TEXAS TURNPIKE AUTHORITY

CONTRACT No. DNT-260

MECHANICAL, ELECTRICAL AND PLUMBING PLANS

SECTION X III
VOLUME III

ADDISON AIRPORT TUNNEL

Index of Drawings

Standard Drawings

DNT Dwg. No.	Description of Standard
	VOLUME I
2	CURB AND GUTTER INLET - TYPE I (2 SHEETS)
5	INLET DETAILS - TYPE F
6	INLET DETAILS - TYPE G
8	MANHOLE DETAILS - TYPE I AND TYPE II
10	TOLLWAY PAVEMENT DETAILS (2 SHEETS)
11	MISCELLANEOUS DETAILS - TOLLWAY
12	MISCELLANEOUS PAVING DETAILS (3 SHEETS)
13	MISCELLANEOUS DRAINAGE DETAILS
14	METAL BEAM GUARD FENCE (2 SHEETS)
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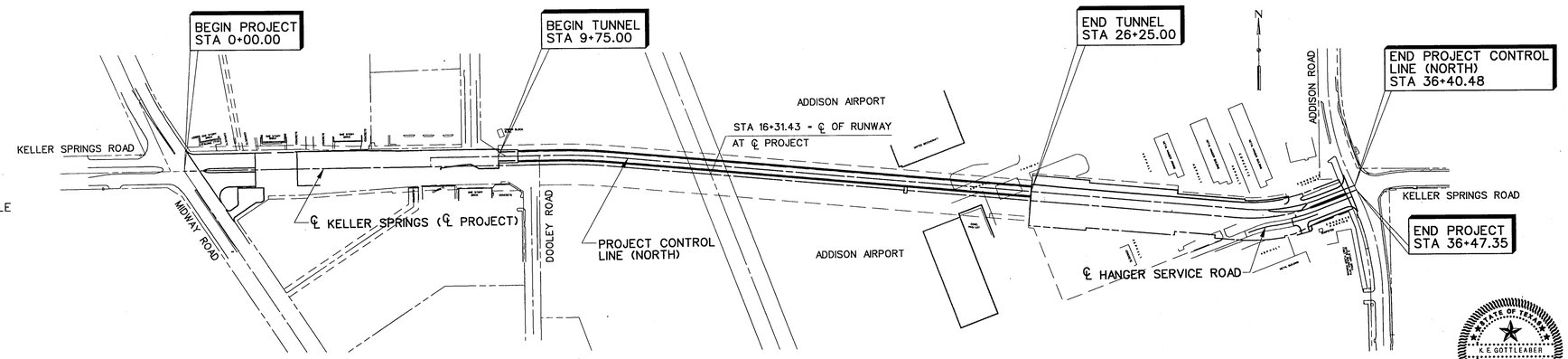
31	METAL BEAM GUARD FENCE FIXED OBJECT ATTACHMENT
95	TECHWALL STANDARD DETAILS (2 SHEETS)

TxDOT Dwg. No.	
CPCR(1)-94	CONCRETE PAVEMENT DETAILS CONTINUOUSLY REINFORCED.
CH-II	CONCRETE HEADWALLS FOR PIPE CULVERTS 12"-72" DIA.
CH-II-B-30 DEG.	CONCRETE HEADWALLS FOR PIPE CULVERTS 12"-72" DIA.
CH-II-B-45 DEG.	CONCRETE HEADWALLS FOR PIPE CULVERTS 12"-72" DIA.
MC5-I	MULTIPLE BOX CULVERTS SIZES 5'x2', 5'x3', 5'x4', 5'x5' DIRECT TRAFFIC TO 4'-0" FILL



PROJECT LAYOUT
SCALE: 1" = 200'

FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS
K.E. GOTTLEABER
61759
REGISTERED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY K. E. GOTTLEABER, P.E. 61759 ON SEPTEMBER 9, 1996.

Prepared by:
HDR ENGINEERING, INC.
William R. Hegood, P.E.
Design Engineer
Date: January 10, 1997

Recommended by:
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Consulting Engineer
Date: 01/10/97

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R. Wayne Simms P.E.
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Date: 1/10/97

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TOWN OF ADDISON
City Manager
Date:

Approved by:
COUNTY OF DALLAS, TEXAS
Director of Public Works
Date:

Recommended by:
TEXAS TURNPIKE AUTHORITY
Director of Engineering
Date:

Approved by:
TEXAS TURNPIKE AUTHORITY
James H. Christian
Executive Director
Date: Jan. 6, 1997

FILE: p:\addtunn\adtuge03.dgn
DATE: 6-Jan-97 11:33

FF-11

MECHANICAL SYMBOLS

NOT ALL SYMBOLS ARE NECESSARILY USED ON THIS PROJECT

(A)	AIR DEVICE DESIGNATION	12x12	DUCT (SIZE IN INCHES, FIRST FIG. SIDE SHOWN)
(T)	THERMOSTAT		90 DEGREE RECTANGULAR ELBOW UP
	PIPE CAP OR BLIND FLANGE		90 DEGREE RECTANGULAR ELBOW DOWN
	RISER DOWN (ELBOW)		DUCT SECTION - SUPPLY
	RISER UP (ELBOW)	— CD —	CONDENSATE DRAIN LINE
(R)	INDICATING LIGHT (R=RED: Y=YELLOW: G=GREEN)		POINT OF CONNECTION - NEW TO EXISTING
— F —	FIRE LINE		FLOW DIRECTION
— PD —	PUMP DISCHARGE LINE		DUCT SECTION - EXHAUST, RETURN, OUTSIDE OR RELIEF
— D —	DRAIN LINE	[S]	CARBON MONIXIDE SENSOR
	FIRE HOSE VALVE		ROADWAY DRAIN

ABBREVIATIONS AND SERVICE DESIGNATIONS

AC	ABOVE CEILING
ACFM	ACTUAL CUBIC FEET PER MINUTE
AD	AIR DRYER
AMB	AMBIENT
AMP	AMPERE
ARCH	ARCHITECTURE
ASR	AUTOMATIC SPRINKLER RISER
AUX	AUXILIARY
AVG	AVERAGE
AFF	ABOVE FINISHED FLOOR
BE	BOTTOM ELEVATION
BF	BELOW FLOOR, BOILER FEEDWATER
BFC	BELOW FINISHED CEILING
BFF	BELOW FINISHED FLOOR
BG	BELOW GRADE
BLDG	BUILDING
BOD	BOTTOM OF DUCT
BOP	BOTTOM OF PIPE
BOT	BOTTOM
BTUH	BRITISH THERMAL UNITS PER HOUR
BYP	BYPASS
C/B	CIRCUIT BREAKER
CAP	CAPICITY
CFH	CUBIC FEET PER HOUR
CFM	CUBIC FEET PER MINUTE
CIP	CAST IRON PIPE
CKT	CIRCUIT
CL	CENTER LINE
CLG	CEILING
CO	CLEAN OUT
COL	COLUMN
COND'S	CONDITIONS
CONN	CONNECTION
CU	CONDENSING UNIT
DET	DETAIL
DF	DRINKING FOUNTAIN
DIA	DIAMETER
DISCH	DISCHARGE
DN	DOWN
DWG	DRAWING
DS	DOWNSPOUT (STORM SEWER)
D	DRAIN
E	EXISTING
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EDH	ELECTRIC DUCT HEATER
EF	EXHAUST FAN
EFF	EFFICIENCY
ELEC	ELECTRICAL
EP	EXPLOSION PROOF
ENT	ENTERING
EUH	ELECTRIC UNIT HEATER
EXP	EXPANSION
EXT	EXTERNAL
ELEV	ELEVATION
EWC	ELECTRICAL WATER COOLER
FCU	FAN COIL UNIT
F	FAHRENHEIT
FCO	FLOOR CLEANOUT
FD	FIRE DAMPER
FD-1	FLOOR DRAIN, TYPE 1
FDC	FIRE DEPARTMENT CONNECTION
FEXT	FIRE EXTINGUISHER
FLEX	FLEXIBLE
FPB	FAN POWER BOX
FPI	FINS PER INCH
FPM	FEET PER MINUTE
FPS	FEET PER SECOND
FT	FOOT, FEET
FT2	SQUARE FEET
FLA	FULL LOAD AMPERES
FS	FREEZE STAT
FEC	FIRE EXTINGUISHER CABINET
G	GAS LOW PRESSURE
GA	GAGE
GAL	GALLON
GCO	GRADE CLEANOUT
GPM	GALLONS PER MINUTE
GPH	GALLONS PER HOUR
HAD	HEAT ACTUATING DEVICE
HD	HUB DRAIN
HGT	HEIGHT
HORI	HORIZONTAL
HP	HORSEPOWER
HZ	HERTZ
IE	INVERT ELEVATION
IN	INCH
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
LG	LENGTH
LVG	LEAVING
MAN	MANUAL
MAX	MAXIMUM
MECH	MECH
MIN	MINIMUM, MINUTE
MVD	MANUAL VOLUME DAMPER
NO	NORMALLY OPEN, NUMBER
NTS	NOT TO SCALE
NC	NORMALLY CLOSED, NOISE CRITERIA
OA	OUTSIDE AIR
OBD	OPPOSED BLADE DAMPER
OD	OVERFLOW DRAIN
PC	PUMPED CONDENSATE
PH	PHASE
3PH	THREE PHASE
PL	PLACES
PRESS	PRESSURE
PRV	PRESSURE REDUCING VALVE
PSI	POUNDS PER SQUARE INCH
PW	POTABLE (DOMESTIC) WATER
R	RETURN, RED
RA	RETURN AIR
RD	ROOF DRAIN
RECIRC.	RECIRCULATING
RH	RELATIVE HUMIDITY
RM	ROOM
RPM	REVOLUTIONS PER MINUTE
RRT	REMOTE RESET THERMOSTAT
RT	RAINTIGHT
RTU	ROOF TOP UNIT
S	SUPPLY
SS	SANITARY SEWER
SC	SCALE
SD	STORM SEWER
SECT	SECTION
SENS	SENSIBLE
SF	SUPPLY FAN
SOL	SOLENOID
SP	STATIC PRESSURE
SA	SUPPLY AIR
TEMP	TEMPERATURE
TYP	TYPICAL
UH	UNIT HEATER
UL	UNDERWRITERS LAB
V	VENT, VOLT
VA	VALVE
VEL	VELOCITY
VERT	VERTICAL
VF	VENT FAN
VTR	VENT THRU ROOF
WB	WET BULB
WCO	WALL CLEANOUT
WG	WATER GAUGE

GENERAL NOTES:

A. ALL LOCATION OF EXISTING PIPING, DUCT AND EQUIPMENT ARE APPROXIMATE AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF WORK. CONTRACTOR SHALL NOTIFY OWNERS REPRESENTATIVE IN WRITING IF CONDITIONS ARE FOUND TO BE DIFFERENT THAN SHOWN ON THE DRAWING BEFORE PROCEEDING.

B. BEFORE ENERGIZING NEW EQUIPMENT OR CONNECTING TO EXISTING POWER SOURCES, THE CONTRACTOR SHALL COORDINATE WITH THE OWNER'S REPRESENTATIVE.

C. ALL WORK IS NEW UNLESS OTHERWISE INDICATED TO BE EXISTING, REMOVED OR RELOCATED.

D. COMPLY WITH APPLICABLE CODES AND STANDARDS AS INDICATED IN SPECIFICATION SECTION 15011.

E. PROVIDE ALL NEW PIPING WITH NEW NAME LABELS AND COLOR CODING TO CORRELATE TO THE DESIGNATION USED ON THE DRAWINGS.

F. ALL STATIONING AND DIMENSIONAL INFORMATION IS APPROXIMATE AND SHALL BE FIELD VERIFIED AND COORDINATED WITH ALL OTHER TRADES PRIOR TO CONSTRUCTION.

STATE OF TEXAS
MIKE L. ASHCRAFT
NO. 56590
REGISTERED
PROFESSIONAL ENGINEER
4/2/97

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MIKE L. ASHCRAFT, P.E., 56590 ON SEPTEMBER 9, 1996

FINAL RECORD DRAWING
Date: 12/25/99

No.	REVISION	BY	DATE

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

SYMBOLS, ABBREVIATIONS & GENERAL NOTES

HDR Engineering, Inc.

SECTION XIII

DRAWN: WTD DATE: 12/05/96 | DESIGNED: MLA DATE: 08/28/96
CHECKED: BL DATE: 08/28/96 | SCALE: NONE

CONTRACT No. DNT-260 SHEET M136 OF 166

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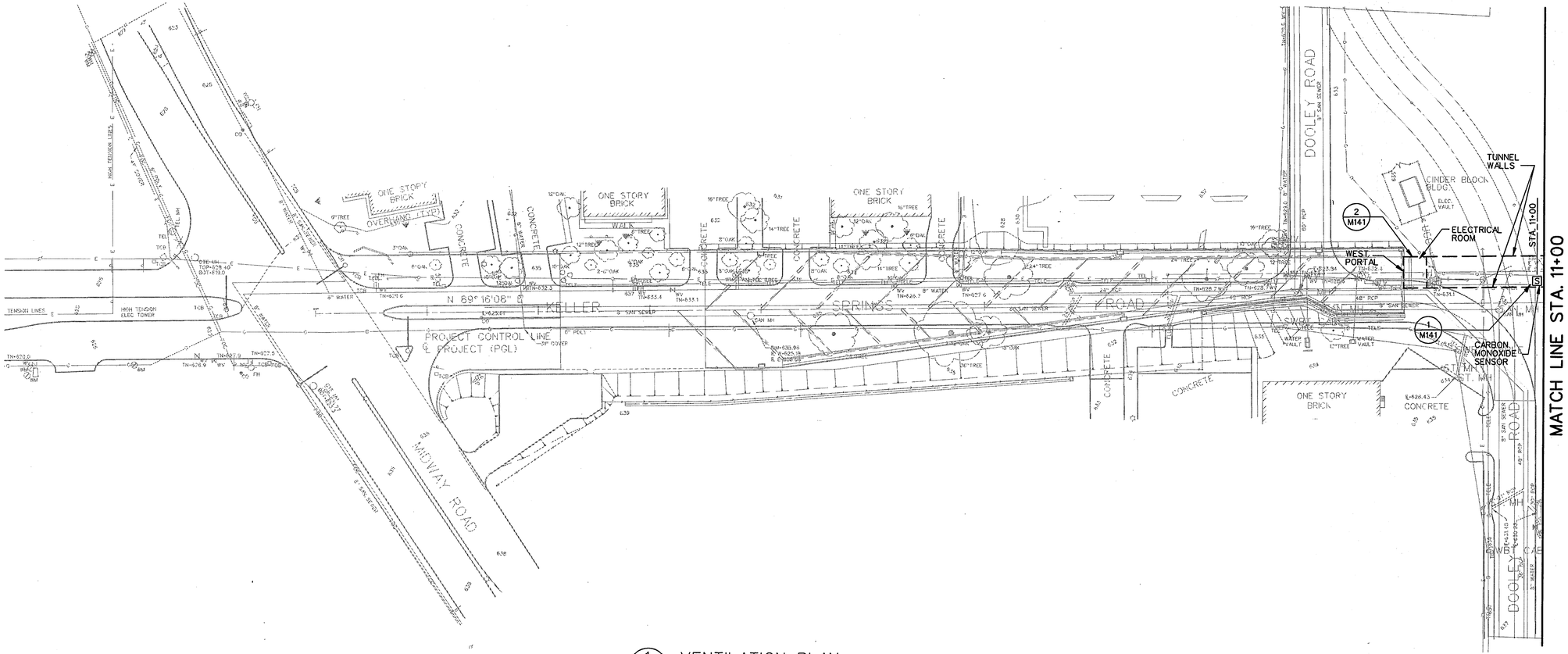

1 VENTILATION PLAN
SCALE: 1" = 50'

STATE OF TEXAS
MIKE L. ASHCRAFT
56590
REGISTERED PROFESSIONAL ENGINEER
1/2/97

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Date: 12/25/99

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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL VENTILATION PLANS

HDR Engineering, Inc.

SECTION XIII

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CHECKED: KG	DATE: 08/28/96	SCALE: 1"= 50'	

CONTRACT No. DNT-260 SHEET M137 OF 166

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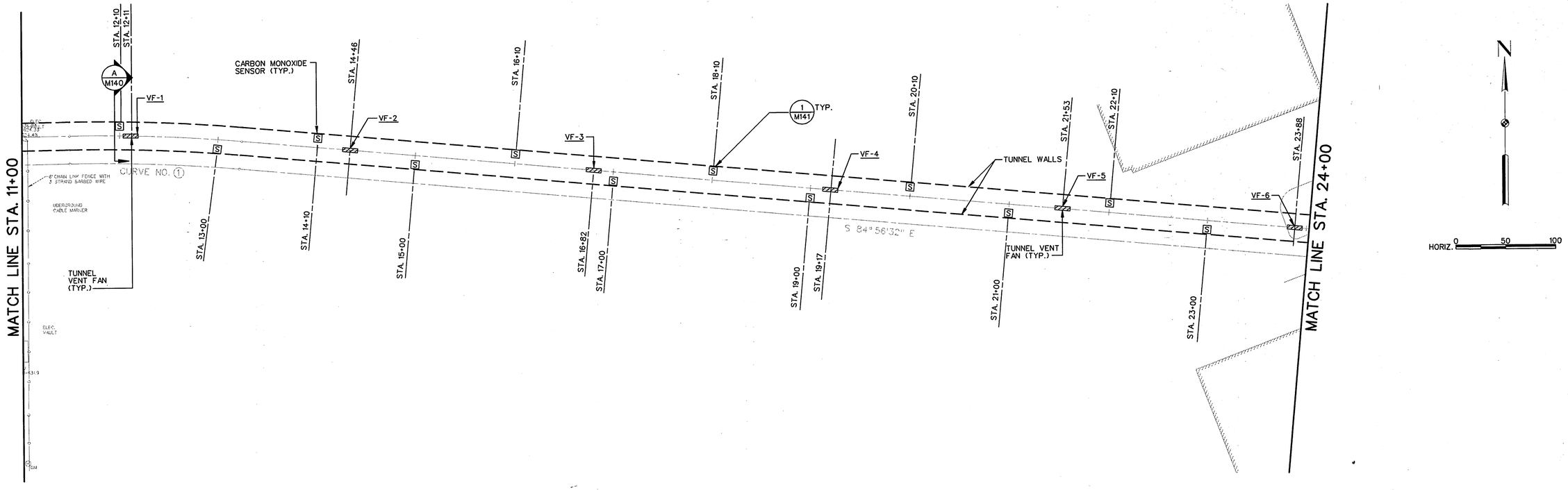

1 / - VENTILATION PLAN
SCALE: 1" = 50'

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MIKE L. ASHCRAFT, P.E., 56590 ON SEPTEMBER 9, 1996

FINAL RECORD DRAWING
Date: 12/25/99

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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL VENTILATION PLANS

HDR HDR Engineering, Inc.

SECTION XIII

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CHECKED: KG DATE: 08/28/96 SCALE: 1"= 50'

CONTRACT No. DNT-260 SHEET M138 OF 166

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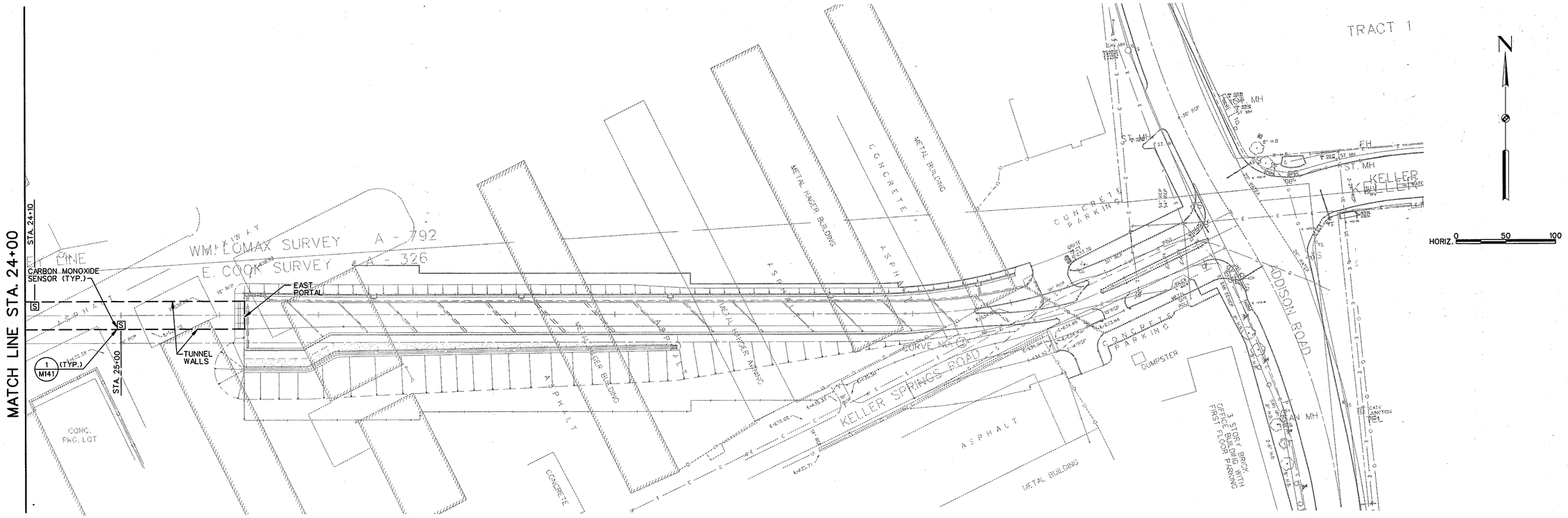

1 / - VENTILATION PLAN
SCALE: 1" = 50'

STATE OF TEXAS
MIKE L. ASHCRAFT
56590
REGISTERED PROFESSIONAL ENGINEER
1/6/97

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MIKE L. ASHCRAFT, P.E., 56590 ON SEPTEMBER 9, 1996

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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL VENTILATION PLANS

HDR HDR Engineering, Inc.

SECTION XIII

DRAWN: WTD DATE: 12/05/96 | DESIGNED: MLA DATE: 08/28/96
CHECKED: KG DATE: 08/28/96 | SCALE: 1"= 50'

CONTRACT No. DNT-260 SHEET M139 OF 166

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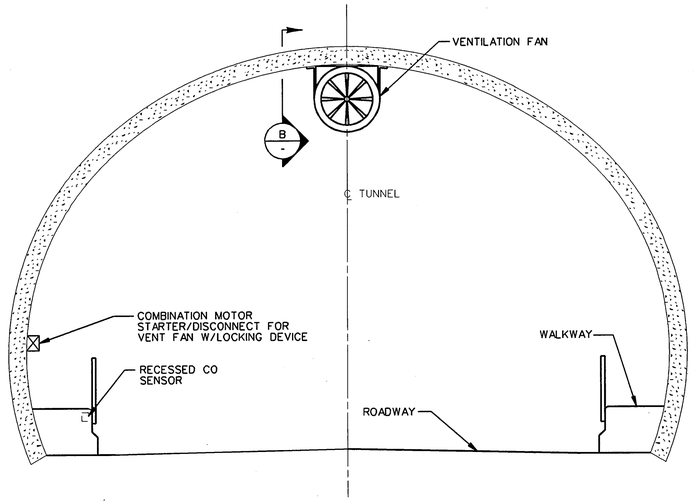
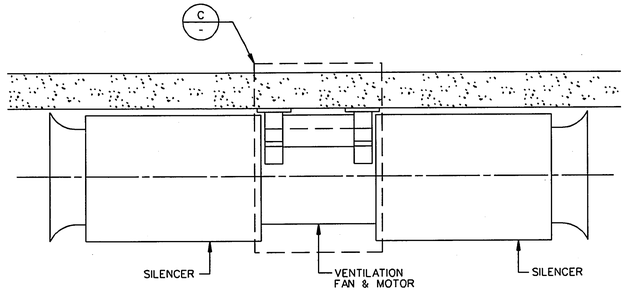


A M138 TUNNEL SECTION
SCALE: 1/4" = 1'-0"



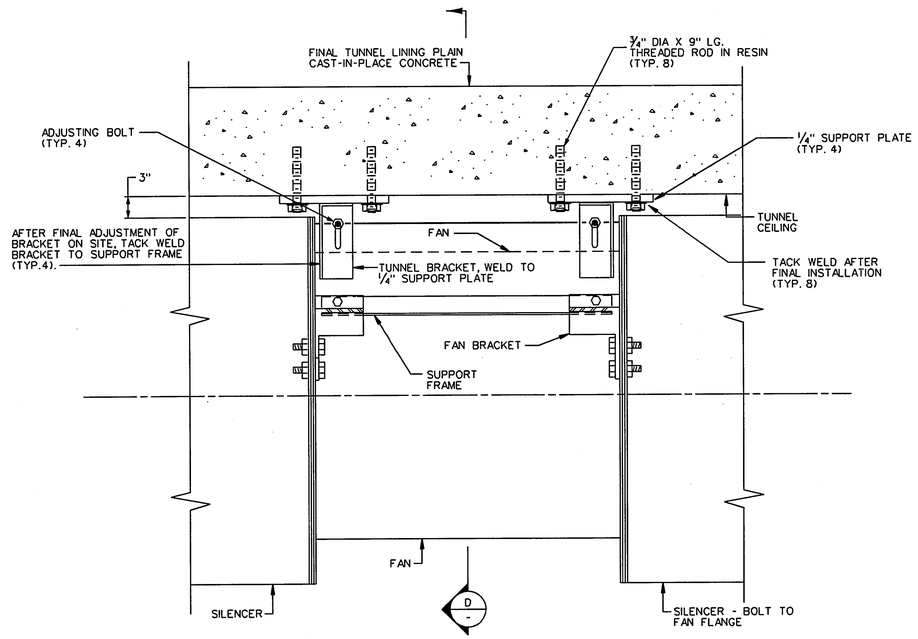
B FAN ELEVATION
SCALE: 1/2" = 1'-0"

GENERAL NOTES:

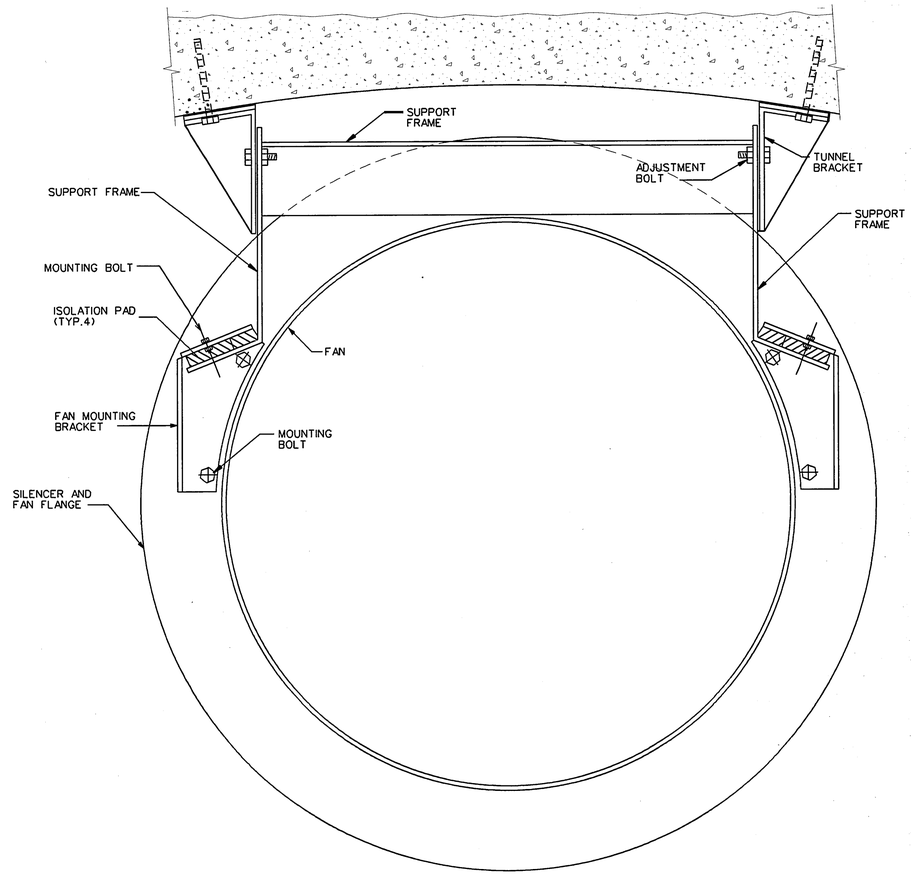
A. SUPPORT FANS AND SILENCERS IN ACCORDANCE WITH THE REQUIREMENTS OF THIS DRAWING AND THE MANUFACTURER'S RECOMMENDATIONS.

B. FAN SUPPORTS SHALL BE PROVIDED BY FAN MANUFACTURER.

C. RFI # 161
VENT FANS - TUNNEL
VENILATION SYSTEM



C FAN MOUNTING DETAIL
NO SCALE



D FAN MOUNTING BRACKET DETAIL
NO SCALE

STATE OF TEXAS
MIKE L. ASHCRAFT
56590
REGISTERED PROFESSIONAL ENGINEER
1/6/97

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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL VENTILATION SECTIONS

HDR HDR Engineering, Inc.

SECTION XIII

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CONTRACT No. DNT-260 SHEET M140 OF 166

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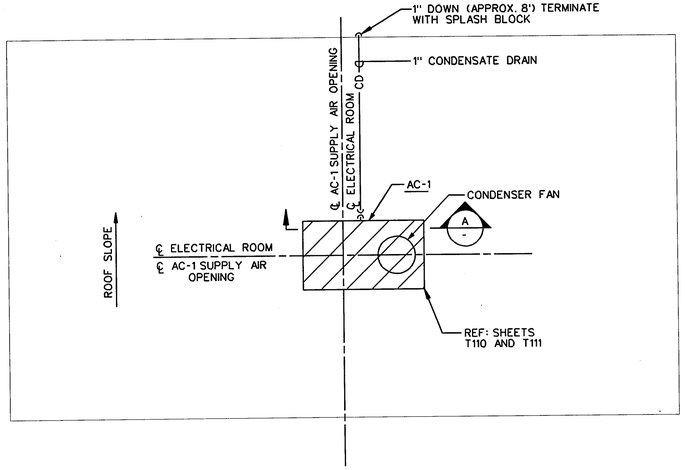
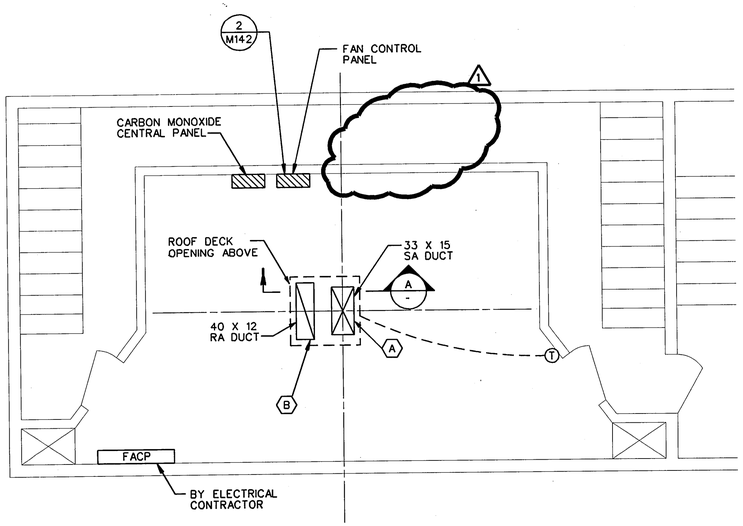
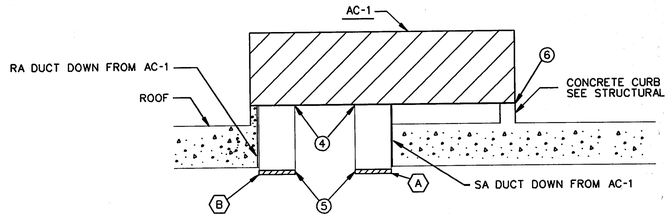


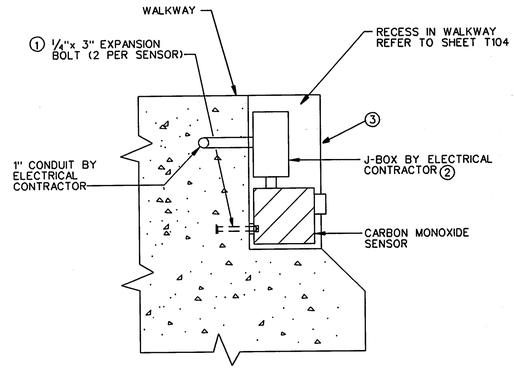
2 / M137 ELECTRICAL ROOM - HVAC ROOF PLAN
SCALE: 1/4" = 1'-0"



3 / - ELECTRICAL ROOM - HVAC FLOOR PLAN
SCALE: 1/4" = 1'-0"



A / - SECTION AT AC UNIT
NO SCALE



B / - SECTION AT CO SENSOR
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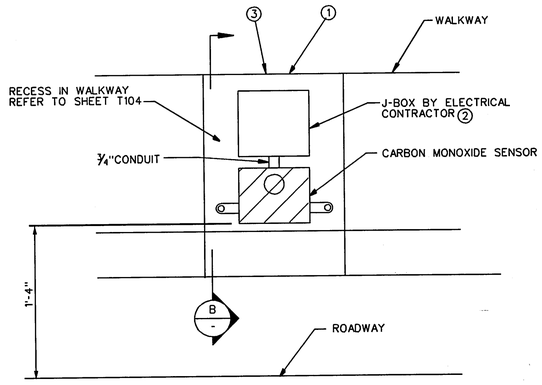

1 / - ELEVATION AT CO SENSOR
NO SCALE

M137
M138
M139

KEY NOTES:

1. FASTEN THE CARBON MONOXIDE SENSOR ACCORDING TO THE MANUFACTURERS RECOMMENDATIONS.
2. COORDINATE WITH THE ELECTRICAL CONTRACTOR. PULL CONTROL WIRING IN CONDUIT AND J-BOXES PROVIDED BY ELECTRICAL CONTRACTOR.
3. THE RECESS IS SIZED FOR THE SENSOR SPECIED. IF AN ALTERNATE MANUFACTURED IS USED, COORDINATE SIZE OF RECESS WITH GENERAL CONTRACTOR PRIOR TO CONSTRUCTION OF WALKWAY. RECESS SHALL BE OF SUFFICIENT SIZE TO ALLOW REMOVAL AND REPLACEMENT OF SENSOR
4. PROVIDE AND INSTALL 1X1X3/8" ANGLE INSIDE THE CURB OPENING TO SUPPORT THE DUCT. LOCATE AND SEAL ACCORDING TO THE MANUFACTURER'S CURB DETAIL.
5. PROVIDE AND INSTALL 1X1X3/8" ANGLE TO SPAN THE BOTTOM OF THE ROOF DECK OPENING FOR DUCT AND AIR DEVICE SUPPORT. MATCH THE SUPPORT PATTERN USED AT THE TOP OF THE DUCTS.
6. SEAL CURB ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. PROVIDE SPACER ALONG TOP OF CURB IF NECESSARY TO MAINTAIN 1/4" + GAP BETWEEN THE CURB AND CABINET PERIMETER FLANGE.

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY MIKE L. ASHCRAFT, P.E., 56590 ON SEPTEMBER 9, 1996

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1	GEN. SETS	MLA	2/7/97

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL VENTILATION SECTIONS & ELECTRIC ROOM AIR CONDITIONING

HDR Engineering, Inc.

SECTION XIII

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CONTRACT No. DNT-260 SHEET M141 OF 166

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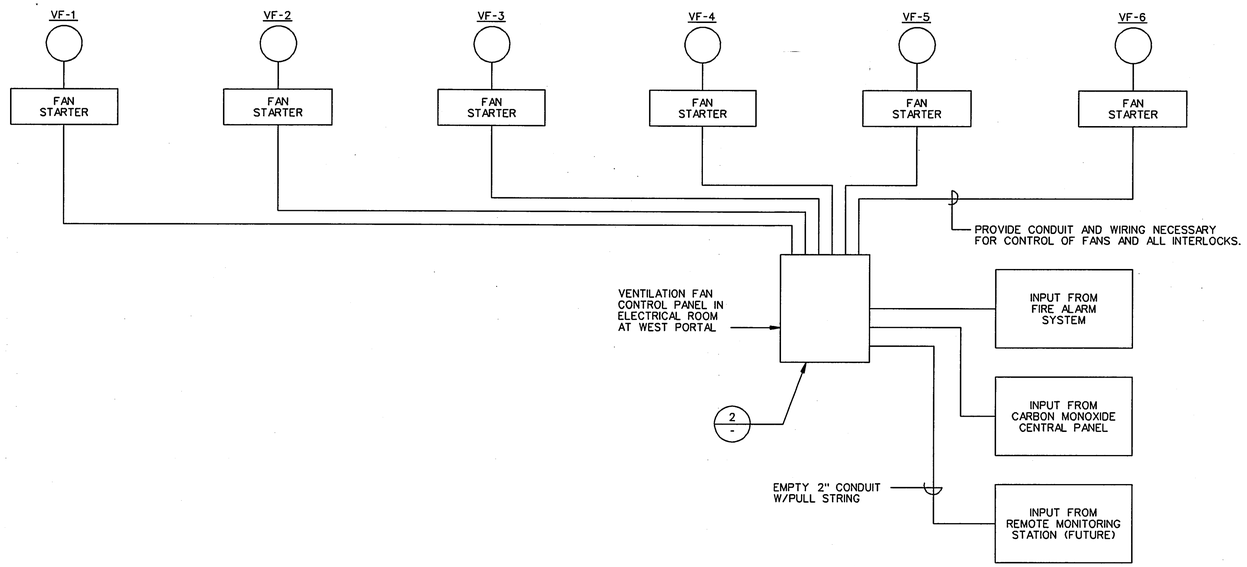

1 - VENTILATION FAN CONTROL SCHEMATIC
NO SCALE

	FAN CONTROL			AIR FLOW INDICATOR		VIBRATION INDICATOR	
FAN No.	OFF	DISCHARGE WEST	DISCHARGE EAST	AIR FLOW WEST	AIR FLOW EAST	VIBRATION ALERT	VIBRATION ALARM
VF-1	(G) (⊘)	(R) (⊘)	(R) (⊘)	(R)	(R)	(Y)	(R)
VF-2	(G) (⊘)	(R) (⊘)	(R) (⊘)	(R)	(R)	(Y)	(R)
VF-3	(G) (⊘)	(R) (⊘)	(R) (⊘)	(R)	(R)	(Y)	(R)
VF-4	(G) (⊘)	(R) (⊘)	(R) (⊘)	(R)	(R)	(Y)	(R)
VF-5	(G) (⊘)	(R) (⊘)	(R) (⊘)	(R)	(R)	(Y)	(R)
VF-6	(G) (⊘)	(R) (⊘)	(R) (⊘)	(R)	(R)	(Y)	(R)
(⊘) PUSH TO TEST INDICATING LIGHTS							

VF-1 VF-2 VF-3 VF-4 VF-5 VF-6
WEST PORTAL — TUNNEL FAN LAYOUT — EAST PORTAL

MOMENTARY CONTACT PUSH BUTTON (TYP.)

INDICATING LIGHT (TYP.)

PROVIDE CONTROL PANEL IN STAINLESS STEEL WEATHERPROOF CABINET WITH LOCKING COVER. LOCATE IN THE ELECTRIC ROOM AT THE WEST PORTAL.

2 / P141 - VENTILATION FAN CONTROL PANEL
NO SCALE

GENERAL NOTES:

A. MOUNT FAN STARTERS ON NORTH WALL OF TUNNEL.

B. VENTILATION FAN CONTROL PANEL IN ELECTRICAL ROOM AT WEST PORTAL OVERRIDES ALL OTHER CONTROLS.

C. INPUT FROM FIRE ALARM SYSTEM INCLUDES PULL STATIONS AND HEAT DETECTORS.

D. PROVIDE AN EMPTY 2" CONDUIT FROM THE TOLL PLAZA AREA TO THE VENTILATION CONTROL PANEL IN ELECTRICAL ROOM AT WEST PORTAL FOR FUTURE INPUT FROM REMOTE MONITORING STATION.

E. A SIGNAL FROM A PULL STATION OR HEAT DETECTOR EAST OF STA. 18+00 SHALL START ALL TUNNEL VENTILATION FANS IN THE "DISCHARGE EAST" MODE. A SIGNAL FROM A PULL STATION OR HEAT DETECTOR WEST OF STA. 18+00 SHALL START ALL TUNNEL VENTILATION FANS IN THE "DISCHARGE WEST" MODE. IF SIGNALS ARE RECEIVED FROM HEAT DETECTORS OR PULL STATIONS ON BOTH SIDES OF STATION 18+00, ALL TUNNEL VENTILATION FANS SHALL GO TO THE "DISCHARGE "WEST" MODE.

F. A SIGNAL FROM ANY CARBON MONOXIDE SENSOR SHALL START ALL TUNNEL VENTILATION FANS IN THE DISCHARGE WEST MODE.

G. PROVIDE ALL CONDUIT, WIRING, TRANSFORMERS, RELAYS AND DEVICES NECESSARY FOR A COMPLETE AND OPERATING FAN CONTROL SYSTEM WITH OPERATING SEQUENCE AS INDICATED ABOVE.

H. PROVIDE A 30 SECOND DELAY BETWEEN ANY FAN REVERSAL, WHETHER FROM THE FIRE ALARM SYSTEM INPUT OR MAIN CONTROL PANEL INPUT.

STATE OF TEXAS
MIKE L. ASHCRAFT
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REGISTERED PROFESSIONAL ENGINEER
11/13/97

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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL VENTILATION CONTROL SCHEMATICS

HDR HDR Engineering, Inc.

SECTION XIII

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DATE: 23-Apr-96 20:01

VENTILATION FAN SCHEDULE

MARK	NOISE SOUND PRESSURE (db)	OUTLET VELOCITY (FPM)	THRUST (LB)	RPM	DRIVE	HP	VOLT	PH	HZ	MANUFACTURER AND MOD. NO.	NOTES / LOCATION
VF-1	62	104	126	1750	DIRECT	30	460	3	60	ABB FRDA-080-1-44-70	1,2 / STA. 12+11
VF-2	62	104	126	1750	DIRECT	30	460	3	60	ABB FRDA-080-1-44-70	1,2 / STA. 14+46
VF-3	62	104	126	1750	DIRECT	30	460	3	60	ABB FRDA-080-1-44-70	1,2 / STA. 16+82
VF-4	62	104	126	1750	DIRECT	30	460	3	60	ABB FRDA-080-1-44-70	1,2 / STA. 19+17
VF-5	62	104	126	1750	DIRECT	30	460	3	60	ABB FRDA-080-1-44-70	1,2 / STA. 21+53
VF-6	62	104	126	1750	DIRECT	30	460	3	60	ABB FRDA-080-1-44-70	1,2 / STA. 23+88

PACKAGE AIR CONDITIONER SCHEDULE

MARK	COOLING (BTUH)	HEATING	MIN. O.A. (CFM)	FAN					UNIT MODEL	NOTES
				CFM	MAX. ESP (IN. W.C.)	VOLT	PHASE	HP		
AC-1	60,000	6KW	200	2000	0.75	460	3	3/4	TRANE TCD060	5,6,7,8

AIR DEVICE SCHEDULE

MARK	TYPE	TTL PRES (IN. W.C.)	NC	DAMPER	MODEL	CFM	NOTES
⟨A⟩	LOUVERED SUPPLY	0.125	30	NO	PRICE 620	2000	3,4
⟨B⟩	EGG CRATE RETURN	0.125	30	NO	PRICE 80FF	2000	3,5

NOTES:

1. INLET AND OUTLET SILENCERS.
2. REVERSIBLE THRUST BY REVERSING FAN ROTATION. THRUST IS THE SAME IN BOTH DIRECTIONS.
3. ALUMINUM
4. DOUBLE DEFLECTION
5. PROVIDE W/FILTER.
6. COOLING CAPACITY IS BY A.R.I. STANDARD 210/240.
7. DOWN DISCHARGE SUPPLY AIR.
8. MAXIMUM EXTERNAL STATIC PRESSURE DOES NOT INCLUDE ECONOMIZER.

STATE OF TEXAS
MIKE L. ASHCRAFT
56590
REGISTERED
PROFESSIONAL ENGINEER
1/2/97

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FINAL RECORD DRAWING
Date: 12/25/99

No.	REVISION	BY	DATE

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL VENTILATION SCHEDULES

HDR HDR Engineering, Inc.

SECTION XIII

DRAWN: WTD DATE: 12/05/96 | DESIGNED: MLA DATE: 08/28/96
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CONTRACT No. DNT-260 SHEET M143 OF 166

FILE: p:\addtun\dgn\addtumh08.dgn
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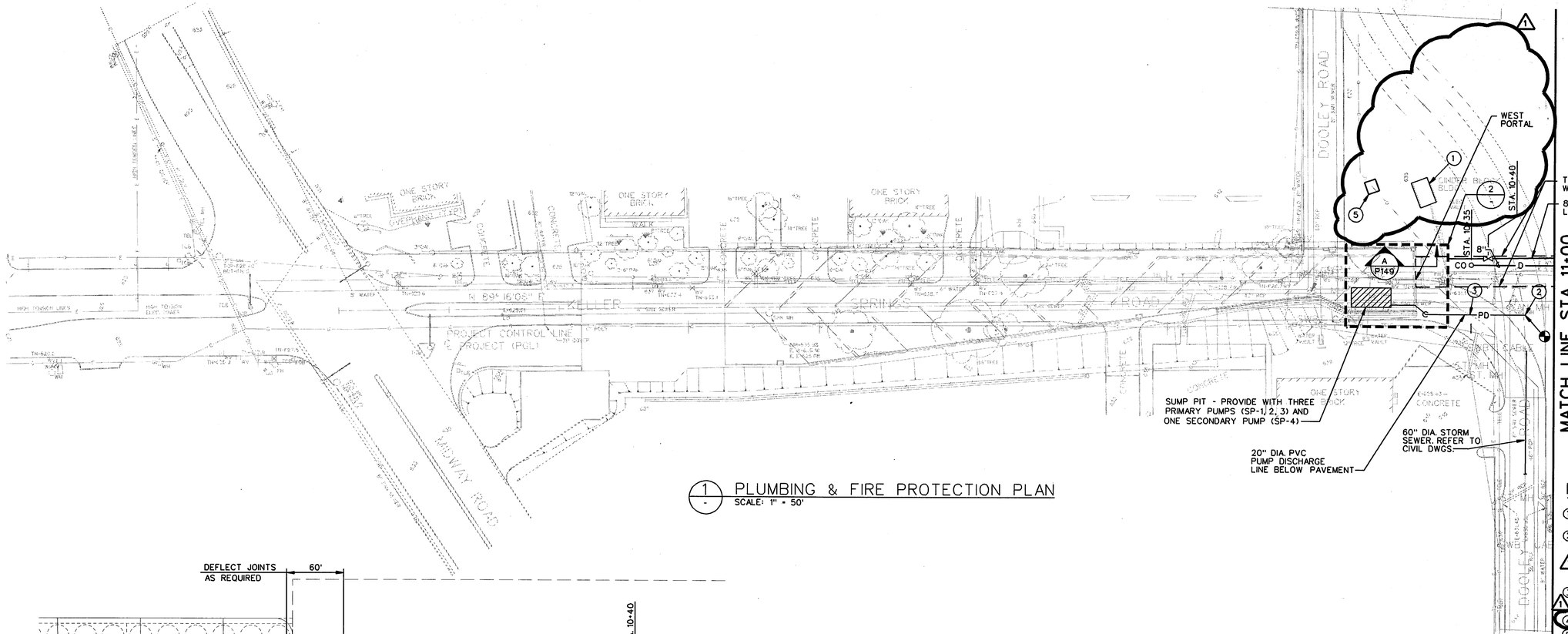
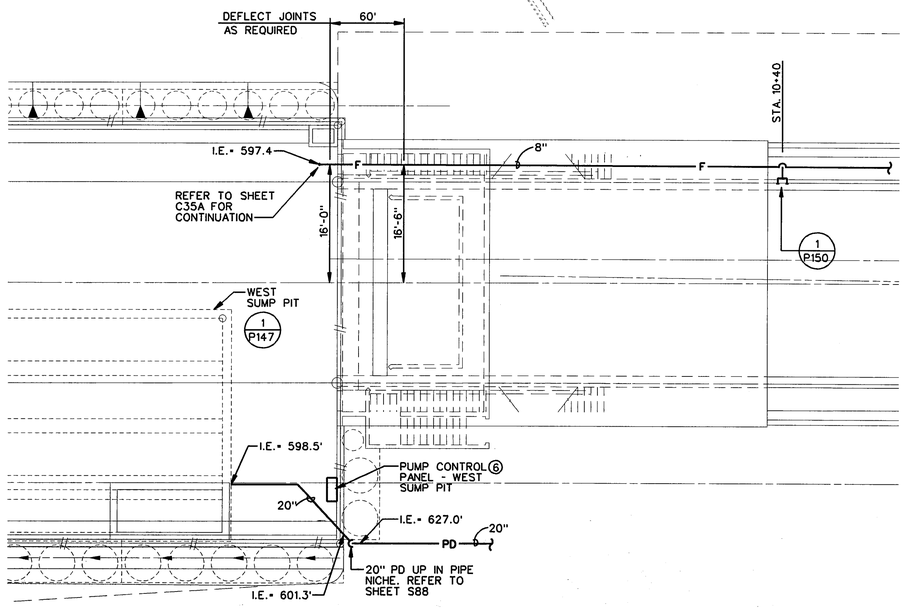


1 / - PLUMBING & FIRE PROTECTION PLAN
SCALE: 1" = 50'



2 / - ENLARGED PLAN AT WEST PORTAL
SCALE: 1" = 10'

KEY NOTES:

1. EXISTING ELECTRICAL VAULT TO REMAIN.
2. CONNECT 20"PD TO 60"x21" WYE FITTING. REFER TO SHEET C40. SEAL CONNECTION WATERTIGHT. I.E. = 627.44'. APPROXIMATE GROUND ELEVATION = 636' COORDINATE LOCATION OF 20" PD WITH ALL NEW AND EXISTING UTILITIES IN THE AREA PRIOR TO CONSTRUCTION. (1)
3. INCLUDE A #12 COPPER WIRE ALONG ENTIRE LENGTH OF PVC PIPE APPROX. 12" ABOVE TOP OF PIPE AS A LOCATOR. (1)
4. NOT USED.
5. TRANSFORMER BY ELECTRICAL CONTRACTOR.
6. IMBED CONTROL CONDUIT IN CONCRETE ADJACENT TO POWER CONDUITS. REF: SHEET E164 FOR POWER CONDUITS.

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Date: 12/25/99

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2 REVISION PER RFI # 919

No.	REVISION	BY	DATE
1	ADDENDUM No.1	HDR	2-12-97

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL
FIRE PROTECTION & PLUMBING PLANS

HDR Engineering, Inc.

SECTION XIII

DRAWN: WTD	DATE: 12/05/96	DESIGNED: MLA	DATE: 08/28/96
CHECKED: BL	DATE: 08/28/96	SCALE: 1"= 50'	

CONTRACT No. DNT-260 SHEET P144 OF 166

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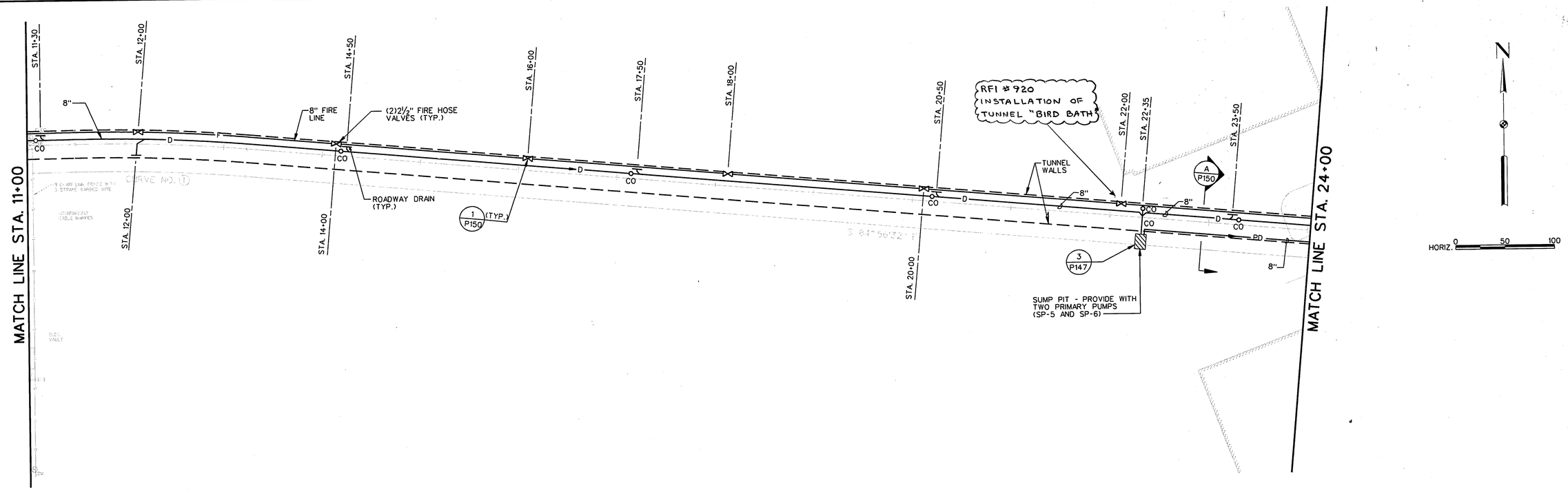

1 PLUMBING & FIRE PROTECTION PLAN
SCALE: 1" = 50'

STATE OF TEXAS
MIKE L. ASHCRAFT
56590
REGISTERED PROFESSIONAL ENGINEER
12/2/97

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FINAL RECORD DRAWING
Date: 12/25/99

No.	REVISION	BY	DATE
1	REVISION PER RFI # 920		

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL
FIRE PROTECTION & PLUMBING PLANS

HDR HDR Engineering, Inc.

SECTION XIII

DRAWN: WTD	DATE: 12/05/96	DESIGNED: MLA	DATE: 08/28/96
CHECKED: BL	DATE: 08/28/96	SCALE: 1"= 50'	

CONTRACT No. DNT-260 SHEET P145 OF 166

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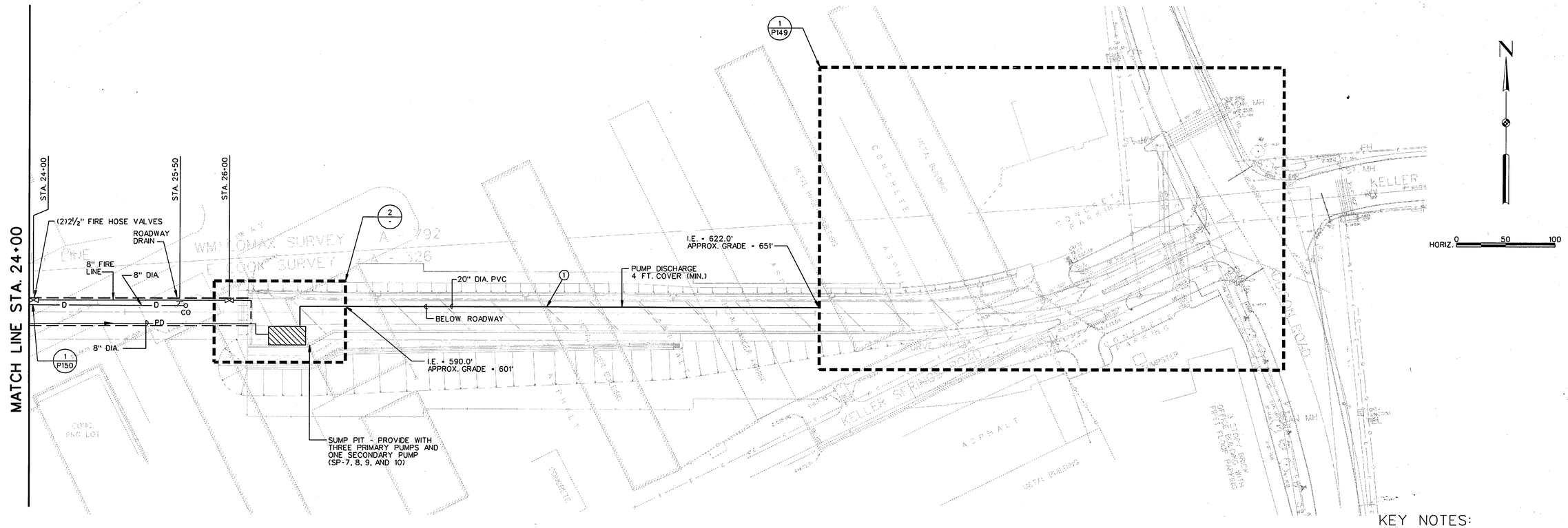
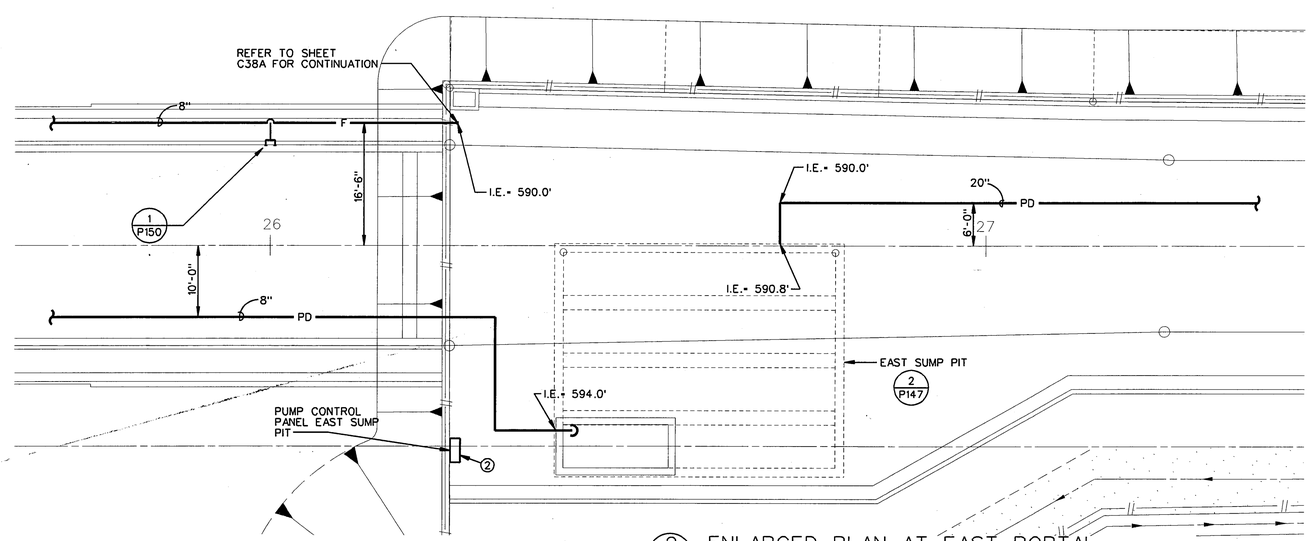


1 - PLUMBING & FIRE PROTECTION PLAN
SCALE: 1" = 50'



2 - ENLARGED PLAN AT EAST PORTAL
SCALE: 1" = 10'

KEY NOTES:

1. INCLUDE A #12 COPPER WIRE IN THE LENGTH OF TRENCH WITH THE PVC PIPE.
2. IMBED CONTROL CONDUIT IN CONCRETE ADJACENT TO POWER CONDUITS. REF: SHEET E164 FOR POWER CONDUITS.

FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS
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56590
REGISTERED PROFESSIONAL ENGINEER
12/25/99

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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL
FIRE PROTECTION & PLUMBING PLAN

HDR Engineering, Inc.

SECTION XIII

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CHECKED: BL	DATE: 08/28/96	SCALE: 1"= 50'	

CONTRACT No. DNT-260 SHEET P146 OF 166

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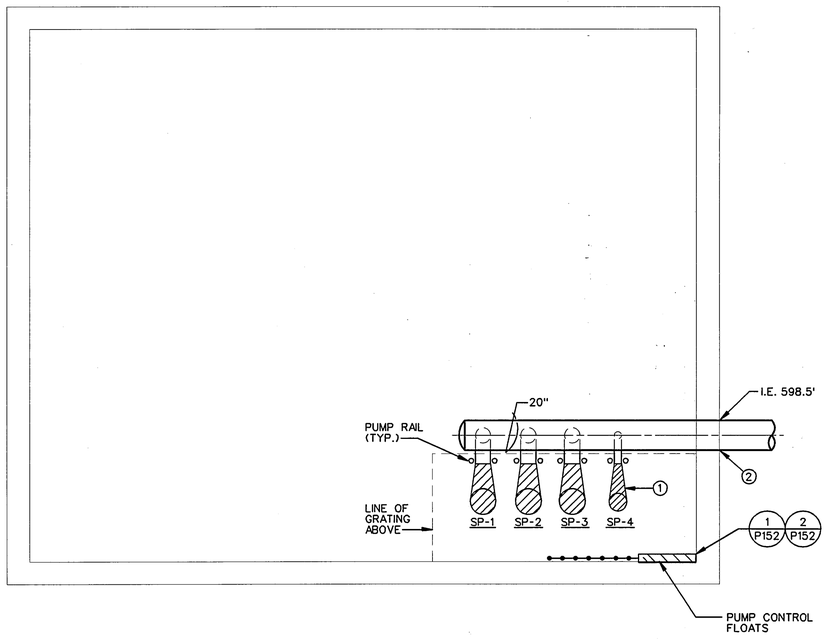
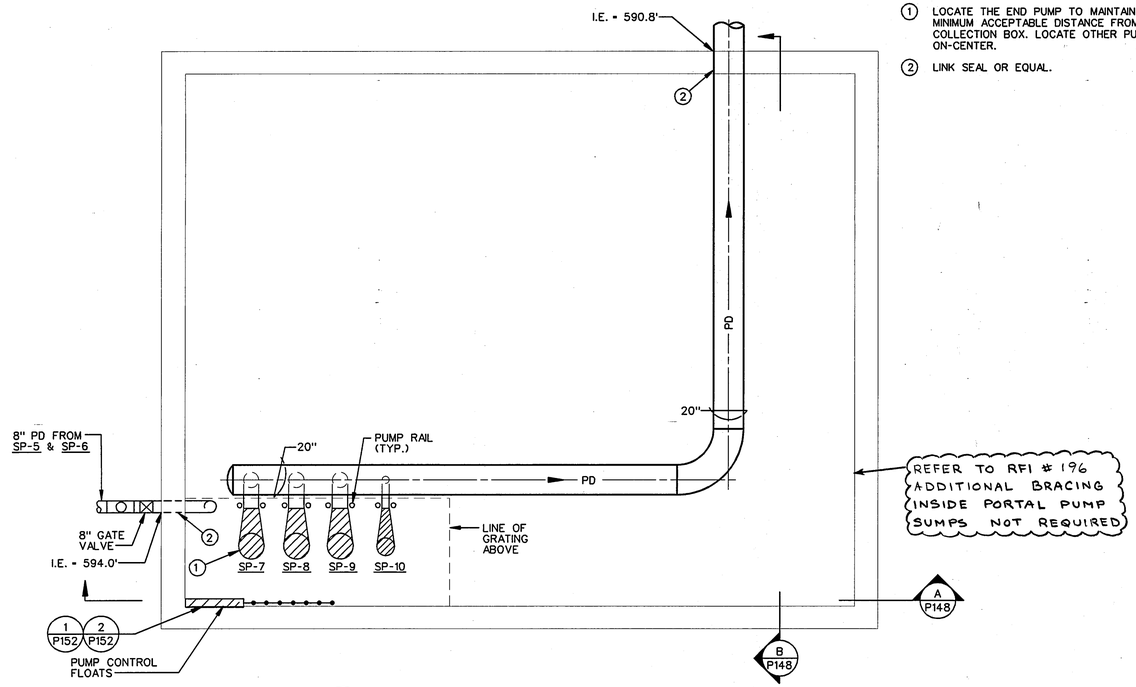
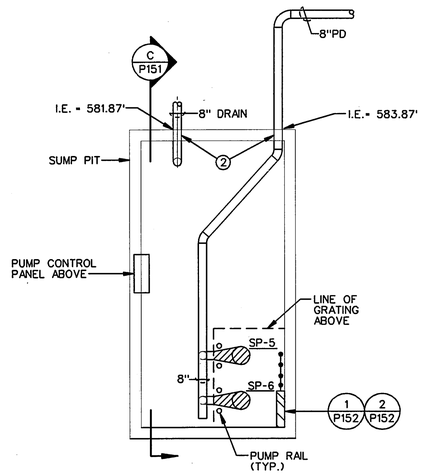


1 P144 ENLARGED WEST SUMP PIT - STA. 9+40
SCALE: 1/4" = 1'-0"



2 P146 ENLARGED EAST SUMP PIT - STA. 26+50
SCALE: 1/4" = 1'-0"



3 P145 ENLARGED TUNNEL SUMP PIT NICHE
SCALE: 1/4" = 1'-0"

KEY NOTES:

1. LOCATE THE END PUMP TO MAINTAIN THE MANUFACTURER'S MINIMUM ACCEPTABLE DISTANCE FROM THE SIDE OF THE COLLECTION BOX. LOCATE OTHER PUMPS AT 30" (MAX.) ON-CENTER.
2. LINK SEAL OR EQUAL.

STATE OF TEXAS
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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

ENLARGED SUMP PIT PLANS

HDR Engineering, Inc.

SECTION XIII

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CONTRACT No. DNT-260 SHEET P147 OF 166

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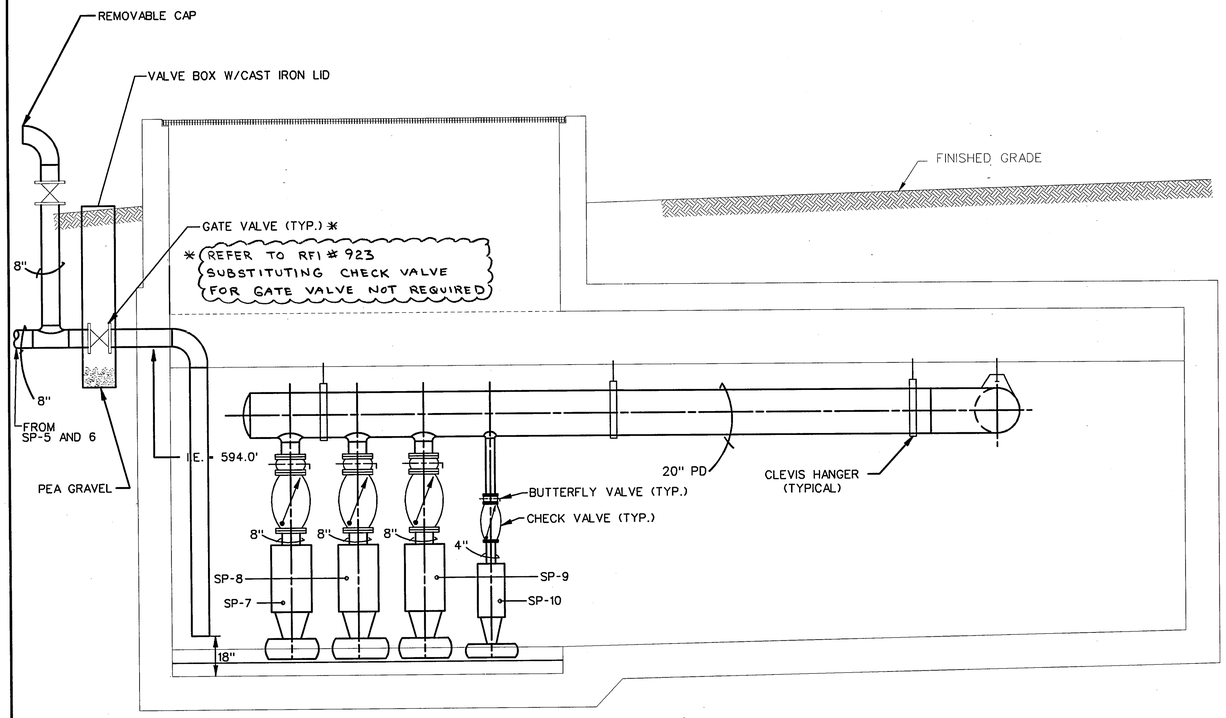
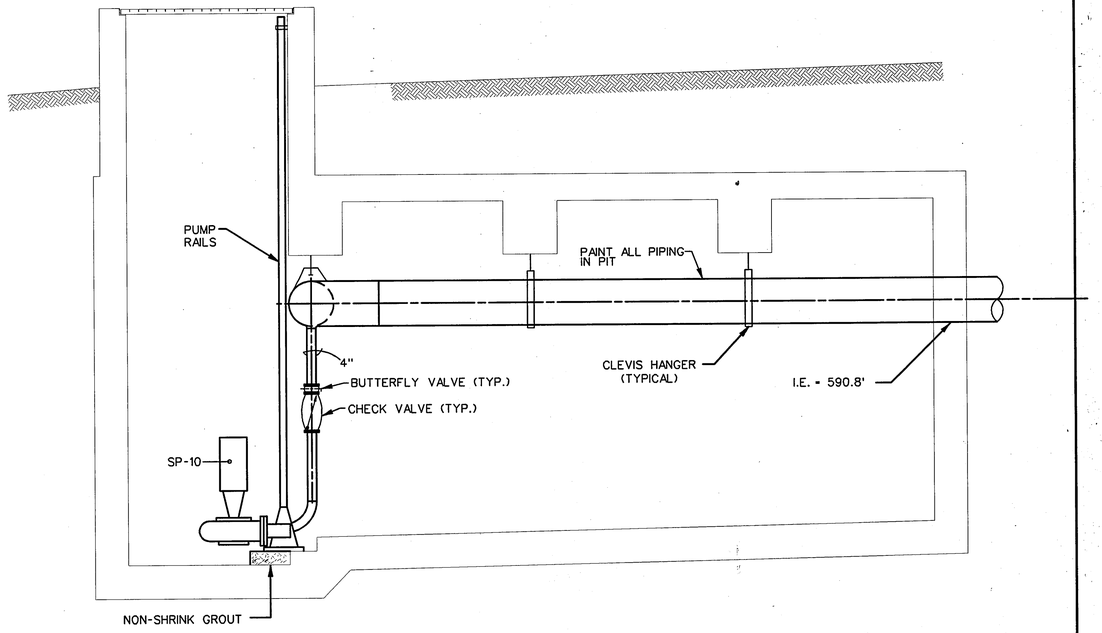


A P148 SECTION AT EAST SUMP PIT (WEST SIMILAR)
SCALE: 3/8" = 1'-0"



B P148 SECTION AT EAST SUMP PIT (WEST SIMILAR)
SCALE: 3/8" = 1'-0"

FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS
MIKE L. ASHCRAFT
56590
REGISTERED
PROFESSIONAL ENGINEER
12/2/97

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1 REVISION PER RFI # 923

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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

ENLARGED
SUMP PIT
PLANS

HDR Engineering, Inc.

SECTION XIII

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CHECKED: KG DATE: 08/28/96 | SCALE: AS SHOWN

CONTRACT No. DNT-260 SHEET P148 OF 166

FILE: p:\addtun\dgn\addtup105.dgn
DATE: 3-Jul-96 14:49

GENERAL NOTE:

A. DIMENSIONS FOR NEW PUMP DISCHARGE LINE LOCATION ARE APPROXIMATE. COORDINATE WITH FIELD DETERMINED LOCATIONS OF EXISTING UTILITIES AND WITH ALL NEW WORK.

BORE BENEATH ADDISON ROAD

20" PD

I.E.- 634.0'

28' 5" RCP

CORE DRILL WALL OF EXISTING INLET BOX AND TERMINATE 20" PD IN BOX. SEAL PIPE PENETRATION WATERTIGHT.

I.E.- 634.0'

30'

REFER TO RFI # 145 PUMP LINE CROSSING ADDISON ROAD

I.E.- 634.0'

I.E.- 631.0'

20"

5'

28'

I.E.- 629.0'

I.E.- 622.0'

20"

PD

5'

PD

MATCH LINE STA 32+00

PC STA. 32+60.20
℄ PROJECT STATIONING

PT STA 35+06.94
℄ PROJECT STATIONING

CONCRETE

METAL BUILDING

ASPHALT

CURVE NO. 2

KELLER SPRINGS ROAD

CONCRETE PARKING

DUMPSTER

ADDISON ROAD

SAN SEWER 8" HDPE

8" H.B.

ST. MH

PB

WV

WATER

24" WATER

3-24" RCP

16"

18" RCP

36" RCP

54" RCP

2-14" RCP

CRATE INLET

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Date: 12/25/99

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1	REVISION PER RFI # 145		

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

PUMP DISCHARGE PIPING EAST ENTRANCE

HDR Engineering, Inc.

SECTION XIII

DRAWN: WTD	DATE: 12/05/96	DESIGNED: MLA	DATE: 08/28/96
CHECKED: KG	DATE: 08/28/96	SCALE: 1"= 20'	

CONTRACT No. DNT-260 SHEET P149 OF 166

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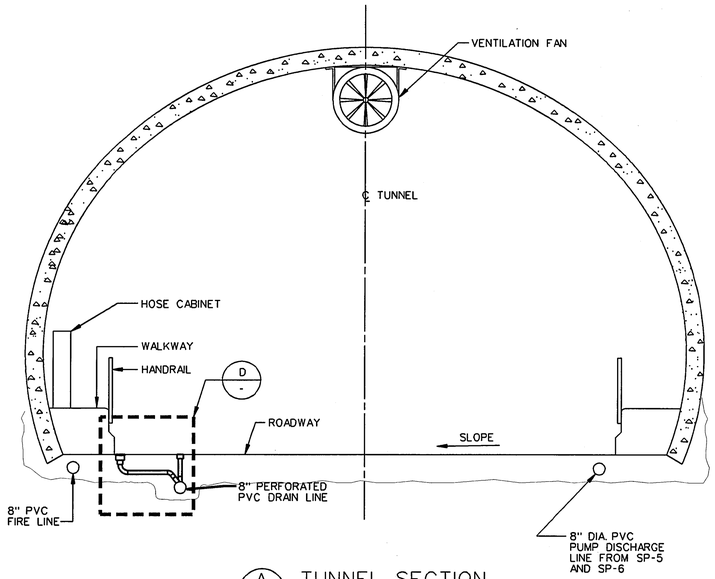
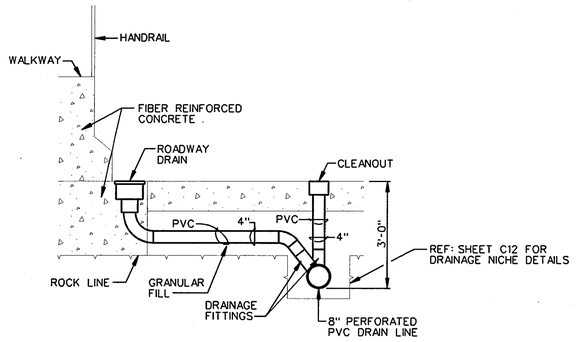
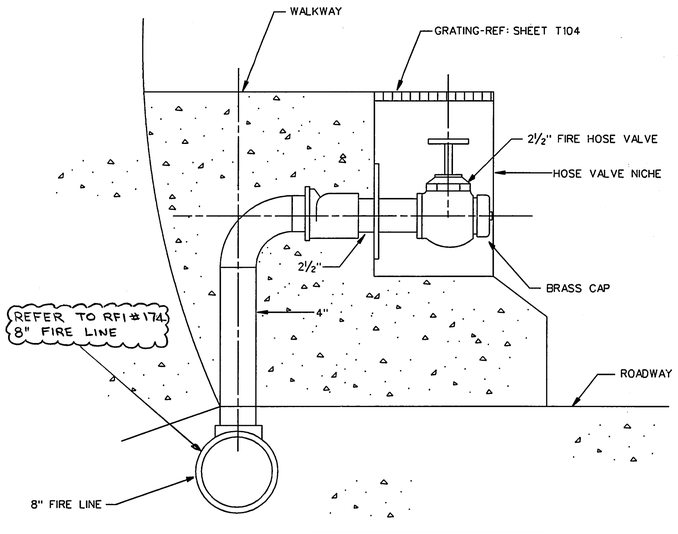


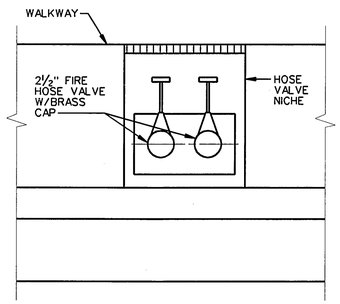
A P145 TUNNEL SECTION
SCALE: 1/4" = 1'-0"



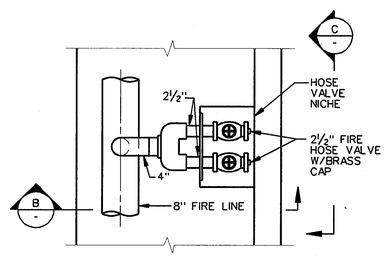
D - SECTION AT ROADWAY DRAIN
SCALE: 1" = 1'-0"



B - SECTION AT FIRE HOSE VALVE
SCALE: 1½" = 1'-0"



C - ELEVATION AT FIRE HOSE VALVE
SCALE: 1½" = 1'-0"



1 - PLAN AT FIRE HOSE VALVE
SCALE: 1½" = 1'-0"
P144
P145
P146

STATE OF TEXAS
MIKE L. ASHCRAFT
56590
REGISTERED
PROFESSIONAL ENGINEER
1/2/97

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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL
FIRE PROTECTION &
PLUMBING SECTIONS

HDR HDR Engineering, Inc.

SECTION XIII

DRAWN: WTD	DATE: 12/05/96	DESIGNED: MLA	DATE: 08/28/96
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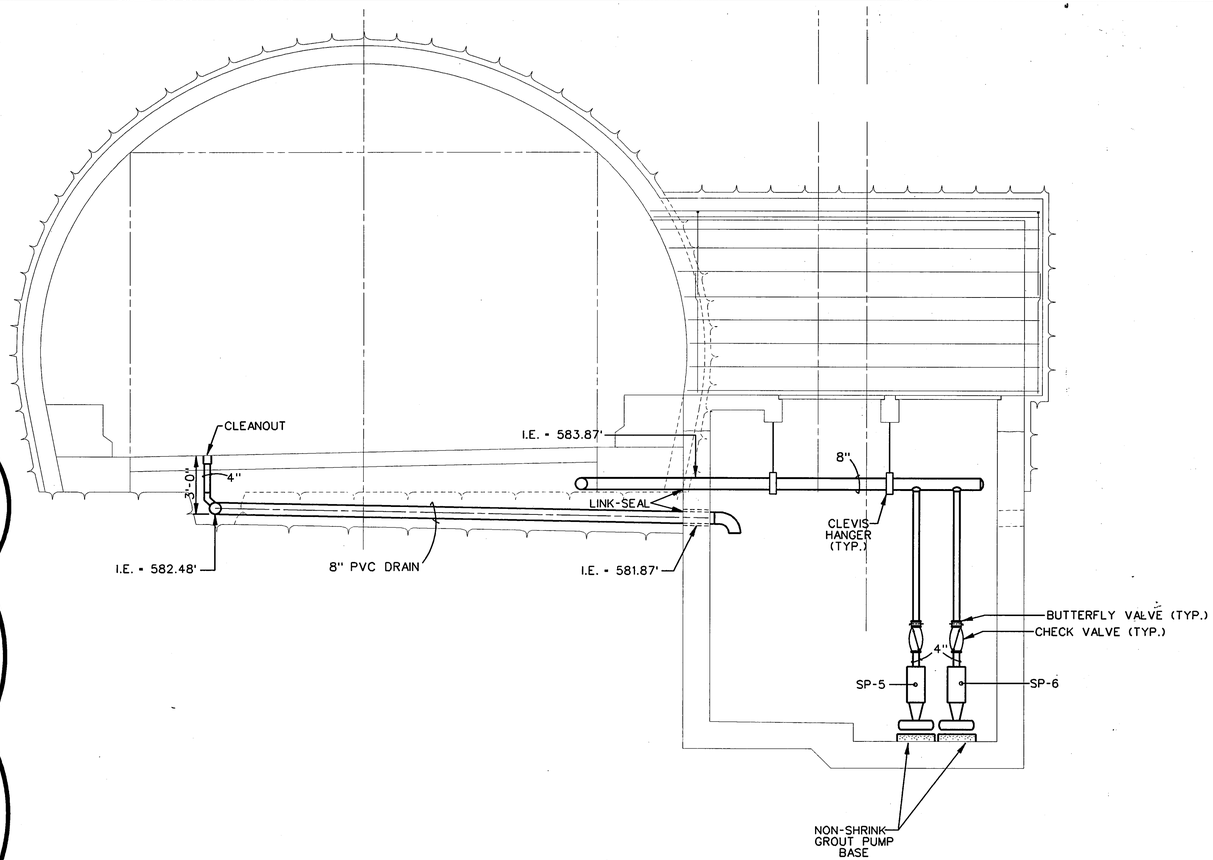
CONTRACT No. DNT-260 SHEET P150 OF 166

FILE: p:\addtun\dgn\adtupl07.dgn
DATE: 23-Apr-96 20:01



B / P147 SECTION AT TUNNEL SUMP PIT
1/4" = 1'-0"

FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS
MIKE L. ASHCRAFT
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2/7/97

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1	GEN. SETS	MLA	2/7/97

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL
GENERATOR & FIRE PROTECTION

HDR Engineering, Inc.

SECTION XIII

DRAWN: WTD DATE: 12/05/96 DESIGNED: MLA DATE: 08/28/96
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CONTRACT No. DNT-260 SHEET P151 OF 166

FILE: p:\addtun\dgn\adtup108.dgn
DATE: 23-Apr-96 20:01

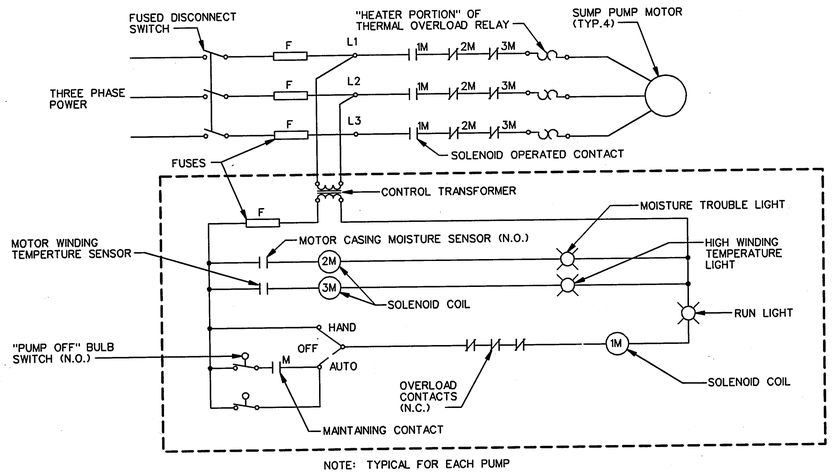
STORM WATER SEWAGE PUMP SCHEDULE

MARK	LOCATION	TYPE	GPM	TDH (FT.)	ELECTRICAL			MANUFACTURER & MODEL	REMARKS
					HP	RPM	VOLT/PH		
SP-1	WEST PORTAL	SUBMERSIBLE NON-CLOG	3000	55	70	1750	460/3	ABS AFP 2001	SEE NOTE 1
SP-2	WEST PORTAL	SUBMERSIBLE NON-CLOG	3000	55	70	1750	460/3	ABS AFP 2001	
SP-3	WEST PORTAL	SUBMERSIBLE NON-CLOG	3000	55	70	1750	460/3	ABS AFP 2001	
SP-4	WEST PORTAL	SUBMERSIBLE NON-CLOG	300	55	10	1750	460/3	ABS AFP 1046	
SP-5	TUNNEL	SUBMERSIBLE NON-CLOG	500	40	10	1750	460/3	ABS AFP 1046	
SP-6	TUNNEL	SUBMERSIBLE NON-CLOG	500	40	10	1750	460/3	ABS AFP 1046	
SP-7	EAST PORTAL	SUBMERSIBLE NON-CLOG	3000	75	84	1750	460/3	ABS AFP 2001	
SP-8	EAST PORTAL	SUBMERSIBLE NON-CLOG	3000	75	84	1750	460/3	ABS AFP 2001	
SP-9	EAST PORTAL	SUBMERSIBLE NON-CLOG	3000	75	84	1750	460/3	ABS AFP 2001	
SP-10	EAST PORTAL	SUBMERSIBLE NON-CLOG	300	75	20	1750	460/3	ABS AFP 1044	

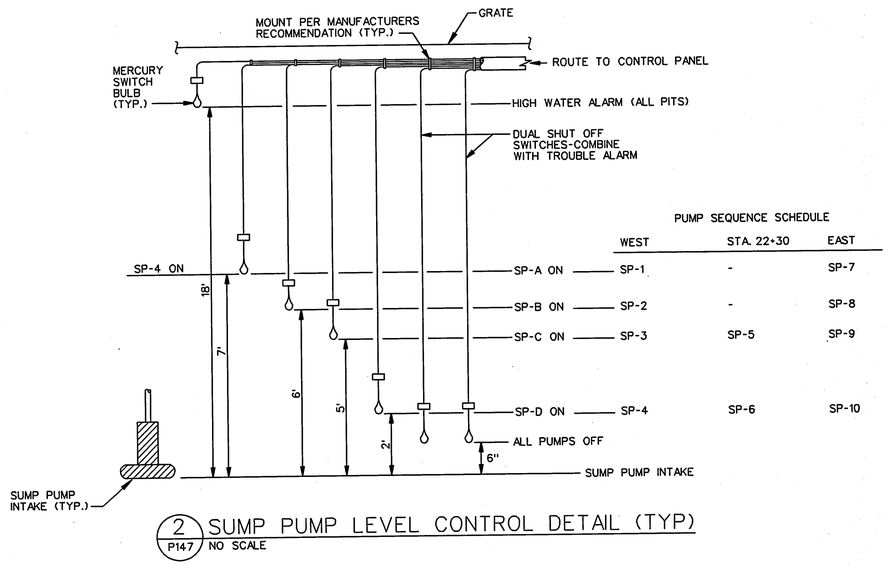
NOTES:
1. MANUFACTURERS STANDARD PACKAGED SUMP CONTROLLER SHALL BE COMPLETE WITH NEMA TYPE 4X CONTROL PANEL, NEMA TYPE 6 INDIVIDUAL COMBINATION MOTOR STARTERS/DISCONNECTS AND WIRING/CONDUIT.

GENERATOR FUEL PUMP SCHEDULE

MARK	TYPE	SIZE & TYPE	IMPELLER	RPM	BHP
FP-1	SUBMERSIBLE	1½X 1 X 6 ESP	1129A10X06YA	1750	½



1 / P147 SUMP PUMP CONTROL SCHEMATIC
NO SCALE



2 / P147 SUMP PUMP LEVEL CONTROL DETAIL (TYP)
NO SCALE

SEQUENCE OF OPERATION:

PROVIDE EACH PUMP WITH AN H-O-A SWITCH AT THE PUMP CONTROL PANEL. THE FOLLOWING SEQUENCE OCCURS FOR EACH SWITCH POSITION.

AUTO POSITION

1. AS THE SUMP PIT WATER LEVEL RISES ABOVE 6IN. THE "ALL PUMPS OFF" BULB SWITCH CLOSES.
2. AS THE SUMP PIT WATER LEVEL RISES ABOVE 2 FT. THE "SP-D" BULB SWITCH CLOSES AND THE RELATED PUMP STARTS.
3. OPERATION 2 IS REPEATED FOR "SP-C", "SP-B" AND "SP-A" BULB SWITCHES AS WATER LEVEL REACHES TABLE LEVELS RESPECTIVELY.
4. AS WATER LEVEL REACHES 18 FT. THE HIGH WATER ALARM IS ACTIVATED.
5. ALL PUMPS STARTED WILL REMAIN ON UNTIL THE, SUMP PIT WATER LEVEL IS LOWERED TO 1 FT. OR UNTIL OVERLOAD CONTACTS ARE OPENED, OR UNTIL MANUALLY DISCONNECTED.

OFF POSITION

1. PUMPS ARE OFF REGARDLESS OF WATER LEVEL WHEN ALL PUMP CONTROLS ARE IN THE OFF POSITION.
2. EACH PUMP MAY BE INDIVIDUALLY PLACED IN THE OFF POSITION, DISABLING THE PUMP.

HAND POSITION

1. PUMPS ARE ON REGARDLESS OF WATER LEVEL WHEN PUMP CONTROLS ARE IN THE HAND POSITION.
2. EACH PUMP MAY BE INDIVIDUALLY PLACED IN THE HAND POSITION, ENABLING THE PUMP.

STATE OF TEXAS
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1/7/97

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FINAL RECORD DRAWING
Date: 12/25/99

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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL
FIRE PROTECTION, PLUMBING
SCHEDULES & CONTROL DIAGRAMS

HDR Engineering, Inc.

SECTION XIII

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CONTRACT No. DNT-260 SHEET P152 OF 166

FILE: p:\addtun\dgn\adtupl09.dgn
DATE: 23-Apr-96 20:01

ELECTRICAL SYMBOLS

ALL SYMBOLS SHOWN DO NOT NECESSARILY APPEAR ON DRAWINGS

"XXX"	DISTRIBUTION SWITCHBOARD OR PANELBOARD (LETTER DENOTES PANEL IDENTIFICATION)	F	FIRE ALARM HORN/BELL COMPLETE WITH ADA APPROVED STROBE LIGHT	$	SINGLE POLE SWITCH (4'-0" AFF) UNLESS NOTED OTHERWISE		NEUTRAL, HOT, ISOLATED GROUND, SWITCH LEG, EQUIPMENT GROUND, CONDUCTORS
"XX"	SURFACE MOUNTED BRANCH PANELBOARD (LETTERS DENOTES PANEL IDENTIFICATION)	F FS	FIRE ALARM FLOW SWITCH	$WP	SINGLE POLE WEATHERPROOF SWITCH (4'-0" AFF) UNLESS NOTED OTHERWISE		HOMERUN TO PANELBOARD AS INDICATED
A	FLUORESCENT LIGHT FIXTURE, EMERGENCY CIRCUIT, W/EMERG. BATTERY/ INVERTER PACK (LETTER DENOTES FIXTURE TYPE)	F S	FIRE ALARM SMOKE DETECTOR ("H" INDICATES FIRE ALARM HEAT DETECTOR)	$2	DOUBLE POLE SWITCH (4'-0" AFF) UNLESS NOTED OTHERWISE	X,X,X	BRANCH CIRCUITS PROTECTED BY SINGLE POLE DEVICES ("X" DENOTES PANELBOARD SPACE CIRCUIT NUMBERS)
A	FLUORESCENT LIGHT FIXTURE (LETTER DENOTES FIXTURE TYPE)	F TS	FIRE ALARM TAMPER SWITCH	$3	THREE WAY SWITCH (4'-0" AFF) UNLESS NOTED OTHERWISE	X/X	BRANCH CIRCUITS PROTECTED BY 2 POLE DEVICES ("X" DENOTES PANELBOARD SPACE CIRCUIT NUMBERS)
A	FLUORESCENT LIGHT FIXTURE - WALL MOUNTED (LETTER DENOTES FIXTURE TYPE)	F	FIRE ALARM MANUAL PULL STATION	$4	FOUR WAY SWITCH (4'-0" AFF) UNLESS NOTED OTHERWISE	X/X/X	BRANCH CIRCUITS PROTECTED BY 3 POLE DEVICES ("X" DENOTES PANEL BOARD SPACE CIRCUIT NUMBERS)
(WALL) A HEB-V3	SURFACE MOUNTED TUNNEL LIGHTING AS INDICATED: LETTER DENOTES FIXTURE TYPE); ALPHA-NUMERIC CHARECTERS INDICATE BRANCH CIRCUIT.	F SD	FIRE ALARM SMOKE DETECTOR - DUCT TYPE	$M	MANUAL MOTOR CONTROLLER WITH OVERLOAD PROTECTION (EQUIPMENT MOUNTED, UNLESS INDICATED OTHERWISE)		CONDUIT EMBEDDED OR CONCEALED IN CEILING OR WALL
(WALL) W	SUPPLEMENTAL EMERGENCY LIGHTING UNIT WITH EMERGENCY BATTERY/INVERTER PACK: LETTER DENOTES FIXTURE TYPE.	F L	EXTERIOR TYPE FIRE ALARM BELL W/ADA APPROVED STROBE LIGHT		CONDUIT STUB OUT AND CAP	1	BRANCH CIRCUITS / DESIGNATION: REFERENCE FEEDER SCHEDULE, SHEET 161.
X	FLUORESCENT STRIP LIGHT FIXTURE (LETTER DENOTES FIXTURE TYPE)	V	WALL MOUNTED VISUAL ALARM SIGNAL APPLIANCE WITH ADA APPROVED STROBE LIGHT		MULTI-OUTLET ASSEMBLY, SURFACE MOUNTED, RECEPTACLES SPACINGS AS INDICATED ON DRAWINGS. POWER, DATA, TELE. COMPARTMENTS AS REQUIRED FOR APPLICATION.	M	MOTOR
X	EXIT LIGHT - CEILING MOUNTED (LETTER DENOTES FIXTURE TYPE, SHADED AREA INDICATES FACE, ARROW DIRECTIONAL ARROW)		FIRE ALARM MAGNETIC DOOR HOLDER W/ RELEASE SWITCH ABOVE.		CONDUIT IN OR UNDER FLOOR	1	MOTOR FEEDER SCHEDULE DESIGNATION (REF. SHEET E161)
X	EXIT LIGHT - WALL MOUNTED (LETTER DENOTES FIXTURE TYPE, SHADED AREA INDICATES FACE, ARROW DIRECTIONAL ARROW)	FACP	FIRE ALARM CONTROL PANEL		CONDUIT EXPOSED	- PEU -	(REFERENCE SHEET 183 FOR SYMBOLS / ABBREVATIONS NOT DEFINED HERE)
TB	TELEPHONE BACKBOARD (4' X 8' X ¾" PLYWOOD) MOUNTED HORIZONTALLY	FAAP	FIRE ALARM ANNUNCIATOR PANEL		FLEXIBLE CONDUIT AND WIRES TO FIXTURE, MOTOR OR EQUIPMENT CONNECTION	- PTU -	PROPOSED OVERHEAD/UNDERGROUND ELECTRICAL PRIMARY (BY ELECTRIC UTILITY COMPANY)
	TELEPHONE OUTLET - WALL MOUNTED (18" AFF) UNLESS NOTED OTHERWISE	OR OR T	POWER TRANSFOMER		CONDUIT STUBBED UP	- T -	PROPOSED UNDERGROUND TELEPHONE SERVICE (BY TELEPHONE UTILITY COMPANY)
EM	EMERGENCY TELEPHONE OUTLET COMPLETE WITH EMERGENCY TELEPHONE/CALL BOX (SEE SPECIFICATIONS), LOCATED 48" A.F.F. UNLESS INDICATED OTHERWISE.	J	JUNCTION BOX - CEILING MOUNTED		CONDUIT STUBBED DOWN	- UP -	UNDERGROUND DUCT FOR FACILITY TELEPHONE UTILITIES
W	TELEPHONE OUTLET - WALL MOUNTED (42" AFF) UNLESS NOTED OTHERWISE	J	JUNCTION BOX - WALL MOUNTED	AM	AMMETER	- US -	UNDERGROUND DUCT FOR FACILITY PRIMARY UTILITIES
C	CEILING/WALL BRACKET MOUNTED BLUE LIGHT (LETTER DENOTES FIXTURE TYPE).	PH	PHOTOCELL	VM	VOLTMETER	- ES -	UNDERGROUND DUCT FOR FACILITY ELECTRICAL UTILITIES
D	20A, 125V, 2P, 3W GROUNDING DUPLEX RECEPTACLE NEMA 5-20R DEDICATED TO OWNERS GENERAL COMPUTER/APPLIANCE EQUIPMENT (18" AFF) UNLESS NOTED OTHERWISE		LIGHTING CONTACTOR		TELE/DATA FLOOR OUTLET, FLUSH MOUNTING		UNDERGROUND DUCT FOR EMERGENCY GENERATOR SERVICE
	20A, 125V, 2P, 3W GROUNDING DUPLEX RECEPTACLE NEMA 5-20R (18" AFF) UNLESS NOTED OTHERWISE	T S	TIME SWITCH (SPECIFY VOLTS, AMPS PER CONTACT, CIRCUIT)	OR	AUTOMATIC TRANSFORMER SWITCH		PAD-MOUNT TRANSFORMER (BY ELECTRIC UTILITY COMPANY) CONCRETE PAD AND PROVISIONS BY CONTRACTOR
GFI	DUPLEX RECEPTACLE WITH BUILT-IN GROUND FAULT PROTECTION, 18" AFF. UNLESS NOTED OTHERWISE	AS	PHASE SELECTOR SWITCH, AMMETER	AFF	ABOVE FINISH FLOOR	H	EMERGENCY GENERATOR ON CONCRETE HOUSEKEEP PAD
*	DUPLEX RECEPTACLE MOUNTED HORIZONTAL 6" ABOVE COUNTER UNLESS NOTED OTHERWISE (COORDINATE EXACT HEIGHT WITH ARCHITECT PRIOR TO INSTALLATION.)	VS	PHASE SELECTOR SWITCH, VOLTMETER	AFG	ABOVE FINISH GRADE	H	ELECTRIC UTILITIES MANHOLE
	GROUND	WP	WEATHERPROOF	30/3 OR 3P-30	3 POLE FUSED DISCONNECT SWITCH, RATING AS INDICATED	[T]	TELEPHONE UTILITIES MANHOLE EXISTING AIRFIELD MANHOLE/HAND HOLE TO REMAIN
	SPECIAL PURPOSE RECEPTACLE, NEMA CONFIG. AS INDICATED	WHM	WATT-HOUR METER	30/3 OR 3P-30	COMBINATION MAGNETIC STARTER AND FUSED SWITCH	PP	OVERHEAD ELECTRICAL PRIMARY UTILITY POWER POLE (BY ELECTRIC UTILITY COMPANY)

LIGHTING FIXTURE SCHEDULE

TYPE	MANUFACTURER / DESCRIPTION	VOLTAGE	LAMPS NO.	LAMPS TYPE	MOUNTING	REMARKS
A	G.E. LIGTHING SYSTEMS/MODEL NO. TUN-40-S-5-M-25-MC3-09-CG-F "TUNNEL GUARD" LUMINARE	480V	1	400W HPS E-18	SEE DETAIL	TYPICAL TUNNEL LIGHTING LUMINAIRE: U.L. LISTED, SUITABLE FOR WET LOCATIONS, GLASS LENS, HEAVY DIE-CAST ALUMINUM HOUSING, FUSED.
B	G.E. LIGTHING SYSTEMS/MODEL NO. TUN-15-S-5-M-2-MC4-09-CG-F "TUNNEL GUARD" LUMINARE	480V	1	E-23½" HPS 150W	SEE DETAIL	SAME AS ABOVE EXCEPT 150 W HPS LAMPS.
BR	G.E. LIGTHING SYSTEMS/MODEL NO. TUN-15-S-5-K-2-MC4-09-CG-F "TUNNEL GUARD" LUMINARE	480V	1	150W HPS E-23½"	SEE DETAIL	SAME AS ABOVE EXCEPT 150 W HPS LAMPS: PROVIDE HOT RE-START BALLAST FOR EMERGENCY LIGHTING.
C	HUBBELL LIGHTING/MODEL NO. NVQ GG-SERIES D'AC 3003	277V	1	18 W QUAD PL	SURFACE/WALL	BLUE LIGHT STATION FIXTURE: NON-METALIC VAPORTITE SERIES, HARSH LOCATION INDUSTRIAL LUMINARE. PROVIDE MATCHING BLUE GLASS GLOBE WITH GUARD AND SURFACE MOUNTING BRACKET HARDWARE AS REQUIRED.
D	HOLOPHANE LIGHTING/MODEL NO. WL3K-070HP-MT-GR-F1-PS-U HUBBELL NRG 307-PC/NRG-B3	120V	1	E-23½" HPS 70W	SURFACE/WALL	EXTERIOR UTILITY AREA WALLPACK LUMINARE: PROVIDE MODEL NO. WL KPR20/24/27/34 W/INTEGRAL PHOTO CONTROL KIT. EXTERIOR MOUNTED FIXTURES ONLY AND NO. WL KWG WIRE GUARD.

LIGHTING FIXTURE SCHEDULE

TYPE	MANUFACTURER / DESCRIPTION	VOLTAGE	LAMPS NO.	LAMPS TYPE	MOUNTING	REMARKS
E	HUBBELL SW42R-B4-WG-ALUM-EM WILLIAMS 76-4-2320C-2320C-EB-ALUM-EM	277V	2	F32T8/741	SUSPENDED/CHAIN (8'-0" A.F.F.)	INDOOR UTILITY FLUORESCENT: PROVIDE COMPLETE WITH EMERGENCY BATTERY/INVERTER PACK
G	USI COLUMBIA LIGHTING MODEL NO. LU240-WL-EL HUBBELL EWL-042R-TADR-LB4/UFO-2PI	277V	2	F32T8/741	SURFACE/CEILING	INDOOR UTILITY FLUORESCENT: PROVIDE COMPLETE WITH REMOTE EMERGENCY BATTERY/INVERTER PACK ELECTRONIC LOW TEMP
H	HUBBEL LIGHTING MODEL NO. EWL042H-TPDR-H1 WILLIAMS 92-4-248H1-EDUB	120V	2	F48T12/ CW/HO	SURFACE/WALL (SEE NOTE *3)	SUMP PIT LIGHTING: U.L. LISTED FOR WET LOCATION (DUST/MOISTURE TIGHT) WITH PLASTIC HOUSING. ELECTRONIC LOW TEMP BALLAST
J	HUBBELL LIGHTING MODEL NO. NVQ-GG SERIES	120V	1	18W QUAD PL	SURFACE/CEILING	SUMP PIT LIGHTING: NON-METALIC VAPORTITE SERIES HARSH LOCATION INDUSTRIAL LUMINARE. PROVIDE MATCHING CLEAR GLASS GLOBE WITH GUARD AND SURFACE/CEILING MOUNTING HARDWARE AS REQUIRED.
W	DUALITE-N4X4I-HEAT-40G HUBBELL N46-25-2-MOD	277V	2	SELF-CONTAINED H7553 12 WATT HALOGEN	SUSPENDED/CHAIN (8'-0" A.F.F.)	SUPPLEMENTAL EMERGENCY LIGHTING: PROVIDE COMPLETE WITH SELF DIANOSTICS, WIRE GUARD, HEATER OPTION, PURE LEAD BATTERY. CONTRACTORSHALL PROVIDE WALL-MOUNT BRACKET AND FIELD ADJUST HEADS SO AS TO ILLUMINATE WALKWAYS.
X	DUALITE EX 21XOI HUBBELL D42 SERIES	277V	NA	SELF-CONTAINED	SURFACE/WALL CEILING (UNIVERSAL)	EXIT LIGHT: EMERGENCY VANDAL PROOF EXIT WITH SELF DIANOSTICS, PURE LEAD BATTERY

LIGHTING FIXTURE SCHEDULE NOTES:

1. TUNNEL ILLUMINATION IS BASED ON LUMINANCEVALUES IN ACCORDANCE WITH IES/ANSI STANDARD RP-22-87, MEASURED IN CD/M2 LIGHTING DESIGN IS BASED ON FIXTURE AS SCHEDULES. COMPUTER GENERATED STATISTICAL POINT-BY-POINT LUMINANCE/PHOTOMETRIC CALCULATION DATA SCALE DRAWING SHALL BE SUBMITTED FOR REVIEW AND APPROVAL AS SHOP DRAWING DATA.
2. FIXTURE LOCATED AT EXTERIOR OF ELECTRICAL ROOM SHALL BE MOUNTED 6 INCHES CLEAR BELOW ROOF LINE, OR 8'-0" ABOVE FINISHED FLOOR/GRADE.
3. PIT LIGHTING SHALL BE MOUNTED 6 INCHES MINIMUM BELOW INSTALLED GRATE.
4. COORDINATE/VERIFY FIXTURE LAMP DATA WITH MANUFACTURER PRIOR TO OPERATING.

GENERAL NOTES:

A. ALL ELECTRICAL INSTALLATIONS SHALL CONFORM TO THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE, NATIONAL ELECTRICAL SAFETY CODE, NATIONAL FIRE PROTECTION ASSOCIATION, UNDERWRITERS LABORATORIES, LOCAL AND STATE CODES, AS ADOPTED BY THE CITY OF ADDISON: SEE SPECIFICATIONS.

B. ALL DRAWINGS ARE DIAGRAMMATIC REPRESENTATIONS: COORDINATE/VERIFY EXACT LOCATIONS OF LIGHTING FIXTURES, DEVICES, EQUIPMENT, ETC., AS INDICATED WITH OTHER DISCIPLINES, TUNNEL STRUCTURAL PLANS, EQUIPMENT AND APPURTENANCES.

C. ALL ELECTRICAL PROVISIONS/APPURTENANCES PROVIDED BY THESE DRAWINGS SHALL BE CORROSION RESISTANT/WEATHERPROOF. CONDUIT UTILIZED THROUGHOUT THIS PROJECT SHALL BE ¾" MINIMUM, UNLESS INDICATED OTHERWISE.

D. HOMERUNS TO PANELBOARD SHALL UTILIZE NO. 10 AWG CONDUCTORS UNLESS INDICATED OTHERWISE OR BY SPECIFICATIONS: EMPTY CONDUIT SHALL BE PROVIDED WITH PULL-WIRE.

E. CONDUIT SHALL BE PVC COATED GALVANIZED RIGID STEEL (GRS) EMBEDDED IN CONCRETE WHERE POSSIBLE, AND PROPERLY SECURED IN PLACE (DUE TO CONCRETE PLACEMENT UNDER HIGH-PRESSURE/MACHINERY): COORDINATE WITH STRUCTURAL CONTRACTOR. ALL EXPOSED CONDUIT AND STUB-UPS SHALL BE GRS, UNLESS INDICATED OTHERWISE.

F. LIGHTING, POWER, COMMUNICATIONS, EMERGENCY, FIRE ALARM, LIFE SAFETY SYSTEMS ARE SEPARATE SYSTEMS AND SHALL BE PROVIDED WITH THEIR OWN CONDUIT, FITTINGS AND APPURTENANCES: I.E., RACEWAY SYSTEMS SHALL NOT BE SHARED.

G. WHERE FEEDERS ARE IN EXCESS OF 400 FT. AND/OR CONDUIT RUNS REQUIRE 360 DEGREE OR MORE OF BENDING RADIUS, PULL-BOXES SHALL BE PROVIDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL.

REFER TO RFI #927
EXTRA CONDUIT IN TUNNEL
VARIFICATION OF QUANTITIES

STATE OF TEXAS
LEOPOLDO F. RIOS
58272
REGISTERED
PROFESSIONAL ENGINEER
9-9-96

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEOPOLDO F. RIOS, P.E., 58272 ON SEPTEMBER 9, 1996

FINAL RECORD DRAWING
Date: 12/25/99

2 REVISION PER RFI # 927

No.	REVISION	BY	DATE
1	ADDENDUM No.1	HDR	2-12-97

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

SYMBOLS, ABBREVIATIONS, SCHEDULES & GENERAL NOTES

HDR HDR Engineering, Inc.

