


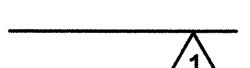
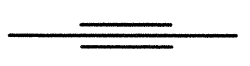
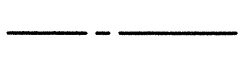
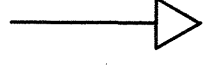
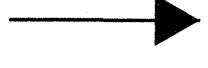




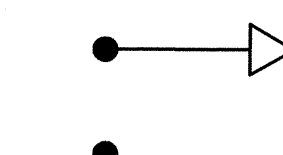
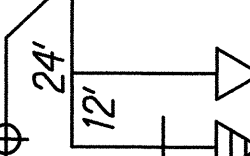

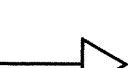
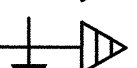
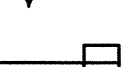





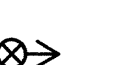

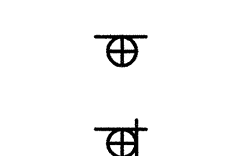
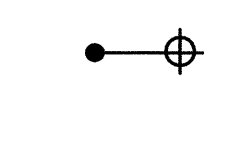


TRAFFIC SIGNAL NOTES

1. The locations of the Traffic Signal Standards, Traffic Signal Standards w/Mast Arms, Pedestrian Push Buttons, Traffic Controller, Pullboxes, Conduits and Loop Detectors shall be staked out in the field by the Contractor and approval of the locations shall be obtained from the Engineer prior to construction and installation.
2. All splicing shall be done in the pullboxes.
3. Furnishing and installing the conduit stubouts (pullboxes to edge of pavement) will not be paid for separately but shall be considered incidental to the various contract items.
4. A solid #8 bare copper wire shall be pulled with the traffic signal control cable for equipment ground. Cost shall be incidental to the installation of the control cable.
5. All Traffic signal controller equipment shall be completely wired in the cabinet and shall control the traffic signals as called for in the plans.
6. The loop amplifier units furnished for this project shall be capable of operating the loop detector configurations shown on the plans. Cost for the loop amplifier shall be incidental to the installation of the loop detector.
7. Should any defect be encountered during the warranty period, the manufacturer will be notified and he shall promptly correct such defect. Service call (by factory qualified representative) during the warranty period for repairs or other maintenance shall be answered within 24 hours and shall be done at no expense to the State. All repairs shall be done as soon as possible.
8. All traffic signal work shall conform to the requirements of the "Manual On Uniform Traffic Control Devices For Streets And Highways", Federal Highway Administration (1988) and Amendments.
9. Locations of traffic markings and markers (lane lines, Stop lines, crosswalk, etc.) shown on the plans shall be verified with the Engineer prior to the installation of the traffic signal system.
10. All Conduits between pullboxes and Traffic Signal Standards and between pullboxes and Pedestrian Signal Heads shall not be paid for separately but considered incidental to the various contract items.
11. All Signal-Drop Cables (Type 5 Cable) from the various Types Traffic Signal Head on the traffic signal standards and mast arms to the pullboxes shall not be paid for separately but considered incidental to the Traffic Signal Head.
12. After installing the cables in the conduits, the Contractor shall duct seal all conduits with an Engineer's approved product. The cost for duct sealing the conduits shall not be paid for separately but considered incidental to the various contract items.
13. After installing all the traffic signal cables, the Contractor shall duct seal all conduits in the pullboxes, traffic signal standards and controller cabinet concrete base. The duct seal material shall be approved by the Traffic Signal Inspector/Engineer and shall not be paid for separately but considered incidental to the direct buried and/or concrete encased conduits.

TRAFFIC SIGNAL LEGEND

-  New Meter Pedestal
-  New Traffic Signal Master Controller
-  New Traffic Signal Controller
-  New Traffic Signal and Street Light Conduits & Cables
-  New Traffic Signal Conduits With Concrete Jacket
-  New Street Light Conduit With Concrete Jacket
-  New 12" RYG Traffic Signal Head
-  New 12" RYU Traffic Signal Head
-  New 12" RYU Traffic Signal Head
-  New 12" RYU Traffic Signal Head (Programmed Visibility)
-  New 12" RYG Fiber Optic Traffic Signal Head
-  New Type I Traffic Signal Standard w/Traffic Signal Head as specified on plan
-  New Type III Traffic Signal Standard w/Mast Arm, Street Light Arm and Luminaire, and Signal Heads (length of mast arm & distance between signal heads as specified on plan)
-  New Type II Traffic Signal Standard w/Mast Arm, w/Mast Arm and Signal Heads (length of mast arm & distance between signal heads as specified on plan)
-  New Pedestrian Signal Head
-  New Type A Pullbox (Traffic Signal)
-  New MECO Pullbox (Hwy. Lighting)
-  New Type B Pullbox (Traffic Signal)
-  New Type C Pullbox (Traffic Signal)
-  New Loop Detectors
-  Opticom Receiver
-  New Pipe Guard
-  New PPB Pedestal with one PPB
-  New PPB Pedestal with two PPB's
-  New St. Light Pole with Luminaire
-  New St. Light Conduit Bypassing Traffic Signal Pullbox
-  New Traffic Signal Conduits Bypassing St. Light Pullbox

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-030-1(33)	2000	18	29

HIGHWAY LIGHTING NOTES

1. All Highway Lighting Luminaires, cables, fuses, ballasts, break-away base and base covers provided by Maui Electric Company (MECO). Contractor to provide concrete bases, ducts and pullboxes. The Contractor shall submit shop drawings of the various highway lighting materials to Ray Okazaki, MECO, phone no. 871-2340, for approval.
2. The Contractor shall contact the MECO Dispatch Office two-weeks prior to the start of construction for assistance in locating existing MECO underground cables.
3. The Contractor shall contact MECO two-weeks in advance for all inspection work concerning the installation of conduits, cables, highway lighting work and risers.

FOUNDATIONS FOR TYPE III TRAFFIC SIGNAL STANDARDS

1. Do not use the footing detail on Sheet TE-42 of the Standard Details.
2. Refer to the Details and Tables on Sheet TE-39 of the Standard Details, instead, and make the following revisions for Type III Standards:

TYPE II FOOTING FOR TYPE III TSS

MAST ARM LENGTH	"c"	"d" BARS
30'	7' 0"	12 - #8
45'	9' 0"	12 - #8

TYPE IIA FOOTING FOR TYPE III TSS

MAST ARM LENGTH	"a"	"b" BARS
30'	7' 6"	12 - #8
45'	9' 0"	12 - #8

DATE	12/28
DESIGNED BY	Paul F. Thompson, Ltd.
TRACED BY	Paul F. Thompson, Ltd.
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
IN.	



THIS WORK WAS DONE BY ME OR UNDER MY SUPERVISION
BY *Paul F. Thompson*

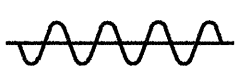
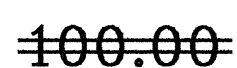
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION TRAFFIC SIGNAL LEGEND AND NOTES HONOAPIILANI HIGHWAY Installation of Traffic Signals at Napili Hau Street F.A. Project No. STP-030-1(33) Scale: No Scale Date: Feb., 1998 SHEET No. 1 OF 1 SHEETS
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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-030-K(33)	2000	20	29

TYPES OF TRAFFIC SIGNAL CABLES

- TYPE 1 SIGNAL LOOP CABLE: Stranded No. 14, 26 conductors
- TYPE 2 DETECTOR LEAD-IN CABLE AND PEDESTRIAN PUSH BUTTON CIRCUIT CABLE: Stranded, No. 14, 2 conductors
- TYPE 3 INTERCONNECT CABLE: Solid No. 19, 12 pairs, conforming to IMSA Spec. 19-2
- TYPE 4 LOOP SENSOR CABLE: Stranded No. 14, single conductor, conforming to IMSA Spec. 51-5.
- TYPE 5 CABLE FROM SIGNAL LOOP TO SIGNAL HEAD: Stranded, No. 14.
- TYPE 6 SERVICE CABLE: No. 6, 3 conductors.
- TYPE 7 OPTICAL DETECTOR CABLE: From optical detector to optical discriminator in controller cabinet; 3 conductor #20 AWG stranded copper in Berktek Type B shielded jacket and one #20 AWG bare stranded ground.
- NOTES:
- All conduits shall be direct buried conduits except where noted otherwise, and at utility crossings where they shall be concrete encased.
 - Type 5 cables between signal face and Traffic Signal Pullbox and Type 7 cables between Optical Receiver and Traffic Signal Pullbox are not noted or called out on the Intersection Plan, but shall be furnished and installed in sufficient numbers and lengths as required. Type 5 cables shall be incidental to installation of signal faces. Type 7 cable shall be run continuously without splices, from Optical Receiver to Controller Cabinet.
 - Type 2 cables between Pedestrian Pushbutton Pedestal and Traffic Signal Pullbox are not noted or called out on the Intersection Plan, but shall be furnished in 2 inch conduits, one cable for each pushbutton on the pedestal.

LEGEND FOR AS-BUILT POSTINGS

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



THIS WORK WAS DONE BY ME OR UNDER MY SUPERVISION

BY _____

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS

HONOAPIILANI HIGHWAY

Installation of Traffic Signals at Napilihau Street

F.A. Project No. STP-030-K(33)

Scale: None

Date: Feb., 1999

SHEET No. 1 OF 7 SHEETS

NEW CONDUITS	NEW CABLE
2" 2" 3" conc. encased	Spare 1 Type 2 MECO Power Cable

NEW CONDUITS	NEW CABLE
2" 2" 3" conc. encased	3 Type 2 Spare MECO Power Cable

NEW CONDUITS	NEW CABLE
2" 2" 2" 2" 2"	1 Type 1 1 Type 1 Spare Spare Spare

NEW CONDUITS	NEW CABLE
2" 2" 2" 2" 2" 3" conc. encased	1 Type 1 1 Type 1 1 Type 2 1 Type 7 Spare MECO Power Cable

NEW CONDUITS	NEW CABLE
2" 2" 2" 2" 2" 3" conc. encased	1 Type 1 1 Type 1 3 Type 2 1 Type 7 1 Spare MECO Power Cable

NEW CONDUITS	NEW CABLE
2" 2" 2" 2" 2" 3" conc. encased	1 Type 1 1 Type 1 3 Type 2 2 Type 7 Spare MECO Power Cable

NEW CONDUITS	NEW CABLE
2" 2" 2" 2" 2" 3" conc. encased	1 Type 1 1 Type 1 4 Type 2 Spare Spare MECO Power Cable

NEW CONDUITS	NEW CABLE
2" 2" 2" 2" 2" 3" conc. encased	1 Type 1 1 Type 1 1 Type 7 5 Type 2 Spare MECO Power Cable

NEW CONDUITS	NEW CABLE
2" 2" 2" 2" 2" 3" conc. encased	1 Type 1 1 Type 1 2 Type 7 6 Type 2 Spare MECO Power Cable

NEW CONDUITS	NEW CABLE
3" 3" 3" 2" 2" 2" 3"	1 Type 1 1 Type 1 12 Type 2 (Future Microwave) 4 Type 7 (Future Telephone) (Future Interconnect)

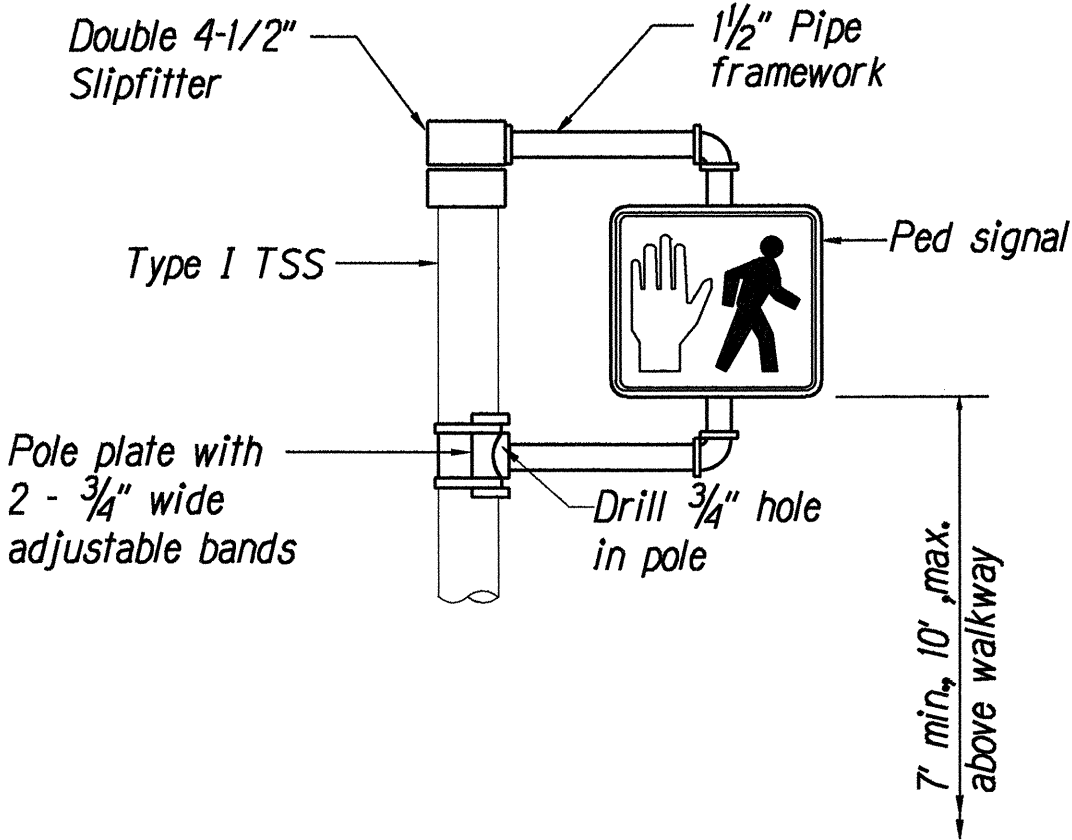
NEW CONDUITS	NEW CABLE
2"	1 Type 6

NEW CONDUITS	NEW CABLE
2" 2" 3" conc. encased	2 Type 2 Spare MECO Power Cable

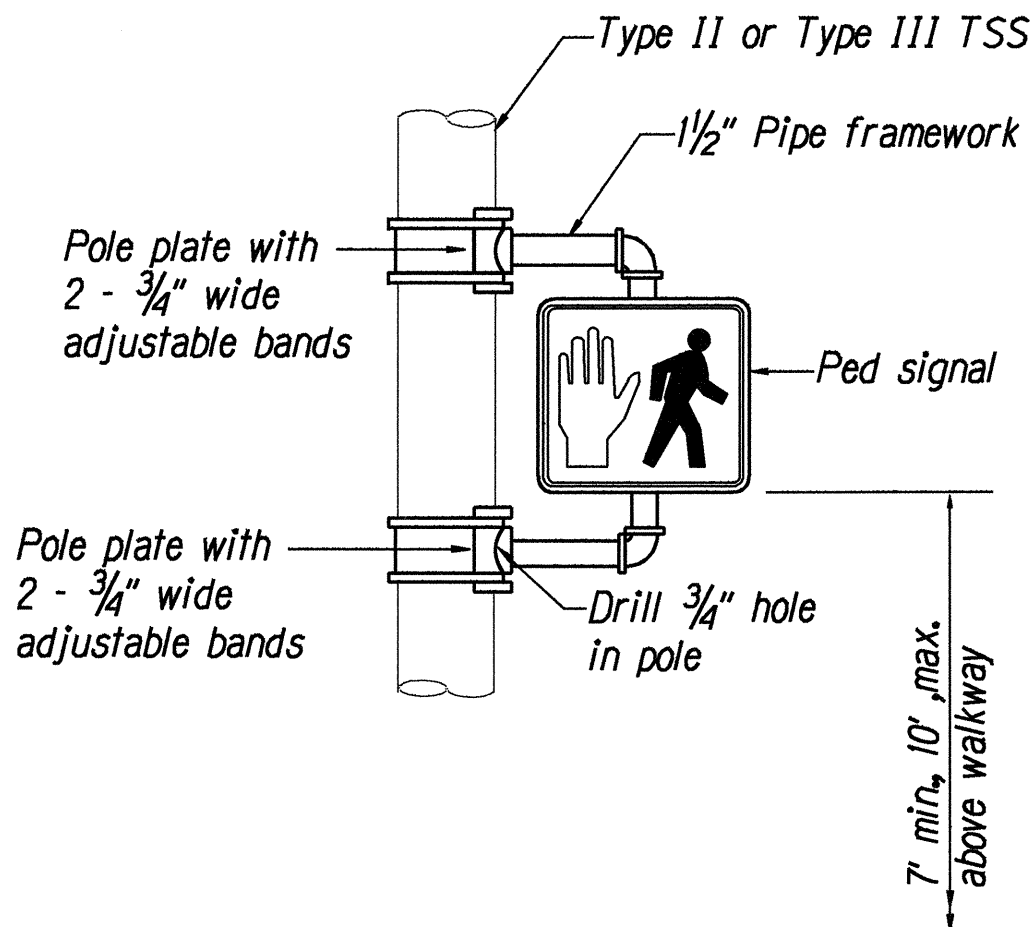
NEW CONDUITS	NEW CABLE
2" conc. encased 2" conc. encased	MECO Power Cable MECO Power Cable

NEW CONDUITS	NEW CABLE
3" conc. encased	MECO Power Cable

NEW CONDUITS	NEW CABLE
2" conc. encased	MECO Power Cable



CANTILEVER MOUNTING
OF PEDESTRIAN SIGNAL FACE



BRACKET MOUNTING
OF PEDESTRIAN SIGNAL FACE

SURVEY PLOTTED BY _____	DATE _____
DRAWN BY _____	DESIGNED BY _____
NOTE BOOK _____	CHECKED BY _____
_____	_____

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-030-1(33)	2000	21	29

STATE RIGHT-OF-WAY BACKFILL NOTES

Trench Backfill Material "A"

Concrete

Beach Sand, Earth, or Earth and Gravel.

