

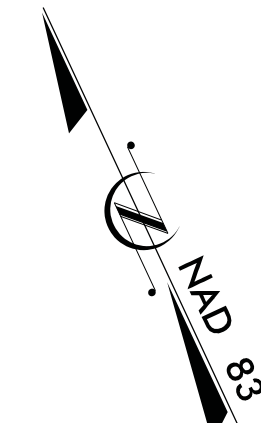
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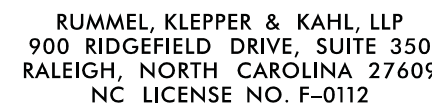
ITS PLAN

MECKLENBURG AND UNION COUNTIES

RFC ITS PLANS
SUBMITTAL NO. S-561R1
DATE: 12-07-2016



PLANS PREPARED BY :



OCTOBER 28, 2010

Stephen E. Roberts, P.E.
PROJECT DESIGN ENGINEER

NCDOT Contact: Sherry Yow

**SEE SHEET IT-02 FOR
INDEX OF SHEETS**

INDEX OF SHEETS

SHEET

DESCRIPTION

IT-01	Title Sheet
IT-02	Index of Sheets /Roadway Standard Drawings
IT-03	General Notes /Legend /Abbreviations
IT-04	Equipment Installation Summary
IT-05	System/Network Block Diagram
CS-01	ITS Communications Schematic
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SD-01	Conduit & Fiber Optic Cable into AET Vaults
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NCTA AET Standard Drawing C-1	Typical Mainline AET Toll Zone Plan View
NCTA AET Standard Drawing A-1	AET Toll Zone Vault Plan
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NCTA AET Standard Drawing A-3	Typical AET Toll Zone Gantry Elevations
NCTA AET Standard Drawing E-4	AET Toll Zone Cabinets with Concrete Pads
NCTA AET Standard Drawing E-5	Toll Zone Vault Electrical Plan
NCTA AET Standard Drawing E-6	AET Toll Zone Vault Conduit Plan
NCTA ITS Standard Detail V-1	CCTV – Block Diagram
NCTA ITS Standard Detail V-2	CCTV – Steel Pole
NCTA ITS Standard Detail V-3	CCTV – Pole Grounding
NCTA ITS Standard Detail V-4	CCTV – Pole Mounted Cabinet
NCTA ITS Standard Detail V-5	CCTV – Camera Lowering Device
NCTA ITS Standard Detail V-6	CCTV – Cabinet Layout
NCTA ITS Standard Detail D-1	DMS – Block Diagram
NCTA ITS Standard Detail D-2A	DMS – Typical Mounting – AET Gantry Structure
NCTA ITS Standard Detail D-2B	DMS – Typical Mounting – On-site DMS Not at Toll Zone
NCTA ITS Standard Detail D-2C	DMS – Typical Mounting – Off-site DMS
NCTA ITS Standard Detail D-3	DMS – Electrical Service and Grounding
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INDEX OF SHEETS

SHEET

DESCRIPTION

NCTA ITS Standard Detail R-1	RWIS – Block Diagram
NCTA ITS Standard Detail R-2	RWIS – Elevation View
NCTA ITS Standard Detail R-3	RWIS – Grounding
NCTA ITS Standard Detail P-1	Power Service Detail – Ground Mounted Cabinet
NCTA ITS Standard Detail P-2	Power Service Detail – Pole Mounted Cabinet


ROADWAY STANDARD DRAWINGS

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - PROJECT SERVICES UNIT - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2012 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:


STD. NO.	TITLE
1101.01	WORK ZONE ADVANCED WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.03	TEMPORARY ROAD CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.02	PORTABLE WORK ZONE SIGNS
1115.01	FLASHING ARROW BOARDS
1130.01	DRUM
1135.01	CONES
1145.01	BARRICADES
1150.01	FLAGGING DEVICES
1165.01	WORK VEHICLE LIGHTING SYSTEMS AND TMA DELINEATION
1180.01	SKINNY-DRUM
1700.01	ELECTRICAL SERVICE OPTIONS
1700.02	ELECTRICAL SERVICE GROUNDING
1715.01	UNDERGROUND CONDUIT – TRENCHING
1716.01	JUNCTION BOXES
1720.01	WOOD POLES
1725.01	INDUCTIVE DETECTION LOOPS

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NC LICENSE NO. E-0112













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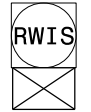

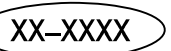


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<div>Prepared for the Offices of:</div> <div></div>	Monroe Bypass - ITS Plans Index of Sheets / Roadway Standard Drawings		<div>SEAL</div> <div> Lisa M. Moon 12/7/2016 DATE</div>		
	Division 10	Union County		near Monroe	
	PLAN DATE: September 2016	REVIEWED BY: LM Moon			
	PREPARED BY: R Nissen	REVIEWED BY: JE Beck			
	SCALE N.T.S.	REVISIONS	INIT.	DATE	CADD Filename:

LEGEND

	NEW CONDUIT
	EXISTING CONDUIT
	NEW DIRECTIONAL DRILLED CONDUIT
	NEW BORED AND JACKED CONDUIT
	NEW STANDARD SIZED JUNCTION BOX
	EXISTING STANDARD SIZED JUNCTION BOX
	NEW OVERSIZED OR SPECIAL SIZED JUNCTION BOX
	EXISTING OVERSIZED OR SPECIAL SIZED JUNCTION BOX
	NEW STANDARD SIZED JUNCTION BOX FOR POWER
	METER WITH DISCONNECT IN COMBINATION PEDESTAL
	EQUIPMENT DISCONNECT
	TRANSFORMER WITH EQUIPMENT DISCONNECT

	NEW SPLICE ENCLOSURE
	NEW METAL POLE
	EXISTING METAL POLE
	NEW CCTV CAMERA ASSEMBLY
	NEW DMS
	NEW RWIS
	NEW CONTROLLER AND CABINET
	ITS DEVICE NUMBER
	VEHICLE DETECTION SYSTEM

ABBREVIATIONS

AET	All-Electronic Tolling
AVC	Automatic Vehicle Classification
AVI	Automatic Vehicle Identification
C	Conduit
CCTV	Closed-Circuit Television
C/L	Centerline
DMS	Dynamic Message Sign
ELEC	Electric
EOP	Edge of Pavement
EQ	Equal Distance
FO	Fiber Optic
FON	Fiber Optic Network (includes conduit, fiber, boxes, etc.)
GFI	Ground Fault Interrupter
ITS	Intelligent Transportation Systems
LD	Lowering Device
LI	Lead-in Cable (Detector)
LPS	Lightning Protection System
NCDOT	North Carolina Department of Transportation
NCTA	North Carolina Turnpike Authority
NEC	National Electric Code
NEMA	National Electrical Manufacturers Association
NFPA	National Fire Protection Association
OH	Overhead
RFP	Request for Proposals
R/W	Right-of-Way
RWIS	Roadside Weather Information System
SOW	Scope of Work
SPD	Surge Protection Device
TMC	Traffic Management Center
TOLL	NC Turnpike Authority
TYP	Typical
UG	Underground
UL	Underwriters Laboratories
UPS	Uninterruptable Power Supply
VDS	Vehicle Detection System
ZEC	Zone Equipment Cabinet

GENERAL NOTES

1.

THE FIELD LOCATION OF ANY ITEM TO BE INSTALLED AS PART OF THIS PROJECT SHALL BE APPROVED BY THE ENGINEER PRIOR TO INSTALLATION.
2.

PIPELINES, STORM SEWERS, POWER CABLES, UTILITY CABLES, BASEMENTS, AND OTHER PUBLICLY AND PRIVATELY OWNED UNDERGROUND OBSTRUCTIONS EXIST ADJACENT TO AND WITHIN THE STREET RIGHT-OF-WAY WITHIN THE CONSTRUCTION LIMITS OF THIS PROJECT. INVESTIGATE THE LOCATION OF SUCH BURIED UTILITIES AND STRUCTURES WITH PUBLIC AND PRIVATE UTILITIES. CALL 811 (1-800-632-4949) OR VISIT WWW.NC811.ORG FOR UTILITY LOCATIONS.
3.

THE PLAN SHEETS HAVE BEEN DEVELOPED AS CLOSE TO SCALE AS PRACTICAL. HOWEVER, ACTUAL FIELD CONDITIONS SHALL PROVIDE THE BASIS FOR APPLYING THE WORK SHOWN.
4.

THE ROADWAY STANDARD DRAWINGS AND THE DETAILS PROVIDED IN THIS PLAN SET SHALL ALL APPLY TO ALL WORK REQUIRED IN THIS PROJECT, WHETHER A PARTICULAR DETAIL IS SPECIFICALLY REFERENCED TO A WORK ITEM OR NOT. IN THE EVENT OF A CONFLICT, THE ORDER OF PRECEDENCE SHALL BE: THE PROJECT SPECIAL PROVISIONS, THE PLAN SET INCLUDING DETAILS SUPPLEMENTAL SPECIFICATIONS, THE NCTA AET STANDARD DRAWINGS, THE NCTA ITS STANDARD DRAWINGS, THE STANDARD SPECIFICATIONS, AND THEN THE ROADWAY STANDARD DRAWINGS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR APPLYING THE PROPER DETAILS.
5.

ANY OF THE CONTRACTOR’S WORK ACTIVITIES WHICH IMPACT ANY UTILITY FACILITY SHALL BE COORDINATED WITH THE OWNER OF THE AFFECTED UTILITIES. THE CONTRACTOR SHALL FOLLOW ANY AND ALL WORK PROCEDURES THE UTILITY OWNERS MAY REQUIRE.
6.

ALL WORK SHOWN ON THESE PLANS SHALL BE PERFORMED BY THE CONTRACTOR UNLESS SPECIFICALLY NOTED TO BE PERFORMED BY OTHERS.
7.

SEE SIGNING PLANS FOR ADDITIONAL DETAILS ON DMS LOCATIONS.
8.

SEE GANTRY PLANS FOR ADDITIONAL DETAILS.
9.

OVERSIZED JUNCTION BOXES TO BE PLACED APPROXIMATELY 1500 FEET APART UNLESS OTHERWISE NOTED ON PLANS.
10.

ELECTRICAL SERVICE WIRES ARE SHOWN SCHEMATICALLY TO THE CONTROLLER CABINET. INSTALL SERVICE WIRES FROM METER/DISCONNECT EITHER DIRECTLY TO CABINET OR TO SECOND EQUIPMENT DISCONNECT AND THEN TO CABINET, AS SHOWN ON PLANS.
11.

THE CONTRACTOR MAY, AT HIS OPTION, INSTALL THE CONDUIT WITH TRENCHING IN LIEU OF DIRECTION DRILL, IF INSTALLATION IS PERFORMED BEFORE THE NEW ROADWAY PAVEMENT IS INSTALLED.
12.

CONDUIT FOR ITS AND TOLL TRUNK LINE WILL BE INSTALLED ALONG LENGTH OF PROJECT. TWO CONDUITS (ONE FOR CABLE, ONE SPARE) WILL BE PROVIDED FOR EACH. FOLLOW COLOR CODE BELOW FOR CONDUIT INSTALLATION. CONDUIT ROUTING FROM TRUNK LINE SHALL FOLLOW COLOR CODE BASED ON CABLES IN CONDUIT AS SHOWN ON THE PLAN SHEETS.
13.

CONDUIT RUNS ARE SHOWN IN APPROXIMATE LOCATIONS. CONTRACTOR SHALL LOCATE CONDUIT IN A MANNER THAT AVOIDS CONFLICT WITH ALL EXISTING AND PROPOSED FEATURES AS FIELD CONDITIONS DICTATE.

CONDUIT COLOR CODE

ITS CABLE – BLACK
ITS SPARE – ORANGE
TOLL CABLE – BLUE
TOLL SPARE – BLACK WITH WHITE STRIPES
POWER SERVICE – GREY
LEAD-IN – BLACK WITH WHITE STRIPES

ALL CONDUIT AND WIRING SHOWN FOR ELECTRICAL SERVICE IS INCOMPLETE. WHERE SHOWN IT IS ONLY AS A PLACEHOLDER FOR FUTURE DESIGN.


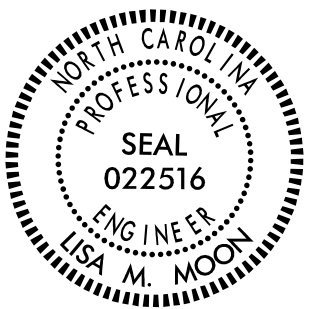
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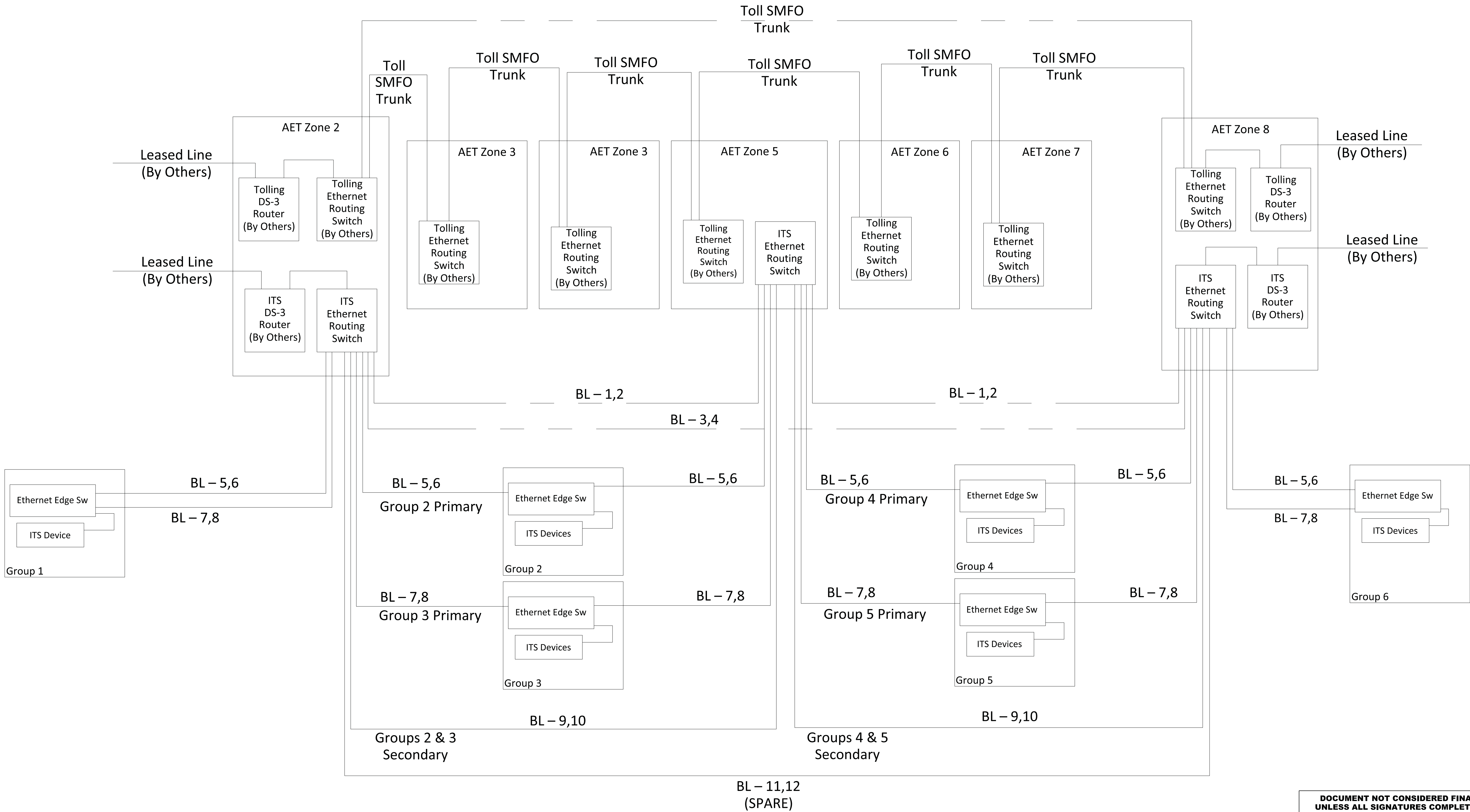
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		Division 10 Union County near Monroe			
PLAN DATE: September 2016		REVIEWED BY: LM Moon			
PREPARED BY: R Nissen		REVIEWED BY: JE Beck			
REVISIONS		INIT. DATE			
SCALE N.T.S.					
				Lisa M. Moon 12/7/2016 DATE	
CADD Filename:					

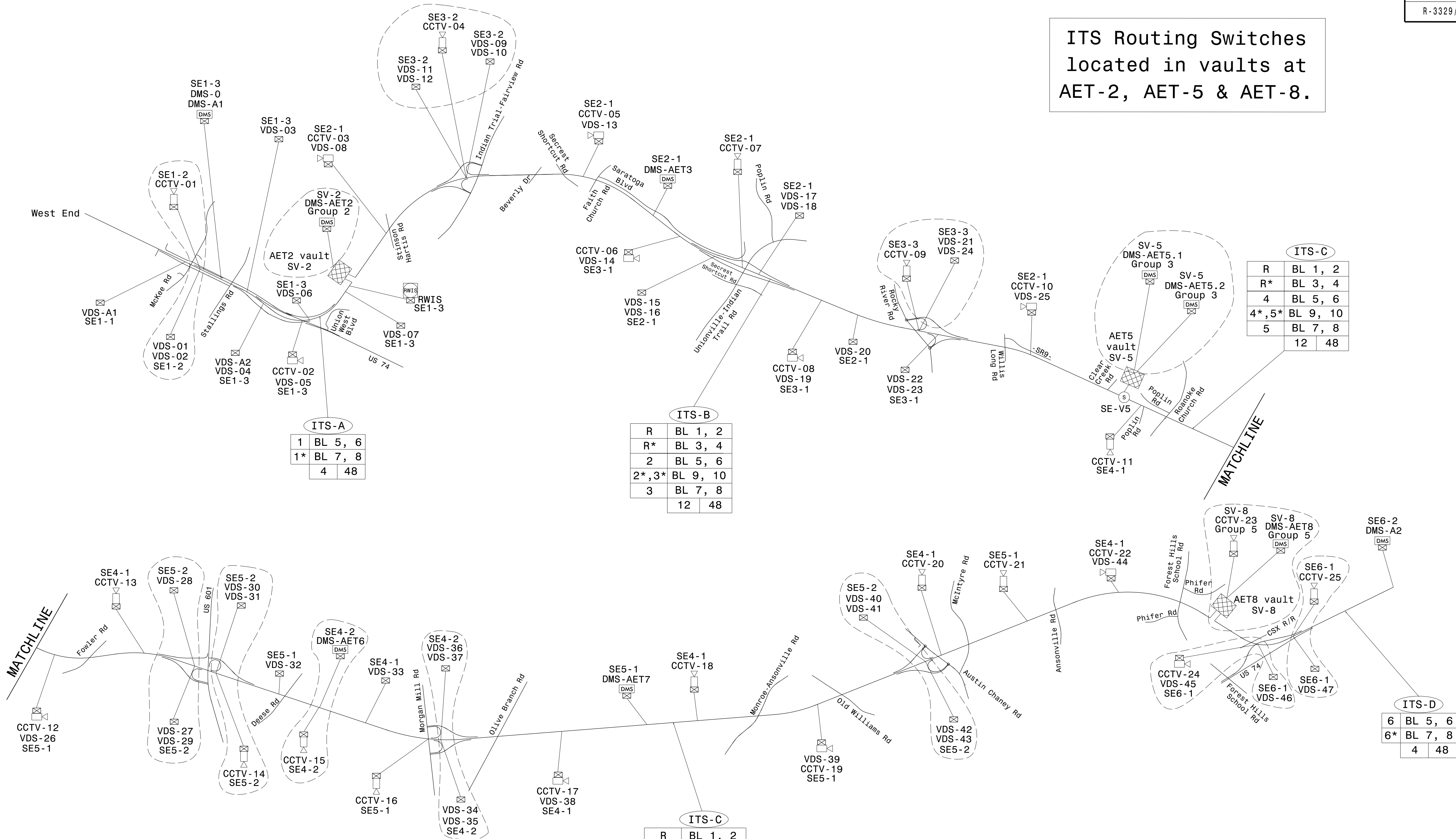


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Prepared for the Offices of:		Monroe Bypass - ITS Plans		SEAL	
NORTH CAROLINA Turnpike Authority		System/Network Block Diagram		NORTH CAROLINA PROFESSIONAL SEAL 036073 ENGINEER BARRY L BRANDT	
Division 10 Union County near Monroe		PLAN DATE: September 2016		REVIEWED BY: B Brandt	
PREPARED BY: K Southwell		REVIEWED BY: MP Smith		INIT. DATE	
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N.T.S.					
				CADD Filename:	

ITS Routing Switches
located in vaults at
AET-2, AET-5 & AET-8.



Legend

(S) = Cable-to-Cable Splice

[Drop to CCTV symbol] = Drop to CCTV

[Drop to shared VDS/CCTV cabinet symbol] = Drop to shared VDS/CCTV cabinet

VDS-A1 = Device ID

SE1-1 = Splice Enclosure ID

SV-2 = Splice in AET Vault ID

SE-V5 = Splice Enclosure outside AET Vault ID

[AET vault symbol] = AET vault

[Drop to VDS symbol] = Drop to VDS

[Drop to DMS symbol] = Drop to DMS

[Drop to RWIS symbol] = Drop to RWIS

Group ID

Cable ID number

Buffer tube and fibers used for each group

Total fibers in cable

Lit fibers in cable (this project)

* Denotes Secondary/Redundant path

Color Code

TIA/EIA	598-B
(1) Blue	BL
(2) Orange	OR
(3) Green	GR
(4) Brown	BR
(5) Slate	SL
(6) White	WH
(7) Red	RD
(8) Black	BK
(9) Yellow	YL
(10) Violet	VI
(11) Rose	RS
(12) Aqua	AQ

Group R is homerun fiber connection between router switches.

= multiple drops from a single splice enclosure or vault

Prepared for the Offices of:

North Carolina Turnpike Authority

Monroe Bypass - ITS Plans
ITS Communications Schematic

Division 10 Union County near Monroe

PLAN DATE: September 2016 REVIEWED BY: LM Moon

PREPARED BY: R Nissen REVIEWED BY: JE Beck

REVISIONS INIT. DATE

SCALE

N.T.S.

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Professional Engineer

Lisa M. Moon

12/7/2016

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ITS UTILIZATION

CABLE NO.=		ITS-A	ITS-B	ITS-C	ITS-D
CABLE SIZE =		48	48	48	48
New/Existing		New	New	New	New
TUBE	STRANDS				
BLUE	1, 2		Router	Router	
BLUE	3, 4		Router	Router	
BLUE	5, 6	1	2	4	6
BLUE	7, 8	1	3	5	6
BLUE	9, 10		2, 3	4, 5	
BLUE	11, 12				
ORANGE	1, 2				
ORANGE	3, 4				
ORANGE	5, 6				
ORANGE	7, 8				
ORANGE	9, 10				
ORANGE	11, 12				
GREEN	1, 2				
GREEN	3, 4				
GREEN	5, 6				
GREEN	7, 8				
GREEN	9, 10				
GREEN	11, 12				
BROWN	1, 2				
BROWN	3, 4				
BROWN	5, 6				
BROWN	7, 8				
BROWN	9, 10				
BROWN	11, 12				

TOLL UTILIZATION - TO BE DETERMINED BY OTHERS

CABLE NO.=		Toll A	Toll B	Toll C	Toll D	Toll E	Toll F	Toll G
CABLE SIZE =		48	48	48	48	48	48	48
New/Existing		New	New	New	New	New	New	New
TUBE	STRANDS							
BLUE	1, 2							
BLUE	3, 4							
BLUE	5, 6							
BLUE	7, 8							
BLUE	9, 10							
BLUE	11, 12							
ORANGE	1, 2							
ORANGE	3, 4							
ORANGE	5, 6							
ORANGE	7, 8							
ORANGE	9, 10							
ORANGE	11, 12							
GREEN	1, 2							
GREEN	3, 4							
GREEN	5, 6							
GREEN	7, 8							
GREEN	9, 10							
GREEN	11, 12							
BROWN	1, 2							
BROWN	3, 4							
BROWN	5, 6							
BROWN	7, 8							
BROWN	9, 10							
BROWN	11, 12							

LEGEND

= Group or Function
Blank = Not Used

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Monroe Bypass - ITS Plans
ITS & Toll
Fiber Utilization Charts

Division 10 Mecklenburg & Union Co. near Monroe

PLAN DATE: September 2016

REVIEWED BY: J E Beck

PREPARED BY: RD Nissen

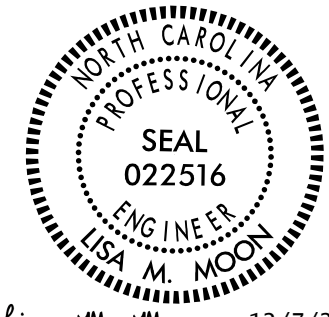
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Lisa M. Moon 12/7/2016

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ITS Splice Diagrams

FS Sheet No.	Splice No.	Device ID	CM Sheet
FS-03	SE1-1	VDS-A1	CM-03
	SE1-2	CCTV-01 & VDS-01/VDS-02	CM-04/CM-05
FS-04	SE1-3	DMS-0/DMS-A1	CM-04
		VDS-03	CM-06
		VDS-A2/VDS-04	CM-06
		CCTV-02/VDS-05	CM-08
		VDS-06	CM-08
		VDS-07	CM-09
		RWIS	CM-09
FS-05	SV-2	DMS-AET2	CM-10
FS-06	SE2-1	CCTV-03/VDS-08	CM-11
		CCTV-05/VDS-13	CM-18
		DMS-AET3	CM-20
		VDS-15/VDS-16	CM-22
		CCTV-07	CM-23
		VDS-17/VDS-18	CM-24
		VDS-20	CM-27
		CCTV-10/VDS-25	CM-33
	SE3-1	CCTV-06/VDS-14	CM-21
		CCTV-08/VDS-19	CM-26
FS-07	SE3-2	VDS-09/VDS-10, VDS-11/VDS-12, & CCTV-04	CM-14/CM-15
	SE3-3	CCTV-09 & VDS-21/VDS-24	CM-29/CM-30
FS-08	SE-V5	AET5 VAULT	CM-36
	SV-5	DMS-AET5.1 & DMS-AET5.2	CM-36

FS Sheet No.	Splice No.	Device ID	CM Sheet
FS-09	SE4-1	CCTV-11	CM-37
		CCTV-13	CM-43
		VDS-33	CM-51
		CCTV-17/VDS-38	CM-57
		CCTV-18	CM-61
		CCTV-20	CM-69
	SE4-2	CCTV-22/VDS-44	CM-74
		CCTV-15 & DMS-AET6	CM-49
		VDS-34/VDS-35 & VDS-36/VDS-37	CM-53/CM-54
FS-10	SE5-1	CCTV-12/VDS-26	CM-40
		VDS-32	CM-48
		CCTV-16	CM-54
		DMS-AET7	CM-60
		CCTV-19/VDS-39	CM-65
		CCTV-21	CM-72
	SE5-2	VDS-27/VDS-29 & VDS-28	CM-44/CM-45/CM-46
		CCTV-14 & VDS-30/VDS-31	CM-45/CM-46/CM-47
		VDS-40/VDS-41 & VDS-42/VDS-43	CM-68
FS-11	SV-8	DMS-AET8 & CCTV-23	CM-77
FS-12	SE6-1	CCTV-24/VDS-45 & VDS-46	CM-79
	SE6-2	CCTV-25 & VDS-47	CM-80
		DMS-A2	CM-83

Toll Splice Diagrams

FS Sheet No.	Splice No.	Device ID	CM Sheet
FS-13	STOLL 1	AET 3,4,5,6,7	CM-20, 26, 36, 49, 60

AET2 AND AET8 SHALL HAVE ALL FIBERS ENTERING VAULT TERMINATED IN INTERCONNECT CENTER.


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Prepared for the Offices of:



750 N. Greenfield Pkwy., Garner, NC 27529

Monroe Bypass - ITS Plans
ITS & Toll
Index of Splice Diagrams

Division 10 Mecklenburg & Union Co. near Monroe

PLAN DATE: September 2016

REVIEWED BY: JE Beck

PREPARED BY: RD Nissen

REVIEWED BY: LM Moon

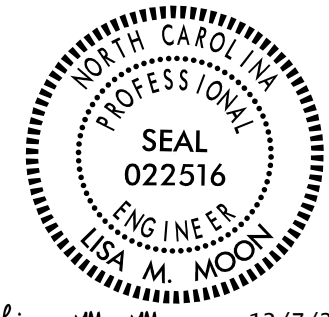
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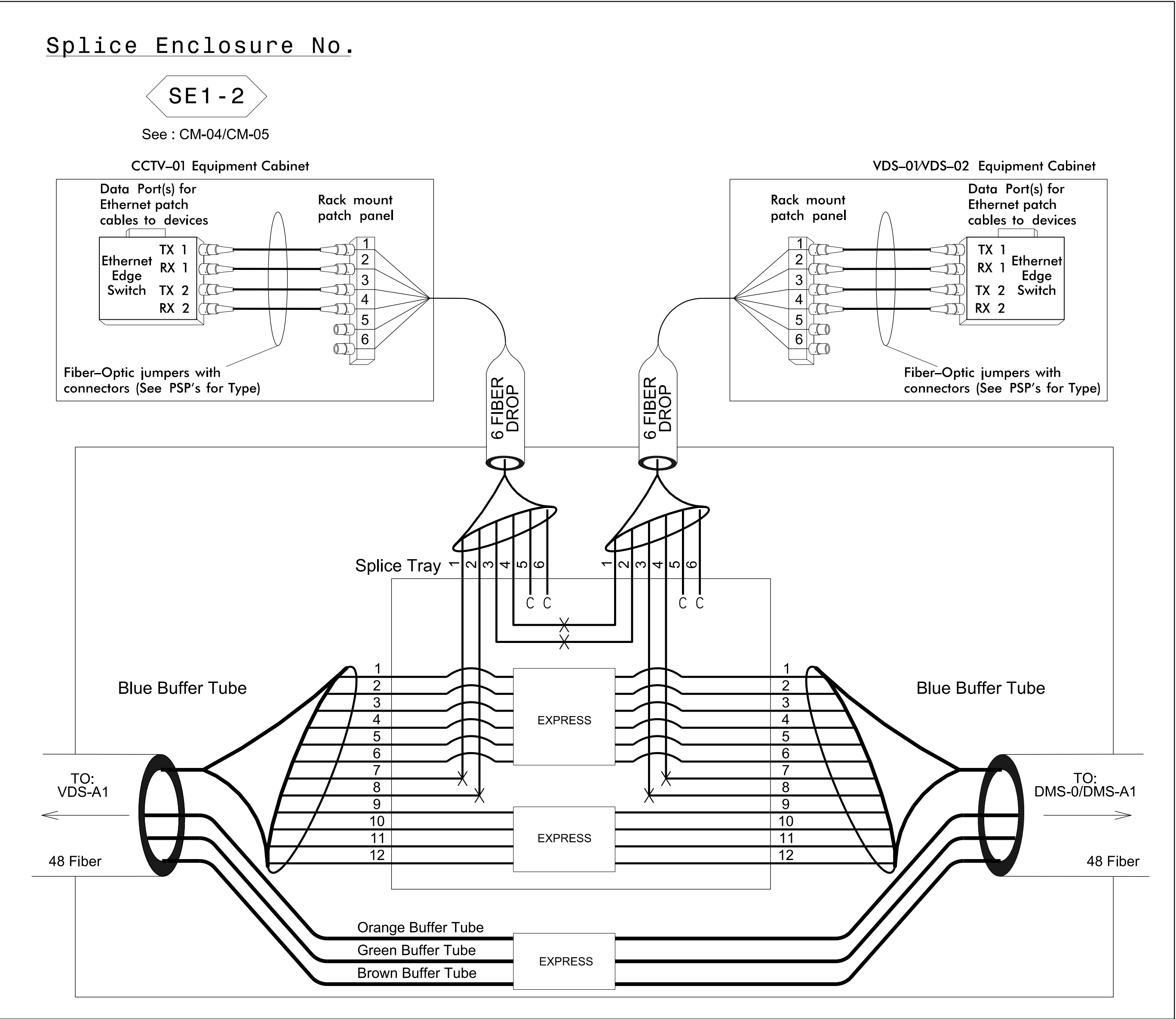
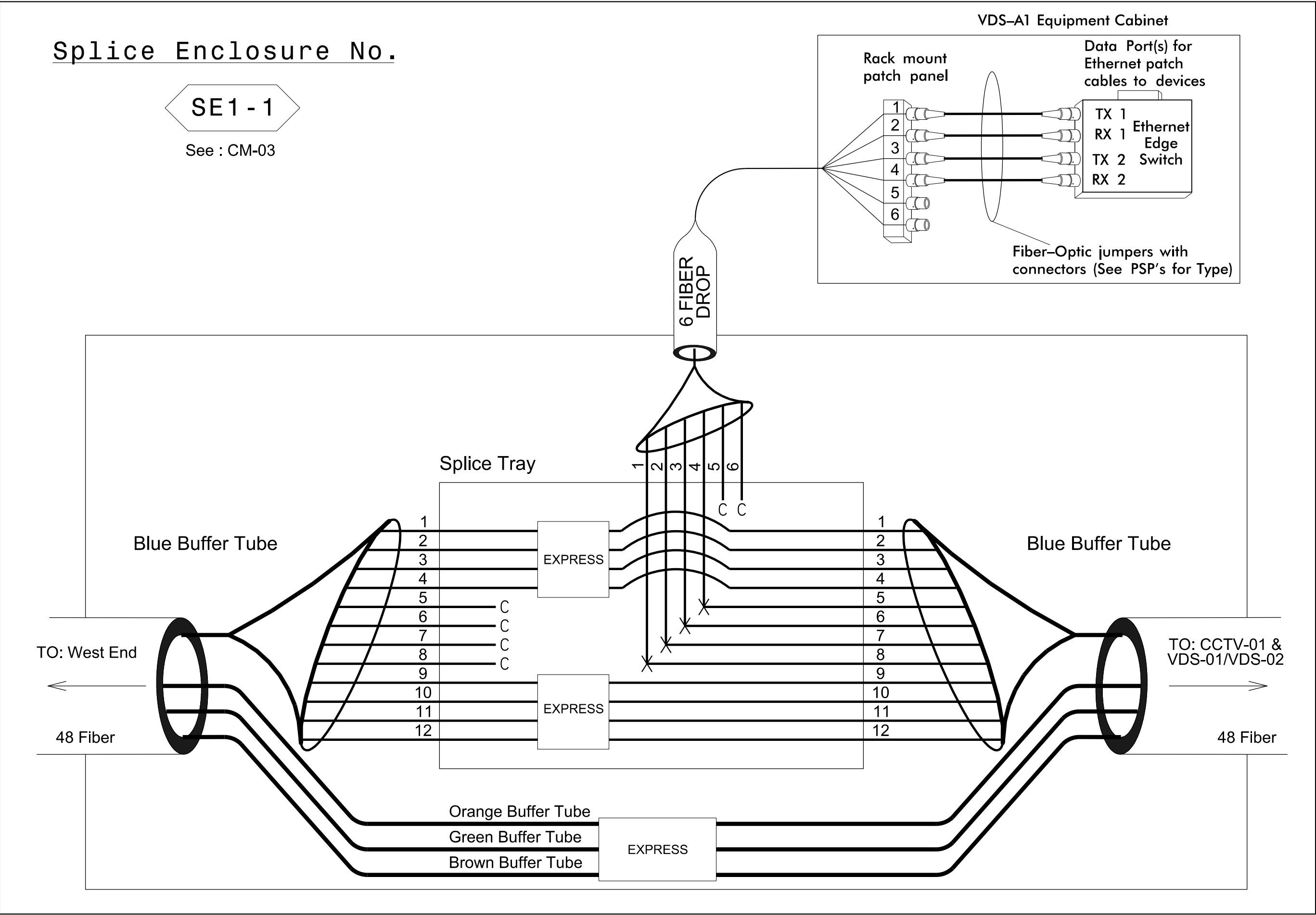
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Lisa M. Moon 12/7/2016

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LEGEND

Color Code		
TIA/EIA	598-B	
BL (1) Blue	RD (7) Red	
OR (2) Orange	BK (8) Black	
GR (3) Green	YL (9) Yellow	
BR (4) Brown	VI (10) Violet	
SL (5) Slate	RS (11) Rose	
WH (6) White	AQ (12) Aqua	

- X = Fusion Splice Individual Fiber
- C = Cap and Seal
- EXPRESS = Express entire buffer tube/fibers through without cutting
- BUFFER SPLICE = Splice all fibers in buffer tube color to color

NOTES

- Unused fibers left coiled and stored in splice tray.
- Unused buffer tubes left coiled and stored in splice enclosure.
- Edge switch configurations are generic. Contractor is responsible for determining/ensuring the proper terminations.



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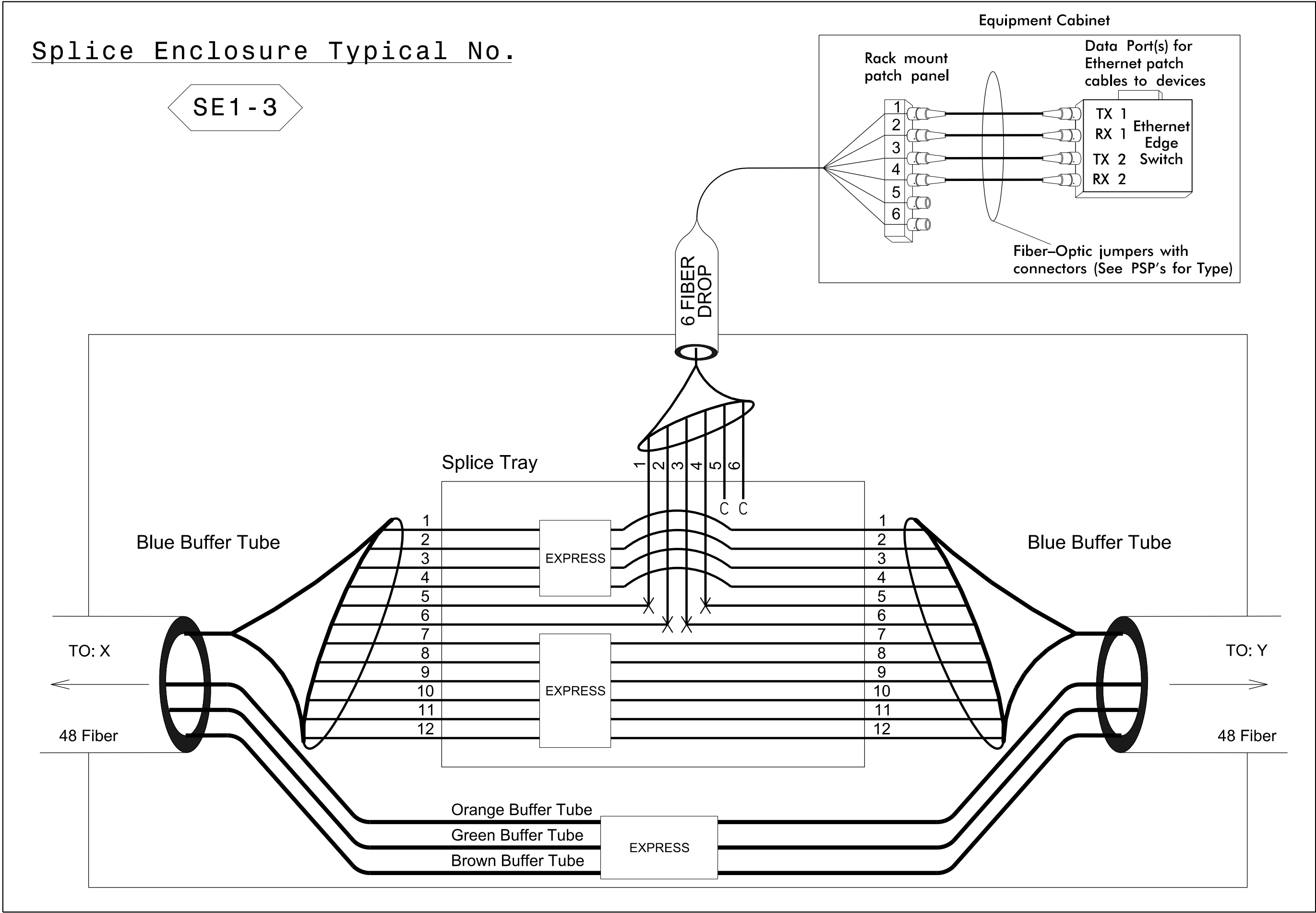
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Prepared for the Offices of:		Monroe Bypass - ITS Plans Fiber Splice Details		SEAL	
		Division 10 Mecklenburg & Union Co. near Monroe			
PLAN DATE: September 2016		REVIEWED BY: JE Beck		DATE: 12/7/2016	
PREPARED BY: RD Nissen		REVIEWED BY: LM Moon		CADD Filename:	
SCALE		REVISIONS		INIT. DATE	
NTS					



Splice Enclosure Typical No. SE1-3			
Device ID	CM Sheet	To	To
		X	Y
DMS-0/DMS-A1	CM-04	CCTV-01 & VDS-01/VDS-02	VDS-03
VDS-03	CM-06	DMS-0/DMS-A1	VDS-A2/VDS-04
VDS-A2/VDS-04	CM-06	VDS-03	CCTV-02/VDS-05
CCTV-02/VDS-05	CM-08	VDS-A2/VDS-04	VDS-06
VDS-06	CM-08	CCTV-02/VDS-05	VDS-07
VDS-07	CM-09	VDS-06	RWIS
RWIS	CM-09	VDS-07	AET2 Vault (inside) & DMS-AET2

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

Color Code			
TIA/EIA	598-B		
BL	(1) Blue	RD	(7) Red
OR	(2) Orange	BK	(8) Black
GR	(3) Green	YL	(9) Yellow
BR	(4) Brown	VI	(10) Violet
SL	(5) Slate	RS	(11) Rose
WH	(6) White	AQ	(12) Aqua

LEGEND

- X = Fusion Splice Individual Fiber
- C = Cap and Seal
- EXPRESS = Express entire buffer tube/fibers through without cutting
- BUFFER SPLICE = Splice all fibers in buffer tube color to color

NOTES

- Unused fibers left coiled and stored in splice tray.
- Unused buffer tubes left coiled and stored in splice enclosure.
- Edge switch configurations are generic. Contractor is responsible for determining/ensuring the proper terminations.

PLANS PREPARED BY:

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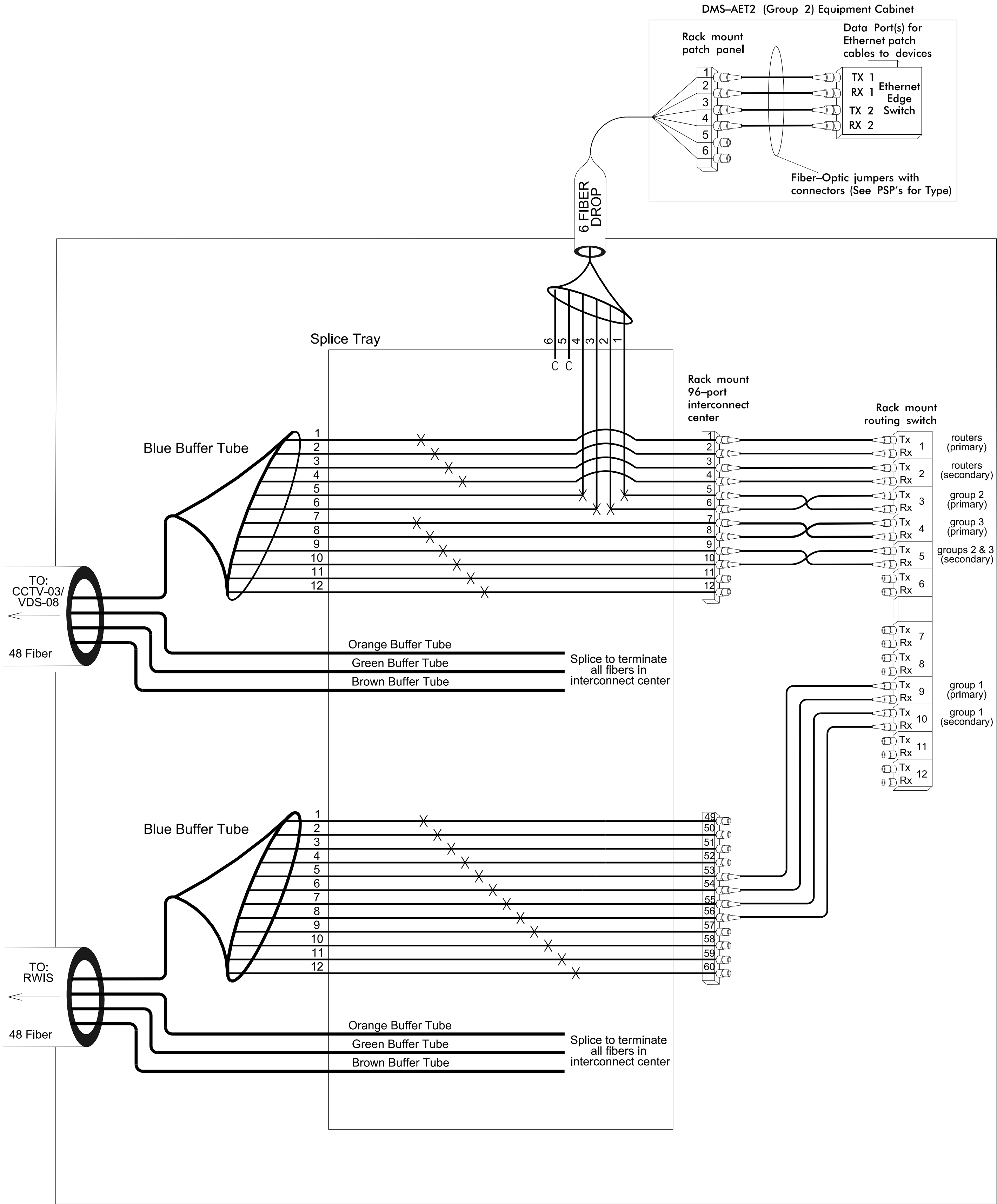
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Prepared for the Offices of:		Monroe Bypass - ITS Plans Fiber Splice Details		SEAL	
		Division 10 Mecklenburg & Union Co. near Monroe			
PLAN DATE: September 2016		REVIEWED BY: JE Beck		DATE: 12/7/2016	
PREPARED BY: RD Nissen		REVIEWED BY: LM Moon		CADD Filename:	
SCALE		REVISIONS		INIT. DATE	
NTS					

Splice in Vault No.

SV-2

See : CM-10



Inside AET Vault

LEGEND

Color Code		
TIA/EIA	598-B	
BL (1) Blue	RD (7) Red	
OR (2) Orange	BK (8) Black	
GR (3) Green	YL (9) Yellow	
BR (4) Brown	VI (10) Violet	
SL (5) Slate	RS (11) Rose	
WH (6) White	AQ (12) Aqua	

X = Fusion Splice Individual Fiber
C = Cap and Seal

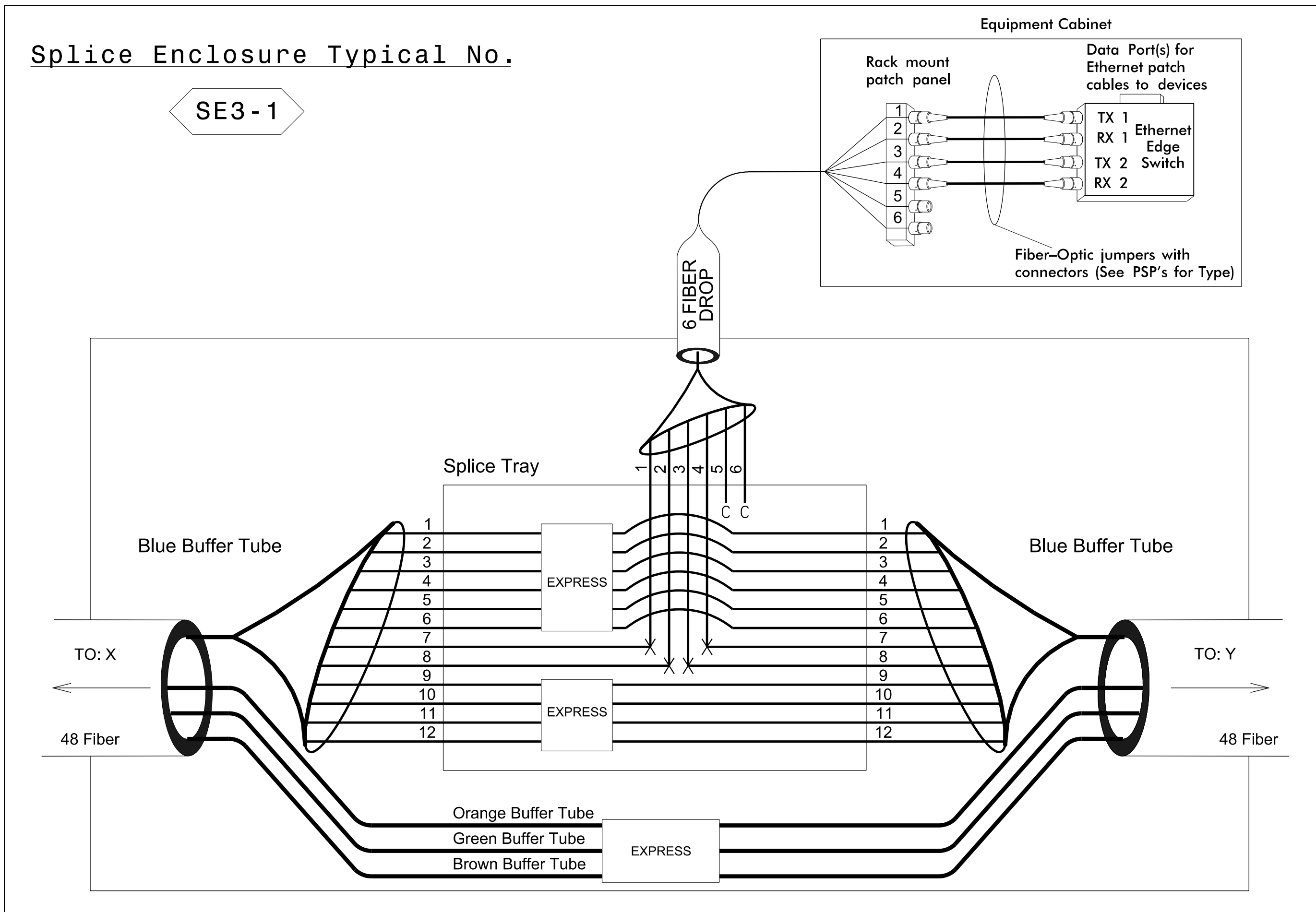
EXPRESS = Express entire buffer tube/fibers through without cutting
BUFFER SPLICE = Splice all fibers in buffer tube color to color

NOTES

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- Unused buffer tubes left coiled and stored in splice enclosure.
- Edge switch configurations are generic. Contractor is responsible for determining/ensuring the proper terminations.

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Prepared for the Offices of:		Monroe Bypass - ITS Plans Fiber Splice Details		SEAL	
NORTH CAROLINA Turnpike Authority		Division 10 Mecklenburg & Union Co. near Monroe		NORTH CAROLINA PROFESSIONAL SEAL 022516 ENGINEER LISA M. MOON	
750 N. Greenfield Pkwy., Garner, NC 27529		PLAN DATE: September 2016	REVIEWED BY: JE Beck	DATE	
		PREPARED BY: RD Nissen	REVIEWED BY: LM Moon	DATE	
SCALE		REVISIONS	INIT.	DATE	
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				CADD Filename:	



Splice Enclosure Typical No. SE3-1			
Device ID	CM Sheet	To	To
		X	Y
CCTV-06/ VDS-14	CM-21	DMS-AET3	VDS-15/VDS-16
CCTV-08/VDS-19	CM-26	VDS-17/VDS-18	VDS-20
VDS-22/VDS-23	CM-29/30	CCTV-09 & VDS-21/VDS-24	CCTV-10/VDS-25

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PLANS PREPARED BY:

Prepared for the Offices of:

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Turnpike Authority

350 N. Greenfield Pkwy., Garner, NC 27529

SCALE

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Monroe Bypass - ITS Plans

Fiber Splice Details

Division 10 Mecklenburg & Union Co. near Monroe

PLAN DATE: September 2016

PREPARED BY: RD Nissen

REVIEWED BY: J.E. Beck

REVIEWED BY: LW Moon

REVISIONS	INIT.	DATE

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SEAL

NORTH CAROLINA

PROFESSIONAL

SEAL

022516

ENGINEER

LISA M. MOON

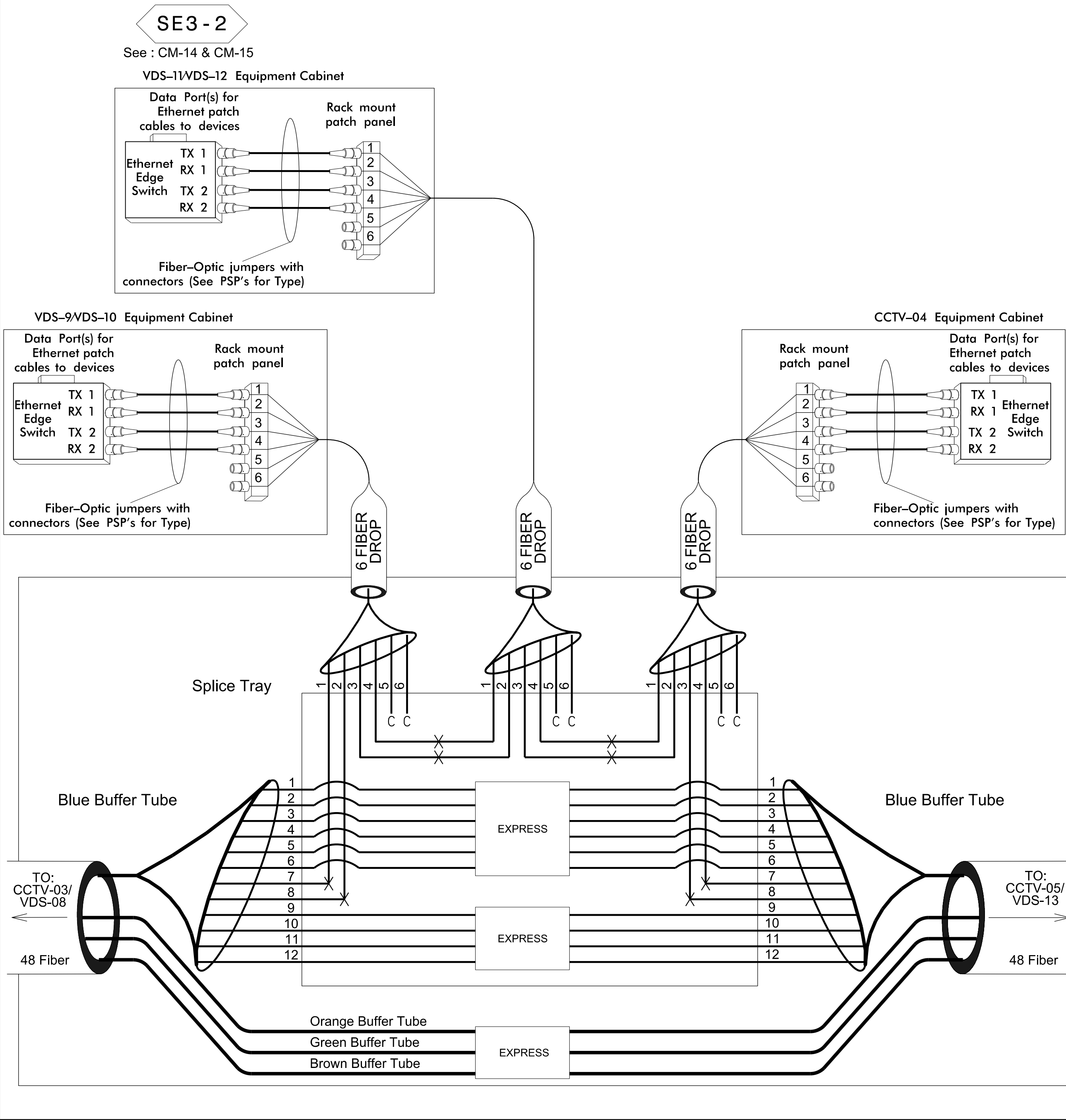
Lisa M. Moon

12/7/2016

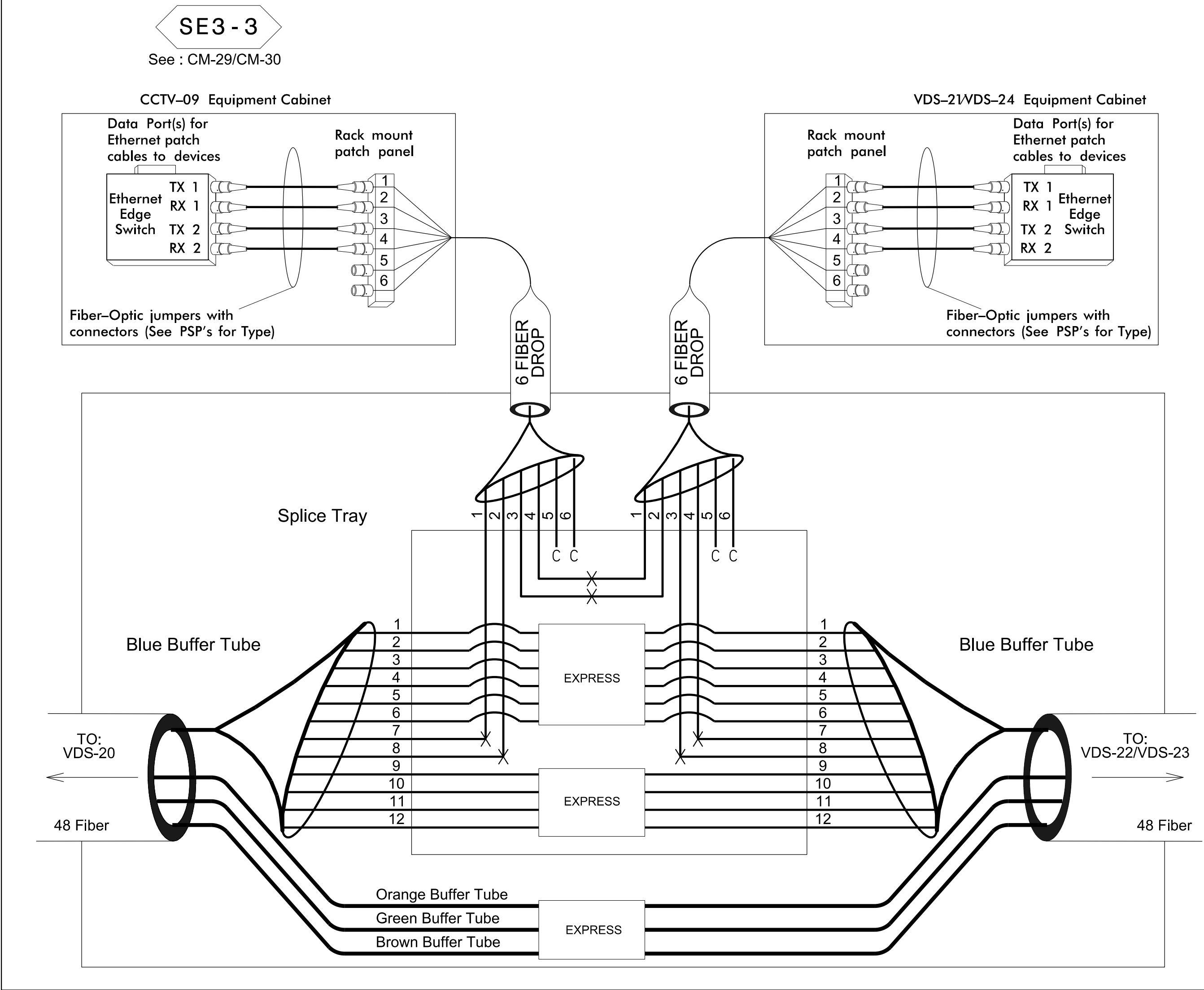
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DATE

Splice Enclosure No.



Splice Enclosure No.



LEGEND

Color Code	
TIA/EIA 598-B	
BL (1) Blue	RD (7) Red
OR (2) Orange	BK (8) Black
GR (3) Green	YL (9) Yellow
BR (4) Brown	VI (10) Violet
SL (5) Slate	RS (11) Rose
WH (6) White	AQ (12) Aqua

X = Fusion Splice Individual Fiber

C = Cap and Seal

EXPRESS = Express entire buffer tube/fibers through without cutting

BUFFER SPLICE = Splice all fibers in buffer tube color to color

NOTES

- Unused fibers left coiled and stored in splice tray.
- Unused buffer tubes left coiled and stored in splice enclosure.
- Edge switch configurations are generic. Contractor is responsible for determining/ensuring the proper terminations.

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Prepared for the Offices of:	Monroe Bypass - ITS Plans Fiber Splice Details		SEAL
	Division 10 Mecklenburg & Union Co. near Monroe		
PLAN DATE: September 2016	REVIEWED BY: JE Beck		
PREPARED BY: RD Nissen	REVIEWED BY: LM Moon		
REVISIONS	INIT.	DATE	
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DATE		12/7/2016	
CADD Filename:			

SE - V5

See : CM-36



SV - 5

See : CM-36



X = Fusion Splice Individual Fiber
C = Cap and Seal
SS = Express entire buffer tube/fibers through without cutting
SP = Splice all fibers in buffer tube color to color

1. Unused fibers left coiled and stored in splice tray.
2. Unused buffer tubes left coiled and stored in splice enclosure.
3. Edge switch configurations are generic. Contractor is responsible for determining/ensuring the proper terminations.

PLANS PREPARED BY:

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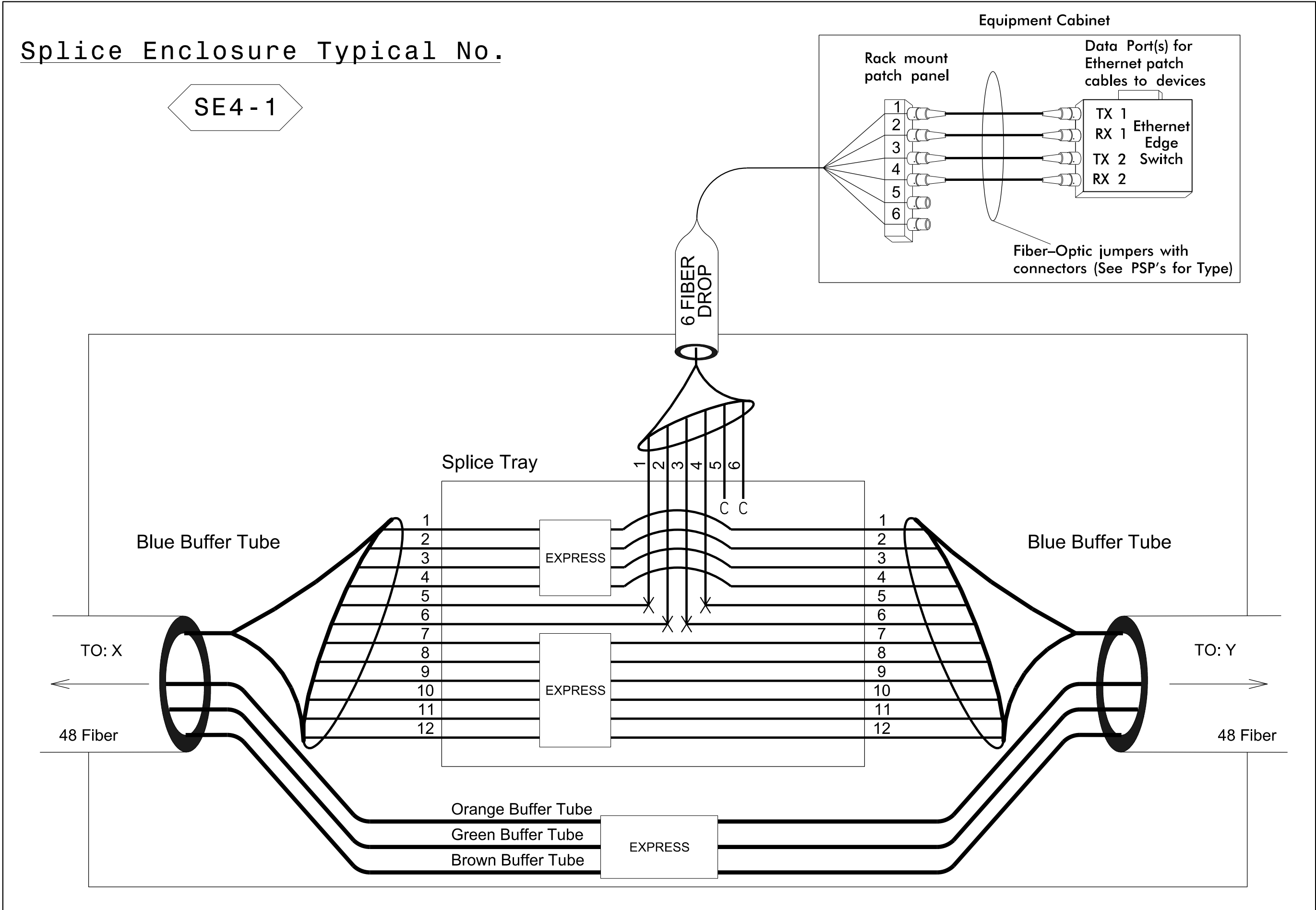
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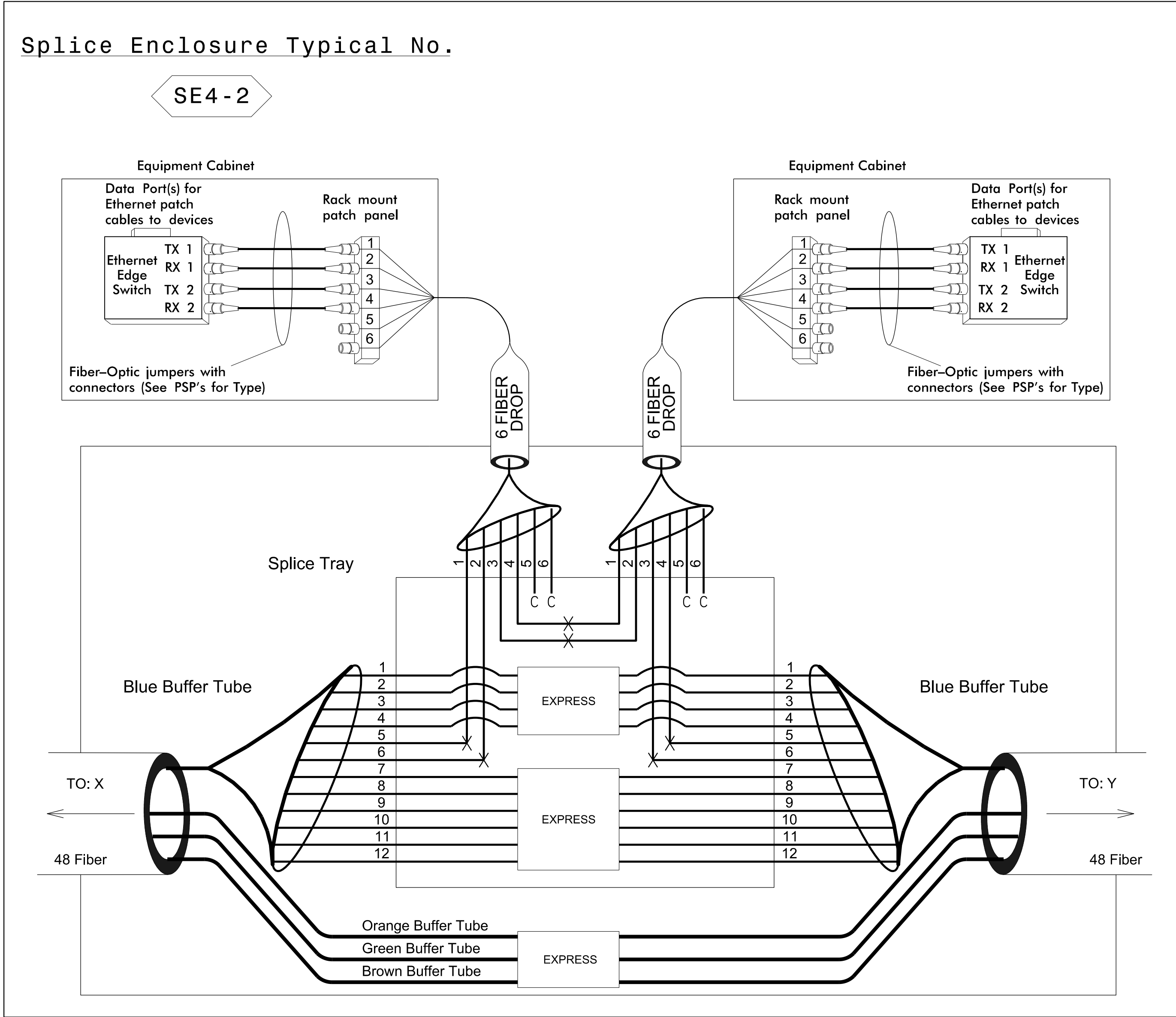


Lisa M. Moon 12/7/2016
DATE

CADD Filename:



Splice Enclosure Typical No. SE4-1			
Device ID	CM Sheet	To	To
		X	Y
CCTV-11	CM-37	AET5 Vault (Outside)	CCTV-12/VDS-26
CCTV-13	CM-43	CCTV-12/VDS-26	VDS-27/VDS-29 & VDS-28
VDS-33	CM-51	DMS-AET6/CCTV-15	CCTV-16
CCTV-17/VDS-38	CM-57	VDS-34/VDS-35 & VDS-36/VDS-37	DMS-AET7
CCTV-18	CM-61	DMS-AET7	CCTV-19/VDS-39
CCTV-20	CM-69	VDS-40/VDS-41 & VDS-42/VDS-43	CCTV-21
CCTV-22/VDS-44	CM-74	CCTV-21	AET8 Vault (Inside) & CCTV-23 & DMS-AET8



Splice Enclosure Typical No. SE4-2			
Device ID	CM Sheet	To	To
		X	Y
DMS-AET6 & CCTV-15	CM-49	VDS-32	VDS-33
VDS-34/VDS-35 & VDS-36/VDS-37	CM-53/54	CCTV-16	CCTV-17/VDS-38

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Color Code			
TIA/EIA		598-B	
BL	(1) Blue	RD	(7) Red
OR	(2) Orange	BK	(8) Black
GR	(3) Green	YL	(9) Yellow
BR	(4) Brown	VI	(10) Violet
SL	(5) Slate	RS	(11) Rose
WH	(6) White	AQ	(12) Aqua

LEGEND

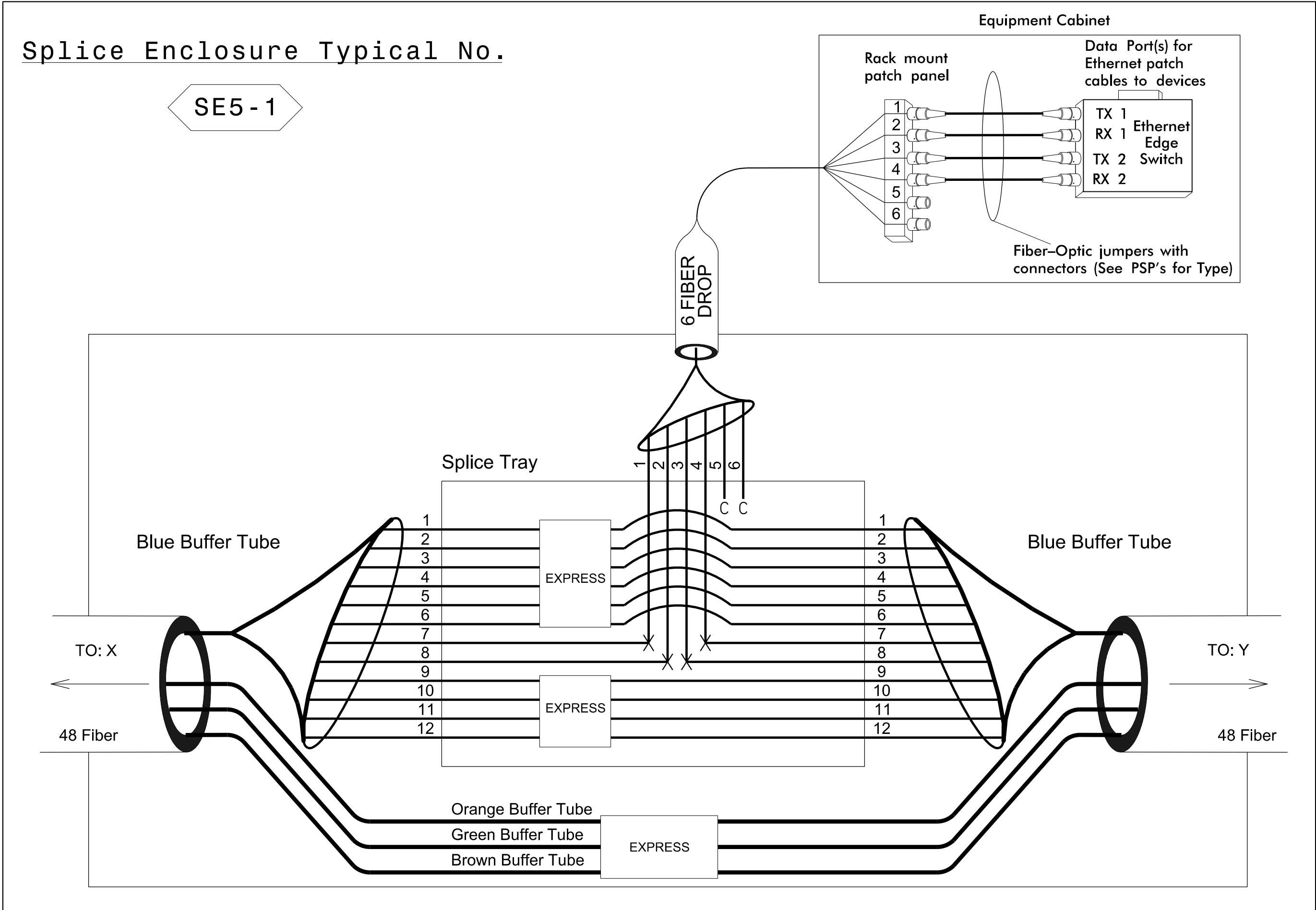
- X = Fusion Splice Individual Fiber
- C = Cap and Seal
- EXPRESS = Express entire buffer tube/fibers through without cutting
- BUFFER SPLICE = Splice all fibers in buffer tube color to color

NOTES

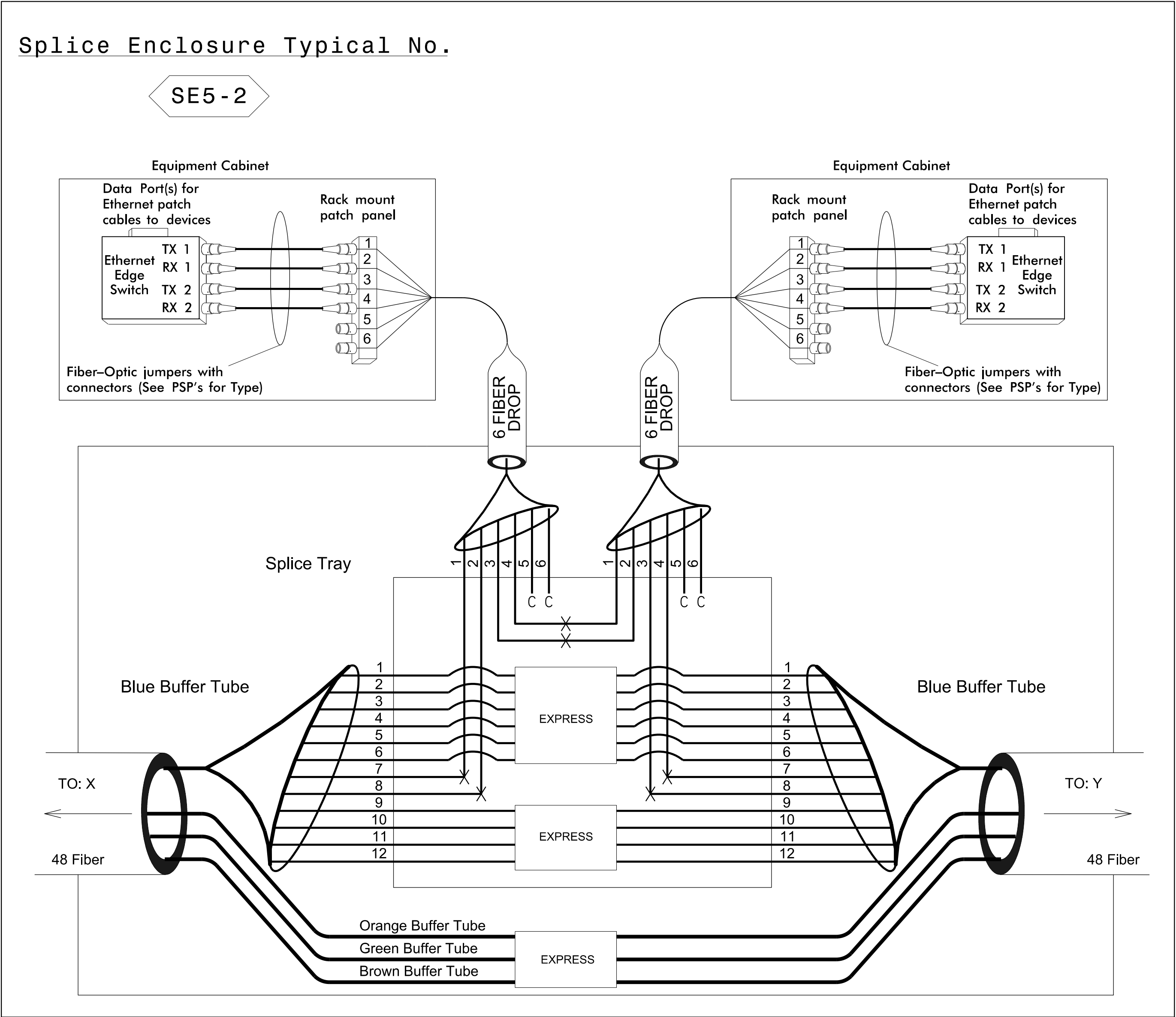
- Unused fibers left coiled and stored in splice tray.
- Unused buffer tubes left coiled and stored in splice enclosure.
- Edge switch configurations are generic. Contractor is responsible for determining/ensuring the proper terminations.



Prepared for the Offices of:		Monroe Bypass - ITS Plans Fiber Splice Details		SEAL			
		Division 10 Mecklenburg & Union Co. near Monroe					
PLAN DATE: September 2016		REVIEWED BY: JE Beck					
PREPARED BY: RD Nissen		REVIEWED BY: LM Moon					
REVISIONS		INIT.					
SCALE		DATE		12/7/2016			
NTS				CADD Filename:			



Splice Enclosure Typical No. SE5-1			
Device ID	CM Sheet	To	To
		X	Y
CCTV-12/VDS-26	CM-40	CCTV-11	CCTV-13
VDS-32	CM-48	CCTV-14 & VDS-30/VDS-31	CCTV-15 & DMS-AET6
CCTV-16	CM-54	VDS-33	VDS-34/VDS-35 & VDS-36/VDS-37
DMS-AET7	CM-60	CCTV-17/VDS-38	CCTV-18
CCTV-19/VDS-39	CM-65	CCTV-18	VDS-40/VDS-41 & VDS-42/VDS-43
CCTV-21	CM-72	CCTV-20	CCTV-22/VDS-44



Splice Enclosure Typical No. SE5-2			
Device ID	CM Sheet	To	To
		X	Y
VDS-27/VDS-29 & VDS-28	CM-44/45/46	CCTV-13	CCTV-14 & VDS-30/VDS-31
CCTV-14 & VDS-30/VDS-31	CM-45/46/47	VDS-27/VDS-29 & VDS-28	VDS-32
VDS-40/VDS-41 & VDS-42/VDS-43	CM-68	CCTV-19/VDS-39	CCTV-20

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Color Code			
TIA/EIA	598-B		
BL	(1) Blue	RD	(7) Red
OR	(2) Orange	BK	(8) Black
GR	(3) Green	YL	(9) Yellow
BR	(4) Brown	VI	(10) Violet
SL	(5) Slate	RS	(11) Rose
WH	(6) White	AQ	(12) Aqua

LEGEND

- X = Fusion Splice Individual Fiber
C = Cap and Seal
EXPRESS = Express entire buffer tube/fibers through without cutting
BUFFER SPLICE = Splice all fibers in buffer tube color to color



NOTES

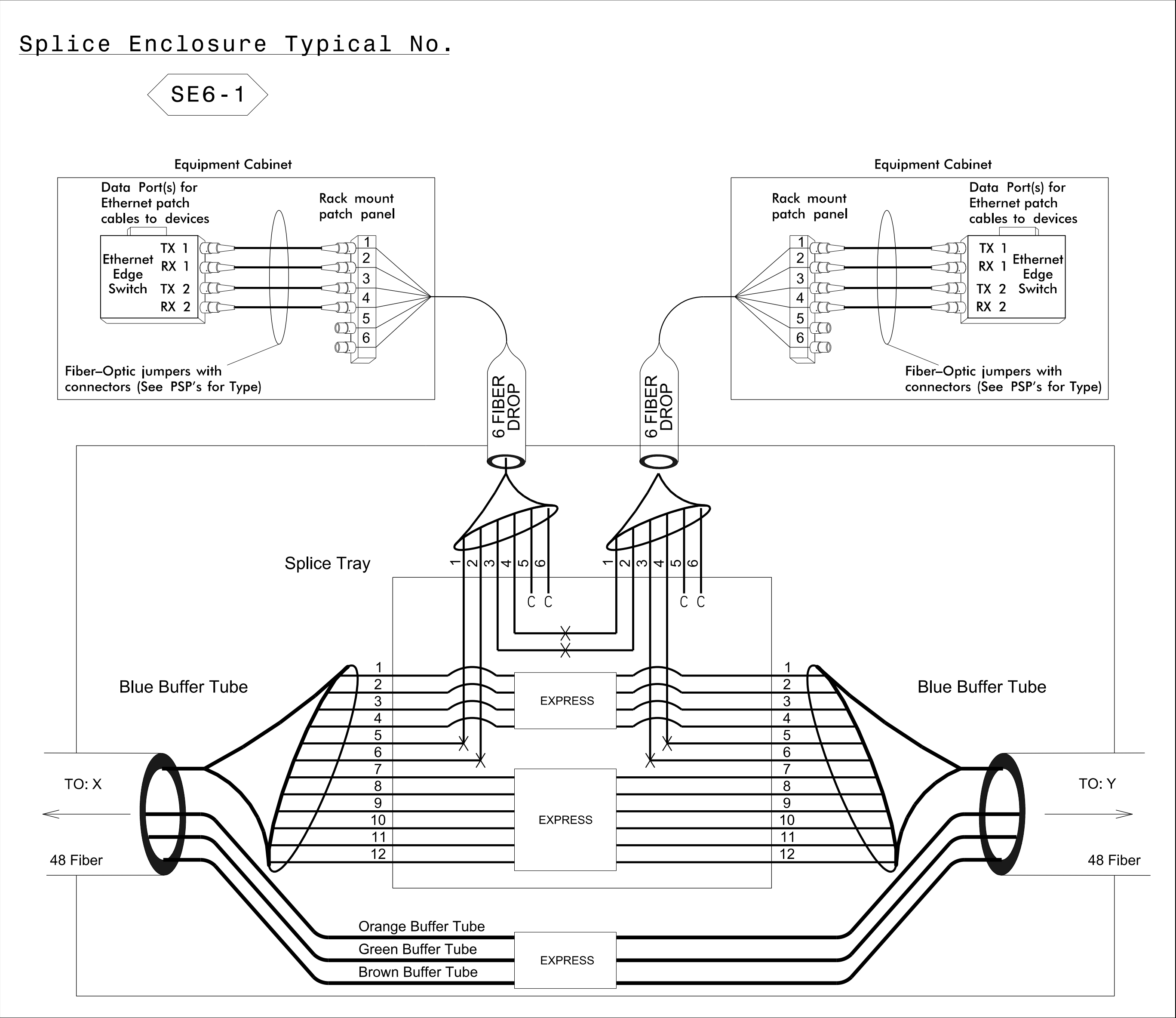
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- Edge switch configurations are generic. Contractor is responsible for determining/ensuring the proper terminations.



