

**NOTES:**

**1. BACKFILL MATERIAL TYPE "A"**

BLACK OR BEACH SAND, EARTH AND GRAVEL MIXTURE. IF EARTH AND GRAVEL MIXTURE, ROCK SIZE SHALL BE 1-INCH OR SMALLER AND SHALL NOT CONTAIN MORE THAN 50% ROCK PARTICLES BY VOLUME. THIS FILL SHALL BE USED OVER CONCRETE ENCASED DUCTS AND OVER DIRECT BURIED DUCTS AND CABLES AFTER BACKFILL TYPE "B" HAS BEEN PLACED IN ACCORDANCE WITH DRAWINGS. BACKFILL SHALL BE COMPACTED TO 95% DENSITY.

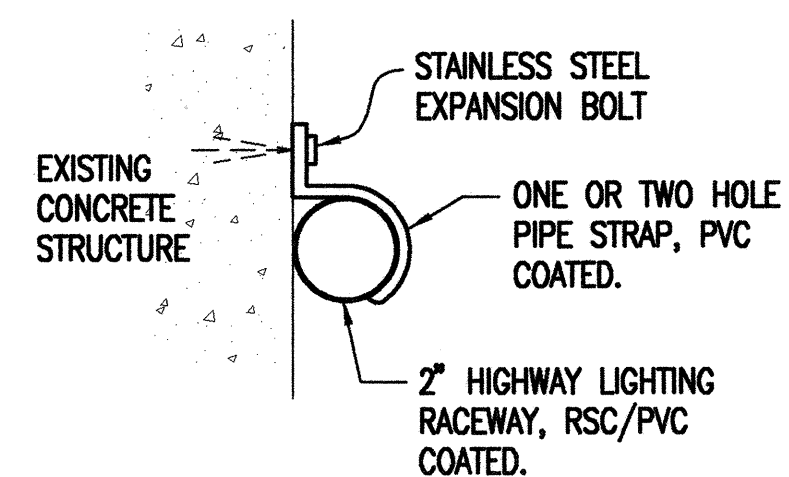
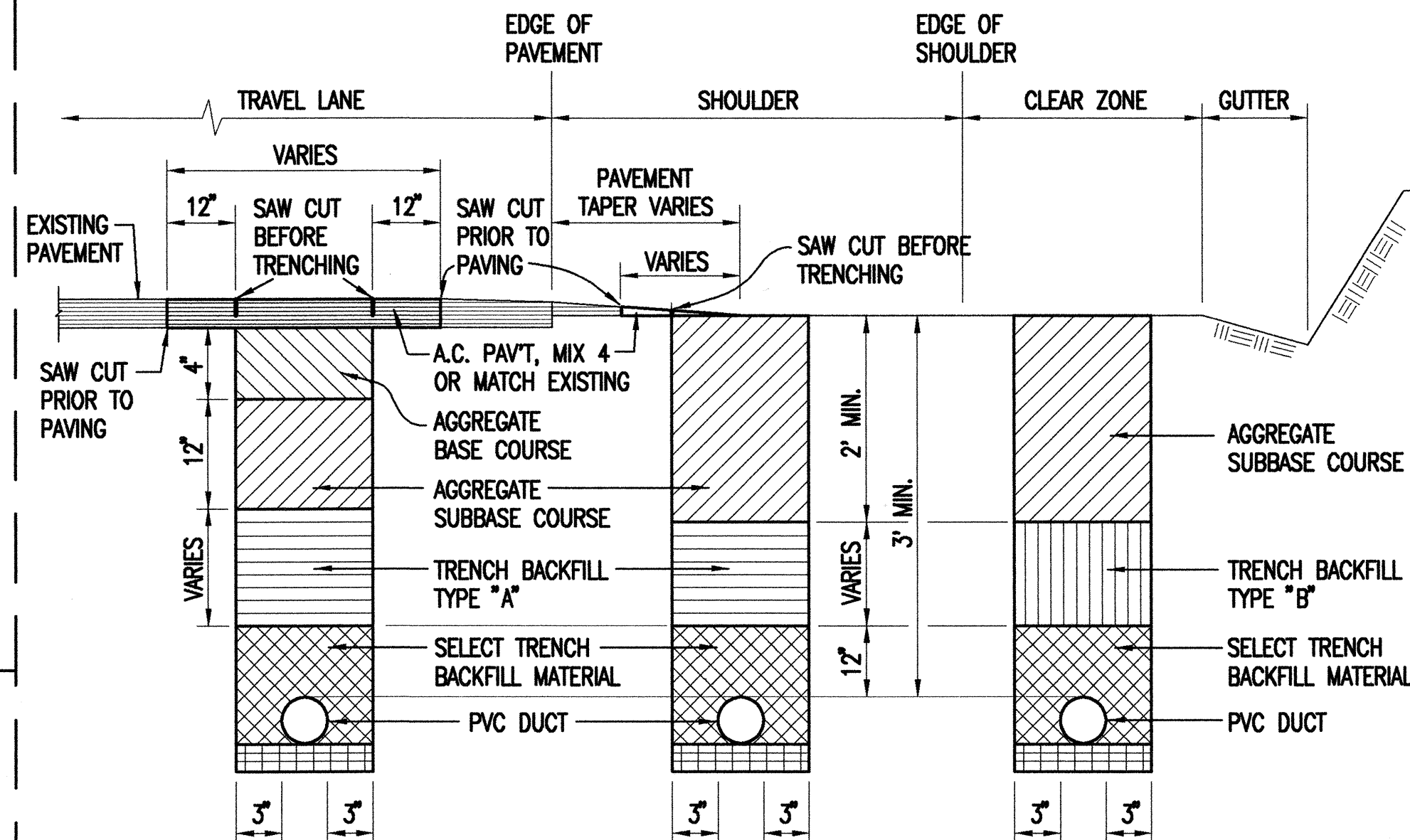
**2. BACKFILL MATERIAL TYPE "B"**

BLACK OR BEACH SAND, EARTH AND GRAVEL MIXTURE. IF EARTH & GRAVEL MIXTURE MUST PASS A 1/2-INCH SCREEN AND CONTAIN NOT MORE THAN 20% ROCK PARTICLES BY VOLUME. THIS FILL SHALL BE ALL AROUND DIRECT BURIED CONDUITS AS SHOWN ON DRAWINGS. BACKFILL SHALL BE COMPACTED TO 95% DENSITY.

3. ALL DUCTS SHALL BE PVC SCHEDULE 40 UNLESS OTHERWISE NOTED. EACH LENGTH SHALL BEAR "UL" LABEL.

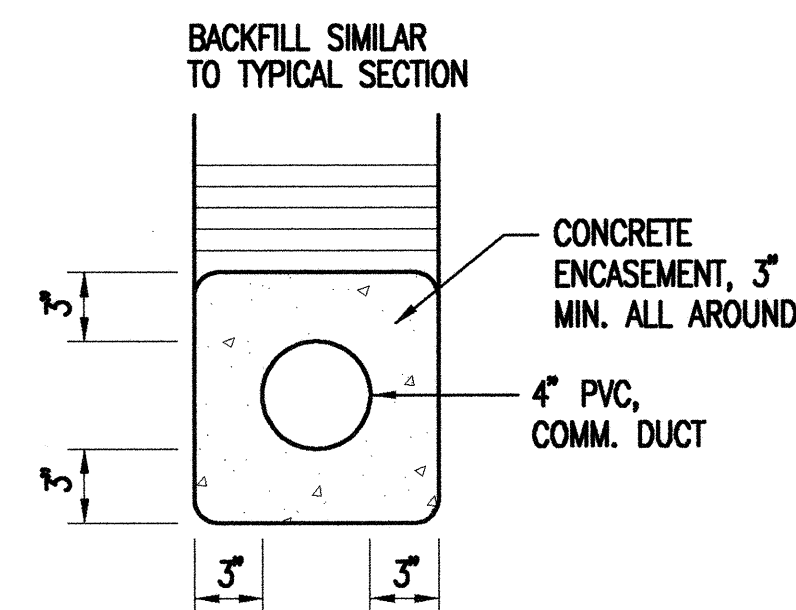
4. PROVIDE 5 mm RED PLASTIC TAPE, THREE INCH (3) MIN. WITH CONTINUOUS METALLIC BACKING AND CORROSION RESISTANT 1-MIL FOIL-CORE INSCRIBED WITH "CAUTION - ELECTRICAL LINE BURIED BELOW" IN BLACK LETTERING, REPEATED AT THIRTY-SIX INCH (36") INTERVALS.

5. WHERE THE NORMAL MATERIAL IN THE BOTTOM OF A TRENCH CONTAINING A DIRECT BURIAL CONDUIT IS NOT TYPE "B", AN ADDITIONAL 3" SHALL BE EXCAVATED AND TYPE "B" BACKFILL SHALL BE PROVIDED.

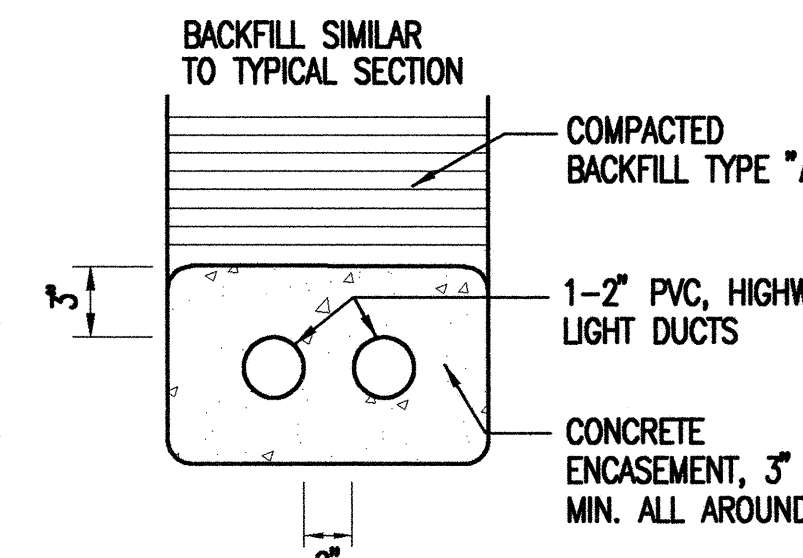


SECTION A

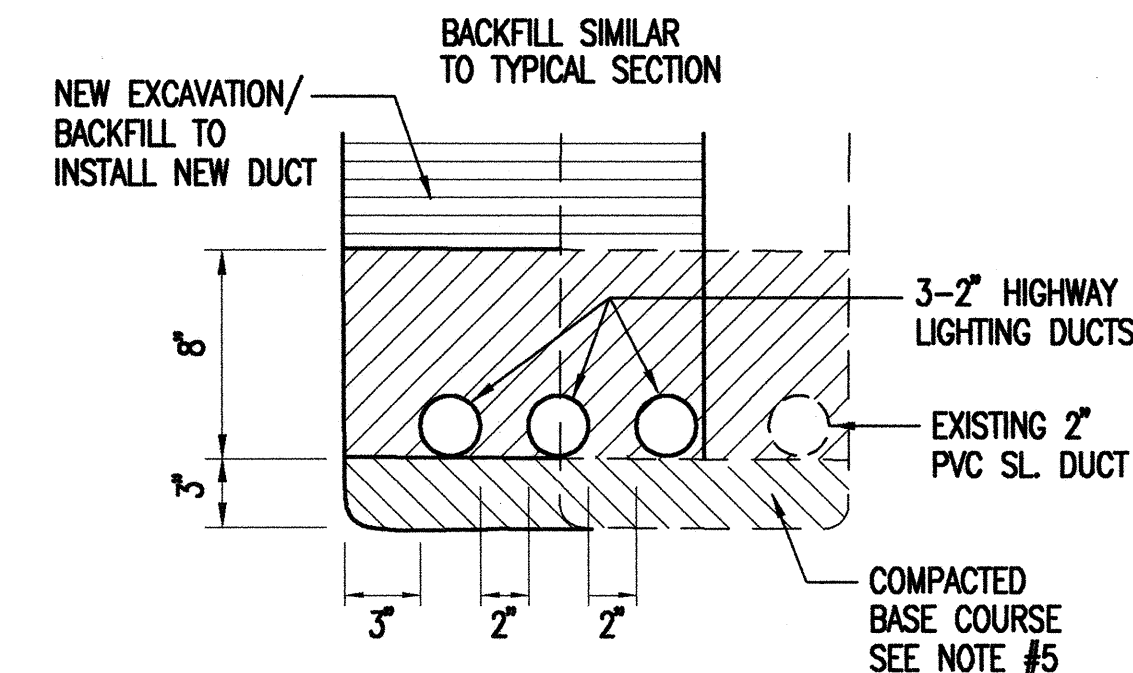
TYPICAL SECTIONS DIRECT BURIED



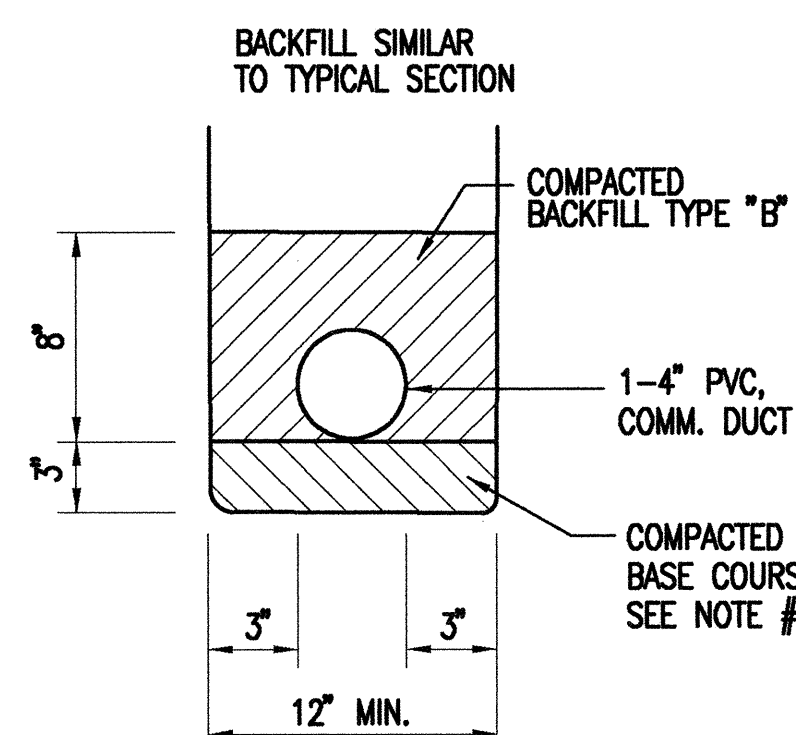
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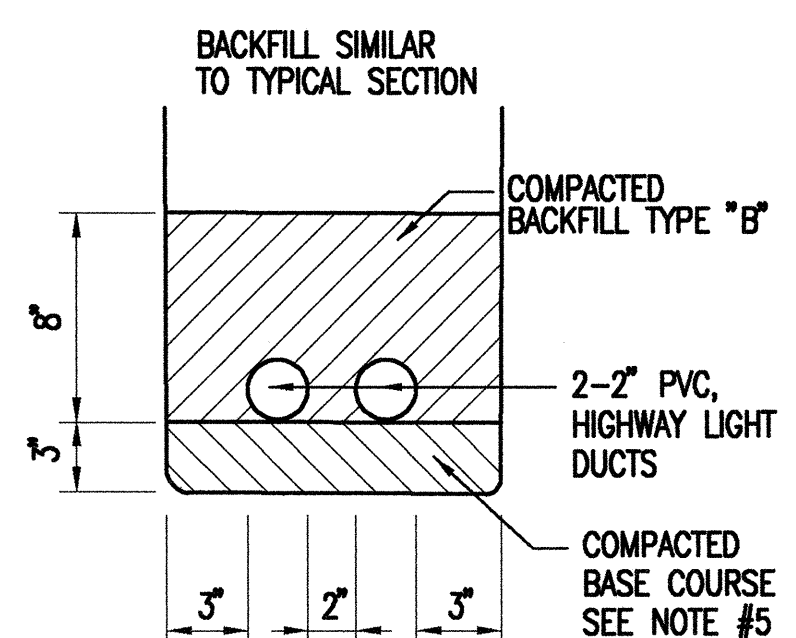
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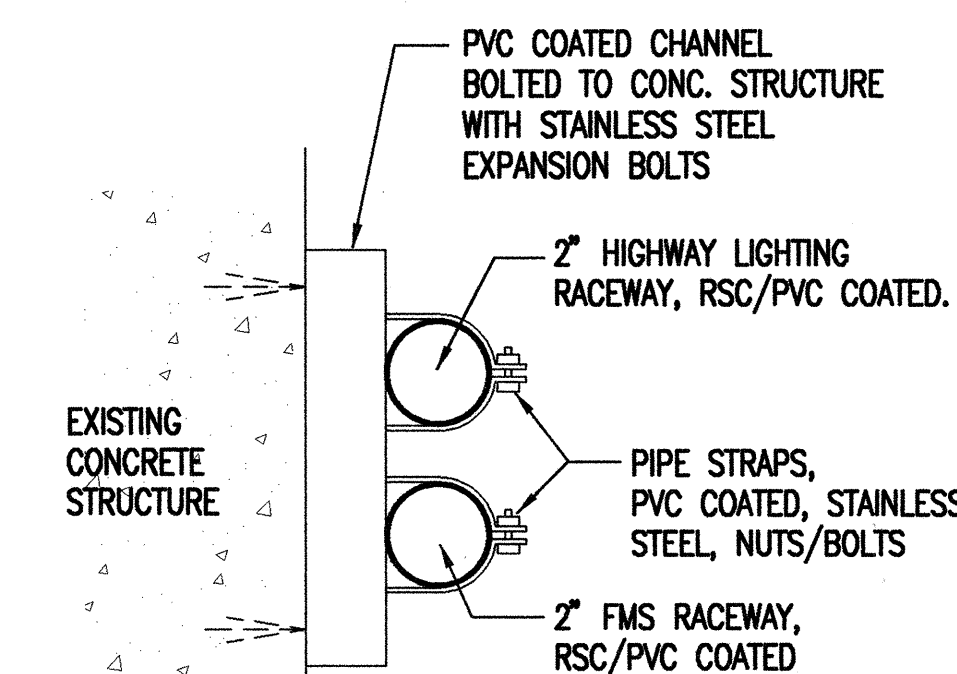
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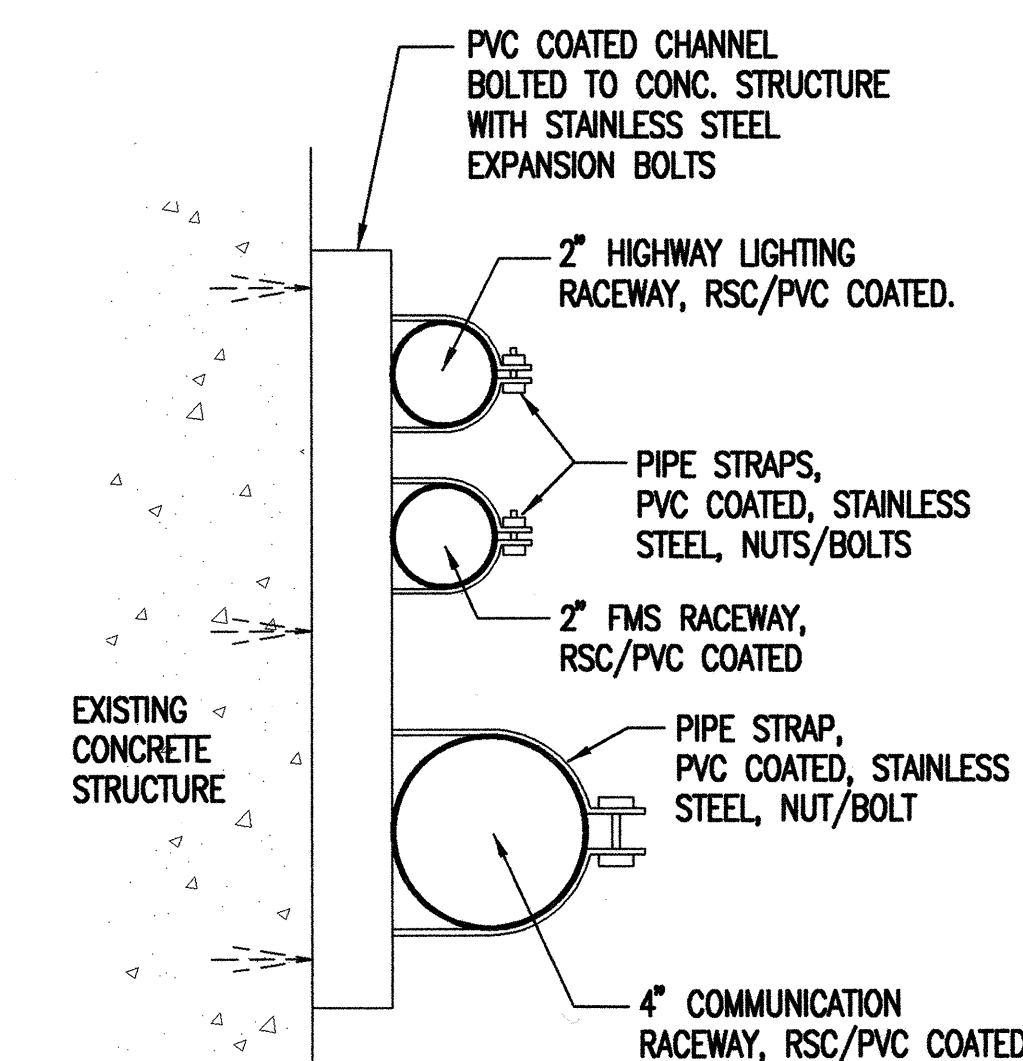
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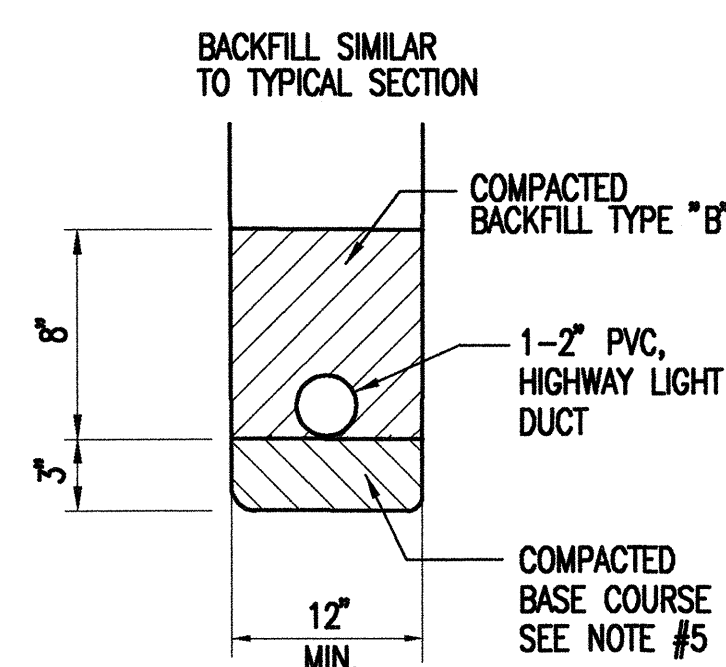
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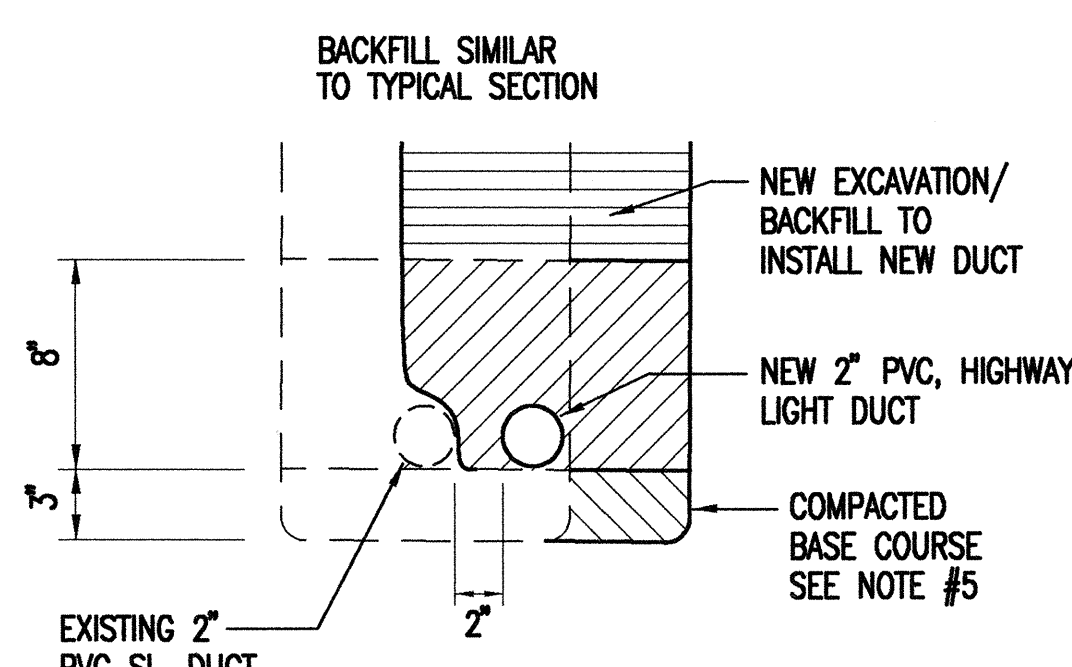
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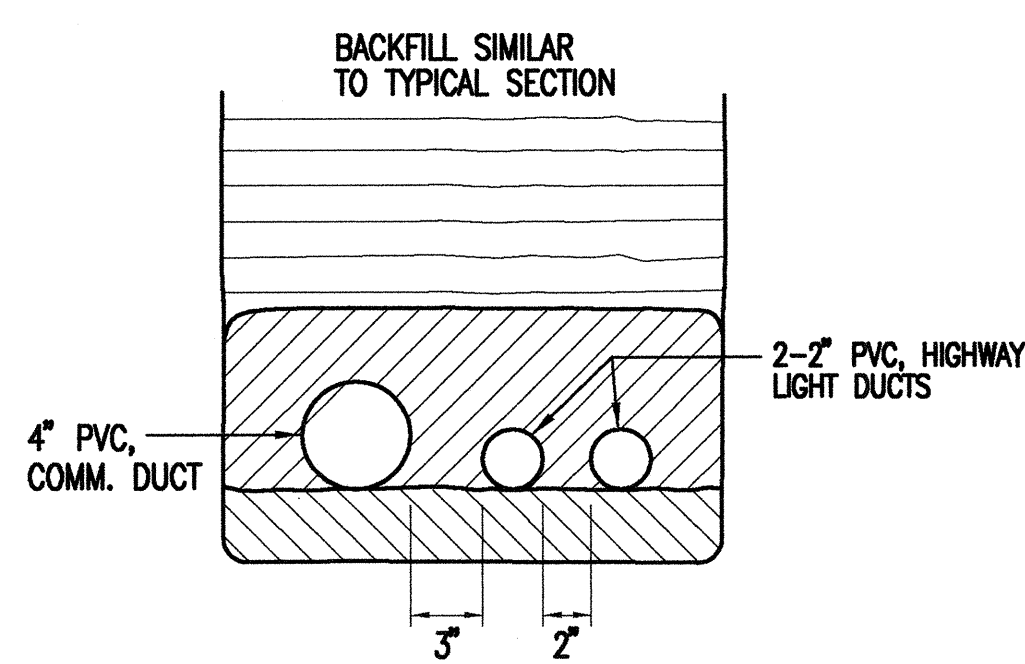
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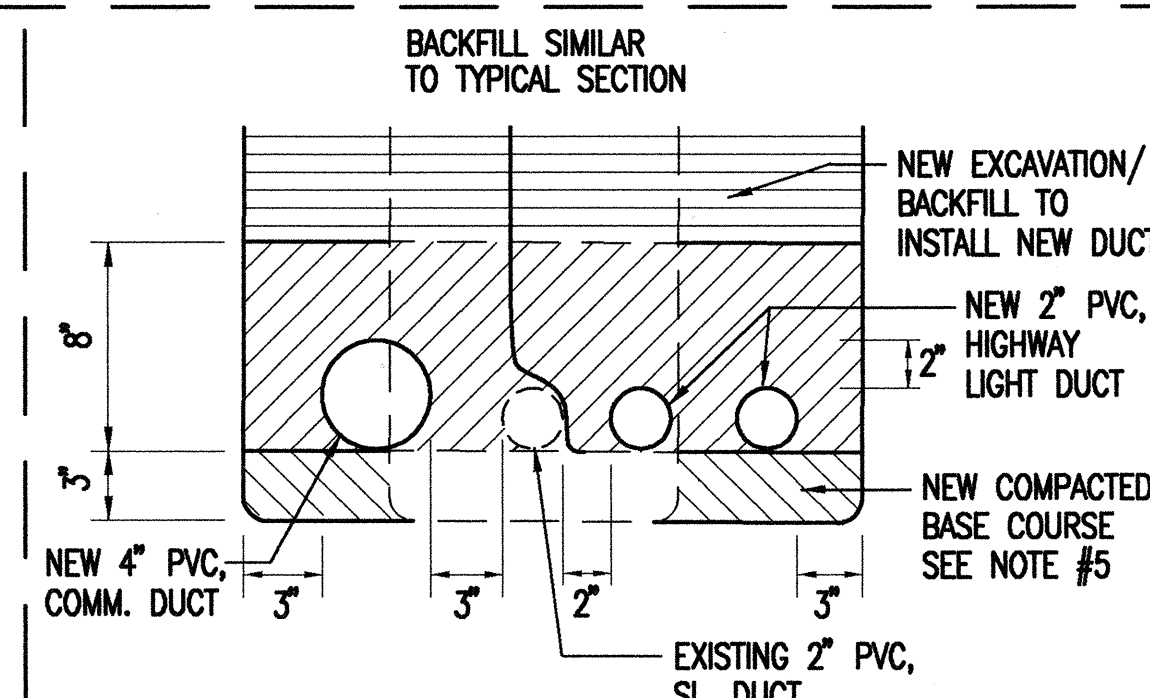
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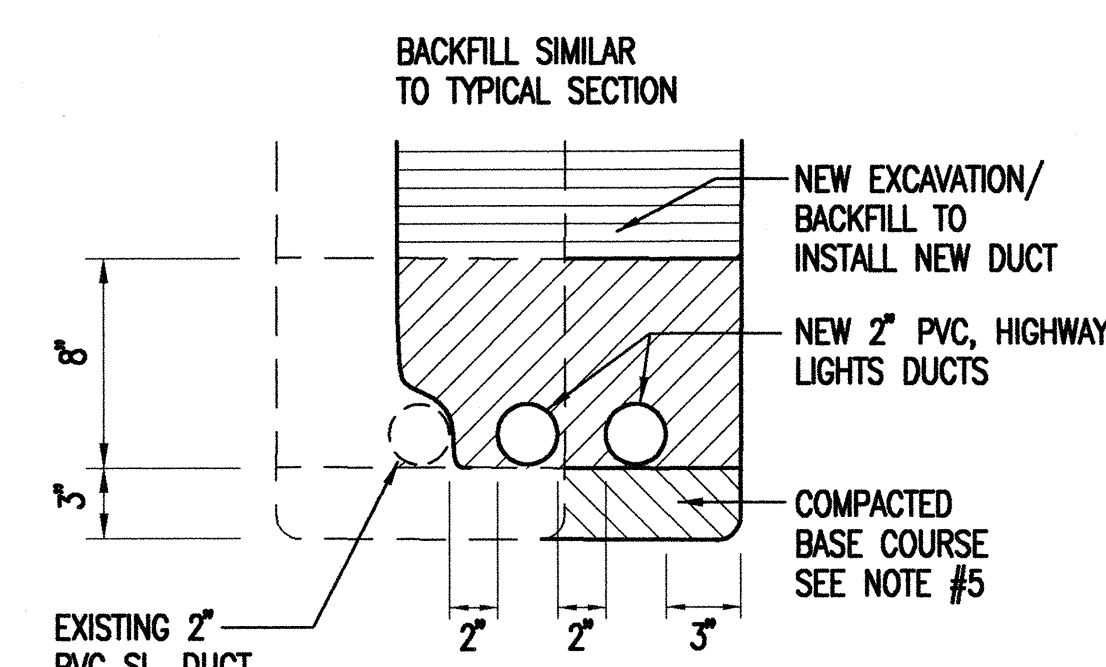
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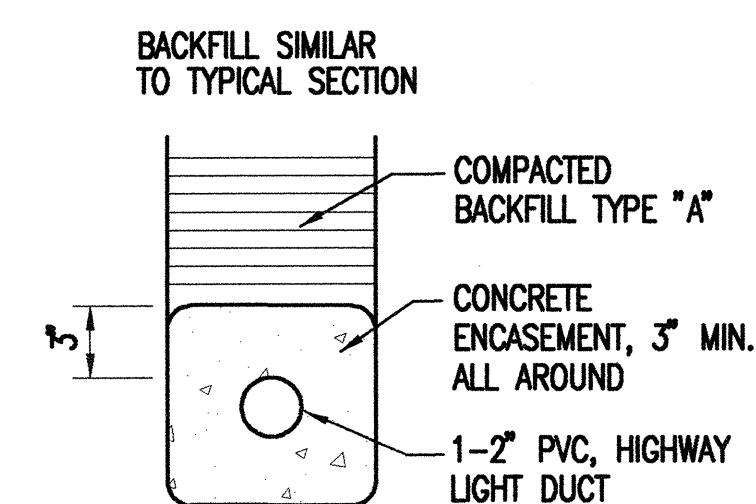
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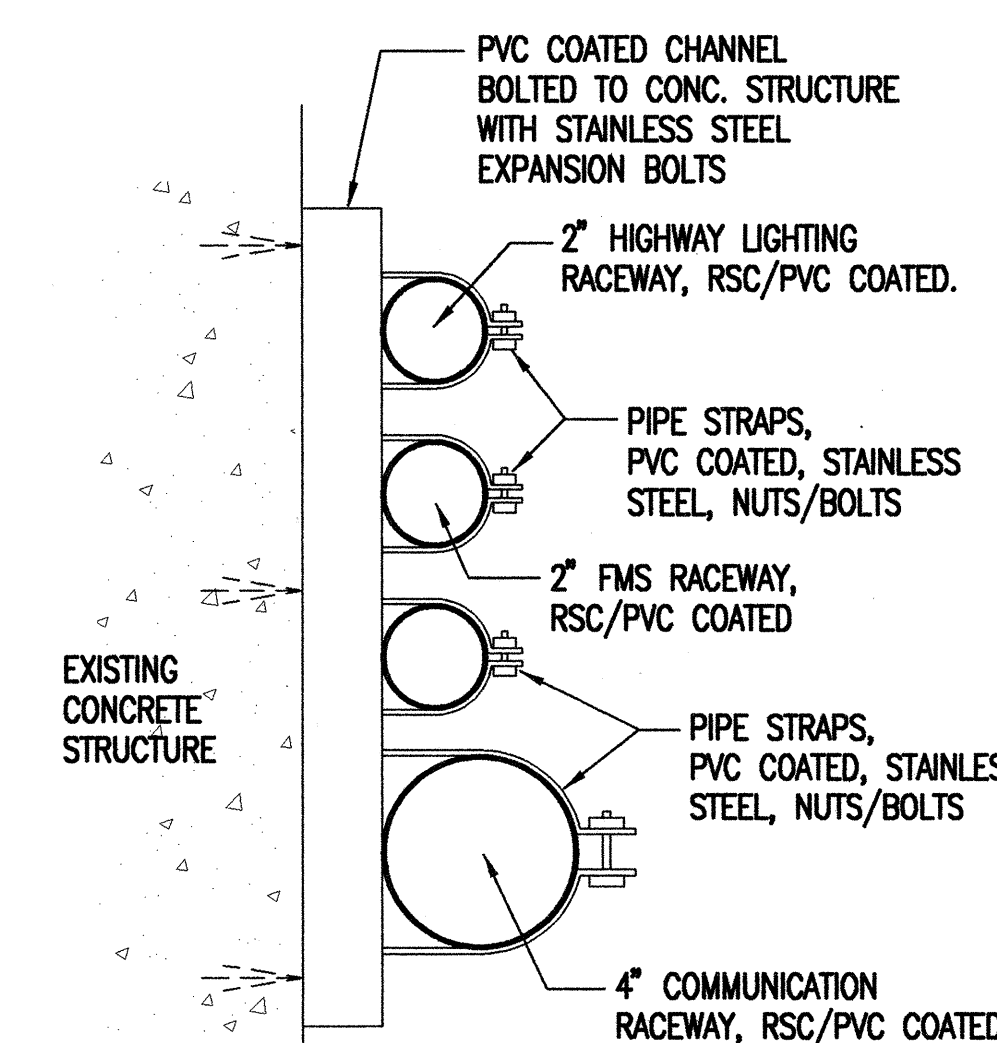
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SECTION I