SECTION XIII

DRAWN: WTD DATE: 12/05/96 DESIGNED: LR DATE: 08/28/96
CHECKED: BL DATE: 08/28/96 SCALE: NONE

CONTRACT No. DNT-260 SHEET E153 OF 166

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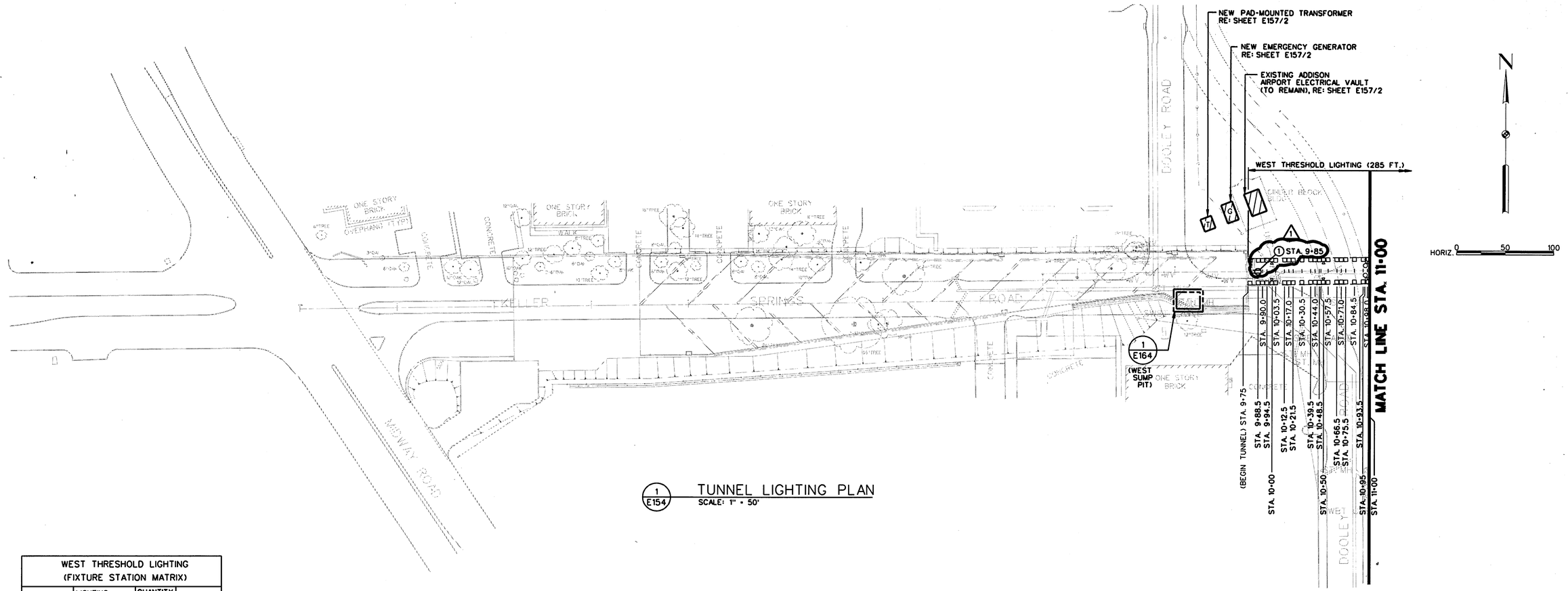

1 E154 TUNNEL LIGHTING PLAN
SCALE: 1" = 50'

WEST THRESHOLD LIGHTING (FIXTURE STATION MATRIX)			
STATION DESIGNATION	LIGHTING FIXTURE TYPE/ DESIGNATION	QUANTITY AT THIS STATION	BRANCH CIRCUIT
9+77.0	A	2	HWB-1/3
9+85.5	A	2	HWB-1/3
9+90.0	BR	2	HWA-1/3
9+94.5	A	2	HWB-1/3
10+00	W	2	HWA-1
10+03.5	A	2	HWB-1/3
10+12.5	A	2	HWB-1/3
10+17.0	BR	2	HWA-1/3
10+21.5	A	2	HWB-1/3
10+30.5	A	2	HWB-1/3
10+39.5	A	2	HWB-1/3
10+44.0	BR	2	HWA-1/3
10+48.5	A	2	HWB-1/3
10+50	W	2	HWA-3
10+57.5	A	2	HWB-1/3
10+66.5	A	2	HWB-5/7
10+71.0	BR	2	HWA-1/3
10+75.5	A	2	HWB-5/7
10+84.5	A	2	HWB-5/7
10+93.5	A	2	HWB-5/7
10+95.0	C	2	HWA-3
10+98.0	BR	2	HWA-1/3
11+00	W	2	HWA-1

GENERAL NOTES:

A. FIXTURES SHALL BE LOCATED AT STATIONS AS SHOWN UNLESS INDICATED OTHERWISE. IN GENERAL, FIXTURE SPACING BEGINS AT BOTH THE WEST AND EAST PORTALS AND PROGRESSES TOWARDS THE TUNNEL MIDPOINT. CIRCUITING NOT INDICATED ON THIS PLAN FOR CLARITY: REFERENCE DETAIL 1/E165, "TYPICAL TUNNEL LIGHTING PLAN" FOR TYPICAL CIRCUIT.

B. REFERENCE DETAIL 2/E166, "TYPICAL TUNNEL CONDUIT SYSTEM DETAIL" FOR GENERAL CONDUIT ROUTING INFORMATION.

C. BRANCH CIRCUITS SERVING BOTH 480 VOLT, SINGLE-PHASE LIGHTING FIXUTRES AND 277 VOLT, SINGLE-PHASE LIGHTING FIXTURES SHALL BE PROVIDED WITH NEUTRAL CONDUCTOR(S).

D. TUNNEL LIGHTING IS REDUCED DURING NIGHT-TIME HOURS BY SWITCHING-OFF FEEDERS SERVING PANELBOARD FOR SELECTED FIXTURES. PROVIDE CONTACTOR CONTROLLED BY PHOTO-ELECTRIC CELL FOR EACH PANELBOARD INDICATED; SEE DETAIL 1/E161 AND 4/E167 FOR FURTHER INFORMATION.

KEY NOTES:

1. ① WEATHERPROOF IG RECEPTACLE (TAYMACK #10370 OR EQUAL)FOR SECURITY CAMERA. RECEPTACLE SHALL BE SERVED FROM PANELBOARD "LWA-2". EXTEND CONDUCTORS AND PROVIDE PULL BOXES AS REQUIRED. REFER TO SHEET 2/E160 FOR ADDITIONAL INFORMATION. VERIFY EXACT LOCATION WITH SECURITY CONSULTANT PRIOR TO INSTALLATION.

FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS
LEOPOLDO F. RIOS
58272
REGISTERED
PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEOPOLDO F. RIOS, P.E., 58272 ON MAY 18,1998

No.	REVISION	BY	DATE
1	CHANGE ORDER	HDR	5-27-98

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL LIGHTING PLAN

HDR Engineering, Inc.

SECTION XIII

DRAWN: WTD DATE: 12/05/96 DESIGNED: LR DATE: 08/28/96
CHECKED: BL DATE: 08/28/96 SCALE: 1"= 50'

CONTRACT No. DNT-260 SHEET E154 OF 166

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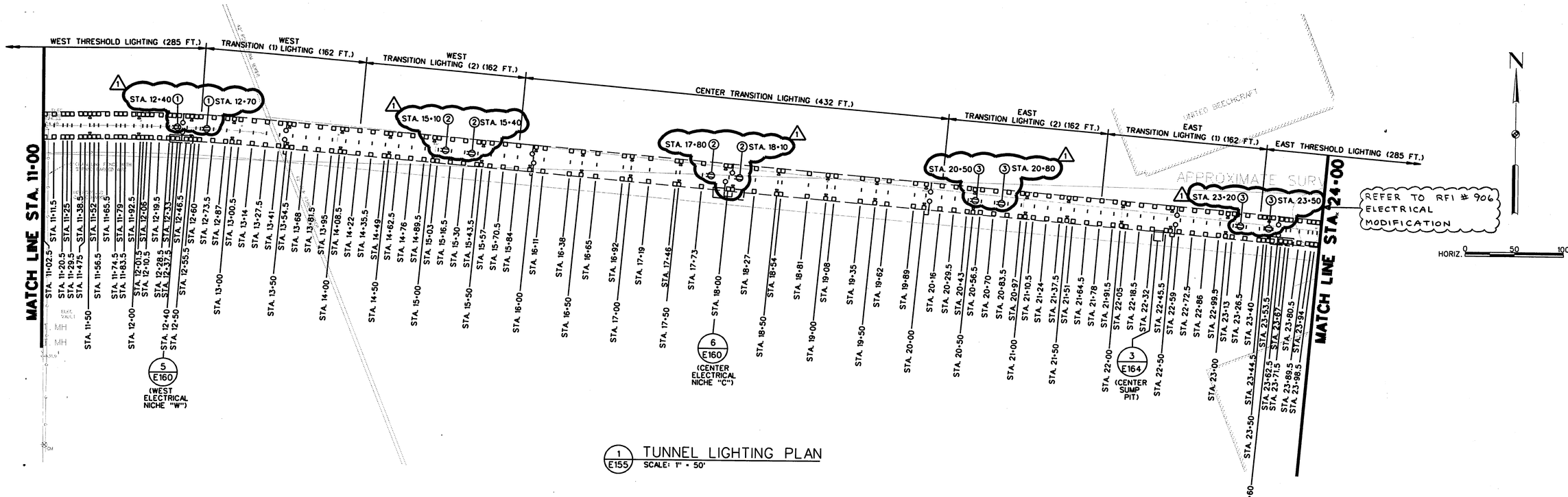

1 / E155 TUNNEL LIGHTING PLAN
SCALE: 1" = 50'

WEST THRESHOLD LIGHTING (FIXTURE STATION MATRIX)			
STATION DESIGNATION	LIGHTING FIXTURE TYPE/ DESIGNATION	QUANTITY AT THIS STATION	BRANCH CIRCUIT
11+02.5	A	2	HWB-5/7
11+11.5	A	2	HWB-5/7
11+20.5	A	2	HWB-5/7
11+25	BR	2	HWA-1/3
11+29.5	A	2	HWB-5/7
11+38.5	A	2	HWB-5/7
11+47.5	A	2	HWB-5/7
11+50	W	2	HWA-1
11+52.0	BR	2	HWA-1/3
11+56.5	A	2	HWB-9/11
11+65.5	A	2	HWB-9/11
11+74.5	A	2	HWB-9/11
11+79.0	BR	2	HWA-1/3
11+83.5	A	2	HWB-9/11
11+92.5	A	2	HWB-9/11
12+00	W	2	HWA-3
12+01.5	A	2	HWB-9/11
12+06.0	BR	2	HWA-1/3
12+10.5	A	2	HWB-9/11
12+19.5	A	2	HWB-9/11
12+28.5	A	2	HWB-9/11
12+33	BR	2	HWA-1/3
12+37.5	A	2	HWB-9/11
12+40	C	2	HWA-1
12+46.5	A	2	HWB-13/15
12+50	W	2	HWA-3
12+55.5	A	2	HWB-13/15

WEST TRANSITION (1) LIGHTING (FIXTURE STATION MATRIX)			
STATION DESIGNATION	LIGHTING FIXTURE TYPE/ DESIGNATION	QUANTITY AT THIS STATION	BRANCH CIRCUIT
12+60	BR	2	HWA-5/7
12+73.5	A	2	HWB-13/15
12+87	BR	2	HWA-5/7

WEST TRANSITION (1) LIGHTING (FIXTURE STATION MATRIX)			
STATION DESIGNATION	LIGHTING FIXTURE TYPE/ DESIGNATION	QUANTITY AT THIS STATION	BRANCH CIRCUIT
13+00	W	2	HWA-5
13+00.5	A	2	HWB-13/15
13+14	BR	2	HWA-5/7
13+27.5	A	2	HWB-13/15
13+41	BR	2	HWA-5/7
13+50	C	2	HWA-7
13+50	W	2	HWA-7
13+54.5	A	2	HWB-13/15
13+68	BR	2	HWA-5/7
13+81.5	A	2	HWB-13/15
13+95	BR	2	HWA-5/7
14+00	W	2	HWA-5
14+08.5	A	2	HWB-13/15

WEST TRANSITION (2) LIGHTING (FIXTURE STATION MATRIX)			
STATION DESIGNATION	LIGHTING FIXTURE TYPE/ DESIGNATION	QUANTITY AT THIS STATION	BRANCH CIRCUIT
14+22	BR	2	HWA-5/7
14+35.5	B	2	HWB-17/19
14+49	BR	2	HWA-5/7
14+50	W	2	HWA-7
14+62.5	B	2	HWB-17/19
14+76	BR	2	HWA-5/7
14+89.5	B	2	HWB-17/19
15+00	W	2	HWA-5
15+03.0	BR	2	HWA-5/7
15+16.5	B	2	HWB-17/19
15+30	BR	2	HWA-5/7
15+43.5	B	2	HWB-17/19
15+50	W	2	HWA-5
15+57	BR	2	HWA-5/7
15+70.5	B	2	HWB-17/19

CENTER TRANSITION LIGHTING (FIXTURE STATION MATRIX)			
STATION DESIGNATION	LIGHTING FIXTURE TYPE/ DESIGNATION	QUANTITY AT THIS STATION	BRANCH CIRCUIT
15+84	BR	2	HCA-1/3
16+00	C	2	HCA-1
16+00	W	2	HCA-3
16+11	B	2	HCB-1/3
16+38	BR	2	HCA-1/3
16+50	W	2	HCA-1
16+65	B	2	HCB-1/3
16+92	BR	2	HCA-1/3
17+00	W	2	HCA-3
17+19	B	2	HCB-1/3
17+46	BR	2	HCA-1/3
17+50	W	2	HCA-1
17+73	B	2	HCB-1/3
18+00	C	2	HCA-3
18+00	BR	2	HCA-1/3
18+00	W	2	HCA-1
18+27	B	2	HCB-1/3
18+50	W	2	HCA-3
18+54	BR	2	HCA-1/3
18+81	B	2	HCB-1/3
19+00	W	2	HCA-1
19+08	BR	2	HCA-1/3
19+35	B	2	HCB-1/3
19+50	W	2	HCA-3
19+62	BR	2	HCA-1/3
19+89	B	2	HCB-1/3
20+00	W	2	HCA-1
20+00	C	2	HCA-3

EAST TRANSITION (2) LIGHTING (FIXTURE STATION MATRIX)			
STATION DESIGNATION	LIGHTING FIXTURE TYPE/ DESIGNATION	QUANTITY AT THIS STATION	BRANCH CIRCUIT
20+16	BR	2	HEA-9/11
20+29.5	B	2	HEB-17/19

EAST TRANSITION (2) LIGHTING (FIXTURE STATION MATRIX)			
STATION DESIGNATION	LIGHTING FIXTURE TYPE/ DESIGNATION	QUANTITY AT THIS STATION	BRANCH CIRCUIT
20+43	BR	2	HEA-9/11
20+50	W	2	HEA-9
20+56.5	B	2	HEB-17/19
20+70	BR	2	HEA-9/11
20+83.5	B	2	HEB-17/19
20+97	BR	2	HEA-9/11
21+00	W	2	HEA-11
21+10.5	B	2	HEB-17/19
21+24	BR	2	HEA-9/11
21+37.5	B	2	HEB-17/19
21+50	W	2	HEA-9
21+51	BR	2	HEA-9/11
21+64.5	B	2	HEB-17/19
21+78	BR	2	HEA-9/11

EAST TRANSITION (1) LIGHTING (FIXTURE STATION MATRIX)			
STATION DESIGNATION	LIGHTING FIXTURE TYPE/ DESIGNATION	QUANTITY AT THIS STATION	BRANCH CIRCUIT
21+91.5	A	2	HEB-13/15
22+00	W	2	HEA-5
22+05	BR	2	HEA-5/7
22+18.5	A	2	HEB-13/15
22+32	BR	2	HEA-5/7
22+45.5	A	2	HEB-13/15
22+50	W	2	HEA-7
22+50	C	2	HEA-5
22+59	BR	2	HEA-5/7
22+72.5	A	2	HEB-13/15
22+86	BR	2	HEA-5/7
22+99.5	A	2	HEB-13/15
23+00	W	2	HEA-7
23+13	BR	2	HEA-5/7
23+26.5	A	2	HEB-13/15
23+40	BR	2	HEA-5/7

EAST THRESHOLD LIGHTING (FIXTURE STATION MATRIX)			
STATION DESIGNATION	LIGHTING FIXTURE TYPE/ DESIGNATION	QUANTITY AT THIS STATION	BRANCH CIRCUIT
23+44.5	A	2	HEB-9/11
23+50	W	2	HEA-1
23+53.5	A	2	HEB-9/11
23+60	C	2	HEA-3
23+62.5	A	2	HEB-9/11
23+67	BR	2	HEA-1/3
23+71.5	A	2	HEB-9/11
23+80.5	A	2	HEB-9/11
23+89.5	A	2	HEB-9/11
23+94	BR	2	HEA-1/3
23+98.5	A	2	HEB-9/11

GENERAL NOTES:

A. FIXTURES SHALL BE LOCATED AT STATIONS AS SHOWN UNLESS INDICATED OTHERWISE. IN GENERAL, FIXTURE SPACING BEGINS AT BOTH THE WEST AND EAST PORTALS AND PROGRESSES TOWARDS THE TUNNEL MIDPOINT. CIRCUITING NOT INDICATED ON THIS PLAN FOR CLARITY: REFERENCE DETAIL 1/E165, "TYPICAL TUNNEL LIGHTING PLAN" FOR TYPICAL CIRCUIT.

B. REFERENCE DETAIL 2/E166, "TYPICAL TUNNEL CONDUIT SYSTEM DETAIL" FOR GENERAL CONDUIT ROUTING INFORMATION.

C. BRANCH CIRCUITS SERVING BOTH 480 VOLT, SINGLE-PHASE LIGHTING FIXUTRES AND 277 VOLT, SINGLE-PHASE LIGHTING FIXTURES SHALL BE PROVIDED WITH NEUTRAL CONDUCTOR(S).

D. TUNNEL LIGHTING IS REDUCED DURING NIGHT-TIME HOURS BY SWITCHING-OFF FEEDERS SERVING PANELBOARD FOR SELECTED FIXTURES. PROVIDE CONTACTOR CONTROLLED BY PHOTO-ELECTRIC CELL FOR EACH PANELBOARD INDICATED: SEE DETAIL 1/E161 AND 4/E167 FOR FURTHER INFORMATION.

KEY NOTES:

1. WEATHERPROOF, IG RECEPTACLE (TAYMAC *10370 OR EQUAL)FOR SECURITY CAMERA. RECEPTACLE SHALL BE SERVED FROM PANELBOARD "LWA-2". EXTEND CONDUCTORS AND PROVIDE PULL BOXES AS REQUIRED. REFER TO SHEET 2/E160 FOR ADDITIONAL INFORMATION. VERIFY EXACT LOCATION WITH SECURITY CONSULTANT PRIOR TO INSTALLATION.
2. WEATHERPROOF, IG RECEPTACLE (TAYMAC *10370 OR EQUAL) FOR SECURITY CAMERA. RECEPTACLE SHALL BE SERVED FROM PANELBOARD "LCA-7". EXTEND CONDUCTORS AND PROVIDE PULL BOXES AS REQUIRED. REFER TO SHEET 4/E160 FOR ADDITIONAL INFORMATION. VERIFY EXACT LOCATION WITH SECURITY CONSULTANT PRIOR TO INSTALLATION.
3. WEATHERPROOF, IG RECEPTACLE (TAYMAC *10370 OR EQUAL) FOR SECURITY CAMERA. RECEPTACLE SHALL BE SERVED FROM PANELBOARD "LEA-6". EXTEND CONDUCTORS AND PROVIDE PULL BOXES AS REQUIRED. REFER TO SHEET 3/E160 FOR ADDITIONAL INFORMATION. VERIFY EXACT LOCATION WITH SECURITY CONSULTANT PRIOR TO INSTALLATION.

STATE OF TEXAS
LEOPOLDO F. RIOS
58272
REGISTERED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEOPOLDO F. RIOS, P.E., 58272 ON MAY 18,1998

FINAL RECORD DRAWING
Date: 12/25/99

2 REVISION PER RFI #906
1 CHANGE ORDER HDR 5-27-98

No.	REVISION	BY	DATE

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL LIGHTING PLANS

HDR HDR Engineering, Inc.

SECTION XIII

DRAWN: WTD DATE: 12/05/96 DESIGNED: LR DATE: 08/28/96
CHECKED: BL DATE: 08/28/96 SCALE: 1"= 50'

CONTRACT No. DNT-260 SHEET E155 OF 166

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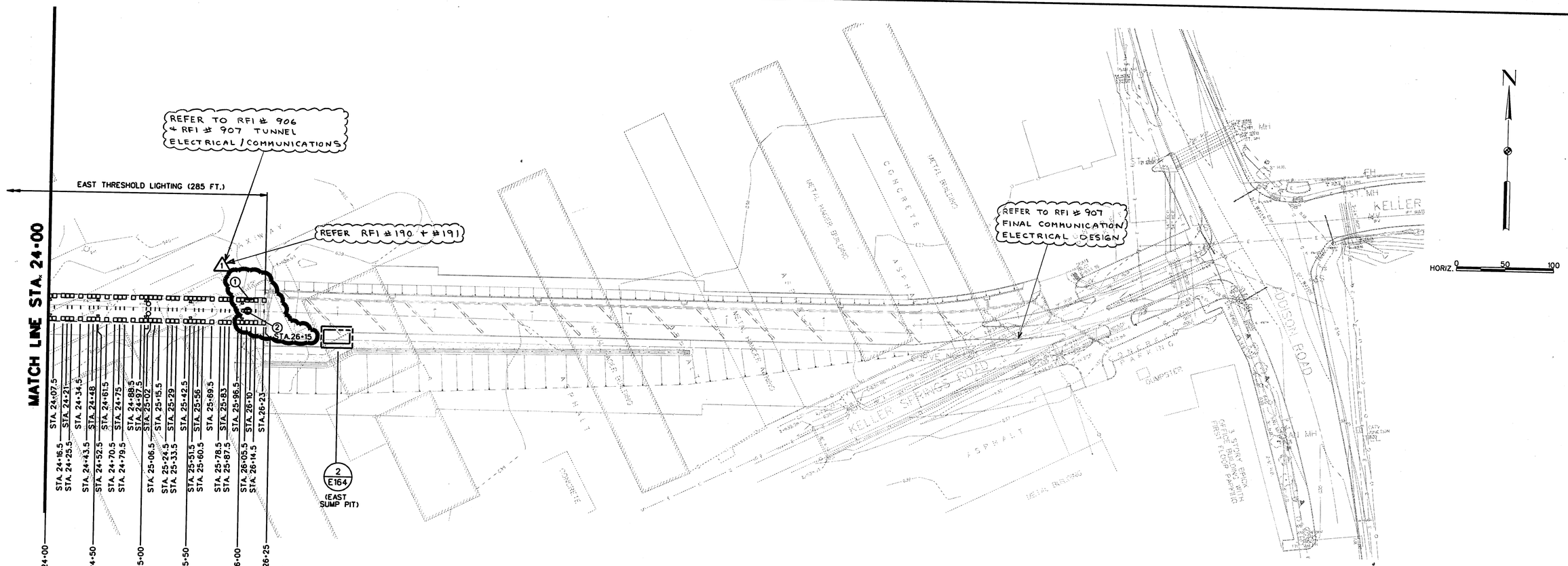
DATE: 23-Apr-96 20:01

Plotted with cn\dgn\user26.plt



1 / E156 TUNNEL LIGHTING PLAN
SCALE: 1" = 50'

EAST THRESHOLD LIGHTING (FIXTURE STATION MATRIX)			
STATION DESIGNATION	LIGHTING FIXTURE TYPE/ DESIGNATION	QUANTITY AT THIS STATION	BRANCH CIRCUIT
24+00	W	2	HEA-3
24+07.5	A	2	HEB-9/11
24+16.5	A	2	HEB-9/11
24+21	BR	2	HEA-1/3
24+25.5	A	2	HEB-9/11
24+34.5	A	2	HEB-9/11
24+43.5	A	2	HEB-5/7
24+48	BR	2	HEA-1/3
24+50	W	2	HEA-1
24+52.5	A	2	HEB-5/7
24+61.5	A	2	HEB-5/7
24+70.5	A	2	HEB-5/7
24+75	BR	2	HEA-1/3
24+79.5	A	2	HEB-5/7
24+88.5	A	2	HEB-5/7
24+97.5	A	2	HEB-5/7
25+00	W	2	HEA-3

EAST THRESHOLD LIGHTING (FIXTURE STATION MATRIX)			
STATION DESIGNATION	LIGHTING FIXTURE TYPE/ DESIGNATION	QUANTITY AT THIS STATION	BRANCH CIRCUIT
25+00	C	2	HEA-1
25+02	BR	2	HEA-1/3
25+06.5	A	2	HEB-5/7
25+15.5	A	2	HEB-5/7
25+24.5	A	2	HEB-5/7
25+29	BR	2	HEA-1/3
25+33.5	A	2	HEB-5/7
25+42.5	A	2	HEB-1/3
25+50	W	2	HEA-1
25+51.5	A	2	HEB-1/3
25+56	BR	2	HEA-1/3
25+60.5	A	2	HEB-1/3
25+69.5	A	2	HEB-1/3
25+78.5	A	2	HEB-1/3
25+83	BR	2	HEA-1/3
25+87.5	A	2	HEB-1/3
25+96.5	A	2	HEB-1/3
26+00	W	2	HEA-3
26+05.5	A	2	HEB-1/3
26+10	BR	2	HEA-1/3
26+14.5	A	2	HEB-1/3
26+23	A	2	HEB-1/3

GENERAL NOTES:

A. FIXTURES SHALL BE LOCATED AT STATIONS AS SHOWN UNLESS INDICATED OTHERWISE. IN GENERAL, FIXTURE SPACING BEGINS AT BOTH THE WEST AND EAST PORTALS AND PROGRESSES TOWARDS THE TUNNEL MIDPOINT. CIRCUITING NOT INDICATED ON THIS PLAN FOR CLARITY: REFERENCE DETAIL 1/E165, "TYPICAL TUNNEL LIGHTING PLAN" FOR TYPICAL CIRCUIT.

B. REFERENCE DETAIL 2/E166, "TYPICAL TUNNEL CONDUIT SYSTEM DETAIL" FOR GENERAL CONDUIT ROUTING INFORMATION.

C. BRANCH CIRCUITS SERVING BOTH 480 VOLT, SINGLE-PHASE LIGHTING FIXUTRES AND 277 VOLT, SINGLE-PHASE LIGHTING FIXTURES SHALL BE PROVIDED WITH NEUTRAL CONDUCTOR(S).

D. TUNNEL LIGHTING IS REDUCED DURING NIGHT-TIME HOURS BY SWITCHING-OFF FEEDERS SERVING PANELBOARD FOR SELECTED FIXTURES. PROVIDE CONTACTOR CONTROLLED BY PHOTO-ELECTRIC CELL FOR EACH PANELBOARD INDICATED: SEE DETAIL 1/E161 AND 4/E167 FOR FURTHER INFORMATION.

KEY NOTES:

1
① 48"W x 48"H x 12"D NEMA 3R LOCKABLE ENCLOSURE WITH INTERIOR BACK PLATE MOUNTED AT STA.26+15, 6'-0" A.F.F. LABLE ENCLOSURE AS "EAST" ENTRANCE SECURITY CABINET" AND PROVIDE THE FOLLOWING:

1. (1) 4" CONDUIT WITH (4) 1¼" INNER-DUCTS WITH PULL STRINGS TO EAST ELECTRICAL NICHE SECURITY CABINET. REF. SHEET E160 KEY NOTE #11.
2. (1) 1" CONDUIT WITH PULL STRING TO SECURITY CAMERA LOCATION EXTEND CONDUIT TO ADDITIONAL CAMERAS AS REQUIRED BY SECURITY CONSULTANT. PROVIDE J-BOXES AS REQUIRED.
3. (2) 4" CONCRETE ENCASED CONDUITS UNDERGROUND ALONG SOUTH SIDE OF KELLER SPRINGS RD. TO TU ELECTRIC UTILITY POLE LOCATED ON THE SOUTHWEST CORNER OF ADDISON RD. AND KELLER SPRINGS RD.

② WEATHERPROOF, IG RECEPTACLE (TAYMAC #10370 OR EQUAL) FOR SECURITY CAMERA. RECEPTACLE SHALL BE SERVED FROM PANELBOARD "LCA-7". EXTEND CONDUCTORS AND PROVIDE PULL BOXES AS REQUIRED. REFER TO SHEET 4/E160 FOR ADDITIONAL INFORMATION. VERIFY EXACT LOCATION WITH SECURITY CONSULTANT PRIOR TO INSTALLATION.

STATE OF TEXAS
LEOPOLDO F. RIOS
58272
REGISTERED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEOPOLDO F. RIOS, P.E., 58272 ON MAY 18, 1998

FINAL RECORD DRAWING
Date: 12/25/99

2 REVISION PER RFI #'S 906, 190, 191, 907

No.	REVISION	BY	DATE
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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL LIGHTING PLANS

HDR Engineering, Inc.

SECTION XIII

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CONTRACT No. DNT-260 SHEET E156 OF 166

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GENERAL NOTES:

A. IN GENERAL, DEVICE SPACING BEGINS AT BOTH THE EAST AND WEST ENTRIES AND PROGRESSES TOWARDS THE TUNNEL MID-POINT; DEVICE LOCATIONS SHALL BE AS INDICATED. REFERENCE MECHANICAL DRAWINGS FOR STATION LOCATIONS OF MECHANICAL EQUIPMENT AND DEVICES.

B. SEE DETAIL 2/E165, "TYPICAL TUNNEL CONDUIT SYSTEM DETAIL" FOR GENERAL CONDUIT ROUTING/CIRCUITING INFORMATION.

C. FIRE ALARM SYSTEM DEVICES, EMERGENCY TELEPHONE SYSTEM DEVICES AND CARBON MONOXIDE (CO) SYSTEM DEVICES SHALL BE PROVIDED WITH APPROPRIAT JUNCTION-BOXES/BACK-BOXES AND CONDUIT AS REQUIRED.

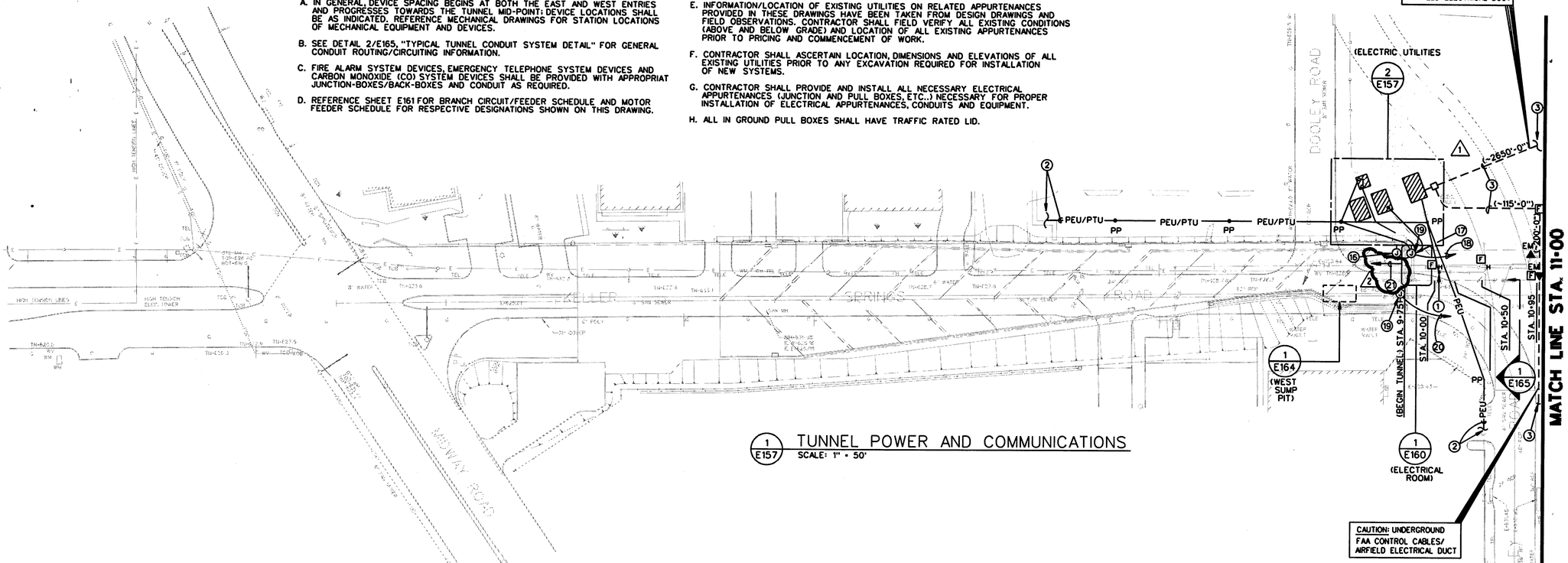
D. REFERENCE SHEET E161 FOR BRANCH CIRCUIT/FEEDER SCHEDULE AND MOTOR FEEDER SCHEDULE FOR RESPECTIVE DESIGNATIONS SHOWN ON THIS DRAWING.

E. INFORMATION/LOCATION OF EXISTING UTILITIES ON RELATED APPURTENANCES PROVIDED IN THESE DRAWINGS HAVE BEEN TAKEN FROM DESIGN DRAWINGS AND FIELD OBSERVATIONS. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS (ABOVE AND BELOW GRADE) AND LOCATION OF ALL EXISTING APPURTENANCES PRIOR TO PRICING AND COMMENCEMENT OF WORK.

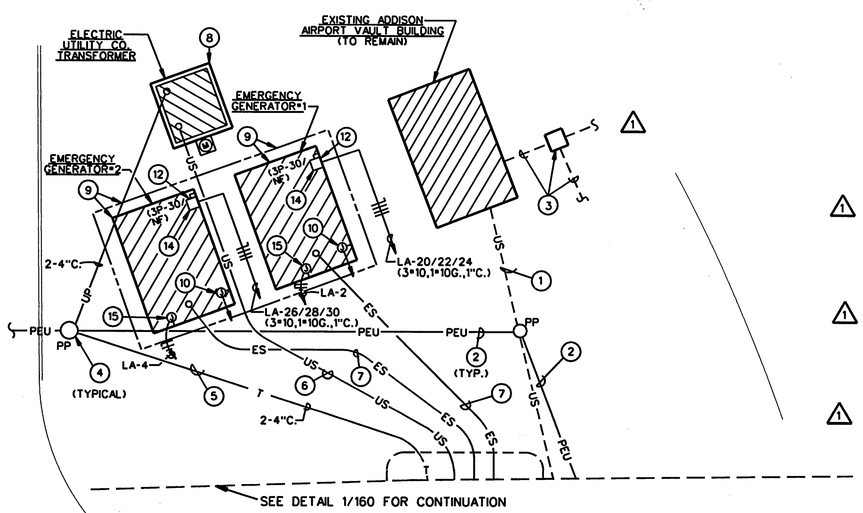
F. CONTRACTOR SHALL ASCERTAIN LOCATION, DIMENSIONS AND ELEVATIONS OF ALL EXISTING UTILITIES PRIOR TO ANY EXCAVATION REQUIRED FOR INSTALLATION OF NEW SYSTEMS.

G. CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY ELECTRICAL APPURTENANCES (JUNCTION AND PULL BOXES, ETC..) NECESSARY FOR PROPER INSTALLATION OF ELECTRICAL APPURTENANCES, CONDUITS AND EQUIPMENT.

H. ALL IN GROUND PULL BOXES SHALL HAVE TRAFFIC RATED LID.



1 E157 TUNNEL POWER AND COMMUNICATIONS
SCALE: 1" = 50'



2 E157 PARTIAL SITE PLAN - ELECTRICAL
SCALE: 1" = 10'-0"

KEY NOTES:

1. EXISTING ELECTRIC UTILITY DUCTBANK TO ADDISON AIRPORT ELECTRICAL VAULT.
2. PROPOSED OVERHEAD PRIMARY POWER LINES BY ELECTRIC UTILITY.
3. EXISTING AIRFIELD HAND-HOLE/MAN-HOLE AND EXISTING UNDERGROUND FAA CONTROL CABLE/AIRFIELD ELECTRICAL DUCT TO REMAIN; COORDINATE NEW CONSTRUCTION IN THIS AREA WITH EXISTING.
4. PROPOSED OVERHEAD PRIMARY POWER POLE PROVIDED AND INSTALLED BY ELECTRIC UTILITY.
5. NEW UNDERGROUND DUCT FOR TUNNEL TELEPHONE UTILITIES.
6. NEW UNDERGROUND DUCT FOR TUNNEL ELECTRICAL SERVICE TO MAIN SWITCHBOARD 'MSB'.
7. NEW UNDERGROUND DUCTS FOR TUNNEL EMERGENCY GENERATOR ELECTRICAL SERVICE TO AUTOMATIC TRANSFER SWITCH 'ATS'.
1. 8. PROPOSED PAD-MOUNTED TRANSFORMER AND WATT-HOUR METER PROVIDED AND INSTALLED BY ELECTRIC UTILITY. PROVIDE TRANSFORMER PAD IN ACCORDANCE WITH ELECTRIC UTILITY CO. STANDARDS; COORDINATE EXACT REQUIREMENTS WITH ELECTRIC UTILITY COMPANY. UNDERGROUND CONDUIT RISER FOR TRANSFORMER PRIMARY SERVICE SHALL BE PROVIDED & INSTALLED BY THE CONTRACTOR.
9. PROVIDE AND INSTALL EMERGENCY GENERATOR COMPLETE WITH WEATHER-PROOF HOUSING AND CONCRETE PAD; PAD SHALL EXTEND 3'-0" MINIMUM BEYOND HOUSING.
1. 10. EXTEND 1-1/2" CONDUIT WITH PULL-WIRE MINIMUM TO RESPECTIVE AUTOMATIC TRANSFER SWITCH "ATS" AND ANNUNCIATOR PANEL FOR GENERATOR CONTROL WIRING.
11. NOT USED.
12. BLOCK HEATER.
13. NEW UNDERGROUND TRANSFORMER PRIMARY SERVICE (2-4").
1. 14. CONTRACTOR SHALL PROVIDE AND INSTALL UNISTRUT SUPPORTS FOR PROPER INSTALLATION OF THIS DEVICE INSIDE ENCLOSURE.
15. POWER FOR GENERATOR RECEPTACLE AND ENCLOSURE LIGHTING.
16. 12"x12"x6" JUNCTION-BOX EMBEDED IN WALL. REF. 568 FOR LOCATION.
17. STUB-OUT A 2" AND 1½" GRS CONDUITS TO IN GROUND PULL-BOX (BROOKS CAT #38).
18. ½"C. AND 2"C. TO JUNCTION BOX IN ELECTRICAL ROOM REF. SHT. E160 FOR LOCATION.
19. IN GROUND PULL-BOX (BROOKS CAT #38).
20. 1½" GRS CONDUIT TO JUNCTION BOX IN ELECTRICAL ROOM REF. SHT. E160 FOR LOCATION.
2. 21. 1-2½" CONDUIT WITH PULL STRING ROUTED ALONG NORHT SIDE OF ROADWAY TO ADDISON TOLL PLAZA. PROVIDE PULL-BOX(ES) AS REQUIRED. REFER TO SHEET E160 FOR ADDITIONAL TOLL PLAZA REQUIREMENTS.

DEVICE STATION MATRIX

STATION DESIGNATION	DEVICE/ DESIGNATION	QUANTITY AT THIS STATION	BRANCH CIRCUIT (WHERE APPLICABLE)
10+00	F H	1	N/A
10+50	F H	1	N/A
10+95	F	2	N/A
10+95	◀ EM	2	N/A

STATE OF TEXAS
LEOPOLDO F. RIOS
58272
REGISTERED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEOPOLDO F. RIOS, P.E., 58272 ON MAY 18,1998

FINAL RECORD DRAWING
Date: 12/25/99

No.	REVISION	BY	DATE
2	CHANGE ORDER	HDR	5-27-98
1	ADDENDUM No.1	HDR	2-12-97

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL POWER AND COMMUNICATIONS PLANS

HDR Engineering, Inc.

SECTION XIII

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CONTRACT No. DNT-260 SHEET E157 OF 166

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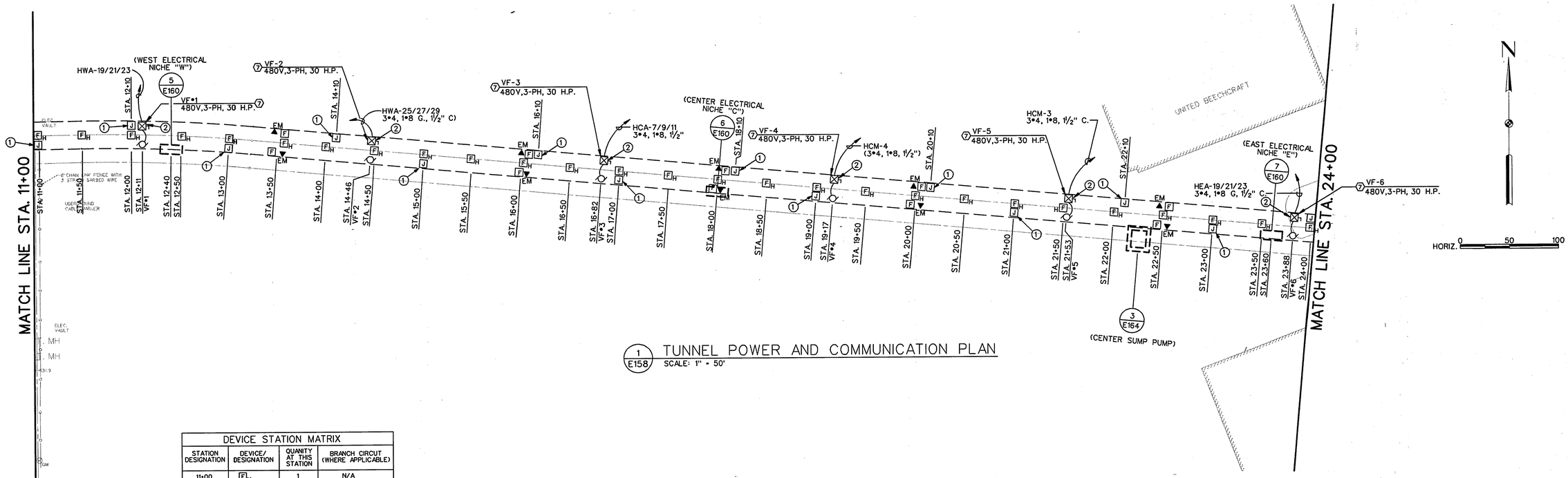

1/E158 TUNNEL POWER AND COMMUNICATION PLAN
SCALE: 1" = 50'

DEVICE STATION MATRIX			
STATION DESIGNATION	DEVICE/ DESIGNATION	QUANITY AT THIS STATION	BRANCH CIRCUT (WHERE APPLICABLE)
11+00	FH	1	N/A
11+50	FH	1	N/A
12+00	FH	1	N/A
12+50	FH	1	N/A
13+00	FH	1	N/A
13+50	F	2	N/A
13+50	EM	2	N/A
13+50	FH	1	N/A
14+00	FH	1	N/A
14+50	FH	1	N/A
15+00	FH	1	N/A
15+50	FH	1	N/A
16+00	F	2	N/A
16+00	EM	2	N/A
16+00	FH	1	N/A
16+50	FH	1	N/A
17+00	FH	1	N/A
17+50	FH	1	N/A
18+00	F	2	N/A
18+00	EM	2	N/A
18+00	FH	1	N/A
18+50	FH	1	N/A
19+00	FH	1	N/A
19+50	FH	1	N/A
20+00	F	2	N/A.
20+00	EM	2	N/A
20+00	FH	1	N/A
20+50	FH	1	N/A
21+00	FH	1	N/A
21+50	FH	1	N/A
22+00	FH	1	N/A
22+50	F	2	N/A
22+50	EM	2	N/A
22+50	FH	1	N/A
23+00	FH	1	N/A
23+50	FH	1	N/A
24+00	FH	1	N/A

GENERAL NOTES:

A. IN GENERAL, DEVICE SPACING BEGINS AT BOTH THE EAST AND WEST ENTRIES AND PROGRESSES TOWARDS THE TUNNEL MID-POINT: DEVICE LOCATIONS SHALL BE AS INDICATED. REFERENCE MECHANICAL DRAWINGS FOR STATION LOCATIONS OF MECHANICAL EQUIPMENT AND DEVICES.

B. SEE DETAIL 2/E165, "TYPICAL TUNNEL CONDUIT SYSTEM DETAIL" FOR GENERAL CONDUIT ROUTING/CIRCUITING INFORMATION.

C. FIRE ALARM SYSTEM DEVICES, EMERGENCY TELEPHONE SYSTEM DEVICES AND CARBON MONOXIDE (CO) SYSTEM DEVICES SHALL BE PROVIDED WITH APPROPRIAT JUNCTION-BOXES/BACK-BOXES AND CONDUIT AS REQUIRED.

D. REFERENCE SHEET E161 FOR BRANCH CIRCUIT/FEEDER SCHEDULE AND MOTOR FEEDER SCHEDULE FOR RESPECTIVE DESIGNATIONS SHOWN ON THIS DRAWING.

E. INFORMATION/LOCATION OF EXISTING UTILITIES ON RELATED APPURTENANCES PROVIDED IN THESE DRAWINGS HAVE BEEN TAKEN FROM DESIGN DRAWINGS AND FIELD OBSERVATIONS. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS (ABOVE AND BELOW GRADE) AND LOCATION OF ALL EXISTING APPURTENANCES PRIOR TO PRICING AND COMMENCEMENT OF WORK.

F. CONTRACTOR SHALL ASCERTAIN LOCATION, DIMENSIONS AND ELEVATIONS OF ALL EXISTING UTILITIES PRIOR TO ANY EXCAVATION REQUIRED FOR INSTALLATION OF NEW SYSTEMS.

G. CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY ELECTRICAL APPURTENANCES (JUNCTION AND PULL BOXES, ETC.) NECESSARY FOR PROPER INSTALLATION OF ELECTRICAL APPURTENANCES, CONDUITS AND EQUIPMENT.

KEY NOTES:

(1) CARBON MONOXIDE (CO) SENSOR/DETECTOR PROVIDED AND INSTALLED BY MECHANICAL CONTRACTOR: FURNISH AND INSTALL JUNCTION-BOX/BACK-BOX AND CONDUIT RACEWAY SYSTEM AS REQUIRED (STANDARD 4" J-BOXES INTER-CONNECTED BY 1" CONDUIT WITH PULL-WIRE MINIMUM AND EXTENDED TO 'CO' PANEL LOCATED AT ELECTRICAL ROOM): SEE MECHANICAL DRAWINGS FOR FURTHER INFORMATION.

(2) COMBINATION MOTOR STARTER PROVIDED AND INSTALLED BY THE MECHANICAL CONTRACTOR.

STATE OF TEXAS
LEOPOLDO F. RIOS
58272
REGISTERED PROFESSIONAL ENGINEER
9/9/97

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEOPOLDO F. RIOS, P.E., 58272 ON SEPTEMBER 9, 1996

FINAL RECORD DRAWING
Date: 12/25/99

No.	REVISION	BY	DATE

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL POWER AND COMMUNICATION PLANS

HDR HDR Engineering, Inc.

SECTION XIII

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CONTRACT No. DNT-260 SHEET E158 OF 166

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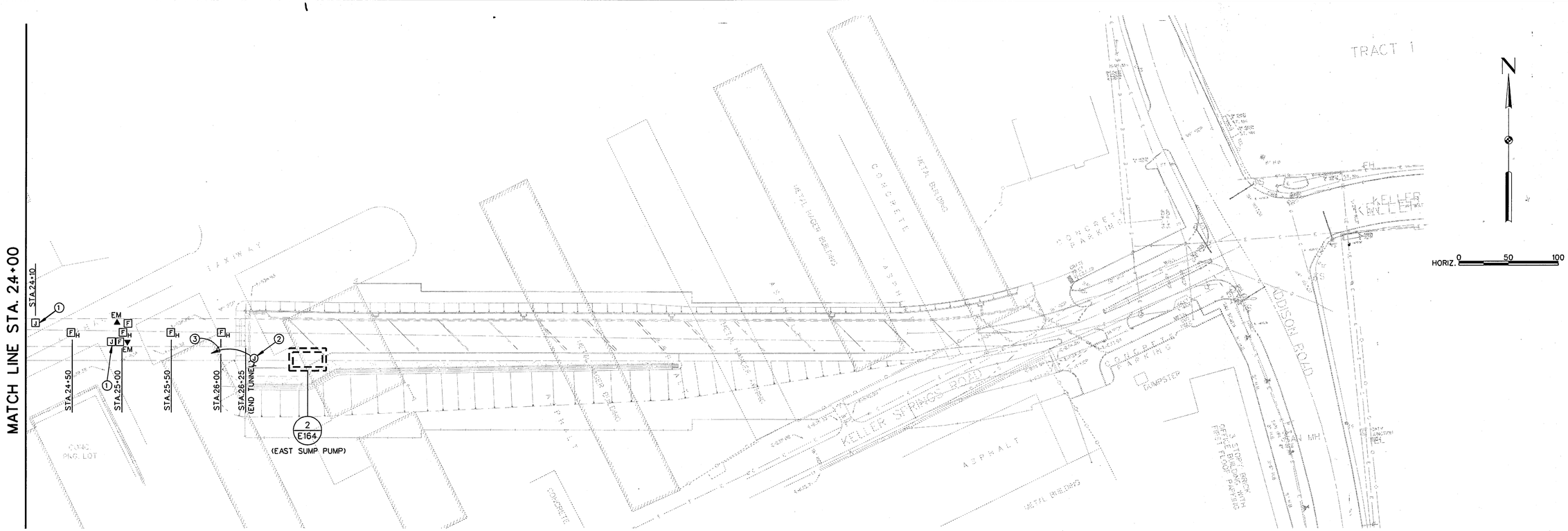

1 / E159 POWER AND COMMUNICATION PLAN
SCALE: 1" - 50'

DEVICE STATION MATRIX			
STATION DESIGNATION	DEVICE/ DESIGNATION	QUANITY AT THIS STATION	BRANCH CIRCUIT (WHERE APPLICABLE)
24+50	F_H	1	N/A
25+00	F	2	N/A
25+00	◀ EM	2	N/A
25+00	F_H	1	N/A
25+50	F_H	1	N/A
26+00	F_H	1	N/A

GENERAL NOTES:

A. IN GENERAL, DEVICE SPACING BEGINS AT BOTH THE EAST AND WEST ENTRIES AND PROGRESSES TOWARDS THE TUNNEL MID-POINT: DEVICE LOCATIONS SHALL BE AS INDICATED. REFERENCE MECHANICAL DRAWINGS FOR STATION LOCATIONS OF MECHANICAL EQUIPMENT AND DEVICES.

B. SEE DETAIL 2/E165, "TYPICAL TUNNEL CONDUIT SYSTEM DETAIL" FOR GENERAL CONDUIT ROUTING/CIRCUITING INFORMATION.

C. FIRE ALARM SYSTEM DEVICES, EMERGENCY TELEPHONE SYSTEM DEVICES AND CARBON MONOXIDE (CO) SYSTEM DEVICES SHALL BE PROVIDED WITH APPROPRIAT JUNCTION-BOXES/BACK-BOXES AND CONDUIT AS REQUIRED.

D. REFERENCE SHEET E161 FOR BRANCH CIRCUIT/FEEDER SCHEDULE AND MOTOR FEEDER SCHEDULE FOR RESPECTIVE DESIGNATIONS SHOWN ON THIS DRAWING.

E. INFORMATION/LOCATION OF EXISTING UTILITIES ON RELATED APPURTENANCES PROVIDED IN THESE DRAWINGS HAVE BEEN TAKEN FROM DESIGN DRAWINGS AND FIELD OBSERVATIONS. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING CONDITIONS (ABOVE AND BELOW GRADE) AND LOCATION OF ALL EXISTING APPURTENANCES PRIOR TO PRICING AND COMMENCEMENT OF WORK.

F. CONTRACTOR SHALL ASCERTAIN LOCATION, DIMENSIONS AND ELEVATIONS OF ALL EXISTING UTILITIES PRIOR TO ANY EXCAVATION REQUIRED FOR INSTALLATION OF NEW SYSTEMS.

G. CONTRACTOR SHALL PROVIDE AND INSTALL ALL NECESSARY ELECTRICAL APPURTENANCES (JUNCTION AND PULL BOXES, ETC..) NECESSARY FOR PROPER INSTALLATION OF ELECTRICAL APPURTENANCES, CONDUITS AND EQUIPMENT.

KEY NOTES:

(1) CARBON MONOXIDE (CO) SENSOR/DETECTOR PROVIDED AND INSTALLED BY MECHANICAL CONTRACTOR: FURNISH AND INSTALL JUNCTION-BOX/BACK-BOX AND CONDUIT RACEWAY SYSTEM AS REQUIRED (STANDARD 4" J-BOXES INTER-CONNECTED BY 1" CONDUIT WITH PULL-WIRE MINIMUM AND EXTENDED TO 'CO' PANEL LOCATED AT ELECTRICAL ROOM): SEE MECHANICAL DRAWINGS FOR FURTHER INFORMATION.

(2) IN GROUND PULL-BOX (BROOKS CAT#38) REFERENCE SHEET T130 FOR LOCATION.

(3) 1½"C. TO JUNCTION-BOX IN EAST ELECTRICAL NICHE 'E'.

STATE OF TEXAS
LEOPOLDO F. RIOS
58272
LICENSED PROFESSIONAL ENGINEER
9/9/97

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEOPOLDO F. RIOS, P.E., 58272 ON SEPTEMBER 9, 1996

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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL POWER AND COMMUNICATION PLANS

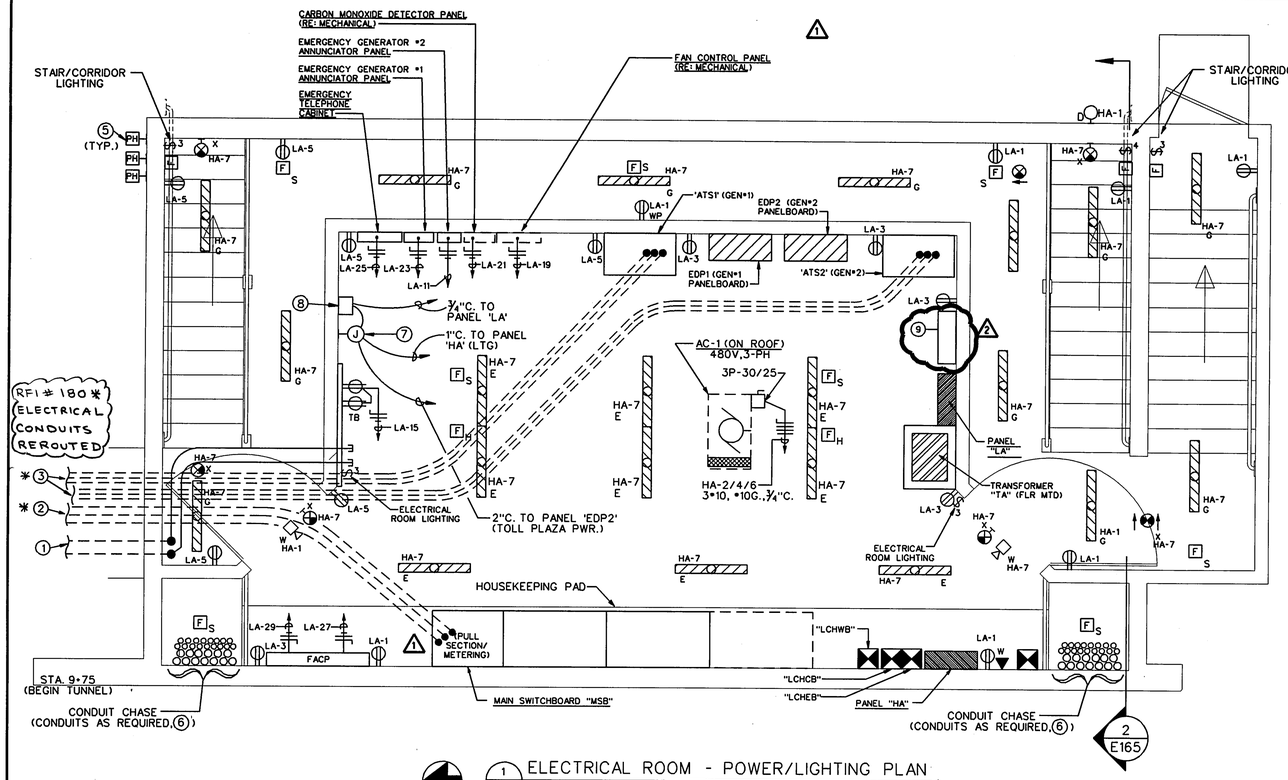
HDR HDR Engineering, Inc.

SECTION XIII

DRAWN: WTD DATE: 12/05/96 DESIGNED: LR DATE: 08/28/96
CHECKED: BL DATE: 08/28/96 SCALE: 1"= 50'

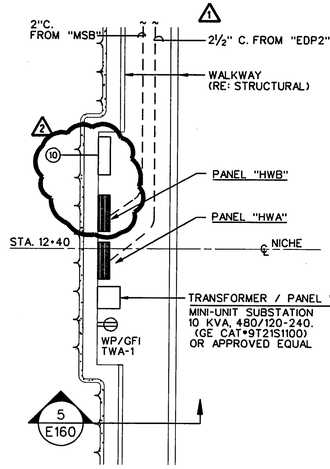
CONTRACT No. DNT-260 SHEET E159 OF 166

FILE: p:\addtun\dgn\adtuel07.dgn
DATE: 23-Apr-96 20:01



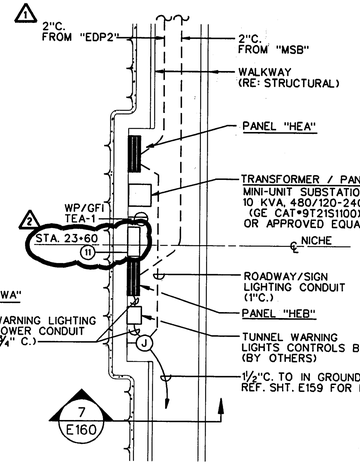
1 E160 ELECTRICAL ROOM - POWER/LIGHTING PLAN
SCALE: 3/8"=1'-0"

NORTH



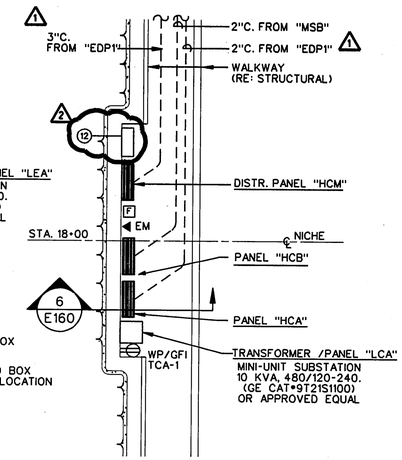
WEST ELECTRICAL NICHE "W" PLAN
2 E160 NO SCALE

NORTH



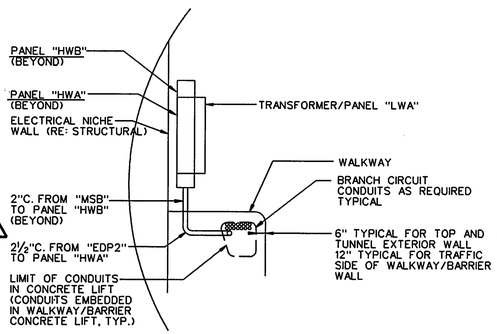
EAST ELECTRICAL NICHE "E" PLAN
3 E160 NO SCALE

NORTH

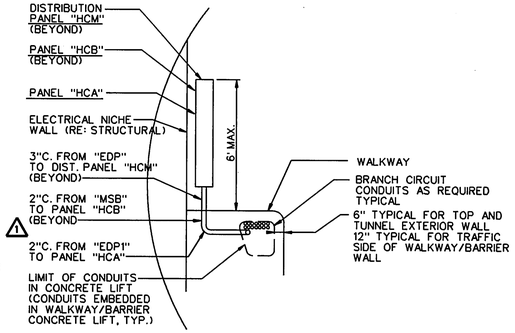


CENTER ELECTRICAL NICHE "C" PLAN
4 E160 NO SCALE

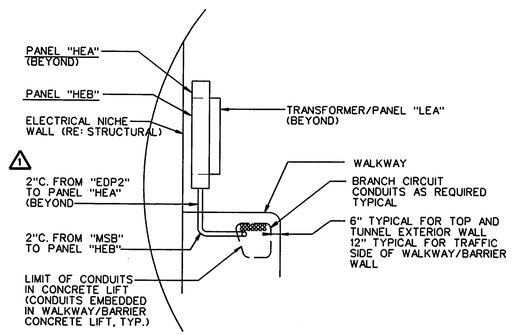
NORTH



5 E160 WEST ELECTRICAL NICHE "W" - SECTION
NO SCALE



6 E160 CENTER ELECTRICAL NICHE "C" - SECTION
NO SCALE



7 E160 EAST ELECTRICAL NICHE "E" - SECTION
NO SCALE

KEY NOTES: ("ELECTRICAL ROOM - POWER/LIGHTING PLAN" ONLY):

1. NEW UNDERGROUND DUCT FOR TUNNEL TELEPHONE UTILITIES; HOLD TIGHT TO STRUCTURE BELOW AND EXTEND TO TELEPHONE BACKBOARD VIA STUB-UP TO CEILING ABOVE; SEE SHEET E166A FOR CONTINUATION.
2. NEW UNDERGROUND DUCT FOR TUNNEL ELECTRICAL SERVICE TO MAIN SWITCHBOARD 'MSB'; HOLD TIGHT TO STRUCTURE BELOW AND EXTEND TO MAIN SWITCHBOARD 'MSB' VIA STUB-UP; SEE SHEET E166A FOR CONTINUATION.
1. 3. NEW UNDERGROUND DUCTS FOR TUNNEL EMERGENCY GENERATORS ELECTRICAL SERVICE TO AUTOMATIC TRANSFER SWITCHES 'ATS'; HOLD TIGHT TO STRUCTURE BELOW. AND STUB-UP TO EACH "ATS"; SEE SHEET E157 FOR CONTINUATION.
4. AC-1 LOCATION, COORDINATE EXACT LOCATION WITH MECHANICAL CONTRACTOR; SEE MECHANICAL DRAWINGS FOR FURTHER INFORMATION. AC-1 MOTER STARTER PROVIDED BY EQUIPMENT MANUFACTURER.
5. PHOTOELECTRIC CONTROL FOR PANELBOARD CONTACTORS (PANELS "HWB", "HCB" AND "HEB"); SEE " ONE-LINE DISTRIBUTION DIAGRAM", SHEET E161 FOR FURTHER INFORMATION
1. 6. CONDUITS FORM MAIN SWITCHBOARD "MSB" AND EMERG. DIST. PANELS "EDP1" AND "EDP2" TO EQUIPMENT LOCATED IN TUNNEL: REFERENCE LIGHTING AND POWER PLANS, SHEETS E154 THRU E159, DETAIL 1/E161 AND PANEL BOARD SCHEDULES, SHEET E162 AND E163 FOR FURTHER INFORMATION.
7. JUNCTION BOX (12"x12"x6") EAST PORTAL SERVICES.
8. TUNNEL WARNING LIGHT CONTROL BOX (BY OTHERS).
2. 9. 36"W x 36"H x 12"D NEMA INTERIOR BACK PLATE LOCKABLE ENCLOSURE WITH INTERIOR BACK PLATE MOUNTED AT 6'-0" A.F.F. LABEL ENCLOSURE AS "TUNNEL SECURITY" AND PROVIDE THE FOLLOWING:
   1. 3#12,1#12GRD-3/4"C. HOMERUN TO (2) 1P-20A CIRCUIT BREAKER IN EMERGENCY PANELBOARD "LA-7,9" LABEL AS "TUNNEL SECURITY CABINET"
   2. (3)4" CONDUIT WITH (4) 1¼" INNER-DUCTS, AND PULL STRING TO ADDISON TOLL PLAZA. ONE CONDUIT DEDICATED FOR FIBER OPTICS/COMM. ONE FOR SPARE. ONE TO WEST ELECTRICAL NICHE SECURITY CABINET.
   3. (2)-2" SPARE CONDUITS TO ADDISON TOLL PLAZA.
   4. (3)-1" CONDUITS, ONE TO FIRE ALARM CONTROL CABINET, ONE TO CARBON MONOXIDE CONTROL CABINET, ONE TO CALL BOX CONTROL CABINET.
   5. (1) 1" CONDUIT TO SECURITY CAMERA LOCATION,EXTEND CONDUIT TO ADDITIONAL CAMERAS AS REQUIRED BY SECURITY CONSULTANT PROVIDE J-BOXES AS REQUIRED.
10. 36"W x 36"H x 12"D NEMA 3R LOCKABLE ENCLOSURE WITH INTERIOR BACK PLATE MOUNTED AT 6'-0" A.F.F. LABEL ENCLOSURE AS "WEST ELECTRICAL NICHE SECURITY CABINET" AND PROVIDE THE FOLLOWING:
    1. 3#12,1#12GRD-3/4"C. HOMERUN TO (2) 1P-20A CIRCUIT BREAKER IN EMERGENCY PANELBOARD "LA-7,9" LABEL AS "TUNNEL SECURITY CABINET"
    2. (1) 4" CONDUIT WITH (4) 1¼" INNER-DUCTS AND PULL STRINGS TO CENTER ELECTRICAL NICHE SECURITY CABINET.
    3. (1) 1" CONDUIT WITH PULL STRING TO SECURITY CAMERA LOCATION. EXTEND CONDUIT TO ADDITIONAL CAMERAS AS REQUIRED BY SECURITY CONSULTANT PROVIDE J-BOXES AS REQUIRED.
    4. 2#10,1#12GRD-1"C. HOMERUN TO (1) 1P-20A CIRCUIT BREAKER IN EMERGENCY PANELBOARD "LWA-2" LABEL AS "SECURITY CAMERAS".
11. 36"W x 36"H x 12"D NEMA 3R LOCKABLE ENCLOSURE WITH INTERIOR BACK PLATE MOUNTED AT 6'-0" A.F.F. LABEL ENCLOSURE AS "EAST ELECTRICAL NICHE SECURITY CABINET" AND PROVIDE THE FOLLOWING:
    1. 2#12,1#12GRD-3/4"C. HOMERUN TO (1) 1P-20A CIRCUIT BREAKER IN EMERGENCY PANELBOARD "LEA-2,4", LABEL AS "NICHE SECURITY EQUIPMENT".
    2. (1)4" CONDUIT WITH (4) 1¼" INNER-DUCTS AND PULL STRINGS TO EAST ENTRANCE SECURITY CABINET. REF. SHEET E156 KEY NOTE #1.
    3. (1) 1" CONDUIT WITH PULL STRING TO SECURITY CAMERA LOCATION. EXTEND CONDUIT TO ADDITIONAL CAMERAS AS REQUIRED BY SECURITY CONSULTANT PROVIDE J-BOXES AS REQUIRED.
    4. 2#10,1#12GRD-1"C. HOMERUN TO (1) 1P-20A CIRCUIT BREAKER IN EMERGENCY PANELBOARD "LEA-6", LABEL AS "SECURITY CAMERAS".
12. 36"W x 36"H x 12"D NEMA 3R LOCKABLE ENCLOSURE WITH INTERIOR BACK PLATE MOUNTED AT 6'-0" A.F.F. LABEL ENCLOSURE AS "CENTER ELECTRICAL NICHE SECURITY CABINET" AND PROVIDE THE FOLLOWING:
    1. 2#12,1#12GRD-3/4"C. HOMERUN TO (1) 1P-20A CIRCUIT BREAKER IN EMERGENCY PANELBOARD "LCA-3,5", LABEL AS "NICHE SECURITY EQUIPMENT".
    2. (1)4" CONDUIT WITH PULL STRINGS TO EAST ELECTRICAL NICHE SECURITY CABINET.
    3. (1) 1" CONDUIT WITH PULL STRING TO SECURITY CAMERA LOCATION. EXTEND CONDUIT TO ADDITIONAL CAMERAS AS REQUIRED BY SECURITY CONSULTANT PROVIDE J-BOXES AS REQUIRED.
    4. 2#10,1#12GRD-1"C. HOMERUN TO (1) 1P-20A CIRCUIT BREAKER IN EMERGENCY PANELBOARD "LCA-7", LABEL AS "SECURITY CAMERAS".

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEOPOLDO F. RIOS, P.E., 58272 ON MAY 14,1998

No.	REVISION	BY	DATE
2	CHANGE ORDER	HDR	5-27-98
1	ADDENDUM No.1	HDR	2-12-97

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

PARTIAL PLANS
FINAL RECORD DRAWING
Date: 12/25/99

HDR Engineering, Inc.

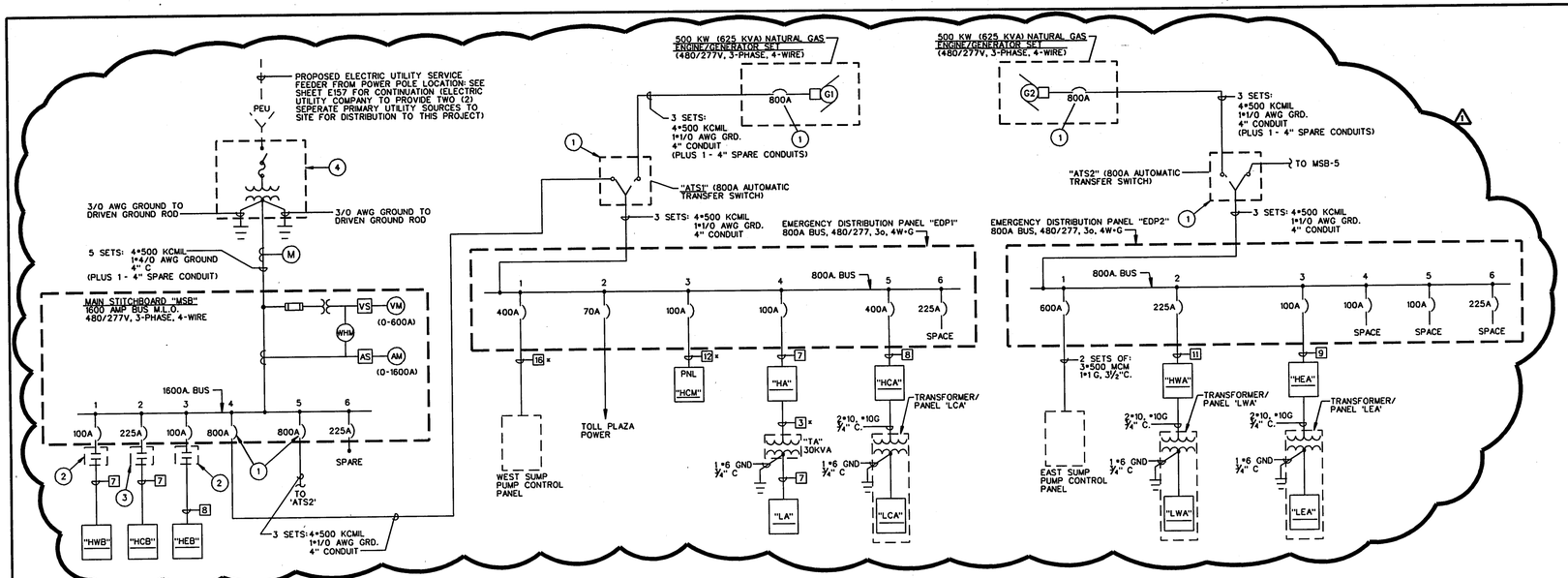
SECTION XIII

DRAWN: WTD DATE: 12/05/96 | DESIGNED: LR DATE: 08/28/96
CHECKED: BL DATE: 08/28/96 | SCALE: NONE

CONTRACT No. DNT-260 SHEET E160 OF 166

FILE: p:\addtun\dgn\addtuel08.dgn
DATE: 23-Apr-96 20:01

Plotted with c:\dgn\user26.plt



1 / E161 TUNNEL ONE-LINE DISTRIBUTION DIAGRAM
NO SCALE

GENERAL NOTES:

A. WHERE FEEDERS ARE IN EXCESS OF 400 FT. AND/OR CONDUIT RUNS REQUIRE 360 DEGREE OR MORE OF BENDING RADIUS, PULL-BOXES SHALL BE PROVIDED IN ACCORDANCE WITH ARTICLE 370 OF THE NATIONAL ELECTRICAL CODE, ARTICLE 370.

KEY NOTES:

(1) FULLY-RATED CIRCUIT BREAKER/ATS.

(2) PANELBOARD CONTACTOR (ASCO MODEL NO. 920-3-100-9 OR APPROVED EQUAL) CONTROLLED BY PHOTOCELL LOCATED AT EXTERIOR OF ELECTRICAL ROOM, RE: SHEET 1/E160.

(3) PANELBOARD CONTACTOR (ALSO MODEL No. 920-3-22J-9 OR APPROVED EQUAL) CONTROLLED BY PHOTOCELL LOCATED AT EXTERIOR OF ELECTRICAL RM. REF: SHEET 1/E160.

(4) ELECTRIC UTILITY CO. PROVIDED AND INSTALLED PAD MOUNTED TRANSFORMER. CONTRACTOR SHALL PROVIDE XFR PAD FOR UTILITY STDS. & PRIMARY SERVICE CONDUITS/RISER TO POLE. UTILITY CO. WILL PRIVIDE PRIMARY SERVICE CONDUCTORS TO TRANSFORMER AND WILL MAKE ALL PRIMARY AND SECONDARY CONDUCTORS CONNECTIONS TO TRANSFORMER.

MAIN SWITCHBOARD "MSB"

BREAKER: "MLO"
MINIMUM AC RATING: 35,000A
LOCATION: ELECTRICAL ROOM
VOLTAGE: 480V/277, 3 - PH, 4 - WIRE
MAINS: 1600A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	BRANCH CIRCUIT DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
100	3	PANEL "HWB"	12532	1				2	1504	PANEL "HCB"	3	225
			12532						1504			
			12532						-			
100	3	PANEL "HEB"	12532	3				4	159671	PANEL "EDP1"	3	800
			12532						159671			
			12532						159671			
				5				6	156525	PANEL "EDP2"	3	800
									156525			
									156525			
		TOTAL CONNECTED	1023780									

FEEDER SCHEDULE

SYMBOL	CONDUCTORS	CONDUIT
1	4*10 • *10 GROUND	¾"
2	4*8 • *10 GROUND	1"
3	4*6 • *8 GROUND	1¼"
4	4*4 • *8 GROUND	1¼"
5	4*3 • *8 GROUND	1¼"
6	4*2 • *6 GROUND	1½"
7	4*1 • *6 GROUND	2"
8	4*1/0 • *6 GROUND	2"
9	4*2/0 • *6 GROUND	2"
10	4*3/0 • *6 GROUND	2½"
11	4*4/0 • *4 GROUND	2½"
12	4*250 • *4 GROUND	3"
13	4*300 • *4 GROUND	3"
14	4*350 • *3 GROUND	3"
15	4*400 • *3 GROUND	3"
16	4*500 • *3 GROUND	3½"

NOTES:
1. WIRES SIZES ARE BASED ON N.E.C. TABLE 310-16 AMPACITIES FOR AWG COPPER CONDUCTORS WITH 75°C INSTALLATION.
* 2. DENOTES "OMITS NEUTRAL CONDUCTORS"

MOTOR FEEDER SCHEDULE

COPPER CONDUCTORS, 75°C INSULATION

DESIGNATION	HORSE POWER	C.B. TRIP AT 480V, 3Ø	MINIMUM "NEMA MOTOR STARTER SIZE" (SEE NOTE 3)	DISCONECT SWITCH SIZE (SEE NOTE 3)	TIME DELAY FUSE SIZE (WHERE REQ'D.)	CONDUIT AND WIRE SIZE (UNLESS INDICATED OTHERWISE)
(1)	1/2, 3/4, 1, 1 1/2, 2	15A	1	3P-30	(SEE NOTE 2)	¾"C., 3*10 & 1*10 GROUND
(2)	3, 5	20A	1	3P-30	(SEE NOTE 2)	¾"C., 3*10 & 1*10 GROUND
(3)	7 - 1/2, 10	30A	1	3P-30	20A	¾"C., 3*10 & 1*10 GROUND
(4)	15	50A	2	3P-30	30A	1", C., 3*10 & 1*10 GROUND
(5)	20	50A	2	3P-60	40A	1", C., 3*8 & 1*10 GROUND
(6)	25	70A	2	3P-60	50A	1", C., 3*6 & 1*8 GROUND
(7)	30	90A	3	3P-60	60A	1"C. 3 *6 &1 *8 GROUND
(8)	40	100A	3	3P-100	80A	1½" C., 3*4 & 1*8 GROUND
(9)	50	100A	3	3P-200	100A	1½"C., 3*3 & 1*8 GROUND
(10)	60	125A	4	3P-200	125A	1½"C., 3*1 & 1*6 GROUND
(11)	75	150A	4	3P-200	150A	1½", C., 3*1/0 & 1*6 GROUND
(12)	100	200A	4	3P-200	200A	2"C., 3*2/0 & 1*6 GROUND

NOTES:
1. FOR SPECIAL EQUIPMENT OR OPERATING CONDITIONS, REFER TO MANUFACTURER'S. RECOMMENDATIONS FOR OVERCURRENT PROTECTIVE DEVICES AND CONDUCTOR SIZING.
2. TIME DELAY FUSES FOR : ½ HP, THRU 1-1/2 HP, SHALL BE 4 AMPERE; 2 HP, SHALL BE 5 AMPERES; 3 HP, SHALL BE 8 AMPERE; AND 5 HP, SHALL BE 15 AMPERE.
3. NEMA MOTORS STARTERS AND DISCONNECT SWITCHES BASED ON FULL-VOLTAGE NON- REVERSING MOTORS; SPECIAL EQUIPMENT REQUIRING TWO-SPEED PART-WINDING/TWO-WINDING MOTORS AND/ORREVERSING TYPE MOTORS SHALL BE PROVIDED WITH MATCHING MOTOR STARTERS/DISCONNECT SWITCHES BY THE EQUIPMENT MANFACTURER AND SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURERS RECOMMENDATIONS.

STATE OF TEXAS
LEOPOLDO F. RIOS
58272
REGISTERED
PROFESSIONAL ENGINEER
9-10-97

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEOPOLDO F. RIOS, P.E., 58272 ON SEPTEMBER 9, 1996

FINAL RECORD DRAWING
Date: 12/25/99

No.	REVISION	BY	DATE
1	GEN. SETS	LR	2/7/97

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

ONE-LINE DIAGRAM & SCHEDULES

HDR Engineering, Inc.

SECTION XIII

DRAWN: WTD DATE: 12/05/96 DESIGNED: LR DATE: 08/28/96
CHECKED: BL DATE: 08/28/96 SCALE: NONE

CONTRACT No. DNT-260 SHEET E161 OF 166

FILE: p:\addtun\dgn\addtue109.dgn
DATE: 23-Apr-96 20:01

PANEL: "HA"
LOCATION: ELECTRICAL ROOM
MOUNTING: ☐ FLUSH ■ SURFACE
VOLTAGE: 277/480V, 3-PH, 4-WIRE + G
MAINS: 100A MLO
MINIMUM AIC RATING: 35,000A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
20	1	PANEL CONTACTOR	200	1				2	4666	A/C*1	3	30
20	1	PANEL CONTACTOR	200	3				4	4666			
20	1	PANEL CONTACTOR	200	5				6	4667			
20	1	LIGHTING	1184	7				8		SPACE	1	20
20	1	SPARE		9				10				
20	1	SPARE		11				12				
20	1	SPACE		13				14	277	FP-1	3	15
				15				16	276			
				17				18	276			
50	3	TRANSFORMER 'TA'	10000	19				20		SPACE	1	20
			10000	21				22				
			10000	23				24				
30	2	ROADWAY		25				26				
		SIGN LIGHTS		27				28				
20	1	SPACE		29				30		ROADWAY	2	30
				31				32		SIGN LIGHTS		

CONNECTED

	LTG	1184
	PWR	15427
	MISC	30000

PANEL: "HWA"
LOCATION: NICHE 'W' (TUNNEL)
MOUNTING: ☐ FLUSH ■ SURFACE
VOLTAGE: 277/480V, 3-PH, 4-WIRE + G
MAINS: 225A MLO
MINIMUM AIC RATING: 35,000A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
30	2	WEST TUNNEL LIGHTING	2296	1				2		SPACE	2	30
			2296	3				4				
30	2	WEST TUNNEL LIGHTING	2436	5				6			2	30
			2424	7				8				
30	2	SPARE		9				10			2	30
				11				12				
50	2	TRANSFORMER/PNL. "LWA"	5000	13				14			3	
			5000	15				16				
20	1	SPARE		17				18				
90	3	VF*1	11073	19				20				
			11073	21				22				
			11074	23				24				
90	3	VF*2	11073	25				26				
			11073	27				28				
			11074	29				30				

CONNECTED

	LTG	9452
	PWR	66440
	MISC	10000

PANEL: "HWB"
LOCATION: NICHE 'W' (TUNNEL)
MOUNTING: ☐ FLUSH ■ SURFACE
VOLTAGE: 277/480V, 3-PH, 4-WIRE + G
MAINS: 100A MLO
MINIMUM AIC RATING: 35,000A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
30	2	WEST TUNNEL LIGHTING	4650	1				2		SPACE	2	30
			4650	3				4				
30	2	WEST TUNNEL LIGHTING	4650	5				6		SPACE	2	30
			4650	7				8				
30	2	WEST TUNNEL LIGHTING	4650	9				10		SPACE	2	30
			4650	11				12				
30	2	WEST TUNNEL LIGHTING	3720	13				14		SPACE	2	30
			3720	15				16				
30	2	WEST TUNNEL LIGHTING	1128	17				18		SPACE	2	30
			1128	19				20				
20	1	SPACE		21				22		SPACE	1	20
				23				24				
				25				26				
				27				28				
				29				30				

CONNECTED

	LTG	37596
	PWR	—
	MISC	—

PANEL: "HCA"
LOCATION: NICHE 'C' (TUNNEL)
MOUNTING: ☐ FLUSH ■ SURFACE
VOLTAGE: 277/480V, 3-PH, 4-WIRE + G
MAINS: 100A MLO
MINIMUM AIC RATING: 18,000A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
30	2	CENTER TUNNEL LIGHTING	1852	1				2		SPACE	2	30
			1840	3				4				
20	1	SPARE		5				6			2	30
90	3	VF*3	11073	7				8				
				9				10			1	20
				11				12			1	20
50	2	TRANSFORMER/"LCA"	5000	13				14			3	
			5000	15				16				
20	1	SPACE		17				18				

CONNECTED

	LTG	3692
	PWR	33220
	MISC	10000

PANEL: "HCB"
LOCATION: NICHE 'C' (TUNNEL)
MOUNTING: ☐ FLUSH ■ SURFACE
VOLTAGE: 277/480V, 3-PH, 4-WIRE + G
MAINS: 100A ☐ MLO ■ MAIN BKR:
MINIMUM AIC RATING: 18,000A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
30	2	CENTER TUNNEL LIGHTING	1504	1				2		SPACE	2	30
			1504	3				4				
30	2	SPACE		5				6		SPACE	2	30
				7				8				
20	2	SPACE		9				10			1	20
				11				12				
				13				14				
				15				16				
				17				18				

CONNECTED

	LTG	3008
	PWR	—
	MISC	—

PANEL: "HEA"
LOCATION: NICHE 'E' (TUNNEL)
MOUNTING: ☐ FLUSH ■ SURFACE
VOLTAGE: 277/480V, 3-PH, 4-WIRE +G
MAINS: 100A MLO
MINIMUM AIC RATING: 18,000A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
30	2	EAST TUNNEL LIGHTING	2108	1				2		SPACE	2	30
			2108	3				4				
30	2	EAST TUNNEL LIGHTING	1236	5				6		SPACE	2	30
			1248	7				8				
30	2	EAST TUNNEL LIGHTING	1248	9				10		SPACE	2	30
			1188	11				12				
50	2	TRANSFORMER PNL "LEA"	5000	13				14		SPACE	3	30
			5000	15				16				
20	1	SPACE		17				18				
90	3	VF*6	11073	19				20		ROADWAY	2	30
				21				22		SIGN LIGHTS		
				23				24		SPACE	1	20
20	1	SPACE		25				26				
				27				28				
				29				30				
									0			

CONNECTED

	LTG	9136
	PWR	33220
	MISC	10000

PANEL: "HEB"
LOCATION: NICHE 'E' (TUNNEL)
MOUNTING: ☐ FLUSH ■ SURFACE
VOLTAGE: 277/480V, 3-PH, 4-WIRE + G
MAINS: 100A MLO
MINIMUM AIC RATING: 18,000A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
30	2	EAST TUNNEL LIGHTING	4650	1				2		SPACE	2	30
			4650	3				4				
30	2	EAST TUNNEL LIGHTING	5115	5				6			2	30
			5115	7				8				
30	2	EAST TUNNEL LIGHTING	5115	9				10			2	30
			5115	11				12				
30	2	EAST TUNNEL LIGHTING	2790	13				14			2	30
			2790	15				16				
30	2	EAST TUNNEL LIGHTING	1128	17				18			2	30
			1128	19				20				
20	1	SPACE		21				22			1	20
				23				24				
				25				26				
				27				28				
				29				30				

CONNECTED

	LTG	37596
	PWR*	—
	MISC	—

PANEL: "LA"
LOCATION: ELECTRICAL ROOM
MOUNTING: ☐ FLUSH ■ SURFACE
VOLTAGE: 120/208V, 3-PH, 4-WIRE + G
MAINS: 100A MLO
MINIMUM AIC RATING: 10,000A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
20	1	MAINT. OUTLET (ELEC. BLDG)	1080	1				2	200	EMERGENCY GEN*1	1	20
20	1	MAINT. OUTLET (ELEC. BLDG)	900	3				4	200	EMERGENCY GEN*2	1	20
20	1	MAINT. OUTLET (ELEC. BLDG)	900	5				6		SPARE	1	20
20	1	TUNNEL SECURITY CABINET	1000	7				8	289	WEST SUMP PIT LTG.	1	20
20	1	TUNNEL SECURITY CABINET	1000	9				10		WARNING LIGHTS	1	20
20	1	EM. GEN*2 ANNUN. PANEL ⚠1	400	11				12		WARNING LIGHTS	1	20
20	1	EM. GENERATOR BATTERY CHG	300	13				14		SPACE ONLY		
20	1	TELEPHONE BACKBOARD	360	15				16		SPACE ONLY		
20	1	SPARE		17				18		SPACE ONLY		
20	1	FAN CONTROL PANEL	400	19				20	267	GEN*1 BLK. HTR (.8 Kw)	3	20
20	1	CO2 CONTROL PANEL	400	21				22	267			
20	1	EM. GEN*1 ANNUN. PANEL ⚠1	400	23				24	267			
20	1	TELEPHONE CABINET	360	25				26	267	GEN*2 BLK. HTR (.8 Kw)	3	20
20	1	FACP	400	27				28	267			
20	1	FACP	400	29				30	267			

CONNECTED

	LTG	289
	PWR	3820
	MISC	1600
	RECEPTACLE	2880

⚠1 ⚠2

FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS
LEOPOLDO F. RIOS
58272
REGISTERED PROFESSIONAL ENGINEER

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEOPOLDO F. RIOS, P.E., 58272 ON MAY 18,1996

No.	REVISION	BY	DATE
⚠2	CHANGE ORDER	HDR	5-27-98
⚠1	ADDENDUM No.1	HDR	2-12-97

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

PANELBOARD SCHEDULES

HDR Engineering, Inc.

SECTION XIII

DRAWN: WTD DATE: 12/05/96 DESIGNED: LR DATE: 08/28/96
CHECKED: BL DATE: 08/28/96 SCALE: NONE

CONTRACT No. DNT-260 SHEET E162 OF 166

FILE: p:\addtun\dgn\adtuel10.dgn
DATE: 23-Apr-96 20:01

Plotted with a:\dgn\user25.plt

Date plotted: 09/03/98 8:22 am
Files: adtuel10.dgn

TRANSFORMER/ PANEL "LWA"
LOCATION: NICHE 'W' (TUNNEL)
MOUNTING: ☐ FLUSH ■ SURFACE

VOLTAGE: 120/240V, 1-PH, 3-WIRE
MAINS: MLO ■ MAIN BKR: 50A
MINIMUM AIC RATING: 10,000A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	BRANCH CIRCUIT DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
20	1	MAINT. RECEPTACLES	180	1				2	1000	SECURITY CAMERA	1	20
20	1	SUMP PUMP CONTROL PANEL	200	3				4		SPARE	1	20
20	1	NICHE SECURITY EQUIPMENT	1000	5				6		SPARE	1	20
20	1	NICHE SECURITY EQUIPMENT	1000	7				8		SPARE	1	20
									0			
CONNECTED		TOTAL	3380									

TRANSFORMER/ PANEL "LCA"
LOCATION: NICHE 'C' (TUNNEL)
MOUNTING: ☐ FLUSH ■ SURFACE

VOLTAGE: 120/240V, 1-PH, 3-WIRE
MAINS: MLO ■ MAIN BKR: 50A
MINIMUM AIC RATING: 10,000A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	BRANCH CIRCUIT DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
20	1	MAINT. RECEPTACLES	180	1				2		SPACE	2	30
20	1	NICHE SECURITY EQUIPMENT	1000	3				4		SPACE	2	30
20	1	NICHE SECURITY EQUIPMENT	1000	5				6		SPACE	1	20
20	1	SECURITY CAMERA	1000	7				8		SPACE	1	20
									0			
CONNECTED		TOTAL	3180									

TRANSFORMER/ PANEL "LEA"
LOCATION: NICHE 'E' (TUNNEL)
MOUNTING: ☐ FLUSH ■ SURFACE

VOLTAGE: 120/240V., 1-PH, 3-WIRE
MAINS: MLO ■ MAIN BKR: 50A
MINIMUM AIC RATING: 10,000A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	BRANCH CIRCUIT DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
20	1	MAINT. RECEPTACLES	180	1				2	1000	NICHE SECURITY EQUIPMENT	1	20
20	1	CENTER SUMP PIT LTG.	289	3				4	1000	NICHE SECURITY EQUIPMENT	1	20
20	1	EAST SUMP PIT LTG.	289	5				6	1000	SECURITY CAMERA	2	30
20	1	WARNING LIGHTS		7				8		SPACE		
									0			
CONNECTED		TOTAL	3758									

EMERGENCY DISTRIBUTION PANEL 'EDP'

BREAKER: M.L.O.
MINIMUM AIC RATING: 35,000A
LOCATION: ELECTRICAL ROOM

VOLTAGE: 480V/277, 3-PH, 4-WIRE + G
MAINS: 1200A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	BRANCH CIRCUIT DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
225	3	PANEL "HWA"	28630	1				2	15637	PANEL "HCA"	3	100
			28630						15637			
			28630						15637			
200	3	PANEL "HEA"	17452	3				4	15537	PANEL "HA"	3	100
			17452						15537			
			17452						15537			
400	3	WEST SUMP PUMP CTR PANEL	83597	5				6	29900	PANEL "HCM"	3	225
			83597						29900			
			83597						29900			
600	3	EAST SUMP PUMP CTR PANEL	110443	7				8	29900	SPARE	3	225
			110443									
			110443									
600	3	SPACE		9				10		SPACE	3	400
CONNECTED		TOTAL	903591									

DISTRIBUTION PANEL "HCM"

BREAKER: 225A "MCB"
MINIMUM AIC RATING: 18,000A
LOCATION: SUMP PIT (CENTER)

VOLTAGE: 480V, 3-PH, 3-WIRE + G
MAINS: 225A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	BRANCH CIRCUIT DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
50	3	SUMP PUMP SP-4 & SP-5	7754	1				2		SPACE	3	50
90	3	VENTILATION FAN VF-5	11073	3				4	11073	VENTILATION FAN VF-4	3	90
100	3	SPACE		5				6		SPACE	3	100
100	3	SPACE		7				8		SPACE	3	100
										SPACE		
										SPACE		
									33219			
CONNECTED		TOTAL	89700									

EMERGENCY DISTRIBUTION PANEL 'EDP1'

BREAKER: M.L.O.
MINIMUM AIC RATING: 35,000A
LOCATION: ELECTRICAL ROOM

VOLTAGE: 480V/277, 3-PH, 4-WIRE + G
MAINS: 800A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	BRANCH CIRCUIT DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
400	3	WEST SUMP PUMP	83597	1				2	15000	TOLL PLAZA XFR	3	70
		—	83597						15000	—		
		—	83597						15000	—		
225	3	PANEL "HCM"	29900	3				4	15537	PANEL "HA"	3	100
		—	29900						15537	—		
		—	29900						15537	—		
100	3	PANEL "HCA"	15637	5				6		SPACE	3	225
		—	15637							—		
		—	15637							—		
				7				8				
				9				10				
			387402						91611			
CONNECTED		TOTAL	479013									

EMERGENCY DISTRIBUTION PANEL 'EDP2'

BREAKER: M.L.O.
MINIMUM AIC RATING: 35,000A
LOCATION: ELECTRICAL ROOM

VOLTAGE: 480V/277, 3-PH, 4-WIRE + G
MAINS: 800A

DEVICE AMPS TRIP	DEVICE POLES	BRANCH CIRCUIT DESIGNATION	VOLT-AMPS	NO.	PHASE LOAD (VOLTS-AMPS) ØA	ØB	ØC	NO.	BRANCH CIRCUIT VOLT-AMPS	BRANCH CIRCUIT DESIGNATION	DEVICE POLES	DEVICE AMPS TRIP
600	3	EAST SUMP PUMP	110443	1				2	28630	PANEL "HWA"	3	225
		—	110443						28630	—		
		—	110443						28630	—		
100	3	PANEL "HEA"	17452	3				4		SPACE	3	150
		—	17452							—		
		—	17452							—		
100	3	SPACE		5				6		SPACE	3	225
		—								—		
		—								—		
				7				8				
				9				10				
			383685						85890			
CONNECTED		TOTAL	469575									

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEOPOLDO F. RIOS, P.E., 58272 ON MAY 18,1998

FINAL RECORD DRAWING
Date: 12/25/99

No.	REVISION	BY	DATE
2	CHANGE ORDER	HDR	5-27-98
1	ADDENDUM No.1	HDR	2-12-97

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

PANELBOARD SCHEDULES

HDR Engineering, Inc.

SECTION XIII

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CHECKED: BL DATE: 08/28/96 SCALE: NONE

CONTRACT No. DNT-260 SHEET E163 OF 166

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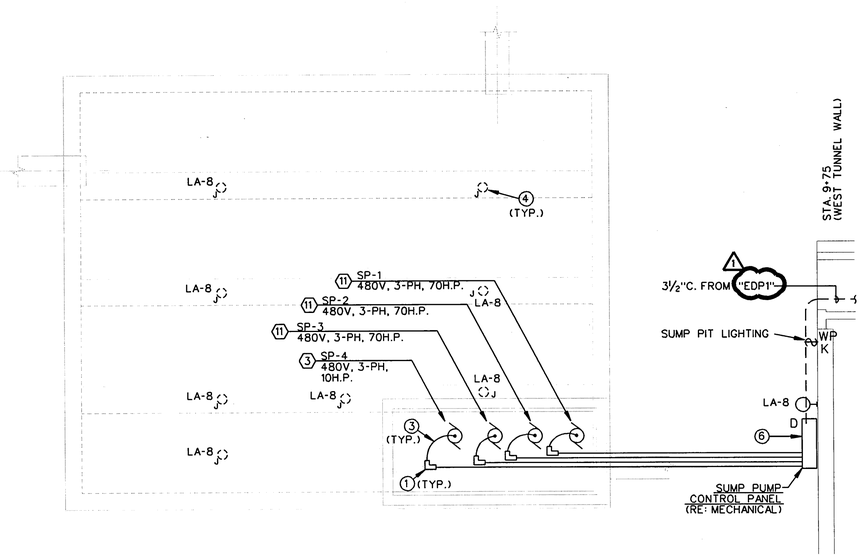
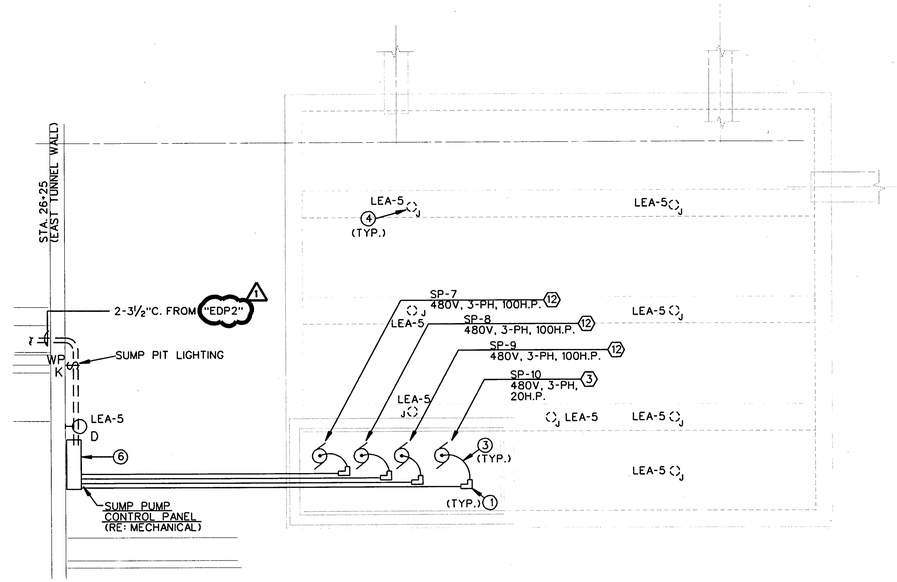
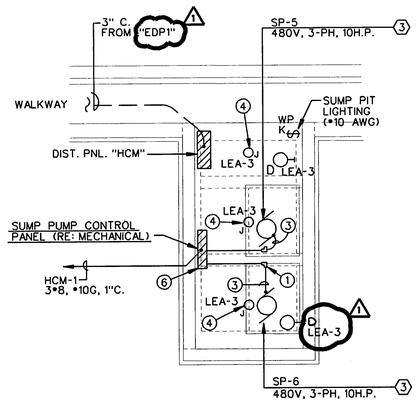


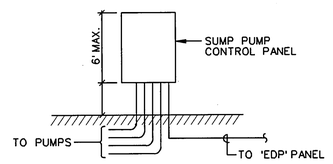
1 E164 WEST SUMP PIT PLAN
SCALE: 3/16" = 1'-0"



2 E164 EAST SUMP PIT PLAN
SCALE: 3/16" = 1'-0"



3 E164 CENTER SUMP PIT NICHE PLAN
NO SCALE



3 E164 SUMP PUMP CONTROL PANEL
NO SCALE

KEY NOTES: (SUMP PIT PLANS ONLY)

1. GASKETED CONDUIT BODY FOR TRANSITION FROM RIGID GALVANIZED CONDUIT TO LIQUID TIGHT FLEXIBLE NON-METALIC CONDUIT.
2. MAINTAIN WORKING CLEARANCES BETWEEN TUNNEL APPURTANCES AND FRONT OF ELECTRICAL EQUIPMENT IN ACCORDANCE WITH N.E.C.
3. LIQUID TIGHT CONDUIT FASTENED TO SURFACE MOUNTED BRACKETS AND EXTENDED UP TO STARTER/DISCONNECT.
4. CEILING SERFACE MOUNTED SUMP PIT LIGHTING FIXTURE TYPE "J", TYPICAL.
5. NOT USED.
6. SUMP PUMP CONTROL PANEL AND COMBINATION MOTOR STARTERS/ DISCONNECTS PROVIDED BY MECHANICAL CONTRACTOR: RE: MECHANICAL DRAWINGS.

STATE OF TEXAS
LEOPOLDO F. RIOS
No. 58272
REGISTERED PROFESSIONAL ENGINEER
2/7/97

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEOPOLDO F. RIOS, P.E., 58272 ON SEPTEMBER 9, 1996

FINAL RECORD DRAWING
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1	GEN. SETS	LR	2/7/97

TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

PARTIAL PLANS/DETAILS

HDR HDR Engineering, Inc.

SECTION XIII

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CHECKED: BL DATE: 08/28/96 SCALE: AS SHOWN

CONTRACT No. DNT-260 SHEET E164 OF 166

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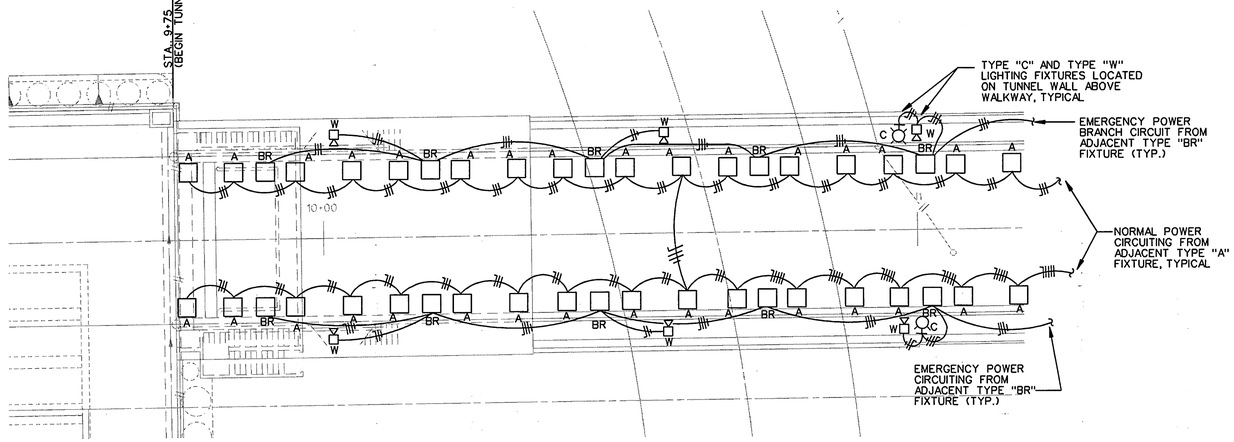
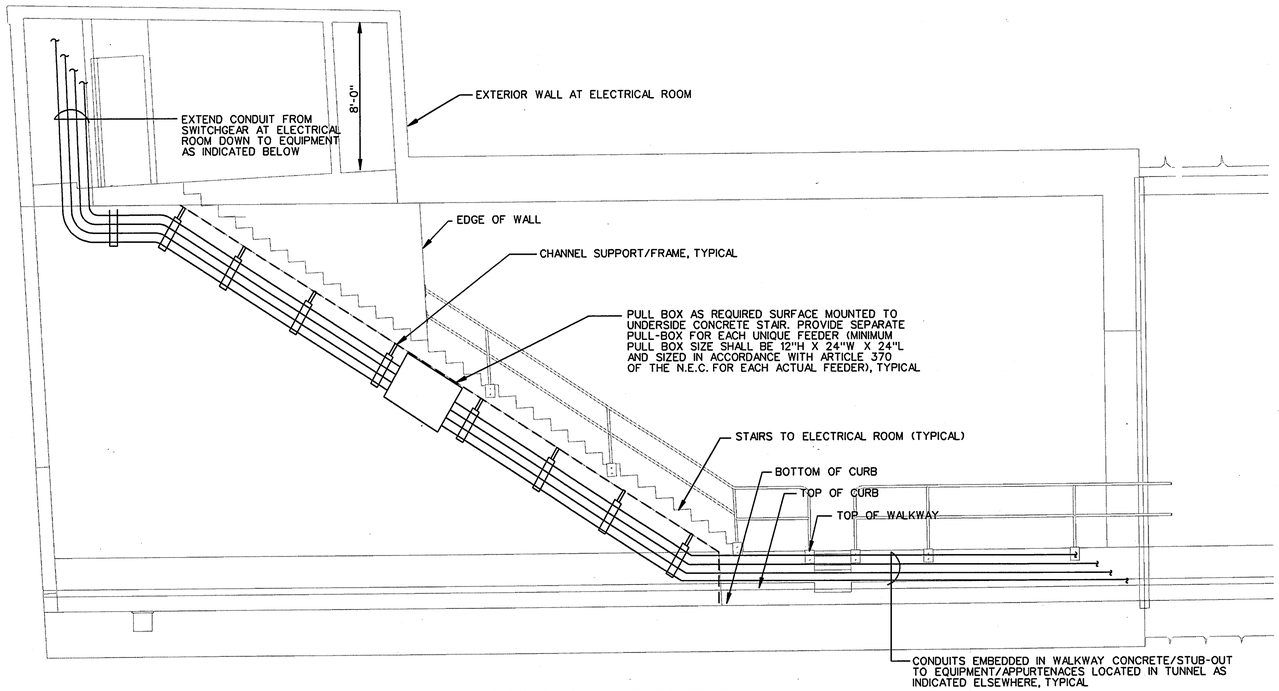


1/E165 TYPICAL TUNNEL LIGHTING PLAN
NO SCALE



TYPICAL CONDUIT ROUTING - SECTION AT ELECTRICAL ROOM
2/E165 NO SCALE

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEOPOLDO F. RIOS, P.E., 58272 ON SEPTEMBER 9, 1996

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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

PARTIAL PLANS/DETAILS

HDR Engineering, Inc.

SECTION XIII

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CHECKED: BL	DATE: 08/28/96	SCALE: NONE	

CONTRACT No. DNT-260 SHEET E165 OF 166

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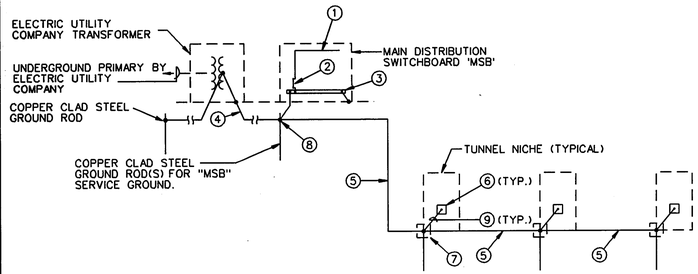
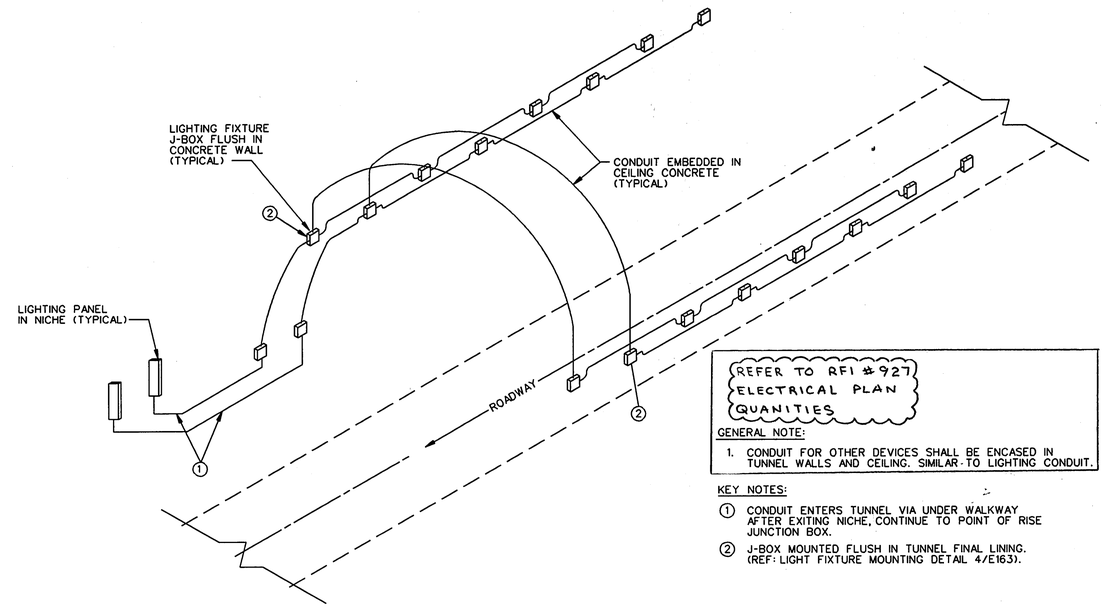


1 E166 GROUNDING SYSTEM SCHEMATIC
NO SCALE

KEY NOTES (GROUNDING SYSTEM SCHEMATIC ONLY):

1. NEUTRAL BUS IN SWITCHBOARD.
2. NEUTRAL DISCONNECT LINK.
3. GROUND BUS.
4. GROUNDING SYSTEM CONNECTION.
5. SYSTEM GROUND CONDUCTORS IN CONDUIT: SEE ONE-LINE DIAGRAM, 1/E161, FOR FURTHER INFORMATION.
6. GROUND PLATE, INSTALL 3/8" x 12" x 4" COPPER PLATE IN NICHE WALL. BOND COPPER CONDUCTORS AS REQUIRED FROM GROUND ROD TO GROUND PLATE. PROVIDE DRILLED AND TAPPED HOLES IN GROUND PLATE FOR GROUND LUGS.
7. PROVIDE GROUND TEST WELL AT EACH NICHE. (TYP.)
8. ADD SUFFICIENT NUMBER OF GROUND RODS TO BRING GROUND RESISTANCE TO LESS THAN 25 OHMS, SEE SPECIFICATIONS SECTION 16452 FOR FURTHER INFORMATION.