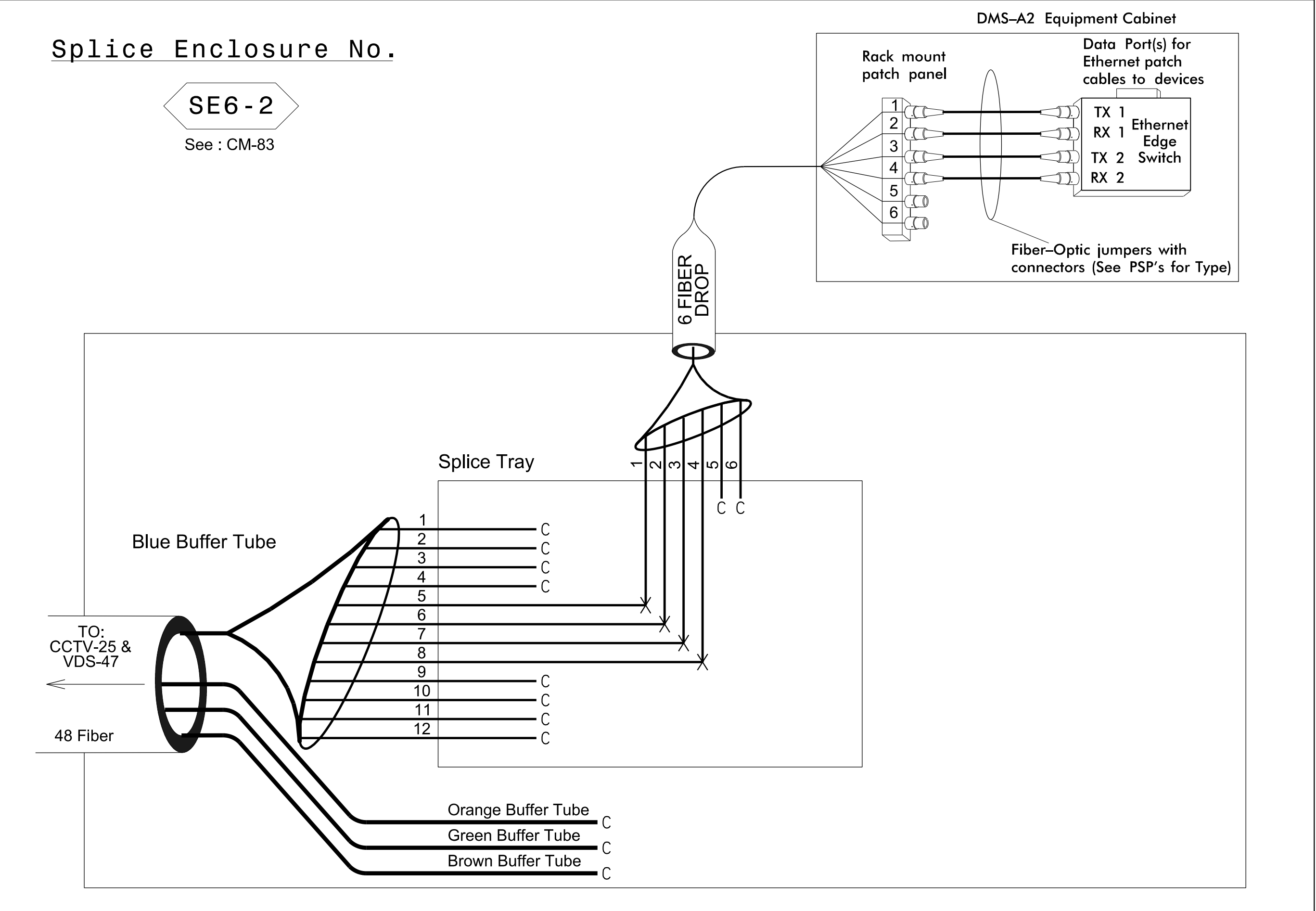
Prepared for the Offices of:		Monroe Bypass - ITS Plans Fiber Splice Details		SEAL	
		Division 10 Mecklenburg & Union Co. near Monroe			
PLAN DATE: September 2016		REVIEWED BY: JE Beck		DATE: 12/7/2016	
PREPARED BY: RD Nissen		REVIEWED BY: LM Moon		CADD Filename:	
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Prepared for the Offices of:		SEAL	
		Monroe Bypass - ITS Plans Fiber Splice Details	
Division 10 Mecklenburg & Union Co. near Monroe			
PLAN DATE: September 2016		REVIEWED BY: JE Beck	
PREPARED BY: RD Nissen		REVIEWED BY: LM Moon	
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750 N. Greenfield Pkwy., Garner, NC 27529		Lisa M. Moon 12/7/2016	
CADD Filename:		DATE	



Splice Enclosure Typical No. SE6-1			
Device ID	CM Sheet	To	To
		X	Y
CCTV-24/VDS-45 & VDS-46	CM-79	AET8 Vault (inside) & DMS-AET8 & CCTV-23	CCTV-25 & VDS-47
CCTV-25 & VDS-47	CM-80	CCTV-24/VDS-45 & VDS-46	DMS-A2



East End of Project

LEGEND

Color Code	
TIA/EIA 598-B	

BL (1) Blue	RD (7) Red	
OR (2) Orange	BK (8) Black	
GR (3) Green	YL (9) Yellow	
BR (4) Brown	VI (10) Violet	
SL (5) Slate	RS (11) Rose	
WH (6) White	AQ (12) Aqua	

X = Fusion Splice Individual Fiber

C = Cap and Seal

EXPRESS = Express entire buffer tube/fibers through without cutting

BUFFER SPLICE = Splice all fibers in buffer tube color to color

NOTES

- Unused fibers left coiled and stored in splice tray.
- Unused buffer tubes left coiled and stored in splice enclosure.
- Edge switch configurations are generic. Contractor is responsible for determining/ensuring the proper terminations.

PLANS PREPARED BY:

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5950 FAIRVIEW ROAD, SUITE 320
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Prepared for the Offices of:

NORTH CAROLINA Turnpike Authority

750 N. Greenfield Pkwy., Garner, NC 27529

Monroe Bypass - ITS Plans
Fiber Splice Details

Division 10 Mecklenburg & Union Co. near Monroe

PLAN DATE: September 2016 REVIEWED BY: JE Beck

PREPARED BY: RD Nissen REVIEWED BY: LM Moon

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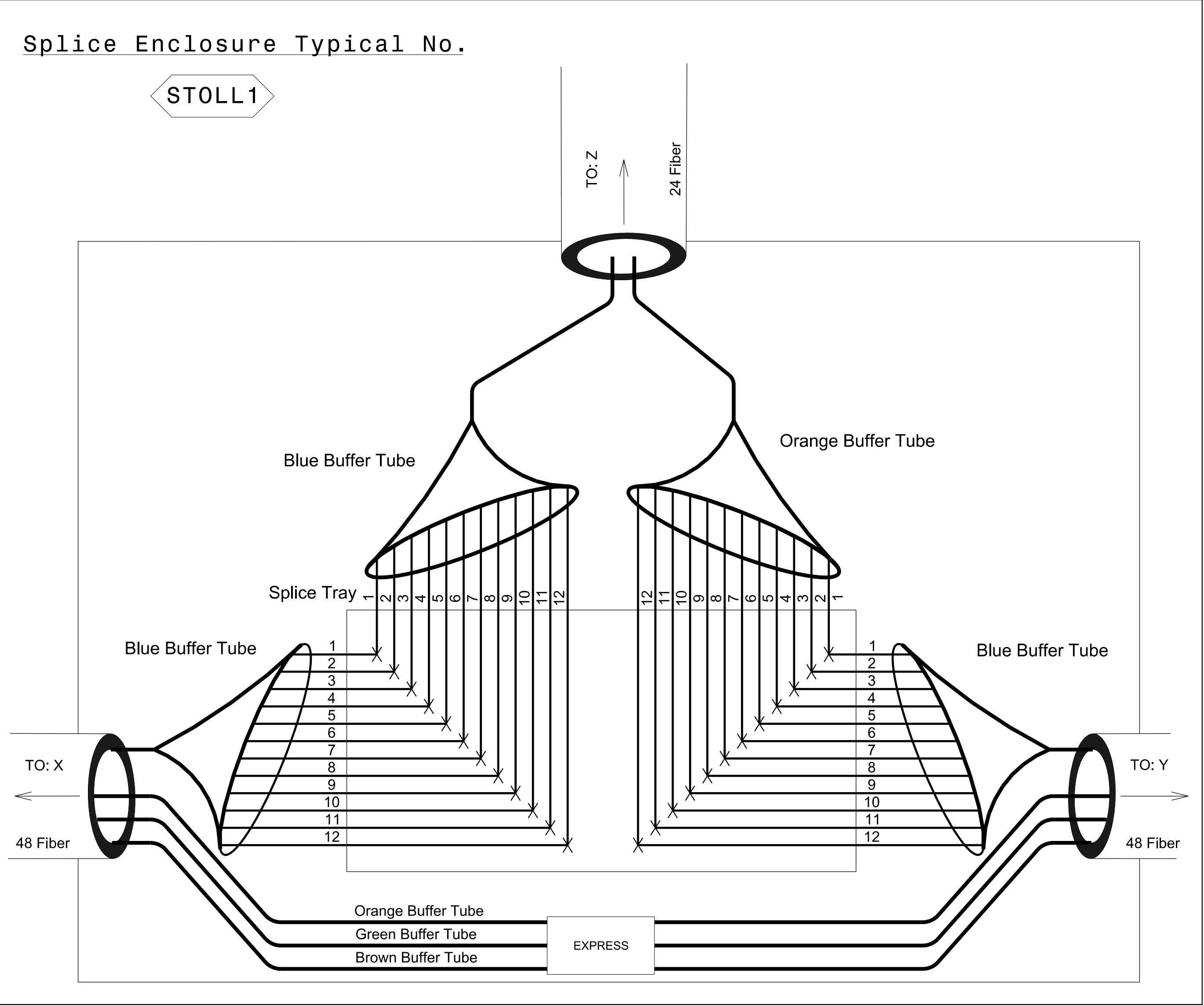
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SEAL 022516

ENGINEER

Lisa M. Moon 12/7/2016

CADD Filename:



Splice Enclosure Typical No. STOLL1				
Device ID	CM Sheet	Cable X	Cable Y	Cable Z
		To	To	To
AET3	CM-20	AET2	AET4	AET3 vault
AET4	CM-26	AET3	AET5	AET4 vault
AET5	CM-36	AET4	AET6	AET5 vault
AET6	CM-49	AET5	AET7	AET6 vault
AET7	CM-60	AET6	AET8	AET7 Vault

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Color Code

TIA/EIA 598-B

BL (1) Blue

OR (2) Orange

GR (3) Green

BR (4) Brown

SL (5) Slate

WH (6) White

RD (7) Red

BK (8) Black

YL (9) Yellow

VI (10) Violet

RS (11) Rose

AQ (12) Aqua

X = Fusion Splice Individual Fiber

C = Cap and Seal

EXPRESS

 = Express entire buffer tube/fibers through without cutting

BUFFER SPICE

 = Splice all fibers in buffer tube color to color

NOTES

1. Unused fibers left coiled and stored in splice tray.

2. Unused buffer tubes left coiled and stored in splice enclosure.

3. Edge switch configurations are generic. Contractor is responsible for determining/ensuring the proper terminations.

PLANS PREPARED BY:

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DRMP INC.

5950 FAIRVIEW ROAD, SUITE 320

CHARLOTTE, NC 28210

NC LICENSE NO. C-2213 • (704) 332-2289

Prepared for the Offices of:

NORTH CAROLINA

Turnpike Authority

750 N. Greenfield Pkwy., Garner, NC 27529

Monroe Bypass - ITS Plans

Fiber Splice Details

Division 10 Mecklenburg & Union Co. near Monroe

PLAN DATE: September 2016

REVIEWED BY: JE Beck

PREPARED BY: RD Nissen

REVIEWED BY: LM Moon

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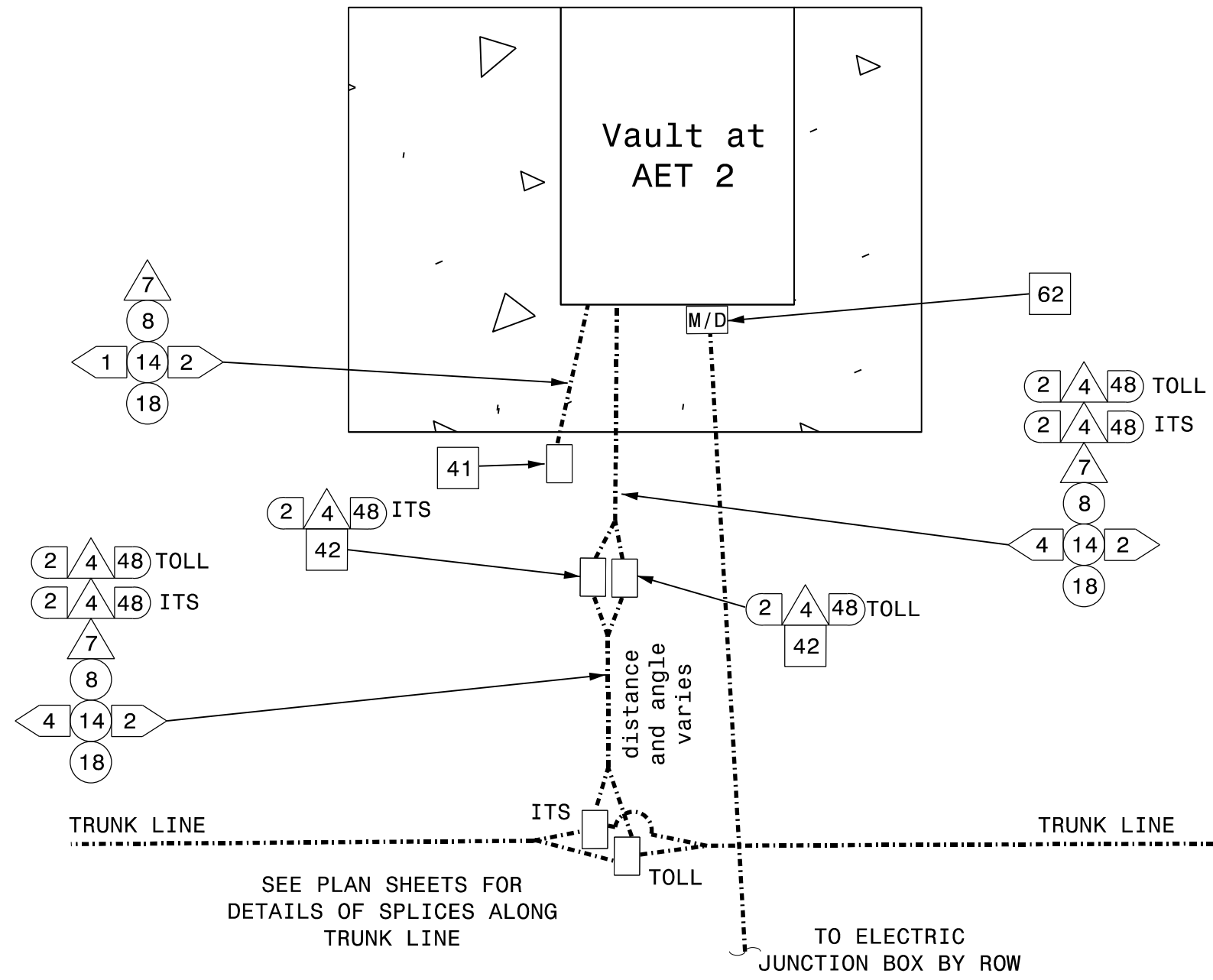
ENGINEER

LISA M. MOON

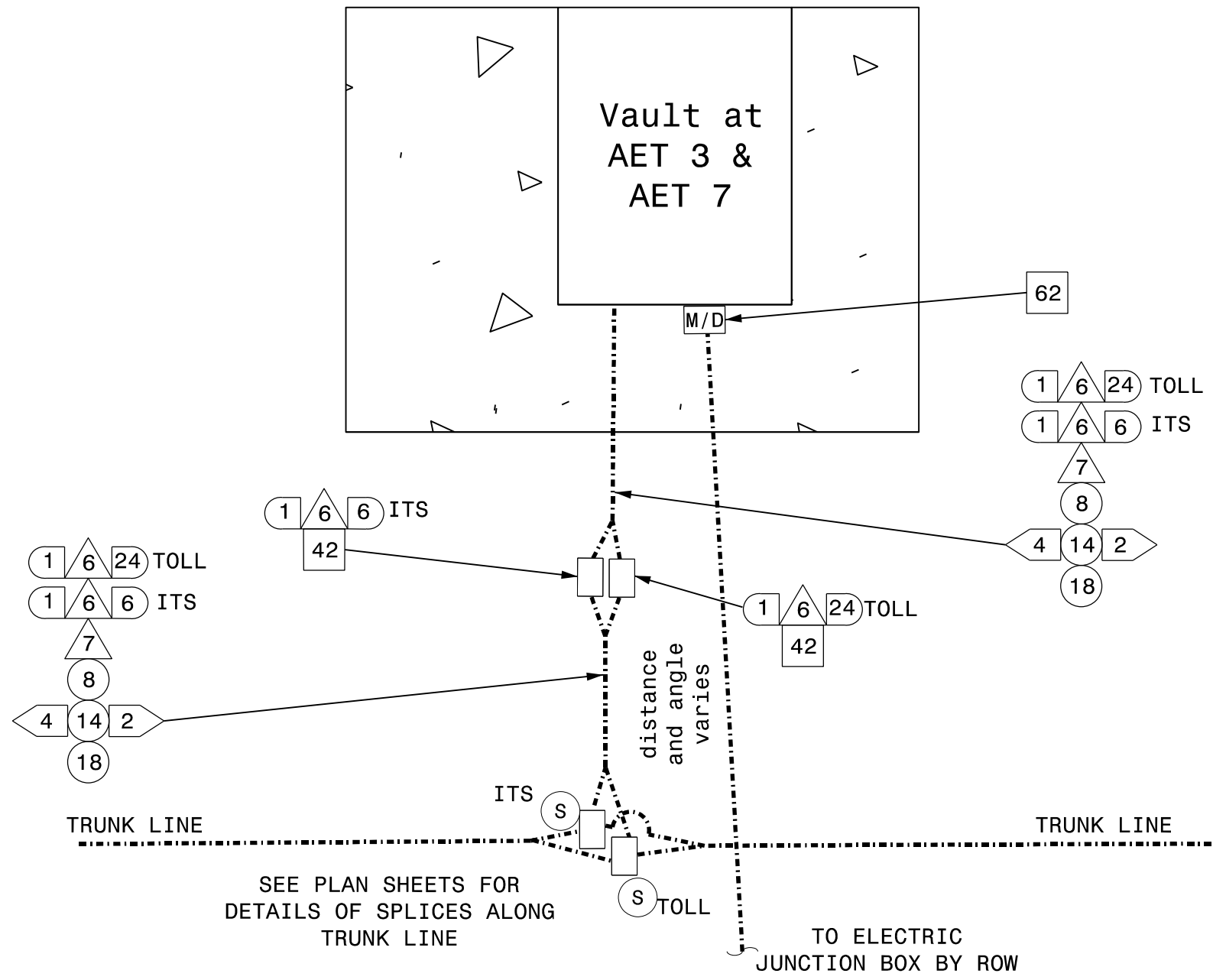
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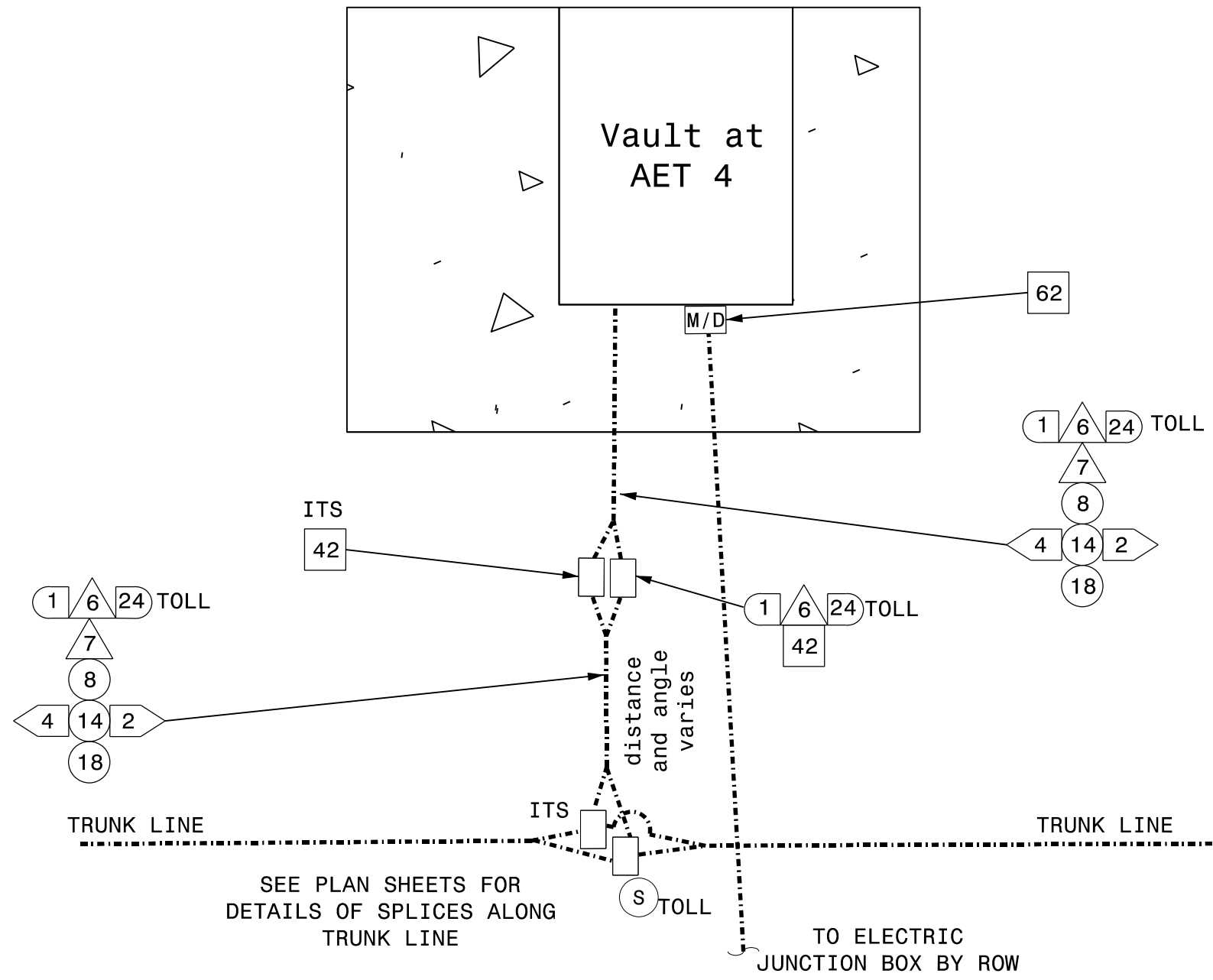
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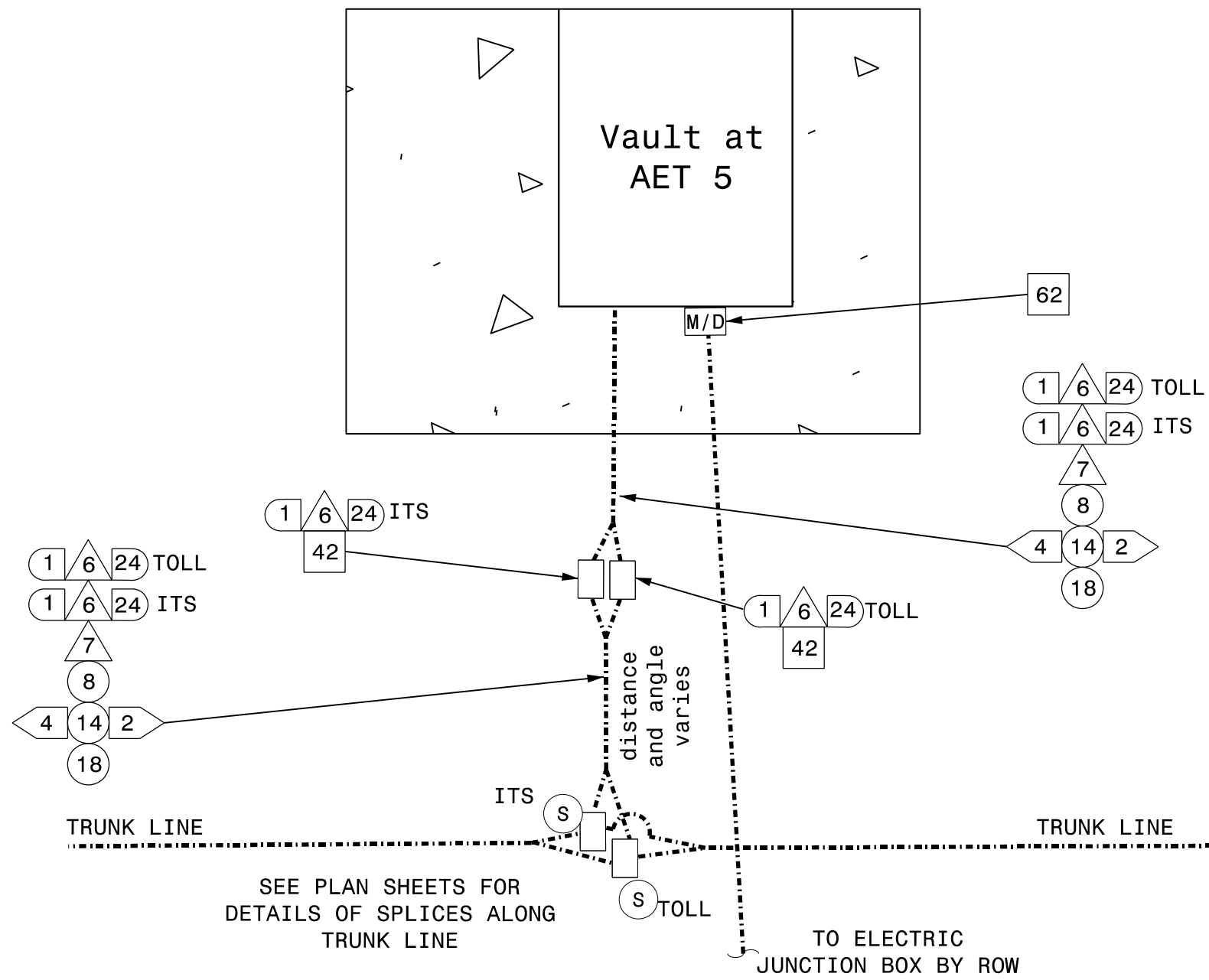
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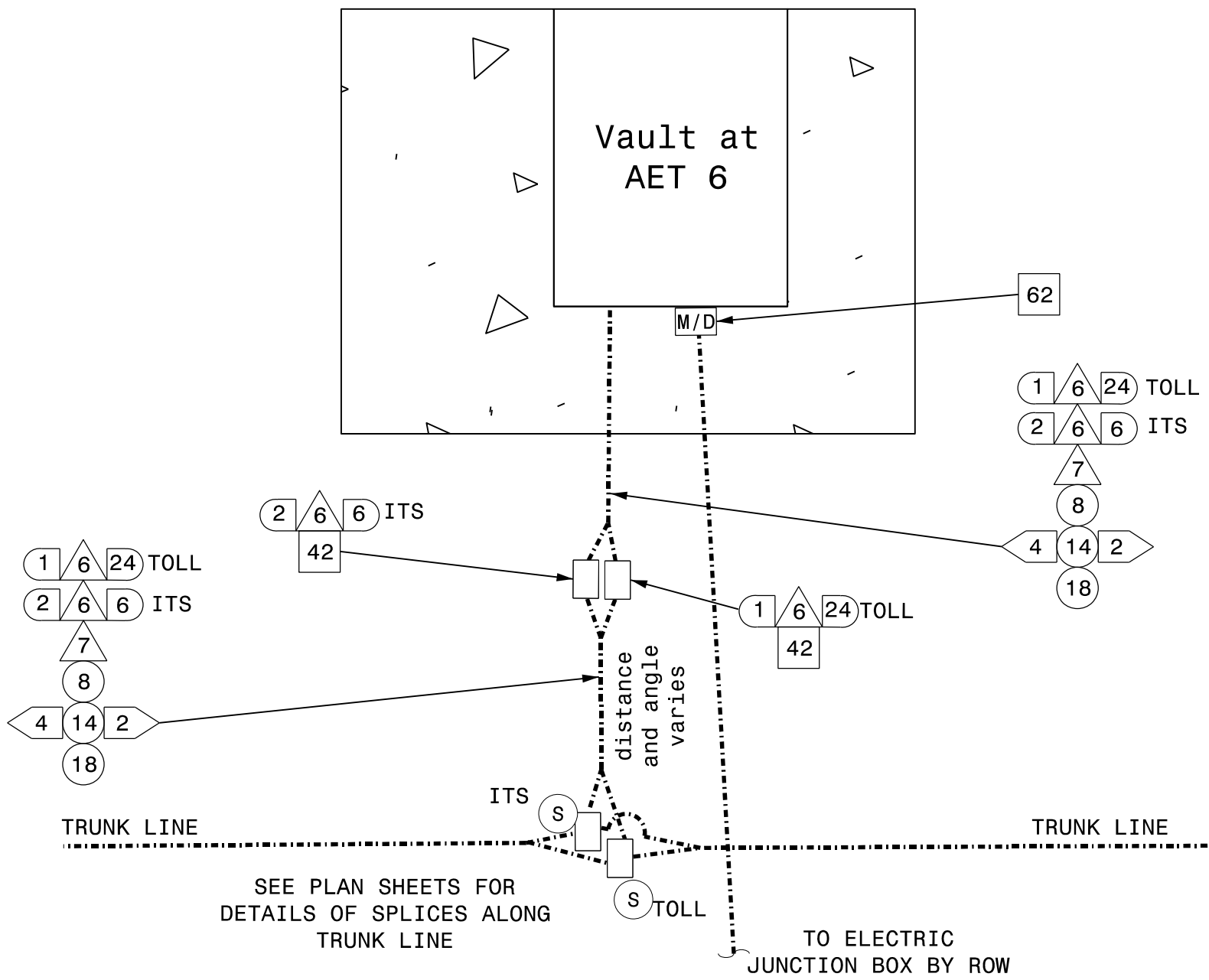
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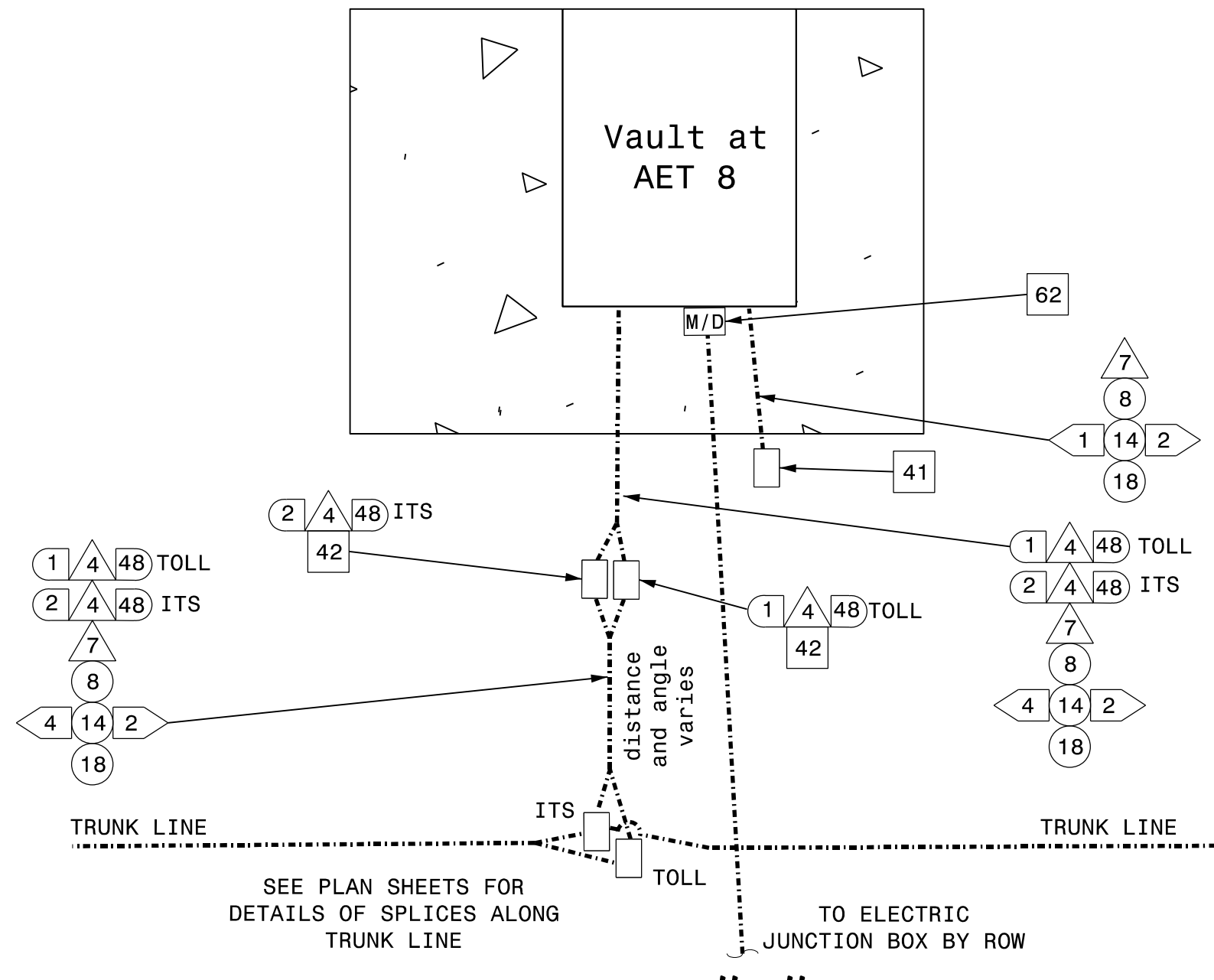
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Detail "D"



Detail "E"



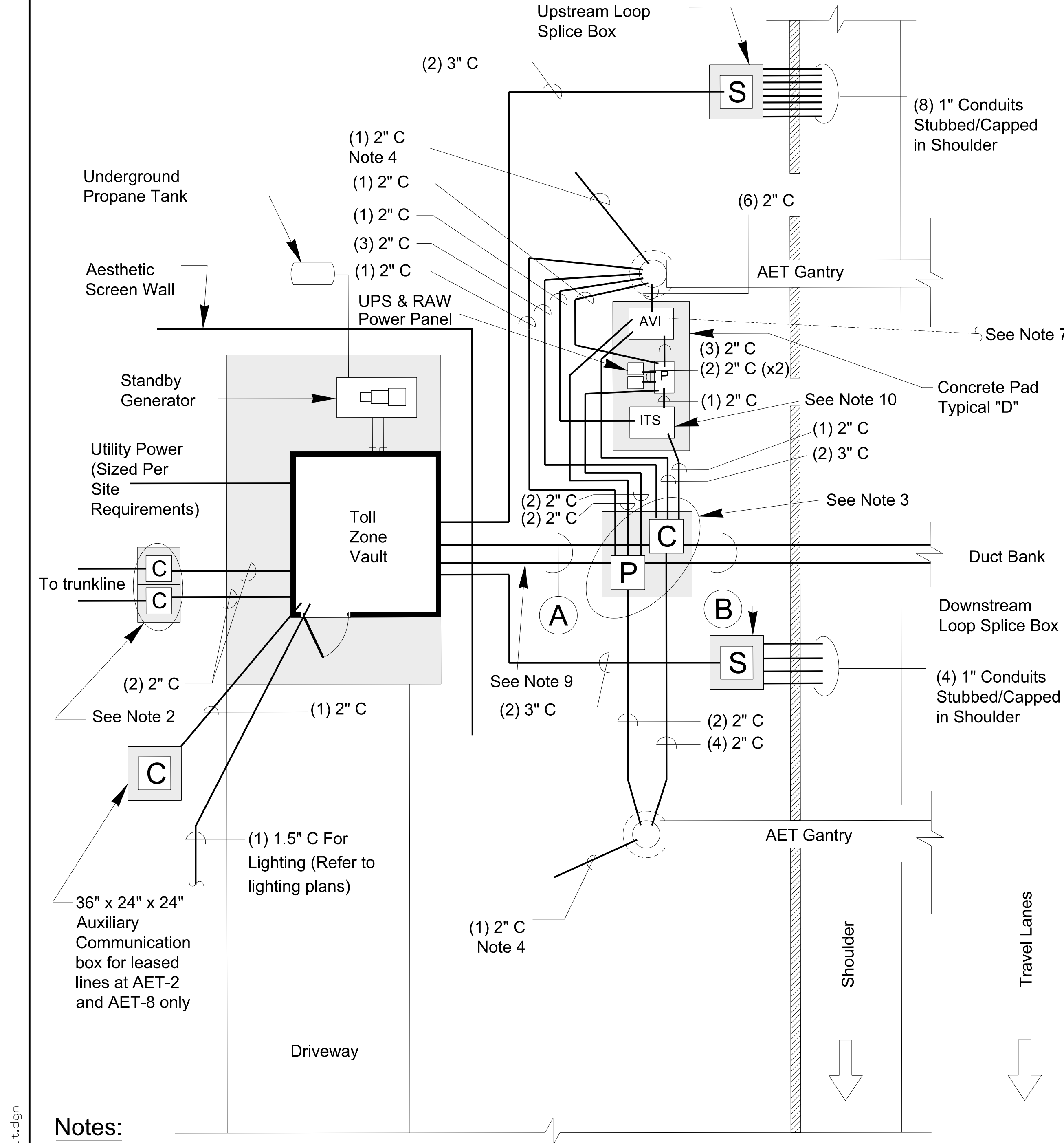
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Prepared for the Offices of:		Monroe Bypass - ITS Plans Conduit & Fiber Optic Cable into AET Vaults		SEAL	
NORTH CAROLINA Turnpike Authority		Division 10 Union County near Monroe		NORTH CAROLINA PROFESSIONAL SEAL 022516 ENGINEER LISA M. MOON	
PLAN DATE: September 2016		REVIEWED BY: LW Moon		DATE: 12/7/2016	
PREPARED BY: R Nissen		REVIEWED BY: JE Beck		CADD Filename: _____	
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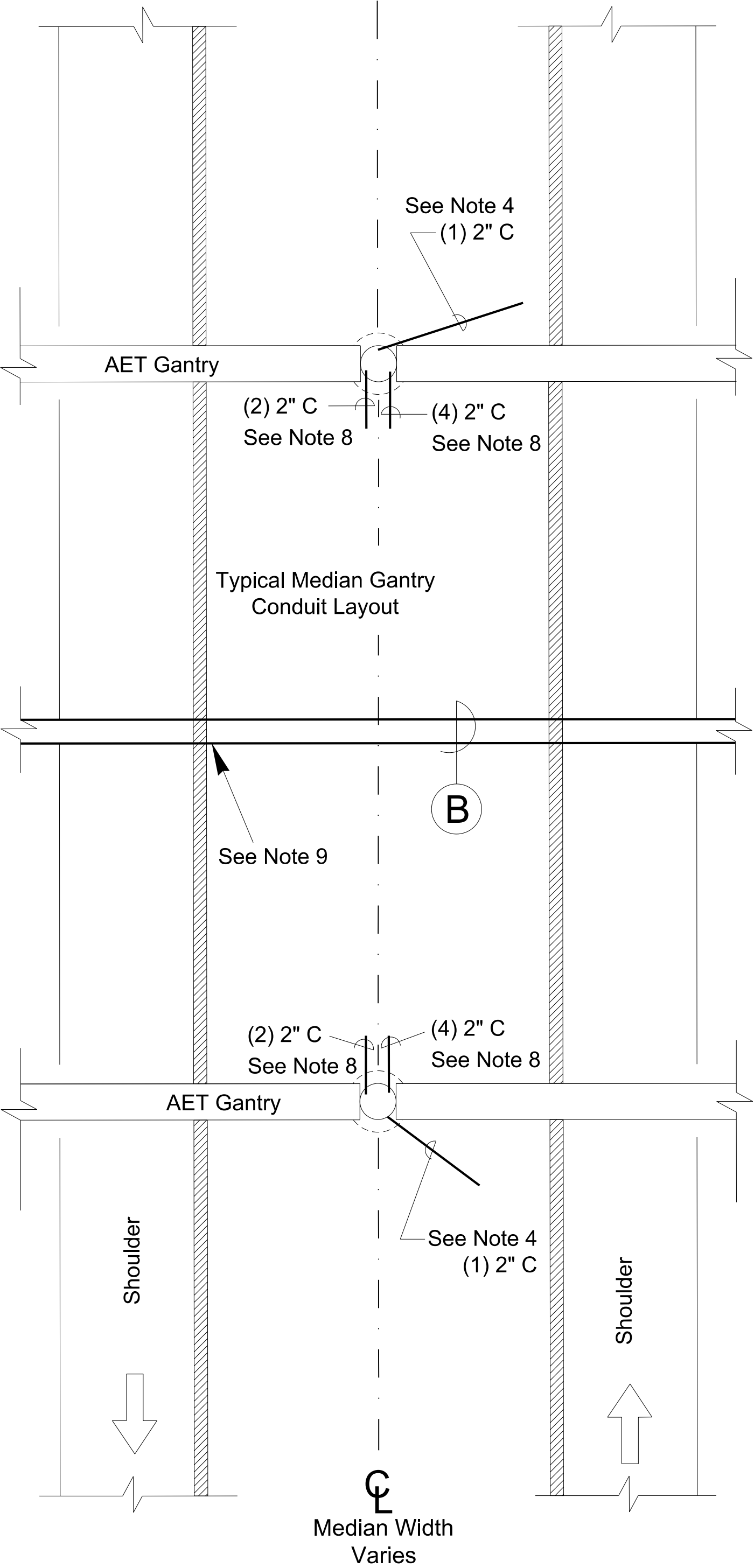


Notes:

- Conduit routing is shown schematically.
- For all conduit runs entering Toll Zone Vault, place conduit boxes as needed to ensure last box before entering Toll Zone Vault is below level of sidewalk concrete slab.
- Provide concrete aprons for all junction boxes.
- Provide 2" conduit for Lightning Protection System grounding.
- Provide drains for loop boxes as directed by the Engineer.
- See AET Standard Drawing E-4 for additional details for equipment pads.
- Provide oversized junction box (30"L x 15"W x 24"D) at location of AVI and ZEC cabinets. Provide a box drain in each junction box below equipment cabinets.
- Provide spare conduits for future use ((2)-2" C for Power, (4)-2" C for Comm.). Stub and cap conduits below grade.
- Route separate power service wires to each raw power panel from the vault, each with three #2 AWG wires and one #6 AWG ground. Before installation, confirm power needs with Toll Integrator. Field Adjust cable size as required by NEC.
- Provide DMS cabinet or provide standard junction box (16"L x 10"W x 10"D) at location of future DMS cabinets, as shown on plans.

Legend

- C** - Communications Junction Box (48" x 48" x 36")
- P** - Power Junction Box (48" x 48" x 36")
- S** - Loop Splice Box (36" x 17" x 30" Min)
- Box** - Box with 18" wide by 4" deep concrete apron, 1" above grade
- 2" C** - Designates 2" Conduit
- 3" C** - Designates 3" Conduit
- 4" C** - Designates 4" Conduit
- (#)** - Designates Quantity
- Guardrail** - Guardrail with doubled posts
- Structure Foundation** - Structure Foundation

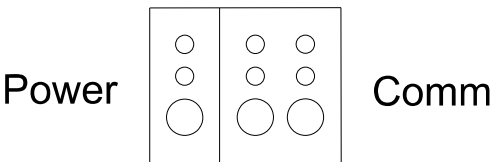


A Conduit from Last Box to Vault

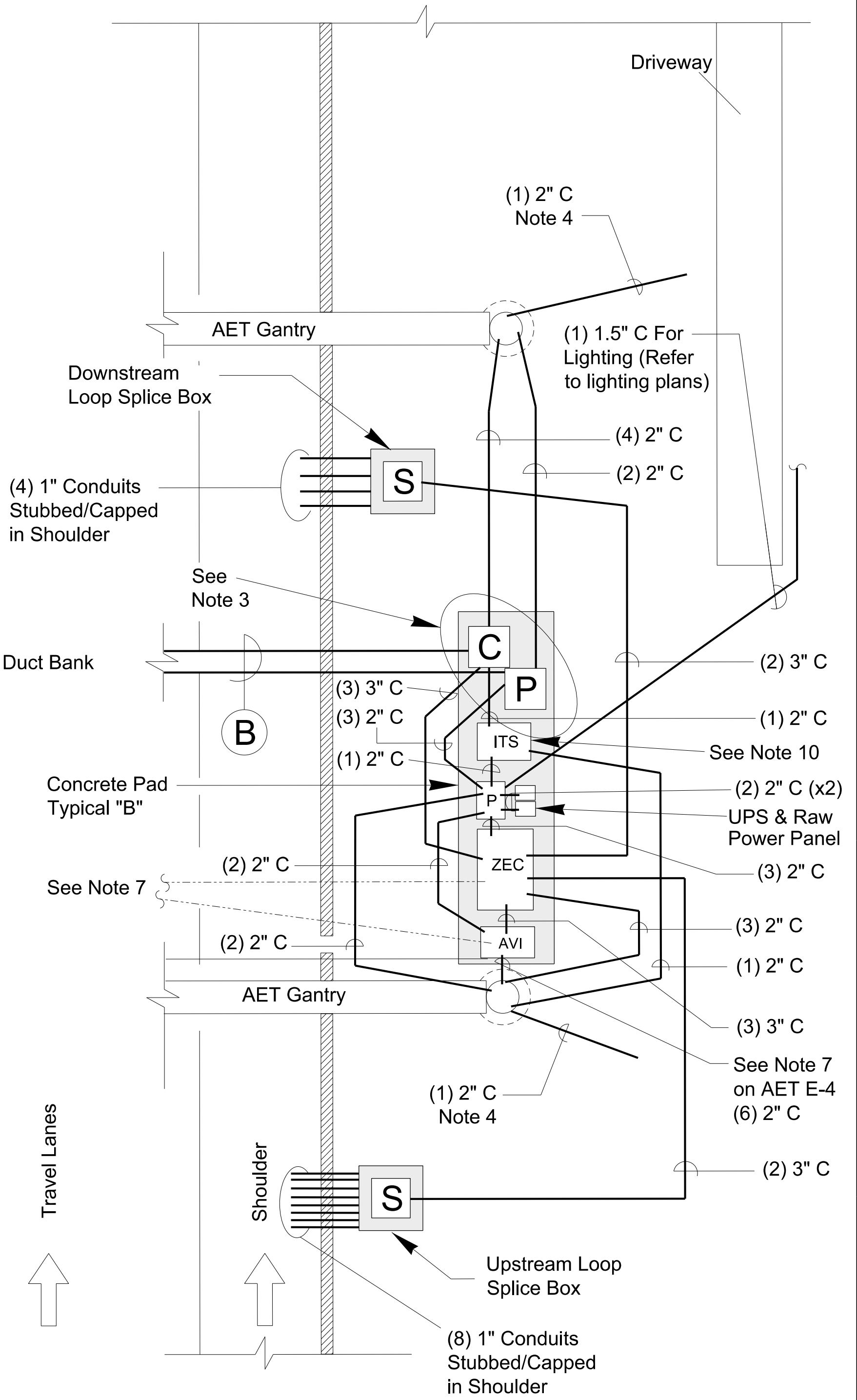
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|-------------------|-------------------|
| Communications: | Power: |
| (7) - 2" Conduits | (4) - 2" Conduits |
| (2) - 4" Conduits | (2) - 4" Conduits |

B Duct Bank Detail

Power, Communication, & FON (As Needed)



Roadway Crossing Duct Bank
6-2" Conduit, 3-4" Conduit
Encased in concrete under proposed roadway
and area of future widening.
Approx. 10 ft of conduit at centerline
of median shall be unencased.

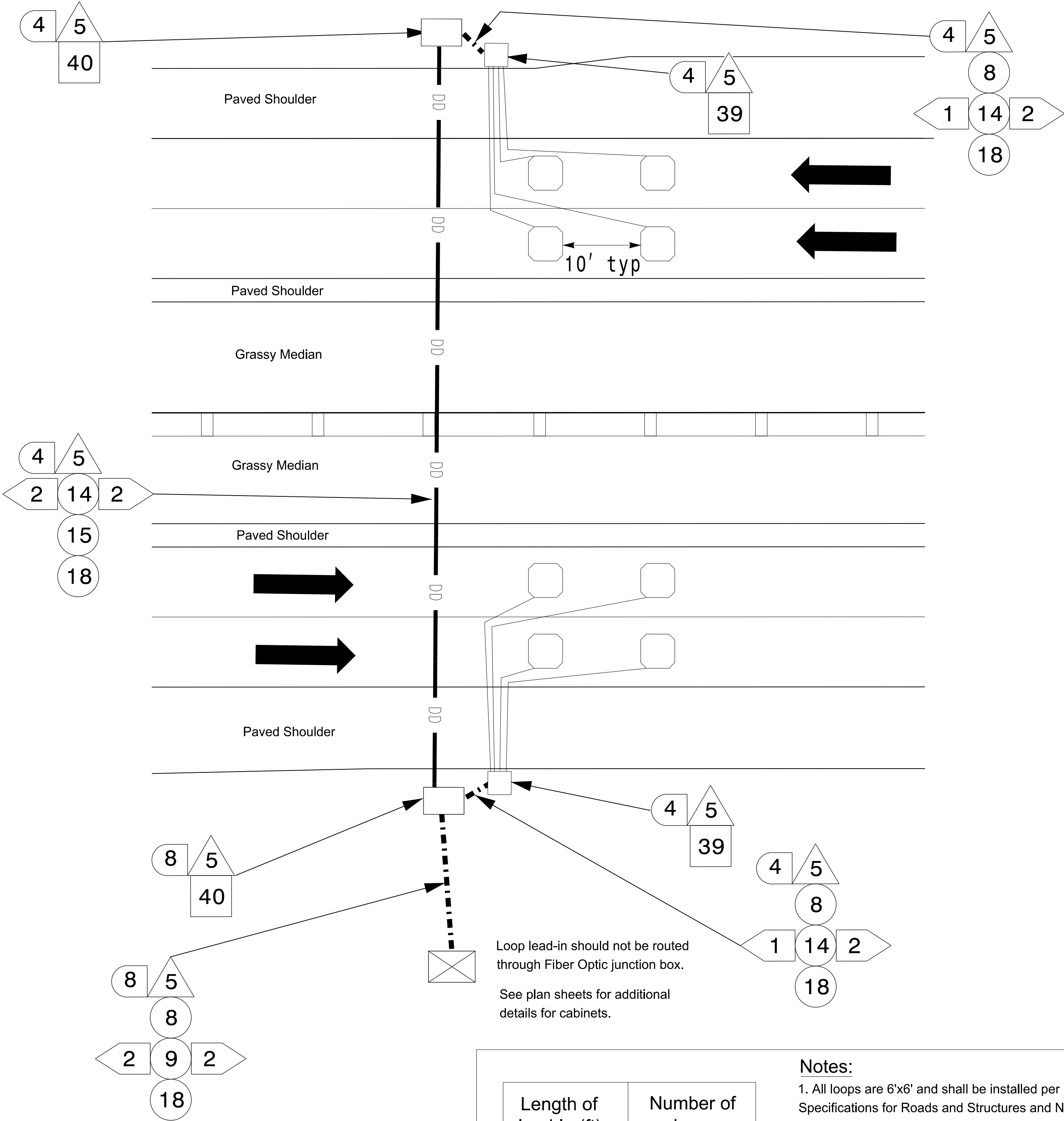


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Prepared for the Offices of:	Monroe Bypass - ITS Plans Typical Conduit Routing at AET Zones	SEAL
NORTH CAROLINA Turnpike Authority	Division 10 Union County near Monroe	SEAL 022516 ENGINEER LISA M. MOON
PLAN DATE: September 2016	REVIEWED BY: LW Moon	DATE: 12/7/2016
PREPARED BY: R Nissen	REVIEWED BY: JE Beck	DATE: 12/7/2016
REVISIONS	INIT.	DATE
N.T.S.		
PLANS PREPARED BY: DRMP ENGINEERS • PLANNERS • SCIENTISTS DRMP, INC. 5950 FAIRVIEW ROAD, SUITE 320 CHARLOTTE, NC 28210 NC LICENSE NO. C-2013 • T096 332-2289		CADD Filename: _____

Mainline

Vehicle Detection Systems on the main line may be standalone systems or may utilize shared cabinets with other VDS or CCTV systems. If cabinet is not directly adjacent to loops, follow conduit routing shown on plans. If standalone, the cabinet will be base-mounted as shown below. If shared, the cabinet will be pole-mounted.

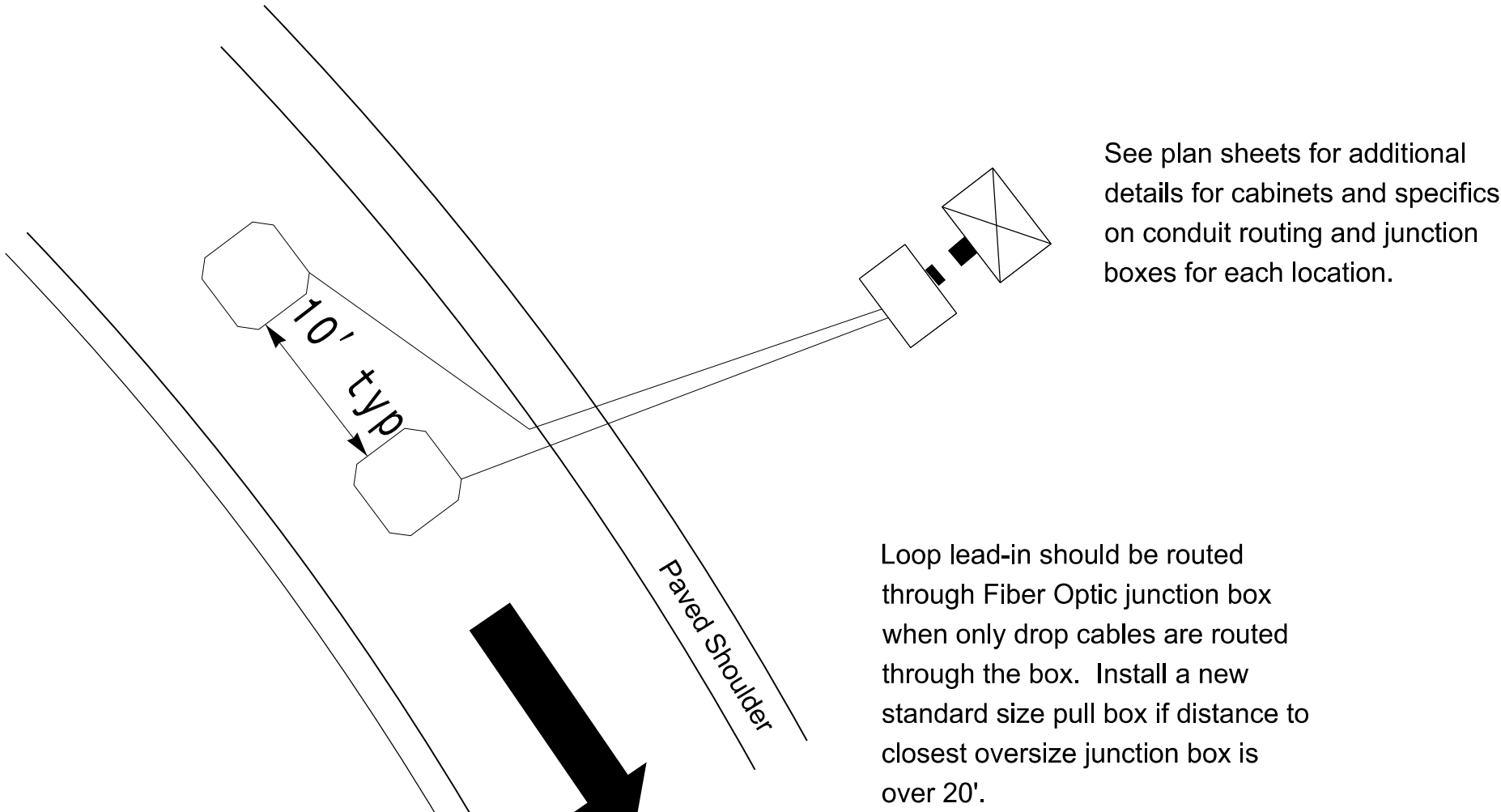


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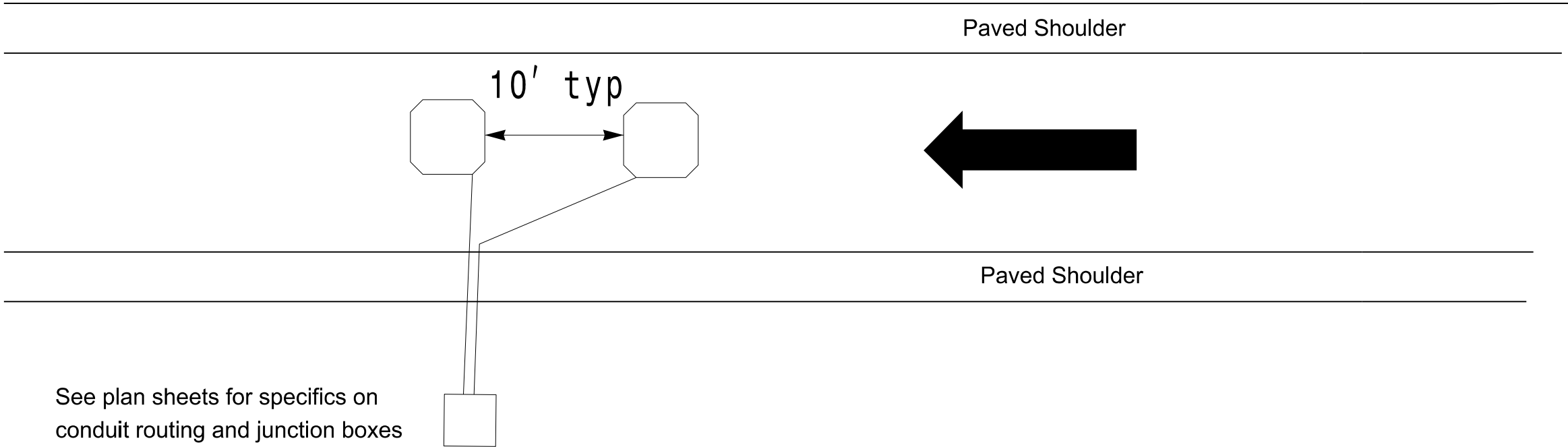
- Details presented are typical situations. For locations with additional lanes, add two loops per lane.
- A maximum of (8) 1" loop conduits shall enter a single junction box. Install additional junction box(es) if more conduit entrances are required.

Ramp/Loop

Vehicle Detection Systems on loops and ramps may utilize shared cabinets with other VDS or CCTV systems. If shared with a VDS, one system is typically adjacent to the cabinet and one has a conduit system to access the cabinet. The two options are shown below. These are typical and are not intended to imply that the cabinet must always be located next to the loop. Additionally, if shared with CCTV, the cabinet must be pole mounted.



Option 1 - adjacent to cabinet



Option 2 - conduit system to cabinet

Notes:

- All loops are 6"x6' and shall be installed per Division 17 of the NCDOT Standard Specifications for Roads and Structures and NCDOT Roadway Standard Drawings.
- Refer to chart for number of turns for each loop based on distance of lead-in from loop to cabinet. Minimum of 4 turns shall be used for all loops.
- Loops shall be placed in asphalt sub-base wherever possible.
- Each VDS system referenced on plan sheets includes two 6"x6' loops, spaced 10' apart.
- Specs for cabinets are shown on the cable routing plan sheets.
- See CM-A1 for construction notes.

Length of lead-in (ft)	Number of turns
<375	4
375-525	5
>525	6



Prepared for the Offices of:

Monroe Bypass - ITS Plans
Mainline and Ramp Vehicle
Detection System Typicals

Division 10 Union County near Monroe

PLAN DATE: September 2016 REVIEWED BY: LM Moon

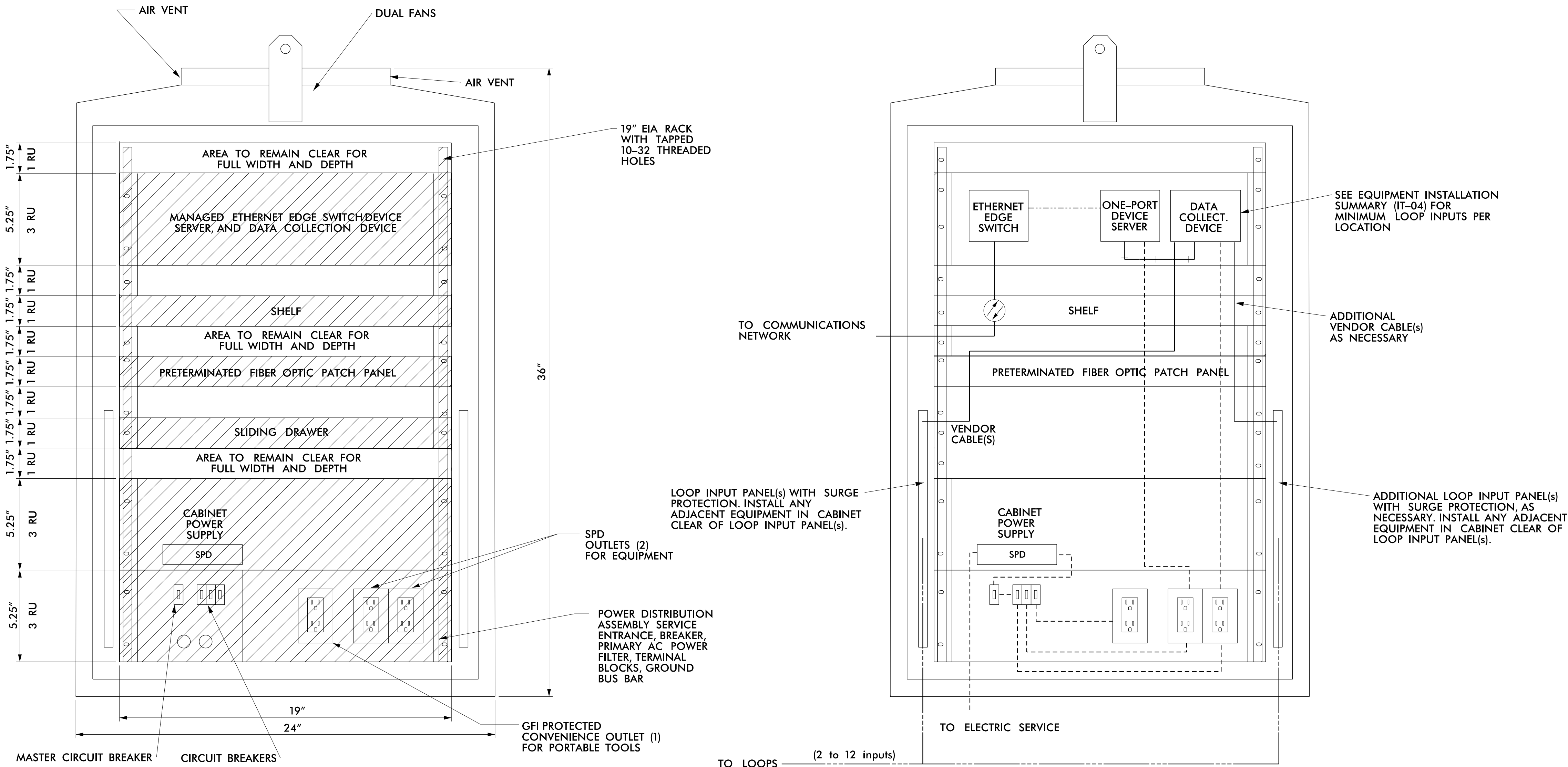
PREPARED BY: R Nissen REVIEWED BY: JE Beck

SCALE: N.T.S.

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NORTH CAROLINA
PROFESSIONAL
ENGINEER
LISA M. MOON
022516
12/7/2016
DATE

CADD Filename: _____



NOTES

1. ALL DIMENSIONS AND SCALE ARE APPROXIMATE.
2. ALL EQUIPMENT RACKS SHALL HAVE A MINIMUM OF ONE RACK UNIT SPACE IN BETWEEN THEM FOR VENTILATION
3. SUPPLY 336, DOUBLE DOOR CABINET.
4. CONDUIT ENTRANCES ARE IN BOTTOM OF CABINET.
5. MINIMUM NUMBER OF OUTLETS IS THREE, (2) SPD AND (1) GFI PROTECTED.
6. SPD SHALL FULLY PROTECT ALL DATA COMMUNICATIONS BETWEEN DETECTOR AND CABINET.
7. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.

CONNECTION LEGEND

	100 BASE FX ETHERNET (FIBER)
	100 BASE TX ETHERNET
	ELECTRICAL POWER
	RS-232/422/485
	VENDOR CABLE
	LOOP LEAD-IN

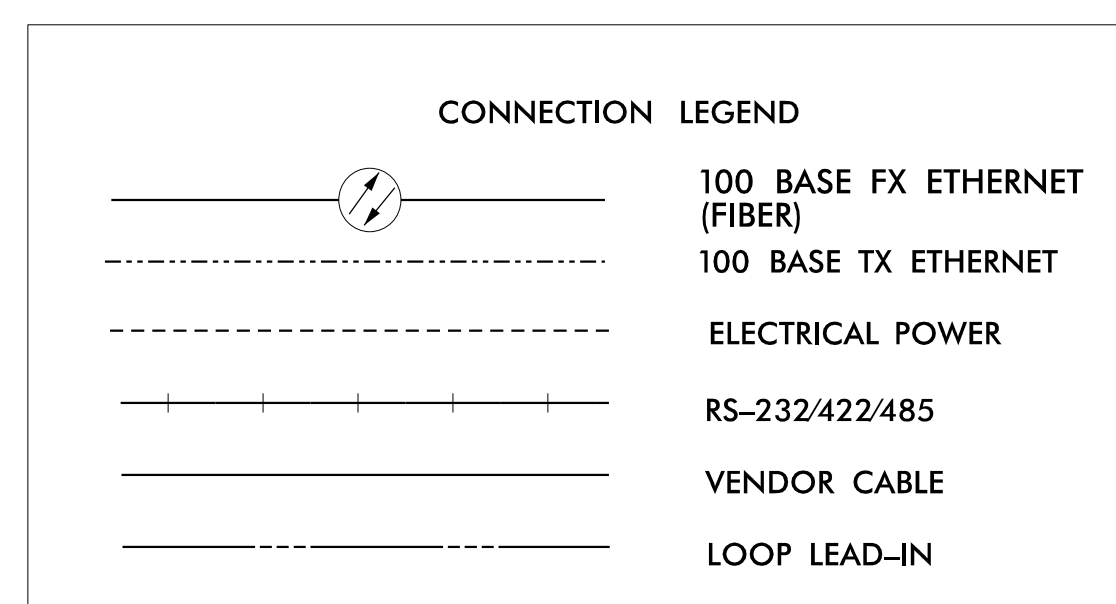
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Prepared for the Offices of:		Monroe Bypass - ITS Plans VDS - Cabinet Layout		SEAL	
		Division 10 Union County near Monroe			
PLAN DATE: September 2016		REVIEWED BY: LM Moon		DATE	
PREPARED BY: R Nissen		REVIEWED BY: JE Beck		DATE	
SCALE		NTS		DATE	
CADD File name:				DATE	

PLANS PREPARED BY:
DRMP
ENGINEERS • PLANNERS • SCIENTISTS
DRMP, INC.
5950 FAIRVIEW ROAD, SUITE 320
CHARLOTTE, NC 28210
NC LICENSE NO. C-32113 • (704) 333-2289

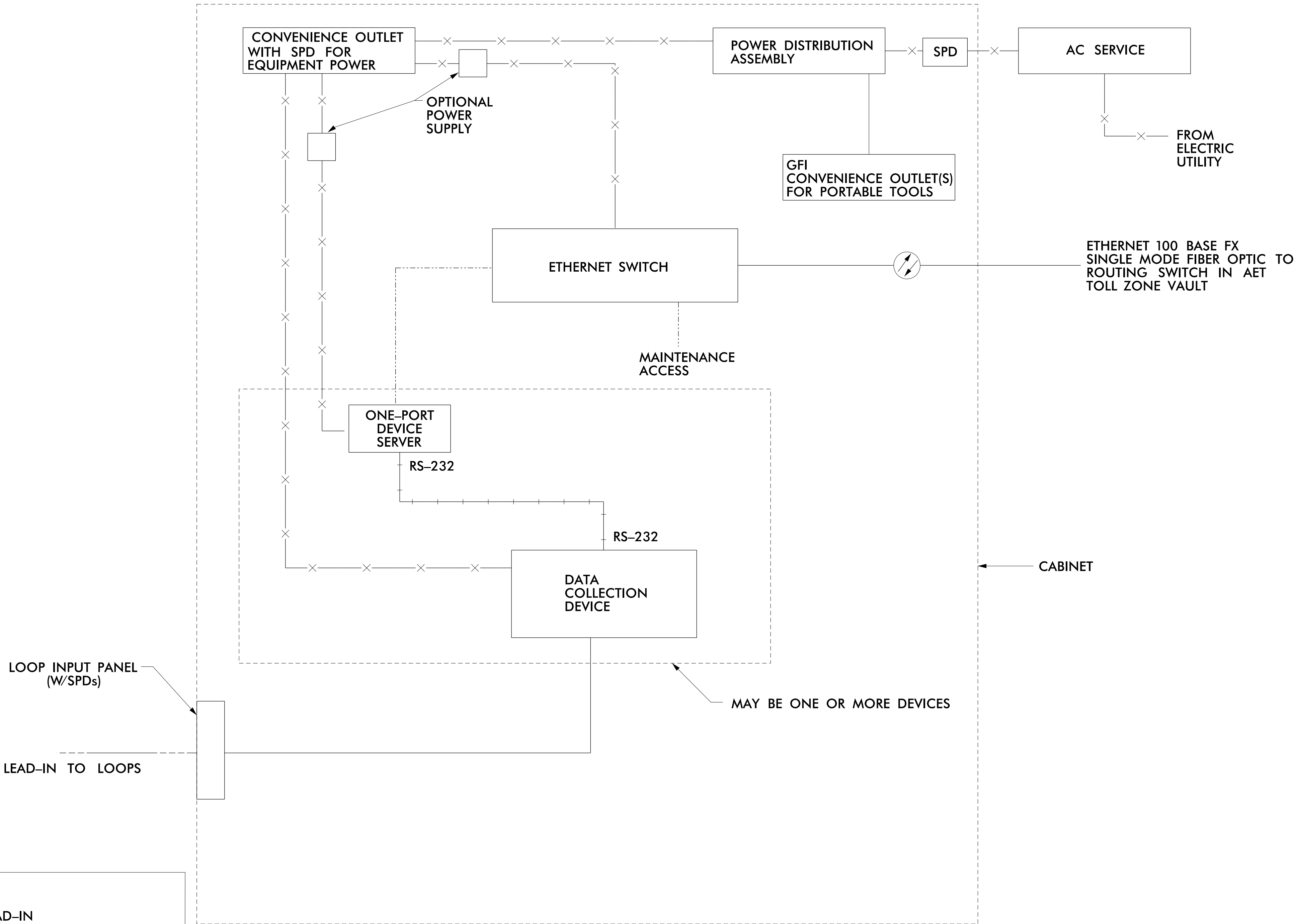


1. ALL DIMENSIONS AND SCALE ARE APPROXIMATE.
2. ALL EQUIPMENT RACKS SHALL HAVE A MINIMUM OF ONE RACK UNIT SPACE IN BETWEEN THEM FOR VENTILATION
3. SUPPLY 336, DOUBLE DOOR CABINET.
4. CONDUIT ENTRANCES ARE IN BOTTOM OF CABINET.
5. MINIMUM NUMBER OF OUTLETS IS THREE, (2) SPD AND (1) GFI PROTECTED.
6. SPD SHALL FULLY PROTECT ALL DATA COMMUNICATIONS BETWEEN DETECTOR AND CABINET.
7. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.



<i>Prepared for the Offices of:</i>		<div style="text-align: center;"> <h1>Monroe Bypass - ITS Plans</h1> <h2>VDS - Two Data Collection Devices - Cabinet Layout</h2> </div>						SEAL	
		Division 10 Union County near Monroe							
		PLAN DATE: September 2016		REVIEWED BY: LM Moon					
		PREPARED BY: R Nissen		REVIEWED BY: JE Beck					
SCALE		REVISIONS				INIT.		DATE	
NTS		
		
								<i>Lisa M. Moon</i> 12/7/2016 _____ DATE	
		CADD Filename:							

PROJECT REFERENCE NO.	SHEET NO.
R-3329/R-2559	SD-06



LEGEND			
	1000 BASE TX ETHERNET		LEAD-IN
	100 BASE TX ETHERNET		100 BASE FX ETHERNET (FIBER)
	ANALOG VIDEO		1000 BASE FX ETHERNET (FIBER)
	120 VAC POWER		RS-232/422/485
	VENDOR CABLES		EXISTING FIBER CABLE

NOTES

1. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.

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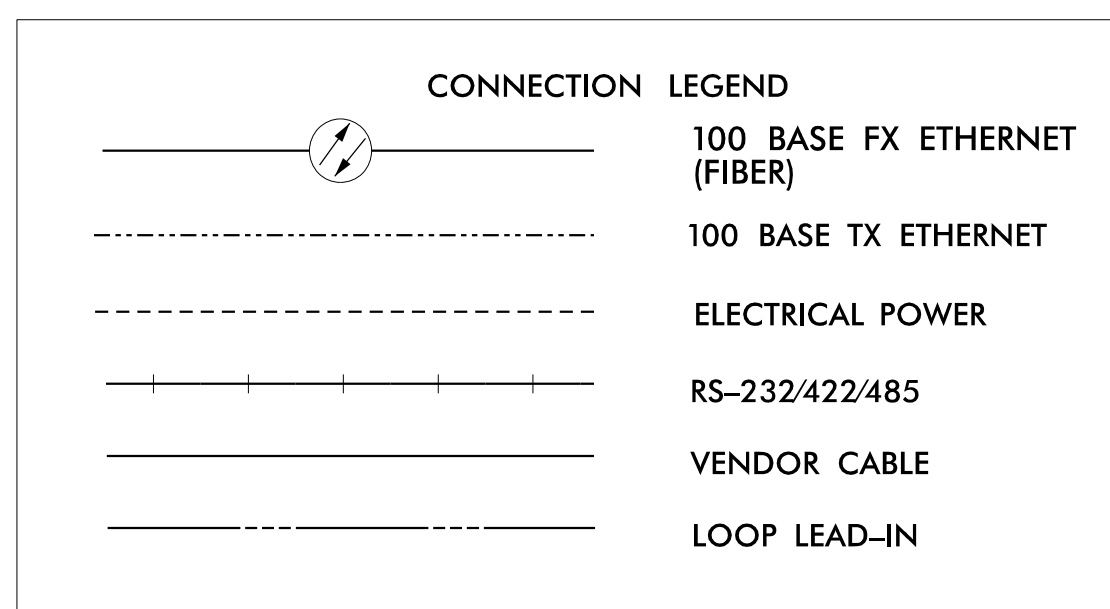
Prepared for the Offices of:		Monroe Bypass - ITS Plans VDS - Block Diagram		SEAL	
		Division 10 Union County near Monroe			
PLAN DATE: September 2016		REVIEWED BY: LM Moon		DATE: 12/7/2016	
PREPARED BY: R Nissen		REVIEWED BY: JE Beck		CADD Filename: _____	
SCALE: N.T.S.		REVISIONS		INIT. DATE	

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Plotter: AT-248-PLM01-W7



CABINET WIRING VIEW

1. ALL DIMENSIONS AND SCALE ARE APPROXIMATE.
2. ALL EQUIPMENT RACKS SHALL HAVE A MINIMUM OF ONE RACK UNIT SPACE IN BETWEEN THEM FOR VENTILATION
3. SUPPLY 336 CABINET WITH FRONT AND BACK DOOR.
4. CONDUIT ENTRANCES ARE IN BOTTOM OF CABINET.
5. MINIMUM NUMBER OF OUTLETS IS FOUR, (3) SPD AND (1) GFI PROTECTED.
6. SPD SHALL FULLY PROTECT ALL DATA COMMUNICATIONS BETWEEN DETECTOR AND CABINET.
7. THERE SHALL BE FRONT AND REAR DOORS. BOTH DOORS SHALL HAVE THE HINGE SIDE NEXT TO THE POLE WHEN POLE MOUNTED.
8. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.


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NORTH CAROLINA
Turnpike Authority

Division 10 Union County near Monroe

PLAN DATE: September 2016	REVIEWED BY: LM Moon
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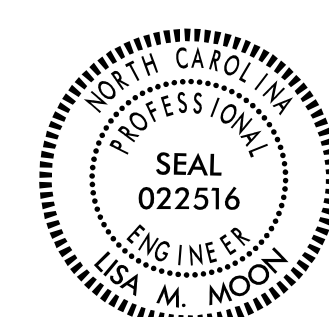
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SCALE	REVISIONS	INIT.	DATE
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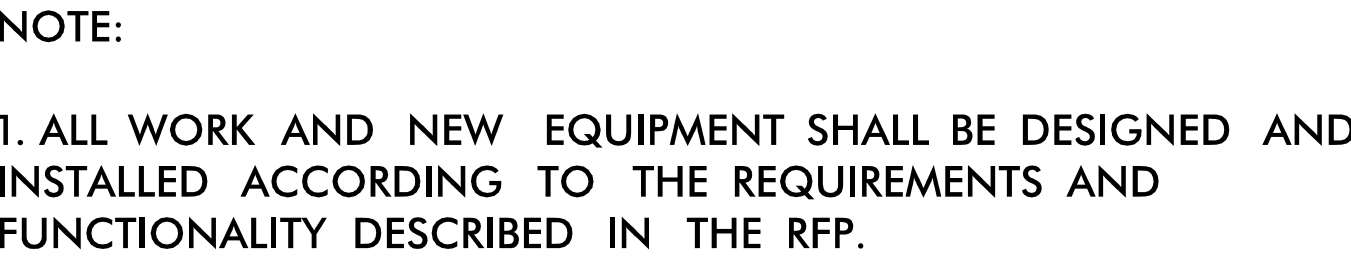
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SEAL



Lisa M. Moore 12/7/2016

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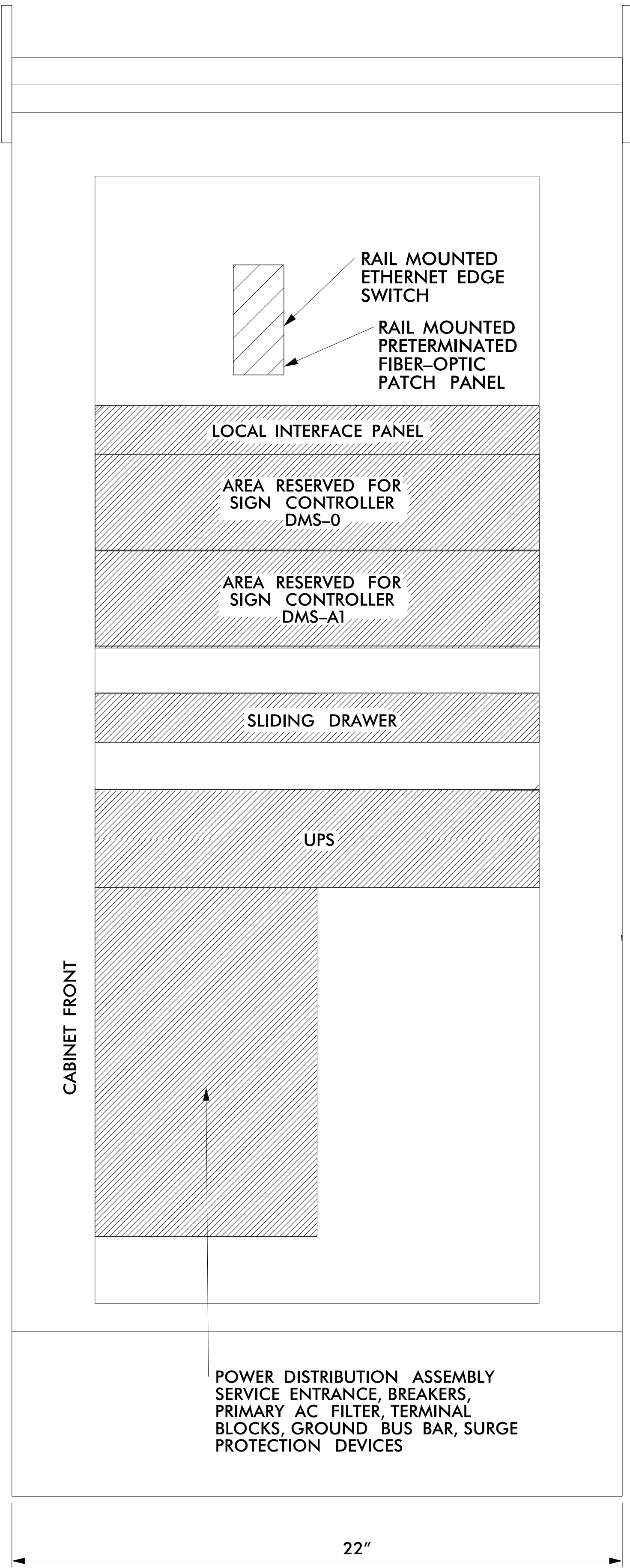
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	1000 BASE TX ETHERNET		LEAD-IN
	100 BASE TX ETHERNET		100 BASE FX ETHERNET (FIBER)
	ANALOG VIDEO		1000 BASE FX ETHERNET (FIBER)
	120 VAC POWER		RS-232/422/485
	VENDOR CABLES		EXISTING FIBER CABLE

PLANS PREPARED BY:

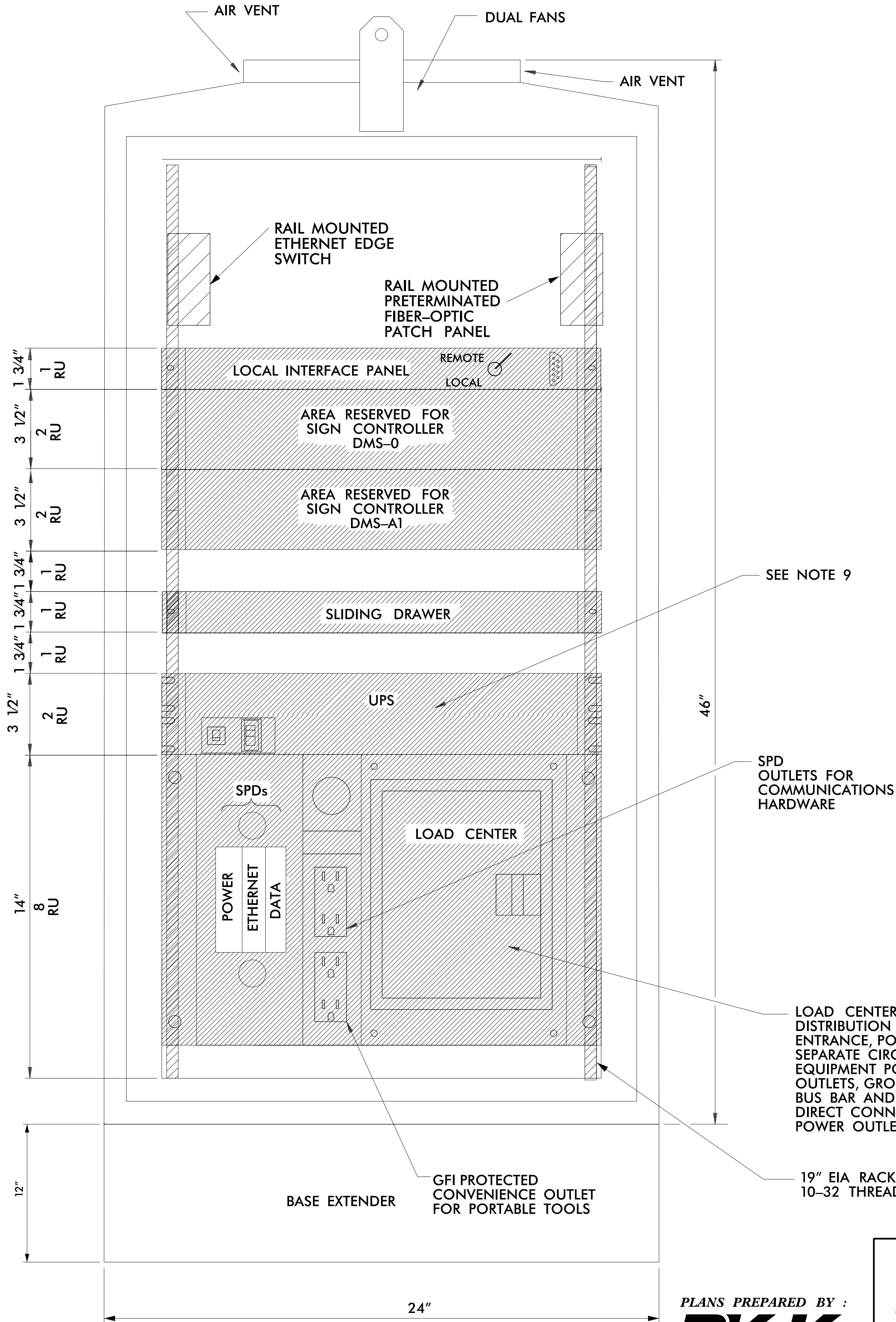
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		<div> <div>Monroe Bypass - ITS Plans</div> <div>CCTV and VDS - Block Diagram</div> </div>		<div> <div>DOCUMENT NOT CONSIDERED FINAL</div> <div>UNLESS ALL SIGNATURES COMPLETED</div> </div>	
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<div> <div>PREPARED BY: R Nissen</div> <div>REVISIONS</div> </div>		<div> <div> <div>REVIEWED BY: JE Beck</div> <div>INIT.</div> <div>DATE</div> </div> </div>			





SIDE VIEW



FRONT VIEW

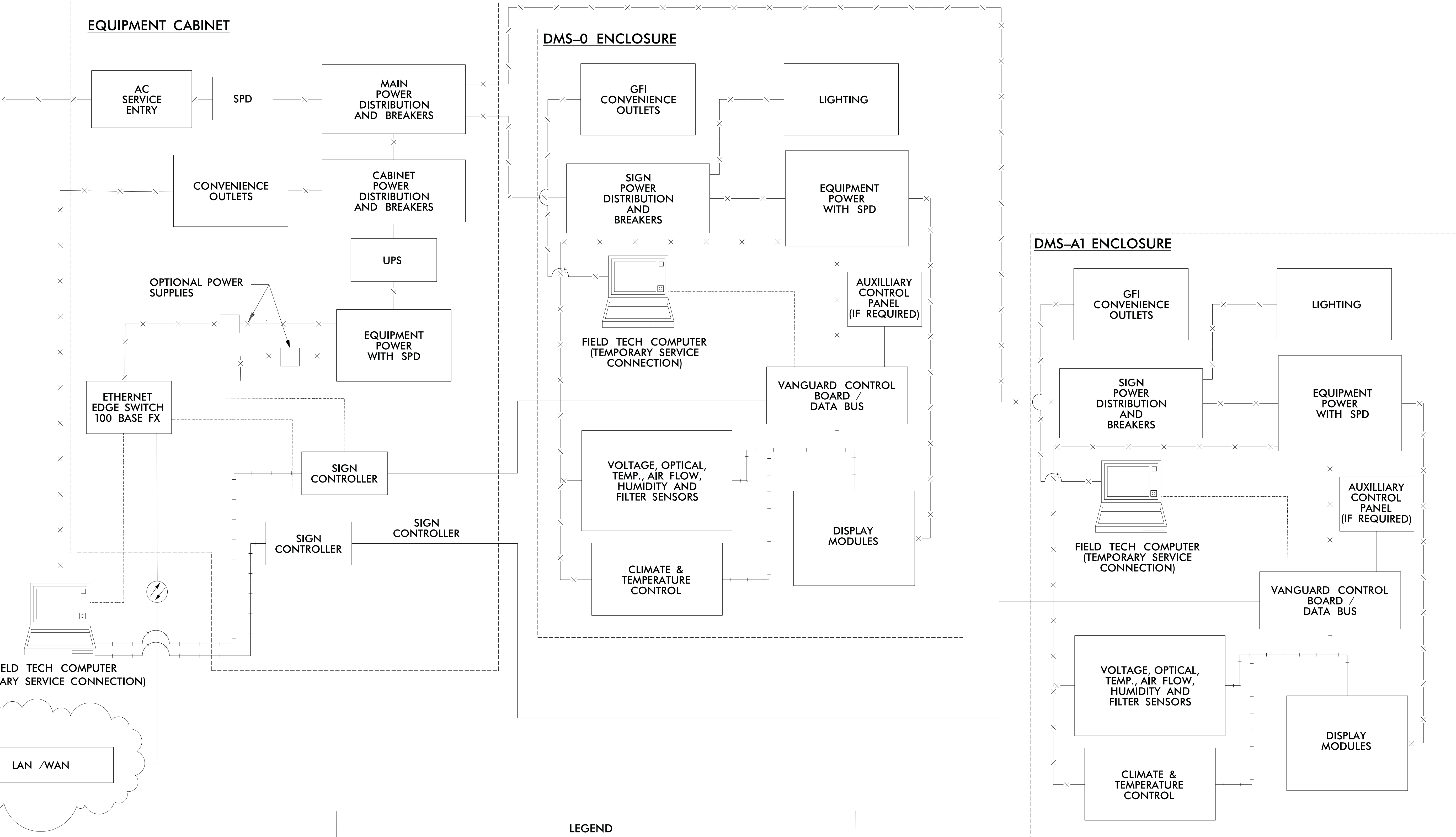
PLANS PREPARED BY

RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
EIGH, NORTH CAROLINA 27609-3
LICENSE NO. F-0112 • (919) 878-9

Prepared for the Offices of:		Monroe Bypass - ITS Plans DMS-0/DMS-A1 Cabinet Layout		SEAL 	
		Division 10 Union County near Monroe			
PLAN DATE: September 2016		REVIEWED BY: B Brandt			
PREPARED BY: K Southwell		REVIEWED BY: MP Smith			
SCALE		REVISIONS		INIT. DATE	
N.T.S.					
				Barry J. Brandt 12/7/16 DATE	
				CAD: Eileenm...	

