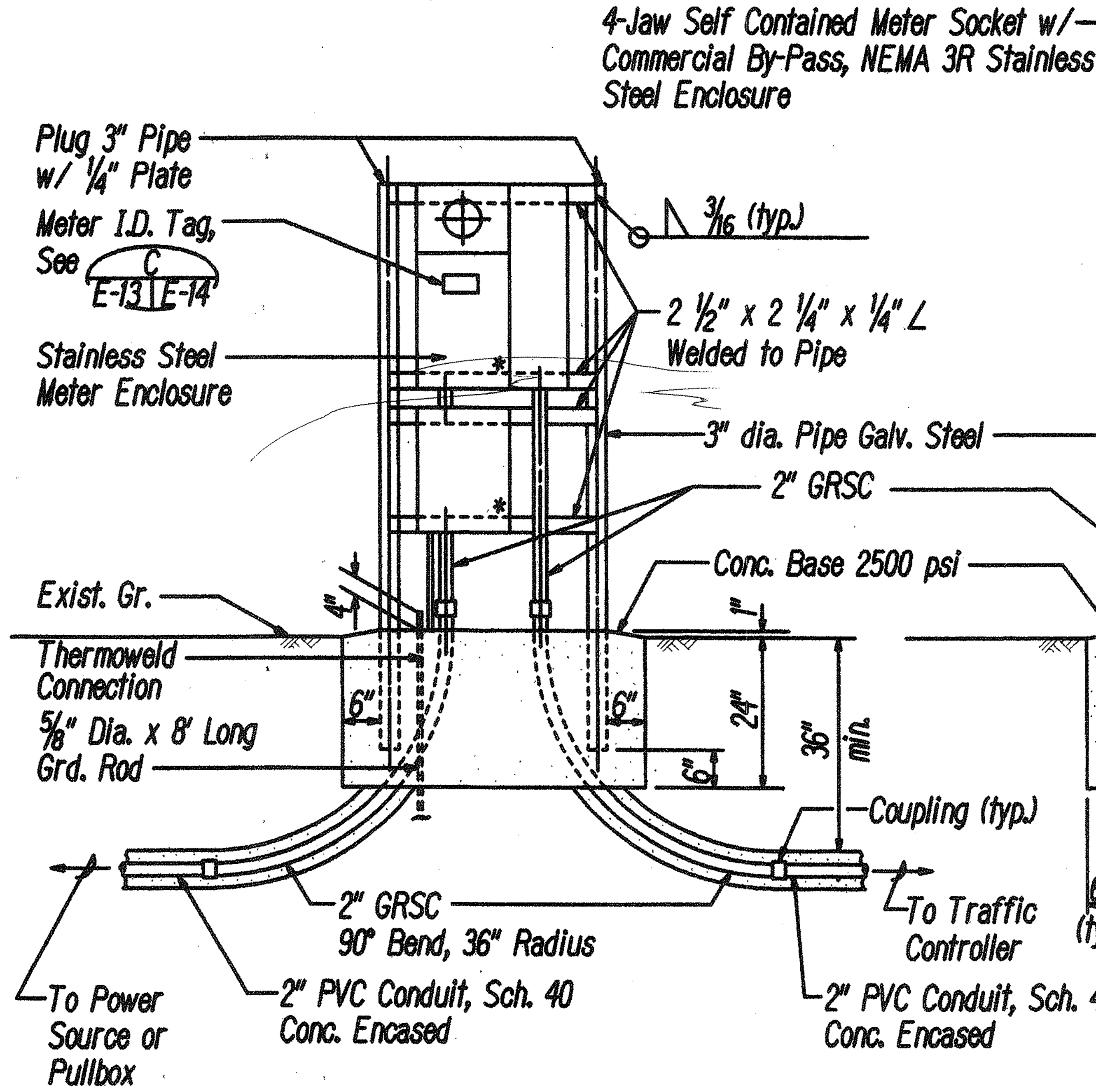
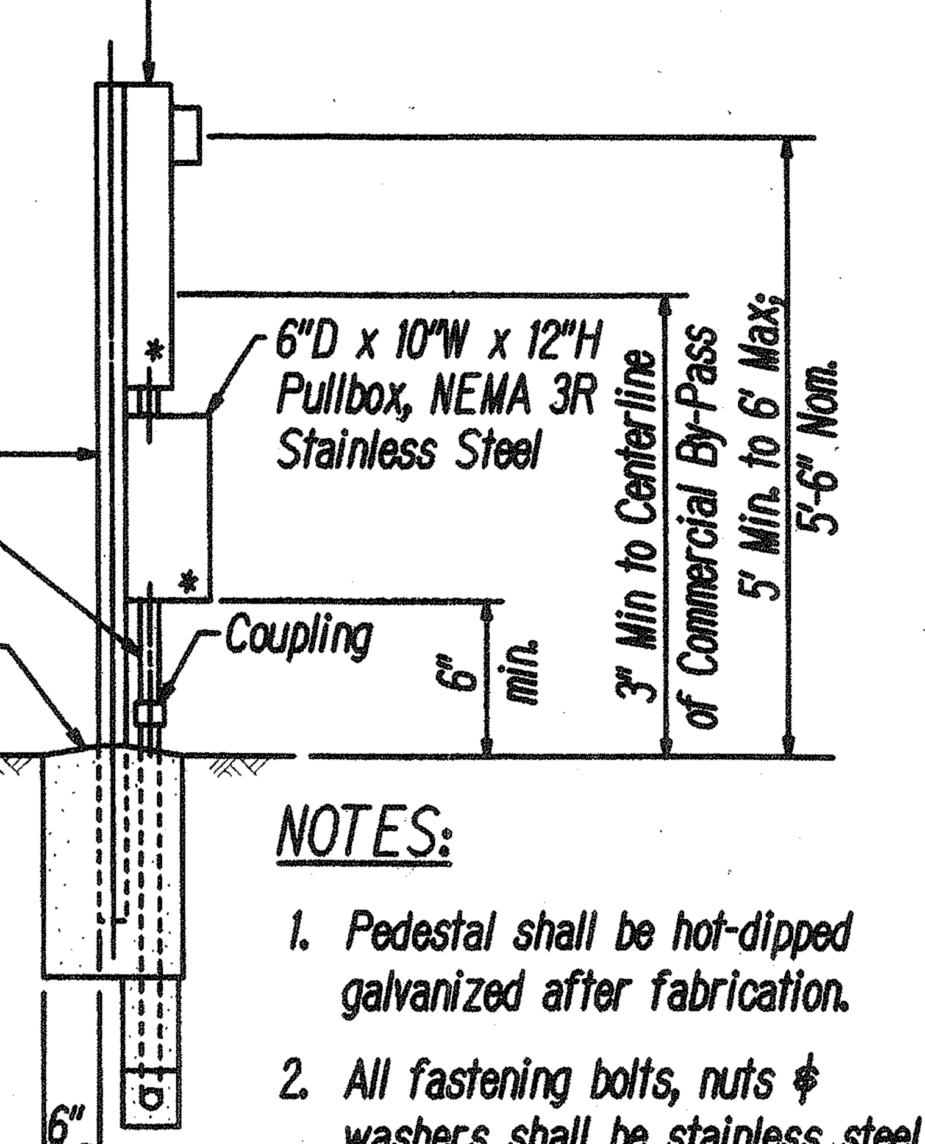
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-04-00	2002	22	63





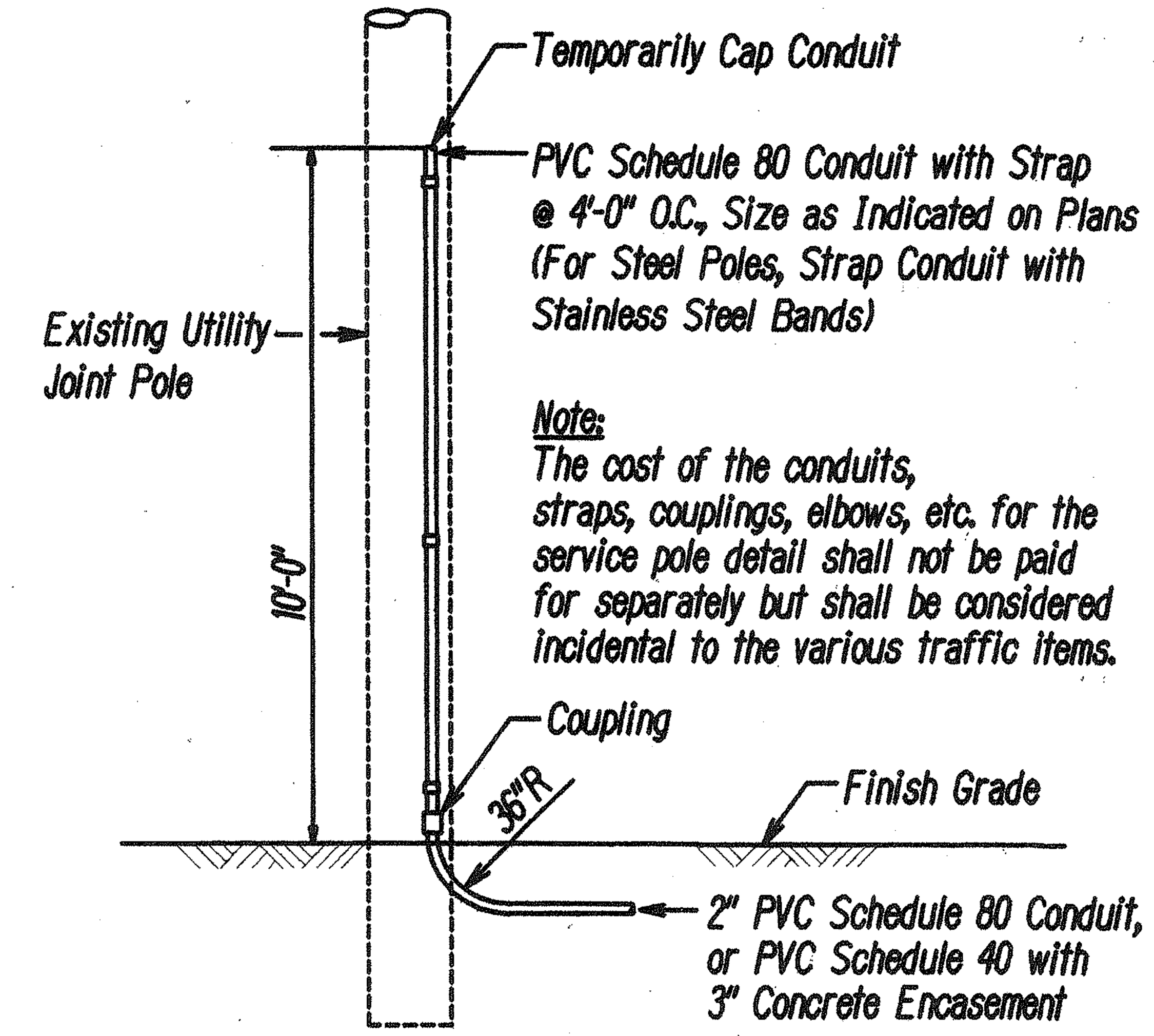
*-Provision for MECo Seal

NOTES:

1. Pedestal shall be hot-dipped galvanized after fabrication.
2. All fastening bolts, nuts & washers shall be stainless steel.
3. Provide 4 ft. clearance in front of meter (to curb).

A (E-1 | E-13) METER PEDESTAL FOR UNDERGROUND SERVICE

N.T.S.

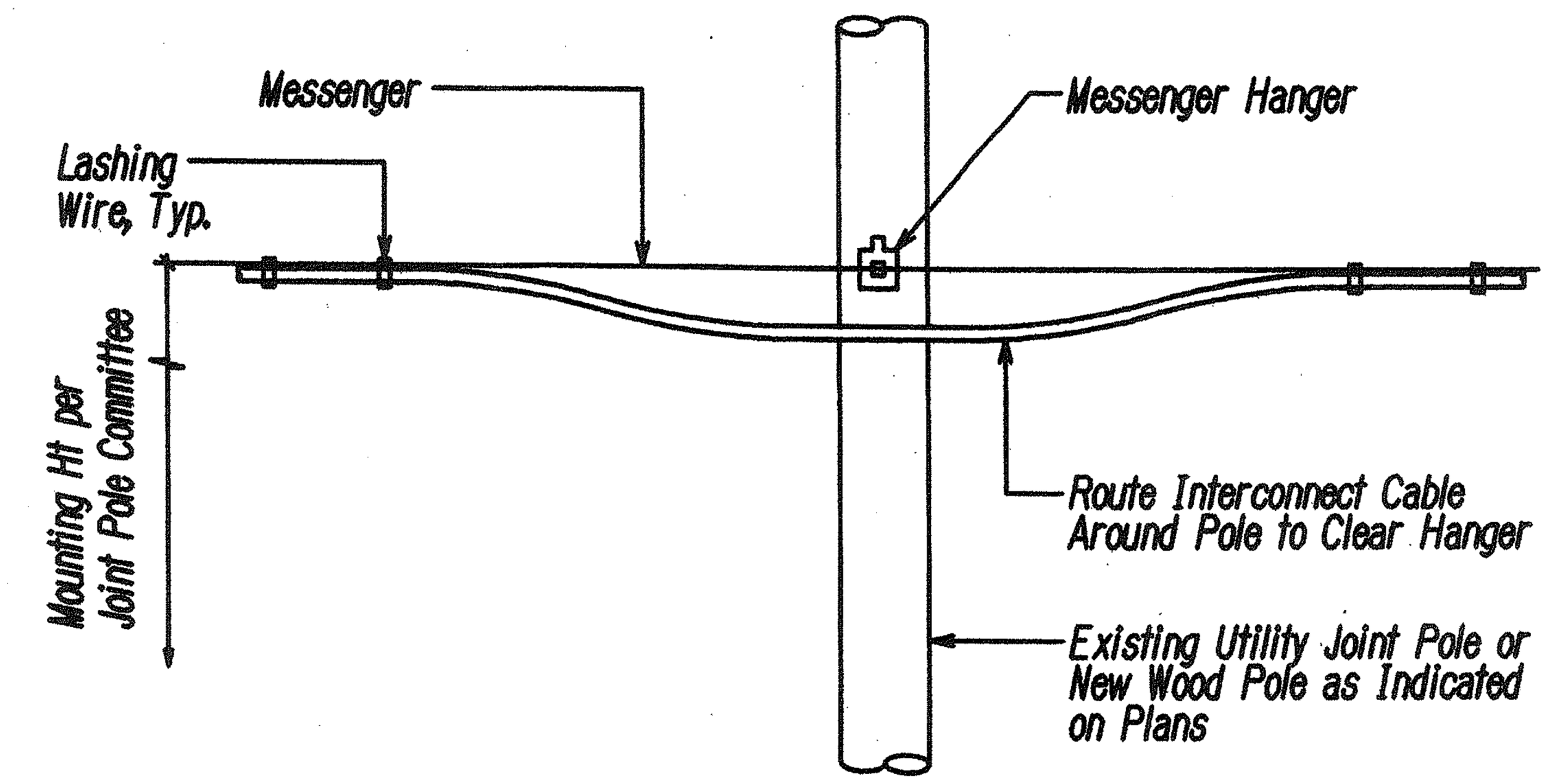


Note: The cost of the conduits, straps, couplings, elbows, etc. for the service pole detail shall not be paid for separately but shall be considered incidental to the various traffic items.

