

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-0300(127)	2011	34	60

ELECTRICAL SYMBOLS		
SYMBOL		DESCRIPTION
EXST	NEW	
		Highway Light Standard
		Large Junction Box, Size as Noted on Plans Wall Surface Mounted
		HECO Transformer Pad
		Traffic Signal Controller
		Metering Equipment & Support, See Detail On Sheet A/E-10
		Type "B" Metric Communication Pullbox, (Approx. 28" X 40"), See State Standard Details TE-37
		Type "A" Metric Electric Pullbox (Approx. 22" X 28"), See Standard State Detail TE-37.
		Electrical Handhole
		DOT Cabinet
		HECO Transformer
		CCTV Equipment Cabinet
		CCTV Camera w/Pole
		Conduit Riser
		PVC Underground Ductline
		Surface Mounted PVC Coated GRC Conduit
		Electrical/Signal Ductline with Designator, Indicates Type "A" Duct Section with "2-4E" Ducts. See Sheet E-7 for Typ Duct Sections and Conduit Schedule
		Traffic Signal Head Mounted on Viaduct
		Type I Traffic Signal Standard with Traffic Signal Head.
		Type II Traffic Signal Standard with Traffic Signal Heads Mounted on Mast Arm and Standard; Number of Traffic Signal Heads May Vary.
		Type III Traffic Signal Standard with Traffic Signal Heads Mounted on Mast Arm and Standard, Highway Light Luminaire and Bracket Arm. Number of Traffic Signal Heads May Vary.
		Electrical Ductline
		Telephone Ductline
		Cable Ductline
		Irrigation Ductline
		Water Ductline
		Sewer Ductline
		Drain Ductline
		Gas Ductline
		Traffic Signal Ductline
		Street Light Ductline
		Traffic Signal & Street Light Ductline
		Overhead Lines
		City & County Signal Ductline

SYMBOL NOTES:

1. "X" Through Symbol Indicates Item to be Removed.

GENERAL ELECTRICAL NOTES

1. Electrical Work shall be New Unless Indicated Otherwise.
2. Existing Electrical Equipment shall Remain Unless Indicated Otherwise.
3. The Location of Existing Underground Utilities Shown on Plans are from Existing Records and are Approximations Only. Contractor shall Exercise Caution when Construction Crosses or is in Close Proximity to Existing Underground Utilities. Damages to Utility Companies' Existing Facilities shall be Repaired by the Respective Utility Company and Repair Costs shall be Paid by the Contractor at No Additional Cost to the State.
4. Communication Conduits to have a Minimum Bending Radii of 12".
5. Contractor to Route Conduit Under Exst. Ductlines at Same Depth.

EQUIPMENT SCHEDULE

The Hawaiian Electric Company (HECO) Pullboxes shall be Constructed as Shown in these Drawings & in Accordance with the Following Standard Drawings:

Type	Description
2' x 4' Elec Pullbox	2' x 4' Precast Concrete Pullbox with Precast Concrete Cover, Provided in Accordance with HECO Standard Drawing No. <u>30-2005</u> Except with Elec Inscribed on Cover.

NO.	DATE	REVISION

STEVEN H. SAKU

LICENSED PROFESSIONAL ENGINEER

No. 7637-E

HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION
EXP. 4/30/12

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

Symbol List

Freeway Management System, Phase 1C,
Part 1B: Installation of CCTV and
Communication Infrastructure

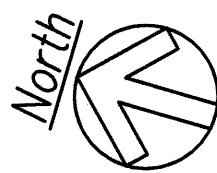
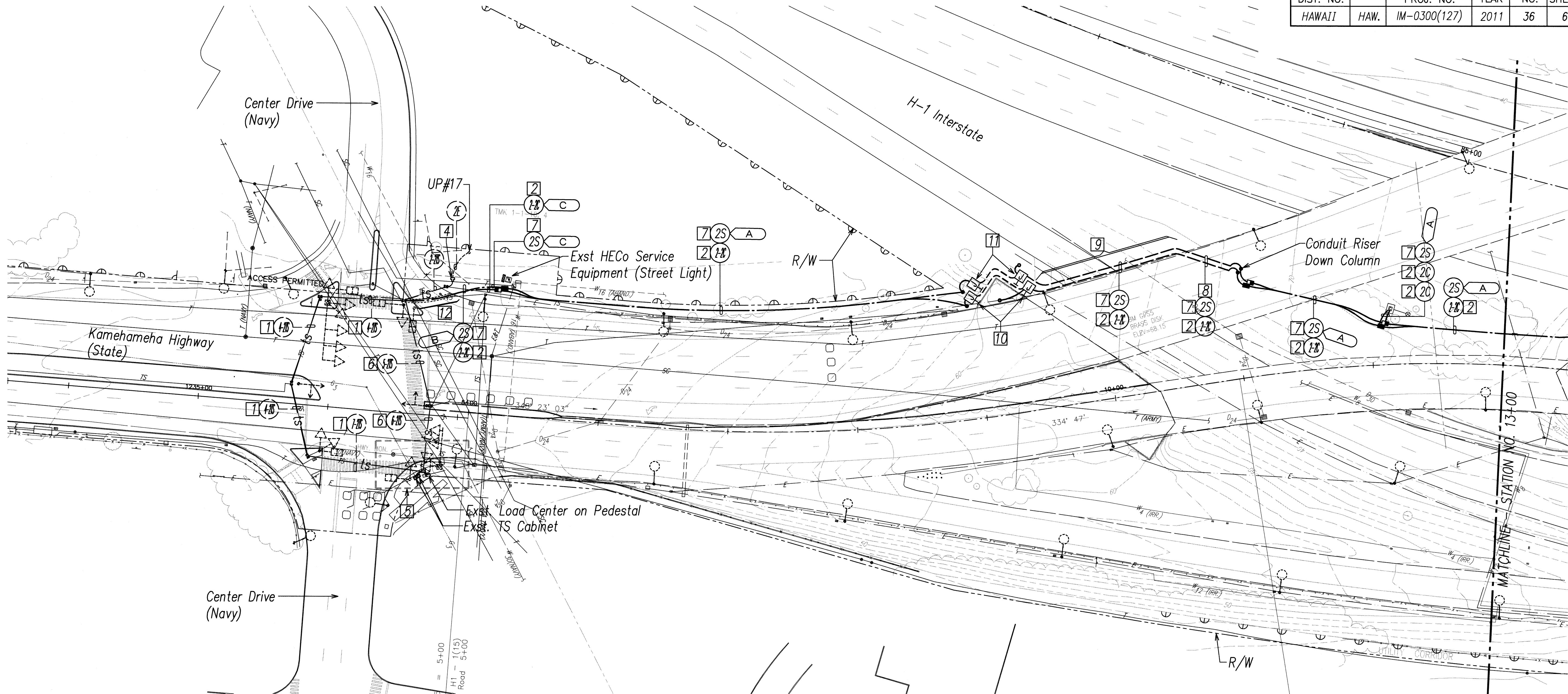
Federal Aid Project No. IM-0300(127)

SCALE: As Noted DATE: 9-7-11

SURVEY PLOTTED BY _____	DATE _____
DESIGNED BY _____	DATE _____
NOTED BY _____	DATE _____
CHECKED BY _____	DATE _____
ORIGINAL PLAN	NO. _____

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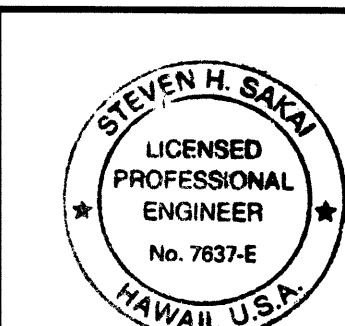
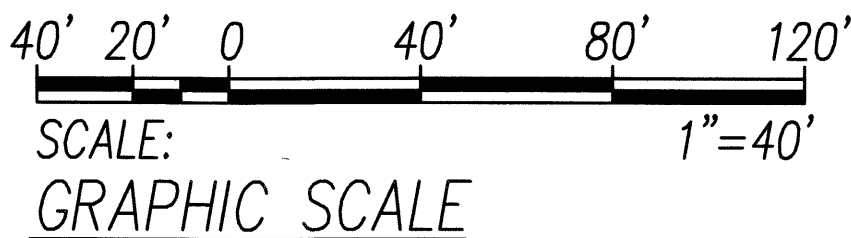
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-0300(127)	2011	36	60



ELECTRICAL & SIGNAL PLAN - 1 SCALE: 1"=40'

NOTE(S):

- Provide New 72-Strand Single Mode Fiber Optic Cable Through Existing Spare 2" Duct.
- Provide New 72-Strand Single Mode Fiber Optic Cable Through One New 2" Duct.
- Fiber Optic Cable Splicing In CCTV Cabinet Shall Be Performed By The Contractor. See Communications Plan for Detail.
- Exst. HECo Meter Pedestal, #550453
- See Enlarged Plan on C/E-8.
- Pull New 1-3C#3/0 in Existing Spare 2" Duct.
- Pull New 1-3C#3/0 in New 2" Duct.
- Strap to Underside of Ramp. See Detail B/E-11.
- Strap to Ramp Parapet. See Detail B/E-11.
- 16" X 16" X 8" SS Communication Junction Box
- 16" X 16" X 8" SS Electrical Junction Box
- Contractor to Avoid Exst. Curb Ramp and Pavement Markings.



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EXP. 4/30/12

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL & SIGNAL PLAN - 1

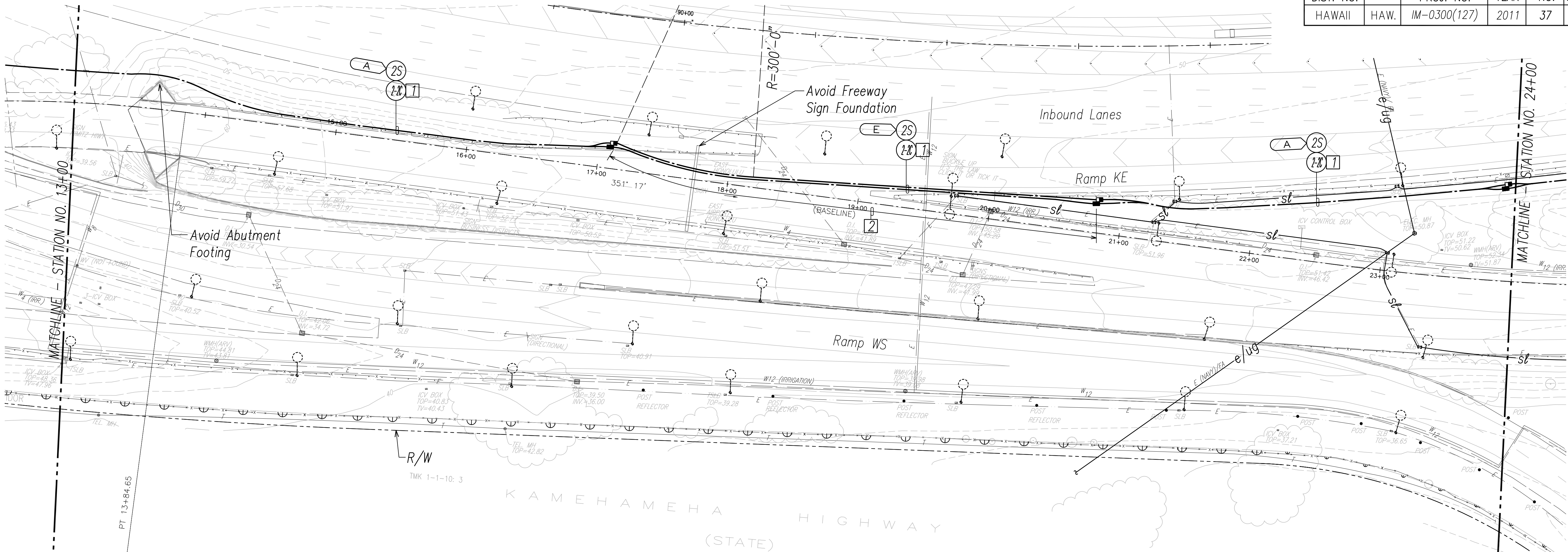
Freeway Management System, Phase 1C,
Part 1B: Installation of CCTV and
Communication Infrastructure

