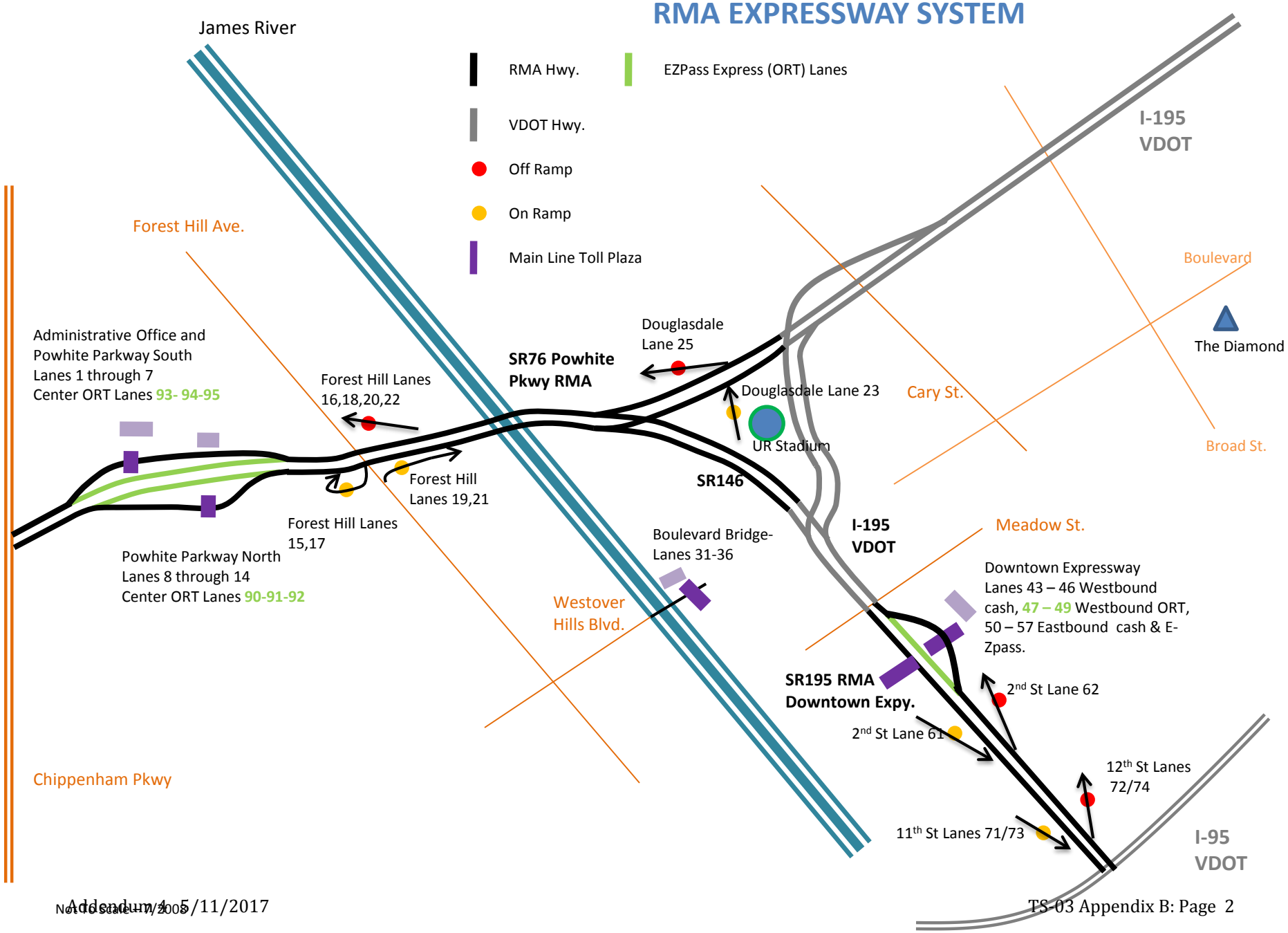
TS-03 APPENDIX B: REFERENCE DRAWINGS

The purpose of the TS-03 APPENDIX B Reference Drawings is to provide a general description of certain of the scope and technical requirements of RMTA's Toll Collection System, and RMTA DOES NOT REPRESENT OR WARRANT THAT THE INFORMATION CONTAINED IN TS-03 APPENDIX B REFERENCE DRAWINGS IS EITHER COMPLETE OR ACCURATE OR IN CONFORMITY WITH THE REQUIREMENTS OF RMTA-PROVIDED APPROVALS. All Proposers are advised that the Work to be undertaken under the RFP is to be performed by the winning Proposer, and each Proposer, by submitting a proposal, understands and agrees that RMTA shall not be responsible or liable in any respect for any losses whatsoever suffered by any Proposer by reason of any use of any information contained in TS-03 APPENDIX B Reference Drawings. Each Proposer further acknowledges and agrees that, by submitting a proposal, (a) if and to the extent it or anyone on its behalf uses any of such information in any way, such use is made on the basis that the Proposer, and not RMTA, has approved and is responsible for such information, and (b) the Proposer is capable of conducting and is obligated hereunder to conduct any and all studies, analyses, diligence and investigations as it deems advisable to verify or supplement such information, and that any use of such information is in all respects at each Proposer's own risk and in its own discretion.

TABLE OF CONTENTS

RMA EXPRESSWAY SYSTEM

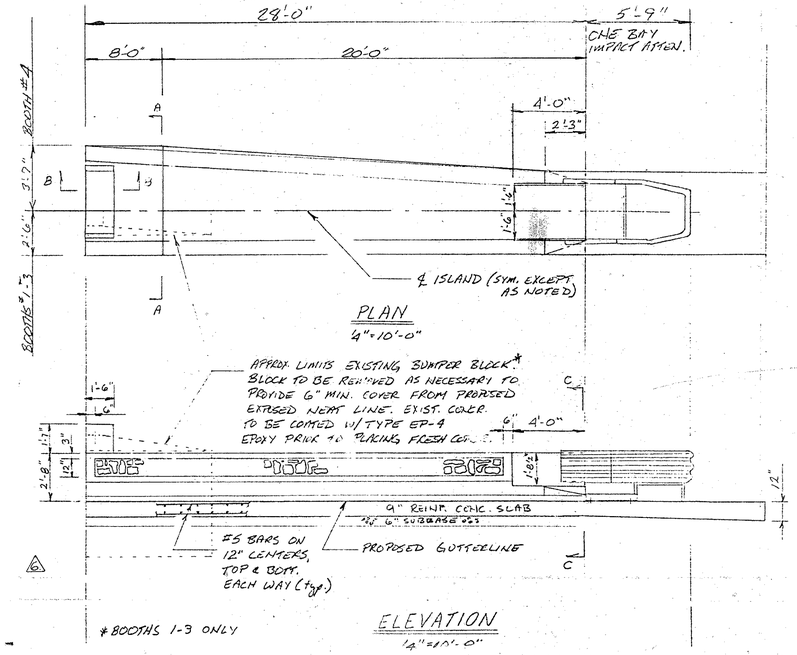


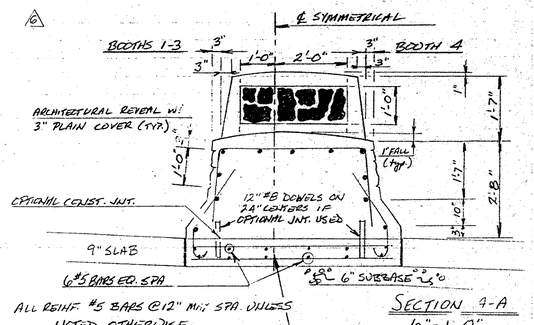
Not to Scale – 7/2005

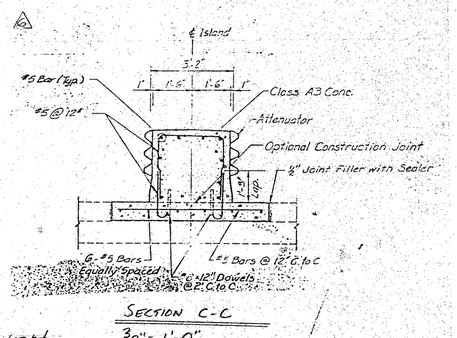
BOULEVARD BRIDGE TOLL PLAZA

TOLL PLAZA AND ADMINISTRATION BUILDING

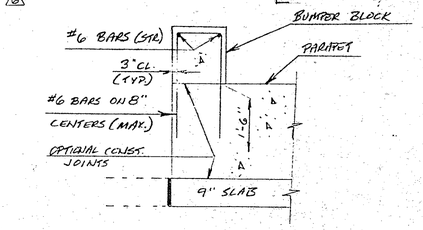
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
173	Boulevard Bridge Rehabilitation		

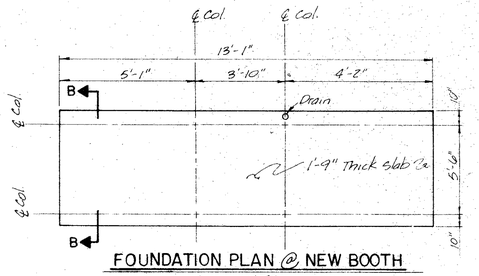




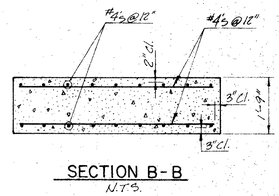


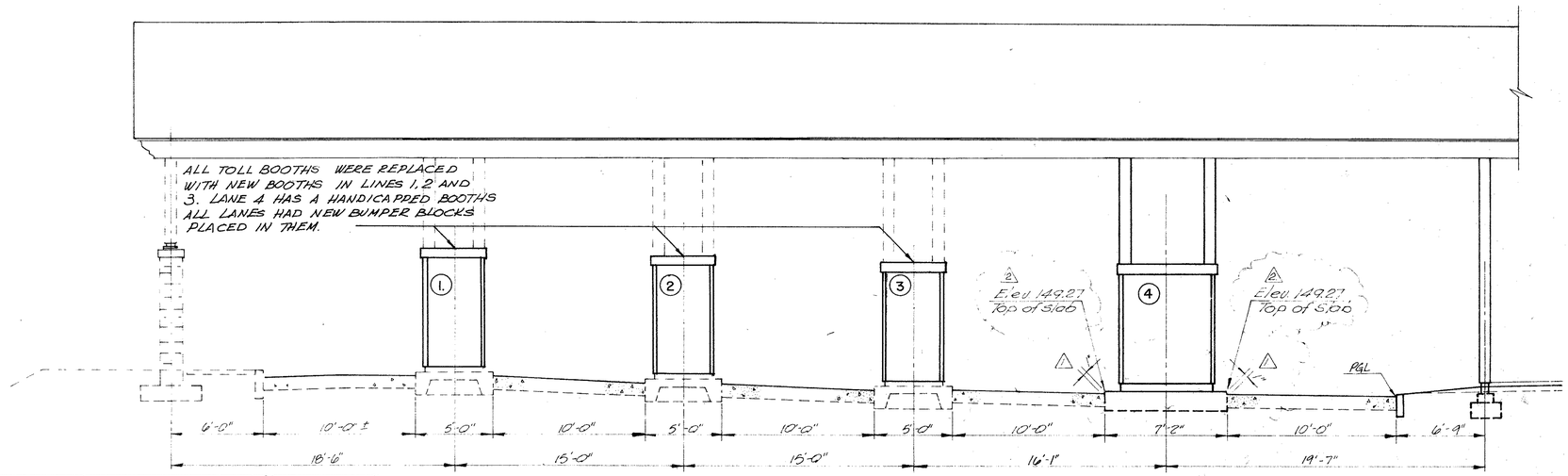
Provide 2-1"ϕ GRC in slab level for Red/Green Light and detector each island (8 runs total). Also provide 1-1"ϕ GRC in slab level to stub up out of proposed bumper block for future warning light w/ cap. GRC to be trenched into exist toll booth foundation and incorporated into Plaza Lighting.





NOTE: △
See Architectural Plan A-2 for Details





	By	Date	No.	Revision	By	Date
Designed	PHT	2-92	△	Exceed 1" dimension to new island. Add Detector Plan	PHT	11-92
Drawn	JLT	2-92	△	Add Elevations	VKS	11-92
Checked	PHT	2-92	△	Add top of slab	G.K.L.	3-93
Approved	RBH	2-92	△	changed island Type and numbered them 1-2		

RECORD DRAWING

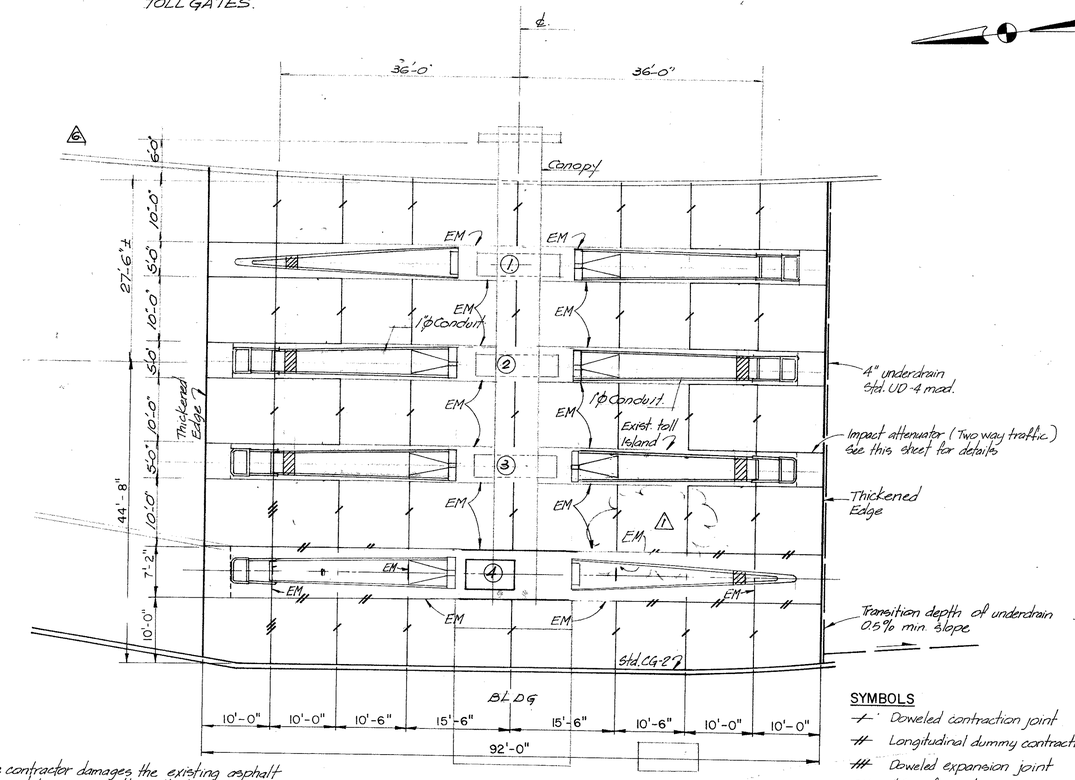
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BLVD. BRIDGE TOLL PLAZA
NEW TOLL ISLANDS

HOWARD NEEDLES TAMMEN & BERGENDOFF
Architects Engineers Planners
ALEXANDRIA, VA.
HNTB

Scale:	Date:	Contract No.	Sheet:
AS SHOWN	3-92	C-175	7 of

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
17B	Boulevard Bridge Rehabilitation	8	

▨ DENOTES BLOCKOUT FOR TOLL GATES.



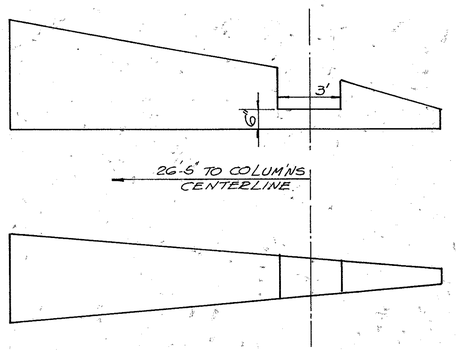
Note: If the contractor damages the existing asphalt pavement to remain in the toll island area, the area must be repaired in such a manner as to provide a straight line where the original saw cut was made.

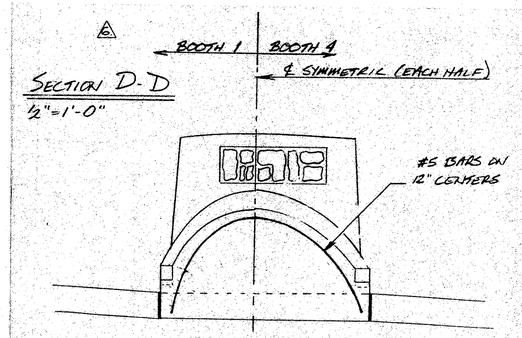
PLAN
3/32" = 1'-0"

SYMBOLS

- Doweled contraction joint
- Longitudinal dummy contraction joint
- Doweled expansion joint
- EM ½" preformed expansion
- SC Saw cut existing asphalt pavement

GATE PEDESTAL ELEVATION



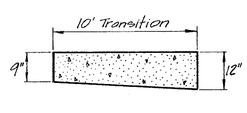


SECTION D-D
½"=1'-0"

NOTES:

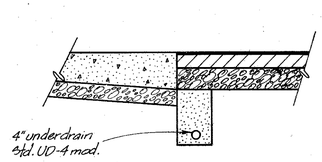
- SEE NOTE SHEET 7 (SECTION A-A) REGARDING OPTIONAL CONSTRUCTION JOINT & #8 DOWELS.
- SLAB LEVEL & LONGITUDINAL REINFORCING SIMILAR TO SECTION A-A (SHEET 7).

ISLANDS NOT REQUIRING IMPACT ATTENUATORS

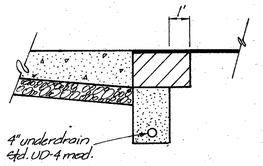


THICKENED EDGE
NTS

DUMMY CONTRACTION JOINT
NTS



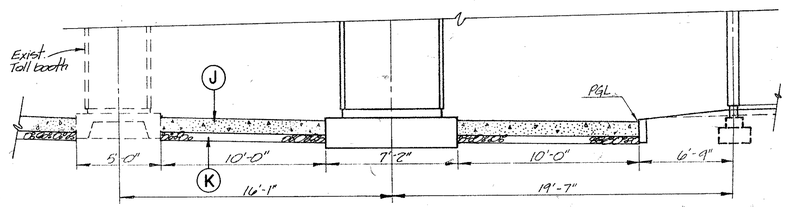
WIDENED PAVEMENT



EXIST. PAVEMENT TO REMAIN

UNDERDRAIN AT STA. 59+53±
NTS

NOTE: ALL EXISTING ISLANDS TO BE DEMOLISHED TO 14" BELOW PROPOSED GRADE TO RECEIVE 5" 21A SUBBASE & 9" REINFORCED CONCRETE PAVEMENT (SEE TYPICAL SECTION AT TOLL ISLAND, THIS SHEET). BUMPER BLOCKS (EXIST.) TO REMAIN & INCORPORATED INTO PROPOSED ISLANDS AS SHOWN ON SHEET 7. SLABS SUPPORTING EXISTING BOOTHS TO REMAIN. EXISTING BOOTHS TO BE DEMOLISHED - SEE ARCHITECTURAL PLANS FOR DETAILS.



TYPICAL SECTION AT TOLL ISLAND
Scale: 1/4"=1'-0"

LEGEND

- (J) 9" Reinforced hydraulic cement concrete pavement
- (K) 6" Subbase aggregate type I, 21A

	By	Date	No.	Revision	By	Date
Designed	PHT	2-92	1	Added EM callout To 1" isolation jts. Paving and title.	PHT	7/92
Drawn	JLT	2-92	2		G.K.L.	3/93
Checked	PHT	2-92				
Approved	RBN	2-92				

RECORD DRAWING

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BLVD. BRIDGE TOLL PLAZA

PAVING DETAILS AND NEW TOLL ISLANDS

HOWARD NEEDLES TAMMEN & BERGENDOFF
Architects Engineers Planners
ALEXANDRIA, VA.

HNTB

Scale:	Date:	Contract No.	Sheet:
AS SHOWN	3-92	C-17B	8 of

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
17B	Boulevard Bridge Rehabilitation	25	

DRAINAGE TABULATION

STR	LINE	LOCATION	DESCRIPTION	INV TO INV.	TOP	'D' OR 'H'	COV.	REMARKS
1		55+15 BL 'B' PUMPHOUSE DR. LT.	DI–2B , MOD. III L=10'		139.9	5.5		
	1–2		23'–18" RCP	126.0 – 123.5			7.5	
2		55+33 BL 'A' PUMPHOUSE DR. RT.	DI–2B , MOD. L=10'		132.0	15.0		
	2–3		40'–18" RCP	117.0 – 111.5			13.5	
3		55+05 BL 'A' PUMPHOUSE DR. LT.	EW–1					EC–1 TY. B 4.5 TONS REQD.
4		57+17 BL 'A' PUMPHOUSE DR. LT.	DI–12C, L=4'		137.2	5.2		
	4 – 5		10'–18" RCP	132.0 – 131.5			4.0	
5		57+17 BL 'A' PUMPHOUSE DR. LT.	DI–10B, MOD L=10'		137.4	6.4		
	5–6		85'–18" RCP	131.0 – 130.0			5.0	
6		56+92 BL 'B' PUMPHOUSE DR. RT.	EW–1					EROSION CONTROL TO BE
								DETERMINED IN THE FIELD
7		59+67 BL 'A' PUMPHOUSE DR. LT.	NEENAH TRANSVERSE DRAINAGE STRUCTURE, R–4999 CX, COVER TY. D					SEE DETAILS ON SHEET 10
			OR EQUIVLENT L=6.25'					
8		60+24 BL 'A' PUMPHOUSE DR. LT.	NEENAH TRANSVERSE DRAINAGE STRUCTURE, R–4999 CX, COVER TY. D					SEE DETAILS ON SHEET 10
			OR EQUIVLENT L=6.25'					
9		59+98 BL 'A' PUMPHOUSE DR. RT.	NEENAH TY. M TRENCH FRAME R–4996–A1 OR EQUIVALENT L=5'					SEE DETAILS ON SHEET 10
	9 – 11		90–DEGREE 6" BEND					
10		59+96.25 BL 'A' PUMPHOUSE DR. RT.	6" X 4" REDUCER					RECEIVES ROOF DRAINAGE
	10–11		1.67'–4" DI PIPE, 90–DEGREE 4" BEND					
11		59+96.25 BL 'A' PUMPHOUSE DR. RT.	6" X 6" X 4" TEE					
	11–13		45'–6" DI PIPE @ 6%					
12		59+50 BL 'A' PUMPHOUSE DR. RT.	CLEAN OUT UNIT					SEE DETAILS ON SHEET 10
	12–13							
13		59+50 BL 'A' PUMPHOUSE DR. RT.	6" X 6" X 6" TEE					
	13–14		72'–6" DIPE @ 3%					
14		59+45 BL 'A' PUMPHOUSE DR. RT.	EW–12					

Note: The contractor has the option to remove the existing drop inlets or remove 4 ft. below the subgrade, break the bottom of the inlets and fill them with sand.

* DROP INLETS #1 AND 2 MOVED DOWN HILL TO HELP ACCOM CONTRACTOR IN BUILDING THESE INLETS.

Note

1. *Remove Exist Tree.
2. Removal of any tree must be verified and approved by field engineer.
3. R/W Offset & Sta. are from the survey ℄

RECORD DRAWING

LEGEND

- NEW PAVEMENT
- DEMOLITION OF PAVEMENT
- PAVEMENT PLANNING
- BH — BORING TEST HOLE
- P-1 — PERCOLATION TEST

	By	Date				
Designed	VVS	3-92				
Drawn	JLT	3-92				
Checked	PHT	3-92	1	Reroute Watermain	GKL	1-29-93
Approved	RBN	3-92	No.	Revision	By	Date

14273-21.00

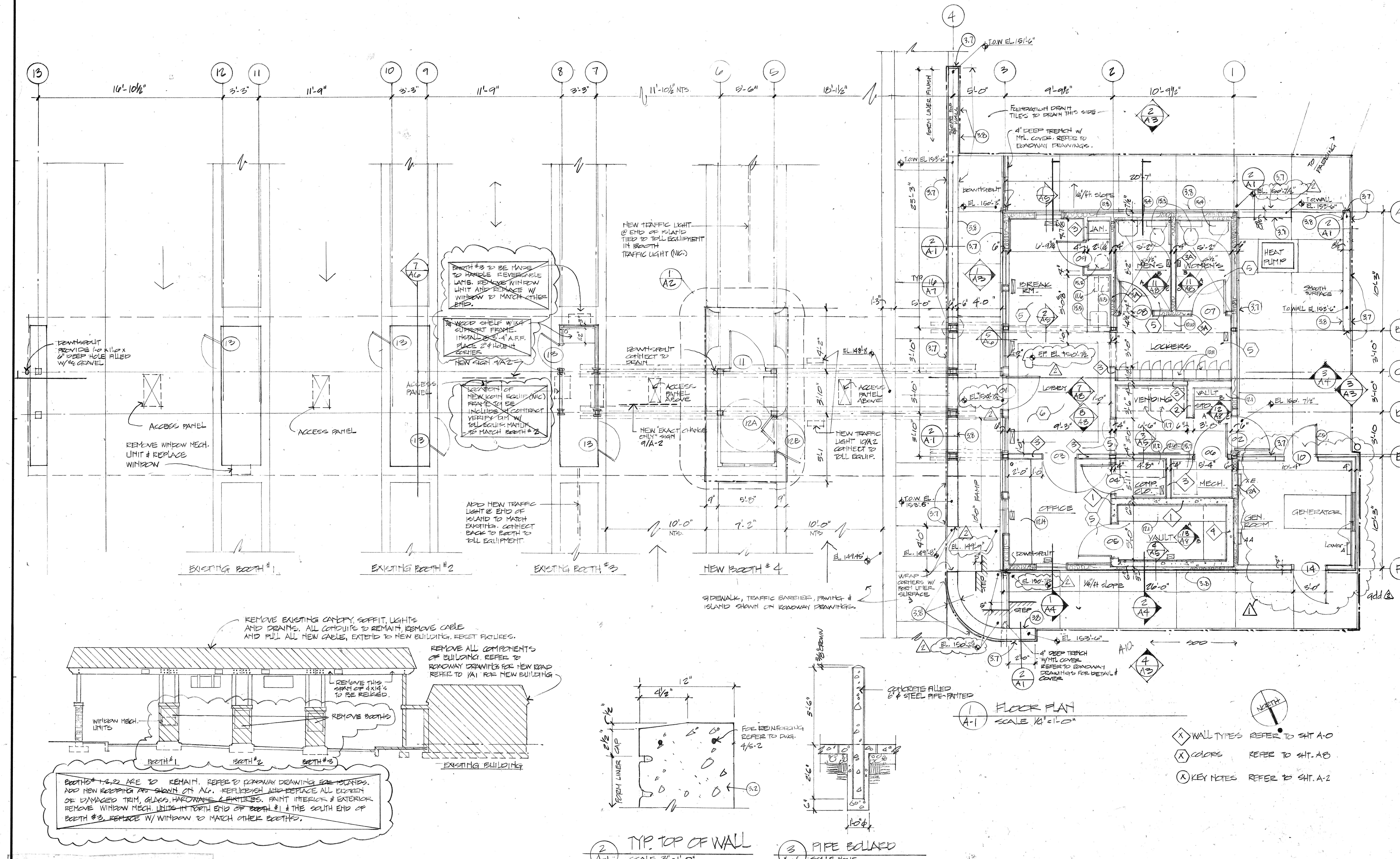
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BLVD. BRIDGE TOLL PLAZA

GRADING, DRAINAGE & PAVEMENT PLAN

HOWARD NEEDLES TAMMEN & BERGENDOFF
Architects Engineers Planners
ALEXANDRIA, VA. — HNTB

Scale:	Date:	Contract No.	Sheet:
1" = 30'	3-92	C-17B	25 of



No.	Revision	By	Date
2	REVISION # 1	DL	7-14-92
1	Addendum # 2	DL	4-23-92

156456

RECORD DRAWING

COMMONWEALTH OF VIRGINIA CARY C. GOODMAN No. 6485 ARCHITECT

HNTB
HOWARD NEEDLES TAMMEN & BERGENDOFF
ARCHITECTS ENGINEERS PLANNERS
99 CANAL CENTER PLAZA
ALEXANDRIA, VIRGINIA 22314
TEL. (703) 684-2700

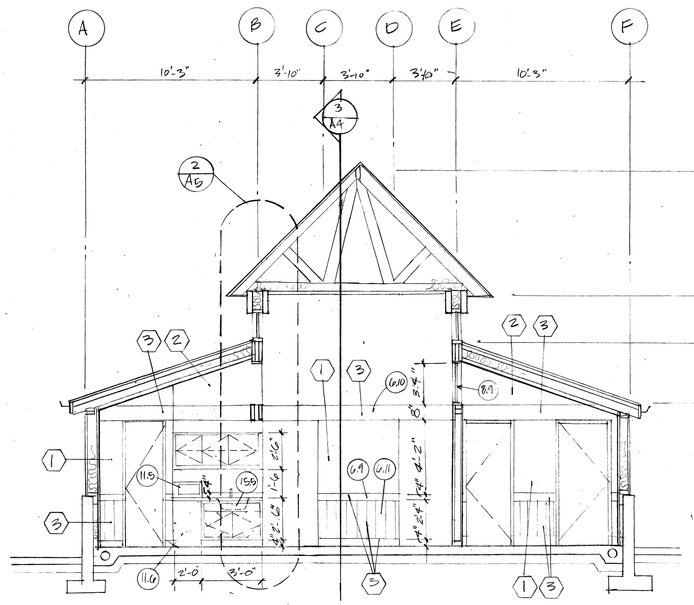
rma Richmond Metropolitan Authority

PROJECT NO: 14237
DATE:
DRAWN BY: tc
CHECKED BY:
CHECKED BY:
REVISED DATE:

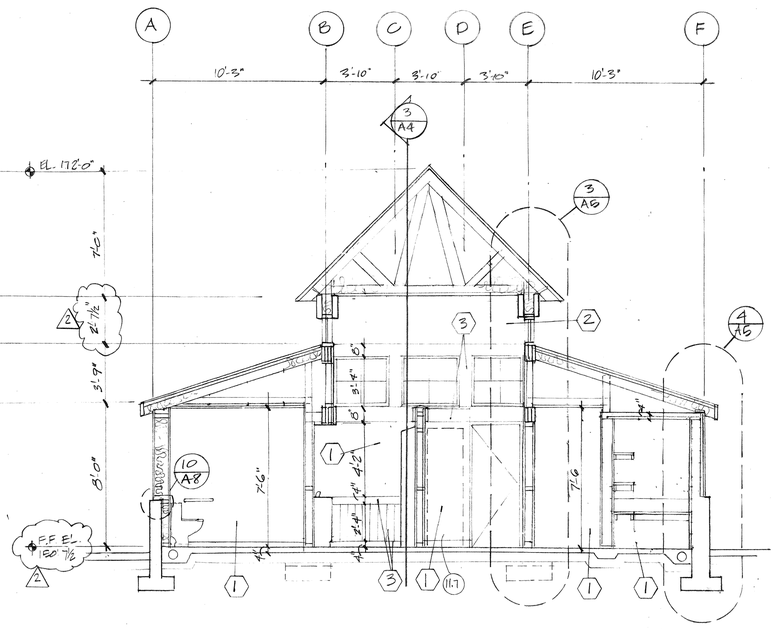
BOULEVARD BRIDGE TOLL PLAZA BUILDING

DRAWING TITLE:
FLOOR PLAN

CONTRACT NO. 17B
36.3
DRAWING NUMBER:
A-1



1 / A4 BUILDING SECTION
SCALE 1/4"=1'-0"



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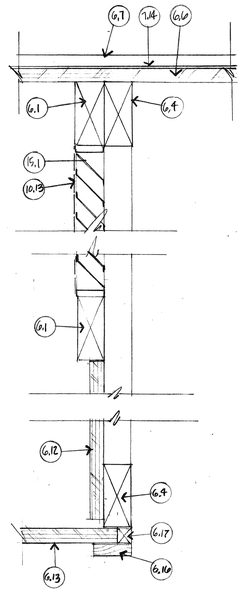

4 / A4 LOUVER DETAIL
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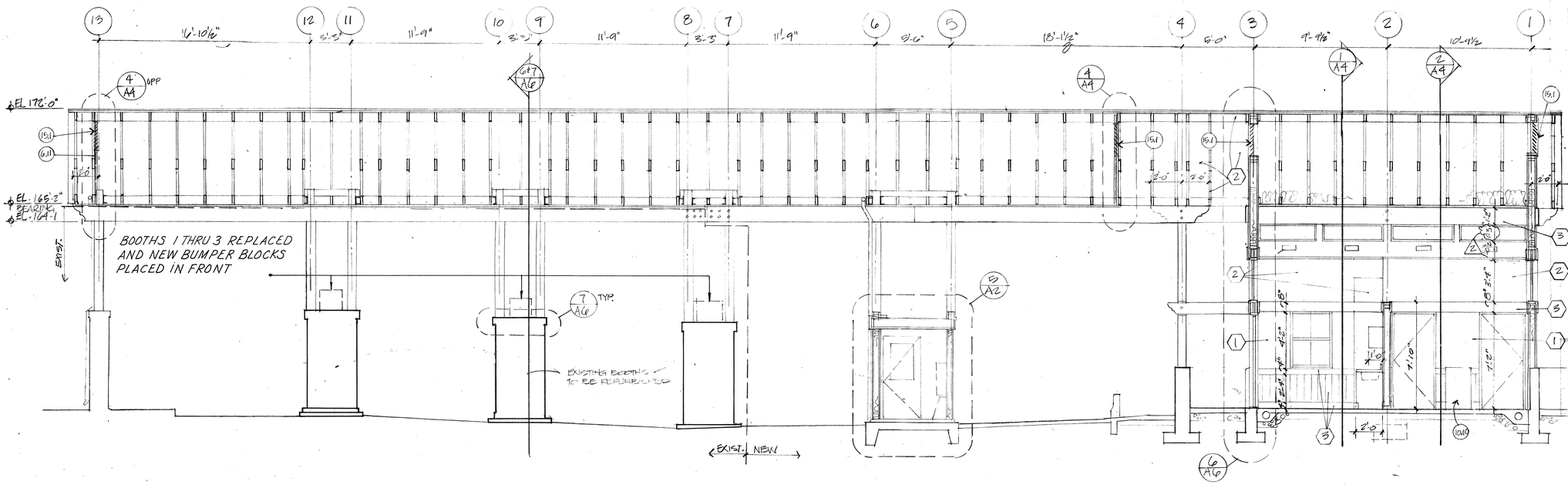


3 / A4 BUILDING SECTION
SCALE 1/8"=1'-0"

No.	Revision	By	Date
2			
1	REVISION #1	DL	7-14-92

156456

RECORD DRAWING

Key Notes

02000 SITE

2.1 Earth subgrade
2.2 Compacted granular fill
2.3 Drainage gravel
2.4 Drain tile
2.5 Steel pipe bollard

03000 Concrete

3.1 Conc. footing
3.2 Conc. foundation wall
3.3 Conc. slab on grade
3.4 4" conc. topping slab
3.5 Conc. walk
3.6 Conc. curb
3.7 Formed and stained conc. surface
3.8 Smooth conc. finish
3.9 Conc. wall

05000 Steel

5.1 Reinf. Stl. Bar
5.2 6x6x10 welded wire fabric
5.3 Steel angle
5.4 Steel plate
5.5 Steel channel
5.6 4x6 stl. tube column
5.7 4x4 stl. tube column
5.8 1/2" RC resilient channel
5.9 16ga. galv. sheet metal
5.10 1 1/2" mtl. roofing deck
5.11 C6x13 guardrail
5.12 1 1/2" mtl. Z channel
5.13 7/8" hat channel
5.14 Painted mtl eave vent (cont.)

06000 Wood

6.1 2x4
6.2 2x6
6.3 2x8
6.4 Pre-manufactured wood truss
6.5 4x14 wood beam
6.6 3/4" sheathing
6.7 Sawn wood shingles
6.8 Wood base
6.9 1x wood trim kerfed
6.10 2x wood trim
6.11 1x4 T&G wood siding w/V groove
6.12 Rough sawn 3/4" plwd. 4" O.C.
6.13 3/4" exterior plywood
6.14 2x10 facia plate
6.15 4x4
6.16 Batten board
6.17 Wood blocking
6.18 Wood grim

07000 Thermal & Moisture

7.1 G.I. flashing
7.2 Sealant
7.3 3 1/2" batt insulation
7.4 5 1/5" Fiberglass batt insul.
7.5 7 1/2" Fiberglass batt insul.
7.6 12" blown-in insulation
7.7 1 1/2" rigid insul.
7.8 Tapered rigid roof insulation
7.9 2" PVC weep w/screen on inside face
7.10 Single ply Hypalon roofing membrane
7.11 Termination bar
7.12 Pre-finished rain gutter
7.13 Rain leader
7.14 Building paper
7.15 Vapor barrier
7.16 Moisture barrier

08000 Doors & Windows

8.1 Metal security door
8.2 HM frame
8.3 Wood frame
8.4 Clad wood double hung window w/screen
8.5 Clad wood fixed window
8.6 Fixed wood window
8.7 1" insulated glass (clear)
8.8 1" insulated glass (tinted)
8.9 1/4" clear glass
8.10 Alum. threshold
8.11 Alum. door

09000 Finishes

9.1 5/8" Gypsum Wallboard (gyp.bd.)
9.2 5/8" WP Gypsum wallboard
9.3 Vinyl composition tile (VCT)

10000 Specialties

10.1 Toilet tissue dispenser
10.2 Soap dispenser
10.3 Paper towel dispenser
10.4 Grab Bar
10.5 Mirror
10.6 Feminine napkin receptacle
10.7 Mop service sink
10.8 Mop hanger
10.9 Drinking fountain
10.10 Lockers
10.11 Fire extinguisher & Cabinet
10.12 Bug screen

11000 Equipment

11.1 Toll computer (NIC)
11.2 Toll modem (NIC)
11.3 Toll P.C. (NIC)
11.4 Toll coin equipment (NIC)
11.5 Microwave
11.6 Undercounter refrigerator
11.7 Vending Machines (NIC)

12000 Furnishings

12.1 Wood shelving
12.2 Kitchen cabinets w/ plast. laminate
12.3 Plastic laminate counter top
12.4 Plastic laminate counter
12.5 bulletin board

15000 Mechanical

15.1 Pre-finished metal louver
15.2 Electric Water heater
15.3 Toilet
15.4 Lavatory
15.5 Kitchen sink
15.6 Heat pump condenser unit
15.7 Heat pump fan unit
15.8 perimeter duct
15.9 Feeder duct
15.10 Rooftop Mech. unit
15.11 Electrical space heater

16000 Electrical

16.1 Emergency Generator
16.2 Light fixture
16.3 Traffic light
16.4 Lighting panels

COMMONWEALTH OF VIRGINIA
CARY C. GOODMAN
No. 6485
ARCHITECT

HNTB
HOWARD NEEDLES TAMMEN & BERGENDOFF
ARCHITECTS ENGINEERS PLANNERS
99 CANAL CENTER PLAZA
ALEXANDRIA, VIRGINIA 22314
TEL. (703) 684-2700

Richmond Metropolitan Authority

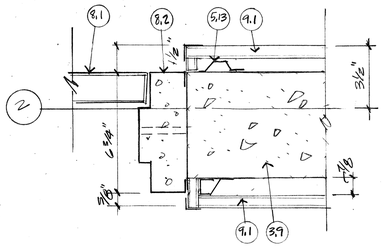
PROJECT NO:
DATE:
DRAWN BY:
CHECKED BY:
CHECKED BY:
REVISED DATE:

BOULEVARD BRIDGE TOLL PLAZA BUILDING

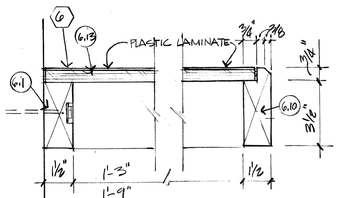
DRAWING TITLE:

BUILDING SECTIONS

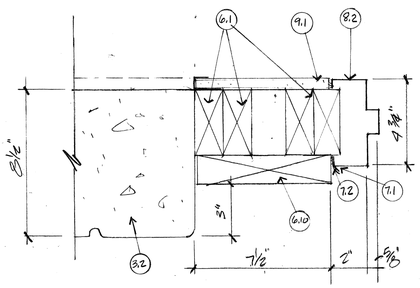
CONTRACT NO. 17B
36.6
DRAWING NUMBER:
A-4



1 / AB JAMB DETAIL
SCALE 1½"=1'-0"



2 / AB SHELVING (TYP.)
SCALE 3"=1'-0"



3 / AB JAMB DETAIL
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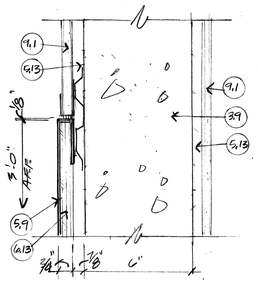
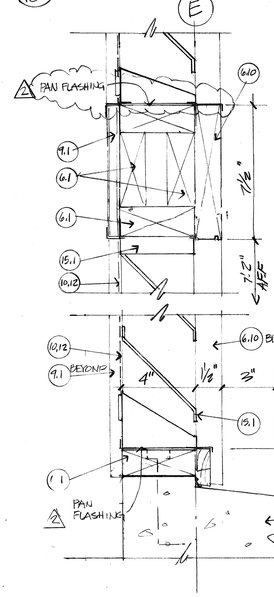


4 / AB WALL DETAIL
SCALE 3"=1'-0"



6 / AB VENT SILL
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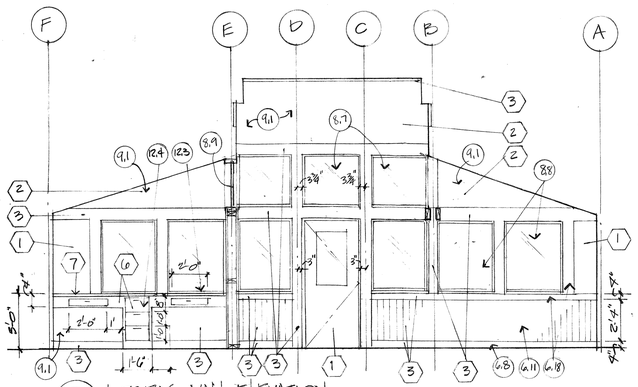
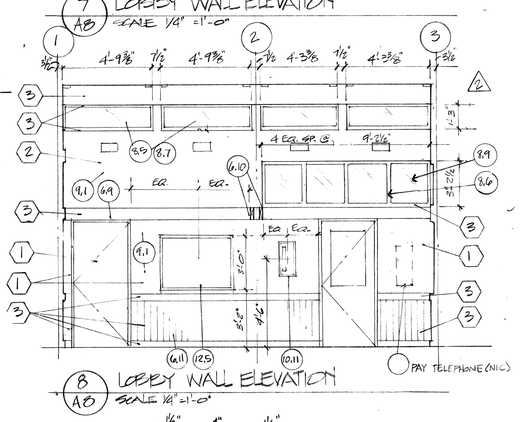
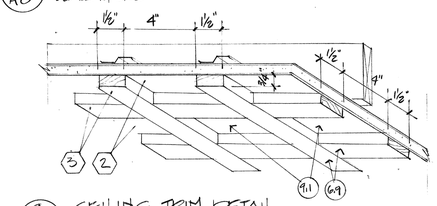


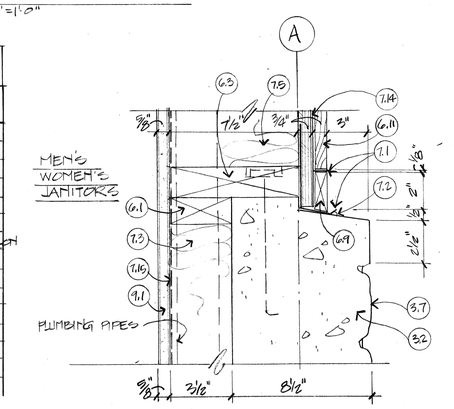
7 / AB LOBBY WALL ELEVATION
SCALE ¼"=1'-0"



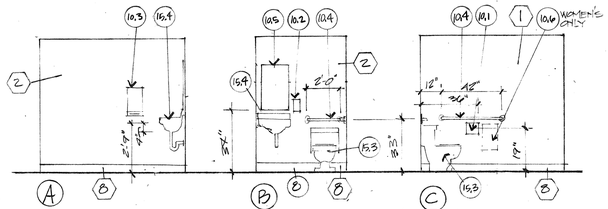
8 / AB LOBBY WALL ELEVATION
SCALE ¼"=1'-0"



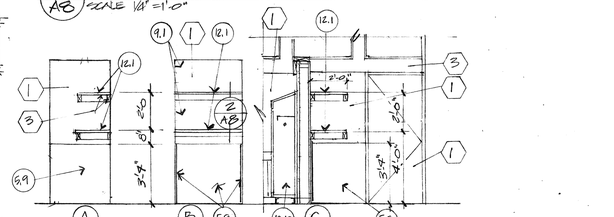
9 / AB CEILING TRIM DETAIL
SCALE 3"=1'-0"



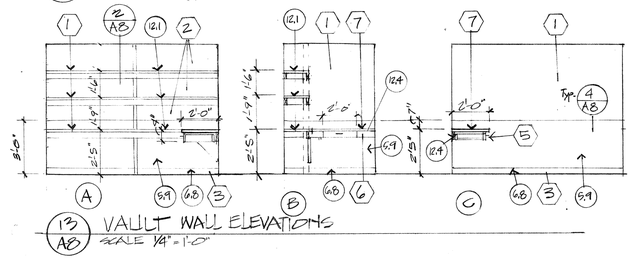
10 / AB WALL DETAIL
SCALE 3"=1'-0"



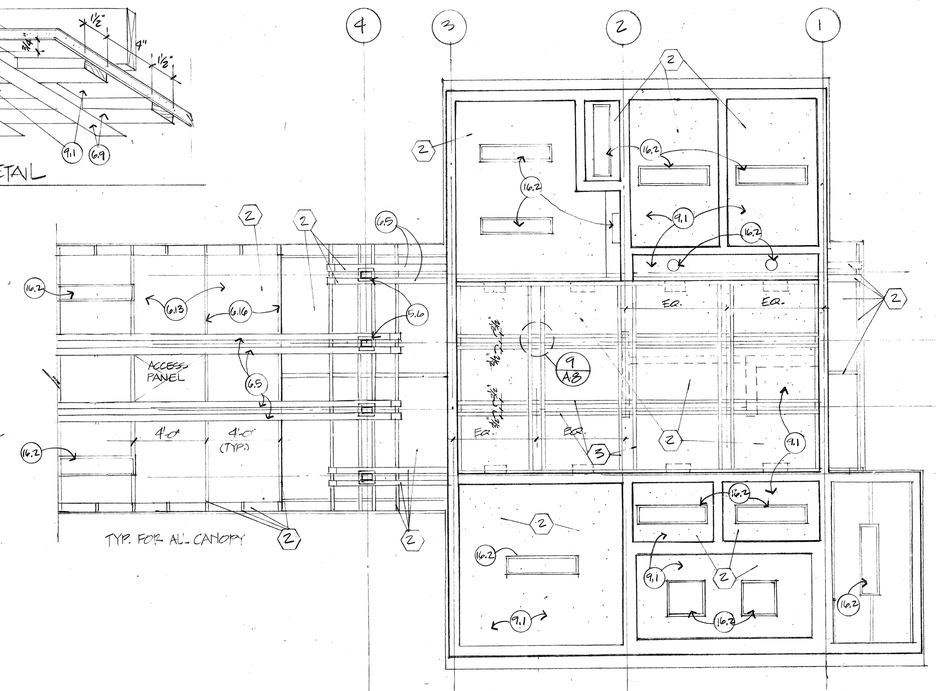
11 / AB MEN'S TOILET ROOMS ELEVATION (WOMEN'S OPP.)
SCALE ¼"=1'-0"



12 / A9 VAULT STORAGE WALL ELEVATIONS
SCALE ¼"=1'-0"



13 / AB VAULT WALL ELEVATIONS
SCALE ¼"=1'-0"



14 / AB REFLECTED CEILING PLAN
SCALE ¼"=1'-0"

COLOR SCHEDULE

	COLOR NAME	NUMBER	MANUFACTURER	FINISH/STYLE
PAINT				
1	CARRIAGE HOUSE	5381W	DURON	SEMI-GLOSS
2	SHELL WHITE	5770W	DURON	SEMI-GLOSS
3	STAIN COLOR TO BE	SELECTED FROM MANUF. STANDARD		ADJUST STAIN FOR VARIOUS WOOD TYPES.
4	ASTEROID	5414D	DURON	SEMI-GLOSS
FLOOR TILE				
4	TAUPE	51701	ARMSTRONG STANDARD	IMPERIAL TEXTURE EXCELON
5	SAND STUCCO	52123	ARMSTRONG PREMIUM	STONETEX EXCELON
PLASTIC LAMINATE				
6	GREIGE	SG210	PIONITE	SUEDE
7	TAWNY WHITE	SW812	PIONITE	SUEDE
BASE (RUBBER)				
8	TO MATCH PAINT #4			

No.	Revision	By	Date
2	Revision #1	RL	7-14-92

Key Notes

02000 SITE

2.1 Earth subgrade
2.2 Compacted granular fill
2.3 Drainage gravel
2.4 Drain tile
2.5 Steel pipe bollard

03000 Concrete

3.1 Conc. footing
3.2 Conc. foundation wall
3.3 Conc. slab on grade
3.4 4" conc. topping slab
3.5 Conc. walk
3.6 Conc. curb
3.7 Formed and stained conc. surface
3.8 Smooth conc. finish
3.9 Conc. wall

05000 Steel

5.1 Reinf. Stl. Bar
5.2 6x6x10 welded wire fabric
5.3 Steel angle
5.4 Steel plate
5.5 Steel channel
5.6 4x6 stl. tube column
5.7 4x4 stl. tube column
5.8 1/2" RC resilient channel
5.9 16ga. galv. sheet metal
5.10 1 1/2" mtl. roofing deck
5.11 C6x13 guardrail
5.12 1 1/2" mtl. Z channel
5.13 7/8" hat channel
5.14 Painted mtl eave vent (cont.)

06000 Wood

6.1 2x4
6.2 2x6
6.3 2x8
6.4 Pre-manufactured wood truss
6.5 4x14 wood beam
6.6 3/4" sheathing
6.7 Sawn wood shingles
6.8 Wood base
6.9 1x wood trim kerfed
6.10 2x wood trim
6.11 1x4 T&G wood siding w/V groove
6.12 Rough sawn 3/4" plwd. 4"O.C.
6.13 3/4" exterior plywood
6.14 2x10 facia plate
6.15 4x4
6.16 Batten board
6.17 Wood blocking
6.18 Wood trim

07000 Thermal & Moisture

7.1 G.I. flashing
7.2 Sealant
7.3 3 1/2" batt insulation
7.4 5 1/5" Fiberglass batt insul.
7.5 7 1/2" Fiberglass batt insul.
7.6 12" blown-in insulation
7.7 1 1/2" rigid insul.
7.8 Tapered rigid roof insulation
7.9 2" PVC weep w/screen on inside face
7.10 Single ply Hypalon roofing membrane
7.11 Termination bar
7.12 Pre-finished rain gutter
7.13 Rain leader
7.14 Building paper
7.15 Vapor barrier
7.16 Moisture barrier

08000 Doors & Windows

8.1 Metal security door
8.2 HM frame
8.3 Wood frame
8.4 Clad wood double hung window w/screen
8.5 Clad wood fixed window
8.6 Fixed wood window
8.7 1" insulated glass (clear)
8.8 1" insulated glass (tinted)
8.9 1/4" clear glass
8.10 Alum. threshold
8.11 Alum. door

09000 Finishes

9.1 5/8" Gypsum Wallboard (gyp.bd.)
9.2 5/8" WF Gypsum wallboard
9.3 Vinyl composition tile (VCT)

10000 Specialties

10.1 Toilet tissue dispenser
10.2 Soap dispenser
10.3 Paper towel dispenser
10.4 Grab Bar
10.5 Mirror
10.6 Feminine napkin receptacle
10.7 Mop service sink
10.8 Mop hanger
10.9 Drinking fountain
10.10 Lockers
10.11 Fire extinguisher & Cabinet
10.12 Bug screen

11000 Equipment

11.1 Toll computer (NIC)
11.2 Toll modem (NIC)
11.3 Toll P.C. (NIC)
11.4 Toll coin equipment (NIC)
11.5 Microwave
11.6 Undercounter refrigerator
11.7 Vending Machines (NIC)

12000 Furnishings

12.1 Wood shelving
12.2 Kitchen cabinets w/ plast. laminate
12.3 Plastic laminate counter top
12.4 Plastic laminate counter
12.5 bulletin board

15000 Mechanical

15.1 Pre-finished metal louver
15.2 Electric Water heater
15.3 Toilet
15.4 Lavatory
15.5 Kitchen sink
15.6 Heat pump condenser unit
15.7 Heat pump fan unit
15.8 perimeter duct
15.9 Feeder duct
15.10 Rooftop Mech. unit
15.11 Electrical space heater

16000 Electrical

16.1 Emergency Generator
16.2 Light fixture
16.3 Traffic light
16.4 Lighting panels

COMMONWEALTH OF VIRGINIA
CARY G. GOODMAN
No. 6485
ARCHITECT

HNTB
HOWARD NEEDLES TAMMEN & BERGENDOFF
ARCHITECTS ENGINEERS PLANNERS
99 CANAL CENTER PLAZA
ALEXANDRIA, VIRGINIA 22314
TEL. (703) 684-2700

Richmond Metropolitan Authority

PROJECT NO: 14237
DATE:
DRAWN BY: RL.
CHECKED BY:
CHECKED BY:
REVISED DATE:

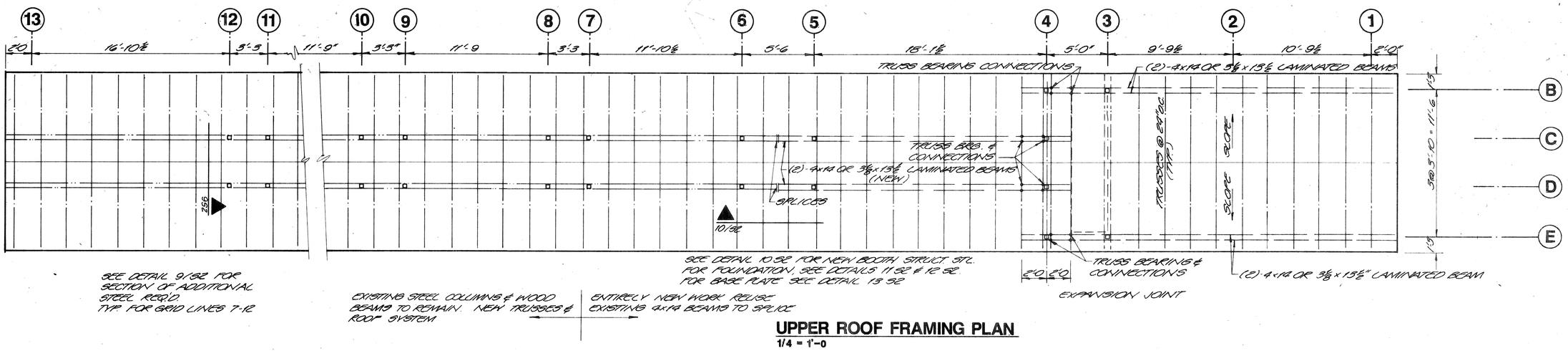
BOULEVARD BRIDGE TOLL PLAZA BUILDING

DRAWING TITLE:

REFLECTED CEILING PLAN, INTERIOR ELEVATIONS

CONTRACT NO. 17B
36.10
DRAWING NUMBER:
A-8

RECORD DRAWING



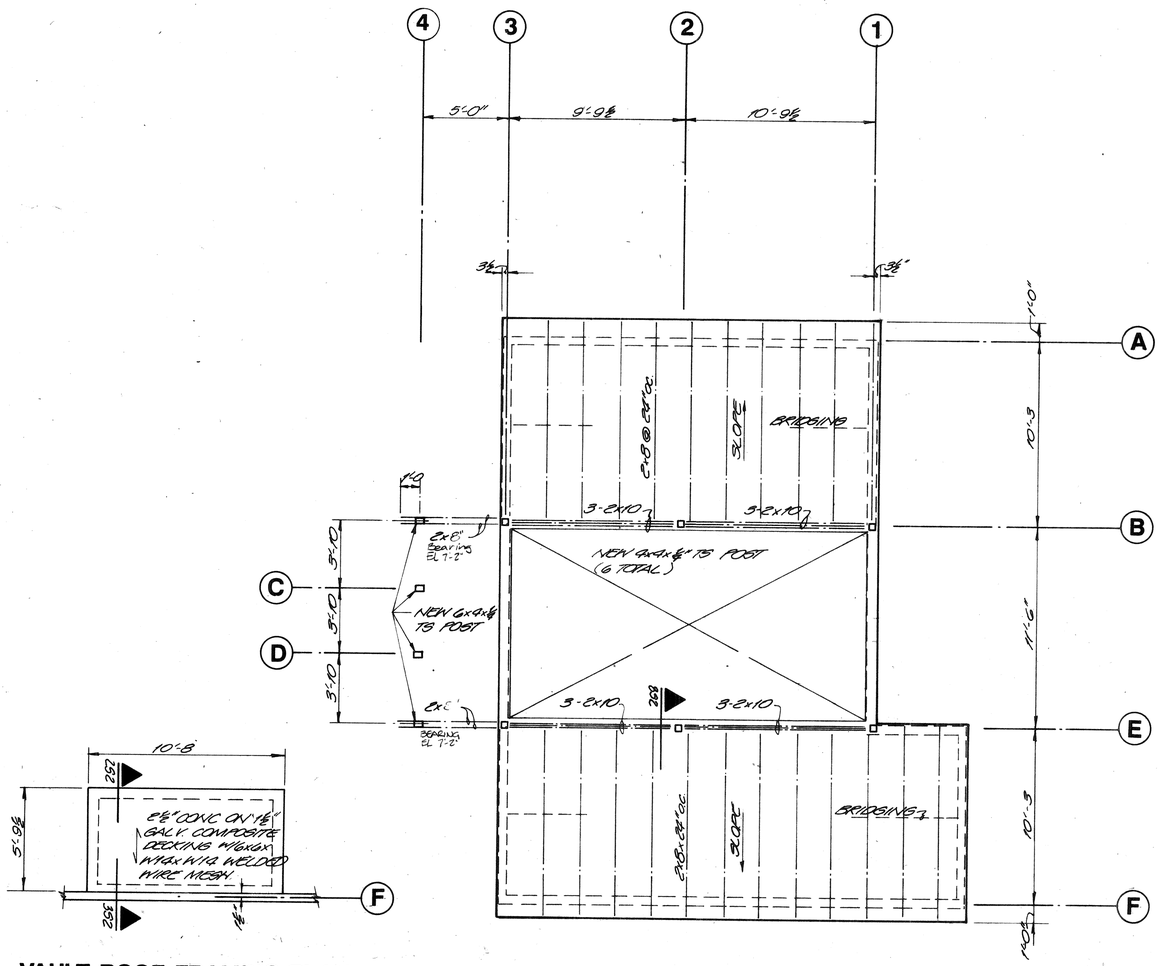
SEE DETAIL 9/S2 FOR SECTION OF ADDITIONAL STEEL REQ'D. TYP. FOR GRID LINES 7-12

SEE DETAIL 10 S2 FOR NEW BOOTH STRUCT. STL. FOR FOUNDATION, SEE DETAILS 11 S2 & 12 S2. FOR BASE PLATE SEE DETAIL 13 S2

EXISTING STEEL COLUMNS & WOOD BEAMS TO REMAIN. NEW TRUSSES & ROOF SYSTEM.

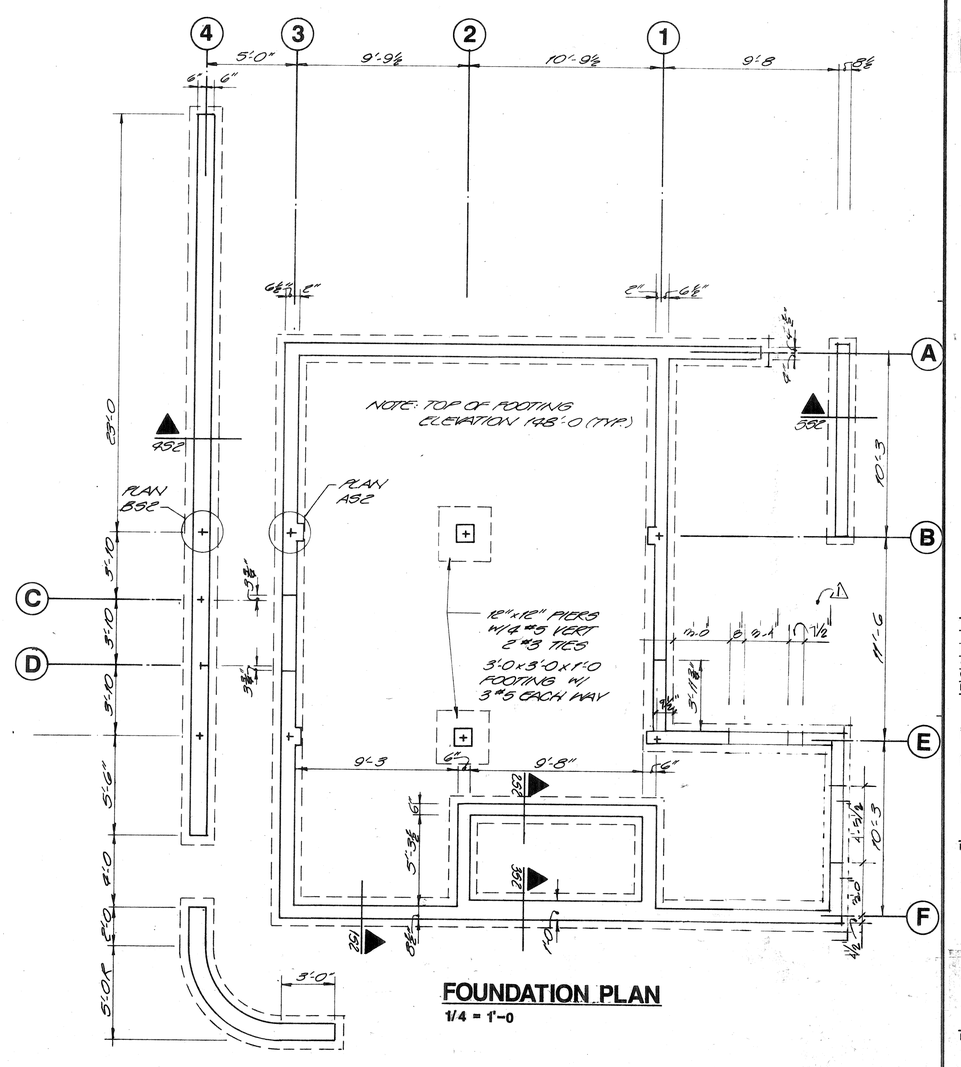
ENTIRELY NEW WORK. REUSE EXISTING 4x18 BEAMS TO SPLICE

UPPER ROOF FRAMING PLAN
1/4 = 1'-0



VAULT ROOF FRAMING PLAN
1/4 = 1'-0

LOWER ROOF FRAMING PLAN
1/4 = 1'-0



FOUNDATION PLAN
1/4 = 1'-0

No.	Revision	By	Date
1	Addendum #2	DL	4-23-92

RECORD DRAWING

COMMONWEALTH OF VIRGINIA
CARY C. GOODMAN
No. 6685
ARCHITECT

HNTB
HOWARD NEEDLES TAMMEN & BERGENDOFF
ARCHITECTS ENGINEERS PLANNERS
99 CANAL CENTER PLAZA
ALEXANDRIA, VIRGINIA 22314
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Richmond Metropolitan Authority

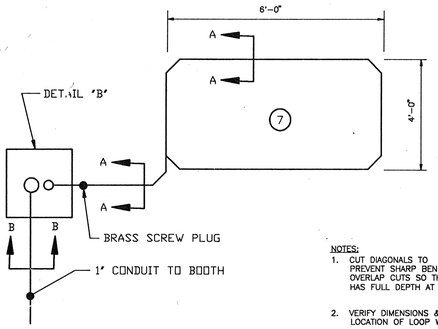
PROJECT NO:
DATE:
DRAWN BY: DL
CHECKED BY:
CHECKED BY:
REVISED DATE:

BOULEVARD BRIDGE TOLL PLAZA BUILDING

DRAWING TITLE:
FRAMING PLANS

CONTRACT NO. 17B
36.12
DRAWING NUMBER:
S-1

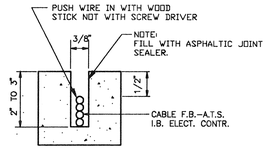
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C17B	BOULEVARD BRIDGE		



NOTES:
1. CUT DIAGONALS TO PREVENT SHARP BENDS OF WIRE OVERLAP CUTS SO THAT SLOT HAS FULL DEPTH AT CORNER
2. VERIFY DIMENSIONS & LOCATION OF LOOP WITH A.T.

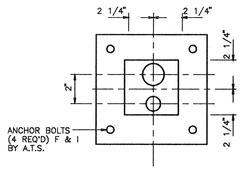
SLOT PLAN - VEHICLE DECTECTION LOOP NORTHBOUND AS SHOWN SOUTHBOUND OPP. HAND

N.T.S.



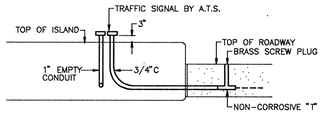
SECTION AA

N.T.S.



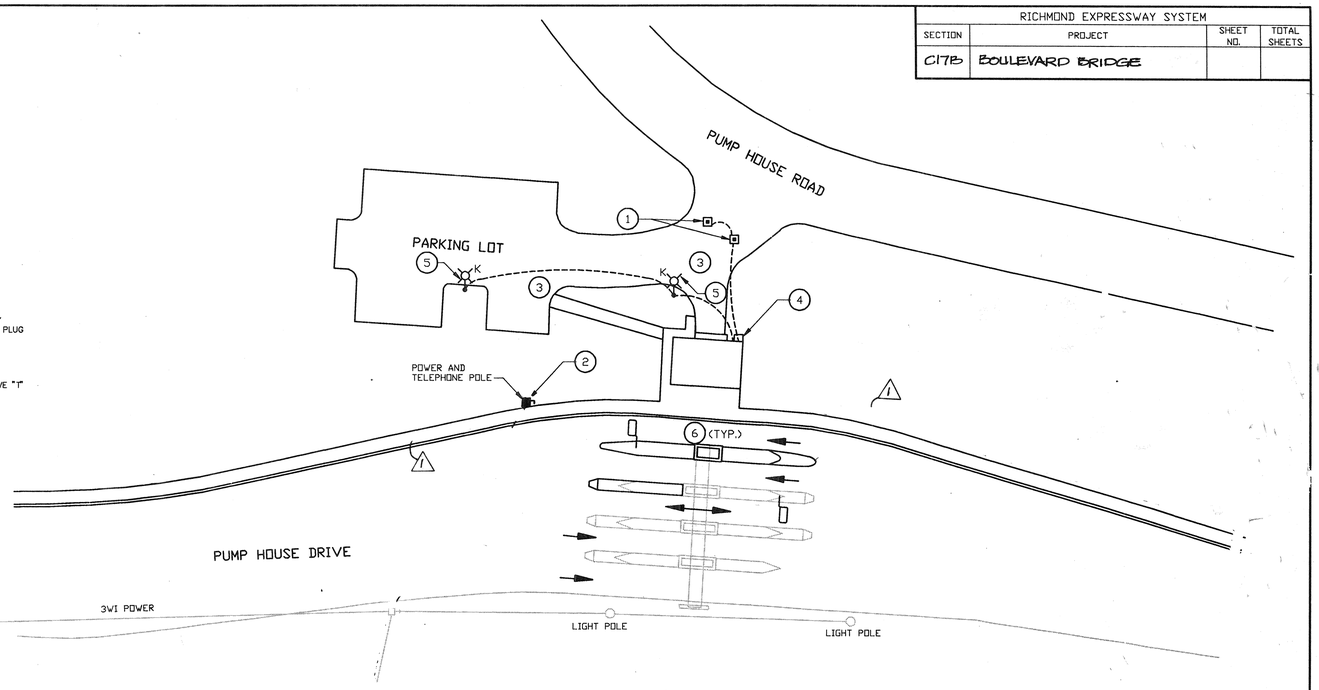
DETAIL 'B'

N.T.S.



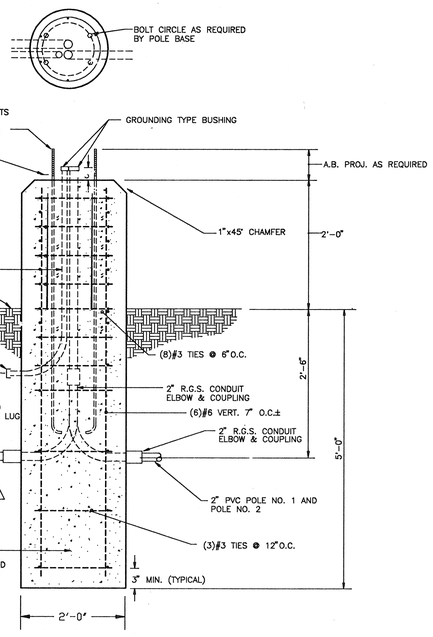
SECTION BB

N.T.S.



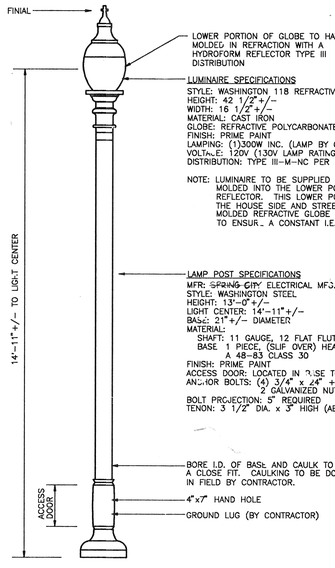
ELECTRICAL SITE PLAN

SCALE: 1"=30'-0"



NEW POLE FOUNDATION DETAIL

N.T.S.

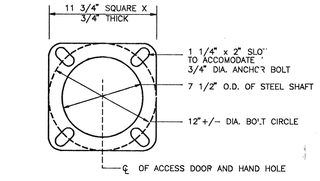


LUMINAIRE SPECIFICATIONS
STYLE: WASHINGTON 118 REFRACTIVE GLOBE WITH FINIAL
HEIGHT: 42 1/2"+/-
WIDTH: 16 1/2"+/-
MATERIAL: CAST IRON
GLOBE: REFRACTIVE POLYCARBONATE
FINISH: PRIME PAINT
LAMPING: (1)300W INC. (LAMP BY OTHERS)
VOLTAGE: 120V (130V LAMP RATING)
DISTRIBUTION: TYPE III-M-NC PER REPORT #ITL 34940

NOTE: LUMINAIRE TO BE SUPPLIED WITH ASYMMETRIC REFRACTION MOLDED INTO THE LOWER PORTION OF GLOBE WITH A HYDROFORMED REFLECTOR. THIS LOWER PORTION SHALL BE INJECTION MOLDED THE HOUSE SIDE AND STREET SIDE ORIENTATION ON THE INJECTION MOLDED REFRACTIVE GLOBE IS LOCKED INTO CASING CASTING TO ENSURE A CONSTANT I.E.S. TYPE III DISTRIBUTION.

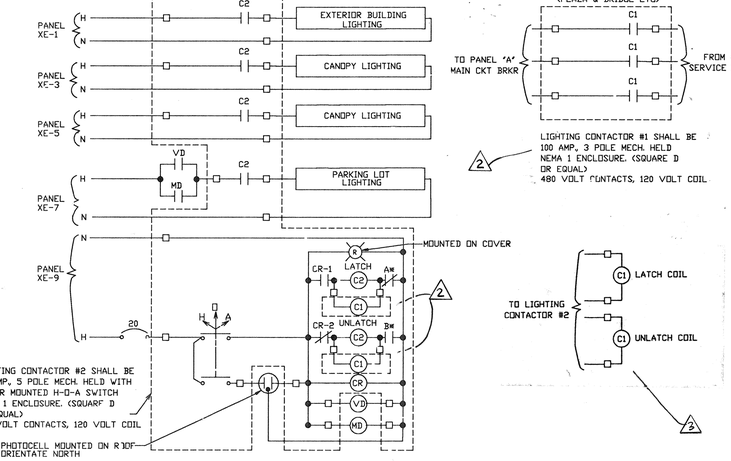
NEW POLE ELEVATION

N.T.S.



BASE PLATE DETAIL

N.T.S.



NOTES:
1. THE PHOTOELECTRICAL CELL SHALL BE SPECIFICATION GRADE WITH A GASKETED WEATHERPROOF, DIE CAST ZINC ENCLOSURE AND A 1" DIAMETER HERMETRICALLY SEALED CADMIUM SULFIDE CELL. THE UNIT SHALL HAVE BUILT-IN TIME DELAY, AND EXTERNAL ADJUSTMENT OF TURN-ON TIME. IN THE EVENT OF PHOTO-CELL FAILURE, LIGHTING SHALL REMAIN ON. MOUNT PHOTO-CELL WITH CELL ORIENTED TO THE NORTH. THE UNIT SHALL BE RATED 120 VOLT. MANUFACTURER SHALL BE IGRK SERIES 2100, OR EQUAL.
2. CONTACTS "AW" & "BW" ARE COIL CLEARING CONTACTS THAT ARE SUPPLIED WITH LIGHTING CONTACTOR.
3. MD: MOTION DETECTOR, ACTIVATES PARKING LOT LIGHTS. PROVIDE ADJUSTABLE TIMER TO DROP LIGHTS OUT (0-30 MIN. RANGE).
4. VD: MAGNETIC VEHICLE DETECTOR EMBEDDED IN PAVEMENT. ACTIVATES PARKING LOT LIGHTS. PROVIDE ADJUSTABLE TIMER TO DROP LIGHTS OUT (0-30 MIN. RANGE).

LIGHTING CONTROL SCHEMATIC - SITE

SCALE: N.T.S. LOCATED IN ROOM A185

KEYED NOTES:

1. EMBEDDED VEHICLE DETECTOR ON CENTER LINE OF ENTRANCE AND EXIT LANES. SEE DETAIL ON THIS SHEET.
2. LIGHT AND POWER POLES. RELOCATED AS PART OF ROADWAY WORK.
3. CARE MUST BE TAKEN NOT TO DAMAGE EXISTING TREES. RUN ALL CONDUIT UNDER ALREADY DISTURBED CONSTRUCTION AREA UNDER NEW PAVEMENT.
4. SEE POWER PLAN FOR UNDERGROUND CONDUITS IN THIS AREA.
5. AREA LIGHTING POLE. SEE DETAILS ON THIS SHEET.
6. CONDUIT AND WIRING FOR AUTOMATIC TOLL SYSTEM (A.T.S.) CONTROL AND POWER INSIDE EACH BOOTH IS NOT SHOWN.
7. LOOP DETECTOR CABLE SUPPLIED BY A.T.S. VENDOR AND INSTALLED BY CONTRACTOR. ALL OTHER WIRE AND CONDUIT FURNISHED BY CONTRACTOR. SEE "SLOT PLAN DETAIL" THIS SHEET.

CONTRACT NO. 17B
36.21

	By	Date				
Designed	HCR	3-17-92	3	CLARIFY NOTE & DETAILS	HCR	2-2-93
Drawn	BSA	3-17-92	2	Revision #1	DL	7-14-92
Checked			1	Addendum #2	EL	4-23-92
Approved			No.	Revision	By	Date

COMMONWEALTH OF VIRGINIA
DOUGLAS M. SAUER
No. 020384
PROFESSIONAL ENGINEER

RECORD DRAWING

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

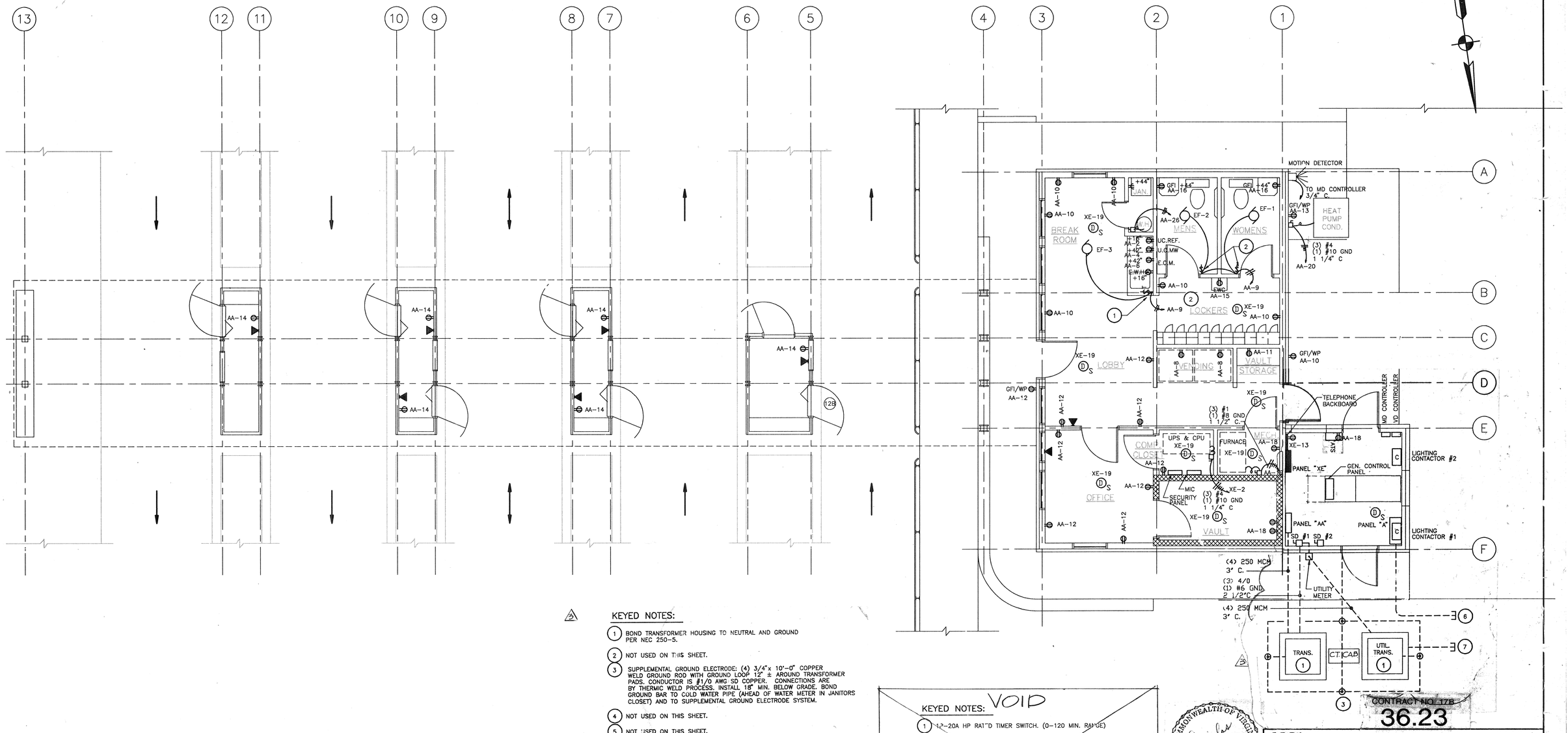
BLVD. BRIDGE TOLL PLAZA

ELECTRICAL SITE PLAN

HOWARD NEEDLES TAMMEN & BERGENDOFF
Architects Engineers Planners
ALEXANDRIA, VA.
HNTB

Scale:	Date	Contract No.	Sheet:
1"=30'(UNI)	2-92	C-17B	E1 of

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C17B	BOULEVARD BRIDGE		



3

KEYED NOTES:

1. BOND TRANSFORMER HOUSING TO NEUTRAL AND GROUND PER NEC 250-5.
2. NOT USED ON THIS SHEET.
3. SUPPLEMENTAL GROUND ELECTRODE: (4) 3/4"x 10'-0" COPPER WELD GROUND ROD WITH GROUND LOOP 12" ± AROUND TRANSFORMER PADS. CONDUCTOR IS #1/0 AWG SD COPPER. CONNECTIONS ARE BY THERMIC WELD PROCESS. INSTALL 18" MIN. BELOW GRADE. BOND GROUND BAR TO COLD WATER PIPE (AHEAD OF WATER METER IN JANITORS CLOSET) AND TO SUPPLEMENTAL GROUND ELECTRODE SYSTEM.
4. NOT USED ON THIS SHEET.
5. NOT USED ON THIS SHEET.
6. (3) 3" RGS CONDUITS, STUB AT 10'-0" OUTSIDE BUILDING LINE. (FOR FUTURE USE FOR ROAD AND BRIDGE LIGHTING CIRCUITS).
7. 4" RGS CONDUIT. STUB AT 10'-0" FROM EDGE OF TRANSFORMER PAD. (FOR UTILITY PRIMARY FEEDER. COORDINATE EXACT REQUIREMENTS, INCLUDING PAD CONSTRUCTION DETAILS WITH UTILITY)
8. UPS AND COMPUTER EQUIPMENT BY OWNER. EXACT REQUIREMENTS INCLUDING MAINTENANCE BYPASS EQUIPMENT TO BE DETERMINED LATER.
9. NOT USED ON THIS SHEET.
10. NOT USED ON THIS SHEET.
11. 1P-20A HP RATED TIMER SWITCH. (0-120 MIN. RANGE)
12. 1P-20A HP RATED MANUAL STARTER. (TOGGLE SWITCH TYPE)

2

KEYED NOTES: VOID

1. 1P-20A HP RATED TIMER SWITCH. (0-120 MIN. RANGE)
2. 1P-20A HP RATED MANUAL STARTER. (TOGGLE SWITCH TYPE)
3. (3) 3/4"x 10'-0" COPPER WELD GROUND ROD, SPACED 15'-0" APART ON AN EQUILATERAL TRIANGLE. CONDUCTOR IS #4 AWG SD COPPER. CONNECTIONS ARE BY THERMIC WELD PROCESS. INSTALL 18" MIN. BELOW GRADE. GENERATOR GROUND IS A SEPARATELY DERIVED SYSTEM AND SHALL NOT BE CONNECTED TO SERVICE GROUND.
4. (3) 3" RSG CONDUITS, STUB AT 10'-0" OUTSIDE BUILDING LINE. (FOR FUTURE USE FOR ROAD AND BRIDGE LIGHTING CIRCUITS).
5. 4" PVC CONDUIT. STUB AT 10'-0" FROM EDGE OF TRANSFORMER PAD. (FOR UTILITY PRIMARY FEEDER. COORDINATE EXACT REQUIREMENTS, INCLUDING PAD CONSTRUCTION DETAILS WITH UTILITY)

COMMONWEALTH OF VIRGINIA
DOUGLAS M. SAUER
No. 022084
PROFESSIONAL ENGINEER

	By	Date				
Designed	HCR		3	CLARIFY NOTES & DETAILS	HCR/DL	2-293
Drawn			2	Revision #1	DL	7-1492
Checked			1	Addendum #2	DL	4-2392
Approved			No.	Revision	By	Date

RECORD DRAWING

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BLVD. BRIDGE TOLL PLAZA

POWER PLAN

HOWARD NEEDLES TAMMEN & BERGENDOFF
Architects Engineers Planners
ALEXANDRIA, VA.
HNTB

Scale:	Date:	Contract No.	Sheet:
1/4"=1'-0"	2-92	C-17B	E3 of

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
C17B	BOULEVARD BRIDGE		

LIGHTING FIXTURE SCHEDULE

TYPE: CODE ON DWG

MTG:
C --- GROUND
P --- POLE
R --- RECESSED
RP--- RECESSED PLASTER
S --- SURFACE
U --- UNIVERSAL
W --- WALL
SUSP – SUSPENDED

* = SEE REMARKS

TYPE:
EL--- ELECTROLUMINESCENT
F --- F40 FLUORESCENT–STRAIGHT
FU--- F40 FLUORESCENT–U SHAPE
FO--- OCTRON FLUO.
FOC---OCT. FL./CURVALUME
CF ---COMPACT FLUORESCENT
I --- INCANDESCENT
M --- MERCURY VAPOR
Q ---QUARTZ
MH ---METAL HALIDE
TH ---TUNGSTEN HALOGEN
HPS---HIGH PRESSURE SODIUM

BULB:
RS --- RAPID START
TS --- TRIGGER START
CW --- COOLWHITE STD
DL --- DAY LIGHT
DW --- DELUXE WHITE
O1 --- OCTRON 31K
O2 --- OCTRON 41K
O3 --- OCTRON 50K
WW --- WARM WHITE STANDARD

* = SEE REMARKS

LENS–DIFFUSER:
F --- FRESNEL
G --- GLASS
T --- TEMPERED
AC --- ACRYLIC (VIRGIN)
FW --- FLAT MILK WHITE
O --- OPAL
PR --- PRISMATIC
POL --- POLYCARBONATE
ASY --- ASYMMETRIC

REFL:
A --- PAINTED ALUM.
AA --- ANODIZED ALUM.
AL --- ALZAK ALUM.
PS --- PAINTED STEEL
SA --- SPECULAR ALUM.
SSA --- SEMI SPECULAR ALUM.

BAFF:
BG --- BLACK MULTI–GROOVE
PB --- PAINTED MATTE BLACK
PAR --- PARABOLIC LOUVER
PW --- PAINTED WHITE
* = SEE REMARKS

DOORS SHALL BE HINGED AND COMPLETE W/LATCH AND LIGHT SEAL UNLESS OTHERWISE NOTED.

MATERIAL:
A --- ALUMINUM
S --- STEEL
AA --- ANODIZED ALUMINUM
CA --- CAST ALUM
EA --- EXTRUDED ALUM.
PB --- PAINTED MATTE BLACK
SS --- STAINLESS STEEL
POR -- PORCELAIN

FINISH
P --- PAINTED
AA --- ANODIZED ALUM.
PB --- PAINTED MATTE BLACK
PP --- POLYESTER POWDER
PW --- PAINTED MATTE WHITE
PBR --- PAINTED DARK BRONZE
PMB --- PAINTED MEDIUM BRONZE

* = SEE REMARKS

SM--- STAD. MAG.
LT --- LOW TEMP. (–20° F)
ESM--- ENER. SAV. MAGNETIC
E --- ELECTRONIC
T8M--- T8 MAG.
T8E--- T8 ELEC.
HPF--- HIGH POWER FACTOR

NOTES:

TYPE	MTG	LAMP TYPE	LAMP QUAN	LAMP BULB	LAMP NOM WATT	NOM FIXT DIM.	BEAM CONTROL LENS	BEAM CONTROL DIFF	BEAM CONTROL THICK	BEAM CONTROL REFL	BEAM CONTROL BAFF	DOOR MAT	DOOR FIN	TRIM MAT	TRIM FIN	BODY MAT	BODY FIN	AUXILIARY EQUIPMENT BALLAST	AUXILIARY EQUIPMENT VOLT	REFERENCE MANUFACTURER	REFERENCE CAT. NO./ SERIES
A	S	F	2	CW	40	1"x4"	PR	AC	.1"	---	---	S	PW	S	PW	S	PW	ESM	120	KLP	ANB240
B	SUSP	F	2	CW	40	1"x4"	---	---	---	AA	---	---	---	S	PW	A	PW	ESM	120	LIGHTOLIER	CD11–3342
C	W	CF	2	---	13	6 1/2"x11"	---	---	---	PS	PW	---	---	S	PW	S	PW	---	120	LITECONTROL	W–ID–30T213–BW
E	S	I	2	TS	20	8 3/4"x10 5/8"	---	---	---	---	---	---	---	A	A	A	---	---	120	McPHILBEN	50LW–6–G
F	R	CF	2	---	13	7 3/8"ø	---	---	---	AL	---	---	---	A	PW	A	---	SM	120	LIGHTOLIER	1800–2–13–BK
G	W	F	2	CW	20	1"x2"	PR	AC	---	---	---	---	---	S	PW	S	PW	---	120	KLP	CWBX–220–HPFH
H	R	MH	1	---	175	14"x14"	T	PR	.156"	---	---	A	PP	S	PP	S	PP	HPF	120	FAIL SAFE	HDR–M0C–120–93–ALP
HH	W	MH	1	---	175	17"x15"	PR	G	---	---	---	---	---	A	P	A	P	---	120	HOLOPHANE	WL2K–175MH–BL–FIU
J	S	FU	1	RS	40	12"x12"	PR	AC	.1"	---	---	---	---	A	P	A	P	---	120	KIRLIN	92240–SM
K	P	I	1	CW	130	---	---	---	---	---	---	---	---	ALK©OA		A	---	---	120	SPRING CITY	WASHINGTON 118
L	S	F	2	TS	20	12"x24"	---	---	---	---	---	---	---	S	P	S	P	---	120	ALKCO	---
M	S	MH	1	---	75	---	---	---	---	---	---	---	---	S	PP	S	PP	HPF	120	MIROFLECTOR	MIRO–T

PANEL SCHEDULE

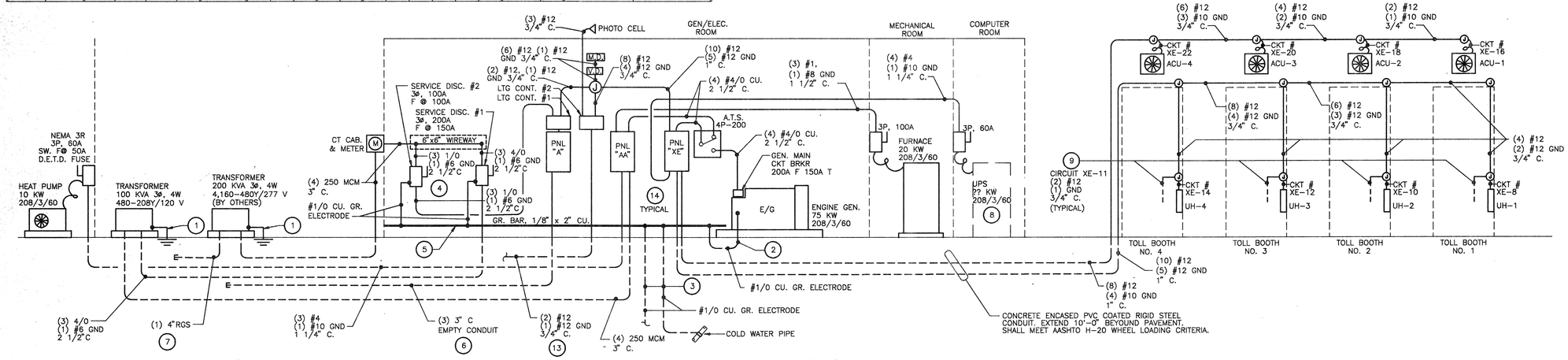
DESIGNATION: PANEL "AA"
LOCATION: GENERATOR ROOM
VOLTAGE: 208Y/120 VOLT
PHASE: 3 PHASE, 4 WIRE
MAINS: 225 AMP MAIN CKT BKR
BUS SIZE: 225 AMP
PANEL MOUNTING: SURFACE
ALL BREAKERS: 10,000 A.I.C. (MIN.)

CKT NO	LOAD DESCRIPTION	*	KVA	CKT BRKR AMPS	CKT BRKR POLE	KVA A	KVA B	KVA C	CKT BRKR AMPS	CKT BRKR POLE	KVA	*	LOAD DESCRIPTION	CKT NO
1	LTG–RESETROOMS & JANITOR		0.30	20	1	1.90	——	——	20	1	1.60		RECEPT–UC. REFRIGERATOR	2
3	LTG–BREAK ROOM		0.35	20	1	——	1.95	——	20	1	1.60		RECEPT–MICROWAVE	4
5	LTG–VAULT & OFFICE		0.60	20	1	——	——	2.20	20	1	1.60		RECEPT–COFFEE MAKER	6
7	LTG–LOBBY		0.20	20	1	1.80	——	——	20	1	1.60		RECEPT–VENDING MACHINES	8
9	EF1, EF2, EF3		1.00	20	1	——	2.20	——	20	1	1.20		RECEPT–BREAK & LOCKER ROOMS	10
11	RECEPT–VAULT STORAGE		0.20	20	1	——	——	1.40	20	1	1.20		RECEPT–OFFICE & LOBBY	12
13	RECEPT–OUTDOOR		0.20	20	1	1.00	——	——	20	1	0.80		RECEPT–TOLLBOOTHS	14
15	EWC		1.60	20	1	——	2.00	——	20	1	0.40		RECEPT–TOILET ROOMS	16
17	SPARE			20	1	——	——	0.40	20	1	0.40		RECEPT–VAULT	18
19	FURNACE		6.70	20	3	10.20	——	——	60	3	3.50		HEAT PUMP	20
	---		6.70	--	--	——	10.20	——	--	--	3.50		---	
	---		6.70	--	--	——	——	10.20	--	--	3.50		---	
25	ATS – NORMAL FEED		14.0	150	3	14.00	——	——	20	2	1.00		WATER HEATER	26
	---		14.0	--	--	——	14.00	——	--	--	1.00		---	
	---		14.0	--	--	——	——	14.00	20	1			SPARE	30
TOTAL CONNECTED LOAD:						28.90	30.35	28.20	TOTAL = 87.45 KVA					

PANEL SCHEDULE

DESIGNATION: PANEL "XE"
LOCATION: GENERATOR ROOM
VOLTAGE: 208Y/120 VOLT
PHASE: 3 PHASE, 4 WIRE
MAINS: 150 AMP MAIN CKT BKR
BUS SIZE: 225 AMP
PANEL MOUNTING: SURFACE
ALL BREAKERS: 10,000 A.I.C. (MIN.)

CKT NO	LOAD DESCRIPTION	*	KVA	CKT BRKR AMPS	CKT BRKR POLE	KVA A	KVA B	KVA C	CKT BRKR AMPS	CKT BRKR POLE	KVA	*	LOAD DESCRIPTION	CKT NO
1	LTG – BLDG. EXTERIOR		0.80	20	1	6.80	——	——	60	3	6.00		UPS	2
3	LTG – CANOPY		2.0	20	1	——	8.00	——	--	--	6.00		---	
5	LTG – CANOPY		2.0	20	1	——	——	8.00	--	--	6.00		---	
7	LTG – PARKING LOT		0.60	20	1	1.35	——	——	20	1	0.75		UNIT HEATER UH–1 #1	8
9	LIGHTING CONTACTOR		0.50	20	1	——	1.25	——	20	1	0.75		UNIT HEATER UH–2	10
11	LTG/RECEPT BOOTHS 1–4		1.24	20	1	——	——	1.99	20	1	0.75		UNIT HEATER UH–3 #2	12
13	TELEPHONE BACKBOARD		0.20	20	1	.95	——	——	20	1	0.75		UNIT HEATER UH–4	14
15	MASTER INTERCOM STATION		0.20	20	1	——	1.82	——	20	1	1.62		AIR CONDITIONER ACU–1	16
17	SECURITY PANEL		0.50	20	1	——	——	2.12	20	1	1.62		AIR CONDITIONER ACU–2	18
19	SMOKE DETECTORS		0.20	20	1	1.82	——	——	20	1	1.62		AIR CONDITIONER ACU–3	20
21	BUILDING LIGHTS		0.20	20	1	——	1.82	——	20	1	1.62		AIR CONDITIONER ACU–4	22
23	SPARE GENERATOR Ø			20	1	——	——	X	20	1			SPARE	24
25	SPARE			20	1	——	——	——	20	1			SPARE	26
27	SPARE			20	1	——	——	——	20	1			SPARE	28
29	SPARE			20	1	——	——	——	20	1			SPARE	30
TOTAL CONNECTED LOAD:						10.92	12.89	12.11	TOTAL = 35.92 KVA					



ELECTRICAL POWER RISER DIAGRAM

SCALE: N.T.S.

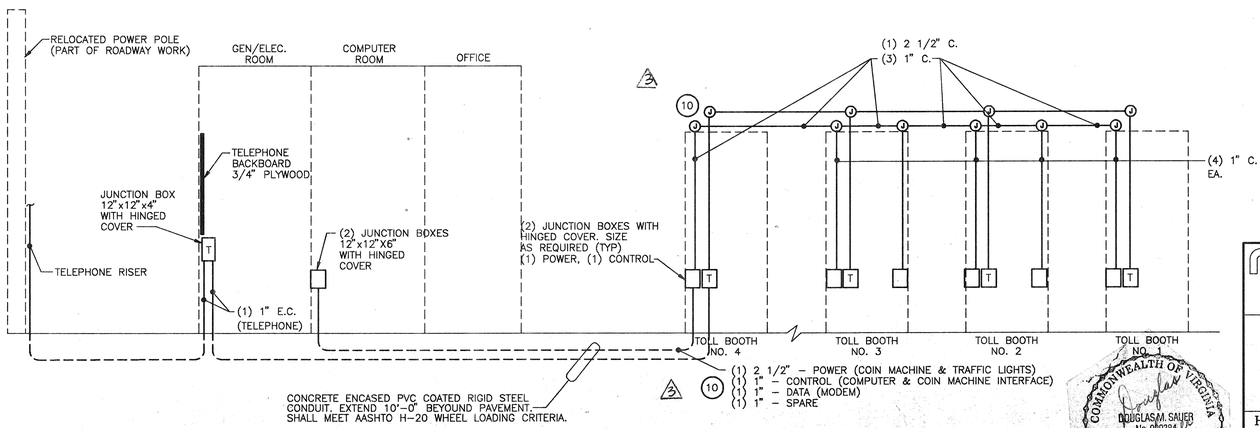
KEYED NOTES:

1. BOND TRANSFORMER HOUSING TO NEUTRAL AND GROUND PER NEC 250–5.
2. GENERATOR POWER IS SEPARTATELY DERIVED SYSTEM. GROUND PER NEC 250–26.
3. SUPPLEMENTAL GROUND ELECTRODE: (4) 3/4"x 10'–0" COPPER WELD GROUND ROD WITH GROUND LOOP 12" ± AROUND TRANSFORMER PADS. CONDUCTOR IS #1/0 AWG SD COPPER. CONNECTIONS ARE BY THERMIC WELD PROCESS. INSTALL 18" MIN. BELOW GRADE. BOND GROUND BAR TO COLD WATER PIPE (AHEAD OF WATER METER IN JANITORS CLOSET) AND TO SUPPLEMENTAL GROUND ELECTRODE SYSTEM.
4. GROUND SERVICE EQUIPMENT PER NEC 250–26.
5. MOUNT GROUND BAR 12" A.F.F. ALONG EAST AND NORTH WALL, WITH EXPANSION ANCHORS, 1" SPACER AND 3/8" CAP SCREWS, SPACED AT 2'–0" O.C. GROUND ALL EQUIPMENT HOUSING IN GEN/ELEC. ROOM BY BONDING TO GROUND BAR, PER NEC 250.
6. (3) 3" RGS CONDUITS, STUB AT 10'–0" OUTSIDE BUILDING LINE. (FOR FUTURE USE FOR ROAD AND BRIDGE LIGHTING CIRCUITS).
7. 4" RGS CONDUIT. STUB AT 10'–0" FROM EDGE OF TRANSFORMER PAD. (TRANSFORMER AND PRIMARY FEEDER BY OTHERS. CONCRETE PAD AND SECONDARY SERVICE AND CONNECTIONS PART OF THIS CONTRACT).
8. COMPUTER EQUIPMENT BY OWNER. EXACT REQUIREMENTS INCLUDING MAINTENANCE BYPASS EQUIPMENT TO BE DETERMINED LATER.
9. TO BOOTH INTERIOR LIGHTS AND RECEPTACLES.
10. USE SEPARATE RACEWAY FOR EACH FUNCTION (CONDUIT & JUNCTION BOX). COLOR CODE JUNCTION BOXES AS FOLLOWS:
    TELEPHONE – BLUE
    POWER – RED
    CONTROL – GREEN
    DATA – YELLOW
    SPARE – NONE
11. NOT USED ON THIS SHEET.
12. NOT USED ON THIS SHEET.
13. CIRCUIT XE–7 TO PARKING LOT LIGHTS.
14. BRANCH CIRCUIT WIRING AND CONDUITS WITHIN BUILDING ARE NOT SHOWN.

PANEL SCHEDULE

DESIGNATION: PANEL "A"
LOCATION: GENERATOR ROOM
VOLTAGE: 480Y/277 VOLT
PHASE: 3 PHASE, 4 WIRE
MAINS: 100 AMP MAIN CKT BKR
BUS SIZE: 100 AMP
PANEL MOUNTING: SURFACE
ALL BREAKERS: 35,000 A.I.C. (MIN.)

CKT NO	LOAD DESCRIPTION	*	KVA	CKT BRKR AMPS	CKT BRKR POLE	KVA A	KVA B	KVA C	CKT BRKR AMPS	CKT BRKR POLE	KVA	*	LOAD DESCRIPTION	CKT NO
1	TOLL PLAZA LIGHTING		1.50	20	1	2.80	——	——	20	1	1.3		BRIDGE LIGHTING	2
3	TOLL PLAZA LIGHTING		1.50	20	1	——	2.80	——	20	1	1.3		BRIDGE LIGHTING	4
5	TOLL PLAZA LIGHTING		1.50	20	1	——	——	2.80	20	1	1.3		BRIDGE LIGHTING	6
7	SPARE		---	20	1	0.00	——	——	20	1	---		SPARE	8
9	---		---	20	1	——	0.00	——	20	1	---		---	10
11	---		---	20	1	——	——	0.00	20	1	---		---	12
TOTAL CONNECTED LOAD:						2.80	2.80	2.80	TOTAL = 8.40 KVA					



AUTOMATIC TOLL SYSTEM RISER DIAGRAM
TELEPHONE SYSTEM RISER DIAGRAM

SCALE: N.T.S.

	By	Date		No.	Revision	By	Date
Designed	HCR	3–13–92	3		CLARIFY NOTES & DETAILS	HCR	2-2-93
Drawn	BSA	3–13–92	2		REVISION #1	BL	7-14-92
Checked			1		Addendum #2	HCR	4-23-92
Approved							

RECORD DRAWING

CONTRACT NO. 17B
36.24

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BLVD. BRIDGE TOLL PLAZA

SCHEDULES

COMMONWEALTH OF VIRGINIA DOUGLAS M. SAUER No. 020384 PROFESSIONAL ENGINEER

HOWARD NEEDLES TAMMEN & BERGENDOFF
Architects Engineers Planners
ALEXANDRIA, VA.

HNTB

Scale:	Date:	Contract No.	Sheet:
NONE	2–92	C–17B	E4 of

DTE TOLL PLAZA

ORIGINAL PLANS

ADMINISTRATION BUILDING & TOLL PLAZA

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
8	DOWNTOWN EXPRESSWAY	70	

P.O.T. Sta. 14+34.88 ℄ Allen Ave.
P.O.T. Sta. 133+15.88 ℄ Parkwood Ave.

P.I. Sta. 133+17.93 ℄ Parkwood Ave.

End Approach Slab
Sta. 14+16.12

End Bridge
Sta. 13+96.12

Special Design Retaining Wall No. 804

4" P.C.C. Sidewalk Std CG-2

P.I. Sta. 134+75.05 Parkwood Ave.

Nose: Sta. 14+35.50 ℄ Ramp E. Meadow
Sta. 233+58.50 ℄ Expressway
SPECIAL DESIGN RET. WALL 805

Std. GR-2A
For Curb Trans. See Detail 'B'

RAMP E-MEADOW

Mountable Curb Std CG-3

Std GR-5 L=37.5', W=2'

P.O.T. Sta. 12+86.45 ℄ Allen Ave.
P.O.T. Sta. 233+16.67 ℄ Expressway

Add. GR Posts

Fitch Attenuator 15 Modules

Begin Bridge
Sta. 11+82.95

Std. MS1G

Std. GR-2A or 2B

For Curb Transition See Detail 'B'

RAMP MEADOW-E

2-ME

3-ME

ALLEN AVE.

B-46 Sheet No. 56

Match Line See Sheet No. 56

SPECIAL DESIGN RETAINING WALL 801

Special Design Retaining Wall No. 802

4" P.C.C. Sidewalk

Begin Approach Slab
Sta. 11+62.95

P.O.T. Sta. 11+55.59 ℄ Allen Ave.
P.I. Sta. 333+17.37 ℄ Grayland Ave.

Nose: Sta. 19+48.93 ℄ Ramp Meadow E.
Sta. 234+50.00 ℄ Expressway

End 8" Cont. Reinf. Concrete Pav't.

SPECIAL DESIGN RETAINING WALL 806

P.C. Sta. 136+94.07 ℄ Parkwood Ave. Bk.
P.C. Sta. 136+17.85 ℄ Parkwood Ave. Ahd.

P.O.T. Sta. 14+08.04 ℄ Parkwood Ave.
P.O.T. Sta. 141+27.03 ℄ Lombardy St.

Std FE-2 Gate Mod. (5' Wide)

4" P.C.C. Sidewalk

PARKWOOD AVENUE

Std CG-2

Std FE-2

P.I. Sta. 21+00.5 Parking Lot

25' R

22 Spaces

Utility Building N.I.C.

Sidewalk (N.I.C.)

Std. MS1G

Std CG-2 Wall (N.I.C.)

P.O.C. Sta. 145+41.86 ℄ Parkwood Ave.
P.O.T. Sta. 141+40.70 ℄ Lady St.

4" P.C.C. Sidewalk

Std GR-1A or 1B

Std CG-G

Std GR-5, W=2', L=37.5'

1" Exp. Jt. Std PR-2

P.O.C. Sta. 10+63.48 ℄ Ramp East Meadow
76.44' Lt. P.O.T. Sta. 237+31.65 ℄ Expressway

1" Exp. Jt. Std. PR-2

WESTBOUND ROADWAY

EASTBOUND ROADWAY

SERVICE ROAD 340 'GA'

℄ Toll Plaza

Toll Plaza Pavt. & Curb by others

P.I. Sta. 242+02.00 ℄ Expressway Bk
P.I. Sta. 241+99.00 ℄ Expressway Ahd.

P.O.T. Sta. 345+40.32 Ser. Rd. "GA"
P.O.T. Sta. 117+5G. 82 ℄ Lady St.

Std GR-1A or 1B

Std GR-5, W=2', L=37.5'

Std CG-G

Std GR-1A or 1B

Std CG-2 4" P.C.C. Sidewalk

P.O.C. Sta. 341+51.92 Ser. Rd. "GA"
P.O.T. Sta. 01+83.42 ℄ Lombardy St.

P.I. Sta. 345+72.58
Grayland Ave.

Begin 8" P.I. PCC Base
w/ 2½" BI Conc. Binder Course Type B-3
& 1" Bit. Conc. Surface Course Type S-5

P.O.T. Sta. 337+14.85 Ser. Rd. "GA"
Sta. 11+32.88 ℄ Temple St.

P.O.C. Sta. 21+27.03 ℄ Ramp Meadow East
73.13' Rt. P.O.T. Sta. 236+29.28 ℄ Expressway

TEMPLE ST.

LOMBARDY ST.

LADY ST.

Match Line See Sheet No. 82

	BY	DATE
MADE		
CHECKED		
IN CHARGE		

NO.	REVISION	BY	DATE
5	Add. Sidewalk	DGT	2-76
4	Rev. Median Section & Delete CG-6 Wheelchair Ramp	HMW	11-3-75
3	Add Pavement Details	R.K.L.	8/21/75
2	Revise Walk Loc. Toll Plaza	P.H.T.	10-5-74
1	Rev. Park. Area	P.H.T.	3-28-74

LEGEND

- Bituminous Concrete Paved Shoulder
- Concrete Bridge Approach Slabs
- Existing Pavement to be Resurfaced
- Bituminous Concrete Pavement
- 6" Plain P.C.C. Base topped with 2" Bituminous Concrete type S-5.
- Longitudinal Joint
- Construction Joint
- Transverse Joint

Note:
For Curb Transition Detail 'B' See Sheet ___
For profile see sheet ___

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
DOWNTOWN EXPRESSWAY

PAVEMENT PLAN
STA. 232+00 TO STA. 247+00

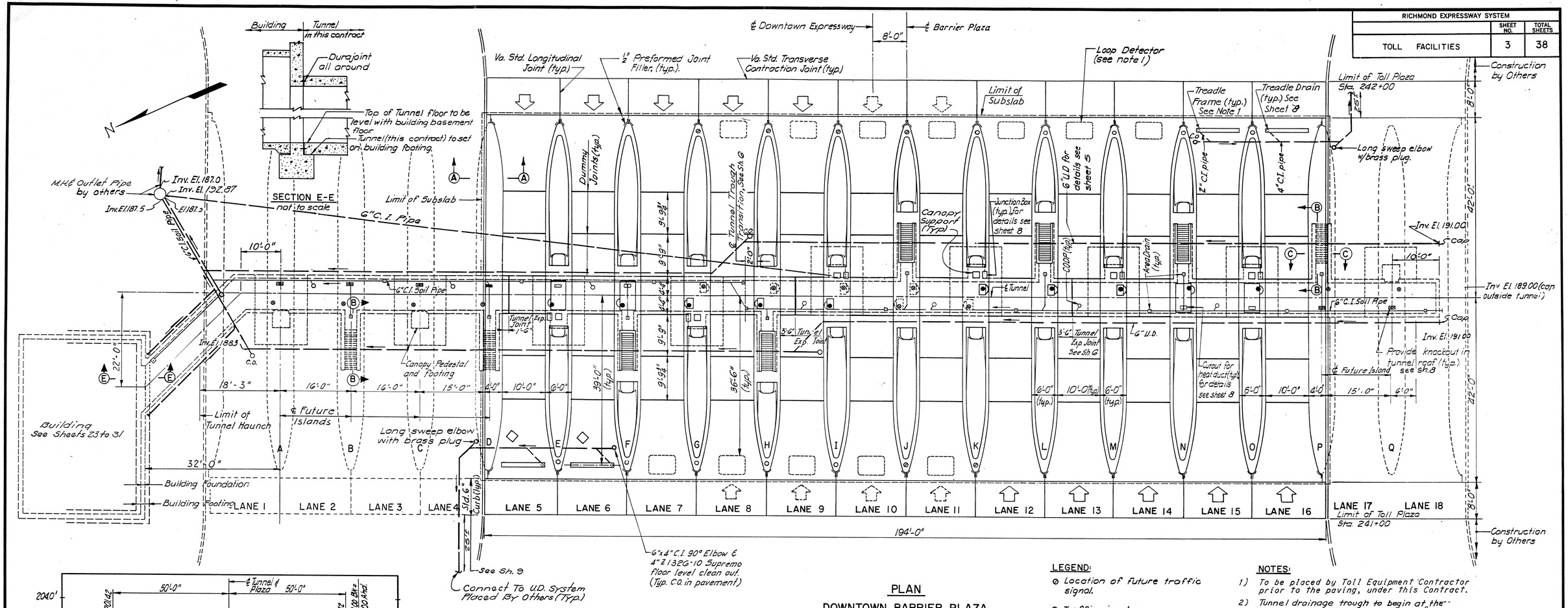
AMERICAN ENGINEERS
Richmond, Virginia

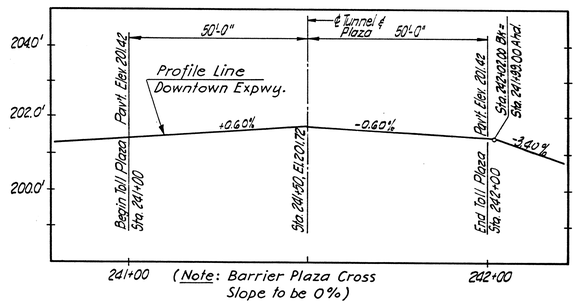
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
General Consultants

SCALE: 1" = 50'
CONTRACT NO.: 8
SHEET NO. ___ OF ___

70

RICHMOND EXPRESSWAY SYSTEM		
	SHEET NO.	TOTAL SHEETS
TOLL FACILITIES	3	38





PROFILE AT DOWNTOWN BARRIER PLAZA

Scale: Horiz: 1"=20'
Vert: 1"= 2'

PLAN

DOWNTOWN BARRIER PLAZA

3/32"=1'-0"

LEGEND:

- ⊘ Location of future traffic signal.
- ○ Traffic signal
- Automatic Toll Machine, (N.I.C.)
- Future Automatic Toll Machine,
- Toll Booth
- ● Proposed Coin Tube
- ⊗ Future Coin Tube

NOTES:

1) To be placed by Toll Equipment Contractor prior to the paving, under this Contract.
2) Tunnel drainage trough to begin at the building foundation.
3) C.O.D.P. = Clean out drain pipe.
4) Sections A-A, B-B and C-C appear on Sheet 6.

	BY	DATE				
MADE	W. J. W.	5-68	2	Added Heating Duct Rel. Treadle Drain	P.H.T.	2-75
CHECKED	D. E. N.	5-68	1	Final Check	D.E.N.	6-68
IN CHARGE H.D.S.			NO.	REVISION	BY	DATE

AS BUILT

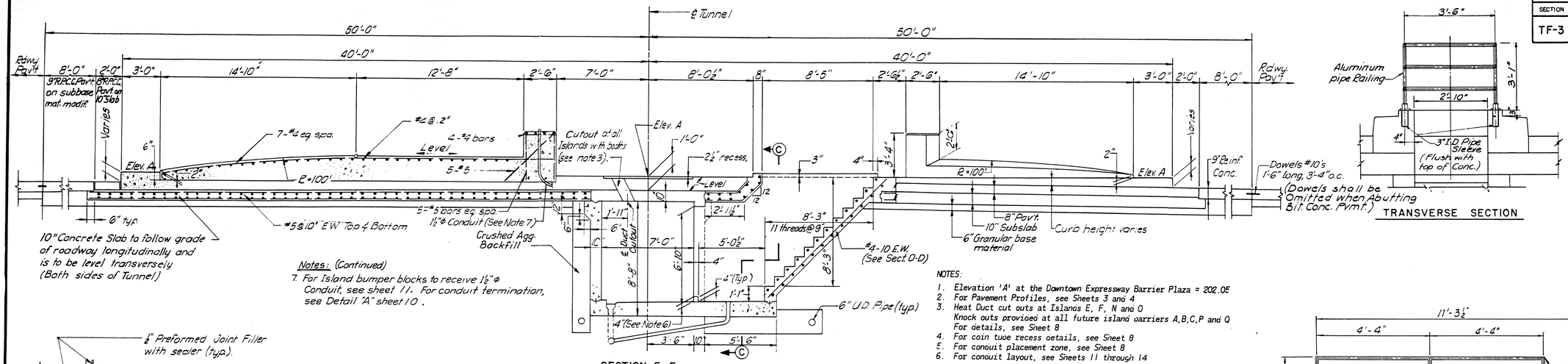
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DOWNTOWN BARRIER PLAZA
PLAN

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO.: TF-3
SHEET NO. 3 OF

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-3	TOLL FACILITIES	5	38



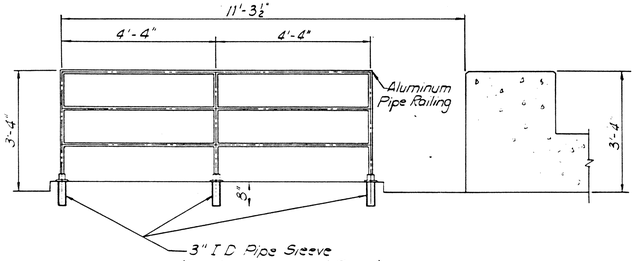
Notes: (Continued)

7. For Island bumper blocks to receive ½"ϕ Conduit, see sheet 11. For conduit termination, see Detail "A" sheet 10.

NOTES:

1. Elevation 'A' at the Downtown Expressway Barrier Plaza = 202.05
2. For Pavement Profiles, see Sheets 3 and 4
3. Heat Duct cut outs at Islands E, F, N and O
   Knock outs provided at all future island carriers A, B, C, P and Q
   For details, see Sheet 8
4. For coin tube recess details, see Sheet 8
5. For conduit placement zone, see Sheet 8
6. For conduit layout, see Sheets 11 through 14

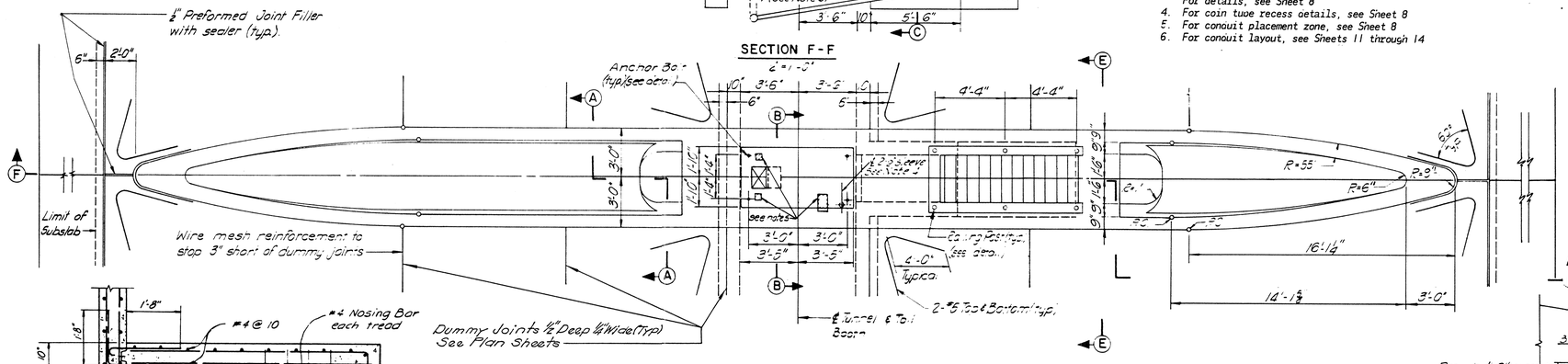
TRANSVERSE SECTION



ALUMINUM RAILING

½" = 1'-0"

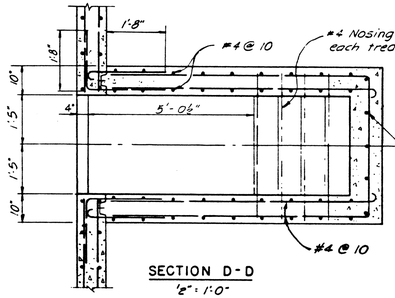
(For additional railing details, see sheet 7)



SECTION F-F

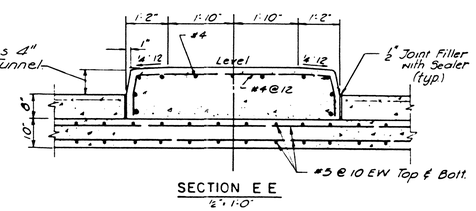
PLAN OF ISLAND WITH STAIRWAY

¼" = 1'-0"



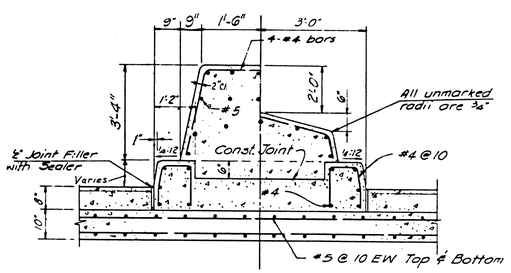
SECTION D-D

1"=1'-0"



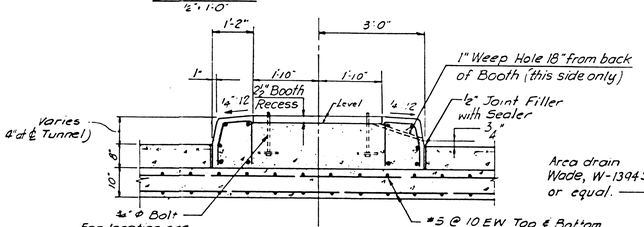
SECTION E E

1"=1'-0"



SECTION A-A

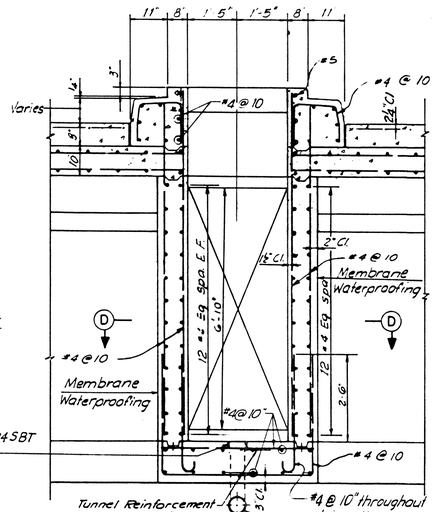
1"=1'-0"



SECTION B-B

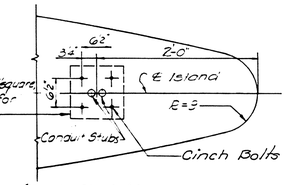
1"=1'-0"

NOTE:
Section B-B typical for islands E, F, N & O. For all other Islands use Section E-E.



SECTION C-C

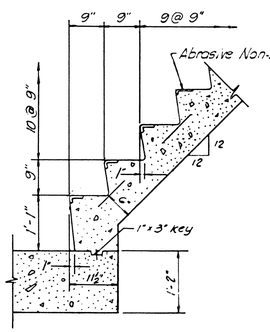
1"=1'-0"



(For traffic light locations see plan sheets) For Details See Sheet 10

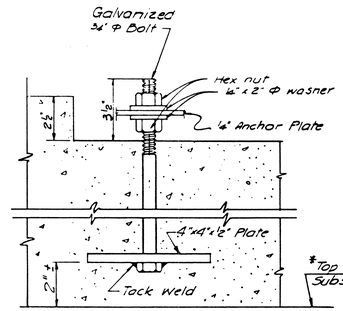
BOLT LAYOUT AT TRAFFIC LIGHT BASE

not to scale



STEP DETAIL

No Scale



DETAIL OF ANCHOR BOLT FOR TOLL BOOTH

3"=1'-0"

For Location see Island Plan this Sheet

R.P.C.C.: Reinforced, Portland Cement Concrete

AS BUILT

	BY	DATE
MADE	W. J. W.	5-68
CHECKED	D. E. N.	5-68
IN CHARGE H.D.S.		