B (E-13 | E-13) SERVICE RISER POLE DETAIL

E-8, E-10,

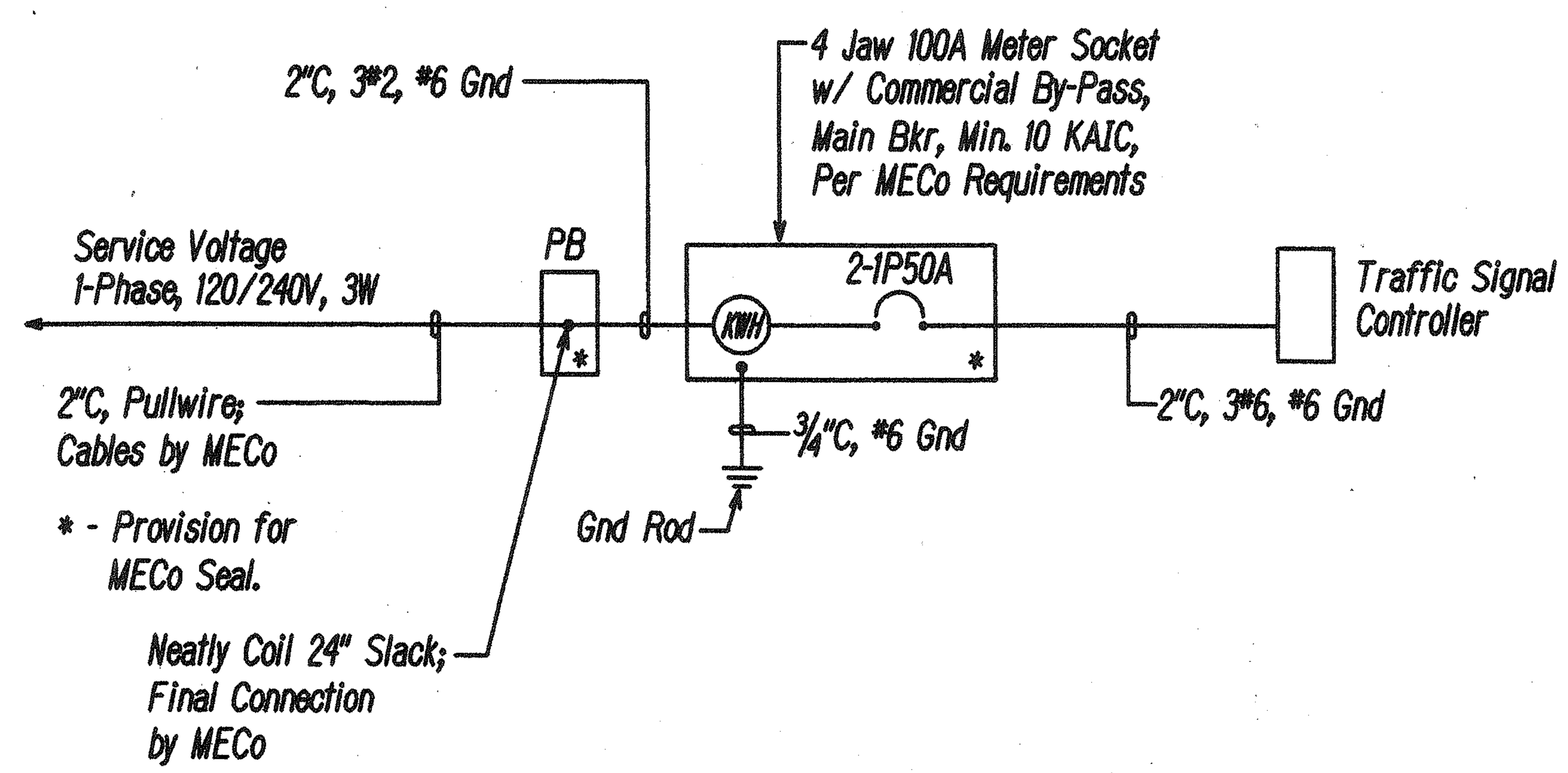
N.T.S.



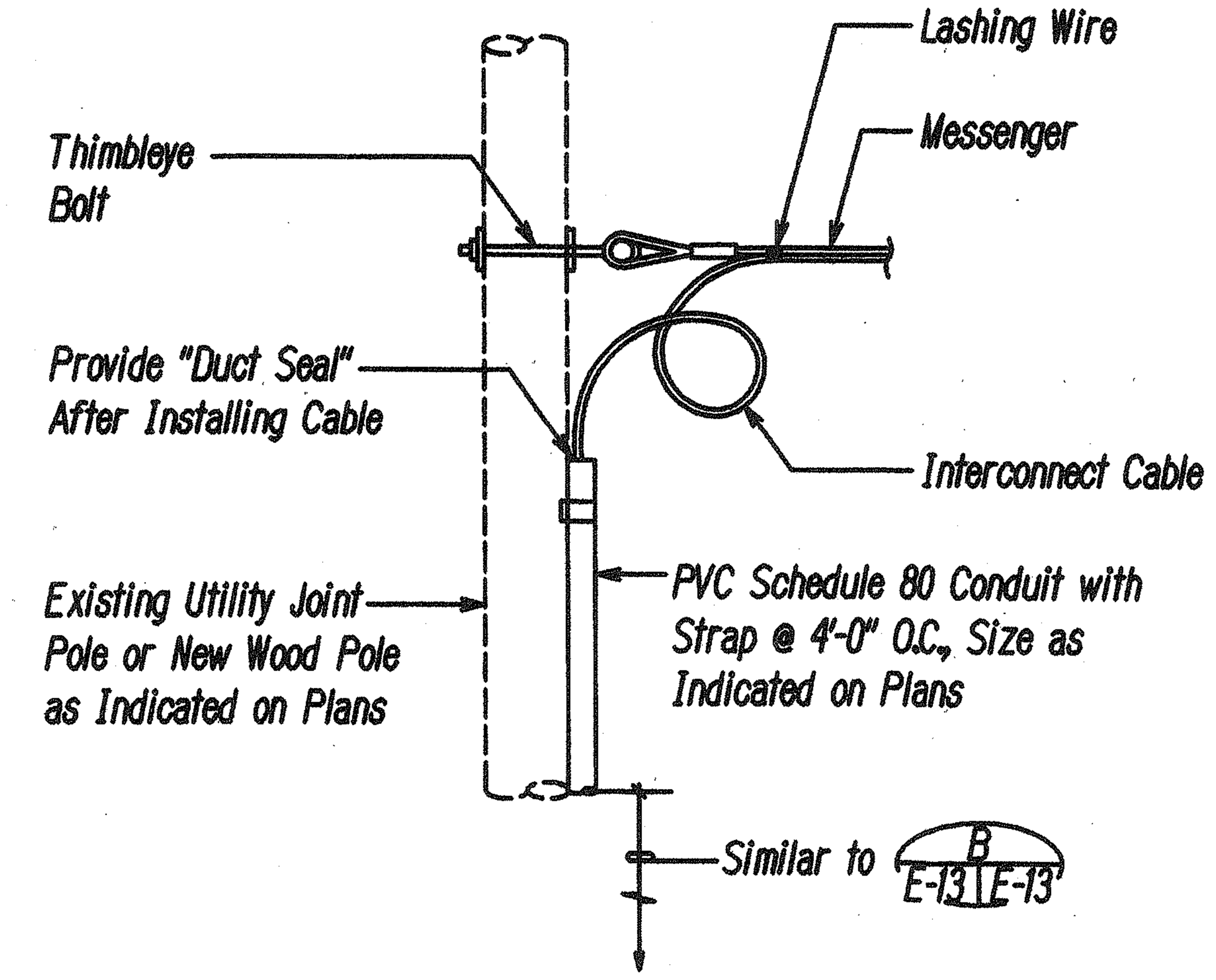
C (E-9 | E-13) TYPICAL INTERCONNECT CABLE ATTACHMENT

E-4, E-5, E-6, E-7,

N.T.S.



ONE LINE DIAGRAM



Note: The cost of the conduits, straps, couplings, elbows, etc. for the riser pole detail shall not be paid for separately, but shall be considered incidental to the various traffic items.

D (E-8 | E-13) INTERCONNECT RISER POLE DETAIL

E-4, E-5, E-7,

N.T.S.

REDUCED PLAN (HALF SIZE)