Federal Aid Project No. IM-0300(127)
SCALE: As Noted DATE: 9-7-11

SHEET No. E-3 OF 11 SHEETS

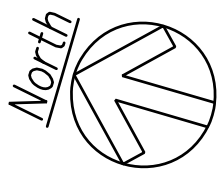
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FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-0300(127)	2011	37	60



NOTE(S):

- 1 Provide New 72-Strand Single Mode Fiber Optic Cable Through One New 2" Duct.
- 2 Install Conduits Using Horizontal Directional Drilling (Approx. 370'-0")

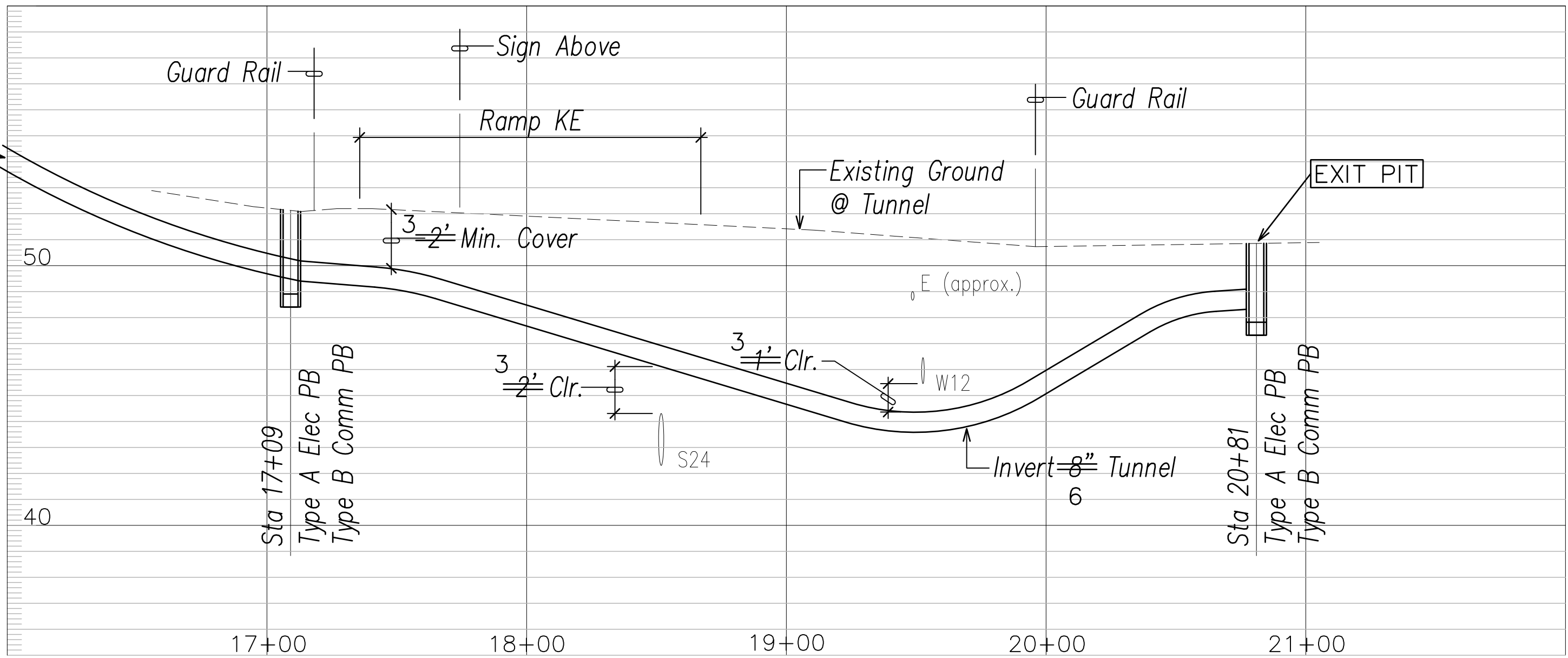


ELECTRICAL & SIGNAL PLAN - II

SCALE: 1"=40'

LEGEND FOR AS-BUILT POSTINGS

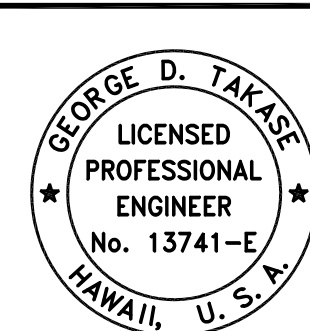
- Squiggly line for as-built deletion
- Double line for as-built deletion
- Roadway Text for as-built posting



PROFILE

SCALES: HORIZ. 1"=40'
VERT. 1"=4'

40' 20' 0 40' 80' 120'
SCALE: 1"=40'
GRAPHIC SCALE



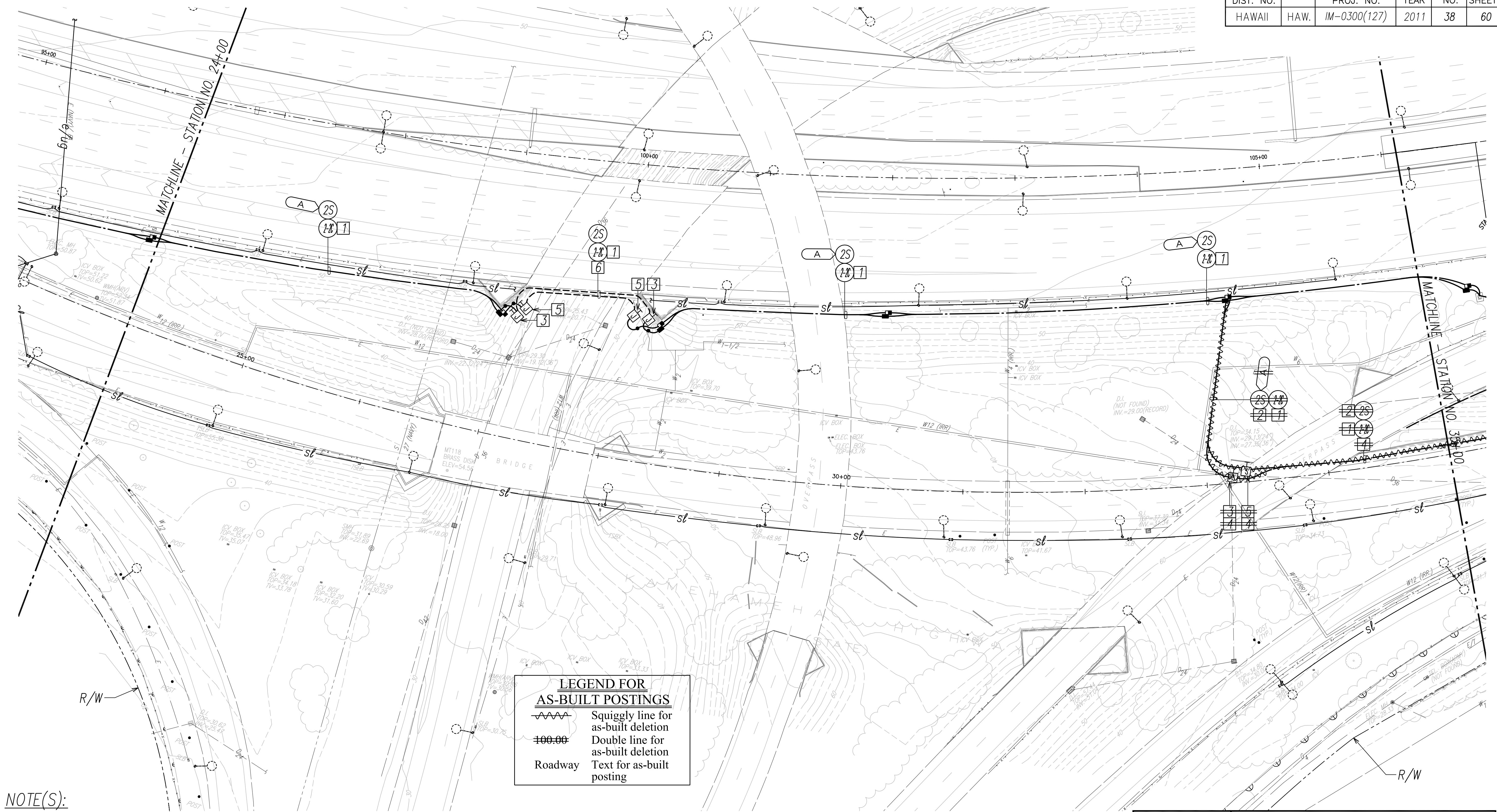
ELECTRICAL & SIGNAL PLAN - II

Freeway Management System, Phase 1C,
Part 1B: Installation of CCTV and
Communication Infrastructure
Federal Aid Project No. IM-0300(127)
SCALE: As Noted DATE: 9-7-11

SHEET No. E-4 OF 11 SHEETS

"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-0300(127)	2011	38	60



LEGEND FOR AS-BUILT POSTINGS

Squiggly line for as-built deletion

Double line for as-built deletion

Roadway Text for as-built posting

NOTE(S):

- 1

Provide New 72-Strand Single Mode Fiber Optic Cable Through One New 2" Duct.
- 2

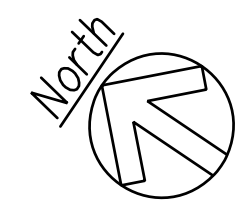
Pull New 1-3C#3/0 in New 2" Duct.
- 3

16" X 16" X 8" SS Electrical Junction Box
- 4

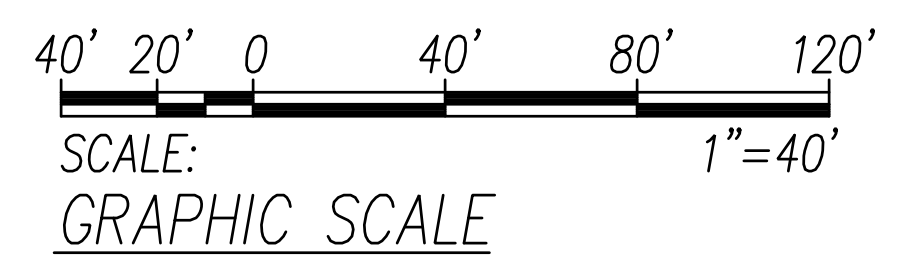
Mount Conduits and Junction Box on Existing Retaining Wall as High as Practicable. See Structural Sheet S-4 for Mounting Detail.
- 5

16" X 16" X 8" SS Communication Junction Box
- 6

Mount Conduits to Overpass Parapet. See Detail A/E-11.