NO.	REVISION	BY	DATE

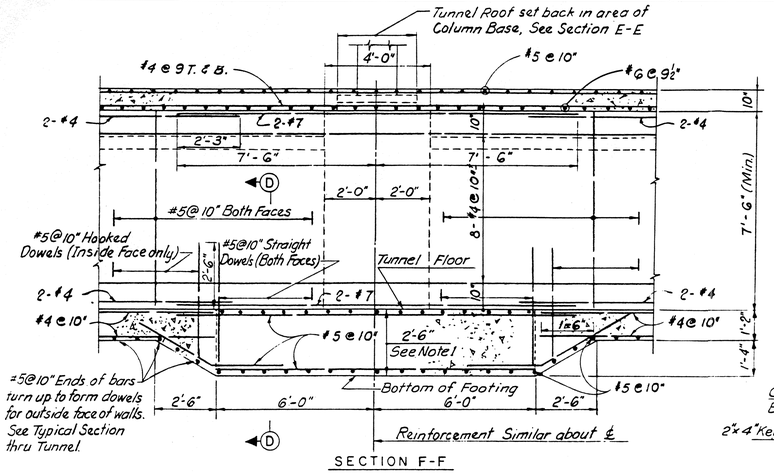
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BARRIER PLAZA
ISLAND AND TUNNEL DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

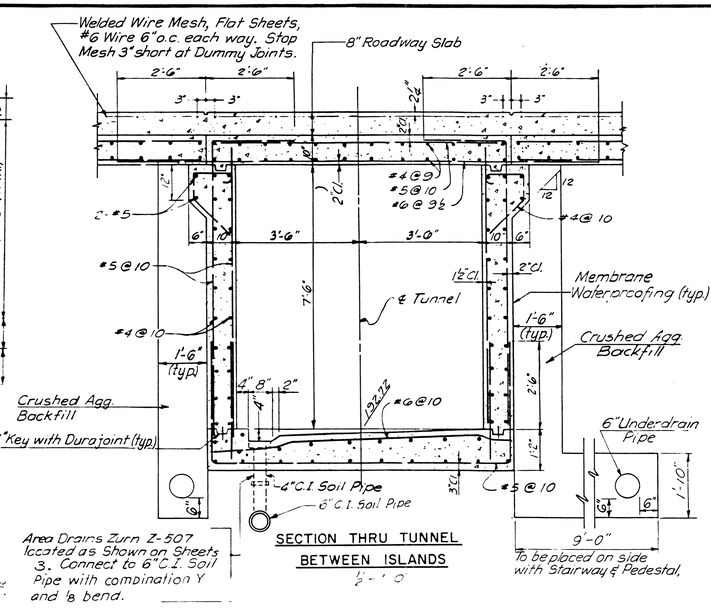
SCALE: AS NOTED
CONTRACT NO.: TF-3
SHEET NO. 5 OF ____

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-3	TOLL FACILITIES	6	38



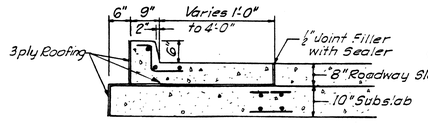
SECTION F-F

(Pedestal Reinforcement not Shown)



SECTION THRU TUNNEL BETWEEN ISLANDS

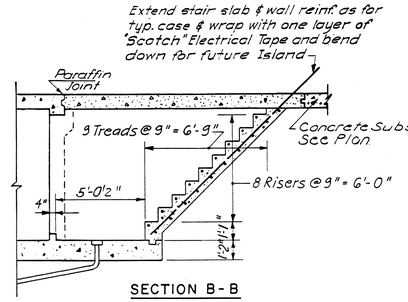
1/2" = 1'-0"



SECTION A-A

½" = 1'-0"

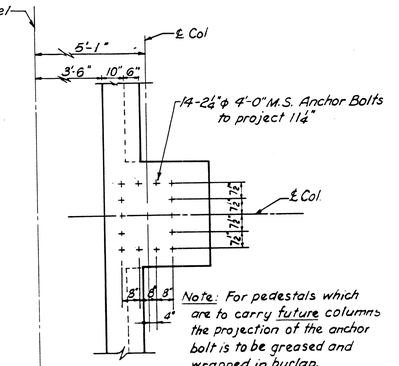
(See Sheet 3)



SECTION B-B

¼" = 1'-0"

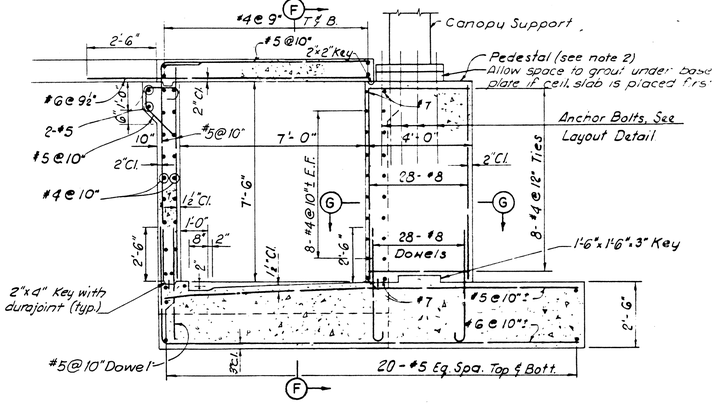
(See Sheet 3)



Note: For pedestals which are to carry future columns the projection of the anchor bolt is to be greased and wrapped in burlap.

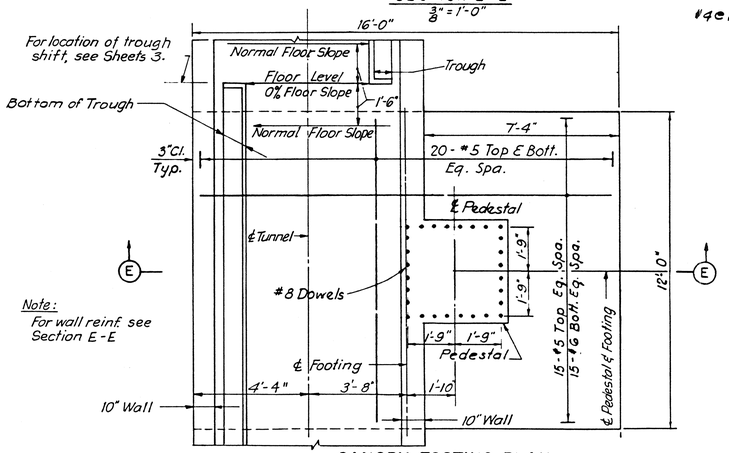
ANCHOR BOLT LAYOUT
BARRIER PLAZA CANOPY COLUMM

3/8" = 1'-0"



SECTION E-E

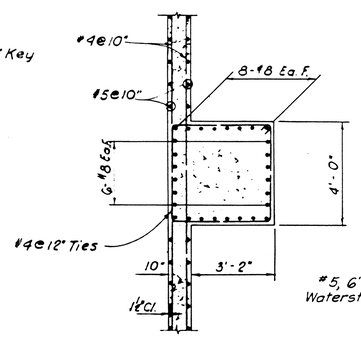
3/8" = 1'-0"



Note:
For wall reinf. see Section E-E

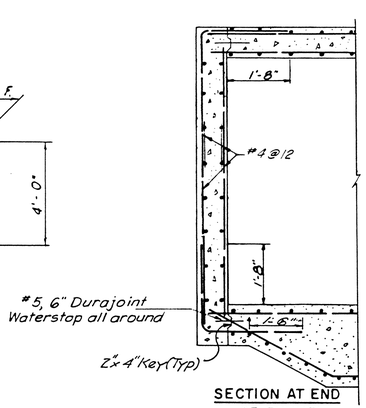
CANOPY FOOTING PLAN

3/8" = 1'-0"



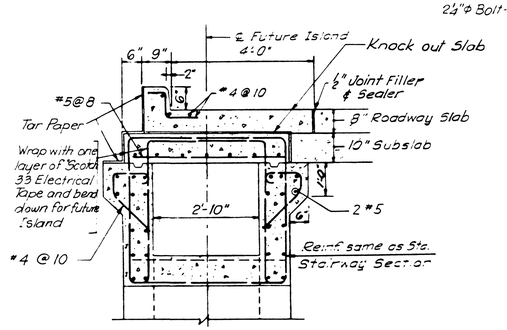
SECTION G-G

3/8" = 1'-0"



SECTION AT END OF TUNNEL

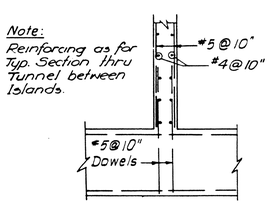
½" = 1'-0"



SECTION C-C

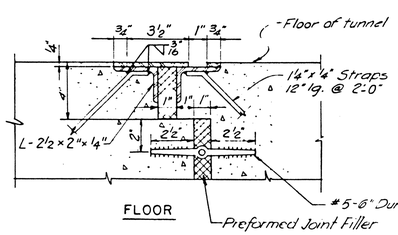
½" = 1'-0"

(See Sheet 3)



SECTION D-D

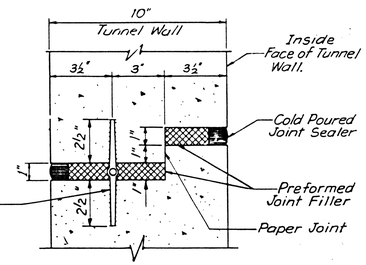
3/8" = 1'-0"



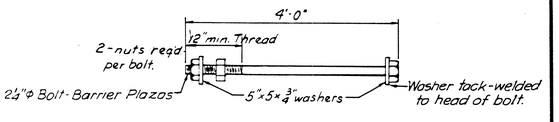
FLOOR

DETAILS OF TUNNEL EXPANSION JOINT

3" = 1'-0"



WALL



COLUMN ANCHOR BOLT DETAIL

¾" = 1'-0"

Notes

1) Top of Canopy footing will parallel slope of Tunnel floor.

2) Canopy Pedestal shall be vertical at all times.

AS BUILT

	BY	DATE				
MADE	W.J.W	5-68				
CHECKED	D.E.N.	5-68	1	Final Check	D.E.N.	6-68
IN CHARGE	H.D.S.		NO.	REVISION	BY	DATE

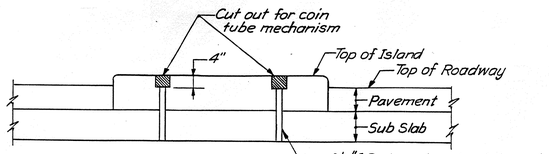
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

BARRIER PLAZA
TUNNEL DETAILS

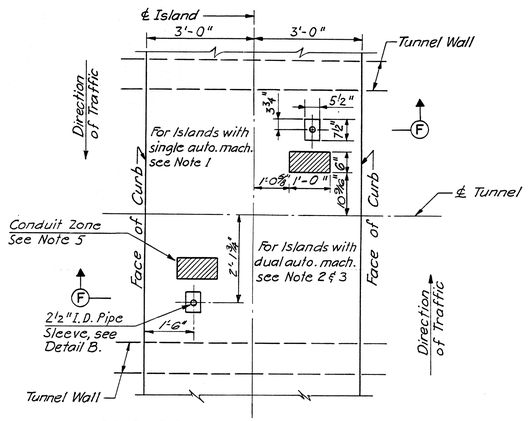
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO.: TF-3
SHEET NO. 6 OF ___

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-3	TOLL FACILITIES	8	38

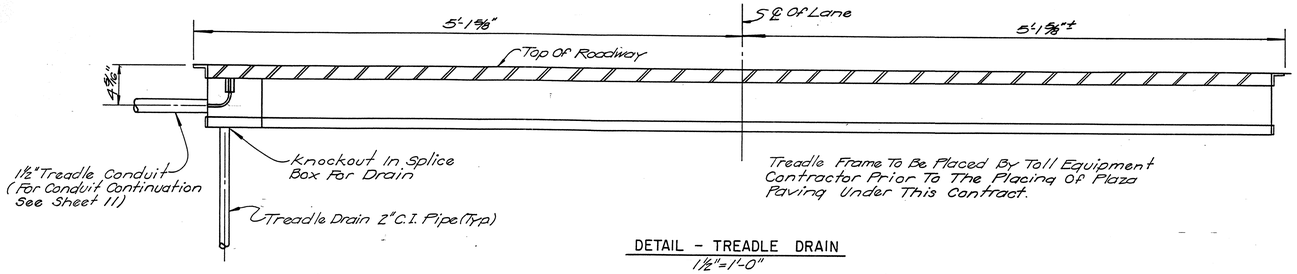


SECTION F-F
2" = 1'-0"

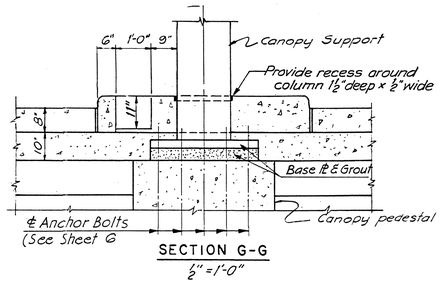


CONDUIT ZONE & PIPE SLEEVE LOCATION
FOR AUTOMATIC TOLL MACHINE
½" = 1'-0"

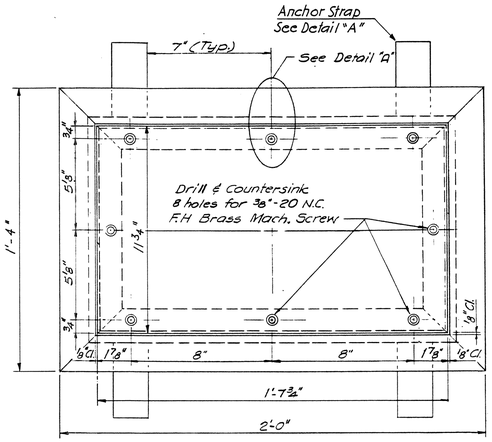
(Location and dimension of Conduit Zones and Pipe sleeves are similar for each Direction of Traffic.)



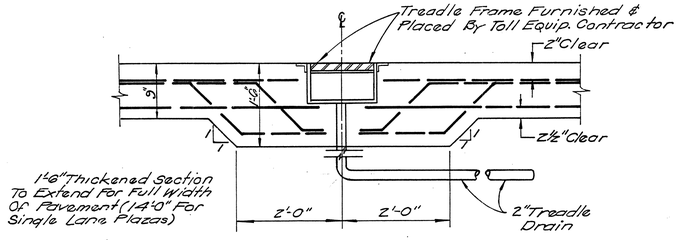
DETAIL - TREADLE DRAIN
1½" = 1'-0"



SECTION G-G
½" = 1'-0"

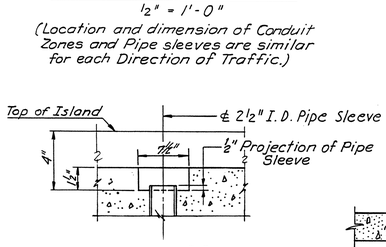


JUNCTION BOX
3" = 1'-0"

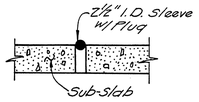


SECTION C-C

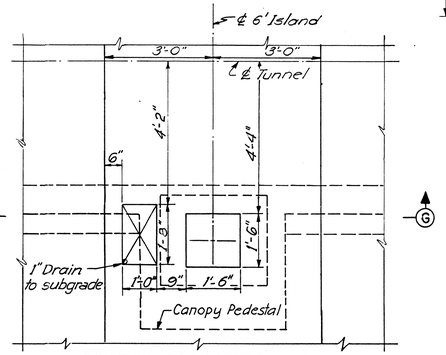
10' TREADLE FRAME INSTALLATION
¾" = 1'-0"



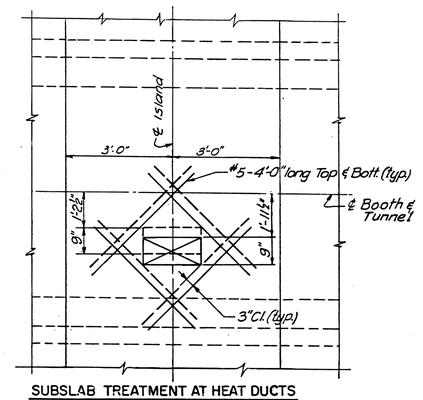
DETAIL "B"
½" = 1'-0"



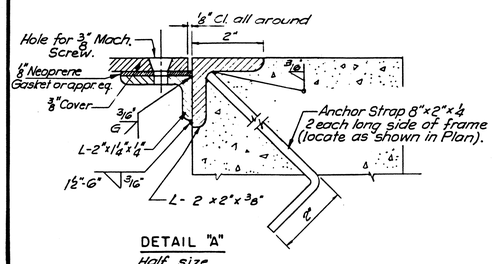
COIN TUBE DETAIL AT
FUTURE ISLAND LOCATION
No Scale



JUNCTION BOX LOCATION PLAN
½" = 1'-0"

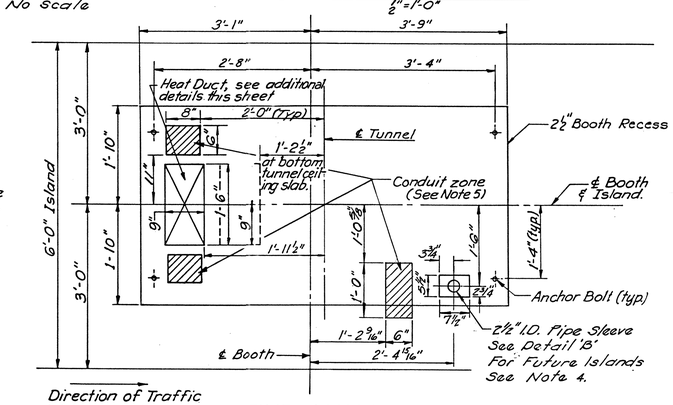


SUBSLAB TREATMENT AT HEAT DUCTS
Not to scale



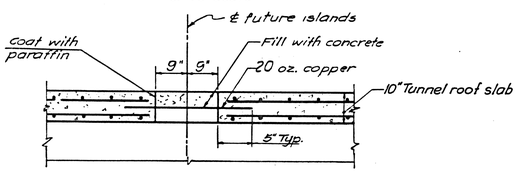
DETAIL "A"
Half size

(Frame & Cover to be Hot-Dipped Galvanized after Fabrication)



NOTE: Utility Locations In Tunnel Ceiling Slab Future Islands A, B, C, P, & Q Similar

UTILITY LOCATIONS
BARRIER PLAZA TOLL BOOTHS
¾" = 1'-0"



KNOCK-OUT DETAIL
Not to Scale

NOTES

1. Islands E, F, L, M, N & O will have a single coin tube and recess for automatic machine.
2. Islands G, H, I & K will have dual coin tubes and tube recesses for automatic machines. One location at each island will be for future automatic machines.
3. Island J will have dual coin tubes and tube recesses for future automatic machines.
4. All future island locations will have a single coin tube. Sleeve to be threaded and plugged.
5. Conduits to or from toll booths or automatic machines are to be placed totally within the zones shown. For conduit layouts and stubbing details, see Sheets 10, 12, 13 & 14.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	W. J. W.	5-68	3	Utility Locations Barrier Plaza Toll Booth	E.J.M.	12-77
CHECKED	D. E. N.	5-68	2	Rev. Treadle Frame & Drain	P.H.T.	2-75
IN CHARGE H.D.S.			1	Final Check	D.E.N.	6-68

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

MISCELLANEOUS DETAILS

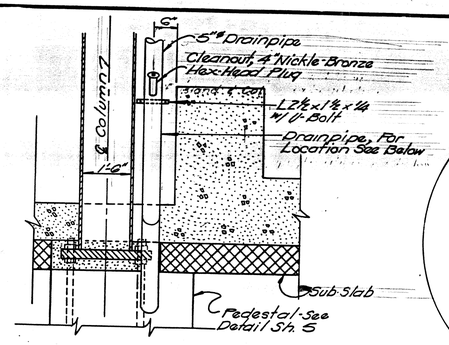
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO.: TF-3
SHEET NO. 8 OF ___

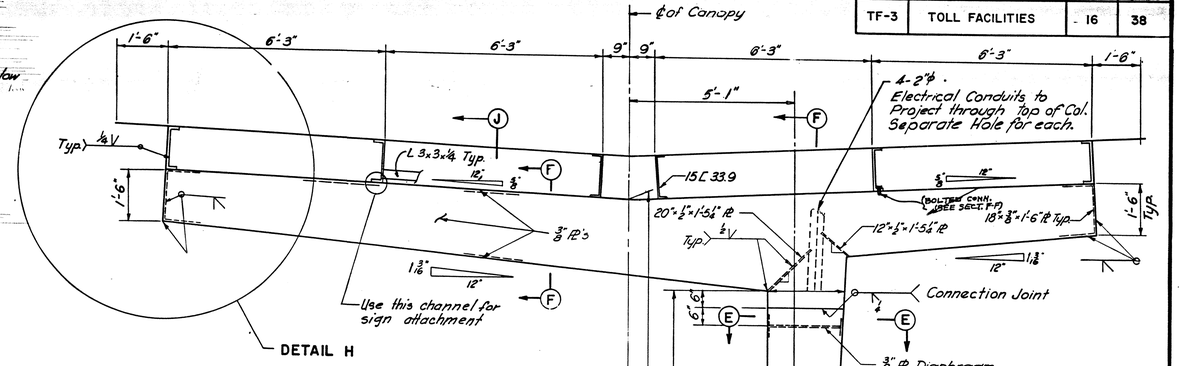
RICHMOND EXPRESSWAY SYSTEM			
SECTION		SHEET NO.	TOTAL SHEETS
TF-3	TOLL FACILITIES	16	38

NOTES:

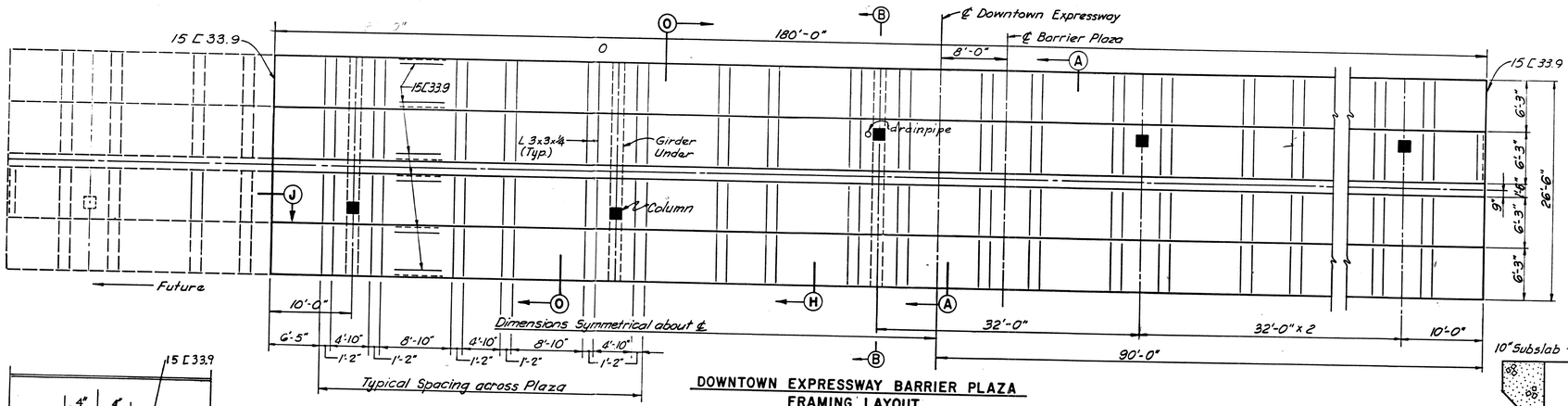
1. LANES 7,8,9,12,13 & 14 ARE TO RECEIVE EXACT CHANGE SIGNS, SEE DETAIL.
2. LIGHT UNITS ARE TO BE PLACED IN FRONT OF EXACT CHANGE SIGNS. THE LIGHT UNITS ARE TO BE FOCUSED ON THE HORIZONTAL ℄ OF THE PANEL. LIGHT UNIT BALLASTS WILL BE EXPOSED.
3. A 3'-0" WIDE SECTION OF ISLAND WHOSE CENTER REPRESENTS THE COL. ℄ INCLUDING A 4'-0" WIDE AND 10" HIGH CONC. FILLER BELOW ARE INCLUDED IN THIS CONTRACT. THE JUNCTION BOX SHOWN IN SECTION B-B WILL BE OWNER SUPPLIED BUT INSTALLED UNDER THIS CONTRACT. ALL WORK SHOWN IN SECTION C-C IS PART OF THIS CONTRACT. PROPER JOINT SEAL AND CURB DIMENSIONS TO FIT WITH THE EXISTING MUST BE PROVIDED.



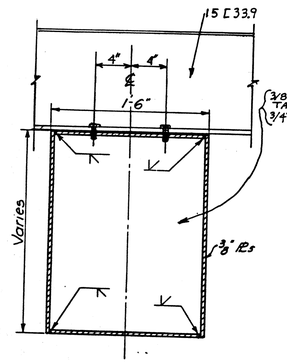
SECTION B-B
Scale: ½"=1'-0"



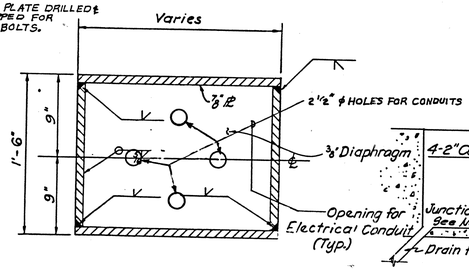
DETAIL H



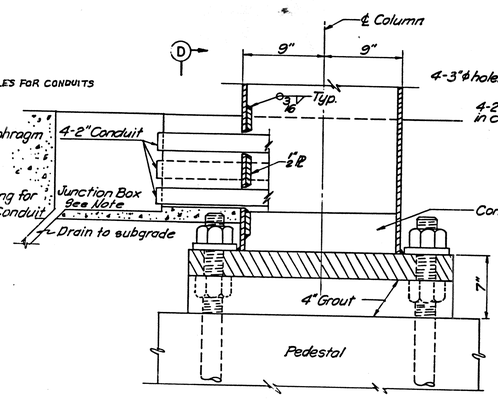
DOWNTOWN EXPRESSWAY BARRIER PLAZA
FRAMING LAYOUT
⅛"=1'-0"



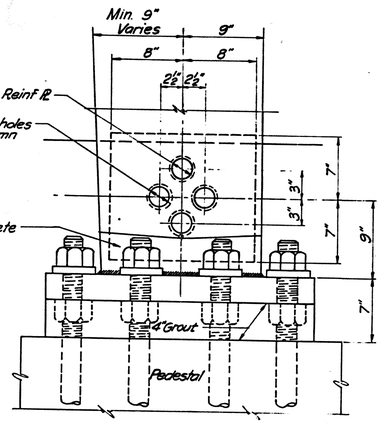
SECTION F-F
Scale: 1½"=1'-0"



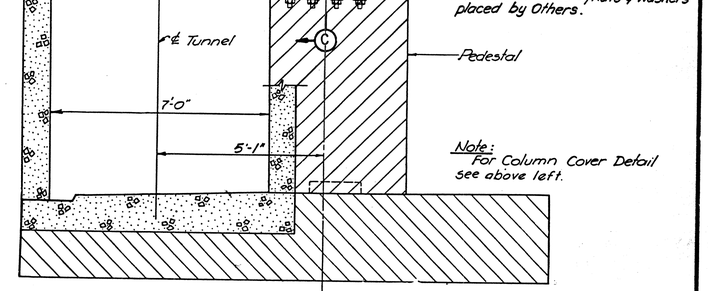
SECTION E-E
Scale: 1½"=1'-0"



SECTION C-C
Scale: 1½"=1'-0"



SECTION D-D
Scale: 1½"=1'-0"



VIEW A-A
Scale ½"=1'-0"

AS BUILT

	BY	DATE
MADE	KL.	9-15-74
CHECKED	KL.	9-15-74
IN CHARGE	J.P.F.	

NO.	REVISION	BY	DATE
1	Rev. Anchor Bolts	P.H.T.	3/75

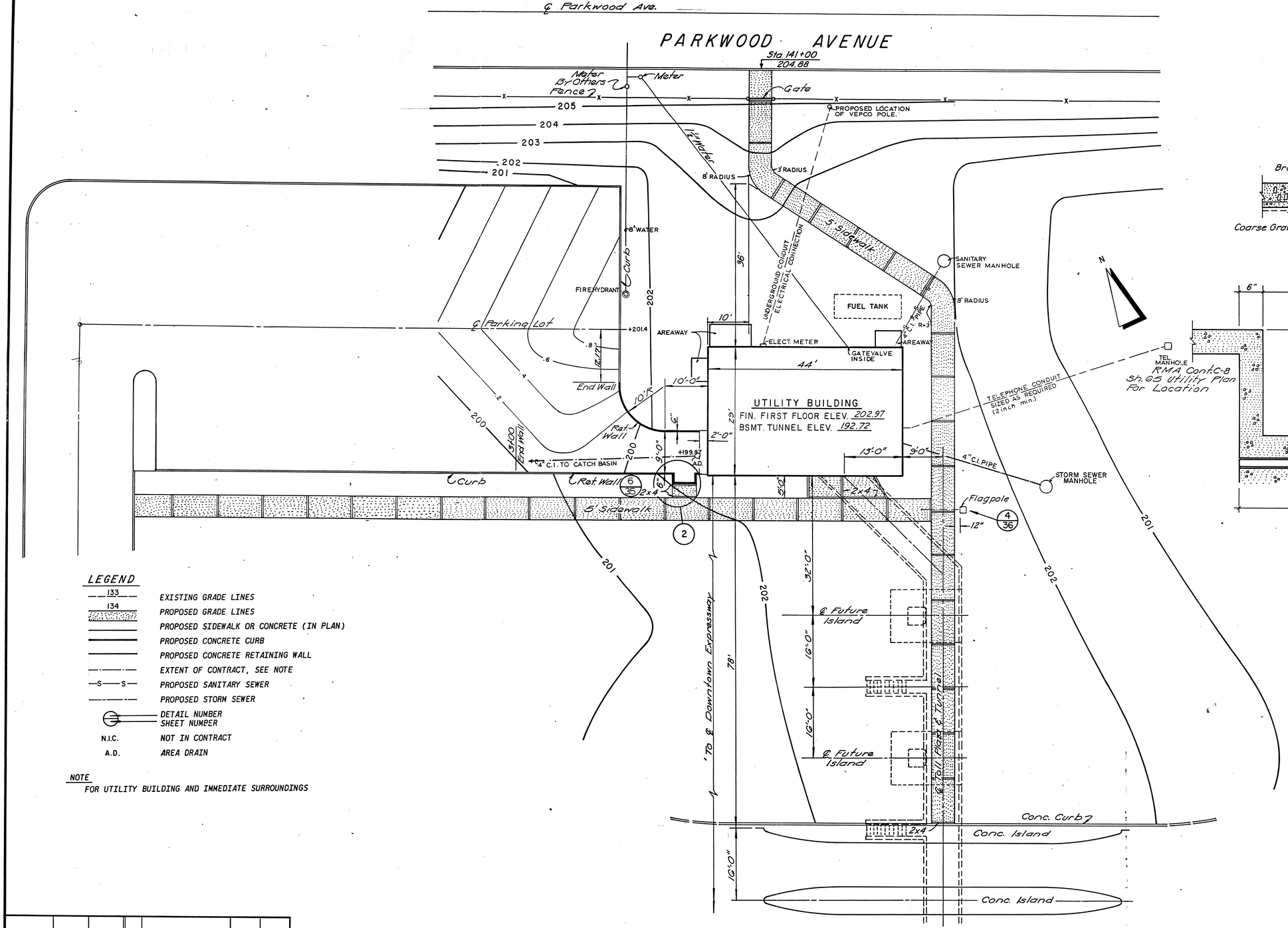
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

CANOPY FRAMING & DETAILS

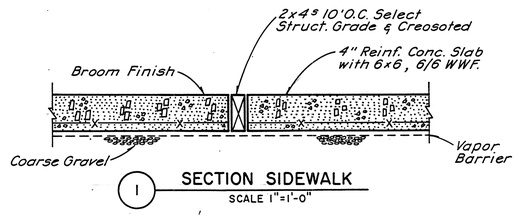
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Shown
CONTRACT NO.: TF-3
SHEET NO. 16 OF 38

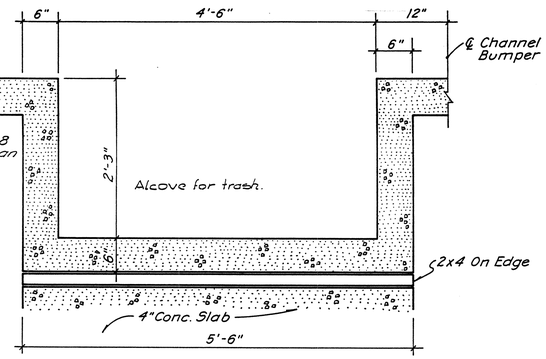
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-3	UTILITY BUILDING	29	38



SITE PLAN
SCALE: 3/32"=1'-0"



1 SECTION SIDEWALK
SCALE 1"=1'-0"



2 PLAN
SCALE 1"=1'-0"

LEGEND

133	EXISTING GRADE LINES
134	PROPOSED GRADE LINES
	PROPOSED SIDEWALK OR CONCRETE (IN PLAN)
	PROPOSED CONCRETE CURB
	PROPOSED CONCRETE RETAINING WALL
	EXTENT OF CONTRACT, SEE NOTE
—S—S—	PROPOSED SANITARY SEWER
	PROPOSED STORM SEWER
	DETAIL NUMBER / SHEET NUMBER
N.I.C.	NOT IN CONTRACT
A.D.	AREA DRAIN

NOTE
FOR UTILITY BUILDING AND IMMEDIATE SURROUNDINGS

			NO.	REVISION	BY	DATE
DESIGNED	KL.	9-15-74				
DRAWN	D.A.S.	9-15-74				
CHECKED	KL.	9-15-74				
IN CHARGE	J.P.F.					

AS BUILT

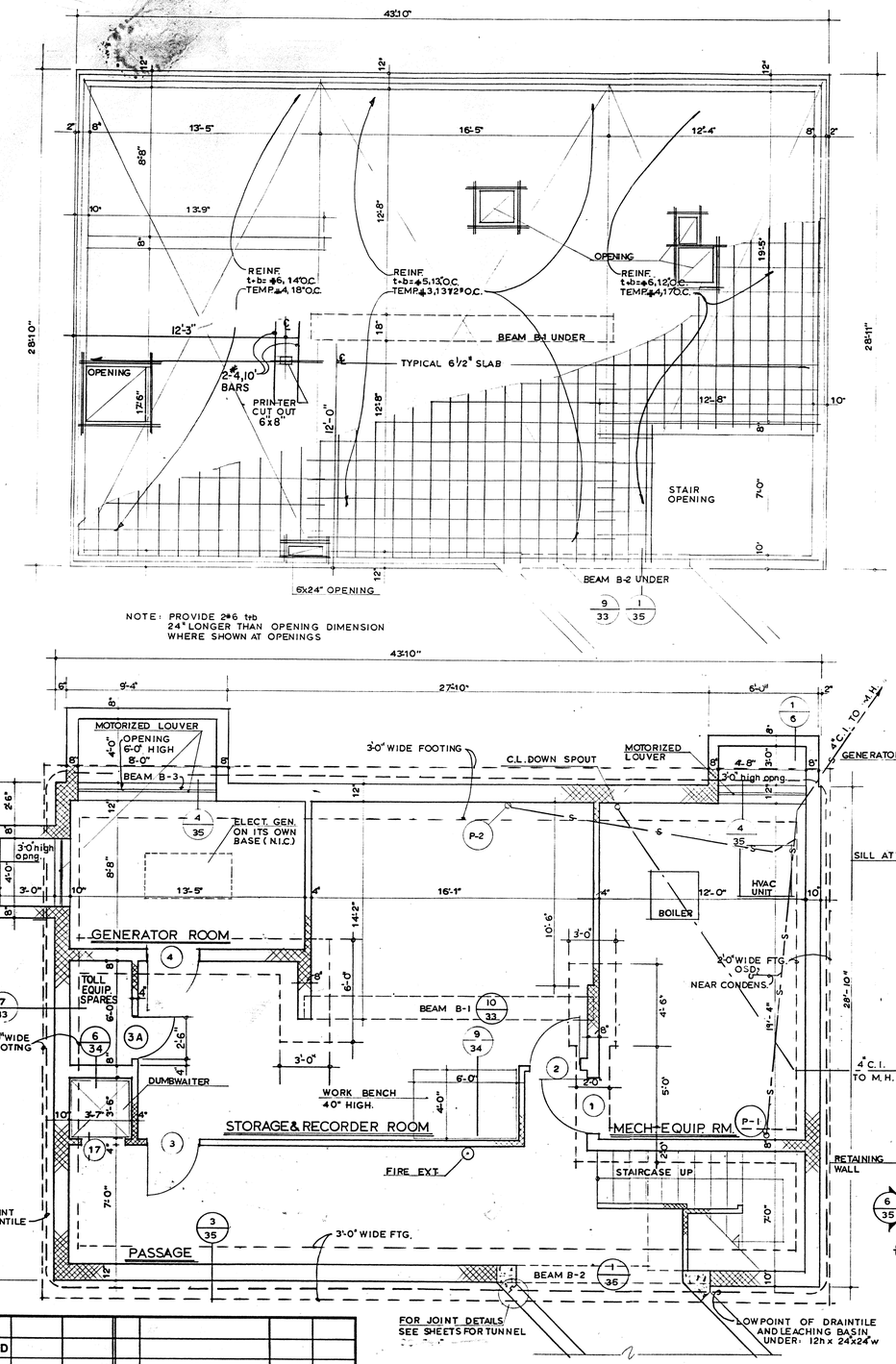
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

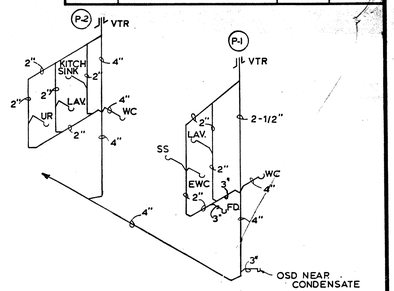
UTILITY BUILDING
SITE PLAN & DETAILS

SCALE As Shown
DATE Sept. 15, 74
SHEET 29 OF 38

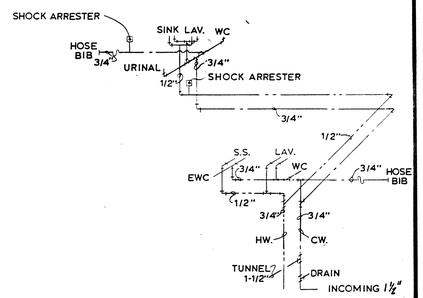
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-3	UTILITY BUILDING	31	38





SOIL WASTE & VENT DIAGRAM



WATER PIPING DIAGRAM

LEGEND

- CONCRETE
- BRICK MASONRY
- CONCRETE MASONRY
- CONCRETE MASONRY 33⅓% SOLID, CONCRETE FILLED
- WOOD STUD PARTITION FACED BOTH SIDES
- WINDOW
- VOID IN MASONRY
- ITEMS BY OTHERS
- A.D. AREA DRAIN
- F.D. FLOOR DRAIN
- O.S.D. OPEN SITE DRAIN

AS BUILT

DESIGNED						
DRAWN						
CHECKED			1	Rev. Material Printer Wall Panel Cubicle Room	F.H.T.	2/75
IN CHARGE			NO.	REVISION	BY	DATE

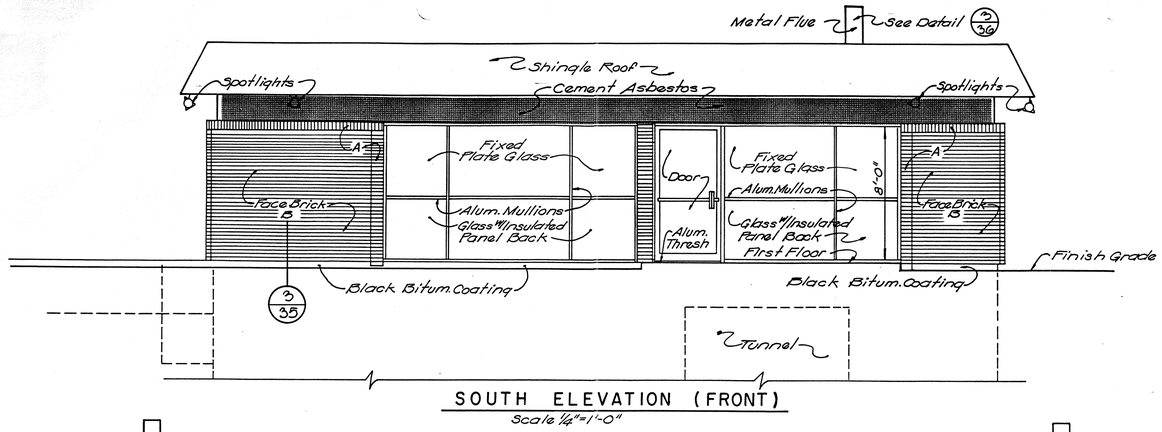
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

UTILITY BUILDING
PLANS
ARCHITECTURAL & STRUCTURAL

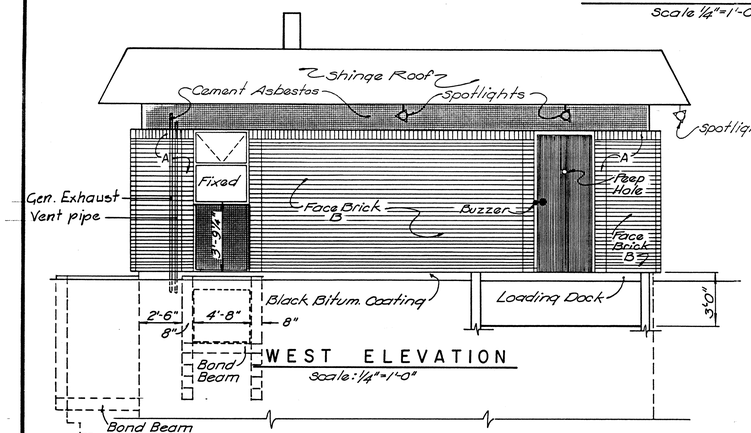
SCALE 1/4"=1'-0" | SHEET 31 OF 38
DATE Sept. 15, 74

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

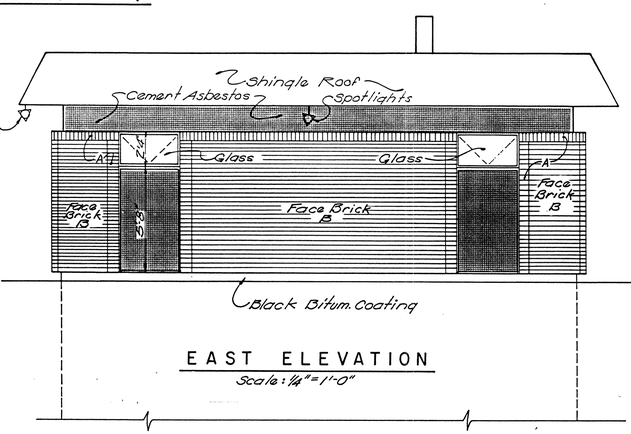
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-3	UTILITY BUILDING	32	38



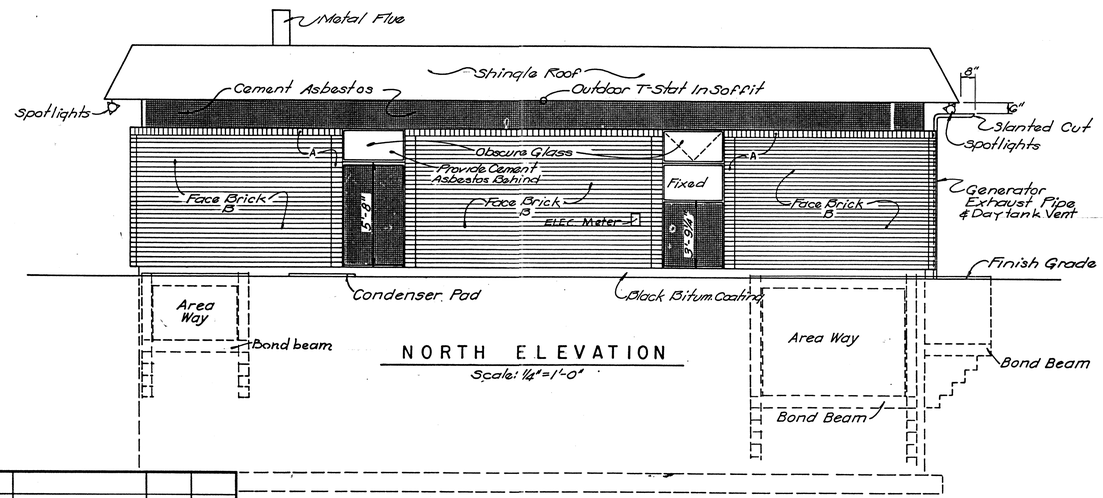
SOUTH ELEVATION (FRONT)
Scale 1/4"=1'-0"



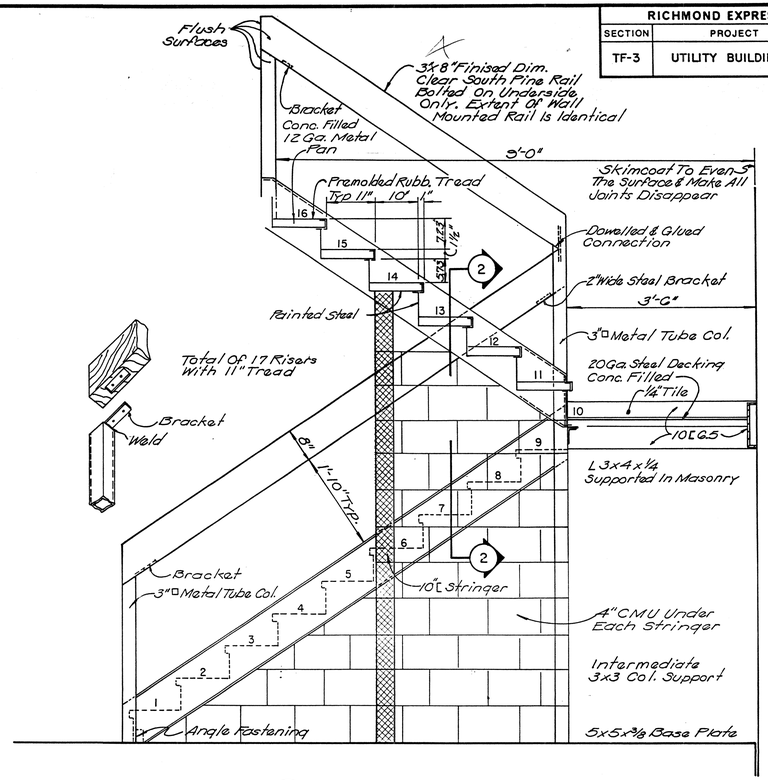
WEST ELEVATION
Scale: 1/4"=1'-0"



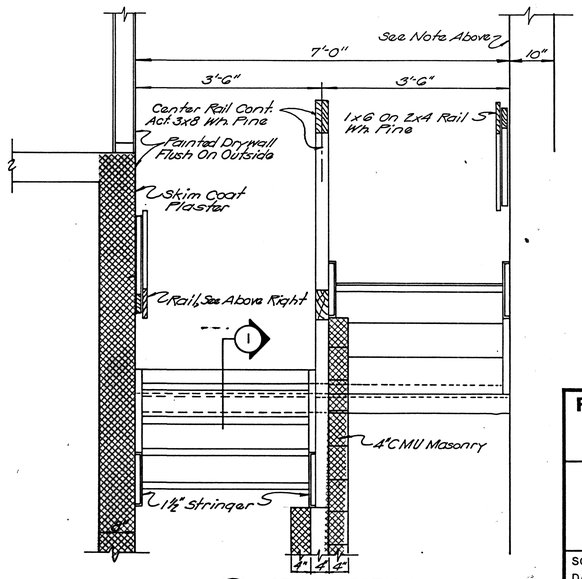
EAST ELEVATION
Scale: 1/4"=1'-0"



NORTH ELEVATION
Scale: 1/4"=1'-0"



1 STAIR SECTION
Scale: 3/4"=1'-0"



2 STAIR SECTION
Scale 3/4"=1'-0"

AS BUILT

DESIGNED	KL.	9-15-74				
DRAWN	D.A.S.	9-15-74				
CHECKED	KL.	9-15-74				
IN CHARGE J.P.F.			NO.	REVISION	BY	DATE

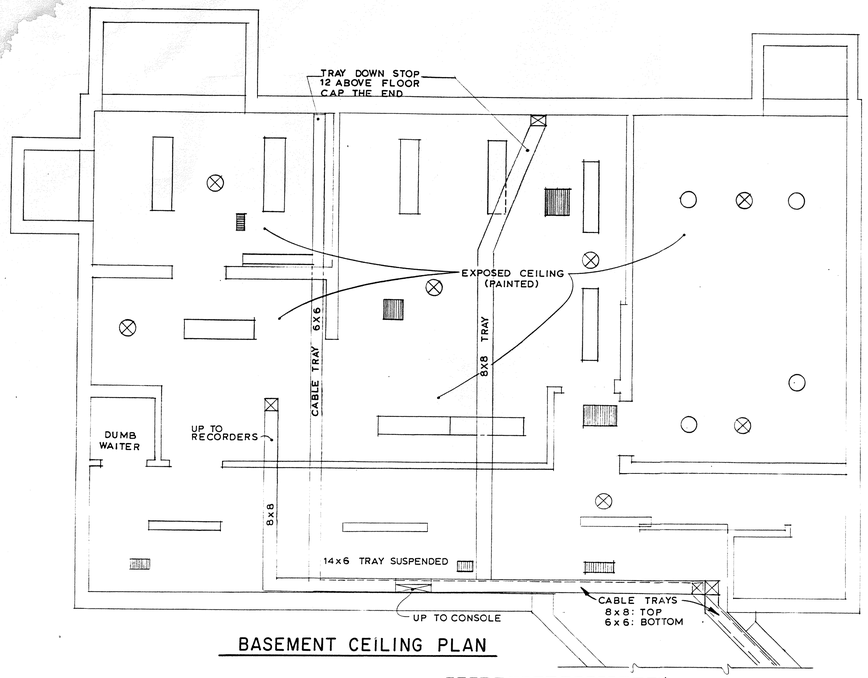
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

UTILITY BUILDING
ELEVATIONS & SECTIONS

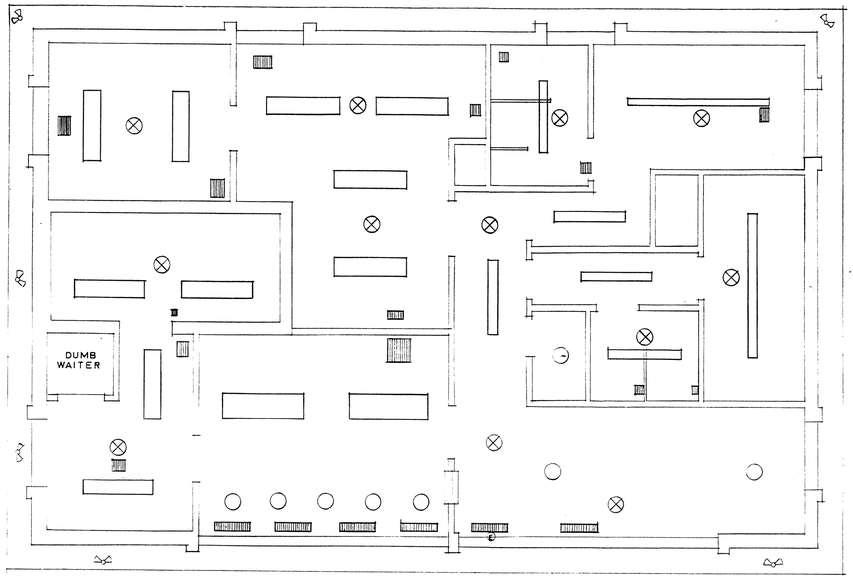
SCALE As Shown
DATE Sept. 15, 74
SHEET 32 OF 38

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-3	UTILITY BUILDING	37	38



BASEMENT CEILING PLAN



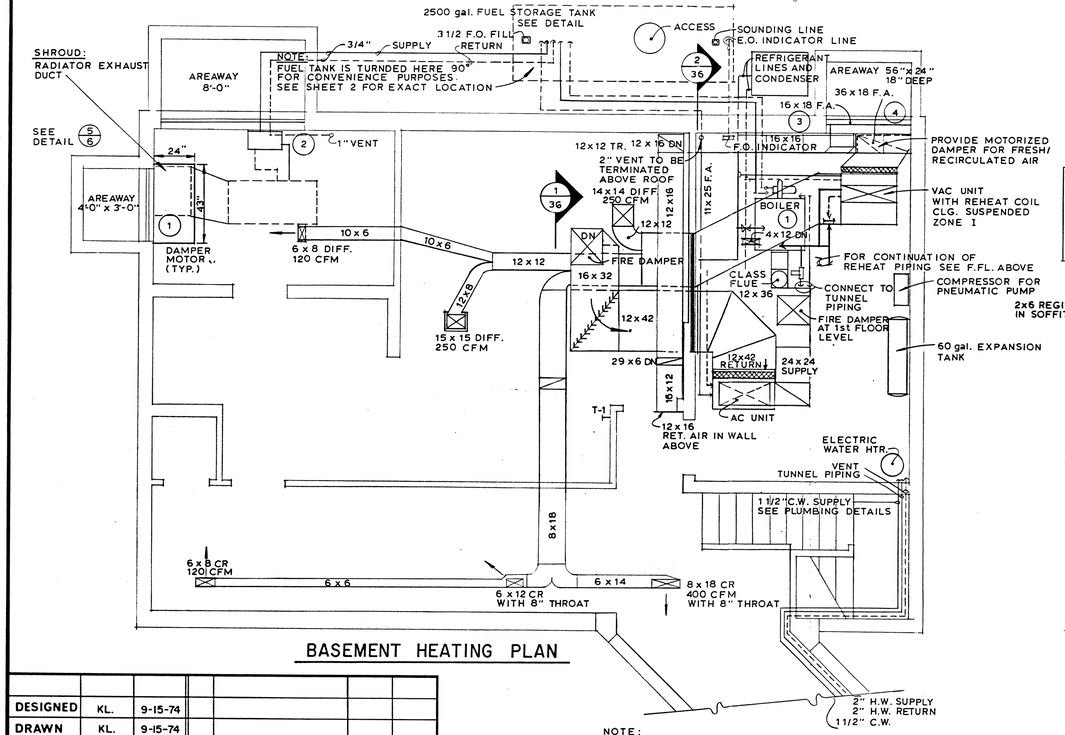
FIRST FLOOR CEILING PLAN

LEGEND

- PARTITION
- 6x12 DUCT (SIZE)
- FLUORESCENT FIXTURE
- INCANDESCENT FIXTURE
- EMERGENCY INCANDESCENT FIXTURE
- CLG. AIR REGISTER
- EXHAUST FAN

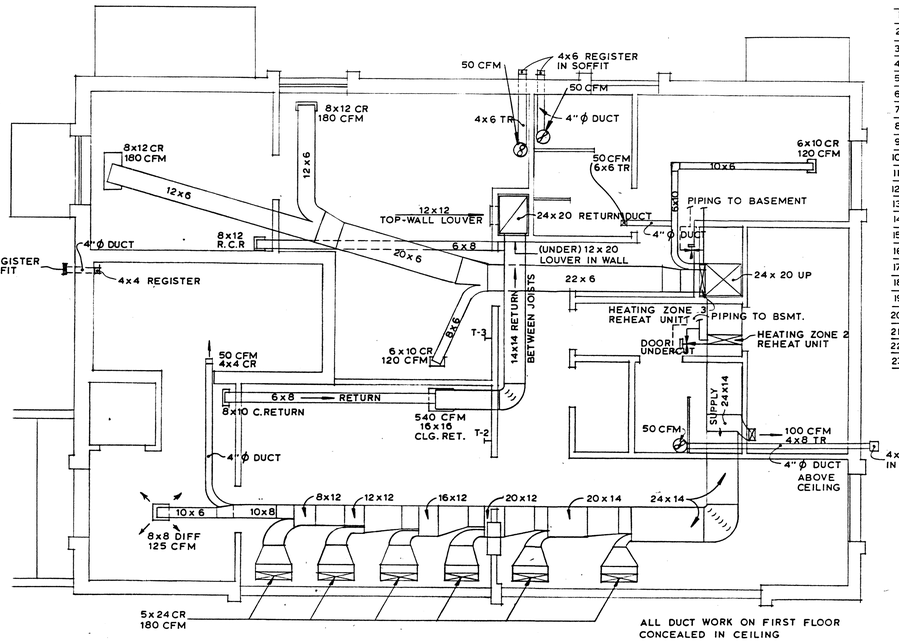
ABBREVIATIONS

TR	TOP REGISTER
CR	CEILING REGISTER
CFM	CUB. FT. / MIN.
CW	COLD WATER



BASEMENT HEATING PLAN

NOTE:
PROVIDE CLEANOUTS AND ACCESS PANELS WHERE CODE AND CONVENIENCE REQUIRES.



FIRST FLOOR HEATING PLAN

MOTOR SCHEDULE

1	INLINE PUMP, TUNNEL HW	3	32 GPM	42 FT. HEAD	3/4 HP	208/3/60	
2	CIRCULATOR 1		12 GPM	12 FT. HEAD	1/6 HP	115/1/60	
3	CIRCULATOR 2		12 GPM	12 FT. HEAD	1/6 HP	115/1/60	
4	EXHAUST FAN, KITCHEN		50 CFM			115/1/60	50 W
5	EXHAUST FAN, MEN TOILET		50 CFM			115/1/60	50 W
6	EXHAUST FAN, FEM. TOIL.		50 CFM			115/1/60	50 W
7	A/C AIRHANDL. UNIT		9000 CFM		2 HP	208/3/60	
8	CONDENSING UNIT 1		3000 CFM		2 HP	208/3/60	30 KW
9	CONDENSING UNIT 2		1300 CFM		1 HP	208/3/60	10 KW
10	H VAC UNIT		1300 CFM		1 HP	208/3/60	10 KW
11	OIL BURNER				1/3 HP	115/1/60	
12	DAMPER MOTOR 1				1/6 HP	115/1/60	
13	DAMPER MOTOR 2		SEE BASEMENT		1/6 HP	115/1/60	
14	DAMPER MOTOR 3		HEATING PLAN		1/6 HP	115/1/60	
15	DAMPER MOTOR 4				1/6 HP	115/1/60	
16	VOID						
17	UNIT HEATER 1				1/3 HP	115/1/60	
18	UNIT HEATER 2		BARRIER PLAZA BOOTHS		1/3 HP	115/1/60	
19	UNIT HEATER 3				1/3 HP	115/1/60	
20	UNIT HEATER 4				1/3 HP	115/1/60	
21	TUNNEL HEATER 1				1/5 HP	115/1/60	
22	TUNNEL HEATER 2				1/5 HP	115/1/60	
23	DUMBWAITER				1 HP	208/3/60	

AS BUILT

DESIGNED	KL.	9-15-74				
DRAWN	KL.	9-15-74				
CHECKED	KL.	9-15-74				
IN CHARGE J.P.F.			NO.	REVISION	BY	DATE

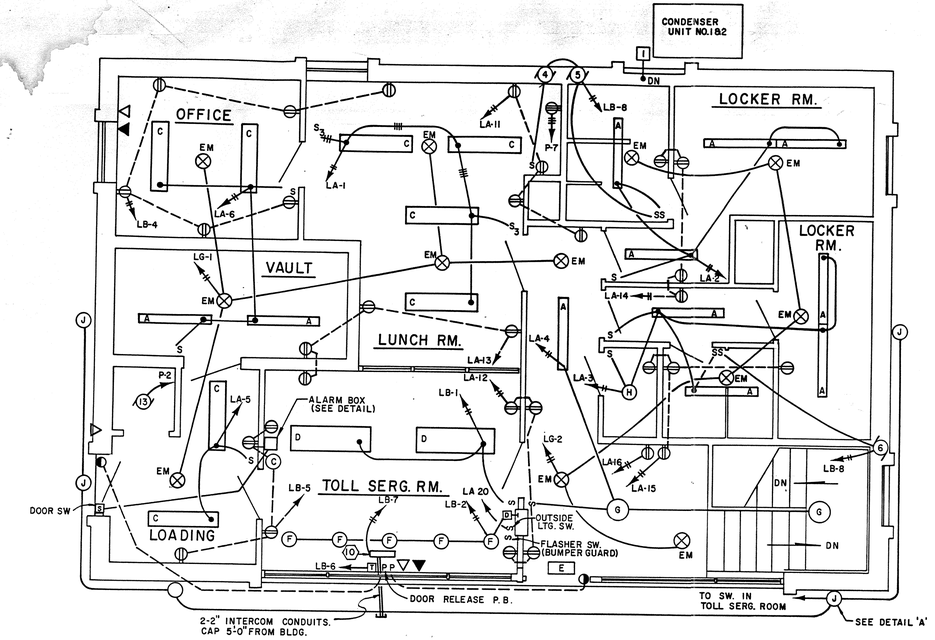
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

UTILITY BUILDING
MECHANICAL PLANS & SCHEDULES

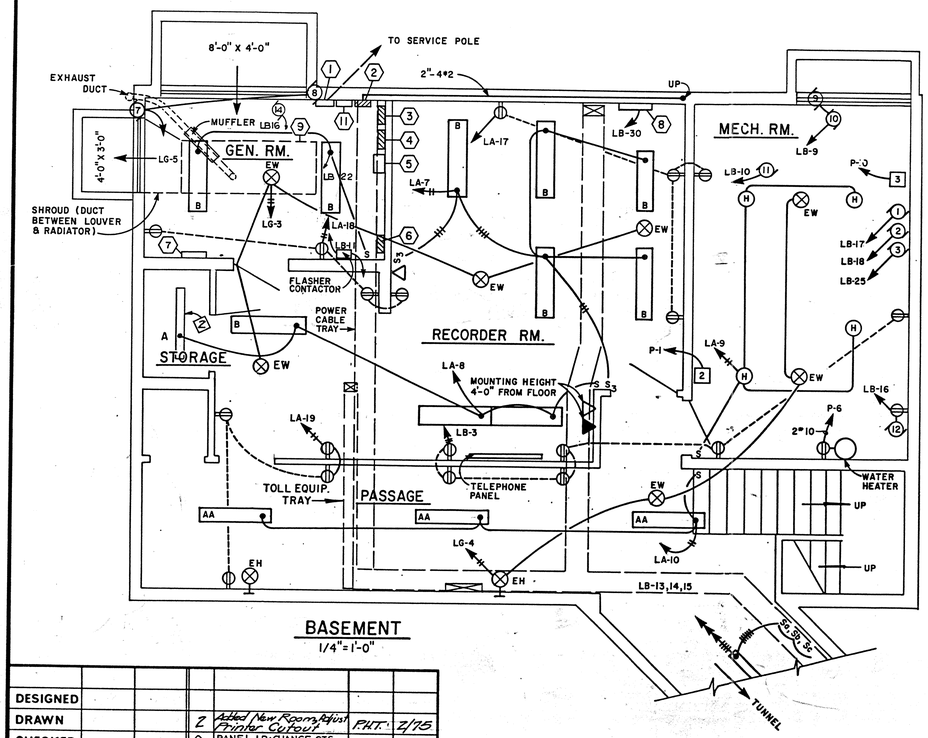
SCALE 1/4"=1-0"
DATE Sept. 15, 74
SHEET 37 OF 38

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO	TOTAL SHEETS
TF-3	UTILITY BUILDING	38	38



FIRST FLOOR
1/4"= 1'-0"



BASEMENT
1/4"= 1'-0"

DESIGNED					
DRAWN		2	Added New Recirculfist Powder Coated	PHT.	2/15
CHECKED		1	PANEL LB-CHANGE CTS. 26,28,29,30,31; ADD 32,33,34	KL	10-17-74
IN CHARGE		NO.	REVISION	BY	DATE

LEGEND

- A — FLUORESCENT FIXTURE, LETTER INDICATES TYPE.
- B — INCANDESCENT FIXTURE, LETTER INDICATES TYPE.
- EMERGENCY LIGHT-IN CEILING
- EMERGENCY LIGHT-WALL MOUNTED
- E — EXIT LIGHT
- D — DIMMER
- DUPLEX WALL RECEPTACLE OUTLET
- RANGE RECEPTACLE
- S — SINGLE POLE SWITCH
- S_3 — THREE WAY SWITCH
- P — DOOR RELEASE SYSTEM
- TELEPHONE OUTLET
- INTERCOM SYSTEM TELEPHONE OUTLET
- C — ELECTRIC CLOCK OUTLET
- T — TRANSFORMER FOR DOOR RELEASE SYSTEM
- PANEL BOARD
- WIRING CONCEALED IN WALLS OR CEILING
- WIRING CONCEALED IN FLOOR
- LA-3 — HOME RUN WITH PANEL & CIRC. DESIGNATION

- (1) CURRENT TRANSFORMER & METERING EQUIPMENT
- (2) MAIN DISTRIBUTION PANEL BOARD-P
- (3) PANEL BOARD-LA
- (4) PANEL BOARD-LB
- (5) AUTO TRANSFER SWITCH
- (6) EMERGENCY GENERATOR PANEL-LG
- (7) GENERATOR CONTROL PANEL
- (8) RECORDER ROOM PANEL BOARD-R
- (9) GENERATOR SET (45 KW. CONTINUOUS)
- (10) INTER-COM PANEL
- (11) DISCONNECT SWITCH (400 A) & FUSES (225 A)

- (1) CIRCU. PUMP #1 (ZONE-1), 1/6 HP, 115 V, 1ϕ, 60~, 2#12
- (2) CIRCU. PUMP #2 (ZONE-2) 1/6 HP, 115 V, 1ϕ 60~, 2#12
- (3) CIRCU. PUMP #3 (TUNNEL), 3/4HP, 208 V, 3ϕ, 60~ 4#12
- (4) EXHAUST FAN (KITCHEN)
- (5) EXHAUST FAN (MEN TOILET)
- (6) EXHAUST FAN (WOMEN TOILET)

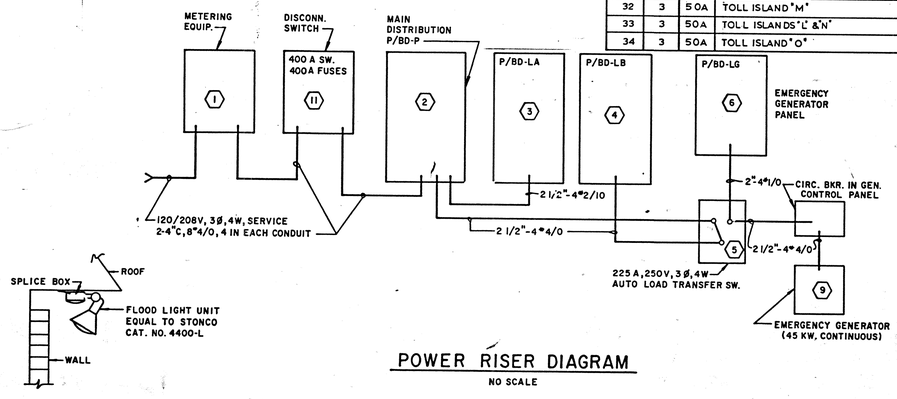
  } ALL 1/12 HP, 115 V, 1ϕ, 60~, 3#12

- (7) DAMPER MOTOR #1
- (8) DAMPER MOTOR #2
- (9) DAMPER MOTOR #3
- (10) DAMPER MOTOR #4

  } ALL 1/6 HP, 115 V, 60~, 1ϕ, 2#12, 1+2 CONNECTED TO GENERATOR CONTROLS, 3+4 CONNECTED TO H & V CONTROLS

- (11) OIL BURNER, 1/3 HP, 115 V, 1ϕ, 60~ 2#12
- (12) SPARE 2#12
- (13) DUMBWAITER 1HP, 208 V, 3ϕ, 60~, 4#12
- (1) CONDENSER UNIT #1 (2 HP&30 KW) & CONDENSER UNIT #2 (2 HP&10 KW)
- (2) A/C AIR HANDLING UNIT (2 HP)
- (3) HVAC UNIT (1 HP)
- (14) GENERATOR DAY TANK PUMP

GENERAL NOTES:
FOR LIGHTING FIXTURE SCHEDULE SEE SPEC'S
TOLL ISLAND 'J' BETWEEN LANES 10 & 11 REQUIRES NO INDIVIDUAL CT.



POWER RISER DIAGRAM
NO SCALE

OUTSIDE LIGHTING
DETAIL A

MAIN DISTRIBUTION PANEL-P

120/208 V, 3Ø, 4W, SN, 42 POLES, 600A BUS } WESTINGHOUSE TYPE CDP

CIRC. NO.	POLE	TRIP	DESCRIPTION
1	2	20 A	AC UNIT #3 (2HP)
2	2	20 A	SPARE
3	2	20 A	SPARE
4	3	20 A	SPARE
5	3	50 A	KITCHEN UNIT 8.5 KW
6	2	30 A	ELECT. W.H. UTILITY (4 KW)
7	2	20 A	DUMB WAITER
8	2	20 A	AC UNIT
9	3	30 A	SPARE
10	3	50 A	HVAC UNIT (1 HP & 10 KW)
11	3	50 A	SPARE
12	3	150 A	CONDENSERS, #1 & #2 (@ 43.0 KW)
13	3	150 A	PANEL BOARD LA
14	3	150 A	PANEL BOARD LB
15	3		SPACE
16	3		SPACE

PANEL BOARD-LB

120/208 V, 3Ø, 4W, SN, 42 POLES, 225 A BUS } WESTINGHOUSE TYPE WBA

CIRC. NO.	POLE	TRIP	DESCRIPTION
1, 2	1	20A	LTG. 1st. FLOOR
3, 4, 5	1	20A	RECEPT. 1st. FLOOR & BASEMENT DR. ALARM
6	1	20A	DOOR RELEASE SYSTEM
7	1	20A	INTERCOM PANEL
8	1	20A	EXHAUST FANS (THREE)
9	1	20A	DAMPER MOTORS #3 & #4
10	1	20A	OIL BURNER
11	1	20A	FLASHER, CONTACTOR (BUMPER GUARD)
12	1	20A	TUNNEL HEATER FANS (THREE)
13, 14, 15	1	20A	LIGHTING TUNNEL ('A' & 'B' LIGHTS)
16	1	20A	LIGHTING TUNNEL
17	1	20A	CIRCULATOR PUMP #1
18	1	20A	CIRCULATOR PUMP #2
19	1	20A	STAIRCASE LTG. (TUNNEL)
20	3	50A	AIR COMPRESSOR (CONTROLS)
21	1	20A	SPARE
22	1	20A	LIGHTS GENERATOR RM.
23	1	20A	LIGHTING TUNNEL ('C' LIGHTS)
24	1	20A	SPARE
25	3	20A	CIRCULATOR PUMP #3 (TUNNEL)
26	3	50A	TOLL ISLAND "E"
27	3	50A	P/BD-R (RECORD RM.)
28	3	50A	TOLL ISLANDS "F" & "H"
29	3	50A	TOLL ISLAND "G"
30	3	50A	TOLL ISLAND "I"
31	3	50A	TOLL ISLAND "K"
32	3	50A	TOLL ISLAND "M"
33	3	50A	TOLL ISLANDS "L" & "N"
34	3	50A	TOLL ISLAND "O"

PANEL BOARD-LA

120/208 V, 3Ø, 4W, SN, 32 POLES, 225A BUS } WESTINGHOUSE TYPE WBA

CIRC. NO.	POLE	TRIP	DESCRIPTION
1, 2, 3, 4, 5, 6	1	20 A	LTG. 1st FLOOR
7, 8, 9, 10	1	20 A	LTG. BASEMENT
11, 12, 13, 14, 15	1	20 A	RECEPTACLES 1st FLOOR
16	1	20 A	ELECT. WATER COOLER
17, 18, 19	1	20 A	RECEPTACLES BASEMENT
20	1	20 A	OUTSIDE FLOOD LIGHTING
21	1	20A	SPARE
22	1	20A	SPARE
23	1	20A	SPARE
24	1	20A	SPARE
25	1	20A	SPARE
26	1	20A	SPARE
27	1	20A	SPARE
28	1	20A	SPARE
29, 30	1		SPACE
31, 32	1		SPACE

PANEL BOARD - R

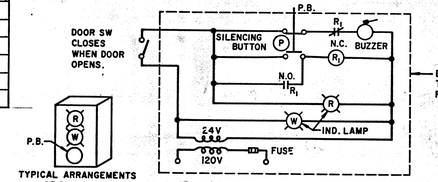
120/208 V, 3Ø, 4W, SN, 10 POLES, 100A BUS } WESTINGHOUSE TYPE WBA

CIRC. NO.	POLE	TRIP	DESCRIPTION
1 to 16	1	20A	RECORDER ROOM CIRCS.
17 to 20	1		SPACES

PANEL BOARD - LG

120/208V, 3Ø, 4W, 10 POLES, 100A BUS — WESTINGHOUSE TYPE WBA.

CIRC. NO.	POLE	TRIP	DESCRIPTION
1	1	20 A	LTG. 1 ST. FLOOR (EMG.)
2	1	20 A	LTG. 1 ST. FLOOR (EMG.)
3	1	20A	LTG. BASEMENT (EMG.)
4	1	20 A	LTG BASEMENT (EMG)
5	1	20 A	DAMPER MOTORS #1 & #2
6	1	20A	SPARE
7	1	20 A	SPARE
8	1		SPACE
9	1		SPACE
10	1		SPACE



ALARM SYSTEM
NO SCALE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

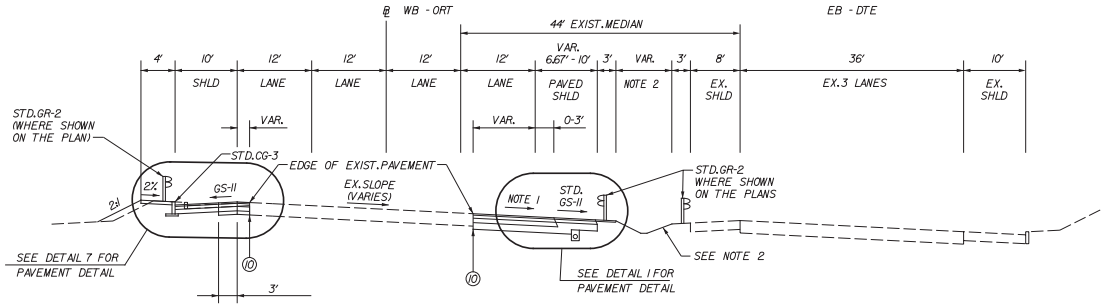
UTILITY BUILDING
ELECTRICAL

SCALE AS NOTED
DATE
SHEET 38 OF 38

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

DOWNTOWN EXPRESSWAY (DTE) OPEN ROAD TOLLING

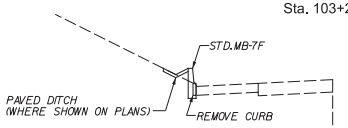
ORIGINAL PLANS



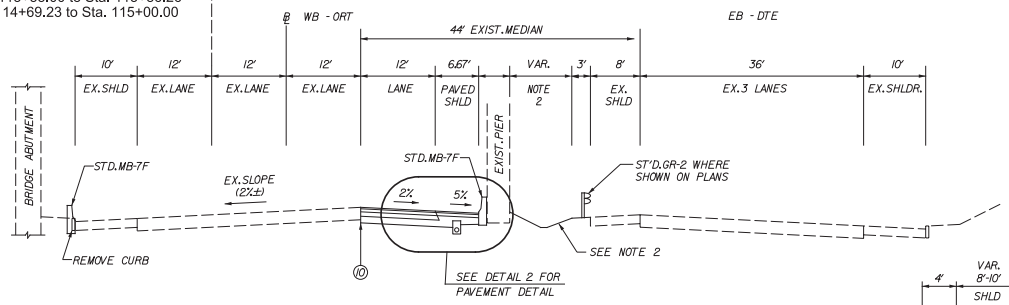
STA. 103+25 TO 104+95 ONLY

WB-ORT (RTE. 195)

Sta. 100+00.00 to Sta. 113+86.26 RT.
Sta. 114+69.23 to Sta. 115+00.00 RT.
Sta. 103+25.00 to Sta. 104+95.00 LT.

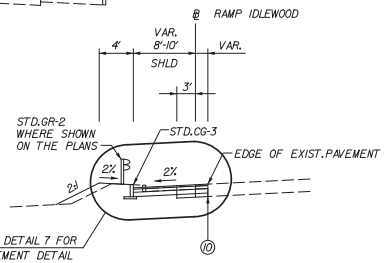


Sta. 113+55.00 to Sta. 113+86.26
Sta. 114+69.23 to Sta. 115+00.00



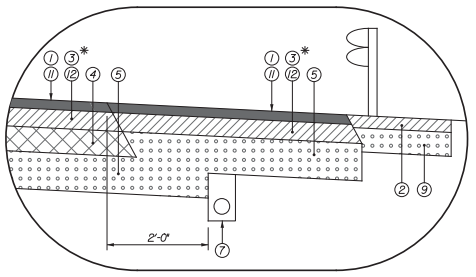
WB-ORT AT MEADOW STREET BRIDGE

Sta. 113+86.26 to Sta. 114+69.23 RT.
Sta. 113+55.00 to Sta. 115+00.00 LT.



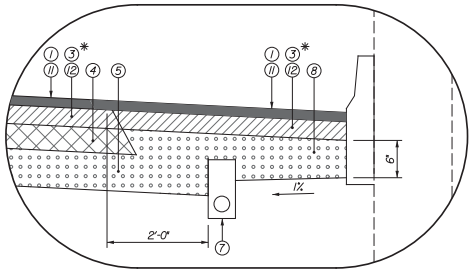
RAMP IDLEWOOD

Sta. 10+00.00 to Sta. 15+32.07

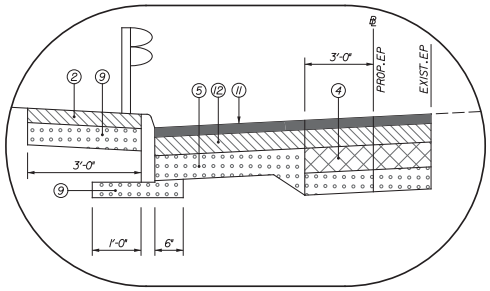


* USE (11) & (12) WB ORT STA.100+00 TO 115+00
USE (1) & (3) WB ORT STA.115+00 TO END OF PROJECT

DETAIL 1
NTS



DETAIL 2
NTS



DETAIL 7
NTS

LEGEND

(1) SURFACE COURSE, 1 1/2 IN. ASPHALT CONCRETE TYPE SMA-9.5 @ 165 LBS./SY.
(2) INTERMEDIATE COURSE, 2.0 IN. ASPHALT CONCRETE TYPE IM-19.0A
(3) INTERMEDIATE COURSE, 3.0 IN. ASPHALT CONCRETE TYPE SMA-19.0
(4) BASE COURSE, 4.0 IN. ASPHALT CONCRETE TYPE BM-25.0A
(5) SUBBASE, 6.0 IN. UNTREATED AGGREGATE MATERIAL TYPE 1, SIZE NO. 21-B
(6) MILL EXISTING PAVEMENT TO A DEPTH OF 1.5 IN. AND OVERLAY WITH ASPHALT CONCRETE TYPE SMA-9.5 @ 165 LBS./SY.
(7) STD. UD-4 UNDERDRAIN REQ'D.
(8) SUBBASE, VAR. THICKNESS, UNTREATED AGGREGATE MATERIAL TYPE 1, SIZE NO. 21-B
(9) SUBBASE, 4.0 IN., UNTREATED AGGREGATE MATERIAL TYPE 1, SIZE NO. 21-B
(10) SAWCUT
(11) 1 1/2 IN. ASPHALT CONCRETE TYPE SM-9.5A @ 165 LBS./SY.
(12) 3 IN. ASPHALT CONCRETE TYPE IM-19.0A
(13) LEVELING COURSE, VAR. DEPTH ASPHALT CONCRETE TYPE SMA-19.0, 2" MIN.
(14) REMOVE AND REPLACE EXISTING PAVEMENT ALONG THE EDGE AS SHOWN IN VDOT STD. WP-2. SEE DETAIL 9 SHT 2(3) FOR REPLACED PAVEMENT
(15) VAR. DEPTH, ASPHALT CONCRETE TYPE BM-25.0, 3" MIN.
(16) NOT USED
(17) HYDRAULIC CEMENT CONCRETE SIDEWALK, 4"
(18) NOT USED
(19) SURFACE COURSE, VAR. DEPTH ASPHALT CONCRETE TYPE SMA-9.5, 1.5" MIN.

NOTES

1. SEE PROFILES FOR CROSS SLOPES.
2. SEE CROSS SECTIONS FOR DITCH LOCATIONS AND INVERTS.
3. SEE SHEET 2L(3) FOR DITCH TYPICAL SECTION.

10' 0 10' 20'
SCALE: 1"=10'

REVISIONS

D487012(11).dgn
Tuesday, March 15, 2011

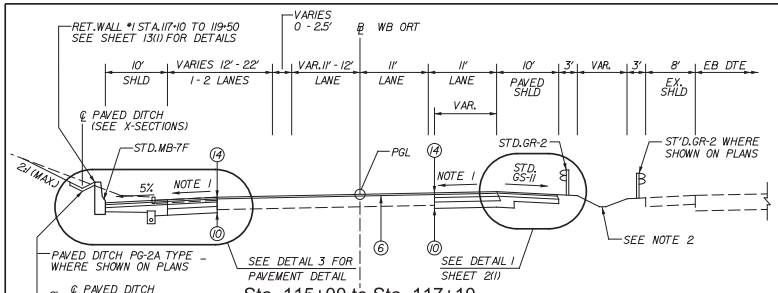
HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100

RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

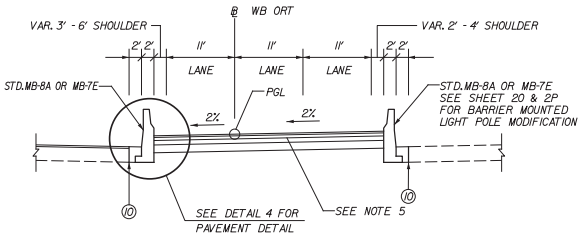
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

TYPICAL SECTIONS

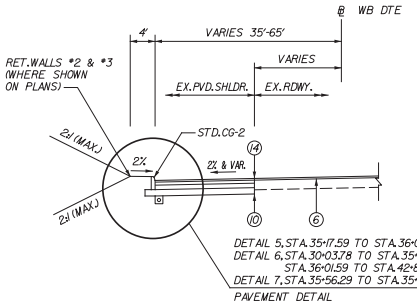
Scale:	Date:	Contract No.:	Sheet:
1"=10'-0"	FEB. 25, 2011	DTEORT-2011	2(11)



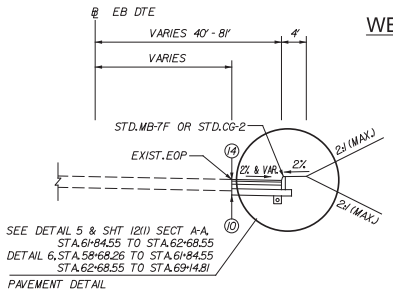
WESTBOUND OPEN ROAD TOLLING (ORT)



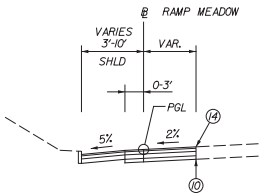
WESTBOUND OPEN ROAD TOLLING (ORT)
Sta. 122+50 to Sta. 129+70



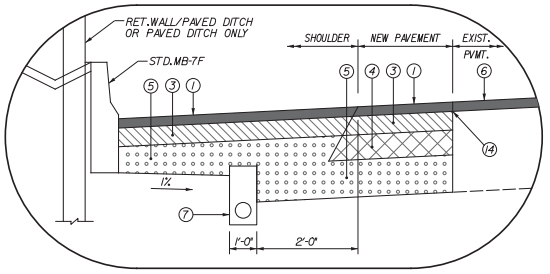
WESTBOUND DOWNTOWN EXPRESSWAY (DTE)
Sta. 30+03.78 to Sta. 42+87.04



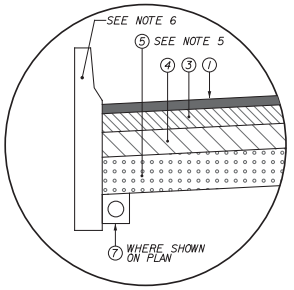
EASTBOUND DOWNTOWN EXPRESSWAY (DTE)
Sta. 58+68.26 to Sta. 69+14.81



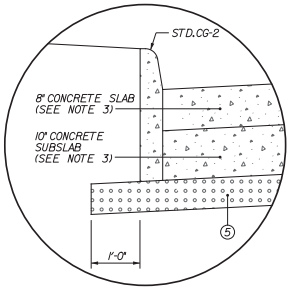
RAMP MEADOW
Sta. 13+00 to Sta. 15+09



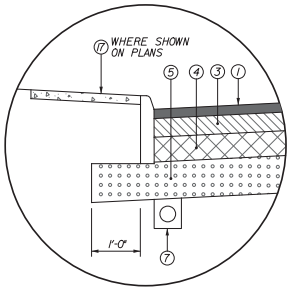
DETAIL 3
NTS



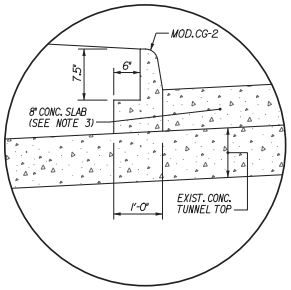
DETAIL 4
NTS



DETAIL 5
NTS



DETAIL 6
NTS



DETAIL 7
NTS

LEGEND

1. SURFACE COURSE, 1 1/2 IN. ASPHALT CONCRETE TYPE SMA-9.5 @ 165 LBS./SY.
2. INTERMEDIATE COURSE, 2.0 IN. ASPHALT CONCRETE TYPE IM-19.0A
3. INTERMEDIATE COURSE, 3.0 IN. ASPHALT CONCRETE TYPE SMA-19.0
4. BASE COURSE, 4.0 IN. ASPHALT CONCRETE TYPE BM-25.0A
5. SUBBASE, 6.0 IN. UNTREATED AGGREGATE MATERIAL TYPE I, SIZE NO. 21-B
6. MILL EXISTING PAVEMENT TO A DEPTH OF 1.5" AND OVERLAY WITH ASPHALT CONCRETE TYPE SMA-9.5 @ 165 LBS./SY.
7. STD. UD-4 UNDERDRAIN REQ'D.
8. SUBBASE, VAR. THICKNESS, UNTREATED AGGREGATE MATERIAL TYPE I, SIZE NO. 21-B
9. SUBBASE, 4.0 IN., UNTREATED AGGREGATE MATERIAL TYPE I, SIZE NO. 21-B
10. SAWCUT
11. 1 1/2 IN. ASPHALT CONCRETE TYPE SM-9.5A @ 165 LBS./SY.
12. 3 IN. ASPHALT CONCRETE TYPE IM-19.0A
13. LEVELING COURSE, VAR. DEPTH ASPHALT CONCRETE TYPE SMA-19.0, 2" MIN.
14. REMOVE AND REPLACE EXISTING PAVEMENT ALONG THE EDGE AS SHOWN IN VDOT STD. WP-2. SEE DETAIL 9 SHT 21(3) FOR REPLACED PAVEMENT
15. VAR. DEPTH, ASPHALT CONCRETE TYPE BM-25.0, 3" MIN.
16. NOT USED
17. HYDRAULIC CEMENT CONCRETE SIDEWALK, 4"
18. NOT USED
19. SURFACE COURSE, VAR. DEPTH ASPHALT CONCRETE TYPE SMA-9.5, 1.5" MIN.

NOTES

1. SEE PROFILES FOR CROSS SLOPES.
2. SEE CROSS SECTIONS FOR DITCH LOCATIONS AND INVERTS.
3. SEE TOLL PLAZA PLANS FOR PAVEMENT DETAILS. 10" SLAB NOT REQ'D. OVER EXISTING TUNNEL.
4. SEE SHEET 2M FOR DETAILS.
5. ASPHALT LAYERS SHALL BE PLACED UPON EXISTING CONCRETE SLAB FROM STATION 130+62 TO 131+47
6. ST'D.MB-7 & MB-8A BARRIER SHALL BE DOWELLED TO EXISTING 10" CONC. SLAB STA.130+62 TO 131+47 IN ACCORDANCE WITH ST'D. MB-7D. COST FOR DOWELLING SHALL BE INCIDENTAL TO THE COST OF CONC. BARRIER.

10' 0 10' 20'
SCALE: 1"=10'

REVISIONS
9-16-11 REVISED WB-DTE & EB-DTE SECTIONS AND NOTE 3. ADDED DETAIL 7.

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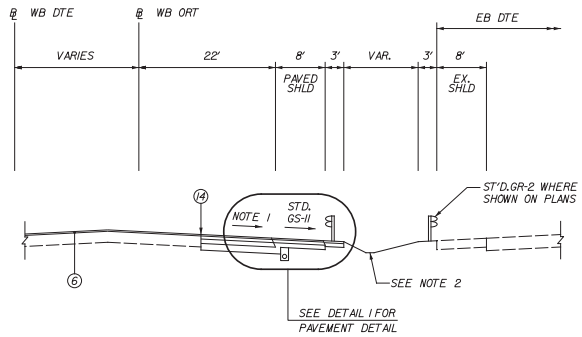
RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

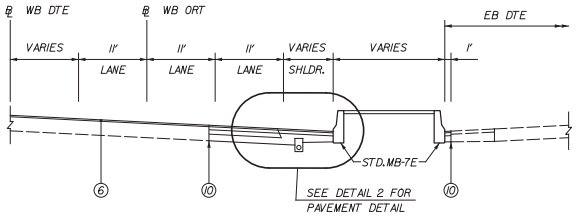
TYPICAL SECTIONS

Scale:	Date:	Contract No.:	Sheet:
1"=10'-0"	FEB. 25, 2011	DTEORT-2011	2(2)

D487010(2).dgn
Tuesday, September 20, 2011

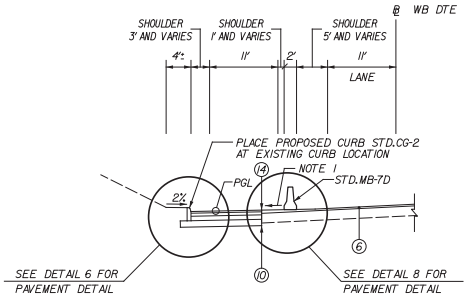


STA. 139+58.61 TO STA. 145+47.05



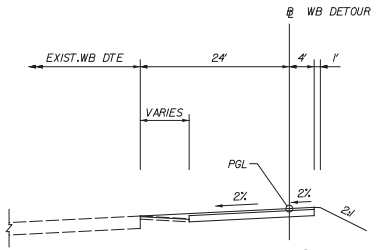
STA. 138+32.89 TO STA. 139+58.61

WESTBOUND DOWNTOWN EXPRESSWAY (DTE)



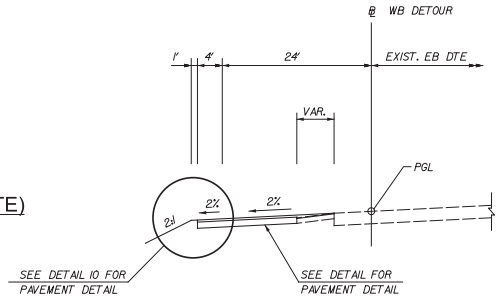
RAMP LINDEN

STA. 9+80.00 TO STA. 19+44.11



WB DETOUR

STA. 22+00.00 to STA. 26+00.00

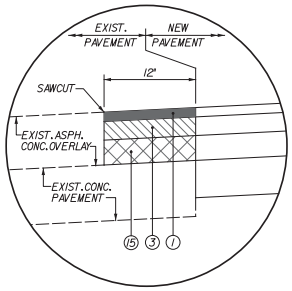


WB DETOUR

STA. 17+00.00 to STA. 22+00.00

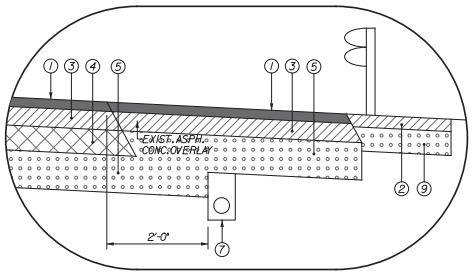
LEGEND

(1) SURFACE COURSE, 1 1/2 IN. ASPHALT CONCRETE TYPE SMA-9.5 @ 165 LBS./SY.
(2) INTERMEDIATE COURSE, 2.0 IN. ASPHALT CONCRETE TYPE IM-19.0A
(3) INTERMEDIATE COURSE, 3.0 IN. ASPHALT CONCRETE TYPE SMA-19.0
(4) BASE COURSE, 4.0 IN. ASPHALT CONCRETE TYPE BM-25.0A
(5) SUBBASE, 6.0 IN. UNTREATED AGGREGATE MATERIAL TYPE 1, SIZE NO. 21-B
(6) MILL EXISTING PAVEMENT TO A DEPTH OF 1.5" AND OVERLAY WITH ASPHALT CONCRETE TYPE SMA-9.5 @ 165 LBS./SY.
(7) STD. UD-4 UNDERDRAIN REQ'D.
(8) SUBBASE, VAR. THICKNESS, UNTREATED AGGREGATE MATERIAL TYPE 1, SIZE NO. 21-B
(9) SUBBASE, 4.0 IN., UNTREATED AGGREGATE MATERIAL TYPE 1, SIZE NO. 21-B
(10) SAWCUT
(11) 1 1/2 IN. ASPHALT CONCRETE TYPE SM-9.5A @ 165 LBS./SY.
(12) 3 IN. ASPHALT CONCRETE TYPE IM-19.0A
(13) LEVELING COURSE, VAR. DEPTH ASPHALT CONCRETE TYPE SMA-19.0, 2" MIN.
(14) REMOVE AND REPLACE EXISTING PAVEMENT ALONG THE EDGE AS SHOWN IN VDOT STD. WP-2. SEE DETAIL 9 SHT 2(3) FOR REPLACED PAVEMENT
(15) VAR. DEPTH, ASPHALT CONCRETE TYPE BM-25.0, 3" MIN.
(16) NOT USED
(17) HYDRAULIC CEMENT CONCRETE SIDEWALK, 4"
(18) NOT USED
(19) SURFACE COURSE, VAR. DEPTH ASPHALT CONCRETE TYPE SMA-9.5, 1.5" MIN.



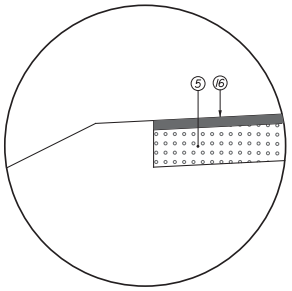
DETAIL 9

NTS



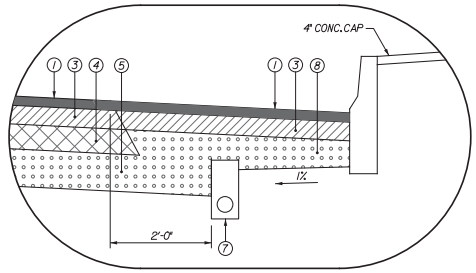
DETAIL 1

NTS



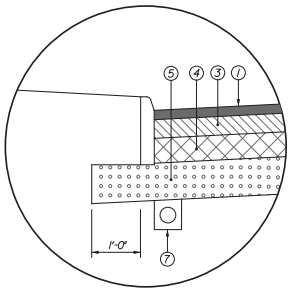
DETAIL 10

NTS



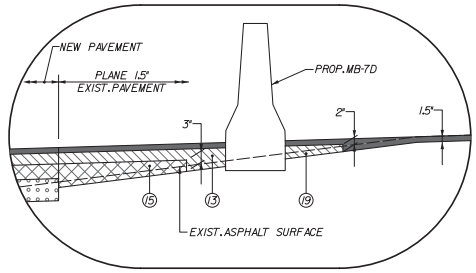
DETAIL 2

NTS



DETAIL 6

NTS



DETAIL 8

NTS

NOTES

1. SEE PROFILES FOR CROSS SLOPES.
2. SEE CROSS SECTIONS FOR DITCH LOCATIONS AND INVERTS.
3. SEE SHEET 2L(3) FOR DITCH TYPICAL SECTION.

10' 0 10' 20'
SCALE: 1"=10'

HNTB
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RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

TYPICAL SECTIONS

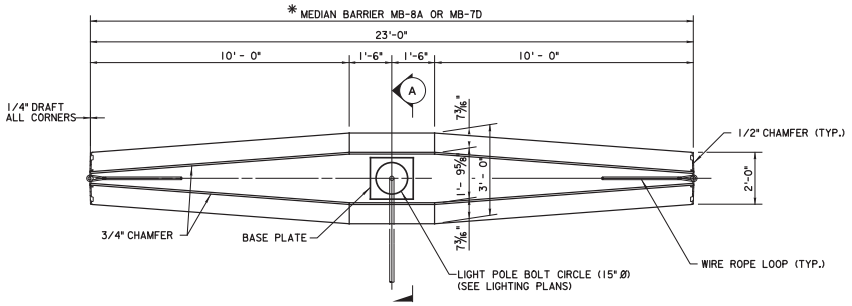
Scale:	Date:	Contract No.:	Sheet:
1"=10'-0"	FEB. 25, 2011	DTEORT-2011	2(3)

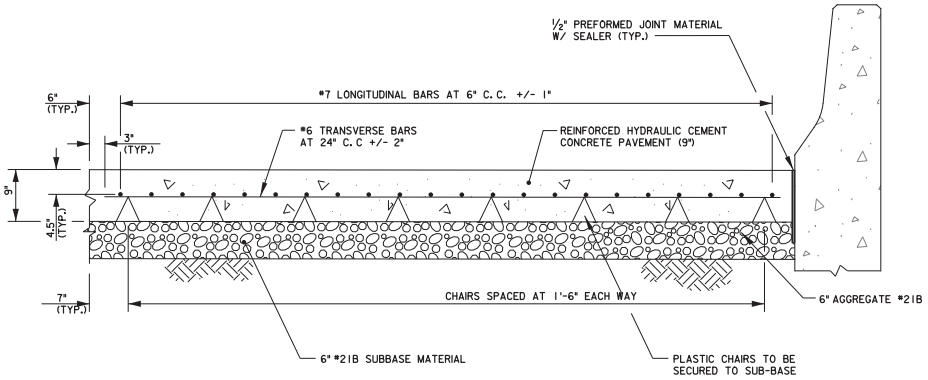
REVISIONS
10-8-12 REVISED RAMP LINDEN TYP. LANE WIDTHS

Level1 Check Print Stamp
Originator Name(Print) Signature Date
Checker
Backchecker
Updater
Validater

D4870102(3).dgn
Wednesday, October 03, 2012

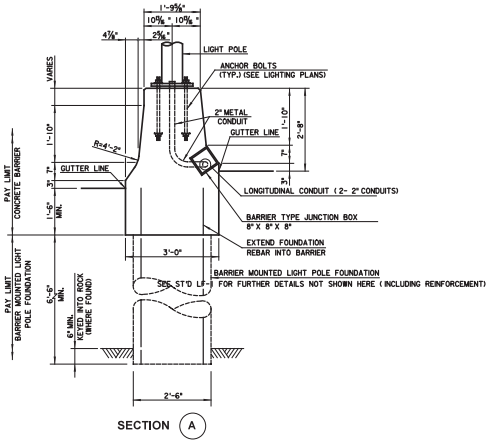
* PAYMENT FOR CONCRETE BARRIER TYPES MB-7D, 7E, 7F & 8A IS PAID ON A LINEAR FOOT BASIS. VARIATIONS IN WIDTH REQUIRED FOR LIGHT POLE INSTALLATIONS UP TO 3'-0" IN WIDTH IS INCIDENTAL TO THE CONTRACT UNIT PRICE FOR CONCRETE BARRIER. COST OF LONGITUDINAL CONDUIT, JUNCTION BOXES, METAL CONDUIT SHALL BE INCIDENTAL TO THE UNIT PRICE BID FOR CONCRETE BARRIER.





WB ORT ZONE CONCRETE PAVEMENT SECTION

NTS



SECTION (A)

BARRIER MOUNTED LIGHT POLE DETAILS

STA. 123+88 RT. WB-ORT
STA. 125+40 RT. WB-ORT
STA. 126+87 RT. WB-ORT
STA. 128+38 RT. WB-ORT
STA. 129+86 RT. WB-ORT
STA. 132+47 RT. WB-ORT
STA. 134+01 RT. WB-ORT
STA. 135+53 RT. WB-ORT
STA. 137+00 RT. WB-ORT
STA. 138+57 RT. WB-ORT

NOTES:

1. CONTRACTOR SHALL SUBMIT POUR SEQUENCE PRIOR TO POUR FOR APPROVAL BY THE ENGINEER.
2. SEE VDOT STANDARD PR-3 AND PR-6 FOR DETAILS NOT SHOWN ON THIS SHEET.
3. SLAB CONCRETE SHALL BE TYPE A4, HIGH EARLY CONCRETE.
4. REINFORCING BARS SHALL BE GLASSFIBER REINFORCED POLYMER MATERIAL. SEE SPEC. SECTION 316 FOR DETAILS.
5. REINFORCING BARS SHALL BE SECURED USING PLASTIC TIES, NYLON TIES, OR PLASTIC SNAP TIES. NO METAL TIES OR TIES CONTAINING METAL SHALL BE USED.
6. ALL WORK SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND AS DIRECTED BY THE ENGINEER.
7. PLASTIC OR NON-METALLIC (NON CORROSIVE) CHAIRS SHALL BE USED TO ELEVATE REBAR AT LOCATIONS SHOWN.
8. REBAR SHALL BE SECURED TO CHAIRS.
9. CHAIRS SHALL BE SECURED TO 6" SUB-BASE BY METHOD(S) APPROVED BY ENGINEER.
10. CONTRACTOR SHALL COORDINATE WITH TOLL PROVIDER PRIOR TO POURING CONCRETE AND PRIOR TO SAW-CUTTING JOINTS TO FACILITATE TOLL PROVIDER INSTALLATION OF PAVEMENT LOOPS, CONDUITS OR OTHER PAVEMENT ITEMS REQUIRED FOR OPEN ROAD TOLLING OPERATIONS.

D48701102M.dgn
Tuesday, March 15, 2011

REVISIONS

HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
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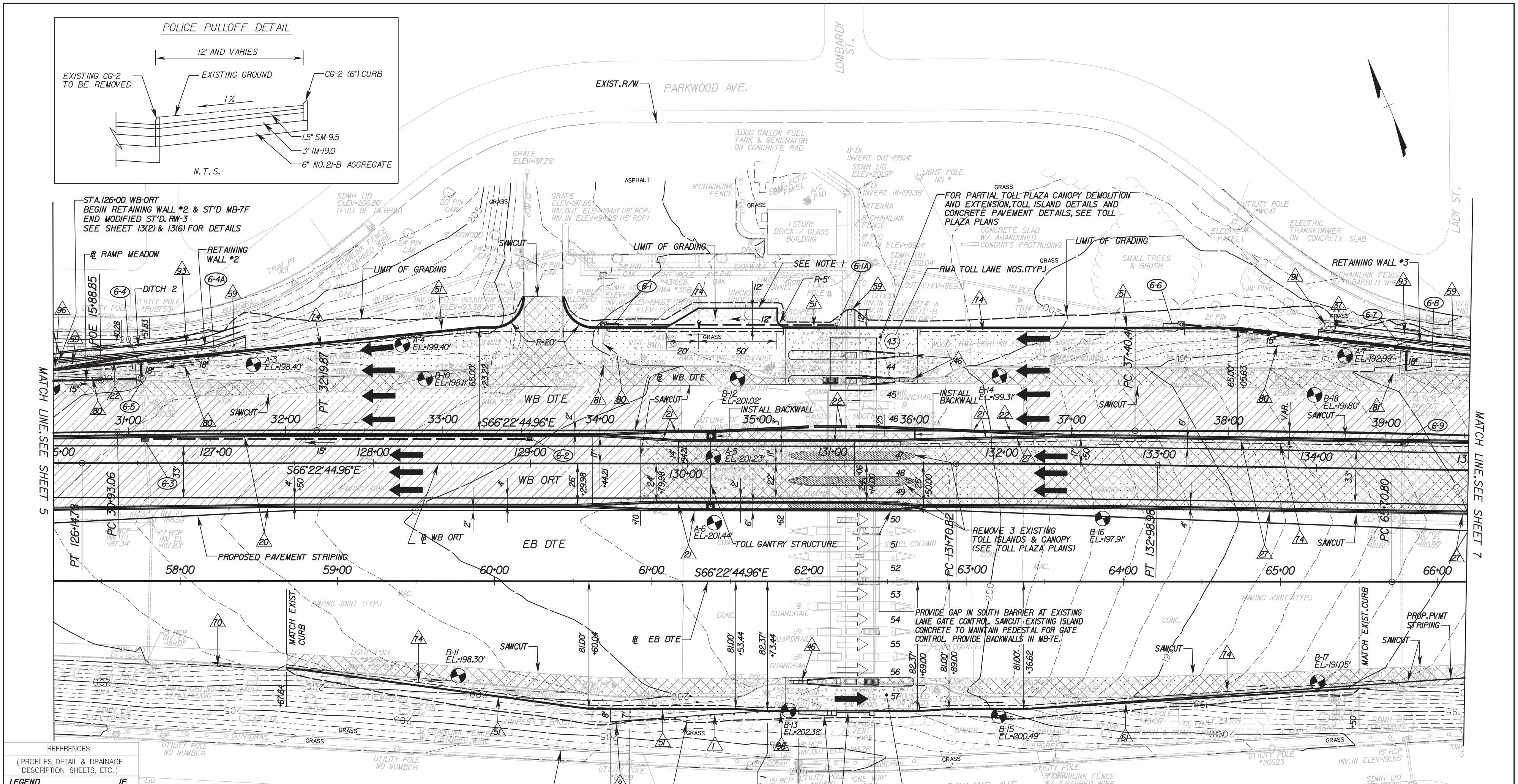
RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

ROADWAY DETAILS
BARRIER MOUNTED LIGHT POLE & ORT ZONE CONCRETE PAVING

Scale:	Date:	Contract No.:	Sheet:
NTS	FEB. 25, 2011	DTEORT-2011	2M



REFERENCES	
(PROFILES, DETAIL & DRAINAGE DESCRIPTION SHEETS, ETC.)	
LEGEND	IF
GEOMETRIC LAYOUT PLAN	IG(I)
TYPICAL SECTIONS	2(2)
E&S PLAN - PHASE I	6(I)
E&S PLAN - PHASE II	6(2)
PROFILE WB-ORT	6A
PROFILE EB-DTE	6B
PROFILE WB-DTE	6C
TOLL PLAZA PLANS	12(I)-12(14)
DRAINAGE TABULATIONS	IK
RET.WALLS *2 & *3	13(2)
MEDIAN BARRIER PROFILES	20
MEDIAN BARRIER DETAILS	2M,2P
IMPACT ATTENUATOR	2Q(I)

11	10-8-12	ADDED POLICE PULLOFF AREA
10	5-18-12	REVISED BARRIER LT OF WB-ORT BASELINE
8	12-7-11	REVISED BARRIER TYPES LT. OF WB-ORT BASELINE
7	11-30-11	REVISED EDGE OF PAVEMENT ALONG EB-DTE
5	11-8-11	ADDED GR-6 TERMINAL ON EB-DTE STA.60+65
3	9-30-11	REVISED RETAINING WALL 2, ADDED MB-7F
REVISIONS		

D4870106 .dgn
Wednesday, October 03, 2012

CONSTRUCTION NOTE LEGEND

- 1 ST'D. GR-2 GUARDRAIL
- 2 ST'D. GR-6 GUARDRAIL TERMINAL
- 7 ST'D.FOA-2 FIXED OBJECT ATTACHMENT TYPE I
- 20 ST'D.MB-7D - 32" CONCRETE MEDIAN BARRIER
- 21 ST'D.MB-7E - 32" CONCRETE MEDIAN BARRIER
- 22 ST'D.MB-7F - 32" CONCRETE MEDIAN BARRIER
- 27 ST'D. MB-8A - 32" CONCRETE BIFURCATED MEDIAN BARRIER (0' TO 4' BIFURCATED)
- 37 CAST-IN PLACE RETAINING WALL
- 45 IMPACT ATTENUATOR (TL-3 >45 MPH DES.SP)
- 46 IMPACT ATTENUATOR (TL-2 <45 MPH DES.SP)
- 51 ST'D. CG-2 CURB
- 59 HYDRAULIC CEMENT CONCRETE SIDEWALK,4"
- 70 NON-PERFORATED OUTLET PIPE
- 74 ST'D. UD-4 UNDERDRAIN
- 80 REMOVE EXISTING PIPE
- 81 REMOVE EXISTING DRAINAGE STRUCTURE
- 91 CLASS I DRY RIPRAP
- 93 PAVED DITCH PG-2A,TYPE E
- 96 ST'D. FOA-I FIXED OBJECT ATTACHMENT TYPE I

PAVEMENT LEGEND

- PROPOSED ASPHALT SHOULDER
- PROPOSED ASPHALT PAVEMENT
- PROPOSED CONCRETE PAVEMENT
- PROPOSED ASPHALT PLANING & OVERLAY
- DEMOLITION OF PAVEMENT

NOTE:

I. CONTRACTOR SHALL REFER TO POLICE PULLOFF DETAIL.

SCALE: 1" = 30'

SEE SHEET 6(3) FOR FURTHER TOLL PLAZA DETAILS

RICHMOND METROPOLITAN AUTHORITY
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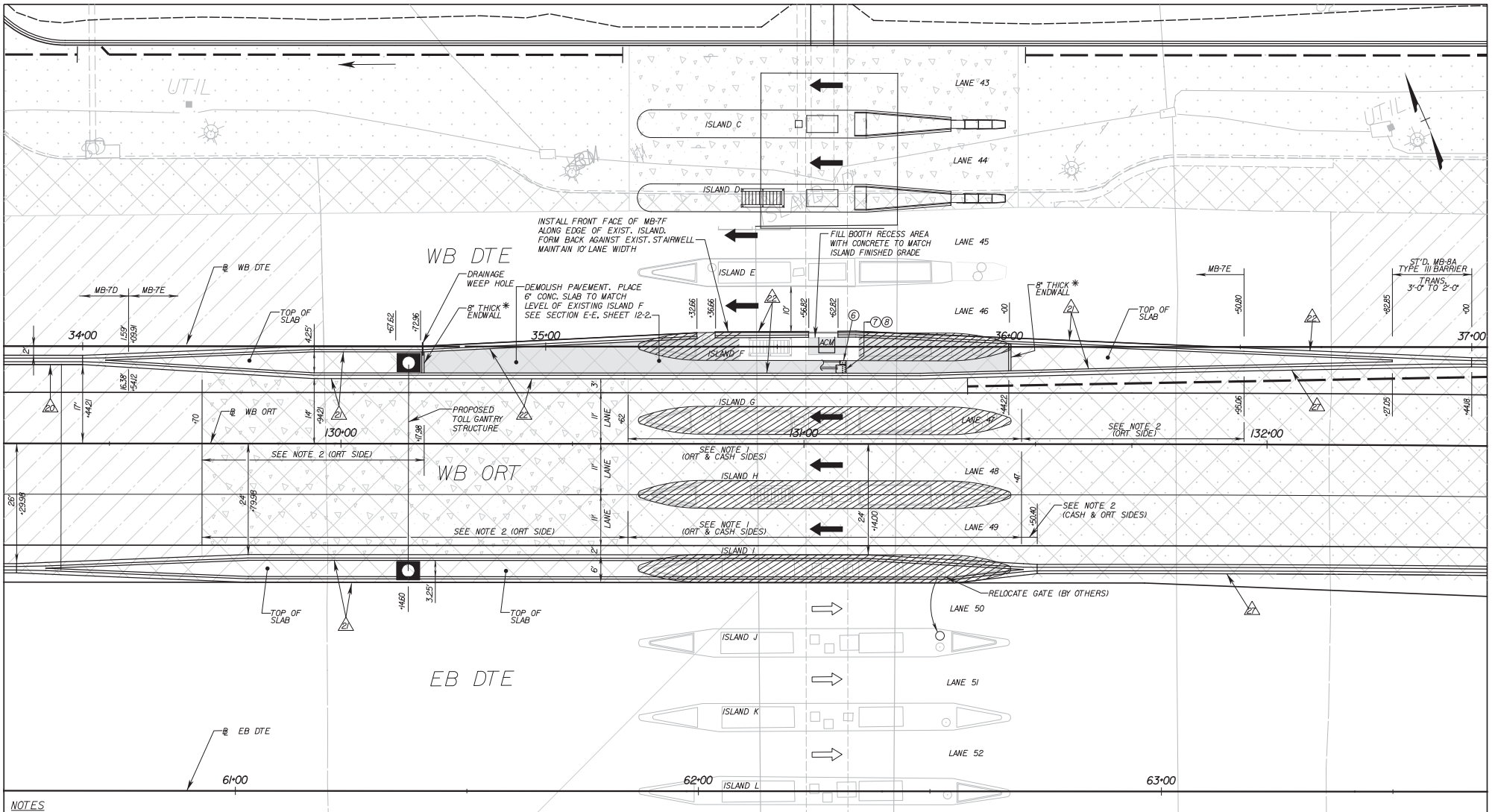
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

ROADWAY PLAN
STA. 126+00.00 TO STA. 135+00.00 WB ORT

Scale:	Date:	Contract No.:	Sheet:
1" = 30'-0"	FEB. 25, 2011	DTEORT-2011	6



NOTES

1) PROVIDE DOWELS FROM BARRIER TO EXISTING CONCRETE SLAB MAXIMUM 3' INTO SLAB AT 2' SPACING. ST'D BARRIER DETAILS MODIFIED FOR ADJUSTED CONCRETE QUANTITY & DOWELING.

2) PROVIDE ADDITIONAL CONCRETE DEPTH TO ST'D DETAIL FOR 18" TOTAL FOOTING DEPTH.

THE ABOVE BARRIER FOOTING MODIFICATION SHALL BE PAID AS "MEDIAN BARRIER FOOTING MODIFICATIONS" BY L.F.

3	5-18-12	REVISED BARRIER STA 13+95 TO 132+27 AND ADDED BARRIER FOOTING NOTES
2	12-7-11	ADDED SHEET
		REVISIONS

D:\87101\06\3\.dgn
Friday, June 08, 2012

TOLL EQUIPMENT LEGEND (SEE SHEET II(13) FOR DETAILS)

(6) SURFACE MOUTED JUNCTION BOX, 12" X 12" X 12" MIN. DIMENSIONS
(7) SURFACE MOUTED JUNCTION BOX, 24" LONG X 18" X 18" MIN. DIMENSIONS
(8) CONCRETE PAD FOR EACH JUNCTION BOX

* ENDWALLS SHALL HAVE 2 ROWS OF #4 HORIZONTAL BARS @ 8" C/C (VERTICALLY) DOWELED INTO THE MB-7F BARRIERS.

PAVEMENT LEGEND

PROPOSED CONCRETE SLAB
PROPOSED ASPHALT PAVEMENT
PROPOSED CONCRETE PAVEMENT
PROPOSED ASPHALT PLANING & OVERLAY
DEMOLITION OF PAVEMENT
PROPOSED DEMOLITION OF CONCRETE ISLAND

CONSTRUCTION NOTE LEGEND

(2) ST'D. MB-7D - 32" CONCRETE MEDIAN BARRIER
(2) ST'D. MB-7E - 32" CONCRETE MEDIAN BARRIER
(2) ST'D. MB-7F - 32" CONCRETE MEDIAN BARRIER
(2) ST'D. MB-8A - 32" CONCRETE MEDIAN BARRIER

10' 0 10' 20'
SCALE: 1" = 10'

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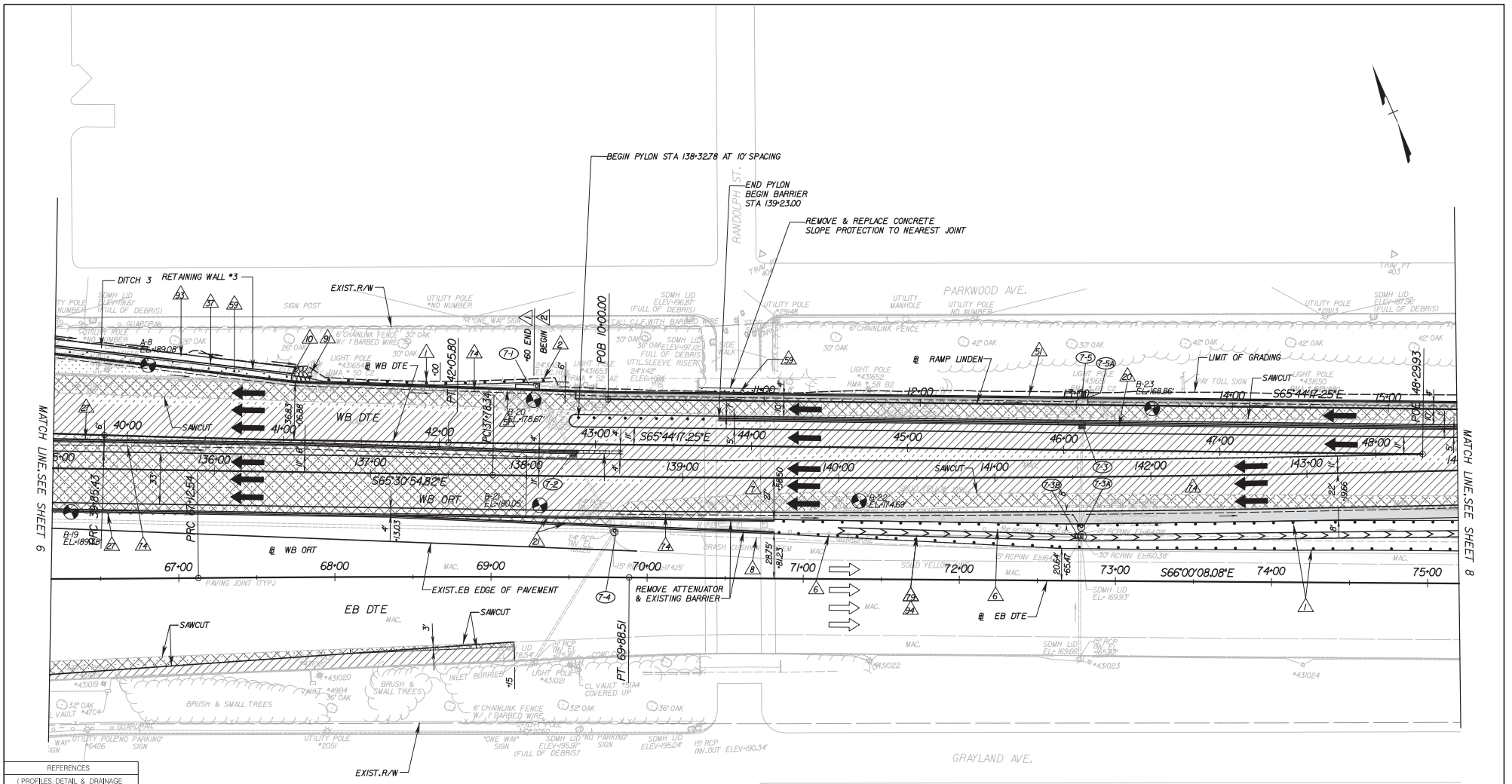
RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

ROADWAY PLAN AT TRAFFIC GANTRY

Scale:	Date:	Contract No.:	Sheet:
1" = 10'-0"	FEB. 25, 2011	DTEORT-2011	6(3)



REFERENCES	
(PROFILES, DETAIL & DRAINAGE DESCRIPTION SHEETS, ETC.)	
LEGEND	1F
GEOMETRIC LAYOUT PLAN	1G(1)
TYPICAL SECTIONS	2(1-3)
E&S PLAN - PHASE I	7(1)
E&S PLAN - PHASE II	7(2)
PROFILE WB-ORT	7A
PROFILE EB-DTE	7B
PROFILE WB-DTE	7C
PROFILE RAMP LINDEN	7D
DRAINAGE TABULATIONS	1K
RETAINING WALL #3	(3)(2)
MEDIAN BARRIER PROFILES	2O
MEDIAN BARRIER DETAILS	2M,2P
IMPACT ATTENUATOR	2O(1)

REVISIONS
10-8-12 REVISED BARRIER ON RAMP, ADDED PYLONS
REVISED BARRIER RIGHT OF WB-ORT BASELINE

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CONSTRUCTION NOTE LEGEND

1. ST'D.GR-2 GUARDRAIL
2. ST'D.GR-6 GUARDRAIL
6. REMOVAL OF EXISTING GUARDRAIL
7. ST'D.FOA-2 FIXED OBJECT ATTACHMENT TYPE I
8. ST'D.FOA-2 FIXED OBJECT ATTACHMENT TYPE II
10. ST'D.FOA-I FIXED OBJECT ATTACHMENT TYPE I
20. ST'D.MB-7D - 32" CONCRETE MEDIAN BARRIER
21. ST'D.MB-7E - 32" CONCRETE MEDIAN BARRIER
22. ST'D. MB-8A - 32" CONCRETE BIFURCATED MEDIAN BARRIER (0 TO 4' BIFURCATED)
57. CONCRETE GRAVITY WALL (RW-3)
45. IMPACT ATTENUATOR (TL-3>45mph DESIGN SPEED)
51. ST'D. CG-2 CURB
59. HYDRAULIC CEMENT CONCRETE SIDEWALK, 4"
74. ST'D. UD-4 UNDERDRAIN
79. ST'D. EC-2 PROTECTIVE COVERING
91. CLASS I DRY RIPRAP
93. PAVED DITCH PG-2A, TYPE E
94. GRADED FLAT BOTTOM DITCH

PAVEMENT LEGEND

- PROPOSED ASPHALT SHOULDER
- PROPOSED ASPHALT PAVEMENT
- PROPOSED CONCRETE PAVEMENT
- PROPOSED ASPHALT PLANING & OVERLAY
- DEMOLITION OF PAVEMENT

30' 0 30' 60'
SCALE: 1" = 30'

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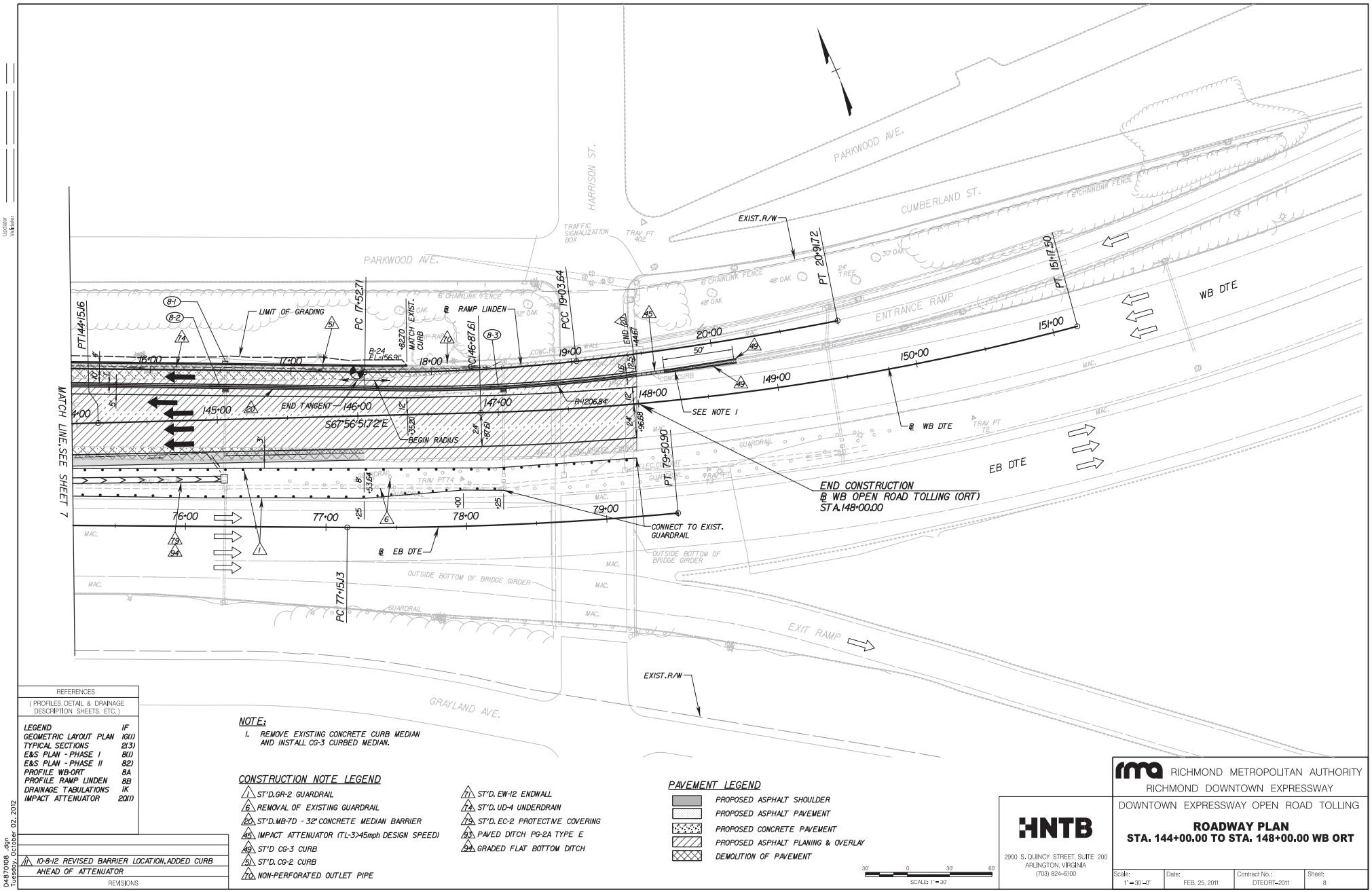
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

ROADWAY PLAN
STA. 135+00.00 TO STA. 144+00.00 WB ORT

Scale:	Date:	Contract No.:	Sheet:
1" = 30'-0"	FEB. 25, 2011	DTEORT-2011	7



REFERENCES

(PROFILES, DETAIL & DRAINAGE DESCRIPTION SHEETS, ETC.)