0 1 2 3

3 INCHES ON ORIGINAL PLAN

6/12/02	REVISED DETAIL
DATE	DESCRIPTION

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS I

TRAFFIC OPERATIONAL IMPROVEMENTS AT VARIOUS LOCATIONS PUUNENE AVENUE AND KAAHUMANU AVENUE

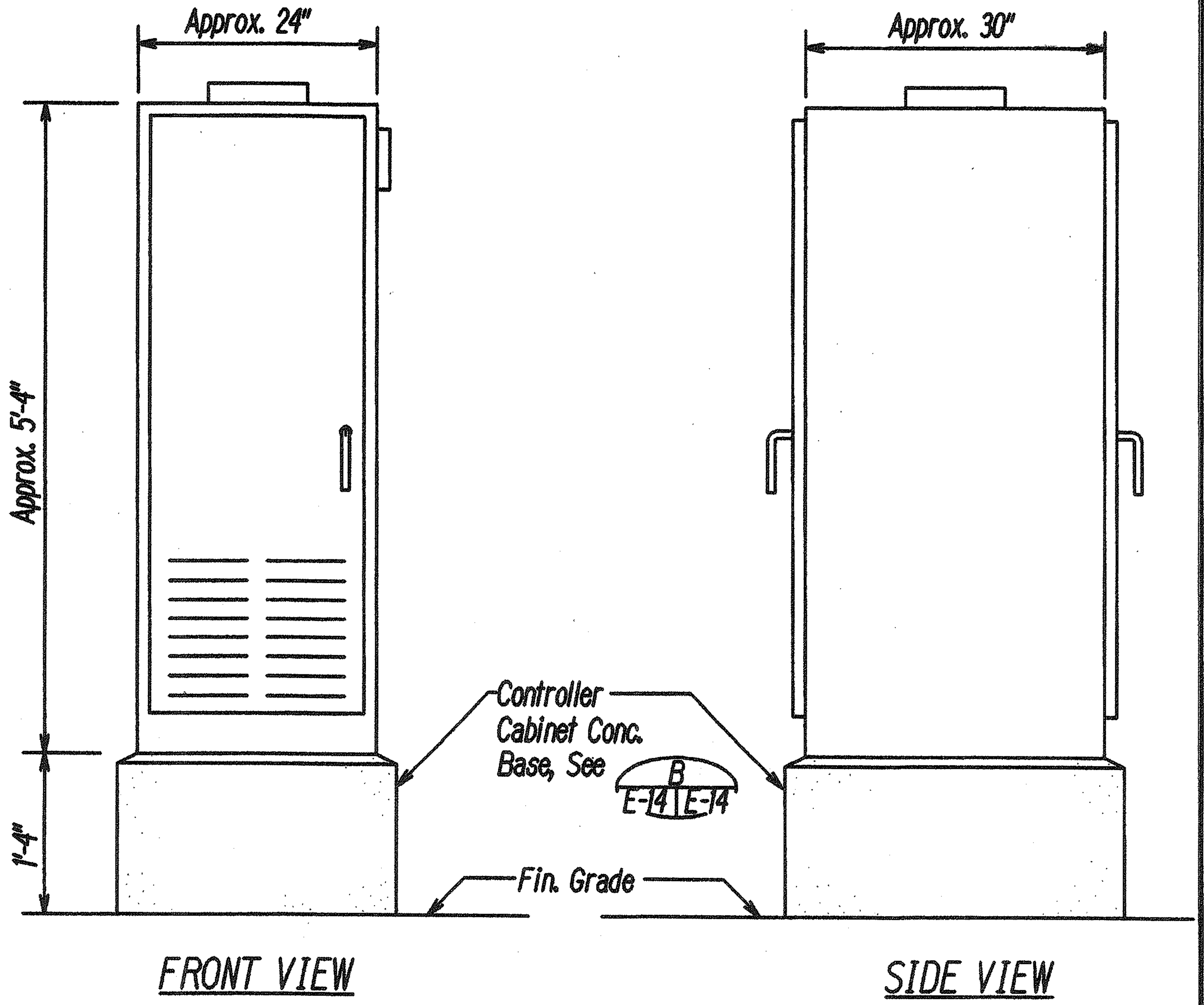
Scale: AS NOTED   Date: April 2002

SHEET No. E-13 OF 22 SHEETS

ADD. 22

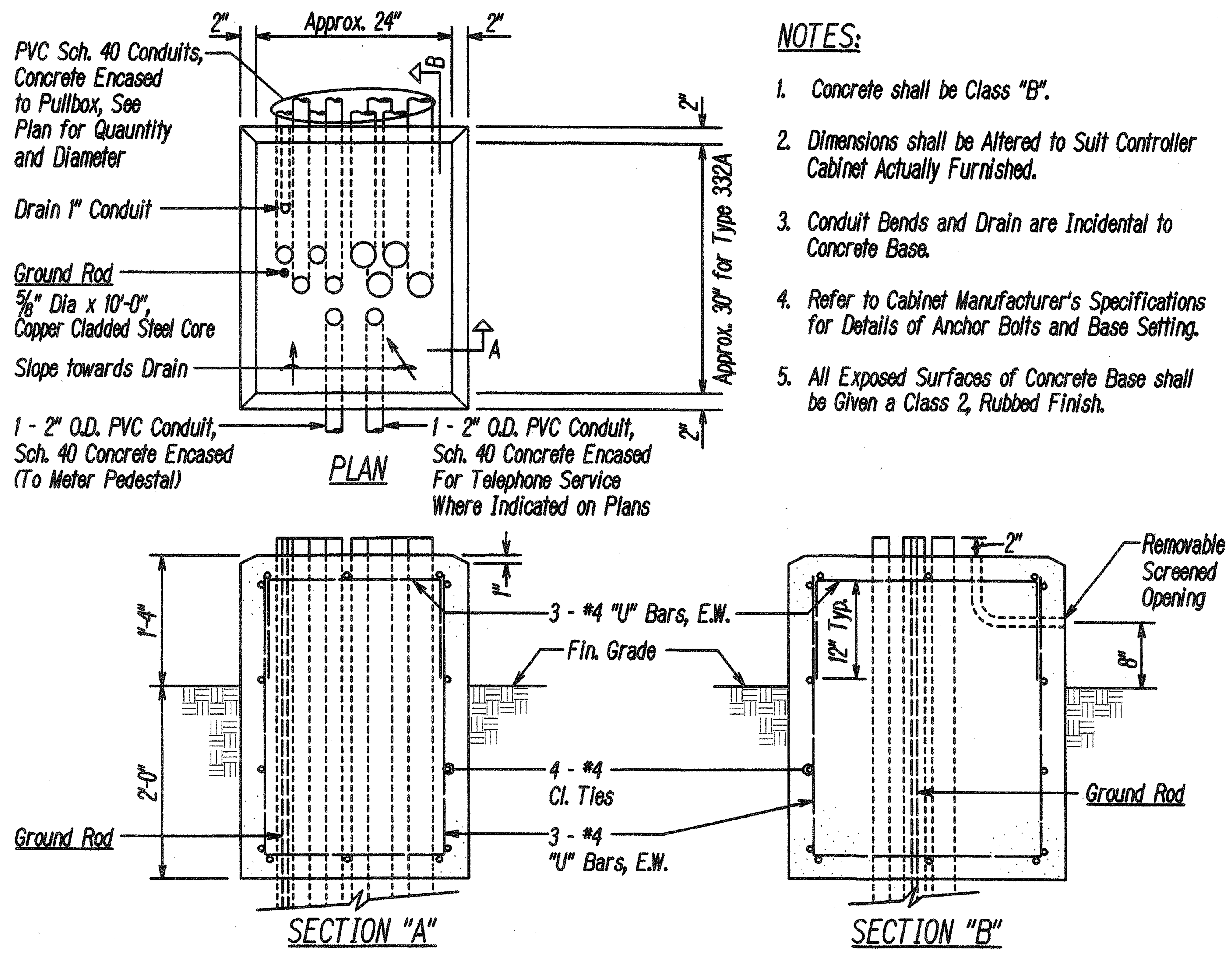
ORIGINAL PLAN	SURVEY PLOTTED BY / DRAWN BY / TRACED BY / DESIGNED BY / QUANTITIES BY / CHECKED BY	DATE
NOTE BOOK		

10 JUN 102 11:50:51 LA z:\ocad\projects\21143\dgn\21143det02a.dgn



A E-1 E-14 TYPE 332A TRAFFIC SIGNAL CONTROLLER CABINET DETAIL

N.T.S.

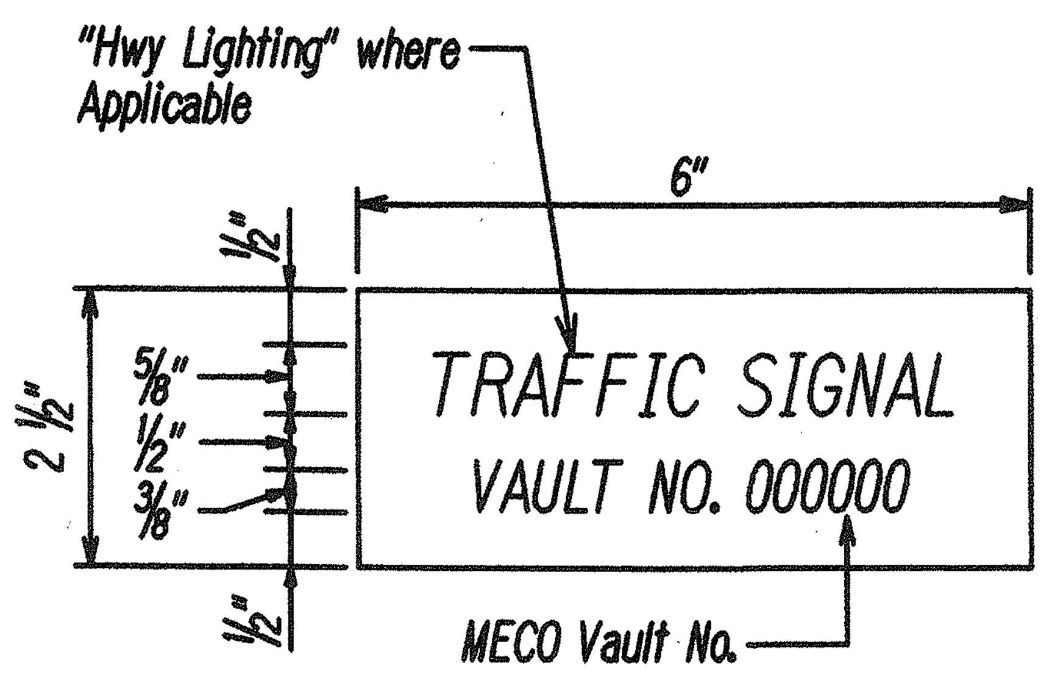


NOTES:

1. Concrete shall be Class "B".
2. Dimensions shall be Altered to Suit Controller Cabinet Actually Furnished.
3. Conduit Bends and Drain are Incidental to Concrete Base.
4. Refer to Cabinet Manufacturer's Specifications for Details of Anchor Bolts and Base Setting.
5. All Exposed Surfaces of Concrete Base shall be Given a Class 2, Rubbed Finish.

B E-14 E-14 CONTROLLER CABINET CONCRETE BASE

N.T.S.

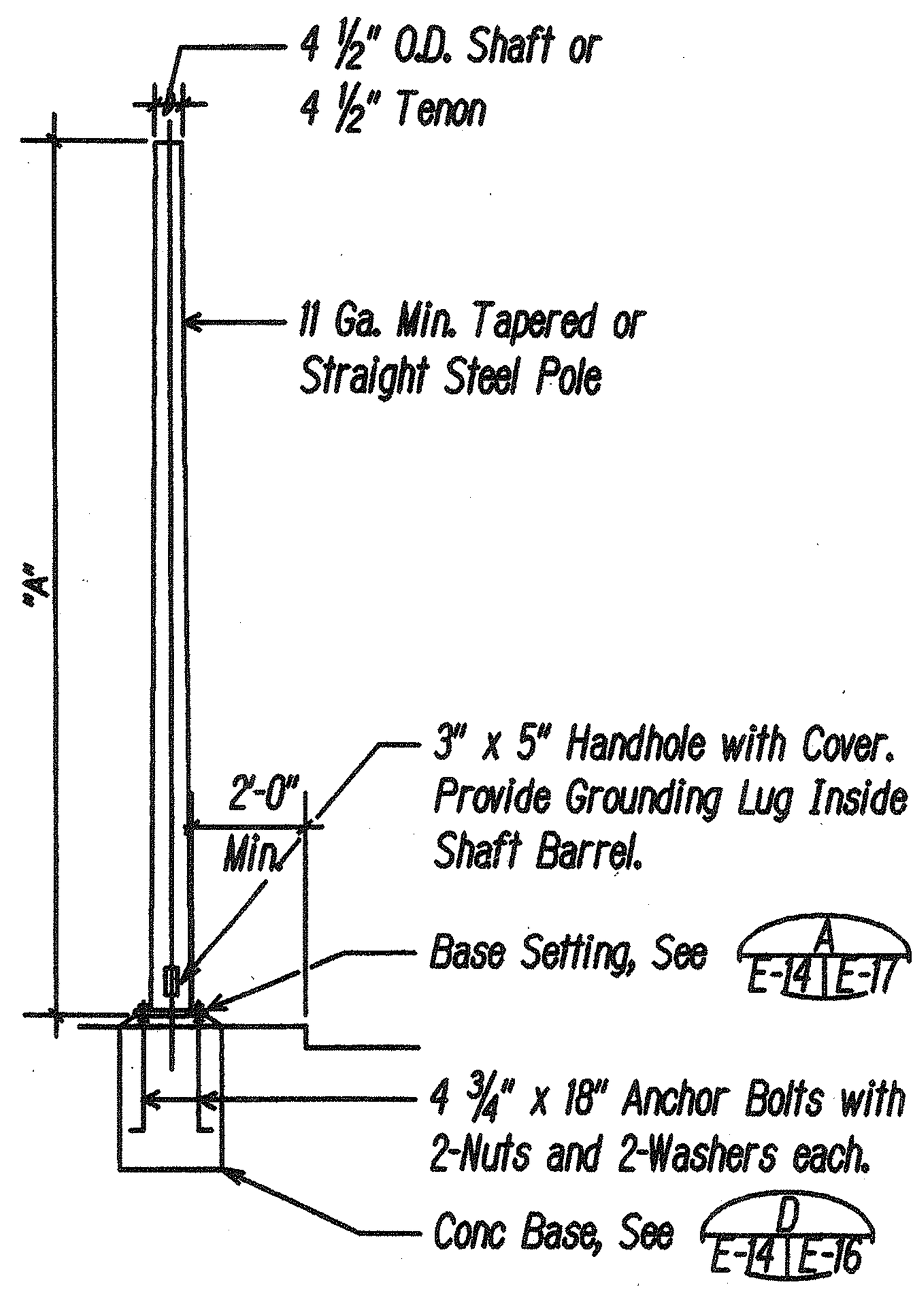


NOTES:

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

C E-13 E-14 METER I.D. TAG DETAIL

N.T.S.



Notes:

1. Standard shall be Designed in Accordance with AASHTO "Standard Specification for Structural Supports for Highway Signs, Luminaires and Traffic Signals", Dated 2001. Traffic Signal Standard and Arm Assembly shall Withstand 105 M.P.H. Sustained Winds with 1.3 Gust Factor without Permanent Deformation.
2. Submit Shop Drawings for Approval.

TYPE OF STANDARD	"A"
TYPE I-13	13
TYPE I-10	10
TYPE I-8	8
TYPE I-3	3

Typical Designation: I-7 (Type; Height "A")

D E-1 E-14 TYPE I STANDARD AND PEDESTAL INSTALLATION

N.T.S.

REDUCED PLAN (HALF SIZE)

0 1 2 3

3 INCHES ON ORIGINAL PLAN

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS II

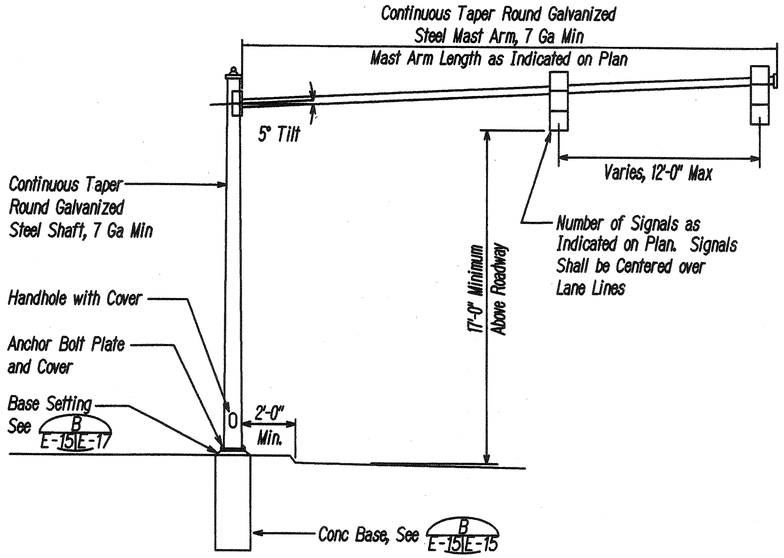
TRAFFIC OPERATIONAL IMPROVEMENTS AT VARIOUS LOCATIONS PUUNENE AVENUE AND KAAHUMANU AVENUE

Scale: AS NOTED Date: April 2002

SHEET No. E-14 OF 22 SHEETS

24 APR 102 13:11:53 LA

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-04-00	2002	24	63

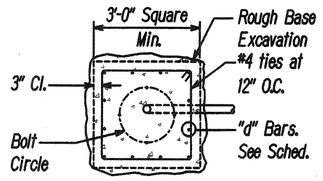


ELEVATION

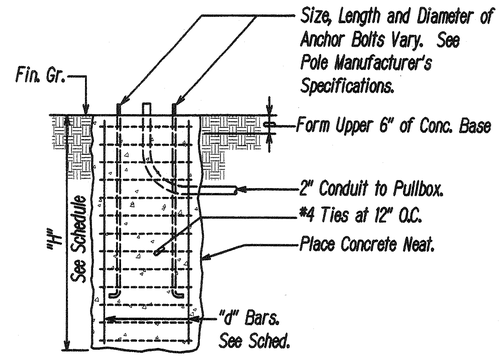
Notes:

1. Standard shall be Designed in Accordance with AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals", Dated 2001. Traffic Signal Standard and Arm Assembly shall Withstand 105 M.P.H. Sustained Winds with 1.3 Gust Factor without Permanent Deformation.
2. Size, Length and Diameter of Anchor Bolts shall be as Recommended by the Manufacturer. Contractor shall Submit Catalog Cuts to the Engineer for Approval.
3. Handhole shall be Opposite of Traffic Flow.