REFER TO RFI #927
ELECTRICAL PLAN QUANITIES

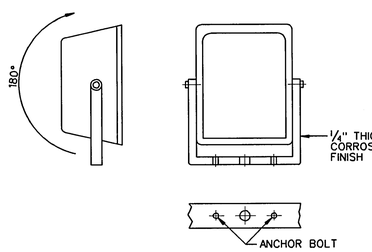
GENERAL NOTE:

1. CONDUIT FOR OTHER DEVICES SHALL BE ENCASED IN TUNNEL WALLS AND CEILING, SIMILAR TO LIGHTING CONDUIT.

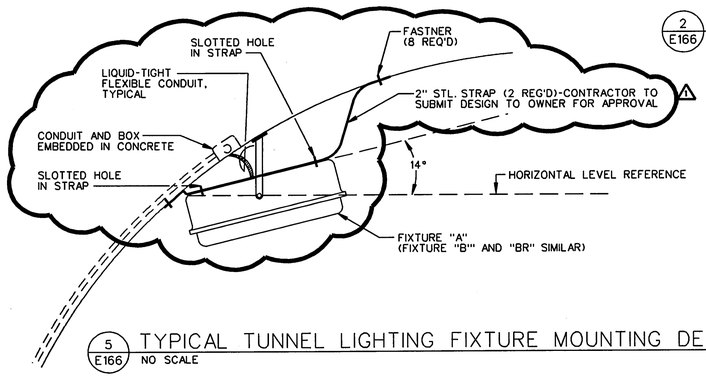
KEY NOTES:

1. CONDUIT ENTERS TUNNEL VIA UNDER WALKWAY AFTER EXITING NICHE, CONTINUE TO POINT OF RISE JUNCTION BOX.
2. J-BOX MOUNTED FLUSH IN TUNNEL FINAL LINING. (REF: LIGHT FIXTURE MOUNTING DETAIL 4/E163).

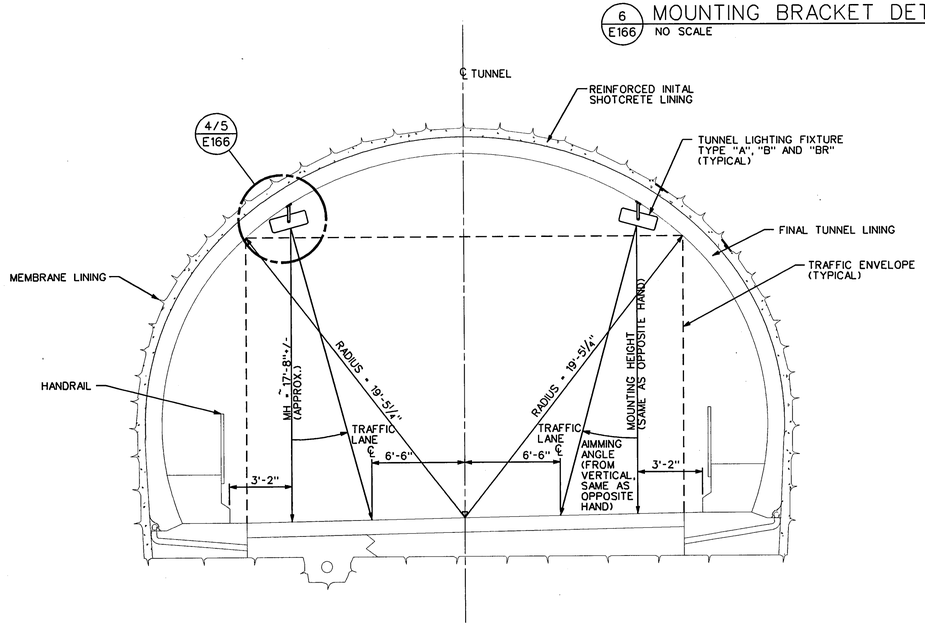
2 E166 TYPICAL TUNNEL CONDUIT SYSTEM DETAIL
NO SCALE



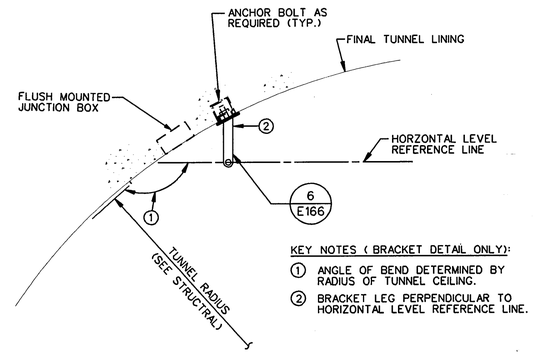
6 E166 MOUNTING BRACKET DETAIL
NO SCALE



5 E166 TYPICAL TUNNEL LIGHTING FIXTURE MOUNTING DETAIL
NO SCALE



3 E166 TUNNEL CROSS SECTION/LIGHTING FIXTURE MOUNTING AND AIMMING DETAIL
NO SCALE



KEY NOTES (BRACKET DETAIL ONLY):

1. ANGLE OF BEND DETERMINED BY RADIUS OF TUNNEL CEILING.
2. BRACKET LEG PERPENDICULAR TO HORIZONTAL LEVEL REFERENCE LINE.

4 E166 TYPICAL TUNNEL LIGHTING FIXTURE MOUNTING BRACKET DETAIL
NO SCALE

2-12-97

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY LEOPOLDO F. RIOS, P.E., 58272 ON SEPTEMBER 9, 1996

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2 REVISED PER RFI #927

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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

DETAILS

HDR HDR Engineering, Inc.

SECTION XIII

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CONTRACT No. DNT-260 SHEET E166 OF 166

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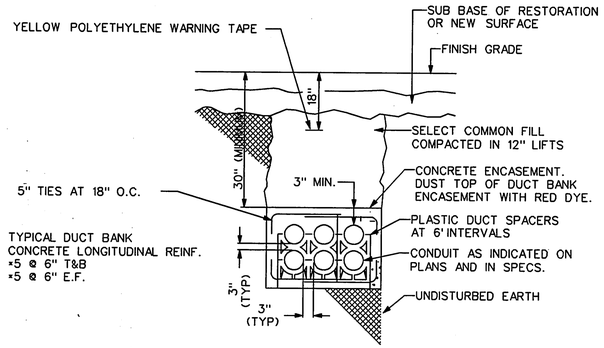
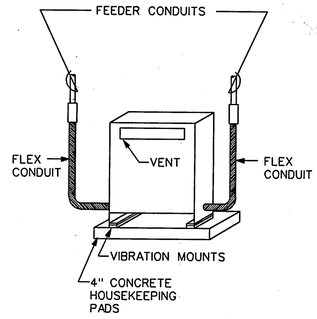


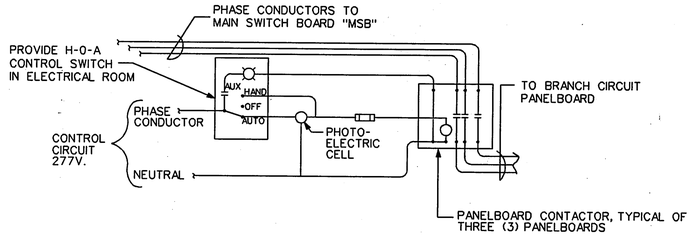
1 / E166A TYPICAL REINFORCED CONDUIT DUCT DETAIL
NO SCALE



NOTES:

1. MAINTAIN MINIMUM OF 6" DISTANCE FROM VERTICAL CONSTRUCTION (WALLS DUCTS, ETC.) AND 12" FROM ALL HORIZONAL CONSTRUCTIONS (CEILINGS, DUCTS, ETC.)
2. FLEXIBLE CONDUIT SHALL BE LENGTH IN SPECIFICATIONS AND POSITIONED TO AVOID TRANSMISSION OF VIBRATION.
3. VIBRATION ISOLATORS SHALL BE SUBMITTED FOR APPROVAL.

2 / E166A TYPICAL FLOOR MOUNTED TRANSFORMER DETAIL
NO SCALE



NOTE:
LIGHTING CONTROL SIMILAR EXCEPT SINGLE PHASE.

3 / E166A TYPICAL PHOTOELECTRIC CELL/ CONTRACTOR CONTROL DETAIL
NO SCALE

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TEXAS TURNPIKE AUTHORITY

ADDISON AIRPORT TUNNEL

DETAILS

HDR HDR Engineering, Inc.

SECTION XIII

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CONTRACT No. DNT-260 SHEET E166A OF 166

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DATE: 23-Apr-96 20:01

NORTH TEXAS TOLLWAY AUTHORITY

CONTRACT NO. DNT-260

SIGNING, PAVEMENT MARKING, AND ILLUMINATION PLANS

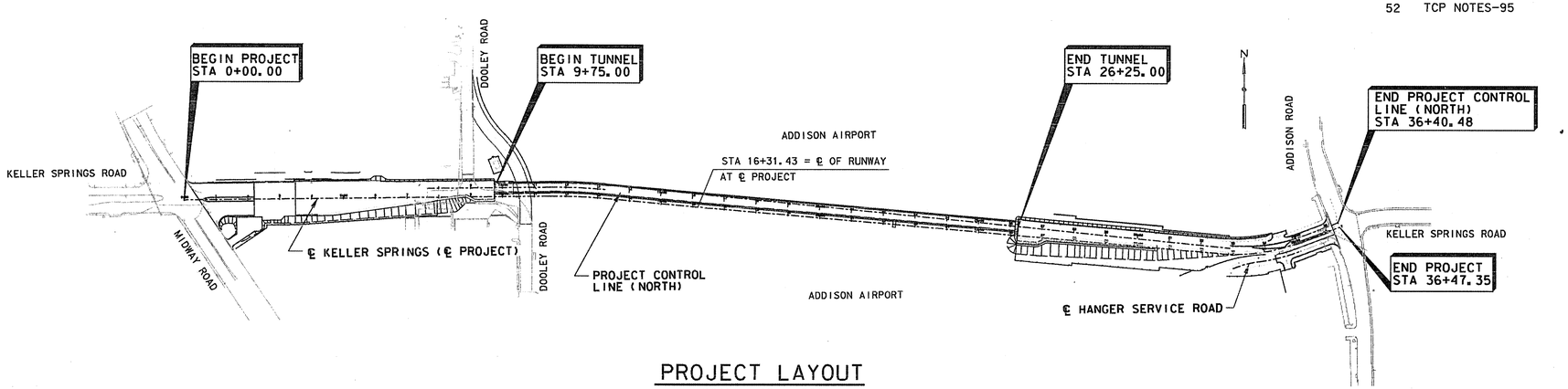
SECTION XIII

VOL. 4

ADDISON AIRPORT TUNNEL

INDEX OF SHEETS

STANDARD DRAWINGS



PROJECT LAYOUT

SCALE: 1" = 200'

AT ANY LOCATION WITHIN THESE PLANS AND ACCOMPANYING SPECIFICATIONS, PROPOSALS, AND CONTRACT WHERE THE WORDS "TEXAS TURNPIKE AUTHORITY" APPEAR, THESE WORDS SHALL, BY DEFINITION, MEAN THE "NORTH TEXAS TOLLWAY AUTHORITY", A BODY POLITIC AND CORPORATE AND A POLITICAL SUBDIVISION OF THE STATE OF TEXAS.

THE STANDARD SHEETS SPECIFICALLY IDENTIFIED ABOVE HAVE BEEN SELECTED BY ME, OR UNDER MY RESPONSIBLE SUPERVISION, AS BEING APPLICABLE TO THE PROJECT.

RK Laird P.E. 1/12/99
DATE

STATE OF TEXAS
RICHARD K. LAIRD
59187
REGISTERED
PROFESSIONAL ENGINEER

Prepared by:
MATEO CONSULTING ENGINEERS, INC.
Project Manager
Date: 1/14/99

Recommended by:
HNTB CORPORATION
Consulting Engineer
Date: 01/15/99

Recommended by:
THE GINN CORPORATION
H Wayne Ginn P.E.
Project Engineer
Date: 1/18/99

Recommended by:
NORTH TEXAS TOLLWAY AUTHORITY
Project Engineer
Date: 1-15-99

Approved by:
NORTH TEXAS TOLLWAY AUTHORITY
Executive Director
Date: 1/15/99

FINAL RECORD DRAWING
Date: 12/25/99

F:\96112\PLANS\COVER.SHT

ESTIMATE SUMMARY

ITEM NO.	DESCRIPTION	UNIT	TOTAL EST.	TOTAL FINAL		ITEM NO.	DESCRIPTION	UNIT	TOTAL EST.	TOTAL FINAL
500 AND SP	MOBILIZATION	LS	1.00	1.00		SS 760	LIGHTING POLE FOUNDATIONS	EA	17.00	17.00
636 AND SP	ALUMINUM SIGNS (TY A)(GROUND MOUNT)	SF	36.00	36.00		SS 760	GROUND WIRE (#6 BARE)	LF	554.00	554.00
636 AND SP	ALUMINUM SIGNS (TY A)(OVERHEAD)	SF	224.25	224.30		SS 760	GROUND WIRE (#8 BARE)	LF	1096.00	1,096.00
636 AND SP	ALUMINUM SIGNS (TY A)(PORTAL)	SF	117.00	117.00		SS 760	GROUND WIRE (#10 BARE)	LF	463.00	463.00
644 AND SP	SMALL ROADSIDE TRAFFIC SIGN (TY A MOUNT)	EA	25.00	25.00		SS 760	CONDUCTOR (#6 THHN/THWN)	LF	908.00	908.00
644 AND SP	SMALL ROADSIDE TRAFFIC SIGN (TY A B-B MOUNT)	EA	1.00	1.00		SS 760	CONDUCTOR (#8 THHN/THWN)	LF	6170.00	6,170.00
644 AND SP	SMALL ROADSIDE TRAFFIC SIGN (TY A-1 MOUNT)	EA	5.00	5.00		SS 760	CONDUCTOR (#10 THHN/THWN)	LF	3627.00	3,627.00
644 AND SP	SMALL ROADSIDE TRAFFIC SIGN (TY B MOUNT)	EA	10.00	10.00		SS 760	GROUND PULL BOXES (13"X24")(INSTALL)	EA	8.00	8.00
644 AND SP	SMALL ROADSIDE TRAFFIC SIGN (TY D-2 MOUNT)	EA	4.00	4.00		SS 760	DUCT-CABLE (2 #6)(2 #8)(1 #6 GRND)(1 1/4" CONDUIT)	LF	801.00	801.00
644 AND SP	SMALL ROADSIDE TRAFFIC SIGN (TY D-6 MOUNT)	EA	2.00	2.00		SS 760	DUCT-CABLE (2 #8)(1 #8 GRND)(1 1/4" CONDUIT)	LF	1240.00	1,240.00
644 AND SP	SMALL ROADSIDE TRAFFIC SIGN (STRUCTURE MOUNT)	EA	2.00	2.00		SS 760	DISTRIBUTION AND CONTROL CENTER	LS	1.00	1.00
647 AND SP	LARGE ROADSIDE SIGN SUPPORTS (STRUCT STL)	LBS	255.20	255.20		SS 760	CONDUIT (1" GRS)	LF	150.00	150.00
650 AND SP	OVERHEAD SIGN SUPPORTS (30' CANTILEVER)	EA	2.00	2.00		SS 760	CONDUIT (1 1/2" GRS)	LF	285.00	285.00
666 AND SP	REFL PVMT MRKGS (TY I)(WHITE, 4" SOLID)	LF	6625.00	6,625.00		SS 760	SIGN-MOUNT SIGNAL LIGHTS (INSTALL)	PAIR	5.00	5.00
666 AND SP	REFL PVMT MRKGS (TY I)(WHITE, 4" BROKEN)	LF	70.00	70.00		SS 760	SIGN FACE LUMINAIRES (INSTALL)	EA	6.00	6.00
666 AND SP	REFL PVMT MRKGS (TY I)(WHITE, 18" SOLID)	LF	185.00	185.00		SS 760	FUSED CONNECTOR KITS (INSTALL)	EA	56.00	56.00
672 AND SP	RAISED PAVEMENT MARKERS (TY II-A-A)(CL B)	EA	310.00	310.00		SS 760	UNFUSED (WIRE) CONNECTOR KITS (INSTALL)	EA	28.00	28.00
672 AND SP	RAISED PAVEMENT MARKERS (TY II-C-R)(CL B)	EA	7.00	7.00						
672 AND SP	RAISED PVMT MARKERS (TY Y)(CL C)(TRAF BTN)	EA	925.00	925.00						
672 AND SP	RAISED PVMT MARKERS (TY Y)(CL A)(JIGGLE BAR)	EA	156.00	156.00						
SS 760	LIGHTING POLE LUMINAIRES (II-400-10-40MH)(INSTALL)	EA	13.00	13.00						
SS 760	LIGHTING POLE LUMINAIRES (III-400-10-40MH)(INSTALL)	EA	4.00	4.00						
SS 760	LIGHTING POLE FLOODLIGHT (400 FLOOD-40MH)(INSTALL)	EA	10.00	10.00						
SS 760	LIGHTING POLE (GROUND MOUNTED) (INSTALL)	EA	17.00	17.00						
SS 760	LIGHTING POLE (WALL MOUNTED)(INSTALL)	EA	4.00	4.00						
SS 760	WALL MOUNTED LUMINAIRES (150W)(INSTALL)	EA	5.00	5.00						
SS 760	WALL MOUNTED LUMINAIRES WITH SWITCH (150W)(INSTALL)	EA	2.00	2.00						

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RICHARD K. LAIRD, P.E. NO. 59187 ON JANUARY 12, 1999. ALTERATION OF A SEALED DOCUMENT WITHOUT PRIOR NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS
RICHARD K. LAIRD
59187
REGISTERED
PROFESSIONAL ENGINEER

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

ESTIMATE & QUANTITY SUMMARY

MCE MATEO CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

DRAWN: SA DATE: 5/97 | DESIGNED: SA DATE: 5/97
CHECKED: RKL DATE: 5/97 | SCALE: NONE

CONTRACT No. DNT-260 SHEET 2 OF 52

112EQS02.SHT

ITEM NO. 636 & SP
SUMMARY OF ALUMINUM SIGNS (TY A)

SHEET NO.	LOCATION	QUANTITY, SF		
		GROUND MOUNT	OVERHEAD	PORTAL *
8	MIDWAY RD. - STA. 10+00	36.00	100.75	58.50
9	STA. 10+00 - STA. 33+00		-	58.50
10	STA. 33+00 - ADDISON RD.		123.50	
	TOTAL	36.00	224.25	117.00

* MATERIALS & LABOR FOR SIGN MOUNTING TO BE SUBSIDIARY TO PORTAL SIGN.

ITEM NO. 644 & SP
SUMMARY OF SMALL ROADSIDE SIGN ASSEMBLIES

SHEET NO.	LOCATION	QUANTITY, EA						
		TY A	TY A (B-B)	TY A-1	TY B	TY D-2	TY D-6	SM
8	MIDWAY RD. - STA. 10+00	11.00		1.00	6.00	2.00	1.00	1.00
9	STA. 10+00 - STA. 33+00	5.00						1.00
10	STA. 33+00 - ADDISON RD.	9.00	1.00	4.00	4.00	2.00	1.00	
	TOTAL	25.00	1.00	5.00	10.00	4.00	2.00	2.00

ITEM NO. 647 & SP
SUMMARY OF LARGE ROADSIDE SIGN SUPPORTS

SHEET NO.	LOCATION	QUANTITY, LBS
		MOUNT TYPE 321
8	STA. 1+75	255.20
	TOTAL	255.20

ITEM NO. 650 & SP
SUMMARY OF OVERHEAD SIGN SUPPORTS

SHEET NO.	LOCATION	CANT. SPAN X TOWER HEIGHT	QUANTITY, EA
8	STA. 6+05, LT.	30'-0" X16'-0"	1.00
10	STA. 35+15, LT.	30'-0" X22'-6"	1.00
	TOTAL		2.00

ITEM NO. 666 & SP
SUMMARY OF REFL PVMT MARKINGS (TY I)

SHEET NO.	LOCATION	QUANTITY, EA	QUANTITY, LF			
		WHITE				
		ARROW	WORD	4" SOLID	4" BROKEN	18" SOLID
8	MIDWAY RD. - STA. 10+00			1720		141
9	STA. 10+00 - STA. 33+00			4600	10	
10	STA. 33+00 - ADDISON RD.			305	60	44
	TOTAL			6625	70	185

ITEM NO. 672 & SP
SUMMARY OF RAISED PAVEMENT MARKERS

SHEET NO.	LOCATION	QUANTITY, EA			
		CL B	CL C	CL B	CL A
		TY II-A-A	TY Y TRAF BTN	TY II-C-R	TY Y JIGGLE BAR
8-10	MIDWAY RD. - ADDISON RD.	310	925	7	156
	TOTAL	310	925	7	156

ITEM NO. SS 760
SUMMARY OF SIGN-MOUNT SIGNAL LIGHTS (INSTALL)*

SHEET NO.	LOCATION	QUANTITY, PAIR
8	STA. 1+75, MEDIAN SIGN	1.00
8	STA. 6+05, LT. CANT. SIGN	1.00
8	STA. 9+75, OVERHEAD STRUC	1.00
9	STA. 26+25, OVERHEAD STRUC	1.00
10	STA. 35+15, LT. CANT. SIGN	1.00
	TOTAL	5.00

* ALL SIGN-MOUNT SIGNAL LIGHTS SHALL BE PROVIDED BY NTTA.

ITEM NO. SS 760
SUMMARY OF SIGN FACE LUMINAIRES (INSTALL)*

SHEET NO.	LOCATION	QUANTITY, EA
8	STA. 6+05, LT. CANT. SIGN	2.00
10	STA. 35+15, LT. CANT. SIGN	4.00
	TOTAL	6.00

* ALL SIGN LIGHTS SHALL BE PROVIDED BY NTTA.

ITEM NO. SS 760
SUMMARY OF LIGHTING POLE LUMINAIRES (INSTALL)*

SHEET NO.	LOCATION	QUANTITY, EA	
		II-400-10-40MH	III-400-10-40MH
18	MIDWAY RD. - STA. 3+50	2	-
19	STA. 3+50 - STA. 8+00	4	2
21	STA. 23+00 - STA. 28+00	1	1
22	STA. 28+00 - STA. 33+00	4	-
23	STA. 33+00 - ADDISON RD.	2	1
	TOTAL	13	4

* ALL LUMINAIRES SHALL BE PROVIDED BY NTTA.

ITEM NO. SS 760
SUMMARY OF LIGHTING POLE FLOODLIGHTS (INSTALL)*

SHEET NO.	LOCATION	QUANTITY, EA
18	MIDWAY RD. - STA. 3+50	6
19	STA. 3+50 - STA. 8+00	4
	TOTAL	10

* ALL FLOODLIGHTS SHALL BE PROVIDED BY NTTA.

ITEM NO. SS 760
SUMMARY OF LIGHTING POLES (INSTALL)* AND LIGHTING POLE FOUNDATIONS

SHEET NO.	LOCATION	GROUND MOUNTED POLES EA	LIGHTING POLE FOUNDATIONS EA	POLES MOUNTED ON EXISTING WALL EA
18	MIDWAY RD. - STA. 3+50	5	5	-
19	STA. 3+50 - STA. 8+00	4	4	4
21	STA. 23+00 - STA. 28+00	2	2	-
22	STA. 28+00 - STA. 33+00	4	4	-
23	STA. 33+00 - ADDISON RD.	2	2	-
	TOTAL	17	17	4

* ALL LIGHTING POLES SHALL BE PROVIDED BY NTTA.

FINAL RECORD DRAWING
Date: 12/25/99

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RICHARD K. LAIRD, P.E. NO. 59187 ON JANUARY 12, 1999. ALTERATION OF A SEALED DOCUMENT WITHOUT PRIOR NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

STATE OF TEXAS
RICHARD K. LAIRD
59187
REGISTERED
PROFESSIONAL ENGINEER

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

QUANTITY/ ITEM SUMMARIES

MCE MATED CONSULTING ENGINEERS, INC.
3580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

DRAWN: TMF DATE: 5/97 DESIGNED: RKL DATE: 5/97
CHECKED: SCF DATE: 5/97 SCALE: NONE

CONTRACT No. DNT-260 SHEET 3 OF 52

112SUM04.SHT

ITEM NO. SS 760
SUMMARY OF CONDUITS AND CONDUCTORS

CONDUIT AND CONDUCTOR RUNS (SHEETS 18, 19 & 20)												
	GROUND LENGTH (FEET)		CONDUCTOR No. & LENGTH (FEET)		DUCT-CABLE CONDUCTOR NUMBER & LENGTH (FEET)					CONDUIT (FEET)	
RUN No.	#8 BARE	#10 BARE	#8 THHN/ THWN	#10 THHN/ THWN	GROUND BARE #8	GROUND BARE #10	#8 THHN/ THWN	#10 THHN/ THWN	1 1/4" POLY DUCT	1 1/2" GRS	1" GRS
1	1-45		4-45							45	
2	1-20		4-27								
3	1-36		4-43								
4	1-36		4-43								
5	1-36		4-43								
6	1-36		4-43								
7	1-56		4-56	2-50							
8	1-131		4-131	2-50							
9	1-61		4-61								
10	1-78		4-78	2-50							
11	1-131		4-131	2-50							
12	1-81		4-81								
13				2-50	1-190		2-190		190		
14				2-50	1-106		2-106		106		
15		1-40		2-40							40
16	1-40	1-40	4-40	2-40						40	
17		1-30		2-30							
18		1-22		2-22							
19					1-210		4-210		210		
20				2-50	1-131		4-131		131		
21				2-50	1-131		4-131		131		
22				2-50	1-131		4-131		131		
23					1-176		4-176		176		
24				2-50	1-68		4-68		68		
25					1-56		4-56		56		
26	1-91		4-91	2-50						91	
27				2-50	41		2-41		41		
28	1-88		2-88	4-50							
29		1-25		2-25							25
30		1-20		3-20							20
31	1-30		4-30								30
32	1-55	3-55	2-55							55	
TOTAL	1051	342	4058	1674	1240	-	4286		1240	186	115

CONDUIT AND CONDUCTOR RUNS (SHEETS 21, 22 & 23)															
	GROUND LENGTH (FEET)			CONDUCTOR No. & LENGTH (FEET)			DUCT-CABLE CONDUCTOR NUMBER & LENGTH (FEET)						CONDUIT (FEET)	
RUN No.	#6 BARE	#8 BARE	#10 BARE	#6 THHN/ THWN	#8 THHN/ THWN	#10 THHN/ THWN	GROUND BARE #6	GROUND BARE #8	#6 THHN/ THWN	#8 THHN/ THWN	#10 THHN/ THWN	1 1/4" POLY DUCT	1 1/2" GRS	1" GRS
33	300			2-300	5-300	2-300								
34			1-65			5-65								
35			1-20			2-20								
36			1-20			2-20								
37	1-20			2-20	2-20									
38	1-41			2-41	2-41	2-50							41	
39						2-50	1-131		2-131	2-131		131		
40						2-50	1-126		2-126	2-126		126		
41						2-50	1-126		2-126	2-126		126		
42						2-50	1-126		2-126	2-126		126		
43						2-50	1-126		2-126	2-126		126		
44						2-50	1-126		2-126	2-126		126		
45							1-40		2-40	2-40		40		
46	1-93			2-93		4-50							28	
47		1-45			4-45									19
48	1-100				4-100								30	
49			1-16			3-16								16
TOTAL	554	45	121	908	2112	1953	801		1602	1602		801	99	35

ITEM NO. SS 760
SUMMARY OF WALL MOUNTED LUMINAIRES (INSTALL)*

SHEET NO.	LOCATION	QUANTITY, EA	
		NO SWITCH	WITH SWITCH
20	STA. 8+00 - STA. 13+00	5	1
21	STA. 26+25	-	1
	TOTAL	5	2

* ALL LUMINAIRES SHALL BE PROVIDED BY NTTA.

ITEM NO. SS 760
SUMMARY OF CONNECTOR KITS

SHEET NO.	LOCATION	QUANTITY, EA	
		FUSED	UNFUSED (WIRE)
18	MIDWAY RD. - STA. 3+50	10	5
19	STA. 3+50 - STA 8+00	16	8
20	STA. 8+00 - STA. 13+00	12	6
21	STA. 23+00 - STA. 28+00	6	3
22	STA. 28+00 - STA. 23+00	8	4
23	STA. 33+00 - ADDISON RD.	4	2
	TOTAL	56	28

ITEM NO. SS 760
SUMMARY OF GROUND BOX (13"X24"X12") (INSTALL)*

SHEET No.	EA.
18	3
19	1
20	2
21	1
23	1
TOTAL	8

* TO BE PROVIDED BY NTTA.

ITEM NO. SS 760
SUMMARY OF DISTRIBUTION AND CONTROL CENTER

SHEET NO.	LOCATION	QUANTITY, LS
18-26	VARIOUS	1
	TOTAL	1

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RICHARD J. MILLER, P.E. NO. 42812 ON JANUARY 12, 1999. ALTERATION OF A SEALED DOCUMENT WITHOUT PRIOR NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS
RICHARD JAMES MILLER
42812
REGISTERED
PROFESSIONAL ENGINEER

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

QUANTITY/ITEM SUMMARIES

MATEO CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

DRAWN: SAA DATE: 5/97 DESIGNED: DR DATE: 5/97
CHECKED: RJM DATE: 5/97 SCALE: NONE

CONTRACT No. DNT-260 SHEET 4 OF 52

F:\96112\PLANS\LIGHTING\C7.DGN

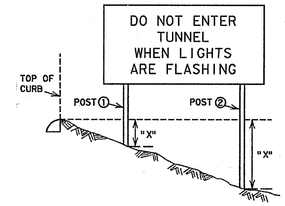
SUMMARY OF LARGE SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN BACK-GROUND COLOR	SIGN MESSAGE	SIGN DIMENSIONS	ROUTE SHIELDS, EXIT ONLY PANELS, & OTHER ATTACHMENTS	BACKGROUND SUBSTRATE (SQ FT)			TYPE OF MOUNT	"X" DIMENSION			GALVANIZED STRUCTURAL STEEL					DRILLED SHAFT[C]			
						GROUND MOUNT		OVERHEAD		post ①	post ②	post ③	SIZE	LINEAR FEET post ①	post ②	post ③	TOTAL WEIGHT LBS.	NON-REINF 12"ø	LINEAR FEET REINFORCED 24"ø	30"ø	36"ø
					ALUMINUM (TYPE A)	PLYWOOD (TYPE A)	ALUMINUM (TYPE A)	ALUMINUM (TYPE A)													
8	5	GREEN	Stop Ahead Pay Toll	186X78				100.75	COSS[A]	FOR DETAILS SEE SHEET 13 FOR COSS NO. 1											
8	18	YELLOW	DO NOT ENTER TUNNEL WHEN LIGHTS ARE FLASHING	96X54			36.00		321	0.0	0.0		S4X7.7	12.0	12.0		255.2	10			
8	23	YELLOW	DO NOT ENTER TUNNEL WHEN LIGHTS ARE FLASHING	108X78				58.50	SM[B]												
9	29	YELLOW	DO NOT ENTER TUNNEL WHEN LIGHTS ARE FLASHING	108X78				58.50	SM[B]												
10	37	GREEN	Addison Toll Tunnel ↑ ↖ Doolittle Rd	156X60				65.00	COSS[A]	FOR DETAILS SEE SHEET 14 FOR COSS NO. 2											
	38	YELLOW	DO NOT ENTER TUNNEL WHEN LIGHTS ARE FLASHING	108X78				58.50													
PAGE TOTALS							36.00	341.25									255.2	10			
PROJECT TOTALS							36.00	341.25									255.2	10			

[A] CANTILEVER OVERHEAD SIGN SUPPORT

[B] STRUCTURE MOUNTED

[C] FOR CONTRACTOR'S INFORMATION ONLY



The "X" dimension is the elevation difference at the post between the ground and the edge of pavement or top of curb.

Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.

The post lengths listed here are approximations, The corrected post lengths will be furnished by the Engineer after the contractor has placed the stud posts.

Tower heights shall be verified with the Engineer before fabrication.

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RICHARD K. LAIRD, P.E. NO. 59187 ON JANUARY 12, 1999. ALTERATION OF A SEALED DOCUMENT WITHOUT PRIOR NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

STATE OF TEXAS · RICHARD K. LAIRD · 59187 · REGISTERED · PROFESSIONAL ENGINEER

FINAL RECORD DRAWING
Date: 12/25/99

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

SUMMARY OF LARGE SIGNS

MCE MATED CONSULTING ENGINEERS, INC. 5580 PETERSON LANE SUITE 225 DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

DRAWN: TMF DATE: 5/97 DESIGNED: RKL DATE: 5/97

CHECKED: SCF DATE: 5/97 SCALE: NONE

CONTRACT No. DNT-260 SHEET 5 OF 52

112sum01.sht

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN TYPE	SIGN TEXT	SIGN DIMENSIONS	REFLECTIVE SHEETING	PLYWOOD TYPE A	ALUMINUM TYPE A	TYPE OF MOUNT A	A (B-B)	A-1	B	C	D-1	D-2	SM*	DRIVEABLE TY I TY II	MILEPOSTS MP	MILEPOSTS MW
8	1	R14-3	HAZARD. CARGO PROHIB. (SYM.)	24X24	C		1				1							
		ATT-1	Addison Toll Tunnel	24X24	C		1											
		M6-8 L	LEFT LANE	24X18	C		1											
		DNT-1	DNT (SYMBOL)	24" DIA.	C		1											
		M6-8GL	LEFT LANE	24X18	C		1											
	2	R14-3	HAZARD. CARGO PROHIB. (SYM.)	24X24	C		1				1							
		ATT-1	Addison Toll Tunnel	24X24	C		1											
		M6-1 L	←	21X15	C		1											
		DNT-1	DNT (SYMBOL)	24" DIA.	C		1											
		M6-1GL	←	21X15	C		1											
	3	R3-8L(MOD)	LANE USE (SYMBOL)	60X30	C		1							1				
	4	R3-8L(MOD)	LANE USE (SYMBOL)	60X30	C		1							1				
	6	W1-4L	REVERSE CURVE (SYMBOL)	30X30	C		1											
	7	W1-8L	CHEVRON (SYMBOL)	18X24	C		1											
	8	W1-8L	CHEVRON (SYMBOL)	18X24	C		1											
	9	W1-8L	CHEVRON (SYMBOL)	18X24	C		1											
	10	W1-8L	CHEVRON (SYMBOL)	18X24	C		1											
	11	R14-3	HAZARD. CARGO PROHIB. (SYM.)	24X24	C		1				1							
		ATT-1	Addison Toll Tunnel	24X24	C		1											
		M6-3	↑	21X15	C		1											
		DNT-1	DNT (SYMBOL)	24" DIA.	C		1											
		M6-3G	↑	21X15	C		1											
	12	R14-3	HAZARD. CARGO PROHIB. (SYM.)	24X24	C		1				1							
		ATT-1	Addison Toll Tunnel	24X24	C		1											
		M6-3	↑	21X15	C		1											
		DNT-1	DNT (SYMBOL)	24" DIA.	C		1											
		M6-3G	↑	21X15	C		1											
	13	R4-7	KEEP RIGHT (SYMBOL)	24X30	C		1											
	14	R6-1R	ONE WAY	36X12	C		1											
	15	R14-3	HAZARD. CARGO PROHIB. (SYM.)	24X24	C		1				1							
		ATT-1	Addison Toll Tunnel	24X24	C		1											
		M6-8 R	RIGHT LANE	24X18	C		1											
		DNT-1	DNT (SYMBOL)	24" DIA.	C		1											
		M6-8GR	RIGHT LANE	24X18	C		1											
	16	R14-3	HAZARD. CARGO PROHIB. (SYM.)	24X24	C		1				1							
		ATT-1	Addison Toll Tunnel	24X24	C		1											
		M6-1 R	→	21X15	C		1											
		DNT-1	DNT (SYMBOL)	24" DIA.	C		1											
		M6-1GR	→	21X15	C		1											
	17	R14-3	HAZARD. CARGO PROHIB. (SYM.)	24X24	C		1											
		R5-10A	PEDESTRIANS BICYCLES MOTOR-DRIVEN CYCLES PROHIBITED	30X36	C		1											
	19	R2-1	SPEED LIMIT 35	24X30	C		1											
	20	R4-1	DO NOT PASS	24X30	C		1											
▼	21	W6-3	TWO-WAY TRAFFIC (SYMBOL)	30X30	C		1											
8	22	W12-3	16 FT 6 IN	84X24	C		1											
9	24	W1-8L	CHEVRON (SYMBOL)	18X24	C		1											
	25	W1-8L	CHEVRON (SYMBOL)	18X24	C		1											
	26	W1-8L	CHEVRON (SYMBOL)	18X24	C		1											
	27	W1-8L	CHEVRON (SYMBOL)	18X24	C		1											
▼	28	W1-4L	REVERSE CURVE (SYMBOL)	30X30	C		1											
9	30	W12-3	16 FT 6 IN	84X24	C		1											
10	31	W4-3R	ADDED LANE (SYMBOL)	36X36	C		1											
		R5-1A	WRONG WAY	36X24	C		1											
	33	R2-1	SPEED LIMIT 35	24X30	C		1											
		W6-3	TWO-WAY TRAFFIC (SYMBOL)	30X30	C		1											
	34	R6-1R	ONE WAY	36X12	C		1											
	35	W12-1	DOUBLE ARROW (SYMBOL)	24X24	C		1											
	36	R14-3	HAZARD. CARGO PROHIB. (SYM.)	24X24	C		1				1							
		R5-10A	PEDESTRIANS BICYCLES MOTOR-DRIVEN CYCLES PROHIBITED	30X36	C		1											
	39	R14-3	HAZARD. CARGO PROHIB. (SYM.)	24X24	C		1				1							
		ATT-1	Addison Toll Tunnel	24X24	C		1											
		M6-8 R	RIGHT LANE	24X18	C		1											
		DNT-1	DNT (SYMBOL)	24" DIA.	C		1											
		M6-8GL	LEFT LANE	24X18	C		1											
	40	R14-3	HAZARD. CARGO PROHIB. (SYM.)	24X24	C		1				1							
		ATT-1	Addison Toll Tunnel	24X24	C		1											
		M6-1 R	→	21X15	C		1											
		DNT-1	DNT (SYMBOL)	24" DIA.	C		1											
		M6-1GL	←	21X15	C		1											
	41	R14-3	HAZARD. CARGO PROHIB. (SYM.)	24X24	C		1				1							
		ATT-1	Addison Toll Tunnel	24X24	C		1											
		M6-3	↑	21X15	C		1											
	42	R14-3	HAZARD. CARGO PROHIB. (SYM.)	24X24	C		1				1							
		ATT-1	Addison Toll Tunnel	24X24	C		1											
		M6-3	↑	21X15	C		1											
	43	R4-7	KEEP RIGHT (SYMBOL)	24X30	C		1											
▼	44	W6-3	TWO-WAY TRAFFIC (SYMBOL)	30X30	C		1											
10	45	R1-2	YIELD	36X36X36	C		1											
			PAGE TOTALS				20		1	5	8			2	2			

Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.

Reflective sheeting will be designated as:

Type C - High Specific Intensity

* FOR STRUCTURE MOUNTING DETAILS, SEE SHEETS 15 THRU 17.

Note:

1. The DNT and the Addison Toll Tunnel Logo Sign Trailblazers will come from the NTTA for installation by the contractor.

FINAL RECORD DRAWING
Date: 12/25/99

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RICHARD K. LAIRD, P.E. NO. 59187 ON JANUARY 12, 1999. ALTERATION OF A SEALED DOCUMENT WITHOUT PRIOR NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

STATE OF TEXAS · RICHARD K. LAIRD · 59187 · REGISTERED · PROFESSIONAL ENGINEER

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

SUMMARY OF SMALL SIGNS

MCE MATEO CONSULTING ENGINEERS, INC. 5580 PETERSON LANE SUITE 225 DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

DRAWN: TMF DATE: 5/97 | DESIGNED: SA DATE: 5/97

CHECKED: SCF DATE: 5/97 | SCALE: NONE

CONTRACT No. DNT-260 SHEET 6 OF 52

112SUM03.SHT

SUMMARY OF SMALL SIGNS

PLAN SHEET NO.	SIGN NO.	SIGN TYPE	SIGN TEXT	SIGN DIMENSIONS	REFLECTIVE SHEETING	PLYWOOD TYPE A	ALUMINUM TYPE A	TYPE OF MOUNT													DRIVEABLE		MILEPOSTS	
								A	A (B-B)	A-1	B	C	D-1	D-2	SM*	D-4	D-5	D-6	F	G	TY I	TY II	MP	MW
10	46	R5-1	DO NOT ENTER	30X30	C		1	1																
	47	R1-2	YIELD	36X36X36	C		1	1																
	48	R3-8(MOD)	LANE USE (SYMBOL)	48X30	C		1							1										
	49	R3-8(MOD)	LANE USE (SYMBOL)	48X30	C		1							1										
	50	DNT-1	DNT (SYMBOL)	24" DIA.	C		1	1																
		M6-3G	↑	21X15	C		1																	
	50A	DNT-1	DNT (SYMBOL)	24" DIA.	C		1	1																
		M6-3G	↑	21X15	C		1																	
	51	R14-3	HAZARD. CARGO PROHIB. (SYM.)	24X24	C		1				1													
		ATT-1	Addison Toll Tunnel	24X24	C		1																	
		M6-1 L	←	21X15	C		1																	
		DNT-1	DNT (SYMBOL)	24" DIA.	C		1																	
		M6-1GR	→	21X15	C		1																	
	52	R14-3	HAZARD. CARGO PROHIB. (SYM.)	24X24	C		1				1													
		ATT-1	Addison Toll Tunnel	24X24	C		1																	
		M6-8 L	LEFT LANE	24X18	C		1																	
↓		DNT-1	DNT (SYMBOL)	24" DIA.	C		1																	
10		M6-8GR	RIGHT LANE	24X18	C		1																	
8	53	SPECIAL	HANDICAPPED SPACE SIGN (SYM.)	12X16	C		1																	
↓		PLAQUE	VAN ACCESSIBLE	12X06	C		1	1																
8	54	SPECIAL	50¢ TOLL ALL VEHICLES	108X36	C		1											1						
10	55	SPECIAL	50¢ TOLL ALL VEHICLES	108X36	C		1											1						
PAGE TOTALS								5			2			2				2						
PROJECT TOTALS								25	1	5	10			4	2			2						

Sign supports shall be located as shown on the plans, except that the Engineer may shift the sign supports, within design guidelines, where necessary to secure a more desirable location or to avoid conflict with utilities. Unless otherwise shown on the plans, the Contractor shall stake and the Engineer will verify all sign support locations.

Reflective sheeting will be designated as:

Type C - High Specific Intensity

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Note:

1. The DNT and the Addison Toll Tunnel Logo Sign Trailblazers will come from the NTTA for installation by the contractor.

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STATE OF TEXAS
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REGISTERED
PROFESSIONAL ENGINEER

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NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

SUMMARY OF SMALL SIGNS

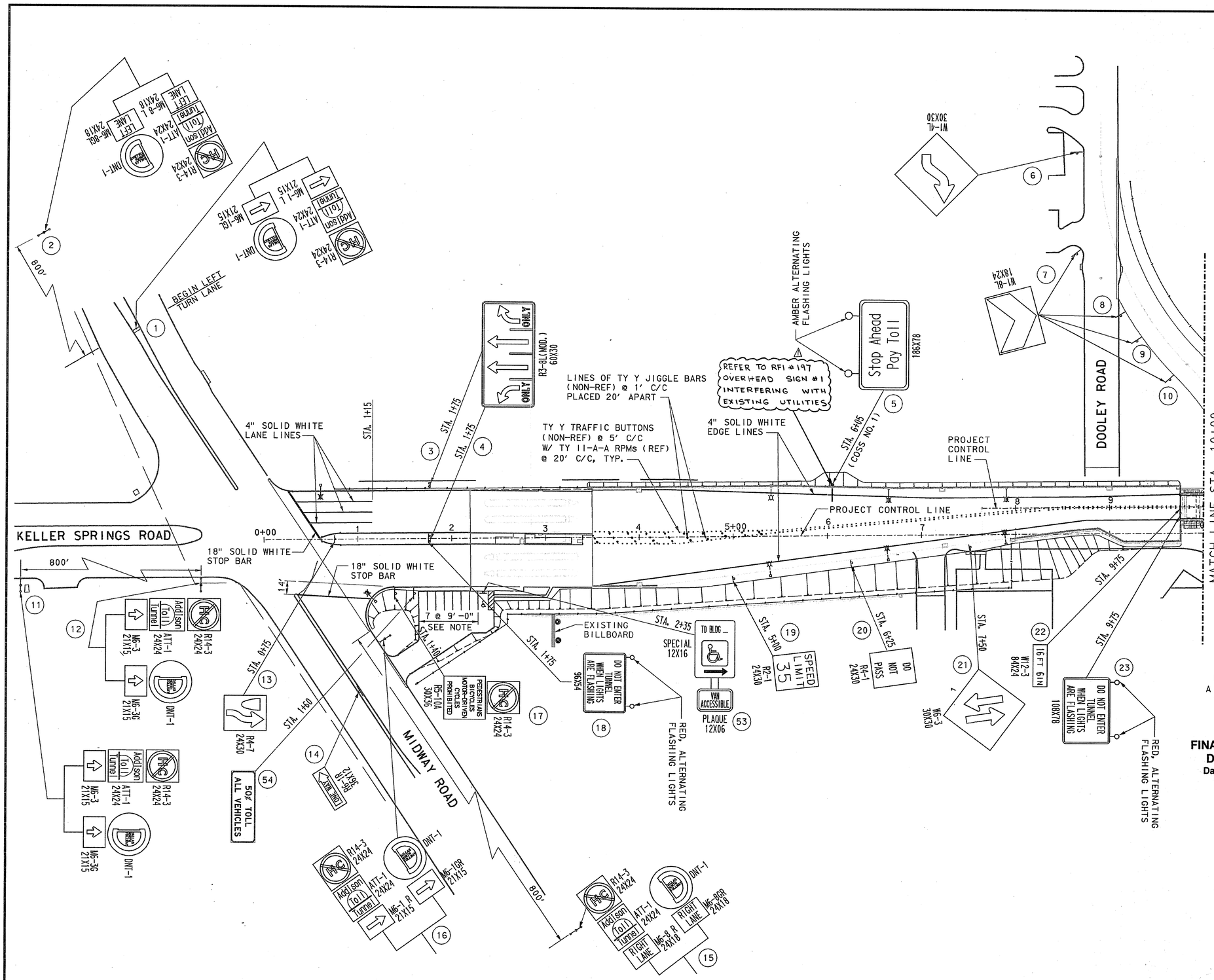
MCE MATEO CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

DRAWN: TMF DATE: 5/97 DESIGNED: RKL DATE: 5/97
CHECKED: SCF DATE: 5/97 SCALE: NONE

CONTRACT No. DNT-260 SHEET 7 OF 52

112SUM02.SHT



N

0 50 100 150
GRAPHIC SCALE IN FEET

LEGEND:

(X) SIGN NUMBER

COSS – CANTILEVER OVERHEAD SIGN STRUCTURE

NOTE:

PARKING SPACES SHALL BE STRIPED IN THIS CONTRACT. NORMAL 9' SPACES SHALL BE STRIPED 4" WIDE BY 20'. 12' HANDICAPPED SPACE SHALL BE 4" BY 20' WITH A 5' WIDE LOADING ZONE WITH 4" SOLID WHITE DIAGONALS AT 3' SPACING.

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STATE OF TEXAS
RICHARD K. LAIRD
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PROFESSIONAL ENGINEER

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No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

SIGNING AND PAVEMENT MARKING LAYOUT MIDWAY ROAD TO STA. 10+00

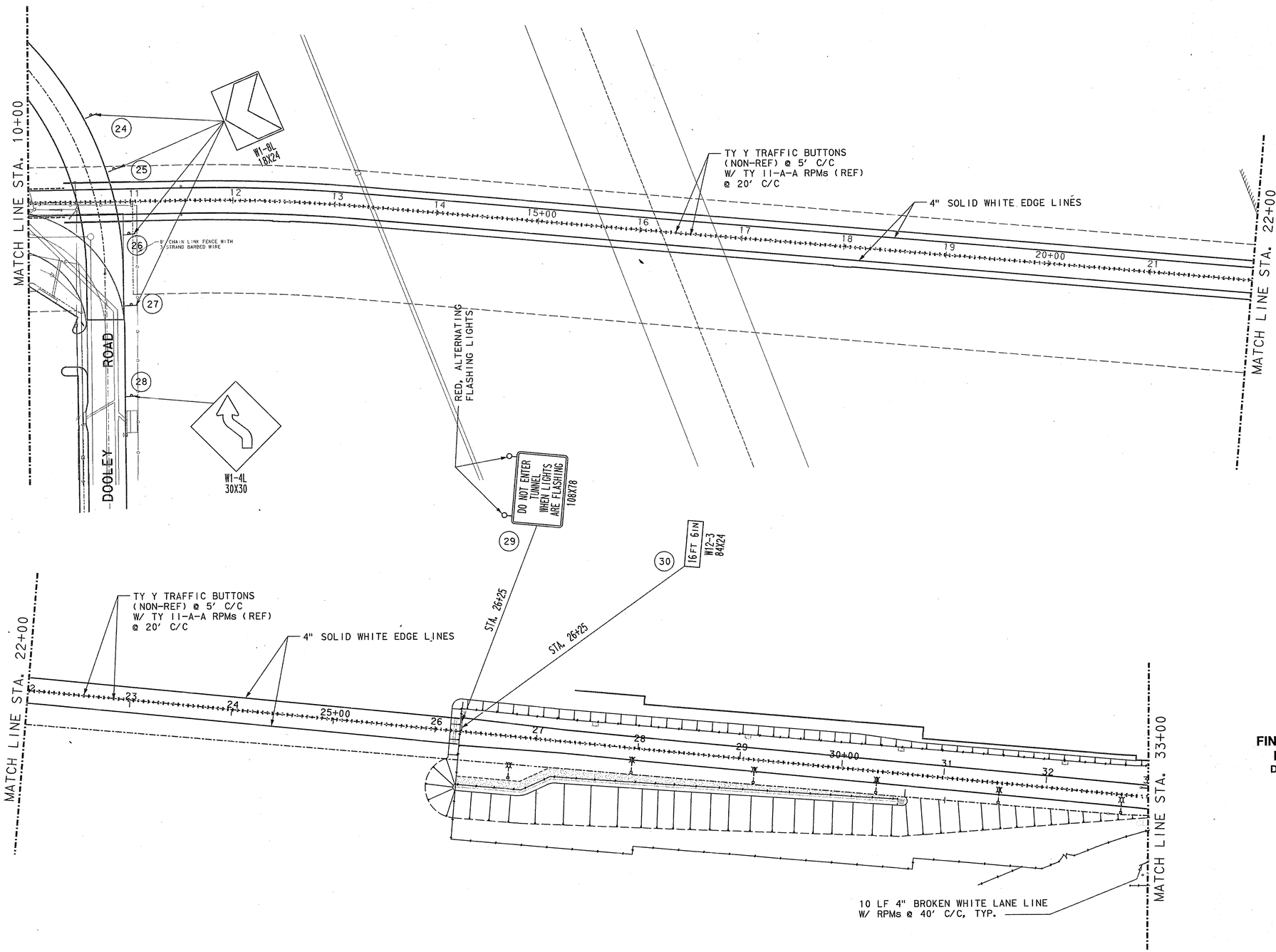
MCE MATED CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

DRAWN: TMF	DATE: 5/97	DESIGNED: SA	DATE: 5/97
CHECKED: SCF	DATE: 5/97	SCALE: 1" = 50'	

CONTRACT No. DNT-260 SHEET 8 OF 52

112SGN01.SHT



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Date: 12/25/99

STATE OF TEXAS
RICHARD K. LAIRD
59187
REGISTERED
PROFESSIONAL ENGINEER

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

SIGNING AND PAVEMENT MARKING LAYOUT STA. 10+00 TO STA. 33+00

MCE MATED CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

DRAWN: TMF DATE: 5/97 DESIGNED: SA DATE: 5/97
CHECKED: RKL DATE: 5/97 SCALE: 1" = 50'

CONTRACT No. DNT-260 SHEET 9 OF 52

112SGN02.SHT

LEGEND:

(X) SIGN NUMBER

COSS – CANTILEVER OVERHEAD SIGN STRUCTURE

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FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS — RICHARD K. LAIRD — 59187 — REGISTERED PROFESSIONAL ENGINEER

⚠ REVISED PER RFI # 197, RFI # 200

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

SIGNING AND PAVEMENT MARKING LAYOUT STA. 33+00 TO ADDISON ROAD

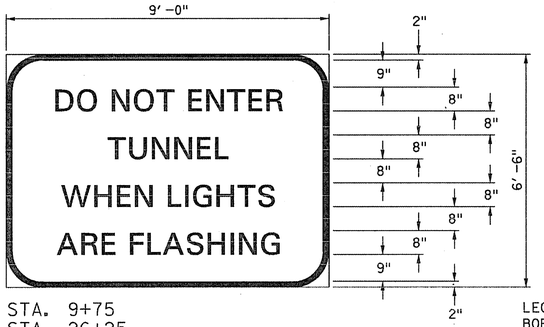
MCE MATED CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

DRAWN: SA DATE: 5/97 DESIGNED: RKL DATE: 5/97
CHECKED: SCF DATE: 5/97 SCALE: 1" = 50'

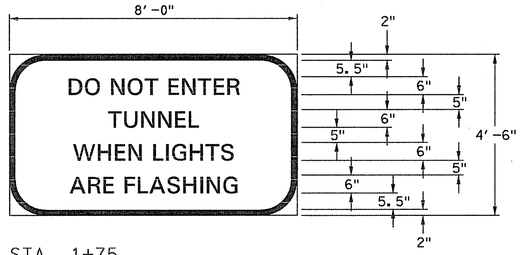
CONTRACT No. DNT-260 SHEET 10 OF 52

112SGN03.SHT



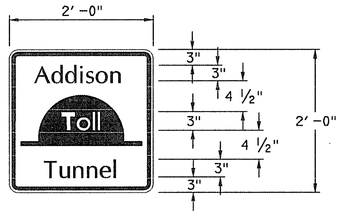
STA. 9+75
STA. 26+25
STA. 35+15 (TY A – ENGINEER GRADE)

LEGEND : BLACK
BORDER : BLACK
BACKGROUND : YELLOW
SHEETING : HIGH SPECIFIC INTENSITY (TY C)
BORDER RADIUS : 1′ −0"
SCALE : ½" = 1′ −0"



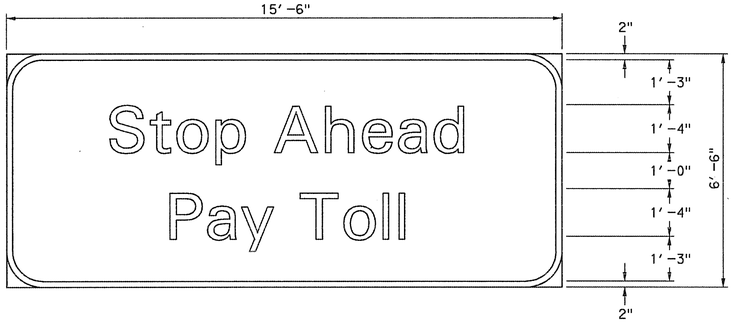
STA. 1+75

LEGEND : BLACK
BORDER : BLACK
BACKGROUND : YELLOW
SHEETING : HIGH SPECIFIC INTENSITY (TY C)
BORDER RADIUS : 9"
SCALE : ½" = 1′ −0"



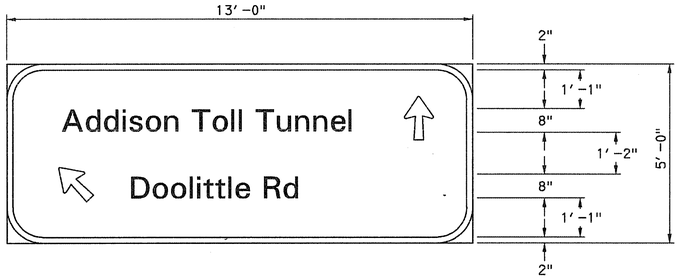
2 ON W. KELLER SPRINGS RD
2 ON E. KELLER SPRINGS RD
2 ON N. MIDWAY RD
2 ON S. MIDWAY RD
2 ON N. ADDISON RD
2 ON S. ADDISON RD

LEGEND : TEXT, WHITE, AND TUNNEL, BLACK
BORDER : WHITE
BACKGROUND : CORAL
SHEETING : HIGH SPECIFIC INTENSITY (TY C)
BORDER RADIUS : 3"
SCALE : 1" = 1′ −0"



STA. 6+05

LEGEND : WHITE
BORDER : WHITE
BACKGROUND : GREEN
SHEETING : TY A – ENGINEER GRADE
BORDER RADIUS : 1′ −0"
SCALE : 1/2" = 1′ −0"



STA. 35+15

LEGEND : WHITE
BORDER : WHITE
BACKGROUND : GREEN
SHEETING : TY A – ENGINEER GRADE
BORDER RADIUS : 9"
SCALE: : ½" = 1′ −0"

LETTER SIZES AND TYPES

UPPER CASE	LOWER CASE LOOP HEIGHT	SERIES
16"	12"	E(M)
8"	6"	E(M)
6"	—	E
3"	2 ¼"	E

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59187
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PROFESSIONAL ENGINEER

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

SIGN DETAILS

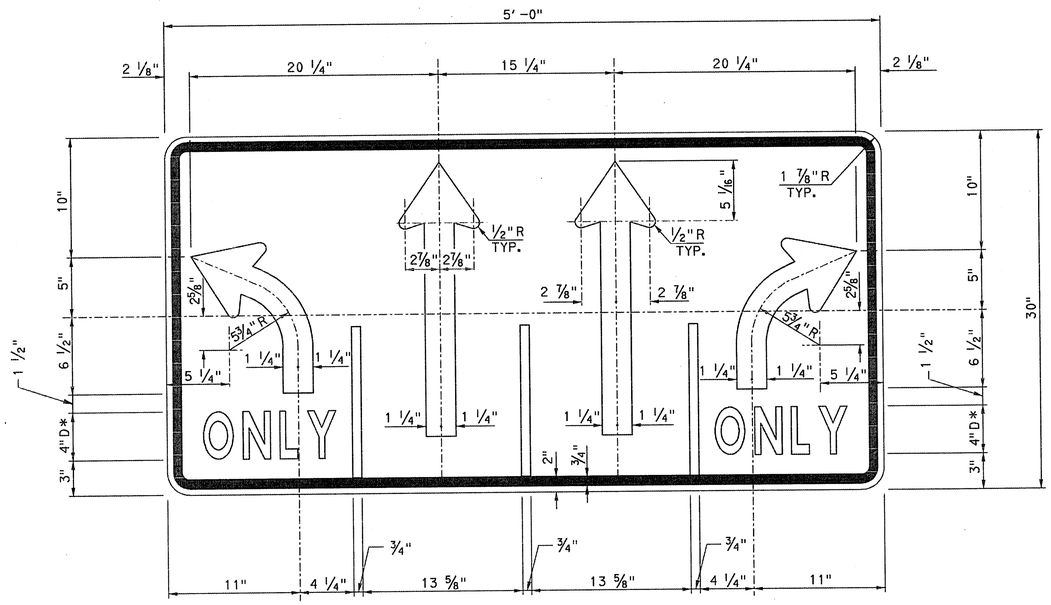
MCE MATED CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

DRAWN: SA DATE: 5/97 DESIGNED: RKL DATE: 5/97
CHECKED: SCF DATE: 5/97 SCALE: AS NOTED

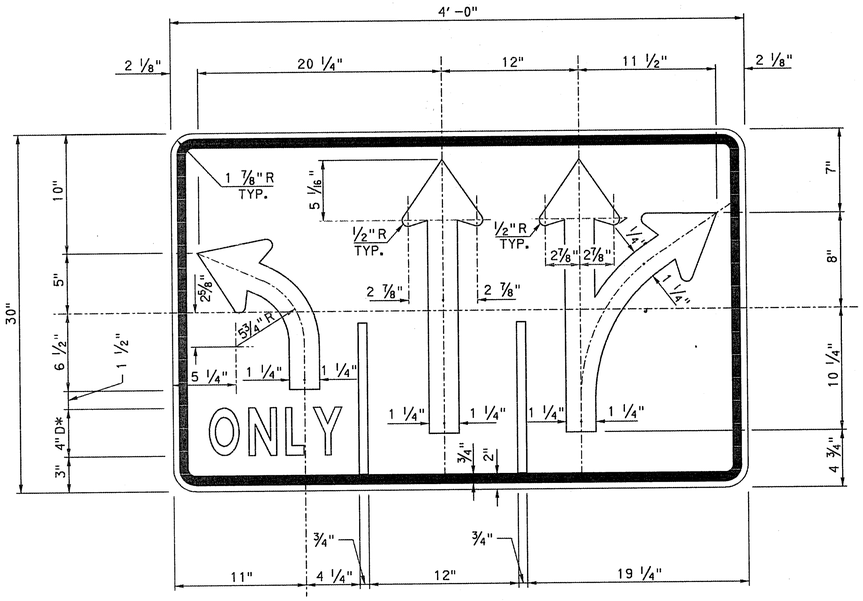
CONTRACT No. DNT-260 SHEET 11 OF 52

112SGN04.SHT



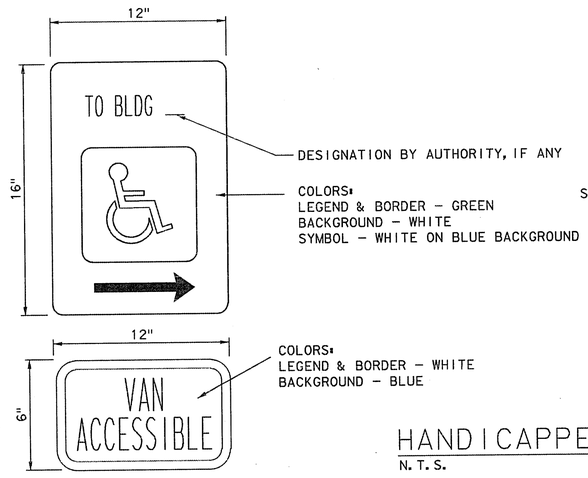
2 AT STA. 1+75

LEGEND : BLACK
BORDER : BLACK
BACKGROUND : WHITE
SHEETING : HIGH SPECIFIC INTENSITY (TY C)
* : SPACING REDUCED 50%



2 AT STA. 35+13

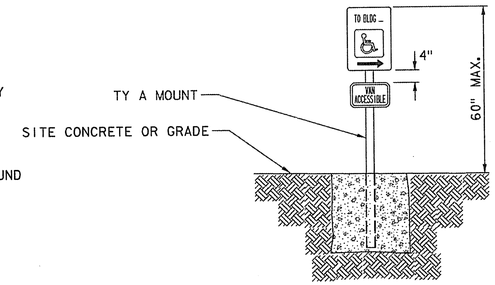
LEGEND : BLACK
BORDER : BLACK
BACKGROUND : WHITE
SHEETING : HIGH SPECIFIC INTENSITY (TY C)
* : SPACING REDUCED 50%



DESIGNATION BY AUTHORITY, IF ANY

COLORS:
LEGEND & BORDER – GREEN
BACKGROUND – WHITE
SYMBOL – WHITE ON BLUE BACKGROUND

COLORS:
LEGEND & BORDER – WHITE
BACKGROUND – BLUE

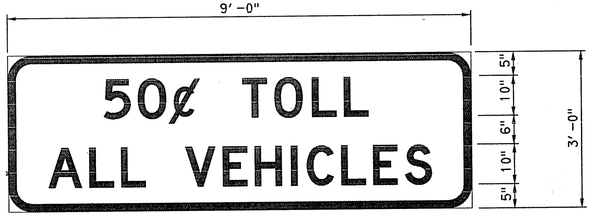


1 EACH AT STA. 2+35

HANDICAPPED SPACE SIGN

N. T. S.

NOTE: CONTRACTOR TO FURNISH AND INSTALL ONE (1) H. C. SIGN IN PROJECT VICINITY AS SHOWN ON THE PLANS.



1 AT STA. 1+60
1 AT STA. 35+75

LEGEND : WHITE
BORDER : WHITE
BACKGROUND : GREEN
SHEETING : HIGH SPECIFIC INTENSITY (TY C)
BORDER RADIUS : 6"

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No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

SIGN DETAILS

MCE MATED CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

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CHECKED: SCF DATE: 5/97 SCALE: NONE

CONTRACT No. DNT-260 SHEET 12 OF 52

112SGN10.SHT

DESIGN DATA

SPAN LENGTH	25.50	FT
DESIGN HEIGHT	17.08	FT
TOWER HEIGHT	16.00	FT
DESIGN SIGN AREA	255.00	SF
ACTUAL SIGN AREA	100.75	SF
PENETROMETER VALUE	ASSUME 15	

STRUCTURE SIZE

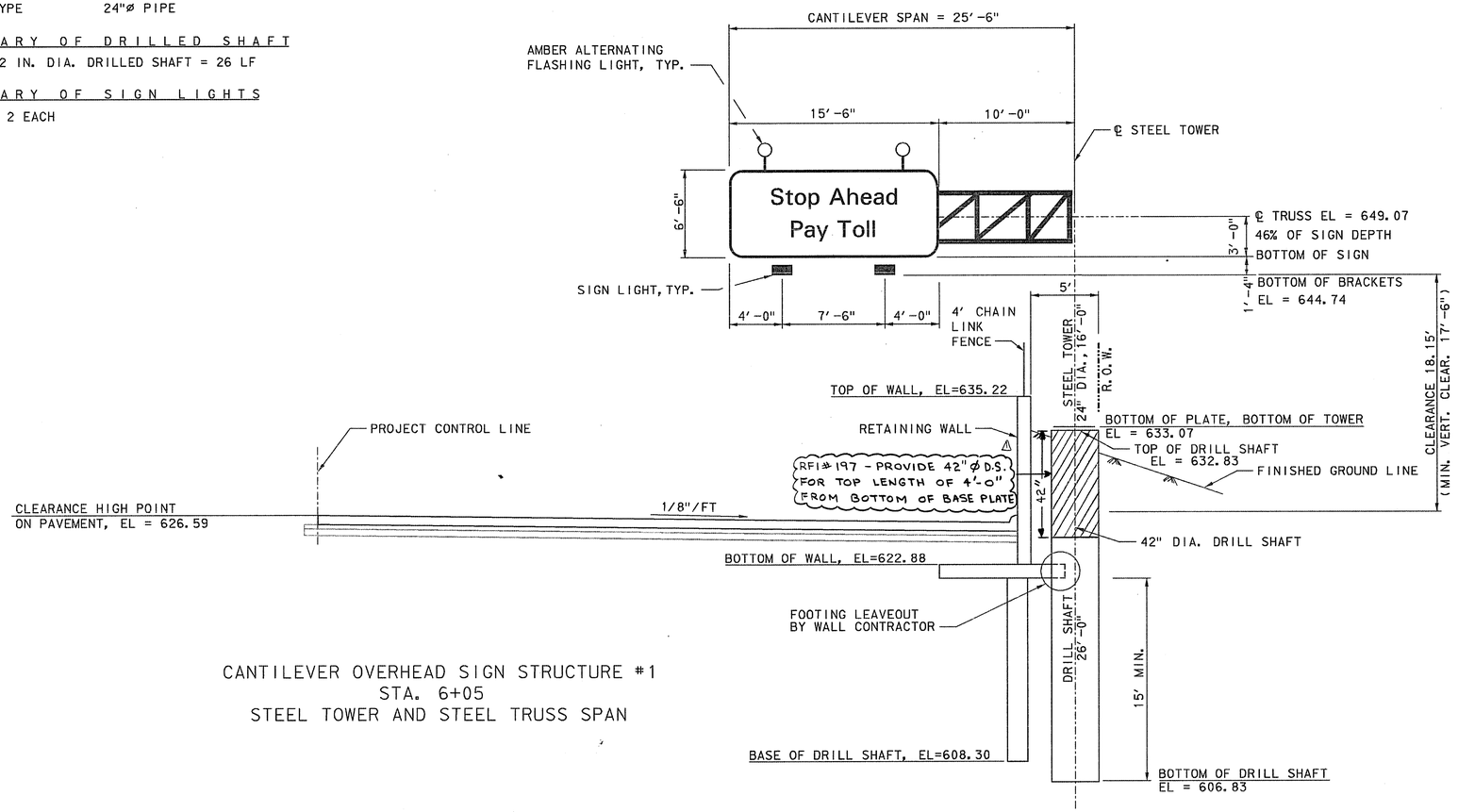
TRUSS TYPE	4.0'×4.0'
TOWER TYPE	24"ø PIPE

SUMMARY OF DRILLED SHAFT

TOTAL 42 IN. DIA. DRILLED SHAFT = 26 LF

SUMMARY OF SIGN LIGHTS

TOTAL = 2 EACH



CANTILEVER OVERHEAD SIGN STRUCTURE #1
STA. 6+05
STEEL TOWER AND STEEL TRUSS SPAN

GENERAL NOTES:

1. THIS OVERHEAD SIGN STRUCTURE WILL BE CONSTRUCTED WITH STEEL TOWER AND STEEL TRUSS.
2. TRUSS CONSTRUCTION SHALL CONFORM TO STANDARD DRAWINGS NO. SS-23, SS-24, AND SS-25.
3. SIGN, SIGN LIGHT BRACKETS, AND SIGN LIGHTS WILL BE INSTALLED UNDER THIS CONTRACT.
4. SEE STANDARD DRAWINGS NO. SS-26 AND SS-27 FOR ADDITIONAL INFORMATION.

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STATE OF TEXAS · RICHARD K. LAIRD · 59187 · REGISTERED PROFESSIONAL ENGINEER

⚠ REVISED PER RFI# 197

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

CANTILEVER
OVERHEAD SIGN STRUCTURE #1
STA. 6+05

MCE MATEO CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

DRAWN: SA DATE: 5/97 DESIGNED: RKL DATE: 5/97
CHECKED: SCF DATE: 5/97 SCALE: 1" = 5'-0"

CONTRACT No. DNT-260 SHEET 13 OF 52

112SGN05.SHT

DESIGN DATA

SPAN LENGTH	30.00	FT
DESIGN HEIGHT	23.24	FT
TOWER HEIGHT	22.50	FT
DESIGN SIGN AREA	300.00	SF
ACTUAL SIGN AREA	123.50	SF
PENETROMETER VALUE	ASSUME 15	

STRUCTURE SIZE

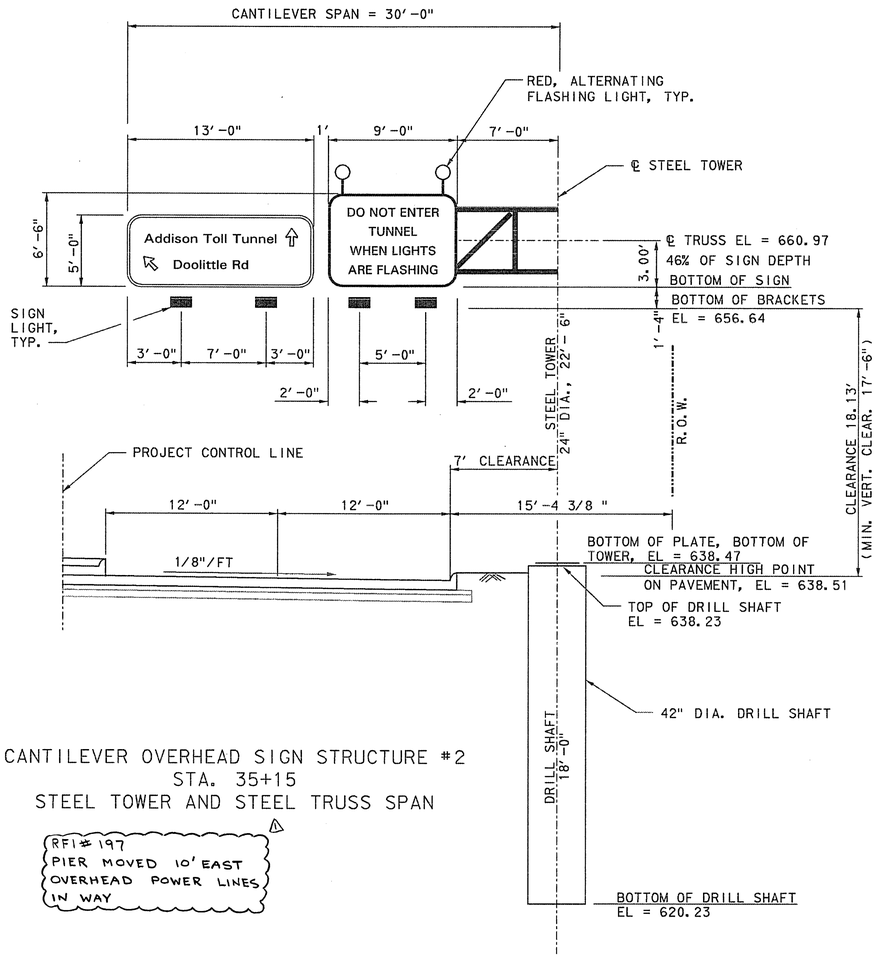
TRUSS TYPE	4.0'×4.0'
TOWER TYPE	24"ø PIPE

SUMMARY OF DRILLED SHAFT

TOTAL 48 IN. DIA. DRILLED SHAFT = 28 LF

SUMMARY OF SIGN LIGHTS

TOTAL = 4 EACH



CANTILEVER OVERHEAD SIGN STRUCTURE #2
STA. 35+15
STEEL TOWER AND STEEL TRUSS SPAN

⚠ RFI # 197
PIER MOVED 10' EAST
OVERHEAD POWER LINES
IN WAY

GENERAL NOTES:

1. THIS OVERHEAD SIGN STRUCTURE WILL BE CONSTRUCTED WITH STEEL TOWER AND STEEL TRUSS.
2. TRUSS CONSTRUCTION SHALL CONFORM TO STANDARD DRAWINGS NO. SS-23, SS-24, AND SS-25.
3. SIGN, SIGN LIGHT BRACKETS, AND SIGN LIGHTS WILL BE INSTALLED UNDER THIS CONTRACT.
4. SEE STANDARD DRAWINGS NO. SS-26 AND SS-27 FOR ADDITIONAL INFORMATION.

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RICHARD K. LAIRD, P.E. NO. 59187 ON JANUARY 12, 1999. ALTERATION OF A SEALED DOCUMENT WITHOUT PRIOR NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS · RICHARD K. LAIRD · 59187 · REGISTERED · PROFESSIONAL ENGINEER

⚠ REVISED PER RFI # 197

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

CANTILEVER
OVERHEAD SIGN STRUCTURE #2
STA. 35+15

MCE MATEO CONSULTING ENGINEERS, INC.
8560 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

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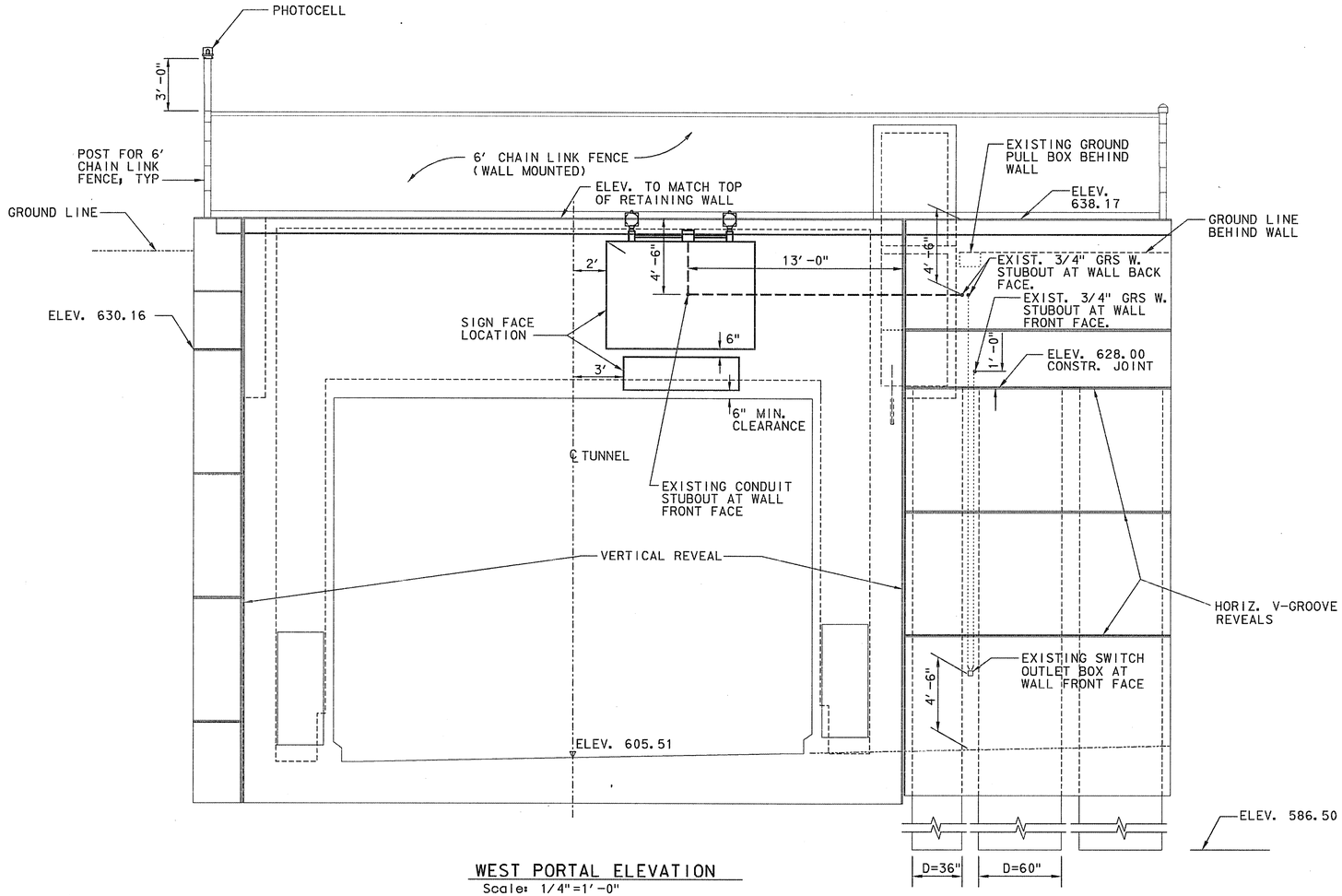
CHECKED: SCF DATE: 5/97 | SCALE: 1" = 5'-0"

CONTRACT No. DNT-260 SHEET 14 OF 52

112SGN06.SHT



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

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STATE OF TEXAS
RICHARD K. LAIRD
59187
REGISTERED
PROFESSIONAL ENGINEER

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

WEST PORTAL STA. 9+75
OVERHEAD SIGN
ATTACHMENT LOCATION

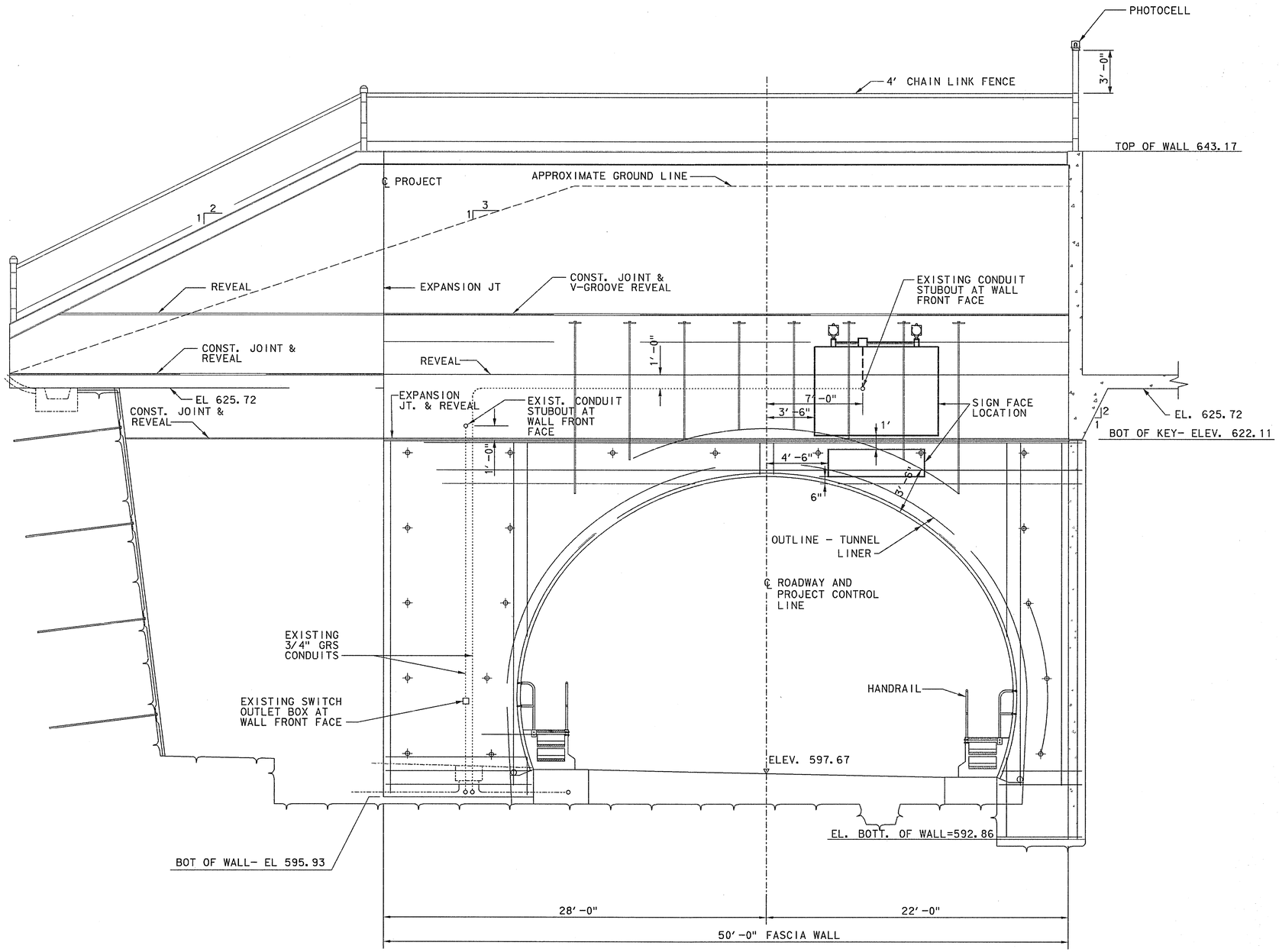
MCE MATEO CONSULTING ENGINEERS, INC.
8580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-0700

SECTION XIII

DRAWN: SA DATE: 5/97 DESIGNED: RKL DATE: 5/97
CHECKED: SCF DATE: 5/97 SCALE: AS SHOWN

CONTRACT No. DNT-260 SHEET 15 OF 52

112SGN12.SHT



SECTIONAL ELEVATION - STA. 26+25
(LOOKING WEST)
SCALE: 1/4"=1'-0"

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RICHARD K. LAIRD, P.E. NO. 59187 ON JANUARY 12, 1999. ALTERATION OF A SEALED DOCUMENT WITHOUT PRIOR NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS
RICHARD K. LAIRD
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PROFESSIONAL ENGINEER

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

EAST PORTAL STA. 26+25
OVERHEAD SIGN
ATTACHMENT LOCATION

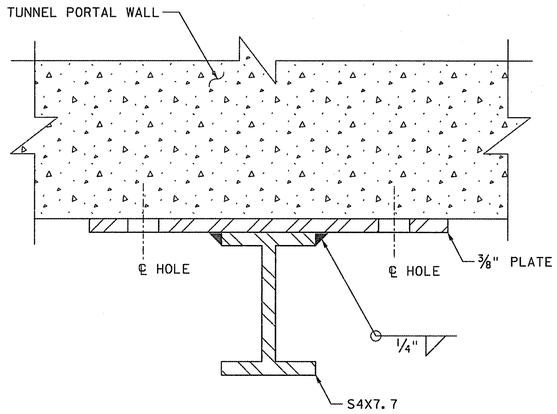
MCE MATEO CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

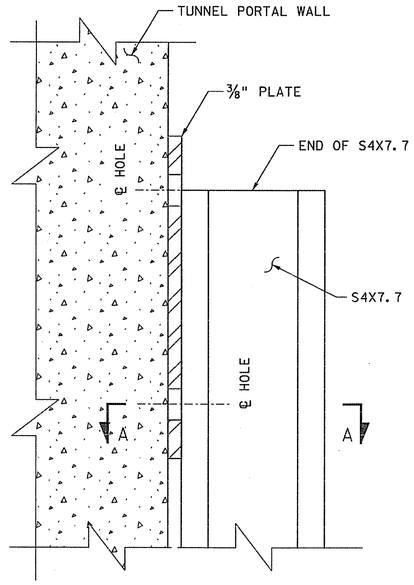
DRAWN: SA DATE: 5/97 DESIGNED: SA DATE: 5/97
CHECKED: SCF DATE: 5/97 SCALE: AS SHOWN

CONTRACT No. DNT-260 SHEET 16 OF 52

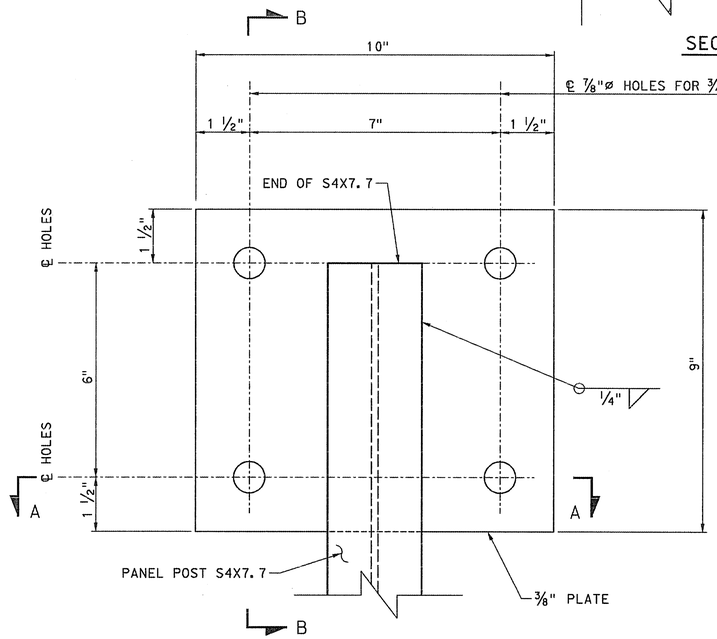
1125GN13.SHT



SECTION A-A



SECTION B-B

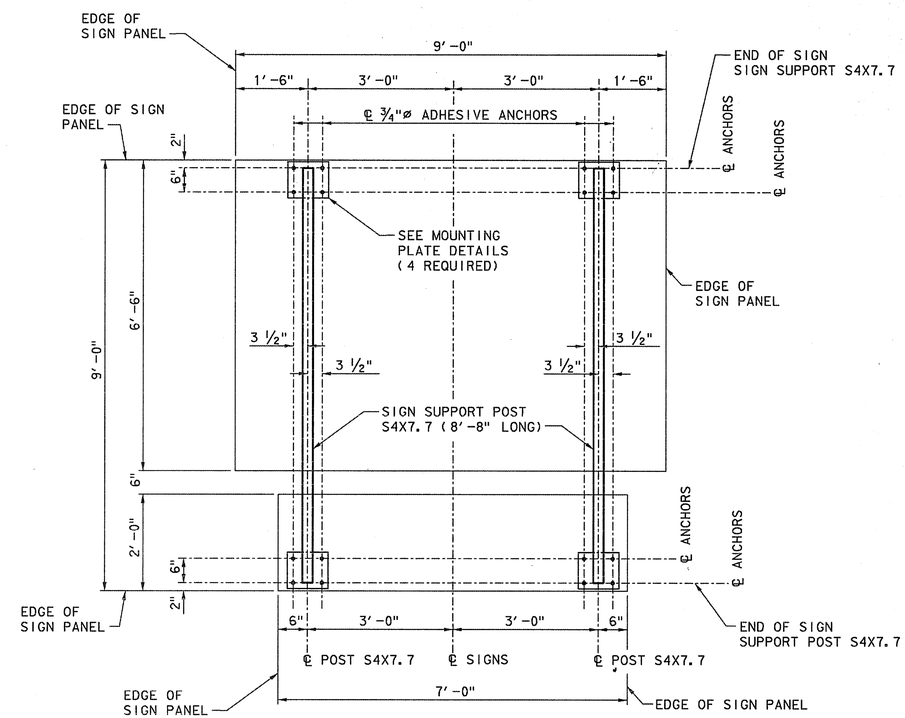


ELEVATION

MOUNTING PLATE DETAILS

NOTES:

1. 4 EACH 3/4"ø X 6 5/8" ADHESIVE TYPE ANCHORS AS APPROVED BY ENGINEER.
2. ONE MOUNTING PLATE AT EACH END OF S4X7.7 POST.



SIGN SUPPORT FRAMING AND ANCHOR DETAILS

GENERAL NOTES:

1. ADHESIVE TYPE ANCHORS SHALL BE APPROVED BY THE ENGINEER.
2. NO DIRECT PAYMENT WILL BE MADE FOR SIGN MOUNTING. COST OF MATERIALS AND LABOR SHALL BE INCLUDED IN THE PRICE BID FOR PORTAL SIGNS ITEM NO. 636 & SP.
3. STRUCTURAL STEEL SHALL CONFORM TO SPECIFICATION ITEM 441.
4. SHOP WELD 3/8" PLATE TO PANEL POST S4X7.7. LOCATE SIGN ON TUNNEL PORTAL AND USE 3/8" PLATE AS TEMPLATE FOR LOCATION OF ADHESIVE ANCHORS BEFORE DRILLING HOLES IN CONCRETE.
5. THE CONTRACTOR MAY SUBMIT A FRAMING TEMPLATE FOR LOCATING THE ANCHOR BOLT PATTERN PRIOR TO ERECTION.
6. FOR OTHER DETAILS, SEE STANDARD SMD (P-1)(MOD.). PROVIDE STRAIGHT 8'-8" LONG S4X7.7 POST FOR SIGN SUPPORT. WALKWAYS WILL NOT BE PROVIDED AND LIGHTS WILL NOT BE PROVIDED AT TUNNEL PORTAL.

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FINAL RECORD DRAWING
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STATE OF TEXAS · RICHARD K. LAIRD · 59187 · REGISTERED · PROFESSIONAL ENGINEER

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

TUNNEL PORTAL SIGN MOUNTING DETAILS

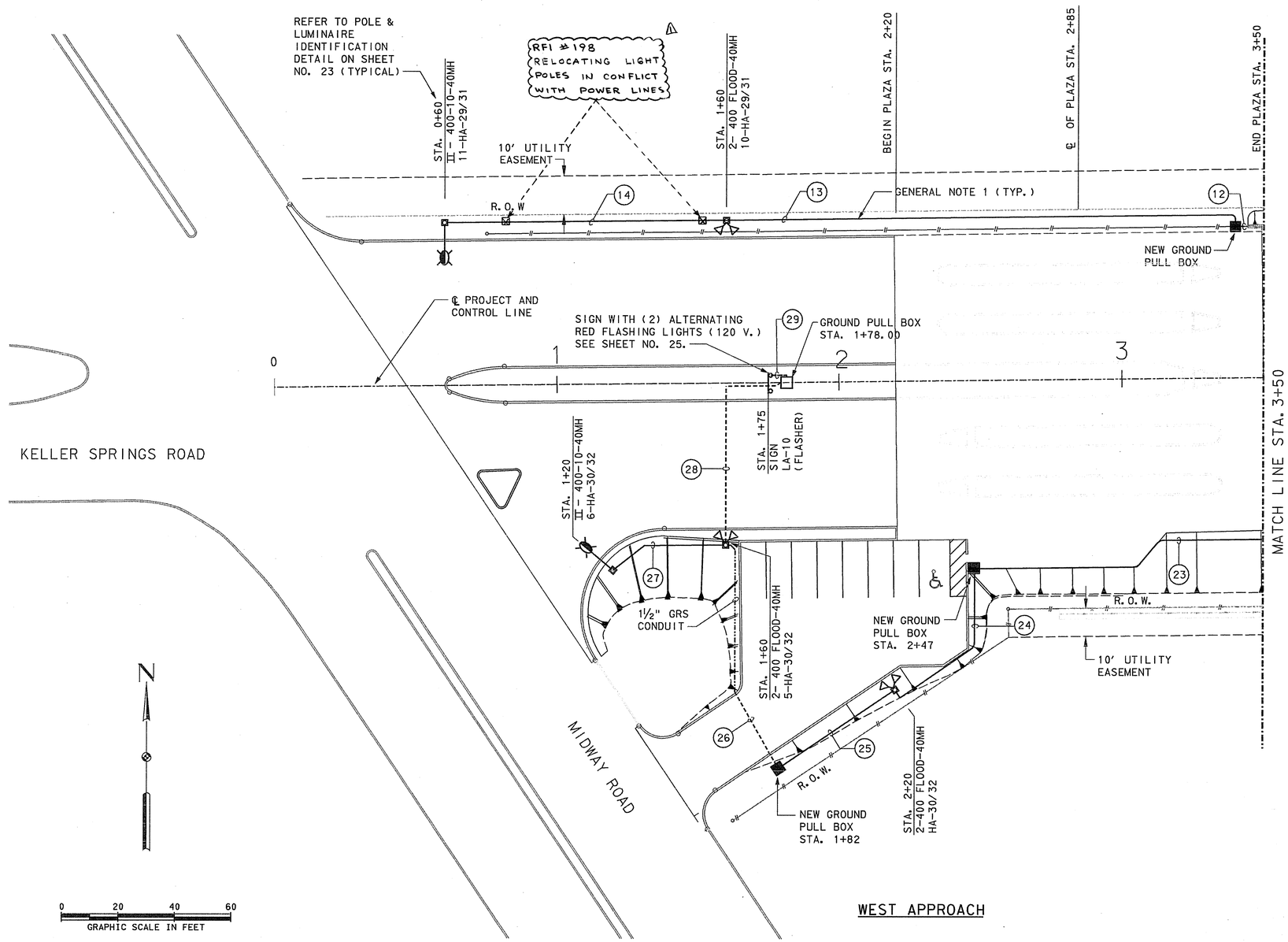
MATEO CONSULTING ENGINEERS, INC.
5560 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

DRAWN: SA DATE: 5/97 DESIGNED: RKL DATE: 5/97
CHECKED: SCF DATE: 5/97 SCALE: NONE

CONTRACT No. DNT-260 SHEET 17 OF 52

112SGN11.SHT



LEGEND:

- ROADWAY LIGHTING LUMINAIRE: 400 WATT HIGH PRESSURE SODIUM, TYPE III DISTRIBUTION.
- ROADWAY LIGHTING LUMINAIRE: 400 WATT HIGH PRESSURE SODIUM, TYPE II DISTRIBUTION.
- ROADWAY LIGHTING FLOODLIGHTS: NEMA 6X5, 400 WATT HIGH PRESSURE SODIUM, MOUNTED ON POLE TOP BRACKET.
- WALL–MOUNTED LIGHTING FIXTURE: 150 WATT HIGH PRESSURE SODIUM.
- W. P. TOGGLE SWITCH.
- PHOTOCELL
- GROUND–MOUNTED LIGHTING UNIT.
- STRUCTURE–MOUNTED LIGHTING UNIT.
- GROUND–MOUNTED ROADSIDE SIGN WITH LIGHTS, AS NOTED ON THE PLAN.
- GROUND–MOUNTED OVERHEAD SIGN WITH LIGHTS, AS NOTED ON THE PLAN.
- NEW GROUND PULL BOX, SEE SHEET NO. 9.
- PREVIOUSLY INSTALLED GROUND PULL BOX.
- PREVIOUSLY INSTALLED EMBEDDED STRUCTURE PULL BOX.
- PREVIOUSLY INSTALLED CONDUIT.
- DUCT–CABLE WITH INSULATED AND ONE BARE CONDUCTOR, SIZE AS SHOWN ON THE PLAN.
- NEW UNDERGROUND CONDUIT, SIZE AS SHOWN ON THE PLAN.
- (1) CONDUIT AND CONDUCTOR RUNS NUMBER, REFER TO SHEET NO. 4, QUANTITY/ITEMS SUMMARIES.

GENERAL NOTES

1. COORDINATE DUCT–CABLE AND CONDUIT INSTALLATION WITH CIVIL CONSTRUCTION ELEMENTS–UNDERDRAINS, CONCRETE GUTTERS, FENCES, ETC.

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FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS · RICHARD JAMES MILLER · 42812 · REGISTERED · PROFESSIONAL ENGINEER

⚠ REVISED PER RFI #198

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

ROADWAY ILLUMINATION LAYOUT
STA. 0+00 TO STA. 3+50

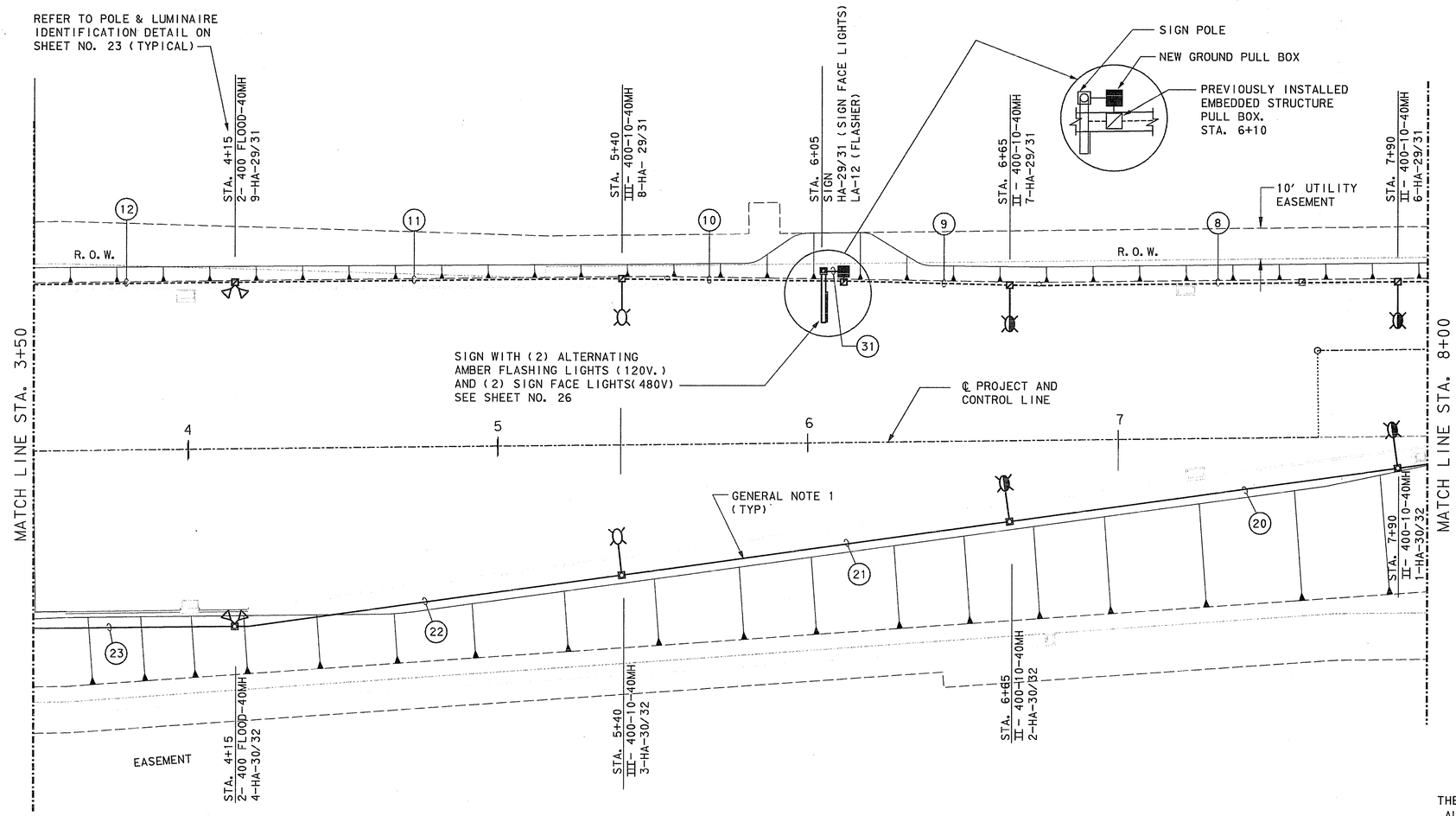
MCE MATEO CONSULTING ENGINEERS, INC.
5580 PETERSON LANE, SUITE 225
DALLAS, TEXAS 75240 (972) 233-8700

SECTION XIII

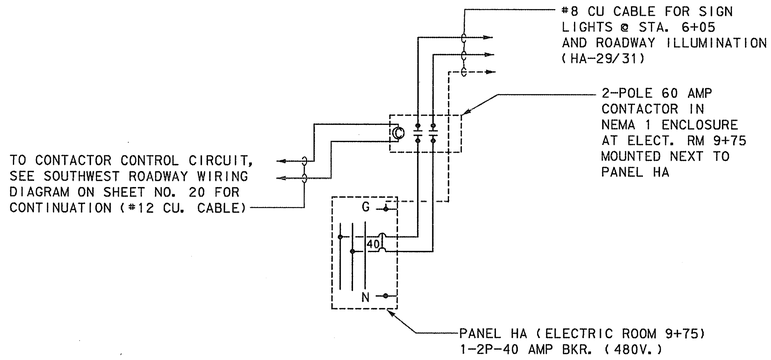
DRAWN: SAA	DATE: 5/97	DESIGNED: DR	DATE: 5/97
CHECKED: RJM	DATE: 5/97	SCALE: 1"=20'	

CONTRACT No. DNT–260 SHEET 18 OF 52

F:\96112\PLANS\LIGHTING\C1.DGN



WEST APPROACH



NORTHWEST ROADWAY - TYPICAL ILLUMINATION WIRING DIAGRAM

N.T.S.

N

0 20 40 60

GRAPHIC SCALE IN FEET

NOTES:

1. SEE SHEET NO. 18 FOR GENERAL NOTES AND LEGEND.

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FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS
RICHARD JAMES MILLER
42812
REGISTERED
PROFESSIONAL ENGINEER

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

ROADWAY ILLUMINATION LAYOUT
STA. 3+50 TO STA. 8+00

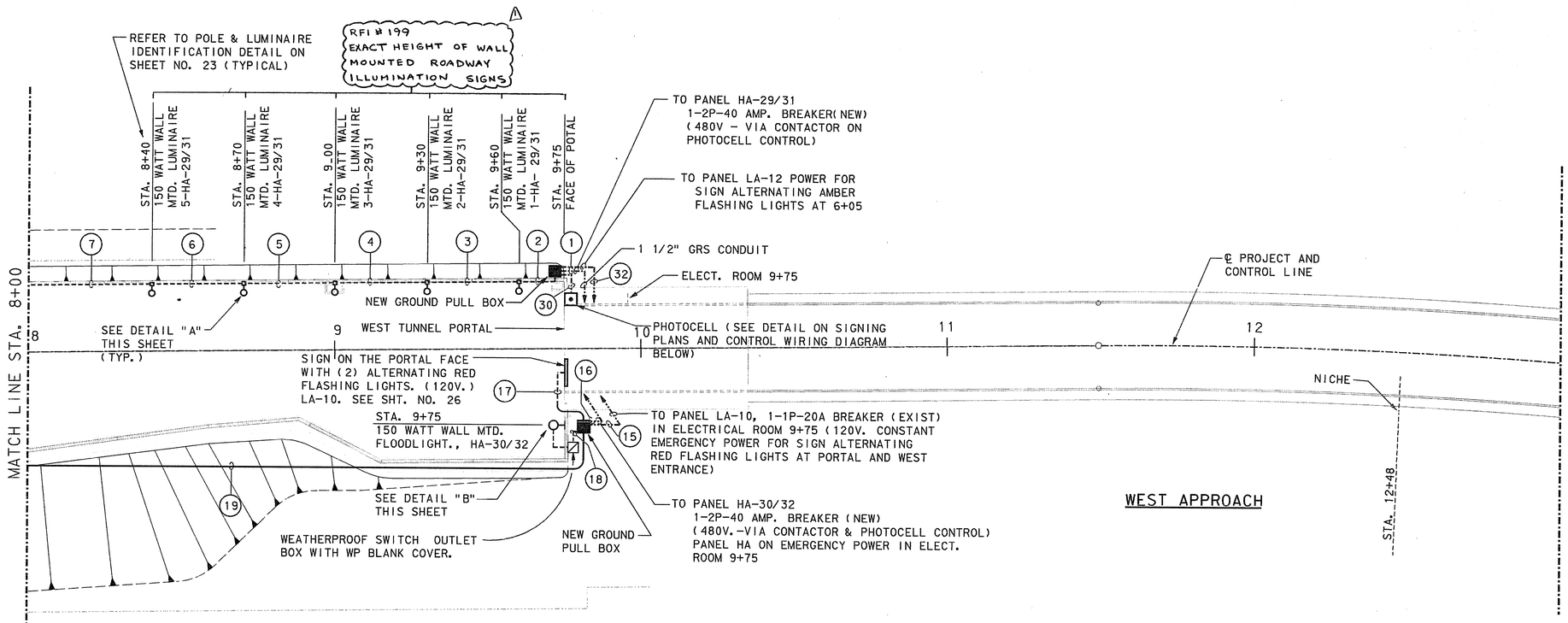
MATED CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

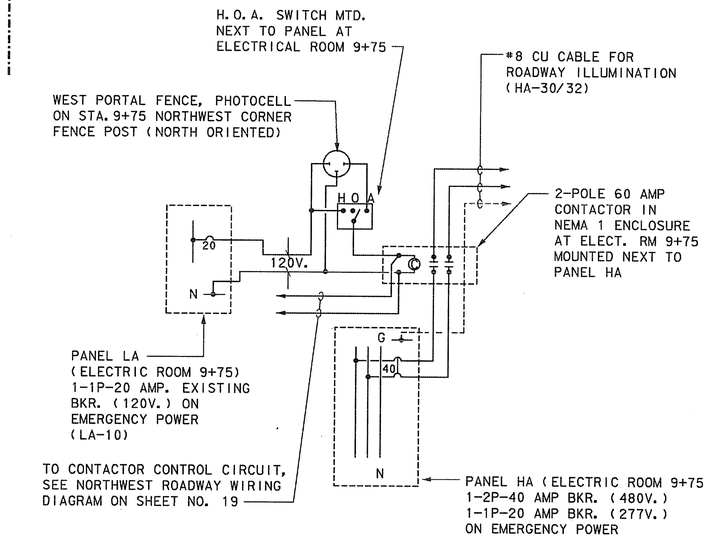
SECTION XIII

DRAWN: SAA DATE: 5/97 DESIGNED: DR DATE: 5/97
CHECKED: RJM DATE: 5/97 SCALE: 1"=20'

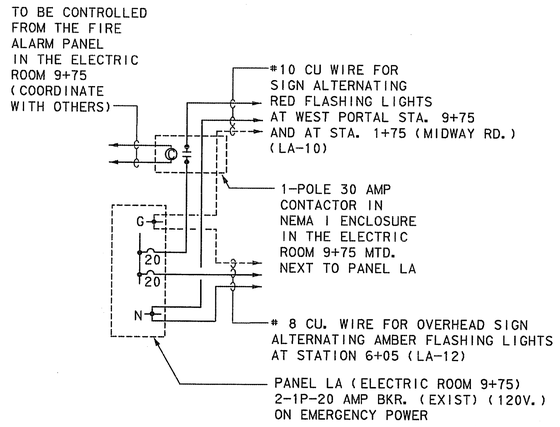
CONTRACT No. DNT-260 SHEET 19 OF 52

F:\96112\PLANS\LIGHTING\C2.DGN

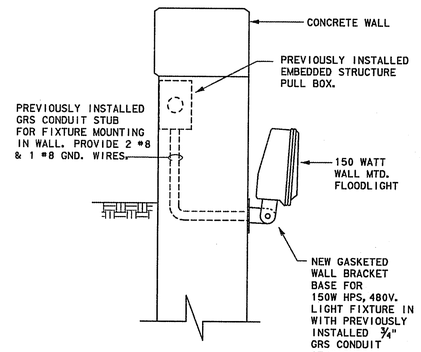




SOUTHWEST ROADWAY - TYPICAL ILLUMINATION WIRING DIAGRAM
N. T. S.