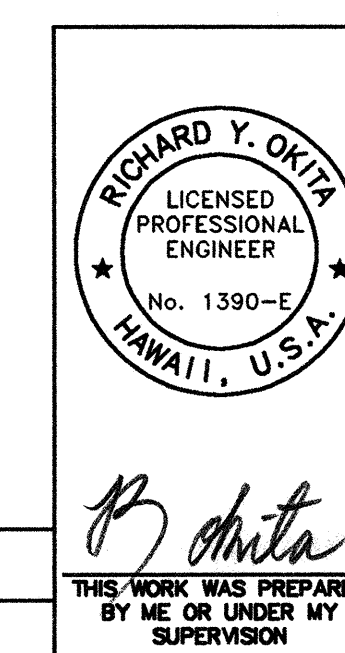
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SECTION O

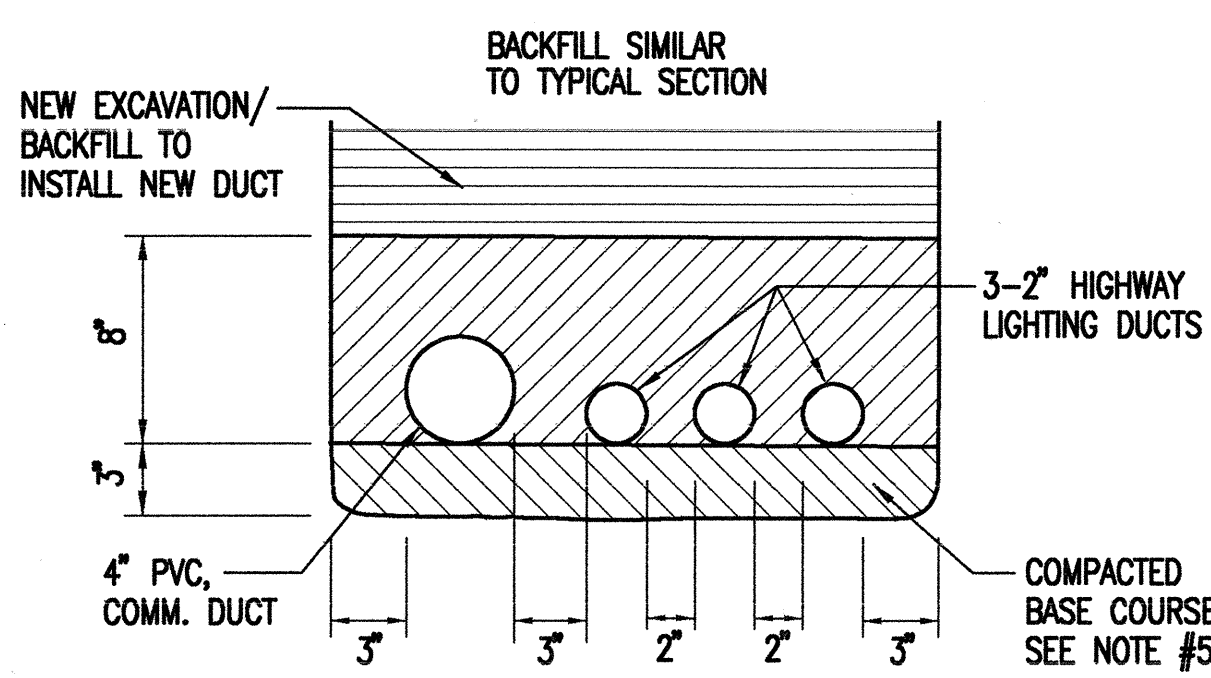
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E-1 TYPICAL DUCT SECTIONS  
NOT TO SCALE

9/13/99	REVISED DUCT SECTIONS
DATE	REVISION

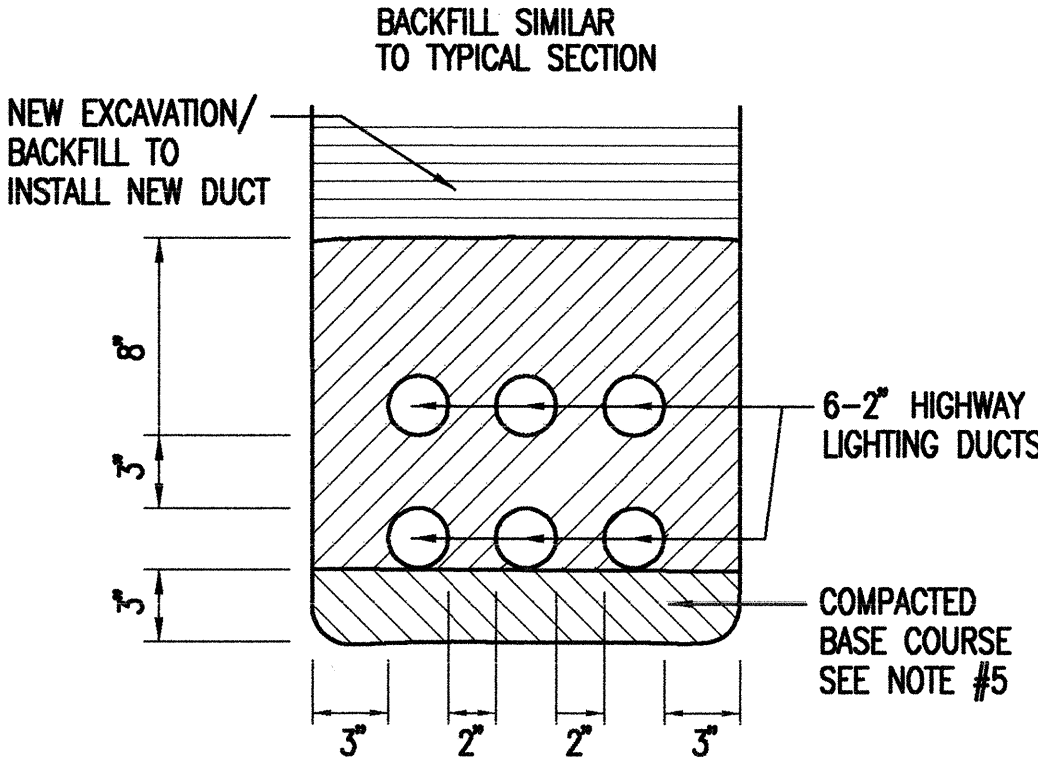


STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
TYPICAL DUCT SECTIONS	
INTERSTATE ROUTE H-2 INSTALLATION OF HIGHWAY LIGHTING LEILEHUA INTERCHANGE TO WAIKAWA INTERCHANGE F.A. PROJECT NO. IM-H2-1(30)	
SCALE: AS SHOWN	DATE: AUGUST 1999
SHEET No. 1 OF 52 SHEETS	

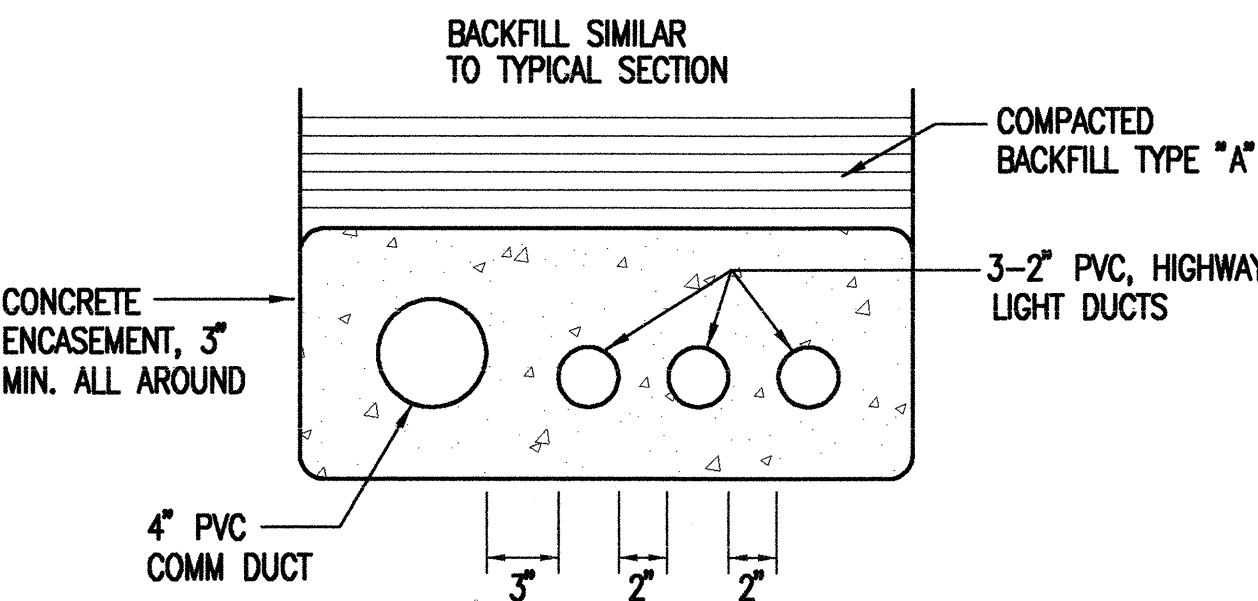
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-H2-1(30)	2000	14	64



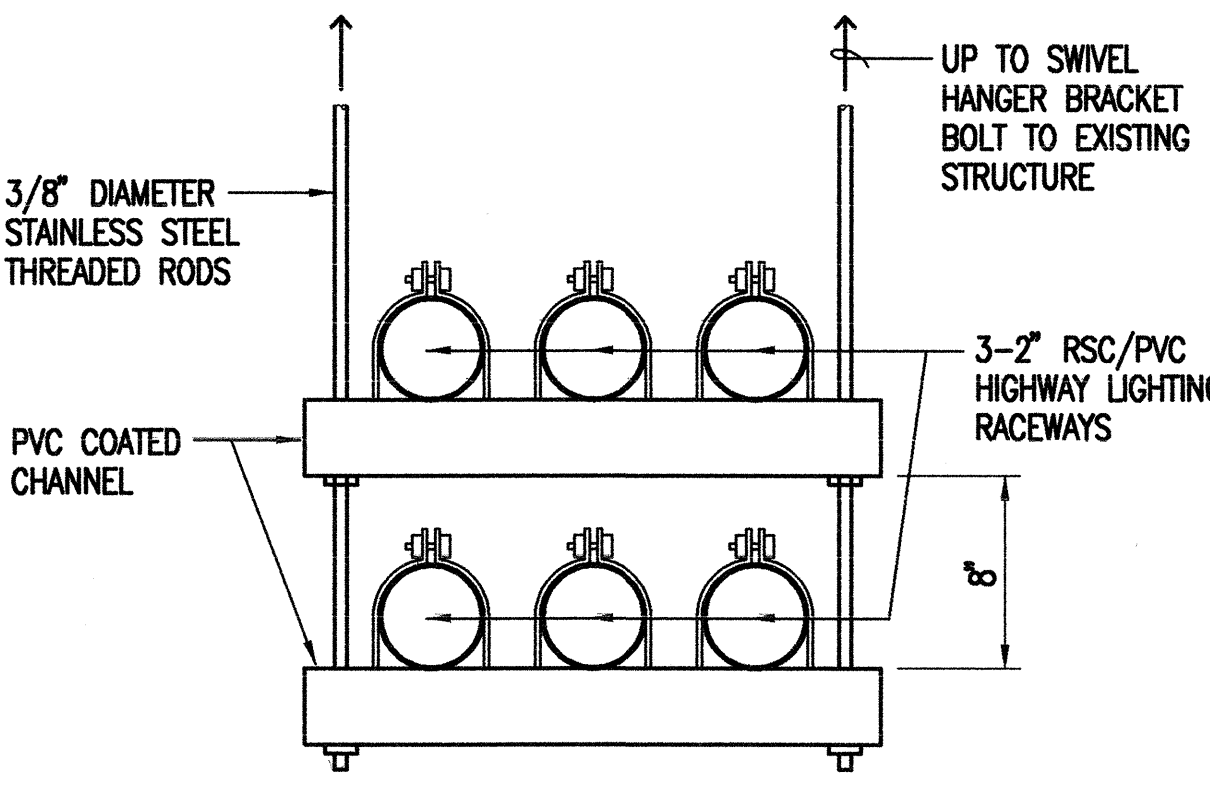
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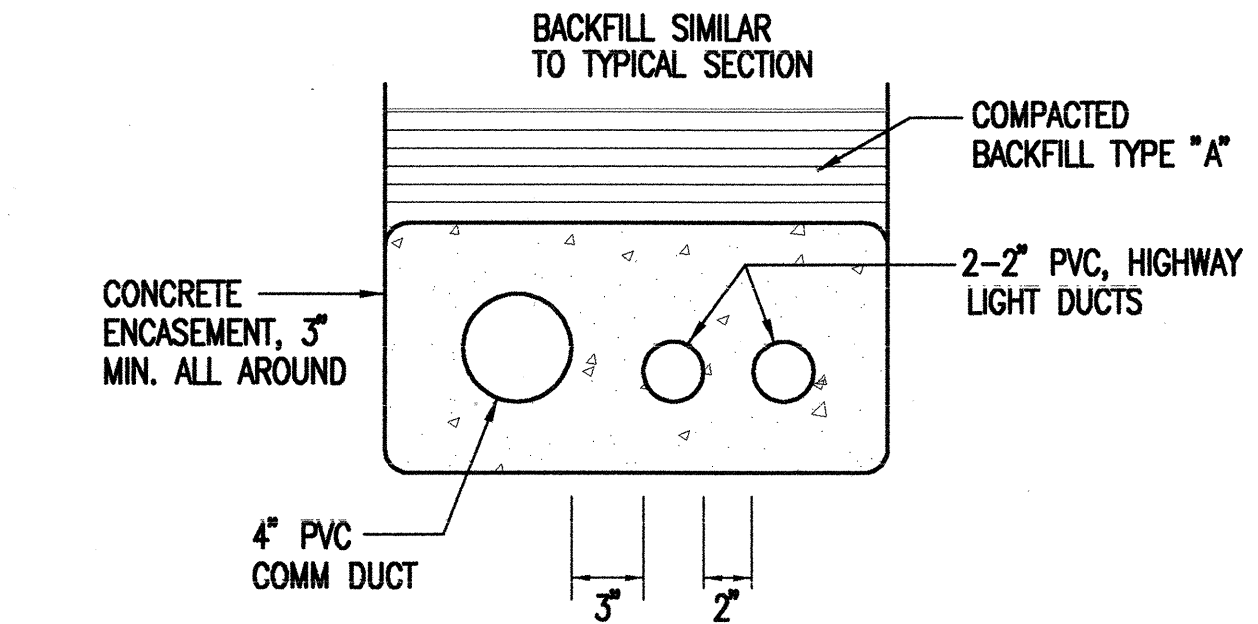
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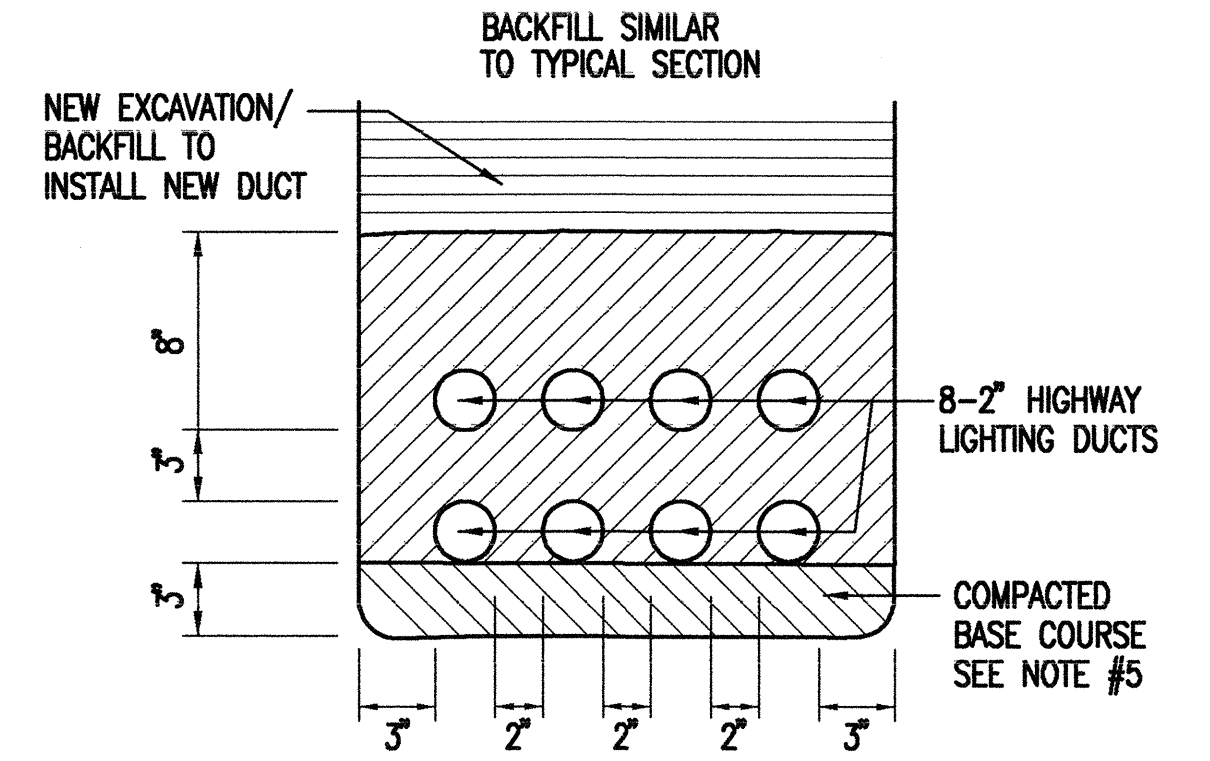
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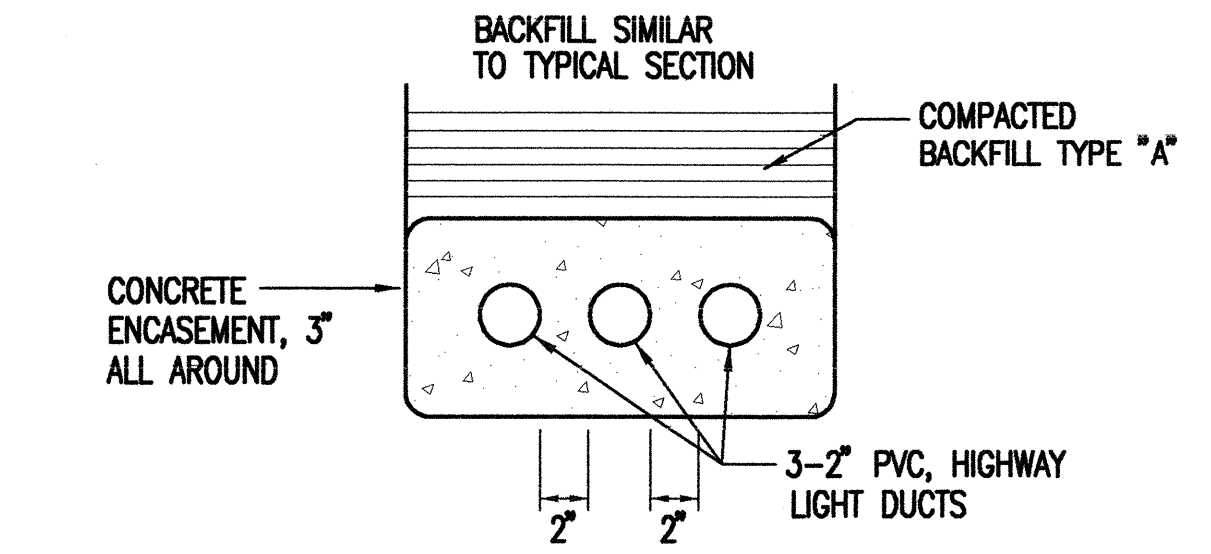
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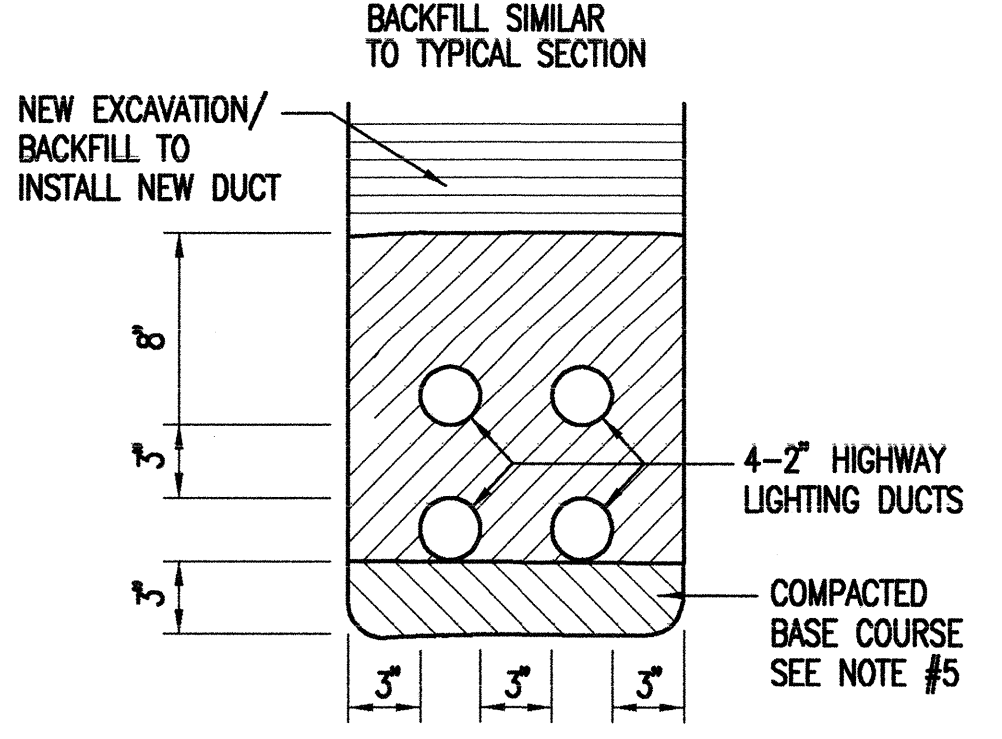
SECTION R