ELECTRICAL & SIGNAL PLAN - III
SCALE: 1"=40'



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL & SIGNAL PLAN - III

*Freeway Management System, Phase 1C,
Part 1B: Installation of CCTV and
Communication Infrastructure*

Federal Aid Project No. IM-0300(127)
SCALE: As Noted DATE: 9-7-11

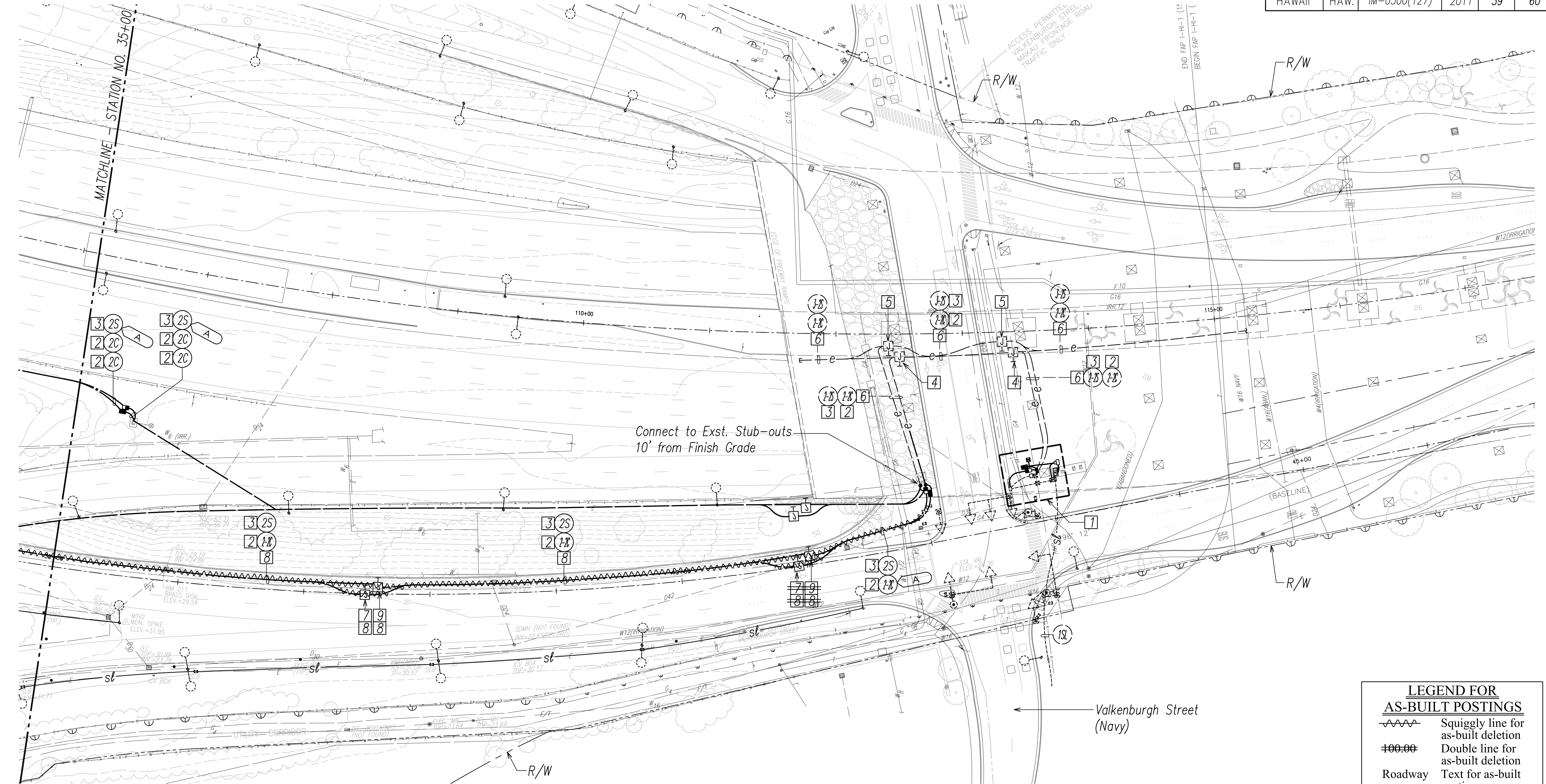
SHEET No. E-5 OF 11 SHEETS

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
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NOTEBOOK	
No.	

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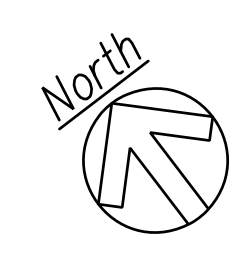
"AS-BUILT"

FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-0300(127)	2011	39	60

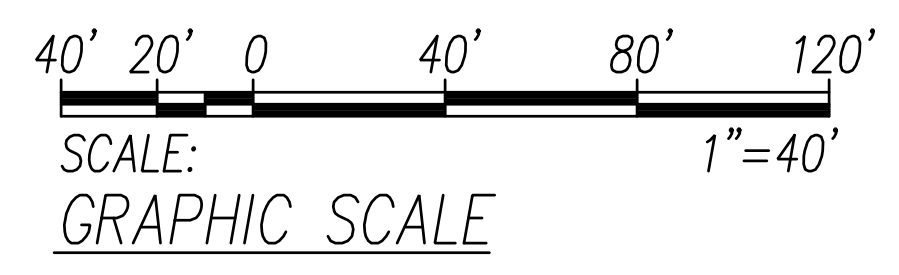


NOTE(S):

- 1 See Sheet C/E-9 for Enlarged Plan.
- 2 Provide New 72-Strand Single Mode Fiber Optic Cable Through One 2" Conduit.
- 3 Pull New 1-3C#3/0 in 2" Conduit.
- 4 Existing 36" X 36" X 8" SS Electrical JB on Viaduct.
- 5 Existing 32" X 32" X 12" SS Communication JB on Viaduct.
- 6 Existing Surface Mounted Conduit on Viaduct.
- 7 16" X 16" SS Electrical Junction Box
- 8 Mount Conduits and Junction Box on Existing Retaining Wall as High as Practicable. See Structural Sheet S-4 for Mounting Details.
- 9 16" X 16" SS Communication Junction Box



ELECTRICAL & SIGNAL PLAN - IV
SCALE: 1"=40'



LEGEND FOR AS-BUILT POSTINGS

- Squiggly line for as-built deletion
- Double line for as-built deletion
- Roadway Text for as-built posting

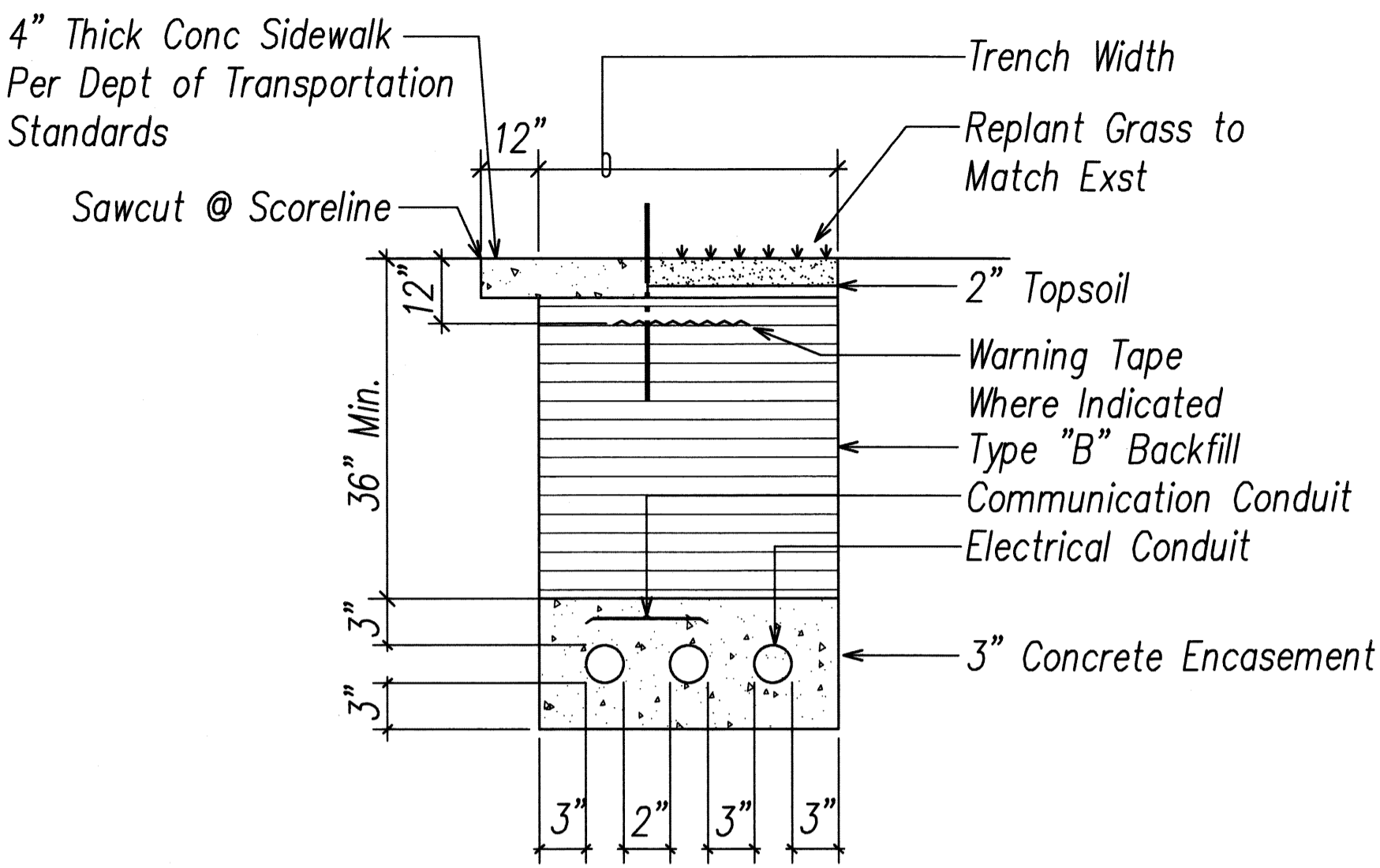
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL & SIGNAL PLAN - IV

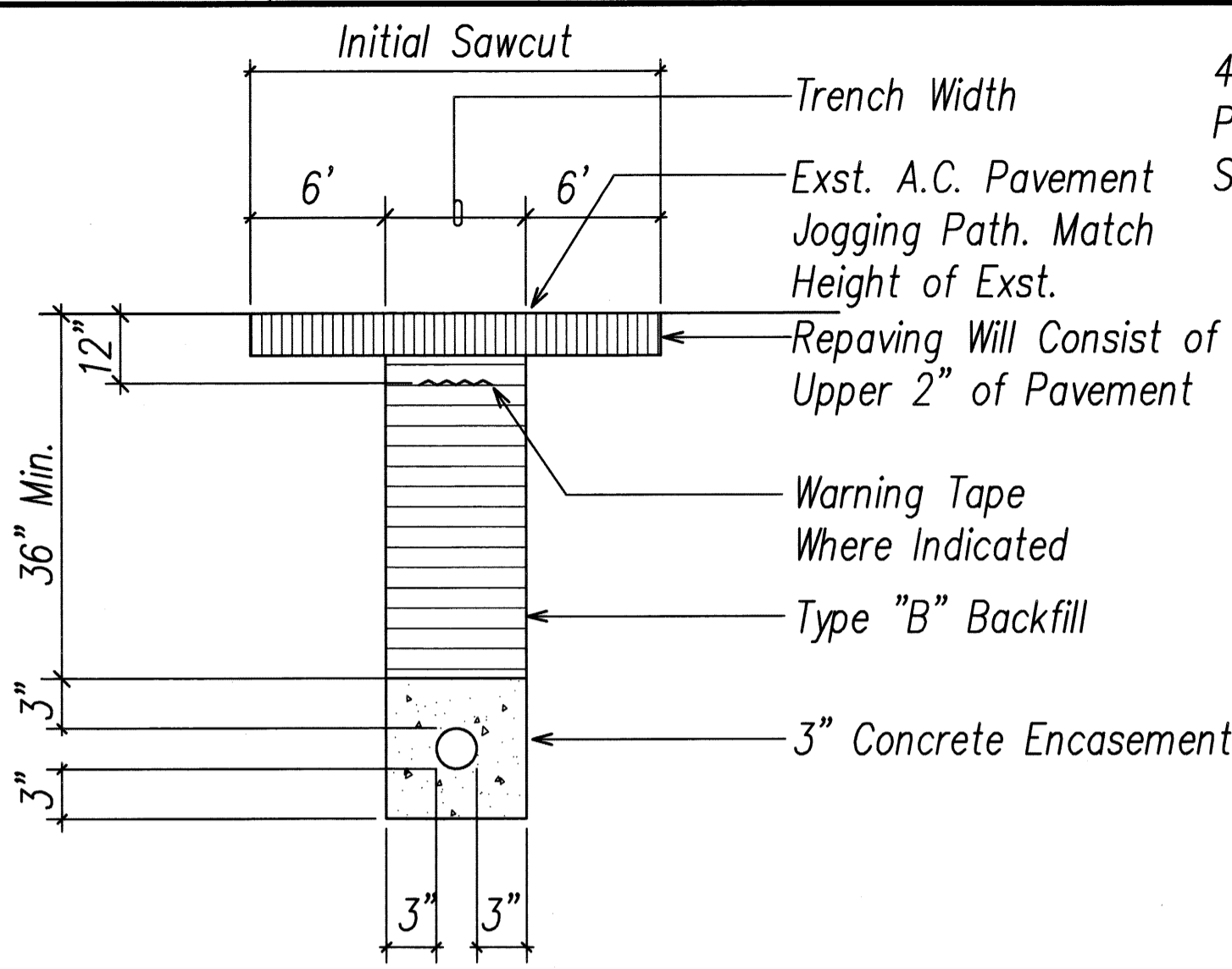
*Freeway Management System, Phase 1C,
Part 1B: Installation of CCTV and
Communication Infrastructure*