LEGEND	1F
GEOMETRIC LAYOUT PLAN	1G(1)
TYPICAL SECTIONS	2(3)
E&S PLAN - PHASE I	8(1)
E&S PLAN - PHASE II	8(2)
PROFILE WB-ORT	8A
PROFILE RAMP LINDEN	8B
DRAINAGE TABULATIONS	1K
IMPACT ATTENUATOR	2Q(1)

1 10-8-12 REVISED BARRIER LOCATION, ADDED CURB AHEAD OF ATTENUATOR

REVISIONS

NOTE:

1. REMOVE EXISTING CONCRETE CURB MEDIAN AND INSTALL CG-3 CURBED MEDIAN.

CONSTRUCTION NOTE LEGEND

- 1 ST'D. GR-2 GUARDRAIL
- 6 REMOVAL OF EXISTING GUARDRAIL
- 20 ST'D. MB-7D - 32" CONCRETE MEDIAN BARRIER
- 45 IMPACT ATTENUATOR (TL-3 >45mph DESIGN SPEED)
- 49 ST'D CG-3 CURB
- 51 ST'D. CG-2 CURB
- 70 NON-PERFORATED OUTLET PIPE
- 71 ST'D. EW-12 ENDWALL
- 74 ST'D. UD-4 UNDERDRAIN
- 79 ST'D. EC-2 PROTECTIVE COVERING
- 93 PAVED DITCH PG-2A TYPE E
- 94 GRADED FLAT BOTTOM DITCH

PAVEMENT LEGEND

- PROPOSED ASPHALT SHOULDER
- PROPOSED ASPHALT PAVEMENT
- PROPOSED CONCRETE PAVEMENT
- PROPOSED ASPHALT PLANING & OVERLAY
- DEMOLITION OF PAVEMENT

SCALE: 1" = 30'

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RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

ROADWAY PLAN
STA. 144+00.00 TO STA. 148+00.00 WB ORT

Scale:	Date:	Contract No.:	Sheet:
1" = 30'-0"	FEB. 25, 2011	DTEORT-2011	8

Level1 Check Print Stamp
Name(Print) Signature Date
Originator
Checker
Backchecker
Updater
Validater

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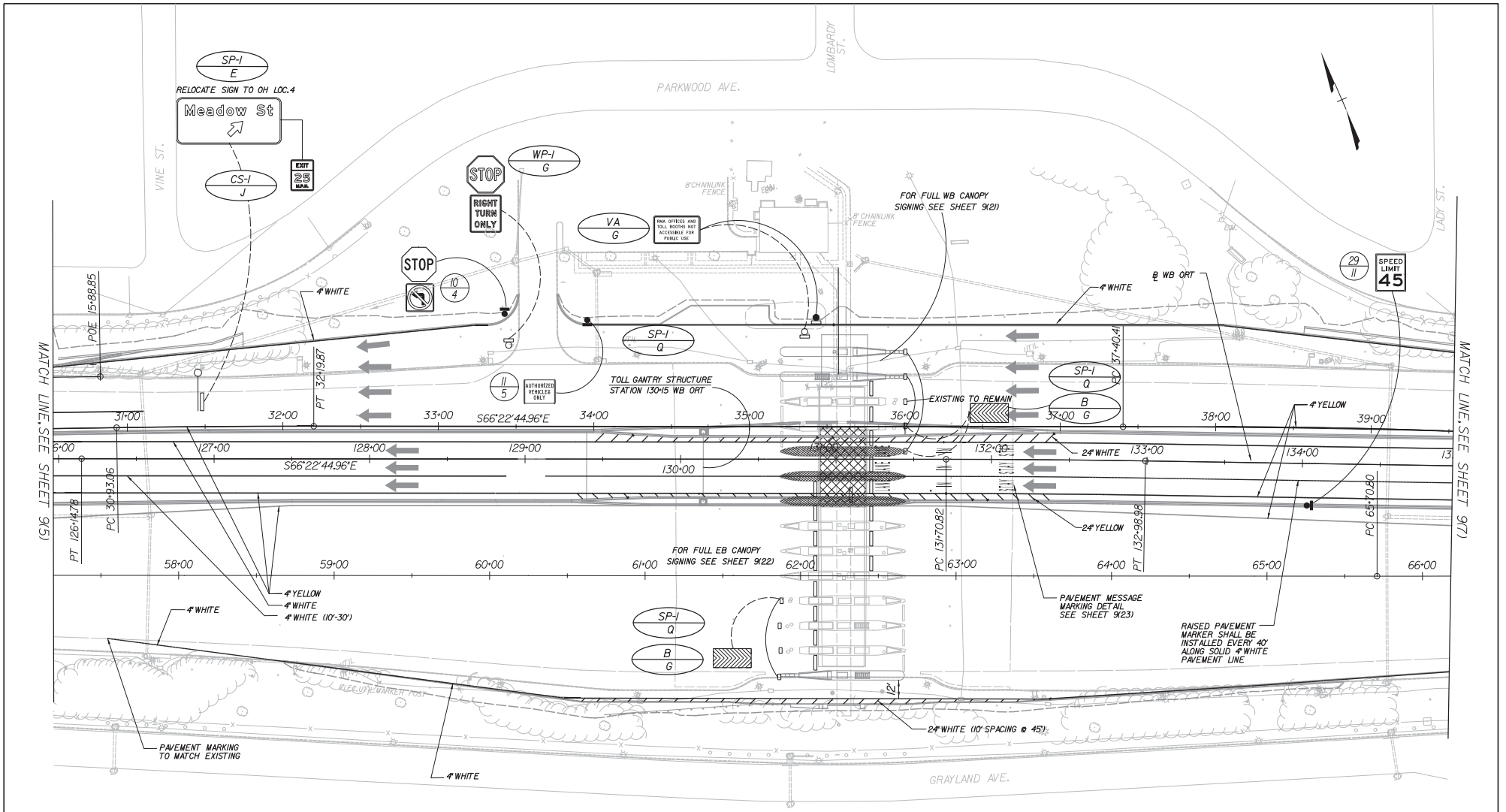
Tuesday, October 02, 2012



REVISIONS
10-8-12 REMOVED "MAINTAIN SPEED THROUGH TOLL" SIGNS MOUNTED TO GANTRY
11-30-11 REVISED LANE 57 STRIPING

SCALE: 1" = 30'

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DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

SIGNING & PAVEMENT MARKING PLAN
STA. 126+00.00 TO STA. 135+00.00 WB ORT

Scale:	Date:	Contract No.:	Sheet:
1" = 30'-0"	FEB. 25, 2011	DTEORT-2011	9(6)

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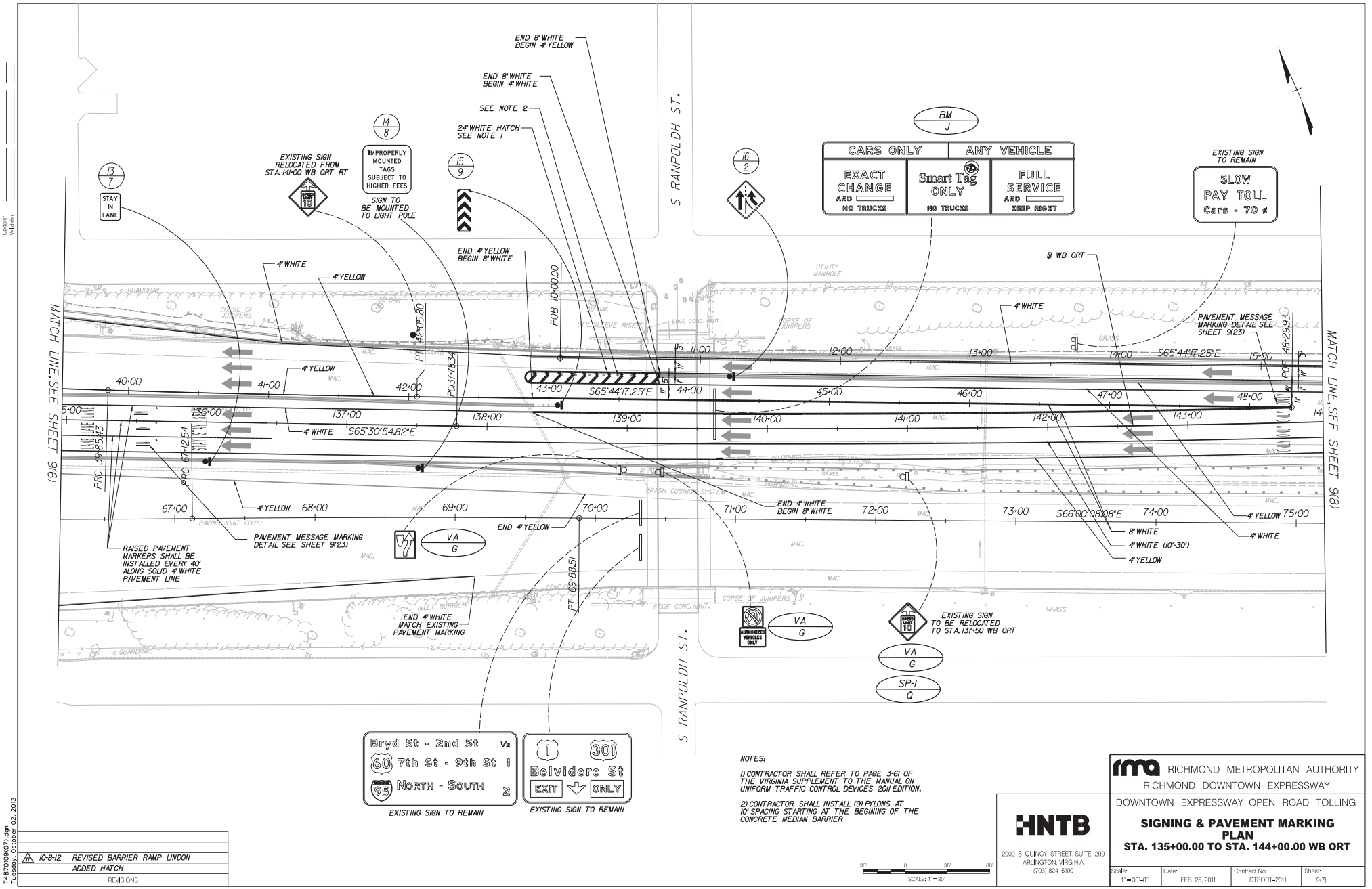

NOTES:

1) CONTRACTOR SHALL REFER TO PAGE 3-6) OF THE VIRGINIA SUPPLEMENT TO THE MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES 2011 EDITION.

2) CONTRACTOR SHALL INSTALL (9) PYLONS AT 10' SPACING STARTING AT THE BEGINING OF THE CONCRETE MEDIAN BARRIER

SCALE: 1" = 30'

REVISIONS
10-8-12 REVISED BARRIER RAMP LINDON ADDED HATCH

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DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

SIGNING & PAVEMENT MARKING PLAN
STA. 135+00.00 TO STA. 144+00.00 WB ORT

Scale:	Date:	Contract No.:	Sheet:
1" = 30'-0"	FEB. 25, 2011	DTEORT-2011	9(7)

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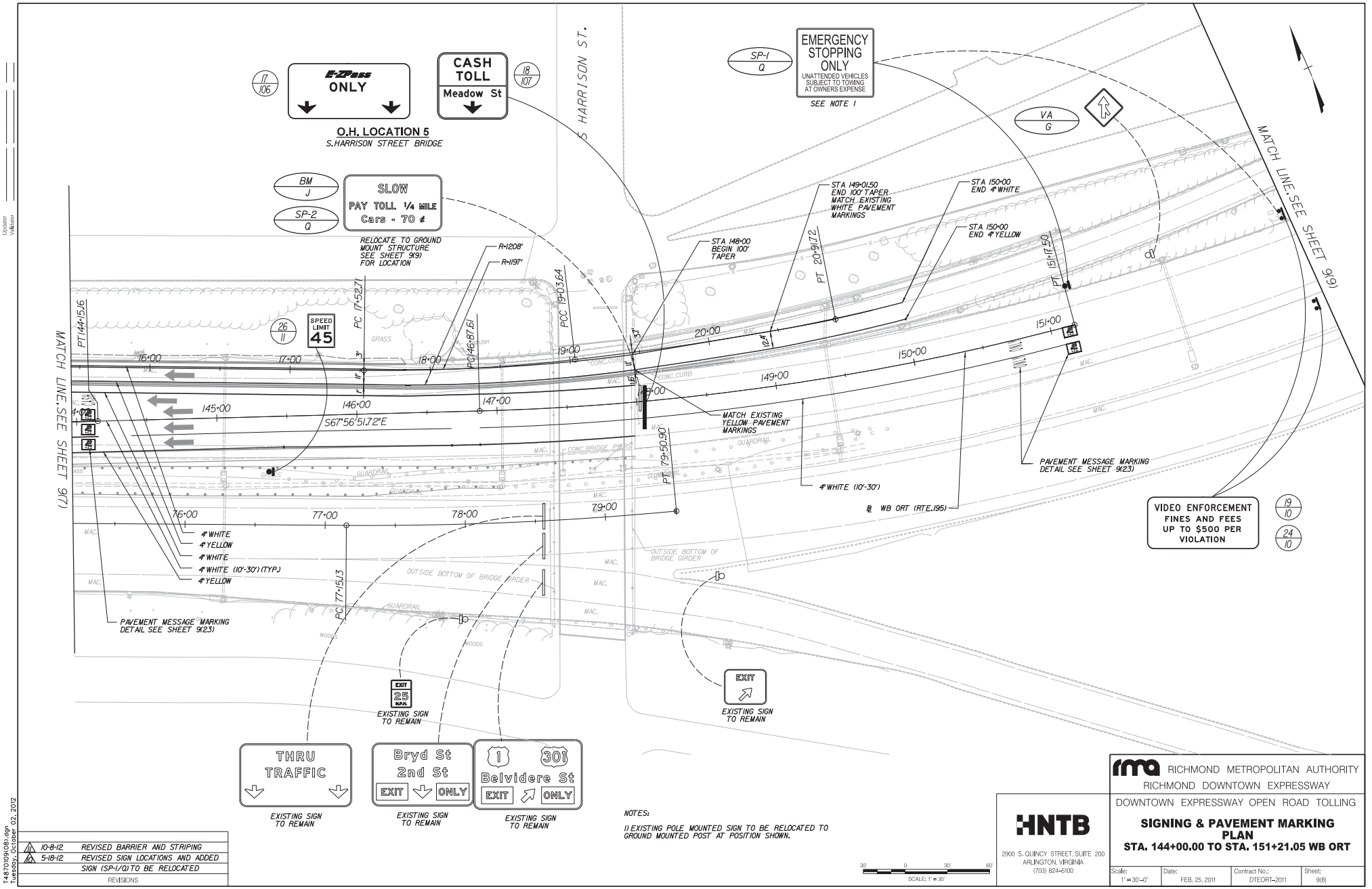
Tuesday, October 02, 2012



NOTES:

1) EXISTING POLE MOUNTED SIGN TO BE RELOCATED TO GROUND MOUNTED POST AT POSITION SHOWN.

REVISIONS	
10-8-12	REVISED BARRIER AND STRIPING
5-18-12	REVISED SIGN LOCATIONS AND ADDED SIGN (SP-1/Q) TO BE RELOCATED

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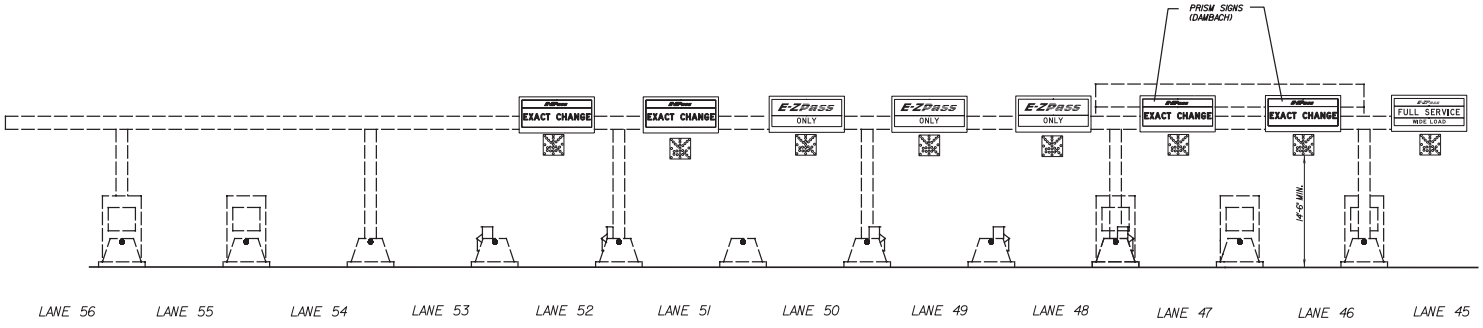
SIGNING & PAVEMENT MARKING PLAN
STA. 144+00.00 TO STA. 151+21.05 WB ORT

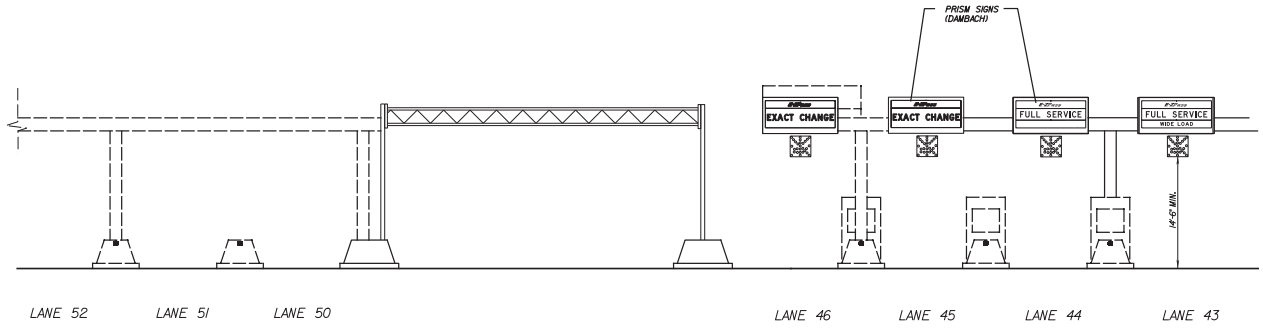
Scale:	Date:	Contract No.:	Sheet:
1" = 30'-0"	FEB. 25, 2011	DTEORT-2011	9(8)

T487019(08).dgn
Tuesday, October 02, 2012

EXISTING CANOPY SIGNS AND LANE CONTROL SIGNALS SHALL BE RELOCATED, REMOVED AND SALVAGED IN ACCORDANCE WITH MAINTENANCE OF TRAFFIC PLAN PHASING SHEETS IH(1) THRU IH(19). PAYMENT FOR INTERMEDIATE RELOCATIONS SHALL BE INCLUDED IN THE TOLL PLAZA ELECTRICAL WORK PAY ITEM



WB EXISTING TOLL PLAZA



WB PROPOSED TOLL PLAZA

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Tuesday, March 15, 2011

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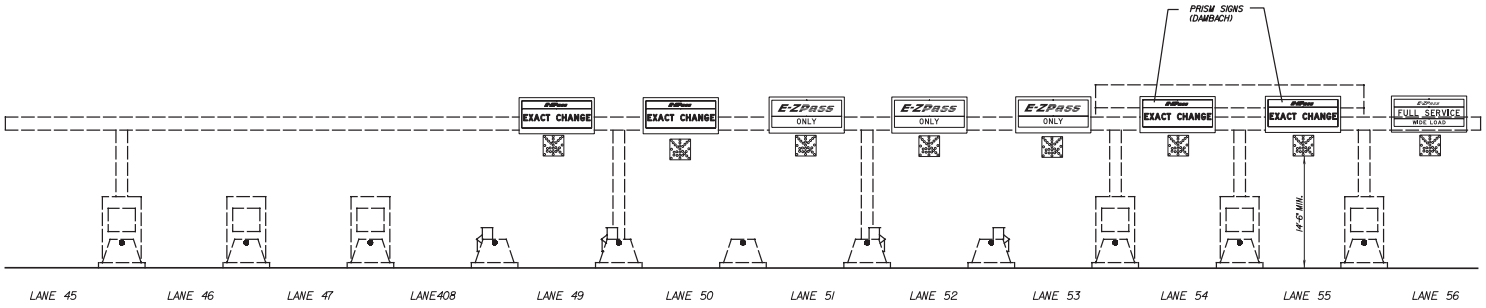
RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

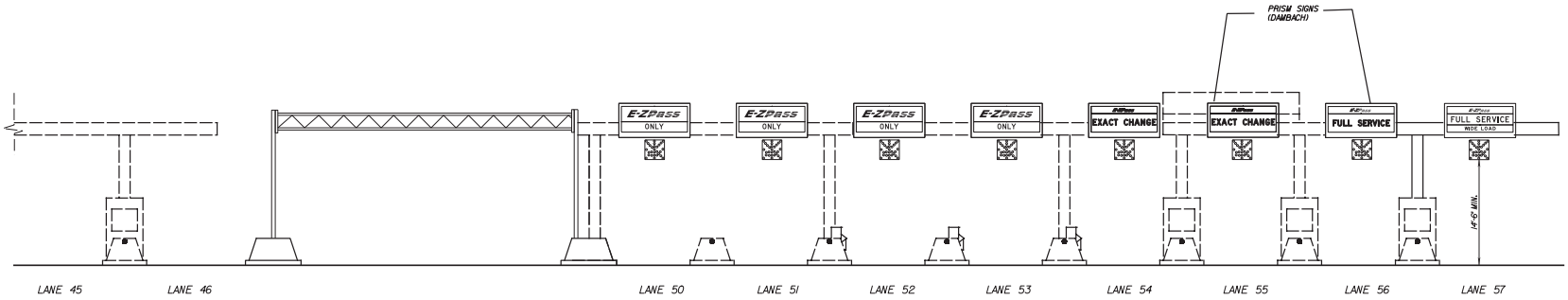
SIGNING & PAVEMENT MARKING
PLAZA CANOPY SIGN ELEVATIONS
WESTBOUND

Scale:	Date:	Contract No.:	Sheet:
NONE	FEB. 25, 2011	DTEORT-2011	9(21)

EXISTING CANOPY SIGNS AND LANE CONTROL SIGNALS SHALL BE RELOCATED, REMOVED AND SALVAGED IN ACCORDANCE WITH MAINTENANCE OF TRAFFIC PLAN PHASING (SHEETS IH(1) THRU IH(19). PAYMENT FOR INTERMEDIATE RELOCATIONS SHALL BE INCLUDED IN THE TOLL PLAZA ELECTRICAL WORK PAY ITEM.



EB EXISTING TOLL PLAZA



EB PROPOSED TOLL PLAZA

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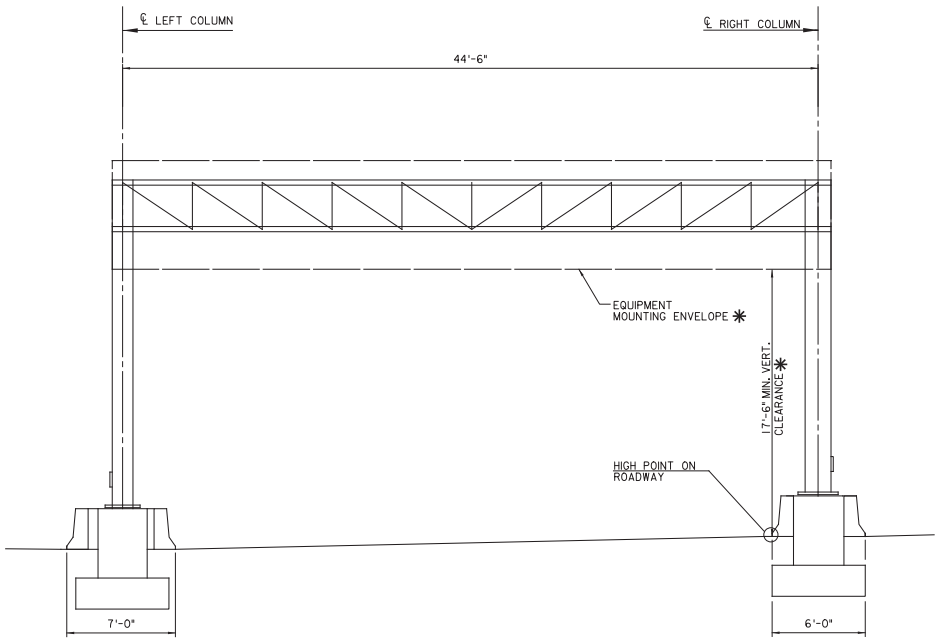
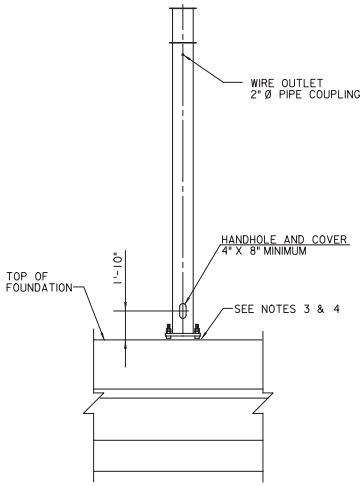
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

SIGNING & PAVEMENT MARKING
PLAZA CANOPY SIGNING ELEVATIONS
EASTBOUND

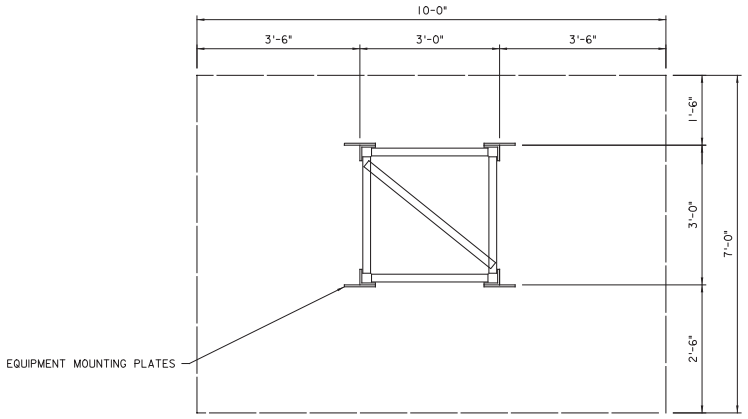
Scale:	Date:	Contract No.:	Sheet:
NONE	FEB. 25, 2011	DTEORT-2011	9(22)



TYPICAL GANTRY STRUCTURE ELEVATION
(LOOKING EAST)
SCALE: 1/4" = 1'-0"



END VIEW
SCALE: 1/4" = 1'-0"



TYPICAL SECTION
EQUIPMENT MOUNTING ENVELOPE ✱
SCALE: 3/4" = 1'-0"

NOTE:
THE EQUIPMENT MOUNTING PLATES SHALL BE INCLUDED WITH THE GANTRY. THE CONTRACTOR SHALL COORDINATE SIZE, NUMBER AND LOCATION OF PLATES WITH THE TOLL INTEGRATOR PRIOR TO GANTRY FABRICATION. THE TOLL INTEGRATOR IS RESPONSIBLE FOR INSTALLATION OF TOLL EQUIPMENT TO THE PLATES INCLUDING ANY OTHER SUPPORT BRACKETS OR MEMBERS REQUIRED.

✱ NOTE: THE EQUIPMENT MOUNTING ENVELOPE AND VERTICAL CLEARANCE FOR THE GANTRY SHALL BE CONFIRMED BY THE ENGINEER AND OWNER'S SELECTED TOLL INTEGRATOR.

OVERHEAD TOLL GANTRY NOTES

GENERAL

1. ALL DIMENSIONS SHOWN ARE APPROXIMATE. THE CONTRACTOR SHALL DETERMINE ALL SPAN LENGTHS, END FRAME HEIGHTS, COLUMN HEIGHTS AND ROADWAY DIMENSIONS REQUIRED TO INSTALL THE STRUCTURE.
2. THE CONTRACTOR SHALL COORDINATE THE FOUNDATION DESIGN WITH ALL OTHER EXISTING AND PROPOSED WORK IN THE VICINITY OF THE GANTRY.
3. THE MAXIMUM SPACE BETWEEN THE BOTTOM OF THE BASE PLATE AND THE TOP OF THE FOUNDATION SHALL BE NO MORE THAN THE DIAMETER OF THE ANCHOR BOLT PLUS ONE INCH.
4. NO MORTAR, GROUT, OR CONCRETE SHALL BE PLACED BETWEEN BOTTOM OF BASE PLATE AND TOP OF PEDESTAL.
5. FOUNDATION RECOMMENDATIONS ARE PROVIDED IN SECTION 5.3.4 OF THE FINAL GEOTECHNICAL REPORT BY FROEHLING & ROBERTSON DATED NOVEMBER 18, 2010.

DESIGN

ALL DESIGN AND DETAILS OF CONSTRUCTION SHALL CONFORM TO THE APPLICABLE REQUIREMENTS OF THE FOLLOWING:

A. 2002 (17TH EDITION) AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, WITH INTERIMS THROUGH 2004

B. 2009 AASHTO STANDARD SPECIFICATIONS FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRES AND TRAFFIC SIGNALS

LIVE LOAD: THE WIND LOAD SHALL BE CALCULATED USING AN IMPORTANCE FACTOR (Ip) = 1.0

DEAD LOAD:
A. 10 PSF APPLIED OVER THE ENTIRE AREA OF STRUCTURE IN ADDITION TO THE SELF WEIGHT OF THE STRUCTURE.

B. A SINGLE 200 LB LOAD APPLIED TO ANY AND ALL NODES, CHORDS AND CONNECTIONS ON THE STRUCTURE.

CAMBER: THE OVERHEAD TOLLING GANTRY SHALL HAVE A RESIDUAL UPWARD CAMBER OF SPAN/1000.

MATERIALS

STRUCTURAL STEEL:	
HSS SHAPES & TUBING	ASTM A500 GRADE B
WIDE FLANGE SHAPES	ASTM A709
ALL OTHER SHAPES AND PLATES	ASTM A36 MIN.
CONCRETE:	
CONCRETE	F'c = 3,000 PSI
REINFORCING STEEL	ASTM A615 GRADE 60
BOLTS:	
HIGH STRENGTH BOLTS	ASTM A325
ANCHOR BOLTS	ASTM F1554

ALL STEEL ITEMS SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123 OR A153

WELDING

WELDING AND WELDING INSPECTION FOR STRUCTURES SHALL CONFORM TO THE CURRENT EDITIONS OF THE ANSI/AASHTO/AWS D1.5-02 BRIDGE WELDING CODE AND ANSI/AWS D1.1-02 STRUCTURAL WELDING CODE. WELDING OF STRUCTURAL ALUMINUM, IF APPLICABLE, SHALL CONFORM TO AWS D1.2-03. E70XX LOW HYDROGEN ELECTRODES SHALL BE USED FOR STRUCTURAL STEEL WELDS. NO WELDING OF ALUMINUM SHALL BE PERMITTED.

BOLTED CONNECTIONS

HIGH STRENGTH BOLTS SHALL BE ASTM A325. THREADS SHALL BE EXCLUDED FROM THE SHEAR PLANE. UNLESS OTHERWISE NOTED, FIELD CONNECTIONS SHALL BE BOLTED USING HIGH STRENGTH BOLTS AND BOLT SIZE SHALL BE MIN. 3/4" DIAMETER. BUTT WELDS SHALL BE FULL (COMPLETE) PENETRATION WELDS. PROVIDE BACKUP PLATES AS REQUIRED.

DESIGN INTENT

THESE ARE DESIGN CRITERIA DOCUMENTS: PRELIMINARY PLANS NOT TO BE USED FOR CONSTRUCTION. THESE PLANS ARE PROVIDED FOR INFORMATIONAL PURPOSES ONLY, INTENDED TO ESTABLISH THE PROPOSED PROJECT'S DESIGN AND CONSTRUCTION INTENT QUALITY, AND CHARACTER. CONTRACTOR SHALL USE THESE PLANS IN ACCORDANCE WITH THE SPECIFICATIONS.

THE CONTRACTOR IS RESPONSIBLE FOR THE DESIGN AND DETAILING OF THE GANTRY STRUCTURE AND FOUNDATIONS. THE CONTRACTOR SHALL COORDINATE WITH THE ENGINEER AND TOLL INTEGRATOR AS NECESSARY FOR REQUIRED EQUIPMENT LOCATIONS AND LOADING AND ANY DESIGN RESTRICTIONS OR REQUIREMENTS.

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Tuesday, March 15, 2011

REVISIONS

RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

SIGNING AND PAVEMENT MARKING TOLL GANTRY ELEVATION

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Scale:	Date:	Contract No.:	Sheet:
AS SHOWN	FEB. 25, 2011	DTEORT-2011	9(29)

GENERAL NOTES

1. VIRGINIA DEPARTMENT OF TRANSPORTATION 2007 ROAD AND BRIDGE SPECIFICATIONS, 2008 ROAD AND BRIDGE STANDRADS, 2006 TRAFFIC ENGINEERING MANUAL, THE CONTRACT DOCUMENTS AND THE CONTRACT PLANS ARE THE GOVERNING PROVISIONS APPLICABLE TO THIS PROJECT.

2. THE LIGHTING DESIGN REFLECTED IN THESE DRAWINGS CONFORMS WITH I.E.S. DESIGN CRITERIA AND STANDARDS, AND VDOT'S REQUIREMENTS AS FOLLOWS:
   - MINIMUM ILLUMINANCE, 0.2 Fc
   - AVERAGE MAINTAINED ILLUMINANCE, 0.6-0.9 Fc ON THE MAINLINE, 1.0 Fc ON RAMPS AND AT BIFURCATION POINTS
   - UNIFORMITY RATIO (AVERAGE TO MINIMUM), SHALL BE BETWEEN 4:1 AND 3:1 OR LESS
   - LIGHT LOSS FACTOR: 0.65
   - VEILING LUMINANCE RATIO, LESS THAN 0.30

3. LIGHT POLE LENGTH RANGES AS SHOWN ON THE PLANS ARE APPROXIMATE; ACTUAL LENGTHS SHALL BE DETERMINED BY THE CONTRACTOR IN THE FIELD AS REQUIRED TO ACHIEVE THE REQUIRED LUMINAIRE MOUNTING HEIGHT, BEFORE ORDERING ANY POLES.

4. JUNCTION BOXES SHALL CONFORM WITH VDOT ST'D JB R1 OR JB R2 AS SHOWN.

5. CONDUIT LOCATIONS AS SHOWN ARE DIAGRAMMATIC. FIELD ADJUSTMENTS SHALL BE MADE AS REQUIRED TO STAY WITHIN THE LIMITS OF CONSTRUCTION, OUT OF DITCH LINES, AWAY FROM GUARDRAIL AND FENCE POSTS, AND TO CLEAR OBSTRUCTIONS.

6. STATION AND OFFSET REFERENCES TO LIGHT POLE FOUNDATIONS ARE BASED ON CONSTRUCTION BASE LINE.

7. MOUNTING HEIGHTS SHOWN ON THE PLANS SHALL BE ADHERED TO WITHIN A TOLERANCE OF 1 Ft, AND SHALL IN NO CASE BE LESS THAN THE MOUNTING HEIGHTS SHOWN.

8. ALL NON-DIRECTIONALLY DRILLED UNDERGROUND CONDUITS SHALL BE INSTALLED IN ACCORDANCE WITH VDOT ST'D EC1-1.

9. CONDUCTOR CABLES TERMINATING IN BOXES OR LIGHT POLES SHALL BE TEST CAPPED AND HAVE A SLACK OF 3 FT PER CONDUCTOR.

10. 4 #6 AWG CONDUCTORS SHALL BE USED BETWEEN ADJACENT JUNCTION BOX AND SIGN STRUCTURE FOR SIGN LIGHTING.

11. 150 WATT H.P.S. LUMINAIRES SHALL BE USED FOR SIGN LIGHTING.

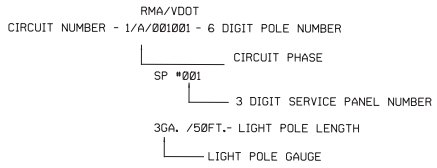
12. BEFORE CONNECTING SIGN LUMINAIRES, THE CONTRACTOR SHALL MAKE SURE THAT BALLAST TAPS ARE SELECTED FOR PROPER VOLTAGE OPERATION.

13. THE EQUIPMENT GROUNDING CONDUCTOR (EGC) IS INCIDENTAL TO THE COST OF NEW CONDUIT. THE EGC SHALL BE THE SAME SIZE AS THE LARGEST POWER CONDUCTOR.

14. ALL ELECTRICAL SERVICE ENCLOSURES SHALL MEET NEMA 3R SPECIFICATIONS AND REQUIREMENTS

15. INSTALLATION OF ELECTRICAL SERVICES SHALL BE COORDINATED WITH DOMINION VIRGINIA POWER BY THE CONTRACTOR.

16. ALL LIGHTING POLES SHALL BE PROVIDED WITH NON-CORROSIVE, METALLIC IDENTIFICATION TAGS, SIZED AS REQUIRED, BEARING THE POLE OWNER AND MAINTAINER, RMA/VDOT, THE GAUGE AND LENGTH OF THE LIGHT POLE, THE CIRCUIT NUMBER, CIRCUIT PHASE, 6 DIGIT POLE NUMBERS; FIRST 3 DIGITS OF THE POLE NUMBER WILL DESIGNATE THE SERVICE PANEL NUMBER AND THE LAST 3 DIGITS WILL DESIGNATE THE NUMBER OF THE POLE CONNECTED TO EACH SERVICE PANEL NUMBER IN THIS FORMAT:



17. LIGHT POLE NUMBERS SHALL BE DETERMINED BY THE CONTRACTOR IN THE FIELD USING THE FOLLOWING GUIDELINES:
   a) LIGHT POLE NUMBER MUST BE ASSIGNED IN CHRONOLOGICAL ORDER TO CORRESPOND WITH THE DIRECTION OF VEHICLE APPROACH.
   b) THE FIRST LIGHT POLE OF EACH SERVICE PANEL SHALL BE NUMBERED 001 AND CONTINUE SEQUENTIALLY THROUGHOUT THE LIGHT POLE CHAIN(S) UNTIL THE LAST LIGHT POLE CONNECTED TO THE SAME SERVICE PANEL IS NUMBERED.
   c) LIGHT POLES ON RAMPS SHALL BE NUMBERED CHRONOLOGICALLY AS PART OF THE MAINLINE LIGHT POLES IN THE DIRECTION OF VEHICLE APPROACH.

18. THE CONTRACTOR SHALL CONTACT NRO MAINTENANCE MANAGEMENT, XXX FOR MAINTENANCE CONCERNS. LIGHT POLE AND SERVICE IDENTIFICATION TAGS/DECALS, SERVICE INSPECTIONS, FINAL FIELD INSPECTION, AND VDOT UTILITY IDENTIFICATION AND MARKING.

19. ALL UTILITIES SHALL BE LOCATED AND MARKED PRIOR TO INITIATION OF CONSTRUCTION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR CONTACTING MISS UTILITY AND SCHEDULING THE LOCATION OF UNDERGROUND UTILITIES. EXISTING RMA CONDUITS AND CABLES SHALL ALSO BE LOCATED AND MARKED.

20. ALL CONDUCTORS IN JUNCTION BOXES, POLES AND EQUIPMENT ENCLOSURES SHALL BE PROVIDED WITH INDIVIDUAL BRASS TAGS, DIE STAMPED WITH SERVICE PANEL NUMBER, PHASE AND CIRCUIT IDENTIFICATIONS. CONDUCTORS SHALL BE NEATLY ARRANGED AND SUPPORTED ON CABLE RACKS.

21. CONDUITS ENTERING JUNCTION BOXES SHALL BE INSTALLED AS SHOWN ON THE PLANS. CONDUITS SHALL EXTEND 2" MIN TO 3" MAX. BEYOND THE INSIDE WALL OF THE JUNCTION BOXES. ALL CONDUITS INSTALLED INSIDE JUNCTION BOXES SHALL BE LEVELED WITH THE FRAME AND COVER, AND SHALL BE SQUARE TO THE INSIDE WALL OF THE JUNCTION BOXES.

22. OFFSET AND CONVENTIONAL LIGHTING POLES SHALL BE ALUMINUM OR STEEL.

23. ALL LIGHTING POLES SHALL BE EQUIPPED WITH ANCHOR BOLT COVERS.

24. LIGHTING POLES THAT ARE PLACED BEHIND GUARDRAILS, RETAINING WALLS AND/OR MEDIAN BARRIERS SHALL BE INSTALLED ON NON-FRANGIBLE TRANSFORMER BASES (NF) AS SHOWN ON THE PLANS.

25. LIGHTS POLES THAT ARE NOT PROTECTED BY GUARDRAIL, RETAINING WALLS OR MEDIAN BARRIERS SHALL BE INSTALLED ON FRANGIBLE TRANSFORMER BASES (F) AS SHOWN ON THE PLANS.

26. LIGHT POLES INSTALLED ON BARRIERS OR WALLS SHALL BE INSTALLED WITHOUT TRANSFORMER BASES AS SHOWN ON THE PLANS.

27. LIGHT POLE FOUNDATIONS THAT SUPPORT FRANGIBLE TRANSFORMER BASES SHALL BE INSTALLED SUCH THAT NO PORTION OF THE FOUNDATION EXTENDS MORE THAN 4" ABOVE THE FINAL GRADE.

28. TRANSFORMER BASES SHALL INCLUDE BOLT COVERS.

29. TRANSFORMER BASE HEIGHTS SHALL BE CALCULATED INTO THE TOTAL LIGHT POLE LENGTH TO ACHIEVE THE REQUIRED LIGHT FIXTURE MOUNTING HEIGHT.

30. TRANSFORMER BASES SHALL BE EQUIPPED WITH HINGED COVERS THAT INCLUDE A LOCKING MECHANISM AND SHALL COMPLY WITH VDOT ST'D LP-2.

31. NON-WALL MOUNTED OFFSET AND CONVENTIONAL LIGHTING POLE FOUNDATIONS SHALL BE IN ACCORDANCE WITH VDOT ST'D. LF-1, TYPE A, AS INDICATED ON THE PLANS.

32. CONDUITS, JUNCTION CHAMBERS, AND ANCHOR BOLTS SPECIFIED TO BE INSTALLED INTO BARRIERS AND/OR WALLS ARE INCIDENTAL TO THE COST OF THE BARRIERS AND/OR WALLS AND SHALL BE COORDINATED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.

33. ALL PROPOSED EMPTY CONDUITS SHALL HAVE A PULL-LINE INSTALLED. TOTAL COST ASSOCIATED WITH THE PULL LINE SHALL BE INCIDENTAL TO THE CONDUIT PAY ITEM.

34. REMOVAL AND SALVAGE OF LIGHT POLE SHALL INCLUDE LIGHT POLE, TRANSFORMER BASE, BRACKET ARM, LIGHT FIXTURE, FOUNDATION AND ASSOCIATED JUNCTION BOX.

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Tuesday, March 15, 2011

REVISIONS

RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

LIGHTING & ELECTRICAL DISTRIBUTION GENERAL NOTES

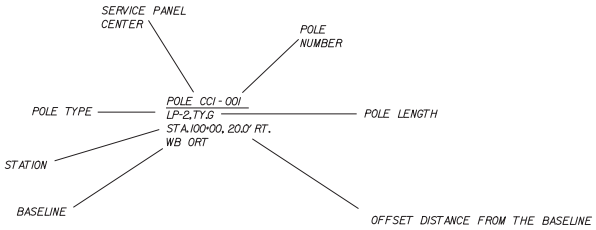
HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100

Scale:	Date:	Contract No.:	Sheet:
NONE	FEB. 25, 2011	DTEORT-2011	10(2A)

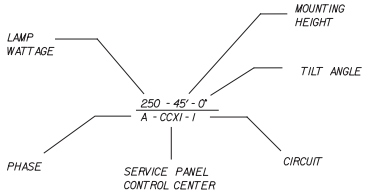
LEGEND	DESCRIPTION
	QUAD 400 WATT, MH, FORWARD THROW. FULL CUTOFF LUMINAIRES. 40 Ft MOUNTING HEIGHT ON NEW LIGHT POLE ON BARRIER. SEE SHEET 10(16) FOR ALUMINUM MOUNTING BRACKETS.
	400 WATT, HPS, FORWARD THROW. CUTOFF LUMINAIRES. 55 Ft MOUNTING HEIGHT WITH 7.5Ft ARM ON NEW LIGHT POLE WITH CONCRETE FOUNDATION LF-I SEE SHEET 10(16) FOR ALUMINUM ARM DETAILS.
	250 WATT, HPS, FORWARD THROW. CUTOFF LUMINAIRES, 40 Ft MOUNTING HEIGHT ON NEW LIGHT POLE WITH NON-FRANGIBLE TRANSFORMER BASE AND CONCRETE FOUNDATION LF-I
F	250 WATT, HPS, FORWARD THROW. CUTOFF LUMINAIRES, 40 Ft MOUNTING HEIGHT ON NEW LIGHT POLE WITH FRANGIBLE TRANSFORMER BASE AND CONCRETE FOUNDATION LF-I
	70 WATT, HPS, WALLPACK TYPE IV, UNDERBRIDGE LIGHTING LUMINAIRES
	150 WATT, HPS, WALLPACK TYPE IV, UNDERBRIDGE LIGHTING LUMINAIRES
	REMOVE AND SALVAGE EXISTING LIGHT POLE
	EXISTING LIGHT POLE WITH NEW ELECTRICAL CONNECTION
JB-RI	JUNCTION BOX JB-RI
	EXPOSED 6"X6"X6" WALL/GIRDER SURFACE MOUNTED NEMA 3R JUNCTION BOX
	JUNCTION CHAMBER (8"H x 8"W x 8"D) INSIDE BARRIER
	JUNCTION CHAMBER (8"H x 8"W x 12"D) INSIDE BARRIER
	TEE JUNCTION BOX
	EXISTING JUNCTION BOX TO BE MODIFIED
	EXISTING SERVICE PANEL/CONTROL CENTER
	GALVANIZED RIGID STEEL CONDUIT RISER BETWEEN JUNCTION BOX EMBEDDED IN WALL/BARRIER OR SURFACE MOUNTED AND JUNCTION BOX INSTALLED IN GROUND
A B C	OVERHEAD SIGN STRUCTURE - LUMINAIRE PHASE CONNECTIONS
A C	BRIDGE MOUNTED SIGN STRUCTURE-LUMINAIRE PHASE CONNECTIONS

LEGEND	DESCRIPTION
	PROPOSED DIRECTIONALLY DRILLED CONDUIT (NUMBER AND SIZE OF CONDUITS PER PLAN SHEET CALLOUTS)
RL	PROPOSED ROADWAY LIGHTING CONDUIT
	PROPOSED CONDUIT IN BARRIER (NUMBER AND SIZE OF CONDUITS PER PLAN SHEET CALLOUTS)
	PROPOSED ONE 1" GALVANIZED RIGID STEEL (GRS) CONDUIT
	EXISTING CONDUIT

POLE DATA



OFFSET LUMINAIRE DATA



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Tuesday, March 15, 2011

REVISIONS

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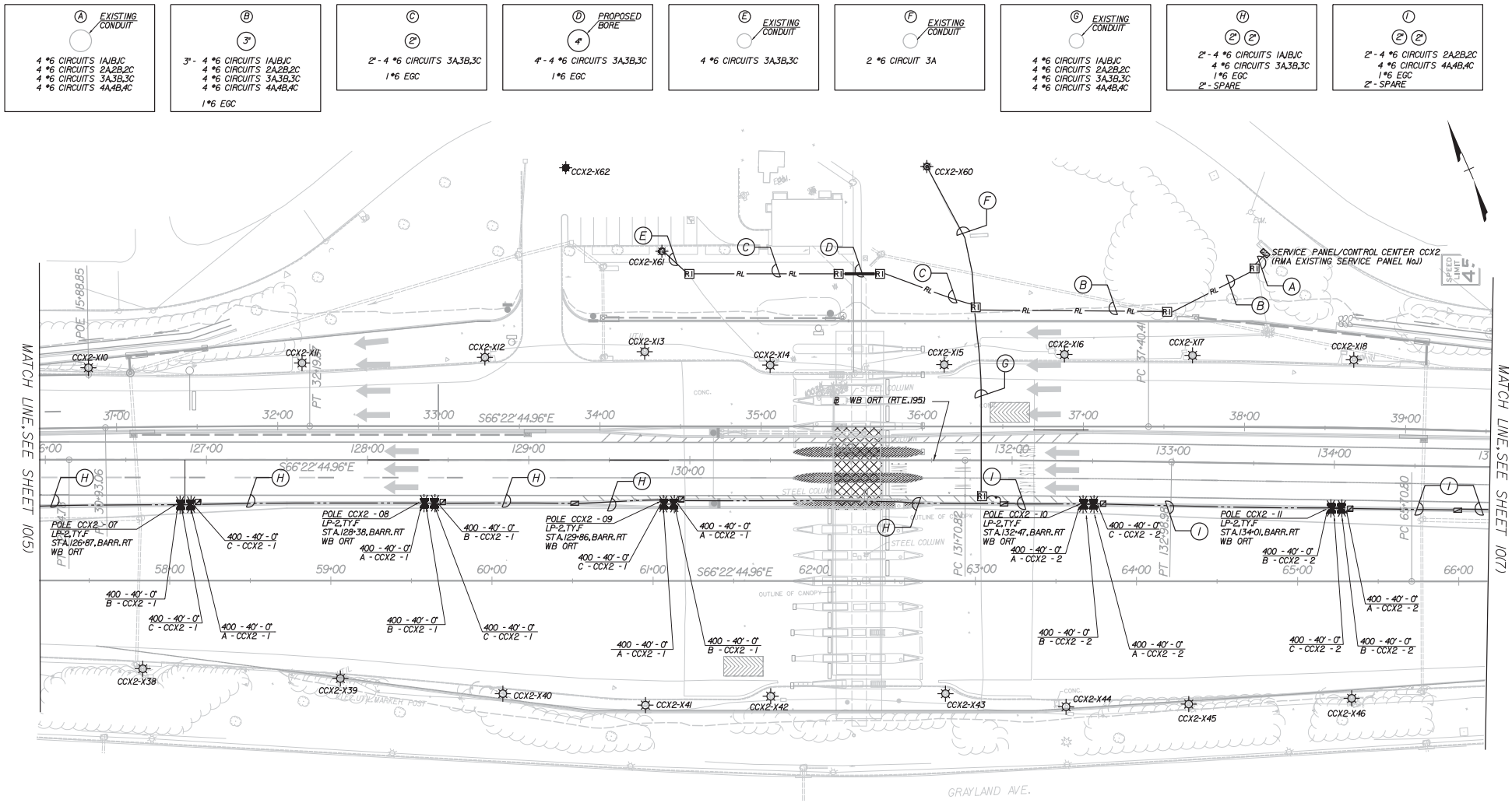
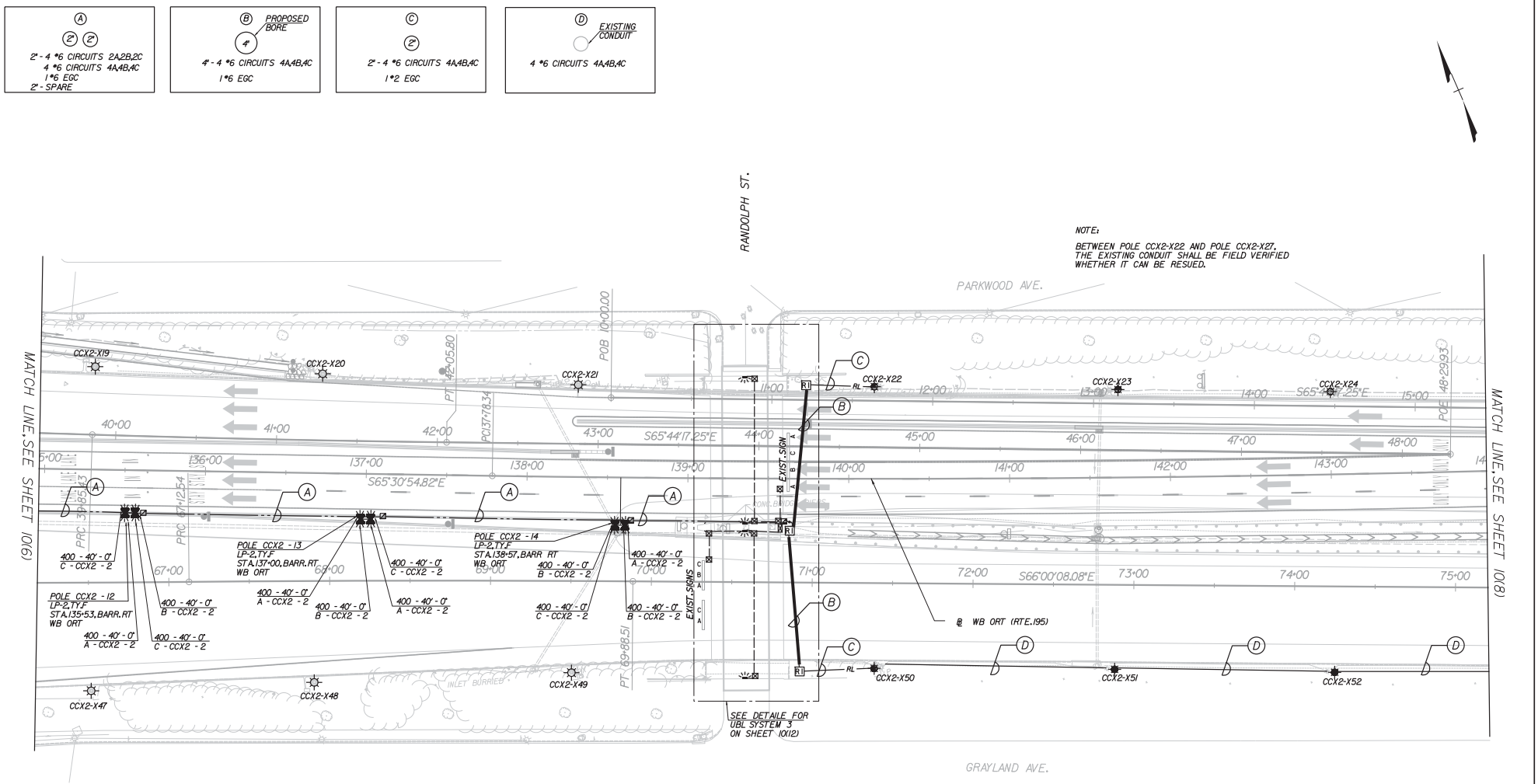
RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

LIGHTING & ELECTRICAL DISTRIBUTION LEGEND

Scale:	Date:	Contract No.:	Sheet:
NONE	FEB. 25, 2011	DTEORT-2011	10(2B)


A EXISTING CONDUIT
4 #6 CIRCUITS 1A,1B,1C
4 #6 CIRCUITS 2A,2B,2C
4 #6 CIRCUITS 3A,3B,3C
4 #6 CIRCUITS 4A,4B,4C
B 3"
3" - 4 #6 CIRCUITS 1A,1B,1C
4 #6 CIRCUITS 2A,2B,2C
4 #6 CIRCUITS 3A,3B,3C
4 #6 CIRCUITS 4A,4B,4C
1 #6 EGC
C 2"
2" - 4 #6 CIRCUITS 3A,3B,3C
1 #6 EGC
D PROPOSED BORE 4"
4" - 4 #6 CIRCUITS 3A,3B,3C
1 #6 EGC
E EXISTING CONDUIT
4 #6 CIRCUITS 3A,3B,3C
F EXISTING CONDUIT
2 #6 CIRCUIT 3A
G EXISTING CONDUIT
4 #6 CIRCUITS 1A,1B,1C
4 #6 CIRCUITS 2A,2B,2C
4 #6 CIRCUITS 3A,3B,3C
4 #6 CIRCUITS 4A,4B,4C
H 2" 2"
2" - 4 #6 CIRCUITS 1A,1B,1C
4 #6 CIRCUITS 3A,3B,3C
1 #6 EGC
2" - SPARE
I 2" 2"
2" - 4 #6 CIRCUITS 2A,2B,2C
4 #6 CIRCUITS 4A,4B,4C
1 #6 EGC
2" - SPARE
MATCH LINE, SEE SHEET 10(5)
MATCH LINE, SEE SHEET 10(7)
CCX2-X62
CCX2-X60
CCX2-X61
SERVICE PANEL/CONTROL CENTER CCX2 (RMA EXISTING SERVICE PANEL NoJ)
SPEED LIMIT 45
CCX2-X10
CCX2-X11
CCX2-X12
CCX2-X13
CCX2-X14
CCX2-X15
CCX2-X16
CCX2-X17
CCX2-X18
WB ORT (RTE.195)
S66°22'44.96"E
POLE CCX2 - 07
LP-2,TY.F
STA.126+87,BARR.RT
WB ORT
POLE CCX2 - 08
LP-2,TY.F
STA.128+38,BARR.RT
WB ORT
POLE CCX2 - 09
LP-2,TY.F
STA.129+86,BARR.RT
WB ORT
POLE CCX2 - 10
LP-2,TY.F
STA.132+47,BARR.RT
WB ORT
POLE CCX2 - 11
LP-2,TY.F
STA.134+01,BARR.RT
WB ORT
400 - 40' - 0" A - CCX2 - 1
400 - 40' - 0" B - CCX2 - 1
400 - 40' - 0" C - CCX2 - 1
400 - 40' - 0" A - CCX2 - 2
400 - 40' - 0" B - CCX2 - 2
400 - 40' - 0" C - CCX2 - 2
CCX2-X38
CCX2-X39
CCX2-X40
CCX2-X41
CCX2-X42
CCX2-X43
CCX2-X44
CCX2-X45
CCX2-X46
GRAYLAND AVE.
RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING
LIGHTING & ELECTRICAL DISTRIBUTION PLANS
STA. 126+00.00 TO STA. 135+00.00 WB ORT
HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100
REVISIONS
SCALE: 1" = 30'
Scale: 1" = 30'-0"
Date: FEB. 25, 2011
Contract No.: DTEORT-2011
Sheet: 10(6)
T:\87010\10(06).dgn
Tuesday, March 15, 2011



RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

LIGHTING & ELECTRICAL DISTRIBUTION PLANS
STA. 135+00.00 TO STA. 144+00.00 WB ORT

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Scale:	Date:	Contract No.:	Sheet:
1" = 30'-0"	FEB. 25, 2011	DTEORT-2011	10(7)

REVISIONS

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Tuesday, March 15, 2011

SERVICE PANEL / CONTROL CENTER NO.CCXI

(VDOT EXISTING SERVICE PANEL NO.XXX)

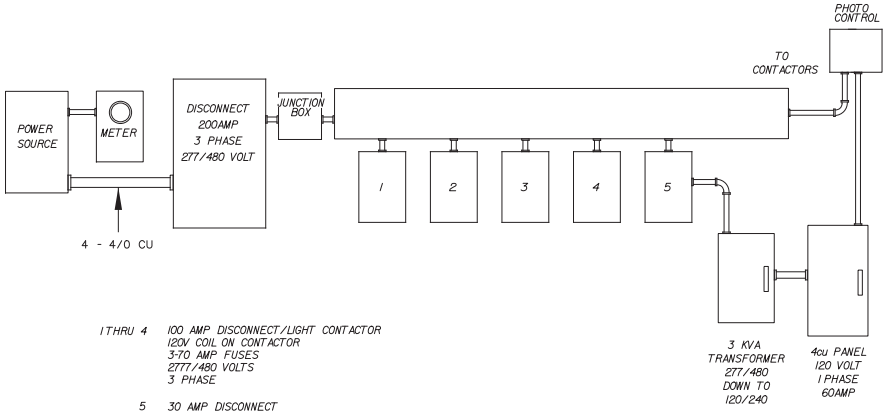
STANDARD	TYPE	VOLTAGE	SAFETY SWITCH		
			VOLTAGE	AMPERE RATING	FUSE
–	–	277/480	–	–	–

CCXI DISTRIBUTION CENTER

AMPERE RATING		CIRCUIT NO.	CIRCUIT NO.	AMPERE RATING	
CONTACTOR	CIRCUIT BREAKER			CIRCUIT BREAKER	CONTACTOR
20 *	15 *	1	2		
20 *	15 *	3	4		
20 *	15 *	5	6		
		7	8		
		9	10		
		11	12		
		13	14		
		15	16		
		17	18		
		19	20		
		21	22		
		23	24		

*: PROPOSED CIRCUIT ARRANGEMENT TO MATCH THE EXISTING CIRCUIT.

VDOT EXISTING SERVICE PANEL ARRANGEMENT



1 THRU 4 100 AMP DISCONNECT/LIGHT CONTACTOR
120V COIL ON CONTACTOR
3-70 AMP FUSES
2777/480 VOLTS
3 PHASE

5 30 AMP DISCONNECT
3-6 AMP FUSES
277/480VOLTS
3 PHASE

NOTE:
1. TRANSFORMER FEED BY #10 THNN ON 6AMP FUSES.
2. LIGHTING CONTACTORS ARE BUILT-IN TO DISCONNECTS 1THRU 4.
3. DISCONNECTS FEED WITH 3#2 THNN CU AND 1#8 CU.

RMA EXISTING SERVICE PANEL NO.1 ARRANGEMENT

INFO PROVIDED BY HARRIS & SON ELECTRIC CO. TEL:(804) 254-3507

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Tuesday, March 15, 2011

REVISIONS

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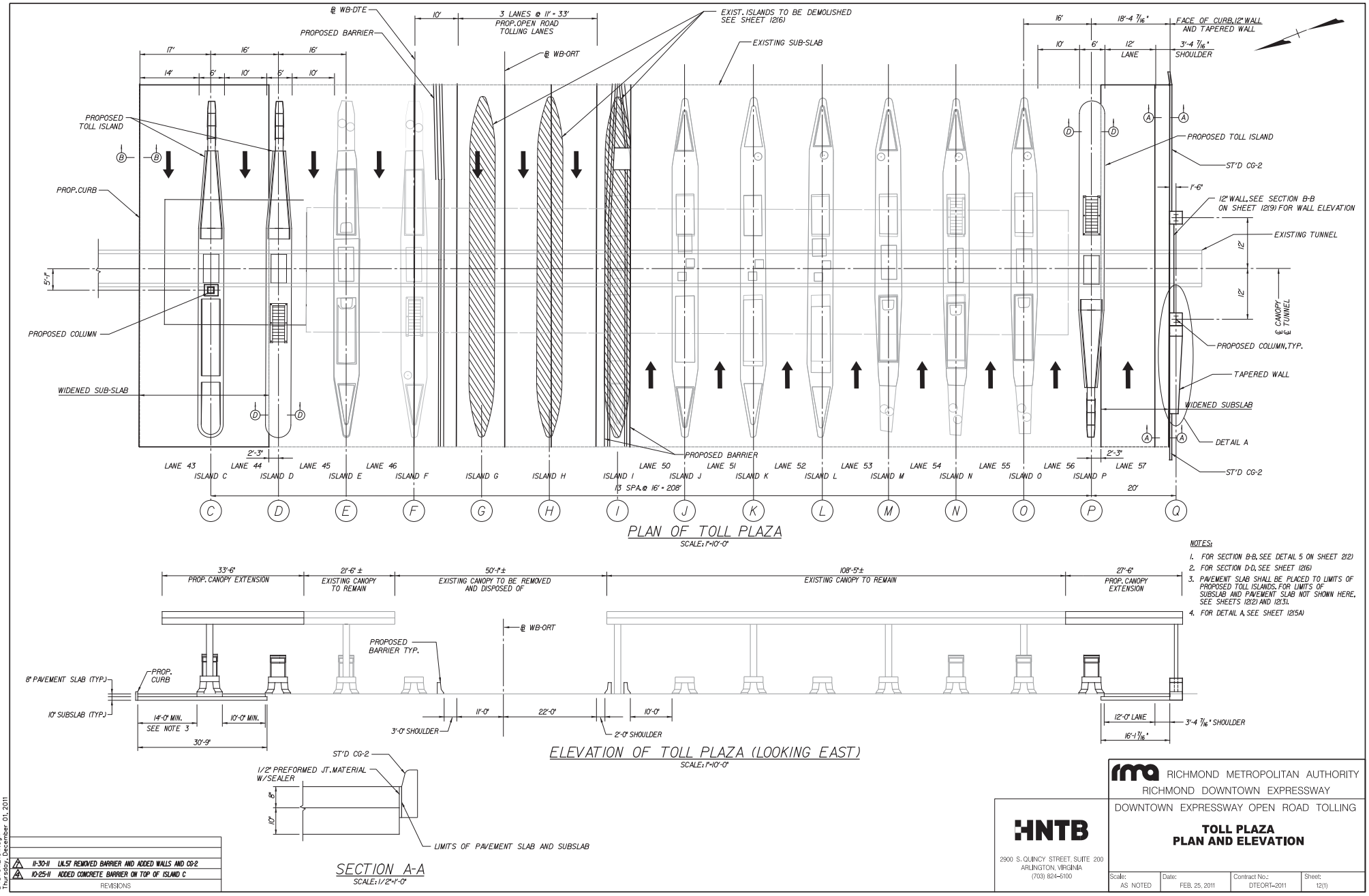
RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

LIGHTING & ELECTRICAL DISTRIBUTION

SERVICE PANEL/CONTROL CENTER ARRANGEMENT

Scale:	Date:	Contract No.:	Sheet:
NONE	FEB. 25, 2011	DTEORT-2011	10(14)



PLAN OF TOLL PLAZA
SCALE: 1"=10'-0"

ELEVATION OF TOLL PLAZA (LOOKING EAST)
SCALE: 1"=10'-0"

NOTES:
1. FOR SECTION B-B, SEE DETAIL 5 ON SHEET 12(2)
2. FOR SECTION D-D, SEE SHEET 12(6)
3. PAVEMENT SLAB SHALL BE PLACED TO LIMITS OF PROPOSED TOLL ISLANDS. FOR LIMITS OF SUBSLAB AND PAVEMENT SLAB NOT SHOWN HERE, SEE SHEETS 12(2) AND 12(3).
4. FOR DETAIL A, SEE SHEET 12(5A)

SECTION A-A
SCALE: 1/2"=1'-0"

REVISIONS
11-30-11 UPDATED BARRIER AND ADDED WALLS AND CG-2
10-25-11 ADDED CONCRETE BARRIER ON TOP OF ISLAND C

B487012(01).dgn
Thursday, December 01, 2011

RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

TOLL PLAZA PLAN AND ELEVATION

HNTB
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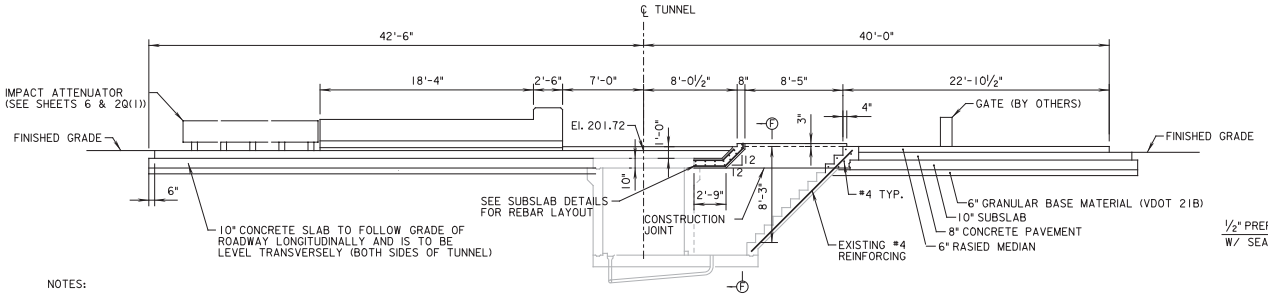
(703) 824-5100

Scale:	Date:	Contract No.:	Sheet:
AS NOTED	FEB. 25, 2011	DTEORT-2011	12(1)



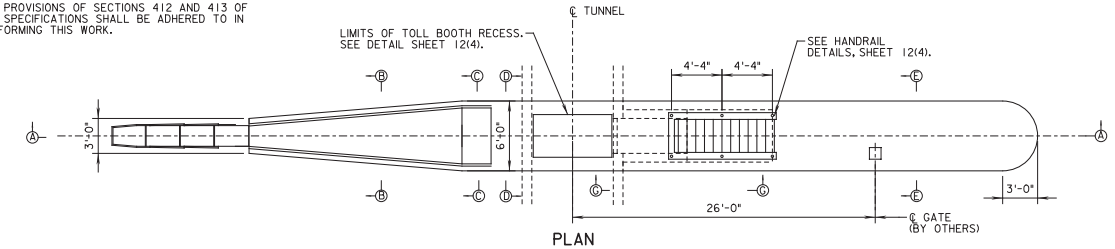
SECTION A-A
SCALE: 3/16" = 1'-0"

NOTES:

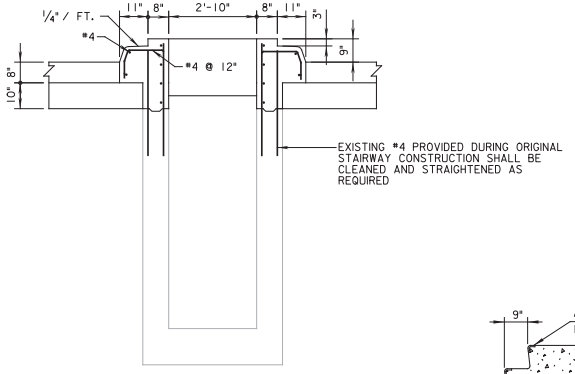
FOR 8" PAVEMENT AND 10" SUBSLAB DETAILS, SEE SHEET 12(4).

FOR DETAILS OF THE CONDUIT AND JUNCTION BOXES EMBEDDED IN THE ISLANDS, SEE TOLL PLAZA ELECTRICAL PLANS.

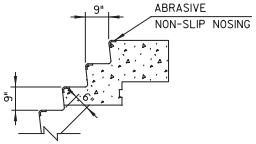
THE PROVISIONS OF SECTIONS 412 AND 413 OF THE SPECIFICATIONS SHALL BE ADHERED TO IN PERFORMING THIS WORK.



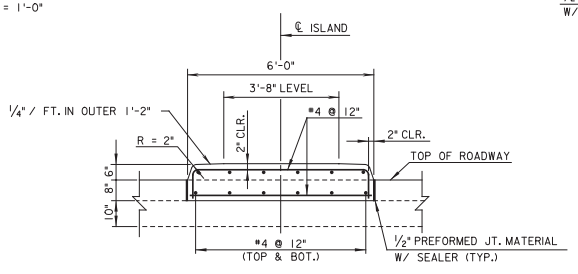
PLAN
SCALE: 3/16" = 1'-0"



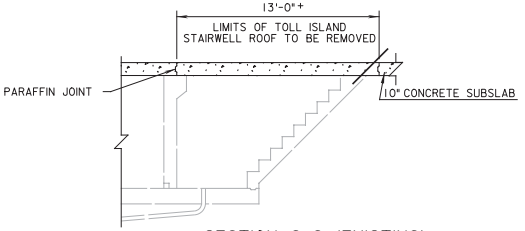
SECTION F-F
SCALE: ½" = 1'-0"



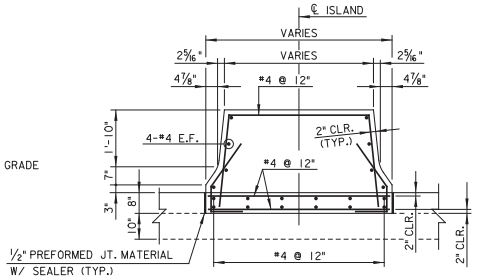
STEP DETAIL
NO SCALE



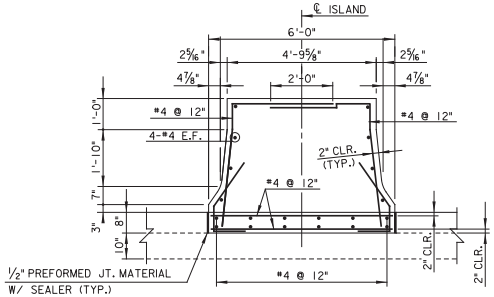
SECTION E-E
SCALE: ½" = 1'-0"



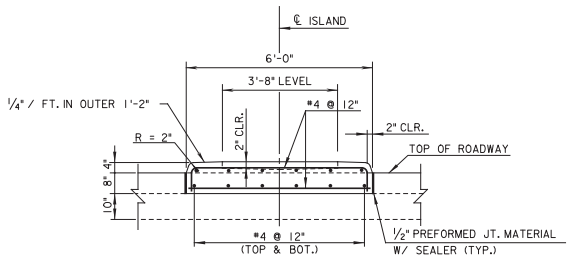
SECTION G-G (EXISTING)
SCALE: ¼" = 1'-0"



SECTION B-B
SCALE: ½" = 1'-0"



SECTION C-C
SCALE: ½" = 1'-0"



SECTION D-D
SCALE: ½" = 1'-0"

NOTE: FOR SECTION BELOW TOLL BOOTH, SEE TOLL BOOTH RECESS DETAIL, SHEET 12(4).

REVISIONS
-

B487012(02).dgn
Tuesday, March 15, 2011

RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

TOLL PLAZA
ISLAND D AND P DETAILS

HNTB
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Scale:	Date:	Contract No.:	Sheet:
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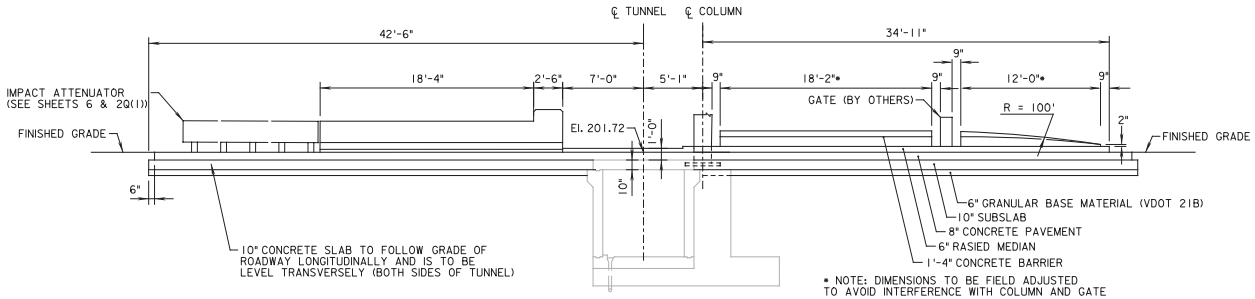


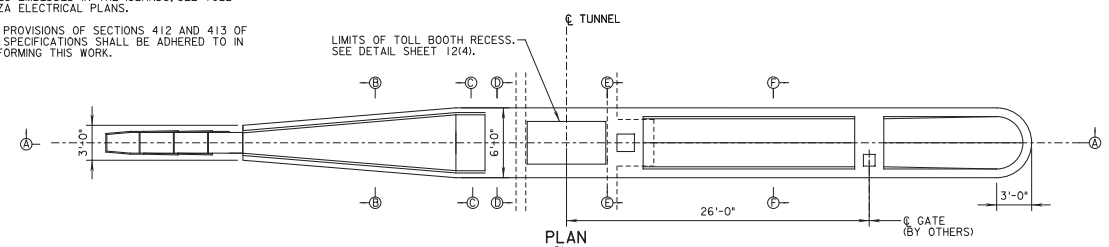
SECTION A-A
SCALE: 3/16" = 1'-0"

NOTES:

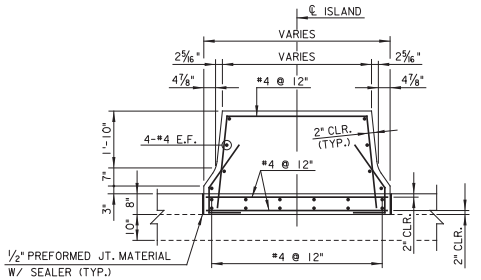
FOR 8" PAVEMENT AND 10" SUBSLAB DETAILS, SEE SHEET 12(4).

FOR DETAILS OF THE CONDUIT AND JUNCTION BOXES EMBEDDED IN THE ISLANDS, SEE TOLL PLAZA ELECTRICAL PLANS.

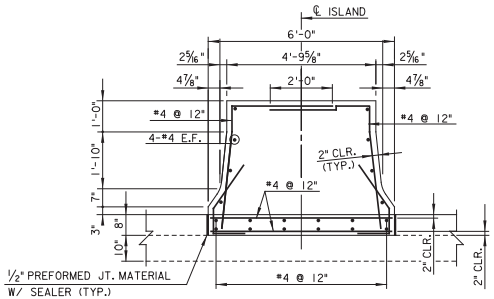
THE PROVISIONS OF SECTIONS 412 AND 413 OF THE SPECIFICATIONS SHALL BE ADHERED TO IN PERFORMING THIS WORK.



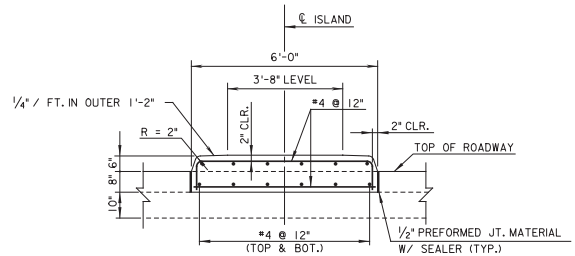
PLAN
SCALE: 3/16" = 1'-0"



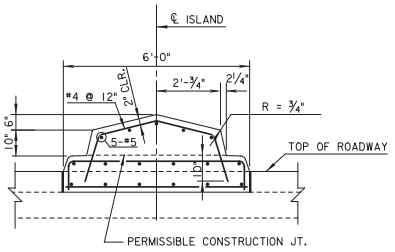
SECTION B-B
SCALE: 1/2" = 1'-0"



SECTION C-C
SCALE: 1/2" = 1'-0"

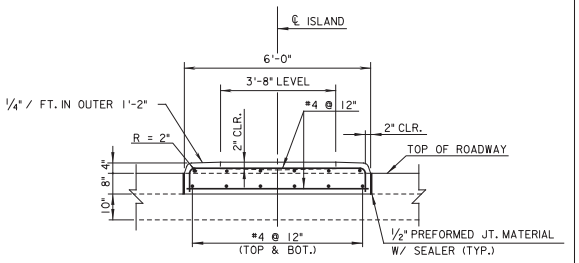


SECTION E-E
SCALE: 1/2" = 1'-0"



SECTION F-F
SCALE: 1/2" = 1'-0"

NOTE: FOR MEDIAN DIMENSIONS NOT LABELED SEE SECTION E-E



NOTE: FOR SECTION BELOW TOLL BOOTH, SEE TOLL BOOTH RECESS DETAIL, SHEET 12(4).

SECTION D-D
SCALE: 1/2" = 1'-0"

REVISIONS
4 10-25-11 ADDED CONCRETE BARRIER ON TOP OF MEDIAN
ADDED SECTION F-F

B487012(03).dgn
Monday, October 31, 2011

RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

TOLL PLAZA ISLAND C DETAILS

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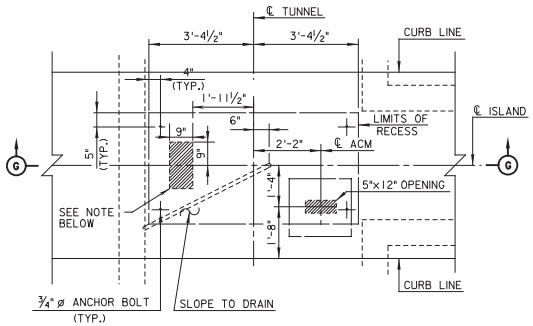
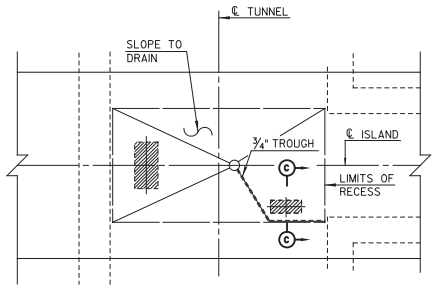
Scale:	Date:	Contract No.:	Sheet:
AS NOTED	FEB. 25, 2011	DTEORT-2011	12(3)



PLAN OF TOLL BOOTH RECESS

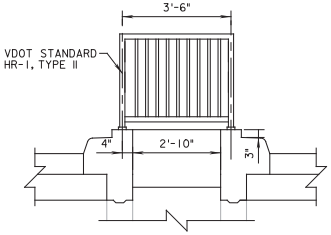
SCALE: ½" = 1'-0"

NOTE: 18" X 9" OPENING IN TUNNEL CEILING IS EXISTING. TOP 5" OF OPENING IS CAPPED WITH UNREINFORCED CONCRETE. CONTRACTOR SHALL REMOVE CAP AND MAINTAIN OPENING THROUGH ISLAND.



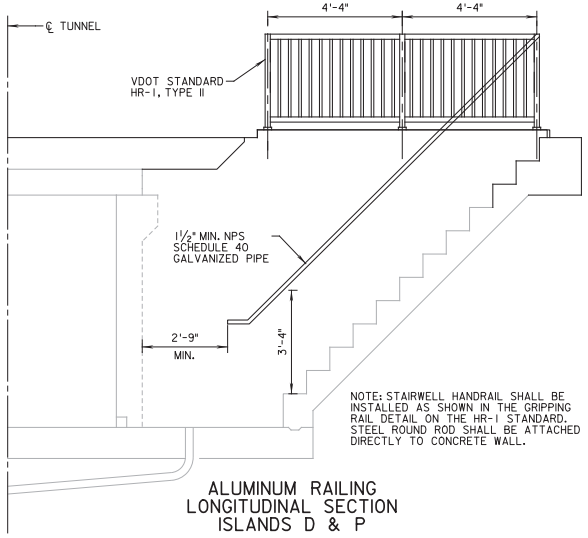
PLAN OF TOLL BOOTH DRAINAGE

SCALE: ½" = 1'-0"



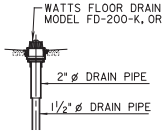
ALUMINUM RAILING TRANSVERSE SECTION ISLANDS D & P

SCALE: ½" = 1'-0"



ALUMINUM RAILING LONGITUDINAL SECTION ISLANDS D & P

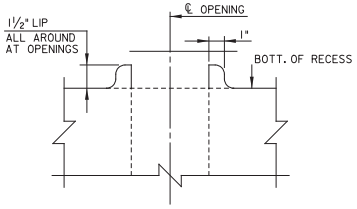
SCALE: ½" = 1'-0"



FLOOR DRAIN DETAIL

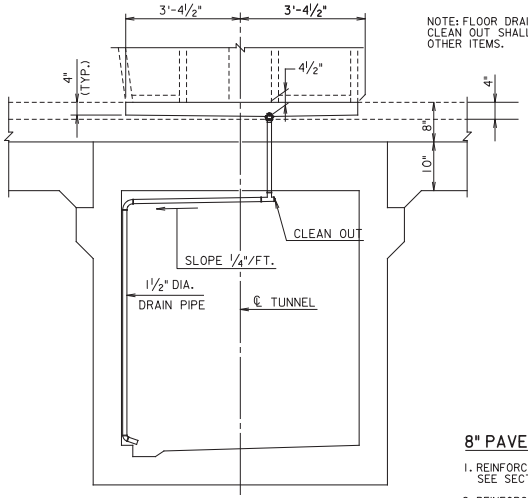
N.T.S.

NOTE: FLOOR DRAIN, PVC DRAIN PIPE AND CLEAN OUT SHALL BE INCIDENTAL TO OTHER ITEMS.



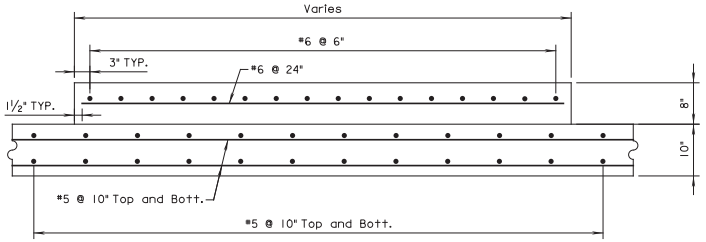
SECTION C-C

SCALE: 3" = 1'-0"



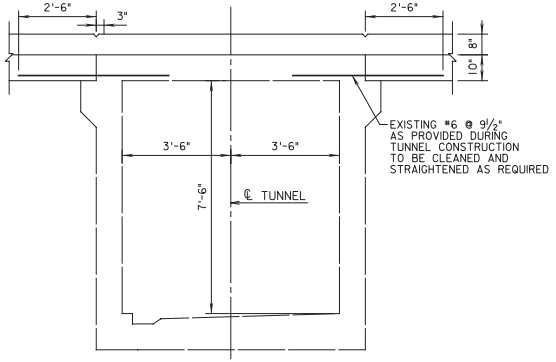
SECTION G-G

N.T.S.



8" PAVEMENT SLAB AND 10" SUBSLAB DETAILS

SCALE: 1" = 1'-0"



SECTION THRU TUNNEL BETWEEN ISLANDS

SCALE: ½" = 1'-0"

8" PAVEMENT SLAB NOTES

1. REINFORCING BARS SHALL BE GLASSFIBER REINFORCED POLYMER (GFRP). SEE SECTION 316 FOR GFRP DETAILS.
2. REINFORCING BARS SHALL BE SECURED USING PLASTIC TIES, NYLON TIES, OR PLASTIC SNAP TIES. NO METAL TIES SHALL BE USED.
3. PLASTIC OR NON-METALLIC CHAIRS SHALL BE USED TO ELEVATE REBAR AT LOCATIONS SHOWN. CHAIRS SHALL BE SECURED TO 10" SLAB BY METHOD(S) APPROVED BY THE ENGINEER.
4. CONTRACTOR TO COORDINATE PLACEMENT OF LOOPS WITH TOLL INTEGRATOR AND ENGINEER PRIOR TO POURING CONCRETE.
5. CONCRETE SHALL BE CLASS A4.
6. SEE VDOT STANDARD PR-3 FOR DETAILS NOT SHOWN ON THIS SHEET.

10" SUBSLAB NOTES

1. REINFORCING BARS SHALL BE ASTM A615, GRADE 60.
2. CONCRETE SHALL BE CLASS A3.
3. DOWELS CONNECTING PROPOSED AND EXISTING SUB-SLABS SHALL BE #6 BARS SPACED AT 18" O.C. DOWELS SHALL PROJECT A MINIMUM OF 9" INTO NEW AND EXISTING CONCRETE.

REVISIONS
1 10-25-11 MODIFIED DIMENSIONS ON SECTION G-G

B487012(04).dgn
Tuesday, October 25, 2011

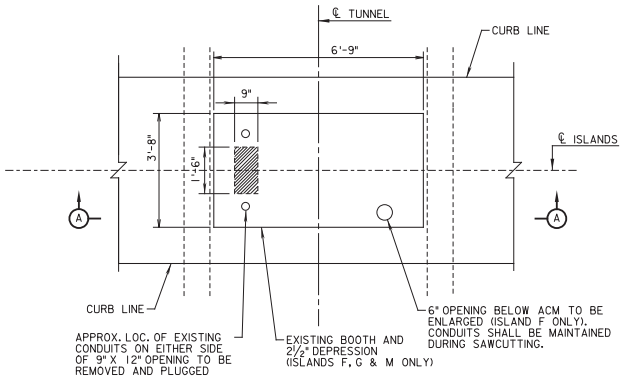
RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

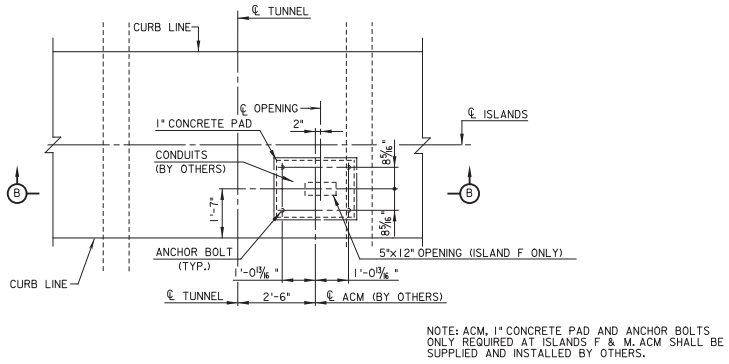
TOLL PLAZA
TOLL ISLAND DETAILS

HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100

Scale:	Date:	Contract No.:	Sheet:
AS NOTED	FEB. 25, 2011	DTEORT-2011	12(4)



EXISTING



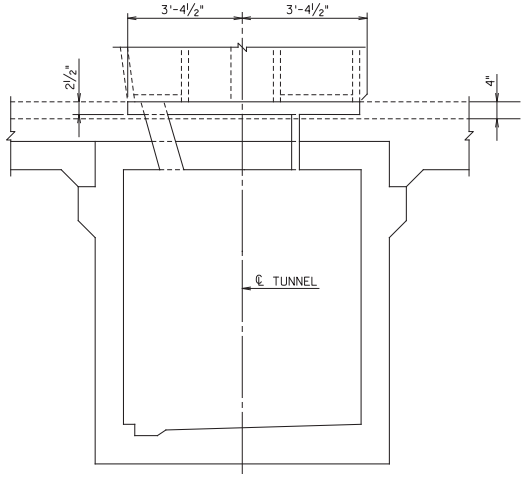
NOTE: ACM, 1" CONCRETE PAD AND ANCHOR BOLTS ONLY REQUIRED AT ISLANDS F & M. ACM SHALL BE SUPPLIED AND INSTALLED BY OTHERS.

PROPOSED

AFTER BOOTH REMOVAL (ISLANDS F, G & M)
AFTER ISLAND DEMOLITION (ISLANDS H & I)

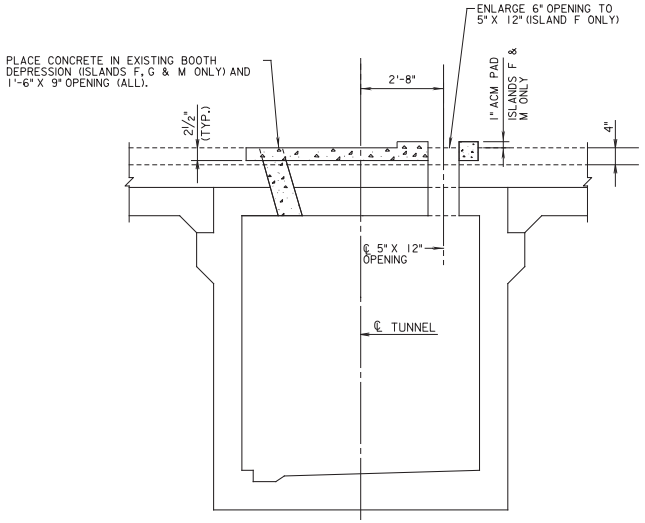
PLAN AT ISLANDS F, G, H, I & M

SCALE: ½" = 1'-0"



SECTION A-A

N.T.S.



SECTION B-B

N.T.S.

NOTE:
ALL MATERIALS, LABOR, EQUIPMENT AND INCIDENTALS NEEDED TO COMPLETE THE WORK SHOWN ON THIS SHEET SHALL BE INCLUDED IN THE REMOVE PORTION OF EXISTING STRUCTURE (TOLL PLAZA ISLANDS) PAY ITEM.

B487012(05).dgn
Tuesday, March 15, 2011

REVISIONS

RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

TOLL PLAZA
TOLL ISLAND DETAILS 2

HNTB
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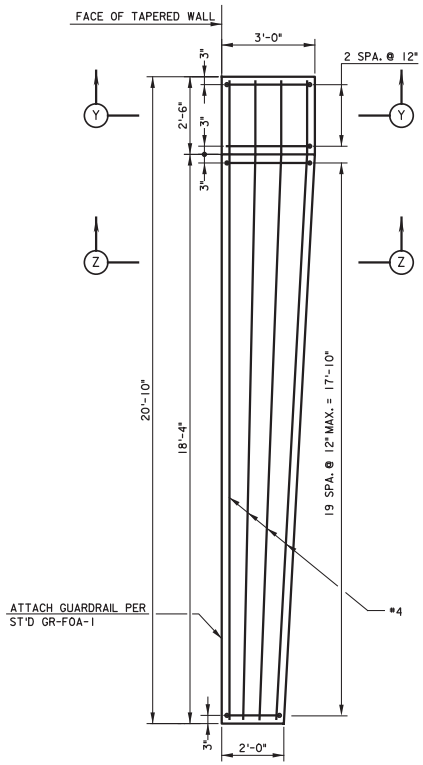
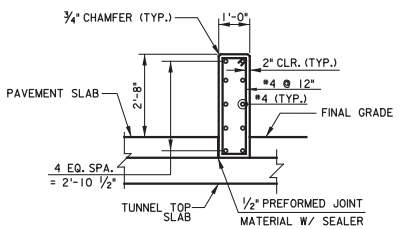
(703) 824-5100

Scale:	Date:	Contract No.:	Sheet:
AS NOTED	FEB. 25, 2011	DTEORT-2011	12(5)

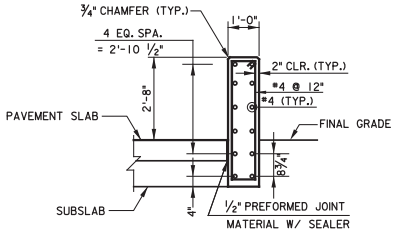


DETAIL A

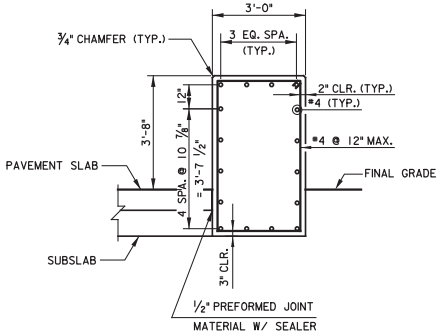
NOTE: FOR LOCATION OF DETAIL A, SEE SHEET 12(1)



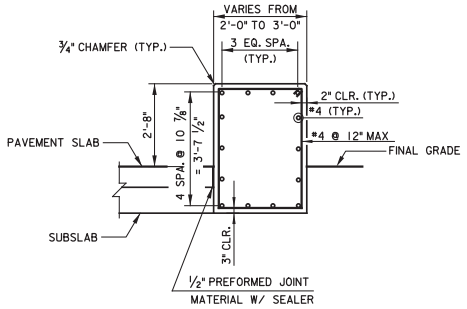
SECTION W-W



SECTION X-X



SECTION Y-Y



SECTION Z-Z

NOTE: FOR LOCATION OF SECTIONS W-W, X-X, Y-Y AND Z-Z, SEE SHEET 12(9)

REVISIONS
1 11-30-11 ADDED SHEET

B487012(05A).dgn
Thursday, December 01, 2011

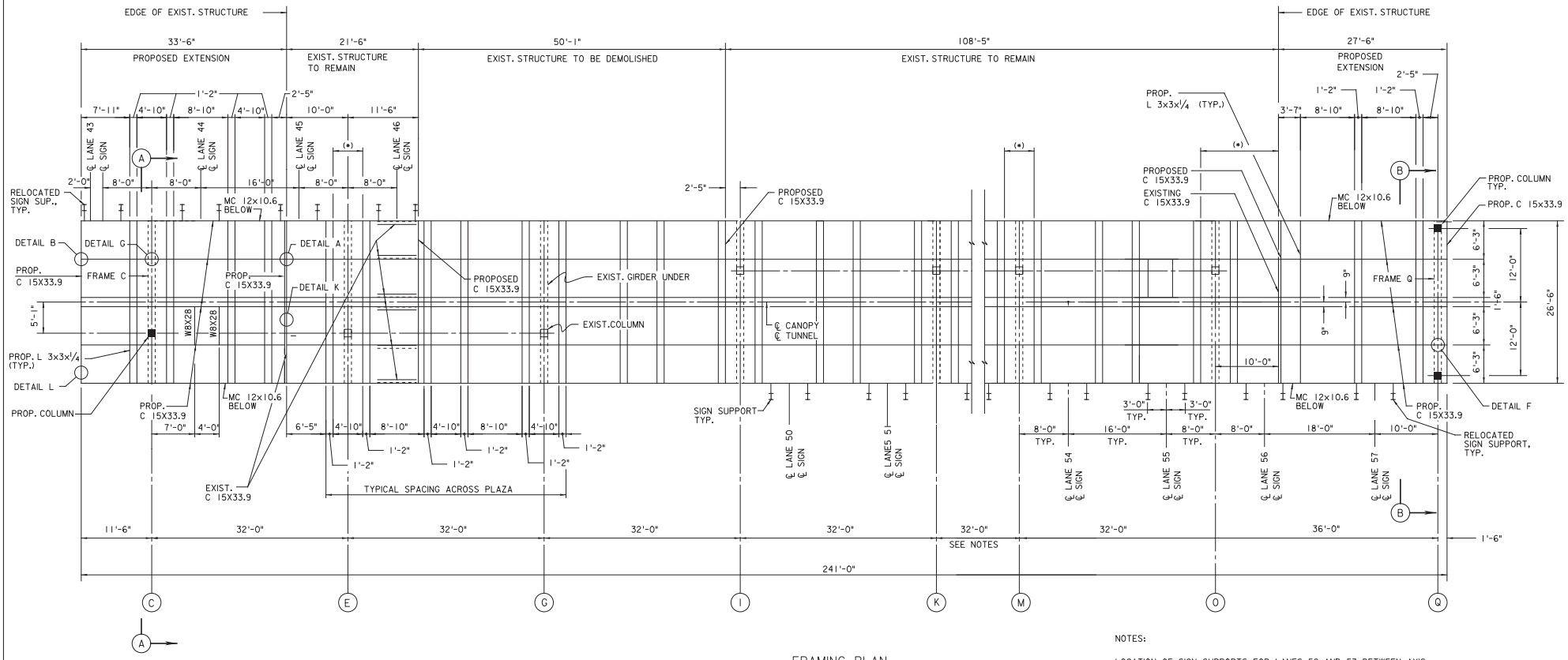
HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100

RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

TOLL PLAZA
ISLAND Q DETAILS

Scale:	Date:	Contract No.:	Sheet:
1/2" = 1'-0"	NOV. 30, 2011	DTEORT-2011	12(5A)



FRAMING PLAN

SCALE: 1/8" = 1'-0"

(*) ALL 6 EXISTING C 15X33.9 IN THIS AREA SHALL BE REINFORCED WITH W5X16, SEE DETAIL 1 ON SHEET 12(10). THIS SHALL BE COMPLETED PRIOR TO ANY CANOPY REMOVAL OR EXTENSION WORK.

NOTES:

LOCATION OF SIGN SUPPORTS FOR LANES 52 AND 53 BETWEEN AXIS K AND M ARE THE SAME AS BETWEEN AXIS M AND O.

FOR SECTIONS A-A AND B-B, SEE SHEETS 12(8) AND 12(9).

FOR CANOPY EXTENSION DETAILS AND SIGN SUPPORT DETAILS, SEE SHEETS 12(10) AND 12(11).

RELOCATED X-ARROW LED SIGN SUPPORTS ARE NOT SHOWN FOR CLARITY. SEE SHEET 12(11) FOR DETAILS.

B487012(07).dgn
Tuesday, March 15, 2011

REVISIONS

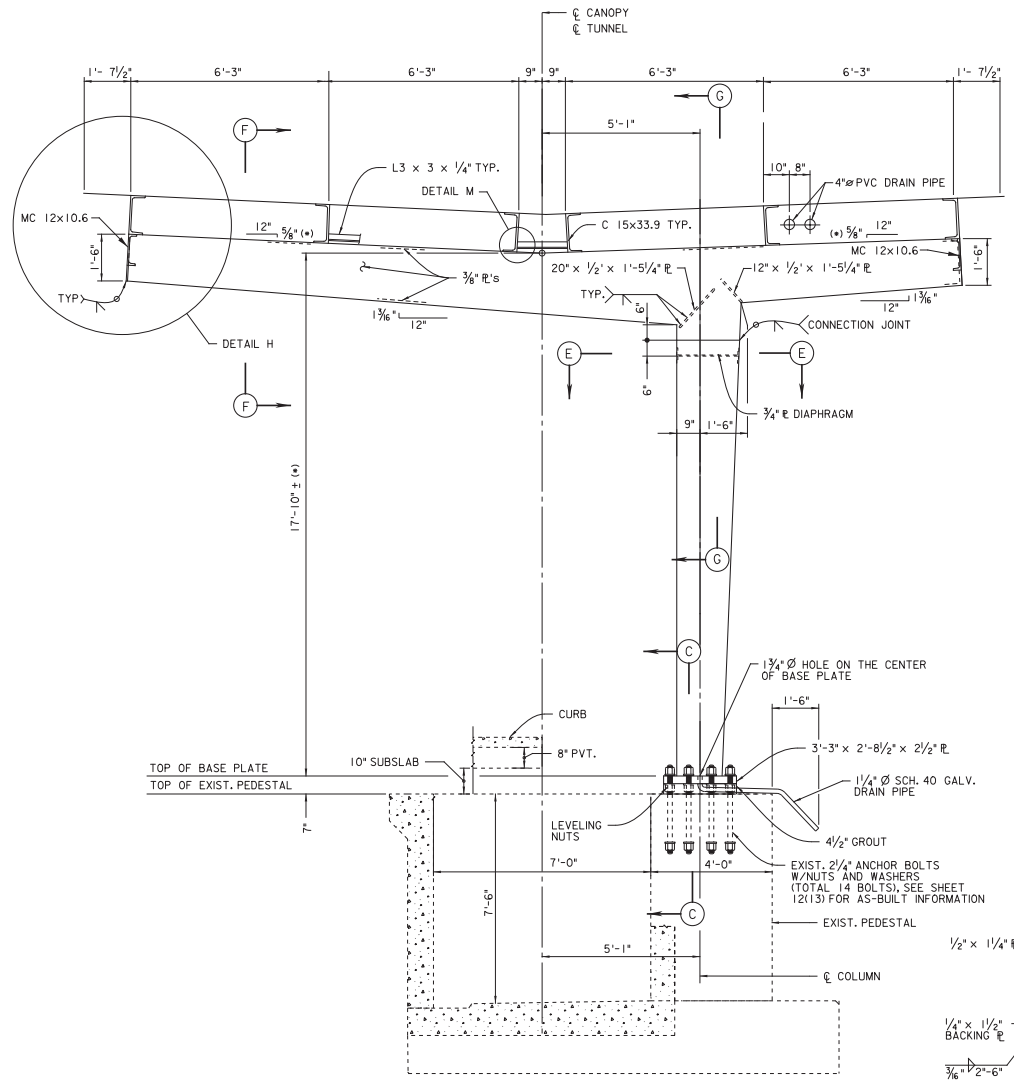
HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100

RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

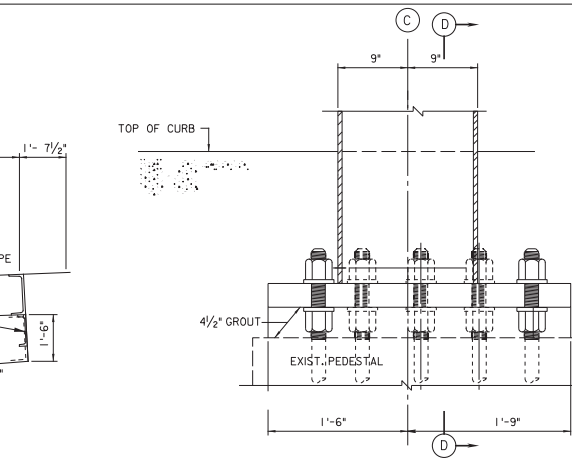
TOLL PLAZA CANOPY FRAMING PLAN

Scale:	Date:	Contract No.:	Sheet:
1/8"=1'-0"	FEB. 25, 2011	DTEORT-2011	12(7)

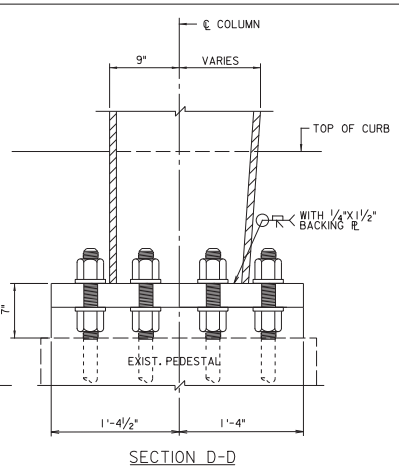


SECTION A-A
SCALE: ½" = 1'-0"

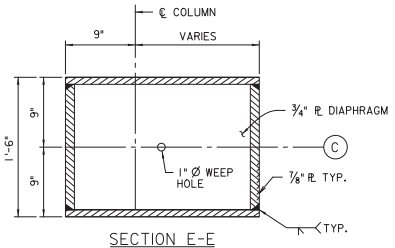
(*) 17'-10" IS BASED ON 17'-8" DIMENSION PER ORIGINAL DESIGN PLANS PLUS 2" ADJUSTMENT AT ℄ OF CANOPY FOR THE ROOF SLOPE. ELEVATIONS OF THE TOP OF THE PROPOSED FRAME "C" AT ALL C15X33.9 LOCATIONS SHALL BE 2" HIGHER THAN ELEVATIONS OF THE TOP OF EXIST. FRAME "E" AT THE SAME LOCATIONS. CONTRACTOR IS RESPONSIBLE FOR SURVEYING OF EXIST. FRAME "E" BEFORE FABRICATION OF PROPOSED FRAME "C". IF REQUIRED, FRAME HEIGHT AND SLOPES OF THE FRAME TOP SHALL BE ADJUSTED.



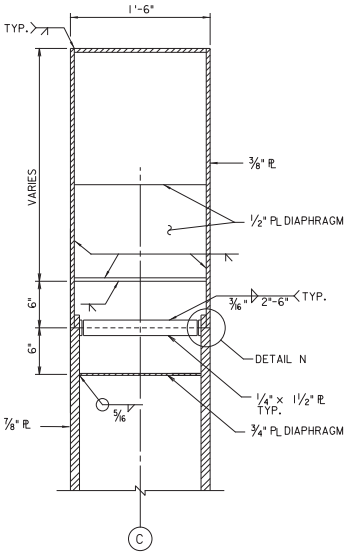
SECTION C-C
SCALE: 1½" = 1'-0"
FOR EXIST. ANCHOR BOLT LOCATION, SEE SHEET 12(13).



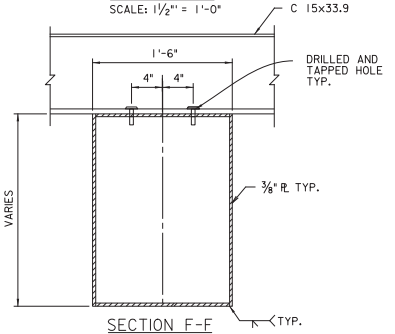
SECTION D-D
SCALE: 1½" = 1'-0"



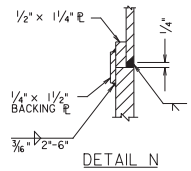
SECTION E-E
SCALE: 1½" = 1'-0"



SECTION G-G
SCALE: 1½" = 1'-0"



SECTION F-F
SCALE: 1½" = 1'-0"



DETAIL N
SCALE: 3" = 1'-0"

NOTES:
FOR LOCATION OF SECTION A-A, SEE SHEET 12(7).
FOR DETAILS M AND H, SEE SHEET 12(11).
LOCATION OF EXISTING ANCHOR BOLTS SHALL BE FIELD VERIFIED BY CONTRACTOR.
GROUT BELOW BASE PLATE AND 1¼" Ø DRAIN PIPE SHALL BE INCIDENTAL.

REVISIONS

B487012(08).dgn
Tuesday, March 15, 2011

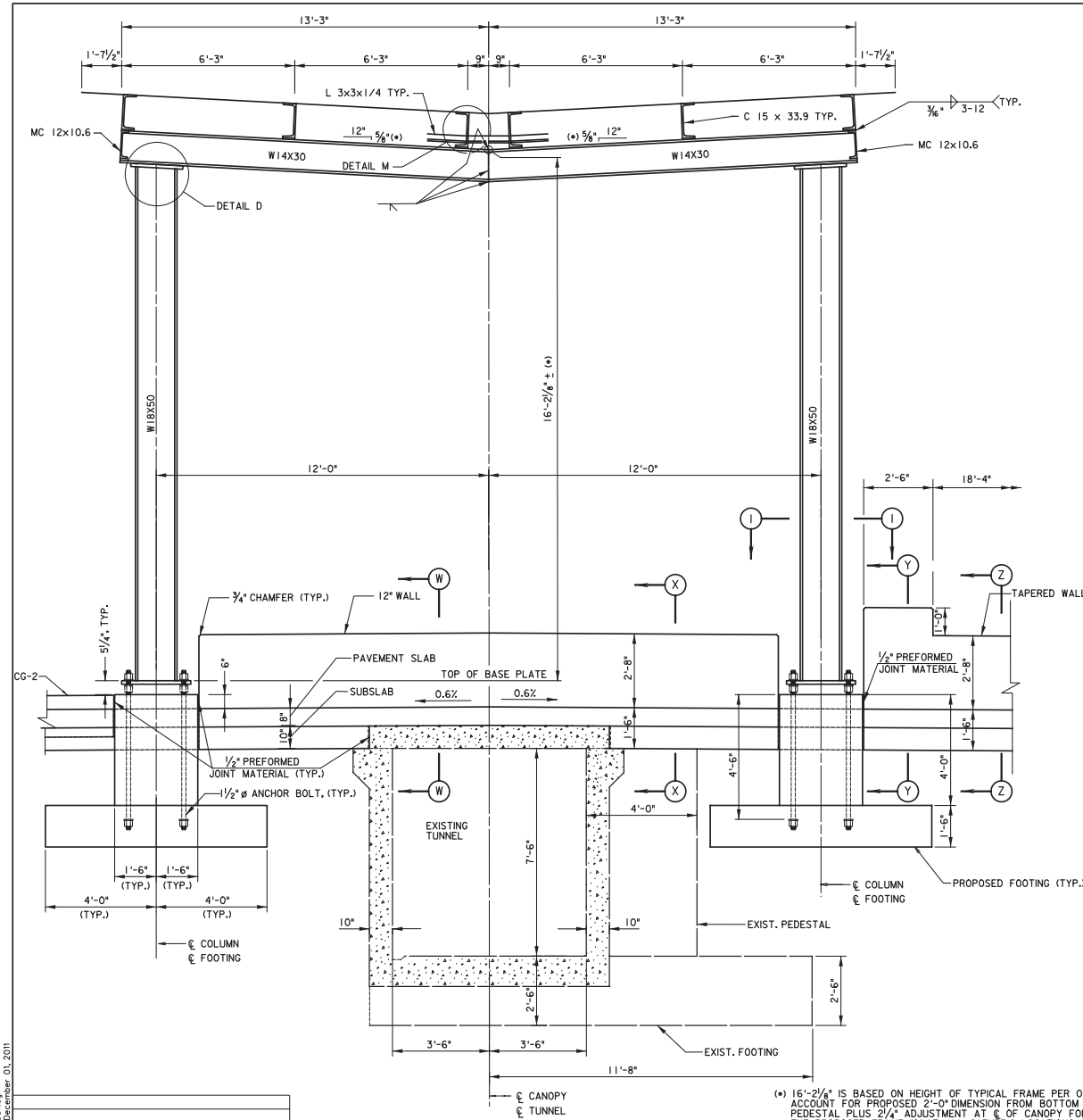
RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

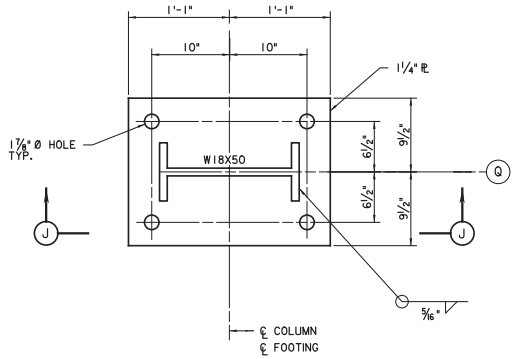
TOLL PLAZA
CANOPY FRAME C DETAILS

HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100

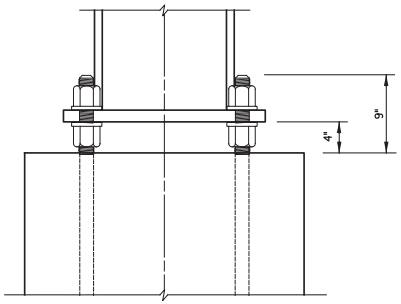
Scale:	Date:	Contract No.:	Sheet:
AS NOTED	FEB. 25, 2011	DTEORT-2011	12(8)



SECTION B-B
SCALE: ½" = 1'-0"



SECTION I-I
SCALE: 1½" = 1'-0"



SECTION J-J
SCALE: 1½" = 1'-0"

NOTES:
FOR LOCATION OF SECTION B-B, SEE SHEET 12(7).

FOR DETAIL D, SEE SHEET 12(10).

FOR DETAIL M, SEE SHEET 12(11).

FOR FOOTING, SEE SHEET 12(13).

FOR 8" PAVEMENT AND 10" SUBSLAB DETAILS, SEE SHEET 12(4).

FOR SECTIONS W-W, X-X, Y-Y AND Z-Z, SEE SHEET 12(5A).

(*) 16'-2 1/8" IS BASED ON HEIGHT OF TYPICAL FRAME PER ORIGINAL DESIGN PLANS MODIFIED TO ACCOUNT FOR PROPOSED 2'-0" DIMENSION FROM BOTTOM OF SUBSLAB TO TOP OF FOOTING PEDESTAL PLUS 2 1/4" ADJUSTMENT AT ℄ OF CANOPY FOR THE ROOF SLOPE. ELEVATION OF THE PROPOSED FRAME "Q" AT ALL C15X33.9 LOCATIONS SHALL BE 2 1/4" HIGHER THAN ELEVATIONS OF THE TOP OF EXIST. FRAME "Q" AT THE SAME LOCATIONS. CONTRACTOR IS RESPONSIBLE FOR SURVEYING THE EXIST. FRAME "Q" PRIOR TO FABRICATION OF PROPOSED FRAME "Q". IF REQUIRED, FRAME HEIGHT AND SLOPES OF THE FRAME TOP SHALL BE ADJUSTED.

REVISIONS
11-30-11 ADDED CONCRETE WALLS AND CG-2

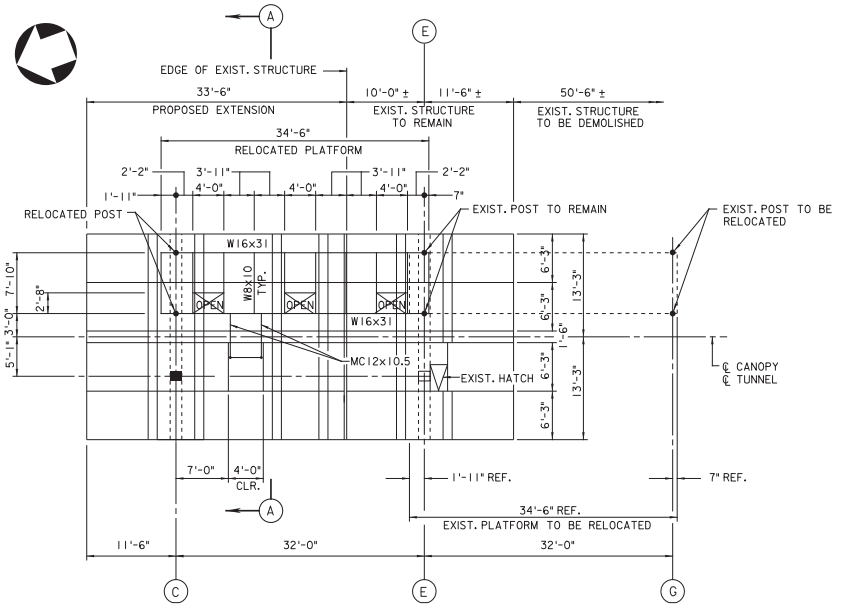
B487012(09).dgn
Thursday, December 01, 2011

HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100

RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

TOLL PLAZA
CANOPY FRAME Q DETAILS

Scale:	Date:	Contract No.:	Sheet:
AS NOTED	FEB. 25, 2011	DTEORT-2011	12(9)



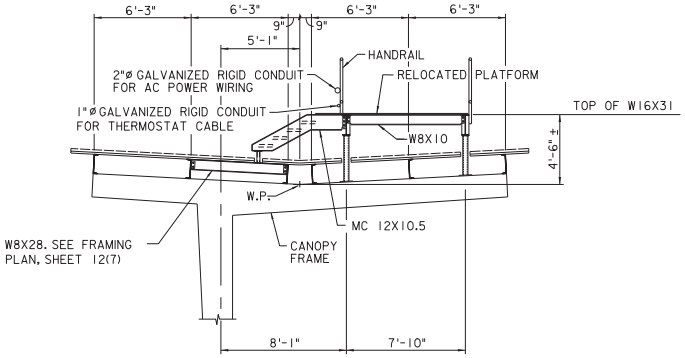
RELOCATED ROOF PLATFORM - NORTH
FRAMING PARTIAL PLAN
SCALE: 1/8" = 1'-0"

HVAC PLATFORM IS EXISTING BETWEEN COLUMN LINES "E" AND "G" AND SHALL BE RELOCATED TO COLUMN LINES "C" AND "E".

ALL DIMENSION AND MEMBER SIZES FOR RELOCATED PLATFORM ARE SHOWN AS REFERENCE ONLY. THIS INFORMATION IS TAKEN FROM PLAN SET "RICHMOND METROPOLITAN AUTHORITY (RMA), DOWNTOWN EXPRESSWAY & POWHITE PARKWAY TOOL BOOTH MECHANICAL SYSTEMS UPGRADES" SHEETS NOS. A-102 REV. 0, S-101 REV. 1 AND S-201 REV. 1 JAN 2003.

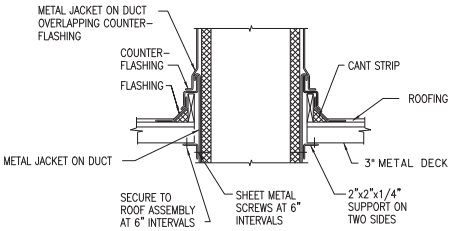
ALL DIMENSIONS AND ELEVATIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR.

CONTRACTOR SHALL FIELD VERIFY CONDITION OF EXISTING POSTS ON COLUMN LINE "G" PRIOR TO INSTALLATION ON COLUMN LINE "C." IF EXISTING POSTS CAN NOT BE REUSED, NEW POSTS SHALL BE FABRICATED. NEW POSTS SHALL MATCH THE EXISTING POSTS AND IF REQUIRED THE HEIGHT SHALL BE ADJUSTED AS NEEDED. THE TOP OF RELOCATED PLATFORM SHALL BE LEVEL.



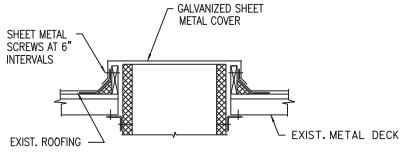
SECTION A-A
1/4"=1'-0"

FOR LOCATION OF ROOF PENETRATION FOR ELECTRICAL CONDUITS, SEE SHEET 12(14).

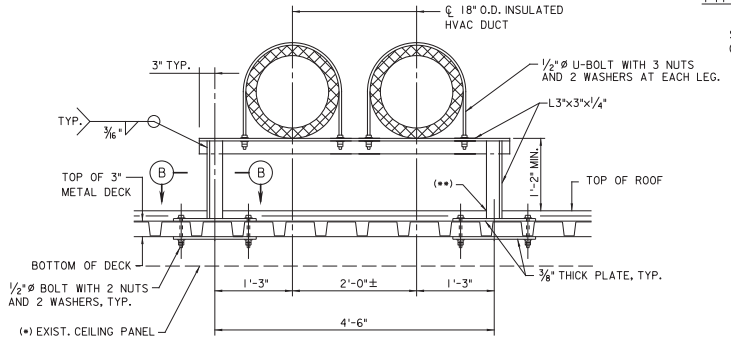


TYPICAL DUCT THRU ROOF DETAIL
SCALE: NONE

SEAL ALL EXPOSED JOINTS WITH SUITABLE MASTIC OR FOIL BACKED TAPE TO PREVENT LEAKING.



EXISTING SEALED DUCT ROOF PENETRATION DETAIL
SCALE: NONE

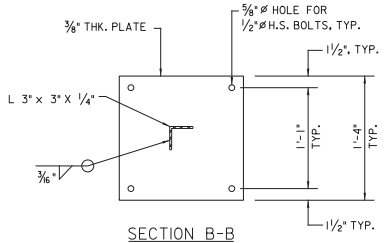


HVAC DUCT SUPPORT DETAIL
SCALE: 1" = 1'-0"

ALL DUCT SUPPORT STEEL, BOLTS, NUTS AND WASHERS SHALL BE HOT-DIP GALVANIZED.

(*) WHEN SUPPORT IS INSTALLED ON EXISTING ROOF, THE CEILING PANEL SHALL BE REMOVED AND REINSTALLED AFTER DUCT SUPPORT INSTALLATION.

(**) WHEN SUPPORT IS INSTALLED ON EXISTING ROOF, REMOVE EXISTING PLY FELTS AND INSULATION BOARD AROUND SUPPORT. ROOFING MATERIAL SHALL BE PUT BACK AFTER PLATE AND ANGLE INSTALLATION. IN ADDITION, CONTRACTOR SHALL INSTALL FLASHING AND CANT STRIP AROUND ANGLE TO PREVENT LEAKING.



SECTION B-B
SCALE: 1 1/2" = 1'-0"

NOTES:

FOR LOCATION OF ROOF PENETRATION DETAILS AND HVAC DUCT SUPPORTS, SEE SHEET 12(14).