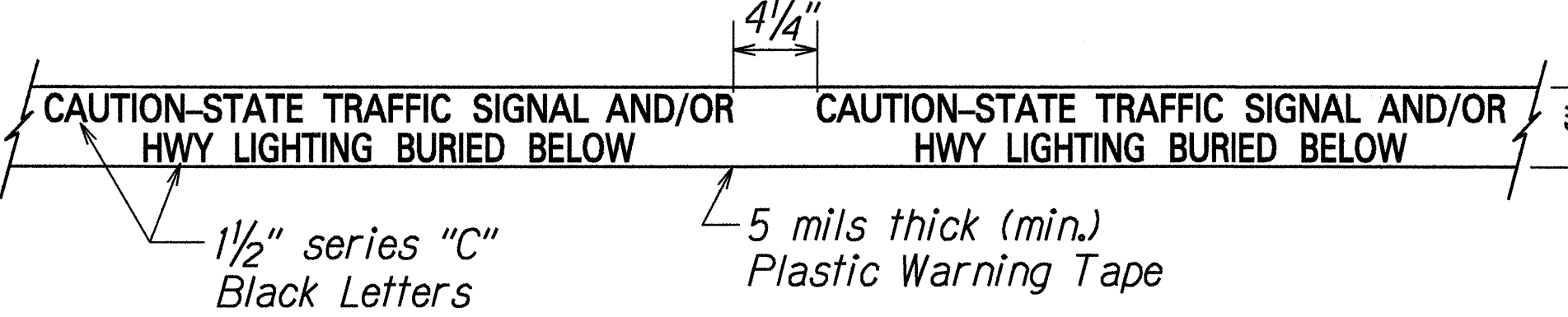
If Earth and Gravel used, the maximum shall contain not more than 50% by volume of rock particles. Maximum 8" loose fill per lift. Obtain 95% compaction for each lift.

3000 psi compressive strength @ 3 days.

NOTE: Base Course ≠ Sub-Base Course per 1994 State Standard Specifications for Highway Construction.

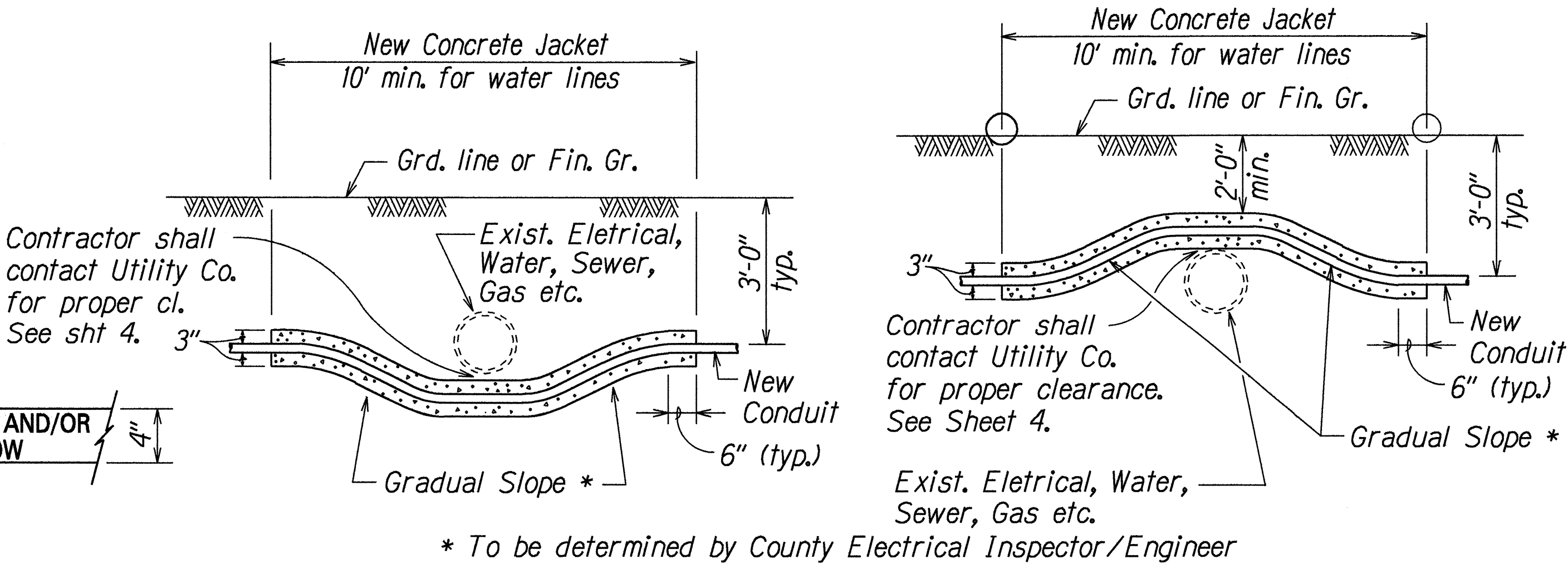
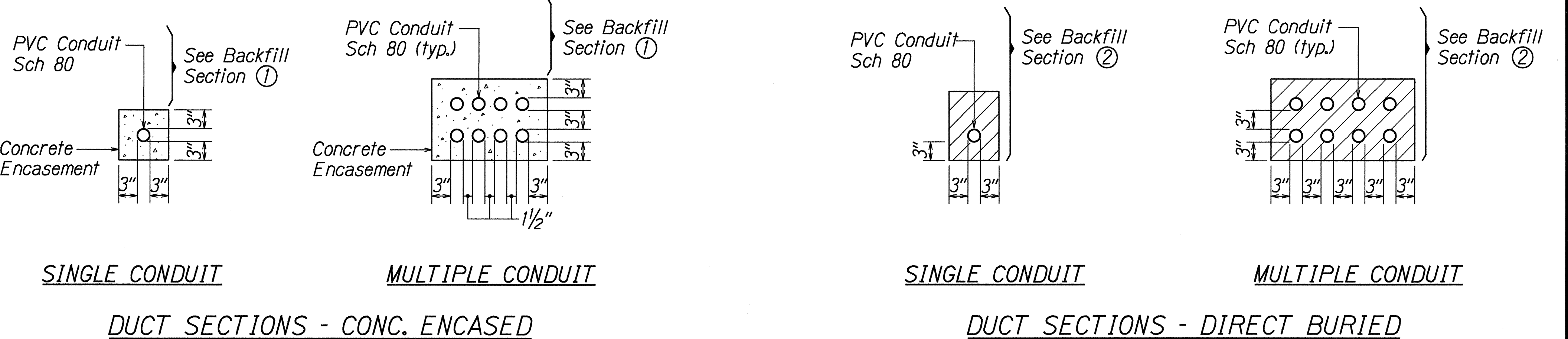
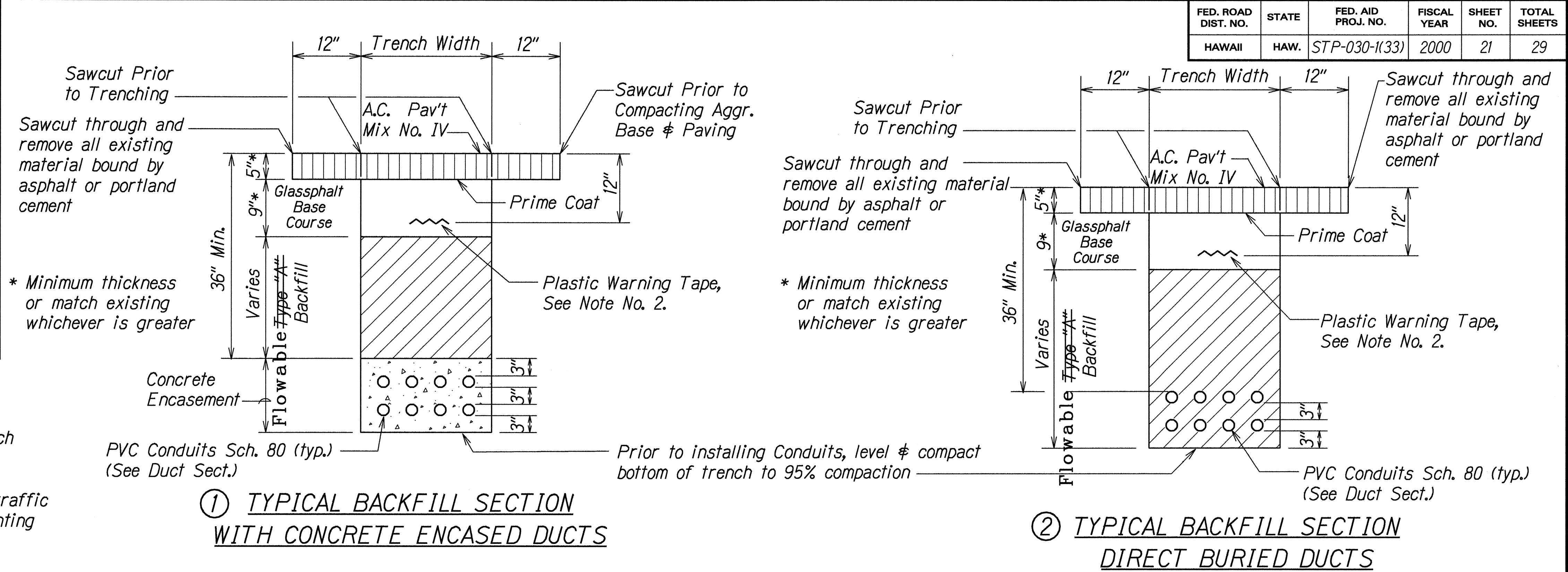
* Flowable Fill - Under AC Pavement Only

- GENERAL NOTES
- See sheet 26 for surface restoration details when trench is not in pavement area.
 - Details shown on this sheet apply only to conduits for traffic signal system. See sheet 28 for details of highway lighting system conduits.
 - The Metal Detectable Yellow Plastic Warning Tape shall be a minimum 5 mils thick and 4" wide with a continuous metallic backing and corrosion resistant 1± mil thick foil core. The message on the tape shall read, "CAUTION - STATE TRAFFIC SIGNAL AND/OR HWY LIGHTING BURIED BELOW," utilizing 1½ inches series "C" black lettering. The message will be repeated with a 4¼" spacing between top line of message and start of next repeat.
 - The Contractor may begin backfilling the conduit trench when the concrete reaches 3000 psi compressive strength after 3 days.
 - Maximum four (4) Conduits per Row for multiple conduit duct section.
 - For direct buried duct sections, the concrete jacket required at the conduit by-pass for various utilities, shall not be paid for separately but considered incidental to the direct buried conduits.
 - After installing all the traffic signal cables, the Contractor shall duct seal all conduits in the pullboxes, traffic signal standards and traffic signal controller cabinet concrete base. The duct seal material shall be approved by the Traffic Signal Inspector/Engineer and shall not be paid for separately but considered incidental to the direct buried and/or concrete encased conduits.



For additional information see note no. 3.

METAL DETECTABLE YELLOW PLASTIC WARNING TAPE



* To be determined by County Electrical Inspector/Engineer

CONDUIT BY-PASS DETAIL AT VARIOUS UTILITIES

Not to Scale



STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS

HONOAII LANI HIGHWAY

Installation of Traffic Signals at Napili Hau Street

F.A. Project No. STP-030-1(33)