A E-1 E-15 TRAFFIC SIGNAL TYPE II STANDARD
NOT TO SCALE



PLAN - SECTION



VERTICAL SECTION
Type C

Notes:

1. Concrete shall be Class "B". Reinforcing Steel shall be High Strength De-Formed Bars Conforming to ASTM A 615, Grade 60.
2. Conduit Bend is Incidental to Concrete Base.
3. Footing shall be Cast-In-Place Against Undisturbed In-Situ Soils. No Backfilling Around the Concrete Base is Allowed.
4. The Square Shaped Base can be Constructed by Pouring Concrete into a Rough Square Hole which may be Made Either by Hand Excavation or Hop-Toe Excavation.
5. The Maximum Soil "Side Shear" for Torsion Resistance is 1,500 p.s.f.. This Value Applies to Stiff In-Situ Cohesive Soils only and is not Applicable to Granular Soils or Soft/Loose Soils. Consult the Soils Engineers in the Event Granular or Loose Soils are Encountered During Excavation of Base.

B E-15 E-15 CONCRETE BASE DETAILS
NOT TO SCALE

CONCRETE BASE SCHEDULE

TYPE OF STANDARD	TYPE OF BASE	"H"	"d" BARS
II - 18	C	5' - 0"	12 - #6
II - 20	C	5' - 6"	12 - #6
II - 25	C	6' - 0"	12 - #6
II - 30	C	6' - 6"	12 - #8
II - 35	C	7' - 0"	12 - #8
II - 40	C	8' - 0"	12 - #8

REDUCED PLAN
(HALF SIZE)
0 1 2 3
3 INCHES ON ORIGINAL PLAN

STEVEN H. SAKAI
LICENSED PROFESSIONAL ENGINEER
No. 7537-E
HAWAII, U.S.A.

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS III

TRAFFIC OPERATIONAL IMPROVEMENTS
AT VARIOUS LOCATIONS
PUUNENE AVENUE AND
KAAHUMANU AVENUE

Scale: AS NOTED Date: April 2002

SHEET No. E-15 OF 22 SHEETS

ORIGINAL PLAN | SURVEY PLOTTED BY | DATA BY | TRACED BY | DESIGNED BY | QUANTITIES BY | CHECKED BY | DATE | NOTE BOOK | No.

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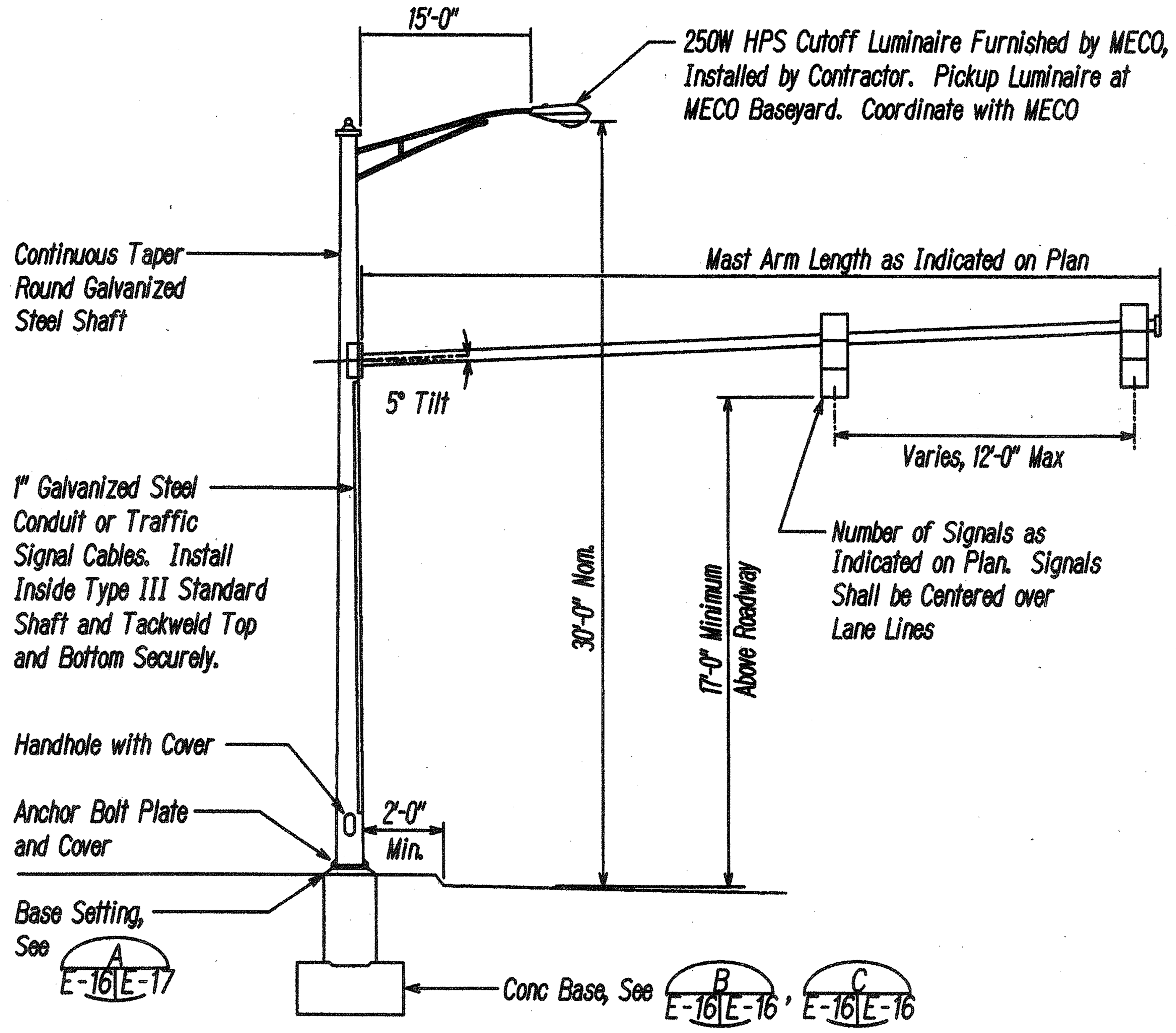
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-04-00	2002	25	63



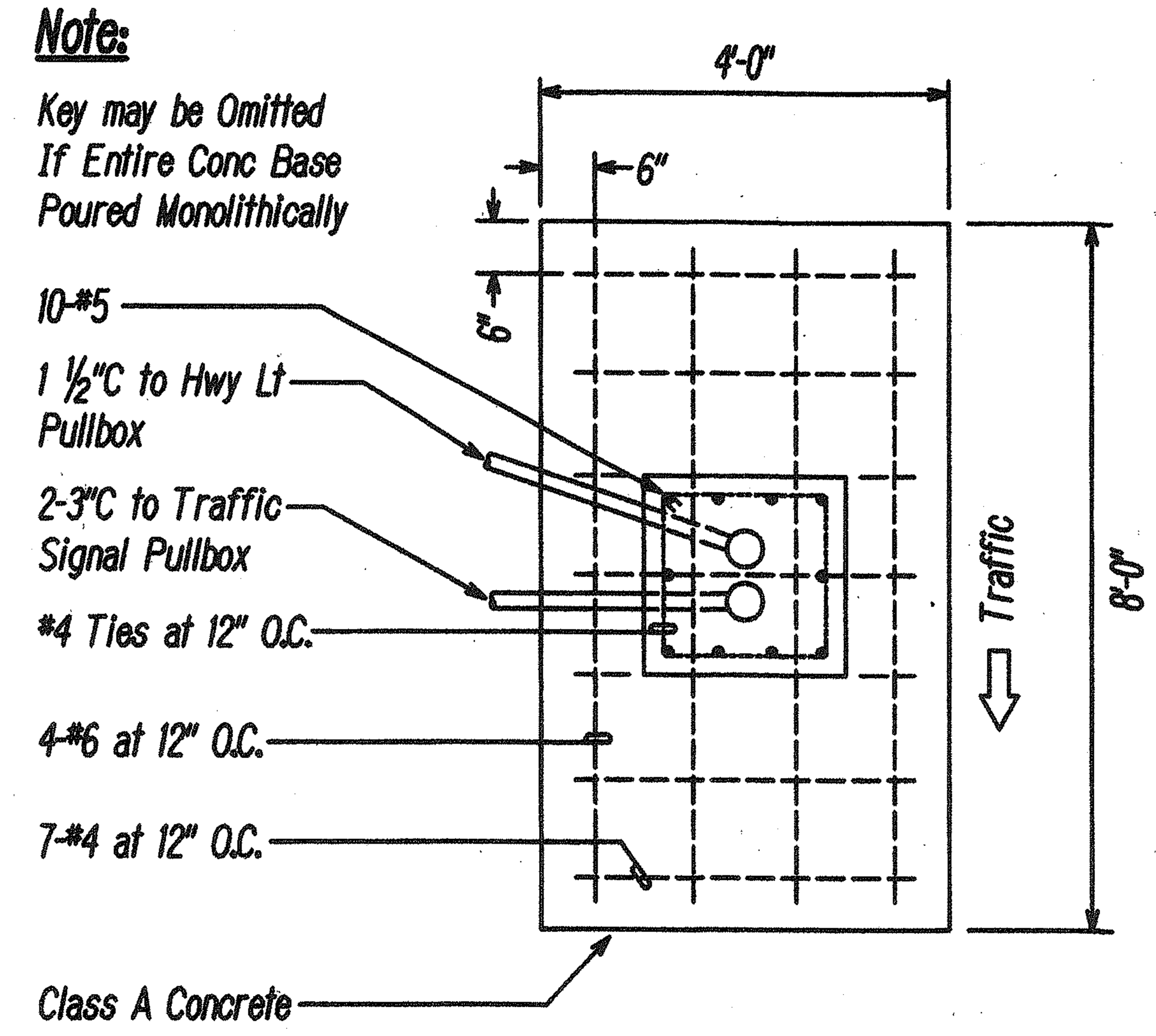
ELEVATION

Notes:

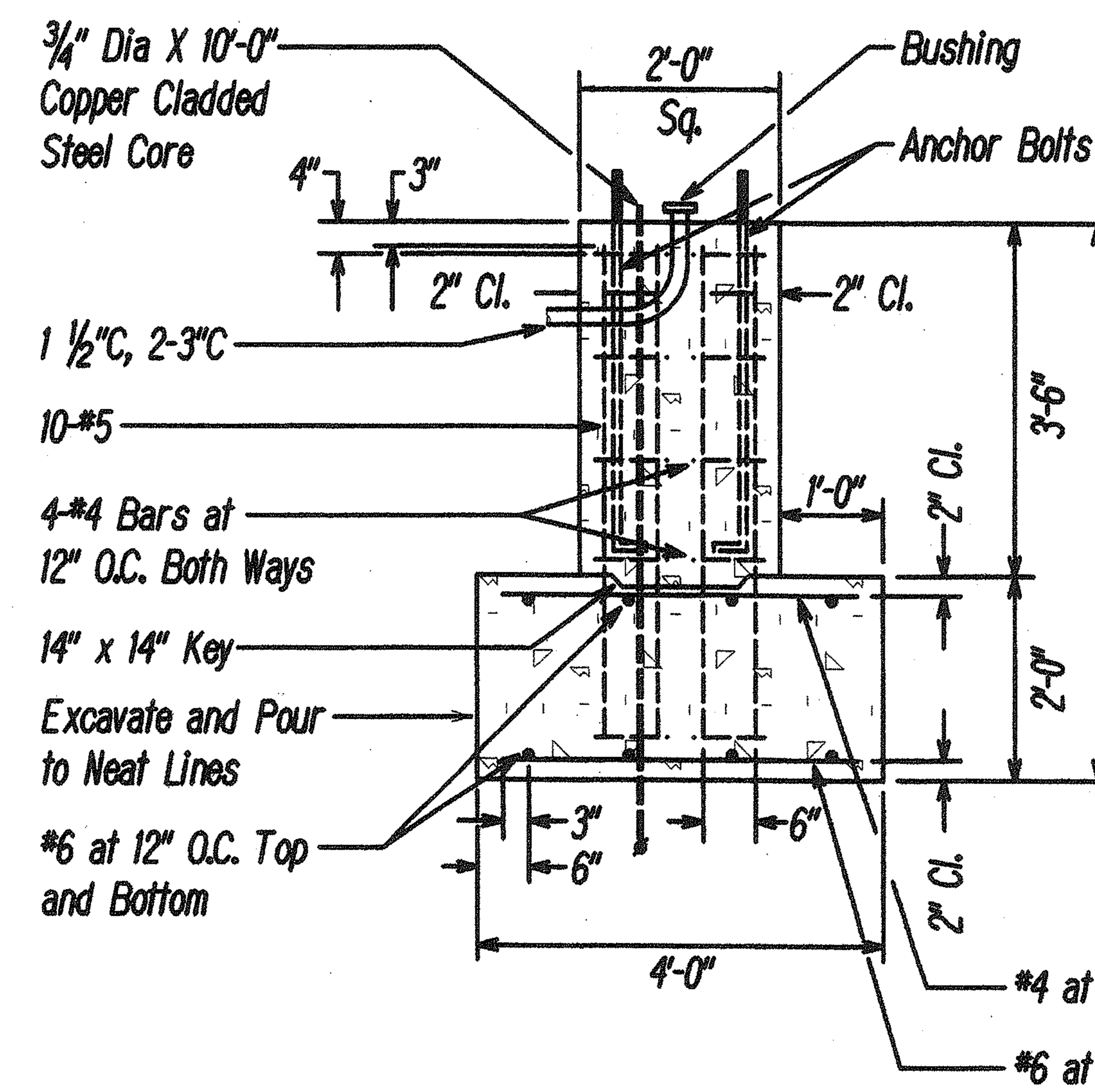
1. Standard shall be Designed in Accordance with AASHTO "Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals", Dated 2001. Traffic Signal Standard and Arm Assembly shall Withstand 105 M.P.H. Sustained Winds with 1.3 Gust Factor without Permanent Deformation.
2. Item for Type III Traffic Sgnal Standard with Mast Arm and Foundation includes Highway Lighting Bracket Arm.
3. Highway Lighting Luminaire to be Paid for by the State and Utility Co. Under the Executed Utility Agreement.
4. For Additional Details See Standard Plan TE-38.
5. Size, Length and Diameter of Anchor Bolts shall be as Recommended by the Manufacturer. Contractor shall Submit Catalog Cuts to the Engineer for Approval.
6. Handhole shall be Opposite of Traffic Flow.