GENERAL NOTES:

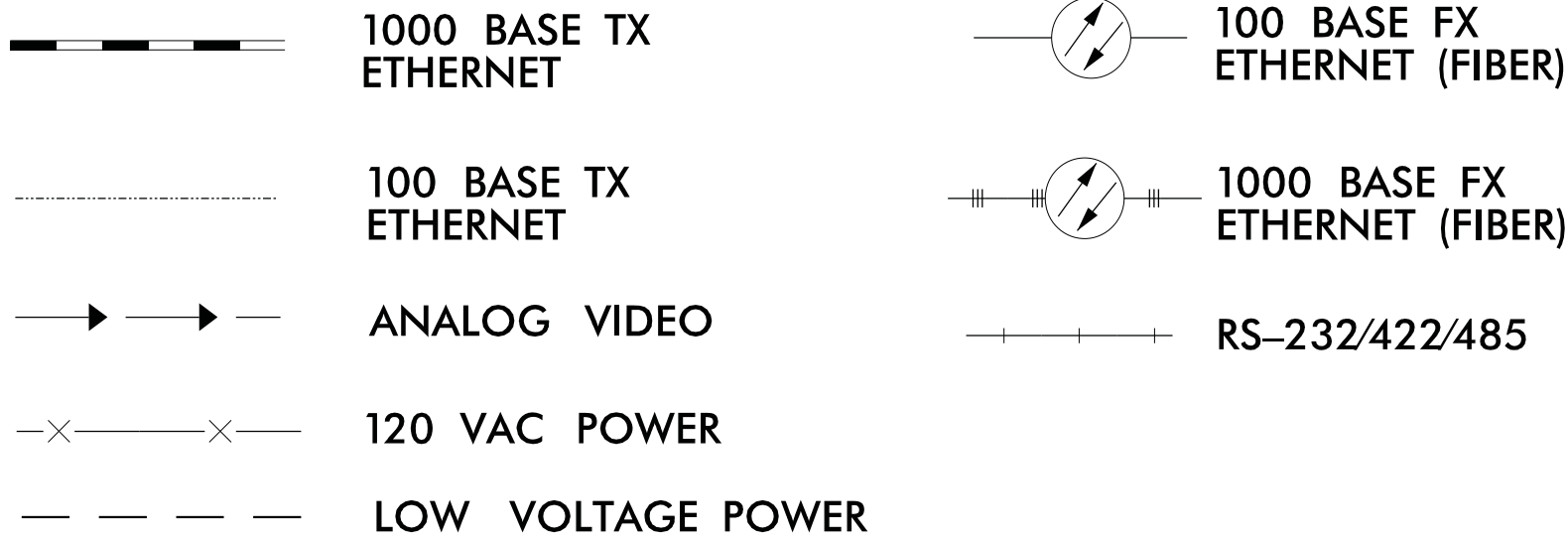
1. CABINET LAYOUT IS FOR BASE-MOUNTED INSTALLATIONS.
2. ALL DIMENSIONS ARE APPROXIMATE.
3. SEE RFP REQUIREMENTS FOR CABINET TYPE AND SIZE.
4. THE MINIMUM DMS CABINET DIMENSIONS SHALL BE 46"H X 24"W X 22"D.
5. CONDUIT ENTRANCES ARE AT BOTTOM OF CABINET.
6. MINIMUM NUMBER OF DUPLEX OUTLETS IS TWO, (1) SPD AND (1) GFI PROTECTED.
7. PROVIDE SIGN CONTROLLER IN BASE-MOUNTED CABINET TO PROVIDE FULL ACCESS TO DMS SIGN FOR CONTROL, PROGRAMMING AND TROUBLESHOOTING.
8. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.
9. PROVIDE UPS FOR DMS SIGNS NOT LOCATED AT AET GANTRY STRUCTURE LOCATIONS.
10. MOUNT PATCH PANEL AS LOW AS POSSIBLE FOR EASY ACCESS (MAINTENANCE).



GENERAL NOTES:

1. AC WIRED CABINET SHALL BE EQUIPPED WITH A SURGE PROTECTOR WITH AN ALARM FEATURE.
2. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN RFP.

LEGEND



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900 RIDGEFIELD DRIVE SUITE 350
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Prepared for the Offices of:

Monroe Bypass - ITS Plans
DMS-0/DMS-A1
Block Diagram

Division 10 Union County near Monroe

PLAN DATE: September 2016	REVIEWED BY: B Brand
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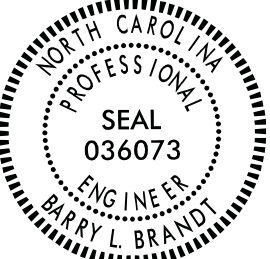
PREPARED BY: K Southwell	REVIEWED BY: MP Smit
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SCALE	REVISIONS	INIT.	DATE
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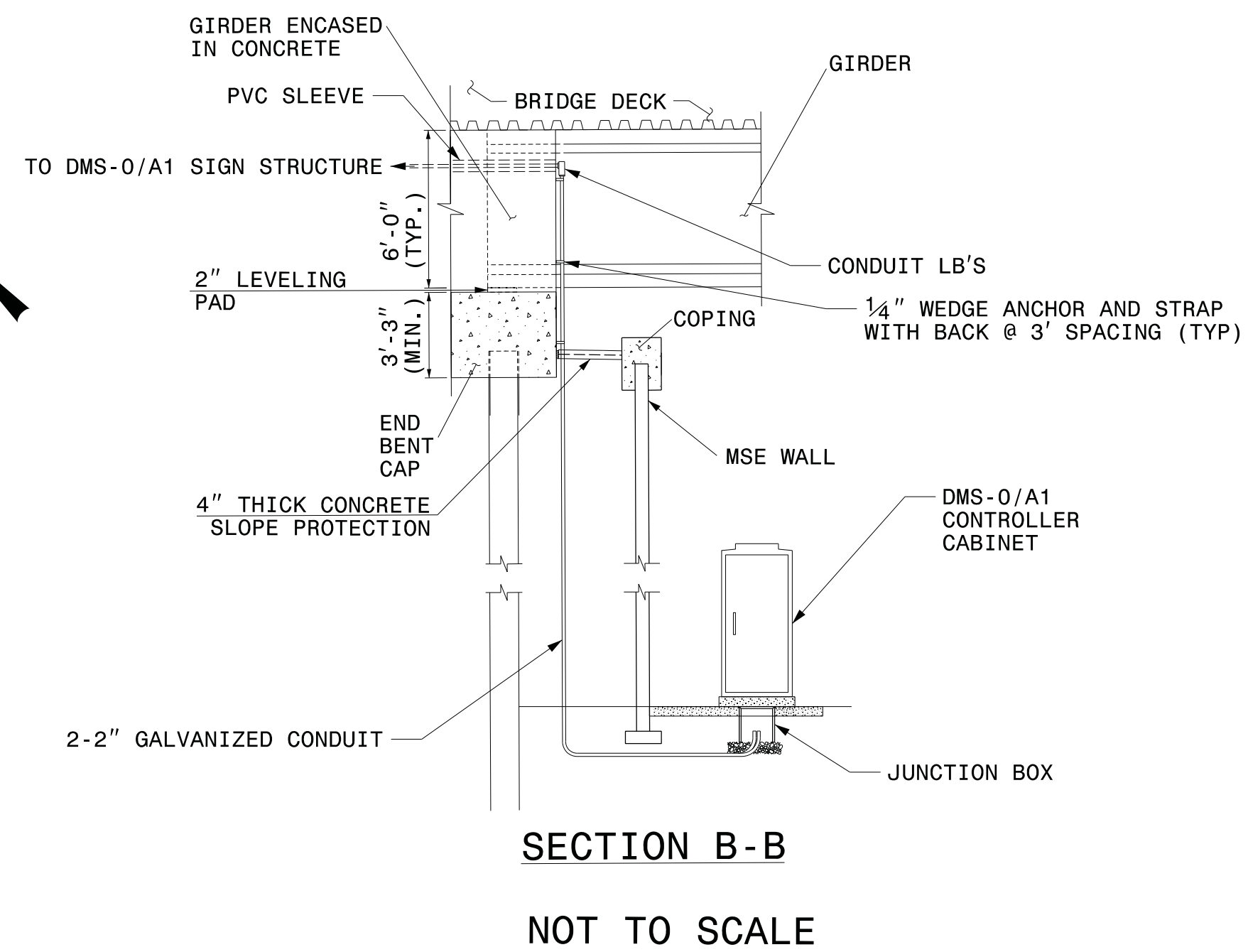
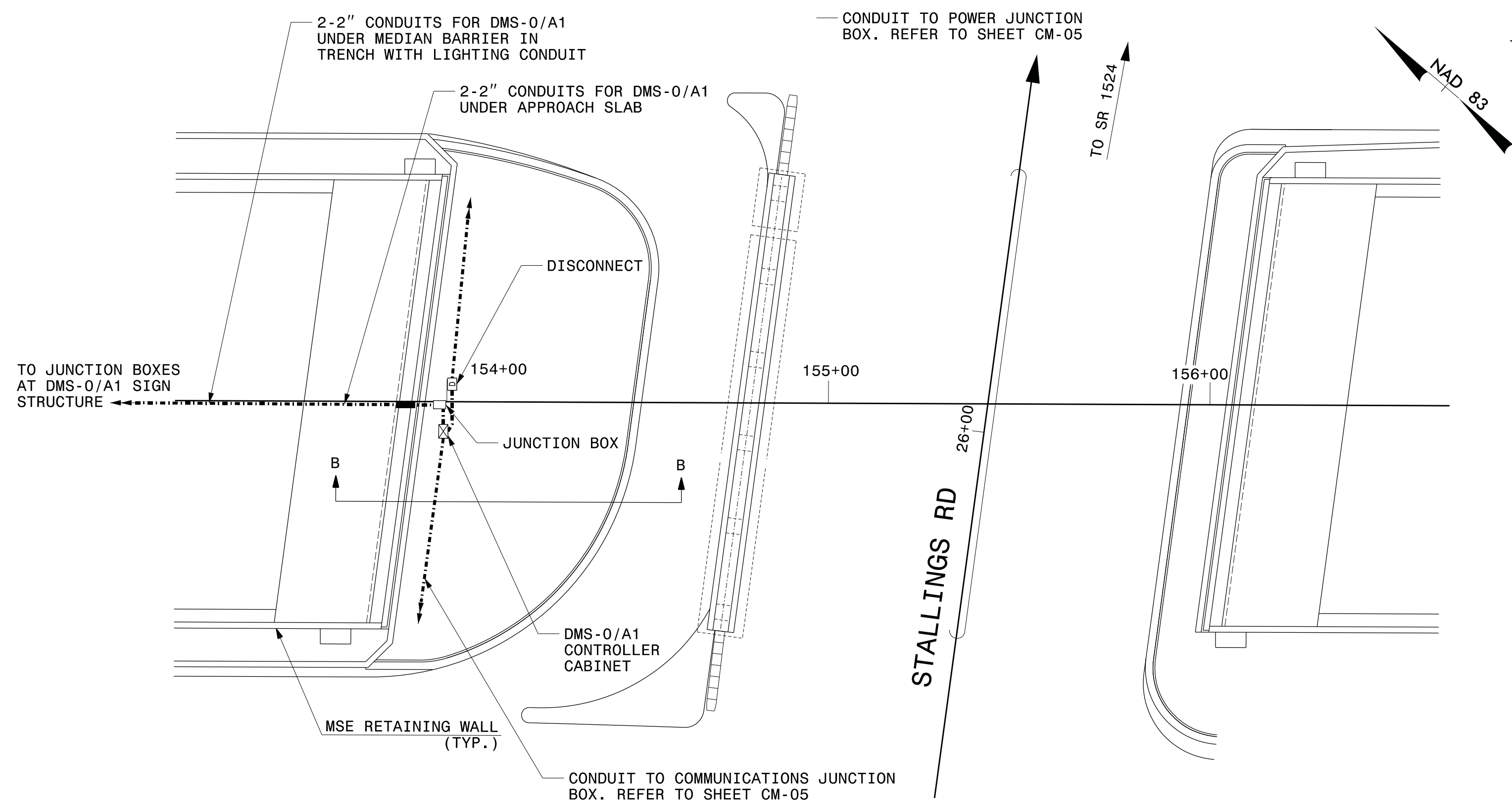
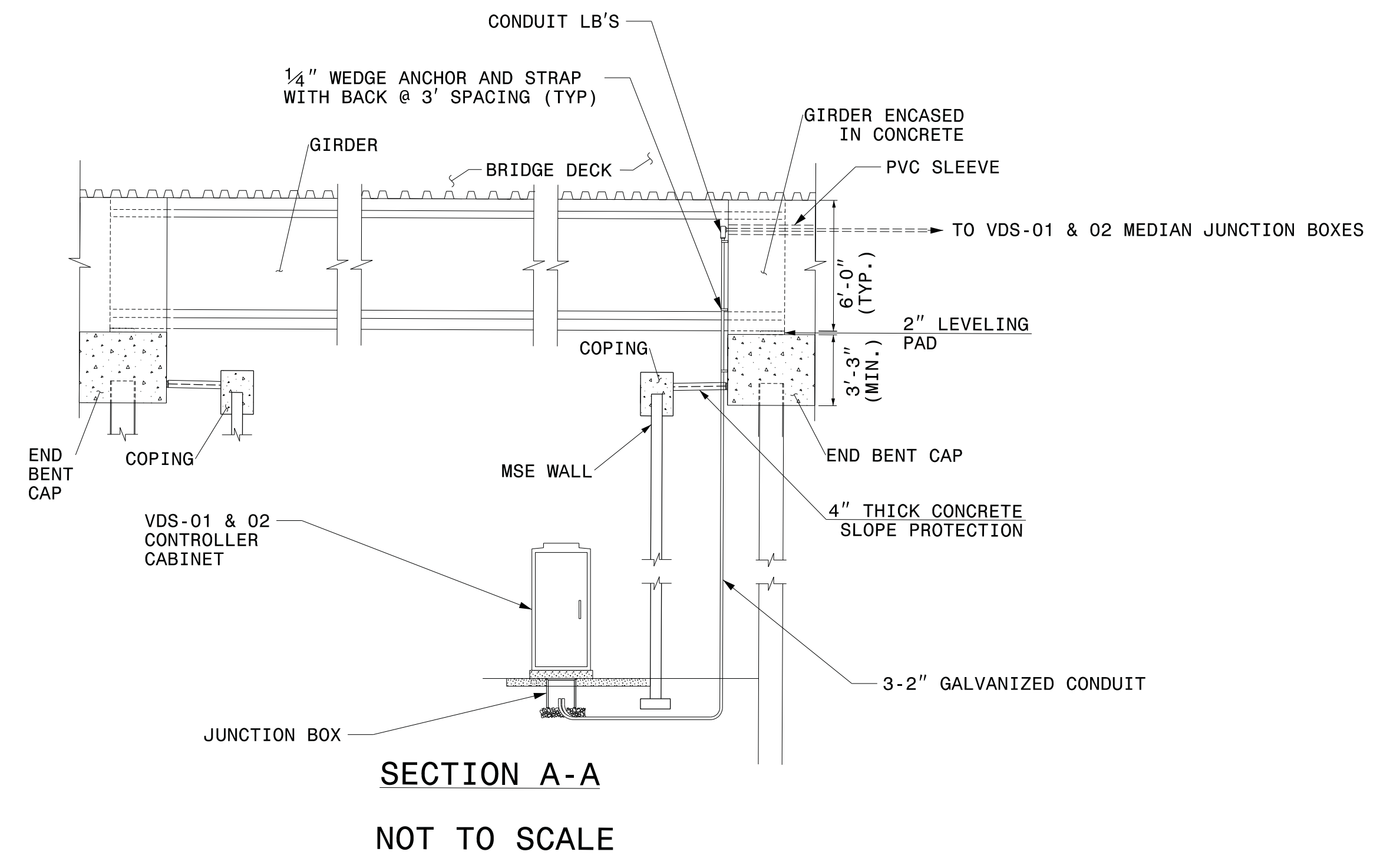
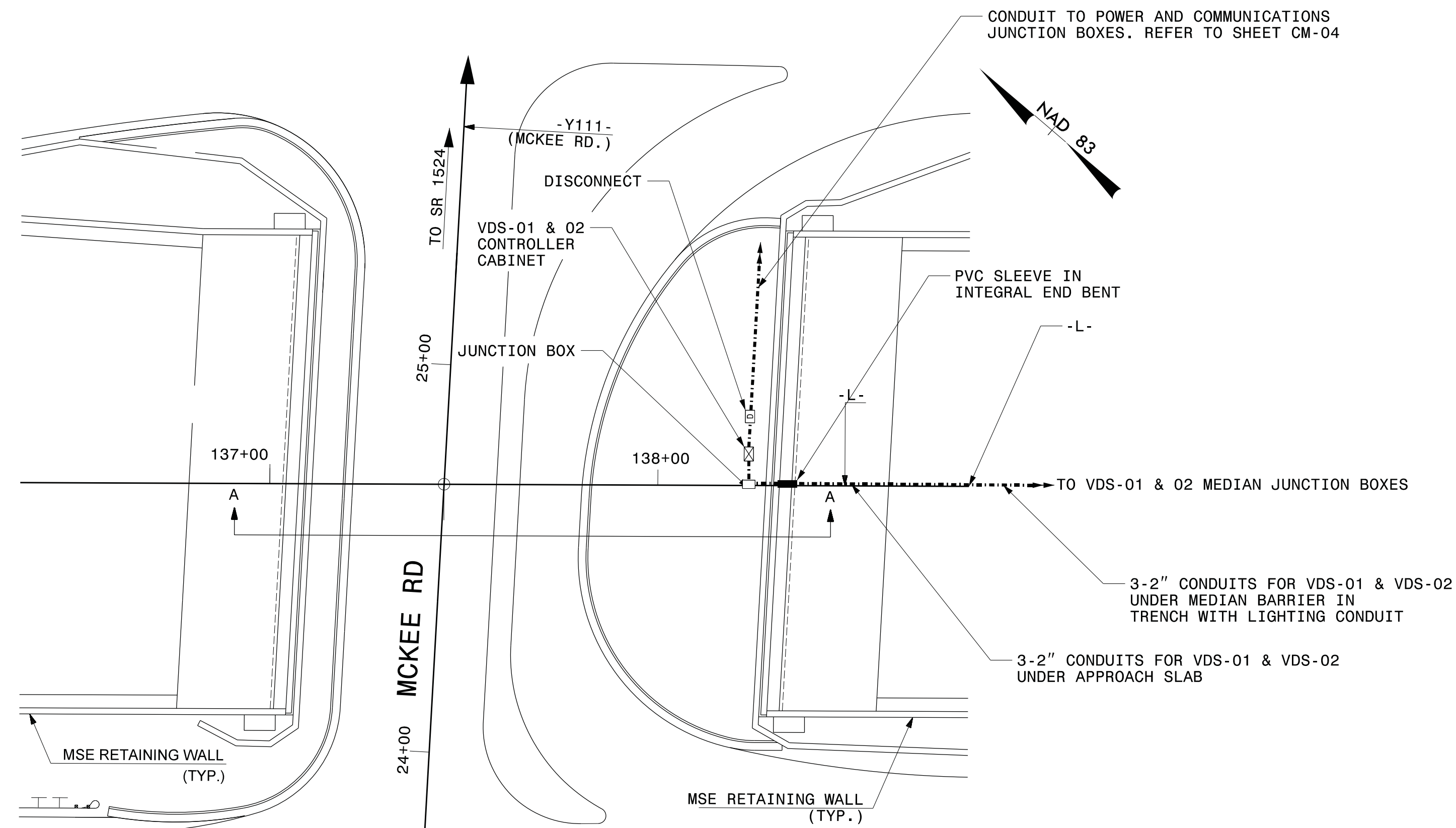
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Barry L Brant 2/7/16

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- NOTES:
1. REFER TO BRIDGE DRAWINGS FOR MCKEE ROAD (B-100, S-446) AND STALLINGS ROAD (B-200, S-476) FOR DETAILS ON PVC SLEEVE IN INTERGRAL END BENT.
 2. COORDINATE INSTALLATION OF CONDUIT WITH CONSTRUCTION OF MSE WALL, BRIDGE, APPROACH SLAB, AND CONCRETE BARRIER.

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[illegible]

- 1

INSTALL CAT5 CABLE
- 2

INSTALL COMMUNICATION CABLE PER MANUFACTURER'S GUIDELINES
- 3

INSTALL ELECTRICAL SERVICE WIRE (BY TYPE)
- 4

INSTALL SMFO CABLE
- 5

LEAD-IN CABLE
- 6

INSTALL FIBER OPTIC DROP CABLE
- 7

INSTALL TRACER WIRE
- 8

TRENCH
- 9

INSTALL PVC CONDUIT
- 10

INSTALL RIGID, GALVANIZED STEEL CONDUIT
- 11

INSTALL RIGID, GALVANIZED STEEL RISER WITH WEATHERHEAD
- 12

INSTALL RIGID, GALVANIZED STEEL RISER WITH FIBER OPTIC CABLE SEAL
- 13

INSTALL FIBERGLASS CONDUIT (FOR BRIDGE MOUNT)
- 14

INSTALL HIGH DENSITY POLYETHYLENE CONDUIT
- 15

DIRECTIONAL DRILL CONDUIT
- 16

BORE AND JACK CONDUIT
- 17

INSTALL CABLE(S) IN EXISTING CONDUIT
- 18

INSTALL CABLE(S) IN NEW CONDUIT
- 19

INSTALL CABLE(S) IN EXISTING RISER
- 20

INSTALL CABLE(S) IN NEW RISER
- 21

INSTALL CABLE(S) IN EXISTING CONDUIT STUBOUTS
- 22

INSTALL NEW CONDUIT INTO CABINET BASE
(USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 23

INSTALL NEW RISER INTO CABINET BASE
(USE EXISTING CONDUIT STUB-OUTS WHEN AVAILABLE)
- 24

INSTALL NEW CONDUIT INTO POLE-MOUNTED CABINET
- 25

INSTALL NEW RISER INTO POLE-MOUNTED CABINET
- 26

NOT USED
- 27

INSTALL FIBER OPTIC EDGE SWITCH WITH JUMPERS
- 28

INSTALL INTERCONNECT CENTER, PATCH PANEL, JUMPERS,
AND FUSION SPLICE CABLE IN VAULT
- 29

INSTALL UNDERGROUND SPLICE ENCLOSURE
- 30

INSTALL FIBER OPTIC VIDEO ENCODER
- 31

INSTALL FIBER OPTIC VIDEO DECODER
- 32

INSTALL TRANSCEIVER
- 33

INSTALL PORT SERVER
- 34

INSTALL CABINET FOUNDATION

- 35

INSTALL TECHNICIAN PAD
- 36

INSTALL ALL DIGITAL CCTV CAMERA ASSEMBLY
- 37

INSTALL 75' CCTV/MVDS METAL POLE AND FOUNDATION WITH
LOWERING DEVICE
- 38

INSTALL 50' CCTV/MVDS METAL POLE AND FOUNDATION
- 39

INSTALL STANDARD SIZED JUNCTION BOX
- 40

INSTALL OVERSIZED HEAVY-DUTY JUNCTION BOX
- 41

INSTALL SPECIAL-SIZED HEAVY-DUTY JUNCTION BOX
- 42

INSTALL CUSTOM SIZED JUNCTION BOX WITH 18" CONCRETE COLLAR
- 43

INSTALL WOOD POLE
- 44

INSTALL TYPE A POLE-MOUNTED CABINET
- 45

INSTALL 336 BASE-MOUNTED CABINET WITH BASE ADAPTER
- 46

INSTALL TYPE C POLE-MOUNTED CABINET
- 47

INSTALL TYPE D CABINET
- 48

INSTALL TWO 6' X 6' LOOPS PER LANE
- 49

TRAFFIC BEARING JUNCTION BOX
- 50

INSTALL FRONT ACCESS DMS
- 51

INSTALL WALK-IN DMS WITH WALKWAY SYSTEM
- 52

INSTALL DELINEATOR MARKER
- 53

STORE 50 FEET OF EACH COMMUNICATIONS CABLE
- 54

STORE 50 FEET OF EACH FIBER OPTIC DROP CABLE
- 55

INSTALL ELECTRICAL SERVICE DISCONNECT
- 56

INSTALL UNINTERRUPTIBLE POWER SUPPLY
- 57

MODIFY EXISTING ELECTRICAL SERVICE
- 58

INSTALL NEW ELECTRICAL SERVICE PEDESTAL (COMBINATION PANEL)
- 59

BOND TRACER WIRE EQUIPMENT GROUND BUS
- 60

INSTALL PEDESTAL SUPPORT FOR DMS
- 61

INSTALL TRUSS SUPPORT FOR DMS
- 62

INSTALL WALL-MOUNTED METER & DISCONNECT
- 63

INSTALL RWIS
- 64

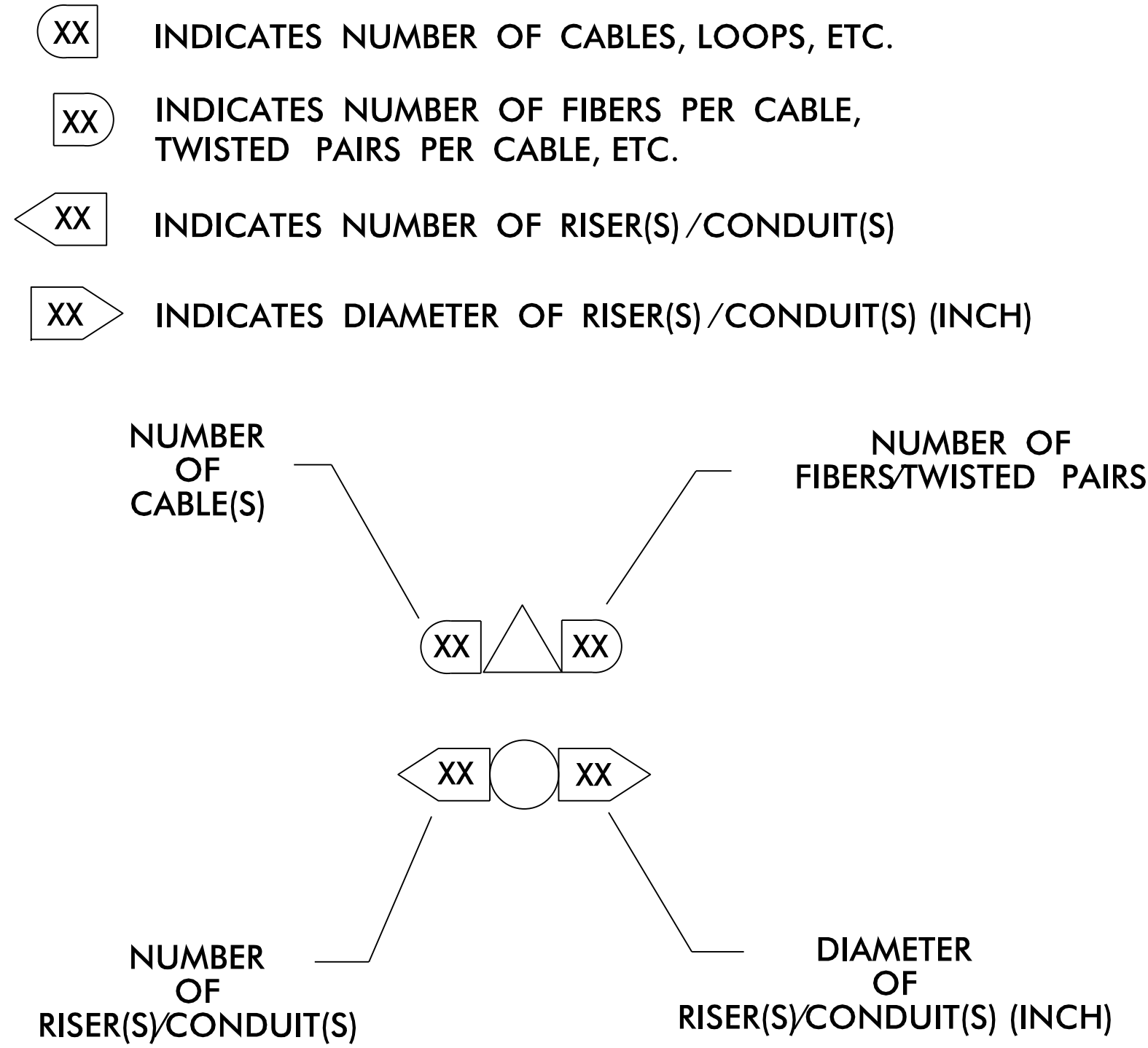
INSTALL LOOP PROCESSOR UNIT
- 65

INSTALL ONE-PORT DEVICE SERVER
- 66

INSTALL STD JUNCTION BOX FOR
FUTURE DMS CABINET (SEE SD-02)
- 67

INSTALL TRANSFORMER

CONSTRUCTION NOTE SYMBOLOGY KEY



SERVICE WIRE TYPE:

WHT = WHITE STRANDED COPPER
BLK = BLACK STRANDED COPPER
RED = RED STRANDED COPPER
GRN = GREEN INSULATED STRANDED COPPER

TYPE I – #8 AWG WHT, #8 AWG BLK, #6 AWG GRN
TYPE II – #6 AWG WHT, #6 AWG BLK, #6 AWG GRN
TYPE IIa – #6 AWG RED, #6 AWG BLK, #6 AWG GRN
TYPE III – #2 AWG WHT, #2 AWG BLK, #4 AWG GRN
TYPE IV – #2 AWG WHT, #2 AWG BLK, #2 AWG RED, #4 AWG GRN
TYPE V – #8 AWG WHT, #8 AWG BLK, #8 AWG RED, #6 AWG GRN
TYPE VI – NOT USED
TYPE VII – #4 AWG WHT, #4 AWG BLK, #6 AWG GRN
TYPE VIIa – #4 AWG RED, #4 AWG BLK, #6 AWG GRN
(TO BE FIELD ADJUSTED AS NECESSARY AND SHOWN IN
AS-BUILT DRAWINGS)

PLANS PREPARED BY:

RK&K

RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE, SUITE 350
RALEIGH, NORTH CAROLINA 27609
NC LICENSE NO. E-0112

PLANS PREPARED BY:

DRMP

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DRMP INC.

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NORTH CAROLINA
Turnpike Authority

Monroe Bypass - ITS Plans
Communication
Construction Notes

Division 10 Union County near Monroe

PLAN DATE: September 2016 REVIEWED BY: LM Moon

PREPARED BY: R Nissen REVIEWED BY: JE Beck

SCALE
N.T.S.

SEAL

NOT A PROFESSIONAL
SEAL
022516
ENGINEER
LISA M. MOON

Lisa M. Moon 12/7/2016
DATE

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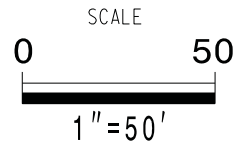
PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
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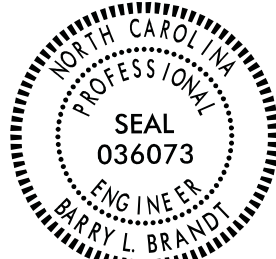
Monroe Bypass - ITS Plans

Division 10	Union County	near Monroe	
PLAN DATE:	September 2016	REVIEWED BY:	B Brandt
PREPARED BY:	K Southwell	REVIEWED BY:	MP Smith

REVISIONS	INIT.	DATE



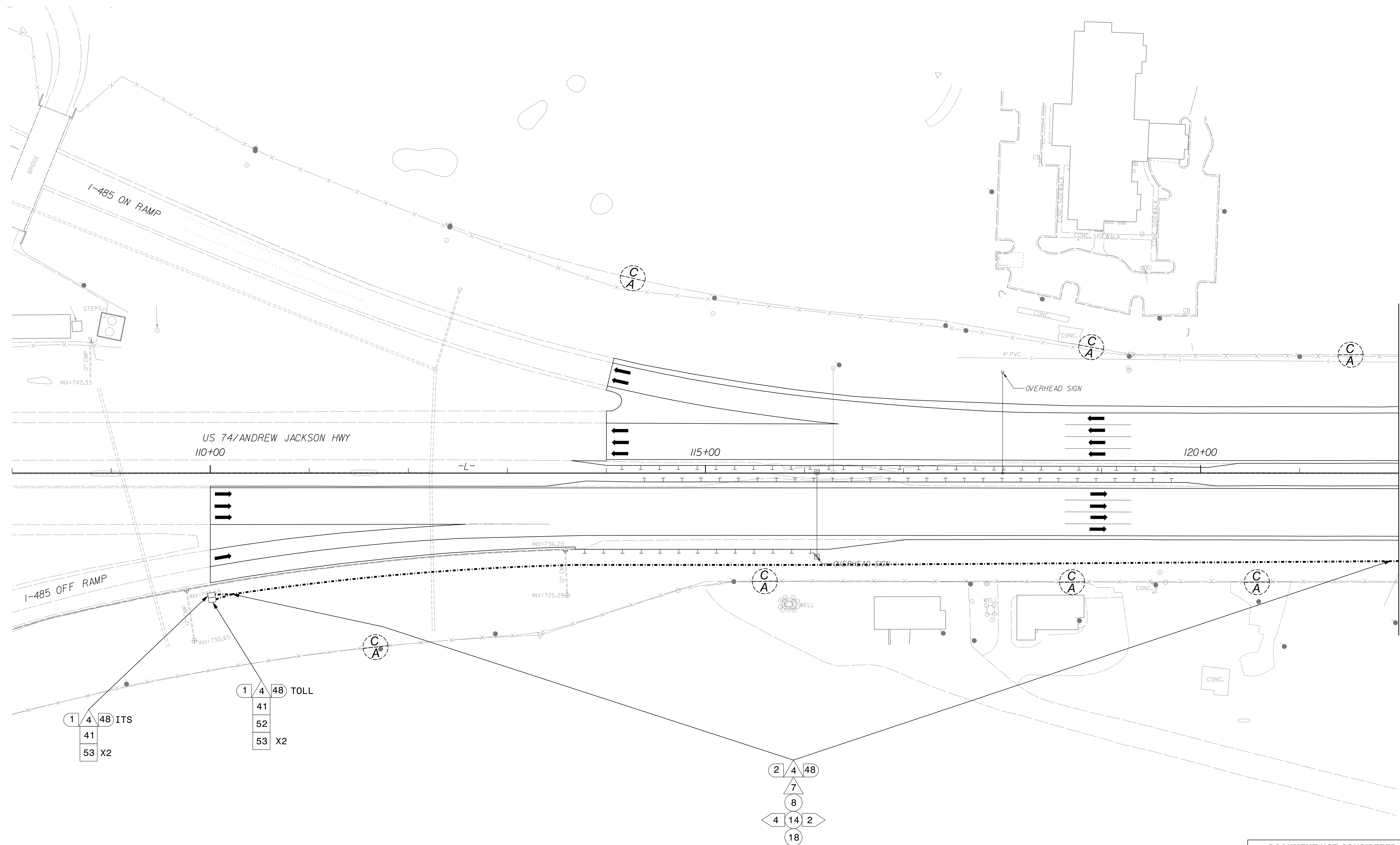
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Barry L. Brandt 12/7/16
DATE





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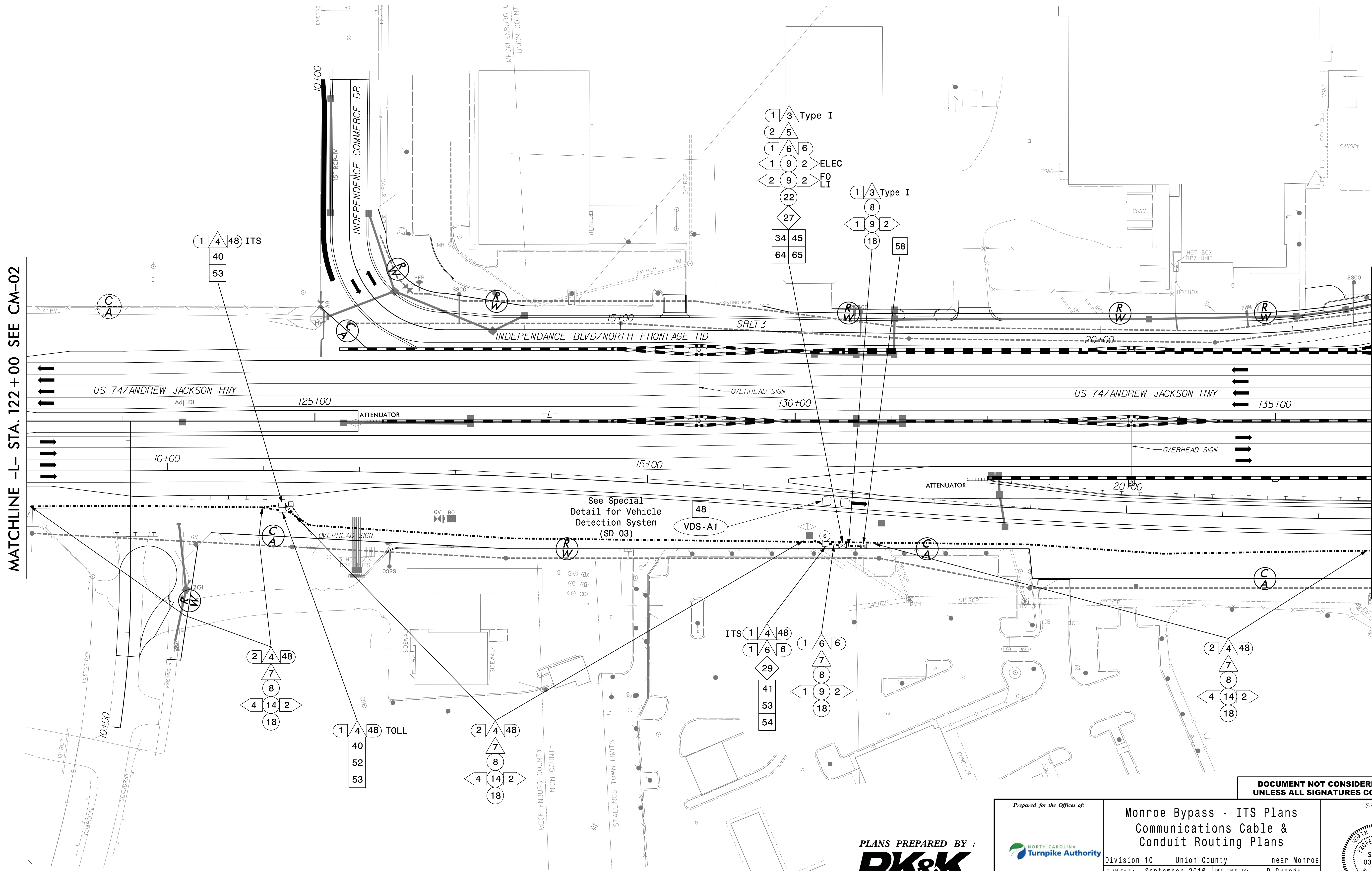
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NC LICENSE NO. F-0112 • (919) 878-9560

Prepared for the Offices of:	<h2 style="margin: 0;">Monroe Bypass - ITS Plans</h2> <h3 style="margin: 0;">Communications Cable & Conduit Routing Plans</h3>	SEAL 																																	
	Division 10 Union County near Monroe	SEAL 036073 ENGINEER BARRY L. BRANDT																																	
	PLAN DATE: <u>September 2016</u> PREPARED BY: <u>K Southwell</u>	REVIEWED BY: <u>8 Brandt</u> REVIEWED BY: <u>WP Smith</u>																																	
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North Carolina Turnpike Authority

Monroe Bypass - ITS Plans
Communications Cable &
Conduit Routing Plans

Division 10 Union County near Monroe

PLAN DATE: September 2016 REVIEWED BY: B Brandt

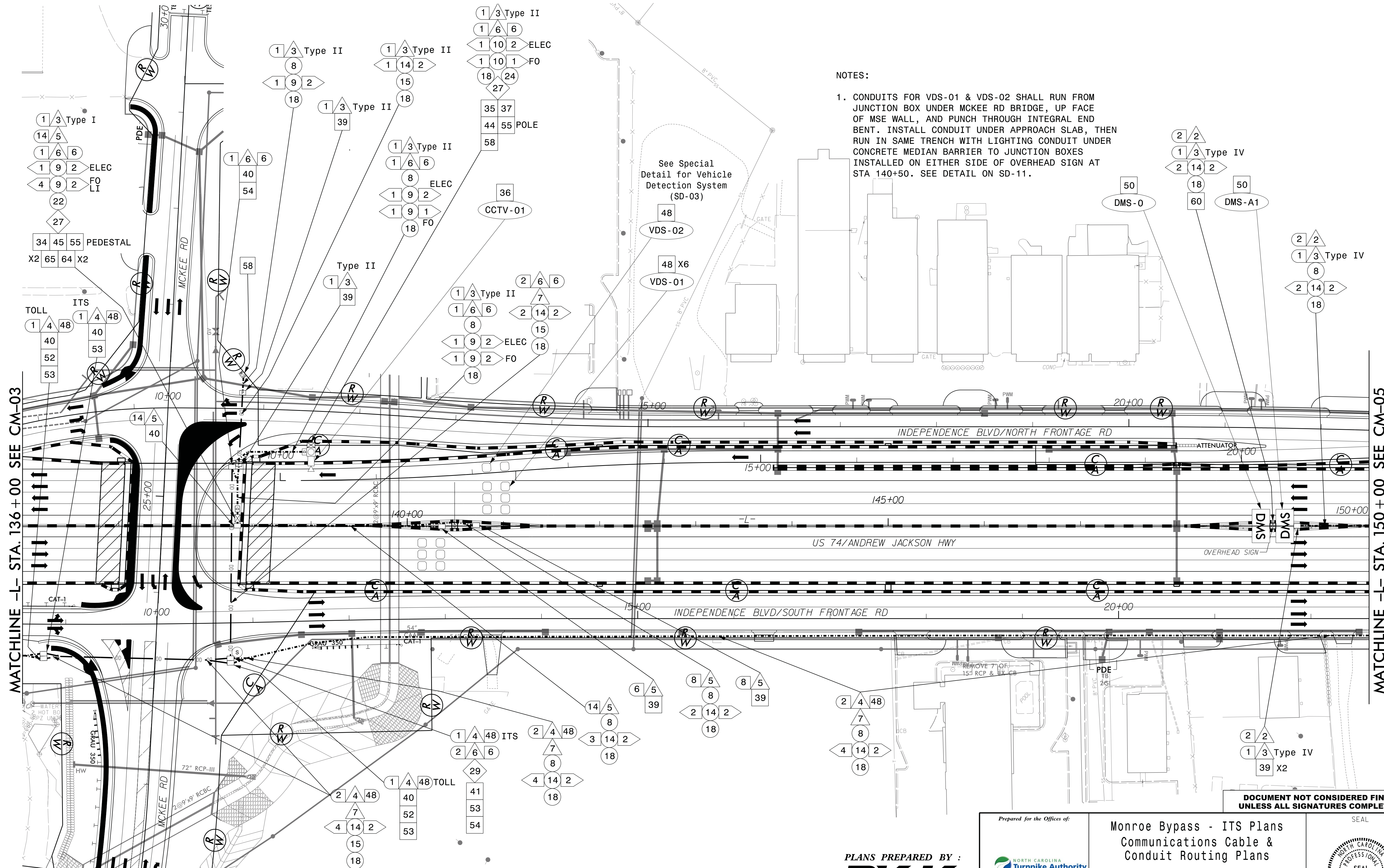
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Barry L. Brandt
DATE: 12/7/16
CADD Filename:



NOTES:

1. CONDUITS FOR VDS-01 & VDS-02 SHALL RUN FROM JUNCTION BOX UNDER MCKEE RD BRIDGE, UP FACE OF MSE WALL, AND PUNCH THROUGH INTEGRAL END BENT. INSTALL CONDUIT UNDER APPROACH SLAB, THEN RUN IN SAME TRENCH WITH LIGHTING CONDUIT UNDER CONCRETE MEDIAN BARRIER TO JUNCTION BOXES INSTALLED ON EITHER SIDE OF OVERHEAD SIGN AT STA 140+50. SEE DETAIL ON SD-11.

MATCHLINE -L- STA. 136+00 SEE CM-03

MATCHLINE -L- STA. 150+00 SEE CM-05

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Southwell, K. SOUTHWELL

1. CONDUITS FOR DMS-0/A1 SHALL RUN FROM JUNCTION BOX UNDER STALLINGS RD BRIDGE, UP FACE OF MSE WALL, AND PUNCH THROUGH INTEGRAL END BENT. INSTALL CONDUIT UNDER APPROACH SLAB, THEN RUN IN SAME TRENCH WITH LIGHTING CONDUIT UNDER CONCRETE MEDIAN BARRIER TO JUNCTION BOX ADJACENT TO DMS-0/A1.





MATCHLINE -L- STA. 160+00 SEE CM-06

MATCHLINE
-R174- STA. 15+00
SEE CM-06

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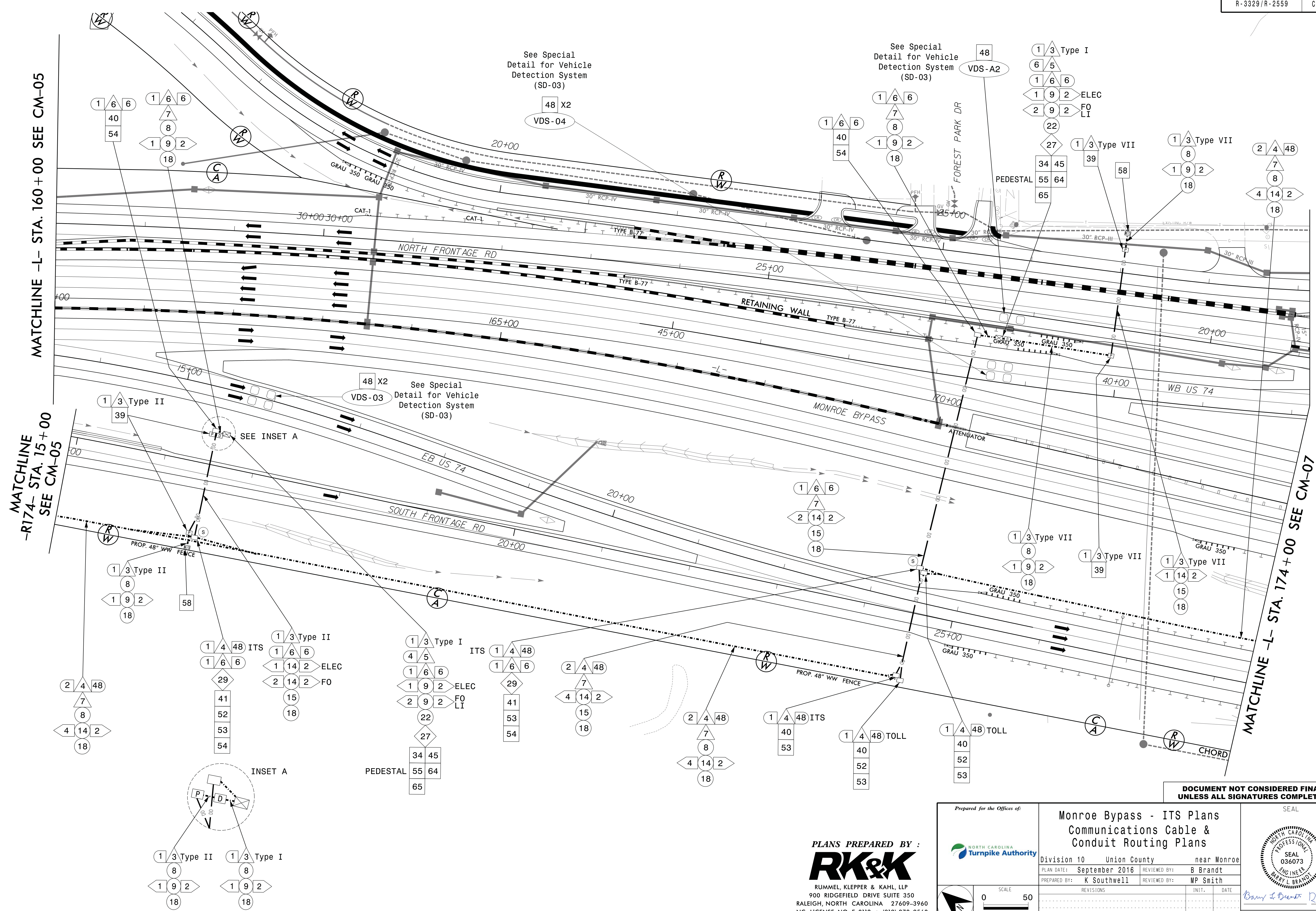
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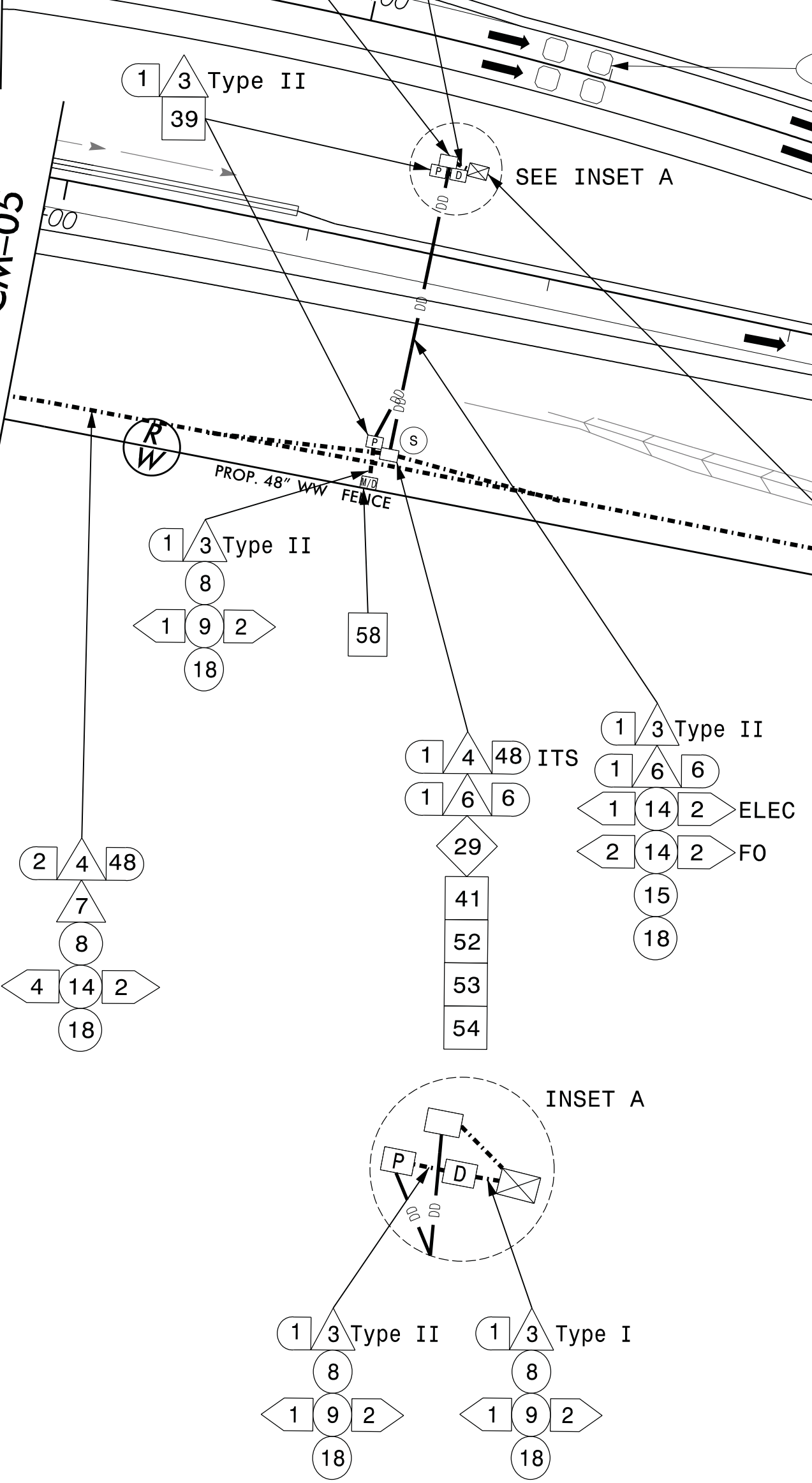


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MATCHLINE -R174- STA. 15+00 SEE CM-05

MATCHLINE -L- STA. 174+00 SEE CM-07

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See Special Detail for Vehicle Detection System (SD-03)

See Special Detail for Vehicle Detection System (SD-03)

See Special Detail for Vehicle Detection System (SD-03)

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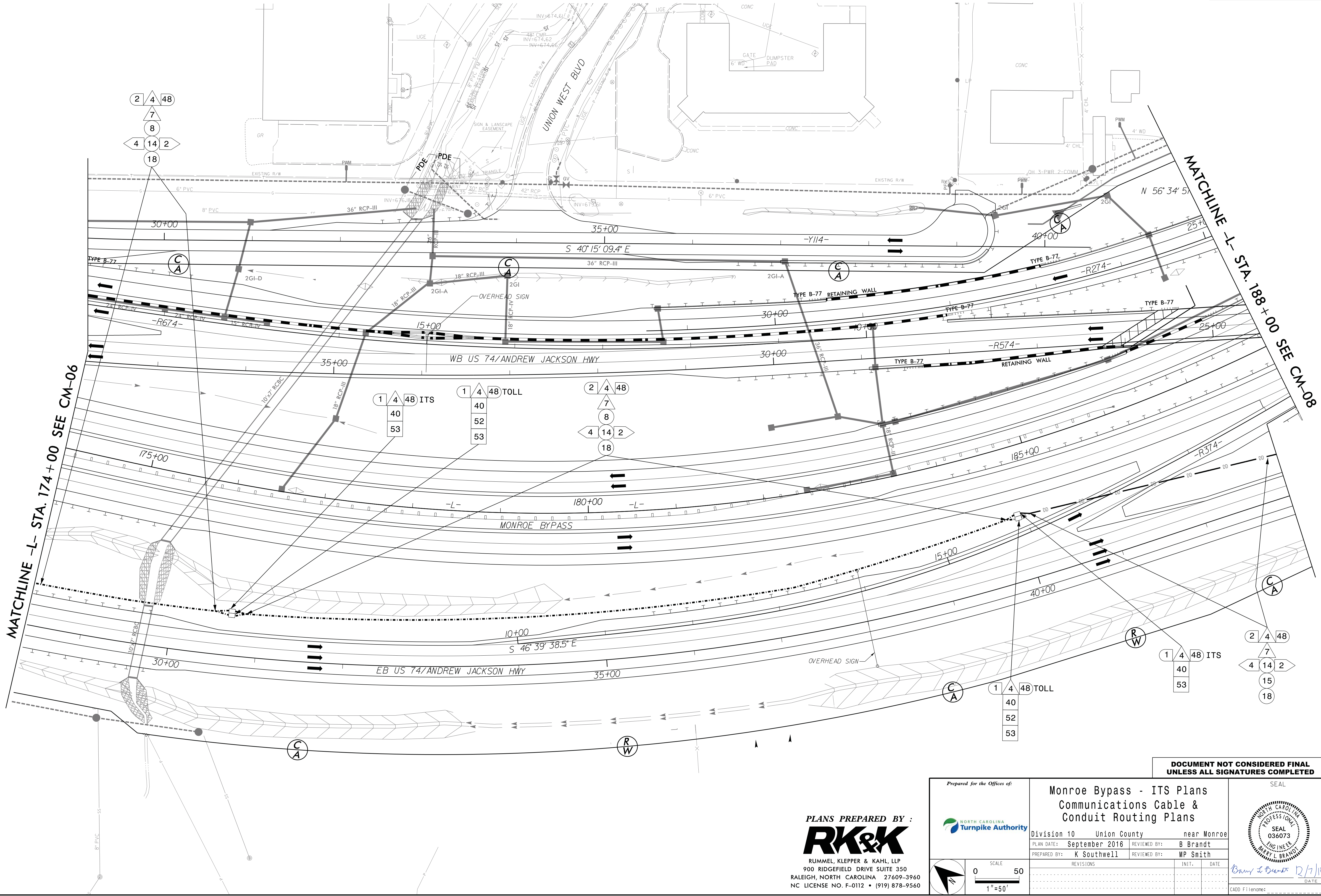
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PREPARED BY: K Southwell REVIEWED BY: MP Smith
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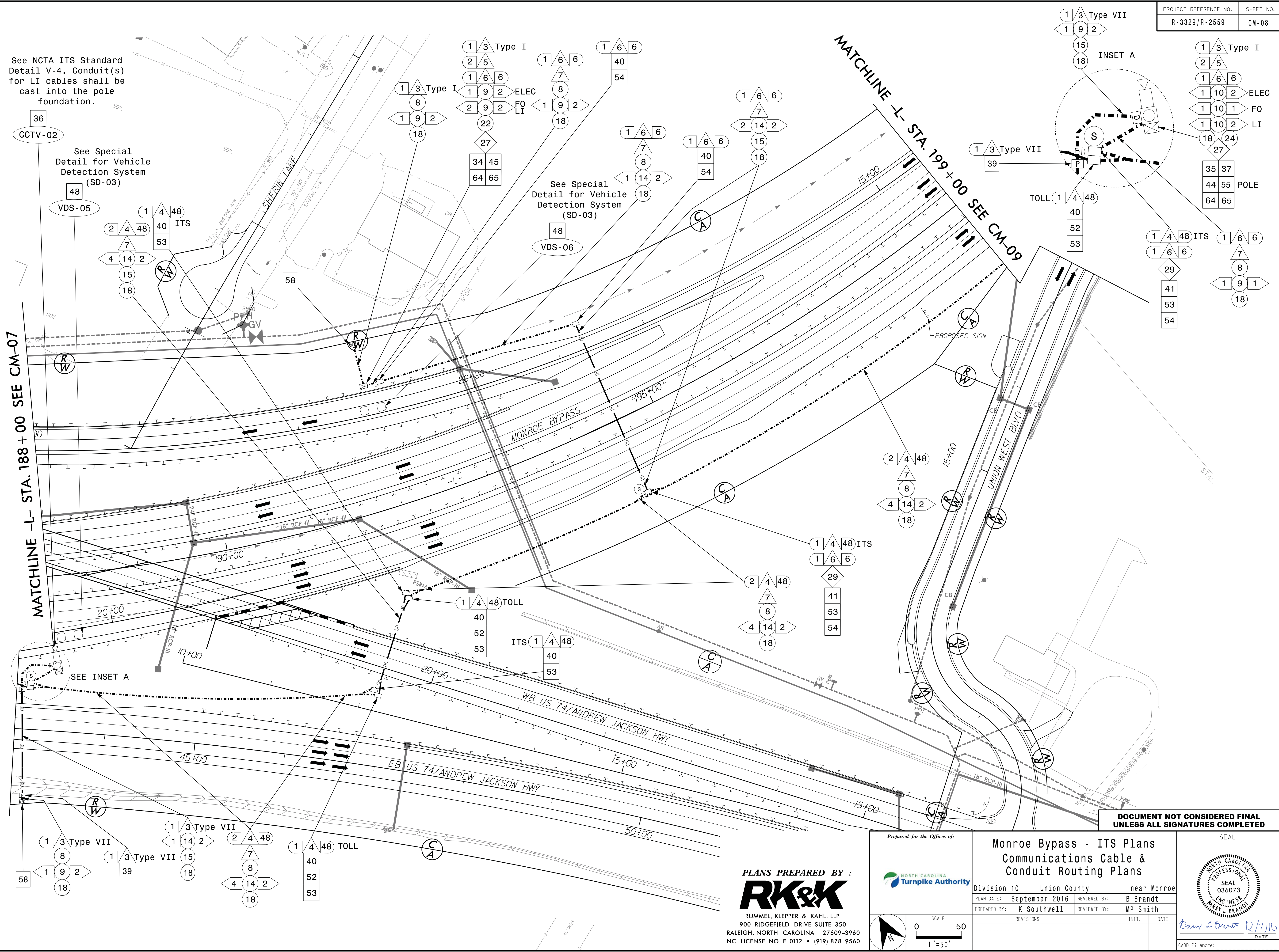
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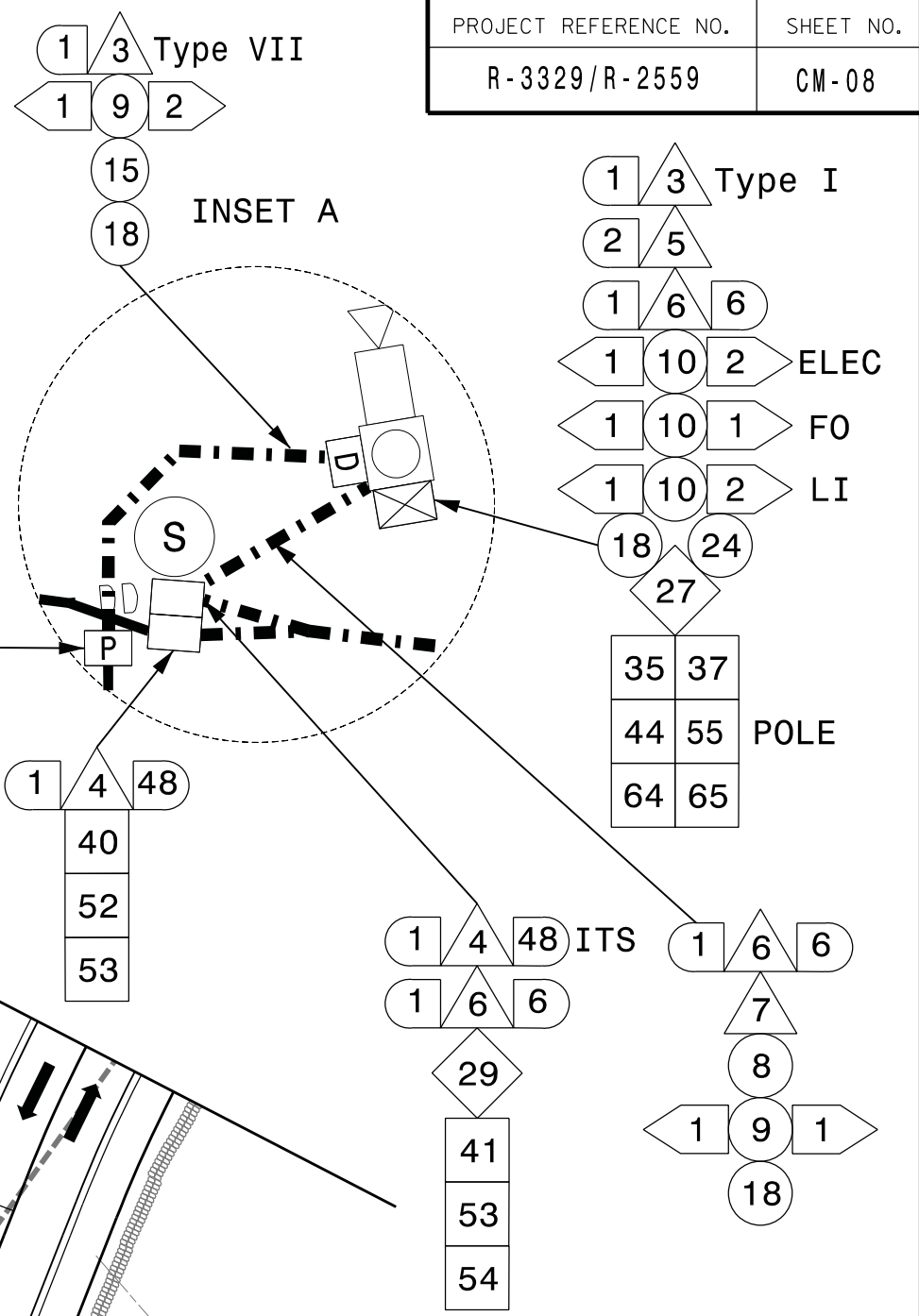
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BARRY L BRANDT

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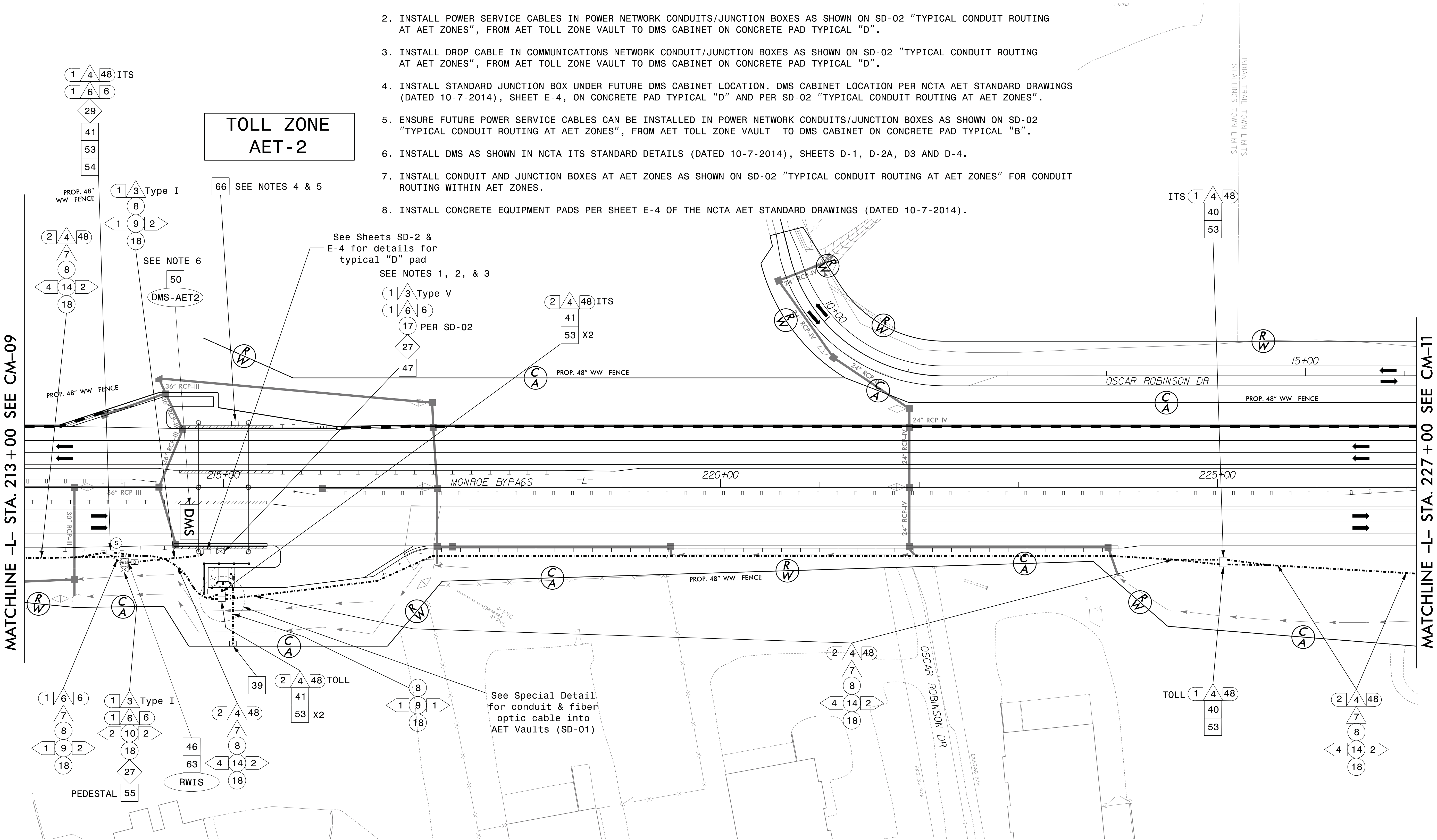


PROJECT REFERENCE NO.	SHEET NO.
R-3329/R-2559	CM-08



NOTES:

1. INSTALL DMS CABINET PER NCTA AET STANDARD DRAWINGS (DATED 10-7-2014), ON SHEET E-4, ON CONCRETE PAD TYPICAL "D" AND PER SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES".
2. INSTALL POWER SERVICE CABLES IN POWER NETWORK CONDUITS/JUNCTION BOXES AS SHOWN ON SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES", FROM AET TOLL ZONE VAULT TO DMS CABINET ON CONCRETE PAD TYPICAL "D".
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4. INSTALL STANDARD JUNCTION BOX UNDER FUTURE DMS CABINET LOCATION. DMS CABINET LOCATION PER NCTA AET STANDARD DRAWINGS (DATED 10-7-2014), SHEET E-4, ON CONCRETE PAD TYPICAL "D" AND PER SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES".
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6. INSTALL DMS AS SHOWN IN NCTA ITS STANDARD DETAILS (DATED 10-7-2014), SHEETS D-1, D-2A, D3 AND D-4.
7. INSTALL CONDUIT AND JUNCTION BOXES AT AET ZONES AS SHOWN ON SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES" FOR CONDUIT ROUTING WITHIN AET ZONES.
8. INSTALL CONCRETE EQUIPMENT PADS PER SHEET E-4 OF THE NCTA AET STANDARD DRAWINGS (DATED 10-7-2014).



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Division 10 Union County near Monroe

PLAN DATE: September 2016 REVIEWED BY: B Brandt

PREPARED BY: K Southwell REVIEWED BY: MP Smith

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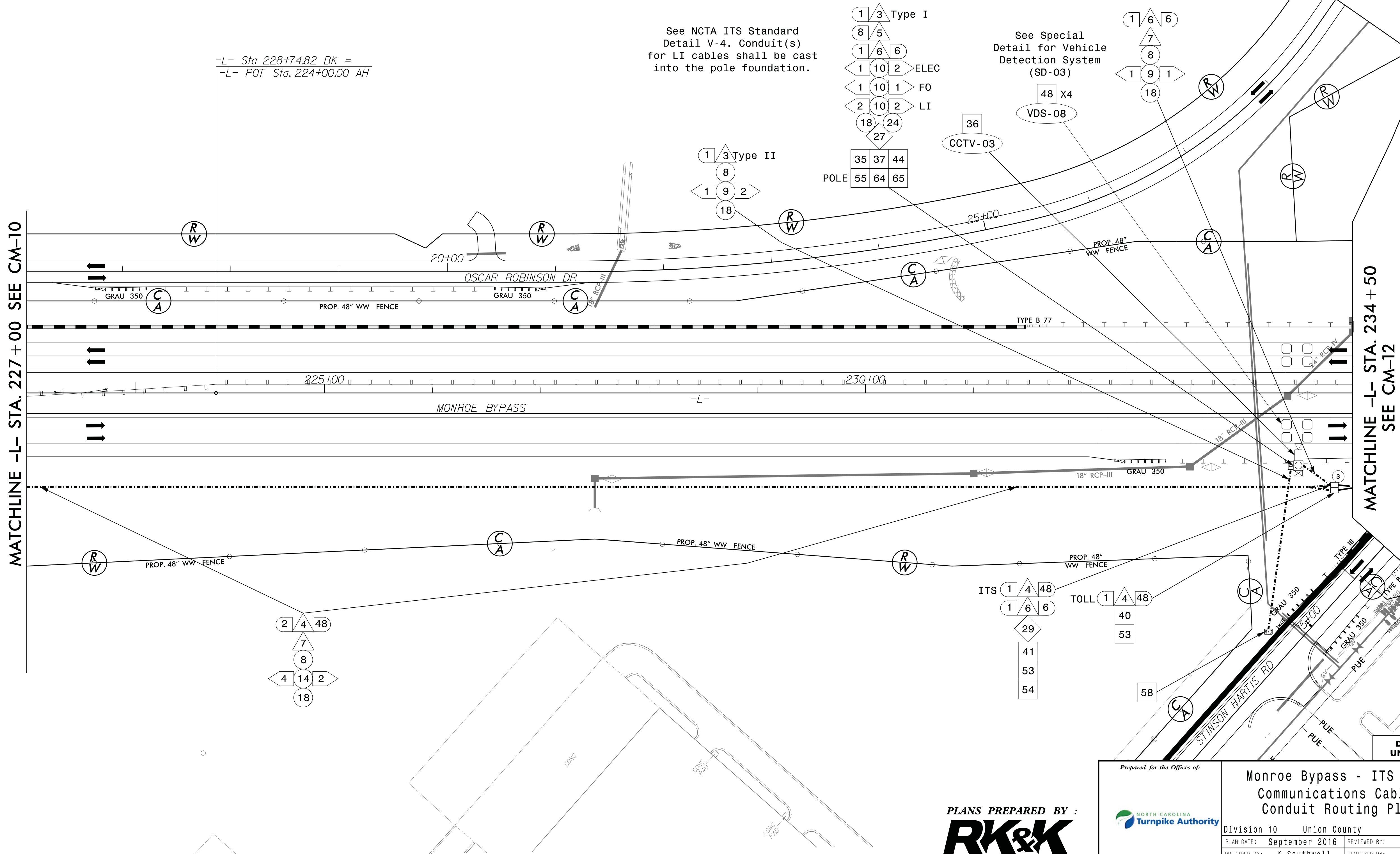
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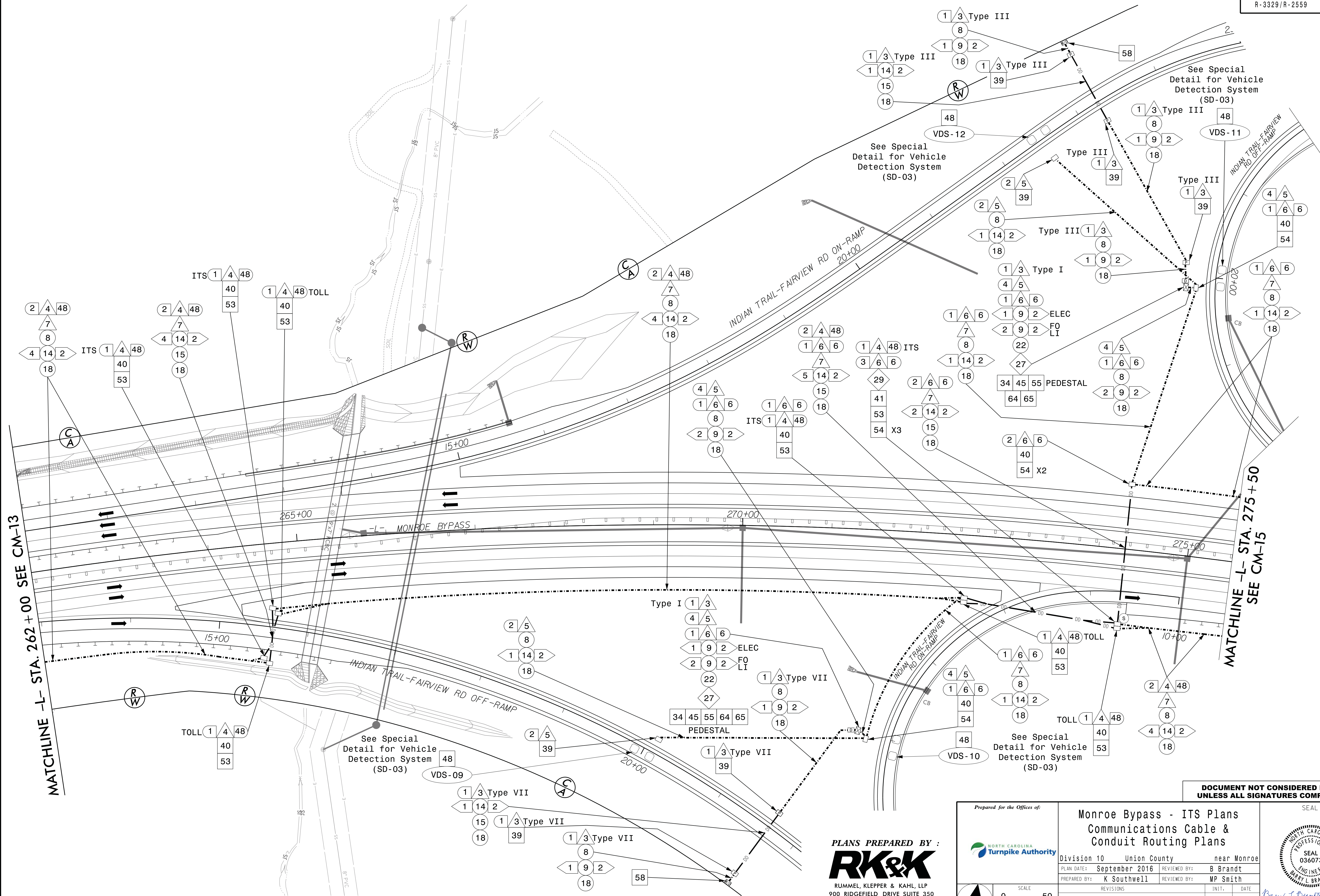
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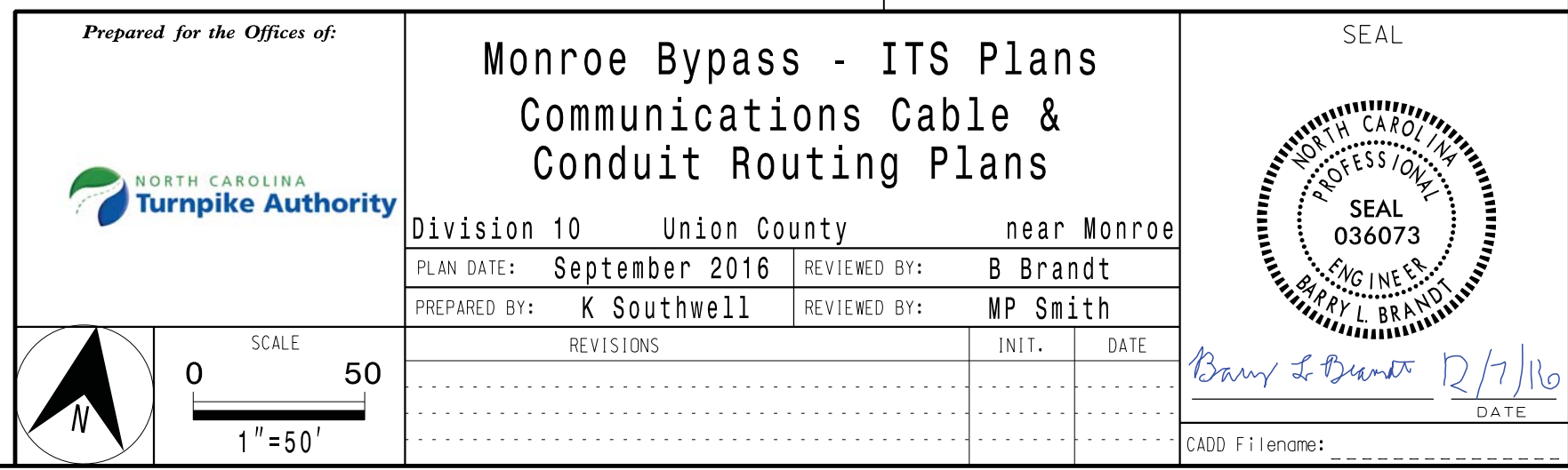
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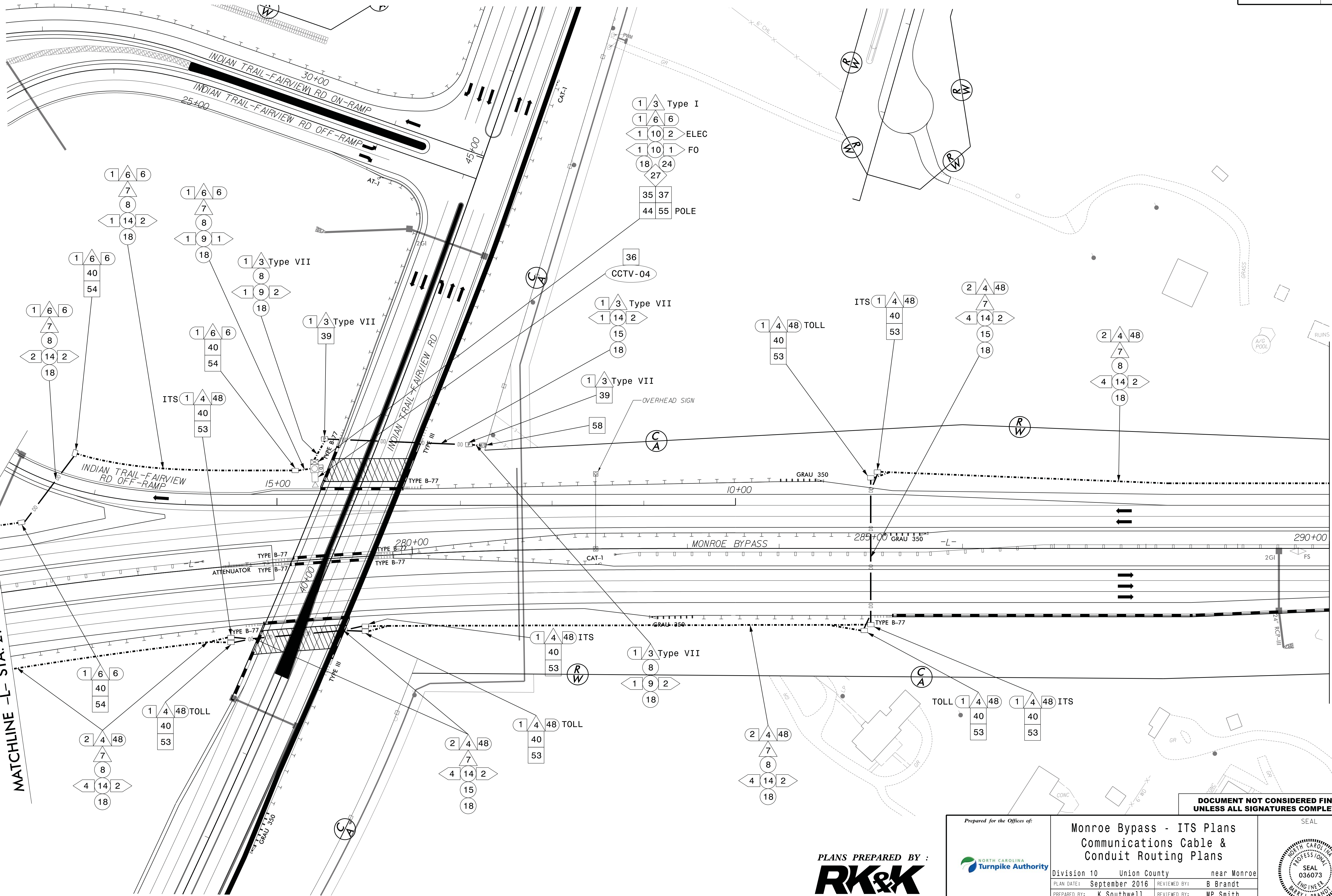


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MATCHLINE -L- STA. 275 + 50 SEE CM-14

MATCHLINE -L- STA. 290 + 00 SEE CM-16

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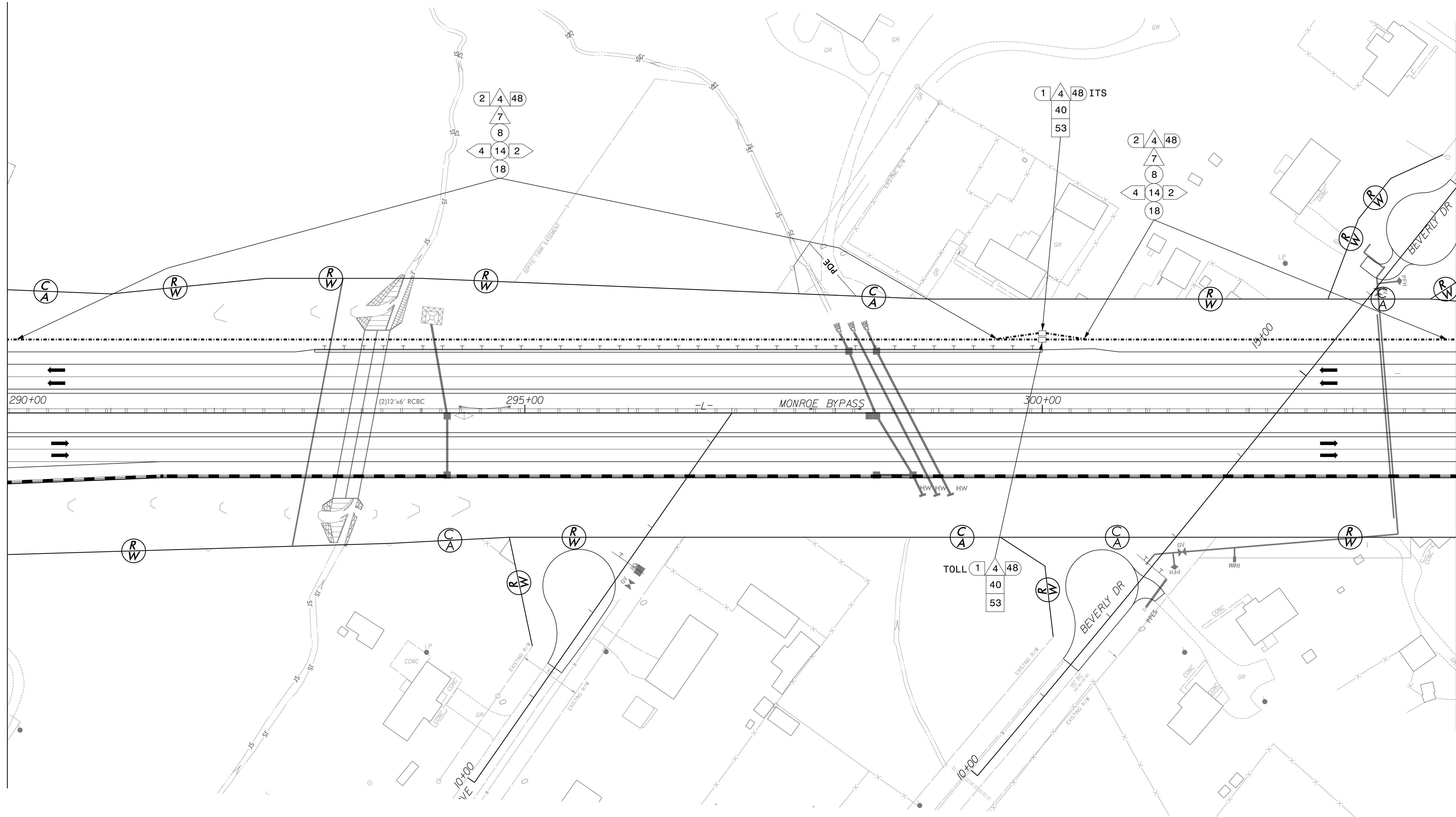
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MATCHLINE -L- STA. 290 + 00 SEE CM-15



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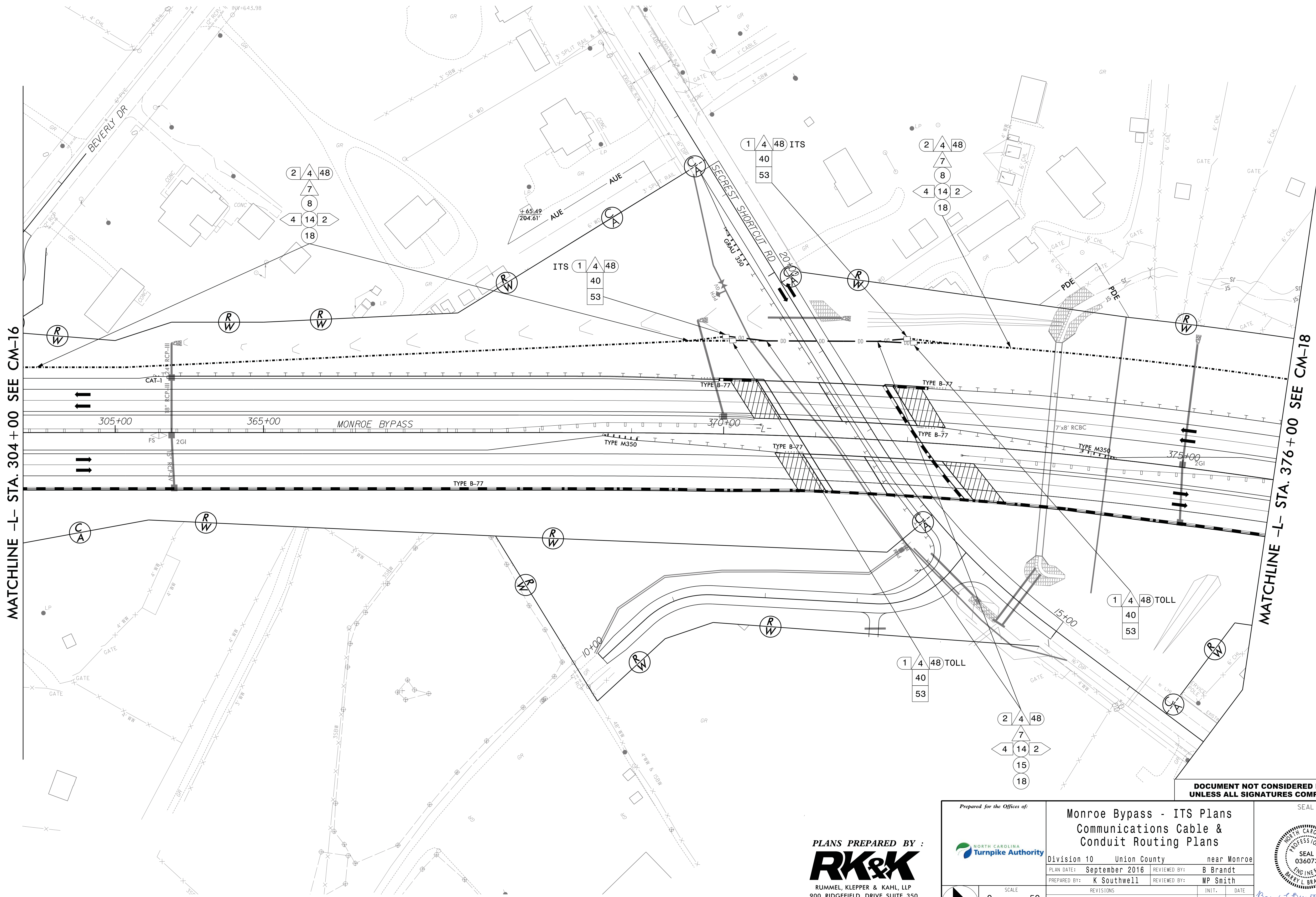


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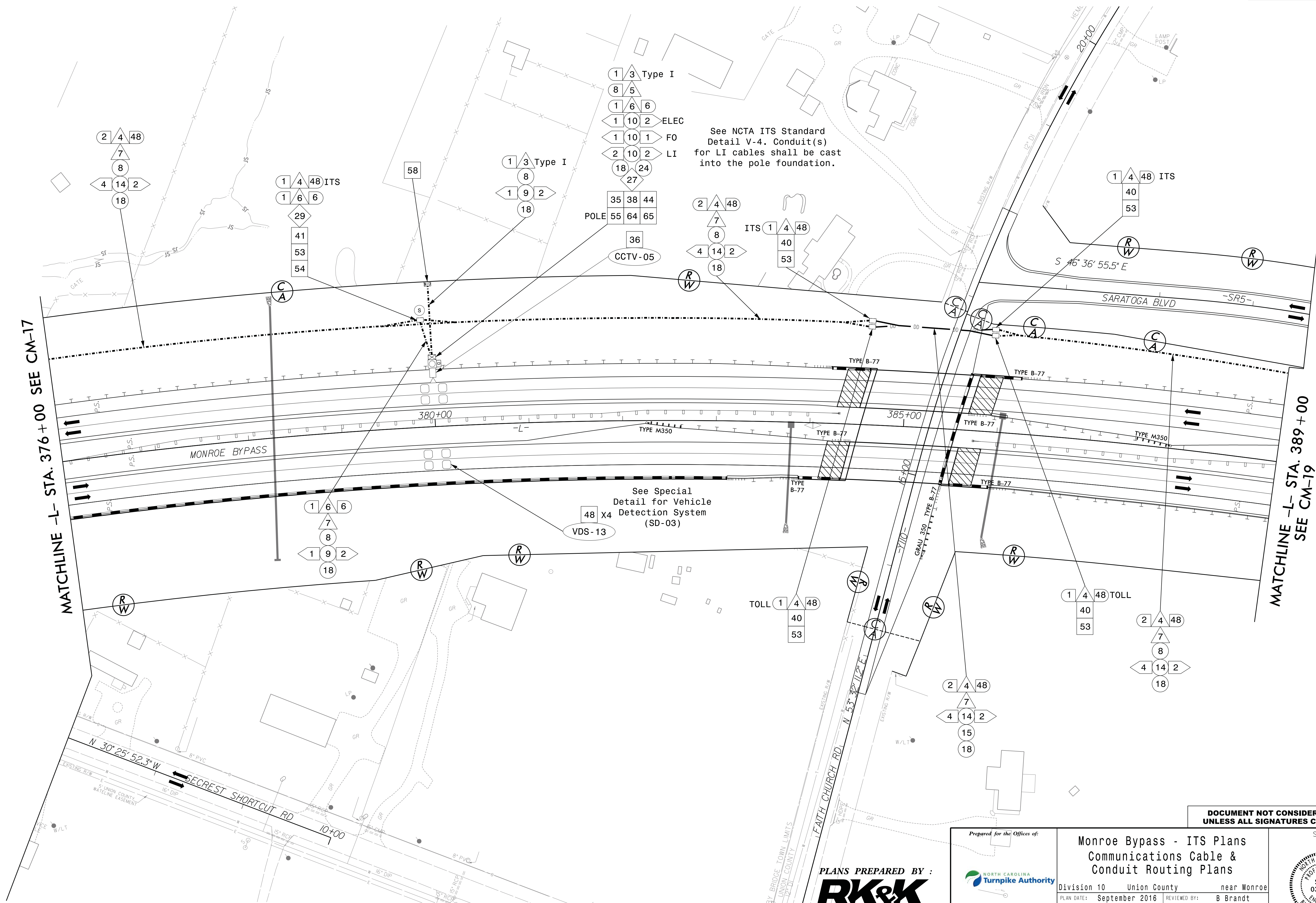
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NORTH CAROLINA
PROFESSIONAL
ENGINEER
BARRY L BRANDT
036073

DATE
12/7/16

CADD Filename:



See NCTA ITS Standard
Detail V-4. Conduit(s)
for LI cables shall be cast
into the pole foundation.

