

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 1-111(III)-14      | 1974        | 115       | 234          |

- REMOVAL AND RELOCATION CONSTRUCTION NOTES:**
- EXISTING UTILITY POLES TO BE REMOVED BY UTILITY COMPANY. CONTRACTOR SHALL COORDINATE WITH RESPECTIVE UTILITY COMPANY.
  - NEW UTILITY POLES AND ANCHORS TO BE PROVIDED BY UTILITY COMPANIES. CONTRACTOR SHALL STAKE OUT LOCATION OF POLE AND SHALL COORDINATE INSTALLATION WITH THE RESPECTIVE UTILITY COMPANY.
  - CONTRACTOR SHALL REMOVE EXISTING NAVY POLES, ANCHORS AND OVERHEAD ELECTRIC AND FIRE ALARM EQUIPMENT. ALL SALVABLE EQUIPMENT SHALL BE REMOVED FROM THE PROJECT SITE AND DISPOSED BY HIM AT NO ADDITIONAL COST TO THIS PROJECT.
  - CONTRACTOR SHALL REMOVE EXISTING STREET LIGHTING EQUIPMENT AS INDICATED ON THE PLANS. ALL SALVABLE EQUIPMENT SHALL BE CLEANED, BUNDLED AND DELIVERED TO THE DEPARTMENT OF TRANSPORTATION PROJECT SITE OFFICE. THE ENGINEER SHALL DETERMINE WHICH EQUIPMENT WILL BE DESIGNATED AS SALVABLE. ALL OTHER EQUIPMENT SHALL BECOME THE PROPERTY OF THE CONTRACTOR AND SHALL BE REMOVED FROM THE PROJECT SITE AND DISPOSED BY HIM AT NO ADDITIONAL COST TO THIS PROJECT.
  - ALL OVERHEAD AND UNDERGROUND HAWAIIAN TELEPHONE CO., U.S. NAVY AND U.S. ARMY SIGNAL CORPS CABLES AND EQUIPMENT SHALL BE REMOVED AND/OR RELOCATED BY THE HAWAIIAN TELEPHONE CO. CONTRACTOR SHALL COORDINATE REMOVAL AND/OR RELOCATION WITH THE HAWAIIAN TELEPHONE CO.
  - THE CONTRACTOR IS TO STAKE OUT PROPOSED DUCTLINES, HANDHOLES, MANHOLES, TRENCHES, SPLICE PIT, POLES AND ANCHOR LOCATION AS INDICATED ON PLANS AND IS TO NOTIFY THE APPROPRIATE UTILITY COMPANY FOR VERIFICATION PRIOR TO INSTALLATION OF THE AFOREMENTIONED ITEMS.
  - EXISTING HTCO MANHOLE SHALL BE ABANDONED IN PLACE. CONTRACTOR SHALL FILL MANHOLE WITH EARTH AFTER EXISTING TELEPHONE CABLES HAVE BEEN REMOVED OR ABANDONED IN PLACE. THE CONTRACTOR SHALL COORDINATE THE FILLING OF THE MANHOLE WITH HTCO.
  - EXISTING HTCO DUCTLINE SHALL BE ABANDONED IN PLACE.
  - EXISTING JOINT TRUCKING CABLES SHALL BE ABANDONED IN PLACE.
  - EXISTING BURIED NAVY COMMUNICATION CABLES SHALL BE ABANDONED IN PLACE.
  - NEW POLES AND ANCHORS FOR THE NAVY ELECTRIC, FIRE ALARM AND COMMUNICATION FACILITIES SHALL BE PROVIDED BY THE CONTRACTOR. SEE SHEETS E-1 TO E-3 FOR CONSTRUCTION REQUIREMENTS.
  - CONTRACTOR SHALL COORDINATE REMOVAL AND/OR RELOCATION OF NAVY ELECTRIC AND FIRE ALARM FACILITIES WITH NAVY'S PUBLIC WORKS CENTER.

C.C.O. #16  
7-17-75

**APPROVED:**

*R.S. Ladd* 4/30/74  
HAWAIIAN ELECTRIC CO., INC. DATE  
J.K. 4-26-74 EN

*R. Man* 10-21-74  
HAWAIIAN TELEPHONE CO. DATE

|          |                                |
|----------|--------------------------------|
| 10/21/74 | OBTAINED UTILITY CO. SIGNATURE |
| 5/2/74   | ADDED NOTE 1/2                 |
| DATE     | REVISIONS                      |

1:1

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

ELECTRICAL SHEET LAYOUT

SYMBOL LIST AND

CONSTRUCTION NOTES

PEARL HARBOR INTERCHANGE

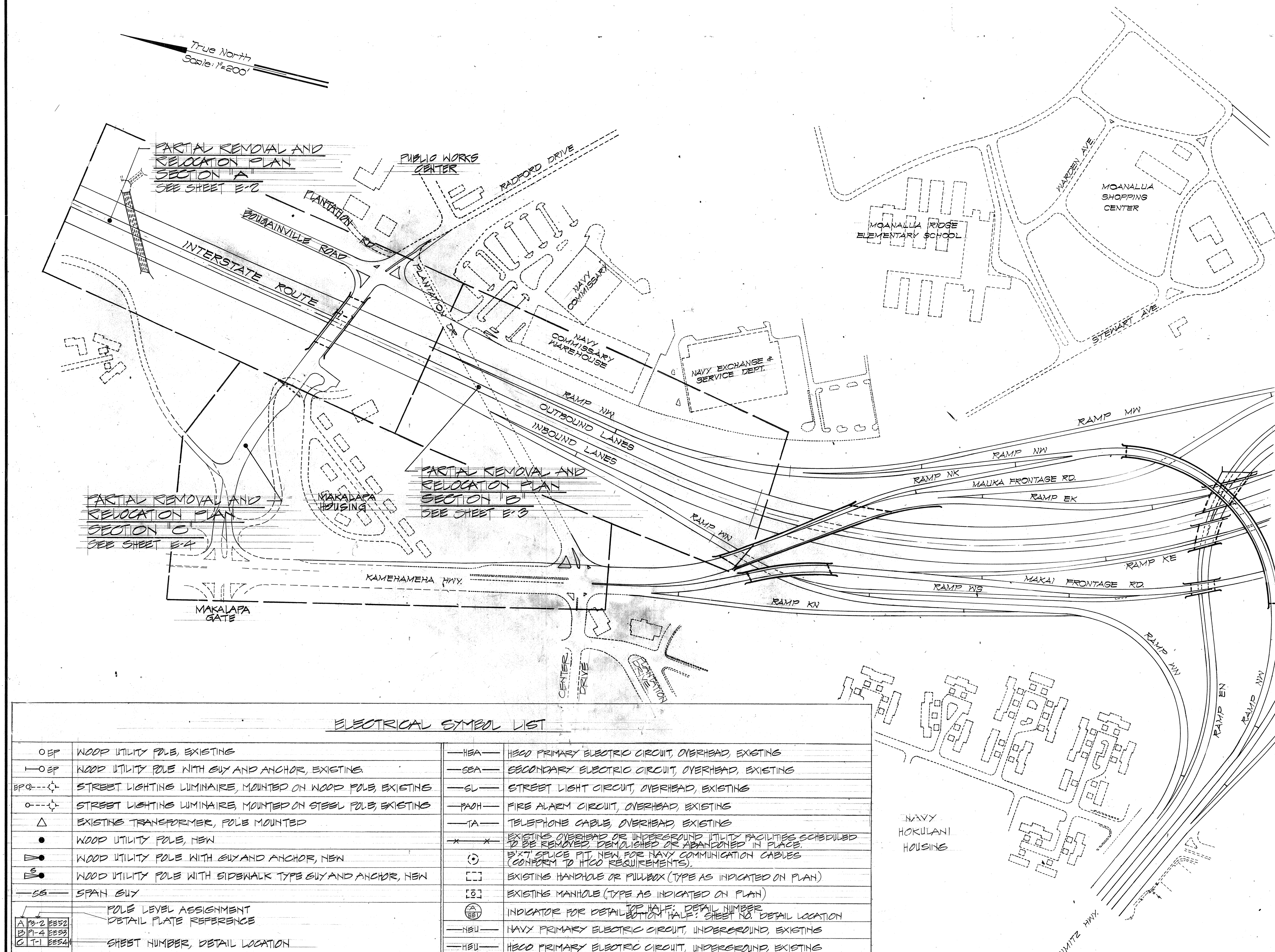
F.A.I. PROJECT NO. I-111(III)-14

SCALE AS SHOWN DATE DEC. 14, 1973

SHEET NO. E-1 OF 40 SHEETS



THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION



**ELECTRICAL SYMBOL LIST**

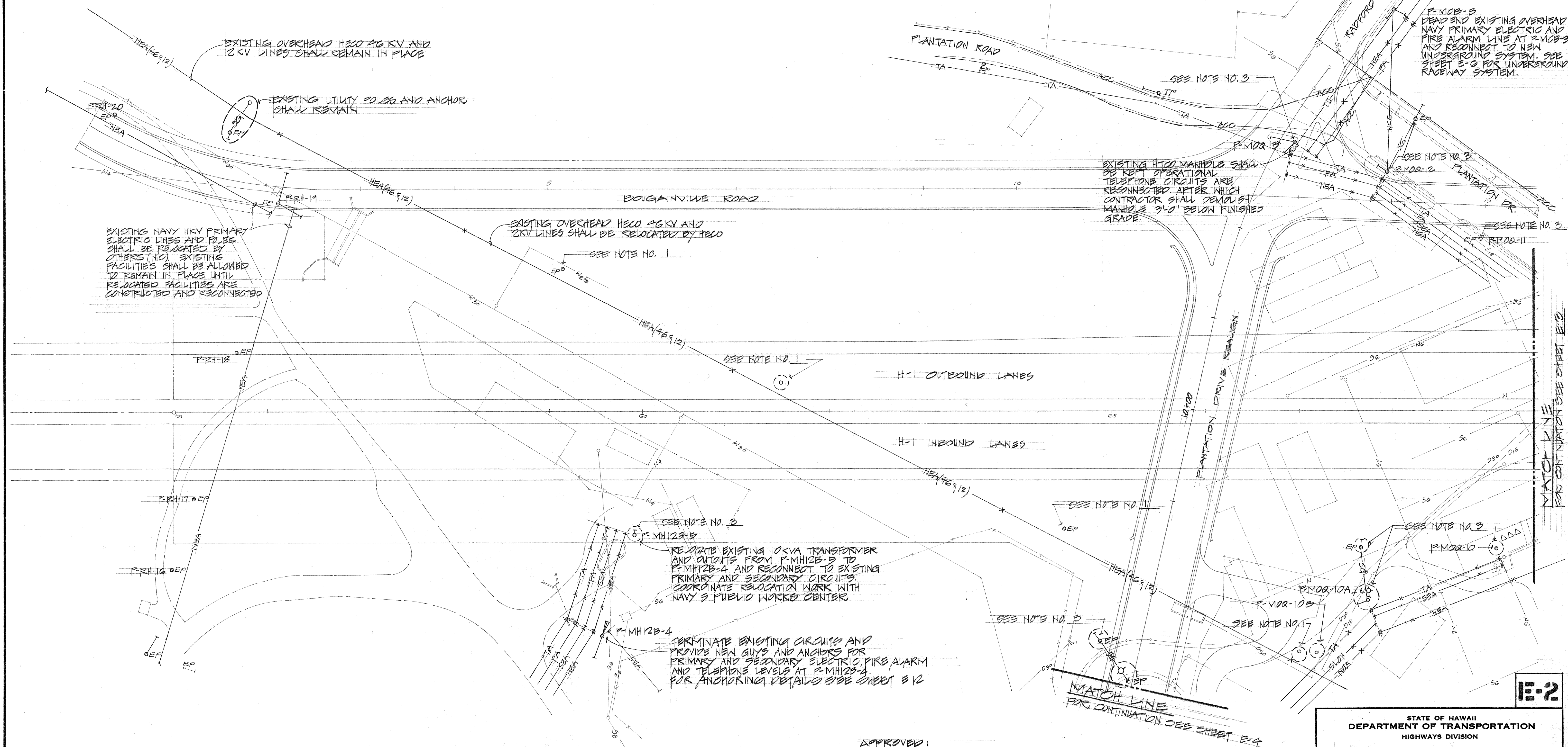
|             |                                                                          |      |                                                                                                                |
|-------------|--------------------------------------------------------------------------|------|----------------------------------------------------------------------------------------------------------------|
| OWP         | WOOD UTILITY POLE, EXISTING                                              | HEA  | HECO PRIMARY ELECTRIC CIRCUIT, OVERHEAD, EXISTING                                                              |
| OWP         | WOOD UTILITY POLE WITH GUY AND ANCHOR, EXISTING                          | SEA  | SECONDARY ELECTRIC CIRCUIT, OVERHEAD, EXISTING                                                                 |
| SPQ---      | STREET LIGHTING LUMINAIRE, MOUNTED ON WOOD POLE, EXISTING                | EL   | STREET LIGHT CIRCUIT, OVERHEAD, EXISTING                                                                       |
| o---        | STREET LIGHTING LUMINAIRE, MOUNTED ON STEEL POLE, EXISTING               | FAOH | FIRE ALARM CIRCUIT, OVERHEAD, EXISTING                                                                         |
| Δ           | EXISTING TRANSFORMER, POLE MOUNTED                                       | TA   | TELEPHONE CABLE, OVERHEAD, EXISTING                                                                            |
| •           | WOOD UTILITY POLE, NEW                                                   | XXXX | EXISTING OVERHEAD OR UNDERGROUND UTILITY FACILITIES SCHEDULED TO BE REMOVED, DEMOLISHED OR ABANDONED IN PLACE. |
| ••          | WOOD UTILITY POLE WITH GUY AND ANCHOR, NEW                               | XXXX | EXISTING SPICE PIT NEW FOR NAVY COMMUNICATION CABLES (CONFORM TO HTCO REQUIREMENTS).                           |
| •••         | WOOD UTILITY POLE WITH SIDEWALK TYPE GUY AND ANCHOR, NEW                 | [ ]  | EXISTING HANDHOLE OR PULLBOX (TYPE AS INDICATED ON PLAN)                                                       |
| SG          | SPAN GUY                                                                 | [ ]  | EXISTING MANHOLE (TYPE AS INDICATED ON PLAN)                                                                   |
| A 12-2 E552 | POLE LEVEL ASSIGNMENT                                                    | (A)  | INDICATOR FOR DETAIL OF HALF, DETAIL NUMBER                                                                    |
| B 12-4 E553 | DETAIL PLATE REFERENCE                                                   | (A)  | INDICATOR FOR DETAIL OF HALF, DETAIL NUMBER                                                                    |
| C 12-1 E554 | SHEET NUMBER, DETAIL LOCATION                                            | NEU  | NAVY PRIMARY ELECTRIC CIRCUIT, UNDERGROUND, EXISTING                                                           |
| AS          | AIR SWITCH, PRIMARY POLE MOUNTED                                         | HEU  | HECO PRIMARY ELECTRIC CIRCUIT, UNDERGROUND, EXISTING                                                           |
| 8           | FUSE CUTOUTS, PRIMARY POLE MOUNTED                                       | SEU  | SECONDARY ELECTRIC CIRCUIT, UNDERGROUND, EXISTING                                                              |
| ---         | OVERHEAD PRIMARY CONDUCTORS, 3φ, 3 WIRE                                  | TU   | TELEPHONE CABLE, UNDERGROUND, EXISTING                                                                         |
| ---         | OVERHEAD PRIMARY CONDUCTORS 1φ, 2 WIRE                                   | ACU  | JOINT TRUNKING CABLE, UNDERGROUND, EXISTING                                                                    |
| →           | DEADEND                                                                  | NCO  | NAVY COMMUNICATION CABLE, UNDERGROUND, EXISTING                                                                |
| ②           | MATERIAL LIST DESIGNATION                                                | ---  | UNDERGROUND RACEWAY, NEW                                                                                       |
| FA #        | OVERHEAD FIRE ALARM CONDUCTORS, HASH MARKS INDICATE NUMBER OF CONDUCTORS | ①    | RACEWAY SECTION INDICATOR, NUMBER IS SECTION DETAIL ASSIGNMENT.                                                |
| NEA         | NAVY PRIMARY ELECTRIC CIRCUIT, OVERHEAD, EXISTING                        | (A)  | DETAIL INDICATOR: TOP HALF: DETAIL ASSIGNMENT<br>BOTTOM HALF: SHEET ASSIGNMENT                                 |

|                   |         |
|-------------------|---------|
| DATE              | 11/1/73 |
| SURVEY PLOTTED BY | ...     |
| DRAWN BY          | ...     |
| DESIGNED BY       | ...     |
| CHECKED BY        | ...     |
| ORIGINAL PLAN     | ...     |
| NOTE BOOK         | ...     |
| NO.               | ...     |



| DATE     | REVISION                                                                                 |
|----------|------------------------------------------------------------------------------------------|
| 3/29/74  | DELETED EXISTING UTILITY POLES                                                           |
| 5/21/74  | REVISED NOTE AT POLE MH 12B-5 FOR CONTRACTOR TO COORDINATE WORK WITH PUBLIC WORKS CENTER |
| 10/21/74 | OBTAINED UTILITY CO. SIGNATURE                                                           |

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | FH-1(III):4        | 1974        | 116       | 23           |



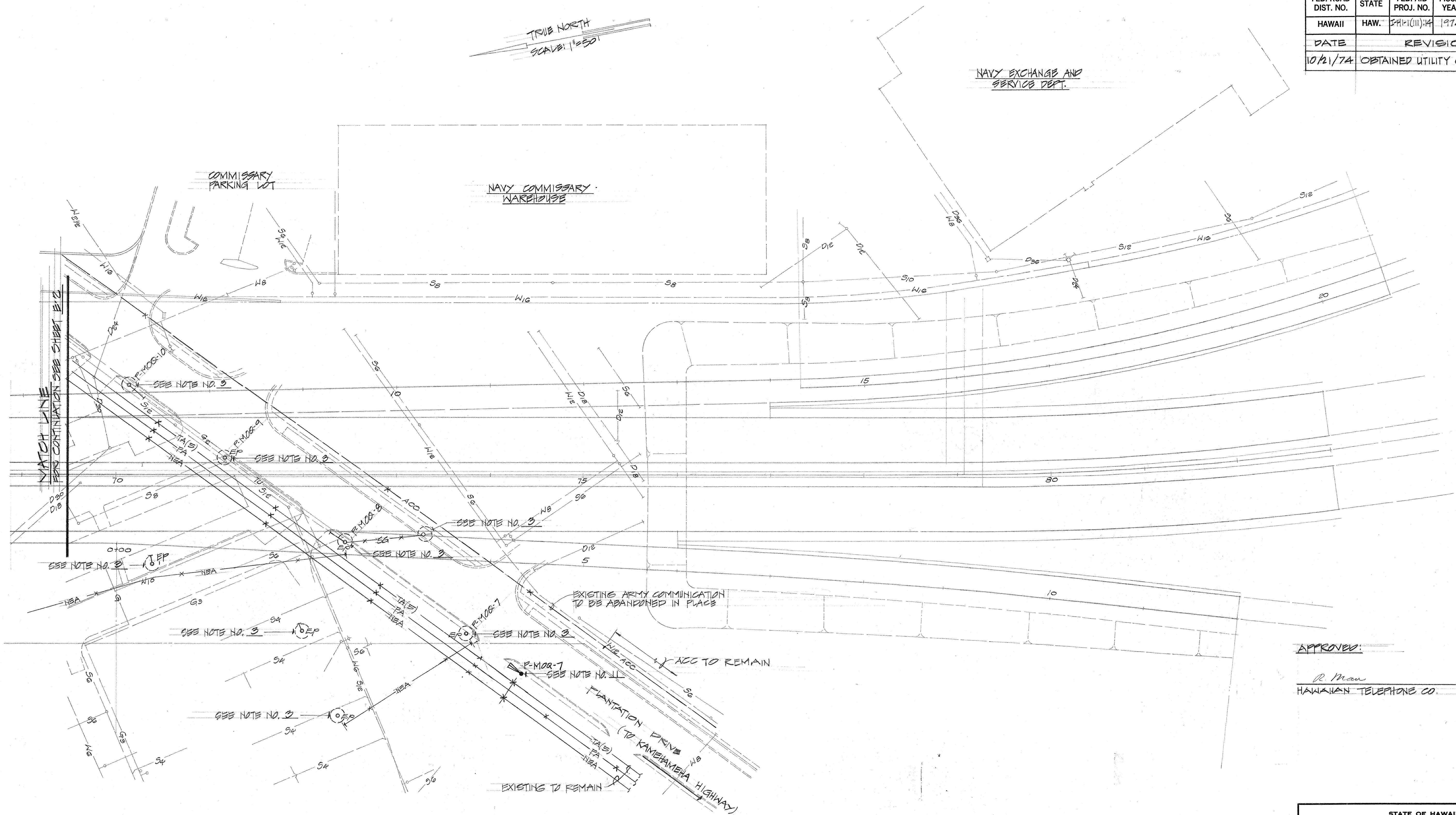
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|------------------|-------------------------|------------|
| ORIGINAL<br>PLAN | SURVEY PLOTTED BY _____ | DATE _____ |
| NOTE BOOK        | DRAWN BY _____          | " "        |
|                  | TRACED BY _____         | " "        |
|                  | DESIGNED BY _____       | " "        |
|                  | QUANTITIES BY _____     | " "        |
| No. _____        | CHECKED BY _____        | " "        |

PARTIAL REMOVAL AND RELOCATION PLAN  
SECTION "A"  
SCALE: 1" = 50'  
NOTE:  
FOR REMOVAL AND RELOCATION CONSTRUCTION  
NOTES SEE SHEET E-1

ADD. 116R



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO.             | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | FAI(III):14                    | 1974        | 117       | 234          |
| DATE                |       | REVISIONS                      |             |           |              |
| 10/21/74            |       | OBTAINED UTILITY CO. SIGNATURE |             |           |              |



**PARTIAL REMOVAL AND RELOCATION PLAN**  
**SECTION "B"**  
 SCALE: 1" = 50'

**NOTE:**  
 FOR REMOVAL AND RELOCATION CONSTRUCTION  
 NOTES SEE SHEET E-1.

**APPROVED:**  
*R. Man* 10-21-74  
 HAWAIIAN TELEPHONE CO. DATE

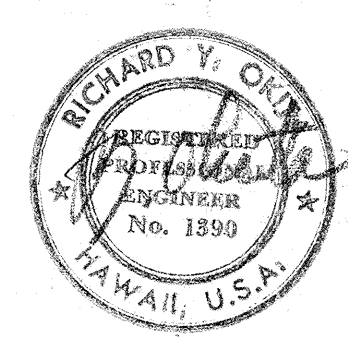
**E-3**

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION

PARTIAL REMOVAL AND  
 RELOCATION PLAN  
 SECTION "B"

PEARL HARBOR INTERCHANGE  
 FAI PROJECT NO. I-HI-1(III):14  
 SCALE AS SHOWN DATE DEC. 14, 1973

SHEET No. E-3 OF 40 SHEETS

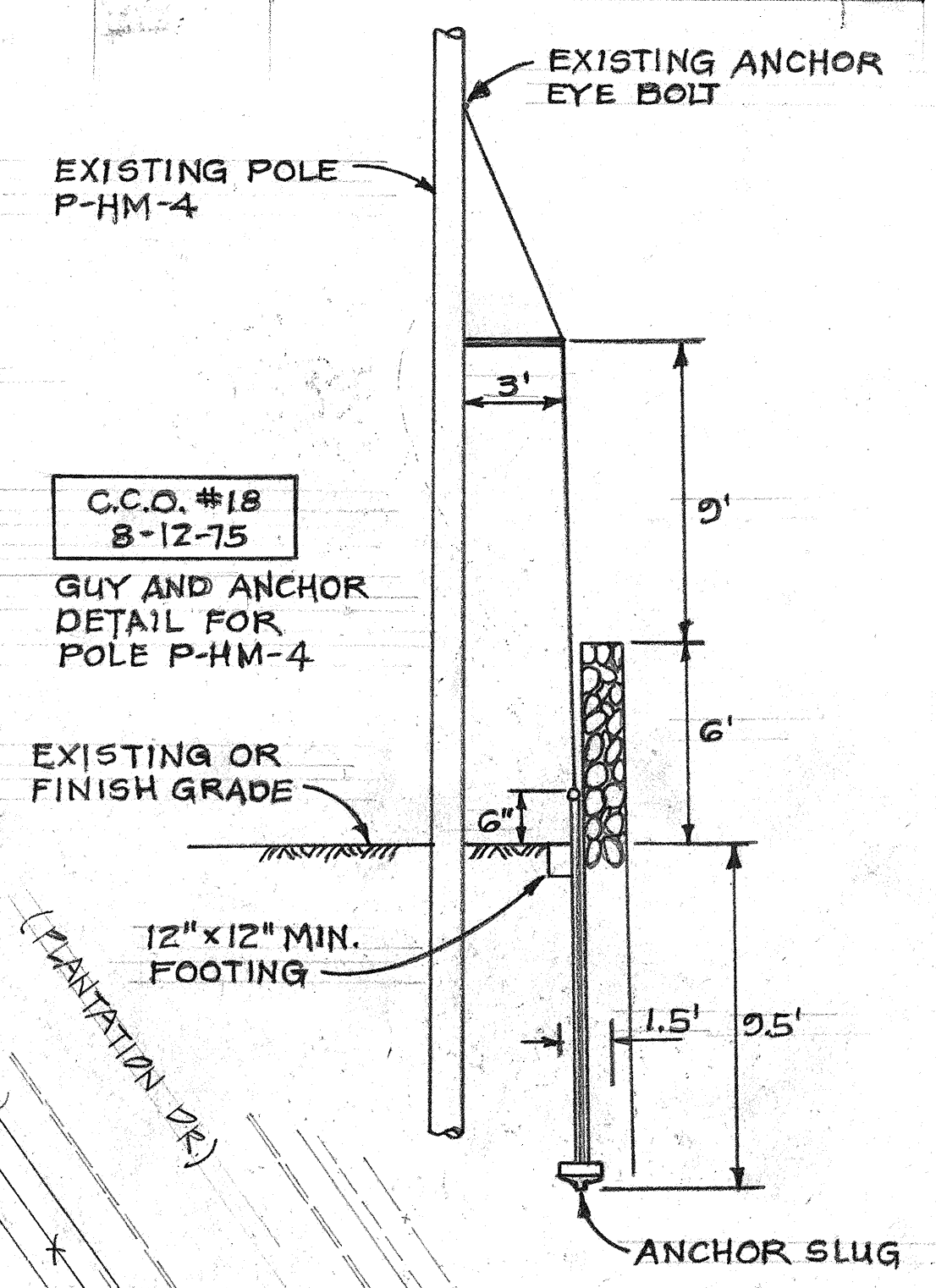
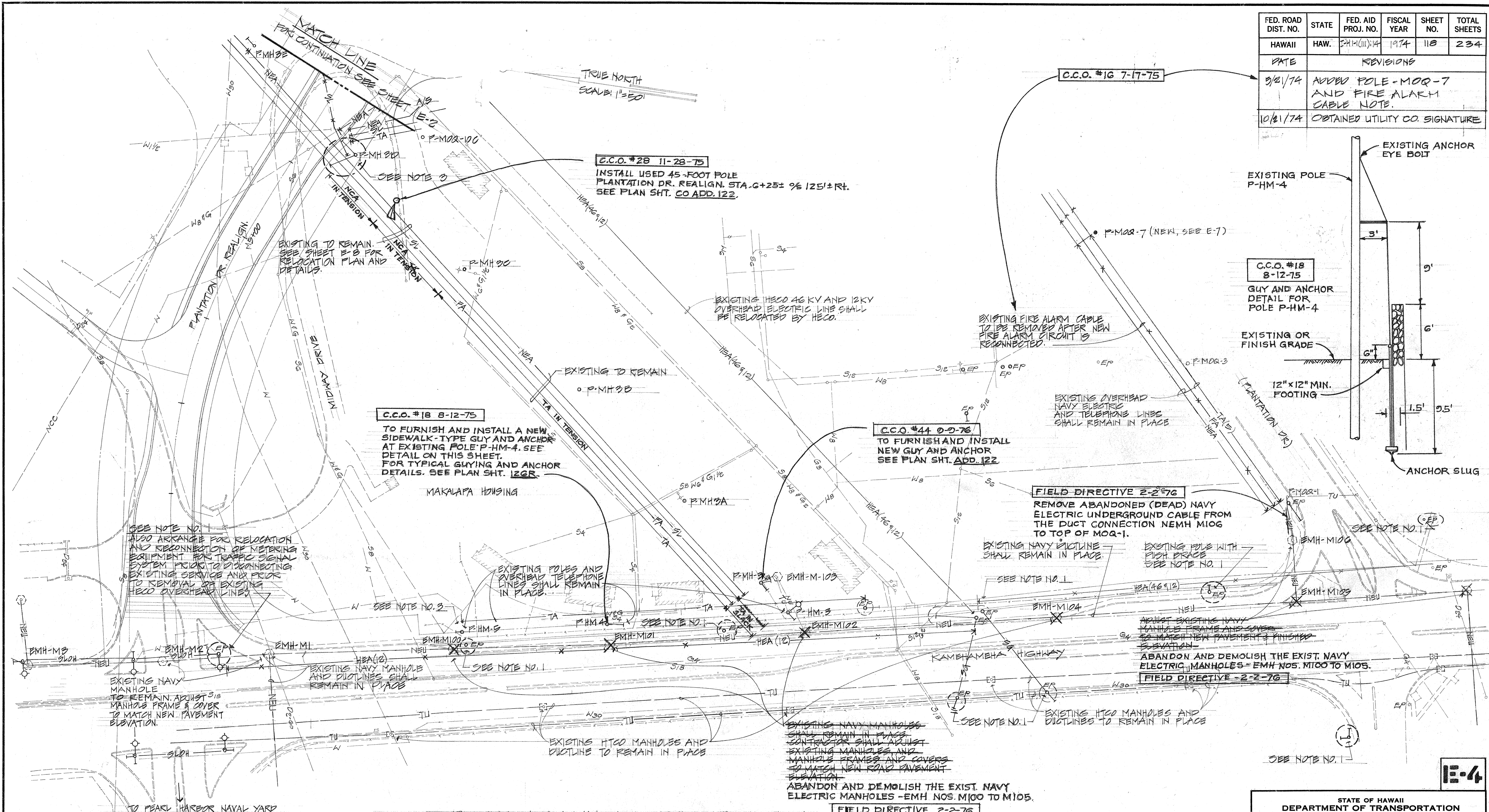


THIS WORK WAS PREPARED BY ME  
 OR UNDER MY SUPERVISION

|           |                   |      |
|-----------|-------------------|------|
| ORIGINAL  | SURVEY PLOTTED BY | DATE |
| PLAN      | DRAWN BY          |      |
| NOTE BOOK | TRACED BY         |      |
|           | QUANTITIES BY     |      |
|           | CHECKED BY        |      |
| No.       |                   |      |



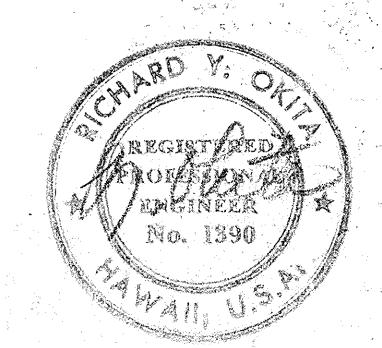
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO.                          | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|---------------------------------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | CHH(III)14                                  | 1974        | 118       | 234          |
| DATE                |       | REVISIONS                                   |             |           |              |
| 9/21/74             |       | ADDED POLE-MOQ-7 AND FIRE ALARM CABLE NOTE. |             |           |              |
| 10/21/74            |       | OBTAINED UTILITY CO. SIGNATURE              |             |           |              |



|                   |          |
|-------------------|----------|
| DATE              | 10-21-74 |
| SURVEY PLOTTED BY | W. J. L. |
| DRAWN BY          | W. J. L. |
| DESIGNED BY       | W. J. L. |
| CHECKED BY        | W. J. L. |
| ORIGINAL PLAN     |          |
| NOTE BOOK         |          |
| No.               |          |

**PARTIAL REMOVAL AND RELOCATION PLAN**  
**SECTION "C"**  
 SCALE: 1"=50'  
 NOTES:  
 FOR REMOVAL AND RELOCATION CONSTRUCTION  
 NOTES SEE SHEET E-1

APPROVED:  
*R. D. L.* 4/30/74  
 HAWAIIAN ELECTRIC CO., INC.  
 JK 4-20-74 R/H  
*W. J. L.* 10-21-74  
 HAWAIIAN TELEPHONE CO. DATE



THIS WORK WAS PREPARED BY ME  
 OR UNDER MY SUPERVISION

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION

**PARTIAL REMOVAL AND RELOCATION PLAN**  
**SECTION "C"**

PEARL HARBOR INTERCHANGE  
 P.A.I. PROJECT NO. I-11(II)14  
 SCALE: AS SHOWN DATE: DEC. 14, 1973  
 SHEET NO. E-4 OF 40 SHEETS







| DATE    | REVISION                                                                             |
|---------|--------------------------------------------------------------------------------------|
| 2/28/79 | ADDED NAVY COMM. HH #1A AND NAVY ELECTRIC HH #1, RELOCATED DUCTLINE AND HH LOCATION. |

C.C.O. #16  
7-17-75

FIELD DIRECTIVE MARCH 5, 1975  
FOR DETAILS SEE SHTS. C.O. 120R S-1, 131 & 132R.

| DATE     | REVISIONS                         |
|----------|-----------------------------------|
| 8/30/74  | REVISED LOCATION OF HECO MH #2695 |
| 10/21/74 | OBTAINED UTILITY CO. SIGNATURE    |

| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | SH-1(III)4         | 1974        | 120       | 234          |

C.C.O. #49  
11-16-76

INSTALL SIDEWALK TYPE GUY & ANCHOR TO EXISTING NAVY POLE NO. RH-20. SEE DETAIL PLAN SHT. C.O. 121 S-1

RELOCATED HECO OVERHEAD 40 KV AND 12 KV ELECTRIC LINES BY HECO.

HECO HH #2696  
4" X 6" (HTCO TYPE 1)  
PROVIDE 2-4 RISER CONDUITS FROM HANDHOLES TO POLE

5" X 7" SPUR PIT  
JOINT TRUNKING MANHOLE #328  
5" X 8" (HTCO TYPE A-2-G) INTERCEPT EXISTING ACC CABLES AT MANHOLE. ALSO PROVIDE 3-4" CONC. ENCASED DUCTS AS DUCT SUBSTITUTES FOR EXISTING CABLES.

NAVY COMM. HH #3  
4" X 6" (HTCO TYPE 1)  
PROVIDE 2-4 COMM RISER CONDUITS FROM HANDHOLES TO EXISTING POLE

NAVY ELECTRIC MH #3  
5" X 8" (HTCO TYPE A-2-G)

NAVY ELECTRIC MH #2  
5" X 8" (HTCO TYPE A-2-G)

C.C.O. #16  
7-17-75  
SEE REVISION NOTES

C.C.O. #12  
SEE SHT. C.O. 120R S-1

FIELD DIRECTIVE APRIL 11, 1975  
ADDED REINFORCEMENT FOR NAVY ELECTRIC DUCT SYSTEM. SEE C.C.O. #12 DRAWINGS ON PLAN SHT. C.O. 120R S-1.

C.C.O. #46  
9-17-76  
ELECTRIC SERVICE CONNECTION TO TWO (2) AUTOMATIC SPRINKLER CONTROLLERS FROM HECO POLE P-11. SEE SHT. 101.

C.C.O. #37  
5-4-76  
FURNISH & INSTALL EXPANSION COUPLING FOR THE HIGHWAY LIGHTING DUCTLINE IN CONC. MEDIAN BARRIER HI- & STA. 55+00 TO 77+00  
SEE SHT. C.O. 121

NOTES  
FOR REMOVAL AND RELOCATION CONSTRUCTION  
NOTES SEE SHEET E-1

PARTIAL ELECTRICAL PLAN  
SECTION "A"  
SCALE: 1" = 50'

1" C. 2-1/2" #8  
TO HECO POLE - 11  
INSTALL COMBINATION MAIN BREAKER AND METER SOCKET 100A, 120/240 VOLT, 1Ø ON POLE IN ACCORDANCE WITH HECO'S CUSTOMER ENGINEERING DEPT.

HECO MH "A"  
7" X 6"  
P-11  
SEE NOTE #2

PROVIDE 2-5" RISER CONDUITS FROM HECO MANHOLE TO P-11

C.C.O. #34  
3-9-76  
SEE SHT. C.O. 122

PROVIDE 2-5" NAVY ELECTRIC, 1-2" FIRE ALARM, AND 2-4" NAVY COMM. RISER CONDUITS AT POLE. EXTEND 1-2" NAVY PRIMARY ELECTRIC AND 1-2" FIRE ALARM RISER CONDUITS UP TO THEIR RESPECTIVE LEVELS ON THE POLE.

NAVY COMM. MH #1  
5" X 8" (HTCO TYPE A-2-G)

NAVY ELECTRIC MH #1  
5" X 8" (HTCO TYPE A-2-G)

NAVY COMM. HH #1A  
4" X 6" (HTCO TYPE 1)

NAVY ELECT. HH #1  
5" X 8" (HTCO TYPE 1)

PROVIDE 1-2" NAVY FIRE ALARM CONDUIT FROM MH #1 TO HH #1  
FOR CONTINUATION SEE SHEET E-8

FIELD DIRECTIVE  
4-25-75  
FOR DETAIL SEE SHTS. C.O. 121 & C.O. 121 S-1.

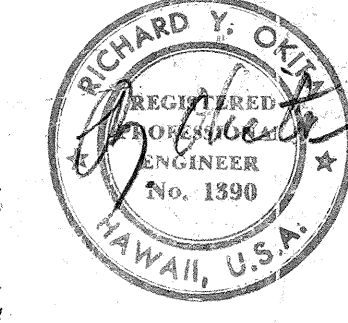
E-6

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

PARTIAL ELECTRICAL PLAN  
SECTION "A"

PEARL HARBOR INTERCHANGE  
F.A.I. PROJ. NO. I-HI-1(III)14

SCALE: AS SHOWN DATE: DEC. 14, 1973  
SHEET NO. E-6 OF 40 SHEETS



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

APPROVED:  
*R. L. Lauer*  
HAWAIIAN ELECTRIC CO., INC.  
DATE: 4/30/74  
*R. L. Lauer*  
HAWAIIAN TELEPHONE CO.  
DATE: 10-21-74

|                   |          |
|-------------------|----------|
| DATE              | 11-16-76 |
| SURVEY PLANNED BY |          |
| DRAWN BY          |          |
| DESIGNED BY       |          |
| QUANTITIES BY     |          |
| CHECKED BY        |          |
| ORIGINAL PLAN     |          |
| NOTE BOOK         |          |
| No.               |          |

PARTIAL ELECTRICAL PLAN AT SALT LAKE BLVD.  
SCALE: 1" = 100'

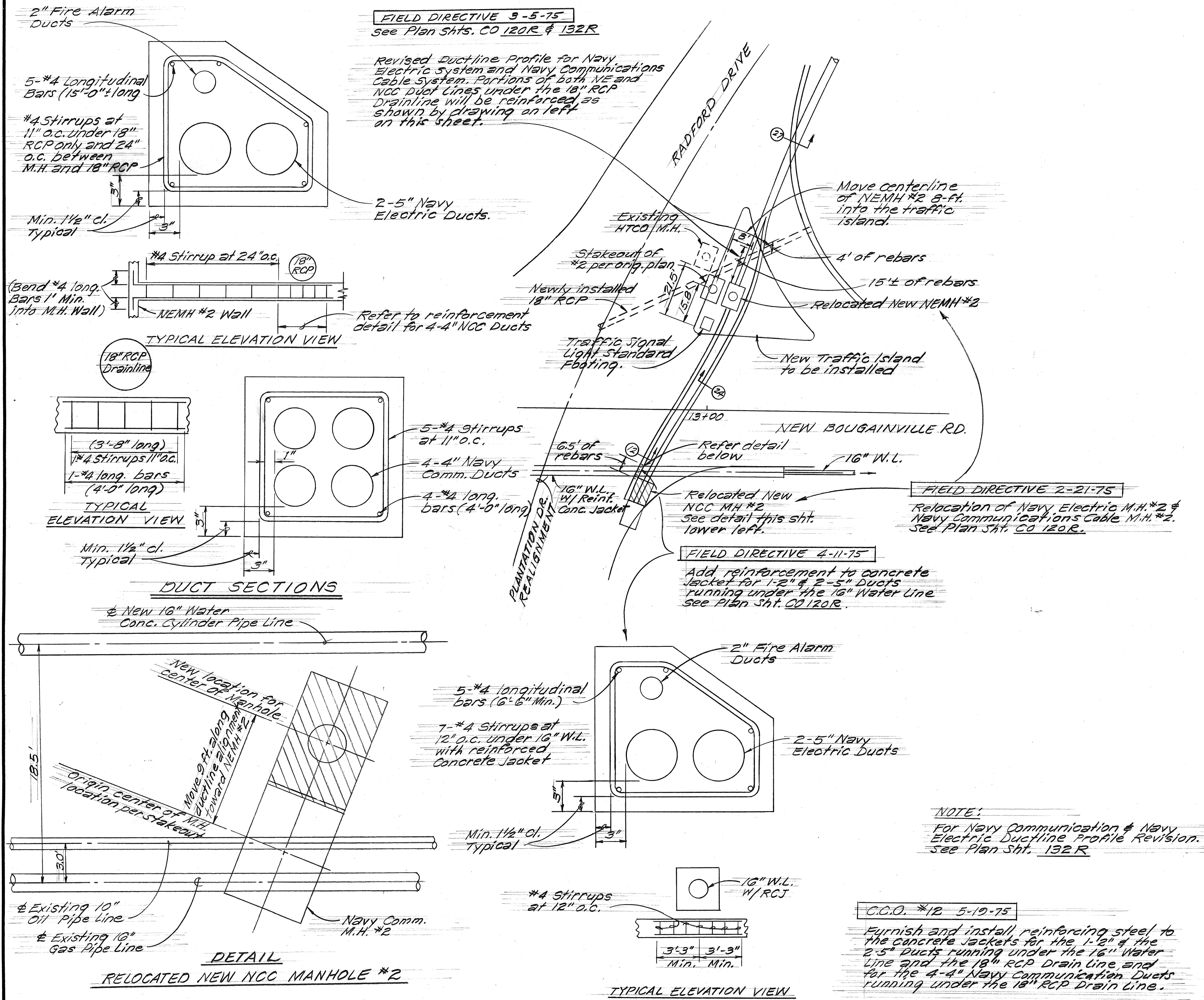
NOTES  
VERIFY LOCATION OF SPUR PIT WITH HECO PRIOR TO STARTING EXCAVATION WORK

ALAMAMU HOME  
SUBDIVISION

C.O. 120R



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO.    | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|--------------|--------------|
| HAWAII              | HAW.  | FHI-1(III)-14      | 1974        | C.O.120R S-1 | 234          |



THIS TRACING PREPARED DURING "AS-BUILT" POSTING

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
LAND TRANSPORTATION FACILITIES DIVISION  
**RELOCATED NAVY ELECTRIC M.H. #2 & NAVY COMMUNICATIONS CABLE M.H. #2 & DETAILS**  
PEARL HARBOR INTERCHANGE  
F.A.I. PROJ. NO. I - HI-1 (III)-14  
Not to Scale Dec., 1977  
SHEET No. OF SHEETS

C.O.120RS-1

|               |                   |      |
|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| TRACED BY     |                   |      |
| NOTED BY      |                   |      |
| CHECKED BY    |                   |      |
| NO.           |                   |      |

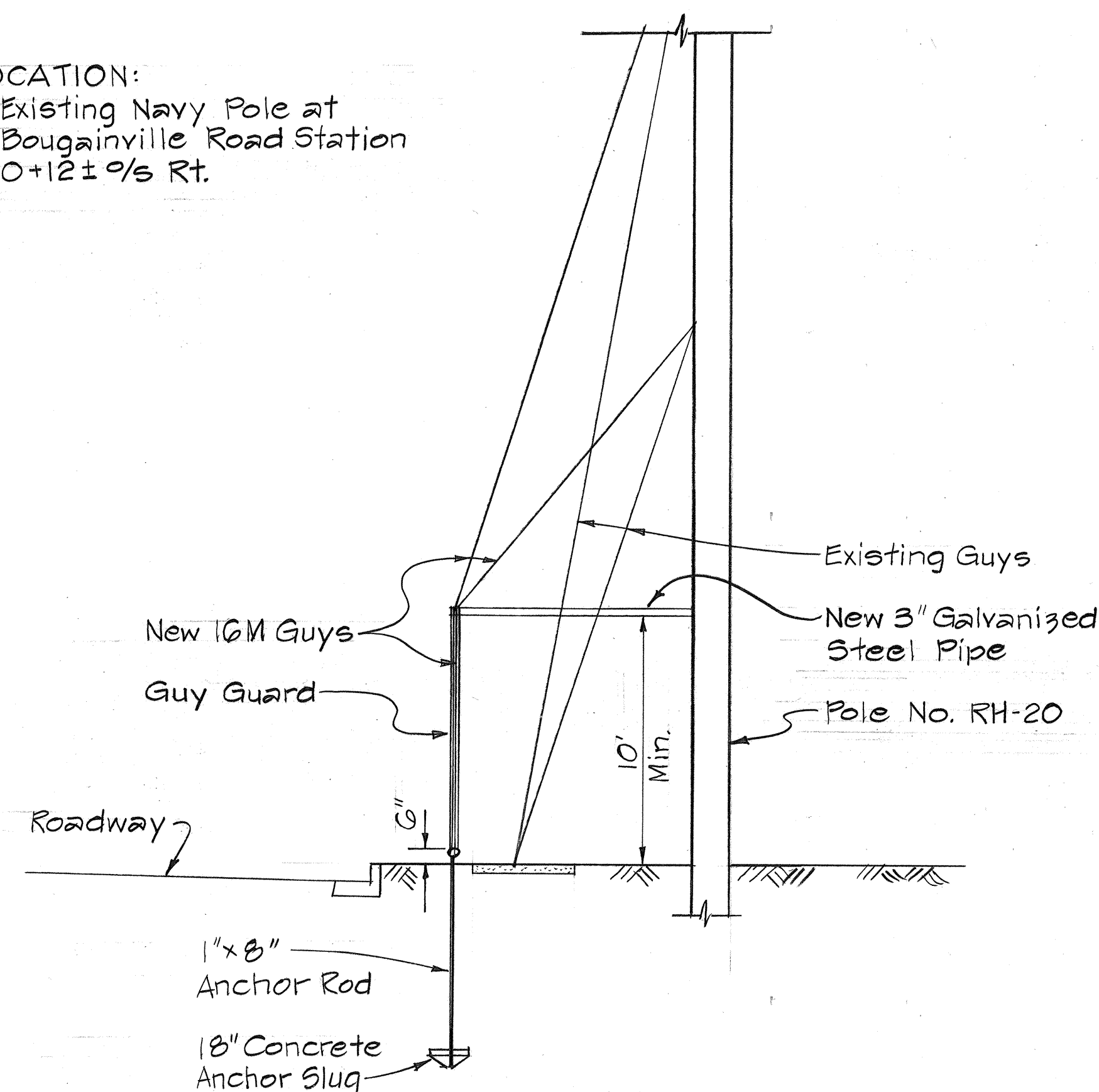






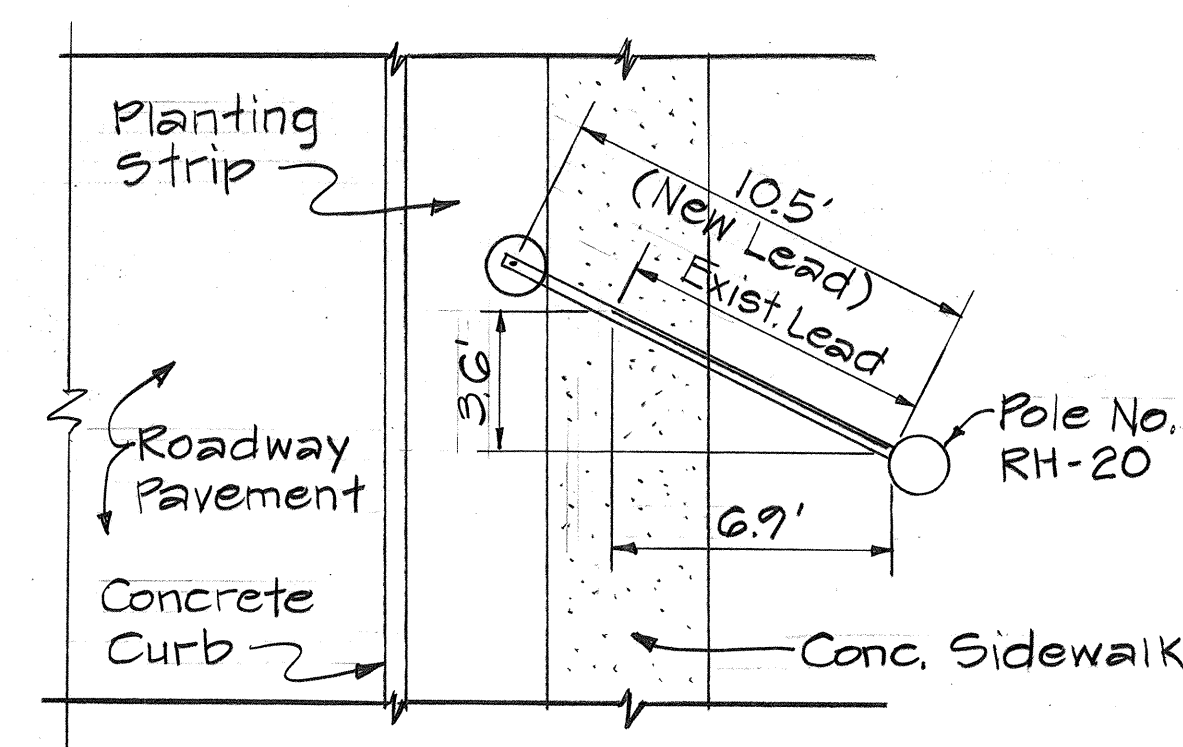
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO.       | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------------|--------------|
| HAWAII              | HAW.  | FHH-1(III)-14      | 1974        | C.O. 121<br>5-1 | 234          |

LOCATION:  
Existing Navy Pole at  
Bougainville Road Station  
0+12 ± 0/5 Rt.

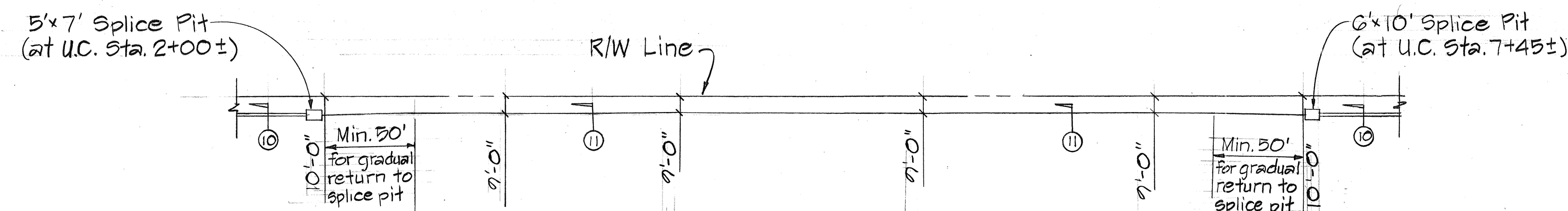


ELEVATION  
Scale: Not to Scale

C.C.O. #49  
SEE PLAN SH. C.O. #120R



PLAN  
Scale: Not to Scale



PLAN  
Scale: Not to Scale  
(Refer to Plan Sh. 120R & C.O. 121)

**FIELD DIRECTIVE 4-25-1975**  
Joint Trunking Cable to be Direct  
Burial has been realigned one foot  
closer to the Right-of-Way Line.  
(U.C. Sta. 2+00 ± to U.C. Sta. 7+45 ±)  
See sh. C.O. 120R & C.O. 121.