A E-1 E-16 TRAFFIC SIGNAL TYPE III STANDARD
NOT TO SCALE

Note:
Key may be Omitted If Entire Conc Base Poured Monolithically

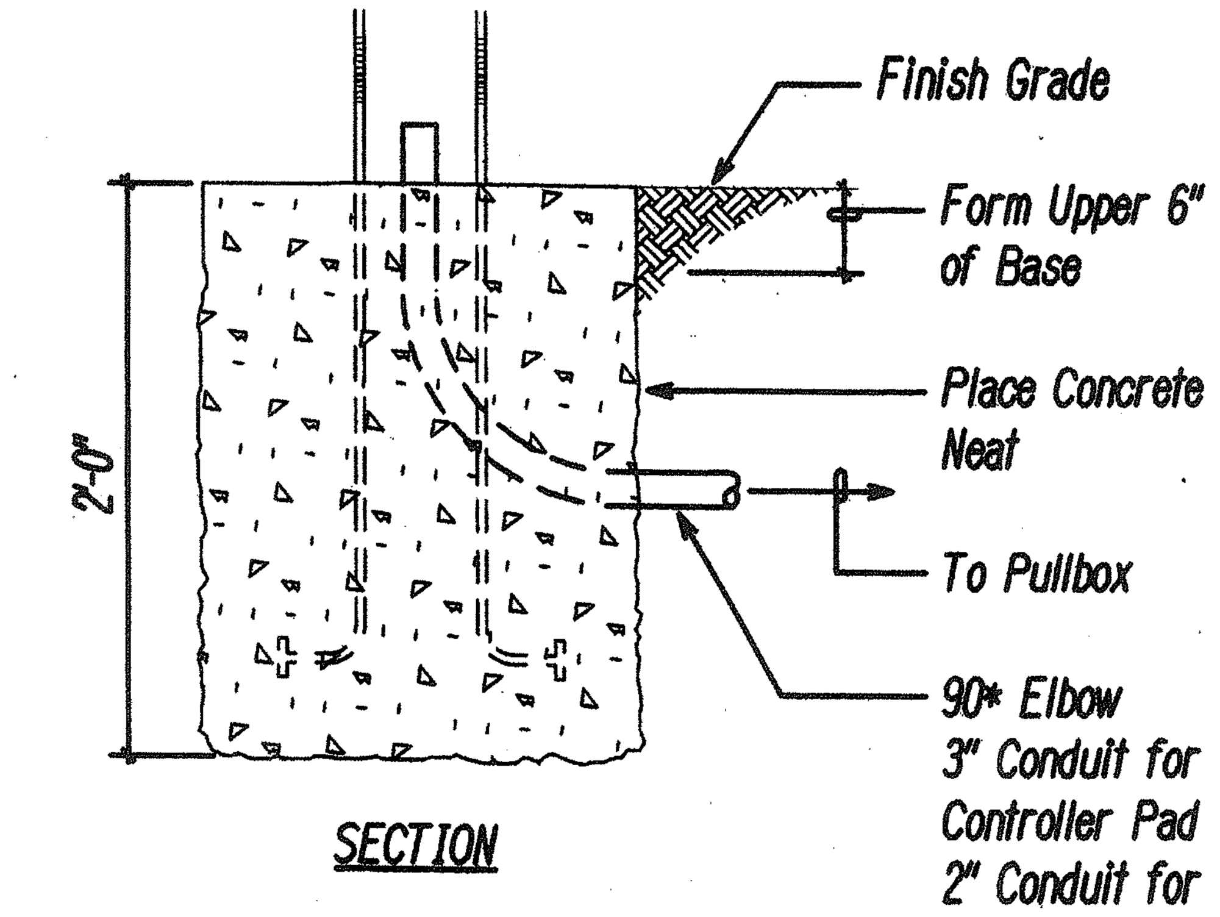


B E-16 E-16 CONCRETE BASE PLAN
NOT TO SCALE

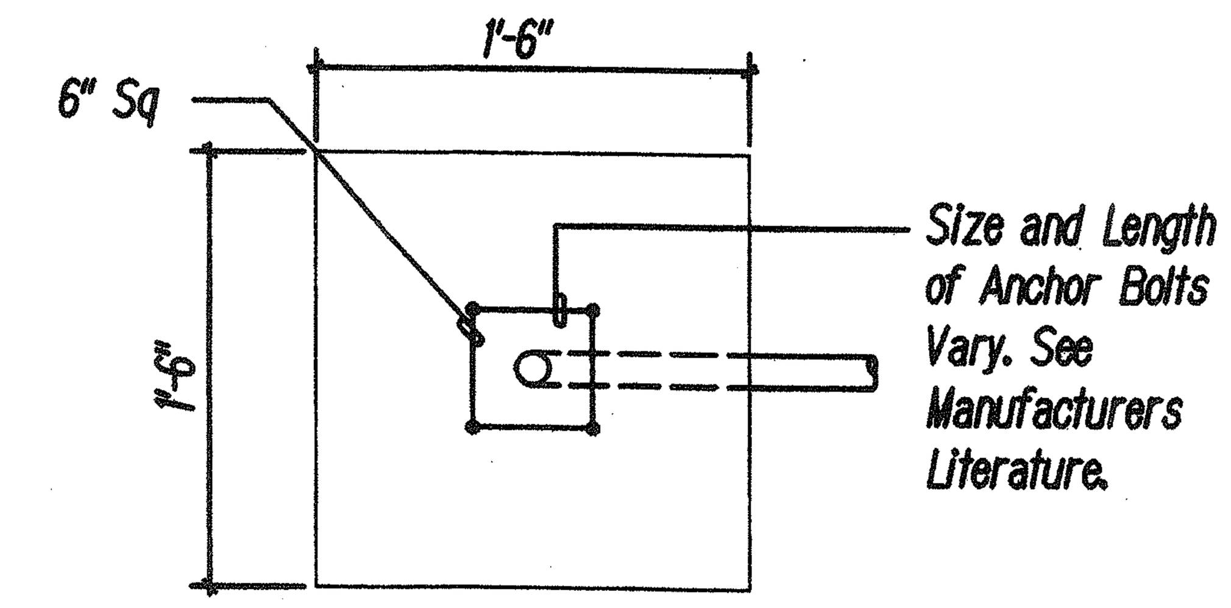


Note: See Details B E-16 E-16

C E-16 E-16 CONCRETE BASE ELEVATION
NOT TO SCALE



SECTION



PLAN

NOTES:

1. Concrete shall be Class "B".
2. Conduit Bend Is Incidental to Concrete Base Construction.

D E-14 E-16 CONCRETE BASE DETAIL
NOT TO SCALE

REDUCED PLAN (HALF SIZE)
0 1 2 3
3 INCHES ON ORIGINAL PLAN

DATE	DESCRIPTION
6/12/02	REVISED DETAIL

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS IV

TRAFFIC OPERATIONAL IMPROVEMENTS AT VARIOUS LOCATIONS PUUNENE AVENUE AND KAAHUMANU AVENUE

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

Scale: AS NOTED Date: April 2002

SHEET No. E-16 OF 22 SHEETS

ORIGINAL PLAN | NOTE BOOK | No. — SURVEY PLOTTED BY / DRAWN BY / TRACED BY / DESIGNED BY / QUANTITIES BY / CHECKED BY — DATE

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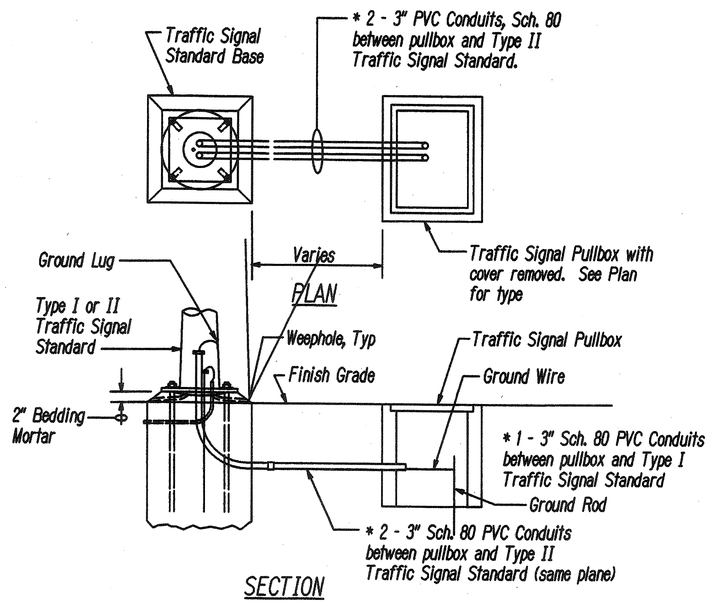
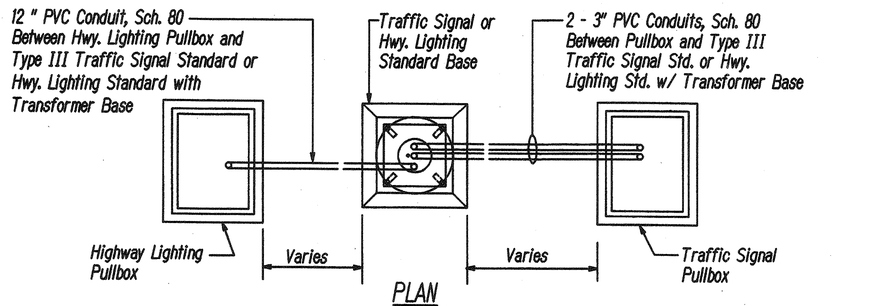
ADD. 25

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-04-00	2002	26	63



CONDUIT FOR TYPE I OR II TRAFFIC SIGNAL STD.

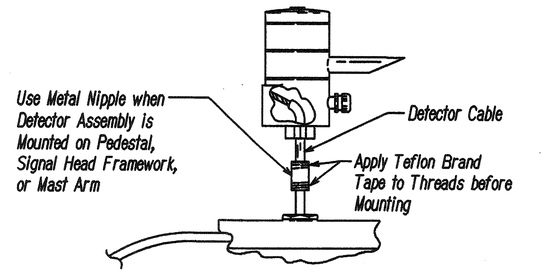


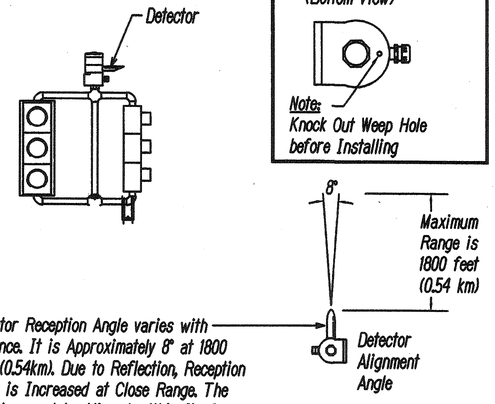
CONDUIT FOR TYPE III TRAFFIC SIGNAL STD. OR HWY. LT'G. STD.

A E-16 E-17 CONDUIT DETAILS FOR TRAFFIC SIGNAL/HWY. LIGHTING STANDARD

Not to Scale

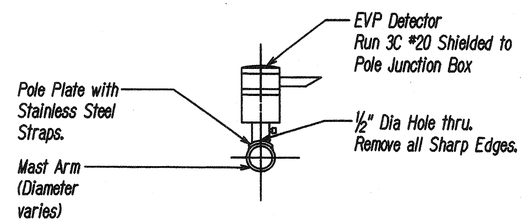
E-14, E-15





Note:
Detector Reception Angle varies with Distance. It is Approximately 8° at 1800 Feet (0.54km). Due to Reflection, Reception Angle is Increased at Close Range. The Detector must be Aligned within 8° of the Farthest Point where Priority Vehicle is to be Sensed.

TYPICAL PEDESTAL/TYPE T.S.S. MOUNTING OF EVP DETECTOR



TYPICAL MAST ARM MOUNTING OF EVP DETECTOR

B E-1 E-17 EVP DETECTOR MOUNTING

Not to Scale

REDUCED PLAN
(HALF SIZE)
0 1 2 3
3 INCHES ON ORIGINAL PLAN

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS V

TRAFFIC OPERATIONAL IMPROVEMENTS AT VARIOUS LOCATIONS PUUNENE AVENUE AND KAAHUMANU AVENUE

Scale: AS NOTED Date: April 2002

SHEET No. E-17 OF 22 SHEETS

ORIGINAL PLAN | SURVEY PLOTTED BY ..... DATE ..... | DRAWN BY X | TRACED BY X | DESIGNED BY X | QUANTITIES BY ..... | CHECKED BY .....

