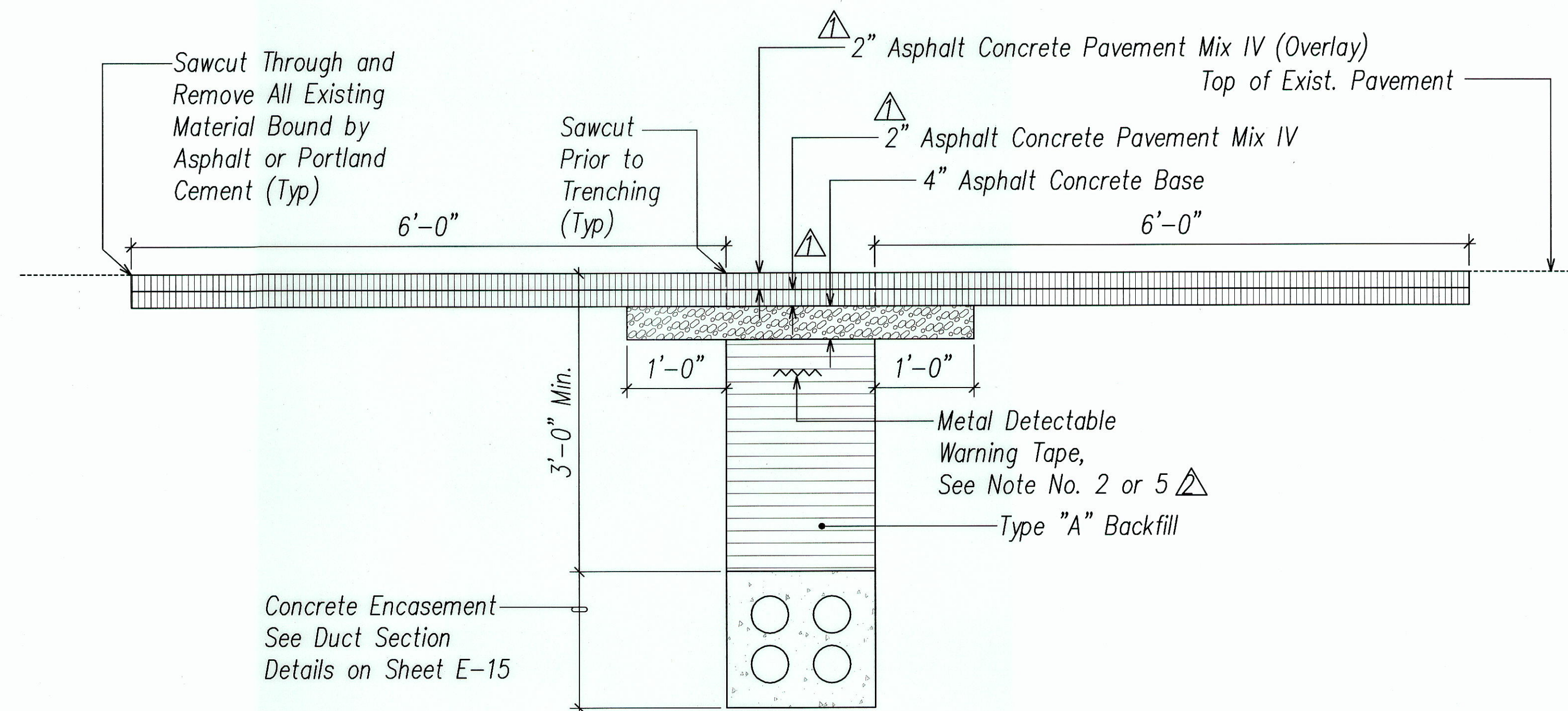