B487\0112\12\.dgn
Tuesday, March 15, 2011

REVISIONS

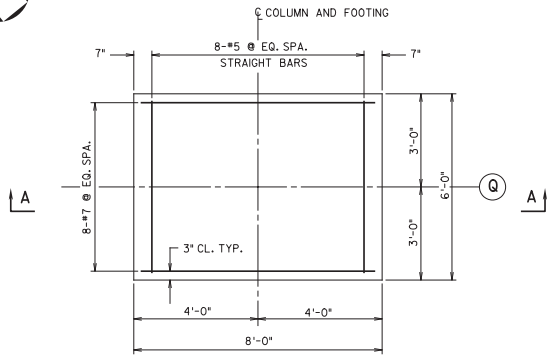
RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

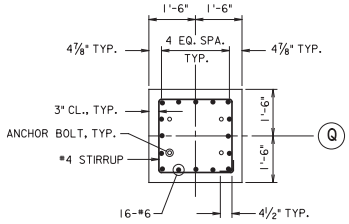
TOLL PLAZA CANOPY
CANOPY EXTENSION DETAILS 3

HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100

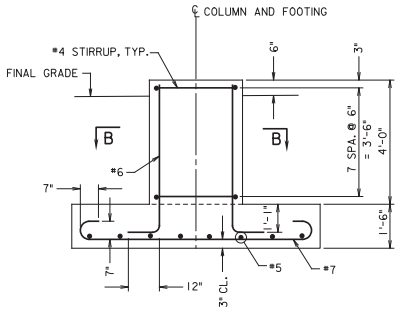
Scale:	Date:	Contract No.:	Sheet:
	FEB. 25, 2011	DTEORT-2011	12(12)



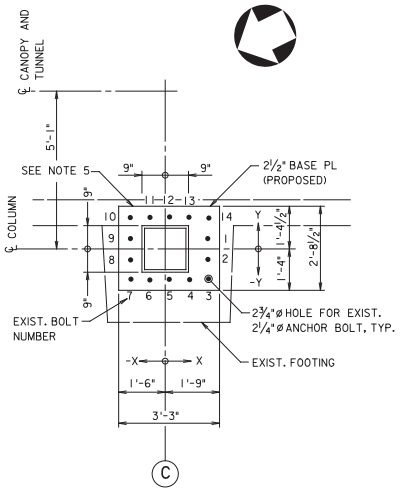
FRAME Q FOOTING PLAN
SCALE: ½" = 1'-0"



SECTION B-B
SCALE: ½" = 1'-0"



SECTION A-A
SCALE: ½" = 1'-0"



FRAME C COLUMN - BASE PLATE PLAN
SCALE: ½" = 1'-0"

EXISTING FRAME C BOLT LOCATION

BOLT NO.	COORDINATES		BOLT PROJECTION ABOVE TOP OF PEDESTAL
	X	Y	
1	1'-4 7/16"	4"	1 1 5/8"
2	1'-4 1/2"	-4 1/16"	1 1 3/4"
3	1'-4 3/4"	-1 1 3/16"	1 1 3/4"
4	9 7/16"	-1 1 7/8"	1 1 3/4"
5	1 9/16"	-1 1 3/4"	1 1 5/8"
6	-5 1/16"	-12"	1 1 5/8"
7	-1'-1 1/4"	-1 1 11/16"	1 1 3/4"
8	-1'-1 3/8"	-4 1/4"	1 1 1/2"
9	-1'-1 7/16"	4"	1 1 1/2"
10	-1'-1 1/2"	1'-0 1/8"	1 1 5/8"
11	-5 7/8"	1'-0 3/16"	1 1 1/2"
12	1 1/16"	1'-0 3/8"	1 1 5/8"
13	9 3/16"	1'-0 1/4"	1 1 3/4"
14	1'-4 7/8"	1 1 5/16"	1 1 5/8"

NOTES:
1. ALL INFORMATION SHOWN IN THIS TABLE IS EXTRACTED FROM PREVIOUS SURVEY FILE AND SHALL BE FIELD VERIFIED PRIOR TO FABRICATION OF BASE PLATE.
2. BOLT PROJECTION IS BASED ON THE TOP OF EXISTING PEDESTAL ELEVATION 200.14'.
3. ALL EXISTING BOLTS SHALL BE HAND-TOOL OR BLAST CLEANED TO REMOVE RUST AND THAN COATED BY ZINC-RICH PRIMER AND COATING SYSTEM FROM VDOT APPROVED PRODUCTS LIST AND IN ACCORDANCE WITH SECTION 411 OF THE SPECIFICATIONS. SUITABLE PRECAUTIONS SHALL BE TAKEN TO PROTECT BOLT THREAD AGAINST DAMAGE DURING REMOVAL OF RUST. TWO NEW NUTS AND TWO NEW WASHERS SHALL BE PROVIDED FOR EACH BOLT. THE NEW NUTS AND WASHERS SHALL BE HOT-DIP GALVANIZED PER ASTM A153.
4. TOP OF EXISTING CONCRETE PEDESTAL SHALL BE CLEANED AND ROUGHENED.
5. IN THE EVENT THERE IS A CONFLICT BETWEEN THE EAST EDGE OF THE PROPOSED BASE PLATE AND THE WEST EDGE OF THE TUNNEL ROOF SLAB, THE ROOF SLAB CONCRETE SHALL BE REMOVED TO THE LIMITS OF THE BASE PLATE.

NOTES:

FOR FRAME Q ANCHOR BOLT LOCATION AND DETAILS, SEE SHEET 12(9).

FOR FRAME C EXISTING ANCHOR BOLT DETAILS, SEE SHEET 12(8).

B487012(13).dgn
Tuesday, March 15, 2011

REVISIONS

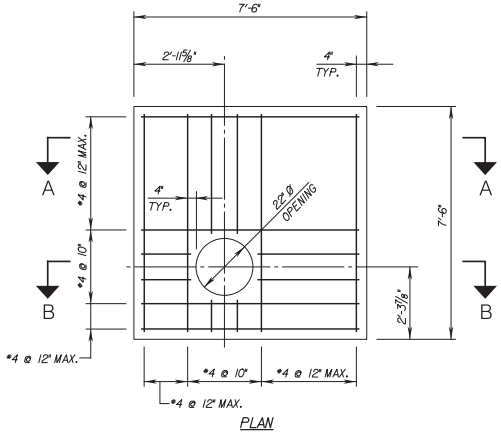
RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY

DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING

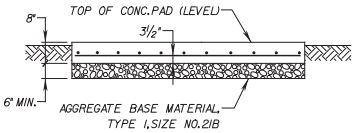
TOLL PLAZA
CANOPY FOOTING DETAILS

HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100

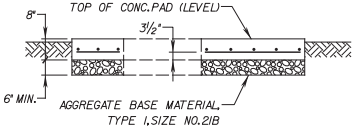
Scale:	Date:	Contract No.:	Sheet:
AS NOTED	FEB. 25, 2011	DTEORT-2011	12(13)



PLAN



SECTION A-A

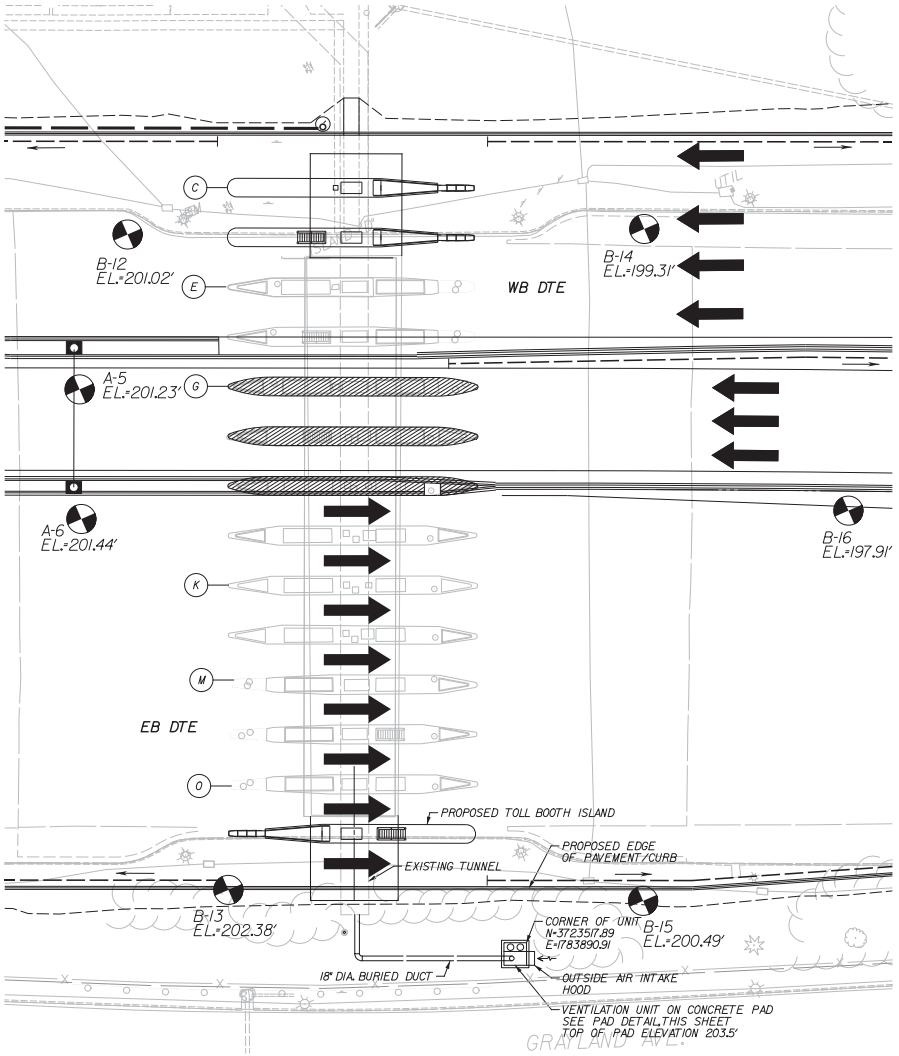


SECTION B-B

NOTES

1. CONCRETE SHALL BE CLASS A3. DEFORMED REINFORCING BARS SHALL CONFORM TO ASTM A615 GRADE 60.
2. PAD DIMENSIONS AND LAYOUT SHOWN SHALL BE USED FOR THE CONTRACT SPECIFIED TRANE OAI UNIT. IF A DIFFERENT UNIT IS APPROVED, CONTRACTOR IS REQUIRED TO SUBMIT PAD LAYOUT TO THE ENGINEER FOR REVIEW AND APPROVAL.
3. CONTRACTOR SHALL INSTALL THE BURIED DUCT ABOVE THE TOP OF PAD ELEVATION PRIOR TO POURING PAD CONCRETE.
4. CONTRACTOR SHALL VERIFY DIMENSIONS OF ACTUAL CURB AND UNIT SUPPLIED AND SUBMIT ANY DISCREPENCIES BETWEEN THE PAD LAYOUT AND UNIT TO THE ENGINEER.

PAD LAYOUT
NTS



PLAN

20' 0 20' 40'
SCALE: 1" = 20'

GENERAL MECHANICAL NOTES:

1. ALL WORK SHALL CONFORM TO THE REQUIREMENTS OF VIRGINIA MECHANICAL CODE
2. VISIT SITE AND NOTE EXISTING CONDITION AFFECTING THE WORK PRIOR TO BIDDING. RELOCATION OF EXISTING SYSTEMS FOR THE INSTALLATION OF NEW WORK SHALL BE INCLUDED IN THE SCOPE OF THIS PROJECT.
3. COORDINATE ALL MECHANICAL WORK WITH THAT OF OTHER TRADES TO ENSURE PROPER AND ADEQUATE INTERFACE OF THEIR WORK WITH THE WORK OF THIS CONTRACTOR.
4. DEMOLITION: REMOVE ALL WORK AS INDICATED. REMOVE OR REROUTE EXISTING WORK TO SUIT NEW WORK. DO ALL CORE DRILLING, CUTTING AND PATCHING FOR INSTALLATION OF NEW WORK. EXISTING EQUIPMENT AND DEVICE SHALL BE REMOVED FROM SITE AT THE DIRECTION OF THE ENGINEER.
5. DAMAGES: CORRECT ALL DAMAGE TO EXISTING FINISHES, TUNNEL WALLS, FLOOR AND CEILING, OR SYSTEMS ASSOCIATED WITH THE INSTALLATION OF NEW WORK.
6. DRAWINGS ARE SCHEMATIC REPRESENTATION OF THE WORK TO BE PERFORMED AND ARE NOT INTENDED TO SHOW ALL DETAIL OF THE WORK. VERIFY LOCATIONS AND MEASUREMENTS OF ALL ITEMS AT PROJECT SITE PRIOR TO FABRICATION AND INSTALLATION.
7. PROVIDE NEC MINIMUM CODE CLEARANCE IN FRONT OF ANY ELECTRICAL EQUIPMENT (FRONT, BELOW, ABOVE, ETC.). ARRANGE EQUIPMENT SO THAT EQUIPMENT ACCESS CLEARANCE INDICATED ON DRAWINGS OR AS RECOMMENDED BY MANUFACTURER ARE PROVIDED.
8. PROVIDE ALL OFFSETS, FITTINGS AND TRANSITIONS REQUIRED TO CONNECT TO MECHANICAL EQUIPMENT.
9. ITEMS NOTED "TYPICAL" ON ANY DRAWING SHEET APPLY TO THE ENTIRE DRAWING SET.
10. REFER TO ELECTRICAL DRAWINGS FOR POWER CONNECTIONS TO MECHANICAL EQUIPMENT.

ABBREVATIONS

FRP FIBER REINFORCED PLASTIC
OSA OUTSIDE AIR

REVISIONS

M4870114(1).dgn
Tuesday, March 15, 2011

HNTB
2900 S. QUINCY STREET, SUITE 200
ARLINGTON, VIRGINIA
(703) 824-5100

RICHMOND METROPOLITAN AUTHORITY
RICHMOND DOWNTOWN EXPRESSWAY
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING
MECHANICAL PLAN

Scale:	Date:	Contract No.:	Sheet:
1" = 20'-0"	FEB. 25, 2011	DTEORT-2011	14(1)

DOWNTOWN EXPRESSWAY (DTE) OPEN ROAD TOLLING

TOLL GANTRY SHOP DRAWINGS
AND STRUCTURAL CALCULATIONS

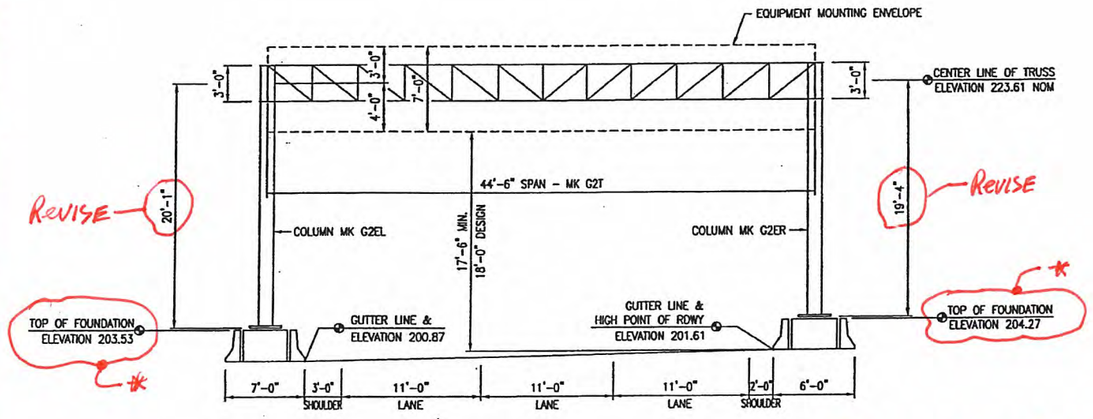
SHOP DRAWING REVIEW

Review is for general compliance with contract documents. It is responsibility for correctness of dimensions, details, [illegible], and safety during fabrication and erection shall remain with the contractor.

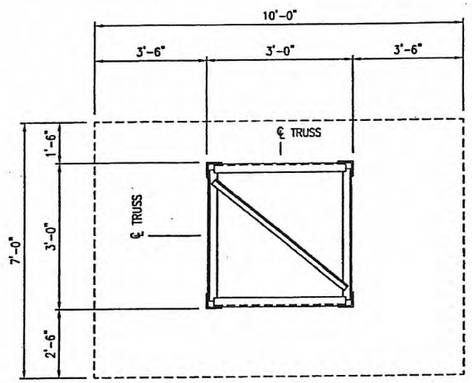
HNTB Corporation

☐ No Exceptions Taken
☒ Make Corrections Noted
☐ Amend and Resubmit
☐ Rejected - See Remarks

By AN Date 12/13/11

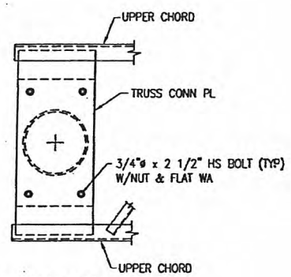


ELEVATION
(LOOKING EAST)

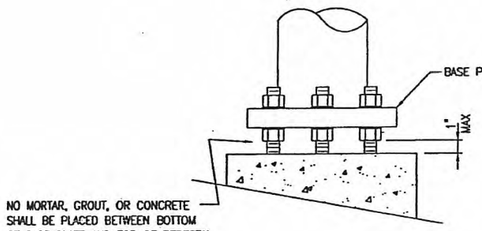


TYPICAL SECTION
EQUIPMENT MOUNTING ENVELOPE

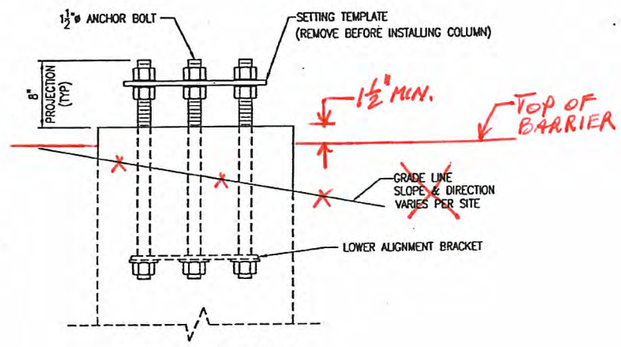
* TOP OF FOUNDATION SHALL BE 1½" MIN. ABOVE THE TOP OF BARRIER



UPPER CONNECTION DETAIL
(LEFT COLUMN SHOWN. RIGHT COLUMN SIMILAR)



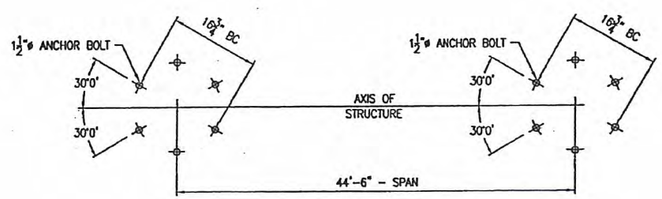
BASE PLATE ERECTION



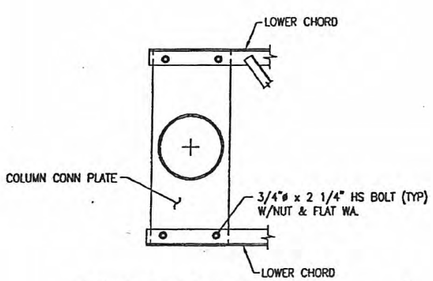
FOUNDATION ELEVATION

ANCHOR NOTE:
USE STEEL SETTING & LOWER ALIGNMENT BRACKET TO ASSURE PROPER ANCHOR BOLT LAYOUT & ALIGNMENT.

REUSE SETTING TEMPLATE AT SIMILAR LOCATIONS.



ANCHOR BOLT LAYOUT
GANTRY



LOWER CONNECTION DETAIL
(LEFT COLUMN SHOWN. RIGHT COLUMN SIMILAR)

GENERAL NOTES:

STRUCTURE DESIGN PER AASHTO STANDARD SPECS. FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRS AND TRAFFIC SIGNALS, 2009 5th EDITION.

DESIGN WIND SPEED 90 MPH.

ALL WELDING PER AWS D1.1 (LATEST EDITION).

STRUCTURE DESIGN, ANCHOR BOLT & FOUNDATION DESIGN BY HURTT FABRICATING CORP.

EQUIPMENT MOUNTING BRACKETS & HARDWARE BY OTHERS.

FOUNDATION & ROADWAY ELEVATIONS PROVIDED BY VENTURE ELECTRIC CO. ON 8-27-11.

THE ELEVATIONS SHOWN ARE FOR REFRENCE AND RELATIONSHIP ONLY AND MAY NOT BE THE ACTUAL SITE ELEVATIONS.

17'-6" MINIMUM (18'-0" DESIGN) CLEARANCE FROM THE HIGH POINT OF THE ROADWAY TO THE BOTTOM OF THE EQUIPMENT MOUNTING ENVELOPE.

THE TRUSS TO COLUMN HIGH STRENGTH BOLT CONNECTIONS SHALL BE INSTALLED USING THE "TURN-OF-NUT" METHOD PER SECTION 407.06(b)3 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS 2002.

REV:

PRINTS ISSUED

FOR	#	DATE	FOR	#	DATE	FOR	#	DATE
PE	E	10-18-11	APP	E	12-13-11			
PE	E	12-13-11						
H-DIST	6	12-13-11						
INSP	1	12-13-11						

COMMONWEALTH OF VIRGINIA
David L. Cowell
Lic. No. 030335
PROFESSIONAL ENGINEER
12-13-11

HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

CUSTOMER: VENTURE ELECTRIC CO.

PROJECT: CONTRACT NO. DTEORT-2011
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING PROJECT
RICHMOND METROPOLITAN AUTHORITY

SUBJECT: ERECTION DIAGRAM FOR TOLL GANTRY

FILE: 5953 OH E1B		DATE: 10-13-11		PKG: A
PRINTED FOR: RICHMOND METRO AUTHORITY	DR BY: TAP	CH BY: CLH	JOB NO: HP-5953	SHEET E1

G

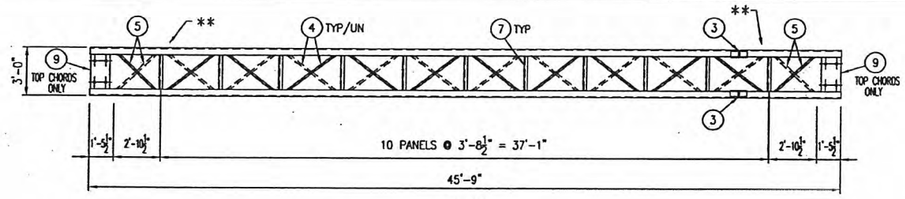
SHOP DRAWING REVIEW

Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities, and safety during fabrication and erection shall remain with the contractor.

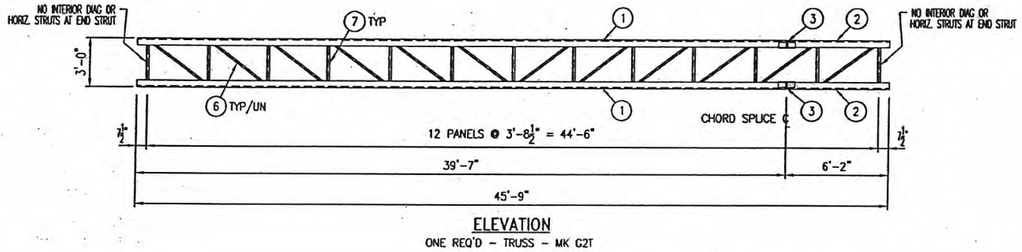
HNTB Corporation

☒ No Exceptions Taken
☐ ☐ Make Corrections Noted
☐ ☐ Amend and Resubmit
☐ ☐ Rejected - See Remarks

By: AW Date 12/15/11

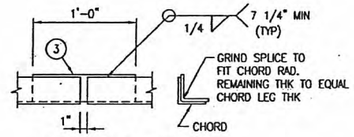


PLAN

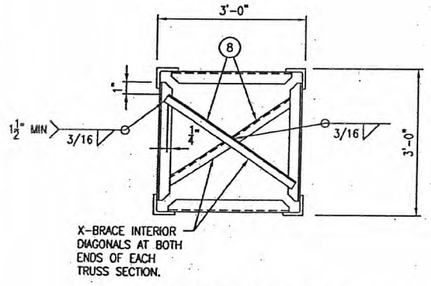


ELEVATION
ONE REQ'D - TRUSS - MK G2T

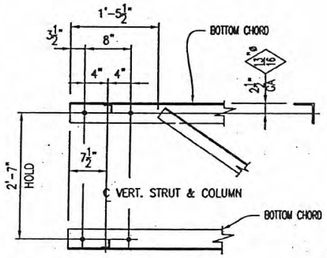
BILL OF MATERIAL				
QTY	MK	DESCRIPTION	LENGTH	REMARKS
4	1	L 4 x 4 x 3/8	39'-6 1/2"	
4	2	L 4 x 4 x 3/8	6'-1 1/2"	
4	3	L 4 x 4 x 3/8	1'-0"	
20	4	L 2 1/2 x 2 1/2 x 1/4	4'-0 1/2"	
4	5	L 2 1/2 x 2 1/2 x 1/4	3'-7 1/8"	
24	6	L 2 x 2 x 3/16	4'-0 1/2"	
48	7	L 2 x 2 x 3/16	2'-7"	
13	8	L 2 x 2 x 3/16	3'-7"	
2	9	PL 1/2 X 14	2'-8"	
8	END COLUMN	3/4"ø HSB	2 1/4"	W/NUT & FLAT WASHER
8		3/4"ø HSB	2 1/2"	W/NUT & FLAT WASHER



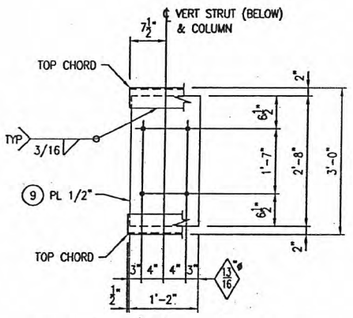
CHORD SPLICE DETAILS



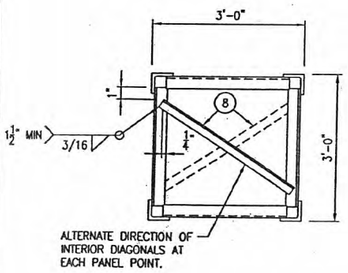
TYPICAL TRUSS SECTION END



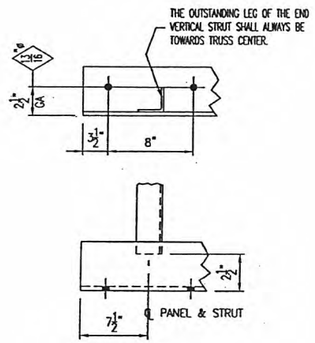
BOTTOM CHORD LAYOUT
LEFT SHOWN
RIGHT SIMILAR



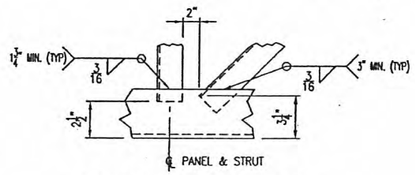
TOP CHORD MOUNTING PLATE
LEFT SHOWN
RIGHT SIMILAR



TYPICAL TRUSS SECTION



END CONNECTION



TYPICAL STRUT & DIAGONAL CONNECTION

CAMBER NOTES:
PROVIDE 1" OF CAMBER AT CENTERLINE OF TRUSS

MATERIAL SPECIFICATIONS:
STEEL CHORDS - ASTM A572 GR 50, A529 GR 50 or A709 GR 50 (50 KSI MIN YIELD)
OTHER STEEL SHAPES, PLATES AND BARS - ASTM A709 GR 36 or A36
GALVANIZE AFTER FAB PER ASTM A123

HS BOLTS - ASTM A325 TYPE 1
NUTS - ASTM A563 DH
WASHERS - ASTM F436
GALVANIZE HARDWARE PER ASTM A153

REV:								
PRINTS ISSUED								
FOR	#	DATE	FOR	#	DATE	FOR	#	DATE
PE	E	10-18-11						
HPDC	F	10-12-11						
TAP	G	12-13-11						
AWP	E	12-13-11						

COMMONWEALTH OF VIRGINIA
10-18-11
DAVID L. COWELL
Lic. No. 030335
PROFESSIONAL ENGINEER

G

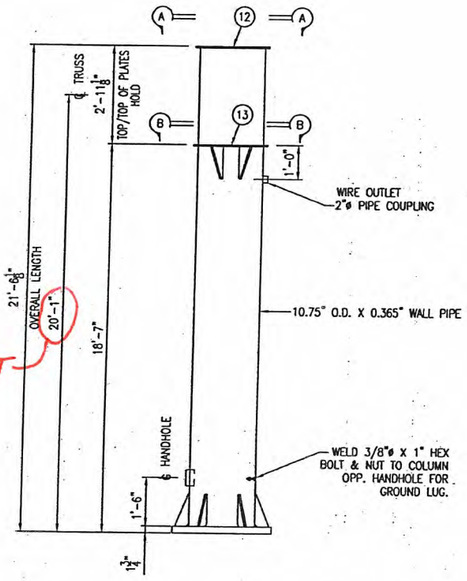
HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

CUSTOMER: VENTURE ELECTRIC CO.

PROJECT: CONTRACT NO. DTEORT-2011
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING PROJECT
RICHMOND METROPOLITAN AUTHORITY

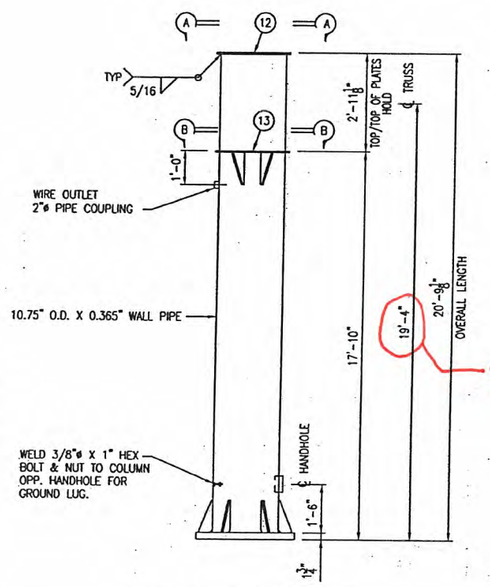
SUBJECT: FABRICATION DETAILS FOR TOLL GANTRY TRUSS

FILE: 5953 OH GANTRY TRUSS		DATE: 10-13-11		PKG: A
PRINTED FOR: RICHMOND METRO AUTHORITY	DR BY: TAP	CH BY: CLH	JOB NO: HF-5953	SHEET 1 OF 2



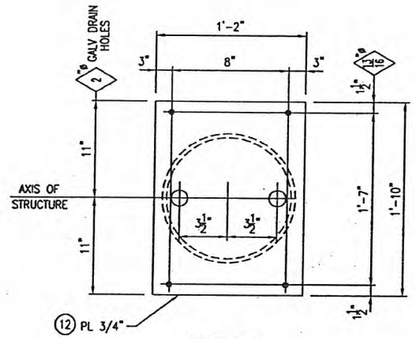
SEE SHEET E1

LEFT END COLUMN DETAIL
ONE REQ'D – MK G2EL

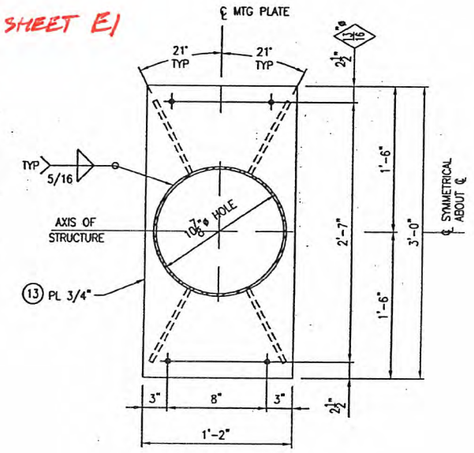


SEE SHEET E1

RIGHT END COLUMN DETAIL
ONE REQ'D – MK G2ER

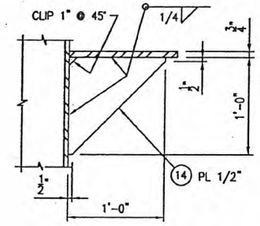


VIEW A–A
UPPER MOUNTING PLATE



SECTION B–B
LOWER MOUNTING PLATE

BILL OF MATERIAL				
QTY	MK	DESCRIPTION	LENGTH	REMARKS
1	G2EL	10.75" O.D. x 0.365" WALL PIPE	21'-4 7/8"	
1	G2ER	10.75" O.D. x 0.365" WALL PIPE	20'-7 7/8"	
2	10	PL 1 3/4 x 22 3/4"ø		
12	11	PL 3/4 x 5	1'-0"	
2	12	PL 3/4 x 14	1'-10"	
2	13	PL 3/4 x 14	3'-0"	
8	14	PL 1/2 x 12	1'-0"	
2	HF	PL 2 x 5 1/2	0'-8"	
2	HC	PL 1/8 x 5 1/2	0'-8"	
2	HG	GASKET 1/16 x 5 1/2	0'-8"	NEOPRENE
8	HAND HOLE	3/8"ø RD HD MS	3/4"	(A307)
2	GROUND LUG	3/8"ø HEX BOLT	1"	W/NUT (A307)
2		2"ø PIPE COUPLING & PLUG		



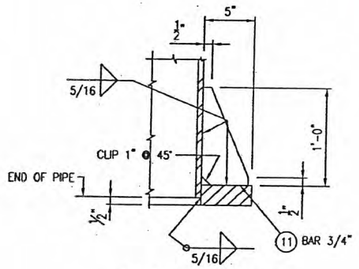
TRUSS CONNECTION GUSSET
REQUIRED @ BOTTOM CONNECTION ONLY

SHOP DRAWING REVIEW

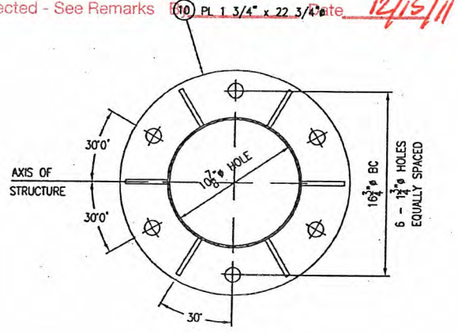
Review is for general compliance with contract documents. Sole responsibilty for correctness of dimensions, details, quantities, and safety during fabrication and erection shall remain with the contractor.

☐ No Exceptions Taken
☒ Make Corrections Noted
☐ Amend and Resubmit
☐ Rejected - See Remarks

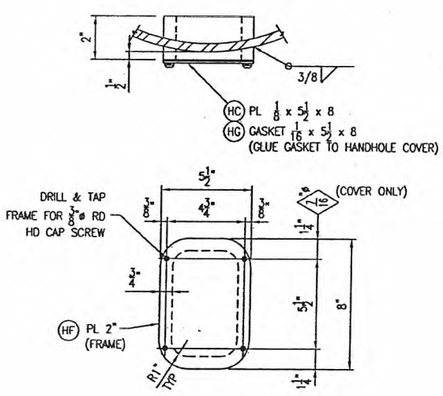
HNTB Corporation
AN
Date 12/15/11



BASE PLATE WELD & GUSSET DETAIL



BASE PLATE DETAIL



HANDHOLE DETAIL

MATERIAL SPECIFICATIONS:

COLUMN PIPE – A500 GR B or API 5L X42, X52, or X60 (42 KSI MIN. YIELD)
STEEL BARS & PLATES – ASTM A709 GR 36 or A36
GALV. STEEL AFTER FAB PER ASTM A123

STD BOLTS, NUTS, & WASHERS – ASTM A307
GALV. HARDWARE PER ASTM A153

REV:								
PRINTS ISSUED								
FOR	#	DATE	FOR	#	DATE	FOR	#	DATE
PE	E	10-18-11						
HDS	10	12-13-11						
INSP	1	12-13-11						
APP	E	12-13-11						

COMMONWEALTH OF VIRGINIA
10-18-11
DAVID L. COWELL
Lic. No. 030335
PROFESSIONAL ENGINEER

G

HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

CUSTOMER: VENTURE ELECTRIC CO.

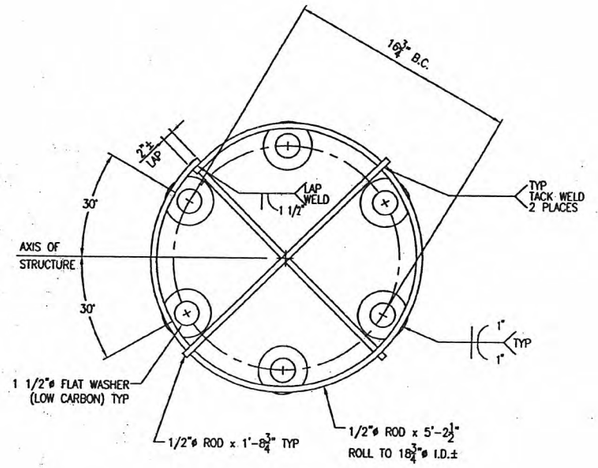
PROJECT: CONTRACT NO. DTEORT-2011
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING PROJECT
RICHMOND METROPOLITAN AUTHORITY

SUBJECT: FABRICATION DETAILS FOR TOLL GANTRY END COLUMNS

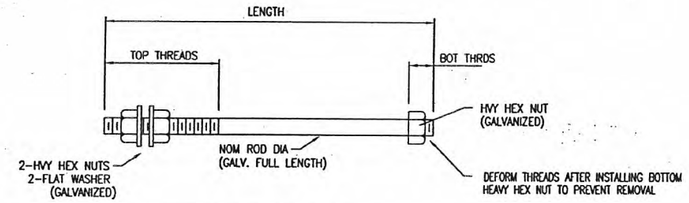
FILE: 5953 GANTRY END COLUMN	DATE: 10-13-11	PKG: A		
PRINTED FOR: RICHMOND METRO AUTHORITY	DR BY: TAP	CH BY: CLH	JOB NO: HF-5953	SHEET 2 OF 2

BILL OF MATERIAL

QTY	MK	DESCRIPTION	LENGTH	REMARKS
2	HOOP	1/2"ø ROD	5'-2 1/2"	BLACK
4		1/2"ø ROD	1'-8 3/4"	BLACK
12		1 1/2" FLAT WASHER		LOW CARBON
2	TEMP	PL 3/8 x 22 3/4"ø		BLACK
12	AB11H	1 1/2" NOM ROD DIA	3'-4"	
36		1 1/2" HEAVY HEX NUT		GALV
24		1 1/2" FLAT WASHER		GALV



ALIGNMENT BRACKET
2 - REQ'D



ANCHOR BOLT DETAIL

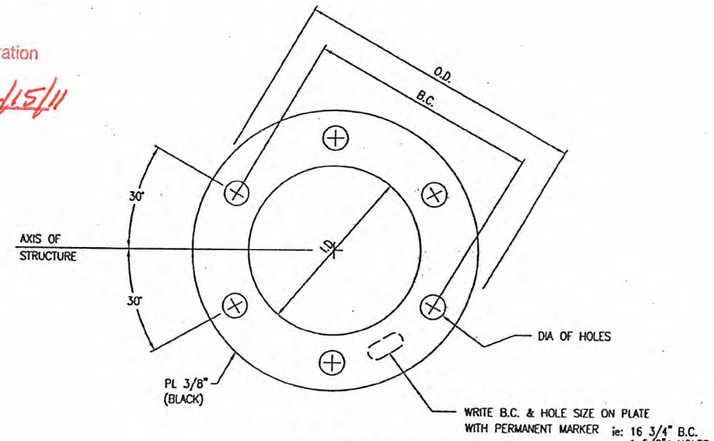
QTY	MK	ROD SIZE NOM DIA	LENGTH	TOP THRDS	BOT THRDS
12	AB11H	1 1/2"	3'-4"	8"	2"

SHOP DRAWING REVIEW

Review is for general compliance with contract documents. Sole responsibilty for correctness of dimensions, details, quantities, and safety during fabrication and erection shall remain with the contractor.

☒ No Exceptions Taken
☐ Make Corrections Noted
☐ Amend and Resubmit
☐ Rejected - See Remarks By AN Date 12/15/11

HNTB Corporation



SETTING TEMPLATE

QTY	O.D.	B.C.	I.D.	DIA OF HOLES
2	22 3/4"	16 3/4"	10 3/4"	1 5/8"ø

MATERIAL SPECIFICATIONS:

STEEL PLATES, BARS & RODS - ASTM A709 GR 36 or A36
BRACKET WASHERS - LOW CARBON STANDARD PATTERN
SHIP ALIGNMENT BRACKETS & SETTING TEMPLATE BLACK

ANCHOR BOLT ROD - ASTM F1554 GR 55 (55 KSI MIN YIELD)
NUTS - ASTM A194 GR 2H OR A563 DH
WASHERS - ASTM F436
GALV ENTIRE ROD, NUTS, AND WASHERS PER ASTM A153 CL C

REV:								
PRINTS ISSUED								
FOR	#	DATE	FOR	#	DATE	FOR	#	DATE
PE	E	10-18-11						
Addl	1	10-20-11						
ADD	E	12-13-11						

COMMONWEALTH OF VIRGINIA
10-18-11
DAVID L. COWELL
Lic. No. 030335
PROFESSIONAL ENGINEER

G

HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

CUSTOMER: VENTURE ELECTRIC CO.

PROJECT: CONTRACT NO. DTEORT-2011
DOWNTOWN EXPRESSWAY OPEN ROAD TOLLING PROJECT
RICHMOND METROPOLITAN AUTHORITY

SUBJECT: ANCHOR BOLT FABRICATION DETAILS FOR TOLL GANTRY STRUCTURE

FILE: 5953 ANCHOR BOLT		DATE: 10-13-11	PKG: A	
PRINTED FOR: RICHMOND METRO AUTHORITY	DR BY: TAP	CH BY: CLH	JOB NO: HF-5953	SHEET AB1

COWELL
ENGINEERING
STRUCTURAL ENGINEERS

October 18, 2011

Craig Hengstenberg
Hurtt Fabricating
P.O. Box 128
Marceline, MO 64658

RE: Independent Review
Sign Structures and Foundations
Project: HF - 5953 Toll Gantry Structure
Richmond, VA

Dear Craig:

This office has reviewed the drawings provided for the above referenced project to determine compliance with the AASHTO standards entitled: Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals (2003) and AASHTO Standard Specifications for Highway Bridges (2002), and the VDOT Road and Bridge Standards.

The review consisted of verifying the input values from the supplied drawings, comparing the drawing against the referenced standard/specification and performing computations to verify some of the computer generated numbers when needed.

Cowell Engineering, LLC has the required independent status necessary for review. Neither the company nor any of its employees have any affiliations (past or present) with any manufacturer, supplier, or contractor associated with traffic structures.

Based upon this review and to the best of my knowledge and belief, the submitted drawings are in compliance with the pertinent passages of the above referenced AASHTO specifications.

Yours very truly,
COWELL ENGINEERING

David L. Cowell, P.E.
W.O. # 11040

COMMONWEALTH OF VIRGINIA
David L. Cowell
Lic. No. 030335
PROFESSIONAL ENGINEER
10-18-11

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314.644.4002 OFFICE
314.644.1988 FAX
www.cowelleng.com

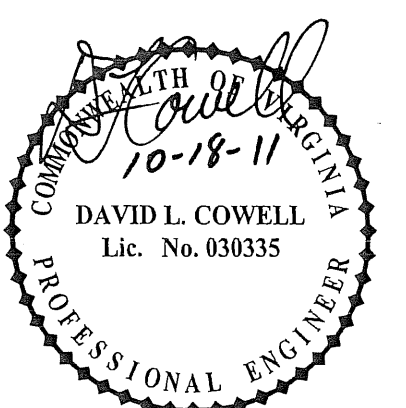
HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

Truss # = GN
Hurtt Job # = HF 5953
Item # =
State Job # =
State Project = DTEORT-2011
DOWNTOWN EXPY

File Name: 5953GNTY.DAT

County = RICHMOND, VA
VMS (Y/N) = N



HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

TRUSS DIMENSIONS (FT)			PANEL LENGTH (FT)	
LENGTH	DEPTH	WIDTH	CENTER	END
44.50	3.00	3.00	3.71	1.85

WIND VELOCITY	NUMBER OF	WALK DESIGN			NUMBER OF PANELS	
MPH	SIGNS	DIST L	LENGTH	WGT/FT	CENTER	END
90.00	2	0.00	0.00	0.00	10	4

COMMONWEALTH OF VIRGINIA
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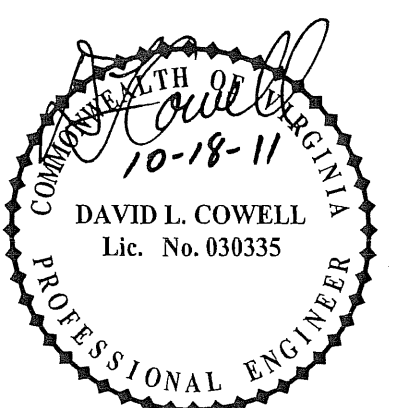
OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

SIGN DATA

SIGN NO.	SIGN LENGTH	nids	SIGN HEIGHT	CD	Kz	DISTANCE FROM LS	DISTANCE CENTER	ECCN	WGT
1	33.00	6	1.50	1.30	1.00	5.75	22.25	-2.25	1816.00
2	44.00	8	0.25	1.30	1.00	-38.50	22.25	1.50	6044.00



HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * * TRUSS DESIGN * * * * * * * * * * *

TRUSS DEPTH = 3.00 FEET
TRUSS WIDTH = 3.00 FEET
DEFLECTION = 0.372 IN.
CAMBER REQUIRED = 0.906 IN.

	L-WIND FORCE (LBS.)	L-DEAD WEIGHT (LBS.)	R-WIND FORCE (LBS.)	R-DEAD LOAD (LBS.)
CASE 1	0.0	5440.4	0.00	5440.4
CASE 2	1979.2	5440.4	1979.20	5440.4
CASE 3	989.6	6364.0	989.60	6364.0

COMMONWEALTH OF VIRGINIA
10-18-11
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HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

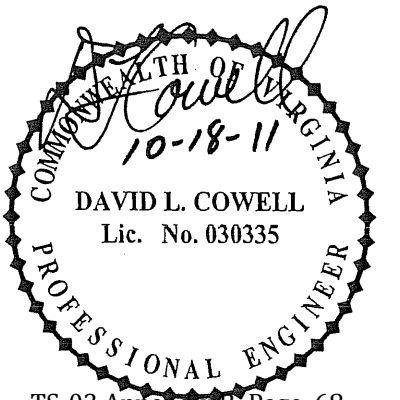
Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * * TRUSS CHORDS * * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	NUMBER OF 0.625" BOLTS(A325)	NUMBER OF 0.75" BOLTS(A325)	NUMBER OF 0.875" BOLTS(A325)
45.00	4	4.00	3.00	2.00

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
4x4x.375	50.00	2.86	2.10	0.79	1764.00

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	18620.4	6510.6	23269.4	6.69
CASE 2	26535.4	9278.1	30948.3	7.17
CASE 3	25127.1	8785.7	30948.3	6.79



HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * * WIND DIAGONAL * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.62	20	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2.5x2.5x.25	36.00	1.19	0.71	0.49	378.55

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	11268.4	0.00
CASE 2	1661.3	1396.0	14986.9	0.45
CASE 3	830.6	698.0	14986.9	0.22

COMMONWEALTH OF VIRGINIA
10-18-11
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HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

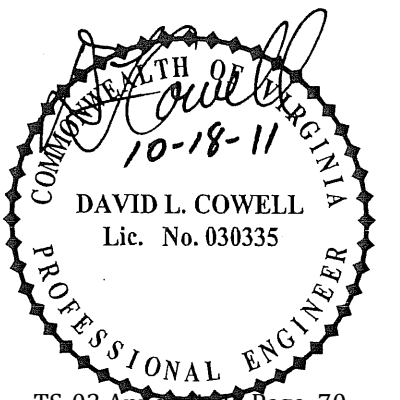
Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * WIND DIAGONAL END PANEL * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
3.32	8	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2.5x2.5x.25	36.00	1.19	0.71	0.49	108.80

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	11268.4	0.00
CASE 2	1193.7	1003.1	14986.9	0.32
CASE 3	596.8	501.6	14986.9	0.16



HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

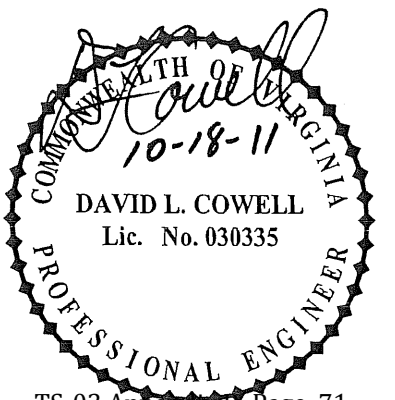
Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * * WIND STRUT * * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	30	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	201.30

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	14905.6	0.00
CASE 2	989.6	1384.1	19824.4	0.27
CASE 3	494.8	692.0	19824.4	0.13



HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * DEAD LOAD DIAGONAL * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.62	20	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	225.28

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	7865.1	11000.1	19800.0	2.83
CASE 2	7865.1	11000.1	26334.0	2.12
CASE 3	8716.5	12190.9	26334.0	2.35

COMMONWEALTH OF VIRGINIA
10-18-11
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HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

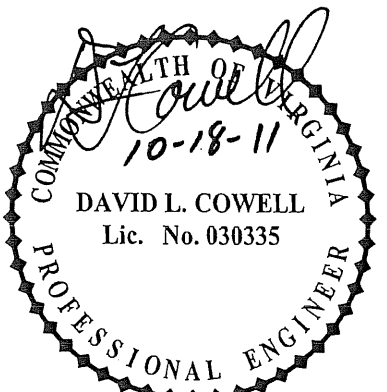
Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * DEAD LOAD DIAGONAL END PANEL * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
3.32	8	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	64.75

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	5651.4	7904.1	19800.0	2.03
CASE 2	5651.4	7904.1	26334.0	1.53
CASE 3	6263.2	8759.8	26334.0	1.69



HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

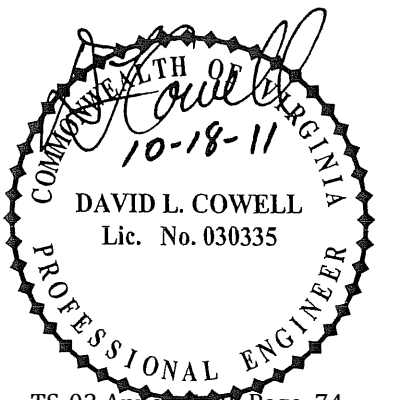
Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * * DEAD LOAD VERTICAL * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	30	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	201.30

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	4685.2	6552.7	14905.6	1.68
CASE 2	4685.2	6552.7	19824.4	1.27
CASE 3	5192.4	7262.1	19824.4	1.40



HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN, version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

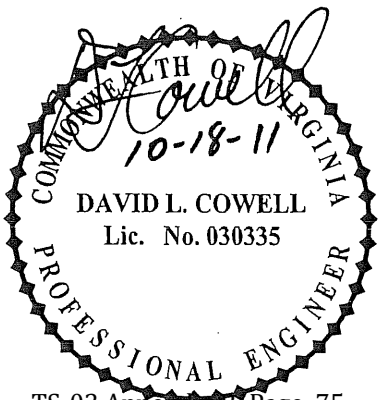
Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:50

* * * * * * * * * * * INTERIOR DIAGONAL * * * * * * * * * * *

LENGTH = 3.55 NUMBER REQUIRED = 15

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	LENGTH OF 0.19" FILLET WELD	LEAST ROG	WEIGHT
1.75x1.75x0.13	36.00	0.42	1.50	0.35	76.75

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	9849.5	1.50
CASE 2	27.3	13.6	13099.8	0.01
CASE 3	0.0	0.0	13099.8	0.00



HURTT FABRICATING CORP., MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
Version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:49

* * * * * * * * * * * COLUMN DESIGN * * * * * * * * * * *

HEIGHT (FT) TOTAL	HEIGHT (FT) TRUSS	DIAMETER (IN)	THICKNESS (IN)	YIELD STRENGTH (KSI)	WEIGHT (LB)
21.83	20.08	10.75	0.3650	42	885

	AXIAL (LBS)	MOMENT (FT-LB)	TORQUE (FT-LB)	SHEAR (LBS)	FA ALLOW	FB ALLOW	FV ALLOW	CSR
CASE 1 COMBINATION 1	6271	60672	0	0	8637	27720	13860	0.940
CASE 2 COMBINATION 1	6271	80056	24395	2246	11487	36868	18434	0.995
CASE 2 COMBINATION 2	6271	76940	14637	1477	11487	36868	18434	0.912
CASE 3 COMBINATION 1	7152	78220	12197	1266	11487	36868	18434	0.927
CASE 3 COMBINATION 2	7152	78385	7318	833	11487	36868	18434	0.918

COMMONWEALTH OF VIRGINIA
10-18-11
DAVID L. COWELL
Lic. No. 030335
PROFESSIONAL ENGINEER

HURTT FABRICATING CORP., MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
Version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:49

* * * * * * * * * TRUSS MOUNTING PLATE * * * * * * * * * *

WIDTH A [IN]	WIDTH B [IN]	THICKNESS C [IN]	GUSSET DEPTH D [IN]	THICKNESS E [IN]	WEIGHT [LBS]
36.00	13.75	0.750	12.00	0.500	177

WELD SIZE-W2 (1/16")	WELD SIZE-W3 (1/16")
5	4

COMMONWEALTH OF VIRGINIA
10-18-11
DAVID L. COWELL
Lic. No. 030335
PROFESSIONAL ENGINEER

HURTT FABRICATING CORP., MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
Version K 06-10-08
16th Ed. AASHTO (2002), 4th Ed. Luminaires (2003)

Structure Name : GANTRY
Job Description : HF 5953
Engineer : CLH
Run Date & Time : 10/13/2011 at 11:49

* * * * * * * * * * ANCHOR BOLT DESIGN * * * * * * * * * *

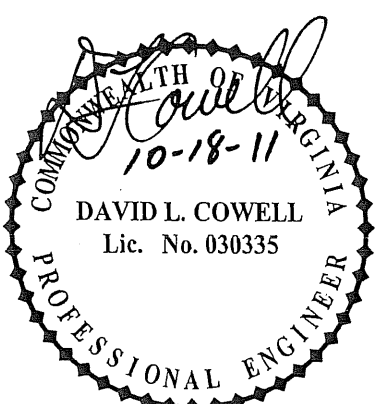
DIAMETER [IN]	EMBEDMENT LENGTH [IN]	YIELD STRENGTH (KSI)	MAXIMUM TENSION [LBS]	WEIGHT [LBS]
2.50	50.00	55.00	61229	323

* * * * * * * * * * * BASE PLATE * * * * * * * * * * *

DIMENSIONS [IN]	BOLT SPACING [IN] X	BOLT SPACING [IN] Y	EDGE DISTANCE [IN]	WEIGHT [LBS]
18.25 x 18.25 x 2.00	10.75	10.75	3.75	188.89

WELD SIZE-W4 (1/16")
5.00

Total Weight of Column Plates & Anchor Bolts = 1573.64 LBS.
Total Weight of Truss, Column, Plates & Anchor Bolts = 2972.28 LBS.



HURTT FABRICATING CORP.
MARCELINE, MO.

Vertical (Single Pole) Pipe Support for Cantilever
Using More Than 4 Anchor Bolts

TRUSS NUMBER	Gantry
OUR JOB NUMBER	HF-5953
RUN DATE	10-17-2011

The end column will be attached to a concrete footing using
6 - 1.5 in. anchor bolts with a Fy= 55 KSI,
with a bolt circle of 16.75 inches having a S = 35.4 cu-in

Check Bolt 1.5 inch diameter, Tensile Area = 1.41 Sq in
Root Area = 1.29 Sq in

Bolt Tension = 38.23 Kips/bolt
Bolt Shear = 0.37 Kips/bolt
Bolt Torsion = 5.83 Kips/bolt

Increase allowable by 1.33 because of wind loads.
Ft = .5(Fy)1.33 = 36.67 Ksi Fv = .3(Fy)1.33 = 21.95 Ksi

fv = (0.37 + 5.83)K / 1.29 Sq in= 4.81 Ksi
fv < Fv or 4.81 ksi < 21.945 ksi OK

ft = 38.23 K / 1.41 Sq in= 27.12 Ksi
ft < Ft or 27.12 ksi < 36.67 ksi OK

k= Fv/Ft=		2		2		2	
0.60		(fv)	+	(k*ft)	<	Fv	
23.10	+	263.36	=	286.5	<	482	OK

Use the 1.5 inch anchor bolts.
and minimum edge distance of 2.25 in < 3 in OK

Weld base plate to pipe with 5/16" fillet welds & 6 - 3/4" thick stiffener plates located 30 degrees off the centerline of the hole with 5/16" fillet welds. . Capacity of the 5/16" weld and the the stiffner plates will exceed the strength of the pipe column.

Plate Fy = 36 KSI, Fb = .66(Fy) = 24.00 Ksi

Check Base Plate Thickness of Dia. = 22.75 inch & 1.75 inch thickness

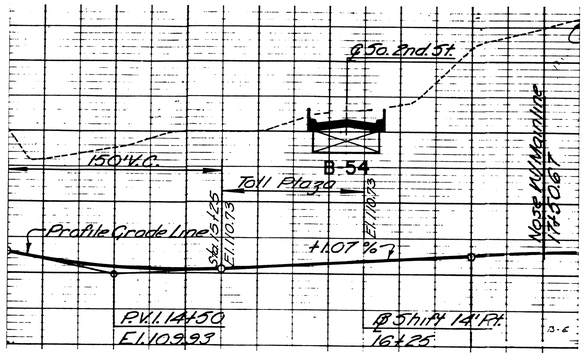
Distance between gussets = 9.67 in Moment = 9[illegible] in-kips
width of resistance = 6.00 in
plate thickness required = 1.70 < 1.75 in O[illegible]

COMMONWEALTH OF VIRGINIA
10-18-11
DAVID L. COWELL
Lic. No. 030335
PROFESSIONAL ENGINEER

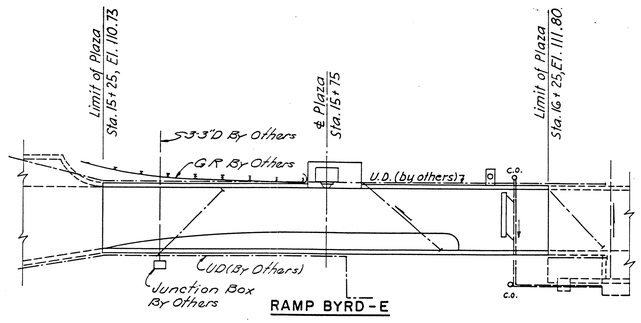
DTE RAMP TOLL PLAZAS

ORIGINAL PLANS

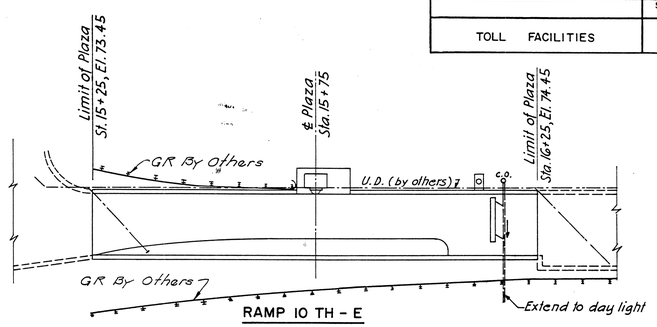
RICHMOND EXPRESSWAY SYSTEM		
	SHEET NO.	TOTAL SHEETS
TOLL FACILITIES	4	38



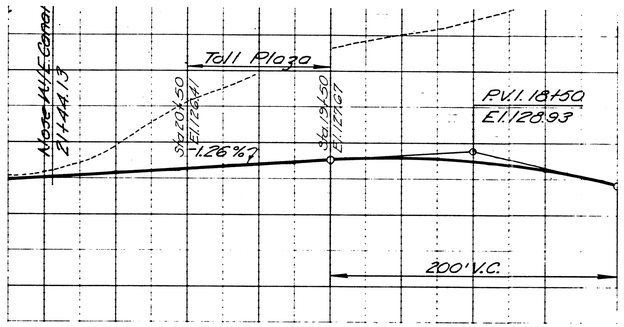
RAMP BYRD-E
Scale: 1"=10' Vert.
1"=50' Horiz.



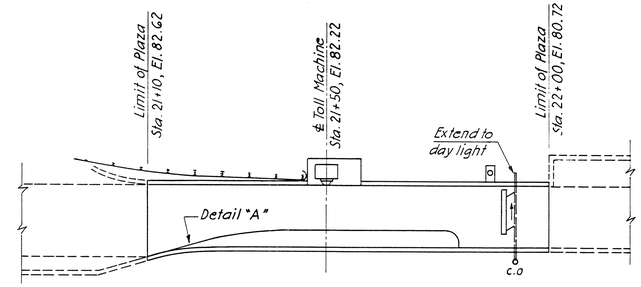
RAMP BYRD-E



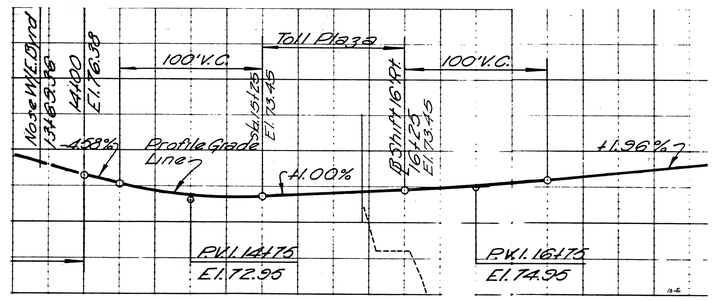
RAMP 10 TH - E



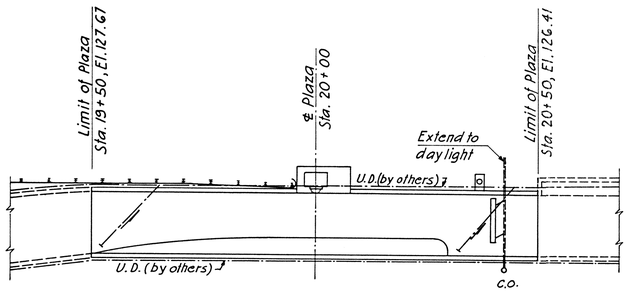
RAMP E-CANAL
Scale: 1"=10' Vert.
1"=50' Horiz.



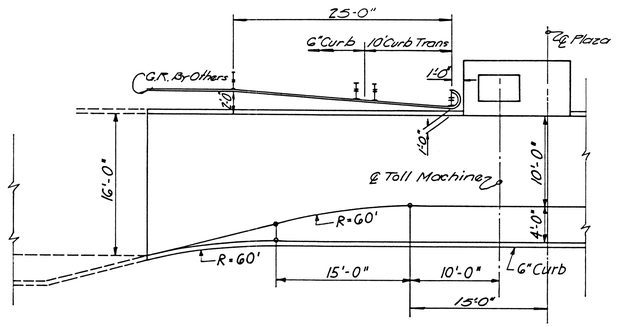
RAMP E - 11 TH



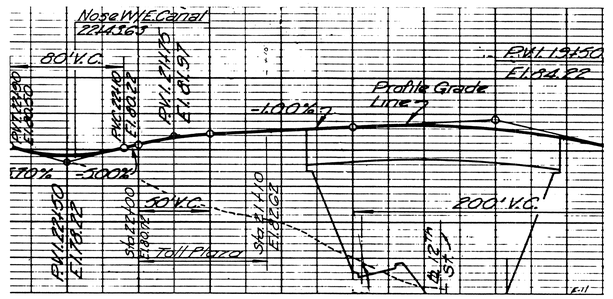
RAMP 10TH-E
Scale: 1"=10' Vert.
1"=50' Horiz.



RAMP E - CANAL



DETAIL "A"
RAMP E - 11 TH
1/8" = 1'-0"



RAMP, E-11TH
Scale: 1"=10' Vert.
1"=50' Horiz.

AS BUILT

	BY	DATE				
MADE	D.E.N.	5-68				
CHECKED	WJW.	5-68	1	Final Check	W.J.W.	6-68
IN CHARGE H.D.S.			NO.	REVISION	BY	DATE

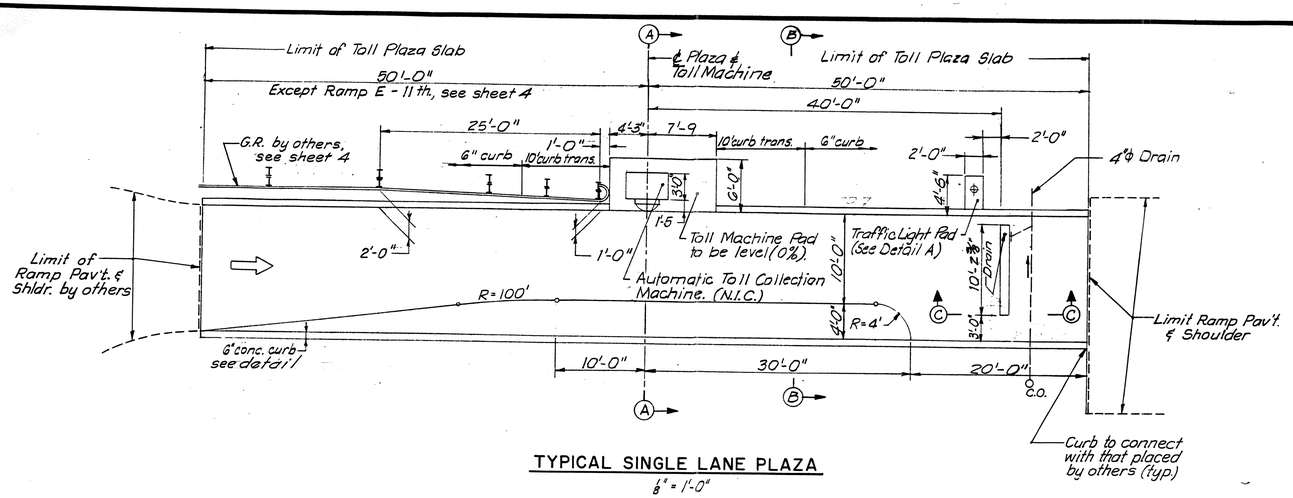
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

RAMP PLAZA LAYOUTS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

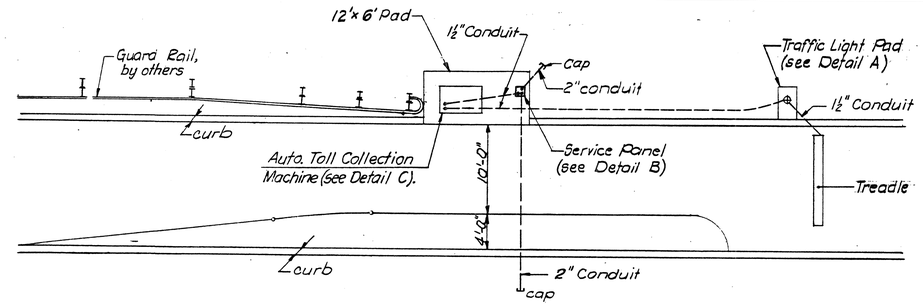
SCALE: 1/16" = 1'-0" (Unless noted)
CONTRACT NO.: TE-3
SHEET NO. 4 OF

RICHMOND EXPRESSWAY SYSTEM		
	SHEET NO.	TOTAL SHEETS
TOLL FACILITIES	9	38



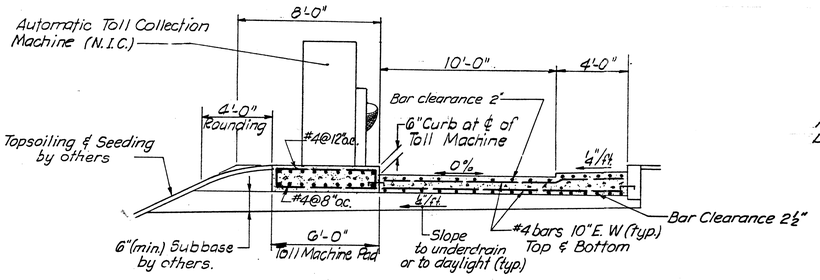
TYPICAL SINGLE LANE PLAZA

⅛" = 1'-0"



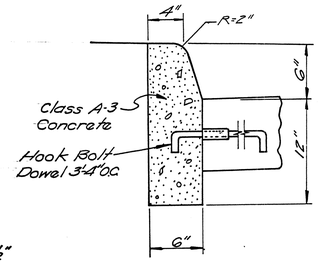
CONDUIT LAYOUT

⅛" = 1'-0"

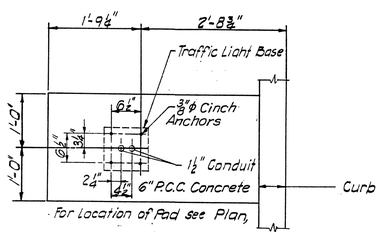


SECTION "A-A"

¼" = 1'-0"



6" CURB DETAIL

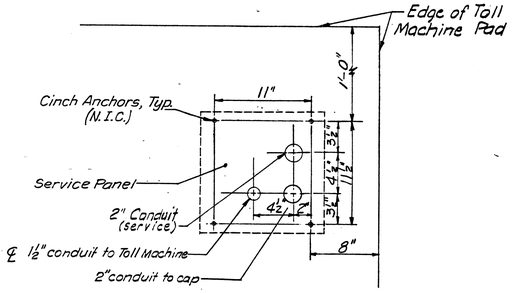


DETAIL "A"

See Detail 'D' For Future Traffic Light Locations

TRAFFIC LIGHT CONDUIT LAYOUT

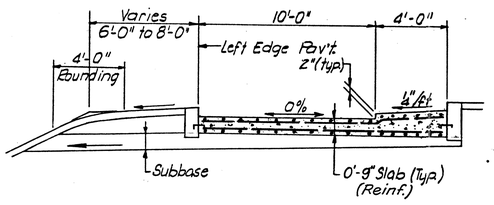
¾" = 1'-0"



DETAIL "B"

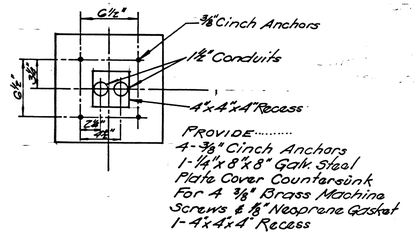
SERVICE PANEL CONDUIT LAYOUT

½" = 1'-0"



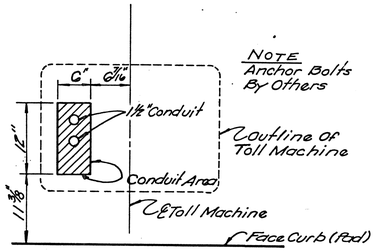
SECTION "B-B"

¼" = 1'-0"



DETAIL 'D'

(For Future Traffic Light Locations)



DETAIL "C"

AUTOMATIC TOLL MACHINE CONDUIT LAYOUT

½" = 1'-0"

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
			3	Rev. Toll Machine Conduit	PHT	4/75
MADE	W. J. W.	5-68	2	Rev. Treadle Detail & Toll Machine Conduit	P.H.T.	2/75
CHECKED	D.E.N.	5-68	1	Final Check	D.E.N.	6-68
IN CHARGE H.D.S.						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

SINGLE LANE RAMP PLAZA
PLAN AND DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO.: TF-3
SHEET NO. 9 OF

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	58	

END CONT. C-8
STA. 228+43.31 BK.
℄ DOWNTOWN EXP.

BEGIN CONT. C-9
STA. 289+00.00 AHD.
℄ DOWNTOWN EXP.

STA. 17+00.81 BK. STA. 11+00.00 AHD.

PAVEMENT PLAN LEGEND:

- Proposed Bit. Concrete Shoulders
- Mainline Shoulder at Ramp Terminals 7" Plain P.C.C. Base Overlaid With 2" Bit. Concrete Pavement, Type S-5
- Proposed Bit. Concrete Overlay of Existing Pavement
- Proposed P.C.C. Sidewalk
- Bridge Approach Slab With Surface Treatment
- Bridge Approach Slab Without Surface Treatment
- C — Construction Joint
- T — Transverse Expansion Joint
- Transverse Joint
- L — Longitudinal Joint

GENERAL NOTES:

- All Standards Referred To On The Grading Or Pavement Plans Are Virginia Department of Highways Standard Drawings.
- For Miscellaneous Details Not Shown On Pavement Plans See Sheets 13814
- Guardrail Installation Shall Be In Accordance With Std. GR-4 and Std. GR-5 Except As Noted On The Plans.
- For Detail A and B See Sheet 13
- Limits of Pavement Patches Are Not Shown Outside Of Areas To Be Completely Repaved. These Patches Will Be Equivalent To The Existing Pavement Section Or Type 2 Pavement Patches Unless Otherwise Noted and Will Be Constructed Before Final Surfacing Is Done.

	BY	DATE
MADE	JRH	4/68
CHECKED	CEP/WHG	4/68
IN CHARGE	JSF	

NO.	REVISION	BY	DATE
3	Add. Sidewalk	DGT	2-76
2	Rev. Joint Layout	DAS	2/22/74
1	Revised G.R.	DAS	2/14/74

PAVEMENT PLAN
STA. 289+00 to STA. 295+50

AS BUILT

SCALE 0 25 50

RICHMOND EXPRESSWAY SYSTEM
SECTION 9
PROJECT DOWNTOWN EXPRESSWAY
SHEET NO. 60
TOTAL SHEETS
PAVEMENT PLAN
STA. 295+50 to STA. 303+00
0 25 50 SCALE
AS BUILT
GENERAL NOTES:
● For Legend See Sheet 58
● For Details Of Raised Concrete Median Barrier Transition At Bridge Piers See Sheet 19
● Cross Street Bridge Approach Slab Surface Treatment: Tack Coat With 0.1 Gal./Sq. Yd. RC-70 Bituminous Material. Surface With 1½" Bituminous Concrete, Type I-2 and 1" Bituminous Concrete, Type S-5.
● Curb or Curb and Gutter Shall Be Tied To Concrete Pavement Or Base By Means of Dowels as Shown on Sheet 13
● For Mainline Shoulder Details At Ramp Terminals See Sheet 14
E. CANAL ST.
℄ CANAL ST.
E. BYRD ST.
℄ BYRD ST.
B BYRD ST.
S. 2nd ST.
S. 3rd ST.
B-54
B-55
RAMP E-CANAL
RAMP BYRD-E
WESTBOUND ROADWAY
EASTBOUND ROADWAY
℄ DOWNTOWN EXPRESSWAY
STA. 295+50 MATCH LINE - SEE SHT. 58
STA. 303+00 MATCH LINE - SEE SHT. 66
W-901
W-902
W-903
Commonwealth Natural Gas Co.
200 2-S-BR
PARKING UNDER BUILDING
PARKING LOT (BY OTHERS)
Limits of Type 2 Pavement
Remove Conc. Driveway Entr.
Type 1 Pvm't Patch and resurface
Parking Barrier For Det. See Sht. 14
Match Exist. S.W. & Curb
16+25± Match Exist Pavt.
13+55.90 ℄ Ramp E-Canal 297+44.69 ℄ D.T. Exp.
10+00 ℄ Ramp E-Canal 301+03.73 ℄ D.T. Exp.
17+50.67 ℄ Ramp Byrd-E 298+35.70 ℄ D.T. Exp.
19+45.20 ℄ Ramp Byrd-E 300+29.50 ℄ D.T. Exp.
℄ Shift 16+25
℄ Shift 19+28.40
Toll Plaza Pavement & Curb By Others
Future 12' Lane
See Wall Trans. Det. Sht. 115
8" R.C. Pvm't.
8" Cont. R.C. Pvm't.
Exist. Curb to Remain
Match Exist. S.W. & Curb 19+80±
Shape Pavement To Have A 3' Gutter From Approach Slab To Inlet No. 700
6 As Built TEM 6-77
	BY	DATE
MADE	J.R.H.	4/68
CHECKED	CEB RWG	4/68
IN CHARGE	J.P.F.	
NO.	REVISION	BY	DATE
3	Rev. Wall Trans.	D.A.S.	2/22/74
2	Rev. Curb Trans.	D.A.S.	2/15/74
1	Revised G.R.	D.A.S.	2/14/74
5	Rev. Pav't Contour	R.T.C.	7-25-74
4	Rev. Joint Layout	D.A.S.	2/22/74

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	72	252

STATE PROJECT 0060-127-102, C-502

E. CANAL ST.

S. 9th ST.

S. 10th ST.

STA. 91+25 MATCH LINE - SEE SHT. 79

STA. 19+25 MATCH LINE - SEE SHT. 79

STA. 318+00 MATCH LINE - SEE SHT. 68

STA. 325+50 MATCH LINE - SEE SHT. 74

MATCH LINE - SEE SHEET 73A

WESTBOUND ROADWAY

EASTBOUND ROADWAY

RAMP 12th.-W

℄ DOWNTOWN EXPRESSWAY

PARKING RAMP 10th.-E

B BYRD ST.

S BYRD ST.

E. BYRD ST.

B-602

B-60

Asphalt

Concrete

Type 2 Pavement

Limits of Type 2 Pavement

Conc. Pvm't. Patches to be used in this area.

Exist. Curb to Remain

Raised Cond. Median Barrier, Std. MB-6A

Exist. Apron, Curb, & S.W. to Remain

Add offset block

Add Posts

Std. CG-2 Mod.

Std. CG-2

Std. CG-6

Std. CG-9A

Std. GR-2A

Std. GR-5

Splay G.R. W=2' L=50'

See Detail 'B'

See Detail 'C'

Meet Exist. Curb @ S.W. 1915.3±

Replace Exist. Conc. Apron With Std. CG-9A

Match Exist. Loading Dock Pavt. @ End Std. CG-2

25'± Taper

50:1 Taper 27 Jts @ 40'

8" R.C. Pvmt.

8" Cont. R.C. Pvmt.

10158.64 @ Ramp 10th.-E
42458.51' @ E. Byrd St.

13463.36 @ Ramp 10th.-E
45471.00 @ E. Byrd St.

5' Shld. A Berm

Shld. A Berm

Std. GR-5

Std. GR-2A

Add Posts

Raised Cond. Median Barrier, Std. MB-6A

CANAL RUNS UNDER TRESTLE

CANAL DEPTH 16'

Limits of Type 2 Pavement

Exist. Curb to Remain

Exist. Apron, Curb, & S.W. to Remain

@ Shift 25' Rt.
44463.30 @ Byrd St.
22169.00 @ Byrd St.

BUILDING REMOVED

GRAVEL PARKING AREA

GENERAL NOTES:

- For Legend See Sheet 58
- For Details Of Raised Concrete Median Barrier Transition At Bridge Piers See Sheet 19
- Cross Street Bridge Approach Slab Surface Treatment: Tack Coat With 0.1 Gal./Sq. Yd. RC-70 Bituminous Material. Surface With 1½" Bituminous Concrete, Type I-2 and 1" Bituminous Concrete, Type S-5.

	BY	DATE
MADE	JRH	4/63
CHECKED	[illegible]	4/63
IN CHARGE	JPF	

NO.	REVISION	BY	DATE
4	Added GR Notes	MMW	11/9/75
3	Added Berm	PHT	11/22/75
2	Rev. Joint Layout	DAS	2/22/74
1	Added Std. HR1 Mod.	DAS	2/21/74

5 As Built ITEM 6-77

PAVEMENT PLAN

STA. 318+00 to STA. 325+50

0 25 50 SCALE

AS BUILT

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
9	DOWNTOWN EXPRESSWAY	74	

	BY	DATE
MADE	JRH	4/68
CHECKED	CLEMING	4/68
IN CHARGE	JPE	

NO.	REVISION	BY	DATE
5	As Built	TEM	6-77
4	Rev. Guard Rail	HMW	11/3/75
3	Rev. Exist Contours @ 13th St	DAS	3/20/74
2	Rev Joint Layout	DAS	3/22/74
1	S.W. & GR Along Ramp 10th-E	JRH	5/68

PAVEMENT PLAN

STA. 325+50 to STA. 333+00

SCALE 0 25 50

AS BUILT

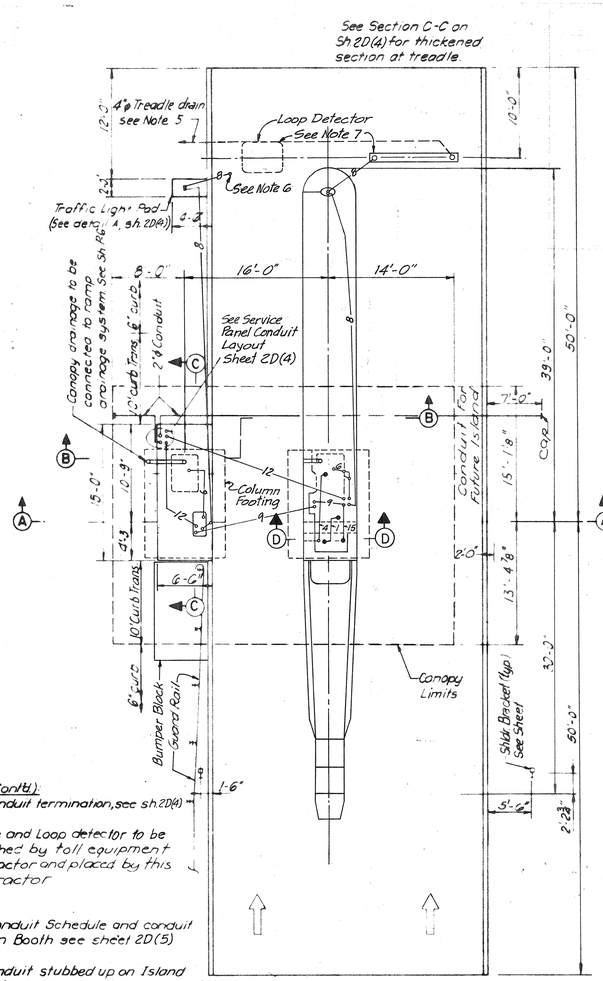
GENERAL NOTES:

- For Legend See Sheet 58
- Mainline Pavement Width Transition At Structures Shall Be In Accordance With Std. WP-1.
- For Guardrail Attachment To Bridge Parapet See Sheet 13
- Curb or Curb and Gutter Shall Be Tied To Concrete Pavement Or Base By Means of Dowels as Shown on Sheet 13
- For Mainline Shoulder Details At Ramp Terminals See Sheet 14

DTE RAMP TOLL PLAZAS

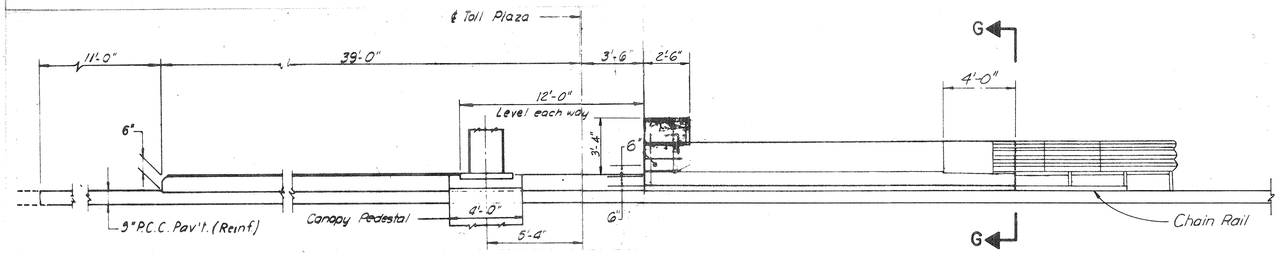
11TH ST RAMP WIDENING PLANS

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
15	1990-1991 IMPROVEMENTS	2D(1)	

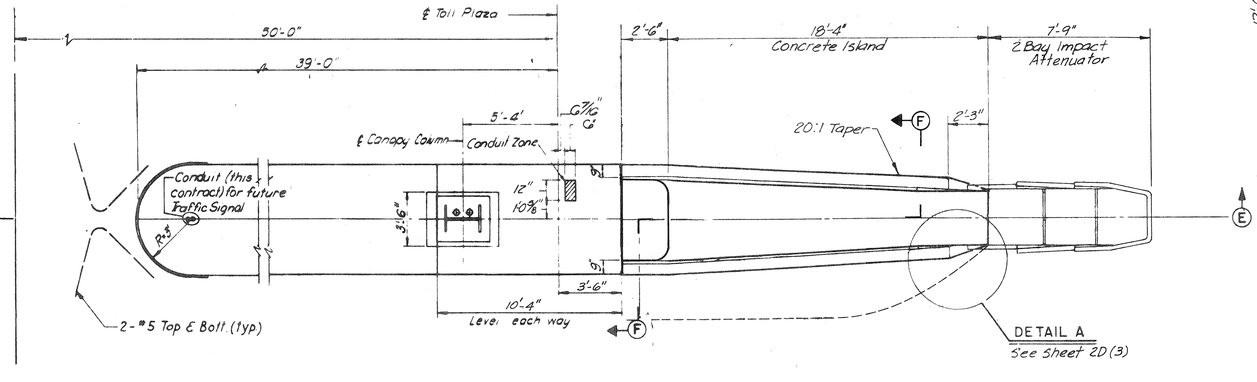


NOTES (Cont'd):

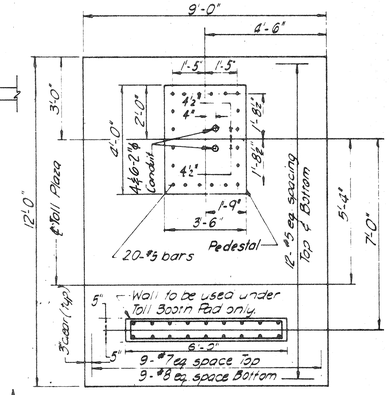
6. For conduit termination, see sh 2D(4)
7. Treadle and Loop detector to be furnished by toll equipment contractor and placed by this contractor
8. For Conduit Schedule and conduit zone in Booth see sheet 2D(5)
9. All conduit stubbed up on Island are to be terminated as per Detail "A"; all other conduit to be stubbed as per Detail "B" on sheet 2D(4)



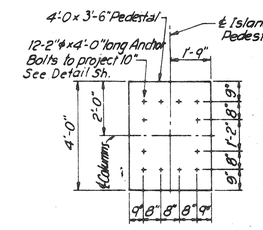
SECTION E-E
1/4" = 1'-0"



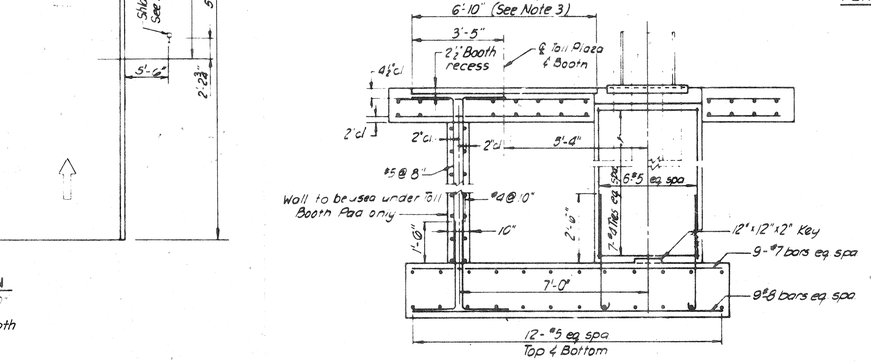
PLAN OF ISLAND
1/4" = 1'-0"



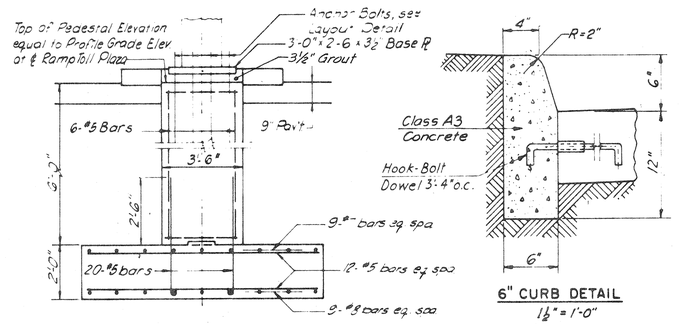
TYPICAL FOOTING PLAN
3/8" = 1'-0"



ANCHOR BOLT LAYOUT
3/8" = 1'-0"

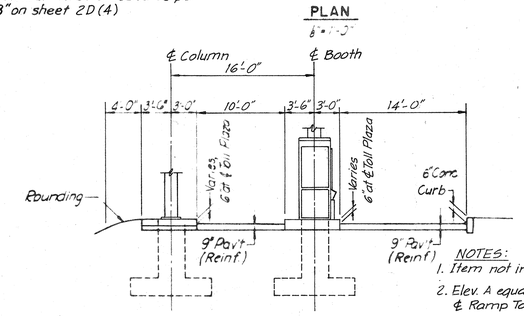


SECTION C-C
3/8" = 1'-0"



SECTION D-D
3/8" = 1'-0"

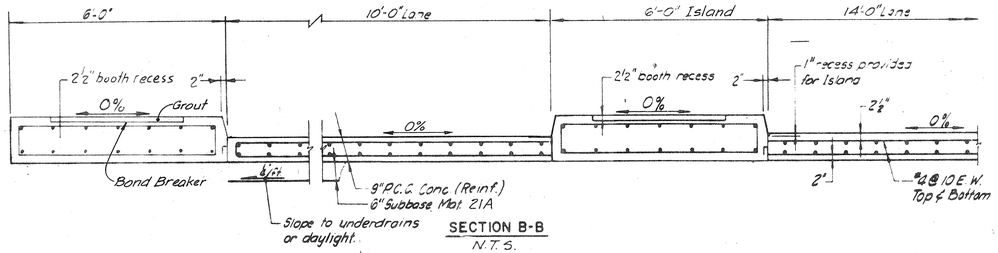
6" CURB DETAIL
1 1/2" = 1'-0"



SECTION A-A
3/8" = 1'-0"

NOTES:

1. Item not in this Contract.
2. Elev. A equals Profile Grade elevation at the ℄ Ramp Toll Plaza, plus six (6) inches.
4. Automatic toll machine to be set with expansion anchors. Item and installation by ATS
5. Treadle drain to be connected to the area drainage system. Direction shown to be verified in the field. For treadle details, see sht. 2D(4)



SECTION B-B
N.T.S.

Note:
For Conduit Schedule & Notes, see Sheet 2D(5).

	By	Date				
Designed	PHT	1-91				
Drawn	CN	1-91				
Checked	ICM	1-91				
Approved	RBN	1-91	No.	Revision	By	Date

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

TWO LANE RAMP TOLL PLAZA

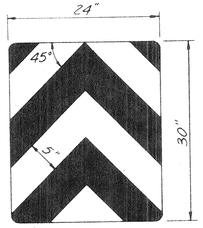
PLAN & DETAILS

HOWARD NEEDLES TAMMEN & BERGENDOFF
Architects Engineers Planners
ALEXANDRIA, VA.

HNTB

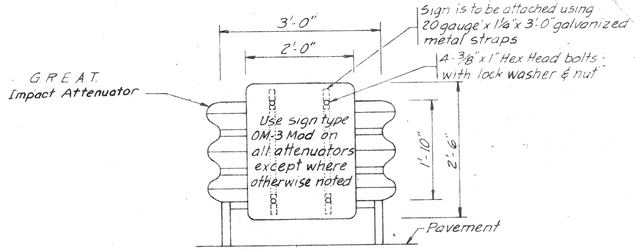
Scale:	Date:	Contract No.	Sheet:
AS NOTED	JAN. 1991	C-15	2D(1) of

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
15	1990-1991 IMPROVEMENTS	2D(2)	



Colors
Alternating black and reflectorized yellow stripes

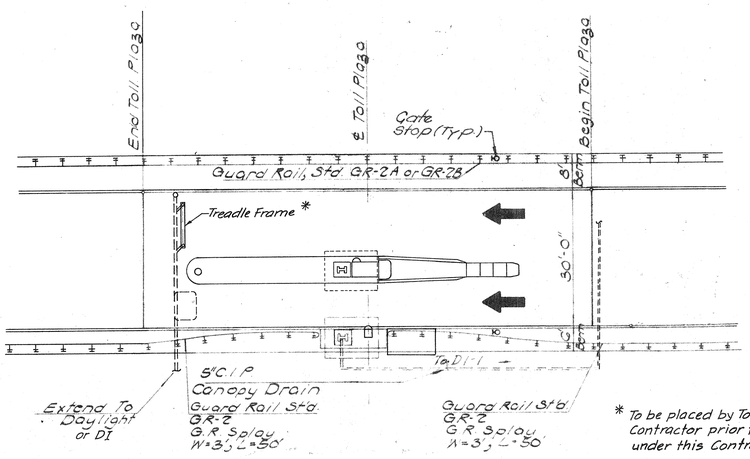
OM-3 Modified
1" = 1'-0"



SIGN ATTACHMENT DETAIL
3/4" = 1'-0"

Note:
Signs are to be as specifield in the current manual on Uniform Traffic Control Devices for Highways & Street, by the Federal Highway Administration.

ATTENUATOR SIGNING DETAILS

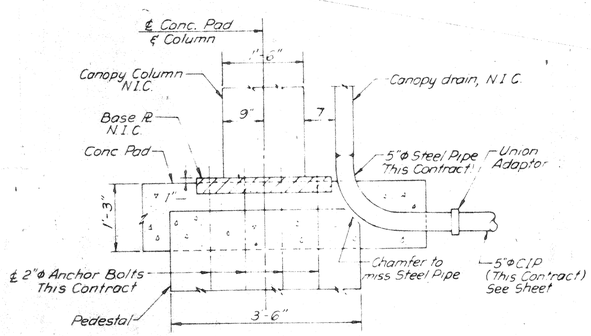


1/16" = 1'-0"

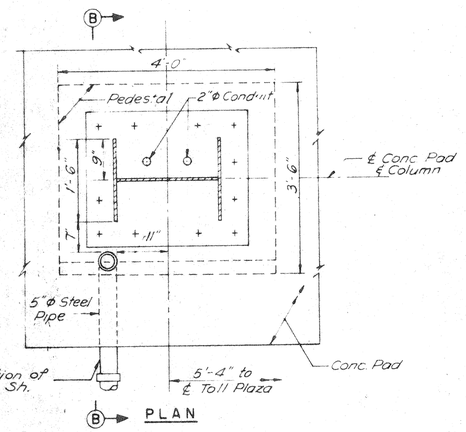
* To be placed by Toll Equipment Contractor prior to the paving, under this Contract.

	By	Date				
Designed	PHT	1-91				
Drawn	CN	1-91				
Checked	ICM	1-91				
Approved	RBN	1-91	No.	Revision	By	Date

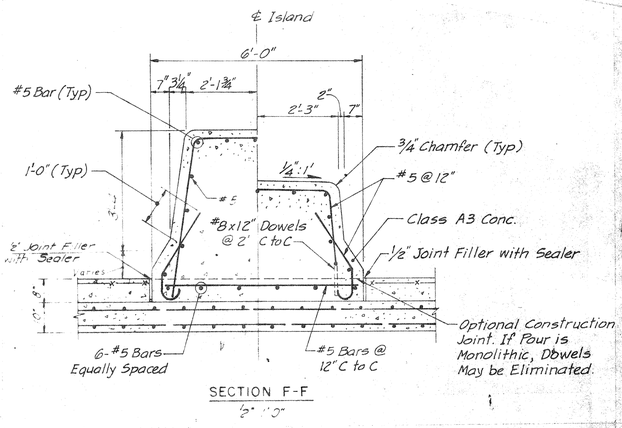
LEGEND:
- o Traffic Signal (N.I.C.)
- * Automatic Toll Machine
- Toll Booth (N.I.C.)



SECTION B-B
3/4" = 1'-0"



RAMP CANOPY DRAIN
3/4" = 1'-0"



SECTION F-F
3/4" = 1'-0"

Note:
For Conduit Schedule, see sheet 2D (5)

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

TWO LANE RAMP TOLL PLAZA

DETAILS

HOWARD NEEDLES TAMMEN & BERGENDOFF
Architects Engineers Planners
ALEXANDRIA, VA.

HNTB

Scale:	Date:	Contract No.	Sheet:
AS NOTED	JAN. 1991	C-15	2D(2) of

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
15	1990-1991 IMPROVEMENTS	4	

E. CANAL ST.

SEE DETAIL BELOW

S 53°10'13.4" E (S 53°21'44" E) 84.37'

S 51°30'02.4" E (S 51°49'33" E) 100.08'

S 36°44'01.6" W (S 36°44'31" W) 0.48'

END PROJECT Meet Exist. Curb

S 54°11'50.4" E 227.38 (S 54°11'23" E) 76.09'

Temporary N 36°48'34" E 11.45

Limit of Const. Easement

S 54°29'27.3" E (S 54°27'26" E) (19.17')

S 36°40'52.1" W (S 36°41'41" W)

JAMES CENTER DEVELOPEMENT CORPORATION D.B. 0106 Pg. 1084 & 1085 .0956 Acres

Note: Deed Bearings shown in parentheses.

DETAIL TEMPORARY EASEMENT

℄ Ramp E-11 TH CEV. E11-3

S 54°29'27.3" E 19.20'

Area = 103.6 S.F.

N 53°19'09.9" W 19.20'

Temp. Const. Easement

N 36°48'34" E 6.01'

S 36°40'52.1" W 7.00'

N 53°06'45.1" W 19.42' (N 53°09'43" W) (19.44')

N 53°10'33.6" W 261.35' (N 53°09'43" W) (261.28')

END PROJECT Meet Ex. Curb

Begin Wall #3 End Std. MB-7C

Remove Exist. Fence

Std. PB-2A, 2E Mod. Std. MS-3C

Std. MS-1A Mod. (See Detail Sht. 2C.)

WESTBOUND ROADWAY

EASTBOUND ROADWAY

RAMP 12th - W

RAMP 10th - E

RAMP E-11th

℄ Exist. Downtown Expwy.

℄ Ex. & Prop. Ramp 10TH-E

℄ Prop. Ramp 12 TH-W

℄ Ex. Ramp 12 TH-W

℄ Ramp 12th-W

℄ Ramp E-11th

℄ Ex. Ramp 12 TH-W

Begin Ramp 12th-W Sta. 10+00 = Sta. 521+08, ℄ 12th-W

Begin Ramp 10th-E Sta. 16+25 to Ft.

Begin Wall #1 Match Exist. Curb Sta. 12+12.30

See Detail Sht. 2C

Begin Ret. Wall #2 ℄ Ramp E-11th

Begin Ret. Wall #4 Sta. 10+36, 28.5' Rt.

End Ret. Wall #1 Sta. 10+48, 18.5' Lt.

End Ret. Wall #2 Sta. 17+17.75

Remove & Reset Exist. Fence

Fence stops here

Temp. Silt Fence

Drop Inlet DI-2C

Deleted from plans

℄ Ex. Byrd. St.

E. BYRD ST.

Square up exist. pvmt. with full depth saw cut

Drop inlet plugged Std. Sht. 2-7

Remove End Curb

Remove Exist. Guardrail

Std. GR-2

Std. CG-2

Std. Temp. Silt Fence

Limit of Const.

Std. PB-2A Mod. Details & Typical Sections, See Sht. 2A

Std. PB-2A Type E (Curb Head)

Std. PCA-2

Remove Exist. Barrier

Remove Exist. Curb & Gutter

Remove Exist. Pavement & Curb

Match Exist. Curb

Removed not converted to Manhole MH-1

BEGIN PROJECT PC Sta. 18+58.41

E. CANAL ST.

SPUR 12th - CANAL

S. 10th ST.

12TH ST.

B-60

B-61

B-62

WM

WV

GV

FH

MH

Note:
1. For Std. PB-2A Mod. Details and Typical Sections, see Sht. 2A
2. For Profiles, see Sheets 5A and 5B.
3. For Drainage Tabulation, see Sheet 2G.
4. For Curve Data, see Sheet 1D.

LEGEND:

- FULL STRENGTH PVMT.
- PAVED SHOULDER
- DEMOLITION OF PAVEMENT
- DEMOLITION OF TOLL PLAZA

SCALE 0 25 50

AS BUILT

	By	Date	No.	Revision	By	Date
Designed						
Drawn						
Checked						
Approved						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

DOWNTOWN EXPRESSWAY

GRADING, DRAINAGE & PAVEMENT PLAN

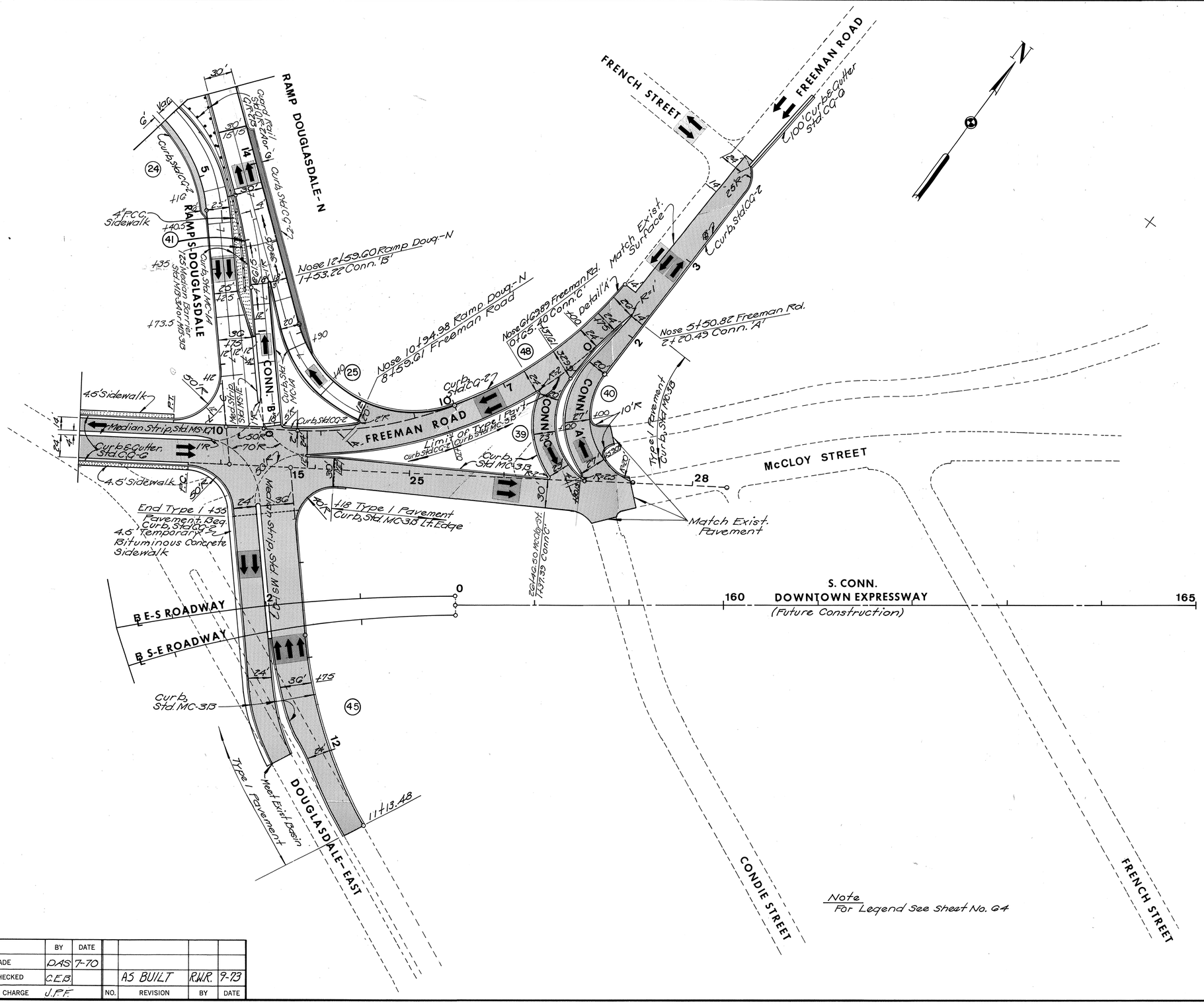
HOWARD NEEDLES TAMMEN & BERGENDOFF Architects Engineers Planners ALEXANDRIA, VA. HNTB

Scale:	Date:	Contract No.	Sheet:
1" = 25'	JAN. 1991	C-15	4 of

DOUGLASDALE RAMP TOLL PLAZA

ORIGINAL PLANS

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	75	155



	BY	DATE				
MADE	DAS	7-70				
CHECKED	C.E.B.			AS BUILT	R.W.R.	9-73
IN CHARGE	J.P.F.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY

PAVEMENT PLAN

STA. 10+50 TO STA. 165+00

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1"=50'
CONTRACT NO.: 4
SHEET NO. 75 OF 155

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	81	155

Notes:
1. See Sheet No. G4 for legend.
2. Use Guard Rail Terminal Section Std. GR-5 on "Run on" end of expressway guard rail.

AS BUILT

	BY	DATE				
				AS BUILT	R.W.R.	9-73
MADE	R.M.S.	1-18-68	2	Changed G.R. Type	DAS	3-30-71
CHECKED	J.L.C.	2-16-68	1	Toll Plaza	R.M.S.	2-12-68
IN CHARGE	R.M.S.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY

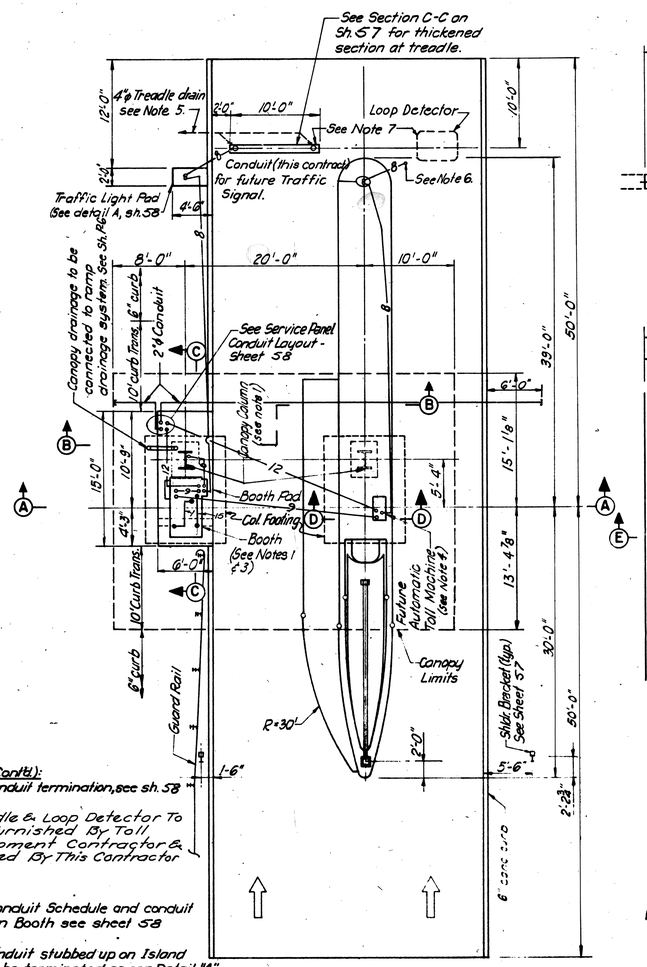
PAVEMENT PLAN

STA 168+20 TO STA. 179+75

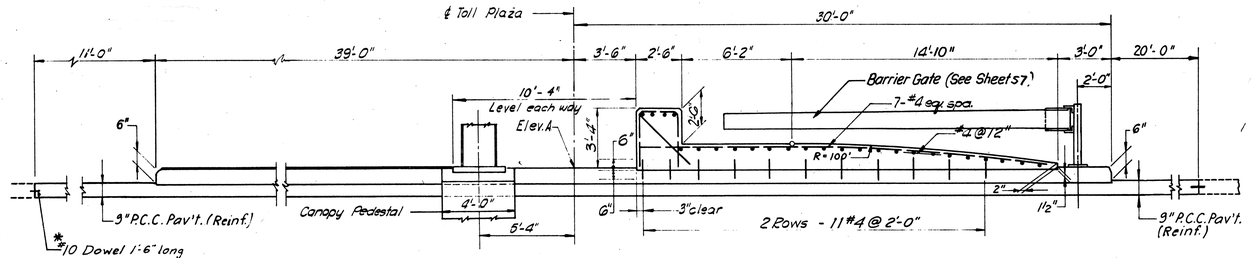
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 50'
CONTRACT NO.: 4
SHEET NO. 81 OF 155

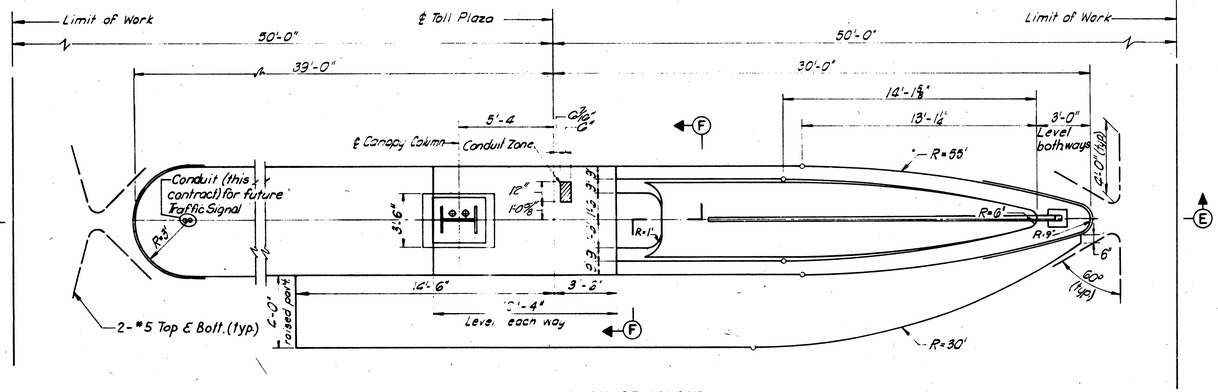
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	55	155



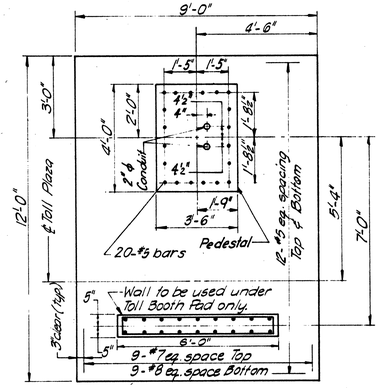
PLAN
3/8" = 1'-0"



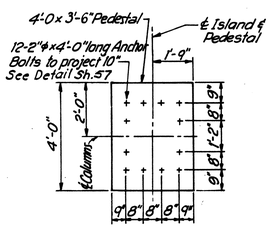
SECTION E-E
1/4" = 1'-0"



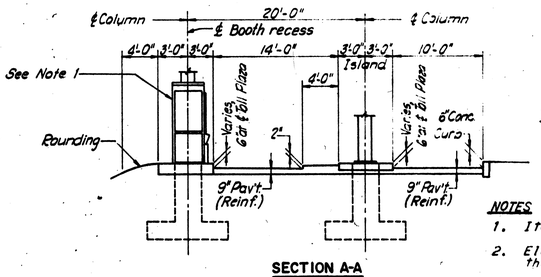
PLAN OF ISLAND
1/4" = 1'-0"



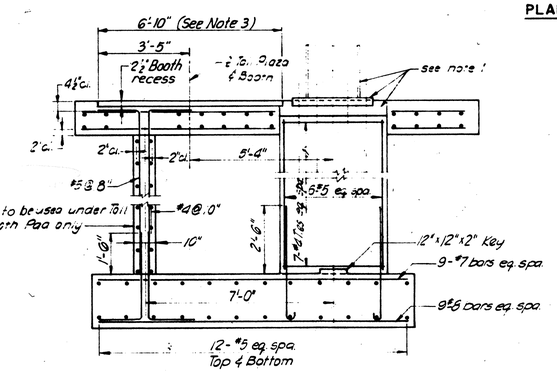
TYPICAL FOOTING PLAN
3/8" = 1'-0"



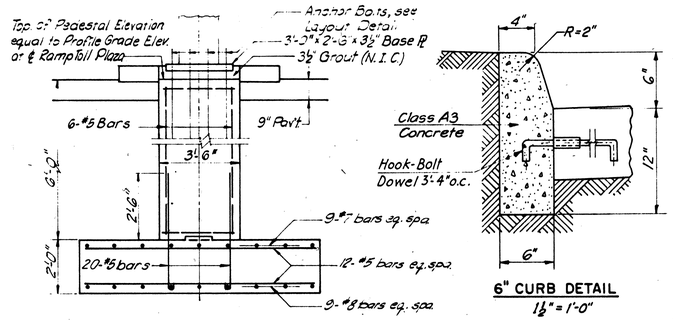
ANCHOR BOLT LAYOUT
3/8" = 1'-0"



SECTION A-A
1/4" = 1'-0"

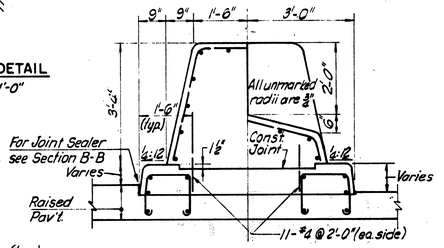


SECTION C-C
3/8" = 1'-0"

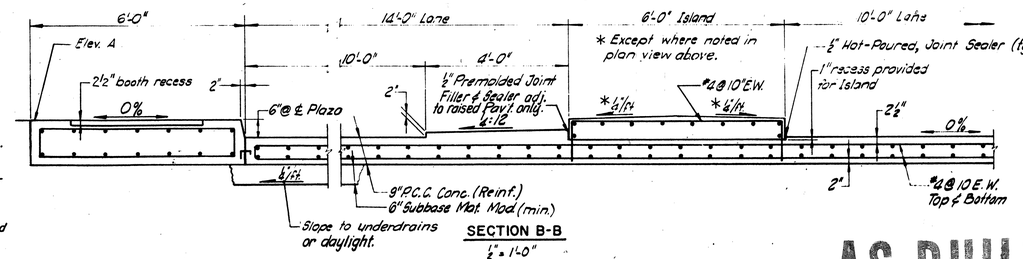


SECTION D-D
3/8" = 1'-0"

6" CURB DETAIL
1½" = 1'-0"



SECTION F-F
1/2" = 1'-0"



SECTION B-B
1/2" = 1'-0"

NOTES

1. Item not in this Contract.
2. Elev. A equals Profile Grade elevation at the ℄ Ramp Toll Plaza, plus six (6) inches.
3. For Anchor Bolt Locations & Booth Recess Dimensions See Sheet No. 57
4. Automatic toll machine to be cinch anchored into place. Item and installation not in this Contract.
5. Treadle drain to be connected to the area drainage system. Direction shown to be verified in the field. For treadle details, see Sh. 57

	BY	DATE	NO.	REVISION	BY	DATE
MADE	W. J. W.	5-68	2	AS BUILTS	LWC	8-73
CHECKED	D.E.N.	5-68	1	Rel. for A.T.S. Mach.	F.H.T.	7-1-71
IN CHARGE	W.D.B.			Final Check	D.E.N.	6-68

AS BUILT

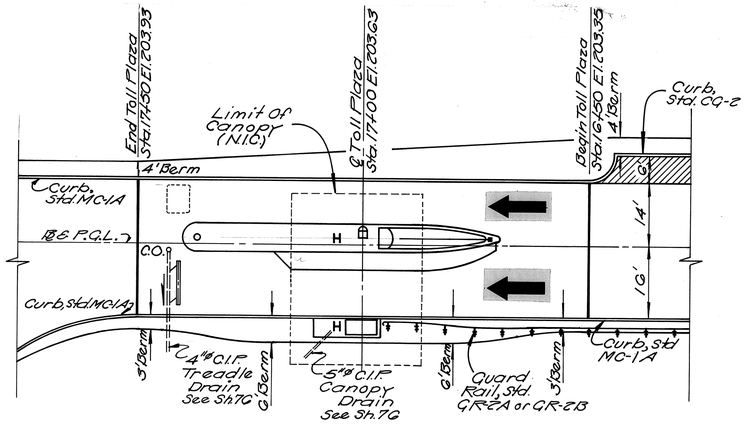
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY

PLAN AND DETAILS
TWO LANE RAMP TOLL PLAZA

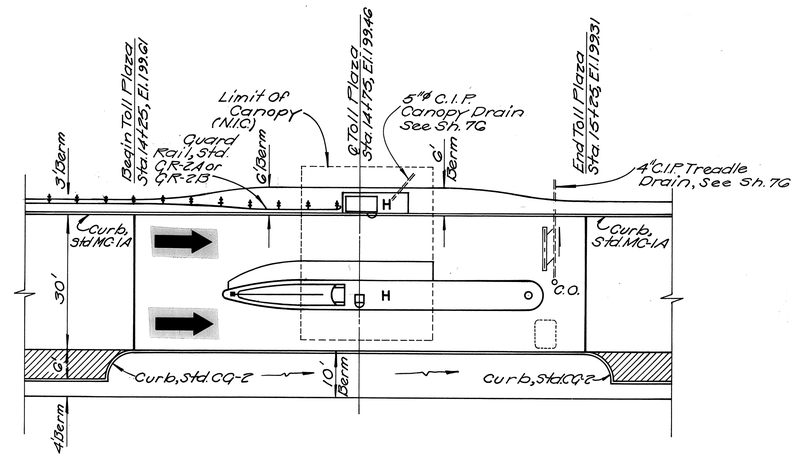
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO.: 4
SHEET NO. 55 OF 155

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
4	BELTLINE EXPRESSWAY	56	155



RAMP N-DOUGLASDALE
Scale 1/16"=1'-0"



RAMP DOUGLASDALE-N
Scale 1/16"=1'-0"

NOTES
1. For Profiles See Sh. No. 33 & 42
2. C.O. In Pavement - 5" C.I. 90° Elbow & 5" x 1/32 - 10 Surpremo Floor Level Cleanout

AS BUILT

	BY	DATE				
MADE	D.A.S.	8-70				
CHECKED	R.W.Q.	8-70		AS BUILT	LWC	8-73
IN CHARGE	J.F.F.		NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
BELTLINE EXPRESSWAY

MISCELLANEOUS
TOLL PLAZA DETAILS

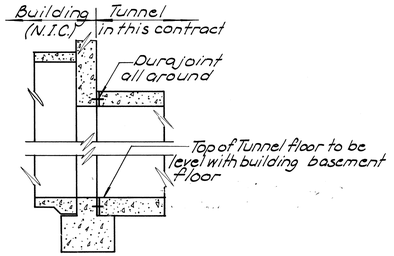
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: 4
SHEET NO. 56 OF 155

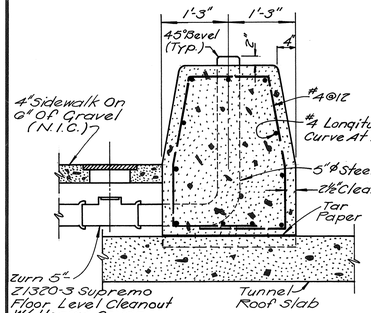
NORTHBOUND POWHITE PARKWAY TOLL PLAZA

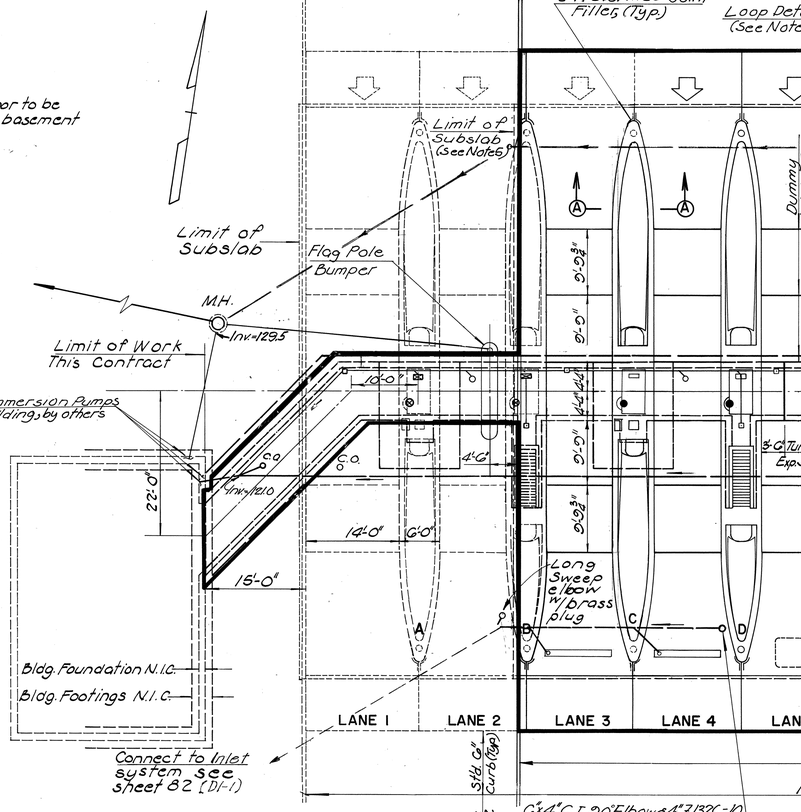
ORIGINAL PLANS - ADMINISTRATION BUILDING & TOLL PLAZA

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	43	188

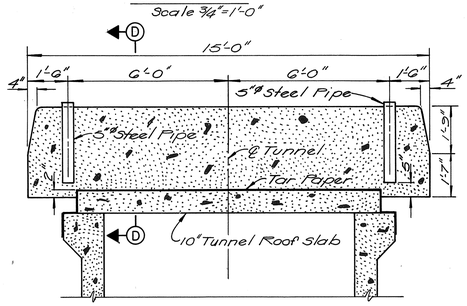


SECTION E-E
not to scale

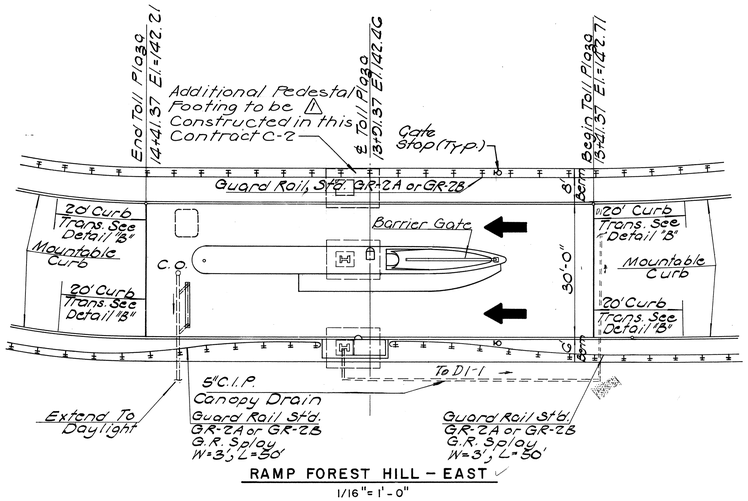




SECTION D-D
Scale 3/4"=1'-0"

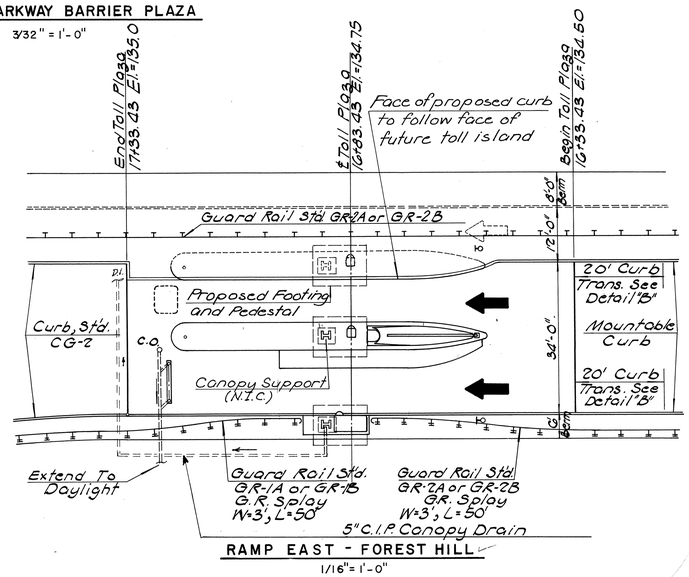


LONGITUDINAL SECTION THRU
FLAG POLE BUMPER
Scale 3/8"=1'-0"



RAMP FOREST HILL – EAST
1/16"= 1'-0"

PLAN
POWHITE PARKWAY BARRIER PLAZA
3/32" = 1'-0"



RAMP EAST - FOREST HILL
1/16"= 1'-0"

NOTES:

1) To be placed by Toll Equipment Contractor prior to the paving, under this Contract.
2) Tunnel drainage trough to begin at the building foundation.
3) C.O.D.P. = Clean out Drain Pipe.
4) Sections A-A, B-B and C-C appear on sheet 43-B.
5) Place 5/8" ϕ Longitudinal hook bolts for future widening.