SECTION V



SECTION S



SECTION W

9/13/99	REVISED DUCT SECTIONS P, Q, R, S, T, V, W.
DATE	REVISION

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

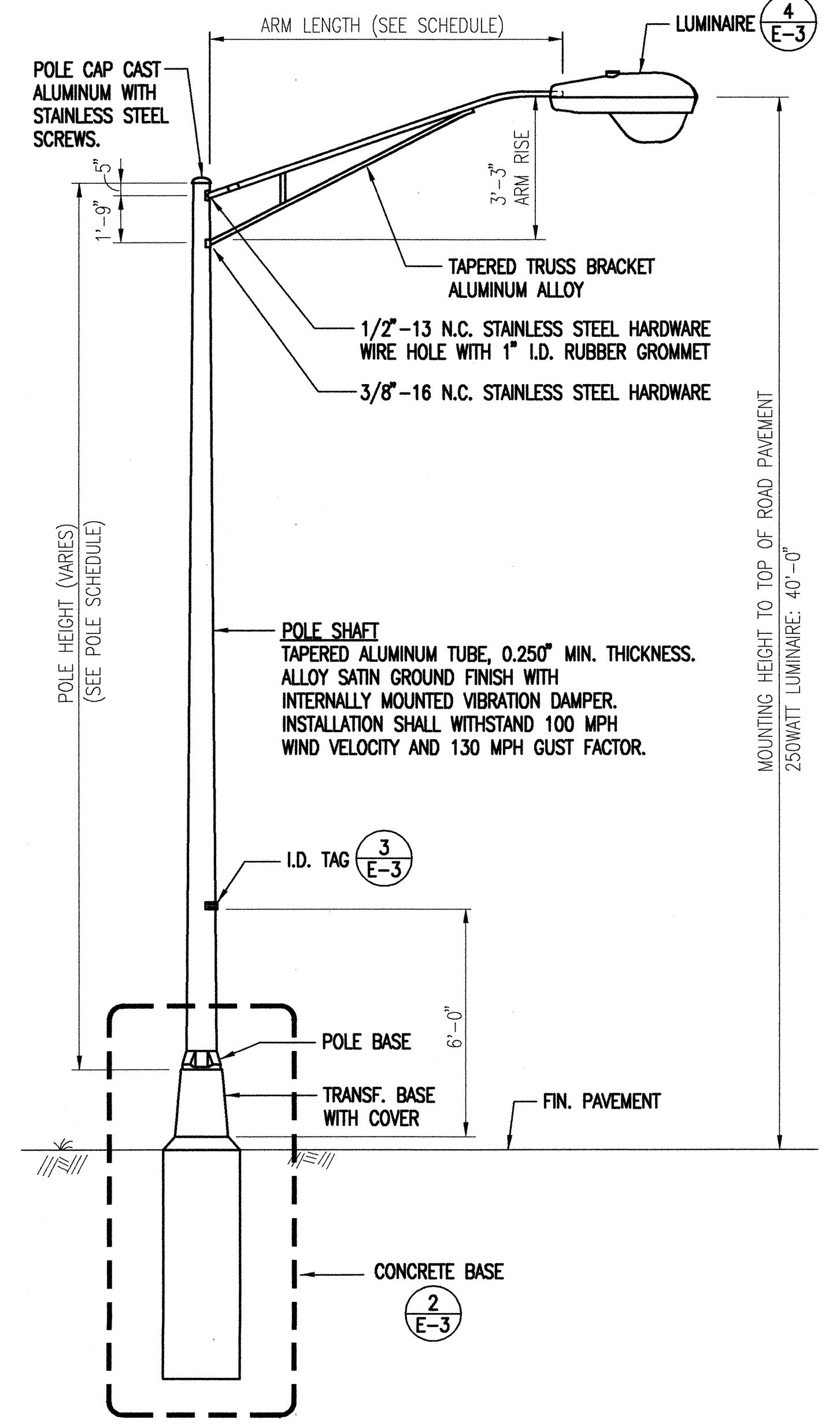
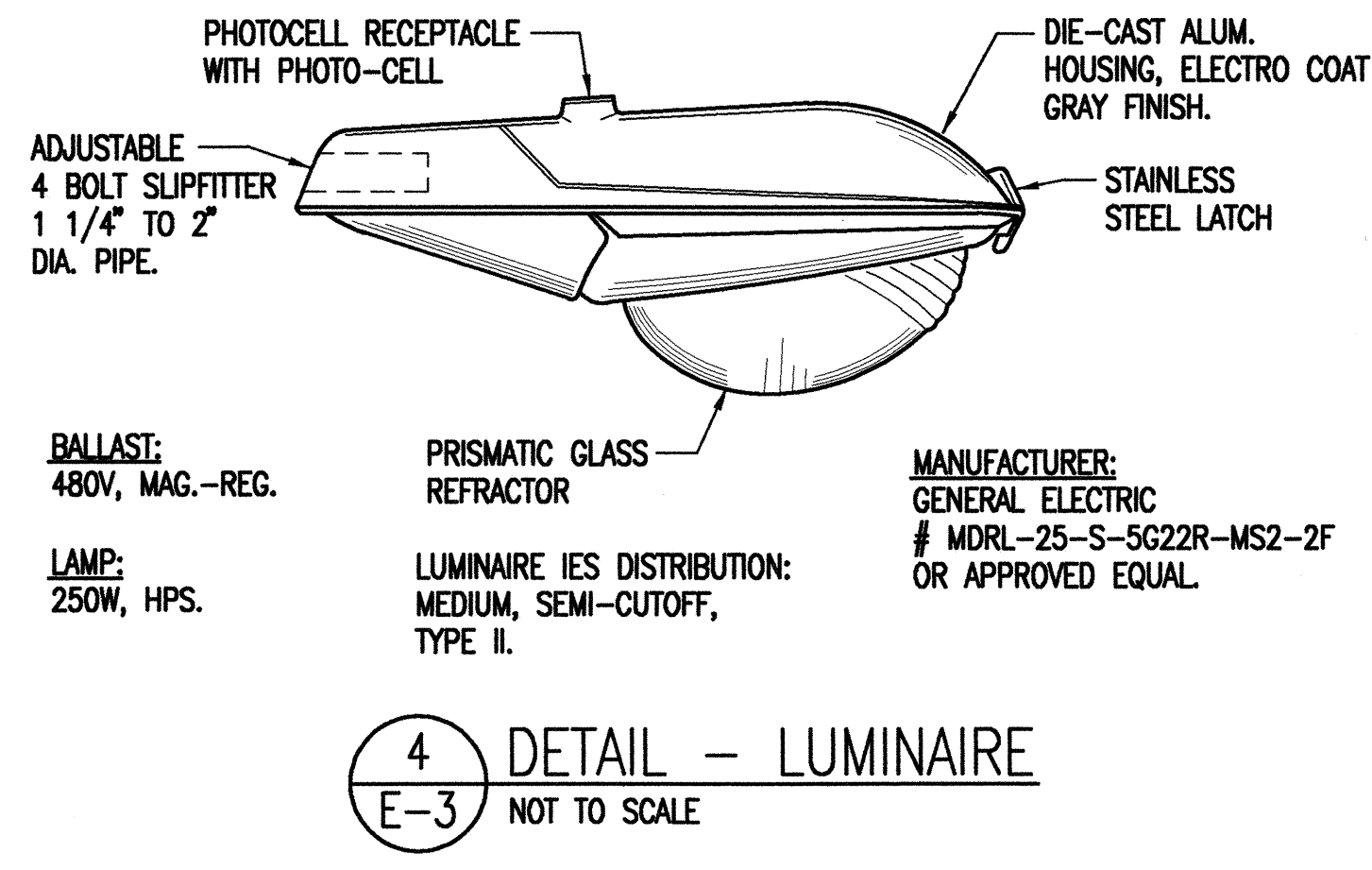
**TYPICAL DUCT SECTIONS**

INTERSTATE ROUTE H-2  
INSTALLATION OF HIGHWAY LIGHTING  
LEILEHUA INTERCHANGE TO WAIAWA INTERCHANGE  
F.A. PROJECT NO. IM-H2-1(30)

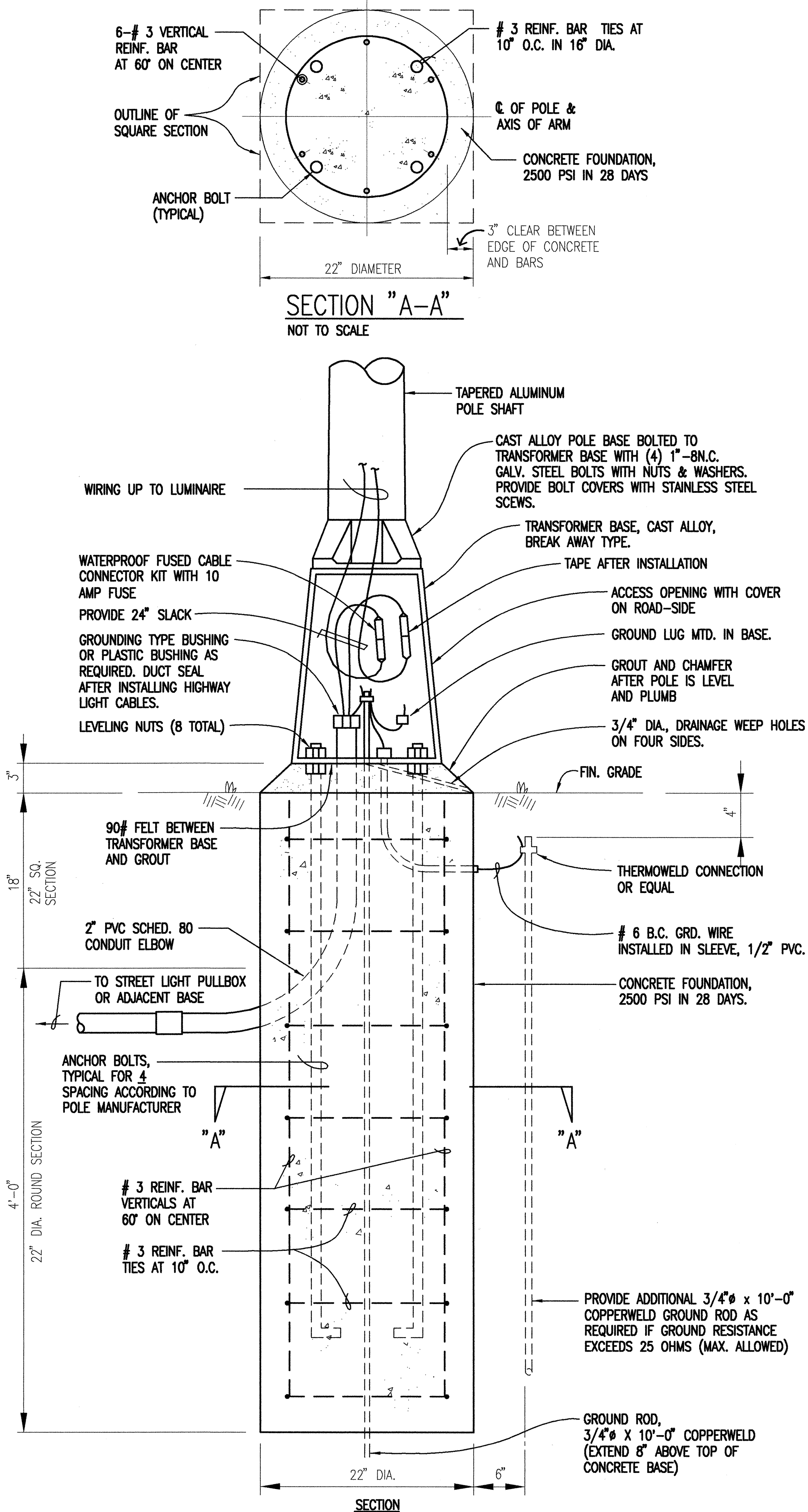
SCALE: AS SHOWN      DATE: AUGUST 1999

SHEET No. 2 OF 52 SHEETS



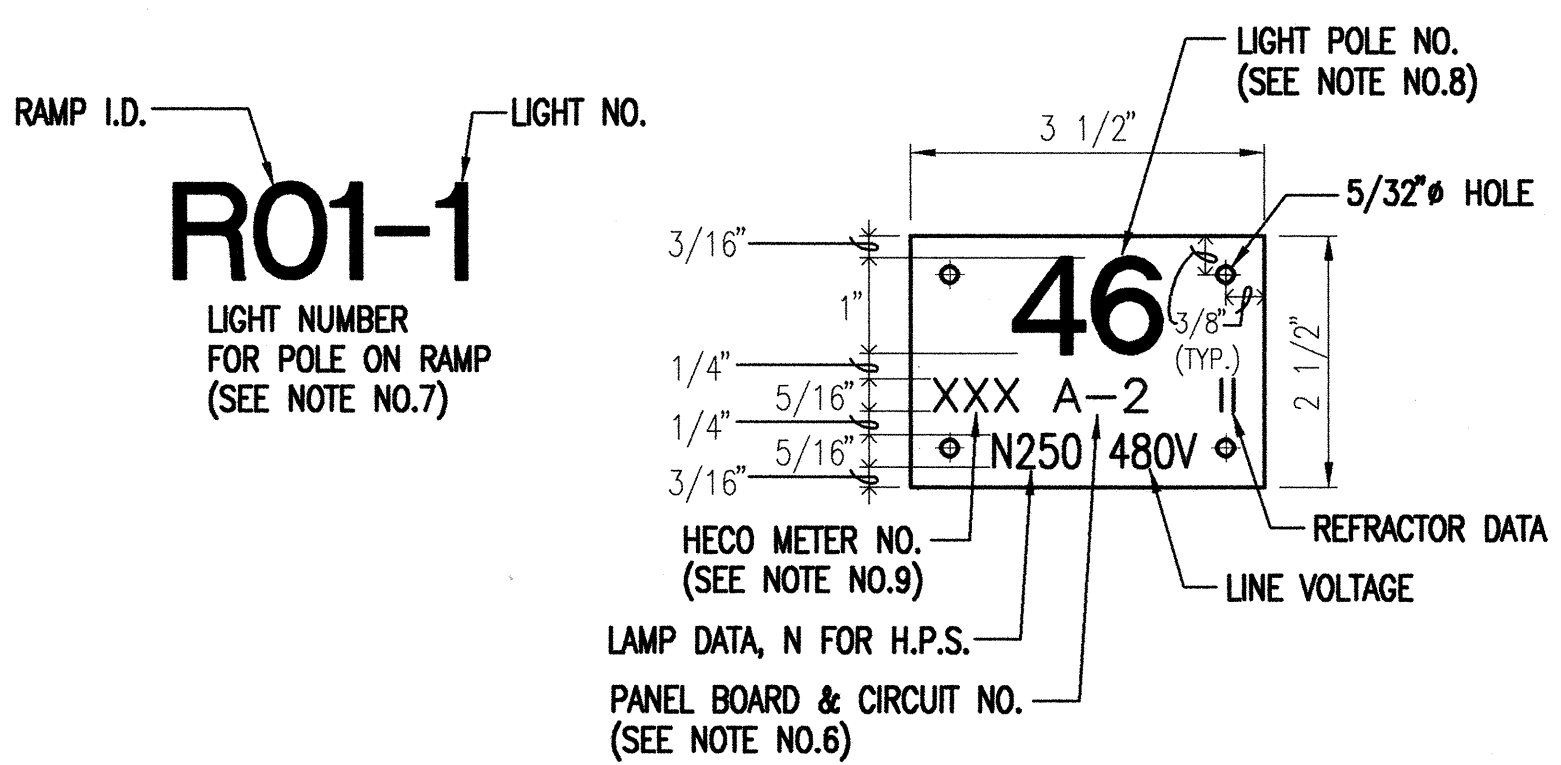


1  
E-3  
DETAIL - HIGHWAY LIGHT STANDARD  
NOT TO SCALE

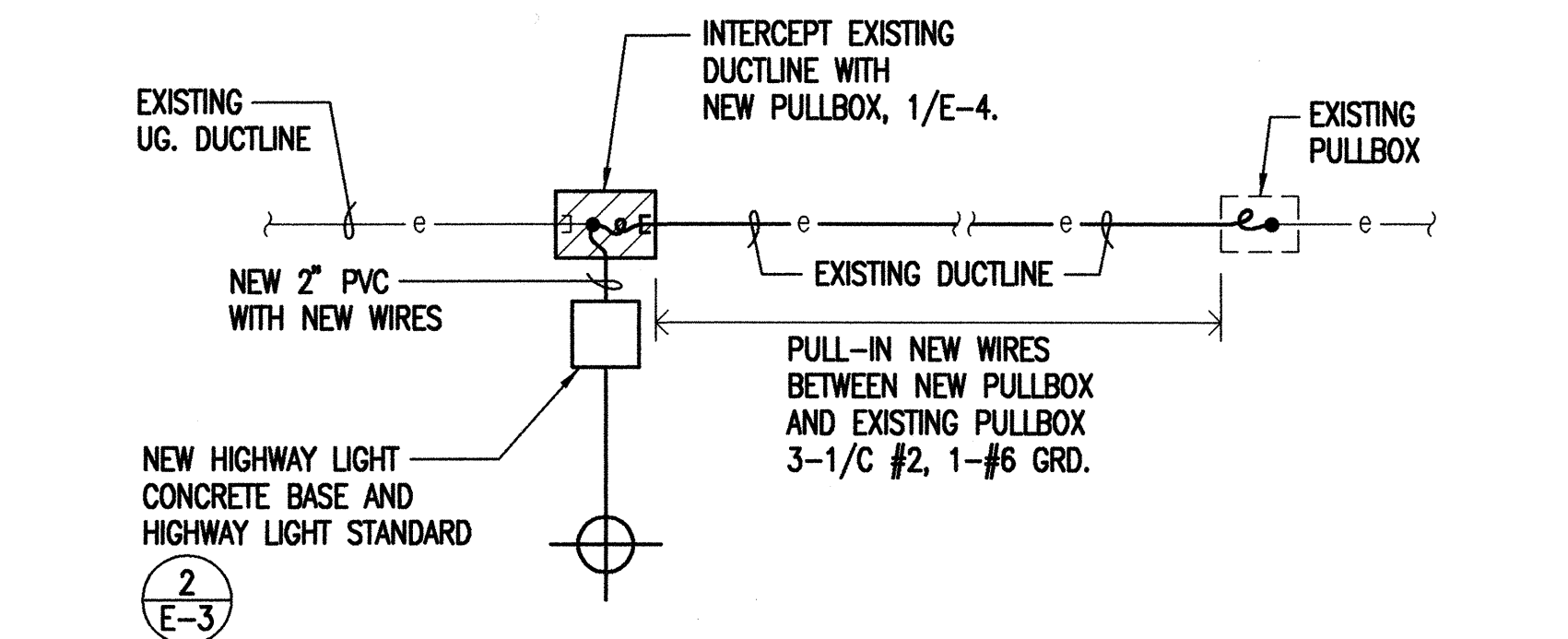


2  
E-3  
DETAIL - CONCRETE BASE  
NOT TO SCALE

- NOTES:
1. USE 3-PLY LAMINATED FLEXIBLE PLASTIC BLACK-WHITE-BLACK THICKNESS BLACK CAP SHEET-0.010", WHITE BASE SHEET-0.052", BLACK BASE SHEET-0.010".
  2. LIGHT POLE NUMBER SIZE SHALL BE 1" HIGH AND ENGRAVED 1/8" WIDE, WHITE IN COLOR (NUMBER AS REQUIRED).
  3. NOMENCLATURE SIZE SHALL BE 5/16" HIGH AND ENGRAVED 1/32" WIDE, WHITE IN COLOR (HECO VAULT NUMBER PANEL BOARD AND CIRCUIT NUMBER, LINE VOLTAGE, LAMP DATA, AND REFRACTOR DATA AS REQUIRED).
  4. ATTACH TO ALUMINUM AND STEEL POST WITH NO.8 STAINLESS STEEL, 1/2" LONG DRIVE SCREWS IN 1/8" DRILL HOLE. ATTACH TO WOOD POLES WITH 4D ALUMINUM NAILS.
  5. NUMBERS ARE INSCRIBED BY CUTTING THROUGH "BLACK CAP SHEET" TO EXPOSE "WHITE LETTERS."
  6. NOMENCLATURE REQUIRED FOR SYSTEMS WITH TWO OR MORE CIRCUITS (LETTER INDICATES PANEL BOARD, NUMBER INDICATES CIRCUITS).
  7. FOR LIGHT POLES INSTALLED ON RAMP, ASSIGN NUMBERS TO INCLUDE RAMP I.D. AND LIGHT NUMBER. LEGEND MAY BE LESS THAN ONE (1) INCH IN HEIGHT.
  8. LIGHT NUMBER SHALL BE OBTAINED FROM THE STATE. USE AN ALPHABET SUFFIX TO DESIGNATE LIGHTS MOUNTED ON THE SAME POLE (e.g. 123A & 123B).
  9. FOR NON-METERED SYSTEM, LEAVE THIS SPACE BLANK.

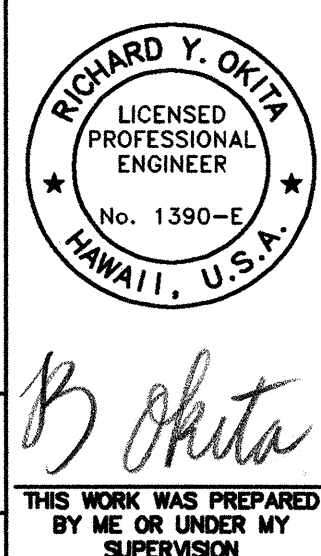


3  
E-3  
HIGHWAY LIGHT POLE TAG DETAIL  
METERED SYSTEM  
NOT TO SCALE



5  
E-3  
CONNECTION DIAGRAM (PULLBOX/EXISTING DUCTLINE)

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-H2-1(30)	2000	15	64



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**TYPICAL HIGHWAY LIGHT STANDARD DETAILS**

INTERSTATE ROUTE H-2  
INSTALLATION OF HIGHWAY LIGHTING  
LEILEHUA INTERCHANGE TO WAIAWA INTERCHANGE  
F.A. PROJECT NO. IM-H2-1(30)

SCALE: AS SHOWN      DATE: AUGUST 1999

SHEET No. 3 OF 52 SHEETS

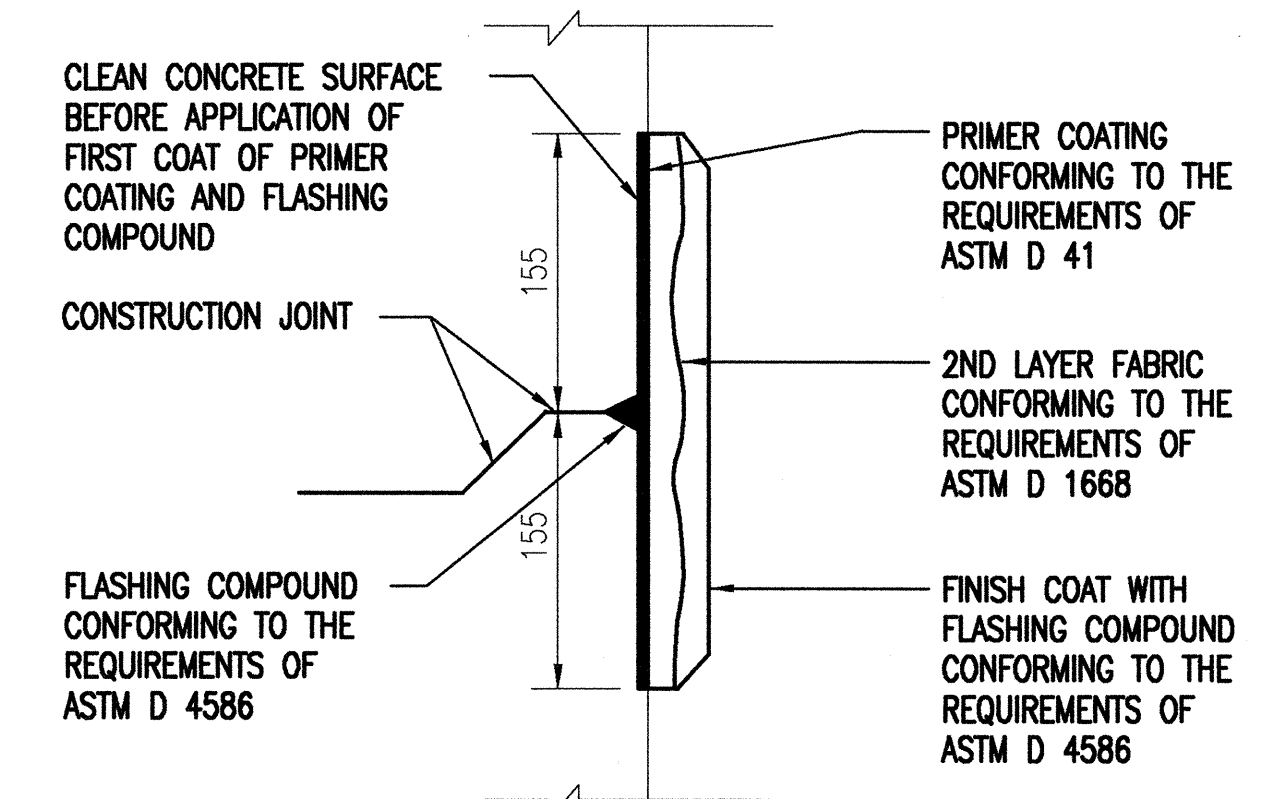
DATE	REVISION
9/13/99	REVISED POLE SHAFT DESCRIPTION, ADDED DETAIL 5/E-3, REVISED DETAIL 4/E-3.



FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-H2-1(30)	2000	16	64

#### GENERAL NOTES:

1. PROVIDE A MINIMUM OF ONE 16# x 2.5M COPPERWELD GROUND ROD IN EACH PULLBOX. WHEN DIRECTED BY THE TRAFFIC SIGNAL INSPECTOR/ENGINEER, INSTALL ADDITIONAL GROUND RODS. COST OF GROUND RODS SHALL BE INCIDENTAL TO THE PULLBOXES.
2. ALL PRE-CAST CONCRETE PULLBOXES SHALL BE MANUFACTURED IN TWO PIECES.
3. THE PULLBOX WITH COVER SHALL BE CAPABLE OF SUPPORTING AN MS 18 LOADING.
4. THE MAXIMUM WEIGHT OF THE PULLBOX COVER SHALL NOT EXCEED 27 KILOGRAMS.
5. THE OPENINGS FOR THE CONDUIT ON ALL PULLBOXES SHALL BE PRE-CAST CONCRETE KNOCKOUTS.
6. AFTER INSTALLING THE CONDUITS IN THE OPENINGS OF THE PULLBOXES, THE CONTRACTOR SHALL FILL THE EXCESS OPENING IN THE PRE-CAST KNOCKOUTS WITH CONCRETE MORTAR.
7. PRIOR TO INSTALLING THE PULLBOXES, THE CONTRACTOR SHALL LEVEL THE BOTTOM OF THE TRENCH AND ACHIEVE A MINIMUM OF 95% RELATIVE COMPACTION OF THE BOTTOM OF THE TRENCH.
7. ALL CONCRETE SHALL BE CLASS A (25MPA, MIN.).
9. REBARS SHALL BE GRADE 300 AND ALL LAPPED SPICES SHALL BE 360MM MINIMUM.
10. THE # 57 OR # 67 SIZE AGGREGATE SHALL CONFORM TO LATEST VERSION OF AASHTO M43 (ASTM D 448).
11. TYPE "C" PULLBOX SHALL BE INSTALLED IN A LOCATION PROTECTED FROM VEHICULAR TRAFFIC (I.E. RAISED SIDEWALK, BEHIND A.C. CURBS, TRAFFIC SIGNAL STANDARD OR PIPE GUARDS).

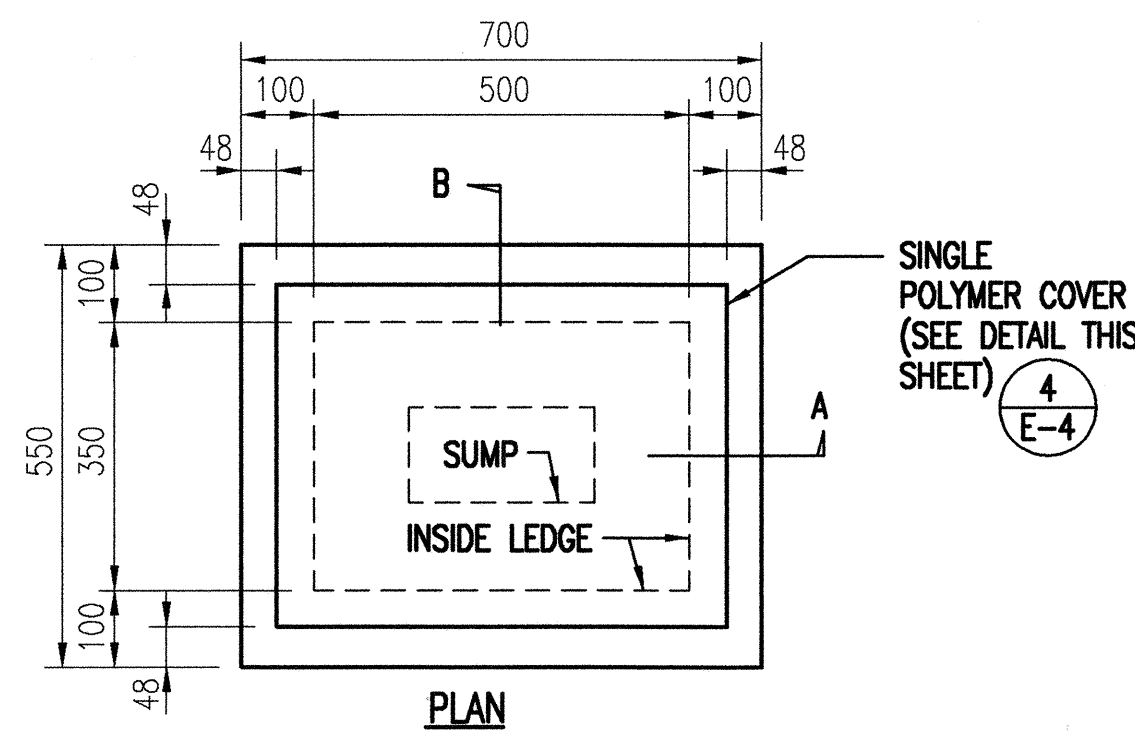


6  
E-4  
TYPICAL FLASHING COMPOUND  
WATERPROOFING DETAILS  
NOT TO SCALE

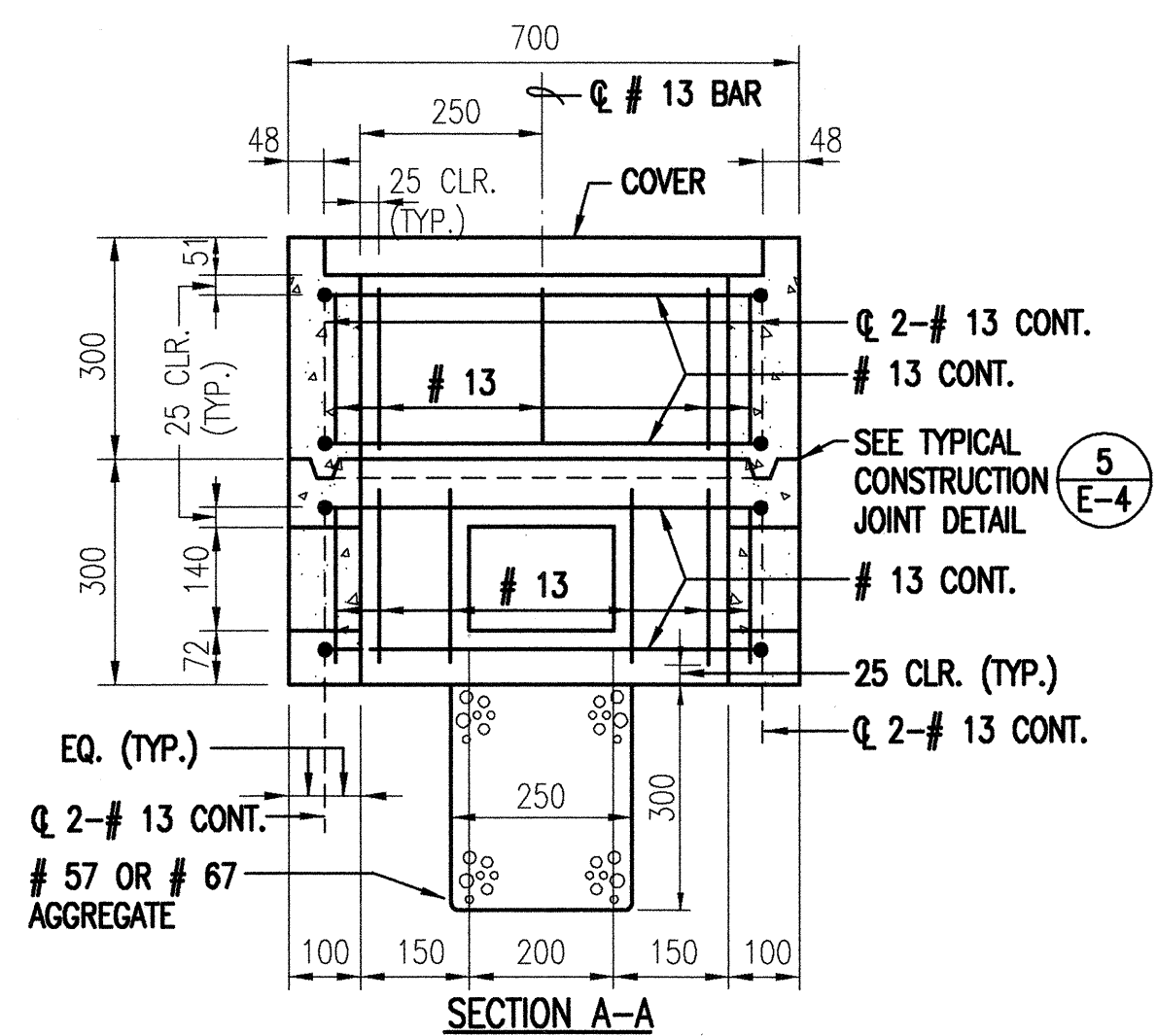
NOTE:  
ALL DIMENSIONS ARE IN MILLIMETERS  
UNLESS OTHERWISE SHOWN.