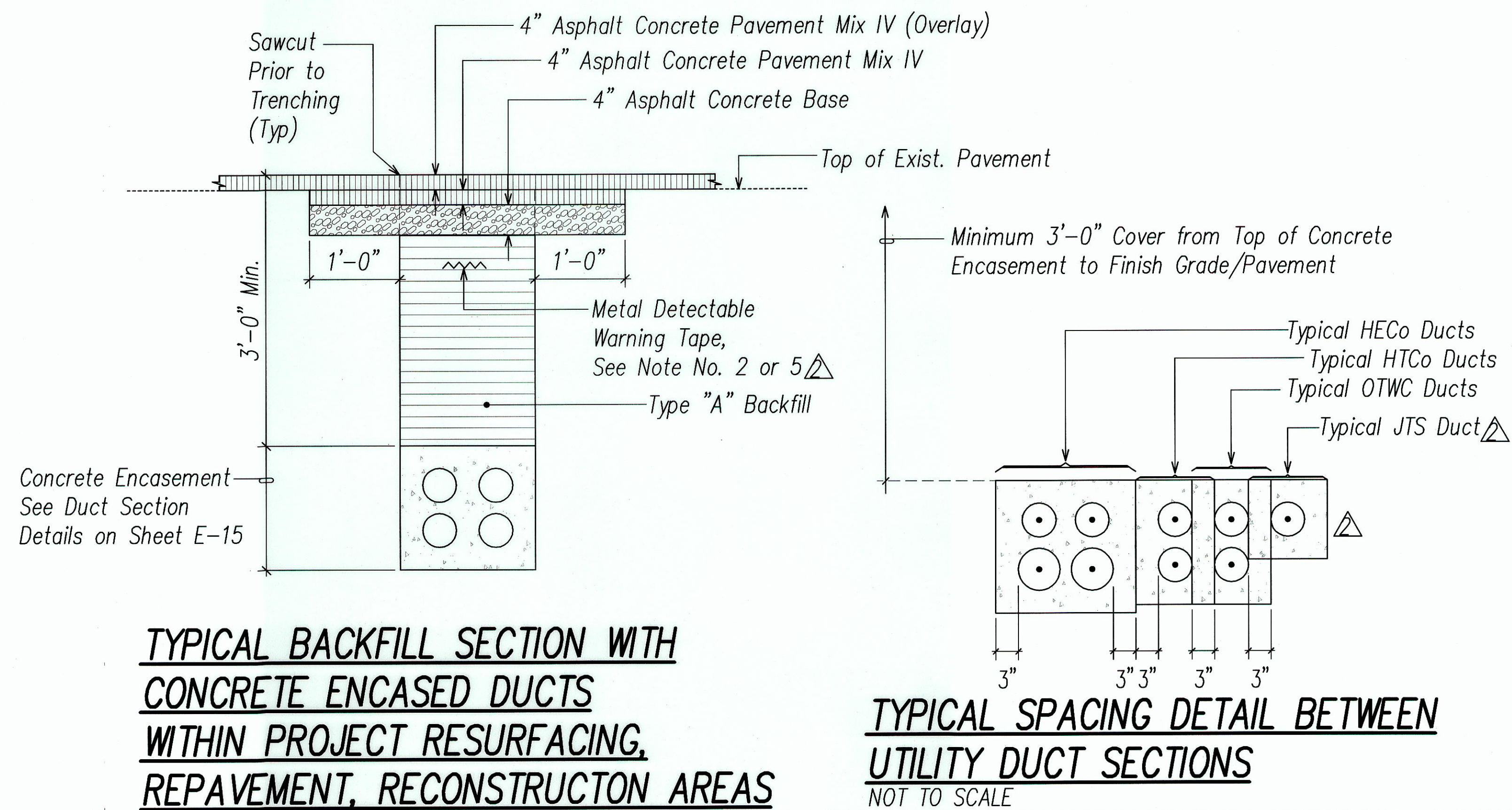


FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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**TYPICAL BACKFILL SECTION WITH CONCRETE ENCASED DUCTS
BEYOND PROJECT RESURFACING, REPAVEMENT, RECONSTRUCTION AREAS**



**TYPICAL BACKFILL SECTION WITH
CONCRETE ENCASED DUCTS
WITHIN PROJECT RESURFACING,
REPAVEMENT, RECONSTRUCTION AREAS**

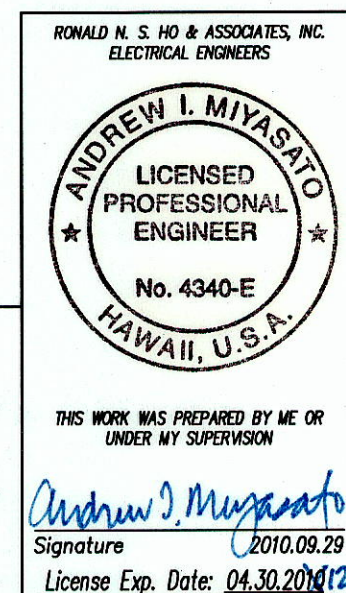
GENERAL DUCTLINE DUCT SECTION NOTES:

1. If trench is located on unpaved area, the Contractor shall replace 4" A.C. Base and 4" A.C. Pavement with Type "A" backfill material.
2. The Metal Detectable Red Plastic Warning Tape shall be a minimum 5 mils thick and 4" wide with a continuous metallic backing and corrosion resistant 1' min thick foil core. For the State DOT traffic signal and highway lighting ducts, the message on the tape shall read, "CAUTION - STATE TRAFFIC SIGNAL AND/OR HWY LIGHTING BURIED BELOW," utilizing 1 1/2 inches series "C" block lettering. The message will be repeated with a 4 1/4" spacing between top line of message and start of next repeat.
 - a. For the respective utility company ducts, provide metal detectable warning tape over respective utility company ducts per respective utility company requirements and approval.
 - b. For HECO, provide warning tape per HECO Specification M0302-0.
3. The Contractor may begin backfilling the conduit trench when the concrete reaches 3000 psi compressive strength after 3 days.
4. Clearances: Refer to HECO Note No. 14 for clearance requirements between all ductlines and all adjacent structures (charted and uncharted) near the trench.

5. Detectable Warning Tape For JTS Ductline shall be as follows:

- a. Warning tape shall be polyethylene (PA) plastic tape, a minimum of 6 inches, IAW APWA Uniform Color Code, and imprinted with the words "Warning - Telecommunication Cable Below" at not more than 48 inch intervals. Minimum thickness of the tape must be 0.004 inch. Tape must have a minimum strength of 1750 pounds per square inch (PSI) lengthwise and 1500 PSI. Tape must be manufactured with integral wires, foil backing, or other means of enabling detection by a metal detector when tape is buried up to 3 feet deep. The materials in the warning tape must be chemically inert and will not degrade when exposed to acids, alkalis, and other destructive substances found in soil.
- b. Detection wire must be insulated, single-strand, solid copper with a minimum of 12 AWG coated with a minimum of 30 mm PE Jacket designed specifically for buried use.
- c. Detectable warning tape must be installed 12 inches to 18 inches above all new non metallic conduit formations and must not exceed the manufacturer's recommended depth below grade. Tape must be placed at a depth of no less than 12 inches below surface grade.
- d. Permanent tracer wire must be installed in all new duct banks. One tracer wire must be installed per duct bank. The tracer wire must be placed centrally as possible in the top conduit formation. Splices in the tracer wire must be connected by means of a compression type connector to ensure continuity. Wire nuts must not be used. After installation, tracer wire should be tested to verify continuity of the tracer wire system and a report indicating continuity should be submitted to the permitting authority as part of the As-Built construction records.