See Special
Detail for Vehicle
Detection System
(SD-03)

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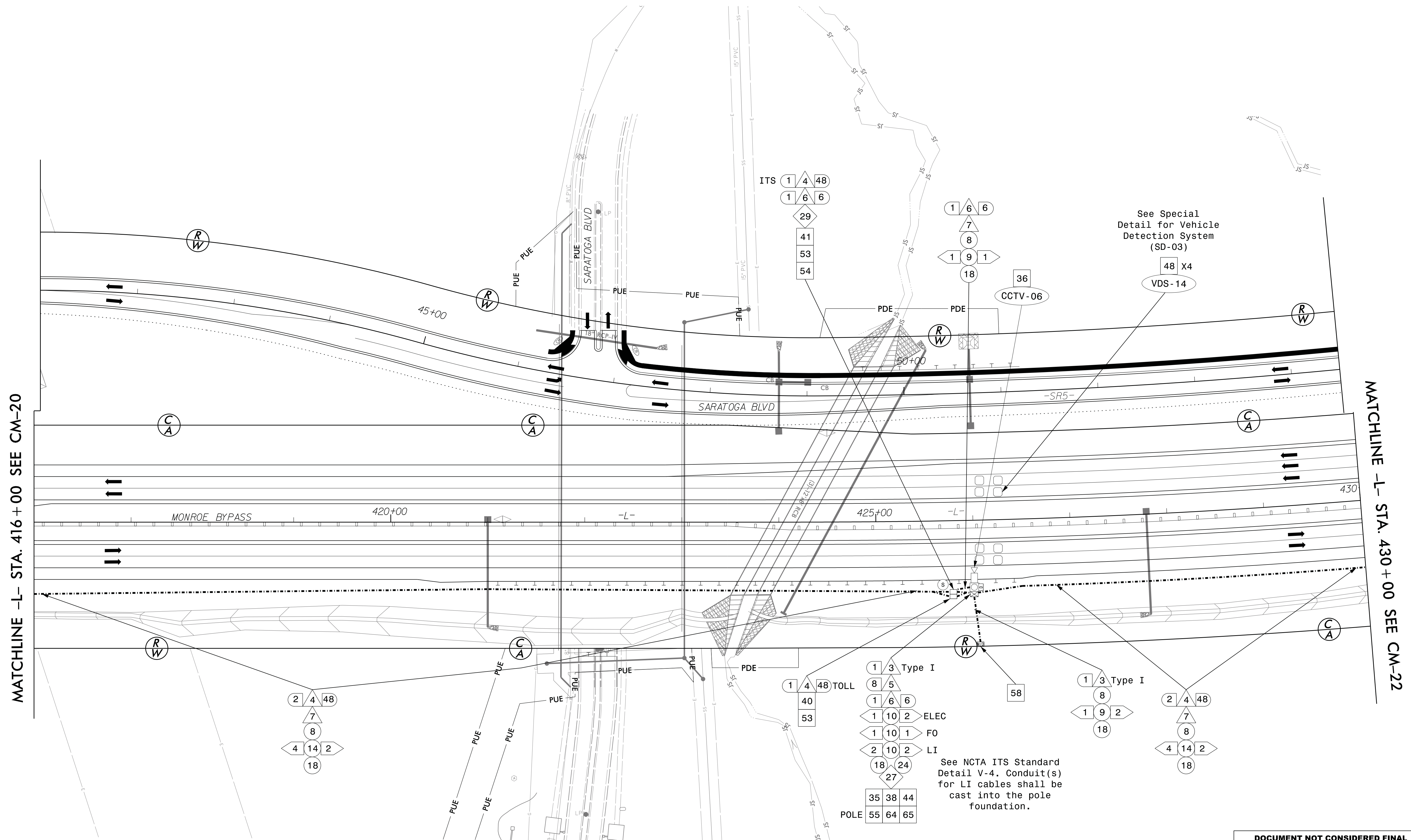
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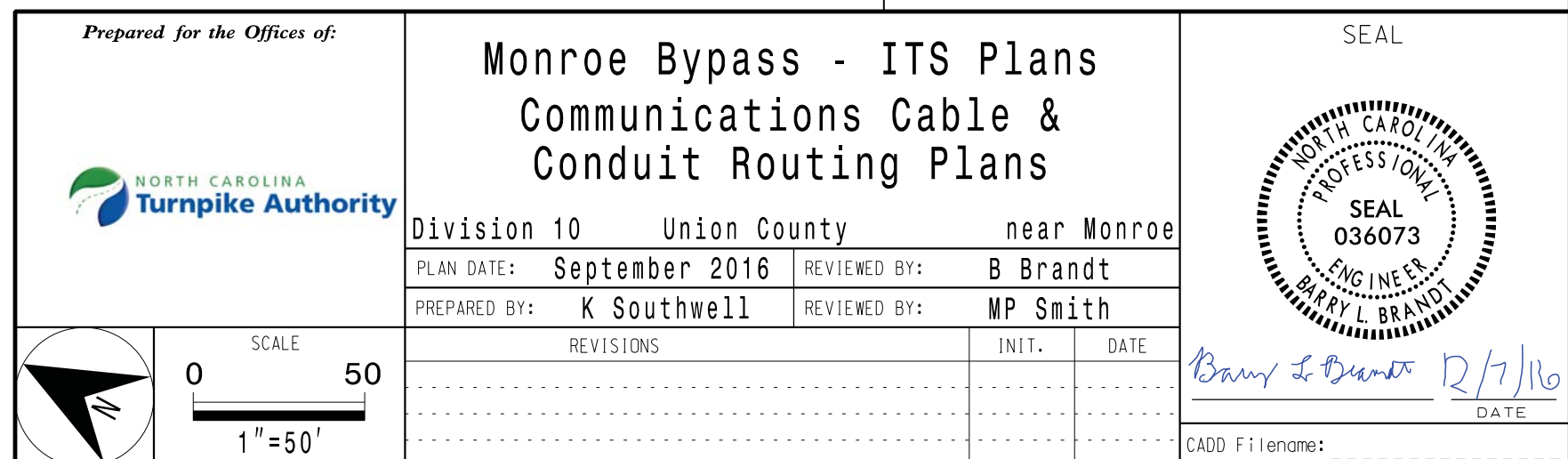
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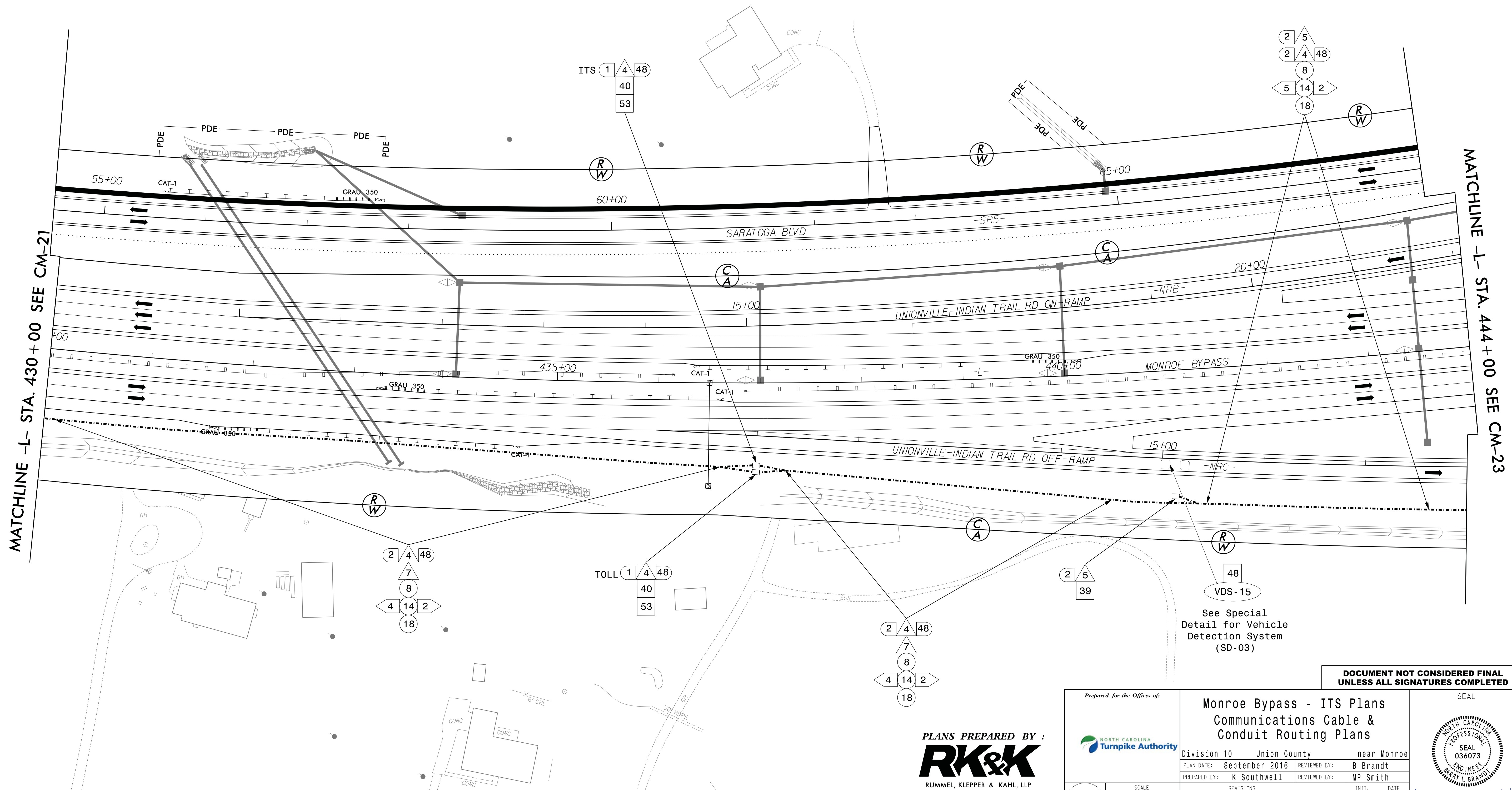




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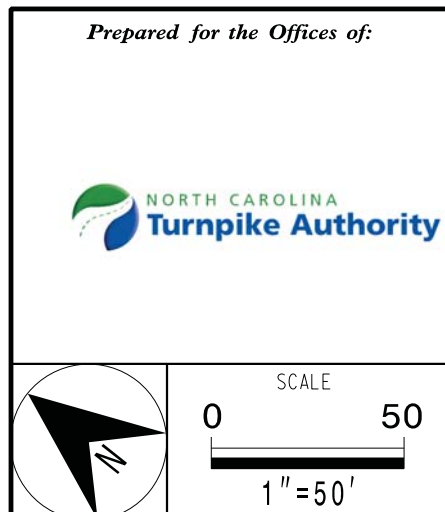
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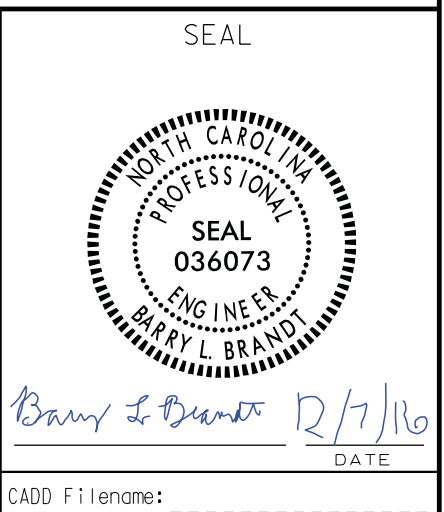


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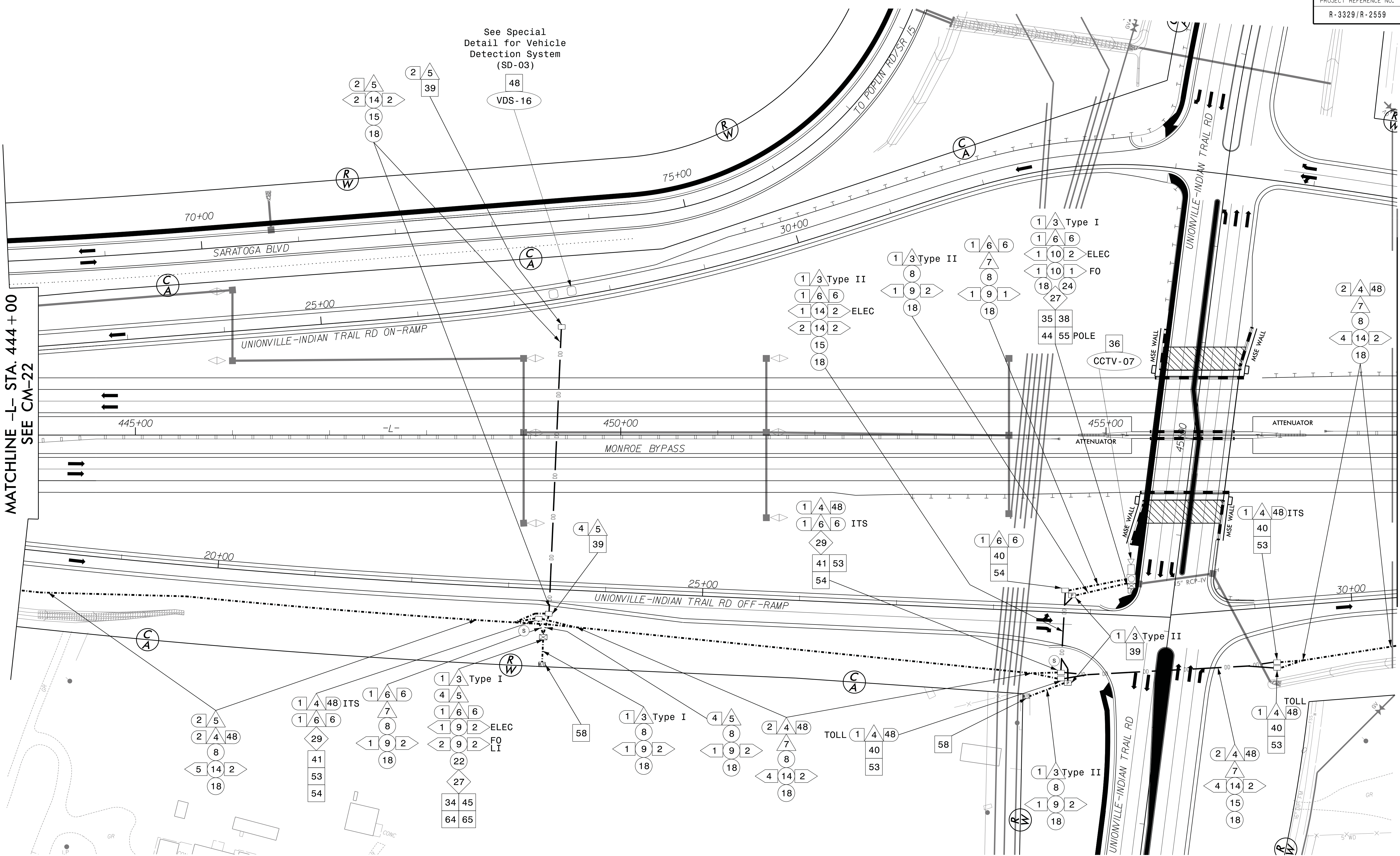


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See Special
Detail for Vehicle
Detection System
(SD-03)



MATCHLINE -L- STA. 444+00
SEE CM-22

MATCHLINE -L- STA. 458+00 SEE CM-24

See Special
Detail for Vehicle
Detection System
(SD-03)

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PREPARED BY: K Southwell REVIEWED BY: MP Smith

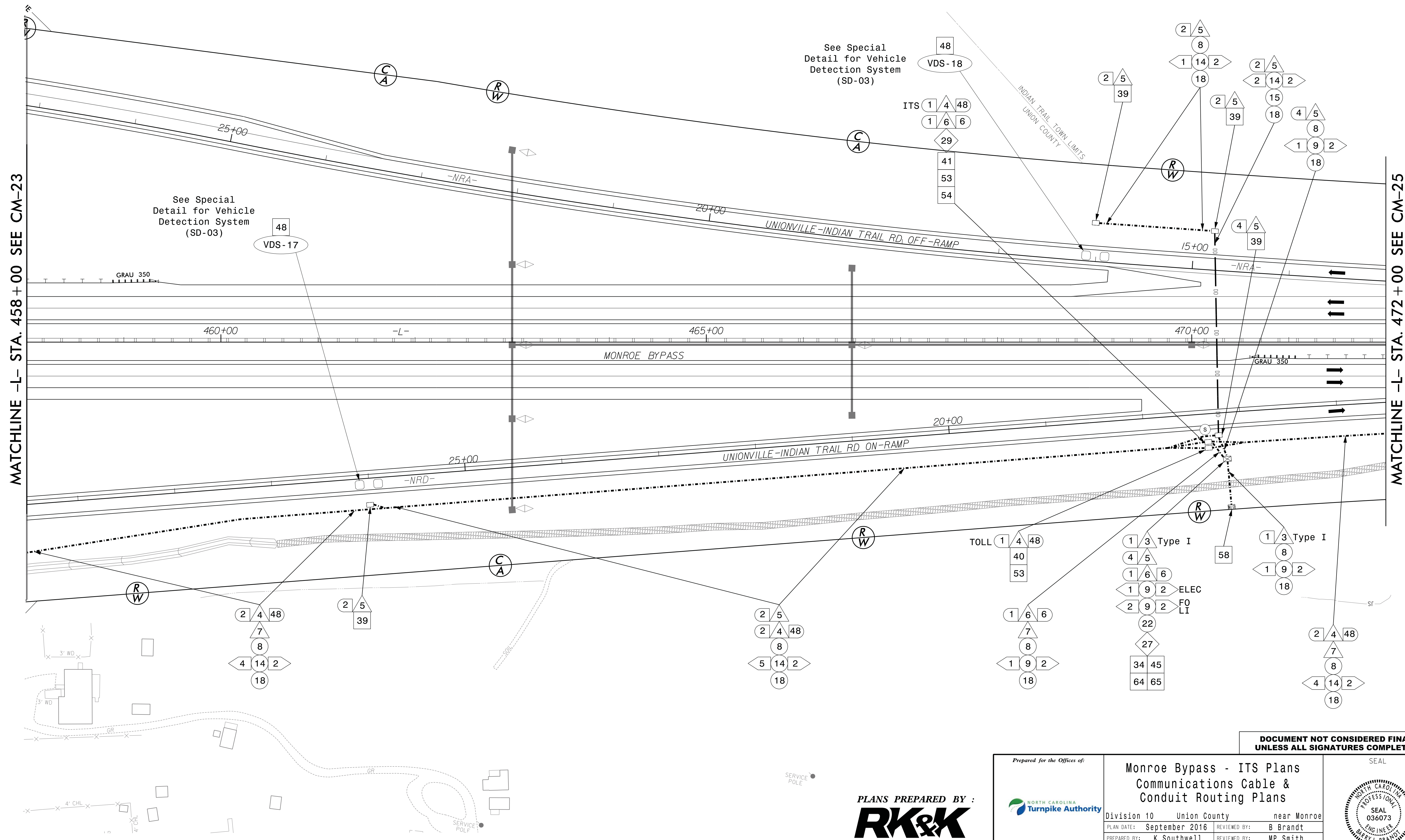
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BARRY L BRANDT

DATE
12/7/16

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Division 10 Union County near Monroe

PLAN DATE: September 2016 REVIEWED BY: B Brandt

PREPARED BY: K Southwell REVIEWED BY: MP Smith

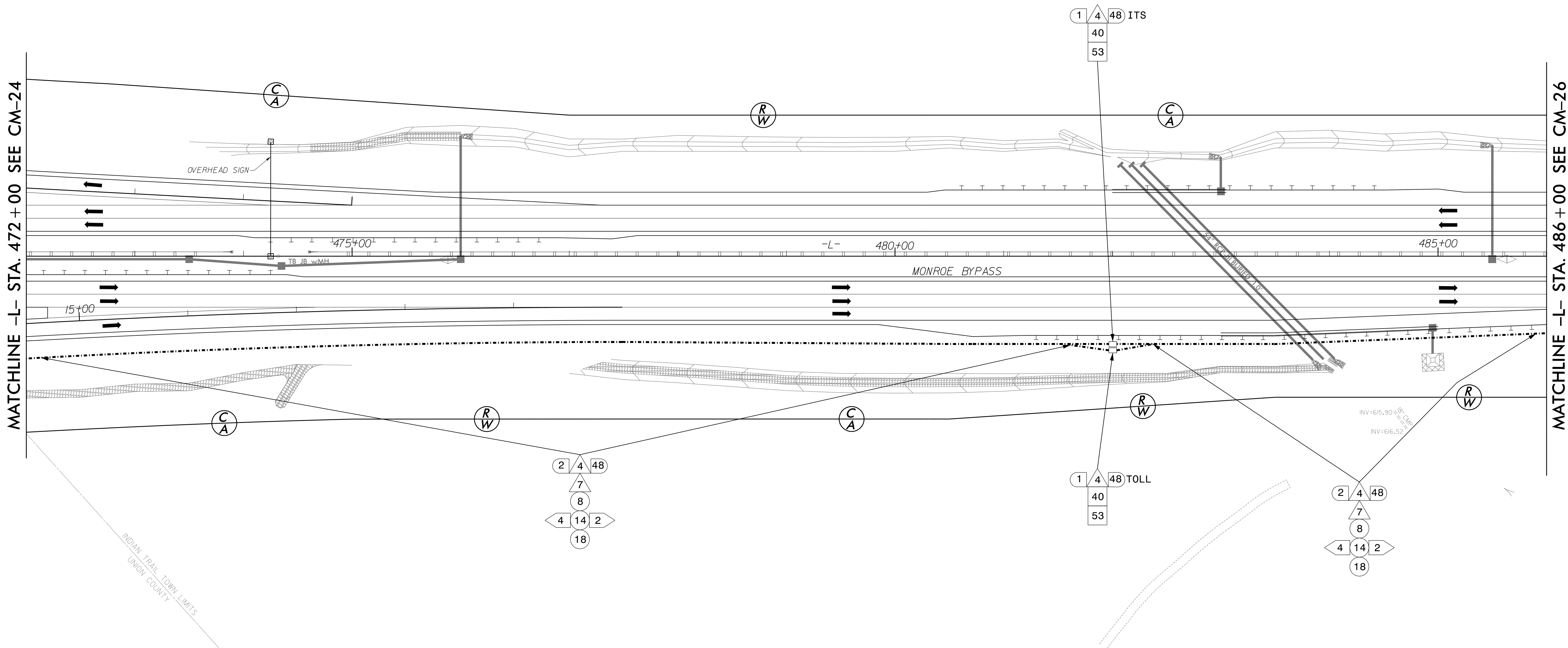
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12/7/16

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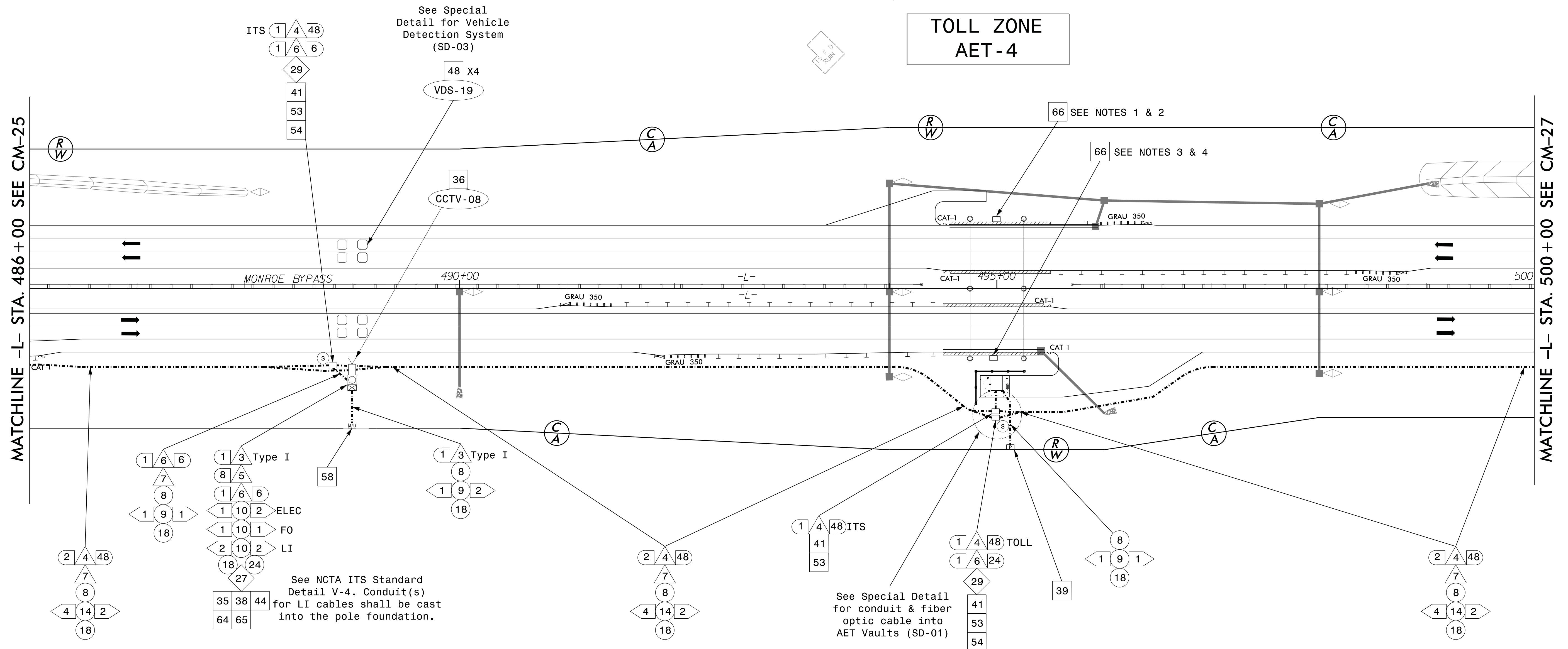
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NOTES:

1. INSTALL STANDARD JUNCTION BOX UNDER FUTURE DMS CABINET LOCATION. DMS CABINET LOCATION PER NCTA AET STANDARD DRAWINGS (DATED 10-7-2014), SHEET E-4, ON CONCRETE PAD TYPICAL "D" AND PER SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES".
2. ENSURE FUTURE POWER SERVICE CABLES CAN BE INSTALLED IN POWER NETWORK CONDUITS/JUNCTION BOXES AS SHOWN ON SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES", FROM AET TOLL ZONE VAULT FROM AET TOLL ZONE VAULT TO DMS CABINET ON CONCRETE PAD TYPICAL "B".
3. INSTALL STANDARD JUNCTION BOX UNDER FUTURE DMS CABINET LOCATION. DMS CABINET LOCATION PER NCTA AET STANDARD DRAWINGS (DATED 10-7-2014), SHEET E-4, ON CONCRETE PAD TYPICAL "D" AND PER SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES".
4. ENSURE FUTURE POWER SERVICE CABLES CAN BE INSTALLED IN POWER NETWORK CONDUITS/JUNCTION BOXES AS SHOWN ON SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES", FROM AET TOLL ZONE VAULT FROM AET TOLL ZONE VAULT TO DMS CABINET ON CONCRETE PAD TYPICAL "D".
5. INSTALL CONDUIT AND JUNCTION BOXES AT AET ZONES AS SHOWN ON SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES".
6. INSTALL CONCRETE EQUIPMENT PADS PER SHEET E-4 OF THE NCTA AET STANDARD DRAWINGS (DATED 10-7-2014).



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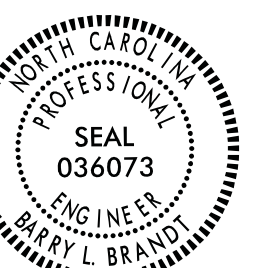
PLAN DATE: September 2016	REVIEWED BY: B Brandt
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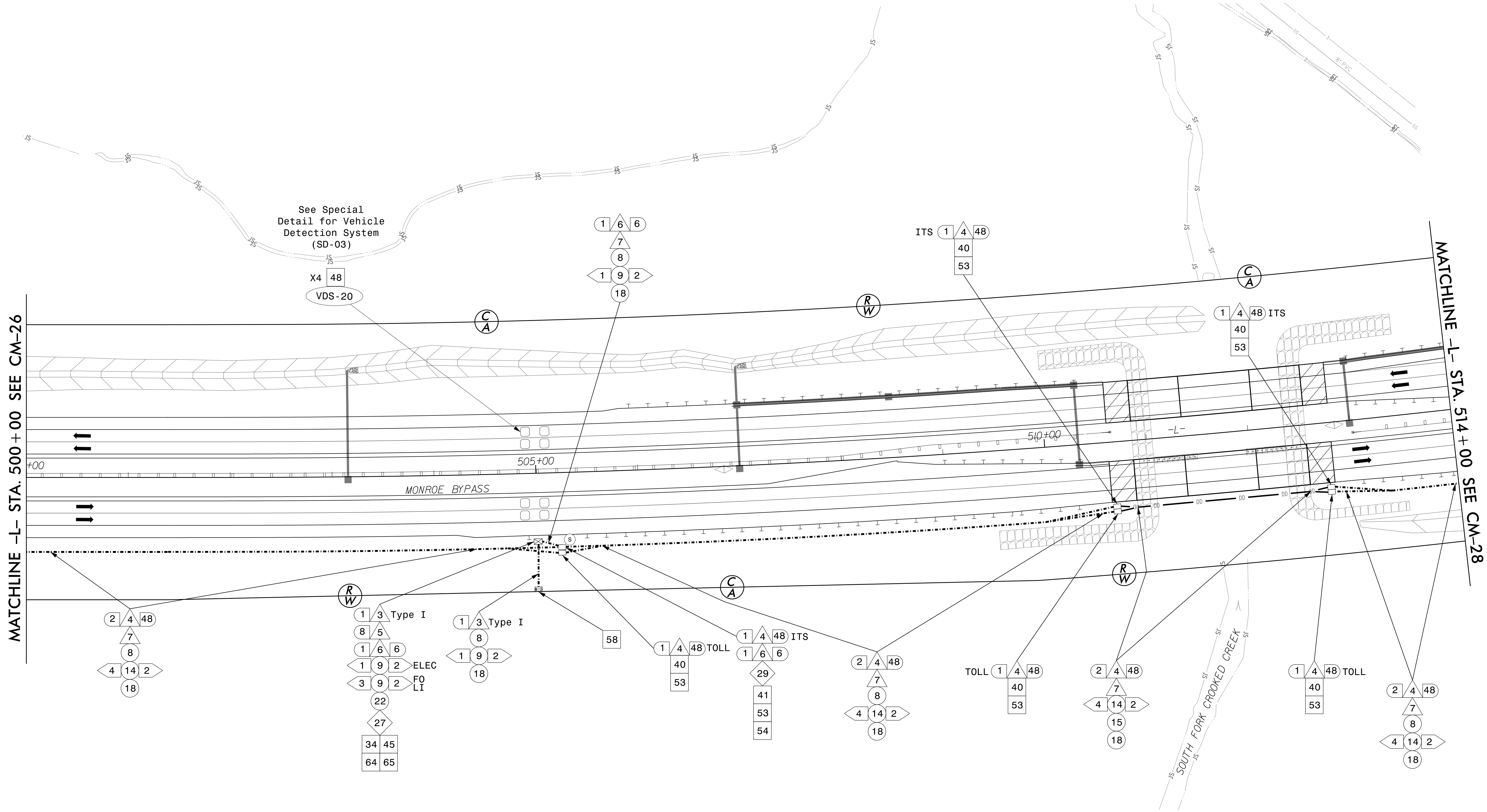
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PROFESSIONAL
ENGINEER
036073
BARRY L BRANDT

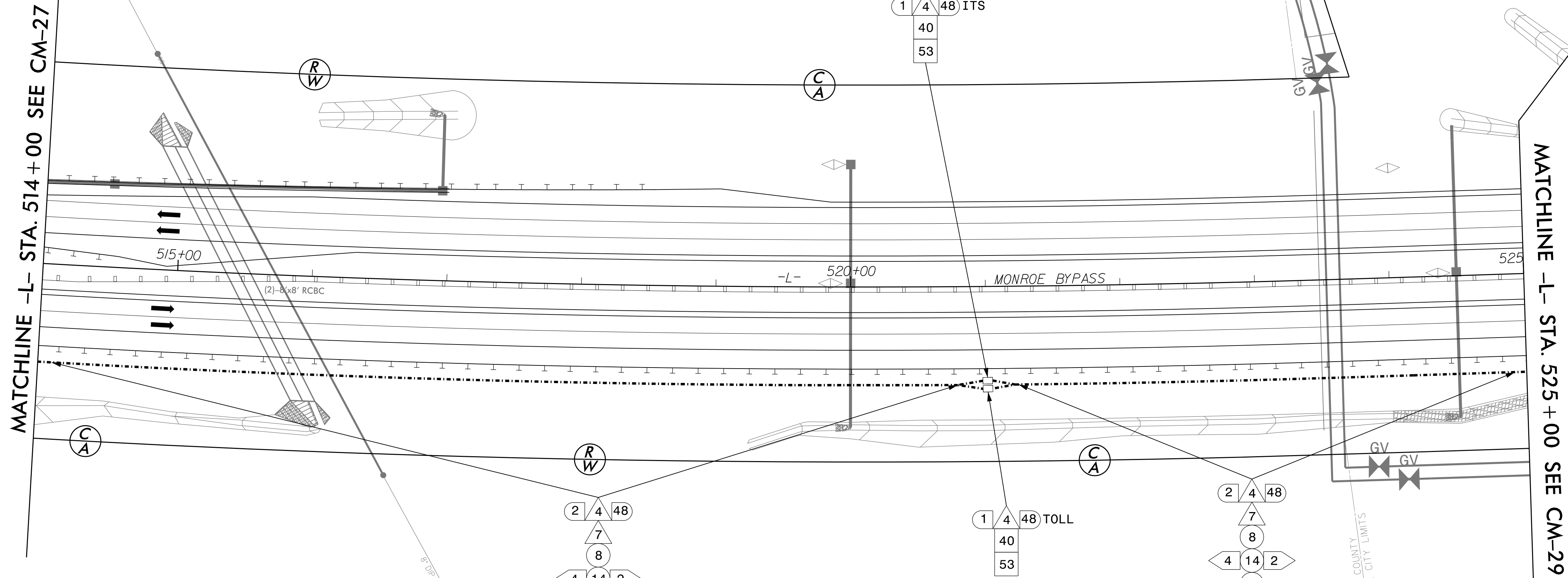
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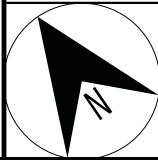


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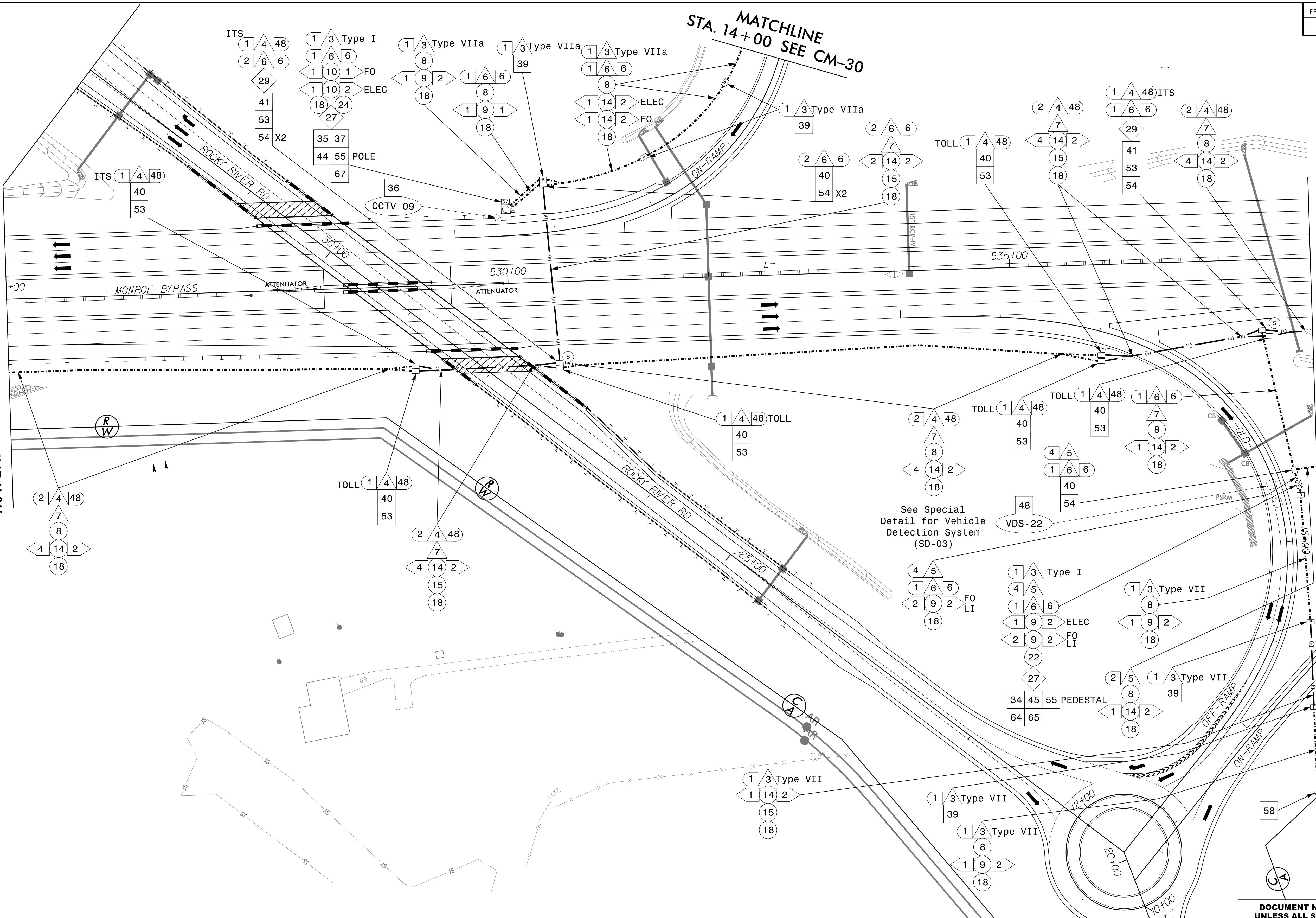
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	Division 10 Union County near Monroe		
PLAN DATE: September 2016	REVIEWED BY: B Brandt	DATE: 12/7/16	
PREPARED BY: K Southwell	REVIEWED BY: MP Smith	CADD Filename: _____	
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See Special
Detail for Vehicle
Detection System
(SD-03)

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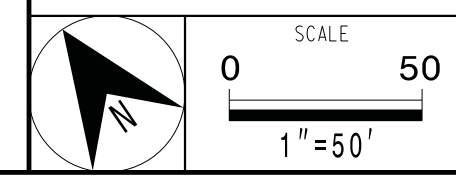
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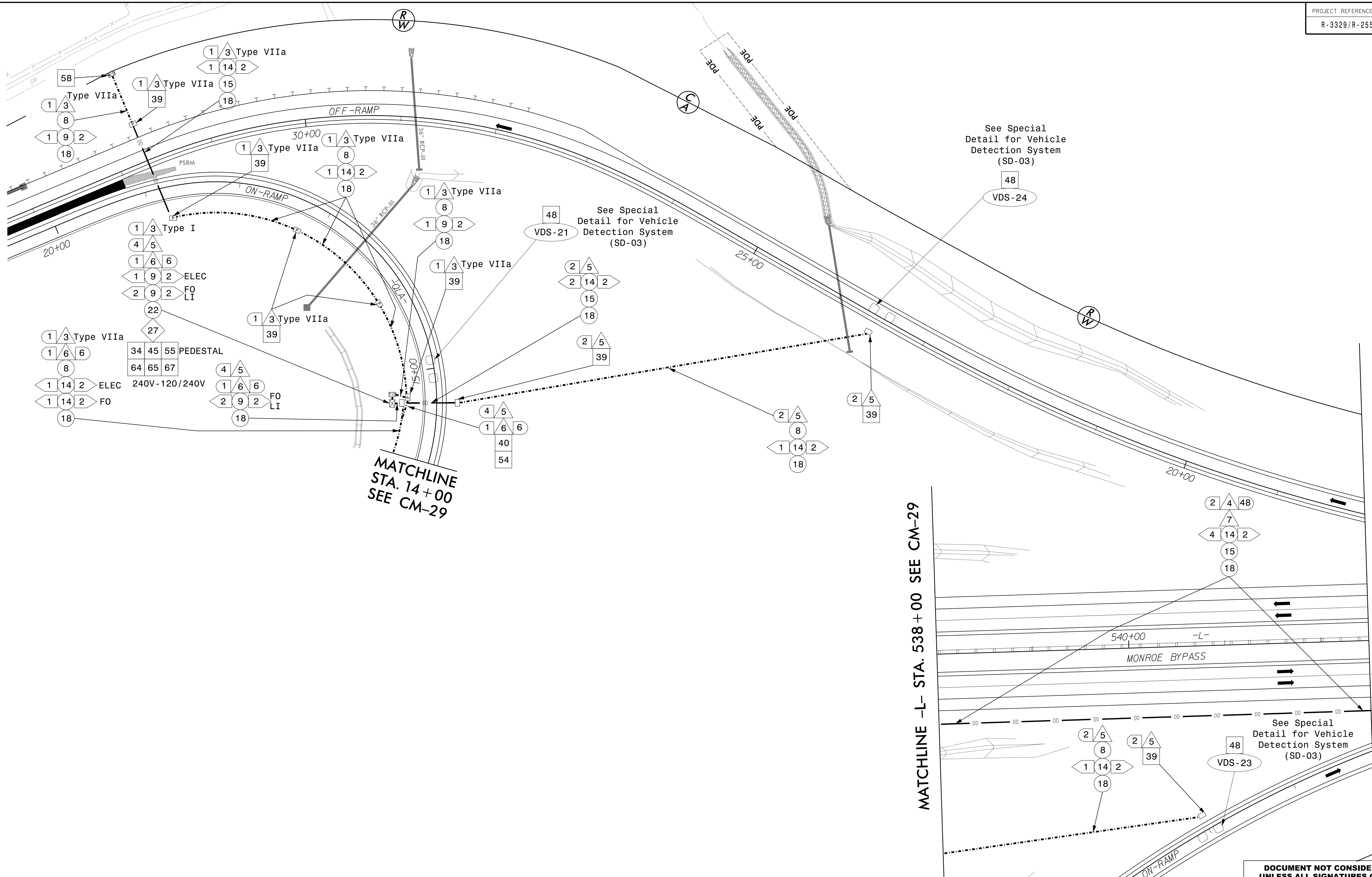
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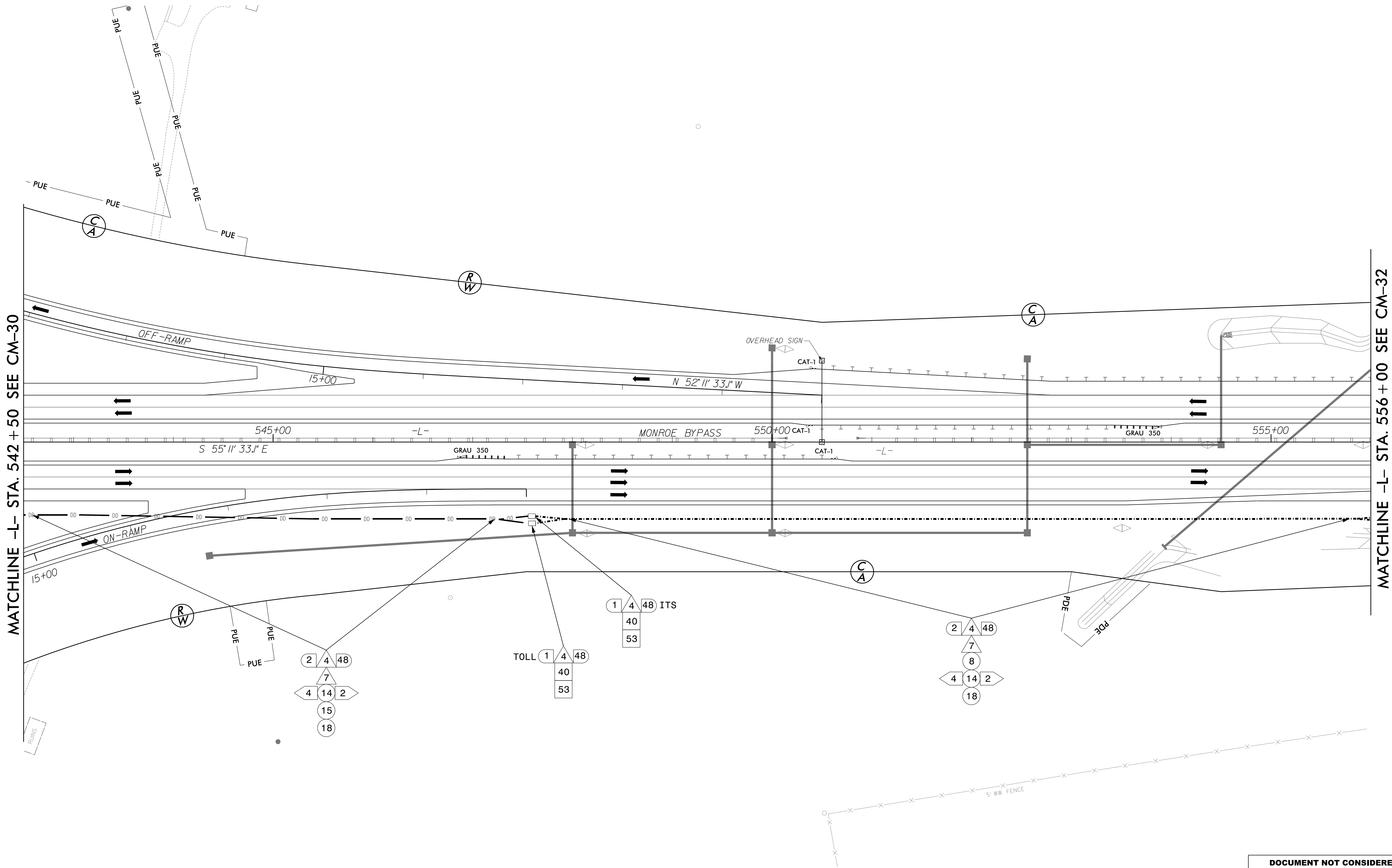
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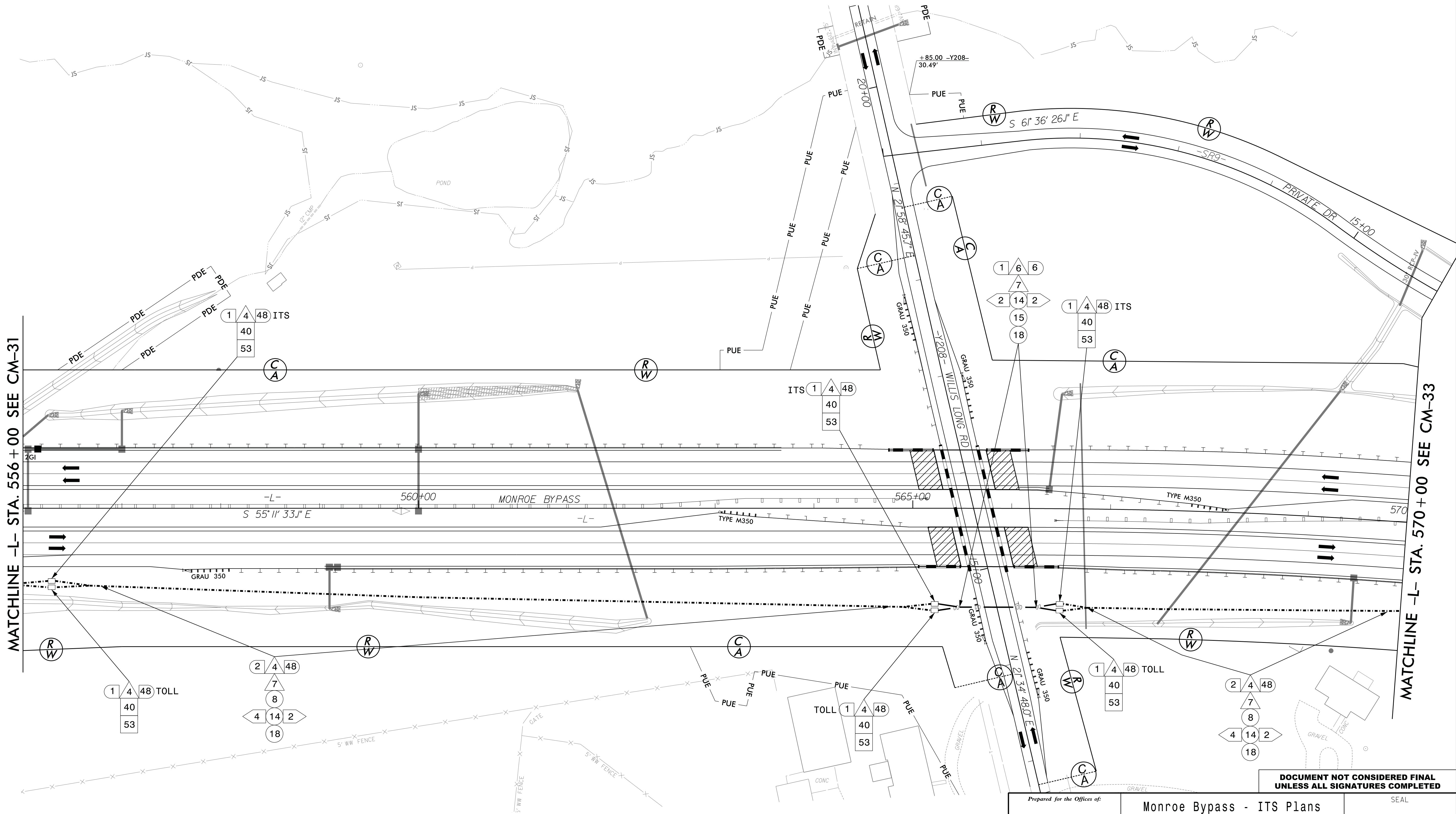
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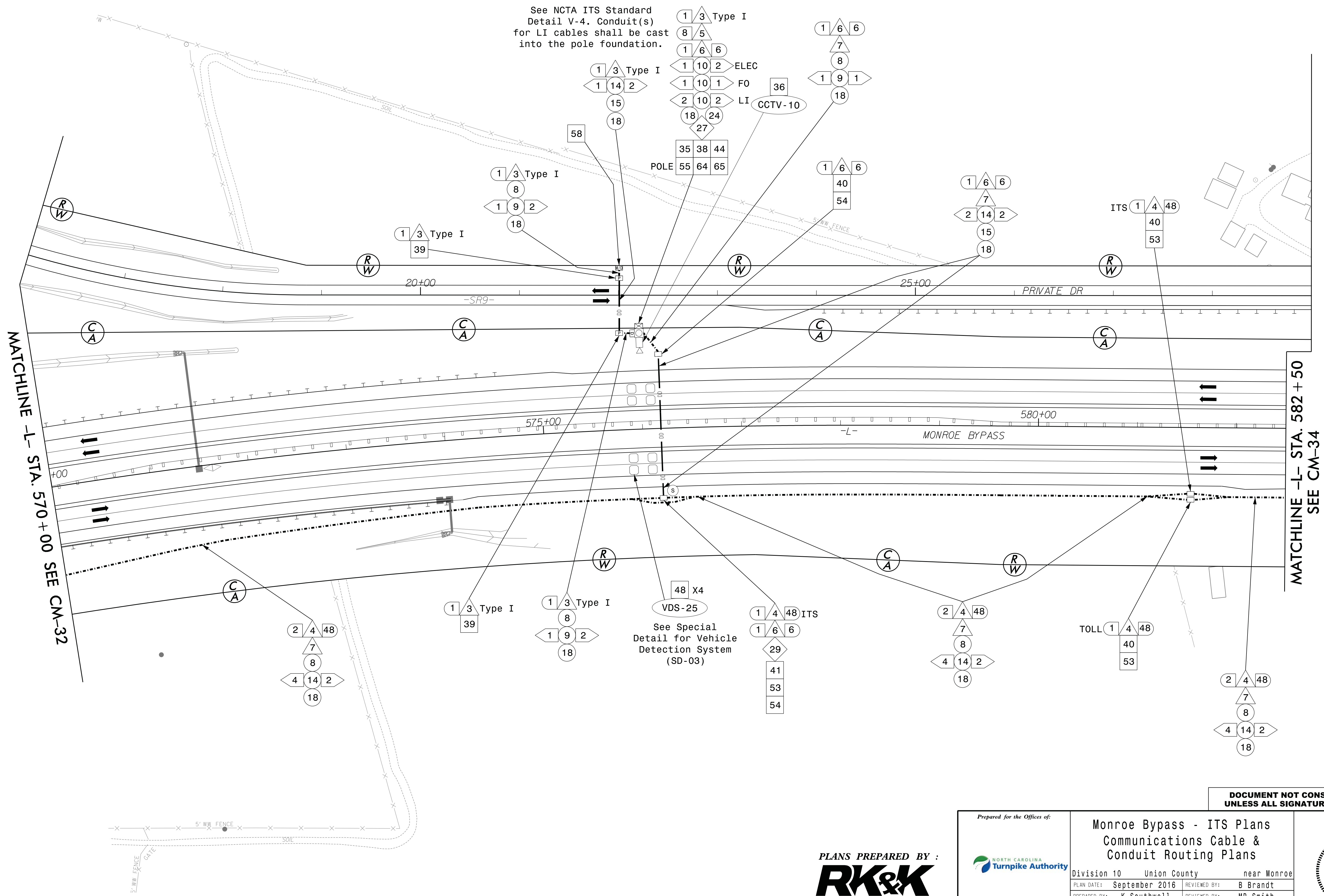
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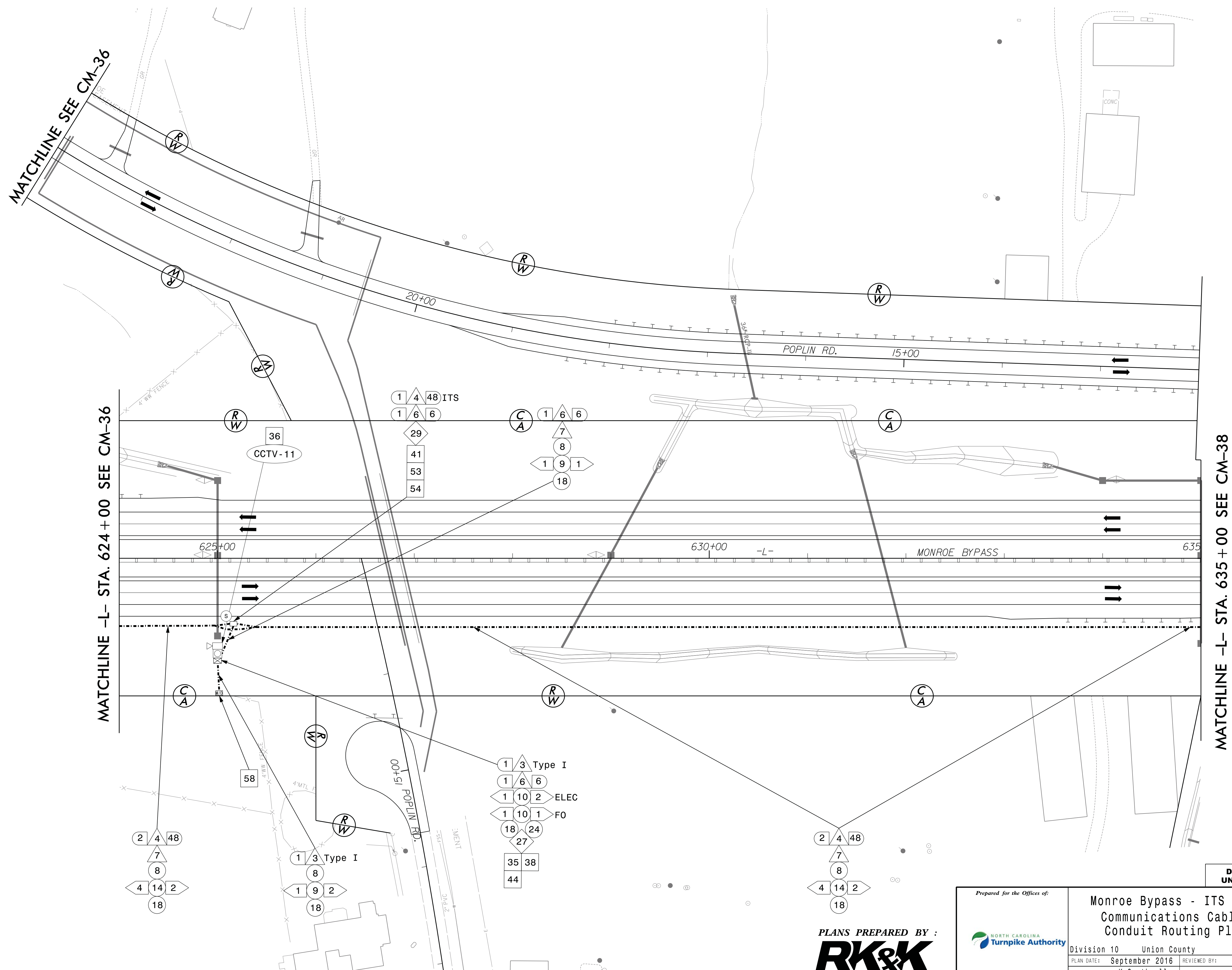
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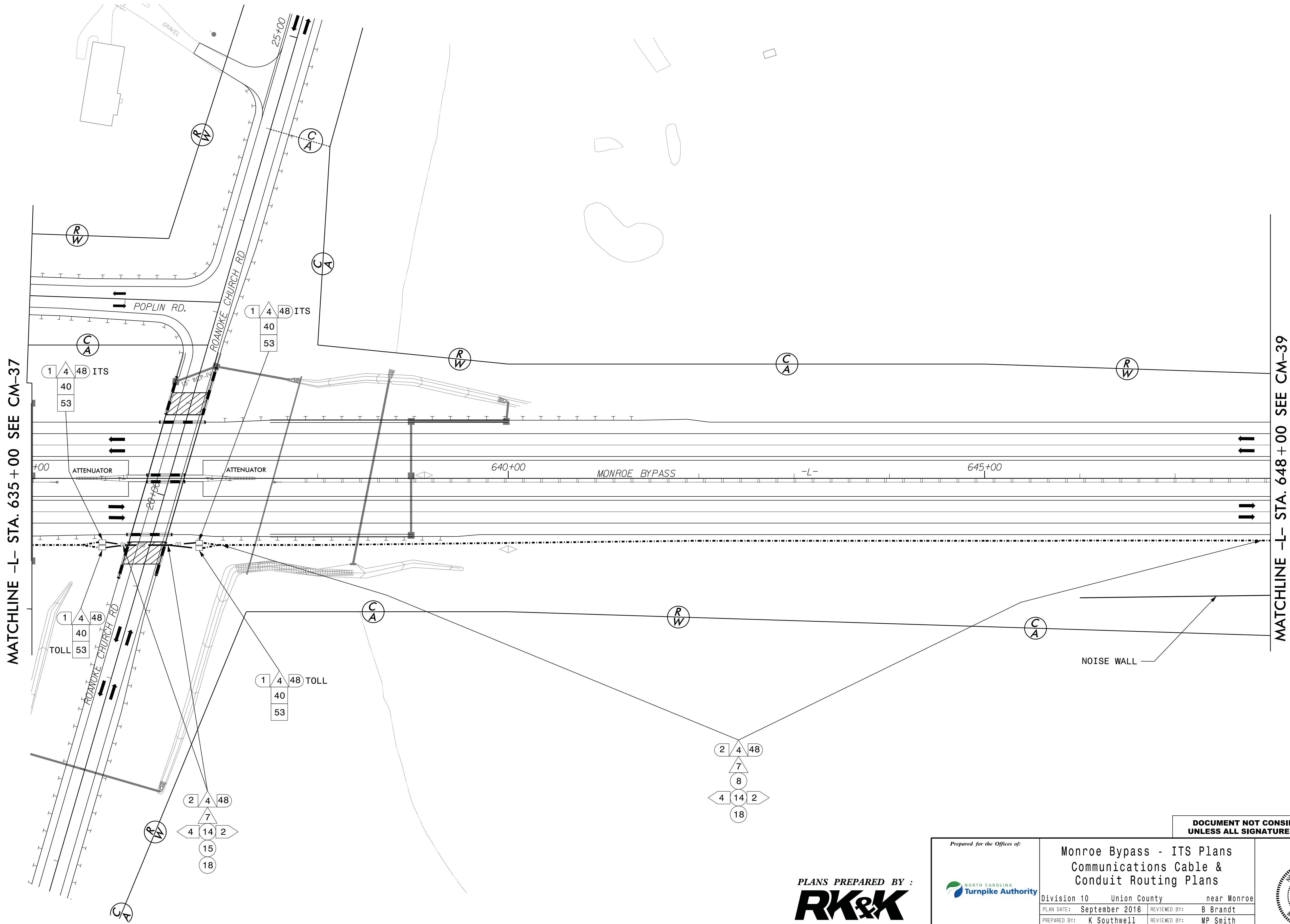
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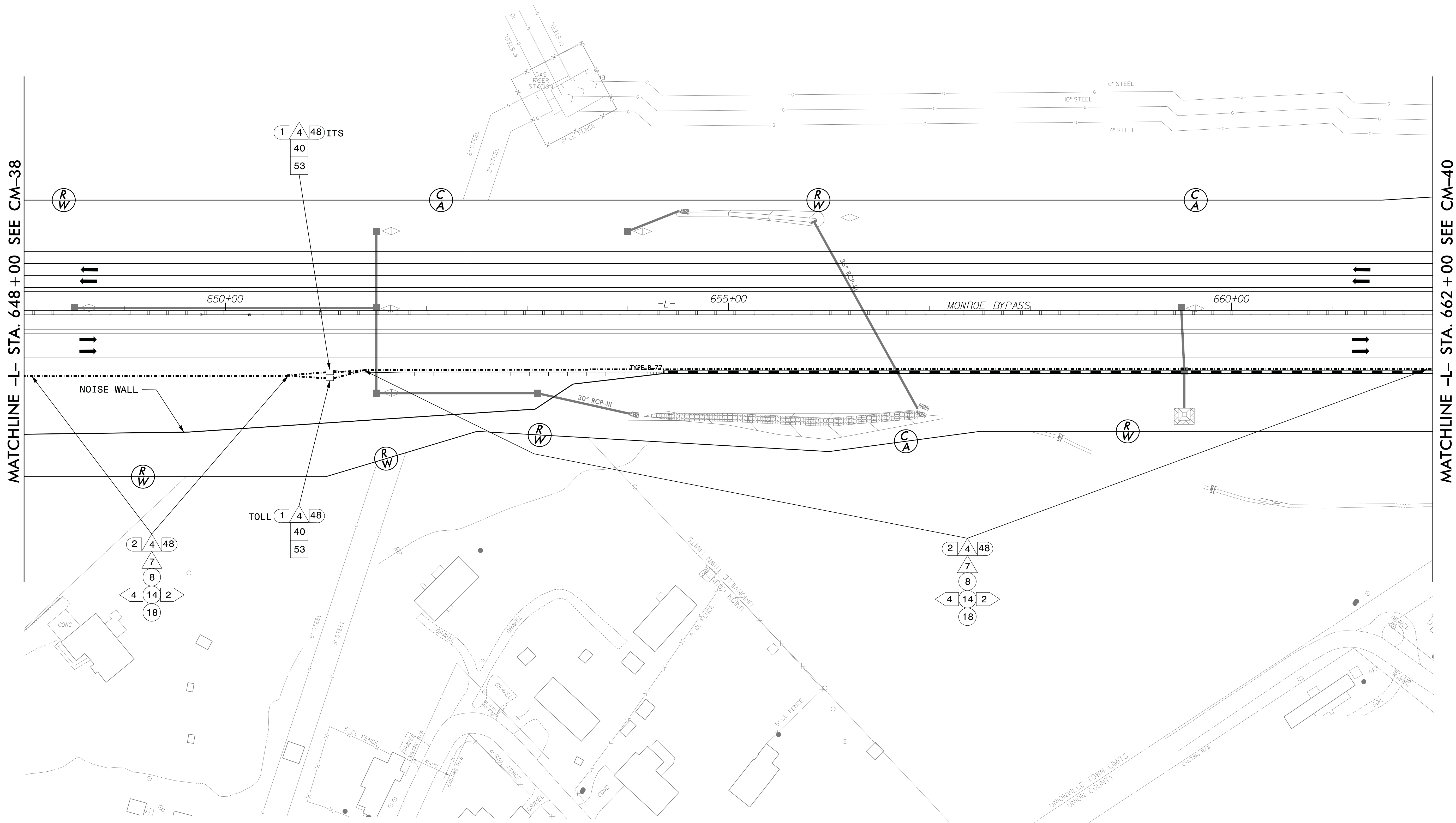


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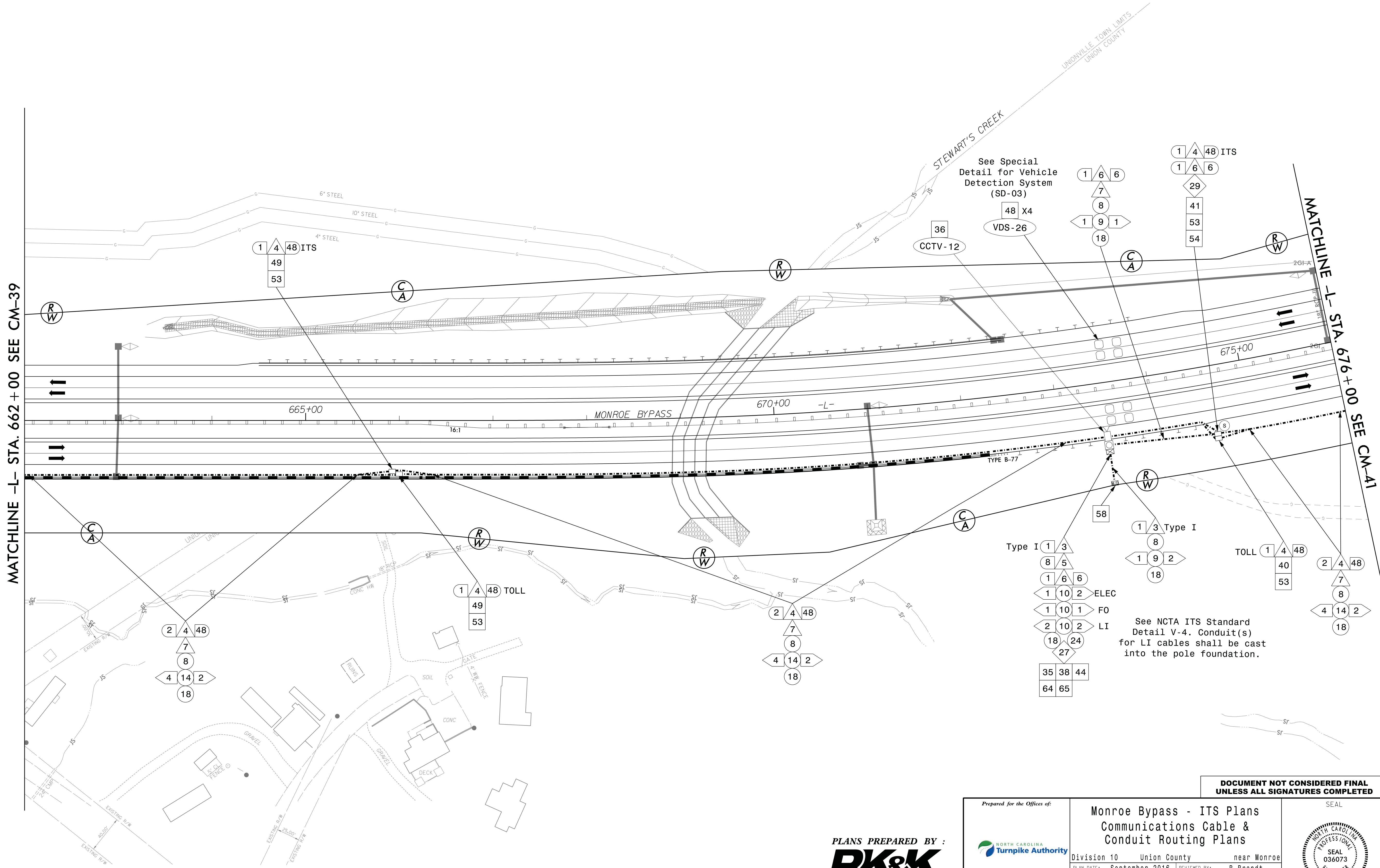


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PLAN DATE: September 2016 REVIEWED BY: B Brandt

