS REQUIRED.
2. TYPE MPE ELECTRICAL SERVICE CENTER ENCLOSURE WILL BE PAID FOR UNDER ITEM 628 AT THE UNIT PRICE BID FOR:  
"ELC SRV TY MPE (120/240)10KVA(SS)PS(U)", OR  
"ELC SRV TY MPE (120/240)15KVA(SS)PS(U)".
3. SEE NTA ESC-003, SHEET 2 OF 3 FOR KEYED NOTES AND CONDUIT BLOCKOUT DETAILS.
4. SEE NTA ESC-001 FOR GENERAL NOTES INFORMATION.
5. SEE NTA ESC 004, 005, AND 006 STANDARDS FOR PROPER ELECTRICAL SERVICE CENTER ENCLOSURE DETAILS.
6. SEE NTA ITS-002 FOR TYPE FO GROUND BOX DETAILS.
7. SEE TXDOT ED (3) FOR TYPE D GROUND BOX DETAILS.
8. CONDUITS SHALL BE IN ACCORDANCE WITH ITEM 618.
9. CONDUCTORS SHALL BE IN ACCORDANCE WITH ITEM 620.
10. SERVICE PAD/FOUNDATION SHALL BE IN ACCORDANCE WITH ITEM 656. PROVIDE CLASS "C" CONCRETE.
11. RIPRAP SHALL BE IN ACCORDANCE WITH ITEM 432.
12. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
13. OMIT 6" THICK WALL WHEN THE ELECTRICAL SERVICE CENTER MPE ENCLOSURE IS LOCATED ON TRANSVERSE OR LONGITUDINAL SLOPE 20:1 OR FLATTER.
14. DO NOT LOCATE THE ELECTRICAL SERVICE CENTER MPE ENCLOSURE IN A FLOW LINE OF A DITCH.
15. DO NOT LOCATE THE ELECTRICAL SERVICE CENTER MPE ENCLOSURE IN AN AREA WHERE TRANSVERSE SLOPE IS STEEPER THAN 4:1.
16. MINIMUM BAR LAPPING = 1'-6".
17. PLACE 9 INCHES (9") MINIMUM GRAVEL BED UNDERNEATH ALL GROUND BOXES.
18. PLACE 2 INCHES (2") MINIMUM SAND BED UNDERNEATH THE ENCLOSURE'S PAD.
19. BRANCH CIRCUIT DIAGRAM SHALL INCLUDE THE LOCATION AND NAME OF THE ELECTRICAL SERVICE CENTER SUPPLYING THE POWER TO THE MPE ENCLOSURE.

MINI-POWER PANELBOARD LAYOUT


KVA RATING	TRANSFORMER CIRCUIT BREAKER			
	PRIMARY		SECONDARY	
10	30A		60A	
15	60A		80A	

10 KVA OR 15 KVA MINIPOWER				
LOAD DESCRIPTION	CT #	PHASE	CT #	LOAD DESCRIPTION
20A/1P SPARE	1	A	2	20A/1P GFCI RECEPTACLE
20A/1P 1.5KVA UPS RECEPTACLE	3	B	4	20A/1P IRRIGATION OR SPARE
20A/1P SPARE	5	A	6	20A/1P SPARE
40A/2P DMS OR	7	B	8	20A/1P SPARE
2-20A/1P CCTV & AVI OR SPARE	9	A	10	20A/1P SPARE

- NOTES:
1. ALL LOADS REQUIRE SEPERATE NEUTRALS.
  2. ALL BREAKERS SHALL BE GFCI BREAKERS
  3. 10 KVA WILL SERVE CCTV & A.V.I.
  4. 15 KVA WILL SERVE A.V.I., DMS, & CCTV; DMS & A.V.I.; OR SINGLE DMS.
  5. PROVIDE ADDITIONAL 20A, 1P BREAKERS FOR 15KVA MINIPOWER PANELBOARD AVAILABLE SPACES

DRAFT

NO.		DATE		REVISION		APPROV.	
 NORTH TEXAS TOLLWAY AUTHORITY							
<b>ELECTRICAL SERVICE CENTER TYPE MPE ENCLOSURE</b>							
ESC-003(1)-2009							
DRAWN	IEL	DATE	12-30-09	DESIGNED	IEL	DATE	12-30-09
CHECKED	RW	DATE	12-30-09	SCALE			NTS
CONTRACT NO. _____				SHEET _____ OF _____			



DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by NTTA for any purpose whatsoever. NTTA assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

12/30/2009 H:\AAI-Proj\1109\3009-15 NTTA STANDARDS Update\ESC\2009\3PH\DGN\Sheet Files\ESC-003(2)-2009.dgn

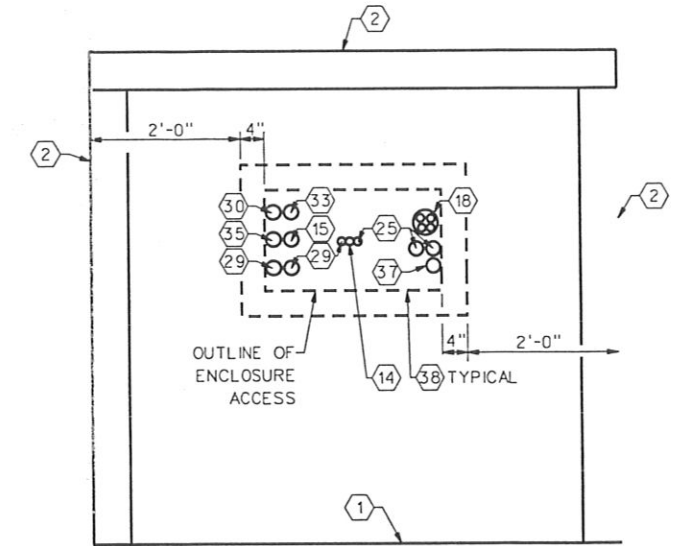
**KEYED NOTES (ELECTRICAL SERVICE CENTER TYPE MPE):**

- ① 12-INCH THICK SERVICE PAD/FOUNDATION.
- ② 6-INCH THICK WALL WHEN TRANSVERSE OR LONGITUDINAL SLOPE IS STEEPER THAN 20:1. THE WALL IS SUBSIDIARY TO ITEM 628.
- ③ STAINLESS STEEL HEX NUT, LOCK WASHER, FLAT WASHER, AND CONCRETE WEDGE ANCHORS. USE 3/4-INCH DIA. CONCRETE WEDGE ANCHORS WITH 6-INCH MINIMUM EMBEDMENT IN THE CONCRETE. TYPICAL.
- ④ ELECTRICAL SERVICE CENTER (ESC) ENCLOSURE TYPE MPE. 36"Wx72"Hx24"D ENCLOSURE, 12 GAUGE, TYPE 316 STAINLESS STEEL, NEMA 3R ENCLOSURE. ENCLOSURE SHALL HAVE A SINGLE-DOOR, DOOR HANDLE, PADLOCK PROVISION, LIFTING DEVICES, AND TWO LOUVER PLATES MOUNTED ON THE DOOR FOR VENTILATION. THE TOP LOUVER PLATE SHALL BE LOCATED 6-INCH FROM THE TOP OF THE DOOR AND THE BOTTOM LOUVER PLATE SHALL BE LOCATED 6-INCH FROM THE BOTTOM OF THE DOOR. EACH LOUVER PLATE ASSEMBLY SHALL HAVE A MINIMUM AREA OF 18"Wx9"H WITH AT LEAST 6 LOUVERS AND A STAINLESS STEEL 18X14 INSECT SCREEN MESH MADE OF 0.011-INCH DIAMETER WIRE. SEE I.T.S. PLANS FOR LOCATION. EACH SIDE OF THE ENCLOSURE FRAME SHALL BE DESIGNED TO SUPPORT AN ADDITIONAL LOAD OF UP TO 500 LBS FOR THE MOUNTING OF CCTV ENCLOSURE OR A.V.I. TRAVEL TIME SENSOR/DMS ENCLOSURE WHEN REQUIRED BY THE PLANS.
- ⑤ LIFTING DEVICE.
- ⑥ MOUNTING PANEL OR BACKBOARD PANEL, 32"Wx 54"H TYPICAL.
- ⑦ METAL DISTRIBUTION RINGS TYPICAL, "D" TYPE. SIZE VARIES.
- ⑧ 5-INCH THICK CONCRETE RIPRAP/APRON REINFORCED WITH #3 BARS AT 18-INCH ON CENTER EACH WAY. THE RIPRAP/APRON IS SUBSIDIARY TO VARIOUS BID ITEMS.
- ⑨ 24"Wx18"Dx 1"MIN. THICK STAINLESS STEEL SHELF WITH BACK SUPPORT. SHELVING MATERIAL SHALL BE TYPE 304 STAINLESS STEEL SHEETING, 12 GAUGE.
- ⑩ 1.5 KVA UNINTERRUPTIBLE POWER SUPPLY (UPS) UNIT FURNISHED AND INSTALLED BY THE NTTA.
- ⑪ 15A, NEMA L5-15, SINGLE TWIST-LOCK RECEPTACLE, CAST ALUMINUM BOX WITH NEMA 1 COVER. USE #10 XHHW-2 CONDUCTORS.
- ⑫ 20A/120V DUPLEX GROUND FAULT INTERRUPTER CIRCUIT, GFCI, RECEPTACLE, CAST ALUMINUM BOX WITH NEMA 1 COVER. USE #12 AWG XHHW-2 CONDUCTORS.
- ⑬ 10 KVA, OR 15 KVA MINIPOWER ENCLOSURE, SINGLE-PHASE, NEMA 1 ENCLOSURE. THIS DRY-TYPE TRANSFORMER CONVERTS 480 VAC TO 120/240 VAC SERVING 3 WIRE PANELBOARD SECTION. SEE I.T.S. PLANS FOR PROPER SIZE.
- ⑭ GROUNDING SYSTEM SHALL INCLUDE 3/4" DIA. x 10 LF COPPER-CLAD STEEL GROUND ROD AND MINIPOWER ENCLOSURE TRANSFORMER GROUND CONDUCTOR SIZED PER NEC, OR AS INDICATED, WHICHEVER IS LARGER.
- ⑮ 2-INCH SCHEDULE 40 PVC CONDUIT AND XHHW-2 CONDUCTORS CONNECTING THE GROUND BOX, TYPE D, AND THE MINIPOWER ENCLOSURE. SEE I.T.S. PLANS FOR CONDUCTOR'S SIZE. CONDUIT, CONDUCTORS AND GROUND BOX ARE SUBSIDIARY TO ITEM 628.
- ⑯ 2-INCH SCHEDULE 40 PVC CONDUIT AND XHHW-2 CONDUCTORS CONNECTING THE ELECTRICAL SERVICE CENTER I.T.S. PANELBOARD TO THE MINIPOWER ENCLOSURE. SEE I.T.S. PLANS FOR CONDUCTOR'S SIZE.
- ⑰ GROUND BOX WITH APRON, TYPE D. SEE I.T.S. PLANS FOR LOCATION. GROUND BOX WILL BE PAID IN ACCORDANCE TO ITEM 624.
- ⑱ FIBER OPTIC LATERAL, MULTIDUCT CONDUIT (PVC) (4-1.25 INCH INNERDUCT) CONNECTING THE FIBER OPTIC GROUND BOX, TYPE FO (484860) AND THE MINIPOWER ENCLOSURE. SEE I.T.S. PLANS FOR LOCATION. MULTIDUCT IS SUBSIDIARY TO ITEM 628.
- ⑲ FIBER OPTIC GROUND BOX WITH APRON, TYPE FO (484860). SEE I.T.S. PLANS FOR LOCATION. FIBER OPTIC GROUND BOX WILL BE PAID IN ACCORDANCE TO ITEM 624.