# JOINT TRUNKING CABLE FIELD CHANGE

Scale: Not to Scale

THIS TRACING PREPARED  
DURING "AS-BUILT" POSTING

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
LAND TRANSPORTATION FACILITIES DIVISION  
**DETAILS FOR EXIST. NAVY POLE  
NO. RH-20 JOINT TRUNKING  
CABLE FIELD CHANGE**  
PEARL HARBOR INTERCHANGE  
F.A.I. PROJ. NO. I-HI-1(III):14  
Not to Scale Dec., 1977  
SHEET NO. OF SHEETS

C0121S-1

|               |                   |      |
|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| NOTE BOOK     | DRAWN BY          |      |
| NO.           | DESIGNED BY       |      |
|               | CHECKED BY        |      |







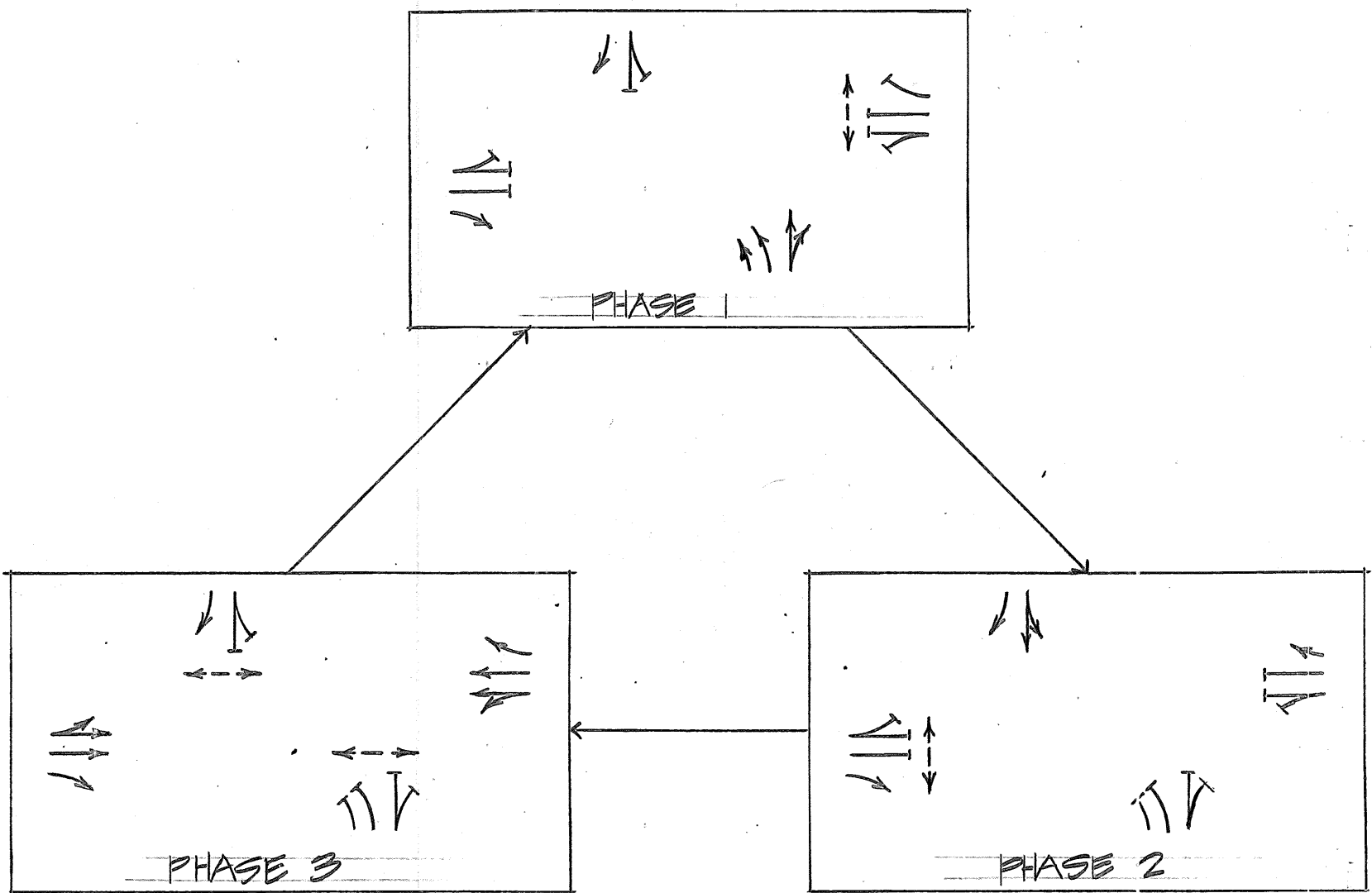
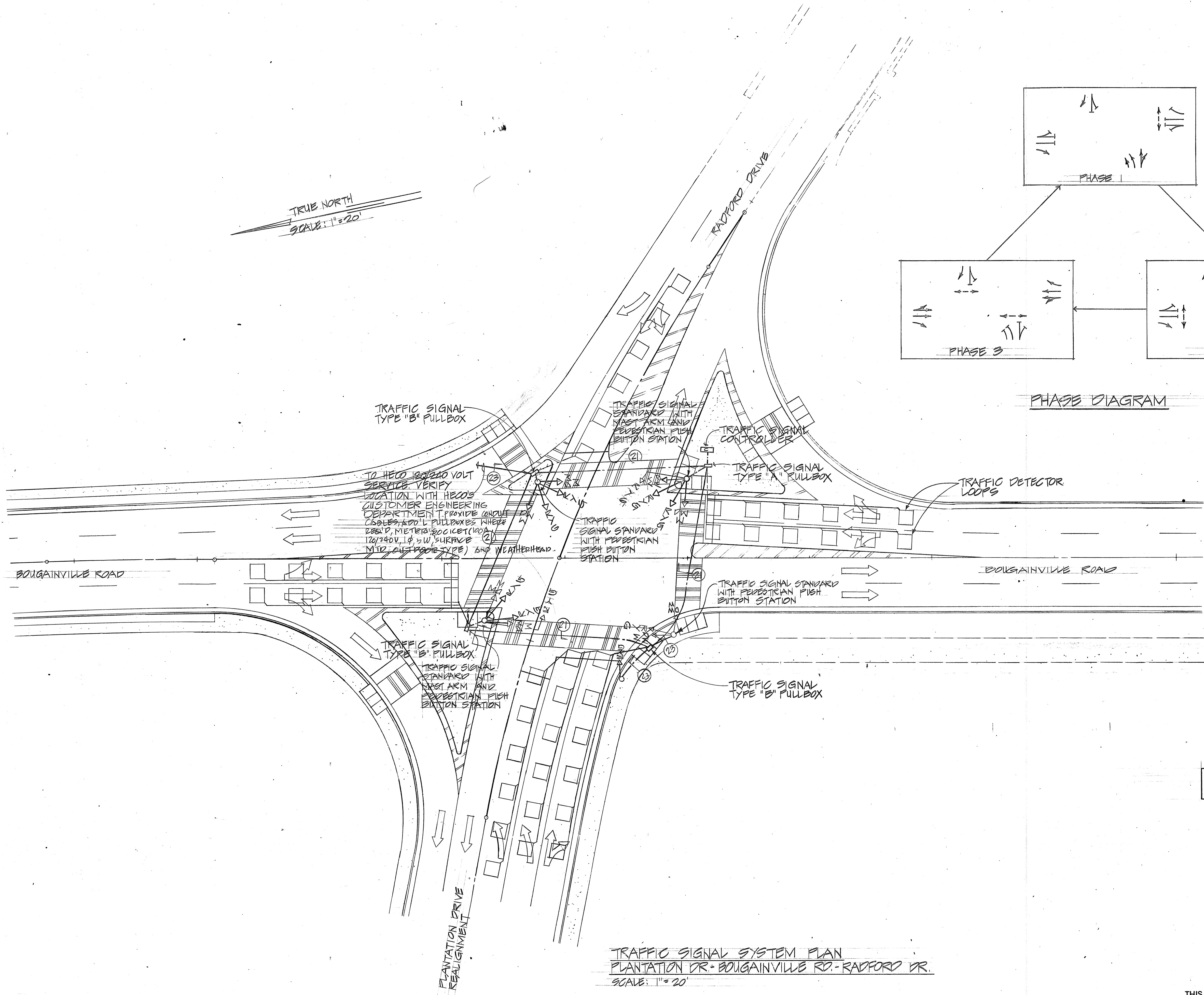
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|------------------|-------------------------|------------|
| ORIGINAL<br>PLAN | SURVEY PLOTTED BY _____ | DATE _____ |
| NOTE BOOK        | DRAWN BY _____          | " _____    |
|                  | TRACED BY _____         | " _____    |
|                  | DESIGNED BY _____       | " _____    |
|                  | QUANTITIES BY _____     | " _____    |
| No. _____        | CHECKED BY _____        | " _____    |





| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 111-1(III)-14      | 1974        | 124       | 234          |

|                   |      |
|-------------------|------|
| SURVEY PLOTTED BY | DATE |
| DESIGNED BY       |      |
| TRACED BY         |      |
| NOTE BOOK         |      |
| QUANTITIES BY     |      |
| CHECKED BY        |      |
| No.               |      |



C.C.O. #40  
6-8-76

|         |                                                             |
|---------|-------------------------------------------------------------|
| 5/1/75  | REVISED TRAFFIC SIGNAL LAYOUT, STRIPING & WHEEL CHAIR RAMP. |
| 3/29/74 | REVISED TRAFFIC SIGNAL LAYOUT                               |
| DATE    | REVISIONS                                                   |

11-10

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

TRAFFIC SIGNAL SYSTEM  
PLANTATION DR. - BOUGAINVILLE RD.  
RADFORD DR. - COMMISSARY RD.

PEARL HARBOR INTERCHANGE  
F.A.I. PROJECT NO. I-H-1(III)-14

SCALE AS SHOWN DATE: DEC. 14, 1973

THIS WORK WAS PREPARED BY ME  
OR UNDER MY SUPERVISION

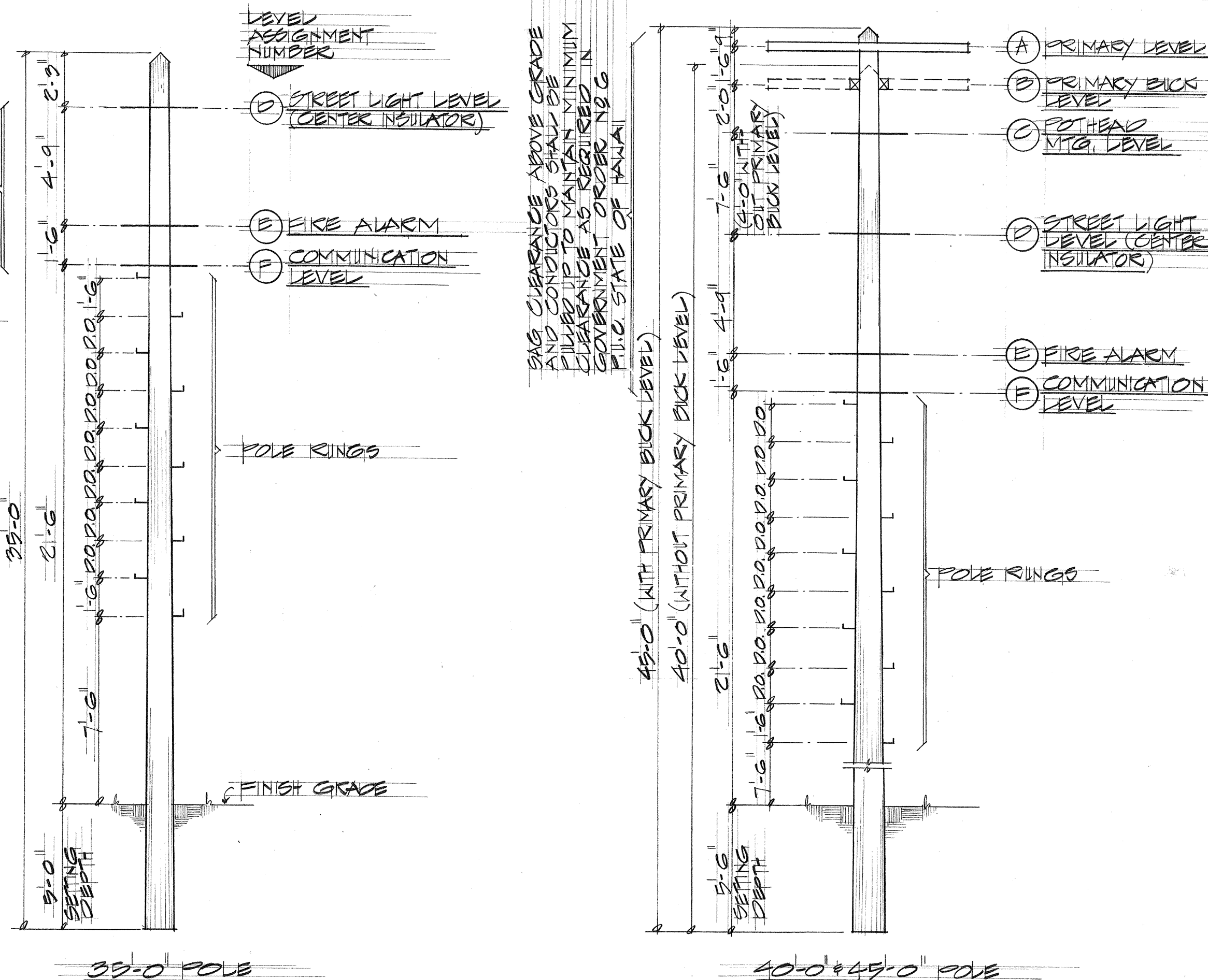
SHEET NO. E-10 OF 40 SHEETS



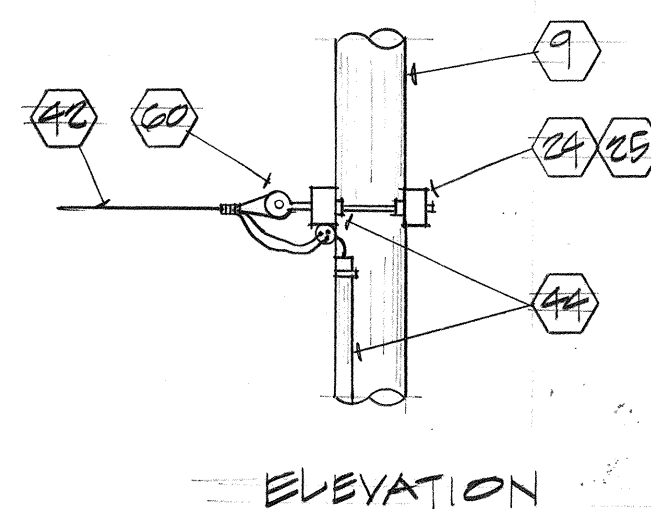
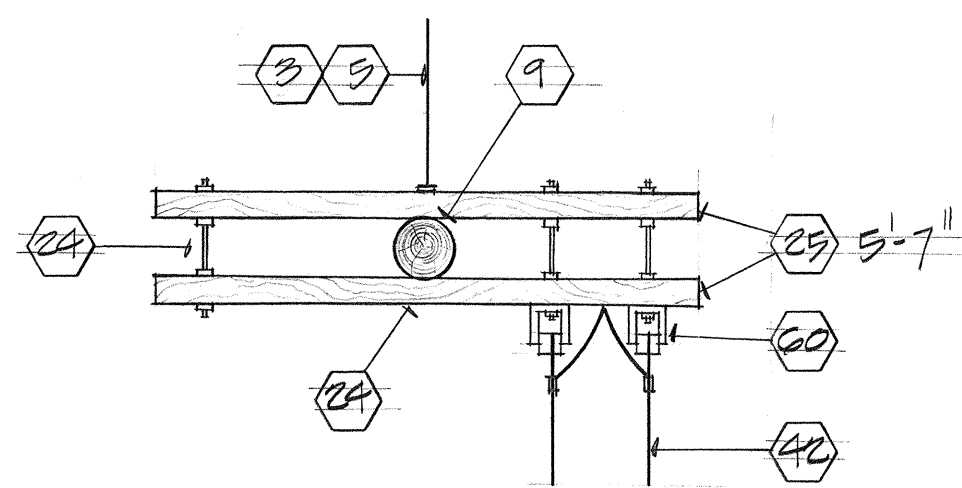
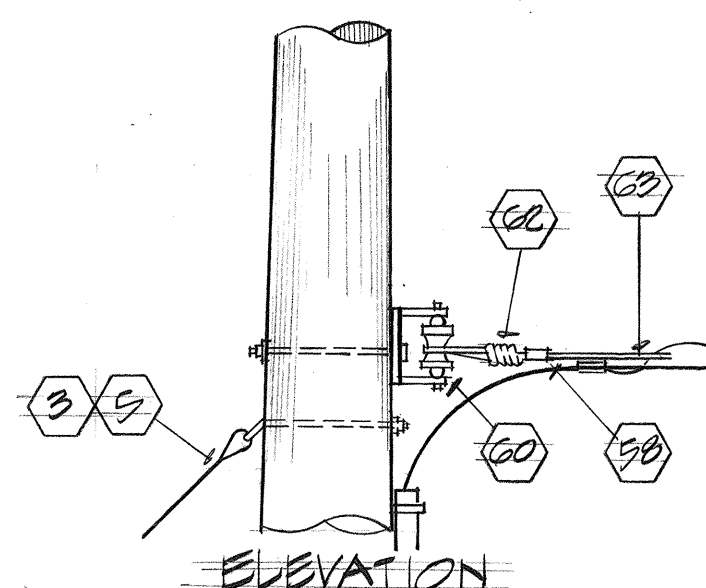
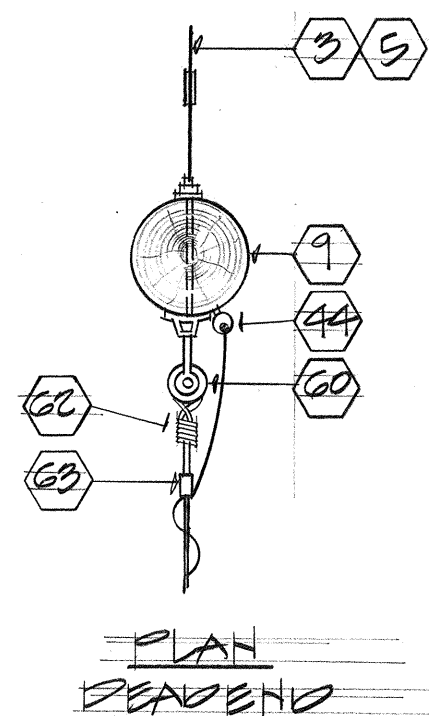
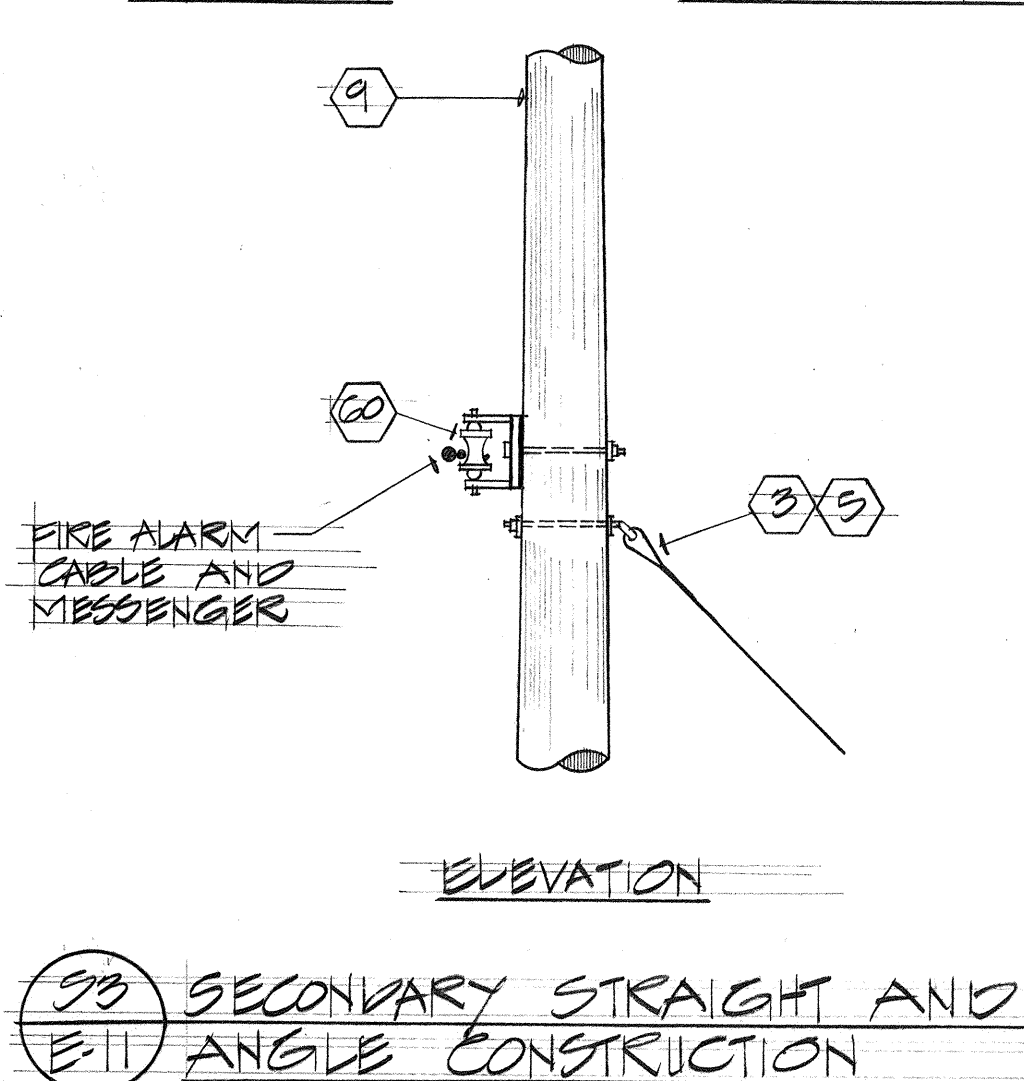
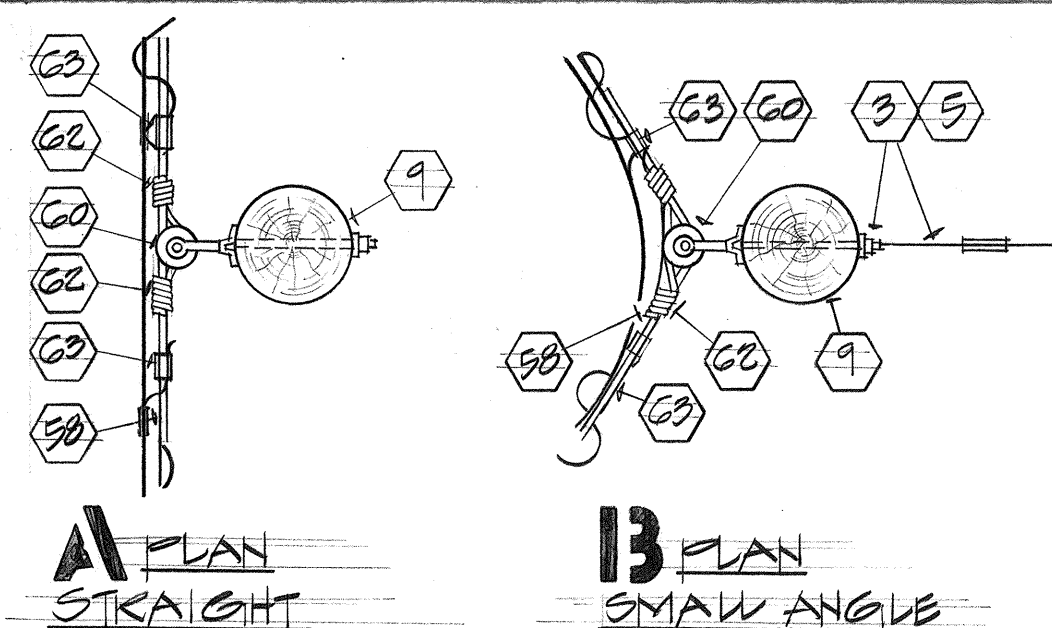
# MATERIAL LIST - OVERHEAD AND UNDERGROUND SYSTEMS

| ITEM | POLE # ANCHOR GROUP - SEE SPECIFICATIONS                                                                     | ITEM | POLE FRAMING GROUP - SEE SPECIFICATIONS                                     | ITEM | WIRING GROUP - SEE SPECIFICATIONS                                    |
|------|--------------------------------------------------------------------------------------------------------------|------|-----------------------------------------------------------------------------|------|----------------------------------------------------------------------|
| (1)  | ANCHOR SLUG, CONCRETE, 18" DIAMETER                                                                          | (20) | BONDING WIRE, #6 SDSC & STAPLES                                             | (40) | BOLT, MACHINE, 3/4" TRANSFORMER MOUNTING WITH CURVED WASHER & NUT    |
| (2)  | ANCHOR ROD - 1" Ø X 8'-0" TRIPLE EYE W/ WASHER & NUT (1/4" Ø X 8'-0" TRIPLE EYE W/ WASHER & NUT WHERE REQ'D) | (21) | CROSSARM BRACE BOLT, CARTRIDGE, 3/8" DIA. WASHERS & NUT                     | (41) | BOLT CAP, WITH FLATHEAD NAILS                                        |
| (3)  | GUY STRAND, 3/8" DIAMETER                                                                                    | (22) | CROSSARM BOLT, 5/8" DIA. WASHERS & NUT                                      | (42) | CABLES SERIES STREET LIGHTING, 1/0 #6, 9KV CLIP                      |
| (4)  | GUY GUARD, 8'-0" STEEL                                                                                       | (23) | CROSSARM BRACE, 1/4" X 1/4" X 20" (5'-7" ARM) 1/4" X 1/4" X 34" (8'-0" ARM) | (43) | CONDUCTOR, PRIMARY, 15,000 VOLTS, N81 MH080                          |
| (5)  | GUY EYE BOLT, 5/8" DIAMETER                                                                                  | (24) | DOUBLE ARMING BOLTS, 5/8" DIA. WASHERS & NUTS                               | (44) | CONDUIT, PVC WITH 2-HOLE STRAPS                                      |
| (6)  | GUY POLE PLATE, SIDEWALK TYPE WITH LAG SCREWS                                                                | (25) | CROSSARM, 3/4" X 4 1/2" X 5'-7" 3/4" X 4 1/2" X 8'-0"                       | (45) | CONDUIT, WIRING, NEC TYPE THW CONDUCTORS                             |
| (7)  | GUY POLE ATTACHMENTS                                                                                         | (26) | GROUND WIRE, #4 SDSC AND STAPLES                                            | (46) | CONNECTOR, SPLIT BOLT, BRONZE                                        |
| (8)  | GUY STRAND CHAMPS, SIDEWALK TYPE                                                                             | (27) | LAG SCREW, 1/2" DIAMETER                                                    | (47) | CUTOUT, 100 AMPERES, 15KV OPEN FUSED                                 |
| (9)  | POLE, CREOSOTE, ANSI CLASS 3                                                                                 | (28) | SIGN, HIGH VOLTAGE WITH FLATHEAD NAILS                                      | (48) | EYEBOLT, 5/8" DIAMETER                                               |
| (10) | POLE STEPS, GALVANIZED, STEEL                                                                                | (29) | WOOD MOLDING, 1/2" WIRING WITH 2-HOLE STRAPS & NAILS                        | (49) | EYENUT, 15KV, CUBIC STRAIN INSULATOR WITH WIRE GRIP                  |
| (11) | PREFORMED STRAND GRIPS                                                                                       |      |                                                                             | (50) | GROUND ROD, 3/4" Ø X 8'-0" WITH CLAMP                                |
| (12) | PIPE, 2" DIA. GALVANIZED STEEL                                                                               |      |                                                                             | (51) | INSULATOR, 15KV, POST TYPE WITH STEEL PINS                           |
| (13) | STRAIN INSULATOR, 20,000 #                                                                                   |      |                                                                             | (52) | INSULATOR, 15KV, CUBIC DEADEND WITH 5/8" MOUNTING BOLT, WASHER & NUT |
| (14) | EYE NUT, 5/8" DIA. BOLT HOLE                                                                                 |      |                                                                             | (53) | INSULATOR, STRAIN 500                                                |
|      |                                                                                                              |      |                                                                             | (54) | TIE WIRE, PRIMARY, #6 SDSC                                           |
|      |                                                                                                              |      |                                                                             | (55) | POTHEAD, 15KV, WITH CROSSARM MOUNTING BRACKET                        |
|      |                                                                                                              |      |                                                                             | (56) | GRIP, CABLE, BRONZE                                                  |
|      |                                                                                                              |      |                                                                             | (57) | LIGHTING ARRESTOR, 12KV, W/ CROSSARM MOUNTING BRACKET                |
|      |                                                                                                              |      |                                                                             | (58) | FIRE ALARM CABLE, 4/0 #10                                            |
|      |                                                                                                              |      |                                                                             | (59) | INSULATOR, GLASS, POST TYPE WITH STEEL PINS                          |
|      |                                                                                                              |      |                                                                             | (60) | INSULATOR, WITH CUBIC BOLT, NUTS AND WASHERS                         |
|      |                                                                                                              |      |                                                                             | (61) | CABLE, PRIMARY, 1/0 #4/0, 15KV, PEI PT                               |
|      |                                                                                                              |      |                                                                             | (62) | PREFORMED GRIP                                                       |
|      |                                                                                                              |      |                                                                             | (63) | MESSANGER                                                            |

SAG CLEARANCE ABOVE GRADE AND CONDUCTORS SHALL BE FILLED UP TO MAINTAIN MINIMUM CLEARANCE AS REQUIRED IN GOVERNMENT ORDER N.G. P.U.C. STATE OF HAWAII



POLE LEVEL ASSIGNMENT  
NOT TO SCALE

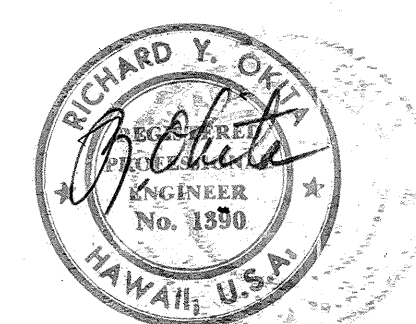


| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 111(III)-14        | 1974        | 125       | 234          |

APPROVED:

R. Maw  
HAWAIIAN TELEPHONE CO. 10-21-74  
DATE

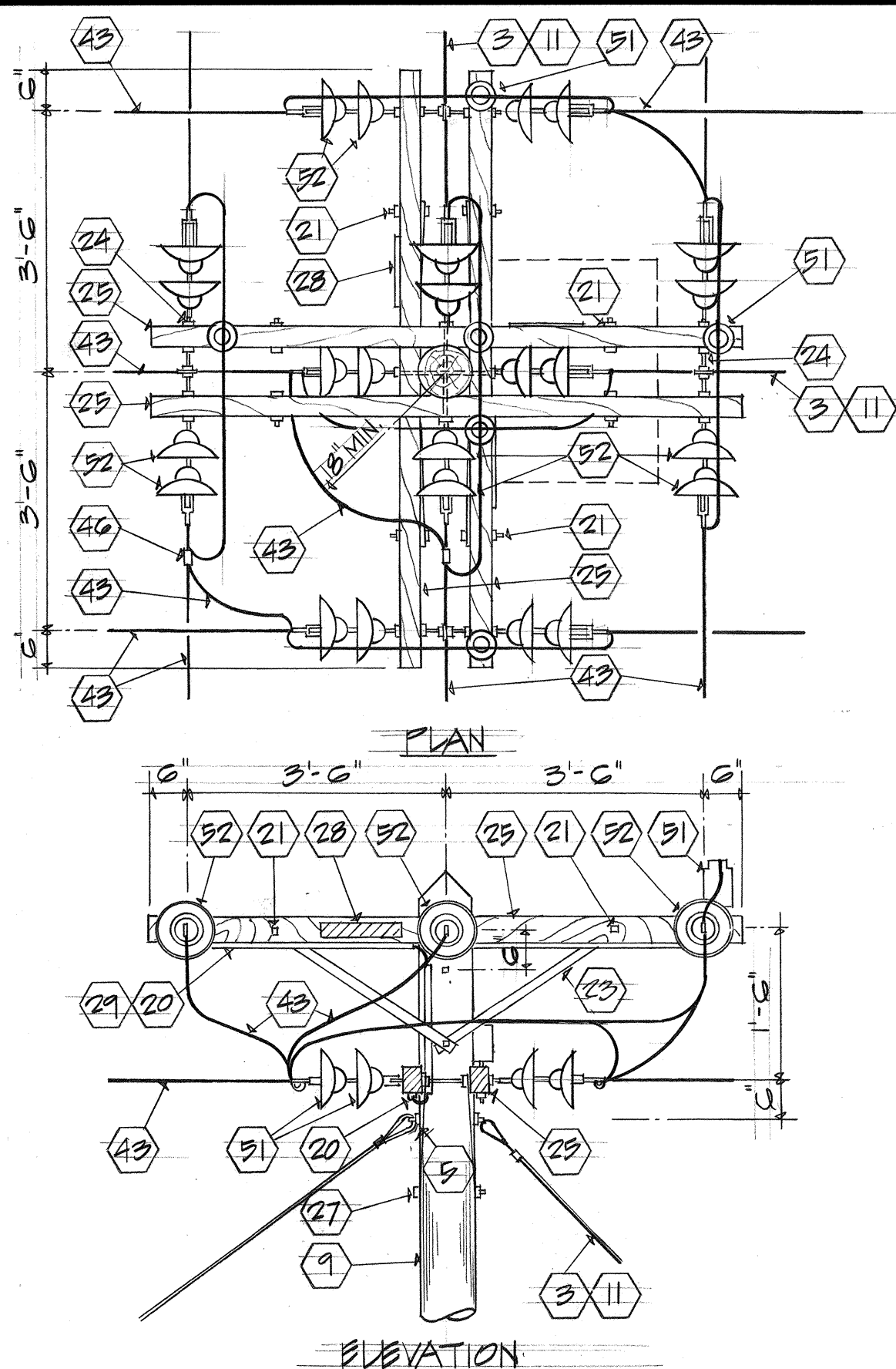
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|-----------------------|----------|---------------------------------------------------------------|
| C.C.O. #16<br>7-17-75 | 01/21/74 | OBTAINED UTILITY CO. SIGNATURE                                |
|                       | 5/2/74   | REVISED RATING OF LIGHTING ARRESTOR ITEM 57 FROM 15KV TO 12KV |
|                       | DATE     | REVISIONS                                                     |



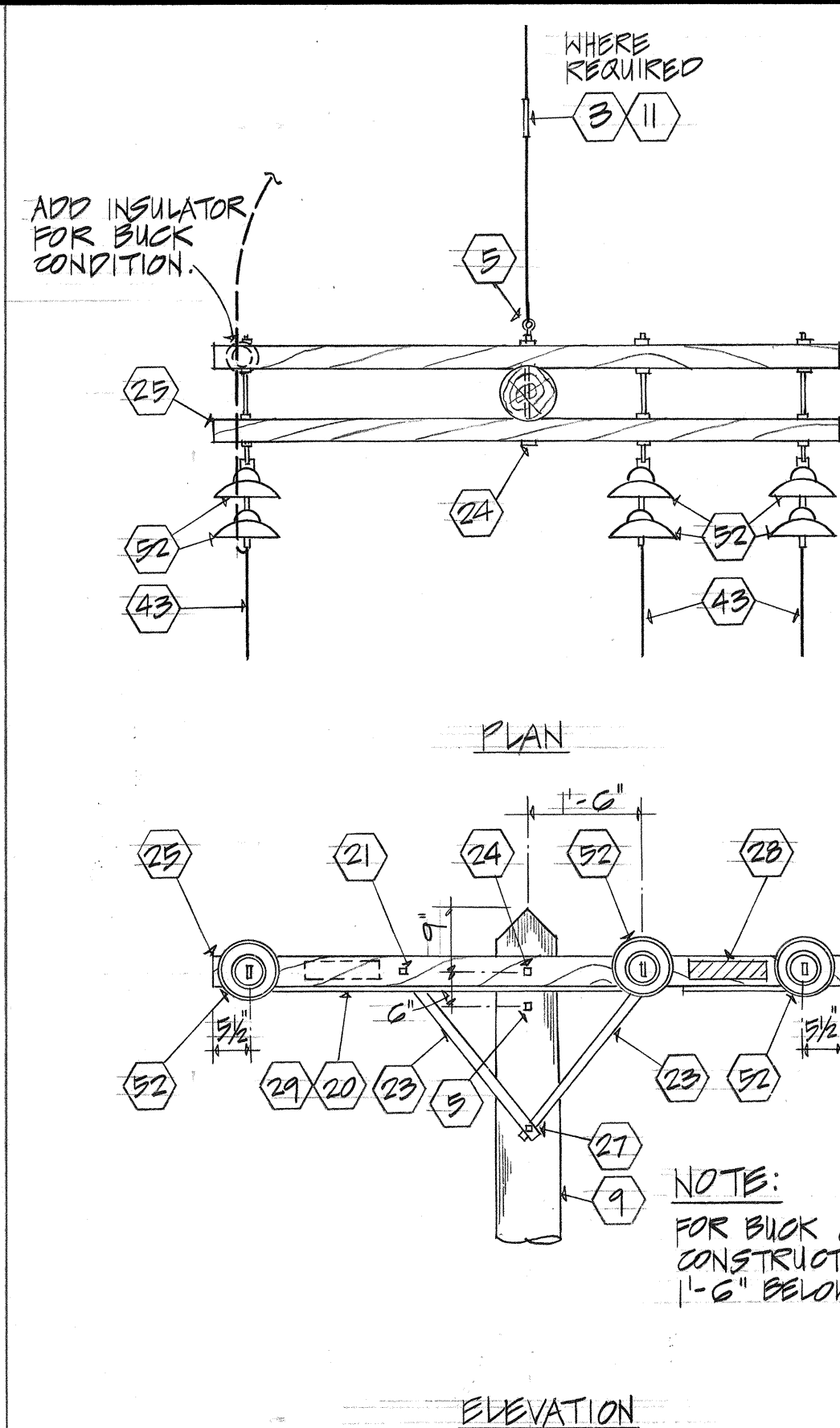
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

|                                                                      |
|----------------------------------------------------------------------|
| STATE OF HAWAII<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION |
| POLE LEVEL ASSIGNMENT<br>AND MATERIAL LIST                           |
| PEARL HARBOR INTERCHANGE<br>F.A.I. PROJ. NO. I-H-1-(III)-14          |
| SCALE: AS SHOWN DATE: DEC. 14, 1973                                  |
| SHEET NO. E-11 OF 40 SHEETS                                          |

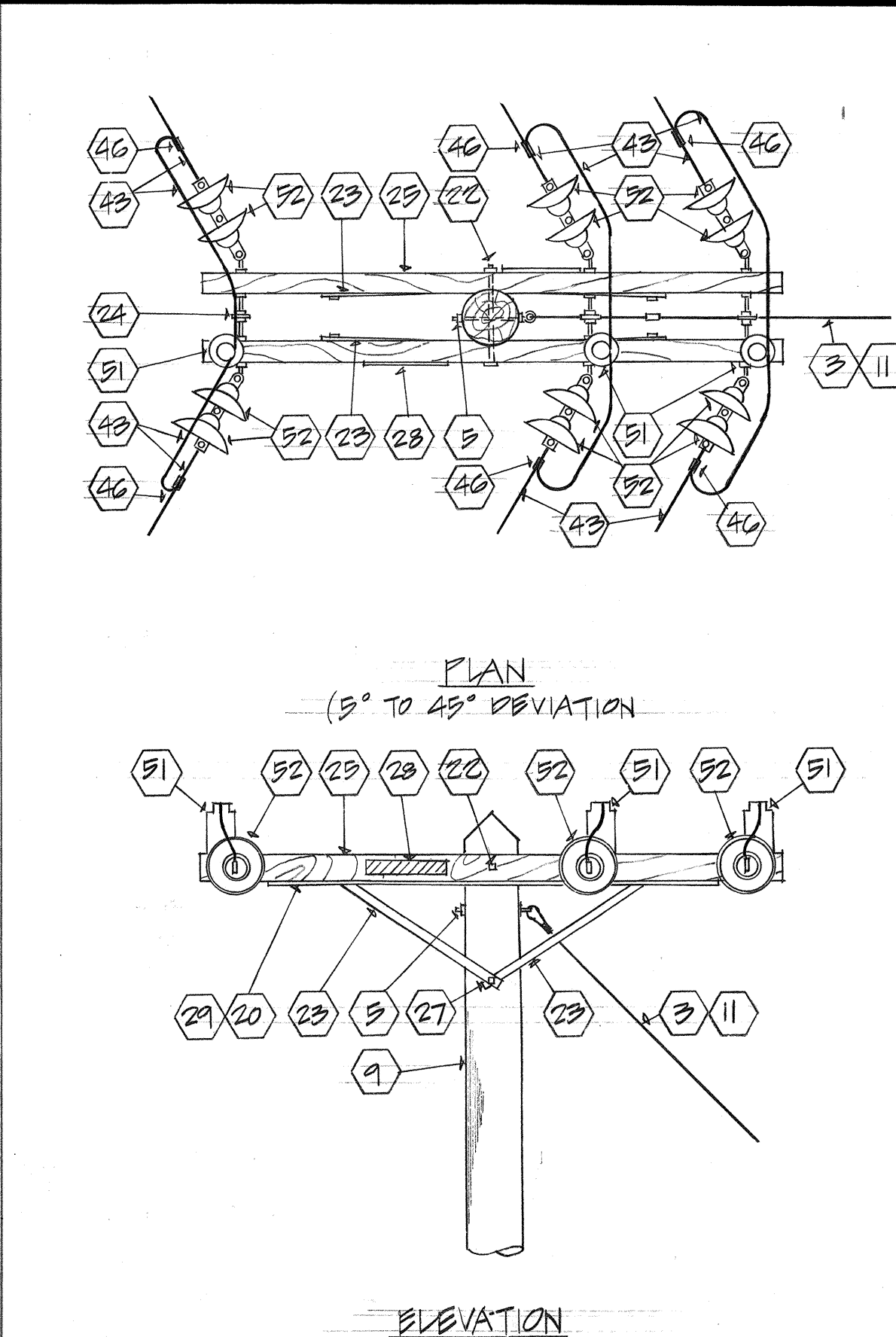




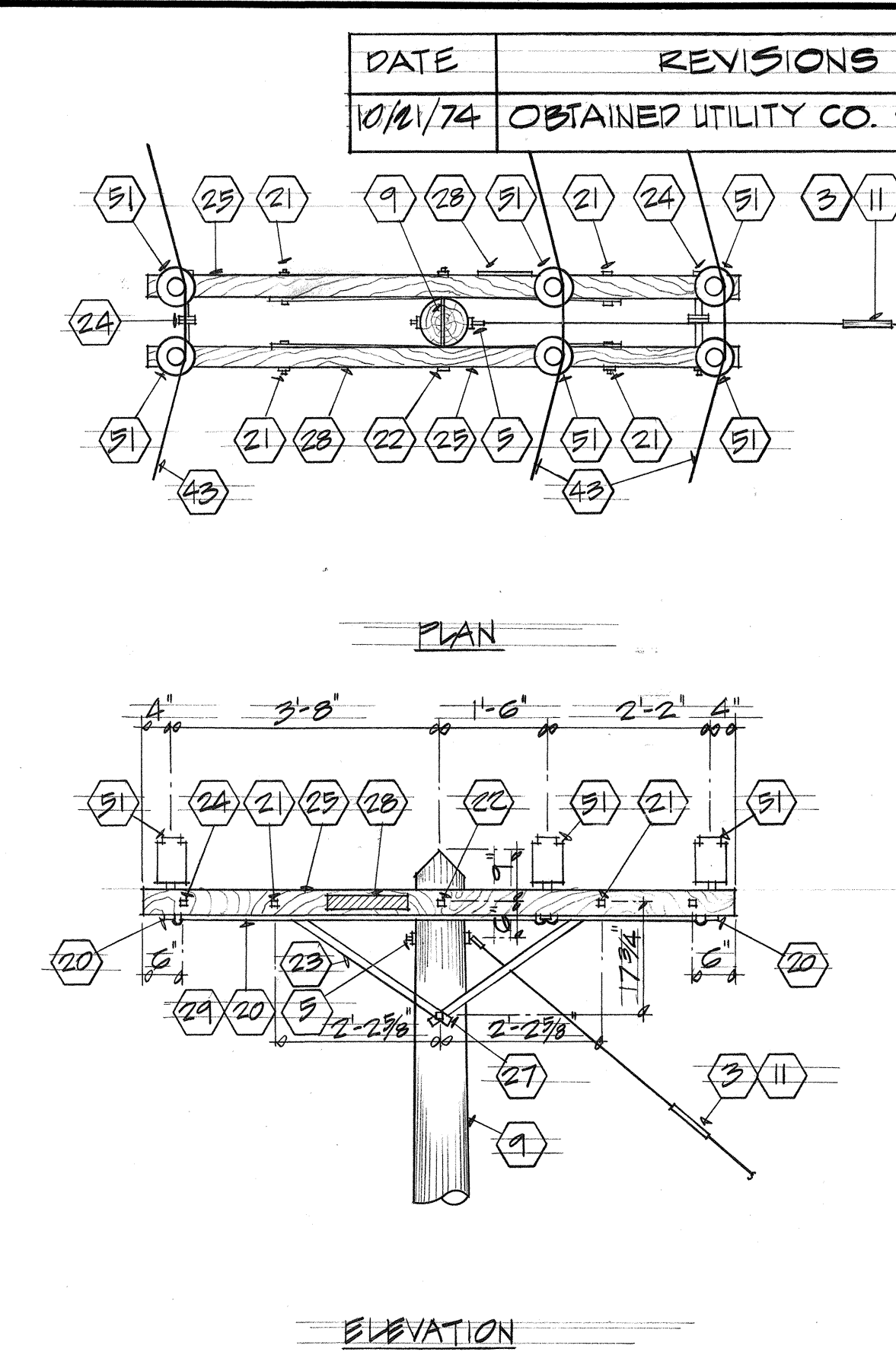
PB-1 THREE PHASE CABLE  
E12 DEADEND POLE FRAMING



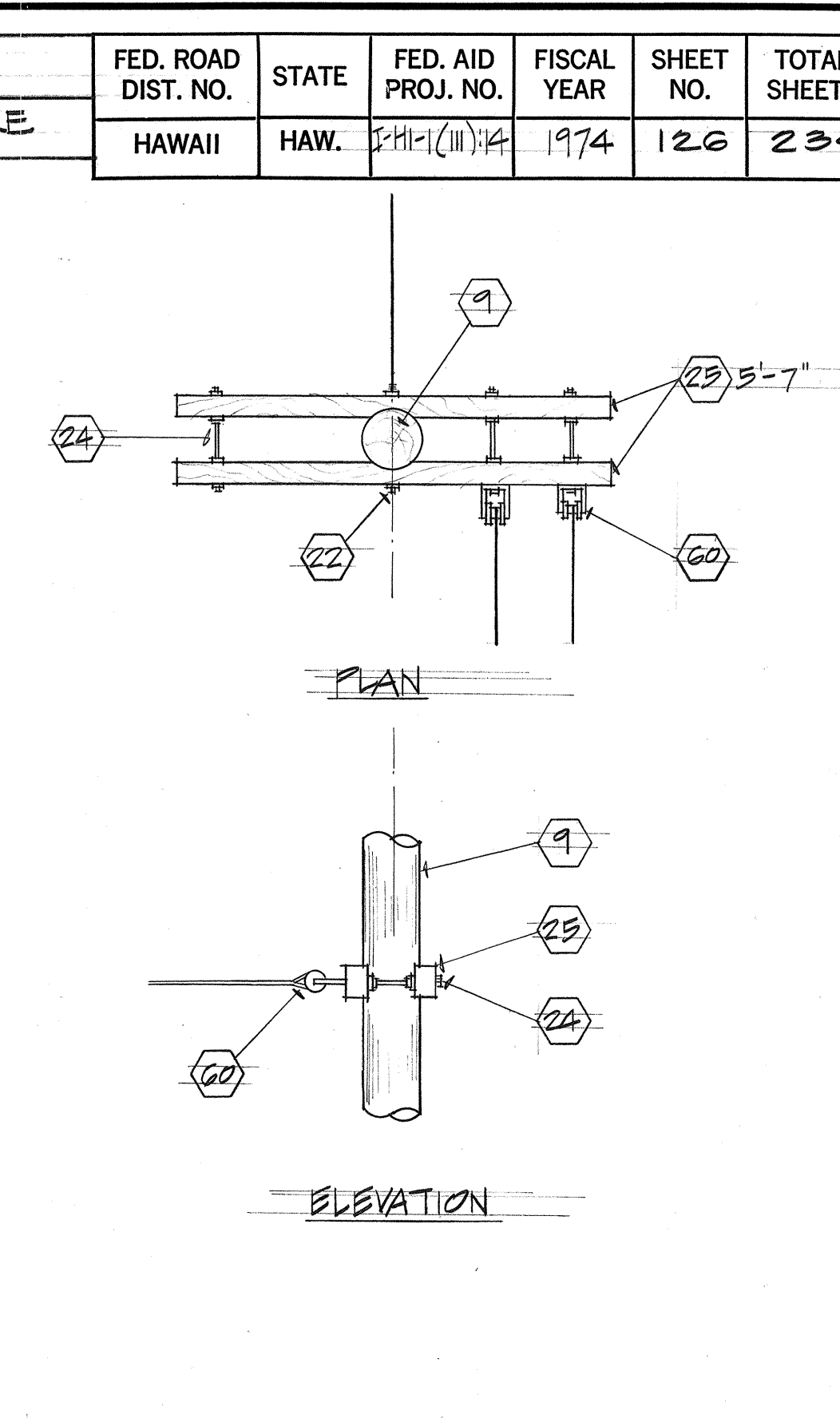
PB-2 THREE PHASE DEADEND  
E12 POLE FRAMING



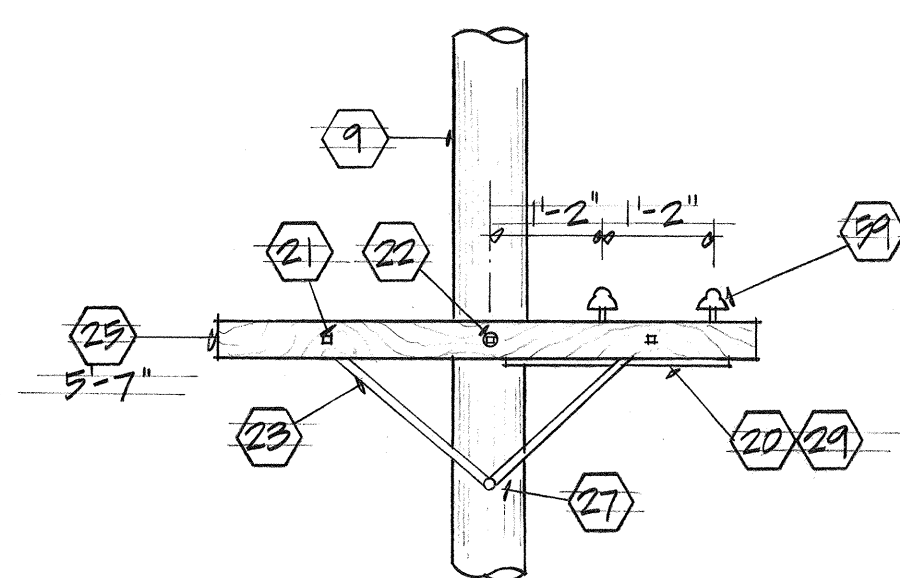
PB-3 THREE PHASE SMALL ANGLE  
E12 (5° TO 45° DEVIATION) POLE FRAMING



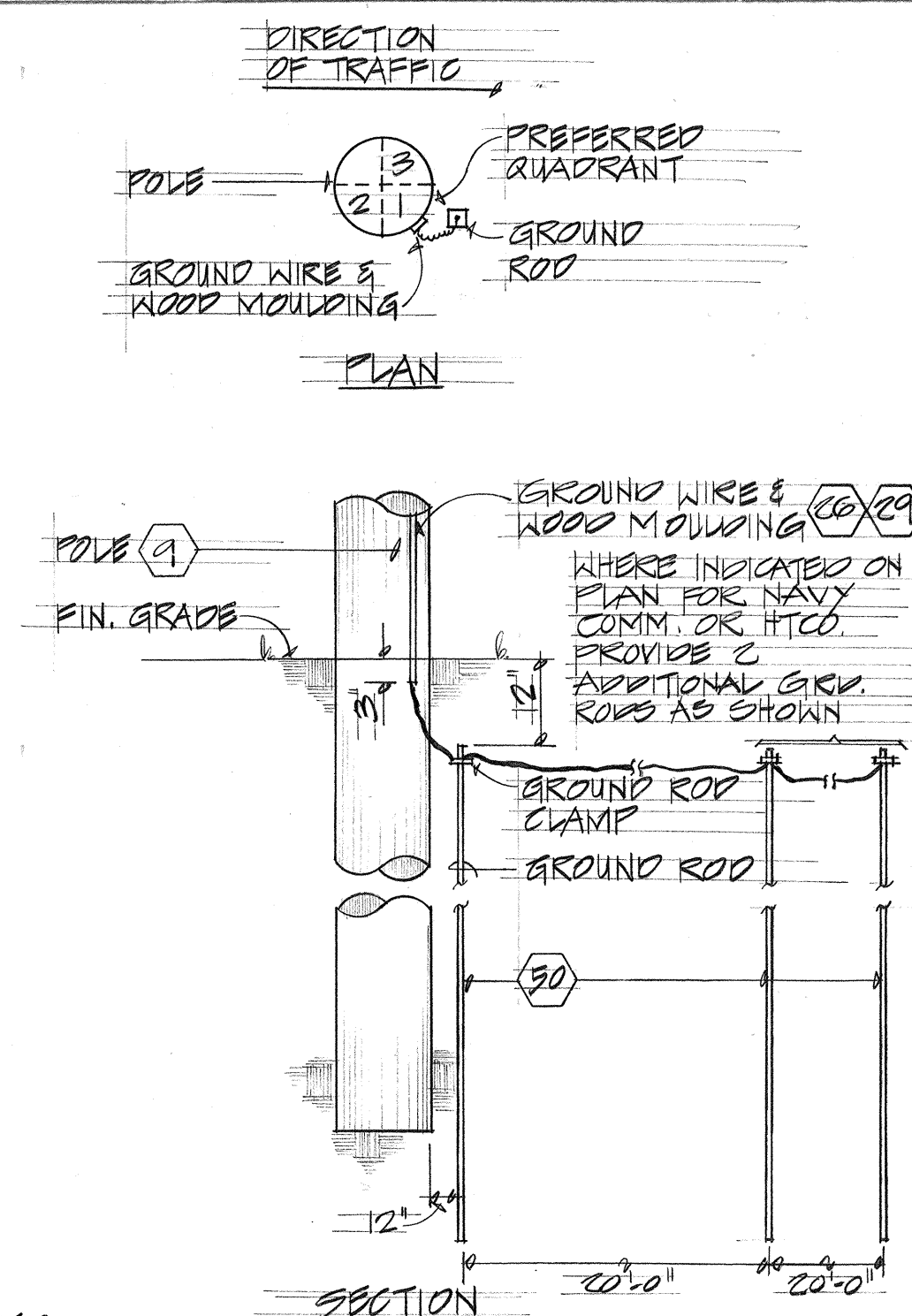
PB-4 THREE PHASE SMALL ANGLE (LESS  
E12 THAN 5° DEVIATION) POLE FRAMING



S1 SECONDARY-DEADEND CONSTRUCTION  
E12

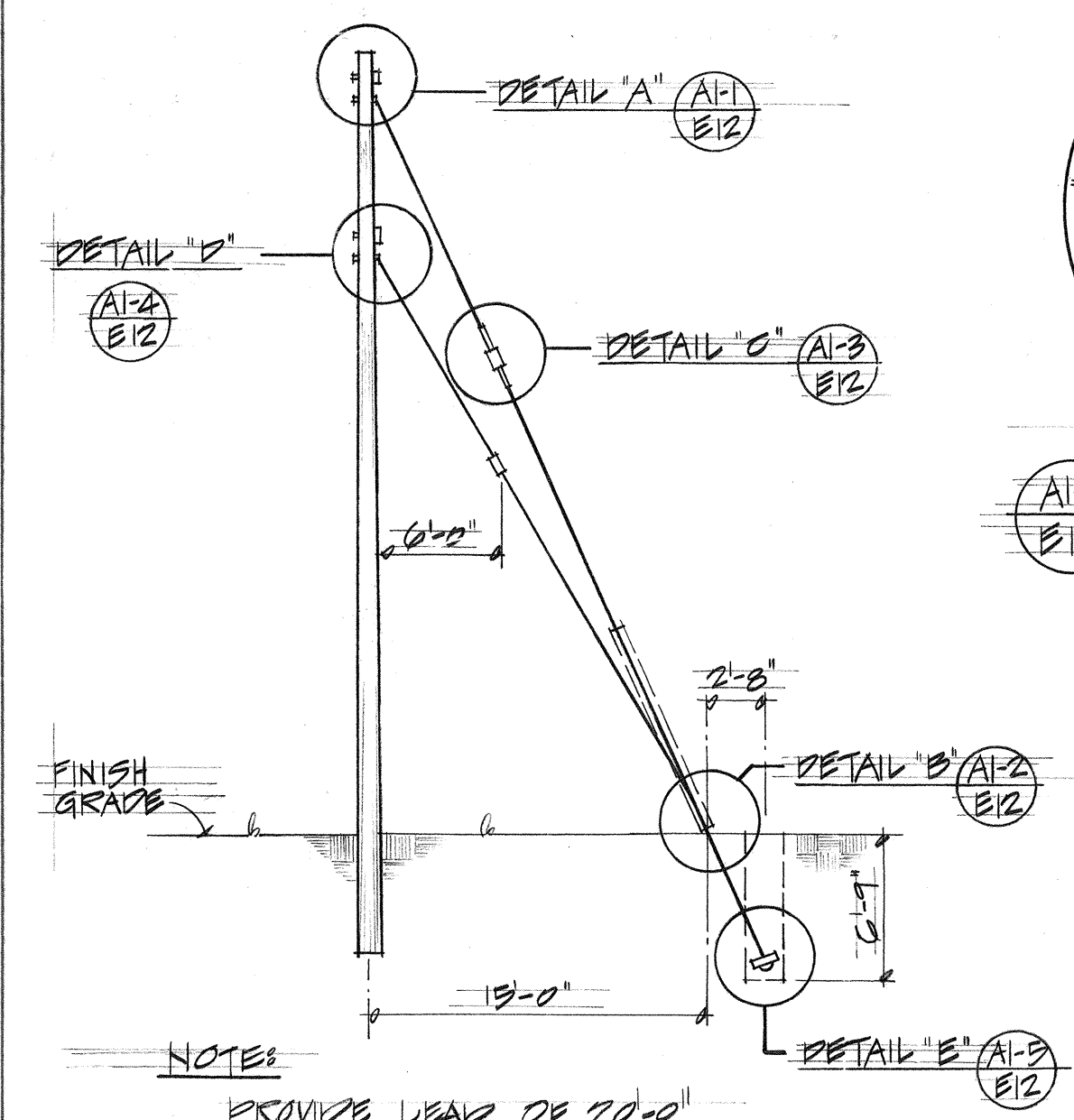


S2 SECONDARY STRAIGHT CONSTRUCTION  
E12



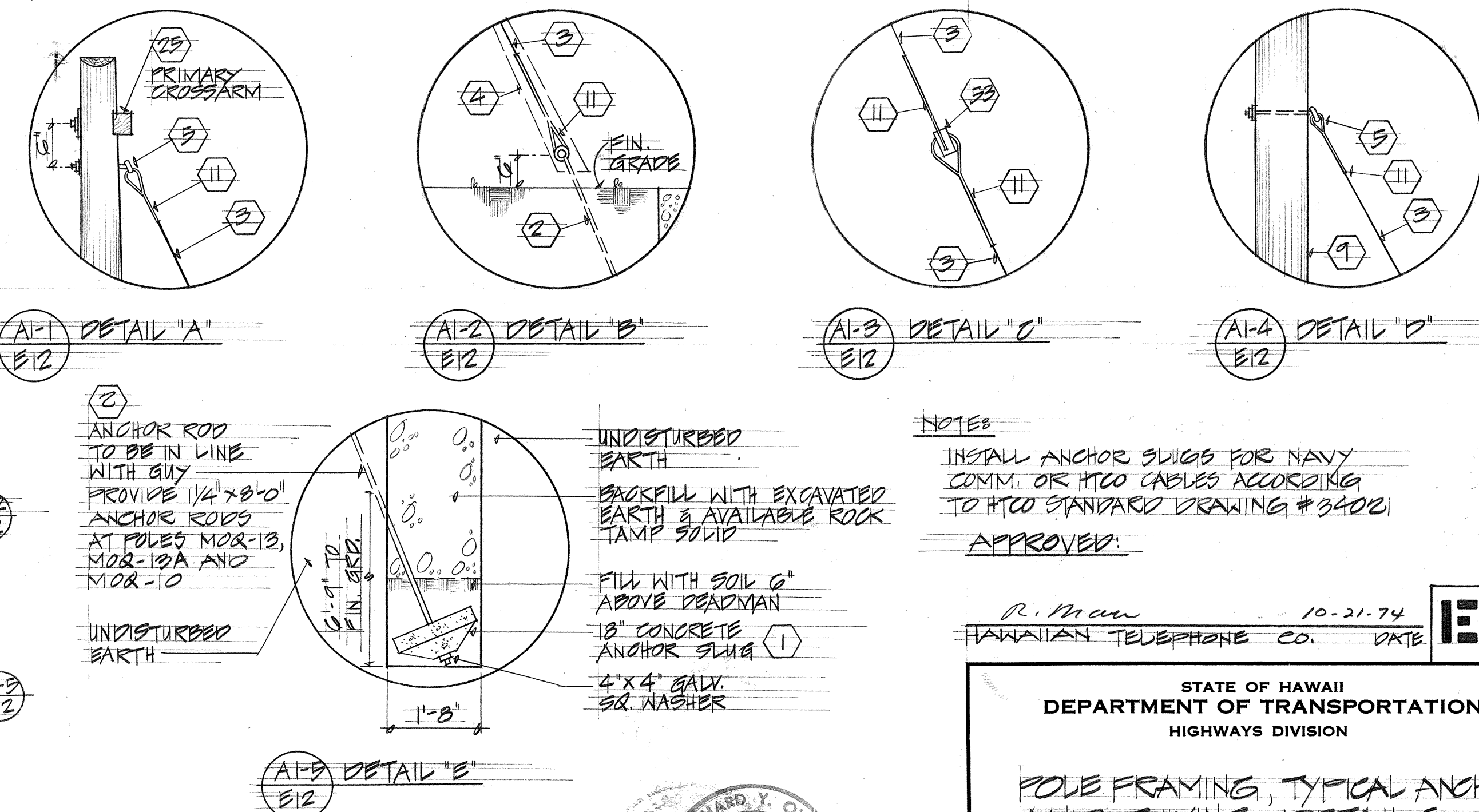
- NOTES:
1. PROVIDE AT EACH TRANSFORMER POLE AND WHERE SHOWN ON PLAN.
  2. TELEPHONE GROUND CONNECTION TO GROUND ROD SHALL BE MADE BY CONTRACTOR.