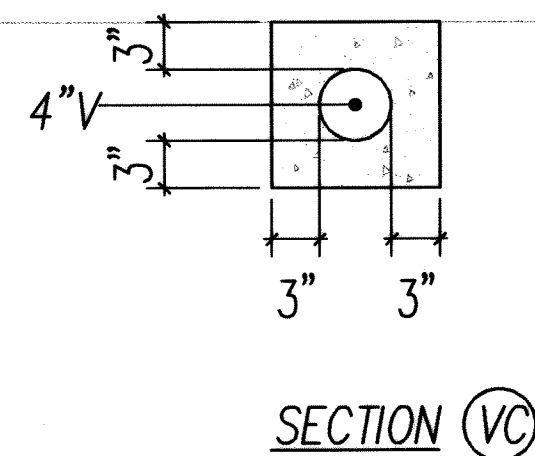
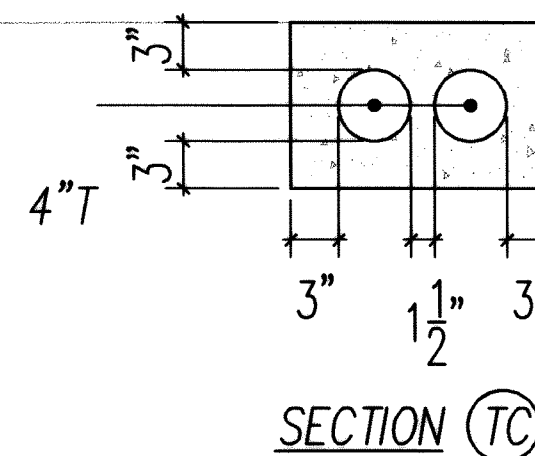
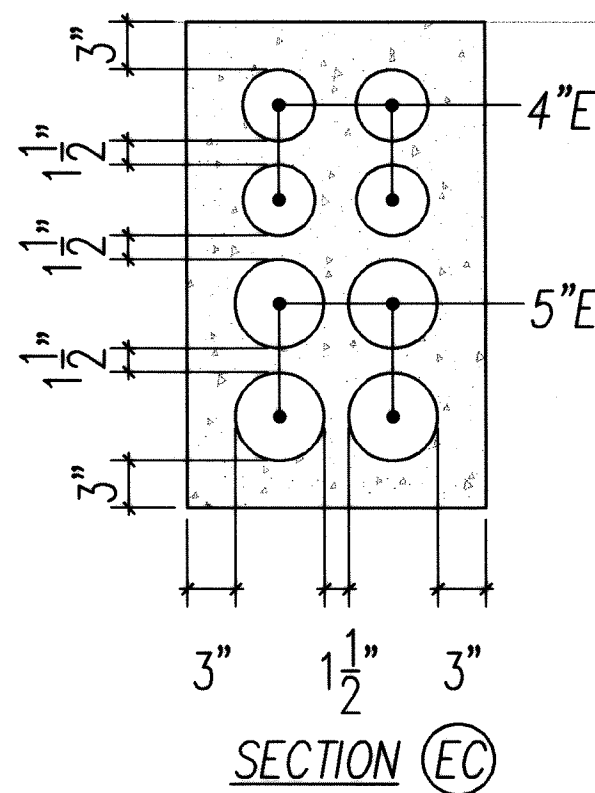
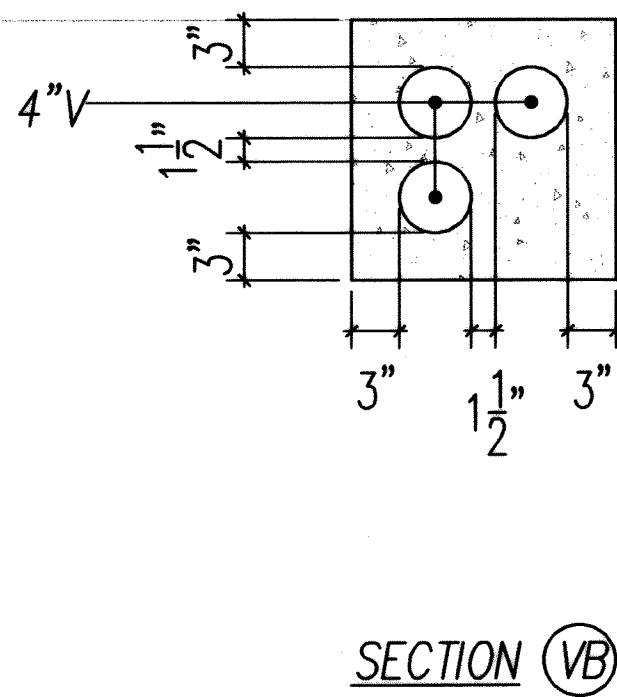
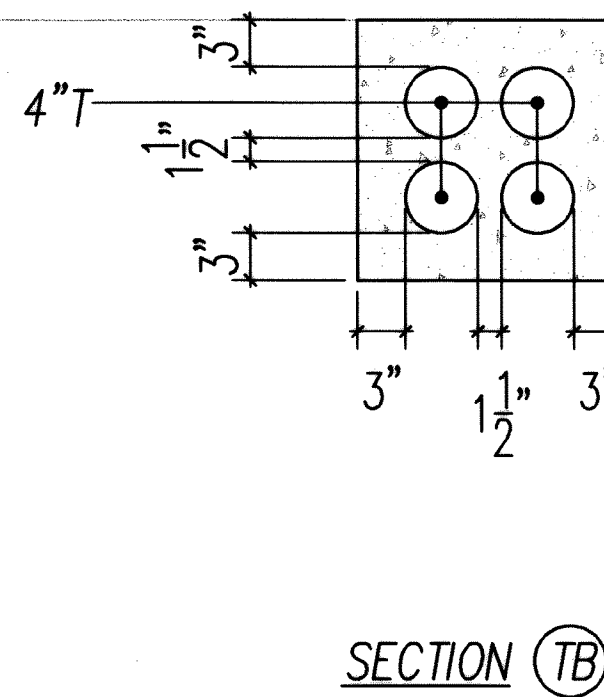
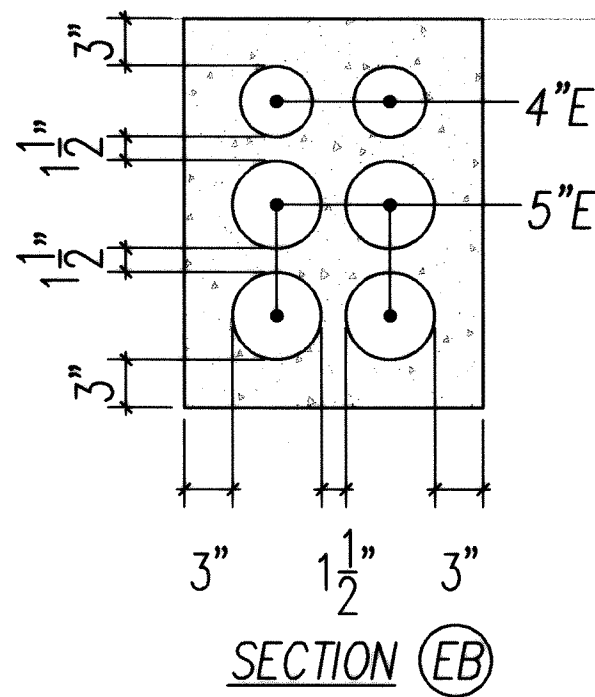