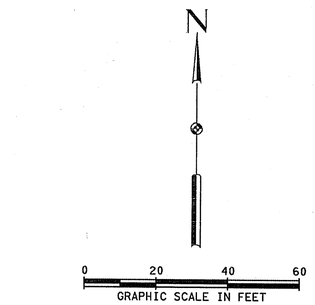


ALARM SIGN WIRING DIAGRAM (WEST ENTRANCE)
N. T. S.

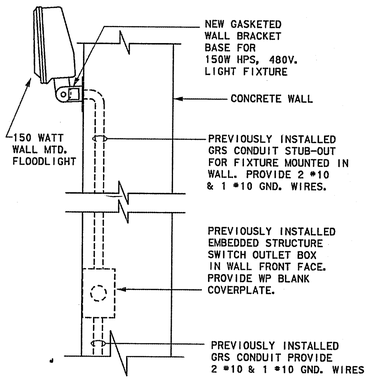


DETAIL "A"
N. T. S.

RFI # 199 EXACT HEIGHT OF WALL MOUNTED ROADWAY ILLUMINATION SIGNS



NOTE:
SEE SHEET NO. 18 FOR GENERAL NOTES AND LEGEND.



DETAIL "B"
N. T. S.

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Date: 12/25/99

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No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

ROADWAY ILLUMINATION LAYOUT
STA. 8+00 TO STA. 13+00

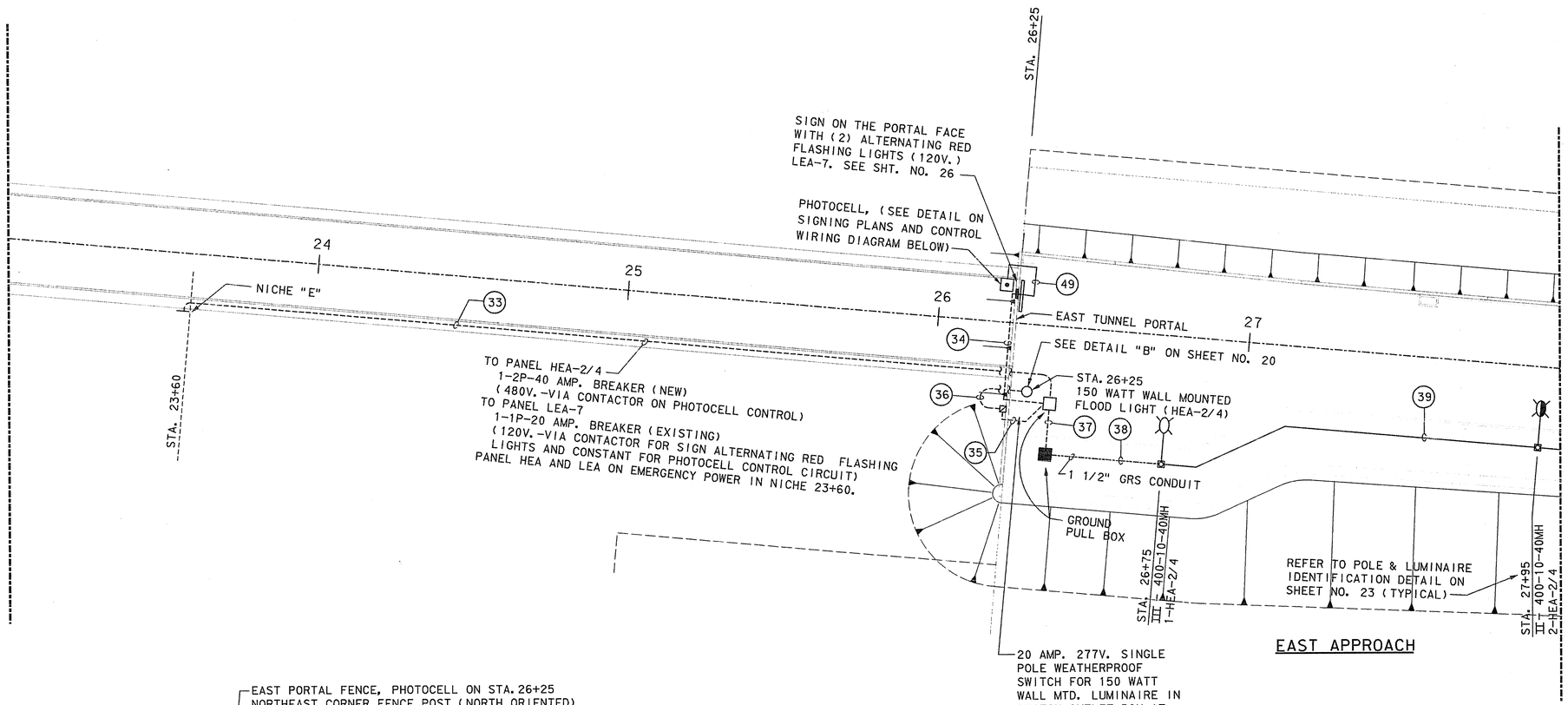
MCE MATEO CONSULTING ENGINEERS, INC. 8580 PETERSON LANE SUITE 225 DALLAS, TEXAS 75240 (972) 233-6760

SECTION XIII

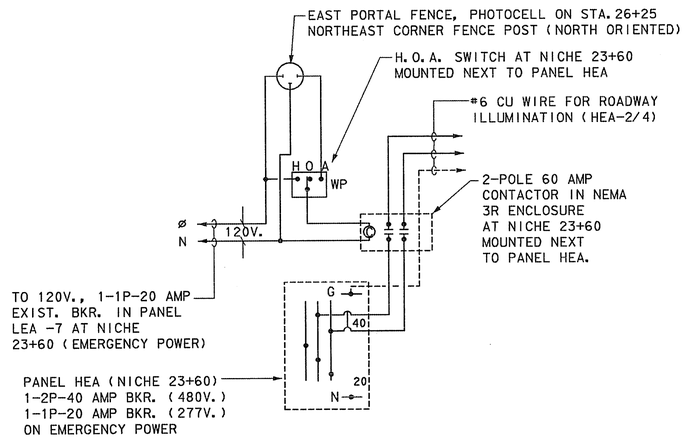
DRAWN: SAA	DATE: 5/97	DESIGNED: DR	DATE: 5/97
CHECKED: RJM	DATE: 5/97	SCALE: 1"=20'	

CONTRACT No. DNT-260 SHEET 20 OF 52

F:\96112\PLANS\LIGHTING\C3.DGN

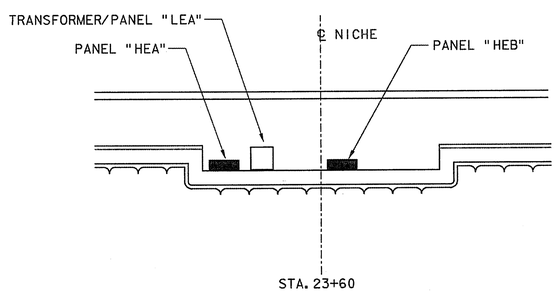


EAST APPROACH



EAST ROADWAY-TYPICAL ILLUMINATION WIRING DIAGRAM

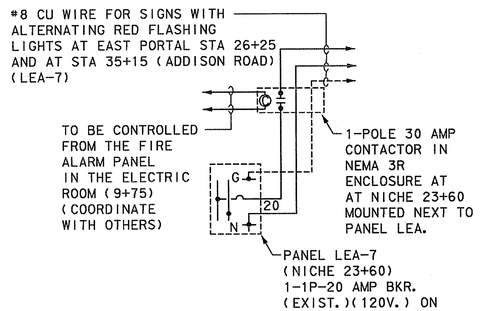
N. T. S.



LIGHTING PANELBOARDS IN EAST NICHE "E"

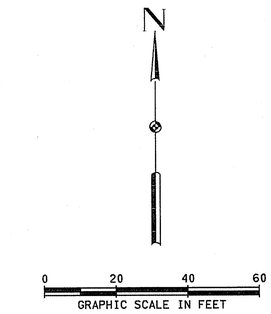
N. T. S.

THESE PANELS, TRANSFORMER ETC ... WILL BE FURNISHED AND INSTALLED UNDER THE TUNNEL DOCUMENTS. UNLESS OTHERWISE NOTED.



ALARM SIGNS WIRING DIAGRAM (EAST ENTRANCE)

N. T. S.



NOTE:

1. SEE SHEET NO. 18 FOR GENERAL NOTES AND LEGEND.

FINAL RECORD DRAWING
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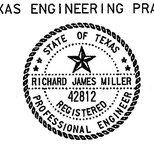


No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

ROADWAY ILLUMINATION LAYOUT
STA. 23+00 TO STA. 28+00

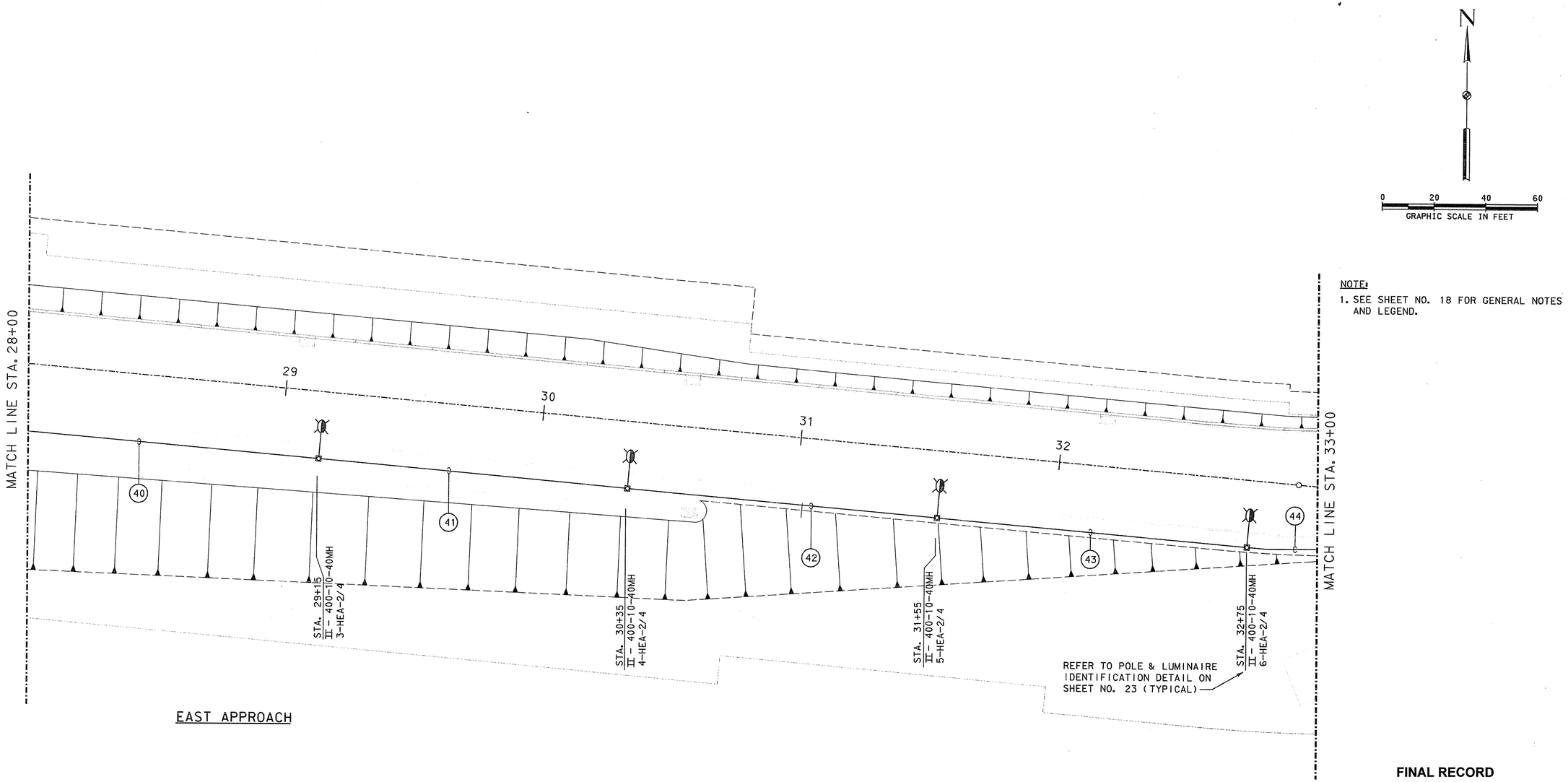
MCE MATEO CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

DRAWN: SAA DATE: 5/97 DESIGNED: DR DATE: 5/97
CHECKED: RJM DATE: 5/97 SCALE: 1"=20'

CONTRACT No. DNT-260 SHEET 21 OF 52

F:\96112\PLANS\LIGHTING\C4.DGN



EAST APPROACH

NOTE:

1. SEE SHEET NO. 18 FOR GENERAL NOTES AND LEGEND.

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Date: 12/25/99

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STATE OF TEXAS
RICHARD JAMES MILLER
42812
REGISTERED
PROFESSIONAL ENGINEER

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

ROADWAY ILLUMINATION LAYOUT
STA. 28+00 TO STA. 33+00

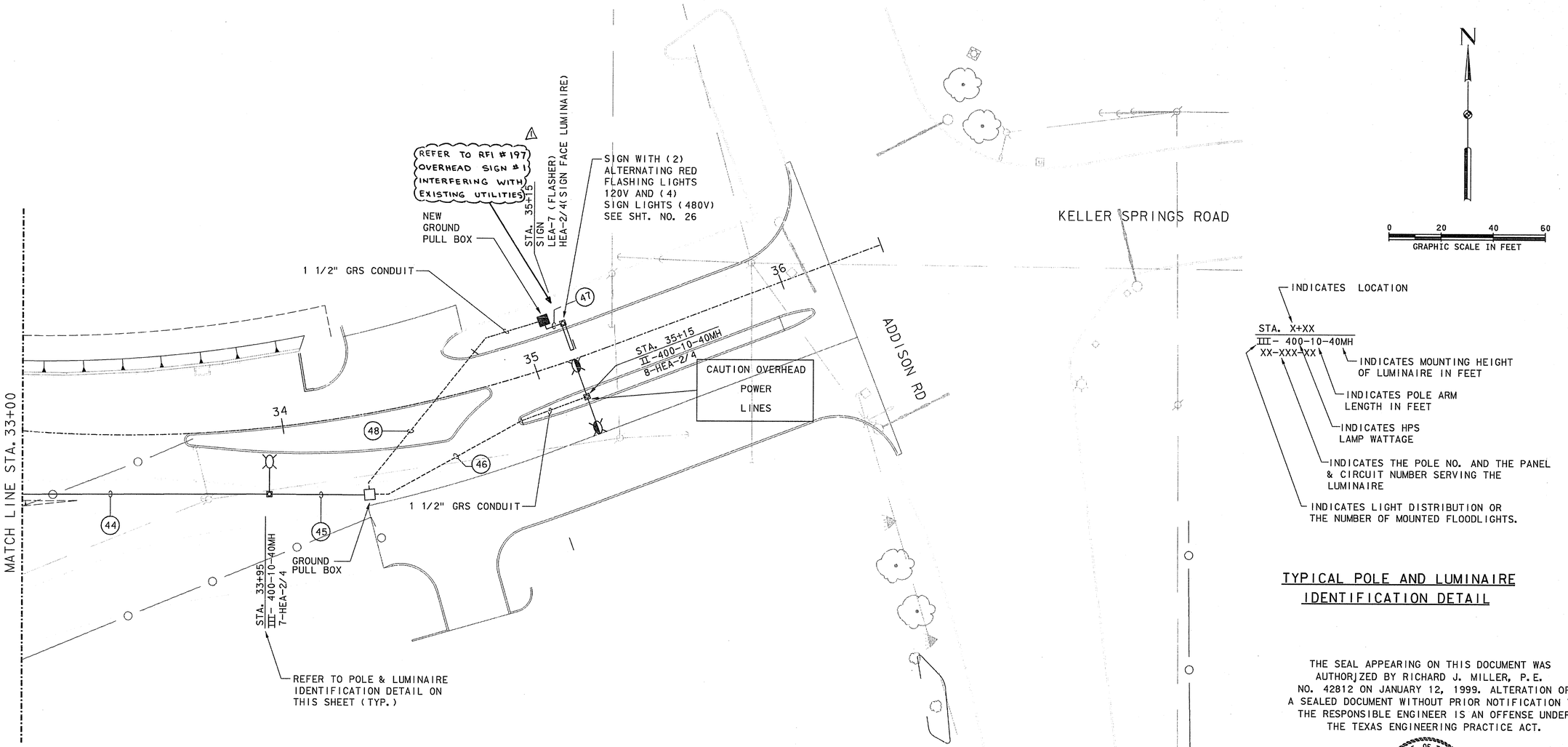
MCE MATEO CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

DRAWN: SAA DATE: 5/97 DESIGNED: DR DATE: 5/97
CHECKED: RJM DATE: 5/97 SCALE: 1"=20'

CONTRACT No. DNT-260 SHEET 22 OF 52

P:\96112\PLANS\LIGHTING\C5.DGN



EAST APPROACH

INDICATES LOCATION

STA. X+XX
III- 400-10-40MH
XX-XXX-XX

- INDICATES MOUNTING HEIGHT OF LUMINAIRE IN FEET
- INDICATES POLE ARM LENGTH IN FEET
- INDICATES HPS LAMP WATTAGE
- INDICATES THE POLE NO. AND THE PANEL & CIRCUIT NUMBER SERVING THE LUMINAIRE
- INDICATES LIGHT DISTRIBUTION OR THE NUMBER OF MOUNTED FLOODLIGHTS.

TYPICAL POLE AND LUMINAIRE IDENTIFICATION DETAIL

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No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

ROADWAY ILLUMINATION LAYOUT
STA. 33+00 TO STA. 36+10

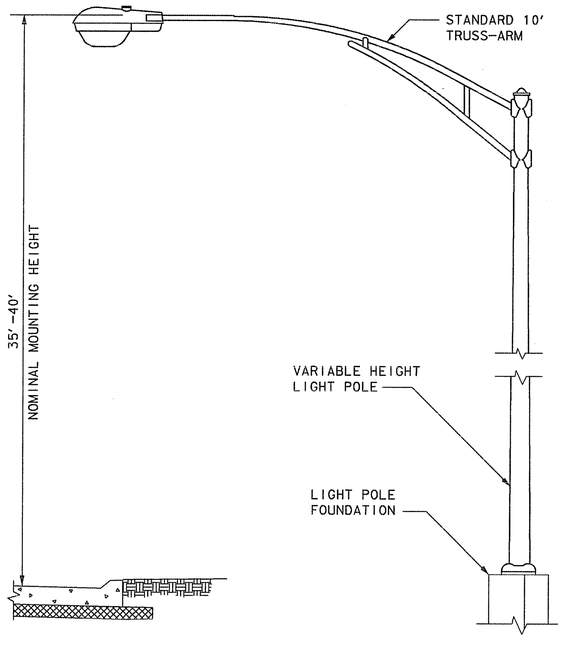
MCE MATED CONSULTING ENGINEERS, INC. 5580 PETERSON LANE SUITE 225 DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

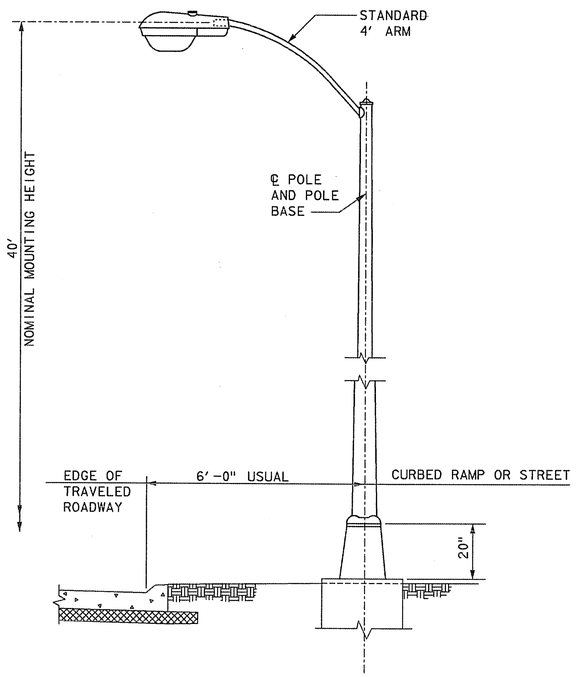
DRAWN: SAA DATE: 5/97 DESIGNED: DR DATE: 5/97
CHECKED: RJM DATE: 5/97 SCALE: 1"=20'

CONTRACT No. DNT-260 SHEET 23 OF 52

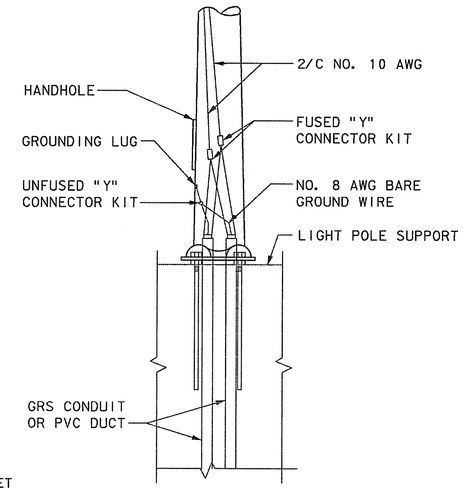
F:\96112\PLANS\LIGHTING\C6.DGN



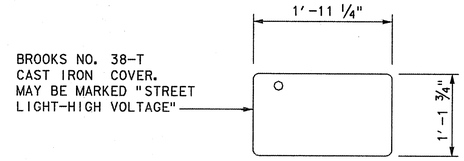
WALL-MOUNTED
LIGHTING STANDARD DETAIL



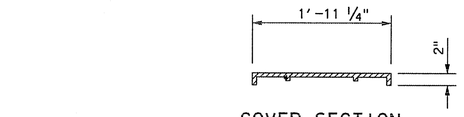
GROUND-MOUNTED
LIGHTING STANDARD DETAIL



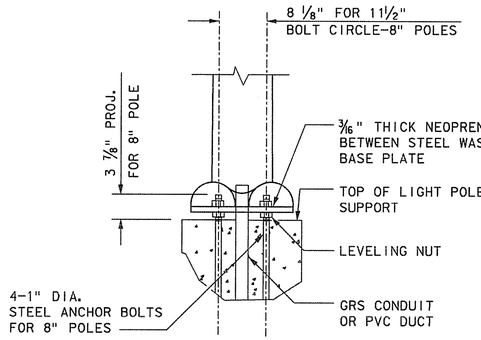
POLE BASE CONDUCTOR
CONNECTION DETAIL



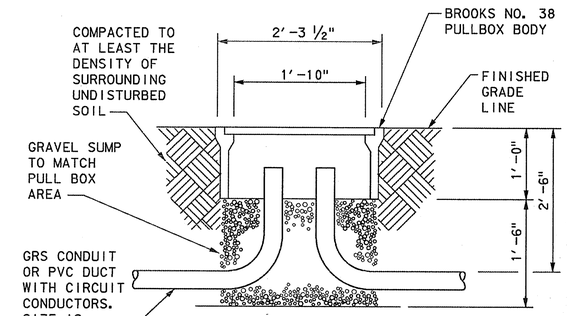
COVER PLAN



COVER SECTION

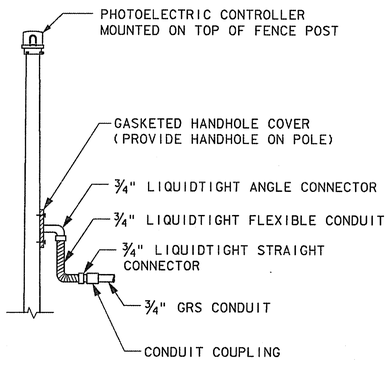


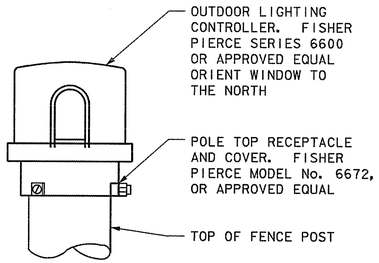
STRUCTURE POLE
MOUNTING DETAIL



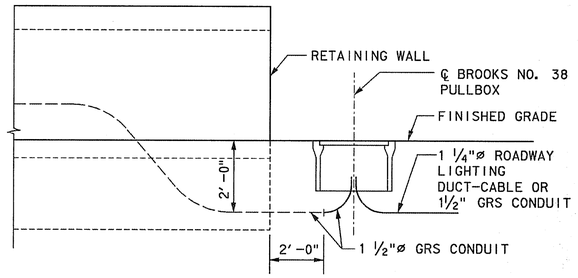
SECTION

PULL BOX DETAILS





PHOTOELECTRIC CONTROLLER-MOUNTING DETAIL ON TOP OF FENCE POST



RAIL TERMINAL
STRUCTURAL CONDUIT DETAIL

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RICHARD J. MILLER, P.E. NO. 42812 ON JANUARY 12, 1999. ALTERATION OF A SEALED DOCUMENT WITHOUT PRIOR NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS
RICHARD JAMES MILLER
42812
REGISTERED
PROFESSIONAL ENGINEER

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

MISCELLANEOUS ELECTRICAL DETAILS

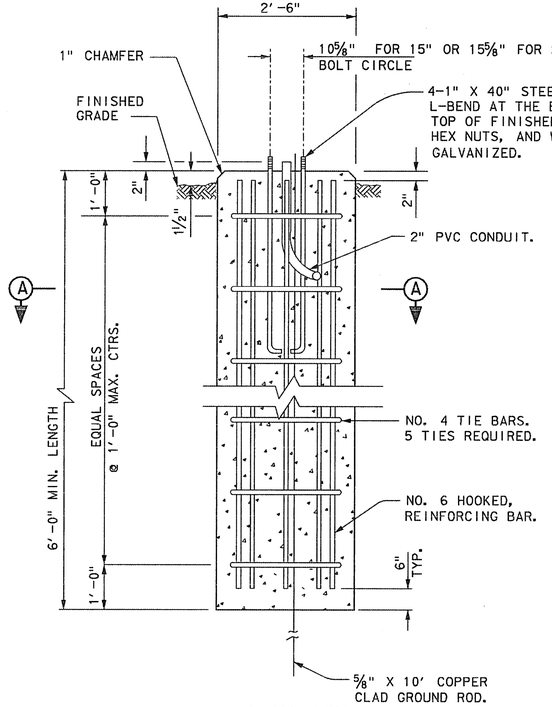
MCE MATED CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

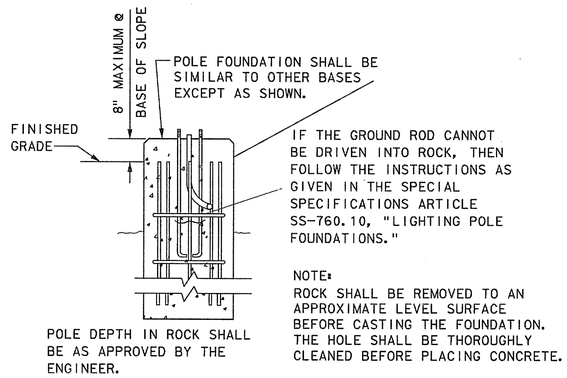
DRAWN: SAA DATE: 5/97 DESIGNED: DR DATE: 5/97
CHECKED: RJM DATE: 5/97 SCALE: NONE

CONTRACT No. DNT-260 SHEET 24 OF 52

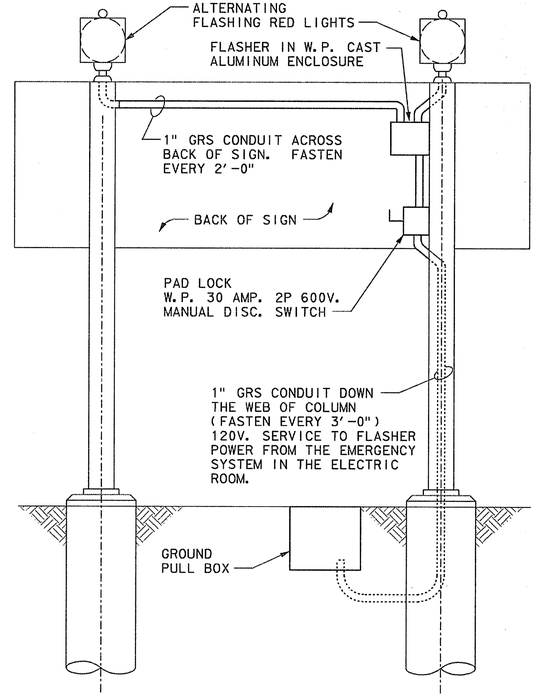
F:\9612\PLANS\LIGHTING\C8.DGN



ELEVATION



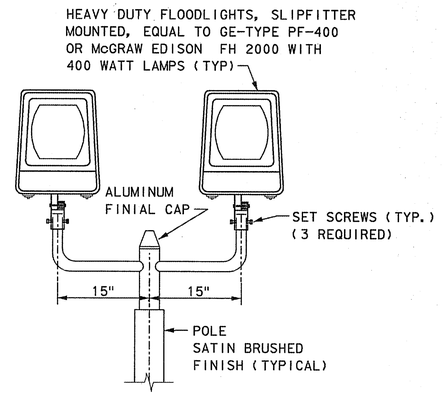
MODIFIED GROUND-MOUNTED
LIGHTING STANDARD FOUNDATION
ROCK ANCHORAGE



NOTES:

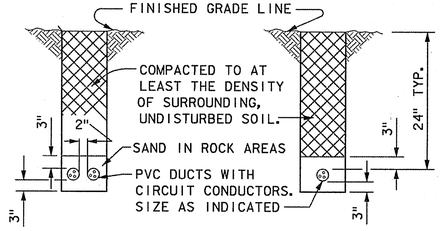
1. SIGN, COLUMNS, CONCRETE BASES ETC. BY OTHERS.

WARNING LIGHTS
"DO NOT ENTER" SIGN
ELECTRICAL DETAIL



ELEVATION

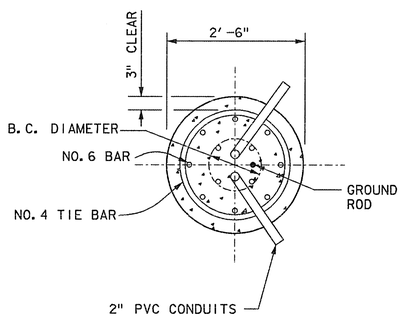
TYPICAL MAIN TOLL
PLAZA LIGHTING UNITS



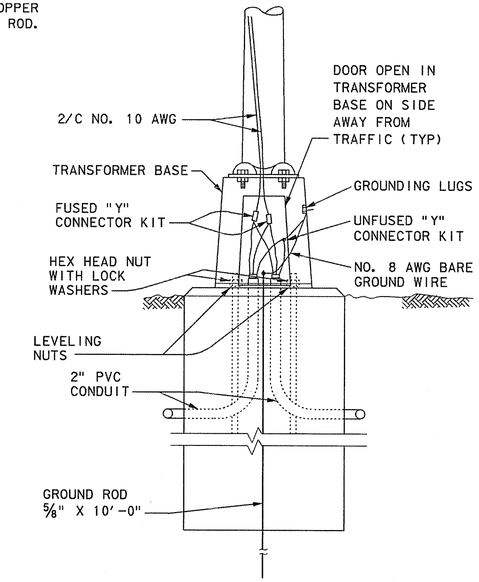
PVC DIRECT BURIAL DUCT

NOTES:

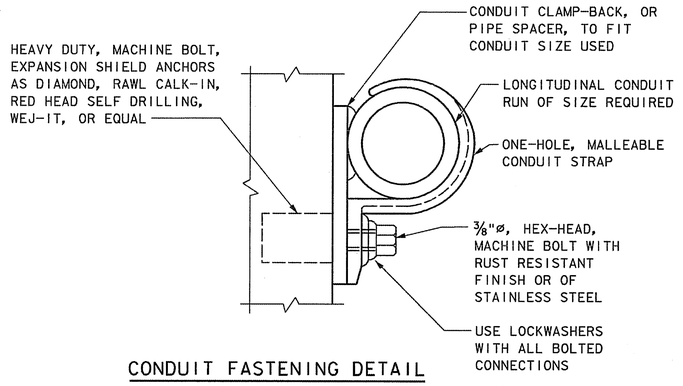
1. IF THE DUCT-CABLE TRENCH EXTENDS INTO ROCK, THE DUCT-CABLE SHALL BE BEDDED IN 3 INCHES OF DAMP SAND AND COVERED WITH 3 INCHES OF DAMP SAND BEFORE BACKFILLING IS STARTED.
2. IN ROCK, THE DUCT-CABLE BURIAL DEPTH MAY BE REDUCED FROM 24 INCHES TO 18 INCHES, WHERE THIS DUCT IS IN A 3 INCH SAND BED ON TOP OF THE ROCK. BURIAL MAY BE LESS THAN 18 INCHES IF DUCT-CABLE AND SAND BED ARE EMBEDDED TO AN 8 INCH MINIMUM.



SECTION A-A
GROUND-MOUNTED
LIGHTING STANDARD FOUNDATION



GROUND-MOUNTED STANDARD
MOUNTING AND WIRING DETAIL



CONDUIT FASTENING DETAIL

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RICHARD J. MILLER, P.E. NO. 42812 ON JANUARY 12, 1999. ALTERATION OF A SEALED DOCUMENT WITHOUT PRIOR NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

STATE OF TEXAS
RICHARD JAMES MILLER
42812
REGISTERED
PROFESSIONAL ENGINEER

FINAL RECORD DRAWING
Date: 12/25/99

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

MISCELLANEOUS ELECTRICAL DETAILS

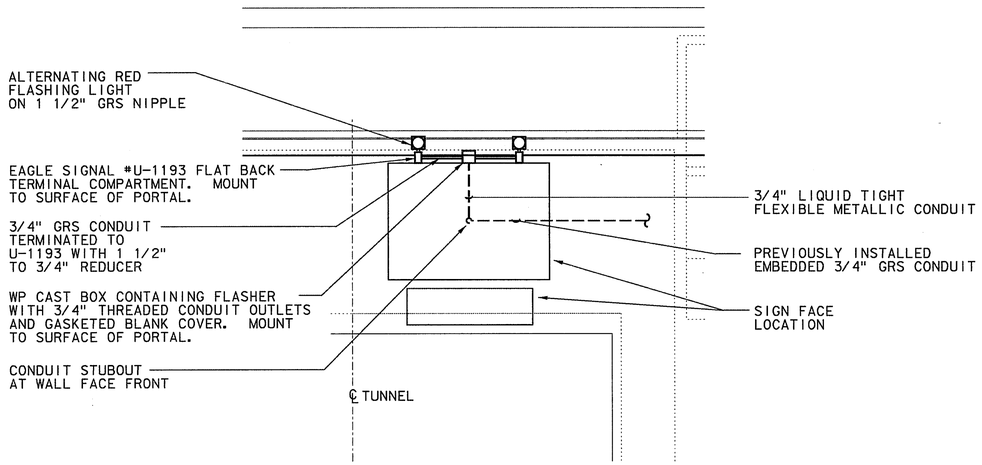
MCE MATED CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6700

SECTION XIII

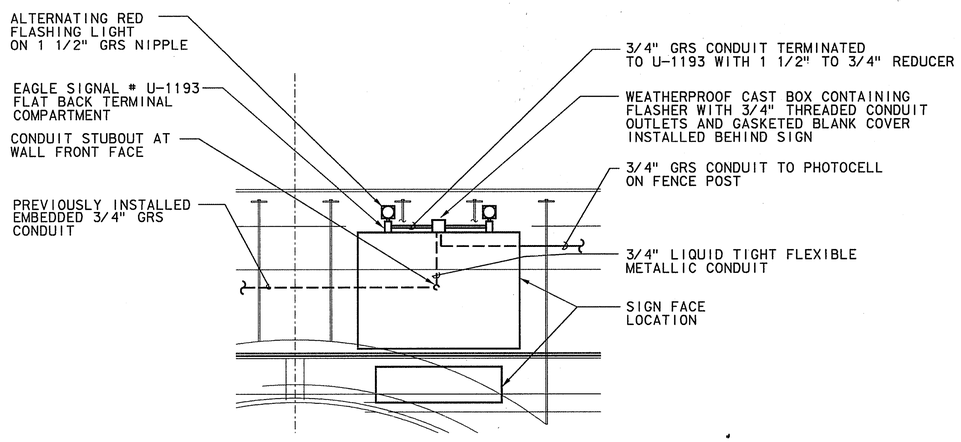
DRAWN: SAA DATE: 5/97 DESIGNED: DR DATE: 5/97
CHECKED: RJM DATE: 5/97 SCALE: NONE

CONTRACT No. DNT-260 SHEET 25 OF 52

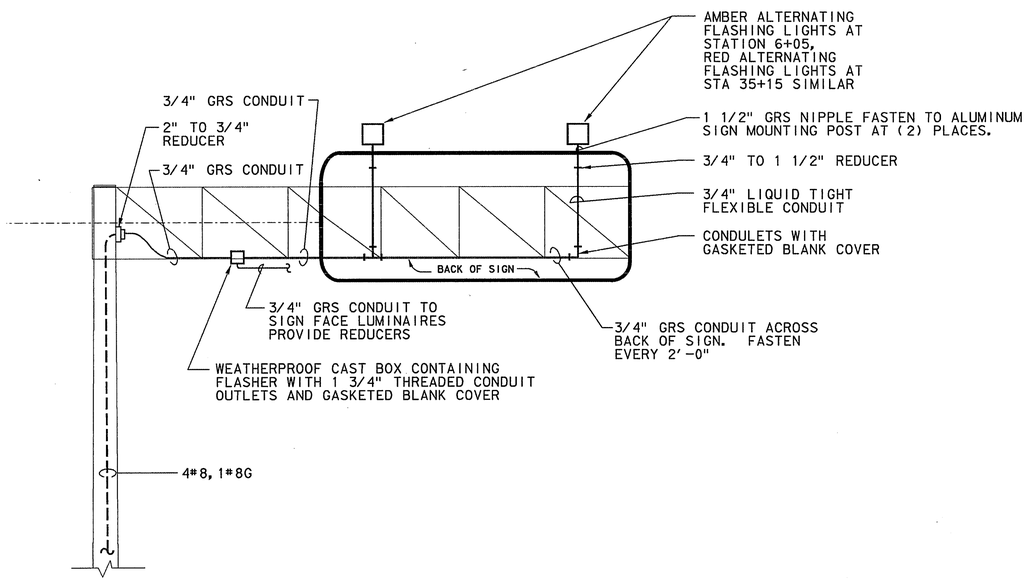
F:\96112\PLANS\LIGHTING\C9.DGN



INSTALLATION DETAIL OF
ALTERNATING RED FLASHING
LIGHTS ON WEST PORTAL SIGN



INSTALLATION DETAIL OF
ALTERNATING RED FLASHING
LIGHTS ON EAST PORTAL SIGN
NOT TO SCALE



INSTALLATION DETAIL OF ALTERNATING
FLASHING LIGHT AT SIGN STRUCTURE ON STEEL POLE
NOT TO SCALE

NOTES:

1. INSTALL FLASHING LIGHTS, FLASHER AND SIGNS FURNISHED BY THE AUTHORITY.
2. FASTEN ALL CONDUIT RUNS.

THE SEAL APPEARING ON THIS DOCUMENT WAS AUTHORIZED BY RICHARD J. MILLER, P.E. NO. 42812 ON JANUARY 12, 1999. ALTERATION OF A SEALED DOCUMENT WITHOUT PRIOR NOTIFICATION TO THE RESPONSIBLE ENGINEER IS AN OFFENSE UNDER THE TEXAS ENGINEERING PRACTICE ACT.

STATE OF TEXAS
RICHARD JAMES MILLER
42812
REGISTERED
PROFESSIONAL ENGINEER

FINAL RECORD DRAWING
Date: 12/25/99

No.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

MISCELLANEOUS ELECTRICAL DETAILS

MATEO CONSULTING ENGINEERS, INC.
5580 PETERSON LANE SUITE 225
DALLAS, TEXAS 75240 (972) 233-6760

SECTION XIII

DRAWN: SAA DATE: 5/97 DESIGNED: DR DATE: 5/97
CHECKED: RJM DATE: 5/97 SCALE: AS SHOWN

CONTRACT No. DNT-260 SHEET 26 OF 52

F:\9612\PLANS\LIGHTING\C10.DGN

ZONE 4 WITH AND WITHOUT ICE 70 M.P.H. WIND

10' SPAN

TOWER HGT. FT.	TOWER PIPE O.D. IN.	TOWER PIPE WALL THICK. IN.	TOWER PIPE DEFL. ΔH IN.	ANCHOR BOLTS SIZE	ANCHOR BOLTS NO.	ANCHOR BOLTS BOLT CIRCLE DIA.	BASE PLATE SIZE IN.	TRUSS DEFL. ΔV IN.	DESIGN LOADS SHEAR V KIPS	DESIGN LOADS TORSION T K-FT	DESIGN LOADS MOMENT M K-FT
14'	16	0.250	0.104	1¼"ϕ	6	20½"	24X1¼"	0.2	2.75	12.39	38.53
15'			0.119						2.76		41.23
16'			0.136						2.77		43.94
17'			0.153						2.79		46.68
18'			0.172						2.80		49.43
19'			0.191						2.81		52.20
20'			0.212						2.83		54.99
21'			0.234						2.84		57.79
22'			0.257					0.2	2.85		60.61
23'			0.280					0.3	2.87		63.45
24'			0.305						2.88		66.30
25'			0.331	1¼"ϕ		20½"	24X1¼"		2.89		69.16
26'			0.358	1⅜"ϕ		20¾"	24½X1⅜"		2.90		72.04
27'			0.386						2.92		74.93
28'			0.416						2.93		77.84
29'			0.446						2.94		80.76
30'			0.477	1⅜"ϕ		20¾"	24½X1⅜"		2.96		83.69
31'			0.509	1½"ϕ		21"	25X1½"		2.97		86.64
32'	16	0.250	0.543	1½"ϕ	6	21"	25X1½"	0.3	2.98	12.39	89.61

15' SPAN

TOWER HGT. FT.	TOWER PIPE O.D. IN.	TOWER PIPE WALL THICK. IN.	TOWER PIPE DEFL. ΔH IN.	ANCHOR BOLTS SIZE	ANCHOR BOLTS NO.	ANCHOR BOLTS BOLT CIRCLE DIA.	BASE PLATE SIZE IN.	TRUSS DEFL. ΔV IN.	DESIGN LOADS SHEAR V KIPS	DESIGN LOADS TORSION T K-FT	DESIGN LOADS MOMENT M K-FT
14'	16	0.250	0.234	1⅜"ϕ	6	20¾"	24½X1¼"	0.5	4.13	28.76	59.63
15'			0.268				24½X1¼"	0.6	4.14		63.62
16'			0.305				24½X1⅜"	0.6	4.16		67.63
17'			0.345	1⅜"ϕ		20¾"	24½X1⅜"	0.6	4.17		71.67
18'			0.386	1½"ϕ		21"	25X1⅜"	0.7	4.18		75.74
19'			0.431				25X1½"	0.7	4.20		79.83
20'			0.477					0.7	4.21		83.94
21'			0.526					0.8	4.22		88.08
22'			0.577		6		25X1½"	0.8	4.23		92.23
23'			0.631		8		25X1⅝"	0.9	4.25		96.40
24'			0.687					0.9	4.26		100.60
25'			0.745					0.9	4.27		104.81
26'			0.806					1.0	4.29		109.03
27'			0.869						4.30		113.28
28'		0.250	0.935						4.31		117.54
29'		0.280	0.898						4.33		121.82
30'			0.961						4.34		126.11
31'			1.026					1.0	4.35		130.42
32'	16	0.280	1.094	1½"ϕ	8	21"	25X1⅝"	1.1	4.36	28.76	134.74

20' SPAN

TOWER HGT. FT.	TOWER PIPE O.D. IN.	TOWER PIPE WALL THICK. IN.	TOWER PIPE DEFL. ΔH IN.	ANCHOR BOLTS SIZE	ANCHOR BOLTS NO.	ANCHOR BOLTS BOLT CIRCLE DIA.	BASE PLATE SIZE IN.	TRUSS DEFL. ΔV IN.	DESIGN LOADS SHEAR V KIPS	DESIGN LOADS TORSION T K-FT	DESIGN LOADS MOMENT M K-FT
14'	16	0.250	0.419	1¾"ϕ	6	21½"	26X1¾"	1.3	5.59	52.67	83.06
15'		0.250	0.481					1.4	5.61		88.34
16'		0.250	0.547					1.5	5.62		93.66
17'		0.281	0.549					1.4	5.63		99.03
18'			0.615					1.5	5.64		104.44
19'			0.685					1.5	5.66		109.88
20'		0.281	0.759				26X1¾"	1.6	5.67		115.36
21'		0.310	0.759				26X2"	1.5	5.68		120.86
22'			0.834					1.6	5.70		126.40
23'			0.911		6			1.7	5.71		131.96
24'		0.310	0.992		8				5.77		138.12
25'		0.340	0.990						5.73		143.15
26'		0.340	1.071					1.7	5.75		148.78
27'		0.340	1.155					1.8	5.76		154.43
28'		0.375	1.139					1.7	5.77		160.10
29'		0.375	1.221					1.8	5.79		165.79
30'		0.375	1.307						5.80		171.49
31'		0.410	1.297						5.81		177.22
32'	16	0.410	1.382	1¾"ϕ	8	21½"	26X2"	1.8	5.83	52.67	182.97

25' SPAN

TOWER HGT. FT.	TOWER PIPE O.D. IN.	TOWER PIPE WALL THICK. IN.	TOWER PIPE DEFL. ΔH IN.	ANCHOR BOLTS SIZE	ANCHOR BOLTS NO.	ANCHOR BOLTS BOLT CIRCLE DIA.	BASE PLATE SIZE IN.	TRUSS DEFL. ΔV IN.	DESIGN LOADS SHEAR V KIPS	DESIGN LOADS TORSION T K-FT	DESIGN LOADS MOMENT M K-FT
14'	20	0.250	0.333	1⅜"ϕ	8	24¾"	28½X1⅜"	1.4	7.00	82.44	107.23
15'			0.382					1.5	7.02		113.64
16'			0.435					1.6	7.03		120.14
17'			0.491					1.7	7.05		126.71
18'			0.550	1⅜"ϕ		24¾"	28½X1⅜"	1.7	7.07		133.34
19'			0.613	1½"ϕ		25"	29X1½"	1.8	7.08		140.03
20'			0.679					1.9	7.10		146.77
21'		0.250	0.749					2.0	7.12		153.56
22'		0.281	0.735				29X1½"		7.13		160.39
23'			0.803				29X1⅝"		7.15		167.26
24'			0.874	1½"ϕ		25"			7.16		174.17
25'		0.281	0.949	1¾"ϕ		25⅜"		2.0	7.18		181.12
26'		0.312	0.920				29X1⅝"	2.1	7.20		188.02
27'			0.992				29¾X1¾"		7.21		195.03
28'			1.067				29¾X1¾"		7.23		202.07
29'		0.312	1.145				29¾X1¾"	2.1	7.24		209.14
30'		0.344	1.119				29¾X2"	2.2	7.26		216.23
31'		0.344	1.194				29¾X2"	2.2	7.28		223.35
32'	20	0.344	1.273	1¾"ϕ	8	25⅜"	29¾X2"	2.2	7.29	82.44	230.50

30' SPAN

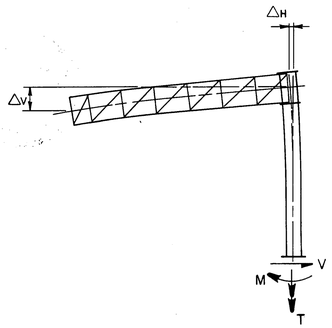
TOWER HGT. FT.	TOWER PIPE O.D. IN.	TOWER PIPE WALL THICK. IN.	TOWER PIPE DEFL. ΔH IN.	ANCHOR BOLTS SIZE	ANCHOR BOLTS NO.	ANCHOR BOLTS BOLT CIRCLE DIA.	BASE PLATE SIZE IN.	TRUSS DEFL. ΔV IN.	DESIGN LOADS SHEAR V KIPS	DESIGN LOADS TORSION T K-FT	DESIGN LOADS MOMENT M K-FT
14'	24	0.250	0.285	1½"ϕ	8	29"	33X1½"	1.6	8.42	119.01	134.48
15'			0.327					1.6	8.44		141.90
16'			0.372					1.7	8.46		149.44
17'			0.420					1.8	8.48		157.10
18'			0.471					1.9	8.50		164.85
19'			0.524					2.0	8.52		172.68
20'			0.581					2.1	8.54		180.60
21'			0.641	1½"ϕ		29"	33X1½"	2.2	8.56		188.59
22'			0.703	1¾"ϕ		29⅜"	33¾X1½"	2.2	8.58		196.65
23'			0.768				33¾X1½"	2.3	8.60		204.76
24'			0.837				33¾X1⅝"	2.4	8.62		212.93
25'			0.908				33¾X1⅝"	2.5	8.64		221.15
26'		0.250	0.982				33¾X1⅝"	2.6	8.66		229.42
27'		0.281	0.949				33¾X1¾"	2.4	8.67		237.74
28'			1.021				33¾X1¾"	2.5	8.69		246.10
29'			1.095	1¾"ϕ		29⅜"	33¾X1¾"	2.6	8.71		254.49
30'			1.172	2"		29¾"	34½X1¾"	2.7	8.73		262.93
31'			1.251	2"		29¾"	34½X1¾"	2.8	8.75		271.41
32'	24	0.281	1.333	2"	8	29¾"	34½X1¾"	2.8	8.77	119.01	279.92

35' SPAN

TOWER HGT. FT.	TOWER PIPE O.D. IN.	TOWER PIPE WALL THICK. IN.	TOWER PIPE DEFL. ΔH IN.	ANCHOR BOLTS SIZE	ANCHOR BOLTS NO.	ANCHOR BOLTS BOLT CIRCLE DIA.	BASE PLATE SIZE IN.	TRUSS DEFL. ΔV IN.	DESIGN LOADS SHEAR V KIPS	DESIGN LOADS TORSION T K-FT	DESIGN LOADS MOMENT M K-FT
14'	24	0.250	0.406	1¾"ϕ	8	29⅜"	33¾X1½"	2.6	9.77	161.98	165.20
15'			0.467					2.7	9.79		173.37
16'			0.531					2.8	9.81		181.71
17'		0.250	0.599				33¾X1½"	3.0	9.83		190.21
18'		0.281	0.602				33¾X1⅝"	2.9	9.85		198.85
19'			0.671					3.0	9.87		207.61
20'			0.743					3.1	9.89		216.48
21'			0.820				33¾X1⅝"	3.2	9.91		225.46
22'		0.281	0.900				33¾X1¾"	3.4	9.93		234.52
23'		0.312	0.889				33¾X1¾"	3.2	9.95		243.67
24'			0.968	1¾"ϕ		29⅜"	33¾X1¾"	3.3	9.96		252.90
25'			1.050	2"ϕ		29¾"	34½X1⅞"	3.5	9.98		262.20
26'			1.136					3.6	10.00		271.57
27'		0.312	1.225					3.7	10.02		280.99
28'		0.340	1.200				34½X1⅞"	3.5	10.04		290.48
29'			1.287				34½X2"	3.6	10.06		300.02
30'			1.377					3.7	10.08		309.61
31'			1.471					3.8	10.10		319.25
32'	24	0.340	1.567	2"ϕ	8	29¾"	34½X2"	3.9	10.12	161.98	328.93

40' SPAN

TOWER HGT. FT.	TOWER PIPE O.D. IN.	TOWER PIPE WALL THICK. IN.	TOWER PIPE DEFL. ΔH IN.	ANCHOR BOLTS SIZE	ANCHOR BOLTS NO.	ANCHOR BOLTS BOLT CIRCLE DIA.	BASE PLATE SIZE IN.	TRUSS DEFL. ΔV IN.	DESIGN LOADS SHEAR V KIPS	DESIGN LOADS TORSION T K-FT	DESIGN LOADS MOMENT M K-FT
14'	30	0.250	0.280	1¾"ϕ	8	35⅜"	39¾X1½"	2.4	11.22	211.94	200.44
15'			0.322					2.5	11.24		209.33
16'			0.366					2.6	11.27		218.45
17'			0.413					2.7	11.29		227.79
18'			0.463					2.8	11.32		237.32
19'		0.250	0.516					2.9	11.34		247.01
20'		0.281	0.510					2.8	11.37		256.86
21'			0.562					2.9	11.39		266.86
22'			0.617					3.0	11.41		276.98
23'			0.675				39¾X1½"	3.1	11.44		287.22
24'			0.735	1¾"ϕ		35⅜"	39¾X1⅝"	3.2	11.46		297.57
25'			0.797	2"ϕ		35¾"	40½X1⅝"	3.3	11.49		308.01
26'			0.862				40½X1⅝"	3.4	11.51		318.55
27'			0.930				40½X1⅝"	3.5	11.54		329.18
28'			1.000				40½X1¾"	3.6	11.56		339.89
29'			1.073					3.7	11.58		350.68
30'			1.148					3.8	11.61		361.53
31'			1.226					3.9	11.63		372.46
32'	30	0.281	1.306	2"ϕ	8	35¾"	40½X1¾"	4.0	11.68	211.94	384.26



ELEVATION

(SHOWING DESIGN LOADS AND DEAD LOAD DEFLECTIONS)

TRUSS DETAILS

SPAN	10', 15' & 20'	25'	30'	35'	40'
W×D = WIDTH × DEPTH	4.0 X 4.0	4.0 X 4.0	4.0 X 4.0	4.0 X 4.0	4.0 X 4.0
CHORD	3X3X3/16 ④	3X3X3/16 ④	3X3X¼(HS50) ⑥	3X3X5/16(HS50) ⑥	3X3X⅜(HS50) ⑨
DEAD LOAD DIAGONAL	2½X1½X3/16 ②	2½X1½X3/16 ②	2½X1½X3/16 ②	2½X1½X3/16 ②	2½X2X3/16 ③
WIND LOAD DIAGONAL	2½X2X3/16 ②	2½X2½X3/16 ②	2½X2½X3/16 ②	3X3X3/16 ②	3X3X3/16 ②
DEAD LOAD VERTICAL	2½X1½X3/16 ②	2½X1½X3/16 ②	2½X1½X3/16 ②	2½X1½X3/16 ②	2½X1½X3/16 ②
WIND LOAD STRUT	2X2X3/16 ①	2X2X3/16 ①	2X2X3/16 ①	2X2X3/16 ①	2X2X3/16 ①
TRUSS DEAD LOAD	37 #/ft.	38 #/ft.	43 #/ft.	50 #/ft.	56 #/ft.
SIZE H.S. BOLTS IN CONN.	⅝"ϕ	⅝"ϕ	⅝"ϕ	⅝"ϕ	⅝"ϕ
NO. & SIZE OF H.S. BOLTS IN CHORD ANGLE TO TOWER CONNECTION PLATE	4 ~ ⅝"ϕ	4 ~ ⅝"ϕ or 3 ~ ¾"ϕ ea.	6 ~ ⅝"ϕ or 5 ~ ¾"ϕ ea.	6 ~ ⅝"ϕ or 5 ~ ¾"ϕ ea.	9 ~ ⅝"ϕ or 7 ~ ¾"ϕ ea.

All truss members are angles.

Number of High Strength bolts required in truss connection or splice are indicated thus ③ after the member size.

Deflections shown include the design loads for Truss, Sign Panel, Lights and Walkways.

GENERAL NOTES:

Steel for tower pipe shall conform to ASTM A53 Grade B or to ASTM A501. Tower pipe wall thickness shown is the minimum allowable. Fabricator may use the wall thickness shown or pipe of the same diameter with greater wall thickness.

All other structural steel shall conform to ASTM A36 except where noted HS 50 which shall be ASTM A441, ASTM A572 or ASTM A588.

All connection bolts shall conform to ASTM A325 or ASTM A449.

All structural steel, connection bolts, nuts and washers shall be galvanized in accordance with the Specifications.

Compensate for truss deflection at free end by offsetting upper and lower bolt holes at truss-to-tower connection.

For truss details see sheet 2 of 3.

For base and foundation details see sheet 3 of 3.

For cantilever truss lengths falling between those shown use sizes called for in the next longer span.

Towers for cantilever sign supports are designed for the equivalent area of a 10 foot deep sign panel over 100% of the span length. Design includes 3 lb./□' for sign panel and 20 lb./lin. ft. for lights and 50 lb./lin. ft. for walkways all placed as specified for the design sign panel.

Details called for hereon are applicable for Design Wind Heights up to 30' inclusive.

FINAL RECORD
DRAWING
Date: 12/25/99

REPRODUCED FROM STATE DEPARTMENT OF
HIGHWAYS AND PUBLIC TRANSPORTATION
STANDARD DRAWING COSS-Z4 & Z41

NO.	REVISION	BY	DATE
1	MISC. REVISION	PJ	9-19-91

TEXAS TURNPIKE AUTHORITY

DALLAS NORTH TOLLWAY

CANTILEVER

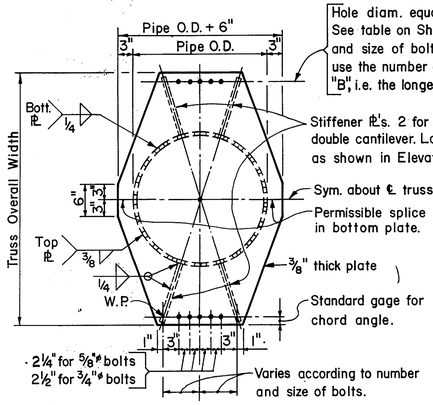
OVERHEAD SIGN SUPPORTS

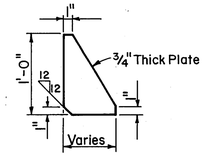
27

HNTB
HOWARD NEEDLES TAMMEN & BERGENDOFF

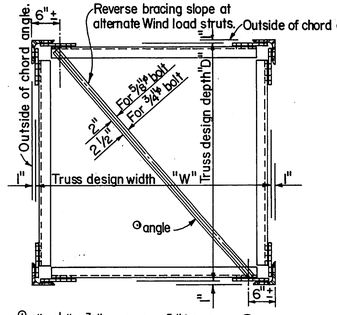
DRAWN ______ DATE ______ DESIGNED ______ DATE ______
CHECKED ______ DATE ______ SCALE ______

STANDARD DRAWING NO. SS-23



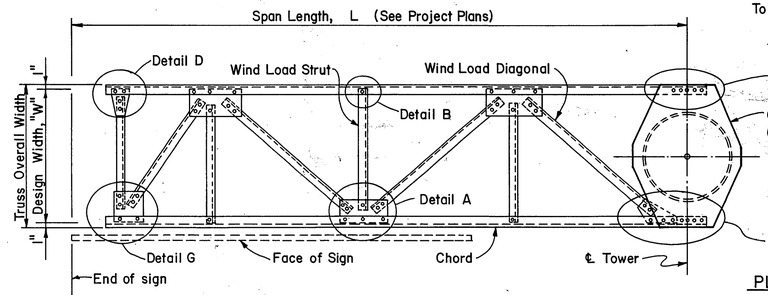


STIFFENER Pl DETAIL

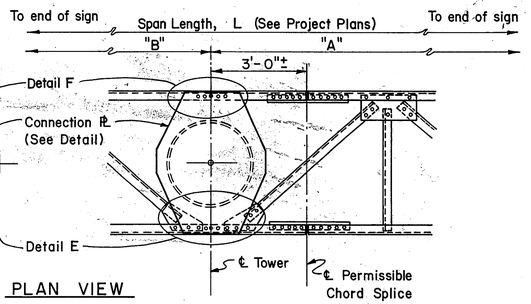


⊙2"X1½"X 3/16"angle for 5/8"ϕ bolts. ①
2½"X1½"X 3/16"angle for 3/4"ϕ bolts. ①

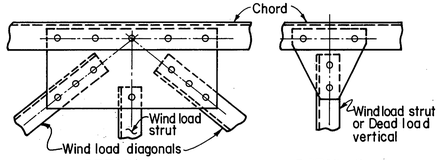
TRUSS SECTION
(DIAGONALS NOT SHOWN)



PLAN VIEW

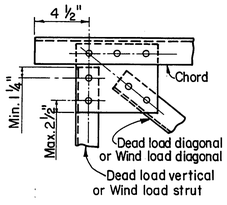


CONNECTION PLATE DETAIL



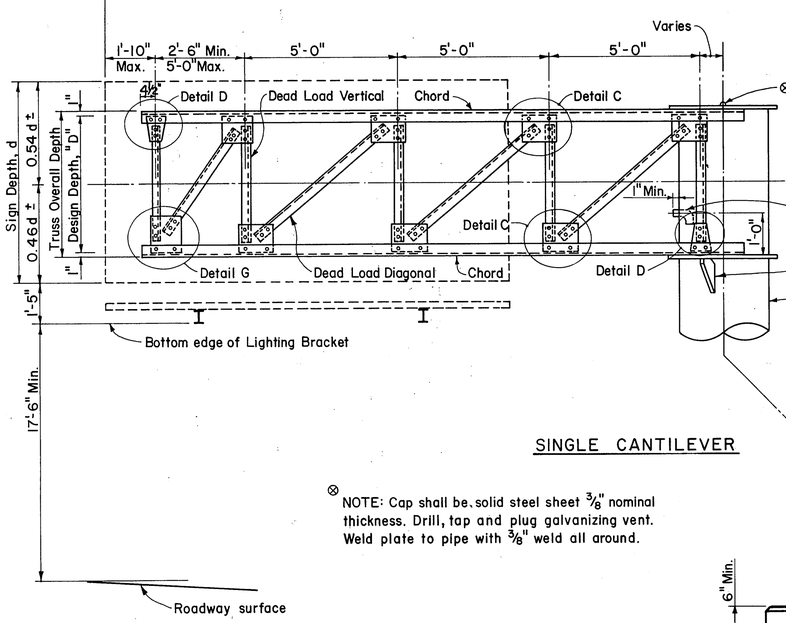
DETAIL A

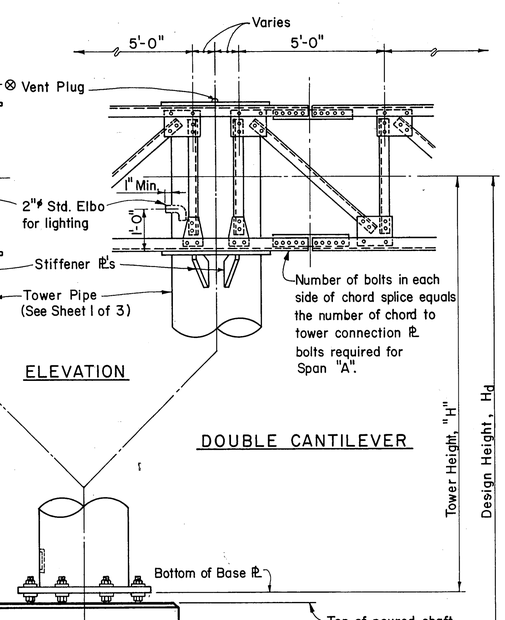
DETAIL D



DETAIL G

NUMBER OF BOLTS Pl TO CHORD CONNECTION	
TOTAL NO. OF BOLTS IN DIAGS. IN JOINT	
0	2
2	2
3	3
4	3
5	4
6	4
8	5
10	6



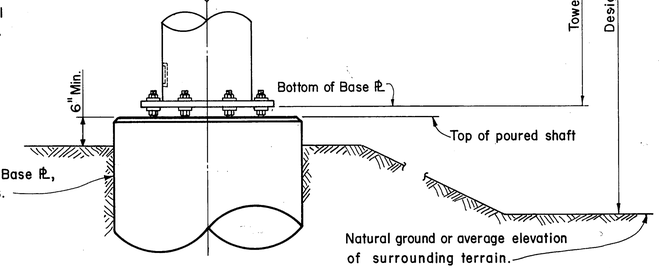


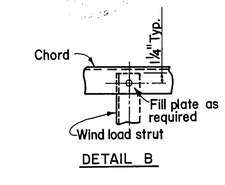
ELEVATION

SINGLE CANTILEVER

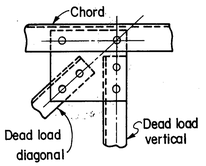
DOUBLE CANTILEVER

⊗ NOTE: Cap shall be solid steel sheet 3/8" nominal thickness. Drill, tap and plug galvanizing vent. Weld plate to pipe with 3/8" weld all around.

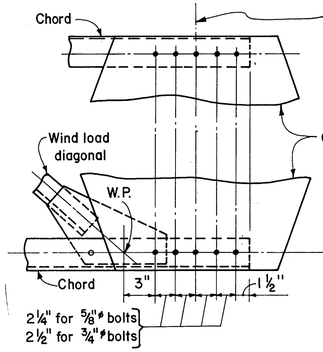




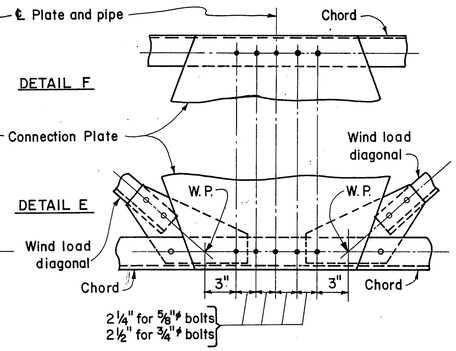
DETAIL B



DETAIL C



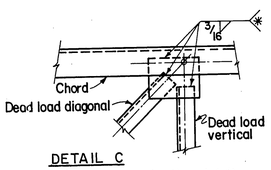
SINGLE CANTILEVER



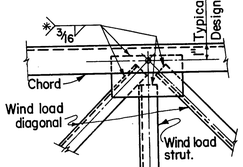
DOUBLE CANTILEVER

CONNECTION DETAILS

* MINIMUM LENGTH OF 3/16" FILLET WELD REQUIRED		
NUMBER OF BOLTS	TO REPLACE 5/8"ϕ BOLTS	TO REPLACE 3/4"ϕ BOLTS
1	2"	3"
2	4"	6"
3	6"	9"
4	8"	11 1/2"
5	10"	14 1/2"
6	12"	17 1/2"
7	14"	20"

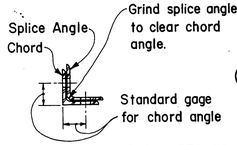


DETAIL C
(Gusset plates in other details to be similar)

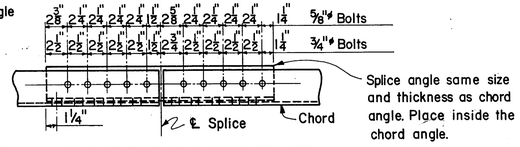


DETAIL A

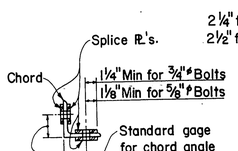
ALTERNATE WELDED CONNECTION DETAILS



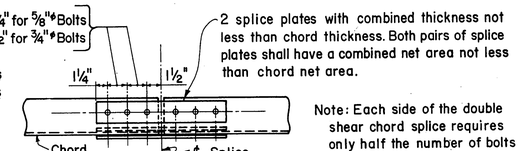
SECTION ON ℄ SPLICE



SINGLE SHEAR CHORD SPLICE



SECTION ON ℄ SPLICE



DOUBLE SHEAR CHORD SPLICE

Note: Each side of the double shear chord splice requires only half the number of bolts shown in the table on sheet 1 of 3.

SPLICE DETAILS

GENERAL NOTES:

Design conforms to 1975 AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals and Interim revisions thereto. Connection details are typical only. Actual size of member and number of bolts will vary. The details on this sheet are intended as a guide only. See Sheet 1 of 3 for number of bolts and size of members.

Gusset plates to be same thickness as thickest web member in connection.

FINAL RECORD DRAWING
Date: 12/25/99

REPRODUCED FROM STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION STANDARD DRAWING COSSD

NO.	REVISION	BY	DATE
1	MISC. REVISION	PJ	9-19-91

TEXAS TURNPIKE AUTHORITY
DALLAS NORTH TOLLWAY

CANTILEVER OVERHEAD SIGN SUPPORT DETAILS 28

HNTB
HOWARD NEEDLES TAMMEN & BERGENDOFF

DRAWN ____ DATE ____ CHECKED ____ DATE ____
DESIGNED ____ DATE ____ SCALE ____

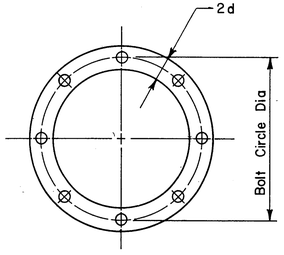
STANDARD DRAWING NO. SS-24

ANCHOR BOLT SIZE	PIPE OUTSIDE DIAMETER 16" BOLT CIRCLE DIA.	16" DR. SHAFT SIZE	16" DR. SHAFT REINF.	20" BOLT CIRCLE DIA.	20" DR. SHAFT SIZE	20" DR. SHAFT REINF.	24" BOLT CIRCLE DIA.	24" DR. SHAFT SIZE	24" DR. SHAFT REINF.	30" BOLT CIRCLE DIA.	30" DR. SHAFT SIZE	30" DR. SHAFT REINF.
1 1/4"ø X 2'-11"	20 1/2"	36"ø	14-#8 (A)	24 1/2"	36"ø	14-#8 (A)						
1 3/8"ø X 3'-1"	20 3/4"	36"ø	12-#9 (A)	24 3/4"	36"ø	12-#9(A)						
1 1/2"ø X 3'-4"	21"	36"ø	12-#9 (A)	25"	42"ø	14-#9(A)	29"	42"ø	14-#9 (C)			
1 3/4"ø X 3'-10"	21 1/2"	36"ø	10-#10(A)	25 3/8"	42"ø	12-#10(B)	29 3/8"	42"ø	12-#10 (C)	35 3/8"	48"ø	16-#10(C)
2"ø X 4'-3"	22"	36"ø	12-#10(A)	25 3/4"	42"ø	12-#10(B)	29 3/4"	48"ø	16-#10 (C)	35 3/4"	54"ø	18-#10(C)
2 1/4"ø X 4'-9"	22 1/2"	36"ø	10-#11(A)	26"	42"ø	10-#11(B)	30"	48"ø	14-#11 (C)	36"	54"ø	14-#11(D)
2 1/2"ø X 5'-2"				26 1/2"	42"ø	12-#11(B)	30 1/2"	48"ø	16-#11 (C)	36 1/2"	54"ø	16-#11(D)
2 3/4"ø X 5'-8"							31 1/2"	48"ø	18-#11 (D)	37"	54"ø	20-#11(D)
3"ø X 6'-1"										37 1/2"	54"ø	24-#11(D)

A = #3 Plain Spiral at 6" pitch (Grade 40)
B = #4 Plain Spiral at 6" pitch (Grade 40)
C = #4 Plain Spiral at 6" pitch (Grade 60)
D = #4 Plain Spiral at 3 1/2" pitch (Grade 60)

Washers shall conform to ASTM F436-76b.

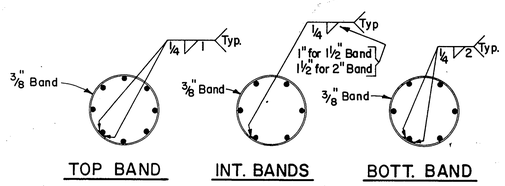
ANCHOR BOLT DIA. d	WASHER DIMENSIONS OUTSIDE DIAMETER	HOLE DIAMETER	THICKNESS MIN.	THICKNESS MAX.	HOLE IN BASE PLATE
1 1/2" or less	2d	d+ 1/8"	0.136"	0.177"	d+ 1/4"
1 3/4"	2d - 1/8"	d+ 1/8"	0.178"	0.280"	d+ 5/16"
2"	2d - 1/4"	d+ 1/8"	0.178"	0.280"	d+ 5/16"
Over 2"	2d - 1/2"	d+ 1/8"	0.240"	0.340"	d+ 5/16"



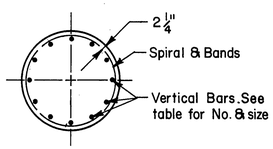
TOP VIEW OF TOP & BOTTOM TEMPLATES

ANCHOR BOLT SIZE DIA.	LENGTH *	PROJ. & THREAD
1 1/4"ø	2'-11"	5"
1 3/8"ø	3'- 1"	5 1/2"
1 1/2"ø	3'-4"	6"
1 3/4"ø	3'-10"	7"
2" ø	4'- 3"	8"
2 1/4"ø	4'-9"	9"
2 1/2"ø	5'- 2"	10"
2 3/4"ø	5'- 8"	11"
3"ø	6'- 1"	12"

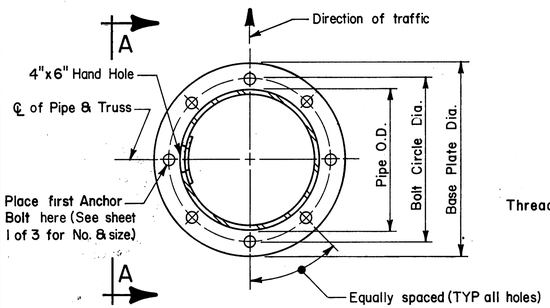
* Minimum dimensions are given.



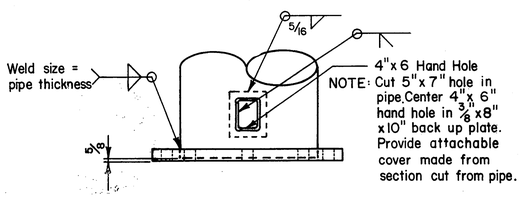
TOP BAND INT. BANDS BOTT. BAND



SECTION

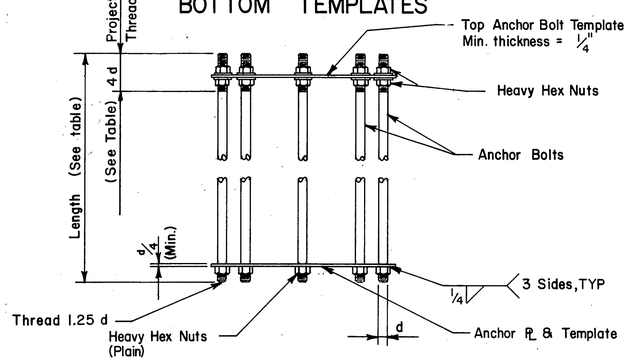


PLAN

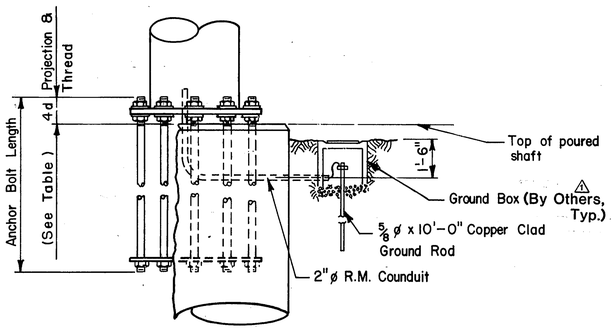


VIEW A-A

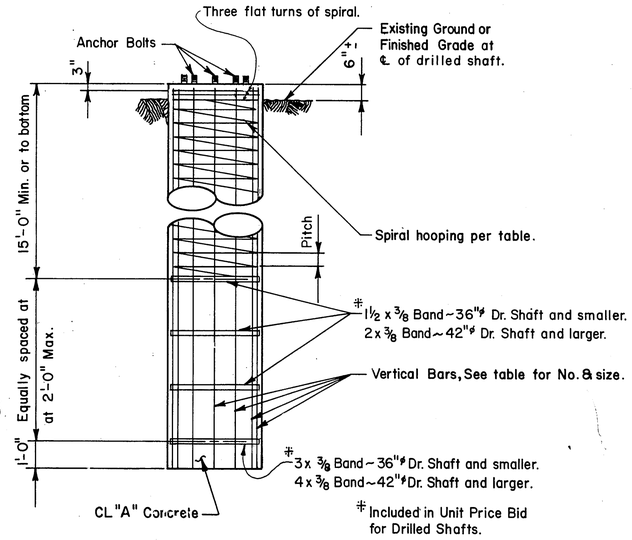
BASE PLATE & HANDHOLE DETAILS
(SEE SHEET 1 OF 3 FOR DIAMETER & THICKNESS OF BASE PLATE)



ANCHOR BOLT ASSEMBLY
(PRIOR TO INSTALLATION)



BEARING SEAT ELEVATION



FOUNDATION DETAIL

GENERAL NOTES:

Concrete shall be Class "A".
Reinforcing shall conform to item 440.
Anchor bolts shall conform to ASTM A193-B7. Nuts for anchor bolts shall be heavy hex and shall conform to ASTM A194-2H. Thread for anchor bolts and nuts shall be 8 UN. Unless noted otherwise, anchor bolt top end projection plus 6" shall be galvanized. Nuts and washers at the base plate shall be galvanized. Nuts shall be tapped or chased after galvanizing. Bolts and nuts shall have Class 2A and 2B fit tolerances.
Anchor bolts shall be rigidly held in position during concrete placement using steel templates at the top and bottom. The top templates shall be removed after the concrete has set.
After the structure has been aligned in its final position, tack weld anchor bolt nuts to washer, and tack weld washers to base plate. Galvanizing in welded area shall be reparied in accordance with the Specification.
Unless shown otherwise welded steel bands may be replaced with spiral as noted on the foundation detail.
All vertical reinforcing shall be carried to the bottom of the Dr. Shaft.

REPRODUCED FROM STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION STANDARD DRAWING COSSF

FINAL RECORD DRAWING
Date: 12/25/99

NO.	REVISION	BY	DATE
2	MISC. REVISION	PJ	9-19-91
1	ADD NOTE	GAL	4-1-86

TEXAS TURNPIKE AUTHORITY
DALLAS NORTH TOLLWAY

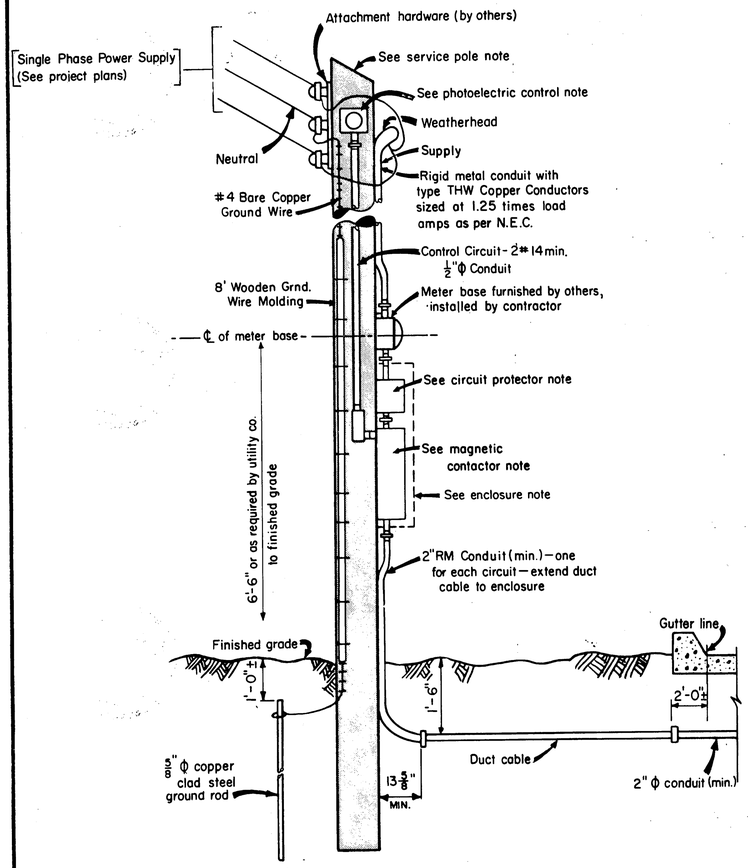
CANTILEVER OVERHEAD SIGN SUPPORT FOUNDATION

29

HNTB
HOWARD NEEDLES TAMMEN & BERGENDOFF

DRAWN ____ DATE ____ DESIGNED ____ DATE ____
CHECKED ____ DATE ____ SCALE ____

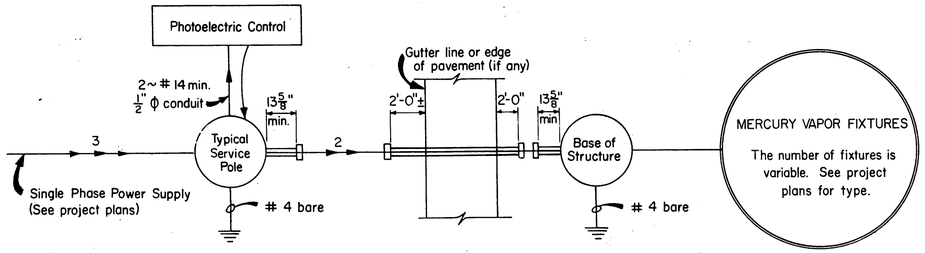
STANDARD DRAWING NO. SS-25



TYPICAL SERVICE POLE

Serving Sign Lights Only : Conduit and wire sizes are minimum, larger sizes shall be provided for if called for elsewhere in the plans.

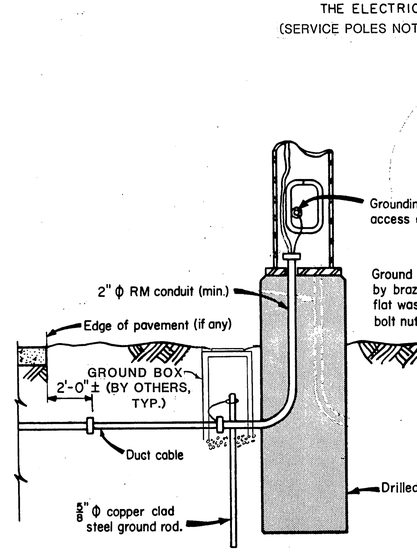
(NOT IN CONTRACT)



TYPICAL WIRING AND CONDUIT DIAGRAM

BASED ON ONE SERVICE POLE PER SIGN STRUCTURE. WIRE AND CONDUIT SIZE SHALL BE AS REQUIRED BY THE ELECTRICAL LOAD

(SERVICE POLES NOT IN CONTRACT)



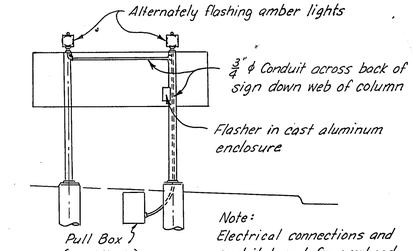
CABLE TRENCH DETAILS

BASE OF OVERHEAD SIGN STRUCTURE

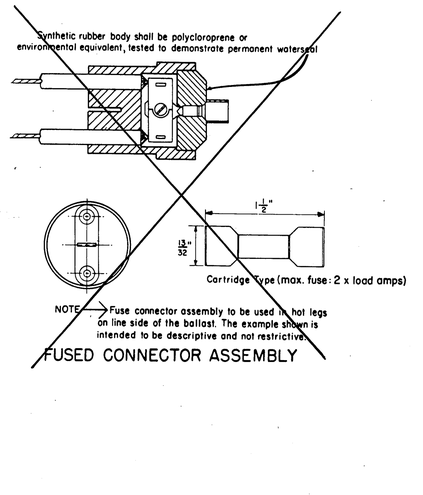
TYPE COSS

BASE OF OVERHEAD SIGN STRUCTURE

TYPE OSBT



APPROACH WARNING LIGHTS "STOP AHEAD PAY TOLL" SIGN



FUSED CONNECTOR ASSEMBLY

ELECTRICAL NOTES AND SPECIFICATIONS

GENERAL NOTES

ALL WORK, MATERIALS, AND SERVICES NOT SHOWN ON THE PLANS, WHICH MAY BE NECESSARY FOR COMPLETE AND PROPER CONSTRUCTION, SHALL BE PERFORMED, FURNISHED, AND INSTALLED BY THE CONTRACTOR. THE LOCATION OF CONDUCTOR, CONDUIT, OTHER ELECTRICAL EQUIPMENT, AND SERVICE POLE IS DIAGRAMMATIC ONLY AND MAY BE SHIFTED BY THE ENGINEER TO ACCOMMODATE LOCAL CONDITIONS. ALL SPECIFICATIONS AND PROVISIONS NOT COVERED HEREIN SHALL BE IN ACCORDANCE WITH THE STANDARD SPECIFICATION ITEMS AND ANY SPECIAL PROVISIONS THERETO. CONDUIT AND EQUIPMENT SHALL BE SECURELY ATTACHED TO THEIR SUPPORTS.

CONDUCTORS

ALL CONDUCTORS SHALL COMPLY TO ITEM "ELECTRICAL CONDUCTOR" OF THE SPECIFICATIONS.

CONDUIT

ALL INSULATED CONDUCTORS ABOVE GROUND, EXCEPT CONDUCTORS IN PIPE TOWER LEGS, SHALL BE INSTALLED IN CONDUIT BETWEEN EQUIPMENT. CONDUIT SHALL BE PLACED ALONG AND ATTACHED TO THE POLE OR STRUCTURAL FRAME UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

CONDUIT ALONG THE MAST OR TOWER LEG SHALL BE RIGID METAL. CONDUIT FROM THE MAST OR TOWER LEG TO AND BETWEEN FIXTURES, AND CONDUIT BETWEEN FIXTURES SHALL PREFERABLY BE RIGID METAL, POLYVINYL CHLORIDE (PVC) OR ELECTRICAL METALLIC TUBING (EMT). HOWEVER, AT PLACES WHERE RIGID METAL, PVC OR EMT IS NOT FEASIBLE, CONDUIT MAY, WITH THE APPROVAL OF THE ENGINEER, BE LIQUID-TIGHT FLEXIBLE CONDUIT. CONDUIT BURIED IN TRENCH OR CONCRETE SHALL BE EITHER RIGID METAL, PVC OR HIGH DENSITY POLETHYLENE (HDP) AS INDICATED ON THE PLANS OR AS DETERMINED BY THE ENGINEER FROM THE SOIL CHARACTERISTICS. ALL BURIED CONDUIT SHALL HAVE STANDARD BUSHINGS AT THE EXTREMITIES.

CIRCUIT PROTECTOR ASSEMBLY (NOT IN CONTRACT)

THE AMPERE RATING OF THE CIRCUIT BREAKER SHALL BE 1.25 TIMES THE CALCULATED CIRCUIT LOAD CURRENT. THE RATING OF THE ASSEMBLY SHALL BE CONSISTENT WITH THE LOAD SERVED AND SHALL BE AS INDICATED ON THE PLANS OR AS DIRECTED BY THE ENGINEER. THE CIRCUIT BREAKERS SHALL BE DOUBLE POLE, THERMAL-MAGNETIC, FRONT MOUNTED, RATED AT THE SUPPLIED VOLTAGE. THE BREAKER OPERATING HANDLE SHALL BE TRIP FREE SO CONTACT CANNOT BE HELD AGAINST SHORT CIRCUIT OR ABNORMAL OVERLOAD. THE SHORT CIRCUIT INTERRUPTING CAPACITY SHALL BE 15,000 AMPERES SYMMETRICAL.

SERVICE POLE (NOT IN CONTRACT)

THE POLE LENGTH SHALL BE 25 FEET UNLESS OTHERWISE NOTED ON THE PLANS. SERVICE POLE SHALL BE CREOSOTE-TREATED TO 8 POUNDS PER CUBIC FOOT RETENTION OR PENTACHLOROPHENOL TREATED TO 0.4 POUNDS PER CUBIC FOOT RETENTION IN ACCORDANCE WITH THE ITEM "TIMBER PRESERVATIVE AND TREATMENT". FOR A PROJECT REQUIRING 10 OR LESS POLES, THE CONTRACTOR MAY PURCHASE POLES LOCALLY IF SOURCE AND TREATMENT ARE DOCUMENTED.

PHOTOELECTRIC CONTROL (NOT IN CONTRACT)

THE PHOTOELECTRIC CONTROL SHALL BE OF THE SINGLE POLE, SINGLE THROW TYPE, DOUBLE BREAK, RATED AT THE SUPPLIED VOLTAGE. CONTROLLER SHALL HAVE FOOTCANDLE ADJUSTMENT, MAGNETICALLY OPERATED RELAY, OPAQUE COVER, AND SHALL BE THE DIRECT ORIENTATION TYPE. THE MOUNTING BRACKET AND CONTROL SHALL BE MOUNTED ON THE SERVICE POLE. THE CONTROL SHALL BE ORIENTED NORTH OR AS SPECIFIED BY THE MANUFACTURER. THE PHOTOELECTRIC CONTROL CIRCUIT SHALL HAVE A THREE POSITION HAND-OFF-AUTOMATIC SELECTOR SWITCH AT A CONVENIENT LOCATION.

MAGNETIC CONTACTOR (NOT IN CONTRACT)

THE MAGNETIC CONTACTOR SHALL BE OF THE TWO POLE TYPE WITH A MINIMUM CONTACT RATING OF 480 VOLTS AND A MINIMUM CONTACT RATING OF 30 AMPS.

GROUNDING

ALL SERVICE POLES AND SIGN STRUCTURE TOWERS SHALL BE GROUNDED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE AND DETAILS SHOWN ON THE PLANS. GROUND RODS SHALL BE 5/8" DIAMETER COPPER CLAD STEEL. WHERE DRILLED HOLES ARE REQUIRED, THE RODS SHALL BE 8 FEET LONG AND THE BACKFILL MATERIAL SHALL HAVE AN ADMIXTURE OF COMMON SALT. DRIVEN GROUND RODS SHALL BE 10 FEET LONG.

ENCLOSURES (NOT IN CONTRACT)

ALL ENCLOSURES HOUSING ELECTRICAL EQUIPMENT SHALL BE GALVANIZED, RAINTIGHT, AND DESIGNED FOR OUT-DOOR INSTALLATION IN ACCORDANCE WITH THE NATIONAL ELECTRICAL MANUFACTURES ASSOCIATION SPECIFICATIONS. THE MAGNETIC CONTACTOR AND CIRCUIT PROTECTOR SHOWN ON THE SERVICE POLE MAY, AT THE CONTRACTOR'S OPTION, BE GROUPED IN ONE ENCLOSURE, OR MAY BE HOUSED IN SEPARATE ENCLOSURES. EACH ENCLOSURE SHALL BE PROVIDED WITH A LOCK AND THE CONTRACTOR SHALL PROVIDE THE ENGINEER WITH THREE COPIES OF A MASTER KEY.

PAYMENT

ALL ITEMS NECESSARY TO ACCOMPLISH THE ILLUMINATION OF THE SIGNS SHALL BE MEASURED AND PAID FOR AS STATED IN THE SPECIFICATIONS.

REPRODUCED FROM STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION STANDARD DRAWING SL(1)

FINAL RECORD DRAWING
Date: 12/25/99

NO.	REVISION	BY	DATE
1.	MISC. REVISIONS	GRB	4-1-86

TEXAS TURNPIKE AUTHORITY

DALLAS NORTH TOLLWAY

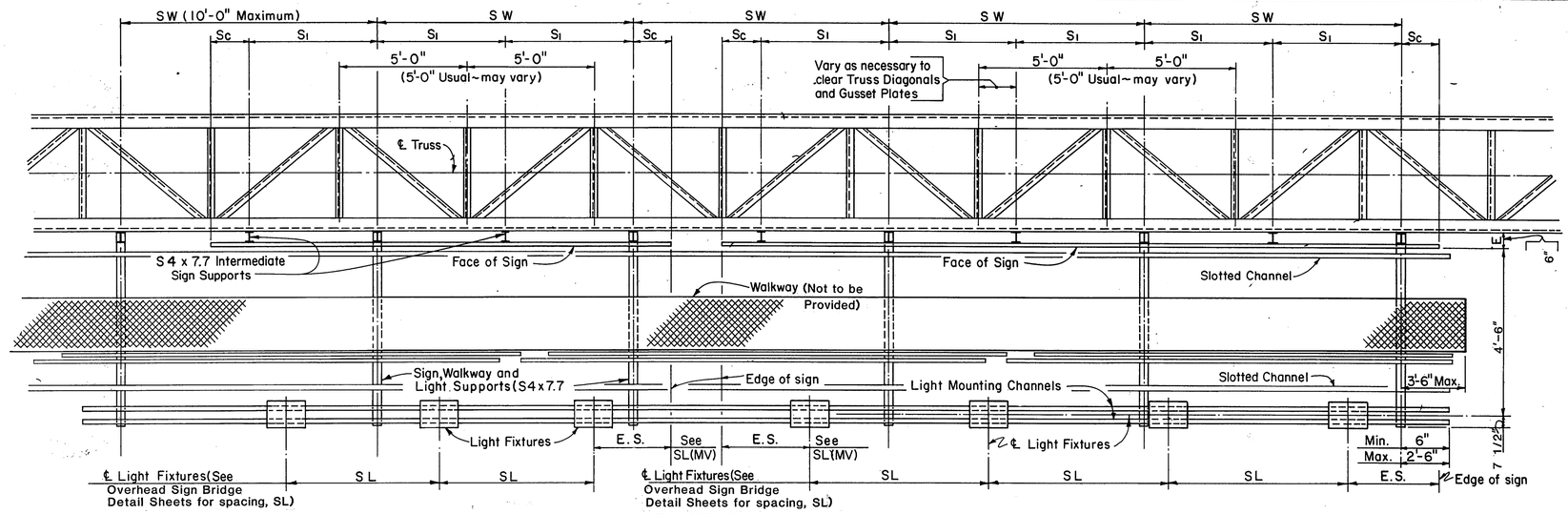
SIGN LIGHTING

(ELECTRICAL DETAILS) 30

HNTB
HOWARD NEEDLES TAMMEN & BERGENDOFF

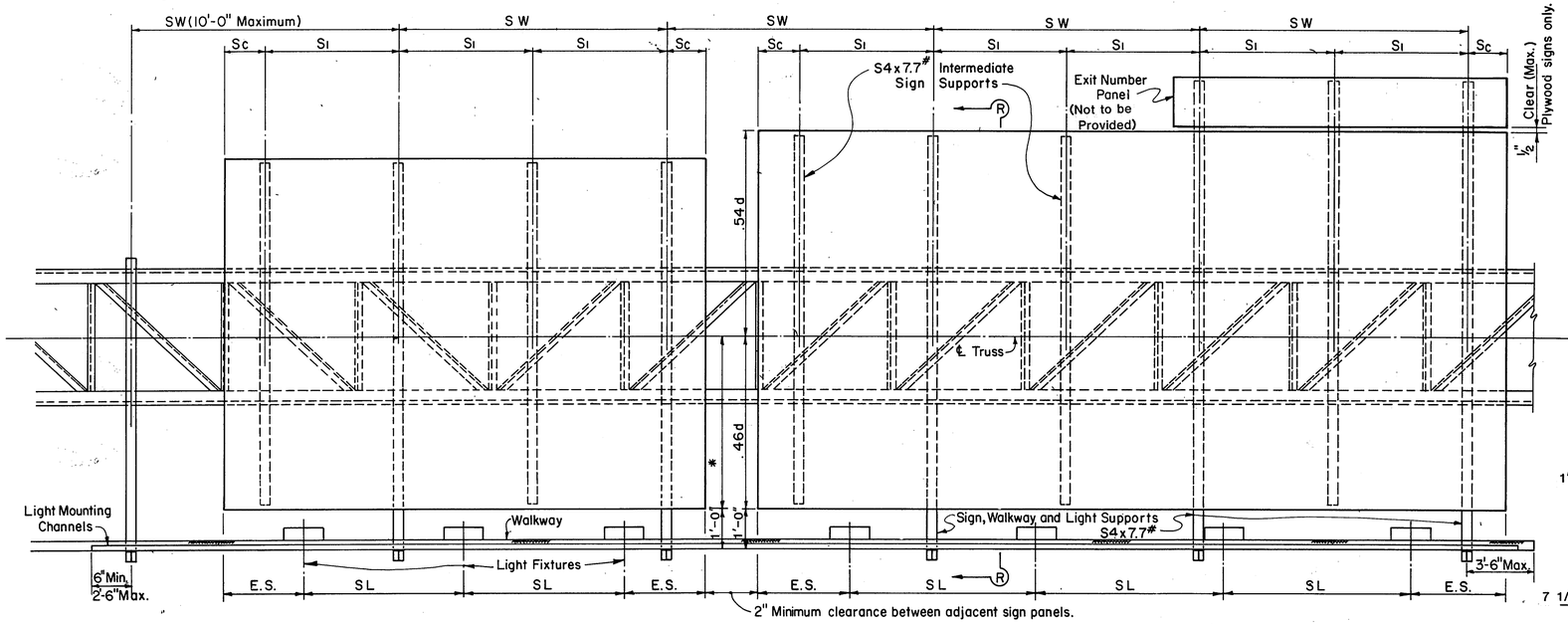
DRAWN ____ DATE ____ DESIGNED ____ DATE ____
CHECKED ____ DATE ____ SCALE ____

STANDARD DRAWING NO. SS-26



PART PLAN

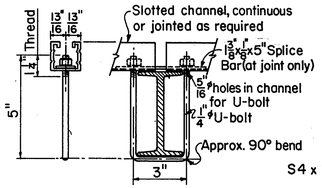
(Showing Truss, Signs, Walkways and Lights)



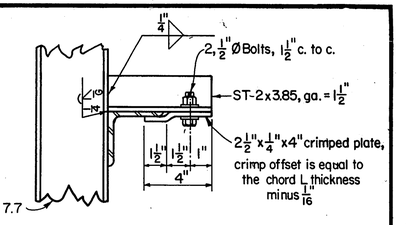
PART ELEVATION

* Where signs of different depths are used, the bottom edges of all signs may be placed in line. Where this is done, all signs should be so positioned that the bottom edges are approximately 0.46 of the depth of the deepest sign below the ℄ of the truss. When signs are spaced thusly, SI is determined by the deepest sign.

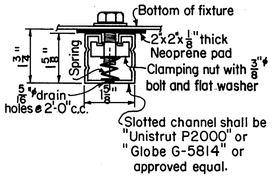
See Overhead Sign Bridge Detail Sheets for Spacing SL & E.S.
See Standard Drawing No. SS-19 for Aluminum Sign Details & Max. Spa. for SI.
Sc = 6" Minimum, .25 SI Maximum.



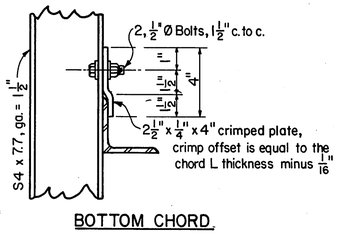
SECTION A-A



TOP CHORD

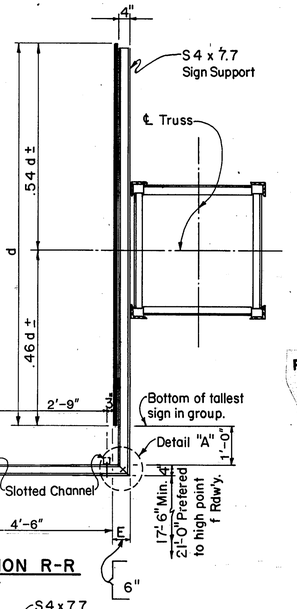


TYPICAL SLOTTED CHANNEL
CONNECTED TO LIGHTING FIXTURE

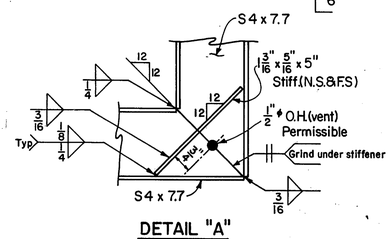


BOTTOM CHORD

SUPPORT TO TRUSS CONNECTION



SECTION R-R



DETAIL "A"

GENERAL NOTES:

Design conforms to the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

Materials, Fabrication, Construction and Erection shall conform with the requirements of specifications for Interstate Signing and Delineation Projects and Texas Department of Highways and Public Transportation Standard Specifications for Construction of Highways, Streets and Bridges. Structural Steel shall conform with A.S.T.M. Specification A36 unless noted otherwise.

Bolts shall have Hexagon Heads and Nuts and conform with A.S.T.M. Specification A307.

All parts shall be galvanized after fabrication

Sign Walkways shall not be provided for this Project.

REPRODUCED FROM STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION STANDARD DRAWING SB(SWL-1)

FINAL RECORD DRAWING
Date: 12/25/99

NO.	REVISION	BY	DATE
1.	MISC. REVISIONS	GRB.	4-1-86

TEXAS TURNPIKE AUTHORITY

DALLAS NORTH TOLLWAY

SUPPORT BRACKETS FOR SIGNS, WALKWAY & LIGHTS 31

HNTB
HOWARD NEEDLES TAMMEN & BERGENDOFF

DRAWN ____ DATE ____ DESIGNED ____ DATE ____
CHECKED ____ DATE ____ SCALE ____

STANDARD DRAWING NO. SS-27

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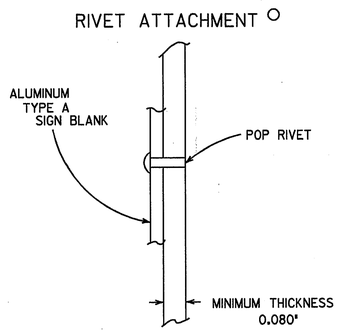
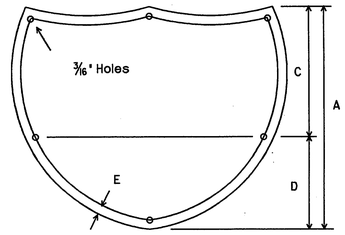
TYPICAL ATTACHMENT OF ROUTE MARKERS AND "EXIT ONLY" PANELS TO GUIDE SIGNS



ALUMINUM GUIDE SIGNS
(SHEET ALUMINUM PANELS)

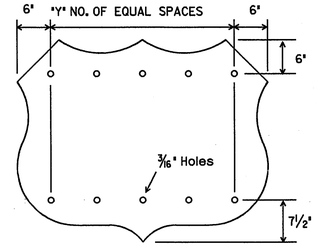
△

SIGN BLANK PUNCHING DETAILS FOR ROUTE MARKERS WHEN ATTACHED TO GUIDE SIGN



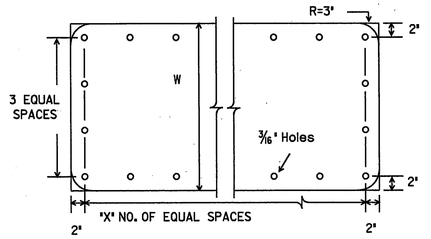
INTERSTATE ROUTE MARKERS

A	C	D	E
36	21	15	1 1/2
48	28	20	1 3/4



U.S. ROUTE MARKERS

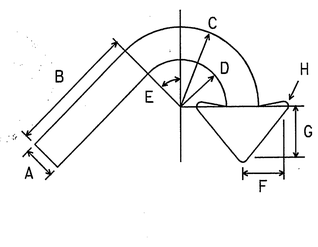
Sign Type	"Y"
MI-4D2	2
MI-4D3	3
MI-4E2	3
MI-4E3	4
MI-4F2	4
MI-4F3	5



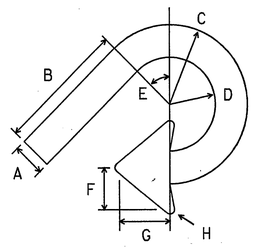
STATE ROUTE MARKERS

No. of Digits	W	X
4	24	4
4	36	5
4	48	6
3	24	3
3	36	4
3	48	5

ARROW DIMENSION DETAILS

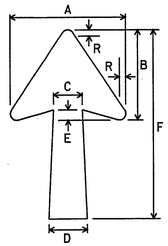


E3 and E3a

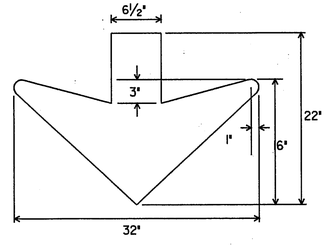


E4 and E4a

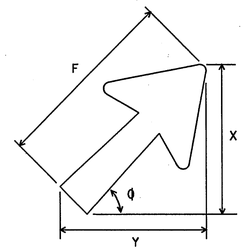
CODE	USED ON SIGN NO.	A	B	C	D	E	F	G	H
E-3 & E-4	E5-3 and E5-4	5	20	12	7	45o	6 1/2	8	3/4
E-3a & E-4a	E5-3a and E5-4a	3 1/2	14	8 1/2	5	45o	4 1/2	5 1/2	1/2



Type A or Type B



Type C



		ARROW DIMENSIONS IN INCHES											
									ϕ = 30°		ϕ = 45°		ϕ = 60°	
CODE	LETTER SIZE	A	B	C	D*	E	F*	R	X	Y	X	Y	X	Y
A-1	8" Caps	15 1/8	11 9/16	3 3/4	5	1 5/16	24 1/4	13/16	15 5/8	22 1/4	19 1/8	19 1/8	22 3/8	15 5/8
A-2	13 1/3" U.C., 10-12" Caps	18 1/4	14	4 1/2	6	1 1/2	29 1/4	3/4	18 1/2	27	23	23	27	19
A-3	16" U.C.	22 1/4	17	5 3/8	7 1/8	1 3/4	35 5/8	1	22 5/8	32 3/4	28	28	32 3/4	22 3/4
B-1	8-10" Caps	14 1/4	9 13/16	3 3/8	4 1/2	1 5/16	17 1/4	3/4	12 1/2	16 1/4	14	14	16 1/8	12 1/2
B-2	13 1/3" U.C., 12" Caps	17 1/2	11 3/4	4 3/8	5 5/8	1 1/2	20 1/4	7/8	15 1/2	19 1/8	16 5/8	16 5/8	19	15 1/2
B-3	16" U.C.	21 7/8	14 1/4	5	6 3/4	1 3/4	25	1	19 1/8	23 1/2	20 3/8	20 3/8	23 1/2	19 1/4

WHERE AN ARROW IS REQUIRED ON A GUIDE SIGN WHICH HAS A HEIGHT OF 2'-0" AND WHICH IS USUALLY ERECTED ON RAMPS AND CROSSROADS AT INTERCHANGES, THE ARROW SHALL BE TYPE B-1.

* RECOMMENDED DIMENSIONS: TAPER SHOULD BE HELD CONSTANT FOR LONGER OR SHORTER SHAFT LENGTHS.

STATE OF TEXAS
GLENN D. HOUSER
24236
REGISTERED PROFESSIONAL ENGINEER

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SPECIFICATION REFERENCE TABLE
MATERIALS AND TEST SPECIFICATIONS (D-9)

ALUMINUM SIGN BLANKS	D-9-7110
SIGN HARDWARE	D-9-7120
FLAT SURFACE REFLECTIVE SHEETING, TYPE C (HIGH SPECIFIC INTENSITY)	D-9-8300

GENERAL NOTES:

Route markers attached to guide signs shall be one piece sheet aluminum alloy conforming with Department Specification "Aluminum Signs (Type A)." Sketches shown are examples only.