E-4

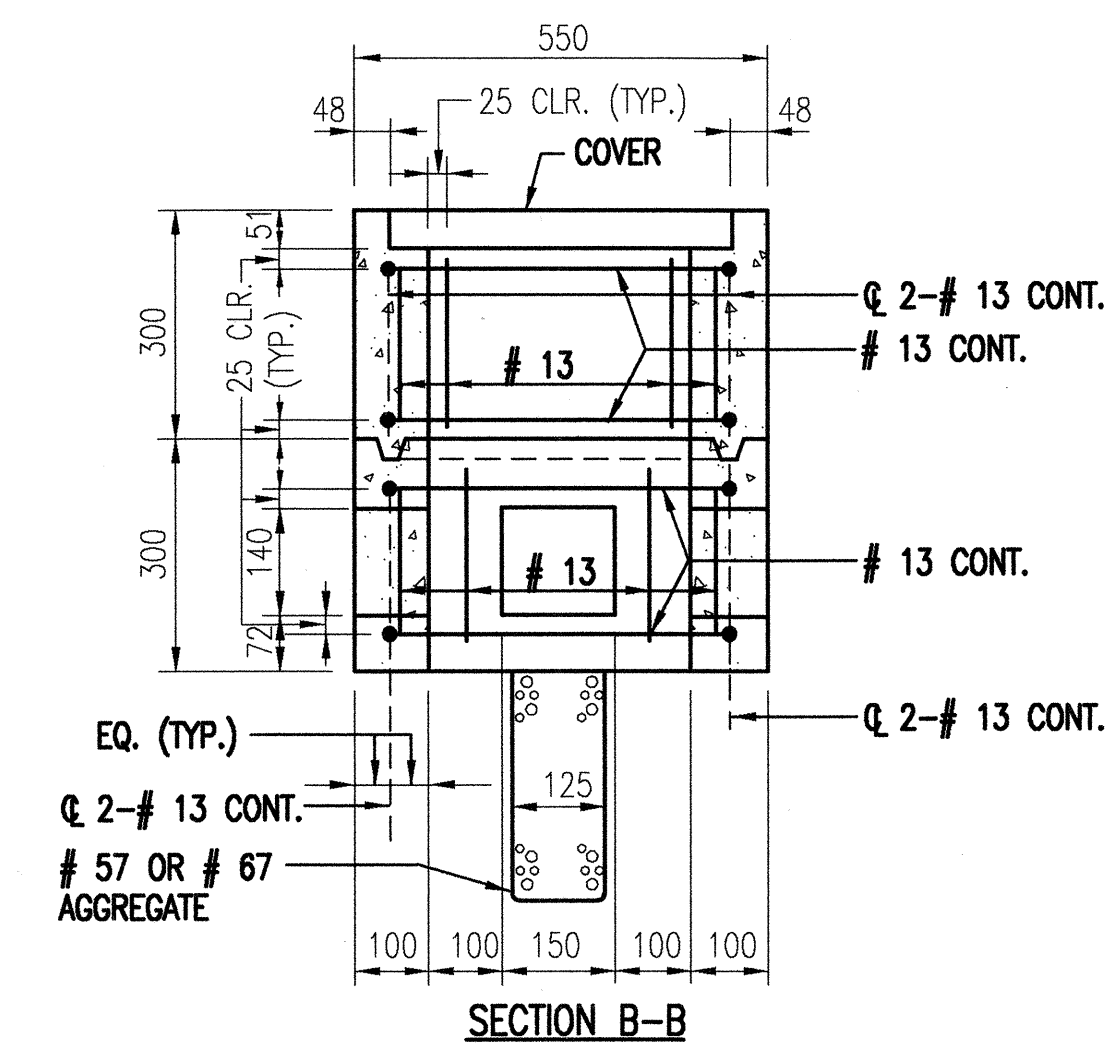
	STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
	PULLBOX AND COVER DETAILS	
	INTERSTATE ROUTE H-2 INSTALLATION OF HIGHWAY LIGHTING LEILEHUA INTERCHANGE TO WAIKAWA INTERCHANGE F.A. PROJECT NO. IM-H2-1(30)	
	SCALE: AS SHOWN	DATE: AUGUST 1999
	SHEET No. 4 OF 52 SHEETS	



PLAN

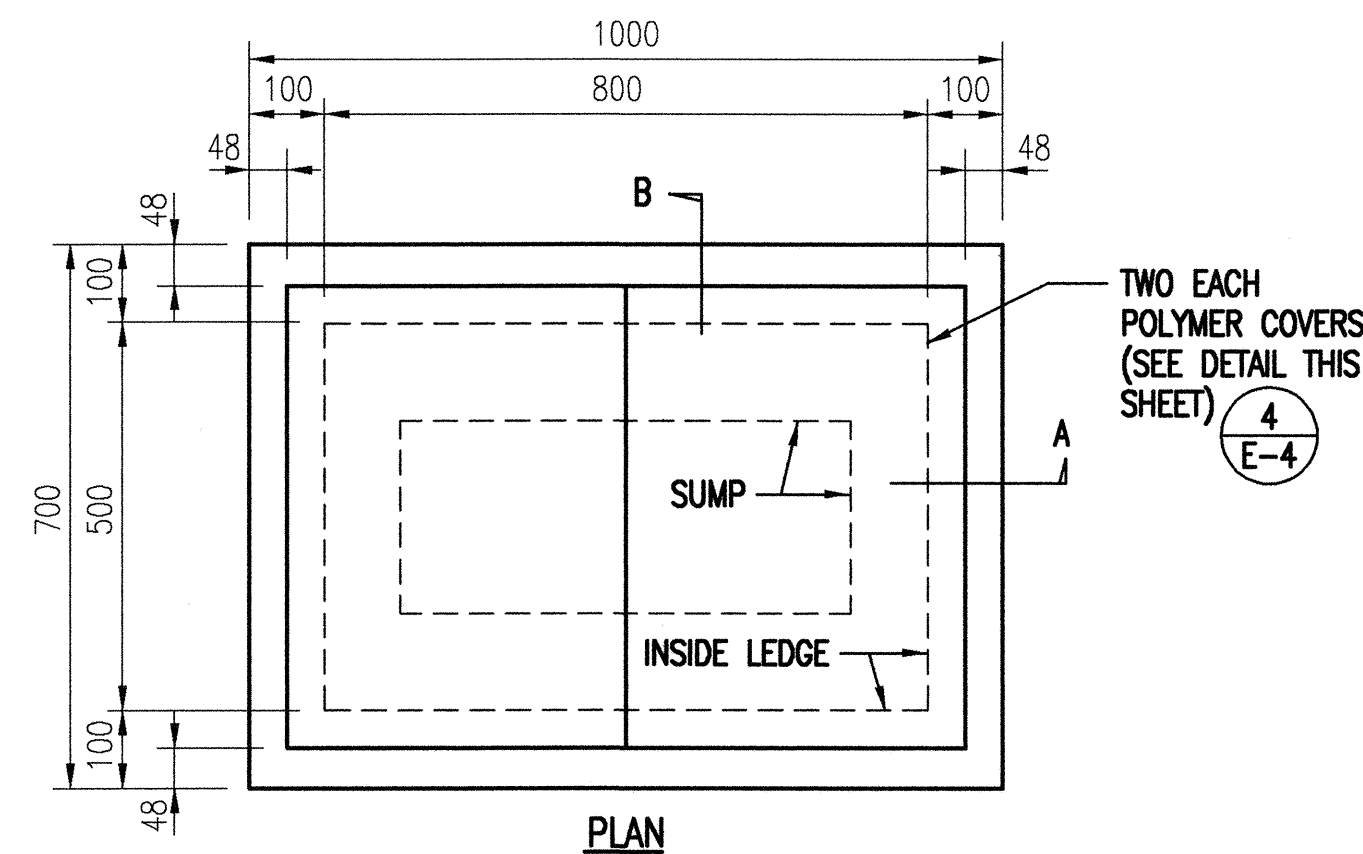


SECTION A-A

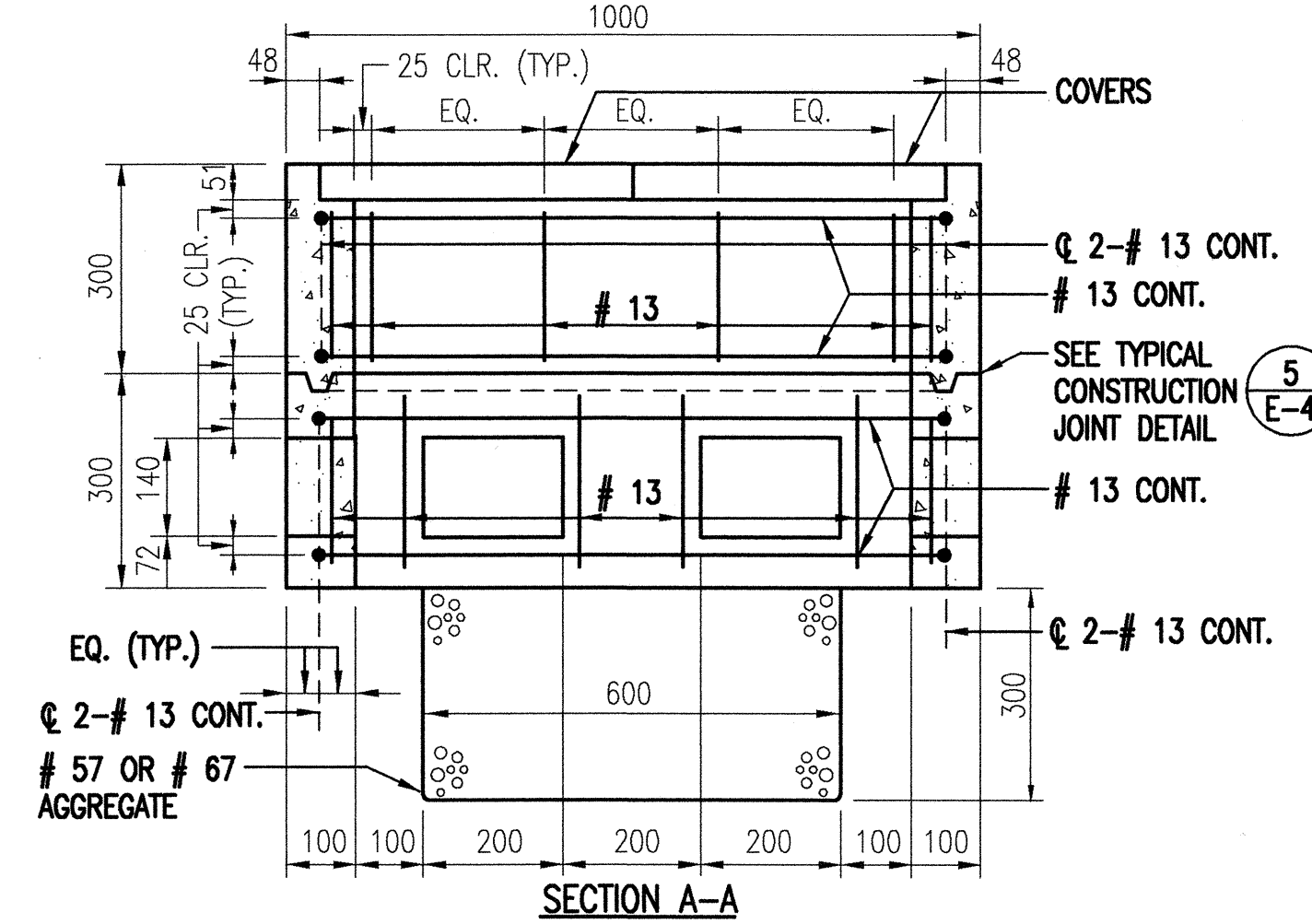


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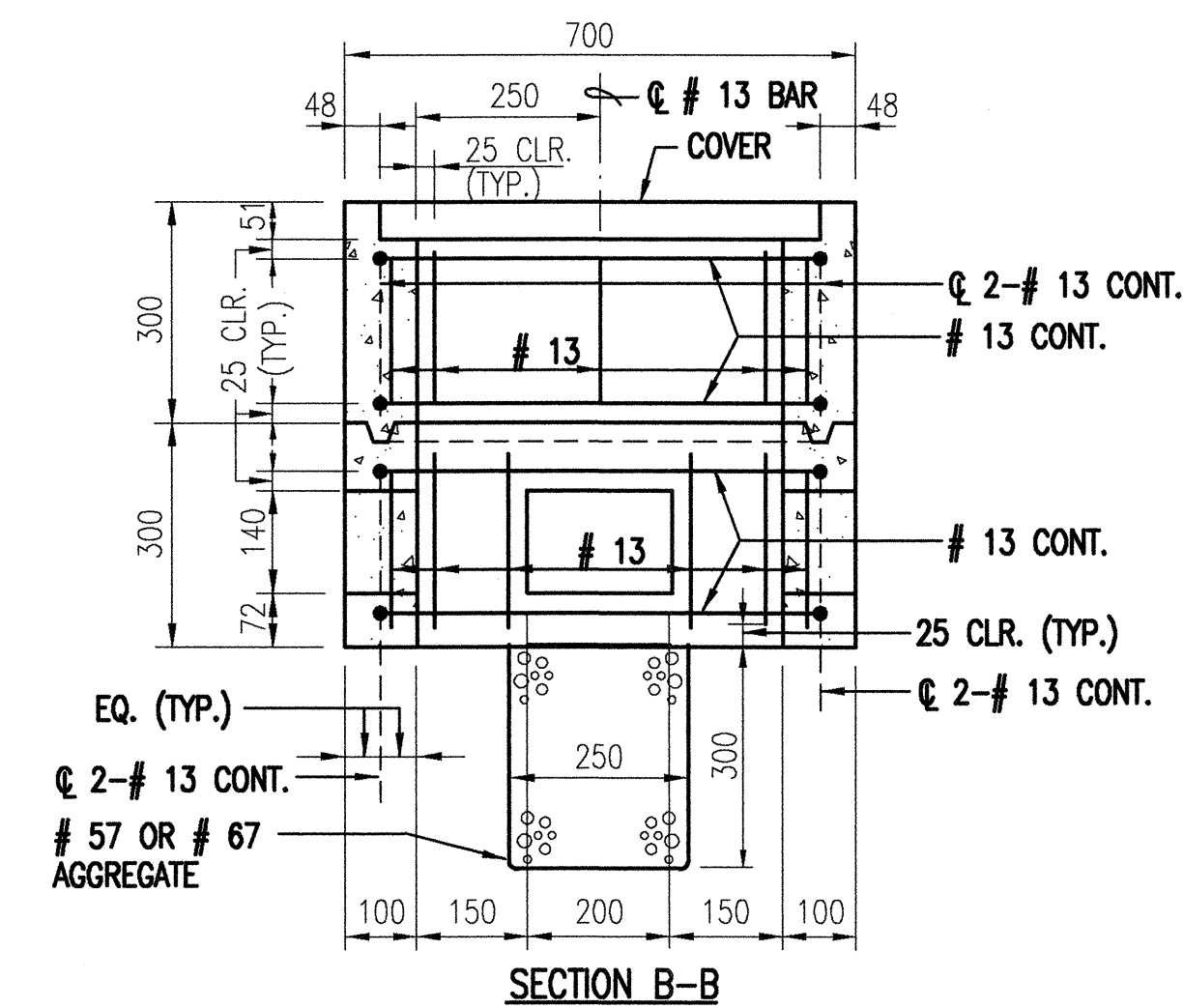
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E-4  
TYPE "A" PULLBOX  
(PREVIOUS TYPE "B")  
SCALE: 1:100



PLAN

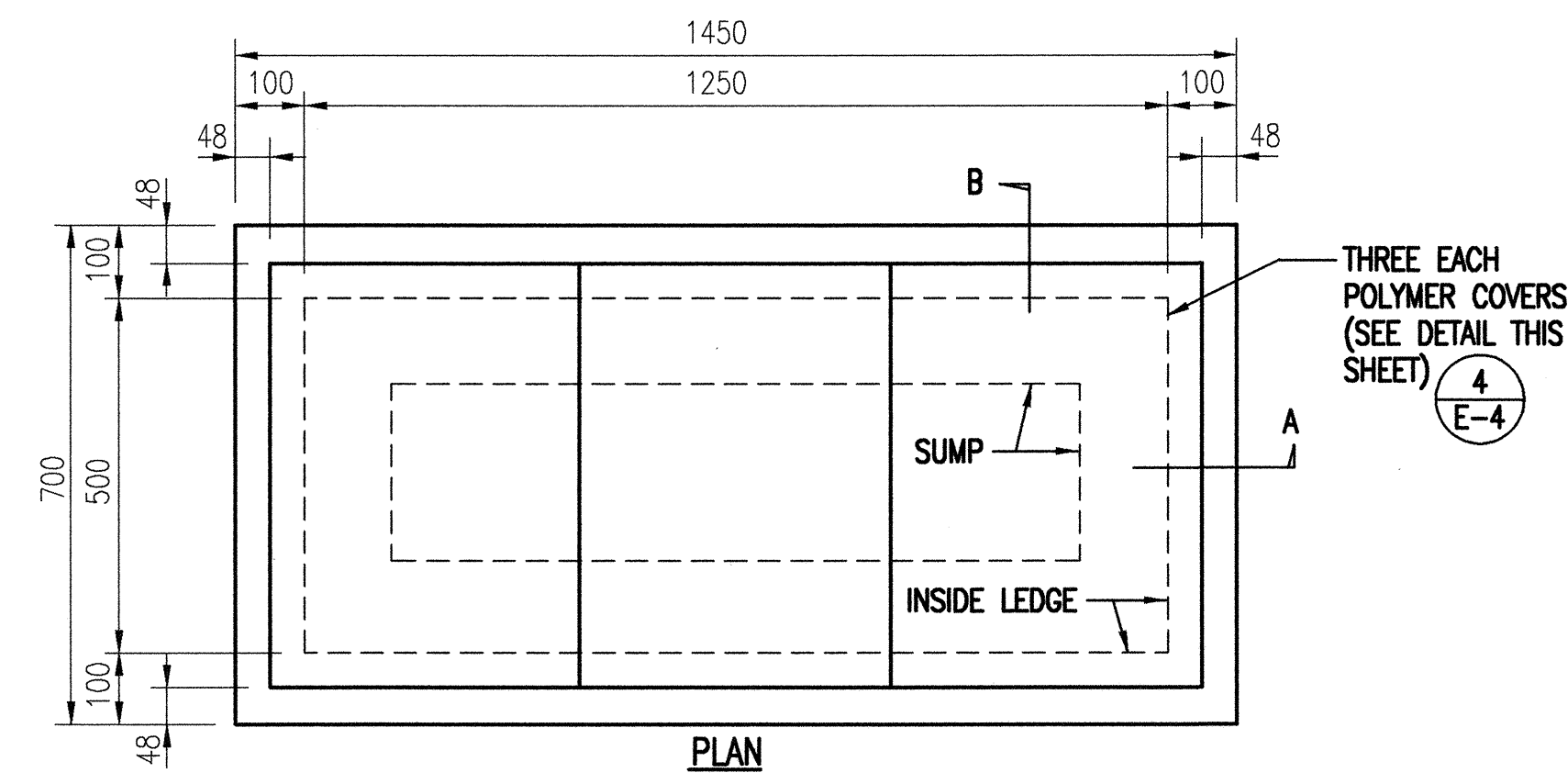


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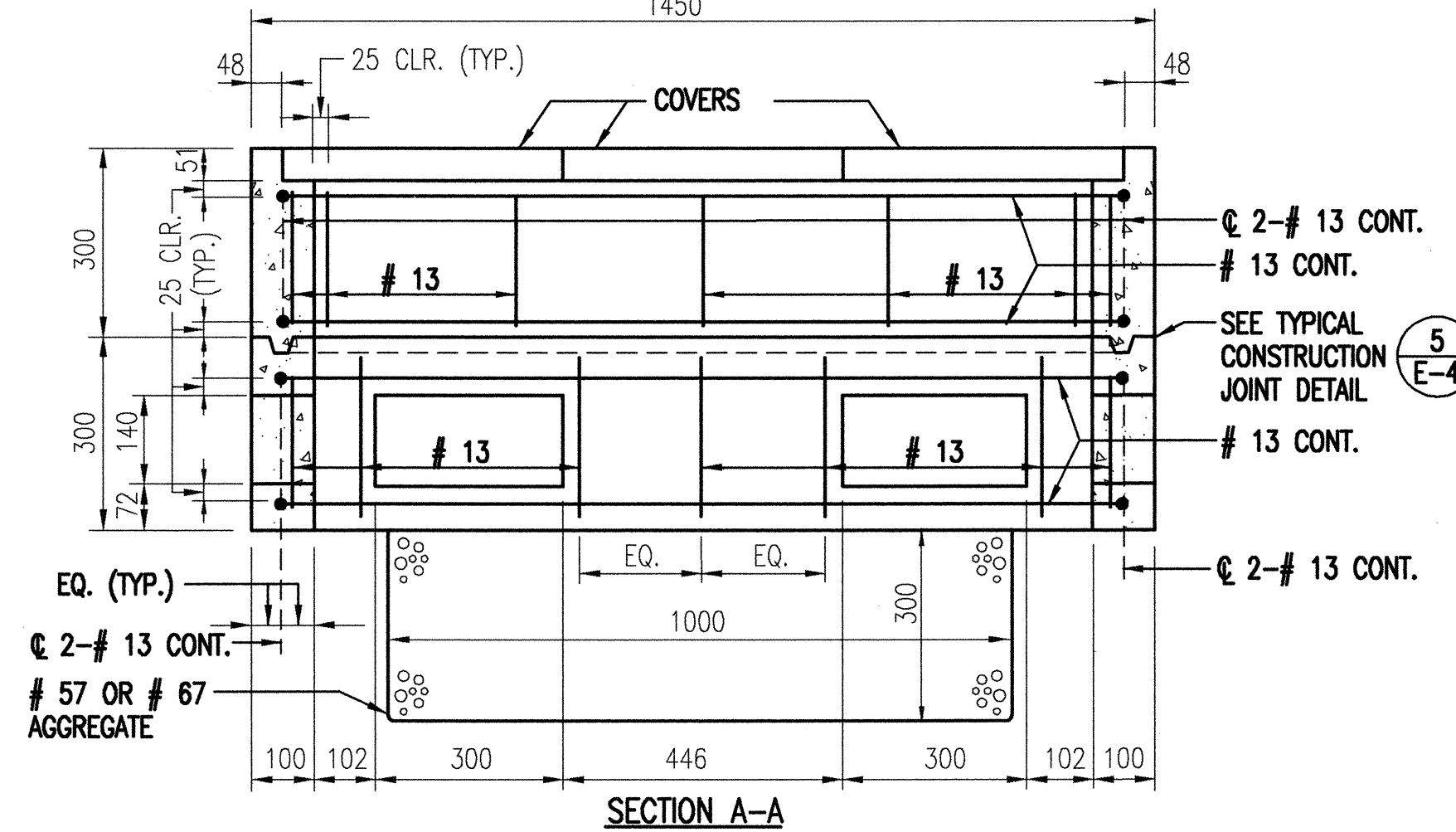


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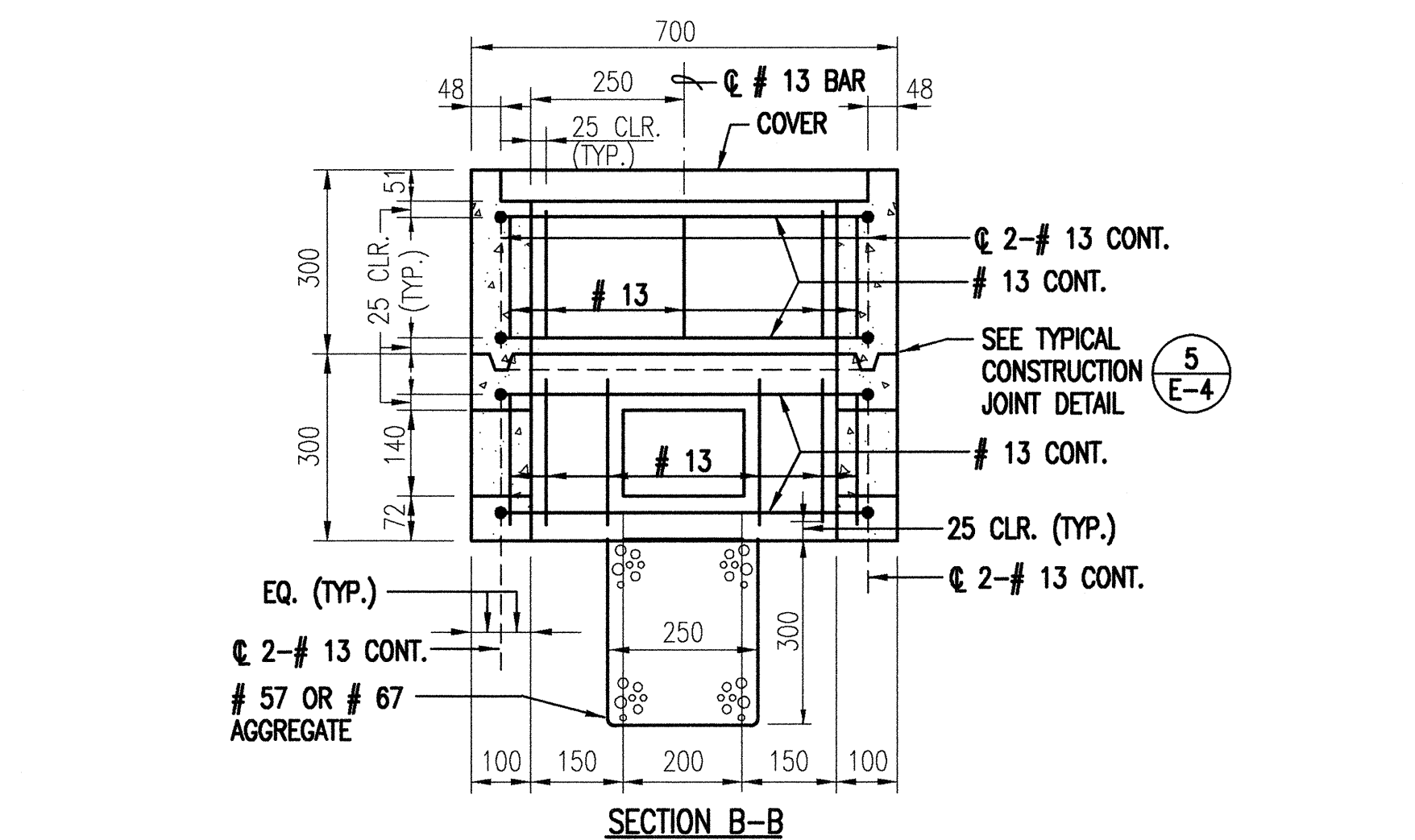
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E-4  
TYPE "B" PULLBOX  
(PREVIOUS TYPE "C")  
SCALE: 1:100