LEGEND:

- ○ Location of future traffic signal.
- ○ Traffic signal, (N.I.C.)
- Automatic Toll Machine, (N.I.C.)
- Future Automatic Toll Machine
- Toll Booth, (N.I.C.)
- ● Prop. Coin Tubes
- ⊗ Future Coin Tubes

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	GP	8/70	2	As Built	JRC	6.73
CHECKED	RWG		1	Rev. per Addendum 5 Amendment 8, Adopt Floating Pedestal	PHT GP	2/22/71
IN CHARGE	JPF					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

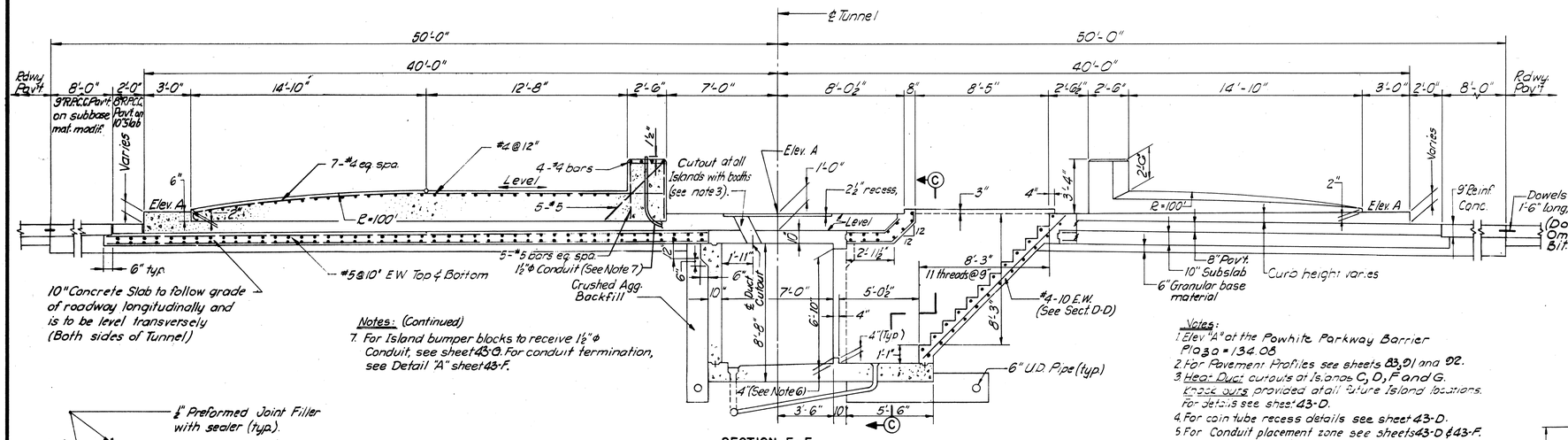
MAINLINE & RAMP

TOLL PLAZA PLANS

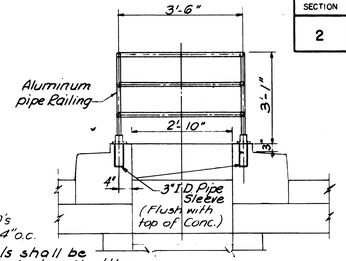
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: As Noted
CONTRACT NO.: C-2
SHEET NO. 43 OF 188

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	43-A	188



TRANSVERSE SECTION

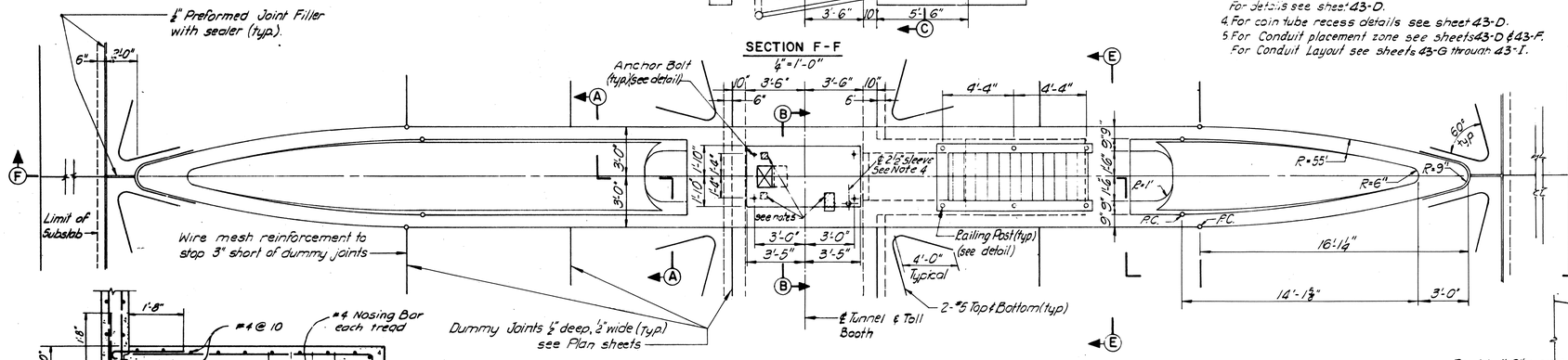


Notes: (Continued)

7. For Island bumper blocks to receive 1½"ϕ Conduit, see sheet 43-G. For conduit termination, see Detail "A" sheet 43-F.

Notes:

1. Elev "A" at the Powhite Parkway Barrier Plaza = 134.08
2. For Pavement Profiles see sheets 83,91 and 92.
3. Heat Duct cutouts at Islands C, D, F and G. Knock outs provided at all future Island locations. For details see sheet 43-D.
4. For coin tube recess details see sheet 43-D.
5. For Conduit placement zone see sheets 43-D & 43-F. For Conduit Layout see sheets 43-G through 43-I.

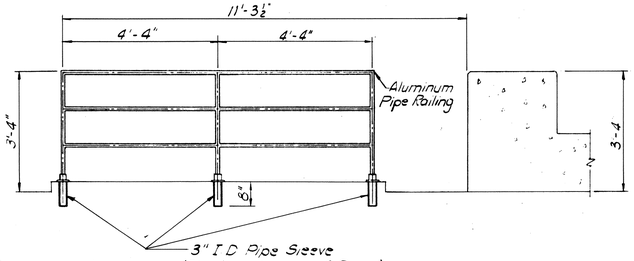


PLAN OF ISLAND WITH STAIRWAY

½"=1'-0"

SECTION F-F

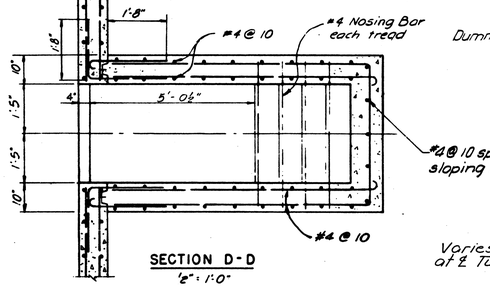
½"=1'-0"



ALUMINUM RAILING

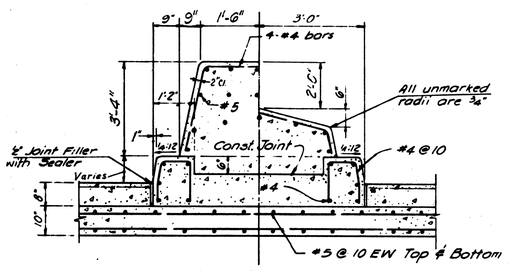
½"=1'-0"

(For additional railing details, see sheet 43-C)



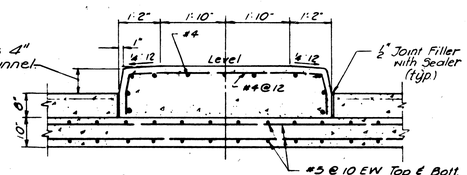
SECTION D-D

½"=1'-0"



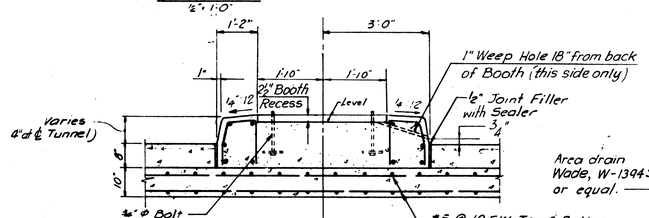
SECTION A-A

½"=1'-0"



SECTION E E

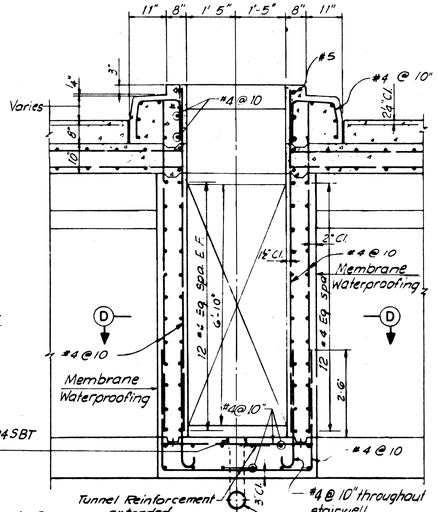
½"=1'-0"



SECTION B-B

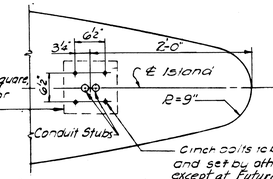
½"=1'-0"

NOTE:
Section B-B typical for Islands C, D, F & G. For all other Islands Use Section E-E.



SECTION C-C

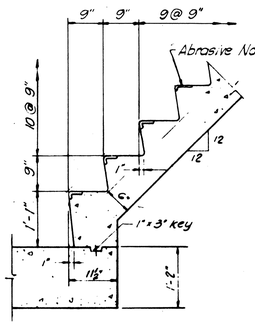
½"=1'-0"



(For traffic light locations see plan sheets) For Details see Sheet 43-F

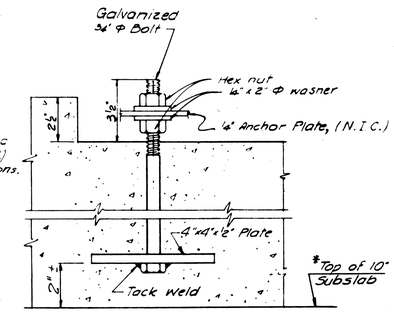
BOLT LAYOUT AT TRAFFIC LIGHT BASE

not to scale



STEP DETAIL

No Scale



DETAIL OF ANCHOR BOLT FOR TOLL BOOTH

3"=1'-0"

For Location see Island Plan this Sheet

* For dual lane Ramp Plaza this line is the bottom of Booth Pad and Roadway Pav't.

R.P.C.C. : Reinforced Portland Cement Concrete

	BY	DATE				
MADE	W.J.W.	5-68				
CHECKED	D.E.N.	5-68	1	As Built	JRC	6-73
IN CHARGE H.D.S.			NO.	REVISION	BY	DATE

AS BUILT

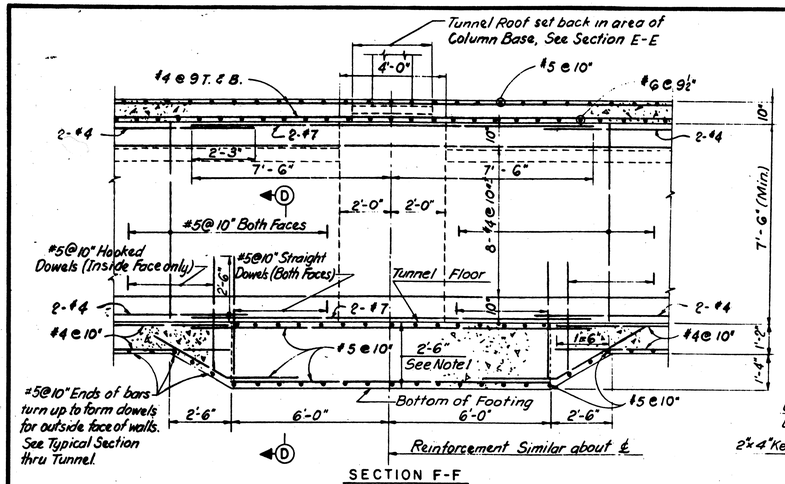
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

BARRIER PLAZA
ISLAND AND TUNNEL DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

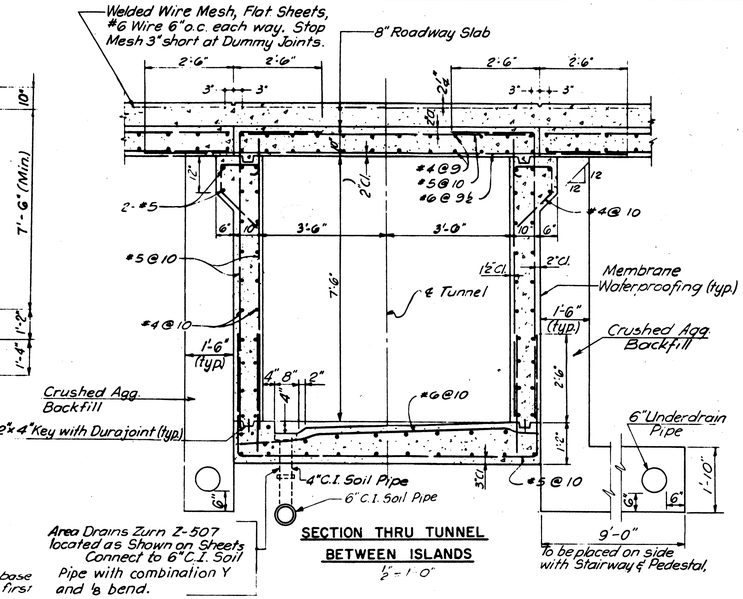
SCALE: AS NOTED
CONTRACT NO.: C-2
SHEET NO. 43-A OF 188

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	43-B	188



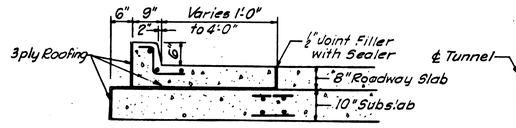
SECTION F-F

(Pedestal Reinforcement not Shown)



SECTION THRU TUNNEL BETWEEN ISLANDS

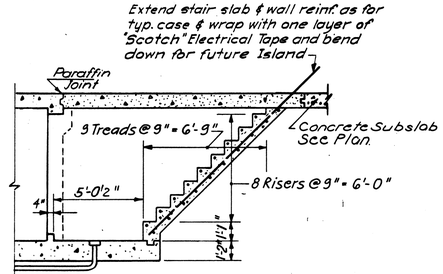
½" = 1'-0"



SECTION A-A

½" = 1'-0"

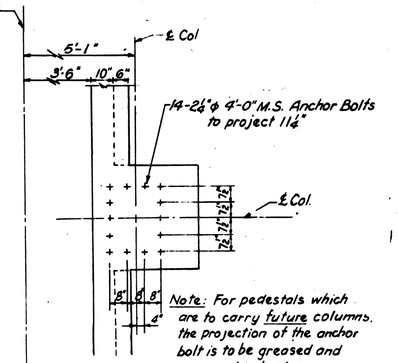
(See Sheet 43)



SECTION B-B

¼" = 1'-0"

(See Sheet 43)

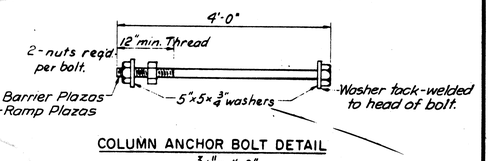


Note: For pedestals which are to carry future columns, the projection of the anchor bolt is to be greased and wrapped in burlap.

ANCHOR BOLT LAYOUT

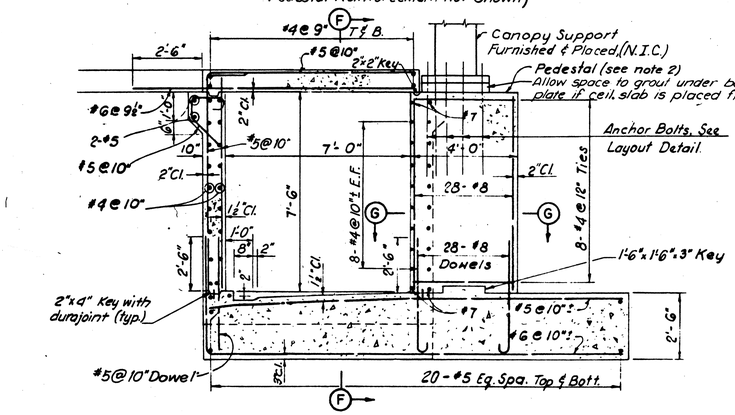
BARRIER PLAZA CANOPY COLUMM

⅜" = 1'-0"



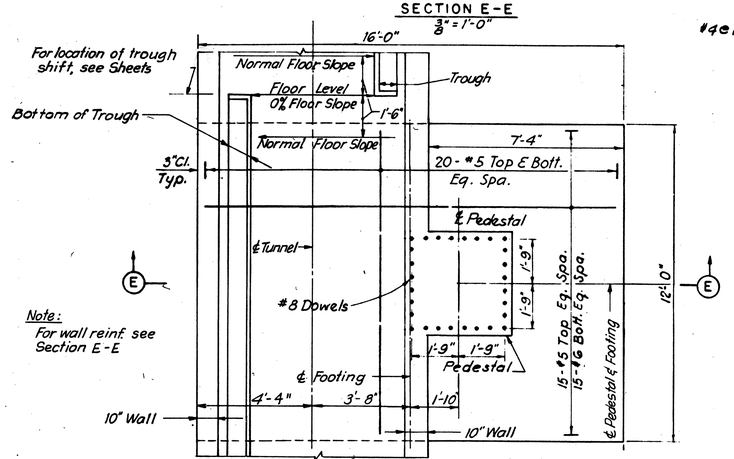
COLUMN ANCHOR BOLT DETAIL

¾" = 1'-0"



SECTION E-E

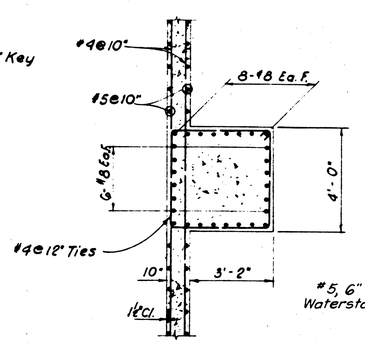
⅜" = 1'-0"



Note: For wall reinf. see Section E-E

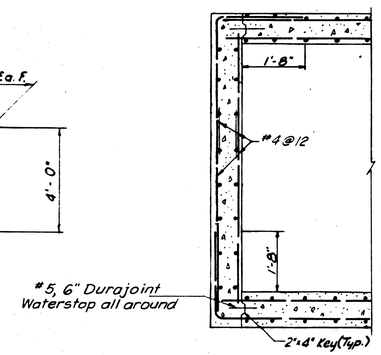
CANOPY FOOTING PLAN

⅜" = 1'-0"



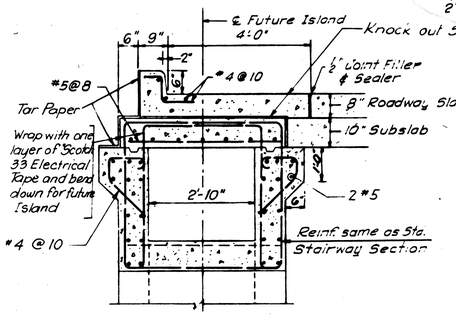
SECTION G-G

⅜" = 1'-0"



SECTION AT END OF TUNNEL

½" = 1'-0"



SECTION C-C

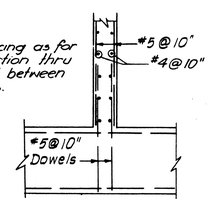
½" = 1'-0"

(See Sheet 43)

Notes:

1) Top & Bot. of Canopy footing will parallel slope of Tunnel floor.

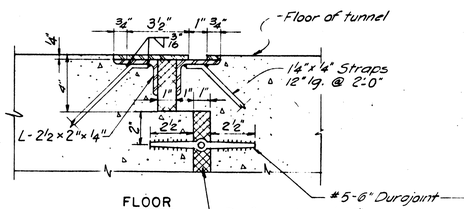
2) Canopy Pedestal shall be vertical at all times.



SECTION D-D

⅜" = 1'-0"

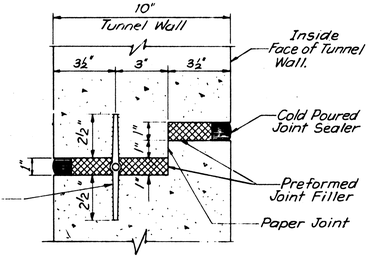
Note: Reinforcing as for Typ. Section thru Tunnel between Islands.



FLOOR

DETAILS OF TUNNEL EXPANSION JOINT

3" = 1'-0"



WALL

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	W.J.W.	5-68	2	As Built	J.R.C.	6-73
CHECKED	D.E.N.	5-68	1	Final Check	D.E.N.	6-68
IN CHARGE	H.D.S.					

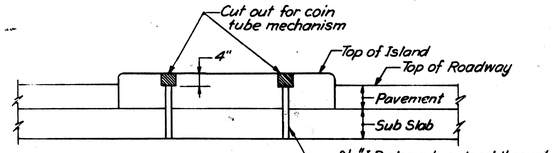
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

BARRIER PLAZA
TUNNEL DETAILS

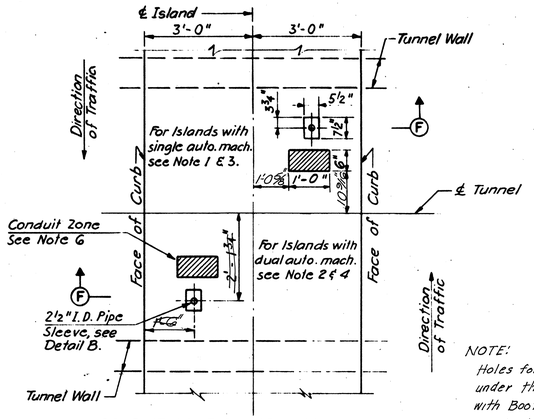
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO.: C-2
SHEET NO. 43-B OF 188

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	43-D	188

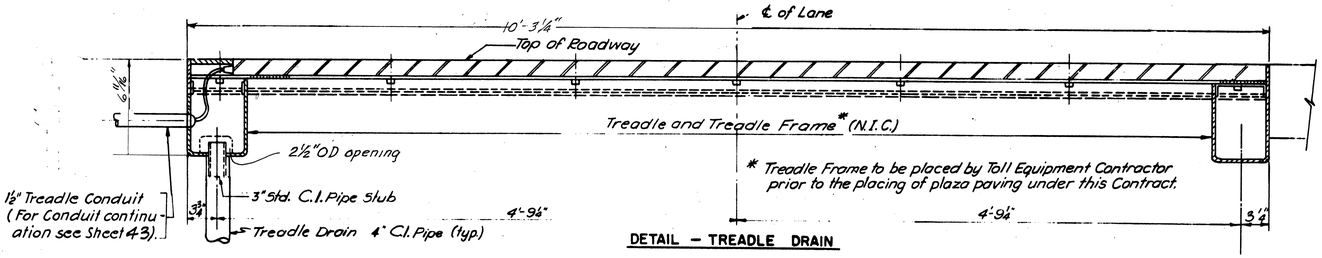


SECTION F-F
½" = 1'-0"

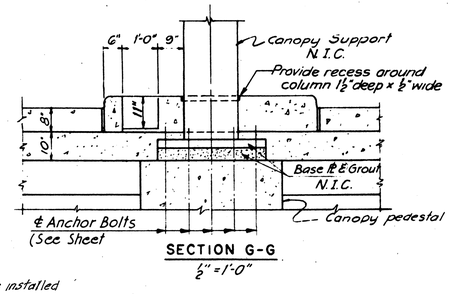


CONDUIT ZONE & PIPE SLEEVE LOCATION FOR AUTOMATIC TOLL MACHINE
½" = 1'-0"
(Location and dimension of Conduit Zones and Pipe sleeves are similar for each Direction of Traffic.)

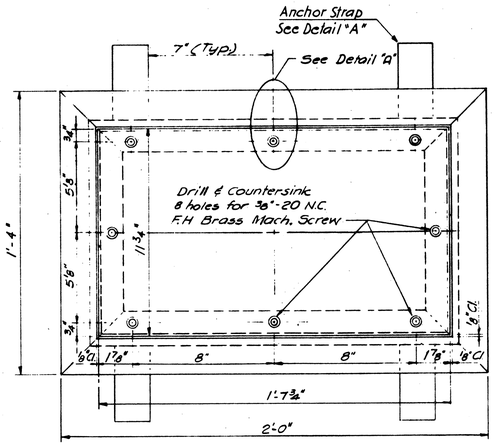
NOTE:
Holes for Coin Tubes as installed under this Contract did not fit with Booths & Coin Machines as supplied. New holes were drilled for machines, etc.



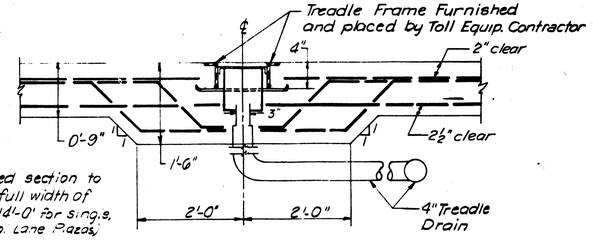
DETAIL – TREADLE DRAIN



SECTION G-G
½" = 1'-0"

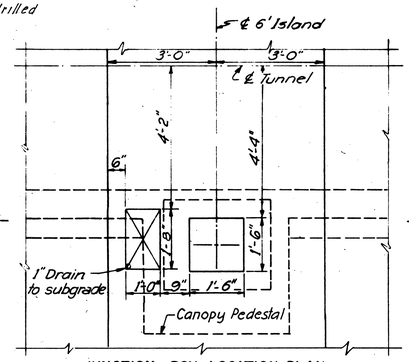


JUNCTION BOX
3" = 1'-0"

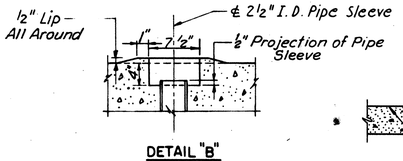


SECTION "C-C"

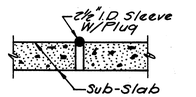
10' TREADLE FRAME INSTALLATION
¾" = 1'-0"



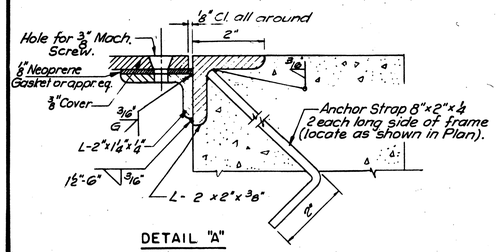
JUNCTION BOX LOCATION PLAN
½" = 1'-0"



DETAIL "B"
½" = 1'-0"

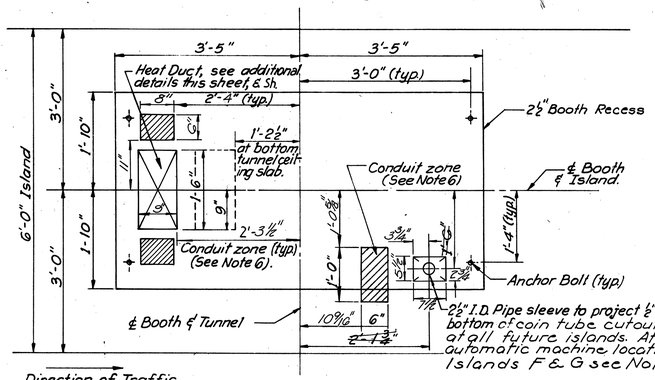


COIN TUBE DETAIL AT FUTURE ISLAND LOCATION
No Scale



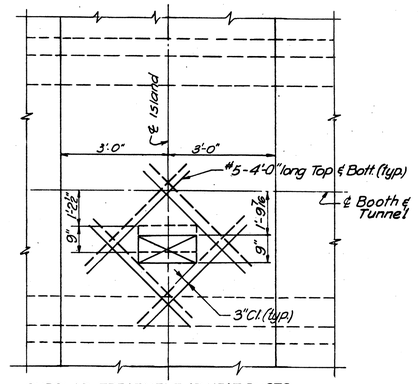
DETAIL "A"
Half size

(Frame & Cover to be Hot-Dipped Galvanized after fabrication)

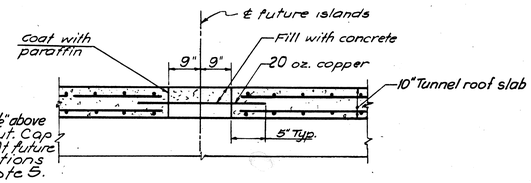


UTILITY LOCATIONS
BARRIER PLAZA TOLL BOOTHS
¾" = 1'-0"
Islands 'D' & 'C'

NOTE
Utility Locations In Tunnel Ceiling Slab Future Island A, B, H, I, J & K Similar



SUBSLAB TREATMENT AT HEAT DUCTS
Not to scale



KNOCK-OUT DETAIL
Not to Scale

NOTES:

1. Islands C & D will have a single coin tube and tube recess for automatic machine.
2. Islands E, F & G will have dual coin tubes and tube recesses for automatic machines. One location at each island will be for future automatic machines. See conduit layouts and Note 5.
4. All future island locations will have a single coin tube. Sleeve to be threaded and plugged.
5. For coin tube recesses at future automatic machine locations, plug 2½ I.D. sleeve at bottom of recess, then coat bottom and sides of recess with paraffin and fill with concrete.
6. Conduits to or from toll booths or automatic machines are to be placed totally within zones shown. For Conduit Layouts and details see Sheets 43-F through 43-I.

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	W. J. W.	5-68	3	As Built	JRC	6-73
CHECKED	D. E. N.	5-68	2	Rev. for ATS Mach.	P.H.T.	7-16-71
IN CHARGE H.D.S.			1	Final Check	D.E.N.	6-68

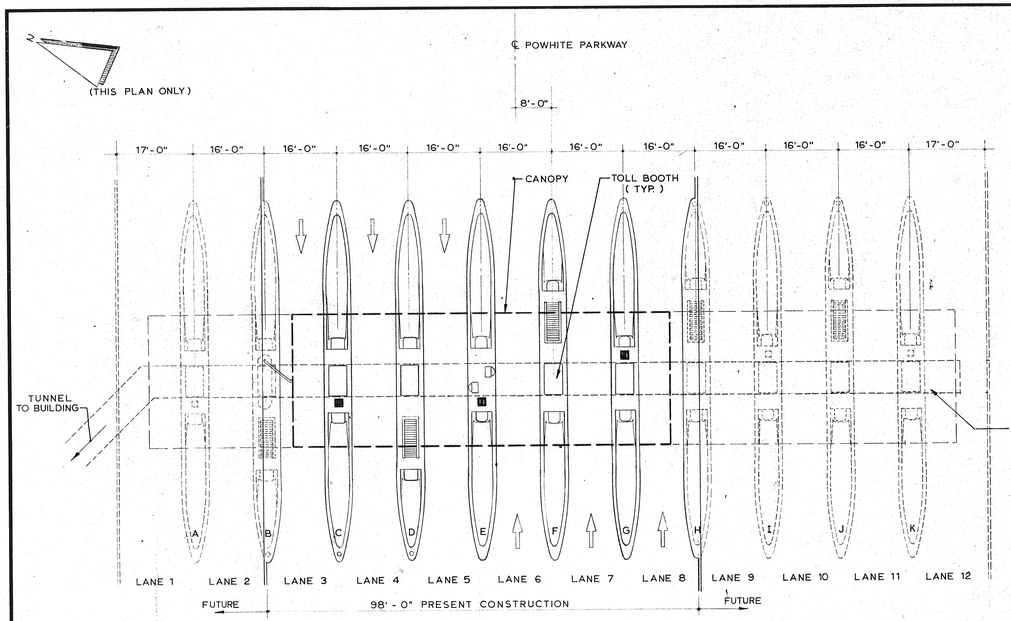
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

MISCELLANEOUS DETAILS

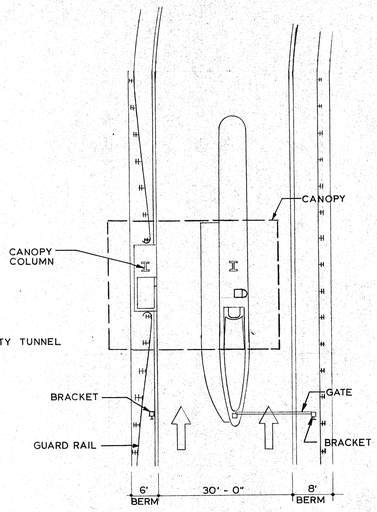
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO.: C-2
SHEET NO. 43-D OF 188

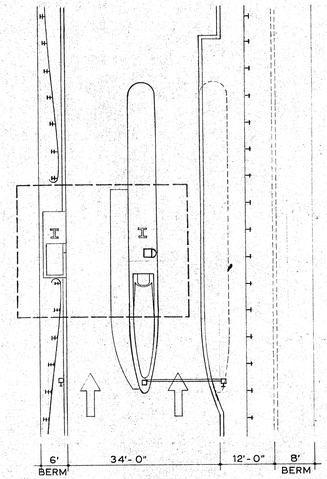
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-2	TOLL FACILITIES	12	26



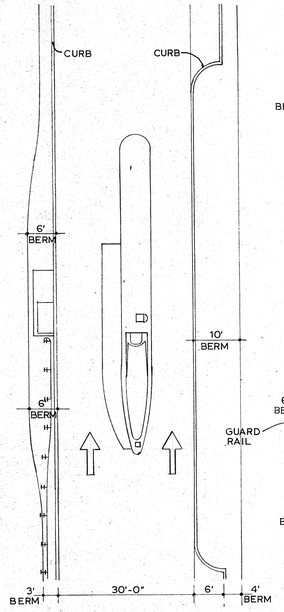
PLAN



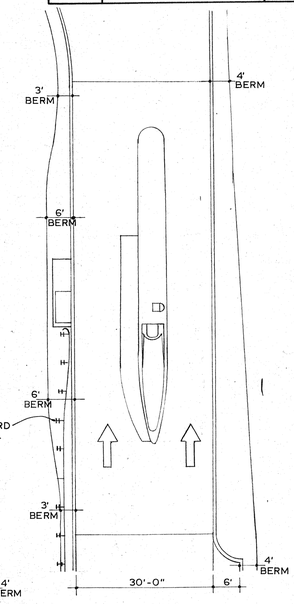
PLAN
RAMP FOREST HILL - EAST



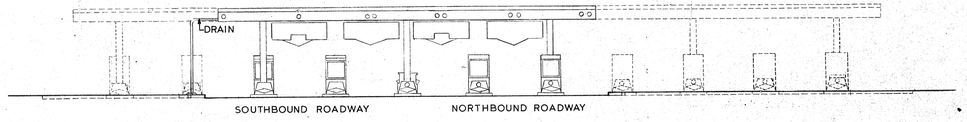
PLAN
RAMP EAST - FOREST HILL



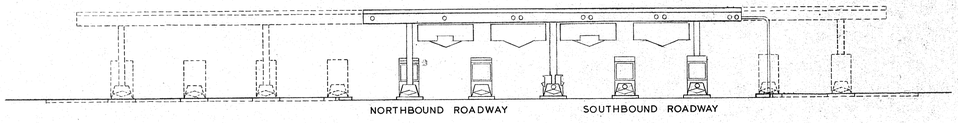
PLAN
RAMP DOUGLASDALE - NORTH



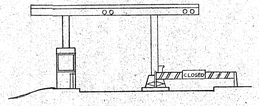
PLAN
RAMP NORTH - DOUGLASDALE



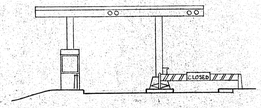
EAST ELEVATION



WEST ELEVATION

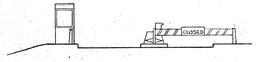


ELEVATION
RAMP FOREST HILL - EAST



ELEVATION
RAMP EAST - FOREST HILL

ELEVATION
RAMP DOUGLASDALE - NORTH



ELEVATION
RAMP NORTH - DOUGLASDALE

NOTE:
THIS SHEET IS INTENDED FOR ORIENTATION ONLY.
PARTS OF THE WORK SHOWN HERE ARE INCLUDED IN THIS CONTRACT.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	R.M.	7-31-71				
CHECKED	K.L.	2-20-72				
IN CHARGE J.P.F.						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

TOLL FACILITIES
PLANS & ELEVATIONS

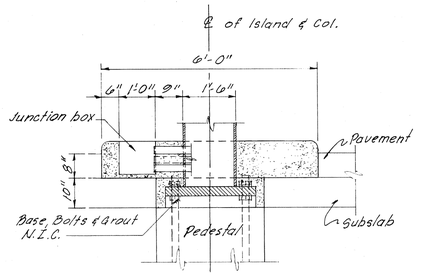
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1/16" = 1'-0"
CONTRACT NO.: TF-2
SHEET NO. 1b OF 15

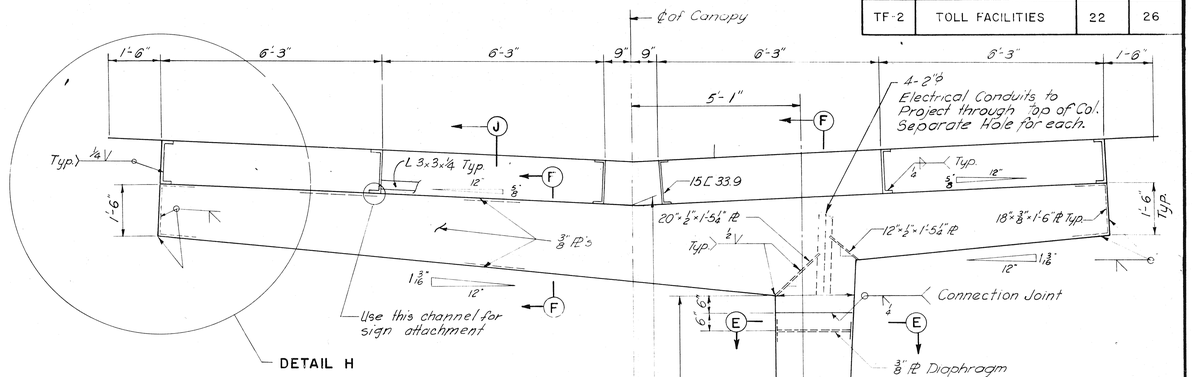
RICHMOND EXPRESSWAY SYSTEM			
SECTION		SHEET NO.	TOTAL SHEETS
TF-2	TOLL FACILITIES	22	26

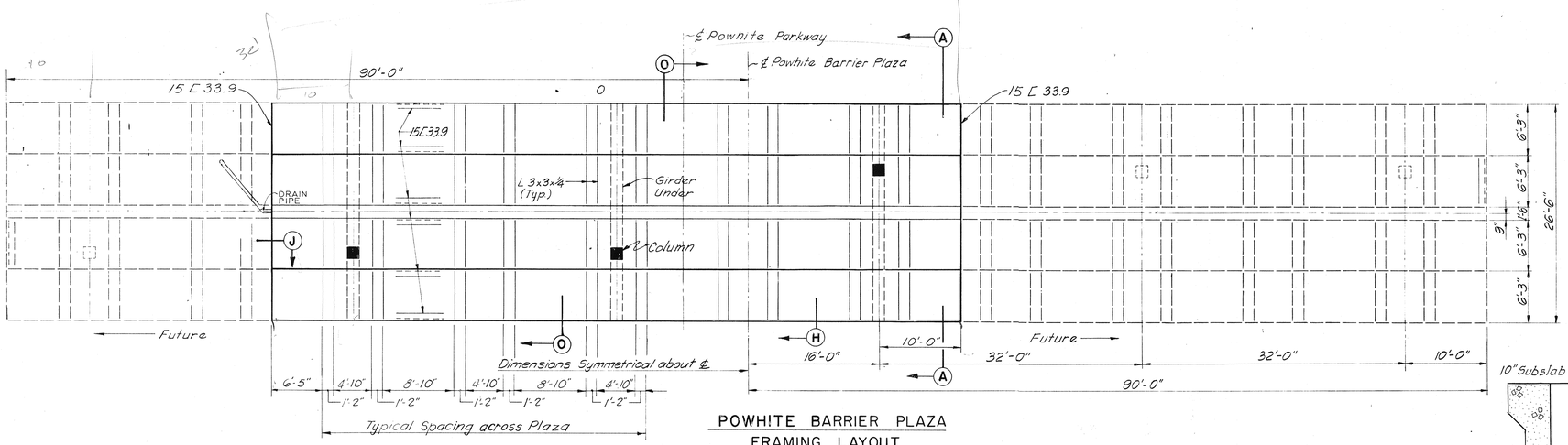
NOTES:

1. LANES 4, 5, 6 AND 7 ARE TO RECEIVE EXACT CHANGE SIGNS, SEE DETAIL.
2. LIGHT UNITS ARE TO BE PLACED IN FRONT OF EXACT CHANGE SIGNS. THE LIGHT UNITS ARE TO BE FOCUSED ON THE HORIZONTAL ℄ OF THE PANEL. LIGHT UNIT BALLASTS WILL BE EXPOSED.
3. A 3'-0" WIDE SECTION OF ISLAND WHOSE CENTER REPRESENTS THE COL. ℄ INCLUDING A 4'-0" WIDE AND 10" HIGH CONC. FILLER BELOW ARE INCLUDED IN THIS CONTRACT. THE JUNCTION BOX SHOWN IN SECTION B-B WILL BE OWNER SUPPLIED BUT INSTALLED UNDER THIS CONTRACT. ALL WORK SHOWN IN SECTION C-C IS PART OF THIS CONTRACT. PROPER JOINT SEAL AND CURB DIMENSIONS TO FIT WITH THE EXISTING MUST BE PROVIDED.



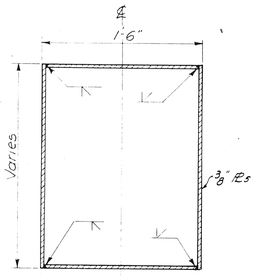
SECTION B-B
Scale: 1½"=1'-0"



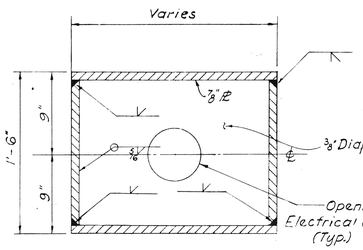


POWHITE BARRIER PLAZA
FRAMING LAYOUT
⅛" = 1'-0"

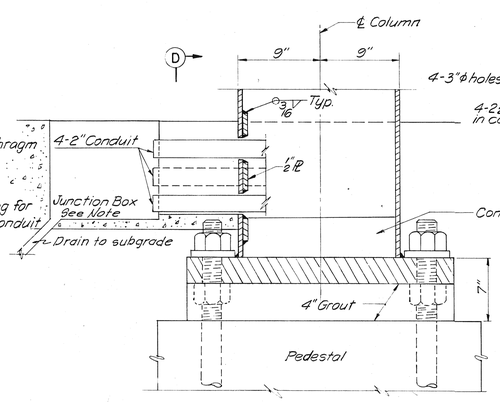
VIEW A-A
Scale ½"=1'-0"



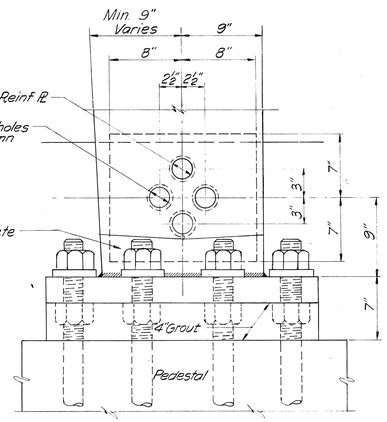
SECTION F-F
Scale: 1½"=1'-0"



SECTION E-E
Scale: 1½"=1'-0"



SECTION C-C
Scale: 1½"=1'-0"



SECTION D-D
Scale: 1½"=1'-0"

	BY	DATE	NO.	REVISION	BY	DATE
MADE	R.B.M.	7-31-71				
CHECKED	K.L.	7-31-71				
IN CHARGE	J.P.F.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

BARRIER PLAZA
CANOPY FRAMING & DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: TF-2
SHEET NO. 11b OF 15

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-2	UTILITY BUILDING	2	26

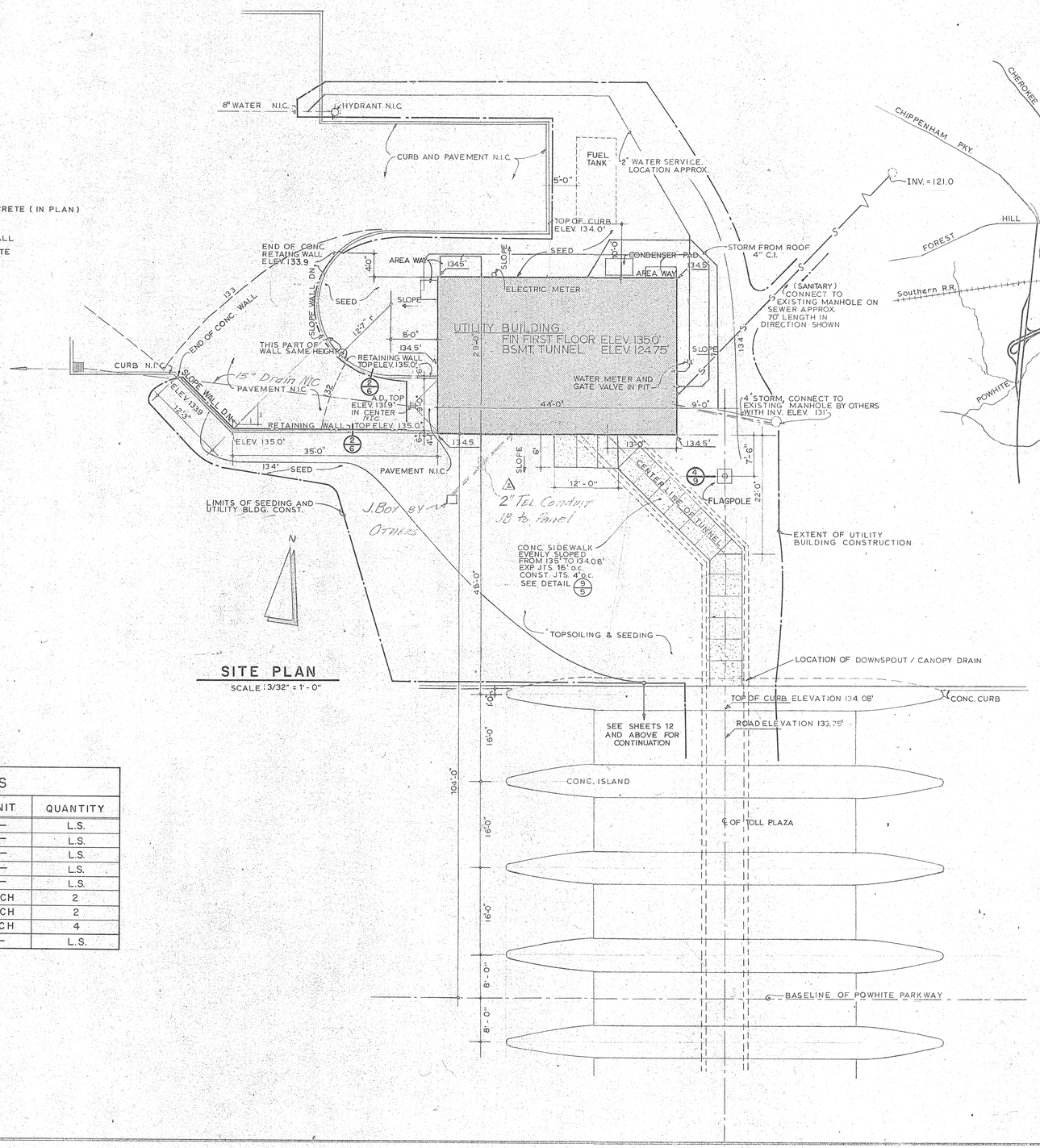
INDEX OF SHEETS

UTILITY BUILDING

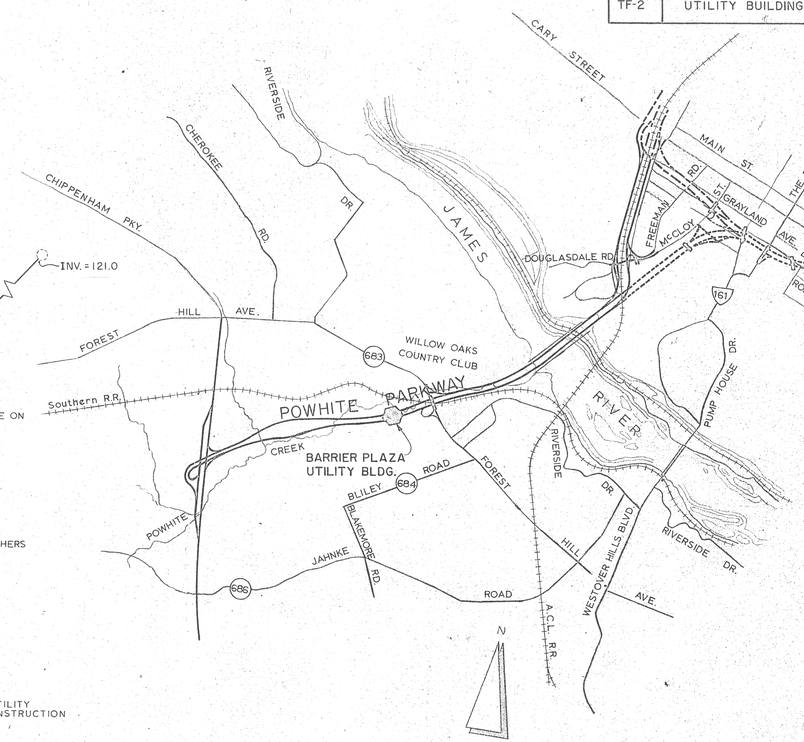
LEGEND

- 133 — EXISTING GRADE LINES
- 134 — PROPOSED GRADE LINES
- PROPOSED SIDEWALK OR CONCRETE (IN PLAN)
- PROPOSED CONC. CURB N.I.C.
- PROPOSED CONC. RETAINING WALL
- EXTENT OF CONTRACT, SEE NOTE
- —S—S— PROPOSED SANITARY SEWER
- PROPOSED STORM SEWER
- ⊕ DETAIL NUMBER / SHEET NUMBER
- N.I.C. NOT IN CONTRACT
- A.D. AREA DRAIN

NOTE:
FOR UTILITY BLDG. AND IMMEDIATE SURROUNDINGS.



SITE PLAN
SCALE: 3/32" = 1'-0"



VICINITY MAP
NO SCALE

SUMMARY OF PAY ITEMS

ITEM DESCRIPTION	UNIT	QUANTITY
Utility Building - General Construction	—	L.S.
Utility Building and Tunnel - Plumbing	—	L.S.
Utility Building and Tunnel - HVAC	—	L.S.
Utility Building and Tunnel - Electrical	—	L.S.
Canopy at Barrier Plaza	—	L.S.
Ramp Plaza With Canopy	EACH	2
Ramp Plaza Without Canopy	EACH	2
Installation of Toll Booth at Barrier Toll Plaza	EACH	4
Mobilization	—	L.S.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	KL.	7-31-71	2	Tel. Conduit & Duct	JRC	7/72
CHECKED	KL.	2-20-72	1	4" Storm Pipe	RTC	6/72
IN CHARGE J.P.F.						

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

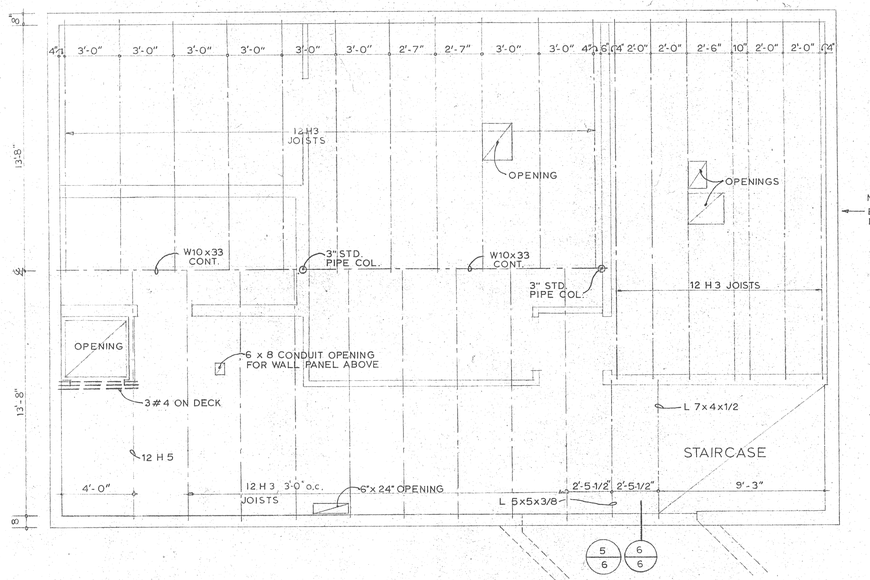
UTILITY BUILDING
SITE PLANS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: TF-2
SHEET NO. 2 OF 11

RICHMOND EXPRESSWAY SYSTEM

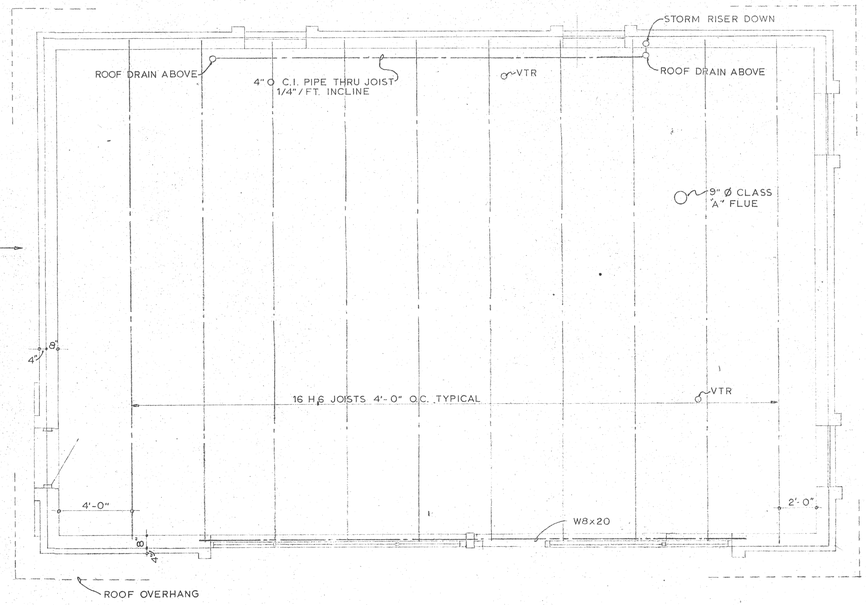
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-2	UTILITY BUILDING	3	26



BASEMENT DECK PLAN

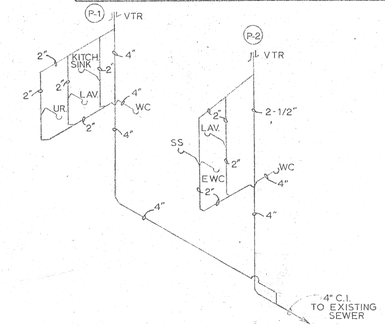
SCALE : 1/4" = 1'-0"

NOTE:
BRIDGING OF JOISTS IS NOT INDICATED

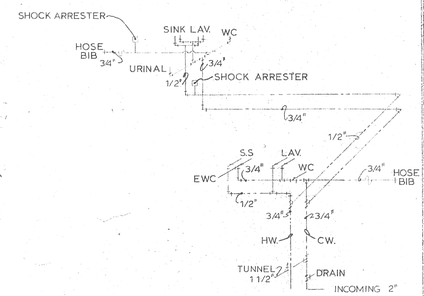


ROOF DECK PLAN

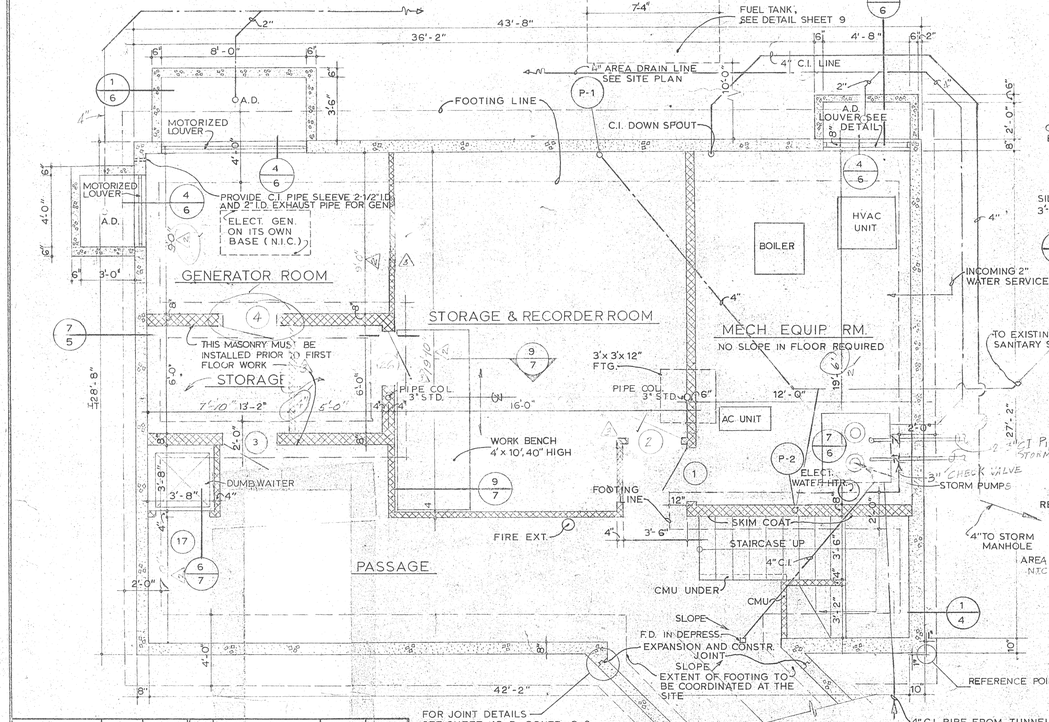
SCALE : 1/4" = 1'-0"



SOIL WASTE & VENT DIAGRAM

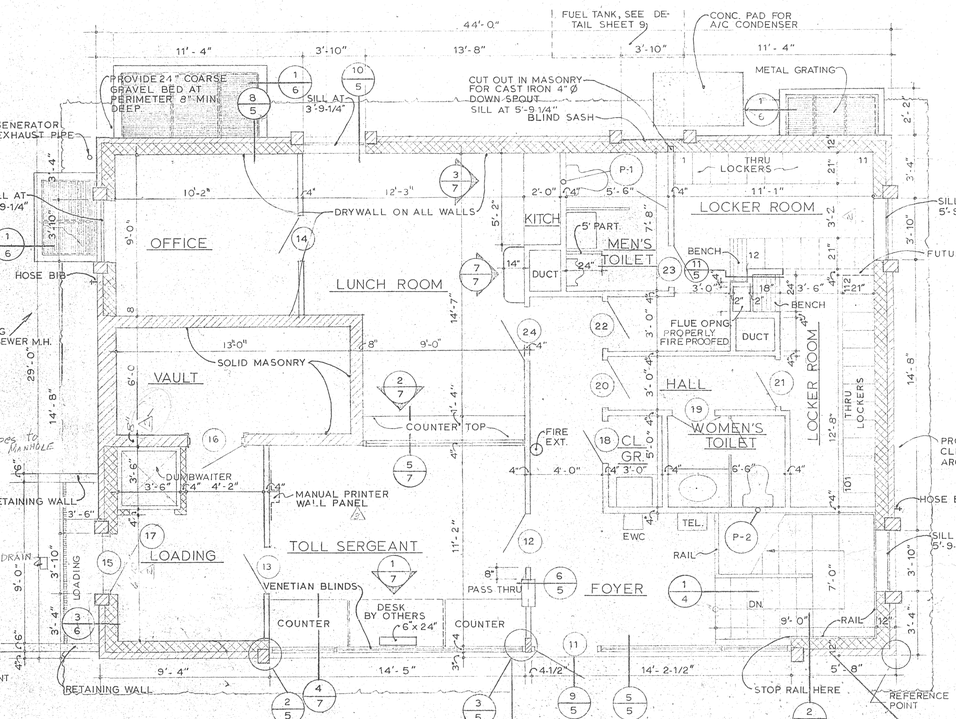


WATER PIPING DIAGRAM



BASEMENT FLOOR PLAN

SCALE : 1/4" = 1'-0"



FIRST FLOOR PLAN

SCALE : 1/4" = 1'-0"

LEGEND

- CONCRETE
- BRICK MASONRY
- CONCRETE MASONRY
- WOOD STUD PARTITION
- WINDOW
- VOID IN MASONRY
- ITEMS BY OTHERS
- A.D. AREA DRAIN
- F.D. FLOOR DRAIN

	BY	DATE
MADE	R.B.M.	7-31-71
CHECKED	K.L.	7-31-71
IN CHARGE	J.P.F.	

NO.	REVISION	BY	DATE
3	ADDENDUM No. 2	JRC	6/72
2	REVISE DIMENSIONS	JPC	6/72
1	STORM PUMPS	RTC	6/72

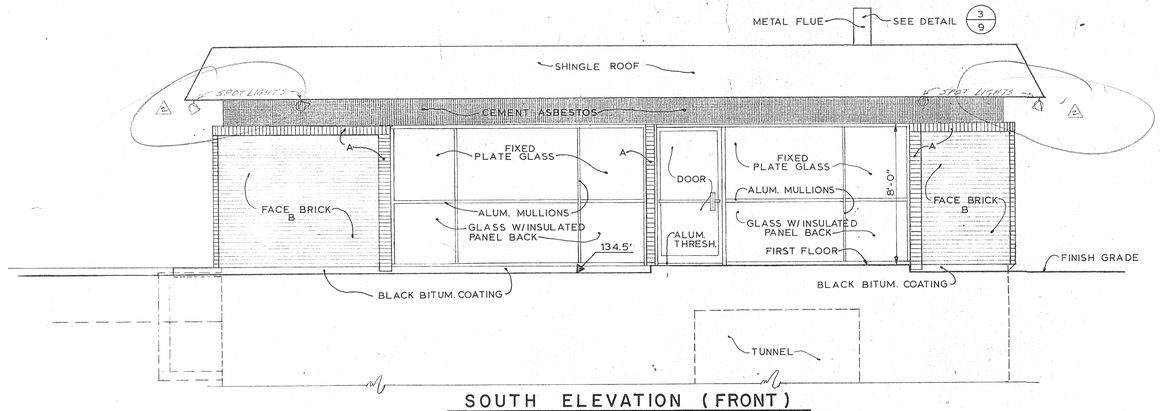
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

UTILITY BUILDING
PLANS & MISC.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

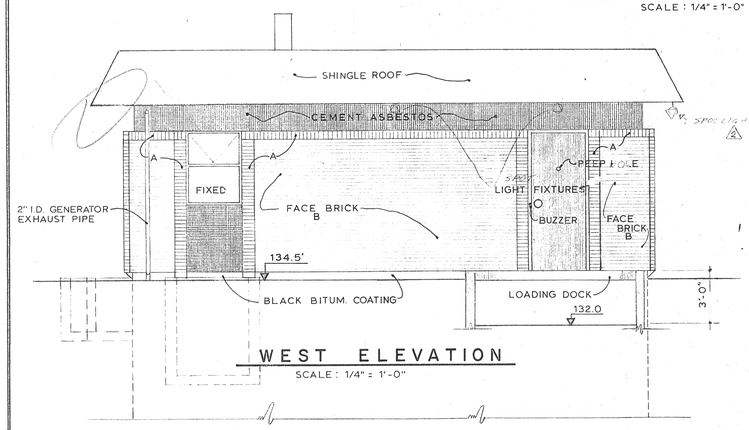
SCALE: 1/4" = 1'-0"
CONTRACT NO.: TF-2
SHEET NO. 3 OF 11

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-2	UTILITY BUILDING	4	26



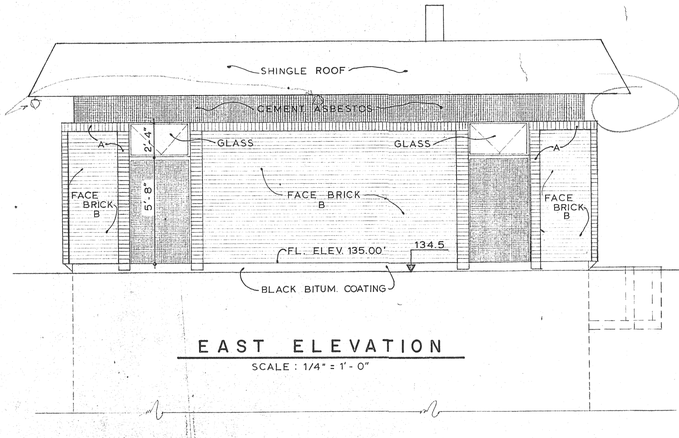
SOUTH ELEVATION (FRONT)

SCALE : 1/4" = 1'-0"



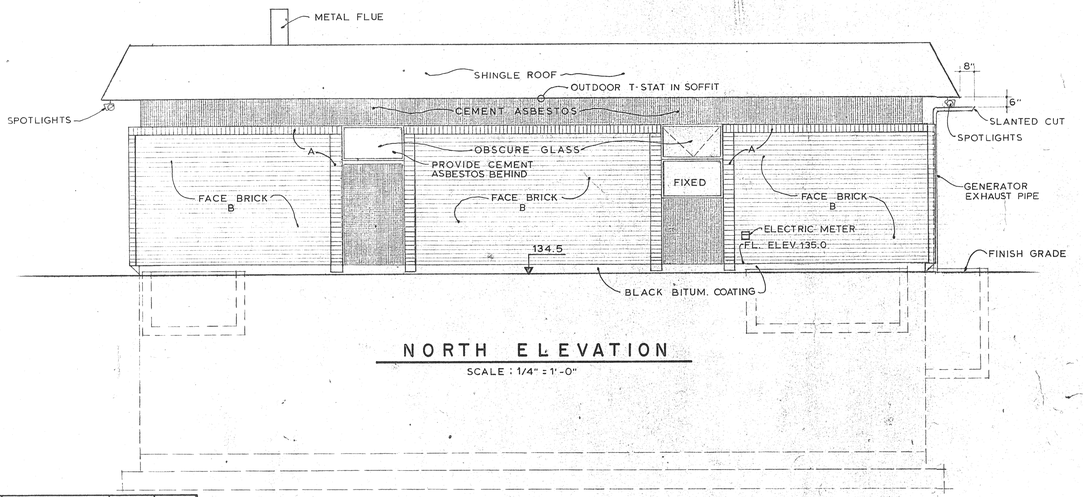
WEST ELEVATION

SCALE : 1/4" = 1'-0"



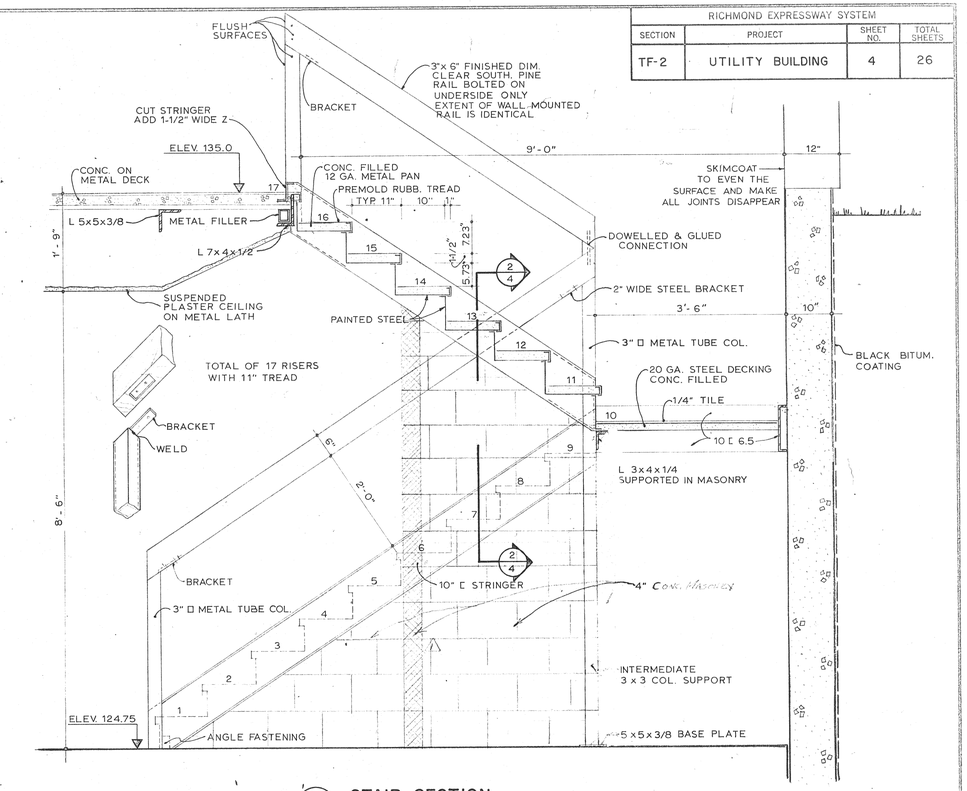
EAST ELEVATION

SCALE : 1/4" = 1'-0"



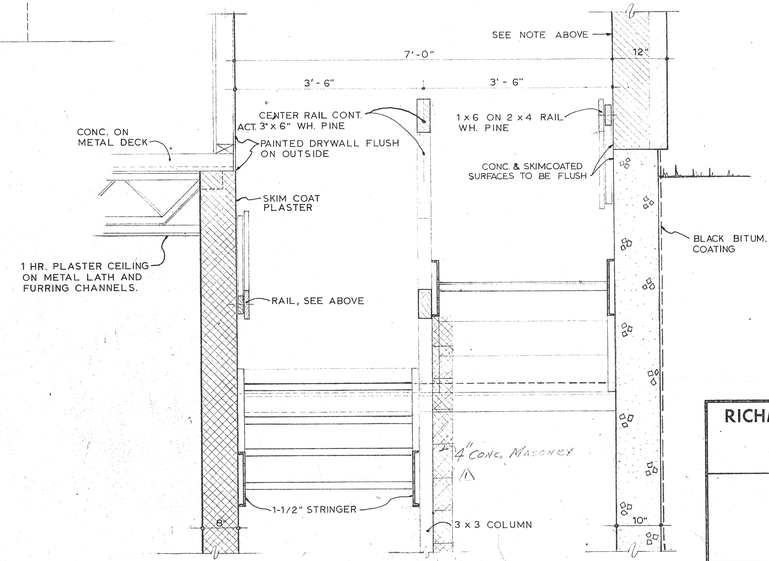
NORTH ELEVATION

SCALE : 1/4" = 1'-0"



1/4 STAIR SECTION

SCALE: 3/4" = 1'-0"



2/4 STAIR SECTION

SCALE : 3/4" = 1'-0"

	BY	DATE
MADE	R.B.M.	7-31-71
CHECKED	K.L.	7-31-71
IN CHARGE	J.P.F.	

NO.	REVISION	BY	DATE
2	Exp. Joint at Entrance	JPF	8/12
1	Revised Masonry Walls to Brick	JPF	9/12

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

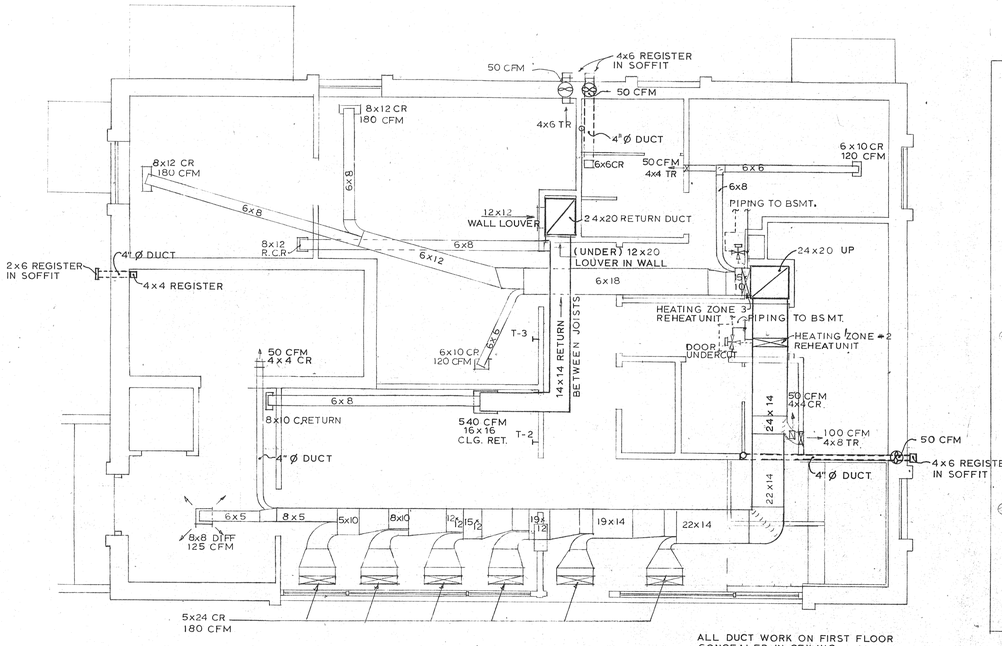
UTILITY BUILDING ELEVATIONS & SECTIONS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: TF-2
SHEET NO. 4 OF 11

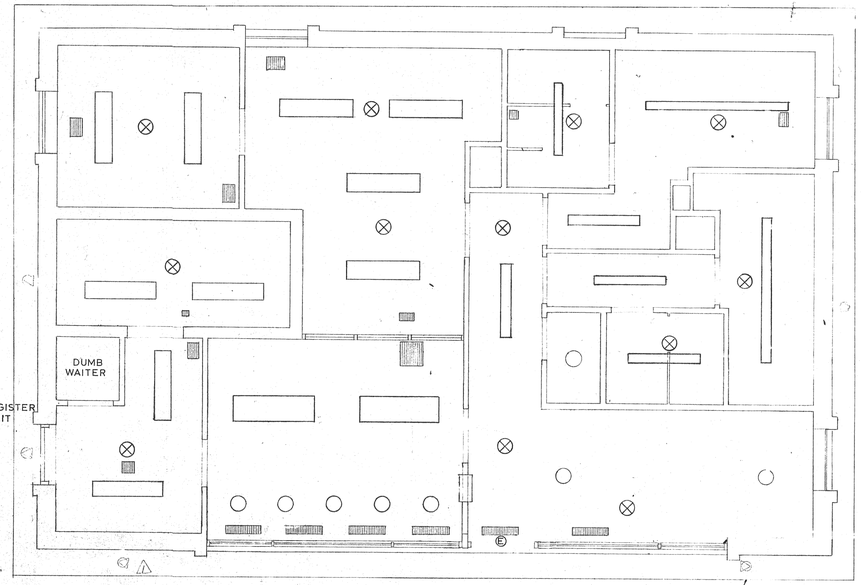
Addendum 4 5/11/2017

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-2	UTILITY BUILDING	8	26



ALL DUCT WORK ON FIRST FLOOR CONCEALED IN CEILING.

FIRST FLOOR HEATING PLAN



FIRST FLOOR CEILING PLAN

LEGEND

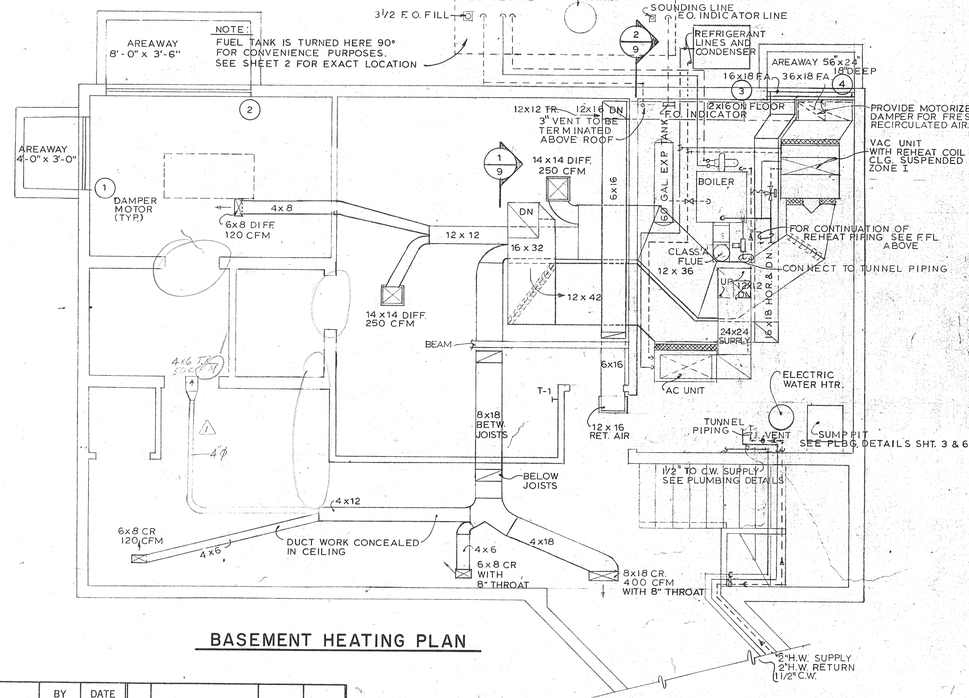
- PARTITION
- 6x12 DUCT (SIZE)
- FLUORESCENT FIXTURE
- INCANDESCENT FIXTURE
- EMERGENCY INCAND. FIXTURE
- CLG. AIR REGISTER
- EXHAUST FAN

ABBREVIATIONS

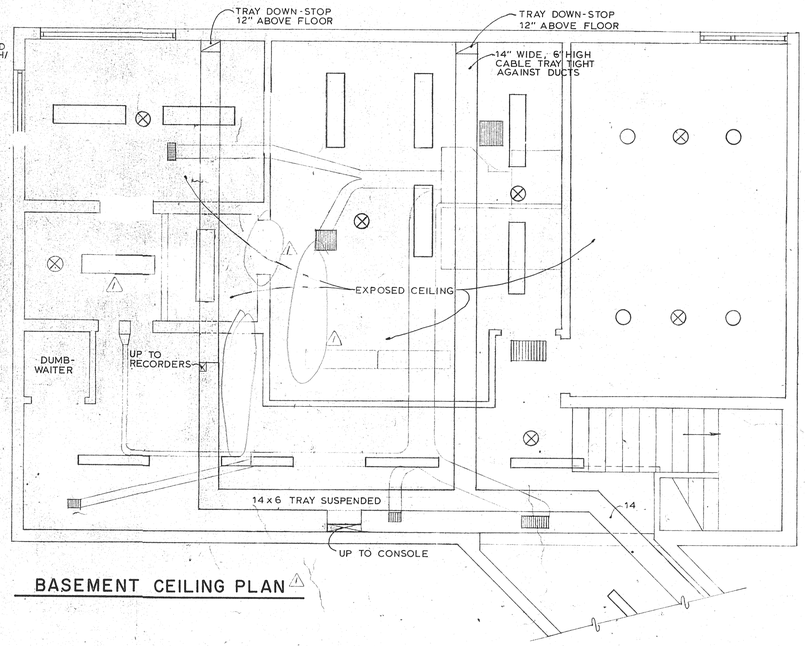
TR	TOP REGISTER
CR	CEILING REGISTER
CFM	CUB. FT. / MIN.
CW	COLD WATER

MOTOR SCHEDULE

1.	INLINE PUMP, TUNNEL HW.	32 GPM.	42 FT HEAD	3/4 HP	208/3/60	
2.	CIRCULATOR 1	12 GPM.	12 FT HEAD	1/6 HP	115/1/60	
3.	CIRCULATOR 2	12 GPM.	12 FT HEAD	1/6 HP	115/1/60	
4.	EXHAUST FAN, KITCHEN	50 CFM.			115/1/60	50 W
5.	EXHAUST FAN, MEN TOILET	50 CFM.			115/1/60	50 W
6.	EXHAUST FAN, FEMALE TOILET	50 CFM			115/1/60	50W
7.	A/C AIRHANDL. UNIT	3000 CFM		2 HP	208/3/60	
8.	CONDENSING UNIT 1	3000 CFM		2 HP	208/3/60	30 KW
9.	CONDENSING UNIT 2	1300 CFM		1 HP	208/3/60	10 KW
10.	HVAC UNIT	1300 CFM		1 HP	208/3/60	10 KW
11.	OIL BURNER			1/3 HP	115/1/60	
12.	DAMPER MOTOR 1			1/6 HP	115/1/60	
13.	DAMPER MOTOR 2 (SEE BASEMENT HEATING PLAN)			1/6 HP	115/1/60	
14.	DAMPER MOTOR 3			1/6 HP	115/1/60	
15.	DAMPER MOTOR 4			1/6 HP	115/1/60	
16.	SEWAGE EJECTOR			1/5 HP	115/1/60	
17.	UNIT HEATER 1			1/3 HP	115/1/60	
18.	UNIT HEATER 2			1/3 HP	115/1/60	
19.	UNIT HEATER 3 (BARRIER PL. BOOTHS)			1/3 HP	115/1/60	
20.	UNIT HEATER 4			1/3 HP	115/1/60	
21.	TUNNEL HEATER 1			1/5 HP	115/1/60	
22.	TUNNEL HEATER 2			1/5 HP	115/1/60	
23.	DUMBWAITER			1 HP	208/3/60	
	FOR RAMPS. (TOTAL 4) ELECTROMODE ELECT. HEATER				240 V 1/60	3 KW



BASEMENT HEATING PLAN



BASEMENT CEILING PLAN

NOTE:
PROVIDE CLEANOUTS AND ACCESS PANELS WHERE CODE AND CONVENIENCE REQUIRES.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	R.B.M.	7-31-71				
CHECKED	K.L.	7-31-71	1	ADD #14 #2 REV	JRC	8-72
IN CHARGE	J.P.F.					

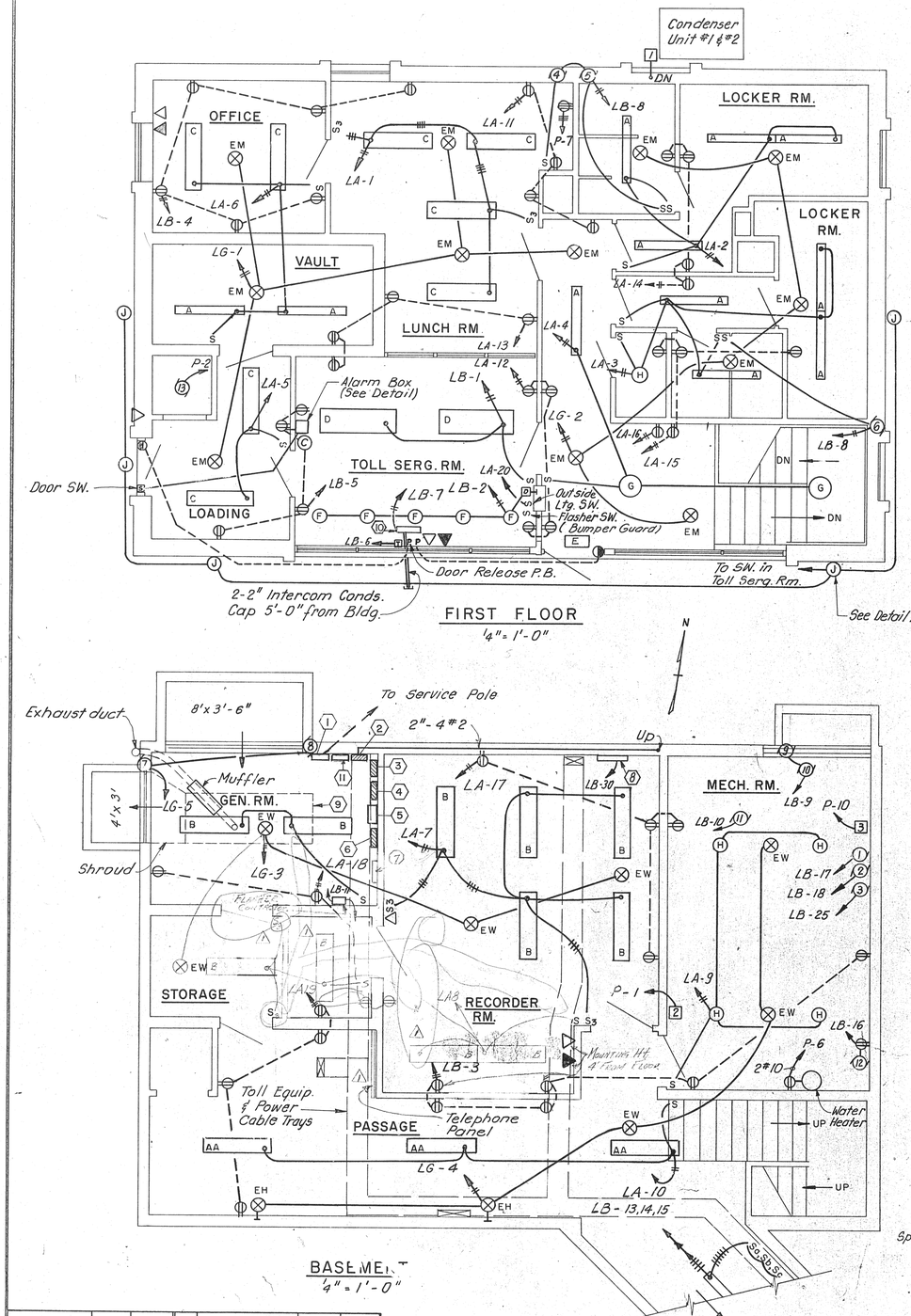
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

UTILITY BUILDING
HTG/AC AND REFL. CLG. PLAN

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: NOT TO SCALE
CONTRACT NO.: TF-2
SHEET NO. 8 OF 11

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF2	UTILITY BUILDING	10	26



FIRST FLOOR
1/4" = 1'-0"

BASEMENT
1/4" = 1'-0"

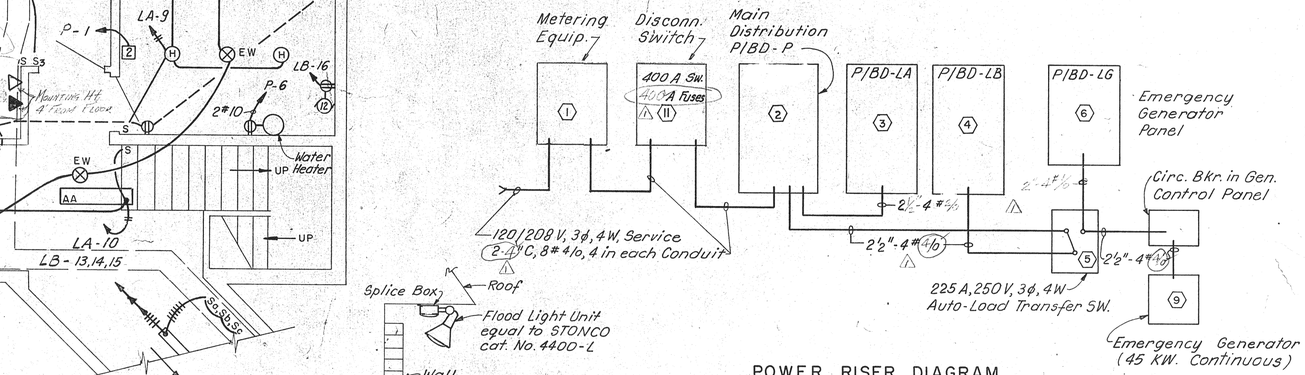
LEGEND

- A — Fluorescent Fixture, Letter indicates type.
- (B) — Incandescent Fixture, Letter indicates type.
- ⊗ — Emergency Light - in ceiling
- ⊗ — Emergency Light - Wall Mounted
- E — Exit Light
- D — Dimmer
- Duplex Wall Receptacle Outlet
- Range Receptacle
- S — Single Pole Switch
- S_3 — Three way Switch
- P — Door Release system
- Telephone Outlet
- Intercom. System telephone Outlet.
- C — Electric clock outlet
- 7 — Transformer for Door Release system
- Panel Board
- Wiring Concealed in Walls or Ceiling
- Wiring Concealed in Floor.
- LA-3 — Home run with Panel & Circ. Designation

1. Current Transformer & Metering Equipment
2. Main Distribution Panel Board - P
3. Panel Board - LA
4. Panel Board - LB
5. Auto - Transfer Switch
6. Emergency Generator Panel - LG
7. Generator Control Panel.
8. Recorder Room Panel Board - R
9. Generator Set (45 KW. Continuous)
10. Inter Com. Panel
11. Disconnect. SW. (400 A.) & Fuses (225 A.)

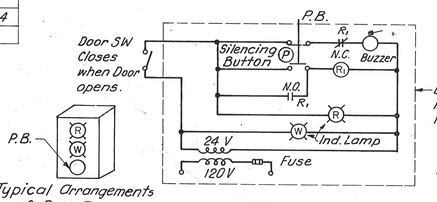
1. Circu. Pump #1 (Zone - 1), 1/6 H.P, 115 V, 1φ, 60 cs, 2#12
2. Circu. Pump #2 (Zone - 2), 1/6 H.P, 115 V, 1φ, 60 cs, 2#12
3. Circu. Pump #3 (Tunnel), 3/4 H.P, 208 V, 3φ, 60 cs, 4#12
4. Exhaust Fan (Kitchen)
5. Exhaust Fan (Men toilet) } all 1/12 H.P, 115 V, 1φ,
6. Exhaust Fan (Women toilet) } 60 cs, 4#12
7. Damper Motor #1
8. Damper Motor #2 } all 1/6 H.P, 115 V, 1φ, 60 cs, 2#12
9. Damper Motor #3 } #1 & 2 Connected to generator
10. Damper Motor #4 } Controls; 3 & 4 Connected to H & V Controls
11. Oil Burner, 1/3 HP, 115 V, 1φ, 60 cs, 2#12
12. Storm Sewage Ejector 1/3 HP, 115 V, 1φ, 60 cs, 2#12
13. Dumb Waiter 1 HP, 208 V, 3φ, 60 cs, 4#12
1. Condenser Unit #1 (2 HP & 30 KW) &
2. Condenser Unit #2 (1 HP & 10 KW)
2. AIC Airhandling Unit (2 HP)
3. HVAC Unit (1 HP)

General Notes:
1- For Lighting Fixture Schedule see Spec's.



POWER RISER DIAGRAM
No Scale

OUTSIDE LIGHTING
DETAIL A



ALARM SYSTEM
No Scale

MAIN DISTRIBUTION PANEL-P

120/208 V, 3φ, 4W, 5N, 42 Poles, 600A BUS } Westinghouse Type CDP

Circ. No.	Pole	Trip	Description
1	2	20A	AC Air handling Unit (2 HP)
2	2	20A	Dumb Waiter (1 HP)
3	2	20A	Spare
4	3	20A	Spare
5	3	20A	Spare
6	2	30A	Elect. W.H. Utility (4 KW)
7	2	50A	Kitchen Unit (8.5 KW)
8	2	30A	Spare
9	3	30A	Spare
10	3	50A	HVAC Unit (1 H.P & 10 KW)
11	3	50A	Spare
12	3	150A	Condensers #1 & #2 (@ 43.0 KW)
13	3	150A	Panel Board - LA
14	3	150A	Panel Board - LB
15	3		Space
16	3		Space

PANEL BOARD - LB

120/208 V, 3φ, 4W, 5N, 42 Poles, 225 A BUS } Westinghouse Type WBA

Circ. No.	Pole	Trip	Description
1, 2	1	20A	Ltg. 1st Floor
3, 4, 5	1	20A	Recept. 1st Fl. & Basement
6	1	20A	Door Release system
7	1	20A	Intercom Panel
8	1	20A	Exhaust Fans (three)
9	1	20A	Damper Motors #3 & #4
10	1	20A	Oil Burner
11	1	20A	Flasher, Contactor (Bumper Guard)
12	1	20A	Tunnel Heater Fans (two)
13, 14, 15	1	20A	Ltg. Tunnel
16	1	20A	Storm Sewage Ejector
17	1	20A	Circulator. Pump #1
18	1	20A	Circulator Pump #2
19	1	20A	Stair Case Ltg. (Tunnel)
20, 21	1	20A	Spare
22, 23, 24	1	20A	Spare
25	3	20A	Circulator Pump #3 (Tunnel)
26	3	50A	Toll Isl. "C" C.B. Panel - 1
27	3	50A	Toll Isls. "D, E & F" C.B. Panel - 2
28	3	50A	Toll Isls. "G, H & I" C.B. Panel - 3
29	3	50A	Future Isls. "J & K" C.B. Panel - 4
30	3	50A	P/BD - R (Record Rm)

PANEL BOARD - LA

120/208 V, 3 φ, 4 W, 5N, 32 Poles, 225 A BUS } Westinghouse Type WBA

Circ. No.	Pole	Trip	Description
1, 2, 3, 4, 5, 6	1	20A	Ltg. 1st Floor
7, 8, 9, 10	1	20A	Ltg. Basement
11, 12, 13, 14, 15	1	20A	Receptacles 1st Floor
16	1	20A	Elect. Water Cooler
17, 18, 19	1	20A	Receptacles Basement
20	1	20A	Out side flood Ltg.
21	1	20A	Spare
22	1	20A	Spare
23	1	20A	Spare
24	1	20A	Spare
25	1	20A	Spare
26	1	20A	Spare
27	1	20A	Spare
28	1	20A	Spare
29, 30	1		Space
31, 32	1		Space

PANEL BOARD - R

120/208 V, 3φ, 4W, 5N: 20 Poles, 100 A Bus } Westinghouse Type WBA

Circ. No.	Pole	Trip	Description
1 to 16	1	20A	Recorder Room Circs.
17 to 20	1		Spaces

PANEL BOARD - LG

120/208 V, 3φ, 4W, 5N. 10 Poles, 100A BUS } Westinghouse Type WBA

Circ. No.	Pole	Trip	Description
1	1	20A	Ltg. 1st Floor (Emg.)
2	1	20A	Ltg. 1st Floor (Emg.)
3	1	20A	Ltg. Basement (Emg.)
4	1	20A	Ltg. Basement (Emg.)
5	1	20A	Damper Motors #1 & #2
6	1	20A	Spare
7	1	20A	Spare
8	1		Space
9	1		Space
10	1		Space

	BY	DATE	NO.	REVISION	BY	DATE
MADE	L.S.	3-2-72				
CHECKED	H.C.A.	3-2-72	1	Rev. for Mod. #2	J.K.C.	8-7-72
IN CHARGE	P.G.P.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

UTILITY BUILDING
ELECTRICAL

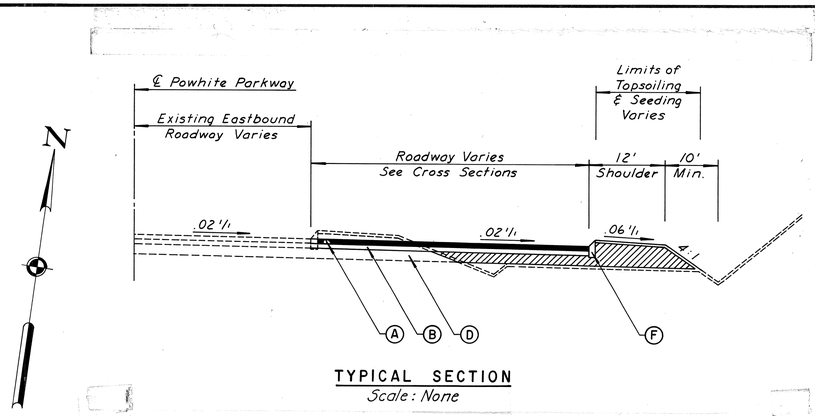
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO.: TF-2
SHEET NO. 10 OF 27

NORTHBOUND POWHITE PARKWAY TOLL PLAZA

1978 WIDENING

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-4	POWHITE PARKWAY	1	



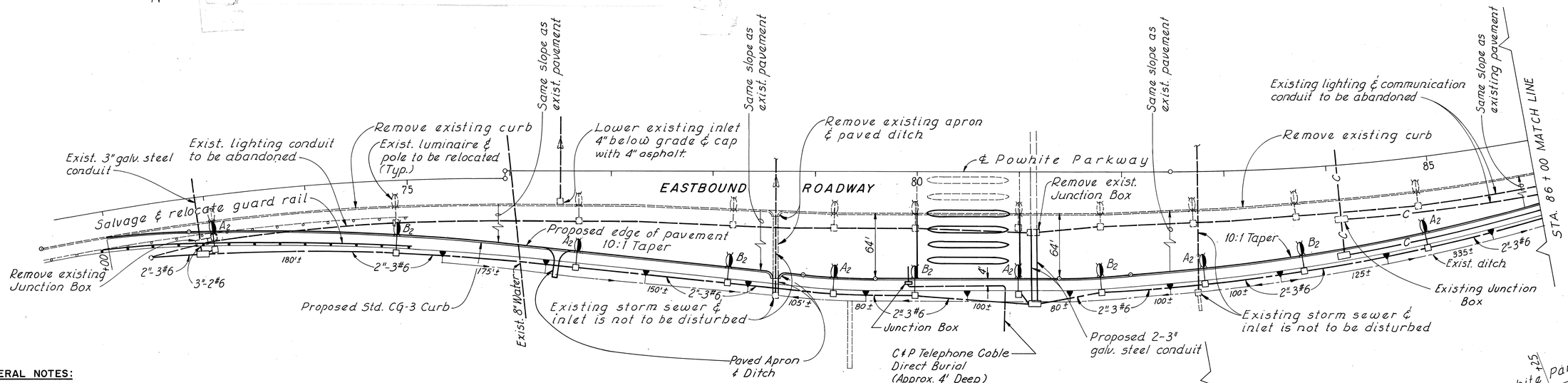
TYPICAL SECTION
Scale: None

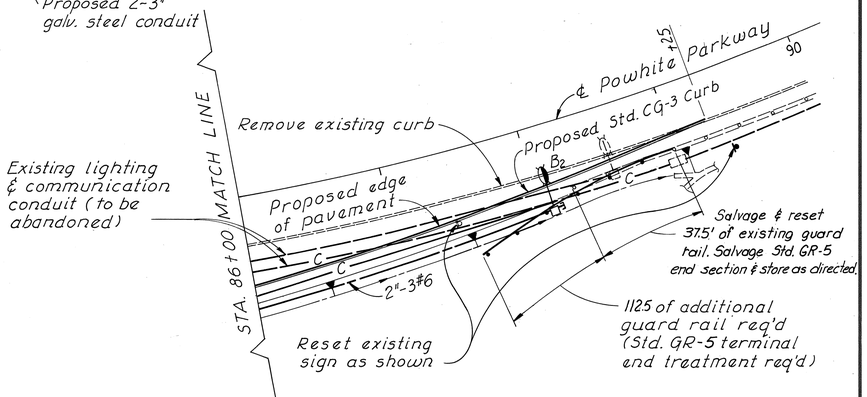
LEGEND:

- (A)-1½" Bituminous Concrete Surface Course Type S-5.
- (B)-5½" Bituminous Concrete Base Course Type B-3.
- (D)-12" Aggregate Subbase Course, Size 21A. Prime Width of Pavement with 0.4 Gal./Sq.Yd. AE-2 or RC-250.
- (F)-Mountable Curb, CG-3.

CONSTRUCTION SEQUENCE:

1. Preparation for placement of concrete slab for Toll Plaza expansion to include all necessary conduit, installing or connecting subsurface drainage where required, removing existing caps to stairways to tunnel, etc.
2. Installing and extending necessary conduit for lighting & communication to include light pole foundations and junction boxes.
3. Island construction with emphasis on Lanes 9 & 10 for automatic coin collection to relieve peak traffic back-up.
4. Continuation of grading and pavement construction to provide access to expanded toll facilities. Put into operation new lighting and communications.
5. Completion of toll plaza island and equipment.
6. Final completion of pavement and toll plaza construction, including guard rail, sign relocation, pavement striping, etc.





GENERAL NOTES:

1. It is the intent of this Plan:
   a. To show the limits of construction in respect to the existing Toll Plaza.
   b. To show either the addition, removal or relocation of existing utilities.
2. a. Electrical or communication conduit shall be extended or replaced in kind, unless otherwise directed by the Engineer.
   b. The letters along side of the proposed luminaires indicate phase connection and the numerical indicates circuit connection.
   c. All electrical wiring to be salvaged when possible and stored as directed by the Engineer.
3. Pavement striping shall be expanded to include expanded facility.
4. Rates of taper refer to offsets from centerline.

ESTIMATED QUANTITIES

ITEM	UNIT	TOTAL QUANTITIES	ITEM	UNIT	TOTAL QUANTITIES
REGULAR EXCAVATION	C.Y.	400	PAVED SHOULDER APRONS	EACH	2
SUBBASE COURSE, SIZE 21A	TON	6706	MULCH	BALES	120
BIT. CONC. BASE COURSE, TYPE B-3	TON	2231	LOWER AND CAP EXISTING DI-1	EACH	1
PRIME, RC-70 OR MC-70	GAL.	1276	ELECTRICAL,		
BIT. CONC. SURFACE COURSE, TYPE S-5	TON	695	2" CONDUIT P.V.C.	L.F.	1568
CG-3	L.F.	1696	3" GALVANIZED STEEL CONDUIT	L.F.	120
REMOVAL, CG-3	L.F.	1740	# 6 ELECTRICAL CONDUCTOR	L.F.	5970
REMOVE AND RELOCATE, STD. GR-2A OR GR-2B	L.F.	402	CONCRETE JUNCTION BOX	EACH	2
STD. GR-2A OR GR-2B	L.F.	213	RESET LIGHT POLES	EACH	12
TOPSOIL, CLASS B	C.Y.	217	COMMUNICATIONS,		
SEED	LB.	200	2" METAL CONDUIT	L.F.	455
TACK COAT	GAL.	175	JUNCTION BOX	EACH	1
			SIGNING, RESET SPEED SIGN	EACH	1

	BY	DATE	NO.	REVISION	BY	DATE
MADE	K.B.P.	9-75				
CHECKED	C.C.J.	9-75	1	Misc. Rev.	P.H.T.	9-75
IN CHARGE	J.P.F.					

AS BUILT

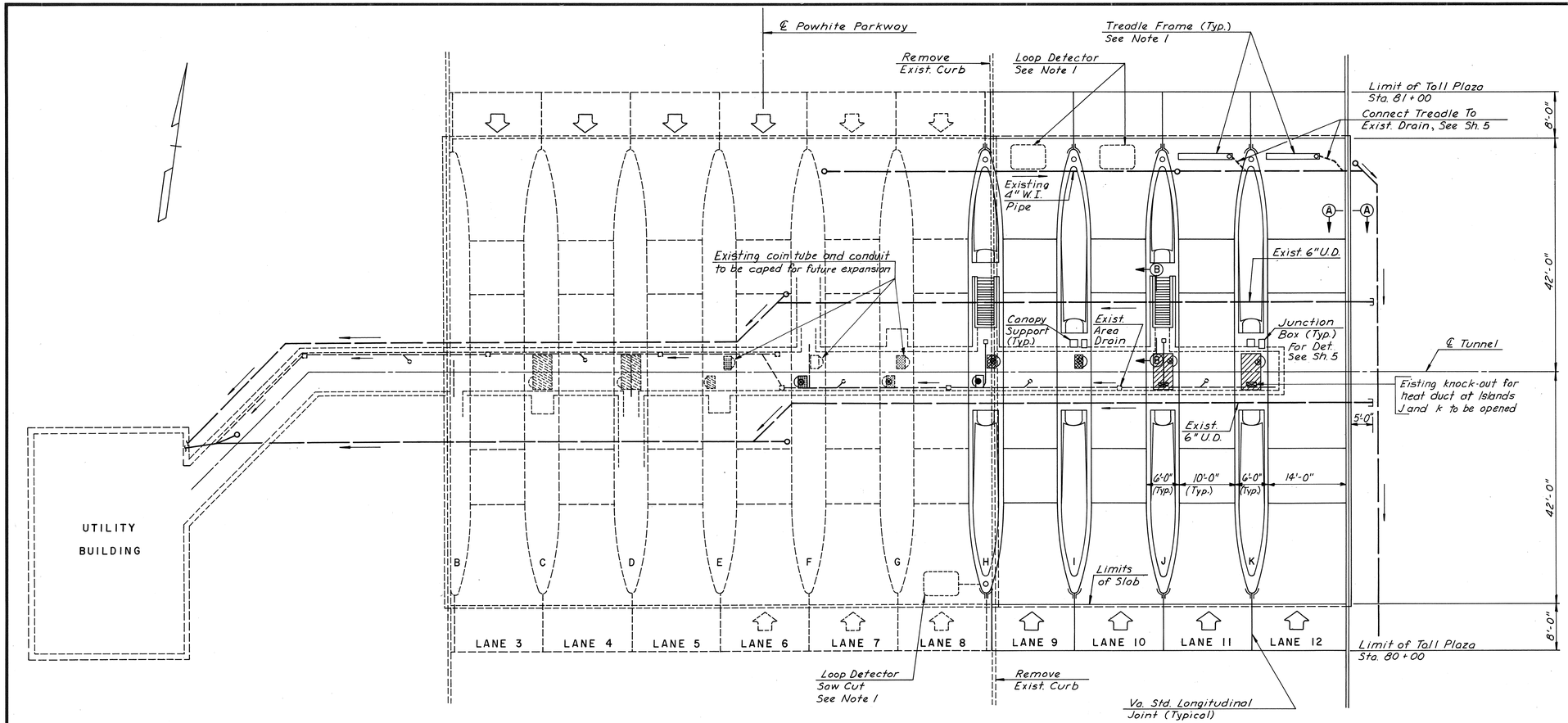
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

EXPANSION OF POWHITE TOLL PLAZA
GRADING, PAVEMENT AND UTILITY PLAN
STA. 72+00 TO STA. 89+25 E.B.L.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: 1" = 50'
CONTRACT NO.:
SHEET NO. 1 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-4	POWHITE PARKWAY	2	



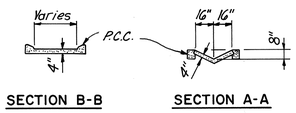
PLAN
Scale : 3/32" = 1'-0"

SEQUENCE

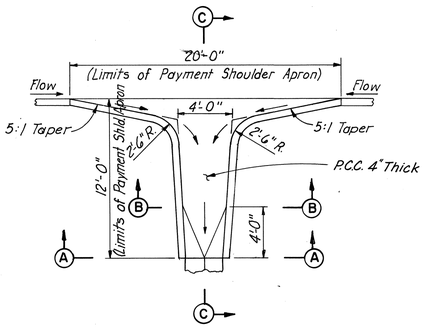
- EXISTING EQUIPMENT TO REMAIN IN SERVICE.
- NEW COLLECTION EQUIPMENT TO BE INSTALLED ON ISLANDS H AND I AS THEY ARE COMPLETED.
- TOLL BOOTH AND EQUIPMENT TO SHIFT FROM ISLANDS F & G TO ISLANDS J & K IN SINGLE UNIT STAGES.
- EQUIPMENT TO BE SHIFTED FROM ISLAND E TO ISLAND F CAP CONDUIT ZONES ON ISLAND E TO ALLOW EASY FUTURE INSTALLATION OF UA MACHINE.
- NEXT LEVEL OF EXPANSION TO INCREASE PEAK NUMBER OF LANES TO FIVE EACH WAY.
- ULTIMATE LEVEL OF EXPANSION WOULD PROVIDE SIX LANES IN PEAK DIRECTION BY REVERSING LANES 7 AND 8.

NOTES:

1) To be placed by Toll Equipment Contractor prior to the paving, under this Contract.
2) Section B-B appears on sheet 4.

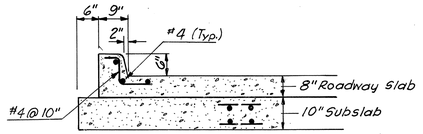


SECTION B-B SECTION A-A

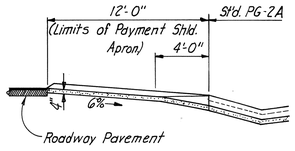


PLAN

SPECIAL DESIGN SHOULDER APRON



SECTION A-A
Scale 1/2" = 1'-0"



SECTION C-C

LEGEND:

- ○ Location of future traffic signal
- ○ Traffic signal,
- D Automatic Toll Machine.
- D Future Automatic Toll Machine
- Toll Booth.
- ● Construct Coin Tube & Plug
- ⊗ Existing Coin Tubes knock-out to be opened
- ◉ Existing pluged coin tube for future expansion.

DESIGNED	T.E.M.	9-19-75				
DRAWN	T.E.M	9-19-75				
CHECKED	P.H.T.	9-75	1	New Sheet	PHT	9-75
IN CHARGE	J.P.F.		NO.	REVISION	BY	DATE

AS BUILT

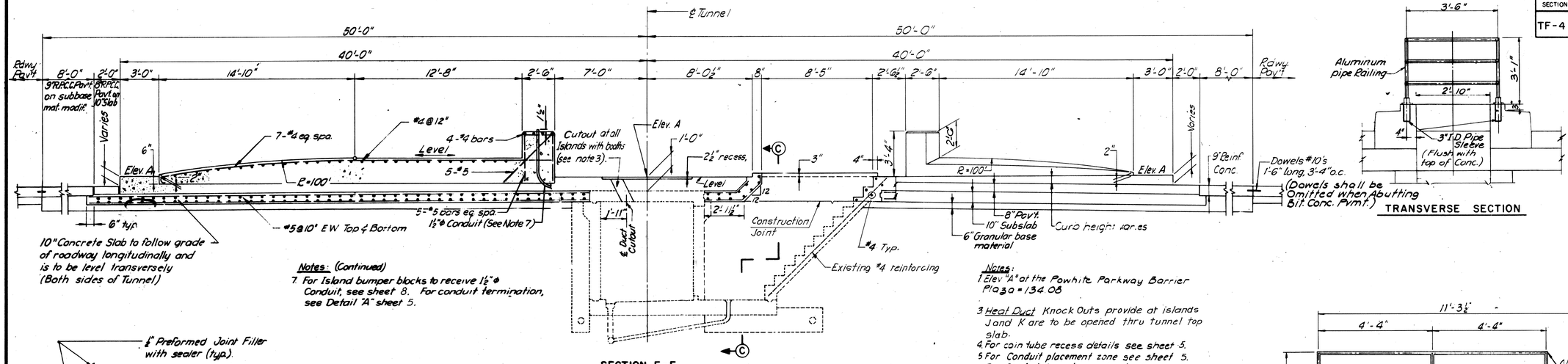
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

EXPANSION OF POWHITE TOLL PLAZA
TOLL PLAZA PLAN AND NOTES

SCALE As noted
DATE 9-75
SHEET 2 OF 18

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
Alexandria, Virginia
HNTB

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-4	POWHITE PARKWAY	3	



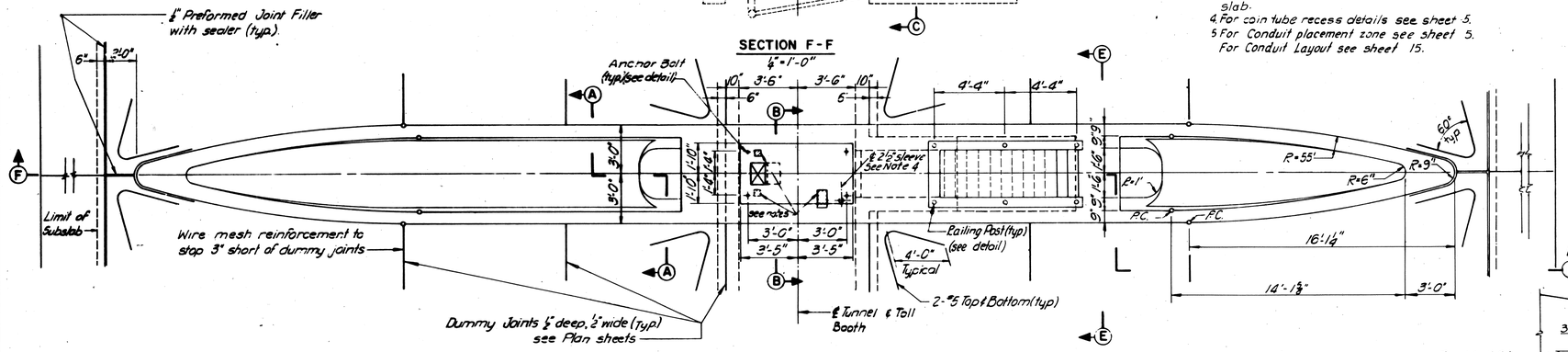
Notes: (Continued)

7. For Island bumper blocks to receive ½"℄ Conduit, see sheet 8. For conduit termination, see Detail "A" sheet 5.

Notes:

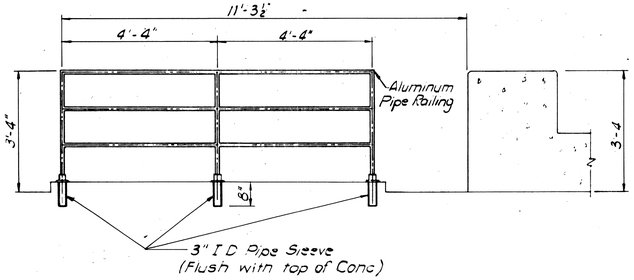
1. Elev. "A" at the Powhite Parkway Barrier Plaza = 134.08
3. Heat Duct Knock Outs provide at islands J and K are to be opened thru tunnel top slab.
4. For coin tube recess details see sheet 5.
5. For Conduit placement zone see sheet 5. For Conduit Layout see sheet 15.

TRANSVERSE SECTION

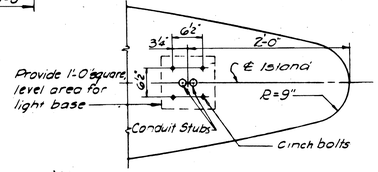


SECTION F-F
½" = 1'-0"

PLAN OF ISLAND WITH STAIRWAY
½" = 1'-0"

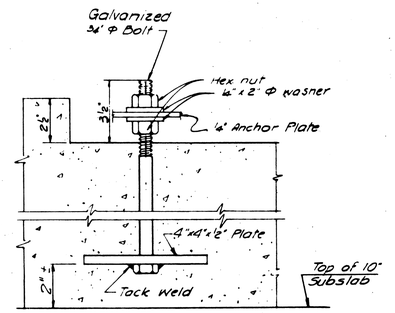


ALUMINUM RAILING
½" = 1'-0"
(For additional railing details, see sheet 6)

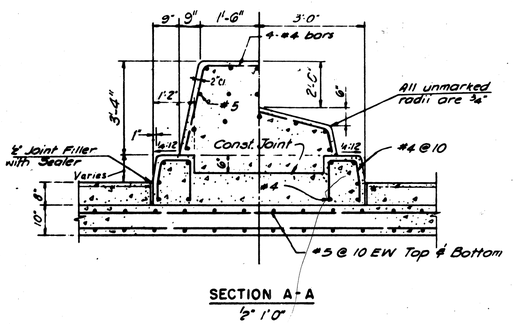


(For traffic light locations see plan sheets) For Details see Sheet 7

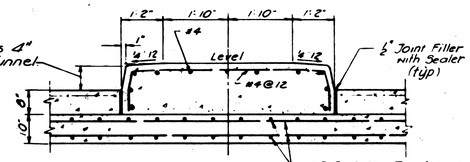
BOLT LAYOUT AT TRAFFIC LIGHT BASE
not to scale



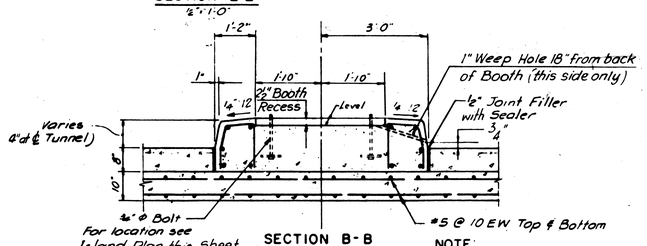
DETAIL OF ANCHOR BOLT FOR TOLL BOOTH
3" = 1'-0"
For Location see Island Plan this Sheet



SECTION A-A
½" 1'0"

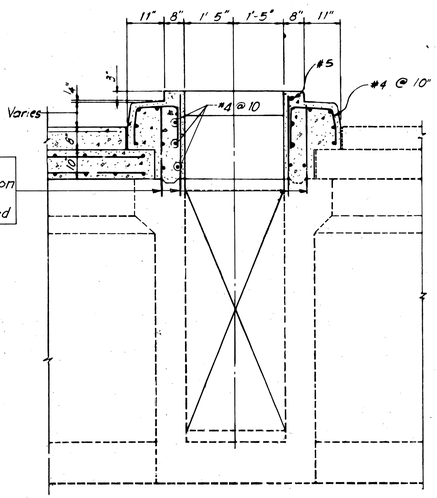


SECTION E E
½"=1'-0"



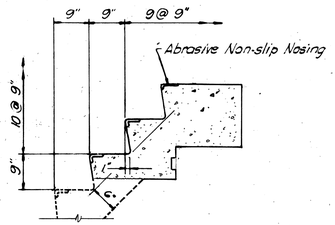
SECTION B-B
½"=1'-0"

NOTE:
Section B-B typical for islands J & K. For all other Islands use Section E-E.



Shown at island H for Section C-C thru island J see Sheet

SECTION C-C
½"=1'-0"



STEP DETAIL
No Scale

R.P.C.C. : Reinforced, Portland Cement Concrete

AS BUILT

	BY	DATE				
MADE	W.J.W.	5-68				
CHECKED	D.E.N.	5-68	1	Add Sh. Nos. to Notes Rev. Proj. Block	P.H.T.	9-75
IN CHARGE H.D.S.			NO.	REVISION	BY	DATE

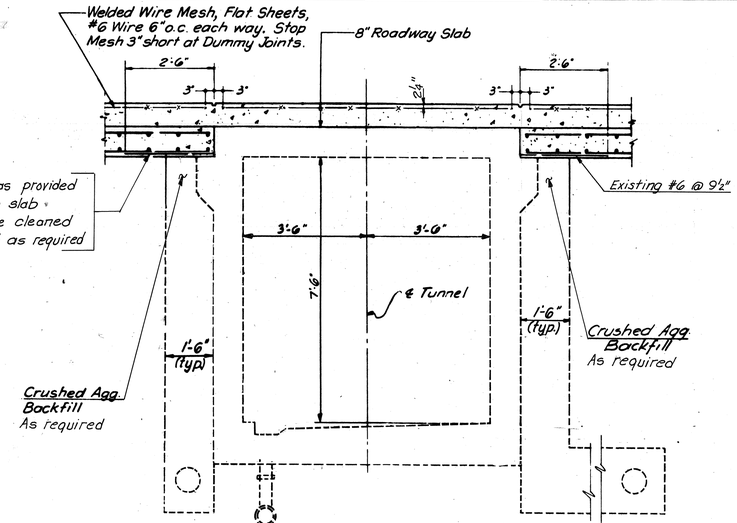
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

BARRIER PLAZA
ISLAND AND TUNNEL DETAILS

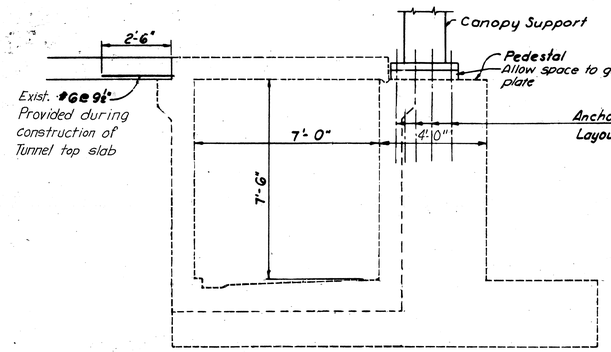
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO.:
SHEET NO. 3 OF 18

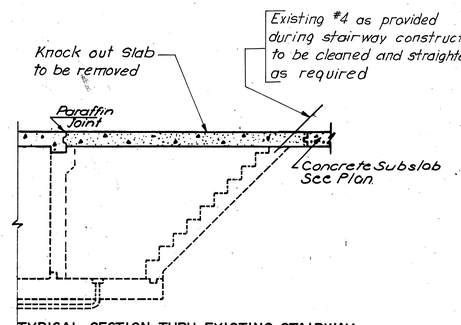
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-4	POWHITE PARKWAY	4	



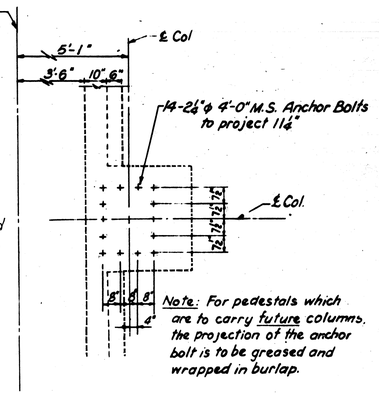
SECTION THRU TUNNEL
BETWEEN ISLANDS
½" = 1'-0"



SECTION THRU TUNNEL
AT CANOPY SUPPORT PEDESTAL

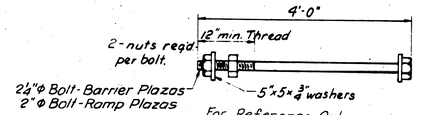


TYPICAL SECTION THRU EXISTING STAIRWAY
SECTION B-B
½" = 1'-0"



Note: For pedestals which are to carry future columns, the projection of the anchor bolt is to be greased and wrapped in burlap.

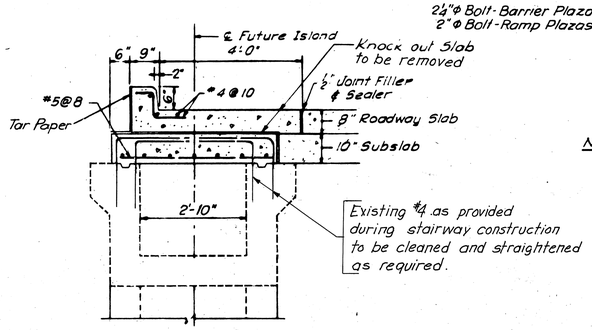
ANCHOR BOLT LAYOUT
BARRIER PLAZA CANOPY COLUMM
3/8" = 1'-0"



For Reference Only
COLUMN ANCHOR BOLT DETAIL
¾" = 1'-0"

Shown at island J for Section
C-C thru island H see Sheet

SECTION C-C
Scale: ½"=1'-0"



EXISTING SECTION AT PROPOSED
ISLAND H
½" = 1'-0"

Notes
1) Top & Bot. of Canopy footing will parallel slope of Tunnel floor.

	BY	DATE				
MADE	W.J.W.	5-68				
CHECKED	D.E.N.	5-68	△	Rev. Sect A-A Rev. Proj. Block	P.H.T.	9-75
IN CHARGE	H.D.S.		NO.	REVISION	BY	DATE

AS BUILT

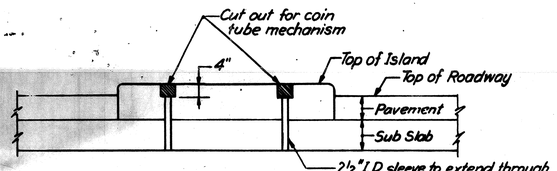
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

BARRIER PLAZA
TUNNEL DETAILS

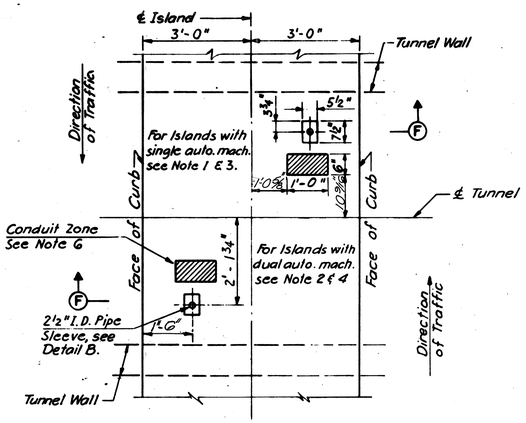
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO.:
SHEET NO. 4 OF 18

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
TF-4	POWHITE PARKWAY	5	



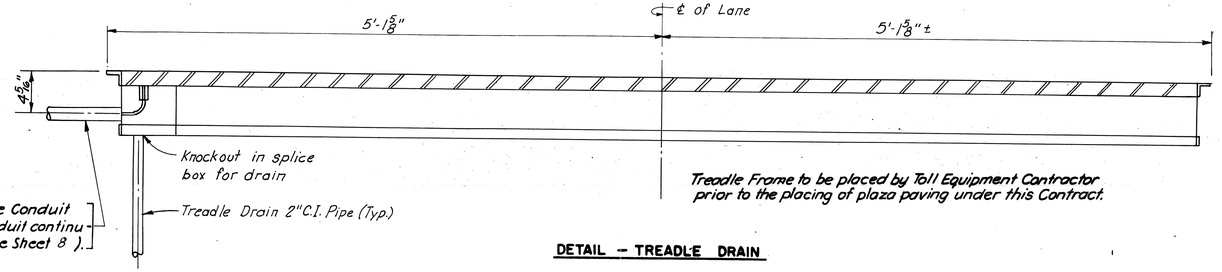
SECTION F-F
½" = 1'-0"



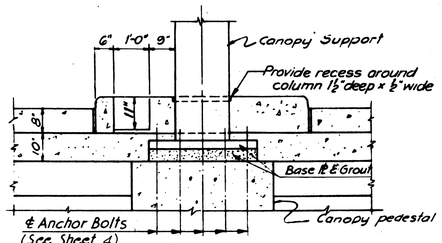
CONDUIT ZONE & PIPE SLEEVE LOCATION FOR AUTOMATIC TOLL MACHINE
½" = 1'-0"
(Location and dimension of Conduit Zones and Pipe sleeves are similar for each Direction of Traffic.)