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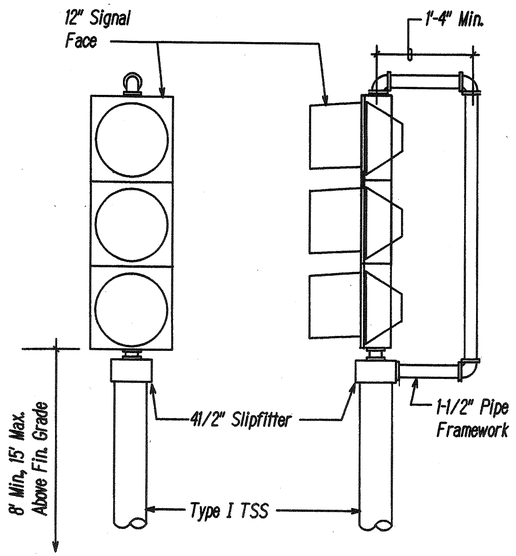
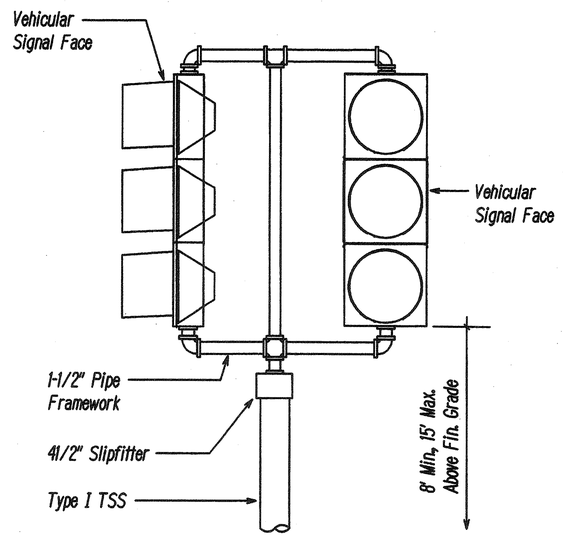
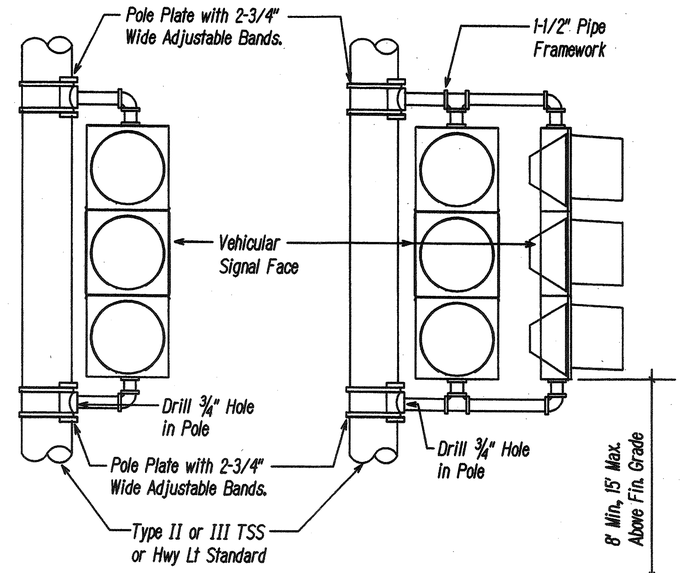
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-04-00	2002	27	63



TOP OF POLE - ONE WAY MOUNTING

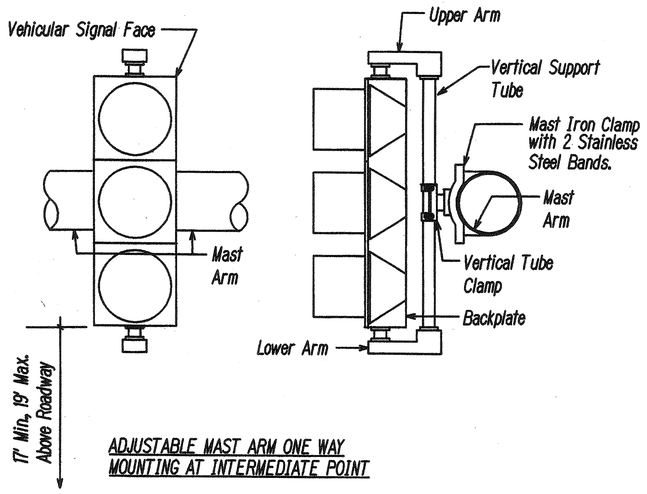


TOP OF POLE - TWO WAY MOUNTING



BRACKET MOUNT - ONE WAY

BRACKET MOUNT - TWO WAY



ADJUSTABLE MAST ARM ONE WAY MOUNTING AT INTERMEDIATE POINT

NOTES:

1. Stainless Steel Bands shall be ½" Wide x .050" Thick, Minimum. Tensile Strength shall be 100,000 PSI Minimum.
2. Upper Arm, Lower Arm and Vertical Support Tube shall be of 356 Cast Aluminum.
3. All Wiring shall be Concealed.
4. Vertical Tube Clamp shall be of Malleable Iron, Grade 32510.
5. All Aluminum Parts shall have an Alodine 1200 Finish.
6. Signal as Noted on Plans.
7. Maintain 16" Min. Clearance at Rear of All Programmed Faces.

ORIGINAL PLAN

SURVEY PLOTTED BY DATE
DRAWN BY X
TRACED BY X
DESIGN BY X
QUANTITIES BY
CHECKED BY
NOTE BOOK dd.xx
No. Ldgn

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A E-1 E-18

VEHICULAR SIGNAL MOUNTING DETAILS

Not to Scale

REDUCED PLAN (HALF SIZE)
0 1 2 3
3 INCHES ON ORIGINAL PLAN

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

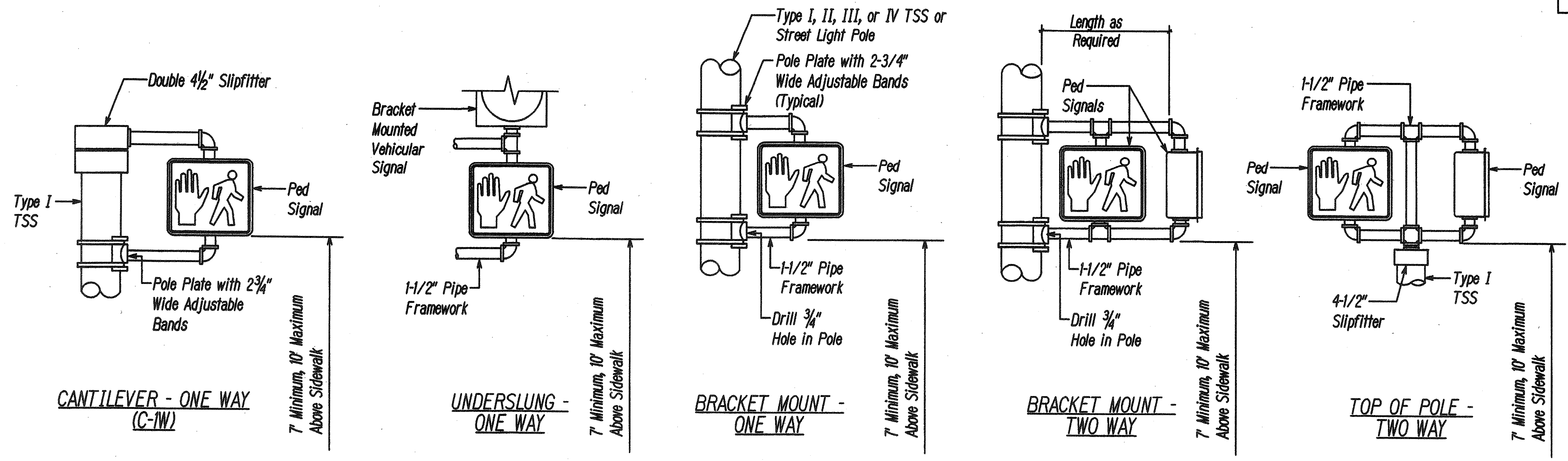
TRAFFIC SIGNAL DETAILS VI

TRAFFIC OPERATIONAL IMPROVEMENTS AT VARIOUS LOCATIONS PUUNENE AVENUE AND KAAHUMANU AVENUE

Scale: AS NOTED Date: April 2002

SHEET No. E-18 OF 22 SHEETS

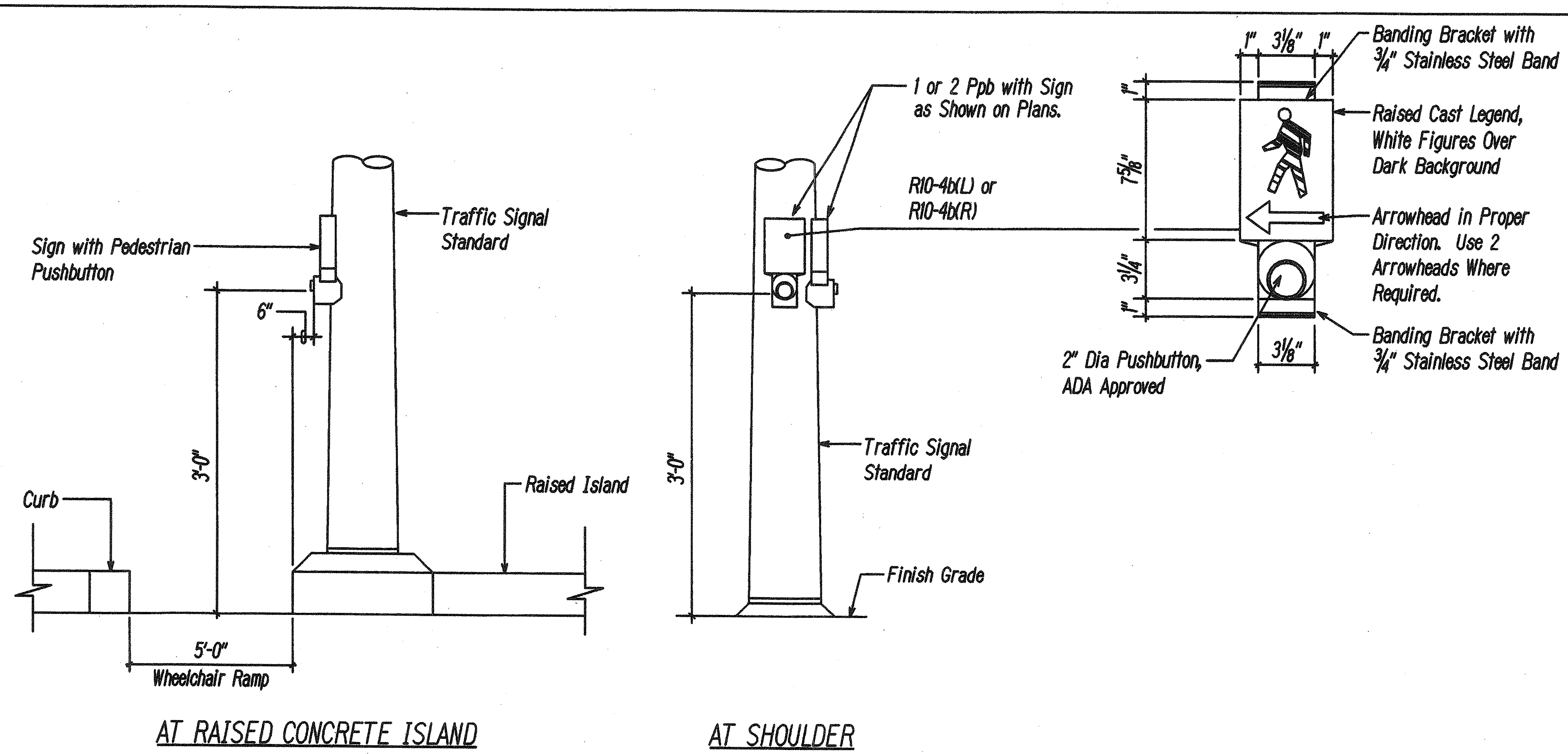
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-04-00	2002	28	63



A / E-1 | E-19

PEDESTRIAN SIGNAL MOUNTING DETAILS

Not to Scale



B / E-1 | E-19

PEDESTRIAN PUSHBUTTON DETAILS

Not to Scale

REDUCED PLAN (HALF SIZE)
0 1 2 3
3 INCHES ON ORIGINAL PLAN

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

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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS VII

TRAFFIC OPERATIONAL IMPROVEMENTS AT VARIOUS LOCATIONS PUUNENE AVENUE AND KAAHUMANU AVENUE

Scale: AS NOTED Date: April 2002

SHEET No. E-19 OF 22 SHEETS

ORIGINAL PLAN | SURVEY PLOTTED BY | DRAWN BY X | TRACED BY | DESIGNED BY X | QUANTITIES BY | CHECKED BY | NOTE BOOK | DATE X