Federal Aid Project No. IM-0300(127)
SCALE: As Noted DATE: 9-7-11

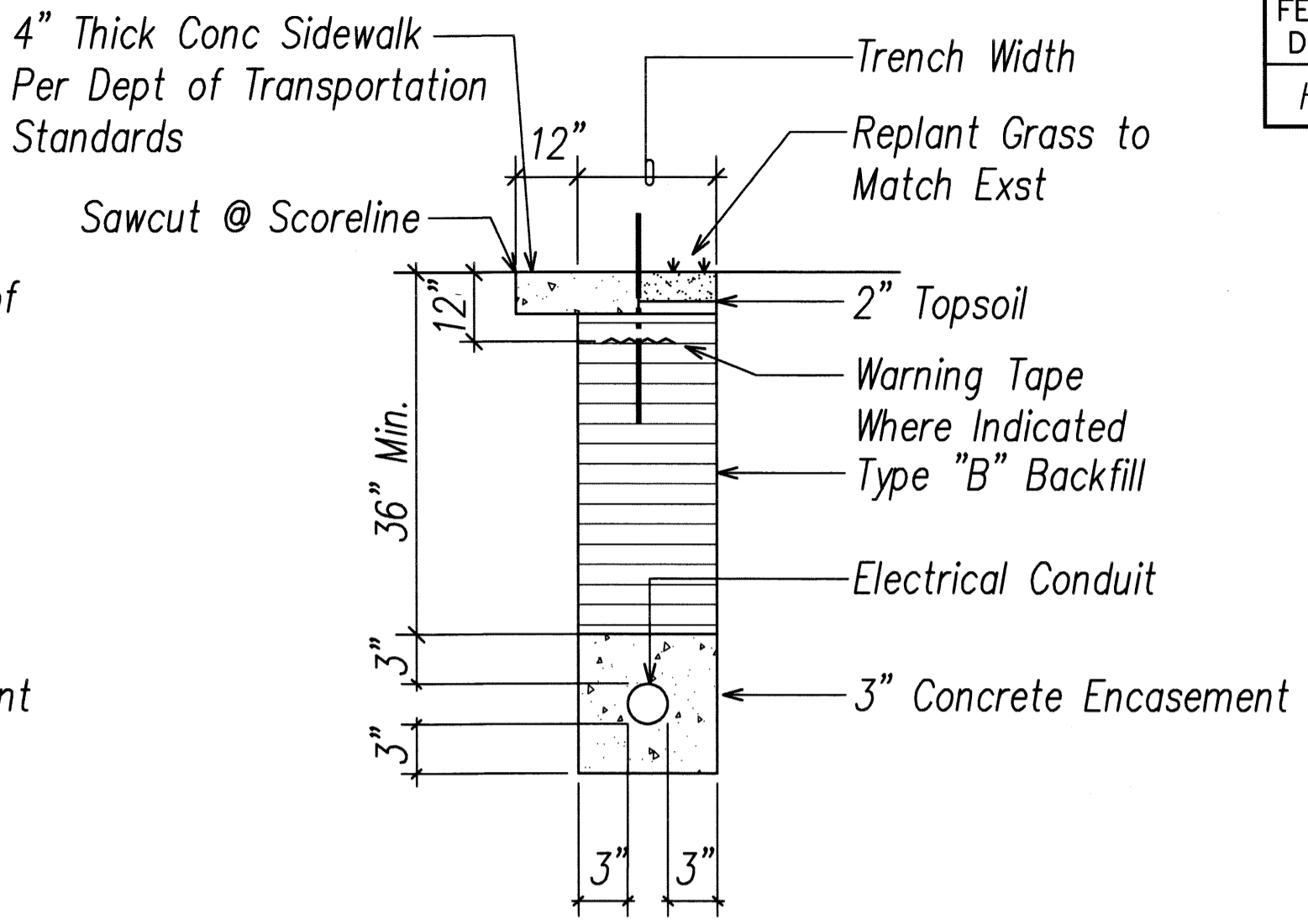
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-0300(127)	2011	40	60



SECTION A

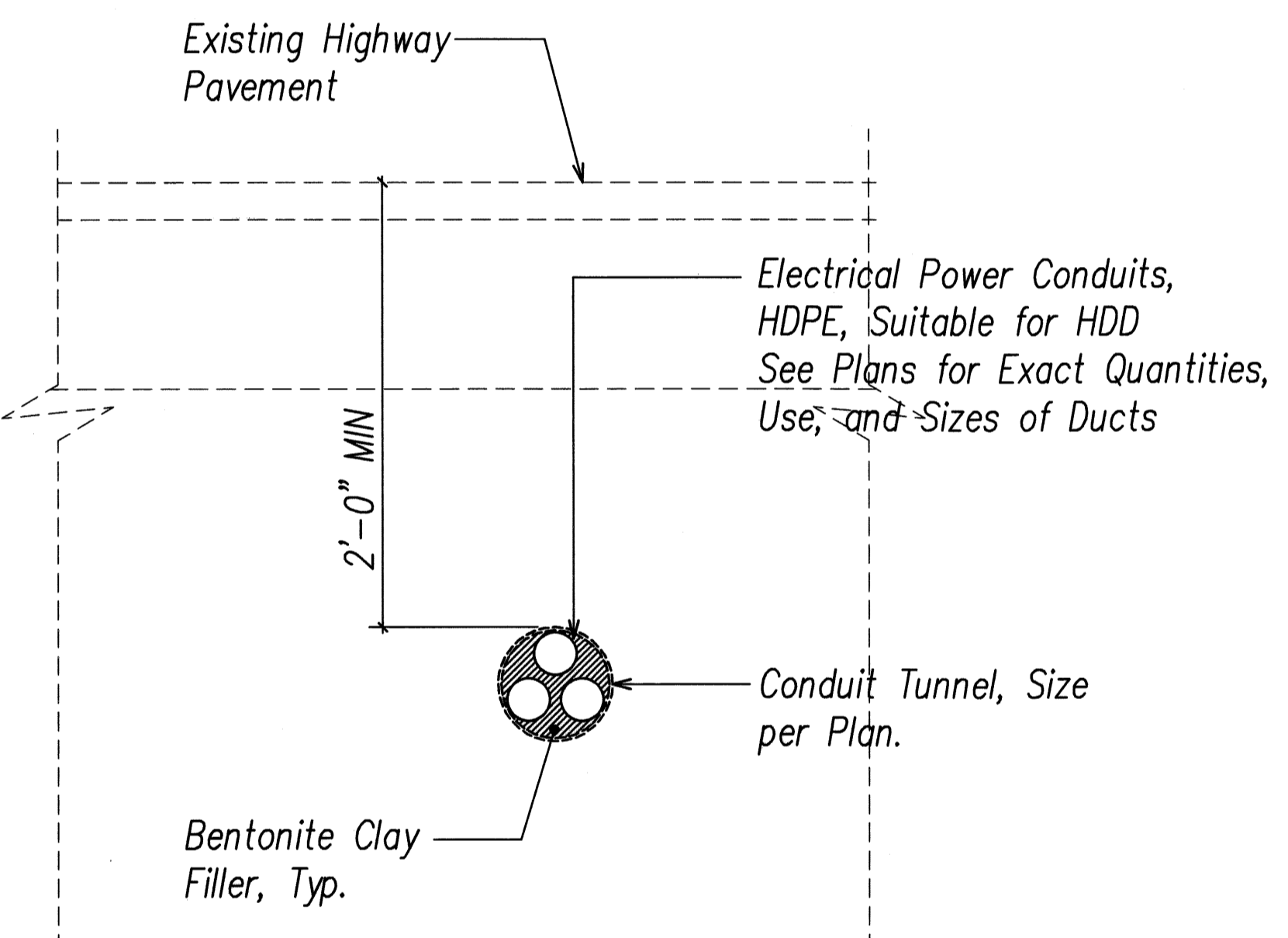


SECTION B

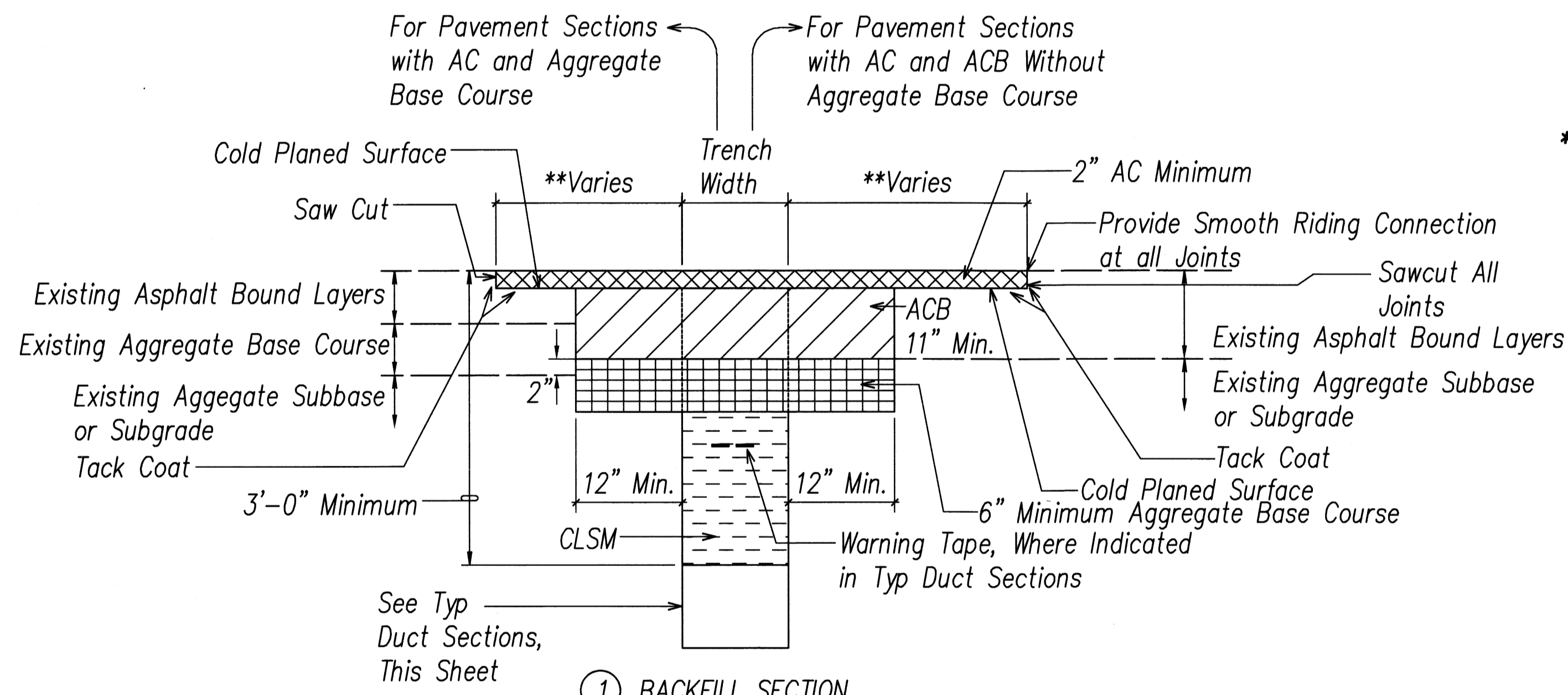


SECTION C

ITEM	DESCRIPTION
(2C)	Communication 2" Conduit
(2-2)	Communication 2-2" Conduit
(2TS)	Traffic Signal 2" Conduit
(2L)	Street Light 2" Conduit
(2S)	Secondary Power 2" Conduit
(2E)	HECO 2" Conduit



SECTION E



① BACKFILL SECTION WITHIN STATE RIGHT-OF-WAY UNDER EXISTING ROADWAY & PAVED SHOULDER ①, ②

TYPICAL BACKFILL SECTION (STATE)
NOT TO SCALE

- ** Notes For Backfill Section ①**
- If Trench Aligned Transverse to Direction of Travel, Sawcut 1 Foot on Each Side of Trench.
 - If Trench Aligned Along Direction of Travel, Sawcut to Edge of Lane in which Edge of Trench is Located.
 - Smoothness of Paved Surfaces: The Distance from the Paved Surface to the Testing Edge of a Ten-foot Straight Edge Between Two Points of Contact shall not Exceed 3/16".