Screws and washers shall be used unless otherwise noted in the plans. Screws or bolts, nuts and washers shall be stainless steel or aluminum.

△

Arrows shall be cut-out reflective sheeting (Type C) applied directly to sign background, or reflective sheeting (Type C) applied to one piece 0.063 inch thick sheet aluminum alloy conforming with Department Specification "Aluminum Signs (Type A)." Attachment of arrows applied to sheet aluminum alloy shall be as illustrated for sign blanks.

FINAL RECORD DRAWING
Date: 12/25/99

ISSUE DATE: 04-09-97

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

ARROW AND ROUTE MARKER ATTACHMENT DETAILS FOR GUIDE SIGNS

IM(2)-93 (MOD.)

ORIG DRAW DATE: July 1990	DN: LR	CK:	DW: DN	CK:	REG NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
9-93		6			32
11-96△	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
4-97○						

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

DATE:
ACC: d58npic/usr/d5800504
FILE:

DN:LR
CK:CW
DW:DN
CK:MT

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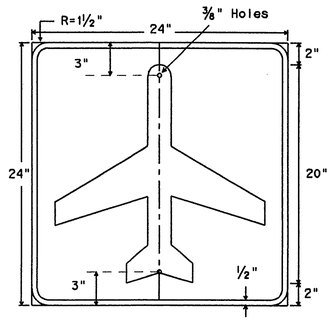
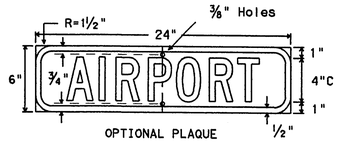
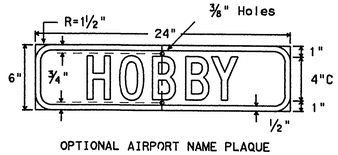


I-5
24" X 24"

Symbol - White Reflective
Border - White Reflective
Background - Green Reflective

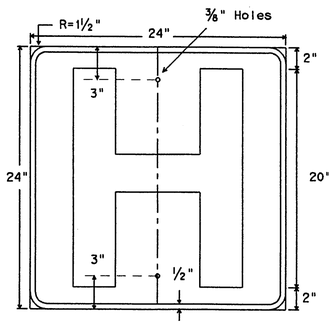


OPTIONAL PLAQUE



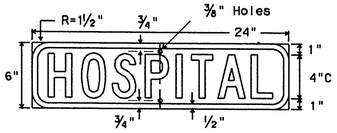
OPTIONAL AIRPORT NAME PLAQUE

Symbol - White Reflective
Border - White Reflective
Background - Green Reflective



D9-2
24" X 24"

Symbol - White Reflective
Border - White Reflective
Background - Blue Reflective



OPTIONAL PLAQUE

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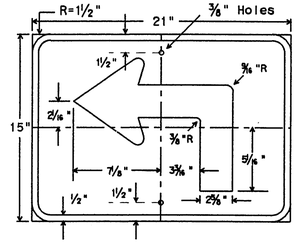
Border - White Reflective
Background - Blue Reflective

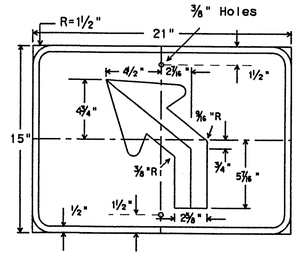


M5-1BL
M5-1BR
21" X 15"

Symbol - White Refl.
Border - White Refl.
Background - Blue Refl.

M5-1GL
M5-1GR
21" X 15"

Symbol - White Refl.
Border - White Refl.
Background - Green Refl.

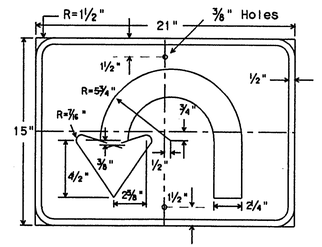


M5-2BL
M5-2BR
21" X 15"

Symbol - White Refl.
Border - White Refl.
Background - Blue Refl.

M5-2GL
M5-2GR
21" X 15"

Symbol - White Refl.
Border - White Refl.
Background - Green Refl.

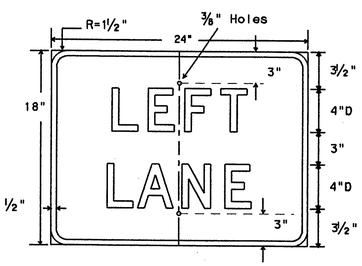


M5-3BL
21" X 15"

Symbol - White Refl.
Border - White Refl.
Background - Blue Refl.

M5-3GL
21" X 15"

Symbol - White Refl.
Border - White Refl.
Background - Green Refl.

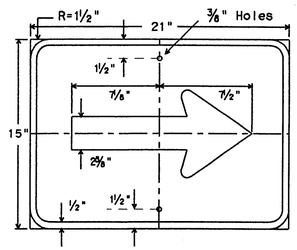


M6-8BL
24" X 18"

Letters - White Refl.
Border - White Refl.
Background - Blue Refl.

M6-8GL
24" X 18"

Letters - White Refl.
Border - White Refl.
Background - Green Refl.

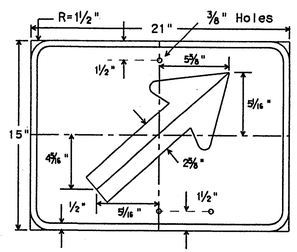


M6-1B
21" X 15"

Symbol - White Refl.
Border - White Refl.
Background - Blue Refl.

M6-1G
21" X 15"

Symbol - White Refl.
Border - White Refl.
Background - Green Refl.

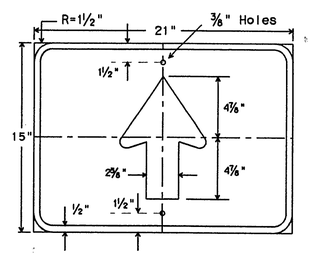


M6-2BR
M6-2BL
21" X 15"

Symbol - White Refl.
Border - White Refl.
Background - Blue Refl.

M6-2GR
M6-2GL
21" X 15"

Symbol - White Refl.
Border - White Refl.
Background - Green Refl.

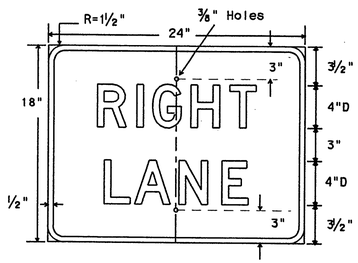


M6-3B
21" X 15"

Symbol - White Refl.
Border - White Refl.
Background - Blue Refl.

M6-3G
21" X 15"

Symbol - White Refl.
Border - White Refl.
Background - Green Refl.

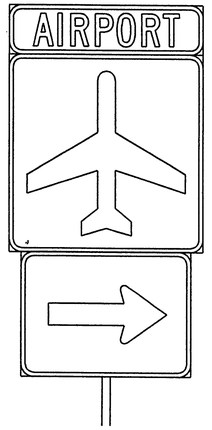


M6-8BR
24" X 18"

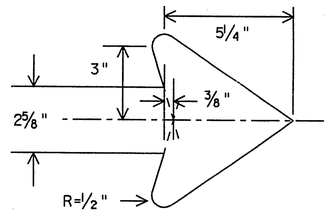
Letters - White Refl.
Border - White Refl.
Background - Blue Refl.

M6-8GR
24" X 18"

Letters - White Refl.
Border - White Refl.
Background - Green Refl.



TYPICAL ASSEMBLY



SPECIFICATION REFERENCE TABLE
MATERIALS AND TESTS DIVISION SPECIFICATIONS

ALUMINUM SIGN BLANKS	D-9-7110
REFLECTIVE SHEETING, TYPE C (HIGH SPECIFIC INTENSITY)	D-9-8300

GENERAL NOTES:

The alphabets and lateral spacing between letters and numerals shall conform with the Texas "Manual on Uniform Traffic Control Devices for Streets and Highways", latest edition, and any approved changes thereto. Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.

Legend shall be applied by reverse screening process with transparent colored ink, cut-out white reflective sheeting applied to colored background or combination thereof. Background shall be reflective sheeting (Type C).

Sign blanks shall be 0.080 inch thick one piece sheet aluminum alloy conforming with Department Specification "Aluminum Signs (Type A)".

FINAL RECORD DRAWING
Date: 12/25/99

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

AIRPORT, HOSPITAL AND DIRECTIONAL MARKERS FOR INDEPENDENT MOUNTING

IM(5)-93

ORIG DRAW DATE: July 1990	DN: LR	CK:	DW: DN	CK:	REG NO.:
REVISIONS 9-93	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
		6			33
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY

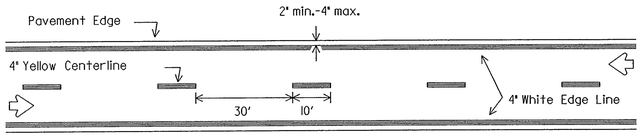
3E

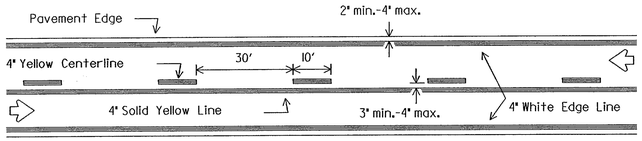
LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

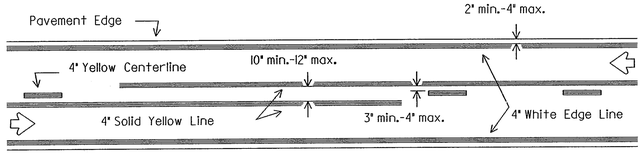
DATE:
ACC: d58npl0/usr/d580504
FILE:

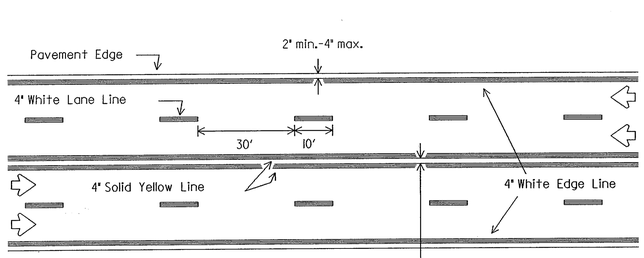
DN: LR
CK: LW
DW: DW
CK: MT

TWO LANE TWO-WAY ROADWAY

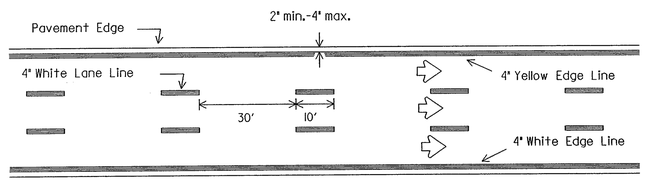




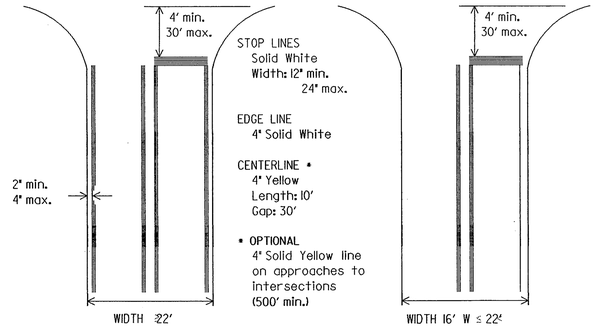




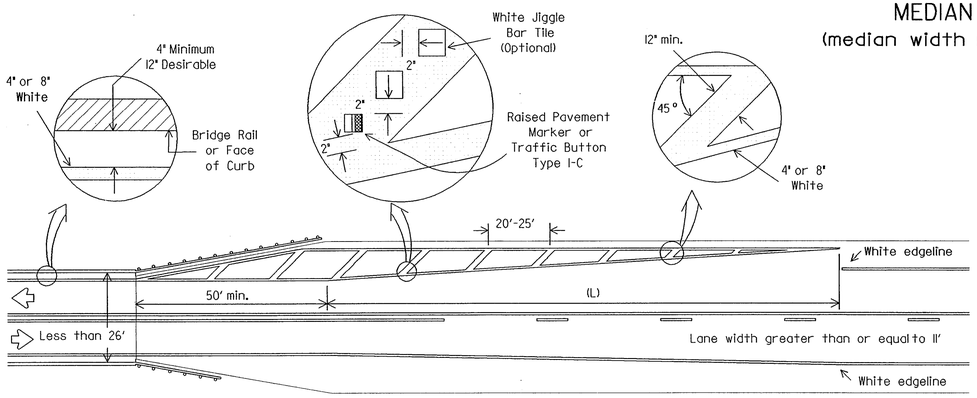
CENTERLINE AND LANE LINES FOUR LANE TWO-WAY ROADWAY



EDGE LINE AND LANE LINES ONE-WAY ROADWAY



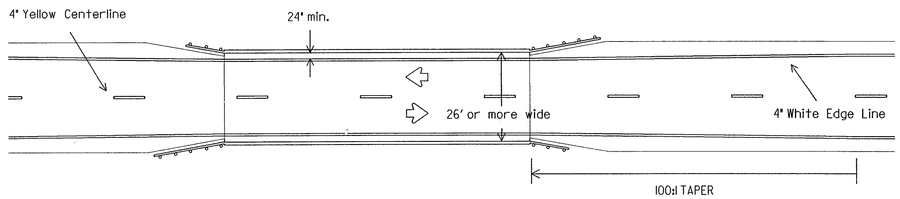
GUIDE FOR PLACEMENT OF STOP LINES, EDGE LINE & CENTERLINE



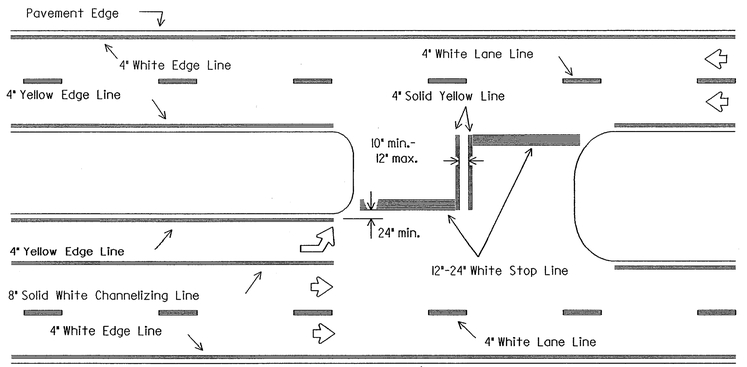
NOTES:

1. No-passing zone on bridge approach is optional but if used, it shall be a minimum 500 feet long.
2. 12 inch crosshatching is optional. See plan quantities.
3. For taper length (L) see Table I.

NARROW BRIDGES (less than 26') TWO LANE TWO-WAY ROADWAY



BRIDGES (26' or greater in width) TWO LANE TWO-WAY ROADWAY



FOUR LANE DIVIDED ROADWAY INTERSECTIONS MEDIAN WIDTH GREATER THAN 30 FEET

(median width measured between crossover stop lines)

TABLE I
TYPICAL TAPER LENGTH (L)

Posted Speed*	Formula	Minimum Desirable Taper Lengths ** 10' Offset	11' Offset	12' Offset
30	$L=\frac{WS^2}{60}$	150'	165'	180'
35		205'	225'	245'
40		265'	295'	320'
45	L=WS	450'	495'	540'
50		500'	550'	600'
55		550'	605'	660'
60		600'	660'	720'
65		650'	715'	780'

* 85th Percentile Speed may be used on roads where traffic speeds normally exceed the posted speed limit.
** Taper lenghts have been rounded.
L=Length of Taper (FT.) W=Width of Offset (FT.)
S=Posted Speed (MPH)

FINAL RECORD DRAWING
Date: 12/25/99

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

TYPICAL STANDARD PAVEMENT MARKINGS

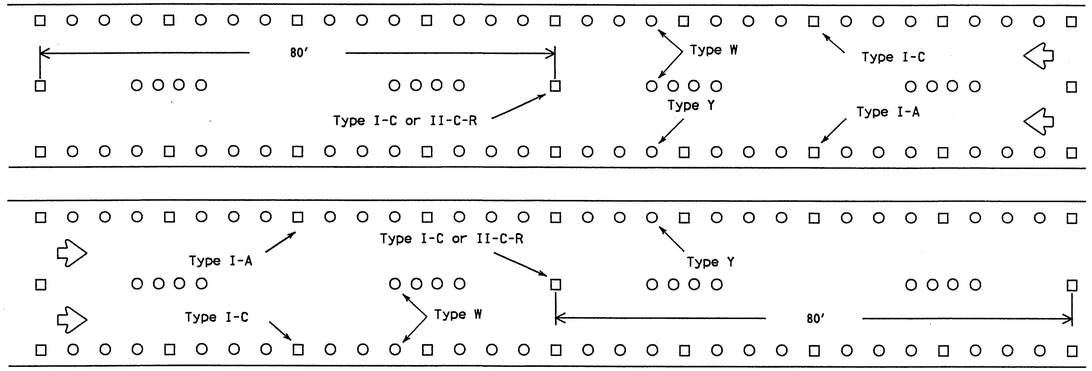
PM(1)-95

ORIG DRAW DATE: NOV. 1978	DN:- LR	CK:-	DW:- DN	CK:-	NEG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
2-82 7-92		6		34
11-85 8-95	COUNTY		CONTROL SECTION JOB	HIGHWAY
7-86				
4-92				

22A

DN:LR CK:CW DW:DN CK:MT
DATE:
ACC: d58hpic/usr/d580504
FILE:
LEVELS DISPLAYED 1 2 3

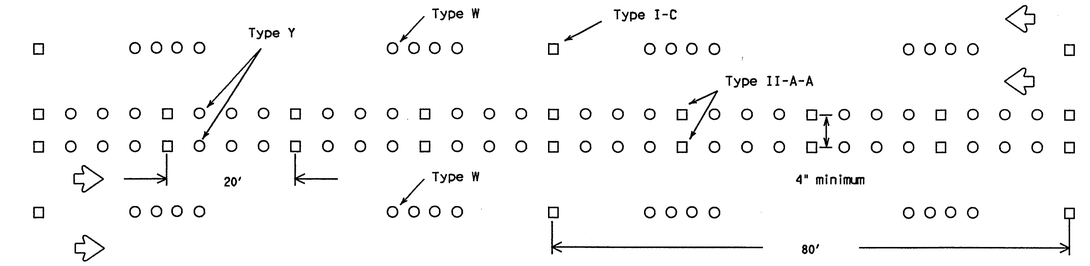


EDGE LINES AND LANE LINES FOR DIVIDED HIGHWAYS

Raised pavement markers Type II-C-R, clear face toward normal traffic and red face toward wrong-way traffic, shall be spaced on 80-foot centers.

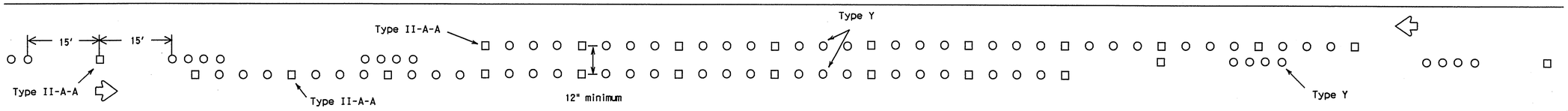
As required by the Engineer or shown elsewhere in the plans, Type II-C-R markers shall be placed on 40-foot centers for the below listed conditions:

1. Vertical curves with grades over 2 percent and less than 1000 feet long,
2. horizontal curves,
3. or continously illuminated sections.

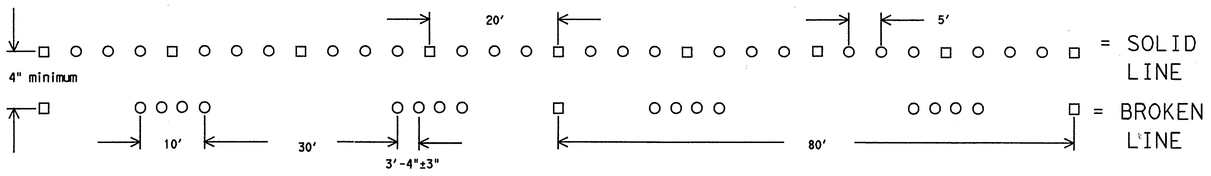


LANE LINES & CENTERLINES FOR MULTI-LANE UNDIVIDED HIGHWAYS

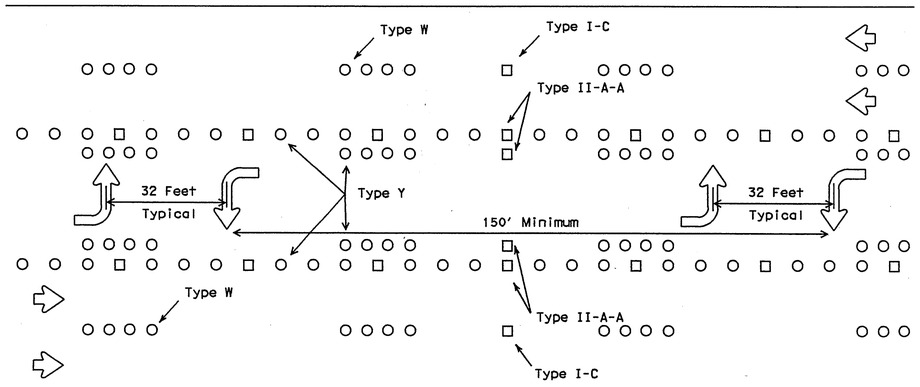
Raised pavement marker Type I-C, clear face toward normal traffic, shall be placed on 80-foot centers.



CENTERLINE & NO-PASSING ZONE BARRIER LINES FOR TWO LANE TWO-WAY HIGHWAYS



PATTERN DETAIL



TWO-WAY LEFT TURN LANE

LEGEND:

- ○ TRAFFIC BUTTON (NONREFLECTORIZED)
- □ RAISED PAVEMENT MARKER (REFLECTORIZED)

GENERAL NOTES:

All raised pavement markers placed in broken lines shall be placed in line with and midway between the stripes.

First and last raised pavement marker in a no-passing line shall be a reflective marker.

On concrete pavements, the raised pavement markers should be placed to one side of the longitudinal joints.

FINAL RECORD DRAWING
Date: 12/25/99

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

TYPICAL STANDARD PAVEMENT MARKINGS RPM TO SIMULATE STANDARD PAVEMENT MARKINGS

PM(3)-92

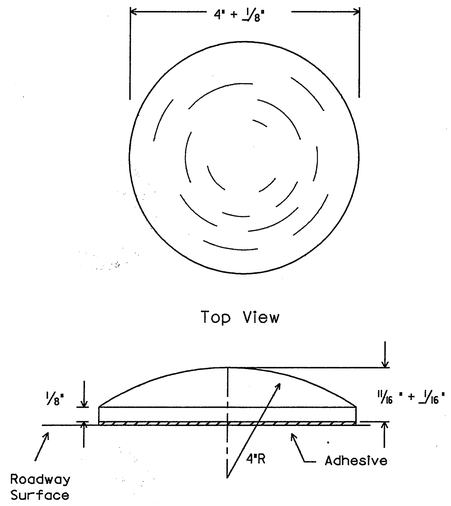
ORIG DRAW DATE:	DN: - LR	CK: -	DW: - DN	CK: -	NEG NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
2-82 7-86 10-86 4-92		6			35
	COUNTY		CONTROL	SECTION	JOB / HIGHWAY

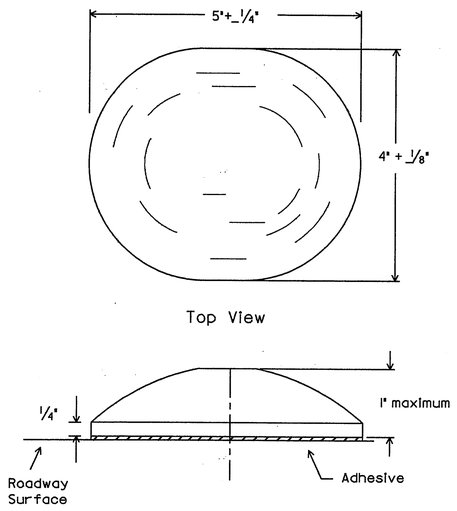
22C

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

DATE:
ACC: d58hp1c/usr/d580504
FILE:

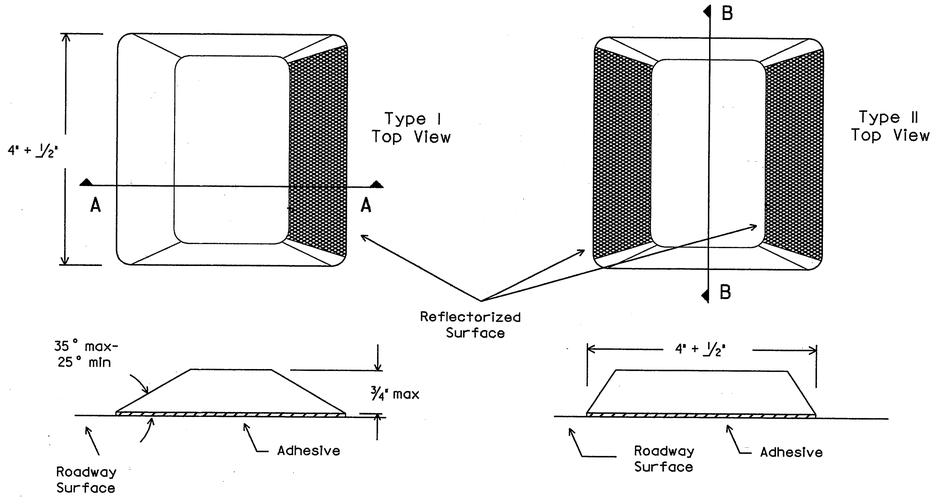
DN: LR
CK: CW
DW: DN
CK: MT



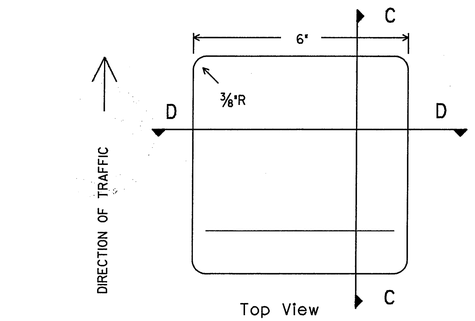


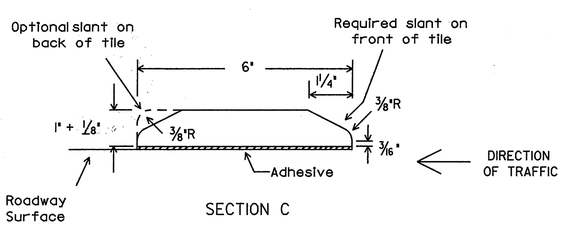
TRAFFIC BUTTONS
(NON-REFLECTORIZED)

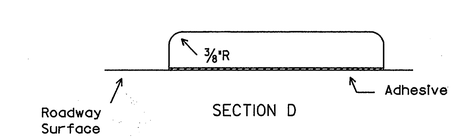
NOTE: Minimum area of markers shall be not less than 12.5 square inches.
Either shape may be used but the same shape shall be used through out the project.



RAISED PAVEMENT MARKERS
(REFLECTORIZED)

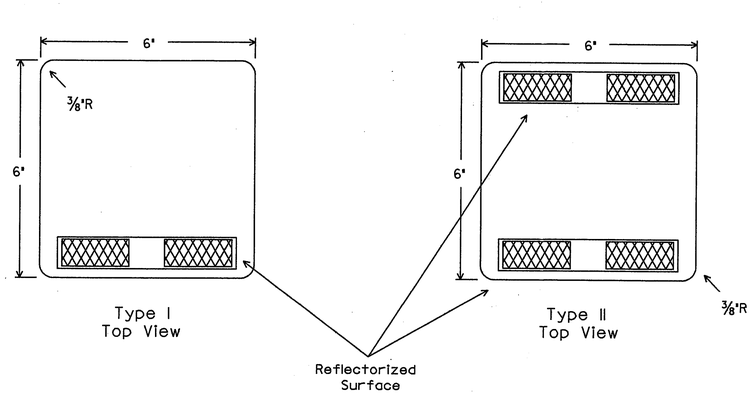


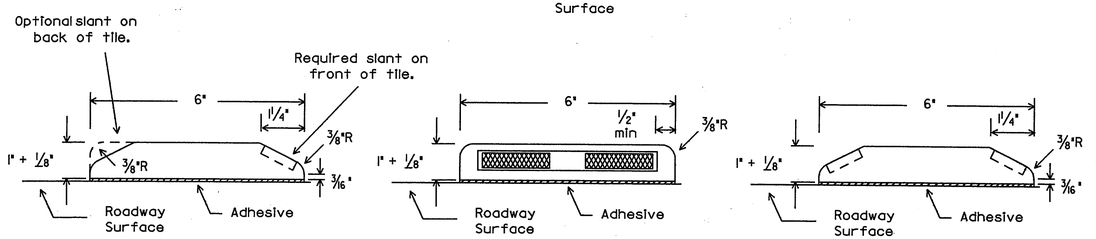




JIGGLE BAR TILES
(NON-REFLECTORIZED)

"Jiggle Bars" consist of a number of Jiggle Bar Tiles placed in a linear configuration.





JIGGLE BAR TILES
(REFLECTORIZED)

SPECIFICATION REFERENCE TABLE
MATERIALS AND TEST SPECIFICATIONS (D-9)

JIGGLE BAR TILE	D-9-4100
PAVEMENT MARKERS (REFLECTORIZED)	D-9-4200
TRAFFIC BUTTONS	D-9-4300
BITUMINOUS ADHESIVE	D-9-6130

GENERAL NOTES:

RAISED PAVEMENT MARKERS (RPMs) MAY CONSIST OF TRAFFIC BUTTONS, PAVEMENT MARKERS AND/OR JIGGLE BAR TILES. PAVEMENT SURFACE SHALL BE PREPARED AND CLEANED SUBJECT TO APPROVAL OF THE ENGINEER BEFORE ADHESIVE AND RPMs ARE PLACED.

JIGGLE BARS SHALL BE ORIENTED PERPENDICULAR TO ROADWAY. JIGGLE BARS SHALL ALSO BE PLACED AT SUCH OTHER LOCATIONS AS SHOWN IN PLANS OR AS DIRECTED BY THE ENGINEER.

MARKERS, BUTTONS AND JIGGLE BAR TILES SHOWN ARE FOR ILLUSTRATION PURPOSES ONLY AND NOT INTENDED TO SPECIFY ANY PARTICULAR PRODUCT. ALL PAVEMENT MARKERS PROVIDED SHALL BE OF THE SAME MANUFACTURER.

ALL DIMENSIONS ARE + 1/8" UNLESS OTHERWISE NOTED.

FINAL RECORD DRAWING
Date: 12/25/99

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

RAISED PAVEMENT MARKERS REFLECTIVE PAVEMENT MARKERS, TRAFFIC BUTTONS & JIGGLE BAR TILE
RPM(1)-92

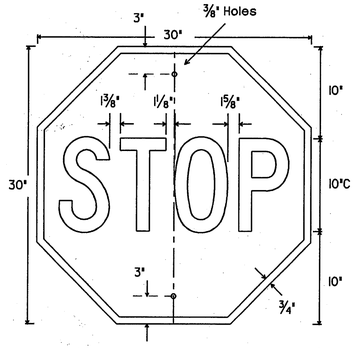
ORIG DRAW DATE: JANUARY 1981	DN:- LR	CK:-	DW:- DN	CK:-	MED NO.:	
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
2-82 10-86		6				36
7-85 12-90	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
11-85 4-92						
7-86						

2IA

DN:LR
CK:CW
DW:DN
CK:MT

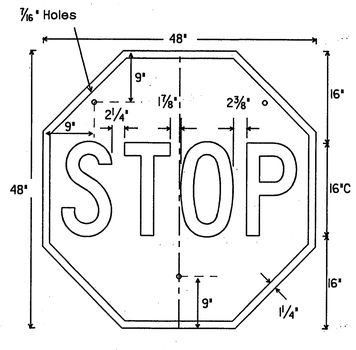
DATE:
FILE: d58hpic/usr/d580504

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63



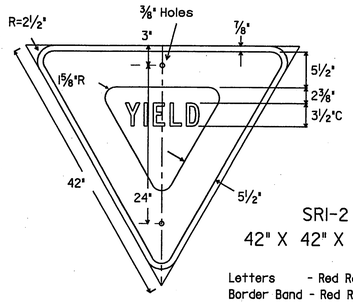
RI-1
30" X 30"

Letters - White Reflective
Border - White Reflective
Background - Red Reflective



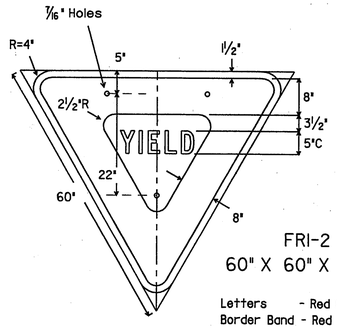
SRI-1
48" X 48"

Letters - White Reflective
Border - White Reflective
Background - Red Reflective



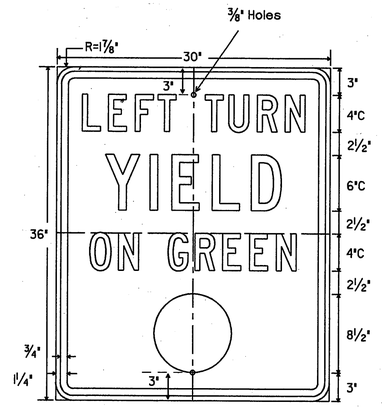
SRI-2
42" X 42" X 42"

Letters - Red Reflective
Border Band - Red Reflective
Background - White Reflective



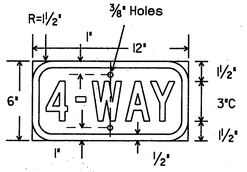
FRI-2
60" X 60" X 60"

Letters - Red Reflective
Border Band - Red Reflective
Background - White Reflective



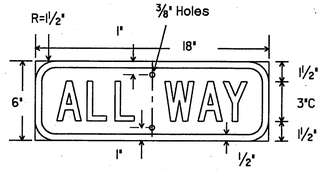
RI0-12
30" X 36"

Letters - Black
Border - Black
Circle - Green Refl.
Background - White Refl.



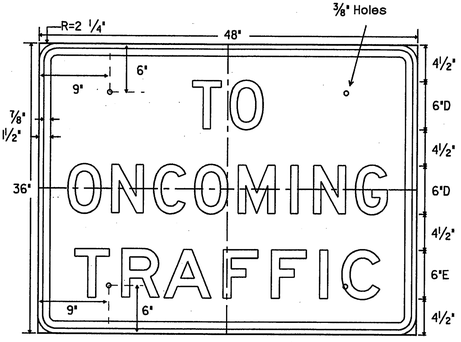
RI-3
12" X 6"

Letters - White Reflective
Border - White Reflective
Background - Red Reflective



RI-4
18" X 6"

Letters - White Reflective
Border - White Reflective
Background - Red Reflective



SRI-2b
48" X 36"

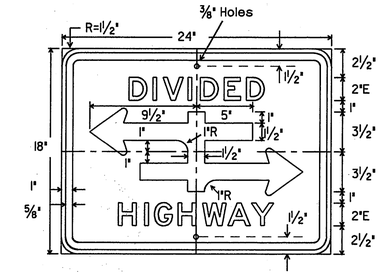
Legend - Black
Background - White Refl.

FR8-4
48" X 36"

Legend - Black
Background - White Refl.

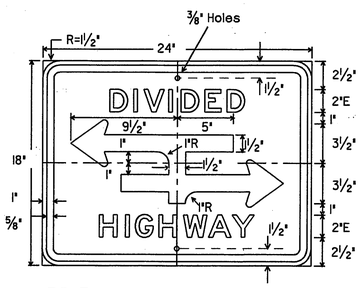
STOPPING 6"D

FR8-7



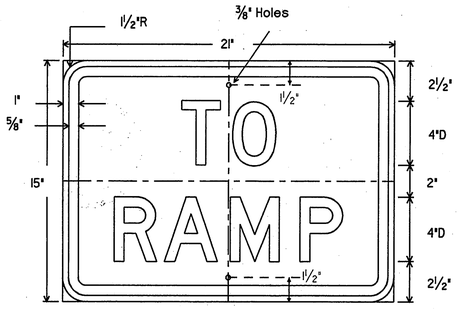
R6-3
24" X 18"

Legend - Black
Background - White Refl.



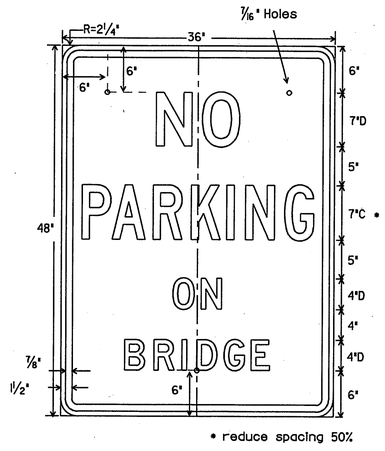
R6-3a
24" X 18"

Legend - Black
Background - White Refl.



RI-2a
21" X 15"

Legend - Black
Background - White Refl.



ER8-IT
36" X 48"

Letters -Red Reflective
Border -Red Reflective
Background - White Reflective

SPECIFICATION REFERENCE TABLE

MATERIALS AND TESTS DIVISION SPECIFICATIONS	
ALUMINUM SIGN BLANKS	D-9-7110 △
REFLECTIVE SHEETING, TYPE A (ENGINEER GRADE) (FOR BLACK AND WHITE SIGNS ON THIS SHEET)	D-9-8300
REFLECTIVE SHEETING, TYPE C (HIGH SPECIFIC INTENSITY) (FOR RED SERIES SIGNS ON THIS SHEET)	D-9-8300
VINYL NON-REFLECTIVE DECAL SHEETING	D-9-8320

GENERAL NOTES:

The alphabets and lateral spacing between letters and numerals shall conform with the Texas 'Manual on Uniform Traffic Control Devices for Streets and Highways', latest edition, and any approved changes thereto. Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.

Legend (except where noted), shall be applied by screening process of black and/or transparent colored ink, cut-out black vinyl non-reflective decal sheeting, and/or reflective sheeting or combination thereof. Legend on RI-1, SRI-1, RI-3 and RI-4 shall be applied by reverse screening process with transparent colored ink or cut-out white reflective sheeting applied to colored background or combination thereof. Background shall be reflective sheeting.

Sign blanks shall be one piece 0.080 inch thick sheet aluminum alloy △ (Type A), unless otherwise noted elsewhere in the plans.

ISSUE DATE: 11-26-96

FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS
GLENN D. HOUSER
24236
REGISTERED PROFESSIONAL ENGINEER
Glenn D. Houser
4-14-97

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

REGULATORY SIGNS

R(1)-95 (MOD.)

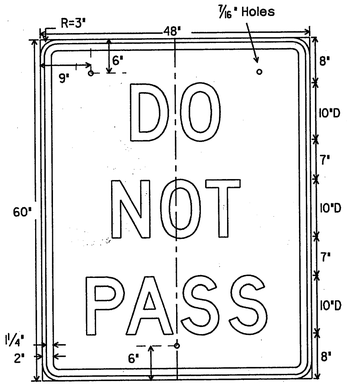
ORIG DRAW DATE: FEB. 1976	DN: LR/MT	CK:	DW: DN	CK:	REG NO.:

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
I-85		6		37
7-90	COUNTY		CONTROL SECTION JOB	HIGHWAY
8-95				
11-96△				

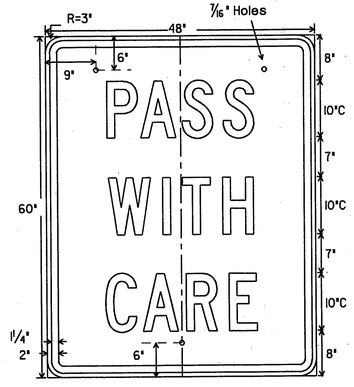
7A

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

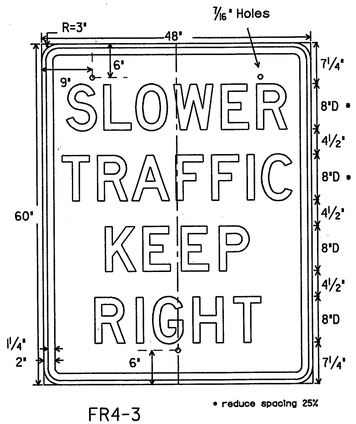
DATE:
ACC: d58hplc/usr/d580504
FILE:
DN:LR
CK:CW
DW:DN
CK:MT



FR4-1
48" X 60"

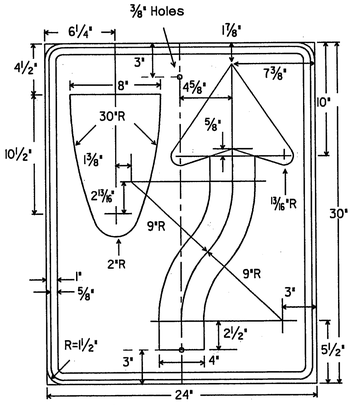


FR4-2
48" X 60"

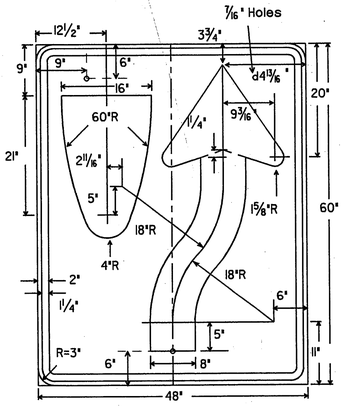


FR4-3
48" X 60"

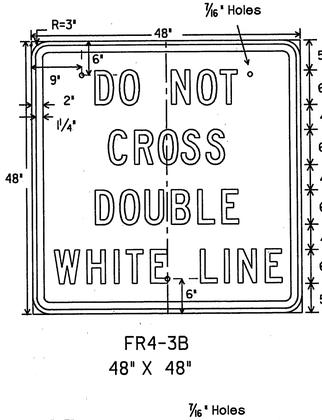
• reduce spacing 25%



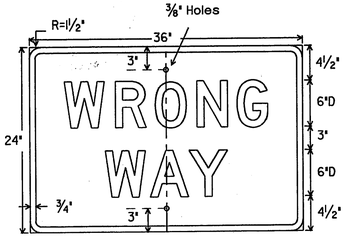
R4-7
24" X 30"



FR4-7
48" X 60"

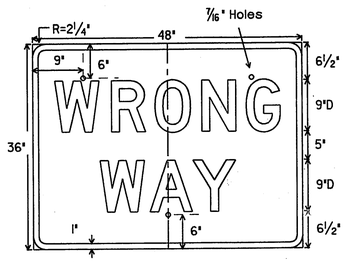


FR4-3B
48" X 48"



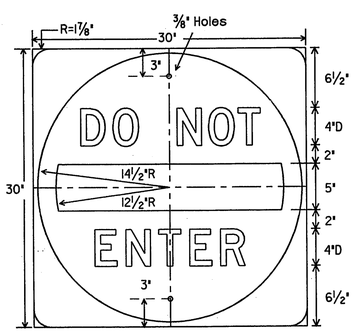
R5-1a
36" X 24"

Letters - White Reflective
Border - White Reflective
Background - Red Reflective



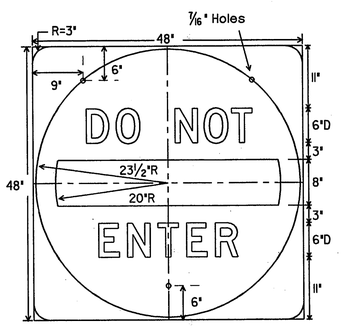
SR5-1a
48" X 36"

Letters - White Reflective
Border - White Reflective
Background - Red Reflective



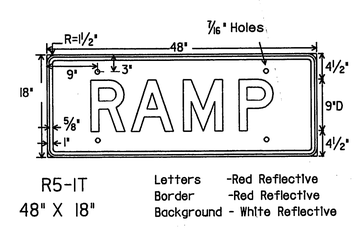
R5-1
30" X 30"

Letters - White Reflective
Bar - White Reflective
Background - Red Reflective



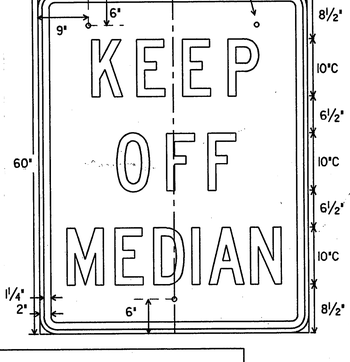
SR5-1
48" X 48"

Letters - White Reflective
Bar - White Reflective
Background - Red Reflective



R5-1T
48" X 18"

Letters -Red Reflective
Border -Red Reflective
Background - White Reflective



FR11-1
48" X 60"

SPECIFICATION REFERENCE TABLE MATERIALS AND TESTS DIVISION SPECIFICATIONS	
ALUMINUM SIGN BLANKS	D-9-7110 △
REFLECTIVE SHEETING, TYPE A (ENGINEER GRADE) (FOR BLACK AND WHITE SIGNS ON THIS SHEET)	D-9-8300
REFLECTIVE SHEETING, TYPE C (HIGH SPECIFIC INTENSITY) (FOR RED SERIES SIGNS ON THIS SHEET)	D-9-8300
VINYL NON-REFLECTIVE DECAL SHEETING	D-9-8320

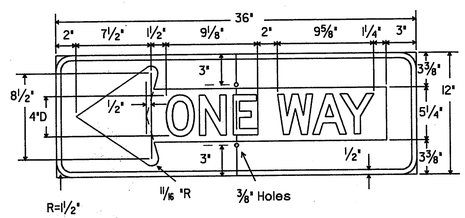
GENERAL NOTES:

The alphabets and lateral spacing between letters and numerals shall conform with the Texas 'Manual on Uniform Traffic Control Devices for Streets and Highways', latest edition, and any approved changes thereto. Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.

Legend (except where noted), shall be black and applied by screening process, cut-out vinyl non-reflective decal sheeting, and/or reflective sheeting or combination thereof. Legend on R5-1, ER5-1, SR5-1, R5-1T, R5-1a and SR5-1a shall be applied by reverse screening process with transparent colored ink or cut-out white reflective sheeting applied to colored background or combination thereof. Background shall be reflective sheeting.

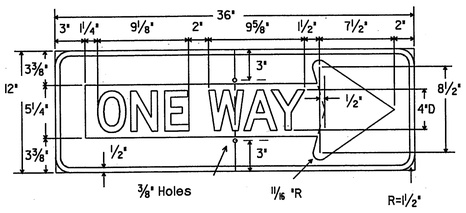
Sign blanks shall be one piece 0.080 inch thick sheet aluminum alloy (Type A), unless △ otherwise noted elsewhere in the plans.

ISSUE DATE: 11-26-96



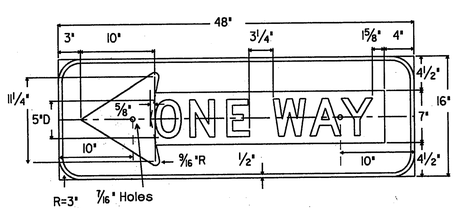
R6-1L
36" X 12"

Letters - Black
Symbol - White Reflective
Border - White Reflective
Background - Black



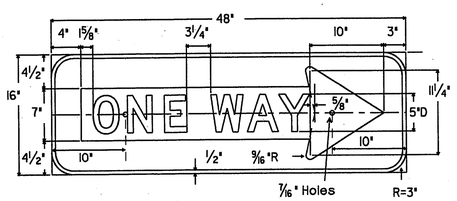
R6-1R
36" X 12"

Letters - Black
Symbol - White Reflective
Border - White Reflective
Background - Black



FR6-1L
48" X 16"

Letters - Black
Symbol - White Reflective
Border - White Reflective
Background - Black



FR6-1R
48" X 16"

Letters - Black
Symbol - White Reflective
Border - White Reflective
Background - Black

FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS
GLENN D. HOUSER
24236
REGISTERED PROFESSIONAL ENGINEER
Glenn D. Houser
4-14-97

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

REGULATORY SIGNS

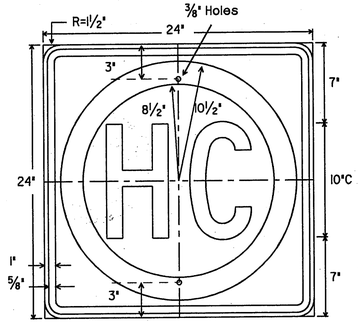
R(2)- 95 (MOD.)

ORIG DRAW DATE: FEB. 1976	DN: LR	CK:	DW: DN	CK:	NEG NO.:	
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
1-85		6				38
7-90	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
8-95						
11-96△						

7B

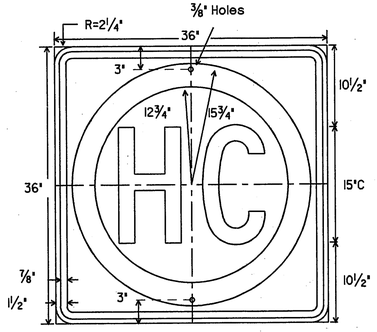
LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

DATE:
ACC: d58hplc/usr/d580504
FILE:
DN:LR
CK:CW
DW:DN
CK:MT



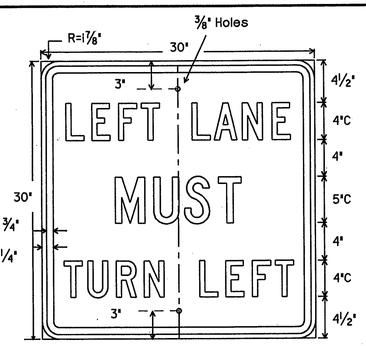
RI4-2
24" X 24"

Letters - Black
Border - Black
Ring - Green Reflective
Background - White Reflective

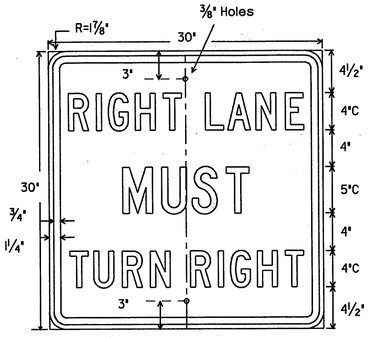


ERI4-2
36" X 36"

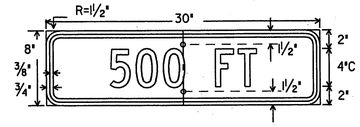
Letters - Black
Border - Black
Ring - Green Reflective
Background - White Reflective

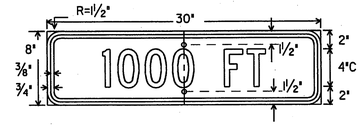


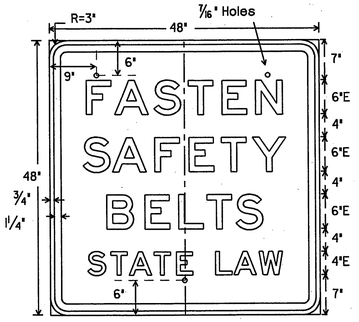
R3-7L
30" X 30"



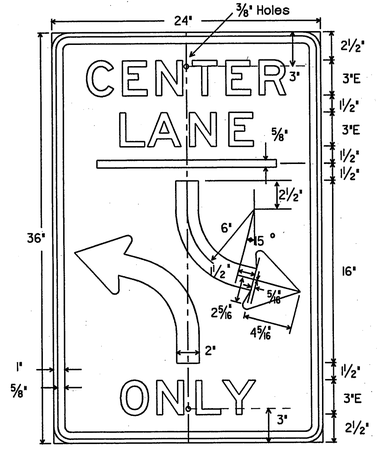
R3-7R
30" X 30"



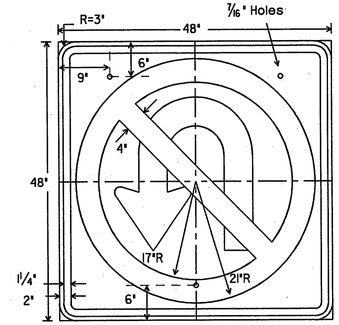




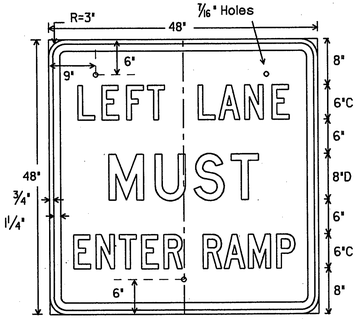
FRI9-8
48" X 48"



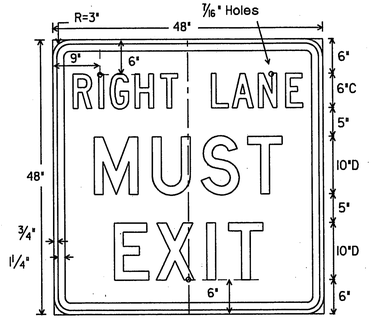
R3-9b
24" X 36"



SR3-4
48" X 48"

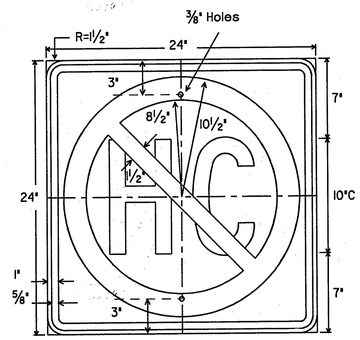


R3-20
48" X 48"



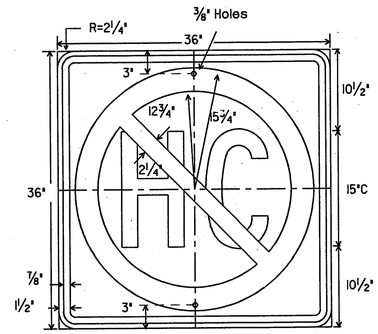
R3-21R
48" X 48"

Letters - Black
Arrow - Black
Border - Black
Circle & Diagonal - Red Reflective
Background - White Reflective



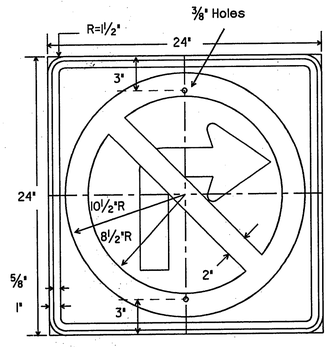
RI4-3
24" X 24"

Letters - Black
Border - Black
Ring/Slash - Red Reflective
Background - White Reflective



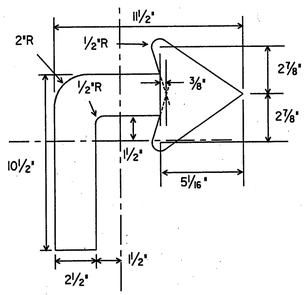
ERI4-3
36" X 36"

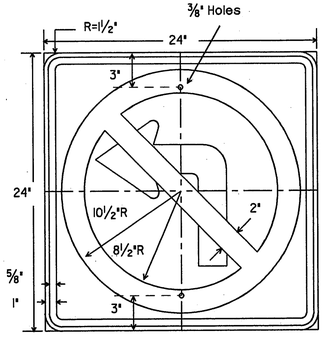
Letters - Black
Border - Black
Ring/Slash - Red Reflective
Background - White Reflective



R3-1
24" X 24"

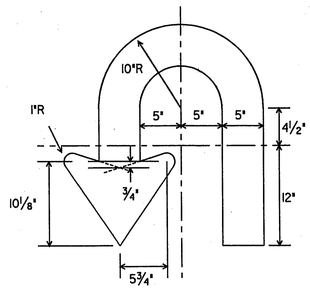
Letters - Black
Arrow - Black
Border - Black
Circle & Diagonal - Red Reflective
Background - White Reflective





R3-2
24" X 24"

Letters - Black
Arrow - Black
Border - Black
Circle & Diagonal - Red Reflective
Background - White Reflective



SPECIFICATION REFERENCE TABLE

MATERIALS AND TESTS DIVISION SPECIFICATIONS	
ALUMINUM SIGN BLANKS	D-9-7110 △
REFLECTIVE SHEETING,	
TYPE A (ENGINEER GRADE)	D-9-8300
TYPE C (HIGH SPECIFIC INTENSITY)	D-9-8300
VINYL NON-REFLECTIVE DECAL SHEETING	D-9-8320

GENERAL NOTES:

The alphabets and lateral spacing between letters and numerals shall conform with the Texas 'Manual on Uniform Traffic Control Devices for Streets and Highways', latest edition, and any approved changes thereto. Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.

Legend (except where noted), shall be applied by screening process of black and/or transparent colored ink, cut-out black vinyl non-reflective decal sheeting and/or reflective sheeting or combination thereof. Background shall be white reflective sheeting (Type A). RI4-2, ERI4-2, RI4-3, ERI4-3, R3-1, R3-2 and SR3-4 signs shall use reflective sheeting (Type C).

Sign blanks shall be one piece 0.080 inch thick sheet aluminum alloy △ (Type A), unless otherwise noted elsewhere in the plans.

FINAL RECORD DRAWING
Date: 12/25/99

ISSUE DATE: 11-26-96

STATE OF TEXAS
GLENN D. HOUSER
24236
REGISTERED PROFESSIONAL ENGINEER
Glenn D. Houser
4-14-97

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

REGULATORY SIGNS

R(3)-95 (MOD.)

ORIG DRAW DATE:	JULY 1990	DN: LR	CK:	DW: DN	CK:	MEG NO.:
REVISIONS		STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
8-95 11-96 △			6			39
		COUNTY		CONTROL	SECTION	JOB	HIGHWAY

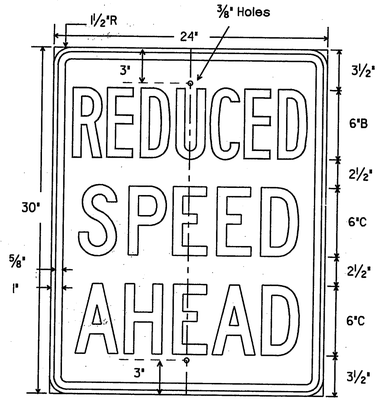
7C

LEVELS DISPLAYED

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	

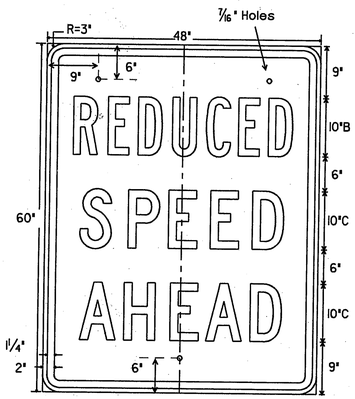
DATE:
ACC: d58hplc/usr/d580504
FILE:

DN:LR
CK:CW
DW:DN
CK:MT



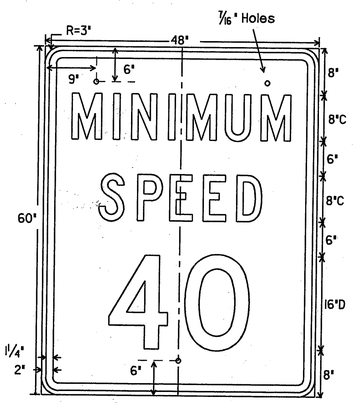
R2-5a
24" X 30"

Legend - Black
Background - White Refl.



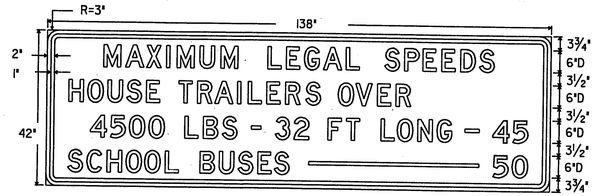
FR2-5a
48" X 60"

Legend - Black
Background - White Refl.



FR2-4
48" X 60"

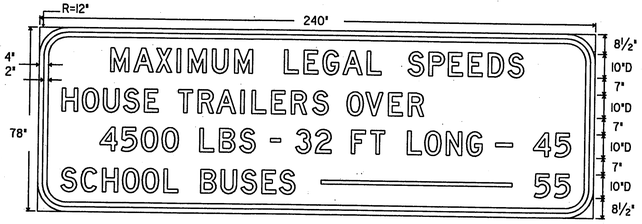
Legend - Black
Background - White Refl.



R2-4T
138" X 42"

Legend - Black
Background - White Refl.

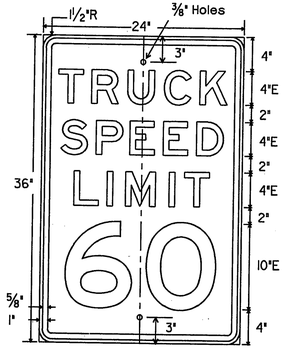
(For Non-Interstate Highways)



FR2-4T
240" X 78"

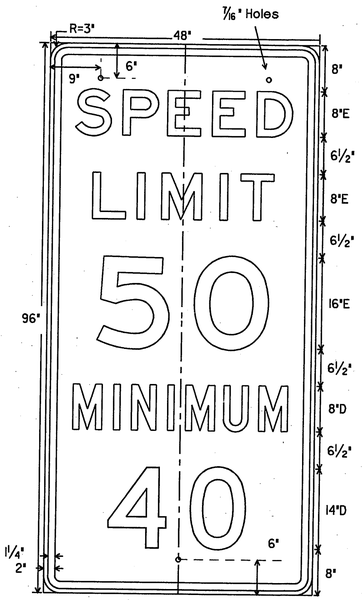
Legend - Black
Background - White Refl.

(For Interstate Highways Only)



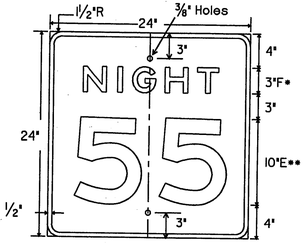
R2-2a
24" X 36"

Legend - Black
Background - White Refl.



FR2-4a
48" X 96"

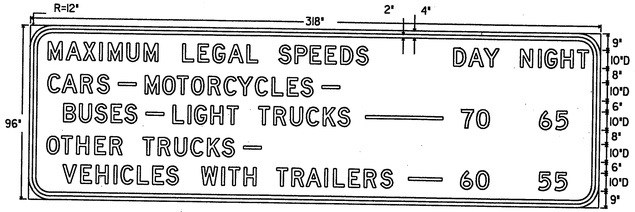
Legend - Black
Background - White Refl.



** optically space numerals about vertical centerline
* increase spacing 50%

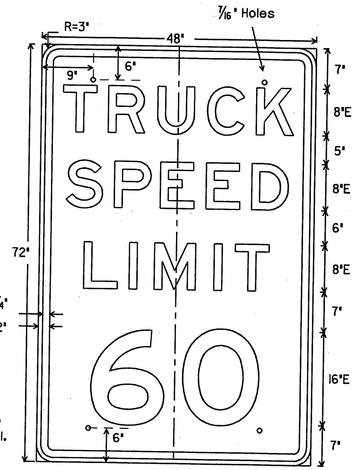
R2-3
24" X 24"

Legend - White Refl.
Background - Black



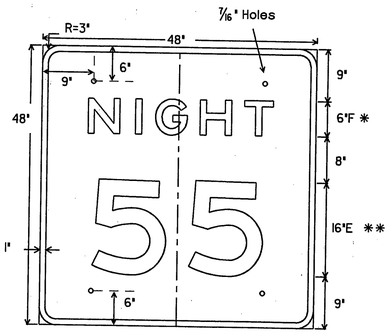
FR2-4Ta
318" X 96"

Legend - Black
Background - White Refl.

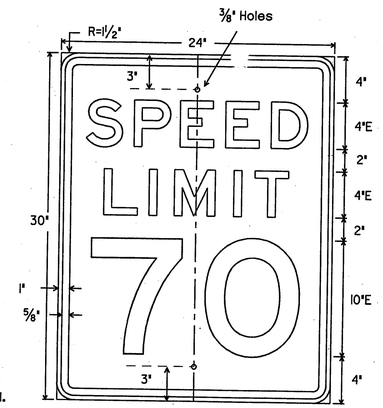


FR2-2a
48" X 72"

Legend - Black
Background - White Refl.

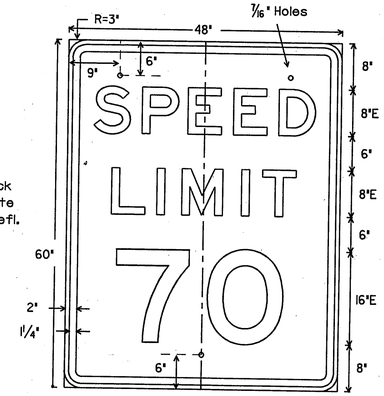


** optically space numerals about vertical centerline
* increase spacing 50%



R2-1
24" X 30"

Legend - Black
Background - White Refl.



FR2-1
48" X 60"

Legend - Black
Background - White Refl.

SPECIFICATION REFERENCE TABLE

MATERIALS AND TESTS DIVISION SPECIFICATION	
ALUMINUM SIGN BLANKS	D-9-7110 △
REFLECTIVE SHEETING, TYPE A (ENGINEER GRADE)	D-9-8300
VINYL NON-REFLECTIVE DECAL SHEETING	D-9-8320

GENERAL NOTES:

The alphabets and lateral spacing between letters and numerals shall conform with the Texas 'Manual on Uniform Traffic Control Devices for Streets and Highways', latest edition, and any approved changes thereto. Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.

Legend (except where noted), shall be black and applied by screening process, cut-out vinyl non-reflective decal sheeting or combination thereof. Legend on FR2-3 shall be applied by reverse screening process, cut-out black vinyl non-reflective decal sheeting and/or cut-out white reflective sheeting or combination thereof. Background shall be reflective sheeting (Type A).

Sign blanks shall be one piece 0.080 inch thick sheet aluminum alloy (Type A), △ unless otherwise noted elsewhere in the plans.

FINAL RECORD DRAWING
Date: 12/25/99

ISSUE DATE: 11-26-96

STATE OF TEXAS
GLENN D. HOUSER
24236
REGISTERED PROFESSIONAL ENGINEER
Glenn D. Houser
4-14-97

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

REGULATORY SIGNS

R(4)-95A (MOD.)

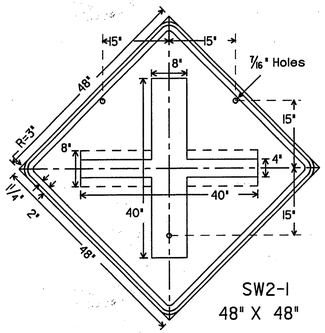
ORIG DRAN DATE: August 1995	DN: LR	CK:	DW: DN	CK:	NEG NOs
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
12-95		6			40
11-96△	COUNTY		CONTROL	SECTION	JOB	HIGHWAY

7D

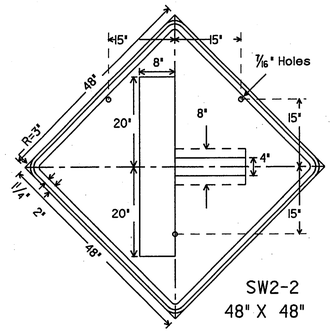
LEVELS DISPLAYED

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	

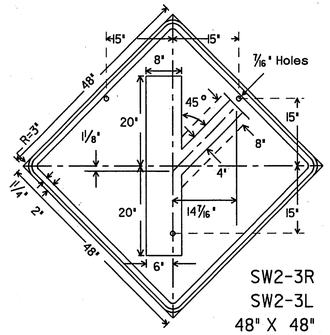
DATE:
ACC: d58hplc/usr/d580504
FILE:
DN:LR
CK:JCW
DW:DN
CK:MT



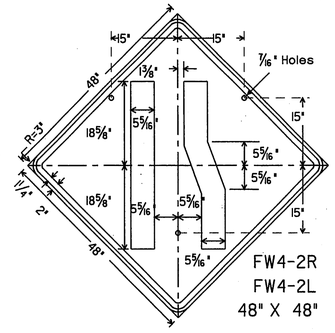
SW2-1
48" X 48"



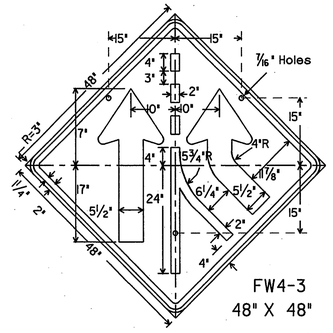
SW2-2
48" X 48"



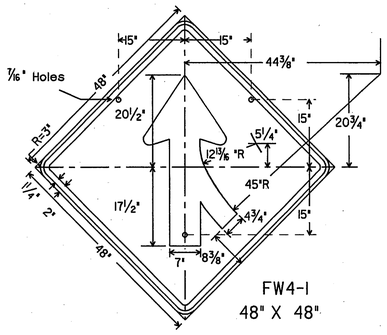
SW2-3R
SW2-3L
48" X 48"



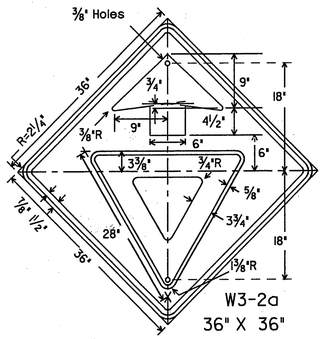
FW4-2R
FW4-2L
48" X 48"



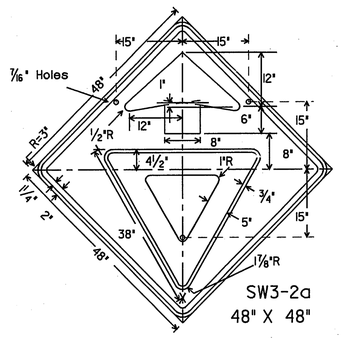
FW4-3
48" X 48"



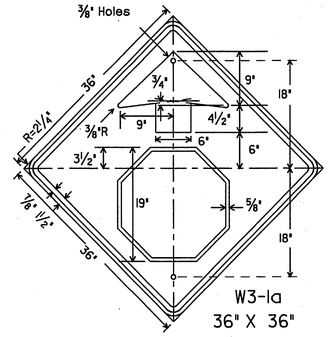
FW4-1
48" X 48"



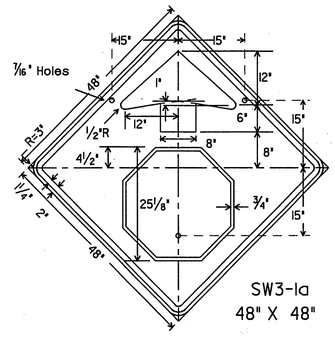
W3-2a
36" X 36"



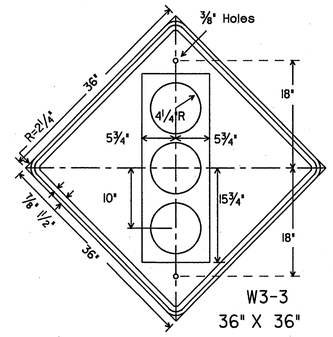
SW3-2a
48" X 48"



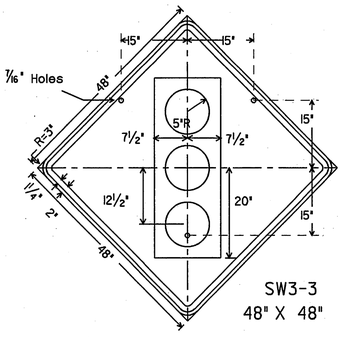
W3-1a
36" X 36"



SW3-1a
48" X 48"

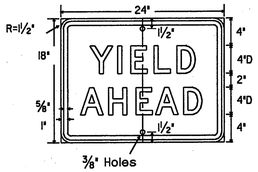


W3-3
36" X 36"



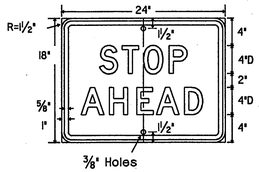
SW3-3
48" X 48"

Border and Arrow - Black
Symbol- Red Border Band on
White Background (Refl)
Background - Yellow Reflective



Border and Arrow - Black
Symbol- Red Border Band on
White Background (Refl)
Background - Yellow Reflective

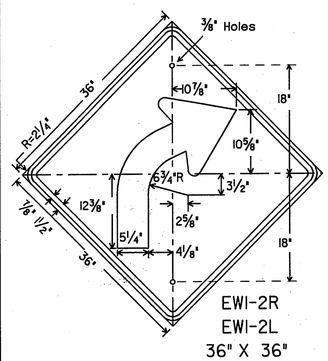
Border and Arrow - Black
Symbol- White Border on
Red Background (Refl)
Background - Yellow Reflective



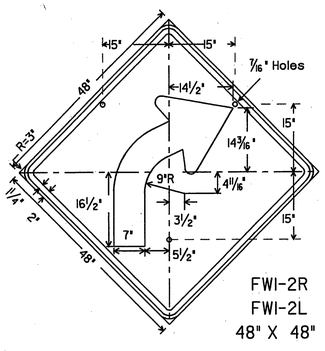
Border and Arrow - Black
Symbol- White Border on
Red Background (Refl)
Background - Yellow Reflective

Symbol and Border - Black
Top Circle - Red Reflective
Botton Circle - Green Reflective
Background - Yellow Reflective

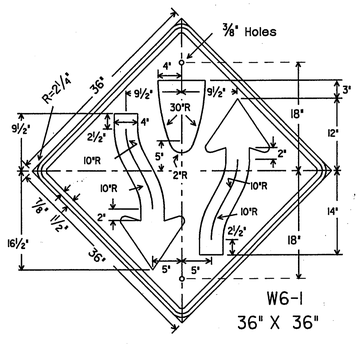
Symbol and Border - Black
Top Circle - Red Reflective
Botton Circle - Green Reflective
Background - Yellow Reflective



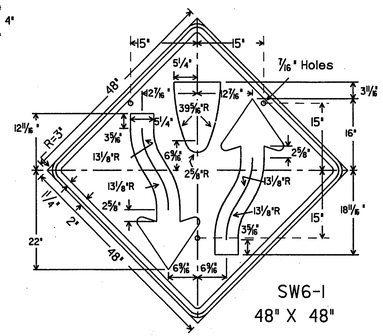
EWI-2R
EWI-2L
36" X 36"



FWI-2R
FWI-2L
48" X 48"

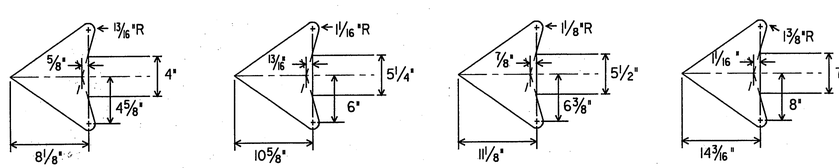


W6-1
36" X 36"



SW6-1
48" X 48"

ARROWHEAD DETAILS



SPECIFICATION REFERENCE TABLE	
MATERIALS AND TESTS DIVISION SPECIFICATIONS	
ALUMINUM SIGN BLANKS	D-9-7110 △
REFLECTIVE SHEETING, TYPE C (HIGH SPECIFIC INTENSITY)	D-9-8300
VINYL NON-REFLECTIVE DECAL SHEETING	D-9-8320

GENERAL NOTES:

The alphabets and lateral spacing between letters and numerals shall conform with the Texas 'Manual on Uniform Traffic Control Devices for Streets and Highways', latest edition, and any approved changes thereto. Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.

Legend (except where noted), shall be applied by screening process of black and/or transparent colored ink, cut-out black vinyl non-reflective decal sheeting and/or reflective sheeting or combination thereof. Background shall be yellow reflective sheeting (Type C).

Sign blanks shall be one piece 0.080 inch thick sheet aluminum alloy (Type A), unless △ otherwise noted elsewhere in the plans.

FINAL RECORD DRAWING
Date: 12/25/99

ISSUE DATE: 11-26-96

STATE OF TEXAS
GLENN D. HOUSER
24236
REGISTERED PROFESSIONAL ENGINEER
Glenn D. Houser
4-14-97

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

WARNING SIGNS

W(1)-95 (MOD.)

ORG DRAW DATE: JAN. 1981	DN: LR	CK:	DW: DN	CK:	NEG NO.:

REVISIONS	STATE DISTRICT	FEDERAL ROUTE	FEDERAL AID PROJECT	SHEET
I-85 7-90 8-95 11-96△		6		41
	COUNTY	CONTROL	SECTION	JOB	HIGHWAY

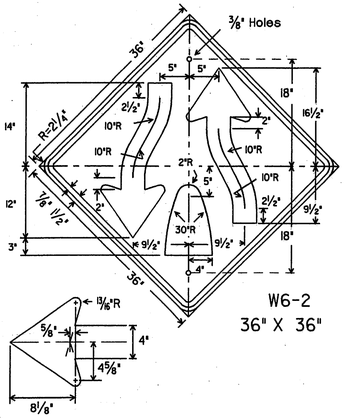
9A

DN:LR
CK:CW
DW:DN
CK:MT

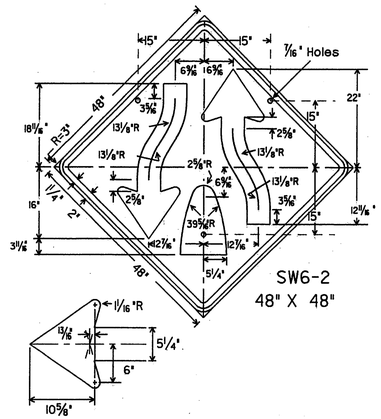
DATE:
ACC: d58npic/usr/d5800504
FILE:

LEVELS DISPLAYED

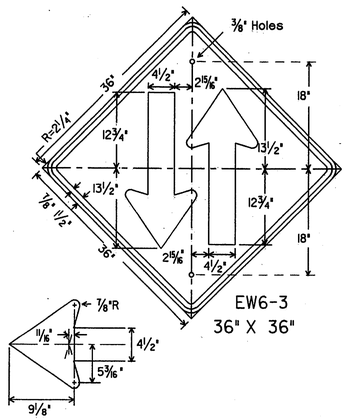
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	



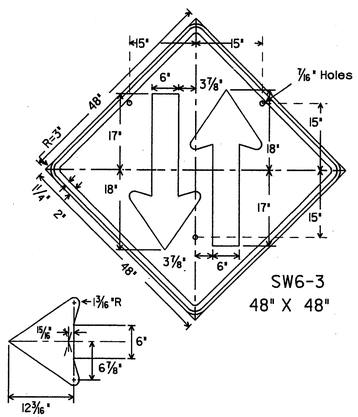
W6-2
36" X 36"



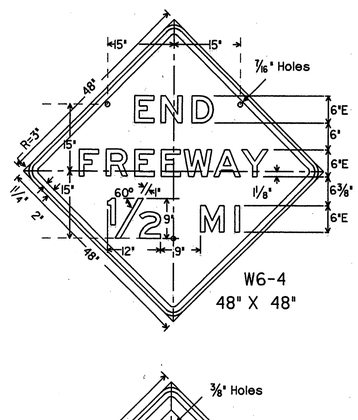
SW6-2
48" X 48"



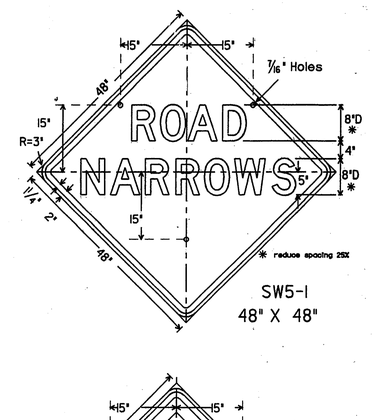
EW6-3
36" X 36"



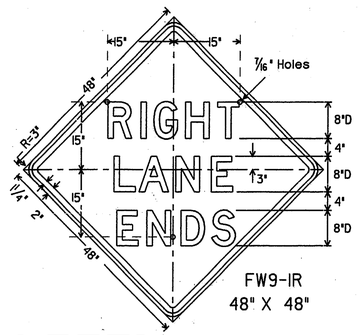
SW6-3
48" X 48"



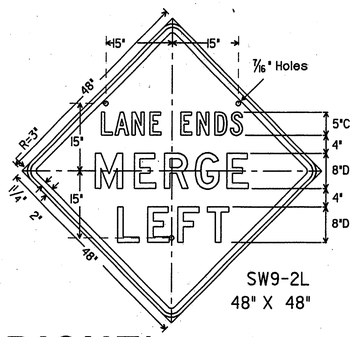
W6-4
48" X 48"



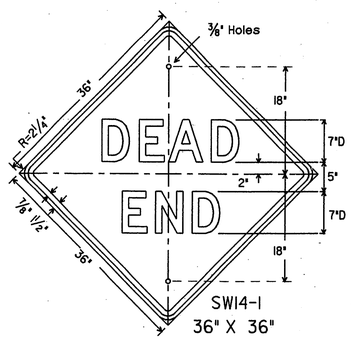
SW5-1
48" X 48"



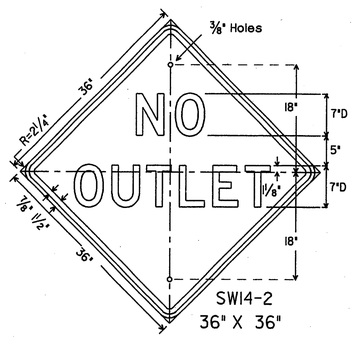
FW9-1R
48" X 48"



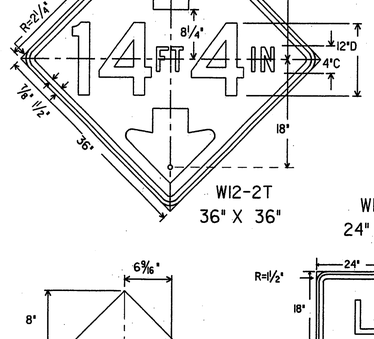
SW9-2L
48" X 48"



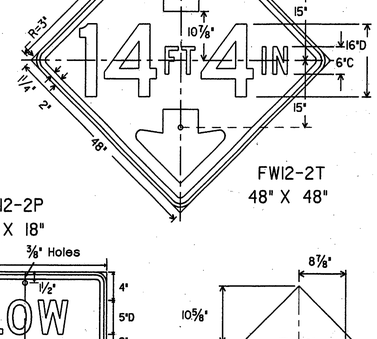
SW14-1
36" X 36"



SW14-2
36" X 36"

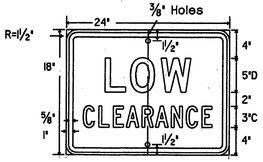


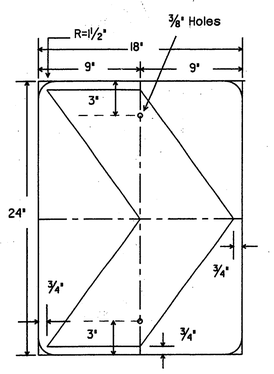
W12-2T
36" X 36"



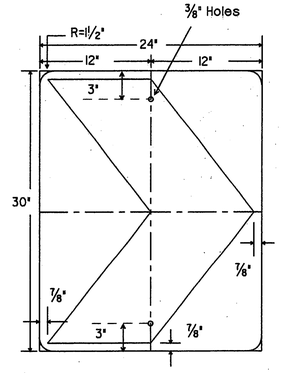
FW12-2T
48" X 48"

W12-2P
24" X 18"

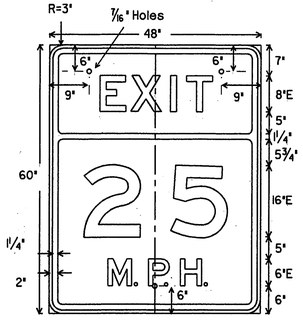




WI-8
18" X 24"



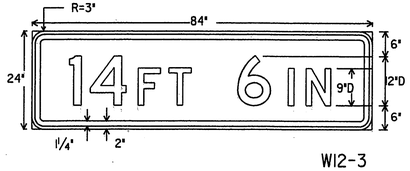
EWI-8
30" X 36"



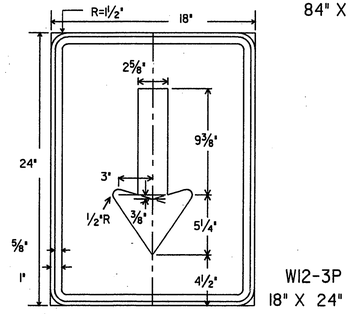
WI3-2
48" X 60"

RAMP 8"E

WI3-3
48" X 60"
(Same as WI3-2 except "EXIT replaced with "RAMP")



WI2-3
84" X 24"



WI2-3P
18" X 24"

SPECIFICATION REFERENCE TABLE	
MATERIALS AND TESTS DIVISION SPECIFICATIONS	
ALUMINUM SIGN BLANKS	D-9-7110 △
REFLECTIVE SHEETING, TYPE C (HIGH SPECIFIC INTENSITY)	D-9-8300
VINYL NON-REFLECTIVE DECAL SHEETING	D-9-8320

GENERAL NOTES:

The alphabets and lateral spacing between letters and numerals shall conform with the Texas 'Manual on Uniform Traffic Control Devices for Streets and Highways', latest edition, and any approved changes thereto. Lateral spacing of text shall provide a balanced appearance. All materials shall conform to Department Specifications.

Legend (except where noted), shall be black and applied by screening process, cut-out vinyl non-reflective decal sheeting or combination thereof. Background shall be yellow reflective sheeting (Type C).

Sign blanks shall be one piece 0.080 inch thick sheet aluminum alloy (Type A), unless otherwise noted elsewhere in the plans. △

FINAL RECORD DRAWING
Date: 12/25/99

ISSUE DATE: 11-26-96

STATE OF TEXAS
GLENN D. HOUSER
24236
REGISTERED PROFESSIONAL ENGINEER
5-5-97

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

WARNING SIGNS

W(2)-95 (MOD.)

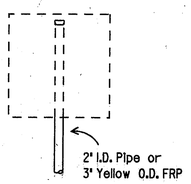
ORIG DRAN DATE: JAN. 1981	DN: LR	CK:	DW: DN	CK:	NEG NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
1-82 11-96△		6			42
1-85	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
7-90						
8-95						

9B

UNIT:	CK: CW
	DW: DN
	CK: MT

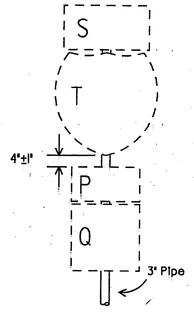
DATE:
FILE: d58hplg/usr/d5805041

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	ACC:
33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	FILE:
49	50	51	52	53	54	55	56	57	58	59	60	61	62	63		



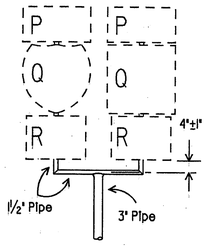
Type A

THIS TYPE PIPE MOUNT OR YELLOW FIBERGLASS REINFORCED PLASTIC (FRP) SUPPORT MAY BE USED FOR ANY SIGN OR COMBINATION OF SIGNS WITH THE SIGN AREAS INDICATED BELOW, EXCEPT FR6-1 AND W1-6 SIGNS (SEE TYPE D-1):
MAX. OF 10 SQ. FT. FOR 2" PIPE MOUNT
MAX. OF 16 SQ. FT. FOR 3" FRP MOUNT
THE AREA OF THE REGULATORY OR WARNING SIGN SUPPLEMENTARY PLAQUES SHALL NOT BE USED IN DETERMINING THE ABOVE SIGN AREA.



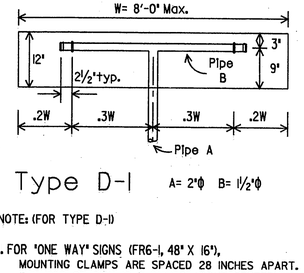
Type A-1

THIS TYPE PIPE MOUNT TO BE USED FOR A 36" OR 45" INTERSTATE ROUTE MARKER WITH A 24" OR 30" ROUTE MARKER ON MAIN LANES OR AS A SPECIFIED OPTIONAL SUBSTITUTE FOR TYPE B.



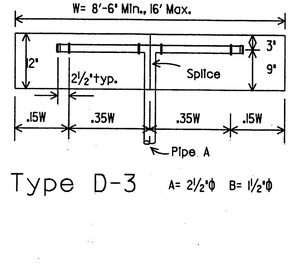
Type B

THIS TYPE PIPE MOUNT TO BE USED WITH 2 ROUTE MARKER ASSEMBLIES.



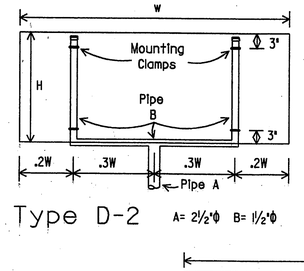
Type D-1

A= 2"ϕ B= 1½"ϕ



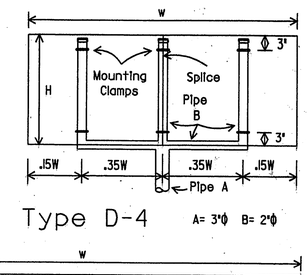
Type D-3

A= 2½"ϕ B= 1½"ϕ



Type D-2

A= 2½"ϕ B= 1½"ϕ



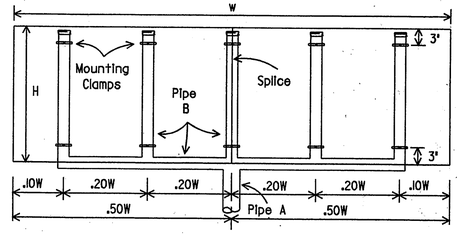
Type D-4

A= 3"ϕ B= 2"ϕ

NOTE: (FOR TYPE D-1)

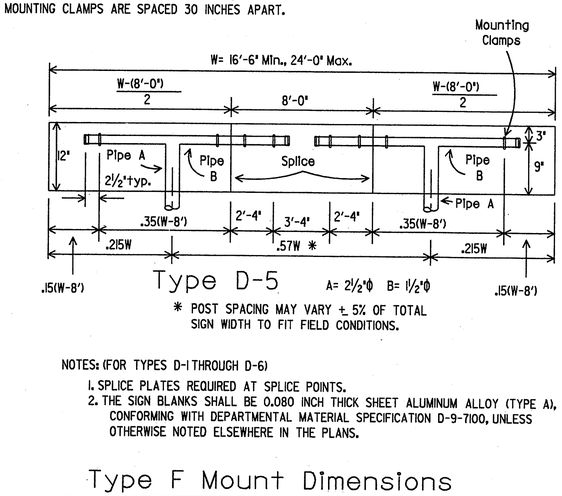
1. FOR "ONE WAY" SIGNS (FR6-1, 48" X 16"), MOUNTING CLAMPS ARE SPACED 28 INCHES APART. THE TOP OF SIGN IS 8 INCHES ABOVE CENTERLINE OF PIPE B.
2. FOR "LARGE ARROW" SIGN (W1-6 , 48" X 24"), MOUNTING CLAMPS ARE SPACED 30 INCHES APART.

MOUNT TYPE	H	W Min	W Max
D-2	24"	n/a	8'
	30"	n/a	6'6"
	36"	n/a	5'6"
D-4	24"	8'6"	12'6"
	30"	8'0"	10'6"
	36"	6'0"	8'0"
D-6	24"	13'0"	13'6"
	30"	10'0"	11'0"
	36"	8'6"	9'0"



Type D-6

A= 3"ϕ B= 2"ϕ



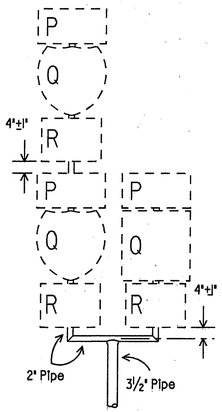
Type D-5

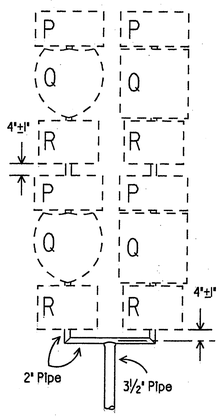
A= 2½"ϕ B= 1½"ϕ

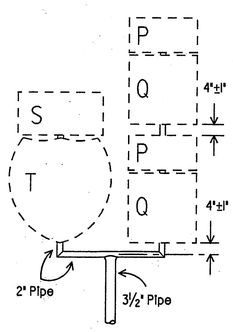
* POST SPACING MAY VARY ± 5% OF TOTAL SIGN WIDTH TO FIT FIELD CONDITIONS.

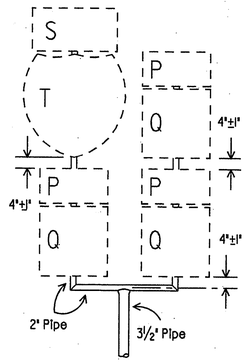
NOTES: (FOR TYPES D-1 THROUGH D-6)

1. SPLICE PLATES REQUIRED AT SPLICE POINTS.
2. THE SIGN BLANKS SHALL BE 0.080 INCH THICK SHEET ALUMINUM ALLOY (TYPE A), CONFORMING WITH DEPARTMENTAL MATERIAL SPECIFICATION D-9-7100, UNLESS OTHERWISE NOTED ELSEWHERE IN THE PLANS. △





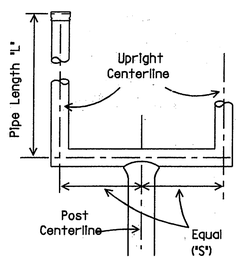




Type C

THIS TYPE PIPE MOUNT TO BE USED:

1. WHEN 3 OR 4 ROUTE MARKERS ARE REQUIRED; OR
2. FOR A 36 INCH OR 45 INCH INTERSTATE ROUTE MARKER WITH 2 OR 3 24 INCH AND/OR 30 INCH ROUTE MARKERS.



See table at right for values of "L"

P = 24"x12" Cardinal Direction Marker
Q_1 = 24"x24" Interstate, US or State Route Marker
Q_2 = 30"x24" Interstate or US Route Marker
R = 21"x15" Direction Arrow
S = 30"x15" Cardinal Direction Marker
T_1 = 36"x36" (2) digit Interstate Route Marker
T_2 = 45"x36" (3) digit Interstate Route Marker

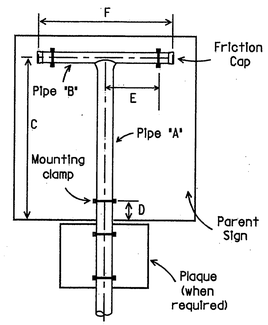
Marker Combinations	"L"
2P+2Q+2R+7"	9'-1"
P+2Q+2R+7"	8'-1"
2Q+2P+7"	6'-7"
Q+R+3"	3'-6"
S+T+3"	4'-6"
P+Q+R+3"	4'-6"
P+Q+S+T+7"	7'-10"

DIMENSION "S"

DIMENSION "S" EQUALS THE DISTANCE FROM THE CENTERLINE OF UPRIGHT TO THE CENTERLINE OF CLEARANCE BETWEEN SIGN GROUP.

"S" = 1'-4 1/2 " for Q_1
"S" = 1'-7 1/2 " for Q_2

"S" = 1'-10 1/2 " for T_1
"S" = 2'-3" for T_2



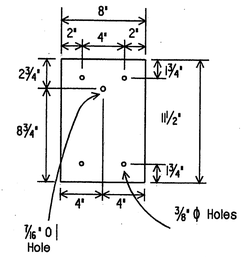
Type F Mount

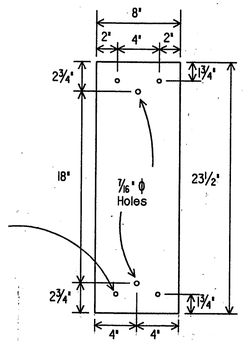
GENERAL NOTES FOR SIGN SUPPORT TYPES A, B, C, D AND F

1. TYPE A SUPPORT SHALL BE PIPE OR YELLOW FRP. FRP MOUNTS SHALL MEET DEPARTMENT SPECIFICATION D-9-4410.
2. PIPE COLLAR COUPLING SHALL BE USED FOR ALL SIGNS SUPPORTED ON 2" AND 2 1/2" PIPE POSTS.
3. TRIANGULAR SLIP BASE SHALL BE USED FOR SIGNS SUPPORTED ON 3" AND 3 1/2" PIPE POSTS.
4. MOUNTING CLAMP, VERTICAL CLEARANCE AND LATERAL CLEARANCE DETAILS ARE SHOWN ON STANDARD SMD(I-2) (MOD.). △
5. WELDED PIPE MOUNT, FRICTION CAP, PIPE COLLAR COUPLING, TRIANGULAR SLIP BASE AND FOUNDATION DETAILS ARE SHOWN ON STANDARD SMD(I-3) AND SMD(I-4) (MOD.). △

Type F Mount Dimensions

Type of Sign		Pipe "A"	Pipe "B"	C	D	E	F	
Regulatory Signs	SRI-1	3"ϕ	2"ϕ	39"	9"	15"	35"	
	FRI-2	3"ϕ	2"ϕ	43"	21"	1 1"	27"	
	36"X48"	3"ϕ	2"ϕ	42"	6"	12"	29"	
	48"X36"	3"ϕ	2"ϕ	30"	6"	15"	35"	
	48"X48"	3"ϕ	2"ϕ	42"	6"	15"	35"	1 2
	48"X60"	3"ϕ	2"ϕ	54"	6"	15"	35"	2
Warning Signs	48"X48"	3"ϕ	2"ϕ	47¾"	17¾"	15"	35"	1
	48"X60"	3"ϕ	2"ϕ	54"	6"	15"	35"	
School Signs	SSI-1	3"ϕ	2"ϕ	30"	6"	12"	30"	3
	SS2-1	3"ϕ	2"ϕ	30"	6"	12"	30"	3





Splice Plates

SPLICE PLATES SHALL BE 1/8" STEEL PLATE (ASTM A36) OR 1/8" ALUMINUM PLATE (ASTM B209 ALLOY 6061-T6 OR 5052-H38). STEEL SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A123.

△1 INCLUDES PARENT SIGNS OF THIS SIZE WHICH HAVE SUPPLEMENTARY PLAQUE. EXAMPLE: WHEN "DO NOT ENTER" SIGN (SR5-1, 48" X 48") IS MOUNTED IN COMBINATION WITH THE "RAMP" PLAQUE (R5-1T, 48" X 18"), THE "DO NOT ENTER" IS MOUNTED AS A 48" X 48" REGULATORY SIGN AND THE "RAMP" IS MOUNTED AS A PLAQUE.

△2 SPEED LIMIT SIGNS FR2-2, FR2-3 AND FR2-4 ARE MOUNTED ONLY IN COMBINATION WITH "SPEED LIMIT" FR2-1ON TYPE G MOUNT. "TRUCK SPEED LIMIT" SIGN (FR2-2A, 48" X 72") IS TO BE MOUNTED INDEPENDENTLY ON TYPE G MOUNT, SEE STANDARD SMD (TY G) FOR DETAILS. WHEN "WRONG WAY" SIGN (SR5-1A, 48" X 36") IS MOUNTED IN COMBINATION WITH "DO NOT ENTER" SIGN (SR5-1, 48" X 48"), TYPE G MOUNT IS USED.

△3 SCHOOL ADVANCE (SSI-1, 48" X 48") AND SCHOOL CROSSING (SS2-1, 48" X 48") SYMBOL SIGNS SHALL BE MOUNTED ON A TYPE F MOUNT.

FINAL RECORD DRAWING
Date: 12/25/99

ISSUE DATE: 12-13-96

STATE OF TEXAS
GLENN D. HOUSER
24236
REGISTERED PROFESSIONAL ENGINEER
6-5-97

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

SIGN MOUNTING DETAILS-SMALL ROADSIDE SIGNS

SMD(I-1)-95 (MOD.)

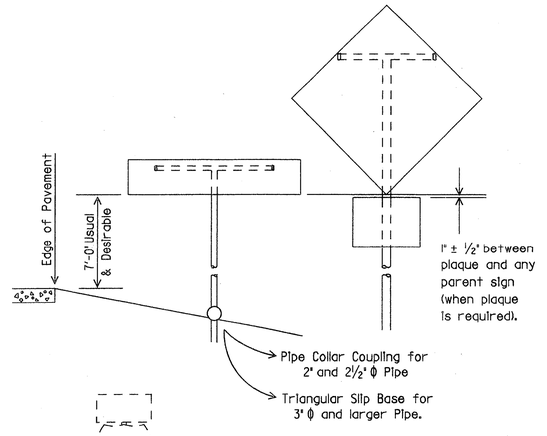
ORIG DRAW DATE: August 1995	DN: LR	CK:	DW: DN	CK:	REG NO.:	
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT			SHEET
II-96 △		6				43
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY

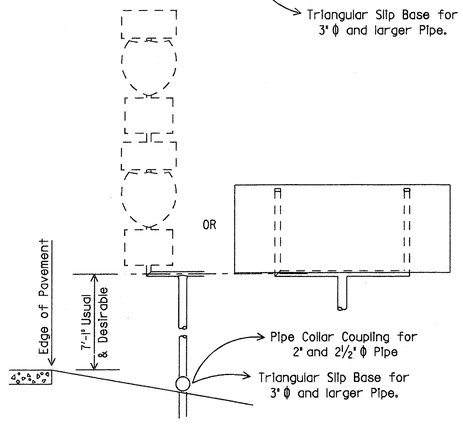
26A

UNLK
CK:CW
DW:DN
CK:MT

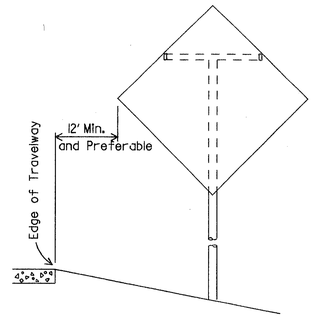
DATE:
FILE: d588pnlc/usr/d580504
ACC:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

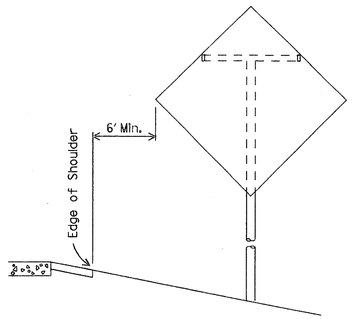




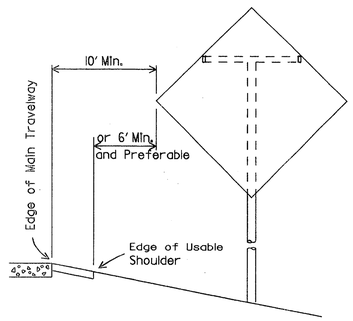
VERTICAL CLEARANCE OF SMALL SIGNS ALL TYPES OF ROADWAYS



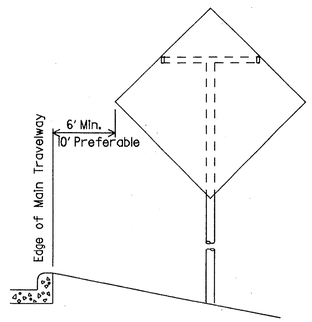
Rural Conventional Highway without shoulder.



Rural Conventional Highway with shoulder.

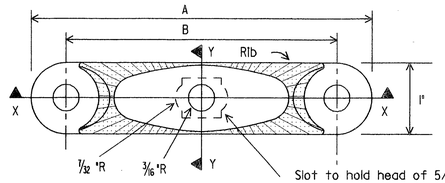


Expressways or Freeways without curb or with mountable curb.

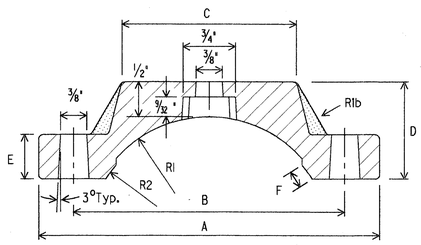


Expressways or Freeways with unmountable curb.

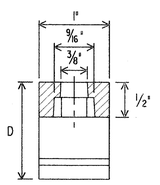
LATERAL CLEARANCE OF SMALL SIGNS TO THE RIGHT OR LEFT SIDE OF ROADWAY



Slot to hold head of 5/16" sq. head bolt. The bolt shall be 1" long for metal signs and 13/4" long for plywood signs, with full threads, a medium washer, and galv. steel or aluminum self-locking hex head nut. The bolt head must not turn in slot.



Section X-X



Section Y-Y

Pipe Clamp Casting

Pipe clamp casting shall be ASTM B26 or B108 aluminum alloy A444.0-T4 or 356.0-F.

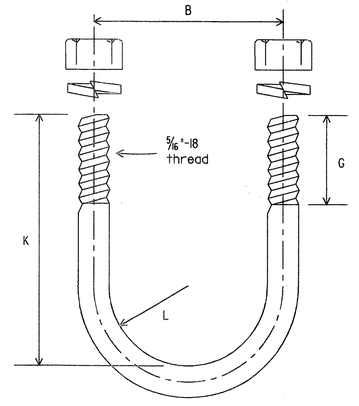
All sign mounting clamp parts not made from aluminum shall be galvanized steel in conformance with ASTM A153 Class A or stainless steel.

Dimensions for Mounting Clamp

Standard Pipe Size	A	B	C	D	E	F	G	K	L	R1	R2
1 1/4	3 5/64	2 5/64	3/4	1 5/16	7/16	3/16	5/8	2 9/64	2 7/32	5 7/64	5 3/64
1 1/2	3 9/32	2 9/32	1	1 1/16	7/16	3/16	5/8	2 1/16	6 3/64	3 1/32	1 5/16
2	3 3/4	2 3/4	1 1/2	1 1/8	1/2	3/16	1	2 11/16	1 7/32	1 1/4	1 3/16
2 1/2	4 1/4	3 1/4	2	1 1/4	1/2	1/4	1	3 3/16	1 15/32	1 1/2	1 7/16
3	4 7/8	3 7/8	2 1/2	1 3/8	5/8	1/4	1	3 13/16	1 25/32	1 13/16	1 3/4

All dimensions shown are in inches.

MOUNTING CLAMP DETAILS

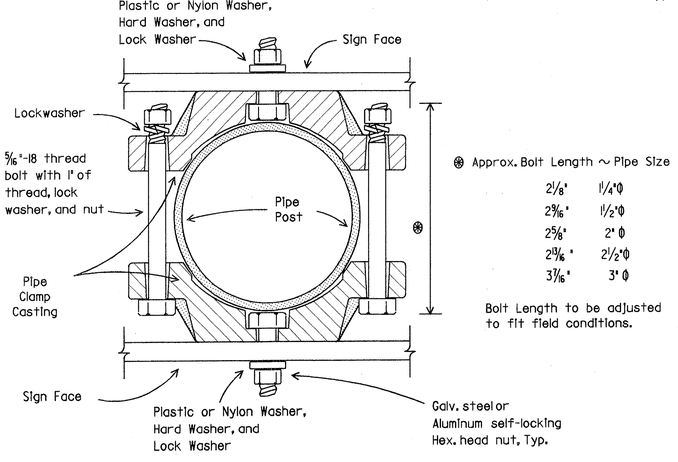


U-Bolt

U-Bolt to be made in accordance with standard manufacturing procedure. 9/32" dia. stock is permissible. American standard regular semi-finished hex. nuts and spring lockwashers.

GENERAL NOTES:

1. All clearances apply to both rural and urban locations, except as noted.
2. Where physical features of the roadway will permit, maximum lateral clearances are desirable. For frontage roads, ramps and other connecting roadways, lesser clearances may be used, but generally no less than six feet is recommended between the edge of the travelway and the edge of the sign. At intersections, signs should be positioned in the optimum location for viewing by traffic.
3. Where necessary, the minimum allowable clearance of two feet may be used in urban locations on conventional highways.
4. Where a sign is to be located behind guardrail, the allowable minimum clearance may be used, measured from the face of the guardrail to the near edge of the sign.
5. Lateral clearances of signs mounted on left side of roadway are the same as shown above where space will permit.



⊛ Approx. Bolt Length ~ Pipe Size

2 1/8"	1 1/4" ϕ
2 3/16"	1 1/2" ϕ
2 5/8"	2" ϕ
2 13/16"	2 1/2" ϕ
3 1/16"	3" ϕ

Bolt Length to be adjusted to fit field conditions.