DETAIL "B"
1½" = 1'-0"

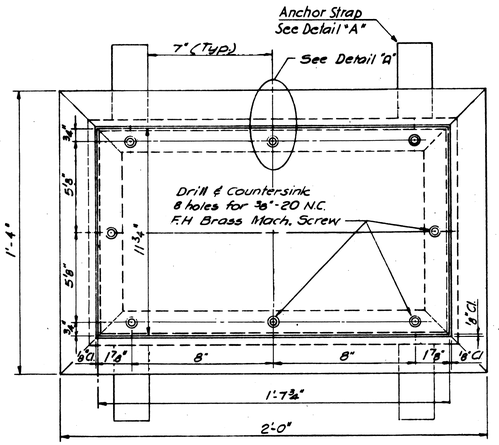
DETAIL OF EXISTING COIN TUBE AT ISLAND LOCATION
No Scale



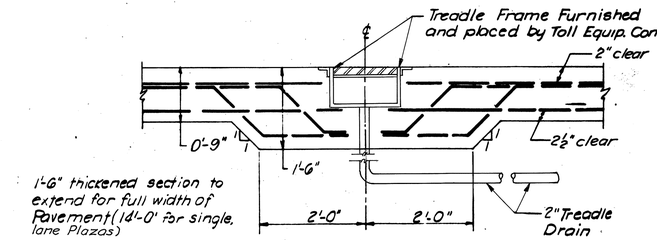
DETAIL — TREADLE DRAIN



SECTION G-G
½" = 1'-0"

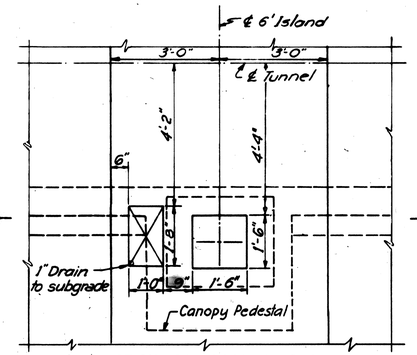


JUNCTION BOX
3" = 1'-0"

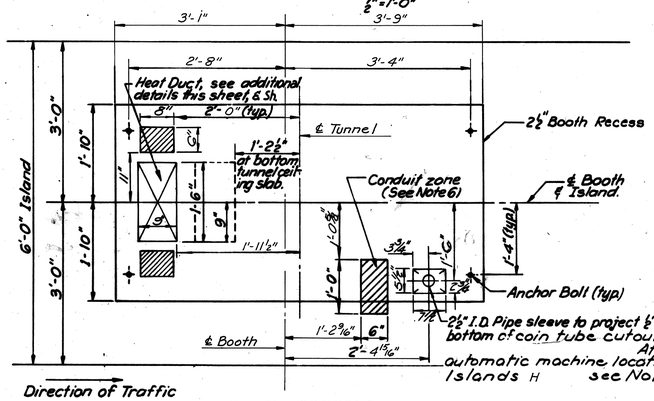


SECTION "C-C"

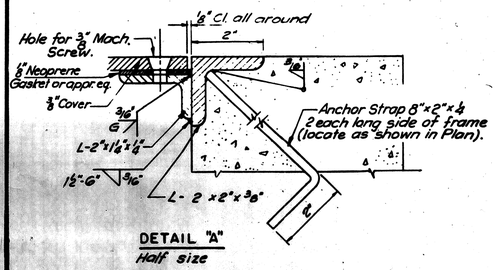
10' TREADLE FRAME INSTALLATION
¾" = 1'-0"



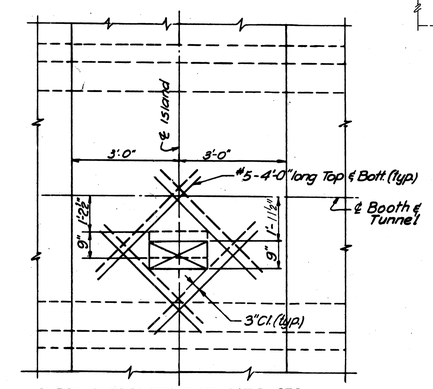
JUNCTION BOX LOCATION PLAN
½" = 1'-0"



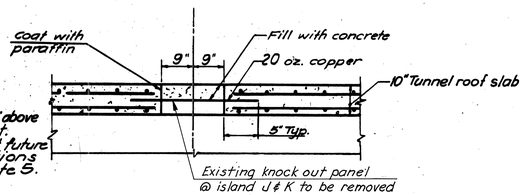
UTILITY LOCATIONS
BARRIER PLAZA TOLL BOOTHS
¾" = 1'-0"



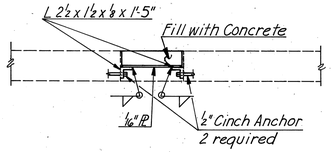
DETAIL "A"
Half size
(Frame & Cover to be Hot-Dipped Galvanized after fabrication)



SUBSLAB TREATMENT AT HEAT DUCTS
Not to scale



KNOCK-OUT DETAIL
Not to Scale



DETAIL OF HEAT DUCT PLUG AT ISLANDS F AND G

NOTES:

1. Islands I, J and K will have a single coin tube and tube recess for automatic machine.
2. Island H will have dual coin tubes and tube recesses for automatic machines. One coin tube will be for a future automatic machine. See Conduit Layout & Note 5.
5. For coin tube recesses at future automatic machine locations, plug 2½ I.D. sleeve at bottom of recess, then coat bottom and sides of recess with paraffin and fill with concrete.
6. Conduits to or from toll booths or automatic machines are to be placed totally within the zones shown. For Conduit Layouts and details see Sheets 8 and 18.

	BY	DATE				
MADE	W. J. W.	5-68				
CHECKED	D. E. N.	5-68	1	New Treadle Drain Misc. Rev.	P.H.T.	9-75
IN CHARGE	H.D.S.		NO.	REVISION	BY	DATE

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

MISCELLANEOUS DETAILS

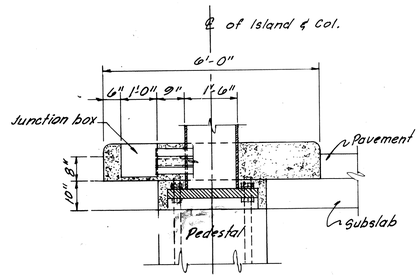
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO.:
SHEET NO. 5 OF 18

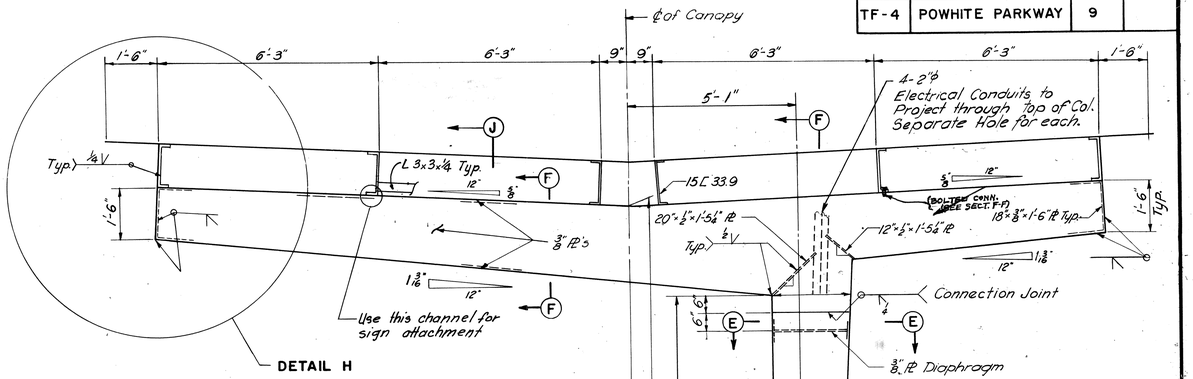
RICHMOND EXPRESSWAY SYSTEM			
SECTION		SHEET NO.	TOTAL SHEETS
TF-4	POWHITE PARKWAY	9	

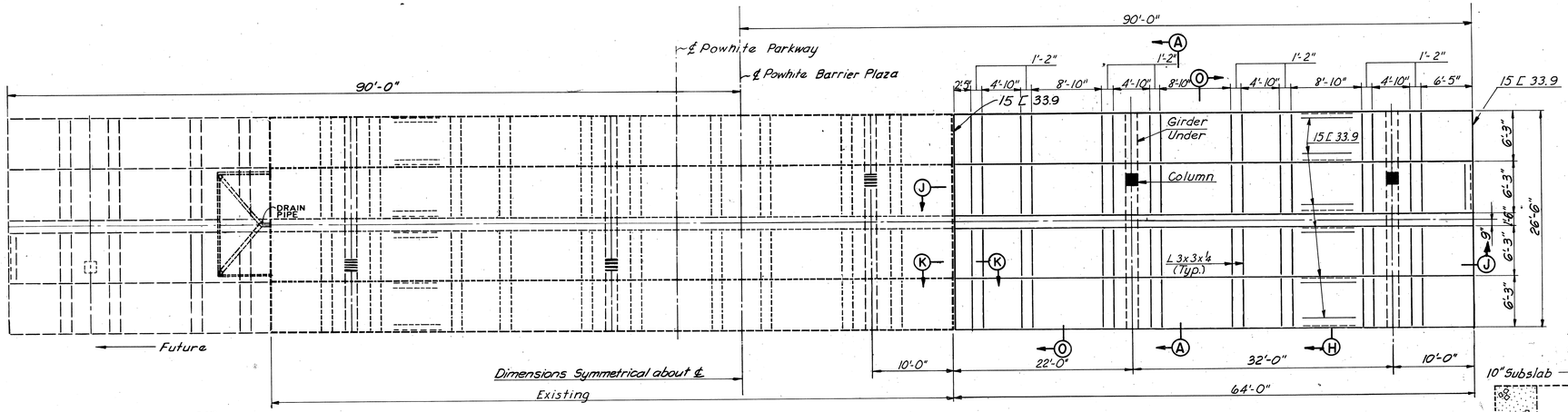
NOTES:

1. LANES 4, 5, 6 AND 7 ARE TO RECEIVE EXACT CHANGE SIGNS, SEE DETAIL.
2. LIGHT UNITS ARE TO BE PLACED IN FRONT OF EXACT CHANGE SIGNS. THE LIGHT UNITS ARE TO BE FOCUSED ON THE HORIZONTAL ℄ OF THE PANEL. LIGHT UNIT BALLASTS WILL BE EXPOSED.
3. A 3'-0" WIDE SECTION OF ISLAND WHOSE CENTER REPRESENTS THE COL. ℄ INCLUDING A 4'-0" WIDE AND 10" HIGH CONC. FILLER BELOW ARE INCLUDED IN THIS CONTRACT. THE JUNCTION BOX SHOWN IN SECTION B-B WILL BE OWNER SUPPLIED BUT INSTALLED UNDER THIS CONTRACT. ALL WORK SHOWN IN SECTION C-C IS PART OF THIS CONTRACT. PROPER JOINT SEAL AND CURB DIMENSIONS TO FIT WITH THE EXISTING MUST BE PROVIDED.

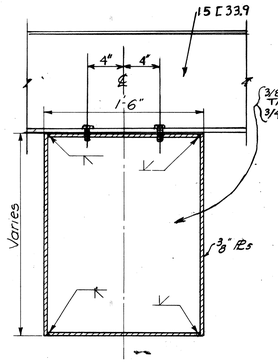


SECTION B-B
Scale: 1½"=1'-0"

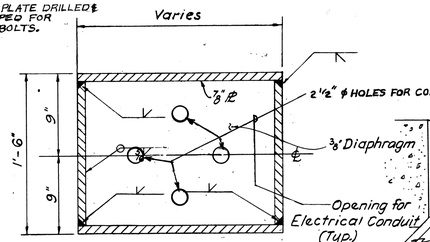




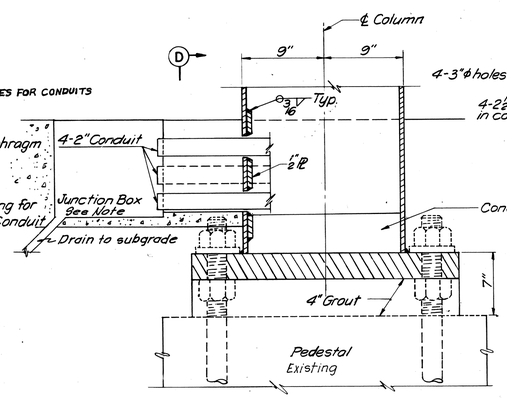
POWHITE BARRIER PLAZA
FRAMING LAYOUT
⅛" = 1'-0"



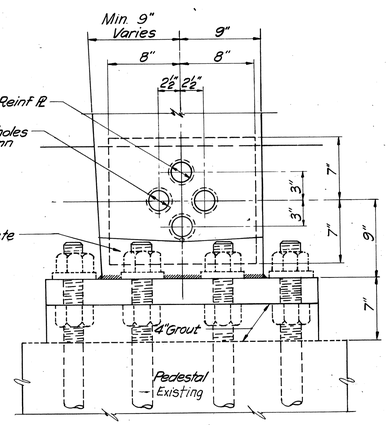
SECTION F-F
Scale: 1½"=1'-0"



SECTION E-E
Scale: 1½"=1'-0"



SECTION C-C
Scale: 1½"=1'-0



SECTION D-D
Scale: 1½"=1'-0"

VIEW A-A
Scale: 1"=1'-0"

NOTE:
For Section J-J and K-K see Sheet 18.

AS BUILT

	BY	DATE
MADE	R.B.M.	7-31-71
CHECKED	K.L.	7-31-71
IN CHARGE	J.P.F.	

NO.	REVISION	BY	DATE
1	Add Sections J-J & K-K, Key Proj. Block	P.H.T.	9-75

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

BARRIER PLAZA CANOPY FRAMING & DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.:
SHEET NO. 9 OF 18

NORTHBOUND POWHITE PARKWAY TOLL PLAZA

1989 WIDENING

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
12	POWHITE PARKWAY	7	101

	By	Date	No.	Revision	By	Date
Designed	TJC	3/87				
Drawn	JLT	3/87				
Checked	RLV	3/87	△1	As Built	TEM	3-89
Approved	DJA	3/87	No.	Revision	By	Date

AS BUILT

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

PAVING, GRADING & DRAINAGE PLAN

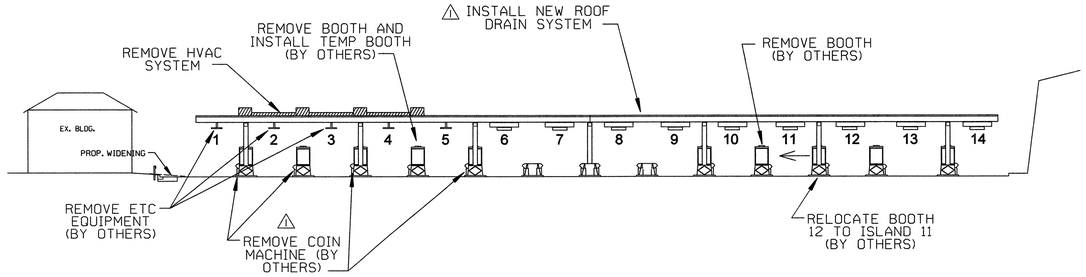
Sta. 79+00 to Sta 93+00

HOWARD NEEDLES TAMMEN & BERGENDOFF
Architects Engineers Planners
ALEXANDRIA, VA.
HNTB

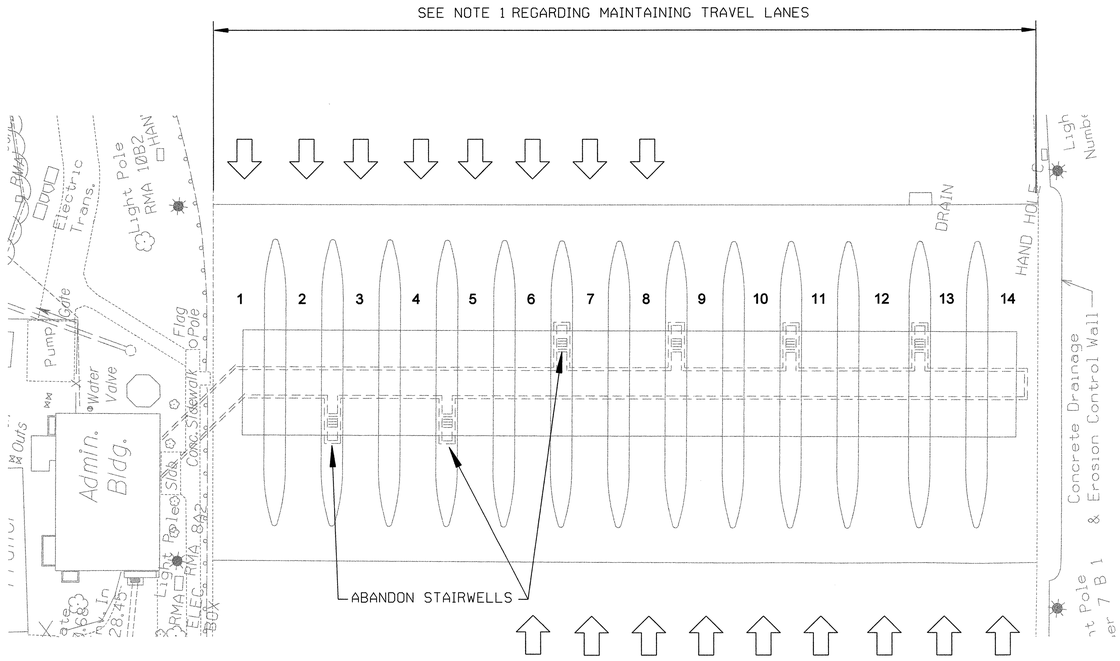
Scale	Date	Contract No.	Sheet
1"= 50'	MARCH 1987	C-12	7 of 101

NORTHBOUND POWHITE PARKWAY TOLL PLAZA

2006 PLANS FOR DEMOLITION OF PORTION OF TOLL PLAZA



STAGE IIB ELEVATION



STAGE IIB PLAN

NOTES:

⚠ 1. CONTRACTOR SHALL COORDINATE WITH ENGINEER WHO WILL PROVIDE SINGLE AND/OR LANE CLOSURES FOR PERIODS LESS THAN 24 HOURS, OR FOR WEEKENDS, TO CREATE WORK ZONE, AS DESCRIBED IN CONTRACT DOCUMENTS.

2. CONTRACTOR SHALL COORDINATE WITH ENGINEER TO ALLOW APPROPRIATE SCHEDULING OF TOLL PLAZA MODIFICATION WORK TO BE PERFORMED BY OTHERS.

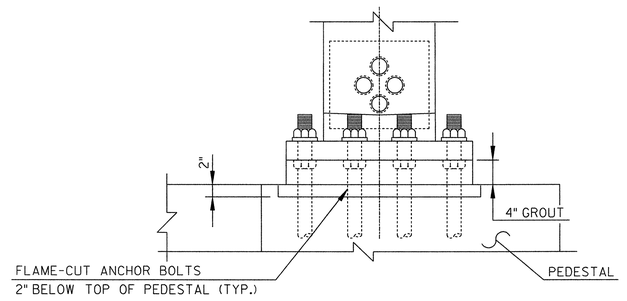
3. NO WORK IMPACTING SB TRAVEL LANES SHALL BE ALLOWED BETWEEN 3:00 PM AND 7:00 PM, MONDAY THROUGH FRIDAY.

4. NO WORK IMPACTING NB TRAVEL LANES SHALL BE ALLOWED BETWEEN 6:00 AM AND 10:00 AM, MONDAY THROUGH FRIDAY.

5. FOR ADDITIONAL SEQUENCE NOTES, SEE MAINTENANCE OF TRAFFIC SHEET OF APPROPRIATE STAGE.

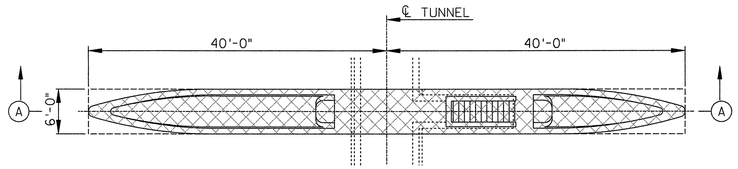
6. CONTRACTOR SHALL MAKE EVERY EFFORT TO SALVAGE EXISTING HVAC UNITS. SEE SPECIAL PROVISIONS.

REVISIONS
⚠2 ADDENDUM NO.2: 5/17/06
⚠1 ADDENDUM NO.1: 5/10/06



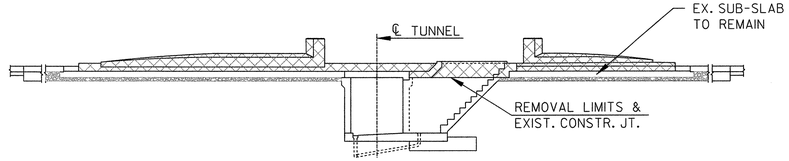
⚠2 CANOPY SUPPORT REMOVAL

NOT TO SCALE



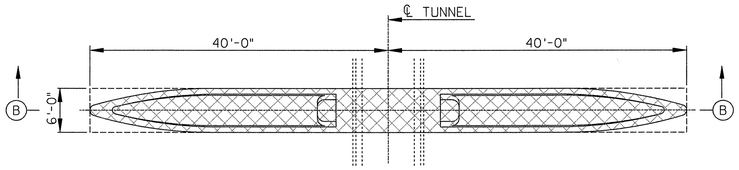
⚠2 ISLAND DEMOLITION PLAN - ISLAND WITH STAIRS

NOT TO SCALE



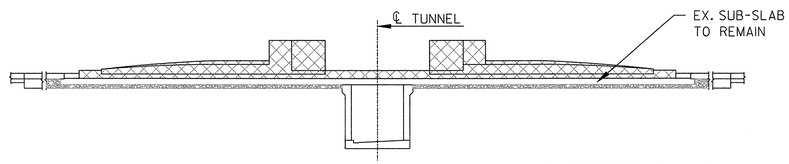
⚠2 SECTION A-A

NOT TO SCALE



⚠2 ISLAND DEMOLITION PLAN - ISLAND WITHOUT STAIRS

NOT TO SCALE



⚠2 SECTION B-B

NOT TO SCALE

HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

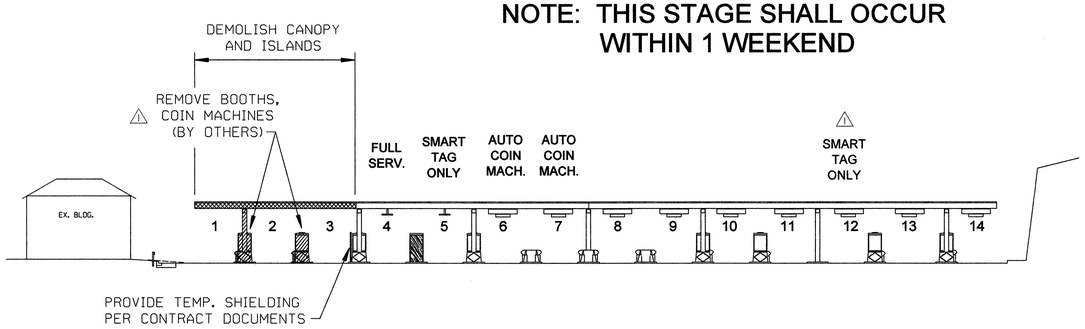
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

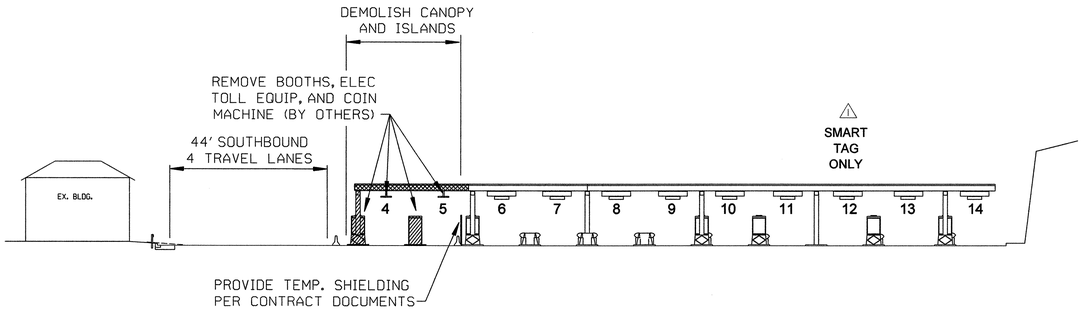
EX. TOLL PLAZA MODIFICATIONS
STAGE IIB

Scale:	Date:	Contract No.:	Sheet:
1" = 20'	07/20/06	PEL-2006	30 of 161

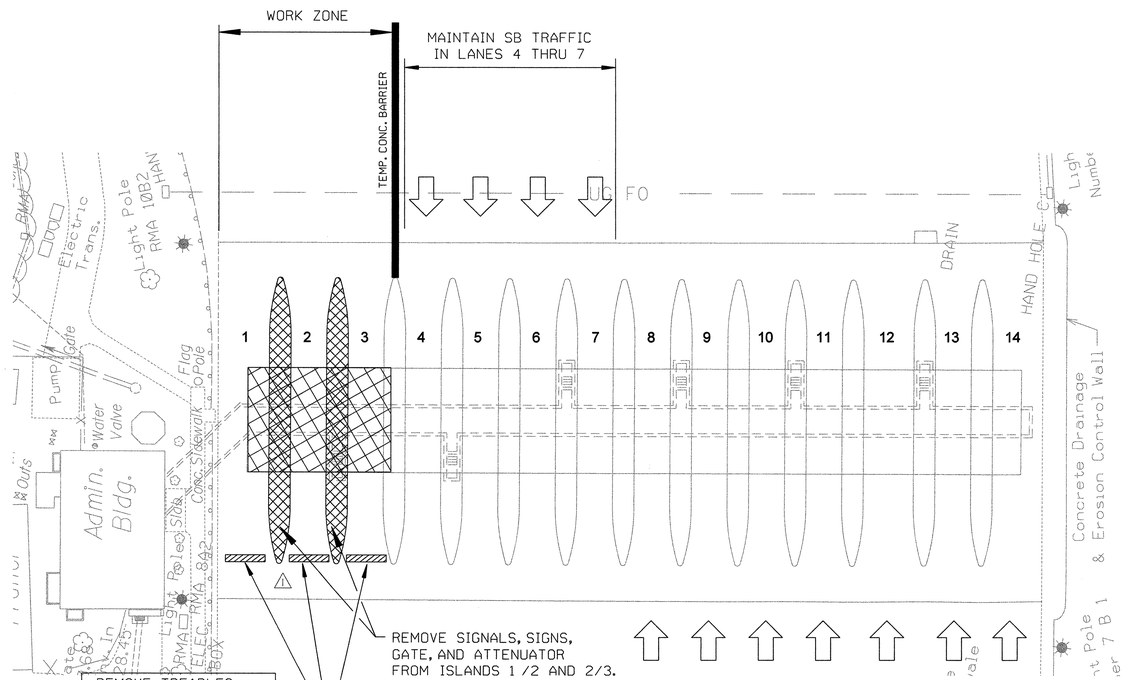
NOTE: THIS STAGE SHALL OCCUR WITHIN 1 WEEKEND



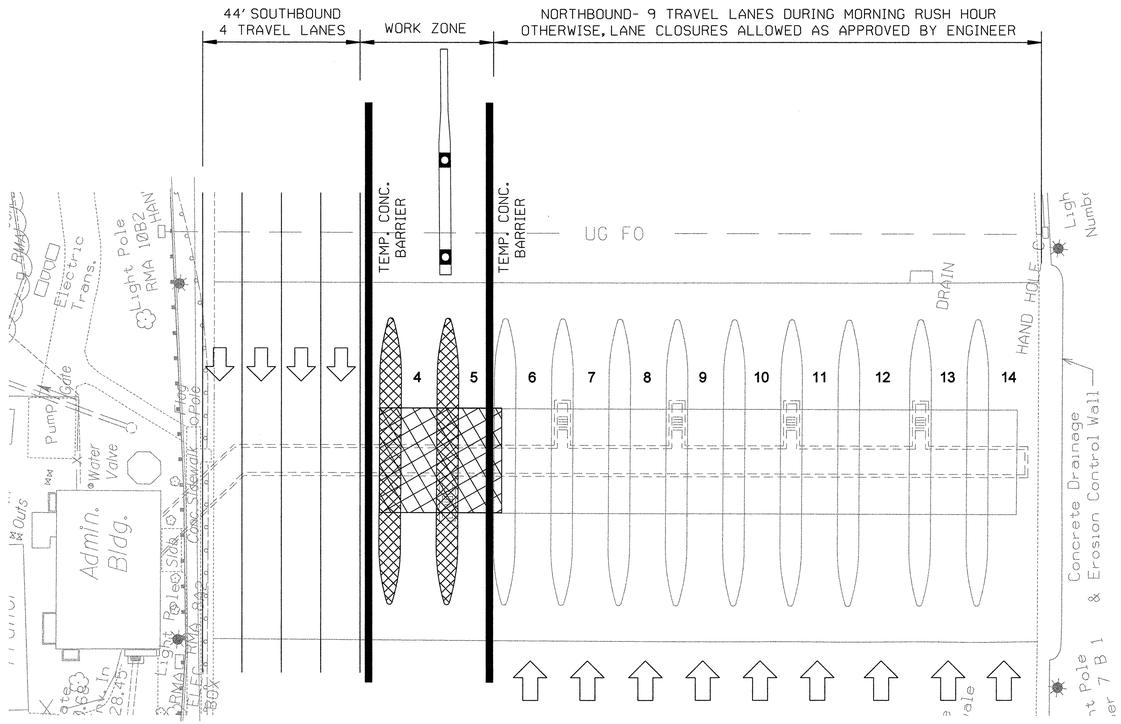
STAGE IIIA ELEVATION



STAGE IIIB ELEVATION



STAGE IIIA PLAN



STAGE IIIB PLAN

NOTES:

1. CONTRACTOR SHALL COORDINATE WITH ENGINEER WHO WILL PROVIDE SINGLE AND/OR MULTIPLE LANE CLOSURES FOR PERIODS LESS THAN 24 HOURS, OR FOR WEEKENDS, TO CREATE WORK ZONE, AS DESCRIBED IN CONTRACT DOCUMENTS.
2. CONTRACTOR SHALL COORDINATE WITH ENGINEER TO ALLOW APPROPRIATE SCHEDULING OF TOLL PLAZA MODIFICATION WORK TO BE PERFORMED BY OTHERS.
3. NO WORK IMPACTING SB TRAVEL LANES SHALL BE ALLOWED BETWEEN 3:00 PM AND 7:00 PM, MONDAY THROUGH FRIDAY.
4. NO WORK IMPACTING NB TRAVEL LANES SHALL BE ALLOWED BETWEEN 6:00 AM AND 10:00 AM, MONDAY THROUGH FRIDAY.
5. FOR ADDITIONAL SEQUENCE NOTES, SEE MAINTENANCE OF TRAFFIC SHEET OF APPROPRIATE STAGE.

REVISIONS
ADDENDUM NO. 1: 5/10/06

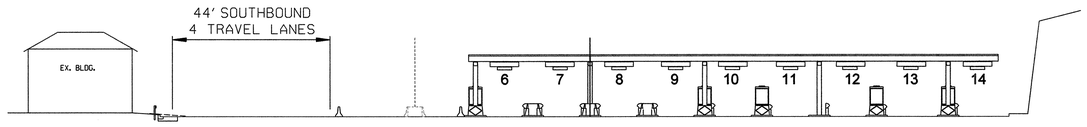
HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

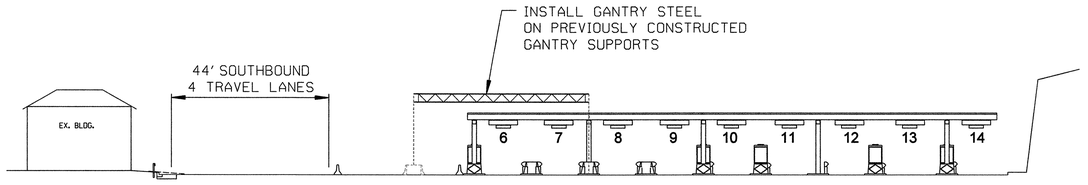
POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

EX. TOLL PLAZA MODIFICATIONS STAGES IIIA & IIIB

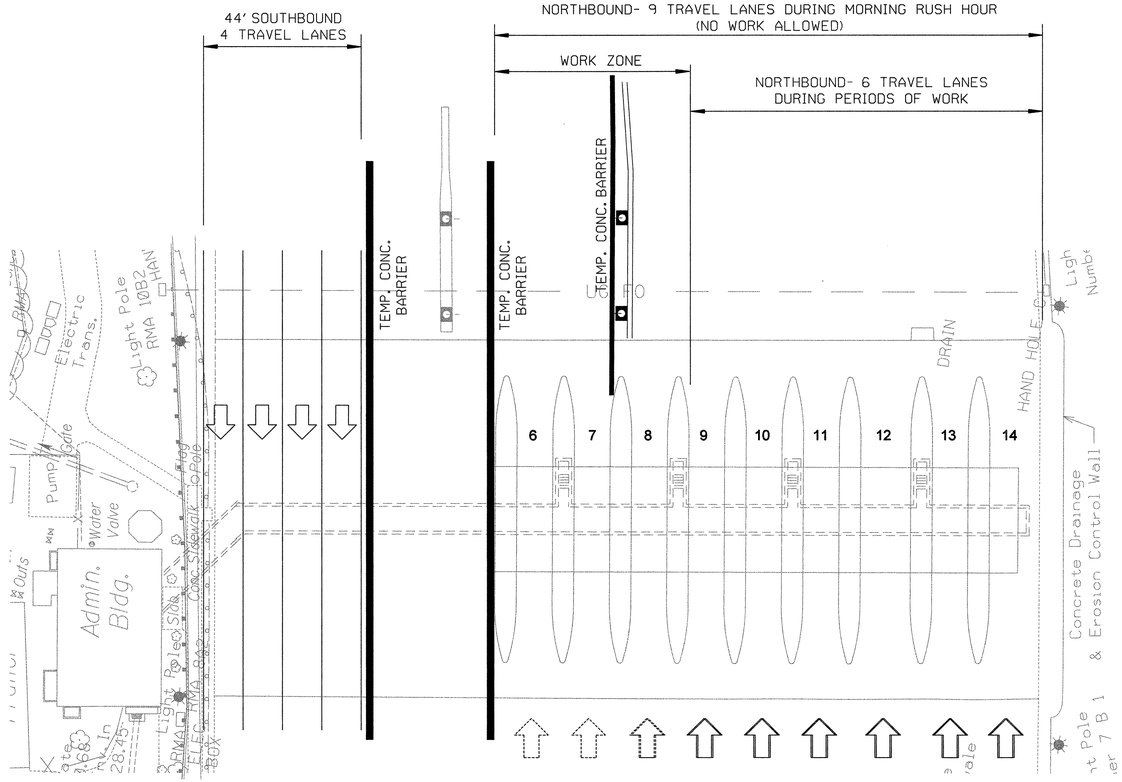
Scale:	Date:	Contract No.:	Sheet:
1" = 20'	07/20/06	PEL-2006	31 of 161



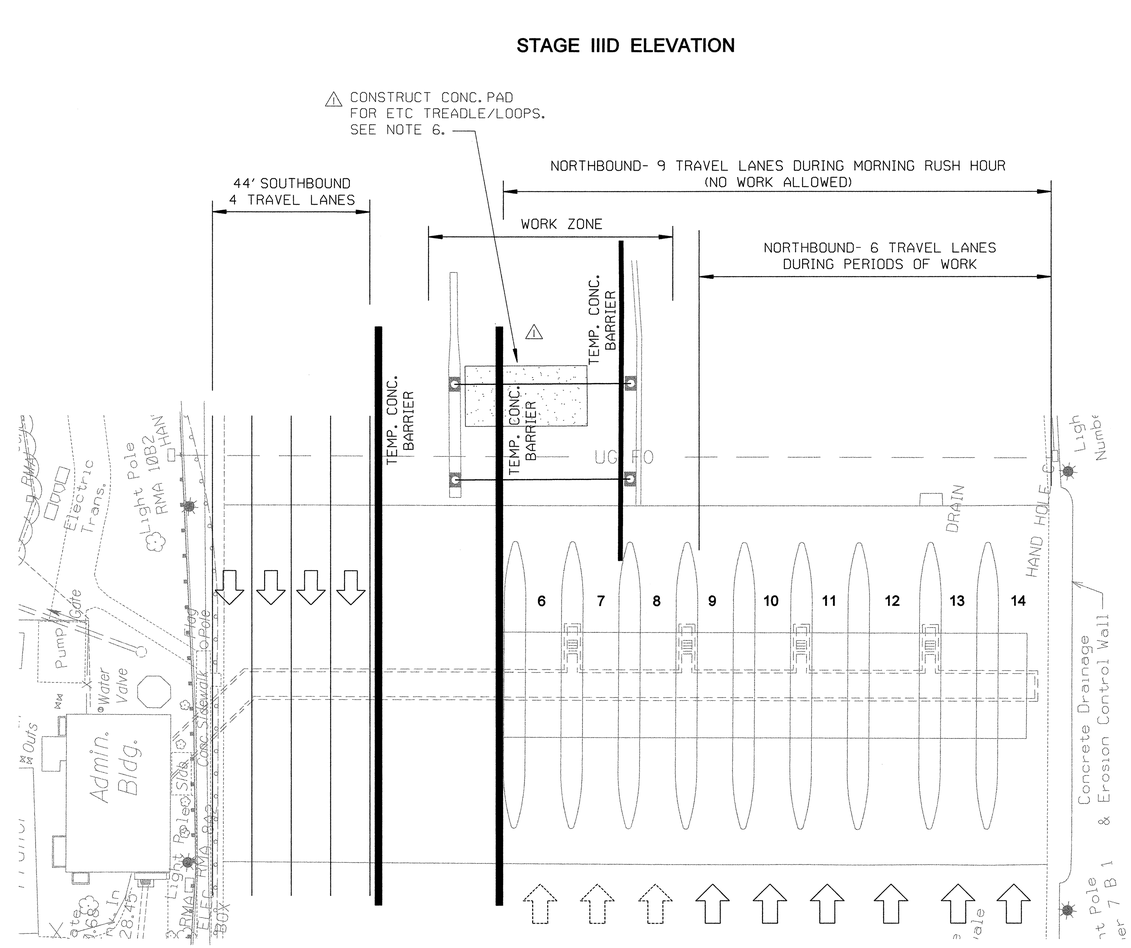
STAGE IIIC ELEVATION



STAGE IIID ELEVATION



STAGE IIIC PLAN



STAGE IIID PLAN

NOTES:

⚠ 1. CONTRACTOR SHALL COORDINATE WITH ENGINEER WHO WILL PROVIDE SINGLE AND/OR MULTIPLE LANE CLOSURES FOR PERIODS LESS THAN 24 HOURS, OR FOR WEEKENDS, TO CREATE WORK ZONE, AS DESCRIBED IN CONTRACT DOCUMENTS.

2. CONTRACTOR SHALL COORDINATE WITH ENGINEER TO ALLOW APPROPRIATE SCHEDULING OF TOLL PLAZA MODIFICATION WORK TO BE PERFORMED BY OTHERS.

3. NO WORK IMPACTING SB TRAVEL LANES SHALL BE ALLOWED BETWEEN 3:00 PM AND 7:00 PM, MONDAY THROUGH FRIDAY.

4. NO WORK IMPACTING NB TRAVEL LANES SHALL BE ALLOWED BETWEEN 6:00 AM AND 10:00 AM, MONDAY THROUGH FRIDAY.

5. FOR ADDITIONAL SEQUENCE NOTES, SEE MAINTENANCE OF TRAFFIC SHEET OF APPROPRIATE STAGE.

⚠ 6. CONC. PAD FOR TREADLE SHALL BE CONSTRUCTED OVER A ONE WEEKEND PERIOD, BETWEEN FRI. 10:00 A.M. AND MON. 6:00 A.M. HIGH-EARLY STRENGTH CONCRETE SHALL BE USED.

⚠ ADDENDUM NO. 1: 5/10/06
REVISIONS

HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

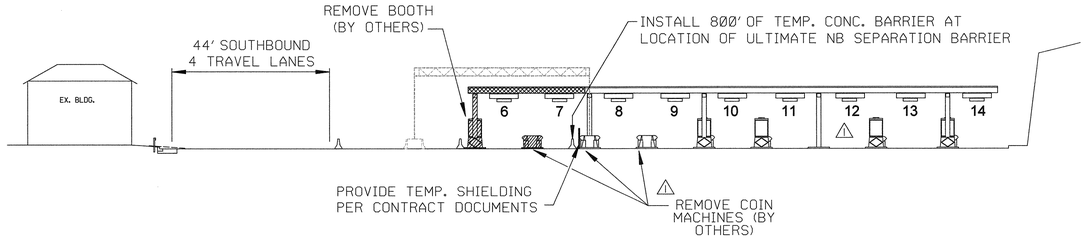
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

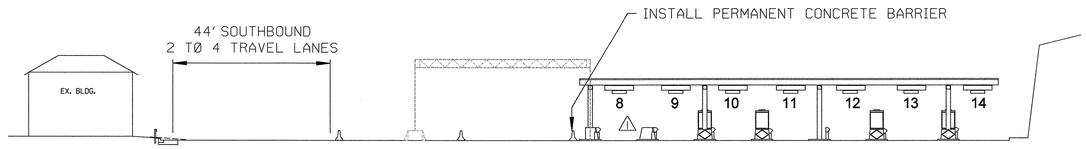
EX. TOLL PLAZA MODIFICATIONS STAGES IIIC & IIID

Scale:	Date:	Contract No.:	Sheet:
1" = 20'	07/20/06	PEL-2006	32 of 161

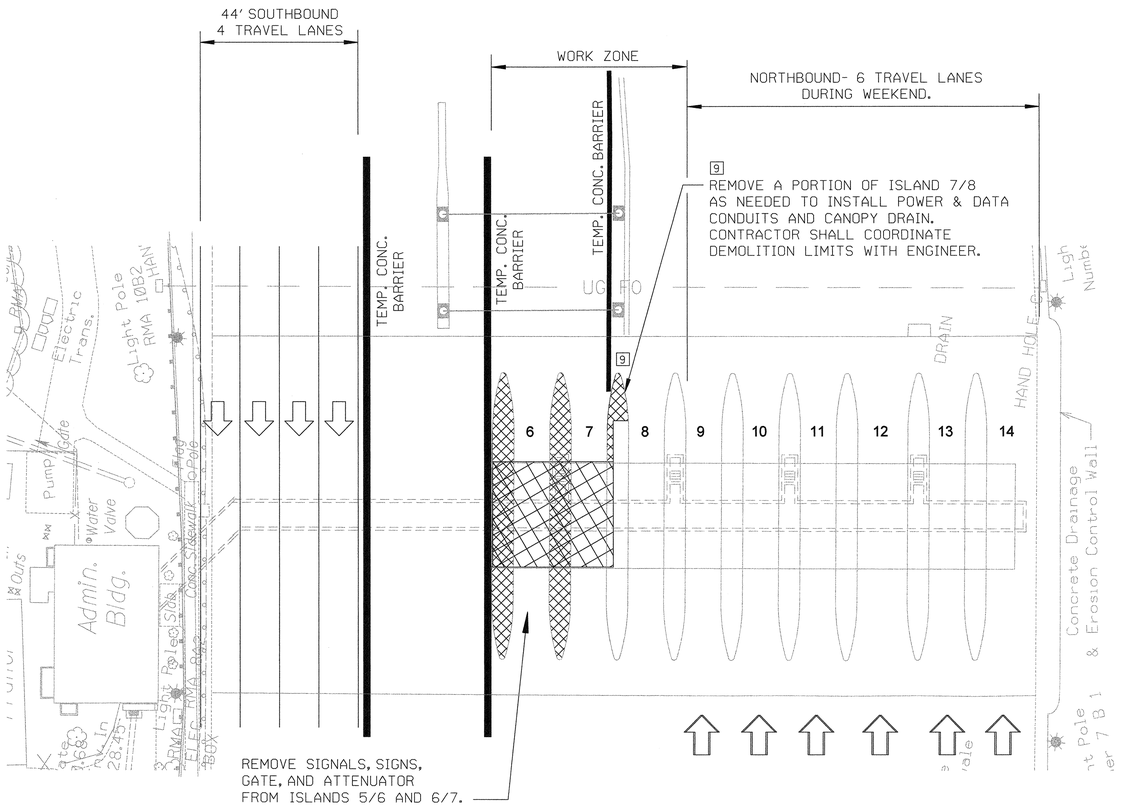
STAGES IVA AND IVB SHALL OCCUR WITHIN 1 WEEKEND.



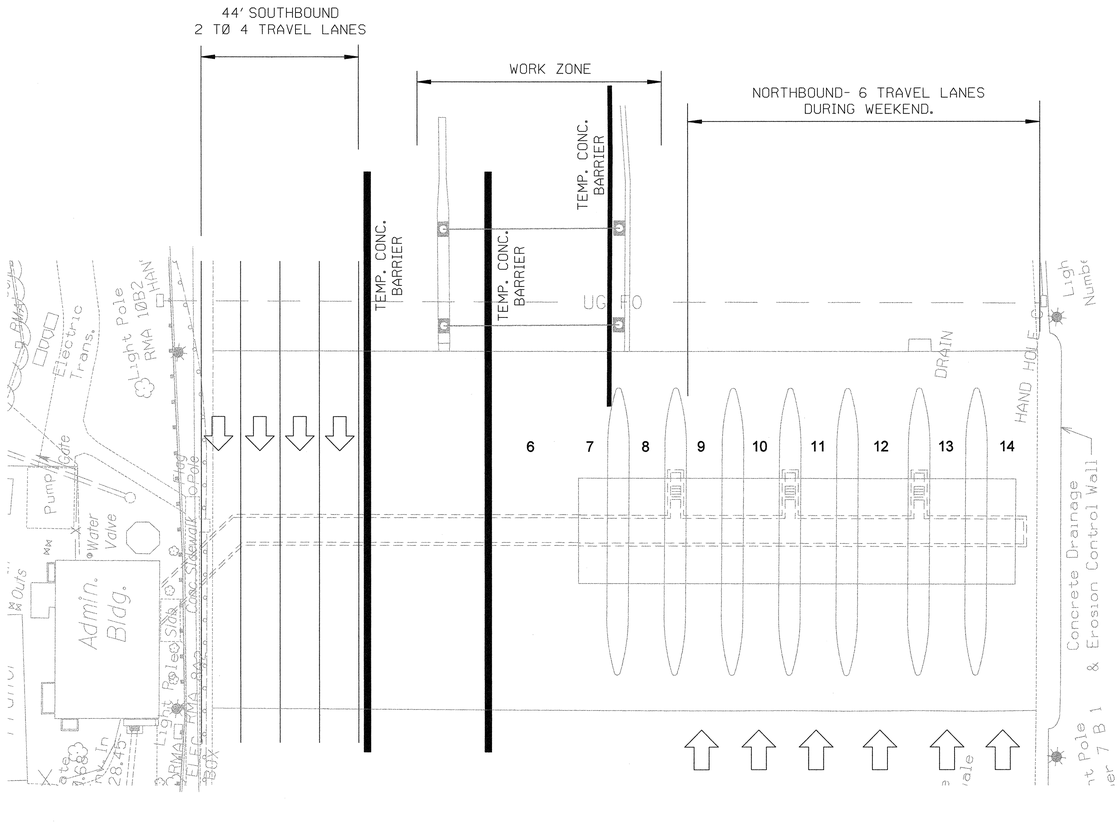
STAGE IVA ELEVATION



STAGE IVB ELEVATION



STAGE IVA PLAN



STAGE IVB PLAN

NOTES:

⚠ 1. CONTRACTOR SHALL COORDINATE WITH ENGINEER WHO WILL PROVIDE SINGLE AND/OR MULTIPLE LANE CLOSURES FOR PERIODS LESS THAN 24 HOURS, OR FOR WEEKENDS, TO CREATE WORK ZONE, AS DESCRIBED IN CONTRACT DOCUMENTS.

2. CONTRACTOR SHALL COORDINATE WITH ENGINEER TO ALLOW APPROPRIATE SCHEDULING OF TOLL PLAZA MODIFICATION WORK TO BE PERFORMED BY OTHERS.

3. NO WORK IMPACTING SB TRAVEL LANES SHALL BE ALLOWED BETWEEN 3:ØØ PM AND 7:ØØ PM, MONDAY THROUGH FRIDAY.

4. NO WORK IMPACTING NB TRAVEL LANES SHALL BE ALLOWED BETWEEN 6:ØØ AM AND 10:ØØ AM, MONDAY THROUGH FRIDAY.

5. FOR ADDITIONAL SEQUENCE NOTES, SEE MAINTENANCE OF TRAFFIC SHEET OF APPROPRIATE STAGE.

REVISIONS
9 3/5/08: REVISED SHEET - SEE SHEET 1C
⚠ ADDENDUM NO. 1: 5/10/06

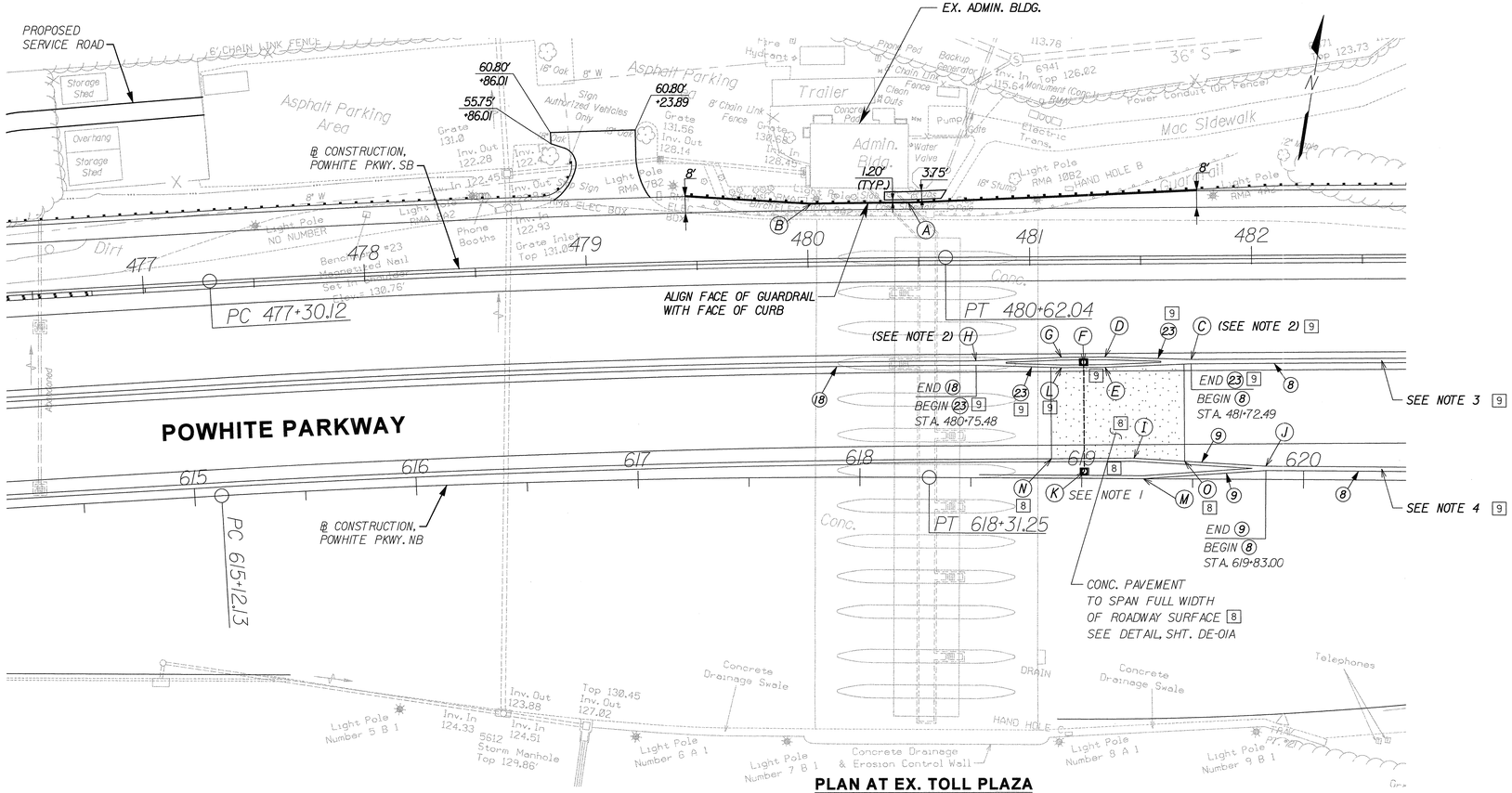
HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

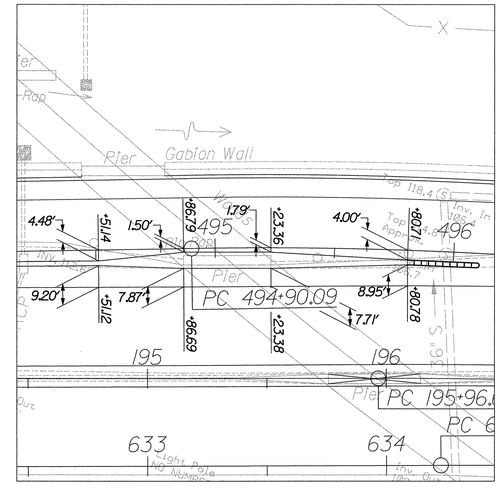
POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

EX. TOLL PLAZA MODIFICATIONS
STAGES IVA & IVB

Scale:	Date:	Contract No.:	Sheet:
1" = 20'	3/06/08	PEL-2006	33 of 161



PLAN AT EX. TOLL PLAZA



BARRIER TRANSITION PLAN AT POWHITE PARKWAY SB RAILROAD BRIDGE PIER

HORIZONTAL CONTROL POINT SCHEDULE

POINT NO.	LOCATION	DESCRIPTION	
(A)	STA. 480+45.49, 25.00' LT., POWHITE PKWY. SB	FACE OF CURB	
(B)	STA. 480+01.69, 25.00' LT., POWHITE PKWY. SB	FACE OF CURB	
(C)	STA. 481+72.49, 47.02' RT., POWHITE PKWY. SB	END BARRIER HORIZONTAL TRANSITION; END 50" BARRIER HEIGHT	
(D)	STA. 481+33.63, 45.67' RT., POWHITE PKWY. SB	BEGIN BARRIER TRANSITION	9
(E)	STA. 481+33.63, 50.33' RT., POWHITE PKWY. SB	BEGIN BARRIER TRANSITION	8 9
(F)	STA. 481+23.98, 48.00' RT., POWHITE PKWY. SB	CENTER GANTRY FOUNDATION TY. 2A	8 9
(G)	STA. 481+13.96, 45.67' RT., POWHITE PKWY. SB	END BARRIER TRANSITION	9
(H)	STA. 480+75.48, 47.02' RT., POWHITE PKWY. SB	BEGIN BARRIER HORIZONTAL TRANSITION; BEGIN 50" BARRIER HEIGHT	
(I)	STA. 619+23.59, 9.33' LT., POWHITE PKWY. NB	BEGIN BARRIER TRANSITION	
(J)	STA. 619+83.00, 5.97' LT., POWHITE PKWY. NB	END BARRIER TRANSITION	
(K)	STA. 619+1.21, 2.95' LT., POWHITE PKWY. NB	CENTER GANTRY FOUNDATION TY. 2B	8
(L)	STA. 481+13.96, 50.33' RT., POWHITE PKWY. SB	END BARRIER TRANSITION	8 9
(M)	STA. 619+27.81, 0.00', POWHITE PKWY. NB	BEGIN BARRIER TRANSITION	
(N)	STA. 618+86.36, POWHITE PKWY. NB	LIMIT OF 9" CONC. PAVEMENT	8 10
(O)	STA. 619+46.36, POWHITE PKWY. NB	LIMIT OF 9" CONC. PAVEMENT	8 10

LEGEND

(8) Modified MB-7D, Concrete Median Barrier

(9) Modified MB-7E, Concrete Median Barrier

(18) Modified MB-8A, Type I Conc. Med. Barrier, See Sht. DE-02

9 (23) St'd MB-12B, Conc. Med. Barrier

NOTES:

1. SEE SHEETS SM-40 AND SM-41 FOR GANTRY FOUNDATION DETAILS.
9 2. TRANSITION FROM THE 32" BARRIER HEIGHT TO A 50" BARRIER HEIGHT OVER A DISTANCE OF 6 FEET. SEE THE VDOT STANDARDS PAGE 501.55 FOR ADDITIONAL BARRIER TRANSITION DETAILS.
9 3. 2-1" CONDUITS TO BE INSTALLED IN CONCRETE MEDIAN BARRIER FROM GANTRY LOCATION TO DVAS POLE AT APPROXIMATE STA. 184+12. SEE SHEET L-07 FOR MORE DETAILS.
9 4. 2-1" CONDUITS TO BE INSTALLED IN CONCRETE MEDIAN BARRIER FROM GANTRY LOCATION TO DVAS CAMERA MOUNTED ON LIGHT POLE LP-15. SEE SHEET L-07 FOR MORE DETAILS.

REVISIONS
10 4/10/08: REVISED SHEET - SEE SHEET 1C
9 3/5/08: REVISED SHEET - SEE SHEET 1C
8 10/03/07: REVISED GANTRY AREA - SEE SHEET 1C
2 7/20/06: ADDED SHEET

DE-06 OF 06

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

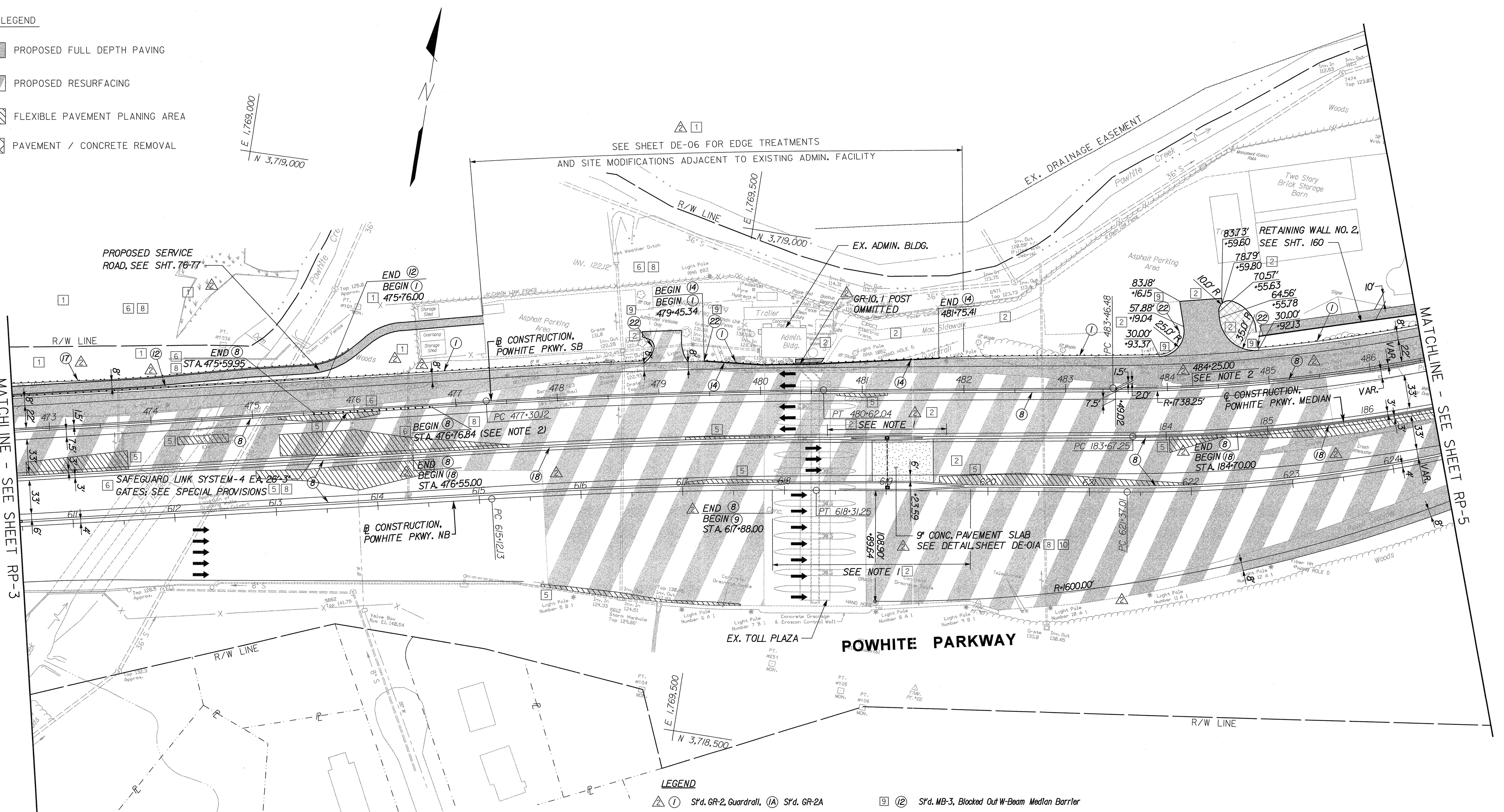
MISCELLANEOUS DETAILS

HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

Scale:	Date:	Contract No.:	Sheet:
1" = 30'	3/06/08	PEL-2006	47 of 161

PAVEMENT LEGEND

- PROPOSED FULL DEPTH PAVING
- △2 PROPOSED RESURFACING
- FLEXIBLE PAVEMENT PLANING AREA
- PAVEMENT / CONCRETE REMOVAL



LEGEND

- △2 (1) St'd. GR-2, Guardrail, (1A) St'd. GR-2A
- (2) St'd. GR-7, Guardrail Terminal
- (3) St'd. GR-9, Guardrail Terminal
- 9 (4) Impact Attenuator (TL-3, > 55 MPH) (4A) (TL-2, > 40 MPH)
- (5) St'd. GR-FOA-2, Fixed Object Attachment, Type I
- (6) St'd. GR-FOA-2, Fixed Object Attachment, Type II
- (7) St'd. MB-5, W-Beam Median Barrier, Weak Post
- △2 (8) Modified MB-7D, Concrete Median Barrier
- △2 (9) Modified MB-7E, Concrete Median Barrier
- △2 (10) Modified MB-7F, Concrete Median Barrier
- △2 (11) Modified MB-8A Conc. Median Barrier, Ty. III, See Sheet DE-02
- 9 (12) St'd. MB-3, Blocked Out W-Beam Median Barrier
- △2 (13) St'd. CG-7, Comb. 4" Curb & Gutter
- △2 (14) St'd. CG-3, Standard 4" Curb
- (15) Constant Slope Concrete Median Barrier, See Sheet DE-04
- (16) 4" Concrete Sidewalk Per Section 504 Of Standard Specifications
- △2 (17) St'd. GR-8, Guardrail (Weak Post)
- △2 (17A) St'd. GR-8A, Guardrail (Weak Post)
- △2 (18) Modified MB-8A, Type I Conc. Med. Barrier, See Sht. DE-02
- △2 (19) St'd. MB-8A, Type II Conc. Med. Barrier
- △2 (20) St'd. MB-8A, Type III Conc. Med. Barrier
- 9 (21) St'd. CG-6, Comb. 6" Curb & Gutter
- 9 (22) St'd. GR-11, Guardrail Terminal

NOTES:

2 1 1. SEE SHEET DE-06 FOR BARRIER TYPES AND TRANSITIONS AT NB GANTRY STRUCTURE.

8 6 △2 2. CONCRETE MEDIAN BARRIER, MODIFIED TYPE 7D, FROM STA. 476+76.84 TO STA. 484+25 SHALL MATCH 2'-9" HEIGHT STANDARD AS SHOWN ON SHT. DE-02.

8 6

REVISIONS
10 4/10/08: REVISED SHEET - SEE SHEET 1C
9 3/5/08: REVISED SHEET - SEE SHEET 1C
8 10/03/07: REVISED SHEET - SEE SHEET 1C
6 5/2/07: REVISED SHEET - SEE SHEET 1B
5 3/27/07: REVISED SHEET - SEE SHEET 1B
2 7/20/06: REVISED SHEET - SEE SHEET 1B
1 6/23/06: SEE SHEET 1A
△2 ADDENDUM NO.2: 5/17/06

RP-4 OF 7

HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT
ROADWAY PAVEMENT PLAN
STA. 472+65 TO STA. 486+50
℄ CONSTR. POWHITE PARKWAY SB

Scale:	Date:	Contract No.:	Sheet:
1" = 50'	3/06/08	PEL-2006	61 of 161

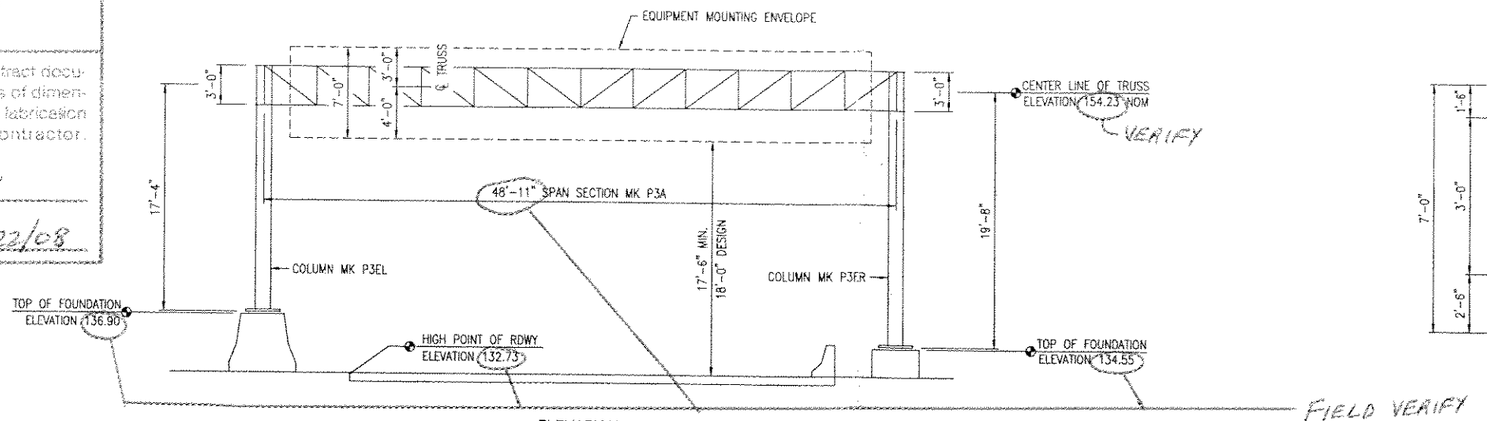
POWHITE PARKWAY TOLL PLAZA

TOLL GANTRY SHOP DRAWINGS
AND STRUCTURAL CALCULATIONS

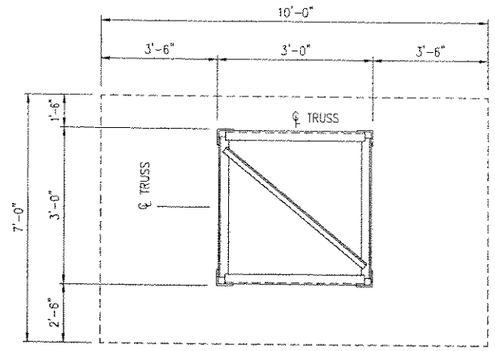
SHOP DRAWING REVIEW
HNTB Corporation

Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities and safety during fabrication and erection shall remain with the Contractor.

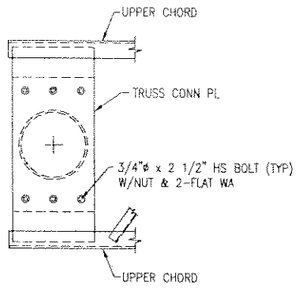
☐ No Exceptions Taken
☒ Make Correction Noted By AN
☐ Amend and Resubmit
☐ Rejected – See Remarks Date 3/22/08



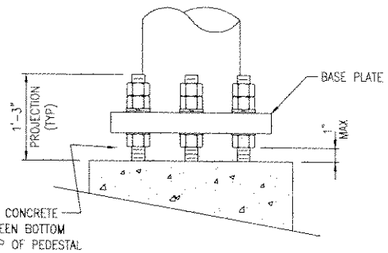
ELEVATION
STR. GANTRY NB @ STA 619+01.21



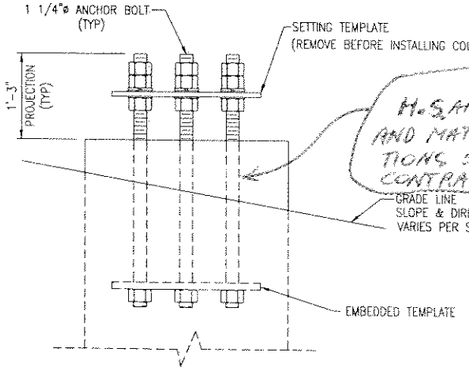
TYPICAL SECTION
EQUIPMENT MOUNTING ENVELOPE



UPPER CONNECTION DETAIL
(LEFT COLUMN SHOWN. RIGHT COLUMN SIMILAR)



BASE PLATE ERECTION



TYPICAL FOUNDATION ELEVATION

M.S. ANCHOR BOLT AND MATERIAL SPECIFICATIONS SHALL COMPLY WITH CONTRACT DRAWING SM-40 OF 41

GENERAL NOTES:

STRUCTURE DESIGN PER AASHTO STANDARD SPECS. FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRS AND TRAFFIC SIGNALS, 1994 EDITION.

DESIGN WIND SPEED 80 MPH.

ALL WELDING PER AWS D1.1 (LATEST EDITION).

STRUCTURE DESIGN BY HURTT FABRICATING CORP.

ANCHOR BOLT & FOUNDATION DESIGN BY HNTB.

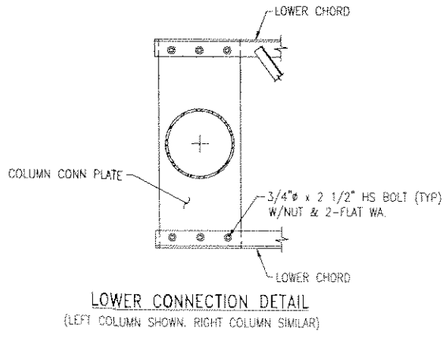
EQUIPMENT MOUNTING BRACKETS & HARDWARE BY OTHERS.

FOUNDATION & ROADWAY ELEVATIONS PROVIDED BY VENTURE ELECTRIC CO. ON 2-5-08.

FIELD VERIFY — THE ELEVATIONS SHOWN ARE FOR REFRENCE AND RELATIONSHIP ONLY AND ARE NOT THE ACTUAL SITE ELEVATIONS.

17'-6" MINIMUM (18'-0" DESIGN) CLEARANCE FROM THE HIGH POINT OF THE ROADWAY TO THE BOTTOM OF THE EQUIPMENT MOUNTING ENVELOPE.

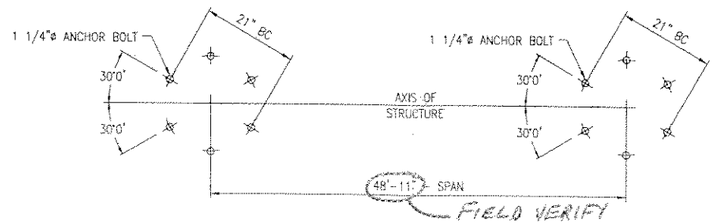
THE TRUSS TO COLUMN HIGH STRENGTH BOLT CONNECTIONS SHALL BE INSTALLED USING THE "TURN-OF-NUT" METHOD PER SECTION 407.06(b).3 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS 2002.



LOWER CONNECTION DETAIL
(LEFT COLUMN SHOWN. RIGHT COLUMN SIMILAR)

ANCHOR NOTE:
USE STEEL SETTING & EMBEDDED TEMPLATES TO ASSURE PROPER ANCHOR BOLT LAYOUT & ALIGNMENT.

REUSE SETTING TEMPLATE AT SIMILAR LOCATIONS.



ANCHOR BOLT LAYOUT
LOC. GANTRY NB

COMMONWEALTH OF VIRGINIA
TIMOTHY D. CAVENY
Lic. NO. 044008
PROFESSIONAL ENGINEER
2/29/08

REV:								
PRINTS ISSUED								
FOR	#	DATE	FOR	#	DATE	FOR	#	DATE

HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

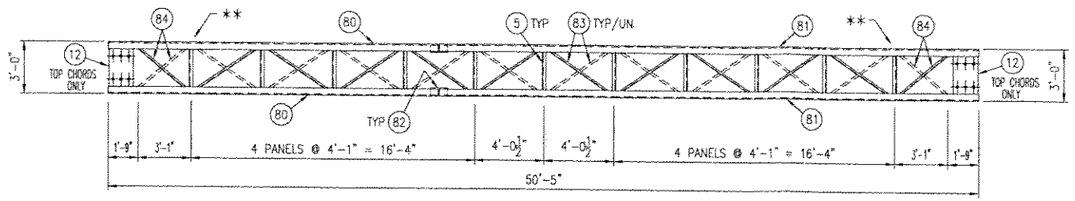
CUSTOMER: VENTURE ELECTRIC CO.

PROJECT: CONTRACT NO. PEL-2006
POWHITE PARKWAY EXPRESS LANES PROJECT
RICHMOND METROPOLITAN AUTHORITY

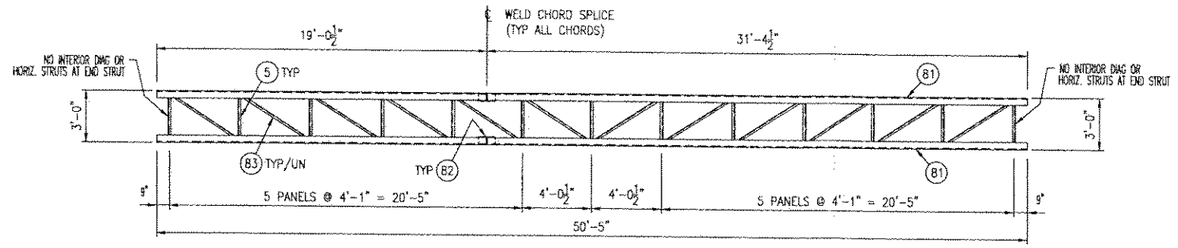
SUBJECT: ERECTION DIAGRAM FOR LOC. NORTH BOUND GANTRY @ STA 619+01.21

FILE: 4871 OH EI PKG F		DATE: 2-13-08	PKG: F
PRINTED FOR: RICHMOND METRO AUTHORITY	DR BY: JBS	CH BY: TAD	JOB NO: HNTB-4871A

SHEET 50

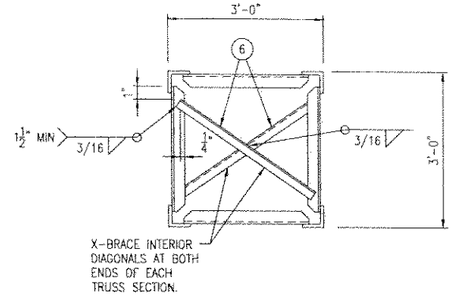


PLAN



ELEVATION

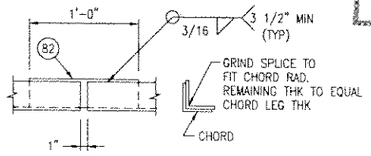
ONE REQ'D - SPAN SECTION - MK P3A



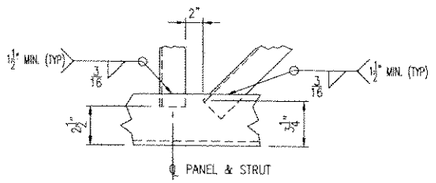
TYPICAL TRUSS SECTION END

TOP CHORD MOUNTING PLATE

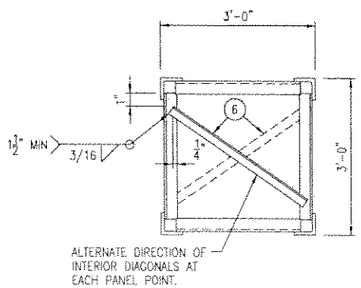
LEFT SECTION SHOWN
RIGHT SECTION SIMILAR



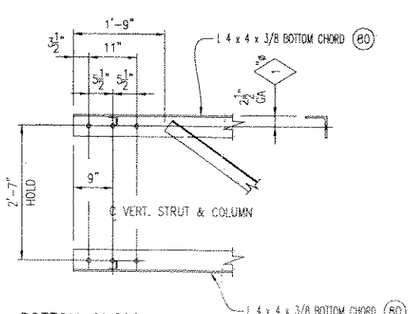
WELD CHORD SPLICE



TYPICAL STRUT & DIAGONAL CONNECTION



TYPICAL TRUSS SECTION



BOTTOM CHORD LAYOUT

LEFT SECTION SHOWN
RIGHT SECTION SIMILAR

BILL OF MATERIAL

QTY	MK	DESCRIPTION	LENGTH	REMARKS
4	80	L 4 x 4 x 3/8	19'-0"	
4	81	L 4 x 4 x 3/8	31'-4"	
4	82	L 4 x 4 x 3/8	1'-0"	
44	83	L 2 x 2 x 3/16	4'-4 1/8"	
4	84	L 2 x 2 x 3/16	3'-9"	
48	5	L 2 x 2 x 3/16	2'-7"	
13	6	L 2 x 2 x 3/16	3'-7"	
2	12	PL 1/2 X 17	2'-8"	
24	END COLUMN	3/4"ø HSB	2 1/2"	W/NUT & 2-FLAT WASHER

SHOP DRAWING REVIEW
HNTB Corporation

Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities and safety during fabrication and erection shall remain with the Contractor.

☒ No Exceptions Taken
☐ Make Correction Noted By MM
☐ Amend and Resubmit
☐ Rejected - See Remarks Date 3/22/08

CAMBER NOTES:

PROVIDE ¾" OF CAMBER AT CENTERLINE OF TRUSS

MATERIAL SPECIFICATIONS:

STEEL SHAPES & PLATE - ASTM A36
GALVANIZE AFTER FAB PER ASTM A123
HS BOLTS - ASTM A325 TYPE 1
NUTS - ASTM A563 DH
WASHERS - ASTM F436
GALVANIZE HARDWARE PER ASTM A153

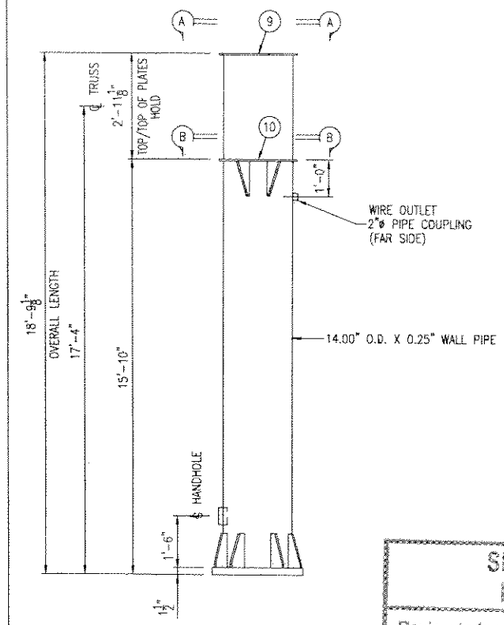
REV:								
PRINTS ISSUED								
FOR	#	DATE	FOR	#	DATE	FOR	#	DATE

COMMONWEALTH OF VIRGINIA
TIMOTHY D. CAVENY
Lic. No. 044008
PROFESSIONAL ENGINEER
2/29/08

HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

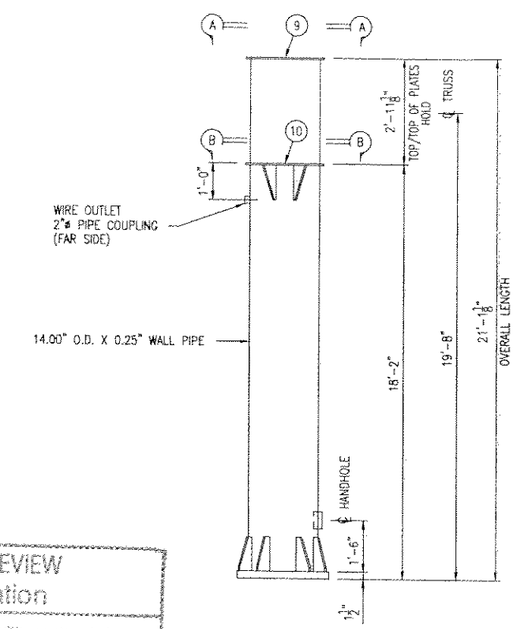
CUSTOMER:	VENTURE ELECTRIC CO.
PROJECT:	CONTRACT NO. PEL-2006 POWHITE PARKWAY EXPRESS LANES PROJECT RICHMOND METROPOLITAN AUTHORITY
SUBJECT:	FABRICATION DETAILS FOR GANTRY TRUSS LOC. NORTH BOUND GANTRY

FILE: 4671 OH GANTRY TRUSS PKG F	DATE: 2-13-08	PKG: F	
PRINTED FOR: RICHMOND METRO AUTHORITY	DR BY: JBS	CH BY: TAD	JOB NO: HF-4671	SHEET OF 2



LEFT END COLUMN DETAIL

ONE REQ'D – MK P3EL



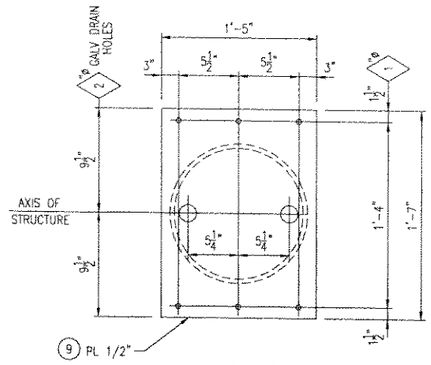
RIGHT END COLUMN DETAIL

ONE REQ'D – MK P3ER

SHOP DRAWING REVIEW
HNTB Corporation

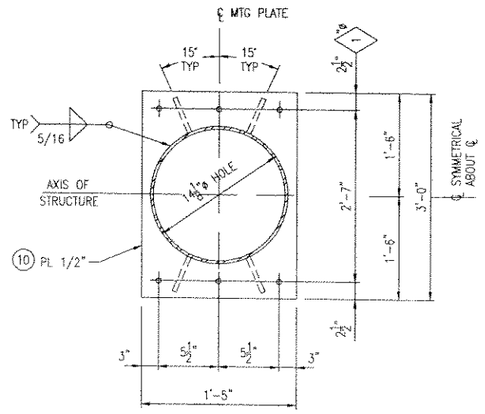
Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities and safety during fabrication and erection shall remain with the Contractor

☒ No Exceptions Taken
☐ Make Correction Noted By AN
☐ Amend and Resubmit
☐ Rejected – See Remarks Date 3/22/08



VIEW A–A

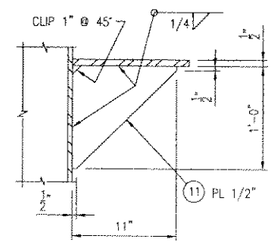
UPPER MOUNTING PLATE



SECTION B–B

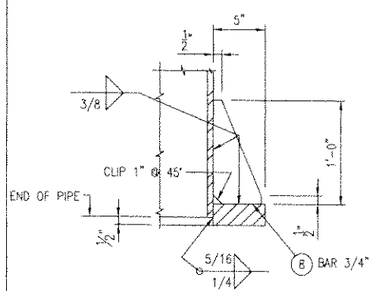
LOWER MOUNTING PLATE

BILL OF MATERIAL				
QTY	MK	DESCRIPTION	LENGTH	REMARKS
1	P3EL	14.00" O.D. x 0.25" WALL PIPE	18'-8 1/8"	
1	P3ER	14.00" O.D. x 0.25" WALL PIPE	21'-0 1/8"	
2	7	PL 1 1/2 x 26"ø		
12	8	PL 3/4 x 5	1'-0"	
2	9	PL 1/2 x 17	1'-7"	
2	10	PL 1/2 x 17	3'-0"	
8	11	PL 1/2 x 11	1'-0"	
2	HF	PL 2 x 5 1/2	0'-8"	
2	HC	BAR 5 1/2 x 1/8	0'-8"	
2	CB	BAR 1 x 1/4	0'-1 1/2"	
2	GROUND LUG	1/2"ø HEX NUT		A307
4	HAND HOLE	3/8"ø HEX BOLT	1 1/4"	W/LOCKNUT (A307)
4		3/8"ø RD HD CAP SCREW	3/4"	W/LOCK WASHER (A307)
2		3/16"ø GALV. CHAIN	1'-6"	
2		2"ø PIPE COUPLING & PLUG		

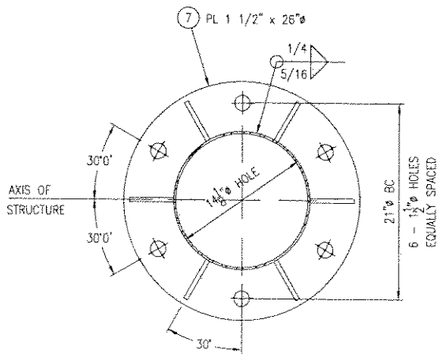


TRUSS CONNECTION GUSSET

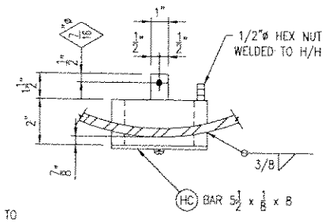
REQUIRED @ BOTTOM CONNECTION ONLY



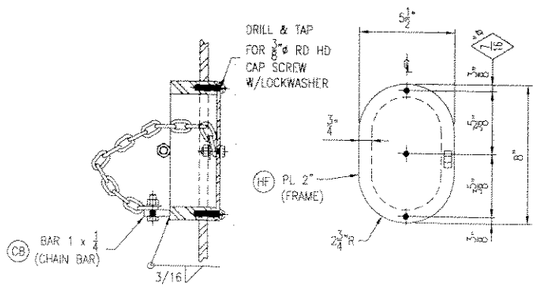
BASE PLATE WELD & GUSSET DETAIL



BASE PLATE DETAIL



NOTE:
ATTACH ⅜"ø x 1'-6" CHAIN TO HANDHOLE FRAME & COVER USING ⅜"ø x 1¼" HEX BOLT W/LOCKNUT



HANDHOLE DETAIL

MATERIAL SPECIFICATIONS:

COLUMN PIPE – A500 GR B or API 5L X42, X52, or X60 (42 KSI MIN. YIELD)
STEEL BARS & PLATES – ASTM A36
GALV. STEEL AFTER FAB PER ASTM A123

STD BOLTS, NUTS, & WASHERS – ASTM A307
GALV. HARDWARE PER ASTM A153

REV:								
PRINTS ISSUED								
FOR	#	DATE	FOR	#	DATE	FOR	#	DATE

COMMONWEALTH OF VIRGINIA
TIMOTHY D. CAVENY
Lic. No. 034008
PROFESSIONAL ENGINEER
2/29/08

HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

CUSTOMER: VENTURE ELECTRIC CO.

PROJECT: CONTRACT NO. PEL-2006
POWHITE PARKWAY EXPRESS LANES PROJECT
RICHMOND METROPOLITAN AUTHORITY

SUBJECT: FABRICATION DETAILS FOR GANTRY END COLUMNS
LOC. NORTH BOUND GANTRY

FILE: 4671 GANTRY END COLUMN PKG F		DATE: 2-13-08	PKG:	F
PRINTED FOR: RICHMOND METRO AUTHORITY	DR BY: JBS	CH BY: TAC	JOB NO: HF-4570	SHEET 2 OF 2

P

COWELL
ENGINEERING
STRUCTURAL ENGINEERS

February 29, 2008

Craig Hengstenberg
Hurtt Fabricating
P.O. 128
Marceline, MO 64658

RE: Independent Review
Sign Structures and Foundations
Project: HF - 4871
Gantry Sign Location:

Dear Craig:

This office has reviewed the drawings provided for the above referenced project to determine compliance with the AASHTO standards entitled: Standard Specifications for Structural Supports for Highway Signs, Luminaries and Traffic Signals (1994) and AASHTO Standard Specifications for Highway Bridges (1996), and the VDOT Road and Bridge Standards.

The review consisted of verifying the input values from the supplied drawings, comparing the drawing against the referenced standard/specification and performing computations to verify some of the computer generated numbers when needed.

Cowell Engineering, LLC has the required independent status necessary for review. Neither the company nor any of its employees have any affiliations (past or present) with any manufacturer, supplier, or contractor associated with traffic structures.

Based upon this review and to the best of my knowledge and belief, the submitted drawings are in compliance with the pertinent passages of the above referenced AASHTO specifications.

Yours very truly,
COWELL ENGINEERING

COMMONWEALTH OF VIRGINIA
TIMOTHY D. CAVENY
Lic. No. 044008
PROFESSIONAL ENGINEER
2/29/08

Timothy D. Caveny, P.E., S.E.
W.O. #07087

3008 Sutton Boulevard
Saint Louis, Missouri 63143
314.644.4002 office
314.644.1988 fax
www.cowelleng.com

HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

Truss # = GNB
Hurtt Job # = HF 4871
Item # =
State Job # = RICH EXPY
State Project = PEL 2006

File Name: 4871GANB.DAT

County = RMA

Although extensive measures have been taken to insure the correctness of this program, the presence of undetected errors in the program or material is possible. Therefore, the application of judgement is required on the correctness of the output and its proper application to the intended use. The program material contained herein is supplied without representation or warranty of any kind. Cowell Engineering LLC and San4dSoft therefore assume no responisbility and shall have no liability, consequential or otherwise, of any kind arising from the use of the program or any part thereof.

SHEETS 1-12 FOR TRUSS DESIGN ONLY

SHOP DRAWING REVIEW
HNTB Corporation

Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities and safety during fabrication and erection shall remain with the Contractor.

☒ No Exceptions Taken
☐ Make Correction Noted By MM
☐ Amend and Resubmit
☐ Rejected – See Remarks Date 3/22/08

HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

TRUSS DIMENSIONS (FT)			PANEL LENGTH (FT)	
LENGTH	DEPTH	WIDTH	CENTER	END
48.92	3.00	3.00	4.08	4.06

WIND VELOCITY MPH	NUMBER OF SIGNS	WALK DESIGN DIST L	WALK DESIGN LENGTH	WALK DESIGN WGT/FT	NUMBER OF PANELS CENTER	NUMBER OF PANELS END
80.00	1	0.00	0.00	0.00	10	2

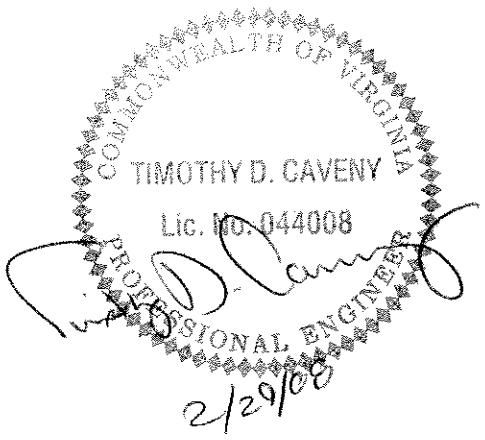
HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

S I G N D A T A

SIGN NO.	SIGN LENGTH	SIGN HEIGHT	CD	CH	DISTANCE FROM LS	DISTANCE CENTER	ECCN	WGT
1	46.92	1.00	1.30	1.00	1.00	24.46	-3.50	0.00



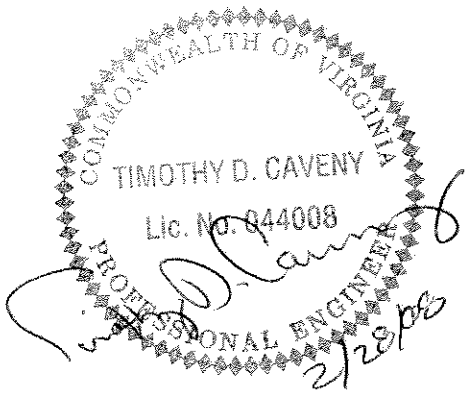
HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

TRUSS DEPTH = 3.00 FEET
TRUSS WIDTH = 3.00 FEET
DEFLECTION = 0.101 IN.
CAMBER REQUIRED = 0.688 IN.

	L-WIND FORCE (LBS.)	L-DEAD WEIGHT (LBS.)	R-WIND FORCE (LBS.)	R-DEAD LOAD (LBS.)
CASE 1	0.0	1464.3	0.00	1464.3
CASE 2	2171.9	1464.3	2171.90	1464.3
CASE 3	1086.0	2343.3	1085.95	2343.3



HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

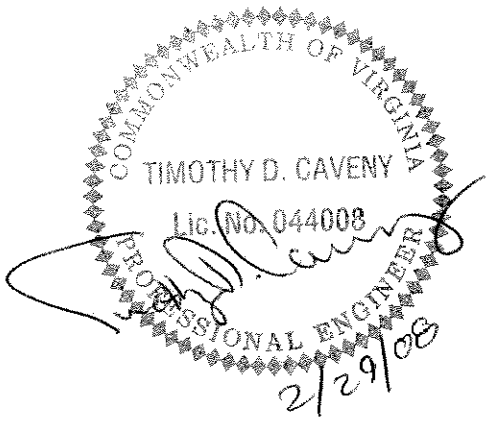
Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * TRUSS CHORDS * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	NUMBER OF 0.625" BOLTS(A325)	NUMBER OF 0.75" BOLTS(A325)	NUMBER OF 0.875" BOLTS(A325)
49.42	4	2.00	2.00	1.00

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
4x4x.375	36.00	2.86	2.10	0.79	1937.26

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	3715.5	1299.1	16447.6	1.33
CASE 2	13519.0	4726.9	23026.7	3.47
CASE 3	10975.3	3837.5	23026.7	2.82



HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

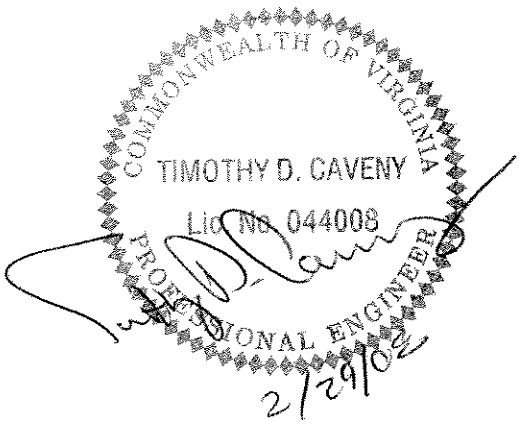
Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * WIND DIAGONAL * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.92	20	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	240.11

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	6627.6	0.00
CASE 2	1943.0	2717.4	9278.6	0.50
CASE 3	971.5	1358.7	9278.6	0.25



HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

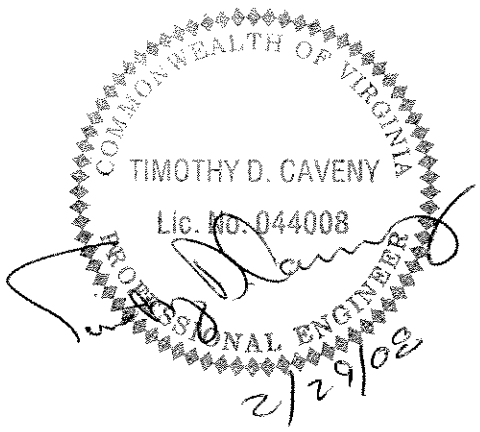
Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * WIND DIAGONAL END PANEL * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.90	4	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	47.86

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	6672.5	0.00
CASE 2	1936.4	2708.3	9341.5	0.50
CASE 3	968.2	1354.1	9341.5	0.25



HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * WIND STRUT * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	26	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	174.46

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	14590.6	0.00
CASE 2	1086.0	1518.8	20426.9	0.28
CASE 3	543.0	759.4	20426.9	0.14

HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

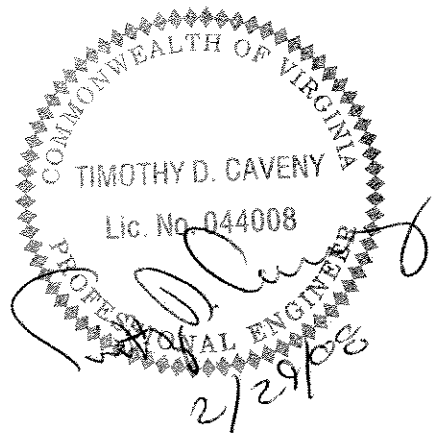
Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * DEAD LOAD DIAGONAL * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.92	20	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	240.11

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	1310.0	1832.1	19800.0	0.47
CASE 2	1310.0	1832.1	27720.0	0.34
CASE 3	2159.3	3019.9	27720.0	0.55



HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

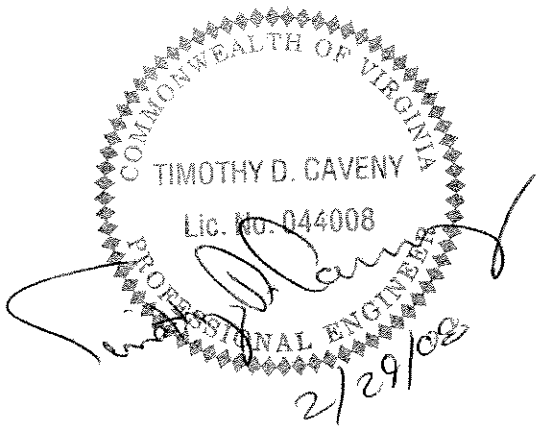
Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * DEAD LOAD DIAGONAL END PANEL * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.90	4	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	47.86

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	1305.6	1826.0	19800.0	0.47
CASE 2	1305.6	1826.0	27720.0	0.33
CASE 3	2152.0	3009.8	27720.0	0.55



HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

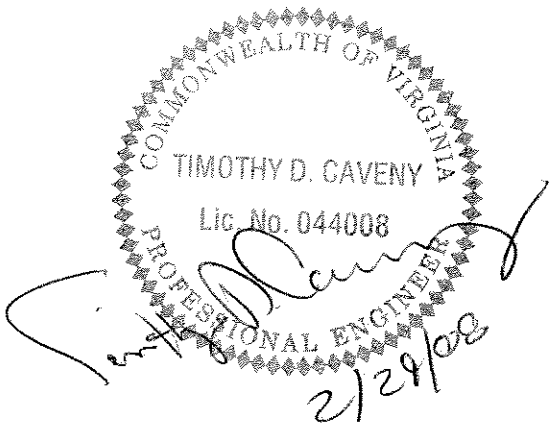
Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * DEAD LOAD VERTICAL * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	26	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	174.46

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	732.2	1024.0	14590.6	0.26
CASE 2	732.2	1024.0	20426.9	0.19
CASE 3	1206.8	1687.9	20426.9	0.31



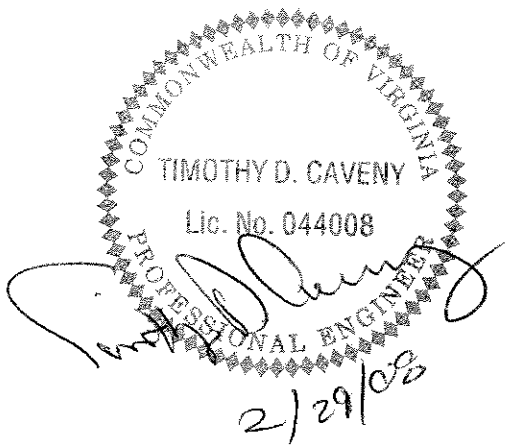
HURTT FABRICATING CORP., MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANT N
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:40

* * * * * * * * * * INTERIOR DIAGONAL * * * * * * * * * *

LENGTH = 3.55 NUMBER REQUIRED = 13

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	LENGTH OF 0.19" FILLET WELD	LEAST ROG	WEIGHT
1.75x1.75x0.13	36.00	0.42	1.50	0.35	66.52



HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

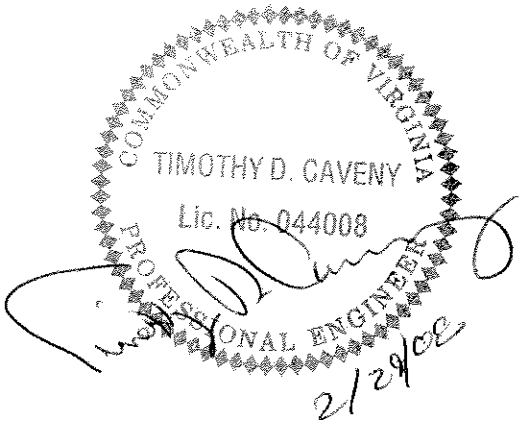
Structure Name : GTY NB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:49

Truss # = GANï File Name: 4871GTNB.DTA
Hurtt Job # = HF 4871
Item # =
State Job # = RICH EXPY
State Project = PEL 2006

County = RMA

Although extensive measures have been taken to insure the correctness of this program, the presence of undetected errors in the program or material is possible. Therefore, the application of judgement is required on the correctness of the output and its proper application to the intended use. The program material contained herein is supplied without representation or warranty of any kind. Cowell Engineering LLC and San4dSoft therefore assume no responisbility and shall have no liability, consequential or otherwise, of any kind arising from the use of the program or any part thereof.

SHEETS 1-10 & EXTRA CHECKS FOR COLUMN DESIGN ONLY



HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY NB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:49

* * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

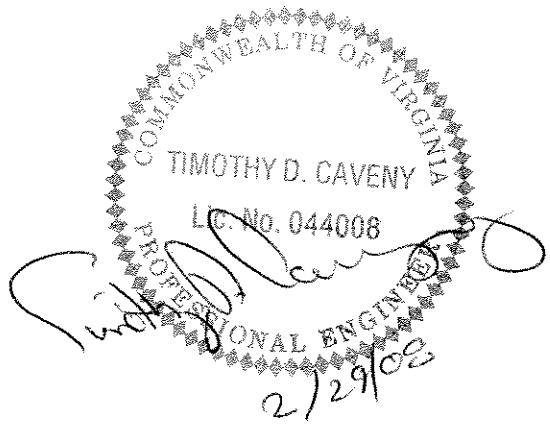
TRUSS DIMENSIONS (FT)

LENGTH	DEPTH	WIDTH	PANEL LENGTH(FT)	NUMBER OF PANELS
24.46	3.00	3.00	4.08	6

WIND VELOCITY MPH	NUMBER OF SIGNS	WALK DESIGN DIST L	WALK DESIGN LENGTH	WALK DESIGN WGT/FT
80.00	1	0.00	0.00	0.00

S I G N D A T A

SIGN NO.	SIGN LENGTH	SIGN HEIGHT	CD	CH	DISTANCE FROM LS	DISTANCE CENTER	ECCN	WGT
1	23.46	1.00	1.30	1.00	1.00	12.73	-3.50	352.00



HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY NB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:49

* * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

TRUSS DEPTH = 3.00 FEET
TRUSS WIDTH = 3.00 FEET
DEFLECTION = 0.118 IN.
CAMBER REQUIRED = 0.412 IN.

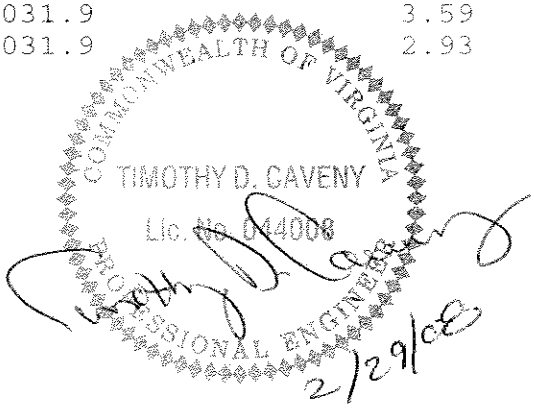
	WIND SHEAR (LBS.)	DEAD WEIGHT (LBS.)	WIND MOMENT (FT.-LBS.)	DEAD-W MOMENT (FT.-LBS.)
CASE 1	0.0	1806.8	0.00	22273.4
CASE 2	2149.6	1806.8	26712.11	22273.4
CASE 3	1074.8	2675.2	13356.06	32928.4

* * * * * * * * * * TRUSS CHORDS * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	NUMBER OF 0.625" BOLTS(A325)	NUMBER OF 0.75" BOLTS(A325)	NUMBER OF 0.875" BOLTS(A325)
25.21	4	2.00	2.00	1.00

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
4x4x.38	36.00	2.86	2.10	0.79	988.23

	FORCE (PSI)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	4760.6	1664.5	16451.3	1.71
CASE 2	13976.8	4887.0	23031.9	3.59
CASE 3	11424.0	3994.4	23031.9	2.93



HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY NB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:49

* * * * * * * * * * * * COLUMN DESIGN * * * * * * * * * * * *

HEIGHT (FT) TOTAL	HEIGHT (FT) TRUSS	DIAMETER (IN)	THICKNESS (IN)	YIELD STRENGTH (KSI)	WEIGHT (LB)
21.43	19.68	14.00	0.2500	42	787

	AXIAL (LBS)	MOMENT (FT-LB)	TORQUE (FT-LB)	SHEAR (LBS)	FA ALLOW	FB ALLOW	FV ALLOW	CSR
CASE 1	2794	22273	0	0	14275	27720	13860	0.283
COMBINATION 1								
CASE 2	2794	52645	26712	2510	19984	38808	19404	0.518
COMBINATION 1								
CASE 2	2794	43434	16027	1651	19984	38808	19404	0.402
COMBINATION 2								
CASE 3	3663	44032	13356	1415	19984	38808	19404	0.405
COMBINATION 1								
CASE 3	3663	42162	8014	931	19984	38808	19404	0.380
COMBINATION 2								

ϕ for overhead sign

Max mom @ BASE = 2172(19.67) = 42,723

$M_{design} = \sqrt{42{,}723^2 + (.2)(42{,}723)^2} = 43{,}569$

COMMONWEALTH OF VIRGINIA
TIMOTHY D. CAVENY
Lic. No. 044008
PROFESSIONAL ENGINEER
2/29/08

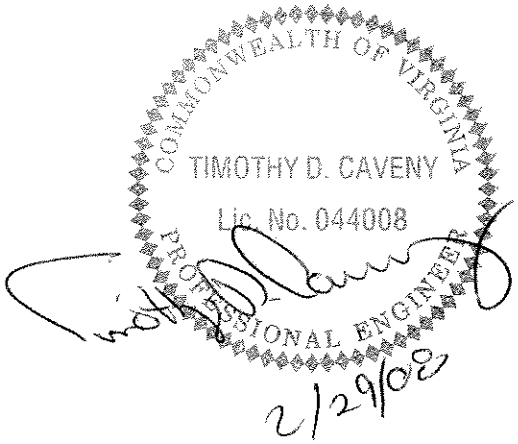
HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY NB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:49

* * * * * * * * * TRUSS MOUNTING PLATE * * * * * * * * *

WIDTH A [IN]	WIDTH B [IN]	THICKNESS C [IN]	GUSSET DEPTH D [IN]	THICKNESS E [IN]	WEIGHT [LBS]
36.00	17.00	0.500	12.00	0.500	149

WELD SIZE-W2 (1/16")	WELD SIZE-W3 (1/16")
5	4



HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN version 2 8-23-07
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY NB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 2/12/2008 at 15:49

* * * * * * * * * * ANCHOR BOLT DESIGN * * * * * * * * * *

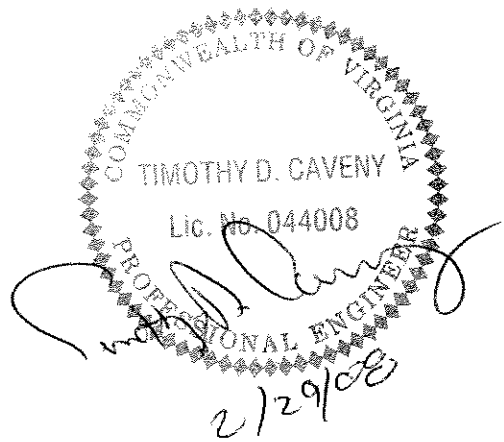
DIAMETER [IN]	EMBEDMENT LENGTH [IN]	YIELD STRENGTH (KSI)	MAXIMUM TENSION [LBS]	WEIGHT [LBS]
2.00	40.00	55.00	31499	171

* * * * * * * * * * * * BASE PLATE * * * * * * * * * * *

DIMENSIONS [IN]	BOLT SPACING [IN] X	Y	EDGE DISTANCE [IN]	WEIGHT [LBS]
21.50 x 21.50 x 2.00	14.00	14.00	3.75	262.16

WELD SIZE-W4 (1/16")
5.00

Total Weight of Column Plates & Anchor Bolts = 1369.44 LBS.
Total Weight of Truss, Column, Plates & Anchor Bolts = 2824.26 LBS.



COWELL ENGINEERING
STRUCTURAL ENGINEERS

PROJECT HF-4871
LOCATION Richmond Virginia
CLIENT Hecht Fab
BY TDC DATE 6/27/07 W.O.#
CHECK DATE SHEET OF

CHECK BASE PLATE

Mactual = 43,569 ∴ ok

$M_{max\ @\ BASE} = 2860(20) = 57{,}200$ ft-Lbs

$M_{design} = \sqrt{57{,}200^2 + [(.3)(57{,}200)]^2} = 58{,}333$

$T = \frac{4(58{,}333\ \text{ft-Lbs})}{6(1.75')} - \left(\frac{1914.8 + 799}{6}\right) = 21{,}770^{\#}$ (452.3)

$V = \sqrt{2859^2 + .2(2859)^2} = 2916^{\#}$

using 1¼" ϕ A.B. $A_t = .969\ in^2$ Assum 55 ksi

$F_v = 0.3(55) = 16.5$ ksi $\quad F_t = 0.5(55) = 27.5$ ksi

$f_v = \frac{2916}{.969} = 3009.3$ $\quad f_t = \frac{21{,}770}{.969} = 22{,}466.4$

$CSR = \left(\frac{3.00}{16.5(4/3)}\right)^2 + \left(\frac{22.5}{27.5(4/3)}\right)^2 = 0.395 < 1.0$ (.376)

BENDING of PL Between Bolts.

$L = 20"(\pi)/6 = 10.47"$ $\quad M_{PL} = \frac{Pl}{8} = \frac{21.8(10.47")}{8} = 28.5\ in\text{-}k$

$f_{bPL} = \frac{28.5\ k\text{-}in\ (6)}{6(1.5)^2} = 12.7$ ksi

Weld to BASE PL

$f_t = \frac{21.7^k}{4.5 \times 2 \times .375} = 6.4$ ksi $< .3(70) = 21$ ksi

COMMONWEALTH OF VIRGINIA
TIMOTHY D. CAVENY
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PROFESSIONAL ENGINEER
6/29/07

COWELL ENGINEERING
STRUCTURAL ENGINEERS

PROJECT HF-4871
LOCATION Richmond VA
CLIENT Wirth Fab
BY DC DATE 6/27/07 W.O.#
CHECK DATE SHEET OF

Weld of Gusset to CoL.

$f_v = \frac{21.7^k}{11.5 \times 2 \times .375} = 2.5$ ksi ok S

STRESS ON Gusset

$f_t = \frac{21.7^k}{45 \times .75} = 6.5$ ksi ok S

COMMONWEALTH OF VIRGINIA
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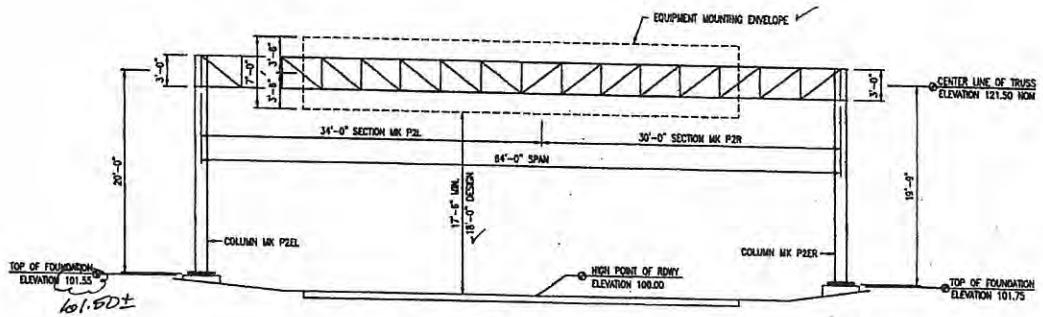
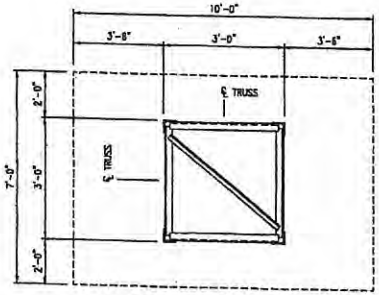
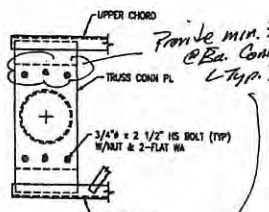
PROFESSIONAL ENGINEER
2/29/08



ELEVATION
STR. GANTRY SB

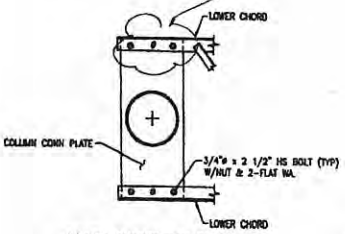


TYPICAL SECTION
EQUIPMENT MOUNTING ENVELOPE

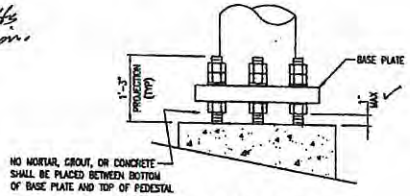


UPPER CONNECTION DETAIL
(LEFT COLUMN SHOWN, RIGHT COLUMN SIMILAR)

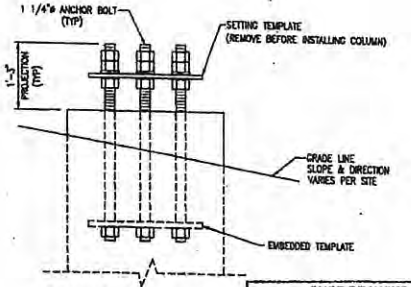
Provide min. 3 bolts @ Ea. Connection. (Typ.)



LOWER CONNECTION DETAIL
(LEFT COLUMN SHOWN, RIGHT COLUMN SIMILAR)



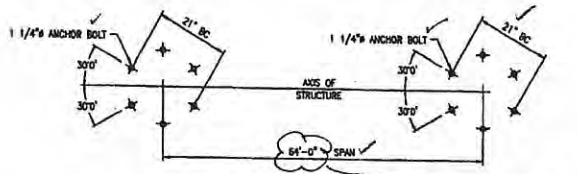
BASE PLATE ERECTION



TYPICAL FOUNDATION ELEVATION

ANCHOR NOTE:
USE STEEL SETTING & EMBEDDED TEMPLATES TO ASSURE PROPER ANCHOR BOLT LAYOUT & ALIGNMENT.

REUSE SETTING TEMPLATE AT SIMILAR LOCATIONS.



ANCHOR BOLT LAYOUT
LOC. GANTRY SB
Field Verify

SHOP DRAWING REVIEW
HNTB Corporation

Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities and safety during fabrication and erection shall remain with the Contractor.

☐ No Exceptions Taken
☒ Make Correction Noted By BS
☐ Amend and Resubmit
☐ Rejected – See Remarks Date 6/29/07

GENERAL NOTES:

STRUCTURE DESIGN PER AASHTO STANDARD SPECS. FOR STRUCTURAL SUPPORTS FOR HIGHWAY SIGNS, LUMINAIRS AND TRAFFIC SIGNALS, 1994 EDITION.

DESIGN WIND SPEED 80 MPH.

ALL WELDING PER AWS D1.1 (LATEST EDITION).

STRUCTURE DESIGN BY HURTT FABRICATING CORP.

ANCHOR BOLT & FOUNDATION DESIGN BY HNTB.

EQUIPMENT MOUNTING BRACKETS & HARDWARE BY OTHERS.

FOUNDATION & ROADWAY ELEVATIONS PROVIDED BY VENTURE ELECTRIC CO. ON 6-12-07.

Field Verify
THE ELEVATIONS SHOWN ARE FOR REFRENCE AND RELATIONSHIP ONLY AND ARE NOT THE ACTUAL SITE ELEVATIONS.

17'-6" MINIMUM (18'-0" DESIGN) CLEARANCE FROM THE HIGH POINT OF THE ROADWAY TO THE BOTTOM OF THE EQUIPMENT MOUNTING ENVELOPE.

THE TRUSS SPLICE CONNECTION SHALL BE MADE USING HIGH STRENGTH BOLTS & DTI WASHERS. TIGHTENING SHALL CONFORM TO SECTION 407.06(b)3 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS 2002 AND THE DTI MANUFACTURERS INSTRUCTIONS. THE TRUSS TO COLUMN HIGH STRENGTH BOLT CONNECTIONS SHALL BE INSTALLED USING THE "TURN-OF-NUT" METHOD PER SECTION 407.06(b)3 OF THE VDOT ROAD AND BRIDGE SPECIFICATIONS 2002.

COMMONWEALTH OF VIRGINIA
David L. Cowell
Lic. No. 030335
PROFESSIONAL ENGINEER

REV:	PRINTS ISSUED					
FOR	#	DATE	FOR	#	DATE	FOR	#	DATE

HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658

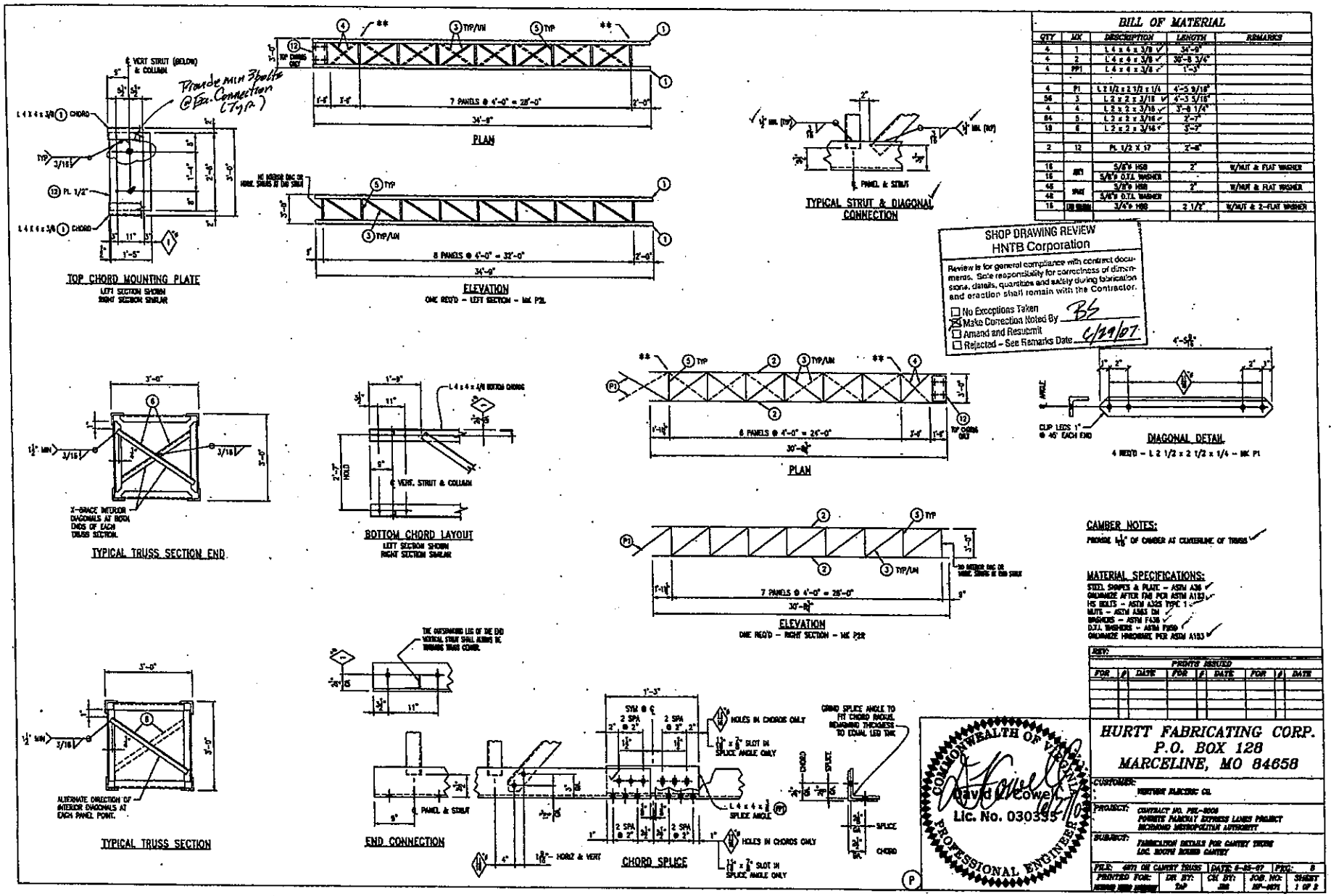
CUSTOMER: VENTURE ELECTRIC CO.