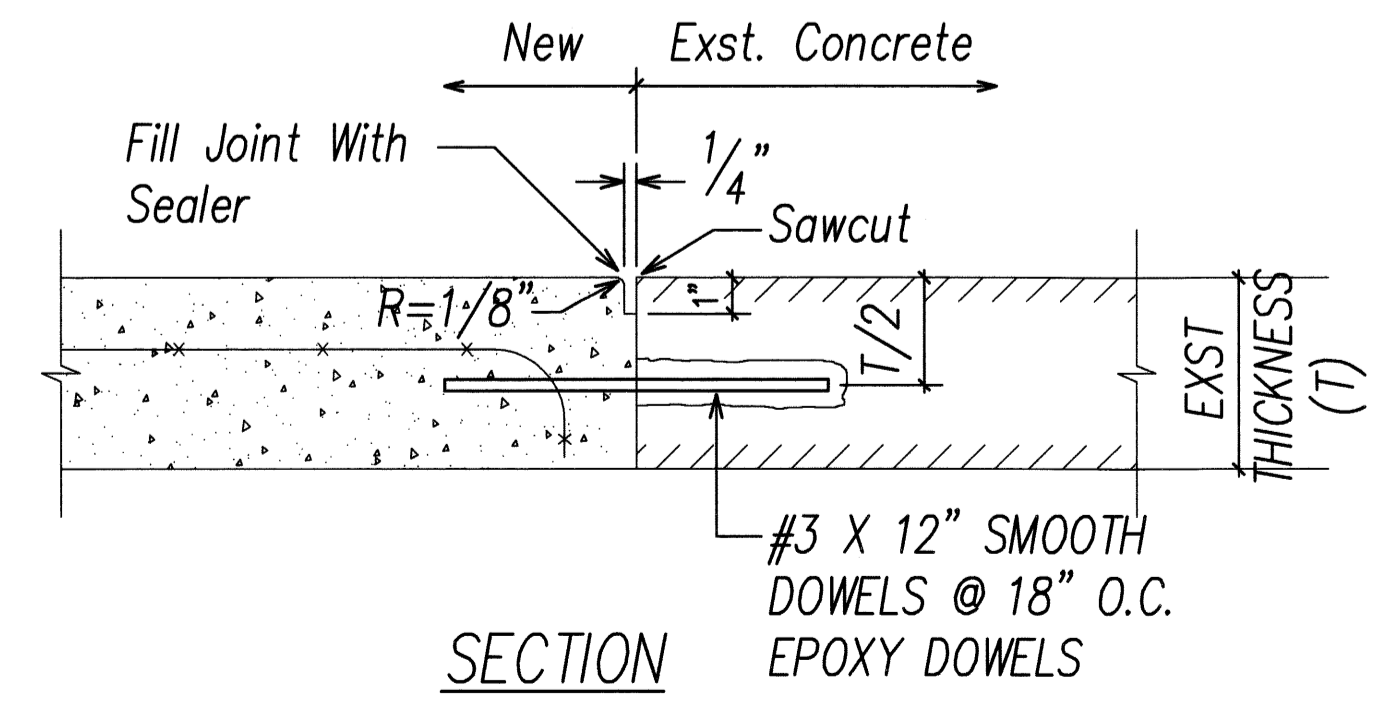
STATE RIGHT-OF-WAY BACKFILL NOTES

- Trench Backfill Material "B"
 - Sand Equivalent ≥ 2
 - 8" Max. Lift Loose
 - 95% Compaction
- Concrete - 3" Encasement, 2500 PSI Compressive Strength @ 28 Days.

NOTE(S):

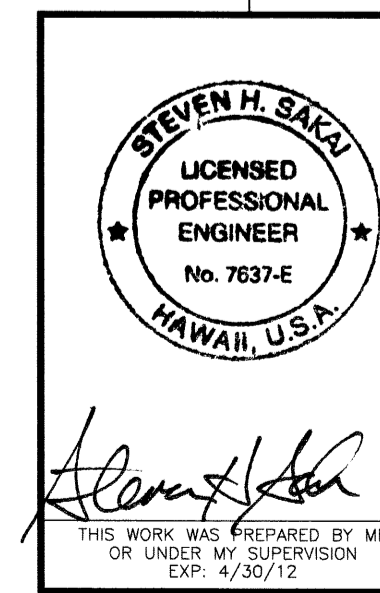
- Contractor to Observe Best Management Practices and take Measures Required for Existing Storm Drain Inlets or Catch Basins. See Sheet C-8 for Details.
- Contractor to Observe Best Management Practices for Existing Grassed or Landscaped Areas. See Detail on Sheet C-8.

Typical Duct Section
NOT TO SCALE



SECTION

Concrete Sidewalk Restoration Detail
NOT TO SCALE

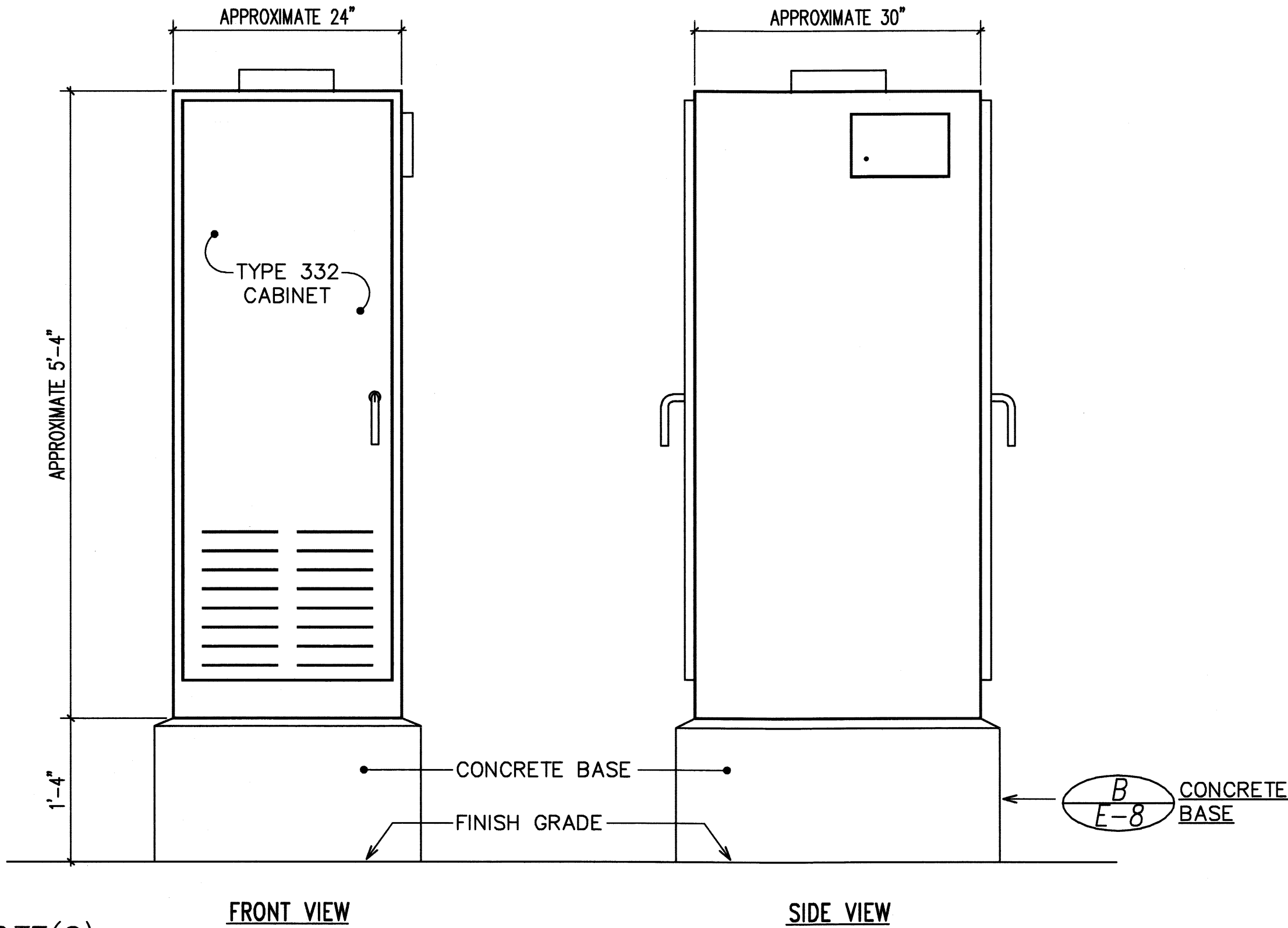


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DUCT SECTION

Freeway Management System, Phase 1C,
Part 1B: Installation of CCTV and
Communication Infrastructure
Federal Aid Project No. IM-0300(127)
SCALE: As Noted DATE: 9-7-11

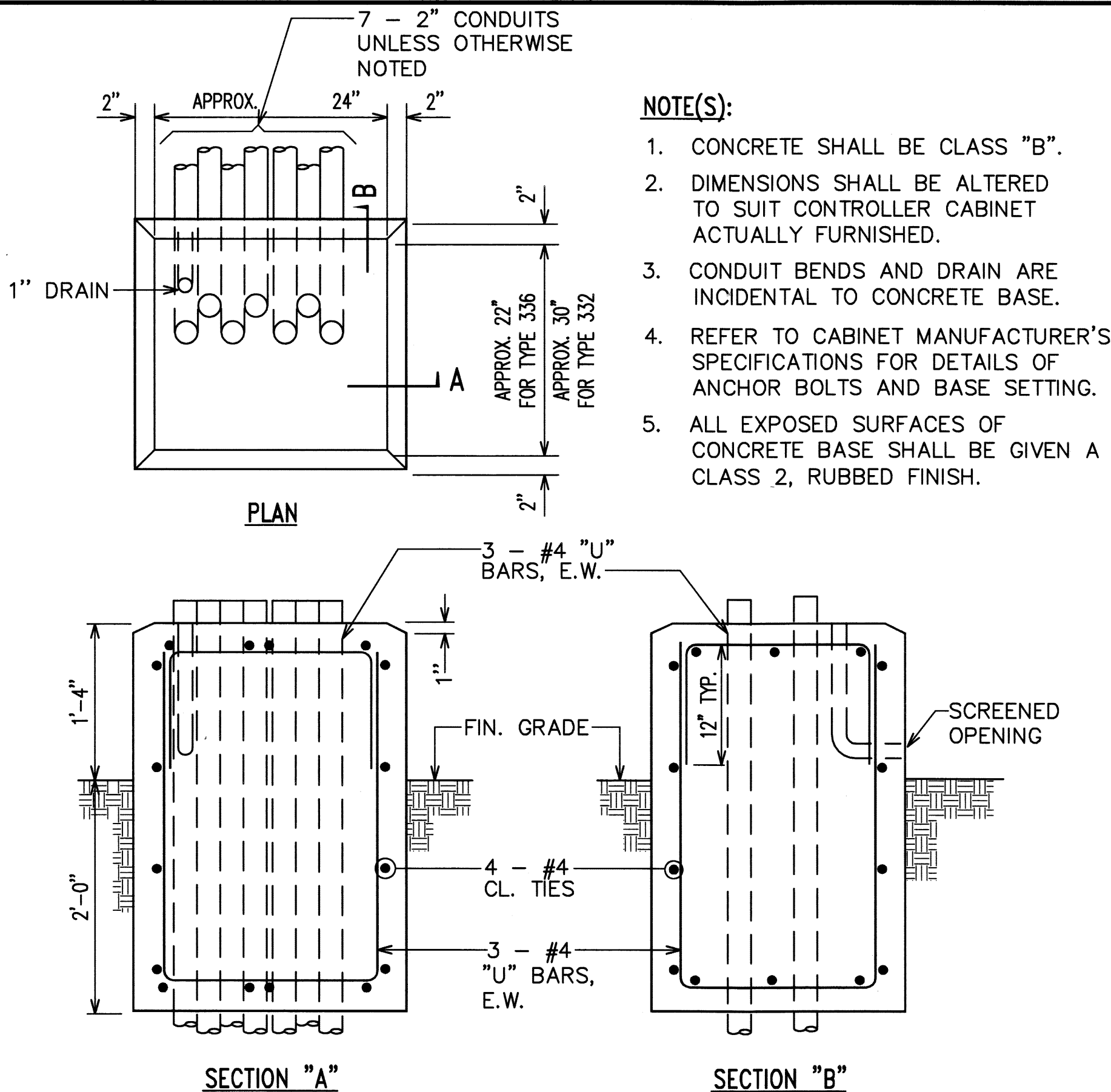
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-0300(127)	2011	41	60