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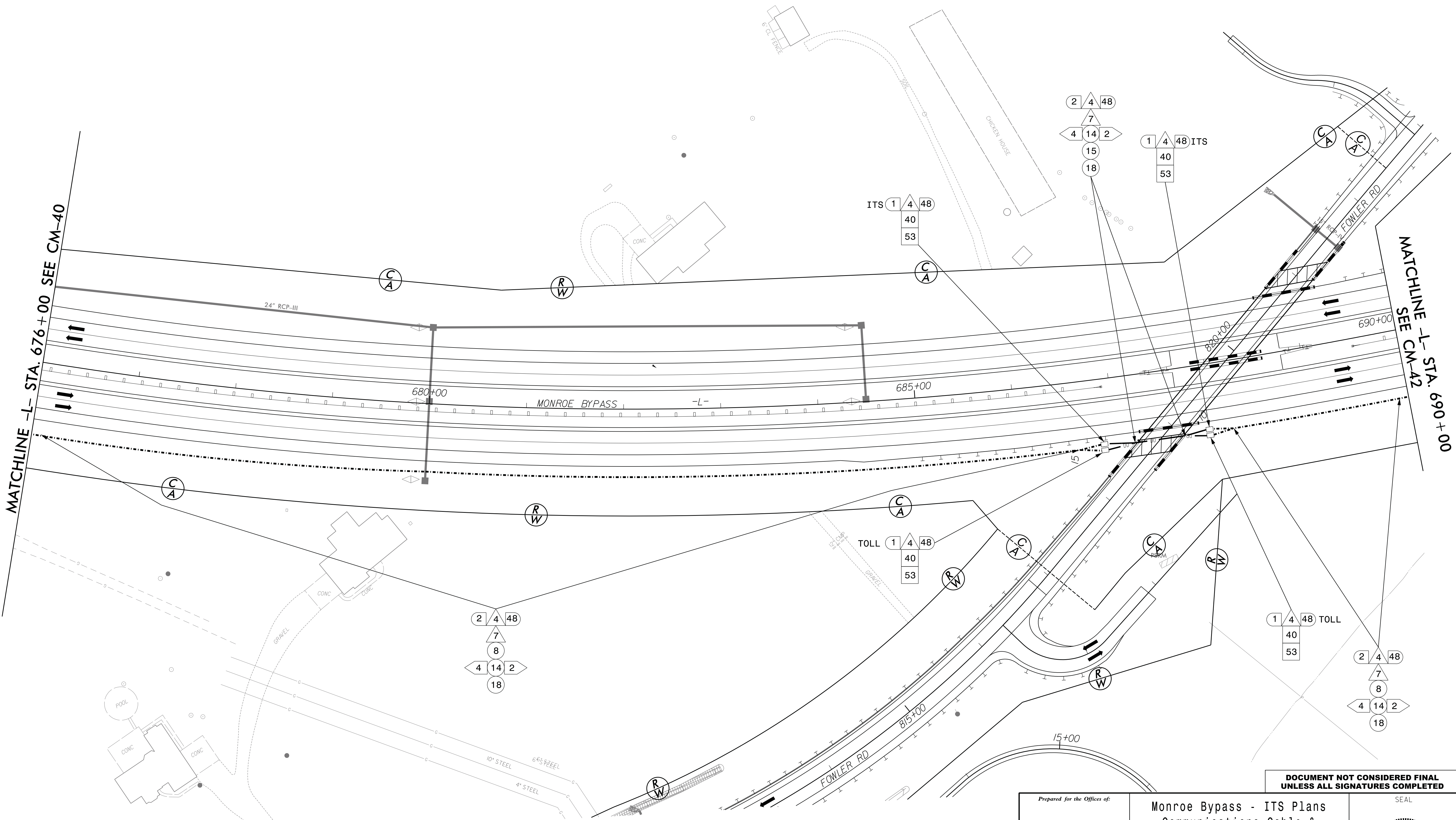
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BARRY L BRANDT
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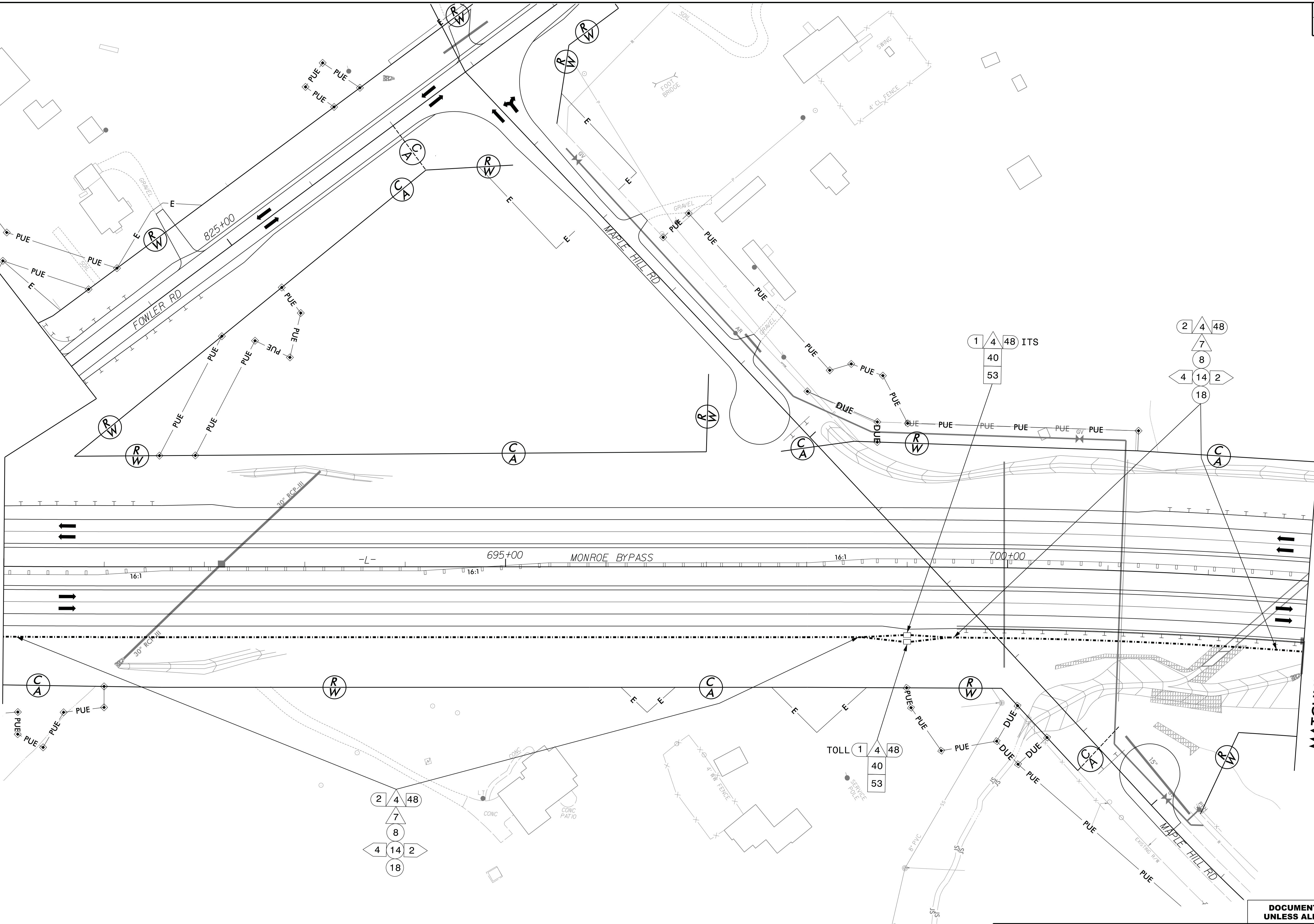
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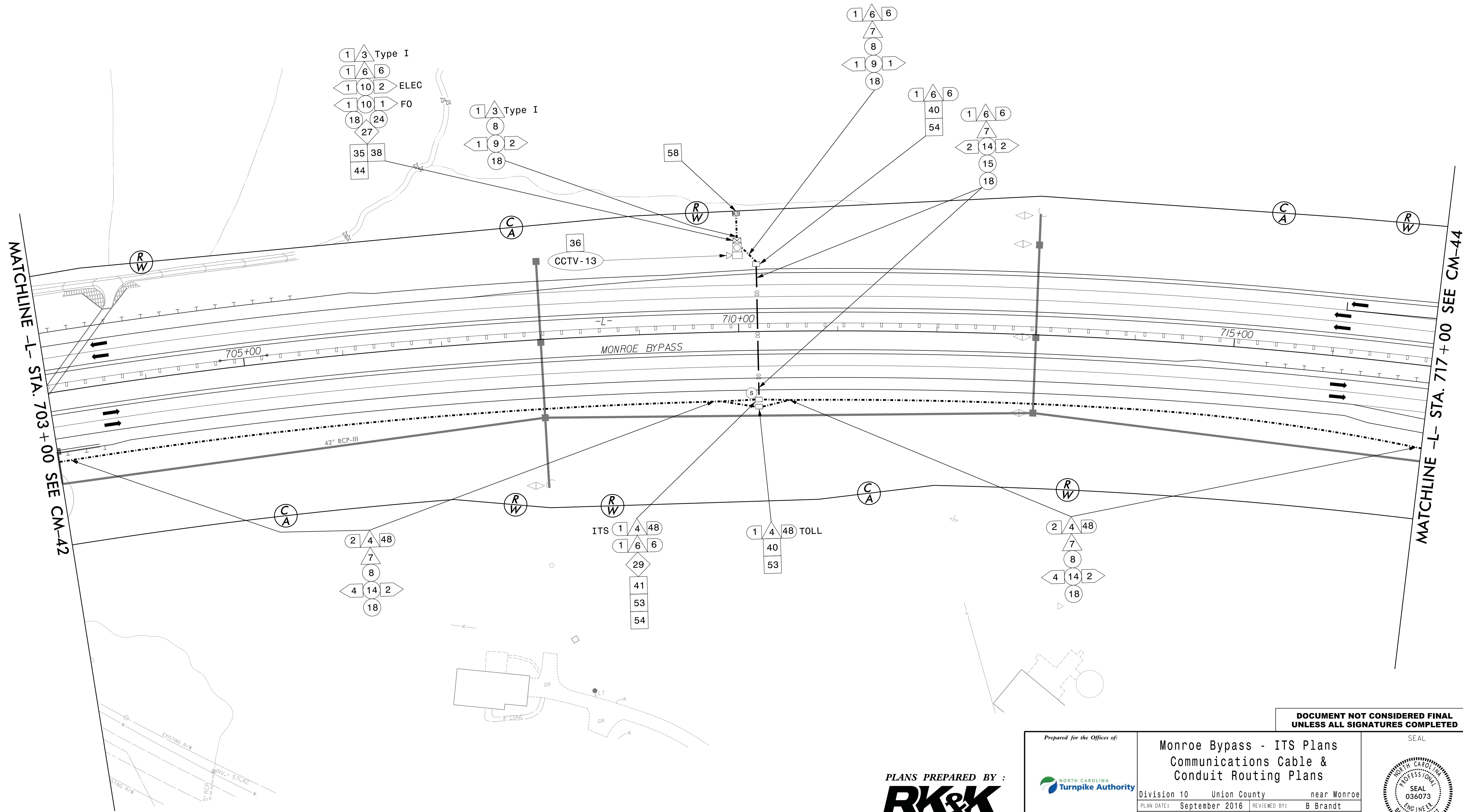
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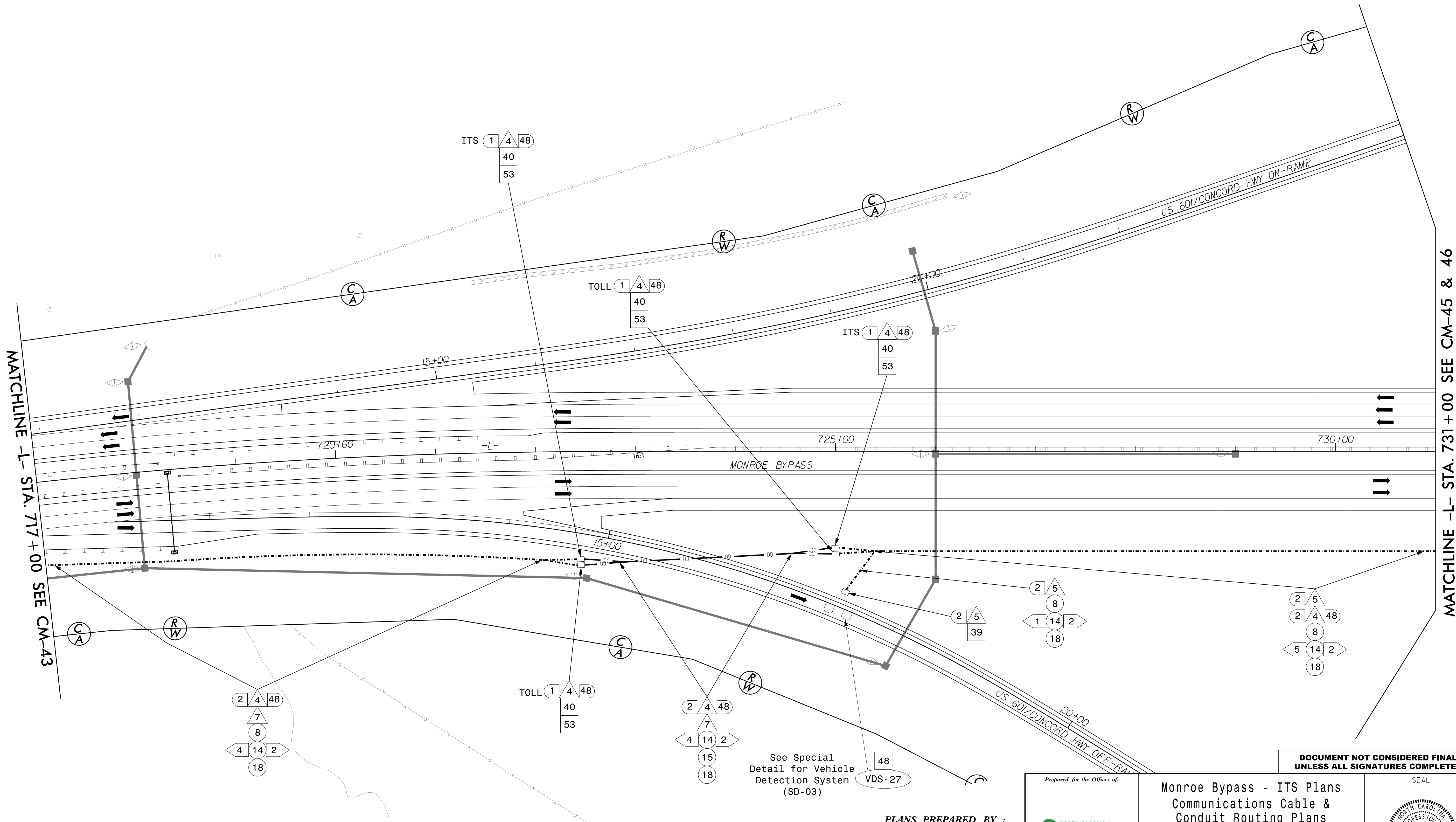
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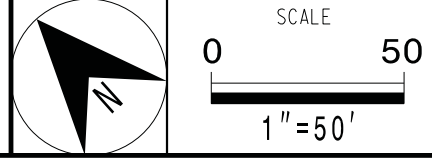
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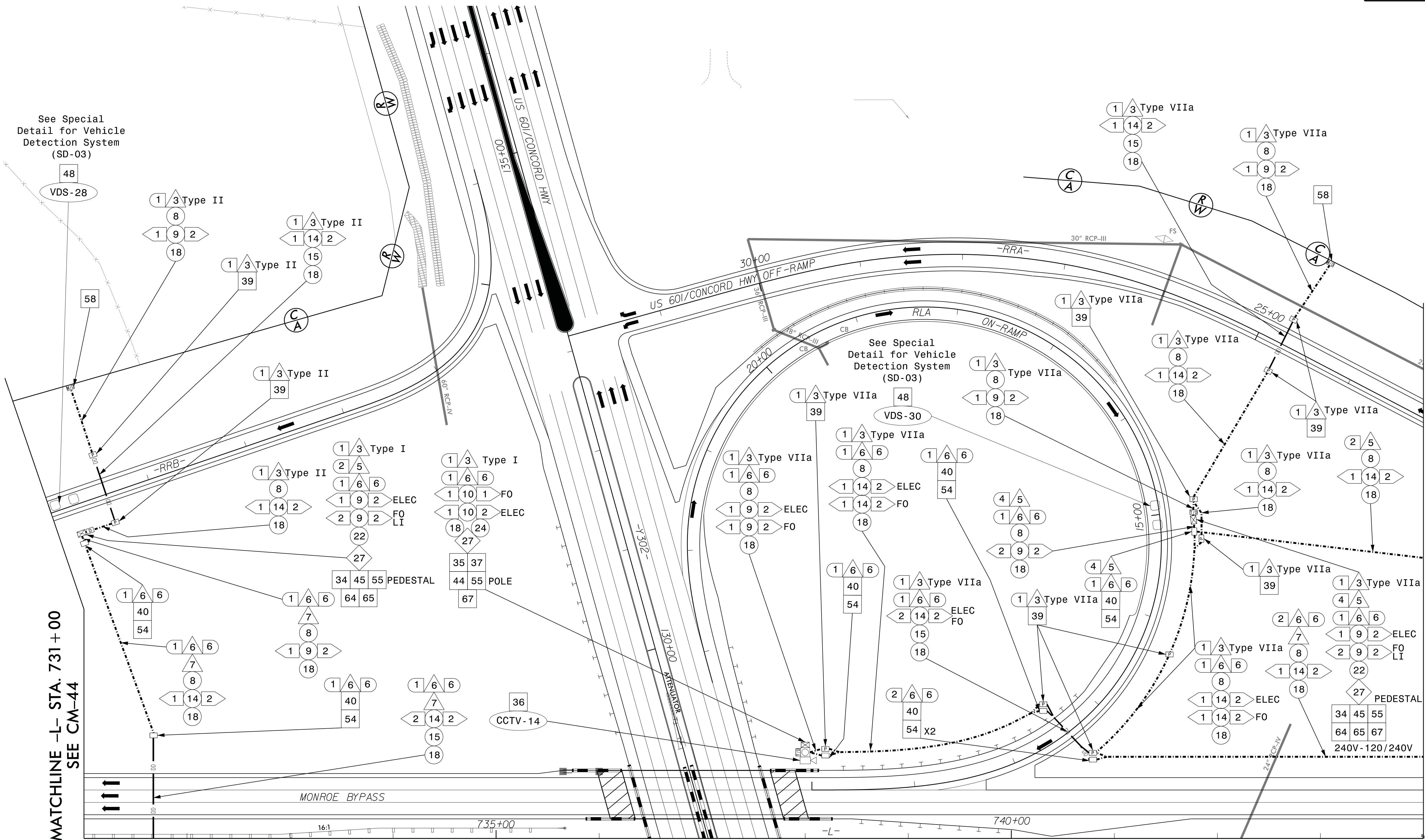
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PREPARED BY: K Southwell REVIEWED BY: MP Smith

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SCALE
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1"=50'

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SEAL

NORTH CAROLINA PROFESSIONAL ENGINEER
SEAL 036073
BARRY L BRANDT

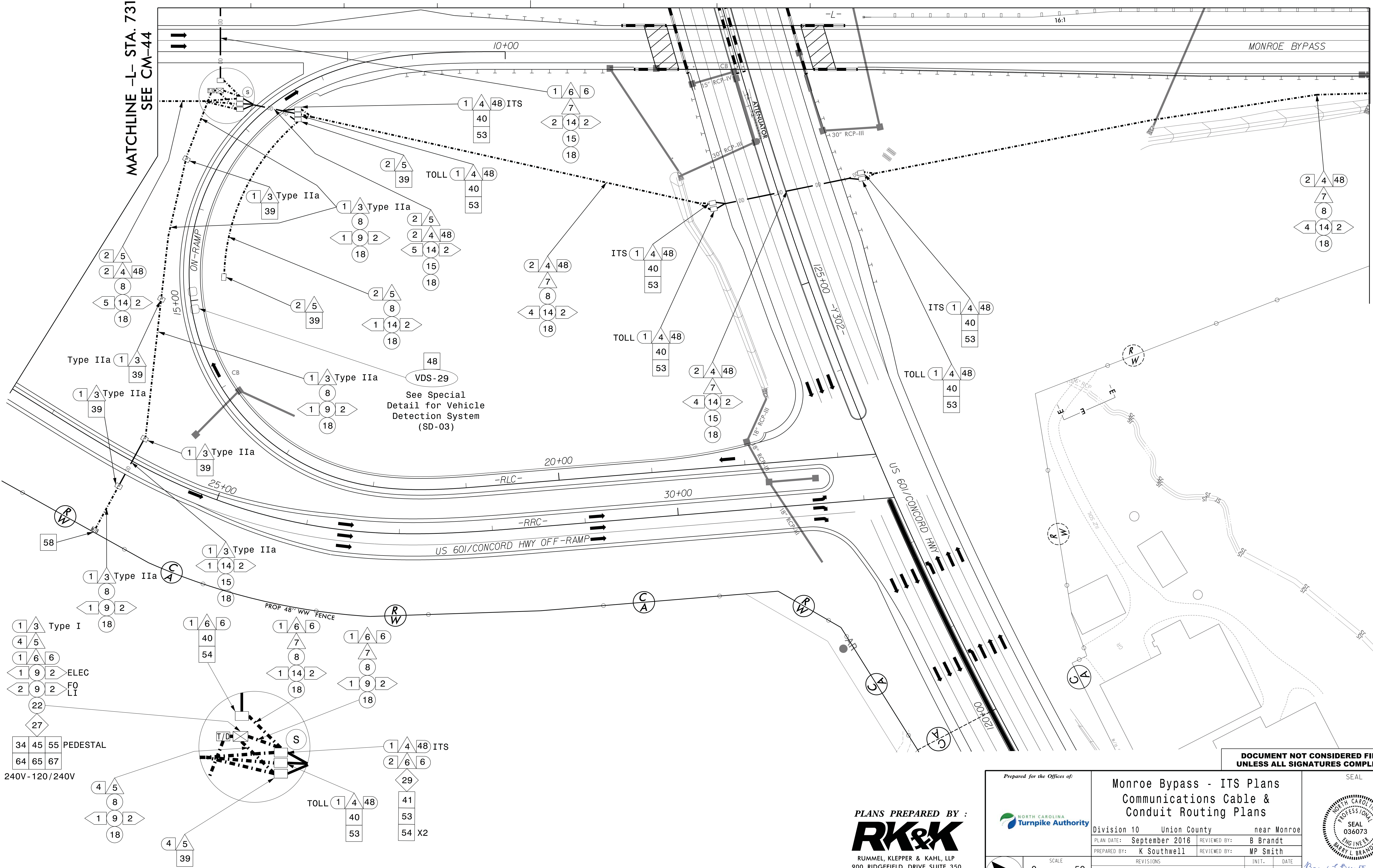
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DATE

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SEE CM-44

MATCHLINE "A" SHEET CM-45

MATCHLINE -L- STA. 744+00 SEE CM-47



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Southwell, A. SOUTHWELL

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PLANS PREPARED BY :
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 • (919) 878-9560

Prepared for the Offices of:

Monroe Bypass - ITS Plans
Communications Cable &
Conduit Routing Plans

Division 10 Union County near Monroe

PLAN DATE: September 2016 REVIEWED BY: B Brandt

PREPARED BY: K Southwell REVIEWED BY: MP Smith

REVISIONS

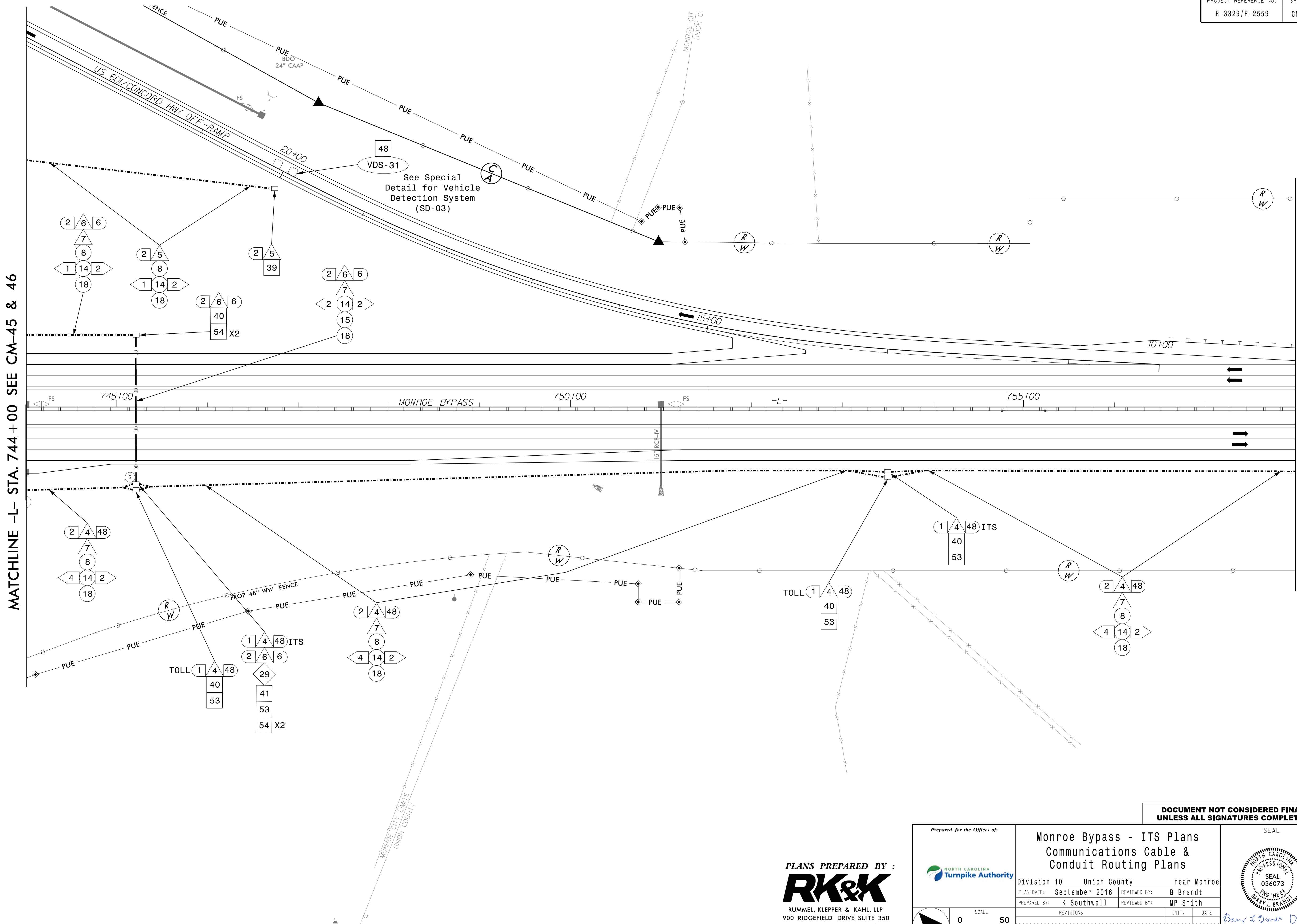
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Barry L. Brandt 12/7/16
DATE

CADD Filename:



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Southwell, K

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REVISIONS

INIT. DATE

SEAL
NORTH CAROLINA
PROFESSIONAL
ENGINEER
BARRY L BRANDT
036073

Barry L Brandt 12/7/16
DATE

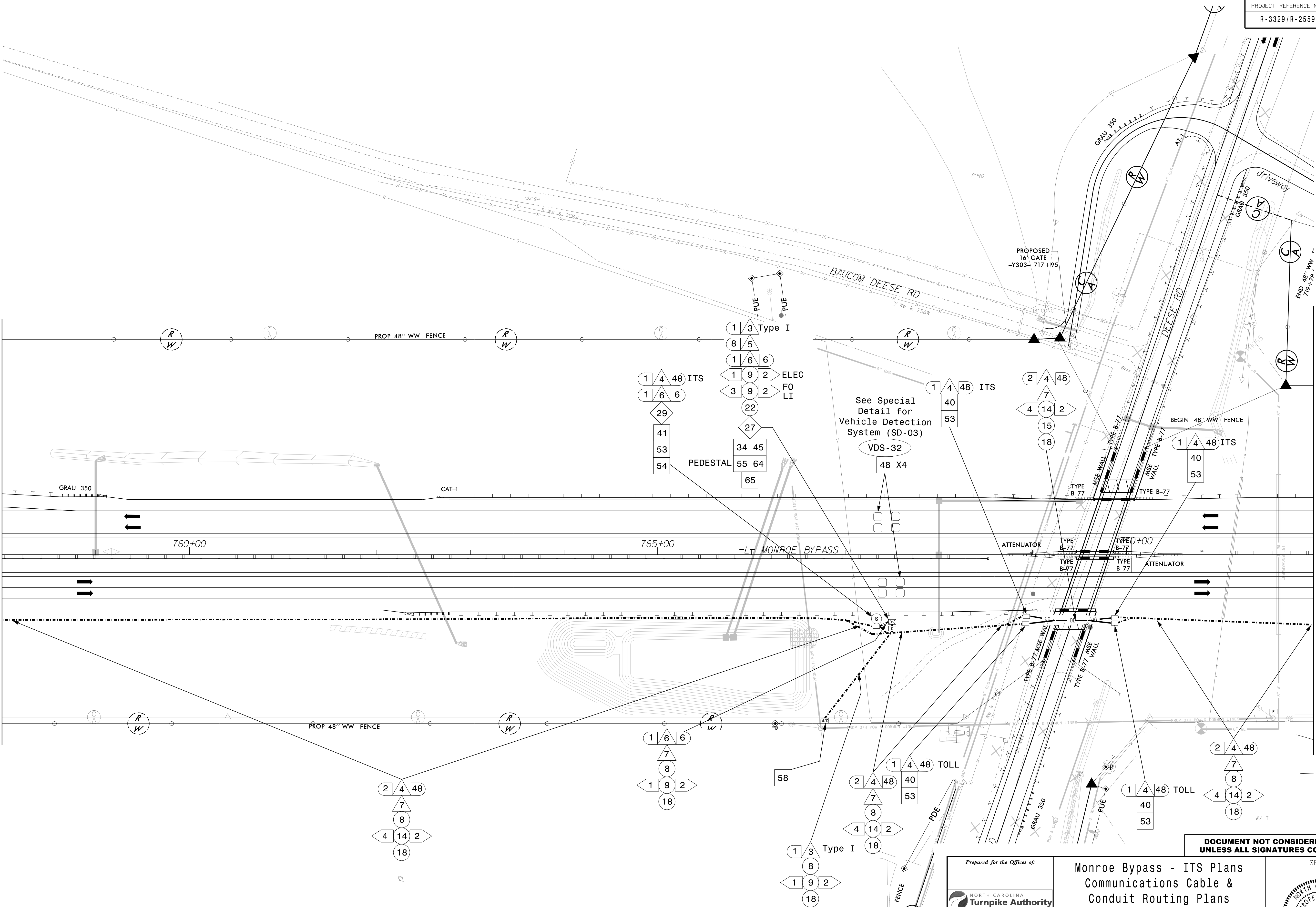
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MATCHLINE -L- STA. 758+00 SEE CM-47

MATCHLINE -L- STA. 772+00 SEE CM-49



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**Monroe Bypass - ITS Plans
Communications Cable &
Conduit Routing Plans**

Division 10 Union County near Monroe

PLAN DATE: September 2016 REVIEWED BY: LW Moon

PREPARED BY: R Nissen REVIEWED BY: JE Beck

REVISIONS	INIT.	DATE

SCALE

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1"=50'

PLANS PREPARED BY:

DRMP

ENGINEERS • PLANNERS • SCIENTISTS

DRMP INC.
5950 FAIRVIEW ROAD, SUITE 320
CHARLOTTE, NC 28210
NC LICENSE NO. C-2213 • TDM 332-2289

SEAL

LEA M. MOON

PROFESSIONAL ENGINEER

SEAL 022516

DATE 12/7/2016

CADD File name: _____

1. INSTALL DMS CABINET PER NCTA AET STANDARD DRAWINGS (DATED 10-7-2014), SHEET E-4, ON CONCRETE PAD TYPICAL "B" AND PER SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES".
 2. INSTALL POWER SERVICE CABLES IN POWER NETWORK CONDUITS/JUNCTION BOXES AS SHOWN ON SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES", FROM AET TOLL ZONE VAULT TO DMS CABINET ON CONCRETE PAD TYPICAL "B".
 3. INSTALL DROP CABLE IN COMMUNICATIONS NETWORK CONDUIT/JUNCTION BOXES AS SHOWN ON SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES", FROM AET TOLL ZONE VAULT TO DMS CABINET ON CONCRETE PAD TYPICAL "B".
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 6. INSTALL DMS AS SHOWN IN NCTA ITS STANDARD DETAILS, DATED 10-7-2014, SHEETS D-1, D-2A, D-3 AND D-4.
 7. INSTALL DROP CABLE IN COMMUNICATIONS NETWORK CONDUIT/JUNCTION BOXES PER NCTA AET STANDARD DRAWINGS (DATED 10-7-2014), SHEET E-4, AND PER SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES", FROM AET TOLL ZONE VAULT TO COMMUNICATIONS JUNCTION BOX ON CONCRETE PAD TYPICAL "B", THEN AS SHOWN ON PLANS.
 8. SEE SHEET IT-4 FOR CCTV POLE LOCATION.
 9. INSTALL CONDUIT AND JUNCTION BOXES AT AET ZONES BASED ON SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES".
 10. INSTALL CONCRETE EQUIPMENT PADS PER SHEET E-4 OF THE NCTA AET STANDARD DRAWINGS (DATED 10-7-2014).
- TOLL ZONE**
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TOLL ZONE
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MATCHLINE -L- STA. 772 + 00 SEE CM-48

WATCHLINE -L- STA. 786+00 SEE CM-50

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1 3 Type I
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See Special Detail
for conduit & fiber
optic cable into
AET Vaults (SD-01)

TS

99

1 4 48 TOLL

— GAS —

SEE NOTE 7

CCTV-15
36

SEE NOTES
3 & 7
ITS (2) (6) (6)
R SD-02 (17)

See Sheets SD-02 &
E-4 for details for
typical "B" pad

SEE NOTE 3

1 6 6

7

17 PERF

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Monroe Bypass - ITS Plans

Communications Cable & Conduit Routing Plans

Division 10 Union County near Monroe

PLAN DATE: September 2016	REVIEWED BY: LM Moon
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PREPARED BY:	R Nissen	REVIEWED BY:	JE Beck
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REVISIONS	INIT.	DATE
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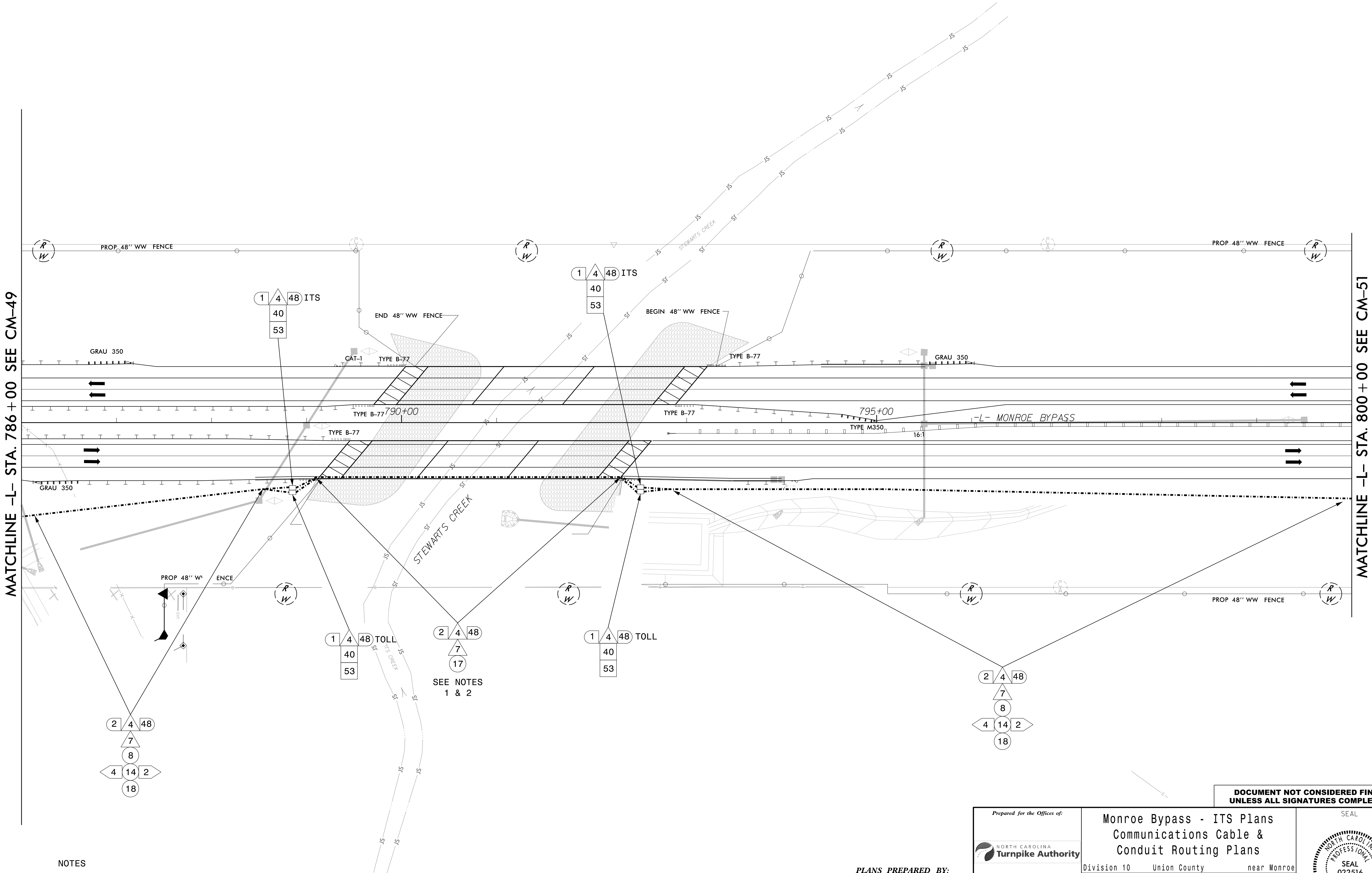
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SEA



Lisa M. Moon 12/7/2016

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NOTES

1. FIND AND INTERCEPT BRIDGE MOUNTED CONDUIT SYSTEM AND EXTEND CONDUIT OUTSIDE OF PAVED SHOULDER. CONTRACTOR SHALL COORDINATE CONDUIT PLACEMENT TO AVOID CONDUIT DAMAGE UNDER PROPOSED GUARDRAIL.
2. RFC PLANS - BRIDGE DETAILS FOR B-1700B, SUBMITTAL NUMBER: S-354R1, DATED 3-24-2016. SEE SHEETS 5, 6, 30A, 30B.

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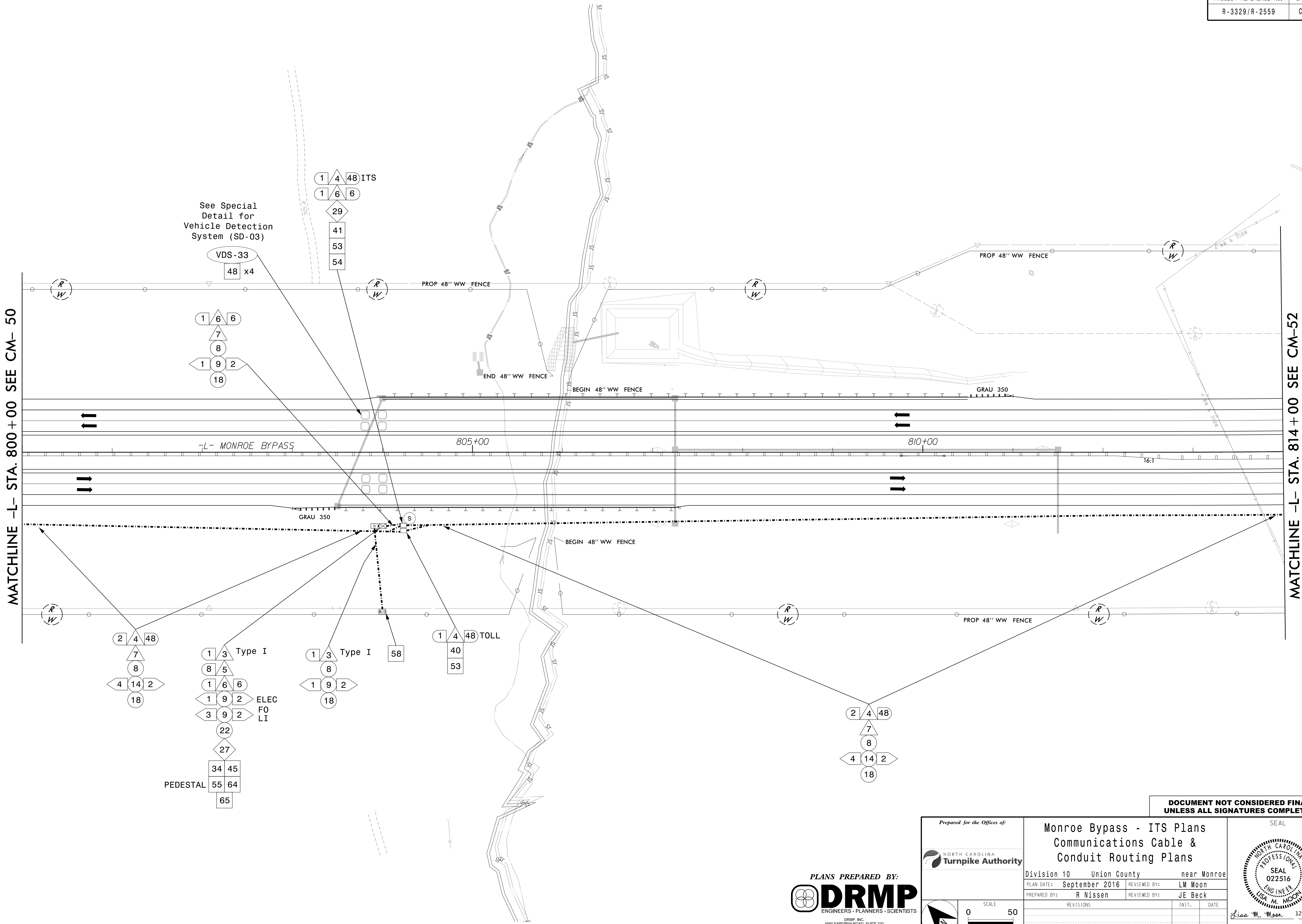
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Monroe Bypass - ITS Plans Communications Cable & Conduit Routing Plans			
Division 10 Union County near Monroe			
PLAN DATE: September 2016	REVIEWED BY: LM Moon		
PREPARED BY: R Nissen	REVIEWED BY: JE Beck		
REVISIONS	INIT.	DATE	

SEAL

PROFESSIONAL ENGINEER
LISA M. MOON
022516
12/7/2016
DATE

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SCALE
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1"=50'

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Division 10 Union County near Monroe

PLAN DATE: September 2016 REVIEWED BY: LM Moon

PREPARED BY: R Nissen REVIEWED BY: JE Beck

REVISIONS	INIT.	DATE

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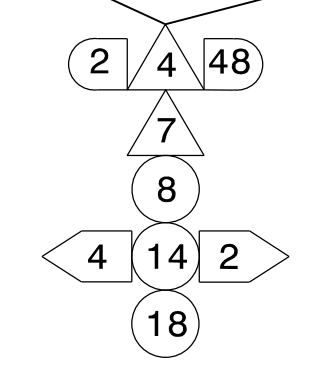
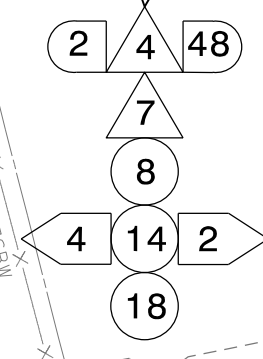
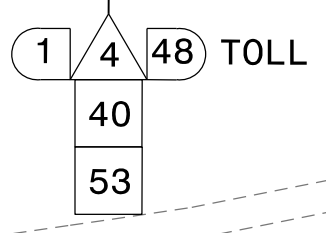
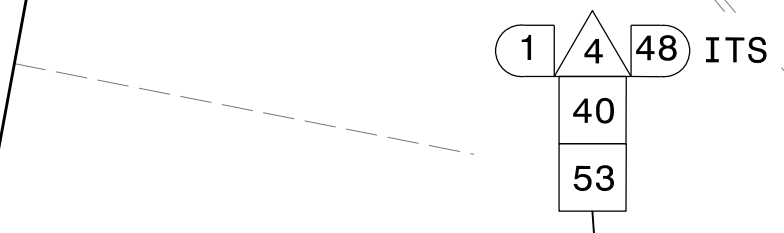
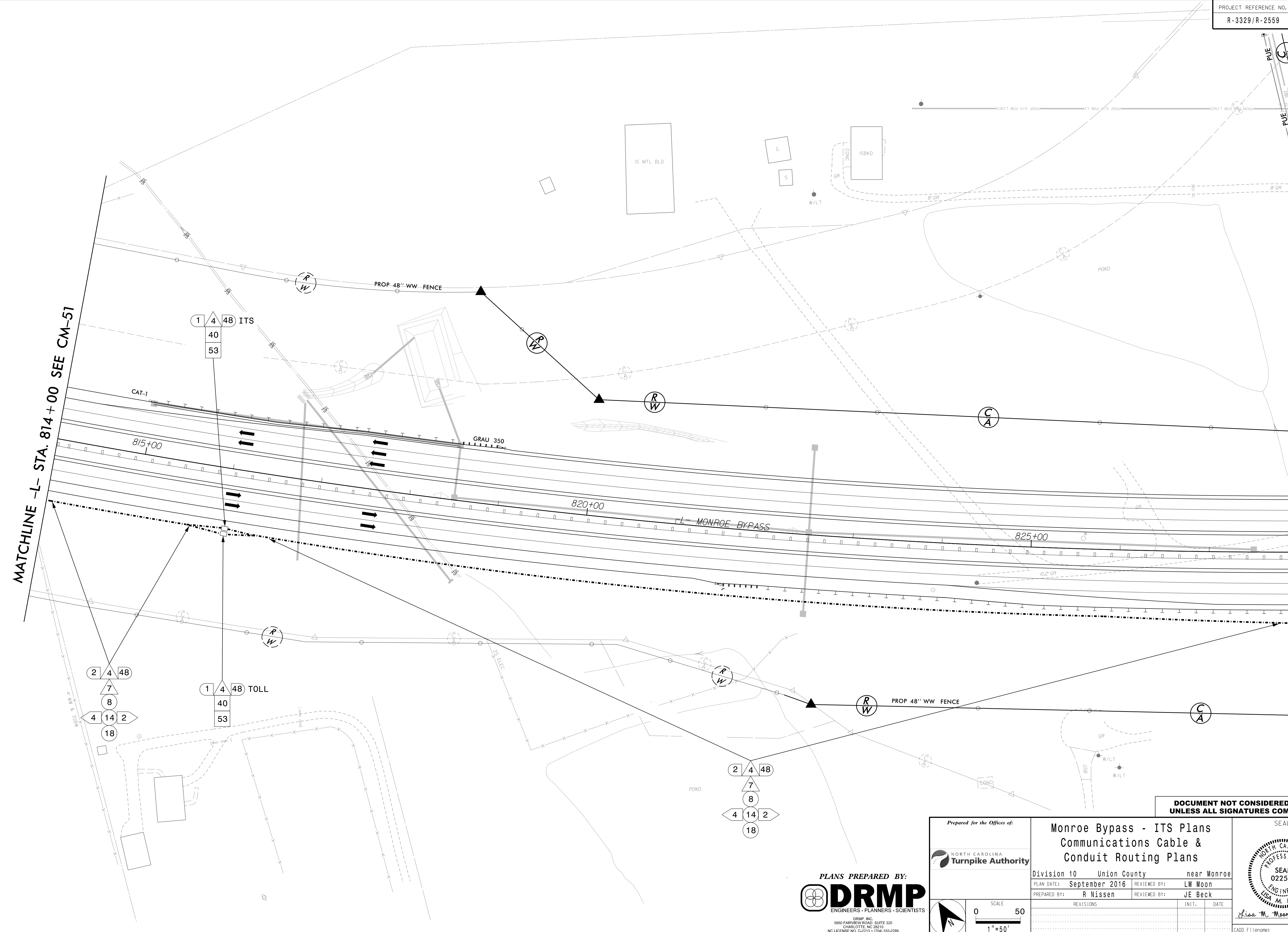
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NORTH CAROLINA
PROFESSIONAL
ENGINEER
SEAL
022516
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12/7/2016

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MATCHLINE -L- STA. 814+00 SEE CM-51

MATCHLINE -L- STA. 828+00 SEE CM-53



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Monroe Bypass - ITS Plans

Communications Cable & Conduit Routing Plans

Division 10 Union County near Monroe

PLAN DATE: September 2016 REVIEWED BY: LM Moon

PREPARED BY: R Nissen REVIEWED BY: JE Beck

REVISIONS	INIT.	DATE

SEAL

PROFESSIONAL ENGINEER

SEAL 022516

LISA M. MOON

12/7/2016

DATE

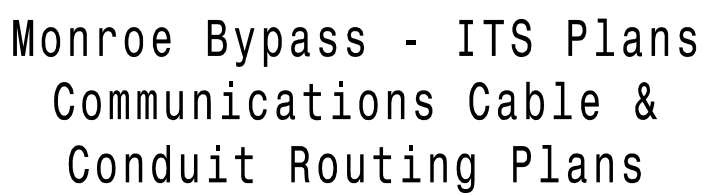
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LISA M. MOON



MATCHLINE SEE CM-53

Prepared for the Offices of:



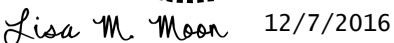
PLAN DATE: September 2016	REVIEWED BY: LM Moon
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PREPARED BY: R Nissen	REVIEWED BY: JE Beck
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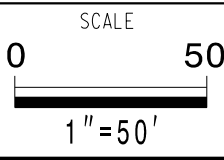


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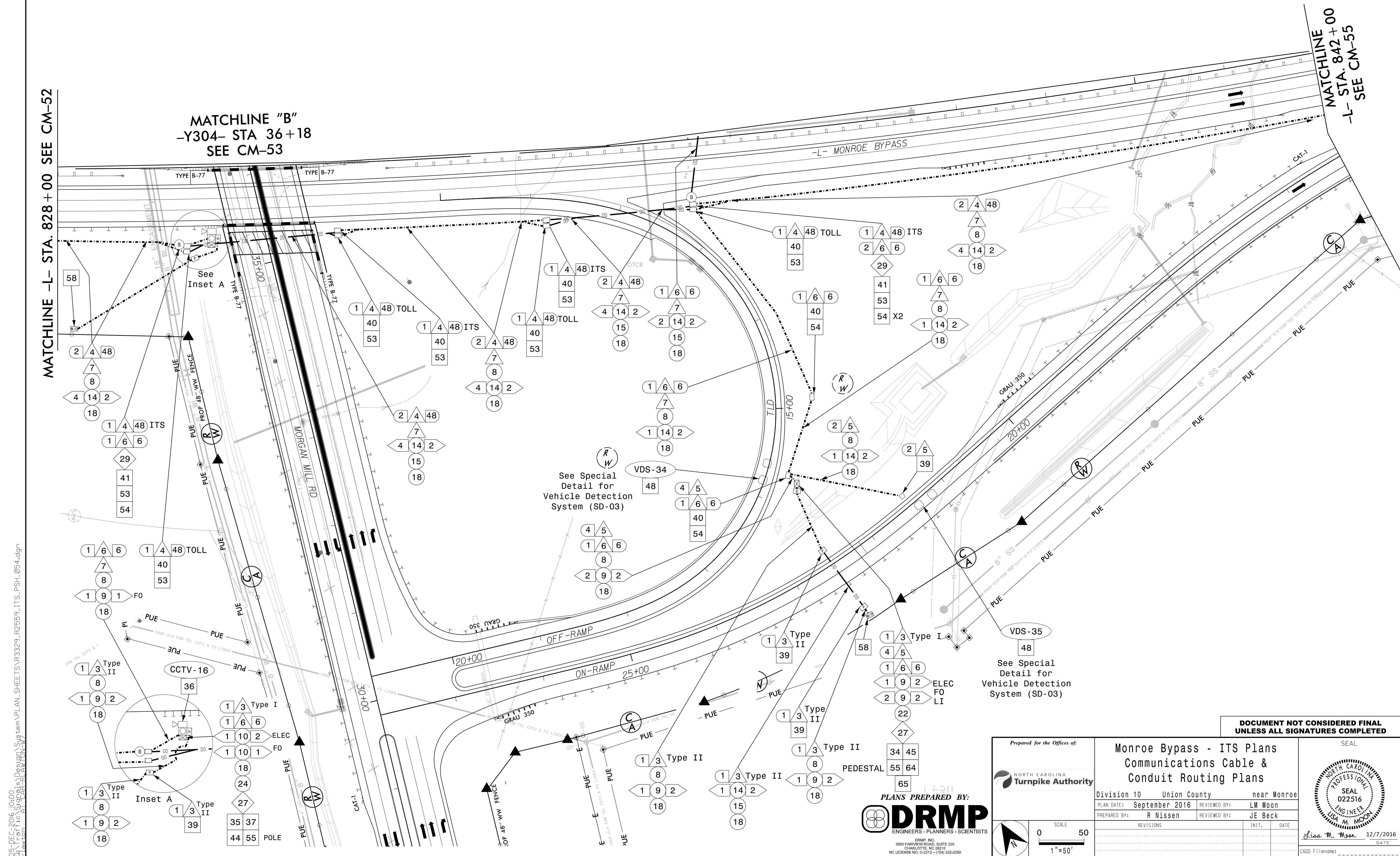
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NC LICENSE NO. C-2213 • (704) 332-2289

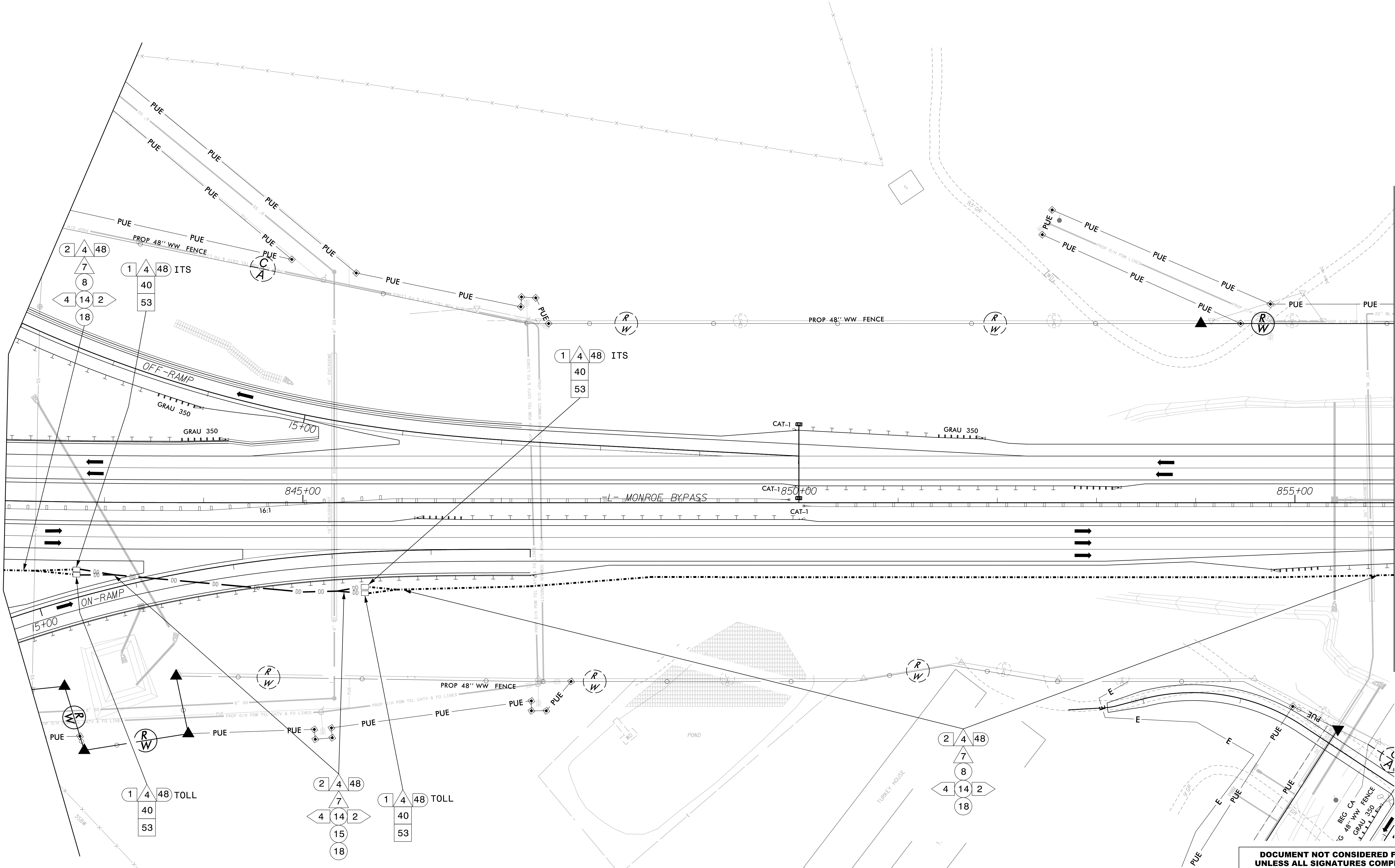


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MATCHLINE -L- STA. 842+00 SEE CM-53 & 54

MATCHLINE -L- STA. 856+00 SEE CM-56



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	<p>Division 10 Union County near Monroe</p>																									
	<p>PLAN DATE: September 2016</p>	<p>REVIEWED BY: LM Moon</p>																								
	<p>PREPARED BY: R Nissen</p>	<p>REVIEWED BY: JE Beck</p>																								
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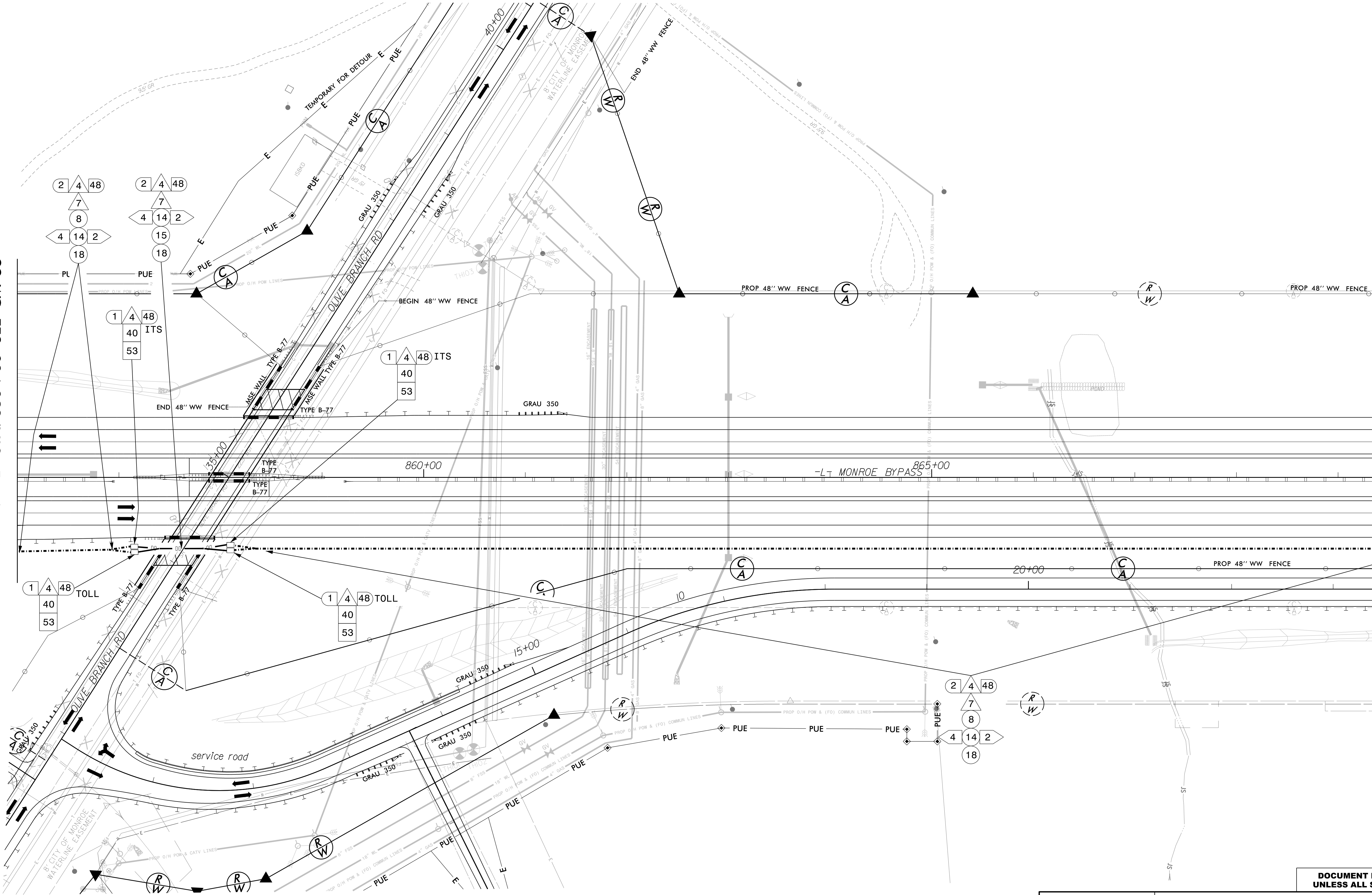
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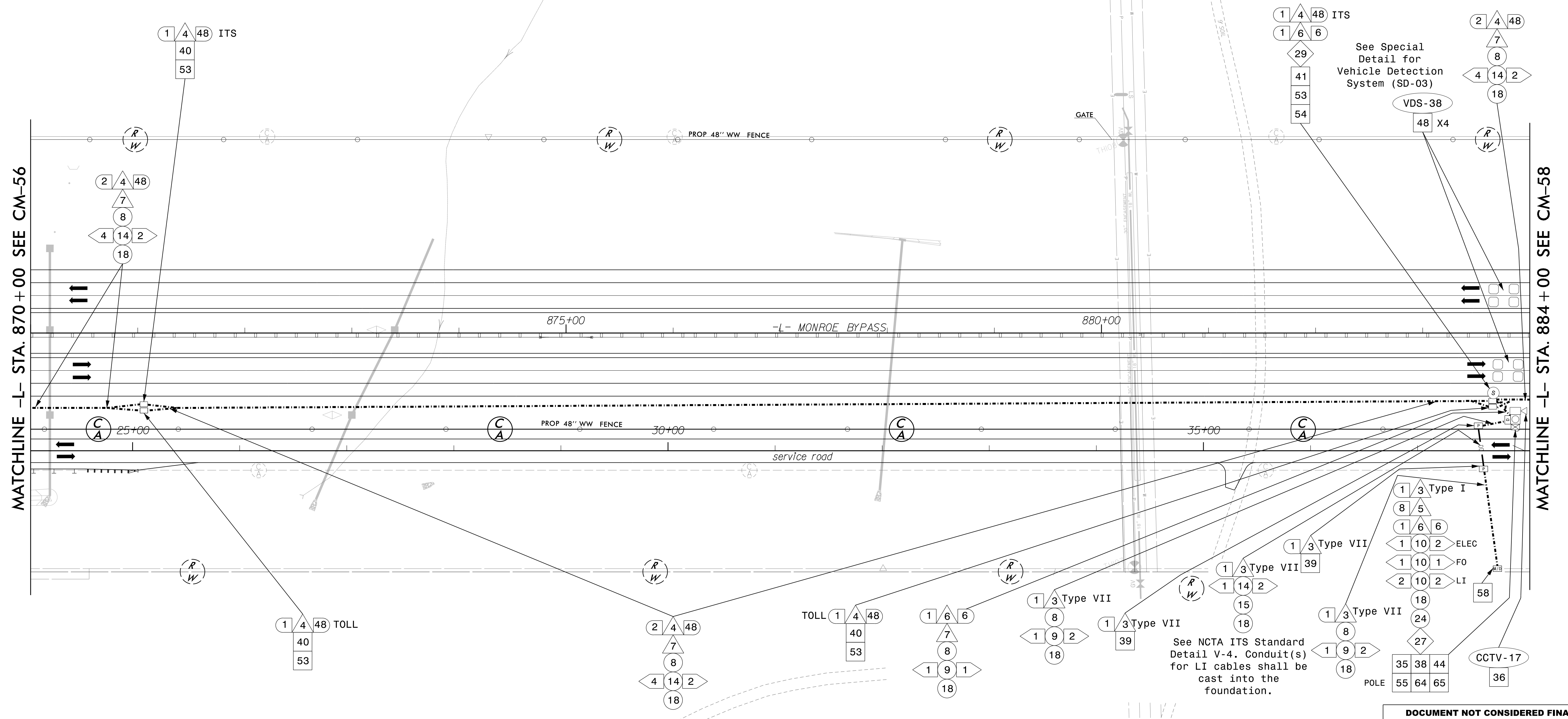
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	<p>Division 10 Union County near Monroe</p>		<p>DATE 12/7/2016</p>	
	<p>PLAN DATE: September 2016 REVIEWED BY: LM Moon</p>		<p>DATE</p>	
	<p>PREPARED BY: R Nissen REVIEWED BY: JE Beck</p>		<p>DATE</p>	
	<p>REVISIONS</p>		<p>INIT. DATE</p>	



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Division 10 Union County near Monroe

PLAN DATE: September 2016	REVIEWED BY: LM Moon
---------------------------	----------------------

PREPARED BY: R Nissen	REVIEWED BY: JE Beck
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Lisa M. Moon 12/7/2016

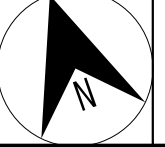
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CHARLOTTE, NC 28210
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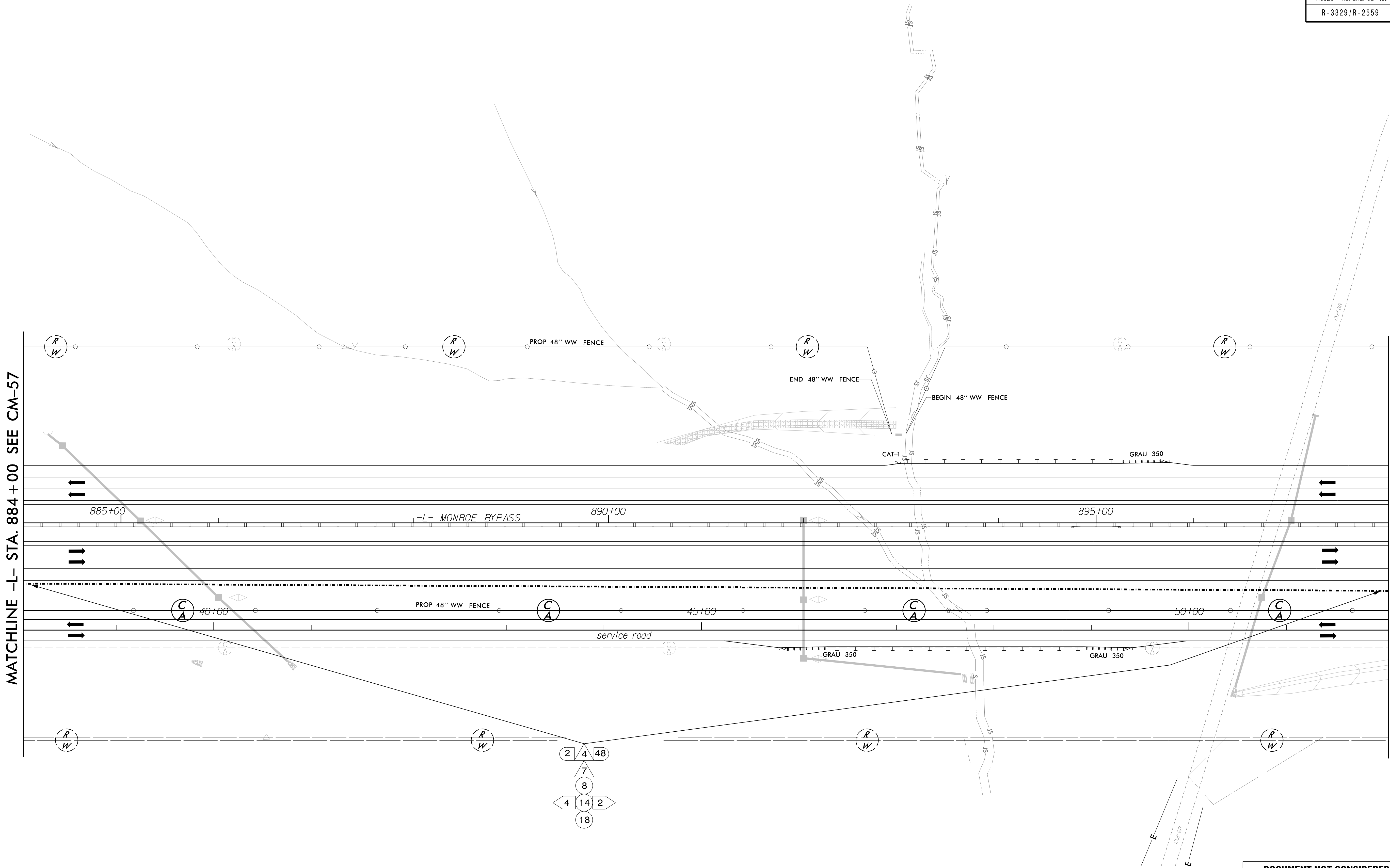


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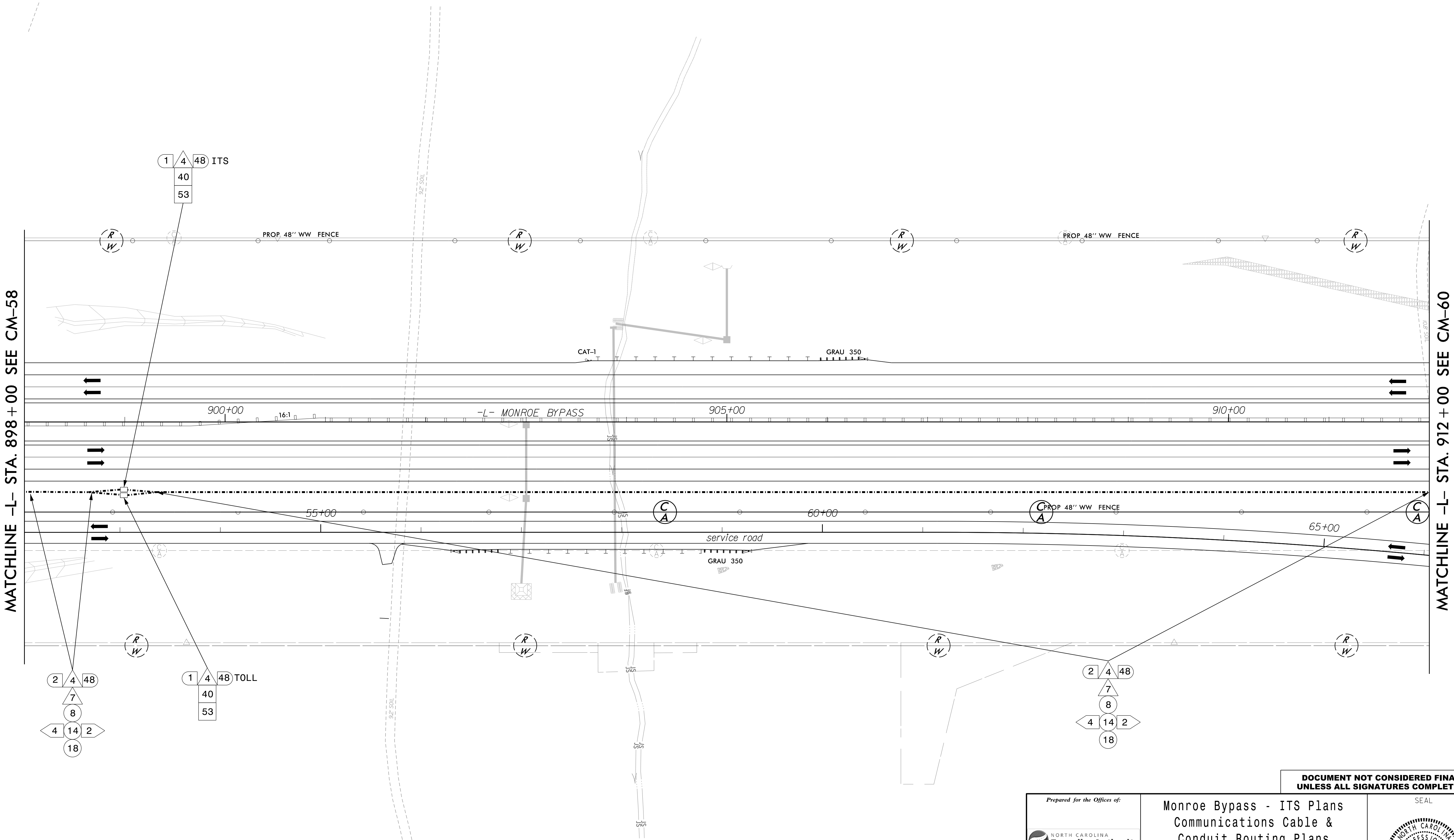
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Monroe Bypass - ITS Plans
Communications Cable & Conduit Routing Plans

Division 10	Union County	near Monroe
PLAN DATE: September 2016	REVIEWED BY: LM Moon	
PREPARED BY: R Nissen	REVIEWED BY: JE Beck	
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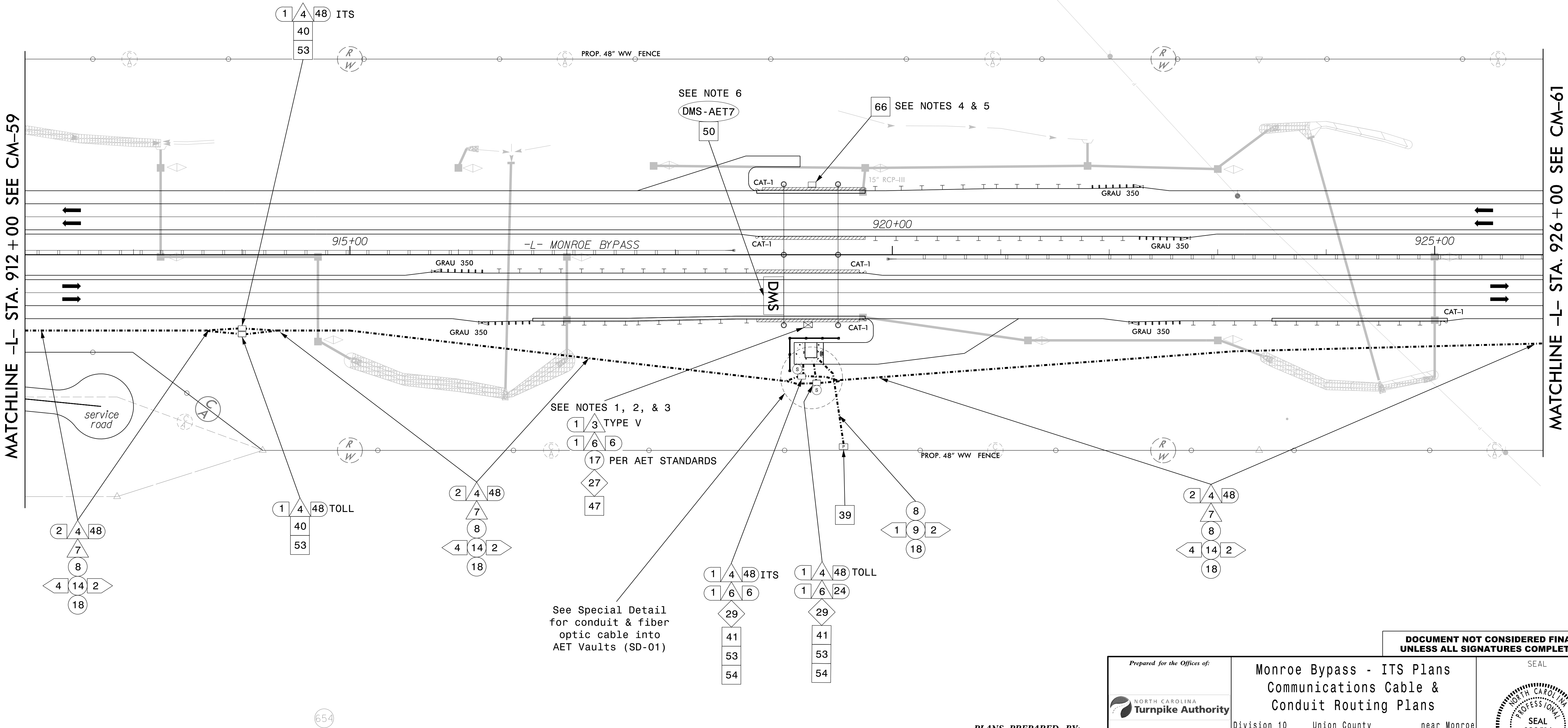
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NOTES

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8. INSTALL CONCRETE EQUIPMENT PADS PER SHEET E-4 OF THE NCTA AET STANDARD DRAWINGS (DATED 10-7-2014).



PROJECT REFERENCE NO.	SHEET NO.
R-3329/R-2559	CM-60

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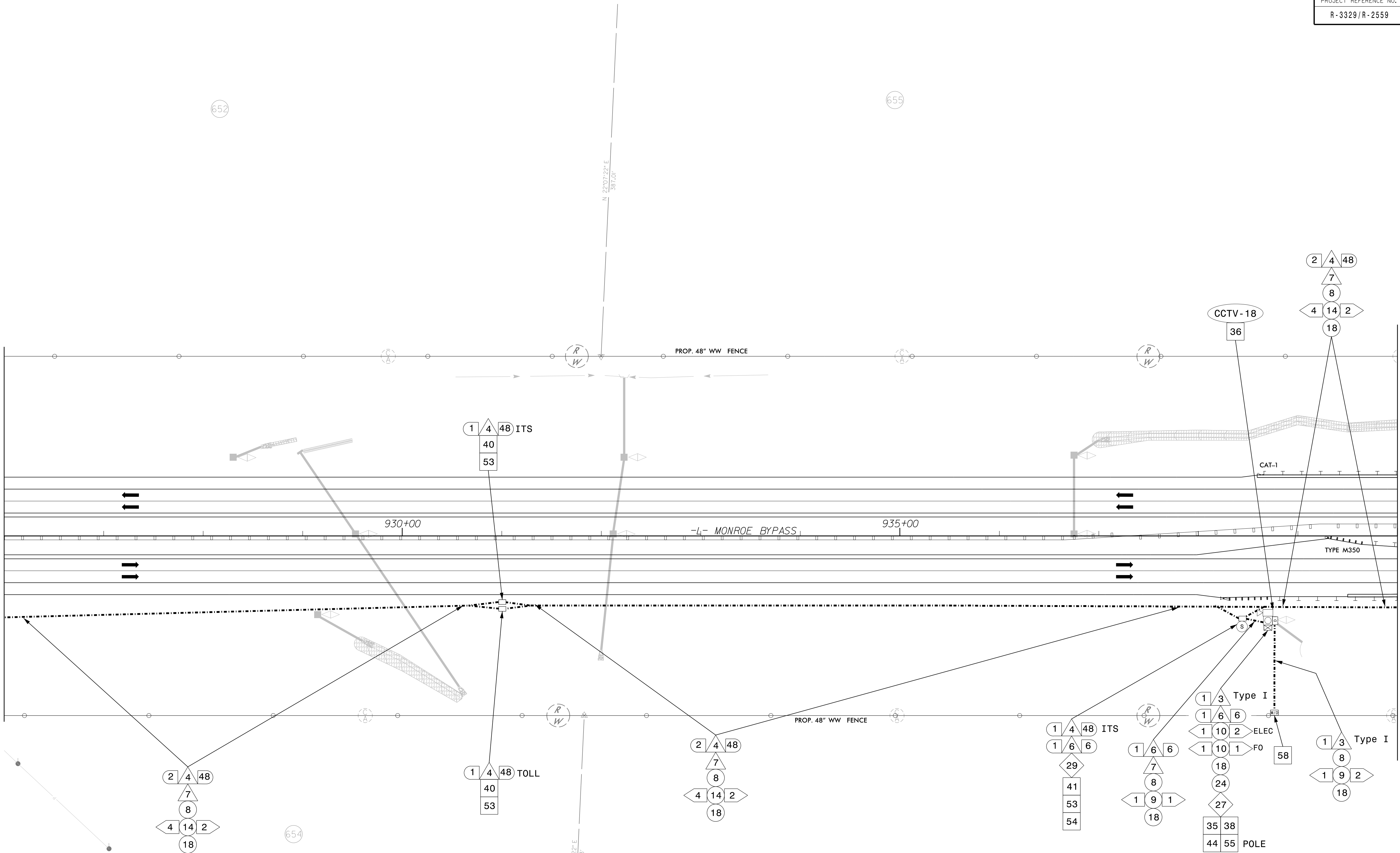
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PLAN DATE: September 2016		REVIEWED BY: LM Moon		DATE: 12/7/2016	
PREPARED BY: R Nissen		REVIEWED BY: JE Beck		CADD Filename: _____	
REVISIONS		INIT.		DATE	

MATCHLINE -L- STA. 926 + 00 SEE CM-60

MATCHLINE -L- STA. 940 + 00 SEE CM-62



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<p>Prepared for the Offices of:</p> <p>NORTH CAROLINA Turnpike Authority</p>	<p>Monroe Bypass - ITS Plans Communications Cable & Conduit Routing Plans</p>		<p>SEAL</p> <p>PROFESSIONAL ENGINEER</p> <p>LISA M. MOON</p> <p>12/7/2016</p> <p>DATE</p> <p>CADD Filename: _____</p>								
	<p>Division 10 Union County near Monroe</p>										
	<p>PLAN DATE: September 2016 REVIEWED BY: LM Moon</p>										
	<p>PREPARED BY: R Nissen REVIEWED BY: JE Beck</p>										
<p>REVISIONS</p> <table><tr><td>INIT.</td><td>DATE</td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr><tr><td> </td><td> </td></tr></table>		INIT.	DATE							<p>SCALE</p> <p>0 50</p> <p>1"=50'</p>	
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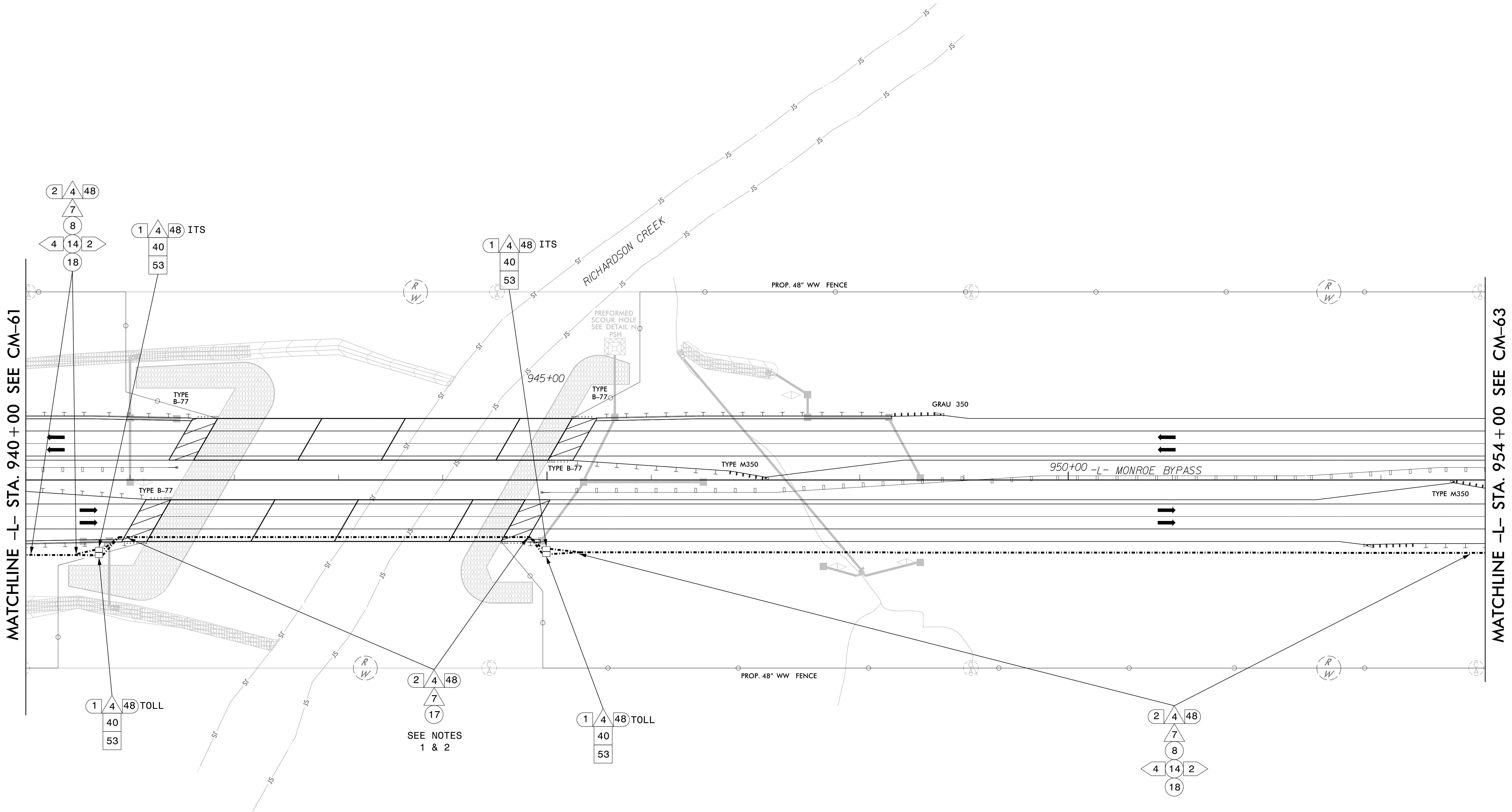
PLANS PREPARED BY:

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DRMP INC.
5950 FAIRVIEW ROAD, SUITE 320
CHARLOTTE, NC 28210
NC LICENSE NO. C-2213 • TDM 332-2289

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LISA M. MOON



NOTES

1. FIND AND INTERCEPT BRIDGE MOUNTED CONDUIT SYSTEM AND EXTEND CONDUIT OUTSIDE OF PAVED SHOULDER. CONTRACTOR SHALL COORDINATE CONDUIT PLACEMENT TO AVOID CONDUIT DAMAGE UNDER PROPOSED GUARDRAIL.
2. RFC PLANS - BRIDGE DETAILS FOR B-2000B, SUBMITTAL NUMBER: S-314R1, DATED 3-18-2016. SEE SHEETS 5, 6, 31, 40, 45A, & 45B.

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SCALE
0 50
1"=50'

**Monroe Bypass - ITS Plans
Communications Cable &
Conduit Routing Plans**

Division 10	Union County	near Monroe
PLAN DATE: September 2016	REVIEWED BY: LM Moon	
PREPARED BY: R Nissen	REVIEWED BY: JE Beck	
REVISIONS	INIT.	DATE

SEAL

PROFESSIONAL ENGINEER

SEAL 022516

Lisa M. Moon 12/7/2016

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1. FIND AND INTERCEPT BRIDGE MOUNTED CONDUIT SYSTEM AND EXTEND CONDUIT OUTSIDE OF PAVED SHOULDER. CONTRACTOR SHALL COORDINATE CONDUIT PLACEMENT TO AVOID CONDUIT DAMAGE UNDER PROPOSED GUARDRAIL.