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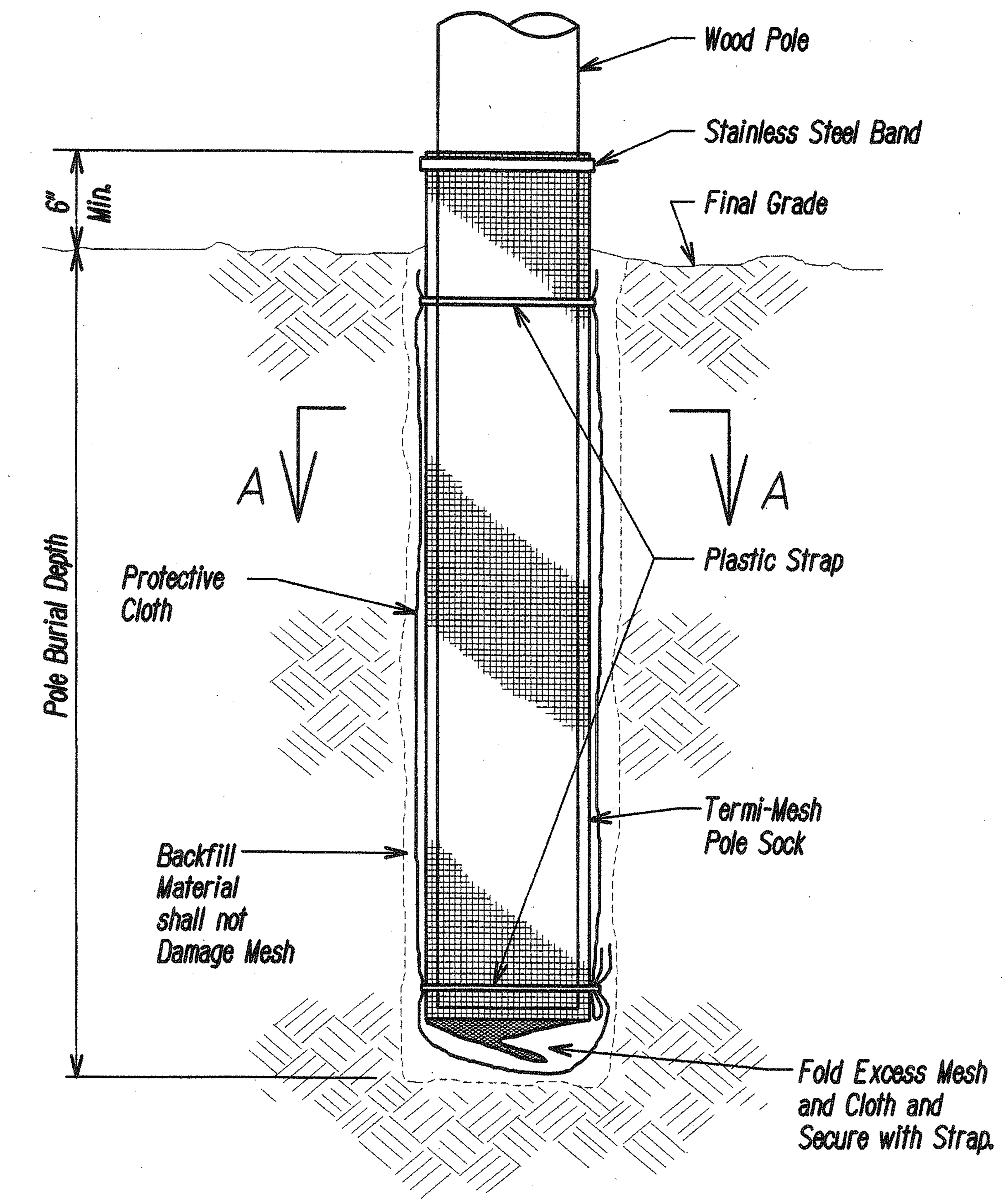
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-04-00	2002	29	63

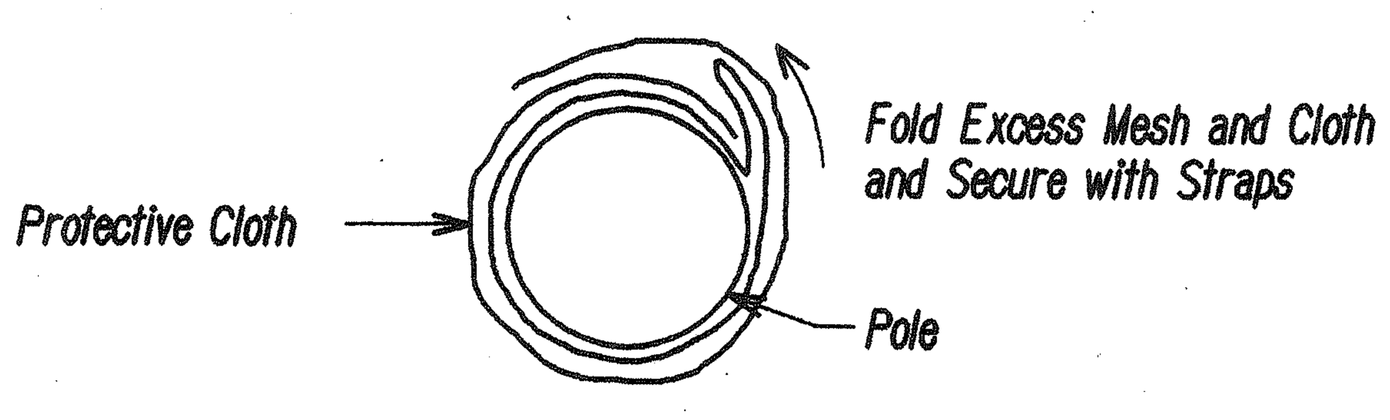
GENERAL NOTES:

Termi-Mesh is a Physical Barrier System that Prevents Ground Termites from Attacking Wood Poles Below Grade. Careful Installation is Essential to Insure Effective Termite Protection.

Termi-Mesh is a Preformed Stainless Steel Mesh Sock that is Installed Over the Butt of the Pole. The Sock is Tightly Secured to the Pole with all Excess Mesh Folded Over to Prevent Termites from Penetrating Through Voids or Checks in the Wood. The Sock Covers The Butt of the Pole up to 6 Inches Above Grade to Prevent Termites From Forming Mud Tunnels Over The Barrier.

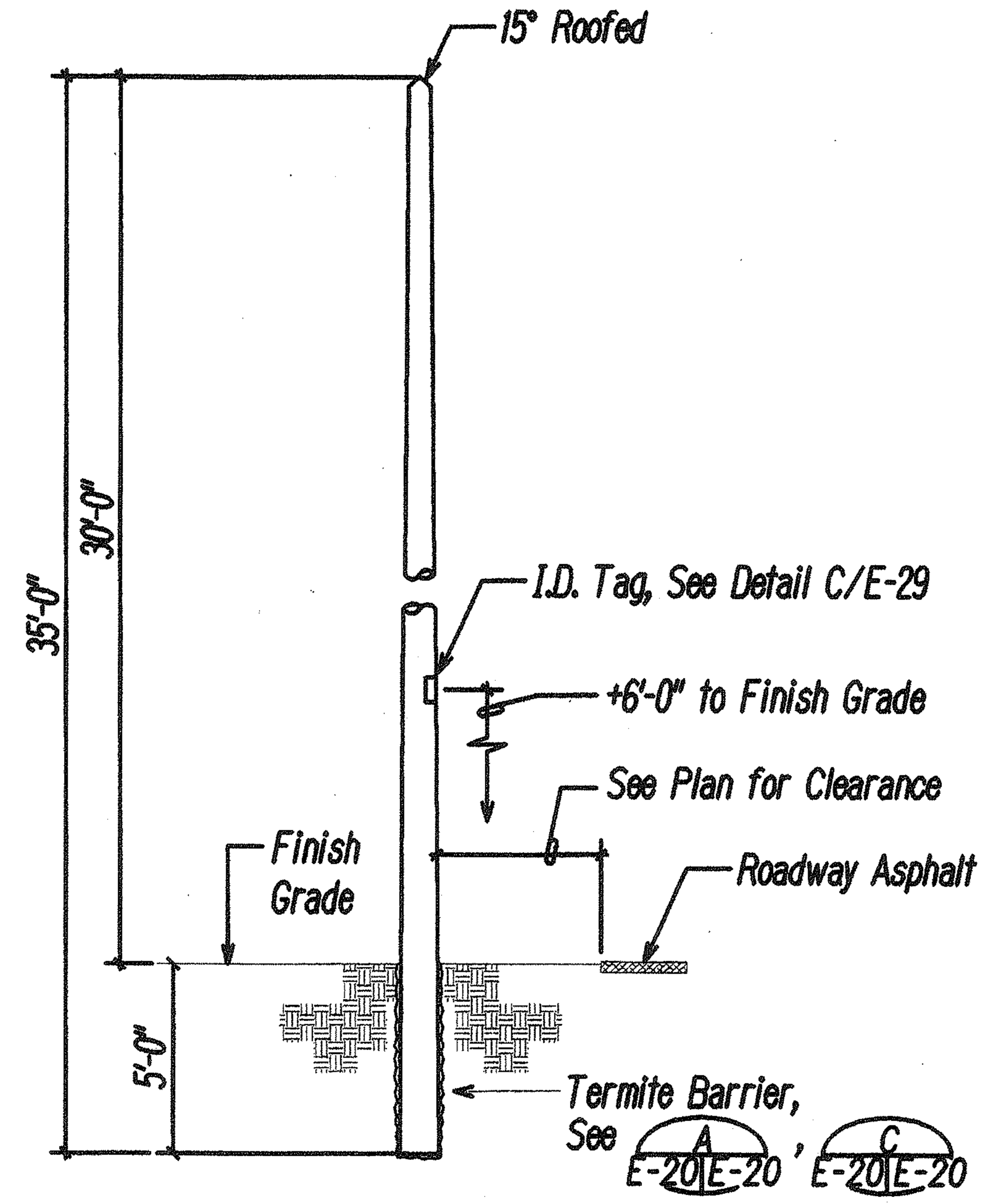


ELEVATION



SECTION A-A

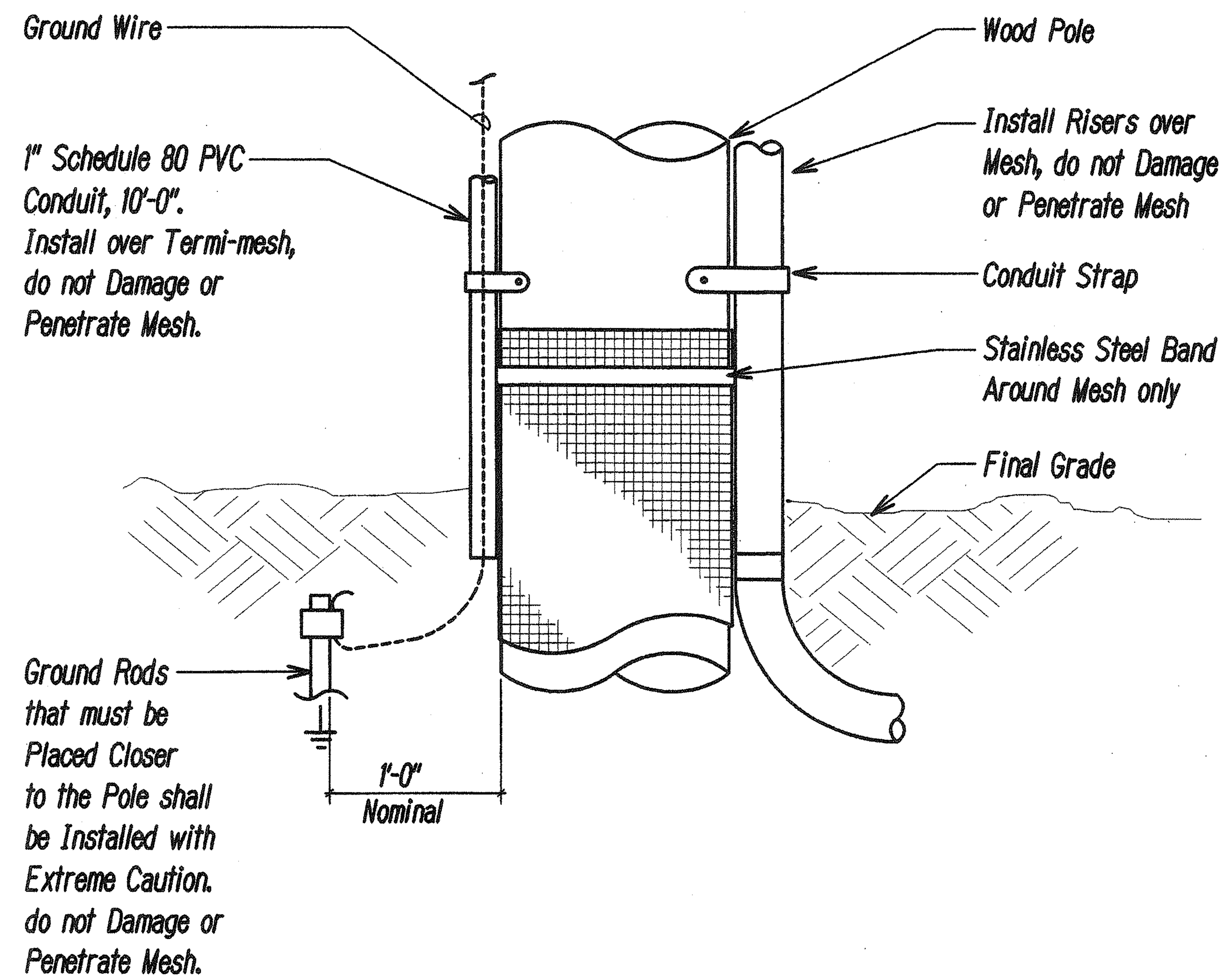
A / E-20 | E-20 TYPICAL BARRIER INSTALLATION N.T.S.



B / E-7 | E-20 TYPICAL WOOD POLE DETAILS N.T.S.

NOTE:

1. Wood Pole Class III
2. Pole shall be Treated with Pentachlorophenol Using the "Celon" Process by Licensed Termite Treatment Company. The Cost for Termite Treatment shall not be Paid for Separately, but shall be Considered Incidental to the Wood Pole.



C / E-20 | E-20 TYPICAL GROUND WIRE/RISER DETAIL N.T.S.