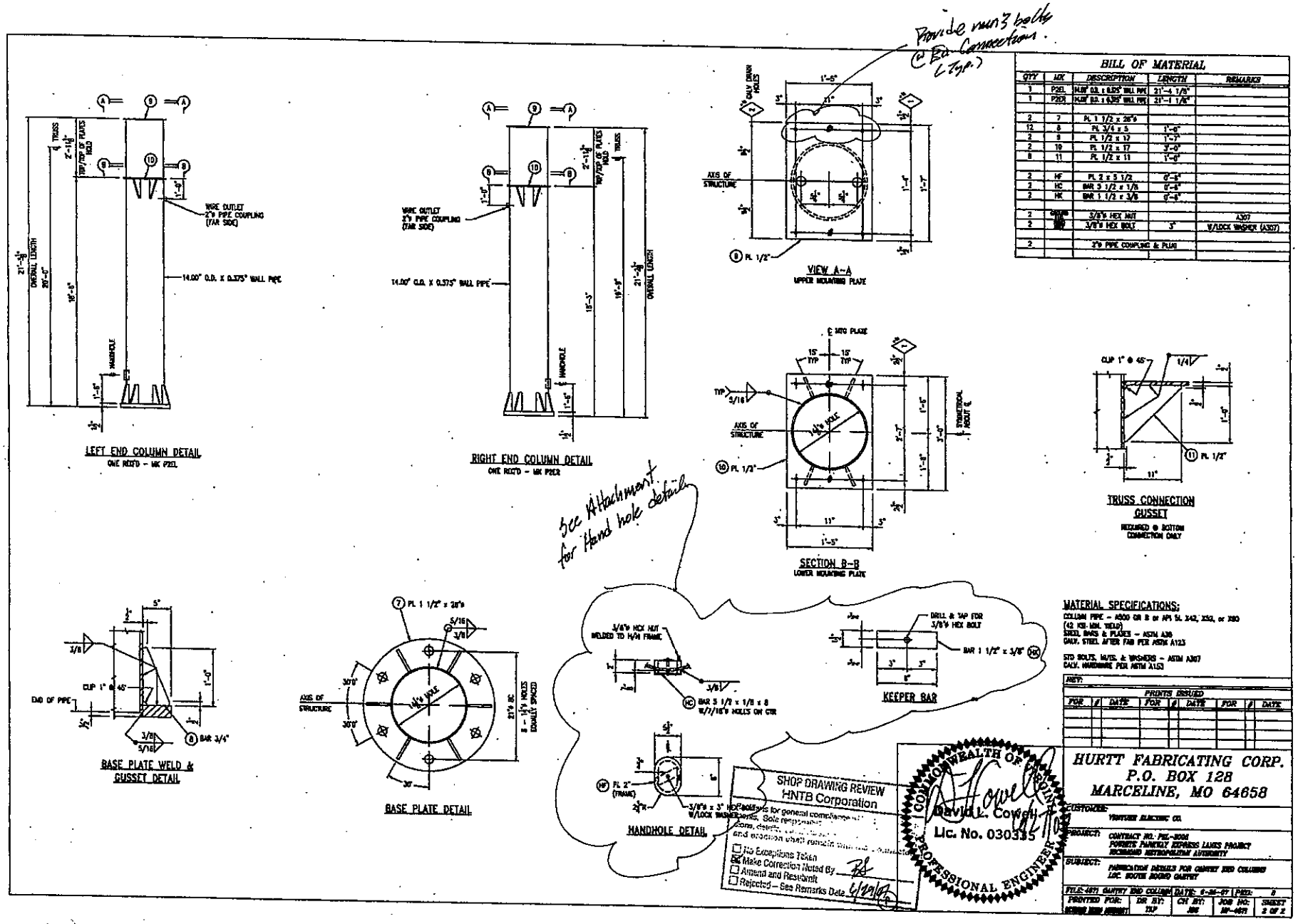
PROJECT: CONTRACT NO. PEL-8008
POWHITE PARKWAY EXPRESS LANES PROJECT
RICHMOND METROPOLITAN AUTHORITY

SUBJECT: ERECTION DIAGRAM FOR LOC. SOUTH BOUND GANTRY

FILE:	4071 GR EIB	DATE: 6-22-07	PKG: B	
PRINTED FOR: RICHMOND METRO AUTHORITY	DR BY: TAP	CH BY: JBB	JOB NO: HP-4071	SHEET E1

SB GANTRY


BILL OF MATERIAL
SHOP DRAWING REVIEW
HNTB Corporation
Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities and safety during fabrication and erection shall remain with the Contractor.
No Exceptions Taken
Make Correction Noted By
Amend and Resubmit
Rejected - See Remarks Date 6/29/07
TOP CHORD MOUNTING PLATE
LEFT SECTION SHOWN
RIGHT SECTION SIMILAR
ELEVATION
ONE REQ'D - LEFT SECTION - MK P2L
PLAN
TYPICAL STRUT & DIAGONAL CONNECTION
TYPICAL TRUSS SECTION END
BOTTOM CHORD LAYOUT
LEFT SECTION SHOWN
RIGHT SECTION SIMILAR
PLAN
DIAGONAL DETAIL
4 REQ'D - L 2 1/2 x 2 1/2 x 1/4 - MK P1
ELEVATION
ONE REQ'D - RIGHT SECTION - MK P2R
CAMBER NOTES:
MATERIAL SPECIFICATIONS:
TYPICAL TRUSS SECTION
END CONNECTION
CHORD SPLICE
HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658
David E. Cowell
Lic. No. 030335
PROFESSIONAL ENGINEER
COMMONWEALTH OF VIRGINIA

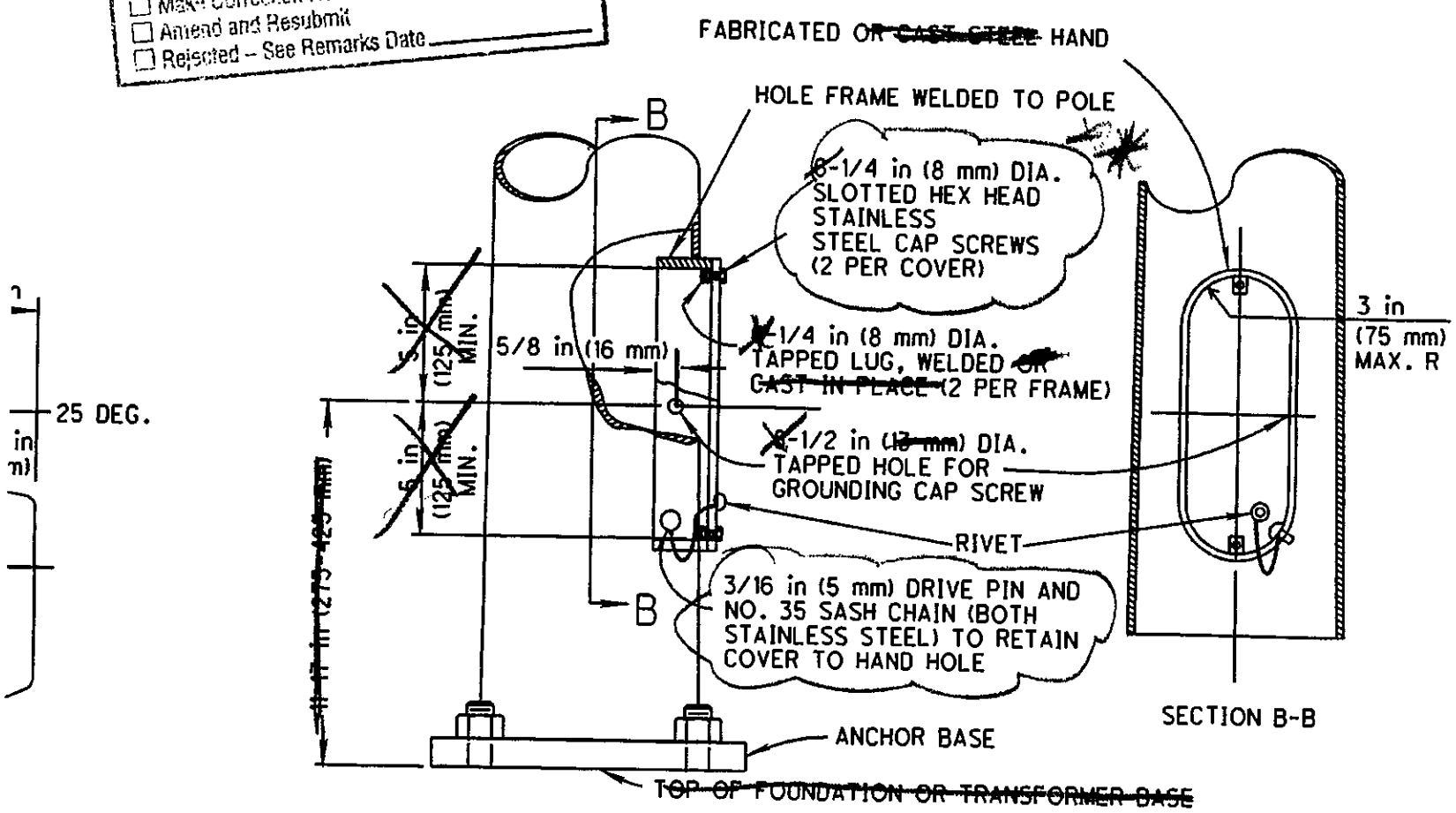

Provide min 3 bolts (C Ea Connections (Typ.)
BILL OF MATERIAL
QTY | MK | DESCRIPTION | LENGTH | REMARKS
1 | P2EL | 14.00" O.D. x 0.375" WALL PIPE | 21'-4 1/8"
1 | P2ER | 14.00" O.D. x 0.375" WALL PIPE | 21'-1 1/8"
2 | 7 | PL 1 1/2 x 28"ø
12 | 8 | PL 3/4 x 5 | 1'-0"
2 | 9 | PL 1/2 x 17 | 1'-7"
2 | 10 | PL 1/2 x 17 | 3'-0"
8 | 11 | PL 1/2 x 11 | 1'-0"
2 | HF | PL 2 x 5 1/2 | 0'-5"
2 | HC | BAR 3 1/2 x 1/8 | 0'-8"
2 | HK | BAR 1 1/2 x 3/8 | 0'-5"
2 | | 3/8"ø HEX NUT | | A307
2 | | 3/8"ø HEX BOLT | 3" | W/LOCK WASHER (A307)
2 | | 2"ø PIPE COUPLING & PLUG
LEFT END COLUMN DETAIL
ONE REQ'D - MK P2EL
RIGHT END COLUMN DETAIL
ONE REQ'D - MK P2ER
VIEW A-A
UPPER MOUNTING PLATE
SECTION B-B
LOWER MOUNTING PLATE
TRUSS CONNECTION GUSSET
REQUIRED @ BOTTOM CONNECTION ONLY
BASE PLATE WELD & GUSSET DETAIL
BASE PLATE DETAIL
See Attachment for Hand hole detail
HANDHOLE DETAIL
KEEPER BAR
MATERIAL SPECIFICATIONS:
COLUMN PIPE - A500 GR B or API 5L X42, X52, or X60
(42 KSI MIN. YIELD)
STEEL BARS & PLATES - ASTM A36
GALV. STEEL AFTER FAB PER ASTM A123
STD BOLTS, NUTS, & WASHERS - ASTM A307
GALV. HARDWARE PER ASTM A153
KEY:
PRINTS ISSUED
FOR | # | DATE
SHOP DRAWING REVIEW
HNTB Corporation
No Exceptions Taken
Make Correction Noted
Amend and Resubmit
Rejected - See Remarks
Date 5/22/17
COMMONWEALTH OF VIRGINIA
David L. Cowell
Lic. No. 030335
PROFESSIONAL ENGINEER
HURTT FABRICATING CORP.
P.O. BOX 128
MARCELINE, MO 64658
CUSTOMER: YORKTOWN ELECTRIC CO.
PROJECT: CONTRACT NO. PEL-0001
PORTER PARKWAY EXPRESS LANES PROJECT
RICHMOND METROPOLITAN EXPRESSWAY
SUBJECT: FABRICATION DETAILS FOR GANTRY END COLUMNS
LOC. SOUTH BOUND GANTRY
FILE: 4871 GANTRY END COLUMN | DATE: 4-26-17 | REV: 0
PRINTED FOR: | DR BY: TKP | CH BY: JDE | JOB NO: 16-4871 | SHEET 2 OF 2

SHOP DRAWING REVIEW
HNTB Corporation

Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities and safety during fabrication and erection shall remain with the Contractor.

☐ No Exceptions Taken
☐ Make Correction Noted By
☐ Amend and Resubmit
☐ Rejected – See Remarks Date

nc = National Coarse



HAND HOLE WITH COVER

(SEE NOTES 1 & 2)

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

Truss # = GT
Hurtt Job # = HF 4871
Item # =
State Job # = RICH EXPY
State Project = PEL 2006

County = RMA

FOR TRUSS DESIGN

SHOP DRAWING REVIEW
HNTB Corporation
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☒ No Exceptions Taken
☐ Make Correction Noted By
☐ Amend and Resubmit
☐ Rejected – See Remarks Date 6/29/07

COMMONWEALTH OF VIRGINIA
David L. Cowell
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6/28/07

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * TRUSS DESIGN * * * * * DLC:03.24.2007 - A15L3*

TRUSS DIMENSIONS (FT)			PANEL LENGTH (FT)	
LENGTH	DEPTH	WIDTH	CENTER	END
64.00	3.00	3.00	4.00	4.00

WIND VELOCITY MPH	NUMBER OF SIGNS	WALK DESIGN DIST L	WALK DESIGN LENGTH	WALK DESIGN WGT/FT	NUMBER OF PANELS CENTER	NUMBER OF PANELS END
80.00	1	0.00	0.00	0.00	14	2

COMMONWEALTH OF VIRGINIA
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6/27/07

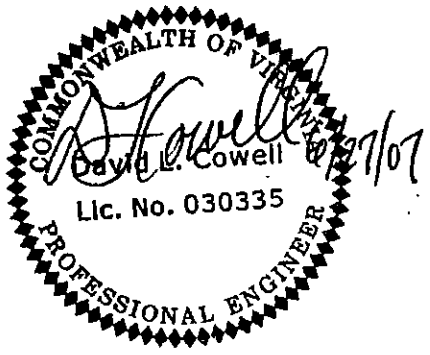
HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * * * TRUSS DESIGN * * * * DLC:03.24.2007 - A15L3*

S I G N D A T A

SIGN NO.	SIGN LENGTH	SIGN HEIGHT	CD	CH	DISTANCE FROM LS	DISTANCE CENTER	ECCN	WGT
1	62.00	1.00	1.30	1.00	1.00	32.00	-3.00	0.00



HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * * TRUSS DESIGN * * * * * DLC:03.24.2007 - A15L3*

TRUSS DEPTH = 3.00 FEET
TRUSS WIDTH = 3.00 FEET
DEFLECTION = 0.295 IN.
CAMBER REQUIRED = 1.063 IN.

	L-WIND FORCE (LBS.)	L-DEAD WEIGHT (LBS.)	R-WIND FORCE (LBS.)	R-DEAD LOAD (LBS.)
CASE 1	0.0	1914.8	0.00	1914.8
CASE 2	2858.7	1914.8	2858.73	1914.8
CASE 3	1429.4	3068.1	1429.36	3068.1

COMMONWEALTH OF VIRGINIA
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6/27/07

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * * * TRUSS CHORDS * * * * DLC:03.24.2007 - A15L3*

LENGTH FT	NUMBER REQUIRED	NUMBER OF 0.625" BOLTS(A325)	NUMBER OF 0.75" BOLTS(A325)	NUMBER OF 0.875" BOLTS(A325)
64.50	4	3.00	2.00	2.00

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
4x4x.375	36.00	2.86	2.10	0.79	2528.40

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	6132.9	2144.4	16535.9	2.20
CASE 2	22856.7	7991.8	23150.2	5.86
CASE 3	18420.3	6440.7	23150.2	4.73

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

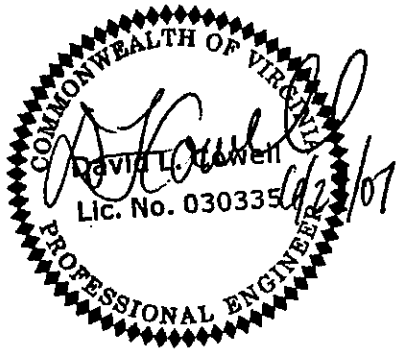
Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * * WIND DIAGONAL * * * * * DLC:03.24.2007 - A15L3*

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.85	28	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	331.63

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	6809.4	0.00
CASE 2	2523.0	3528.7	9533.2	0.65
CASE 3	1261.5	1764.4	9533.2	0.32



HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

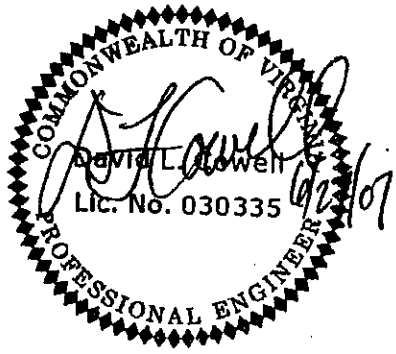
Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * WIND DIAGONAL END PANEL * * * * DLC:03.24.2007- A15L

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.85	4	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	47.38

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	6809.4	0.00
CASE 2	2523.0	3528.7	9533.2	0.65
CASE 3	1261.5	1764.4	9533.2	0.32



HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * * WIND STRUT * * * * * DLC:03.24.2007 - A15L3*

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	34	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	228.14

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	14590.6	0.00
CASE 2	1429.4	1999.1	20426.9	0.37
CASE 3	714.7	999.6	20426.9	0.18

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * DEAD LOAD DIAGONAL * * * * DLC:03.24.2007 - A15L3*

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.85	28	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	331.63

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	1690.0	2363.6	19800.0	0.61
CASE 2	1690.0	2363.6	27720.0	0.43
CASE 3	2789.9	3902.0	27720.0	0.72

COMMONWEALTH OF VIRGINIA
David L. Colvin
Lic. No. 030335
PROFESSIONAL ENGINEER

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

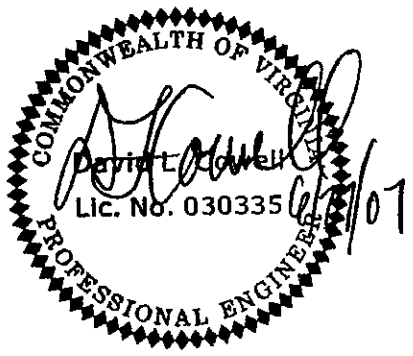
Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * DEAD LOAD DIAGONAL END PANEL * * * DLC:03.24.2007 - A15

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLTS NO. & SIZE (A325)
4.85	4	2 - 0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	47.38

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	1690.0	2363.6	19800.0	0.61
CASE 2	1690.0	2363.6	27720.0	0.43
CASE 3	2789.9	3902.0	27720.0	0.72



HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * DEAD LOAD VERTICAL * * * * * DLC:03.24.2007 - A15L3

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	34	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	228.14

	FORCE (LBS)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	957.4	1339.0	14590.6	0.34
CASE 2	957.4	1339.0	20426.9	0.25
CASE 3	1580.6	2210.6	20426.9	0.41

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7/1/07

HURTT FABRICATING CORP. MARCELINE, MO.
OVERHEAD ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GANTRY
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:21

* * * * * * * * * INTERIOR DIAGONAL * * * * DLC:03.24.2007 - A15L3

LENGTH = 3.55 NUMBER REQUIRED = 17

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	LENGTH OF 0.19" FILLET WELD	LEAST ROG	WEIGHT
1.75x1.75x0.13	36.00	0.42	1.50	0.35	86.98

= 2.6x2x7/16

COMMONWEALTH OF VIRGINIA
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6/27/07

HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

Truss # = GA
Hurtt Job # = HF 4871
Item # =
State Job # = RICH EXPY
State Project = PEL 2006

County = RMA

* FOR END COLUMN DESIGN ONLY *

* * * * * * * * * * TRUSS DESIGN * * * * * * * * * *

TRUSS DIMENSIONS (FT)

LENGTH	DEPTH	WIDTH	PANEL LENGTH(FT)	NUMBER OF PANELS
32.00	3.00	3.00	4.00	8

WIND VELOCITY MPH	NUMBER OF SIGNS	WALK DESIGN DIST L	WALK DESIGN LENGTH	WALK DESIGN WGT/FT
80.00	1	0.00	0.00	0.00

SIGN DATA

SIGN NO.	SIGN LENGTH	SIGN HEIGHT	CD	CH	DISTANCE FROM LS	DISTANCE CENTER	ECCN	WGT
1	31.00	1.00	1.30	1.00	1.00	16.50	-3.00	0.00

SHOP DRAWING REVIEW
HNTB Corporation

Review is for general compliance with contract documents. Sole responsibility for correctness of dimensions, details, quantities and safety during fabrication and erection shall remain with the Contractor.

☒ No Exceptions Taken
☐ Make Correction Noted By
☐ Amend and Resubmit
☐ Rejected – See Remarks Date 6/29/07

COMMONWEALTH OF VIRGINIA
David L. Cowell 6/27/07
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HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

* * * * * * * * * * TRUSS DESIGN * * * * * * DLC:03.24.20

TRUSS DEPTH = 3.00 FEET
TRUSS WIDTH = 3.00 FEET
DEFLECTION = 0.185 IN.
CAMBER REQUIRED = 0.569 IN.

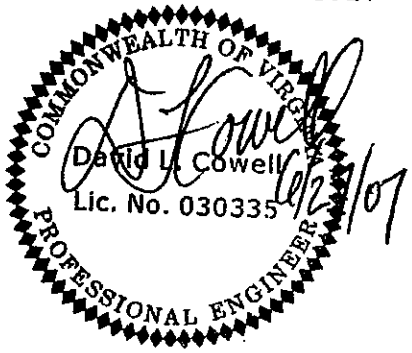
	WIND SHEAR (LBS.)	DEAD WEIGHT (LBS.)	WIND MOMENT (FT.-LBS.)	DEAD-W MOMENT (FT.-LBS.)
CASE 1	0.0	1897.7	0.00	30362.8
CASE 2	2829.0	1897.7	45821.48	30362.8
CASE 3	1414.5	3034.0	22910.74	48591.2

* * * * * * * * * * TRUSS CHORDS * * * * * * * * * *

LENGTH FT	NUMBER REQUIRED	NUMBER OF 0.625" BOLTS(A325)	NUMBER OF 0.75" BOLTS(A325)	NUMBER OF 0.875" BOLTS(A325)
32.75	4	3.00	2.00	2.00

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
4x4x.38	36.00	2.86	2.10	0.79	1283.80

	FORCE (PSI)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	5402.6	1889.0	16535.9	1.94
CASE 2	20108.2	7030.8	23150.2	5.16
CASE 3	16271.9	5689.5	23150.2	4.17



HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

* * * * * * * * * * WIND DIAGONAL * * * * * * DLC:03.24.2

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
4.45	14	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	152.05

	FORCE (PSI)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	8098.3	0.00
CASE 2	4095.6	5728.1	11337.6	1.05
CASE 3	2047.8	2864.1	11337.6	0.53

* * * * * * * * * * WIND DIAGONAL END PANEL* * * * * * DLC:03.24.2

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
3.89	2	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	18.98

	FORCE (PSI)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF FILLET WELD
CASE 1	0.0	0.0	10461.2	0.00
CASE 2	3578.5	5004.8	14645.7	0.90
CASE 3	1789.2	2502.4	14645.7	

COMMONWEALTH OF VIRGINIA
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6/27/2007
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HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

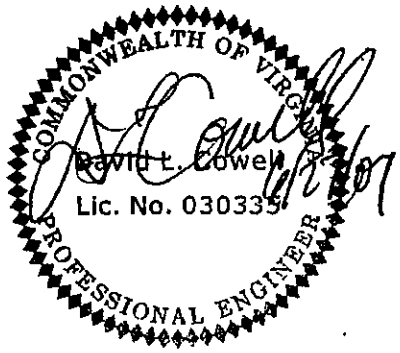
Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

* * * * * * * * * * WIND STRUT * * * * * * DLC:03.24.2

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	16	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19✓	36.00	0.72	0.39	0.39	107.36

	FORCE (PSI)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	0.0	0.0	14590.6	0.00
CASE 2	2530.4	3539.0	20426.9	0.65
CASE 3	1265.2	1769.5	20426.9	0.32



HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

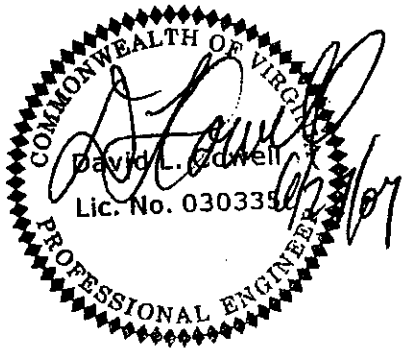
Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

* * * * * * * * * * DEAD LOAD DIAGONAL * * * * * * DLC:03.24.2

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
4.45	16	0.625

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	173.77

	FORCE (PSI)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	1535.8	2147.9	19800.0	0.55
CASE 2	1535.8	2147.9	27720.0	0.39
CASE 3	2530.7	3539.4	27720.0	0.65



HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

* * * * * * * * * * DEAD LOAD VERTICAL * * * * * * DLC:03.24.2

LENGTH FT	NUMBER REQUIRED	MINIMUM BOLT SIZE (A325)
2.75	18	0.625

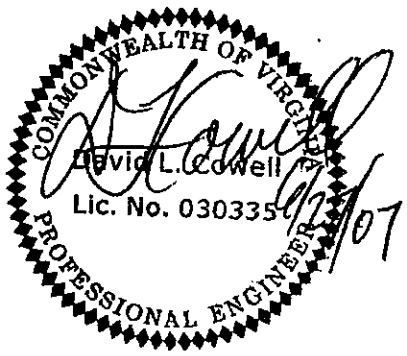
MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	NET AREA	LEAST ROG	WEIGHT (LBS)
2x2x.19	36.00	0.72	0.39	0.39	120.78

	FORCE (PSI)	FA (PSI)	ALLOWABLE (PSI)	LENGTH OF 0.19" FILLET WELD
CASE 1	948.8	1327.0	14590.6	0.34
CASE 2	948.8	1327.0	20426.9	0.24
CASE 3	1563.5	2186.7	20426.9	0.40

* * * * * * * * * * INTERIOR DIAGONAL * * * * * * DLC:03.24.2

LENGTH = 3.55 NUMBER REQUIRED = 8

MEMBER AND SHAPE CONFIGURATION	YIELD KSI	GROSS AREA	LEAST ROG	WEIGHT
1.75x1.75x0.13	36.00	0.42	0.35	40.93



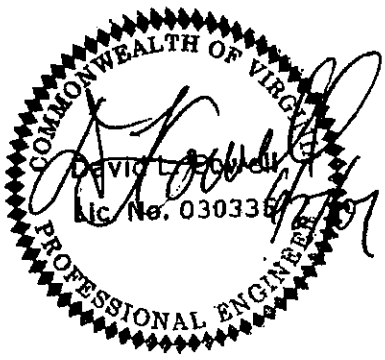
HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

* * * * * * * * * TRUSS MOUNTING PLATE * * * * * * DLC:03.24.20

WIDTH A [IN]	WIDTH B [IN]	THICKNESS C [IN]	GUSSET DEPTH D [IN]	THICKNESS E [IN]	WEIGHT [LBS]
36.00	17.00	0.500	12.00	0.500	149

WELD SIZE-W2 (1/16")	WELD SIZE-W3 (1/16")
5	4



HURTT FABRICATING CORP. MARCELINE, MO.
CANTILEVER ANGLE SIGN SUPPORT DESIGN
15th Ed. AASHTO, 3rd Ed. Luminaires

Structure Name : GTY SB
Job Description : HF 4871
Engineer : CLH
Run Date & Time : 6/27/2007 at 13:17

* * * * * * * * * * * COLUMN DESIGN * * * * * * * DLC:03.24.2

HEIGHT (FT) TOTAL	HEIGHT (FT) TRUSS	DIAMETER (IN)	THICKNESS (IN)	YIELD STRENGTH (KSI)	WEIGHT (LB)
21.75	20.00	14.00	0.2500	42	799

	AXIAL (LBS)	MOMENT (FT-LB)	TORQUE (FT-LB)	SHEAR (LBS)	FA ALLOW	FB ALLOW	FV ALLOW	CSR
CASE 1 COMBINATION 1	2897	30363	0.0	0.0	14027	27720	13860	0.380
CASE 2 COMBINATION 1	2897	70357	45821	3207	19637	38808	19404	0.778
CASE 2 COMBINATION 2	2897	58305	27493	2110	19637	38808	19404	0.568
CASE 3 COMBINATION 1	4033	62334	22911	1766	19637	38808	19404	0.589
CASE 3 COMBINATION 2	4033	60369	13746	1162	19637	38808	19404	0.548

Ø for OVERHEAD SPAN

Max Mom @ BASE = 2860 (20') = 57,200 ft-Lbs

$M_{DESIGN} = \sqrt{(57{,}200^2) + [(.2)(57{,}200)]^2} = 58{,}333$ ft-Lbs

∴ DESIGN IS Conservative

COMMONWEALTH OF VIRGINIA
David L. Colwell
Lic. No. 030335
PROFESSIONAL ENGINEER
6/27/07

COWELL ENGINEERING
STRUCTURAL ENGINEERS

PROJECT Hf-4871
LOCATION Richmond Virginia
CLIENT Hurtfab
BY TDC DATE 6/27/07 W.O.# _____
CHECK _____ DATE _____ SHEET 1 OF 2

CHECK BASE PLATE

M_{max} @ BASE = 2860(20) = 57,200 ft-Lbs

$M_{DESIGN} = \sqrt{57,200^2 + [(.2)(57,200)]^2} = 58,333$

$T = \frac{4(58,333 \text{ ft-Lbs})}{6(1.75')} - \left(\frac{1914.8 + 799}{6}\right) = 21,770^{\#}$ (452.3)

$V = \sqrt{2859^2 + .2(2859)^2} = 2916^{\#}$

USING 1¼" ϕ A.B $A_t = .969 \text{ in}^2$ ASSUM 55 ksi (NOT BY Hurtfab)

$f_v = 0.3(55) = 16.5 \text{ ksi}$ $f_t = 0.5(55) = 27.5 \text{ ksi}$

$f_v = \frac{2916}{.969} = 3009.3$ $f_t = \frac{21,770}{.969} = 22,466.4$

$CSR = \left(\frac{3009}{16.5(4/3)}\right)^2 + \left(\frac{22.5}{27.5(4/3)}\right)^2 = 0.395 < 1.0$ (ANCHOR BOLT SIZE SEEMS REASONABLE)

.376

BENDING of PL Between Bolts.

$L = 20"(11)/6 = 10.47"$ $M_{PL} = \frac{Pl}{8} = \frac{21.8(10.47")}{8} = 28.5 \text{ in-k}$

$f_{bPL} = \frac{28.5 \text{ k-in}(6)}{6(1.5)^2} = 12.7 \text{ ksi}$

Weld to BASE PL

$f_t = \frac{21.7^k}{4.5 \times 2 \times .375} = 6.4 \text{ ksi} < .3(70) = 21 \text{ ksi}$

COMMONWEALTH OF VIRGINIA
David L. Cowell
LIC. NO. 030335
PROFESSIONAL ENGINEER
6/27/07

COWELL ENGINEERING
STRUCTURAL ENGINEERS

PROJECT Hf-4871
LOCATION Richmond Va
CLIENT Wirth Fab
BY JAC DATE 6/27/07 W.O.# _____
CHECK _____ DATE _____ SHEET 2 OF 2

Weld of Gusset to CoL.

$f_v = \frac{21.7^k}{11.5 \times 2 \times .375} = 2.5\ ksi$ ok

STRESS ON Gusset

$f_t = \frac{21.7^k}{45 \times .75} = 6.5\ ksi$ ok

SHOP DRAWING REVIEW
HNTB Corporation

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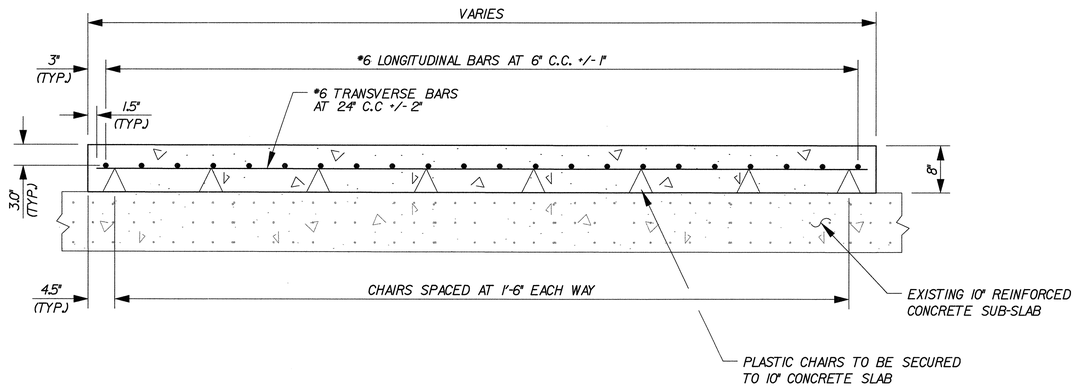
☒ No Exceptions Taken
☐ Make Correction Noted By _____
☐ Amend and Resubmit
☐ Rejected – See Remarks Date 6/29/07

COMMONWEALTH OF VIRGINIA
David L. Powell
Lic. No. 030335
6/27/07
PROFESSIONAL ENGINEER

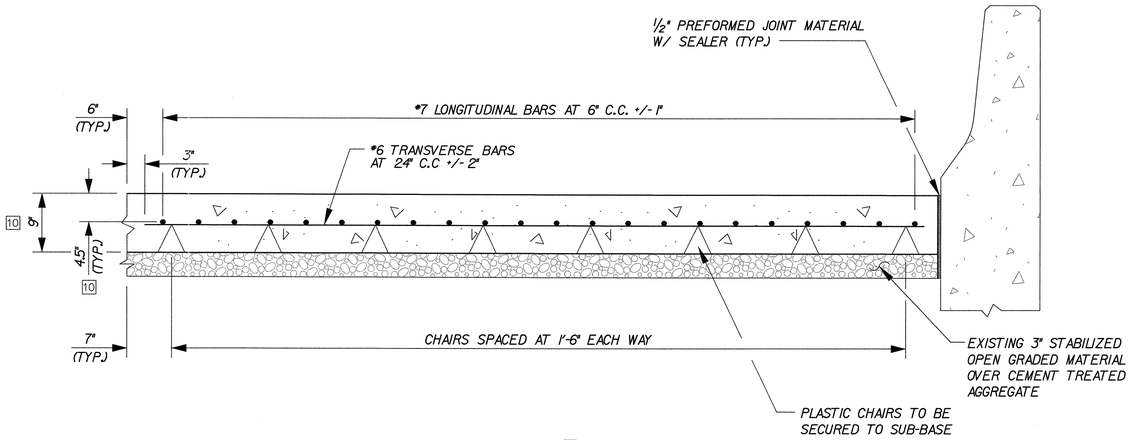
SOUTHBOUND POWHITE PARKWAY TOLL PLAZA

ORIGINAL PLANS - ADMINISTRATION BUILDING & TOLL PLAZA



PROPOSED TOLL PLAZA 8" PAVEMENT SLAB SECTION

NTS



9

PROPOSED EXPRESS LANE 9" PAVEMENT SLAB SECTION

NTS

NOTES:

1. CONTRACTOR TO SUBMIT POUR SEQUENCE PRIOR TO POUR FOR APPROVAL BY THE ENGINEER.
2. SEE VDOT SPECIFICATION PR-3 AND PR-6 FOR DETAILS NOT SHOWN ON THIS SHEET.
3. SLAB CONCRETE SHALL BE TYPE A4, HIGH EARLY CONCRETE WITH NON-METALLIC FIBERGLASS ADDITIVE.
4. REINFORCING BARS SHALL BE V-ROD REINFORCING BARS MANUFACTURED BY CONCRETE PROTECTION SYSTEMS INC. OR ENGINEER APPROVED EQUAL.
5. REINFORCING BARS SHALL BE SECURED USING PLASTIC TIES, NYLON TIES, OR PLASTIC SNAP TIES. NO METAL TIES OR TIES CONTAINING METAL SHALL BE USED.
6. ALL WORK SHALL BE IN ACCORDANCE WITH MANUFACTURER'S SPECIFICATIONS AND AS DIRECTED BY THE ENGINEER.
7. PLASTIC OR NON-METALLIC (NON CORROSIVE) CHAIRS SHALL BE USED TO ELEVATE REBAR AT LOCATIONS SHOWN.
8. REBAR SHALL BE SECURED TO CHAIRS.
9. CHAIRS SHALL BE SECURED TO 10" SLAB OR 3" SUB-BASE BY METHOD(S) APPROVED BY ENGINEER.
10. CONTRACTOR TO COORDINATE PLACEMENT OF LOOPS WITH ORT CONTRACTOR PRIOR TO POURING CONCRETE AND PRIOR TO SAW-CUTTING JOINTS.

REVISIONS
10 4/10/08: REVISED SHEET - SEE SHEET 1C
9 3/5/08: REVISED SHEET - SEE SHEET 1C
8 10/03/07: ADDED SHEET.

DE-01A

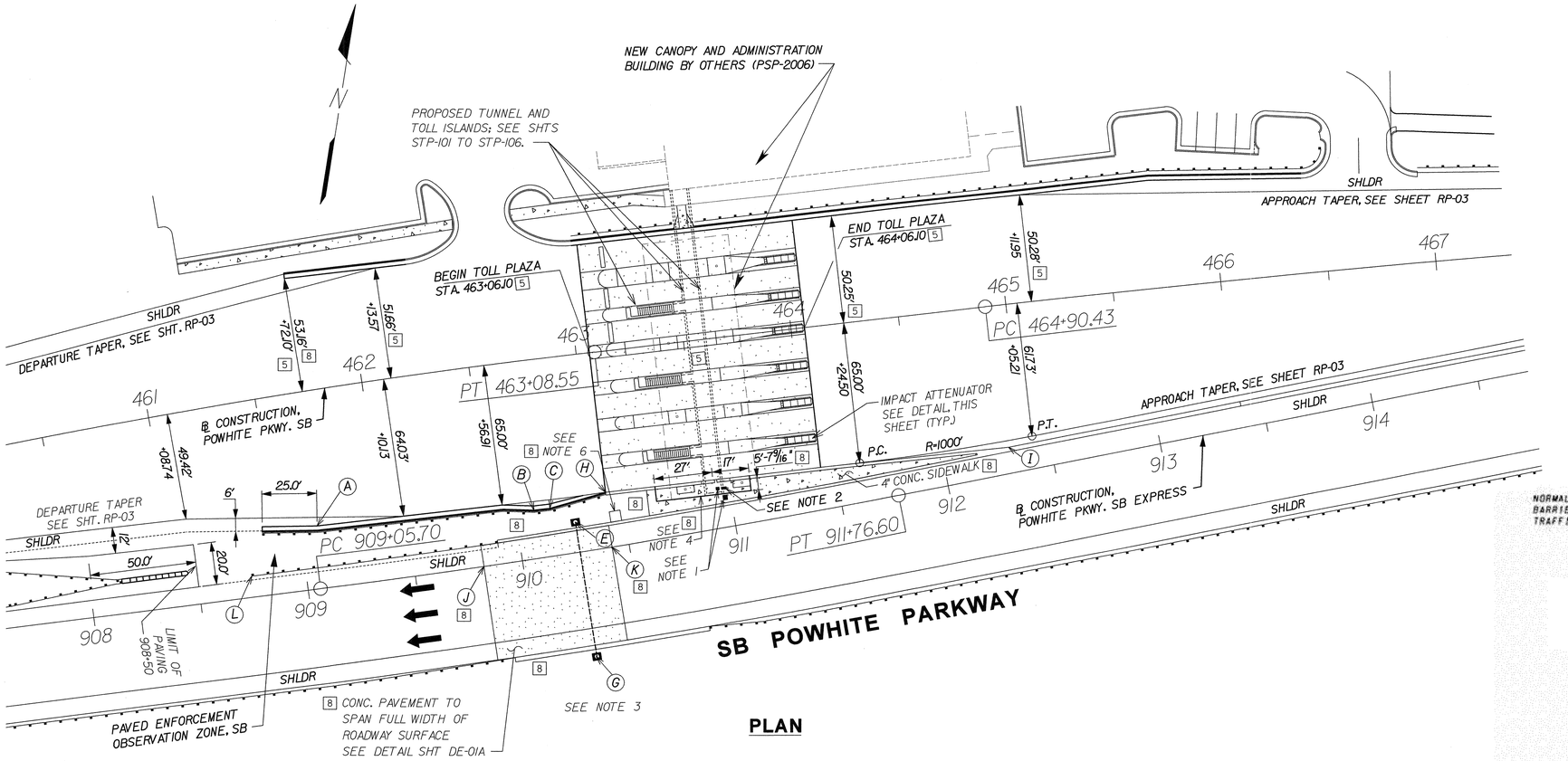
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

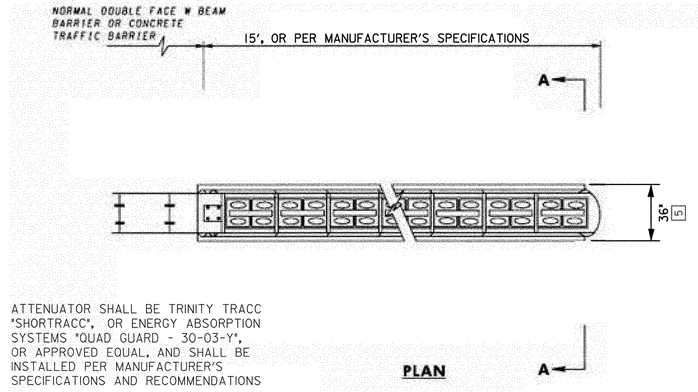
MISCELLANEOUS ROADWAY DETAILS

HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

Scale:	Date:	Contract No.:	Sheet:
NONE	3/06/08	PEL-2006	42A of 161



PLAN



SECTION A-A

TOLL ISLAND ATTENUATOR DETAIL

NOT TO SCALE

HORIZONTAL CONTROL POINT SCHEDULE

	POINT NO.	LOCATION	DESCRIPTION	
	Ⓐ	STA. 461+69.06, 62.55' RT., POWHITE PKWY. SB	EDGE OF GUTTER PAN	
	Ⓑ	STA. 462+71.5, 69.35' RT., POWHITE PKWY. SB	FACE OF CURB (SET BACK FOR INLET)	
	Ⓒ	STA. 462+79.00, 69.35' RT., POWHITE PKWY. SB	FACE OF CURB (SET BACK FOR INLET)	
[8]				
	Ⓔ	STA. 910+27, 14.00' LT., POWHITE PKWY. SB EXPRESS	CENTER GANTRY FOUNDATION TY. I	
[8]				
	Ⓖ	STA. 910+27, 50.00' RT., POWHITE PKWY. SB EXPRESS	CENTER GANTRY FOUNDATION TY. I	
[5]	Ⓗ	STA. 463+06.05, 65.00' RT., POWHITE PKWY. SB	FACE OF CURB/END OF BARRIER	
	Ⓘ	STA. 464+93.82, 65.67' RT., POWHITE PKWY. SB	BEGIN MEDIAN BARRIER TRANSITION	
[8]	Ⓙ	STA. 909+82, 0.00' RT., POWHITE PKWY. SB EXPRESS	LIMIT OF 9" CONC. PAVEMENT	[10]
[8]	Ⓚ	STA. 910+42, 0.00' RT., POWHITE PKWY. SB EXPRESS	LIMIT OF 9" CONC. PAVEMENT	[10]
	Ⓛ	STA. 908+75, 10.00' LT., POWHITE PKWY. SB EXPRESS	BEGIN GUARD RAIL	

NOTES:

1. ELECTRICAL EQUIPMENT TO BE INSTALLED BY OTHERS.
2. MECHANICAL EQUIPMENT TO BE INSTALLED BY OTHERS.
3. SEE SHEET SM-40 FOR GANTRY FOUNDATION DETAILS.
4. [8] LIMITS OF 10" BASE SLAB WITH 8" (MAX) SURFACE SLAB PER SHEET STP-105 SECTION A-A.
5. [8] SEE SHEET DE-05A FOR SPOT ELEVATIONS BETWEEN EXPRESS LANE AND TOLL PLAZA.
6. [8] SEE SHEET DE-05A FOR CONCRETE PAD FOR ORT EQUIPMENT ENCLOSURE.

REVISIONS

[10]	4/10/08: REVISED SHEET - SEE SHEET 1C
[8]	10/03/07: REVISED SHEET - SEE SHEET 1C
[5]	3/27/07: REVISED DIMENSION - SEE SHEET 1B
[1]	6/23/06: ADDED SHEET

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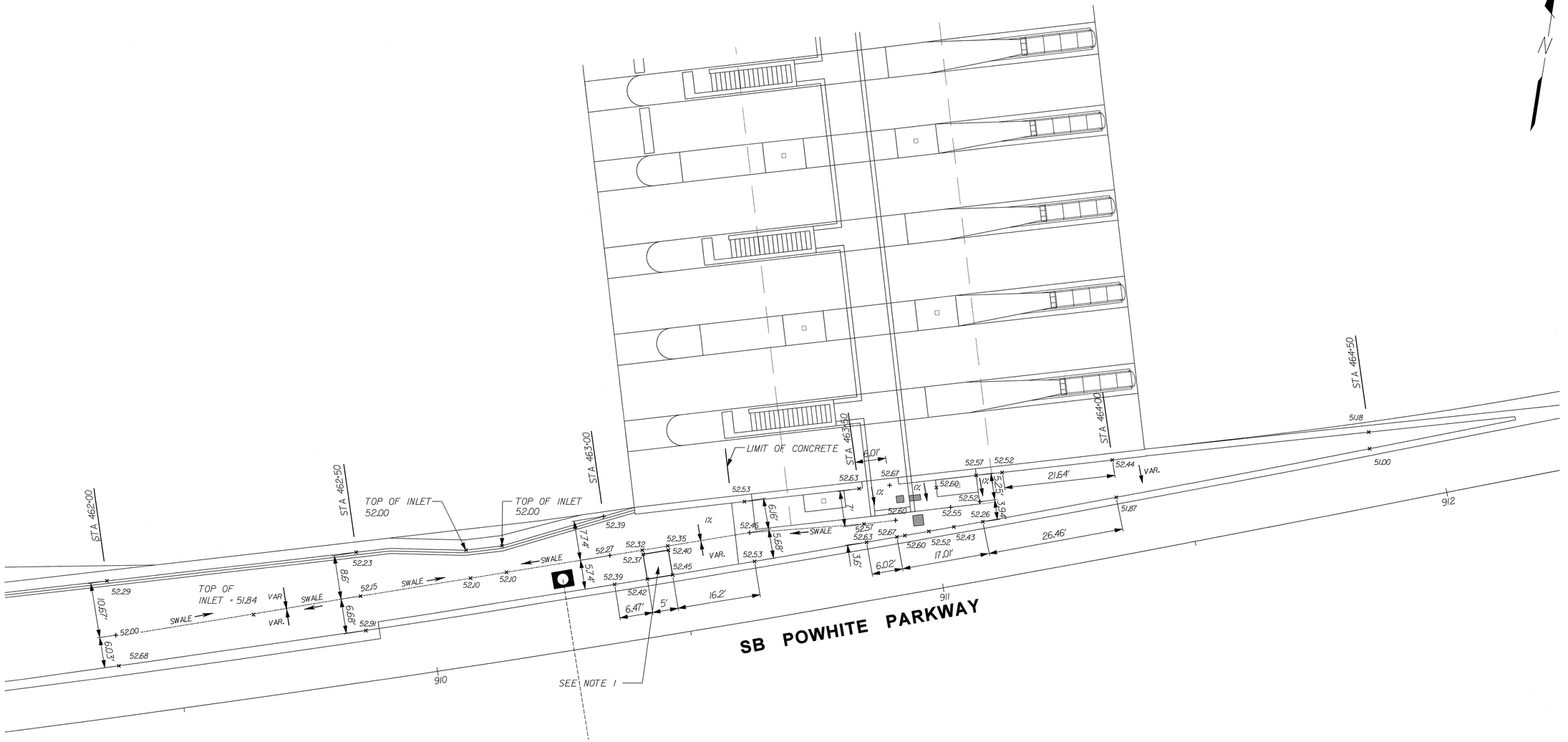
DE-05 OF 06

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

MISCELLANEOUS DETAILS
NEW TOLL PLAZA

Scale:	Date:	Contract No.:	Sheet:
1" = 30'	3/06/08	PEL-2006	46 of 161



NOTES:

1. CONCRETE PAD FOR ORT EQUIPMENT ENCLOSURE. COORDINATE EXACT LOCATION AND REQUIRED DEPTH OF PAD WITH ORT CONTRACTOR.
2. COORDINATE PLACEMENT OF ORT CONDUITS AND EQUIPMENT WITH ORT CONTRACTOR PRIOR TO STARTING WORK.

PLAN

DE-05A OF 06

REVISIONS
8 10/3/07: ADDED SHEET

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RICHMOND EXPRESSWAY SYSTEM

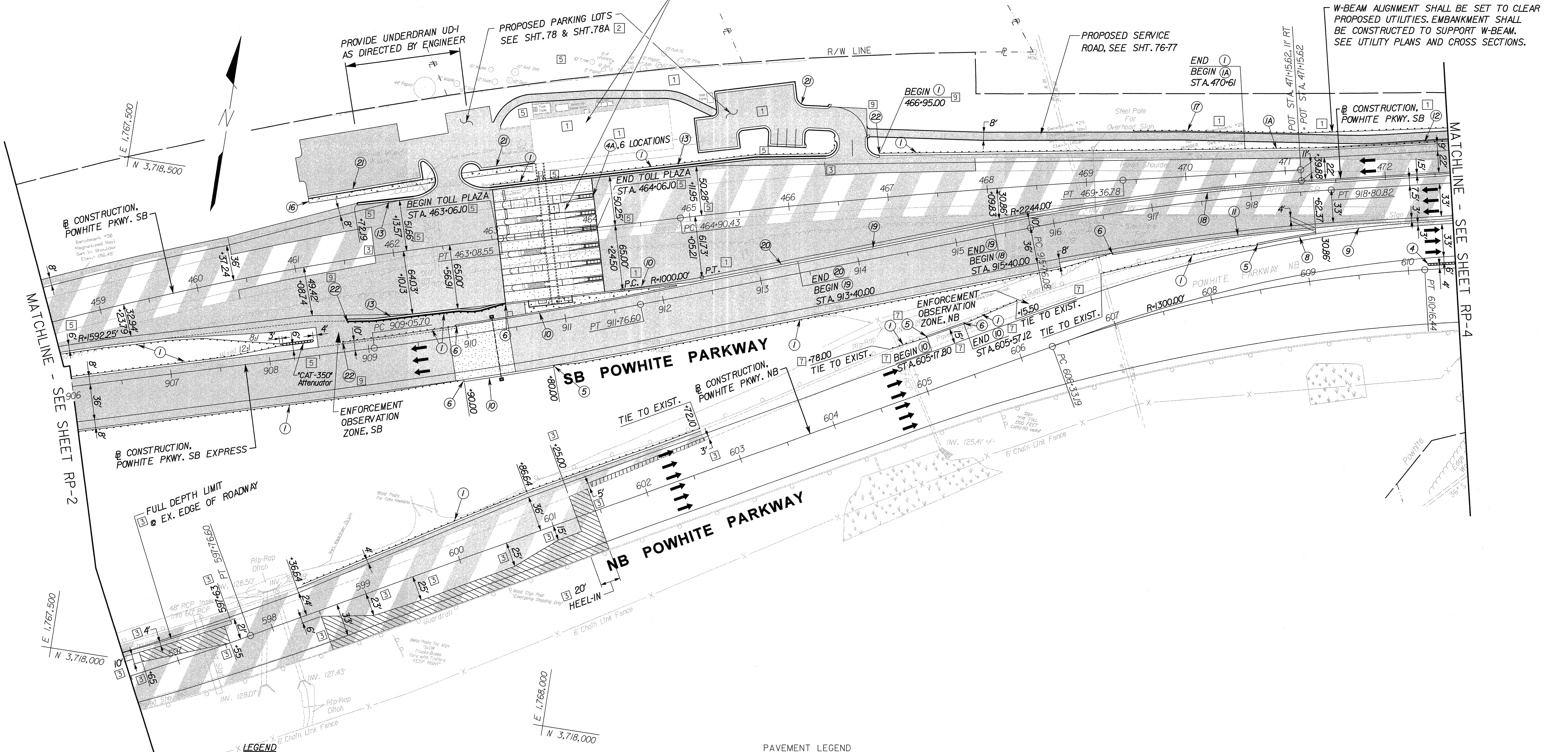
POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

MISCELLANEOUS DETAILS
NEW TOLL PLAZA

Scale:	Date:	Contract No.:	Sheet:
1" = 10'	10/03/07	PEL-2006	46A of 161

NOTES:

[1] I. FOR TUNNEL AND TOLL PLAZA DETAILS, SEE SHTS DE-05 AND STP-101 THRU STP-106 [2] [2]



<u>LEGEND</u>

- (1) St'd. GR-2, Guardrail, (1A) St'd. GR-2A
- (2) St'd. GR-7, Guardrail Terminal
- (3) St'd. GR-9, Guardrail Terminal
- [9] (4) Impact Attenuator (TL-3, > 55 MPH) (4A) (TL-2, > 40 MPH)
- (5) St'd. GR-FOA-2, Fixed Object Attachment, Type I
- (6) St'd. GR-FOA-2, Fixed Object Attachment, Type II
- (7) St'd. MB-5, W-Beam Median Barrier, Weak Post
- (8) Modified MB-7D, Concrete Median Barrier
- (9) Modified MB-7E, Concrete Median Barrier
- (10) Modified MB-7F, Concrete Median Barrier
- (11) Modified MB-8A Conc. Median Barrier, Ty. III, See Sheet DE-02
- [9] (12) St'd. MB-3, Blocked Out W-Beam Median Barrier
- (13) St'd. CG-7, Comb. 4" Curb & Gutter
- (14) St'd. CG-3, Standard 4" Curb
- (15) Constant Slope Concrete Median Barrier, See Sheet DE-04
- (16) 4" Concrete Sidewalk Per Section 504 Of Standard Specifications
- (17) St'd. GR-8, Guardrail (Weak Post)
- (17A) St'd. GR-8A, Guardrail (Weak Post)
- (18) Modified MB-8A, Type I Conc. Med. Barrier, See Sht. DE-02
- (19) St'd. MB-8A, Type II Conc. Med. Barrier
- (20) St'd. MB-8A, Type III Conc. Med. Barrier
- [9] (21) St'd. CG-6, Comb. 6" Curb & Gutter
- [9] (22) St'd. GR-11, Guardrail Terminal

<u>PAVEMENT LEGEND</u>

- PROPOSED FULL DEPTH PAVING
- PROPOSED RESURFACING
- FLEXIBLE PAVEMENT PLANING AREA
- PAVEMENT REMOVAL

REVISIONS
[9] 3/5/08: REVISED SHEET - SEE SHEET 1C
[7] 5/22/07: REVISED SHEET - SEE SHEET 1C
[5] 3/27/07: REVISED SHEET - SEE SHEET 1B
[3] 10/17/06: REVISED SHEET - SEE SHEET 1B
[2] 7/20/06: SEE SHEET 1B
[1] 6/23/06: SEE SHEET 1A
△2 ADDENDUM NO.2: 5/17/06: REPLACED SHEET

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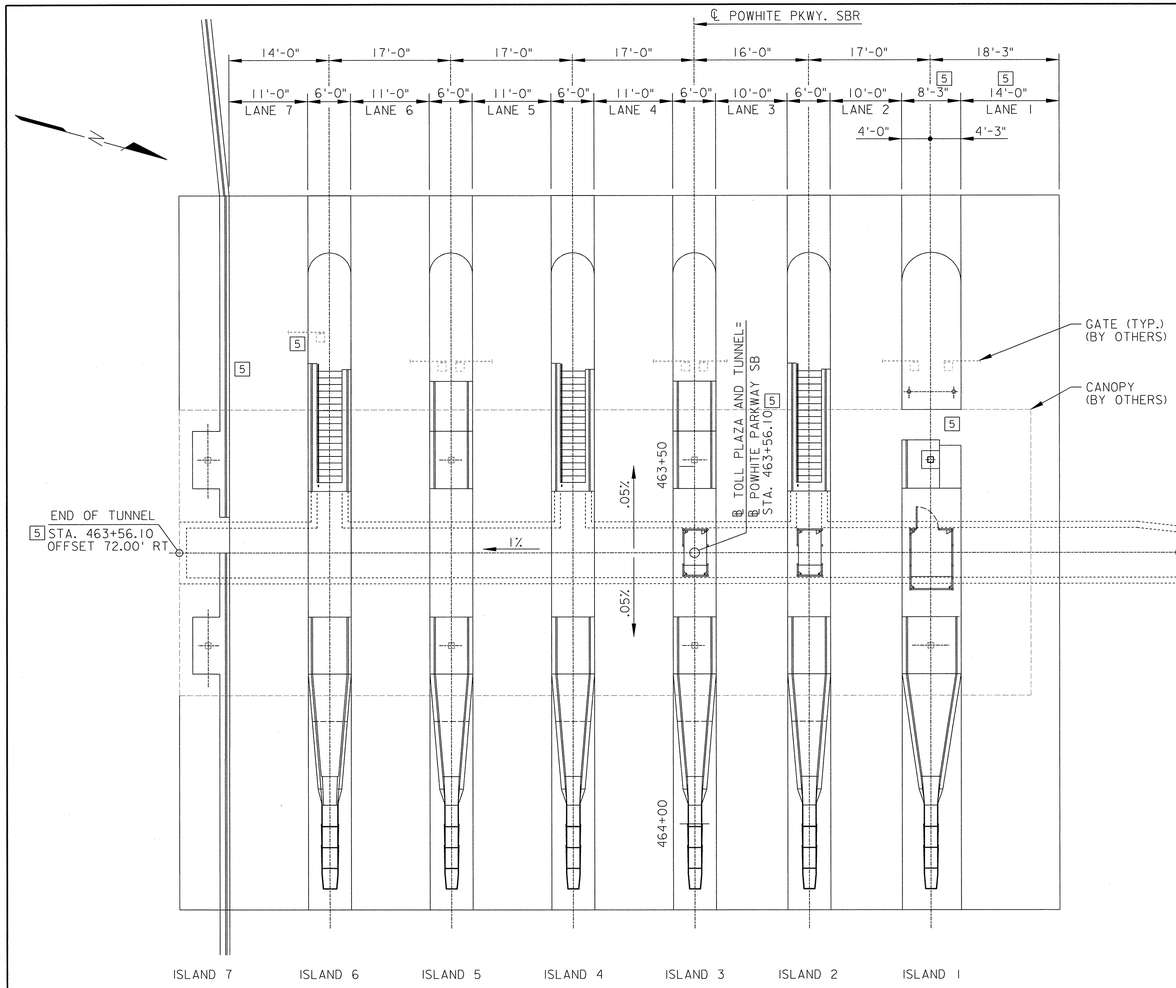
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

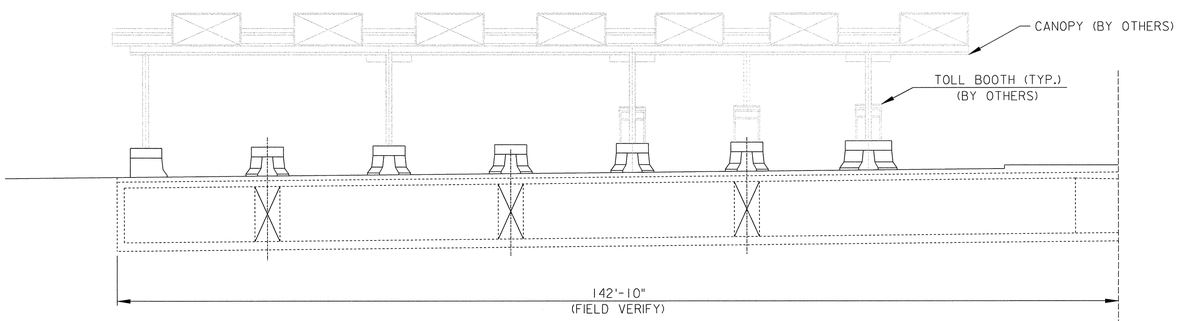
POWHITE PARKWAY EXPRESS TOLL LANES PROJECT
ROADWAY PAVEMENT PLAN
STA. 458+50 TO STA. 472+65
℄ CONSTR. POWHITE PARKWAY SB

Scale:	Date:	Contract No.:	Sheet:
1" = 50'	3/06/08	PEL-2006	60 of 161



PLAN OF TOLL PLAZA
SCALE: 1" = 10'-0"

PROPOSED BUILDING
(BY OTHERS)



ELEVATION OF TOLL PLAZA
SCALE: 1" = 10'-0"

5	3/27/07: REVISED ISLANDS 1, 6 & 7
2	7/20/06: REVISED SHEET SIZE AND TITLE BLOCK
1	6/23/06: ADDED SHEET
	REVISIONS

SPECIFICATIONS:

CONSTRUCTION - VIRGINIA DEPARTMENT OF TRANSPORTATION, ROAD AND BRIDGE SPECIFICATIONS, 2002

DESIGN - 2002 (17TH EDITION) AASHTO STANDARD SPECIFICATIONS FOR HIGHWAY BRIDGES, WITH INTERIMS THROUGH 2004

DESIGN LOADS:

ROOF LIVE LOAD	20 PSF
WIND	40 PSF
FLAT ROOF SNOW LOAD	20 PSF

DESIGN STRENGTHS:

CONCRETE	FC'= 3000 PSI
REINF. STEEL	FY= 60 KSI

STRUCTURAL STEEL
MATERIAL SPECIFICATIONS:

WIDE FLANGE SHAPES,	ASTM A992
CHANNELS, ANGLES AND PLATES	ASTM A36
STRUCTURAL TUBING AND PIPE	ASTM A500, GRADE C
HIGH STRENGTH BOLTS	ASTM A325X
ANCHOR BOLTS	ASTM F1554, GRADE 55
HARDENED STEEL WASHERS	ASTM F436

GENERAL NOTES:

ALL SHOP CONNECTIONS SHALL BE WELDED AND ALL FIELD CONNECTIONS SHALL BE BOLTED.

ALL STRUCTURAL STEEL SHALL BE HOT-DIP GALVANIZED PER ASTM A123, UNLESS OTHERWISE NOTED. ALL BOLTS, ANCHOR BOLTS, WASHERS AND NUTS SHALL BE HOT-DIP GALVANIZED PER ASTM A153. THE LOWER CANOPY FRAMING STEEL SHALL BE PAINTED, SEE SPECIAL PROVISIONS.

ALL METAL ROOF DECK SHALL BE 3", 22 GAGE, WIDE RIB TYPE B, GALVANIZED, WITH THE MINIMUM PROPERTIES DEFINED BY THE STEEL DECK INSTITUTE (SDI).

7/8" DIAMETER BOLTS SHALL BE USED FOR THE CANOPY STRUCTURE AND 3/4" DIAMETER BOLTS FOR ROOF SCREEN STRUCTURES.

ALL SHOP AND FIELD WELDING SHALL BE PERFORMED BY QUALIFIED WELDERS IN ACCORDANCE WITH AWS D1.1-2002 USING E70XX ELECTRODES.

ALL HOLES REQUIRED IN STRUCTURAL STEEL MEMBERS FOR PIPING AND DUCTWORK SHALL BE SHOWN ON THE SHOP DRAWINGS AND BE MADE N THE SHOP. NO HOLES SHALL BE CUT IN THE FIELD WITHOUT APPROVAL OF THE ARCHITECT/ENGINEER.

ALL BOLTED CONNECTIONS SHALL BE BEARING TYPE, NON SLIP-CRITICAL, TIGHTENED TO A "SNUG-TIGHT CONDITION" AS DEFINED BY AISC.

THE FRAME OF THE STEEL SKELETON SHALL BE CARRIED UP TRUE AND PLUMB AND TEMPORARY BOLTING AND BRACING SHALL BE INTRODUCED TO SAFELY CARRY ALL LOADS TO WHICH THE STRUCTURE MAY BE SUBJECTED, INCLUDING EQUIPMENT AND OPERATION OF SAME. INDIVIDUAL COLUMNS MUST BE BRACED BEFORE BEAM CONNECTIONS ARE MADE AND BRACING SHALL BE LEFT IN PLACE AS LONG AS MAY BE REQUIRED FOR SAFETY.

AFTER COMPLETION OF ERECTION, THE OWNER SHALL ENGAGE AN INDEPENDENT TESTING AGENCY TO INSPECT HIGH STRENGTH BOLTED CONNECTIONS, TO PERFORM TESTS, AND TO PREPARE TEST REPORTS. THE TESTING AGENCY SHALL CONDUCT AND INTERPRET TESTS AND STATE IN EACH REPORT WHETHER THE TEST RESULTS COMPLY WITH THE REQUIREMENTS AND SPECIFICALLY STATE ANY DEVIATIONS THERE FROM. THE TESTING SHALL CONFORM TO THE REQUIREMENTS FOUND IN THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 AND A490 BOLTS", DATED JUNE 2000, WITH SUPPLEMENTS. BOLTS THAT ARE NEITHER NON SLIP CRITICAL NOR SUBJECT TO DIRECT TENSION NEED NOT BE INSPECTED FOR BOLT TENSION OTHER THAN TO INSURE THAT THE PLIES OF THE CONNECTED ELEMENT HAVE BEEN BROUGHT INTO SNUG CONTACT. THE INDEPENDENT TESTING AGENCY SHALL SUBMIT THE INTENDED TEST PROCEDURES TO THE STRUCTURAL ENGINEER FOR REVIEW PRIOR TO BEGINNING TESTING.

FOUNDATIONS

FOUNDATIONS FOR THIS STRUCTURE AND SPREAD FOOTINGS BEARING ON EITHER FIRM VIRGIN SOIL OR COMPACTED STRUCTURAL FILL WITH AN ALLOWABLE BEARING CAPACITY OF 3000 PSF IN ACCORDANCE WITH THE OWNER'S GEOTECHNICAL ENGINEER'S REPORT BY FROEHLING & ROBERTSON, INC. DATED OCTOBER, 2005. THE OWNER'S GEOTECHNICAL ENGINEER SHALL VERIFY, PRIOR TO POURING, THAT THE SOIL IS CAPABLE OF SUSTAINING SUCH A LOAD.

PREPARATION OF SOIL AND SUBGRADE BENEATH FOOTINGS AND SLABS ON GRADE SHALL BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE OWNER'S GEOTECHNICAL ENGINEER'S REPORT AND THE PROJECT SPECIFICATIONS.

ALL BACKFILL BEHIND TUNNNEL WALLS SHALL BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE OWNER'S GEOTECHNICAL ENGINEER'S REPORT AND THE PROJECT SPECIFICATIONS.

ALL WALLS SUBJECT TO LATERAL LOAD DUE TO UNBALANCED FILL SHALL BE BRACED PLUMB UNTIL BACKFILL HAS BEEN PLACED AND COMPACTED AND SHALL REMAIN BRACED UNTIL THE PERMANENT STRUCTURE ABOVE AND BELOW IS IN PLACE AND CAPABLE OF RESISTING ALL LOADS.

THE CONTRACTOR SHALL VERIFY ALL FIELD MEASUREMENTS, EXISTING DIMENSION, ELEVATIONS, AND THE SHAPES OF SIZES OF EXISTING STRUCTURAL MEMBERS SHOWN ON THE CONTRACT DRAWINGS PRIOR TO BEGINNING WORK. THE ARCHITECT/ENGINEER SHALL BE NOTIFIED IN WRITING OF ALL DISCREPANCIES THAT WOULD RESULT IN REVISIONS TO THE CONTRACT DRAWINGS.

THE CONTRACTOR SHALL VERIFY ALL DRAWINGS FOR COORDINATION BETWEEN TRADES. HE SHALL LOCATE SLOTS, SLEEVES AND TRENCHES AS REQUIRED FOR MECHANICAL TRADES AND PROVIDE AND INSTALL ANCHORS, INSERTS, HANGERS, ETC. AS REQUIRED FOR VARIOUS OTHER TRADES.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND ERECTION OF ALL TEMPORARY BRACING, FORMWORK, SHEETING, SHORING AND UNDERPINNING NECESSARY TO PERFORM THE WORK.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR SAFETY PRECAUTIONS AND PROGRAMS AS THEY RELATE TO THE WORK OF THIS PROJECT.

THE CONTRACTOR SHALL SUBMIT THE REQUIRED SHOP DRAWINGS FOR REVIEW PRIOR TO BEGINNING WORK. THE CONTRACTOR SHALL CHECK ALL DIMENSIONS AND ACCEPT FULL RESPONSIBILITY FOR DIMENSIONAL CORRECTNESS. UNDER NO CIRCUMSTANCES SHALL REPRODUCTIONS OF CONTRACT DRAWINGS BE USED AS SHOP DRAWINGS.

ALL STRUCTURAL STEEL SHOP DRAWINGS SHALL BE PREPARED UNDER THE DIRECT SUPERVISION OF PROFESSIONAL ENGINEER REGISTERED IN THE COMMONWEALTH OF VIRGINIA.

STP-101

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

TOLL PLAZA
PLAN AND ELEVATION

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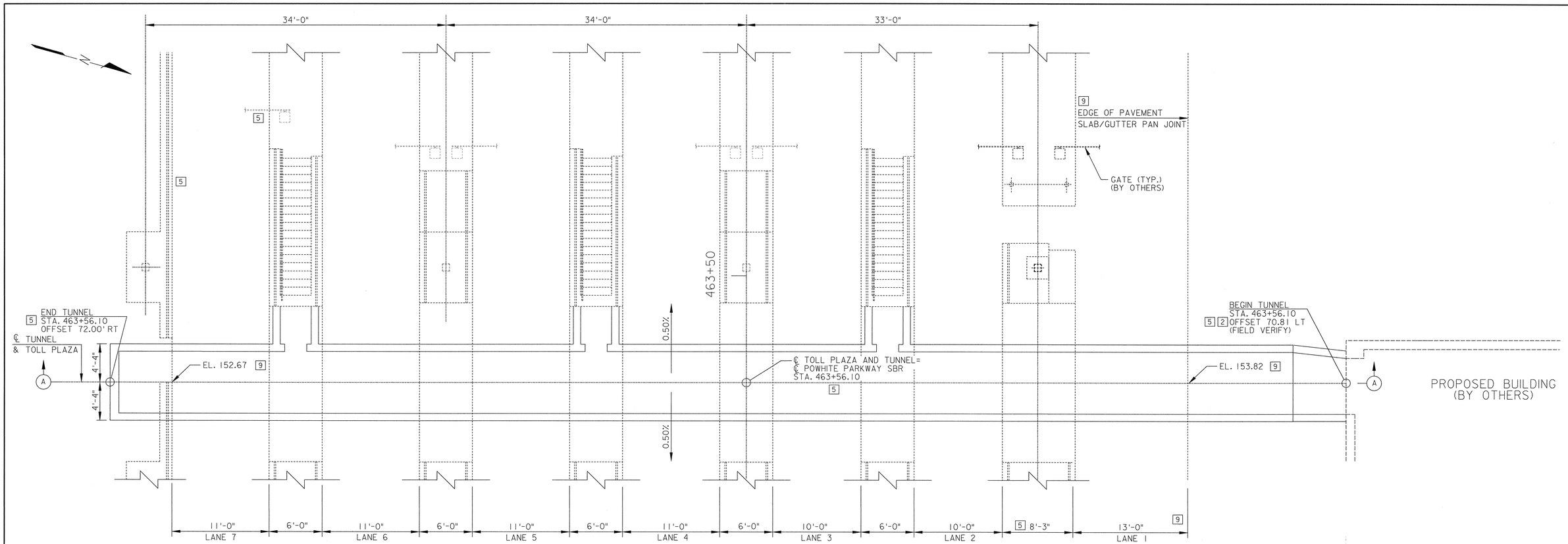
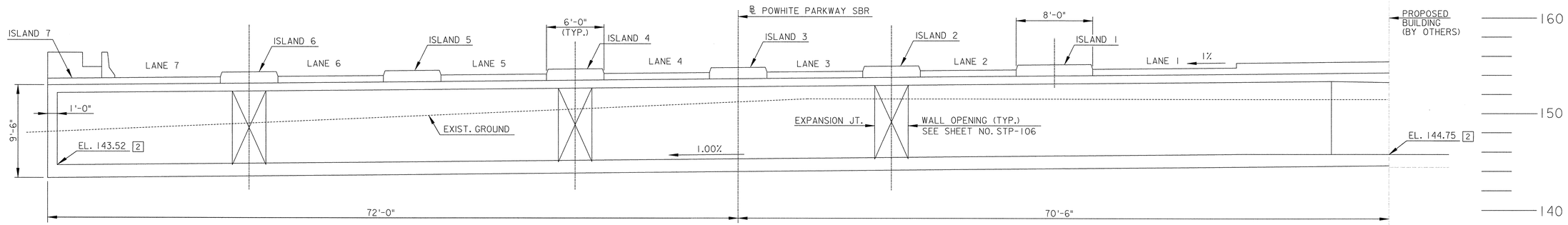
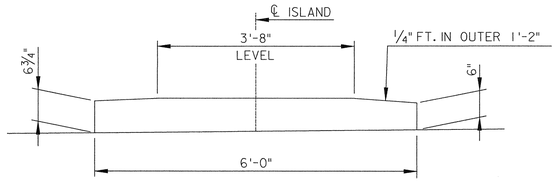
Scale:	Date:	Contract No.:	Sheet:
1" = 10'	3/27/07	PEL-2006	158B of 161



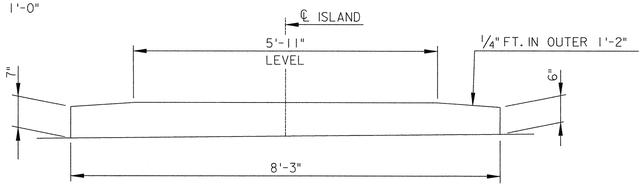
PLAN
SCALE: 3/16" = 1'-0"



SECTION A-A
SCALE: 3/16" = 1'-0"



6" RAISED MEDIAN DETAILS
5 (ISLANDS 2 THRU 6)
SCALE: 3/4" = 1'-0"



6" RAISED MEDIAN DETAILS
5 (ISLAND 1 ONLY)
SCALE: 3/4" = 1'-0"

9	3/5/08: REVISED SHEET - SEE SHEET 1C
5	3/27/07: REVISED TUNNEL LOCATION AND DETAILS
2	7/20/06: REVISED SHEET SIZE AND TITLE BLOCK
1	6/23/06: ADDED SHEET

REVISIONS

STP-102

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

TOLL PLAZA
TUNNEL PLAN & ELEVATION

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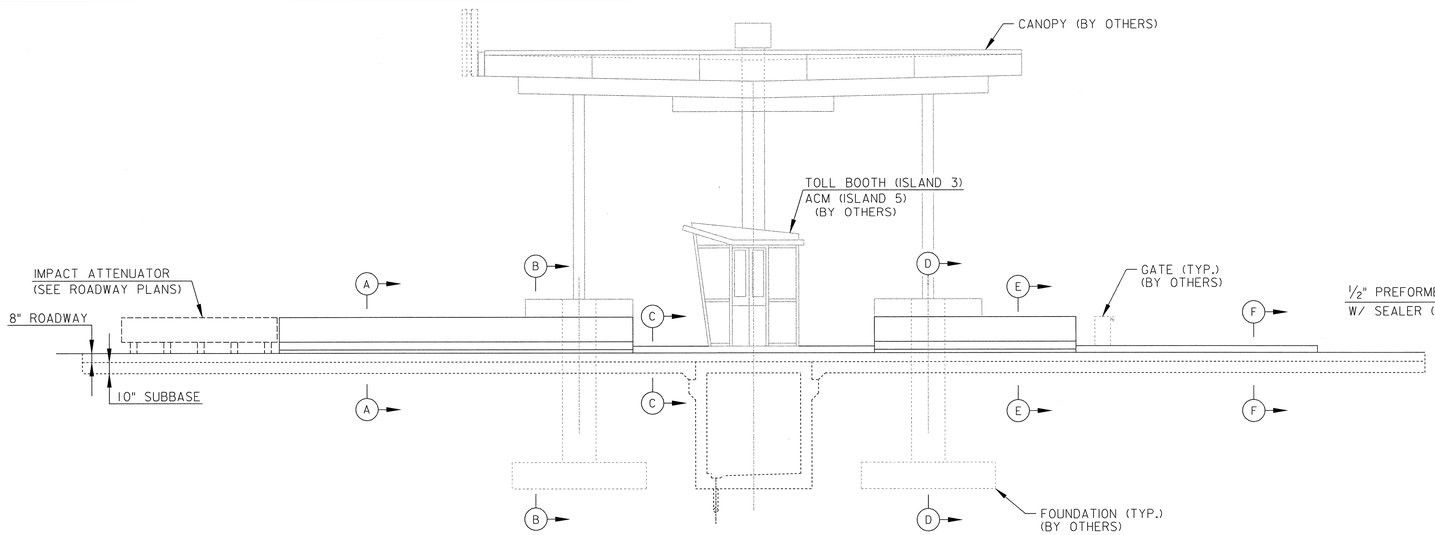
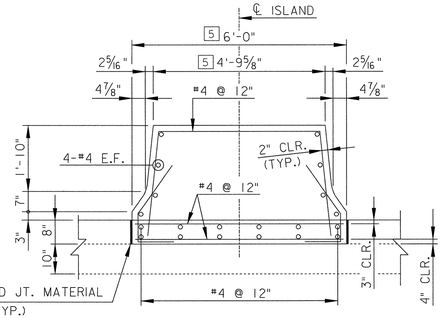
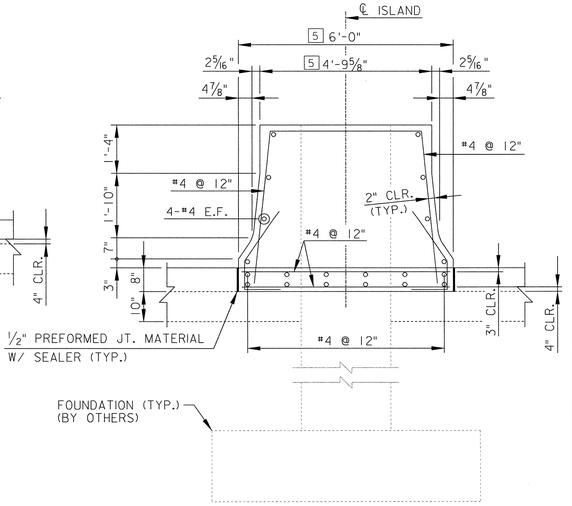


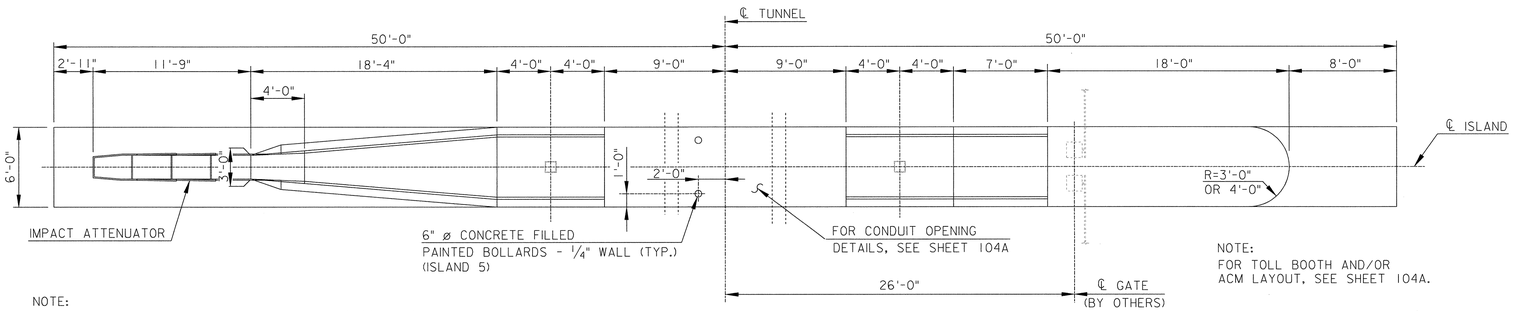
ELEVATION OF 6'-0" ISLAND
SCALE: 3/16" = 1'-0"



SECTION A-A
SCALE: 1/2" = 1'-0"



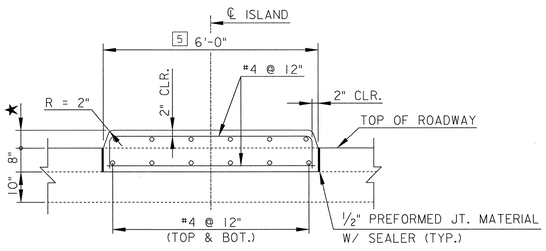
SECTION B-B
SCALE: 1/2" = 1'-0"



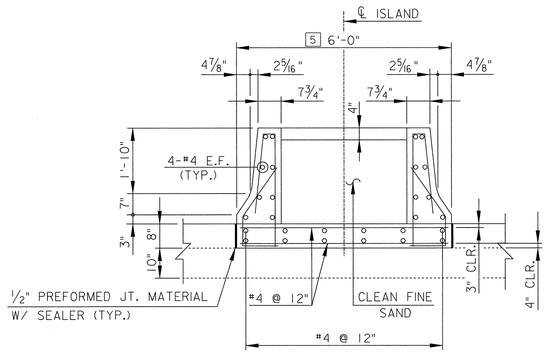
PLAN OF 6'-0" ISLAND
SCALE: 3/16" = 1'-0"

NOTE:
A TEMPLATE SHALL BE DEVELOPED BY THE CONTRACTOR TO BE USED FOR THE ANCHOR BOLT SETTING OF BOTH TOLL BOOTH ASSEMBLIES AND THE ACM.

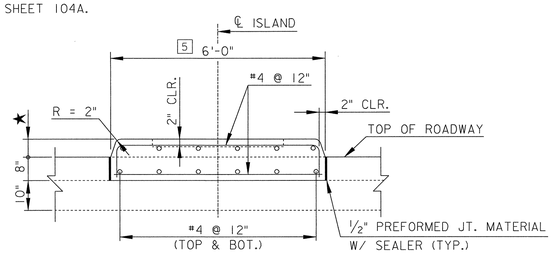
NOTE:
FOR TOLL BOOTH AND/OR ACM LAYOUT, SEE SHEET 104A.



SECTION F-F
SCALE: 1/2" = 1'-0"



SECTION E-E
SCALE: 1/2" = 1'-0"



SECTION C-C
SCALE: 1/2" = 1'-0"

★ FOR RAISED MEDIAN DETAILS, SEE SHEET NO. STP-102

SECTION D-D
SCALE: 1/2" = 1'-0"

REVISIONS
5 3/27/07: REVISED DIMENSIONS
3 10/17/06: REVISED PLAN OF TOLL BOOTH RECESS
2 7/20/06: REVISED SHEET - SEE SHEET 1B
1 6/23/06: ADDED SHEET

STP-103A

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

TOLL PLAZA
ISLANDS 3 AND 5 DETAILS

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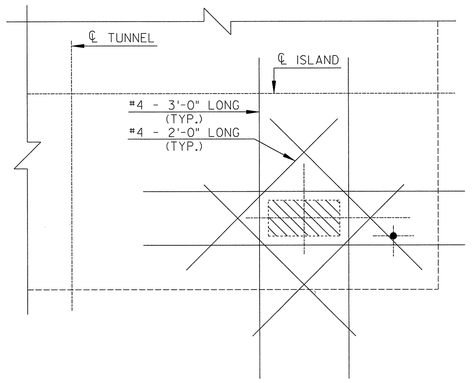
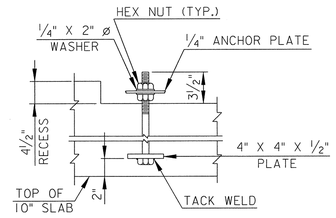
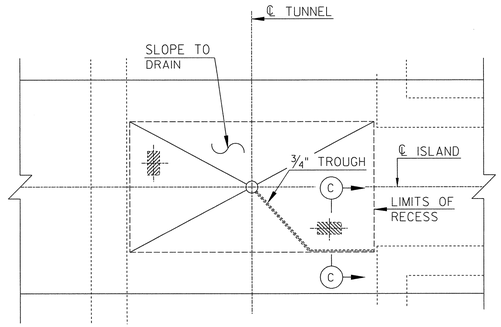
...\103a-toll islands 3 & 5.dgn Mar. 29, 2007 12:40:41



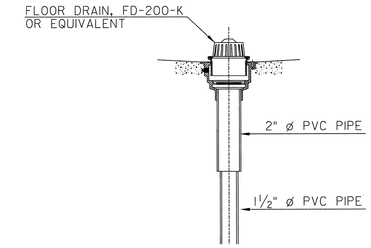
5 TYPICAL CUT OUT REINFORCEMENT DETAIL
(AT TUNNEL ROOF SLAB)
SCALE: 1½" = 1'-0"



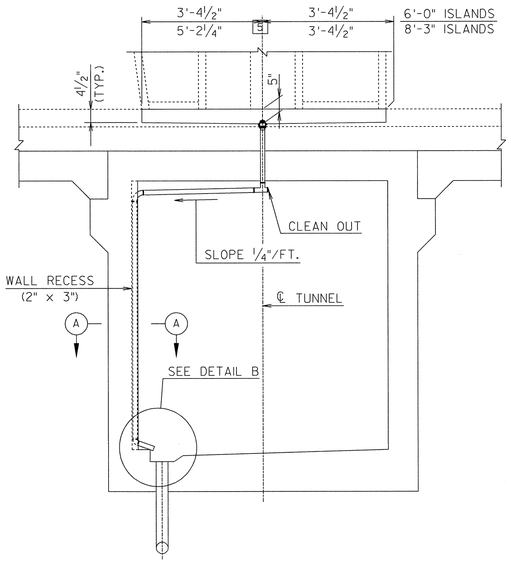
DETAIL OF ANCHOR BOLT
FOR TOLL BOOTH
SCALE: 1½" = 1'-0"



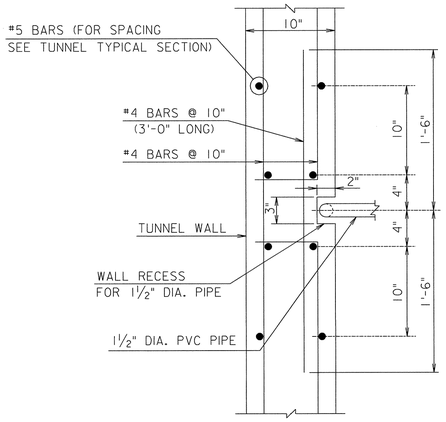
PLAN OF TOLL BOOTH DRAINAGE
SCALE: ½" = 1'-0"



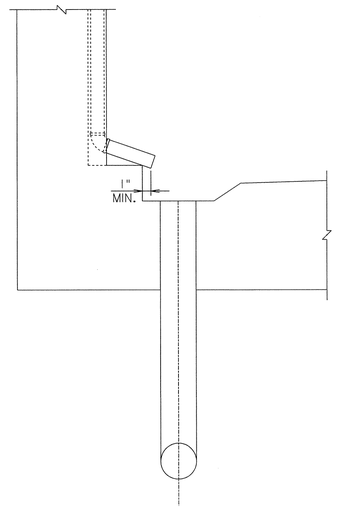
FLOOR DRAIN DETAIL
NO SCALE



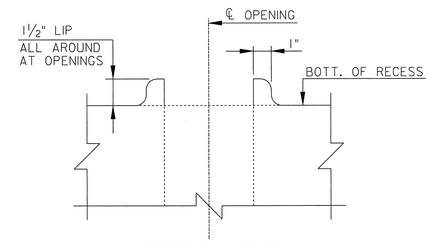
SECTION G-G
SCALE: ½" = 1'-0"
3



SECTION A-A
SCALE: 1½" = 1'-0"
3



DETAIL B
SCALE: 1½" = 1'-0"
3



SECTION C-C
SCALE: 3" = 1'-0"

NOTE:
FOR LOCATION OF SECTION G-G,
SEE SHEET STP-103C OR STP-104A.

REVISIONS
5 3/27/07: REVISED CUT OUT DETAIL & SECT. F-F
3 10/17/06: ADDED A-A & DETAIL B: REVISED G-G
2 7/20/06: ADDED SHEET FOR DETAILS PREVIOUSLY SHOWN ON SHEET STP-103

STP-103B

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS
TOLL LANES PROJECT

TOLL PLAZA
TYPICAL DETAILS - 1

HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

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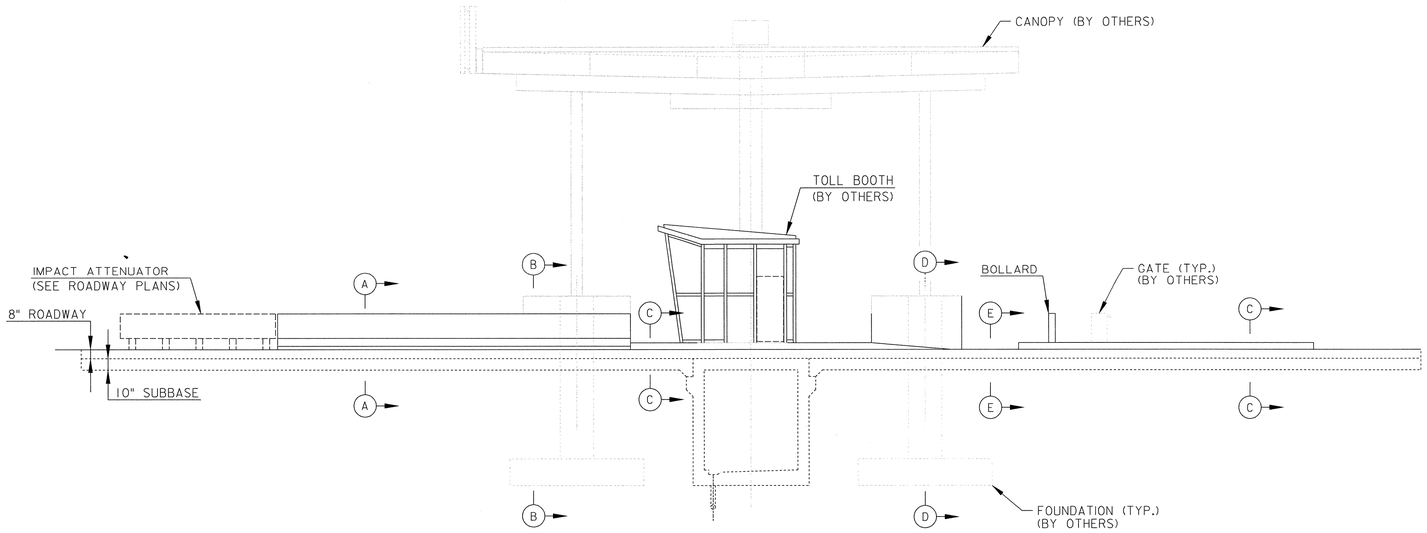
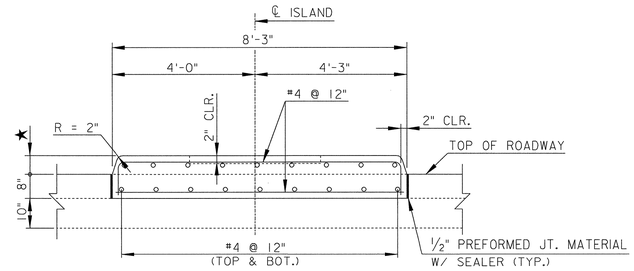


ELEVATION OF 8'-3" ISLAND

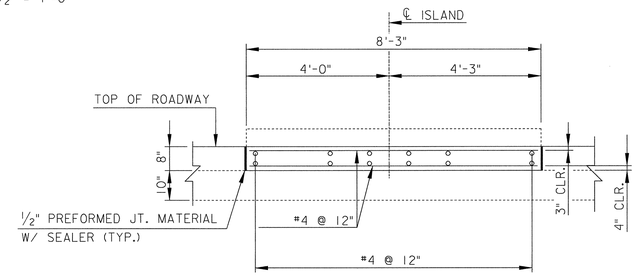
(ISLAND 1)
SCALE: 3/16" = 1'-0"

NOTE:
A TEMPLATE SHALL BE DEVELOPED BY THE CONTRACTOR TO BE USED FOR THE ANCHOR BOLT SETTING OF BOTH TOLL BOOTH ASSEMBLIES AND THE ACM.



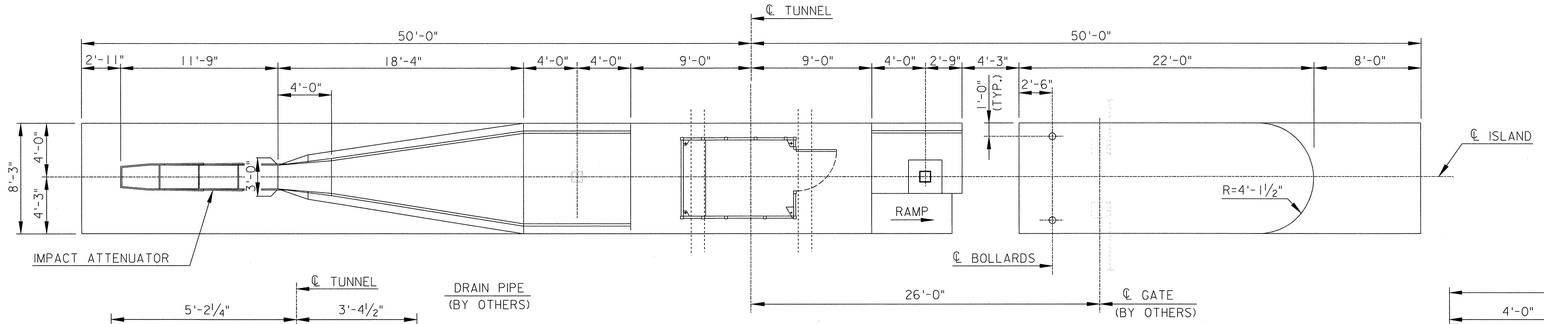
SECTION C-C

SCALE: 1/2" = 1'-0"



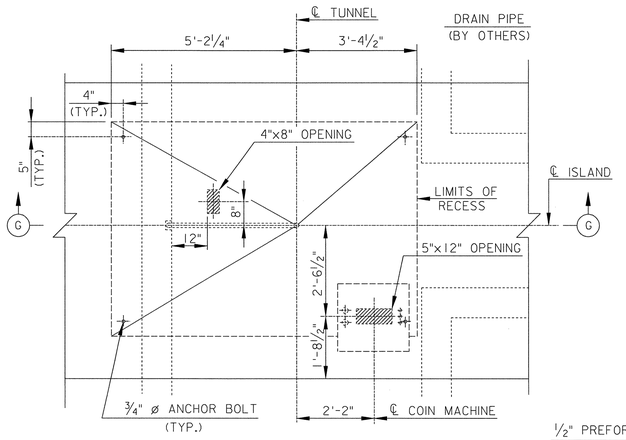
SECTION E-E

SCALE: 1/2" = 1'-0"



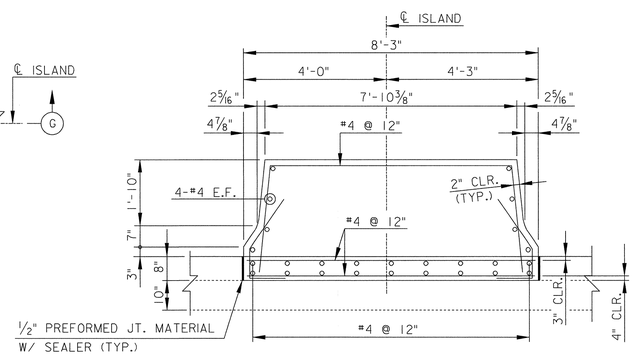
PLAN OF 8'-3" ISLAND

SCALE: 3/16" = 1'-0"



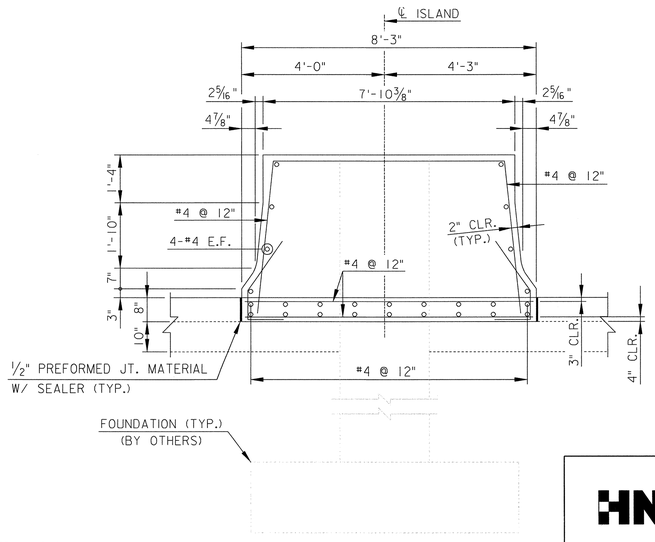
PLAN OF TOLL BOOTH RECESS

SCALE: 1/2" = 1'-0"



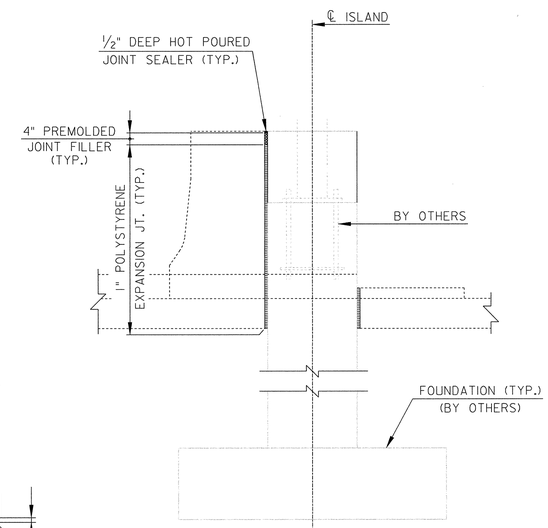
SECTION A-A

SCALE: 1/2" = 1'-0"



SECTION B-B

SCALE: 1/2" = 1'-0"



SECTION D-D

SCALE: 1/2" = 1'-0"

NOTE: FOR SECTION G-G, SEE SHEET STP-103B.

★ FOR RAISED MEDIAN DETAILS, SEE SHEET NO. STP-102

REVISIONS
5 3/27/07: ADDED SHEET

STP-103C

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

TOLL PLAZA
ISLAND 1 DETAILS

HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

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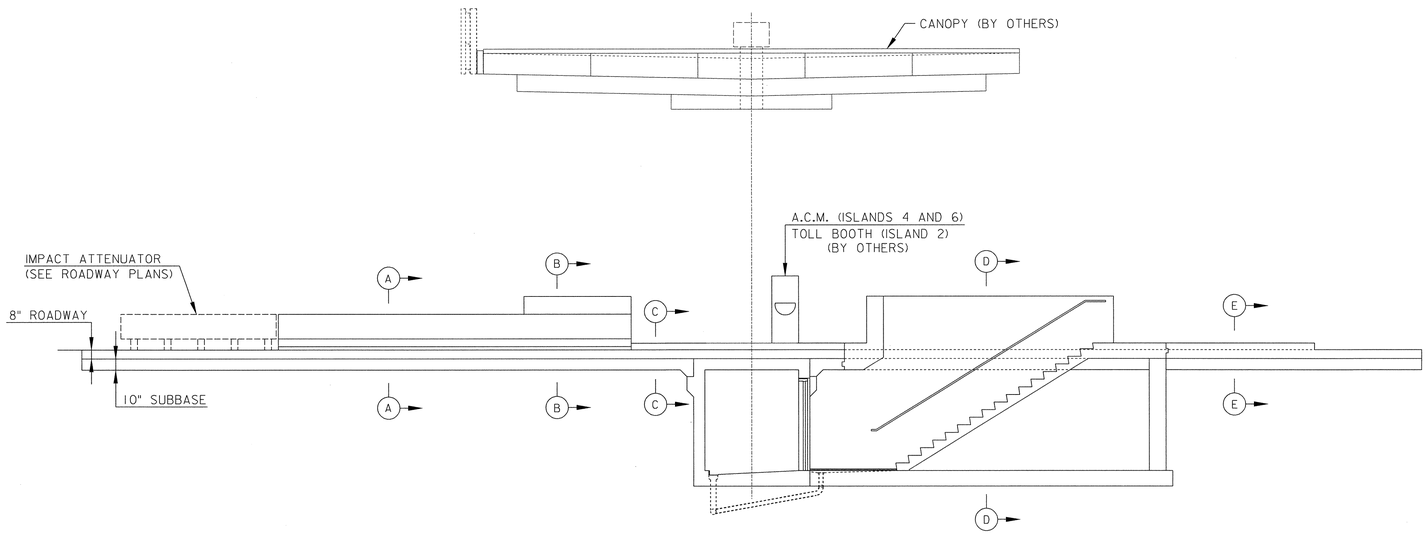
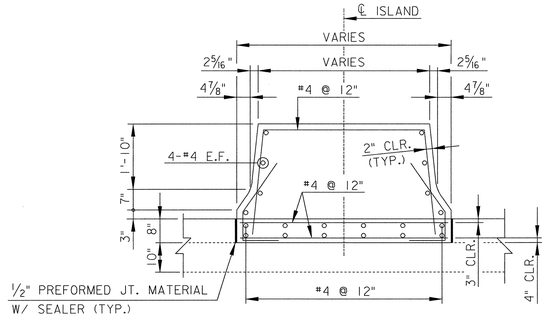
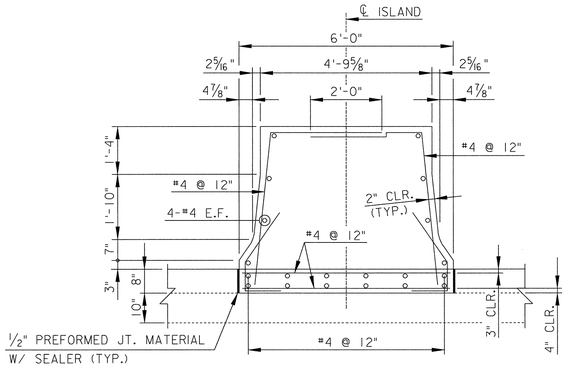


NOTE:
A TEMPLATE SHALL BE DEVELOPED BY THE CONTRACTOR TO BE USED FOR THE ANCHOR BOLT SETTING OF BOTH TOLL BOOTH ASSEMBLIES AND THE ACM.

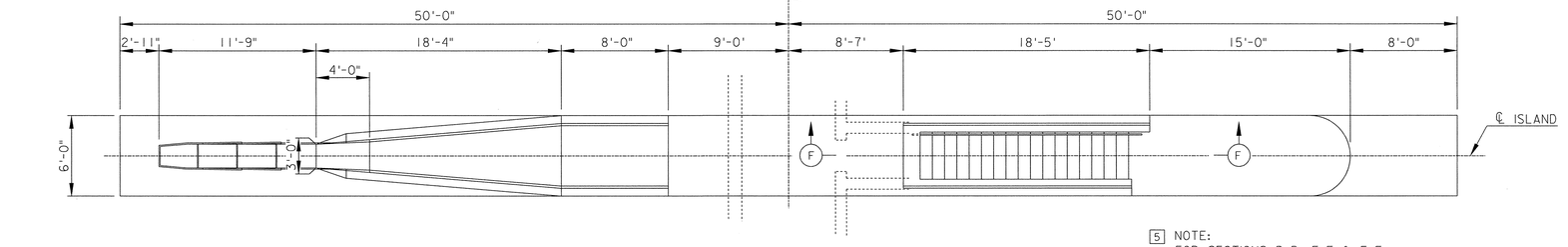
ELEVATION OF 6'-0" ISLAND W/STAIRWAY
SCALE: 3/16" = 1'-0"



SECTION A-A
SCALE: 1/2" = 1'-0"

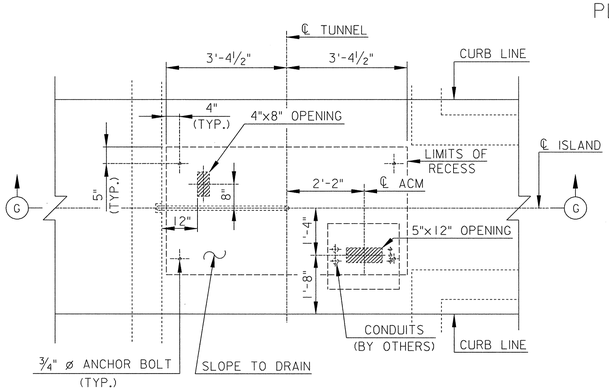


SECTION B-B
SCALE: 1/2" = 1'-0"



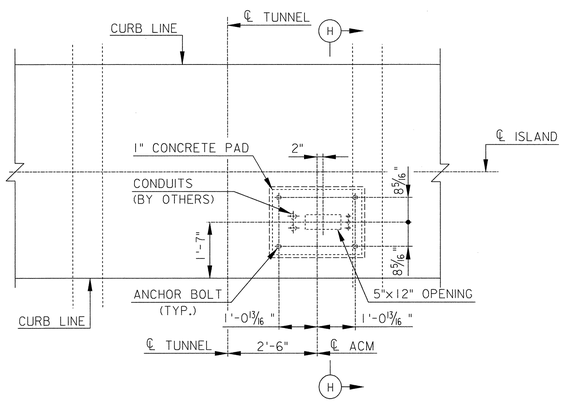
PLAN OF 6'-0" ISLAND W/STAIRWAY
SCALE: 3/16" = 1'-0"

[5] NOTE:
FOR SECTIONS D-D, E-E & F-F, SEE SHEET STP-104B.

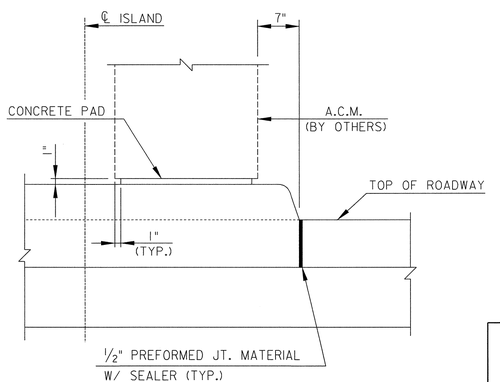


[5] PLAN OF TOLL BOOTH RECESS
(ISLAND 2 ONLY)
SCALE: 1/2" = 1'-0"

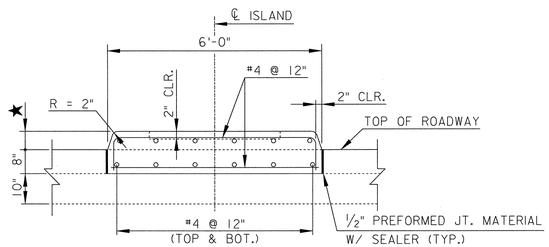
NOTE:
FOR SECTION G-G AND TOLL BOOTH RECESS DRAINAGE DETAIL, SEE SHEET STP-103B.



[5] PLAN AT ACM MACHINE
(ISLANDS 4 & 6 ONLY)
SCALE: 1/2" = 1'-0"



SECTION H-H
SCALE: 1" = 1'-0"



SECTION C-C
SCALE: 1/2" = 1'-0"

★ FOR RAISED MEDIAN DETAILS, SEE SHEET NO. STP-102.

STP-104A

[5] 3/27/07:	REVISED SHEET - SEE SHEET 1B
[2] 7/20/06:	REVISED SHEET - SEE SHEET 1B
[1] 6/23/06:	ADDED SHEET
REVISIONS	

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

TOLL PLAZA
TOLL ISLANDS 2, 4 AND 6 DETAILS - 1

HNTB
9175 GUILFORD ROAD, SUITE 100
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(301) 543-1000

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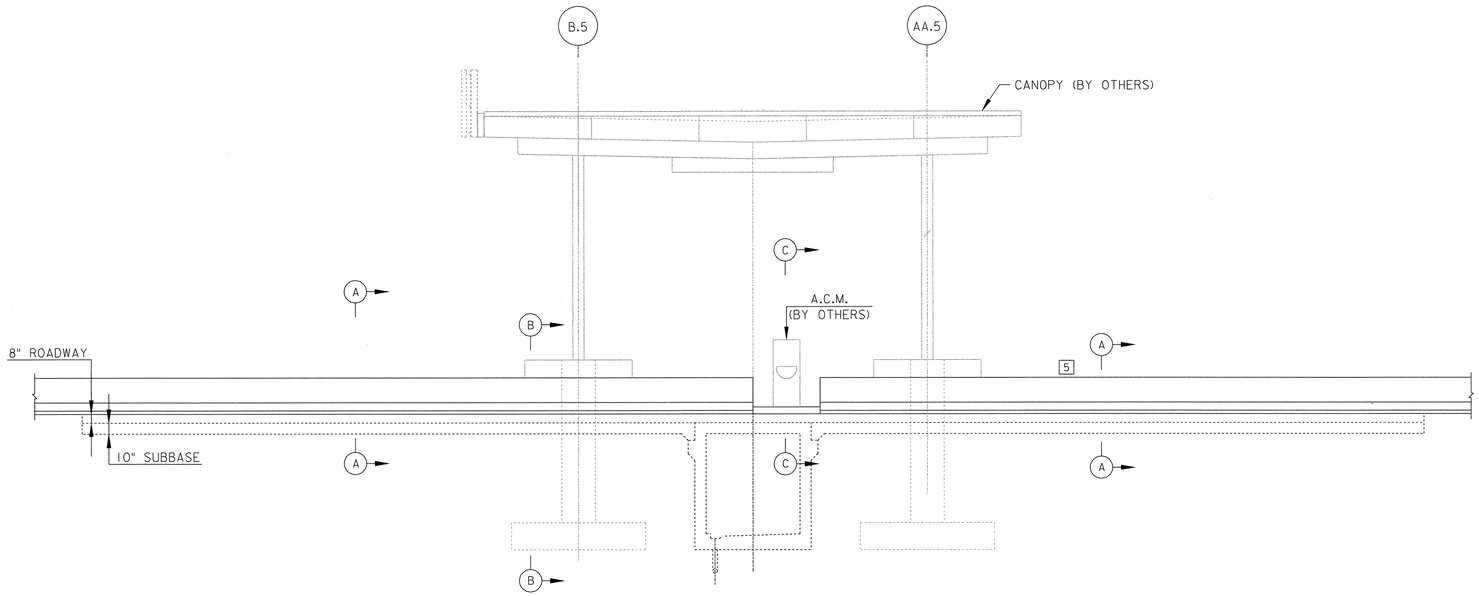
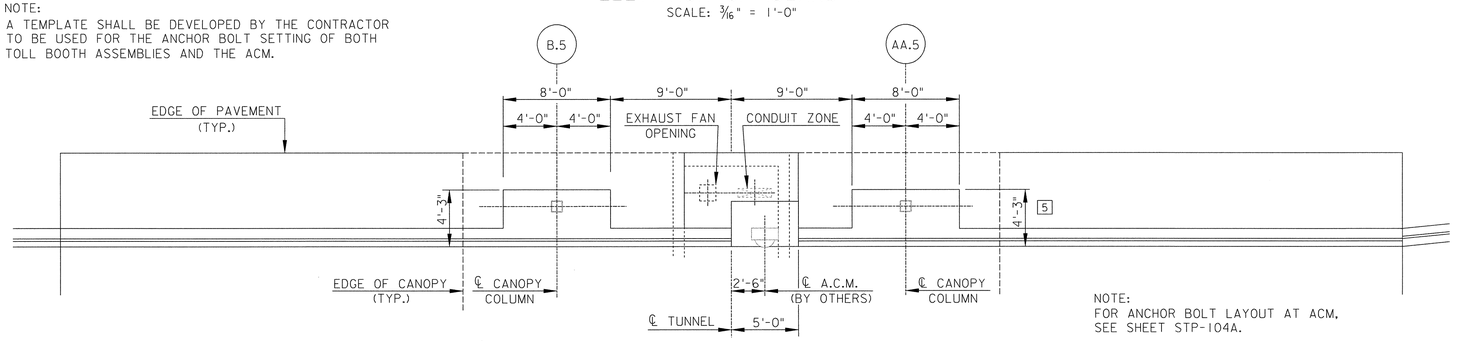


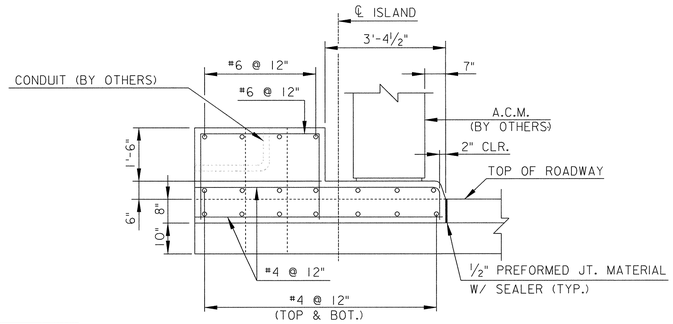
ELEVATION OF ISLAND 7
SCALE: 3/16" = 1'-0"

NOTE:
A TEMPLATE SHALL BE DEVELOPED BY THE CONTRACTOR TO BE USED FOR THE ANCHOR BOLT SETTING OF BOTH TOLL BOOTH ASSEMBLIES AND THE ACM.

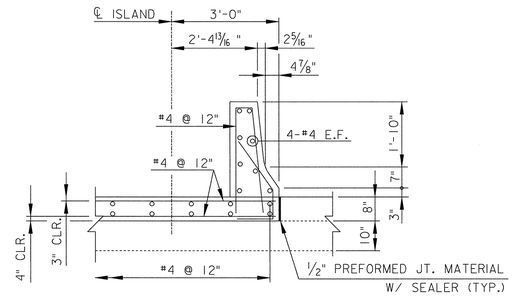


NOTE:
FOR ANCHOR BOLT LAYOUT AT ACM, SEE SHEET STP-104A.

PLAN OF ISLAND 7
SCALE: 3/16" = 1'-0"



SECTION C-C
SCALE: ½" = 1'-0"



SECTION A-A
SCALE: ½" = 1'-0"

SECTION B-B
SCALE: ½" = 1'-0"

5	3/27/07: REMOVED GATE
2	7/20/06: REVISED SHEET SIZE AND TITLE BLOCK
1	6/23/06: ADDED SHEET
REVISIONS	

STP-105

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

TOLL PLAZA
ISLAND 7 DETAILS

HNTB
9175 GUILFORD ROAD, SUITE 100
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(301) 543-1000

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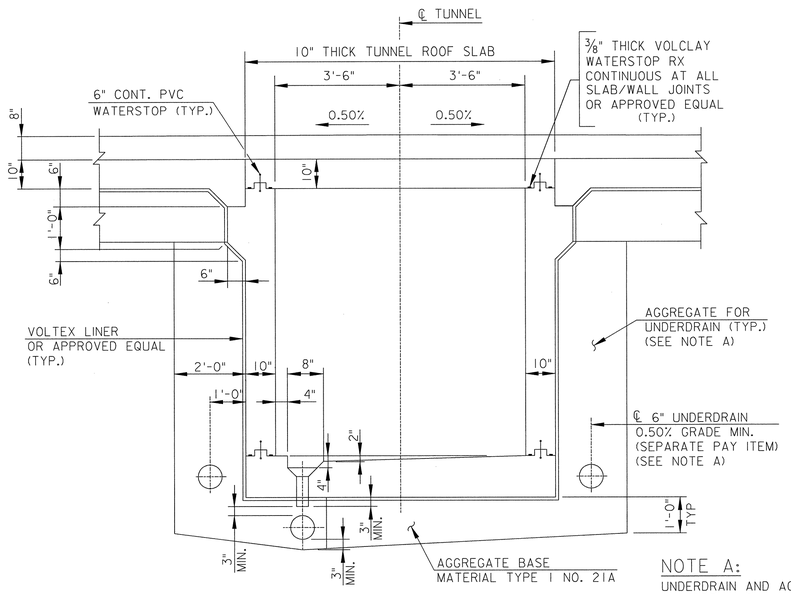
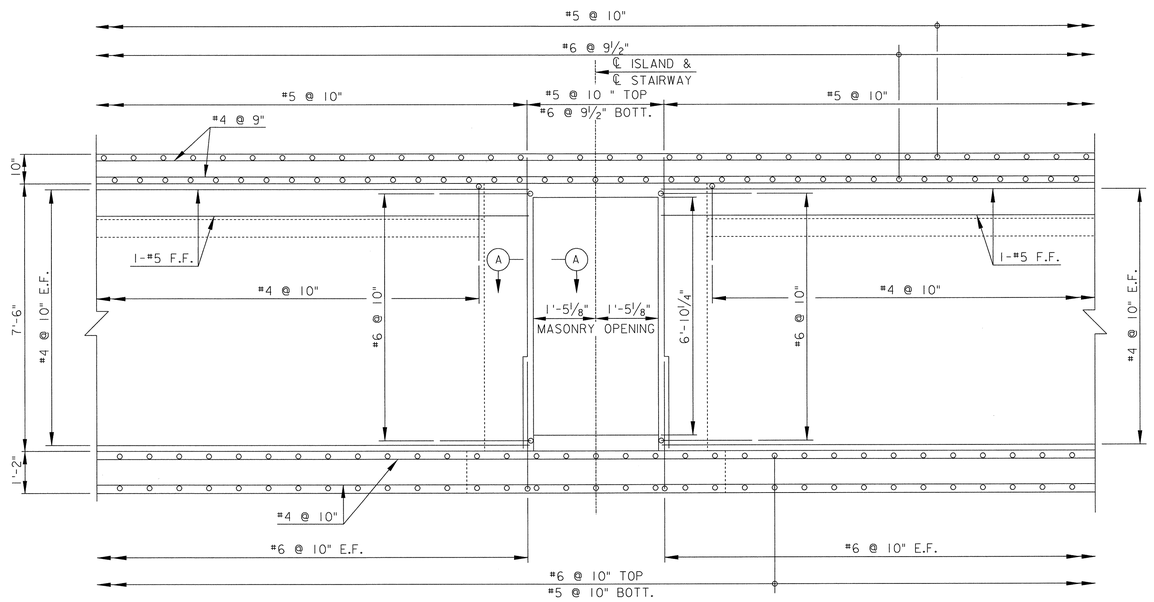
...\105-toll island 7 details.dgn Mar. 29, 2007 12:52:31



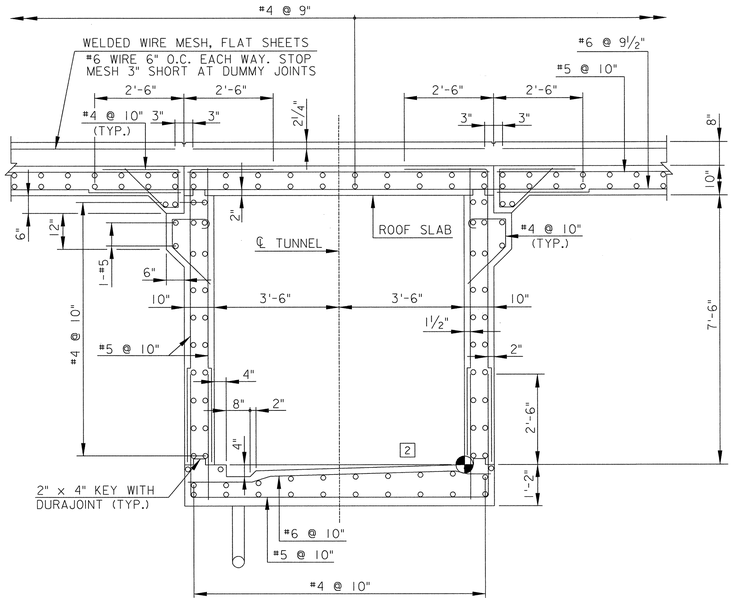
TYPICAL SECTION - BETWEEN ISLANDS
SCALE: 1/2" = 1'-0"

NOTE A:
UNDERDRAIN AND AGGREGATE FOR UNDERDRAIN SHALL BE PLACED AROUND THE OUTLINE OF THE STAIR WELLS. UNDERDRAIN SHALL BE SLOPED TO DRAIN.

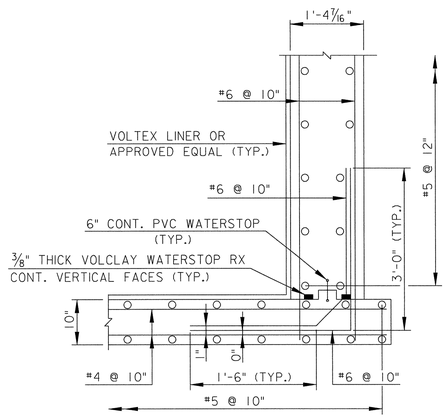


TUNNEL LONGITUDINAL SECTION
AT STAIRWAY ENTRANCE
SCALE: 1/2" = 1'-0"

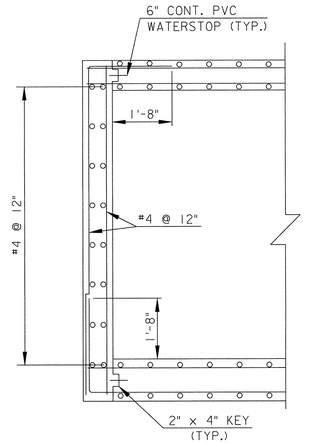
NOTE A:
MASONRY OPENING SHALL BE FIELD VERIFIED AT EXISTING POWHITE TOLL PLAZA WITH ENGINEER.



TUNNEL TYPICAL SECTION
SCALE: 1/2" = 1'-0"



SECTION A-A
SCALE: 3/4" = 1'-0"



SECTION AT END OF TUNNEL
SCALE: 1/2" = 1'-0"

5	3/27/07: REMOVED AND UPDATED DETAILS
2	7/20/06: REVISED SHEET - SEE SHEET 1B
1	6/23/06: ADDED SHEET

REVISIONS

STP-106A

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM

HNTB
9175 GUILFORD ROAD, SUITE 100
COLUMBIA, MARYLAND 21046
(301) 543-1000

POWHITE PARKWAY EXPRESS TOLL LANES PROJECT

TOLL PLAZA

MISCELLANEOUS TUNNEL DETAILS-1

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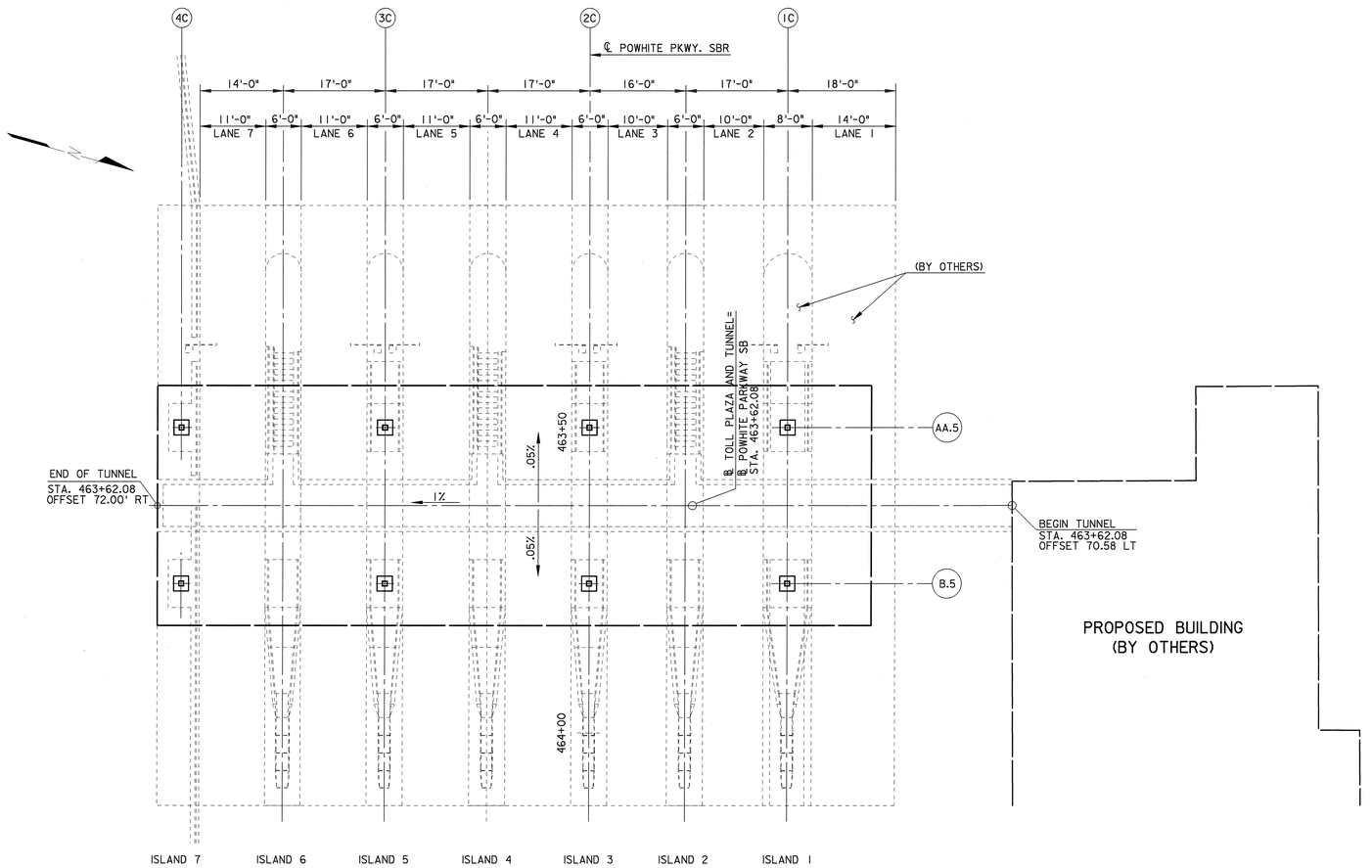
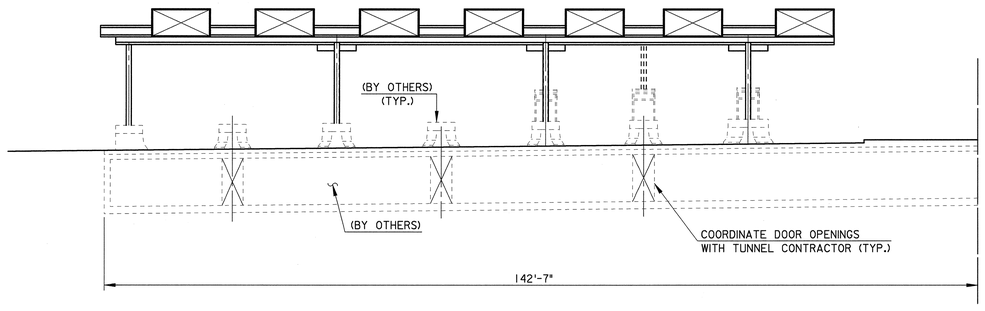


PLAN OF TOLL PLAZA
SCALE: 1" = 10'-0"



ELEVATION OF TOLL PLAZA
SCALE: 1" = 10'-0"

GENERAL NOTES:

SPECIFICATIONS:
CONSTRUCTION - VIRGINIA DEPARTMENT OF TRANSPORTATION,
ROAD AND BRIDGE SPECIFICATIONS, 2002

DESIGN - 2002 (17TH EDITION) AASHTO STANDARD SPECIFICATIONS
FOR HIGHWAY BRIDGES, WITH INTERIMS THROUGH 2004

DESIGN LOADS:

ROOF LIVE LOAD	20 PSF
WIND	40 PSF
FLAT ROOF SNOW LOAD	20 PSF

DESIGN STRENGTHS:

CONCRETE	FC'= 3000 PSI
REINF. STEEL	FY= 60 KSI

STRUCTURAL STEEL
MATERIAL SPECIFICATIONS:

WIDE FLANGE SHAPES,	ASTM A992
CHANNELS, ANGLES AND PLATES	ASTM A36
STRUCTURAL TUBING AND PIPE	ASTM A500, GRADE C
HIGH STRENGTH BOLTS	ASTM A325X
ANCHOR BOLTS	ASTM F1554, GRADE 55
HARDENED STEEL WASHERS	ASTM F436

ALL SHOP CONNECTIONS SHALL BE WELDED AND ALL FIELD CONNECTIONS SHALL BE BOLTED.