G1 GROUNDING DETAIL  
E12



- NOTES:
1. PROVIDE LEAD OF 20'-0" FOR HTCO AND NAVY COMM. CABLES AT NEW POLES.
  2. PROVIDE 1/4" X 8'-0" ANCHOR RODS AT POLES MOR-13, MOR-13A AND MOR-10.

A1 TYPICAL ANCHOR AND GUYING DETAILS  
E12



- NOTES:
1. ANCHOR ROD TO BE IN LINE WITH GUY.
  2. PROVIDE 1/4" X 8'-0" ANCHOR RODS AT POLES MOR-13, MOR-13A AND MOR-10.
  3. UNDISTURBED EARTH.
  4. BACKFILL WITH EXCAVATED EARTH & AVAILABLE ROCK TAMP SOLID.
  5. FILL WITH SOIL 6" ABOVE DEADMAN.
  6. 18" CONCRETE ANCHOR SLUG.
  7. 4" X 4" GALV. SQ. WASHER.

- NOTES:
1. INSTALL ANCHOR SLUGS FOR NAVY COMM. OR HTCO CABLES ACCORDING TO HTCO STANDARD DRAWING #3402.
  2. APPROVED:

R. Man 10-21-74  
HAWAIIAN TELEPHONE CO. DATE

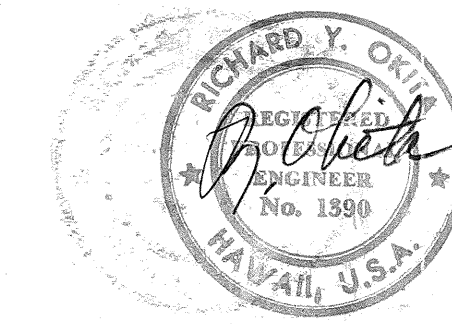
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

POLE FRAMING, TYPICAL ANCHOR AND GUYING DETAILS

PEARL HARBOR INTERCHANGE  
F.A.T. PROJ. NO. I-H-1(III)-14

NOT TO SCALE DATE: DEC. 14, 1973

SHEET NO. E12 OF 40 SHEETS



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INSULATOR

CROSSARM

STEEL PIN

BONDING WIRE

WASHER & NUT

CONNECT TO OVERHEAD PRIMARY CIRCUIT

3-1/2 LIGHTNING ARRESTOR

3-PRIMARY OUTLET SWITCHES, 200A WITH 50A FUSES ON BOTH SIDES OF EXISTING CIRCUIT

3-1/2 POTHEAD

PROVIDE 3-PRIMARY OUTLET SWITCHES, 200A WITH 50A FUSES ON BOTH SIDES OF EXISTING CIRCUIT

NEW OVERHEAD PRIMARY CIRCUIT, 3-#1 MEDIUM HARD DRAWN BARE COPPER WIRES

RECONNECT TO EXISTING OVERHEAD TO MAKALAPA HOLDING MR. MCB-12

3-1/2 LIGHTNING ARRESTOR

3-PRIMARY OUTLET SWITCHES, 200A WITH SWGS ONLY

3-1/2 POTHEADS

PRIMARY RISER AT POLE MCB-13

EXISTING OVERHEAD PRIMARY CIRCUIT

BMH #1

BMH #2

BMH #3

CABLE SPLICED

PRIMARY CABLES 3-1/2 #4/0 FET-PJ, 15KV, UNDERGROUND

EXISTING OVERHEAD 11.5 KV NAVY ELECTRIC CIRCUIT, 3-#1, 18G WIRES

CONNECT TO EXISTING PRIMARY CIRCUIT AT POLE MCB-2

3-1/2 PRIMARY OUTLET SWITCHES, 200A, WITH SWGS ONLY

3-1/2 POTHEADS

PRIMARY RISER AT POLE #MCB-3

CABLE SPLICED

EXISTING OVERHEAD PRIMARY CIRCUIT

OUT

PRIMARY RISER AT POLE (REMOVE)

EXISTING BMH M-100

OUT # HOT CAP

EXISTING BMH M-106

EXISTING BMH M-101

EXISTING BMH M-102

EXISTING BMH M-104

EXISTING BMH M-105

EXISTING OVERHEAD PRIMARY CIRCUIT ALONG EXISTING PLANTATION DR.

EXISTING PRIMARY CIRCUIT 1-3/0 #4/0 15KV, 15KV (TO REMAIN)

OUT # HOT CAP

EXISTING PRIMARY CIRCUIT TO BMH #101 3/0, 500MCM, 15KV, 15KV (TO REMAIN)

EXISTING PRIMARY CABLES TO BE LEFT IN PLACE

## ONE LINE DIAGRAM

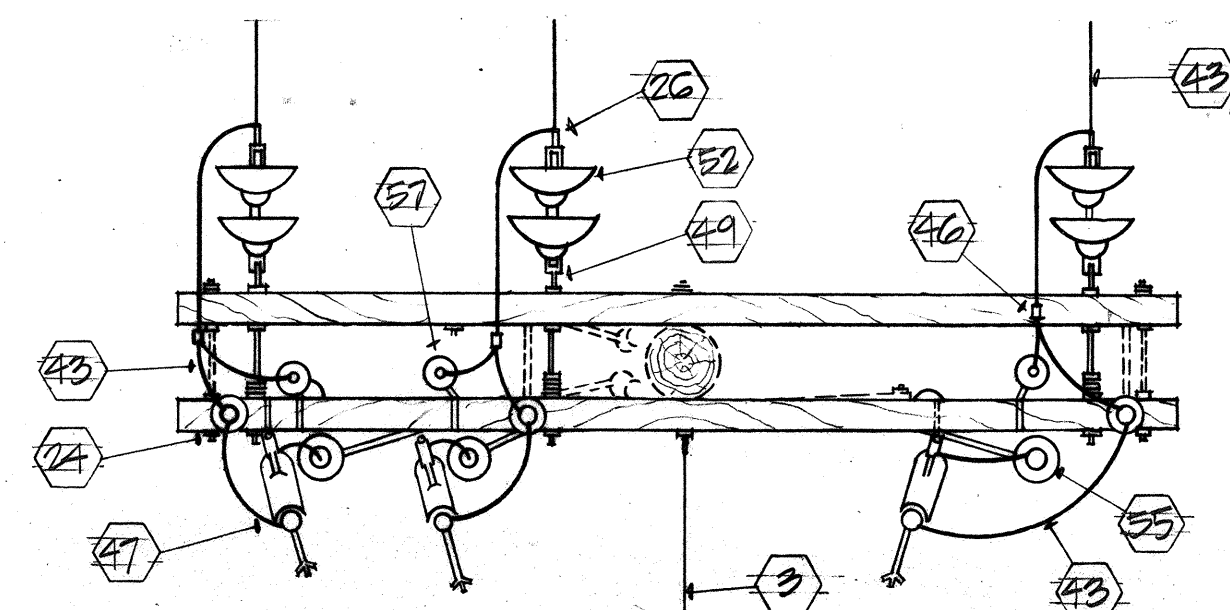
### NAVY II KV, PRIMARY ELECTRIC SYSTEM

C.O.127

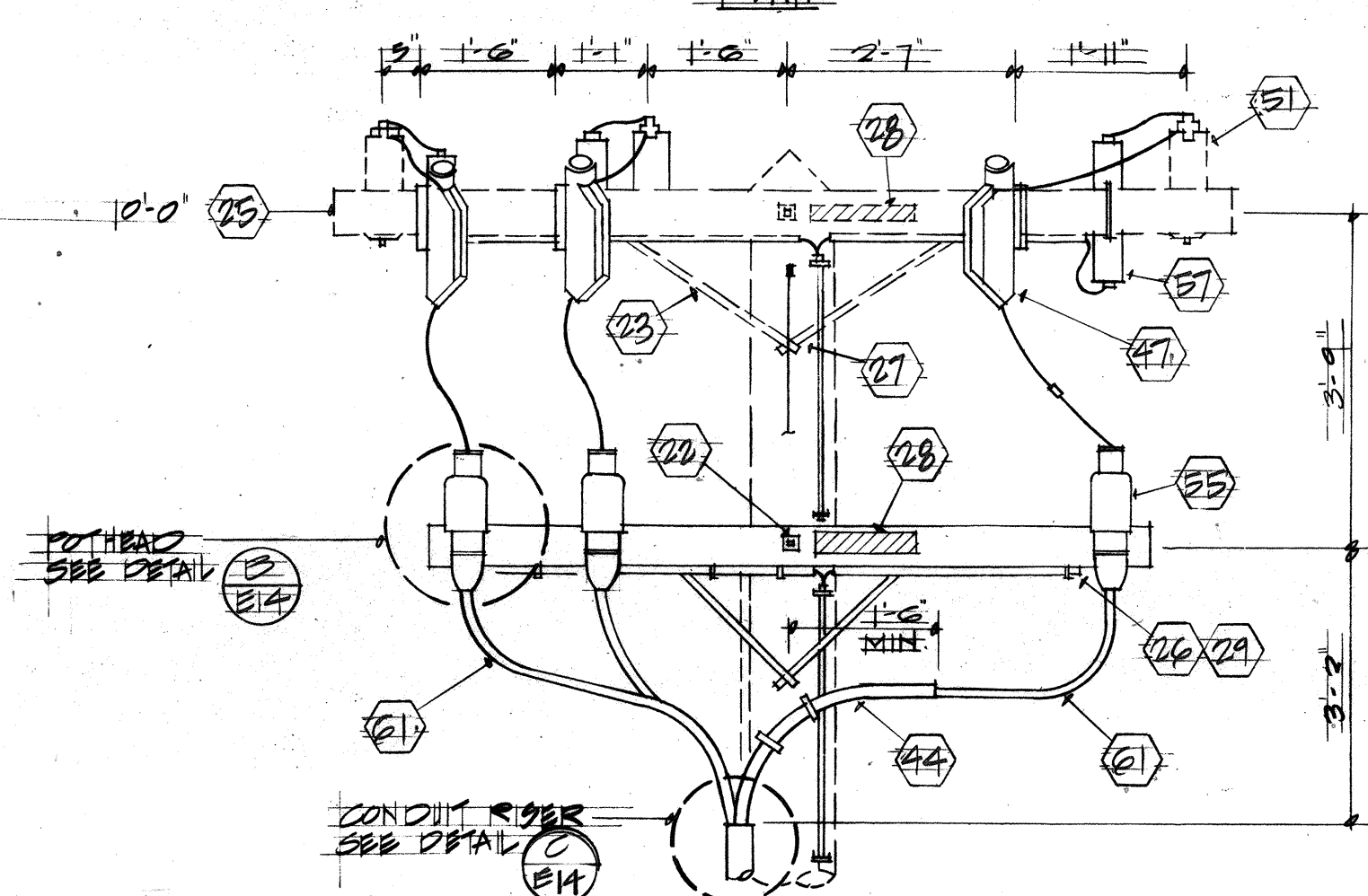
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| ORIGINAL<br>PLAN | SURVEY PLOTTED BY _____ |  | DATE _____ |
|                  | DRAWN BY _____          |  | " "        |
|                  | TRACED BY _____         |  | " "        |
| NOTE BOOK        | DESIGNED BY _____       |  | " "        |
|                  | QUANTITIES BY _____     |  | " "        |
| No. _____        | CHECKED BY _____        |  | " "        |



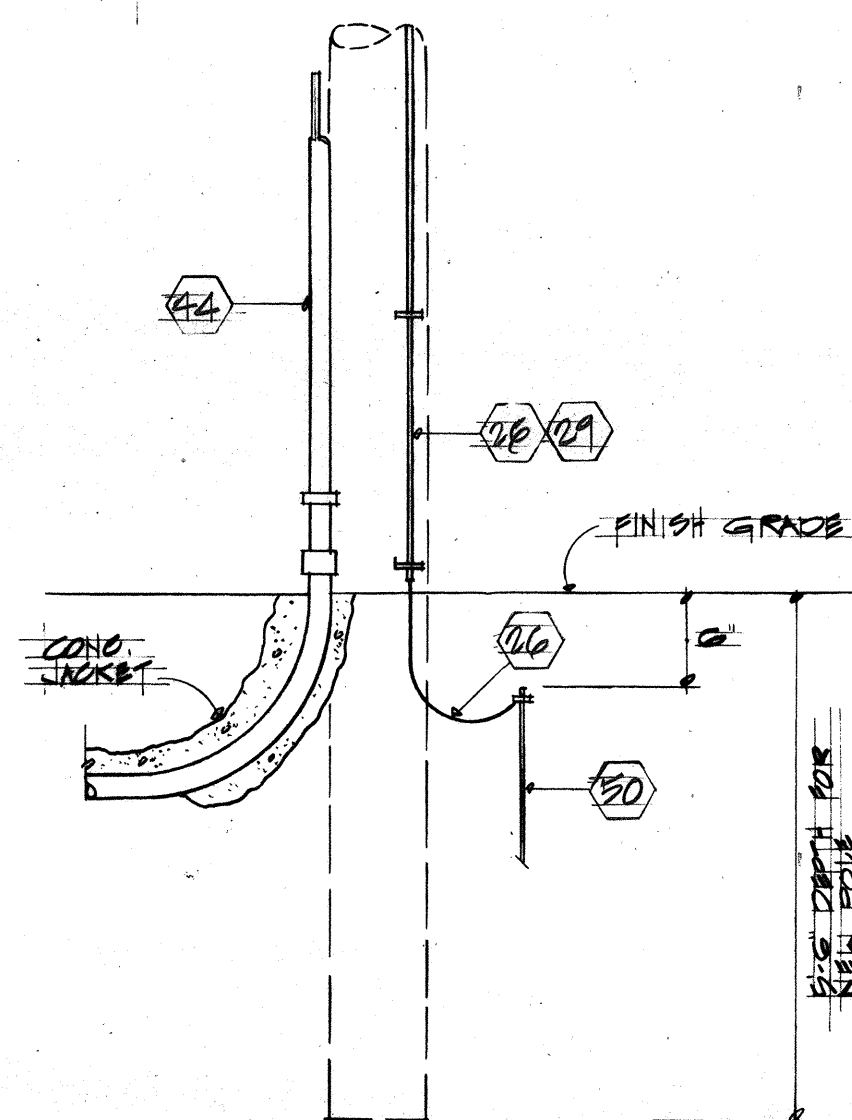
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 111-1(111)-14      | 1974        | 128       | 234          |



PLAN

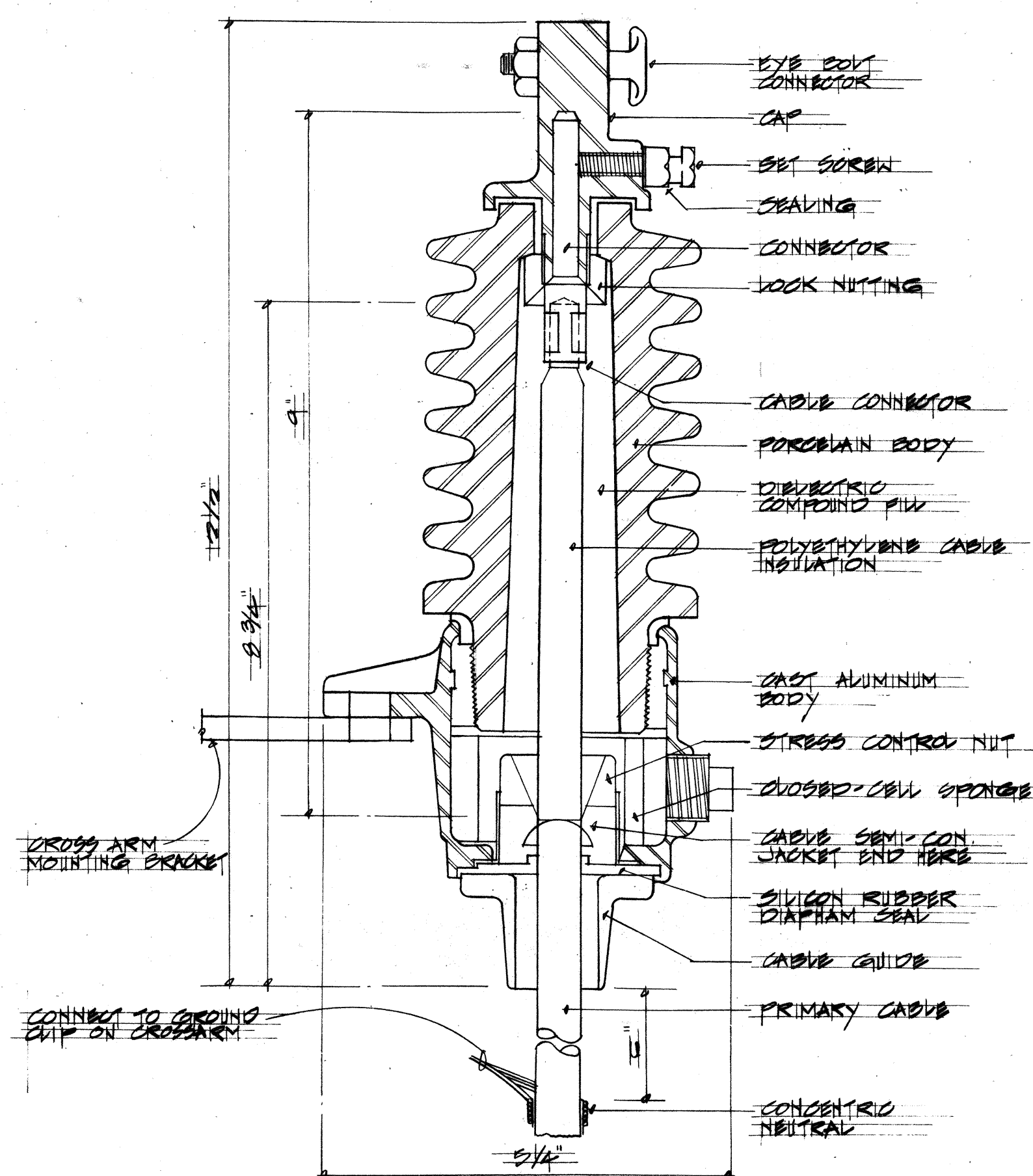


FRONT ELEVATION

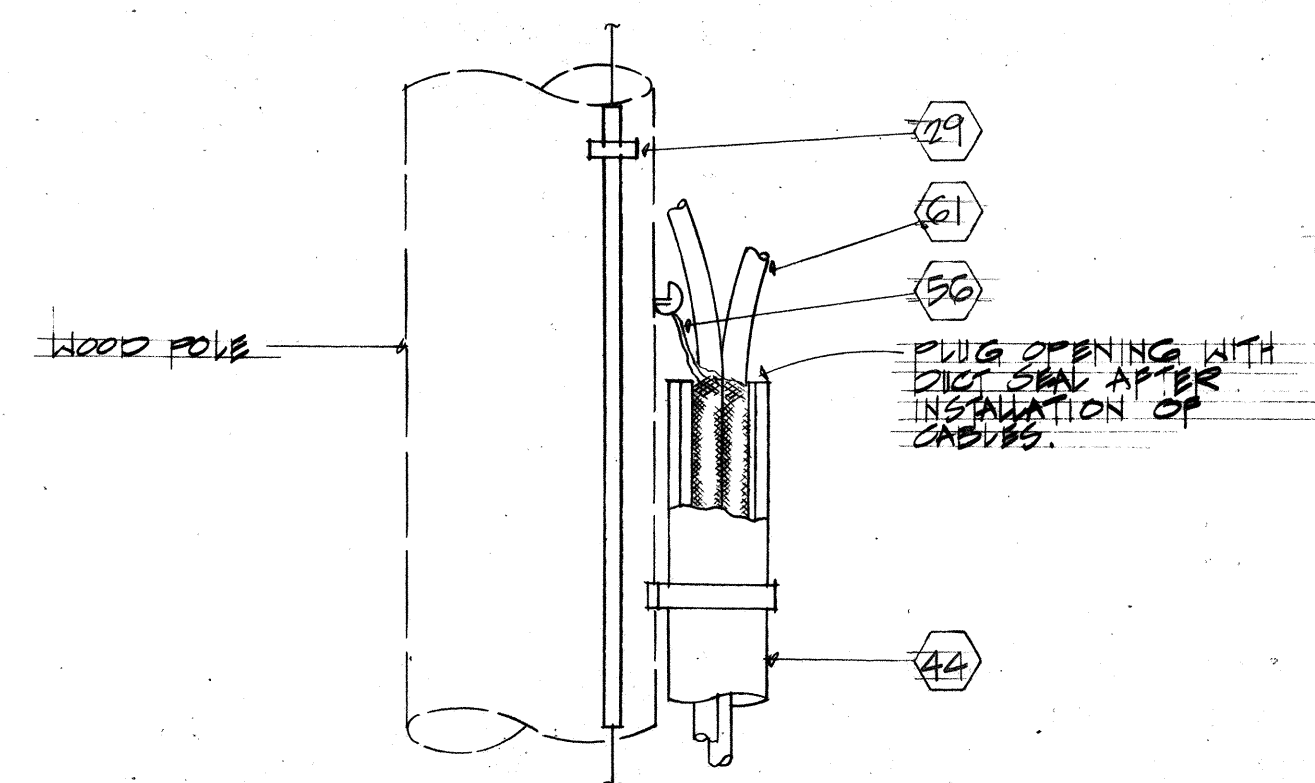


ELEVATION AT POLE BASE

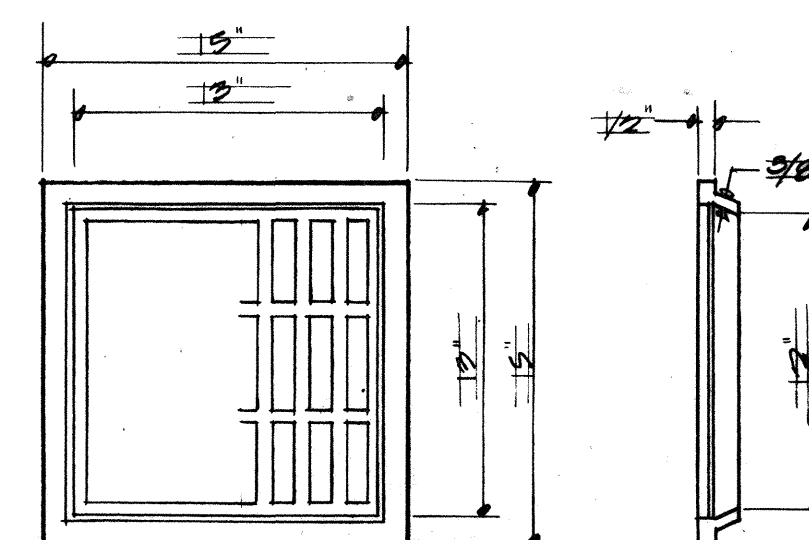
P3-5 DETAIL - PRIMARY SERVICE RISER - TYPE I  
E14 NOT TO SCALE



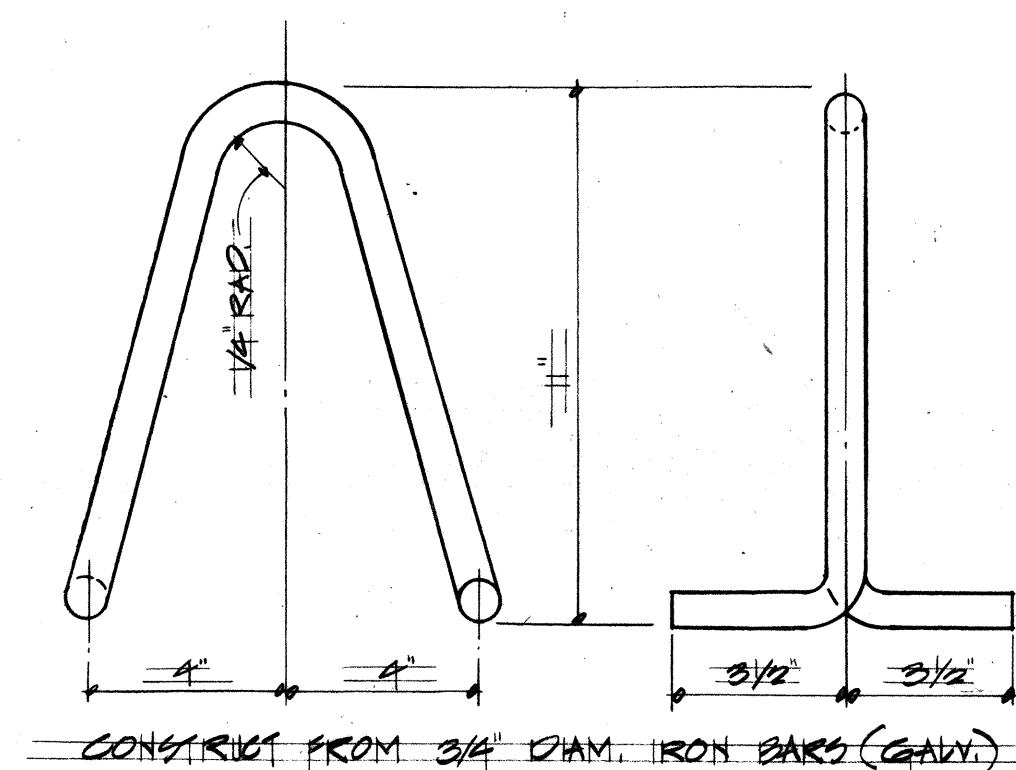
POTHEAD  
E14 PRIMARY CABLE TERMINATOR  
NOT TO SCALE



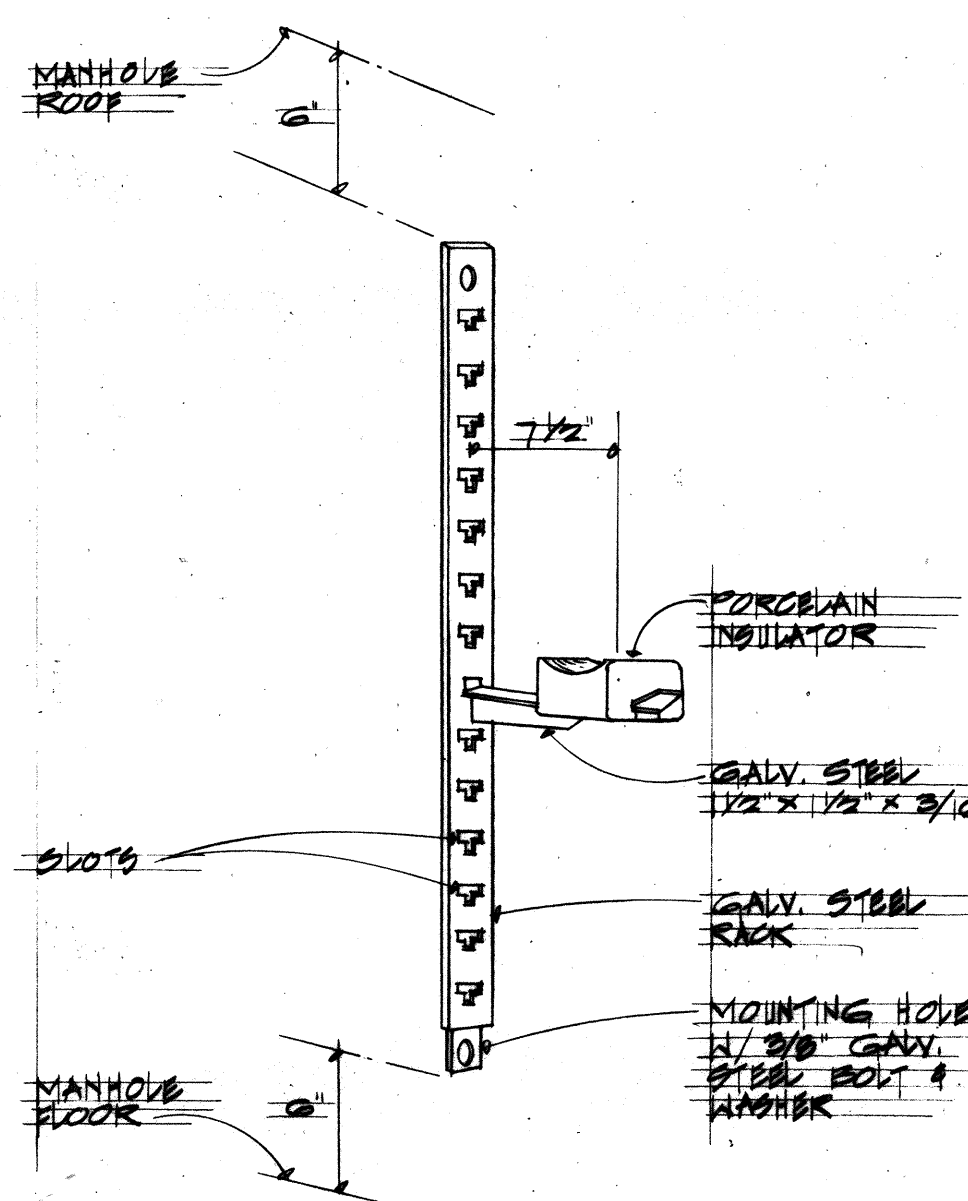
DETAIL - CONDUIT RISER  
E14 NOT TO SCALE



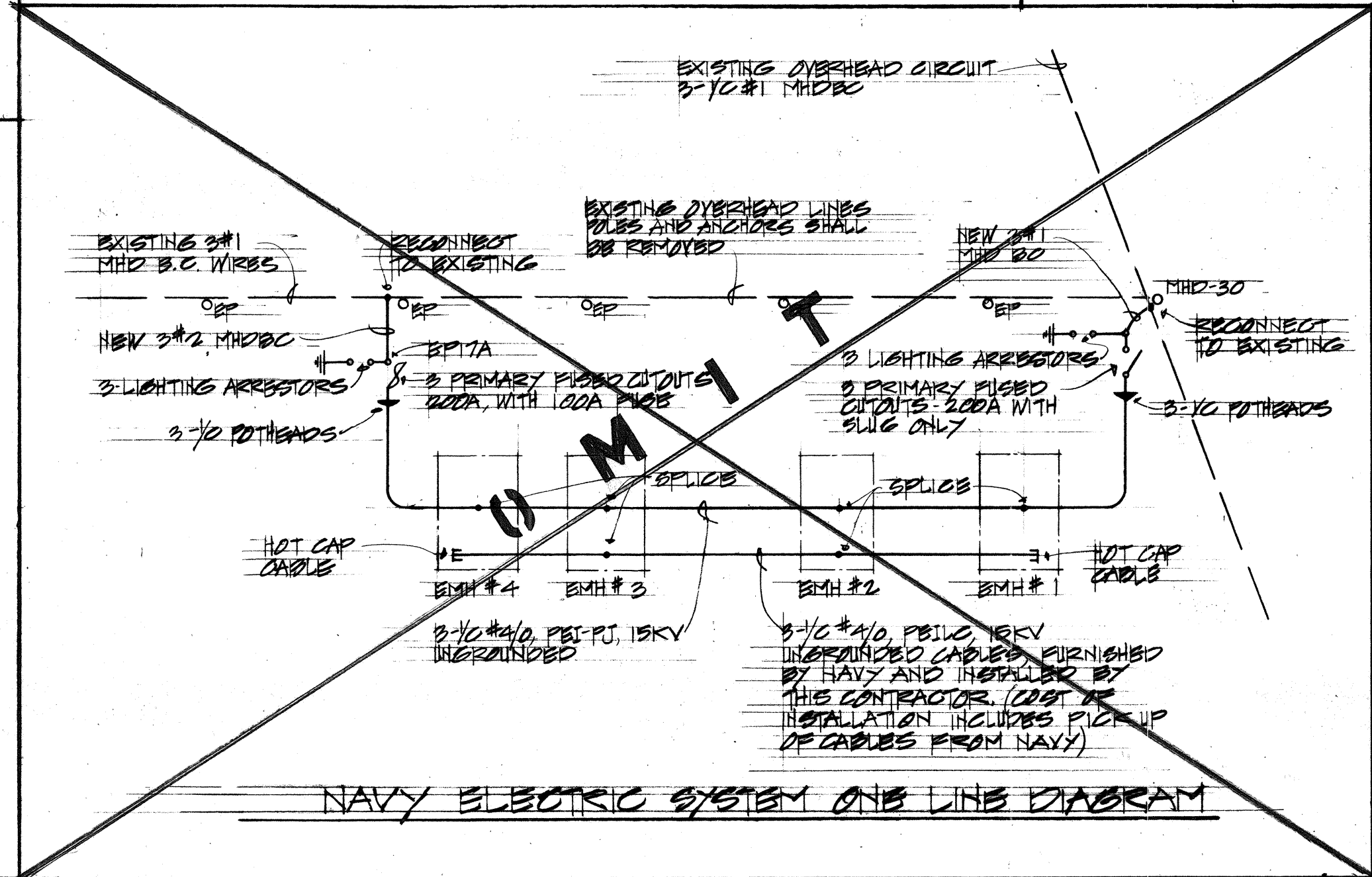
DETAIL - SUMP FRAME AND COVER  
E14 NOT TO SCALE



DETAIL - PULL-IN IRON  
E14 NOT TO SCALE



DETAIL - CABLE RACK AND INSULATOR (SLOT TYPE)  
E14 NOT TO SCALE



NAVY ELECTRIC SYSTEM ONE LINE DIAGRAM

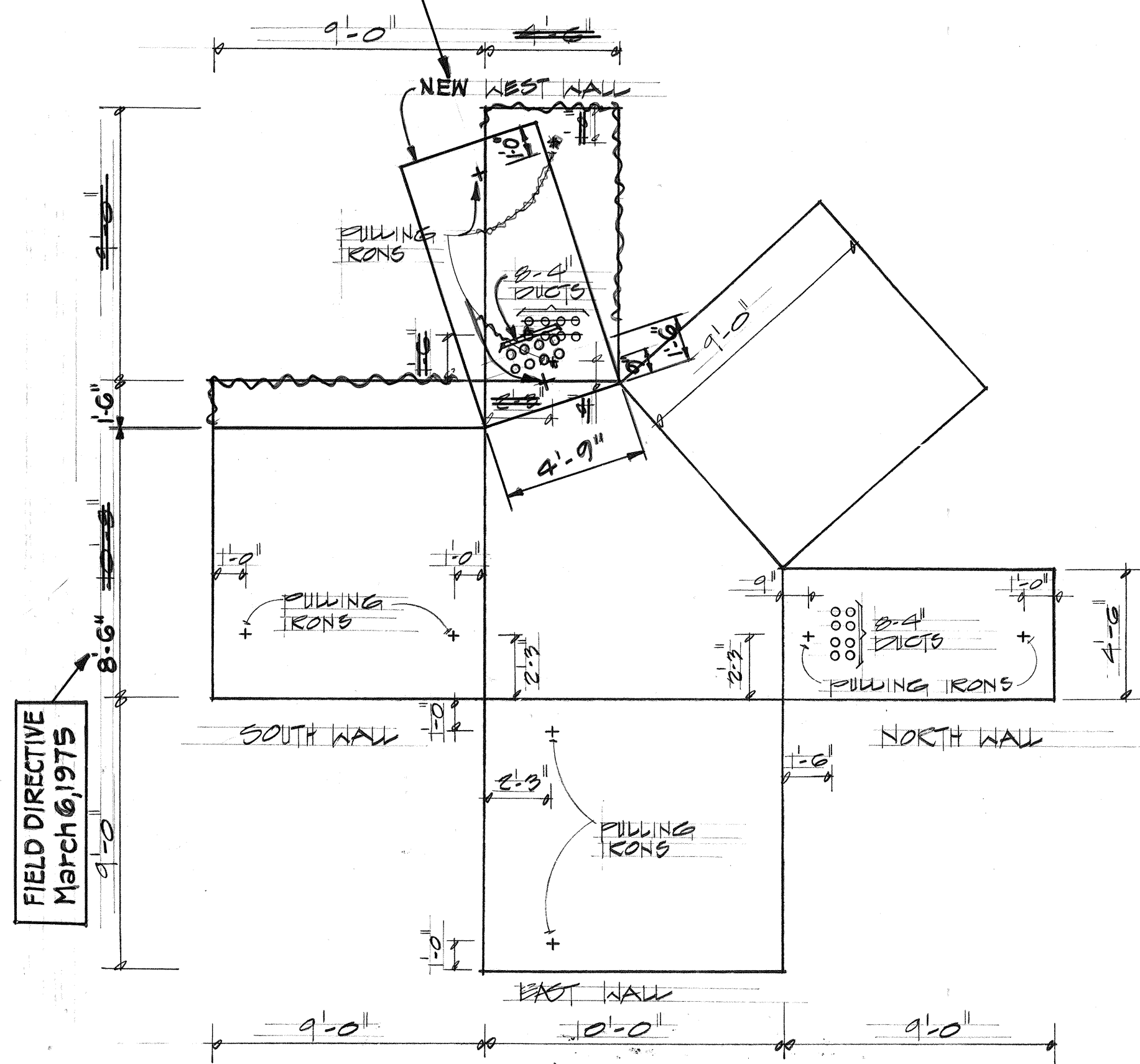
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|-----------|-------------------|------|
| ORIGINAL  | SURVEY PLOTTED BY | DATE |
| PLAN      | DRAWN BY          |      |
| NOTE BOOK | TRACED BY         |      |
|           | DESIGNED BY       |      |
|           | CHECKED BY        |      |
|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

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OR UNDER MY SUPERVISION

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
  
POLE RISER AND MANHOLE  
DETAILS  
  
PEARL HARBOR INTERCHANGE  
P.A.I. PROJECT NO. I-HI-1(111)-14  
SCALE: AS SHOWN DATE: DEC. 14, 1973  
SHEET NO. E-14 OF 40 SHEETS

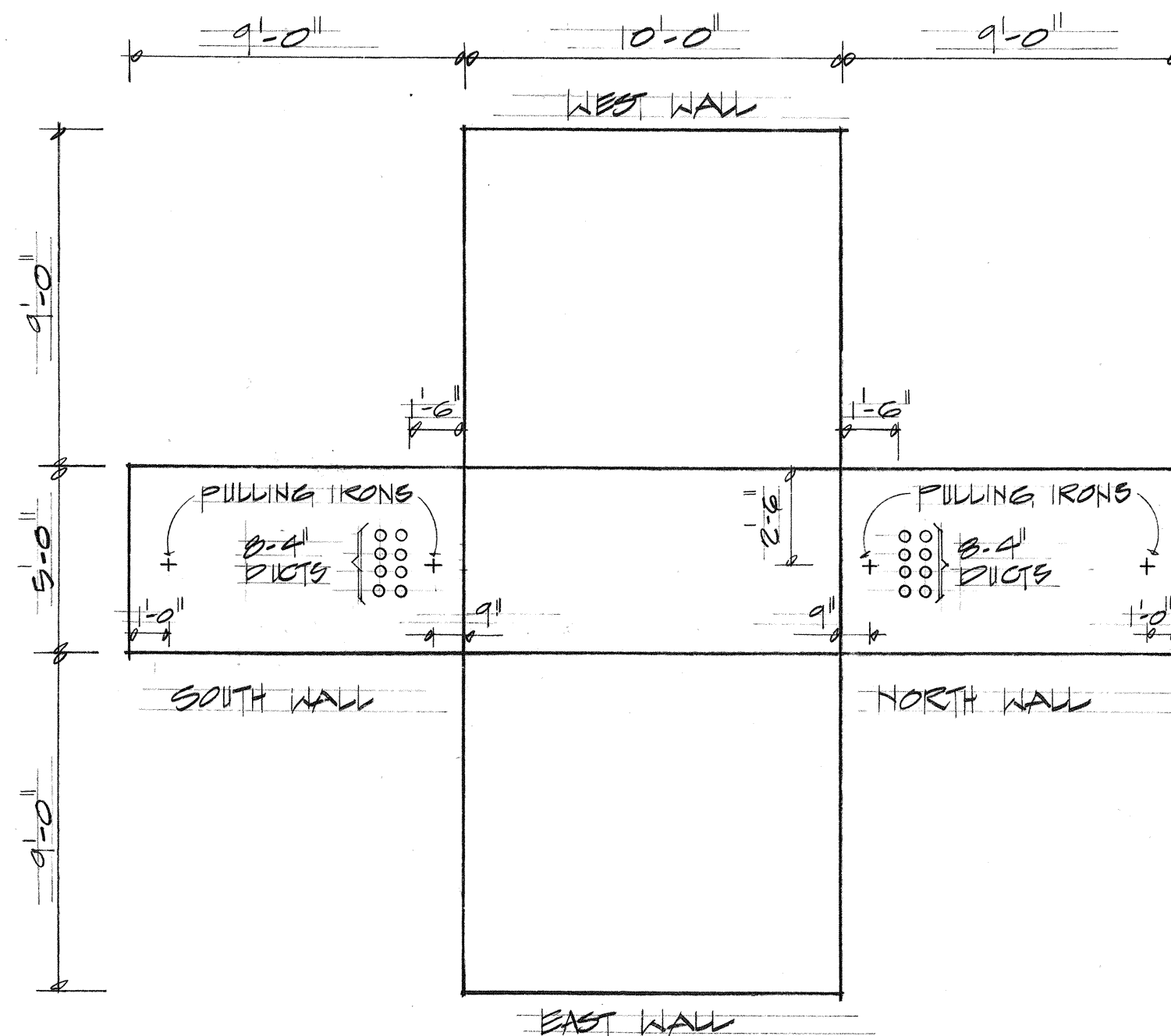


DUCTLINE - STRAIGHT INTO  
MH, NO CURVATURE

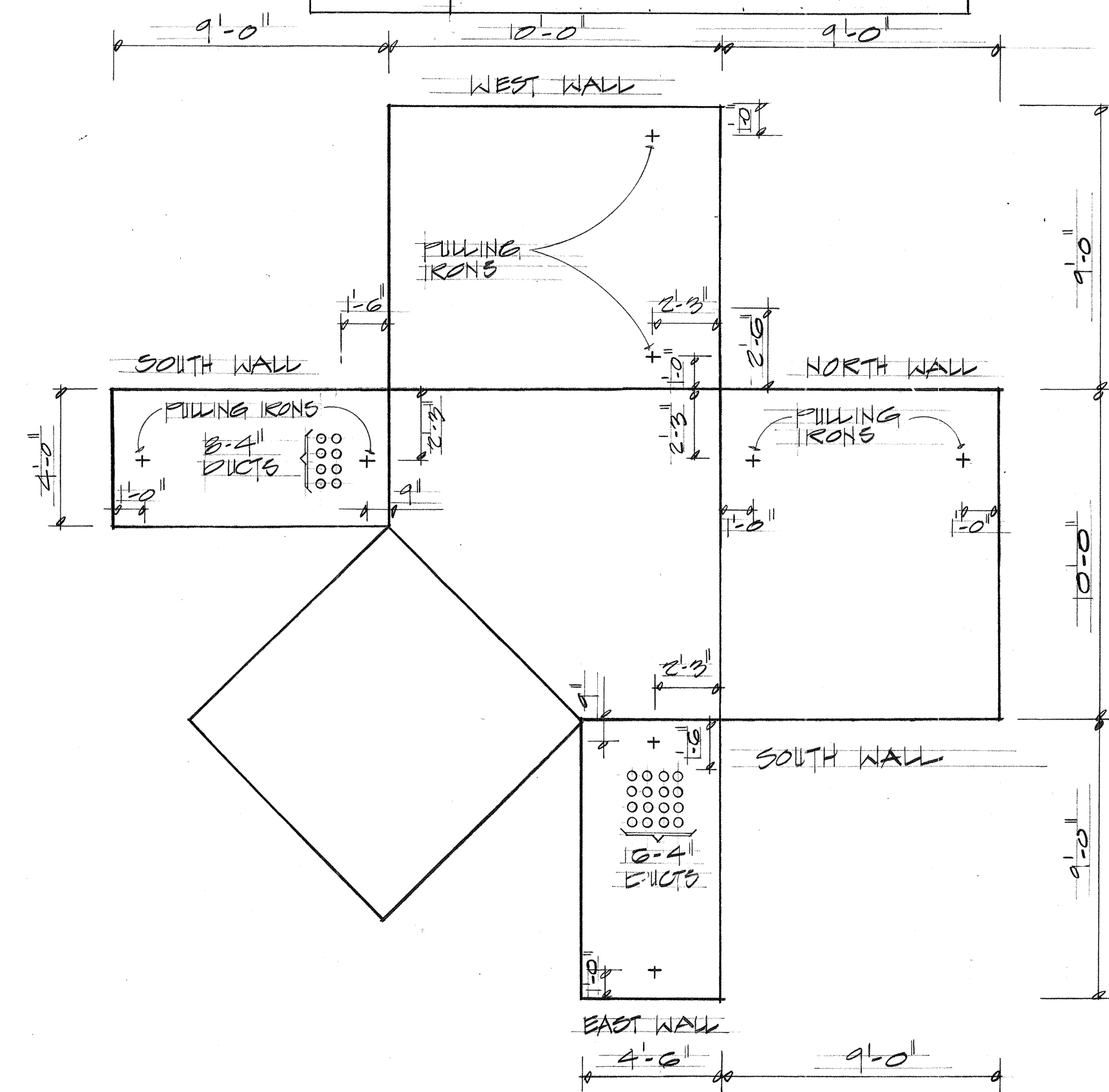


HTO MANHOLE #2622

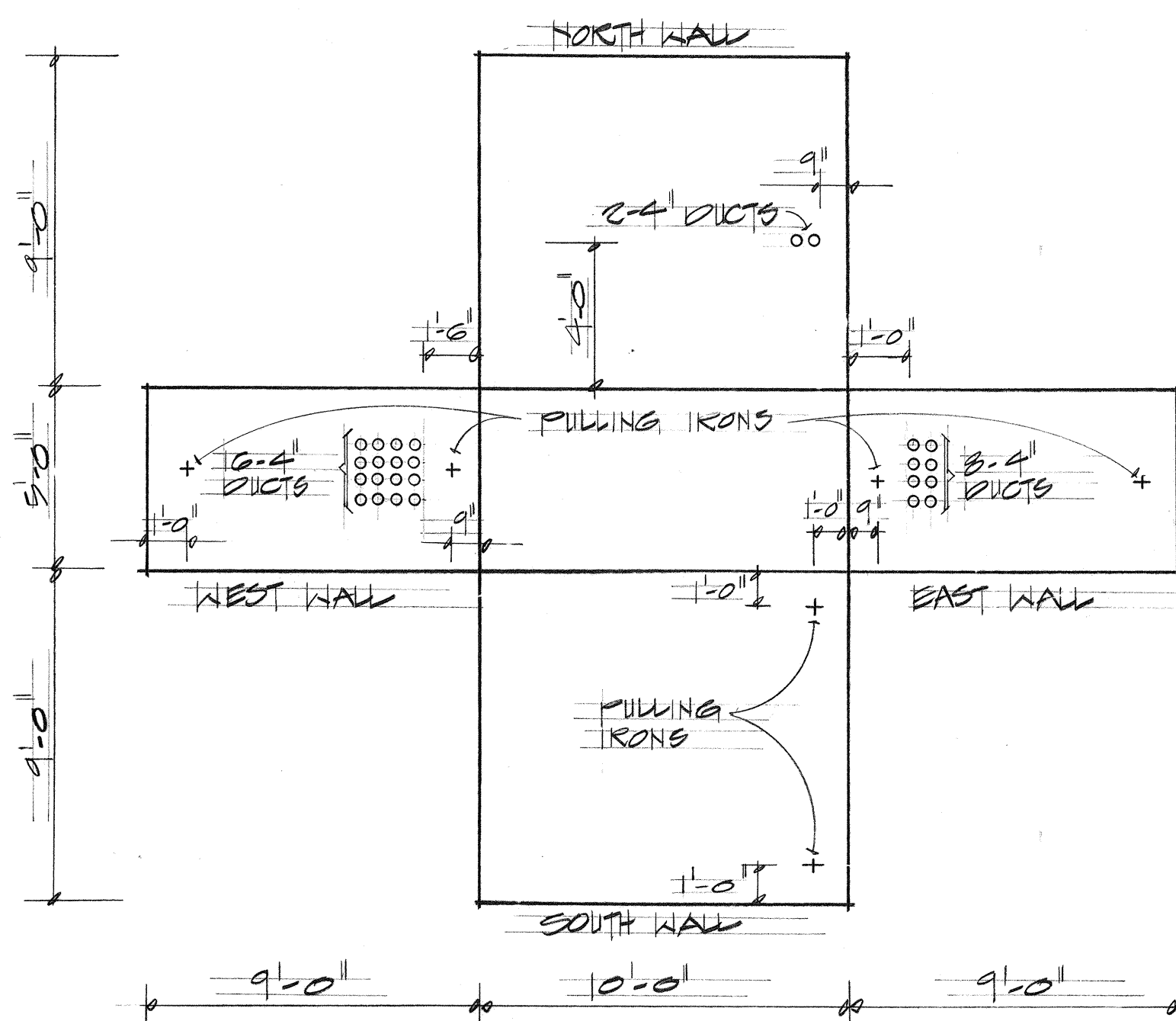
FIELD DIRECTIVE  
Nov. 29, 1974



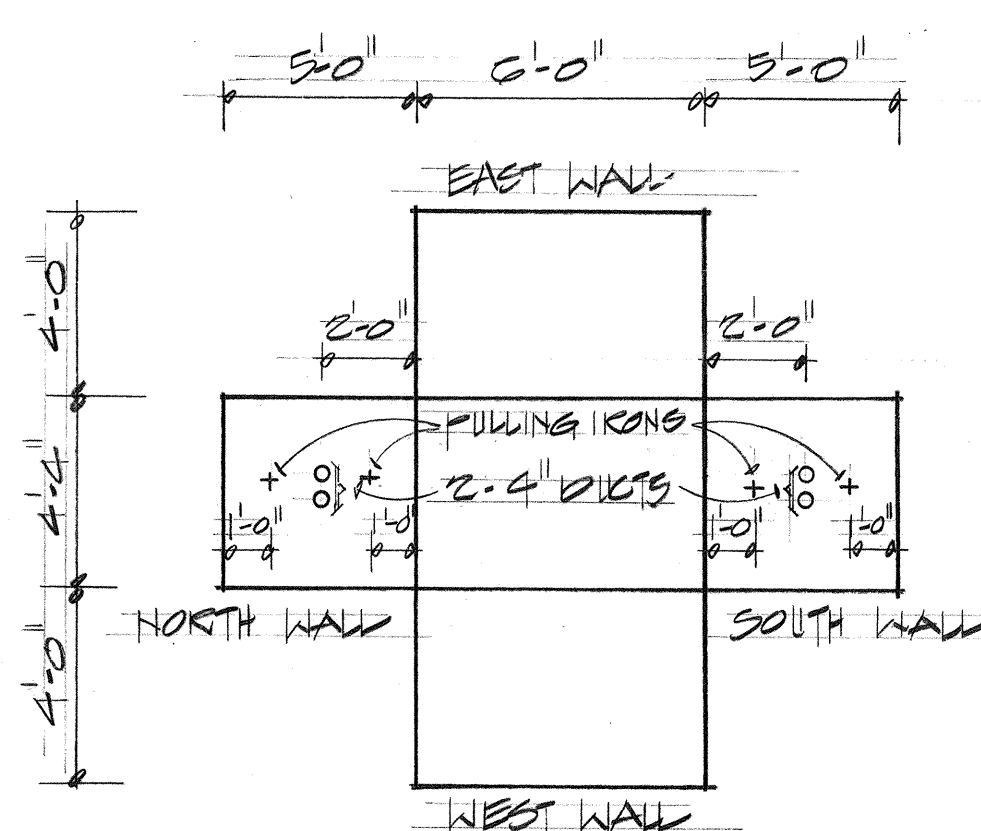
HTO MANHOLE #2623



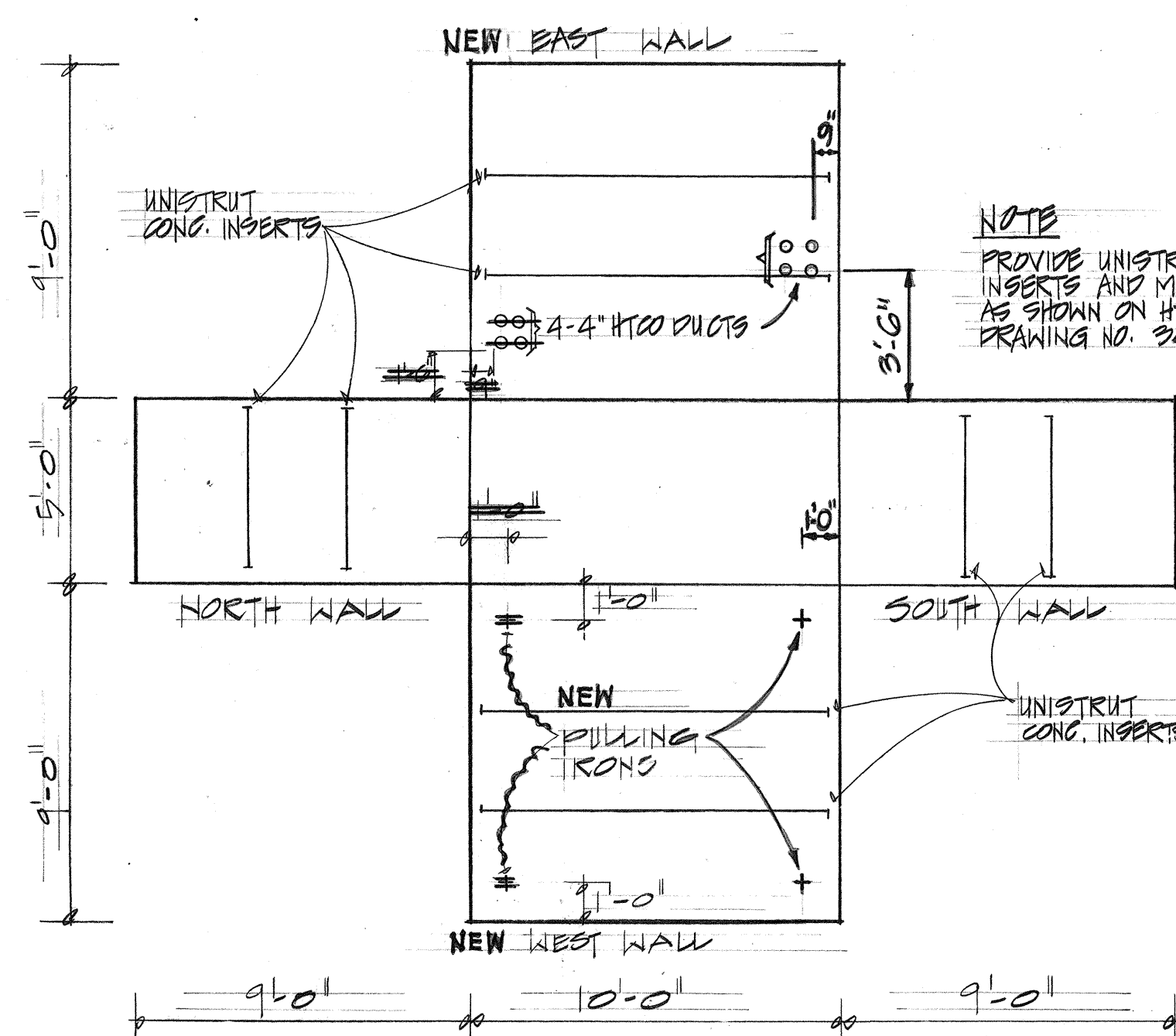
HTO MANHOLE #2624



HTO MANHOLE #2695

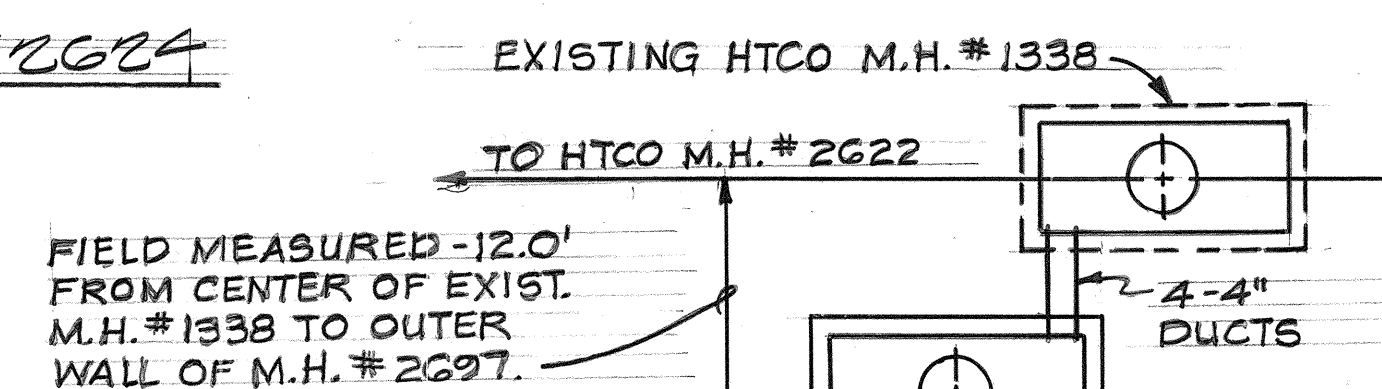


HTO MANHOLE #2696



HTO MANHOLE #2697

FIELD DIRECTIVE  
Nov. 29, 1974 &  
Jan. 15, 1975



FIELD DIRECTIVE JAN. 15, 1975

APPROVED:

R. Man  
HAWAIIAN TELEPHONE CO. 10-21-74 DATE

15-15

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

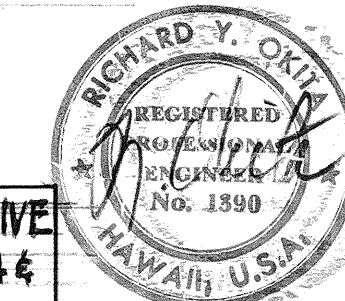
MANHOLE WALL  
ELEVATIONS

PEARL HARBOR INTERCHANGE  
P.A.T. PROJ. NO. I-15-1 (111) 114

SCALE: 1/4" = 1'-0" DATE: DEC. 14, 1973

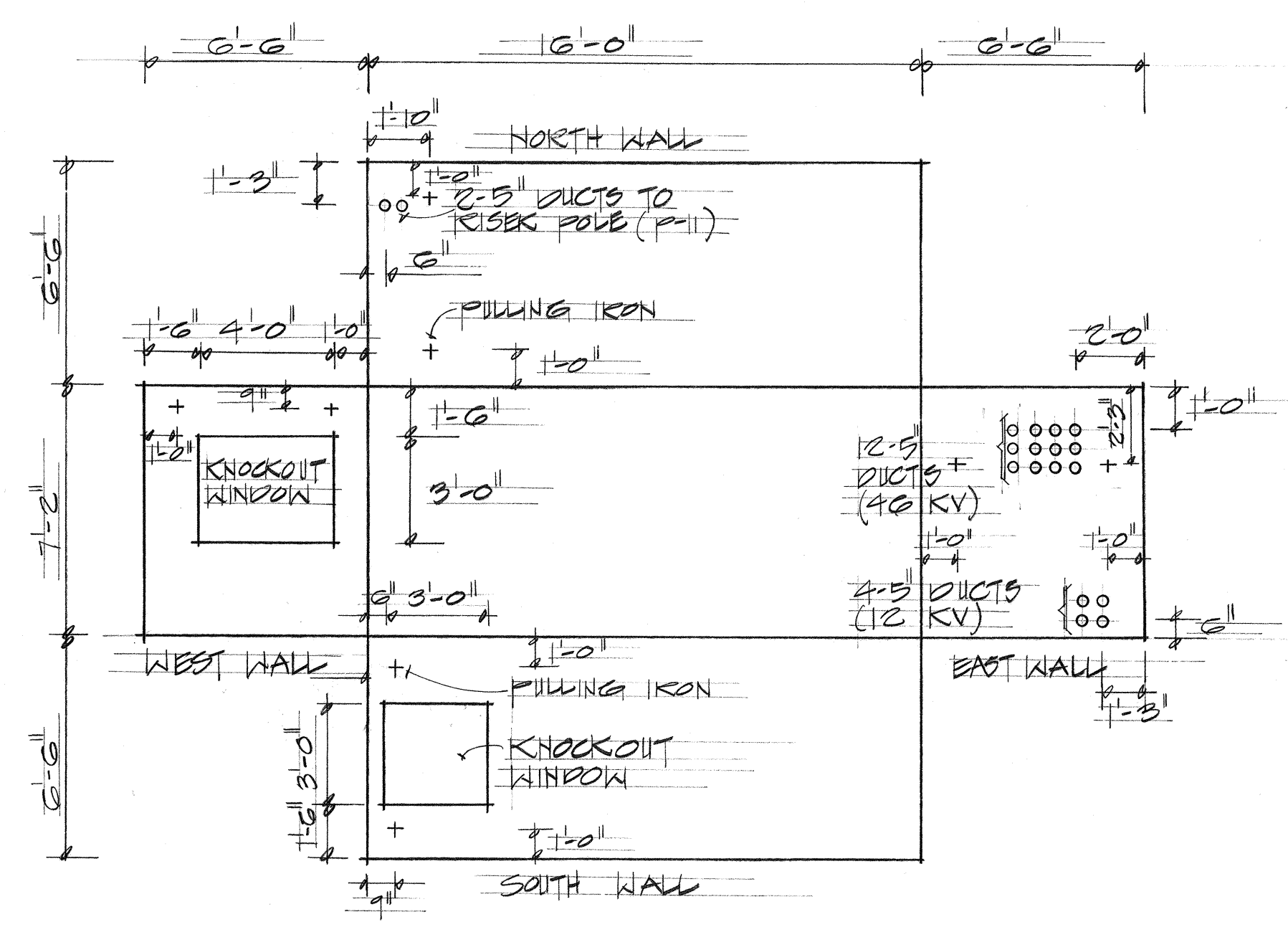
SHEET NO. 15 OF 40 SHEETS

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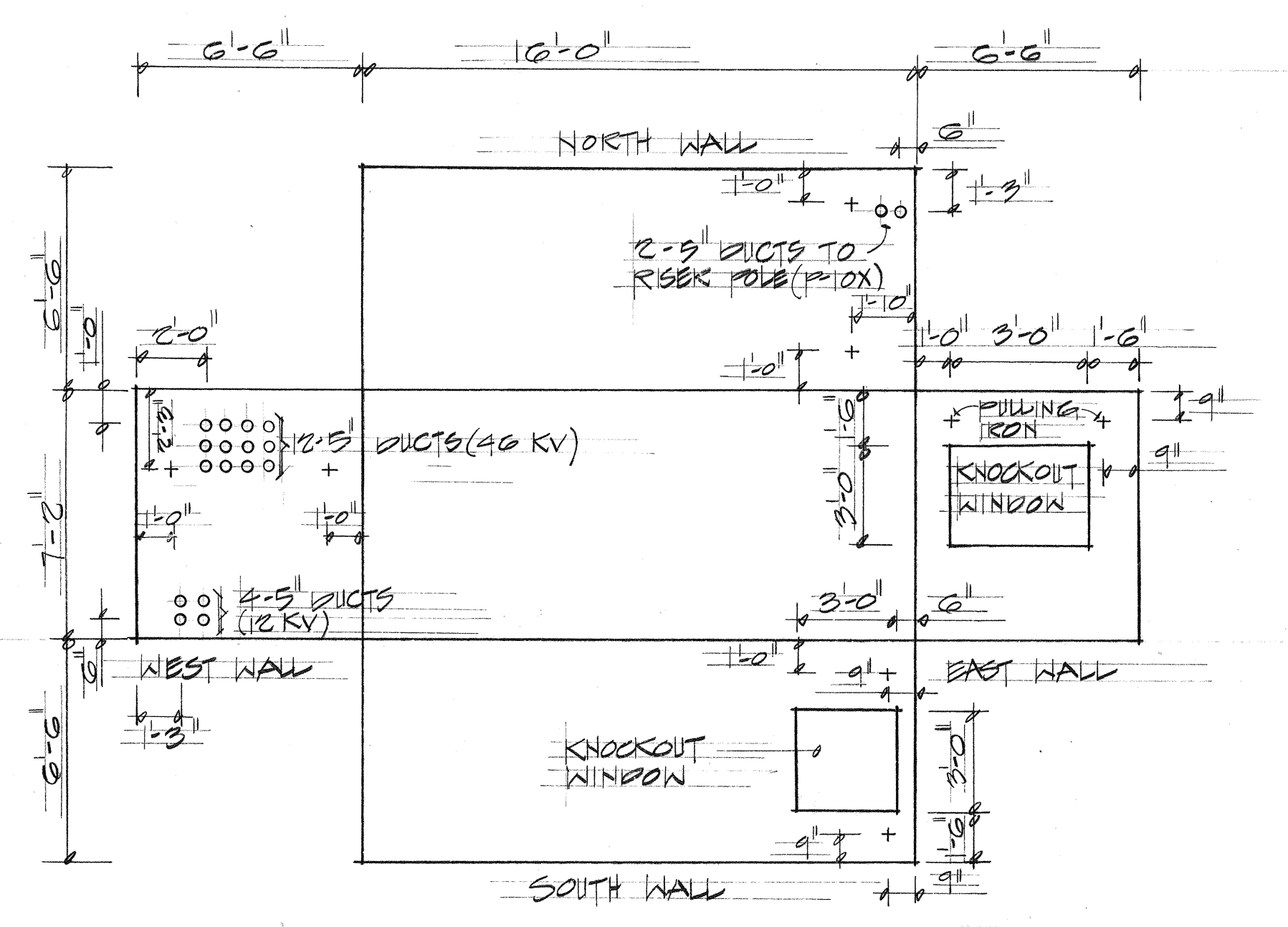




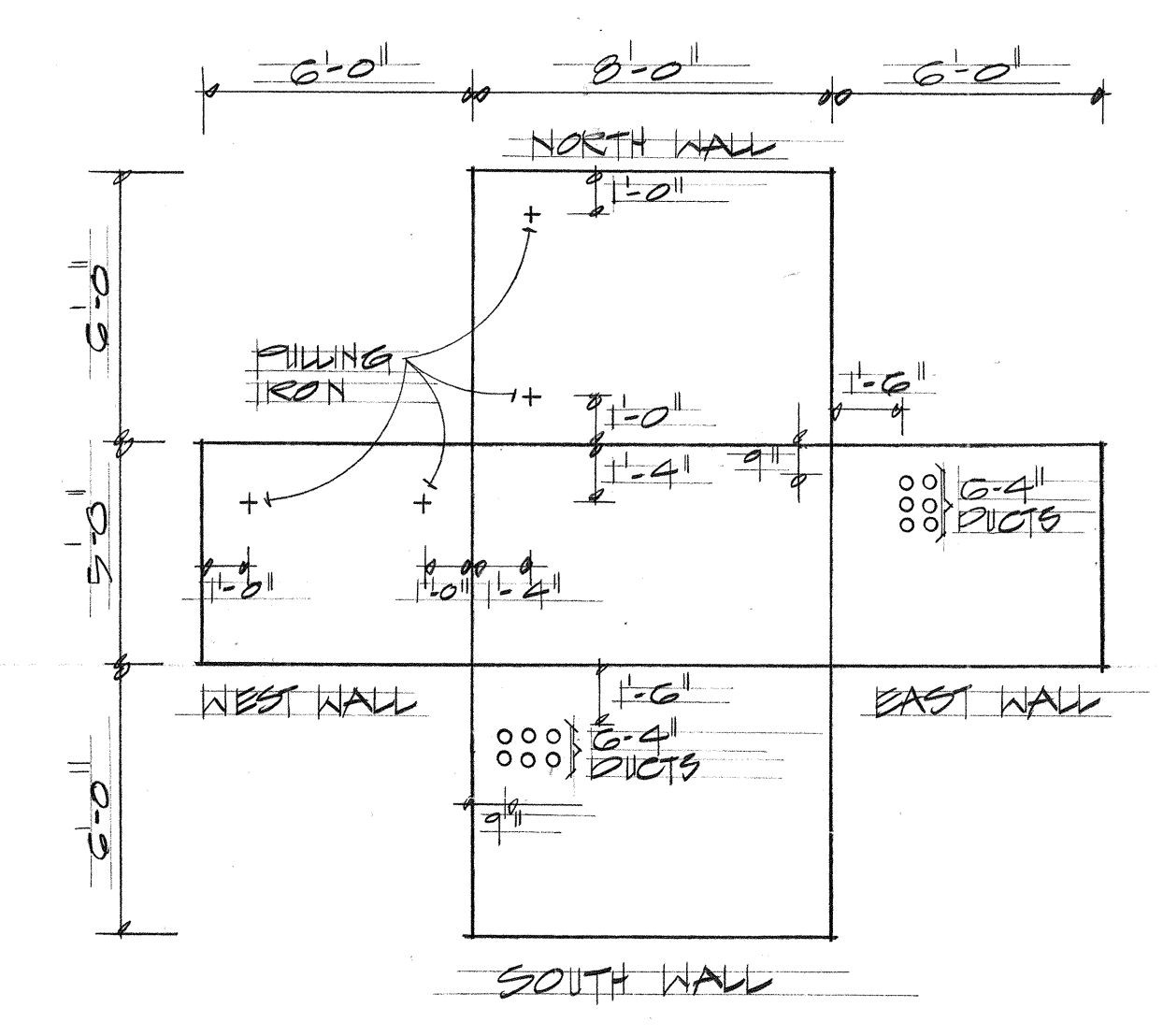
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 5-H-1(III)14       | 1974        | 130       | 234          |



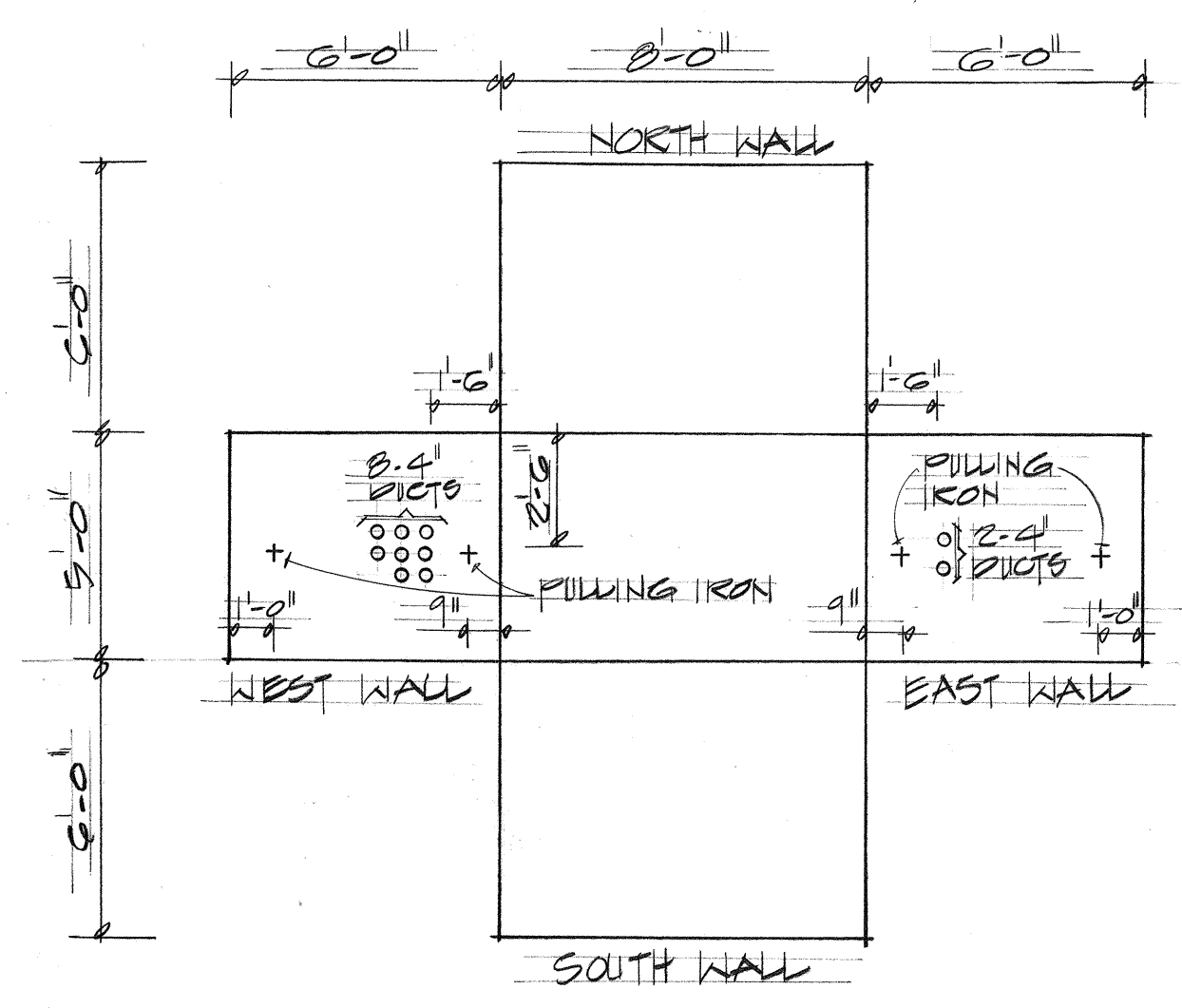
HECO MANHOLE "A"



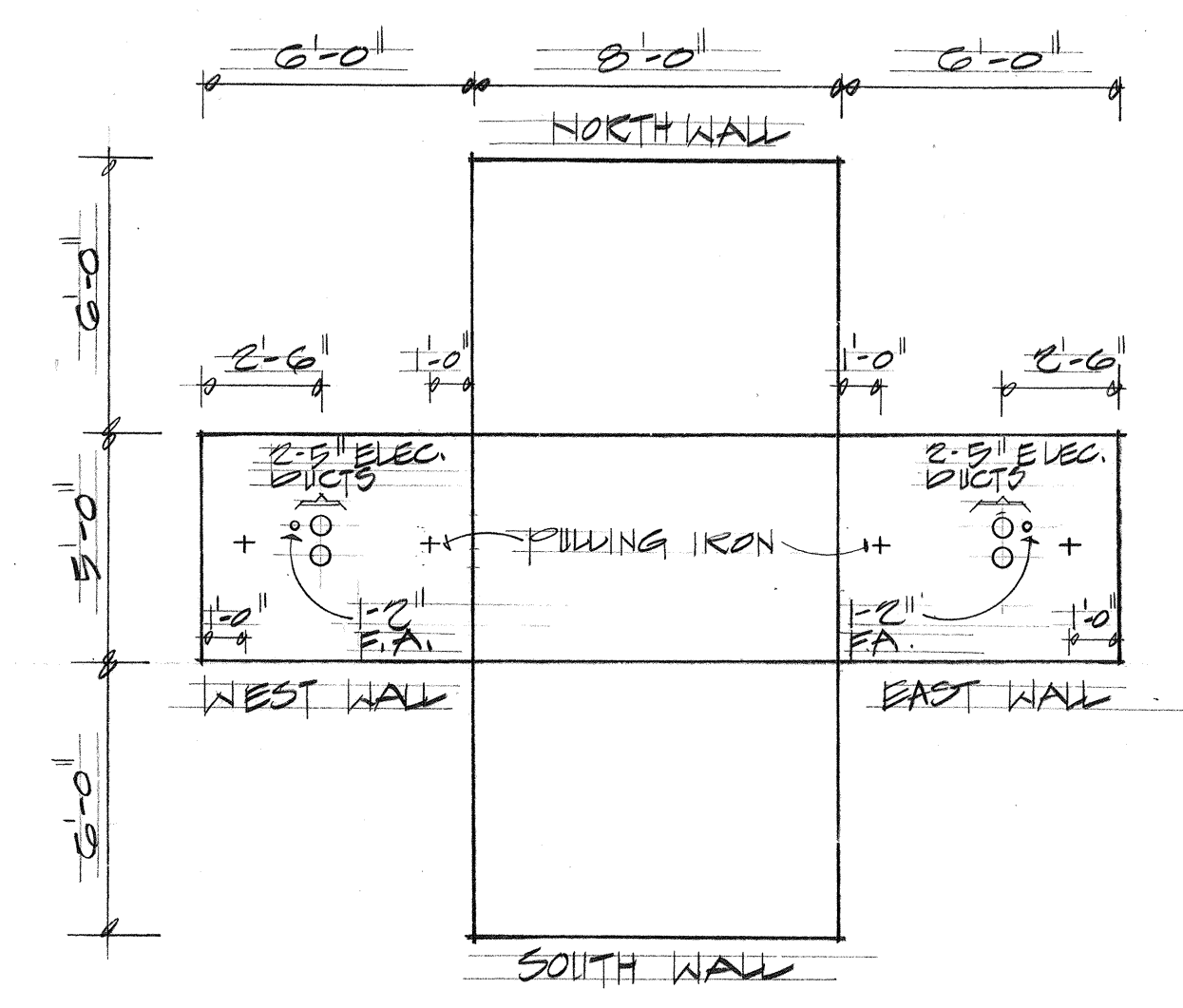
HECO MANHOLE "B"



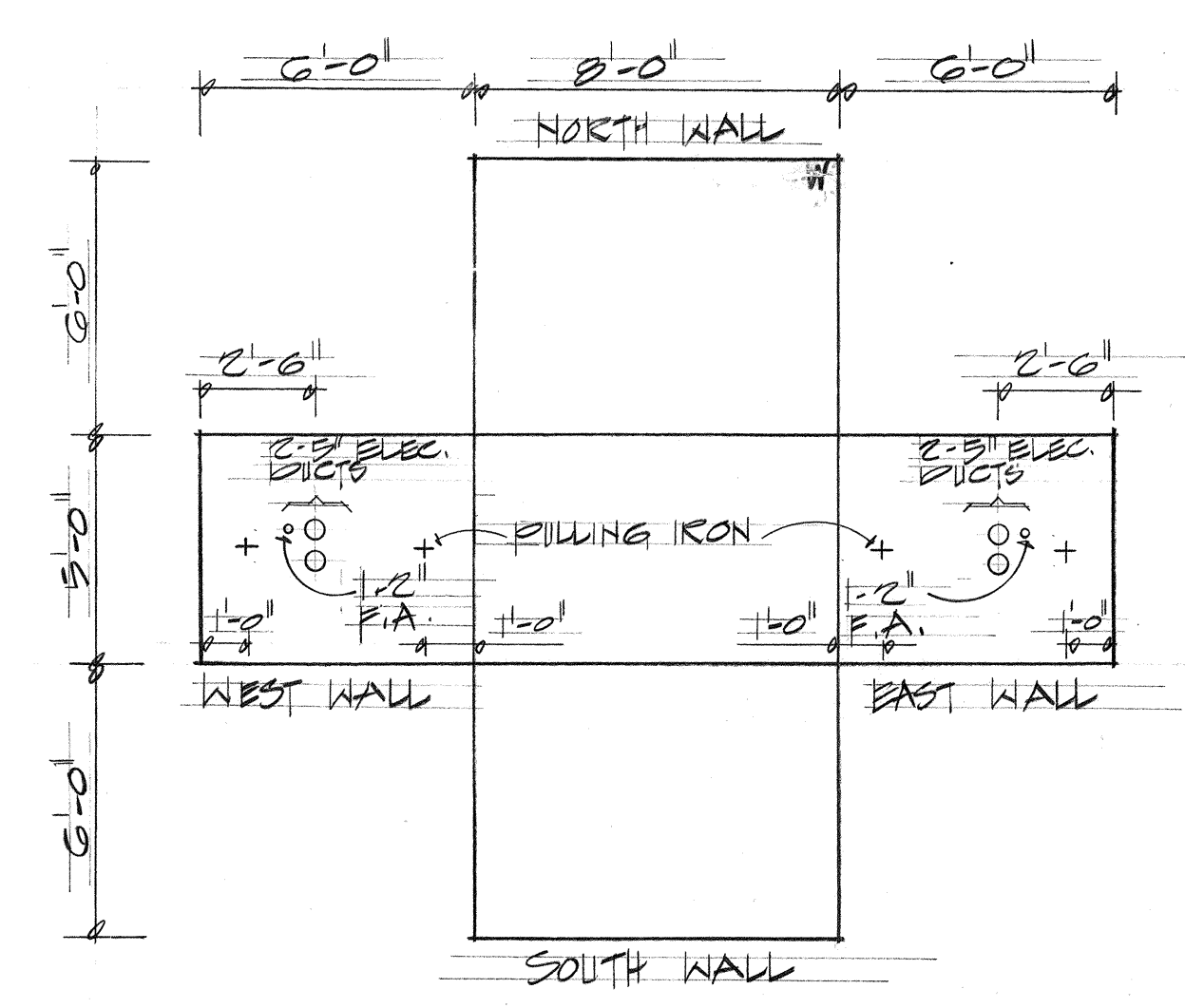
JOINT TRUNKING MANHOLE #1



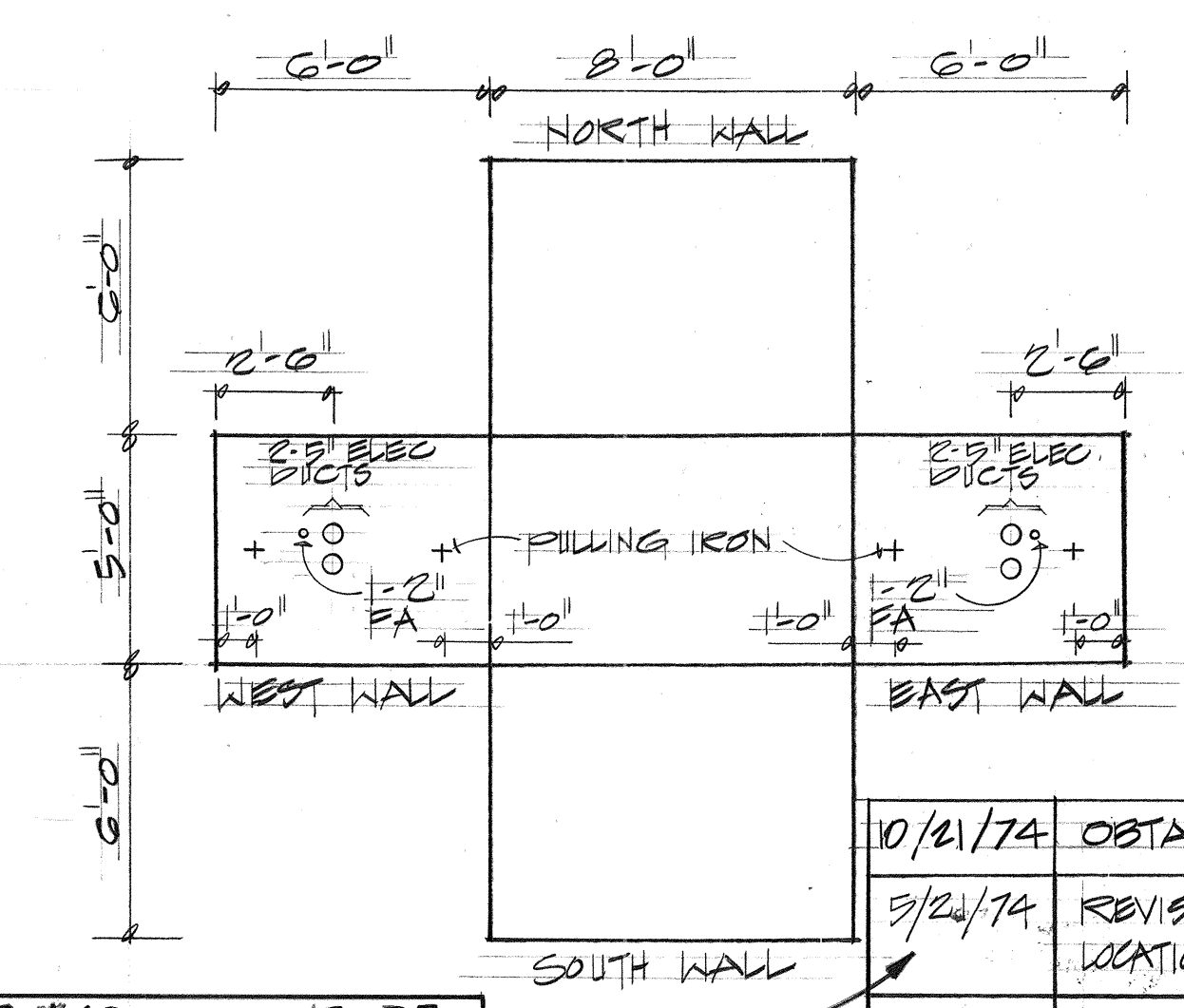
JOINT TRUNKING MANHOLE #2



NAVY ELECTRIC MANHOLE #1



NAVY ELECTRIC MANHOLE #2



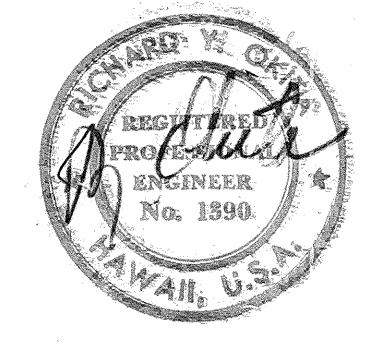
NAVY ELECTRIC MANHOLE #3

|                            |  |
|----------------------------|--|
| DATE                       |  |
| ORIGINAL SURVEY PLOTTED BY |  |
| DRAWN BY                   |  |
| DESIGNED BY                |  |
| QUANTITIES BY              |  |
| CHECKED BY                 |  |
| NO.                        |  |

APPROVED:

*R. S. L...* 4/30/74  
HAWAIIAN ELECTRIC CO. INC. RN DATE

*R. Man* 10-21-74  
HAWAIIAN TELEPHONE CO. DATE



THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

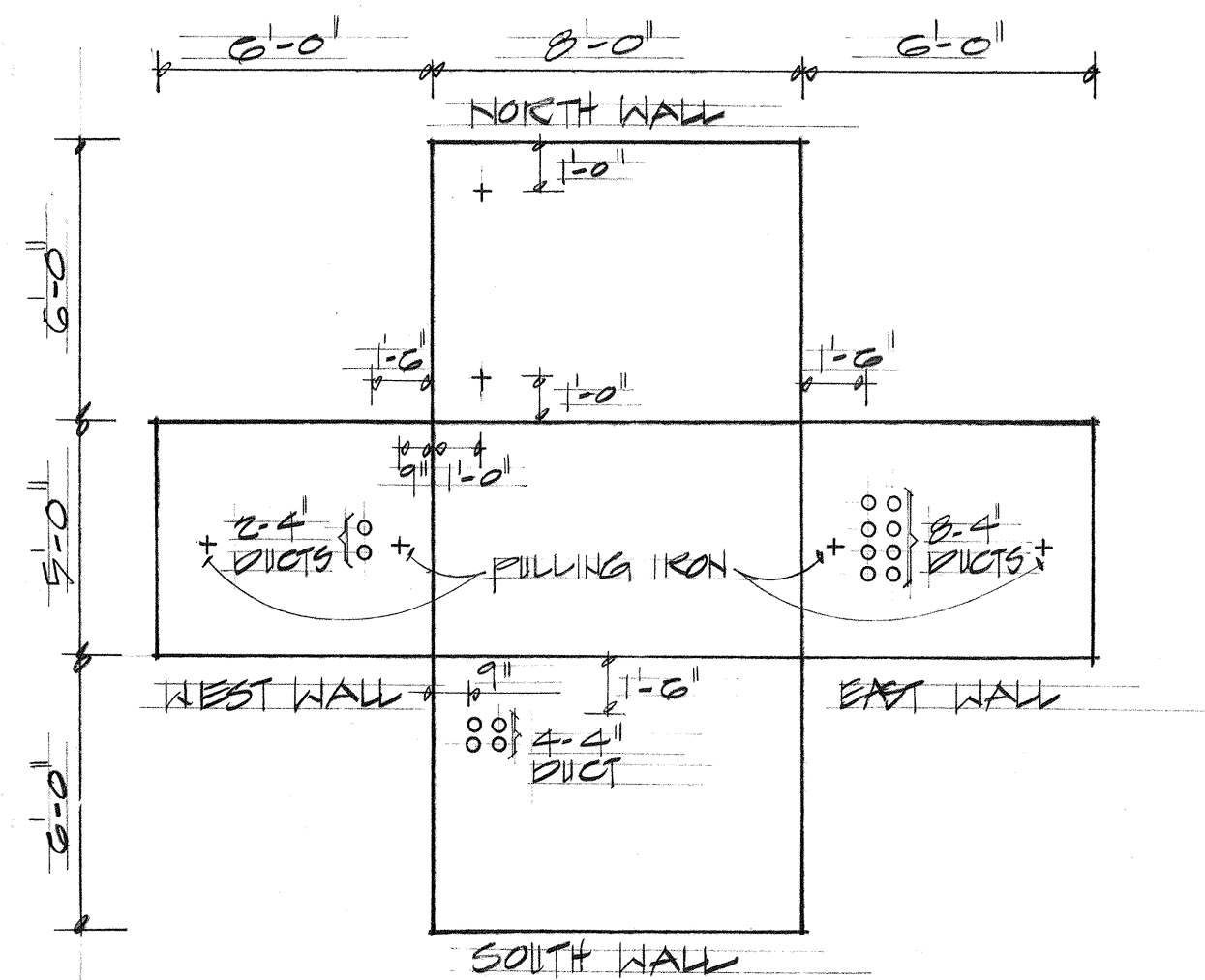
|          |                                                                |
|----------|----------------------------------------------------------------|
| 10/21/74 | OBTAINED UTILITY CO. SIGNATURE                                 |
| 3/24/74  | REVISED FIRE ALARM CONDUIT LOCATION FOR NAVY EMH #1, #2 AND #3 |
| 3/29/74  | REVISED DUCT ARRANGEMENT FOR HECO MH A & B                     |
| DATE     | REVISIONS                                                      |

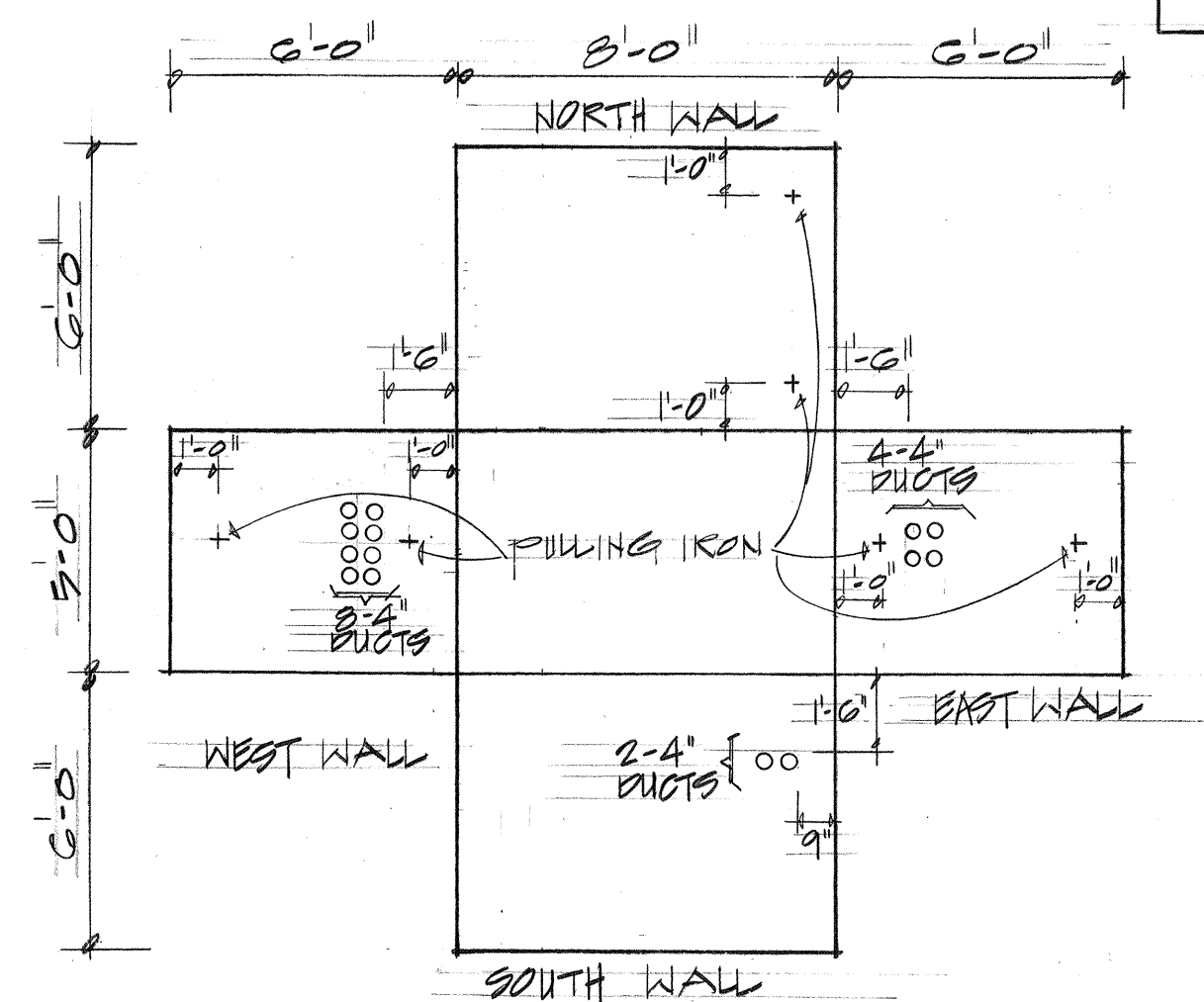
|                                                                      |
|----------------------------------------------------------------------|
| STATE OF HAWAII<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION |
| MANHOLE WALL ELEVATIONS                                              |
| PEARL HARBOR INTERCHANGE<br>F.A.I. PROJ. NO. 5-H-1(III)14            |
| SCALE: 1/4" = 1'-0" DATE: DEC. 14, 1973                              |
| SHEET NO. E-16 OF 40 SHEETS                                          |



| DATE    | REVISIONS                                                        | DATE    | REVISIONS                               | FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------|------------------------------------------------------------------|---------|-----------------------------------------|---------------------|-------|--------------------|-------------|-----------|--------------|
| 2/25/75 | ADDED WALL ELEVATION FOR NAVY COMM. HH #1A & NAVY ELECTRIC HH #1 | 8/30/74 | REVISED DUCT ENTRIES FROM NAVY MH #2    | HAWAII              | HAW.  | 5H-1(III)14        | 1974        | 131       | 234          |
| 7-17-75 |                                                                  | 10/2/74 | ADDED WALL ELEV. FOR HTCO MH 1317 & 213 |                     |       |                    |             |           |              |
|         |                                                                  |         | OBTAINED UTILITY CO. SIGNATURE          |                     |       |                    |             |           |              |



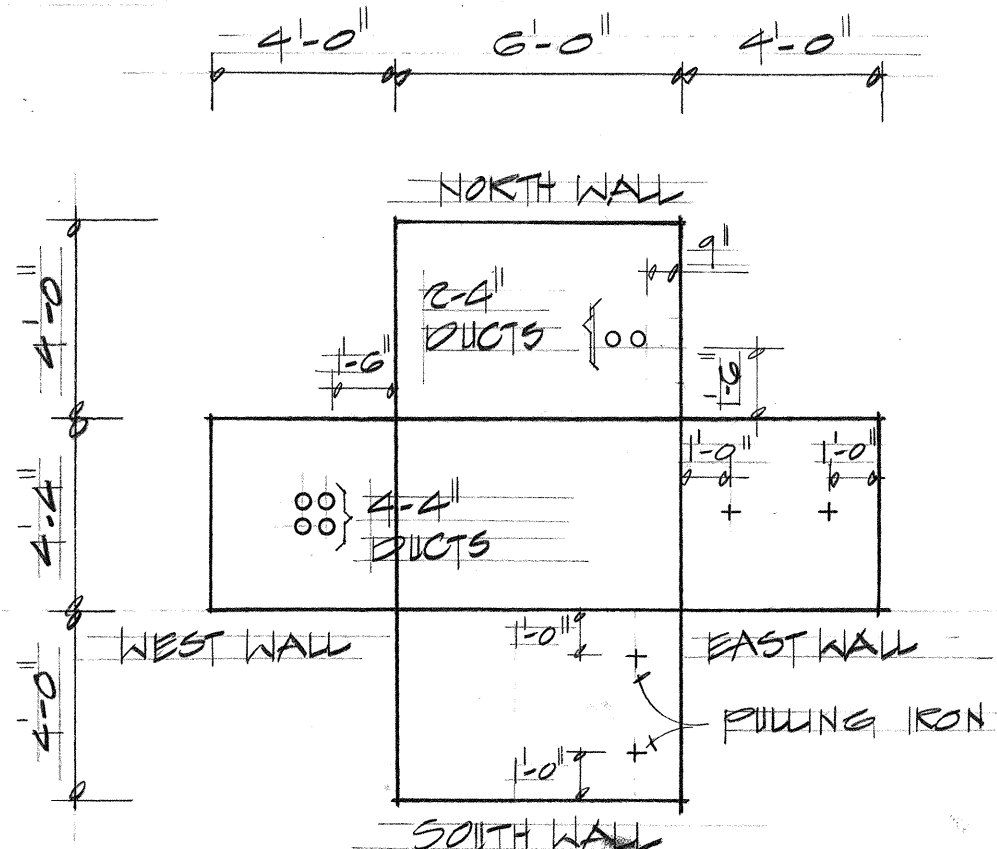
NAVY COMMUNICATION MANHOLE #1



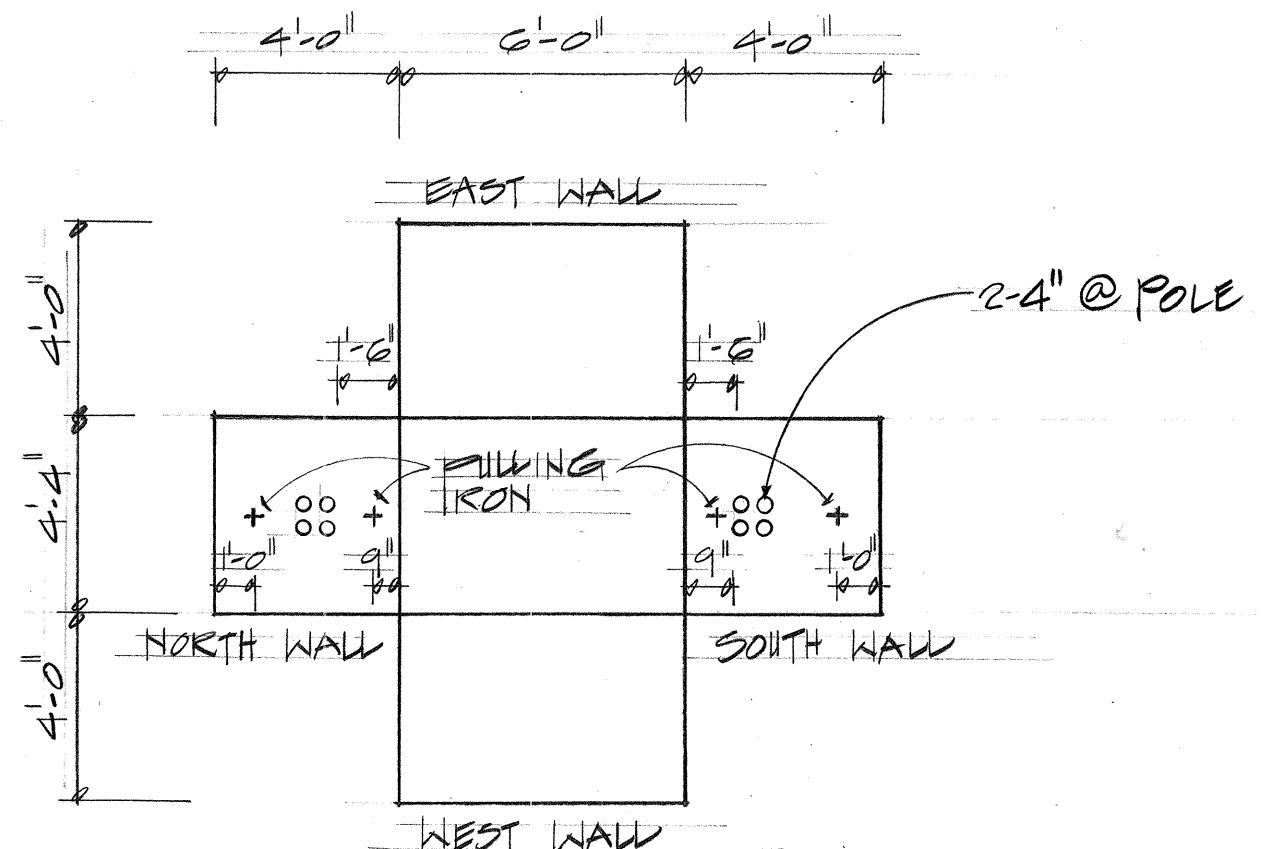
NAVY COMMUNICATION MANHOLE #2

Relocation of Navy Communications Cable M.H. #2 See Plan Sht. C.O. 120RS-1.

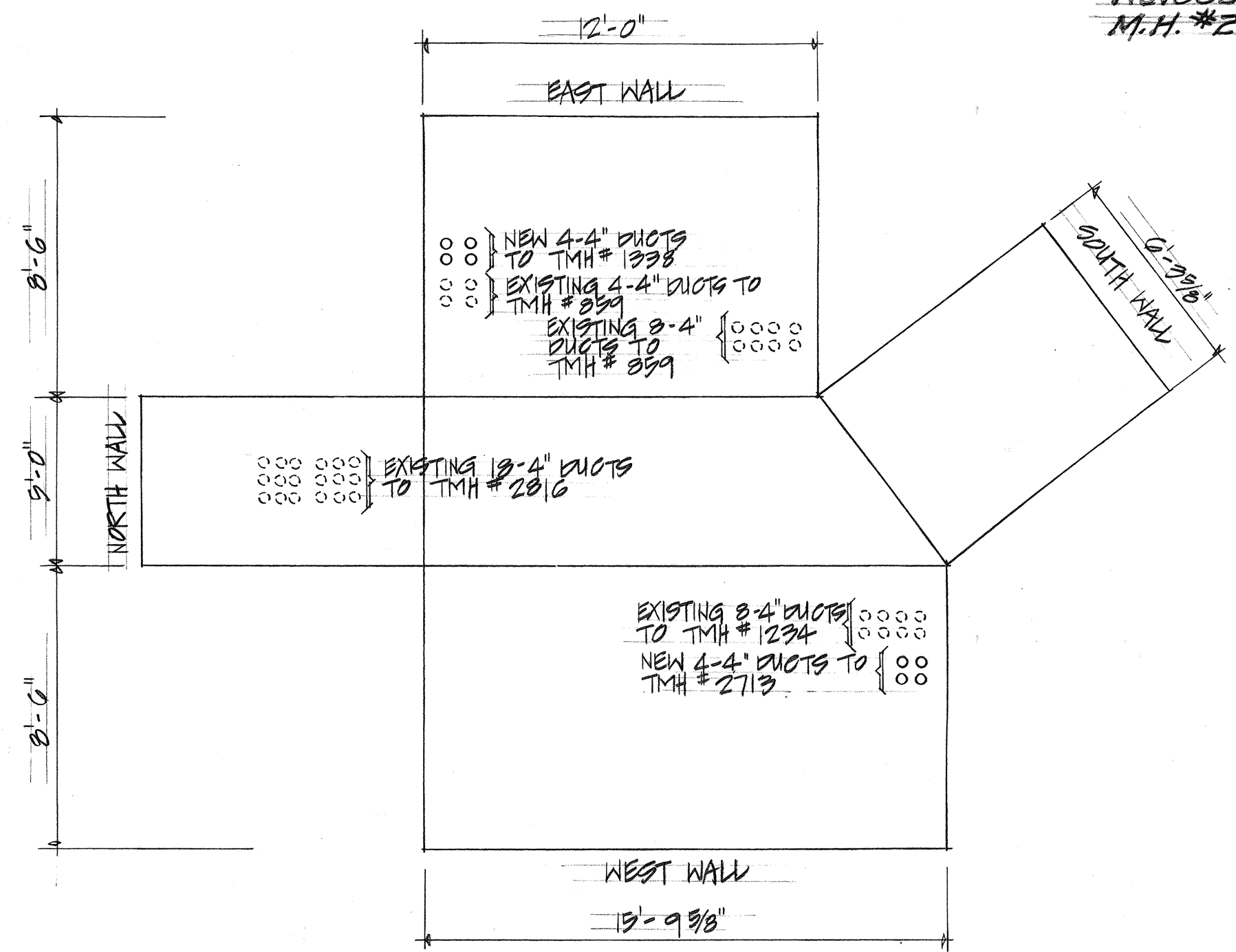
FIELD DIRECTIVE 2-21-75



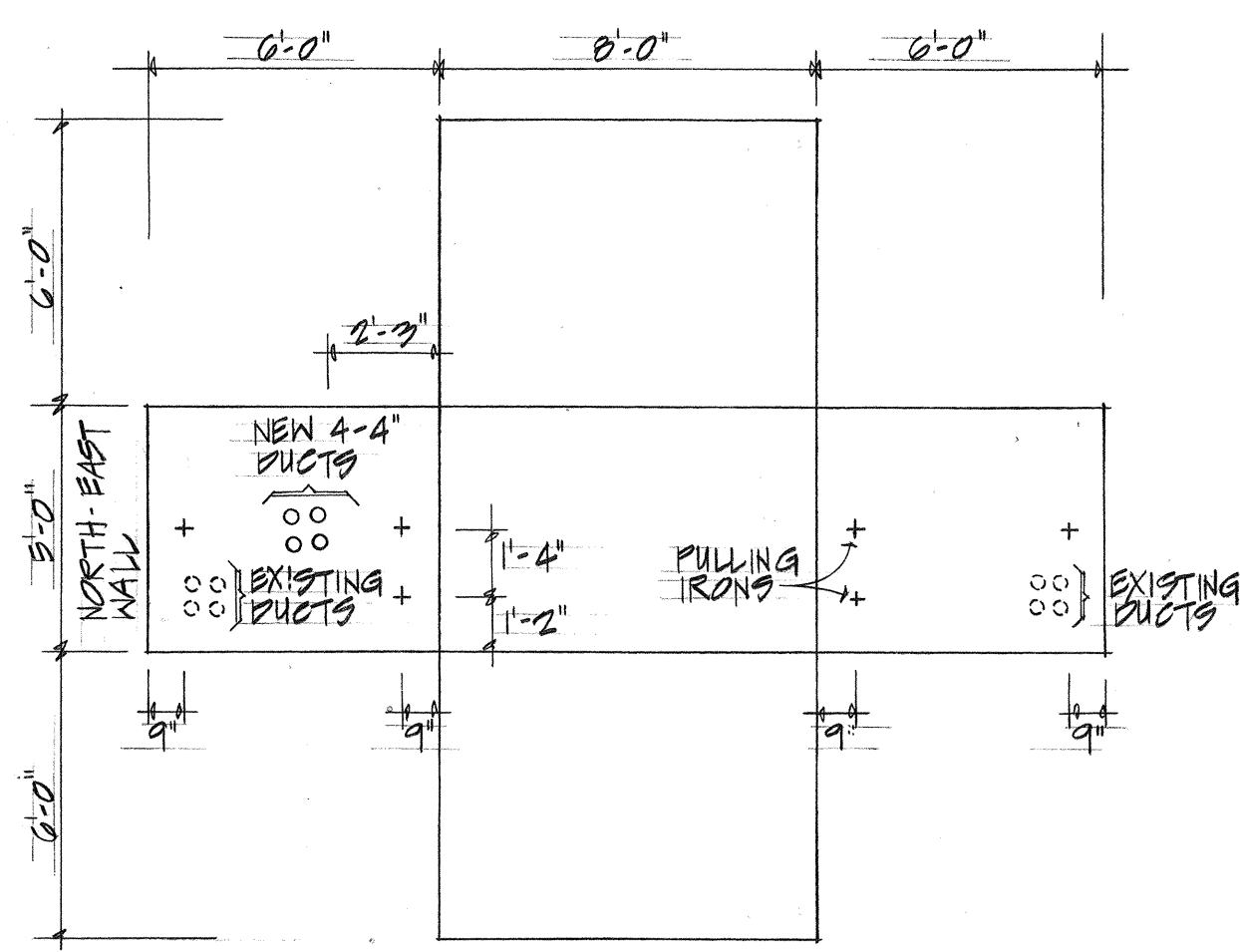
NAVY COMMUNICATION HANDHOLE #3



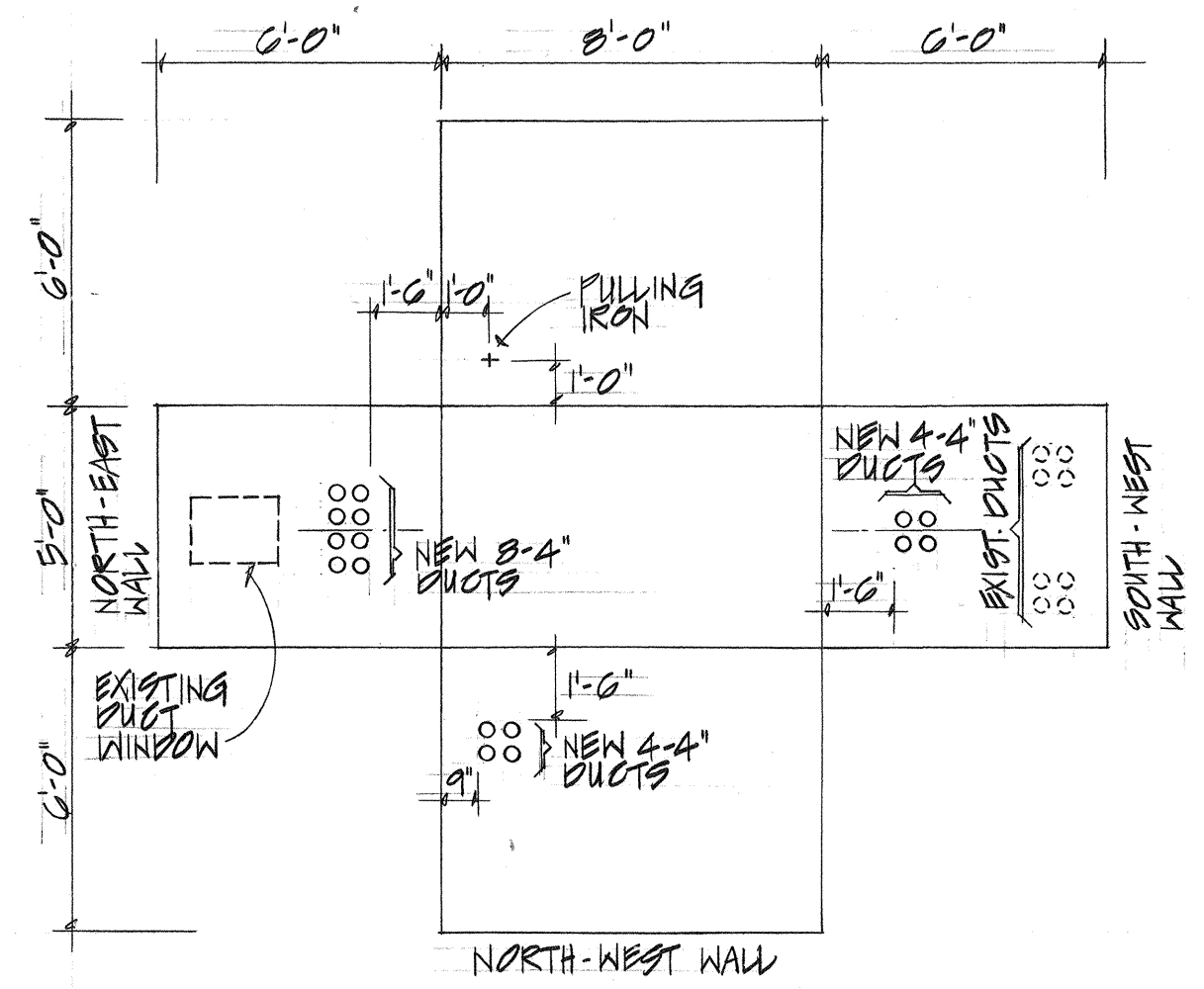
NAVY COMMUNICATION HANDHOLE #1A & #4



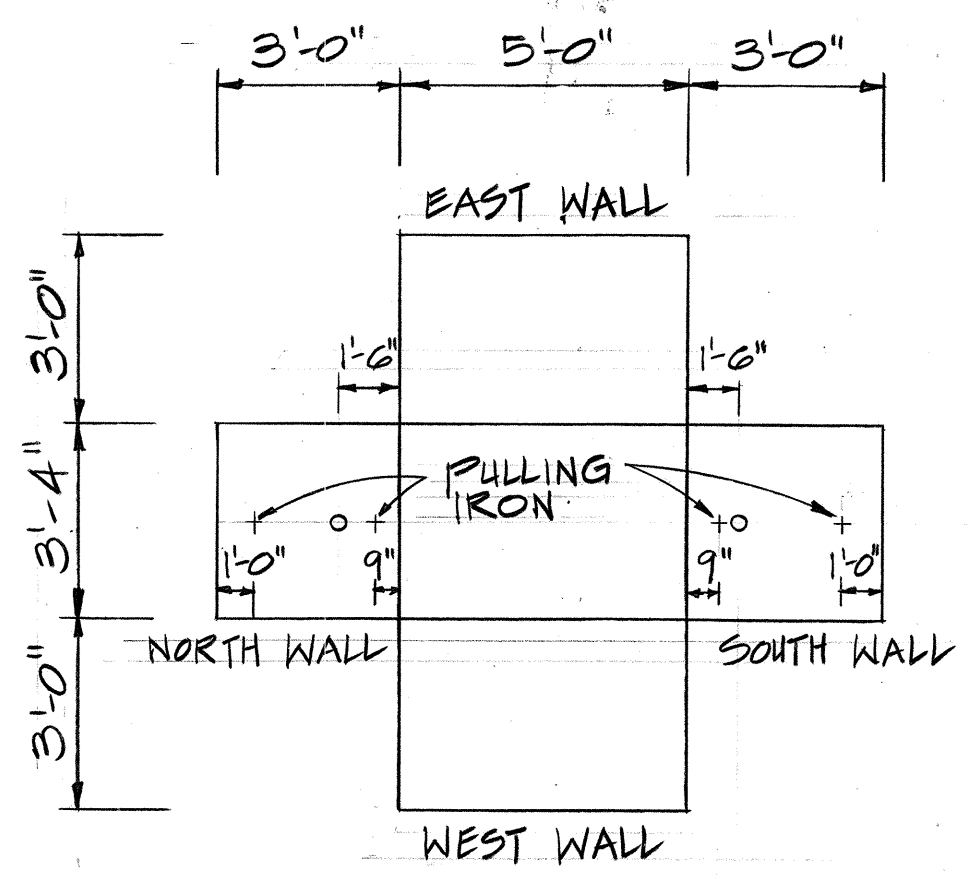
EXISTING HTCO MANHOLE #2317



HTCO MANHOLE #2713



HTCO MANHOLE #1235



NAVY ELECTRIC HANDHOLE #1 (N.T.S.)