PLAN

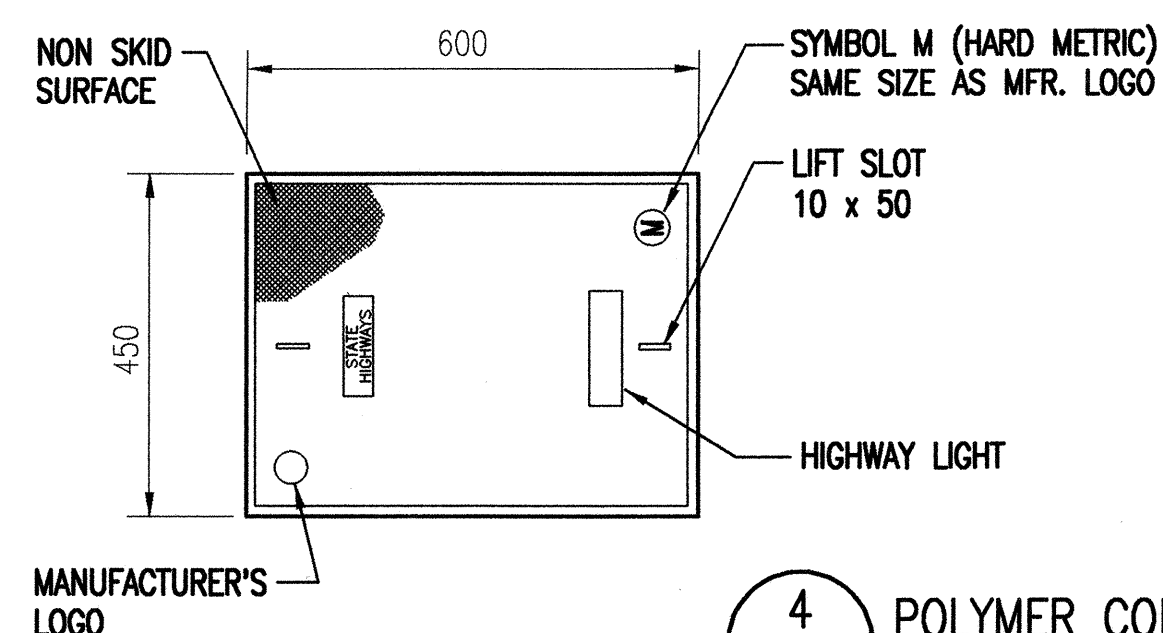


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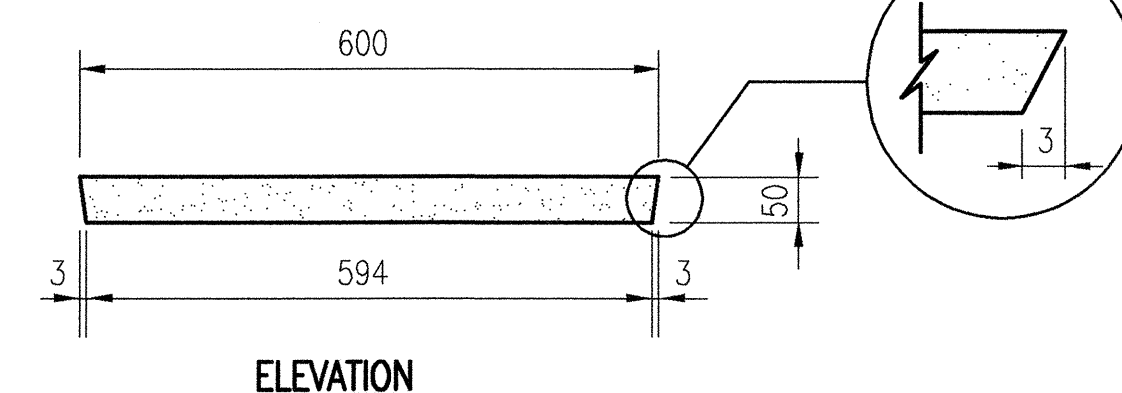


SECTION B-B

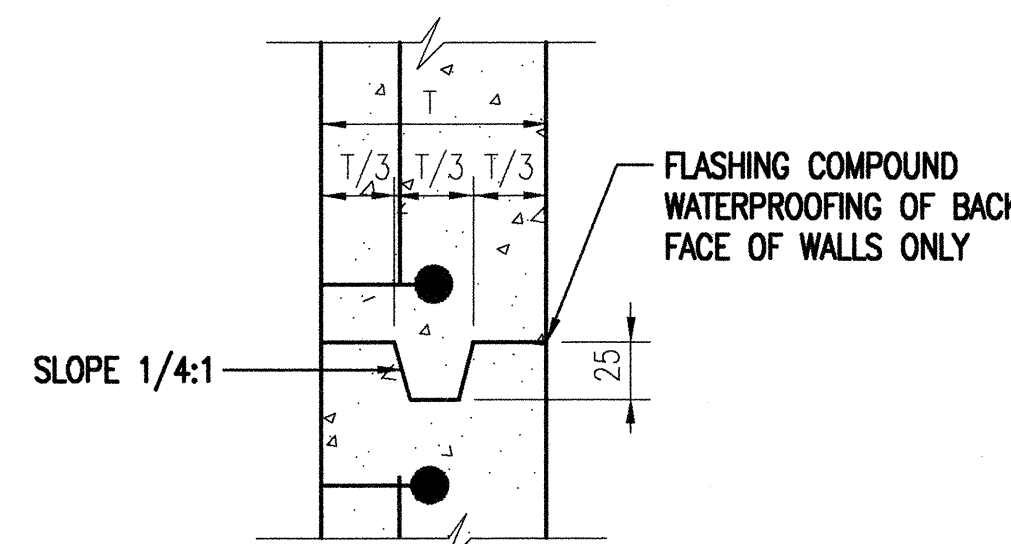
3  
E-4  
TYPE "C" PULLBOX  
(PREVIOUS TYPE "D")  
SCALE: 1:100



4  
E-4  
POLYMER CONCRETE COVER  
NOT TO SCALE

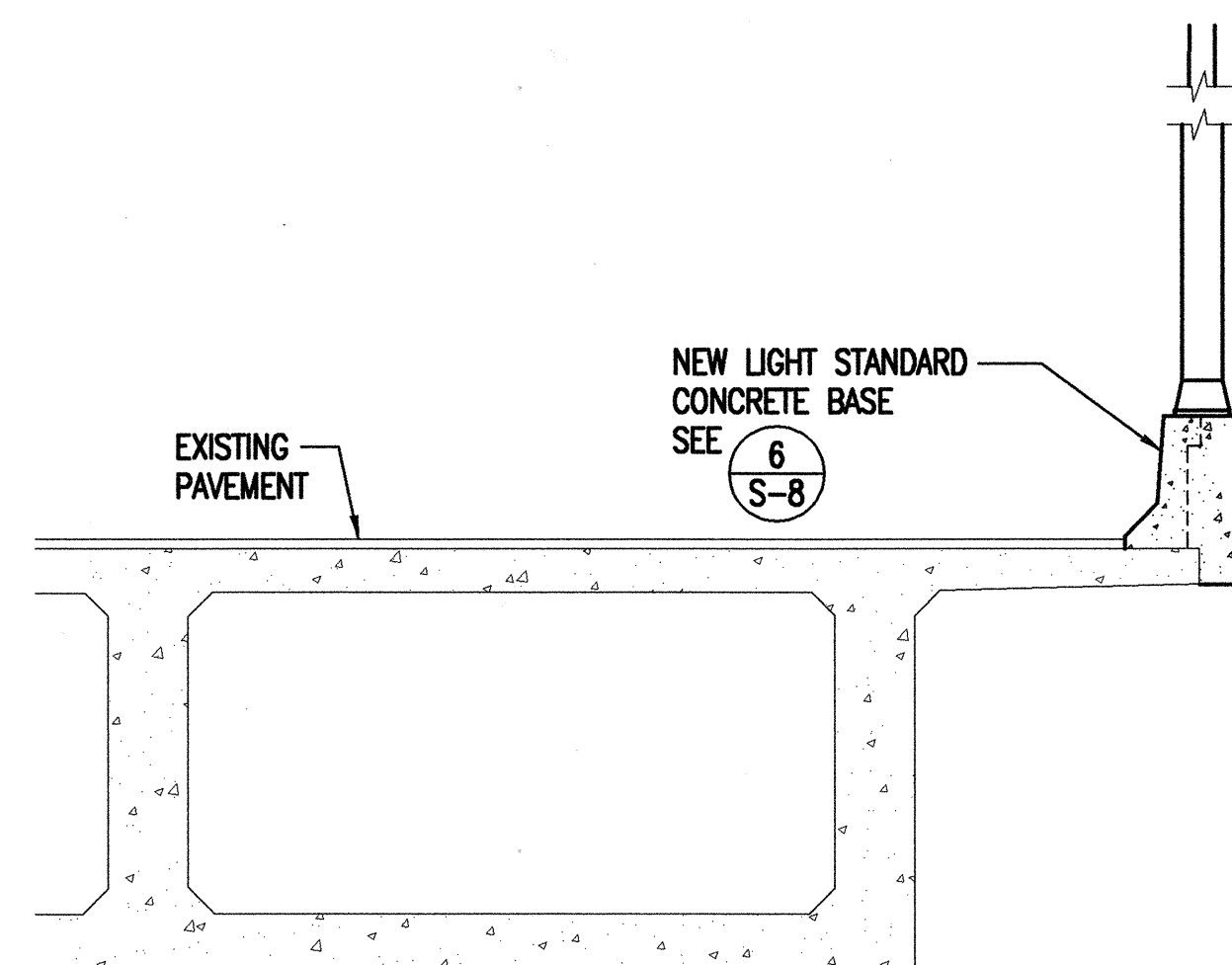


ELEVATION

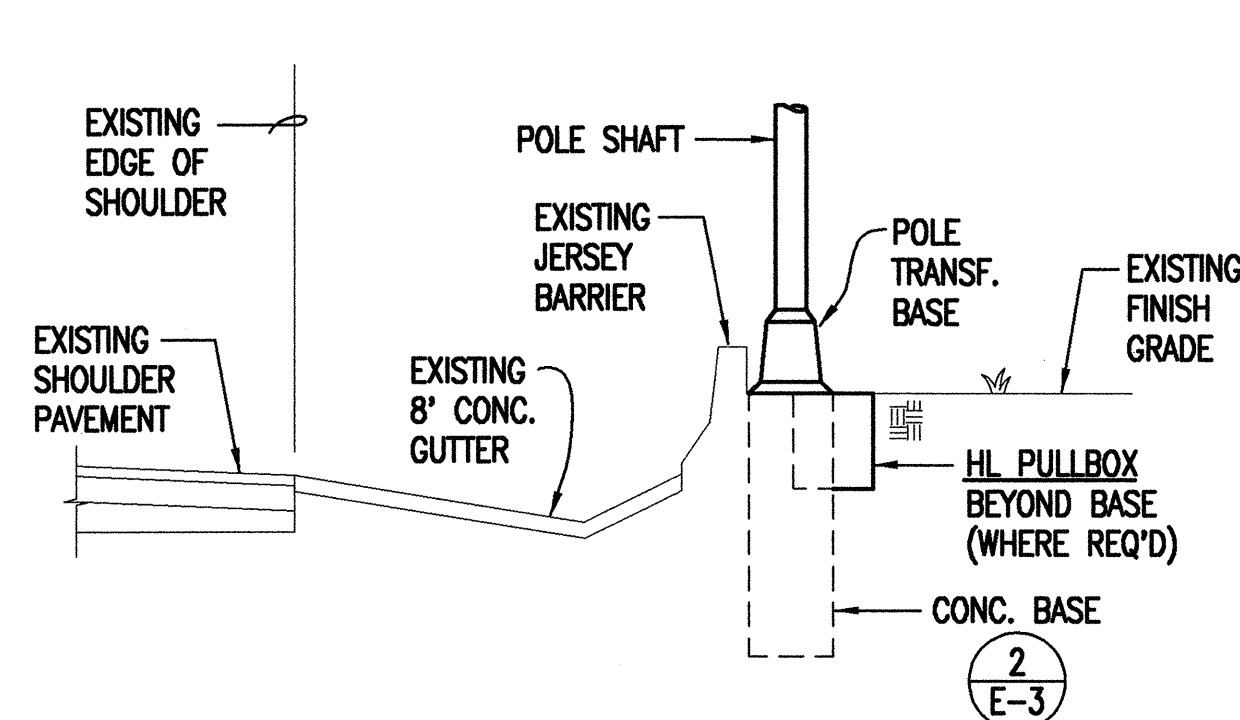


5  
E-4  
TYPICAL CONSTRUCTION  
JOINT DETAIL  
NOT TO SCALE

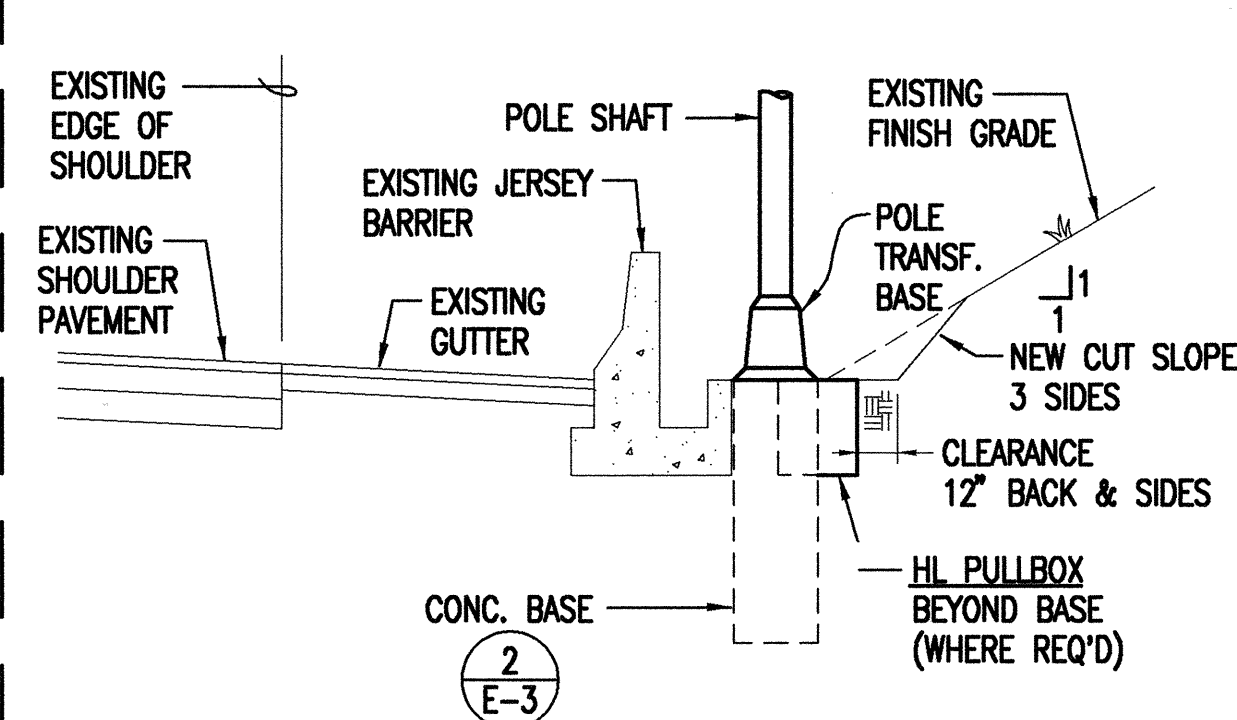
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HAWAII	HAW.	IM-H2-1(30)	2000	17	64