- ⑳ FIBER OPTIC BACKBONE, MULTIDUCT CONDUIT (PVC) (4-1.25 INCH INNERDUCT) SEE I.T.S. PLANS FOR LOCATION. MULTIDUCT CONDUIT WILL BE PAID IN ACCORDANCE TO ITEM 860.
- ㉑ FIBER OPTIC CABLES, INSTALLED BY THE NTTA, SERVING A.V.I. TRAVEL TIME SENSOR/DMS EQUIPMENT.
- ㉒ FIBER OPTIC CABLES, INSTALLED BY THE NTTA, SERVING CCTV ENCLOSURE.
- ㉓ CLOSED CIRCUIT TELEVISION (CCTV) ENCLOSURE WHERE REQUIRED. THE NTTA WILL FURNISH AND SHALL INSTALL THE ENCLOSURE. SEE I.T.S. PLANS FOR REQUIREMENTS.
- ㉔ ONE (1) POWER CORD PROVIDED BY THE NTTA CONNECTING THE U.P.S. AND THE CCTV ENCLOSURE WHEN REQUIRED.
- ㉕ (2) 2-INCH SCHEDULE 40 PVC COMMUNICATION AND POWER CONDUITS, (1) 1 INCH SCHEDULE 40 PVC GROUNDING CONDUIT AND XHHW-2 CONDUCTORS TO CCTV STRUCTURE.
- ㉖ PREFABRICATED 3.594" DIA. FOR NOMINAL 3" HOLE TO CCTV ENCLOSURE. VERIFY WITH I.T.S. IF REQUIRED PRIOR TO ROUGH IN. SEE ESC-003(1) FOR OPENING DETAIL.
- ㉗ COMMUNICATION/POWER CABLES INSTALLED BY THE NTTA CONNECTING THE CCTV ENCLOSURE AND THE CCTV CAMERAS.
- ㉘ ONE (1) POWER CORD PROVIDED BY NTTA CONNECTING THE U.P.S. AND THE A.V.I. TRAVEL TIME SENSOR/DMS EQUIPMENT WHEN REQUIRED.
- ㉙ (2) 2-INCH SCHEDULE 40 PVC COMMUNICATION AND POWER, (1) 1 INCH SCHEDULE 40 PVC GROUNDING CONDUIT AND XHHW-2 CONDUCTORS TO DMS STRUCTURE. SEE I.T.S. PLANS FOR SIZE OF CONDUCTORS.
- ㉚ 2-INCH SCHEDULE 40 PVC COMMUNICATION CONDUIT TO THE A.V.I. TRAVEL TIME SENSOR MOUNTED ON THE OVERHEAD SIGN STRUCTURE OR DMS STRUCTURE. COMMUNICATION CABLES WILL BE INSTALLED BY THE NTTA.
- ㉛ COMMUNICATION CABLES INSTALLED BY THE NTTA CONNECTING THE CCTV ENCLOSURE AND THE A.V.I. TRAVEL TIME SENSOR/DMS EQUIPMENT.
- ㉜ COMMUNICATION/POWER CABLES INSTALLED BY THE NTTA CONNECTING THE A.V.I. TRAVEL TIME SENSOR/DMS EQUIPMENT.
- ㉝ 2-INCH SCHEDULE 40 PVC COMMUNICATION CONDUIT TO THE A.V.I. TRAVEL TIME SENSOR MOUNTED ON THE DMS. COMMUNICATION CABLES WILL BE INSTALLED BY THE NTTA.
- ㉞ COMMUNICATION CABLE INSTALLED BY NTTA CONNECTING THE A.V.I. TRAVEL TIME SENSOR/DMS EQUIPMENT.
- ㉟ 2-INCH SCHEDULE 40 PVC CONDUIT WITH 5/8-INCH POLYESTER, 1800 LB PULL TAPE TO GROUND BOX, TYPE D, FOR FUTURE USE. CAP AT BOTH ENDS. CONDUIT IS SUBSIDIARY TO ITEM 628.
- ㊱ SPARE GROUND BOX, TYPE D WITH APRON, FOR FUTURE USE. THE NTTA WILL SPECIFY THE LOCATION OF GROUND BOX IF NOT SHOWN ON THE PLANS. GROUND BOX IS SUBSIDIARY TO ITEM 628.
- ㊲ 2-INCH SCHEDULE 40 PVC CONDUIT AND XHHW-2 CONDUCTORS, AS REQUIRED, TO LANDSCAPING CONTROLLER. SEE LANDSCAPING PLANS FOR SIZE OF CONDUCTORS. PROVIDE EMPTY CONDUIT WITH 5/8-INCH POLYESTER, 1800 LB PULL TAPE AND TYPE D GROUND BOX FOR FUTURE CONNECTION OF LANDSCAPING CONTROLLER. CONDUIT AND GROUND BOX ARE SUBSIDIARY TO ITEM 628.
- ㊳ CONDUIT STUB UP 3" ABOVE FINISHED SURFACE. CONDUIT STUB UP LAYOUT SHALL BE INSTALLED WITH A TEMPLATE MATCHING CABINET BOTTOM. TEMPLATE SHALL BE SECURED IN PLACE PRIOR TO PLACEMENT OF CONCRETE. (TYPICAL)

**GENERAL NOTES:**

1. SEE NTTA ESC-003, SHEET 1 OF 3 FOR GENERAL NOTES, TYPICAL LAYOUT, PLAN AND ELEVATION, BAR DETAILS, AND PANELBOARD LAYOUT.
2. SEE NTTA ESC-003, SHEET 3 OR 3 FOR SPECIFIC SITE LAYOUTS, AND MPE CONFIGURATIONS.
3. A SIGN SHALL BE PERMANENTLY PLACED PER THE NEC FOR EMERGENCY POWER PANELS AND ENCLOSURES WHEN CONNECTED TO AN EMERGENCY SYSTEM WITH THE WORDS "EMERGENCY SYSTEM".

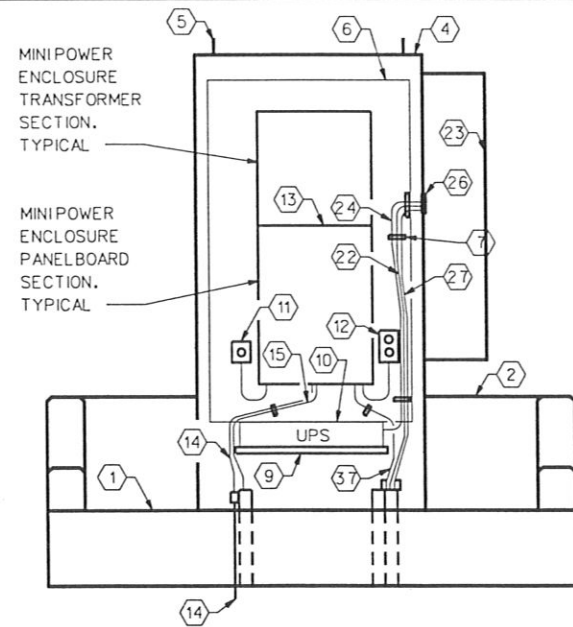


**CONDUIT STUB UP/BLOCKOUT DETAIL**

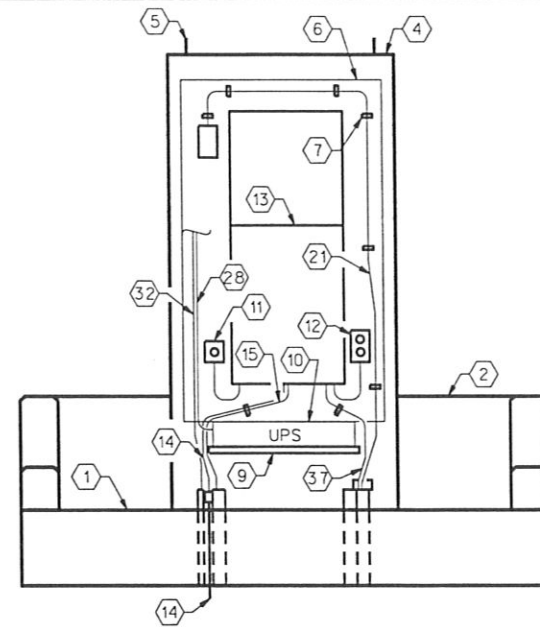
**DRAFT**

NO.	DATE	REVISION	APPROV.
<b>NTTA</b> NORTH TEXAS TOLLWAY AUTHORITY			
<b>ELECTRICAL SERVICE CENTER TYPE MPE ENCLOSURE</b>			
ESC-003(2)-2009			
DRAWN	EEL	DATE 12-30-09	DESIGNED
DECKED	RW	DATE 12-30-09	SCALE NTS
CONTRACT NO. _____		SHEET _____ OF _____	

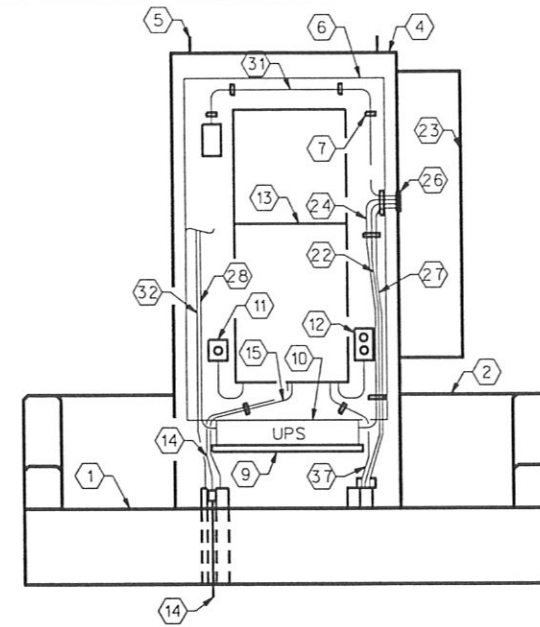
DISCLAIMER  
 The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by NITA for any use of this standard for any purpose other than for which it was intended. NITA assumes no responsibility for incorrect results or damages resulting from its use.



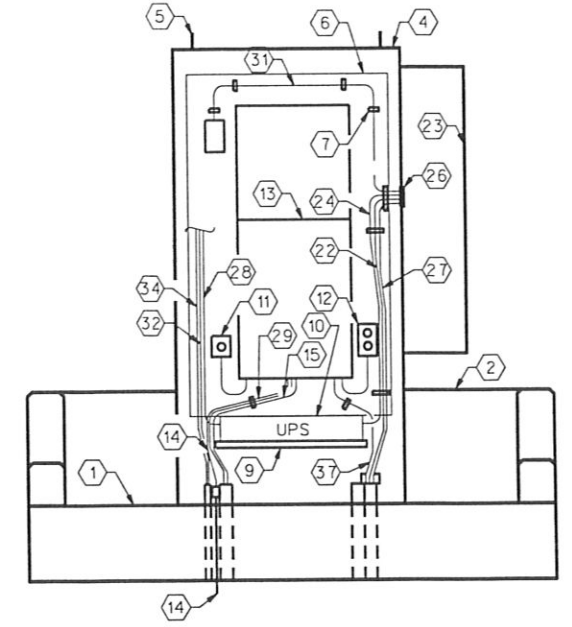
**CASE #1 - 10 KVA MPE CONFIGURATION FOR CCTV AND LANDSCAPING ELEMENTS**



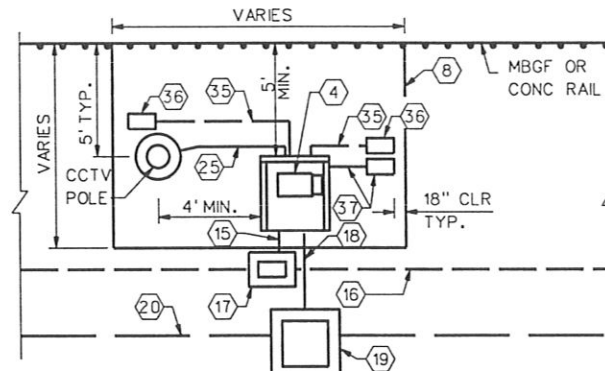
**CASE #2 - 10 KVA MPE CONFIGURATION FOR AVI TRAVEL TIME SENSOR, AND LANDSCAPING ELEMENTS**



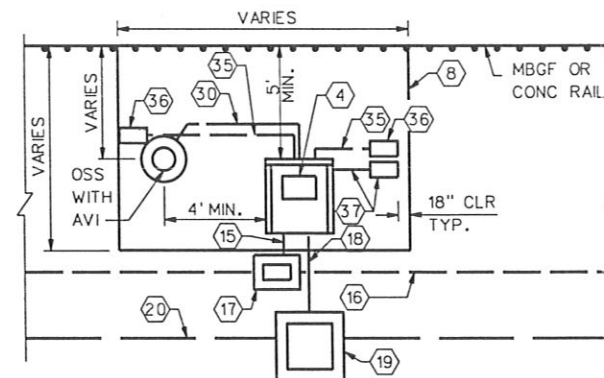
**CASE #3 - 10 KVA MPE CONFIGURATION FOR CCTV, AVI TRAVEL TIME SENSOR, AND LANDSCAPING ELEMENTS**



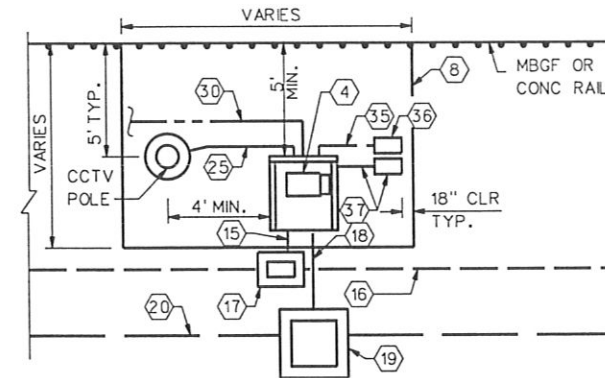
**CASE #4 - 15 KVA MPE CONFIGURATION FOR CCTV, DMS, AVI TRAVEL TIME SENSOR, AND LANDSCAPING ELEMENTS**