APPROVED:

R. Man  
HAWAIIAN TELEPHONE CO. 10-21-74 DATE

1317



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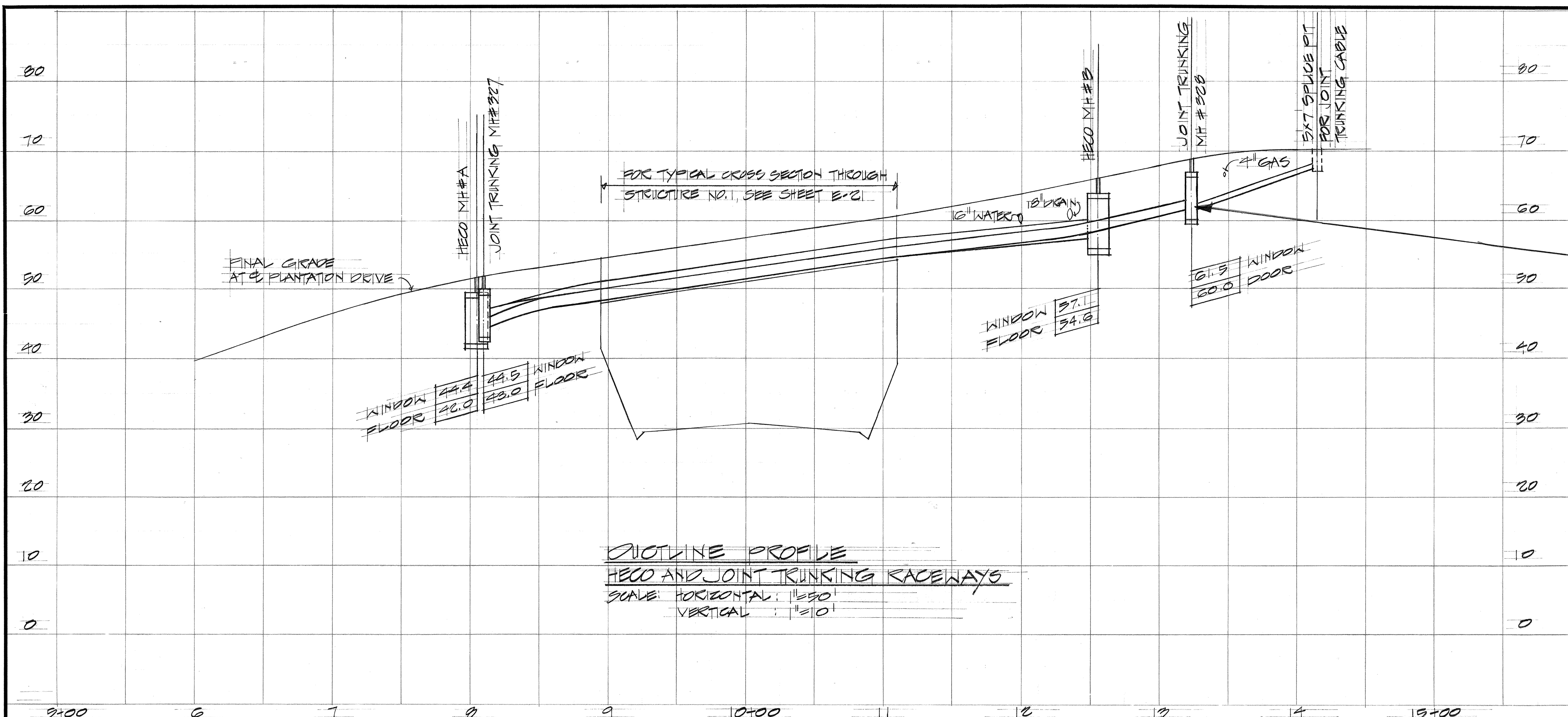
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
  
MANHOLE WALL  
ELEVATIONS  
  
PEARL HARBOR INTERCHANGE  
F.A.T. PROJ. NO. I-H-1(III)14  
SCALE: AS SHOWN DATE: DEC. 14, 1973  
SHEET NO. E-17 OF 40 SHEETS

C.O. 131R

|               |      |
|---------------|------|
| ORIGINAL PLAN | DATE |
| NOTED BY      |      |
| DESIGNED BY   |      |
| CHECKED BY    |      |
| QUANTITIES BY |      |
| NO.           |      |



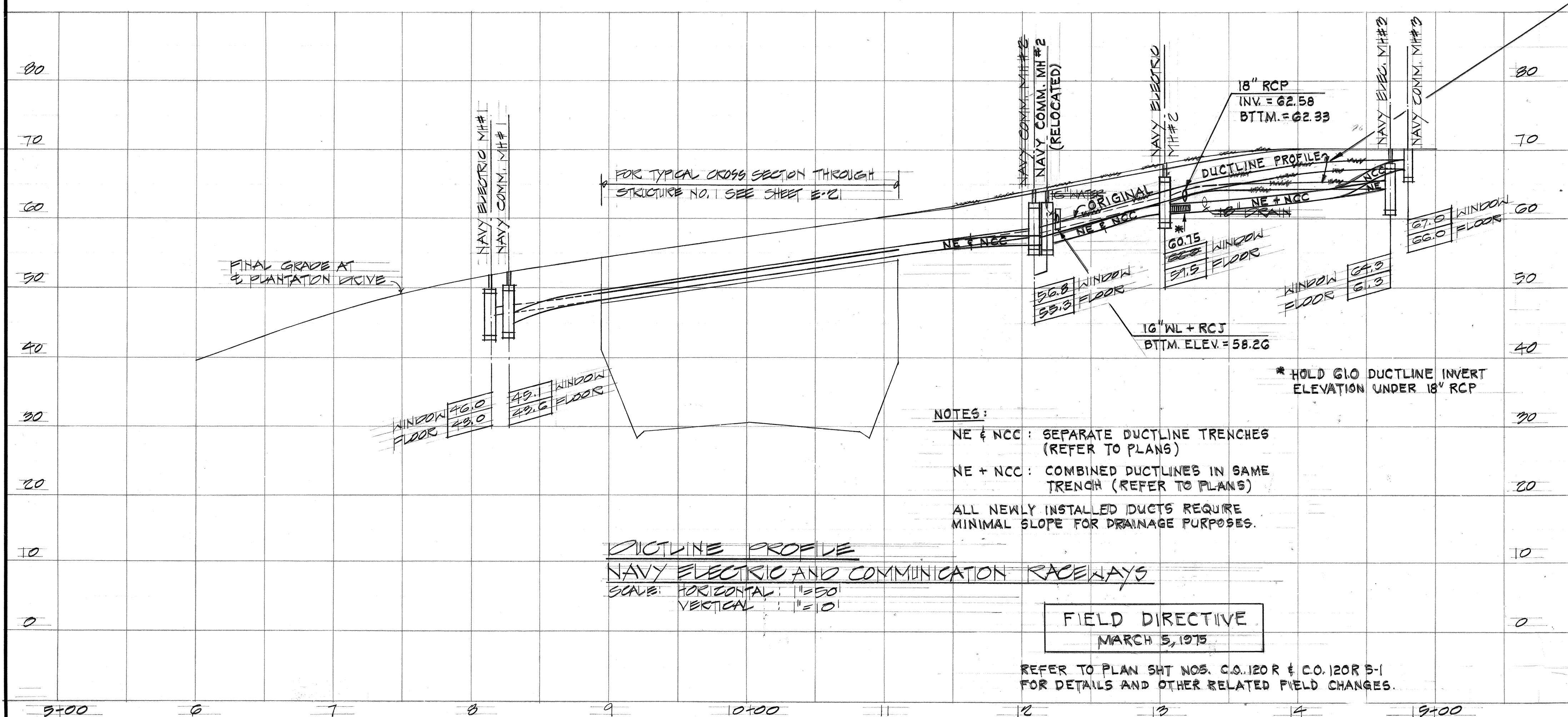
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO.                                                          | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|-----------------------------------------------------------------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | I-HI(III)14                                                                 | 1974        | 132       | 234          |
| DATE                |       | REVISIONS                                                                   |             |           |              |
| 8/21/74             |       | REVISED DUCTLINE PROFILE BETWEEN EXISTING EMH #1 AND AND POLE-MOR-10        |             |           |              |
| 8/30/74             |       | REVISED NAVY ELEC. & COMM. PROFILE FROM NAVY COMM. HH#2 TO NAVY COMM. HH#3. |             |           |              |
| 10/21/74            |       | OBTAINED UTILITY CO. SIGNATURE                                              |             |           |              |



CCO. #16  
7-17-75

CCO. #13  
6-30-75

TO LOWER AN EXISTING ARMY COMMUNICATION CABLE DUCT SYSTEM.



NOTES:  
NE & NCC: SEPARATE DUCTLINE TRENCHES (REFER TO PLANS)  
NE + NCC: COMBINED DUCTLINES IN SAME TRENCH (REFER TO PLANS)  
ALL NEWLY INSTALLED DUCTS REQUIRE MINIMAL SLOPE FOR DRAINAGE PURPOSES.

FIELD DIRECTIVE  
MARCH 5, 1975

REFER TO PLAN SHT NOS. C.O. 120R & C.O. 120R B-1 FOR DETAILS AND OTHER RELATED FIELD CHANGES.

CCO. #16  
7-17-75

DUCTLINE PROFILE  
NAVY ELECTRIC AND COMMUNICATION RACEWAYS  
SCALE: HORIZONTAL 1"=50'  
VERTICAL 1"=10'

APPROVED:  
*R. Law* 4/30/74  
HAWAIIAN ELECTRIC CO., INC. DATE  
JK 4-26-74 RM  
*R. Law* 10-21-74  
HAWAIIAN TELEPHONE CO. DATE



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

DUCTLINE PROFILES

PEARL HARBOR INTERCHANGE  
F.A.I. PROJ. NO. I-HI-1(III)14

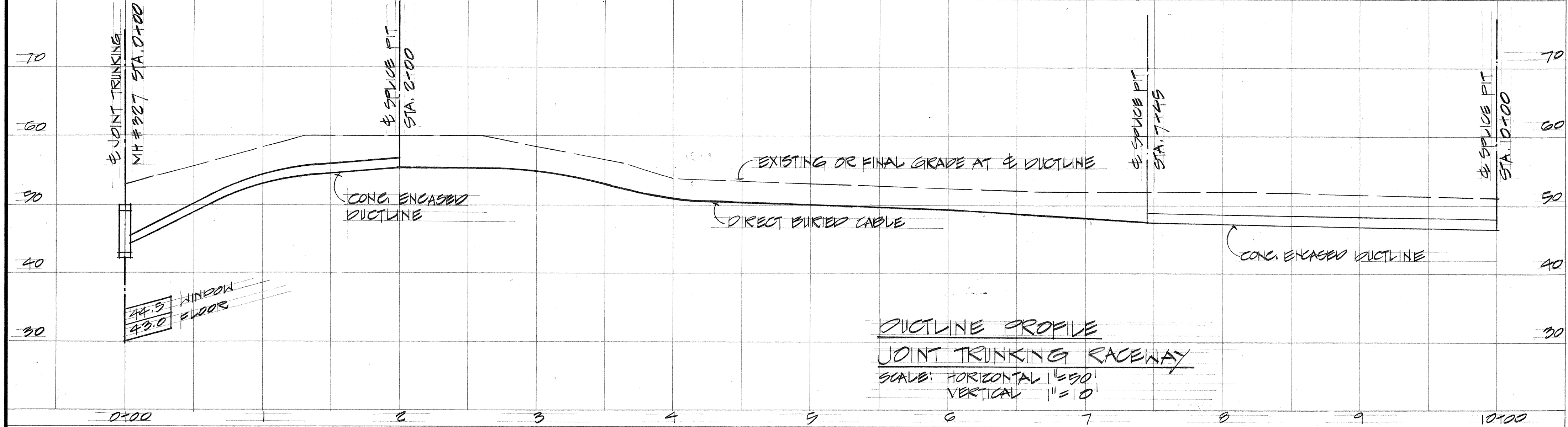
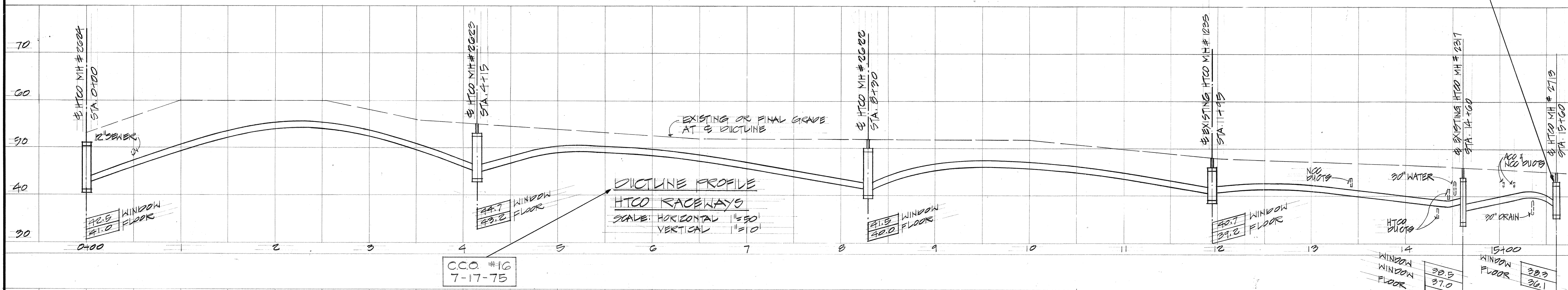
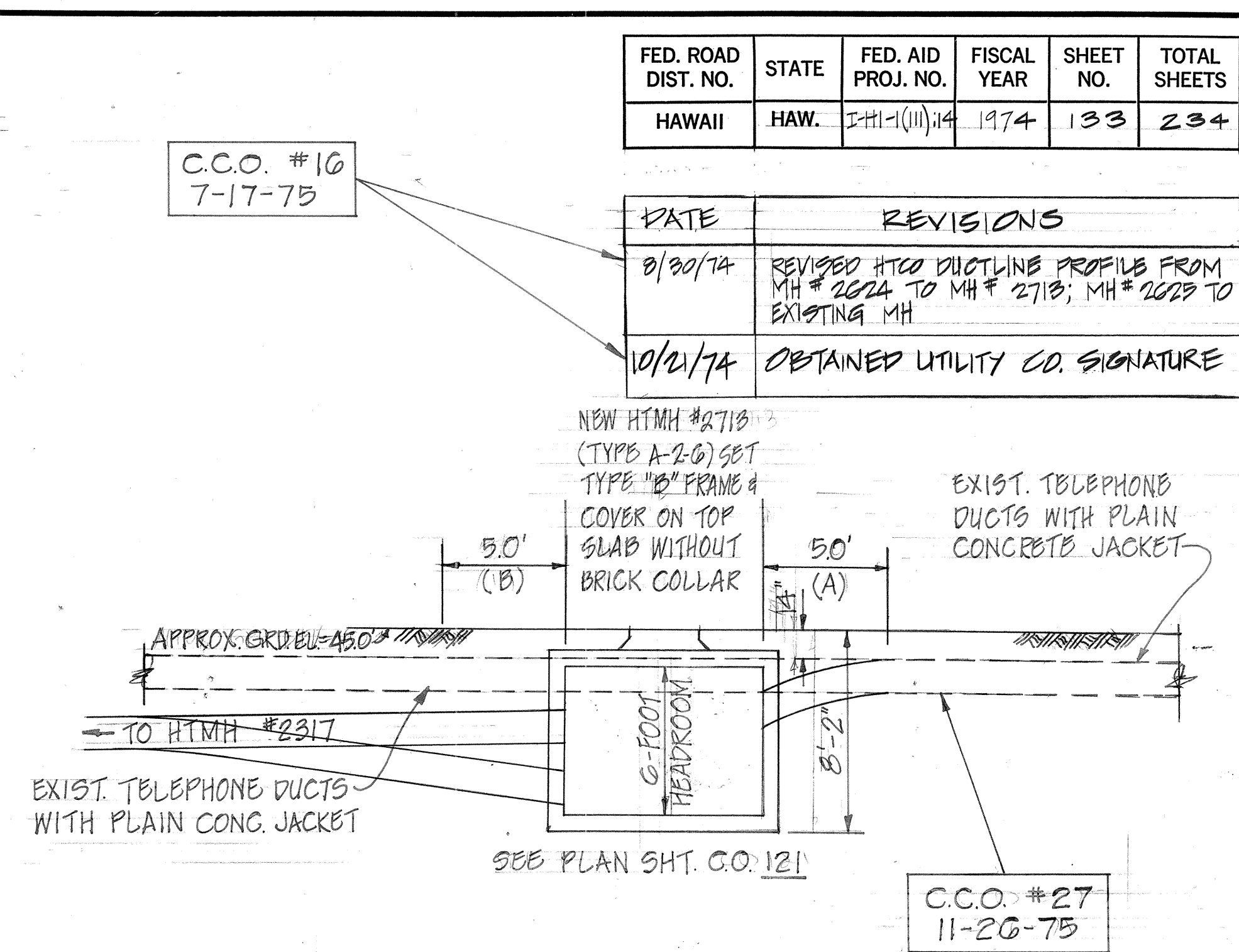
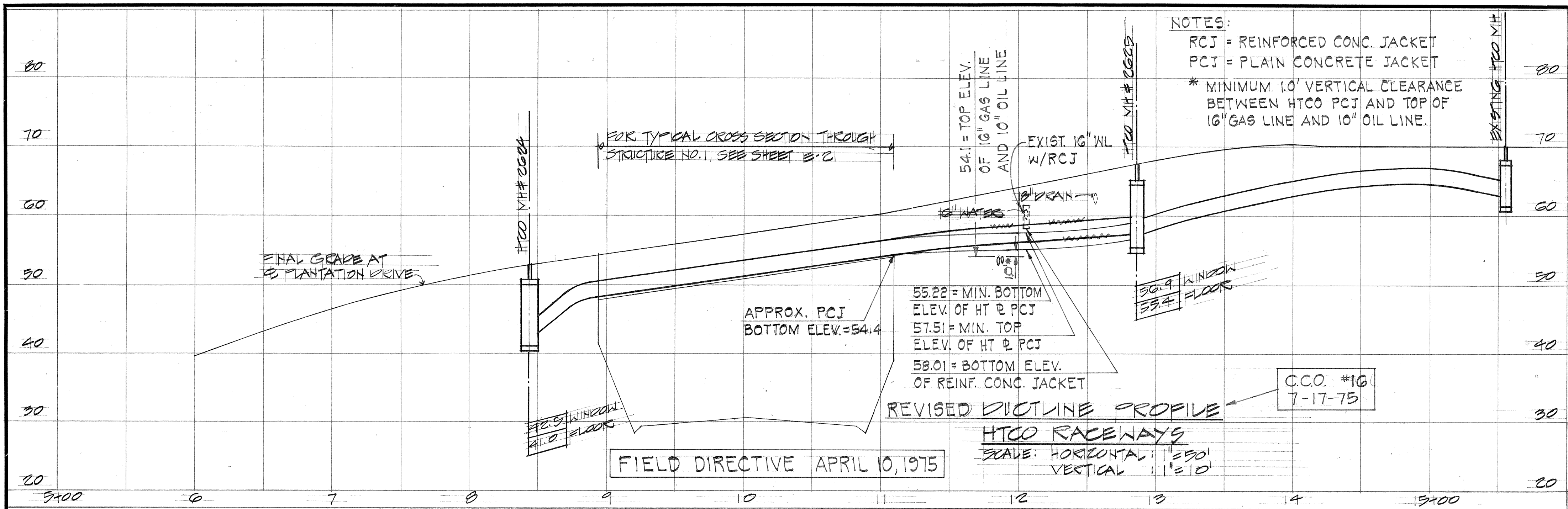
SCALE: AS SHOWN DATE: DEC. 14, 1973

SHEET NO. E-18 OF 40 SHEETS

ORIGINAL PLAN  
DATE: \_\_\_\_\_  
DRAWN BY: \_\_\_\_\_  
TRACED BY: \_\_\_\_\_  
DESIGNED BY: \_\_\_\_\_  
CHECKED BY: \_\_\_\_\_  
NO. \_\_\_\_\_

E-18





| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | I-H-1(III)14       | 1974        | 133       | 234          |

| DATE    | REVISIONS                                                                        |
|---------|----------------------------------------------------------------------------------|
| 8/30/74 | REVISED HTCO DUCTLINE PROFILE FROM MH #2024 TO MH #2718; MH #2025 TO EXISTING MH |
| 10/2/74 | OBTAINED UTILITY CO. SIGNATURE                                                   |

NEW HTMH #2718 (TYPE A-2-G) SET TYPE "B" FRAME # COVER ON TOP SLAB WITHOUT BRICK COLLAR

EXIST. TELEPHONE DUCTS WITH PLAIN CONC. JACKET

TO HTMH #2317

SEE PLAN SHT. C.O. 121

C.C.O. #27 11-26-75

APPROVED:

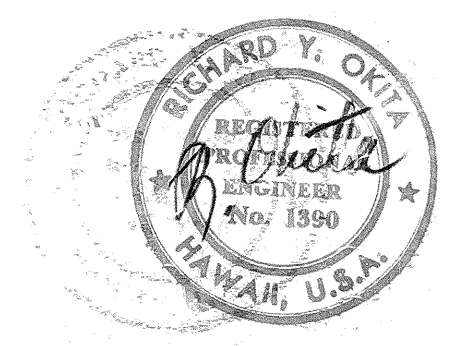
*P. Man*

HAWAIIAN TELEPHONE CO. DATE 10-21-74

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

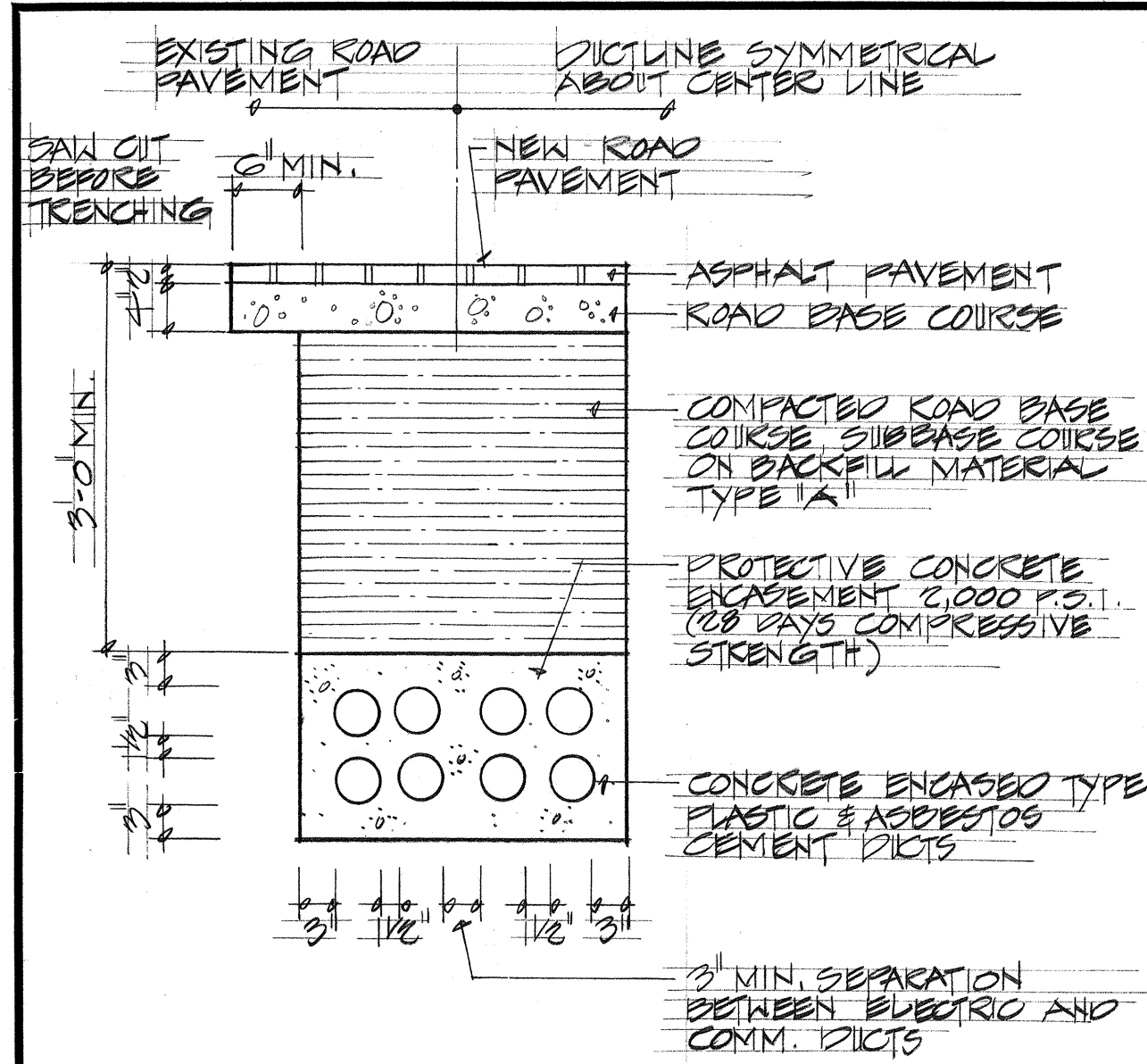
DUCTLINE PROFILES

PEARL HARBOR INTERCHANGE  
P.A.T. PROJ. NO. I-H-1(III)14  
SCALE: AS SHOWN DATE: DEC. 14, 1973  
SHEET NO. E-19 OF 40 SHEETS

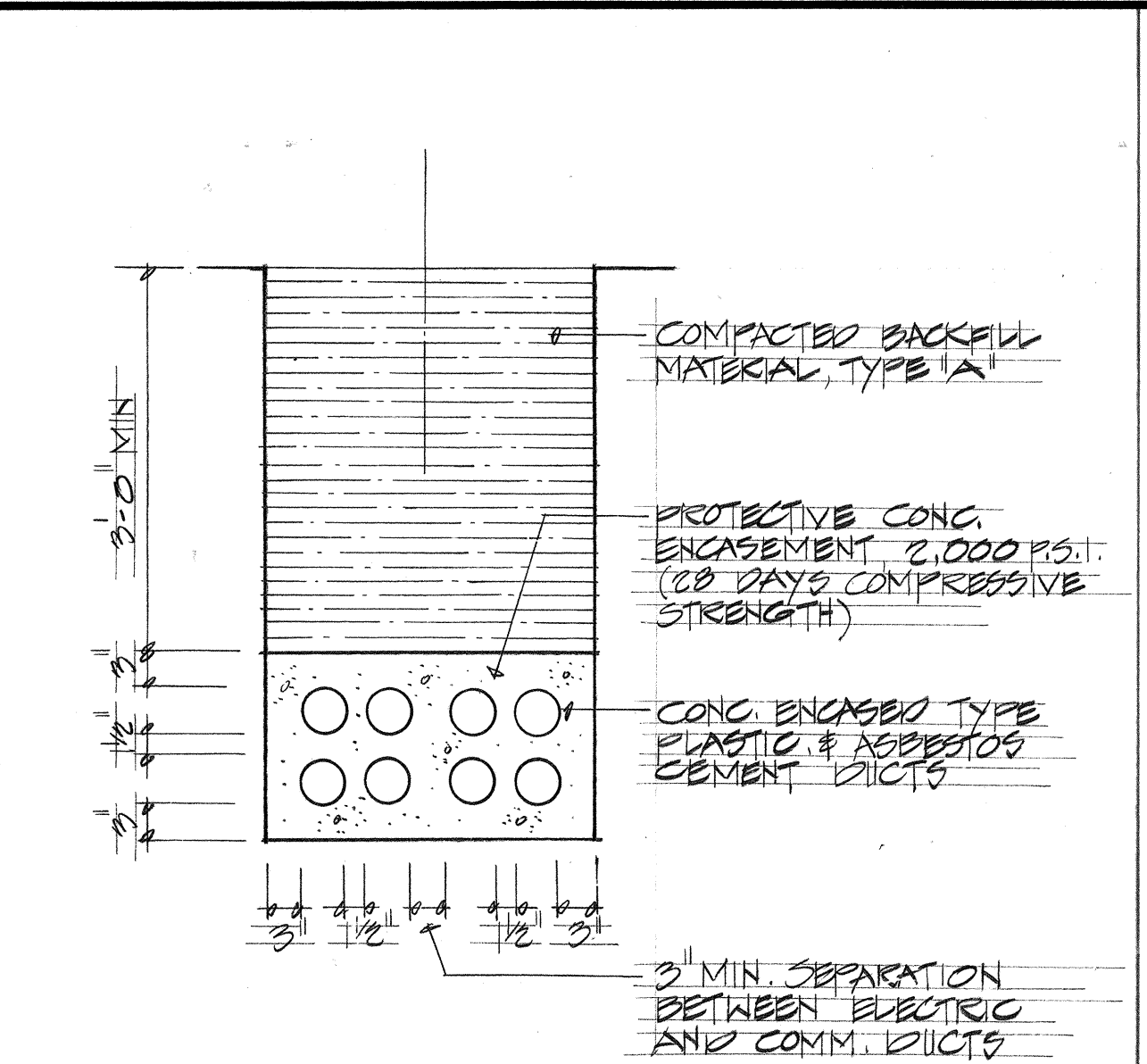


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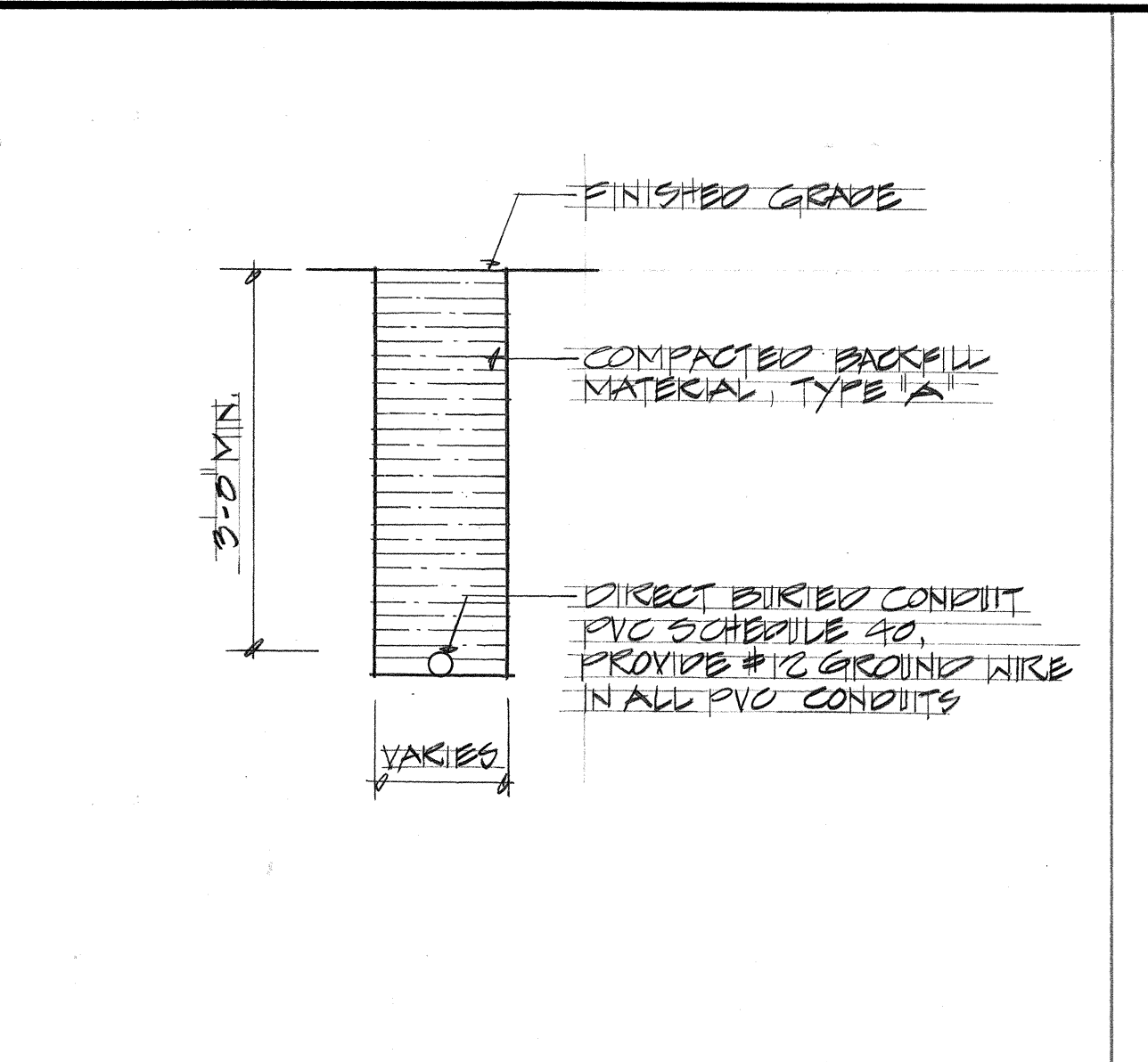




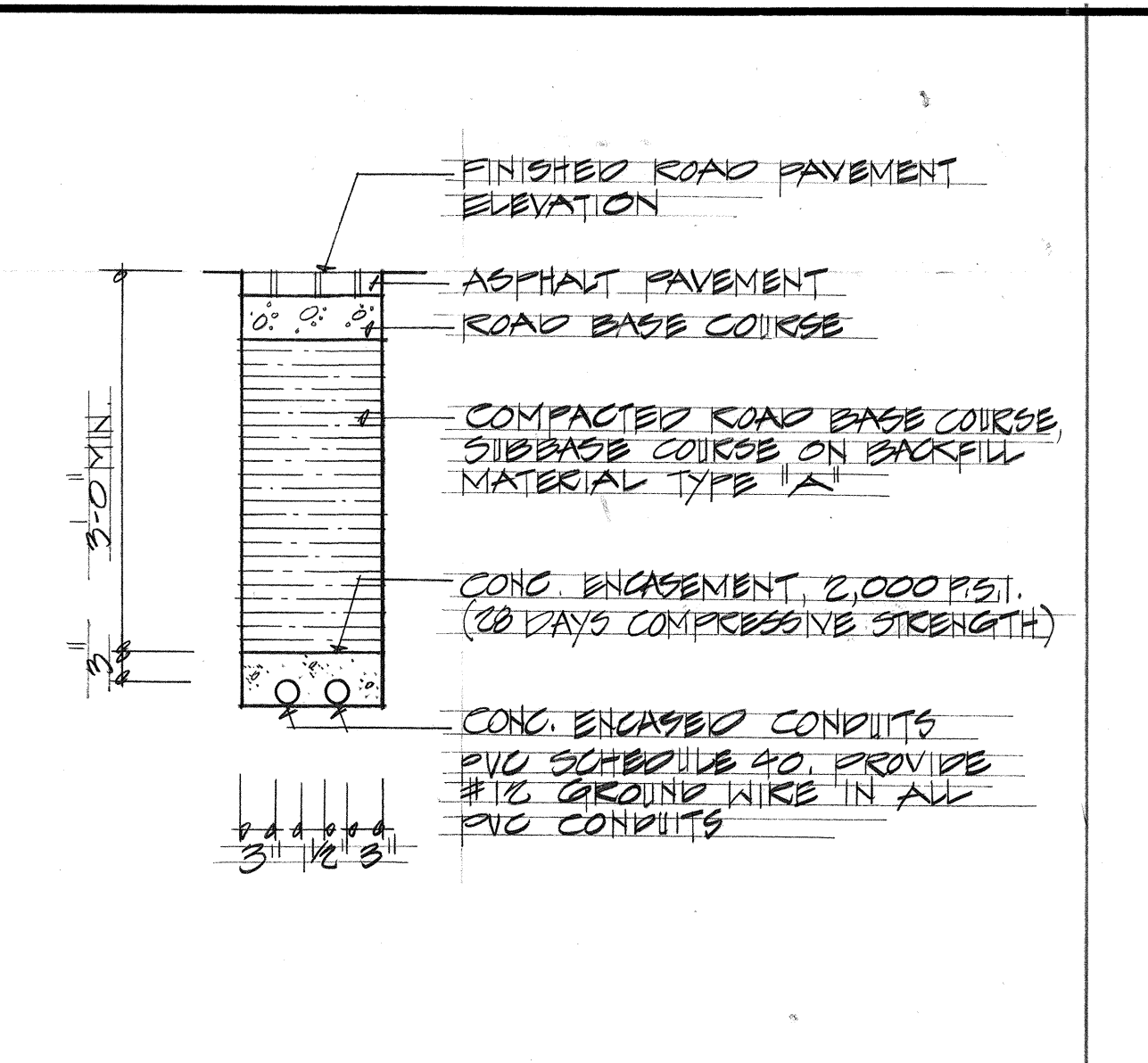
**A** TYPICAL CONCRETE ENCASED RACEWAY  
E20 SECTION UNDER ROAD PAVEMENT  
NOT TO SCALE



**B** TYPICAL CONCRETE ENCASED RACEWAY  
E20 SECTION IN OPEN AREAS  
NOT TO SCALE

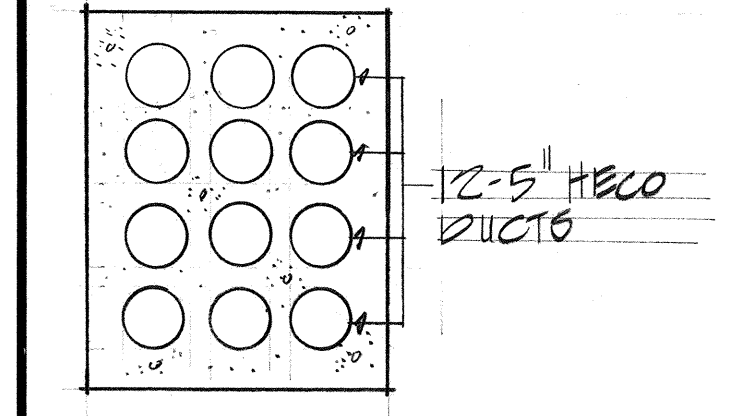


**C** TYPICAL DIRECT BURIED RACEWAY  
E20 SECTION FOR LIGHTING & POWER CIRCUITS  
NOT TO SCALE

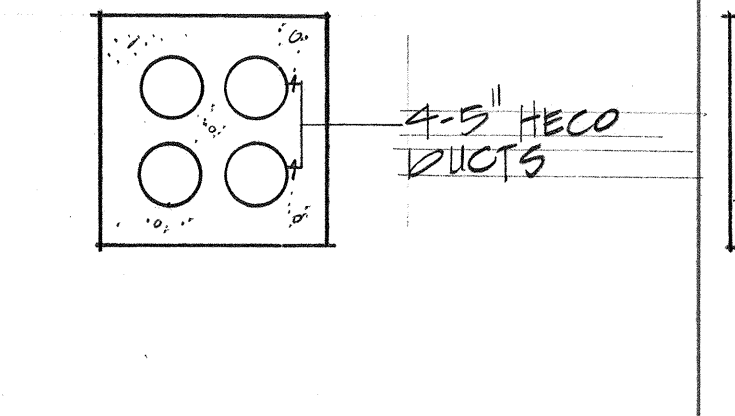


**D** TYPICAL CONCRETE ENCASED RACEWAY  
E20 SECTION FOR LIGHTING & POWER CIRCUITS  
NOT TO SCALE

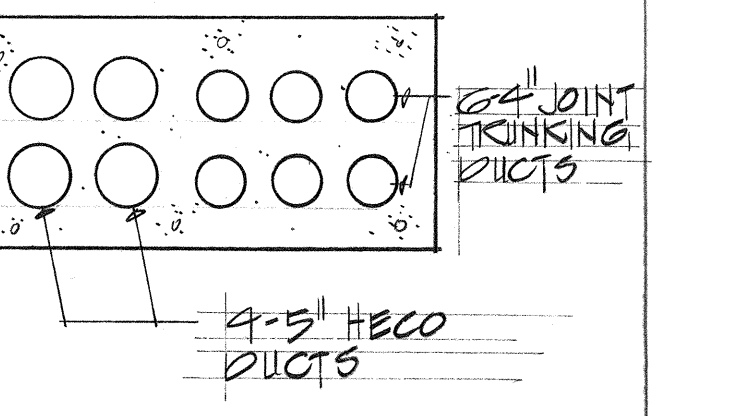
| FED. ROAD DIST. NO.                     | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|-----------------------------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII                                  | HAW.  | HH(III)14          | 1974        | 134       | 234          |
| DATE                                    |       |                    |             |           |              |
| REVISIONS                               |       |                    |             |           |              |
| 10/21/74 OBTAINED UTILITY CO. SIGNATURE |       |                    |             |           |              |



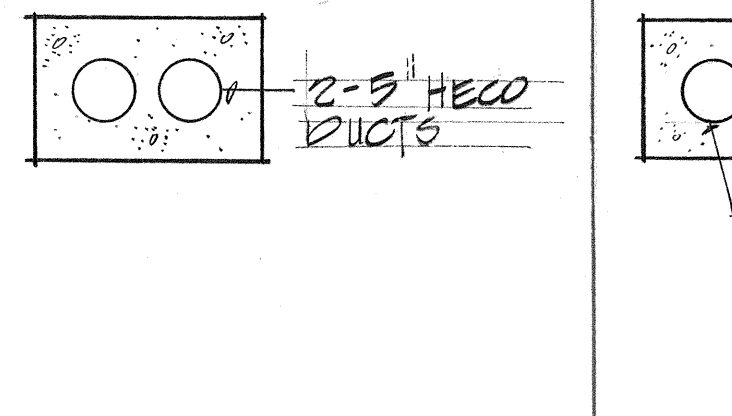
**DUCT SECTION 1**  
NOT TO SCALE



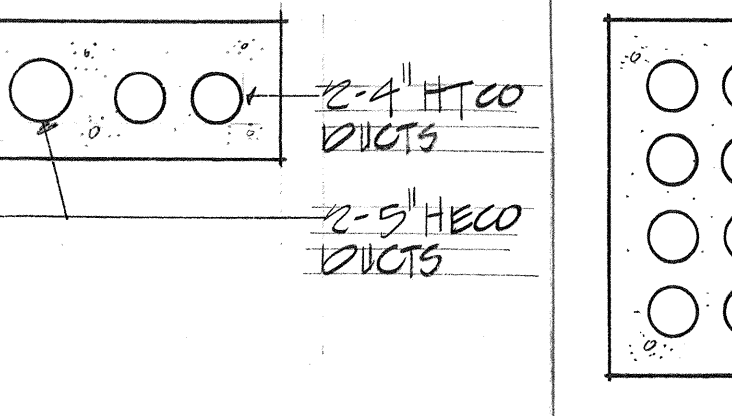
**DUCT SECTION 2**  
NOT TO SCALE



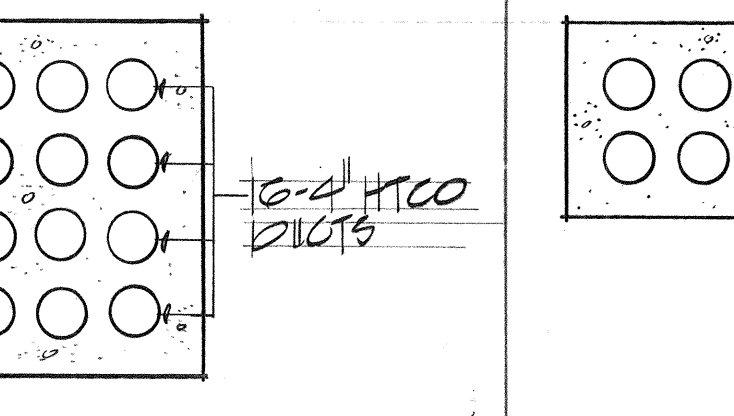
**DUCT SECTION 3**  
NOT TO SCALE



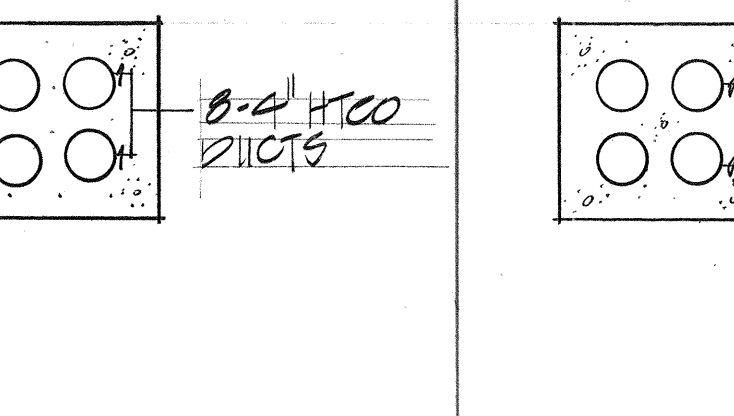
**DUCT SECTION 4**  
NOT TO SCALE



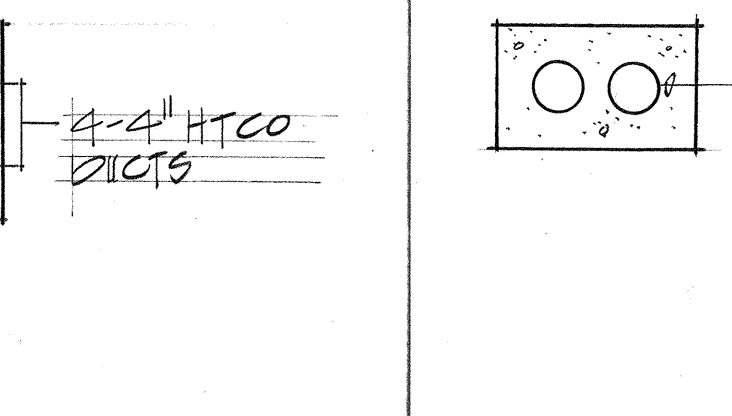
**DUCT SECTION 5**  
NOT TO SCALE



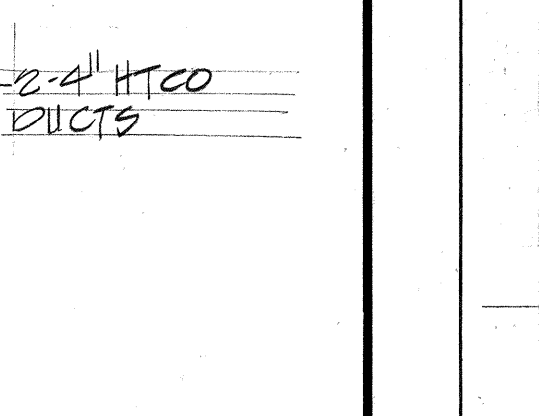
**DUCT SECTION 6**  
NOT TO SCALE



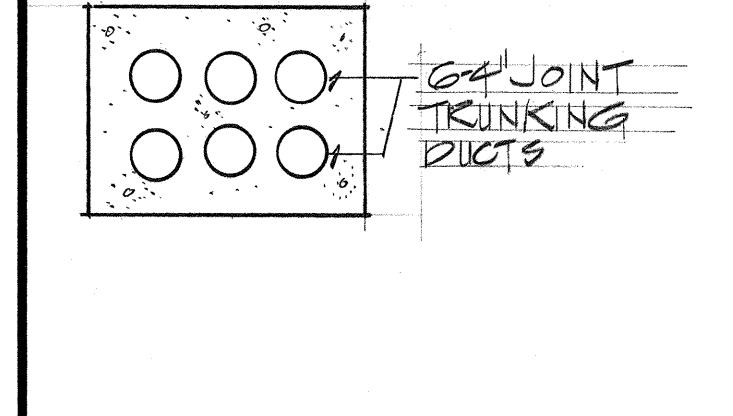
**DUCT SECTION 7**  
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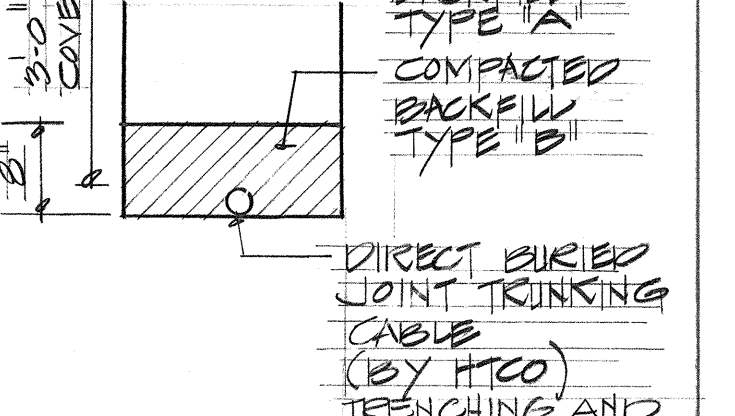
**DUCT SECTION 8**  
NOT TO SCALE



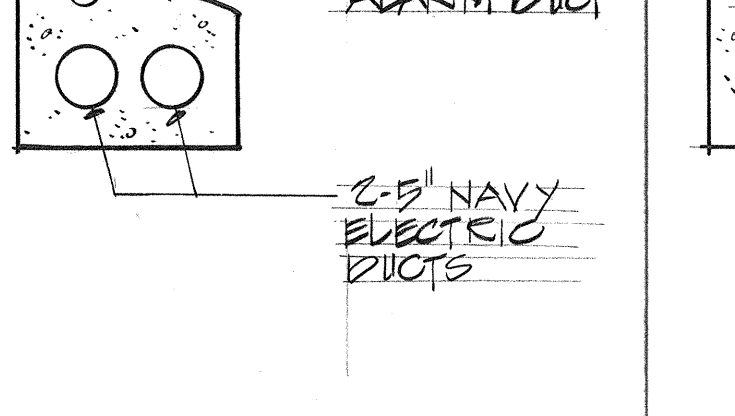
**DUCT SECTION 9**  
NOT TO SCALE



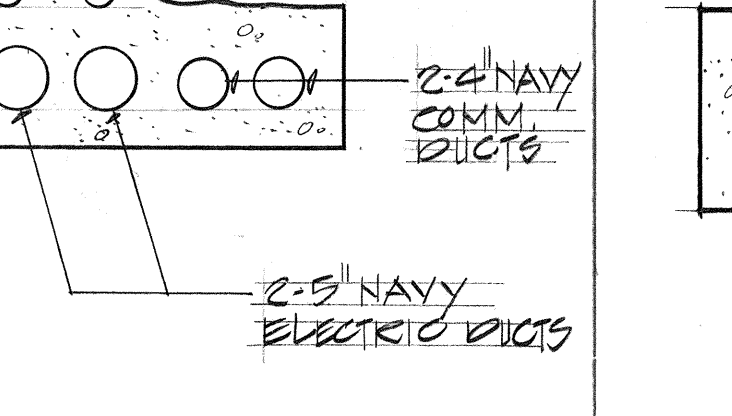
**DUCT SECTION 10**  
NOT TO SCALE



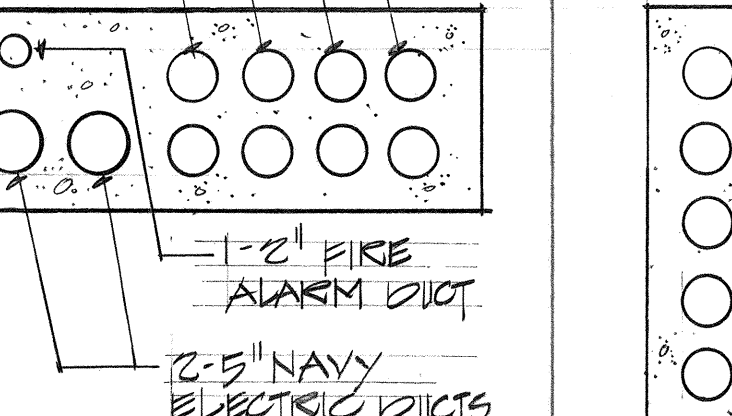
**DUCT SECTION 11**  
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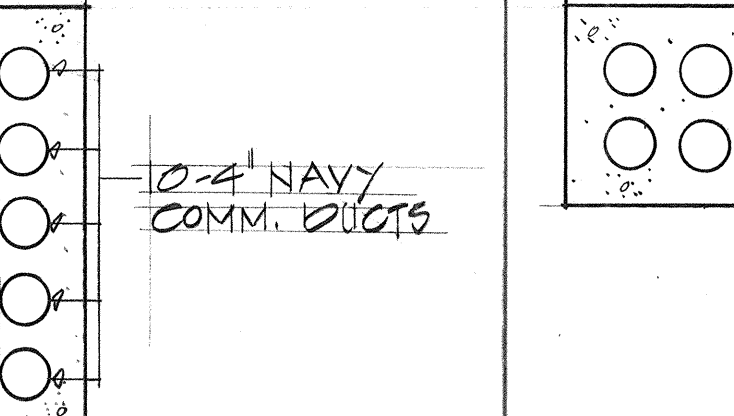
**DUCT SECTION 12**  
NOT TO SCALE