2. RFC PLANS - BRIDGE DETAILS FOR B-2100B, SUBMITTAL NUMBER: S-262R2, DATED 3-18-2016. SEE SHEETS 5, 6, 8, 38A, & 38B.



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Monroe Bypass - ITS Plans

Communications Cable & Conduit Routing Plans

Division 10 Union County near Monroe

PLAN DATE: September 2016	REVIEWED BY: LM Moon
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PREPARED BY: R Nissen	REVIEWED BY: JE Beck
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SEA



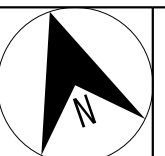
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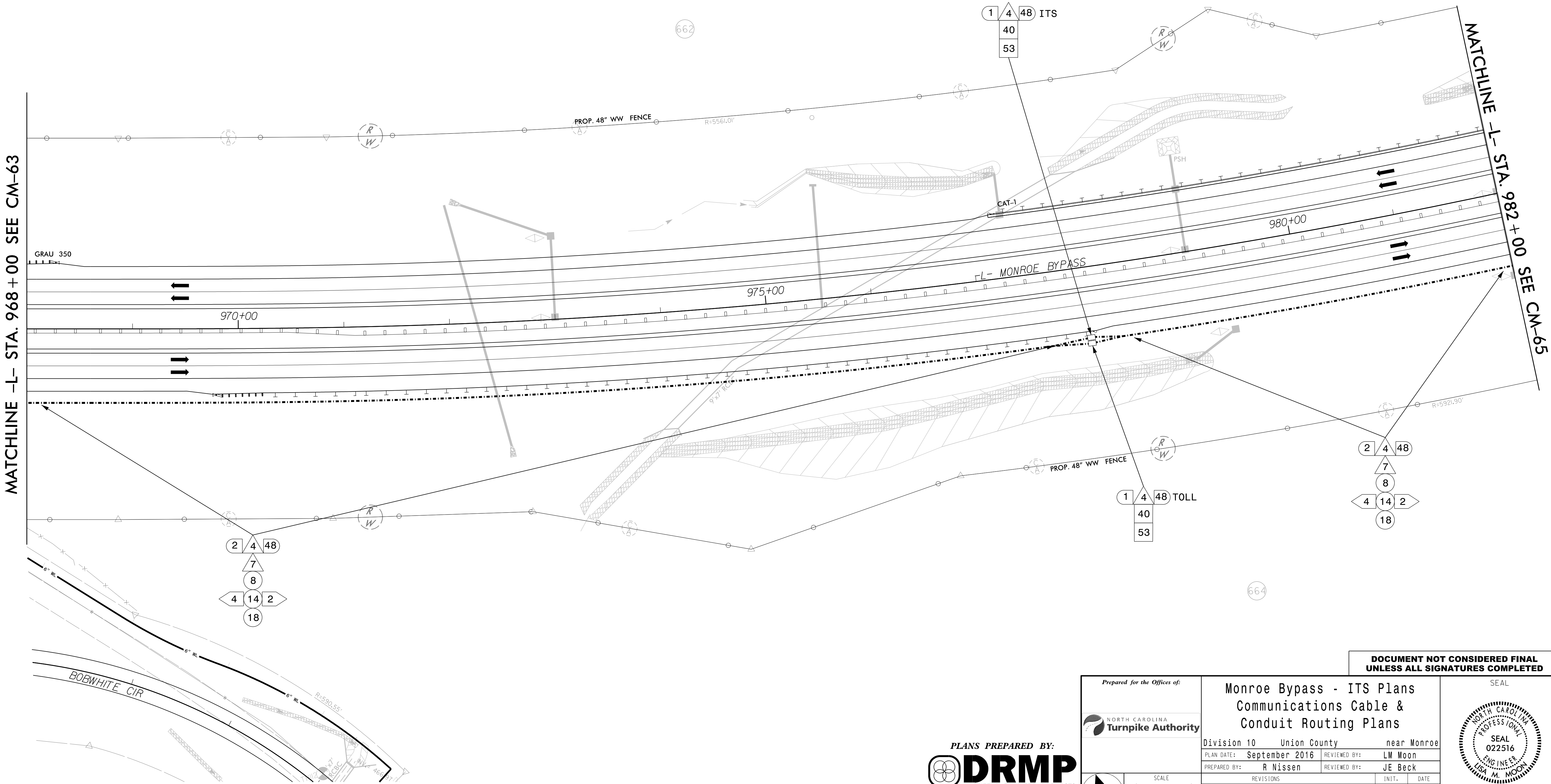
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SCALE
0 50
1"=50'

**Monroe Bypass - ITS Plans
Communications Cable &
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Division 10	Union County	near Monroe
PLAN DATE: September 2016	REVIEWED BY: LM Moon	
PREPARED BY: R Nissen	REVIEWED BY: JE Beck	
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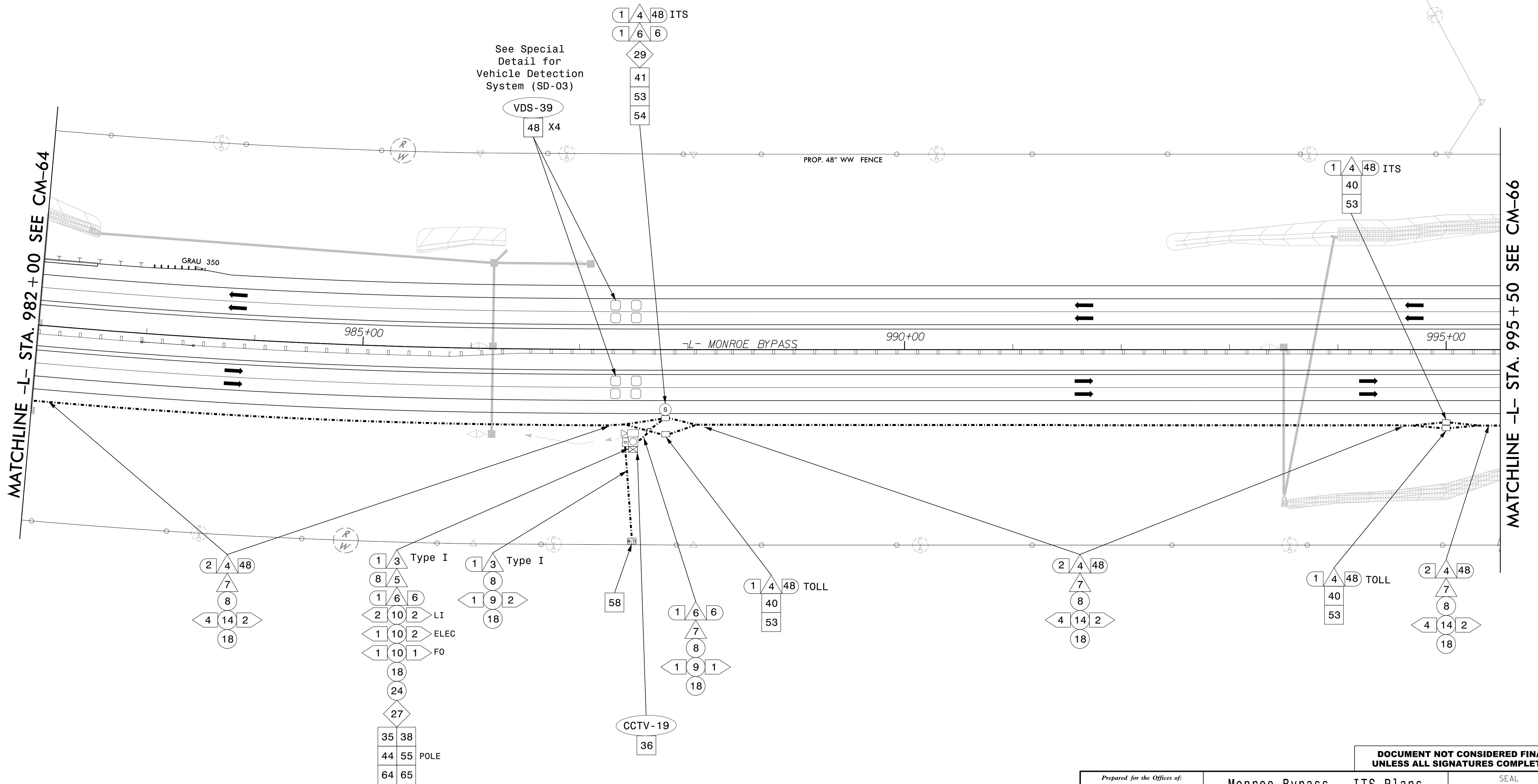
SEAL

PROFESSIONAL ENGINEER
LISA M. MOON
022516

12/7/2016
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PROJECT REFERENCE NO.	SHEET NO.
R-3329/R-2559	CM-65



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Division 10 Union County near Monroe

PLAN DATE: September 2016	REVIEWED BY: LM Moon
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PREPARED BY:	R Nissen	REVIEWED BY:	JE Beck
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REVISIONS	INIT.	DATE

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13/7/2016

Lisa M. Moen 12/7/2010
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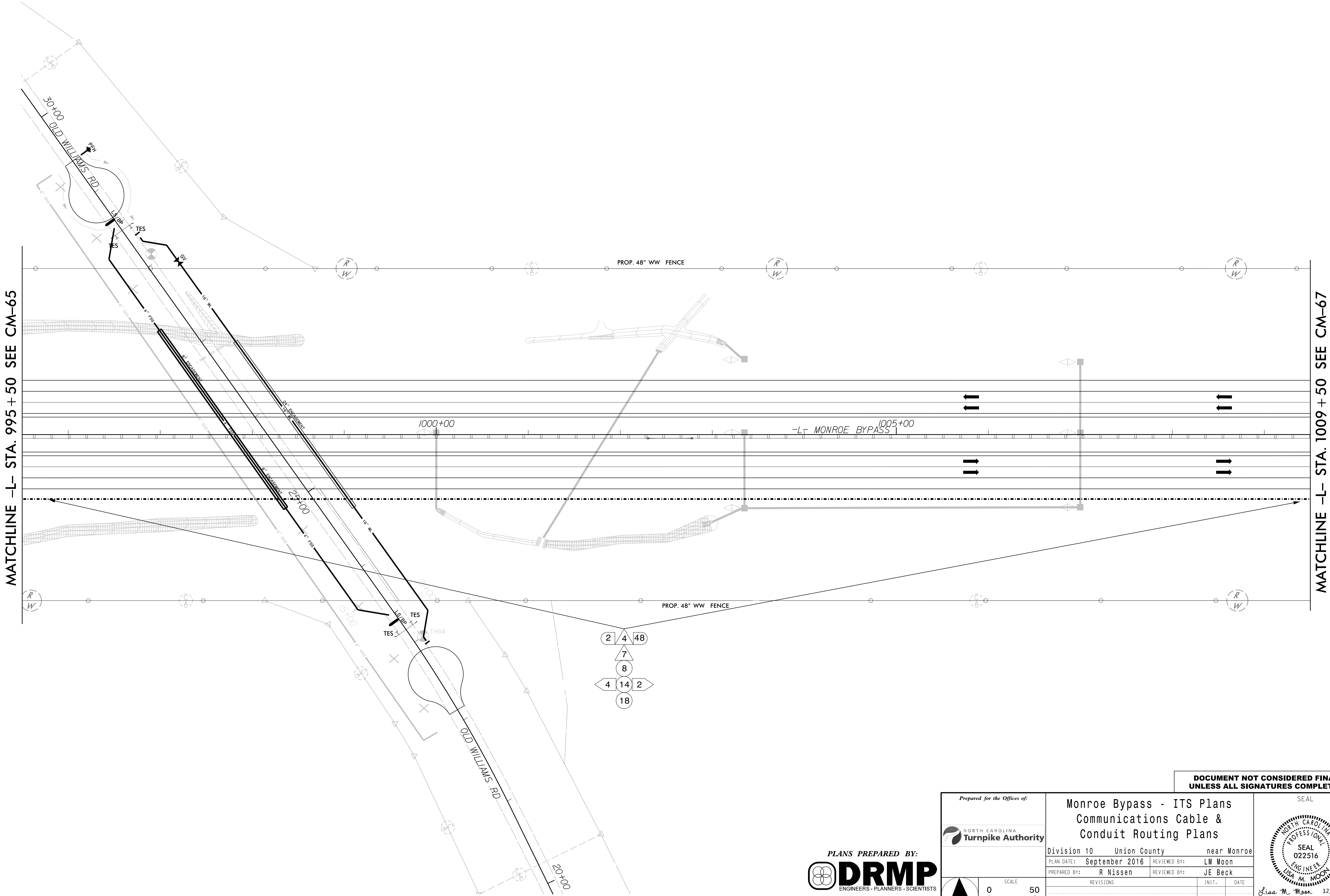
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CHARLOTTE, NC 28210
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SCALE

0 50

1" = 50'



MATCHLINE -L- STA. 995 + 50 SEE CM-65

MATCHLINE -L- STA. 1009 + 50 SEE CM-67

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SCALE
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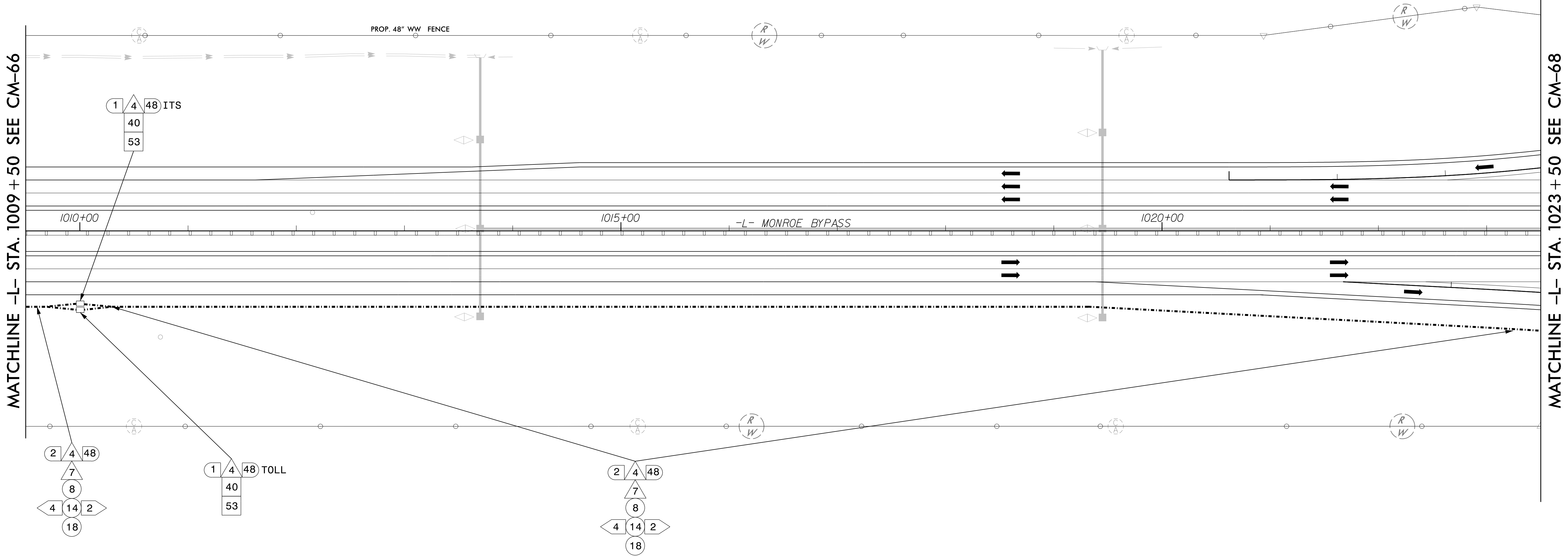
Monroe Bypass - ITS Plans Communications Cable & Conduit Routing Plans			
Division 10 Union County near Monroe			
PLAN DATE: September 2016		REVIEWED BY: LM Moon	
PREPARED BY: R Nissen		REVIEWED BY: JE Beck	
REVISIONS	INIT.	DATE	

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SCALE
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1"=50'

**Monroe Bypass - ITS Plans
Communications Cable &
Conduit Routing Plans**

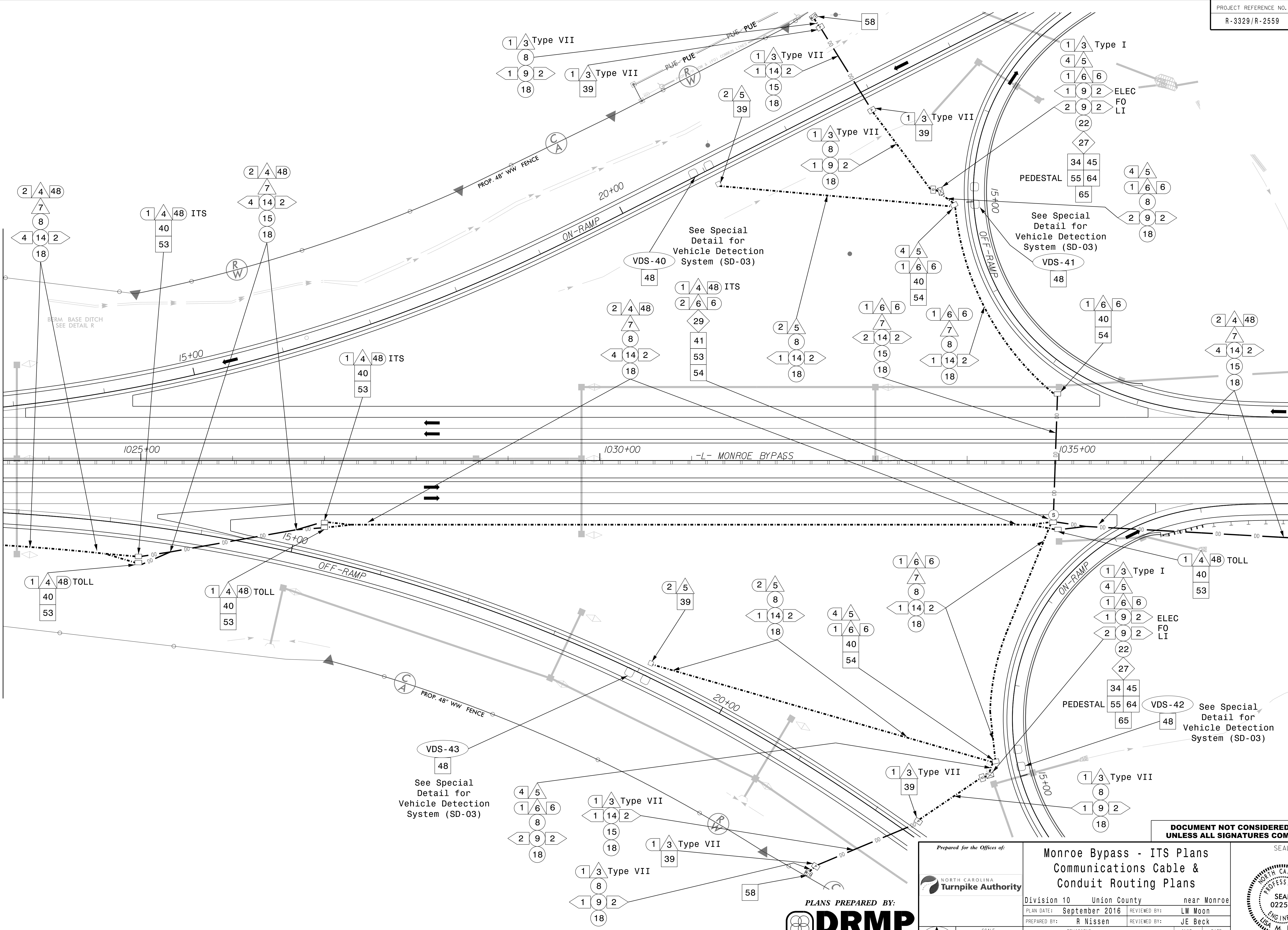
Division 10	Union County	near Monroe
PLAN DATE: September 2016	REVIEWED BY: LM Moon	
PREPARED BY: R Nissen	REVIEWED BY: JE Beck	
REVISIONS	INIT.	DATE

SEAL

PROFESSIONAL ENGINEER
LISA M. MOON
SEAL 022516
DATE 12/7/2016
CADD Filename: _____

MATCHLINE -L- STA. 1023 + 50 SEE CM-67

MATCHLINE -L- STA. 1037 + 50 SEE CM-69



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**Monroe Bypass - ITS Plans
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Division 10	Union County	near Monroe
PLAN DATE: September 2016	REVIEWED BY: LM Moon	
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REVISIONS	INIT.	DATE

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**PROFESSIONAL
ENGINEER**

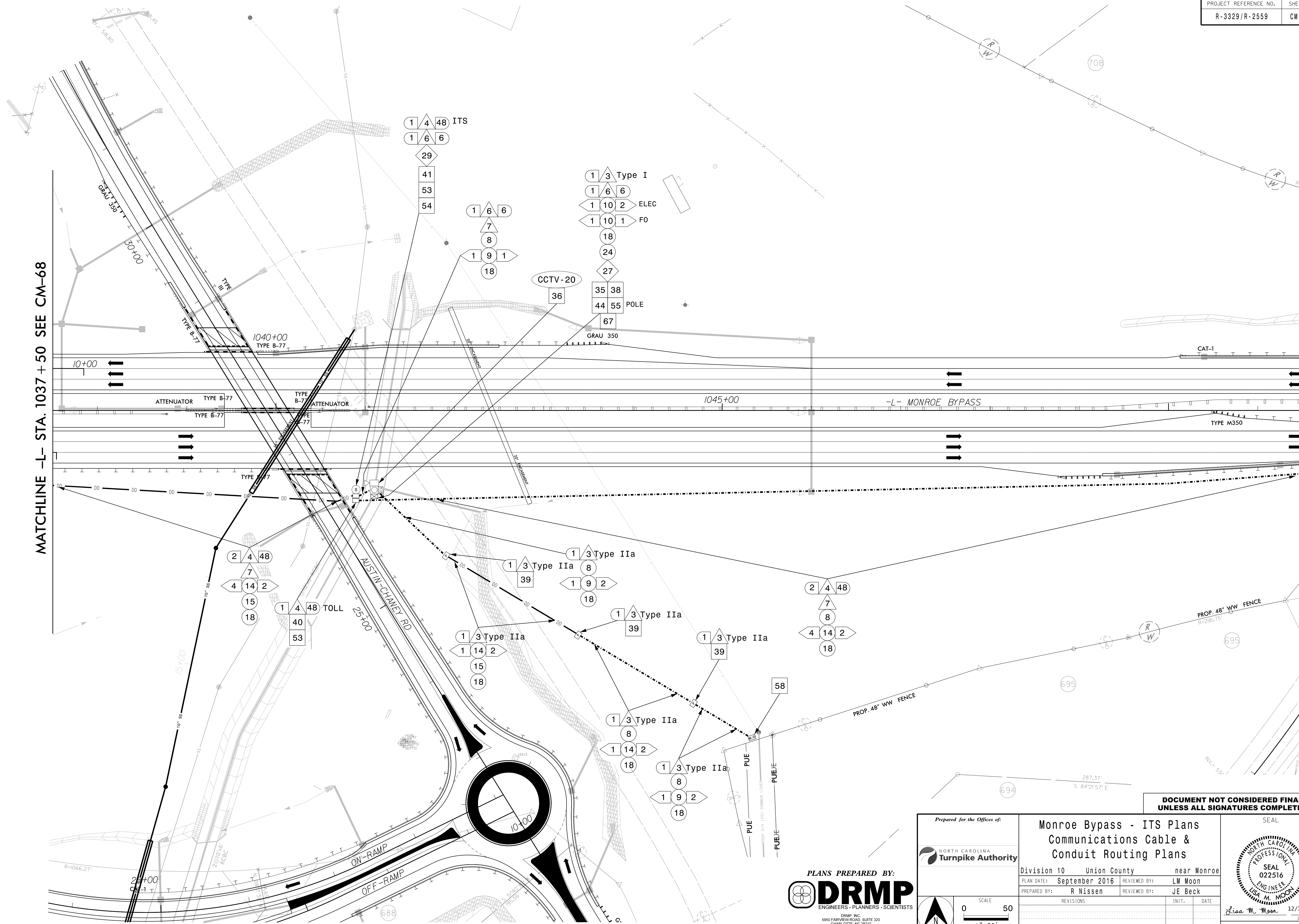
LISA M. MOON

12/7/2016

CADD Filename: _____

MATCHLINE -L- STA. 1037 + 50 SEE CM-68

MATCHLINE -L- STA. 1051 + 50 SEE CM-70



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CHANGED: AUSTIN-CHANEY RD

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1"=50'

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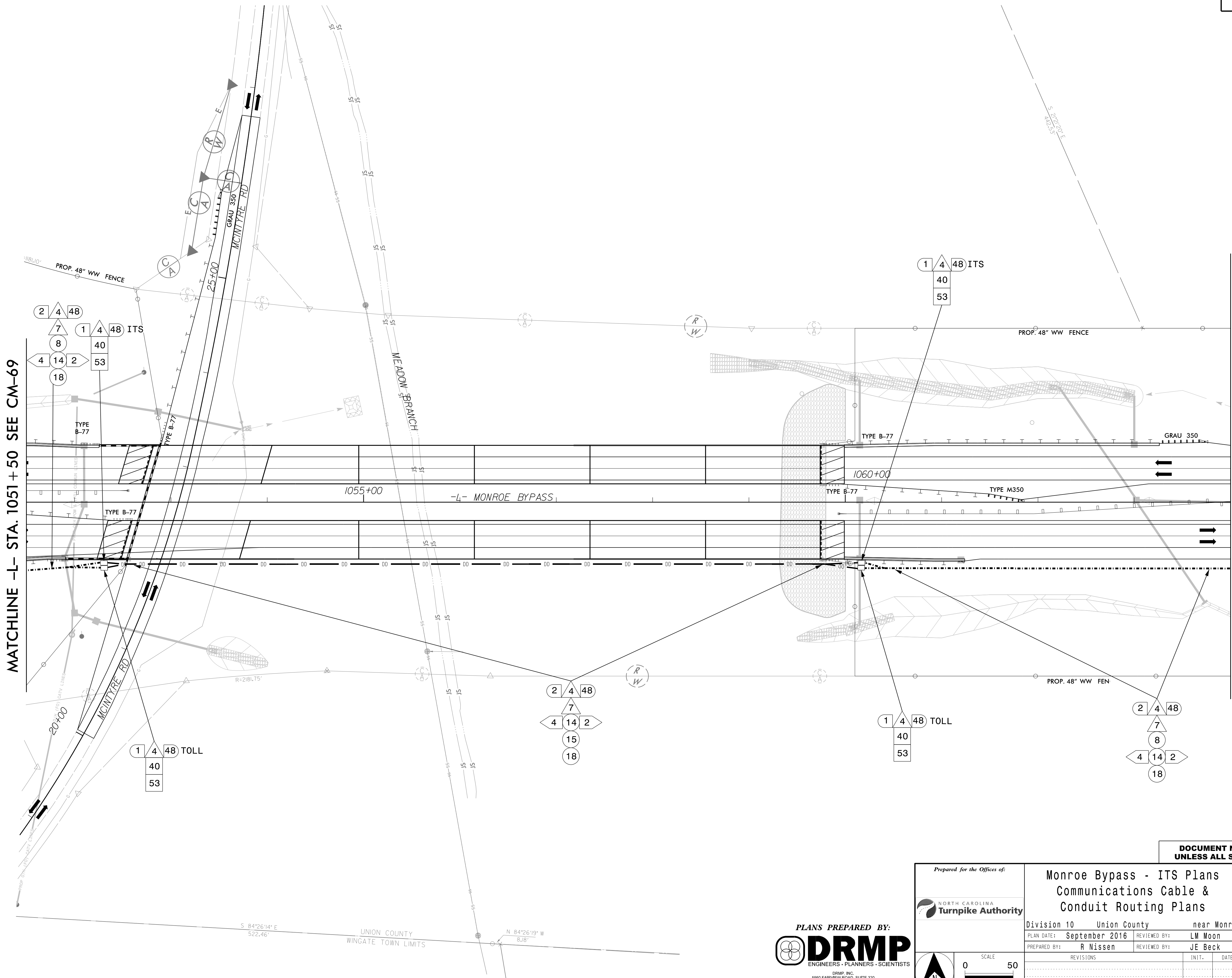
Monroe Bypass - ITS Plans Communications Cable & Conduit Routing Plans			
Division 10 Union County		near Monroe	
PLAN DATE:	September 2016	REVIEWED BY:	LW Moon
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PROFESSIONAL ENGINEER
NORTH CAROLINA
SEAL 022516
LEA M. MOON
12/7/2016
DATE

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SCALE
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1"=50'

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Division 10	Union County	near Monroe
PLAN DATE: September 2016	REVIEWED BY: LM Moon	
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REVISIONS	INIT.	DATE

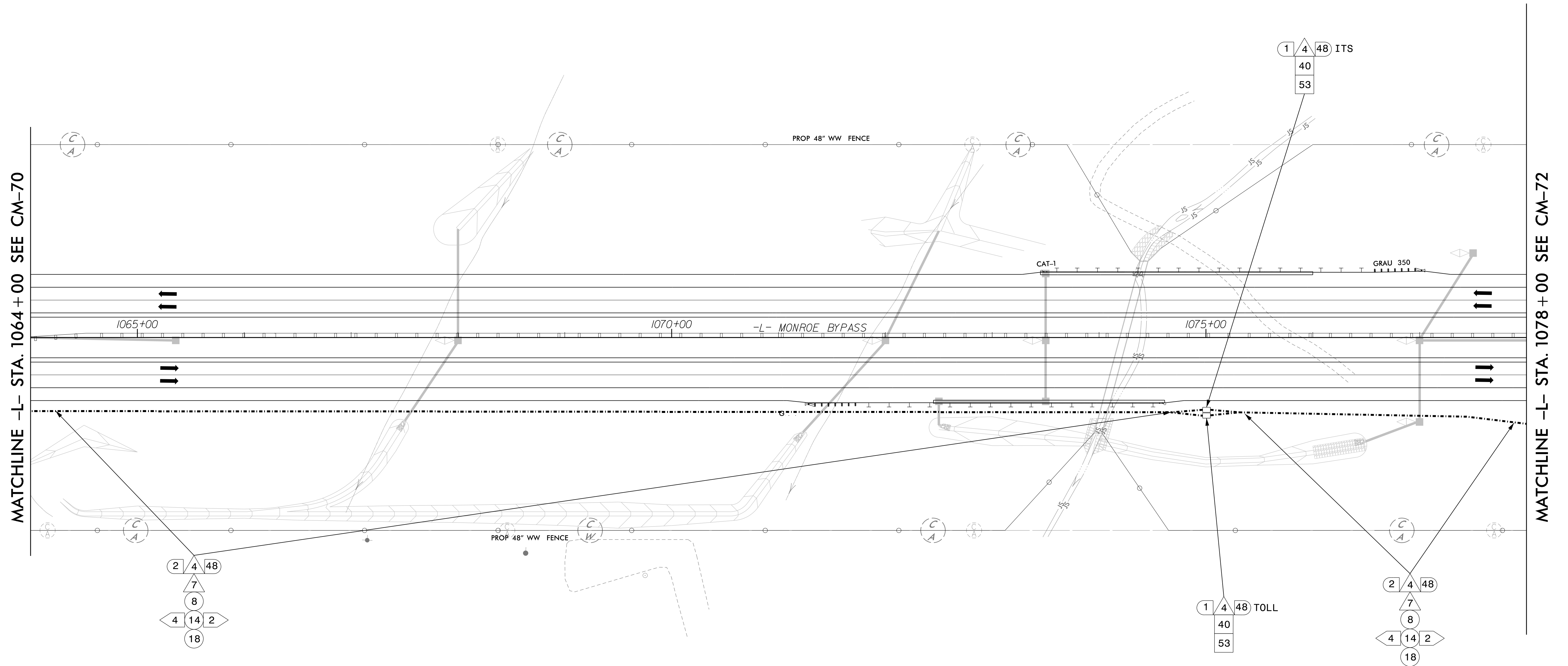
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SEAL 022516
LISA M. MOON

12/7/2016
DATE

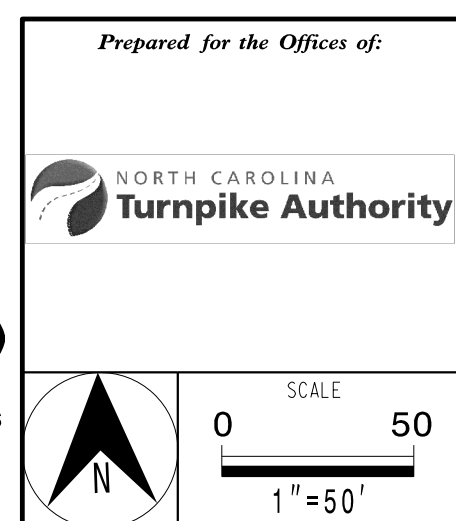
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Monroe Bypass - ITS Plans
Communications Cable &
Conduit Routing Plans

Division 10	Union County	near Monroe
PLAN DATE: September 2016	REVIEWED BY: LM Moon	
PREPARED BY: R Nissen	REVIEWED BY: JE Beck	

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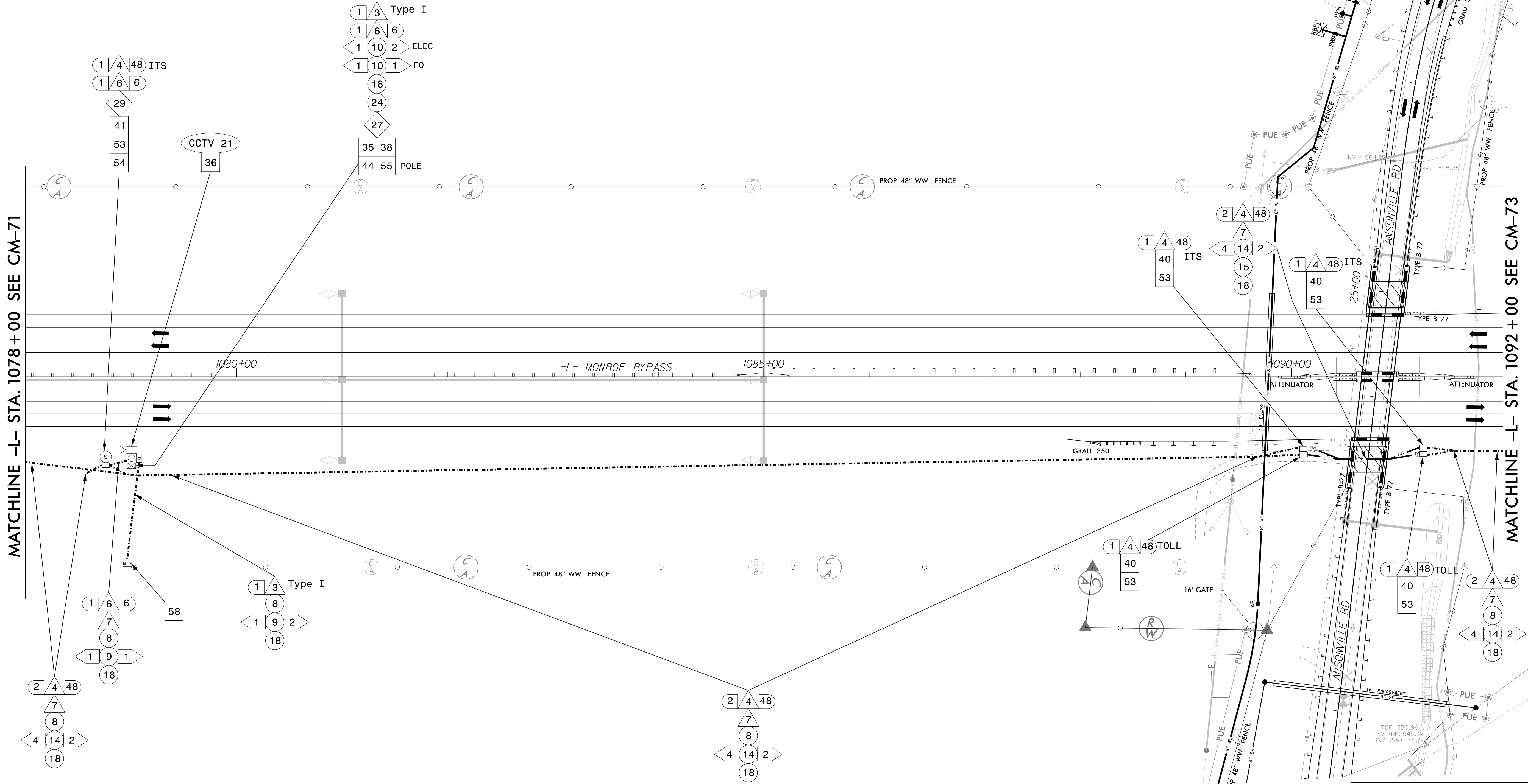
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Lisa M. Moon 12/7/2016

DATE

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<p>Prepared for the Offices of:</p> <p>NORTH CAROLINA Turnpike Authority</p> <p>Division 10 Union County near Monroe</p> <p>PLAN DATE: September 2016 REVIEWED BY: LW Moon</p> <p>PREPARED BY: R Nissen REVIEWED BY: JE Beck</p> <p>REVISIONS</p> <p>INIT. DATE</p>	<p>Monroe Bypass - ITS Plans Communications Cable & Conduit Routing Plans</p>		<p>SEAL</p> <p>PROFESSIONAL ENGINEER</p> <p>SEAL 022516</p> <p>Lisa M. Moon 12/7/2016</p> <p>CADD Filename: _____</p>

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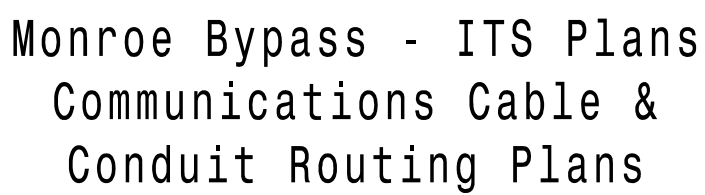


MATCHLINE -L- STA. 1106+00 SEE CM-74

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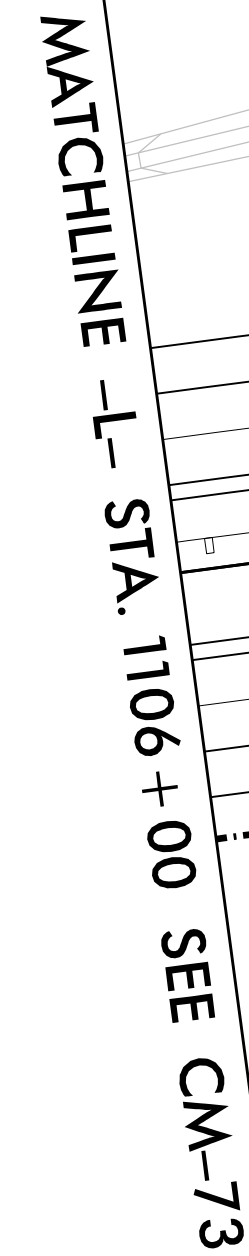
NORTH CAROLINA
PROFESSIONAL
SEAL
022516
ENGINEER
LISA M. MOON

sa M. Moon 12/7/2





DATE

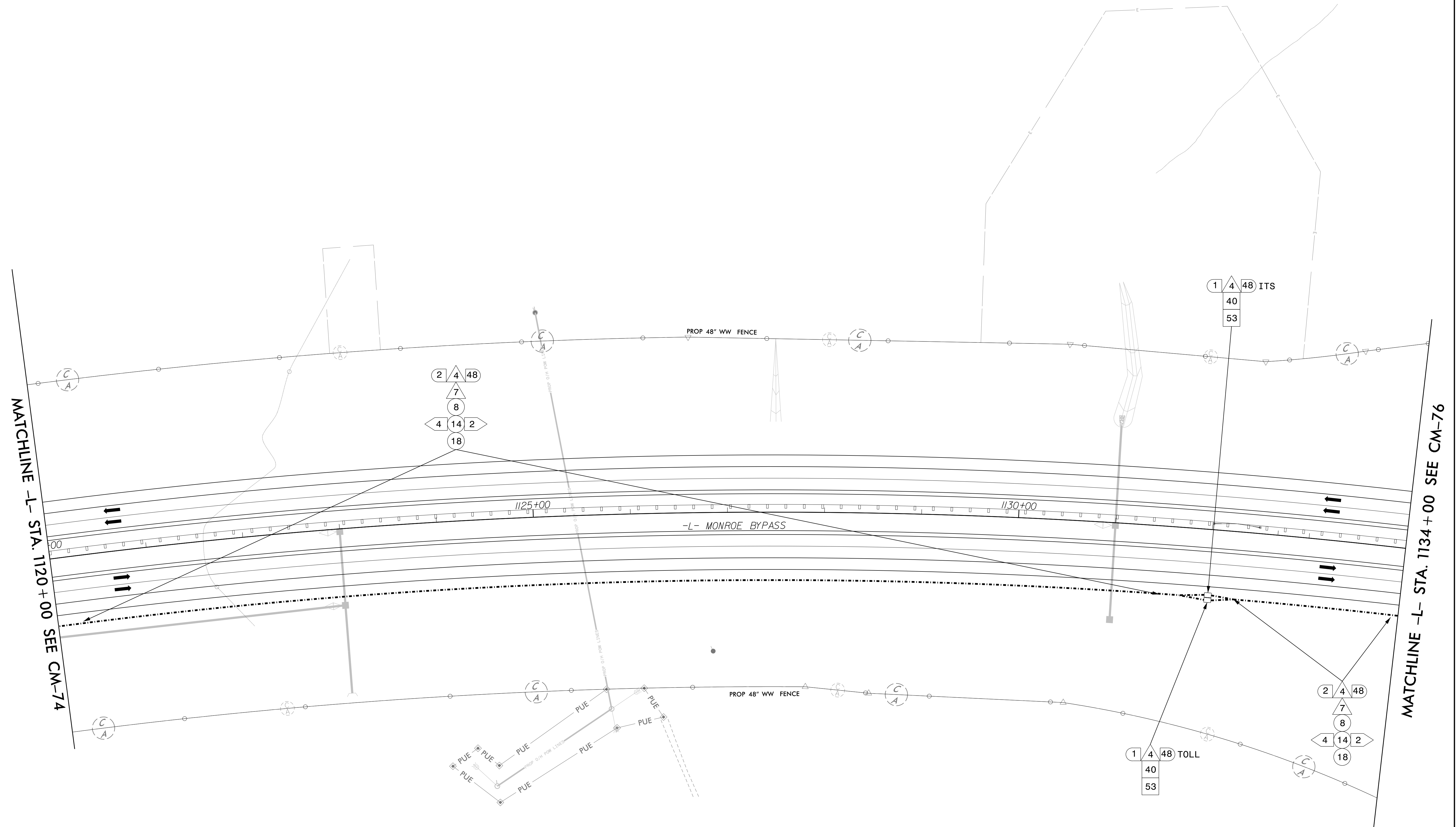
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MATCHLINE -L- STA. 1120+00 SEE CM-75

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	Division 10 Union County near Monroe															
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PLAN DATE: September 2016	REVIEWED BY: LM Moon															
PREPARED BY: R Nissen	REVIEWED BY: JE Beck															
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REVISIONS	INIT. DATE															
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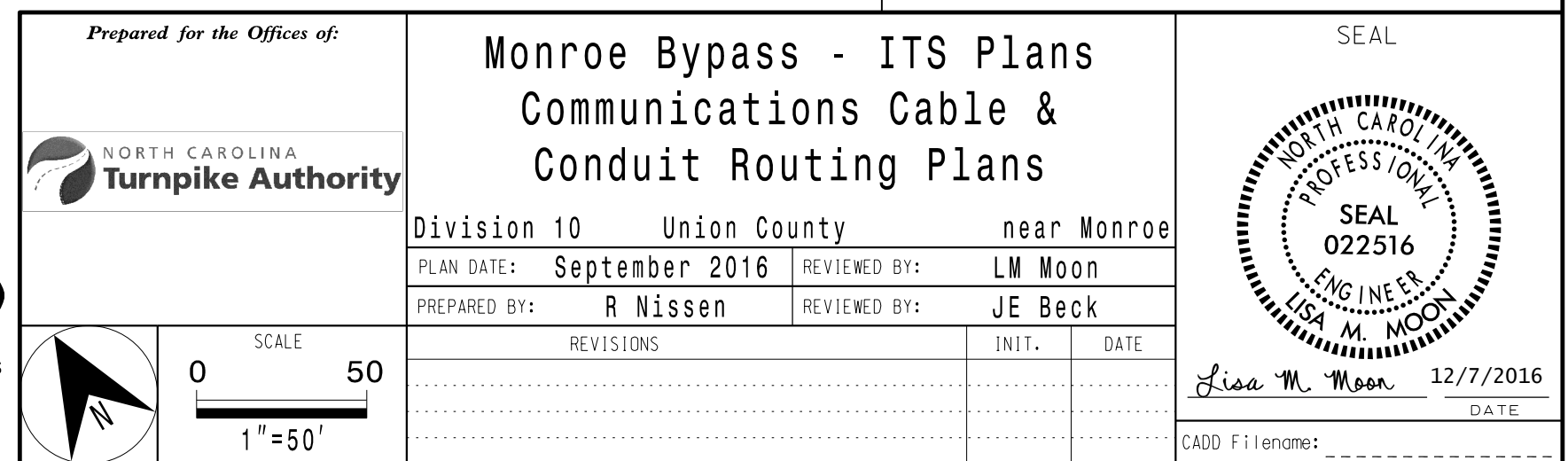


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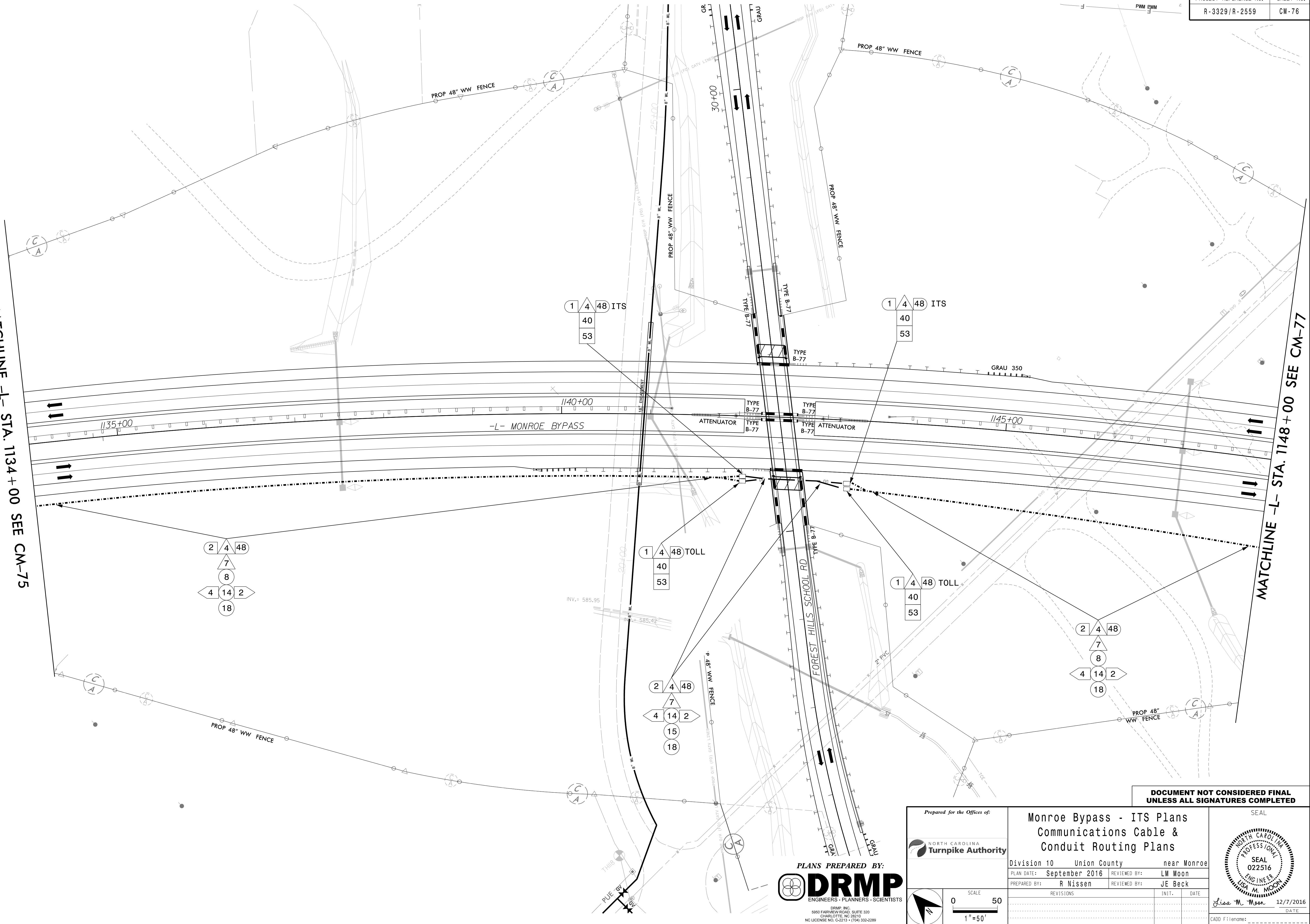
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MATCHLINE -L- STA. 1134+00 SEE CM-75

MATCHLINE -L- STA. 1148+00 SEE CM-77



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0 50
1"=50'

Monroe Bypass - ITS Plans Communications Cable & Conduit Routing Plans			
Division 10 Union County near Monroe			
PLAN DATE: September 2016	REVIEWED BY: LM Moon		
PREPARED BY: R Nissen	REVIEWED BY: JE Beck		
REVISIONS	INIT.	DATE	

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LISA M. MOON
12/7/2016
DATE

CADD Filename: _____

TOLL ZONE
AET 8

NOTES

- 1.INSTALL DMS CABINET PER NCTA AET STANDARD DRAWINGS (DATED 10-7-2014), SHEET E-4, ON CONCRETE PAD TYPICAL "B" AND PER SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES".
- 2.INSTALL POWER SERVICE CABLES IN POWER NETWORK CONDUITS/JUNCTION BOXES AS SHOWN ON SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES", FROM AET TOLL ZONE VAULT TO DMS CABINET ON CONCRETE PAD TYPICAL "B".
- 3.INSTALL DROP CABLE IN COMMUNICATIONS NETWORK CONDUIT/JUNCTION BOXES AS SHOWN ON SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES", FROM AET TOLL ZONE VAULT TO DMS CABINET ON CONCRETE PAD TYPICAL "B".
- 4.INSTALL STANDARD JUNCTION BOX UNDER FUTURE DMS CABINET LOCATION. DMS CABINET LOCATION PER NCTA AET STANDARD DRAWINGS (DATED 10-7-2014), SHEET E-4, ON CONCRETE PAD TYPICAL "D" AND PER SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES".
- 5.ENSURE FUTURE POWER SERVICE CABLES CAN BE INSTALLED IN POWER NETWORK CONDUITS/JUNCTION BOXES AS SHOWN ON SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES", FROM AET TOLL ZONE VAULT TO FUTURE ITS/DMS CABINET ON CONCRETE PAD TYPICAL "D".
6. INSTALL DMS AS SHOWN IN NCTA ITS STANDARD DETAILS, DATED 10-7-2014, SHEETS D-1, D-2A, D-3 AND D-4.
7. INSTALL DROP CABLE IN COMMUNICATIONS NETWORK CONDUIT/JUNCTION BOXES PER NCTA AET STANDARD DRAWINGS (DATED 10-7-2014), SHEET E-4, AND PER SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES", FROM AET TOLL ZONE VAULT TO COMMUNICATIONS JUNCTION BOX ON CONCRETE PAD TYPICAL "B", THEN AS SHOWN ON PLANS.
8. SEE SHEET IT-4 FOR CCTV POLE LOCATION.
9. INSTALL CONDUIT AND JUNCTION BOXES AT AET ZONES BASED ON SD-02 "TYPICAL CONDUIT ROUTING AT AET ZONES".
10. INSTALL CONCRETE EQUIPMENT PADS PER SHEET E-4 OF THE NCTA AET STANDARD DRAWINGS (DATED 10-7-2014).

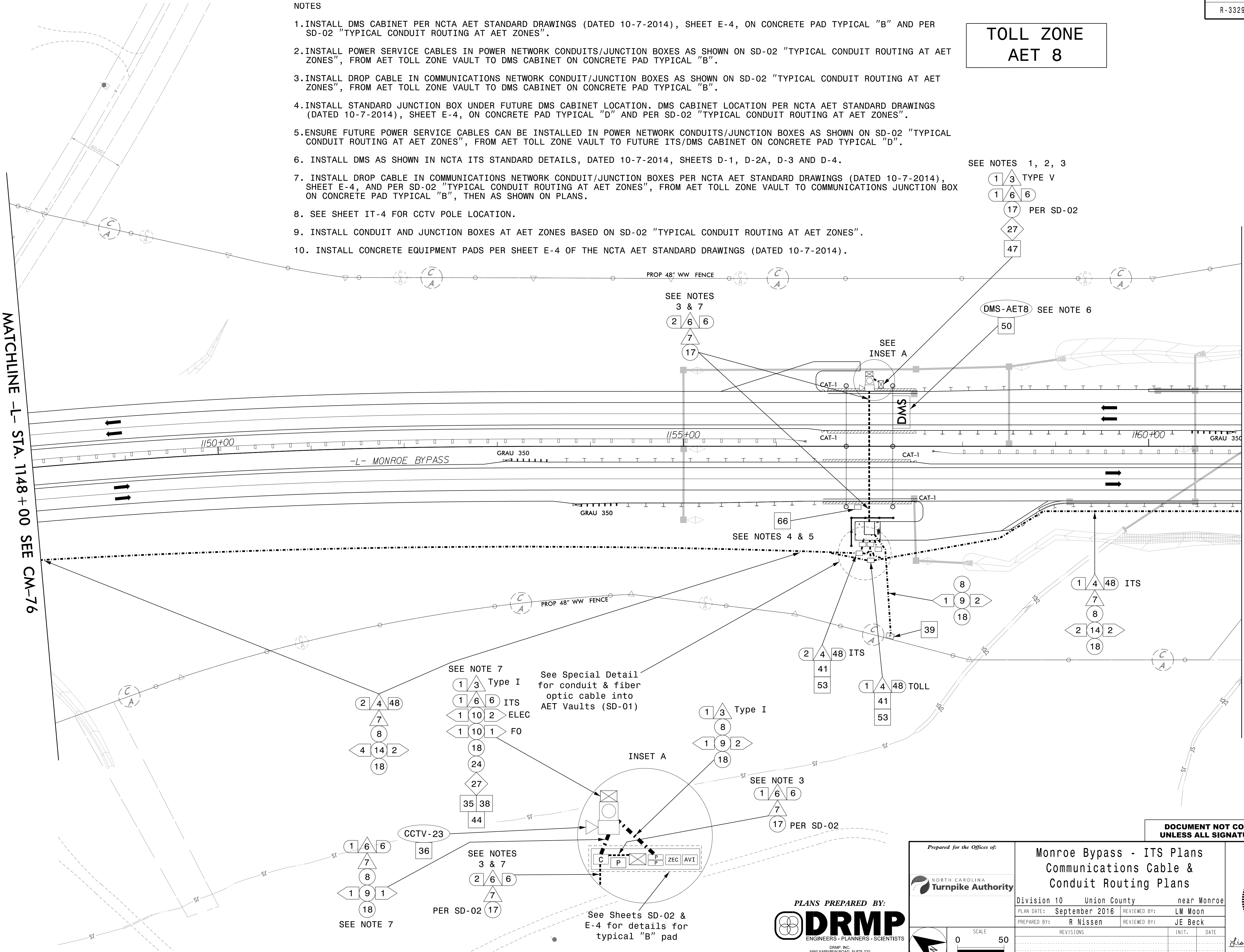
SEE NOTES 1, 2, 3

1 3 TYPE V
1 6 6
17 PER SD-02

DMS-AET8 SEE NOTE 6

MATCHLINE -L- STA. 1148+00 SEE CM-76

MATCHLINE -L- STA. 1161+00 SEE CM-78



See Special Detail
for conduit & fiber
optic cable into
AET Vaults (SD-01)

INSET A

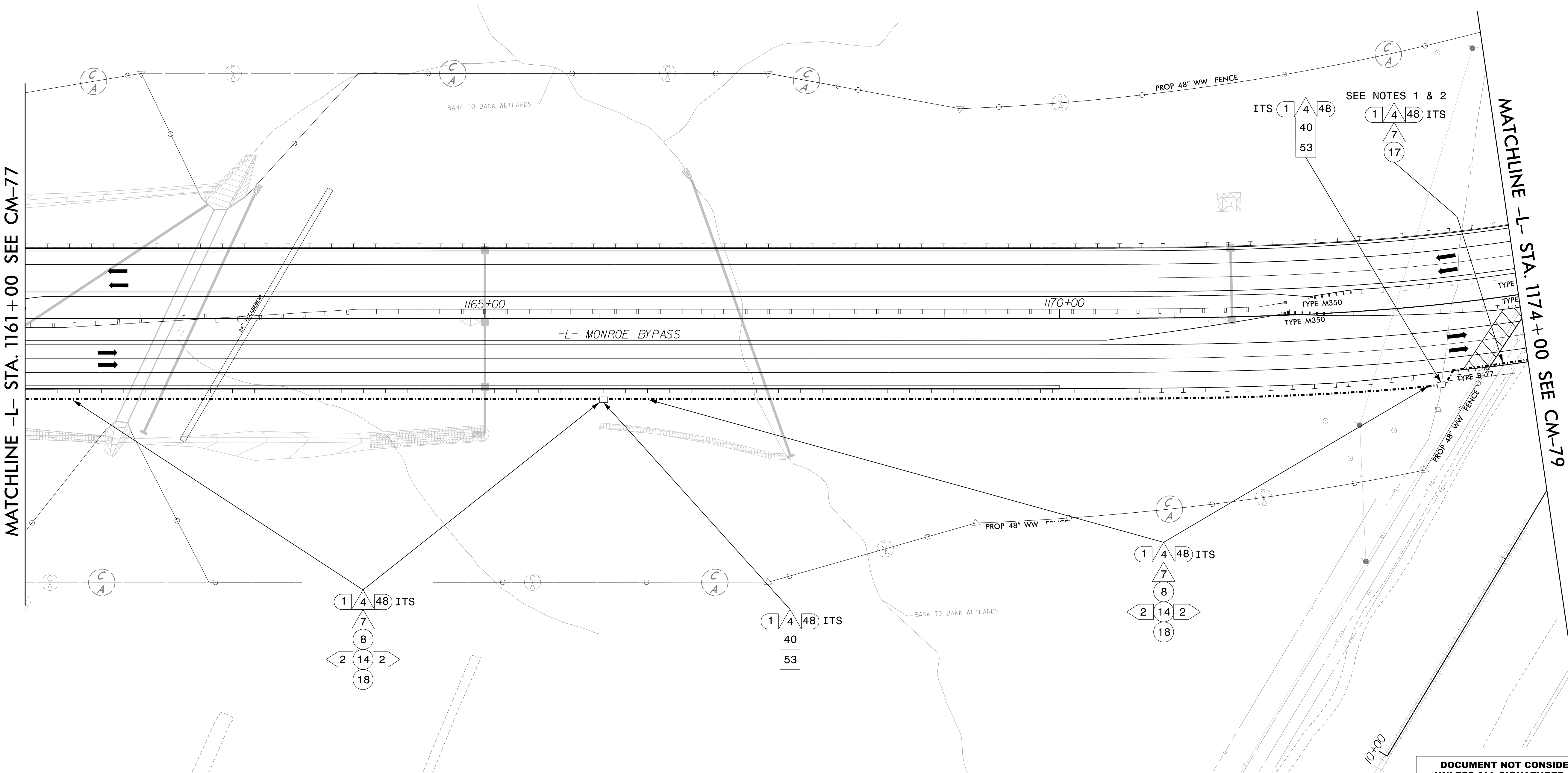
See Sheets SD-02 &
E-4 for details for
typical "B" pad

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NOTES

1. FIND AND INTERCEPT BRIDGE MOUNTED CONDUIT SYSTEM AND EXTEND CONDUIT OUTSIDE OF PAVED SHOULDER. CONTRACTOR SHALL COORDINATE CONDUIT PLACEMENT TO AVOID CONDUIT DAMAGE UNDER PROPOSED GUARDRAIL.
2. RFC PLANS - BRIDGE DETAILS FOR B-2800B, SUBMITTAL NUMBER: S-322R2, DATED 3-3-2016. SEE SHEETS 6, 8, 35, 42, 44A, & 44B.



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<div>Prepared for the Offices of:</div> <div></div> <div></div>	<div>Monroe Bypass - ITS Plans Communications Cable & Conduit Routing Plans</div> <div>Division 10 Union County near Monroe</div> <div>PLAN DATE: September 2016 REVIEWED BY: LM Moon</div> <div>PREPARED BY: R Nissen REVIEWED BY: JE Beck</div> <div>REVISIONS INIT. DATE</div> <div></div> <div></div> <div></div>		<div>SEAL</div> <div></div> <div>Lisa M. Moon 12/7/2016</div> <div>CADD Filename: _____</div>

PLANS PREPARED BY:

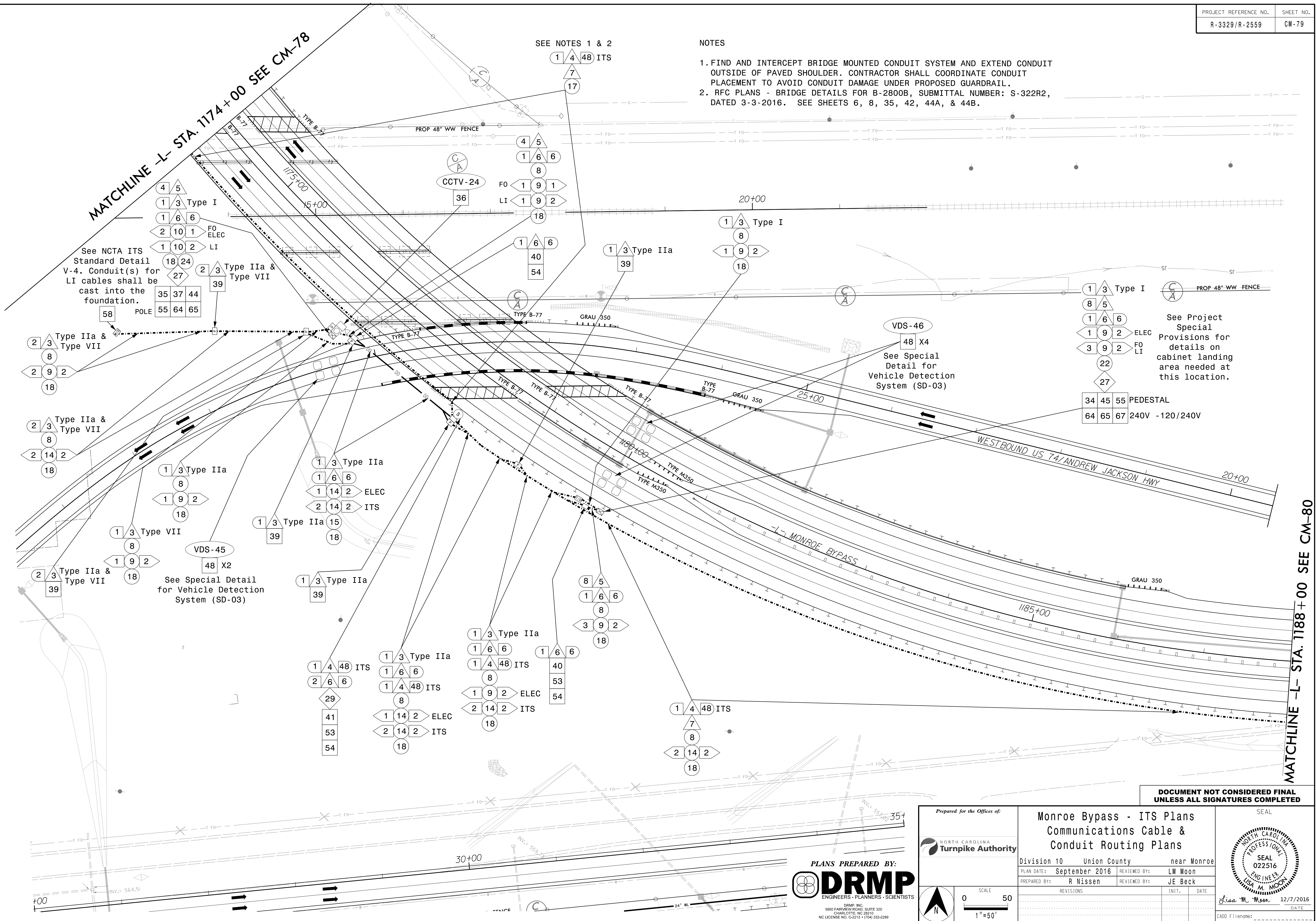
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DRMP INC.
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CHARLOTTE, NC 28210
NC LICENSE NO. C-2213 • TDM 332-2289

05-DEC-2016 10:10
C:\Users\lmoor\Documents\Projects\3329\2559\ITS_PSH_078.dgn
LMOOR

NOTES

1. FIND AND INTERCEPT BRIDGE MOUNTED CONDUIT SYSTEM AND EXTEND CONDUIT OUTSIDE OF PAVED SHOULDER. CONTRACTOR SHALL COORDINATE CONDUIT PLACEMENT TO AVOID CONDUIT DAMAGE UNDER PROPOSED GUARDRAIL.
2. RFC PLANS - BRIDGE DETAILS FOR B-2800B, SUBMITTAL NUMBER: S-322R2, DATED 3-3-2016. SEE SHEETS 6, 8, 35, 42, 44A, & 44B.



See NCTA ITS Standard Detail V-4. Conduit(s) for LI cables shall be cast into the foundation.

VDS-46
48 X4
See Special Detail for Vehicle Detection System (SD-03)

See Project Special Provisions for details on cabinet landing area needed at this location.

VDS-45
48 X2
See Special Detail for Vehicle Detection System (SD-03)

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	Monroe Bypass - ITS Plans Communications Cable & Conduit Routing Plans		SEAL	
	Division 10	Union County	near Monroe	
	PLAN DATE: September 2016	REVIEWED BY: LM Moon	SEAL 022516	
	PREPARED BY: R Nissen	REVIEWED BY: JE Beck	ENGINEER LISA M. MOON	
REVISIONS		INIT.	DATE	
		DATE		12/7/2016
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A1




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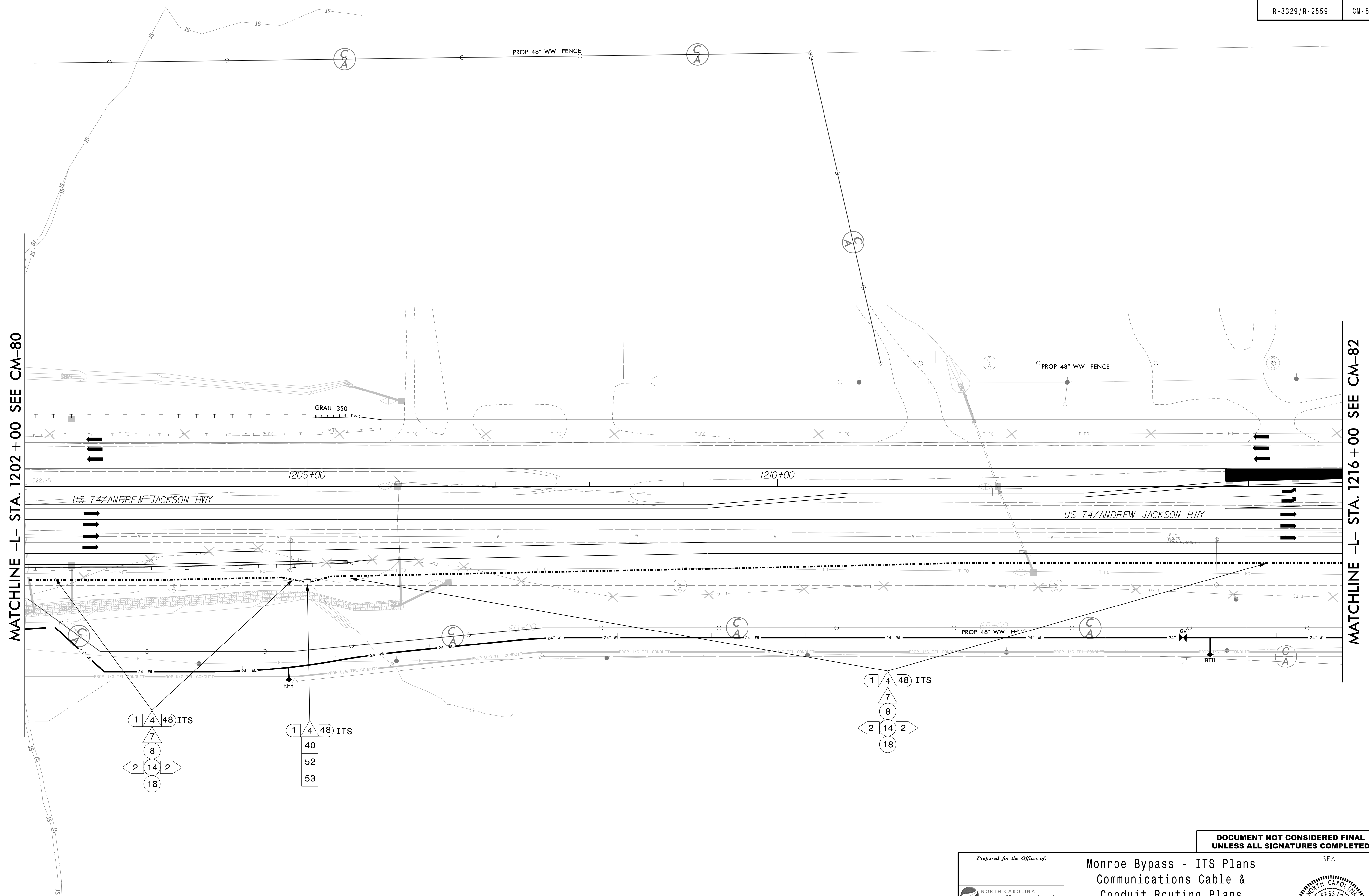
SEAL



Lisa M. Moon 12/7/2016

DATE

CADD Filename:



MATCHLINE -L- STA. 1202+00 SEE CM-80

WATERWAY
MATCHLINE -L- STA. 1216+00 SEE CM-82






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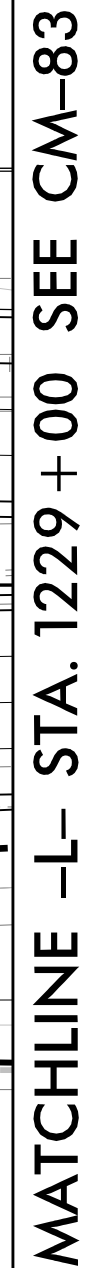
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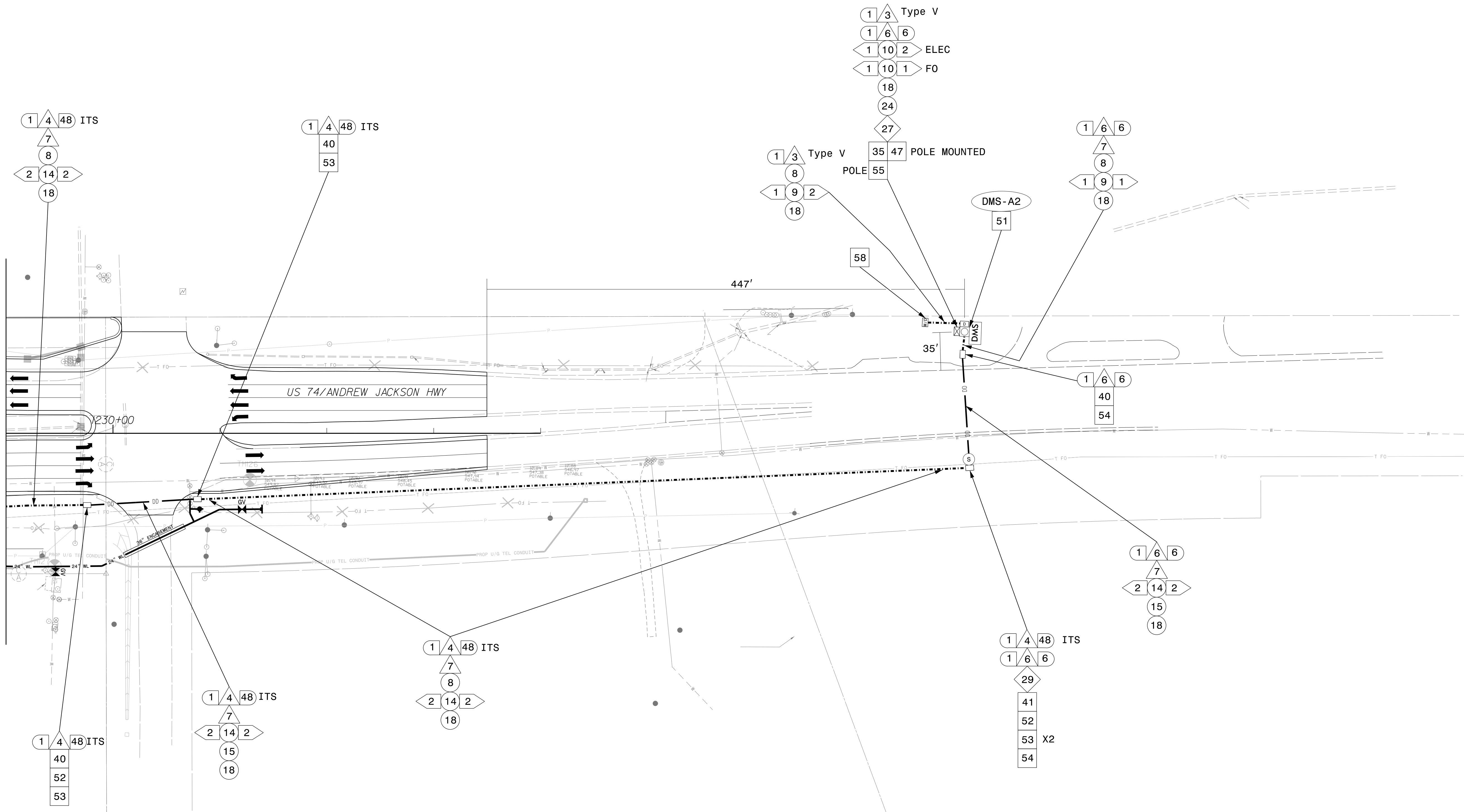
DRMP, INC.
5950 FAIRVIEW ROAD, SUITE 320
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Prepared for the Offices of:	<h2 style="margin: 0;">Monroe Bypass - ITS Plans</h2> <h2 style="margin: 0;">Communications Cable & Conduit Routing Plans</h2>		SEAL 																		
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<div style="display: flex; justify-content: space-between;"> PLAN DATE: September 2016 REVIEWED BY: LM Moon </div>																					
<div style="display: flex; justify-content: space-between;"> PREPARED BY: R Nissen REVIEWED BY: JE Beck </div>																					
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REVISIONS	INIT.	DATE																			
CADD Filename:																					



Prepared for the Offices of:	<h2 style="margin: 0;">Monroe Bypass - ITS Plans</h2> <h2 style="margin: 0;">Communications Cable & Conduit Routing Plans</h2>		SEAL 
	Division 10 Union County near Monroe		
PLAN DATE: September 2016		REVIEWED BY: LM Moon	
PREPARED BY: R Nissen		REVIEWED BY: JE Beck	
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MATCHLINE -L- STA. 1229 + 00 SEE CM-82

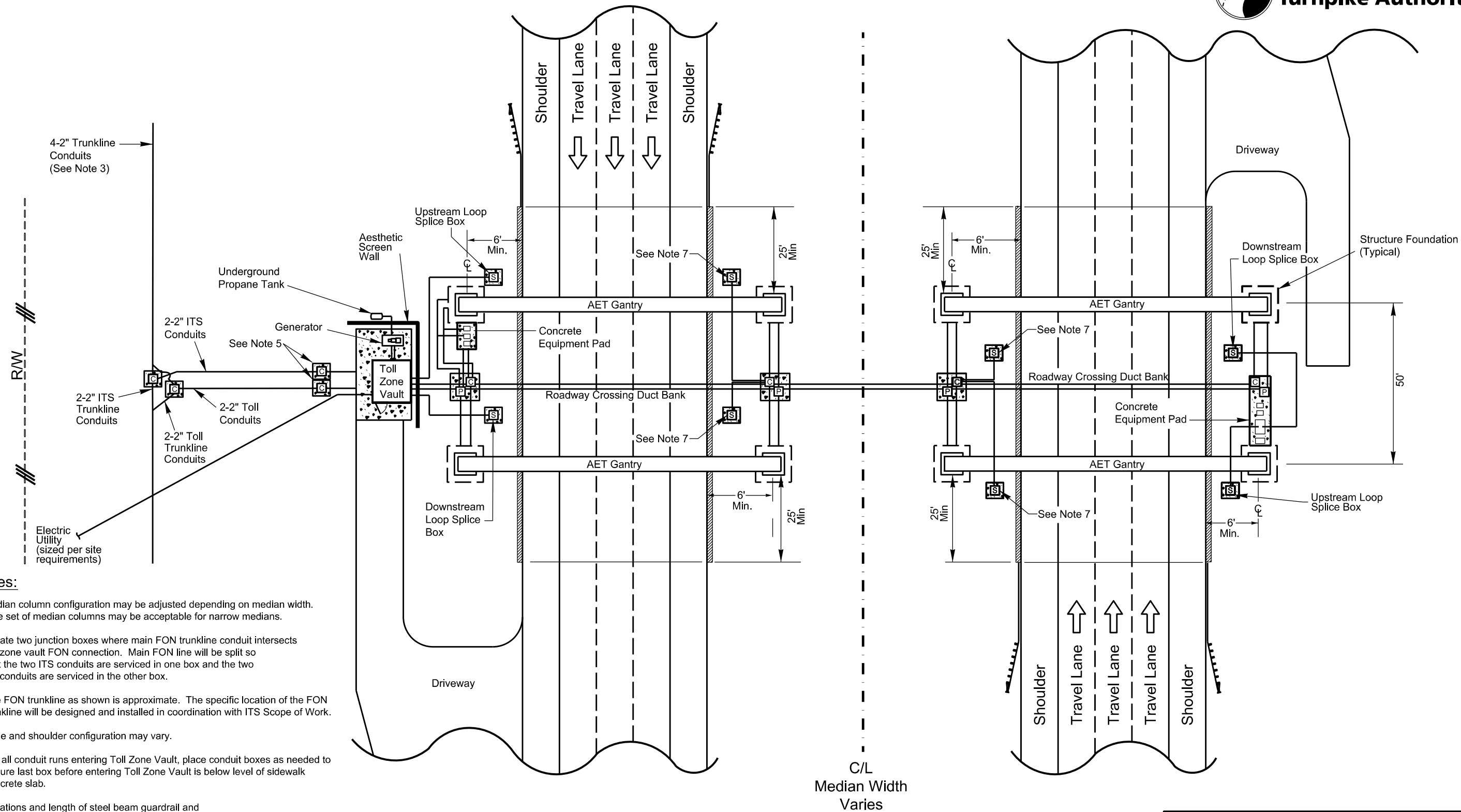


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LISA M. MOON

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DRMP INC.
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CHARLOTTE, NC 28210
NC LICENSE NO. C-2213 • TDM 332-2289

 Prepared for the Offices of: SCALE 0 50 1"=50'	Monroe Bypass - ITS Plans Communications Cable & Conduit Routing Plans		 Lisa M. Moon 12/7/2016 DATE CADD Filename: _____
	Division 10 Union County near Monroe		
	PLAN DATE: September 2016	REVIEWED BY: LM Moon	
	PREPARED BY: R Nissen	REVIEWED BY: JE Beck	
REVISIONS		INIT.	DATE








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Notes:

- Median column configuration may be adjusted depending on median width. One set of median columns may be acceptable for narrow medians.
- Locate two junction boxes where main FON trunkline conduit intersects toll zone vault FON connection. Main FON line will be split so that the two ITS conduits are serviced in one box and the two toll conduits are serviced in the other box.
- The FON trunkline as shown is approximate. The specific location of the FON trunkline will be designed and installed in coordination with ITS Scope of Work.
- Lane and shoulder configuration may vary.
- For all conduit runs entering Toll Zone Vault, place conduit boxes as needed to ensure last box before entering Toll Zone Vault is below level of sidewalk concrete slab.
- Locations and length of steel beam guardrail and location of end terminals shall be determined during design in accordance with AASHTO roadside safety design guidelines and NCDOT standards.
- For mainline segments with 4 or more tolled travel lanes in each direction, install additional loop splice boxes in median.
- Anchor Barrier Wall on top of pavement edge by installing dowel bars tied into every other vertical reinforcing bar of the Barrier Wall.
- Provide concrete aprons for all junction boxes as per the ITS and AET Scope of Work.

Legend

- | | |
|---|--|
|  - Communications Junction Box |  - Guardrail |
|  - Power Junction Box |  - Guardrail with doubled posts |
|  - Loop Splice Box |  - Structure Foundation |
|  - Box with 18" concrete apron; 1" above grade | |

ATKINS 1616 EAST MILLBROOK ROAD, SUITE 310
RALEIGH, NORTH CAROLINA 27609
(919) 876-6888 NCBEES #F-0326

NORTH CAROLINA TURNPIKE AUTHORITY
AET STANDARD DRAWINGS

Typical Mainline AET Toll Zone Plan View

SCALE: N.T.S.	NORTH CAROLINA TURNPIKE AUTHORITY	SHEET NO.
Rev. Oct 2014		C-1

GENERAL NOTES:

1. See Scope of Work for additional details and requirements.
2. Provide prefabricated, pre-cast or built-in-place vault with R-24 insulation, per State building codes.
3. Provide 3/4" chamfered edge on maintenance pad.
4. Field-adjust exterior cabinets/boxes as needed for local conditions, wire size, etc.

VAULT PLAN - ELECTRICAL:

1. Provide SPD on all distribution panels.
2. Locate conduit stub-ups a maximum of 12" from interior wall surface.
3. Provide integral safety disconnect on HVAC unit.

LIGHTING SYSTEM:

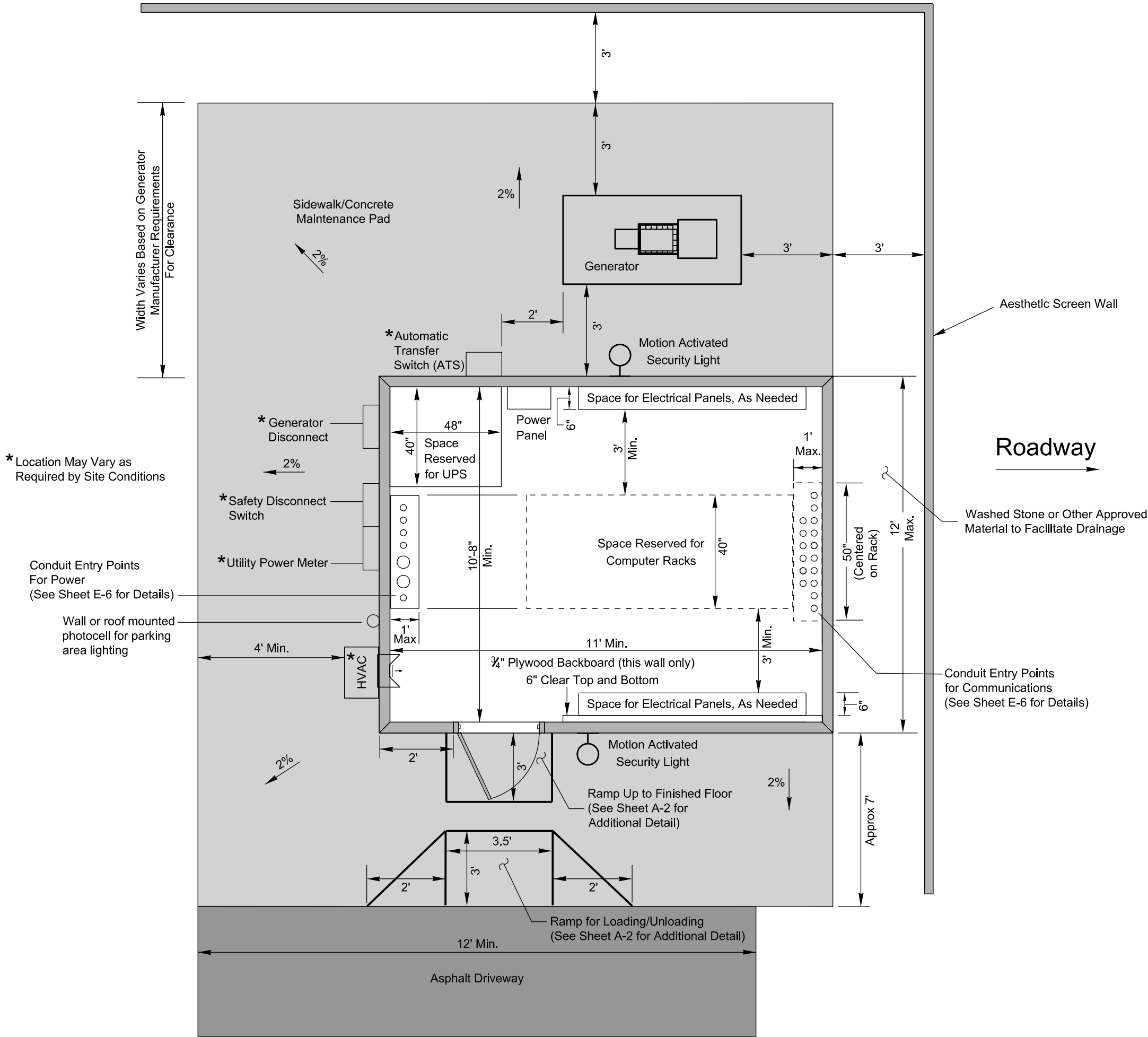
1. Provide lighting system with battery backup for power loss capable of maintaining one interior light fixture for 30 minutes minimum.

SECURITY SYSTEM:

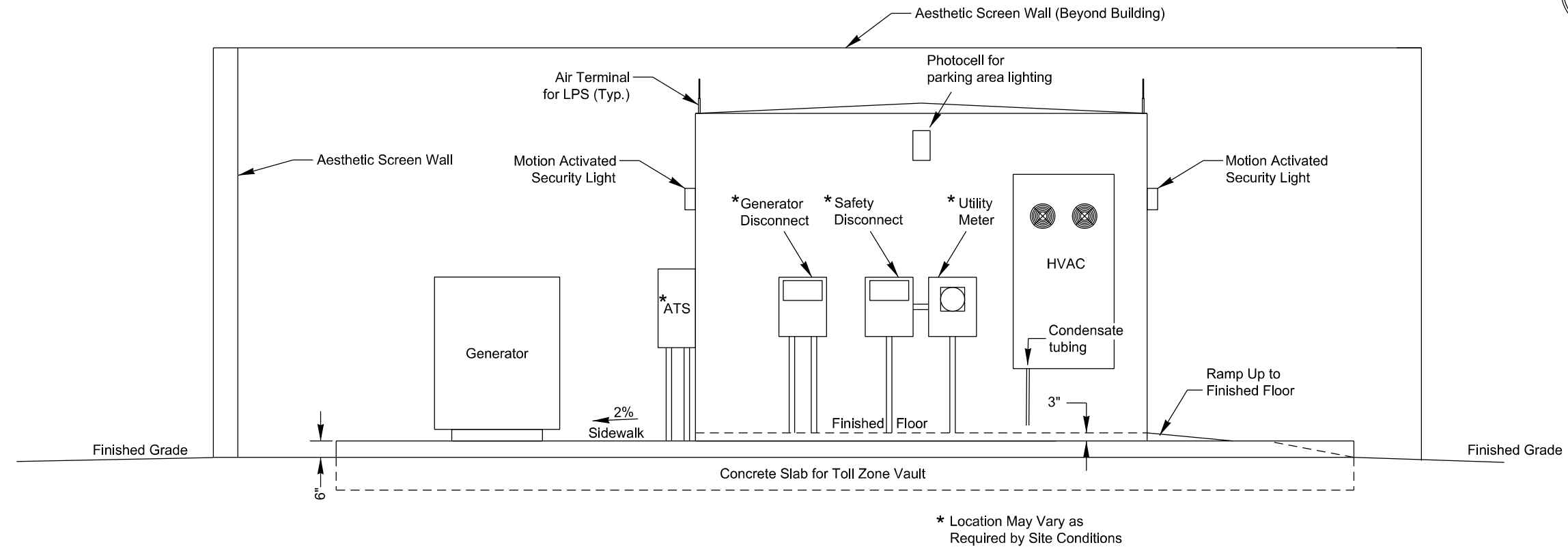
1. Provide conduit and electrical boxes to support the electronic door security system to be installed by the Toll System Integrator.