Scale: None

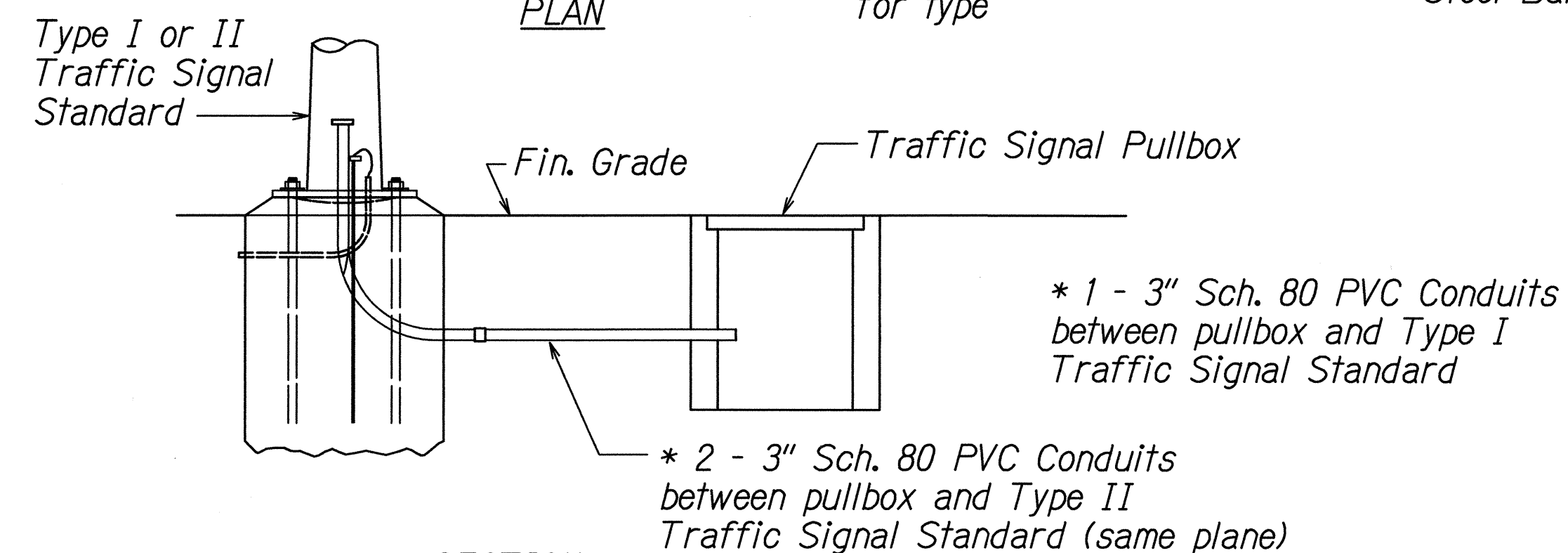
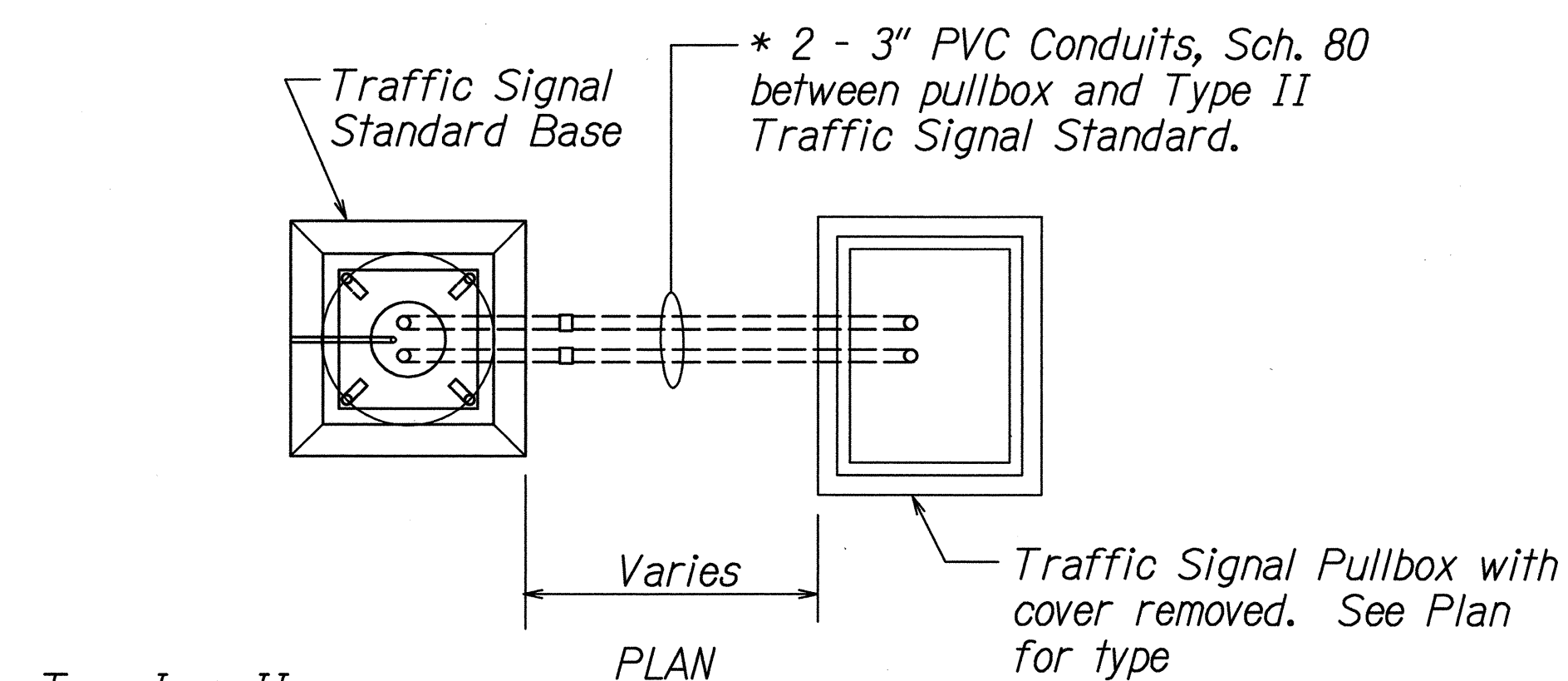
Date: Feb., 1999

SHEET No. 2 OF 7 SHEETS

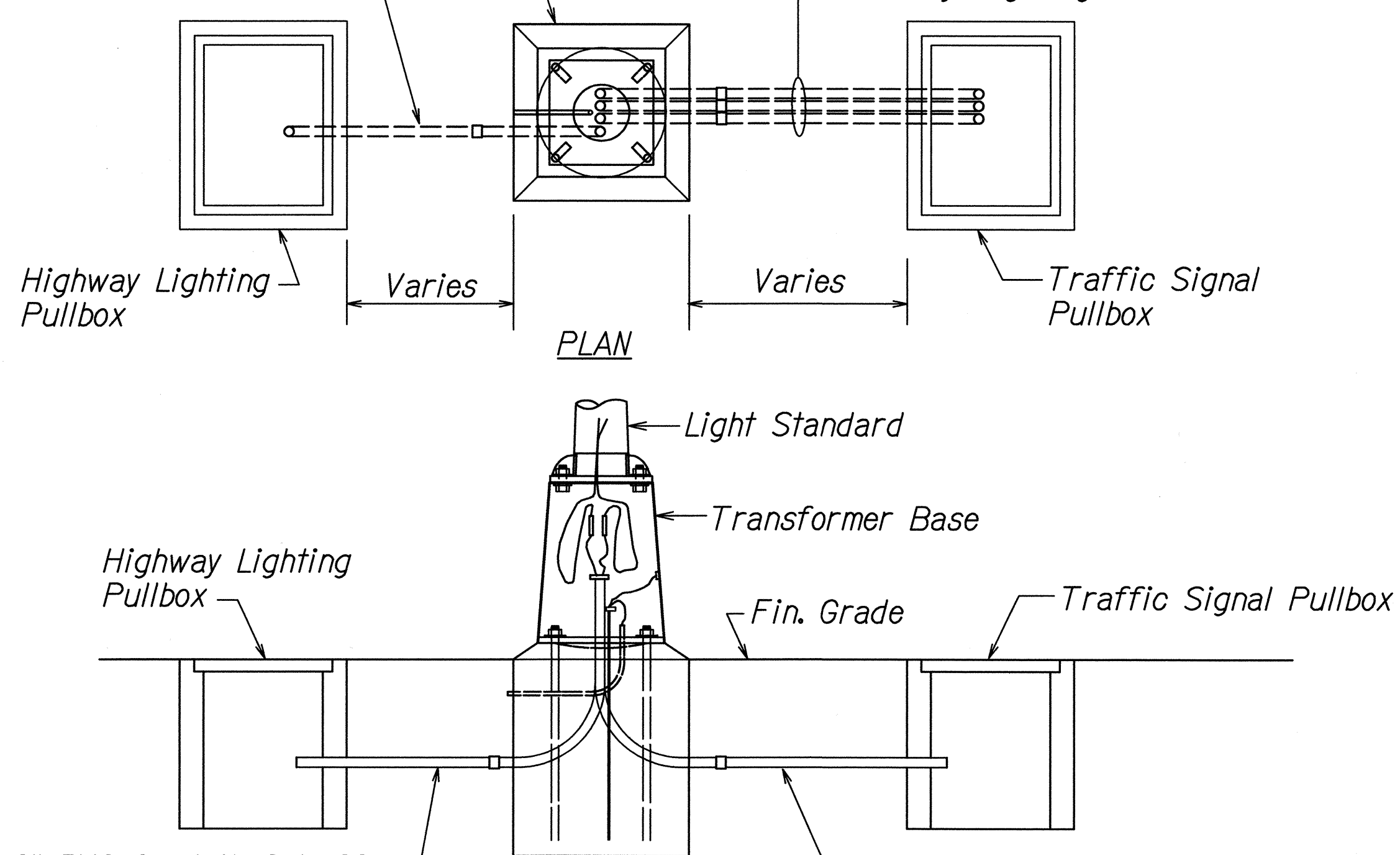
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CHECKED BY	
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NOTE BOOK	
NO.	

R4/20/98

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-030-1(33)	2000	22	29

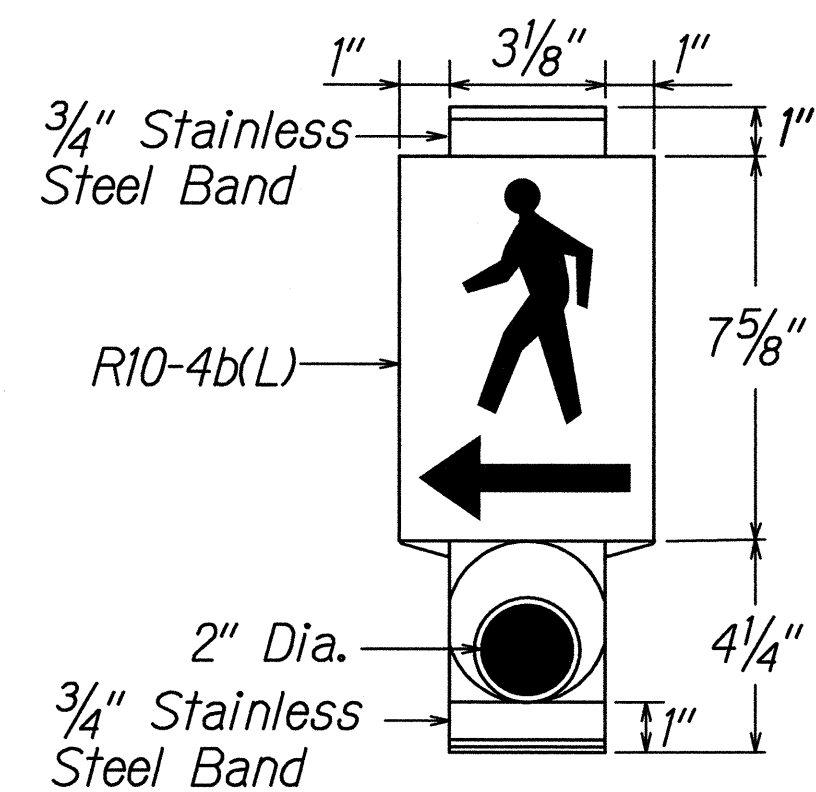


CONDUIT FOR TYPE I OR II TRAFFIC SIGNAL STD.

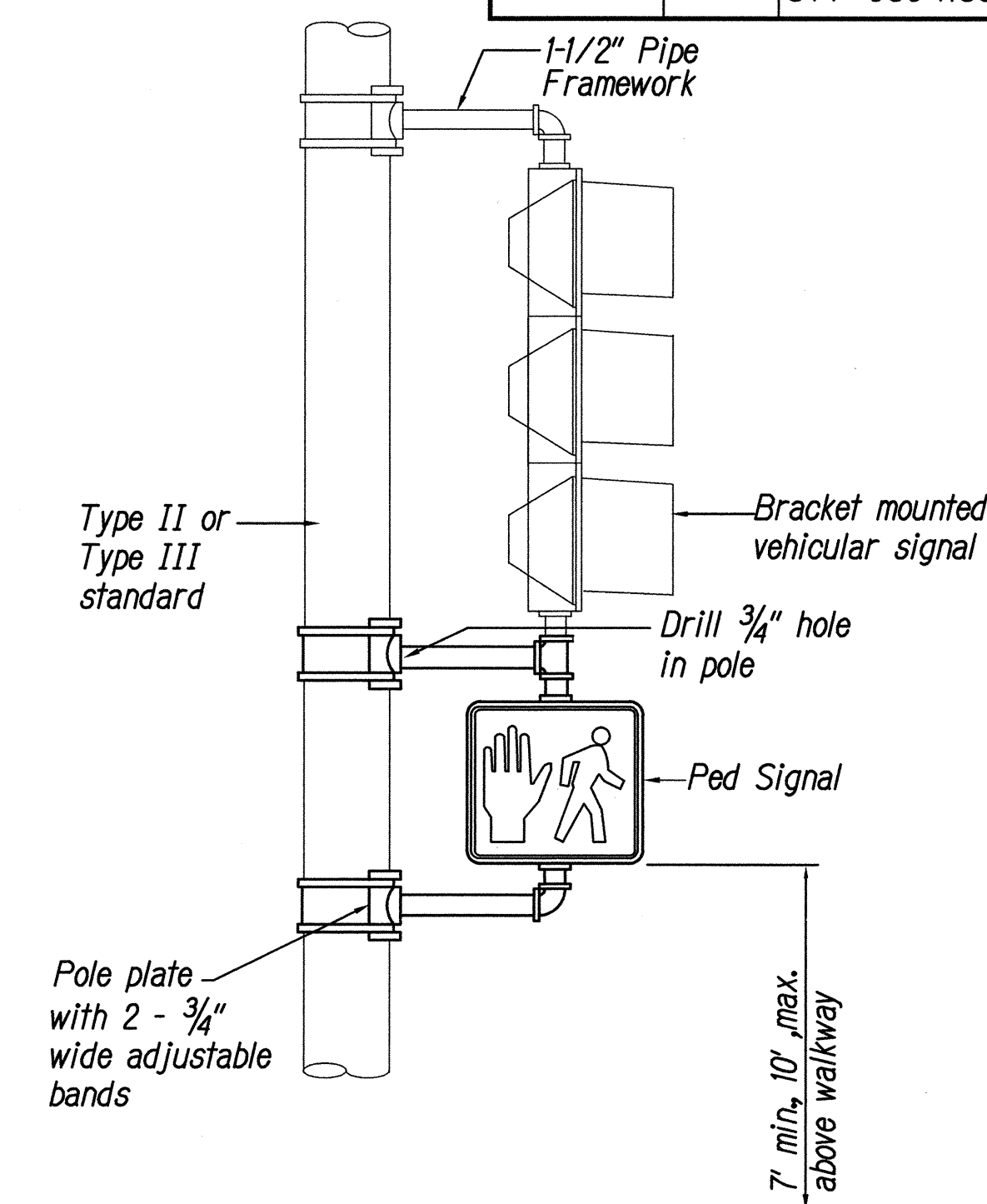
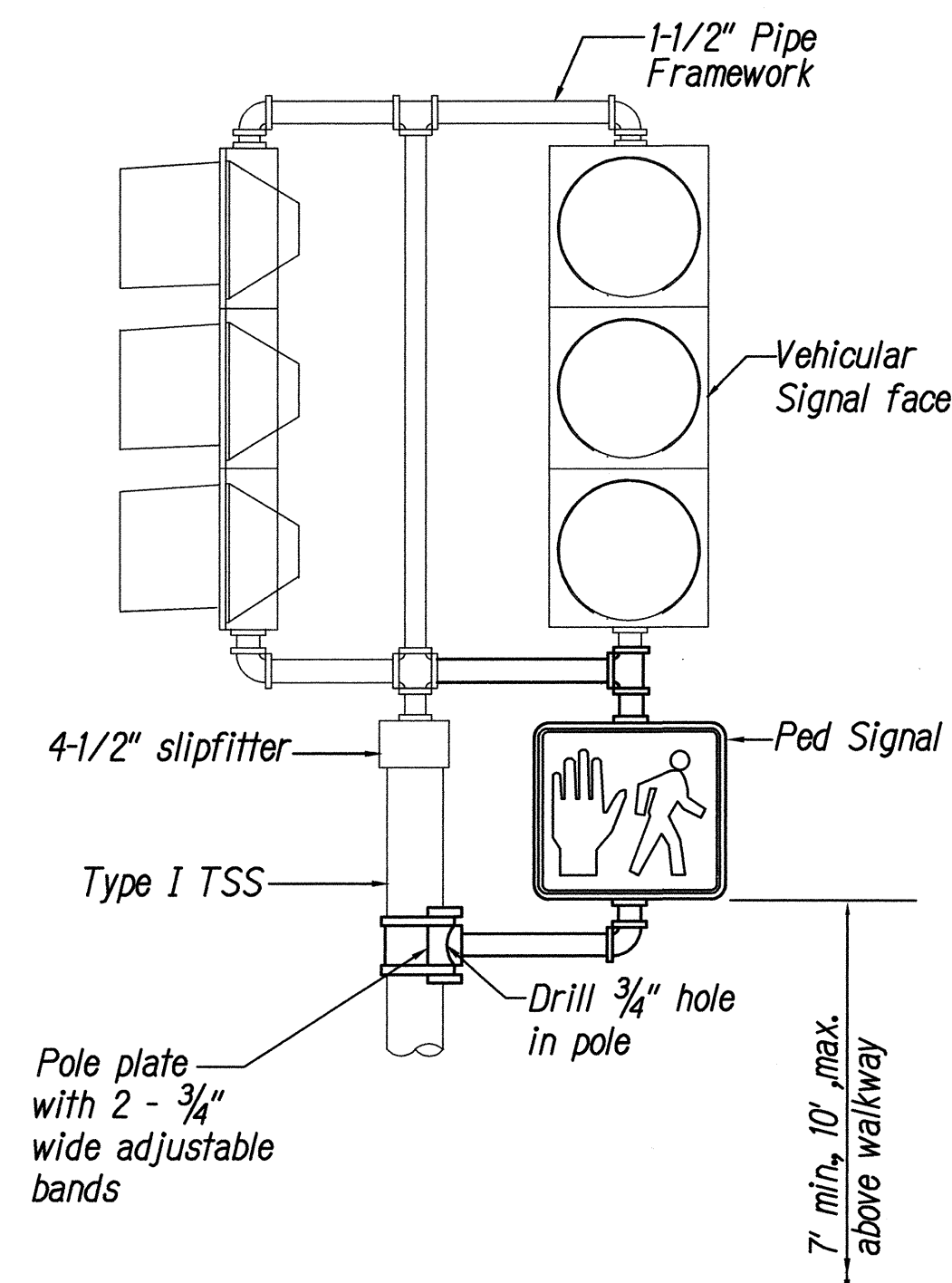