△ Typical Detail

Back to Back Mounting of Signs

△

FINAL RECORD DRAWING
Date: 12/25/99

ISSUE DATE: 12-02-96

STATE OF TEXAS
GLENN D. HOUSER
24236
REGISTERED PROFESSIONAL ENGINEER
5-5-97

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

SIGN MOUNTING DETAILS-SMALL ROADSIDE SIGNS

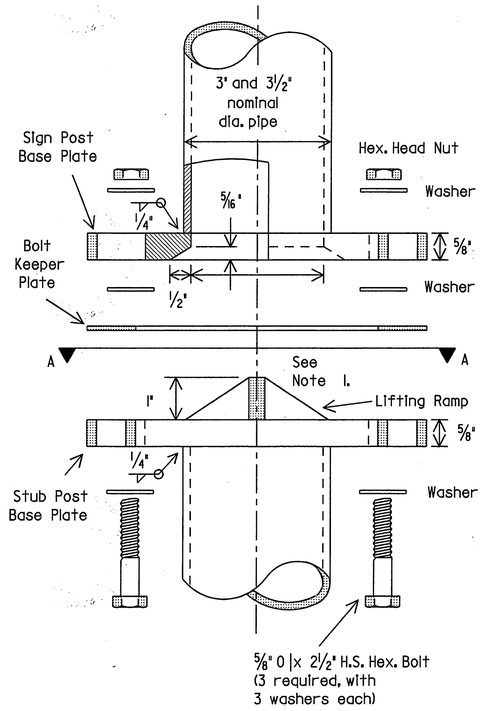
SMD(I-2)-95 (MOD.)

ORIG DRAN DATE: August 1995	DN: LR	CK:	DW: DN	CK:	NEG NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
11-96△		6			
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY

26B

UN:LH CK:CW DW:DN CK:MT
DATE:
ACC: d58hpla/usr/d580504
FILE:

TRIANGULAR SLIP BASE DETAILS



SIGN POST & STUB POST ELEVATION

TRIANGULAR SLIP BASE NOTES:

1. The lifting device may consist of welded ramps or a conical shape formed into the center of the Stub Post Base Plate.
2. The Sign Post Base Plate of the Triangular Slip Base shall have the same exterior dimensions as the bottom plate. The lifting device shall be a part of the Stub Post Base Plate only. A hole equal to the inside diameter of the Sign Post shall be cut through the center of the Sign Post Base Plate with the hole edge beveled as detailed.
3. The Base Plates and lifting device shall conform with the requirements of ASTM A36 or A572 Grade 50.
4. All structural steel shall be galvanized in accordance with ASTM A123. The entire support shall be galvanized from the top down to a minimum depth of 6 inches into the foundation. All nuts, bolts and washers shall be galvanized in accordance with ASTM Designation: B695 Class 50 or A153 Class C or D.
5. All high strength bolts shall conform to ASTM A325 (ASTM A449 may be substituted for ASTM A325 provided proper bolt head, nut and/or washer clearances are maintained). All high strength nuts shall be of such capacity as to develop the bolt strength.

BOLTING PROCEDURE FOR ASSEMBLY OF BASE CONNECTION:

(1) Assemble Sign Post, Bolt Keeper Plate and Stub Post with bolts and three flat washers per bolt as shown.

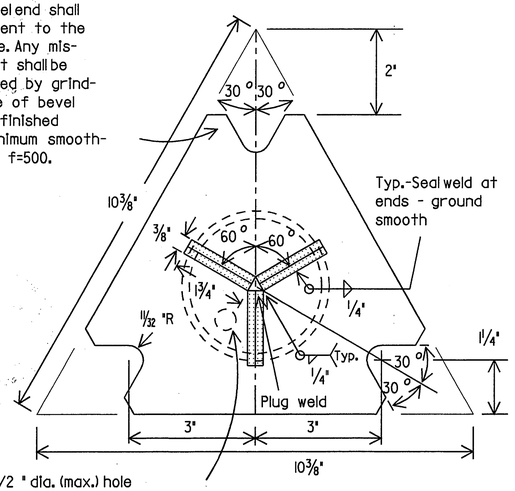
(2) Shim as required to plumb post.

(3) Tighten all bolts the maximum possible with a 12 to 15 inch wrench to clean bolt threads and to bed washers and shims.

(4) Loosen each bolt in sequence and retighten bolts in a systematic order to the prescribed torque of 440 to 450 inch pounds or 36 to 38 foot pounds. DO NOT OVERTIGHTEN.

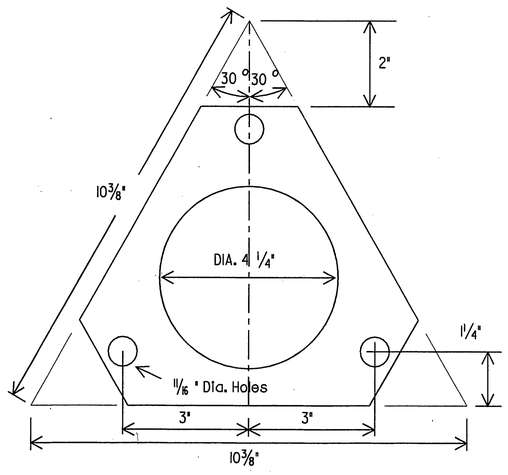
(5) To prevent nut loosening, burr threads of bolt at junction with nut using a center punch.

The bevel end shall be tangent to the bolt hole. Any misalignment shall be corrected by grinding. Face of bevel shall be finished to a minimum smoothness of f=500.



Provide 1/2" dia. (max.) hole in the Stub Post Base Plate within the inside radius of the stub post for galvanized drainage.

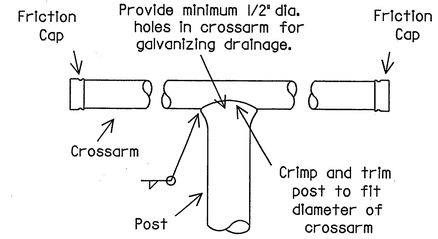
VIEW A-A



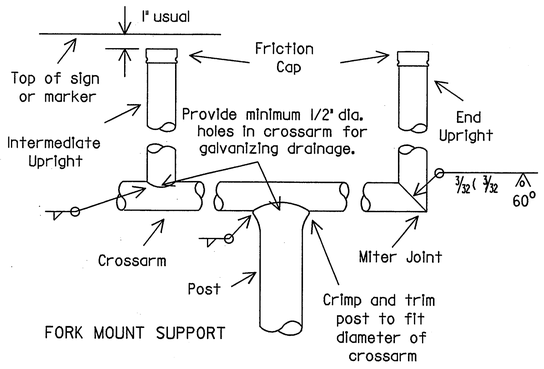
BOLT KEEPER PLATE

Bolt Keeper Plate shall be 30 gauge galvanized steel.

WELDED PIPE MOUNT DETAILS



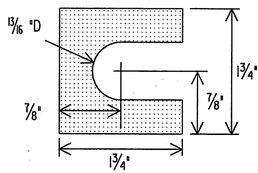
TEE MOUNT SUPPORT



FORK MOUNT SUPPORT

The contractor at his option may furnish standard weight pipe conforming to ASTM Specification A53 Grade B, A501 or any other standard weight steel pipe. Pipe may be of either electric resistance welded or seamless type, with a minimum yield strength of 35,000 PSI and a minimum elongation of 15 percent in 2 inches. Pipe shall have outside diameters and wall thicknesses which are equivalent to or better than those specified hereon.

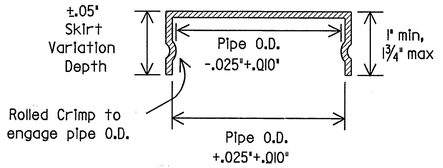
All pipes to be welded shall be of weldable quality.



SHIM

Furnish two .012"+ thick and two .032"+ thick shims per post. Shims shall be fabricated from brass shim stock or strip conforming to ASTM B36.

FRICTION CAP DETAIL



Friction caps may be manufactured from hot rolled or cold rolled steel sheets. The minimum sheet metal thickness shall be 24 guage for all cap sizes.

The rim edges shall be reasonably straight and smooth. Caps shall be sized and formed in such a manner as to produce a drive-on friction fit and have no tendency to rock when seated on the pipe. The depth shall be sufficient to give positive protection against entrance of rainwater. They shall be free of sharp creases or indentations and show no evidence of metal fracture.

Caps shall have an electrodeposited coating of zinc in accordance with the requirements of ASTM B633 Class FE/ZN 8.

GENERAL NOTES:

Support and design shall conform with AASHTO Standard Specifications for structural supports of Highway signs, luminaires and traffic signals with a design wind speed of 60 mph.

Steel pipe shall be galvanized in accordance to ASTM Designation A123.

FINAL RECORD DRAWING
Date: 12/25/99

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

SIGN MOUNTING DETAILS- SMALL ROADSIDE SIGNS

SMD(1-3)-95

ORIG DRAW DATE: August 1995	DN: LR	CK:	DW: DN	CK:	REC NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
		6			45
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY

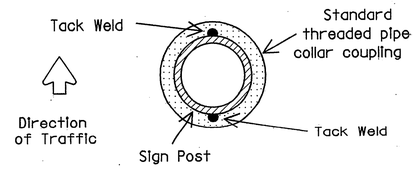
26C

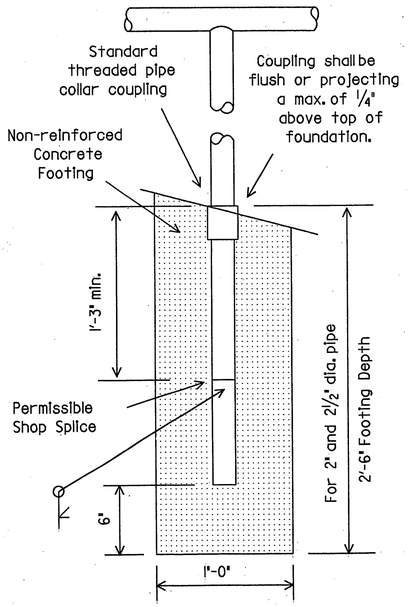
DN:LR CK:CW DW:DN CK:MT

DATE:
ACC: d58npig/usr/d580504
FILE:

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

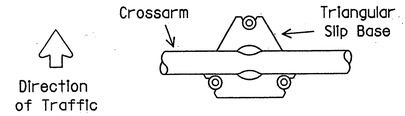
BREAKAWAY PIPE COLLAR COUPLING



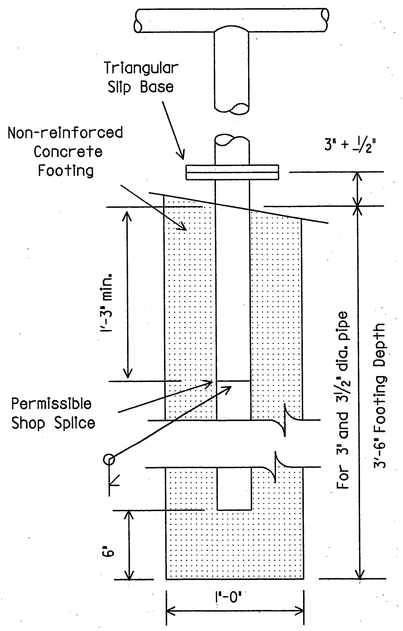


Pipe collar coupling shall be used for all signs supported on 2" and 2 1/2 " diameter pipe post.

TRIANGULAR SLIP BASE



Triangular slip base shall be used for 3" and larger pipe posts. The crossarm should be parallel to one side of the triangular slip base.



Triangular Slip Base shall be used for signs supported on 3" diameter and larger pipe posts.

GENERAL NOTES:

Support and design shall conform with AASHTO Standard Specifications for structural supports of highway signs, luminaires and traffic signals with a design wind speed of 60 mph.

Steel pipe shall be galvanized in accordance to ASTM Designation A123.

Where solid rock is encountered at ground level, the foundation shall be a minimum depth of 18 inches. When solid rock is encountered below ground level, the foundation shall extend into the solid rock a minimum depth of 18 inches or provide a minimum foundation depth of 30 inches. △

△

FINAL RECORD DRAWING
Date: 12/25/99

ISSUE DATE: 11-26-96

STATE OF TEXAS
GLENN D. HOUSER
24236
REGISTERED PROFESSIONAL ENGINEER
Glenn D. Houser 5-5-97

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

SMALL ROADSIDE SIGN FOUNDATION DETAILS

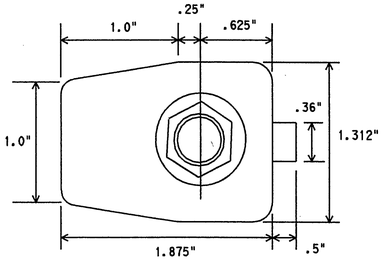
SMD(I-4)-95 (MOD.)

ORIG DRAW DATE: August 1995	DN: LR	CK:	DW: DN	CK:	NEG NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
11-96△		6			46
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY

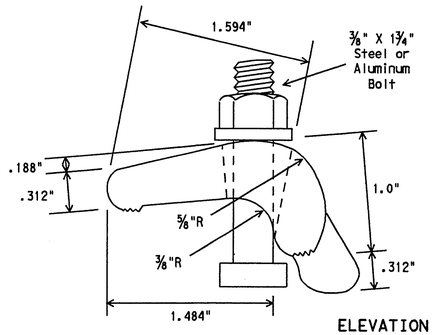
26D

DN:LR
CK:CW
DW:DN
CK:MT

DATE:
FILE: acc: d58hplc/usr/d580504



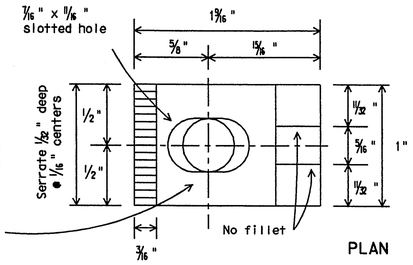
PLAN



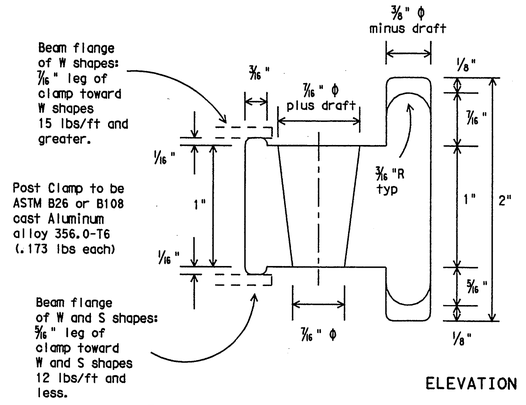
ELEVATION

ALTERNATE POST CLAMP DETAIL

NOTE: centerline of hole for 3/8" diameter squarehead bolt x 2 1/4" long with a flat washer and self-locking nut, or lock washer and hex. nut. Bolt head dimensions shall be in accordance with ANSI B 18.2.1 as referred to in the AISC Manual of steel construction. Bolt assembly shall be galvanized.

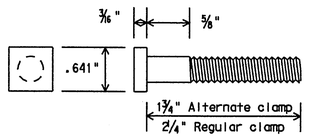


PLAN



ELEVATION

POST CLAMP DETAIL



POST CLAMP BOLT DETAIL

WIND BEAM TABLES

For sign widths not in whole foot increments, select next larger sign width from tables for maximum wind beam spacing.

Example: Sign Code = 120, Sign Width = 14'6" ⟶ select 15' Sign Width
Max. Wind Beam Spacing = 3'0"

CODE

SIGN TYPE 1 3 0
- 1 — Wind Design Zone
- 3 — Series No. (Zero Denotes Plywood) (1 Denotes Aluminmum)
- 0 — No. of Posts

ZONE 1 (Types 100)

	Two Posts (120)							Three Posts (130)									
Sign Width (W)	4' thru 12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	23'	24'	25'	26'	27'	28'
Max. Wind Beam Spacing	4'-0"	3'-8"	3'-4"	3'-0"	2'-8"	2'-4"	2'-0"	4'-0"		3'-9"	3'-6"	3'-3"	3'-0"	2'-9"	2'-6"	2'-3"	2'-0"

ZONE 2 (Types 200)

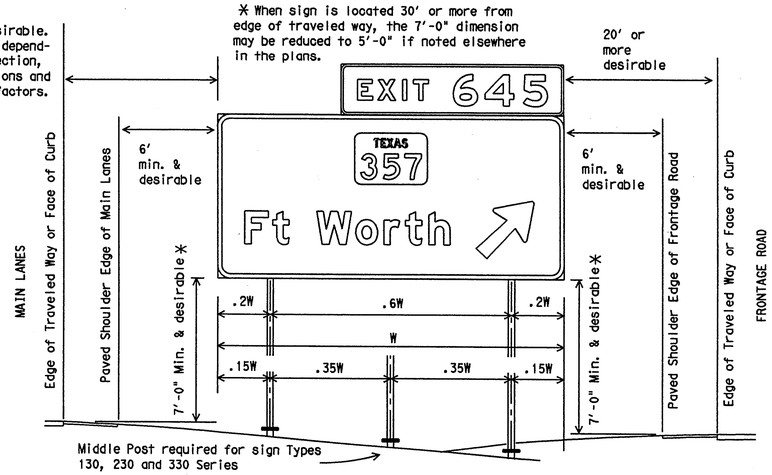
	Two Posts (220)			Three Posts (230)			
Sign Width (W)	4' thru 16'	17'	18'	19' thru 24'	25'	26'	27'	28'
Max. Wind Beam Spacing	4'-0"	3'-9"	3'-6"	4'-0"	3'-9"	3'-6"	3'-3"	3'-0"

ZONE 3 (Types 300)

	Two Posts (320)	Three Posts (330)
Sign Width (W)	4' thru 18'	19' thru 28'
Max. Wind Beam Spacing	4'-0"	4'-0"

30' or more desirable. May be reduced depending on cross section, viewing conditions and other related factors.

* When sign is located 30' or more from edge of traveled way, the 7'-0" dimension may be reduced to 5'-0" if noted elsewhere in the plans.



TYPICAL SIGN INSTALLATION AND LOCATION

LATERAL CLEARANCE NOTES:

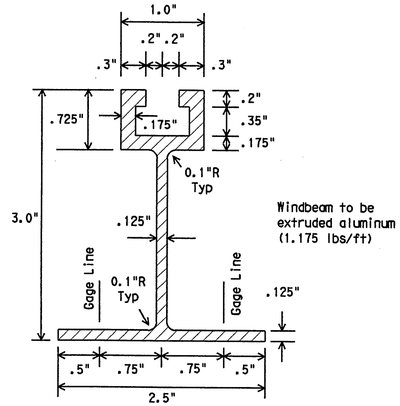
Lateral clearances of signs mounted on median side of main lanes are the same as shown above where space will permit.

Where a sign is to be located behind guardrail, an allowable minimum clearance of two feet may be used, measured from the face of the guardrail to the near edge of sign.

POST SPACING NOTES:

Post spacing on a two post sign may vary a maximum of plus or minus 10% of total sign width to fit field conditions.

Post spacing on a three post sign may vary a maximum of plus 5% of total sign width to fit field conditions.



WINDBEAM CROSS SECTION

SPECIFICATION REFERENCE TABLE
MATERIALS AND TESTS DIVISION SPECIFICATIONS
SIGN HARDWARE D-9-7120

GENERAL NOTES:

1. Design conforms with AASHTO Specifications for the design and construction of structural supports for highway signs.
2. Materials and fabrication shall conform to the requirements of the Department material specifications.
3. Structural steel shall conform to the Item, "METAL FOR STRUCTURES."
4. Parts shall be saw cut either before galvanizing and the galvanized cut cleaned of zinc build-up, or saw cut after galvanizing and the cut surface treated with zinc-based solder or zinc-rich paint in accordance with ASTM A780. (Cut surface will not be treated until plate is installed and all bolts fully tightened.)
5. Exit number panel shall be mounted to the right hand side of the parent sign for right exits and to the left for left hand exits. The number panel shall be mounted with two uprights so its right edge is even with the right edge of the parent sign or vice-versa for left hand exits.

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

SIGN MOUNTING DETAILS-LARGE ROADSIDE SIGNS STRUCTURE

SMD(2-1)-95

ORIG DRAW DATE: August 1995 | DN:- LR | CK:- | DW:- DN | CK:- | MEG NO.:
REVISIONS

STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
	6		47

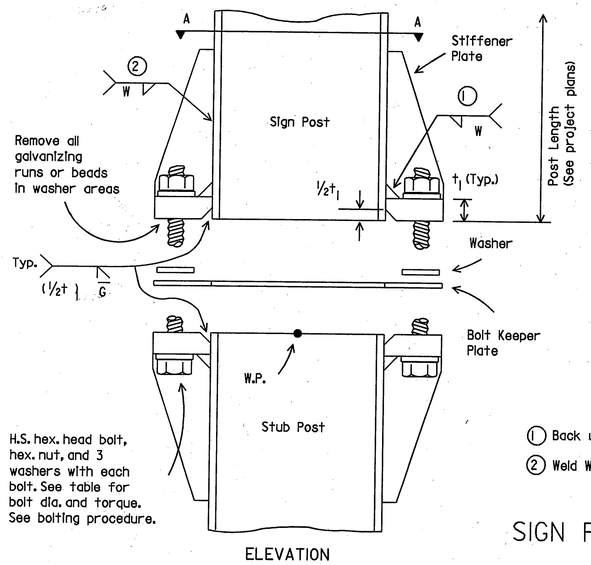
COUNTY	CONTROL	SECTION	JOB	HIGHWAY

27A

FINAL RECORD DRAWING
Date: 12/25/99

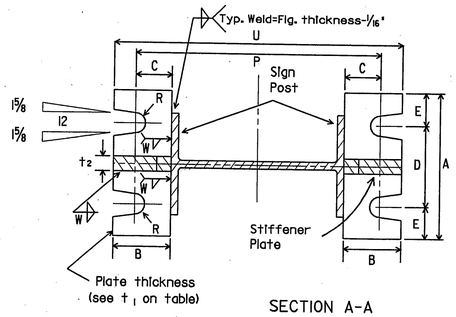
LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 55 63 73 83 93 04 14 24 34 44 54 64 74 84
49 05 15 25 35 45 55 65 75 85 96 06 16 26 36 46

DATE:
ACC: d58hplc/usr/d580504
FILE:
DN: LR CK: CW DW: DN CK: MT

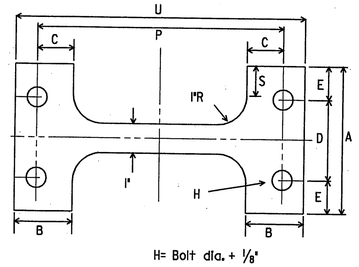


ELEVATION

H.S. hex. head bolt, hex. nut, and 3 washers with each bolt. See table for bolt dia. and torque. See bolting procedure.



SECTION A-A



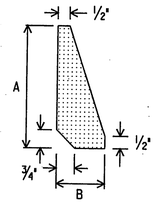
H= Bolt dia. + 1/8"

BOLT KEEPER PLATE
30 Ga galv. sheet steel

① Back up weld to be made before installing stiffener plate

② Weld W may be continued across clips to seal joint

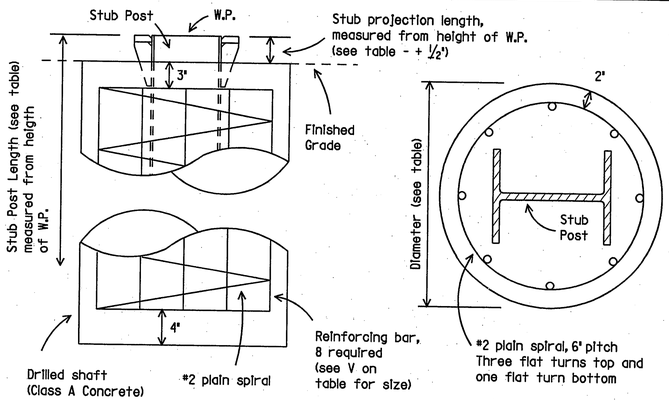
SIGN POST AND STUB POST
(For W Shapes)



STIFFENER PLATE DETAIL

Steel Plate (thickness = t 2)

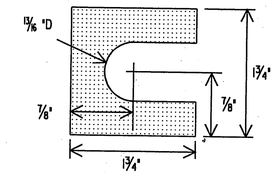
(See table for dimensions)



ELEVATION

PLAN

FOUNDATION DETAIL



SHIM DETAIL

Furnish two .012"+ thick and two .032"+ thick shims per post. Shims shall be fabricated from brass shim stock or strip conforming to ASTM B36.

BOLTING PROCEDURE FOR ASSEMBLY OF BASE CONNECTION:

1. Assemble sign post, BOLT KEEPER PLATE and stub post with bolts and three flat washers per bolt as shown.
2. Shim as required to plumb post.
3. Tighten all bolts the maximum possible with a 12 to 15 inch wrench to clean bolt threads and to bed washers and shims.
4. Loosen each bolt in sequence and retighten bolts in a systematic order to the prescribed torque. Do not overtighten.
5. To prevent nut loosening, burr threads of bolt at junction with nut using a center punch.

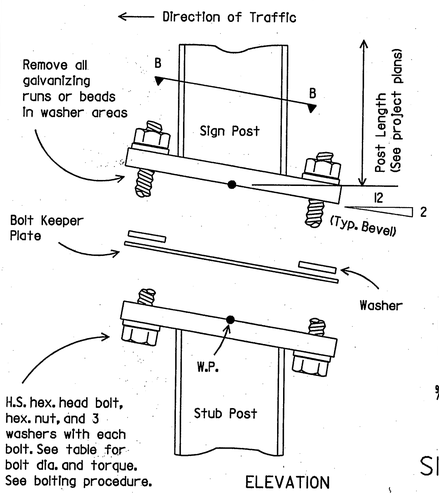
Dimensions / Post Size	Base Connection Data Table: Bolt Size & Torque	A	B	C	D	E	t_1	t_2	W	R
W6X9	5/8"Ø x 2¾"	5"	2"	1¼"	2¾"	1⅛"	¾"	½"	¼"	11/32"
W6X12	440-450 Inch pounds 36-38 foot pounds									
W6X15										
W8X18										
W8X21	¾"Ø x 3½"	6"	2¼"	1⅜"	3½"	1¼"	1"	¾"	5/16"	13/32"
W10X22	740-750 Inch pounds 62-63 foot pounds									
W10X26										
W12X26										
S3X5.7	½"Ø x 2½" 440-450 Inch pounds 36-38 foot pounds	See Detail Below								
S4X7.7										

Perforated Fuse Plate Data Table: F	G	J	K	M	d_1	d_2	t_3	Bolt Dia.	Wt. (ea.) (lbs.)	Bolt length
4¼"	2"	4"	2¼"	1"	9/16"	¾"	¼"	½"	1.01	1½"
5"	2½"	6"	3½"	1½"	11/16"	1¼"	⅜"	⅝"	2.51	2¼"
5"	2½"	5¼"	2¾"	1¼"	11/16"	1 5/16"	⅜"	⅝"	2.26	2¼"
5½"	2½"	5¼"	2¾"	1¼"	13/16"	1"	½"	¾"	3.35	2¼"
6"	3"	5¾"	2¾"	1⅜"	13/16"	1⅛"	½"	¾"	4.03	2¼"
6"	3"	6½"	3½"	1⅝"	13/16"	1 5/16"	½"	¾"	4.47	2¼"
3¾"	1½"	2⅝"	1½"	⅝"	9/16"	⅜"	¼"	½"	0.60	1½"

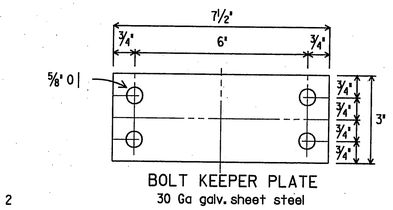
Bolt Keeper Data: P	S	U
8⅜"	1"	9⅞"
8½"		10"
8½"		10"
10⅝"		12⅛"
11"	1½"	12¾"
12⅞"		14⅝"
13⅛"		14⅞"
15"		16¾"
See Detail Below		

Foundation Data: Stub length	Stub projection	Dr. Shaft diameter	Bar V Size
2'-0"	3"	24"	#5
2'-0"	3"		#5
2'-0"	3"		#6
2'-6"	3"		#7
2'-6"	3"		#8
3'-0"	2½"		#9
3'-0"	2½"		#10
3'-0"	2½"		#11
3'-3½"	3½"	12"	Non-reinforced ③

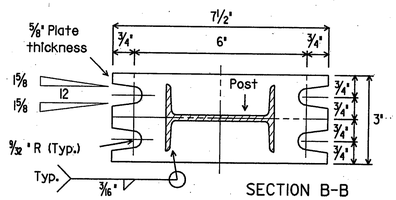
③ Foundation design shall be Type G Mount, see SMD (TY G).



ELEVATION

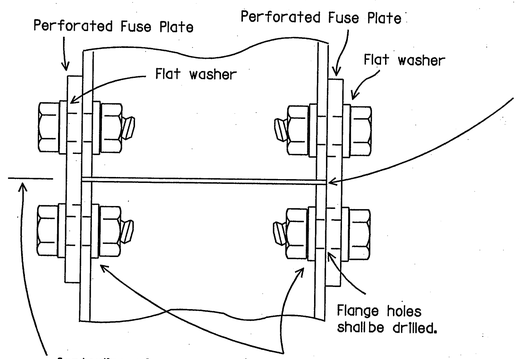


BOLT KEEPER PLATE
30 Ga galv. sheet steel



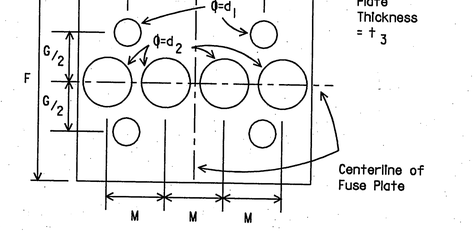
SECTION B-B

SIGN POST AND STUB POST
(For S4x7.7 and S3x5.7)



DETAIL "A"

Parts shall be saw cut either before galvanizing and the galvanized cut cleaned of zinc build-up, or saw cut after galvanizing and the cut surface treated with zinc-based solder or zinc-rich paint in accordance with ASTM A780. (Cut surface will not be treated until plate is installed and all bolts fully tightened.)



PERFORATED FUSE PLATE DETAIL

Use H.S. hex head bolts, hex head nut and bevel or flat washer (where req'd) under nut. All holes shall be drilled. All plate cuts shall preferably be saw cuts. However; flame cutting will be permitted provided all edges are ground. Metal projecting beyond the plane of the plate face will not be permitted. Steel fuse plates shall conform to the requirements of ASTM A36. ASTM A572 Grade 50 or ASTM A588 may be substituted for A36 at the option of the fabricator. Mill test reports shall be submitted for Fuse Plates. Steel used shall have an ultimate tensile strength not to exceed 80 KSI.

FINAL RECORD DRAWING
Date: 12/25/99

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

SIGN MOUNTING DETAILS- LARGE ROADSIDE SIGNS FOUNDATION & STUB

SMD(2-2)-95

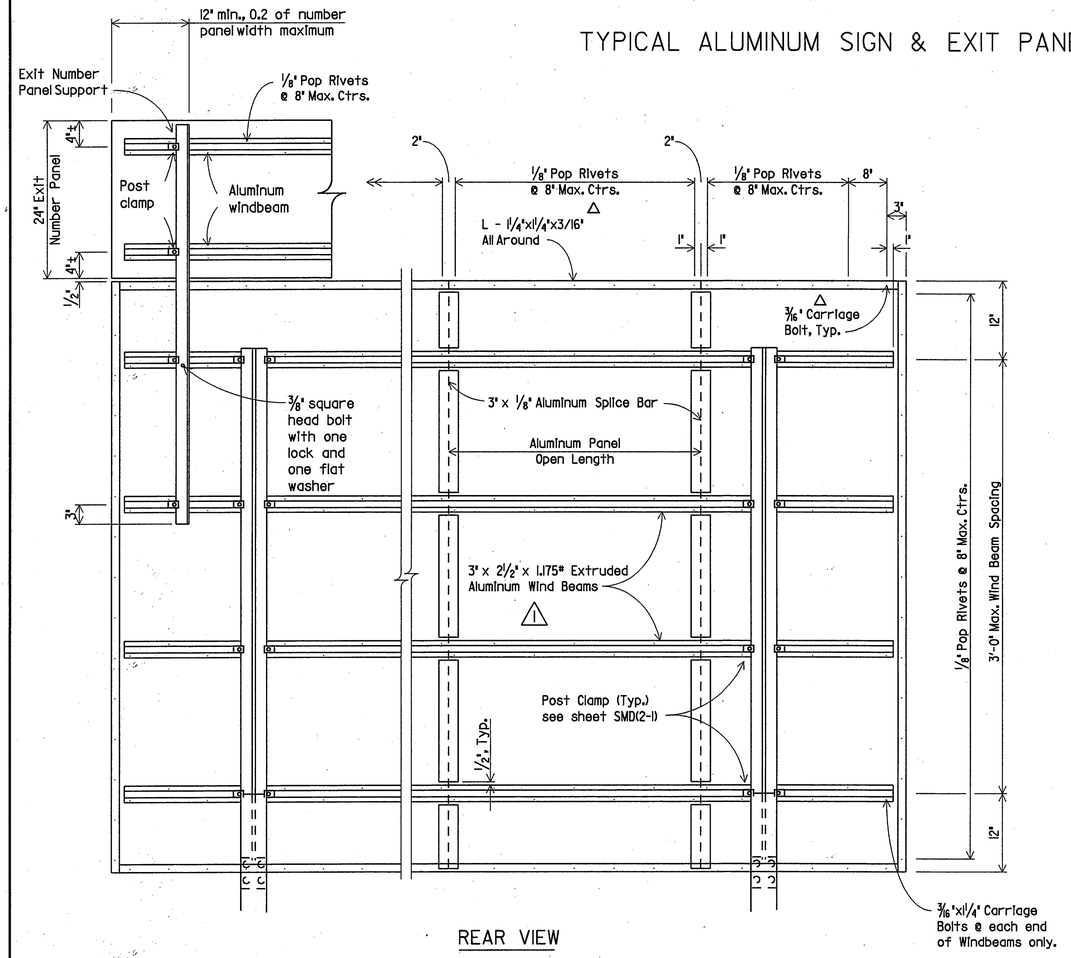
ORIG DRAW DATE: August 1995	DN: LR	CK:	DW: DN	CK:	REG NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
		6			48
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY

27B

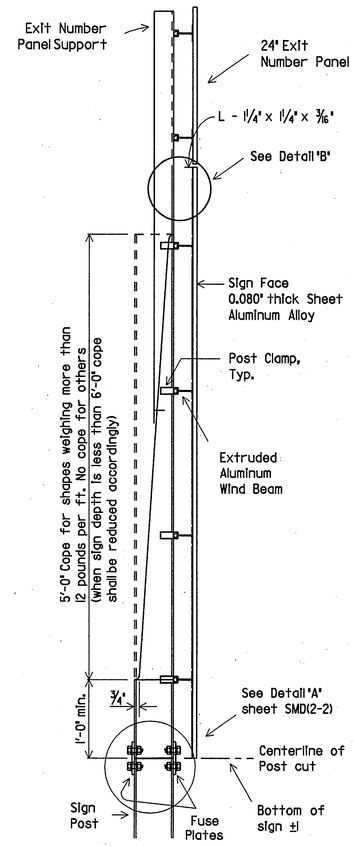
LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

DATE:
ACC: d58hplg/usr/d580504
FILE:
DN:LR
CK:CW
DW:DN
CK:MT

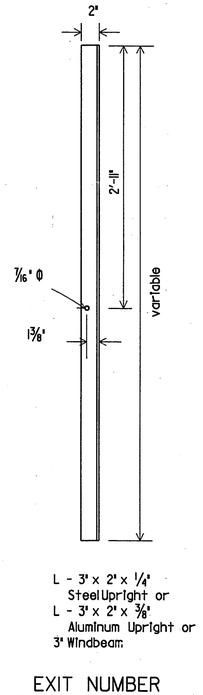
TYPICAL ALUMINUM SIGN & EXIT PANEL ASSEMBLY DETAILS



REAR VIEW

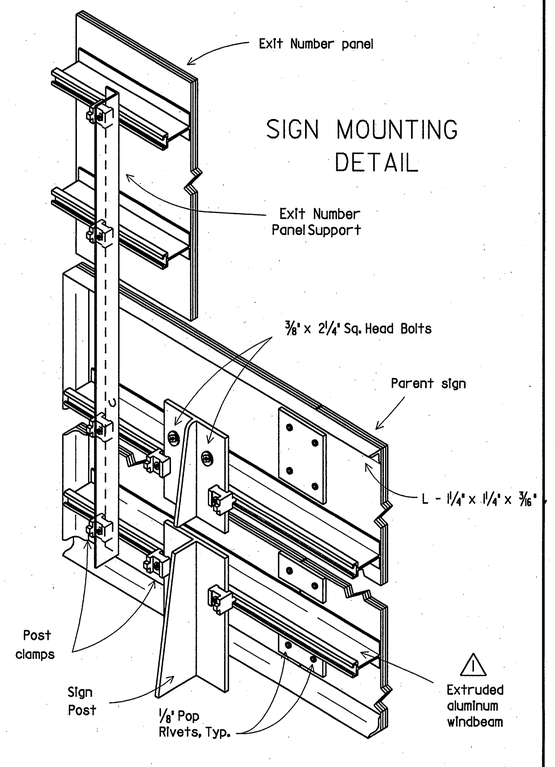


SIDE VIEW



L - 3" x 2" x 1/4" Steel Upright or
L - 3" x 2" x 3/8" Aluminum Upright or
3" Windbeam

EXIT NUMBER PANEL SUPPORT



NOTES:

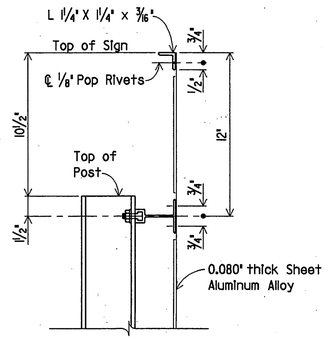
1. Exit number panel shall be mounted to the right hand side of the parent sign for right exits and to the left for left hand exits. The number panel shall be mounted with two uprights so its right edge is even with the right edge of the parent sign or vice-versa for left hand exits.
2. Exit number panel support shall be symmetrical about number panel centerline.
3. Exit number panel support shall be of ASTM A36 structural steel galvanized after fabrication, or ASTM B221 aluminum alloy 6061-T6.
4. All bolts, nuts, washers and pop rivets shall be galvanized per ASTM Designation: B695 Class 50, or A153 Class C or D.
5. When splice bars are required to fabricate the number panel, the splice bar detail as shown for the parent sign is to be used. Splice bars on number panel need not align with those on parent sign.
6. Posts, parent sign panels and exit number panels shall comply with notes on sheets SMD(2-1)(MOD.) and SMD(2-2).
7. Signs (such as exit number panels) attached above a parent sign shall be made of the same type material as the parent sign.
8. Exit number panel support and other connection hardware required to fasten exit number panel to parent sign shall be subsidiary to the sign blank.

NOTES:

1. A tolerance of plus or minus 1/4 inch will be permitted in the plan dimensions for fabrication of each single increment sign panel when necessary for squaring. A tolerance of plus or minus 1/4 inch will be permitted for each increment of a multi-increment sign panel where necessary to secure square, tight-fitting joints.

2. Splices shall be kept to a minimum. Panels 4'x8' or larger shall be used to the maximum extent possible in the fabrication of any sign. Signs or sign sections which cannot be fabricated from at least a 4'x8' panel shall be of one piece construction.

1 Extruded aluminum wind beams shall be continuous with no splices. (see sheet SMD(2-1)



DETAIL "B"

FINAL RECORD DRAWING
Date: 12/25/99

STATE OF TEXAS
GLENN D. HOUSER
24236
REGISTERED
PROFESSIONAL ENGINEER

Glenn D. Houser
7-9-97

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

SIGN MOUNTING DETAILS-LARGE ROADSIDE SIGNS

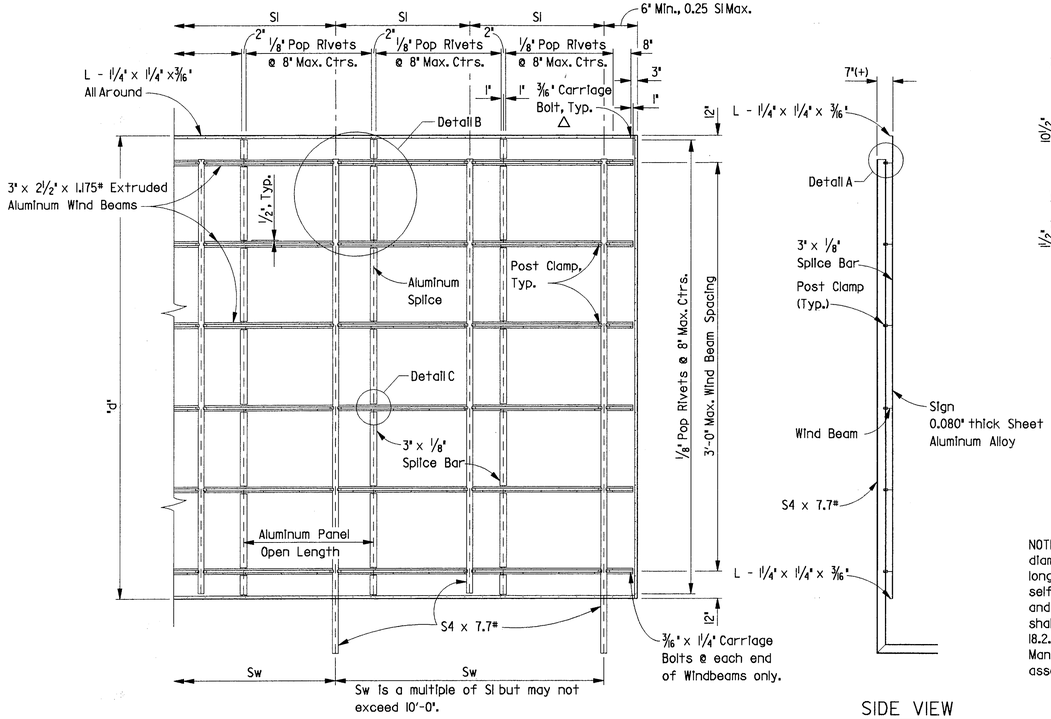
SMD(2-3)-95 (MOD.)

ORIG DRAW DATE: August 1995	DN: LR	CK:	DW: DN	CK:	MSG NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
6-97△		6			49
	COUNTY		CONTROL	SECTION	JOB	HIGHWAY

DN:LR
CK:CW
DW:DN
CK:MT

DATE:
FILE: d58pplc/usr/d580504

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
7 8 9 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

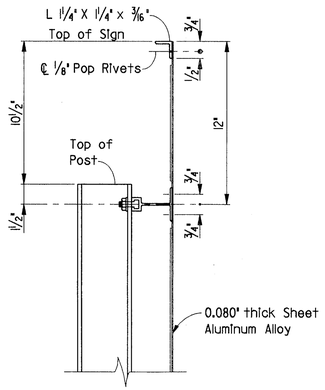


REAR VIEW

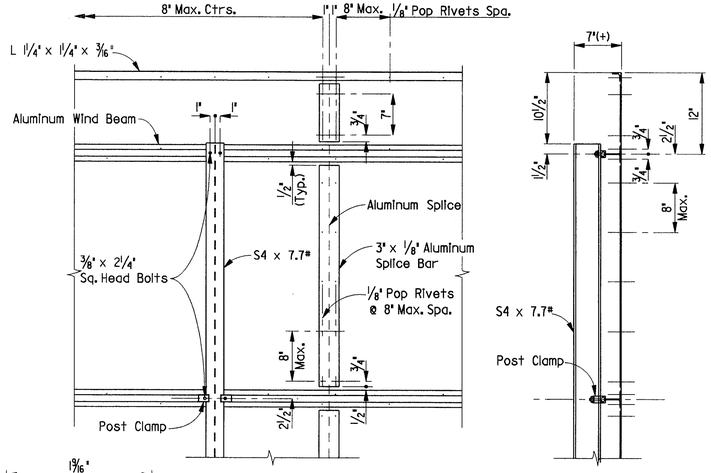
SHEET ALUMINUM SIGNS WITH WIND BEAMS

SIDE VIEW

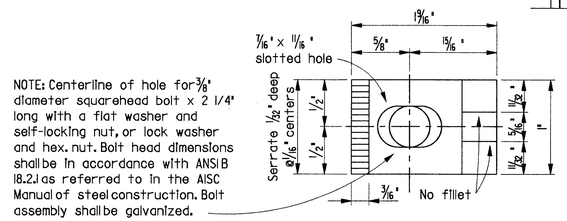
Signs over 8.0 feet deep may have a single horizontal splice, and may be shipped in two pieces.



DETAIL A

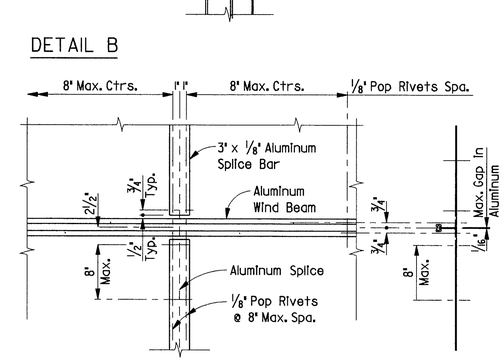


DETAIL B

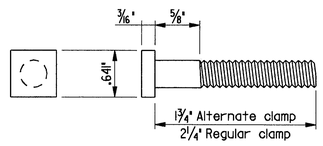


NOTE: Centerline of hole for 3/8" diameter squarehead bolt x 2 1/4" long with a flat washer and self-locking nut, or lock washer and hex. nut. Bolt head dimensions shall be in accordance with ANSI B 18.2.1 as referred to in the AISC Manual of steel construction. Bolt assembly shall be galvanized.

PLAN



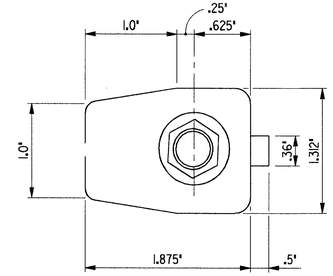
DETAIL C



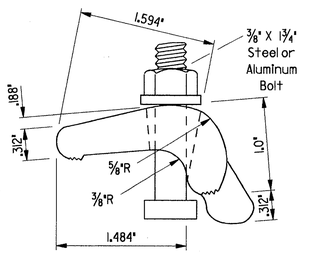
POST CLAMP BOLT DETAIL

Note: See SB(SWL-1) (MOD.) for Exit Number Panel attached to Sign Support Brackets.

EXIT NUMBER PANEL MOUNTING DETAILS

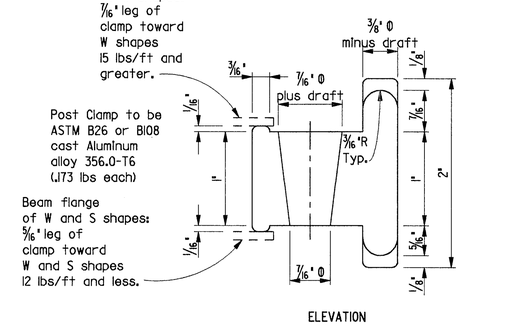


PLAN



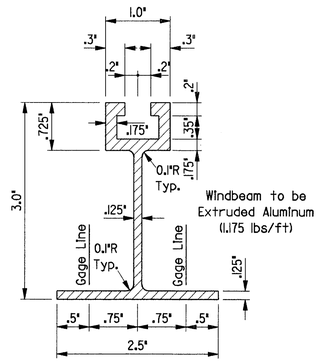
ELEVATION

ALTERNATE POST CLAMP DETAIL



ELEVATION

POST CLAMP DETAIL



WINDBEAM CROSS SECTION

GENERAL NOTES:

Materials, fabrication, construction and erection shall conform with the requirements of the Departments Material Specifications.

All structural steel, bolts, nuts, washers, and pop rivets shall be galvanized after fabrication.

Refer to Sheet SB(SWL-1) (MOD.) for details not shown.

FINAL RECORD DRAWING
Date: 12/25/99

ISSUE DATE: 04-09-97

STATE OF TEXAS
GLENN D. HOUSER
24236
REGISTERED PROFESSIONAL ENGINEER

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STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

STRUCTURAL MOUNTING DETAILS FOR OVERHEAD SIGN BRIDGES

SMD(P-1) (MOD.)

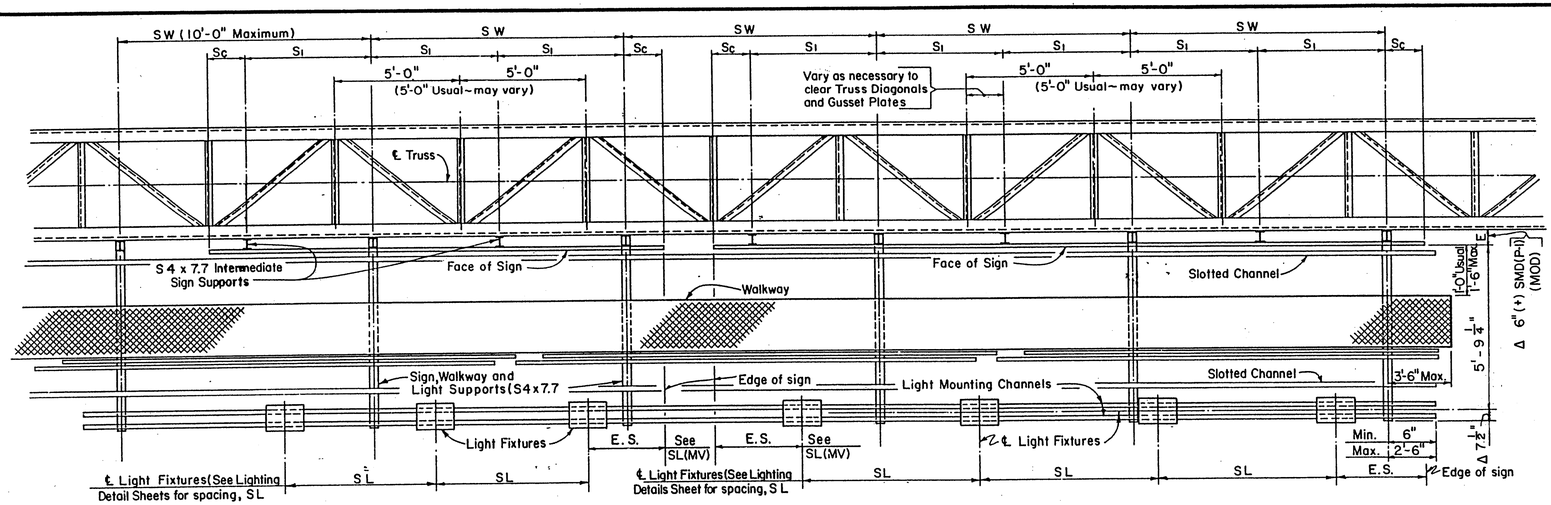
ORIG DRAW DATE:	DN:-	CK:-	DW:-	CK:-	NEG NO.:
REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT		SHEET
11-96 (ALL)		6			
4-97△	COUNTY		CONTROL	SECTION	JOB	HIGHWAY

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16
17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32
33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48
49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

DATE:
ACC: d58hplg/usr/d580504
FILE:

DN:LR CK:CW DW:DN CK:MT

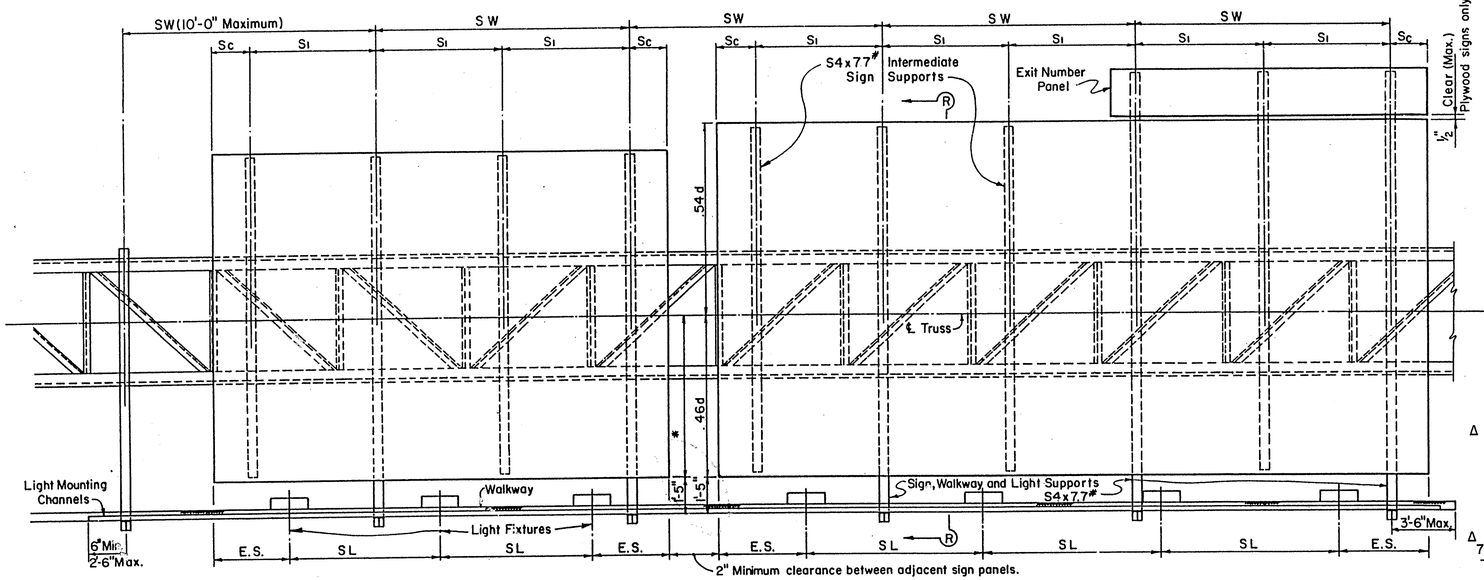
26B



Sc = 6" Min. and .25 S1 Max.

PART PLAN

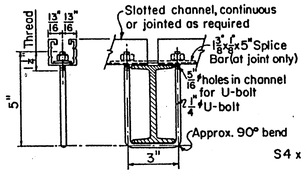
(Showing Truss, Signs, Walkways and Lights)



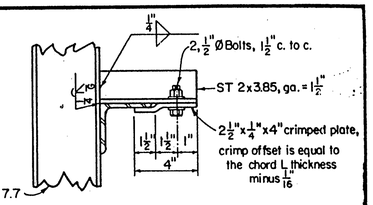
PART ELEVATION

* Where signs of different depths are used, the bottom edges of all signs may be placed in line. Where this is done, all signs should be so positioned that the bottom edges are approximately 0.46 of the depth of the deepest sign below the ℄ of the truss. When signs are spaced thusly, S1 is determined by the deepest sign.

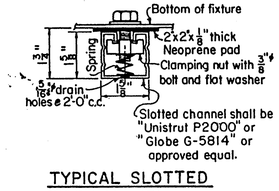
Δ See Sheet SMD(P-1)(MOD.) for Sign Details & Max. Spa. for S1. Sc = 6" Minimum, .25 S1 Maximum.



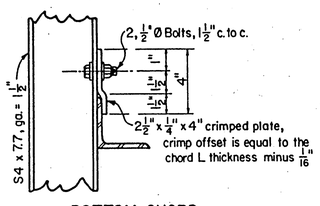
SECTION A-A



TOP CHORD



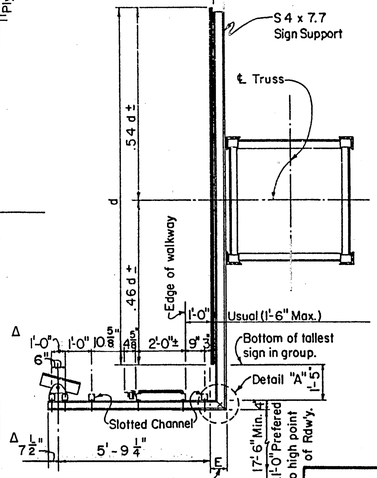
TYPICAL SLOTTED CHANNEL CONNECTED TO LIGHTING FIXTURE



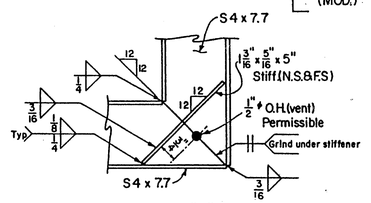
BOTTOM CHORD

SUPPORT TO TRUSS CONNECTION

NOTE: Exit Panel may be supported by sign support brackets as shown hereon, or may be supported as shown on sheet SMD(P-1)(MOD.) Regardless of method used spacing of supports shall not exceed S1.



SECTION R-R



DETAIL "A"

GENERAL NOTES:

Design conforms to the AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals.

Materials, Fabrication, Construction and Erection shall conform with the requirements of specifications for Interstate Signing and Delineation Projects and Texas Department of Highways and Public Transportation Standard Specifications for Construction of Highways, Streets and Bridges. Structural Steel shall conform with A.S.T.M. Specification A36 unless noted otherwise.

Bolts shall have Hexagon Heads and Nuts and conform with A.S.T.M. Specification A307.

All parts shall be galvanized after fabrication

STATE OF TEXAS
GLENN D. HOUSER
24236
REGISTERED PROFESSIONAL ENGINEER
Glenn D. Houser
12-13-96

NOTE: Δ WALKWAYS AND SIGN LIGHTS SHALL NOT BE PROVIDED AS A PART OF THIS PROJECT.

FINAL RECORD DRAWING
Date: 12/25/99

STATE DEPARTMENT OF HIGHWAYS AND PUBLIC TRANSPORTATION

SUPPORT BRACKETS FOR SIGNS, WALKWAY & LIGHTS

SB (SWL-1)(MOD.)

ORIGINAL DRAWING DATE: 2-82	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT #			SHEET
DN.:-CWC						51
CK.:- REVISIONS	DALLAS	6				
DW.:-EDS Δ 12-11-96	COUNTY		CONTROL	SECTION	JOB	HIGHWAY
CK.:-CWC	COLLIN		2384	05	028	78

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GENERAL NOTES

1. MINOR OPERATION is defined as those activities that will require traffic control devices to warn or direct traffic during daytime conditions. At the end of each work day, all traffic control devices should be removed from the view of motorists and no unusual conditions or potential hazards should exist that require advance warning.
2. MAJOR OPERATION is defined as those activities that may effect traffic during daytime and nighttime conditions. Work activities on high speed, high volume roadways may also be considered a major operation.
3. Additional details may be provided in the plans concerning sign size, type of channelization devices, sequence of work details, and required measures needed to control traffic during changes in the sequence of work.
4. All distance and spacing shown on the TCP Standards are approximate.
5. All traffic control devices used during nighttime shall be reflectorized, illuminated from within or externally illuminated.
6. Additional information for fabrication, erection and usage of the following traffic control devices is found in the "Texas Manual on Uniform Traffic Control Devices"(TMUTCD) and Barricade and Construction (BC) Standards:

BARRICADES	BC(2) and BC(3)
CONES	BC(3)
DELINEATION	WZ (BD)
DRUMS	BC(3)
PAVEMENT MARKINGS	BC(8) and BC(9) WZ (STPM) or TCP(7-1) if applicable
SIGNS	BC(4), BC(5), BC(6), BC(7)

SIGNS

1. Selection of sign size should be based on Table I.
2. Flashing warning lights, channelizing devices and/or flags may be required to call attention to the advance warning signs.
3. The words UTILITY, SIGNAL, BRIDGE, LIGHTING, SIGN, STREET or RAMP may be substituted for ROAD in all signs where applicable.
4. Advisory speed plaques, if used in conjunction with warning signs, speeds shall be determined in the field by the Engineer.
5. Regulatory signs shall be mounted at 5 foot minimum mounting height for rural areas and 7 foot minimum mounting height for urban areas.
6. Warning signs may be mounted on three types of supports at the minimum mounting heights as stated on BC(4):

Portable	(1 foot)
Temporary	(3 feet)
Fixed	(5 feet rural, 7 feet urban)

The illustrated sign spacing (X) and distance message (500 FT, 1000 FT, 1500 FT) are based on 55 mph 85th percentile speed with distance rounded to the nearest 500 feet. For slower speeds or minor operations, the word "AHEAD" may be used in lieu of the distance message.

CHANNELIZING DEVICES

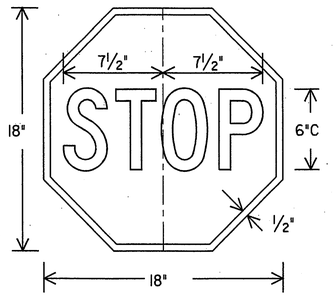
1. The maximum spacing between channelizing devices in a taper should be approximately equal in feet to the speed limit (S).
2. When channelizing devices are used to direct traffic across existing lane line or edge lines the spacing between channelizing devices shall be reduced by as much as 50%.
3. Channelizing device spacing should be reduced when placed on curves, hills or next to potential hazards. At least three channelizing devices should be in view at all times.
4. Lane closure taper length is equal to "L". Shifting taper length is equal to "1/2 L" Shoulder closure taper length is equal to "1/2 L".
5. Tapers downstream from the work area are optional and when used should be 50'-100' long.
6. Tapers shall be 50 feet minimum length when placed downstream of a flagger, YIELD sign or STOP sign.
7. The selection of channelizing devices should be based on degree of hazard associated with the work area. The selection priority of channelizing devices, in the order of increasing hazard recognition are:

   portable mounted delineators
   28" cones
   36" or more tubular cones
   portable mounted vertical panels
   36" cones
   Type I Barricade
   Type II Barricade
   plastic drums
   MBGF, fixed or barrel mounted
   concrete traffic barrier

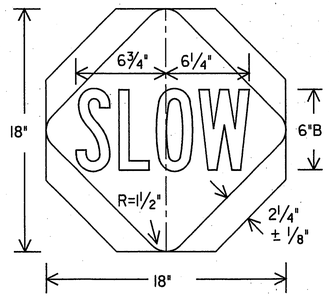
8. Flashing arrow panels used on two-way, two-lane roadways should flash in the caution mode.

FLAGGER CONTROL

1. Flagger shall wear orange safety vests. Flaggers should wear saftey hats to provide a professional image to the motorist and to protect the head from flying objects.
2. STOP/SLOW paddles shall be used as the primary method to control traffic by flaggers. The STOP/SLOW paddle minimum size is 18" x 18". Paddles may be attached to a 60 inch staff for easier handling. The larger size (24" x 24") should be attached to a 60 inch staff.
3. Flags are only used to control traffic for emergency situations and the STOP/SLOW paddles are not available.
4. Flaggers may carry hand held air horns to alert workers of an emergency condition.
5. For one lane two-way traffic control, one or more flaggers should be used where traffic density, road conditions or motorists' sight distance justify their use. If flaggers are used, the taper should be reduced to 50 feet minimum. When flaggers are used to control traffic, the FLAGGER symbol sign (FCW20-7a) shall be used. When flaggers are used, the BE PREPARED TO STOP sign (FCW21-8) should be used. Proper spacing between signs should be maintained.
6. When flaggers are used to draw attention to traffic control devices, the FLAGGER symbol sign should be used. Proper spacing should be maintained.
7. When more than one flagger is used, a chief flagger should be assigned the responsibility of making decisions concerning traffic control.

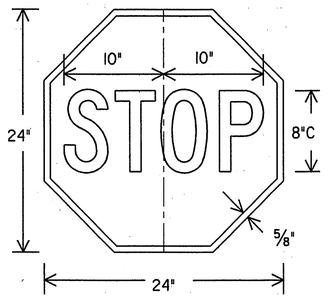


Background - Red
Legend & Border - White

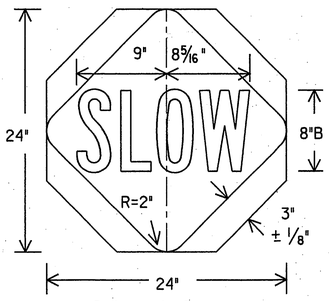


Background - Orange
Legend & Border - Black

18" STOP-SLOW PADDLE



Background - Red
Legend & Border - White



Background - Orange
Legend & Border - Black

24" STOP-SLOW PADDLE

WORKER SAFETY

1. Workers exposed to traffic should wear orange safety vests.
2. Work vehicles within 30 feet of the traveled way should have strobe lights or rotating beacons in use.
3. When work vehicles are used to shadow the work area, the vehicle should be parked 30 feet or more from the work area, transmission in gear (or set in PARK), emergency brake set on, and front wheels turned away from work area.
4. Inactive work vehicles, including workers' private vehicles, should be parked away from the work area and as close to the right-of-way line as possible.

Table I

TYPICAL CONSTRUCTION WARNING SIGN SIZE AND SPACING [1,5,6]

Roadway Classification	Posted Speed	Sign Spacing ▲	Major Construction Or Major Maintenance Approach Warning Signs — CW 20n Series And CW 22-1 Sign		Minor Construction Or Minor Maintenance Approach Warning Signs — CW 21 Series		Other Warning Signs
	MPH	Ft. (Apprx.)	Standard Inches	Minimum [4] Inches	Standard Inches [7]	Minimum [4] Inches [7]	Standard Inches [7]
Conven.	30	80	48X48	36X36	30X30 or 36x36	24X24 or 30x30	30X30 or 36x36
	35	120					
	40	160					
	45	240		Use Standard Size		Use Standard Size	
	50	320					
	55	500 [2]					
Exp or Frwy	55	500 [3]			48X48 *	48X48 *	48X48 *
	65	750 [3]					

▲ Minimum distance from work area to First Advance Warning sign and/or distance between each additional sign.

* Smaller sign sizes may be used where sign designs have not been included in the "Standard Highway Sign Design for Texas" publication.

General Notes:

1. Special or larger size signs may be used as may be necessary.
2. Distance between signs should be increased as required to have 1500' advance warning.
3. Distance between signs should be increased as required to have 1/2 mile or more advance warning.
4. For use only on secondary roads or city streets where speeds are low.
5. Only diamond shaped warning signs are indicated.
6. See sign listing in TMUTCD, Appendix A for complete list of all available sign design sizes.
7. Where two sizes are listed, see sign listing in TMUTCD, Appendix A for proper size.

FINAL RECORD DRAWING
Date: 12/25/99

STANDARD PLANS
TEXAS DEPARTMENT OF TRANSPORTATION
Traffic Operations Division

TRAFFIC CONTROL PLAN

TCP NOTES-95

ORIG DRAW DATE:	DN:	CK:	DW:	CK:	REC NO.:
Febuary 1994	LR/MT		DN	MT	

REVISIONS	STATE DISTRICT	FEDERAL REGION	FEDERAL AID PROJECT	SHEET
8-95		6		52
	COUNTY	CONTROL	SECTION	JOB / HIGHWAY

150

LEVELS DISPLAYED
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52 53 54 55 56 57 58 59 60 61 62 63

DATE:
ACC: d58nplc/usr/d580504
FILE:
DN:LR
CK:CW
DW:DN
CK:MT

FORM NO. 103

TEXAS TURNPIKE AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **1**

PROJECT: Addison Airport Tunnel
DATE: 7/22/97 SUPPLEMENTAL AGREEMENT NO. 1
SHEET NO. 1 OF 1 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

It is desireable to add the following Items of Work to the Contract for the protection of the environment.

		SY		
SS5141	Construction Exits (Ty 3)	600	17.82	10692.00
SS5141	Construction Exits (Ty 3) (Remove & Replace)	600	11.40	6840.00
SS5141	Construction Exits (Ty 3) (Remove)	600	8.72	5232.00

Total for all items and this Supplementl Agreement $22,764.00

SUBMITTED BY BROWN & ROOT, INC. — CONSTRUCTION MANAGER 8/12/97 (DATE)
RECOMMENDED FOR APPROVAL: GINN CORP — PE. 8/19/97 (DATE)
APPROVAL RECOMMENDED TEXAS TURNPIKE AUTHORITY — BY DIRECTOR OF ENGINEERING 8/25/97 (DATE)
APPROVED TEXAS TURNPIKE AUTHORITY — BY EXECUTIVE DIRECTOR 8/31/97 (DATE)
BY CHAIRMAN 8/31/97 (DATE)
ATTEST SECRETARY 8/31/97 (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE
CONTRACTOR H.B. Zachry Company
BY Brian Salerno, Area Manager 8 6 97 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 8/6/97 (DATE)

TEXAS TURNPIKE AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **2**

PROJECT: Addison Airport Tunnel
DATE: 6/27/97 SUPPLEMENTAL AGREEMENT NO. 2
SHEET NO. 1 OF 1 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

HB Zachry wishes to enter into an agreement with HDR Engineering to perform the following services:
Review the alternate designs of Teckwall at DS Type retaining walls. HDR Engineering has agreed to this arrangement for a price not to exceed $8,478.61.
Review of shop drawings for alternate design at DS Type retaining walls.
Geotechnical assistance associated with the alternate design of DS walls.
All parties agree that this is a "Value Engineering" change and will result in no cost to Texas Turnpike Authority. HDR will invoice Texas Turnpike Authority and the same shall be deducted from monies due HB Zachry. The net cost to Texas Turnpike Authority will be $0.00.
Total charges to H.B. Zachry will not exceed $8,478.61.

SUBMITTED BY BROWN & ROOT, INC. — CONSTRUCTION MANAGER 7/8/97 (DATE)
RECOMMENDED FOR APPROVAL: HNTB — 7/23/97 (DATE)
APPROVAL RECOMMENDED TEXAS TURNPIKE AUTHORITY — BY DIRECTOR OF ENGINEERING 7/25/97 (DATE)
APPROVED TEXAS TURNPIKE AUTHORITY — BY EXECUTIVE DIRECTOR 7/23/97 (DATE)
BY CHAIRMAN 7/25/97 (DATE)
ATTEST SECRETARY 7/28/97 (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE.
CONTRACTOR H. B. Zachry Company
BY Brian Salerno, Area Manager 7 8 97 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 7/8/97 (DATE)

THE TEXAS TURNPIKE AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **3**

PROJECT: Addison Airport Tunnel
DATE: 8/14/97 SUPPLEMENTAL AGREEMENT NO 3
SHEET NO. 1 OF 1 CONTRACT NO DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT DESCRIBED AS FOLLOWS. (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

The contractor shall perform the following item of work:

Item #	Description	Unit	Approximate Quantity	Unit price	Total
132 & SP	Embankment (190T) Ty B C CL3	CY	70000	2.07	$144,900

In addition to the requirements of Item 132 & SP "Embankment" the following work shall be performed and shall considered subsidiary to Item 132 & SP "Embankment.
1. Furnish, install and maintain required silt fence in accordance with Storm Water Pollution Prevention Plan (SW3P) until acceptance of embankment by the Texas Turnpike Authority ("TTA").
2. Furnish, install and maintain construction exits as required by SW3P until acceptance of embankment by the TTA.
3. Prepare existing embankment area in accordance with Item 132 & SP "Embankment".
4. This item shall not be subject to adjustment for overruns and/or underruns in quantities as specified in Item 4 & SP "Scope of Work", Article 4.2, "Significant Change in the Character of Work".

SUBMITTED BY BROWN & ROOT, INC — CONSTRUCTION MANAGER 8/25/97 (DATE)
RECOMMENDED FOR APPROVAL: Ginn — PE. 8/28/97 (DATE)
APPROVAL RECOMMENDED TEXAS TURNPIKE AUTHORITY — BY DIRECTOR OF ENGINEERING 8/28/97 (DATE)
APPROVED TEXAS TURNPIKE AUTHORITY — BY EXECUTIVE DIRECTOR 8/28/97 (DATE)
BY CHAIRMAN 8-28-97 (DATE)
ATTEST SECRETARY (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE
CONTRACTOR H.B. Zachry Company
BY Brian Salerno, Area Manager 8 28 97 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 8/28/97 (DATE)

FORM NO. 103

THE TEXAS TURNPIKE AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **4**

PROJECT: Addison Airport Tunnel
DATE: 8/25/97 SUPPLEMENTAL AGREEMENT NO. 4
SHEET NO. 1 OF 1 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

1. Install 15 PK nails in asphalt paving on Dooley Rd as shown in the sketch (typical 15' center to center both ways) attached
LUMP SUM $253.00
2. Initial level readings on nails (1 reading on each nail daily for 3 days
LUMP SUM $379.00
3. Subsequent readings (15 PK nails per set) as required by engineer Estimate 10 readings @ $189.75 per set $1,897.50
* Est Total this Adjustment $2,529.50

* This item shall not be subject to adjustment for overruns and/or underruns in quantities as specified in Item 4 & SP "Scope of Work" Article 4.2 "Significent Chang in the Character of Work".

SUBMITTED BY BROWN & ROOT, INC. — CONSTRUCTION MANAGER 8/28/97 (DATE)
RECOMMENDED FOR APPROVAL: Ginn — PE. 8/28/97 (DATE)
APPROVAL RECOMMENDED THE TEXAS TURNPIKE AUTHORITY — BY DIRECTOR OF ENGINEERING 8/28/97 (DATE)
APPROVED THE TEXAS TURNPIKE AUTHORITY — BY EXECUTIVE DIRECTOR 8/28/97 (DATE)
ATTEST SECRETARY 8/28/97 (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE
CONTRACTOR H.B. Zachry Company
BY Brian Salerno, Area Manager 8 28 97 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 8/28/97 (DATE)

FORM NO. 103

NORT TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **5**

PROJECT: Addison Airport Tunnel
DATE: 9/16/97 SUPPLEMENTAL AGREEMENT NO. 5
SHEET NO. 1 OF 1 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

Enlarge south junction box to dimensions and location as per sketch frunished by HDR Engineering.

Replace the two 36" x 8' RCP sections with two 36" x 4' RCP sections entering the box on west side.

Delete all reference to 24" drain, and connect the two 18" drain liner into the Junction box.

Total additional cost to Item 465 & Special = $2,702.15

SUBMITTED BY BROWN & ROOT, INC. — CONSTRUCTION MANAGER 9-10-98 (DATE)
RECOMMENDED FOR APPROVAL: GINN CORPORATION — PE. 10/13/98 (DATE)
APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY — PROJECT MANAGER 10-15-98 (DATE)
APPROVED NORTH TEXAS TOLLWAY AUTHORITY — BY DEPUTY EXECUTIVE DIRECTOR 10/15/98 (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE.
CONTRACTOR H.B. Zachry Company
BY BRIAN SALERNO, AREA MANAGER 3 25 98 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 3/25/98 (DATE)

FORM NO. 103

NORT TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **6**

PROJECT: Addison Airport Tunnel
DATE: 10/24/97 SUPPLEMENTAL AGREEMENT NO 6
SHEET NO. 1 OF 1 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT DESCRIBED AS FOLLOWS. (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

Extra work required to perform the reduction of the 6" diameter borehole and installation, tensioning, and testing of the rock bolts at approximately 156 each rock anchors @ $11.99 = $1,870.44
Either the double plate method or the backoff configuration may be used

Total change for this Supplemental Agreement
156 Each $11.99 $1,870.44

SUBMITTED BY BROWN & ROOT, INC — CONSTRUCTION MANAGER 11/11/97 (DATE)
RECOMMENDED FOR APPROVAL: GINN CORPORATION — P.E. 11/7/97 (DATE)
APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY — BY DIRECTOR OF MAINTENANCE 11-18-97 (DATE)
APPROVED NORTH TEXAS TOLLWAY AUTHORITY — BY EXECUTIVE DIRECTOR 11-19-97 (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE
CONTRACTOR H. B. ZACHRY COMPANY
BY BRIAN SALERNO, AREA MANAGER 10 31 97 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 10/21/97 (DATE)

FORM NO. 103

NORT TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **7**

PROJECT: Addison Airport Tunnel
DATE: 10/27/97 SUPPLEMENTAL AGREEMENT NO. 7
SHEET NO 1 OF 1 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT DESCRIBED AS FOLLOWS. (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

To add work not specifically called for by plans & specifications on the hanger modifications required by the Town of Addison:
1) Pin door & brace with I-beam $1,150.00
2) Enclosure of hanger #1100 $4,025.00
3) Install doors at hanger $1,035.00
(I -"3070" W/D door & 1 - 8X8 roll up door)
TOTAL = $6,210.00

TOTAL EXTRA WORK ON THIS AGREEMENT = $6,210.00

SUBMITTED BY BROWN & ROOT, INC — CONSTRUCTION MANAGER 11/11/97 (DATE)
RECOMMENDED FOR APPROVAL Ginn Corporation — PE. 11/7/97 (DATE)
APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY — BY DIRECTOR OF MAINTENANCE 11-18-97 (DATE)
APPROVED NORTH TEXAS TOLLWAY AUTHORITY — BY EXECUTIVE DIRECTOR 11-19-97 (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE
CONTRACTOR H. B. ZACHRY COMPANY
BY BRIAN SALERNO, AREA MANAGER 10.31.97 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 10/31/97 (DATE)

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **8**

PROJECT: Addison Airport Tunnel
DATE: 11/4/97 SUPPLEMENTAL AGREEMENT NO. 8
SHEET NO 1 OF 1 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

Rock Bolts / dowels - 8'	EA	42.0	463.75	$19,477.50
Shotcrete (Bentonite Seam)	CY	1.3	978.00	$1,271.40
Welded Wire Fabric	SF	430.0	21.55	$9,266.50
Over Excavation (Ty 2)(includes Shotcrete)	CY	10.9	469.50	$5,117.55
Over Excavation Sta. 11+75 - 12+20	CY	24.3	469.50	$11,408.85
				$46,541.80

Prices include markup and overhead for all delays covered by this additional work.

SUBMITTED BY BROWN & ROOT, INC — CONSTRUCTION MANAGER 11/29/97 (DATE)
RECOMMENDED FOR APPROVAL Ginn Corporation — PE. 11/6/97 (DATE)
APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY — BY Chief Engineer 12-10-97 (DATE)
APPROVED NORTH TEXAS TOLLWAY AUTHORITY — BY Interim Executive Director 1/4/97 (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE
CONTRACTOR H. B. ZACHRY COMPANY
BY BRIAN SALERNO, AREA MANAGER 11 17 97 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 11/17/97 (DATE)

SUPPLEMENTAL AGREEMENT NO. 9 VOID AND REPLACED WITH S.A. NO. 10

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **10**

PROJECT: Addison Airport Tunnel
DATE: 12/18/97 SUPPLEMENTAL AGREEMENT NO 10
SHEET NO. 1 OF 1 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

This supplemental agreement is necessary to reroute 20" discharge pipe from the tunnel sump to prevent the shut down of Longshots Sports Bar. The original location would have required additional easements that are not now available. Line must be lowered to a depth of 15' to clear utilities

46' added 20" bore @ 430.50/LF =	$19,803.00
80' additional depth (now located in rock) @ 72.45 =	$5,796.00
Additional depth for shoring for bore & receiving pits =	$7,350.00
All work necessary to connect line from bored pipe in receiving pit to junction box including & replacing sidewalk, asphalt pavement, curbs, all pipe, fittings etc. to complete the connection. Also includes protection of existing utilities. Contractor makes no guarantee that the tree roots in the area will not be damaged. =	$26,829.39
Restock of unused 20" PVC pipe =	$518.00
Total Added Costs =	$60,296.39
Deduct Item 15302-6 - 20" PVC pump discharge pipe 157 LF @ 96.00 =	($15,072.00)
Total this Agreement =	$45,224.39

SUBMITTED BY BROWN & ROOT, INC. — CONSTRUCTION MANAGER 1-5-98 (DATE)
RECOMMENDED FOR APPROVAL Ginn Corporation — PE. 1/7/98 (DATE)
APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY — BY CHIEF ENGINEER 1-16-98 (DATE)
APPROVED NORTH TEXAS TOLLWAY AUTHORITY — BY INTERIM EXECUTIVE DIRECTOR 1/20/98 (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE
CONTRACTOR H. B. ZACHRY COMPANY
BY DAVID S. ZACHRY, VICE PRESIDENT 12/29/97 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 12/29/97 (DATE)

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **11**

VOID

PROJECT: Addison Airport Tunnel
DATE: 12/18/97 SUPPLEMENTAL AGREEMENT NO. 11
SHEET NO. 1 OF 1 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

This supplemental agreement is necessary to establish a price for the installation of the modifications to the Traffic Signals at Midway Road and Keller Springs near the west tunnel portal. Work includes: Removal of two existing Signal Poles/Foundations with Signal Heads; Furnish and install two new Signal Poles/Foundations; Bore approximately 260 LF of PVC Conduit; Sawcut four new Loop Detectors; Trench approximately 140 LF of PVC Conduit; Furnish and install six new Pull Boxes with Aprons; Rewire the Controller Cabinet; Furnish and install require Signal Cable and Power Cable; Furnish and install 2 each 5 section and 4 each 3 section; Signal Heads; Splice the new Signal items with the existing Cable Systems; Traffic Control and Utility Clearance; Any and all other work necessary for the modifications of the Traffic Signals.

Total Lump Sum = $47,911.87

SUBMITTED BY BROWN & ROOT, INC — CONSTRUCTION MANAGER (DATE)
RECOMMENDED FOR APPROVAL Ginn Corporation — (DATE)
APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY — BY CHIEF ENGINEER (DATE)
APPROVED NORTH TEXAS TOLLWAY AUTHORITY — BY INTERM EXECUTIVE DIRECTOR (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE
CONTRACTOR
BY (DATE)
SURETY
BY (DATE)

Void S.A. # 14

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **12**

PROJECT: Addison Airport Tunnel
DATE: 1/15/98 SUPPLEMENTAL AGREEMENT NO. 12
SHEET NO. 1 OF 1 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
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Place filter fabric around filter material on the LW1 & LW3 retaining walls.

Approximately 840 LF @ 1.27 = $1066.80

SUBMITTED BY BROWN & ROOT, INC — CONSTRUCTION MANAGER 3-24-98 (DATE)
RECOMMENDED FOR APPROVAL Ginn Corporation — PE. 3/30/98 (DATE)
APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY — BY CHIEF ENGINEER 4/1/98 (DATE)
APPROVED NORTH TEXAS TOLLWAY AUTHORITY — BY INTERM. EXECUTIVE DIRECTOR 4/1/98 (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE
CONTRACTOR H.B. Zachry Company
BY BRIAN SALERNO, AREA MANAGER 2.2.98 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 2-2-98 (DATE)

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **13**

PROJECT: Addison Airport Tunnel
DATE: 3/4/98 SUPPLEMENTAL AGREEMENT NO 13
SHEET NO. 1 OF 1 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

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Original Survey & Final Layout		LS		$880.00
Repour Inlet Throat		LS		$643.75
* Cut & Restore Pavement	71.111	SY	$60.00	$4,266.66
TOTAL THIS CHANGE				$5,790.41

Remove and replace concrete pavement on parking lot on Southwest corner of Addison Road and Keller Springs Road as shown in plans. Water will not drain off parking lot to new inlet

* Cut and restore pavement price is original bid price from contract.

SUBMITTED BY BROWN & ROOT, INC. — CONSTRUCTION MANAGER 4/10/98 (DATE)
RECOMMENDED FOR APPROVAL Ginn Corporation — PE. 4/10/98 (DATE)
APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY — BY CHIEF ENGINEER 4/13/98 (DATE)
APPROVED NORTH TEXAS TOLLWAY AUTHORITY — BY ACTING EXECUTIVE DIRECTOR 4/14/98 (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE.
CONTRACTOR H B ZACHRY COMPANY
BY BRIAN SALERNO, AREA MANAGER 3.17.98 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 3/17/98 (DATE)

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **14**

PROJECT: Addison Airport Tunnel
DATE: 3/9/98 SUPPLEMENTAL AGREEMENT NO 14
SHEET NO 1 OF 2 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
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ITEM	QUANTITY	UNIT	UNIT $	TOTAL $
Trench & install PVC Conduit (2"), Remove & replace electrical cable, rewire cabinet for temporary operations of existing signals at Midway Road & Keller Spring for the purpose of shutting off Keller Springs eastbound at Midway Rd	1.000	LS	$2,235.56	$2,235.56
Replace Signals at Keller Springs & Midway Road				
Conduit, 1.5" PVC (Sch 40)	80.000	LF	$2.48	$198.40
Conduit, 2" PVC (Sch 40)	11.000	LF	$3.72	$40.92
Conduit, 3" PVC (Sch 40)(Bore)	116.000	LF	$17.36	$2,013.76
** Service Box	7.000	EA	$620.00	$4,340.00
Foundation, Type 30-A	10.000	LF	$248.00	$2,480.00
Foundation, Type 36-A	10.000	LF	$285.20	$2,852.00
** Signal Head, 3 Section (12")	4.000	EA	$620.00	$2,480.00
** Signal Head, 5 Section (12")	2.000	EA	$620.00	$1,240.00
** Signal Head, Optical Detector	2.000	EA	$124.00	$248.00
Traffic Signal Cables, 16 conductor #14 AWG	469.000	LF	$2.48	$1,163.12
Traffic Signal Cables, 4 conductor # 18 AWG Optical Detector	469.000	LF	$1.24	$581.56
Traffic Signal Cables, 4 conductor # 18 AWG Shided Detector cble	604.000	LF	$2.48	$1,497.92
Traffic Signal Cables, # 14 AWG Loop Wire for saw cut detectors	810.000	LF	$0.12	$97.20
** Traffic Signal Pole Assembly w/ 32' Mast Arm	1.000	EA	$6,249.60	$6,249.60
** Traffic Signal Pole Assembly w/ 40' Mast Arm	1.000	EA	$6,249.60	$6,249.60
Traffic Signal Detectors, 5'x40' Loop detector	445.000	LF	$5.58	$2,483.10
Remove old Structures (Signal Poles)	2.000	EA	$1,240.00	$2,480.00
Relocating Mast Arm Mounted Signs	2.000	EA	$124.00	$248.00
** Items furnished by City of Carrollton				
TOTAL THIS CHANGE				$36,943.18
Add two (2) 36"x36" inlets on Line A at Approx. Sta. 7+00 and Sta 7+15 on lineA to intercept drainage from private drive, Midway Road and parking lot.				
Item 464 & SP Uncover existing Line "A" and stub out for inlets	1.000	LS	$4,005.00	$4,005.00
* Item 465 & SP Grate inlets (36"x36")	2.000	EA	$4,000.00	$8,000.00
* Existing Bid Price				
TOTAL THIS CHANGE				$12,005.00
TOTAL THIS SUPPLEMENTAL AGREEMENT				$51,183.74

SUBMITTED BY BROWN & ROOT, INC — CONSTRUCTION MANAGER 4-10-98 (DATE)
RECOMMENDED FOR APPROVAL Ginn Corporation — PE 3/16/98 (DATE)
APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY — BY CHIEF ENGINEER 4/9/98 (DATE)
APPROVED NORTH TEXAS TOLLWAY AUTHORITY — BY ACTING EXECUTIVE DIRECTOR 4/14/98 (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE
CONTRACTOR H. B. Zachry Company
BY BRIAN SALERNO, AREA MANAGER 3.25.98 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 3/25/98 (DATE)

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **15**

PROJECT: Addison Airport Tunnel
DATE: 3/26/98 SUPPLEMENTAL AGREEMENT NO. 15
SHEET NO. 1 OF 1 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

ITEM	QUANTITY	UNIT	UNIT $	TOTAL $
At the design engineers recommendation, additional support is needed within the limits of the Type II Excavation near the east portal. The prices to be paid are as follows:				
Rock Bolts 10' long	10.000	EA	$598.00	$5,980.00
Rock Bolts 15' long	20.000	EA	$924.13	$18,482.60
TOTAL THIS SUPPLEMENTAL AGREEMENT				$24,462.60

SUBMITTED BY: BROWN & ROOT, INC. — CONSTRUCTION MANAGER 5-29-98 (DATE)
RECOMMENDED FOR APPROVAL: Ginn Corporation — PE. 5/29/98 (DATE)
APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY — BY CHIEF ENGINEER 5/29/98 (DATE)
APPROVED NORTH TEXAS TOLLWAY AUTHORITY — BY ACTING EXECUTIVE DIRECTOR 6/1/98 (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE.
CONTRACTOR: H. B. ZACHRY COMPANY
BY: BRIAN SALERNO, AREA MANAGER 5.15.98 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 5/15/98 (DATE)

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **16**

PROJECT: Addison Airport Tunnel
DATE: 3/26/98 SUPPLEMENTAL AGREEMENT NO. 16
SHEET NO. 1 OF 2 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

REMEDIAL WORK AT ROCK SLIDE AT EAST PORTAL:

ITEM	QUANTITY	UNIT	UNIT $	TOTAL $
Preparation Work	1.000	LS	$1,974.03	$1,974.03
Drill and install Dowels Approximately	20.000	EA	$1,220.16	$24,403.20
Drill and install Rock Bolts Approximately	85.000	EA	$368.00	$31,280.00
Place Welded Wire Fabric Approximately	1,089.000	SF	$30.56	$33,279.84
Place Shot Crete Approximately	30.000	CY	$308.50	$9,255.00
Place 15' Rock Bolts	4.000	EA	$1,551.21	$6,204.84
Subcontractor Subtotal				$106,396.91
Zachry Mark-up @ 5%				$5,319.85
Subcontractor total with Mark-up				$111,716.76
Misc Work for Vertical Rock Bolts	1.00	LS	$3,584.00	$3,584.00
Build Small Ramp at Wedge @ Sta. 27+30	1.00	LS	$1,242.10	$1,242.10
Rental of Lindbelt Long Boom Crane	1.00	LS	$5,640.00	$5,640.00
Subtotal				$10,466.10
15% Overhead				$1,569.92
Subtotal				$12,036.02
10% Profit				$1,203.60
Total Zachry Work				$13,239.62
Total Zachry Work & Subcontractor Work				$124,956.37
TOTAL LUMP SUM PRICE THIS SUPPLEMENTAL AGREEMENT				$124,956.37

SUBMITTED BY BROWN & ROOT, INC — CONSTRUCTION MANAGER 5-29-98 (DATE)
RECOMMENDED FOR APPROVAL: Ginn Corporation — PE. 5/29/98 (DATE)
APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY — BY CHIEF ENGINEER 5-29-98 (DATE)
APPROVED NORTH TEXAS TOLLWAY AUTHORITY — BY ACTING EXECUTIVE DIRECTOR 6/3/98 (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE
CONTRACTOR H. B. Zachry
BY BRIAN SALERNO, AREA MANAGER 5.15.98 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 5/15/98 (DATE)

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK — **17**

PROJECT: Addison Airport Tunnel
DATE: 5/8/98 SUPPLEMENTAL AGREEMENT NO. 17
SHEET NO. 1 OF 2 CONTRACT NO. DNT-260
H B Zachry Company (CONTRACTOR) PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

Reimbursement for Project Personnel and Equipment placed on Project during the period of time that the Project was delayed by utility relocations.

ITEM	QUANTITY	UNIT	UNIT $	TOTAL $
Salaries and Burdens - H.B. Zachry				$37,411.80
Salaries and Burdens - Zachry/Monterey				$45,775.75
Misc. Utilities & Office Equipment				$4,023.85
Misc. Equipment & Vehicles				$19,876.60
Bond & Insurance				$1,689.35
Subtotal for Personnel & Equipment				$108,777.35
Investigate Sewer Water in Tunnel; Gamma globulin shots for all personnel; and Repair damage to tunnel caused by fall out under Sewer Line				
Shots for personnel				$1,670.52
Place Grout under SS line				$3,357.12
Prep. Work for Shotcrete				$2,529.12
Place Shotcrete				$9,068.24
Subtotal for investigation, shots, & damage repair				$16,625.00
Rock Slide Repair: Scope of work was changed from original quotation to repair rock slide to add approximately 20 rock bolts, and to roughen surface to receive backfill material. Added items are:				
Rock Bolts **	20	EA	386.40	$7,728.00
Roughen Surface of Rock	1	LS	8989.65	$8,989.65
Subtotal Rock Slide				$16,717.65
** Previously Established Price				
TOTAL PRICE THIS SUPPLEMENTAL AGREEMENT				$142,120.00

SUBMITTED BY BROWN & ROOT, INC. — CONSTRUCTION MANAGER 6-3-98 (DATE)
RECOMMENDED FOR APPROVAL: Ginn Corporation — PE. 6/8/98 (DATE)
APPROVAL RECOMMENDED: NORTH TEXAS TOLLWAY AUTHORITY — BY ENGINEERING ADVISOR 6/10/98 (DATE)
APPROVED NORTH TEXAS TOLLWAY AUTHORITY — BY ACTING EXECUTIVE DIRECTOR 6/11/98 (DATE)

(WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4.4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE.
CONTRACTOR: H. B. Zachry Company
BY: 5.26.98 (DATE)
SURETY AMERICAN HOME ASSURANCE COMPANY
BY Socrates Ramirez, Attorney-In-Fact 5/26/98 (DATE)

FINAL RECORD DRAWING
Date: 12/25/99

NO.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

SUPPLEMENTAL AGREEMENTS 1-17

DRAWN ____ DATE ____ DESIGNED ____ DATE ____
CHECKED ____ DATE ____ SCALE ____

CONTRACT NO. DNT-260 SHEET ____ OF ____

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK
18

PROJECT: Addison Airport Tunnel

DATE: 6/18/98 — SUPPLEMENTAL AGREEMENT NO. 18

SHEET NO. 1 OF 2 — CONTRACT NO: DNT-260

H B Zachry Company (CONTRACTOR) — PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

I AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT.
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It has been found necessary to alter the concrete paving designs to (1) install jointed reinforced concrete pavement in lieu of continuous reinforced paving with sawed joints for the paving outside the tunnel area Design now calls for #3 rebar on 2'-0" centers - both ways with Dowell baskets spaced at 20' centers (3/4" dowels at 15" centers in basket); (2) inside tunnel, place 10" continuous reinforced paving, and eliminate transverse sawed joints. Price reduction as follows:

ITEM	QUANTITY	UNIT	UNIT $	TOTAL $
Concrete Pavement as bid	(12.362)	SY	$28.00	($346,136.00)
* Concrete Pavement, Jointed Reinforced	12.362	SY	$27.25	$336,100.70
10" Paving as bid	(4.593)	SY	$35.00	($160,755.00)
* 10" Concrete Paving Cont. Reinf.	4.593	SY	$34.33	$157,677.69
Net this change				($11,112.61)

* New Prices for these concrete paving items

There is conflict between water line "W-3" and Wall Panel #11 drilled shaft. It will be necessary to add an additional drilled shaft of 12.5 LF to correct the conflict. Using existing bid item add:

Item 416 18" Drilled shaft	12.50	LF	$20.00	$250.00

In order to reduce the lane closures on Addison Road from 2 lanes to one lane, and to protect existing trees along Addison Road, the direction of the 8" bored line need to be changed, and the tie in to the thrust block. Total additional work not covered by bid items is $2,104.96

TOTAL PRICE THIS SUPPLEMENTAL AGREEMENT ($8,757.65)

SUBMITTED BY: BROWN & ROOT, INC. — CONSTRUCTION MANAGER — (DATE)

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RECOMMENDED FOR APPROVAL: Ginn Corporation — 9/17/98 (DATE)

CONTRACTOR: H B Zachry — BY: BRIAN VALERIO, AREA MANAGER (DATE) 8498

APPROVAL RECOMMENDED: NORTH TEXAS TOLLWAY AUTHORITY — PROJECT MANAGER — (DATE) 9-22-98

SURETY: AMERICAN HOME ASSURANCE COMPANY — BY: Socrates Ramirez, Attorney-In-Fact — 10/7/98 (DATE)

APPROVED: NORTH TEXAS TOLLWAY AUTHORITY — DEPUTY EXECUTIVE DIRECTOR — 9/17/98 (DATE)

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK
19

PROJECT: Addison Airport Tunnel

DATE: 7/20/98 — SUPPLEMENTAL AGREEMENT NO. 19

SHEET NO. 1 OF 2 — CONTRACT NO: DNT-260

H B Zachry Company (CONTRACTOR) — PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

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Water line W-4 alignment change to avoid ripping up Addison Road and extensive traffic control. The 20" water main is located further out in Addison Road than shown on the plans. Therefore, it is proposed to bore the 8" line over the existing 20" line and make the tap on the eastside as shown on the attached drawing. This will allow a one lane closure on Addison Road.

ITEM	QUANTITY	UNIT	UNIT $	TOTAL $
Additional fittings and trust blocks	1	LS	$2,105.00	$2,105.00
Additional 8" bored hole PVC water pipe (Item 2660-4) (Bid Item 2660-4)	25	LF	$400.00	$10,000.00
Reduction 8" cut-and-cover PVC water pipe (Bid Item 2660-3)	(50)	LF	$32.00	($1,600.00)
SUBTOTAL				$10,505.00

Geotechnical instrumentation installations at night and on weekend near airport runway. (NTTA accepted Disputes Review Board recommendation - Heaning Dispute No. 1)

ITEM	QUANTITY	UNIT	UNIT $	TOTAL $
Install multi-position borehole extensometers BEX-1 and BEX-1 additional costs	1	LS	$5,332.00	$5,332.00
Contractor's mark up	1	LS	$1,333.00	$1,333.00
SUBTOTAL				$6,665.00

Drainage improvement on concourse Plaza parking lot (SW corner Addison and Keller Spring Roads). A portion of the existing parking lot, which was to remain in place, will not drain. That portion of the parking lot is to be removed and replaced as shown. Attached sketch shows area to be removed and replaced.

ITEM	QUANTITY	UNIT	UNIT $	TOTAL $
Additional cutting and replacing paving (Bid item - 400)	41	SY	$80.00	$3,660.00
SUBTOTAL				$3,660.00

TOTAL THIS SUPPLEMENTAL AGREEMENT $20,830.00

SUBMITTED BY: BROWN & ROOT, INC. — CONSTRUCTION MANAGER — (DATE)

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RECOMMENDED FOR APPROVAL: Ginn Corporation — 9/17/98 (DATE)

CONTRACTOR: H B Zachry — BY: BRIAN VALERIO, AREA MANAGER (DATE) 8498

APPROVED: NORTH TEXAS TOLLWAY AUTHORITY — PROJECT MANAGER — (DATE) 9/21/98

SURETY: AMERICAN HOME ASSURANCE COMPANY — BY: Socrates Ramirez, Attorney-In-Fact — 9/24/98 (DATE)

APPROVED: NORTH TEXAS TOLLWAY AUTHORITY — DEPUTY EXECUTIVE DIRECTOR — 9/25/98 (DATE)

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK
20

PROJECT: Addison Airport Tunnel

DATE: 8/27/98 — SUPPLEMENTAL AGREEMENT NO. 20

SHEET NO. 1 OF 1 — CONTRACT NO: DNT-260

H B Zachry Company (CONTRACTOR) — PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

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The communications work was not a part of the original contract. It has been decided to add the communications to the contract as per plans given to contractor on May 28, 1998 and added duct bank given by HDR Engineering from walkway redesign. An addition of 4 contract days is hereby granted.

Total Lump Sum for work	$477,729.52
Bond at 1%	$4,777.30
TOTAL PRICE THIS SUPPLEMENTAL AGREEMENT	$482,506.82

SUBMITTED BY: BROWN & ROOT, INC. — CONSTRUCTION MANAGER — (DATE)

I (WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE

RECOMMENDED FOR APPROVAL: Ginn Corporation — 10/1/98 (DATE)

CONTRACTOR: H B Zachry Company — BY: 10/2/98 (DATE)

APPROVAL RECOMMENDED: NORTH TEXAS TOLLWAY AUTHORITY — PROJECT MANAGER — 10-2-98 (DATE)

SURETY: American Home Assurance Company — BY: Socrates Ramirez, Attorney-In-Fact — 10/7/98 (DATE)

APPROVED: NORTH TEXAS TOLLWAY AUTHORITY — DEPUTY EXECUTIVE DIRECTOR — 10/8/98 (DATE)

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK
21

PROJECT: Addison Airport Tunnel

DATE: 8/27/98 — SUPPLEMENTAL AGREEMENT NO. 21

SHEET NO. 1 OF 2 — CONTRACT NO: DNT-260

H B Zachry Company (CONTRACTOR) — PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

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AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT
DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

In the area of the rock slides, it has been deemed necessary to reinforce the existing rock slope by placing additional rock bolts, welded wire fabric, reinforcing steel and concrete. This necessitates a different method of placing NE Walls 22, 23, &24. The total cost of this is as follows:

Repair of Rock Slide and Erection of NE Walls 22, 23, & 24

Dowel & place welded wire fabric at rock face			$21,340.89	
Dowel & set rebar & fill area			$42,311.40	
Spice and extend rock anchors			$11,007.37	
Furnish and set FW wall panels			$37,931.91	
Install underdrain			$865.79	
Form and place leveling pad			$1,630.94	
Spice/Extend Ty 503 Bars and install Miraft Filter material			$21,859.56	
Brace and shore FW panels			$9,556.72	
Install water stop and water proofing			$9,235.41	
Place mass concrete in fill area (5 pa/US lifts)			$76,713.84	
Reform bottom footing for LW2 walls and pour concrete			$5,822.54	
Additional work materials installed as backfill on LW2 walls			$10,622.64	
Deduct 2470 SF of FW Walls	(2,470.00)	SF	$24.00	($59,280.00)

TOTAL PRICE THIS SUPPLEMENTAL AGREEMENT $189,617.41

Page 2 Of 2

SUBMITTED BY: BROWN & ROOT, INC. — CONSTRUCTION MANAGER — (DATE)

I (WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE

RECOMMENDED FOR APPROVAL: Ginn Corporation — 10/1/98 (DATE)

CONTRACTOR: H B Zachry Company — BY: 09/18/98 (DATE) — **See Below

APPROVAL RECOMMENDED: NORTH TEXAS TOLLWAY AUTHORITY — PROJECT MANAGER — 10-17-98 (DATE)

SURETY: AMERICAN HOME ASSURANCE COMPANY — BY: Socrates Ramirez, Attorney-In-Fact — 09/18/98 (DATE)

APPROVED: NORTH TEXAS TOLLWAY AUTHORITY — DEPUTY EXECUTIVE DIRECTOR — (DATE)

**Executed Subject to H. B. Zachry Company Letter No. HBZ 227, dated 09/18/98 (Copy Attached)

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK
22

PROJECT: Addison Airport Tunnel

DATE: 8/27/98 — SUPPLEMENTAL AGREEMENT NO. 22

SHEET NO. 1 OF 2 — CONTRACT NO: DNT-260

H B Zachry Company (CONTRACTOR) — PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

I AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT.
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT
DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

It is desirable to alter the tunnel walkway from a solid floor reinforced concrete structure to a structure with a meshed T-501 rail on the street side of the concrete footings, and a 6" precast sidewalk supported by steel angles on the back of the T-501 and the face of the tunnel lining. This forms a "crawl space" that will carry the utilities (water and electrical) through the tunnel. These details are shown on the plans submitted by H. B. Zachry (with revisions) dated 6/8/98.

Total Lump Sum price for this addition is $28,250.00 C

3008.SP Expansion Joints are needed between the concrete footing and the 10" concrete pavement. These longitudinal expansion joints will be 3/4" preformed fiber board, and the top of the joint routed and sealed with hot poured rubber joint sealing compound.

Total Lump Sum price for this change is $12,367.59 b

Fall out repair at approximately Sta 20+95 to 21+55 and add extra tunnel support.

Total Lump Sum price for this change is $60,620.68 C

The plans and specifications were unclear as to the amount of steel fibers in the footing block along the edges of the tunnel. An agreed-upon price has been established for this work.

Extra fibers in footing block $27,770.00 d

The specifications require that the concrete used in the tunnel liner be placed at not more than 80 degrees F. Due to the delay caused by utility adjustments in the early stages of the work, the placing of the liner was delayed by approximately two (2) months. This moved the schedule of liner placement into the warmer months and necessitated the addition of ice and chilled water to the concrete in order to meet the temperature specifications. The change for this for the two months is as follows:

Ice and chilled water for temperature control $101,850.00 C

Substitute reinforcing steel hangers that would provide a better seal in the tunnel liner. These hangers were patented, and cost more than the hangers that the contractor originally wanted to use. As agreed-upon price has been established for the difference in material costs.

Total price change for hangers	$26,182.00
Subtotal	$265,040.47
Bond at 1%	$2,650.40
TOTAL PRICE THIS SUPPLEMENTAL AGREEMENT	$267,690.87

SUBMITTED BY: BROWN & ROOT, INC. — CONSTRUCTION MANAGER — (DATE)

I (WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE

RECOMMENDED FOR APPROVAL: Ginn Corporation — 10/14/98 (DATE)

CONTRACTOR: H B Zachry Company — BY: 10/2/98 (DATE)

APPROVAL RECOMMENDED: NORTH TEXAS TOLLWAY AUTHORITY — PROJECT MANAGER — 10-17-98 (DATE)

SURETY: American Home Assurance Company — BY: Socrates Ramirez, Attorney-In-Fact — 10/21/98 (DATE)

APPROVED: NORTH TEXAS TOLLWAY AUTHORITY — DEPUTY EXECUTIVE DIRECTOR — 10/22/98 (DATE)

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK
23

PROJECT: Addison Airport Tunnel

DATE: 10/8/98 — SUPPLEMENTAL AGREEMENT NO. 23

SHEET NO. 1 OF 1 — CONTRACT NO: DNT-260

H B Zachry Company (CONTRACTOR) — PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

I AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT.
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT
DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

In order to complete the slide repair and the contract terms concurrently without affecting the critical path, it has been found necessary to work nights. The extra expenses are listed below for night work.