NOTE(S):

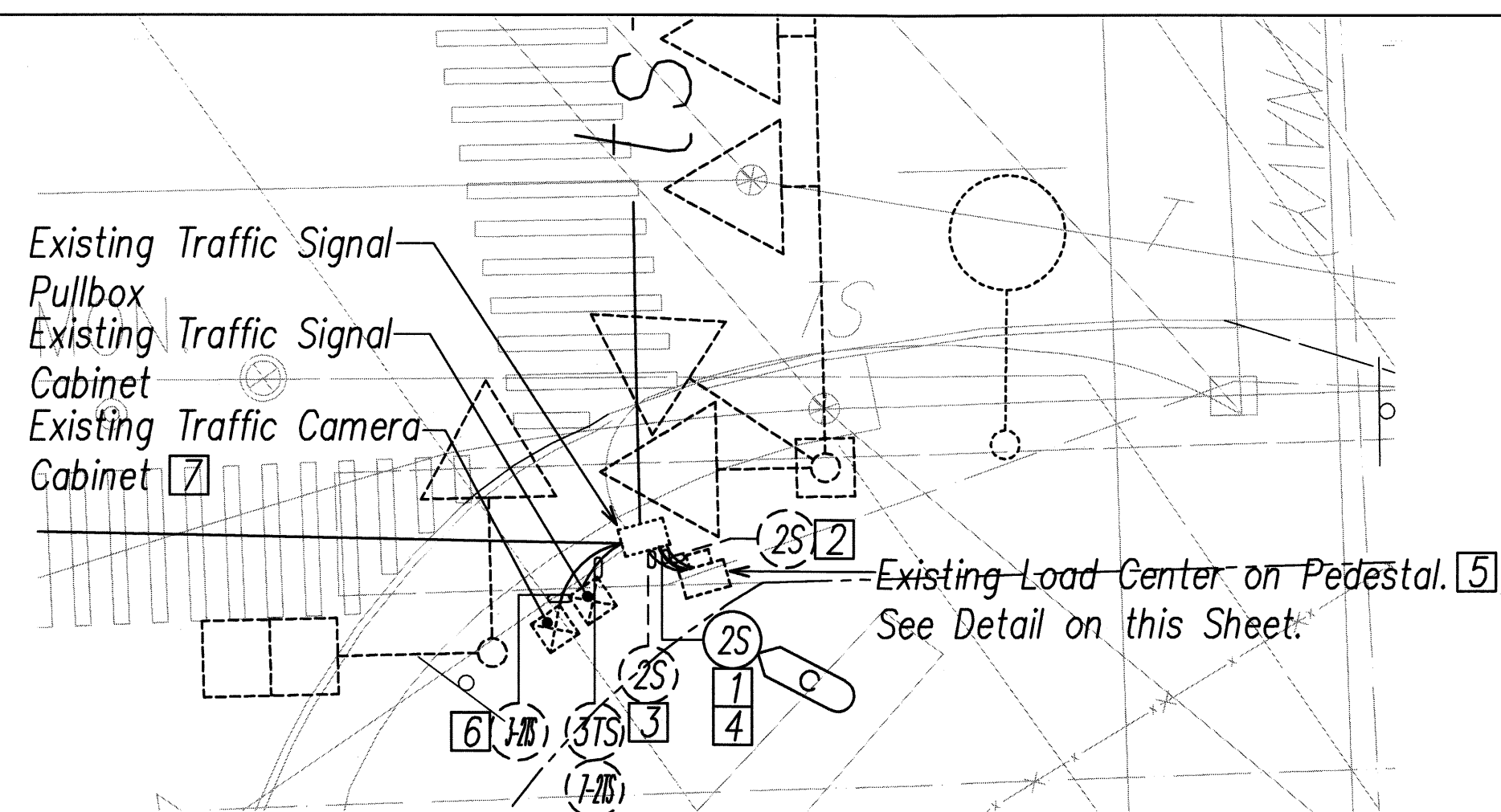
- Splice Cabinet with Rack Mounted Interconnect Center. Rack Mounted Interconnect Center shall be paid under Section 681-CCTV System.

Type 332 Traffic Controller Cabinet Detail
Not To Scale



- NOTE(S):
- CONCRETE SHALL BE CLASS "B".
 - DIMENSIONS SHALL BE ALTERED TO SUIT CONTROLLER CABINET ACTUALLY FURNISHED.
 - CONDUIT BENDS AND DRAIN ARE INCIDENTAL TO CONCRETE BASE.
 - REFER TO CABINET MANUFACTURER'S SPECIFICATIONS FOR DETAILS OF ANCHOR BOLTS AND BASE SETTING.
 - ALL EXPOSED SURFACES OF CONCRETE BASE SHALL BE GIVEN A CLASS 2, RUBBED FINISH.

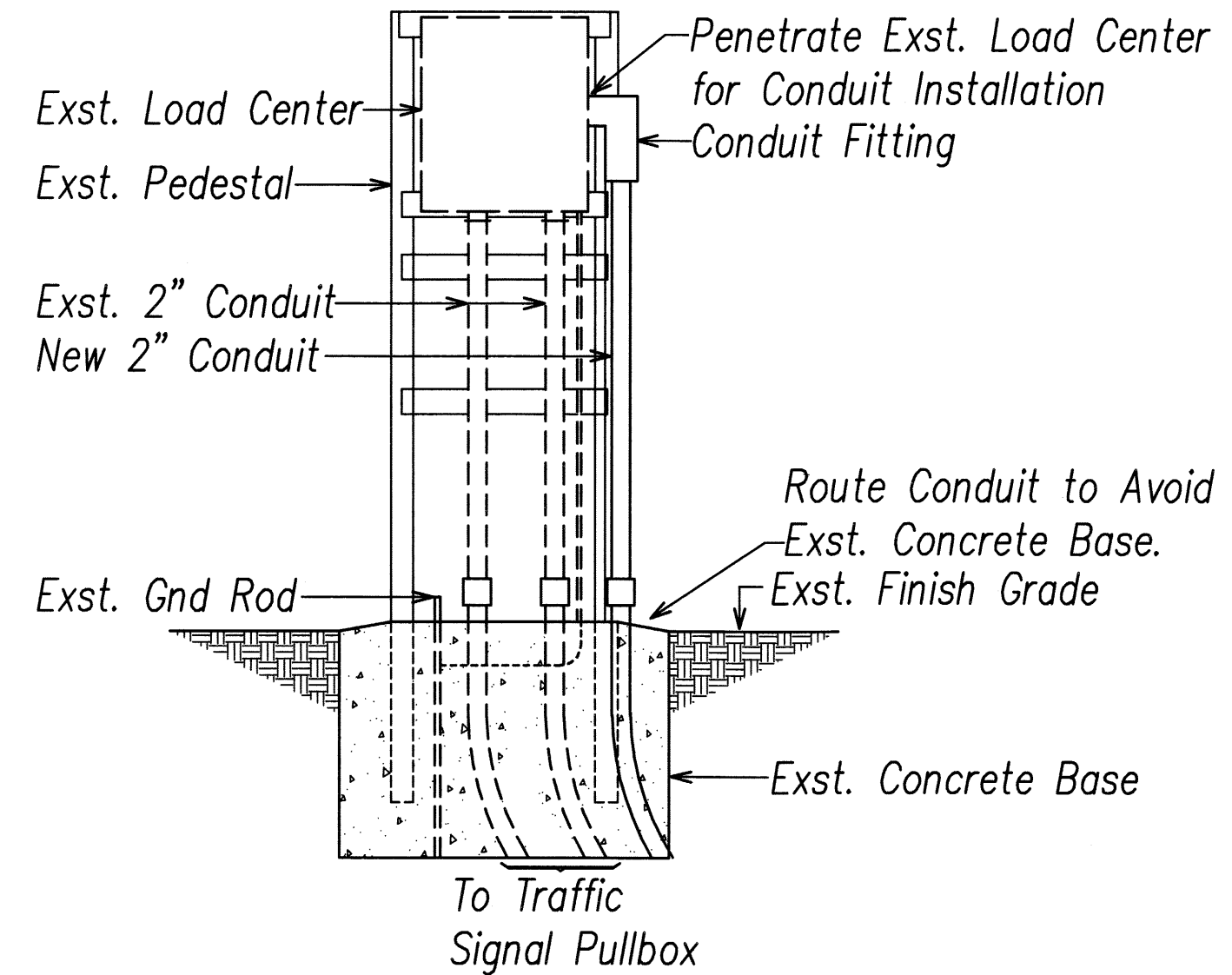
Type "D" Concrete Base Detail
Not To Scale



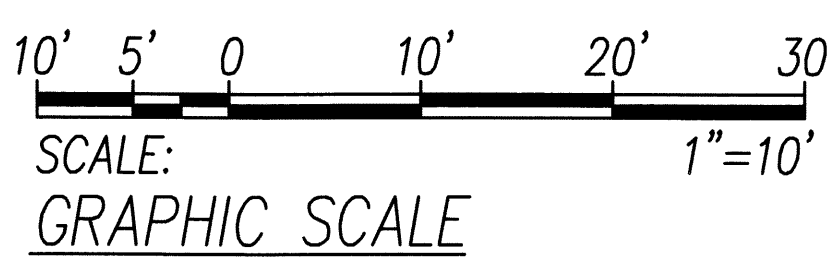
NOTE(S):

- Provide new 2" Conduit from Existing Load Center to Existing Traffic Signal Pullbox. Penetrate Pull Box for Conduit Installation.
- Exst. 2"C, 1-3C#2
- Exst. 2"C, 1-3C#6
- New 2"C, 1-3C#1/0
- Provide new 1P30A Circuit Breaker in Exst. Load Center for Traffic Camera.
- Provide New 72-Strand Single Mode Fiber Optic Cable Through Existing 2" Duct with Exst. Fiber Cable.
- See Communications Plan for Fiber Splicing Details.

Center Drive Enlarged Plan
SCALE: 1"=10'



Center Drive Load Center Pedestal
NOT TO SCALE



NO.	DATE	REVISION

STEVEN H. SAKAI
LICENSED PROFESSIONAL ENGINEER
No. 7037-E
HAWAII, U.S.A.