CONDUIT DETAILS FOR TRAFFIC SIGNAL/HWY. LIGHTING STANDARD

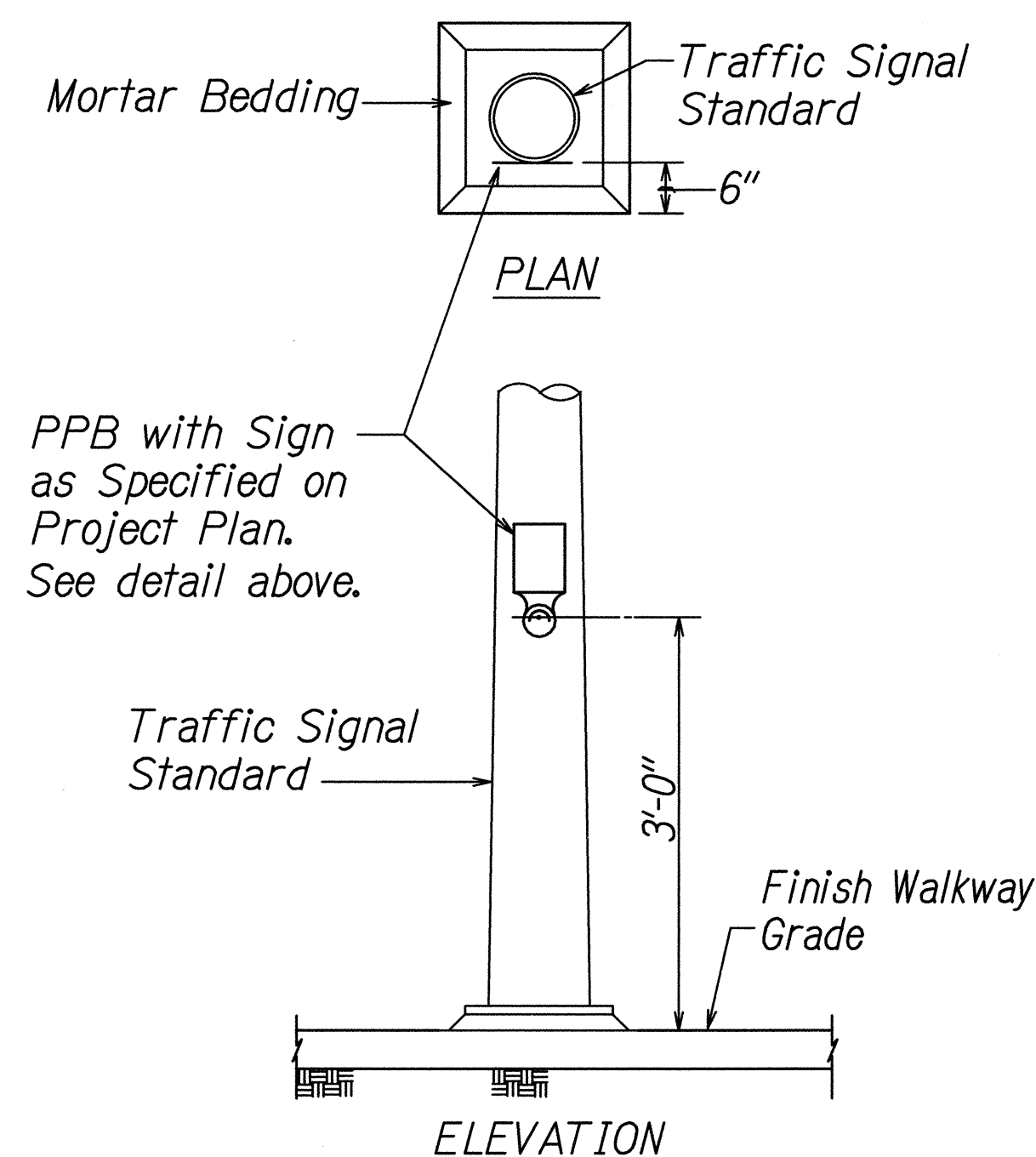
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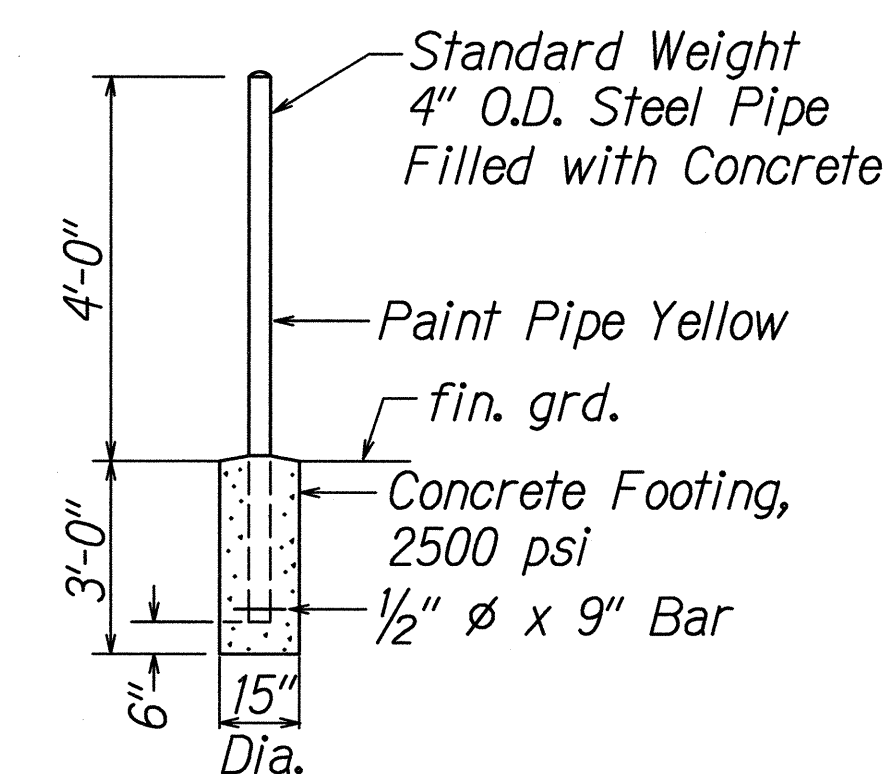


UNDERSLUNG MOUNTING OF PEDESTRIAN SIGNAL FACE



TYP. PEDESTRIAN PUSHBUTTON INSTALLATION

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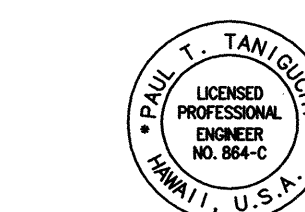


PIPE GUARD DETAIL

Not to Scale

NOTE:
Cost of the conc. filled galvanized pipe guard shall be incidental to other items of work.

SURVEY PLOTTED BY	DATE
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TRACED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
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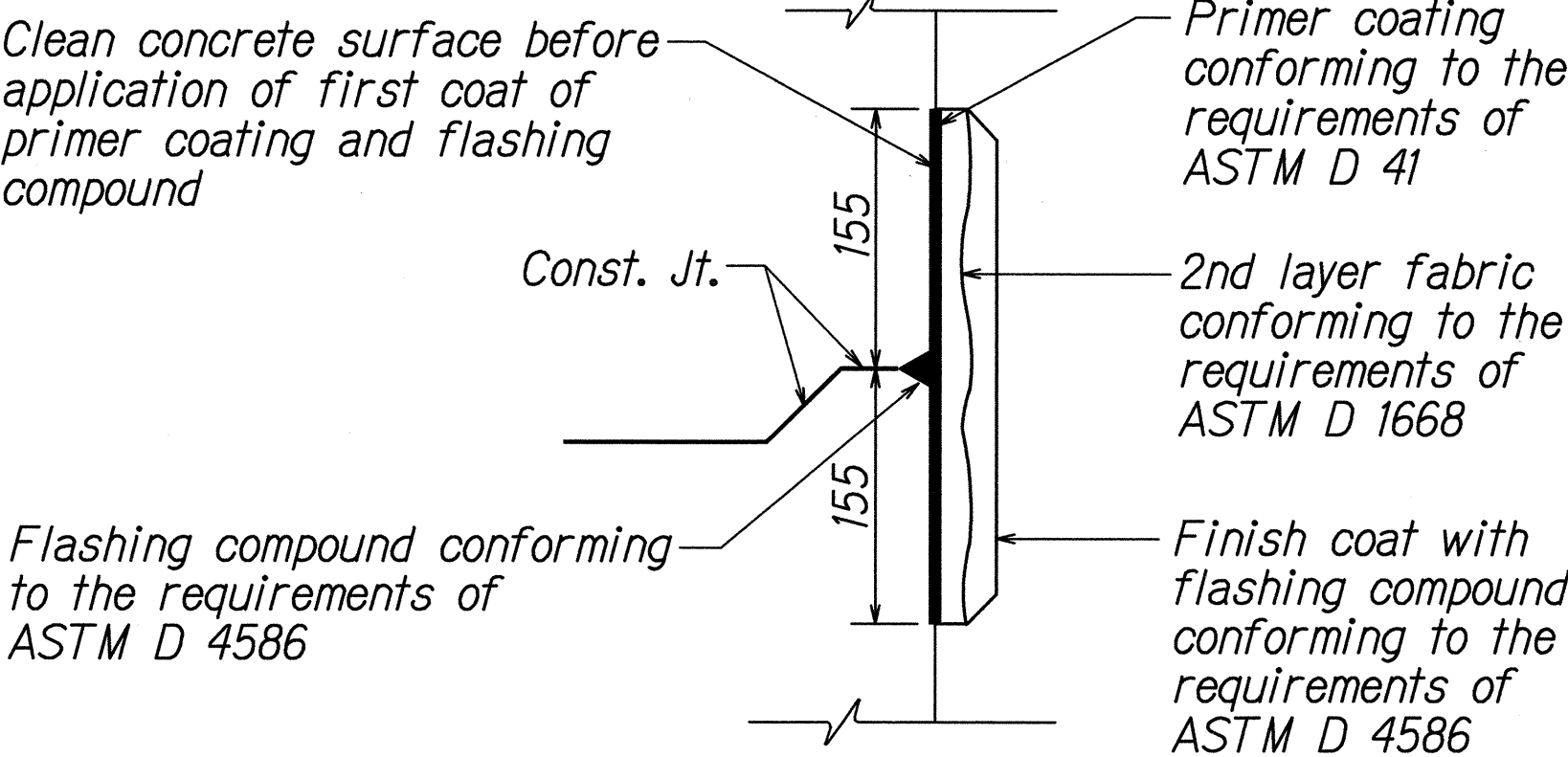
THIS WORK WAS DONE BY ME OR UNDER MY SUPERVISION
BY Paul T. Taniguchi

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
TRAFFIC SIGNAL DETAILS
HONOAPIILANI HIGHWAY
Installation of Traffic Signals at Napili Hau Street
F.A. Project No. STP-030-1(33)
Scale: None Date: Feb., 1999
SHEET No. 3 OF 7 SHEETS

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-030-1(33)	2000	24	29

GENERAL NOTES

- Provide a minimum of one 16 ϕ 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.
- All pre-cast concrete pullboxes shall be manufactured in two pieces.
- The pullbox with cover shall be capable of supporting an MS 18 Loading.
- The maximum weight of the pullbox cover shall not exceed 27 kilograms.
- The openings for the conduits on all pullboxes shall be pre-cast concrete knockouts.
- 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.
- 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.
- All concrete shall be Class A (25MPa, min.)
- Rebars shall be Grade 300 and all lapped splices shall be 360mm minimum.
- The #57 or #67 size aggregate shall conform to latest version of AASHTO M3 (ASTM D 448).
- 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).



TYPICAL FLASHING COMPOUND WATERPROOFING DETAILS

Not to Scale

ALL DIMENSIONS ARE IN MILLIMETERS UNLESS OTHERWISE SHOWN

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS

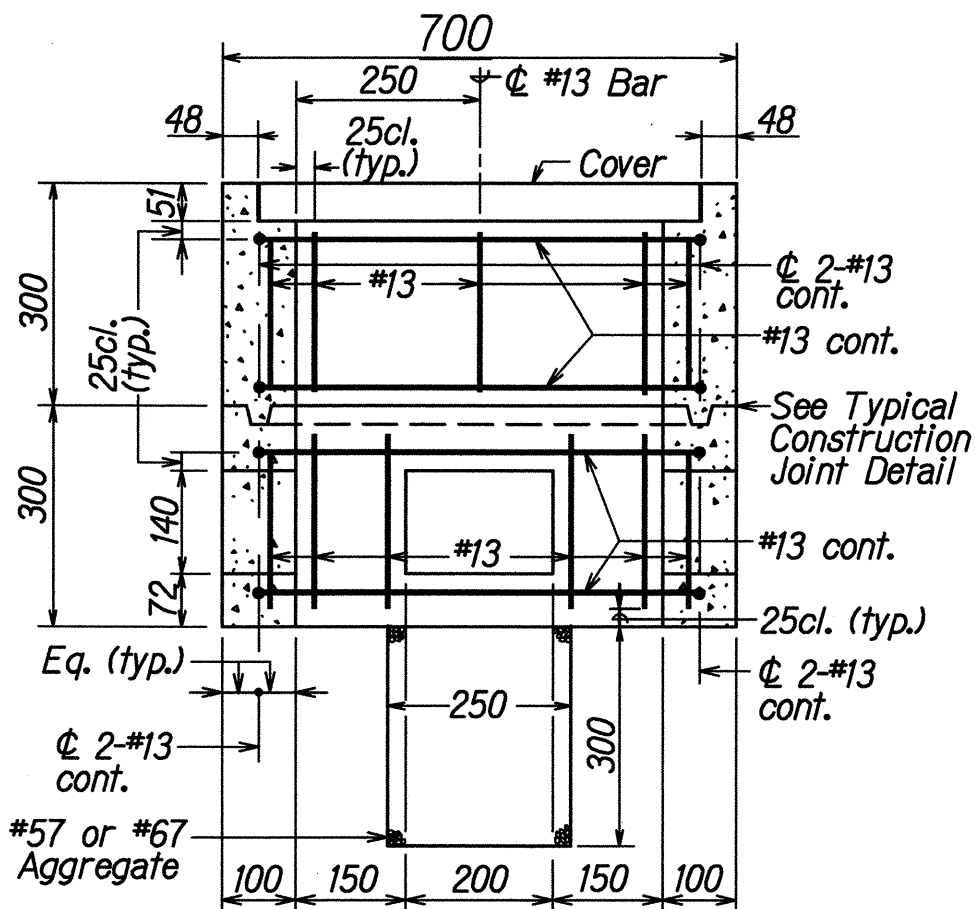
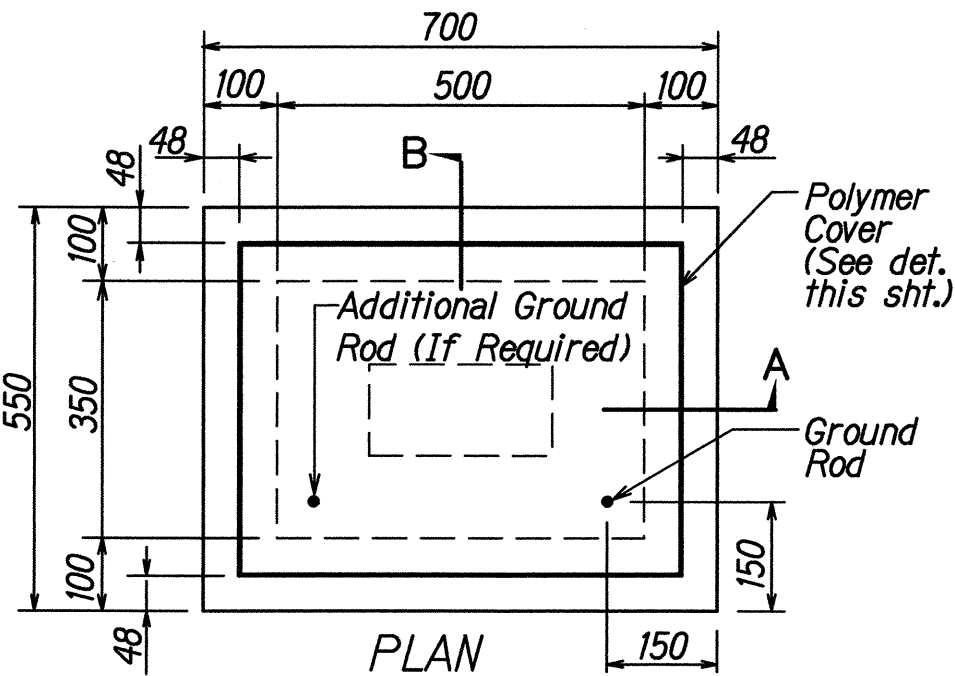
HONOAPIILANI HIGHWAY