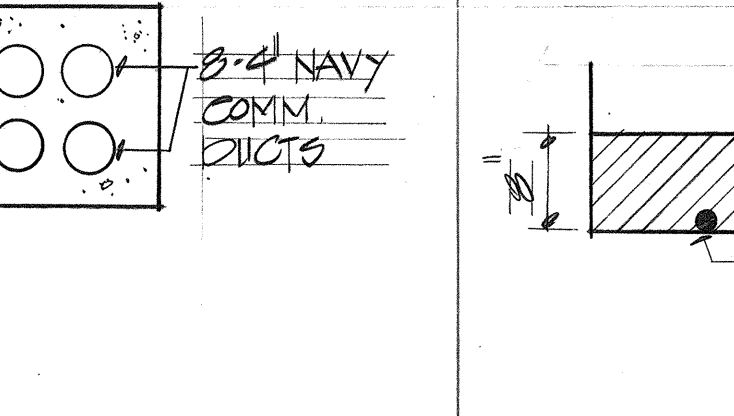
**DUCT SECTION 13**  
NOT TO SCALE



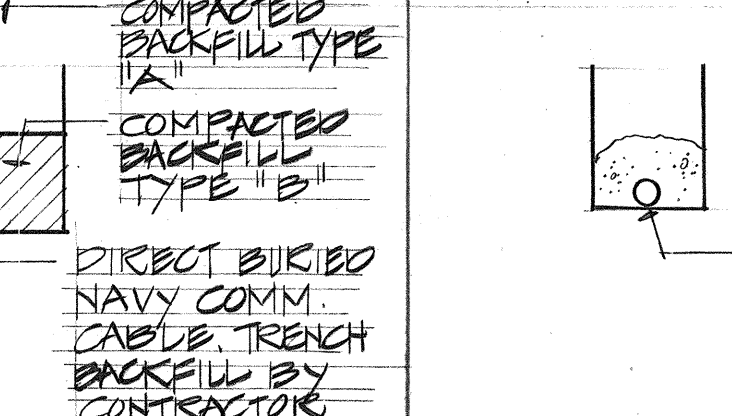
**DUCT SECTION 14**  
NOT TO SCALE



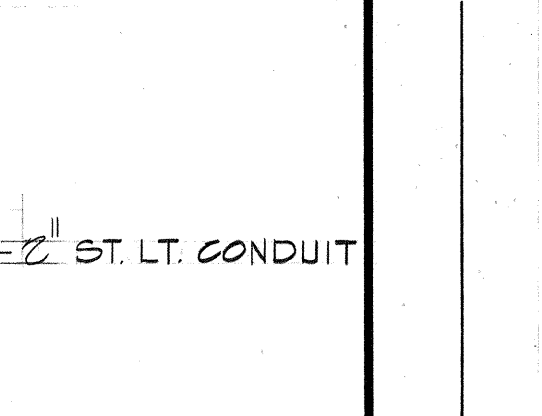
**DUCT SECTION 15**  
NOT TO SCALE



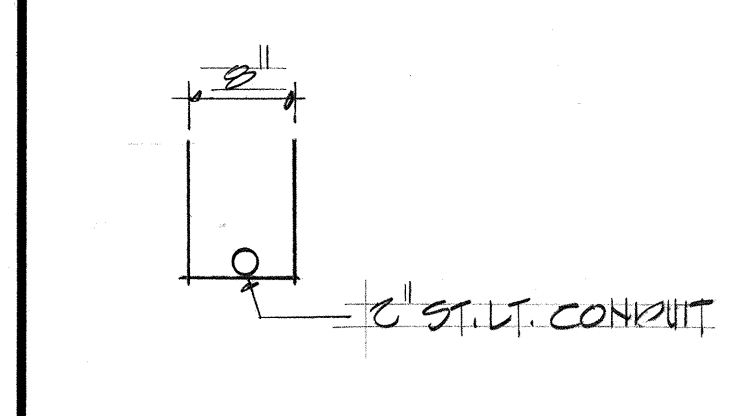
**DUCT SECTION 16**  
NOT TO SCALE



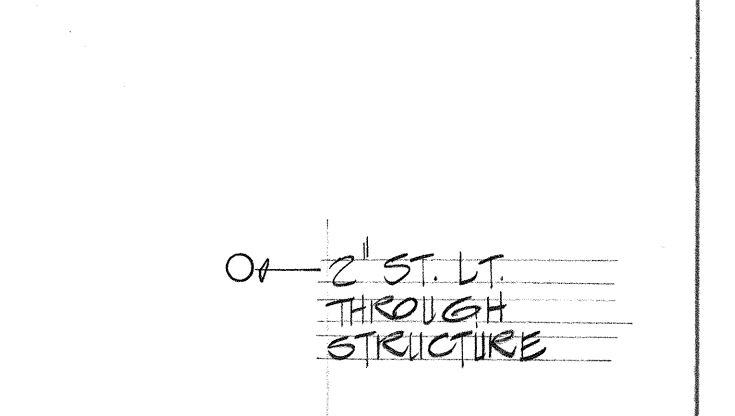
**DUCT SECTION 17**  
NOT TO SCALE



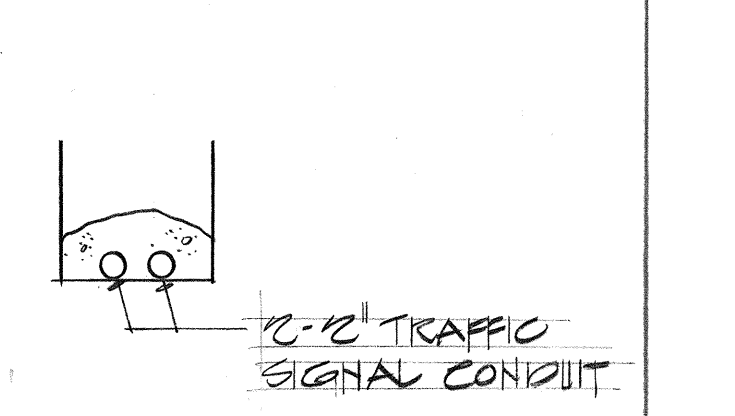
**DUCT SECTION 18**  
NOT TO SCALE



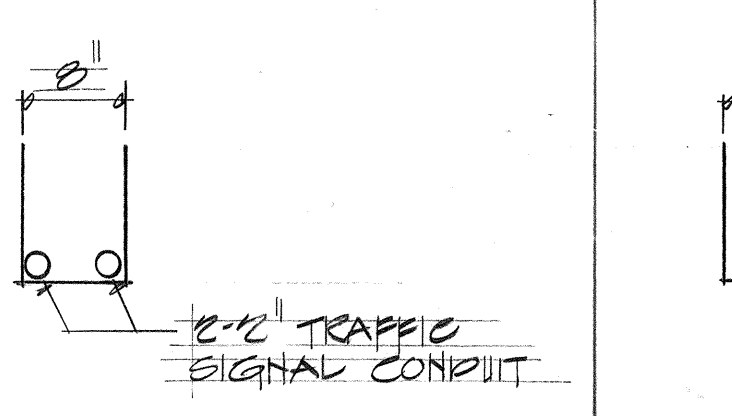
**DUCT SECTION 19**  
NOT TO SCALE



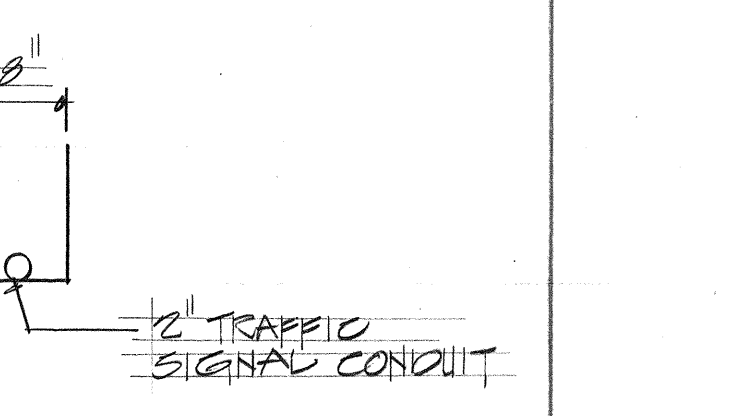
**DUCT SECTION 20**  
NOT TO SCALE



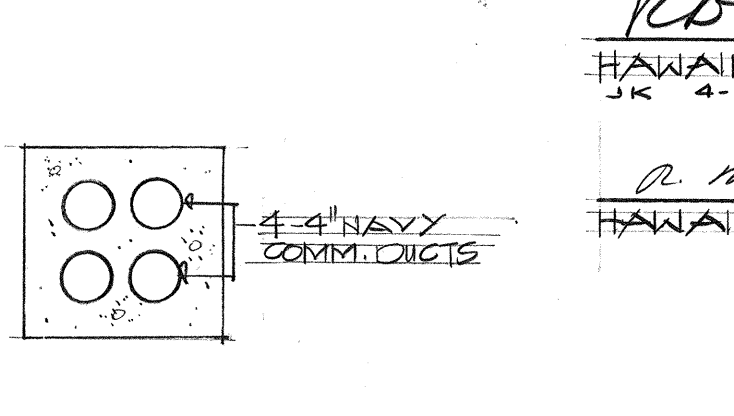
**DUCT SECTION 21**  
NOT TO SCALE



**DUCT SECTION 22**  
NOT TO SCALE

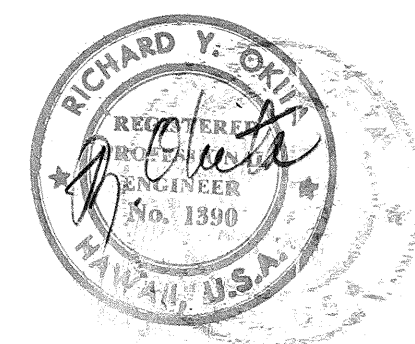


**DUCT SECTION 23**  
NOT TO SCALE



**DUCT SECTION 24**  
NOT TO SCALE

APPROVED:  
R. S. Ladd 4/30/74  
HAWAIIAN ELECTRIC CO., INC. RN  
R. Man 10-21-74  
HAWAIIAN TELEPHONE CO. DATE



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OR UNDER MY SUPERVISION

**E-20**

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

DUCT SECTIONS

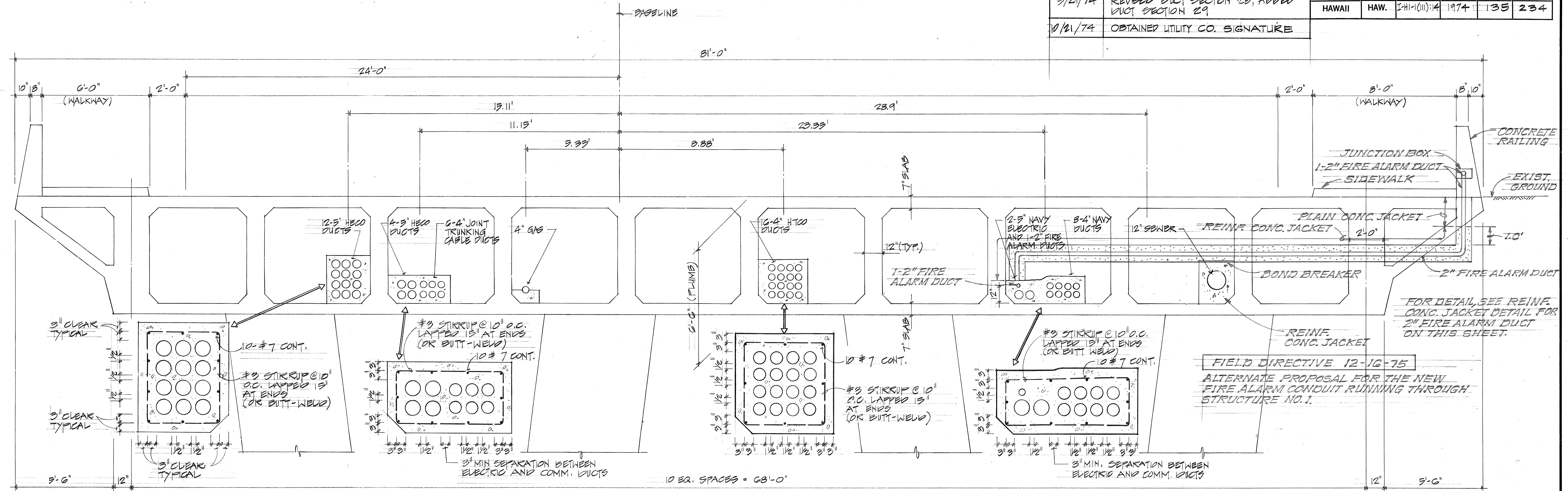
PEARL HARBOR INTERCHANGE  
F.A.T. PROJECT NO. I-H-1(III)14

SCALE AS SHOWN DATE: DEC. 14, 1973

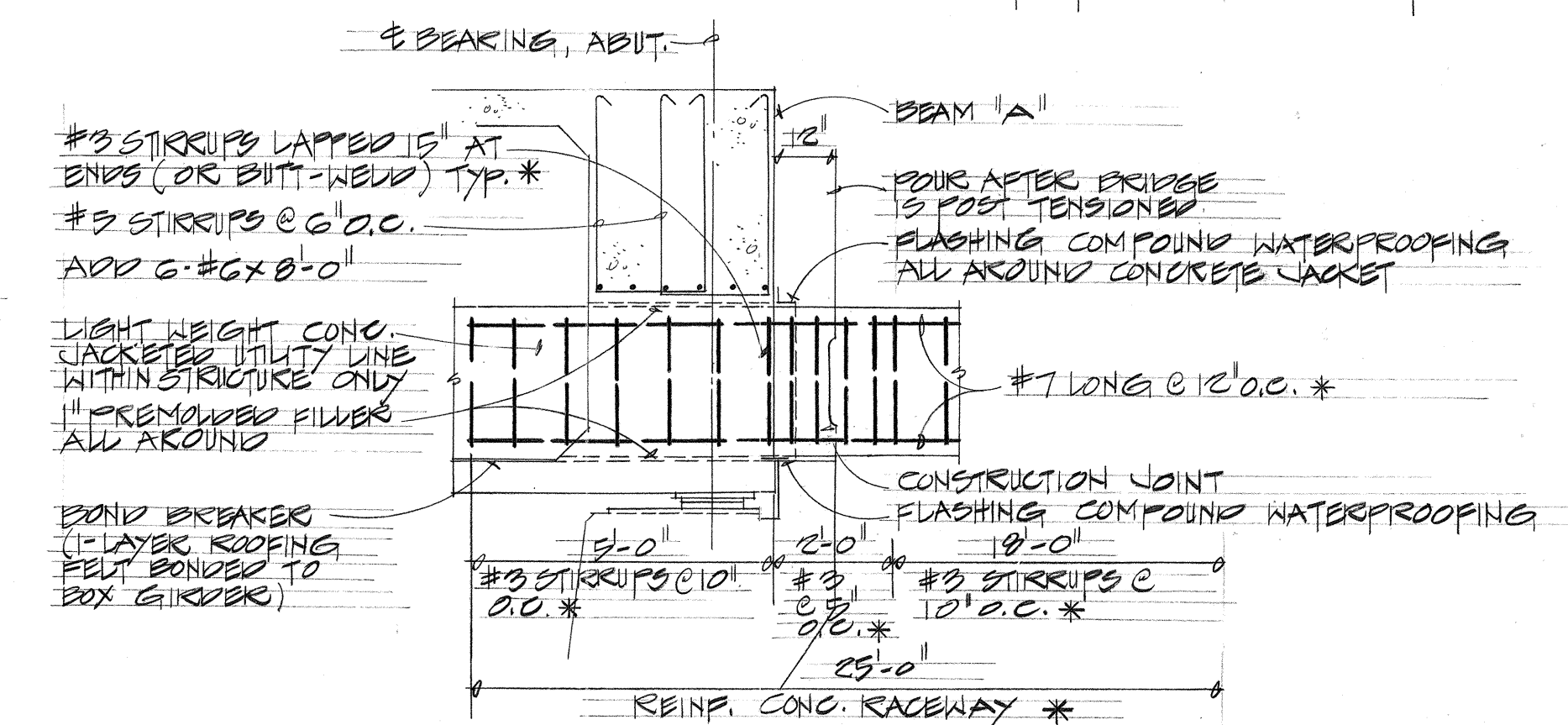
SHEET NO. E-20 OF 40 SHEETS



| DATE     | REVISIONS                                      | FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|----------|------------------------------------------------|---------------------|-------|--------------------|-------------|-----------|--------------|
| 3/2/74   | REVISED DUCT SECTION 28, ADDED DUCT SECTION 29 | HAWAII              | HAW.  | 1-H1-1(III)-14     | 1974        | 35        | 234          |
| 10/21/74 | OBTAINED UTILITY CO. SIGNATURE                 |                     |       |                    |             |           |              |



(A) TYPICAL CROSS SECTION AT ABUTMENT STRUCTURE NO. 1  
SCALE: 3/8" = 1'-0"

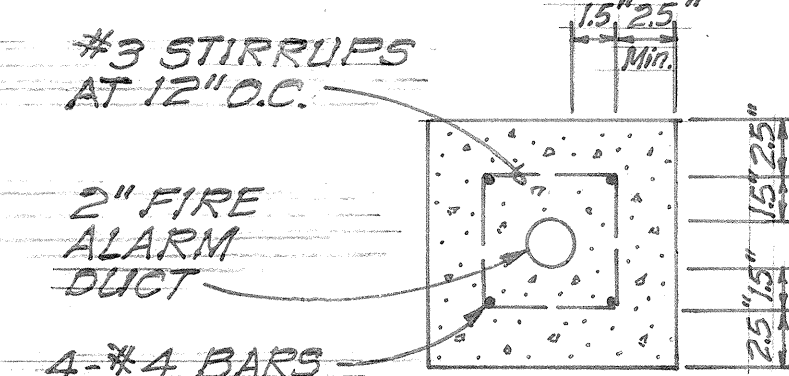


\* FOR ELECTRICAL, TELEPHONE AND COMMUNICATION RELOCATION ONLY. FOR SOWER AND GAS RELOCATION DETAILS, SEE SHEET 73

(B) TYPICAL DUCTLINE REINFORCING AT ABUTMENT DETAIL  
SCALE: 3/8" = 1'-0"

# NOTES:

1. ALL CONCRETE JACKETS WITHIN STRUCTURE SHALL BE LIGHT WEIGHT CONCRETE. SEE SECTION 600 STRUCTURAL CONCRETE.
2. FOR TYPICAL DUCTLINE REINFORCING DETAILS AT ABUTMENT SEE (B)
3. REINFORCED CONCRETE DUCTLINE SHALL EXTEND A MINIMUM OF 20 FEET BEYOND END OF ABUTMENT



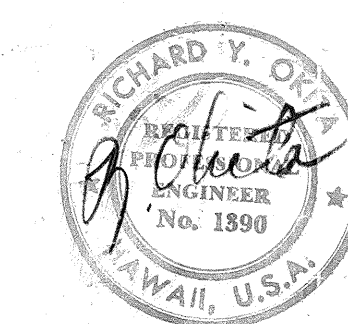
REINFC. CONC. JACKET DETAIL FOR 2" FIRE ALARM DUCT  
NOT TO SCALE

APPROVED:

R. L. Linder  
HAWAIIAN ELECTRIC CO., INC.  
4-26-74

R. Man  
HAWAIIAN TELEPHONE CO.  
10-21-74

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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

TYPICAL CROSS SECTION -  
STRUCTURE NO. 1

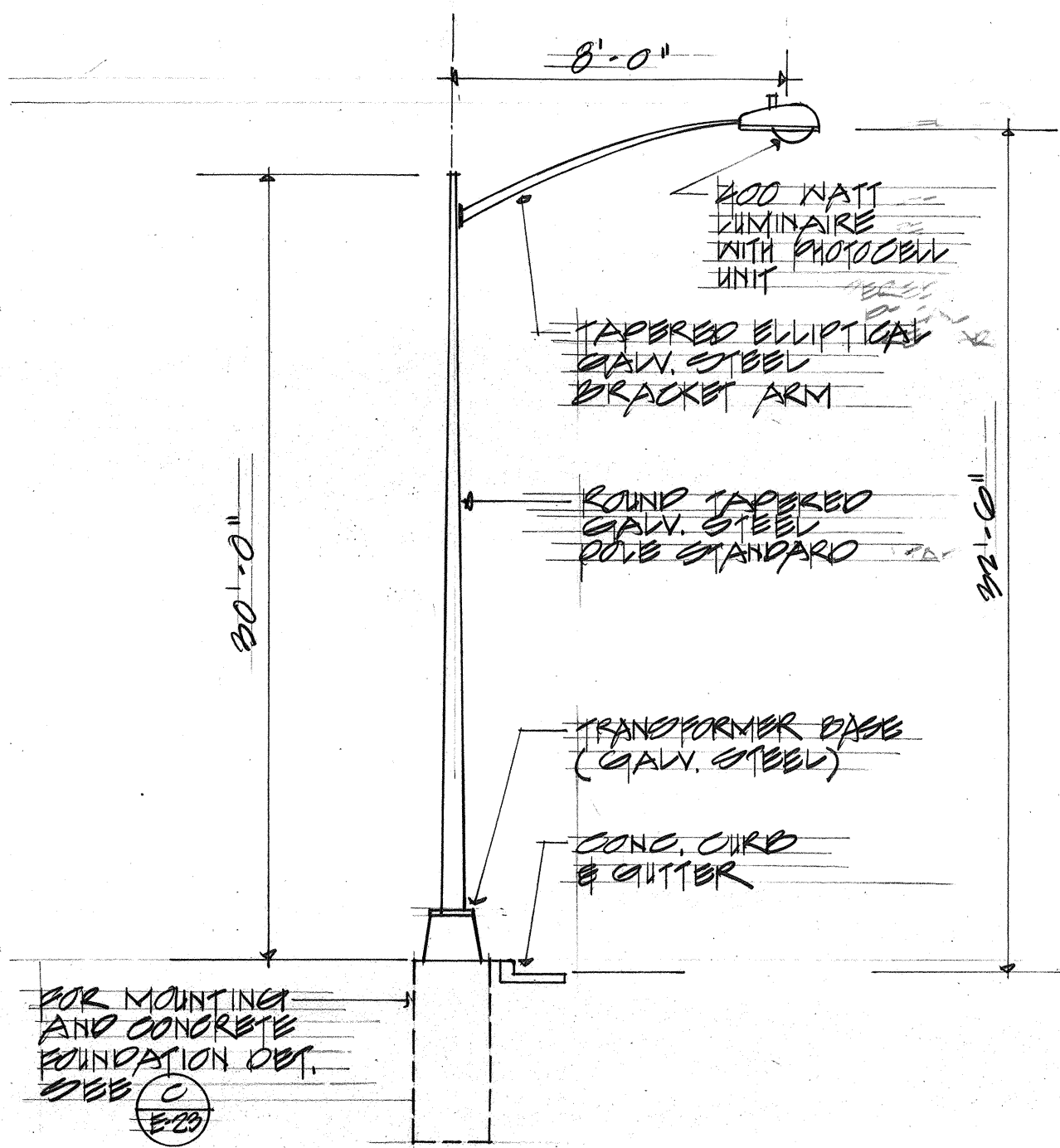
PEARL HARBOR INTERCHANGE  
F.A.I. PROJECT NO. I-H1-1(III)-14

SCALE: AS SHOWN DATE: DEC. 14, 1973

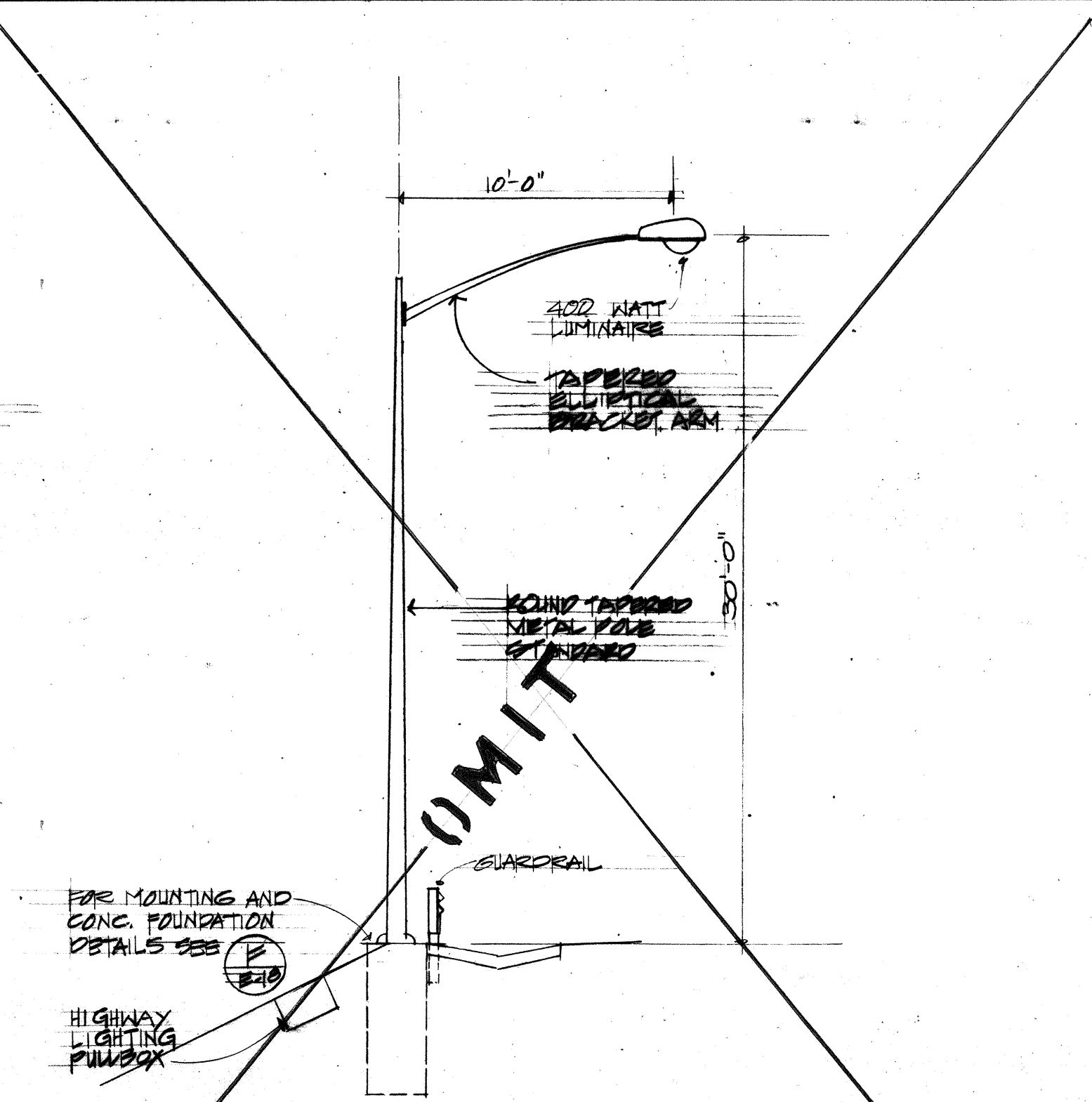
SHEET NO. E-21 OF 40 SHEETS



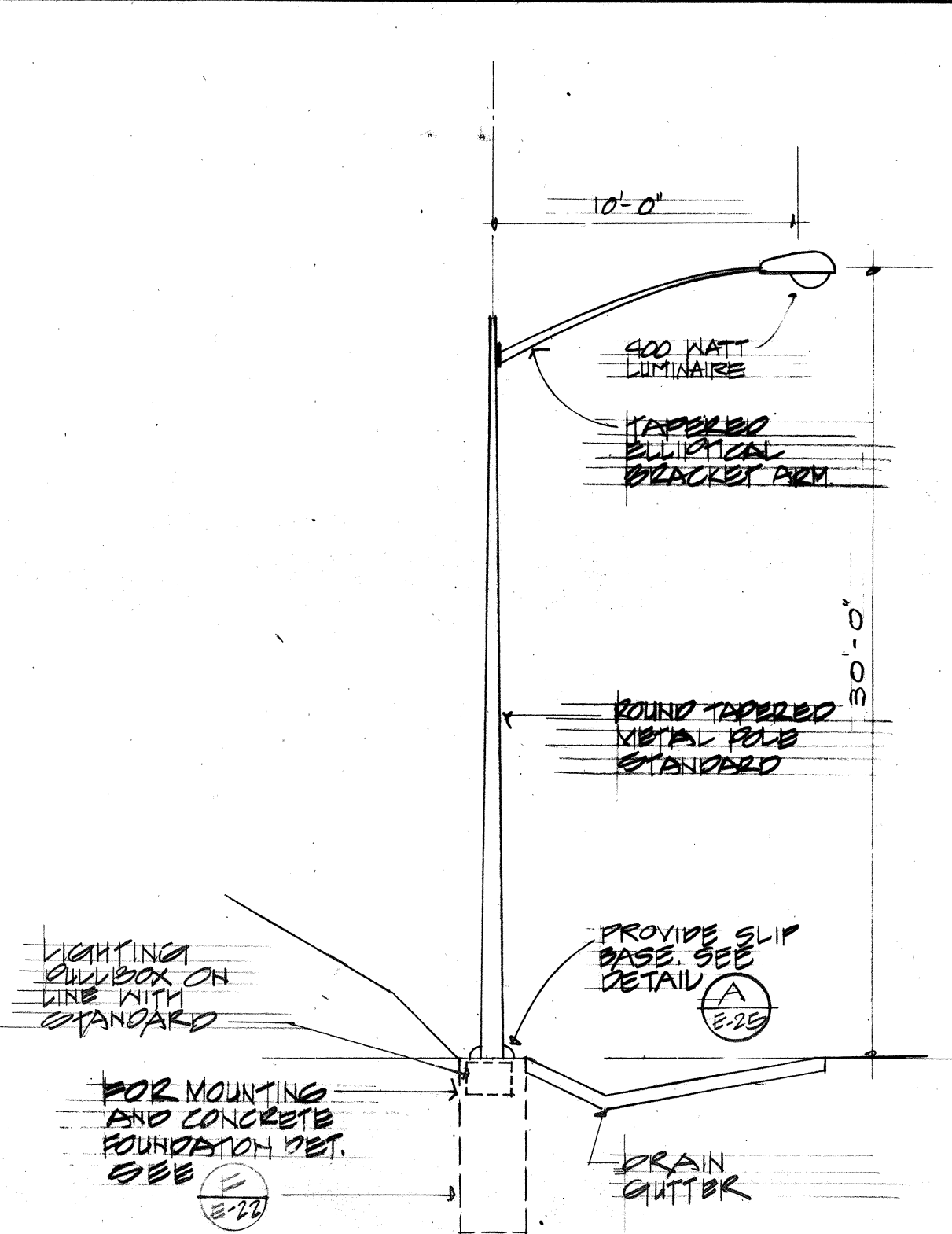
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 1-HI-1(III):14     | 1974        | 136       | 234          |



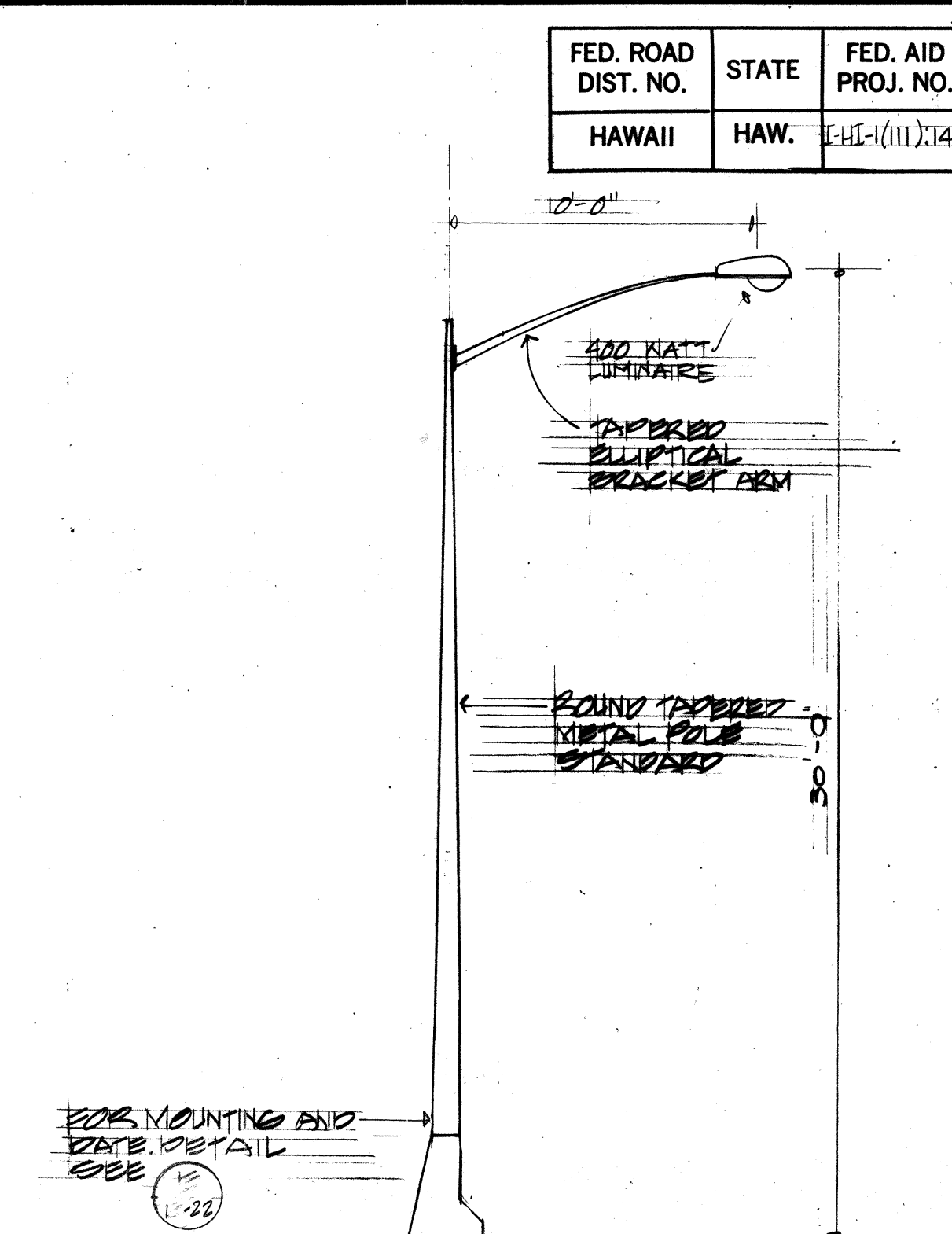
**A TYPE 'A' LIGHTING STANDARD DETAIL**  
E-22



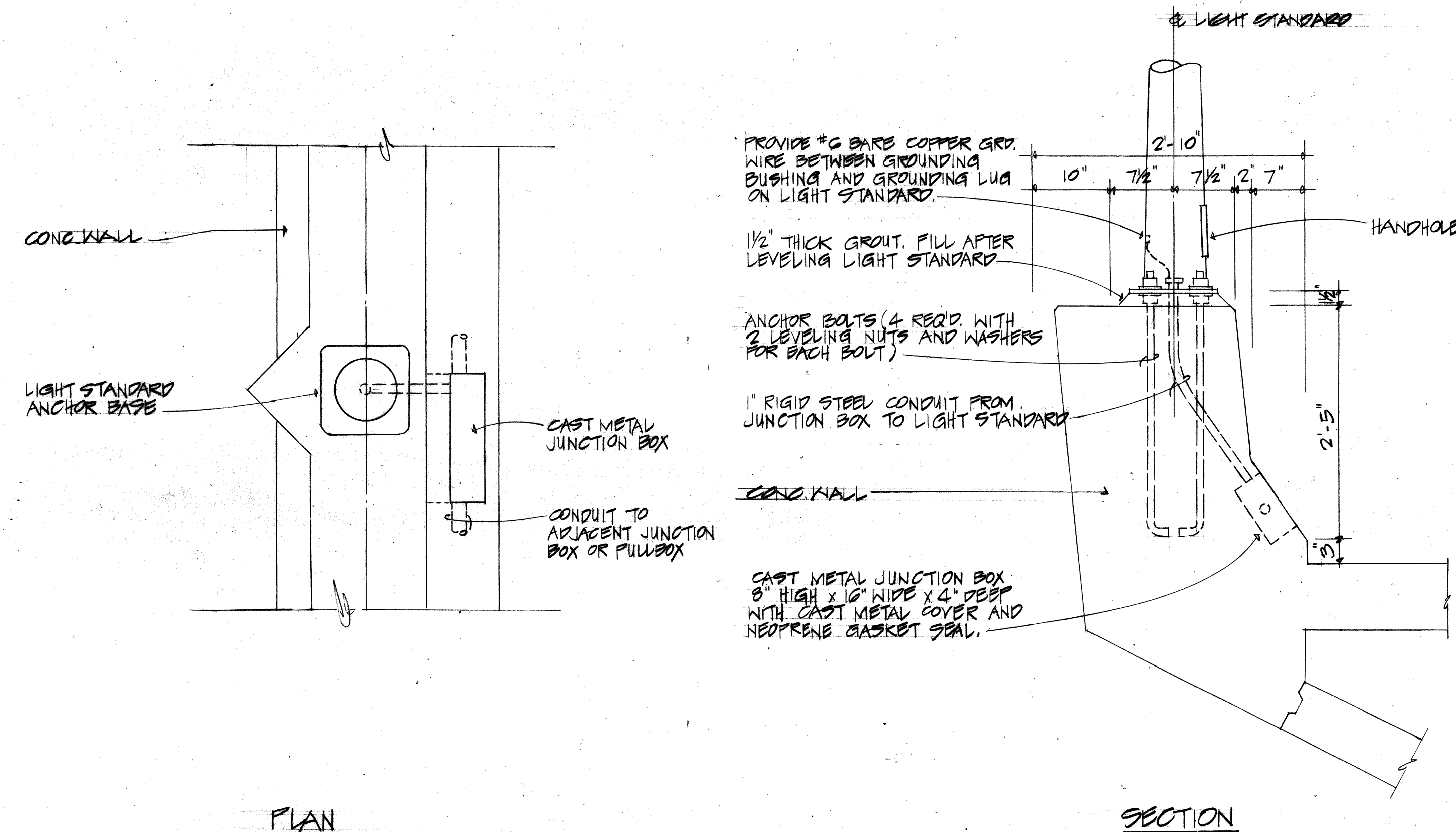
**B TYPE 'B' LIGHTING STANDARD DETAIL**  
E-22



**C TYPE 'C' LIGHTING STANDARD DETAIL**  
E-22



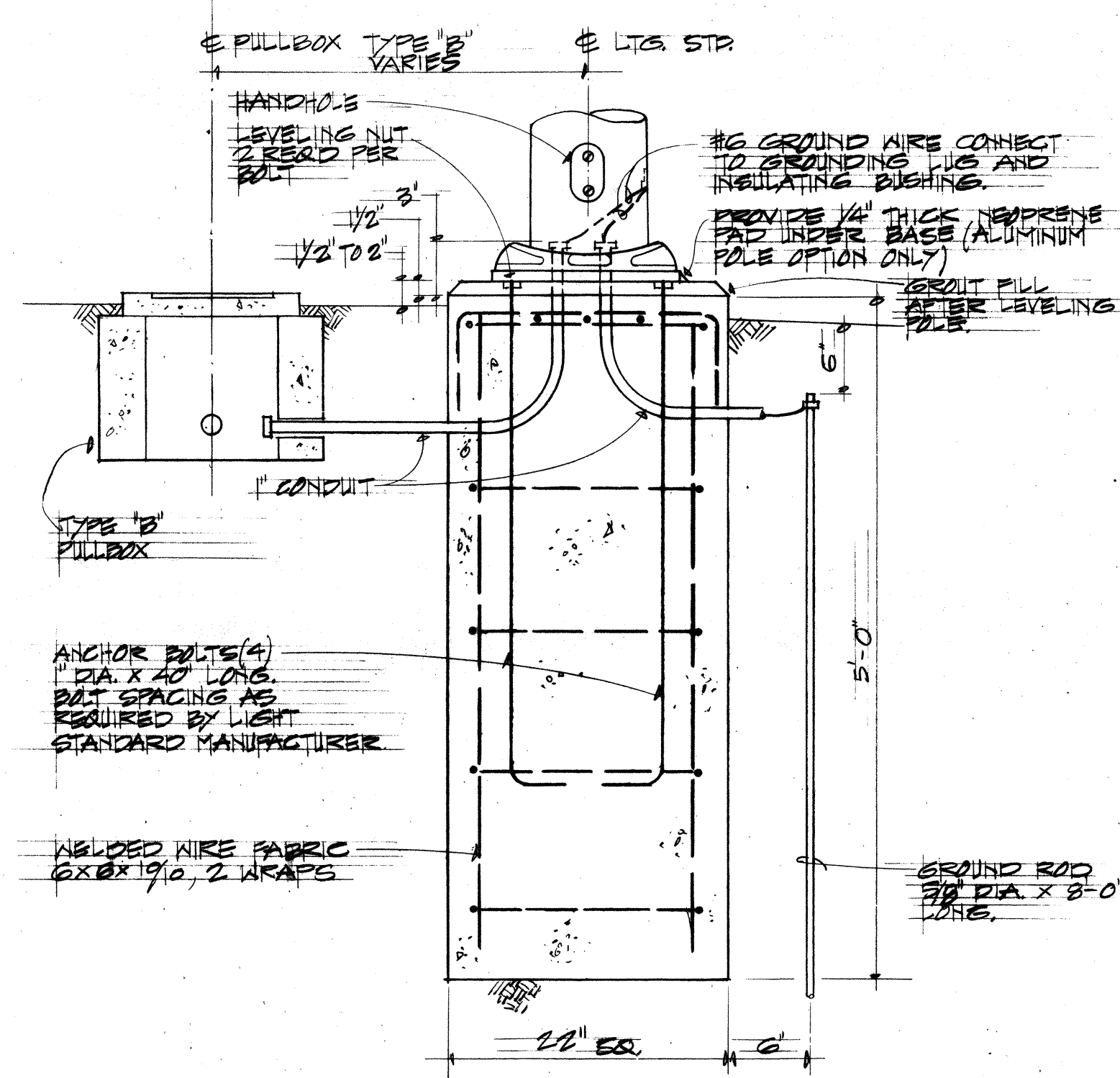
**D TYPE 'D' LIGHTING STANDARD DETAIL**  
E-22



**PLAN**

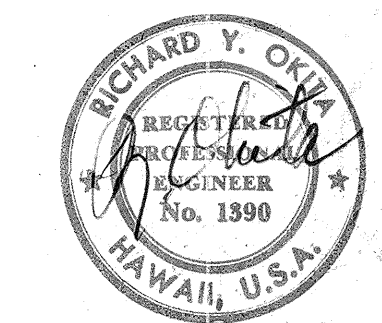
**SECTION**

**E MOUNTING DETAIL FOR TYPE 'B' LIGHTING STANDARD**  
E-22  
NOT TO SCALE



**F MOUNTING DETAIL FOR TYPE 'C' LIGHTING STANDARD**  
E-22  
NOT TO SCALE

|               |                   |      |
|---------------|-------------------|------|
| ORIGINAL PLAN | SURVEY PLOTTED BY | DATE |
| DESIGNED BY   | TRACED BY         |      |
| CHECKED BY    | NOTED BY          |      |
| NO.           |                   |      |



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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**HIGHWAY LIGHTING DETAILS**

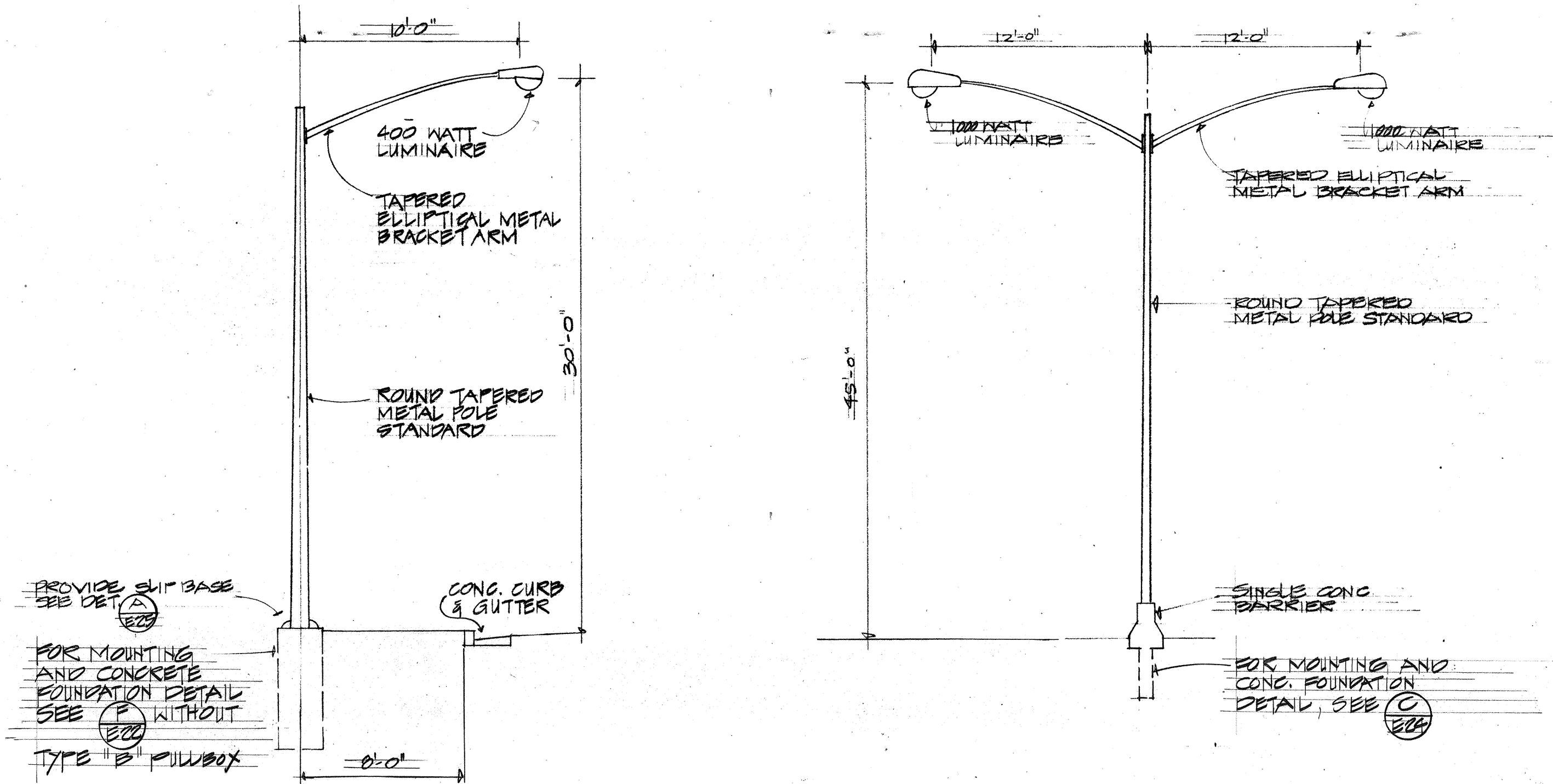
PEARL HARBOR INTERCHANGE  
F.A.I. PROJECT NO. I-HI-1(III):14  
SCALE: AS SHOWN  
DATE DEC. 14, 1973

SHEET NO. E-22 OF 40 SHEETS

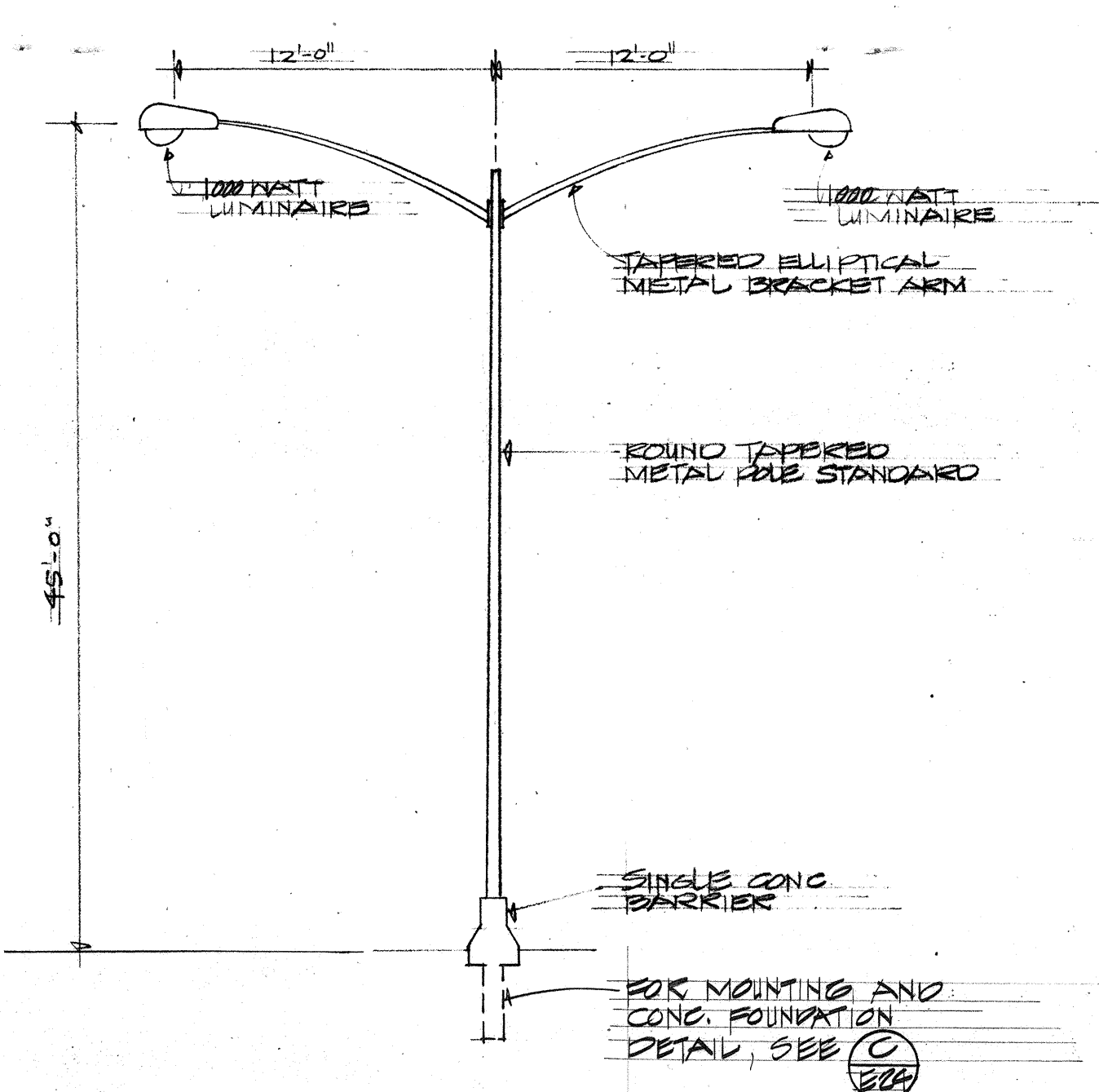
**E-22**



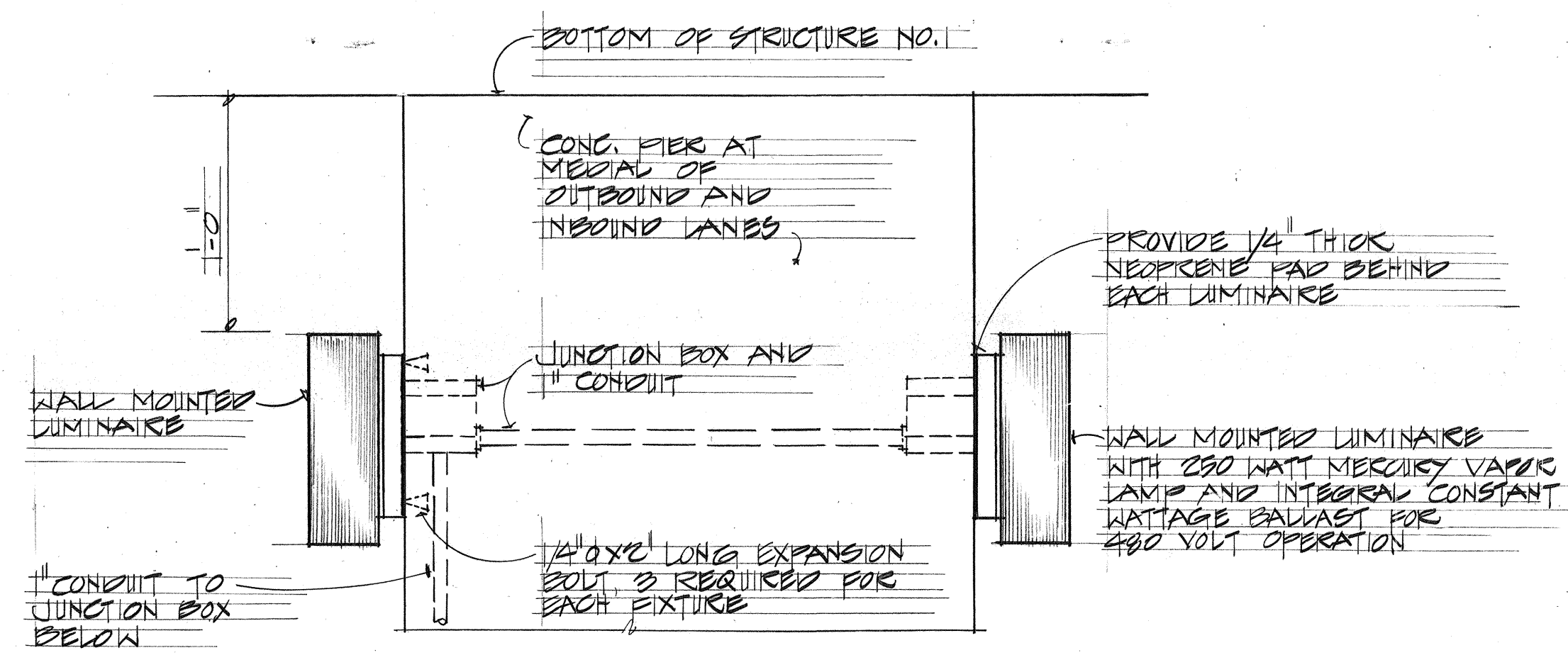
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 1-HH(III)14        | 1974        | 137       | 234          |