2 Each Portable Light Towers (rent & operation expenses)	LS		$7,033.40
Mechanic & Supplies for Night Shift	LS		$8,523.57
Substitute Concrete Pump for Crane for night work	LS		$8,283.87
Lost Productivity for night work (20% of est. Labor)	LS		$9,888.69

TOTAL PRICE THIS SUPPLEMENTAL AGREEMENT $31,829.53

SUBMITTED BY: BROWN & ROOT, INC. — CONSTRUCTION MANAGER — (DATE)

I (WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE

RECOMMENDED FOR APPROVAL: Ginn Corporation — 10/16/98 (DATE)

CONTRACTOR: H B Zachry Company — BY: 10/16/98 (DATE)

APPROVAL RECOMMENDED: NORTH TEXAS TOLLWAY AUTHORITY — PROJECT MANAGER — 10-21-98 (DATE)

SURETY: American Home Assurance Company — BY: Socrates Ramirez, Attorney-In-Fact — 10/26/98 (DATE)

Hugh E. Johnson, Division Operations Manager

APPROVED: NORTH TEXAS TOLLWAY AUTHORITY — DEPUTY EXECUTIVE DIRECTOR — 10/27/98 (DATE)

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR ALTERED QUANTITY AND/OR UNIT PRICES
24

Project: Addison Airport Toll Tunnel

Date: November 25, 1998 — Supplemental Agreement No. 26

Sheet No. 1 of 1 Sheets — Contract No: DNT-260

N.B. Zachry Company (Contractor) — P.O. Box 531558 Grand Prairie, TX 75053 (Address)

(Agreement shall pertain to only one Contract and shall be numbered consecutively for each Contract)

1 ITEM No.	2 CODE NO.	3 LOCATION	4 DESCRIPTION OF ITEM	5 QUANTITY	6 UNIT	7 UNIT PRICE	8 ADDITION	9 NON-PER-FORMANCE
402 & SP	1610-11593	"	Trench Excavation Protection (Ctn Sew)	110	LF	1.00		110.00
403 & SP	1610 11993		Temporary Special Shoring	1100	SF	10.00	11,000	
(Explanation of work if necessary) Quantity of Temporary Special Shoring was placed before Disputes Review Board ("DRB") for adjudication. SA #24 reflects and incorporates the determination and recomendation of the DRB.				Totals			$ 11,000	$110.00
				Net Total			$ 10,890	

SUBMITTED BY: Brown & Root, Inc. — CONSTRUCTION MANAGER — 1-9-99 (DATE)

RECOMMENDED FOR APPROVAL: Ginn Corporation — 1/18/99 (DATE)

APPROVAL RECOMMENDED: NORTH TEXAS TOLLWAY AUTHORITY — Engineering Manager — 11/25/98 (DATE)

APPROVED: NORTH TEXAS TOLLWAY AUTHORITY — Deputy Executive Director — 12/15/98 (DATE)

I (WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME AS DEFINED IN ARTICLE 4.3 AND SP-0F THE CONTRACT AND THAT I(WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE

CONTRACTOR: H.B. Zachry Company

BY: Hugh E. Johnson, Division Operations Manager (DATE) 12/08/98

SURETY: AMERICAN HOME ASSURANCE COMPANY

BY: Socrates Ramirez, Attorney-In-Fact (DATE)

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK
25

PROJECT: Addison Airport Tunnel

DATE: 12/31/98 — SUPPLEMENTAL AGREEMENT NO 25

SHEET NO. 1 OF 3 — CONTRACT NO: DNT-260

H B Zachry Company (CONTRACTOR) — PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

I AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT.
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT
DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

It is desirable to add to the existing contract, DNT-260, the signing, pavement markings, and illumination. This addition will expedite the installation of these items, and will save the expense of bidding and awarding of the contract for these items. The Contractor, H. B. Zachry, has proposed pricing for these items that is fair and equitable for this work, and is as follows:

ITEM #	DESCRIPTION	PER	QUANTITY	COST	TOTAL
500.ASP	Mobilization	LS	1.00	$20,000.00	$20,000.00
8365SP	Aluminum Signs	SF	224.25	$24.22	$5,431.34
8365SP	Aluminum Signs (TY A)(Ground Mounted)	SF	36.00	$32.63	$1,255.52
8365SP	Aluminum Signs (TY A)(Posts)	SF	117.00	$33.14	$3,877.38
6445SP	Small Roadside Traffic Sign (TY A Mount)	EA	29.00	$414.27	$10,208.75
6445SP	Small Roadside Traffic Sign (TY A-1 Mount)	EA	8.00	$586.33	$2,931.75
6445SP	Small Roadside Traffic Sign (TY A-B-B Mount)	EA	1.00	$497.13	$497.13
6445SP	Small Roadside Traffic Sign (TY B Mount)	EA	10.00	$873.18	$8,731.60
6445SP	Small Roadside Traffic Sign (TY D-2 Mount)	EA	4.00	$597.72	$2,370.92
6445SP	Small Roadside Traffic Sign (TY D-8 Mount)	EA	2.00	$1,208.31	$2,536.62
6445SP	Small Roadside Traffic Sign (Structure Mount)	EA	2.00	$1,551.12	$3,110.24
8476SP	Large Roadside Sign Supports (Struct Stl)	LBS	255.20	$8.77	$2,238.10
8508SP	Overhead Sign Supports (2D Cantilever)	EA	2.00	$24,651.38	$49,302.76
6665SP	Thermoplastic Pvmt Mark (Perm)(White, 4" Solid)	LF	5625.00	$1.41	$9,941.25
6665SP	Thermo Pvmt Mrkg (Perm)(White, 4" Broken)	LF	70.00	$3.22	$225.40
6666SP	Thermo Pvmt Mrkg (Perm)(White, 18" Solid)	LF	185.00	$17.43	$3,226.25
6724SP	Raised Pavement Markers (TY E-A-A)(CI B)	EA	319.00	$9.37	$2,974.75
6725SP	Raised Pavement Markers (TY II C-R)(CI B)	EA	7.00	$8.38	$58.66
6724SP	Raised Pvmt Mrkrs (TY Y)(CI Cy/Tnsl Bin)	EA	80.00	$8.49	$8,002.23
6725SP	Raised Pvmt Mrkrs (TY Y)(CI A)(Jiggle Bar)	EA	156.00	$10.20	$1,591.20
SS 760	Light Pole Lumaires (II-400-10-40MH)(Install)	EA	13.00	$309.52	$4,578.96
SS 760	Light Pole Lumaires (III-400-10-40MH)(Install)	EA	4.00	$305.53	$1,223.72
SS 760	Light Pole Floodlight (400 Fld-40MH)(Install)	EA	10.00	$305.92	$3,059.20
SS 760	Lighting Pole (Concrete)(Install)	EA	17.00	$468.83	$7,966.71

DNT 260 Supplemental Agreement No. 25 — Page 2 of 3

SS 760	Lighting Pole (Wall Mounted)(Install)	EA	4.00	$812.61	$3,250.44
SS 760	Wall Mounted Lumara (150W)(Install)	EA	5.00	$554.49	$2,772.45
SS 760	Wall Mounted Lumara w/ Switch (150W)(Install)	EA	2.00	$630.97	$1,261.94
SS 760	Lighting Pole Foundations	EA	17.00	$975.88	$16,589.96
SS 760	Ground Wire (#6 Bare)	LF	564.00	$1.02	$565.08
SS 760	Ground Wire (#6 Bare)	LF	1096.00	$0.83	$909.68
SS 760	Ground Wire (#10 Bare)	LF	463.00	$0.83	$384.29
SS 760	Conductor (#6THWN/THWN)	LF	908.00	$0.89	$808.12
SS 760	Conductor (#8THWN/THWN)	LF	6170.00	$0.83	$5,121.10
SS 760	Conductor (#10THWN/THWN)	LF	3527.03	$0.76	$2,756.52
SS 760	Distribution & Control Center	LS	1.00	$11,317.21	$11,317.21
SS 760	Ground Pull Boxes (13"X24")(Install)	EA	8.00	$529.00	$4,232.00
SS 760	Duct-Cable (2#6)(2#8)(1#6 Grnd)(1 1/4" Conduit)	LF	801.00	$18.59	$13,128.89
SS 760	Duct-Cable(2#8)(1#8 Grnd)(1 1/4" Conduit)	LF	1240.00	$13.13	$16,281.20
SS 760	Conduit (1" GRS)	LF	1810.00	$20.08	$3,012.00
SS 760	Conduit (1 1/2" GRS)	LF	285.00	$19.82	$5,648.70
SS 760	Sign Mount Signal Lights (Install)	Per	5.00	$1,648.29	$9,241.45
SS 760	Sign Face Luminares (Install)	EA	6.00	$1,153.38	$6,921.48
SS 760	Fused Connector Kits (Install)	EA	56.00	$63.73	$3,568.88
SS 763	Unfused (Wire) Connector Kits (Install)	EA	28.00	$63.73	$1,784.44
	SUBTOTAL				$263,845.24

In order to provide drainage from behind the retaining wall from approximate Sta 29+50 to 34+02, it is necessary to add some 5' wide Ty A Flumes, approximately 150 LF of 15" storm sewer pipe, and approximately 175 LF 21" pipe. Also, two Type F inlets will be needed. The prices for these items are as follows:

Approximately 150 LF of 15" CI #II pipe @ $50.27/LF =	$7,540.50
Approximately 175 LF of 21" CI #II pipe @ $66.35 =	$11,436.25
Approximately 453 LF of Ty A Flume w/ curb @ $ 39.75 =	$18,006.75
2 each Ty F inlets @ $ 850.00 =	$1,700.00
	$38,683.50

It was determined that temperature control was necessary for the concrete used for the deck pours at the cut and cover section near Station 10+00. Payment for this item previously approved by NTTA. The cost of adding ice and chilled water is as follows:

Chilled Water and Ice	CY	252.00	$25.94	$6,538.88

DNT-260 Supplemental Agreement No. 25 — Page 3 of 3

In the design of the side repair 4 sacks per cubic yard concrete was to be used for the fill by design. This necessitated the extension of the Type 503 reinforcing bars on the N. E. Retaining wall. Zachry proposed to place 5 Sk (300 LB) concrete in order to be able to complete the work at an earlier date. Since 5 Sk. Concrete was used for this, the need for the extension of the bars became unnecessary. Therefore, a credit is due to NTTA for this change. The credit is as follows:

Eliminate extension of Type 503 bars	LS	1.00	(8,000.82)	($8,000.82)
TOTAL THIS SUPPLEMENTAL AGREEMENT				$298,064.80

SUBMITTED BY: BROWN & ROOT, INC. — CONSTRUCTION MANAGER — 7-1-99 (DATE)

I (WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE

RECOMMENDED FOR APPROVAL: Ginn Corporation — 7/1/99 (DATE)

CONTRACTOR: H.B. Zachry Company — BY: Hugh E. Johnson, Division Operations Manager (DATE) 01/25/99

APPROVAL RECOMMENDED: NORTH TEXAS TOLLWAY AUTHORITY — PROJECT MANAGER — 2-8-99 (DATE)

SURETY: American Home Assurance Company — BY: Socrates Ramirez, Attorney-In-Fact (DATE) 01/25/99

APPROVED: NORTH TEXAS TOLLWAY AUTHORITY — DEPUTY EXECUTIVE DIRECTOR — 2/3/99 (DATE)

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK
26

PROJECT: Addison Airport Tunnel

DATE: 3/15/99 — SUPPLEMENTAL AGREEMENT NO 26

SHEET NO 1 OF 1 — CONTRACT NO: DNT-260

H B Zachry Company (CONTRACTOR) — Zachry Construction Corporation — PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

I AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT.
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT
DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

NTTA has requested that the inside of the tunnel be sealed (painted). This work will be accomplished between the hours of 9:00 p. m and 5:00 a.m. Color of the Tunnel surface above the walkway will be Porter Paint color 7178-1, "Platinum White" and for the traffic rail, color 7183-1 "Cobblestone."

Agreed upon price to be $129,354.23

Upon completion of the paving it was discovered that the drainage inlets in the tunnel were not at the low point. Portions of the concrete flume and concrete paving had to be removed to place two inlets and tie into the drain line

Total cost of the work is as follows

Install two floor drains in tunnel	$11,383.74
TOTAL PRICE THIS SUPPLEMENTAL AGREEMENT	$140,737.97

SUBMITTED BY: BROWN & ROOT, INC. — CONSTRUCTION MANAGER — (DATE)

I (WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE

RECOMMENDED FOR APPROVAL: Ginn Corporation — 3/17/99 (DATE)

CONTRACTOR: H.B. Zachry Construction Corporation — BY: 03/22/99 (DATE)

APPROVAL RECOMMENDED: NORTH TEXAS TOLLWAY AUTHORITY — PROJECT MANAGER — 4/6/99 (DATE)

SURETY: American Home Assurance Company — BY: Socrates Ramirez, Attorney-In-Fact — 03/22/99 (DATE)

Hugh E. Johnson, Division Operations Manager

APPROVED: NORTH TEXAS TOLLWAY AUTHORITY — DEPUTY EXECUTIVE DIRECTOR — 4/7/99 (DATE)

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK
27

PROJECT: Addison Airport Tunnel

DATE: 3/17/99 — SUPPLEMENTAL AGREEMENT NO 27

SHEET NO 1 OF 1 — CONTRACT NO: DNT-260

H B Zachry Company (CONTRACTOR) — Zachry Construction Corporation — PO Box 531558, Grand Prairie, TX 75053 (ADDRESS)

I AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT.
AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT
DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

NTTA has requested the contractor to construct the footing as per plans furnished for the communications tower and erect owner furnished tower on the footing at a site adjacent to the tunnel at the CC and Tower MEP room. Contractor assumes no responsibility of the operations of said tower, since it is owner furnished. Total cost is as follow:

Antenna Footing	LS			$7,041.00
Erection of Tower				$1,635.00
TOTAL				$8,676.00

Addendum No 1 changed the fuel for the emergency generators from diesel to natural gas. There were no provisions to connect the natural gas supply to the generators. Cost to install the meter and plumbing is as follows

Natural Gas Supply installation for Emergency Generators LS TOTAL $6,208.29

The City of Addison fire department required a change in the Tunnel Fire Protection Equipment. The cabinets were ordered to be changed to stainless steel cabinets and 150 LF of fire hose per cabinet. Net change after receiving credit for the already purchased equipment is as follows:

9 each. Fire Cabinets with specified hose and nozzles $717.33 ea. $33,445.97

If left alone, serious erosion would occur between the headwalls of Culverts 2 & 3 headwalls. It was decided to place a rip rap channel between these two headwalls. Total price for this approximately 113

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK

29

PROJECT Addison Airport Tunnel

DATE 4/20/99 SUPPLEMENTAL AGREEMENT NO. 29

SHEET NO. 1 OF 3 CONTRACT NO. DNT-260

H B Zachry Company Zachry Construction Corporation PO Box 531558, Grand Prairie, TX 75053
(CONTRACTOR) (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)

AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT
DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

Contractor proposes to install a directional arrow using reflective markers near the east bound exit. Total price for this work including traffic control is as follows:

Install Directional Arrow $437.50

An electrical change is needed to accommodate the removal of the east & west sump for maintenance
Total cost of this change is as follows

Electrical work for the disconnect/connect of the pumps at the east & west sump areas $3,240.27

Additional equipment (strainers and regulators) is needed to connect the emergency generators to the natural gas pipeline. Total cost for this installation is $2,146.05

The sign foundation for overhead sign #1 had to be reworked in order to miss water line W-1, and electrical cables. This involved re-working the steel for the drilled shaft, and furnishing a sonalute for the top of the drilled pier.
Total cost of this operation is $2,370.62

The material supplier, TXI, in error, put fly ash in approximately 54 CY of concrete on Keller Springs, eastbound lane, south side near Addison Road. The strength of the concrete averaged 496.25 instead of 555 as required. A deduction of 30% will be made as per item 420.25 as follows

ITEM #	DESCRIPTION	PER	QUANTITY	COST	TOTAL
	360 Concrete Pavement CP 8"	SY	(225.42)	$27.35	($5,165.24)
	360 Concrete Pavement CP 9"	SY	225.42	$19.15	$4,316.79
					($1,848.44)

Upon completion of the driveway at Concourse Plaza West, there was water trapped on the small apron west of the driveway. It was decided to add a small apron and an inlet directly into the top of the 30" storm sewer line.
Total cost of this apron, curb, and inlets is as follows:

ITEM #	DESCRIPTION	PER	QUANTITY	COST	TOTAL
4658SP	Special inlet and appurtenances	LS	1	$1,737.50	$1,737.50

Page 2 Of 3

DNT-260 Supplemental Agreement No. 29

NTTA requested a concrete pad & posts to protect the Photoelectric cells on the north side of the electrical room
Total price for this item is as follows:

Labor $443.38
Materials $69.75
$513.13

While laying Storm Sewer Line B, a sanitary sewer line was encountered that required the flow line to be raised. Eleven ponts of 60" pipe had to be removed and relaid at the higher elevation. Total cost is as follows

Equipment $1,664.56
Labor $3,548.20
Material $547.46
Field Engineer $808.43
Total $6,568.65

Contractor was asked to extend the 2 1/2" coated metal conduit. to the toll plaza from the tunnel plan termination
Total lump sum cost for this item is as follows

Extend 2 1/2" conduit to toll plaza $17,600.00

Several items of electrical work were increased to facilitate construction. Contractor has agreed to furnish these over-runs at the original bid price as follows

Extend 1 1/2" PVC coated conduit from plan termination to accommodate roadway lighting
140 LF @ $13.50/LF= $1,890.00

Install pull & junction box to accommodate road lighting $3,400.00

Extra 4" PVC coated conduit to accommodate change from electrical room to generators
440 LF @ $44.00/LF $19,360.00

Total this Supplemental Agreement $57,413.28

SUBMITTED BY BROWN & ROOT, INC. 5/14/99
CONSTRUCTION MANAGER (DATE)

I (WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4 4 OF THE STANDARD SPECIFICATIONS AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE

RECOMMENDED FOR APPROVAL Ginn Corporation
(DATE)

CONTRACTOR H-B-Zachry Zachry Construction Corporation

BY David S. Zachry 05/06/99
David S. Zachry, President, CEO99 Group

APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY

BY (DATE)
DIRECTOR OF ENGINEERING

SURETY American Home Assurance Company

APPROVED NORTH TEXAS TOLLWAY AUTHORITY

BY Socrates Ramirez, Attorney-in-Fact 05/06/99

BY (DATE)
DEPUTY EXECUTIVE DIRECTOR

*Signed subject to Zachry Construction Corporation Letter No. 266, dated May 10, 1999.

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK

30

PROJECT Addison Airport Tunnel

DATE 6/11/99 SUPPLEMENTAL AGREEMENT NO. 30

SHEET NO. 1 OF 3 CONTRACT NO. DNT-260

H B Zachry Company PO Box 531558, Grand Prairie, TX 75053
(CONTRACTOR) (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)

AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT
DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

There were no provisions for panic release bar on the inside of the door to the MEP room. The cost of this installed is as follows:

Material $252.45
Labor & Burden $193.75
Total this change $446.20

The shotcrete wall near the east portal has been replaced with a keystone retaining wall. This necessitated additional excavation for the Type A flume. Also, riprap needs to be added on both sides of the flume, also requiring additional excavation. This added excavation is in hard Austin Chalk, and has very limited access to the usual excavating equipment. Some removal of the shotcrete wall is also necessary for the riprap. Cost of this item is as follows:

Extra Rebar & Extra Excavation with rented backhoe $5,348.71
417.87 SY Riprap (Bid price) @ 41.00 $17,124.47
Total this change $22,473.18

Water is seeping into the electrical box located at the east portal facia wall. Contractor proposes to raise the box and construct a curb around the box. Total lump sum price for this change is $471.50

The fence contractor reduced the size of the post holes, thereby reducing the amount of concrete necessary to set the fence posts. We feel that with the rock encountered, and the mow strip poured around the posts, the fence, as installed meets the intent of the specifications. However, NTTA requires a reduction in costs to offset the saving to the contractor. Total credit for concrete not used is as follows:

Credit for reducing amount of concrete is ($1,650.00)

TOTAL THIS SUPPLEMENTAL AGREEMENT $21,740.88

DNT-260 Supplemental Agreement No. 30

Page 2 of 2

SUBMITTED BY BROWN & ROOT, INC.
CONSTRUCTION MANAGER (DATE)

I (WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4 4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE

RECOMMENDED FOR APPROVAL Ginn Corporation
(DATE)

CONTRACTOR H-B- Zachry Construction Corporation

BY Ralph Wilson, Operations Mgr. 07/06/99
(DATE)

APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY

BY (DATE)
DIRECTOR OF ENGINEERING

SURETY American Home Assurance Company

APPROVED NORTH TEXAS TOLLWAY AUTHORITY

BY Socrates Ramirez 07/06/99
Attorney-In-Fact (DATE)

BY (DATE)
DEPUTY EXECUTIVE DIRECTOR

Original Contract Amount: 13,178,790.55
Approved Changes to Date: 2,557,319.22
This CO/SA 122,696.13
Revised Contract Amount: 15,858,805.90
Percentage Change: 20.04%

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK

31

PROJECT Addison Airport Tunnel

DATE 8/16/99 SUPPLEMENTAL AGREEMENT NO. 31

SHEET NO. 1 OF 3 CONTRACT NO. DNT-260

H B Zachry Company PO Box 531558, Grand Prairie, TX 75053
(CONTRACTOR) (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)

AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT
DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

In January, 1998, a rock slide occurred near the east portal of the Addison Airport Tunnel. At the time, the amount of clean up was difficult to determine, and it was decided to do the clean up by Force Account. All repair work has been paid by agreed upon prices. The amount of time added to the contract has now been established as 27 calendar days. This is the time that the completion of the contract was actually delayed by the rock slide. Even though the clean up occurred over several weeks, other work was being accomplished at the same time. Charges for project overhead have been gathered and are summarized below. Charges for the clean up items are also summarized. Paid invoices have been delivered to substantiate these charges, and are on file in the project records. Payroll records are a part of these proofs of expenditures. The summaries are as listed:

Overhead for 27 calendar days:

Labor	$32,148.24
Equipment	$8,769.60
Misc., Project office overhead	$7,787.90
Subtotal	$48,655.74
.0625 Home office Overhead	$3,042.86
Subtotal	$51,728.60
Profit @ 5.33%	$2,757.13
Total Overhead	$54,485.73

Force Account work for removal of Slide debris:

	Direct cost	Addn'l OH	Profit	Total
Labor	$16,162.32	$1,618.23	$2,666.78	$20,445.33
Equipment				
K. Odonnell	$26,640.00	N/A	N/A	$26,640.00
R Do Esvio	$7,541.49	N/A	N/A	$7,541.49
Bans	$2,050.00	N/A	N/A	$2,050.00
Co. Owned	$730.16	N/A	N/A	$730.16
Total Equipment				$36,967.65

DNT-260 Supplemental Agreement No. 31

Page 2 of 2

Materials & Supplies	$1,941.60	$194.16	$320.36	$2,456.12
S/C & Hauling	$7,583.00	$758.30	–	$8,341.30
Total Removal Costs				$68,210.40

TOTAL THIS SUPPLEMENTAL AGREEMENT $122,696.13

SUBMITTED BY BROWN & ROOT, INC. 9-21-99
CONSTRUCTION MANAGER (DATE)

I (WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4 4 OF THE STANDARD SPECIFICATIONS, AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE.

RECOMMENDED FOR APPROVAL Ginn Corporation
P.E. 9/21/99 (DATE)

CONTRACTOR H-B- Zachry Construction Corporation

BY 9/13/99
Ralph Wilson, Operations Mgr. (DATE)

APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY

BY 10-5-99 (DATE)
DIRECTOR OF ENGINEERING

SURETY American Home Assurance Company

APPROVED NORTH TEXAS TOLLWAY AUTHORITY

BY 10/7/99 DATE
DEPUTY EXECUTIVE DIRECTOR

Original Contract Amount: 13,178,790.55
Approved Changes to Date: 2,680,015.35
This CO/SA 153,477.47
Revised Contract Amount: 15,833,277.37
Percentage Change: 20.06%

FORM NO. 103

NORTH TEXAS TOLLWAY AUTHORITY
SUPPLEMENTAL AGREEMENT FOR EXTRA WORK

32

PROJECT Addison Airport Tunnel

DATE 9/29/99 SUPPLEMENTAL AGREEMENT NO. 32

SHEET NO. 1 OF 2 CONTRACT NO. DNT-260

Zachry Construction Company PO Box 531558, Grand Prairie, TX 75053
(CONTRACTOR) (ADDRESS)

(AGREEMENT SHALL PERTAIN TO ONLY ONE CONTRACT AND SHALL BE NUMBERED CONSECUTIVELY FOR EACH CONTRACT)

AUTHORIZATION IS HEREBY REQUEST FOR THE PERFORMANCE OF EXTRA WORK UNDER THE ABOVE CONTRACT
DESCRIBED AS FOLLOWS (ATTACH DRAWING OR SKETCHES WHERE APPLICABLE) (EXPLAIN BELOW IF REQUIRED)

The plans provide for cast iron grates over the trench drains. These were installed, and have proven to be undesirable due to excess breakage. NTTA requests that steel grates be installed in lieu of the cast iron grates.
The cost of this is as follows:

Labor	Lump Sum	$2,791.95
Supplies	Lump Sum	$1,029.31
* Equipment	(per shift)	$1,730.00
Materials	Lump Sum	$3,965.00
Estimated Total		$9,516.28

* If more than one shift is required, an additional price of $1730.00 will be paid to the contractor for equipment.

The Town of Addison has requested covers over the fire connections inside the tunnel. Cost to add 9 covers is as follows:

Materials & Supplies	$18,667.51
Labor & Equipment $1755.90 per shift	
* Estimate 3 shifts	$5,267.70
Estimated Total	$23,935.21

* Number of shifts to be paid are the actual number of shifts that it takes to do the work.

Estimated Total, This Supplemental Agreement $33,471.47

DNT-260 Supplemental Agreement No. 32

Page 2 of 2

SUBMITTED BY BROWN & ROOT, INC. 10-7-99
CONSTRUCTION MANAGER (DATE)

I (WE) HEREBY AGREE THAT THE WORK LISTED IN THIS FOREGOING APPLICATION IS "EXTRA WORK" AS THE SAME IS DEFINED IN ARTICLE 4 4 OF THE STANDARD SPECIFICATIONS AND THAT I (WE) WILL PERFORM SAID WORK IN CONSIDERATION FOR PAYMENT AND COMPENSATION AS SPECIFIED ABOVE.

RECOMMENDED FOR APPROVAL Ginn Corporation
P.E. 10/7/99 (DATE)

CONTRACTOR Zachry Construction Corporation

BY Ralph Wilson, Operations Mgr. October 13, 1999
(DATE)

APPROVAL RECOMMENDED NORTH TEXAS TOLLWAY AUTHORITY

BY 11-17-99 (DATE)
DIRECTOR OF ENGINEERING

SURETY AMERICAN HOME ASSURANCE COMPANY

APPROVED NORTH TEXAS TOLLWAY AUTHORITY

BY Socrates Ramirez October 13, 1999
Attorney-In-Fact (DATE)

BY 11/17/99 (DATE)
DEPUTY EXECUTIVE DIRECTOR

FINAL RECORD DRAWING
Date: 12/25/99

NO.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

SUPPLEMENTAL AGREEMENTS 29-32

DRAWN _____ DATE _____ DESIGNED _____ DATE _____
CHECKED _____ DATE _____ SCALE _____

CONTRACT NO. DNT-260 SHEET ____ OF ____

ZACHRY-MONTEREY — REQUEST FOR INFORMATION — ADDISON AIRPORT TUNNEL - JOB #9080.01 — 111

MAY 16 1997 — HB2 # 111 — RFI No.: 005 — Date 05/12/97

Subcontractor (if applicable): _____

Subject: Membrane Lining - Inspection of wire strands
Drw/Spec. No.: Special Spec 4103-3.1.D.

Reply Req'd By: D. Hubenak
Distribution List:
Jim Roskie - Monterey
Job 9080.01 - 005

Problem:

The above referenced section requires "inspection of the shotcrete lining and bend all wire strands which protrude so that they are parallel to the shotcrete surface and will not damage or puncture the synthetic membrane." Experience with this method is that it is theoretical but not practical. The rough and piercing texture of the fiber shotcrete does not provide adequate protection of the membrane liner.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0.5 Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: |Date: |Reviewed By:

We recommend placing a thin coat of fiberless shotcrete over the fiber shotcrete to protect the membrane from tears and punctures. Cost to place fiberless shotcrete will be per cubic yard of fiberless shotcrete. Please request issuance of a change order for fiberless shotcrete for membrane protection.

Response by Construction Management:

Solution By: |Date: |Reviewed by: |Date:

ZACHRY-MONTEREY — REQUEST FOR INFORMATION — ADDISON AIRPORT TUNNEL - JOB #9080.01 — 111B

HB2 # 111B — RFI No.: 111B — Date 05/30/97

Subcontractor (if applicable): _____

Subject: Membrane Lining - Inspection of wire strands
Drw/Spec. No.: Special Spec 4103-3.1.D.

Reply Req'd By: D. Hubenak
Distribution List:
Jim Roskie - Monterey
Job 9080.01 - 005B

Problem:

The above referenced section requires "inspection of the shotcrete lining and bend all wire strands which protrude so that they are parallel to the shotcrete surface and will not damage or puncture the synthetic membrane." Experience with this method is that it is theoretical but not practical. The rough and piercing texture of the fiber shotcrete does not provide adequate protection of the membrane liner.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0.5 Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: |Date: |Reviewed By:

We propose to overexcavate 2" to 4" to allow for placing an additional 1" of fiberless shotcrete. The additional excavation and concrete for the tunnel liner will be at no cost to the owner. The additional 1" of fiberless shotcrete will require approximately 525 CY @ $235.00/CY = $123,375.00
Please request issuance of a change order for fiberless shotcrete for membrane protection.

Response by Construction Management:

Solution By: |Date: |Reviewed by: |Date:

ZACHRY-MONTEREY — REQUEST FOR INFORMATION — ADDISON AIRPORT TUNNEL - JOB #9080.01 — 110

HB2 # 110 — RFI No.: 004 — Date 05/12/97

Subcontractor (if applicable): _____

Subject: Membrane Lining - Rebar Reinforcement
Drw/Spec. No.: Special Spec 4103-3.3.1.

Reply Req'd By: D. Hubenak
Distribution List:
Jim Roskie - Monterey
Job 9080.01 - 004

Problem:

The above referenced section specifies rebar reinforcement to be supported by the liner. Recent discussions with the manufacturer indicate this design is "not adequate to support the rebar reinforcement." This design has been implemented, without success, on other tunnel projects supplied by the manufacturer.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0.5 Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: |Date: |Reviewed By:

We recommend using epoxy rock anchors as shown in the attached drawing. This system has been implemented successfully on other tunnel projects and a similar system was utilized on the DART tunnel. There will be no cost to implement this rock anchor system. Please request issuance of a change order for the recommended system.

Response by Construction Management: INSUFFICIENT DATA PROVIDED. AGAINST ORIGINAL SEALED ENGINEERING AND CONTRACTUAL DOCS & CONCEPTS. ORIGINAL DESIGN AS INCLUDED BOLTING WITH EMBEDMENT AND ATTACHMENT AND SEALING MEETS THE INTENT OF ENGINEERING SPECS AND CONTRACT DOCS. ANY ALTERNATE SPECS MUST BE SUBMITTED, REVIEWED AND APPROVED BEFORE IMPLEMENTATION. ANY ADDITIONAL EXCAVATION, SHOTCRETE, REBAR, ANCHORS, ETC. REQUIRED TO IMPLEMENT ANY ALTERNATE SYSTEM WILL BE AT NO ADDITIONAL COST TO OWNER. THAT MUST ASSIST US IN EXPEDITIOUSLY ASSESSING THE PROPOSED SOLUTION.

Solution By: Ed Freeman (ECM) Date: 6/3/97 Reviewed by: Date:

H. B. ZACHRY COMPANY — REQUEST FOR INFORMATION — ADDISON AIRPORT TUNNEL — 109

Subcontractor (if applicable): Lone Star Gas, Renaissance — RFI No.: 109 — Date 13-May-97

Subject: Natural Gas Line Crossing @ Dooley Road
Drw/Spec. No.: As Supplied

Originator: Jim Gardner
Reply Req'd By: 15-May-97
Distribution List:
Brown & Root
Renaissance
Majed Limam
Lone Star Gas

Problem:

There are no horizontal or vertical layouts for the proposed Lone Star Gas line that crosses our utilities at Dooley Rd. We need to explore the options as soon as possible.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Jim Gardner |Date: 5/13/97 |Reviewed By: Majed Limam

Attached are two alternatives:
1. H. B Zachry believes this option would be safer and simpler because it requires a shallow ditch.
2. Requires a deep trench. This solution still is acceptable to H. B. Zachry Co.

Both options should allow for the construction of our utilities.

Response by Construction Management:

Solution By: |Date: |Reviewed by: |Date:

H. B. ZACHRY COMPANY — REQUEST FOR INFORMATION — ADDISON AIRPORT TUNNEL — 108

Subcontractor (if applicable): Renaissance — RFI No.: 108 — Date 12-May-97

Subject: Staking & Relocation of Telephone Line @ Dooley Road
Drw/Spec. No.: C33

Originator: Majed Limam
Reply Req'd By: 14-May-97
Distribution List:
Thomas Kelley
Majed Limam
Renaissance

Problem:

No existing telephone line is shown on the western side of Dooley Road on sheet C33 (Existing Utilities). In actuality, a telephone line is located on that particular area of the project (just off of existing west side curb). This RFI is to request that the line be relocated as soon as possible so that yard utilities construction can proceed without any further delays. This phone line was encountered on Saturday 5/10/97 by a Renaissance crew, and we are currently waiting for any damage assessment by Southwestern Bell Telephone. Your prompt attention to this matter is greatly appreciated.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: |Date: |Reviewed By:

Response by Construction Management:

Solution By: |Date: |Reviewed by: |Date:

H. B. ZACHRY COMPANY — REQUEST FOR INFORMATION — ADDISON AIRPORT TUNNEL — 107

Subcontractor (if applicable): _____ — RFI No.: 107 — Date 05/12/97

Subject: Utility Locations at Keller-Springs Rd (West Side)
Drw/Spec. No.: Attached

Reply Req'd By: 05/14/97
Distribution List:
Bill Leech
Majed Limam
Job File

Problem:
The narrow easement along the north side of Keller-Springs Road (W) does not allow room for placement of all utilities (third party & contract) according to plans. The NW retaining wall footings fall very close to the proposed water line location in some areas.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 3 Hrs
Surveying Crew: 2 Hrs
Other: Hrs

Proposed Solution by Contractor By: J. Gardner |Date: 05/12/9 |Reviewed By: C.Terrana

In the area adjacent to the parking lot, we propose to locate the T.U. electric poles approximately 1 foot from the back of the parking lot curb. As per the attached drawings, we also propose to move the gas and water lines closer to the curb to avoid the footings. We will return to the original utility locations (see RFI 103) in the area once space allows.

Response by Construction Management:

Solution By: |Date: |Reviewed by: |Date:

ZACHRY-MONTEREY — REQUEST FOR INFORMATION — ADDISON AIRPORT TUNNEL - JOB #9080.01 — 106

HB2 # 106 — RFI No.: 003 — Date 05/06/97

Subcontractor (if applicable): _____

Subject: Shotcrete Strength
Drw/Spec. No.: Special Spec 4102-1.1.C.1.

Reply Req'd By: D. Hubenak
Distribution List:
Jim Roskie - Monterey
Job 9080.01 - 003

Problem:

The above referenced section specifies a design strength for the shotcrete of 3,500 psi. Section 1.2.D.7.j.ii., Section 1.2.D.7.j.i. and Section 3.1.A.8.a. reference 28 day strength of 4,000 psi. Please advise.

Possible rework or extra work involved with this RFI? Y (N)
Delays in project execution involved with this RFI? Y (N)
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0.25 Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: |Date: |Reviewed By:

Response by Construction Management:

Under section 1.2.D.7.j.i ~~the~~ is a remark which states the 28 day strength differs from the design strength due to more lenient conditions under preconstruction Testing this coupled with section 1.1.C. tells me that the design strength is as stated in the special specification @ 4,000 psi and the 28 day strength is 4,000psi

This should clear up any questions you may have. I have verbally notified Majed at H. B. Zachry at no holiday weather no visit inlet agreed

Solution By: Gary Hall (HBZ) Date: 6/2/97 |Reviewed by: |Date:

ZACHRY-MONTEREY — REQUEST FOR INFORMATION — ADDISON AIRPORT TUNNEL - JOB #9080 — 105

HB2 # 105 — RFI No.: 002 — Date 05/05/97

Subcontractor (if applicable): _____

Subject: Instrumentation
Drw/Spec. No.: Special Spec 4104-2.10.A.

Reply Req'd By: D. Hubenak
Distribution List:
Jim Roskie - Monterey
Job 9080.01 - 002

Problem:

The above referenced section specifies to provide roof leveling pins in the crown of the tunnel. The pin shall be equipped with a bulls-eye or cross hair target suitable for measuring changes in elevation of the target either optically or with a laser leveling instrument. the target and instrument shall be capable of indicating deflections at the crown of the tunnel within a tolerance of +/- 0.005 inch. Should this read +/- 0.005 feet? Please advise.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0.25 Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: |Date: |Reviewed By:

CORRECTION SHOULD BE +/- 0.005 FOOT

Ed Freeman 5/9/97

Response by Construction Management:

Solution By: |Date: |Reviewed by: |Date:

ZACHRY-MONTEREY — REQUEST FOR INFORMATION — ADDISON AIRPORT TUNNEL - JOB #9080.01 — 104

HB2 # 104 — RFI No.: 001 — Date 05/06/97

Subcontractor (if applicable): _____

Subject: Tunnel Shotcrete Test Specimen
Drw/Spec. No.: Special Spec 4102-3.1.A.1.

Reply Req'd By: D. Hubenak
Distribution List:
Jim Roskie - Monterey
Job 9080.01 - 001

Problem:

The above referenced section specifies to furnish three-inch diameter core test specimens with minimum length of six inches. It is assumed that the core sample in the Type I tunnel will consist of a core that is three inches of shotcrete and three inches of rock since the Type I tunnel requires three inches of shotcrete. Please advise.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0.25 Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: |Date: |Reviewed By:

Gary Hall HBZ 5/7/97

ASSUME IS A PROFESSIONAL GEOTECHNICAL ENG IS USED THAT WILL BE ABLE TO ACCOMPANY ANY TESTING ENGINEER Ed Freeman

Response by Construction Management:

Solution By: |Date: |Reviewed by: |Date:

H. B. ZACHRY COMPANY — REQUEST FOR INFORMATION — ADDISON AIRPORT TUNNEL — 103

Rec'd 5-5-97 — MAY 05 1997 — RFI No.: 103 — Date 6/2/97

Subcontractor (if applicable): _____

Subject: Location of Gas Line, Water Line, and Conduit
Drw/Spec. No.: None

Reply Req'd By: 5/7/97 MSR
Distribution List:
Jim Gardner
Lone Star Gas
Pat Quinlivan
Sue

Problem:
Trying to confirm the location of the following utilities as conveyed to Zachry by Brown & Root.

TU Electric Line 1' off easement line.
Gas Line 5' off easement line.
Water Line 8' off road line.

All these lines are located on the west side, north of C of Keller Springs, adjacent to Business Parking Lot.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: |Date: |Reviewed By:

Response by Construction Management:
Phone Discussion Wilson Gerrard & me 5/7 TIA
Rpt'd Mr Jerry Pullen 5/5/97 at 10:45 AM
Confirmed Neil Yerby @ 3:45 PM 5/7/97 SMR

Solution By: |Date: |Reviewed by: |Date:

H. B. ZACHRY COMPANY — REQUEST FOR INFORMATION — ADDISON AIRPORT TUNNEL — 102

APR 28 1997 — RFI No.: 102 — Date 4/28/97

Subcontractor (if applicable): Zachry/Monterey

Subject: Roadway plan & Profile exam.
Drw/Spec. No.: C19

Reply Req'd By: 5/5/97
Distribution List:
J.D. Martin
Ross Navenette
Majed Limam

Problem:
Please look at attached memo for discrepancy on time

The profile information on sheets C-19 and C-20 is incorrect. The slope from PVI station 5+50 to PVI station 11+25 calculates 6.1113% not 6.061% as shown on the drawings. We need to bring this to the owners attention so that these two sheets can be revised.

Thanks,

JEFFY

Possible rework or extra work involved with this RFI? Y (N)
Delays in project execution involved with this RFI? Y (N)
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Jeff Lehman |Date: |Reviewed By:

Response by Construction Management:

Solution By: |Date: |Reviewed by: |Date:

H. B. ZACHRY COMPANY — REQUEST FOR INFORMATION — ADDISON AIRPORT TUNNEL — 101

April, 1997 — RFI No.: 101 — Date 04/21/97

Subcontractor (if applicable): _____

Subject: Payment Process/Deadlines
Drw/Spec. No.: Item 9. Measurement and Payment

Reply Req'd By: 05/02/97
Distribution List:
Tommy Kelly
Bobby Kemp
Pete Davis

Problem:
Monthly estimate closing has been established to be the last Saturday of each month, but, the process that follows this closing has not been formulated and accepted by all involved parties. Additionally, the method of payment to H.B. Zachry Company from the Texas Turnpike Authority has not been established.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs 1

Proposed Solution by Contractor By: Carlina J. Terrana |Date: 04/21/97 |Reviewed By: James Gardner

This Proposal suggests that after the closing day of each month, H.B. Zachry representatives and Brown & Root representatives will review the monthly estimate and submit for payment to the Texas Tollway Authority by Friday of the next week. The Texas Tollway Authority will then have 15 days to pay H.B. Zachry Company for the work completed and submitted in the monthly estimate. The preferred method of payment to H. B. Zachry Company is a direct deposit transaction which can be set up upon approval of this RFI.

Response by Construction Management:

Solution By: |Date: |Reviewed by: |Date:

Missing
RFI # 24

FINAL RECORD DRAWING
Date: 12/25/99

NO.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

RFI# 101 - 111

DRAWN _____ DATE _____ DESIGNED _____ DATE _____
CHECKED _____ DATE _____ SCALE _____

CONTRACT NO. DNT-260 SHEET ____ OF ____

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RFI No.: 127B
Date 09-Jul-97

Subcontractor (if applicable): Renaissance

Originator: Majed Limam
Reply Req'd By: 7/10/97 (ASAP)
Distribution List:
Ross
Jim Gardner
Renaissance
Brown & Root

Subject: Conflict between 60" storm sewer/8 and existing 8" sanitary

Drw/Spec. No.: Sheet C40, C41

Problem:

This is an additive to RFI 127.
Additional info required by HDR

Renaissance stopped laying the 60" pipe at station 1+20.67 (Line B Sta.)
The existing sanitary intersects Line B align. at sta. 0+91.83
The old 60" pipe connects to line B at sta. 0+47.83
The existing inlet at Dooley flow line is 624.07' (Connects to line B shown on C41)
Existing Manhole north of line B at sta. -1+03.69 (Flow line 620.24)

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI?
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs
Surveying Crew: 1 Hrs
Other: ? Hrs (Renaissance)

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management: REVISED GRADE STA. 0+00 TO STA. 1+80.67 AS SHOWN ON ATTACHED MARKUPS. (REVISED ON AS BUILTS.) ALSO HDR BACK TO BE DEMOED

Solution By: Date: 7/10/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RFI No.: 126
Date 7/02/97

Subcontractor (if applicable): Renaissance Coffractors

Originator: J.Gardner
Reply Req'd By: B. Leech
Distribution List: B. Leech
Majed Limam
MikeBerber

Subject: S.W. Bell vault / water line "A"

Drw/Spec. No.:

Problem:

S.W. Bell's contractor installed a vault behind the curb along the east side of Midway Rd., to the north of the intersection with Keller Springs Rd. In order to stay within their ROW, the contractor installed vault where it will now interfere with the placement of the water line (A) as shown on the plans.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs
Surveying Crew: 1 Hrs
Other: 1 Hrs

Proposed Solution by Contractor By: J. Gardner Date: 7/02/97 Reviewed By:

There appears to be enough room between the back of curb and the west side of the vault for the water line to pass. The narrow space now allowed, may require our pipe subcontractor, Renaissance Construction, to undergo some minor adjustments/ precautions during water line installation, but it appears that, if permissible, the water line could be routed around the vault.

Response by Construction Management: CONTRACTOR'S SUGGESTED ABOVE APPROVED TO BE ACCEPTABLE. THIS SOLUTION WITH WHAT TO BE DETERMINED IN FIELD AS HOW DEEPER TO BE POINED, PROPER FORM CHANGE ON AS-BUILTS.

Solution By: Date: 7/14/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RFI No.: 125
Date 01-Jul-97

Subcontractor (if applicable):

Originator: Majed Limam
Reply Req'd By: 08-Jul-97
Distribution List:
Jim Gardner
Ross Navarette

Subject: Existing duct line protrudes into limr at Dooley Road.

Drw/Spec. No.: C28

Problem:

Existing concrete encased duct protrudes into line at Dooley road.
The difference in elevation between the bottom of liine and the top of the encasement varies, it reaches a maximum of six inches (the encasement being higher). H. B. Zachry has the exact location of the duct as surveyed in the field.
Please advise.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? N
Estimate of time spend evaluating, finding alternate solution to RFI? Engineering: 1 Hrs
Surveying Crew: 2 Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management: WANT TO BORE SIDE OF CURB WHICHEVER SIDE HAS MOST TOP CLEARANCE. A CORE WILL BE NEEDED JUST BEHIND WHERE LINE SHOULD BE FOUND. BORED FORM CHANGE ON AS-BUILTS.

Solution By: Date: 7/14/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RFI No.: 124
Date 01-Jul-97

Subcontractor (if applicable): Renaissance

Originator: Majed Limam
Reply Req'd By: 08-Jun-97
Distribution List:
Jim Gardner
Ross Navarette

Subject: Interfrence between pipe encasement at Line B and Dooley Road

Drw/Spec. No.: C28, T108A

Problem:

There are two discrepancies associated with the pipe support footing at line B.
1. The top of encasement elevation at the southern end of the structure protrudes into the lime @ CTB at Dooley Road. As shown on the drawing attached, the elevation of the southern edge is at around 634.32. The top of asphalt elevation at Dooley is 634.92, into 7 1/4" higher. Dooley calls for 6" of lime, 6" of CTB and 4 1/4" of Asphalt. The bottom of subgrade at that location would be around 633.37.
2. The station and elevation (Flow line of 60" RCP) are off. The pipe alignment intersects the CL of tunnel alignment at sta. 4+15.4 at a FL elevation of 626.5± (not 628.40)

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? N
Estimate of time spend evaluating, finding alternate solution to RFI? Engineering: 4 Hrs
Surveying Crew: 4 Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Please advise

Response by Construction Management:
(1) AS SHOWN ON SHT. T108A SHT. 1 KNOT THE BOTTOM SLAB OF CONC. AS DETAILED AND CLEARS THE TOP OF CURB UNIFORMLY AT THE BOTTOM OF ABANDON CONC. SUMMARY (PLANS) TO ABANDON IN PLACE IT IS FT. HIGH AS SHOWN IN SHT. 4
(2) LOCATION IS CORRECT FOR ALIGNMENT

Solution By: Date: 7/7/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RFI No.: 123
Date 6/28/97

Subcontractor (if applicable): Zachry/Monterey & Mastec

Originator: J. Gardner
Reply Req'd By: B. Leech
Distribution List: B. Leech
Majed Limam
Spike Hubenak

Subject: Instrumentaion relocations

Drw/Spec. No.: T152, 152

Problem:

The instrumentation locations shown in the plans will create problems with taxiway traffic during installation and while monitoring during the tunnelling operation.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 5 Hrs
Surveying Crew: 2 Hrs
Other: 3 Hrs

Proposed Solution by Contractor By: Zachry/Monterey Date: 6/28/97 Reviewed By:

Relocate the instruments to minimize any obstructions, safety hazards and/ or inconveniences to both airport traffic and Mastec's operations. Please advise of acceptable alternate locations.

In question: P1 P2 P3, DSM1, DSM2 and Bev-1

Response by Construction Management: PLEASE SUBMIT A PLAN SHOWING THE EXISTING LOCATIONS, INTERFERENCE OR CONFLICT AND YOUR RECOMMENDED & ALTERNATE VIEW AND REASONS TO MOVE THEM TO. WE WILL THEN REVIEW THE RECOMMENDED FOR APPROVAL

Solution By: Date: 7/3/97 Reviewed by: Daily:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RFI No.: 123B
Date 26-Aug-97

Subcontractor (if applicable): Zachry/Monterey

Originator: Majed Limam
Reply Req'd By: 05-Sep-97
Distribution List:
Spike Hubenak
MasTek

Subject: Summary of as-built instruments locations

Drw/Spec. No.:

Problem:

For your request, Zachry/Monterey is providing a summary of all the instrument locations that have moved, along with the reason for moving them. The summary was provided by Zachry/Monterey's subcontractor, MAS-TEK engineering, who installed all the geotechnical instruments in the project.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

JUN 13 1997

RFI No.: 122
Date 6/12/97

Subcontractor (if applicable): Renaissance Const.

Originator: HB Zachry Co.
Reply Req'd By: J Gardner
Distribution List:
Bill Leech
Majed Limam
Renaissance Construction Co.

Subject: Conflict in alignment of Sanitary Sewer "A" and existing concrete ductbank

Drw/Spec. No.:

Problem: An existing electrical ductbank is not located as shown in plans. It runs instead, directly over the top of proposed Sanitary sewer line "A" for approximately 35 feet.

Possible rework or extra work involved with this RFI? N Y
Delays in project execution involved with this RFI? N Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1/2 Hrs
Surveying Crew: 1/2 Hrs
Other: Hrs

Proposed Solution by Contractor By: Renaissance/ Ross Navarete Date: 6/13/97 Reviewed By: J. Gardner

In this area, there is adequate distance (> 12 ft.) between the sanitary line and the proposed water line to move the sanitary line closer to the water line and avoid having to run directly beneath the existing ductbank. By crossing the ductbank at the north and relocating the sanitary line about 2 feet to the west, the problem can probably be avoided. Field dimensions will be recorded and incorporated in the final 'As-builts'

Response by Construction Management: HDR HAS REVIEWED CONTRACTOR'S PROPOSAL TO MOVE SANITARY WITH WATER DISTANCE AND CROSSES WITH MINIMUM SPACING. THEREFORE, IF WATER LINE AND EQUIPMENT CAN BE WORKED AROUND THESE OBSTRUCTIONS, THEN WE DO NOT HAVE A SANITARY SEWER WITH SPACING IN QUESTION. CONTRACTOR TO USE SDR-26 PVCP. AUTH TO PROCEED GRANTED AS BUILTS WILL BE REQUIRED. CONTRACTOR TO PROCEED ALONG CONSIDERED AS BUILTS

Solution By: Date: 6/18/97 Reviewed by: Date:

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

RECEIVED
JUN 11 1997
Brown & Root, Inc.

RFI No.: 121
Date 06/11/97

Subcontractor (if applicable):

Originator: D. Hubenak
Reply Req'd By:
Distribution List:
Jim Roskie - Monterey
Job 9080.01 - 010

Subject: Control of Materials

Drw/Spec. No.: Special Provision to Item 6 and Item 5.5

Problem:

Section 6.2. of the above referenced Special Provision states "Design, sampling, and testing, including professional quality control efforts in general, will be performed by engineering testing laboratories. Such services will be provided at the direction and expense of the Authority, except as may be specified for Item 441 and SP, "Steel Structures". An exception to the above is the requirement that the Contractor develop all Portland cement concrete and hot mix asphaltic concrete designs and prepare and analyze trial and hot bin batches of the different designs as appropriate, as directed by the Engineer, entirely at its expense." Item 5.5 of the TxDOT Blue Book states "...plans shall govern over standard and special specifications, and special provisions shall govern over both standard and special specifications and plans.
It has been brought to our attention that the shotcrete testing during construction is the responsibility of the Contractor. The above referenced Special Provision and General Requirement indicate to us that the required design and trial testing is the expense of the Contractor and the required testing during construction is the expense of the Authority, therefore, we plan to use Mas-Tek Engineering & Associates to provide the design and trial tests at our expense and expect the construction testing to be at the Authority's expense.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? N N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0.5 Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

RECEIVED
JUN 11 1997
Brown & Root, Inc.

RFI No.: 120
Date 06/11/97

Subcontractor (if applicable):

Originator: D. Hubenak
Reply Req'd By:
Distribution List:
Jim Roskie - Monterey
Job 9080.01 - 009

Subject: Generator and Transformer Pad Conflict

Drw/Spec. No.:

Problem:

Attached is a sketch (not to scale) which shows a new power pole (#2) in conflict with Emergency Generator Pad #1.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0.25 Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Hubenak Date: 06/11/9 Reviewed By:

Shift both Emergency Generator Pads and the Transformer Pad approximately three feet (3') to the north northwest to get power pole #2 out of conflict.

Response by Construction Management: HDR HAS REVIEWED CONTRACTOR'S PROPOSED SOLUTION AND CONCURS WITH MOVING THE PADS 3'-0" NORTH. AS BUILT DRAWINGS WILL BE ISSUED. CONTRACTOR TO PROCEED ONCE SIGNED AS BUILTS ARE RECEIVED

Solution By: Date: 6/19/97 Reviewed by: Date:

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

RECEIVED
JUN 10 1997
Brown & Root, Inc.

RFI No.: 119
Date 06/10/97

Subcontractor (if applicable): Mas-Tek Engineering & Associates, Inc.

Originator: J. Gardner
Reply Req'd By: D. Hubenak
Distribution List:
Jim Roskie - Monterey
Job 9080.01 - 008

Subject: Borehole Extensometer installation

Drw/Spec. No.: 4104

Problem:

Attached is a letter from the above referenced subcontractor indicating their schedule for the installation of borehole extensometers BEX-1 and BEX-2. They plan to install these on July 20 beginning at 4:00 a.m. and will complete both in the 6 hour window provided by the Addison Airport. The alternate date for installation is July 27. Please note that these dates are contingent upon receiving an approval of the Instrumentation submittal on or before June 20, 1997.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
nate of time spent evaluating, finding alternate solution to RFI? Engineering: 0.25 Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

MAY 23 1997

RFI No.: 118
Date 22-May-97

Subcontractor (if applicable):

Originator: J. Gardner
Reply Req'd By: 10 days
Distribution List:
Bill Leech
Majed Limam

Subject: Conflict in location of San. Sewer 'A' manholes & Gas line

Drw/Spec. No.: Sheet 35A

Problem:
In the area where Sanitary Sewer 'A' and the proposed third party Gas line both pass beneath future Dooley Rd., the two sanitary manholes on either side of Dooley will be built against the outside wall of the gas conduit.
At the time the manholes will apparently be built, this gas line will be active.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
"imate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: J. Gardner Date: 5/22/97 Reviewed By: J. Gardner

In this area, where the gas line, sanitary line and water line are all 'squeezed' into a narrow slot, there appears to be room to move the two sanitary manholes on either side of new Dooley Rd. directly to the North. Moving the manholes (and the connecting sewer pipe) 4 feet to the north would eliminate having to build the 4' diameter manholes directly alongside an active gas line later. This short distance would change the slope of the sanitary pipe slope so slightly, that adjusting manhole elevations probably would not be necessary. Also, there appears to be adequate room for the sanitary line to still pass under the storm sewer in this same area, if moved.

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

RFI No.: 117
Date 05/21/97

Subcontractor (if applicable):

Reply Req'd By: D. Hubenak
Distribution List:
Jim Roskie - Monterey
Job 9080.01 - 007

Subject: Instrumentation

Drw/Spec. No.: Special Spec Item 4104

Problem:

*** SEE ATTACHED ***

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 2 Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management: SEE ATTACHED RESPONSE FOR RFI #117 FROM OUR SUBCONSULTANT, LANGAN AND ASSOCIATES. WE CONCUR WITH THEIR RESPONSE

Solution By: Date: 6/10/97 Reviewed by: Date:

ZACHRY COMPANY
QUEST FOR INFORMATION
DDISON AIRPORT TUNNEL

RFI No.: 116
Date 10/21/97

Subcontractor (if applicable):

Reply Req'd By: ASAP
Distribution List:
BILL LUEGI
MAJED LIMAM
RENF. EARTH CO

Subject: REINFORCED EARTH COMPANY REQUEST

Drw/Spec. No.:

Problem:
THE REINFORCED EARTH CO. IS REQUESTING INFORMATION REGARDING LATERAL EARTH PRESSURES. HDR ENGINEERING HAS DISCUSSED THIS WITH R.E. AND ARE ASSISTING FOR A FORMAL REQUEST.

Possible rework or extra work involved with this RFI? Y (N)
De in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: J. GARDNER Date: 5/21/97 Reviewed By: J. GARDNER
LET THE R.E.T. KNOW AS A FORMAL REQUEST FOR LATERAL EARTH PRESSURE INFORMATION FOR OUR RET WALL SUPPLIER, REINFORCED EARTH COMPANY

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

RECEIVED
MAY 21 1997
Brown & Root, Inc.

RFI No.: 115
Date 05/20/97

Subcontractor (if applicable):

Reply Req'd By: D. Hubenak
Distribution List:
Jim Roskie - Monterey
Job 9080.01 - 006

Subject: Shotcrete - Proportioning and Mixing

Drw/Spec. No.: Special Spec 4102-3.2.A.

Problem:

The above referenced section specifies to"have aggregate and cement proportioned by an approved batching plant based on weight..."

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0.5
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

We recommend using a volumetric batching plant. The plant we propose to use is a Model RPM3-18.
Attached is a description and layout of the plant and past projects where this type of plant has been used. The actual plant we propose to use was used on the Super Collider project in Waxahachie, Texas and on a UDOT project.
Reasons for using a volumetric plant are as follows:
1. We will batch 4-5 CY per shift during a 24 hour period. Commercial plants will not dedicate a plant for night work because of the small demand and DOT driver restrictions.
2. The plant will be used for batching only. A mixer truck will be provided to mix and transport the shotcrete.
3. This plant will be used for fiber shotcrete only. All other non-fibered shotcrete will be supplied from a commercial plant and placed only during the day shift.
4. The small size of the plant will allow us to locate the plant and materials nearer to the tunnel in lieu of a larger site required for a weighted plant.
5. The location of the plant's close proximity to the tunnel will provide security in case of emergency.

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RECEIVED
MAY 21 1997

RFI No.: 114
Date 20-May-97

Subcontractor (if applicable): Renaissance Construction Brown & Root, Inc.

Originator: J. Gardner
Reply Req'd By: 10 days
Distribution List:
Bill Leech
Majed Limam
Renaissance Contractors

Subject: Layout /dimensioning discrepancy @ Pipe Culvert 2

Drw/Spec. No.: Sheets C46 & C48

Problem:
Offset Stationing (84.59 ft. Right of Sta 33+37.58) for the end of Pipe Culvert 2 as detailed on sheet C46, does not correspond to the 242.59 ft. length of pipe culvert dimensioned on sheet C48 when laid out in field.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: J. Gardner Date: 5/20/97 Reviewed By: J. Gardner

Await clarification of apparent discrepancy. Will then layout accordingly.

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RFI No.: 113
Date 13-May-97

Subcontractor (if applicable): N.A.

Originator: Majed Limam
Reply Req'd By: 19-May-97
Distribution List:
Brown & Root
Ross N.
Majed Limam
Jim Gardner

Subject: Right Of Way and Easement location.

Drw/Spec. No.: C25, C29, C31

Problem:

H. B. Zachry Co. needs clarifications on exact location of ROW & Easement Lines.

Possible rework or extra work involved with this RFI? Y (N)
Delays in project execution involved with this RFI? Y (N)
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0 Hrs
Surveying Crew: 0 Hrs
Other: 0 Hrs

Proposed Solution by Contractor By: Date: Reviewed By: Jim Gardner

Drawing on C29 gives the bearings and lengths of different segments of the ROW.
We need a start point coordinates of the traverse, or some kind of reference point so we can locate where the ROW and the Easement are exactly.
Please provide us with coordinates for all POB's necessary to lay out the ROW.

ELECTRONIC MAILS AND PAYMENT OF CLEARANCE TO BEGIN ARE P.O.'S AS REQUESTED HAVE BEEN RECEIVED AT A.E.S. AND SUBMITTED BY HDR. [signature] 7/23/97

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

MAY 16 1997

RFI No.: 112
Date 13-May-97

Subcontractor (if applicable): Renaissance

Originator: Jim Gardner
Reply Req'd By: 19-May-97
Distribution List:
Brown & Root: Thomas Kelley
Renaissance: Mike Berber
H. B. Zachry: Majed Limam

Subject:

Drw/Spec. No.:

Problem:

The rock directly below the storm sewer support (Line B) is possibly weathered and/or fissured.
The rock anchors that we install through this rock to support the pipe and tunnel arch may not serve their purpose if exposed and tested as planned.

Possible rework or extra work involved with this RFI? Y (N)
Delays in project execution involved with this RFI? Y (N)
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Jim Gardner Date: Reviewed By:

1. Drill these 20 anchors to plan depth but with a larger diameter (1 7/8").
2. Install anchors and grout the holes using non shrink grout that can fill any cracks and help form a homogeneous arch over the future tunnel.
3. Tension the bolts only minimally to avoid reopening of cracks.

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

FINAL RECORD DRAWING
Date: 12/25/99

NO.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

RFI# 112 - 127B

DRAWN _____ DATE _____
CHECKED _____ DATE _____
DESIGNED _____ DATE _____
SCALE _____

CONTRACT NO. DNT-260 SHEET ____ OF ____

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

PRELIMINARY 140 — RFI # 140

Subcontractor (if applicable): _____ Originator: D. Hubenak
Date 08/04/97
Subject: Bore for Electrical Conduit on Addison Road — Reply Req'd By: 08/26/97
Dwg/Spec. No.: Sheet C25 of 166 — Distribution List: Jim Roskie - Monterey; Job 9080.01 - 014

Problem:

Sheet C25 of 166 indicates boring 2 $2\frac{1}{8}$-4" conduits in Addison Road. The existing pull box on the southeast corner is located in Addison Road. Please advise us on the actual location of this bore so that we can make arrangements for bore pits and receiving pits.

RFI ENTERED ON AUTOCAD 17 JULY 97

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management: THE CONDUIT IS TO CONSIST OF SCHED 40 PVC. THE PULL BOX IS TO BE CONSTRUCTED WITH CONCRETE WALLS, FLOOR & TOP. THE TOP IS TO BE FLUSH WITH THE ROADWAY AND HAVE PROPER WARNING OF SIGNAL CABLES. THE ROAD CONSTRUCTION WITH ADDISON NEEDS TO BE DESIGNED BY C.T. & I. GROUP.

Solution By: _____ Date: 8/07/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

PRELIMINARY 139

RFI No.: 139
Date 05-Aug-97
Subcontractor (if applicable): Zachry Monterey — Originator: Majed Limam
Subject: Rock bolts on TW walls — Reply Req'd By: 26-Aug-97
Dwg/Spec. No.: S86 — Distribution List: Jim Gardner; Spike Hubenak; Ross Navarette

Problem:
On sheet S86, Detail 1, there is a 6" diameter borehole required for the rock bolt/resin anchorage combination. On Table 4 of the attached, the recommended hole diameter for a #4 bolt is 1.5". This table is part of submittal number 101, which was approved on May 13, 1997. Please advise concerning this discrepancy concerning borehole diameter. Also, are the rock bolts post-tensioned or are they dywidi?

FIND BOLT SPEC
2) RUN HOLE DIAMETER THRU FOR DRILLER TO BE USED
3) ASK MICHEL TO BACK CALCULATE (WITH DATA FROM TESTING)

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management: PROVIDE HOLE SIZE SUFFICIENT TO MEET RESIN MANUFACTURER'S RECOMMENDATIONS. THEY ARE ROCK BOLTS (TEMPORARY AS SHOWN ON SECTION / SHT S86).

PLEASE RE-VERIFY: TENSIONED BUT ROCKS ARE NORMALLY USED TO HOLD THE ROCK TOGETHER ON TUNNEL AND NOT FOR INSTRUMENTATION. ROCK BOLTS ARE NORMALLY USED TO HOLD CONCRETE AFTER INSTALL. YOU DON'T NORMALLY TENSION BOLTS IN THE SIDES. RESTORE PAGE 5.6.2, PG. 5.6-3 (ROCK BOLTS) FOR ADDISON AIRPORT TUNNEL (DRAWING NO. C-6439, SHT. 2 OF 2). REFERENCE SECT. 5.6.4 (C).

Solution By: _____ Date: 8/8/97 Reviewed by: Date:

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

138

RFI No.: 138
Date 08/01/97
Originator: D. Hubenak
Subject: Tape Extensometers — Reply Req'd By: 08/11/97
Dwg/Spec. No.: 4104 — Distribution List: Jim Roskie - Monterey; Job 9080.01 - 013

Problem:

Tape extensometers in the Type 2 excavation cannot be installed as required in the specification "...within 24 hours after excavation has exposed the individual reference point location" because of the staggered sequencing of Type 2 excavation. Each location in the Type 2 excavation will be exposed for more than 24 hours before the eye bolts can be embedded and the grout can set up which contradicts the specification of taking an initial reading within 24 hours. Any subsequent seem to be meaningless without a proper initial reading.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:
Please advise use of an alternate method to perform the function of tape extensometers.

Response by Construction Management: JACOBS REQUIRES THE EXTENSIVE POINTS OF MEASURING WITHIN 24 HRS. MORE OBSERVATIONS FOR VERIFIED TAPE READINGS. TAPE WERE INTERMITTENT, 10-15 PERIOD WITH COMMUNICATION THE COMPLETION OF THE TUNNEL TO INTERFACE AT JOSEPH'S LOOP. PUT TAPES ... WITHIN EXPOSED AREA TO OBTAIN AS SOON AS THE ANCHOR & GROUT HAS OBTAINED SUFFICIENT STRENGTH TO WITHSTAND FORCES IMPOSED BY THE TAPE TENSIONING LOADS. AS WITH ANY INSTRUMENT INSTALLED FROM WITHIN THE EXCAVATION, A DEGREE OF ERRONEOUS READINGS WILL BE OBSERVED. PRIOR TO THE INITIAL READING BEING NOT BEEN ESTABLISHED. THESE INSTRUMENTS WITH READINGS OVER TIME ARE CLEARLY INDICATIVE OF TRENDS.

Solution By: _____ Date: 8/05/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

139B

RFI No.: 139B
Date 07-Aug-97
Subcontractor (if applicable): Zachry Monterey — Originator: Majed Limam
Subject: Rock bolts on PW walls — Reply Req'd By: 26-Aug-97
Dwg/Spec. No.: S86 — Distribution List: Jim Gardner; Spike Hubenak; Ross Navarette

Problem:
RFI 139 concerned the borehole diameters, whether the 6" on the plans or the 1.5" diameter needed for the approved rock bolt/resin anchorage combination would be used. The RFI also asked if the rock bolts are to be post-tensioned or are simply dowels. Sheet S86 of the plans shows a plate to be positioned 9" off the excavated rock face for embedment within the closure pour. Tensioning of the anchor would require the plate to be directly against the face of rock.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0.25 Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:
Please advise a method for post-tensioning the rock bolts.

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RECEIVED AUG 04 1997 — Brown & Root, Inc.

137

RFI No.: 137
Date 01-Aug-97
Subcontractor (if applicable) Zachry/ Monterey — Originator: Jim Gardner
Subject: Completion of East Portal RW before Type II excav. — Reply Req'd By: 08-Aug-97
Dwg/Spec. No.: T107, T130 / 4100, 423 — Distribution List: Jim Gardner; Majed Limam

Problem: At Station 26+25, it is required that the East Portal Retaining Wall be completed and backfilled before the Type II excavation and support begins. We would like for our tunnelling operation to begin without delay, and feel that the complete construction of the wall as required is not necessary to begin tunnelling.

Possible rework/extra work involved with this RFI? Y (N)
Delays in project execution involved with this RFI? Y (N)
Estimate of time spent evaluating, finding alternate solution? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: J Gardner Date: 8/1/97 Reviewed By:
We propose building the bottom portion of the wall below the permissible construction joint, and leaving the section with rebar, such as concrete traffic barriers. The attached drawing will show this more clearly. The construction of the upper portion of the wall and its subsequent backfill will be completed at a later date.
The weight of the mass will be equal or greater than the weight of the earth backfill on this particular wall

Response by Construction Management

DATE 8/4/97 DISTRIBUTION LIST: TWO SETS FOR ... [illegible]

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RESOLVED NOT USED FOR CONSTRUCTION

136

RFI No.: 136
Date 31-Jul-97
Subcontractor (if applicable): Renaissance — Originator: Majed Limam
Subject: Existing irrigation system not shown in the drawings — Reply Req'd By:
Dwg/Spec. No.: C16A — Distribution List: Jim Gardner; Mike Barber

Problem:
Irrigation system for grassy area adjacent to building on the south side of the intersection of Distribution Road and Keller Springs has been removed by Renaissance site crew.
The crew had to remove the irrigation system in order to build the storm sewer line A, and Sanitary line B.
The system is located inside of the flaresent line, and some even inside the ROW line. It is not shown anywhere in the plans and have not been relocated before the start of construction.

Possible rework or extra work involved with this RFI? (Y) N
Delays in project execution involved with this RFI? (Y) N
Estimate of time spent evaluating, finding alternate solution? Engineering: 1 Hrs; Surveying Crew: 0 Hrs; Other: Hrs to be determined

Proposed Solution by Contractor By: Date: Reviewed By:
Please advise.

Response by Construction Management: PER GRADING NOTES ON SHEET C5A CONTRACTOR TO VERIFY EXISTING UTILITIES PRIOR TO ANY EXCAVATION OR ALIGN PROTECTION. THE CONTRACTOR SHOULD HAVE HAD LOCATED, STAKED & DUG TEST HOLES. CLIENT HAS MUST VERIFIED. THE IRRIGATION IS CONTROL SYSTEM SHOULD HAVE BEEN MARKED & CONTACTED. WHOEVER HAS DUG TEST HOLES SHOULD HAVE CONTACTED THE OWNER TO HAVE IT LOCATED. THIS IS AMONG THE THAT WAS DESIGN & BUILT WITH LITTLE OR NO COORDINATION TO EXISTING FACILITIES THAT WERE CUT & EXPENSIVE.

Solution By: Date: 8/6/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

PRELIMINARY 135

RFI No.: 135
Date 7/31/97
Subcontractor (if applicable): Renaissance — Originator: Majed Limam
Subject: Manhole location on sanitary line C, interfere with slope — Reply Req'd By: ASAP
Dwg/Spec. No.: C13, C16A — Distribution List: Ross Navarette; Jim Gardner; Renaissance

Problem:
Sheet C13 calls for the 4" top soil coating/sodding slope to be at a 2 to 1 slope. The bottom of the slope starts 2' from the edge of the type A gutter, the top of the slope is at 5' from the ROW line. Manhole on sanitary sewer line C (C6439, S4 RT) is also shown to be at the top of the slope on sheet C16A. As laid out in the field, in order to achieve the 2 to 1 slope, the top of the slope will be located much further than shown in the contract drawings (towards the south). That will be a problem because the manhole will be located right on the middle of the slope, and will be protruding in the air. In order to keep the top of slope line as shown in the drawings, we will have to go with a 2 to 1 slope instead. That slope may be too steep for maintaining the grass at a later date.

Possible rework or extra work involved with this RFI? Y (N)
Delays in project execution involved with this RFI? Y (N)
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 2 Hrs; Surveying Crew: 1 Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management: THE CONTRACTOR WILL BE REQUIRED TO TAKE PRECAUTIONS TO PROTECT THE MANHOLE FROM EROSION AND SETTLEMENT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE TO THE MANHOLE AND SHALL REPAIR OR REPLACE IT AT NO ADDITIONAL COST TO THE OWNER.

Solution By: Date: 8/6/97 Reviewed by: Date:

H.B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RECEIVED AUG 01 1997 — Brown & Root, Inc.

134

RFI No.: 134
Date 31-Jul-97
Subcontractor (if applicable): Mas-Tek — Originator: Majed Limam
Subject: Three geotechnical Instruments on the way of footing constr. — Reply Req'd By: ASAP
Dwg/Spec. No.: T136,T130 — Distribution List: Jim Gardner; Spike Hubenak; Ross Navarette

Problem:
Instrument I5, SRP7, and I6 were installed as shown on the construct drawings. Please look at attached drawing showing the interference between the east portal retaining wall footing and these three instruments. The worse case discrepancy is with the I6 located at sta. 26+15, 28' right of CL of Tunnel (6 in right at the edge of the footing. Existing ground elevation at this location is around 636.5' I5 and SRP7 are also too close to the footing (4', 5' respectively). The bottom elevation of the footing is at 629.22, that will generate a 7 to 8 ft excavation to build the footing. Sloping will be required on this excavation due to the nature of the ground at that location. The two instruments will interfere with the sloping and excavation of the footing. Please advise.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs; Surveying Crew: 1.5 Hrs; Other: Hrs (to be determined)

Proposed Solution by Contractor By: Date: Reviewed By:
Please provide a solution

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

HDR RCVD JUL 31 '97 — DATE

133

RFI # 133
RFI No.: 133
Date 07/29/97
Originator: D. Hubenak
Subject: Rock Bolt Pattern on the S.E. Wall — Reply Req'd By: 08/01/97
Dwg/Spec. No.: 4101 — Distribution List: Jim Roskie - Monterey; Job 9080.01 - 012

Problem:
Plan sheet T130 of 166 show the bottom rock bolt as being three feet (3') above the excavation line for the asphalt shoulder. It is not clear whether the pattern should be parallel to the shoulder excavation line or parallel to the unweathered Austin Chalk line. The Austin Chalk line parallels the above gutter line.

Possible rework or extra work involved with this RFI? N N
Delays in project execution involved with this RFI? N N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:
Lay out rock bolt pattern three feet (3') below and parallel to the gutter line. Fill in voids, as needed, in areas not covered by the rock bolt pattern. This lay out coincides with the method of excavation. See attached lay out. ATTACH 4 POST CHANNELS THE ATTACHED SHEAR BOLTS PATTERN. 8/8/97

Response by Construction Management: WILL APPROVE THE ROCK BOLT SPACING SUBMITTED AS PART OF THE RFI

Solution By: Date: 8/7/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

HDR RCVD JUL 28 '97 — PRELIMINARY

132

RFI No.: 132
Date 24-Jul-97
Subcontractor (if applicable): Renaissance — Originator: Majed Limam
Subject: Two 18" existing storm drains not shown in the Contract Drwgs. — Reply Req'd By: ASAP
Dwg/Spec. No.: C44 — Distribution List: Jim Gardner; Ross Navarette; Renaissance

Problem:
Renaissance subcontractor, Austin Bridge & Roads, encountered 2 lines of 18" RCP storm sewer while excavating the south end of Culvert 1. Neither of these lines of pipe is shown on the Contract Drawings. One line appears to drain the area near the dumpster, and the other drains the parking lot area on the airport. Please make corrections/ conceptual drawings.

CA REMEDIATION

Please look at the attached drawing for an approximate location. The two pipes have not been laid out by our surveyors.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 2 Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management: ADDITIONAL BOX TO BE INSTALLED TO 19' (APPX.) WIDTH TO SPAN OUT SUBJECT WALL(S). BOTH SIDES TO INCLUDE BOX EXTENSION, ALSO INSTALL BOX TO MATCH EXISTING WIDTH. ADDITIONAL APPROX. 30' OF 18" RCP TO BE INSTALLED AT 2% SLOPE TO MATCH EXISTING. CONTRACTOR TO SAWCUT AT JOINT AND REMOVE TWO (2) FEET OF EXISTING RCP TO INSTALL NEW PIPE. CONTRACTOR TO VERIFY THE LINES ON & NEAR THE ATTACHED REMOVED BY SURVEYORS. CONTACT MARK DEPEW OF WEST LOOP ENGINEERING.

Solution By: Date: 8/1/97 Reviewed by: Date:

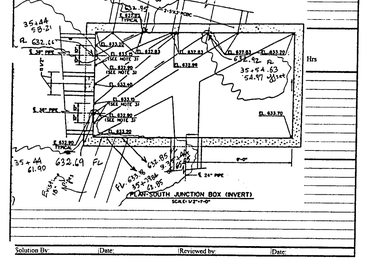
H.B. ZACHRY COMPANY
REQUEST FOR INFORMATION
DDISON AIRPORT TUNNEL

132B

RFI No.: 132B
Date 28-Jul-97
Subcontractor (if applicable): Renaissance — Originator: Majed Limam
Subject: Additional information on RFI 132 — Reply Req'd By: ASAP
Dwg/Spec. No.: — Distribution List: Jim Gardner; Ross Navarette; Renaissance

Problem:

Attached are elevations requested by Brown & Root on Culvert1, South junction Box



Attached are elevations requested by Brown & Root on Culvert1, South junction Box

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs; Surveying Crew: 2 Hrs; Other: Hrs (maximize crew)

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management: PROVIDED GRADES TO TOP OF 1+80 (+) AS SHOWN ON ATTACHED DWGS. PROVIDED ON 45° BASIS. NO ADDL DWGS TO BE ISSUED.

Solution By: Date: 8/20/97 Reviewed by: Date:

CHRY-MONTEREY
EQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

HDR RCVD JUL 22 '97

131

RFI # 131
RFI No.: 131
Date 07/21/97
Subcontractor (if applicable): Zachry - Monterey J.V.
Subject: Drain Material for S.E. Wall Shotcrete — Reply Req'd By: D. Hubenak
Dwg/Spec. No.: Sheet T130 of 166 — Distribution List: Jim Roskie - Monterey; Job 9080.01 - 011

Problem:
The above referenced drawing does not address drainage between the shotcrete and excavated wall. We anticipate water will be trapped between the wall and the shotcrete without an escape route. Please advise us on whether or not precautions are required.

YOUR AT LAST OUT Before Abandonment

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0.5 Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:
Install a drainage material to drain trapped water to weep holes in the shotcrete or to a perforated drain.

Response by Construction Management: THE S.E. WALL IS TEMPORARY SUPPORT OF THE EXCAVATION UNTIL PERMANENT LINING AND WATERPROOFING IS COMPLETED. THE SHOTCRETE IS DESIGNED TO SEAL THE SURFACE OF THE ROCK AND PREVENT IT FROM WEATHERING. SLIGHT GROUNDWATER SEEPAGE IS ENCOUNTERED AS EXCAVATION PROGRESSES, WEEP HOLES SHOULD BE PROVIDED IN THE SHOTCRETE AT THOSE LOCATIONS TO ALLOW RELIEF OF THE GROUNDWATER, AND TO PREVENT BUILD UP OF HYDROSTATIC PRESSURE. SLIGHT LOCAL SEEPAGE FLOWS TO GROUNDWATER BY MOISTENING, FOR NORMAL PURPOSES, WILL BE DISREGARDED IN THE EFFORT TO SEAL THE ANNUAL QUANTITY EXCAVATED.

Solution By: Date: 7/28/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

FILM RCVD JUL 21 '97 — DRAWING 386 NOTE 12

130

RFI No.: 130
Date 19-Jul-97
Subcontractor (if applicable): _____ Originator: Majed Limam
Subject: Concrete cure time for cap beam on DS type RW — Reply Req'd By: ASAP
Dwg/Spec. No.: S84 — Distribution List: Rudy Mandujo; Ross Navarette; Jim Gardner

Problem:
Note 12 on sheet S84 states that the concrete use for the cap beam must be a minimum of 14 days before commencing excavation for the fascia wall. H. B. Zachry has two concerns related to this note.
1. What is the expected concrete strength after 14 days of cure. It is ambiguous from the note what actual strength is required.
2. H. B. Zachry requests the use of extra concrete test beams for the above referenced cap beams on DS type walls. After achieving the required strength, H. B. Zachry Co plans to proceed with excavation on the west side.

Please give this matter immediate attention. Excavation on the west side being on the critical path to our project, as shown on our schedule.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Jim Gardner Date: Reviewed By:
Please advise.

Response by Construction Management: THE CONTRACTOR WILL BE REQUIRED TO TAKE CYLINDERS FOR CAP BEAM TEST OF CONCRETE. THE REQUIREMENT NOW FOR TIME COMPRESSIVE STRENGTH OF 2500 psi IS 80% OF REQUIRED STRENGTH WILL BE MET BEFORE EXCAVATION. CONTRACTOR HAS ATTACHED SHEET TO VERIFY ONE AFOREMENTIONED ENGINEERING.

Solution By: Date: 7/21/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

129

RFI No.: 129
Date 21-Jul-97
Subcontractor (if applicable): _____ Originator: J. GARDNER
Subject: POWER POLE / RETAINING WALL EXCAV. CONFLICT — Reply Req'd By: B. LEECH
Dwg/Spec. No.: — Distribution List: B LEECH; MAJED LIMAM

Problem:
TWO OF THE POWER POLES RECENTLY INSTALLED ALONG THE TEMPORARY EASEMENT FOR SUPPLYING ELECTRICITY TO THE HANGARS HAVE BEEN FOUND TO BE VERY CLOSE TO THE PROPOSED FOOTINGS FOR THE N.E. RETAINING WALLS. THE ATTACHED DRAWING SHOWS THAT AT LEAST ONE OF THE POLES IS ONLY 4 FT. FROM THE EDGE OF A FOOTING THAT IS 9 FT. DEEP. THE POWER COMPANY WAS ASKED TO INSTALL THE POLES AS FAR AS POSSIBLE FROM THE EXCAVATION BUT WE WERE INFORMED THAT IT IS UNSAFE TO ALLOW ANY POWER WIRES TO PASS DIRECTLY OVER ANY HANGARS.

Possible rework or extra work involved with this RFI? N Y
Delays in project execution involved with this RFI? N Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs; Surveying Crew: 2 Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:
SINCE THE HANGAR REMOVAL AS PER PLANS IS NOT NOW PRACTICAL, AND THE WALLS CAN'T BE MOVED, IT SEEMS THE SIMPLEST SOLUTION IS TO BRACE THE POLE(S) IN QUESTION UNTIL THE FOOTING HAS BEEN EXCAVATED, POURED AND BACKFILLED.

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

129B

RFI No.: 129B
Date 21-Jul-97
Subcontractor (if applicable): _____ Originator: Majed Limam
Subject: Additional information on RFI 129 — Reply Req'd By: 31-Jul-97
Dwg/Spec. No.: — Distribution List: Jim Gardner; Ross Navarette

Problem:
Retaining wall excavation, power poll location conflict.
Attached is additional information requested by Brown & Root.
Attached are dimensions, locations, for three power poles on the east side by the hangars.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 4 Hrs; Surveying Crew: 4 Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
TTA HAS APPROVED COST TO TEMPORARY SUPPORT ELECTRICAL POLES #1 & NO. 2

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

128

RFI No.: 128
Date 7/10/97
Subcontractor (if applicable): RENAISSANCE CONSTRUCTION — Originator: J. GARDNER
Subject: Traffic Plan & Culvert Installation @ KellerSprings & Addison — Reply Req'd By: B. Leech
Dwg/Spec. No.: C16 — Distribution List: B Leech; majed Limam

Problem:
1. The traffic plan calls for traffic barrier where barrels could be used.
2. The suggested construction sequence calls for the box culvert to be built across Keller-Springs in two phases. This could be done in one phase with better results. The pipe culvert that crosses futher to the west on Keller Springs is built during one phase.

Possible rework or extra work involved with this RFI? N Y
Delays in project execution involved with this RFI? N Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:
1. Allow barrels to be used instead of traffic barrier. During the culvert construction, the barriers will only be a added obstruction that hinders installation.
2. Allow the box culvert to be built in one phase like the pipe culvert being built across the same road further to the west. Even if built in two phases, the box culvert joints would have to extend past the Phase 1 pavement into the existing road, disrupting traffic for a day. The entire culvert crossing could be done in one day--with better final results.

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

URGENT !! 8pc

127

RFI No.: 127
Date 08-Jul-97
Subcontractor (if applicable): _____ Originator: Majed Limam
Subject: Conflict between 60" storm sewer B and existing 8" sanitary — Reply Req'd By: 08-Jul-97 (ASAP)
Dwg/Spec. No.: Sheet C40, C41 — Distribution List: Rene; Jim Gardner; Renaissance

Problem:
Pipe crew encountered existing sanitary sewer (8") conflicting with the 60" storm sewer line B. As shown on the two pictures attached, the 8" sanitary is crossing the 60" and protrudes in the way of the connection between the existing 60" and line B.
The flow line of line B at the location shown on the picture (about 25' from the sanitary) is 623.61'. At the connection area, the flow line of the 60" old RCP is 620.97'. The top elevation of the sanitary at the intersection with line B at closest is 622.07. Line B will have to go up (counter the flow) by 0.90' in order to avoid the sanitary sewer.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs; Surveying Crew: 2 Hrs; Other: Hrs (maximize crew)

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management: REMOVED CONCRETE TO TOP OF 8" SAN. SEWER AS SHOWN ON ATTACHED PICTURE. CONTRACTOR TO INSTALL NEW 8" SAN. SEWER AS SHOWN ON ATTACHED DWG. CONTRACTOR TO COORDINATE WITH CITY OF ADDISON FOR INSPECTION OF NEW SEWER.

Solution By: Date: 7/10/97 Reviewed by: Date:

FINAL RECORD DRAWING
Date: 12/25/99

NO.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

RFI# 127 - 140

DRAWN _____ DATE _____ DESIGNED _____ DATE _____
CHECKED _____ DATE _____ SCALE _____

CONTRACT NO. DNT-260 SHEET ____ OF ____

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

Preliminary — Have no title to Plans 8/5/97

RFI No.: 141
Date: 12-Aug-97

Subcontractor (if applicable): RECO

Originator: Majed Limam
Reply Req'd By: ASAP
Distribution List: RECO, Jim Gardner, Rudy Machado, Ross Navarette

Subject: Modifications of RECO existing wall design to expedite approv.
Drw/Spec. No.:

Problem:
H. B. Zachry intends to revert to the original design in order to consoon the 48" drill shafts(with no embedded plates) to the precast panels.
It is also H. B. Zachry intend to use a continuous class "C" closure pour in order to alleviate potential pressure created by using aggregates. This scenario should result in the same pressure put on the drill shafts as the original design by HDR. Therefore we expect a prompt response to this RFI. Please be advised that work on the drill shafts and top beams is still being delayed due to non approval of submittals 124 and 124B.

Entered As Built S-84 — Entered As Built S Sht 93 TG

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management: THIS IS IN THE WRONG FORMAT THIS IS NOT AN RFI BUT RATHER A REQUEST TO ADDENDUM INFORMATION IN THE PLANS SUBMITTED IN PAPER FORMAT.
ALSO NOTE THAT AS OF 2:30pm on 8/13/97 HDR HAS NOT RECEIVED ANY OF THE SLIM DRIVE DATA NEEDED TO COMPLETE REVIEW OF THE DRILLING PLANS. HOWEVER WE WERE PLANNING TO PROVIDE SLIM DRIVE REVIEW THIS MORNING IF WE THE FAXT THING IN THE MORNING

Solution By: Date: 8/13/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

Preliminary — Urgent

RFI No.: 142
Date: 12-Aug-97

Subcontractor (if applicable):

Originator: Majed Limam
Reply Req'd By: ASAP
Distribution List: Jim Gardner, Ross Navarette

Subject: Drill shaft elevations on SW wall/West portal wall
Drw/Spec. No.: 579, T129, 584

Problem:
On sheet 579, the West portal retaining wall drilled shafts are shown to be at the same bottom of shaft elevation as the drilled shafts on Panel 53 of the SW retaining wall. Sheet T129 shows the bottom of shaft elevations to be 556.50 for the West portal retaining wall shafts. Sheet 584 shows the bottom of shaft elevations for Panel 53 as 578.50. Which is correct, Sheet 579, which shows the drilled shafts at the same elevation, or Sheets 584 and T129, which show different elevations for both walls?

Entered As Built S Sht 93 TG

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management: The 2'6" road the two 60'x Drill Shafts for the front of West Recess. Bottom elevation is to be 556.50 as shown on Sht. T129. The bottom elevation for the SW Retaining Wall Panels 52 and 53 shall be 578.50 as shown on Sheet 579. The reason the SW wall drilled shafts are deeper is because that wall is adjacent to the West Recess. Drilled Shaft and the Shaft sheets have to be consistent Bear Bottom at Same.

Solution By: Date: 8/14/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

143

RFI No.: 143
Date: 14-Aug-97

Subcontractor (if applicable): Renaissance

Originator: Majed Limam
Reply Req'd By: 04-Sep-97
Distribution List: Jim Gardner, Renaissance

Subject: Removal of water vaults and meters not shown on plans
Drw/Spec. No.: 35A/2660

Problem:
Sheet 35A specifies the removal and resetting of 2 existing water vaults from an area north of Line B between stations 1+00 and 2+00 to Line B.
Renaissance Co. ended up putting five Vaults instead of the two the plans called for.
Also the plans don't mention any water meters in that area. Renaissance had to remove and reset two water meters.
Please be advised of these changes in the quantities of the respective bid items.

As Built S Sht 93 TG

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: 2 Hrs (Renaissance)

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

Preliminary — 144

RFI No.: 144
Date: 14-Aug-97

Subcontractor (if applicable):

Originator: Majed Limam
Reply Req'd By: ASAP
Distribution List: Jim Gardner, Rudy Machado

Subject: Expansion joint use in DS retaining wall cap beams
Drw/Spec. No.: Spec. 423

Problem:
The approved cap beam design for the DS retaining walls does not include any form of expansion joint material between beam sections. Is my required? Please advise.

As Built A-Built Sht 93 TG

HB ZACHRY IS PRIVATE MASTER AND PLANNING FOR CAP BEAMS NEED AN ANSWER TOMORROW OR SOONER
RdB

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management: SEE SHEET S-97 GR. DETAILS OF CONTRACTION AND EXPANSION JOINTS. SEE CONSTRUCTION ACCEPTANCE CRITERIA FOR LIMITS OF UNDERRUN AND CONSTRUCTION JOINTS

Solution By: Date: 8/15/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

145

RFI No.: 145
Date: 21-Aug-97

Subcontractor (if applicable): Renaissance

Originator: Majed Limam
Reply Req'd By:
Distribution List: Jim Gardner, Renaissance

Subject: ROW at Keller Springs - Addison intersection
Drw/Spec. No.: C31, P149

Problem:
On Sheet C31, at the northwest corner of the intersection of Keller Springs and Addison Roads, the existing right of way runs north-south, and then runs eastward towards the intersection. This leaves a section of area which falls within neither the existing right of way limits or the new right of way limits. The pump discharge pipe crosses this area on Sheet P149.
Also need clarification on the exact location and meaning of "Existing Right of Way". Is it a ROW that TTA has already purchased? Can H. B. Zachry perform work in that area? The pump discharge would run through a parking lot area belonging to an existing business. It will also close access to the parking lot from the north driveway.

Entered As Built Sht 93 TG

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 2 Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: M.Limam Date 8/21/97 Reviewed By:
Reroute the pump discharge pipe so that it terminates at the north junction box of Culvert 1. This would eliminate the need to cross the area (parking lot) in question and would eliminate the boring beneath Addison Road.

Response by Construction Management:
PRELIMINARY RESPONSE: DRAIN = ROCK BERMS IN B. ZACHRY ROW TO ACT AS A DAM ON THE UPHILL OR EAST SIDE UNTIL THE EAST-OF-WAYS (EASEMENTS) ARE RECEIVED

Solution By: Date: Reviewed by: Date:

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

Formwork Response 146 — RFI # 146 — RFI No.: 15 — Date: 08/20/97

Subcontractor (if applicable):

Originator: D. Hubenak
Reply Req'd By: 08/29/97
Distribution List: Jim Reskie - Monterey

Subject: West Sump Pit
Drw/Spec. No: Sheet P147/P148 of 166

Problem:
The above referenced sheets do not provide an elevation for the pumps in the west pit. This information is required at this time so that we can create shop drawings for some pre-fabricated materials.

Entered As Built Sht 93 TG

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:
Please provide the pump elevation for the west pit.

Response by Construction Management:
Added HDR Sht SK7 For Sump Pit Elevations

Solution By: W. Leech Date: 21Aug97 Reviewed by: W. Leech Date: 21Aug97

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

Preliminary — RFI # 147

RFI No.: 147
Date: 09/10/97

Subcontractor (if applicable): RECO Ashton

Originator: D. Hubenak
Reply Req'd By: 09/17/97
Distribution List: Jim Reskie - Monterey, Job 9080.01 - 016

Subject: N E Wall Lighting
Drw/Spec. No:

Problem:
The plans indicate "Typical Lighting" for the above referenced wall with a 1" diameter anchor bolt embed. There appears to be no detail for the "Typical Lighting" and specs for the anchor bolts. WE DO HAVE EXIST WALL. DOES THE CONTRACTOR USE SAME DETAIL?

Bill, We need an answer to this ASAP. The anchor bolts are embedded in the panels we are going to be precasting very soon.
Majed Limam 9/10/97

Entered As Built T-3 TG

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:
Please provide information for "Typical Lighting" and anchor bolt specifications.

Response by Construction Management: HDR TALKED TO TTA & WAITED AND UNTIL THERE ARE LIGHT POLES NEXT OF TUNNEL (ON NORTH SIDE) THERE IS SOME OF THESE POLES TO MOUNT THE RECEIVING ANTENNAS. THEREFORE NO WORRIES IN SOT MAKE YEAST OF PRECAST WALL BE INSTALLED

Solution By: Date: 9/8/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

147B

RFI No.: 147B
Date: 24-Sep-97

Subcontractor (if applicable): Zachry/Monterey

Originator: Majed Limam
Reply Req'd By: 30-Sep-97
Distribution List: Jim Gardner, Zachry/Monterey, RECO

Subject: DS type RW Wall Lighting, LW1 Wall Lightings (West Side)
Drw/Spec. No.: S81, S84

Problem:
On their response to RFI 147, HDR covered the lighting for all the RW on the east side. The response has been forwarded to RECO.
This is a reminder that the drawings do call for embedded anchor bolts on the DS and LW1 type walls. The drawings clearly state that the anchor bolts to be provided by the authority (TTA). H. B. Zachry will be starting casting those panels in the near future. Please forward the response for these anchor bolts to be provided to us.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
Action : RFI Log
Info : HDR Ltr.
As shown in "Typical" detail on "Light Standard Support Details" Sheet S84 of Contract Drgs. "Dia Anchor Bolt Provided by Authority" This to be Coordinated by Detail 4 Sht T83 TTA.

Solution By: Date: 9/24/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

Preliminary — 148

RFI No.: 148
Date: 13-Sep-97

Subcontractor (if applicable):

Originator: Majed Limam
Reply Req'd By: ASAP
Distribution List: J. D. Martin, Sandy Walls, Jim Gardner, Ross Navarette

Subject: Constructibility Problem on the FW Retaining Walls
Drw/Spec. No.: S85, S86

Problem:
The bottom row rock bolts, on the FW type wall (NB RW), cause a constructibility problem. The elevations of the bottom row rock bolts, shown on sheet S85, are lower than the elevations of the top of line rubgrade in that area in front of the FW wall. The worst cases occur on panels 23, 24, 25, and 29. The difference in elevation between the top of subgrade and the bottom rock bolts in these panels vary from 2.12' to 2.80'. In order to drill short bolts, H. B. Zachry will have to over excavate in front of the wall by as much as 8 to 10 feet in order to provide enough room for the drilling machine to drill a horizontal bolt.

Extend As Built Sht 93 TG

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 2 Hrs; Surveying Crew: 1 Hrs; Other: Hrs

Proposed Solution by Contractor By: Majed Limam Date: Reviewed By:
In order to circumvent the problem, H. B. Zachry proposes to install these bolts (just the bottom row) at a 30 degree angle. That will allow the drill to operate without major over excavation of the subgrade. The structural excavation for the leveling pad will allow for the drilling of these bottom bolts at that angle. See attached sketch for details.
Please respond ASAP, H. B. Zachry is starting drilling the rock anchors on the NE RW starting 9/15/97.

THE SECOND OPTION IS TO EXCAVATE TO MEDIUM BROWN ORGANIC SOILS AND DRILL HOLES HORIZONTALLY, AND IN ADDITION, WITH STRUCTURAL CONCRETE. — A DAY RDEN

Response by Construction Management: HDR CONCURS WITH PROPOSED SOLUTION TO DRILL THE BOTTOM ROW OF ANCHOR TO INCLUDE ANGLE OF 30 DEGREES AS ATTACHED SKETCH. JUST IN THE ABOVE NOTED HOWEVER NOTE.

Solution By: Date: 9-15-97 Reviewed by: Date:

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

Preliminary — 149

RFI No.: 149
Date: W19/97

Subcontractor (if applicable):

Originator: J. Gardner
Reply Req'd By:
Distribution List: Limam, M. Leech, B.

Subject: Rock Subgrade
Drw/Spec. No.: SP260

Problem:
A considerable amount of the subgrade under the roadway leading into the tunnel from east and west, will be in solid rock. Do those areas need to be left 'as-is' or undercut and then backfilled. Would it still be necessary to lime 'backfill' subgrade when it is only 6"thick and resting on solid rock.

As Built 11 Sht 93 TG Detail C9

Fwd - RBE

ADDISON AIRPORT TUNNEL (WEST PORTAL)
Date 7/17/97
Pt Num 11 (Line)
11 Sta 1+50 | 12 1+40
13 Sta 1+30 | 14 1+20
15 Sta 1+10 | 16 1+00
17 Sta 0+90 | 18 0+80
19 Sta 0+70 | 20 0+60
21 Sta 0+50 | 22 0+40
23 Sta 0+30 | 24 0+20
25 Sta 0+10 | 26 0+00
Elev 0+00 = 545.00

Possible rework or extra work involved with this RFI? N Y
Delays in project execution involved with this RFI? N Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: HB Zachry Co. Date: 9/19/97 Reviewed By:
Possible solutions;
1. Excavate to top of subgrade elevation. Place CTB directly on rock. Eliminate lime in those areas.
2. Overexcavate to bottom of subgrade elevation and backfill to top of subgrade with native marl. Eliminate lime.
3. Overexcavate to bottom of subgrade elevation, backfill with native material and lime treat.
4. Overexcavate to bottom of subgrade elevation and embank with with granular material. Place CTB.
5. Other solutions proposed by owner/ designers, etc....

Response by Construction Management: #3, Never place a new compressible material on a re-compressible material. Material and specification for backfill should be approved by Engineer before work is started.
HDR: INFO
Am: ACTION

Solution By: Date: Reviewed by: Date:

QUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

B&E — 149B

Subcontractor (if applicable): NA

Originator: Majed Limam
Reply Req'd By:
Distribution List: Jim Gardner, Ross Navarette, James Brookshire

Subject: Lime Treated Subgrade on Rock
Drw/Spec. No.: SP 260

Problem:
On its response to RFI 149 Brown & Root directed H. B. Zachry to overexcavate the rock to the bottom of subgrade elevation, backfill with native material and lime treat the backfilled material. This is a request to increase the Roadway Excavation bid item (110), and the Embankment bid Item (133) in order to compensate for the extra quantities (Approximately 2000 CY in each of the two bid items).

Entered As Built 20 Sht 93 TG

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
B+R ACTION
HDR INFO

HDR IS TO BE ADVISED THAT AN ADDENDUM IMPLEMENTING THIS CHANGE IN BOTTOM OF SUBGRADE ELEVATION IS PENDING. HOWEVER WE REQUEST WRITTEN APPROVAL FOR CONCEPT, AND WORK MAY SHOULD BE PROCEEDED ONE WEEK AHEAD

Solution By: Date: 10/23/97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

150

RFI No.: 150
Date: 24-Sep-97

Subcontractor (if applicable): RECO

Originator: Majed Limam
Reply Req'd By: ASAP
Distribution List: Jim Gardner, Ross Navarette, RECO

Subject: Bars 507 vs. 407
Drw/Spec. No.: S86, S87

Problem:
Sheet S86, detail 1 and the bar bending diagram requires a # 4 Lbar with a 1'-7" leg. Sheet S87 and the reinforcing schedule, call for a # 5 Lbar. Which is correct? Please answer ASAP, RECO is ordering the rebars for the FW precast panels.
Attached is a copy of sheet S86 showing the bar bending diagram.

Entered As Built 20 Sht 93 TG

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
Action: HDR Ltr.
Info: GTR

Solution By: Date: Reviewed by: Date:

ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

HDR RCVD SEP 29 '97

151

RFI No.: 151 (154)
Date: 26-Sep-97

Subcontractor (if applicable):

Originator: Majed Limam
Reply Req'd By: 05-Oct-97
Distribution List: Jim Gardner, Rudy Machado

Subject: LW2 drainage mechanism into gravel drain
Drw/Spec. No.: S93

Problem:
H. B. Zachry proposes to do away with the drainage nut shown on sheet S93, and extend the weep holes to drain directly into the gravel drain behind the FW panels. It is important to note that H. B. Zachry had to undercut the slope of the LW2 footing due to the location of the face of rock cut in the FW panels undercuts. Please look at attached sketch for better understanding of the situation.
H. B. Zachry believes using the weep holes draining directly to the gravel drain will improve the overall drainage system and the construction of the wall. The drainage nut will deteriorate with time and will be damaged by the weight of the footing on top. That will cause drainage problems and will not allow the proper drainage of the water into the gravel.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
ACTION : RFI LOG
INFO : HDR LTR.
I AGREE THAT THE WEEP HOLES WOULD BE BETTER THAN THE NUT. HOWEVER, THE WEEP HOLES SHOULD BE PLACED AT A MINIMUM OF 2 FEET ABOVE THE TOP OF THE FOOTING. (THE WEEP HOLES SHOULD NOT INTERFERE WITH THE PANEL STEEL IN SOME AREAS.)

Solution By: Date: 10/6/97 Reviewed by: Date:

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

HDR RCVD 152

RFI No.: 152
Date: 10/01/97

Subcontractor (if applicable): Zachry/Monterey

Originator: D. Hubenak
Reply Req'd By: 10/1/97
Distribution List: Jim Reskie - Monterey, Job 9080.01 - 017

Subject: Pull Tests on Installed Rock Bolts
Drw/Spec. No: 4101

Problem:
Section 3.4 of the above referenced specification requires 10 of the first 100 installed rock bolts and 1 per 100 of the remaining installed rock bolts are to be pull tested using a hollow ram jack arrangement. Section 3.3 of the same specification requires all installed rock bolts to be tensioned "by either direct pull using approved hydraulic jacks or approved calibrated torque wrench..."

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:
Waive section 3.4 of this specification since all installed rock bolts will be tensioned with a calibrated torque wrench. A torque-tension relationship has been developed as specified in section 1.2 which will provide the required tension on all rock bolts.

Response by Construction Management:
HDR (Leech): Action
Ref. - Reference/Drawing/Info
HDR ACCEPTS PROPOSED SOLUTION BY CONTRACTOR AS NOTED ABOVE USING CALIBRATED TORQUE WRENCH PER SPEC. 4101, PART 1.2, C.2. ALSO THAT RESULTS TO BE SUBMITTED PER SPEC. 4101, PART 1.5

Solution By: Date: 10-7-97 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

A — 11/3

153

RFI No.: 153
Date: 10-Oct-97

Subcontractor (if applicable):

Originator: Limam, Majed
Reply Req'd By: ASAP
Distribution List: Jim Gardner, Jim Stockbridge, JD Martin, Bill Leech, Renaissance Cont.

Subject: Inadequate drainage into Y inlet and grate inlet on Line A Stores Sewer
Drw/Spec No.: C19, C40

Problem:
Based upon field observations during rains (approx 2-3 inches) the last two days, it appears the provisions shown in the plans are inadequate for draining the 'Access Easement' (around Sta. 7+10, Centerline Project) into the 'Y' inlet (4+05, line A) and the 36"X36" grate inlet (PCL Sta. 7+42). The heavy flow of water, coming from the parking lots, open fields, and Midway Rd. is collecting and then traveling down the access road at a relatively high velocity. It appears this flow cannot be diverted into these inlet(s) (located 30 ft. to either side of the access road) with just a 6" curb at the end of the road. We have built a trench and a 3 ft. high temporary 'diversion-berm' which, for the time being, is able to hold the rainwater from pouring into the tunnel entrance ramp while the 'Y' inlet drains. The grate inlet to the east of the access road does not help this road drainage since it is higher than the existing road. Please see attached sheet for access road elevations. If left as shown in the plans, we feel there will be a chronic problem with erosion of the slope between the end of the road and the ramp below. The eroded dirt and grass will end up in the sump pits.

Possible rework or extra work involved with this RFI? N Y x
Delays in project execution involved with this RFI? N Y x
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 4 Hrs; Surveying Crew: 2 Hr; Other: 8 Hr

Proposed Solution by Contractor By: Date: Reviewed By:
Please advise of a solution.
Water is currently being held back by a temporary berm. When it flows around the ber, it flows into the tunnel work area, greatly impacting our tunnel schedule. All roadheading activities are critical to our schedule.

Response by Construction Management:
HDR ACTION!
CHK. HDR!

Solution By: Date: Reviewed by: Da

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

RFI # 154

RFI No.: 154
Date: 10/15/97

Subcontractor (if applicable):

Originator: D. Hubenak
Reply Req'd By: 10/20/97
Distribution List: Jim Reskie - Monterey, Job 9080.01 - 018

Subject: 42" Storm Drain Crossing Tunnel
Drw/Spec. No: C33 of 166

Problem:
Sheet C33 of 166 indicates an existing 42" storm drain crossing the tunnel at approximate tunnel Sta 13+30. This sheet nor sheet S70 of 166 indicates the flow line elevation of the 42" storm drain.

Entered As Built 20 Sht 93 TG

West Loc.

C33

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:
Provide flow line elevation on or before October 20, 1997. We anticipate tunnel excavation at Sta 13+30 on or about October 22, 1997.

Response by Construction Management:
INFO: ACTION
RETN!: RFI
INFO: HDR

Solution By: Date: Reviewed by: Date:

L. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

155

RFI No.: 155
Date: 22-Oct-97

Subcontractor (if applicable): NA

Originator: Majed Limam
Reply Req'd By: 07-Nov-97
Distribution List: Jim Gardner, Ross Navarette, James Brookshire

Subject: Discrepancy between "Typical Sections" and "Roadway Plan & Profile" sheets.
Drw/Spec. No.: C9, C19

Problem:
Sheet C9 of contract drawings shows the island to extend all the way to station 6+15.01 on the roadway pavement section.
Also, sheet C9 shows no 8" slope (1/2"/ft) top soil up to station 6+15.01, it but shows a 2" rounding.
Sheet C19, on the other hand, shows no island from station 3+60 going east. It does show the 8" slope (1/2"/ft) starting at around station 6+50.
Plase advise on the correct pavement section to use from sta. 3+50 to 6+15.

Entered As Built 20 Sht 93 TG

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
HDR ACTION: USE 2" ROUNDING TO STA. 6+50. THEN TAPERED OUT TO MEDIAN END POINT. 8" SLOPE WITH 2" ROUNDING BEGINNING AT STA. 6+50. THERE WILL BE NO ISLAND FROM STA. 3+50 TO 6+50.

Solution By: Date: 10/28/97 Reviewed by: Date:

FINAL RECORD DRAWING
Date: 12/25/99

NO.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

RFI# 141 - 155

DRAWN ____ DATE ____ DESIGNED ____ DATE ____
CHECKED ____ DATE ____ SCALE ____

CONTRACT NO. DNT-260 SHEET ____ OF ____

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

RFI No.: 170 (was RFI # 110)
Date: 03/01/99
Originator: D. Hubenak

Subcontractor (if applicable): _____

Subject: Concrete in Tunnel
Drwg/Spec. No: T104 of 166

Distribution List:
Jim Reskie - Monterey
Job 9080.01 - 023

Problem:

The plans do not make any provisions for shear pressmiss between the concrete footer block and the concrete walkway.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Install a TxDOT T-501 rail modified to the height of the walkway shown on the plans. Backfill with gravel and top with a 4" concrete sidewalk reinforced with welded wire mesh. The T-501 rail reinforcement will be attached and its stirrups embedded in the footer block. The stirrups will have a 12" spacing for the length of the rail and should provide shear protection.
Since steel reinforcement will be installed in the T-501 rail and the sidewalk, we propose to eliminate the steel fibers in this concrete. A sketch is attached for this proposal.

Response by Construction Management:
HDR (Lemon) - Agree
Apply for change

HDR's fax of 3/2 has not been written. Original Addis. Air. 51 1978 Contract) in Trinity County at Stroud's Store?

Status By: [illegible] Date: 03/11/99 Reviewed by: Date:

We are returning the above-referenced RFI. The RFI concerned H.B. Zachry's request for a change in the concept of the walkway areas of the tunnel. The concept is for a change in the concept of the walkway areas of the tunnel. The concept is acceptable to HDR, however, the final design will have to address the following considerations:

- Add extra #5 stirrup, as shown in red on Exhibit No "A," every 12 inches.
- Reinforced sidewalk to be 4 inches thick, precast in approximately 5' sections. Design sidewalk and its supports for a live load of 150 pounds per square foot. Where manhole frames/covers are noted, cast manhole frame into precast sections and centered as shown on Exhibit "A."
- Provide 2 inch weepholes on 25 foot centers through T-501 rail as shown on Exhibit "A."
- Develop revised details for walkway ladder recess and tunnel handrail anchorage.
- Area between sidewalk and footer to be used as electrical and communication chaseway. No pea gravel will be required, as noted on Exhibit "A."
- Four inch fire line riser to be ductile iron, class 52, flanged ends as shown on Sketch.
- B. Section at Fire Hose Valve, Volume III, Page P150" and included as Exhibit "B."
- Manhole frame and cover with locking lugs to be Neenah R-1741, or equal (catalog page attached). The lugs/ears are submitted as Exhibit "C." The ¼" thick diamond pattern steel plate and appurtenances, as shown on Vol. II, Sheet T127, Detail 1, will not be required. Aforementioned manhole frame and cover to be used in lieu of steel plate cover. However, the recess in the top of the footer at all inlet locations is also required (as shown in Section A, Sheet T126).
- 3-4" conduits for crossovers as shown on Exhibit "D," at Stations 10+60 and 24+85. Encase in concrete as shown in section and make sure conduits do not interfere with utilities or drainage.

This detailed information is for the walkways on both sides of the tunnel. This design to be completed and sealed by a registered Texas P.E. and submitted for approval. The aforementioned considerations that HDR has included in this letter are for a guide only. It will be the responsibility of the contractor to ensure that all areas affected by this change are reviewed and any necessary changes are made.

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RECEIVED
MAR 31 1998
Brown & Root, Inc.

RFI No.: 169
Date: March 27, 1998

Subcontractor (if applicable): Renaissance

Originator: J. Gardner
Reply Req'd By: ASAP
Distribution List: Bill Leech
Majed Limam

Subject: Water Line W-4 Bore beneath Addison Road
Drwg/Spec No.: Dwg. C-954 & C-956

Problem:

To tie into the existing 20" water main beneath Addison with proposed line W-4, will require extensive traffic control and the possibility of night work. As an option, Renaissance has proposed closing only the outside lane of northbound Addison Rd. to excavate a receiving pit. The bore would then extend beyond the existing 20" pipe, passing over it. The tap would then be made from the eastside of the water main and the 8" line would then connect from the east. See attached sketch. While requiring a few more fittings and some different trench shoring, this would create much less traffic disturbance. By boring the pipe from the corner at an 'angle' the receiving pit could be built north of the actual intersection of Addison and Keller Springs creating fewer traffic problems. By boring from the intersection, this shouldn't affect trees along west side of Addison Rd. Bore distance would increase somewhat.