Installation of Traffic Signals at Napilihau Street

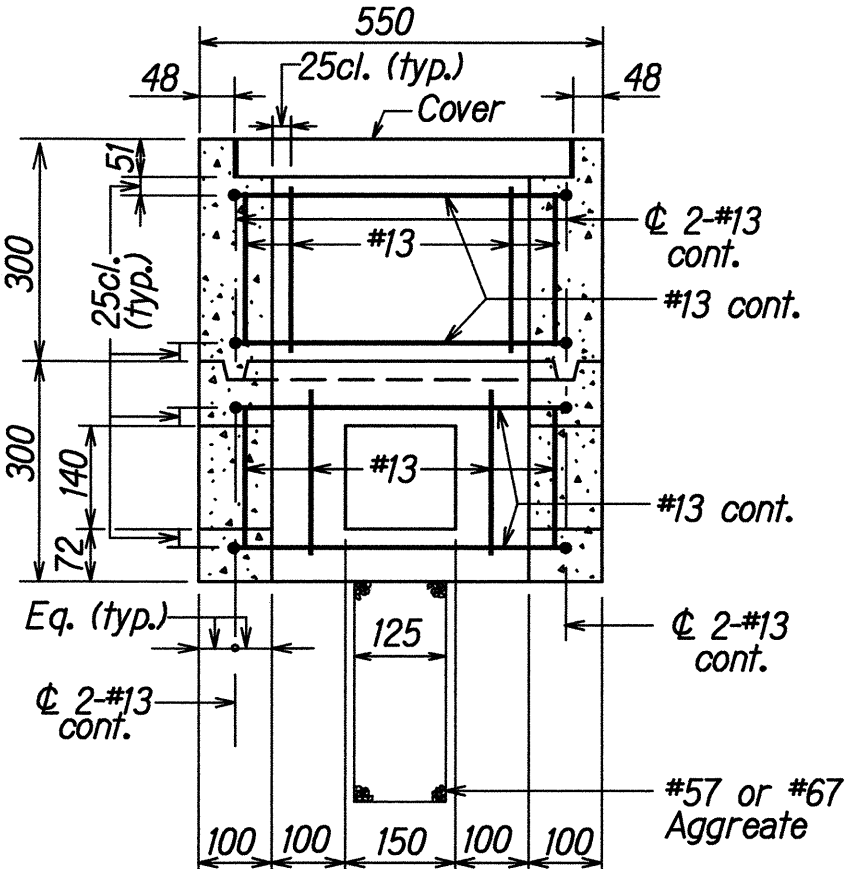
F.A. Project No. STP-030-1(33)

Scale: None Date: Feb., 1999

SHEET No. 5 OF 7 SHEETS



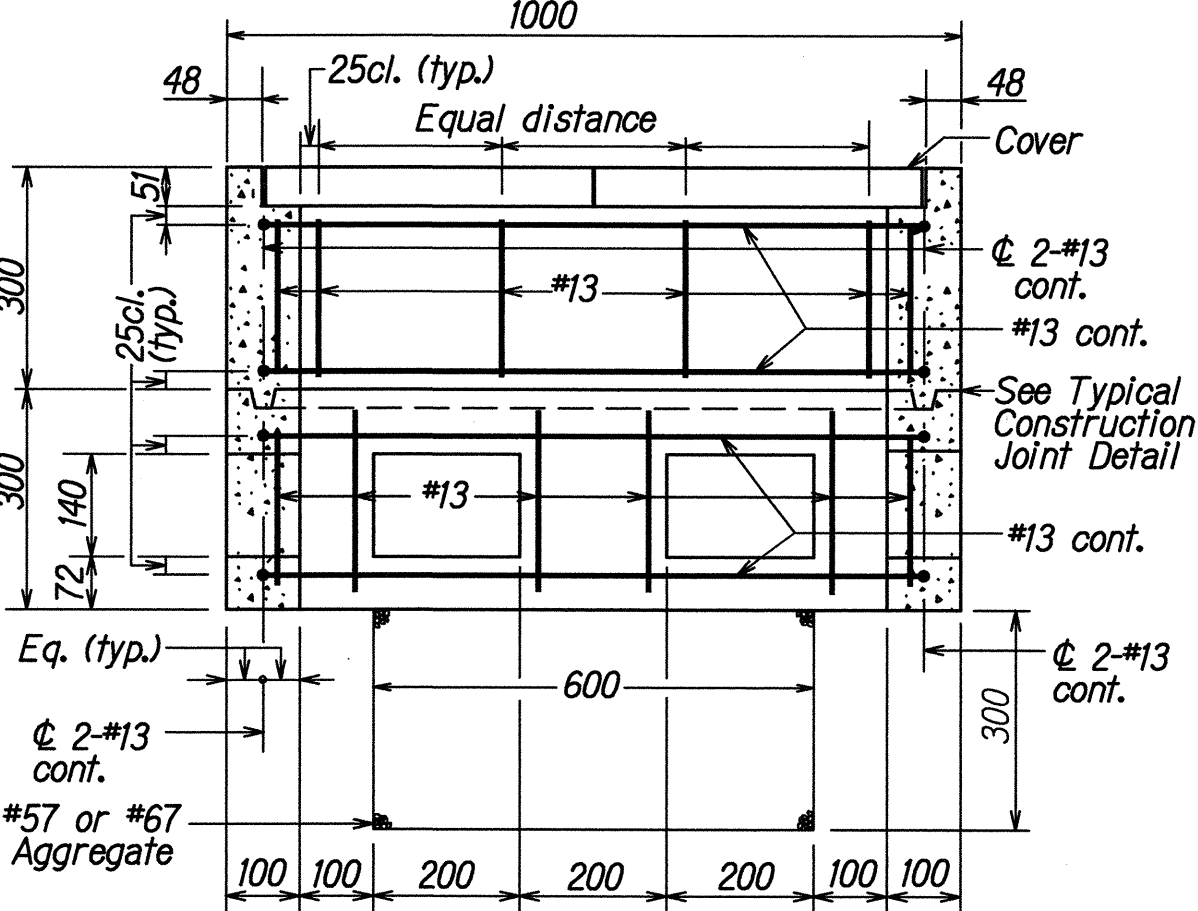
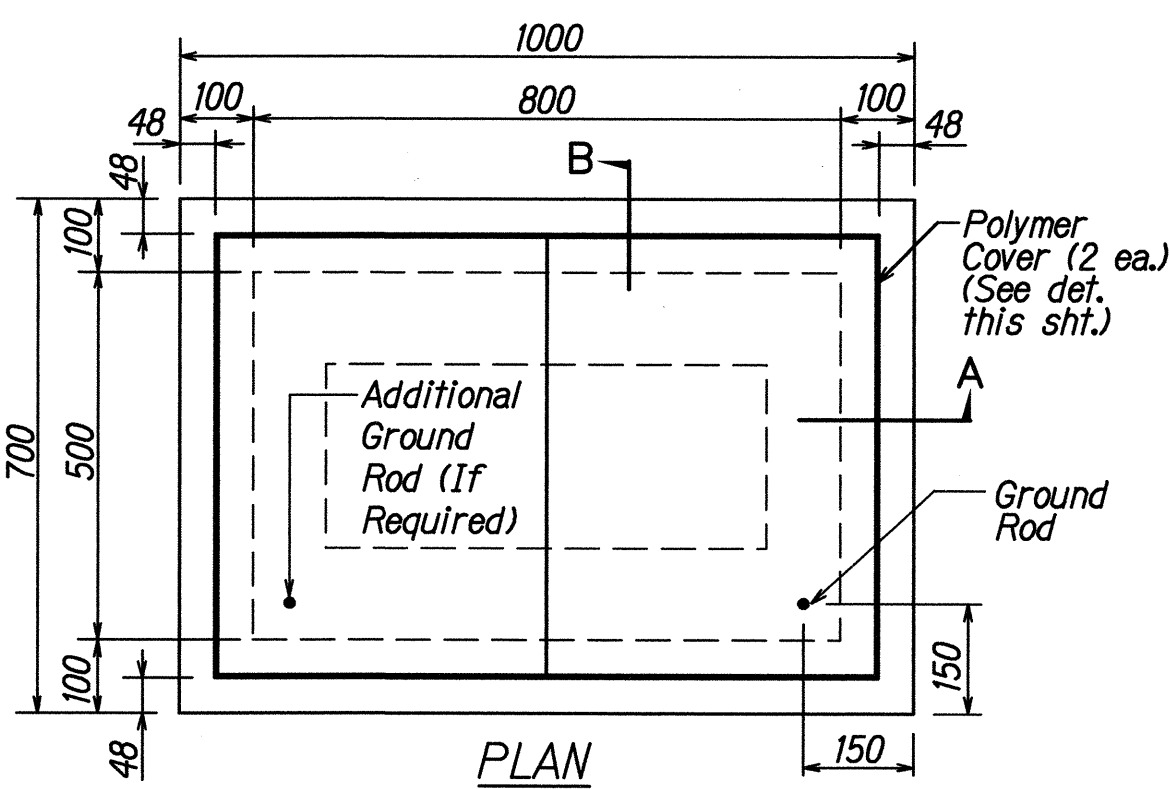
SECTION A-A



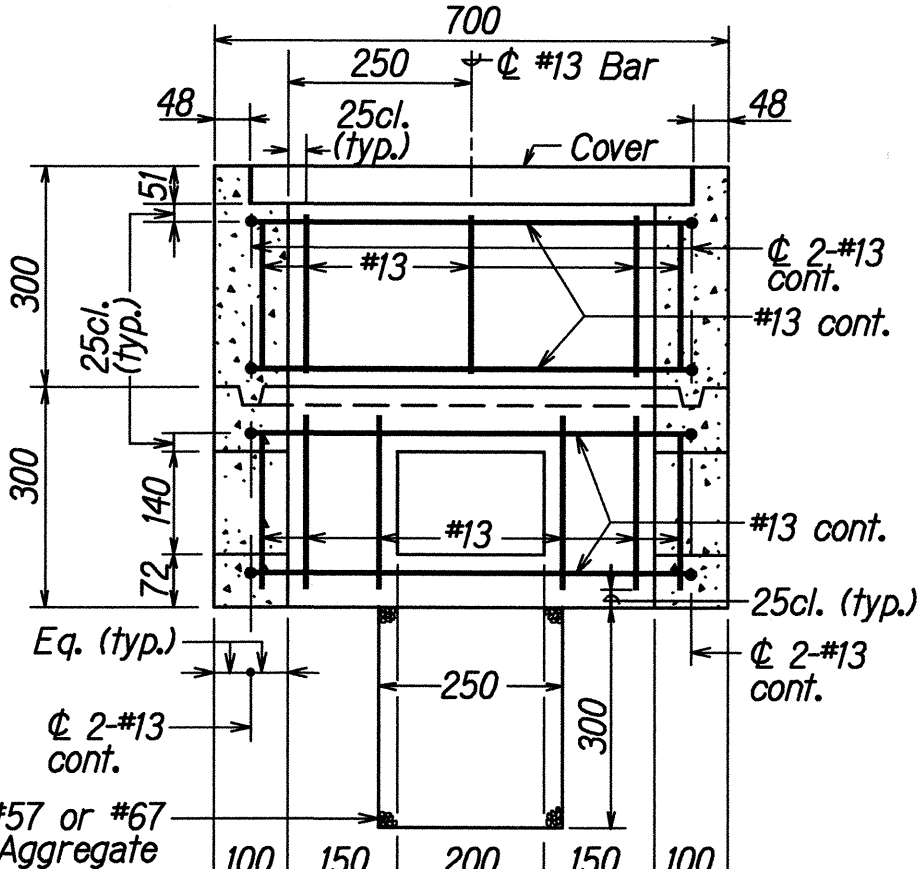
SECTION B-B

TYPE "A" PULLBOX (Old Type "B")