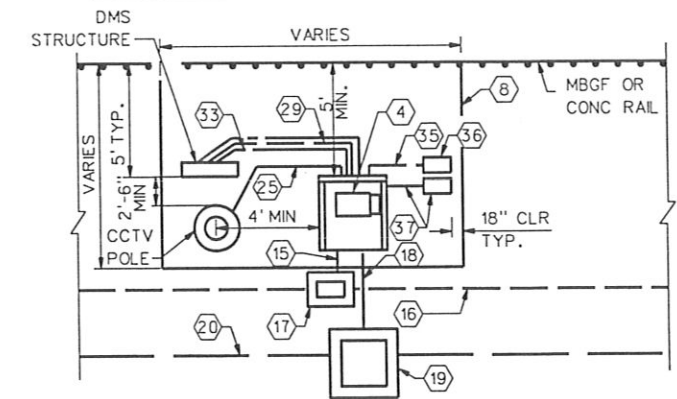
**TYPICAL LAYOUT FOR CASE 1**



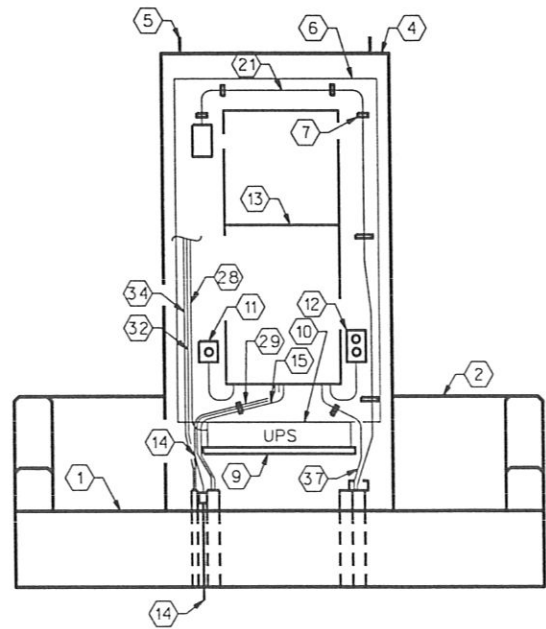
**TYPICAL LAYOUT FOR CASE 2**



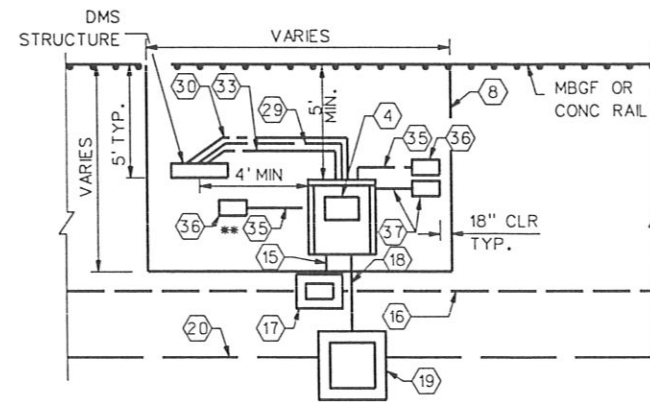
**TYPICAL LAYOUT FOR CASE 3**



**TYPICAL LAYOUT FOR CASE 4**



**CASE #5 - 15 KVA MPE CONFIGURATION FOR DMS, AVI TRAVEL TIME SENSOR, AND LANDSCAPING ELEMENTS**




**TYPICAL LAYOUT FOR CASE 5**

- \* CONDUIT DESIGNATED FOR FUTURE A.V.I.
- \*\* CONDUIT DESIGNATED FOR FUTURE CCTV

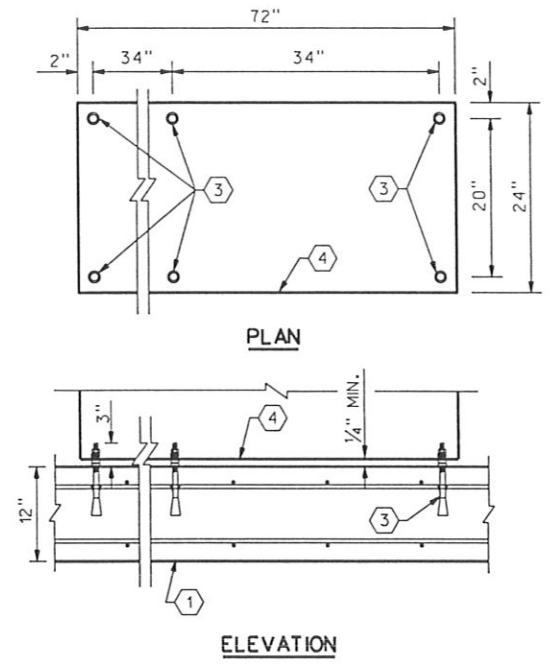
**GENERAL NOTES:**

1. SEE NITA ESC-003, SHEET 1 OF 3 FOR GENERAL NOTES, PLAN AND ELEVATION, BAR DETAILS, AND PANELBOARD LAYOUT.
2. SEE NITA ESC-003, SHEET 2 OF 3 FOR KEYED NOTES AND CONDUIT BLOCKOUT DETAILS.

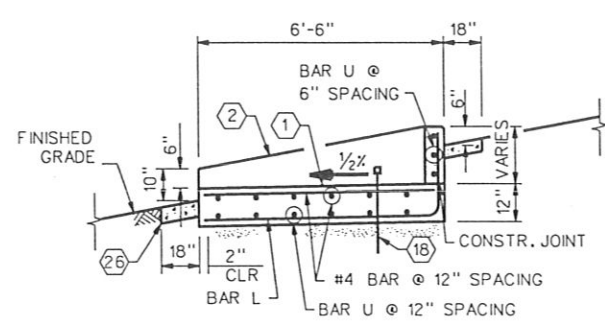
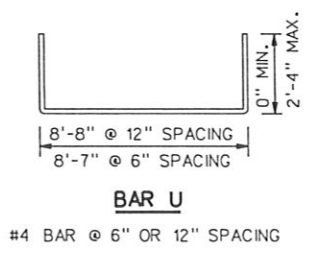
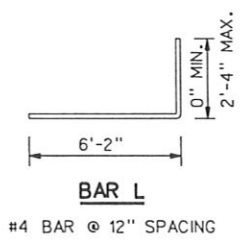
**DRAFT**

NO.	DATE	REVISION	APPROV.
 NORTH TEXAS TOLLWAY AUTHORITY			
<b>ELECTRICAL SERVICE CENTER TYPE MPE ENCLOSURE</b>			
ESC-003(3)-2009			
DRAWN	EEL	DATE 12-30-09	DESIGNED
CHECKED	RW	DATE 12-30-09	SCALE NTS
CONTRACT NO.		SHEET ___ OF ___	

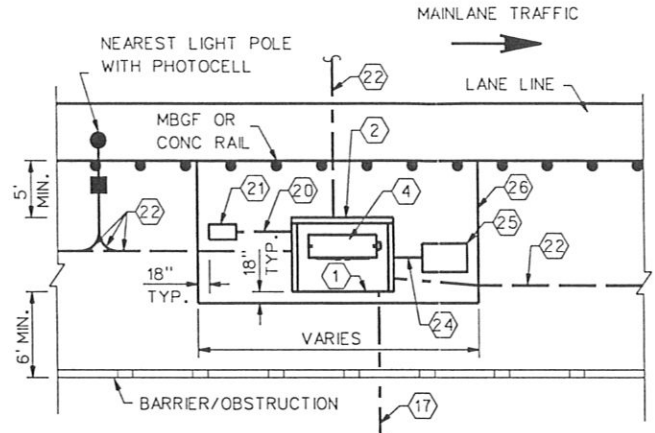
DISCLAIMER  
The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by NTTA for any purpose whatsoever. NTTA assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.



CONCRETE ANCHORING DETAILS

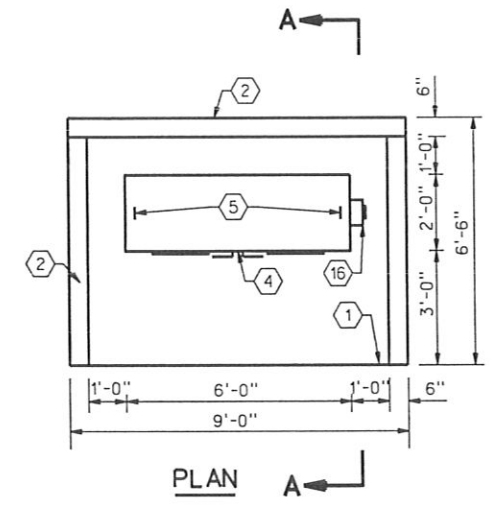


SECTION A-A - BAR DETAILS  
NOTE: ENCLOSURE IS NOT SHOWN FOR CLARITY

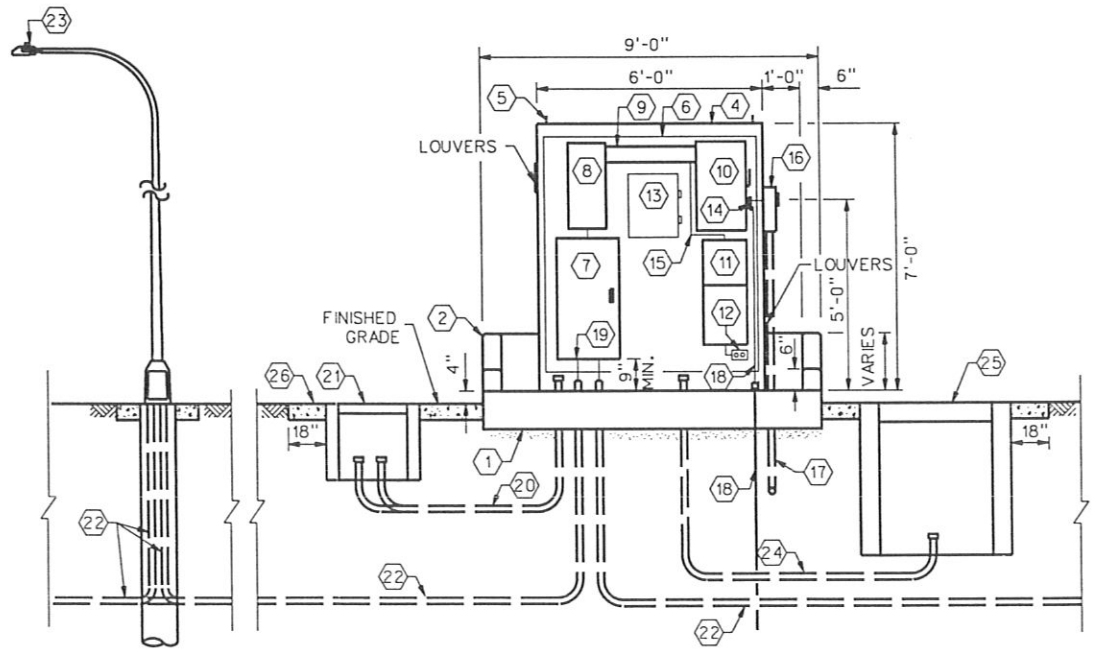


TYPICAL LAYOUT

SEE NOTE 1 FOR APPROVAL DOCUMENTATION REQUIREMENTS



PLAN




ELEVATION

SEE NOTE 1 FOR APPROVAL DOCUMENTATION REQUIREMENTS

GENERAL NOTES:

- TYPE R ELECTRICAL SERVICE CENTER ENCLOSURE PROVIDES POWER FOR ROADWAY ILLUMINATION. THIS TYPE SHALL ONLY BE USED WITH NTTA WRITTEN PERMISSION ONLY.
- TYPE R ELECTRICAL SERVICE CENTER ENCLOSURE WILL BE PAID FOR UNDER ITEM 628 AT THE UNIT PRICE BID FOR: "ELC SRV TY R (480)100A(SS)PS(U)".
- SEE NTTA ESC-004, SHEET 2 OF 2 FOR KEY NOTES.
- SEE TABLE 1 ON ESC-004, SHEET 2 OF 2, FOR RECOMMENDED MODELS AND MANUFACTURERS OF DIFFERENT TYPES OF EQUIPMENT.
- SEE NTTA ESC-001, FOR GENERAL NOTES INFORMATION.
- SEE NTTA RID STANDARDS FOR LIGHT POLE DETAILS.
- SEE NTTA ITS-002 FOR TYPE FO GROUND BOX DETAILS.
- SEE TxDOT ED (3) FOR TYPE D GROUND BOX DETAILS.
- CONDUITS SHALL BE IN ACCORDANCE WITH ITEM 618.
- CONDUCTORS SHALL BE IN ACCORDANCE WITH ITEM 620.
- SERVICE PAD/FOUNDATION SHALL BE IN ACCORDANCE WITH ITEM 656. PROVIDE CLASS "C" CONCRETE.
- RIPRAP SHALL BE IN ACCORDANCE WITH ITEM 432.
- ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
- OMIT 6" THICK WALL WHEN THE ELECTRICAL SERVICE CENTER TYPE R ENCLOSURE IS LOCATED ON TRANSVERSE OR LONGITUDINAL SLOPE 20:1 OR FLATTER.
- DO NOT LOCATE THE ELECTRICAL SERVICE CENTER TYPE R ENCLOSURE IN A FLOW LINE OF A DITCH.
- DO NOT LOCATE THE ELECTRICAL SERVICE CENTER TYPE R ENCLOSURE IN AN AREA WHERE TRANSVERSE SLOPE IS STEEPER THAN 4:1.
- MINIMUM BAR LAPPING = 1'-6".
- PLACE 9 INCHES (9") MINIMUM GRAVEL BED UNDERNEATH ALL GROUND BOXES.
- PLACE 2 INCHES (2") MINIMUM SAND BED UNDERNEATH THE ENCLOSURE'S PAD.