REDUCED PLAN (HALF SIZE)
0 1 2 3
3 INCHES ON ORIGINAL PLAN

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

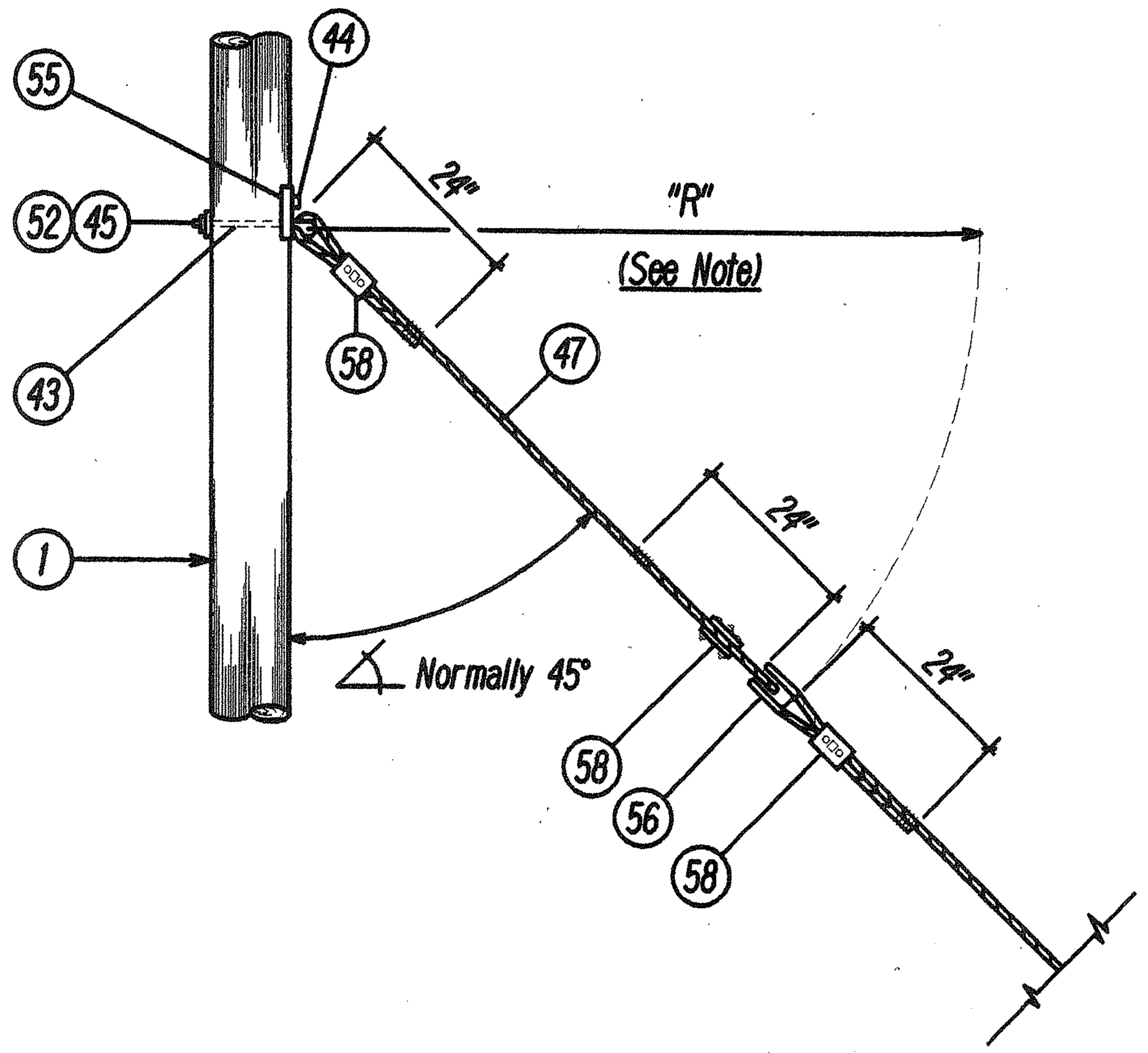
TRAFFIC SIGNAL DETAILS VIII

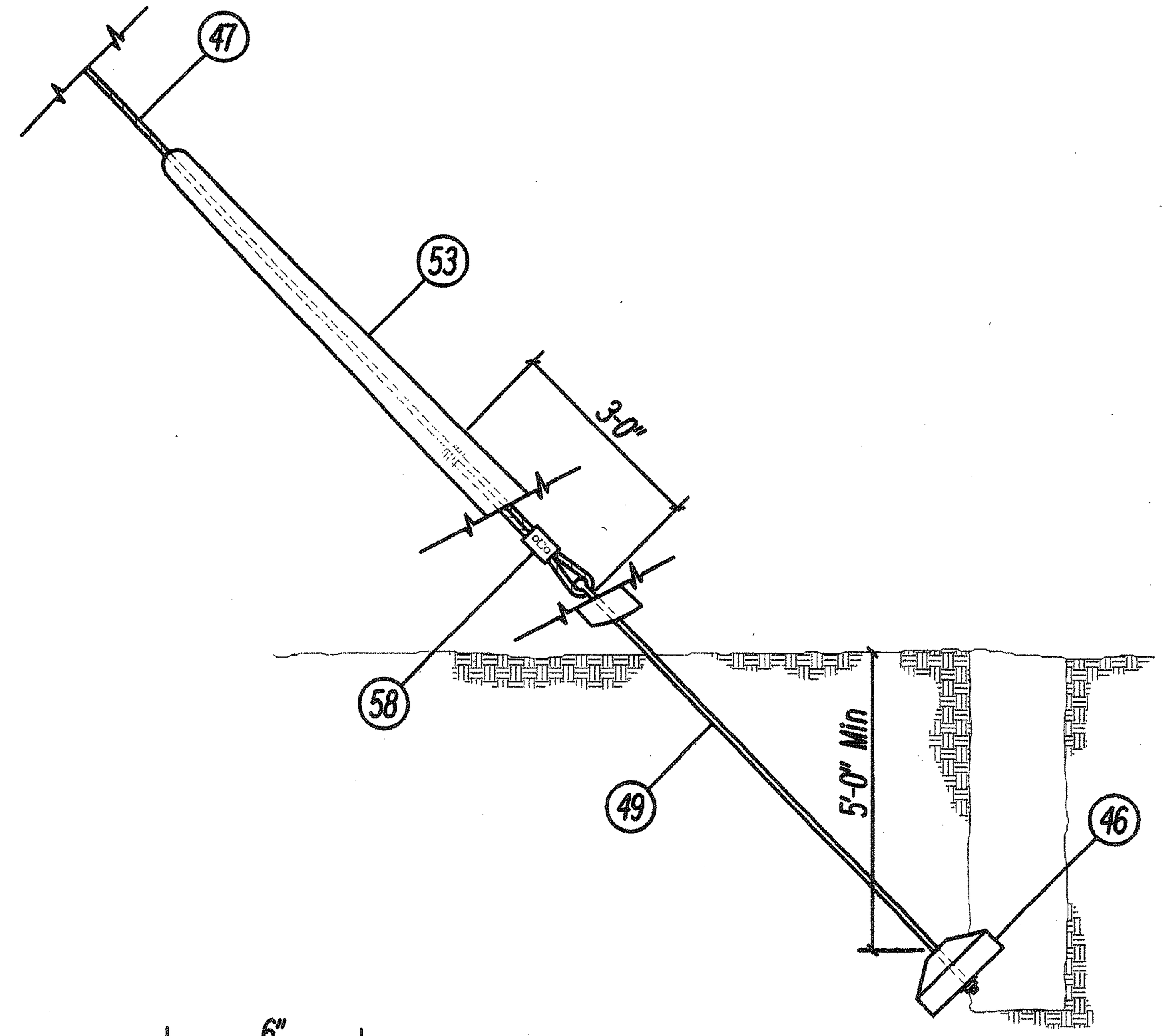
TRAFFIC OPERATIONAL IMPROVEMENTS AT VARIOUS LOCATIONS PUUNENE AVENUE AND KAAHUMANU AVENUE

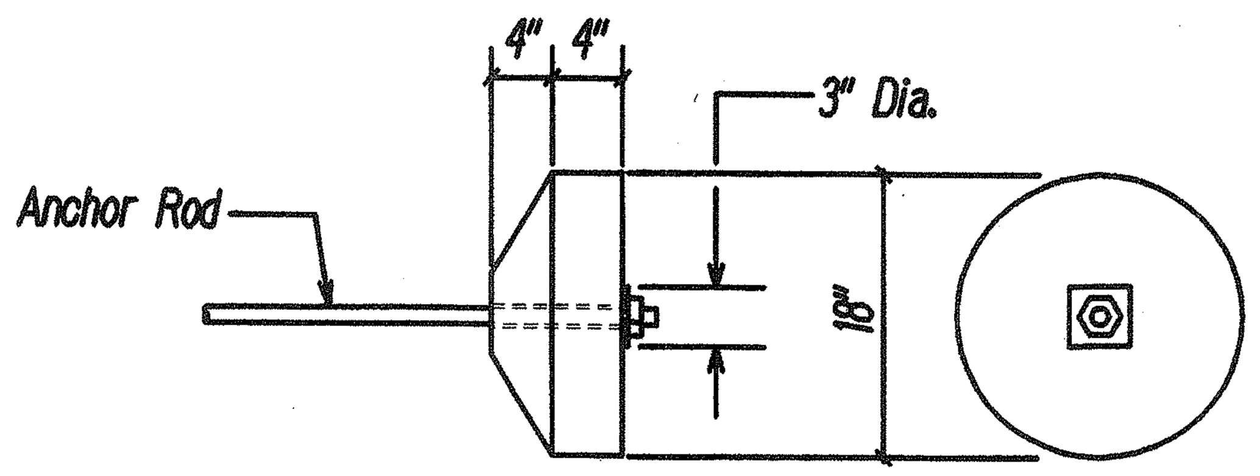
Scale: AS NOTED Date: April 2002

SHEET No. E-20 OF 22 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-M-04-00	2002	30	63

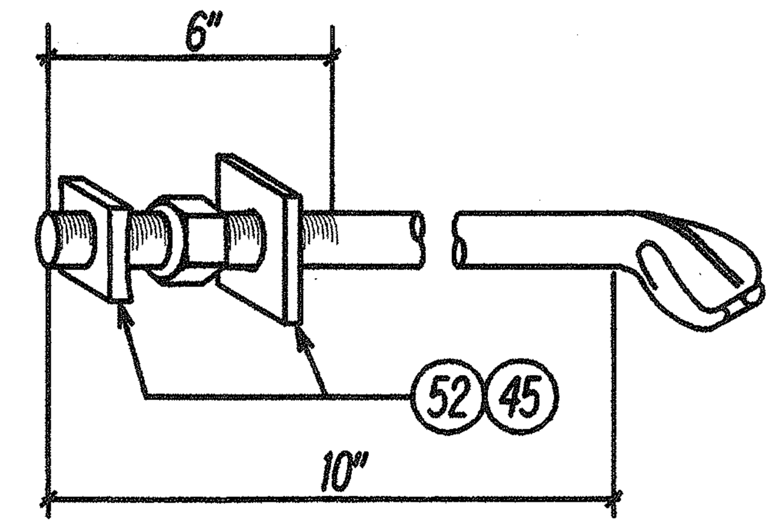




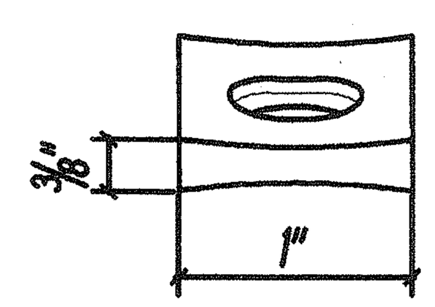


PART NO. 46

CONCRETE ANCHOR



PART NO. 43



PART NO. 52

A E-7 E-21 TYPICAL GUY AND ANCHOR ASSEMBLY DETAIL N.T.S.

LIST OF MATERIALS

Part No.	Description
1	Wood Pole, Class II, 40'-0" Unless Otherwise Indicated
43	Thimbleye Bolt, 5/8" X 10"
44	Lag Screw, 1/2" X 4" (Fetter Drive)
45	Washers, Square, 2 1/4" X 2 1/4" X 3/16", 11/16" Dia. Hole
46	Concrete Anchor
47	Galvanized Guy Wire, 7 Strand Utilities, Grade, 7/16" Size.
49	Anchor Rod, Threaded Thimbleye 5/8" X 8'-0", Twineye 3/4" X 8'-0"
52	Square M-F Locknut, for 5/8" Dia. Bolt
53	Guy Protector, Round, 8 Feet, Yellow Color PVC Material
55	Lift Plate, 3-Hole, 1/4" Steel Plate
56	Guy Strain Insulator
58	Guy Clamp, 6" 3-Bolt, 5/8" Bolt

Notes:

1. All Hardware shall be Galvanised in Conformance with ASTM Designation A-153.
2. Radius "R" shall be Length Required to Locate Guy Insulator Four Feet Below Communication Conductor Level; Minimum "R" Equal to Six Feet.
3. Required Bolt Lengths Indicated are Approximate. Modify to Suit Pole Diameter.
4. Provide Drilling as Required.

REDUCED PLAN (HALF SIZE)
0 1 2 3
3 INCHES ON ORIGINAL PLAN

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

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

TRAFFIC SIGNAL DETAILS IX

TRAFFIC OPERATIONAL IMPROVEMENTS AT VARIOUS LOCATIONS PUUNENE AVENUE AND KAAHUMANU AVENUE

Scale: AS NOTED Date: April 2002

SHEET No. E-21 OF 22 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY / DRAWN BY X / TRACED BY / DESIGNED BY X / QUANTITIES BY / CHECKED BY	DATE X
NOTE BOOK ddx.x No. X.dgn		

23 APR 102 10:06:41 LA z:\...\21143d21.dgn