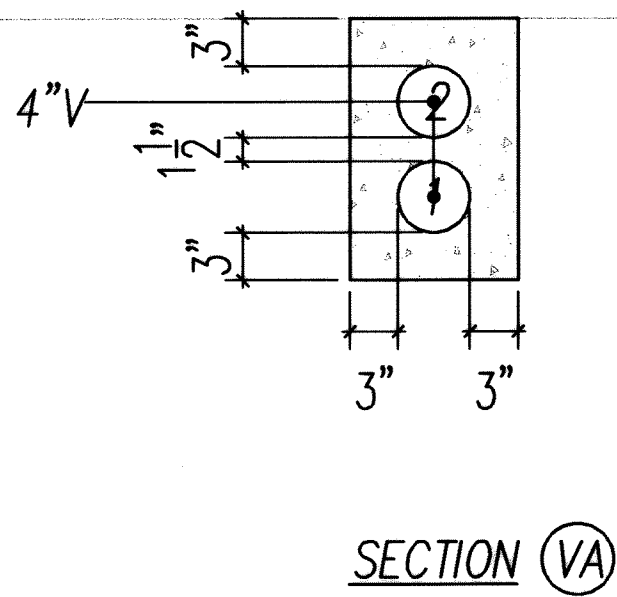
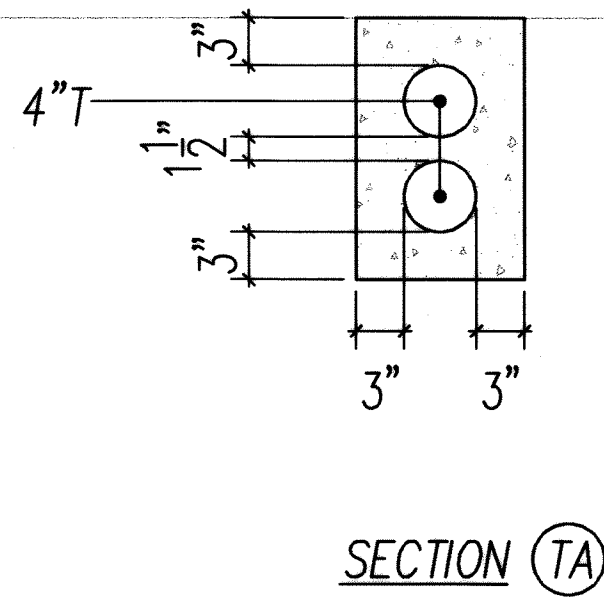
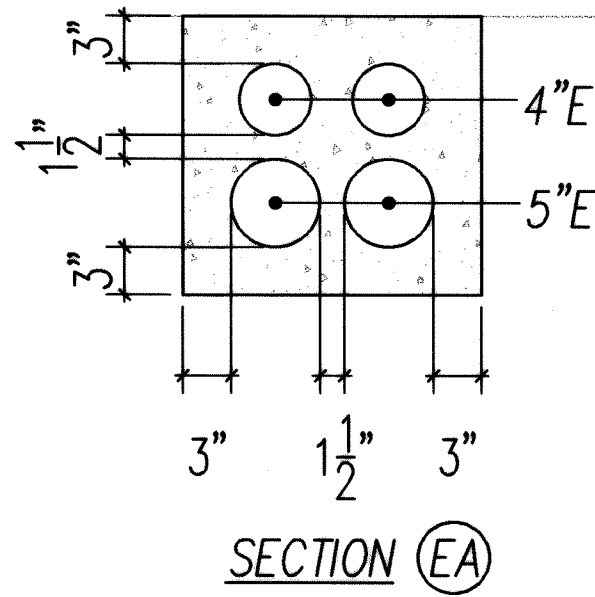
02/09/2010	Added JTS Duct Requirements
03/09/09	Revised Pavement Thickness
DATE	REVISION