DRAFT

NO.	DATE	REVISION	APPROV.
 NORTH TEXAS TOLLWAY AUTHORITY			
<b>ELECTRICAL SERVICE CENTER TYPE R ENCLOSURE, 100 AMP</b>			
ESC-004(1)-2009			
DRAWN	EEL	DATE 12-30-09	DESIGNED EEL DATE 12-30-09
CHECKED	RW	DATE 12-30-09	SCALE NTS
CONTRACT NO.		SHEET ____ OF ____	

12/30/2009 H:\AAI-Proj\1109\3009-15 NTTA STANDARDS Update\ESC\2009\3PH\DGN\Sheet Files\ESC-004(1)-2009.dgn

**KEYED NOTES (ELECTRICAL SERVICE CENTER TYPE R):**

- 1 12-INCH THICK SERVICE PAD/FOUNDATION.
- 2 6-INCH THICK WALL WHEN TRANSVERSE OR LONGITUDINAL SLOPE IS STEEPER THAN 20:1. THE WALL IS SUBSIDIARY TO ITEM 628.
- 3 STAINLESS STEEL HEX NUT, LOCK WASHER, FLAT WASHER, AND CONCRETE WEDGE ANCHORS. USE 3/4-INCH DIA. CONCRETE WEDGE ANCHORS WITH 6-INCH MINIMUM EMBEDMENT IN THE CONCRETE. TYPICAL.
- 4 ELECTRICAL SERVICE CENTER (ESC) ENCLOSURE TYPE R. 72"XW84"XHX24"D ENCLOSURE, 10 GAUGE, TYPE 316 STAINLESS STEEL, NEMA 3R ENCLOSURE OR BETTER. ENCLOSURE SHALL HAVE A DOUBLE-DOOR, DOOR HANDLES, PADLOCK PROVISION, LIFTING DEVICES, AND TWO LOUVER PLATES MOUNTED ON THE SIDES FOR VENTILATION. EACH LOUVER PLATE ASSEMBLY SHALL HAVE A MINIMUM AREA OF 18"X9"H WITH AT LEAST 6 LOUVERS AND A STAINLESS STEEL 18X14 INSECT SCREEN MESH MADE OF 0.011-INCH DIAMETER WIRE. SEE PLANS FOR LOCATION.
- 5 LIFTING DEVICE.
- 6 MOUNTING PANEL OR BACKBOARD PANEL. 68"XW74"H TYPICAL.
- 7 ILLUMINATION PANELBOARD. 125 AMP MAIN LUGS ONLY (MLO), NEMA 1 ENCLOSURE, 480Y/277 VAC, 3-PHASE, 4-WIRE, COPPER BUS, GROUND BAR, AND 18-POLE CAPACITY PANELBOARD FED FROM FUSIBLE DISCONNECT SWITCH THROUGH LIGHTING CONTACTOR WITH 4#2'S AND 1#8 GROUND. BRANCH CIRCUIT BREAKER FOR STANDARD ROADWAY LIGHTING SHALL BE FULL SIZE 40-AMP/2-POLE, BOLT-IN BREAKERS, THERMAL MAGNETIC, AND SHALL HAVE SHORT CIRCUIT RATING OF 18 KAIC OR BETTER. SEE ILLUMINATION PLANS FOR LIGHTING PANELBOARD LAYOUT. THE MAXIMUM ENCLOSURE SIZE SHALL BE 20"Wx38"Hx16"D.
- 8 LIGHTING CONTACTOR ENCLOSURE WITH BUILT-IN HAND-OFF-AUTOMATIC (H-O-A) SWITCH, 100A, 480 VAC, 3-PHASE, 3-POLE, NEMA 1 ENCLOSURE, UL LISTED, AND ELECTRICALLY HELD, 480Y/277 VAC COIL, FED FROM FUSIBLE DISCONNECT SWITCH WITH 4#2'S AND 1#8 GROUND. THE MAXIMUM ENCLOSURE SIZE SHALL BE 12"Wx27"Hx16"D.
- 9 6"x6"x30" LONG WIREWAY SCREW-ON COVER AND GUTTER TAP.
- 10 HEAVY DUTY TYPE SERVICE ENTRANCE RATED DISCONNECT SWITCH, 100 AMP, 480Y/277 VAC, 3-PHASE, 4-WIRE, NEMA 1 ENCLOSURE, SINGLE THROW FUSIBLE WITH 100 AMP FUSES. THE MAXIMUM ENCLOSURE SIZE SHALL BE 11"Wx22"Hx16"D.
- 11 10 KVA MINIPOWER ENCLOSURE FED FROM FUSIBLE DISCONNECT SWITCH WITH 2#8'S AND 1#10 GROUND, SINGLE-PHASE, NEMA 1 ENCLOSURE OR BETTER. THIS DRY-TYPE TRANSFORMER CONVERTS 480 VAC TO 120/240 VAC SERVING 3 WIRE PANELBOARD SECTION. INCLUDE TEN (10) 20-AMP/1-POLE CIRCUIT BREAKERS. PROVIDE TRANSFORMER SECONDARY GROUNDING CONNECTION TO GROUND ROD WITH 1#8 CONDUCTOR. THE MAXIMUM ENCLOSURE SIZE SHALL BE 16"Wx33"Hx16"D.
- 12 20A, 120V DUPLEX GROUND FAULT INTERRUPTER CIRCUIT, GFCI, RECEPTACLE, CAST ALUMINUM BOX WITH NEMA 1 COVER. USE #12 AWG XHHW-2 CONDUCTORS.
- 13 FUTURE ELECTRICAL AND LIGHTING MANAGEMENT SYSTEM (ELMS) TO BE INSTALLED BY OTHERS.
- 14 METAL DISTRIBUTION RINGS TYPICAL, "D" TYPE. SIZE VARIES WITH 2-INCH MINIMUM.
- 15 PROVIDE MINIPOWER ENCLOSURE TRANSFORMER PRIMARY XHHW-2 CONDUCTORS AS INDICATED.
- 16 480VAC METERING, 100 AMP, 3-PHASE, 4-WIRE. ALL MOUNTING HARDWARE AND INSTALLATION OF THE METERING SHALL BE IN ACCORDANCE WITH UTILITY PROVIDER SPECIFICATIONS. CONTACT UTILITY PROVIDER FOR THE LATEST REQUIREMENTS.
- 17 3-INCH SCHEDULE 40 PVC CONDUIT CONNECTING THE METER AND THE UTILITY SERVICE POINT. CONDUIT WILL BE PAID FOR IN ACCORDANCE TO ITEM 618. CONDUCTORS MAY BE PROVIDED BY UTILITY PROVIDER. CONTRACTOR SHALL COORDINATE WORK WITH UTILITY PROVIDER. SEE ILLUMINATION PLANS FOR LOCATION OF UTILITY SERVICE POINT.
- 18 GROUNDING SYSTEM SHALL INCLUDE, 3/4" DIA. x 10 LF COPPER-CLAD STEEL GROUND ROD AND SERVICE ENTRANCE GROUNDING ELECTRODE CONDUCTOR ATTACHED TO GROUND BUS.
- 19 #8 MINIMUM XHHW-2 CONDUCTORS CONNECTING THE CONTACTOR AND THE PHOTO ELECTRIC CONTROL MOUNTED ATOP THE NEAREST LIGHT POLE LUMINAIRE. PHOTO ELECTRIC CONTROL CONDUCTORS WILL SHARE SAME CONDUIT AS ILLUMINATION CONDUCTORS. SEE ILLUMINATION PLANS FOR LOCATION OF PHOTO ELECTRIC CONTROL.
- 20 TWO (2) 2-INCH SCHEDULE 40 PVC CONDUITS WITH 5/8-INCH POLYESTER, 1800 LB PULL TAPE TO GROUND BOX, TYPE D, FOR FUTURE USE. CAP AT BOTH ENDS WITH THREADED PLUG. CONDUIT IS SUBSIDIARY TO ITEM 628.
- 21 POWER GROUND BOX, TYPE D WITH APRON, FOR FUTURE USE. THE AUTHORITY WILL SPECIFY THE LOCATION OF GROUND BOX IF NOT SHOWN ON THE PLANS. GROUND BOX IS SUBSIDIARY TO ITEM 628. BOX SHALL BE LOCATED IN AN ACCESSIBLE AREA.

- 22 CONDUITS AND CONDUCTORS TO INDIVIDUAL LIGHT POLES. SEE ILLUMINATION PLANS FOR LOCATIONS, TYPES, AND SIZES OF CONDUITS AND CONDUCTORS.
- 23 PHOTO ELECTRIC CONTROL MOUNTED ATOP THE LUMINAIRE OF THE NEAREST LIGHT POLE. SEE ILLUMINATION PLANS FOR LOCATION OF PHOTO ELECTRIC CONTROL.
- 24 FIBER OPTIC LATERAL, MULTIDUCT CONDUIT (PVC) (4-1.25-INCH INNERDUCTS) TO FIBER OPTIC GROUND BOX, TYPE FO (484860), FOR FUTURE USE. CAP AT BOTH ENDS WITH THREADED PLUG. CONDUIT IS SUBSIDIARY TO ITEM 628.
- 25 FIBER OPTIC GROUND BOX WITH APRON, TYPE FO (484860) FOR FUTURE USE. FIBER OPTIC GROUND BOX IS SUBSIDIARY TO ITEM 628. SEE ILLUMINATION PLANS FOR LOCATION.
- 26 5-INCH THICK CONCRETE RIPRAP/APRON REINFORCED WITH #3 BARS AT 18-INCH ON CENTER EACH WAY. THE RIPRAP/APRON IS SUBSIDIARY TO VARIOUS BID ITEMS.


**GENERAL NOTES:**

- 1. SEE NTTA ESC-004, SHEET 1 OF 2 FOR GENERAL NOTES, TYPICAL LAYOUT, PLAN AND ELEVATION, BAR DETAILS, AND CONCRETE ANCHORING DETAILS.

**TABLE 1 - EQUIPMENT INFORMATION.**

EQUIPMENT DESCRIPTION	MANUFACTURERS- SQUARE D, SIEMENS, OR APPROVED EQUAL	
	SQUARE D'S MODEL	SIEMENS'S MODEL
ILLUMINATION PANELBOARD 7	NF MERCHANDISED PANEL. TYPE EDB	TYPE P1 PANEL.
LIGHTING CONTACTOR 8	LIGHTING CONTROL, MULTIPOLE LIGHTING CONTACTORS, TYPE S	AC CONTROLS, LIGHT, AND HEAT. CONTACT, TYPE CLH
MINIPOWER ENCLOSURE (WITH TRANSFORMER AND PANELBOARD) 11	MINIPOWER ZONE	SENTRON POWER CENTER

**DRAFT**

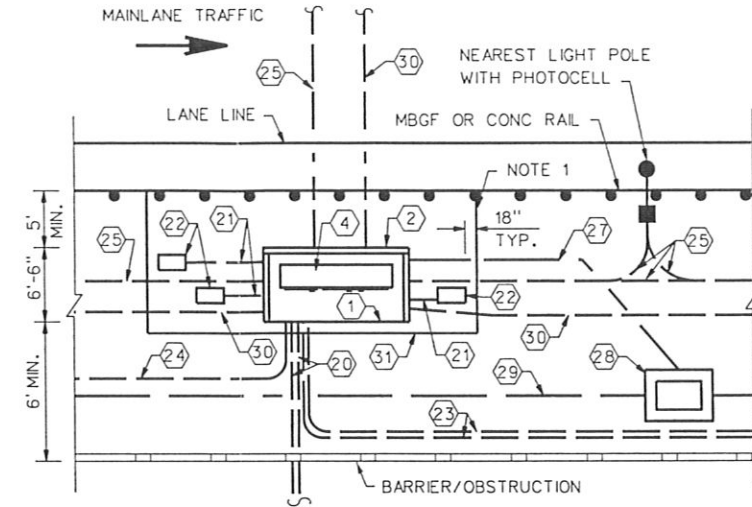
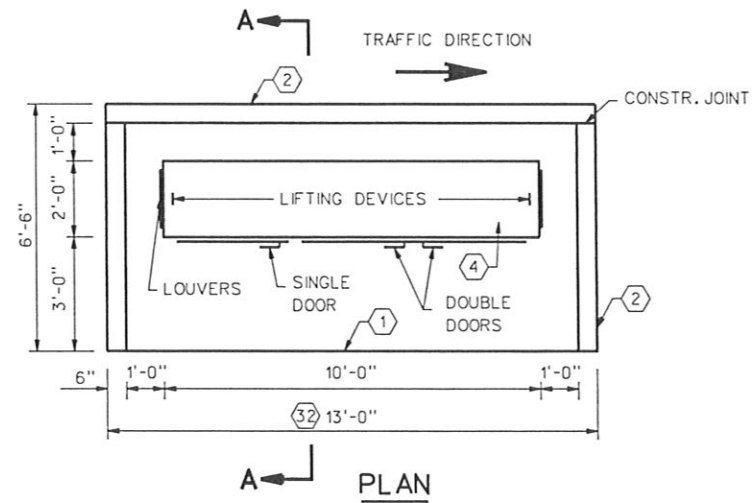
NO.	DATE	REVISION	APPROV.
 NORTH TEXAS TOLLWAY AUTHORITY			
<b>ELECTRICAL SERVICE CENTER TYPE R ENCLOSURE, 100 AMP</b> ESC-004(2)-2009			
DRAWN	IEL	DATE 12-30-09	DESIGNED
CHECKED	RW	DATE 12-30-09	SCALE
		DATE 12-30-09	NTS
CONTRACT NO.		SHEET ____ OF ____	

DISCLAIMER  
 The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by NTTA for any purpose whatsoever, and no liability for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