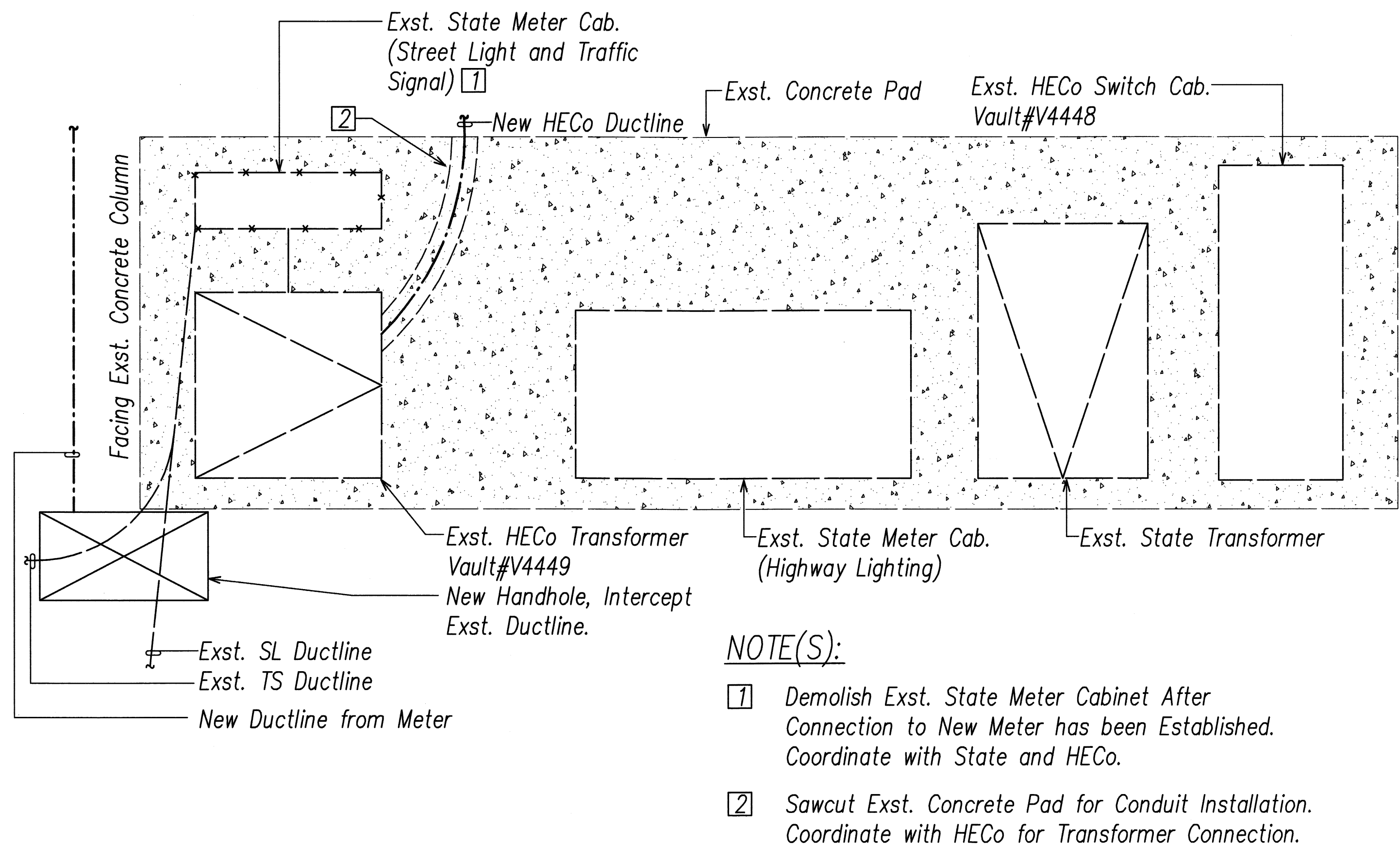
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

Fiber Cabinet & Center Drive Detail

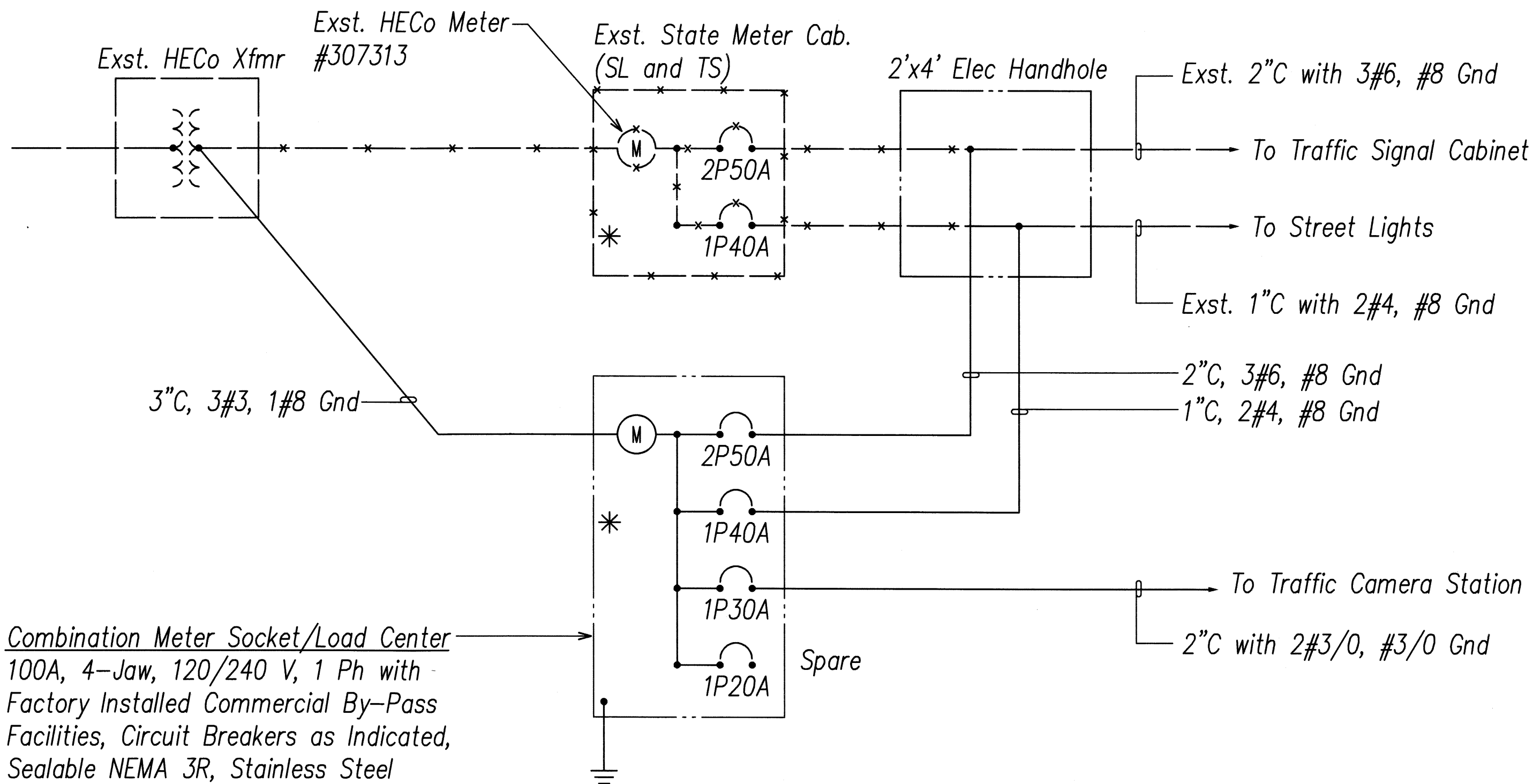
Freeway Management System, Phase 1C,
Part 1B: Installation of CCTV and
Communication Infrastructure

Federal Aid Project No. IM-0300(127)
SCALE: As Noted DATE: 9-7-11

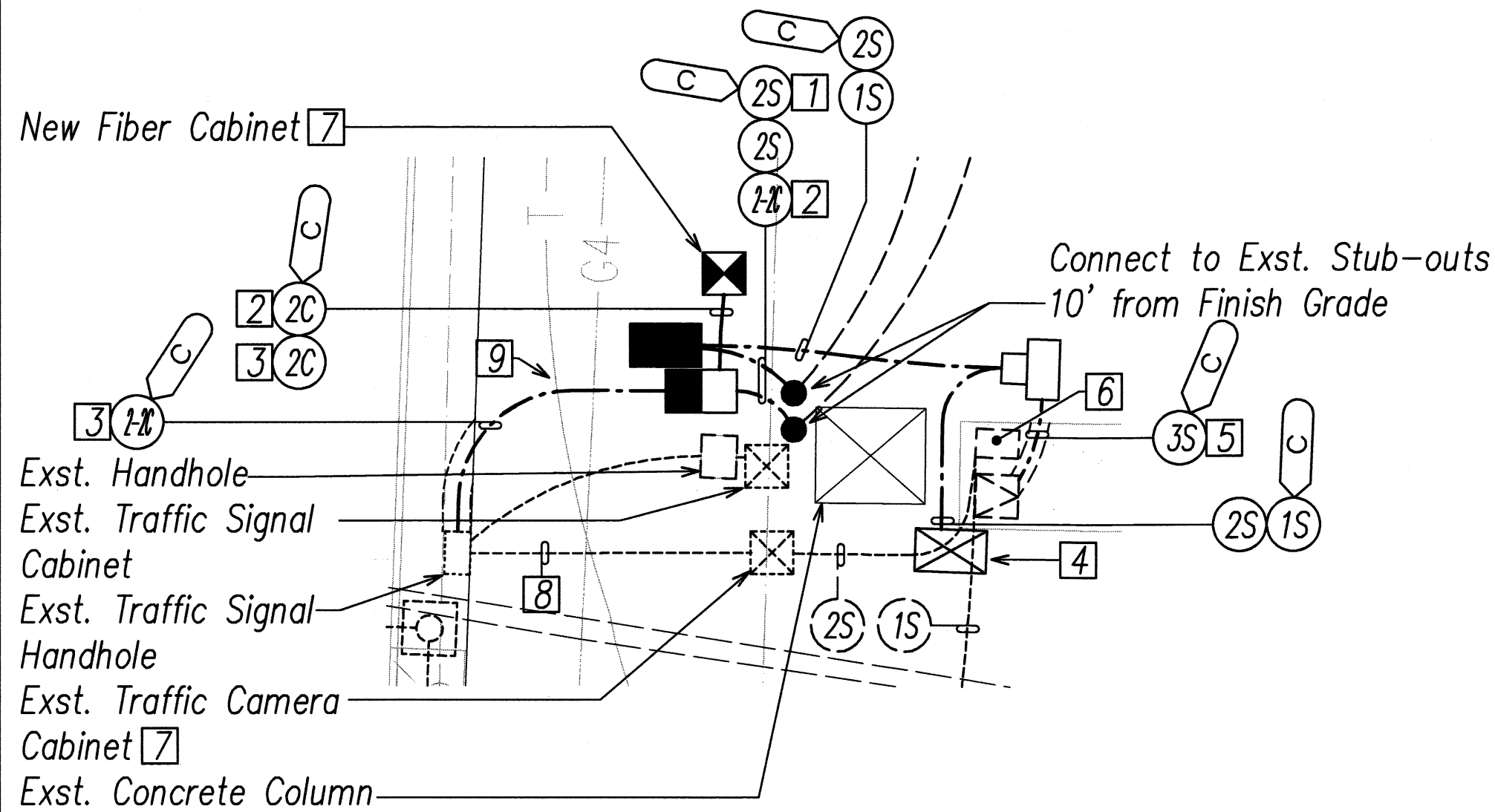
FED. ROAD DIST. NO.	STATE	FEDERAL AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	IM-0300(127)	2011	42	60



A
E-9
Electrical Equipment Pad Plan
Not to Scale



B
E-9
Existing Street Lighting System and Traffic Signal Service One-Line Diagram
Not to Scale



C
E-9
Enlarged Communication Equipment Plan
SCALE: 1"=10'

- NOTE(S):**
- [1] Pull New 1-3C#3/0 in 2" Conduit.
 - [2] Provide New 72-Strand Single Mode Fiber Optic Cable Through One 2" Conduit.
 - [3] Provide New 24-Strand Single Mode Fiber Optic Cable Through One 2" Conduit.
 - [4] Contractor to Tone for Electrical Ductline and Intercept with Handhole.
 - [5] Sawcut Exst. Concrete Pad for Conduit Installation.
 - [6] Exst. State Meter Cab. (SL and TS)
 - [7] See Communications Plan for Fiber Splice Details.
 - [8] Provide New 24-Strand Single Mode Fiber Optic Cable Through Exst. 2" Conduit.
 - [9] Route Ductline Under Exst. Telephone and Gas lines. Provide 12" Vertical Clearance from both Telephone and Gas lines.