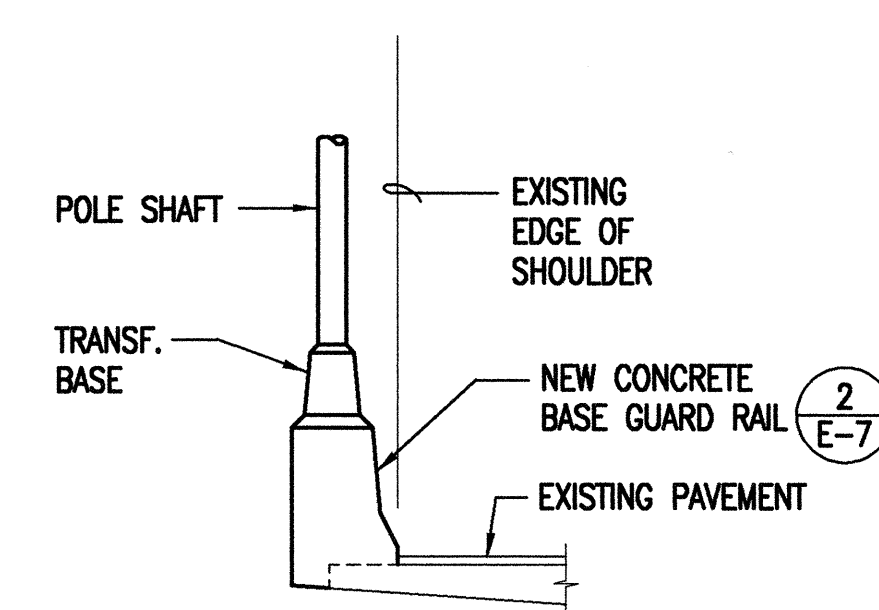
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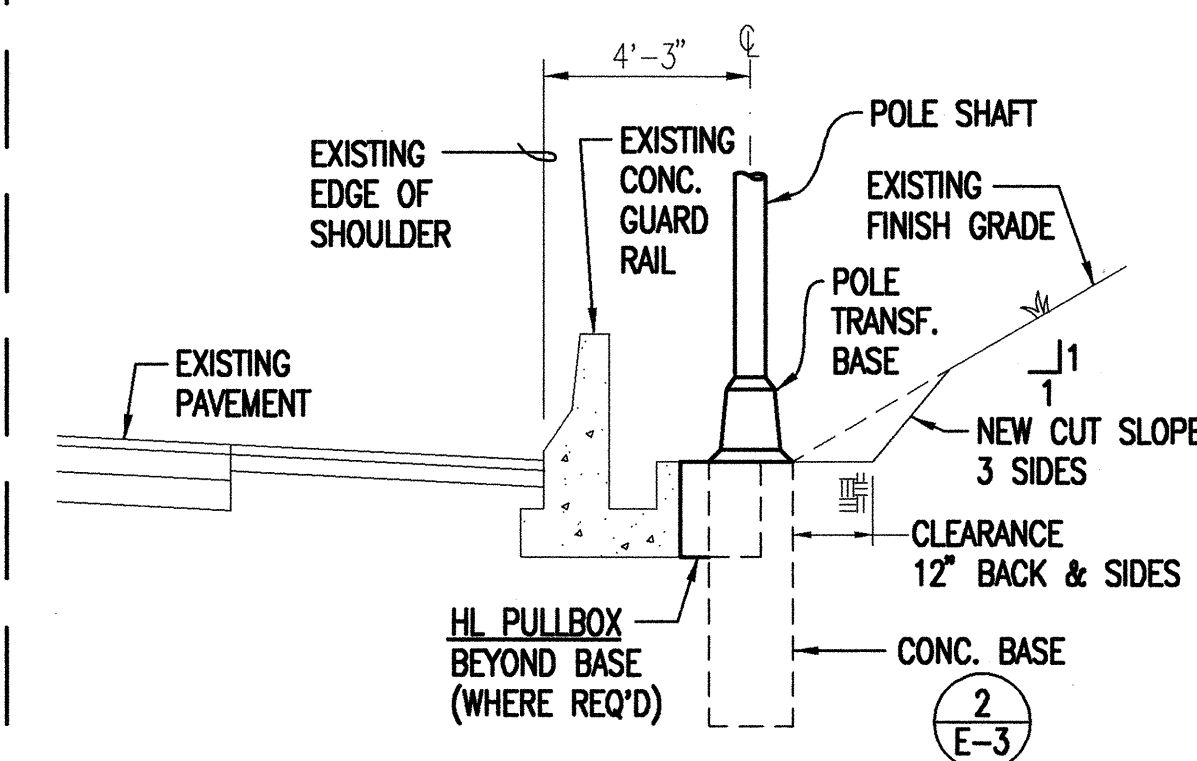
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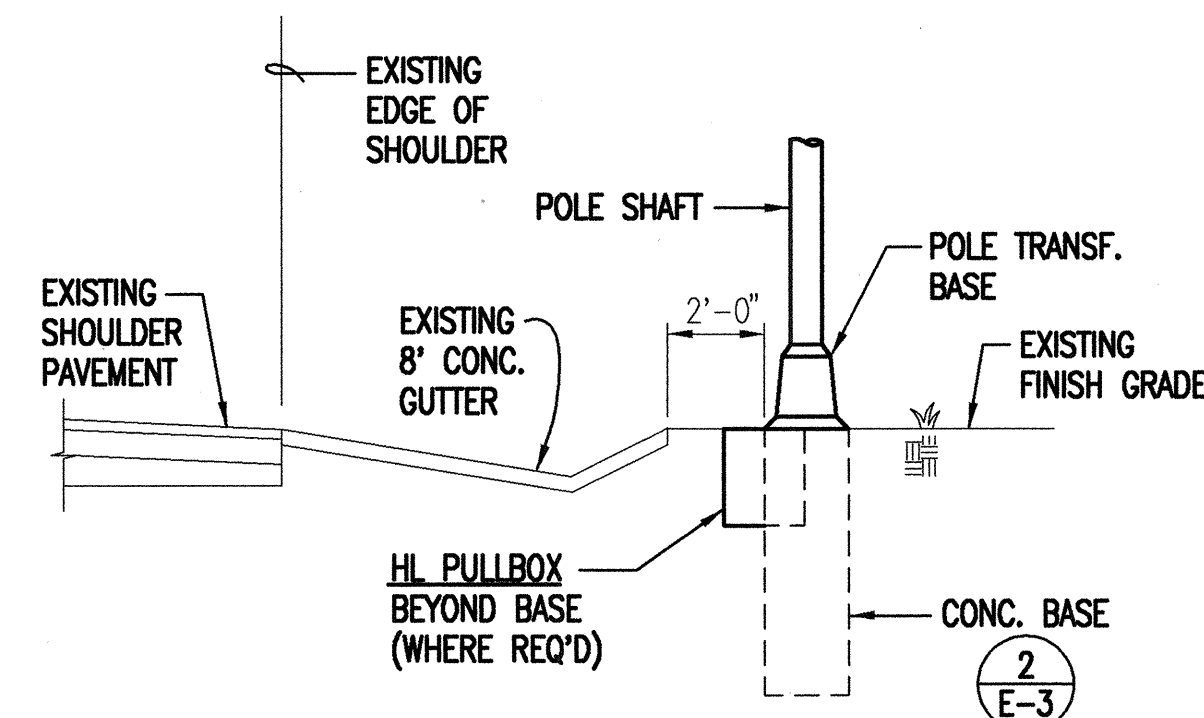
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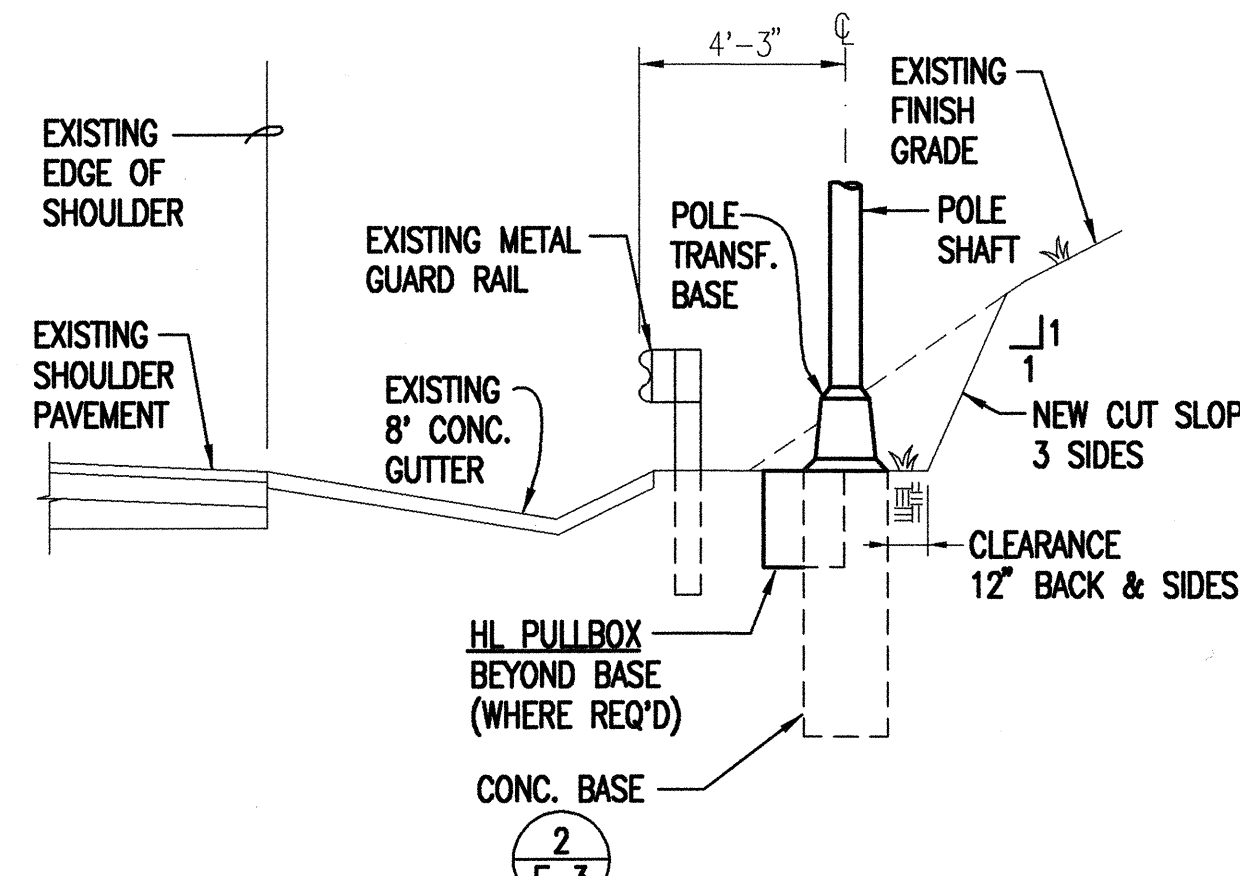
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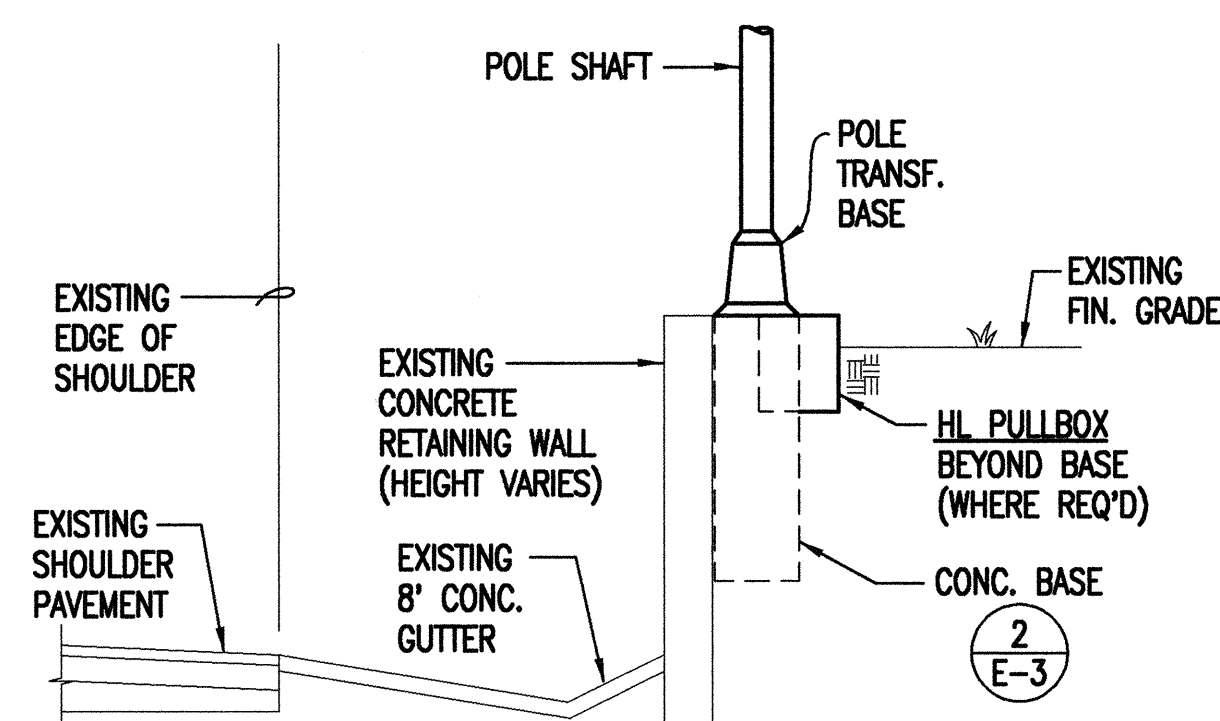
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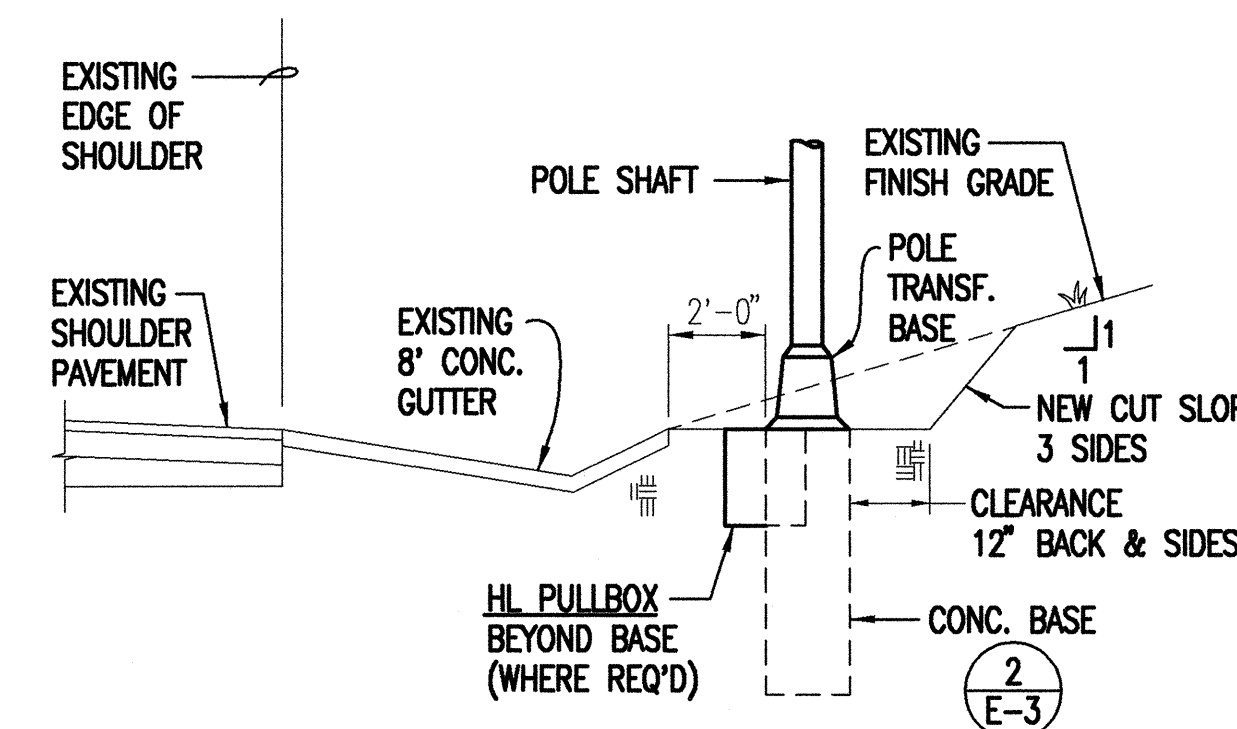
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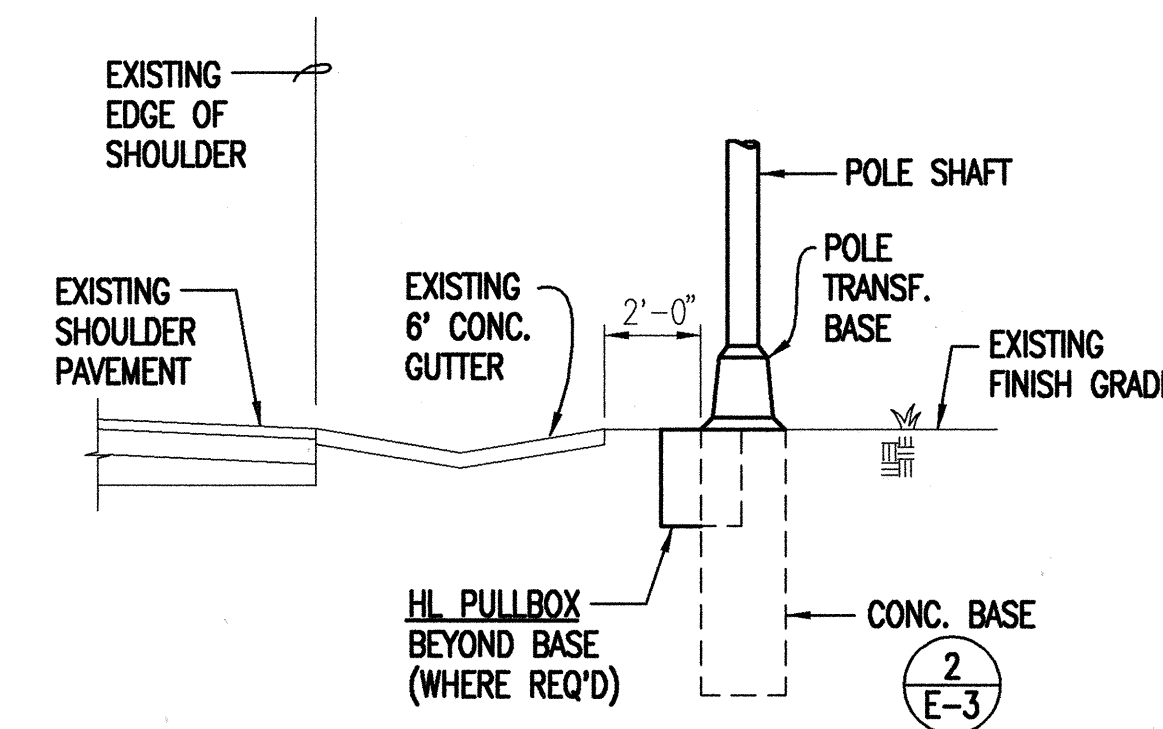
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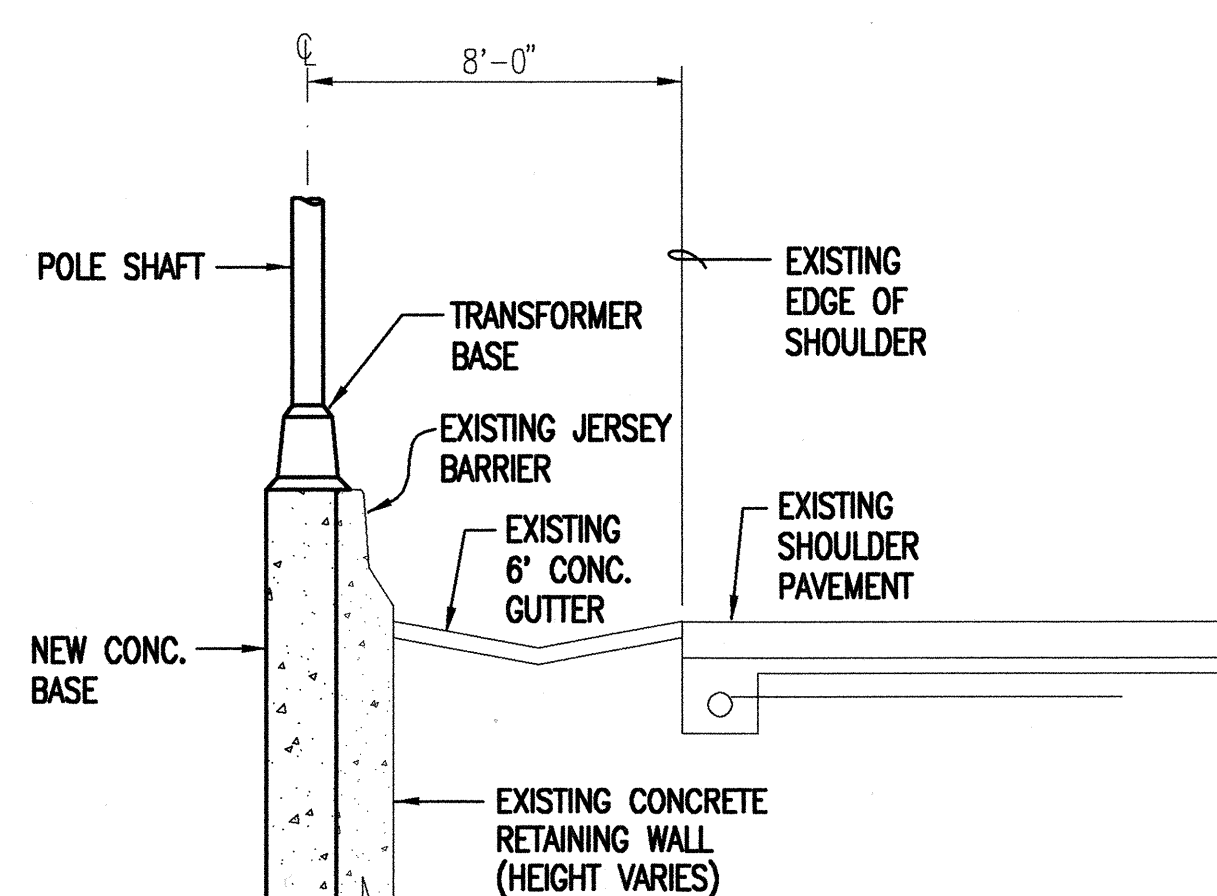
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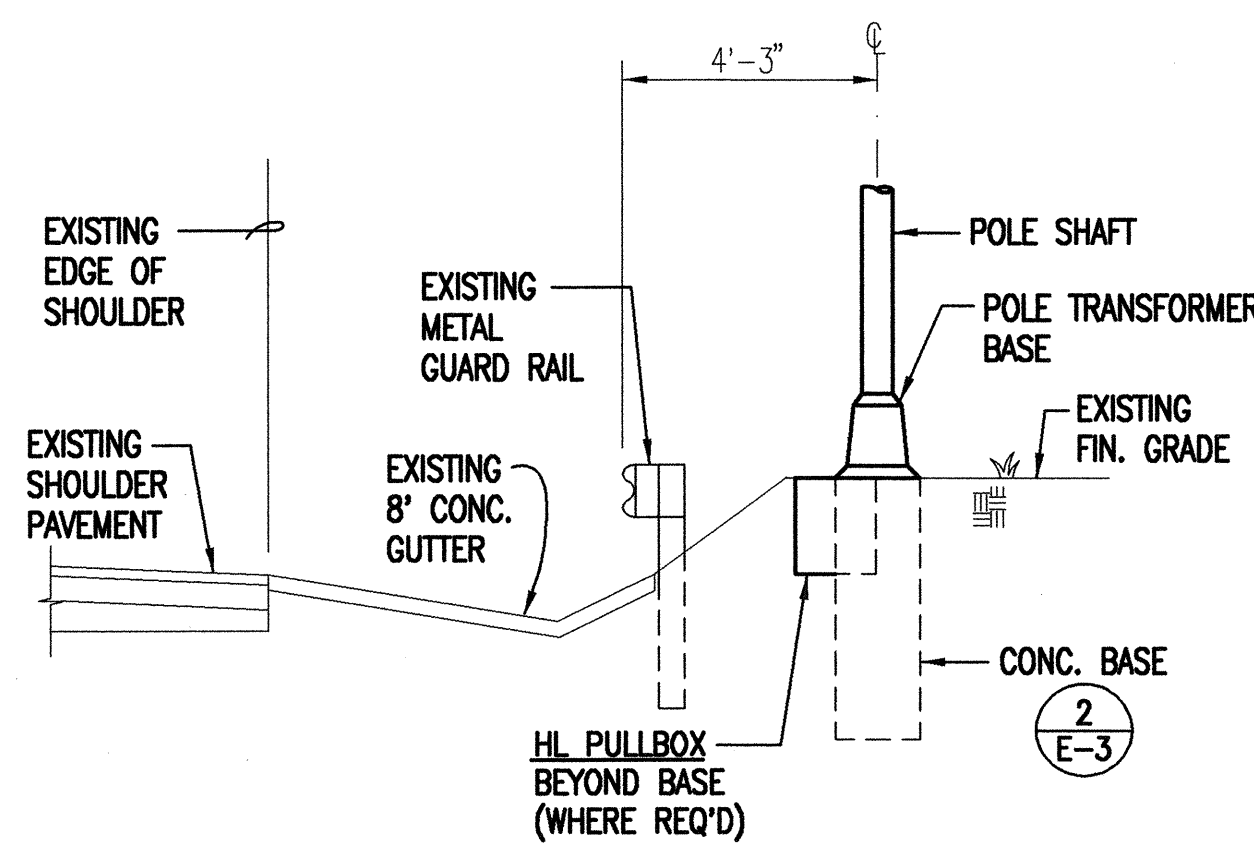
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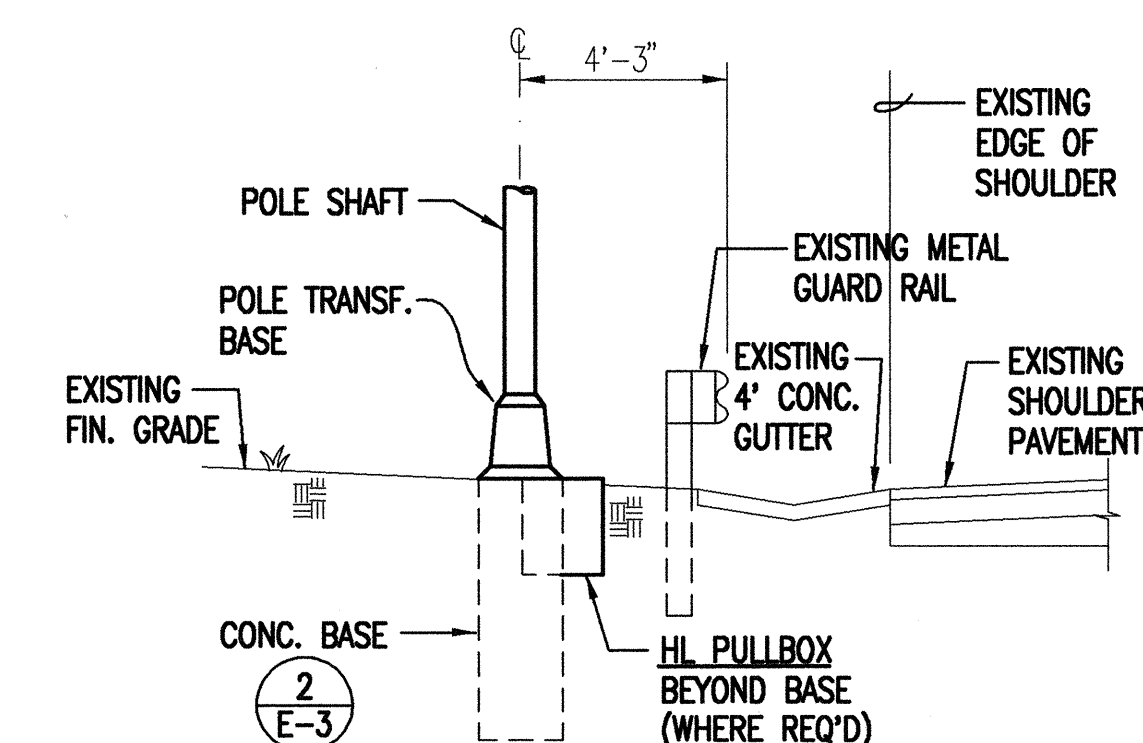
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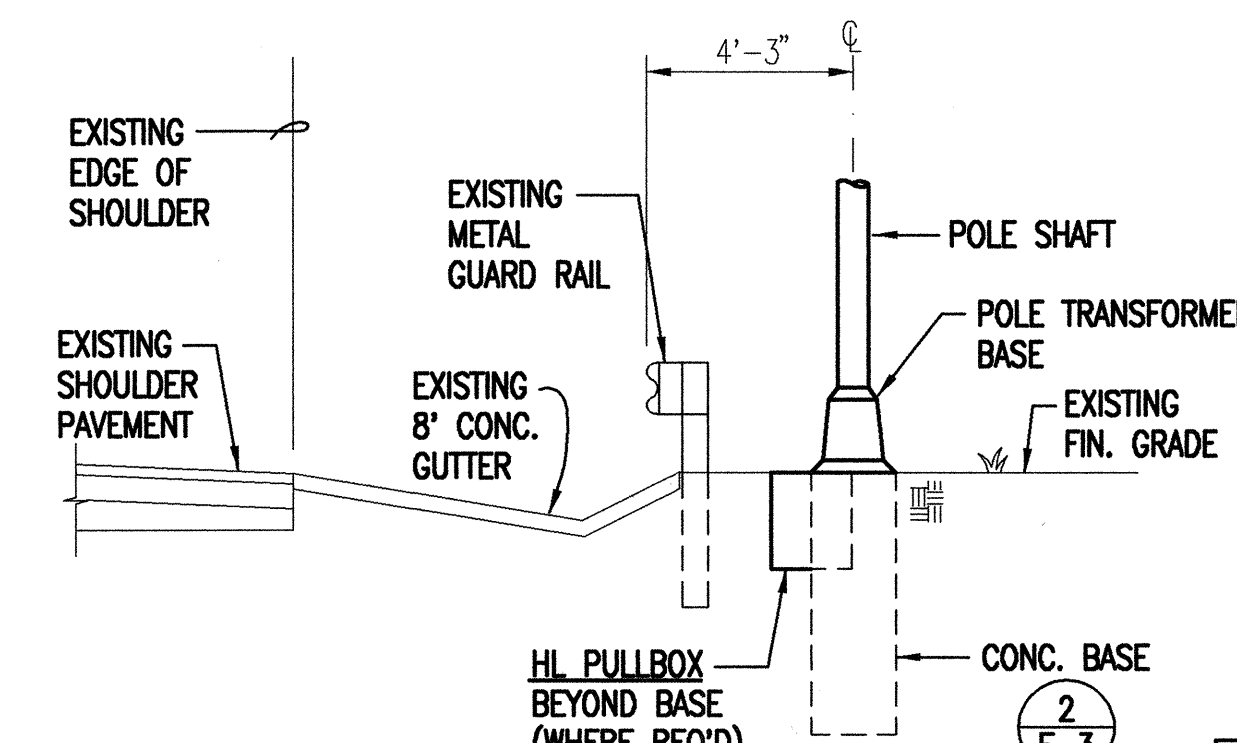
DETAIL 11



DETAIL 12

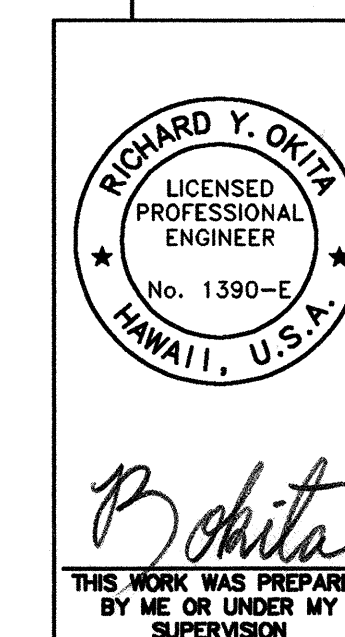


DETAIL 13



DETAIL 14

1  
E-5  
TYPICAL HIGHWAY LIGHT STANDARD LOCATION DETAILS  
NOT TO SCALE

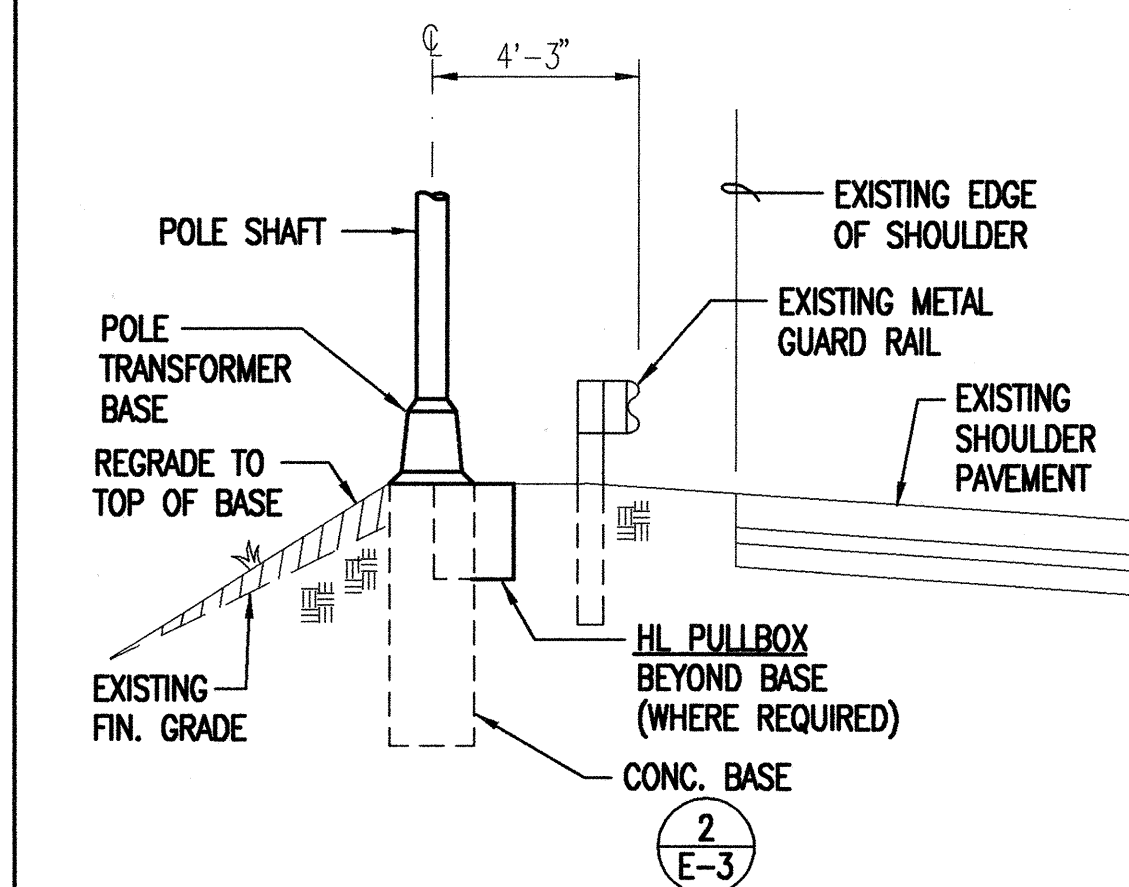


STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**TYPICAL HIGHWAY LIGHT STANDARD**  
**LOCATION DETAILS**  
INTERSTATE ROUTE H-2  
INSTALLATION OF HIGHWAY LIGHTING  
LEILEHUA INTERCHANGE TO WAIKAWA INTERCHANGE  
F.A. PROJECT NO. IM-H2-1(30)  
SCALE: AS SHOWN DATE: AUGUST 1999  
SHEET No. 5 OF 52 SHEETS

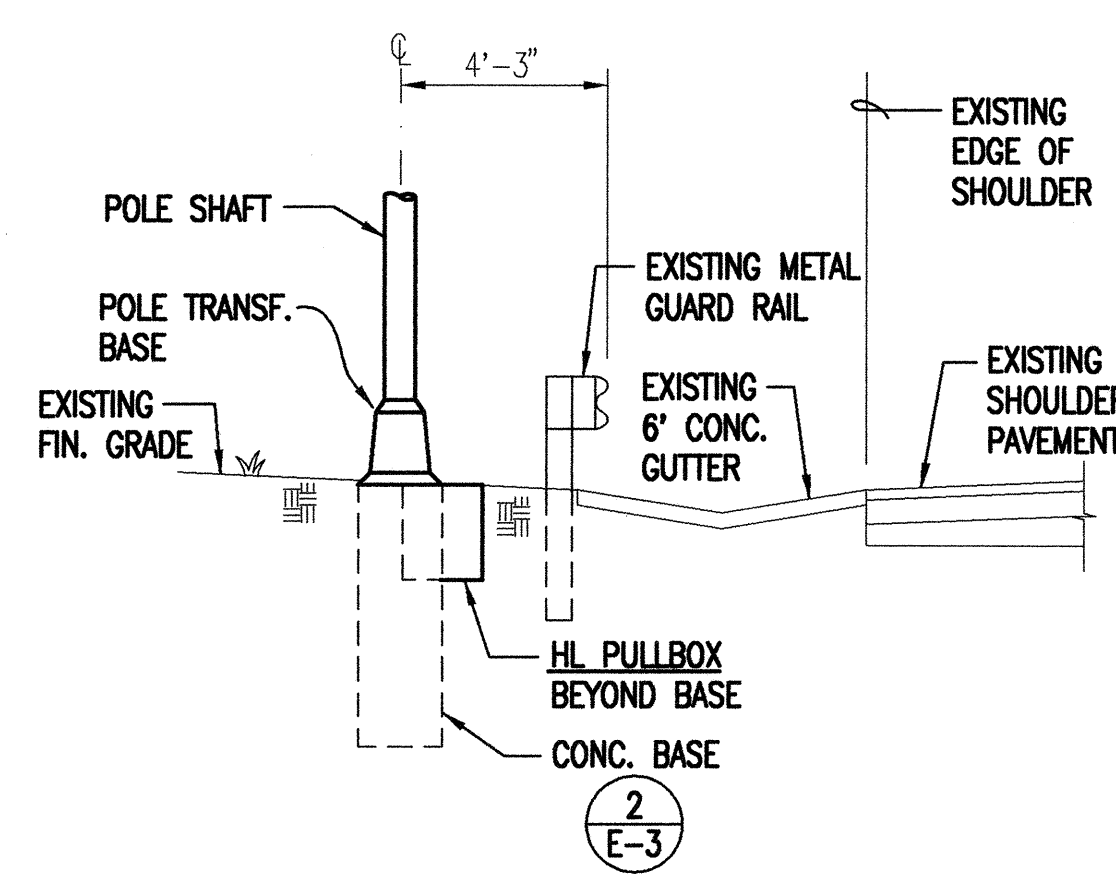
E-5



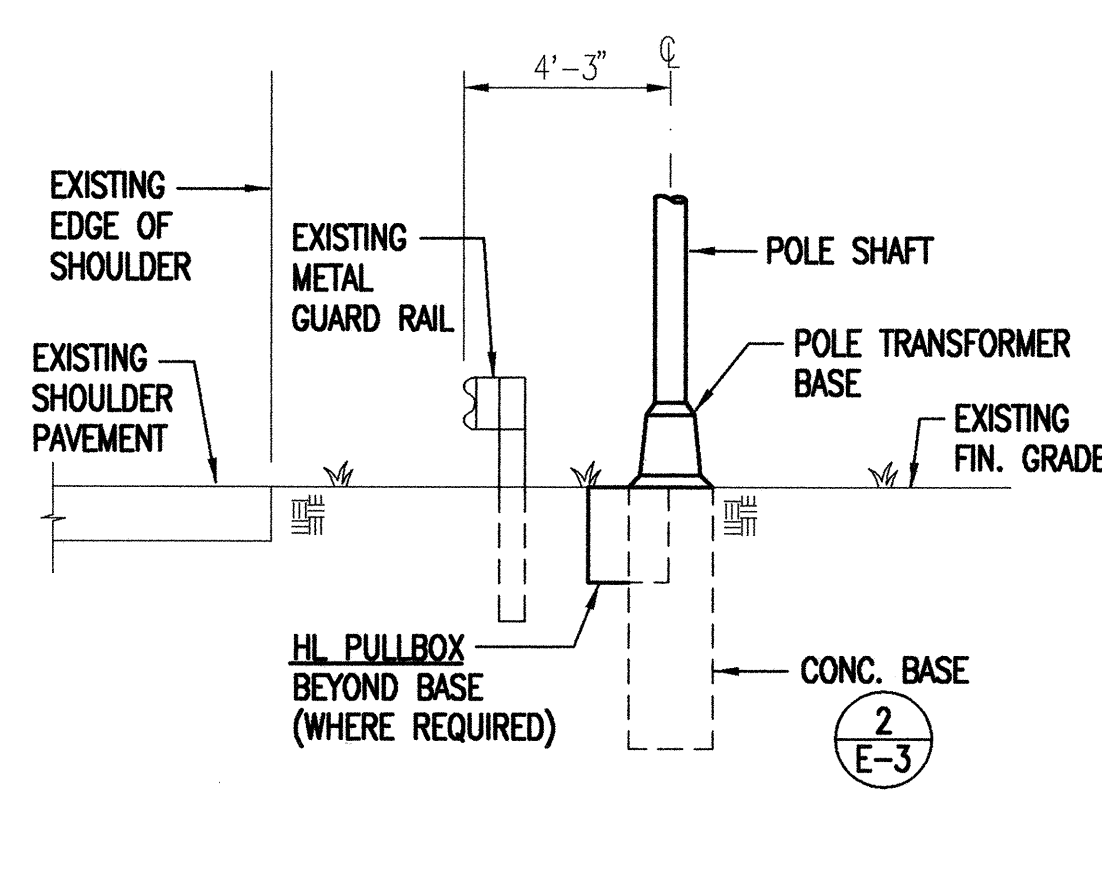
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-H2-1(30)	2000	18	64