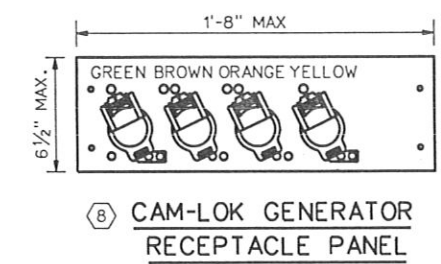
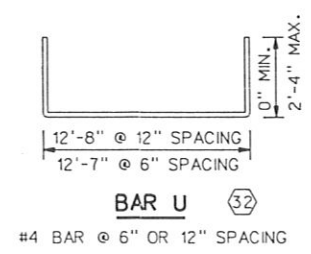
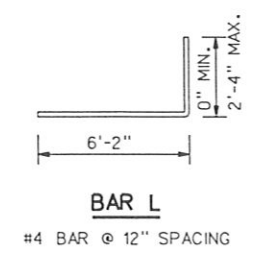
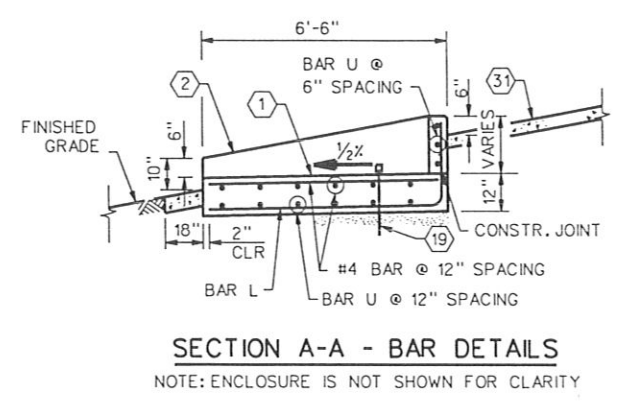
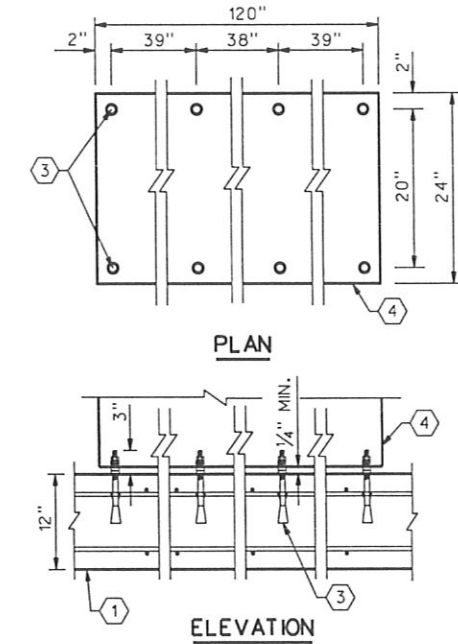
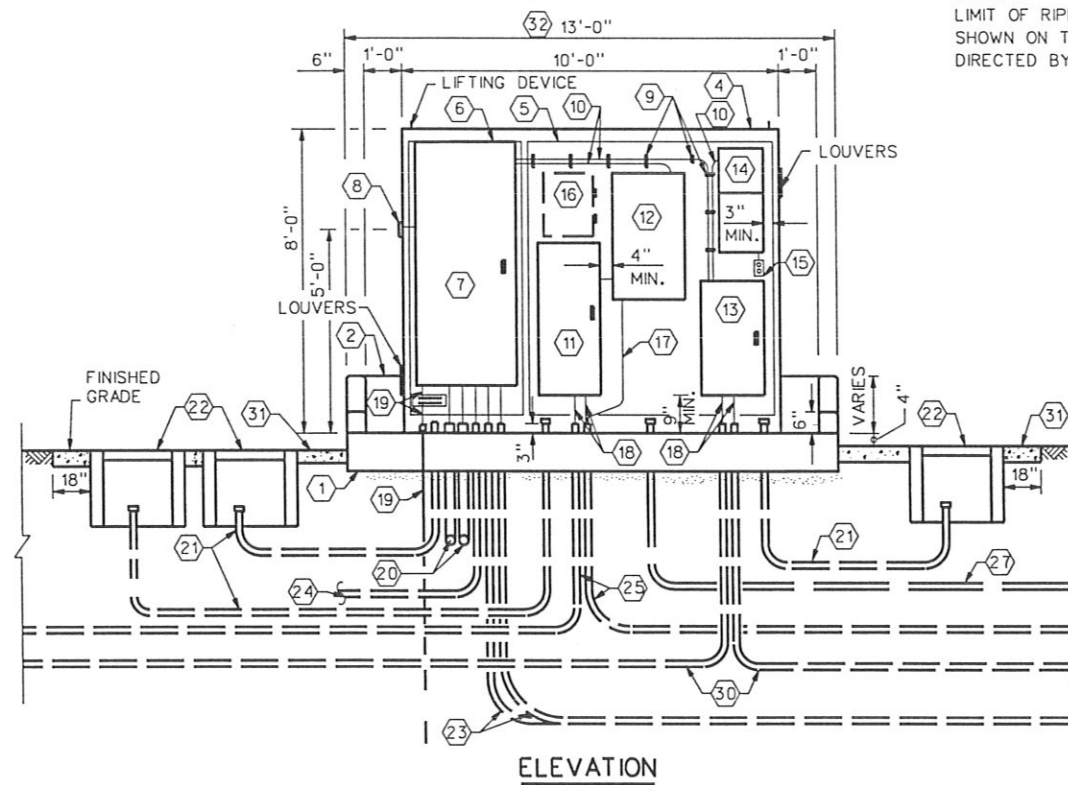
12/30/2009  
 H:\AAI-Proj\1109\3009-15 NTTA STANDARDS Update\ESC\2009\3PH\DCN\Sheet Files\ESC-004(2)-2009.dgn

DISCLAIMER: This standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by NITA for any purpose whatsoever. NITA assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

12/30/2009 H:\AAI-Proj\1109\3009-15 NTTA STANDARDS Update\ESC\2009\3PH\DGN\Sheet Files\ESC-005(1)-2009.dgn



NOTE 1:  
LIMIT OF RIPRAP WILL BE SHOWN ON THE PLANS OR AS DIRECTED BY THE AUTHORITY.



**GENERAL NOTES:**

- TYPE S ELECTRICAL SERVICE CENTER ENCLOSURE PROVIDES POWER FOR ROADWAY ILLUMINATION, I.T.S. EQUIPMENT, RAMP GANTRY STRUCTURES, AND/OR A COMMUNICATION HUT.
- TYPE S ELECTRICAL SERVICE CENTER ENCLOSURE WILL BE PAID FOR UNDER ITEM 628 AT THE UNIT PRICE BID FOR: "ELC SRV TY S (480)400A(SS)PS(U)".
- SEE NTTA ESC-005, SHEET 2 OF 2 FOR KEYED NOTES.
- SEE TABLE 1 ON NTTA ESC-005, SHEET 2 OF 2, FOR RECOMMENDED MODELS AND MANUFACTURERS OF DIFFERENT TYPES OF EQUIPMENT.
- SEE NTTA ESC-001 FOR GENERAL NOTES INFORMATION.
- SEE NTTA ESC-002 FOR SERVICE ENTRANCE ENCLOSURE DETAILS, TYPE S/E. THE SERVICE ENTRANCE ENCLOSURE TYPE S/E IS REQUIRED AND PAID SEPARATE.
- SEE NTTA ESC-003 FOR MINIPOWER ENCLOSURE DETAILS, TYPE MPE.
- SEE NTTA ITS-002 FOR TYPE FO GROUND BOX DETAILS.
- SEE NTTA RID STANDARDS FOR LIGHT POLE DETAILS.
- SEE TxDOT ED (3) FOR TYPE D GROUND BOX DETAILS.
- CONDUITS SHALL BE IN ACCORDANCE WITH ITEM 618.
- CONDUCTORS SHALL BE IN ACCORDANCE WITH ITEM 620.
- SERVICE PAD/FOUNDATION SHALL BE IN ACCORDANCE WITH ITEM 656. PROVIDE CLASS "C" CONCRETE.
- RIPRAP SHALL BE IN ACCORDANCE WITH ITEM 432.
- ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
- OMIT 6" THICK WALL WHEN THE ELECTRICAL SERVICE CENTER TYPE S ENCLOSURE IS LOCATED ON TRANSVERSE OR LONGITUDINAL SLOPE 20:1 OR FLATTER.
- DO NOT LOCATE THE ELECTRICAL SERVICE CENTER TYPE S ENCLOSURE IN A FLOW LINE OF A DITCH.
- DO NOT LOCATE THE ELECTRICAL SERVICE CENTER TYPE S ENCLOSURE IN AN AREA WHERE TRANSVERSE SLOPE IS STEEPER THAN 4:1.
- MINIMUM BAR LAPPING = 1'-6".
- PLACE 9 INCHES (9") MINIMUM GRAVEL BED UNDERNEATH ALL GROUND BOXES.
- PLACE 2 INCHES (2") MINIMUM SAND BED UNDERNEATH THE ENCLOSURE'S PAD.

**DRAFT**

NO.	DATE	REVISION	APPROV.
<p><b>NTTA</b> NORTH TEXAS TOLLWAY AUTHORITY</p>			
<p><b>ELECTRICAL SERVICE CENTER TYPE S ENCLOSURE, 400 AMP</b></p> <p>ESC-005(1)-2009</p>			
DRAWN	EL	DATE 12-30-09	DESIGNED
CHECKED	RW	DATE 12-30-09	SCALE NTS
CONTRACT NO.		SHEET OF	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by NITA for any purpose whatsoever. NITA assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

**KEYED NOTES (ELECTRICAL SERVICE CENTER TYPE S):**

- ① 12-INCH THICK SERVICE PAD/FOUNDATION.
- ② 6-INCH THICK WALL WHEN TRANSVERSE OR LONGITUDINAL SLOPE IS STEEPER THAN 20:1. THE WALL IS SUBSIDIARY TO ITEM 628.
- ③ STAINLESS STEEL HEX NUT, LOCK WASHER, FLAT WASHER, AND CONCRETE WEDGE ANCHORS. USE 1" DIA. CONCRETE WEDGE ANCHORS WITH 6" MINIMUM EMBEDMENT IN THE CONCRETE. TYPICAL.
- ④ ELECTRICAL SERVICE CENTER (ESC) ENCLOSURE TYPE S. 120"Wx96"Hx24"D ENCLOSURE, 10 GAUGE, TYPE 316 STAINLESS STEEL, NEMA 3R ENCLOSURE. ENCLOSURE SHALL HAVE 3-DOORS (ONE SET OF DOUBLE-DOORS AND ONE SINGLE DOOR), DOOR HANDLES, PADLOCK PROVISION, LIFTING DEVICES, AND TWO LOUVER PLATES MOUNTED ON THE SIDES FOR VENTILATION. EACH LOUVER PLATE ASSEMBLY SHALL HAVE A MINIMUM AREA OF 18"Wx9"H WITH AT LEAST 6 LOUVERS AND A STAINLESS STEEL 18X14 INSECT SCREEN MESH MADE OF 0.011-INCH DIAMETER WIRE. SEE PLANS FOR LOCATION.
- ⑤ MOUNTING PANEL OR BACKBOARD PANEL. 78"Wx 86"H TYPICAL FOR DOUBLE-SECTION.
- ⑥ MOUNTING PANEL OR BACKBOARD PANEL. 36"Wx 86"H TYPICAL FOR SINGLE SECTION.
- ⑦ 400 AMP MAIN DISTRIBUTION PANELBOARD (MDP) WITH PROVISIONS FOR BUILT-IN TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS), KEY INTERLOCK KIT, AND GENERATOR BREAKER. THE MDP SHALL BE NEMA 1 ENCLOSURE, 480Y/277 VAC, 3-PHASE, 4-WIRE, 400A MAIN BREAKER, SHORT CIRCUIT RATING OF 35 KAIC, COPPER BUS, GROUND BAR, BOLT-ON CIRCUIT BREAKERS AND 30-POLE CAPACITY PANELBOARD. TVSS SHALL HAVE 200 KA SURGE CURRENT PER PHASE. BRANCH CIRCUIT BREAKERS ARE FULL SIZE, BOLT-IN BREAKERS, THERMAL MAGNETIC, 480 VAC, SHORT CIRCUIT RATING OF 35 KAIC, AND VARIES IN AMPERAGE. SEE TABLE 2 FOR CIRCUIT BREAKER LAYOUT.
- ⑧ CAM-LOK GENERATOR RECEPTACLE PANEL WITH FOUR (4) COLOR CODED RECEPTACLES (GROUND-GREEN, BROWN, ORANGE, AND YELLOW) AND PADLOCK PROVISION MANUFACTURED BY COOPER CROUSE-HINDS OR APPROVED EQUAL. RECEPTACLE PANEL IS A 3-PHASE, 480Y/277 VAC, MALE CONTACT OUTPUT FED FROM MAIN DISTRIBUTION PANEL WITH 3#2'S AND 1#8 GROUND. THE DEVICE SHALL BE DESIGNED TO OPERATE WITH GENERATOR BREAKER LOCATED IN THE MAIN DISTRIBUTION PANELBOARD AND BE MOUNTED 60" ABOVE FINISH FLOOR TO CENTER OF RECEPTACLE. PROVIDE PLEXIGLASS COVER ON EXPOSED SUPPORT BOLTS INSIDE CABINET. SEE NTTA ESC-005, SHEET 1 OF 2 FOR DETAIL. RECEPTACLE MALE/FEMALE SHALL BE WEATHER TIGHT WHEN CONNECTED.
- ⑨ METAL DISTRIBUTION RINGS TYPICAL, "D" TYPE. SIZE VARIES WITH 2-INCH MINIMUM.
- ⑩ PROVIDE XHHW-2 TYPE CONDUCTOR AS INDICATED.
- ⑪ ILLUMINATION PANELBOARD, 250 AMP MAIN LUGS ONLY (MLO), NEMA 1 ENCLOSURE, 480Y/277 VAC, 3-PHASE, 4-WIRE, COPPER BUS, GROUND BAR, AND 30-POLE CAPACITY PANELBOARD FED FROM MAIN DISTRIBUTION PANEL MDP THROUGH LIGHTING CONTACTOR WITH 4#3/0'S AND 1#6 GROUND. BRANCH CIRCUIT BREAKER SHALL BE FULL SIZE 20-AMP MINIMUM, 2-POLE, BOLT-IN BREAKERS, THERMAL MAGNETIC, AND SHALL HAVE SHORT CIRCUIT RATING OF 35 KAIC OR BETTER. SEE ILLUMINATION PLANS FOR LIGHTING PANELBOARD LAYOUT.
- ⑫ LIGHTING CONTACTOR ENCLOSURE WITH BUILT-IN HAND-OFF-AUTOMATIC (H-O-A) SWITCH, 200A, 480 VAC, 3-PHASE, 3-POLE, NEMA 1 ENCLOSURE, UL RATED, AND ELECTRICALLY HELD, 480 VAC COIL, FED FROM MAIN DISTRIBUTION PANEL MDP WITH 4#3/0'S AND 1#6 GROUND.
- ⑬ I.T.S. PANELBOARD, 125 AMP MAIN LUGS ONLY (MLO), NEMA 1 ENCLOSURE, 480Y/277 VAC, 3-PHASE, 4-WIRE, COPPER BUS, GROUND BAR, AND 18-POLE CAPACITY PANELBOARD FED FROM MAIN DISTRIBUTION PANEL MDP WITH 4#2'S AND 1#8 GROUND. BRANCH CIRCUIT BREAKER SHALL BE FULL SIZE 40-AMP MINIMUM, 2-POLE, BOLT-IN BREAKERS, THERMAL MAGNETIC, AND SHALL HAVE SHORT CIRCUIT RATING OF 35 KAIC OR BETTER. SEE I.T.S. PLANS FOR PANELBOARD LAYOUT.
- ⑭ 10 KVA MINIPOWER ENCLOSURE FED FROM I.T.S. PANELBOARD WITH 2#8'S AND 1#10 GROUND, SINGLE-PHASE, NEMA 1 ENCLOSURE. THIS DRY-TYPE TRANSFORMER CONVERTS 480 VAC TO 120/240 VAC SERVING 3 WIRE PANELBOARD SECTION. PROVIDE TEN (10) 20 AMP/1-POLE CIRCUIT BREAKERS. PROVIDE TRANSFORMER SECONDARY GROUNDING CONNECTION TO GROUND ROD WITH 1#8 CONDUCTOR.
- ⑮ 20A, 120V DUPLEX GROUND FAULT CIRCUIT INTERRUPTER, GFCI, RECEPTACLE, CAST ALUMINUM BOX WITH NEMA 1 COVER. USE #12 AWG XHHW-2 CONDUCTORS.
- ⑯ FUTURE ELECTRICAL AND LIGHTING MANAGEMENT SYSTEM (ELMS) TO BE INSTALLED BY OTHERS.
- ⑰ #8 MINIMUM XHHW-2 CONDUCTORS CONNECTING THE CONTACTOR AND THE PHOTO ELECTRIC CONTROL MOUNTED ATOP THE NEAREST LIGHT POLE LUMINAIRE. PHOTO ELECTRIC CONTROL CONDUCTORS WILL SHARE SAME CONDUIT AS ILLUMINATION CONDUCTORS. SEE ILLUMINATION PLANS FOR LOCATION OF PHOTO ELECTRIC CONTROL.
- ⑱ TYPE XHHW-2 CONDUCTORS. SEE ILLUMINATION PLANS AND I.T.S. PLANS FOR PROPER SIZES.