Possible rework or extra work involved with this RFI? N Y
Delays in project execution involved with this RFI? N Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 4 Hrs
Surveying Crew: 2 Hr
Other: 4 Hr

Proposed Solution by Contractor By: Date: 3/27/98 Reviewed By:

Renaissance will submit a price proposal to Zachry Co. and we will supply this to you if this option is acceptable to B&R, HDR, etc. A meeting was already held with Town Addison the morning of 3/27/98 to discuss this option. All agreed at meeting that joints must be restrained-joints, thrust blocks must poured, sanitary sewer clearance must be observed and street and water pipe clearance maintained with the bored pipe. This information was relayed to Mike Barber and agreed upon.

Response by Construction Management:
B+R Agree
Addison Concur
HDR Concur

Solution By Date Reviewed by Date

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RECEIVED
MAR 26 1998
Brown & Root, Inc.

RFI No.: 168
Date: 25-Mar-98

Subcontractor (if applicable): NA

Originator: Wayne Crabtree
Reply Req'd By: ASAP
Distribution List:
Jim Gardner
Ross Navarette
Majed Limam

Subject: Existing Parking Lot Drainage after Driveway Built
Drwg/Spec. No.: C97

Problem:

A topo of the existing concrete parking lot area right of CL sta. 34+25 to sta. 35+90 was done. We have discovered that once the construction of the new driveway and the doweled curb are completed, this area would not drain as the plans indicate. Please see attached drawing.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 2 Hrs
Surveying Crew: 7 Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Please provide us with solution. One solution could be to cut & restore portion of the parking lot and build a drop inlet into culvert 2.

Response by Construction Management:
[illegible] DATE 3-31-98
DOC NO 9727
HDR - INFO
B&R - AGREE

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RECEIVED

RFI No.: 168A
Date: 16-Apr-98

Subcontractor (if applicable): _____

Originator: Wayne Crabtree
Reply Req'd By: ASAP
Distribution List:
Jim Gardner
Ross Navarette
Majed Limam

Subject: Existing Parking Lot Drainage After Roadway & Drive Built
Drwg/Spec. No.: C97

Problem:

The drainage of the parking lot right of CL sta. 34+25 to sta 34+75 is now blocked by the newly constructed Keller Springs pavement and the new driveway. The water now builds up in the parking lot and the adjoining airport paved area to the west then either drains to headwall of culv "A-2" or the recently constructed inlet on the north side of the parking lot. Ref. RFI #168

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

One solution is to build a drop inlet 84' right of CL sta. 34+37 with a top elevation of 636.23, connected to culv. "A-2" with RCP.

Response by Construction Management:
HDR - Agree
B&R - Agree
HDR/Lemon - Agree
Cross Culvert Drop Inlet into Culv. A-2 with 18" RCP. Cut top of pipe as shown & 45 deg. Grate. Open Area 4.5 sq. ft. Provide this address to the accountable - Lemon, Carter, Inc. Ensure to verify this open areas with this inlet.

Solution By: Date: 4/20/98 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RFI No.: 167
Date: 18-Mar-98

Subcontractor (if applicable): Zachry/Monterey

Originator: Majed Limam
Reply Req'd By: ASAP
Distribution List:
Jim Gardner
Wayne Crabtree

Subject: Security Fence @ Airport Taxiway by Fault
Drwg/Spec. No.: NA

Problem:

Due to the fault fallure, H. B. Zachry Co. had to remove a portion of the security chain link fence and relocate the storm water drainage ditch further to the north. H. B. Zachry placed a safety fence inside the ditch, supported by steel posts. The fence had to be lowered at the airport's management request.
It transpired from the Project Progress Meeting of the 3/18/98 that the Addison Airport Management is requesting for the fence to be supported by flexible plastic post with lights. A flexible plastic pipe may not support a safety fence.
Please explain & clarify. Before proceeding, Zachry needs to know the exact details about the procedures to be followed when working close to the Taxiway, and the exact location and type of fencing and protection needed.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: 3 Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

In response to H. B. Zachry's RFI-167 dated 18 March 1998, Brown & Root recommends the following course of action to resolve the conflicting airport and construction safety issues:

a. Place the temporary security fence in the drainage ditch, which is above the rock side area.
b. Substitute the current No. 6 reinforcing bars supporting the orange safety fabric with 2-inch diameter PVC pipe.
c. Place one night flashing traffic light on the PVC pipe vertical or on another type of stanchion, at a point that is closest to Taxiway Tango.
d. Keep the fabric, its supports and the light at the lowest practical safety height.
e. Place a sign on the airport side stating "Do Not Cross over Security Fence".

This recommendation should resolve Addison Airport of Texas, Inc. – ATTI's concern, i.e., low wing aircraft striking the metal supports of the security fence. This recommendation should resolve H. B. Zachry concern, i.e., the public wondering too close to the edge of the rock side area.

Besides this area H. B. Zachry should identify and secure other more critical areas from the general public. Some of the areas discussed in the past were the tunnel and the edge of the southeast shotcreted wall.

Since security and safety of the Project remains a H. B. Zachry responsibility, Brown & Root considers our recommendation, if implemented, as part of the Contract or the indirect costs to any supplemental agreement.

Solution By: Date: 4/27/98 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RECEIVED
MAR 31 1998
Brown & Root, Inc.

RFI No.: 166
Date: 28-Feb-98

Subcontractor (if applicable): J. L. Steel

Originator: Majed Limam
Reply Req'd By: ASAP
Distribution List:
Jim Gardner
Wayne Crabtree
Ross Navarette
J. L. Steel

Subject: Roadway Pavement Curb Design
Drwg/Spec. No.: NA

Problem:
Attached is a roadway pavement curb design that was handed over to H. B. Zachry by Brown & Root's resident engineer.
We could not find any reference to the keyway shown in this drawing in the plans. We bring to your attention that sheet # SD11 shows a doweled curb design for this project. That particular drawing does not show the requested keyway.
It is also important to note that some of the paving has already been done according to what is shown on sheet SD11.
In case NTTA denies the attached curb design with the keyway, please provide a method of construction.
Be advised that H. B. Zachry would consider this an "extra work" to the contract.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? Y (Toll Booth area completion)
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
B+R - Agree. Curb is to be inverted detail in Change Order #5
HDR - Info. Per memo to plan addendum #4 for Concrete. It set up with Keyway - Option - Pour Curb then Allow to cure 3 - 4 hours & then pour slope. Anchor sheet SD11 is for Doweled Curb - Not Keyed Curb.
(Use here per consistent w/ prior curb pour which Keyway was to be 1.5 E.C. Without dowelling Bars)

Solution By: Date: 4/1/98 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RECEIVED
MAR 12 1998
Brown & Root, Inc.

RFI No.: 165
Date: 10-Mar-98

Subcontractor (if applicable): _____

Originator: Majed Limam
Reply Req'd By: 20-Mar-98
Distribution List:
Jim Gardner
Wayne Crabtree
Ross Navarette

Subject: Existing Elevations @ Hangars & Long Shots Parking Lot
Drwg/Spec. No.: N. A

Problem:

Attached is drawing reflecting existing elevation at the "Long Shots" parking lot area and the hangars in the proximity. This information was requested by Brown & Root to help in providing a solution to the storm drainage situation at the hangars area.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 4 Hrs
Surveying Crew: 6 Hrs
Other: 3 Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
[illegible] DATE 3-13
DOC NO 9727
HDR - INFO
B&R - AGREE
Please refer to your memo and page to your detail on the Drawing

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RFI No.: 165A
Date: 23-Mar-98

Subcontractor (if applicable): NA

Originator: Majed Limam
Reply Req'd By: ASAP
Distribution List:
Jim Gardner
Wayne Crabtree
Ross Navarette

Subject: Existing Elevations@ Hangar Area: Additional Info
Drwg/Spec. No.: _____

Problem:

Attached is additional surveying layouts for the hangars area north of Keller Springs. This is extra information requested by Brown & Root to solve drainage problems in the area. This is additional to previous data provided by H. B. Zachry in RFI 165.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 4 Hrs
Surveying Crew: 8 Hrs
Other: 2 Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management: WE HAVE ATTACHED THE PROPOSED DITCH DESIGN.
HDR AGREE ALONG THE RETAINING WALL. DETAIL FOR DITCH INFO HOWEVER WILL BE VERY OPEN. ALSO, SUBGRADE TRENCHING FOR TRAPPED DITCH ALONG THE RETAINING WALL HAS DID NOT EXIST IN THE UNIT PRICES AS ULTIMATE SUBGRADE WILL BE NOT THAT A CONCRETE BID DOCUMENT. THE EXCAVATION IS DONE BY SUBGRADE AND NOT ROCK. DITCH WAS CONSTRUCTED BY MUCK EXCAVATION AND NOT ROCK.

Solution By: Date: 7-10-98 Reviewed by: Date:

ZACHRY-MONTERREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

RFI No.: 164 (was RFI # 104)
Date: 02/20/98
Originator: D. Hubenak

Subcontractor (if applicable): _____

Subject: Concrete in Tunnel
Drwg/Spec. No.: T104 of 166

Distribution List:
[redacted]

Problem:

The plans indicate a section of the concrete footer block is to be sloped in the area under the tunnel liner concrete. We propose to eliminate the slope and provide a "squared off" key. See attached sketch.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
SEE ATTACHED RESPONSE BY LEMON AND ASSOCIATES FOR AGENCY

We have reviewed RFI No: 164 and find that the proposed joint configuration between the arch and the footer block is an acceptable alternative to that shown on the contract drawings. Please note that the horizontal dimension of 4.00 feet shown on HB2's sketch will vary from 3.80 feet to 4.02 feet depending upon which side of the tunnel and the amount of superelevation of the roadway.

However, considering the benefits of reduced shrinkage cracking in fiber reinforced concrete, we will waive the 50-foot maximum spacing on construction joints for the footer block and walkway pours. The contractor shall select the number and location of construction joints for the footer block and walkway concrete to suit his method of placement. All construction joints in the footer block and walkway concrete shall be normal to roadway grade and have a nominal 6 inch wide by 1 inch deep keyway.

Solution By: Date: 5/27/98 Reviewed by: Date:

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

RFI No.: 163 (was RFI # 103)
Date: 02/18/98
Originator: D. Hubenak

Subcontractor (if applicable): _____

Subject: Concrete in Tunnel
Drwg/Spec. No.: T104 of 166

Distribution List:
Jim Reskie - Monterey
Job 9080.01 - 021

Problem:

The plans and spec section regarding the concrete footer block and walkway do not indicate any type of joint or joint pattern. Are any joints necessary in this concrete? If so, what type and at what spacing?

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
HDR (Lemon) - Agree
B+R - Info.

SEE ATTACHED RESPONSE BY LEMON AND ASSOCIATES FOR AGENCY

In response to RFI No: 163, Special Specification SS-4105, Part 3.7.A requires construction joints to be normal to roadway grade, have a nominal 6 inch wide by 1 inch deep keyway and be spaced no further than 50 feet apart.

However, considering the benefits of reduced shrinkage cracking in fiber reinforced concrete, we will waive the 50-foot maximum spacing on construction joints for the footer block and walkway pours. The contractor shall select the number and location of construction joints for the footer block and walkway concrete to suit his method of placement. All construction joints in the footer block and walkway concrete shall be normal to roadway grade and have a nominal 6 inch wide by 1 inch deep keyway.

Solution By: Date: 4/20/98 Reviewed by: Date:

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

RFI No.: 162 (was RFI # 102)
Date: 02/18/98
Originator: D. Hubenak

Subcontractor (if applicable): _____

Subject: Concrete in Tunnel
Drwg/Spec. No.: T104 of 166

Distribution List:
Jim Reskie - Monterey
Job 9080.01 - 020

Problem:

The above referenced drawing indicates the footer block and walkway are to be fiber reinforced. The notes on this sheet nor the spec section 4105 indicate the amount of fibers to be added in this concrete. Please provide this information.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
HDR (Lemon) - Agree
B+R - Info.

THE FIBER CONTENT FOR THE FOOTER BLOCK AND ASPHALT WALK CONCRETE SHOULD BE 50 POUNDS PER CUBIC YARD. H.B. SHALL BE ESTABLISHED BY LEMON AND ASSOCIATES DURING SAMPLE.

Solution By: Date: 4/27/98 Reviewed by: Date:

ZACHRY-MONTERREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

RFI No.: 161
Date: 01/29/98
Originator: D. Hubenak

Subcontractor (if applicable): _____

Subject: Vent Fans - Tunnel Ventilation System
Drwg/Spec. No.: T100 - Section 15852

Distribution List:
Jim Reskie - Monterey
Job 9080.01 - 019

Problem:

Our Submittal No. 7100-003 in reference to the above specification was returned to "furnish as noted". One of the notes indicates to provide an air flow switch to detect air flow and air flow direction. Part 2.6.A of this section indicates to "Furnish each fan assembly with an airflow switch that is capable of detecting airflow in either direction of motor operation." Our supplier can not locate a switch which detects air flow and air flow direction.
Please provide us a manufacturer's name for this type of switch.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
HDR: AGREE
B+R: INFO
USE 2 VANE TYPE AIRFLOW DETECTING PER FAN, EACH DETECTOR WILL DETERMINE AIRFLOW IN ONE DIRECTION.

Solution By: Date: 1/31/98 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RECEIVED
JAN 23 1998
Brown & Root, Inc.

RFI No.: 160
Date: 22-Jan-98

Subcontractor (if applicable): _____

Originator: Majed Limam
Reply Req'd By: NA
Distribution List:
Jim Gardner
Ross Navarette

Subject: Elevations @ Existing Parking Lot
Drwg/Spec. No.: _____

Problem:

As requested by Brown & Root, we are attaching the contours of the existing parking lot south of the junction box located at the south west corner of the intersection of Kellersprings and Addison Road.
The existing contours and elevations were prepared at the request of Brown & Root's Resident Engineer.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 4 Hrs
Surveying Crew: 4 Hrs
Other: 3 Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
B+R: Agree! Attached is copy of the centerline of the tunnel showing the area we may request. Also attached is a sketch showing the sections.
DATE 1-23
DOC NO 9727
HDR - INFO
B&R - AGREE
Please refer to your memo and page to your detail on the Drawing

Solution By: T. Kelley Date: 1-23-98 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

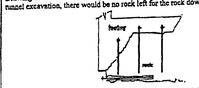
RFI No.: 159
Date: Jan. 20, 1998

Subcontractor (if applicable): Zachry/Monterrey

Originator: J. Gardner
Reply Req'd By: ASAP
Distribution List: Bill Leech
Majed Limam

Subject: Rock Dowels @ East Fascia
Drwg/Spec No.: T 139

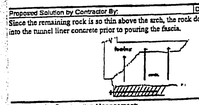
Problem:
Drawing does not correctly depict area where fascia-rock dowels and the tunnel excavation meet. Following tunnel excavation, there would be no rock left for the rock dowels in the area directly over the tunnel arch.



Possible rework or extra work involved with this RFI? N Y
Delays in project execution involved with this RFI? N Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs
Surveying Crew: 1 Hr
Other: 1 Hr

Proposed Solution by Contractor By: Date: 1/20/98 Reviewed By:

Since the remaining rock is so thin above the arch, the rock dowels, or equivalent strength rebars, could be cast into the tunnel liner concrete prior to pouring the fascia.



Response by Construction Management:
We have reviewed RFI No: 159 and have the following comments. This RFI deals with only two (2) rock dowels, one each located either side of centerline of tunnel at the east portal. The current location of these two dowels is shown as 6-inches beyond excavation neat line for the tunnel arch.
To provide 1-foot of clearance from the excavation neat line, move the two dowels 5.5-inches radially outward from the location shown on the contract drawing and look the dowels up slightly. This should provide the contactor with sufficient construction tolerance for potential overbreak in this area.

Solution By: [illegible] Date: 1/26/98 Reviewed by: Da

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RFI No.: 158
Date: 12/02/97

Subcontractor (if applicable): (None)

Originator: H B Zachry Co.
Reply Req'd By: ASAP
Distribution List: Bill Leech
Majed Limam

Subject: Fiber fabric at Retaining Wall Backfill
Drwg/Spec N/A:

Problem:
There is nothing to prevent the granular backfill material behind the retaining walls from percolating into the gravel material beneath it. Although the pipe underdrain contained within the gravel material is wrapped with filter fabric, the gravel itself, is an open-graded material. Over time, the potential exists for fines from the granular backfill, which is in direct contact with the gravel, to enter the spaces between the gravel and begin "packing" – actually impeding the migration of water to the underdrain pipe.

Possible rework or extra work involved with this RFI? X Y
Delays in project execution involved with this RFI? X Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Place a water- permeable 'barrier' between the gravel and the granular backfill material. One suggestion would be to install a sheet of filter fabric between the two materials which would prevent fines from entering the gravel, while allowing water to pass.

Response by Construction Management:
B+R ACTION!
HDR INFO!

Solution By: Date: Reviewed by: Da

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RFI No.: 157
Date: Dec 2, 1997

Subcontractor (if applicable): NA

Originator: J. Gardner
Reply Req'd By: ASAP
Distribution List: Bill Leech
Majed Limam

Subject: Lost filter material for underdrain
Drwg/Spec No.: SP-1350

Problem:
The plans don't specify type of filter material to be used for pipe underdrain, but Special Provisions state that a processed sand filter material must be used. We feel that using sand, even with underdrain pipe that has been wrapped with fabric, opens up the possibility of sand eventually migrating into the perforations in the pipe.

Possible rework or extra work involved with this RFI? X Y
Delays in project execution involved with this RFI? X Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Using a gravel material, in lieu of sand, would allow water to percolate into the pipe underdrain –however, there would be little possibility of the perforations plugging up

Response by Construction Management:
B+R ACTION! Had been sent to HB2 this morning.
HDR INFO! USE COARSE FILTER MATERIAL INSTEAD OF SAND

Solution By: Date: Reviewed by: Da

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

RFI No.: 156
Date: 23-Oct-97

Subcontractor (if applicable): NA

Originator: Majed Limam
Reply Req'd By: ASAP
Distribution List:
Jim Gardner
Ross Navarette

Subject: Discrepency in the exact location of the Profile Grade Line
Drwg/Spec. No.: C9, C18

Problem:
Sheet C9 shows the PGL to be located at the bottom of the 4" median riprap pavement, and on top of the CTB.
This is a request to clarify that location. Do we have to subtract 2" from the PGL elevations on the vertical profile curves, between sta. 0+46.7 and sta. 2+20, before calculating grades on the roadway?

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs
Surveying Crew: Hrs
Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
HDR ACTION!
B+R INFO!

Solution By: Date: Reviewed by: Date:

FINAL RECORD DRAWING
Date: 12/25/99

NO.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

RFI# 156 - 170

DRAWN ____ DATE ____ DESIGNED ____ DATE ____
CHECKED ____ DATE ____ SCALE ____

CONTRACT NO. DNT-260 SHEET ____ OF ____

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

171

RFI No.: 171
Date: 06-Apr-98

Subcontractor (if applicable): N.A.
Originator: Majed Limam
Subject: Requested info on Rockslide
Reply Req'd By: 10-Apr-98
Drw/Spec. No.: N.A.
Distribution List: Jim Gardner, Ross Navarette, Wayne Crabtree

Problem:

Attached please find the requested survey of the eastern end of the rockslide. The survey was performed at the request of Brown & Root. Survey includes location of rock bolts as well as edge of fault location.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 4 Hrs, Surveying Crew: 2 Hrs, Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
HDR - INFO (D. GILLETT)
B+R - INFO + ASSIGNED (LEACH)

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

172

RFI No.: 172
Date: 06-Apr-98

Subcontractor (if applicable): J. L. Steel
Originator: Majed Limam
Subject: Pavement grades at the intersection of Addison & Kellers
Reply Req'd By: ASAP
Drw/Spec. No.: C-23
Distribution List: Jim Gardner, Wayne Crabtree, Ross Navarette

Problem:

Attached please find a layout of Addison Road "tie in" to Keller Springs Rd. new pavement.
The layout was performed at the request of Brown & Root and the City of Addison representatives, after a potential "flat area" was discovered by H. B. Zachry Co.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 4 Hrs, Surveying Crew: 2 Hrs, Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:
B+R Action
HDR - INFO

Solution By: Date: Reviewed by: Date:

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

Preliminary C-25A

173

HB RFI #: 173
RFI No.: 24
Date: 04/08/98

Subcontractor (if applicable):
Originator: D. Hubenak
Subject: 8" Fire Main
Reply Req'd By: 04/09/98
Drw/Spec. No.: C15A and C18A of 166 358 + 368
Distribution List: Jim Roskie - Monterey, Job 9080.01 - 024

Problem:

The above referenced sheets show the 8" fire main to bend at a specified elevation immediately outside of the tunnel. The slope going into the tunnel is shown as 0.00% but does not indicate how far into the tunnel it goes.

Bill: We need an answer ASAP. Thanx Majed

Fireman ties into "W-5" on West Portal and "W-4" at East Portal.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs, Surveying Crew: Hrs, Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

We propose to install 2 additional 45 degree bends into the tunnel at each portal to bring the main to tunnel profile grade. B+R agrees & will Propose.

Response by Construction Management:
HDR - Action
B+R - INFO

Hot Concerns with Contractor and B+R's Solution.
Each Group Requires a Concept Thought Again.

Solution By: Date: 6/17/98 Reviewed by: Date:

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

Preliminary

174

HB RFI #: 174
RFI No.: 25
Date: 04/09/98

Subcontractor (if applicable):
Originator: D. Hubenak
Subject: 8" Fire Main
Reply Req'd By: 04/10/98
Drw/Spec. No.: P150 of 166
Distribution List: Jim Roskie - Monterey, Job 9080.01 - 025

Problem:

The above referenced sheet shows a cross-section detail the 8" fire main to be installed off of the ground in the footer block. The detail does not indicate this dimension.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs, Surveying Crew: Hrs, Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

We recommend to make this dimension 0". Laying the pipe on the ground will enable us to tie the pipe down more securely in order to keep it from floating, which could cause the joints to come apart, during concrete placement.

Response by Construction Management:
HDR-ACTION
B&R - INFO/INPUT

HDR has Discussed (Laying of 8" Fire Line onto B.F.
with Construction and Concurs. with Action Proposed Solution.
However, Check with Tom to Address this Final Approval.

Solution By: Date: 6/23/98 Reviewed by: Date:

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

Preliminary

175

HB RFI #: 175
RFI No.: 26
Date: 04/10/98

Subcontractor (if applicable):
Originator: D. Hubenak
Subject: Keyway
Reply Req'd By: 04/11/98
Drw/Spec. No.: T127A of 166
Distribution List: Jim Roskie - Monterey, Job 9080.01 - 026

Problem:

Brown & Root's letter HBZ 420 dated March 20, 1998 states that a keyway will provided at each intentional or unintentional break in the continuous pour of the concrete footer block in lieu of installing a keyway every 50'. We agree with this method but request a waiver to this method at each of the drain boxes on the south wall footer block.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs, Surveying Crew: Hrs, Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

We propose to dowel into the footer block walls at each drain box with #5 rebar and tie a mat of rebar to the dowels for the footing of the box.

Response by Construction Management:
HDR-ACTION
B&R - INPUT

Hot Denies Contractor's Request for a Waiver. As Stated Previously, All Construction Joints in the Center Plastic and Waterstop Continuous. Allow Rebar to Remain Cogged and Bent. A Notation is Made What Are Your Next Days Activity.

Solution By: Date: 5/6/98 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

176

RFI No.: 176
Date: 05-May-98

Subcontractor (if applicable):
Originator: Wayne Crabtree
Subject: Existing water line "w3" in conflict with 18" wall drillshaft
Reply Req'd By: ASAP
Drw/Spec. No.: C15A and S67
Distribution List: Jim Gardner, Ross Navarette, Majed Limam

Problem:

Line "W-3" TEE was placed at plan Line "W-3" pipe station 7+78 and laid beneath the footing of the N.W. Wall. After Baking the 18' drill shafts of the N.W. Wall H.B.Z. has found there is a distance of 5" from the CL of Line "W-3" to the west edge of the first 18" drillshaft in bay #11.
See attached drawing for more details.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 3 Hrs, Surveying Crew: 2 Hrs, Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

One solution: remove the drillshaft to the east clearing the water line.

Response by Construction Management:
Keith Hummel: Let's Review and Discussion This and Possible - Bid.
Gather the Situation We Are Faced with in the Field. The most Straightforward Solution to Problem is to Move Another 18" Drill Shaft as Should Be Anticipated Originally By HDR.
HDR Action
B+R Action

Solution By: Date: 5/19/98 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

Preliminary

177

RFI No.: 177
Date: 09-Jun-98

Subcontractor (if applicable): N/A
Originator: Majed Limam
Subject: L Bar for Cut & Cover Footing
Reply Req'd By: ASAP
Drw/Spec. No.: Sheet T-113
Distribution List: Joaquin Gomez, Wayne Crabtree

Problem:

The L Bars next to the trench drain for the cut and cover footing were short one foot on the bent end.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 5 Hrs, Surveying Crew: 0 Hrs, Other: 0 Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

29 Extra No. 8 L Bars were ordered and overlapped with the existing L Bars by approximately 6 feet.

Response by Construction Management/ Engineer: How this was Communicated and Why Should not Part Have Been Built that Short. We Are Having Difficulty Determining Who is Responsible for Change. Is Side Hollaway, The Shotcrete Maintenance that Evolved Specifications and Assumes to be Satisfactory Solution.

HDA → Action
B+R → INPUT

Solution By: Date: 6/15/98 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

178

RFI No.: 178
Date: 7-Jun-98

Subcontractor (if applicable): NA
Originator: Majed Limam
Subject: Water Stop Configuration at the intersection of Cut & Cover and DS R/W
Reply Req'd By: ASAP
Drw/Spec. No.: T129, S86, BR RFI 908
Distribution List: George James, Joaquin Gomez

Problem:
The NW R/W being pre cast panels. H.B. Zachry proposes to use the Type C Waterstop (Swell Seal RX101). The type C waterstop would be installed on both the Cut & Cover back wall and DS back of panel. A continuous pour will cover both waterstops at the corner between the two structures. This solution would be also valid for the Southwest Corner of the Cut & Cover structure. Look at attached drawing for more details.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs, Surveying Crew: Hrs, Other: Hrs

Proposed Solution by Contractor By: Majed Limam Date:6/23/98 Reviewed By:
This solution is similar to water stop configuration of F/W Type R/W at closure pours. Detail of that closure pour is shown on sheet S86 Detail 1.

Response by Construction Management:
HDR & Lacher & Assoc. Have Reviewed the Above Mentioned Configuration Proposed by Contractor. See Attached Response from Lacher & Assoc.
HDA (Lacher) → Action
B+R → INPUT

Solution By: Date: 7/6/98 Reviewed by: Date:

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

Distributed to Brown & Root 7/21/98 H.B. Zachry Co.

Preliminary

179

RFI No.: 179
Date: 07/21/98

Subcontractor (if applicable):
Originator: D. Hubenak
Subject: Grouting - Flow meters
Reply Req'd By: 07/22/98
Drw/Spec. No.: 4106
Distribution List: Jim Roskie - Monterey, Job 9080.01 - 027

Problem:

The above referenced specification requires a meter to measure the amount of mixing water and a meter to determine the amount of grout injected.

Entered into Bull 23 Jul 98

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs, Surveying Crew: Hrs, Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

We are requesting a variance to eliminate these meters. We propose to calibrate the tanks on the grout pump to measure the amount of mixing water required and to measure the amount of grout injected. A secondary calibrated device to measure the mixing water can be provided, if required.

Response by Construction Management: Defer Approval to Brown & Root for Elimination of Flow Meters. Use Info Attached Calcs & Assoc. Comments for Further Clarification.

Fax → Lacher (Action)
Fax → HDR (Info)
cc → B+R (Info)

Solution By: Date: 7/28/98 Reviewed by: Date:

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

Preliminary

180

HB RFI #: 180
RFI No.: 28
Date: 07/24/98

Subcontractor (if applicable):
Originator: D. Hubenak
Subject: Electrical Conduits into Electrical Room
Reply Req'd By: 07/28/98
Drw/Spec. No.: "160 of 166 and details
Distribution List: Jim Roskie - Monterey, Job 9080.01 - 028

Problem:

The electrical conduits feeding into the electrical room from the commercial source and the emergency generators take up a great deal of space as they cross the railway landing into the room as shown in Attachment 1. Attachment 2 shows a configuration in which all conduits will fit but may not allow the concrete for the slab/deck to encase the conduit. Attachment 3 shows a layout per National Electrical Code which indicates the conduits will lay outside the limits of the slab/deck.

Entered into Bull 25 Jul 98

THIS IS A VERY HOT ONE. HB. ZACHRY PLANS TO POUR THE TOP DECK ON THURSDAY EARLY AM (30 JUL 98).

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs, Surveying Crew: Hrs, Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Reroute the eight (8) conduits from the emergency generators to enter the electrical room from the east side of the room.

Response by Construction Management: Approve Extrusion of West Conduits to West Room from Which Conductors to Future Room #. Show on Room See Attached Location & Assoc. Responsible for Elevation Clarification.

Fax → Lacher - Mangrum (Action)
Fax → HDR Engineering (Action)
cc → B+R/M-K Field (Info)

Solution By: Date: 7/28/98 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

Preliminary

181

RFI No.: 181
Date: 27-Jul-98

Subcontractor (if applicable): J. L. Steel
Originator: Majed Limam
Subject: L-bars too short at Cut & Cover deck
Reply Req'd By: ASAP
Drw/Spec. No.: T-115
Distribution List: George James, Ross Navarette, J. L. Steel

Problem:

L-bars (#4 @ 1004 in the deck of the Cut & Cover are supposed to have 3" clearance. As it stands, the bars are protruding around 1" - 1/2" from the top of wall (construction joint between wall and deck). According to drawings that distance should be 2 - 3". See attached Fig. #1.

HB&R immediately Activate Road Placement is scheduled for Monday, 30 Jul 98.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs, Surveying Crew: Hrs, Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

In order to provide the recessed 3" clearance, H. B. Zachry proposes to raise the bars by using # 5 Chairs as shown on Fig. # 2.
The 3" clearance would be achieved around 4' to 5' from the bent on the Lbar. See attached Fig. # 3.

HDA (Lacher) Please Call Asp. Less Issues This One.

Response by Construction Management: Approve Request to Raise Misplaced #20 L-Bars to the 3" Clear Height Using the Attached Location & Assoc. Responsible for Material Clarifications.

Fax → Lacher - Mangrum (Action)
Fax → HDR (Action)
Cc → B+R (Info)

Solution By: Date: 7/28/98 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

Preliminary

182

RFI No.: 182
Date: 27-Jul-98

Subcontractor (if applicable):
Originator: Majed Limam
Subject: Construction Joint @ Cut & Cover Deck
Reply Req'd By: ASAP
Drw/Spec. No.: T-115
Distribution List: Jennie Alaniz, Ross Navarette, George James

Problem:

H. B. Zachry Co. proposes to use a construction joint at the tie in between the cut & cover deck and the tunnel liner. The remaining pour at the deck will be done monolithically with the last membrane liner pour. Tunnel forms would be pushed outside the portal a certain distance, enough to pour the ends of the cut & cover. (See fig. # 1).

Entered into Bull 28 Jul 98

HB&R immediately Activate Road Placement is scheduled for Monday, 30 Jul 98.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs, Surveying Crew: Hrs, Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

HDA (Lacher) Please Call Asp. Less Issues This One.

Response by Construction Management: Disapprove Request to Relocate the Cut & Cover End Wall Construction Joints.

Fax → Lacher - Mangrum (Action)
Fax → HDA
cc → B+R

Solution By: Date: 7/28/98 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

182A

RFI No.: 182A
Date: 28-Jul-98

Subcontractor (if applicable):
Originator: Majed Limam
Subject: Construction Joint @ Cut & Cover Deck
Reply Req'd By: ASAP
Drw/Spec. No.: T-115
Distribution List: George James, Jessie Alaniz, James Gardner

Problem:

As discussed in RFI 182, Zachry is requesting the use of a construction joint at the tie in between the cut & cover and the tunnel liner. The remaining pour at the deck will be done monolithically with the last liner pour.
This RFI provides a solution for preventing water to seep through possible cracks between the cut & cover structure and concrete liner.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs, Surveying Crew: Hrs, Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Solution: See fig. # 1. Water barrier shown on original configuration will still be provided, by means of welding to membrane liner. 10.5" long key way provided at the construction joint of the deck, along with a waterstop as shown on drawing.
Zachry plans to pump fast concrete liner pour. Disturbance to the water barrier would be minimum as the concrete slowly fills in the area between/around form and membrane liner. That type D waterstop will go around the arch of the tunnel, as radial for as the plans. Extra precaution will be taken during the pour to ensure that waterbarrier stays horizontal.

Response by Construction Management:

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

182C

RFI No.: 182C (1998)
Date: 30-Jul-98

Subcontractor (if applicable): N/A
Originator: Majed Limam
Subject: Construction Joint at Cut & Cover Deck
Reply Req'd By: ASAP
Drw/Spec. No.: T115
Distribution List: Jim Gardner, Joaquin Gomez, George James, Jesse Alaniz

Problem:

See proposal.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0 Hrs, Surveying Crew: 0 Hrs, Other: 0 Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Solution #1
We propose making a construction joint on the vertical edge of the cut & cover deck as shown in diagram. We will also extend the tunnel liner to the top of the cut & cover deck, keeping it flush with the existing shotcrete. A custom water barrier shaped like the entrance to the tunnel except with a larger radius will be welded to the extended, vertical tunnel liner. The remaining concrete will be poured against these items. (See Figure # 4)
Solution #2
Use three pours. Extend Longitudinal Tunnel Reinforcing into the Cut & Cover Fascia Wall. See Figure #2.

Response by Construction Management/ Engineer:

Draw → B+R (Info)
Fax → HDR (Action)
Fax → L+M (Action)

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

182D

RFI No.: 182D
Date: 31-Jul-98

Subcontractor (if applicable): N/A
Originator: Majed Limam
Subject: Construction Joint at Cut & Cover Deck
Reply Req'd By: ASAP
Drw/Spec. No.: T115
Distribution List: Jim Gardner, Joaquin Gomez, George James, Jesse Alaniz

Problem:

See proposal.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0 Hrs, Surveying Crew: 0 Hrs, Other: 0 Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

We propose making a construction joint on the vertical edge of the cut & cover deck as shown in diagram. We will also extend the tunnel liner to the top of the cut & cover deck, keeping it flush with the existing shotcrete. A custom water barrier shaped like the entrance to the tunnel except with a larger radius will be welded to the extended, vertical tunnel liner. In addition the deck will be poured with No. 8 L-bars extending approx 22" above the deck as shown in the figure. The pour will be made in three pours. The tunnel pour, the deck pour, and the final pour. The final pour will be poured as shown in the figure with steel reinforcing approx 4' x 20' which will overlap the deck by approx 2'. The final pour will also include the L-bars that extend from the cut & cover deck.

Response by Construction Management/ Engineer:

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

Entered into Bull 3 Aug 98

183

RFI No.: 183
Date: 30-Jul-98

Subcontractor (if applicable): N/A
Originator: Majed Limam
Subject: Construction Joint at Cut & Cover Electrical Room
Reply Req'd By: ASAP
Drw/Spec. No.: Details 1& 2 Sheet T117, see also Sheet T113
Distribution List: Jim Gardner, Joaquin Gomez, George James, Jesse Alaniz

Problem:

See proposal.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0 Hrs, Surveying Crew: 0 Hrs, Other: 0 Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

We propose moving the construction joints for the electrical room shown in Details 1 and 2 on Sheet T117 of the plans down even with the step shown in Detail 1 and even with the cut & cover deck in Detail 2.

Response by Construction Management/ Engineer:

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

Preliminary

184

RFI No.: 184
Date: 17-Aug-98

Subcontractor (if applicable): N.A.
Originator: Majed Limam
Subject: Block out for 20" Discharge Pump interfere with manhole @ Wyoming
Reply Req'd By: ASAP
Drw/Spec. No.: S102, S100, P147, P148
Distribution List: Ross Navarette, Jessie Alaniz, George James

Problem:
The flow line of the 20" discharge pump is shown to be 598.5 on sheet P147. Using that flow line elevation, the 20" pipe will interfere with one of the second row rock bolt on the east wall of the sump.
The 598.5 elevation and location of the pipe conveyance is the future location, and dimensions of the pumps. Sheet S100, on the other hand shows a flowline of 596.16. That elevation will not allow placement of the pumps, but will clear all rock bolts in the proximity.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1.5 Hrs, Surveying Crew: 1 Hr, Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Please correct discrepancy.

Response by Construction Management: Location at Sht. S100. The 20" Sump Discharge should be 7'0" to E and of South Wall. Sheet S102 shows the first row of rock bolts is 8'5" off of South Wall. Added Second Row is 6'0" further North at 2'6" off of South Wall. If the Rock Bolts were Delayed Any Contractor Claims. Need that 20" Sump Discharge Location Confirmed. The First 2 Rocks Bolts at Each Sump is the Key Elevation. Cc → HDA (Action) Needs Input Not Related Vacancy For Rocks. Cc → HDA (Input) Needs Move the 20" Simplex to the North 2'-3" as Necessary to Miss the Rock Bolt Pattern. Low Vacancy Impact of 8'8.5" is Shown on Section 1 Sheet P147.

Solution By: Date: 8/19/98 Reviewed by: Date:

FINAL RECORD DRAWING
Date: 12/25/99

NO.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

RFI# 171 - 184

DRAWN ____ DATE ____ DESIGNED ____ DATE ____
CHECKED ____ DATE ____ SCALE ____

CONTRACT NO. DNT-260 SHEET ____ OF ____

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

185 — Entered in Log Book

RFI No.: 185 | Date: 17-Aug-98

Subcontractor (if applicable): | Originator: Majed Limam | Reply Req'd By: 21-Aug-98 | Distribution List: Ross Navarette, Jessie Alaniz, George James

Subject: Blockouts in Sump Deck

Dwg/Spec. No.:

Problem:

A formwork support system is needed when removing super studs from underneath deck pour at the west sump

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

H. B. Zachry Co. proposes to leave around sixteen 4" diameter blockouts in the deck pour of the West Sump structure. These blockouts are necessary in removing the panel forms after the pour. Zachry plans to run cables through openings, and use a crane to support the panels while under super studs are removed. Holes will be patched at a later date, after completion of form removals.

Response by Construction Management:

Fax → HDR (Action)
Bus → Gyt (Info)

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

185C

RFI No.: 185C | Date: 27-Aug-98

Subcontractor (if applicable): | Originator: Majed limam | Reply Req'd By: ASAP | Distribution List: Ross Navarette, Jessie Alaniz, George James

Subject: Blockouts in Sump Deck

Dwg/Spec. No.:

Problem:

This is a further clarification to RFI 185B. The locations of the four blockouts are shown on RFI 185B. Zachry intends to drive cables through the blockouts to support deck forms when shoring towers are dismantled. So the blockouts would be placed around the reinforcing. A 4" diameter PVC pipe would be used as forming material. After pour, cure time, and removal of forms, the blockouts would be patched with grout (water-cement ratio of 1).

Possible rework or extra work involved with this RFI? Y (N)
Delays in project execution involved with this RFI? Y (N)
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Response by Construction Management:

- USE Corrugated Polyethylene Pipe to allow patch to stay in place
- USE NON-SHRINK Grout to be premanufactured and placed according to manufacturer recommendations
- See response to RFI 185A for location of holes, not sent to HDR
- Fax → HDR (Action) (There is NO 185 B only 185, 185A, 185C)
- cc → Bus (Info)
- Locations of 4 holes to be placed (See RFI 185A) is the provision to repair it cut or removed. Only the 4 holes are affected (regard RFI 185A.

Solution By: Date: 8/31/98 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

186

RFI No.: 186 | Date: 31-Aug-98

Subcontractor (if applicable): J. L. Steel | Originator: Majed Limam | Reply Req'd By: ASAP | Distribution List: George James, J. L. Steel

Subject: Exact shape of 542 bars @ Electrical Room

Dwg/Spec. No.: T113, T119

Problem:

Sheet T119 shows a type 108 for rebar # 542
Sheet T113 shows the bars 542 to connect the deck of the Electrical Room to the walls. The bend on the bars as delivered and as shown in the plans is too wide. Zachry had to reorder the bars as shown on the attached drawing.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs; Surveying Crew: Hrs; Other: Hrs (Subc. crew hours)

Proposed Solution by Contractor By: Majed Limam Date: Reviewed By:

Please advise. WHAT IS THE PLACING SITUATION ON QUESTION? - WSR

Response by Construction Management:

FAX → HDR (Action) & Gyt
cc → Bus (Info)
FAX → HDR → Info

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

187 — 185

RFI No.: 187 | Date: 9/18/98

Subcontractor (if applicable): NA | Originator: Majed Limam | Reply Req'd By: ASAP | Distribution List: George James, Jessie Alaniz

Subject: Rail in the cut & cover structure

Dwg/Spec. No.:

Problem:

Zachry proposes to use the same configuration rail used inside the tunnel when building the rail in the cut & cover. Consistency in the rail design is the main reason for the request. Please refer to Submittal 185, submitted by Zachry/ Monterey for design details.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

See submittal 185

Response by Construction Management:

osits → Bus → Action
Fax → HDR → Info

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

188

RFI No.: 188 | Date: 10/7/98

Subcontractor (if applicable): NA | Originator: George James | Reply Req'd By: ASAP | Distribution List: George James, Jessie Alaniz

Subject: Blockouts in the East Sump Walls

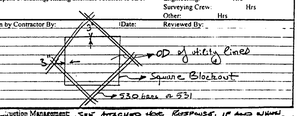
Dwg/Spec. No.:

Problem:

H. B. Zachry Company proposes to use square blockouts connecting to the sump, instead of the round ones

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:



Response by Construction Management: See attached item. Response, if any shown, you Engineer must take Contact Zachry Engineering Call this Department for 185A

Solution By: Date: 10/9/98 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

189

RFI No: 189 | Date: 10/27/98

Subcontractor (if applicable): J.L. Steel | Originator: Zachry | Reply Req'd By: B&R, HDR, NTTA | Distribution List: Brown & Root, HDR, NTTA, Majed Limam, JL Steel

Subject: Substitution of Porous Asphalt for 6" of Coarse Concrete Aggregate in tunnel

Dwg./Spec.No. Sheet C12

Problem

The stability of the proposed 17 inch (average) thick layer of coarse aggregate below the concrete paving inside the tunnel is questionable. Sheet C12 shows the cross-section detail design. The narrow available width inside the tunnel will force loaded ready mix trucks to pass within a couple feet of the set paving forms while placing paving concrete. There may be a tendency for the gravel to 'shove' or displace under repeated and heavy, moving tire load. Additionally, the vibration and bouncing-action of the Clary-type screed has also been mentioned as a factor that could lead to grade-problems with the paving forms sitting on crushed gravel.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering 2 Hrs; Surveying Crew Hrs; Other 3 Hrs

Proposed Solution by Contractor By: HBZ Date: 10/27/98 Reviewed By: J. Garber

The top 5-6 inches of coarse aggregate should be replaced with either CTB or an asphalt base. This would still leave 11-12 inches (average) of coarse rock below the asphalt/CTB for any water to percolate through to the underdrain system. If trapped water between the bottom of pavement and the CTB/asphalt is a foreseable problem, porous asphalt (Ty G) asphalt mix should be used instead of CTB or Ty Basphalt. Either would provide a much better base from which to work off of while paving , ultimately creating a better finished pavement.

Response by Construction Management

cc → Bus, Mon (Action)
cc → Gyt, Tao (Info)
cc → HNDR (Info)

Solution By Date Reviewed by: Date

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

190 — Preliminary — HDR 190

RFI No.: 190 | Date: 10/30/98

Subcontractor (if applicable): Bus. Zac | Originator: D. Huberak | Reply Req'd By: 11/13/98 | Distribution List: Jim Rankin - Monterey, Job 9080.01 - 029

Subject: Communications Additions

Dwg/Spec. No.:

Problem:

The conduits for the security cameras on the east end of the tunnel were not embedded into the tunnel concrete due to no drawings for these conduits not being complete before the start of the tunnel concrete.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Please indicate the desired location of the security cameras at this end of the tunnel and location of the conduits.

Response by Construction Management: CHECK WITH AGUILERA REGARDING LOCATION OF CAMERAS. 972-788-1508) FOR THEM ASSIGNED TO MONITORING CAMERAS. AGUILERA HAD A DIRECT CONTRACT WITH UTEK FOR THE CAMERAS AND CAN NOT WORK FOR HDR. We also might want to relocate

Fax → HDR (Action) MORE STRENGTH WHERE E MUST QUICK TAKE
cc → Gyt (Info) QUESTIONS WE'LL SEE

NOTE: See attached Aguilera's response to RFI 190

11/16/98

Fax → HDR (Action)
cc → Gyt, Tao (Info)

Solution By: Date: 10/6/98 Reviewed by: Date:

ZACHRY-MONTEREY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - JOB #9080.01

191 — Preliminary — HDR 191

RFI No.: 191 | Date: 10/30/98

Subcontractor (if applicable): | Originator: D. Huberak | Reply Req'd By: 11/13/98 | Distribution List: Jim Rankin - Monterey, Job 9080.01 - 030

Subject: Communications Additions

Dwg/Spec. No.:

Problem:

The drawings indicate four each 1-1/4" inner ducts inside of the 4" conduit. Four each 1-1/4" inner ducts will not fit in a 4" conduit.

Possible rework or extra work involved with this RFI? Y N
Delays in project execution involved with this RFI? Y N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Submittal 1" inner ducts in place of the 1-1/4" inner ducts.

Response by Construction Management: CHECK WITH AGUILERA REGARDING (FAX # 214-788-1508) FOR THEM ASSIGNED TO MONITORING CAMERAS. AGUILERA HAD A DIRECT CONTRACT WITH UTEK FOR THE CAMERAS AND CAN NOT WORK FOR HDR. We also might want to relocate

Fax → HDR (Action) MORE STRENGTH WHERE E MUST QUICK TAKE
cc → Gyt (Info) QUESTIONS WE'LL SEE

NOTE: See attached Aguilera's response to RFI 191

11/16/98

Solution By: Date: 11/2/98 Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

192

RFI No: 192 | Date: 11/17/98

Subcontractor (if applicable): JL Steel | Originator: HBZachry Co./JL Steel | Reply Req'd By: Brown & Root | Distribution List: Bill Leech, Majed Limam, Rob Robinson

Subject: Discrepancies in pavement joint layout

Dwg./Spec.No. C27A

Problem

Sheet C27-A has numerous paving joint layout discrepancies. The north-edge of the paving has a 3 ft. break in alignment at Station 6+00. Also, every joint, except along the Project Control Line, is mismatched at Station 6+00. See Attachment A.

Possible rework or extra work involved with this RFI? N Y
Delays in project execution involved with this RFI? N Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering 3 Hrs; Surveying Crew: 1 Hrs; Other: 1 Hrs

Proposed Solution by Contractor By: HBZachry Co./JL Steel Date: 11/17/98 Reviewed By: J. Garber

See Attachment B for proposed joint layout. Use standard lane width of 14 ft. Northernmost lane would still need to be variable and southern most lane would be odd-width, too. Longitudinal Joint types would remain same (alternating 'SL' and 'LC') and transverse joints ('S') spacing the same

(Verbal agreement from Monty)

Response by Construction Management

cc → Bus, Mon (Action)
cc → Gyt, Tao (Info)
Fax → HDR (Info)

Solution By Date Reviewed by Date

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

193 — Preliminary — Fax this date

RFI No.: 193 | Date: 30-Nov-98

Subcontractor (if applicable): NA | Originator: Majed Limam | Reply Req'd By: ASAP | Distribution List: George James, Ramiro Ross Navarette

Subject:Conflict between LW1 footing @ SW RW and Type "G" inlet

Dwg/Spec. No.: C42, S79

Problem:

Type "G" inlet at sta. 7+97, 34.5 RT is in conflict with the LW1 type wall footing, bay 48. The flow line of the inlet is at elevation 609.00.

The top of the 21" lateral connecting to the type G inlet is at elevation 611'. The bottom elevation of the LW1 footing on bay 48 is 609.5'. The top of footing elevation is 611'. Accordingly, the pipe is in conflict with the footing at that location. Please see attached drawing.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 2 Hrs; Surveying Crew: 1 Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Please provide solution to discrepancy.

Response by Construction Management: THE LW1R FOOTING IS PART OF THE FOUNDATION FOR THE ENTIRE WALL THAT IS CONSIDERED CRITICAL. THAT CANNOT BE MOVED AS REQ. SUGGEST YOU SEND REQ TO OWNER INTERVIEW OR IF CONSIDER AN EMERGENCY, PLEASE INDICATE THEN COPY FOR INFO ACTION

Solution By: Date: 11/1/98 Reviewed by: Date:

FINAL RECORD DRAWING
Date: 12/25/99

NO.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

RFI# 185 - 193

DRAWN ____ DATE ____ DESIGNED ____ DATE ____
CHECKED ____ DATE ____ SCALE ____

CONTRACT NO. DNT-260 SHEET ____ OF ____

RFI-194 Sent/Fax

Brown & Root

16610 Dallas Parkway, Suite 2200 / Dallas, TX 75248

194

December 18, 1998

LETTER NO.: HBZ 260-552
SUBJECT FILE CODE: 765.10

H. B. Zachry Company
PO Box 1004
Addison, Texas 75001-1004

REF: Addison Airport Toll Tunnel
DNT-260

Attention: Mr. James Gardner

SUBJECT: Underdrain along Southeast "Shotcreted" Retaining Wall (RFI-194, EAR-26)

Dear Mr. Gardner:

In formal response to H. B. Zachry's RFI-194 dated 7 December 1998, Brown & Root instructs you to install pipe underdrains along the Southeast "Shotcreted" Retaining Wall according to the attached plan and section sketches. Brown & Root has considered the possible conflict of a future "fascia-wall" footing, the lighting power line (Signing, Pavement Marking, and Illumination Plans (DNT-305) Contract Drawing Sheets 21 22, & 23), the inplace video communications conduits (Contract Drawing Sheet E156 – Note 1-3), and the pavement curb (Contract Drawing Sheets C-24 & C-25). Therefore, place the underdrains as close as possible to the shotcreted wall. Install the underdrains according to the instructions in RFI-157 and Pipe Underdrains Special Provision Item 556. Backfill with Cement Treated Base as shown on the section sketch between the wall and the pavement curb only.

The North Texas Tollway Authority intends not to issue revised Contract Drawing Sheets C-24 & C-25. Therefore, H. B. Zachry shall make the pipe underdrain additions to their as-built Contract Drawings.

Brown & Root considers that the pipe underdrain additions and the cement treated base usage to be a quantity increase change to the Contract. If acceptable to H. B. Zachry, the added underdrains will be paid at the Pipe Underdrain Item 556 & SP bid prices for 6-in. pipe roadway and slope underdrains. The cement treated base will be paid at the Cement Treated Base Item 276 bid price for 6-in. thickness times two, for the two lifts of 6-in. cement treated base.

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

Preliminary 195

RFI No.: 195
Date: 28-Dec-98

Subcontractor (if applicable): N/A

Originator: Majed Limam
Reply Req'd By: ASAP
Distribution List: Jim Gardner, Bill Leech, George James

Subject: Rock bolts at east portal of tunnel
Drwg/Spec. No.: T130

Problem:

See proposal.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0 Hrs; Surveying Crew: 0 Hrs; Other: 0 Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Delete the two rockbolts highlighted in the included drawing. The rockbolts are only 6 to 10 inches above the pavement. Would there be enough support provided by the pavement at this location?

Respon: Construction Management/ Engineer: SURE THAT ATTACHED PROPOSAL BY LACHER & ASSOC. PVT. LTD. ISE WHICH WAS DISCUSSED.

FAX → LACHER → ACTION
FAX → HBZ → ACTION
EMAIL → BCC → INFO

Solution By: Date: Reviewed by: Date:

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

Preliminary 196

RFI No.: 196
Date: 12/28/98

Subcontractor (if applicable): Zachry/Monterey

Originator: HBZachry Co.
Reply Req'd By: Zachry/Monterey
Distribution List: Bill Leech
Majed Limam

Subject: Sump Bracing
Drwg /Spec No: P148

Problem:
Zachry/Monterey has expressed concern about the lack of any lateral bracing for the discharge pipes inside the East and West Sumps. Is there a need for bracing? Also, the PVC relay-pipe from the tunnel sump into the East Sump splashes directly onto the floor of the sump. Is a plate needed to protect concrete slab from eroding?

Possible rework or extra work involved with this RFI? N / y
Delays in project execution involved with this RFI? N / y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs; Surveying Crew: 0 Hrs; Other: 1 Hrs

Proposed Solution by Contractor By: HBZachry Co. Date: 12/28/98 Reviewed By: J. Gardner

Structural steel braces could be erected off the interior walls to brace the discharge pipe when the large pumps start up.
See sketch showing a possible bracing configuration.

Response by Construction Management:

- THE LATERAL BRACING IS NOT REQD.
- A FLOOR PLATE IS NOT REQD.

FAX → HDR (ACTION)
CC → HDR (INFO)

Solution By: MIKE ANDREAE Date: 1/6/99 Reviewed by: Date

ZACHRY CONSTRUCTION CORP.
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

Fax 197

RFI No.: 197
Date: 12/29/98

Subcontractor (if applicable): S&J Electrical

Originator: Zachry Const. Corp.
Reply Req'd By: S&J Electrical
Distribution List: Bill Leech
Majed Limam

Subject: OSB Sovereins #1 and #2
Drwg /Spec No: DNT-305, Sheets 8, 10, 13 and 14

Problem:
The plan locations for OSB#1 and #2 will conflict with existing utilities. See attachments.

LTR PARTIAL

Possible rework or extra work involved with this RFI? N / y
Delays in project execution involved with this RFI? N / y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs; Surveying Crew: 3 Hrs; Other: Hrs

Proposed Solution by Contractor By: HBZachry Co. Date: 01/12/99 Reviewed By: J. Gardner

Move the Overhead Sign Bridges to avoid the existing utilities. Moving OSB #2 to East appears to be simplest. Existing footings and waterline W-1 conflict with the foundation for OSB #1.

Response by Construction Management:

FAX → MCE → ACTION
CC → GM → INFO

Solution By: Date: Reviewed by: Date

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

197A

RFI No.: 197a
Date: 09-Feb-99

Subcontractor (if applicable): S&J

Originator: Majed Limam
Reply Req'd By: ASAP
Distribution List: George James, S&J

Subject: Overhead Sign # 1 interfering with existing utilities
Drwg/Spec. No.: Sheet # 8, 13

Problem:
Water line W1 and existing electrical cables interfere with the drilling of overhead sign # 1 foundation. See attached drawing for exact location of water line W 1, electrical cables, and proposed drill shaft.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs; Surveying Crew: 1 Hrs; Other: 2 Hrs

Proposed Solution by Contractor By: Majed Limam Date: 2/9/99 Reviewed By:

Relocate a section of the W1 water line around the drill shaft.

Response by Construction Management:

CC → BEK (INFO)
FAX → MCE (RESPONSE)
FAX → HDR (INFO)

Solution By: Date: Reviewed by: Date:

ZACHRY CONSTRUCTION CORP.
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

Preliminary 198

RFI No.: 198
Date: 1/19/99

Subcontractor (if applicable): S&J Electrical (Sign and Illumination Sub)

Originator: Zachry Const. Corp.
Reply Req'd By: ASAP
Distribution List:

Subject: Location of proposed Light Poles along north edge of Keller Springs
Drwg /Spec No.: SP#5 Plans –sheet 18

Problem:
Zachry Construction's Sign & Illumination subcontractor, S&J Electrical, has notified (1/19/99) us that the Plan locations for proposed Light Poles #10 and #11 will both be within 10 ft. of the existing overhead power lines along the north edge of Keller-Springs (Addison Airport Tunnel). Zachry and S&J agree that drilling would be dangerous without first de-energizing or 'blanketing' the existing lines and no work will start until a safe drilling-plan has been devised. S&J has already installed the other foundations on the west side and requests an answer, ASAP, to avoid having to re-mobilize later.

Possible rework or extra work involved with this RFI? N / y
Delays in project execution involved with this RFI? N / y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs; Surveying Crew: 1 Hrs; Other: ? Hrs

Proposed Solution by Contractor By: Zachry Const. Corp. Date: 1/19/98 Reviewed By: J. Gardner

If permissible, the light poles could be moved in toward the street approximately 4-feet, in order to stay at least 10 ft clear of the power line. Another option would be to install the existing electrical lines below ground.

USE FAST OPTION 1) MAINTAIN 2FT OFFSET FROM CURB FACE TO POLE EDGE AND 2) MOVE POLE NO.11 EAST 20 FT AND POLE NO. 10 EAST 10 FT FROM LOCATIONS SHOWN ON CONTRACT DRAWING SHEET NO. 18. (SEE ATTACHED SKETCH) – WDC

Response by Construction Management:

CC → B+B(NTH) → ACTION
FAX → MCE → INPUT
FAX → HDR → INFO

Solution By: Date: Reviewed by: Date

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

Preliminary 199

RFI No.: 199
Date: 26-Jan-99

Subcontractor (if applicable): S & J Electric

Originator: Majed Limam
Reply Req'd By: ASAP
Distribution List: Cyngo, George James

Subject: Exact height of wall mounted roadway illumination signs
Drwg/Spec. No.: Sheet 20, DNT-305

Problem:

Detail "A" on sheet 20 shows the wall mounted lighting fixture to be connected to an embedded GRS conduit and an embedded pull box. These items were not shown, or required by the DNT-260 contract that contained retaining walls construction. Neither of these items were embedded in the wall panels.
Also, no clearance is provided of how far the lights are from the top of wall.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Drill through the existing DS panels and install conduits. Please provide distance from top of wall to light fixture bracket base.

Response by Construction Management:

REFERENCE SHEET 15 OF THIS NCE SET FOR MOUNTING HEIGHT OF DETAIL B AND SHEET S&E VOLUME II OF NOR SET FOR DETAIL A (NCE LIGHT) MAY BE SHIFTED TO ABOVE CAP BEAM AND JUNCTION BOXES ON BACK OF WALL MUST REMAIN ACCESSIBLE.

FAX → MARIA (ACTION)
FAX → HDR (INFO)
CC → BJK (INFO)

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

200

RFI No.: 200
Date: 27-Jan-99

Subcontractor (if applicable): S&J

Originator: Majed Limam
Reply Req'd By: ASAP
Distribution List: George James, S&J

Subject: Relocation of sign # 40
Drwg/Spec. No.: Sheet 10, DNT 260 Signage Plans

Problem:

Sign # 40, cannot be placed as shown on sheet 10 of contract drawings because of the interference of existing trees in the area in question.

Possible rework or extra work involved with this RFI? N
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Suggest moving the sign towards the North slightly to avoid obstructions. Please be aware of existing utilities just south of Long Shots driveway.

Response by Construction Management:

FAX → HDR (ACTION)
FAX → ADDISON (AGENCY)
CC → BJK (INFO)
FAX → MCE (INFO)

Solution By: Date: Reviewed by: Date:

H. B. ZACHRY COMPANY
REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL

201

RFI No.: 201
Date: 03-Mar-99

Subcontractor (if applicable): S&J, ZM

Originator: Majed Limam
Reply Req'd By: ASAP
Distribution List: George James, S&J, ZM

Subject: Ground pull box behind West Portal RW and conduits.
Drwg/Spec. No.: Sheet 15 DNT 305, Sheet T129 DNT 260

Problem:
Sheet 15 of DNT 305 shows the pull box behind the West Portal to be "existing". Sheet T129 of DNT 260 shows the same pull box to be "installed by others". Please clarify.
Our electrical subcontractor for DNT 260, Zachry/Monterey, installed a pull box at that location anyway. A 3/4" conduit was run from the pull box into the electrical room. That conduit was installed, even though not called for on the plans.
In order: 1 → Zachry/Monterey's work only.
Our electrical subcontractor for DNT 305, S&J Electrical, needs a 2" conduits to accomodate for three #10 wire. The 3/4" existing conduit will not suffice.
Please provide information on how to reconcile the two different drawings.

Possible rework or extra work involved with this RFI? Y
Delays in project execution involved with this RFI? N
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 1 Hrs; Surveying Crew: Hrs; Other: 1 Hrs

Proposed Solution by Contractor By: Date: Reviewed By:

Please advise.

CMMA ASSOCIATED DRAWINGS
DNT-260 JNT E157
E160
E165
(not JNT E0)

Response by Construction Management: PLEASE REFERENCE SHT. NO. E156 AND E157, VOL III, THIS PLAN SHT WAS REVISED TO BE INSTALLED.
FAX → MCE → INPUT
CC → RTR → INFO

ALSO, PLEASE NOTE THAT THE MINIMUM ELECTRICAL CODE ALLOWS A MINIMUM INSTALLATION OF 6 #10 AWG CONDUCTORS IN A 3/4" CONDUIT.

Solution By: Date: Reviewed by: Date: 3/6/99

FINAL RECORD DRAWING
Date: 12/25/99

NO.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY

ADDISON AIRPORT TUNNEL

RFI# 194 - 201

DRAWN _____ DATE _____ DESIGNED _____ DATE _____
CHECKED _____ DATE _____ SCALE _____

CONTRACT NO. DNT-260 SHEET ____ OF ____

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260)

905

Contractor / Subcontractor : H.B. Zachry — RFI No. BAR 905 — Date: 6/17/98

Subject: Expansion joint between panel #12 and #13 — Originator: Ramon Dagoberto Rodriguez — Reply Req'd By: 6/22/98

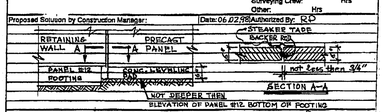
DrwgSpec. No.: S-67, S-80, C-81 — Distribution List: Tommy Kelley (BAR)

Problem:
Dr. #S-80 calls for expansion joint #3/8 between panel 12 and 13. Dr. #S-67 shows panel #12 to be attached to panel #13 with 1" thick footing against top face of panel #13. How does the weight of panel #12 bear on 1/2" expansion joint material and avoid shear loads between them?
Need this info A.S.A.P. because the contractor to pour footing of panel #12 tomorrow afternoon.

RECEIVED
JUN - 4 1998
Brown & Root, Inc.

Possible rework or extra work involved with this RFI? N (Y) — Delays in project execution involved with this RFI? N (Y) — Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Construction Manager: Date: 06/02/98 Authorized By: RD



Response by Designer or other Organization: THIS RFI SHOULD HAVE BEEN DIRECTED TO CONTRACTOR. SURVEY PANEL ALIGNMENT, AS CONSTRUCTED DRAWINGS BOTH THAT DS AND NW SHOWS THE NEED IN QUESTION. ALTHOUGH B.A.R. WAS ASSIGNED OF PANEL CLOSURES, SAMPSON DAVIS AGR, FOR THIS REASON. APPARENTLY REJECTED THIS ITEM. THEREFORE, NOT BEING QUALIFIED BY CONTRACT AND ESCALATING THE PROBLEM CAUSED IN THIS REGARD. DAVIS RESPONSIBILITY OF CONTRACT NEEDED THAT IT WILL TAKE PROPER AND LEGIMATE MEASURES TO HOLD → BROWN — IMMEDIATELY THEY WILL CONFIRM CONTINUANCE BR → HARRISON — WITH THE SURVEYOR ASAP.

Solution By: [signature] Date: 6/8/98 — THIS IS A TYPICAL PASS-THE-BUCK HDR → ACTION

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260)

906

Contractor / Subcontractor : H.B. Zachry (ZACHRY/MONTEREY) — RFI No. BAR 906 — Date: 5/14/98

Subject: TUNNEL ELECTRICAL / COMMUNICATIONS — Originator: W. LEECH — Reply Req'd By: 10 JUN 98

DrwgSpec. No.: CHANGE ORDER A, E-154, -155, -156, -157, -160, -161, -162, E-212 — Distribution List: T. KELLEY (BAR)

Problem:
TUNNEL CONDUITS HAS BEEN PLACED FROM STATION 33+87 TO STATION 42+83. THE ALIGNMENT OF CONDUIT DIAGONALLY CROSS EXPANSION JOINTS AT STATIONS 34+87, 36+87, 38+87, 40+87 AND 42+83. THE CONDUITS ARE CONSTRUCTED OF RIGID GALVANIZED STEEL CONDUIT AND ELBOWS. THE CONDUITS ARE ENCASED IN CONCRETE DUCTBANK. THESE CONDUITS ARE NOT BE EMBEDDED IN CONCRETE DUCTBANK. THESE CONDUITS CANNOT BE CUT OR BENT. CUTTING CONDUIT FOR A RIGID EMBEDMENT WILL CUT THE RIGID GALVANIZED COATING AND CAUSE CORROSION. BENDING CONDUIT FOR A RIGID EMBEDMENT WILL CUT THE RIGID GALVANIZED COATING AND CAUSE CORROSION. REMOVING SHELL CONCRETE TO EXPOSE CONDUIT FOR A RIGID EMBEDMENT WILL CUT THE RIGID GALVANIZED COATING AND CAUSE CORROSION. REMOVING SHELL CONCRETE TO EXPOSE CONDUIT FOR A RIGID EMBEDMENT WILL CUT THE RIGID GALVANIZED COATING AND CAUSE CORROSION.

Possible rework or extra work involved with this RFI? (N/A) N Y — Delays in project execution involved with this RFI? N (Y) — Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: / Hrs; Surveying Crew: n/a Hrs; Other: n/a Hrs

Proposed Solution by Construction Manager: W. LEECH Date: 6/19/98 Authorized By: [signature]
PLACE CONDUITS, W/ ROCKS, BETWEEN LEGS ON CONCRETE DUCTBANK.

Response by Designer or other Organization: MET WITH TUNNEL CREW & FIELD LEADER TO DISCUSS ABOVE ISSUES PROBLEMS. DUE TO TUNNEL LINING & ALIGNMENT TOLERANCES, CONDUITS CANNOT BE BENT OR CUT. CONTRACTOR TO COME OUT OF TUNNEL WHERE PVC DUCTS WILL GO DOWN WALKWAY AND BACK BEHIND 2ND PANEL UP THROUGH FLOOR WELL & DETERMINE IN TUNNEL EXACT WHAT SPACING THE CONDUITS NEED AND SET TUNNEL MEMO. THIS WILL MINIMIZE CONDUIT OF CONDUIT & ALL AT PERIMETER CONDUITS. CONFIRMED THAT THIS WAS THE BEST GOOD SOLUTION TO PROBLEM ENCOUNTERED AS NOTED.

Solution By: [signature] Date: 6/19/98

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260)

907

Contractor / Subcontractor : H.B. Zachry / ZACHRY-MONTEREY — RFI No. BAR 907 — Date: 5/14/98

Subject: FINAL CONFIGURATION / ELECTRICAL CLOSET — Originator: W. LEECH — Reply Req'd By: 10 JUN 98

DrwgSpec. No.: E-154, -155, -156, -157, -160, -162, -163, C1/1102 — Distribution List: T. KELLEY (BAR), J. GALLAGHER (HDR)

Problem:
1) NEED QUANTITY TAKE-OFF FOR ITEMS CONTAINED IN BAR BID UNIT PRICES. 2) IDENTIFY ITEMS AND QUANTITIES OF ITEMS NOT IN BASE BID UNIT PRICES. 3) PROVIDE DEPTH OF BURIAL CONDUIT BELOW ROADWAY PAVEMENT WHERE NECESSARY FOR REMAINING WORK. 4) REVISED DRAWING OF 12 KV CONDUIT UNDERGROUND IN TUNNEL ALONG SOUTH EAST PORTICO'S TERMINATING WALL (CONDUITS CROSS BENEATH NEW CONCRETE PAVEMENT). SUGGEST TYING INTO EXISTING MANHOLE #4 NORTHEAST CORNER OF PARKING LOT. DEPTH OF 4" CONDUITS 4) IS THERE ADDITIONAL WORK REQUIRED NEAR TOLL PLAZA ?

Possible rework or extra work involved with this RFI? (N/A) N Y — Delays in project execution involved with this RFI? N (Y) — Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: / Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Construction Manager: W. LEECH Date: 6/19/98 Authorized By: [signature]
PROVIDE ANSWERS TO ABOVE PROBLEM QUESTIONS.

RECEIVED
JUN - 3 1998
Brown & Root, Inc.

Response by Designer or other Organization:

Solution By: Date:

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260)

907A

Contractor / Subcontractor : H.B. Zachry — RFI No. BAR 907A — Date: 10AUG98

Subject: FIBER OPTICS CABLE TERMINATION — Originator: ALLISON D. LEECH — Reply Req'd By: 21 AUG 98

DrwgSpec. No.: E-156 (A) NOTE (1) - 3. — Distribution List: T. KELLEY

Problem:
IS THE 2 EACH 4-INCH CONDUIT ENCASED CONDUIT UNDERGROUND FROM THE SOUTH SIDE OF MEDIAN SERVICE BUILDING (SOUTH EAST PORTICO) TO THE FIBER OPTIC TUNNEL FROM TO A 30 FOOT DEEP PIT AT THE SOUTHWEST CORNER OF ADDISON AND KELLER SPRINGS ROAD. THE CONDUIT CROSS UNDER ADDISON ROAD AT A DEPTH OF 5' PLUS/MINUS. THE CONDUIT REQUIRE THE PATENCY TO BE CUT AT THE CONDUIT MUST BE DONE UNDER THE PAVEMENT.

Possible rework or extra work involved with this RFI? N Y — Delays in project execution involved with this RFI? (N) Y — Estimate of time spent evaluating, finding alternate solution to RFI? n/a Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Construction Manager: Date: 10AUG98 Authorized By: [signature]
TERMINATE CONDUIT TO ATU ELECTRIC RACK. REMOVE MORE THAN NECESSARY REMOVAL WILL ALLOW WELL AND MANY MINOR OR MORE SEVERE CRACKS TO FORM.

Response by Designer or other Organization: HAS CONSIDERED THIS & FOUND PROBLEMS AROUND AND THAT WILL BE CAUSED TO ADJUSTMENTS TO ALIGNMENT ABOUT THE POINTS. TO ADDITIONAL TO BE ADDRESSED BY CONTRACT. NOW PROVIDING ONLY THE CONDUITS FOR THIS PERIOD AT THE OUTSIDE MANHOLE CONNECTION. THE DESIGN WORKS WHERE ADJUSTMENT AND FOR CLOSURE AT 972-788-1000 WAS THAT P.M. OR THIS PROVIDES EQUIPMENT UNDERGROUND DETECTION FOR NOTES AND Fax → HDR 6688 (ACTION) THAT WATER NOT A SUB-CONSULTANT OF HDR. EC → BAR (INFO) DUCT ADVISED CAN GIVE YOU THE PROPER CONFIGURATIONS AT THE TUNNEL AT THE TIME OF NTP CONSIDERATIONS EXPLICIT.

Solution By: [signature] Date: 8/11/98

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260)

908

Contractor / Subcontractor : H.B. Zachry — RFI No. BAR 908 — Date: 22JUN98

Subject: WATER MAIN INSTALLATION BETWEEN C.J.P. & THE CANAL WALL — Originator: YUAN KAN — Reply Req'd By: 6-25-98

DrwgSpec. No.: T-124 # 166 — Distribution List: Tommy Kelley (BAR)

Problem:
SECTIONS A & B call for vertical waterstop in between NW wall and west wall of pump station and at valves (sheet S-80) NW wall and west wall of valve box. Also section D calls for another vertical waterstop in between NW wall and west wall of valve box. Please advise if waterstop is required in these locations.
Dwg S-67 DS wall typical 8" thick. If we knock back to apply waterproofing and PANEL #12 is installed as per S-67, is there any problem with the waterstop being installed between panel #12 and the wall? Is there a need for a construction joint between panel #12 and the wall?
How/the waterstop designed to be installed between) case-in-place wall & P/C section? And precast panels?

Possible rework or extra work involved with this RFI? N Y — Delays in project execution involved with this RFI? N (Y) — Estimate of time spent evaluating, finding alternate solution to RFI? n/a Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Construction Manager: Date: 22JUN98 Authorized By: W. LEECH
ADD WATER STOP TO PRECAST PANELS INVOLVED

Response by Designer or other Organization: HDR → ACTION
See Carter & Assoc. Response (ATTACHED). HDR CONCURS WITH THEIR RESPONSE.

Solution By: [signature] Date: 6/23/98

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260)

909

Contractor / Subcontractor : H.B. Zachry — RFI No. BAR 909 — Date: 22JUN98

Subject: T.I.B. TO NW WALL — Originator: YUAN KAN — Reply Req'd By: 6-23-98

DrwgSpec. No.: T124 # 166 — Distribution List: Tommy Kelley (BAR)

Problem:
Please give B.A.R. inspectors and P.E. an explanation of what detail "Tie to NW Wall" of section "D" on sheet T124 means.

Possible rework or extra work involved with this RFI? N Y — Delays in project execution involved with this RFI? N Y — Estimate of time spent evaluating, finding alternate solution to RFI? n/a Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Construction Manager: Date: 23JUN98 Authorized By: W. LEECH

HDR → ACTION

Response by Designer or other Organization:
SEE CARTER & ASSOC. RESPONSE (ATTACHED). HDR CONCURS WITH THEIR RESPONSE.

Solution By: [signature] Date: 6/23/98

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260)

JUL 10 1998 Brown & Root, Inc.

910

Contractor / Subcontractor : H.B. Zachry — RFI No. BAR 910 — Date: 7-7-98

Subject: crack reinforcement in C/C roof slab — Originator: YUAN KAN — Reply Req'd By:

DrwgSpec. No.: T-113 and T-115 # 166 — Distribution List:

Problem:
B.A.R. inspectors think that the absence of crack reinforcement between two horizontal rebars might cause potential cracks in the C/C roof slab. Would do install crack reinforcement between these rebars? Please advise engineers decision of this potential problem. See attached report.

PLEASE CALL AND DISCUSS WITH Y. KAN AND W. LEECH

Possible rework or extra work involved with this RFI? (N) Y — Delays in project execution involved with this RFI? (N) Y — Estimate of time spent evaluating, finding alternate solution to RFI? n/a Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Construction Manager: Date: 7.10.98 Authorized By:
DO NOT HAVE SOLUTION. REQUEST DELIVERED.

Response by Designer or other Organization: HDR HAS TALKED TO RICK CLAWSON (C.J.A.) on 7/8/98 and AGREES WITH HIS RECOMMENDATION THAT THE STEEL SHOWN SHOWN ON THE PLANS IS SUFFICIENT FOR THE TOP SLAB OF C/C & CONST. JOINTS. - ADD BUNTING ACTION) calls for REVISIONS

HDR (LEECH) → ACTION
BAR → INPUT

Solution By: [signature] Date: 7/10/98

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260)

911

Contractor / Subcontractor : H.B. Zachry — RFI No. BAR 911 — Date: 7-10-98

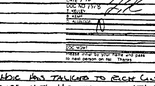
Subject: Construction joint & cut-in at 1121 walls @ C/C — Originator: YUAN KAN — Reply Req'd By:

DrwgSpec. No.: T-112, T-113, T-114 # 166 — Distribution List:

Problem:
Based on HDR supplemental given to BAR P.E. and Inspectors that HDR wants each section of roof slab poured 30 hours apart. Since C/C slab has fourth and fourth walls to make the monolithic joint there is T-475 & 120. 10435 HDR measurement should be taken. Have wall separation - date been given. 120 or 336 HRS? HDR said second pours are 10+01 to 10+25. This means that they will have to have construction joints @ sta 10+01. Steel cuts are detailing on steel plan & details given. Inside 6.0" measured by the engineer. What is your opinion on this matter?

Possible rework or extra work involved with this RFI? N Y — Delays in project execution involved with this RFI? N Y — Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Construction Manager: Date: 7-10-98 Authorized By:
It appears to have only one joint between 10+01 with a additional control joint at sta 10+01. Steel cuts are detailing on steel plan & details given. Inside 6.0" measured by the engineer. What is your opinion on this matter?



Response by Designer or other Organization: APPROVED AS SUBMITTED - SEE LEECH & ASSOC. ATTACHED RESPONSE FOR CLARIFICATION.

HDR (LEECH) → ACTION
BAR → INPUT

Solution By: [signature] Date: 7/13/98

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260)

912

Contractor / Subcontractor : H.B. Zachry — RFI No. BAR 912 — Date: 7-10-98

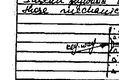
Subject: Crack reinforcement for slabs @ C/C joints — Originator: YUAN KAN — Reply Req'd By: 24 JULY 1998

DrwgSpec. No.: T-116, T-117 (B), T-111 (C) — Distribution List:

Problem:
Will steel reinforcement installation for the slabs @ roof deck and North walls of C/C see the overhangs installed unilateral-ly (South walls the walls be instead of rebar = 532 Hook 1" + slabs. Rebars = 6811 were called inside of walls steel instead above for 5" wood wall. Based on the overhangs explanation given by B.A.R. they did not take = 532 L-bars in the above slabs & walls. Can you have additional details inside the walls & slabs?
Thank & Upon approval

Possible rework or extra work involved with this RFI? N Y — Delays in project execution involved with this RFI? N Y — Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Construction Manager: Date: 7/28/98 Authorized By: W. LEECH
Install #5 HOOK REV. - WALLS ABOVE FIXED SLAB. WALLS AND MATE these installations to Details 4a & 4c.



Response by Designer or other Organization: APPROVED SUBJECT TO SUBMITTAL OF PLACEMENT DRAWING, MATERIAL SPECIFICATIONS AND DESIGN CALCULATIONS. - SEE ATTACHED LEECH & ASSOC. RESPONSE FOR FURTHER CLARIFICATION).

Solution By: [signature] Date: 7/28/98

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260)

914

Contractor / Subcontractor : H.B. Zachry — RFI No. BAR 914 — Date: 24JUL98 (1998)

Subject: steel reinforcement in c/c roof slab — Originator: YUAN KAN — Reply Req'd By: P.S.A.P. 7-10-98

DrwgSpec. No.: T-113, T-115 T-116, T-117 # 166 — Distribution List: HDR, CARTER & ASSOCIATES

Problem:
Sheet T-115 calls for 24-1 GOV Bars @ 12" - c/c roof slab to be on alternative bar spacing of 6"o.c. with 40-1GO3 Bars @ 12" o.c. Sheet T-116 calls for 134 - 1GOV bars (6'-11" (avg.) in both walls of c/c area. Sheet T-118 calls for 78 - 1GOV rebars @ 10'-6" (avg.) each in "A & B dimensions (see sheet) in the walls.
Where are these 1GOV rebars used how were they supposed to be installed in both walls and roof as cut/broken rebars? Please confirm that both walls of the c/c area had been already poured.

Possible rework or extra work involved with this RFI? N Y — Delays in project execution involved with this RFI? N Y — Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Construction Manager: Date: Authorized By:
1GOV BARS SHOULD BE STAGGERED LEFT AND RIGHT ACROSS ROOF EXPANSION JNT. OVER CUT SECTION.

ONLY → BTD (LEECH) AND (RECOMMENDATION)
Fax → HDR (ACTION)
Fax → LPA (ACTION)

Solution By: [signature] Date: 8/10/98

ADDISON AIRPORT TUNNEL - PROJECT (DNT-260)

915

Contractor / Subcontractor : H.B. Zachry — RFI No. BAR 915 — Date: 8-4-98

Subject: Waterproofing wall, top of CIP box and MEP room. — Originator: YUAN KAN — Reply Req'd By: 8-10-98

DrwgSpec. No.: T-118 # 166, T-112 # 166 — Distribution List: HDR, Loebel & Associates

Problem:
B.A.R. field inspectors believe that top of our precast box, north, east, and south walls of MEP room need waterproofing as well as the roof of MEP room.

Please let us know about this matter A.S.A.P.
The C/C roof slab was poured this morning.

Possible rework or extra work involved with this RFI? N Y — Delays in project execution involved with this RFI? N Y — Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Construction Manager: Date: Authorized By:

Response by Designer or other Organization: WATERPROOFING over top of CIP & Count Box on tunnels is not required because the information/design and Precast Sections shown on the contract drawings the tunnel has solid water barrier. See (LEECH & ASSOC. RESPONSE TO THIS QUESTION).

FAX → HDR (RUSH)
FAX → LPA (ASSIST)
FAX → BTD (INPUT)

Solution By: [signature] Date: 8/19/98

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260)

916

Contractor / Subcontractor : H.B. Zachry — RFI No. BAR 916 — Date: 8-2-98

Subject: T&P Requirement for concrete base of sub sumps — Originator: YUAN KAN — Reply Req'd By: 8-2-98 A.S.A.P.

DrwgSpec. No.: C-279, C-279, S-100 — Distribution List: BAR

Problem:
The roof slabs of either sumps are shown as part of pavement on sheets #279 and C-279.
Sheet A S-100 shows roof slabs of either sumps as just regular concrete structure with a finished grade above "elev." What is it and what is the temperature requirement for concrete pour for these Wet & Dry Portal Sumps.

Please respond A.S.A.P. because the Wet Portal Sump roof deck when was scheduled on tomorrow morning @ 6:00 am.

Possible rework or extra work involved with this RFI? N Y — Delays in project execution involved with this RFI? N Y — Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Construction Manager: Date: Authorized By:

Response by Designer or other Organization: 1) NO SLAB BELOW. (SHT 317) or W. ROYAL SUMP IS SOLID w/ REINFORCEMENT. SUMP SHT. #C-279 MARK. (47) 90 to 608.90 or 8" MINUS TOP SLAB OF SUMP. THE SUMP SHOWN WITH THE 5 3/4" TOP SLAB. THEREFORE ADDITIONAL TOP SLAB OF SUMPS. SUMP HAS DIFFERENT EXPANSION TRAFFIC (THIS THE BOTH RULE REQUIRES APPLY. WE REQUIRED THE RECOMMEND IN THE TOP SLAB OF SUMP 3 CYLINDER PATTERN OF TRAFFIC. BECAUSE WE DO NOT WANT SIGNIFICANT CRACKS TO WORRY THE SUMP REINFORCEMENT AT TO ALLOW) Fax → HDR (MIKE) DISCUSSING ABOVE SUMPS WITH A DIFFERENT DESIGN CC → BAR (MARK) ALTERNATIVE FROM THE TOP SLAB OF SUMP PITS.

Solution By: [signature] Date: 9/1/98

QUEST FOR INFORMATION
DDISON AIRPORT TUNNEL - PROJECT (DNT-260)

917

Contractor / Subcontractor : H.B. Zachry — RFI No. BAR 917 — Date: 9SEP98

Subject: ELECTRICAL OPENING SIZE — Originator: W. LEECH — Reply Req'd By: 15SEP98

DrwgSpec. No.: ROOF OPENING T-110 & T-111, DOOR SIZE T-110 — Distribution List:

Problem:
THE LARGEST EQUIPMENT SUBMITTED AND CURRENT MEASURES 46-IN. WIDE X 79-IN. DEEP X 90-IN. HIGH. M.B. BALMY PLANS TO INSTALL THIS EQUIPMENT AND OTHER MAJOR COMPONENTS FROM TOP BEHIND THE ROOF OPENING. IN THE FUTURE, IF ANY OF THE MAJOR COMPONENTS NEED TO BE REMOVED AND REPLACED, WILL THE 4'-0" X 2'-1" ROOF OPENING AND/OR 3'-0" X 7'-2" DOOR OPENING BE LARGE ENOUGH FOR REMOVAL AND REPLACEMENT? PLEASE ADVISE.

Possible rework or extra work involved with this RFI? (N) Y — Delays in project execution involved with this RFI? (N) Y — Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs; Surveying Crew: Hrs; Other: Hrs

Proposed Solution by Construction Manager: W. LEECH Date: 9SEP98 Authorized By: W. LEECH
ENLARGE ROOF OPENING

Response by Designer or other Organization: THIS IS NOT A PROBLEM. VARIOUS COMPONENTS OF SKILTECH CANAL SHOP MIGHT HAVE CONTAINED IN THE NEXT 20 TO 30 YEARS BUT NOT AN URGENT SCHED THAT 90 INCH HIGH (DISCHARGER ABOVE SHOWN) MORE THAT TO BE REMOVED. IF SO, THE DISCHARGER IS A BOLTED DISCHARGE AND COULD BE TAKEN APART FOR REMOVAL IF WERE REQUIRED.

Solution By: [signature] Date: 9/4/98

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260)

918

Contractor / Subcontractor : H.B. Zachry / ZACHRY-MONTEREY — RFI No. BAR 918 — Date: 9 OCT 98

Subject: TUNNEL SUMP CONCRETE CONSTRUCTION JOINTS — Originator: W. LEECH — Reply Req'd By: 13 OCT 98

DrwgSpec. No.: T122, SHT B + SHT D, T127, SHT 2 — Distribution List:

Problem:
1) CAN THE WALLS AND ROOF MEH BE PLACED SEPARATELY WITH A CONSTRUCTION JOINT IN BETWEEN. SEE DWG. SHT T123 - SHT B
2) CONSTRUCTION JOINT LOCATION ON DWG. SHT T122 - SHT D APPEARS TO CONFLICT WITH DWG. SHT T127 - DET. 2. SUGGEST USING DETAIL 3 AS CONSTRUCTION JOINT LOCATION.

SKATES ATTACHED

Possible rework or extra work involved with this RFI? (N) Y — Delays in project execution involved with this RFI? (N) Y — Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: N/A Hrs; Surveying Crew: N/A Hrs; Other: N/A Hrs

Proposed Solution by Construction Manager: W. LEECH Date: 9 OCT 98 Authorized By: W. LEECH
(1) ALLOW CONSTRUCTION JOINT BETWEEN WALLS AND ROOF
(2) USE DWG SHT T127 - DETAIL 2 FOR CONSTRUCTION JOINT LOCATION

Response by Designer or other Organization:
(1) THE ADDITIONAL HORIZONTAL CONSTRUCTION JOINT BETWEEN THE WALLS AND THE ROOF IS PERMITTED, PROVIDED THAT: a) THE REINFORCING ACROSS THE JOINT JOINT IS CONTINUOUS, b) THE JOINT SURFACE WILL BE PREPARED PER THE SPECIFICATIONS OR A SHEAR KEY WILL BE PROVIDED, AND c) THE JOINT WILL BE LOCATED 3" ABOVE THE HORIZONTAL REINFORCING BAR IN THE WALL (THIS APPEARS TO BE 3" ABOVE THE LOCATION SUGGESTED BY DET 2). SEE ATTACHMENT 1.
(2) USE DRAWING T127 DETAIL 2 - AGREED

Solution By: [signature] Date: 10OCT98

FINAL RECORD DRAWING
Date: 12/25/99

NO.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

RFI# 905 - 918

DRAWN ____ DATE ____ DESIGNED ____ DATE ____
CHECKED ____ DATE ____ SCALE ____

CONTRACT NO. DNT-260 SHEET ____ OF ____

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260) — 919

RFI No.: B&R 919
Contractor / Subcontractor : H.B. Zachry / RENAISSANCE
Date: 20 OCT 98
Originator: W. LEECH
Subject: TUNNEL MAIN SYN. UNDERDRAIN PERFORATIONS
Reply Req'd By: ASAP NOT ONE
Drw/Spec. No.: C12, T104, P150 — STANDARD SPEC 556 - ARTICLE 556.2 - TYPE 8
Distribution List:

Problem: THE PERFORATION HOLES FOR THE ON-SITE SYN. TUNNEL MAIN UNDERDRAIN APPEAR TO BE: 1) TOO SMALL IN DIAMETER, 2) IN THE WRONG LOCATION ON THE PIPE, AND 3) ANY INSUFFICIENT NUMBER ALONG THE PIPE. THE HOLES ARE ABOUT 1/4-IN. DIAMETER. THEIR LOCATION IS AT PIPE SPRING LINE. THERE ARE TWO SETS ON EACH SIDE OF THE PIPE. THEIR SPACING IS ABOUT 2-IN. ALONG THE LENGTH OF THE PIPE.
PLEASE PROVIDE BROWN + ROOT HOLES CONFIGURATION OF UNDERDRAIN PIPE: DIAMETER, SPACING, AND LOCATIONS

Possible rework or extra work involved with this RFI? N (Y)
Delays in project execution involved with this RFI? N (Y)
Estimate of time spent evaluating, finding alternate solution to RFI? N/A Engineering: Hrs Surveying Crew: Hrs Other: Hrs

Proposed Solution by Construction Manager: W. LEECH Date: 20 OCT 98 Authorized By: W. LEECH
REPLACE PIPE WITH PROPER DESIGNED PIPE.

Response by Designer or other Organization: IF THE CONTRACTOR IS INSTALLING THE UNDERDRAINS AS YOU ARE DESCRIBING ABOVE, THEY ARE TOTALLY WRONG AND OUT OF SPEC. THE SPEC CLEARLY REFERENCES TXDOT SPEC 556, "PIPE UNDERDRAINS" AND ON PAGE 1034, SPEC. 556.2 TYPE 8, (AS CALLED FOR IN SPECS), IT REFERENCES ASTM F758. I HAVE INCLUDED THE TXDOT PAGE 1034 AND ASTM PAGE 1726 CLEARLY SHOWING THE PERFORATIONS AROUND THE BOTTOM OF PIPE, THEIR REQUIRED SIZES AND THEIR REQUIRED SPACING. HDR WILL NOT ACCEPT ANYTHING IN LIEU OF THEIR REQUIREMENTS

Solution By: [signature] Date: 10/22/98

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260) — 920

RFI No.: B&R 920
Contractor / Subcontractor : H.B. Zachry / ZACHRY-MONTEREY
Date: 4 DEC 98
Originator: W. LEECH
Subject: TUNNEL BIRD BATH
Reply Req'd By: 14 DEC 98
Drw/Spec. No.: C-22 AND P-145
Distribution List: HDR, B+R, HBZ

Problem:
a) THE LOWEST ELEVATION OF TUNNEL PAVEMENT IS AT APPROXIMATELY STATION 22+20 (DRAWING SHEET C-22).
b) THE TUNNEL DRAIN INLETS EACH SIDE OF LOWEST ELEVATION POINT ARE AT STATIONS 20+50 AND 23+50 (DRAWING SHEET P-145).
c) ANY WATER THAT GETS BY THESE INLETS WILL CREATE A WATER POND AT STATION 22+20. THE POND COULD BE UP TO 4 INCHES DEEP. IF THE INLETS ON EACH SIDE DO NOT FUNCTION PROPERLY, THE POND COULD BE DEEPER.
THIS PROBLEM CAME TO LIGHT AFTER THE LAST PLACEMENT OF TUNNEL CONCRETE PAVEMENT AND THE RECENT RAINS.

Possible rework or extra work involved with this RFI? N (Y)
Delays in project execution involved with this RFI? N (Y) POSSIBLE
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: N/A Hrs Surveying Crew: N/A Hrs Other: N/A Hrs

Proposed Solution by Construction Manager: Date: 4 DEC 98 Authorized By: W. LEECH
1) SAW CUT AND REMOVE A 2-FT WIDE SECTION OF PAVEMENT FROM THE TUNNEL NORTH FOOT BLOCK TO THE 8-INCH TUNNEL DRAIN LINE.
2) REMOVE ROCK BALLAST AND ROCK.
3) INSTALL 8-INCH TEE, PIPE, AND INLET FROM 8-INCH DRAIN LINE.
4) PLACE AND COMPACT ROCK BALLAST.
5) DRILL AND INSTALL EPOXY-RESIN TRESTEEL DOWELS IN PAVEMENT CONCRETE.
6) PLACE AND FINISH CONCRETE TO PAVEMENT GRADE.

Response by Designer or other Organization: AFTER RUNNING A VERTICAL CURVE CHECK (COPY ATTACHED) IT IS APPARENT THAT THE LOW POINT (SAG) ON SAID CURVE IS STATION 22+35 WITH A TOP PAVEMENT ELEVATION OF 585.65 ON SHEET P145 WE SHOW JUST THE CLEANOUT INSTEAD OF AN INLET AND A CLEANOUT AS SHOULD BE. PLEASE ADD THE INLET AT STATION 22+35 WITH A TOP OF GRATE ELEVATION OF 585.65 ALONG THE NORTH SIDE OF PAVEMENT USING THE PROCESS YOU HAVE NOTED ABOVE.
FAX → HDR (ACTION)
CC → B+R (INPUT)
CC → HBZ (INFO)

Solution By: [signature] Date: 12/7/98

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260) — 921

RFI No.: B&R 921
Contractor / Subcontractor : H.B. Zachry / RENAISSANCE / J.L. STEEL
Date: 5 JAN 99
Originator: W. LEECH
Subject: TYPE I INLETS (CURB + GAM. SET)
Reply Req'd By: 8 JAN 99
Drw/Spec. No.: C-19, 20, 23, 24, 25 → ROADWAY; C-42, 45, 46 → STORM WATER; BID ITEM 465 TSP, C-6A → BID QUANTITIES
Distribution List: KEITH HOLMAN HDR, JIM GARDNER HBZ

Problem: THE TYPE I INLET WITH 5 FT EXTENSIONS DO NOT MATCH BETWEEN THE ROADWAY DRAWINGS AND THE STORM WATER DRAWINGS, AND THE BID QUANTITIES. SEE TABLE ATTACHED. NEED TO KNOW WHICH IS CORRECT FOR CONCRETE PAVING.

Possible rework or extra work involved with this RFI? N (Y)
Delays in project execution involved with this RFI? N (Y)
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: 0 Hrs Surveying Crew: 0 Hrs Other: 0 Hrs

Proposed Solution by Construction Manager: [signature] Date: 5 JAN 98 Authorized By: W. LEECH
UNKNOWN

Response by Designer or other Organization: SPEC ITEM 465 CALLS FOR 10 TYPE I (5' INL). PAVEMENT SHTS. CALL FOR 10 TYPE I (5' INL), C-19 (4), C-20 (1), C-23 (1), C-24 (3) AND C-25 (1) OR A TOTAL OF 10; STORM DRAIN SHTS. CALL FOR 10 TYPE I (5' INLETS), C-42 (5), C-45 (3) AND C-46 (2) OR A TOTAL OF 10. HDR DOES NOT UNDERSTAND WHAT THE PROBLEM IS AND DOES NOT SEE ANY DISCREPANCY BETWEEN THE SPECS. AND THE PLANS. THE 10' INLET ON SHT. C-46 DOES NOT HAVE A 5' EXTENSION REQUIRED.
FAX → HDR (ACTION)
CC → B+R (ORIENTATION)

Solution By: [signature] Date: 1/7/99

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260) — 922

RFI No.: B&R 922
Contractor / Subcontractor : H.B. Zachry / RENAISSANCE
Date: 7 JAN 99
Originator: W. D. LEECH
Subject: OUTFALL OF UNDERDRAIN SYSTEM
Reply Req'd By: 9 JAN 99
Drw/Spec. No.: C-20, C-42
Distribution List: B+R

Problem: THE UNDERDRAIN SYSTEM SHOWN ON DRAWING C-20 APPEARS TO HAVE NO OUTFALL. WHERE DOES THE COLLECTED WATER DRAIN TO? (SEE ATTACHED SKETCH C-20)

Possible rework or extra work involved with this RFI? N (Y)
Delays in project execution involved with this RFI? N (Y)
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: N/A Hrs Surveying Crew: N/A Hrs Other: N/A Hrs

Proposed Solution by Construction Manager: W. D. LEECH Date: 7 JAN 99 Authorized By: [signature]
TIE THE UNDERDRAIN SYSTEM INTO THE 21-IN. RCP OR 8-IN. PVC AT THE WEST PORTAL WALL SHOWN ON DRAWING C-42

Response by Designer or other Organization: CONNECT 8" UNDERDRAIN TO TYPE "F" INLET AT STA. 9+72.96, 20.46' LEFT, AS SHOWN ON ATTACHED DWG.
FAX → HDR (ACTION)
CC → B+R (ORIG)

Solution By: [signature] Date: 1/8/99

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260) — 923

RFI No.: B&R 923
Contractor / Subcontractor : H.B. Zachry / ZACHRY-MONTEREY
Date: 18 JAN 99
Originator: W. D. LEECH
Subject: TUNNEL SUMP DISCHARGE LINE - VALVE
Reply Req'd By: ASAP
Drw/Spec. No.: P-147 + P-148
Distribution List: HBZ

Problem: SHOULD THE 8-IN GATE VALVE SHOWN ON THE CONTRACT DRAWINGS P-147 AND P-148 BE AN 8-IN. CHECK VALVE INSTEAD? A CHECK VALVE WOULD PREVENT SIPHONING OF WATER FROM THE EAST SUMP BACK TO THE TUNNEL SUMP. IF THE GATE VALVE IS REQUIRED, PLEASE INFORM US OF ITS FUNCTION WHEN CLOSED.

Possible rework or extra work involved with this RFI? (N) Y
Delays in project execution involved with this RFI? (N) Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: N/A Hrs Surveying Crew: N/A Hrs Other: Hrs N/A

Proposed Solution by Construction Manager: W.D. LEECH Date: 8 JAN 99 Authorized By: [signature]
SUBSTITUTE CHECK VALVE FOR GATE VALVE, OR ADD CHECK VALVE IN ADDITION TO GATE VALVE.

Response by Designer or other Organization:
THE GATE VALVE IS IN THE PUMP DISCHARGE LINE FROM THE TUNNEL SUMP PUMP. THIS LINE ALREADY HAS CHECK VALVES AT THE PUMPS. AN ADDITIONAL CHECK VALVE IS NOT REQUIRED.
FAX → HDR → ACTION
CC → B+R → INPUT

Solution By: MIKE ASHCRAFT Date: 1/20/99

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260) — 924

RFI No.: B&R 924
Contractor / Subcontractor : H.B. Zachry
Date: 01-26-99
Originator: JERRY ROWAN
Subject: Clarification for Location of Sod & Hydro Mulch
Reply Req'd By: ASAP
Drw/Spec. No.: DNT 260, C18, 19, 20, 23, 24 & 25, C28 — ITEM 162 - ITEM 164
Distribution List: B+R MOFC

Problem: Need Clarification For Sod and Hydro Mulch, need Clarification Between STA. 0+07 to STA. 2+20 Behind North Curb, Clarify Area Around Parking lot at The South East Corner of Midway & Keller Springs. What Type of Treatment goes between The Top of Slopes and The Row Line Throughout The Project. Clarify Area between The North Curb And The Existing Parking Lot, between STA. 34+77 To STA. 35+88
DOES ANY TREATMENT GO ALONG DOOLEY ROAD - BOTH SIDE? HOW WERE SY AREA DETAILED ON SHEET C-4. IF A FIELD PROBLEM, WHAT WAS HDR'S LOGIC?

Possible rework or extra work involved with this RFI? N (Y)
Delays in project execution involved with this RFI? (N) Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: N/A Hrs Surveying Crew: N/A Hrs Other: N/A Hrs

Proposed Solution by Construction Manager: W.D. LEECH Date: 26 JAN 99 Authorized By: [signature]
SOD SLOPES GREATER THAN OR EQUAL TO 1:3. HYDRO SEED SLOPES LESS THAN 1:3 AND FLAT AREAS TO FENCE LINES. DO NOT KNOW WHAT TO BEYOND FENCE LINES. PLEASE PROVIDE GUIDANCE.

Response by Designer or other Organization: 3:1 SLOPE OR GREATER, USE SODDING, [illegible] USE HYDROMULCH. QUANTITIES ON SHT. C4. CANNOT DO ANY SODDING EXCEPT BETWEEN MARCH 1 & OCTOBER 1, UNLESS DIRECTED BY ENGINEER.
FAX → HDR → (ACTION)
CC → B+R → (INPUT)

Solution By: [signature] Date: 1/27/99

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260) — 924A

RFI No.: B&R 924A
Contractor / Subcontractor : H.B. Zachry
Date: 01-26-99
Originator: JERRY ROWAN
Subject: Clarification for Location of Sod & Hydro Mulch
Reply Req'd By: ASAP
Drw/Spec. No.: DNT 260, C18, 19, 20, 23, 24 & 25, C28 — ITEM 162 - ITEM 164
Distribution List: B+R MOFC

Problem: Need Clarification For Sod and Hydro Mulch, need Clarification Between STA. 0+07 to STA. 2+20 Behind North Curb, Clarify Area Around ~~Parking lot at The South East Corner of Midway & Keller Springs.~~ What Type of Treatment goes between The Top of Slopes and The Row Line Throughout The Project. And/or Fences. Clarify Area between The North Curb And The Existing Parking Lot, between STA. 34+77 To STA. 35+88
DOES ANY TREATMENT GO ALONG DOOLEY ROAD - BOTH SIDES? HOW WERE SY AREA DETAILED ON SHEET C-4. IF A FIELD PROBLEM, WHAT WAS HDR'S LOGIC?

Possible rework or extra work involved with this RFI? N (Y)
Delays in project execution involved with this RFI? (N) Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: N/A Hrs Surveying Crew: N/A Hrs Other: N/A Hrs

Proposed Solution by Construction Manager: W.D. LEECH Date: 26 JAN 99 Authorized By: [signature]
SOD SLOPES GREATER THAN OR EQUAL TO 1:3. HYDRO SEED SLOPES LESS THAN 1:3 AND FLAT AREAS TO FENCE LINES. DO NOT KNOW WHAT TO BEYOND FENCE LINES. PLEASE PROVIDE GUIDANCE.
RESUBMITTED - WDL PLEASE ANSWER QUESTIONS CIRCLED - WDL

Response by Designer or other Organization: 3:1 SLOPE OR GREATER, USE SODDING, [illegible] USE HYDROMULCH. QUANTITIES ON SHT. C4. CANNOT DO ANY SODDING EXCEPT BETWEEN MARCH 1 & OCTOBER 1, UNLESS DIRECTED BY ENGINEER.
SEE ATTACHED LETTER FOR RESPONSE TO RFI 924A [signature] 1/28/99
FAX → HDR → (ACTION)
CC → B+R → (INPUT)

Solution By: [signature] Date: 1/27/99

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260) — 925

RECEIVED JAN 28 1999 Brown & Root

RFI No.: B&R 925
Contractor / Subcontractor : H.B. Zachry
Date: 28 JAN 99
Originator: TOM GRAY
Subject: CONCRETE GUTTER (TY "A")
Reply Req'd By: ASAP / 5 FEB 99
Drw/Spec. No.: C-45; C-23; C-24 — STA 26+25 To 30+60 RT. SIDE
Distribution List: ~~HDR~~ - HBZ -

Problem: THE PLANS INDICATE A 5 FT WIDE GUTTER (GUTTER "C") FROM STA 26+25 TO STA 30+60 ON SHEET C-45. ON SHEETS C-23 & C-24 THE PLANS CALL FOR A 3 FT WIDE GUTTER FOR THE SAME STATIONS. ALSO THERE IS NO BID ITEM LISTING FOR A 5 FT WIDE GUTTER.
PLEASE CLARIFY WHICH SIZE OF GUTTER IS REQUIRED. 3 FT OR 5 FT WIDTH

Possible rework or extra work involved with this RFI? (N) Y
Delays in project execution involved with this RFI? (N) Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: N/A Hrs Surveying Crew: N/A Hrs Other: N/A Hrs

Proposed Solution by Construction Manager: W.D. LEECH Date: 28 JAN 99 Authorized By: [signature]
USE A TYPE A 3'-0" SHOWN ON SHEET C-20 FOR GUTTER "C" SHOWN ON SHEETS C23, C24 + C45

Response by Designer or other Organization:
DATE 1-28 DISTRIBUTION LIST / DOC NO 2/99 / T. KELLEY / B. KEMP / D. ALDRIDGE / DOC MGMT / Please initial by your name and pass to next person on list. Thanks
FAX → HDR → ACTION
CC → B+R → INPUT

Solution By: Date:

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260) — 926A

RFI No.: B&R 926A
Contractor / Subcontractor : H.B. Zachry
Date: 8 MAR 99
Originator: W. LEECH
Subject: SAFETY DOOR
Reply Req'd By: 15 MAR 99
Drw/Spec. No.: DRAWING SHEET T-110
Distribution List: B+R, HBZ

Problem: THE DOOR TO THE OUTSIDE OF THE ELECTRICAL MEP ROOM DOES NOT HAVE PANIC RELEASE DOOR HARDWARE INSIDE. THE EXIT SIGNS ABOVE THE TUNNEL WALKWAY STAIRS ROUTE PERSONS INTO THE MEP ROOM. SHOULD THERE BE A QUICK RELEASE DOOR TO THE OUTSIDE FROM THE MEP ROOM TO ROUTE PERSONS OUTSIDE?

Possible rework or extra work involved with this RFI? N (Y)
Delays in project execution involved with this RFI? (N) Y
Estimate of time spent evaluating, finding alternate solution to RFI? Engineering: Hrs Surveying Crew: Hrs Other: Hrs

Proposed Solution by Construction Manager: WDL Date: 8 MAR 99 Authorized By: [signature]
INSTALL PANIC RELEASE HARDWARE ON INSIDE OF DOOR

RECEIVED MAR 18 1999 Brown & Root, Inc.

Response by Designer or other Organization:
FAX → HDR (DETERMINATION)
CC → B+R (INPUT)
INSTALL PANIC RELEASE HARDWARE.
PLEASE PROVIDE B+R A SPECIFICATION ON HARDWARE. - WDL
ATTACHED FAX SHEET HAS SPEC'S ON VON DUPRIN SERIES 88 PANIC DOOR RELEASES & SALES REP PHONE NO. [signature]

Solution By: MIKE ASHCRAFT Date: 3/12/99

REQUEST FOR INFORMATION
ADDISON AIRPORT TUNNEL - PROJECT (DNT-260) — 927

RFI No.: B&R 927
Contractor / Subcontractor : H.B. Zachry / ZACHRY-MONTEREY
Date: 11 MAR 99
Originator: W. LEECH
Subject: ELECTRICAL PLAN QUANTITIES
Reply Req'd By: 25 MAR 99
Drw/Spec. No.: E-153 THRU E-166A, C-18, C-25, S-66, S-67, S-68, T-129, T-130, AND BASE BID
Distribution List: B+R MAIN OFC

Problem:
+ ZACHRY-MONTEREY, H.B. ZACHRY'S ELECTRICAL SUBCONTRACTOR, BELIEVES THERE MAY BE OVERRUNS IN THE PLAN QUANTITIES FOR BID ITEMS 618 (BASE BID SHEETS 9 AND 10) AND BID ITEMS 8100 SERIES (BASE BID SHEETS 18 THRU 22). SEE MARKED BID ITEMS ON BASE BID THAT MAY HAVE QUANTITY OVERRUNS.
+ PLEASE PROVIDE BROWN + ROOT THE MATERIALS TAKE-OFF CALCULATIONS TO DETERMINE THESE BID QUANTITIES.

Possible rework or extra work involved with this RFI? (N) Y
Delays in project execution involved with this RFI? N (Y)
Estimate of time spent evaluating, finding alternate solution to RFI? N/A Engineering: Hrs Surveying Crew: Hrs Other: Hrs

Proposed Solution by Construction Manager: W. LEECH Date: 11 MAR 99 Authorized By: [signature]
NOT APPLICABLE

Response by Designer or other Organization:
FAX → HDR (PROVIDE INFO)
CC → B+R
OVERRUNS MAY HAVE BEEN CAUSED DUE TO ROUTING SELECTION OF CONDUITS BY THE CONTRACTOR AS WELL AS BY THE ADDITION OF CONDUITS FOR SECURITY/COMM. SYSTEMS BY AGUIRRE ARCHITECTS. RECOMMEND FOR THE CONTRACTOR TO PROVIDE A TAKE-OFF BASED ON AGUIRRE'S DWGS AND COMPARE OUTPUT TO OVERRUNS.

Solution By: [signature] Date: 3/16/99

Pg 1 of 8

NO.	REVISION	BY	DATE

NORTH TEXAS TOLLWAY AUTHORITY
ADDISON AIRPORT TUNNEL

RFI# 919 - 927

FINAL RECORD DRAWING
Date: 12/25/99

DRAWN ____ DATE ____ DESIGNED ____ DATE ____
CHECKED ____ DATE ____ SCALE ____

CONTRACT NO. DNT-260 SHEET ____ OF ____