Scale: 1 : 100



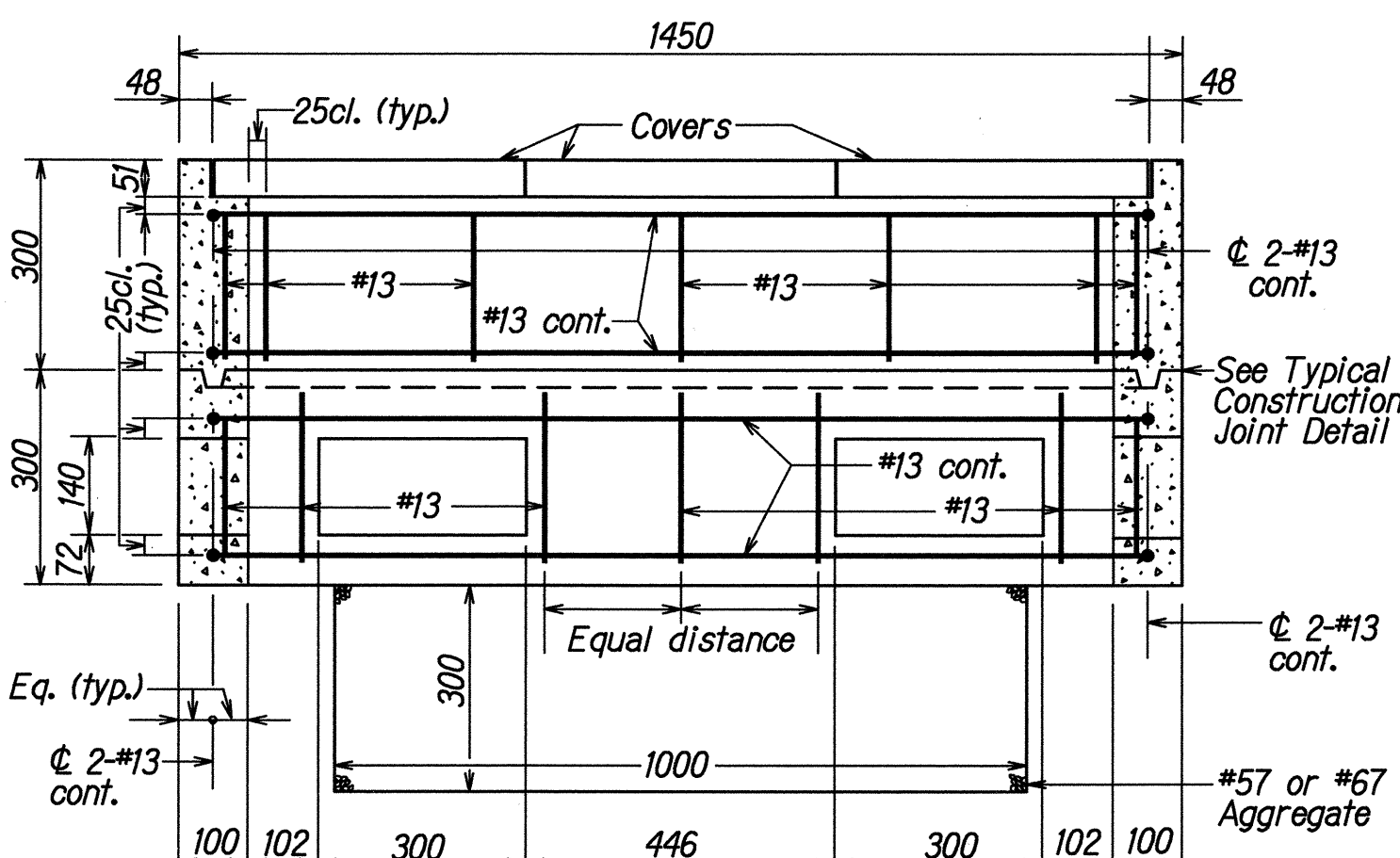
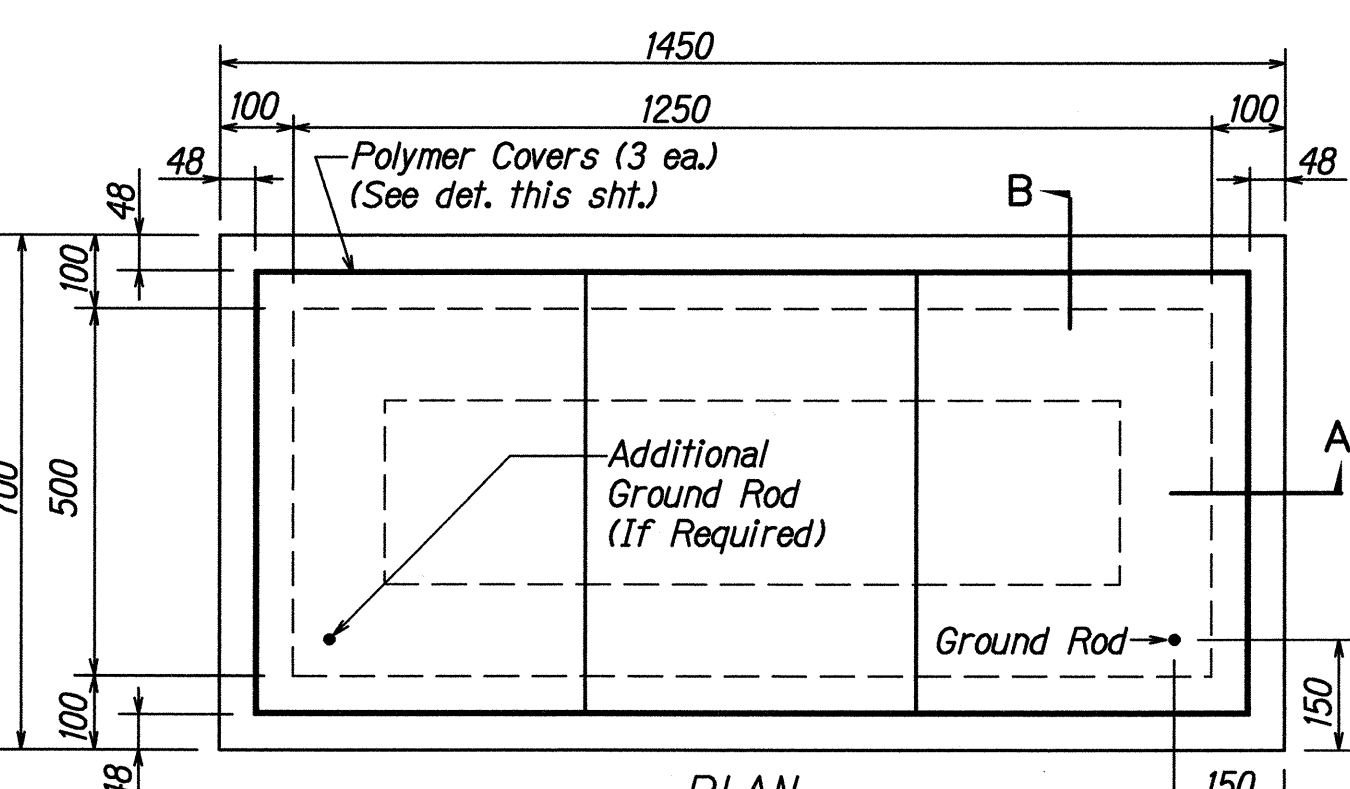
SECTION A-A



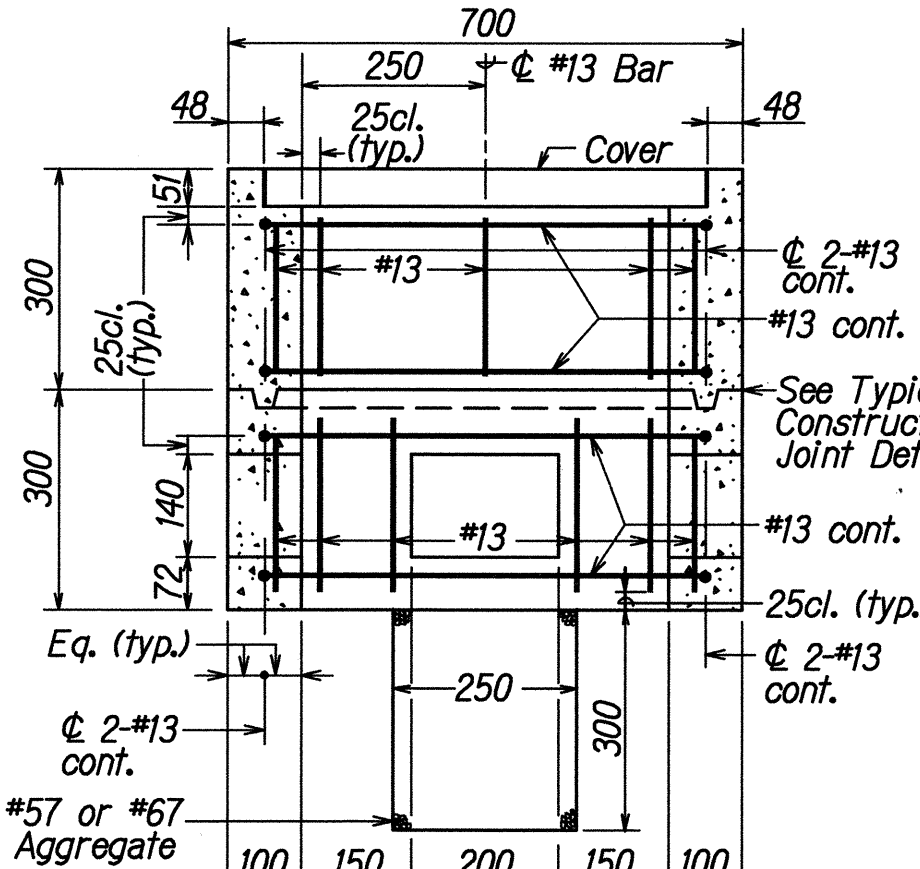
SECTION B-B

TYPE "B" PULLBOX (Old Type "C")

Scale: 1 : 100



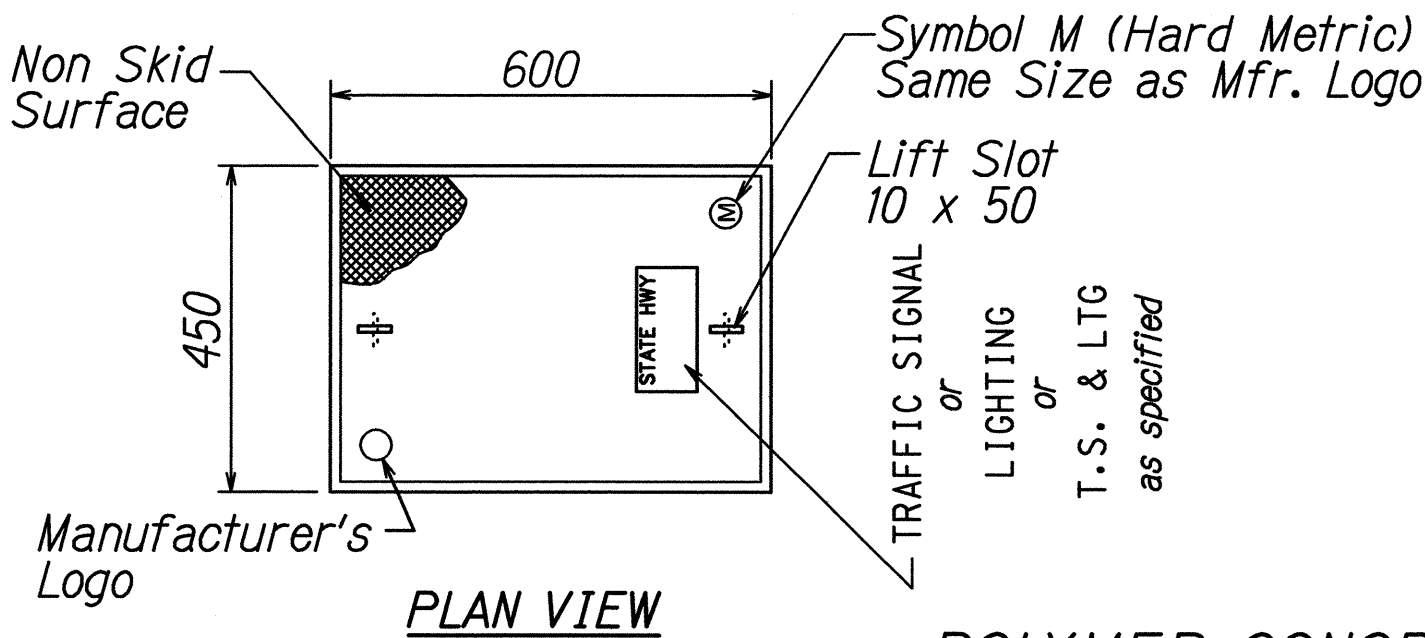
SECTION A-A



SECTION B-B

TYPE "C" PULLBOX (Old Type "D")

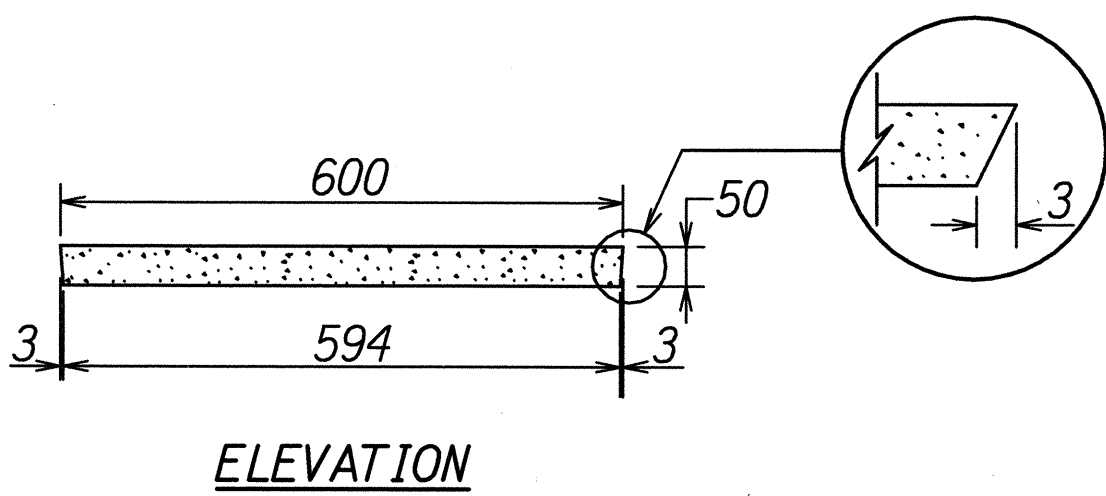
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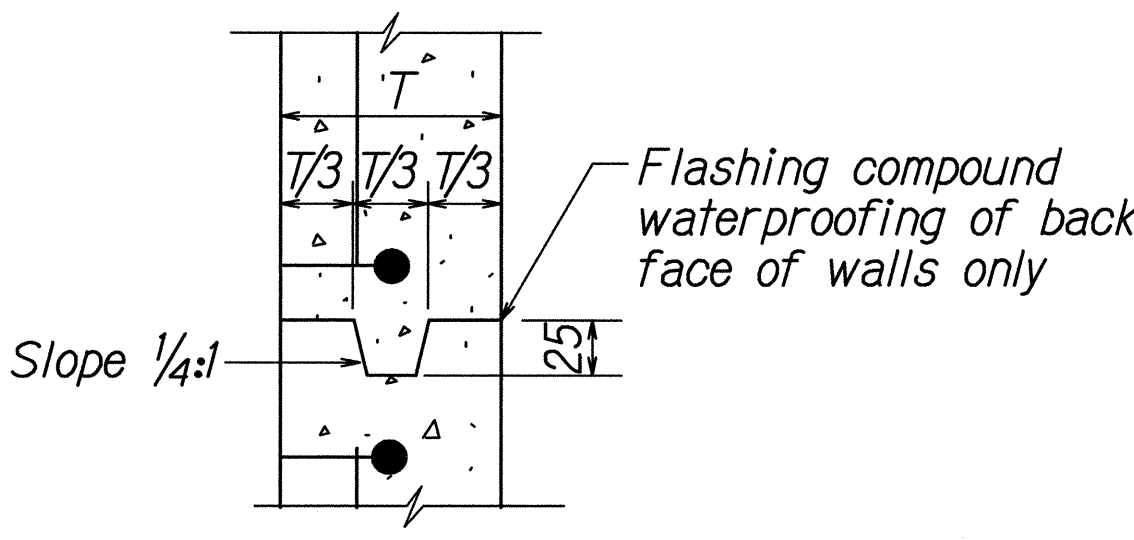
PLAN VIEW