- ⑲ GROUNDING SYSTEM SHALL INCLUDE, 3/4" DIA. x 10 LF COPPER-CLAD STEEL GROUND ROD, PREDRILLED RECTANGULAR GROUNDING BUS OF ANNEALED COOPER, 1/4 INCH THICK, WITH 3/8-INCH HOLES SPACED 1-1/8-INCHES APART AND (4) 1-INCH STAND OFF INSULATORS FOR MOUNTING WHICH COMPLIES WITH UL891 FOR USE IN SWITCHBOARDS, AND EQUIPMENT GROUNDING CONDUCTOR.
- ⑳ TWO (2) 3-INCH SCHEDULE 40 PVC CONDUITS AND XHHW-2 CONDUCTORS CONNECTING THE MAIN DISTRIBUTION PANELBOARD (MDP) AND THE SERVICE ENTRANCE RATED DISCONNECT SWITCH AT THE ELECTRICAL SERVICE CENTER ENCLOSURE TYPE S/E. CONDUCTORS IN EACH CONDUIT SHALL BE 4#3/0 AND 1#2 GROUND MINIMUM. CONDUIT AND CONDUCTORS SHALL BE INCREASED IN SIZE AS REQUIRED TO ACCOMMODATE VOLTAGE DROP FROM THE LOCATION OF SERVICE CENTER TYPE S/E. SEE NTTA-ESC-002, SHEET 1 OF 1, FOR PAYMENT AND ADDITIONAL DETAILS.
- ㉑ 2-INCH SCHEDULE 40 PVC CONDUIT WITH 5/8-INCH POLYESTER, 1800 PULL TAPE TO GROUND BOX, TYPE D, FOR FUTURE USE. CAP AT BOTH ENDS WITH THREADED PLUG. CONDUIT IS SUBSIDIARY TO ITEM 628.
- ㉒ POWER GROUND BOX, TYPE D WITH APRON, FOR FUTURE USE. THE AUTHORITY WILL SPECIFY THE LOCATION OF GROUND BOX IF NOT SHOWN ON THE PLANS. GROUND BOX IS SUBSIDIARY TO ITEM 628. BOX SHALL BE LOCATED IN AN ACCESSIBLE AREA.
- ㉓ CONDUITS AND CONDUCTORS SERVING RAMP GENTRY TRANSFORMER DISCONNECT. SEE PLANS FOR LOCATIONS, TYPES, AND SIZES OF CONDUITS AND CONDUCTORS.
- ㉔ CONDUITS AND CONDUCTORS TO TYPE D GROUND BOX SERVING COMMUNICATION HUT AS REQUIRED BY THE PLANS. SEE I.T.S. PLANS FOR LOCATIONS, TYPES, AND SIZES OF CONDUITS AND CONDUCTORS.
- ㉕ CONDUITS AND CONDUCTORS TO INDIVIDUAL LIGHT POLES. SEE ILLUMINATION PLANS FOR LOCATIONS, TYPES, AND SIZES OF CONDUITS AND CONDUCTORS.
- ㉖ PHOTO ELECTRIC CONTROL MOUNTED ATOP THE LUMINAIRE OF THE NEAREST LIGHT POLE. SEE ILLUMINATION PLANS FOR LOCATION OF PHOTO ELECTRIC CONTROL.
- ㉗ FIBER OPTIC LATERAL, MULTIDUCT (PVC) (4-1.25-INCH INNERDUCTS) TO FIBER OPTIC GROUND BOX, TYPE FO (484860), FOR FUTURE USE. CAP AT BOTH ENDS WITH THREADED PLUG. MULTI-DUCT CONDUIT IS SUBSIDIARY TO ITEM 628.
- ㉘ FIBER OPTIC GROUND BOX WITH APRON, TYPE FO (484860). SEE I.T.S. PLANS FOR LOCATION.
- ㉙ FIBER OPTIC CABLE BACKBONE, MULTIDUCT (PVC) (4-1.25-INCH INNERDUCTS). SEE I.T.S. PLANS FOR LOCATION.
- ㉚ CONDUIT AND CONDUCTORS CONNECTING THE I.T.S. PANELBOARD AND THE MINIPOWER ENCLOSURE SERVING I.T.S. AND LANDSCAPING EQUIPMENT. SEE I.T.S. AND LANDSCAPING PLANS FOR LOCATIONS, TYPES, AND SIZES OF CONDUITS AND CONDUCTORS.
- ㉛ 5-INCH THICK CONCRETE RIPRAP/APRON REINFORCED WITH #3 BARS AT 18-INCH ON CENTER EACH WAY. THE RIPRAP/APRON IS SUBSIDIARY TO VARIOUS BID ITEMS.
- ㉜ SEE NTTA ESC-002, SHEET 1 OF 1, FOR WIDTH OF PAD/FOUNDATION AND BAR LENGTH WHEN THE TYPE S ELECTRICAL SERVICE CENTER ENCLOSURE IS LOCATED ADJACENT TO THE SERVICE ENTRANCE TYPE S/E ENCLOSURE.

**TABLE 1 - EQUIPMENT INFORMATION.**

EQUIPMENT DESCRIPTION	MAXIMUM ENCLOSURE SPACE	MANUFACTURERS- SQUARE D, SIEMENS, OR APPROVED EQUAL	
		SQUARE D'S MODEL	SIEMENS'S MODEL
MDP PANELBOARD ⑦	32"Wx78"Hx16"D	I-LINE POWER DISTRIB. PANELBOARD, TYPE HCM	TYPE P4 PANEL
ILLUMINATION PANELBOARD ⑪	20"Wx38"Hx16"D	NF MERCHANDISED PANEL TYPE EDB	TYPE P1 PANEL
LIGHTING CONTACTOR ⑫	23"Wx40"Hx16"D	LIGHTING CONTROL, MULTIPOLE LIGHTING CONTACTORS, TYPE S	AC CONTROLS, LIGHT AND HEAT. CONTACT TYPE CLH
I.T.S. PANELBOARD ⑬	20"Wx32"Hx16"D	NF MERCHANDISED PANEL TYPE EDB	TYPE P1 PANEL
MINIPOWER ENCLOSURE (WITH TRANSFORMER AND PANELBOARD) ⑭	16"Wx33"Hx16"D	MINIPOWER ZONE	SENTRON POWER CENTER

**GENERAL NOTES:**

- 1. SEE NTTA ESC-005, SHEET 1 OF 2 FOR GENERAL NOTES, TYPICAL LAYOUT, PLAN AND ELEVATION, BAR DETAILS, AND CONCRETE ANCHORING DETAILS.

**TABLE 2 - MAIN DISTRIBUTION PANELBOARD (MDP) LAYOUT.**


400A/3P MAIN BREAKER				
LOAD DESCRIPTION	CT #	PHASE	CT #	LOAD DESCRIPTION
100A/3P GENERATOR BREAKER	1	A	2	200A/3P, LIGHTING CONTACTOR
	3	B	4	
	5	C	6	
80A/3P, 45KVA TRANSFORMER SERVING RAMP GENTRY#1 OR SPARE	7	A	8	100A/3P, I.T.S. PANELBOARD
	9	B	10	
	11	C	12	
80A/3P, 45KVA TRANSFORMER SERVING RAMP GENTRY#2 OR SPARE	13	A	14	80A/3P, 45 KVA TRANSFORMER SERVING COMMUNICATION HUT OR SPARE
	15	B	16	
	17	C	18	
80A/3P, 45KVA TRANSFORMER SERVING RAMP GENTRY#3 OR SPARE	19	A	20	80A/3P, SPARE
	21	B	22	
	23	C	24	
80A/3P, 45KVA TRANSFORMER SERVING RAMP GENTRY#4 OR SPARE	25	A	26	TVSS, SIZE BREAKER PER MANUFACTURER RECOMMENDATIONS
	27	B	28	
	29	C	30	

MODIFICATIONS:  
1. BUILT-IN TVSS;  
2. KEY INTERLOCK KIT FOR GENERATOR BREAKER AND MAIN BREAKER

NOTE: THE FOLLOWING SHOWS THE MAXIMUM DEMANDED LOAD THAT CAN BE USED WITHOUT MODIFYING THE ABOVE MAIN DISTRIBUTION PANELBOARD LAYOUT:

LOAD DESCRIPTION	CASE #1		CASE #2	
	VA	AMP	VA	AMP
LIGHTING	132,000	159	132,000	159
I.T.S.	47,400	57	47,400	57
COMMUNICATION HUT	36,000	43	---	---
RAMP GENTRY #1	36,000	43	36,000	43
RAMP GENTRY #2	36,000	43	36,000	43
RAMP GENTRY #3	---	---	36,000	43
RAMP GENTRY #4	---	---	36,000	43
SPARE	41,000	50	4,000	5
TOTAL	328,400	395	328,400	395

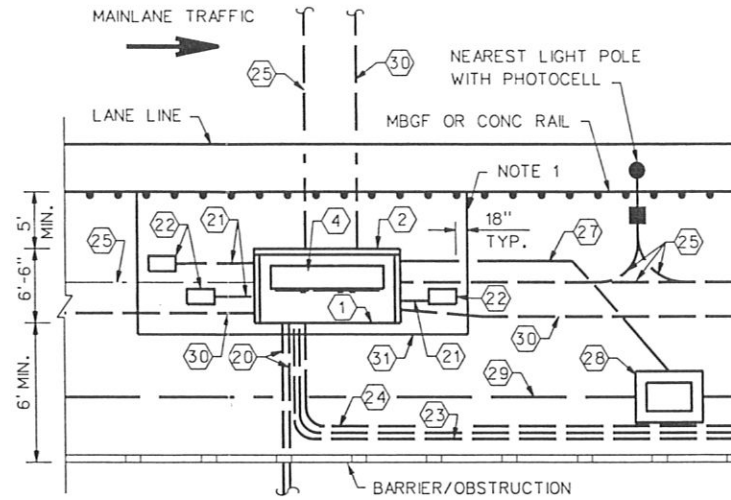
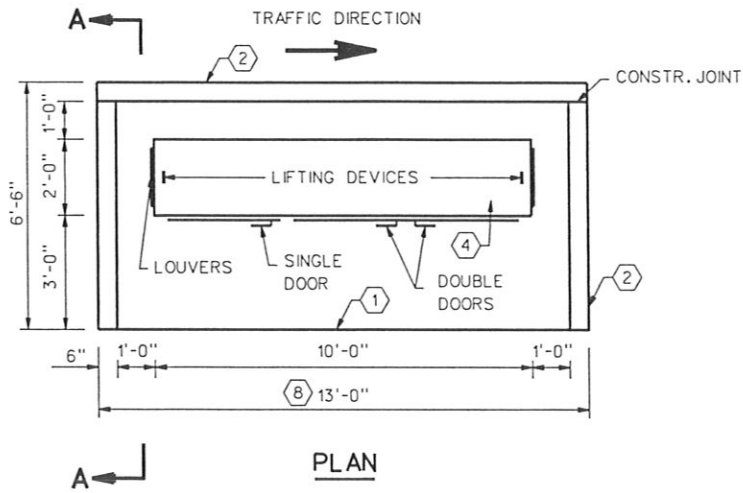
**DRAFT**

NO.		DATE		REVISION		APPROV.	
 NORTH TEXAS TOLLWAY AUTHORITY							
<b>ELECTRICAL SERVICE CENTER TYPE S ENCLOSURE, 400 AMP</b> ESC-005(2)-2009							
DRAWN	IEL	DATE	12-30-09	DESIGNED	IEL	DATE	12-30-09
CHECKED	RW	DATE	12-30-09	SCALE			NTS
CONTRACT NO.				SHEET ____ OF ____			