ALL STRUCTURAL STEEL SHALL BE HOT-DIP GALVANIZED PER ASTM A123, UNLESS OTHERWISE NOTED. ALL BOLTS, ANCHOR BOLTS, WASHERS AND NUTS SHALL BE HOT-DIP GALVANIZED PER ASTM A153. THE LOWER CANOPY FRAMING STEEL SHALL BE PAINTED, SEE SPECIAL PROVISIONS.

ALL METAL ROOF DECK SHALL BE 3", 22 GAGE, WIDE RIB TYPE B, GALVANIZED, WITH THE MINIMUM PROPERTIES DEFINED BY THE STEEL DECK INSTITUTE (SDI).

7/8" DIAMETER BOLTS SHALL BE USED FOR THE CANOPY STRUCTURE AND 3/4" DIAMETER BOLTS FOR ROOF SCREEN STRUCTURES.

ALL SHOP AND FIELD WELDING SHALL BE PERFORMED BY QUALIFIED WELDERS IN ACCORDANCE WITH AWS D1.1-2002 USING E70XX ELECTRODES.

ALL HOLES REQUIRED IN STRUCTURAL STEEL MEMBERS FOR PIPING AND DUCTWORK SHALL BE SHOWN ON THE SHOP DRAWINGS AND BE MADE N THE SHOP. NO HOLES SHALL BE CUT IN THE FIELD WITHOUT APPROVAL OF THE ARCHITECT/ENGINEER.

ALL BOLTED CONNECTIONS SHALL BE BEARING TYPE, NON SLIP-CRITICAL, TIGHTENED TO A "SNUG-TIGHT CONDITION" AS DEFINED BY AISC.

THE FRAME OF THE STEEL SKELETON SHALL BE CARRIED UP TRUE AND PLUMB AND TEMPORARY BOLTING AND BRACING SHALL BE INTRODUCED TO SAFELY CARRY ALL LOADS TO WHICH THE STRUCTURE MAY BE SUBJECTED, INCLUDING EQUIPMENT AND OPERATION OF SAME. INDIVIDUAL COLUMNS MUST BE BRACED BEFORE BEAM CONNECTIONS ARE MADE AND BRACING SHALL BE LEFT IN PLACE AS LONG AS MAY BE REQUIRED FOR SAFETY.

AFTER COMPLETION OF ERECTION, THE OWNER SHALL ENGAGE AN INDEPENDENT TESTING AGENCY TO INSPECT HIGH STRENGTH BOLTED CONNECTIONS, TO PERFORM TESTS, AND TO PREPARE TEST REPORTS. THE TESTING AGENCY SHALL CONDUCT AND INTERPRET TESTS AND STATE IN EACH REPORT WHETHER THE TEST RESULTS COMPLY WITH THE REQUIREMENTS AND SPECIFICALLY STATE ANY DEVIATIONS THERE FROM. THE TESTING SHALL CONFORM TO THE REQUIREMENTS FOUND IN THE AISC "SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 AND A490 BOLTS", DATED JUNE 2000, WITH SUPPLEMENTS. BOLTS THAT ARE NEITHER NON SLIP CRITICAL NOR SUBJECT TO DIRECT TENSION NEED NOT BE INSPECTED FOR BOLT TENSION OTHER THAN TO INSURE THAT THE PLIES OF THE CONNECTED ELEMENT HAVE BEEN BROUGHT INTO SNUG CONTACT. THE INDEPENDENT TESTING AGENCY SHALL SUBMIT THE INTENDED TEST PROCEDURES TO THE STRUCTURAL ENGINEER FOR REVIEW PRIOR TO BEGINNING TESTING.

FOUNDATIONS

FOUNDATIONS FOR THIS STRUCTURE AND SPREAD FOOTINGS BEARING ON EITHER FIRM VIRGIN SOIL OR COMPACTED STRUCTURAL FILL WITH AN ALLOWABLE BEARING CAPACITY OF 3000 PSF IN ACCORDANCE WITH THE OWNER'S GEOTECHNICAL ENGINEER'S REPORT BY FROEHLING & ROBERTSON, INC. DATED OCTOBER, 2005. THE OWNER'S GEOTECHNICAL ENGINEER SHALL VERIFY, PRIOR TO POURING, THAT THE SOIL IS CAPABLE OF SUSTAINING SUCH A LOAD.

PREPARATION OF SOIL AND SUBGRADE BENEATH FOOTINGS AND SLABS ON GRADE SHALL BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE OWNER'S GEOTECHNICAL ENGINEER'S REPORT AND THE PROJECT SPECIFICATIONS.

ALL BACKFILL BEHIND TUNNNEL WALLS SHALL BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE OWNER'S GEOTECHNICAL ENGINEER'S REPORT AND THE PROJECT SPECIFICATIONS.

ALL WALLS SUBJECT TO LATERAL LOAD DUE TO UNBALANCED FILL SHALL BE BRACED PLUMB UNTIL BACKFILL HAS BEEN PLACED AND COMPACTED AND SHALL REMAIN BRACED UNTIL THE PERMANENT STRUCTURE ABOVE AND BELOW IS IN PLACE AND CAPABLE OF RESISTING ALL LOADS.

THE CONTRACTOR SHALL VERIFY ALL FIELD MEASUREMENTS, EXISTING DIMENSION, ELEVATIONS, AND THE SHAPES OF SIZES OF EXISTING STRUCTURAL MEMBERS SHOWN ON THE CONTRACT DRAWINGS PRIOR TO BEGINNING WORK. THE ARCHITECT/ENGINEER SHALL BE NOTIFIED IN WRITING OF ALL DISCREPANCIES THAT WOULD RESULT IN REVISIONS TO THE CONTRACT DRAWINGS.

THE CONTRACTOR SHALL VERIFY ALL DRAWINGS FOR COORDINATION BETWEEN TRADES. HE SHALL LOCATE SLOTS, SLEEVES AND TRENCHES AS REQUIRED FOR MECHANICAL TRADES AND PROVIDE AND INSTALL ANCHORS, INSERTS, HANGERS, ETC. AS REQUIRED FOR VARIOUS OTHER TRADES.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN AND ERECTION OF ALL TEMPORARY BRACING, FORMWORK, SHEETING, SHORING AND UNDERPINNING NECESSARY TO PERFORM THE WORK.

THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL CONSTRUCTION MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES AND FOR SAFETY PRECAUTIONS AND PROGRAMS AS THEY RELATE TO THE WORK OF THIS PROJECT.

THE CONTRACTOR SHALL SUBMIT THE REQUIRED SHOP DRAWINGS FOR REVIEW PRIOR TO BEGINNING WORK. THE CONTRACTOR SHALL CHECK ALL DIMENSIONS AND ACCEPT FULL RESPONSIBILITY FOR DIMENSIONAL CORRECTNESS. UNDER NO CIRCUMSTANCES SHALL REPRODUCTIONS OF CONTRACT DRAWINGS BE USED AS SHOP DRAWINGS.

ALL STRUCTURAL STEEL SHOP DRAWINGS SHALL BE PREPARED UNDER THE DIRECT SUPERVISION OF PROFESSIONAL ENGINEER REGISTERED IN THE COMMONWEALTH OF VIRGINIA.

OWNER:
RICHMOND METROPOLITAN AUTHORITY
919 EAST MAIN STREET
SUITE 600
RICHMOND, VA 23219
TEL: 804.523.3300
FAX: 804.523.3330

ARCHITECT:
HNTB
HNTB ARCHITECTURE
The HNTB Companies
ARCHITECTS
ENGINEERS
PLANNERS
431 7TH STREET NW
WASHINGTON, DC 20004
(202) 638-7521 FAX (202) 624-1000

MEP / STRUCTURAL:
HANKINS & ANDERSON
4880 SADLER ROAD
SUITE 300
GLEN ALLEN, VA. 23060
TEL: 804.285.4171
FAX: 804.217.8520

CIVIL / LANDSCAPE:
HNTB CORPORATION
9175 GUILFORD ROAD
COLUMBIA, MD 21046
TEL: 301.543.1000
FAX: 301.498.5070

RICHMOND METROPOLITAN AUTHORITY
POWHITE PARKWAY SPLIT PLAZA TOLL FACILITY
RICHMOND, VIRGINIA

DATE	7/20/2006
ISSUED FOR CONSTRUCTION	
PROJECT NO.	PSP-2006
DRAWN BY	EJM
CHECKED BY	BS
APPROVED BY	BCC

REVISION	DATE	DESCRIPTION
2	6/23/06	REVISED SHEET

SHEET TITLE & NUMBER

STRUCTURAL TOLL PLAZA
TOLL PLAZA
PLAN AND ELEVATION
STP-101

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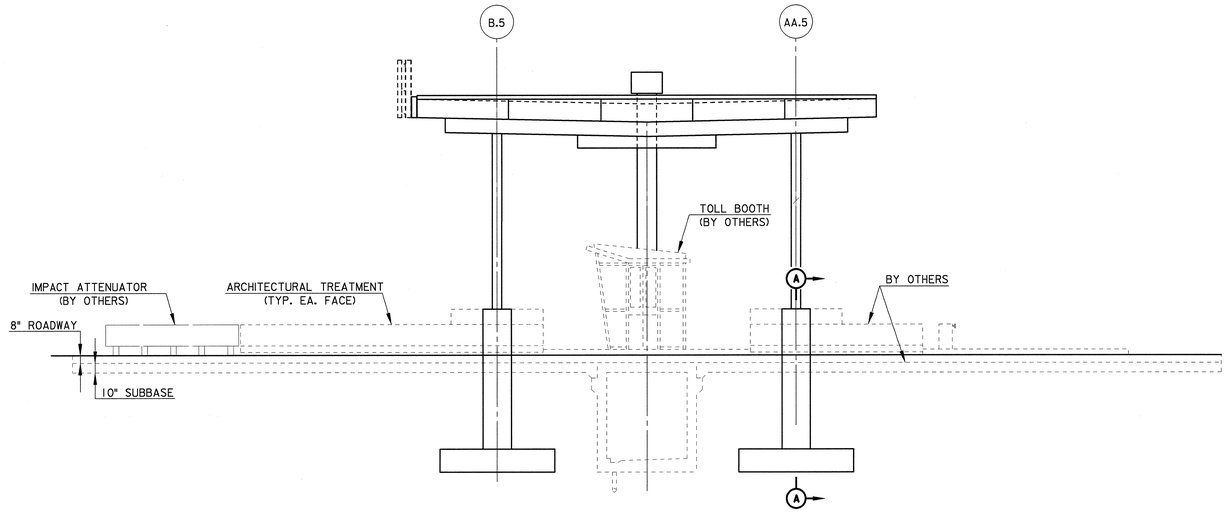
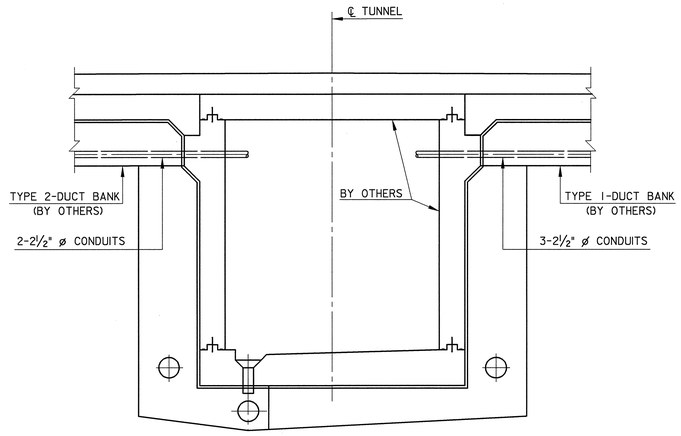


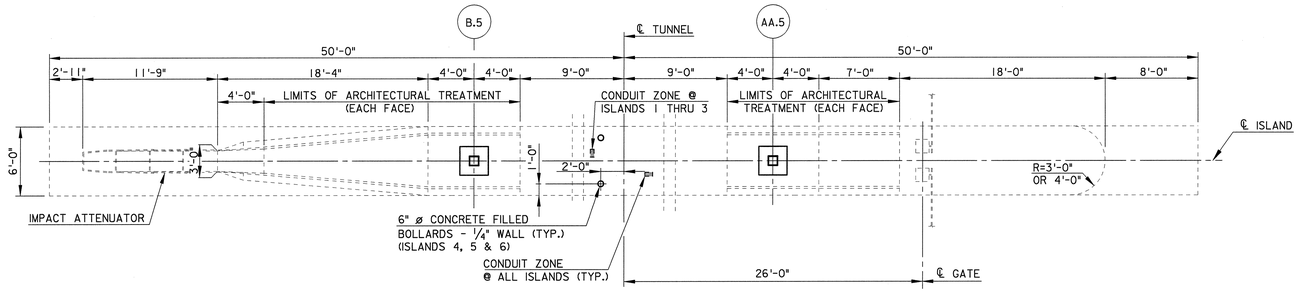
ELEVATION OF 6'-0" ISLAND

(ISLANDS 3 & 5)
(ISLAND 1 SIMILAR)
SCALE: 3/16" = 1'-0"



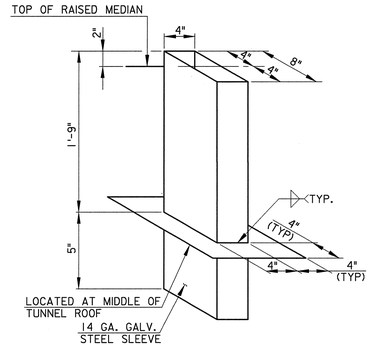
TYPICAL SECTION - BETWEEN ISLANDS

SCALE: ½" = 1'-0"



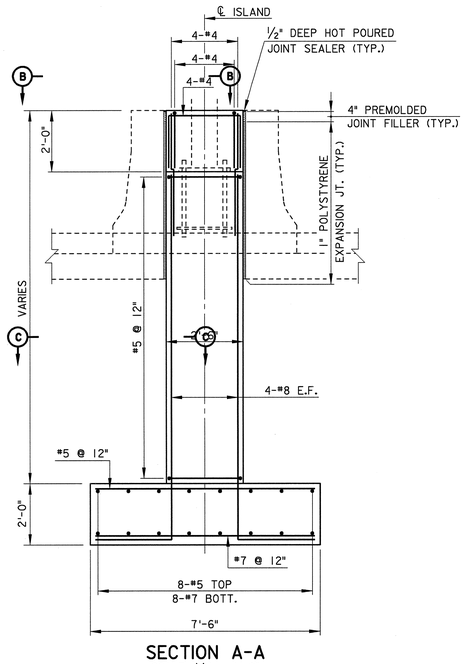
PLAN OF 6'-0" ISLAND

(ISLANDS 3 & 5)
(ISLAND 1 SIMILAR)
SCALE: 3/16" = 1'-0"



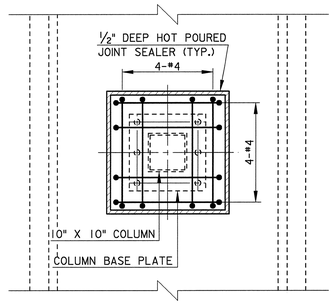
TUNNEL SLEEVE DETAIL

SCALE: 1½" = 1'-0"



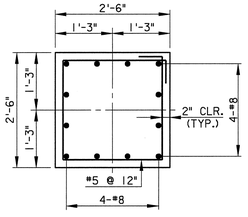
SECTION A-A

SCALE: ½" = 1'-0"



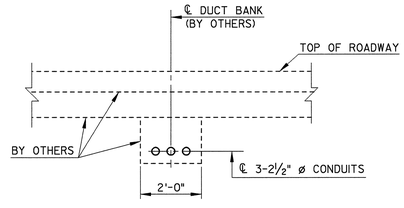
SECTION B-B

SCALE: ¾" = 1'-0"

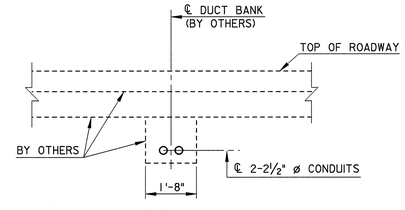


SECTION C-C

SCALE: ¾" = 1'-0"



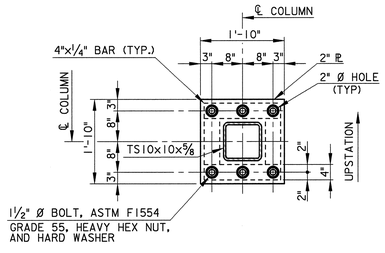
TYPE 1



TYPE 2

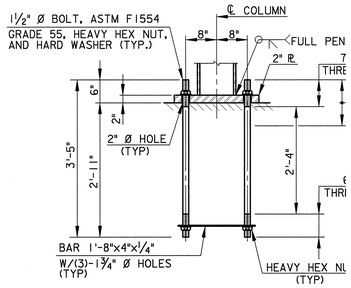
TYPICAL DUCTBANK DETAILS

SCALE: ½" = 1'-0"



BASE PLATE DETAIL

SCALE: ¾" = 1'-0"



ANCHOR BOLT DETAIL

SCALE: ¾" = 1'-0"

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RICHMOND METROPOLITAN AUTHORITY
POWHITE PARKWAY SPLIT PLAZA TOLL FACILITY
RICHMOND, VIRGINIA

DATE	7/20/2006
ISSUED FOR CONSTRUCTION	
PROJECT NO.	PSP-2006
DRAWN BY	EJM
CHECKED BY	BS
APPROVED BY	BCC

REVISION	DATE	DESCRIPTION
3	6/23/06	REVISED SHEET

SHEET TITLE & NUMBER

STRUCTURAL TOLL PLAZA
TYPICAL TOLL ISLAND DETAILS - 1
STP-103

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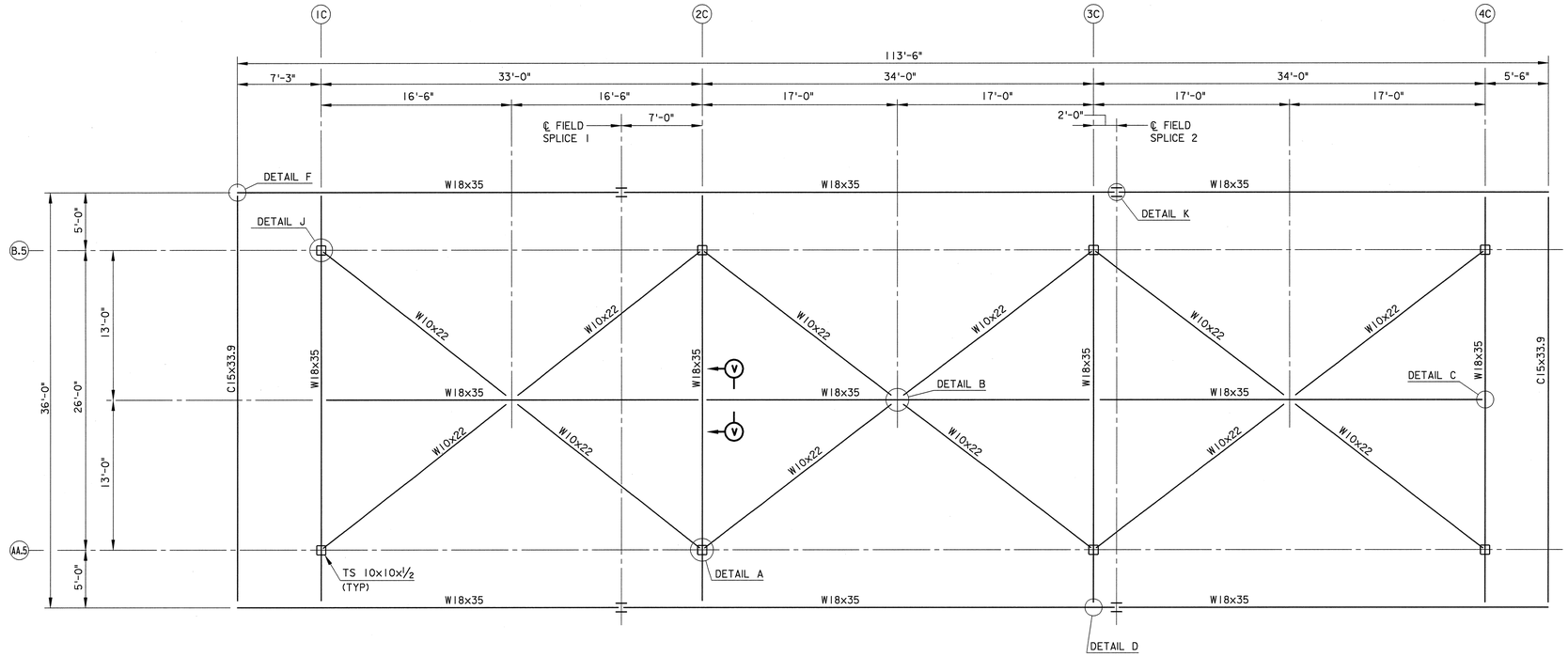
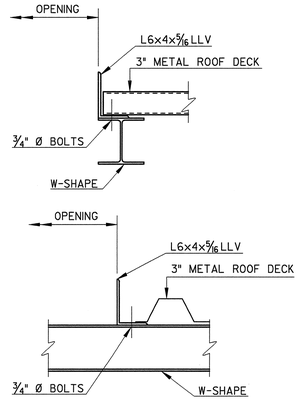
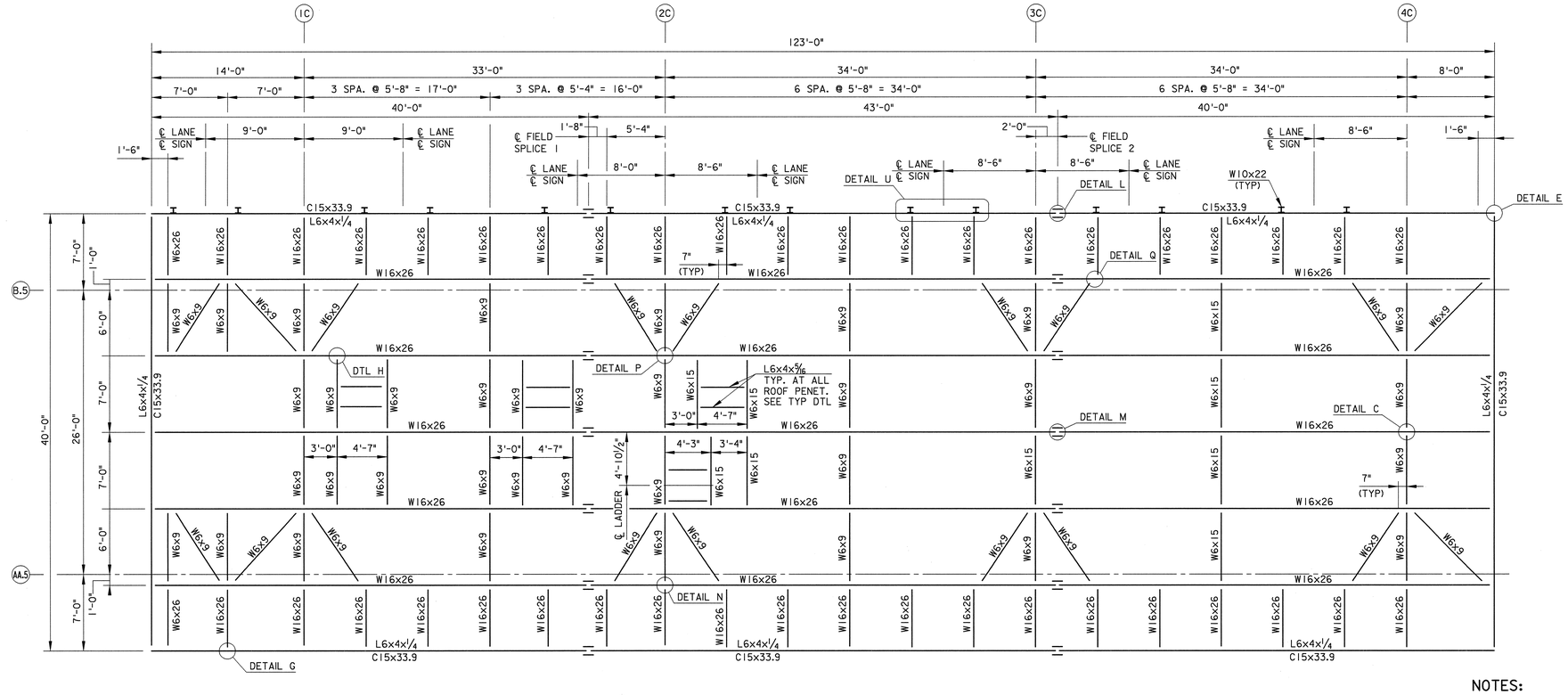


FRAMING PLAN - LOWER LEVEL
SCALE: 1" = 5'-0"



(4 - PENETRATIONS REQUIRED)

TYPICAL ROOF PENETRATION DETAILS
SCALE: 1½" = 1'-0"



FRAMING PLAN - UPPER LEVEL
SCALE: 1" = 5'-0"

NOTES:

1. FOR TYPICAL SECTION, SEE SHEET STP-108.
2. FOR GENERAL NOTES, SEE SHEET STP-101.
3. FOR FRAMING CONNECTION DETAILS, SEE SHEET STP-109 AND STP-110.
4. FOR ROOF SCREEN FRAMING PLAN AND DETAILS, SEE SHEET STP-111.
5. LOCATION OF W16x26 MAY BE ADJUSTED TO ACCOMODATE W10x22 SIGN BRACKET CONNECTION.
6. FOR SECTION V-V, SEE SHEET NO. STP-109.

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RICHMOND METROPOLITAN AUTHORITY
POWHITE PARKWAY SPLIT PLAZA TOLL FACILITY
RICHMOND, VIRGINIA

DATE	7/20/2006
ISSUED FOR CONSTRUCTION	
PROJECT NO.	PSP-2006
DRAWN BY	CR
CHECKED BY	BS
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REVISION	DATE	DESCRIPTION
3	6/23/06	REVISED SHEET

SHEET TITLE & NUMBER

STRUCTURAL TOLL PLAZA
CANOPY FRAMING PLAN
STP-107

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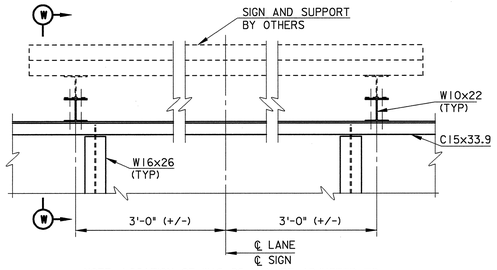
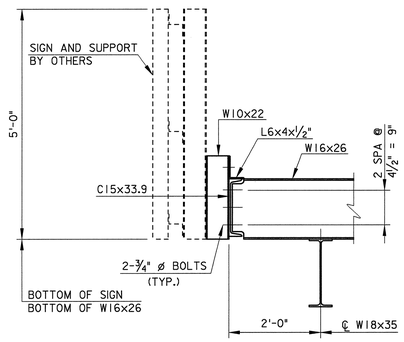
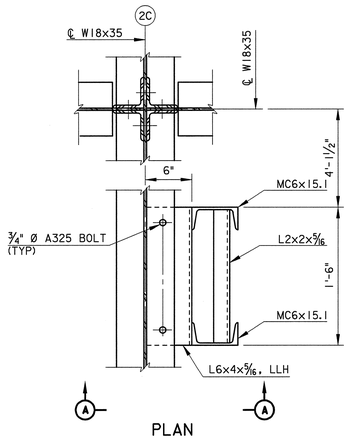


NOTE: LOCATION OF W16x26 MAY BE ADJUSTED TO ACCOMODATE W6x9 SIGN BRACKET CONNECTIONS.

DETAIL U
SCALE: 3/4" = 1'-0"

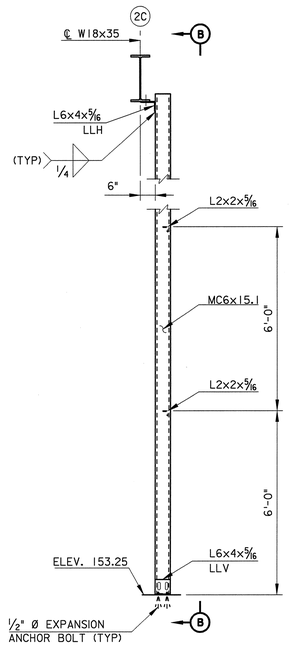


SECTION W-W
SCALE: 3/4" = 1'-0"

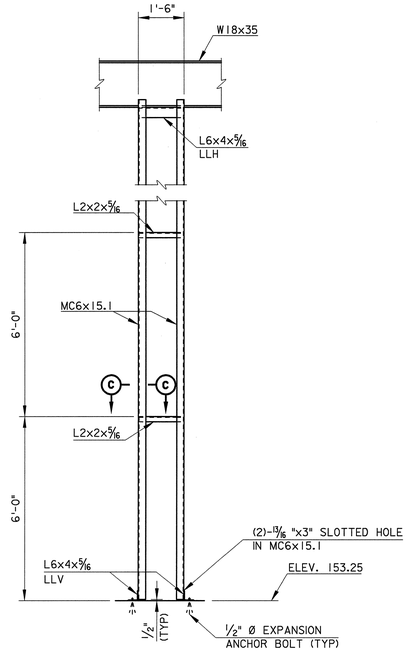


PLAN

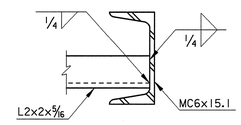
LADDER SUPPORT DETAIL
SCALE: 1 1/2" = 1'-0"



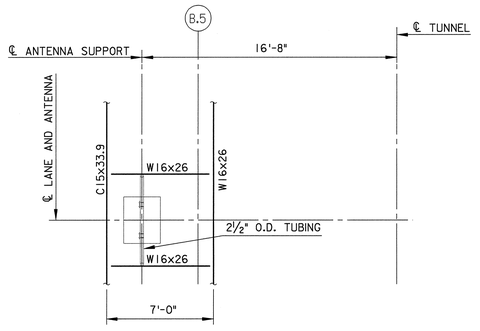
VIEW A-A
SCALE: 1/2" = 1'-0"



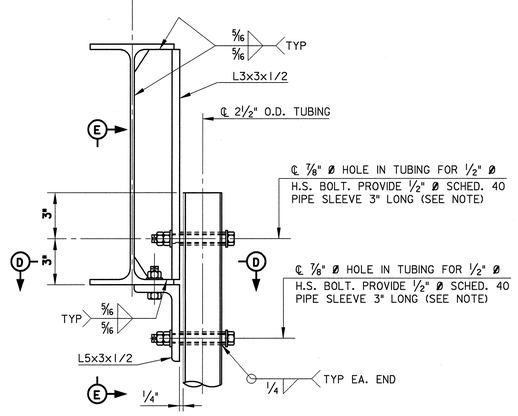
VIEW B-B
SCALE: 1/2" = 1'-0"



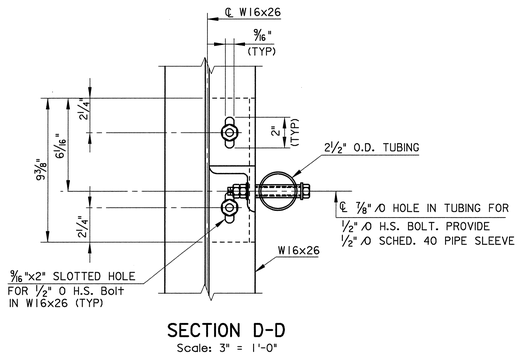
SECTION C-C
SCALE: 3" = 1'-0"



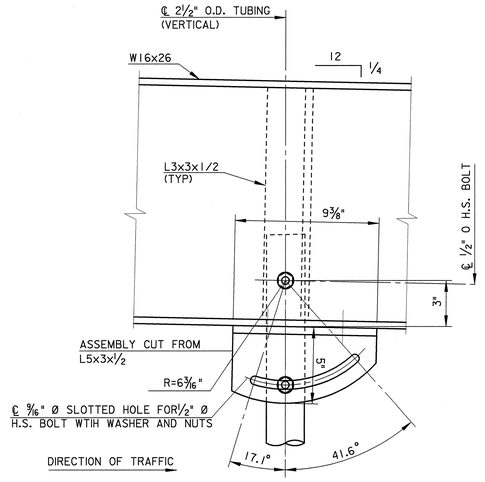
PARTIAL ANTENNA SUPPORT PLAN
SCALE: 1/4" = 1'-0"



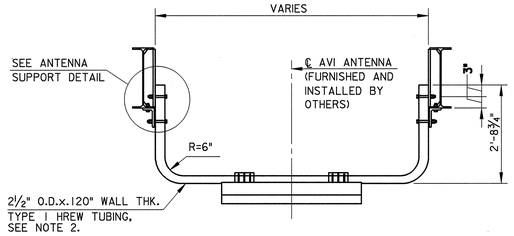
ANTENNA SUPPORT DETAIL
Scale: 3" = 1'-0"



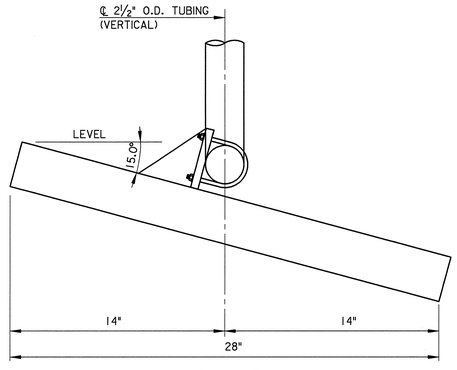
SECTION D-D
Scale: 3" = 1'-0"



SECTION E-E
SCALE: 3" = 1'-0"



TYPICAL ANTENNA SUPPORT
(LOOKING IN THE DIRECTION OF TRAFFIC)
SCALE: 3/4" = 1'-0"



ELEVATION
ANTENNA POSITION DETAIL
SCALE: 3" = 1'-0"

NOTES:

1. FOR INSTALLATION OF ELECTRICAL INFRASTRUCTURE AND EQUIPMENT SEE ELECTRICAL DRAWINGS.
2. ANTENNA SUPPORT BRACKETS SHALL BE FABRICATED FROM ASTM 513 TYPE I HOT-ROLLED ELECTRICWELDED (HREW) MECHANICAL TUBING.
3. STEEL MEMBERS AND PLATES FOR ANTENNA SUPPORT SHALL BE ASTM A709, GRADE 36 GALVANIZED TO ASTM-123.
4. THE C15x33.9 AND W16x26 MEMBERS ARE CANOPY STEEL.

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RICHMOND METROPOLITAN AUTHORITY
POWHITE PARKWAY SPLIT PLAZA TOLL FACILITY
RICHMOND, VIRGINIA

DATE	7/20/2006
ISSUED FOR CONSTRUCTION	
PROJECT NO.	PSP-2006
DRAWN BY	CR
CHECKED BY	BS
APPROVED BY	BCC

REVISION	DATE	DESCRIPTION
3	6/23/06	REVISED SHEET

SHEET TITLE & NUMBER

STRUCTURAL TOLL PLAZA
CANOPY DETAILS
STP-110

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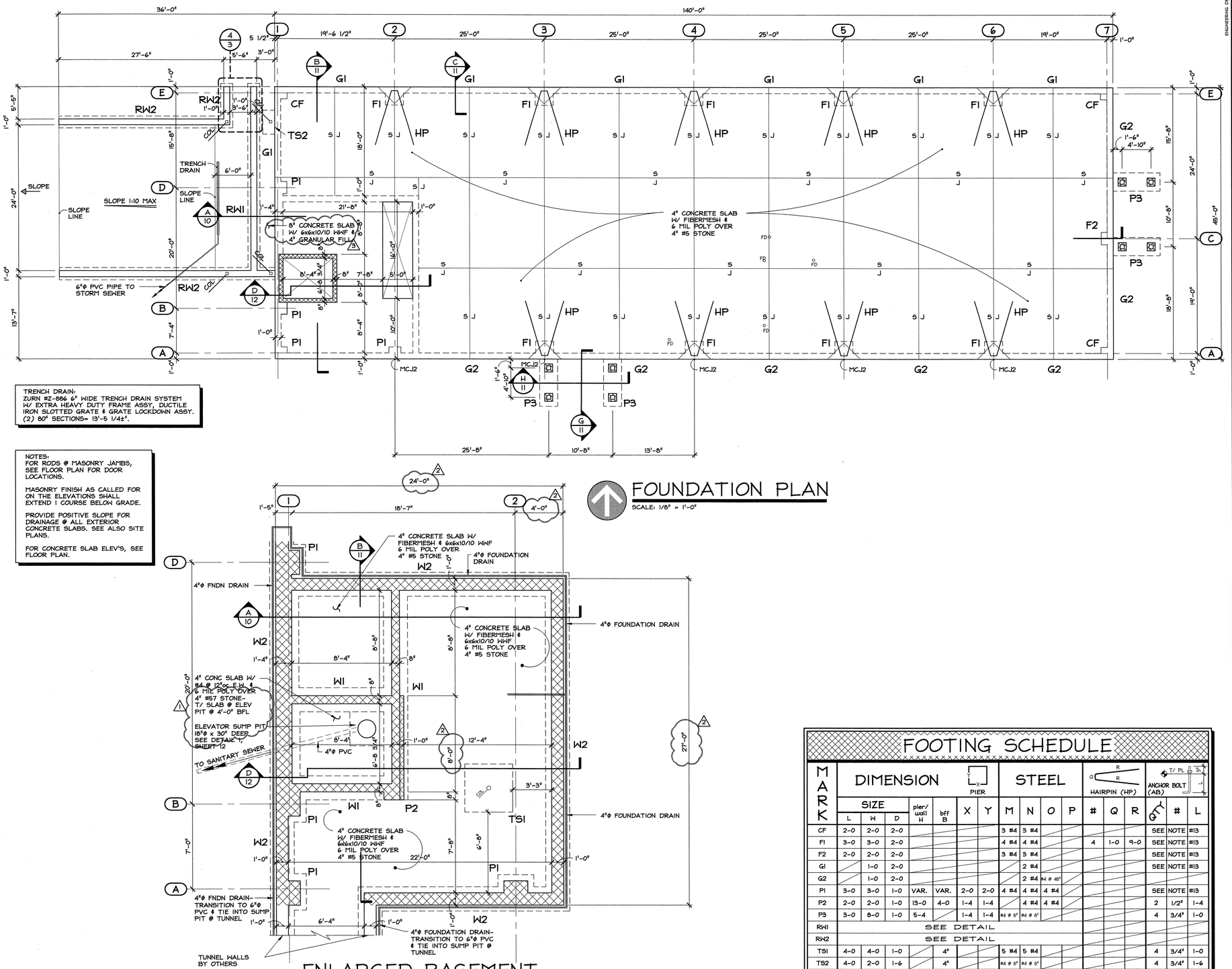
STRUCTURAL NOTES:

1. CONCRETE: f'c = 3500psi SLABS, f'c = 3000psi FOOTINGS AND WALLS.
2. RE-STEEL: f'u = 60 KSI.
3. ANCHOR BOLTS SHALL BE ASTM A36 STEEL.
4. ALL RE-STEEL SHALL BE LAPPED A MIN. OF 36 BAR DIA'S (UNLESS NOTED OTHERWISE).
5. ALL REINFORCING STEEL UTILIZED IN THE MASONRY WALLS SHALL BE #4 RODS FURNISHED IN 5'-4" LENGHTS FOR THE FULL HEIGHT OF THE WALLS. RODS EMBEDDED IN FOOTINGS SHALL BE HOOKED.
6. ACCURATELY POSITION, SUPPORT, & SECURE IN PLACE ALL STEEL REINFORCING & WIRE FABRIC USING CHAIRS, BOLSTERS, BAR SUPPORTS, & SPACERS SIZED AND SHAPED FOR ADEQUATE SUPPORT OF REINFORCING DURING CONCRETE PLACEMENT.

   MIN COVERAGE @ FOOTINGS: 3"
   MIN COVERAGE @ SLABS / WALLS: 1 1/2"
7. SOIL BEARING CAPACITY: 2000 PSF NET (ASSUMED).
8. CURING COMPOUND AND SEALER SHALL BE (BASF BUILDING PRODUCTS) SONNEBORN KURE-N-SEAL. CURING COMPOUND SHALL BE APPLIED IMMEDIATELY FOLLOWING CONCRETE FINISHING, AND IN ACCORDANCE WITH THE MANUFACTURER'S WRITTEN SPECIFICATIONS.
9. GRANULAR FILL: #57 OR #5 (AS NOTED) STONE THICKNESS: 4"
10. VAPOR BARRIER: 1 LAYER 6 MIL POLY.
11. SLAB REINFORCING: 6 x 6 x 10/10 WWM & FIBERMESH (BASEMENT), FIBERMESH (1st FLOOR)
12. ALL CONCRETE JOINTS SHALL BE FILLED WITH A NO-TRACK FILLER.
13. * REFER TO THE METAL BUILDING MANUFACTURERS ANCHOR BOLT PLAN FOR QUANTITY, SIZE, AND LOCATION OF ALL ANCHOR BOLTS. ***VERY IMPORTANT***
14. ALL MASONRY PIERS SHALL BE FULLY BONDED.
15. ALL MASONRY WALLS SHALL BE FULLY BONDED AT INTERSECTIONS.
16. ALL MASONRY CORES WITH RODS SHALL BE FILLED WITH CONCRETE.
17. ALL MASONRY WALLS SHALL HAVE DUR-O-WAL HORZ TRUSS REINFORCING @ 24" ABOVE GRADE & 16" BELOW GRADE.
18. ALL MASONRY BELOW GRADE & OTHER INTERIOR MASONRY SHALL BE STANDARD UNITS, ASTM C 90, TYPE 1, NORMAL WEIGHT, NOMINAL 8"x16"x8" UNLESS NOTED OTHERWISE ON THE DRAWINGS.
19. MORTAR SHALL BE IN ACCORDANCE WITH ASTM C 270, TYPE M FOR BELOW GRADE APPLICATIONS, AND TYPE S FOR ALL OTHER MASONRY.
20. STRIKE EXPOSED JOINTS FOR MASONRY CONCAVE. STRIKE ALL UNEXPOSED JOINTS FLUSH.
21. ALL MASONRY WALLS SHALL HAVE EXPANSION JOINTS AT A MAXIMUM 25' (12' FROM (MASONRY) BUILDING CORNERS) OR CLOSER IF SO INDICATED ON THE DRAWINGS. ALL JOINTS SHALL CONTAIN A FIBER EXPANSION MATERIAL AND SHALL BE CAULKED WITH A TWO PART POLYSULFIDE CAULKING. ALL JOINTS IN FIRE WALLS SHALL BE CAULKED WITH A FIRE CAULKING. SEE EXTERIOR ELEVATIONS FOR LOCATIONS OF MASONRY EXPANSION JOINTS (MCJ'S). MCJ SHALL EXTEND FULL HIEGHT OF MASONRY.
22. ALL EXPOSED EXTERIOR PRE-COLORED OR UNFINISHED MASONRY SHALL BE SEALED WITH TWO COATS OF ENVIROSEAL DOUBLE 7 BLOCK SEALANT AS MANUFACTURED BY HARRIS SPECIALTY CHEMICALS, INC., OR AN APPROVED EQUAL.
23. ALL WALLS PENETRATING THE FLOOR SLAB SHALL HAVE A 1/2" EXPANSION JOINT (E.J.) AT THE FLOOR LINE.
24. EXPANSION JOINT MATERIAL AT WALLS TO SLAB SHALL BE 1/2" ASPHALT IMPREGNATED FIBERBOARD.
25. ALL CONCRETE WALLS ABOVE GRADE SHALL BE PLUGGED AND RUBBED.
26. PROVIDE SHORING ADEQUATE TO PREVENT DAMAGE OR MOVEMENT OF THE RETAINING WALLS PRIOR TO BACK FILLING. RETAINING WALLS SHALL BE EVENLY BACK FILLED ON BOTH SIDES OF THE WALL TO THE LOW SIDE GRADE LINE BEFORE BACK FILLING ABOVE THE LOW GRADE LINE. ALL BACK FILL SHALL BE COMPACTED WHEN PLACED AND PRIOR TO PLACING ANOTHER LIFT, TO 98% OPTIMUM DENSITY BASED ON STANDARD PROCTOR.
27. ALL BASEMENT WALLS SHALL BE BACKFILLED ENTIRELY W/ #5 STONE.
28. PROVIDE PERIMETER INSULATION ALONG ALL EXTERIOR WALLS (1" RIGID).
29. THE BOTTOM OF ALL FOOTINGS SHALL BE A MINIMUM OF 18" BELOW FINISHED GRADE.
30. ALL CONCRETE WORK SHALL BE PERFORMED IN ACCORDANCE WITH ACI 318, LATEST EDITION.
31. ALL FOOTINGS SHALL BEAR ON ORIGINAL EARTH. FILL COMPACTED TO 95% PROCTOR OR FLOWABLE FILL.



FOUNDATION PLAN
SCALE: 1/8" = 1'-0"

ENLARGED BASEMENT FOUNDATION PLAN
SCALE: 1/4" = 1'-0"

FOOTING SCHEDULE

MARK	DIMENSION SIZE L	W	D	pier/ wall H	bff B	PIER X	Y	STEEL M	N	O	P	HAIRPIN (HP) #	Q	R	ANCHOR BOLT (AB) QTY	#	L
CF	2-0	2-0	2-0					3 #4	3 #4						SEE	NOTE	#13
FI	3-0	3-0	2-0					4 #4	4 #4			4	1-0	9-0	SEE	NOTE	#13
F2	2-0	2-0	2-0					3 #4	3 #4						SEE	NOTE	#13
GI		1-0	2-0						2 #4						SEE	NOTE	#13
G2		1-0	2-0						2 #4	#4 @ 40"							
PI	3-0	3-0	1-0	VAR.	VAR.	2-0	2-0	4 #4	4 #4	4 #4					SEE	NOTE	#13
P2	2-0	2-0	1-0	13-0	4-0	1-4	1-4		4 #4	4 #4					2	1/2"	1-4
P3	3-0	8-0	1-0	5-4		1-4	1-4	#4 @ 8"	#4 @ 8"						4	3/4"	1-0
RWI	SEE DETAIL																
RW2	SEE DETAIL																
TSI	4-0	4-0	1-0		4"			5 #4	5 #4						4	3/4"	1-0
TS2	4-0	2-0	1-6		4"			#4 @ 8"	#4 @ 8"						4	3/4"	1-6
WI		2-0	1-0						2 #4	#4 @ 16"							
W2		2-0	1-0						2 #4	#4 @ 8"							

NOTE: G2, PI, P2, RWI; EXTEND RE-STEEL THRU COLUMN FOOTINGS.

DO NOT SCALE DRAWING FOR DIMENSIONS

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EDA
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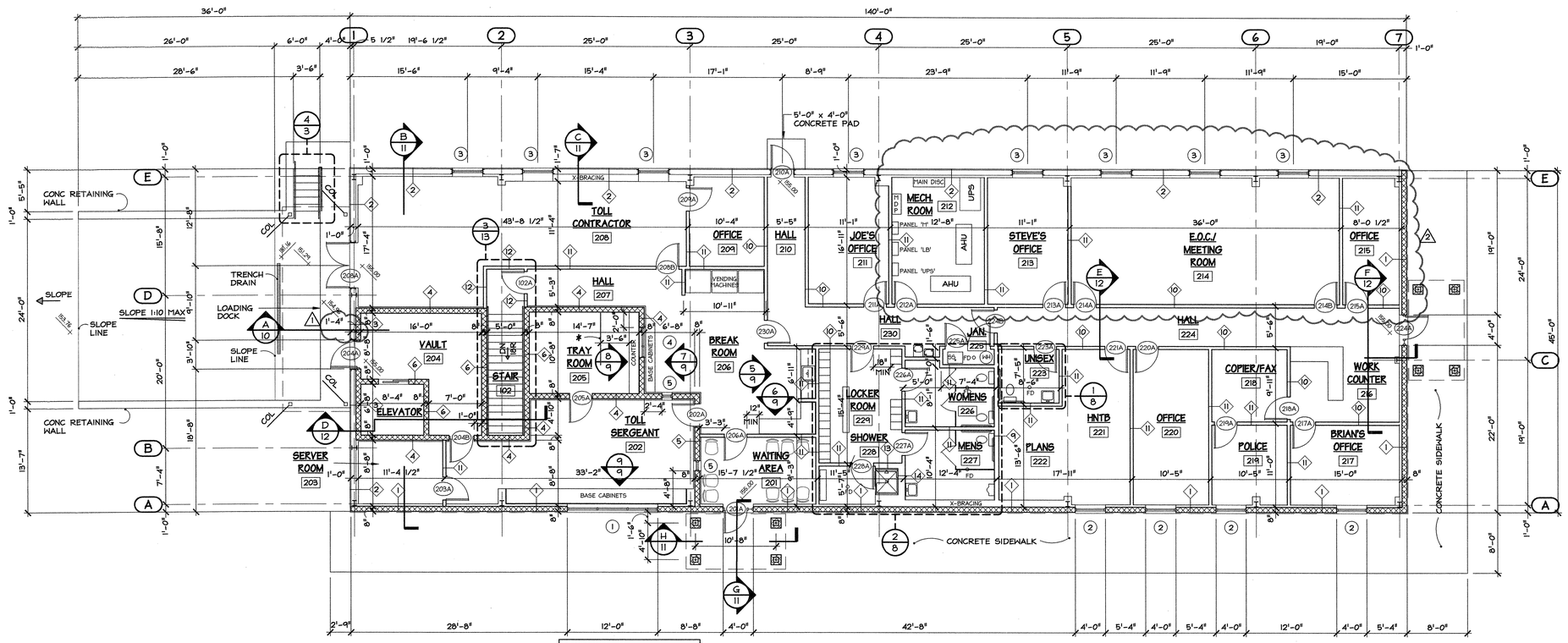
REVISION:

NO.	DATE:	DESCRIPTION:
-	10.11.06	ISSUED FOR CONSTRUCTION
1	10.24.06	ELEVATOR SUMP
2	11.07.06	REVISED/ADDED DIMENSIONS
3	12.08.06	REV. DOCK SLAB THICKNESS

PROPOSED BUILDING FOR:
RICHMOND METROPOLITAN AUTORITY
6254 FOWHITE PARKWAY . CITY of RICHMOND . VIRGINIA
FOUNDATION PLAN

DRAWN BY: RANDY HOOKER | CHECKED BY: RFN
SCALE: 1/8" = 1'-0" | DATE: OCTOBER 11, 2006 | PROJECT NO: 06357

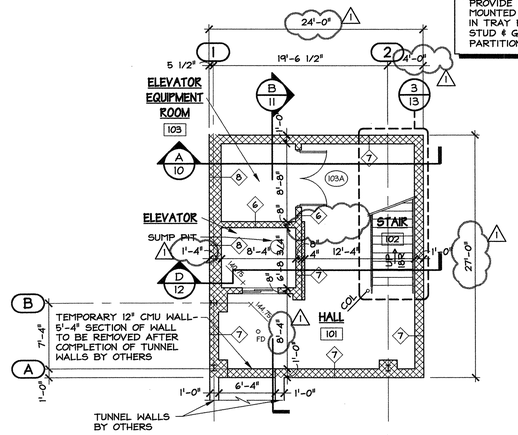
DRAWING NO: 2 of 16



FLOOR PLAN

SCALE: 1/8" = 1'-0"

* NOTE:
PROVIDE FLOOR / WALL MOUNTED TOILET PARTION IN TRAY ROOM OR METAL STUD & GYPSUM BOARD PARTITION- LENGTH= 7'



BASEMENT FLOOR PLAN

SCALE: 1/8" = 1'-0"

WALL LEGEND

1. 8" SPLIT FACE CMU WALL TO 3'-4" AFF- METAL BUILDING WALL BEGINS AT 3'-4" AFF- W/ INTERIOR 4" x 20ga STEEL STUD WALL W/ 3 1/2" R-11 FG BATT INSUL W/ VAPOR BARRIER & 5/8" GYPSUM BOARD. PROVIDE VINYL BACKED R-19 FG INSULATION FROM TOP OF STUD WALL TO TOP OF METAL BUILDING WALL.
2. METAL BUILDING WALL W/ INTERIOR 4" x 20ga STEEL STUD WALL W/ 3 1/2" R-11 FG BATT INSUL W/ VAPOR BARRIER & 5/8" GYPSUM BOARD. PROVIDE VINYL BACKED R-19 FG INSULATION FROM TOP OF STUD WALL TO TOP OF METAL BUILDING WALL.
3. METAL BUILDING WALL W/ INTERIOR 8" CMU WALL.
4. 8" CMU WALL W/ 1 1/2" x 20ga HAT CHANNELS & 5/8" GYPSUM BOARD.
5. 8" CMU WALL W/ 1 1/2" x 20ga HAT CHANNELS & 5/8" GYPSUM BOARD EACH FACE.
6. 8" CMU WALL.
7. 12" CMU WALL.
8. 16" CMU WALL.
9. 6" x 20ga METAL STUDS @ 24oc W/ 5/8" GYPSUM BOARD EACH FACE.
10. 1 HOUR RATED WALL ASSEMBLY - UL DESIGN #U419 4" x 20ga METAL STUDS @ 24oc W/ 3 1/2" FG SOUND BATTS & 5/8" FIRE RATED GYPSUM BOARD EACH FACE.
11. 4" x 20ga METAL STUDS @ 24oc W/ 3 1/2" FG SOUND BATTS & 5/8" GYPSUM BOARD EACH FACE.
12. 4" x 20ga METAL STUDS @ 24oc W/ 3 1/2" R-13 FG BATT INSULATION W/ VAPOR BARRIER & 5/8" EXTERIOR GRADE GYPSUM BOARD ON INTERIOR FACE OF STAIRWELL & 5/8" GYPSUM BOARD ON TOLL CONTRACTOR & HALL FACE OF WALL.
13. 8" x 20ga METAL STUDS @ 24oc W/ 3 1/2" FG SOUND BATTS & 5/8" GYPSUM BOARD EACH FACE.
14. 11 1/2" CHASE WALL- 2 1/4" AIR SPACE BETWEEN 4" x 20ga STEEL STUD WALLS W/ 5/8" GYPSUM BOARD.

NOTE: PROVIDE MOISTURE RESISTANT GYPSUM BOARD IN ALL TOILET ROOMS, SHOWER & STAIR.

DO NOT SCALE DRAWING FOR DIMENSIONS

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FAX: 804-580-3334

REVISION:

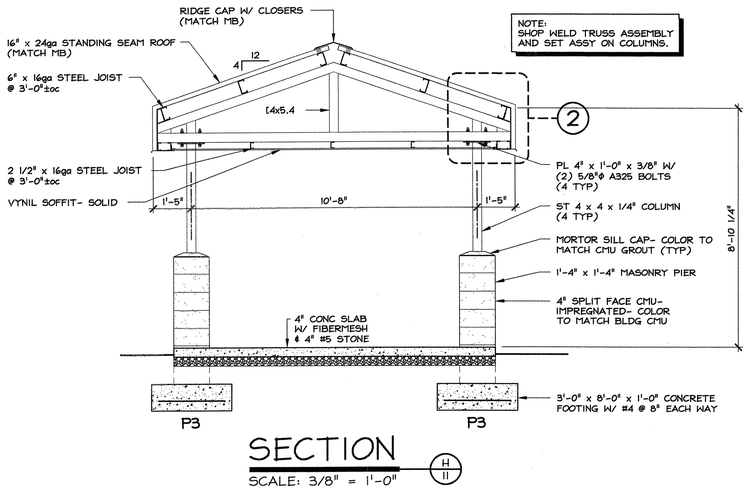
NO.	DATE:	DESCRIPTION:
-	10.11.06	ISSUED FOR CONSTRUCTION
1	11.07.06	REVISED/ADDED DIMENSIONS
2	11.27.06	MOVED WALLS & WINDOWS

PROPOSED BUILDING FOR:
RICHMOND METROPOLITAN AUTORITY
6234 POWHITE PARKWAY . CITY of RICHMOND . VIRGINIA

FLOOR PLAN

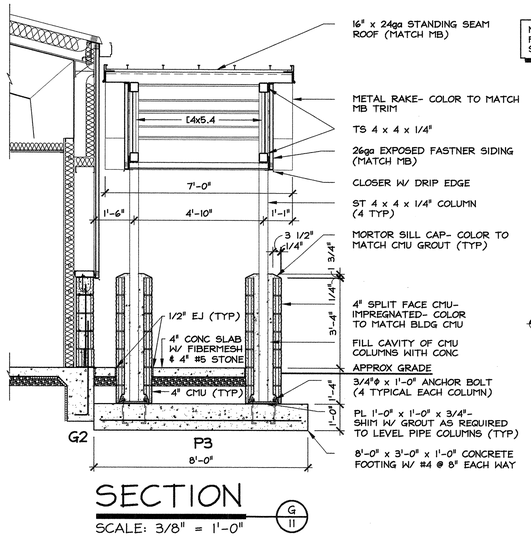
DRAWN BY: RANDY HOOKER | CHECKED BY: LTC
SCALE: 1/8" = 1'-0" | DATE: OCTOBER 11, 2006 | PROJECT NO. 06567

DRAWING NO: 4 of 16



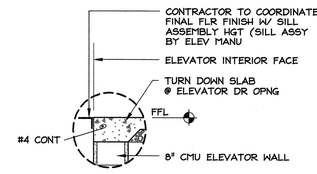
SECTION

SCALE: 3/8ª = 1'-0ª — H/11



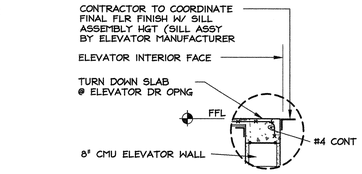
SECTION

SCALE: 3/8ª = 1'-0ª — G/11



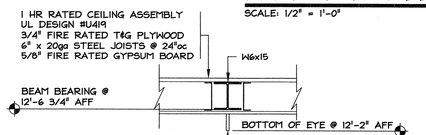
ELEVATOR SILL 1

SCALE: 1/2ª = 1'-0ª



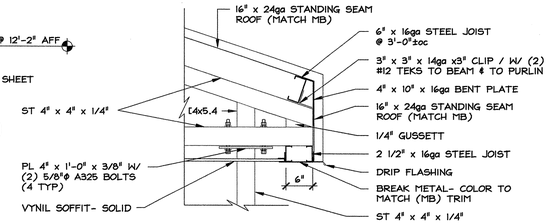
ELEVATOR SILL 2

SCALE: 1/2ª = 1'-0ª



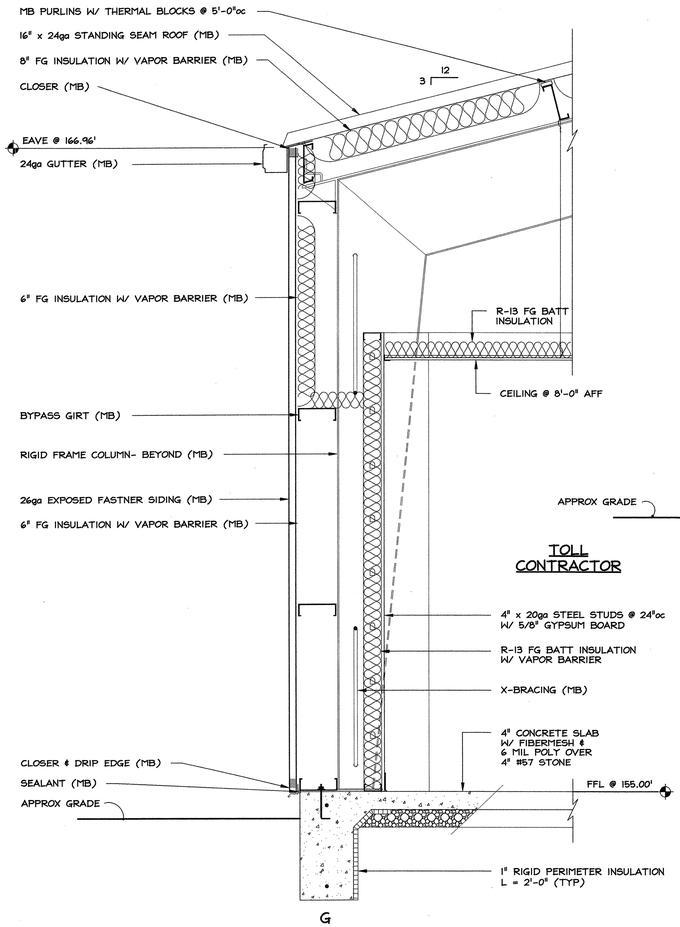
DETAIL

SCALE: 3/4ª = 1'-0ª — 1



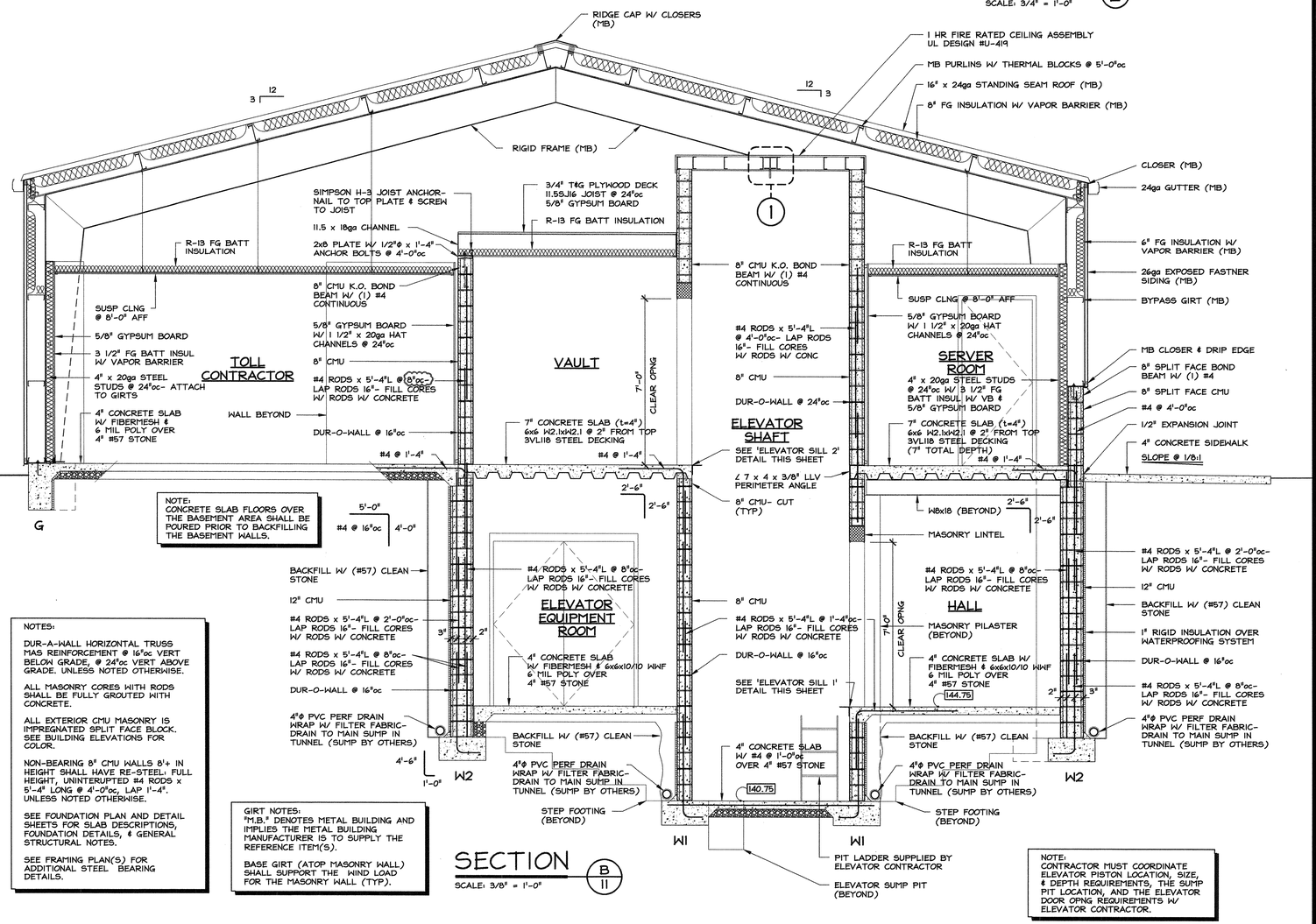
DETAIL

SCALE: 3/4ª = 1'-0ª — 2



SECTION

SCALE: 3/4ª = 1'-0ª — C/11



SECTION

SCALE: 3/8ª = 1'-0ª — B/11

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PHONE: 804-580-2227
FAX: 804-580-3334

REVISION:

NO.	DATE:	DESCRIPTION:
	12/11/06	ISSUED FOR CONSTRUCTION

PROPOSED BUILDING FOR:
RICHMOND METROPOLITAN AUTORITY

6234 POWHITE PARKWAY , CITY of RICHMOND , VIRGINIA

BUILDING SECTIONS

DRAWN BY: RANDY HOOKER — CHECKED BY: KFN — PROJECT NO: 06357

SCALE: 3/4ª = 1'-0ª — DATE: December 11, 2006

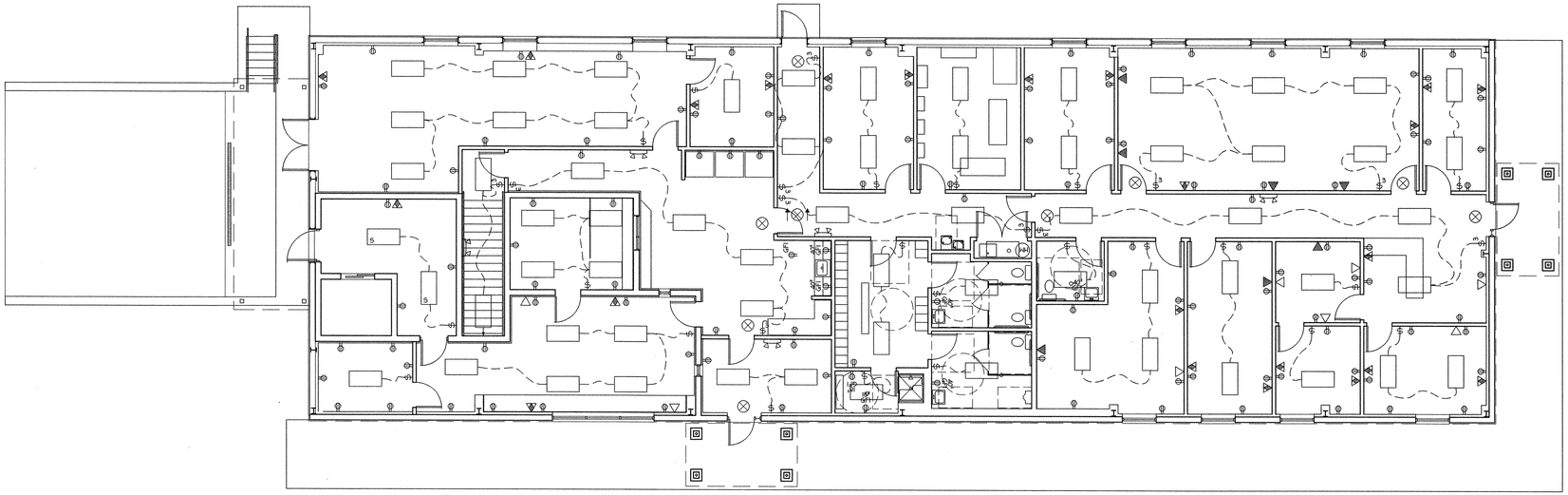
DRAWING NO: 11 of 16

ELECTRICAL SCHEDULE

MARK	DESCRIPTION
	EXIT LIGHT W/ DIRECTIONAL ARROW OPTION & BATTERY PACK
	EMERGENCY EGRESS LIGHT W/ BATTERY PACK
	2x4 LAY-IN FLUORESCENT 120V, W/ (4) 40 WATT TUBES W/ PRISMATIC LENS
S	2x4 SURFACE MTD FLUORESCENT 120V, W/ (4) 40 WATT TUBES W/ PRISMATIC LENS
S	SINGLE POLE SWITCH
S3	THREE-WAY SWITCH
	DUPLEX OUTLET, 120 VOLT
GFI	DUPLEX OUTLET, 120 VOLT W/ GROUND FAULT INTERUPT (GFI)
	TELE OUTLET, PROVIDE BOX AND PULL STRING
	DATA LINK OUTLET, PROVIDE BOX AND PULL STRING
	TELE / DATA LINK OUTLET, PROVIDE BOX AND PULL STRING
WH	ELECTRICAL WATER HEATER, 120V / 2000W ENERGY EFFICIENT TYPE
	WATER COOLER, ADA COMPLIANT, BI-LEVEL, 120 VOLT

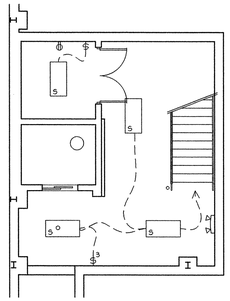
ELECTRICAL NOTES

1. THE ELECTRICAL WORK SHALL BE PER THE NATIONAL ELECTRICAL CODE AND ALSO CONFORM TO THE REQUIREMENTS OF THE LOCAL POWER COMPANY AND THE CITY OF RICHMOND, VIRGINIA.
2. THE ELECTRICAL CONTRACTOR SHALL DETERMINE THE ELECTRICAL SERVICE REQUIREMENTS AND VERIFY THE VOLTAGE AVAILABLE FOR THE ELECTRICAL SERVICE.
3. ALL MECHANICAL AND ELECTRICAL EQUIPMENT SHALL BE U.L. APPROVED.
4. THE ELECTRICAL CONTRACTOR SHALL FURNISH ANY AND ALL ACCESSORY MATERIAL AND LABOR AS REQUIRED TO INSURE THE PROPER OPERATION AND CODE COMPLIANCE OF ALL MECHANICAL AND ELECTRICAL EQUIPMENT.
5. THE CONTRACTOR SHALL SUPPLY AND INSTALL ALL POWER WIRING AND ASSOCIATED ITEMS (SWITCHES, STARTERS, FUSES, BREAKERS, PANEL BOXES, CUT-OFFS FOR THE PROPOSED MECHANICAL EQUIPMENT, I.E., HEATING, AIR CONDITIONING, FANS, LOUVERS, ETC. WHICH WILL BE SUPPLIED BY THE MECHANICAL CONTRACTOR. THE MECHANICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL LOW VOLTAGE CONTROL WIRING.
6. CONTRACTOR SHALL VERIFY EXACT LOCATION AND RATING OF EQUIPMENT TO BE INSTALLED AND ACCOMMODATE ELECTRICAL INTERFACES AS RECOMMENDED BY THE MANUFACTURER.
7. ALL WIRING SHALL HAVE COPPER CONDUCTORS. WIRE INSULATION RATING SHALL MATCH OR EXCEED EQUIPMENT RATING.
8. WHERE PERMITTED BY CODE AND AUTHORITY HAVING JURISDICTION, TYPE MC CABLE MAY BE USED.
9. DO NOT MIX RECEPTACLE CIRCUITS WITH LIGHTING CIRCUITS.
10. LABEL CIRCUITS ON PANELS AND JUNCTION BOX COVERS USING EMBOSSED OR PRINTED SELF-ADHESIVE TAPE.
11. PROVIDE FOR ANY ADDITIONAL EGRESS / EXIT LIGHTING AS REQUIRED BY THE FIRE MARSHALL'S OFFICE.
12. THE ELECTRICAL CONTRACTOR SHALL ROUGH-IN TELEPHONE / DATA COMMUNICATION BOXES WITH 3/4"ø CONDUIT AND SHALL EXTEND EMPTY CONDUIT 4" ABOVE THE CEILING. THE OWNER SHALL BE RESPONSIBLE FOR THE INSTALLATION OF THE PHONE / DATA COMMUNICATIONS SYSTEM.
13. ALL EGRESS LIGHTING (INCLUDING BATTERY PACKS) & EXTERIOR WALL PACK FIXTURES SHALL HAVE A 5-YR. (MIN.) WARRANTY.
14. PANEL BOXES, DISCONNECTS, ETC. SHALL BE SQUARE D OR G.E. BRAND OR EQUAL AS APPROVED BY ENGINEER.
15. ALL WIRING SHALL BE CONCEALED WHERE POSSIBLE.
16. ELECTRICAL OUTLETS IN THE TOILETS AND @ BREAK RM SINK COUNTER SHALL BE GFI DUPLEX OUTLETS. MOUNT OUTLETS ABOVE THE LAVATORIES / COUNTERS.
17. OWNER SHALL PAY ANY POWER COMPANY CHARGES FOR PERMANENT POWER.
18. CONTRACTOR TO MAKE ALL ARRANGEMENTS FOR ELECTRICAL SERVICE TO INCLUDE LOAD LETTER.
19. COORDINATE ALL WORK WITH THE MECHANICAL CONTRACTOR AND OTHER TRADES AS APPROPRIATE.



FIRST FLOOR ELECTRICAL LAYOUT PLAN

SCALE: 1/8" = 1'-0"



BASEMENT ELECTRICAL LAYOUT PLAN

SCALE: 1/8" = 1'-0"

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FAX: 804-580-3334

REVISION:

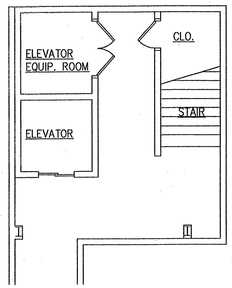
NO.	DATE:	DESCRIPTION:
	12/11/06	ISSUED FOR CONSTRUCTION

PROPOSED BUILDING FOR:
RICHMOND METROPOLITAN AUTORITY
6234 POWHITE PARKWAY . CITY of RICHMOND . VIRGINIA

ELECTRICAL LAYOUT PLAN

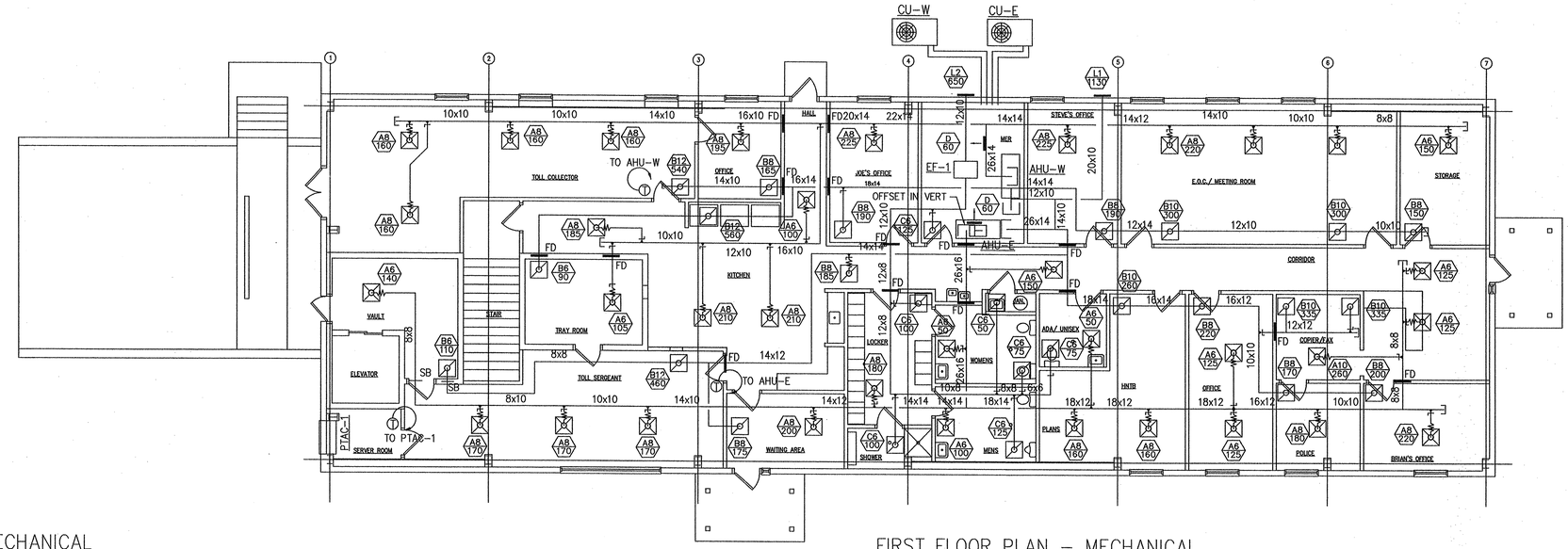
DRAWN BY: RANDY HOOKER | CHECKED BY: LTC
SCALE: 1/8" = 1'-0" | DATE: December 11, 2006 | PROJECT NO: 06357

DRAWING NO: 15 of 16



BASEMENT FLOOR PLAN – MECHANICAL

SCALE: 1/8" = 1'-0"



FIRST FLOOR PLAN – MECHANICAL

SCALE: 1/8" = 1'-0"

SPLIT SYSTEM AIR COOLED HEAT PUMP SCHEDULE

UNIT NUMBER	LOCATION AND AREAS SERVED	INDOOR UNIT: FAN DATA CFM	OA	EXTERNAL S.P. IN. H_2O	TOTAL S.P. IN. H_2O	MOTOR DATA HP	RPM	V	PH	HZ	DX COOLING COIL DATA NO. ROWS	FPI	NO. CKTS.	FACE AREA S. F.	EAT °F DB / LAT °F WB	SENS. MBH	TOTAL MBH	HEATING COIL DATA CFM	EAT °F / LAT °F	CAPACITY MBH	ELECTRIC COIL DATA V	PH	HZ	KW	SELECTION BASED ON MANUFACTURER	MODEL NUMBER	OUTDOOR CONDENSING UNIT: UNIT NUMBER	COMPRESSOR DATA NO.	INPUT KW EA.	V	PH	HZ	CONDENSER FAN DATA HP	CFM	V	PH	HZ	SELECTION BASED ON MANUFACTURER	MODEL NUMBER	REMARKS
AHU–E	EAST OFFICES	2915	650	0.75	2.00	2	1725	230	3	60	4	12	1	11.2	81 / 67	75.8	99.2	2915	59 / 78	61.5	230	3	60	35	AM STD	TWE120A3	CU–E	1	9.84	230	3	60	1	8200	230	1	60	AM STD	TWA120A3	
AHU–W	WEST OFFICES	2965	480	0.75	2.00	2	1725	230	3	60	4	12	1	11.2	80 / 60	76.7	95.9	2965	62 / 78	50.9	230	3	60	35	AM STD	TWE120A3	CU–W	1	9.84	230	3	60	1	8200	230	1	60	AM STD	TWA120A3	

PACKAGED AIR CONDITIONING UNIT SCHEDULE

UNIT NUMBER	LOCATION AND AREAS SERVED	COOLING COIL DATA CFM	OA	COOLING TOTAL BTU/HR	HEATING COIL DATA CFM	OA	HEATING CAPACITY BTU/HR	ELECTRIC COIL DATA V	PH	HZ	KW	FAN DATA CFM	MOTOR DATA WATTS	V	PH	HZ	SELECTION BASED ON MANUFACTURER	MODEL NUMBER	REMARKS
PTAC–1	SERVER ROOM	300	50	11,700	310	50	10,600	230	1	60	2.0	310	1114	230	1	60	MCQUAY	PSHA1012EZ	

AIR DISTRIBUTION DEVICE SCHEDULE

UNIT NUMBER	SERVICE	SHAPE	MATERIAL	FRAME	FINISH	ACCESSORIES	SELECTION BASED ON MANUFACTURER	MODEL NUMBER	REMARKS
A	SUPPLY	SQUARE	ALUMINUM	LAY IN	WHITE	OBD	TITUS	RAS	
B	RETURN	SQUARE	ALUMINUM	LAY IN	WHITE	OBD	TITUS	PAR	
C	EXHAUST	SQUARE	ALUMINUM	LAY IN	WHITE	OBD	TITUS	PAR	
D	SUPPLY	RECT	ALUMINUM	SURFACE	WHITE	OBD	TITUS	3FL	8x6
L1	O A INTAKE	RECT	ALUMINUM	SURFACE	WHITE	SB,BD,BS	RUSKIN	ELF211D	30x24
L2	EXHAUST	SQUARE	ALUMINUM	SURFACE	WHITE	SB,BD,BS	RUSKIN	ELF211D	18x18

GENERAL FAN SCHEDULE

UNIT NUMBER	LOCATION AND AREAS SERVED	TYPE	CFM	TOTAL S.P. IN. H_2O	FAN RPM	MOTOR DATA HP	RPM	V	PH	HZ	SELECTION BASED ON MANUFACTURER	MODEL NUMBER	REMARKS
EF–1	GENERAL EXHAUST	INLINE	650	1.00	UNIT	1/2	1330	115	1	60	PENNBARRY	Z102H	

MECHANICAL GENERAL NOTES

ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE APPLICABLE STATE AND LOCAL CODES.

THE ROUTING OF ALL DUCTWORK AND PIPING AS SHOWN ON THE DRAWING ARE DIAGRAMMATIC ONLY, INTENDING TO SHOW GENERAL RUNS AND LOCATIONS OF EQUIPMENT, DUCTWORK PIPING AND SPEACIALTIES. THE CONTRACTOR SHALL COORDINATE WORK WITH ALL OTHER TRADES.

NO DUCTWORK OR PIPING SHALL BE ROUTED OVER ELECTRIAL EQUIPMENT.

ALL DUCTWORK AND PIPING SHALL BE ROUTED CONCEALED IN WALLS OR ABOVE CEILING EXCEPT IN MECHANICAL EQUIPMENT ROOM WHERE EXPOSED WORK IS ACCEPTABLE.

ALL DUCTWORK SHALL BE CONSTRUCTED AND INSTALLED PER SMACNA.

SUPPLY DUCTWORK SHALL BE LINED, GALVANIZED SHEET METAL WITH INSULATED FLEXIBLE BRANCH DUCTWORK NOT TO EXCEED 10'–0" IN LENGTH.

RETURN AIR AND OUTSIDE AIR DUCTWORK SHALL BE LINED, GALVANIZED SHEET METAL.

EXHAUST DUCTWORK SHALL BE GALVANIZED SHEET METAL. EXHAUST DUCTWORK FROM THE SHOWER ROOM SHALL BE ALUMINUM UNTIL IT CONNECTS TO THE MAIN DUCT.

PROVIDE FIRE DAMPERS AND ACCESS DOORS AS SHOWN.

PROVIDE SECURITY BARS AT ALL VAULT WALL PENETRATIONS.

PROVIDE ELECTRICAL DISCONNECTS FOR ALL MECHANICAL EQUIPMENT.

PROVIDE TYPE L COPPER REFRIGERANT LINES AS SIZED BY THE EQUIPMENT MANUFACTURER.

PROVIDE CONDENSATE TRAPS AND DRAINS TO NEAREST FLOOR DRAIN AND TERMINATE WITH AN AIR GAP.

MECHANICAL SYMBOLS

SYMBOL	DESCRIPTION
A / #	NEW DIFFUSER DESIGNATION (TOP – TYPE/NECK DIAMETER , BOTTOM – CFM)
	NEW EQUIPMENT
	NEW DUCT
	NEW SUPPLY DIFFUSER
	NEW R/A OR EXHAUST GRILLE
	FLEXIBLE DUCT
T	THERMOSTAT
	SPIN–IN TAP WITH VOLUME DAMPER
	SPIN–IN TAP W/O VOLUME DAMPER
	MANUAL VOLUME DAMPER
RL	REFRIGERANT LIQUID PIPE
RG	REFRIGERANT GAS PIPE

MECHANICAL ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR
BD	BACKDRAFT DAMPER
BS	BIRD SCREEN
CU	CONDENSING UNIT
EF	EXHAUST FAN
OBD	OPPOSED BLADE DAMPER
RA	RETURN AIR
SA	SUPPLY AIR
SB	SECURITY BARS
FD	FIRE DAMPER WITH ACCESS DOOR

PROJ. NO.: CJ600007F
PROJ. MGR.: CS
DESIGNED BY: CLM
DRAWN BY: EFM
CHECKED BY: CS
DATE: 11–30–06

REVISIONS

DRAWING TITLE
FLOOR PLANS, LEGEND, NOTES AND SCHEDULES – MECHANICAL

PROJECT
PROPOSED BUILDING FOR:
RICHMOND METROPOLITAN AUTHORITY

SOUTHWORTH MECHANICAL CORPORATION
2200 Cedar Lane
Richmond, Virginia 23223
804 – 222 – 4066

SHEET NO.
M–1
1 OF 1

FOREST HILL AVENUE RAMPS

TOLL PLAZA ORIGINAL PLANS

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	86	188

Match Line See Sheet No 88

57+78.22 Reloc. F.H. Ave. Beg. F.H. Ave. Pvmt. Sec.
10+93.46 Ramp E-F End Ramp Pvmt. Sec.

Guard Rail Std GR-2B

Std. CG-6

4" PCC Sidewalk

Curb Std CG-2

See Detail "A"

Mountable curb

133.42

TOLL PLAZA

RAMP EAST - FOREST HILL

Asphalt Parking For Toll Attendant

Guard Rail Std. GR-2B

19+28.04 Spur E-F
16+31.80 Ramp E-F

19+28.25 Spur "E-F"
56+22.18 Reloc. F.H. Ave.

See Detail "B"

+72.66

+47.66

SPUR "E-F"

End Spur Pvmt Sec.

See Detail "B"

See Detail "A"

See Detail "B"

RELOC. SOUTHERN RAILWAY

+17.92

12+34.13 Ramp "F-E"
97+65.37 ℄ Powh. Pkwy.

Guard Rail Std GR-2B

Mountable Curb

5'-8" To (Typ) Face Rail

Raised Grass Med, Std MS-2D Mod

WESTBOUND ROADWAY

EASTBOUND ROADWAY

Std. MB-3B

Mountable Curb

Guard Rail Std. GR-2B

Std. MB-3B (Typ)

Match Line See Sheet No 82

Std. GR-2A or GR-2B

Std. CG-2

Std. GR-5

72+04.25 Ramp "F-E"
98+39.44 ℄ Pow. Pkwy.

+55.01

Guard Rail Std.

Guard Rail GR-2B

Mountable Curb

RAMP FOREST HILL IS EAST

Guard Rail Std. GR-2B

Curb Std. CG-2

Asphalt Parking For Toll Attendant

Guard Rail Std. GR-2B

See Detail "B"

SPUR "F-E"

Std. GR-2

Std. GR-5

12+41.24 Ramp "F-E"
12+33.91 Spur F-E

10+58.33 Ramp "F-E"
90+08.26 Reloc. F.H. Ave.

Mountable Curb

Break Line

24" PCC Sidewalk

RELOC. FOREST HILL AVENUE

Std. MS-1G

Std. CG-G

For details see sheet 87

FAIRLEE ROAD

Std. MS-1G (Std. CG-G)

Std. CG-G 4" PCC Sidewalk

℄ Reloc. Southern Railway.

End R.R. Relocation @ Sta. 27+50.28

Match Line See Sheet No 87

BEGIN RAMP "F-E" PAVEMENT SECTION

END FOREST HILL AVE PAVEMENT SECTION

TOLL PLAZA

AS BUILT

NOTE For Legend see sheet 7
For Profile see sheet 82-22, 97, 109
For Grading and Drainage see sheet 84

0 50 100 SCALE

	BY	DATE	NO.	REVISION	BY	DATE
MADE	KDP/K GB	2/68 6/70				
CHECKED	RWG	6/70		AS BUILT	RWR	10-73
IN CHARGE	J.P.F.					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

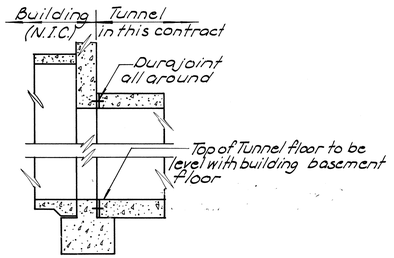
PAVEMENT PLAN
STA. 93+00 TO STA. 107+00

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

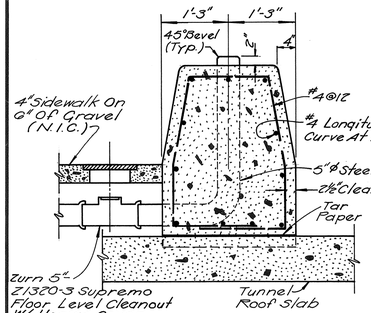
SCALE: 1"=50'
CONTRACT NO.: C-2
SHEET NO. 86 OF 188

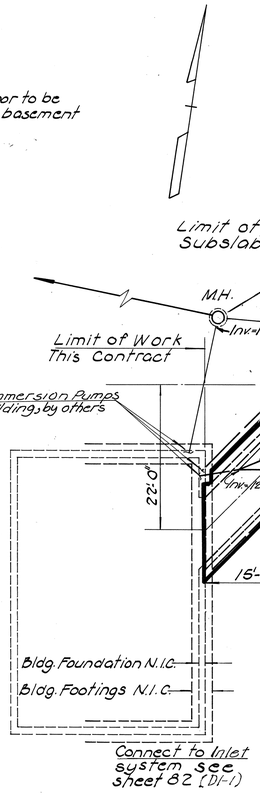
93+ 107

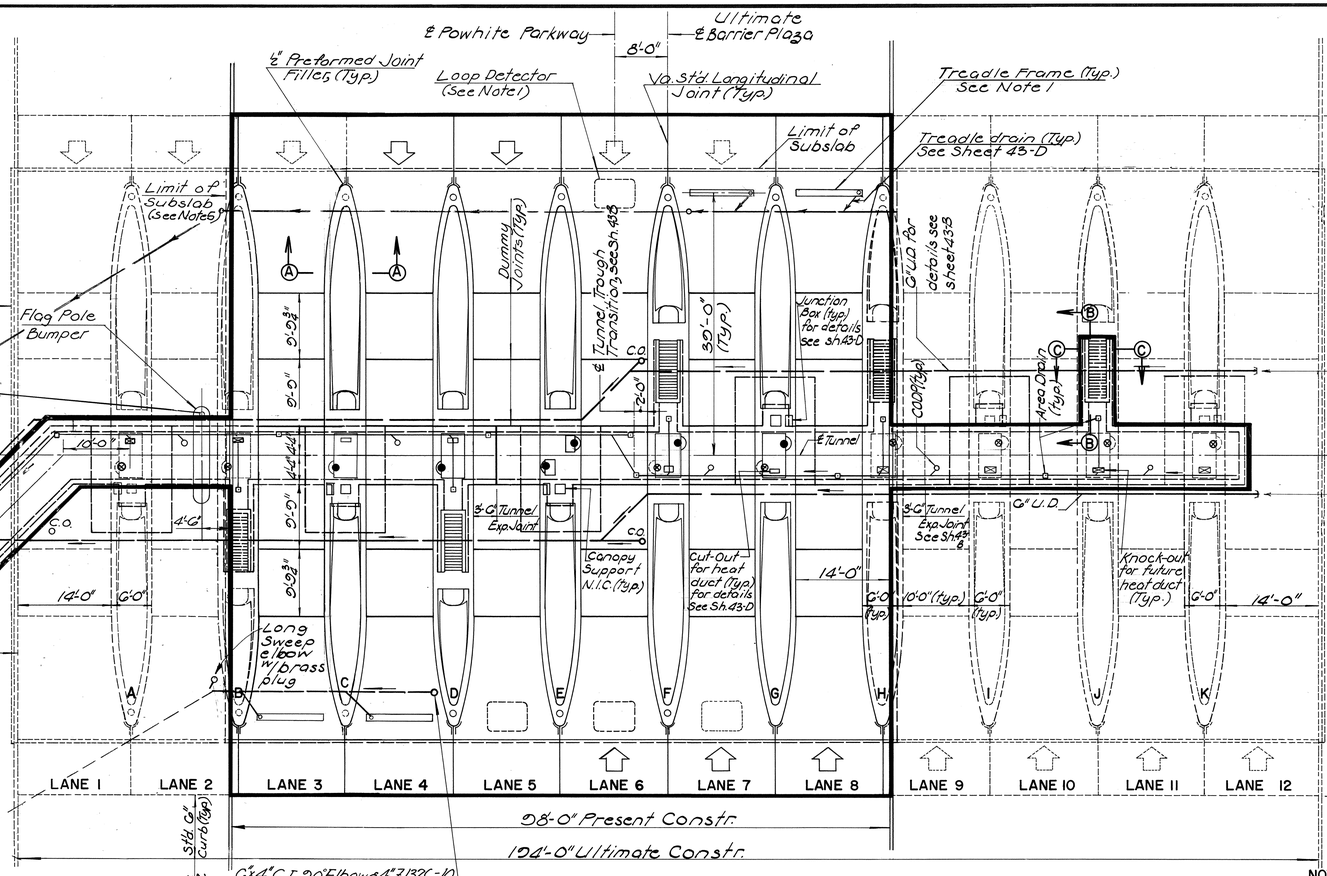
RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	43	188



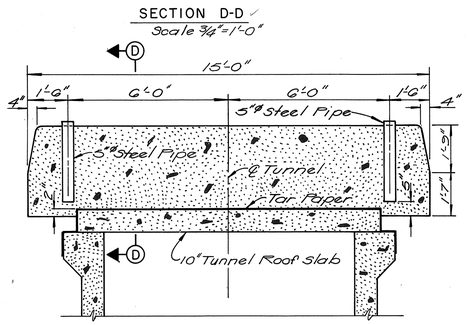
SECTION E-E
not to scale





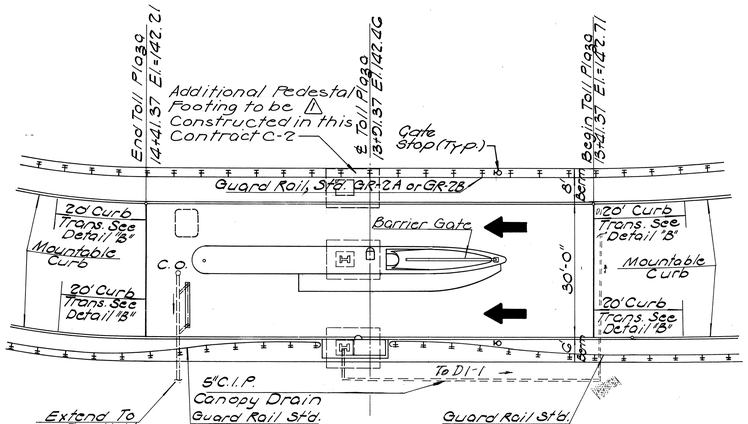


SECTION D-D
Scale ¾"=1'-0"

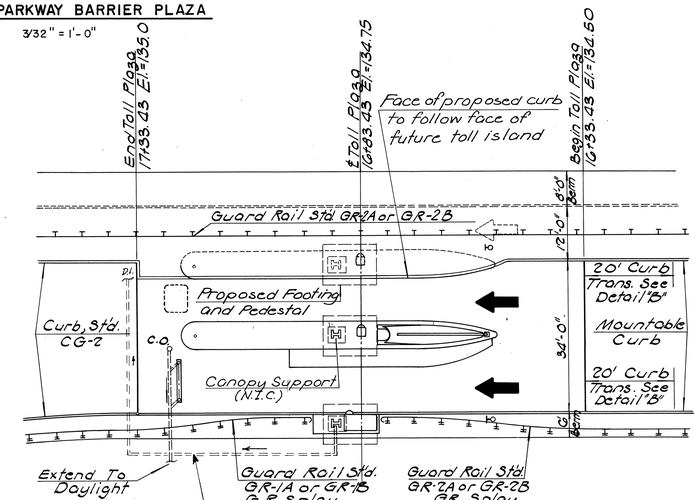


LONGITUDINAL SECTION THRU
FLAG POLE BUMPER
Scale ⅜"=1'-0"

PLAN
POWHITE PARKWAY BARRIER PLAZA
3/32" = 1'-0"



RAMP FOREST HILL – EAST
1/16" = 1'-0"



RAMP EAST - FOREST HILL
1/16" = 1'-0"

NOTES:

1) To be placed by Toll Equipment Contractor prior to the paving, under this Contract.
2) Tunnel drainage trough to begin at the building foundation.
3) C.O.D.P. = Clean out Drain Pipe.
4) Sections A-A, B-B and C-C appear on sheet 43-B.
5) Place ⅝" ϕ Longitudinal hook bolts for future widening.

LEGEND:

- ○ Location of future traffic signal.
- ○ Traffic signal, (N.I.C.)
- Automatic Toll Machine, (N.I.C.)
- Future Automatic Toll Machine
- Toll Booth, (N.I.C.)
- ● Prop. Coin Tubes
- ⊗ Future Coin Tubes

AS BUILT

	BY	DATE	NO.	REVISION	BY	DATE
MADE	GP	8/70	2	As Built	JRC	6.73
CHECKED	RWG		1	Rev. per Addendum 5 Amendment 2, Adopt Floating Pedestal	PHT GP	2/22/71
IN CHARGE	JPF					

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

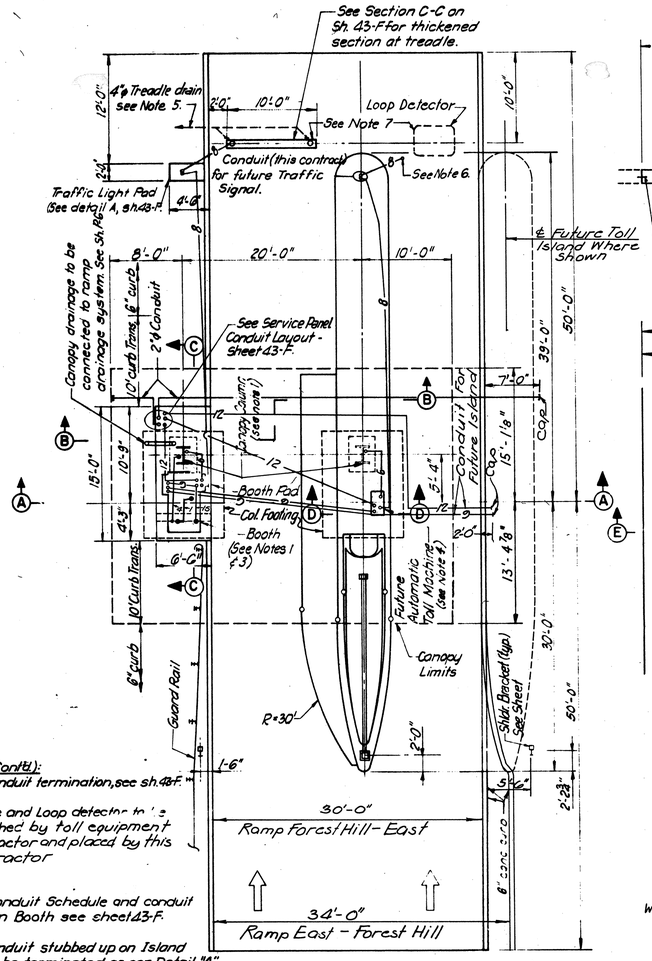
MAINLINE & RAMP

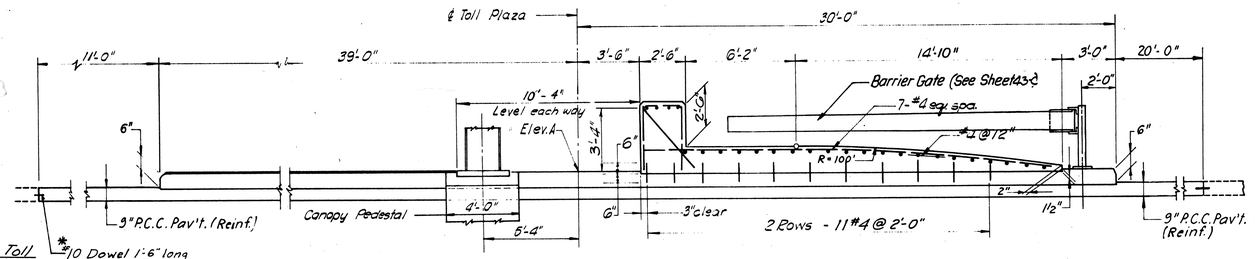
TOLL PLAZA PLANS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

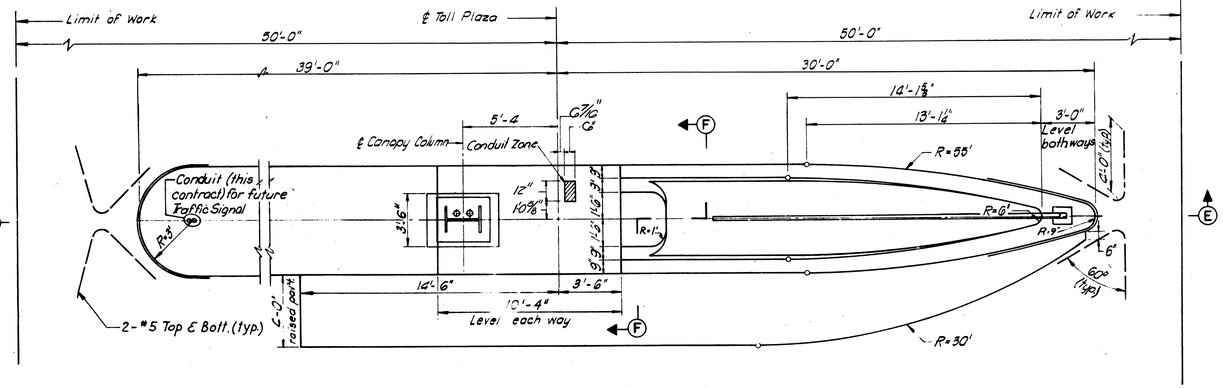
SCALE: As Noted
CONTRACT NO.: C-2
SHEET NO. 43 OF 188

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
2	POWHITE PARKWAY	43-E	188

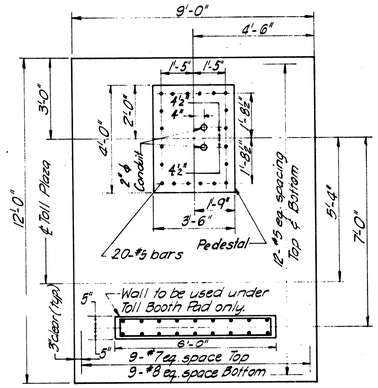




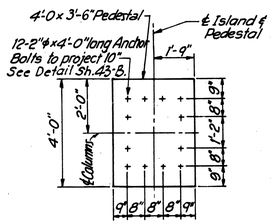
SECTION E-E
1" = 1'-0"



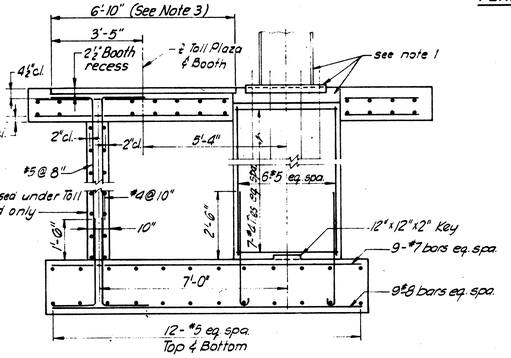
PLAN OF ISLAND
1/4" = 1'-0"



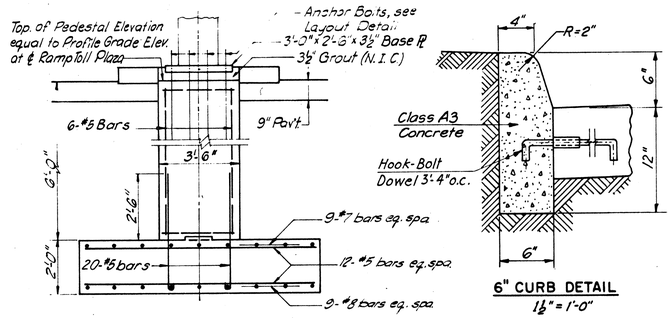
TYPICAL FOOTING PLAN
3/8" = 1'-0"



ANCHOR BOLT LAYOUT
3/8" = 1'-0"

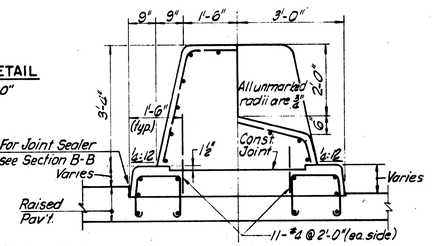


SECTION C-C
3/8" = 1'-0"



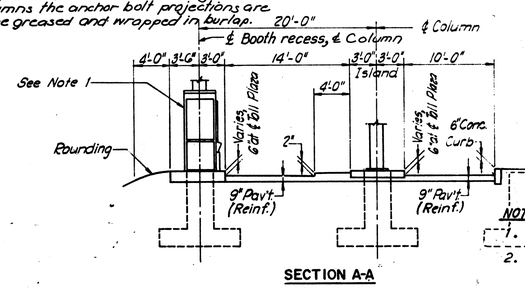
SECTION D-D
3/8" = 1'-0"

6" CURB DETAIL
1½" = 1'-0"

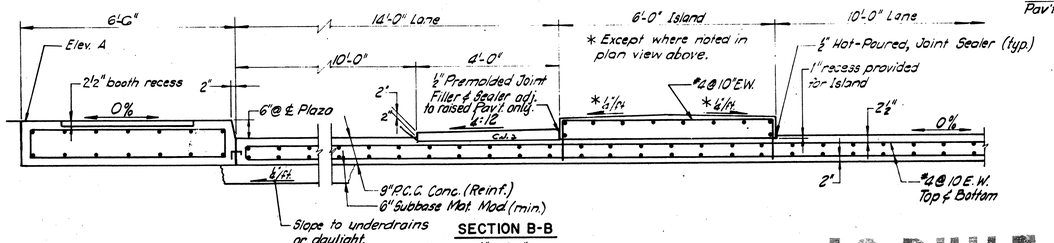


SECTION F-F
½" = 1'-0"

PLAN
1/8" = 1'-0"



SECTION A-A
1/8" = 1'-0"



SECTION B-B
1/2" = 1'-0"

NOTES(Cont'd):

6. For conduit termination, see sh. 48-F.

7. Treadle and Loop detector to be furnished by toll equipment contractor and placed by this contractor

8. For Conduit Schedule and conduit zone in Booth see sheet 43-F.

9. All conduit stubbed up on Island are to be terminated as per Detail "A", all other conduit to be stubbed as per Detail "B" on sheet 43-F.

10. For pedestals which are to carry future columns the anchor bolt projections are to be greased and wrapped in burlap.

NOTES

1. Item not in this Contract.
2. Elev. A equals Profile Grade elevation at the ℄ Ramp Toll Plaza, plus six (6) inches.
3. Anchor bolt locations and booth recess dimensions the same as those on "Plan of Island with stairway" and details, Sh. 43-A.
4. Automatic toll machine to be cinch anchored into place. Item and installation not in this Contract.
5. Treadle drain to be connected to the area drainage system. Direction shown to be verified in the field. For treadle details, see Sh. 48-D.

	BY	DATE	NO.	REVISION	BY	DATE
MADE	W. J. W.	5-68	3	As Built	JRC	6-73
CHECKED	D.E.N.	5-68	2	Rev. for ATS Mach. P.H.T.		7-1671
IN CHARGE	H.D.S.		1	Final Check	D.E.N.	6-68

AS BUILT

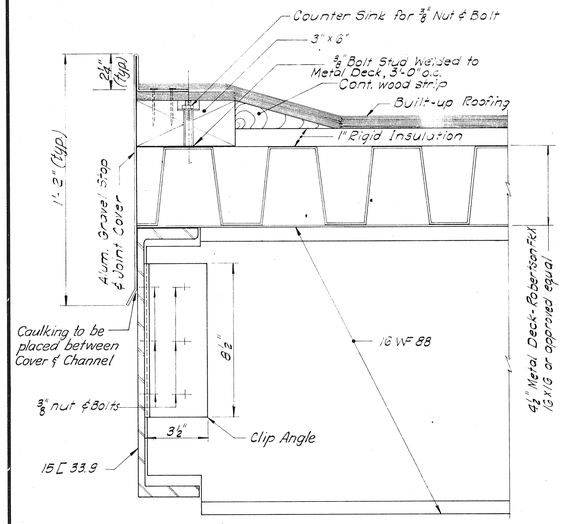
RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

PLAN AND DETAILS
TWO LANE RAMP TOLL PLAZA

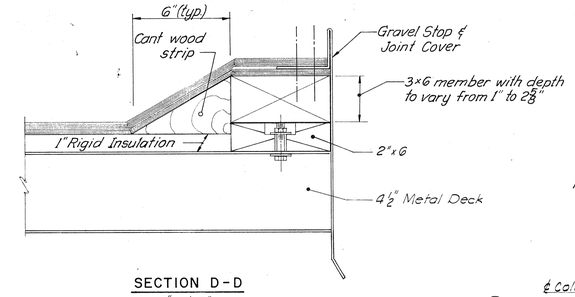
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS NOTED
CONTRACT NO.: C-2
SHEET NO. 43-E OF 188

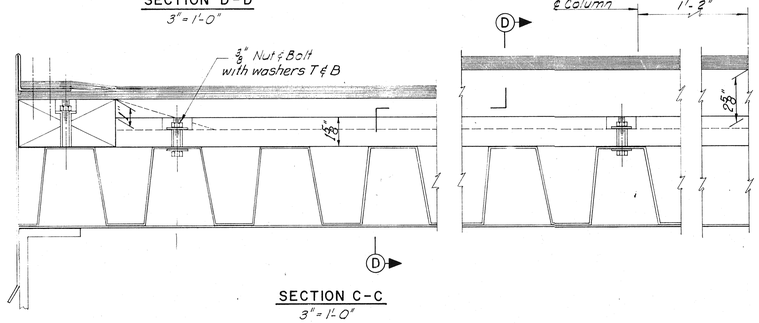
RICHMOND EXPRESSWAY SYSTEM			
SECTION		SHEET NO.	TOTAL SHEETS
TF-2	TOLL FACILITIES	24	26



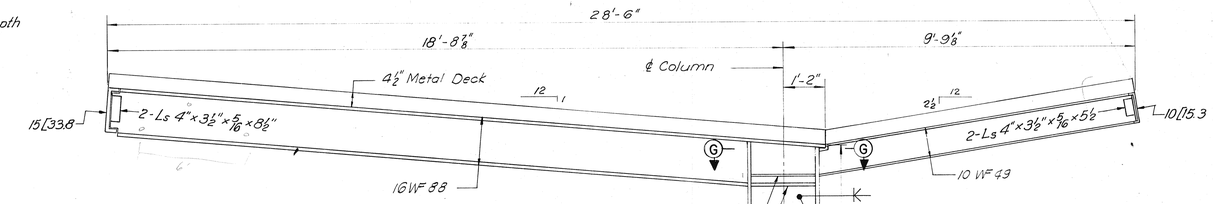
SECTION B-B
3"=1'-0"

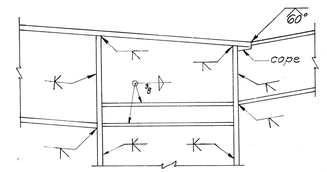


SECTION D-D
3"=1'-0"

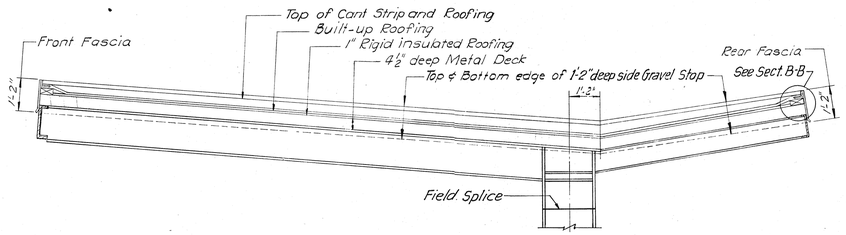


SECTION C-C
3"=1'-0"

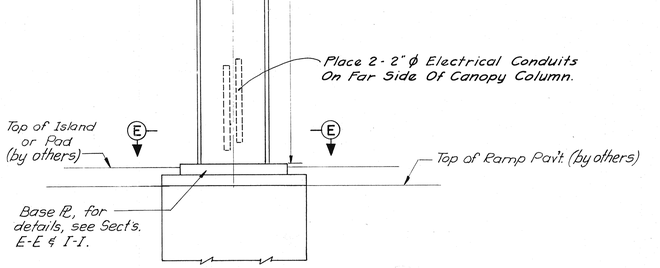




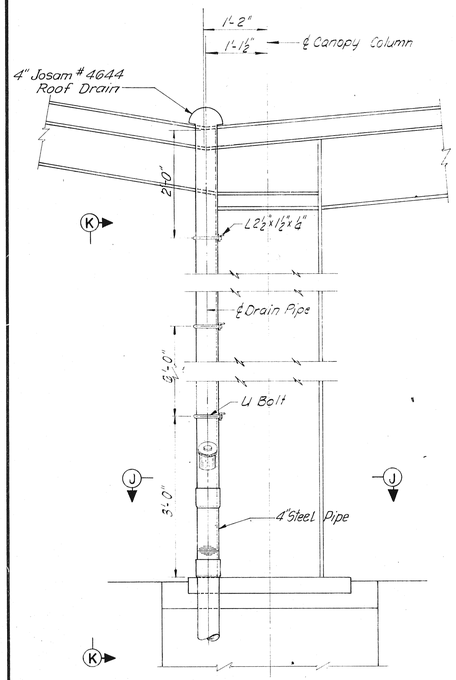
SECTION H-H
1" = 1'-0"



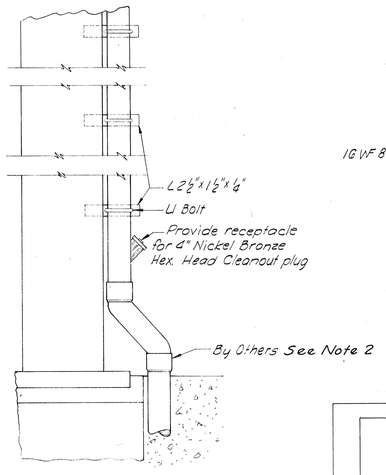
SECTION F-F
⅜"=1'-0"



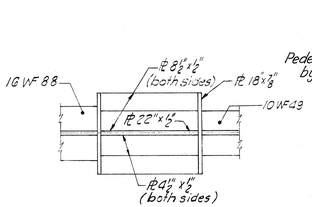
VIEW A-A
½"=1'-0"



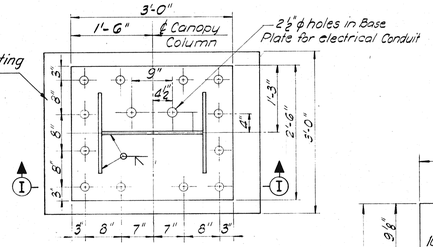
CANOPY DRAIN END VIEW
¾"=1'-0"



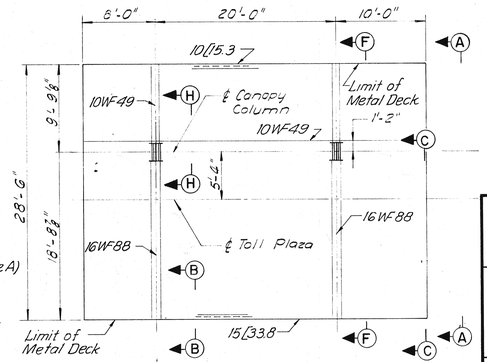
VIEW K-K
¾"=1'-0"



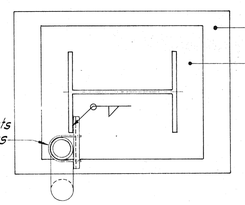
SECTION G-G
¾"=1'-0"



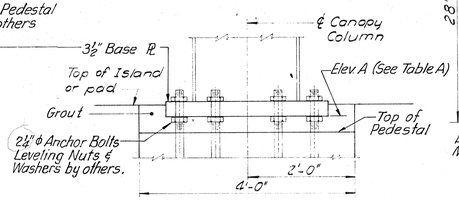
SECTION E-E
¾"=1'-0"



CANOPY PLAN VIEW
⅛"=1'-0"



SECTION J-J
¾"=1'-0"



SECTION I-I
¾"=1'-0"

Notes:
1. ℄ PS to be located at the same elevation as the ℄ bottom flange of beam.
2. If Storm Drainage System is not provided by others, contractor is to provide "L" and concrete splash block so that surface run off will divert towards sodded embankment.

	BY	DATE
MADE	R.B.M.	7-31-71
CHECKED	K.L.	7-31-71
IN CHARGE	J.P.F.	

NO.	REVISION	BY	DATE

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

TWO LANE RAMP
CANOPY FRAMING

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
consulting engineers
NEW YORK ALEXANDRIA KANSAS CITY

SCALE: AS SHOWN
CONTRACT NO.: TF-2
SHEET NO. 13 b OF 15

FOREST HILL AVENUE RAMPS

WIDENING OF RAMP FROM S.B. POWHITE PARKWAY TO FOREST HILL AVENUE

ORIGINAL PLANS FOR CONSTRUCTION OF RAMP FROM E.B. FOREST HILL AVENUE TO N.B. POWHITE PARKWAY

RICHMOND EXPRESSWAY SYSTEM			
SECTION	PROJECT	SHEET NO.	TOTAL SHEETS
12	POWHITE PARKWAY	8	

GEOMETRIC TABLE

NO.	STATION	OFFSET	NO.	STATION	OFFSET
1	PC 95+94.13		13	POC 13+38.87	30.01' Lt.
2	Nose 97+13.74	46.25' Rt.	14	PT 15+15.78	
3	PCC 98+79.09		15	POT 15+65.78	4.00' Lt.
4	PCC 98+27.43	38.25' Rt.	16	POT 16+65.78	4.00' Lt.
5	PCC 98+79.09	57.25' Rt.	17	PC 17+00.78	
6	P.I., N.C. 19+83.00	20.00' Lt.	18	PT 17+94.45	
7	PC 20+42.99	18.78' Lt.	19	PC 18+22.58	25.06' Lt.
8	Nose 20+83.01	19.34' Lt.	20	PCC 102+77.91	
9	PCC 21+52.34		21	103+97.88	59.12' Rt.
10	PC 11+95.07	40.40' Rt.	22	105+00.00	62.57' Rt.
11	POC 12+52.95	22.00' Lt.	23	PT 105+62.94	
12	PCC 13+40.22				

Energy Absorption System, Inc.
Model No. 20620652 Great or Equal

Legend:
1. Hi-Dri Cartridge
2. Diaphragm
3. Thrie Beam Fender Panel
4. Nose Cover
5. Stabilizing Chain

Outline of Concrete Pad

Cold Plane Existing Pavement 1"± Avg. Depth. Taper From 0" To 1½" Depth In 50' At Each End.

6" Min. Reinforced Portland Cement Concrete Pad

DETAIL A

Two rows of guardrail with fixed object attachments to MB-7A both sides of Pier

Adjust Top of Manhole to Meet Proposed Grading

Remove Exist. Concrete Raised Median Strip, Repair the area, & Pour & Reshape the Nose

POWHITE CREEK Retaining Wall No.1 95+55 to 99+00

Std. MB-7C

WESTBOUND ROADWAY

Begin Taper

End Taper

Std. MB-7B

EASTBOUND ROADWAY

MB-7A Median Wall

50:1 Taper

End Taper

Begin Taper

Std. MB-7A

Std. GR-2

Adjust Top of Manhole to Meet Proposed Grading

PC 20+67.00 End Exist. Curb, Begin Pavement Overlay

PCC 21+98.89 End Ramp FE 98+35.97, 49.25' Lt. ℄ Powhite Parkway

1" Ø Water Line to Restroom Facility

Retaining Wall No.2

Limit of Const.

Std. GR-2

Std. CG-3 Std. CG-6 Thru Toll Plaza

Toe of Slope

End Exist. & Prop. Retaining Wall

Prop. Concrete Gravity Retaining Wall No.4 See Detail C This Sheet

RAMP E-F

Adjust Top of Manhole to Meet Proposed Grading

End Existing Curb, Begin Pavement Overlay

See Sheet 11 of 101 for Transition Details

℄ Powhite Parkway

Curb Opening L=4'

Std. CG-3

PG-2A (D=2')

Railroad Crossing Extension See Detail on Sheet 16.

Begin Standard Paved Ditch (PG-2A) Ramp SE Sta. 15+00 44'± Rt. Match Existing Ditch Flowline. (D=2')

RAMP S-E

℄ MB-7C

Adjust Top of Manhole to Meet Proposed Grading

Retaining Wall No.2

Match Line, See Sheet 9

Match Line, See Sheet 7

RAMP F-E

FOREST HILL AVENUE

Begin Ramp SE Sta. 10+00.00 = Forest Hill Ave. Sta. 50+05.07

Std. CG-3

DETAIL A
See This Sheet

DETAIL B
See This Sheet

Std. 6" Curb CG-7, CG-2 Or 6" Concrete | 10' Transition | Std. 4" Curb CG-3

DETAIL B
4" TO 6" CURB TRANSITION

2:1

2' Min.

6"

#4 bars

.G.H.

Concrete Gravity Retaining Wall

Existing Powhite Creek Culvert South Headwall

DETAIL C
RETAINING WALL NO.4 RAMP EF

AS BUILT

	By	Date
Designed	TJC	3/87
Drawn	JLT	3/87
Checked	RLV	3/87
Approved	DJA	3/87

No.	Revision	By	Date
	As Built	TEM	3-89
5	Drainage Revisions	RLV	9/87
4	Inlet	RLV	7/87
3	Water Service	RLV	7/87
2	Elimination of Retaining Wall	RLV	5/27/87
1	Addendum No. 1	RLV	4/87

RICHMOND METROPOLITAN AUTHORITY
RICHMOND EXPRESSWAY SYSTEM
POWHITE PARKWAY

PAVING, GRADING & DRAINAGE PLAN
Sta. 93+00 to Sta. 107+00

HOWARD NEEDLES TAMMEN & BERGENDOFF
Architects Engineers Planners
ALEXANDRIA, VA.

HNTB

Scale	Date	Contract No.	Sheet
1" = 50'	MARCH 1987	C-12	8 of