POLYMER CONCRETE COVER

Not to Scale



ELEVATION

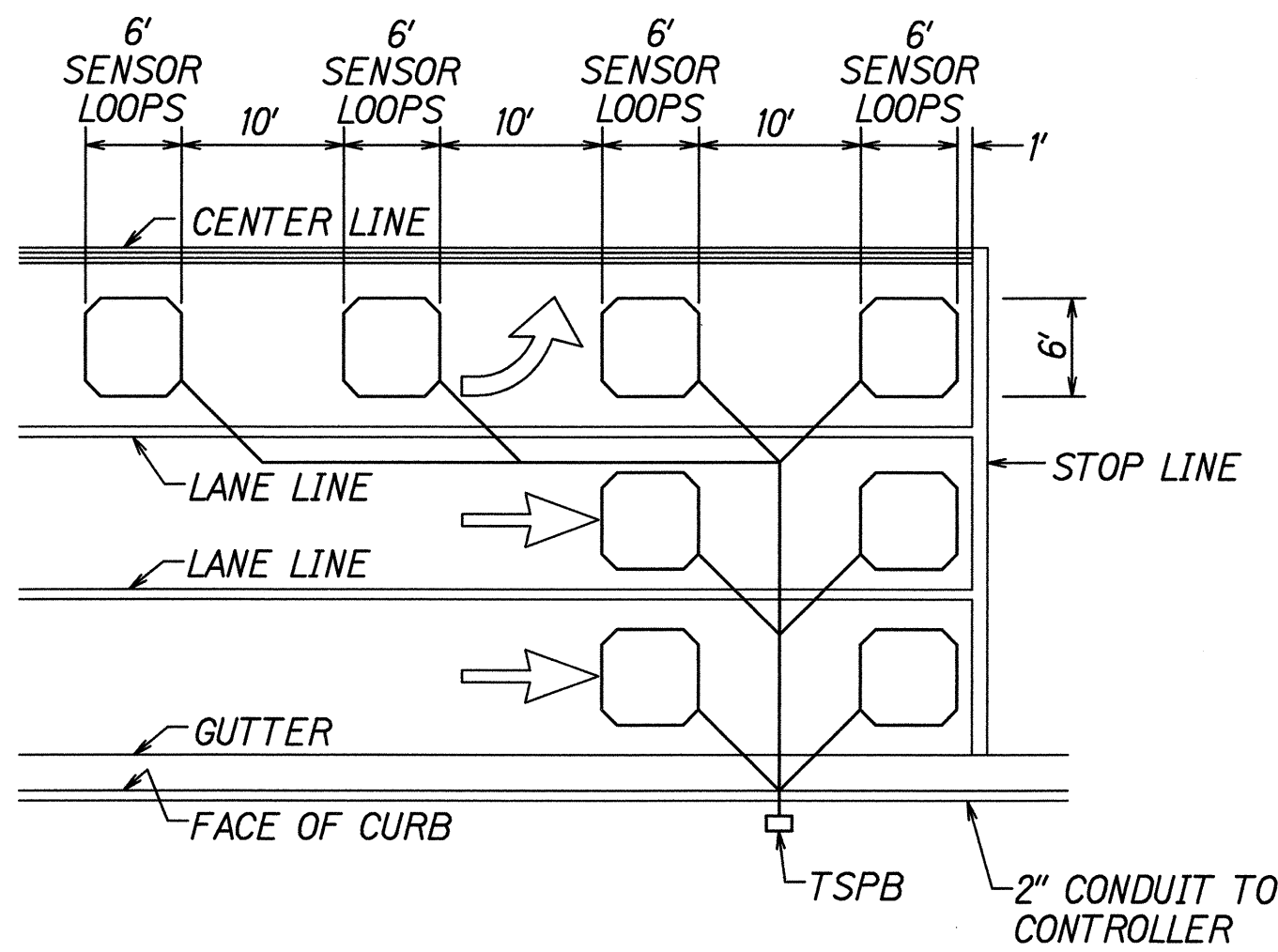


TYPICAL CONSTRUCTION JOINT DETAIL

Not to Scale

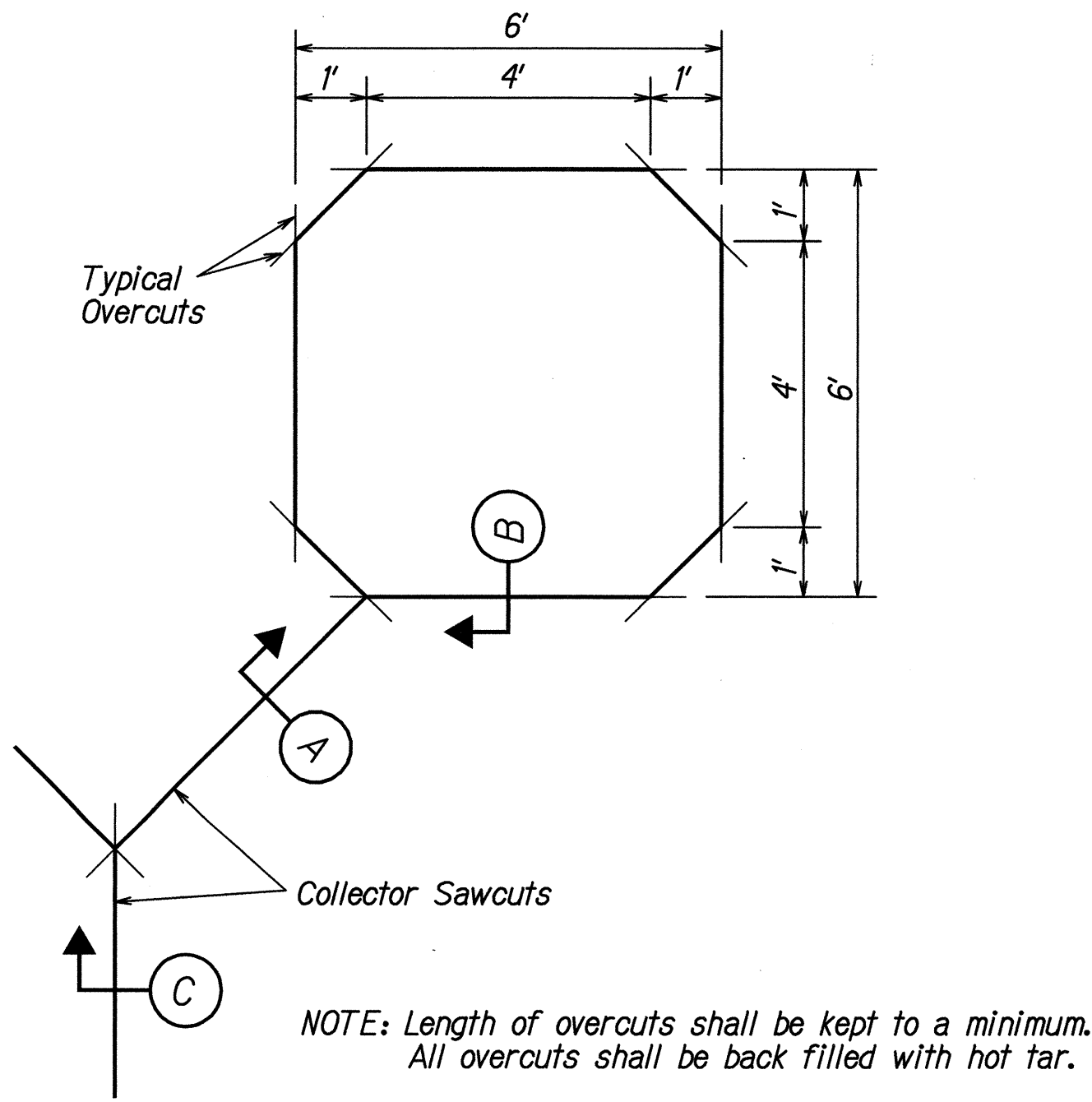
DESIGNED BY	DATE
TRACED BY	02/99
QUANTITIES BY	02/99
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
N.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	STP-030-1(33)	2000	25	29

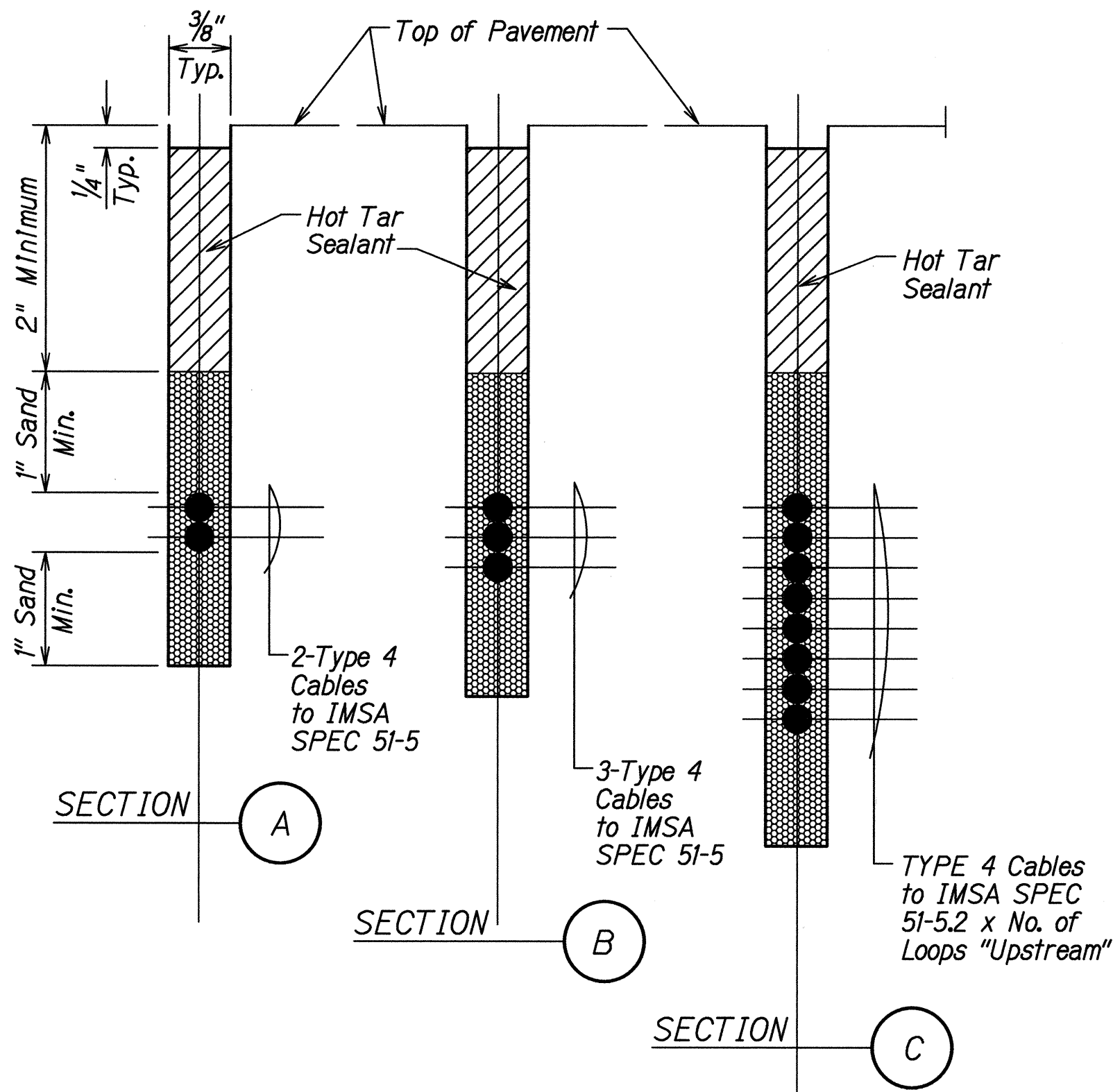


- NOTES:
- Center sensor loops in lanes.
 - Collector cables shall be twisted 2 turns per foot.
 - Number of loops and locations vary. See project plans.
 - Number and locations of collector sawcuts may be varied in the field to suit.

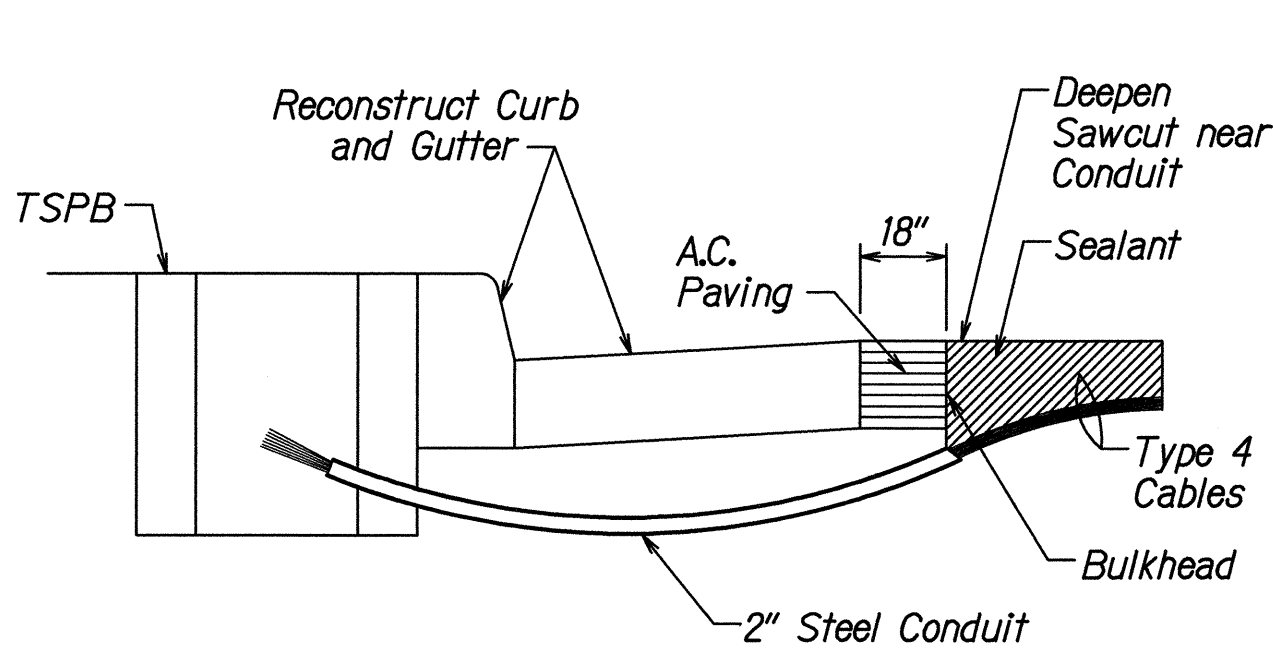
TYPICAL SENSOR LOOP LAYOUT



TYPICAL SENSOR LOOP SAWCUT DETAIL

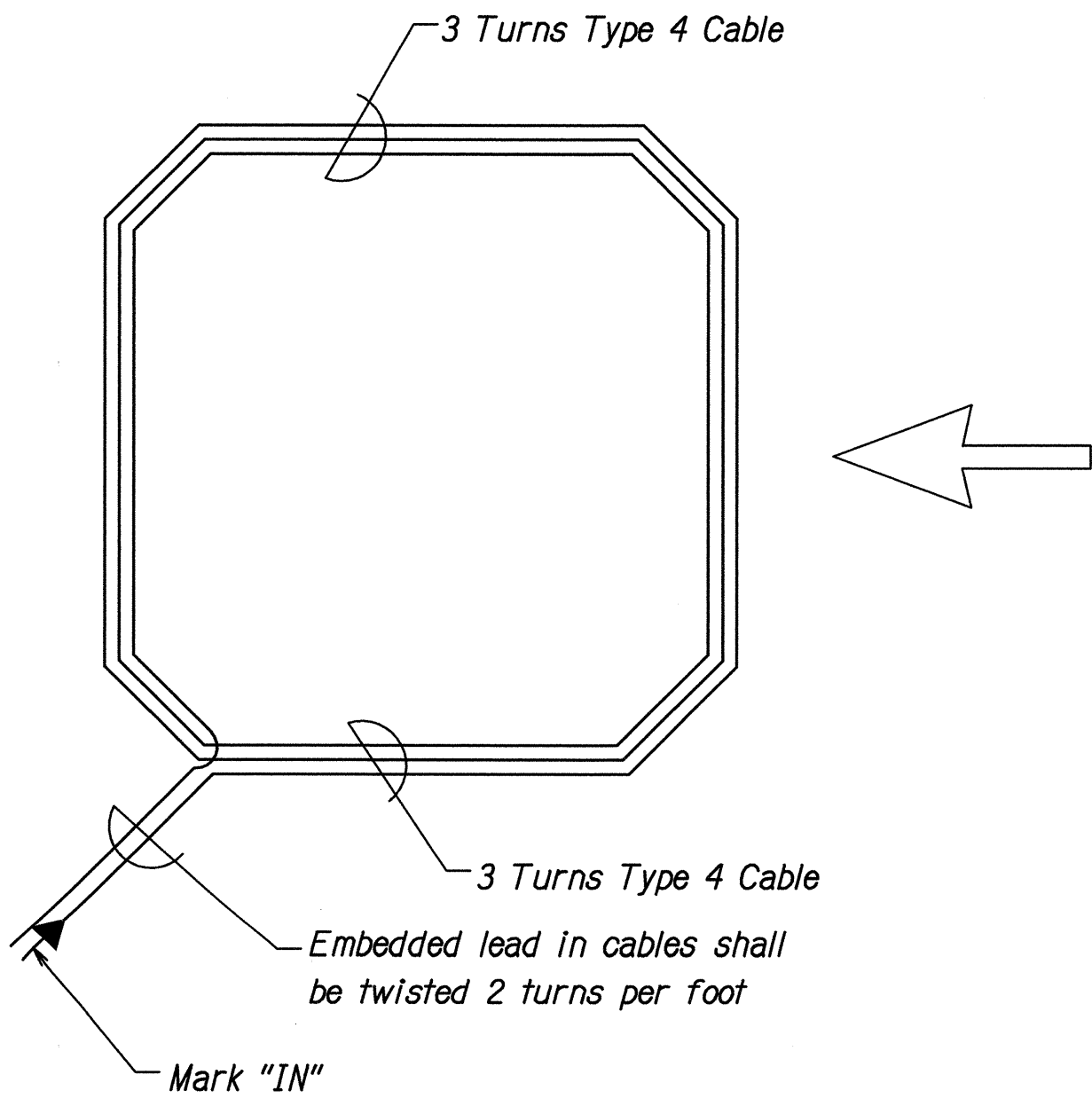


TYPICAL SECTION THROUGH SENSOR LOOP



- NOTES ON CONSTRUCTION AT END OF SAWCUT
- Seal roadway end of conduit after installation of conductors.
 - Install bulkhead across conduit trench.
 - Place hot tar in sawcut.
 - Backfill over conduit with new A.C.
 - Reconstruct curb and gutter as required.