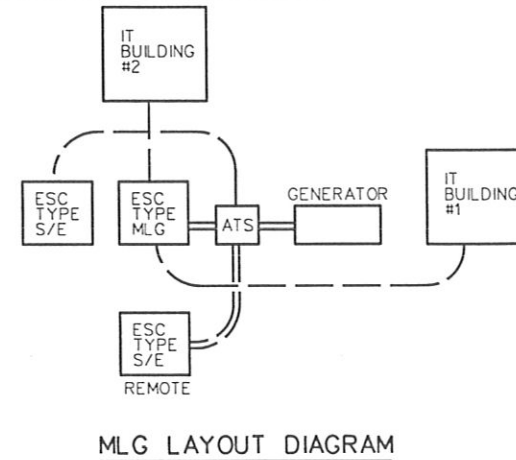
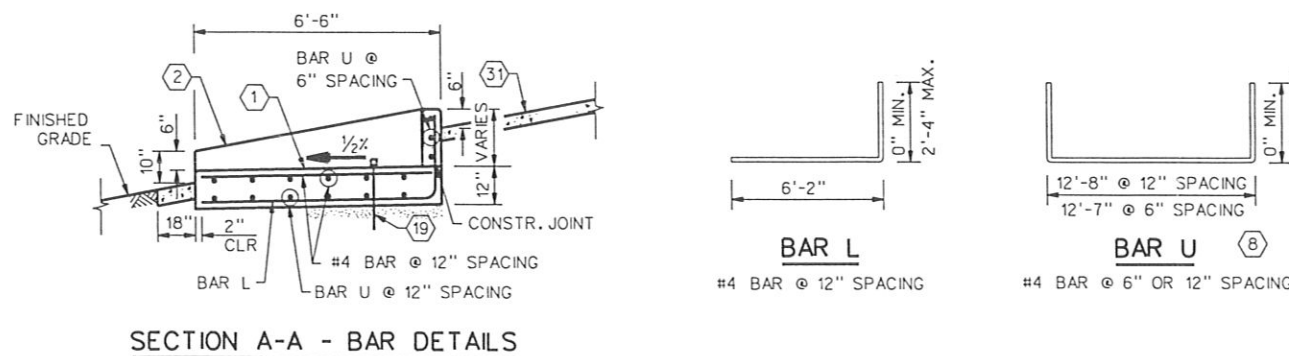
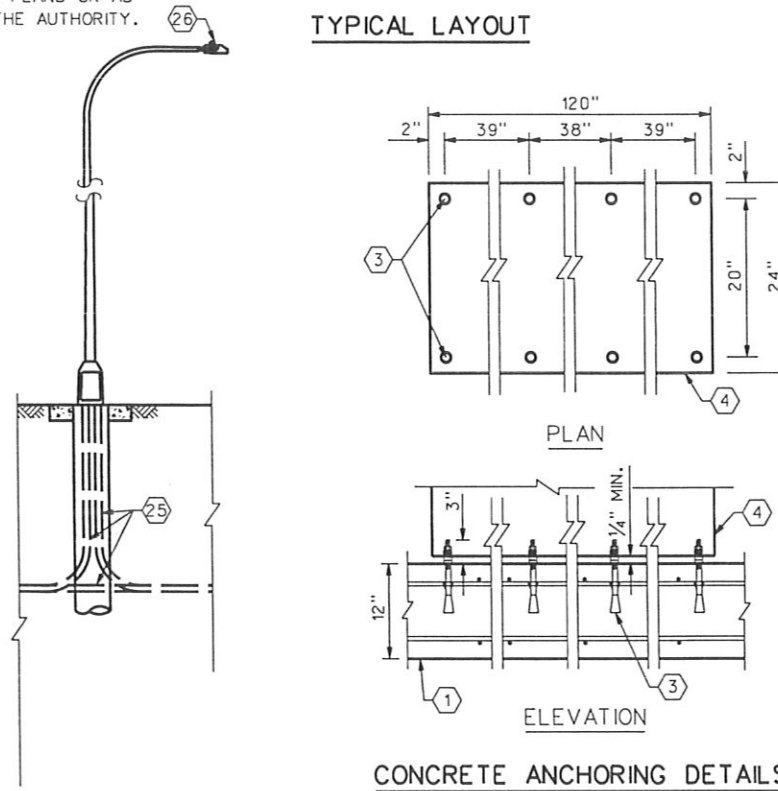
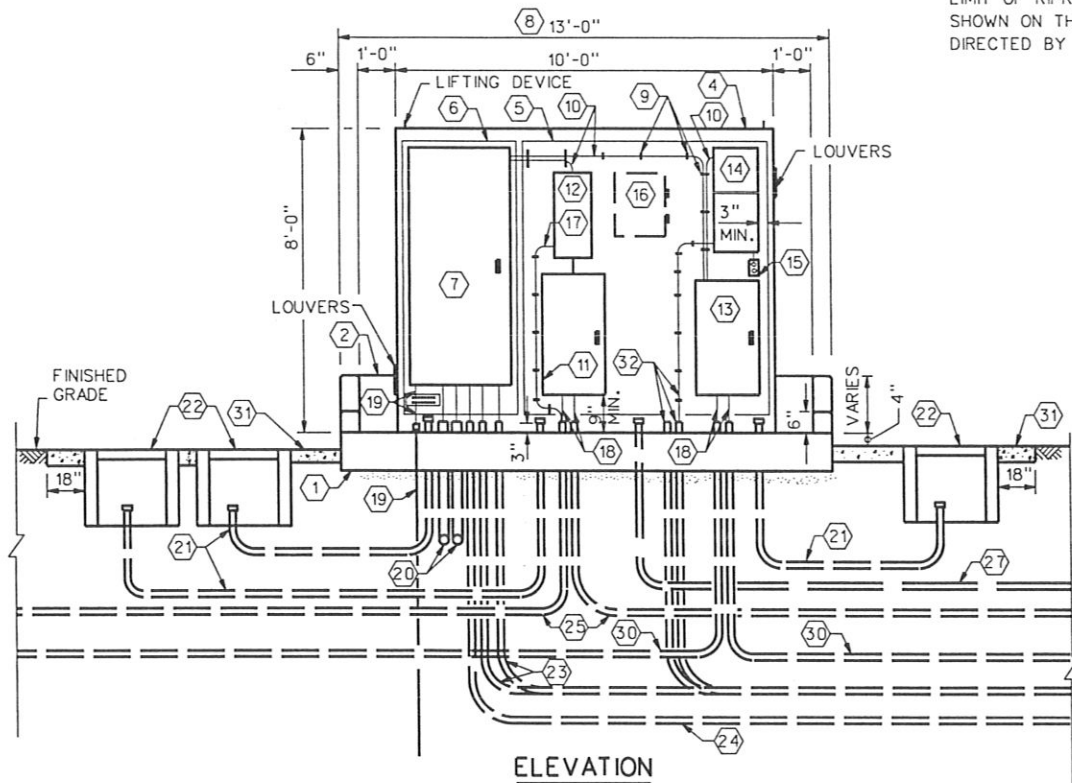
12/30/2009 H:\AAI-Proj\1109\3009-15 NTTA STANDARDS Update\ESC\2009\3PH\DGN\Sheet Files\ESC-005(2)-2009.dgn

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by NTTA for any purpose whatsoever. NTTA assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

12/30/2009 H:\AAI-Proj\1109\3009-15 NTTA STANDARDS Update\ESC\2009\3PH\DCN\Sheet Files\ESC-006(1)-2009.dgn



NOTE 1:  
LIMIT OF RIPRAP WILL BE SHOWN ON THE PLANS OR AS DIRECTED BY THE AUTHORITY.



**GENERAL NOTES:**

- TYPE MLG ELECTRICAL SERVICE CENTER ENCLOSURE PROVIDES POWER FOR ROADWAY ILLUMINATION, I.T.S. EQUIPMENT, AND MAINLANE GANTRY STRUCTURES.
- TYPE MLG ELECTRICAL SERVICE CENTER ENCLOSURE WILL BE PAID FOR UNDER ITEM 628 AT THE UNIT PRICE BID FOR: "ELC SRV TY MLG (480)400A(SS)PS(U)".
- SEE NTTA ESC-006, SHEET 2 OF 2 FOR KEYED NOTES.
- SEE TABLE 1 ON NTTA ESC-006, SHEET 2 OF 2, FOR RECOMMENDED MODELS AND MANUFACTURERS OF DIFFERENT TYPES OF EQUIPMENT.
- SEE NTTA ESC-001 FOR GENERAL NOTES INFORMATION.
- SEE NTTA ESC-002 FOR SERVICE ENTRANCE ENCLOSURE DETAILS, TYPE S/E. THE SERVICE ENTRANCE ENCLOSURE TYPE S/E IS REQUIRED AND PAID SEPARATE.
- SEE NTTA ESC-003 FOR MINIPOWER ENCLOSURE DETAILS, TYPE MPE.
- SEE NTTA ITS-002 FOR TYPE FO GROUND BOX DETAILS.
- SEE NTTA RID STANDARDS FOR LIGHT POLE DETAILS.
- SEE NTTA MLG STANDARDS FOR MAINLANE GANTRY DETAILS.
- SEE TxDOT ED (3) FOR TYPE D GROUND BOX DETAILS.
- CONDUITS SHALL BE IN ACCORDANCE WITH ITEM 618.
- CONDUCTORS SHALL BE IN ACCORDANCE WITH ITEM 620.
- SERVICE PAD/FOUNDATION SHALL BE IN ACCORDANCE WITH ITEM 656. PROVIDE CLASS "C" CONCRETE.
- RIPRAP SHALL BE IN ACCORDANCE WITH ITEM 432.
- ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
- OMIT 6" THICK WALL WHEN THE ELECTRICAL SERVICE CENTER TYPE MLG ENCLOSURE IS LOCATED ON TRANSVERSE OR LONGITUDINAL SLOPE 20:1 OR FLATTER.
- DO NOT LOCATE THE ELECTRICAL SERVICE CENTER TYPE MLG ENCLOSURE IN A FLOW LINE OF A DITCH.
- DO NOT LOCATE THE ELECTRICAL SERVICE CENTER TYPE MLG ENCLOSURE IN AN AREA WHERE TRANSVERSE SLOPE IS STEEPER THAN 4:1.
- MINIMUM BAR LAPPING = 1'-6".
- PLACE 9 INCHES (9") MINIMUM GRAVEL BED UNDERNEATH ALL GROUND BOXES.
- PLACE 2 INCHES (2") MINIMUM SAND BED UNDERNEATH THE ENCLOSURE'S PAD.

**DRAFT**

NO.	DATE	REVISION	APPROV.
 NORTH TEXAS TOLLWAY AUTHORITY			
<b>ELECTRICAL SERVICE CENTER TYPE MLG ENCLOSURE, 400A</b>			
<b>ESC-006(1)-2009</b>			
DRAWN	EEL	DATE 12-30-09	DESIGNED
CHECKED	RW	DATE 12-30-09	SCALE
			DATE 12-30-09
			NTS
CONTRACT NO.		SHEET ____ OF ____	