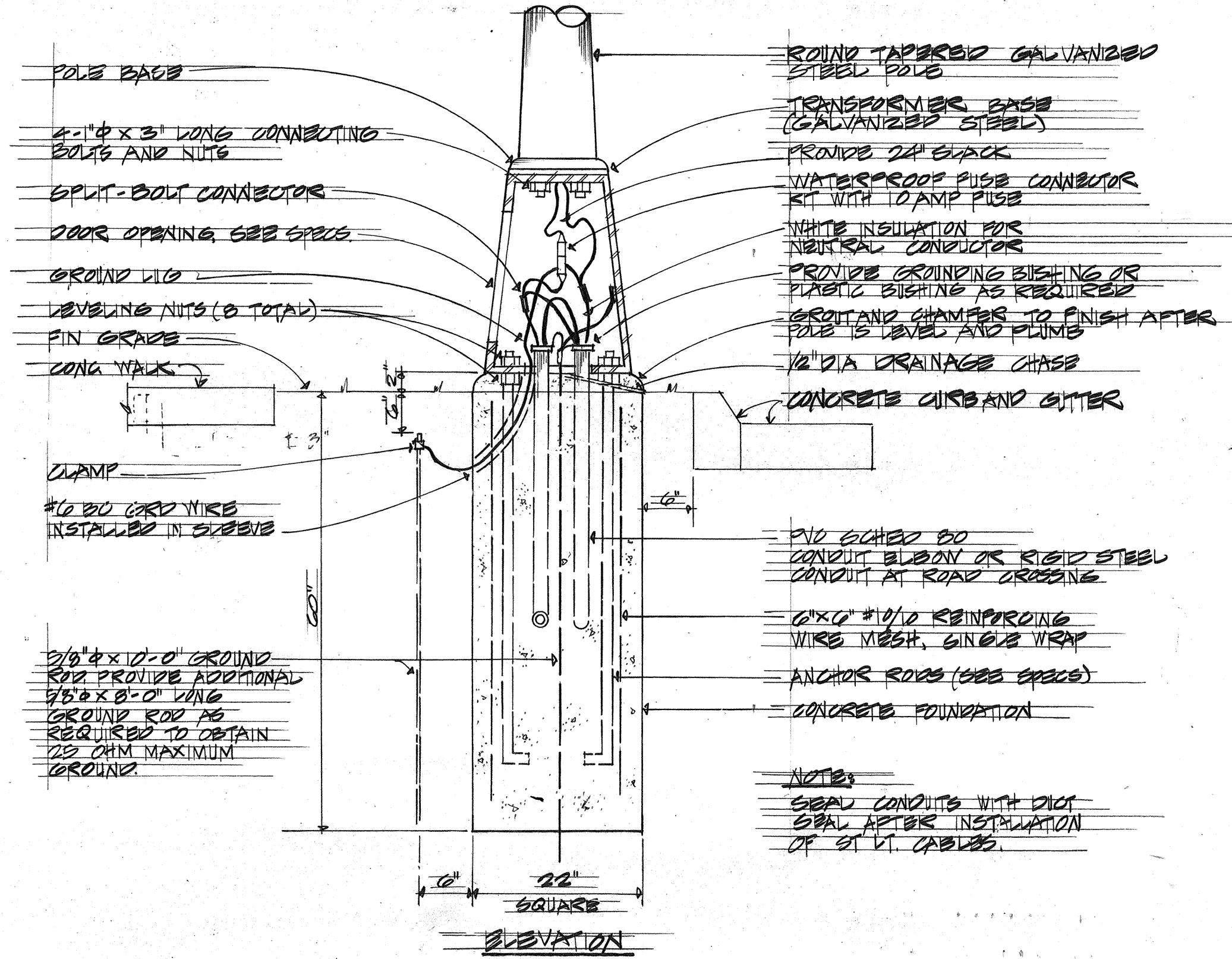
**A TYPE "A" LIGHTING STANDARD DETAIL**  
E23 NOT TO SCALE



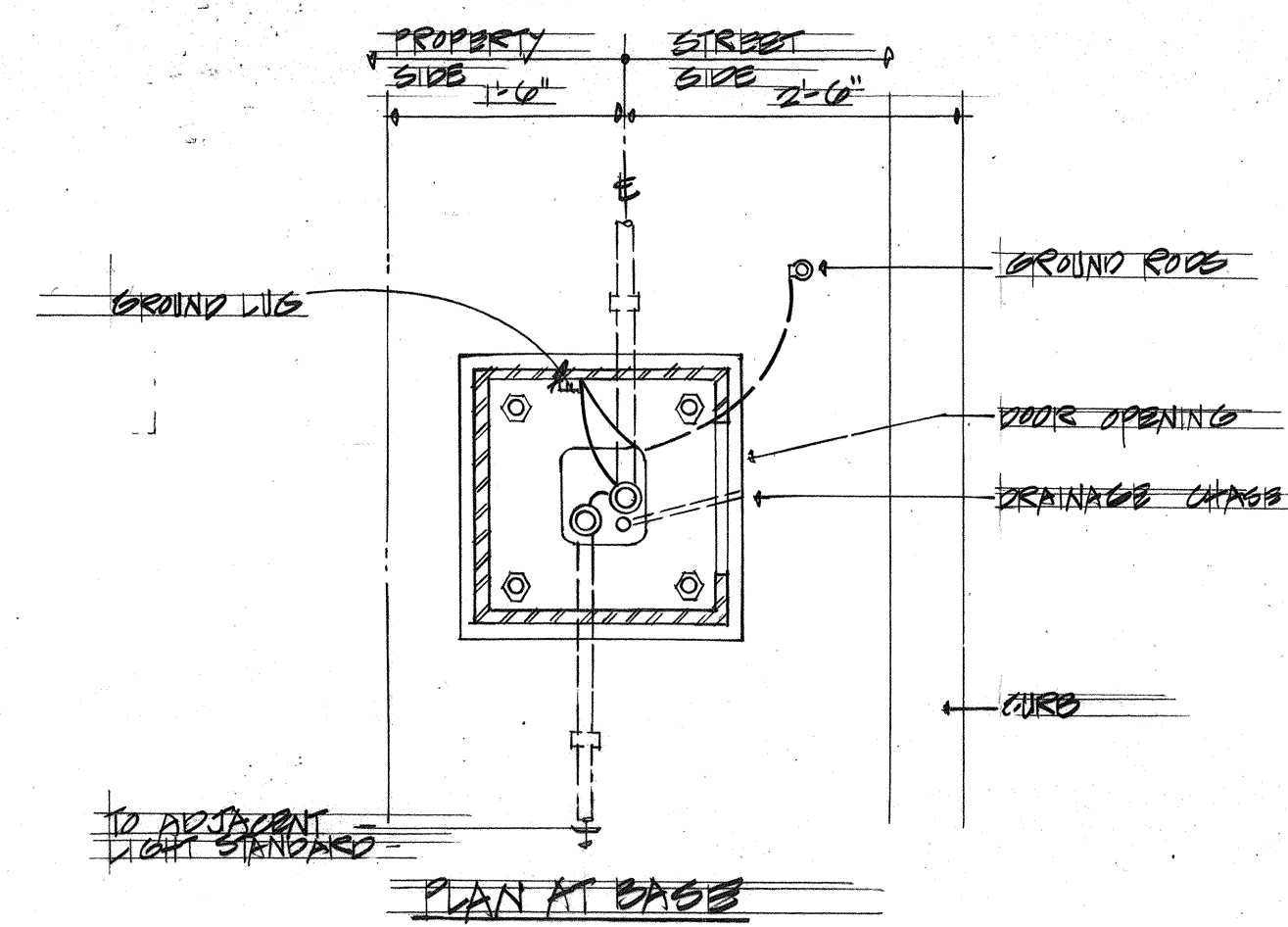
**B TYPE "B" LIGHTING STANDARD DETAIL**  
E23 NOT TO SCALE



**D UNDERPASS LIGHTING DETAIL**  
E23 NOT TO SCALE

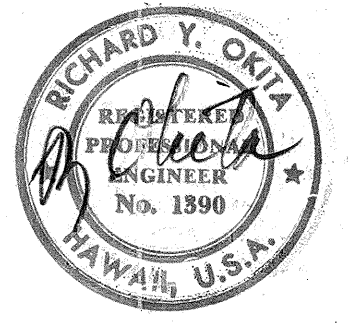


**C MOUNTING DETAIL FOR TYPE "A" LIGHTING STANDARD**  
E23 NOT TO SCALE



**E PLAN SECTION TYPE "A" LIGHTING STANDARD CONCRETE FOUNDATION**  
E23 NOT TO SCALE

|      |          |
|------|----------|
| DATE | REVISION |
| NO.  | BY       |



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

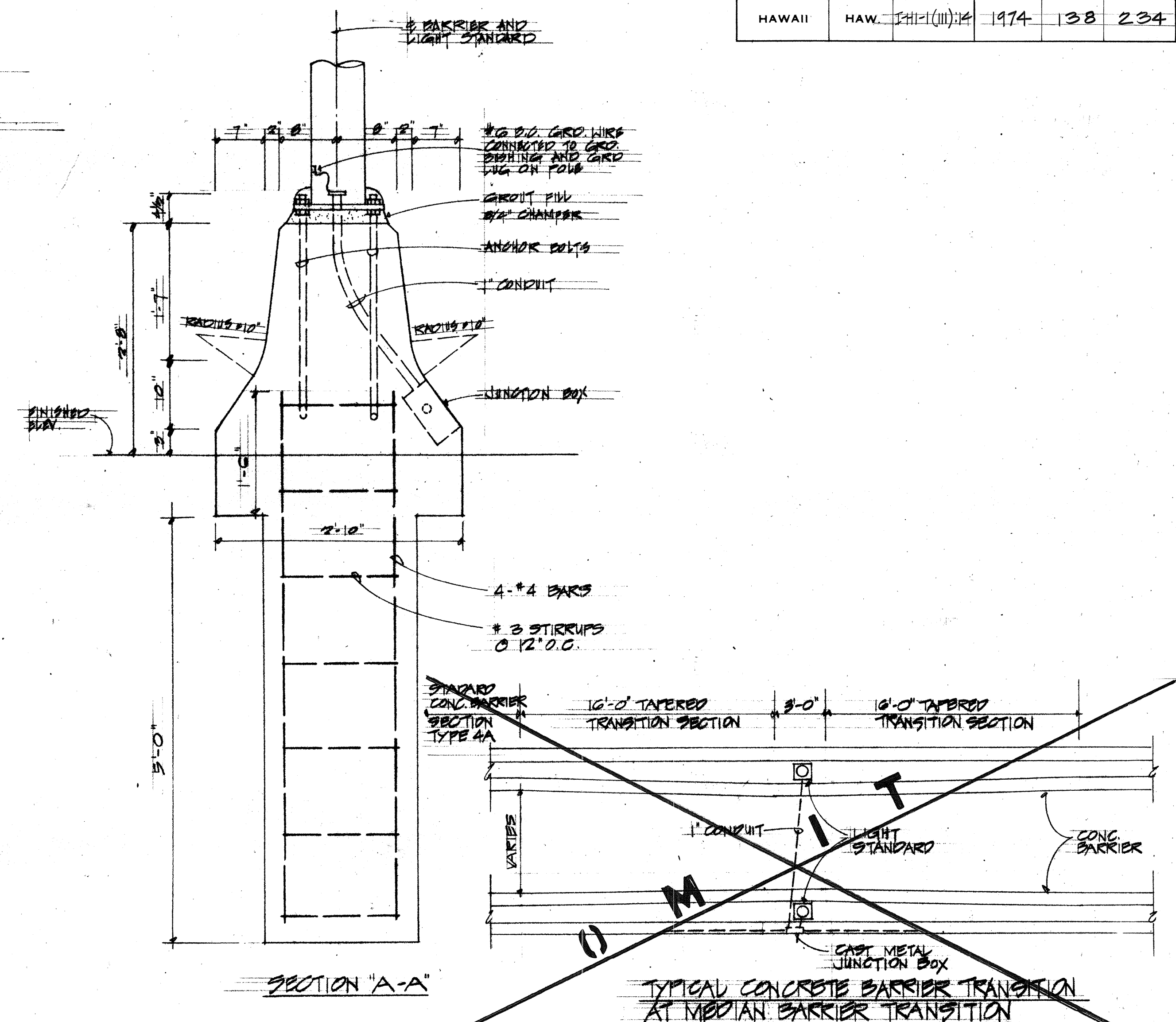
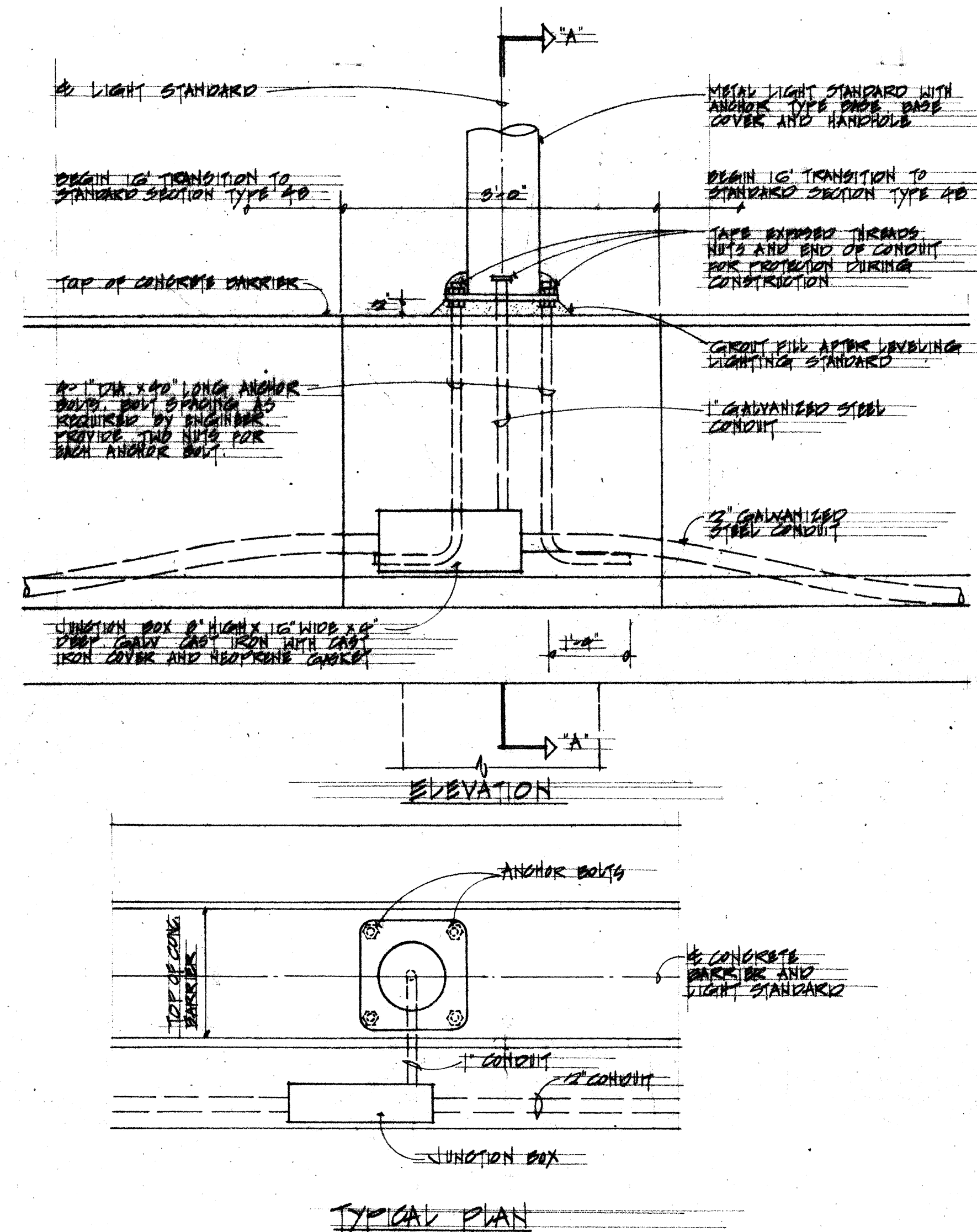
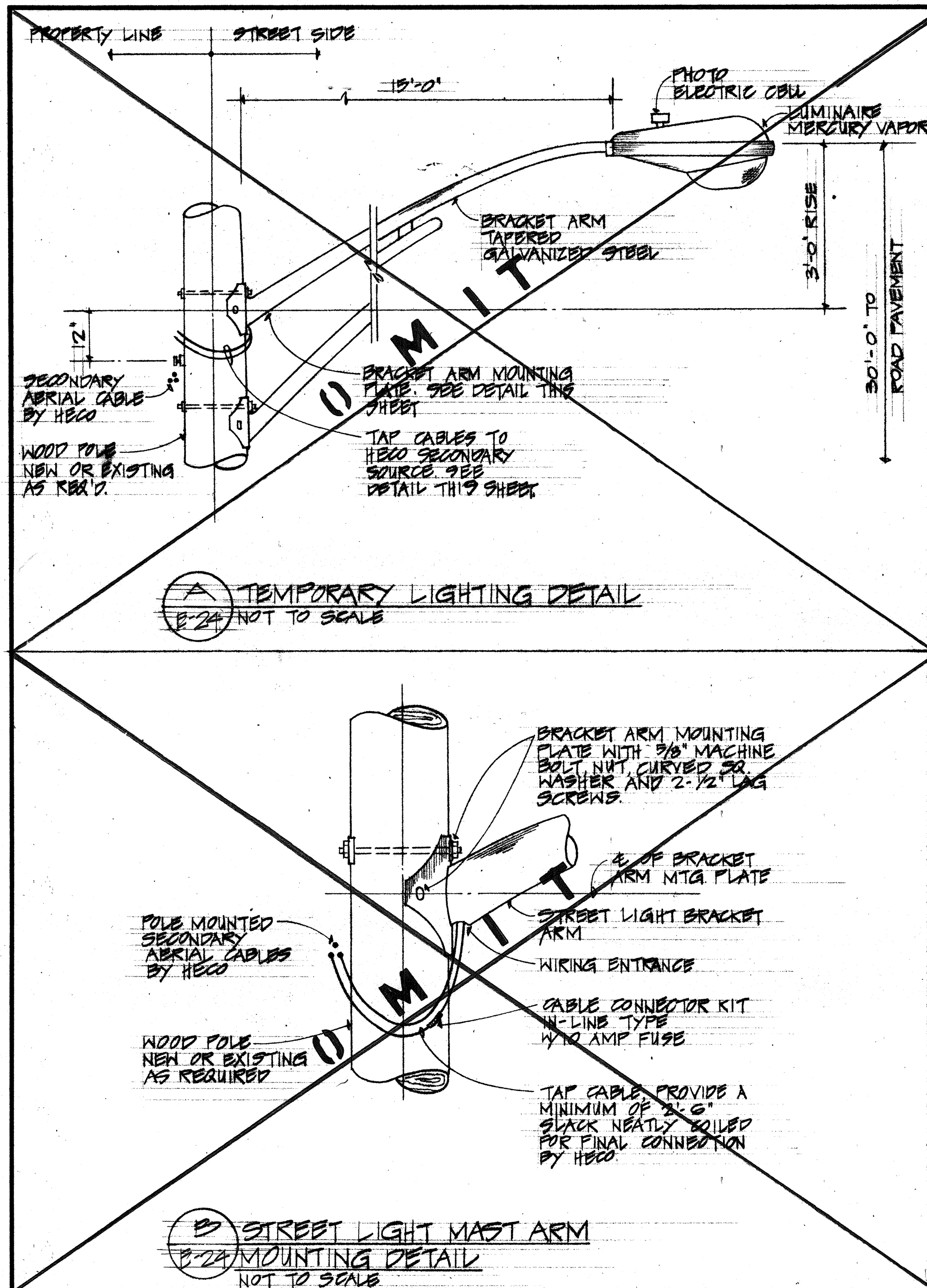
**1E-23**  
HIGHWAY LIGHTING DETAILS

PEARL HARBOR INTERCHANGE  
P.A.I. PROJECT NO. 1-HI-1(III)14  
SCALE: AS SHOWN DATE: DEC. 14, 1973

SHEET NO. E23 OF 40 SHEETS



| FED. ROAD<br>DIST. NO. | STATE | FED. AID<br>PROJ. NO. | FISCAL<br>YEAR | SHEET<br>NO. | TOTAL<br>SHEETS |
|------------------------|-------|-----------------------|----------------|--------------|-----------------|
| HAWAII                 | HAW.  | 141-1(III)-14         | 1974           | 38           | 234             |



|                  |                                    |
|------------------|------------------------------------|
| ORIGINAL<br>PLAN | SURVEY PLOTTED BY _____ DATE _____ |
| NOTE BOOK        | DRAWN BY _____                     |
|                  | TRACED BY _____                    |
|                  | DESIGNED BY _____                  |
|                  | QUANTITIES BY _____                |
| NO. _____        | CHECKED BY _____                   |

**E-24**

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

## HIGHWAY LIGHTING DETAILS

PEARL HARBOR INTERCHANGE

F.A.I. PROJECT NO. I-HI-1(III):14

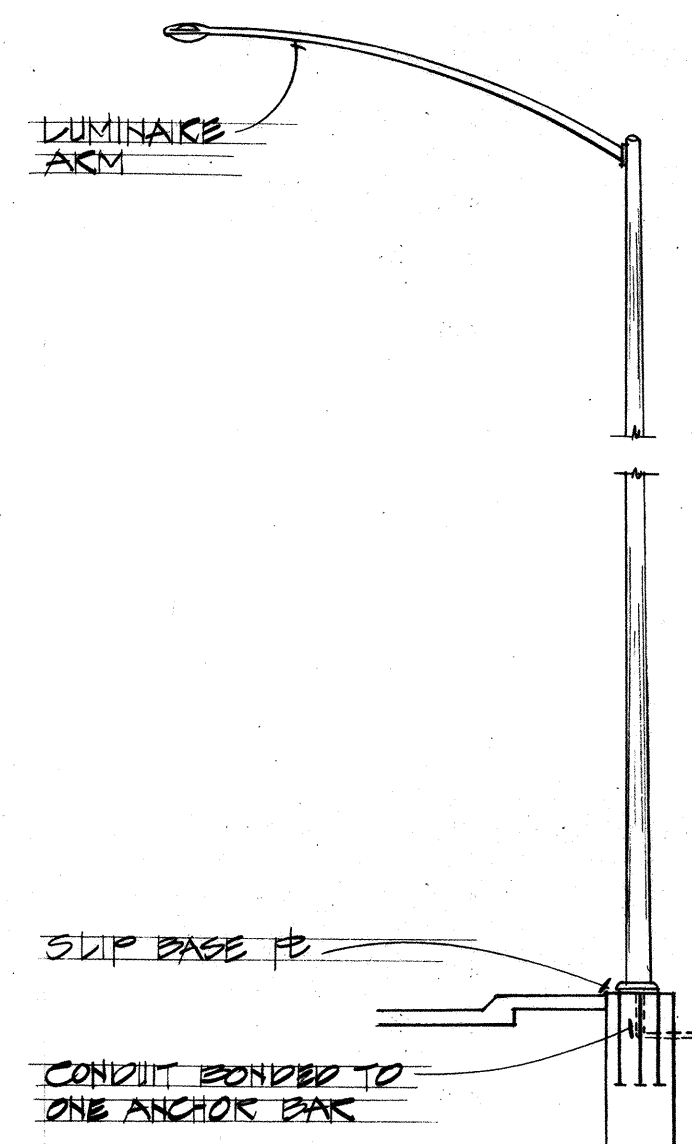
SCALE: AS SHOWN      DATE: DEC. 14, 1973

SHEET NO. ~~F-24~~ OF 40 SHEETS

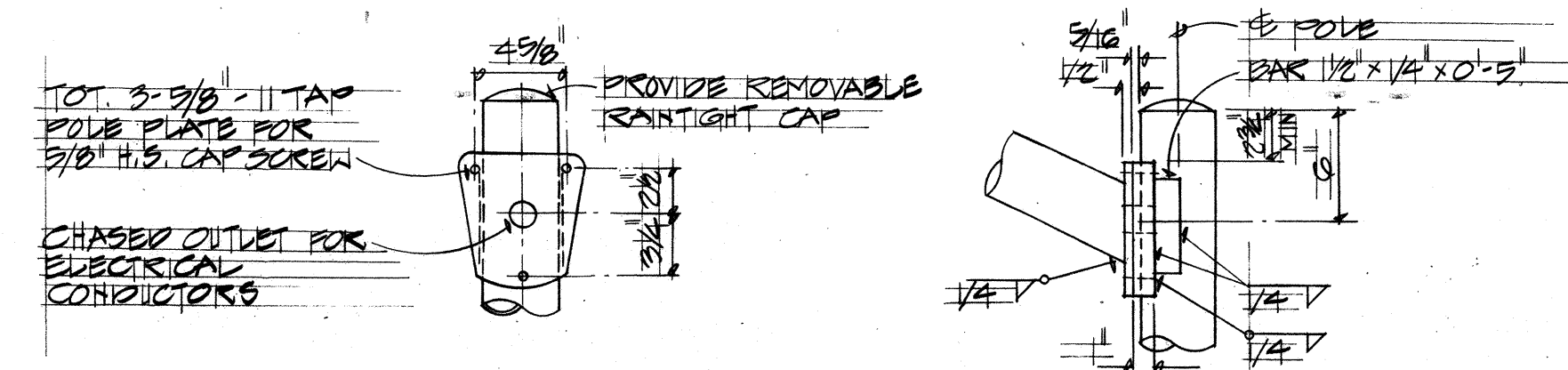
THIS WORK WAS PREPARED BY  
ME OR UNDER MY SUPERVISION.



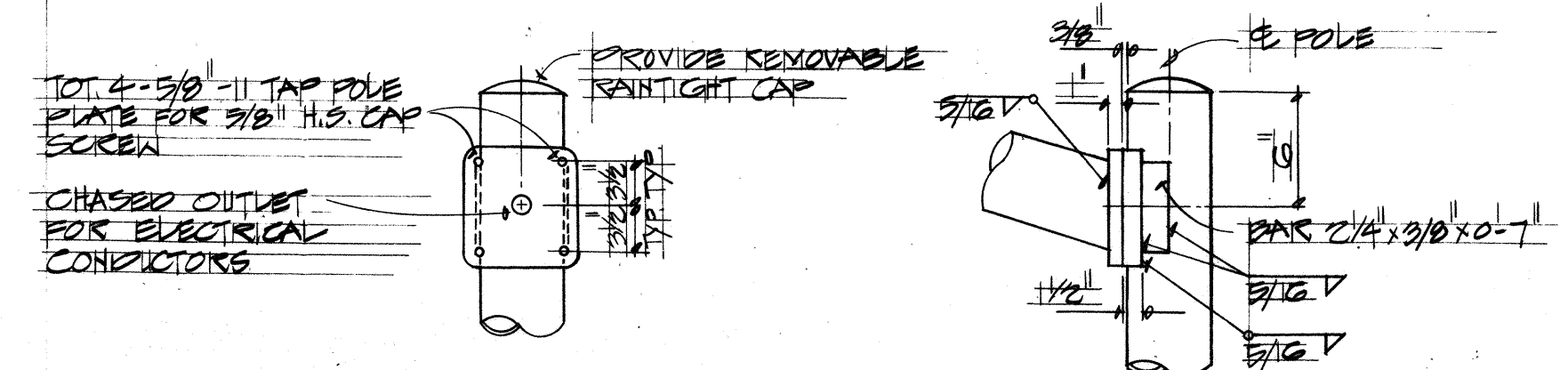
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 1-111(111)14       | 1974        | 139       | 234          |



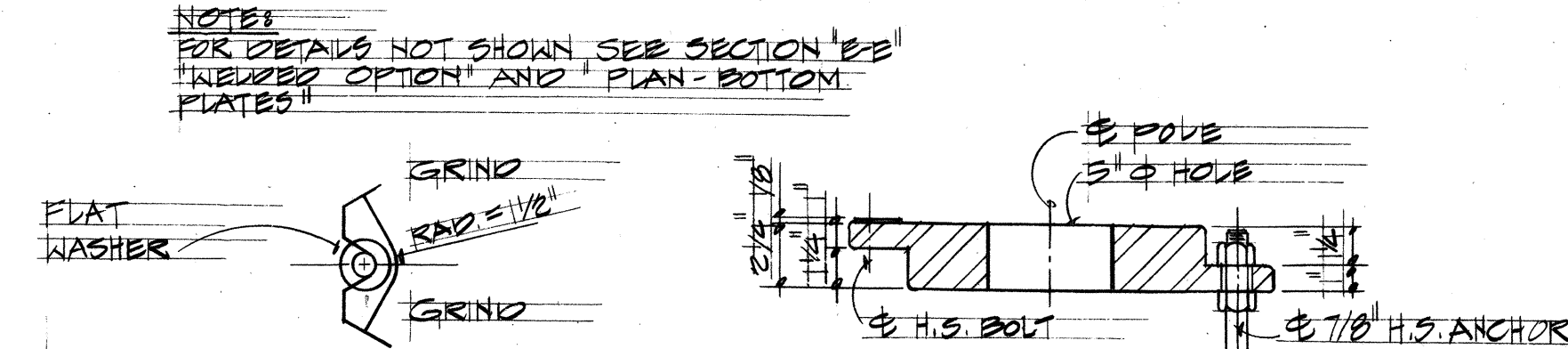
ELEVATION



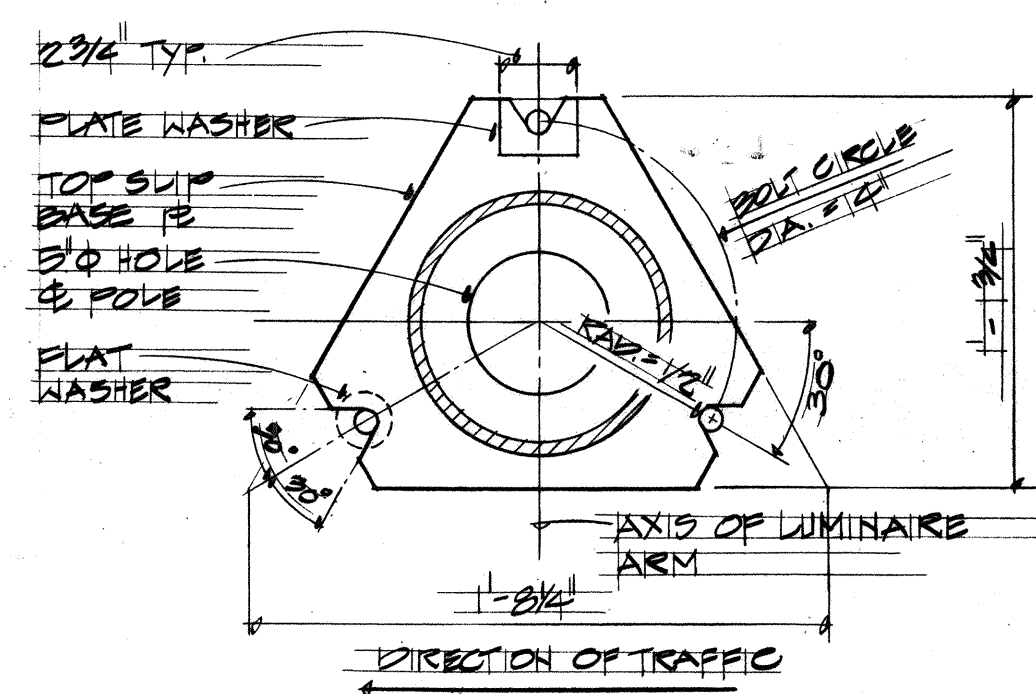
DETAIL A



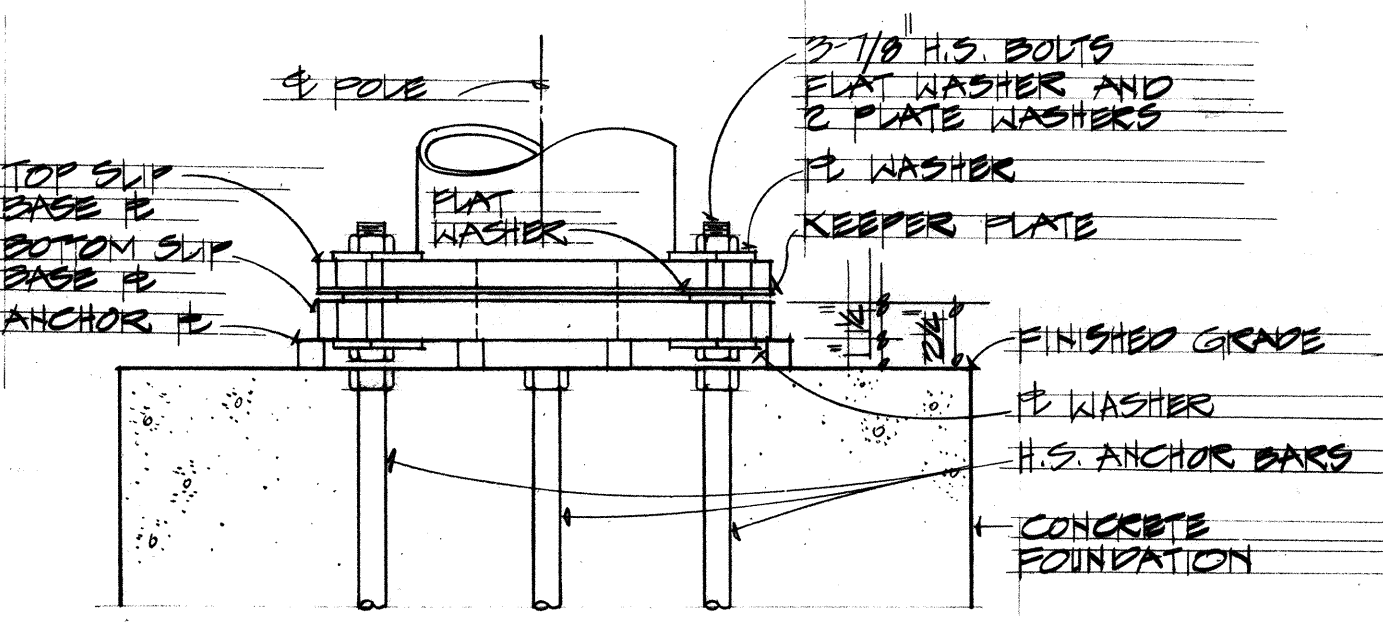
DETAIL A



CAST OPTION



PLAN - TOP PLATE



ELEVATION

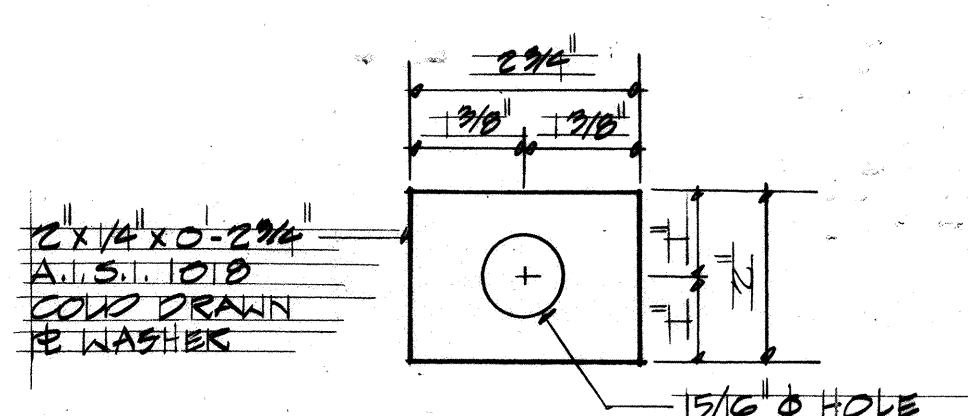
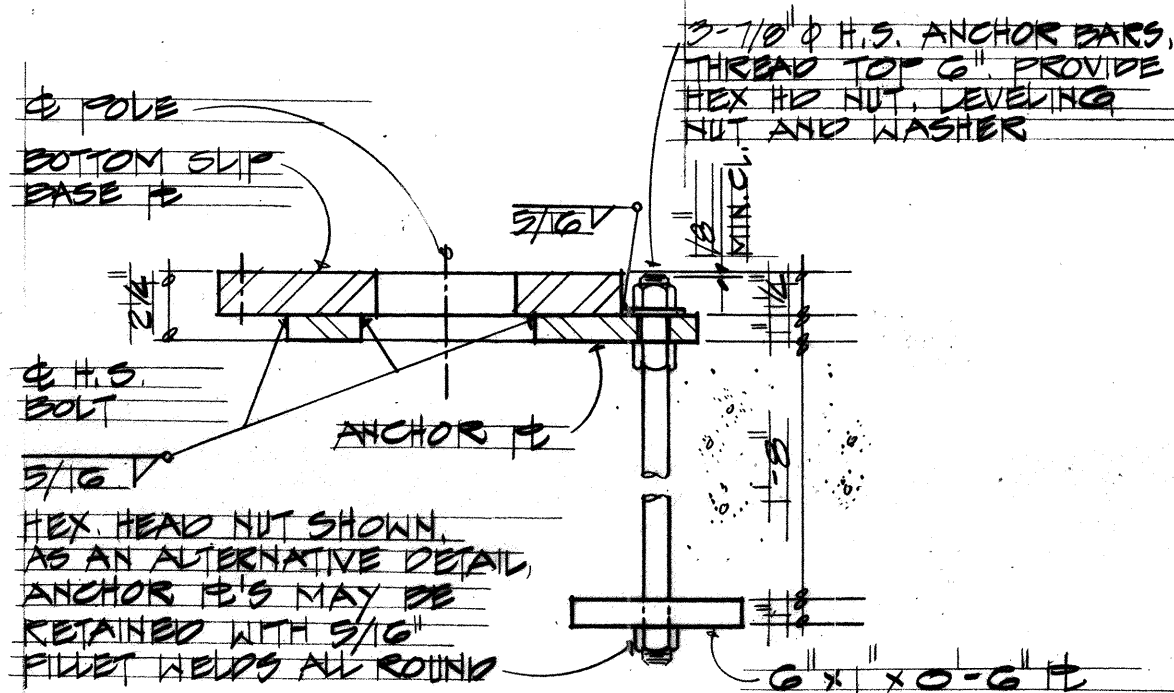
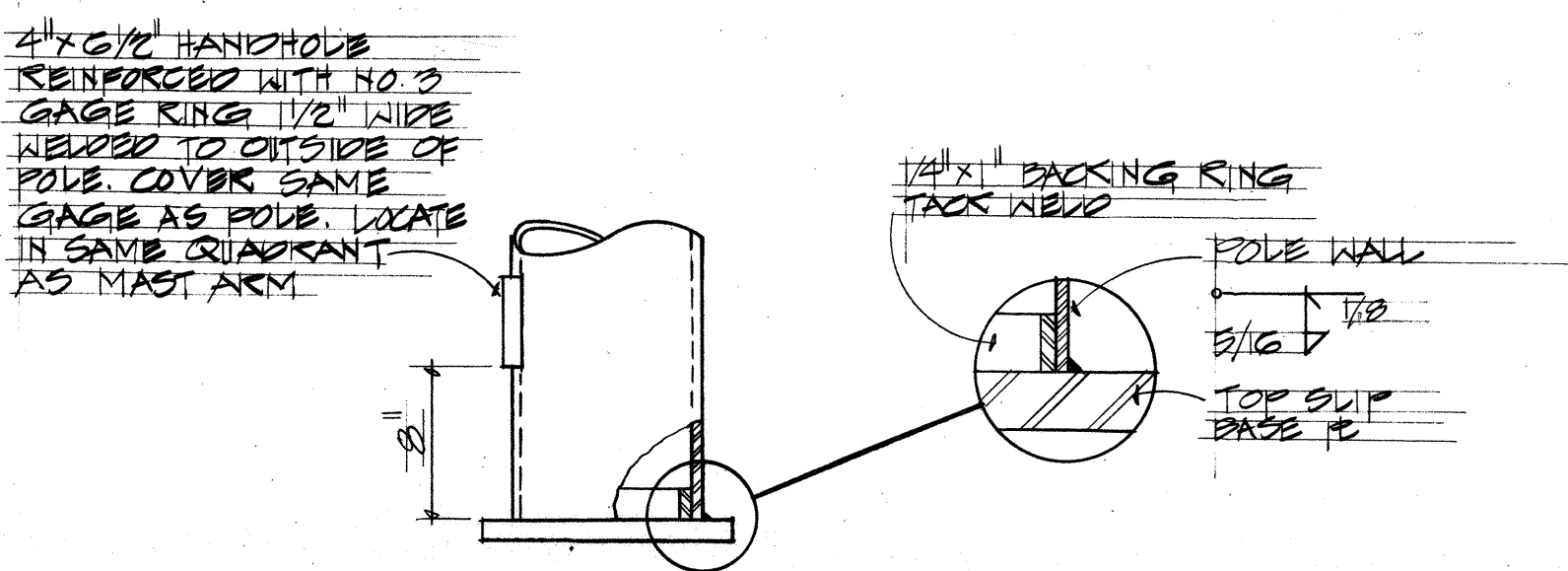


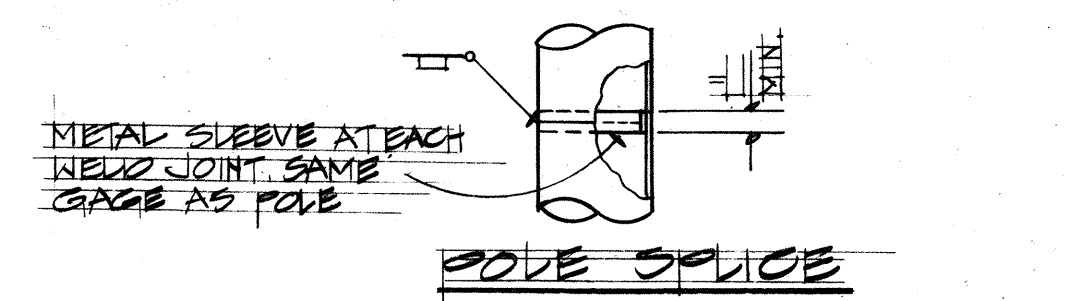
PLATE WASHER



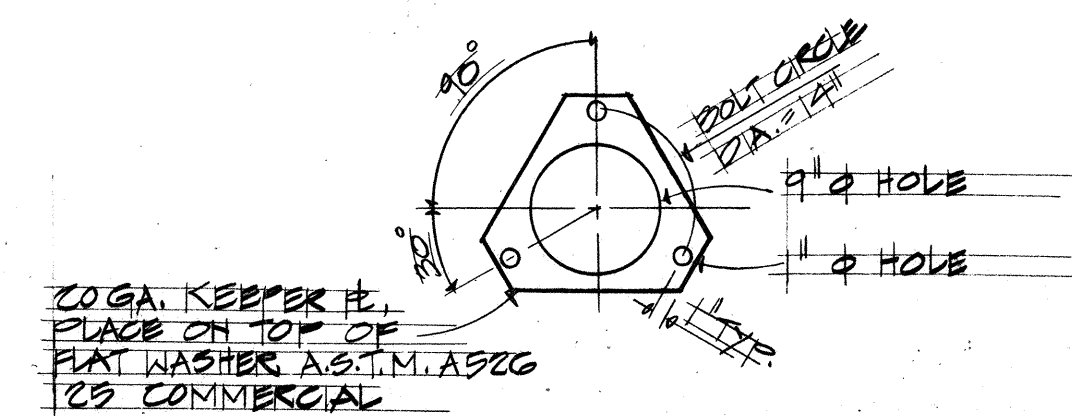
HELPED OPTION SECTION E-E



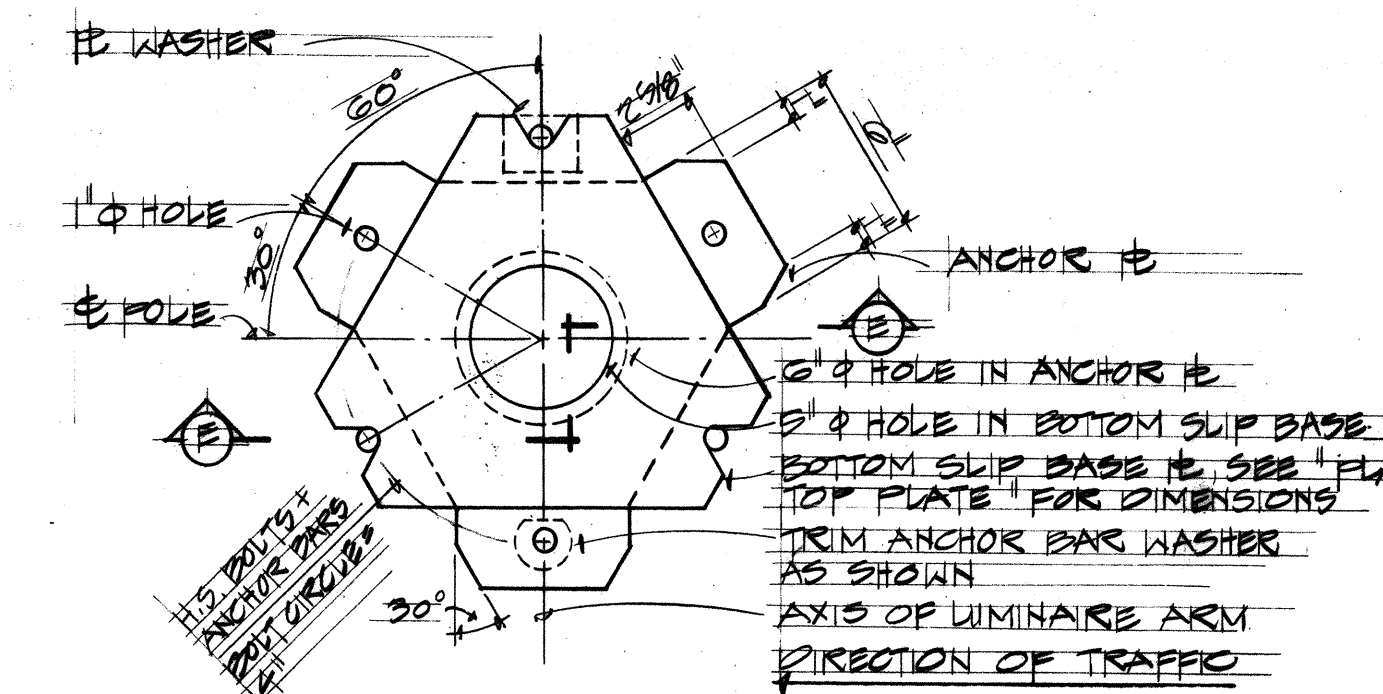
DETAIL B



POLE SPLICING



KEEPER PLATE



PLAN - BOTTOM PLATES

SUP BASE PLATE DETAILS

A TYPICAL SUP BASE INSERT DETAIL FOR HIGHWAY LIGHTING STANDARDS NOT TO SCALE

|                   |      |
|-------------------|------|
| ORIGINAL PLAN     | DATE |
| SURVEY PLOTTED BY |      |
| DRAWN BY          |      |
| CHECKED BY        |      |
| NOTED BY          |      |
| QUANTITIES BY     |      |
| CHECKED BY        |      |
| NO.               |      |

B. Chik

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|                                 |                              |
|---------------------------------|------------------------------|
| STATE OF HAWAII                 | DEPARTMENT OF TRANSPORTATION |
| HIGHWAYS DIVISION               |                              |
| HIGHWAY LIGHTING DETAILS        |                              |
| PEARL HARBOR INTERCHANGE        |                              |
| F.A.I. PROJECT NO. I-H-1(111)14 |                              |
| SCALE AS SHOWN                  | DATE DEC. 14, 1973           |
| SHEET NO. E-25 OF 40 SHEETS     |                              |

E-25

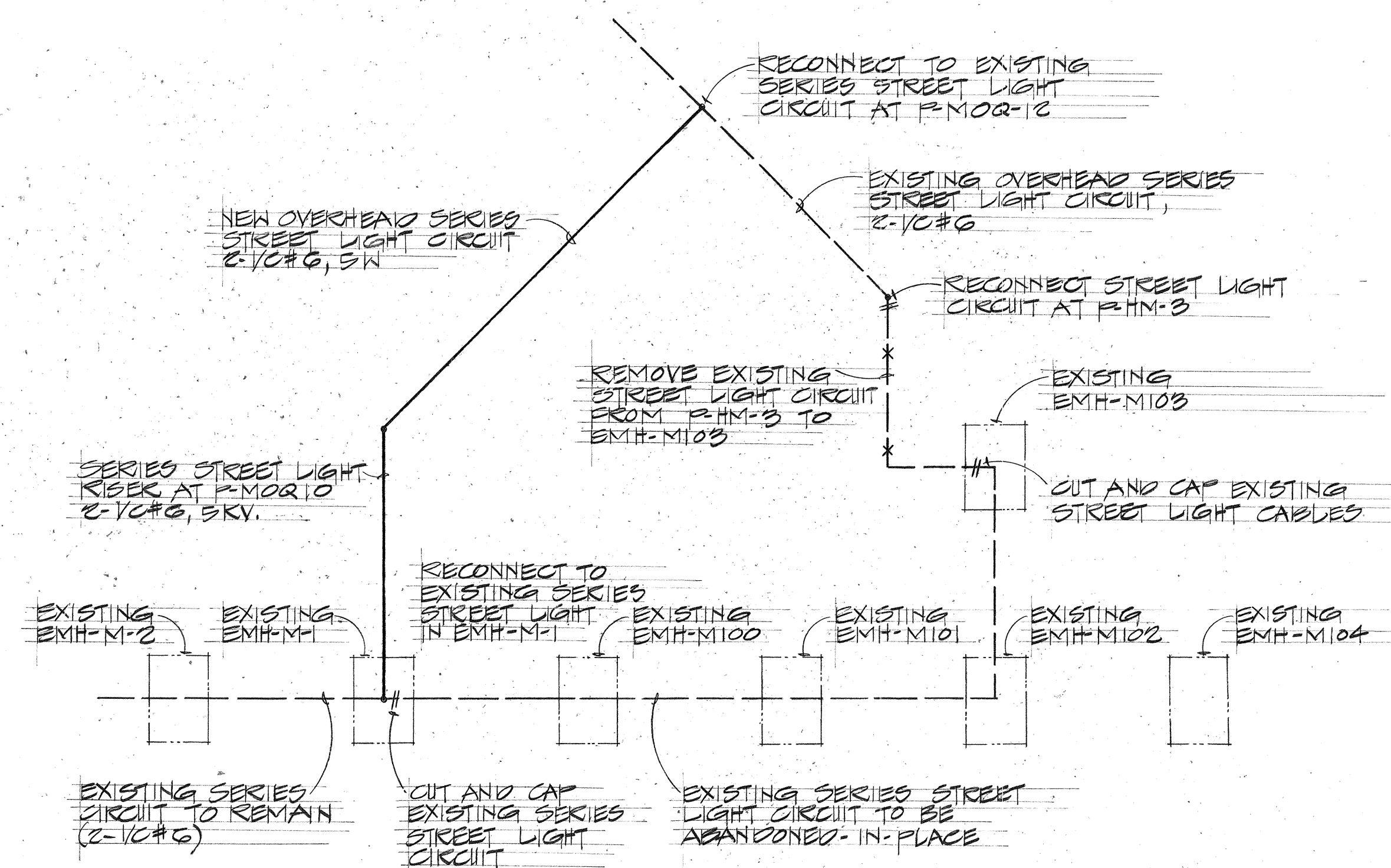


CCO #16  
7-17-75

Diagram 1 (Left):  
#1 BALLAST ASSIGNMENT  
#2 BALLAST ASSIGNMENT  
SHOULDER  
RAMP-WN  
SHOULDER  
BALLAST AND TRANSFORMER HOUSING  
SIGN E-1  
RAMP WN @ STA 11+00

Diagram 2 (Middle):  
BALLAST ASSIGNMENT  
#1 BALLAST ASSIGNMENT  
#2 BALLAST ASSIGNMENT  
BALLAST AND TRANSFORMER HOUSING  
SHOULDER  
H-1 INBOUND  
SHOULDER  
SIGN E-5  
H-1 INBOUND @ STA 56+00

Diagram 3 (Right):  
#1 BALLAST ASSIGNMENT  
#2 BALLAST ASSIGNMENT  
SHOULDER  
H-1 INBOUND  
RAMP WN  
SHOULDER  
BALLAST AND TRANSFORMER HOUSING  
SIGN E-6  
RAMP WN @ STA 2+50



PARTIAL ONE LINE DIAGRAM  
NAVY SERIES STREET LIGHTING SYSTEM

# PARTIAL ONE LINE DIAGRAM - NAVY FIRE ALARM SYSTEM



STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

SIGN LIGHTING, PARTIAL  
ONE LINE DIAGRAM -  
NAVY FIRE ALARM SYSTEM  
AND STREET LIGHTING SYSTEM

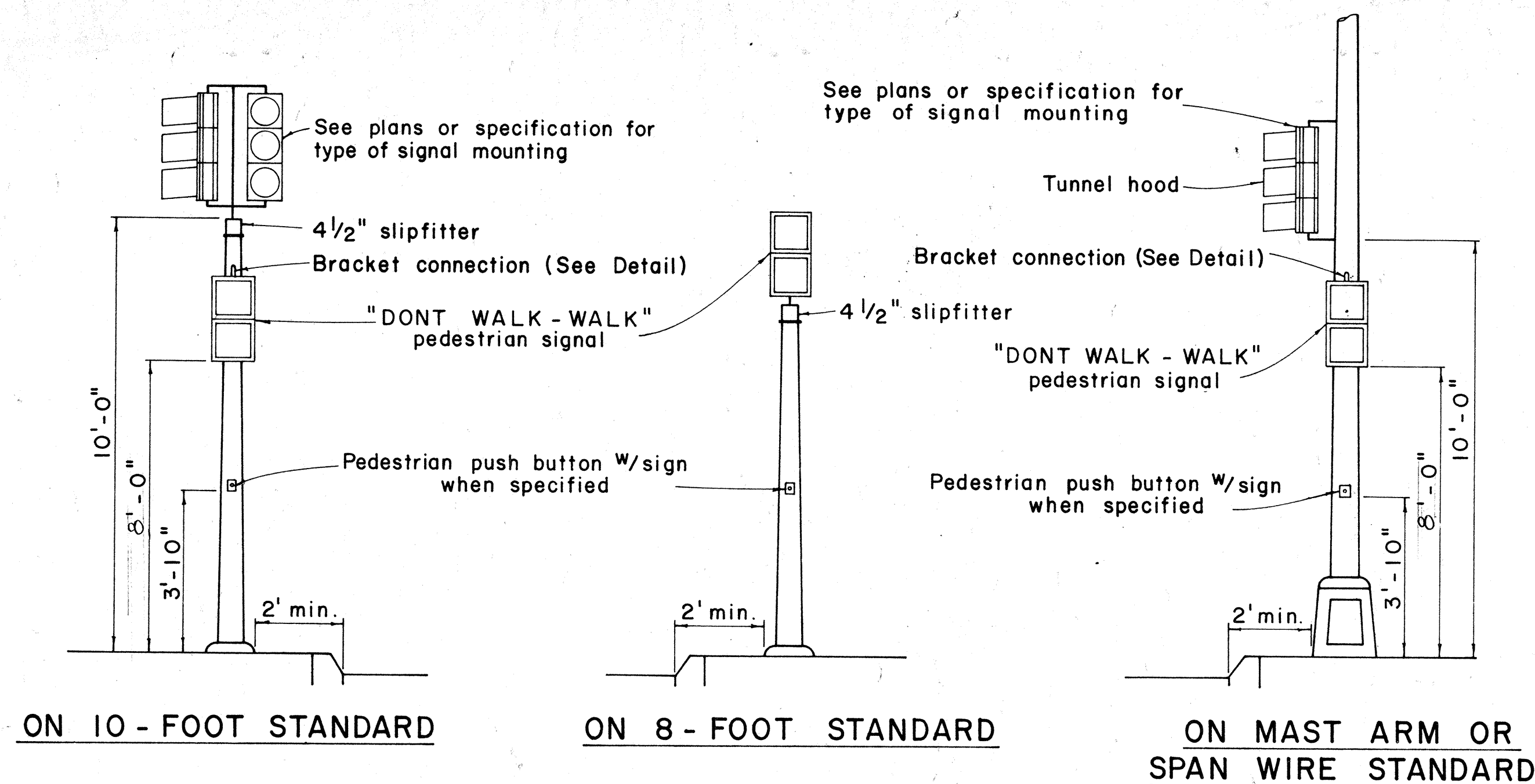
PEARL HARBOR INTERCHANGES  
F.A.I. PROJ. NO. I-#1-1 (111) 14

SCALE: AS SHOWN DATE: DEC. 14, 1983

SHEET No. E-26 OF 40 SHEETS

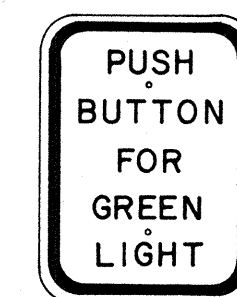


| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 141-1(III)14       | 1974        | 234       | 234          |

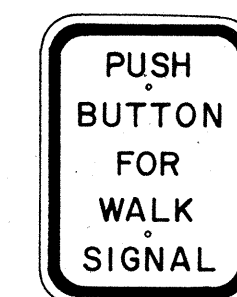


**TYPICAL EQUIPMENT MOUNTINGS**

TRAFFIC SIGN AS SPECIFIED IN PLAN  
1. "PUSH BUTTON FOR GREEN LIGHT" (RIO-3)  
2. "PUSH BUTTON FOR WALK SIGNAL" (RIO-4)



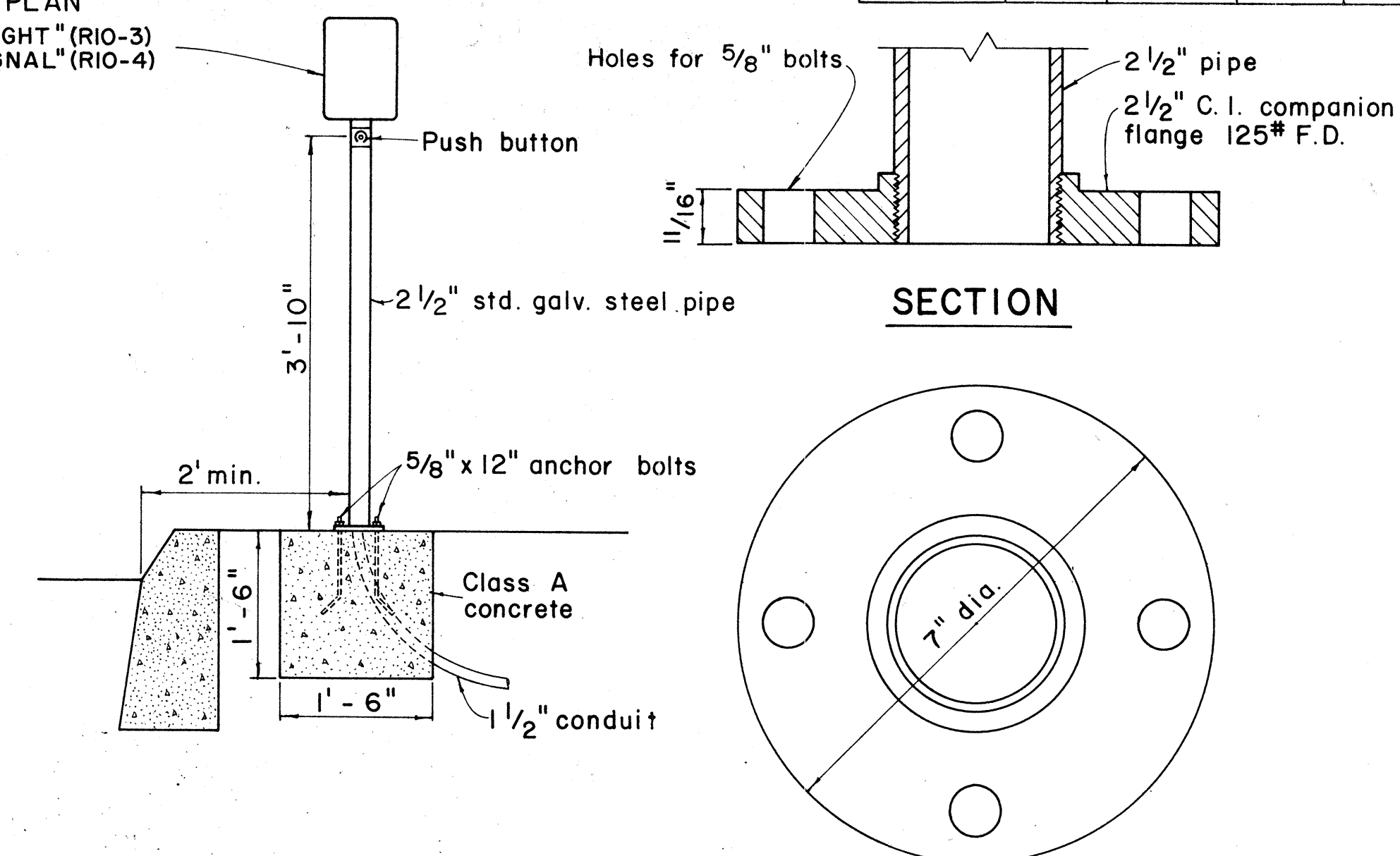
RIO-3  
9" x 12"



RIO-4  
9" x 12"

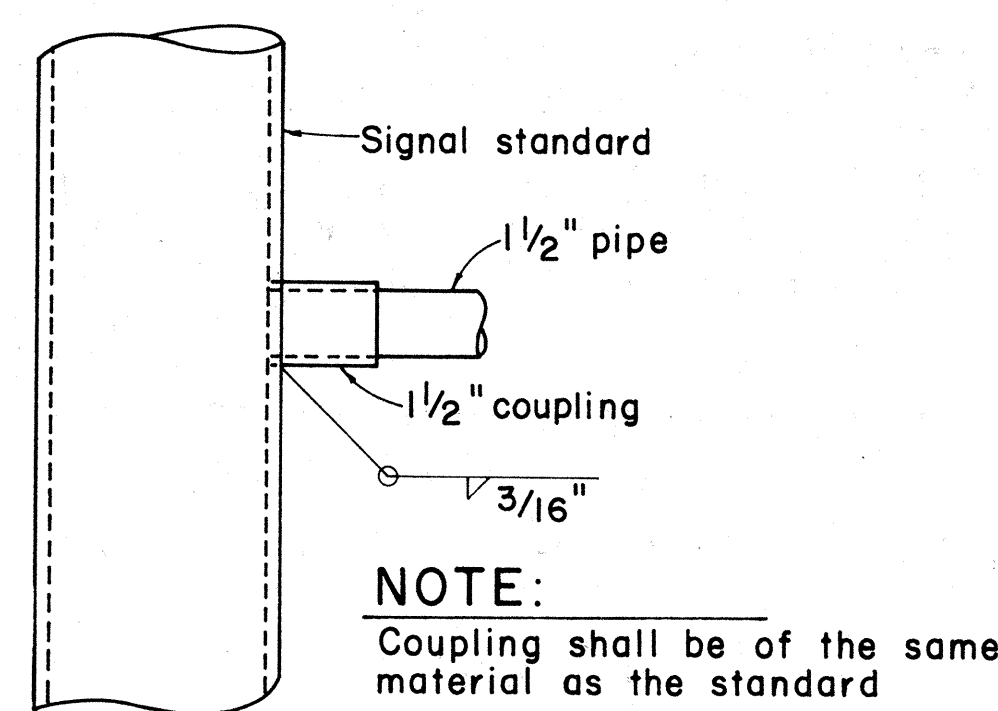
**NOTE:**

1. Conduits shall protrude 2" max. above finished surface of foundation.
2. Conduits shall slope away from pole foundation.
3. Post and base shall be painted with one coat of approved weather proof dark green enamel.