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**TYPICAL DUCT SECTION
BACKFILL DETAILS**
Kalanianaʻole Highway Improvements
Retaining Wall at Makapuu, Oahu
Federal Aid Project No. NH-072-1 (51)
SCALE: AS NOTED
DATE: APR. 2007
SHEET No. E-14 OF 18 SHEETS

APPROVED BY:	
HAWAIIAN ELECTRIC COMPANY (HECO)	DATE
HAWAIIAN TELECOM (HTCO)	DATE
OCEANIC TIME WARNER CABLE (OTWC)	DATE

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1 (51)	2007	55	106



NOTE:
For Typical Duct Section Backfill Notes,
See Sheet E-14.

DUCT SECTION DETAILS

NOT TO SCALE

DRAWING REVIEW
Reviewed for HECO's Facilities Only
Date 8/25/07 By P. Dyer
Engineering Department
Hawaiian Electric Company, Inc.

HECO's review of these drawings shall in no way relieve the Customer, its Consultant, its Contractor or anyone acting on the Customer's behalf from the responsibility for engineering, design, materials and any other liability associated with this project.

APPROVED BY:
HAWAIIAN ELECTRIC COMPANY (HECO)
HAWAIIAN TELCOM (HTCO)
OCEANIC TIME WARNER CABLE (OTWC)

RONALD N. S. HO & ASSOC., INC.
ELECTRICAL ENGINEERS
ANDREW I. MIYASAKI
LICENSED PROFESSIONAL ENGINEER
No. 4340-E
HAWAII, U.S.A.
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
Signature: Andrew I. Miyasaki
Expiration Date of the License: 04-30-08

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DUCT SECTION DETAILS

Kalaniana'ole Highway Improvements
Retaining Wall at Makapuu, Oahu
Federal Aid Project No. NH-072-1 (51)

SCALE: AS NOTED
DATE: APR. 2007
SHEET No. E-15 OF 18 SHEETS