CONDUIT SYSTEM:

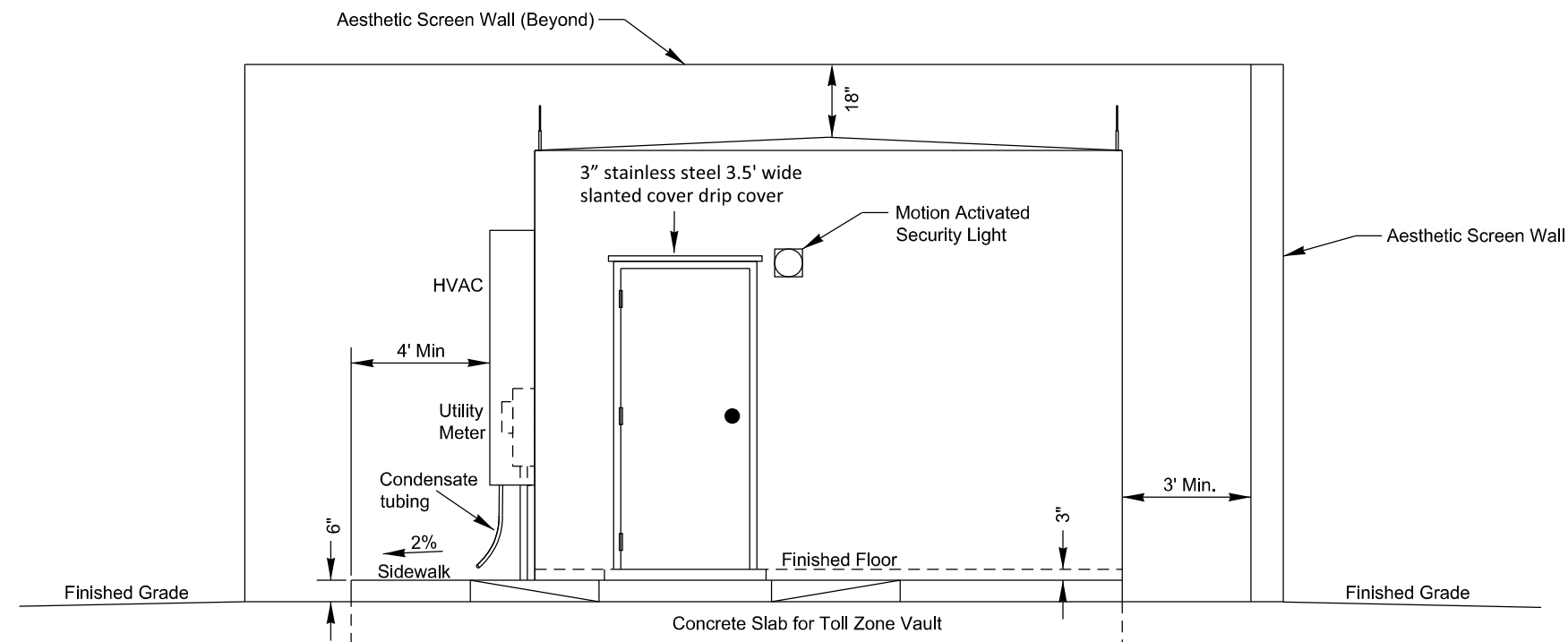
1. Contractor may choose to place conduit entrances in side of building rather than up through floor.



<div>ATKINS1616 EAST MILLBROOK ROAD, SUITE 310 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888NCBEES #F-0326</div>		
NORTH CAROLINA TURNPIKE AUTHORITY AET STANDARD DRAWINGS AET Toll Zone Vault Plan		
SCALE: N.T.S. Rev. Oct 2014	NORTH CAROLINA TURNPIKE AUTHORITY	SHEET NO. A-1

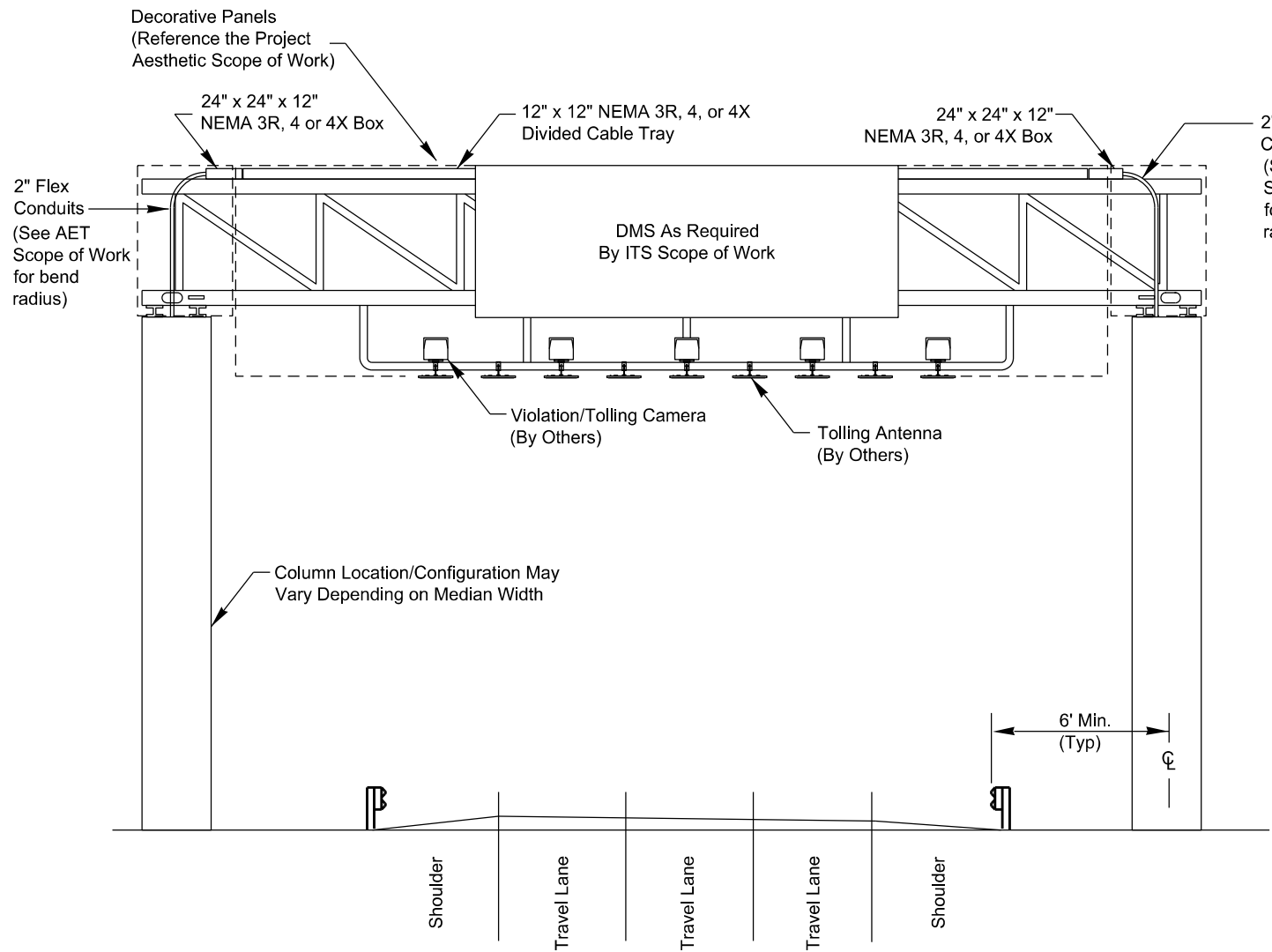


Side Elevation
Not to Scale

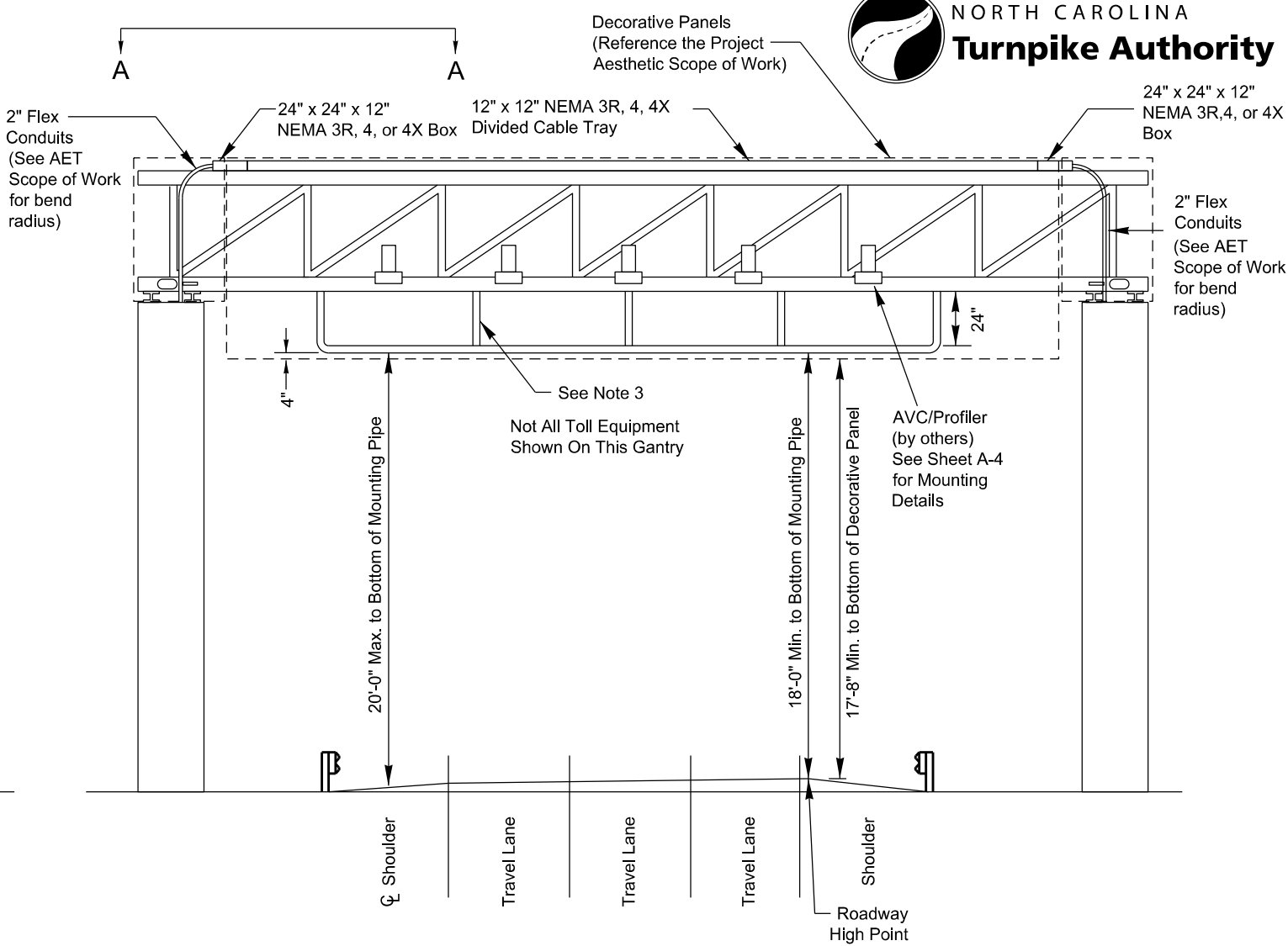


Front Elevation
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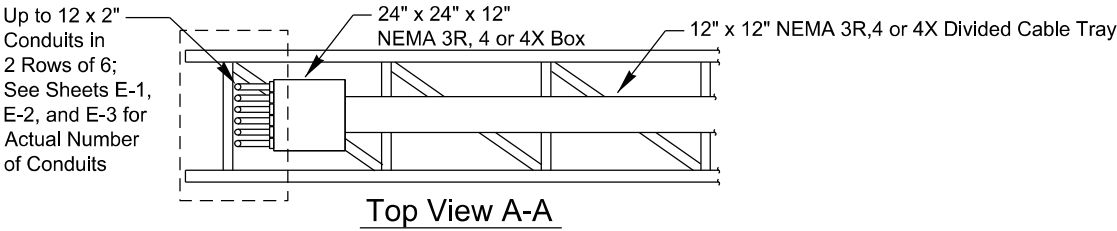
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NORTH CAROLINA TURNPIKE AUTHORITY AET STANDARD DRAWINGS AET Toll Zone Vault Elevations		
SCALE: N.T.S.	NORTH CAROLINA TURNPIKE AUTHORITY	SHEET NO. A-2
Rev. Oct 2014		



Upstream Mainline Gantry Front Elevation
Not to Scale

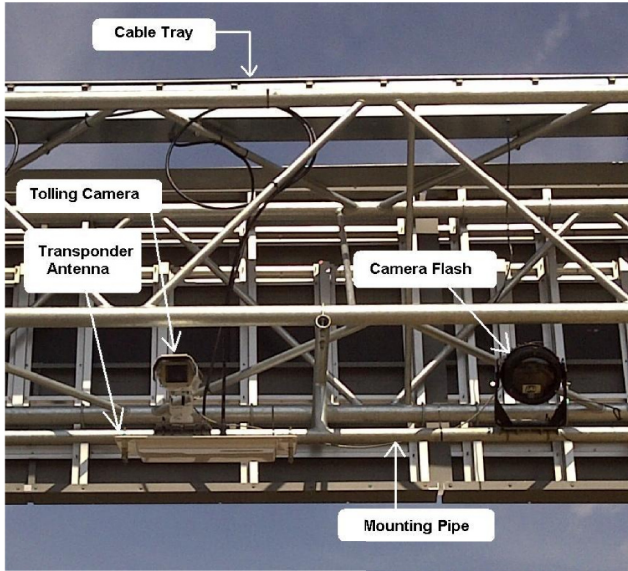


Upstream Mainline Gantry Rear Elevation
Not to Scale

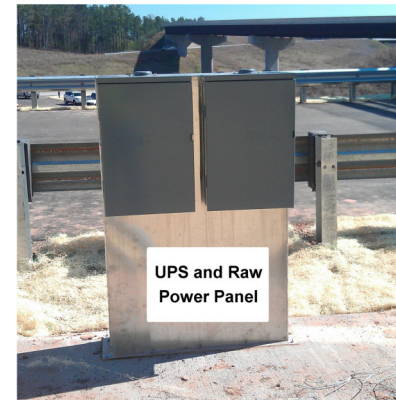


Notes:

1. Downstream gantry is similar but without DMS and AVC/Profilers.
2. Number of travel lanes may vary.
3. Location of vertical supports to be coordinated with Toll System Integrator.
4. Mounting pipes are horizontal.



<div><div>ATKINS</div><div>1616 EAST WILLBROOK ROAD, SUITE 310 RALEIGH, NORTH CAROLINA 27609 (919) 876-6888 NCBEES #F-0326</div></div>		
NORTH CAROLINA TURNPIKE AUTHORITY AET STANDARD DRAWINGS Typical AET Toll Zone Gantry Elevations		
SCALE: N.T.S.	NORTH CAROLINA TURNPIKE AUTHORITY	SHEET NO. A-3
Rev. Oct 2014		

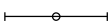


















N.T.S.

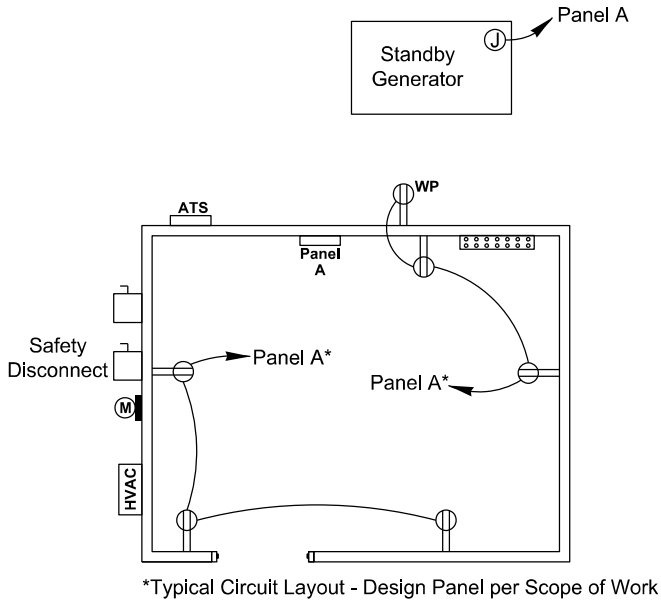


AVI Cabinet - 35"W x 34"D x 67"H
DMS Cabinet - 25"W x 30"D x 46"H
Zone Cabinet - 48"W x 36"D x 72"H
UPS & Raw Power Panel - 32"W x 16"D

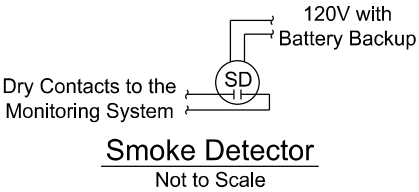
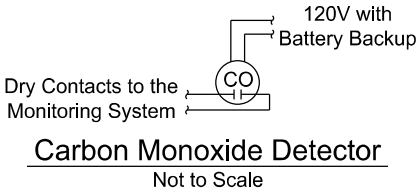
Legend

Symbol	Description	Remarks
	Industrial Fluorescent Fixture	Lithonia EJ-332-MVOLT
	Sharp Cut-Off Fluorescent Walpack Suitable for Wet Location	Lithonia TWFI-2/42TRT-120-CW20-LPI
	Combination Exit/Emergency Light	Lithonia LHQMS-W3R-120-H
	Outdoor Motion Sensor for Fixture Control	Watt Stopper EW-200-120-G
	20 AMP, Specification Grade Switch, Mount 42" A.F.F.	Hubbell 122IH with PJ1 Cover
	Ultrasonic Motion Sensor Switch, Mount 42" A.F.F.	Watt Stopper UW-100-1
	Specification Grade 20 AMP, 120 Volt Duplex Receptacle Mount 18" A.F.F. Unless Otherwise Noted	Hubbell 5362-1 with PJ8 Cover Plate
	Specification Grade Weather Resistant/Ground Fault Interrupting Duplex Receptacle with In-Use Weather Proof Cover, Mount 18" A.F.F.	Hubbell GFTR20-** with WP26M Cover Plate
	New Concealed Wiring	Per NEC
	Unswitched Lighting Conductor	Per NEC
	Home Run to Panel Board; Numbers of Arrow Indicate Circuits	Per NEC
	Heavy Duty, Fusable Disconnect	Square D Heavy Duty
	Junction Box Sizing Per NEC	
	120/240V 1Ø, 3W Panel Board	Square D NQ
	Utility Meter Base	See Power Riser
	Vault Ground Bar	
A.F.F.	Above Finished Floor - Note All Mounting Dimensions Given are to the Bottom of the Outlet Box	
	Ground Rod Per NEC, Copper; Copper/Aluminum, See Scope of Work for Details	

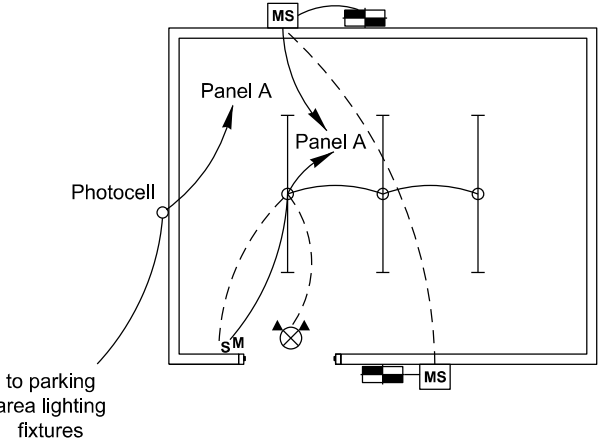
Note: Locations of All Equipment May Vary
Note: Field-Adjust outlet locations to avoid conduit entrances



Power Plan
Not to Scale



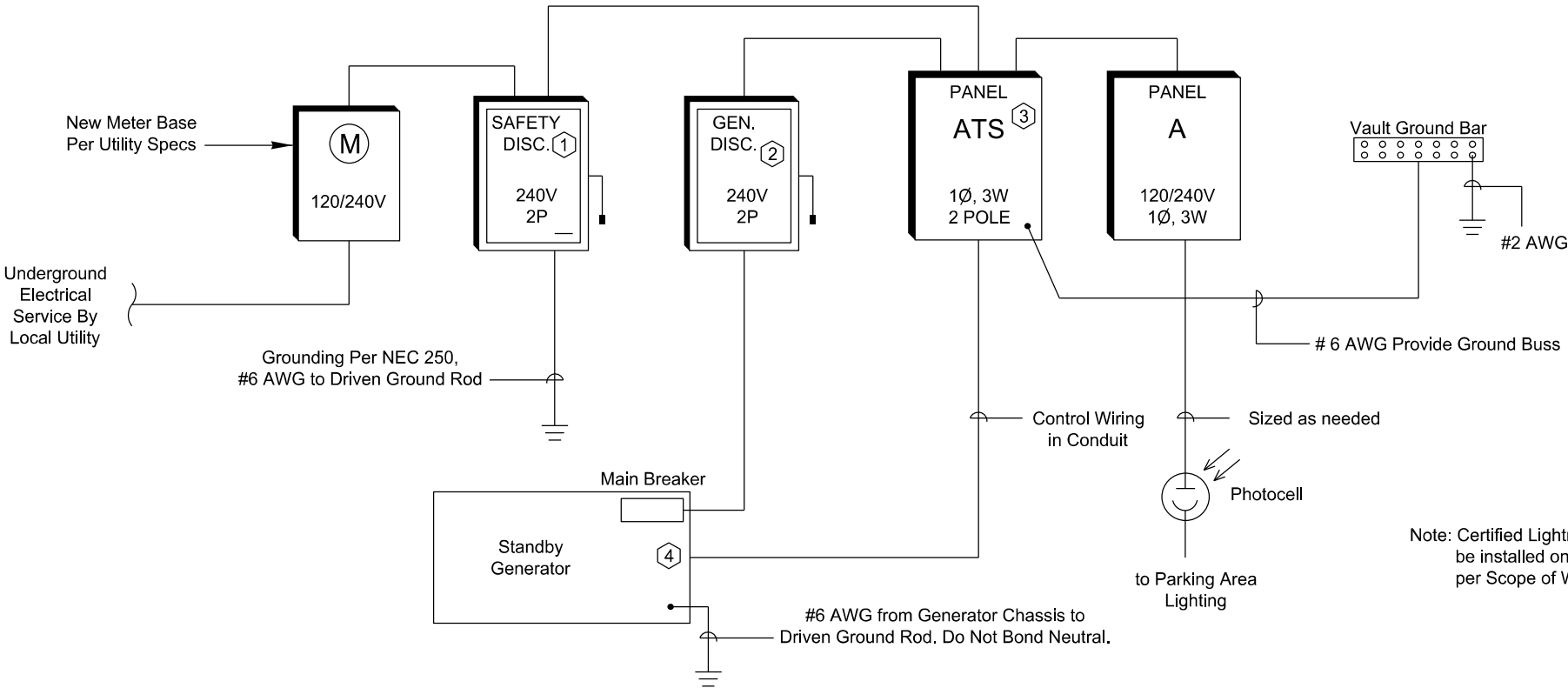
Note: Lights and Motion Sensors may be Field Adjusted as Necessary to Provide Proper Illumination
Note: Wire outside lights directly to panel as shown



Lighting Plan
Not to Scale

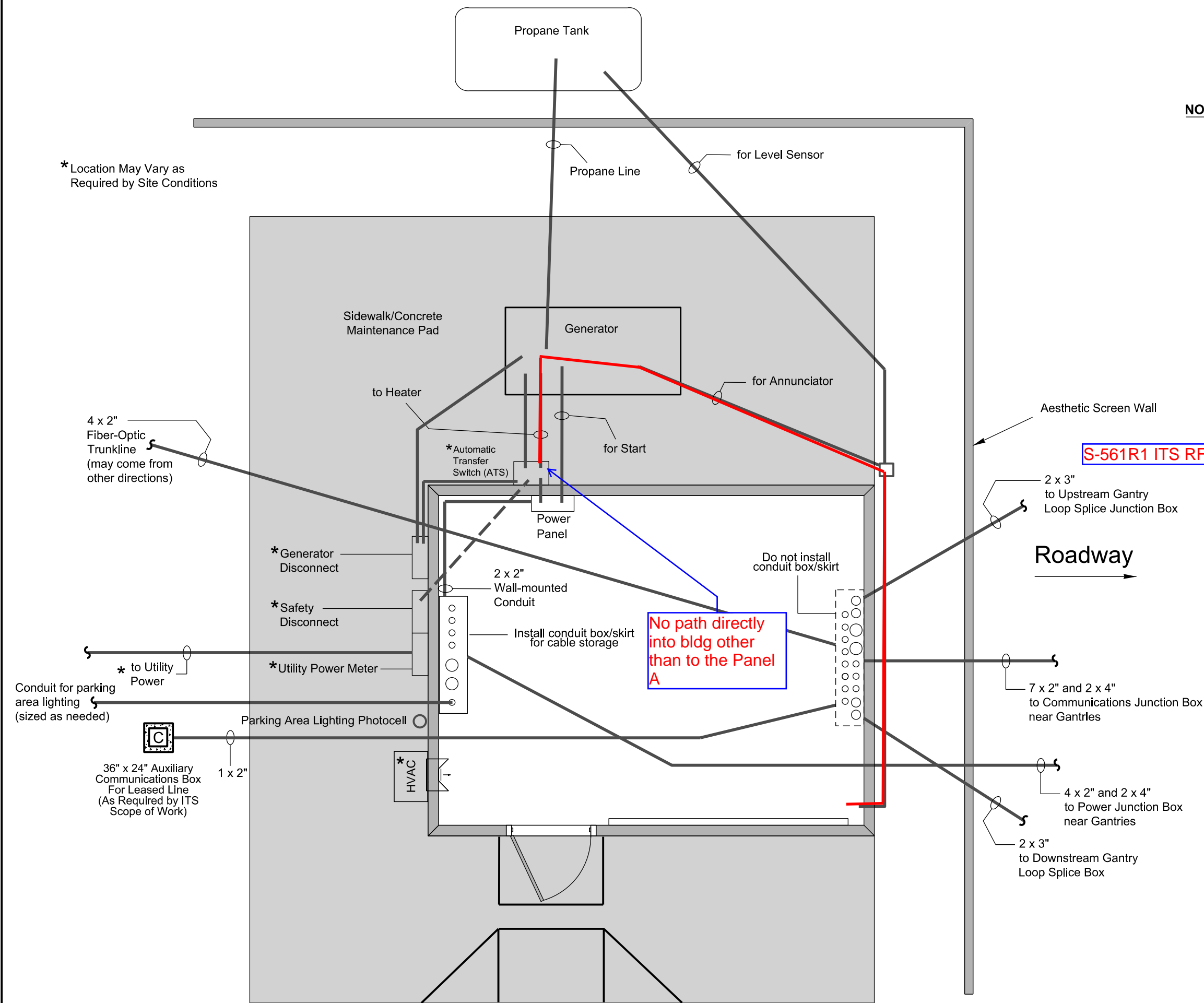
Key Notes:

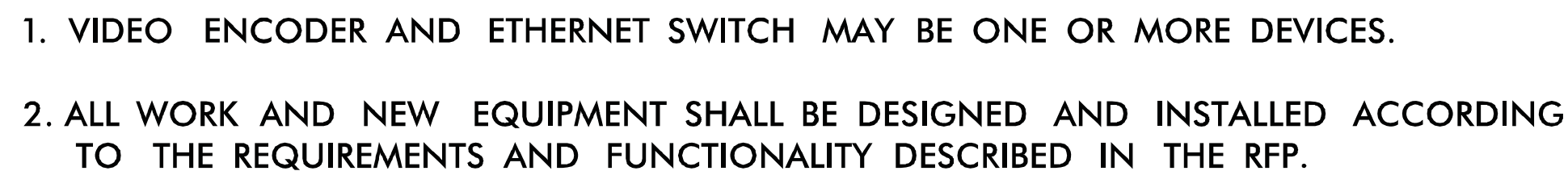
- Utility Service Disconnect: Sized per Scope of Work, 2 Pole, NEMA 3R. Fuse at Rated AMPS
- Generator Service Disconnect: Sized per Scope of Work, 2 Pole, NEMA 3R Non Fused
- New Automatic Transfer Switch: Sized per Scope of Work, Rated, 2 Pole, Neutral Conductor is not switched
- KVA sized per Scope of Work 120/240 Volt, Single Phase, 3 Wire Standby Generator with the following features:
 - Provide exhaust silencer and sound attenuated weather proof enclosure
 - Provide 120 volt battery charger and 120 volt jacket heater
 - Generator shall be propane (LP) gas fired. Contractor to provide fuel tank with 72 hour capacity at full load. Provide all piping, valves, and regulators
 - Provide appropriately sized circuit breakers



Note: Certified Lightning Protection System shall be installed on AET Toll Zone Vaults and gantries per Scope of Work

- NOTES:**
1. Provide UL-Listed PVC or HDPE conduit for all underground conduit runs.
 2. Provide rigid galvanized conduit for all above-ground exterior conduit runs.
 3. Unless otherwise labeled, provide one (1) conduit, size to be determined by Design/Build Team, for all conduit runs.
 4. Contractor may choose to run conduit entrances thru the walls rather than the floor.





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ATKINS

ITS STANDARD DETAILS

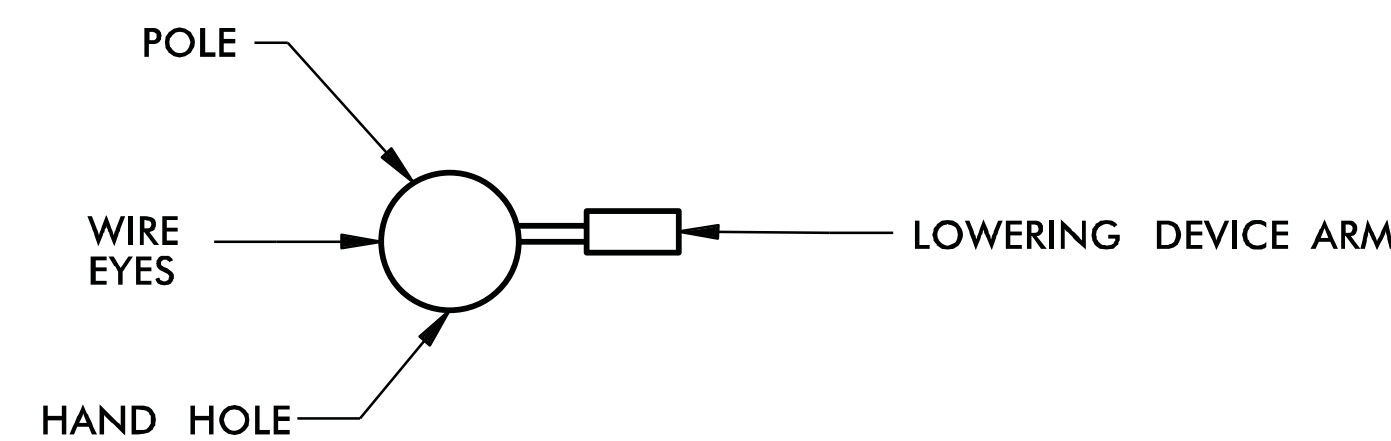
CCTV BLOCK DIAGRAM

SCALE:	N.T.S.
DATE:	August, 2011
DWG. BY:	B. Slocum
DESIGN BY:	A. Badgett / D. Jones
APPROVED:	A. Lelewski

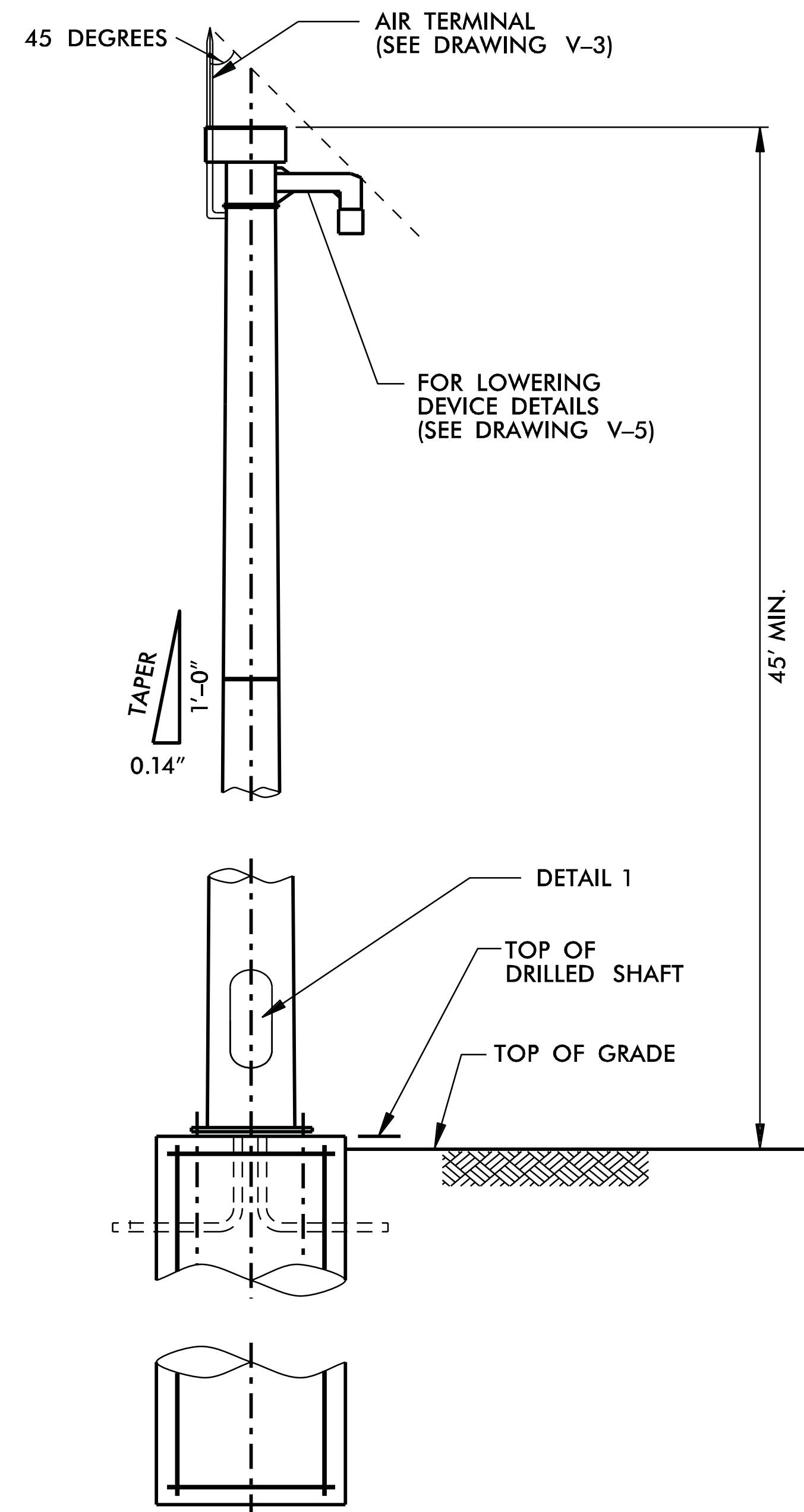
NORTH CAROLINA
TURNPIKE AUTHORITY

SHEET NO.

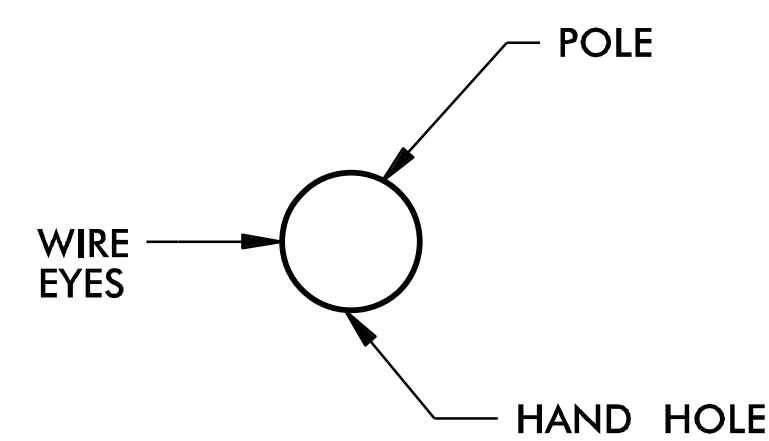
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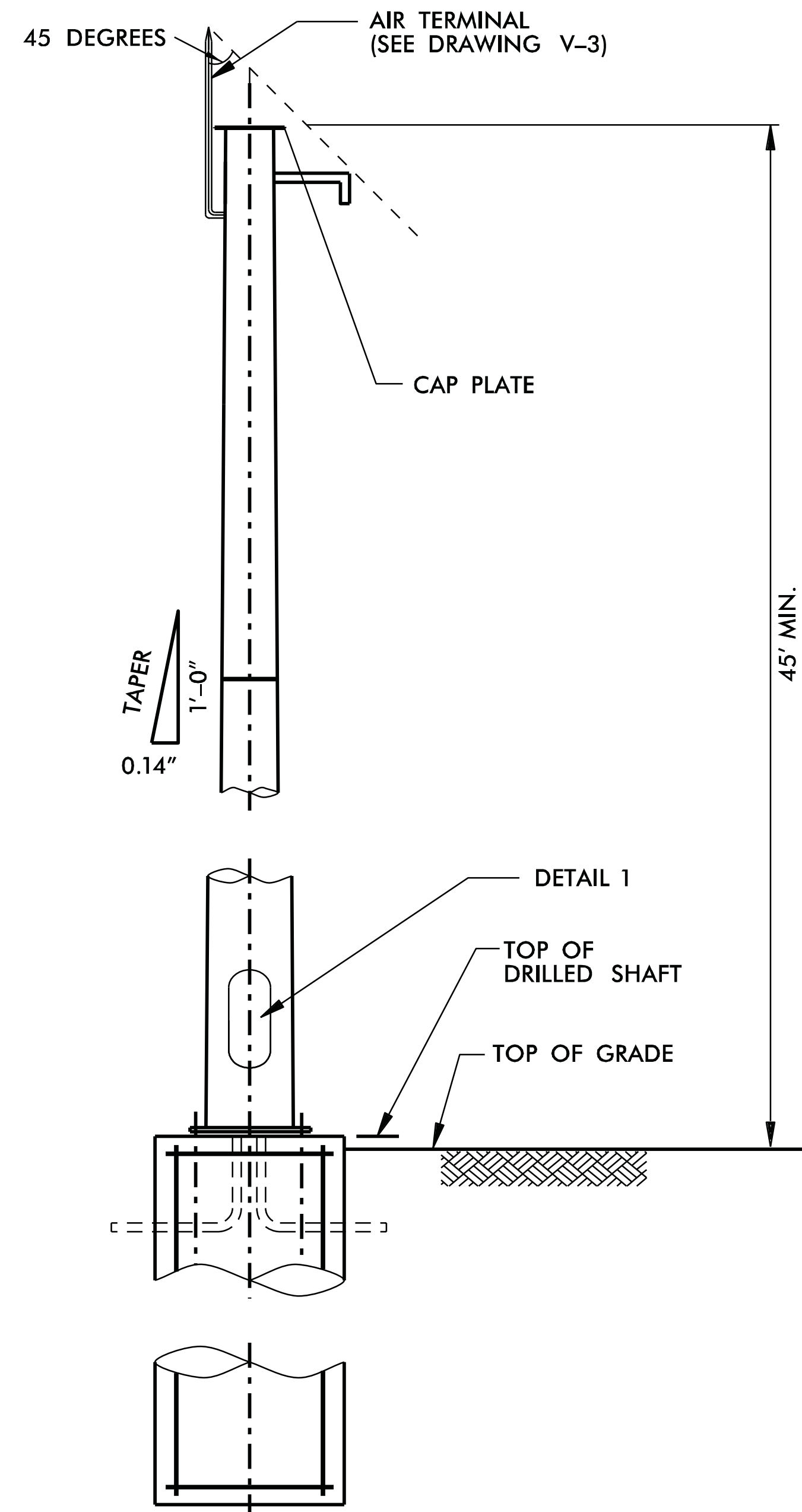
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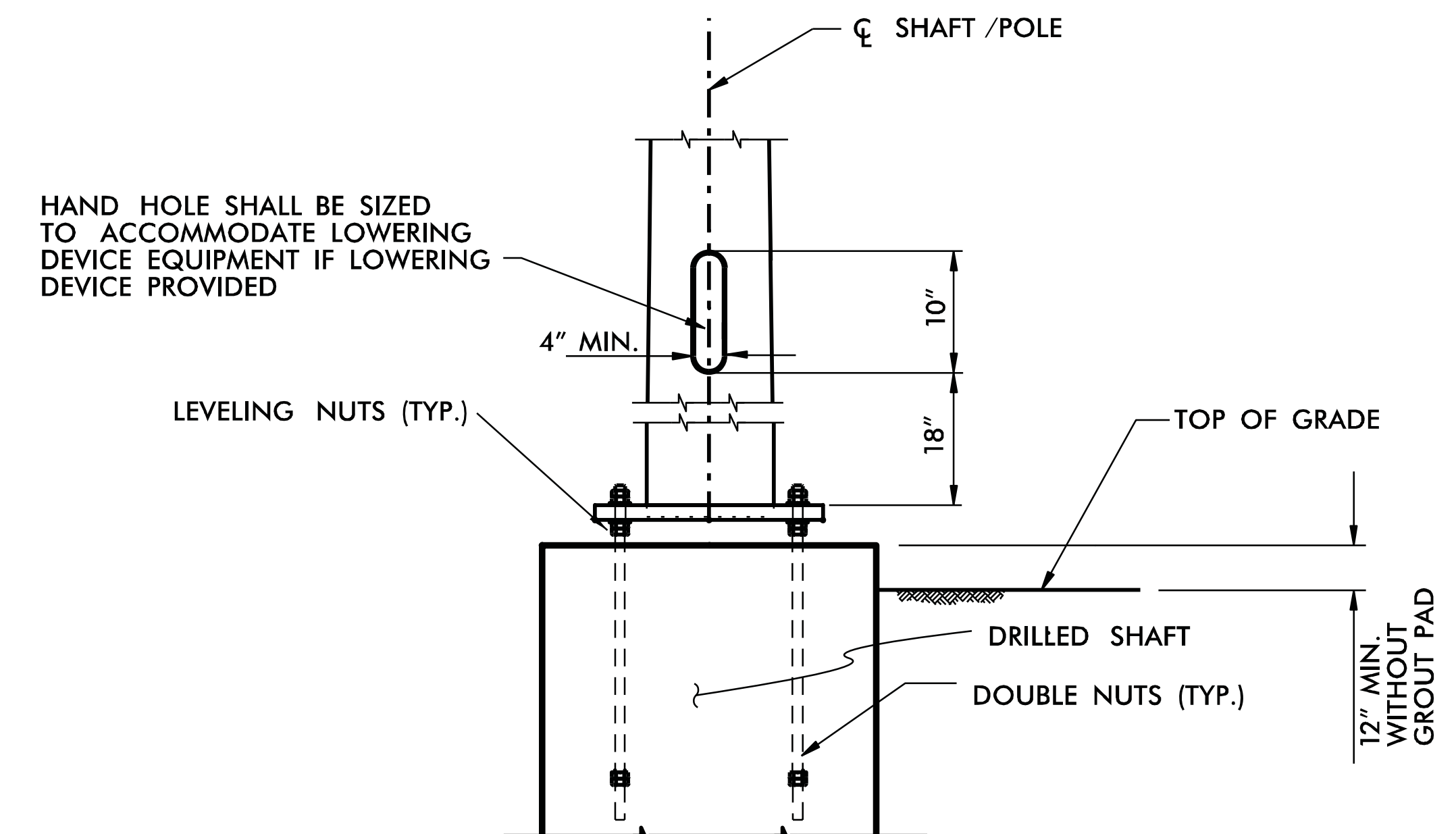
WITH LOWERING DEVICE
ELEVATION



ORIENTATION VIEW



WITHOUT LOWERING DEVICE
ELEVATION



DETAIL 1

- NOTE**
1. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.
 2. BANDING TO ATTACH CABINET AND ANY CONDUITS SHALL NOT INTERFERE WITH THE HAND HOLE.

ATKINS 5200 77 Center Drive, Suite 50
Charlotte, North Carolina 28217
(704) 522-7275 NCBEEs #F-0326

ITS STANDARD DETAILS
CCTV
STEEL POLE

SCALE: N.T.S.
DATE: August, 2011
DWG. BY: B. Slocum
DESIGN BY: A. Badgett / D. Jones
APPROVED: A. Lelewski

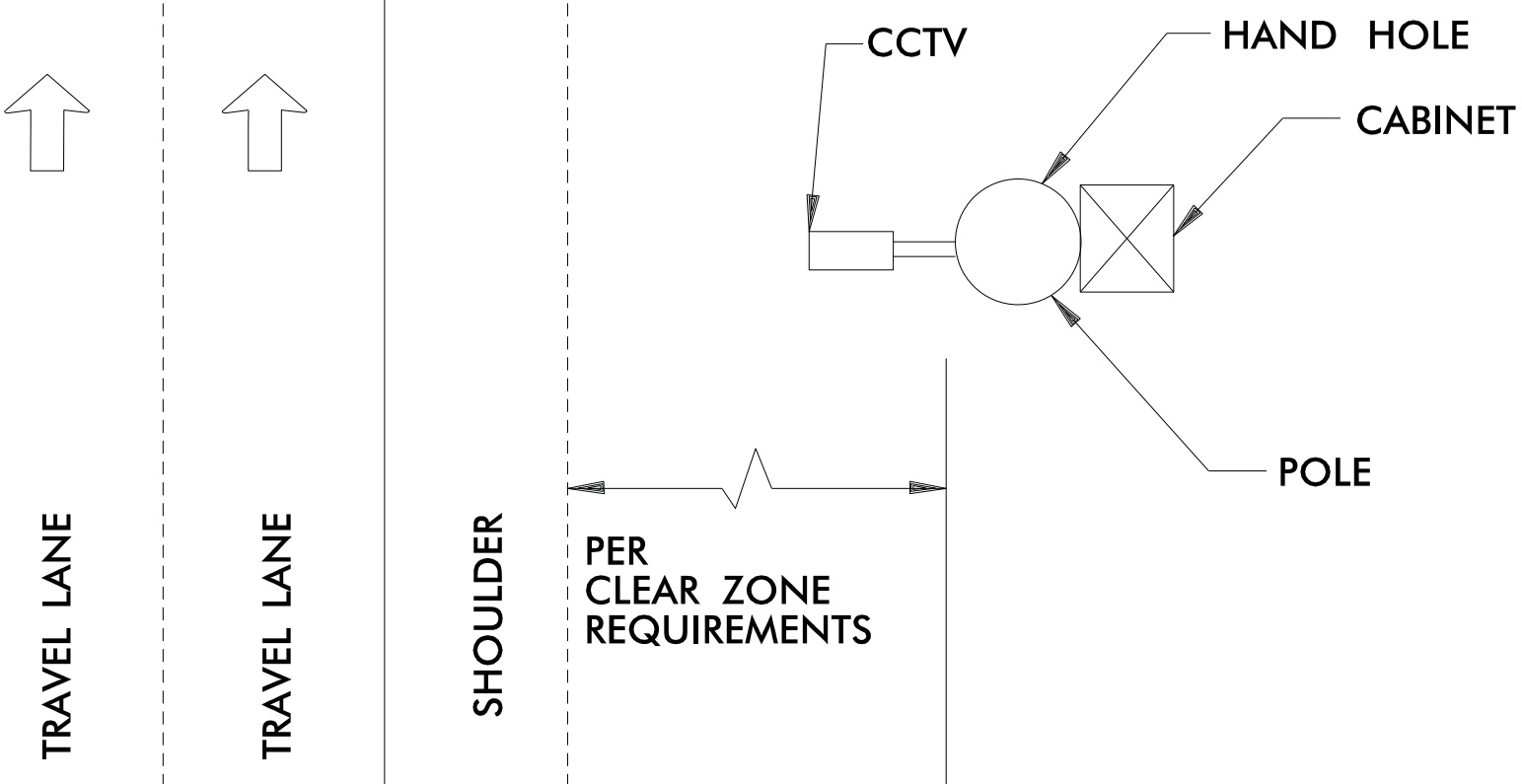
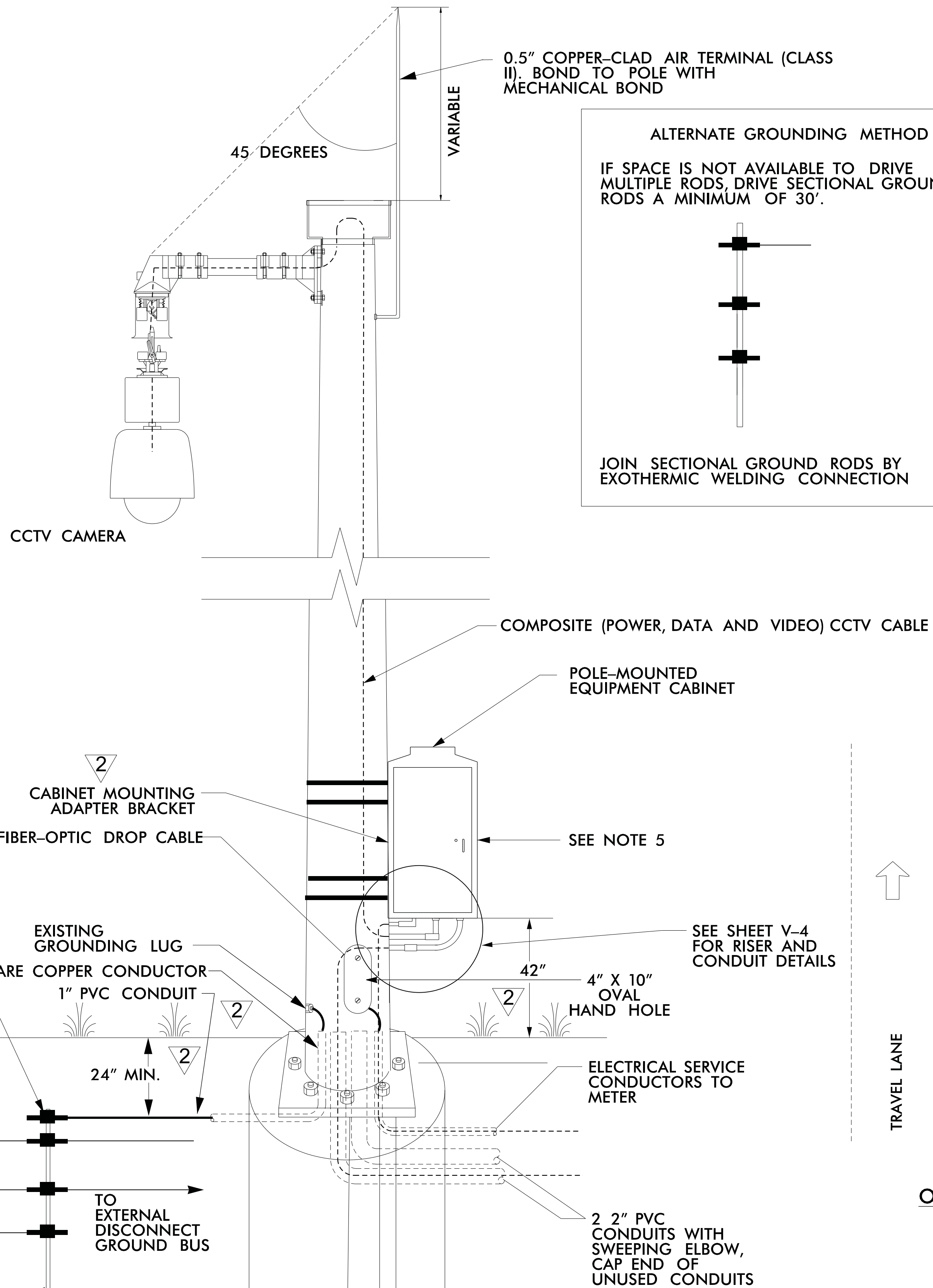
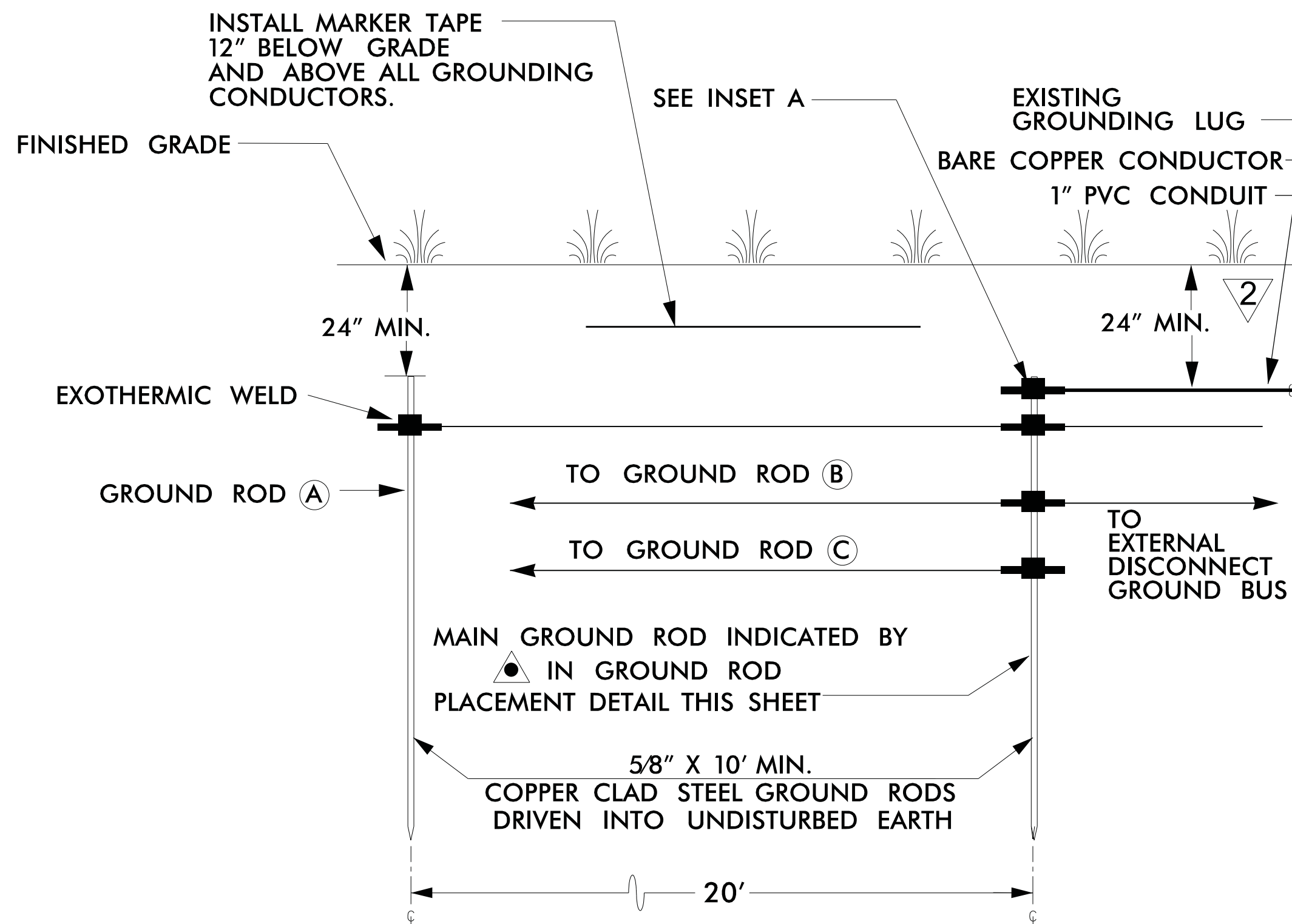
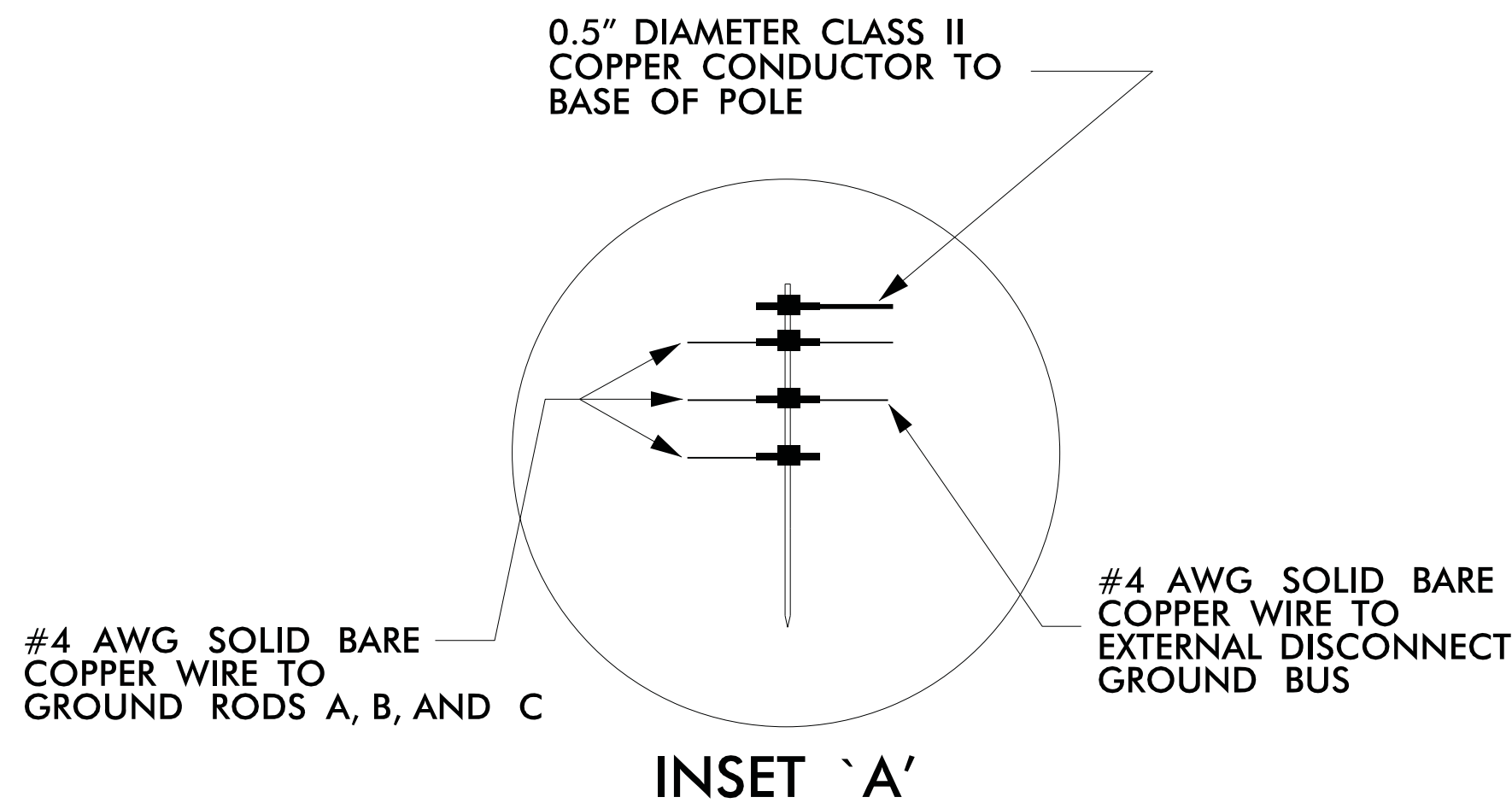
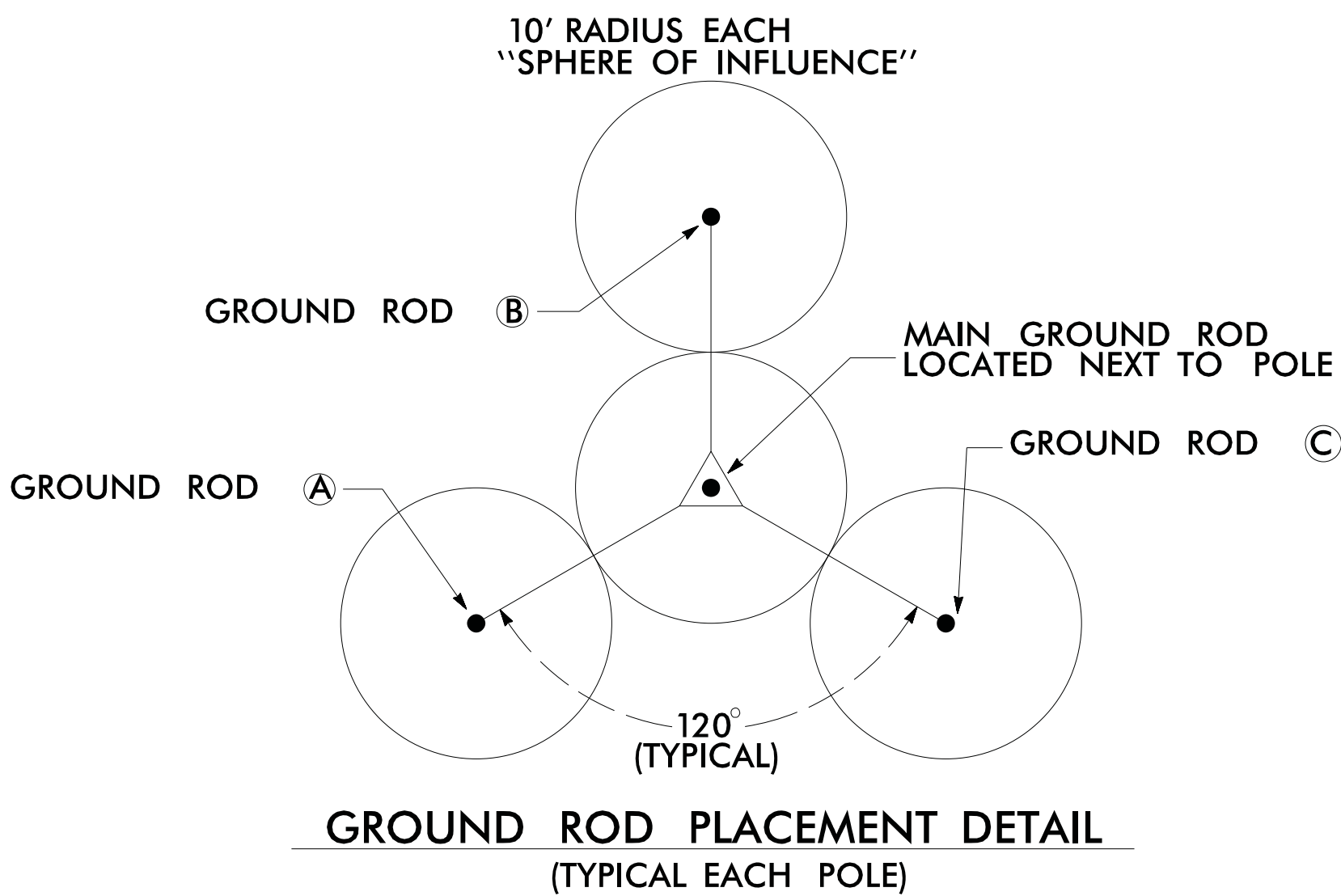
NORTH CAROLINA
TURNPIKE AUTHORITY

SHEET NO.

V-2

REV. NO.	BY	DATE	DESCRIPTION
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\$\$\$\$\$SDONS\$\$\$\$\$
\$\$\$\$\$USERAME\$\$\$\$\$



ORIENTATION OF DEVICES ON POLE

REVISED 10 /21 /2011

REV. NO.	BY	DATE	DESCRIPTION
1	DLJ	10/7/14	Border content and labeling only
2	DLJ	8/31/16	See Notes

ATKINS 5200 77 Center Drive, Suite 50
Charlotte, North Carolina 28217
(704) 522-7275 NCBEES #F-0326

ITS STANDARD DETAILS
CCTV
POLE GROUNDING

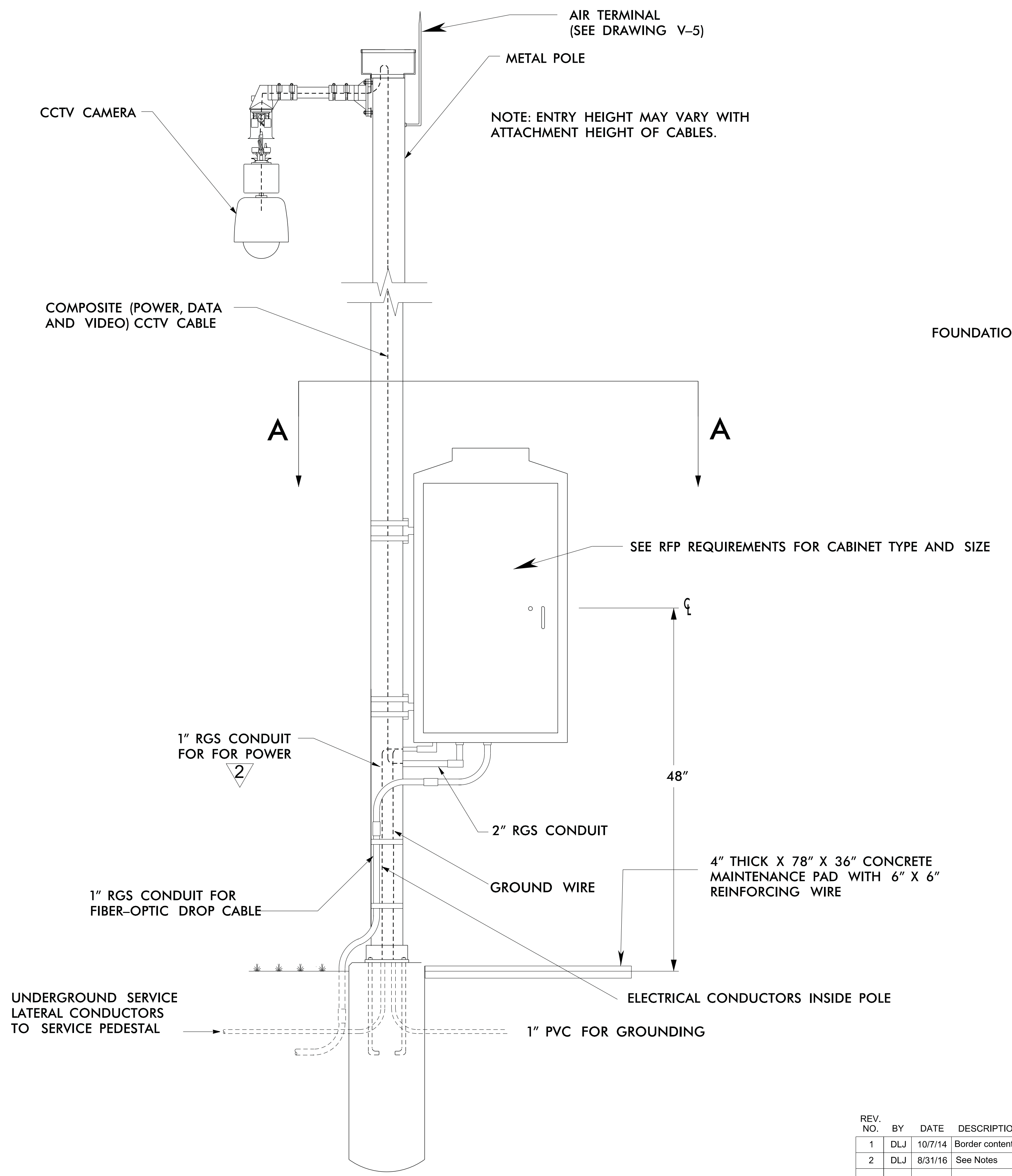
SCALE: N.T.S.
DATE: August, 2011
DWG. BY: B. Slocum
DESIGN BY: A. Badgett / D. Jones
APPROVED: A. Lelewski

NORTH CAROLINA
TURNPIKE AUTHORITY

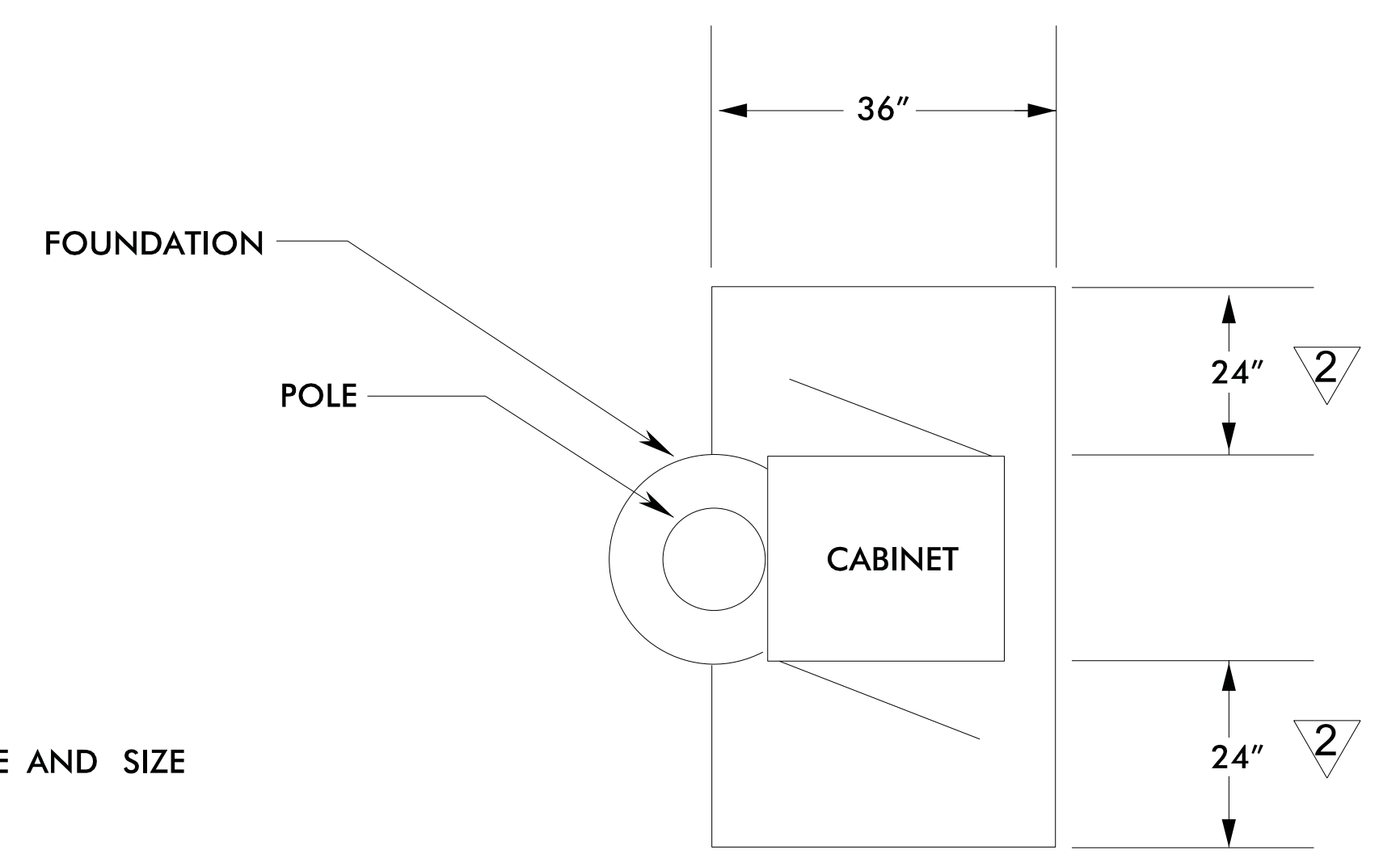
SHEET NO.

V-3

POLE-MOUNTED CCTV CABINET DETAIL



SECTION A-A



NOTES

1. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.
2. ENSURE CONDUITS STRAPS DO NOT OBSTRUCT ACCESS TO HANDHOLES.
3. DO NOT INSTALL MAINTENANCE PAD ON EXCESSIVE SLOPE (GREATER THAN 3:1)

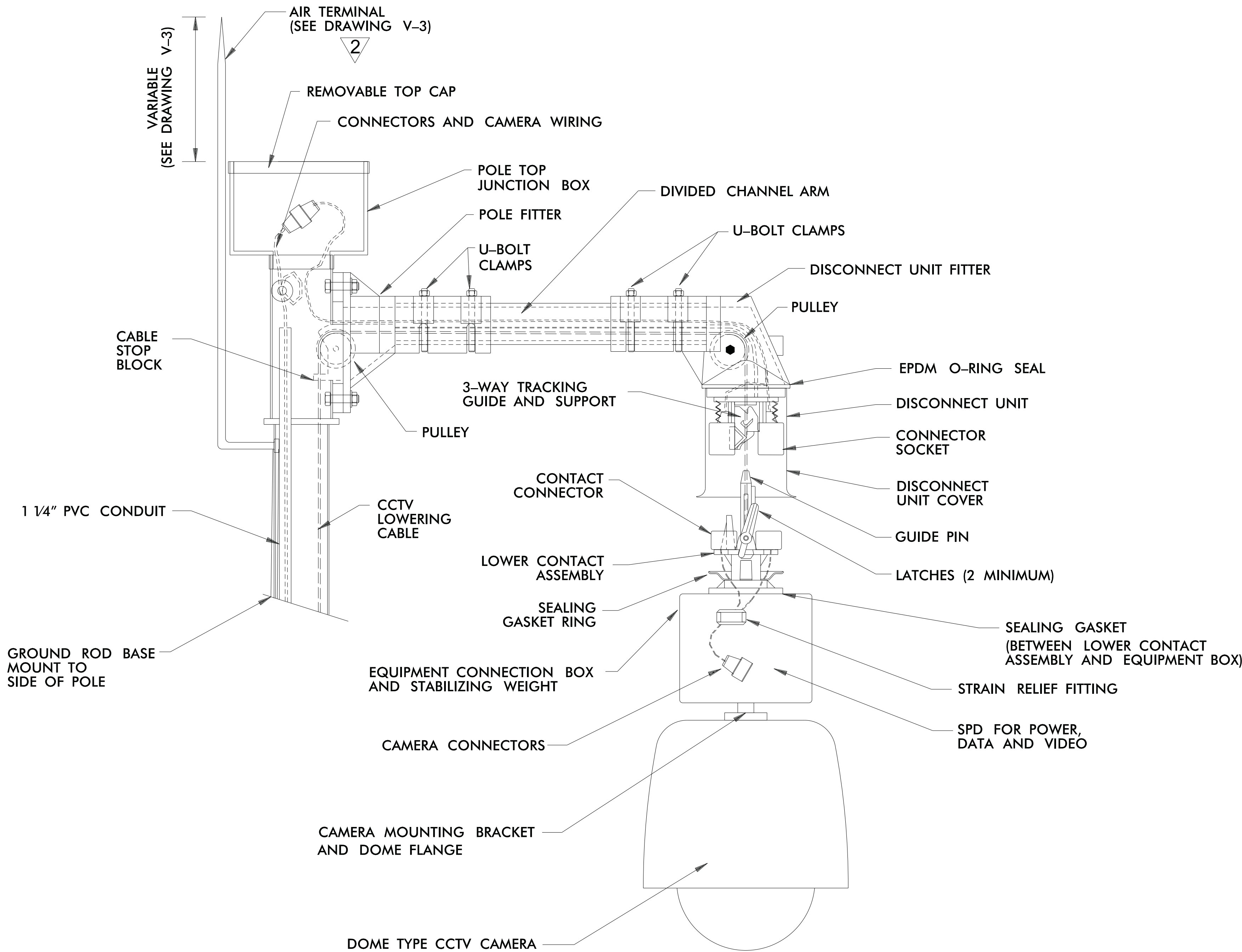
REVISED 8 / 24 / 11

ATKINS		5200 77 Center Drive, Suite 50 Charlotte, North Carolina 28217 (704) 522-7275 NCBEEES #F-0326	
ITS STANDARD DETAILS			
CCTV POLE-MOUNTED CABINET			
SCALE:	N.T.S.	NORTH CAROLINA TURNPIKE AUTHORITY	SHEET NO. V-4
DATE:	August, 2011		
DWG. BY:	B. Slocum		
DESIGN BY:	A. Badgett / D. Jones		
APPROVED:		A. Lelowski	

REV. NO.	BY	DATE	DESCRIPTION
1	DLJ	10/7/14	Border content and labeling only
2	DLJ	8/31/16	See Notes

GENERAL NOTES:

1. LOWERING DEVICE TO BE SHIPPED READY FOR POLE ATTACHMENT TO INCLUDE 100 FT. OF COMPOSITE POWER AND SIGNAL CABLE PREWIRED TO LOWERING DEVICE AT THE FACTORY.
2. THE LOWERING DEVICE MANUFACTURER SHALL SUPPLY BOTH A PORTABLE LOWERING TOOL WITH A MANUAL HAND CRANK AND A PORTABLE ELECTRIC DRILL MOTOR WITH CUSTOM CLUTCH ADAPTER. ONE LOWERING TOOL PER EVERY 10 LOWERING DEVICES IS REQUIRED.
3. THE LOWERING DEVICE MANUFACTURER SHALL PROVIDE AN ON-SITE INSTALLATION INSPECTION AND OPERATOR INSTRUCTION AND CERTIFICATION. THIS ENSURES THE PRODUCT IS ASSEMBLED CORRECTLY AND, MORE IMPORTANTLY, THAT ALL NECESSARY PERSONS ARE TRAINED IN THE PROPER, SAFE OPERATION OF THE SYSTEM. BEFORE ERECTING THE FIRST POLE THE CONTRACTOR MUST CONTACT THE LOWERING DEVICE SUPPLIER AND SCHEDULE A FACTORY REPRESENTATIVE TO BE ON-SITE.
4. LOWERING DEVICE CONNECTION TO TOP OF POLE SHALL BE CAPABLE OF SERVICE TENSION AND SHEAR OF 1 KIP MINIMUM. THE CONTRACTOR SHALL PROVIDE PRODUCT CUT SHEET AND CAPACITY DATA FOR THE ENGINEER'S REVIEW AND APPROVAL PRIOR TO INSTALLATION.
5. CAMERA TO BE MOUNTED TO CAMERA JUNCTION BOX AND STABILIZING WEIGHT VIA 1 1/2" STANDARD NPT PIPE THREAD.
6. USE AIR TERMINAL EXTENSION WHEN THE POLE TOP JUNCTION BOX IS WIDER THAN TOP OF POLE.
7. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.



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ITS STANDARD DETAILS
CCTV
CAMERA LOWERING DEVICE

SCALE: N.T.S.
DATE: August, 2011
DWG. BY: B. Slocum
DESIGN BY: A. Badgett / D. Jones
APPROVED: A. Lelowski

NORTH CAROLINA
TURNPIKE AUTHORITY

SHEET NO.

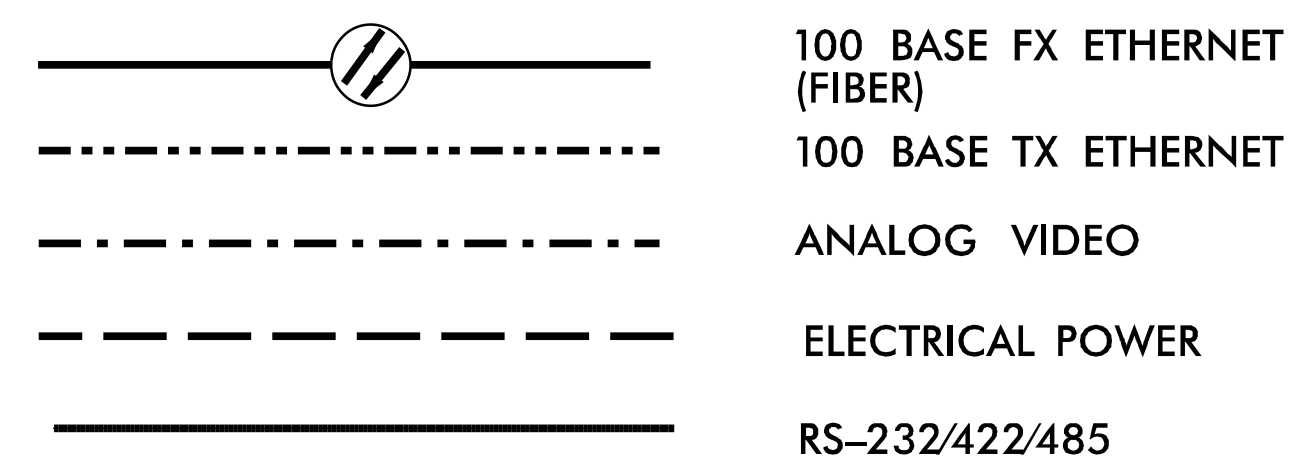
V-5

REV. NO.	BY	DATE	DESCRIPTION
1	DLJ	10/7/14	Border content and labeling only
2	DLJ	8/31/16	See Notes

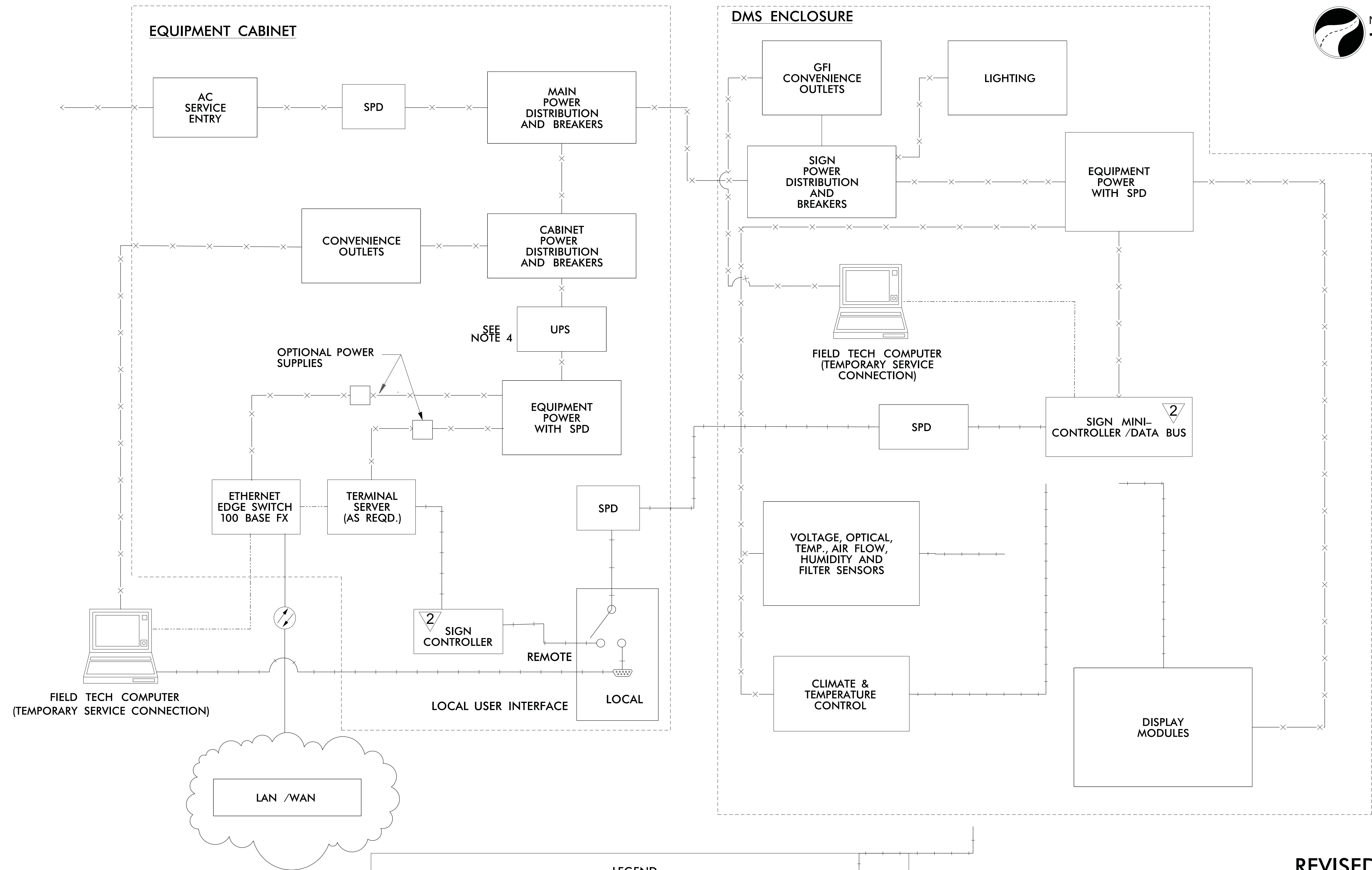


FRONT VIEW

- ## CONNECTION LEGEND



REV. NO.	BY	DATE	DESCRIPTION
1	DLJ	10/7/14	Border content and labeling only



GENERAL NOTES:

- AC WIRED CABINET SHALL BE EQUIPPED WITH A SURGE PROTECTOR WITH AN ALARM FEATURE.
- (NOTE DELETED)
- ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN RFP.
- SIGNS AT AET VAULT LOCATIONS SHALL USE UPS FOR AET VAULT.