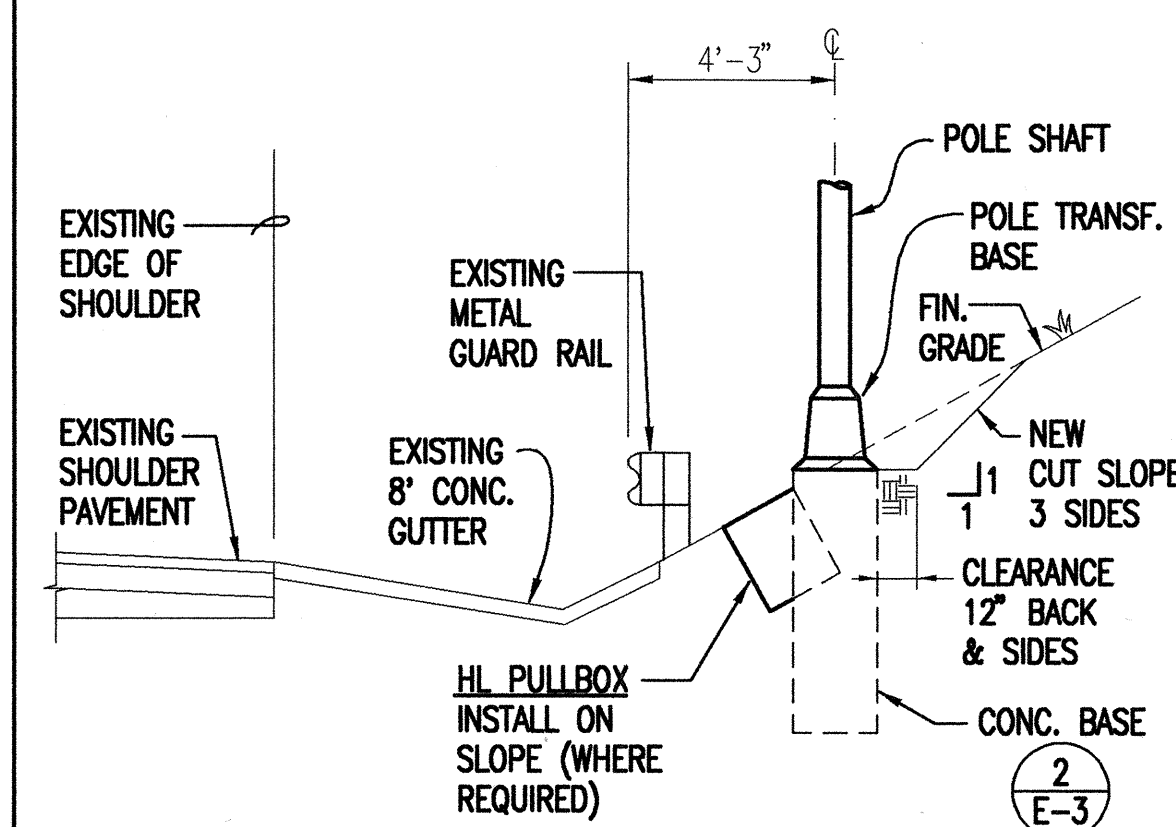
DETAIL 15



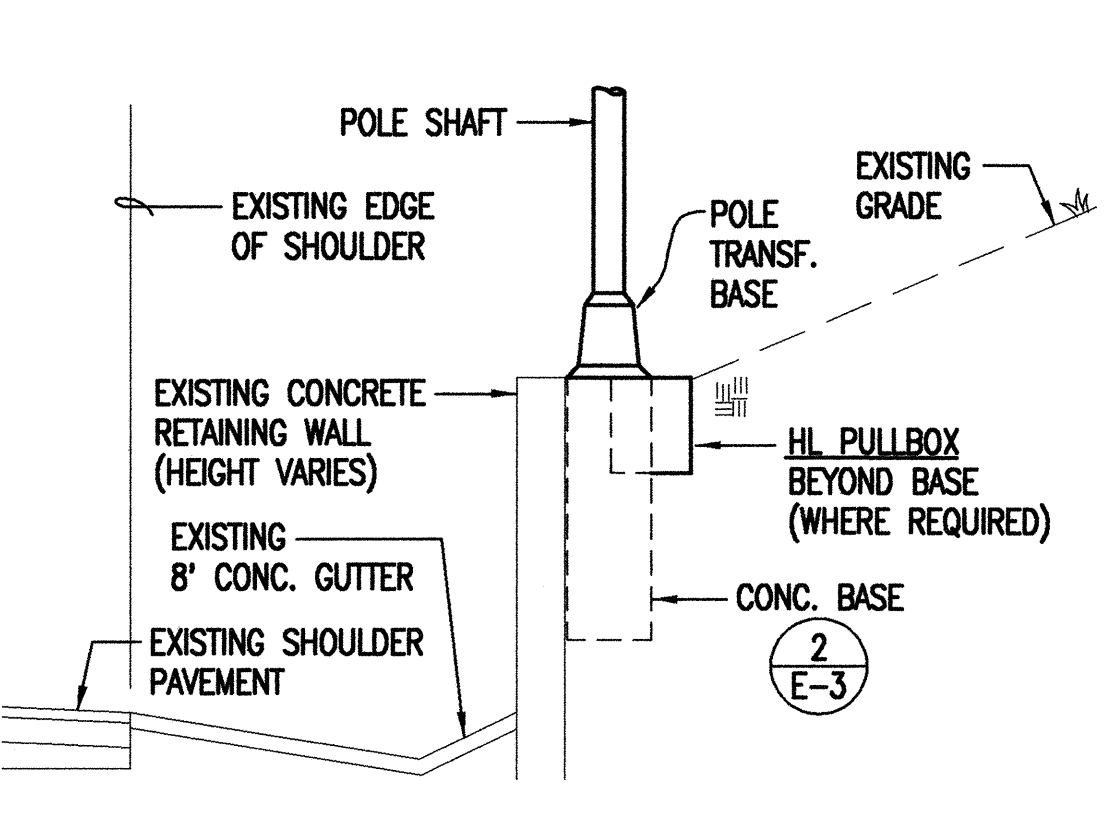
DETAIL 16



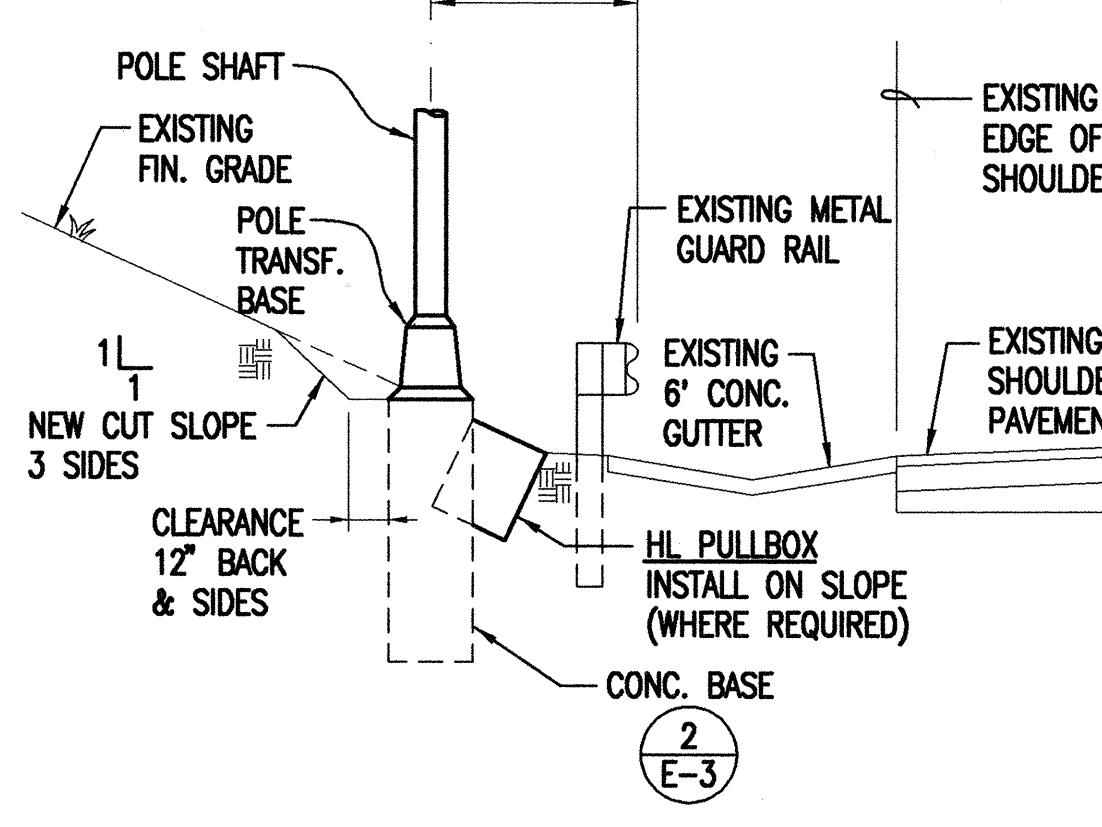
DETAIL 17



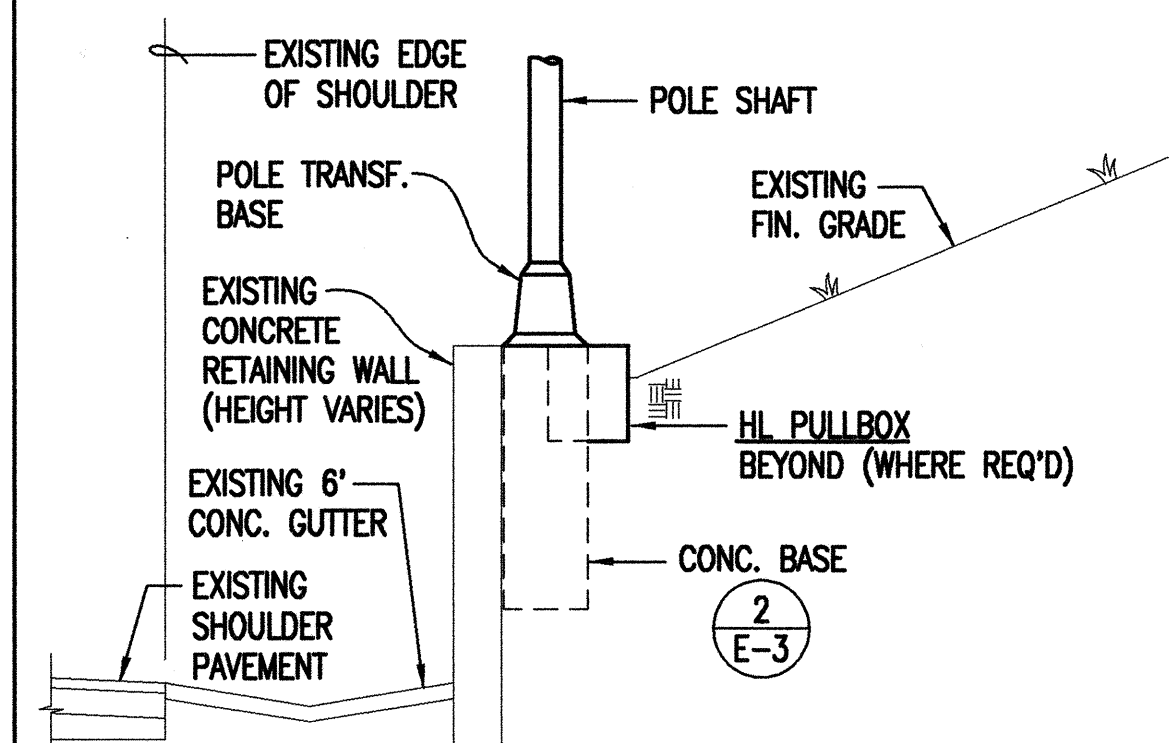
DETAIL 18



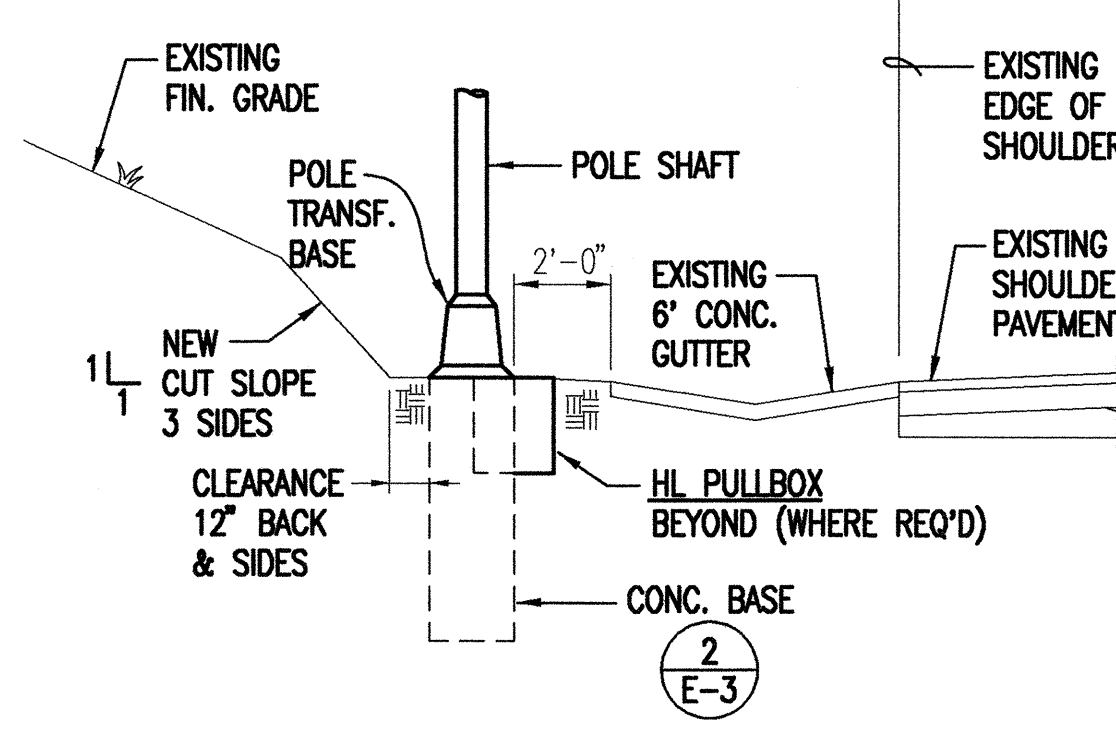
DETAIL 19



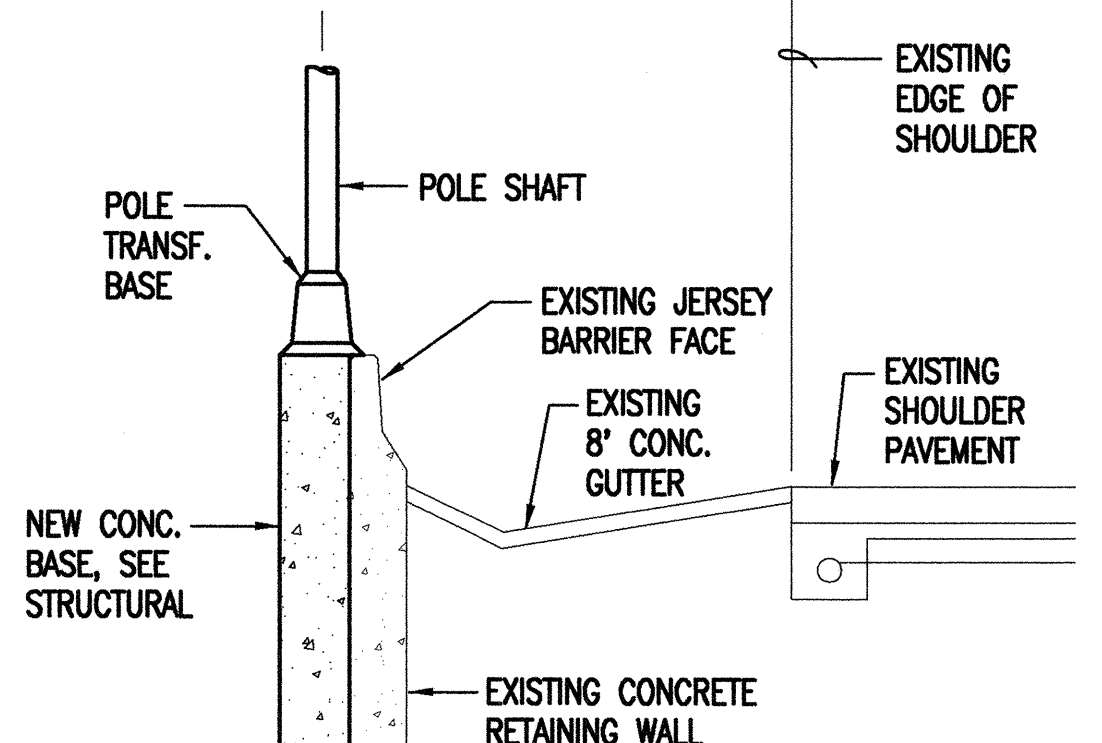
DETAIL 20



DETAIL 21

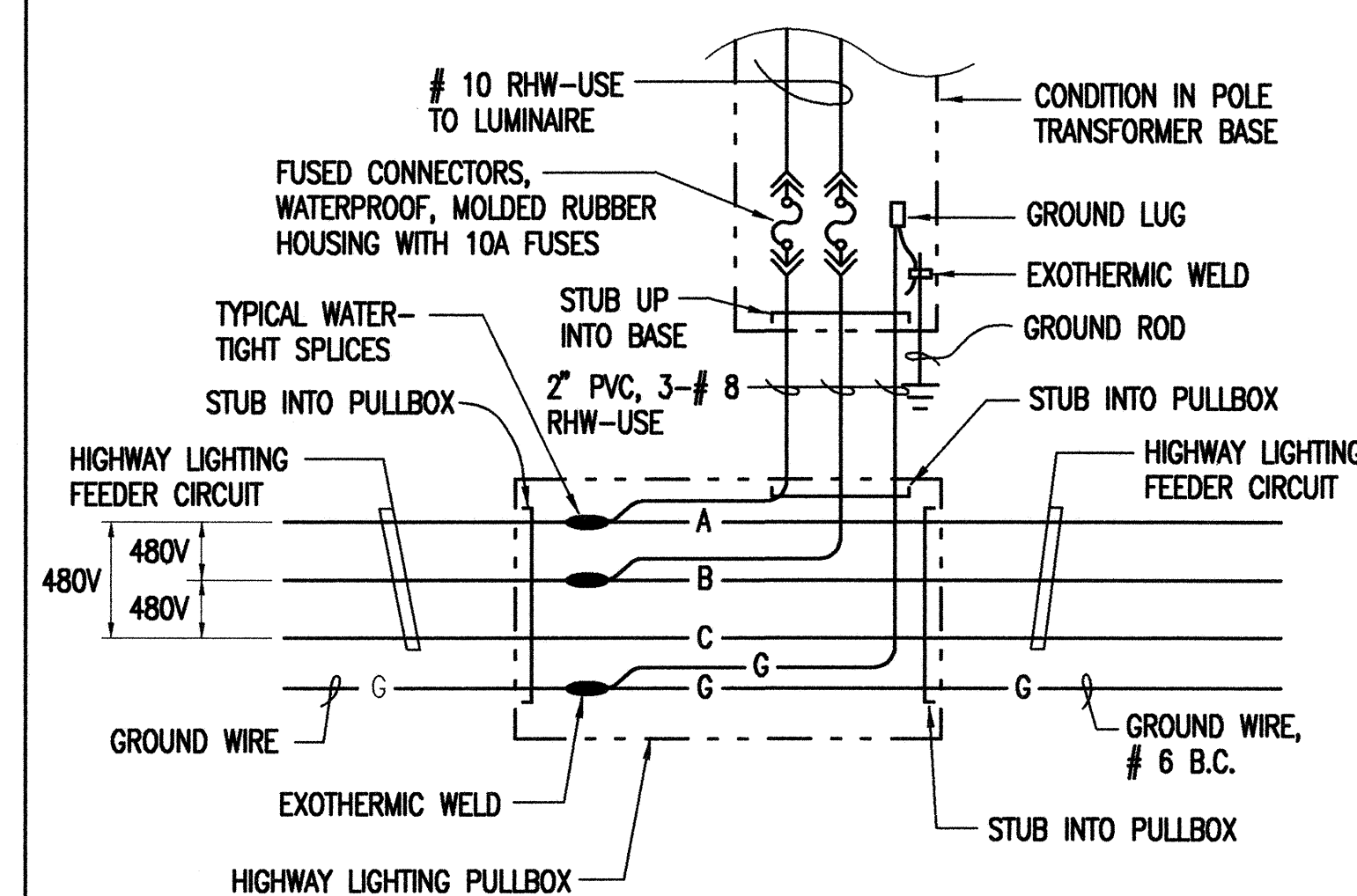


DETAIL 22

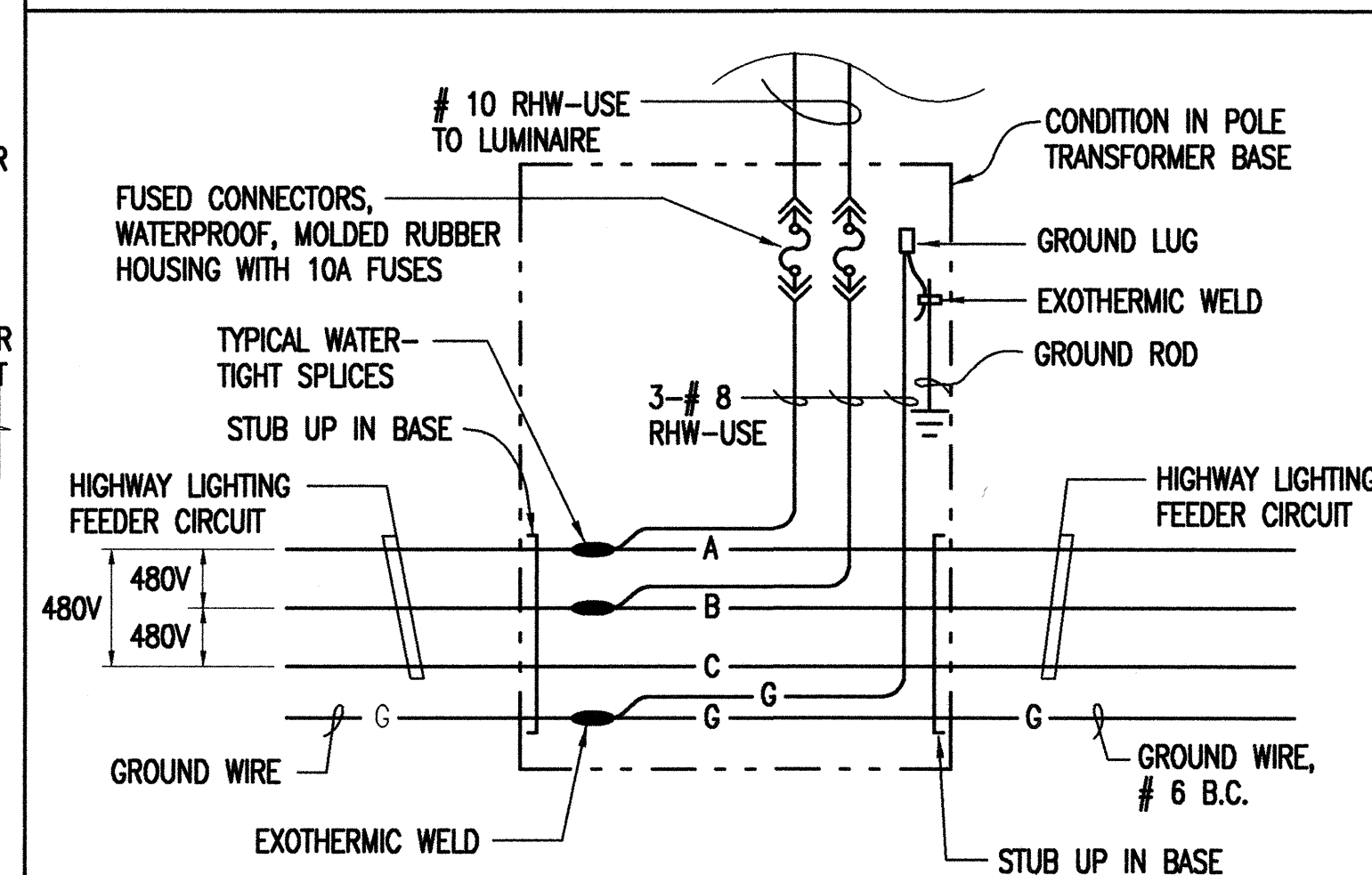


DETAIL 23

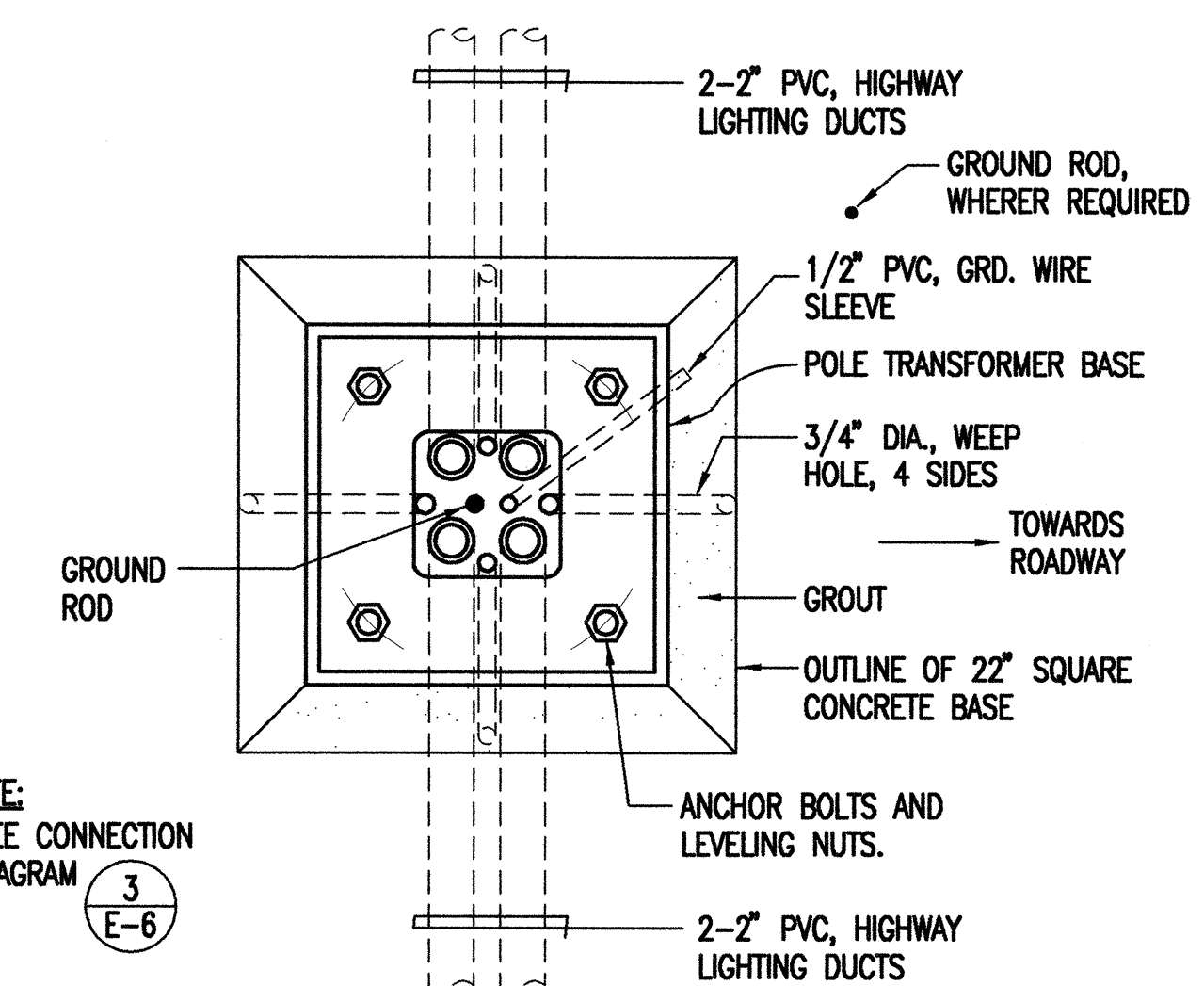
1 TYPICAL HIGHWAY LIGHT STANDARD LOCATION DETAILS  
E-6 NOT TO SCALE



2 CONNECTION DIAGRAM - PULLBOX & TRANSFORMER BASE CONDITION  
E-6 NOT TO SCALE

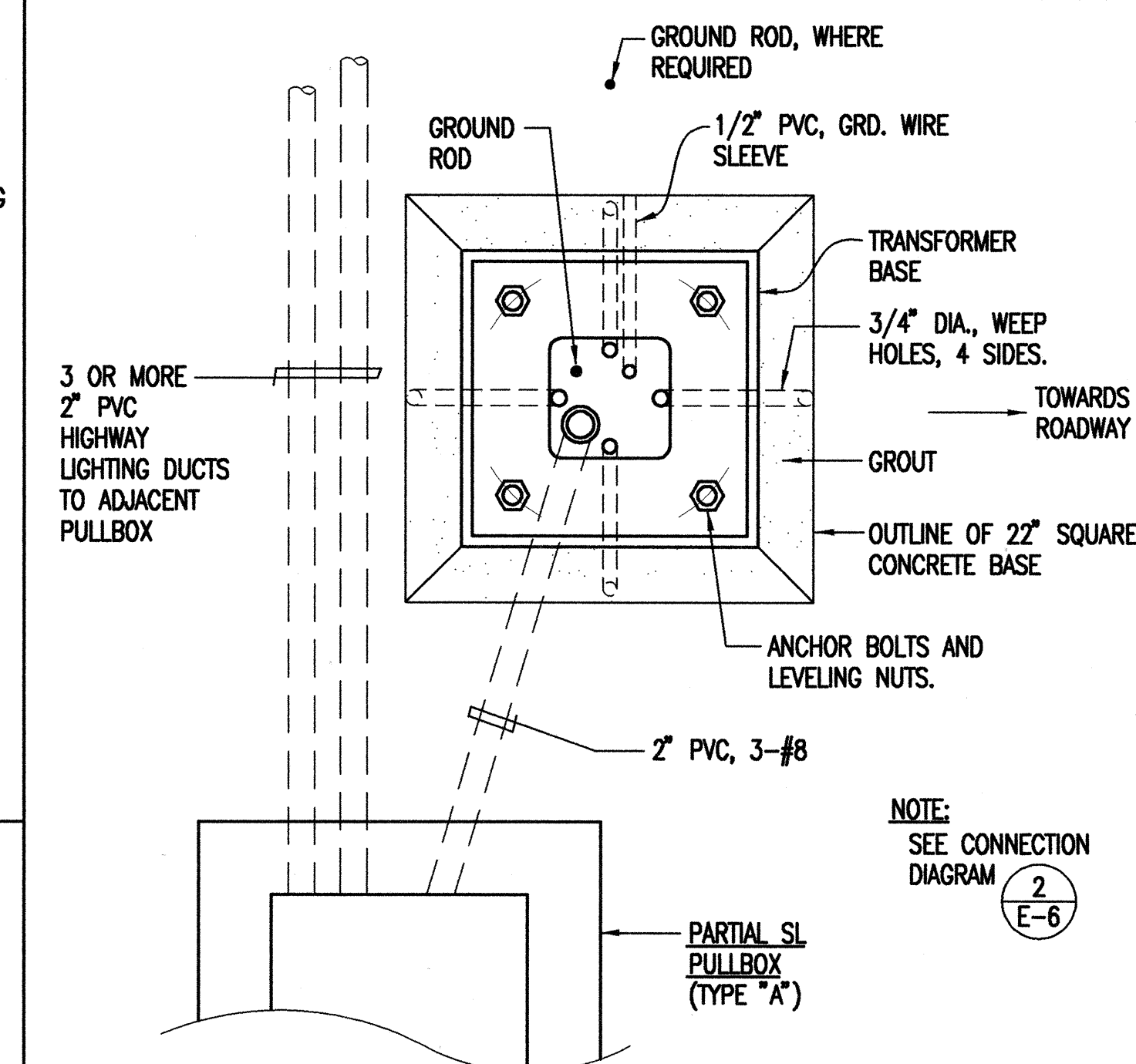


3 CONNECTION DIAGRAM - TRANSFORMER BASE CONDITION  
E-6 NOT TO SCALE



NOTE:  
SEE CONNECTION  
DIAGRAM  
3  
E-6

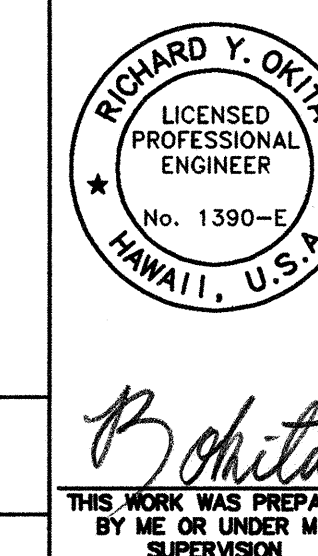
4 PLAN - HIGHWAY LIGHT STANDARD TRANSFORMER BASE  
E-6 NOT TO SCALE



NOTE:  
SEE CONNECTION  
DIAGRAM  
2  
E-6

5 PLAN - HIGHWAY LIGHT STANDARD/PULLBOX  
E-6 NOT TO SCALE

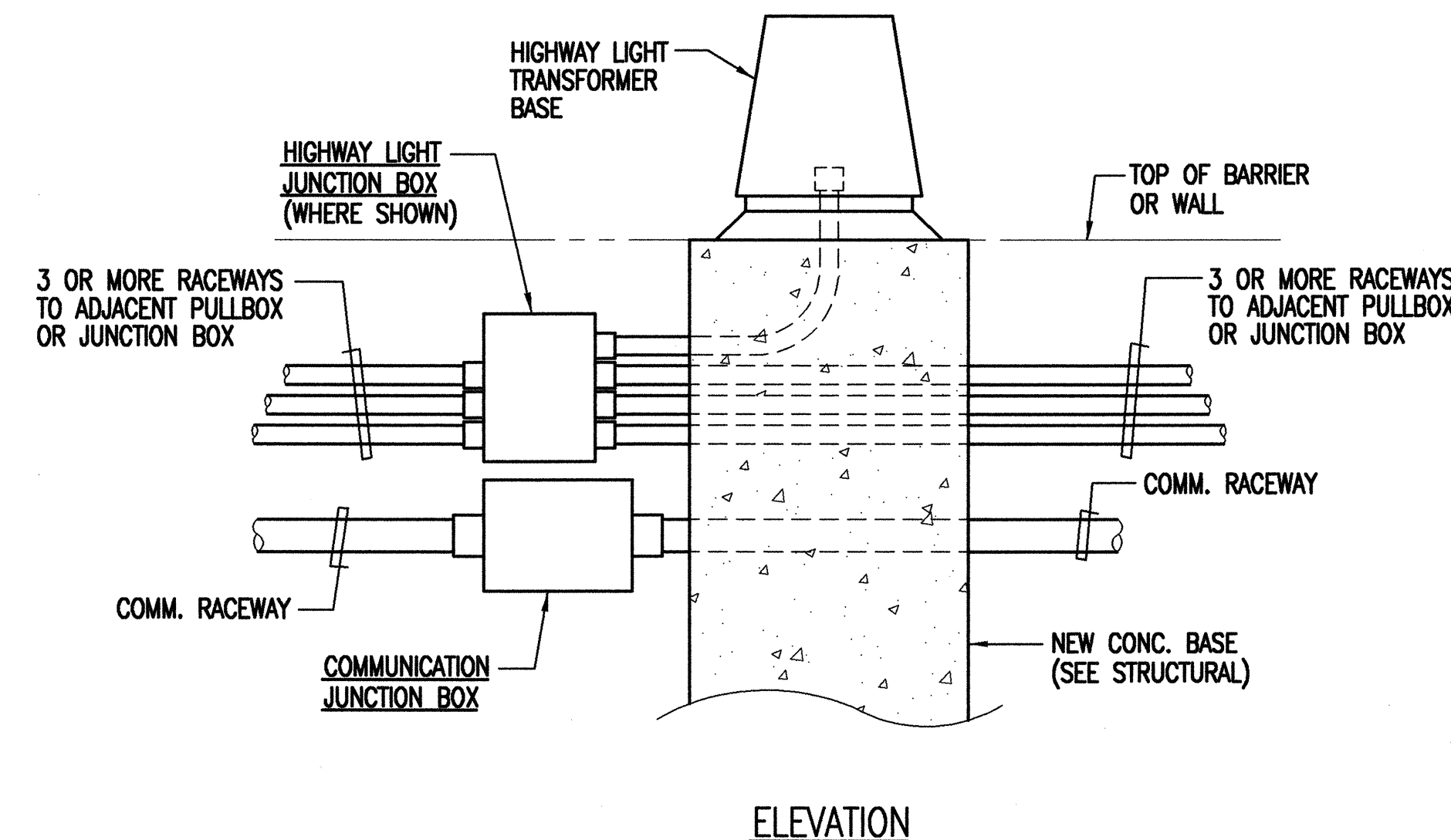
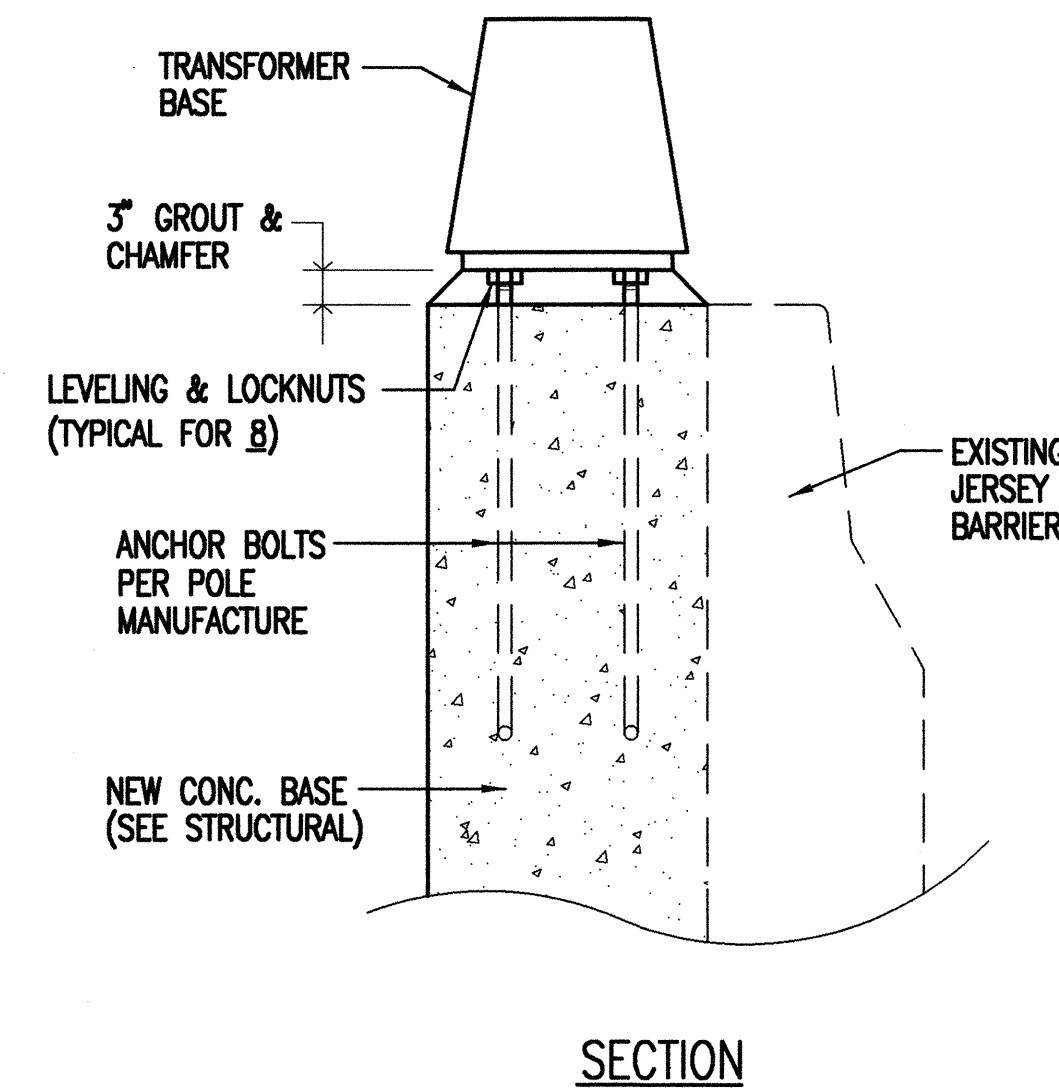
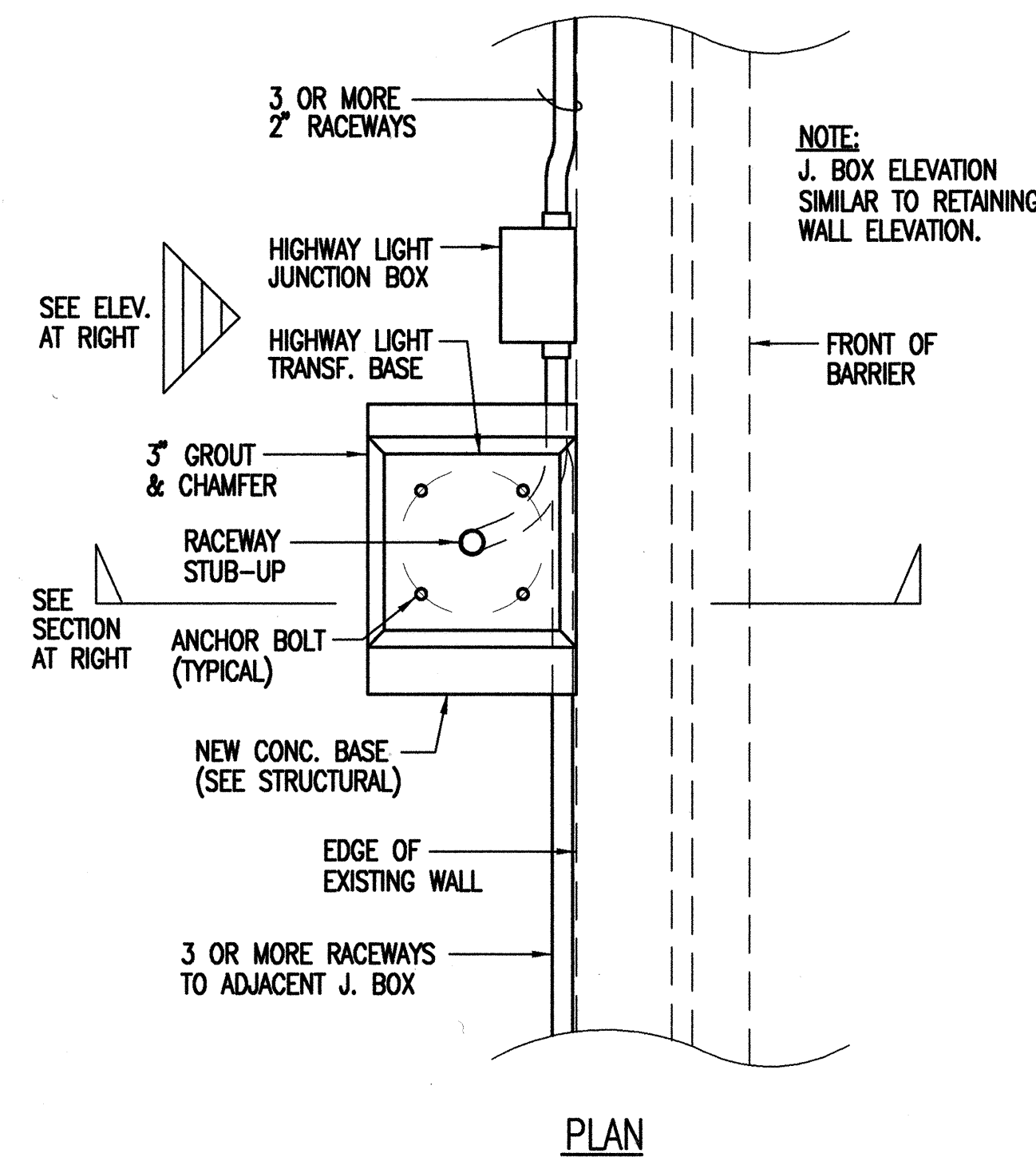
E-6



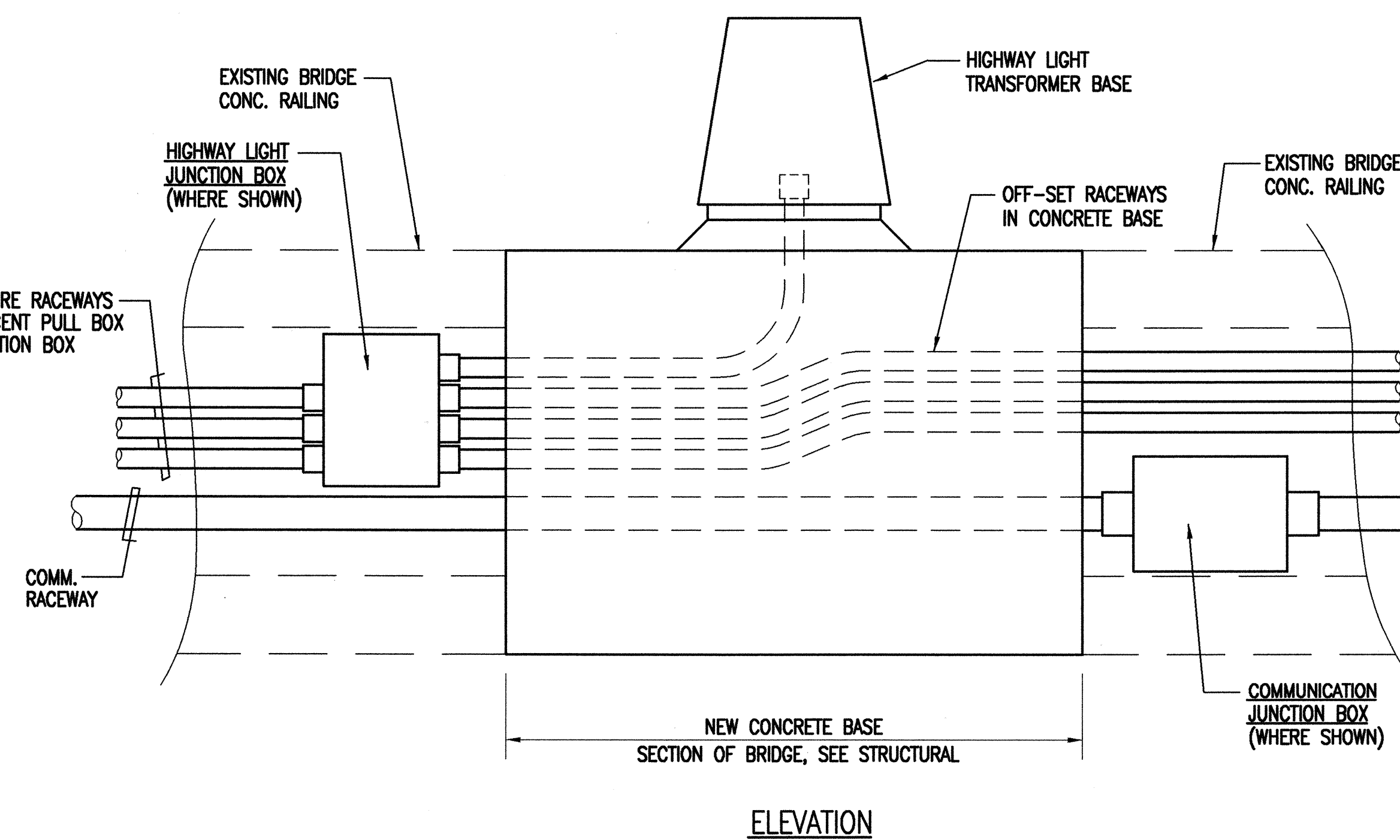