10' 5' 0 10' 20' 30'
SCALE: 1"=10'
GRAPHIC SCALE

NO.	DATE	REVISION

STEVEN H. SAKAI
LICENSED PROFESSIONAL ENGINEER
No. 7837-E
HAWAII, U.S.A.

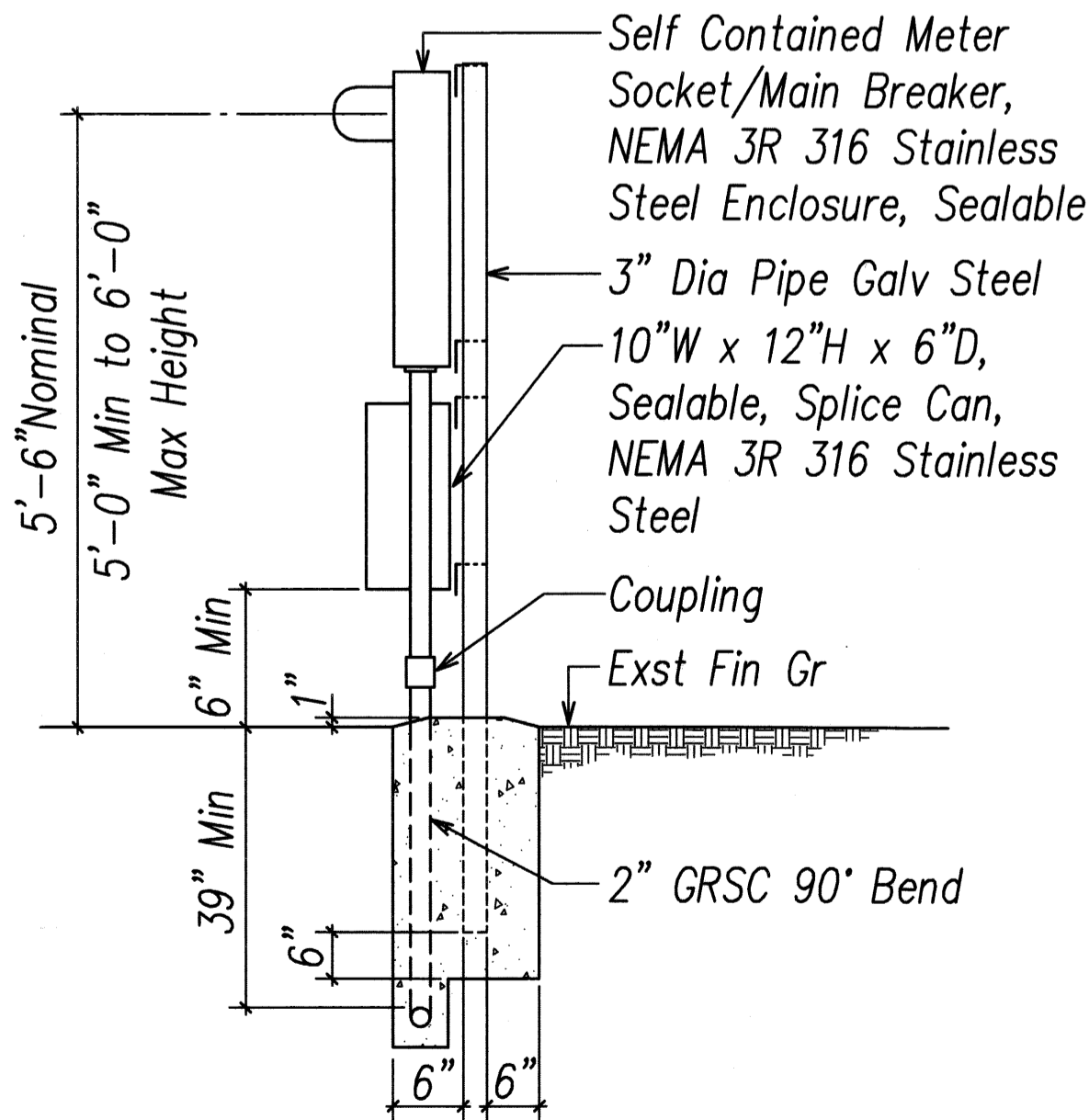
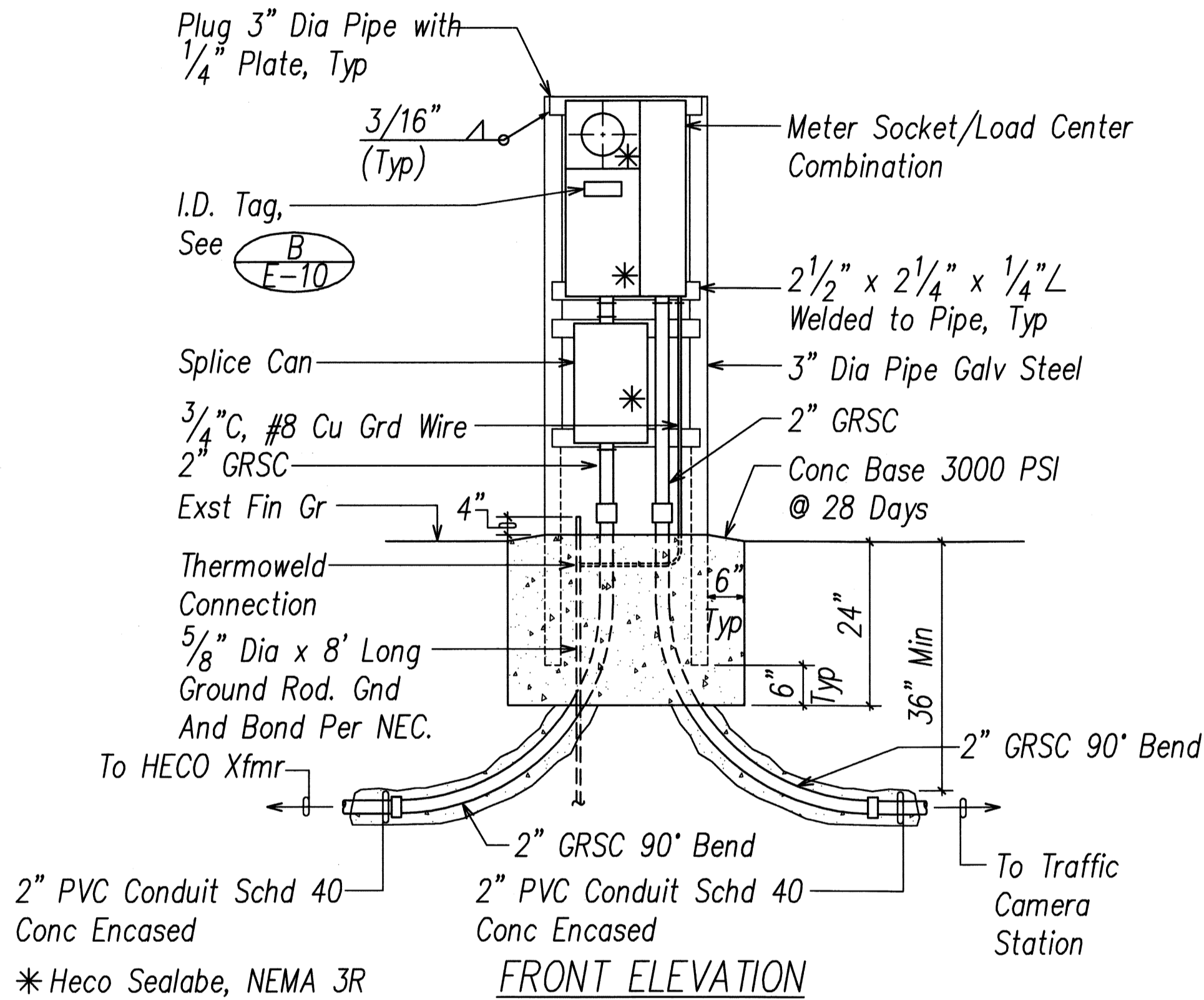
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
Valkenburgh Detail
*Freeway Management System, Phase 1C,
Part 1B: Installation of CCTV and
Communication Infrastructure*
Federal Aid Project No. IM-0300(127)
SCALE: As Noted DATE: 9-7-11

SHEET No. E-9 OF 11 SHEETS

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HAWAII	HAW.	IM-0300(127)	2011	43	60

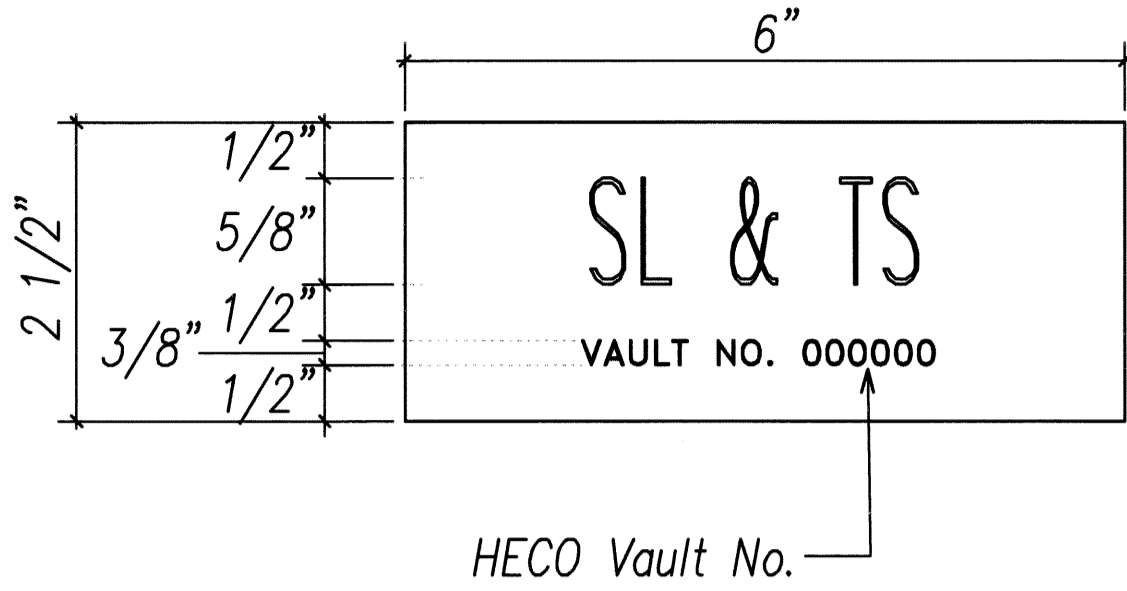
NOTES:

- All Conduits to Contain a Polyolefin Pull Line.
- Pedestal shall be Hot-Dipped Galvanized After Fabrication.
- All Fastening Bolts, Nuts & Washers shall be 316 Stainless Steel.
- Provide 4 Ft Clearance in Front of Meter.
- See One-Line Diagram on B/E-9.
- Contractor shall Make All Electrical Connection to Traffic Camera Cabinet.



A
E-10

METER SOCKET DETAIL
NOT TO SCALE



NOTES:

- 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".
- Attach to Meter Socket Using Scotch 3M Brand Very High Bond (VHB) Double Coated Acrylic Foam Tape or Equivalent.
- Letters/Numbers shall be 1/16" Stroke, (White in Color).
- Letters/Numbers Area Inscribed by Cutting through "Black Cap Sheet" to Expose White Letters/Numbers.

B
E-10

METER SOCKET I.D. TAG DETAIL
NOT TO SCALE

NO.	DATE	REVISION

STEVEN H. SAKAI
LICENSED PROFESSIONAL ENGINEER
No. 7637-E
HAWAII, U.S.A.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

Meter Pedestal Detail

Freeway Management System, Phase 1C,
Part 1B: Installation of CCTV and
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