LEGEND

	1000 BASE TX ETHERNET		100 BASE FX ETHERNET (FIBER)
	100 BASE TX ETHERNET		1000 BASE FX ETHERNET (FIBER)
	ANALOG VIDEO		RS-232/422/485
	120 VAC POWER		EXISTING DEVICE
	LOW VOLTAGE POWER		EXISTING FIBER CABLE

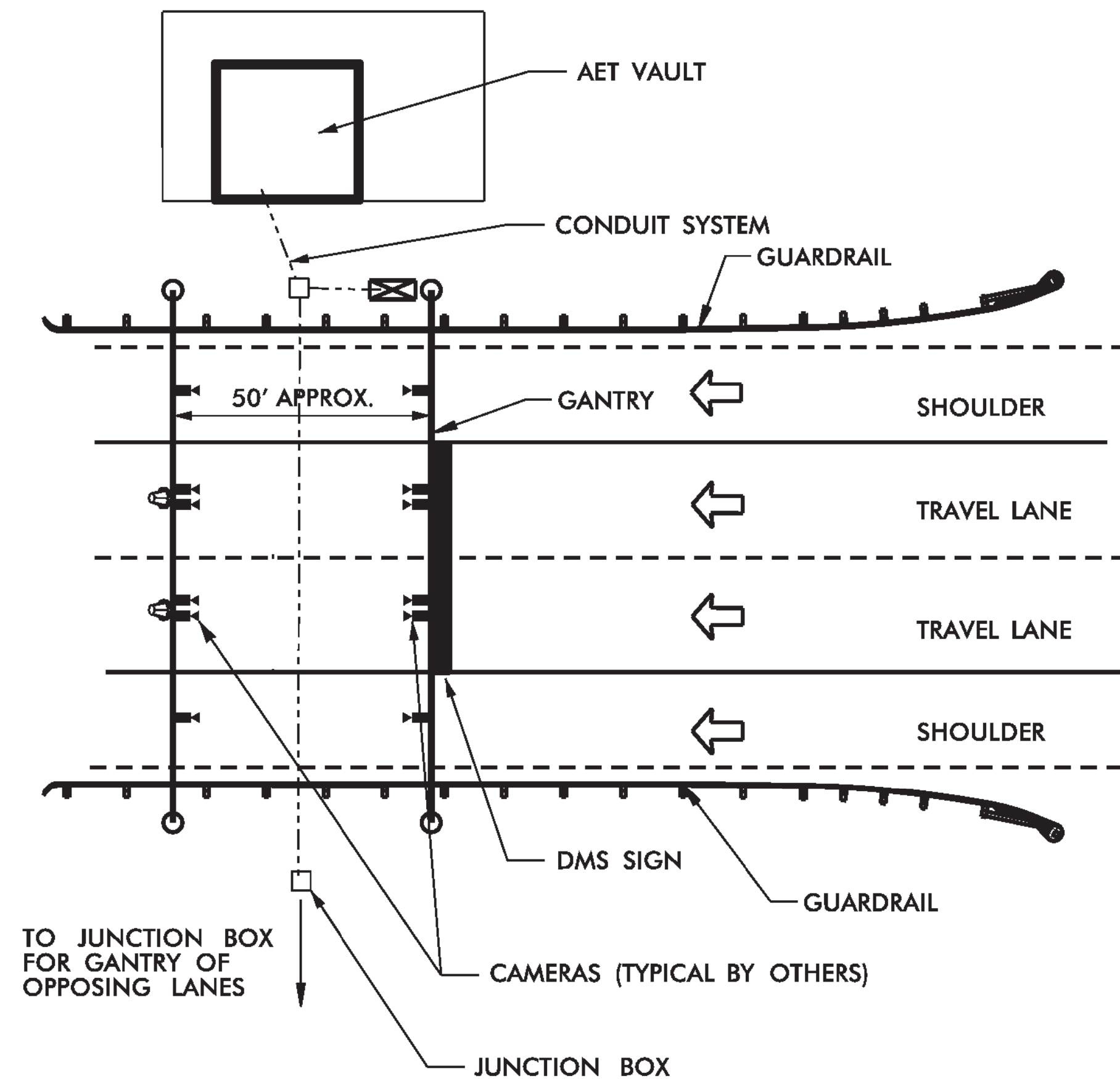
REV. NO.	BY	DATE	DESCRIPTION
1	DLJ	10/7/14	Border content and labeling; see revision marks
2	DLJ	8/31/16	See Notes

REVISED 10 /21 /2011

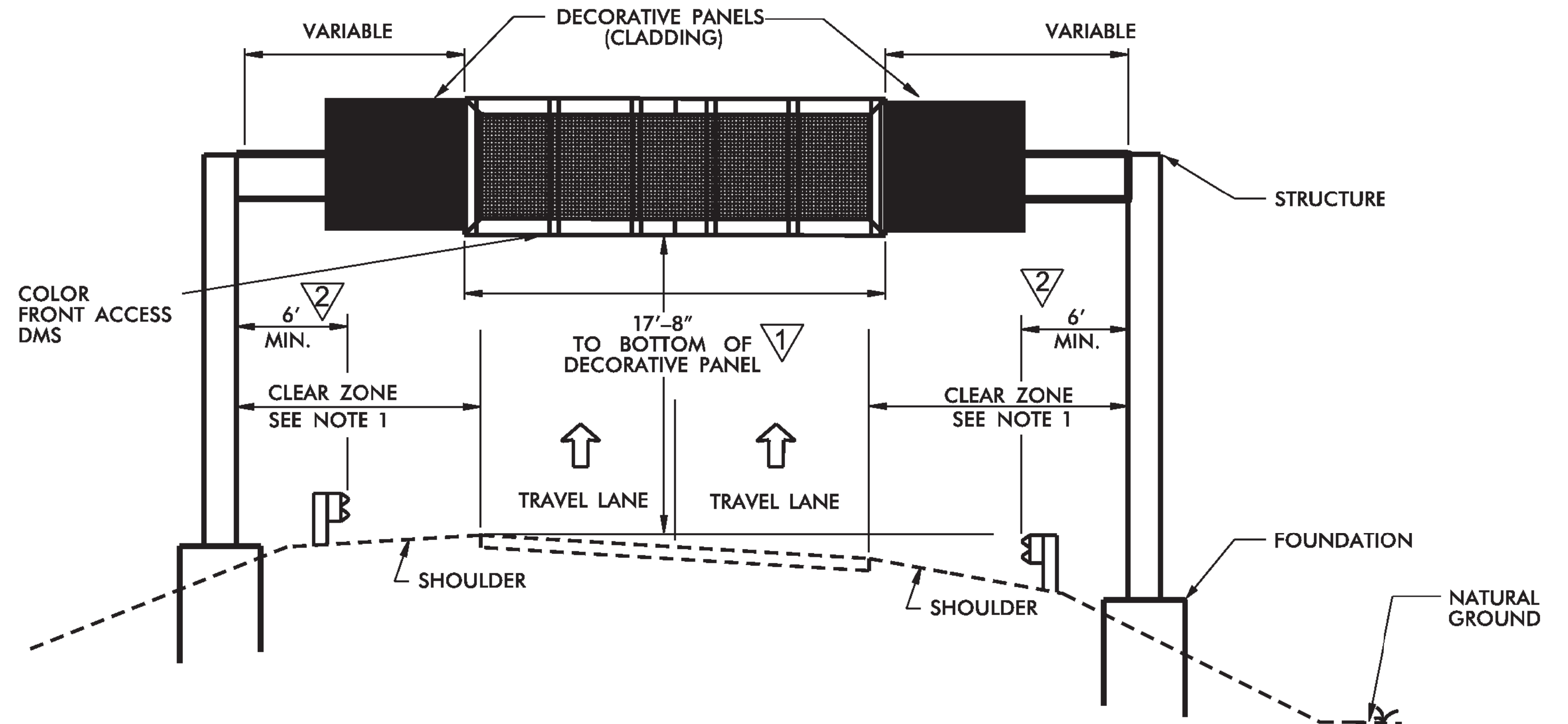
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Charlotte, North Carolina 28217
(704) 522-7275 NCBEEES #F-0326

ITS STANDARD DETAILS
DMS
BLOCK DIAGRAM

SCALE: N.T.S.	NORTH CAROLINA TURNPIKE AUTHORITY	SHEET NO. D-1
DATE: August, 2011		
DWG. BY: B. Slocum		
DESIGN BY: A. Badgett / D. Jones		
APPROVED: A. Lelewski		



**TYPICAL PLAN VIEW
ON-SITE DMS AT AET GANTRY STRUCTURE**



**TYPICAL ELEVATION VIEW
ON-SITE DMS AT AET GANTRY STRUCTURE**

GENERAL NOTES:

- DESIGN COLUMNS IN ACCORDANCE WITH NCTA AESTHETIC DESIGN GUIDELINES AS REQUIRED BY RFP.
- ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.
- CONDUCTORS SHALL BE CONNECTED TO STEEL FRAMEWORK THAT HAVE BEEN CLEANED TO BASE METAL, BY USE OF BONDING PLATES HAVING CONTACT AREA OF NOT LESS THAN 8 SQUARE INCHES OR BY WELDING OR BRAZING. DRILLING AND TAPPING THE STEEL STRUCTURE TO ACCEPT A THREADED CONNECTOR IS ALSO AN ACCEPTABLE METHOD.
- IF STEEL FRAMEWORK IS TO BE DRILLED AND TAPPED TO ACCEPT THREADED CONNECTOR, THE THREADED CONNECTOR SHALL HAVE AT LEAST 5 THREADS FULLY ENGAGED AND SECURED WITH A JAM NUT TO THE STEEL FRAMEWORK.
- BENDS IN THE CONDUIT WITH DMS COMMUNICATIONS CABLE (6-COUNT SINGLE MODE FIBER-OPTIC CABLE) SHALL NOT EXCEED THE MANUFACTURER'S MINIMUM RADIUS FOR THE FIBER-OPTIC CABLE.
- CONDUITS ON STRUCTURE OR COLUMNS SHALL BE HIDDEN FROM VIEW OF APPROACHING TRAFFIC BY PLACING THEM ON DOWNSTREAM SIDE OR WITHIN STRUCTURAL MEMBERS OR COLUMNS.
- (NOTE DELETED)
- ALL DATA AND POWER CABLES FOR THE DMS SHALL BE COMPLETELY CONCEALED FROM ONCOMING TRAFFIC.

REV. NO.	BY	DATE	DESCRIPTION
1	DLJ	10/7/14	Border content and labeling; see revision marks
2	DLJ	8/31/16	See Notes

REVISED 10 /21 /2011

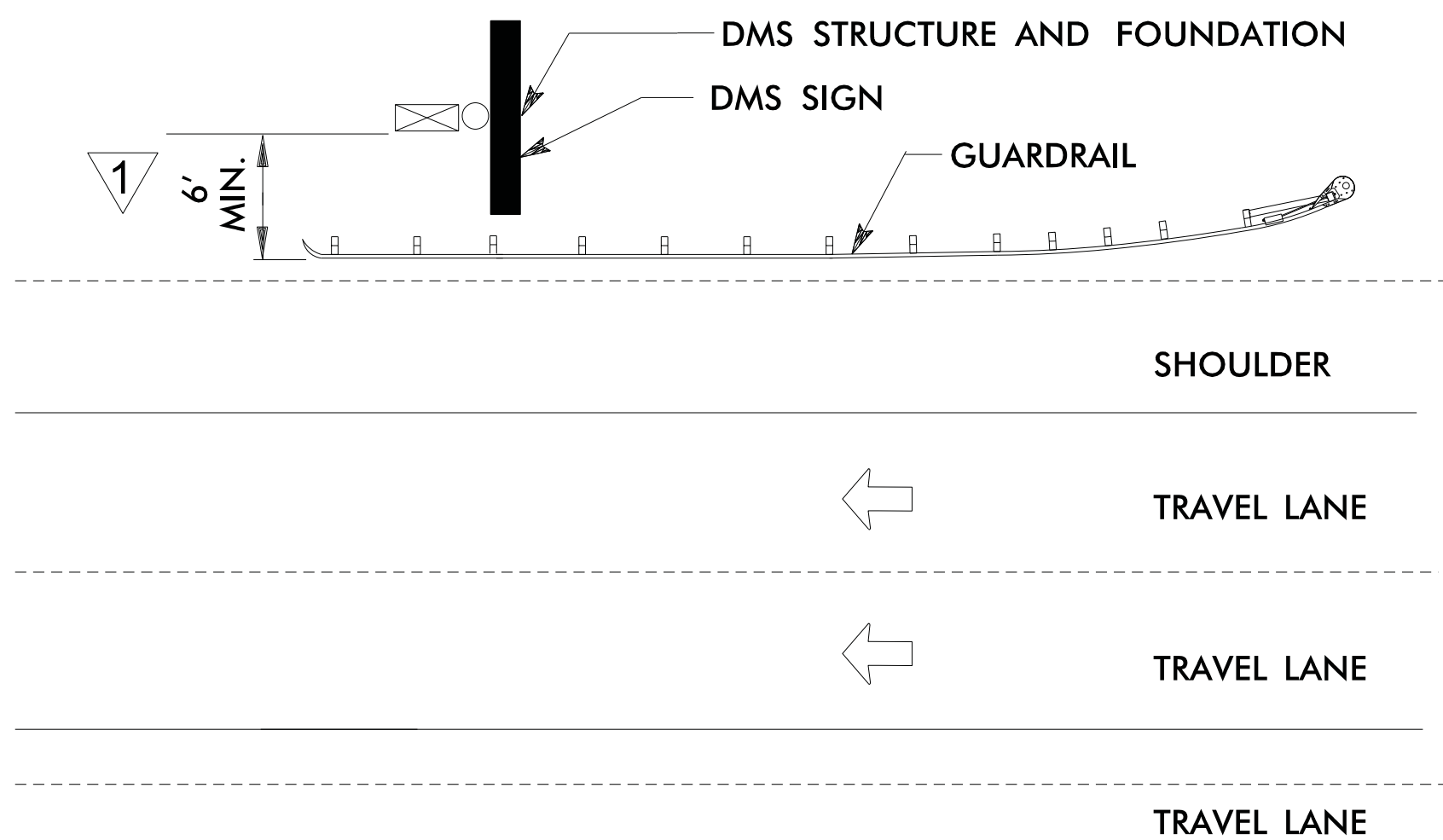
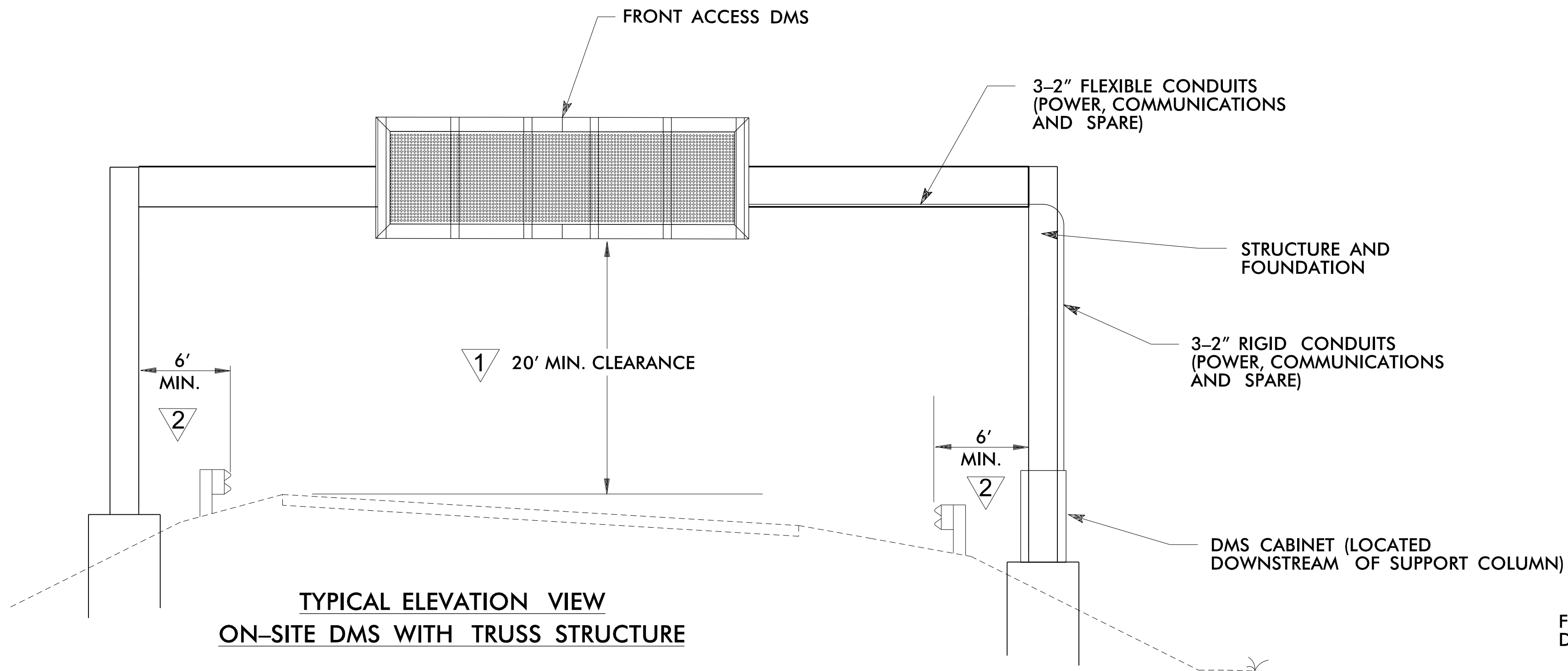
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(704) 522-7275 NCBEES #F-0326

ITS STANDARD DETAILS
DMS - TYPICAL MOUNTING
AET GANTRY STRUCTURE

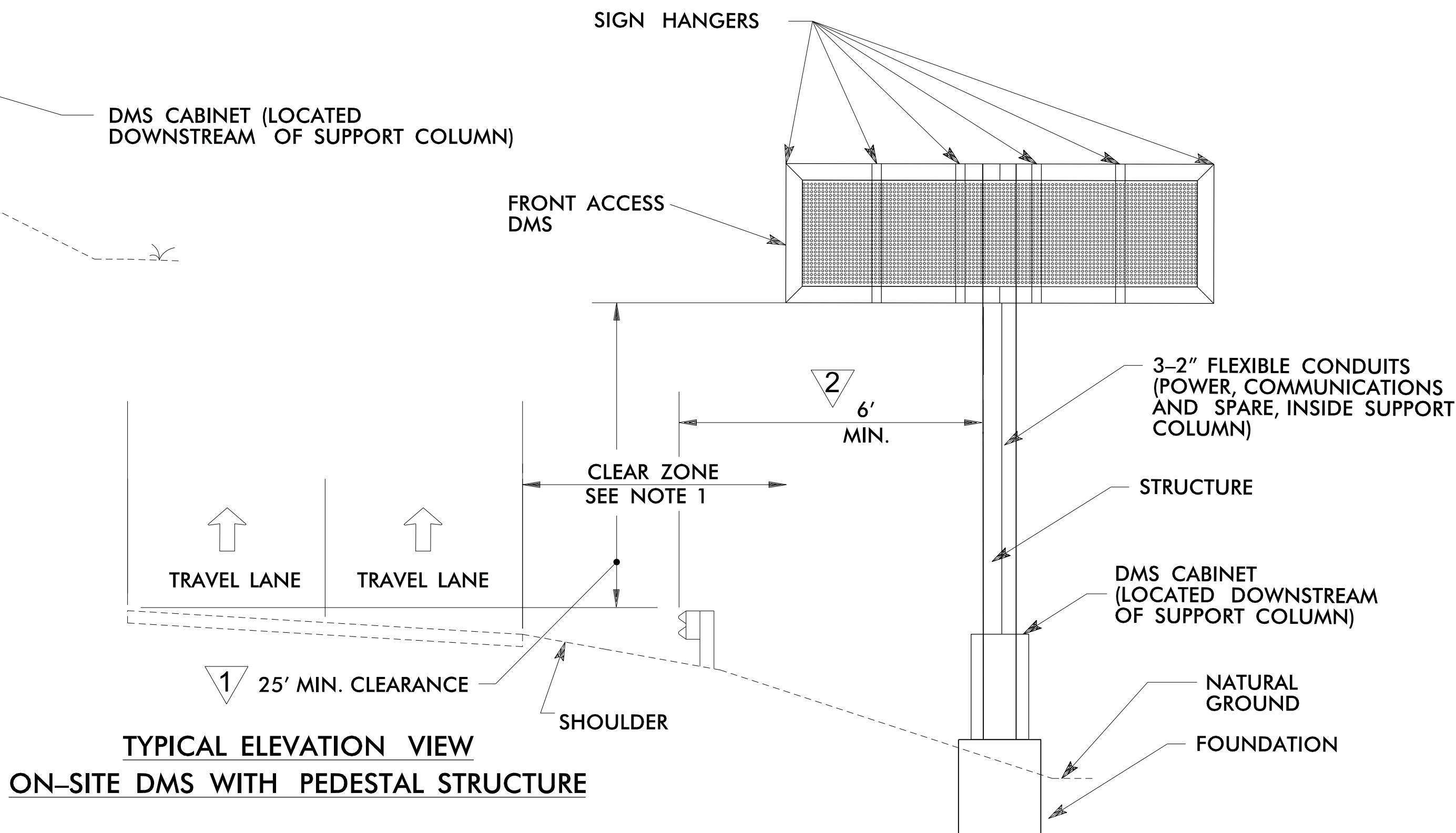
SCALE: N.T.S.
DATE: August, 2011
DWG. BY: B. Slocum
DESIGN BY: A. Badgett / D. Jones
APPROVED: A. Lelewski

NORTH CAROLINA
TURNPIKE AUTHORITY

SHEET NO.
D-2A



TYPICAL PLAN VIEW
ON-SITE DMS CANTILEVER STRUCTURE



TYPICAL ELEVATION VIEW
ON-SITE DMS WITH PEDESTAL STRUCTURE

REV. NO.	BY	DATE	DESCRIPTION
1	DLJ	10/7/14	Border content and labeling: see revision marks
2	DLJ	8/31/16	See Notes

GENERAL NOTES:

- CONDUCTORS SHALL BE CONNECTED TO STEEL FRAMEWORK THAT HAVE BEEN CLEANED TO BASE METAL, BY USE OF BONDING PLATES HAVING CONTACT AREA OF NOT LESS THAN 8 SQUARE INCHES OR BY WELDING OR BRAZING. DRILLING AND TAPPING THE STEEL STRUCTURE TO ACCEPT A THREADED CONNECTOR IS ALSO AN ACCEPTABLE METHOD.
- IF STEEL FRAMEWORK IS TO BE DRILLED AND TAPPED TO ACCEPT THREADED CONNECTOR, THE THREADED CONNECTOR SHALL HAVE AT LEAST 5 THREADS FULLY ENGAGED AND SECURED WITH A JAM NUT TO THE STEEL FRAMEWORK.
- BENDS IN THE CONDUIT WITH DMS COMMUNICATIONS CABLE (6-COUNT SINGLE MODE FIBER-OPTIC CABLE) SHALL NOT EXCEED THE MANUFACTURER'S MINIMUM RADIUS FOR THE FIBER-OPTIC CABLE.
- CONDUITS ON STRUCTURE OR COLUMNS SHALL BE HIDDEN FROM VIEW OF APPROACHING TRAFFIC BY PLACING THEM ON DOWNSTREAM SIDE OR WITHIN STRUCTURAL MEMBERS OR COLUMNS.

- ALL DATA AND POWER CABLES FOR THE DMS SHALL BE COMPLETELY CONCEALED.
- (NOTE DELETED)
- DMS CABINETS SHALL BE GROUND MOUNTED OR MOUNTED ON STRUCTURE, AS DIRECTED BY THE ENGINEER.
- ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.
- TRUSS DETAIL ONLY APPLIES IF TRUSS IS NOT AT AN AET TOLL ZONE. FOR CONDUIT DETAILS FOR TRUSSES AT AET TOLL ZONES, SEE AET STANDARD DRAWINGS.
- IF NO GUARDRAIL OR BARRIER WALL EXISTS, STRUCTURE SHALL BE OUTSIDE CLEAR ZONE. CLEAR ZONE SHALL BE MEASURED TO EDGE OF DRILLED SHAFT IF DRILLED SHAFT IS MORE THAN 4" ABOVE ADJACENT GRADE.
- DESIGN COLUMNS IN ACCORDANCE WITH NCTA AESTHETIC DESIGN GUIDELINES AS REQUIRED BY RFP.

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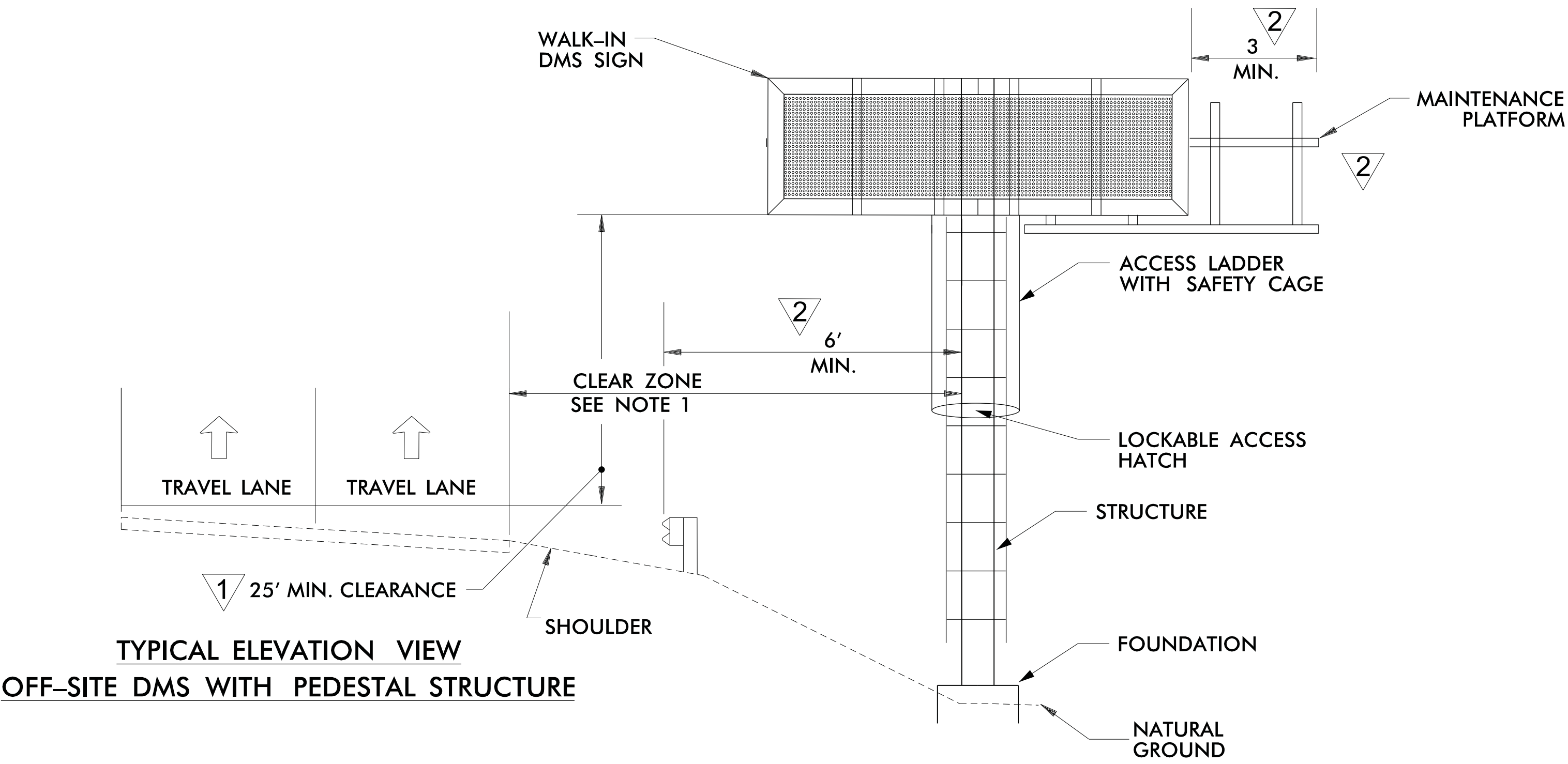
ITS STANDARD DETAILS
DMS - TYPICAL MOUNTING
ON-SITE DMS NOT AT TOLL ZONE

SCALE: N.T.S.
DATE: August, 2011
DWG. BY: B. Slocum
DESIGN BY: A. Badgett / D. Jones
APPROVED: A. Lelewski

NORTH CAROLINA
TURNPIKE AUTHORITY

SHEET NO.

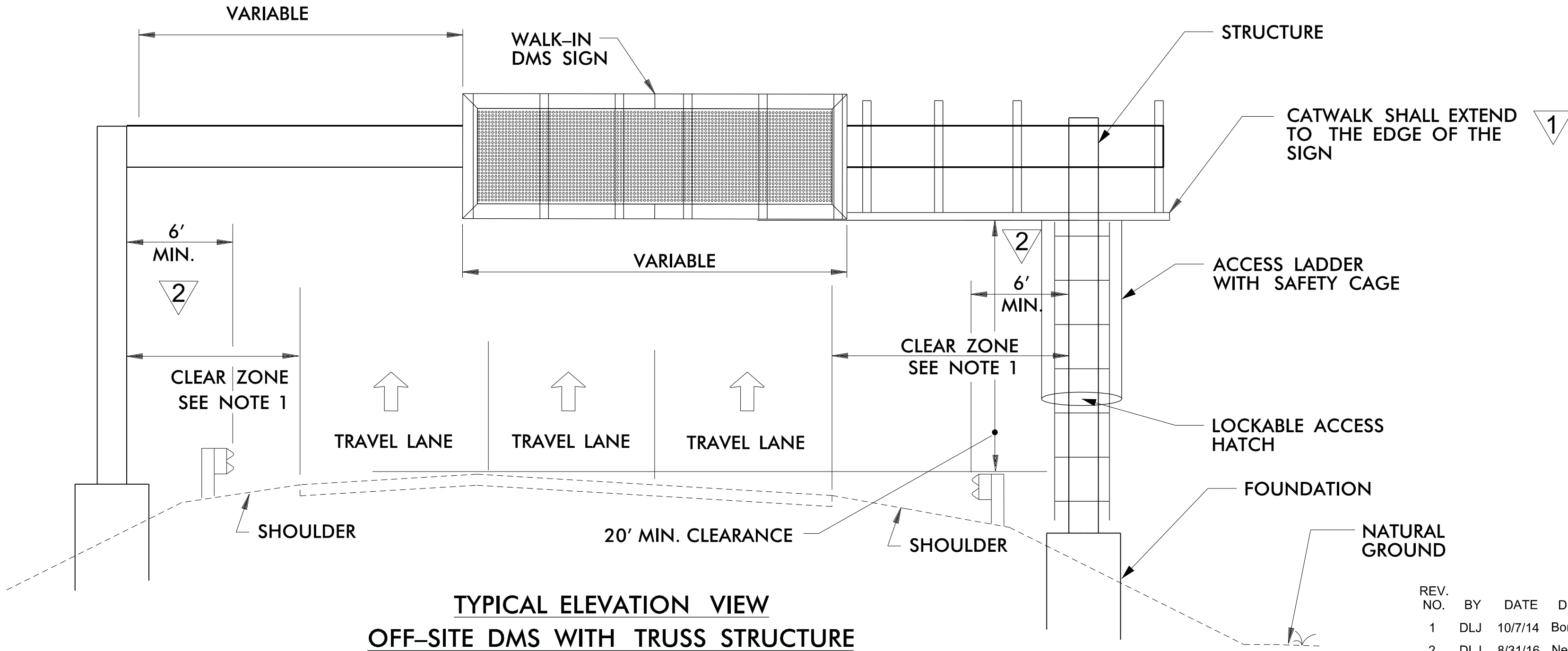
D-2B



TYPICAL ELEVATION VIEW
OFF-SITE DMS WITH PEDESTAL STRUCTURE

1 GENERAL NOTES:

1. IF NO GUARDRAIL OR BARRIER WALL EXISTS, STRUCTURE SHALL BE OUTSIDE CLEAR ZONE. CLEAR ZONE SHALL BE MEASURED TO EDGE OF DRILLED SHAFT IF DRILLED SHAFT IS MORE THAN 4" ABOVE GRADE.
2. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.
3. CONTRACTOR IS RESPONSIBLE FOR FURNISHING DMS ELEVATIONS FOR ENGINEER'S APPROVAL.
4. USE THE ACTUAL DIMENSIONS AND WEIGHT OF THE DMS PROVIDED BY THE DMS FABRICATOR TO COMPLETE THE DESIGN OF THE DMS STRUCTURE.
5. FIELD VERIFY ALL FOOTING ELEVATIONS AND GROUND SLOPES AT THE FOOTINGS USING THE LATEST NCDOT STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES.
6. ENSURE THAT THE TOP OF THE FOOTING EXTENDS AT LEAST 6 INCHES AND NOT MORE THAN 24 INCHES ABOVE THE HIGHEST POINT OF THE GROUND SURFACE AT THE FOOTING.
7. DESIGN AND CONSTRUCT THE PEDESTAL STRUCTURE AND DMS ENCLOSURE TO WITHSTAND WIND VELOCITIES OF 90 MPH.
8. VERIFY ALL UNDERGROUND UTILITY LOCATIONS BEFORE BEGINNING ANY UNDERGROUND WORK. DO NOT DAMAGE ANY EXISTING UTILITIES OR NCDOT COMMUNICATIONS CABLE DURING CONSTRUCTION.
9. PROVIDE A FIXED LADDER LEADING TO THE ACCESS PLATFORM. EQUIP THE LADDER WITH A SECURITY COVER (LADDER GUARD). START THE FIRST LADDER RUNG NO MORE THAN 18 INCHES ABOVE A CONCRETE LANDING PAD. DESIGN RUNGS ON 12 INCH CENTER-TO-CENTER TYPICAL SPACING.
10. INSTALL A CONCRETE LANDING PAD MEASURING A MINIMUM 4 INCHES DEEP, 24 INCHES WIDE, AND 36 INCHES LONG DIRECTLY BENEATH THE LADDER.
11. SEE ROADWAY PLANS FOR GUARDRAIL DETAILS.
12. BENDS IN THE CONDUIT WITH DMS COMMUNICATIONS CABLE (6-COUNT SINGLE MODE FIBER-OPTIC CABLE) SHALL NOT EXCEED THE MANUFACTURER'S MINIMUM RADIUS FOR THE FIBER-OPTIC CABLE.
13. DMS CABINETS SHALL BE EITHER BE GROUND-MOUNTED OR MOUNTED ON STRUCTURE, AS DIRECTED BY THE ENGINEER.

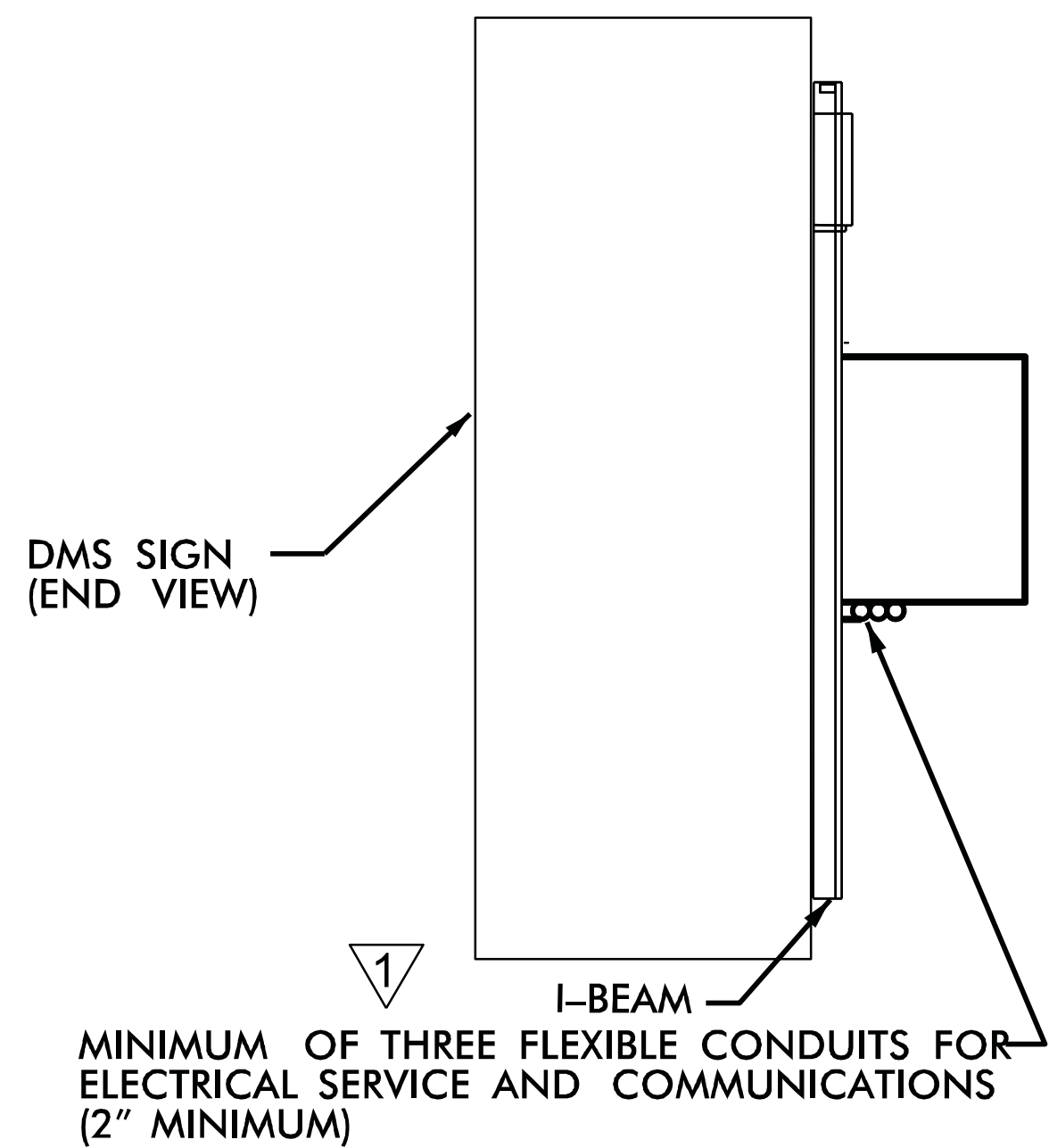
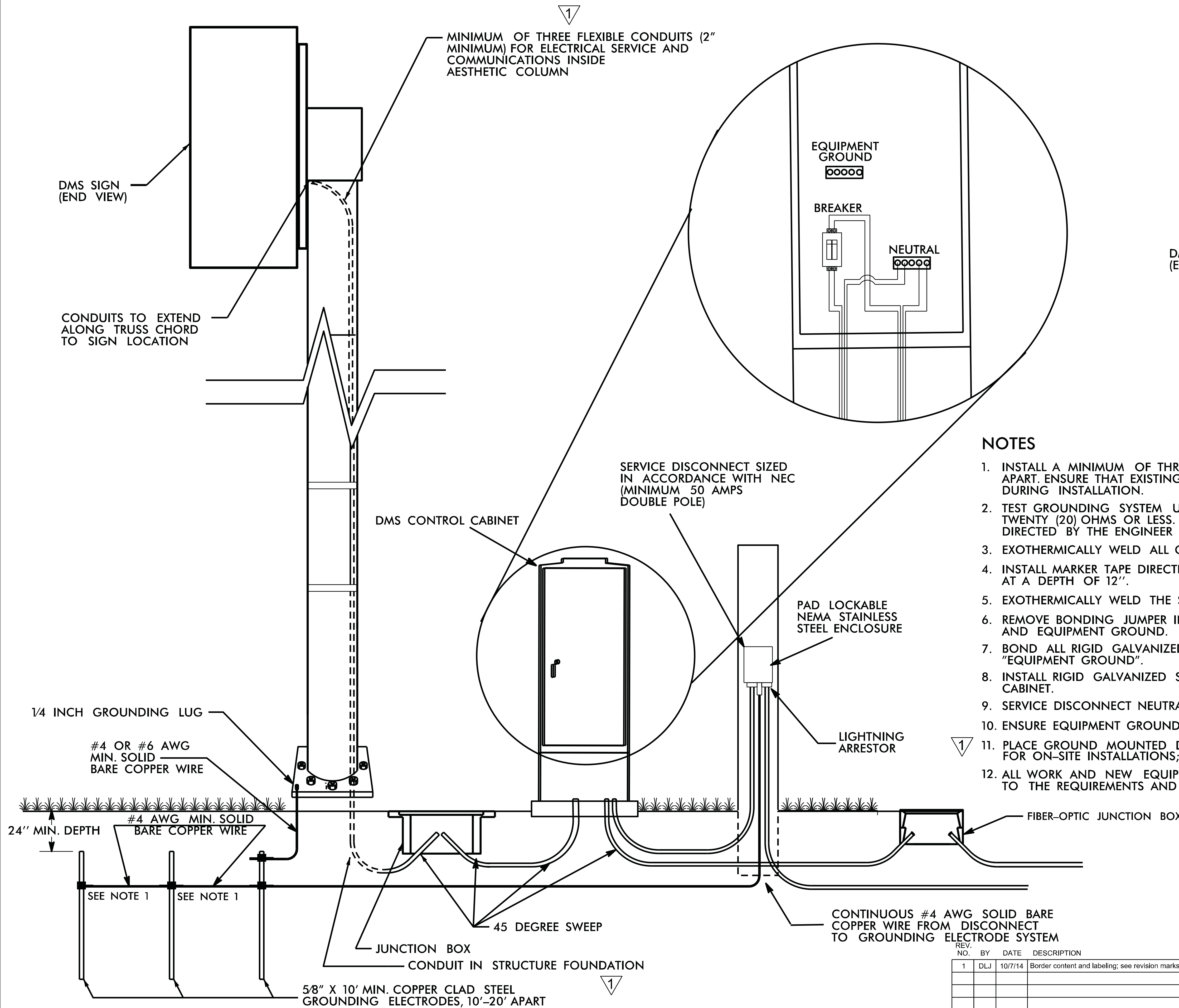


TYPICAL ELEVATION VIEW
OFF-SITE DMS WITH TRUSS STRUCTURE

REVISED 10 /21 /2011

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ITS STANDARD DETAILS DMS - TYPICAL MOUNTING OFF-SITE DMS		
SCALE: N.T.S.	NORTH CAROLINA TURNPIKE AUTHORITY	SHEET NO. D-2C
DATE: August, 2011		
DWG. BY: B. Slocum		
DESIGN BY: A. Badgett / D. Jones		
APPROVED: A. Lelewski		

REV. NO.	BY	DATE	DESCRIPTION
1	DLJ	10/7/14	Border content and labeling; see revision marks
2	DLJ	8/31/16	New notes



NOTES

1. INSTALL A MINIMUM OF THREE (3) GROUND RODS SPACED A MINIMUM OF 10 FEET APART. ENSURE THAT EXISTING UNDERGROUND FACILITIES ARE NOT DAMAGED DURING INSTALLATION.
2. TEST GROUNDING SYSTEM USING AN APPROVED METHOD. SYSTEM SHALL MEASURE TWENTY (20) OHMS OR LESS. ADDITIONAL GROUND RODS SHALL BE INSTALLED AS DIRECTED BY THE ENGINEER TO MEET THIS REQUIREMENT.
3. EXOTHERMICALLY WELD ALL CONNECTIONS TO GROUND RODS.
4. INSTALL MARKER TAPE DIRECTLY ABOVE ALL GROUNDING ELECTRODES AND CONDUCTORS AT A DEPTH OF 12".
5. EXOTHERMICALLY WELD THE SERVICE POLE GROUND WIRE TO THE GROUND ROD SYSTEM.
6. REMOVE BONDING JUMPER IN EQUIPMENT CABINET IF INSTALLED BETWEEN AC NEUTRAL AND EQUIPMENT GROUND.
7. BOND ALL RIGID GALVANIZED STEEL CONDUITS ENTERING THE CABINET TO "EQUIPMENT GROUND".
8. INSTALL RIGID GALVANIZED STEEL CONDUIT (MINIMUM 2") BETWEEN DISCONNECT AND CABINET.
9. SERVICE DISCONNECT NEUTRAL BUS BAR SHALL PROVIDE FOR 2 #4 AWG CONNECTIONS.
10. ENSURE EQUIPMENT GROUND IS ELECTRICALLY BONDED TO CABINET.
11. PLACE GROUND MOUNTED DMS CABINET DOWNSTREAM AND BEHIND SUPPORT COLUMN FOR ON-SITE INSTALLATIONS; OTHERWISE PLACE AS DIRECTED BY ENGINEER.
12. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.

1

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ITS STANDARD DETAILS
DMS
ELECTRICAL SERVICE AND GROUNDING

SCALE: N.T.S.	NORTH CAROLINA TURNPIKE AUTHORITY	SHEET NO. D-3
DATE: August, 2011		
DWG. BY: B. Slocum		
DESIGN BY: A. Badgett / D. Jones		
APPROVED: A. Lelewski		

REV. NO.	BY	DATE	DESCRIPTION
1	DLJ	10/7/14	Border content and labeling; see revision marks

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GENERAL NOTES:

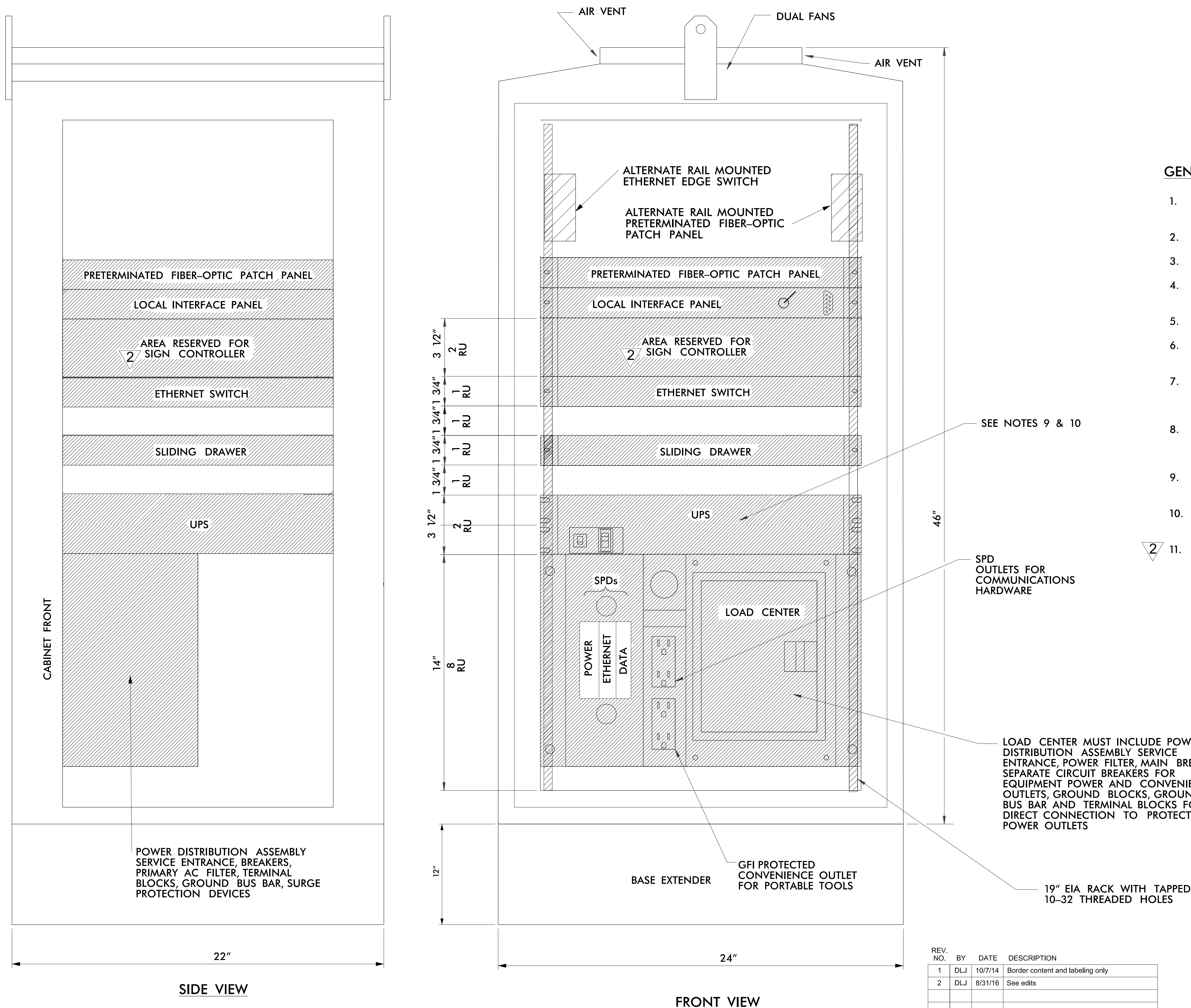
1. CABINET LAYOUT IS FOR BASE-MOUNTED INSTALLATIONS.
2. ALL DIMENSIONS ARE APPROXIMATE.
3. SEE RFP REQUIREMENTS FOR CABINET TYPE AND SIZE.
4. THE MINIMUM DMS CABINET DIMENSIONS SHALL BE 46"H X 24"W X 22"D.
5. CONDUIT ENTRANCES ARE AT BOTTOM OF CABINET.
6. MINIMUM NUMBER OF DUPLEX OUTLETS IS TWO, (1) SPD AND (1) GFI PROTECTED.
7. PROVIDE SIGN CONTROLLER IN GROUND CABINET TO PROVIDE FULL ACCESS TO DMS SIGN FOR CONTROL, PROGRAMMING AND TROUBLESHOOTING.
8. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.
9. PROVIDE UPS FOR ALL DMS NOT LOCATED AT AET GANTRY STRUCTURES.
10. UTILIZE UPS IN AET VAULT FOR ALL DMS LOCATED AT AET GANTRY STRUCTURE LOCATIONS.
11. MOUNT PATCH PANEL AS LOW AS POSSIBLE FOR EASY ACCESS AND MAINTENANCE.

REVISED 10 /21 /2011

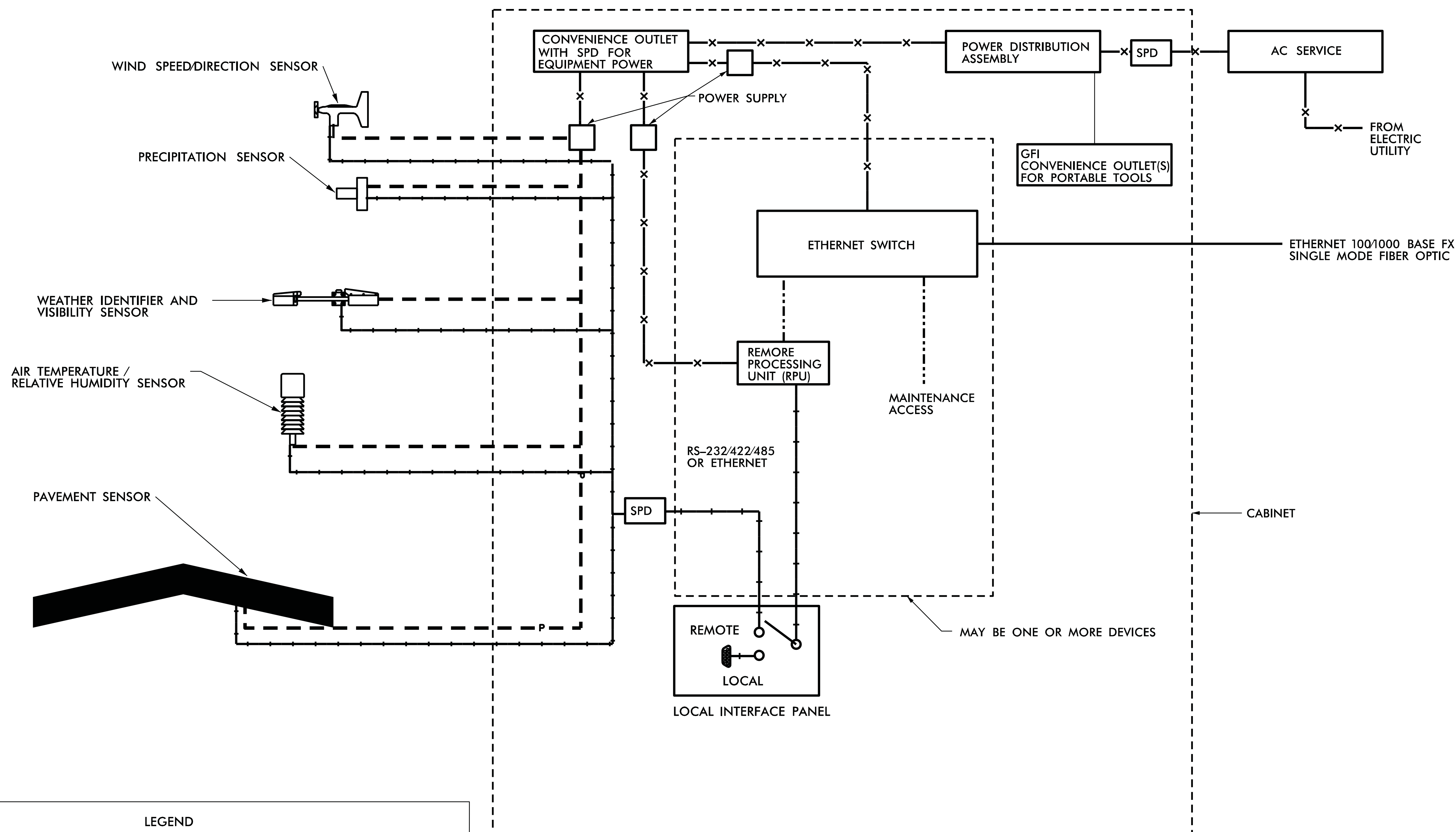
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ITS STANDARD DETAILS
DMS
CABINET LAYOUT

SCALE:	N.T.S.	NORTH CAROLINA TURNPIKE AUTHORITY	SHEET NO. D-4
DATE:	August, 2011		
DWG. BY:	B. Slocum		
DESIGN BY:	A. Badgett / D. Jones		
APPROVED:	A. Lelewski		



REV. NO.	BY	DATE	DESCRIPTION
1	DLJ	10/7/14	Border content and labeling only
2	DLJ	8/31/16	See edits



LEGEND			
	1000 BASE TX ETHERNET		100 BASE FX ETHERNET (FIBER)
	100 BASE TX ETHERNET		1000 BASE FX ETHERNET (FIBER)
	ANALOG VIDEO		RS-232/422/485
	120 VAC POWER		EXISTING DEVICE
	LOW VOLTAGE POWER		EXISTING FIBER CABLE

NOTES

1. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.

REV. NO.	BY	DATE	DESCRIPTION
1	DLJ	10/7/14	Border content and labeling only

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ITS STANDARD DETAILS

RWIS BLOCK DIAGRAM

SCALE:	N.T.S.
DATE:	August, 2011
DWG. BY:	B. Slocum
DESIGN BY:	A. Badgett / D. Jones
APPROVED:	A. Lelewski

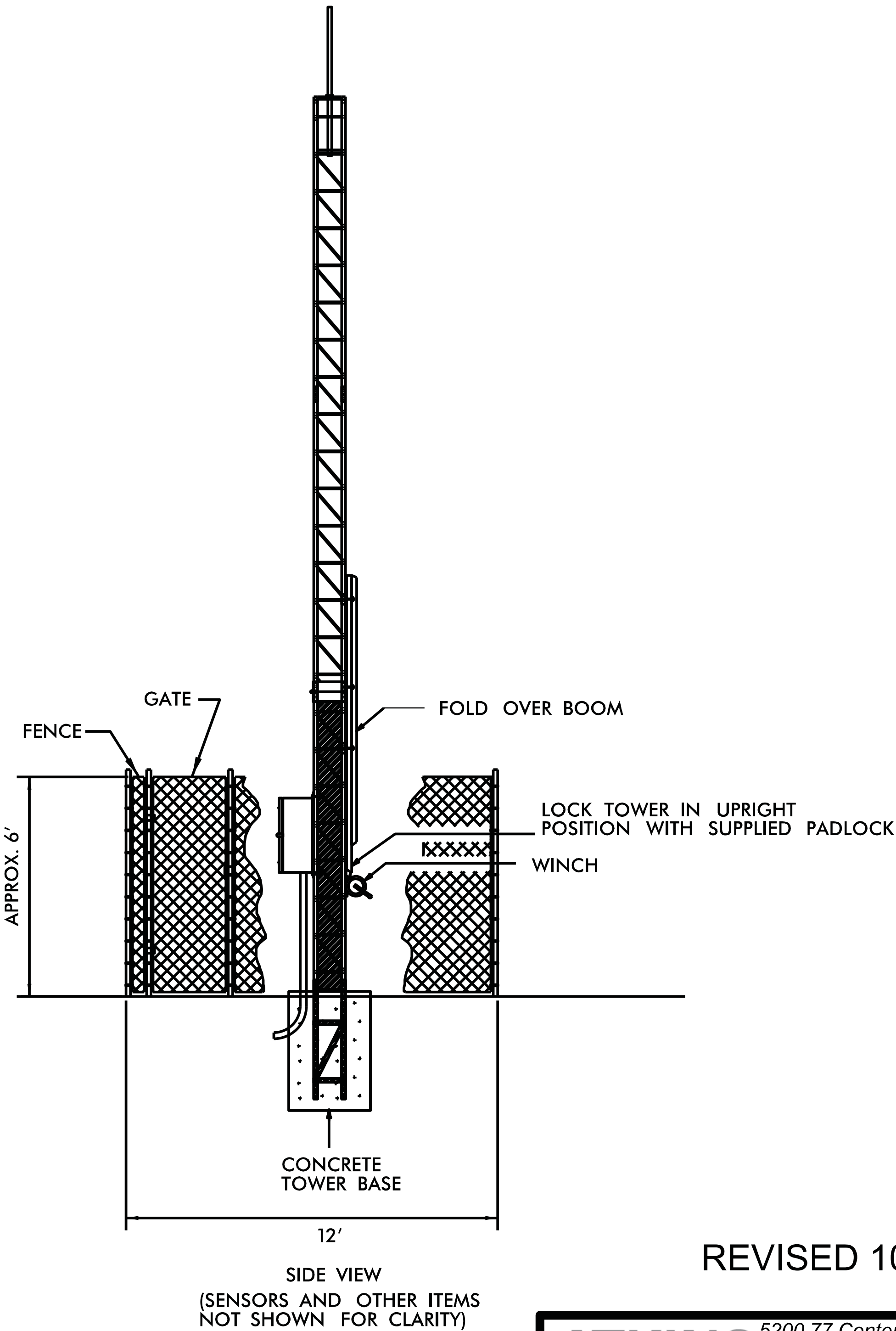
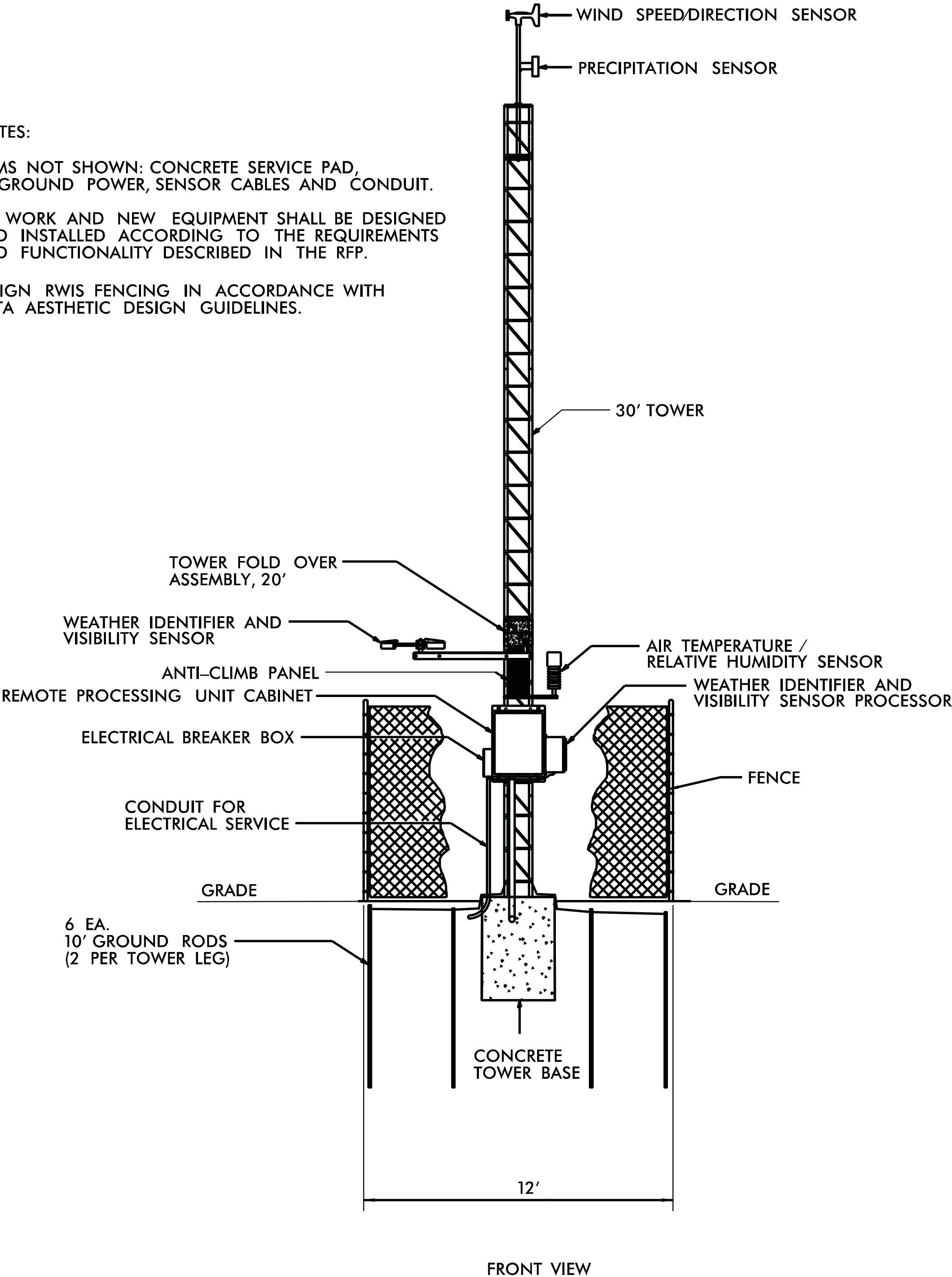
NORTH CAROLINA
TURNPIKE AUTHORITY

SHEET NO.

R-1

NOTES:

1. ITEMS NOT SHOWN: CONCRETE SERVICE PAD, IN-GROUND POWER, SENSOR CABLES AND CONDUIT.
2. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.
3. DESIGN RWIS FENCING IN ACCORDANCE WITH NCTA AESTHETIC DESIGN GUIDELINES.



REVISED 10/21/2011

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ITS STANDARD DETAILS

RWIS
ELEVATION VIEW

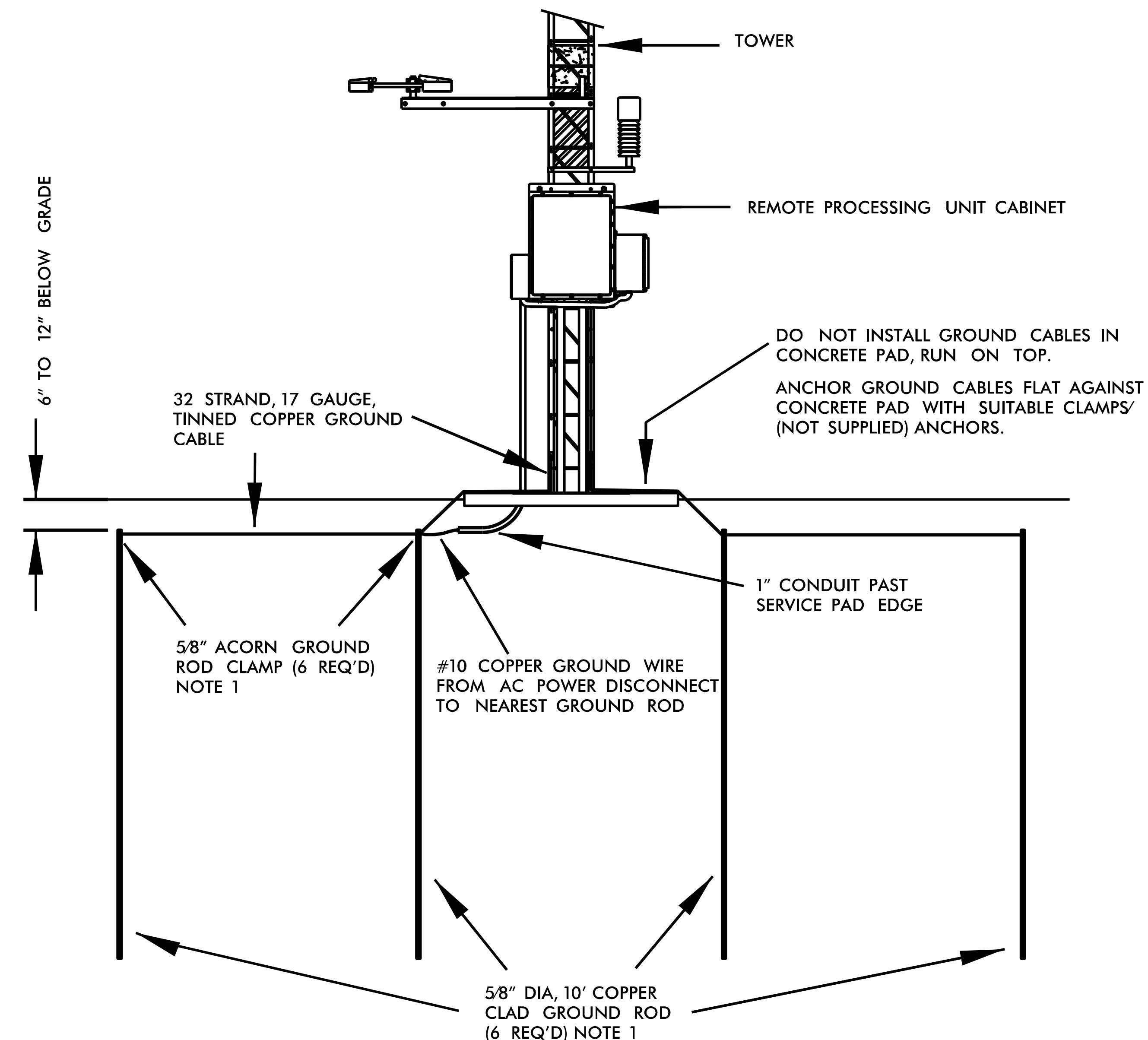
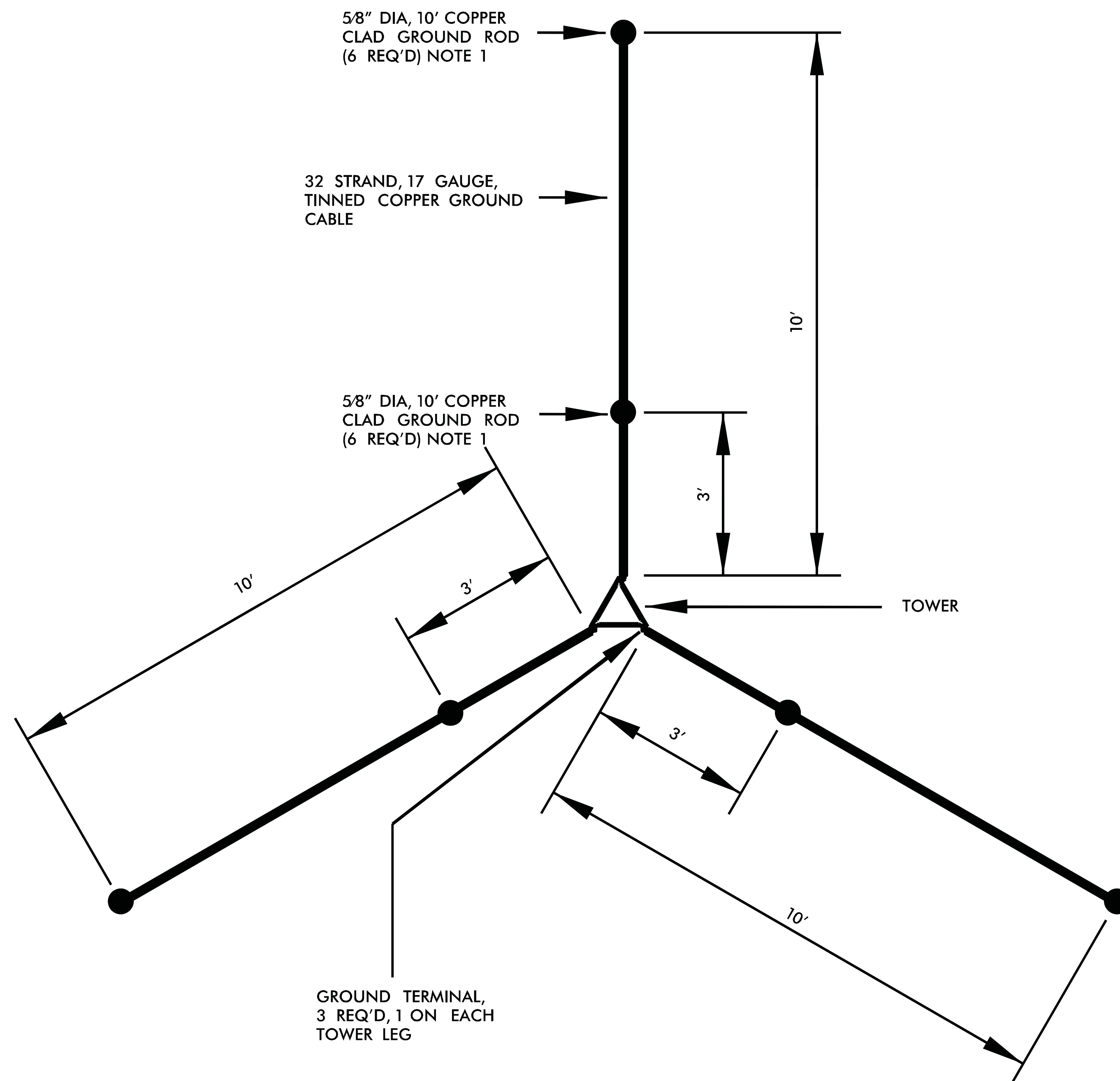
SCALE: N.T.S.
DATE: August, 2011
DWG. BY: B. Slocum
DESIGN BY: A. Badgett / D. Jones
APPROVED: A. Lelewski

NORTH CAROLINA
TURNPIKE AUTHORITY

SHEET NO.

R-2

REV. NO.	BY	DATE	DESCRIPTION
1	DLJ	10/7/14	Border content and labeling only



NOTES:

1. 6 EA. 5/8" DIA, 10' COPPER CLAD GROUND RODS AND 5/8" ACORN GROUND ROD CLAMPS ARE NOT SUPPLIED. INSTALLATION CONTRACTOR RESPONSIBLE FOR PROVIDING.
2. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.

REV. NO.	BY	DATE	DESCRIPTION
1	DLJ	10/7/14	Border content and labeling only

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ITS STANDARD DETAILS

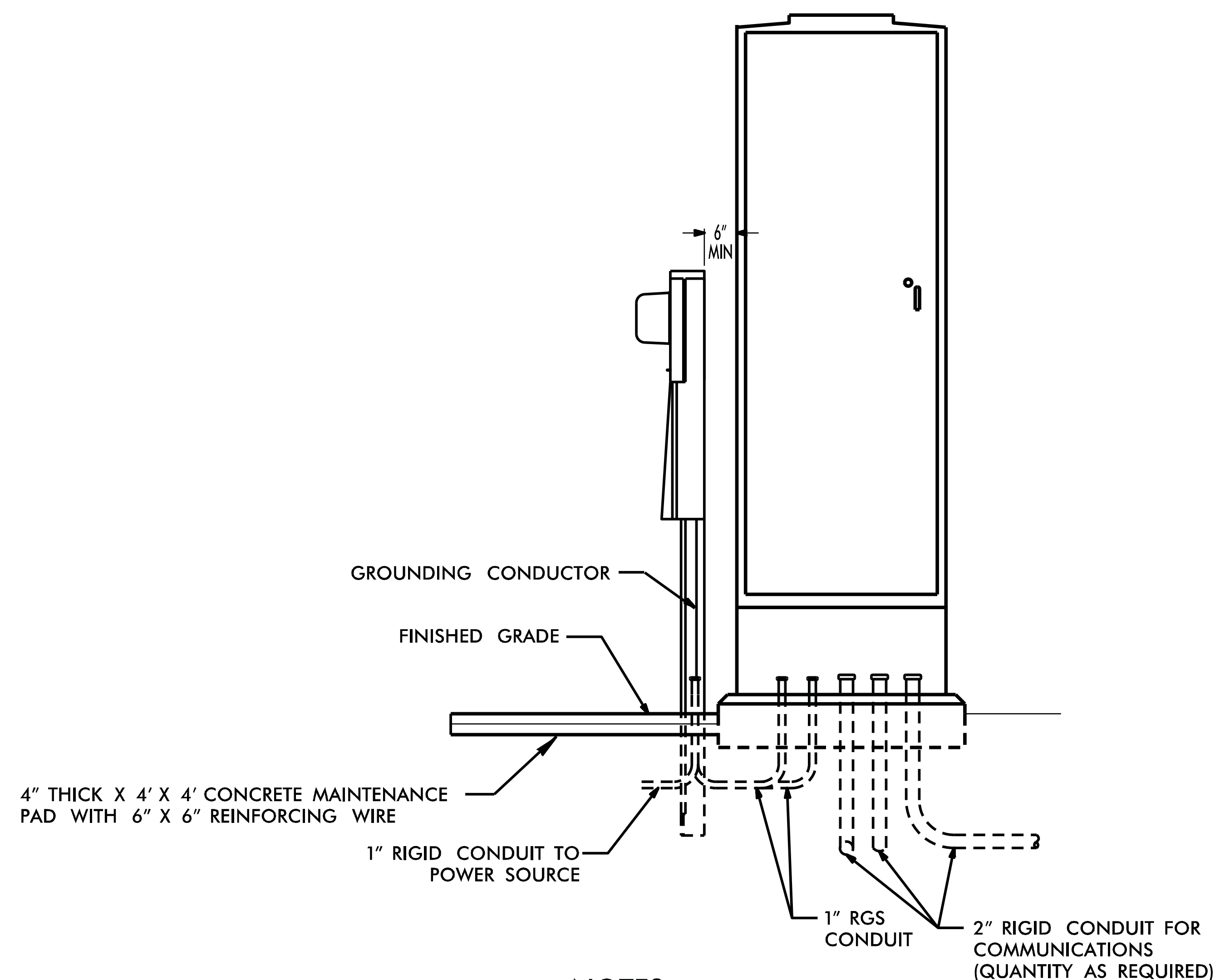
RWIS GROUNDING

SCALE: N.T.S.
 DATE: August, 2011
 DWG. BY: B. Slocum
 DESIGN BY: A. Badgett / D. Jones
 APPROVED: A. Lelewski

NORTH CAROLINA
 TURNPIKE AUTHORITY

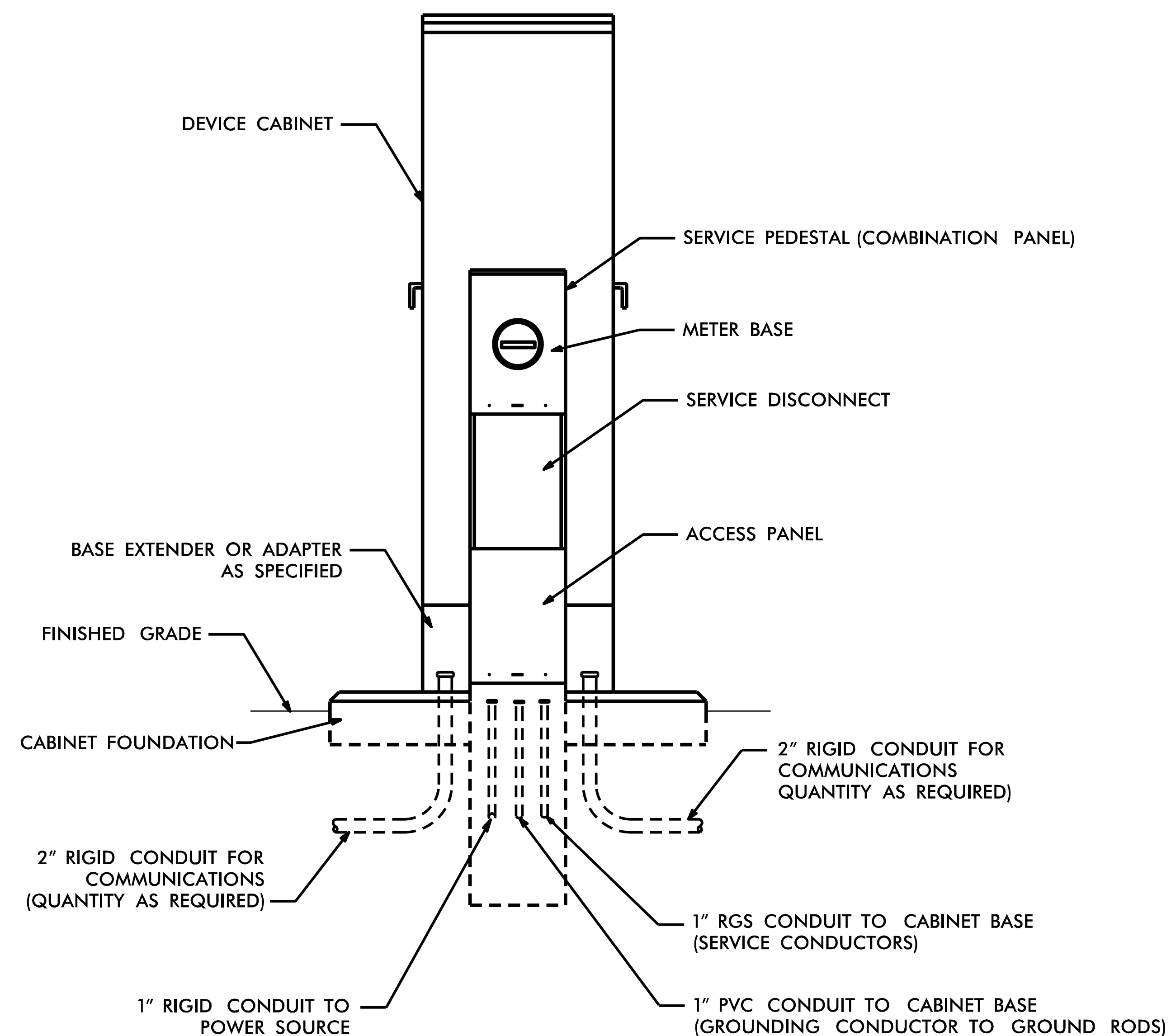
SHEET NO.

R-3



NOTES

1. TEST GROUNDING SYSTEM USING AN APPROVED METHOD IN ACCORDANCE WITH SPECIAL PROVISIONS. INSTALL GROUND RODS AS DIRECTED BY THE ENGINEER TO MEET THIS REQUIREMENT.
2. REMOVE ANY EXISTING GROUND RODS IN CONCRETE CABINET FOUNDATION BY CUTTING OFF FLUSH WITH FOUNDATION SURFACE.
3. REMOVE BONDING JUMPER IN EQUIPMENT CABINET IF INSTALLED BETWEEN AC NEUTRAL AND EQUIPMENT GROUND.
4. BOND ALL RIGID GALVANIZED STEEL CONDUITS ENTERING THE CABINET TO EQUIPMENT GROUND.
5. INSTALL RIGID GALVANIZED STEEL CONDUIT (MINIMUM 1") BETWEEN DISCONNECT AND CABINET.
6. SERVICE DISCONNECT GROUND BUS BAR SHALL PROVIDE FOR 2 #4 AWG CONNECTIONS.
7. IF CONDITIONS REQUIRE SERVICE PEDESTAL TO BE INSTALLED IN FRONT OR REAR OF CABINET, MAINTAIN SUFFICIENT CLEARANCE FOR DOOR TO FULLY OPEN.
8. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.
9. COMBINATION PANELS NOT ADJACENT TO CABINETS DO NOT REQUIRE MAINTENANCE PADS.



REVISED 08 /24 /2011

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ITS STANDARD DETAILS

POWER SERVICE DETAIL
GROUND-MOUNTED CABINET

SCALE: N.T.S.
DATE: August, 2011
DWG. BY: B. Slocum
DESIGN BY: A. Badgett / D. Jones
APPROVED: A. Lelewski

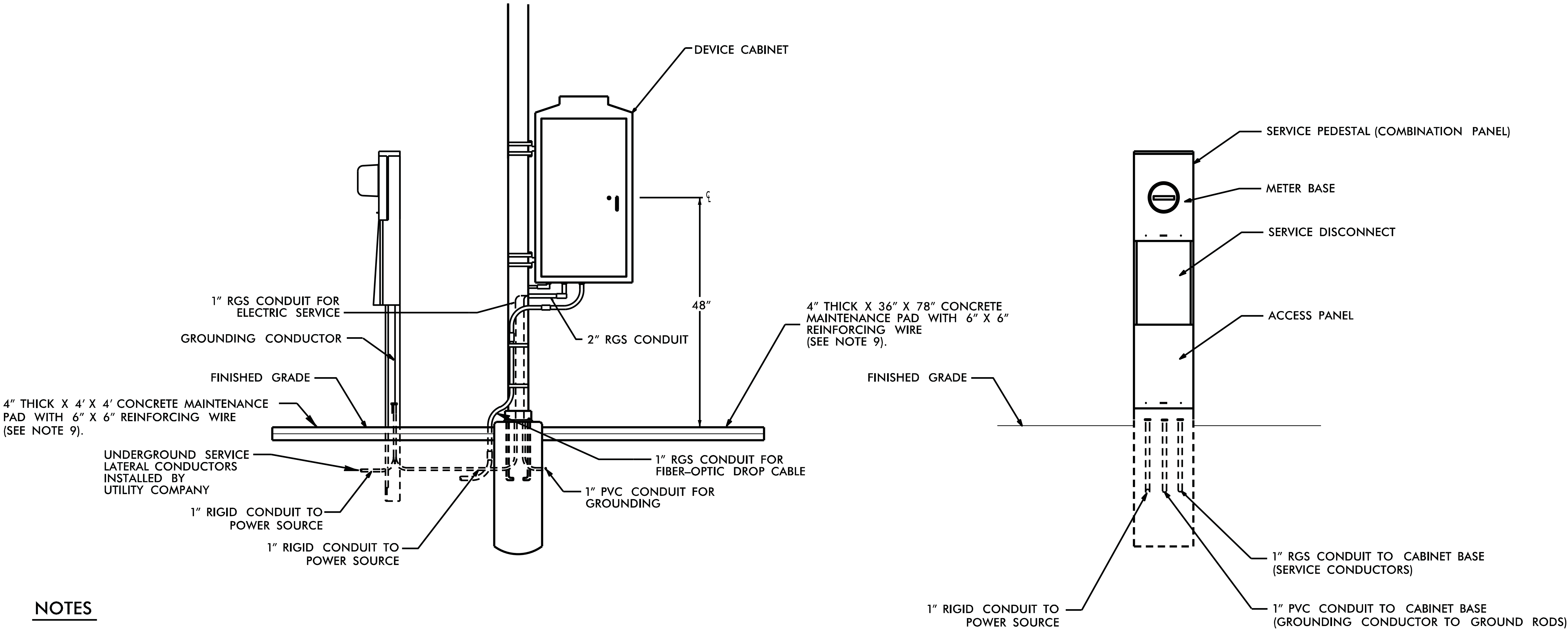
NORTH CAROLINA
TURNPIKE AUTHORITY

SHEET NO.

P-1

REV. NO.	BY	DATE	DESCRIPTION
1	DLJ	10/7/14	Meter pad, border content

DO NOT INSTALL MAINTENANCE PAD ON
EXCESSIVE SLOPE (GREATER THAN 3:1)



NOTES

1. TEST GROUNDING SYSTEM USING AN APPROVED METHOD IN ACCORDANCE WITH SPECIAL PROVISIONS. INSTALL GROUND RODS AS DIRECTED BY THE ENGINEER TO MEET THIS REQUIREMENT.
2. REMOVE ANY EXISTING GROUND RODS IN CONCRETE CABINET FOUNDATION BY CUTTING OFF FLUSH WITH FOUNDATION SURFACE.
3. REMOVE BONDING JUMPER IN EQUIPMENT CABINET IF INSTALLED BETWEEN AC NEUTRAL AND EQUIPMENT GROUND.
4. BOND ALL RIGID GALVANIZED STEEL CONDUITS ENTERING THE CABINET TO "EQUIPMENT GROUND".
5. INSTALL RIGID GALVANIZED STEEL CONDUIT (MINIMUM 1") BETWEEN DISCONNECT AND CABINET.
6. SERVICE DISCONNECT GROUND BUS BAR SHALL PROVIDE FOR 2 #4 AWG CONNECTIONS.
7. IF CONDITIONS REQUIRE SERVICE PEDESTAL TO BE INSTALLED IN FRONT OR REAR OF CABINET, MAINTAIN SUFFICIENT CLEARANCE FOR DOOR TO FULLY OPEN.
8. ALL WORK AND NEW EQUIPMENT SHALL BE DESIGNED AND INSTALLED ACCORDING TO THE REQUIREMENTS AND FUNCTIONALITY DESCRIBED IN THE RFP.
9. CONCRETE PADS FOR SERVICE PEDESTAL AND CABINET SHALL BE COMBINED INTO A SINGLE PAD, IF PEDESTAL IS PRESENT NEXT TO POLE. COMBINATION PANELS NOT ADJACENT TO CABINETS DO NOT REQUIRE A MAINTENANCE PAD.

REV. NO.	BY	DATE	DESCRIPTION
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REVISED 8 / 24 / 11

ATKINS 5200 77 Center Drive, Suite 50
Charlotte, North Carolina 28217
(704) 522-7275 NCBEES #F-0326

ITS STANDARD DETAILS
POWER SERVICE DETAIL
POLE-MOUNTED CABINET

SCALE: N.T.S.
DATE: August, 2011
DWG. BY: B. Slocum
DESIGN BY: A. Badgett / D. Jones
APPROVED: A. Lelewski

NORTH CAROLINA
TURNPIKE AUTHORITY

SHEET NO.
P-2

\$\$\$\$\$SYTIME\$\$\$\$\$
\$\$\$\$\$SDON\$\$\$\$\$
\$\$\$\$\$USERAME\$\$\$\$\$