**KEYED NOTES (ELECTRICAL SERVICE CENTER TYPE MLG):**

- ① 12-INCH THICK SERVICE PAD/FOUNDATION.
- ② 6-INCH THICK WALL WHEN TRANSVERSE OR LONGITUDINAL SLOPE IS STEEPER THAN 20:1. THE WALL IS SUBSIDIARY TO ITEM 628.
- ③ STAINLESS STEEL HEX NUT, LOCK WASHER, FLAT WASHER, AND CONCRETE WEDGE ANCHORS. USE 1" DIA. CONCRETE WEDGE ANCHORS WITH 6" MINIMUM EMBEDMENT IN THE CONCRETE. TYPICAL.
- ④ ELECTRICAL SERVICE CENTER (ESC) ENCLOSURE TYPE MLG. 120"WX96"HX24"D ENCLOSURE, 10 GAUGE, TYPE 316 STAINLESS STEEL, NEMA 3R ENCLOSURE. ENCLOSURE SHALL HAVE 3-DOORS (ONE SET OF DOUBLE-DOORS AND ONE SINGLE DOOR), DOOR HANDLES, PADLOCK PROVISION, LIFTING DEVICES, AND TWO LOUVER PLATES MOUNTED ON THE SIDES FOR VENTILATION. EACH LOUVER PLATE ASSEMBLY SHALL HAVE A MINIMUM AREA OF 18"WX9"H WITH AT LEAST 6 LOUVERS AND A STAINLESS STEEL 18X14 INSECT SCREEN MESH MADE OF 0.011-INCH DIAMETER WIRE. SEE PLANS FOR LOCATION.
- ⑤ MOUNTING PANEL OR BACKBOARD PANEL. 78"WX 86"H TYPICAL FOR DOUBLE-SECTION.
- ⑥ MOUNTING PANEL OR BACKBOARD PANEL. 36"WX 86"H TYPICAL FOR SINGLE SECTION.
- ⑦ 400 AMP MAIN DISTRIBUTION PANELBOARD (MDP) WITH PROVISIONS FOR BUILT-IN TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS). THE MDP SHALL BE NEMA 1 ENCLOSURE, 480Y/277 VAC, 3-PHASE, 4-WIRE, 400A MAIN BREAKER, SHORT CIRCUIT RATING OF 35 KAIC, COPPER BUS, GROUND BAR, BOLT-ON CIRCUIT BREAKERS AND 30-POLE CAPACITY PANELBOARD. TVSS SHALL HAVE 200 KA SURGE CURRENT PER PHASE. BRANCH CIRCUIT BREAKERS ARE FULL SIZE, BOLT-IN BREAKERS, THERMAL MAGNETIC, 480 VAC, SHORT CIRCUIT RATING OF 35 KAIC, AND VARIES IN AMPERAGE. SEE TABLE 2 FOR CIRCUIT BREAKER LAYOUT.
- ⑧ SEE NTTA ESC-002, SHEET 1 OF 1, FOR WIDTH OF PAD/FOUNDATION AND BAR LENGTH WHEN THE TYPE MLG ELECTRICAL SERVICE CENTER ENCLOSURE IS LOCATED ADJACENT TO THE SERVICE ENTRANCE TYPE S/E ENCLOSURE.
- ⑨ METAL DISTRIBUTION RINGS TYPICAL, "D" TYPE. SIZE VARIES WITH 2-INCH MINIMUM.
- ⑩ PROVIDE XHHW-2 TYPE CONDUCTOR AS INDICATED.
- ⑪ ILLUMINATION PANELBOARD, 125 AMP MAIN LUGS ONLY (MLO), NEMA 1 ENCLOSURE, 480Y/277 VAC, 3-PHASE, 4-WIRE, COPPER BUS, GROUND BAR, AND 30-POLE CAPACITY PANELBOARD FED FROM MAIN DISTRIBUTION PANEL MDP THROUGH LIGHTING CONTACTOR WITH 4#2'S AND 1#8 GROUND. BRANCH CIRCUIT BREAKER SHALL BE FULL SIZE 20-AMP MINIMUM, 2-POLE, BOLT-IN BREAKERS, THERMAL MAGNETIC, AND SHALL HAVE SHORT CIRCUIT RATING OF 35 KAIC OR BETTER. SEE ILLUMINATION PLANS FOR LIGHTING PANELBOARD LAYOUT.
- ⑫ LIGHTING CONTACTOR ENCLOSURE WITH BUILT-IN HAND-OFF-AUTOMATIC (H-O-A) SWITCH. 100A, 480 VAC, 3-PHASE, 3-POLE, NEMA 1 ENCLOSURE, UL RATED, AND ELECTRICALLY HELD. 480 VAC COL, FED FROM MAIN DISTRIBUTION PANEL MDP WITH 4#2'S AND 1#8 GROUND.
- ⑬ I.T.S. PANELBOARD, 125 AMP MAIN LUGS ONLY (MLO), NEMA 1 ENCLOSURE, 480Y/277 VAC, 3-PHASE, 4-WIRE, COPPER BUS, GROUND BAR, AND 18-POLE CAPACITY PANELBOARD FED FROM MAIN DISTRIBUTION PANEL MDP WITH 4#2'S AND 1#8 GROUND. BRANCH CIRCUIT BREAKERS SHALL BE FULL SIZE 40-AMP MINIMUM, 2-POLE, BOLT-IN BREAKERS, THERMAL MAGNETIC, AND SHALL HAVE SHORT CIRCUIT RATING OF 35 KAIC OR BETTER. SEE I.T.S. PLANS FOR PANELBOARD LAYOUT.
- ⑭ 10 KVA MINIPOWER ENCLOSURE FED FROM I.T.S. PANELBOARD WITH 2#8'S AND 1#10 GROUND, SINGLE-PHASE, NEMA 1 ENCLOSURE. THIS DRY-TYPE TRANSFORMER CONVERTS 480 VAC TO 120/240 VAC SERVING 3 WIRE PANELBOARD SECTION. PROVIDE TEN (10) 20 AMP/1-POLE CIRCUIT BREAKERS. PROVIDE TRANSFORMER SECONDARY GROUNDING CONNECTION TO GROUND ROD WITH 1#8 CONDUCTOR.
- ⑮ 20A, 120V DUPLEX GROUND FAULT CIRCUIT INTERRUPTER, GFCI, RECEPTACLE, CAST ALUMINUM BOX WITH NEMA 1 COVER. USE #12 AWG XHHW-2 CONDUCTORS.
- ⑯ FUTURE ELECTRICAL AND LIGHTING MANAGEMENT SYSTEM (ELMS) TO BE INSTALLED BY OTHERS.
- ⑰ #8 MINIMUM XHHW-2 CONDUCTORS CONNECTING THE CONTACTOR AND THE PHOTO ELECTRIC CONTROL MOUNTED ATOP THE NEAREST LIGHT POLE LUMINAIRE. PHOTO ELECTRIC CONTROL CONDUCTORS WILL SHARE SAME CONDUIT AS ILLUMINATION CONDUCTORS. SEE ILLUMINATION PLANS FOR LOCATION OF PHOTO ELECTRIC CONTROL.
- ⑱ TYPE XHHW-2 CONDUCTORS. SEE ILLUMINATION PLANS AND I.T.S. PLANS FOR PROPER SIZES.
- ⑲ GROUNDING SYSTEM SHALL INCLUDE, 3/4" DIA. x 10 LF COPPER-CLAD STEEL GROUND ROD, PREDRILLED RECTANGULAR GROUNDING BUS OF ANNEALED COPPER, 1/4-INCH THICK, WITH 3/8-INCH HOLES SPACED 1-1/8-INCHES APART AND (4)1-1 INCH STAND OFF INSULATORS FOR MOUNTING WHICH COMPLIES WITH UL891 FOR USE IN SWITCHBOARDS, AND EQUIPMENT GROUNDING CONDUCTOR.

- ⑳ AN EMERGENCY GENERATOR IS REQUIRED. REFER TO PLANS FOR LOCATION OF THE AUTOMATIC TRANSFER SWITCH (ATS). TWO (2) 3-INCH SCHEDULE 40 PVC CONDUITS AND XHHW-2 CONDUCTORS CONNECTING THE MAIN DISTRIBUTION PANELBOARD MDP AND THE ATS SHALL TERMINATE AT THE ATS LOCATION. PROVIDE 10 FEET OF ADDITIONAL XHHW-2 CONDUCTORS COILED AND SECURED AT THE ATS STUB UP LOCATION. GENERATOR AND ATS WILL BE PAID FOR IN ACCORDANCE WITH ITEM 858. CONDUCTORS IN EACH CONDUIT SHALL BE 4#3/0 AND 1#2 GROUND MINIMUM. CONDUIT AND CONDUCTORS WILL BE SUBSIDIARY TO ITEM 658.
- ㉑ 2-INCH SCHEDULE 40 PVC CONDUIT WITH 5/8-INCH POLYESTER, 1800 LB PULL TAPE TO GROUND BOX, TYPE D, FOR FUTURE USE. CAP AT BOTH ENDS WITH THREADED PLUG. CONDUIT IS SUBSIDIARY TO ITEM 628.
- ㉒ POWER GROUND BOX, TYPE D WITH APRON, FOR FUTURE USE. THE AUTHORITY WILL SPECIFY THE LOCATION OF GROUND BOX IF NOT SHOWN ON THE PLANS. GROUND BOX IS SUBSIDIARY TO ITEM 628. BOX SHALL BE LOCATED IN AN ACCESSIBLE AREA.
- ㉓ CONDUIT AND CONDUCTORS SERVING MAINLANE GANTRY IT BUILDING #1 TRANSFORMER DISCONNECT. SEE MAINLANE GANTRY PLANS FOR LOCATIONS, TYPES, AND SIZES OF CONDUITS AND CONDUCTORS. CONDUITS AND CONDUCTORS WILL BE PAID FOR IN ACCORDANCE WITH ITEM 858.
- ㉔ CONDUIT AND CONDUCTORS SERVING MAINLANE GANTRY IT BUILDING #2 TRANSFORMER DISCONNECT. SEE MAINLANE GANTRY PLANS FOR LOCATIONS, TYPES, AND SIZES OF CONDUITS AND CONDUCTORS. CONDUITS AND CONDUCTORS WILL BE PAID FOR IN ACCORDANCE WITH ITEM 858.
- ㉕ CONDUIT AND CONDUCTORS TO INDIVIDUAL LIGHT POLES. SEE ILLUMINATION PLANS FOR LOCATIONS, TYPES, AND SIZES OF CONDUITS AND CONDUCTORS.
- ㉖ PHOTO ELECTRIC CONTROL MOUNTED ATOP THE LUMINAIRE OF THE NEAREST LIGHT POLE. SEE ILLUMINATION PLANS FOR LOCATION OF PHOTO ELECTRIC CONTROL.
- ㉗ FIBER OPTIC LATERAL, MULTIDUCT (PVC) (4-1.25-INCH INNERDUCTS) TO FIBER OPTIC GROUND BOX, TYPE FO (484860), FOR FUTURE USE. CAP AT BOTH ENDS WITH THREADED PLUG. MULTI-DUCT CONDUIT IS SUBSIDIARY TO ITEM 628.
- ㉘ FIBER OPTIC GROUND BOX WITH APRON, TYPE FO (484860). SEE I.T.S. PLANS FOR LOCATION.
- ㉙ FIBER OPTIC CABLE BACKBONE, MULTIDUCT (PVC) (4-1.25-INCH INNERDUCTS). SEE I.T.S. PLANS FOR LOCATION.
- ㉚ CONDUIT AND CONDUCTORS CONNECTING THE I.T.S. PANELBOARD AND THE MINIPOWER ENCLOSURE SERVING I.T.S. AND LANDSCAPING EQUIPMENT. SEE I.T.S. AND LANDSCAPING PLANS FOR LOCATIONS, TYPES, AND SIZES OF CONDUITS AND CONDUCTORS.
- ㉛ 5-INCH THICK CONCRETE RIPRAP/APRON REINFORCED WITH #3 BARS AT 18-INCH ON CENTER EACH WAY. THE RIPRAP/APRON IS SUBSIDIARY TO VARIOUS BID ITEMS.
- ㉜ CONDUITS AND CONDUCTORS SERVING MAINLANE GANTRY GENERATOR BLOCK HEATER AND BATTERY CHARGER. SEE MAINLANE GANTRY PLANS FOR LOCATIONS, TYPES, AND SIZES OF CONDUITS AND CONDUCTORS. CONDUITS AND CONDUCTORS WILL BE PAID FOR IN ACCORDANCE WITH ITEM 858.

**GENERAL NOTES:**

- 1. SEE NTTA ESC-006, SHEET 1 OF 2 FOR GENERAL NOTES, TYPICAL LAYOUT, PLAN AND ELEVATION, BAR DETAILS, AND CONCRETE ANCHORING DETAILS.
- 2. A SIGN SHALL BE PERMANENTLY PLACED PER THE NEC FOR EMERGENCY POWER PANELS AND ENCLOSURES WHEN CONNECTED TO AN EMERGENCY SYSTEM WITH THE WORDS "EMERGENCY SYSTEM".

**TABLE 2 - MAIN DISTRIBUTION PANELBOARD (MDP) LAYOUT.**

400A/3P MAIN BREAKER				
	CT #	PHASE	CT #	LOAD DESCRIPTION
80A/3P, 45KVA TRANSFORMER SERVING MAINLANE GANTRY IT BUILDING #1	1	A	2	100A/3P, LIGHTING CONTACTOR
	3	B	4	
	5	C	6	
80A/3P, 45KVA TRANSFORMER SERVING MAINLANE GANTRY IT BUILDING #2	7	A	8	100A/3P, I.T.S. PANELBOARD
	9	B	10	
	11	C	12	
80A/3P, SPARE	13	A	14	80A/3P, SPARE
	15	B	16	
	17	C	18	
80A/3P SPARE	19	A	20	80A/3P, SPARE
	21	B	22	
	23	C	24	
80A/3P SPARE	25	A	26	TVSS, SIZE BREAKER PER MANUFACTURER RECOMMENDATIONS
	27	B	28	
	29	C	30	

MODIFICATIONS:  
1. BUILT-IN TVSS


NOTE: THE FOLLOWING SHOWS THE MAXIMUM DEMANDED LOAD THAT CAN BE USED WITHOUT MODIFYING THE ABOVE MAIN DISTRIBUTION PANELBOARD LAYOUT:

LOAD DESCRIPTION	DEMANDED LOAD	
	VA	AMP
LIGHTING	66,000	80
I.T.S.	47,400	57
IT BUILDING #1	36,000	43
IT BUILDING #2	36,000	43
SPARE	143,000	172
TOTAL	328,400	395

**TABLE 1 - EQUIPMENT INFORMATION.**

EQUIPMENT DESCRIPTION	MAXIMUM ENCLOSURE SPACE	MANUFACTURERS- SQUARE D, SIEMENS, OR APPROVED EQUAL	
		SQUARE D'S MODEL	SIEMENS'S MODEL
MDP PANELBOARD ⑦	32"Wx78"Hx16"D	I-LINE POWER DISTRIB. PANELBOARD, TYPE HCM	TYPE P4 PANEL
ILLUMINATION PANELBOARD ⑪	20"Wx38"Hx16"D	NF MERCHANDISED PANEL TYPE EDB	TYPE P1 PANEL
LIGHTING CONTACTOR ⑫	23"Wx40"Hx16"D	LIGHTING CONTROL, MULTIPOLE LIGHTING CONTACTORS, TYPE S	AC CONTROLS, LIGHT AND HEAT, CONTACT TYPE CLH
I.T.S. PANELBOARD ⑬	20"Wx32"Hx16"D	NF MERCHANDISED PANEL TYPE EDB	TYPE P1 PANEL
MINIPOWER ENCLOSURE (WITH TRANSFORMER AND PANELBOARD) ⑭	16"Wx33"Hx16"D	MINIPOWER ZONE	SENTRON POWER CENTER

**DRAFT**

NO.	DATE	REVISION	APPROV.
 NORTH TEXAS TOLLWAY AUTHORITY			
<b>ELECTRICAL SERVICE CENTER TYPE MLG ENCLOSURE, 400A</b> ESC-006(2)-2009			
DRAWN IEL	DATE 12-30-09	DESIGNED IEL	DATE 12-30-09
CHECKED RW	DATE 12-30-09	SCALE	NTS
CONTRACT NO. _____		SHEET _____ OF _____	

DISCLAIMER: The use of this standard is governed by the "Texas Engineering Practice Act". No warranty of any kind is made by NTTA for any purpose whatsoever. NTTA assumes no responsibility for the conversion of this standard to other formats or for incorrect results or damages resulting from its use.

12/30/2009 H:\AAI-Proj\1109\3009-15 NTTA STANDARDS Update\ESC\2009\3PH\DGN\Sheet Files\ESC-006(2)-2009.dgn