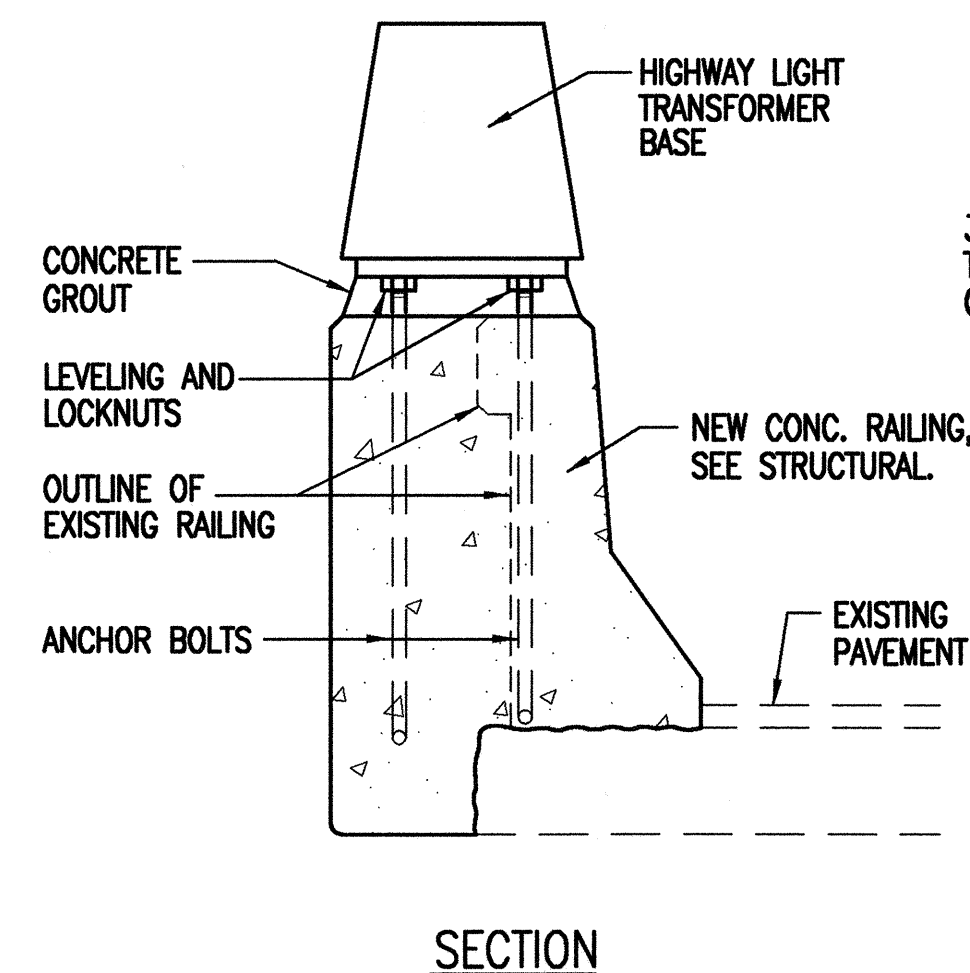
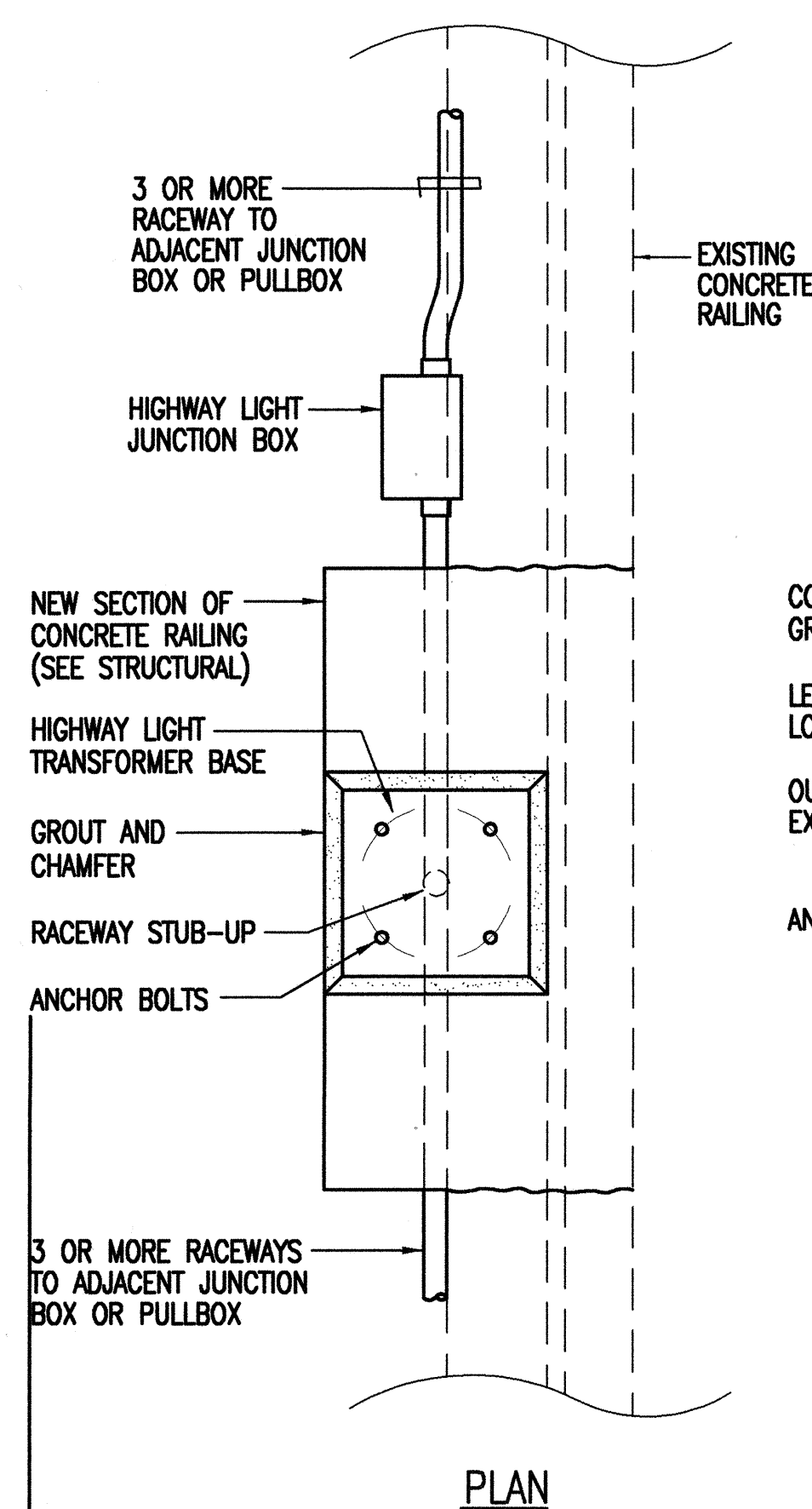
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
TYPICAL HIGHWAY LIGHT STANDARD  
LOCATION DETAILS  
INTERSTATE ROUTE H-2  
INSTALLATION OF HIGHWAY LIGHTING  
LEILEHUA INTERCHANGE TO WAIKAWA INTERCHANGE  
F.A. PROJECT NO. IM-H2-1(30)  
SCALE: AS SHOWN DATE: AUGUST 1999  
SHEET No. 6 OF 52 SHEETS

9/13/99	ADDED NOTE, DETAIL 19, DELETE HL PULLBOX REFERENCE, 3/E-6.
DATE	REVISION

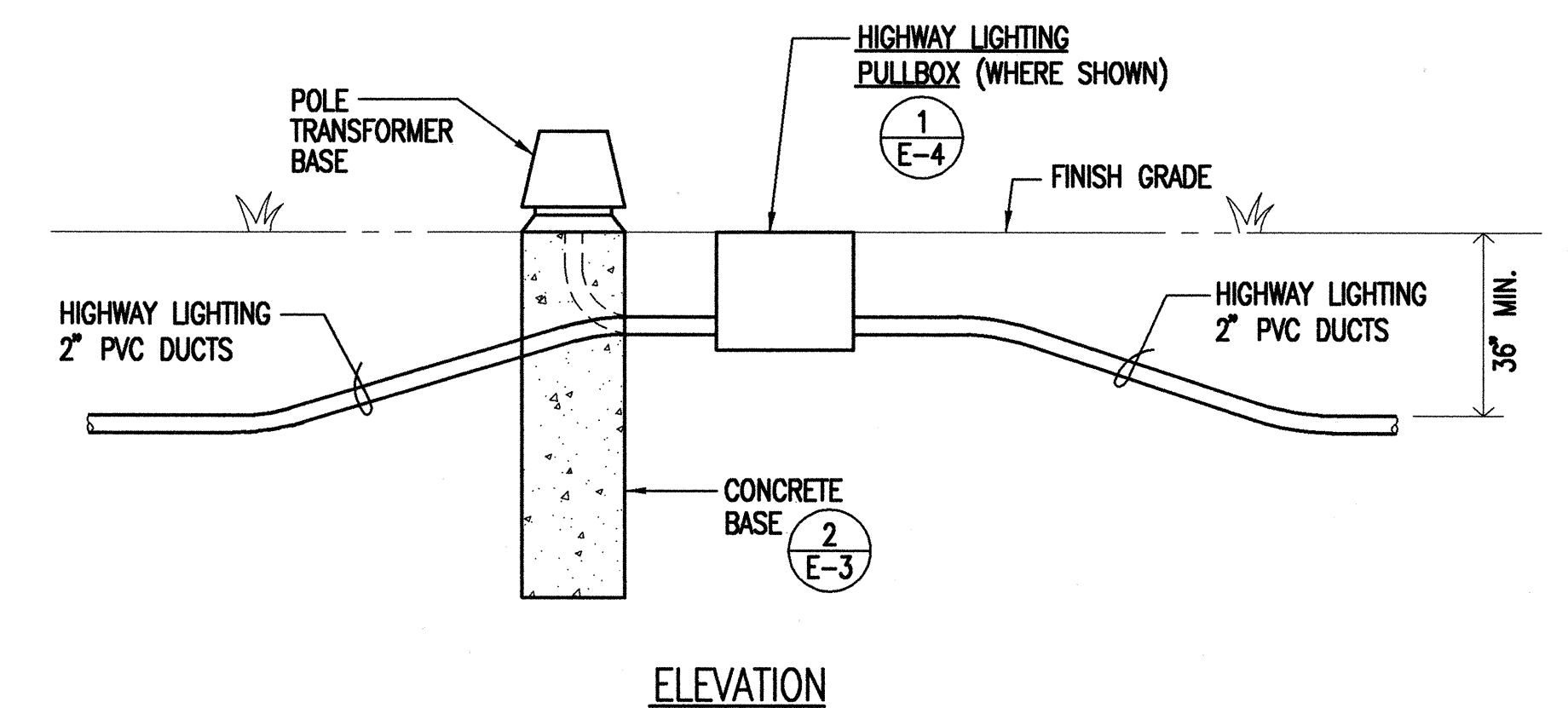
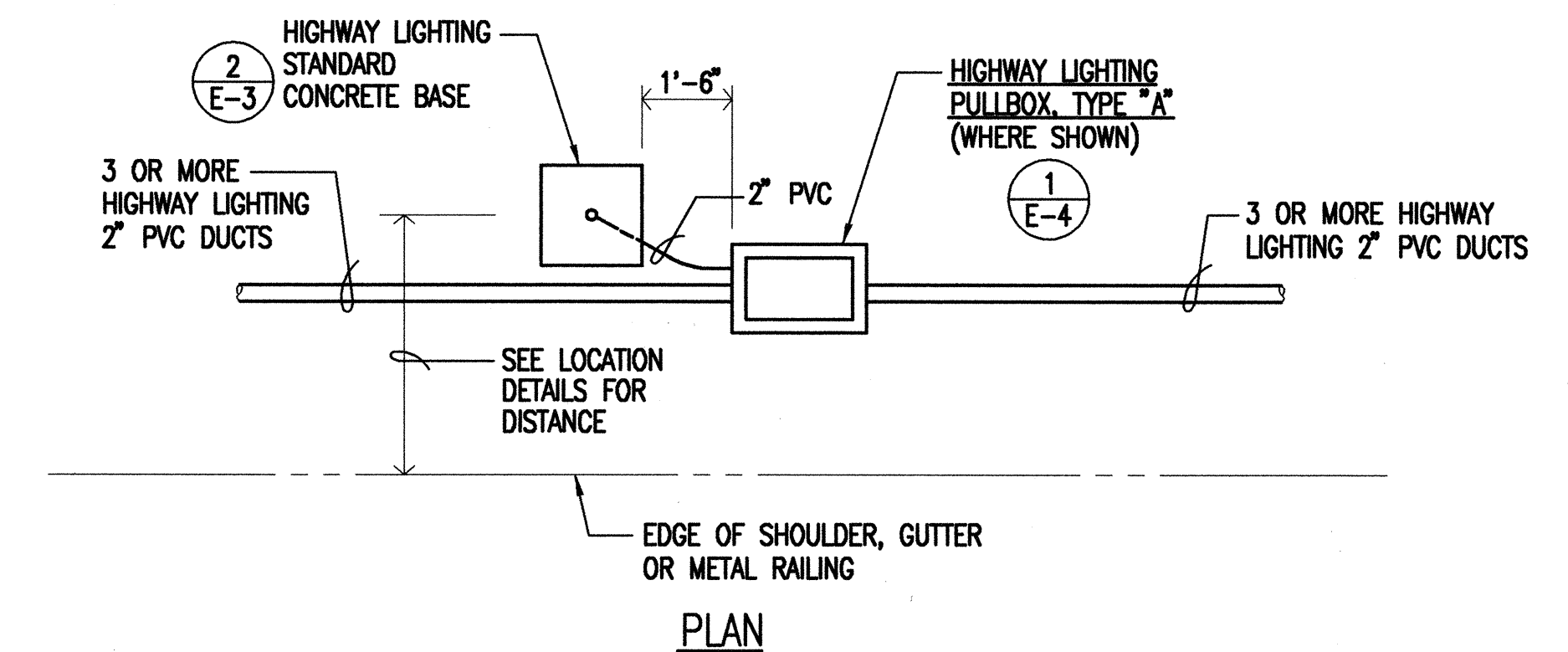
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-H2-1(30)	2000	19	64



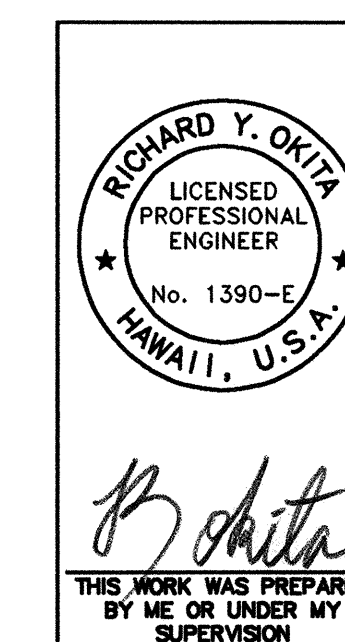
1  
E-7  
DETAIL - HIGHWAY LIGHT ON RETAINING WALL  
NOT TO SCALE



2  
E-7  
DETAIL - HIGHWAY LIGHT ON BRIDGE RAILING  
NOT TO SCALE



3  
E-7  
DETAIL - TYPICAL ON-GRADE LIGHT STANDARD  
NOT TO SCALE



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**MISCELLANEOUS DETAILS**

INTERSTATE ROUTE H-2  
INSTALLATION OF HIGHWAY LIGHTING  
LEILEHUA INTERCHANGE TO WAIAWA INTERCHANGE  
F.A. PROJECT NO. IM-H2-1(30)

SCALE: AS SHOWN DATE: AUGUST 1999

SHEET No. 7 OF 52 SHEETS