DETAIL OF SENSOR LOOP INSTALLATION
AT EDGE OF ROADWAY



TYPICAL SENSOR LOOP WIRING DIAGRAM

ORIGINAL PLAN	DESIGNED BY	DATE
NOTE BOOK	DESIGNED BY	02/99
Quantity	QUANTITIES BY	02/99
Checked	CHECKED BY	

R4-1-97



THIS WORK WAS DONE BY ME
OR UNDER MY SUPERVISION
Date: Feb., 1999

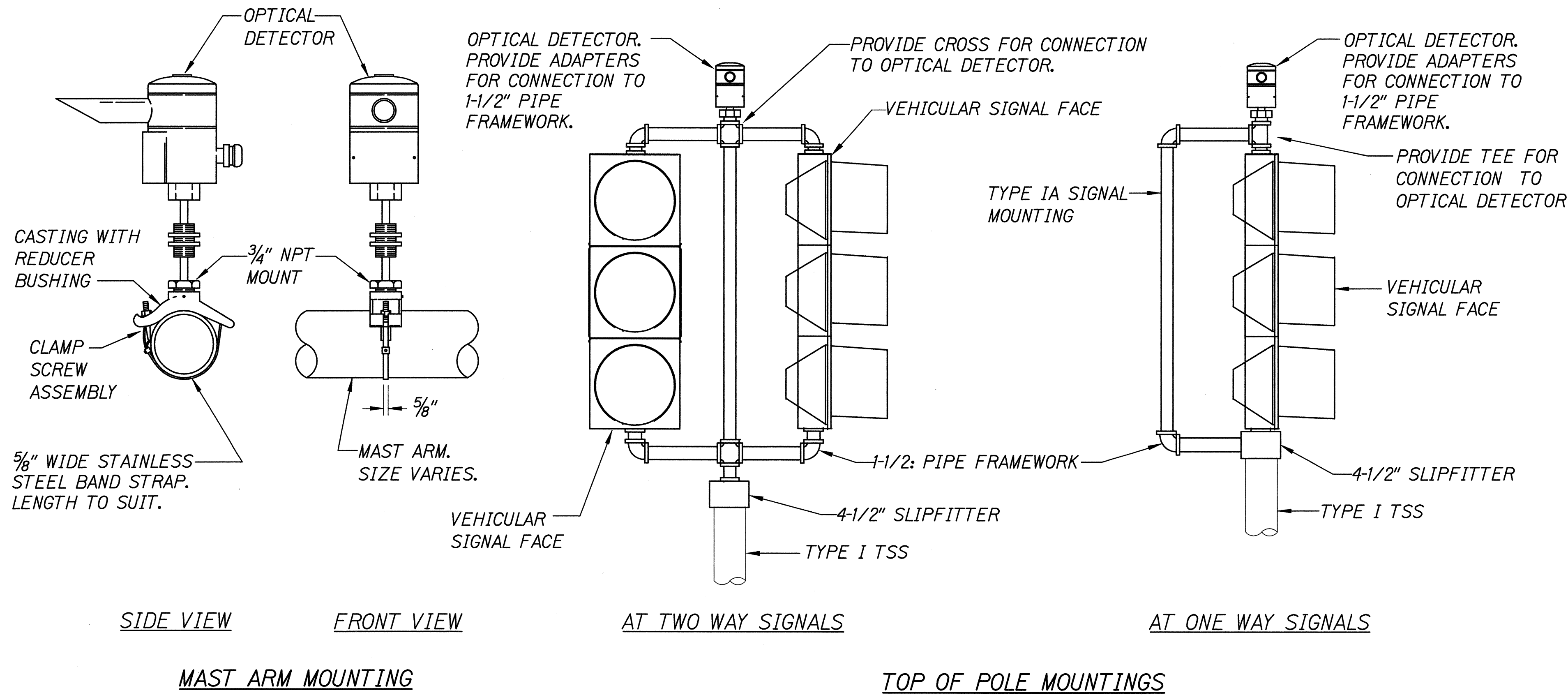
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS
HONOAPIILANI HIGHWAY
Installation of Traffic Signals at Napilihau Street
F.A. Project No. STP-030-1(33)

Scale: Not to Scale
Date: Feb., 1999

SHEET No. 6 OF 7 SHEETS

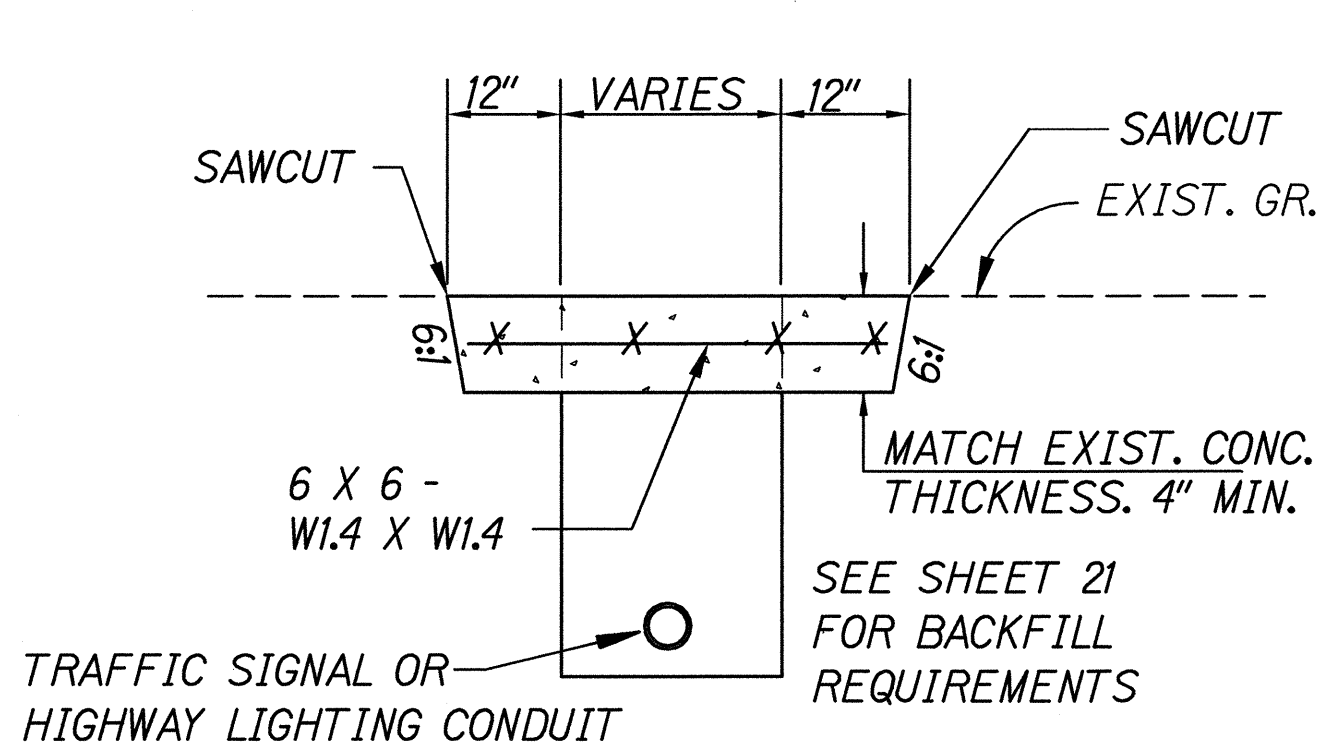
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HAWAII	HAW.	STP-030-1(33)	2000	26	29



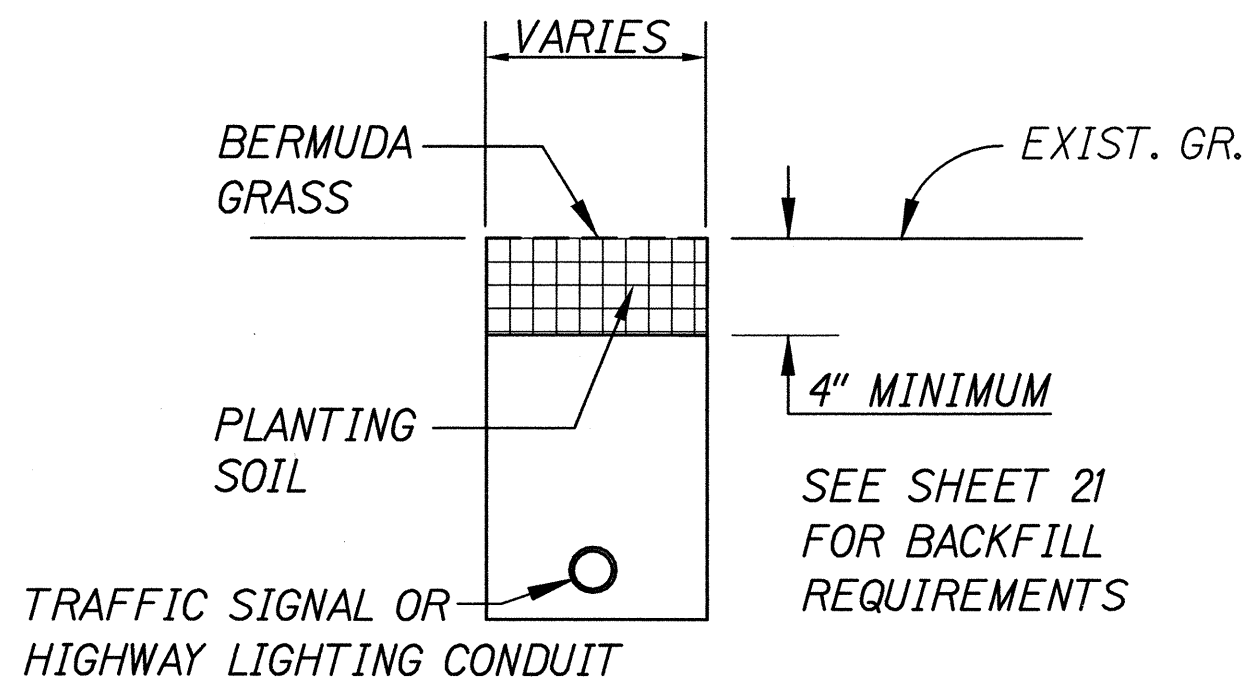
NOTES ON OPTICAL DETECTOR MOUNTINGS:

- OPTICAL DETECTOR SHALL BE "OPTICOM M511 OPTICAL DETECTOR", OR APPROVED EQUAL, UNLESS NOTED OTHERWISE IN THE SPECIAL PROVISIONS.
- SUPPORT SADDLE ASSEMBLY FOR MAST ARM MOUNTING SHALL BE "ASTRO MINI-BRAC, AB-0132-29", OR APPROVED EQUAL, UNLESS NOTED OTHERWISE IN THE SPECIAL PROVISIONS.

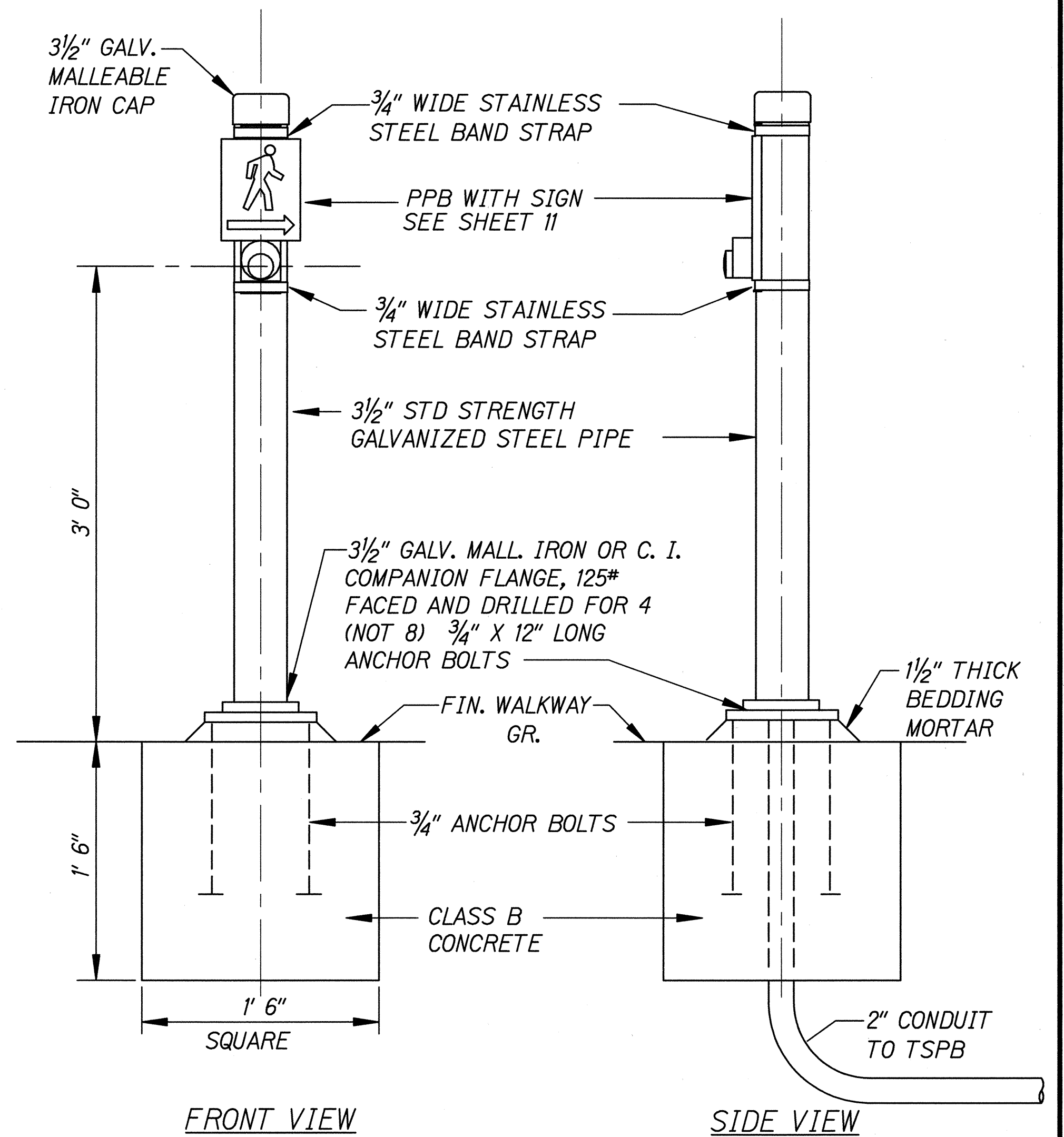
OPTICAL DETECTOR MOUNTINGS



SURFACE RESTORATION IN
P. C. CONCRETE PAVED SWALES



SURFACE RESTORATION IN
ALL OTHER AREAS NOT PAVED



NOTES ON PPB PEDESTAL INSTALLATION:

- CONDUITS SHALL PROTRUDE 2" MAX. ABOVE FIN. SURFACE OF FOUNDATION.
- CONDUITS SHALL SLOPE AWAY FROM PEDESTAL FOUNDATION.
- DETAILS SHOWN ARE FOR A SINGLE PPB INSTALLATION. WHERE 2 PPB'S ARE CALLED FOR, THE PEDESTAL SIZE SHALL BE INCREASED TO A 4" STANDARD STRENGTH GALV. STEEL PIPE WITH A 4" COMPANION FLANGE. ALL OTHER DETAILS SHALL BE IDENTICAL.

SURVEY PLOTTED BY	DATE
DESIGNED BY	12/99
TRACED BY	12/99
DESIGNED BY	12/99
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	



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OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS
HONOAPIILANI HIGHWAY
Installation of Traffic Signals at Napilihau Street
F.A. Project No. STP-030-1(33)
Scale: None

Date: Feb., 1999

SHEET No. 7 OF 7 SHEETS