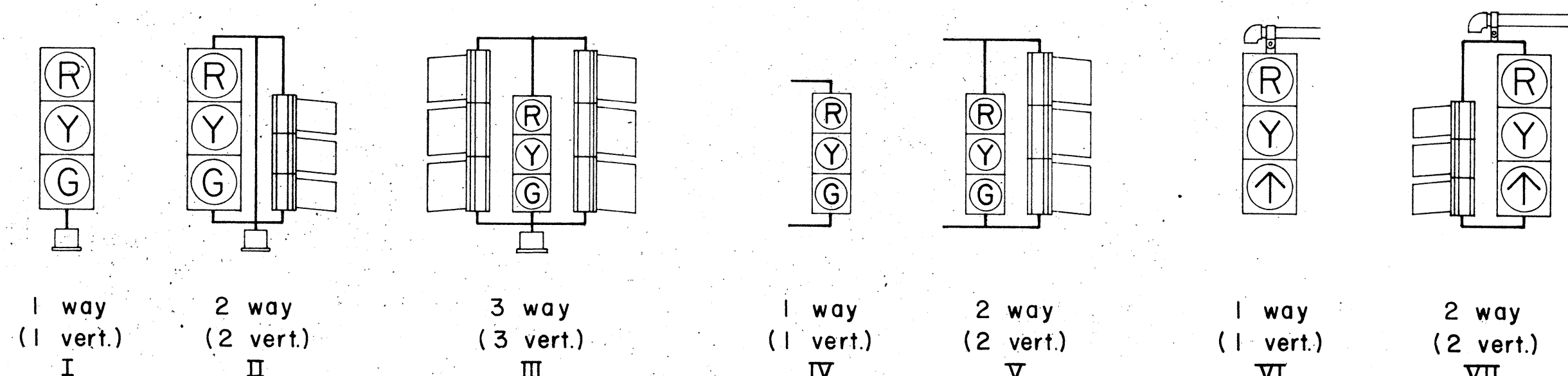
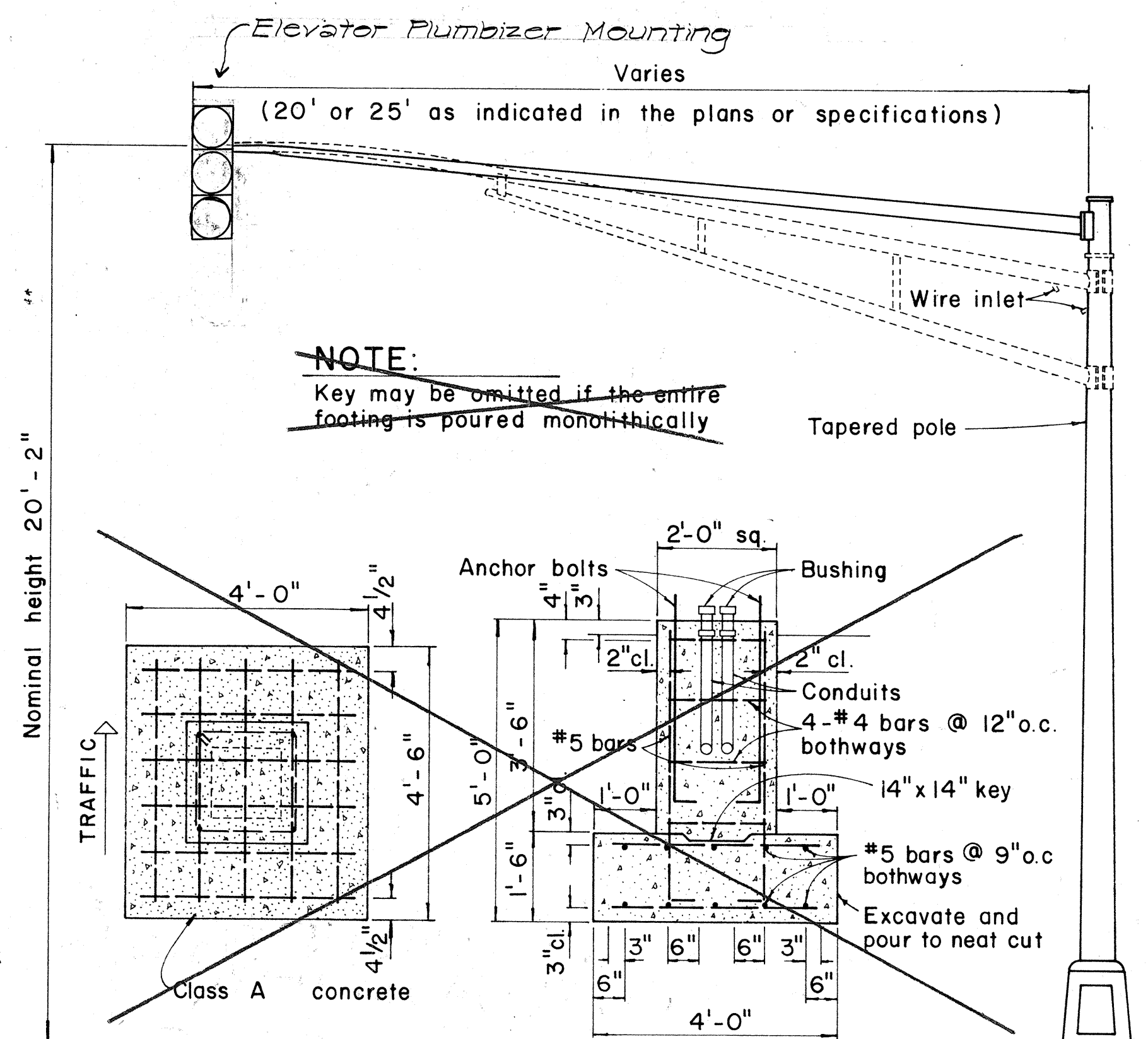


**BASE DETAIL**

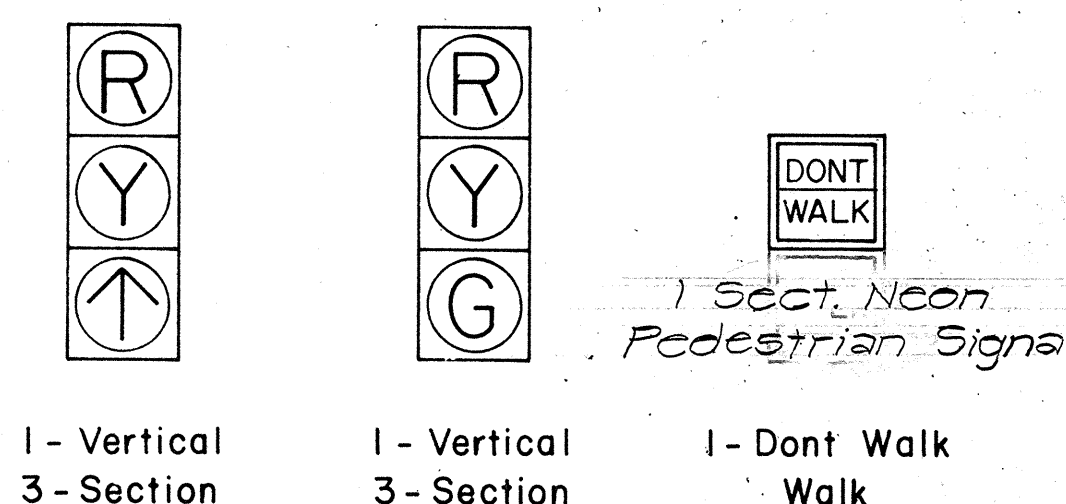
**PEDESTRIAN PUSH BUTTON POST AND FOOTING**



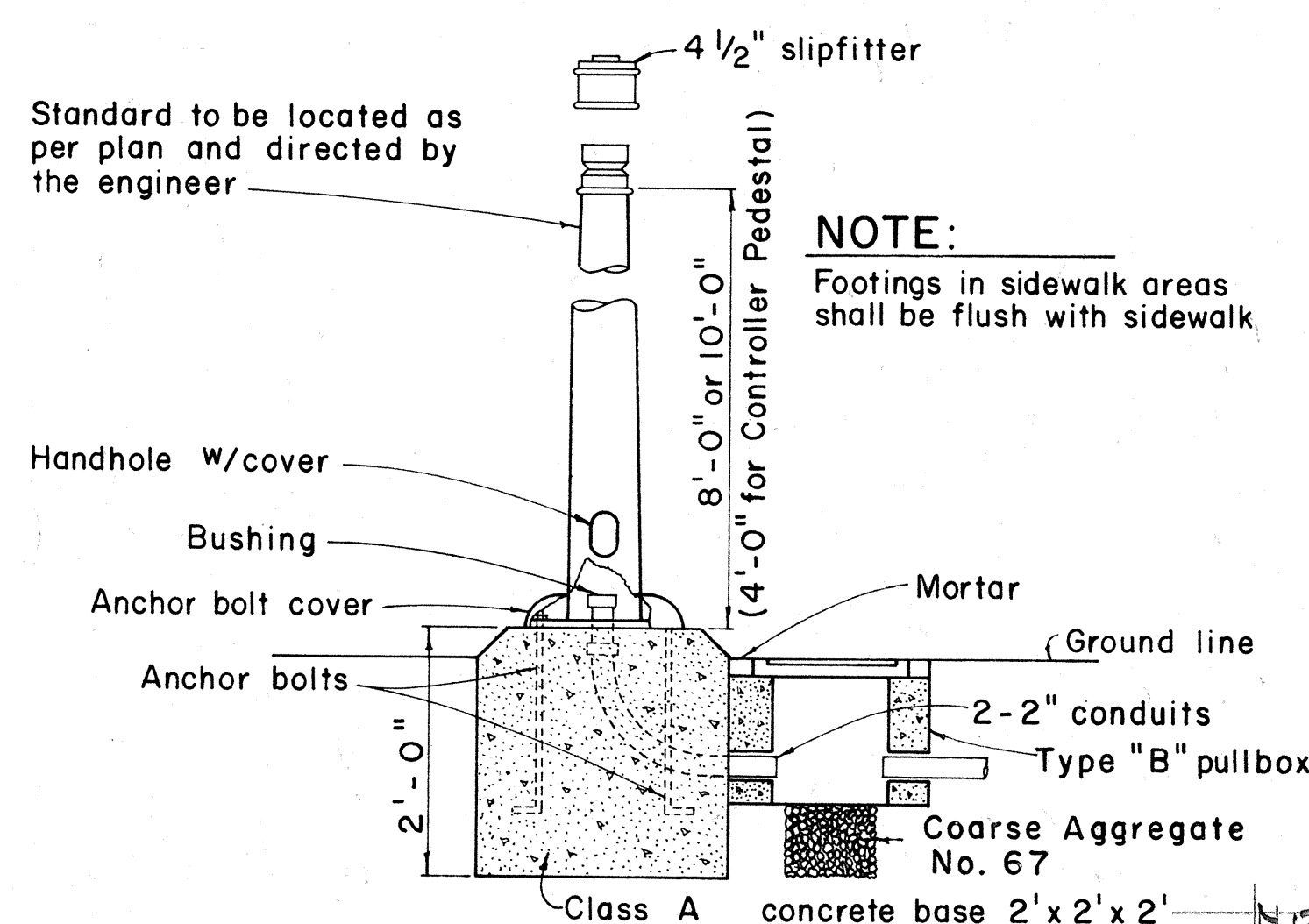
**DETAIL OF BRACKET CONNECTION**



**TYPICAL VEHICULAR AND PEDESTRIAN SIGNAL MOUNTINGS**



**TYPICAL SIGNAL ARRANGEMENTS**

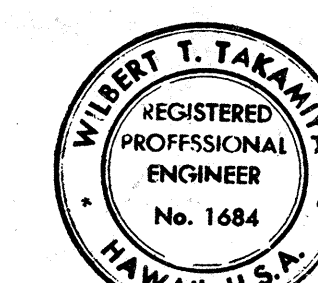
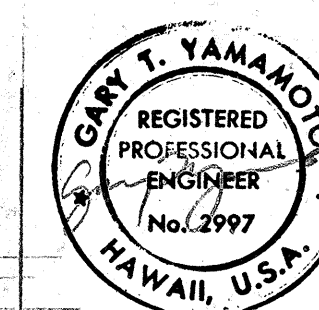


**FOOTING FOR SIGNAL STANDARD OR CONTROLLER PEDESTAL**

**NOTE:**  
FOR MAST ARM FOOTING DETAIL SEE SHT. # 2014 8-1  
**MAST ARM FOOTING AND STANDARD**

CCO#41 7-776  
4-2-76 DELETE MAST ARM FOOTING DETAIL

DATE REVISION



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STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**TRAFFIC SIGNAL SYSTEM  
MISCELLANEOUS DETAILS**

PEARL HARBOR INTERCHANGE  
P.A.I. PROJECT NO. I-H-1(III)14

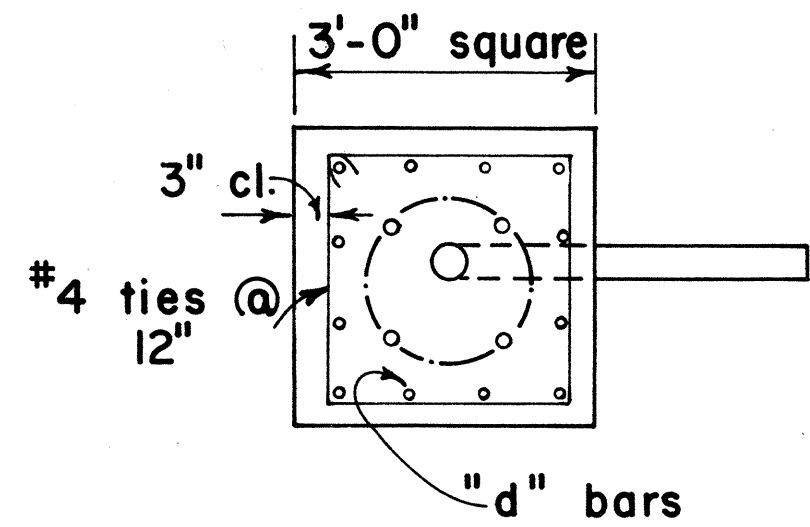
Not to Scale DATE: DEC. 14, 1973

SHEET No. 27 OF 40 SHEETS DT 400

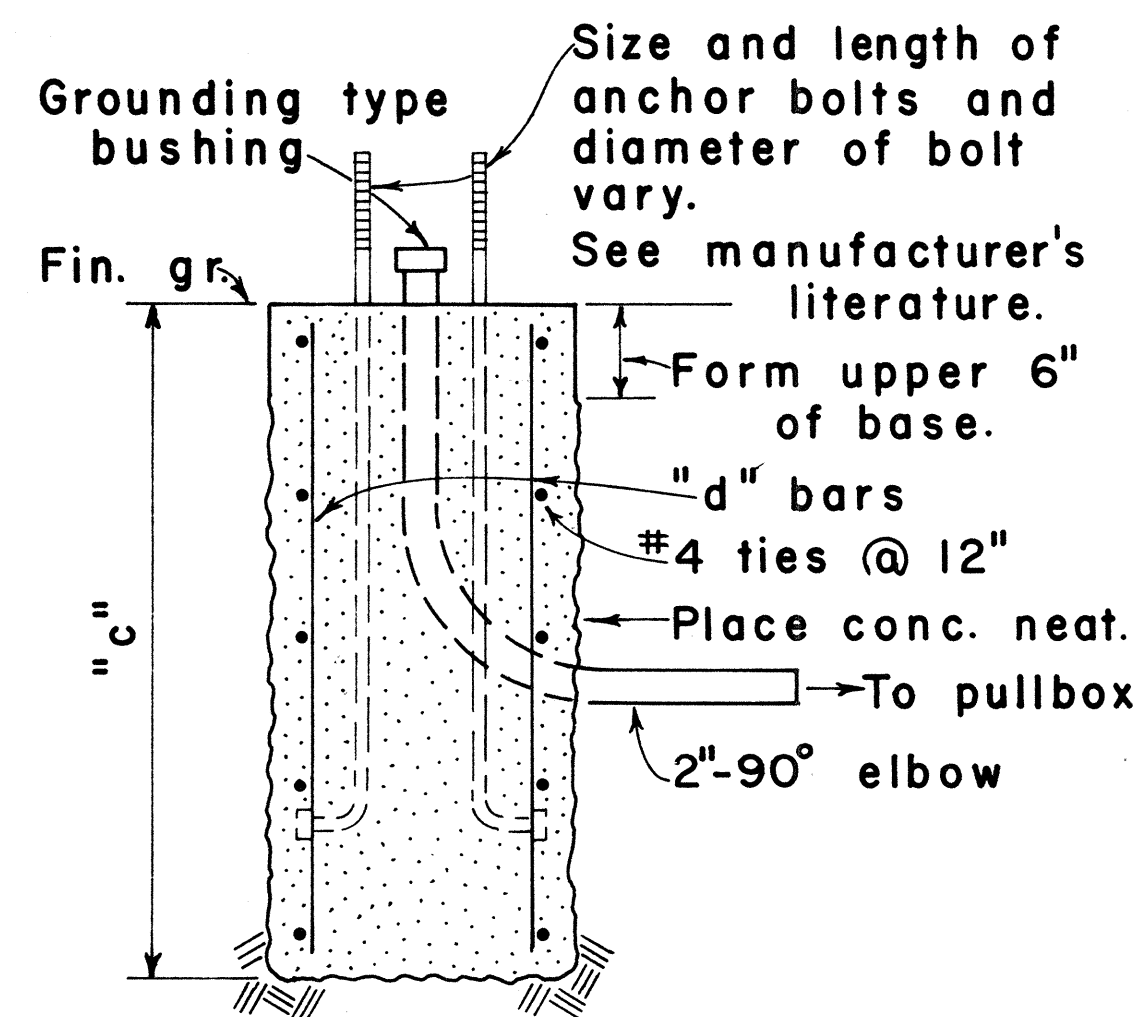
C.O. 141



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 541-1014           | 1976        | 284       | 284          |



PLAN - SECTION

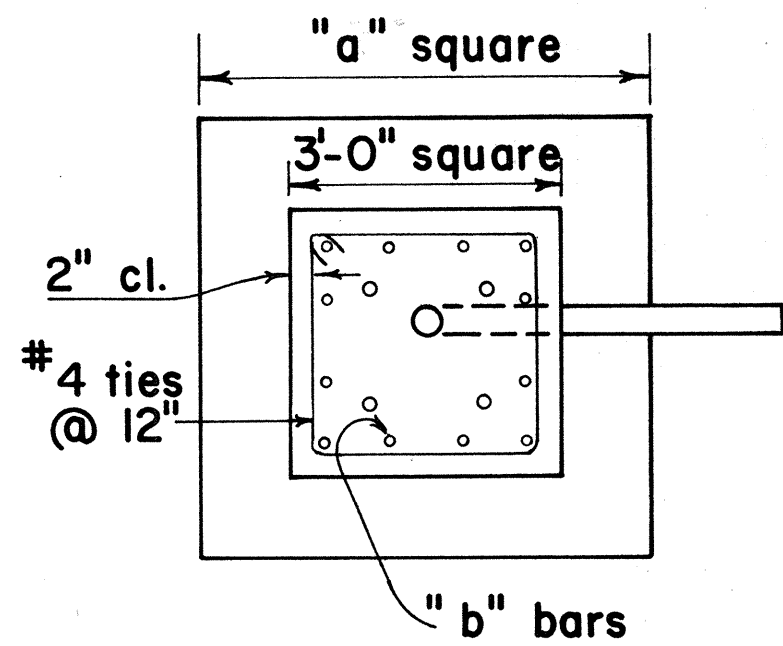


NOTE:  
Concrete shall be Class B.

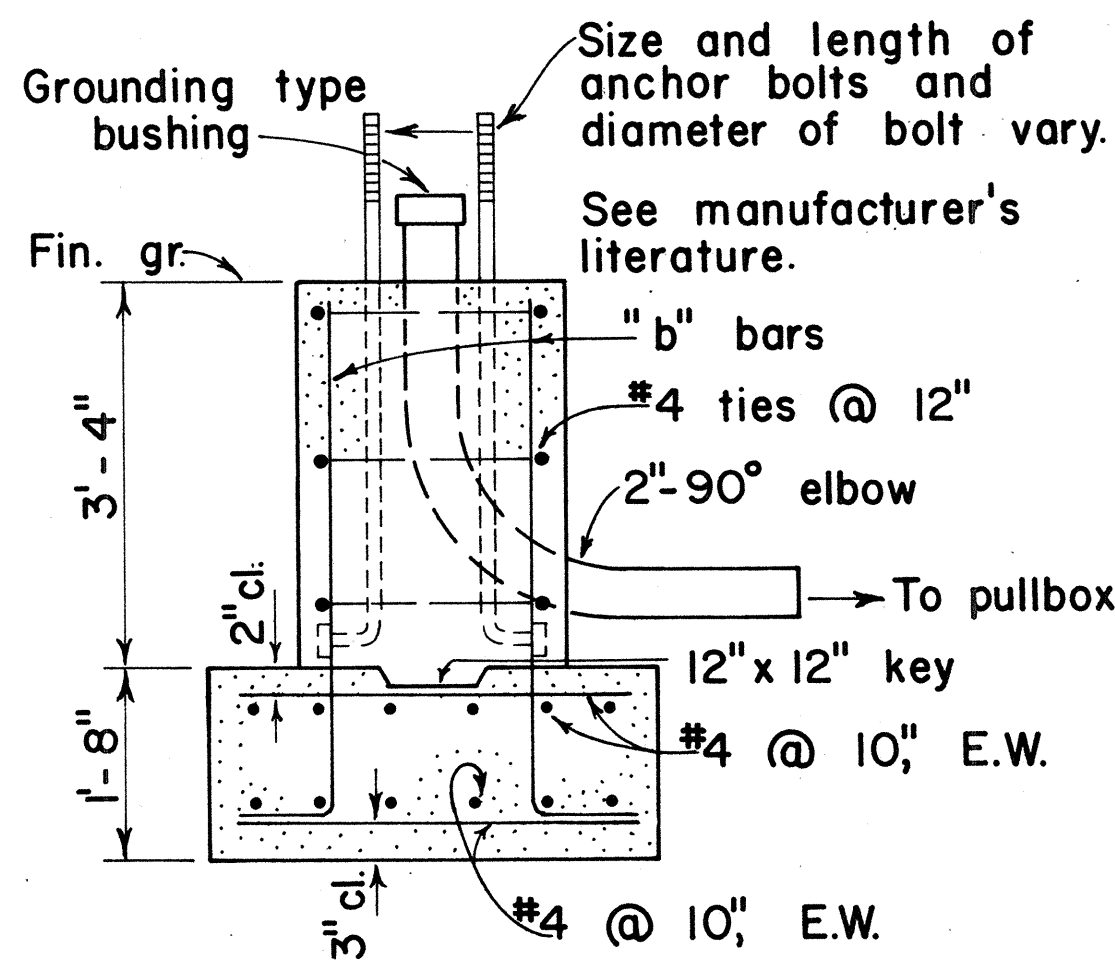
SECTION

| MAST ARM LENGTH | "c"     | "d" BARS |
|-----------------|---------|----------|
| 16' - 18'       | 5' - 0" | 12 - #6  |
| 20'             | 5' - 6" | 12 - #6  |
| 25'             | 6' - 0" | 12 - #6  |
| 30'             | 6' - 6" | 12 - #6  |
| 35'             | 7' - 0" | 12 - #8  |
| 40'             | 8' - 0" | 12 - #8  |

TYPE II



PLAN - SECTION



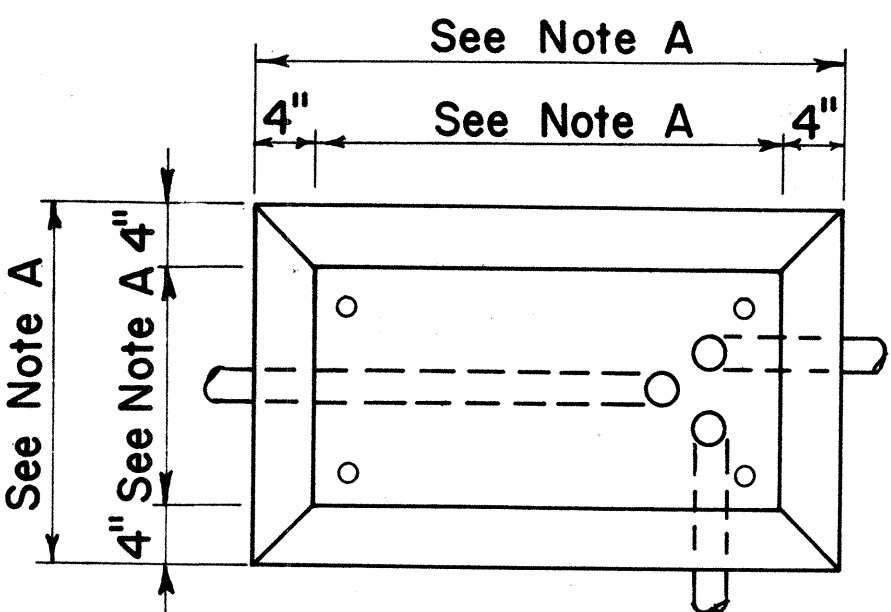
NOTE:  
Concrete shall be Class B.

SECTION

| MAST ARM LENGTH | "a"     | "b" BARS |
|-----------------|---------|----------|
| 16' - 18'       | 5' - 0" | 12 - #6  |
| 20'             | 5' - 6" | 12 - #6  |
| 25'             | 6' - 0" | 12 - #6  |
| 30'             | 6' - 6" | 12 - #8  |
| 35'             | 6' - 6" | 12 - #8  |
| 40'             | 7' - 0" | 12 - #8  |

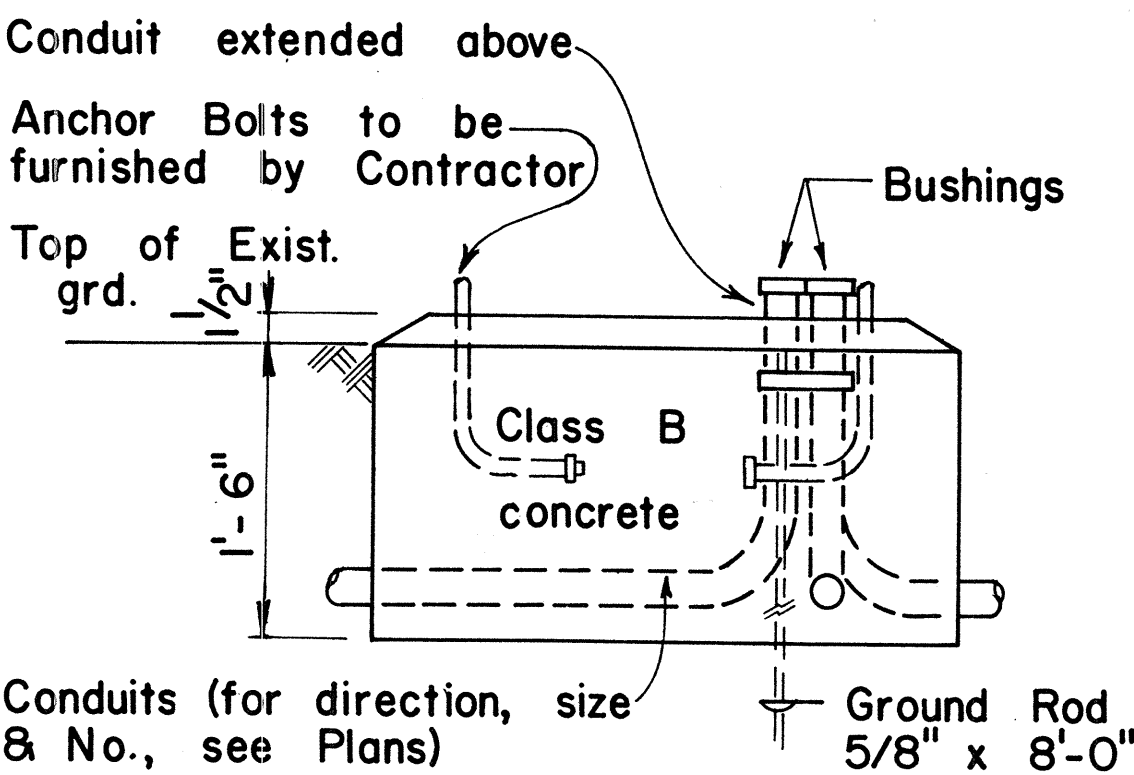
TYPE II A

FOOTING FOR MAST ARM STANDARD



PLAN

CONCRETE BASE FOR CONTROLLER CABINET



ELEVATION

- NOTES:
- Dimensions to be determined by the size of the Controller Cabinet to be furnished under this Contract.
  - Details of Conduits, Anchor Bolts, etc., are approximate only. Exact details shall be secured by the Contractor from Manufacturer.

APPROVAL RECOMMENDED:  
*Erich Tanaka* 3/4/76  
TRAFFIC ENGINEER DATE

APPROVED:  
*Robert B. Sakai* 2-5-76  
ASSISTANT CHIEF, ENGINEERING DATE

CCO #41 7-7-76  
See Plan Sht. C.O. 141

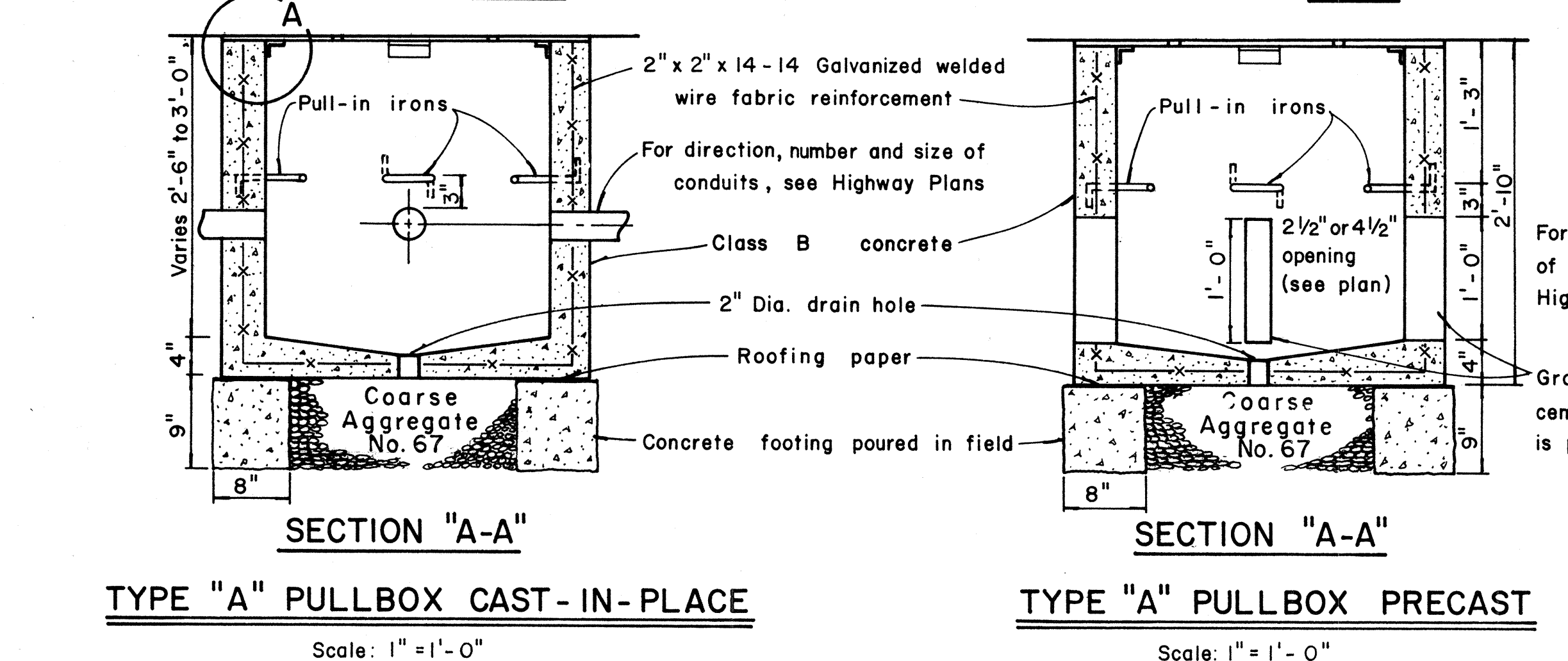
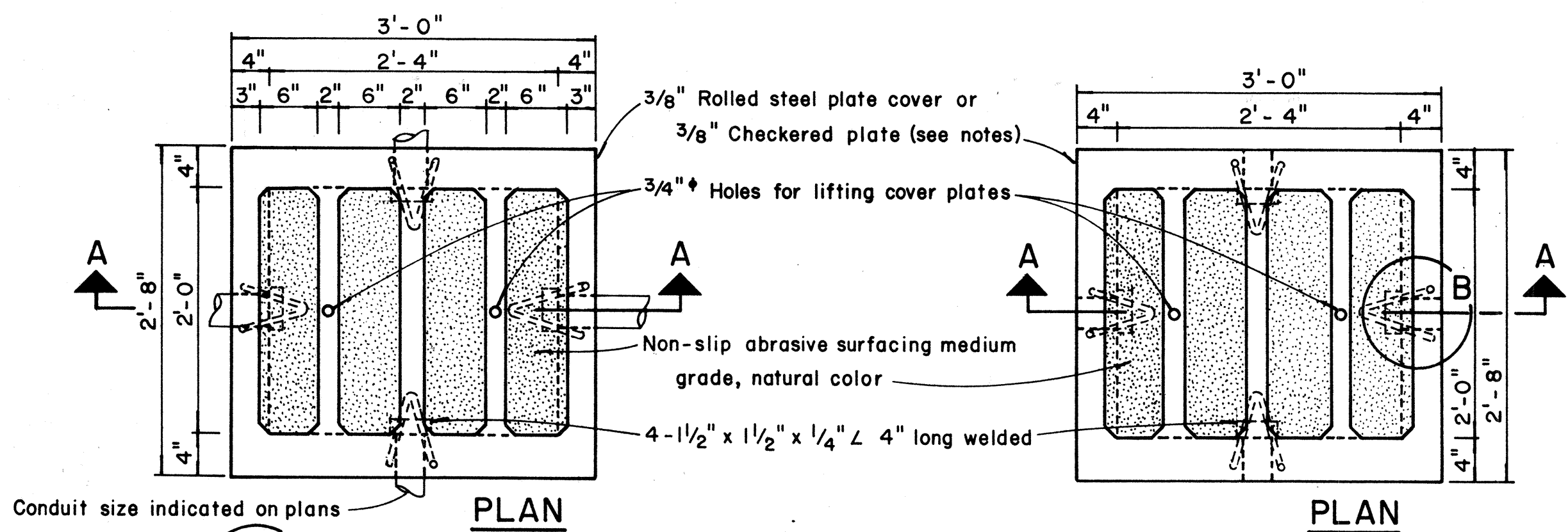
| NO. | REVISION | APPROVED BY | DATE |
|-----|----------|-------------|------|
|     |          |             |      |

|                                                                      |  |
|----------------------------------------------------------------------|--|
| STATE OF HAWAII<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION |  |
| TRAFFIC SIGNAL SYSTEM<br>MISCELLANEOUS DETAILS                       |  |
| Not to Scale                                                         |  |
| SHEET NO. OF SHEETS DT404                                            |  |

C.O. 141 S-1

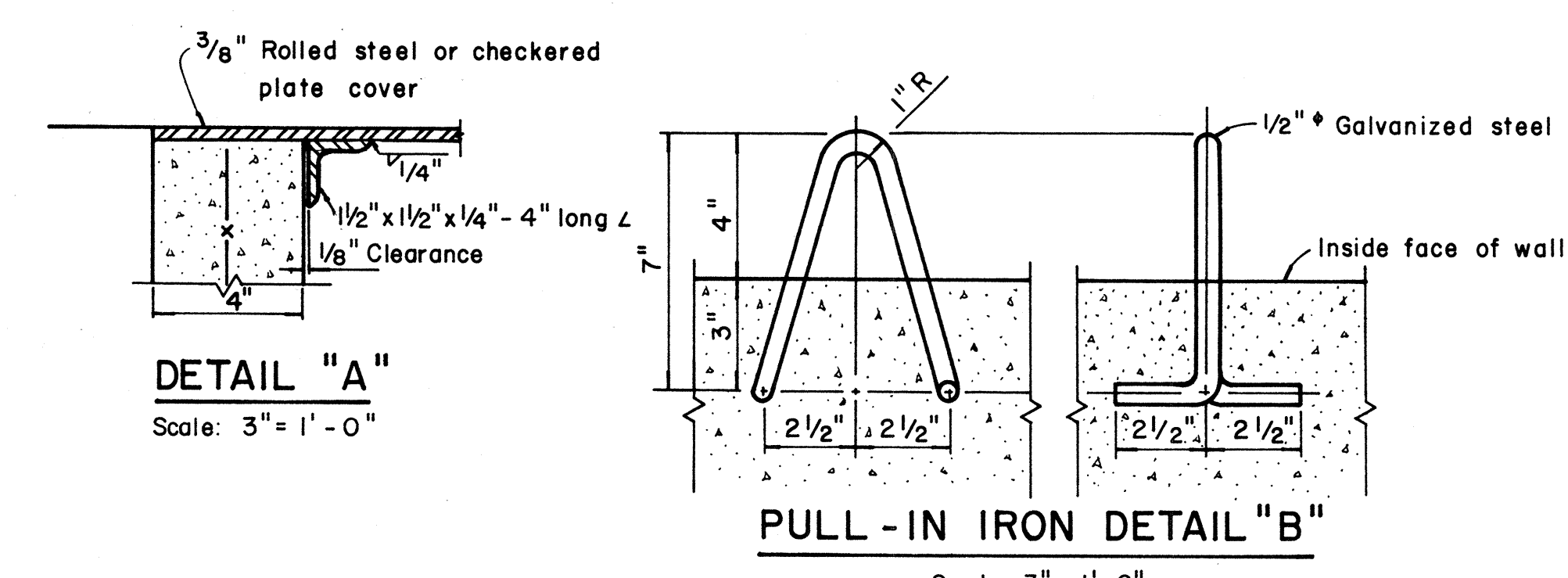


| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | J-11-1(III)14      | 1974        | 142       | 234          |

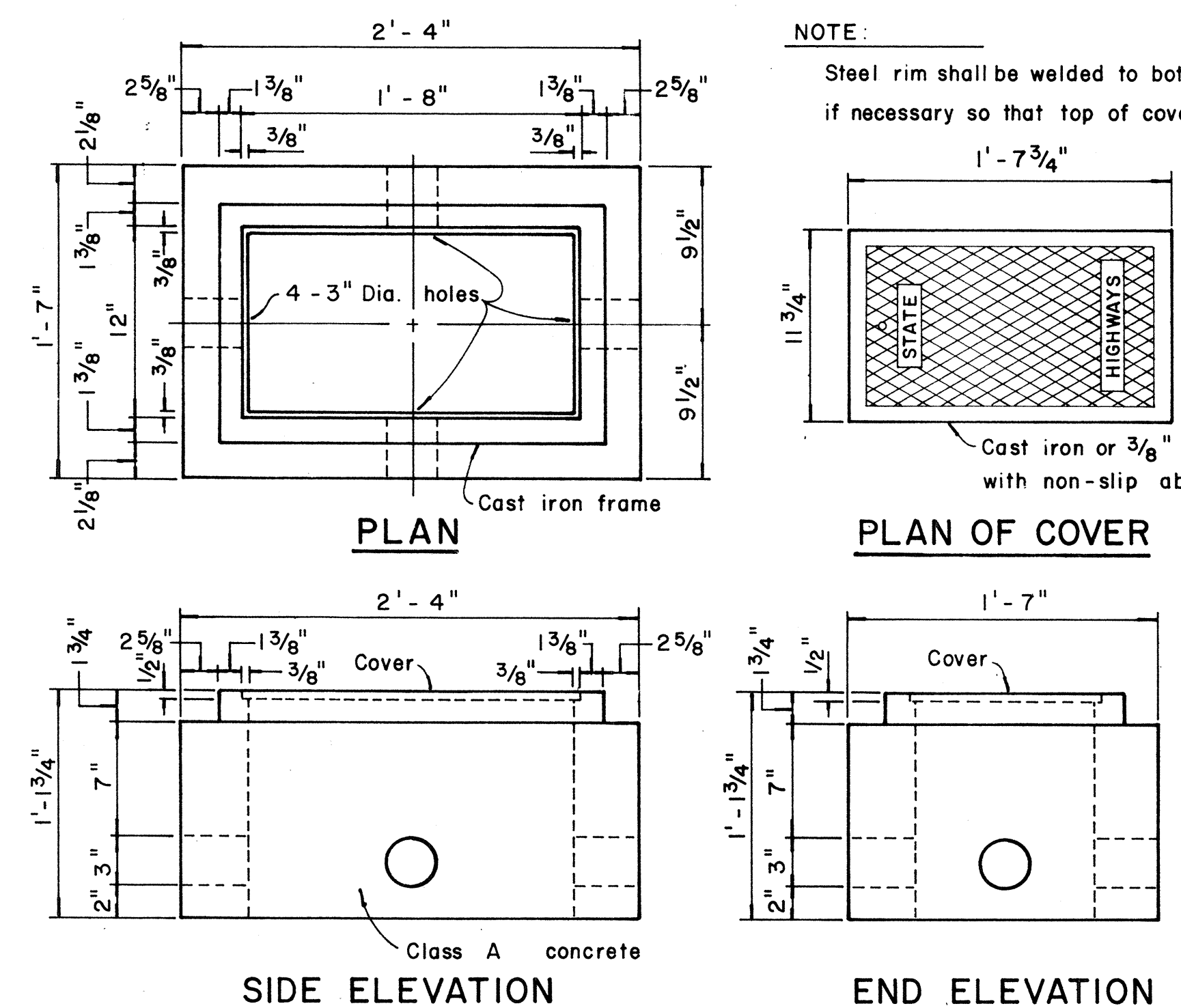


**TYPE "A" PULLBOX CAST-IN-PLACE**  
Scale: 1" = 1'-0"

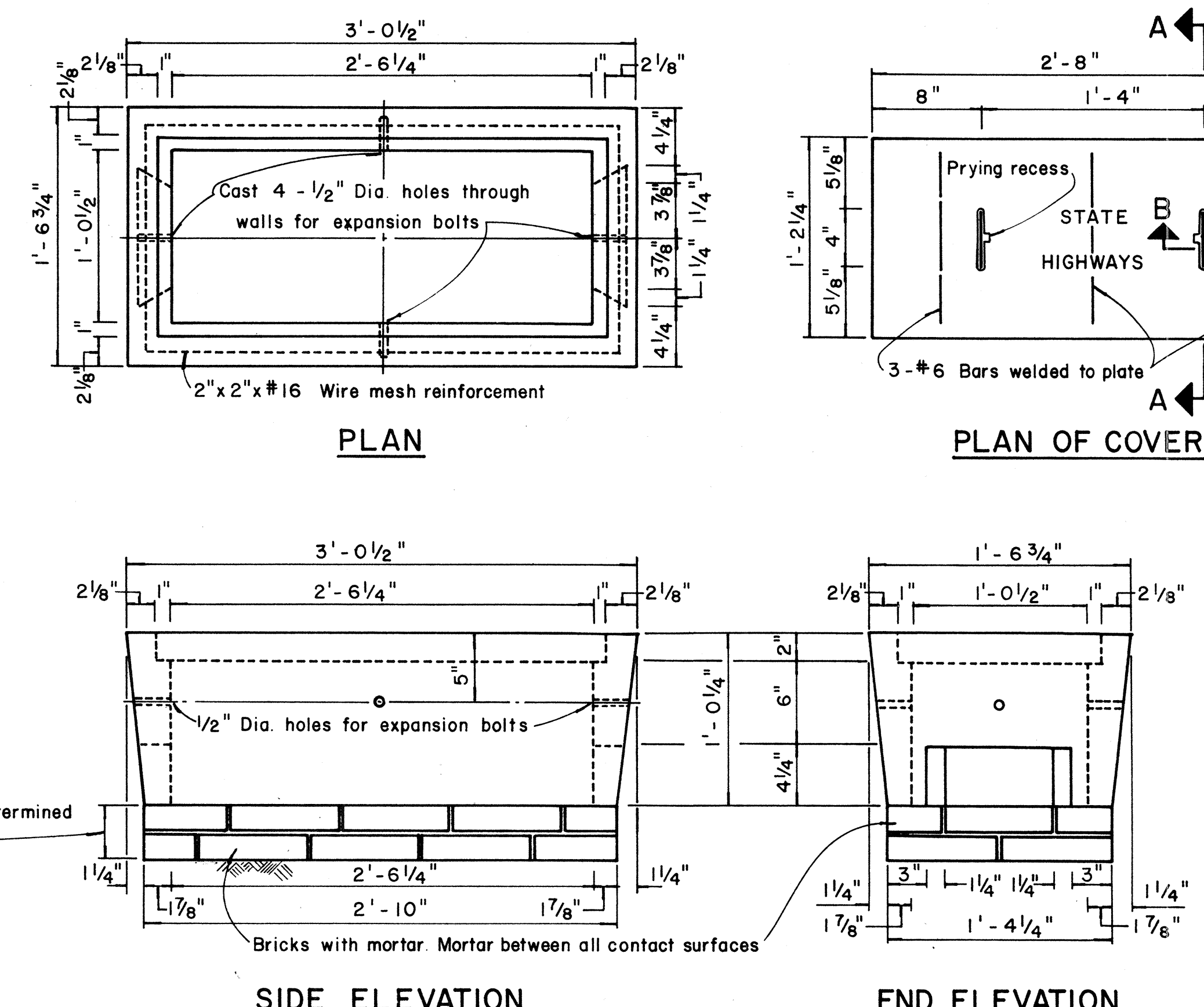
**TYPE "A" PULLBOX PRECAST**  
Scale: 1" = 1'-0"



- NOTES: (FOR TYPE "A" PULLBOX)
- 3/8" Rolled steel plate cover with non-slip abrasive surfacing medium grade, natural color shall be used on all pullboxes located on sidewalk areas where pedestrians are walking.
  - 3/8" Checkered plate cover shall be used on all pullboxes located in median areas and other locations where there are no pedestrians walking.
  - Pull irons shall be placed opposite each conduit slot.
  - Covers on all pullboxes located in sidewalk areas shall be set flush with the concrete sidewalk.
  - Each pullbox shall have a pair of pull irons opposite each other for lifting purposes.

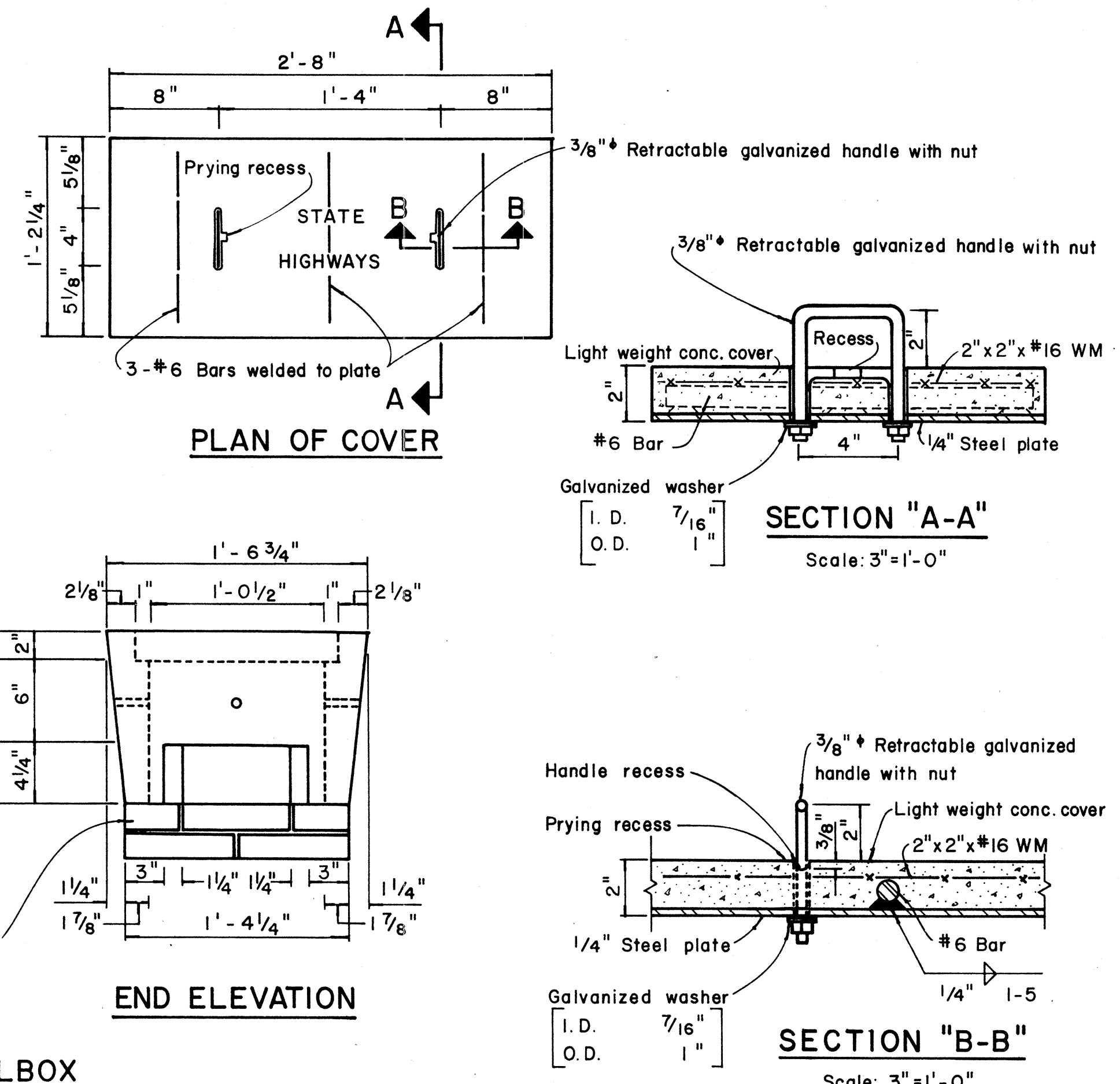
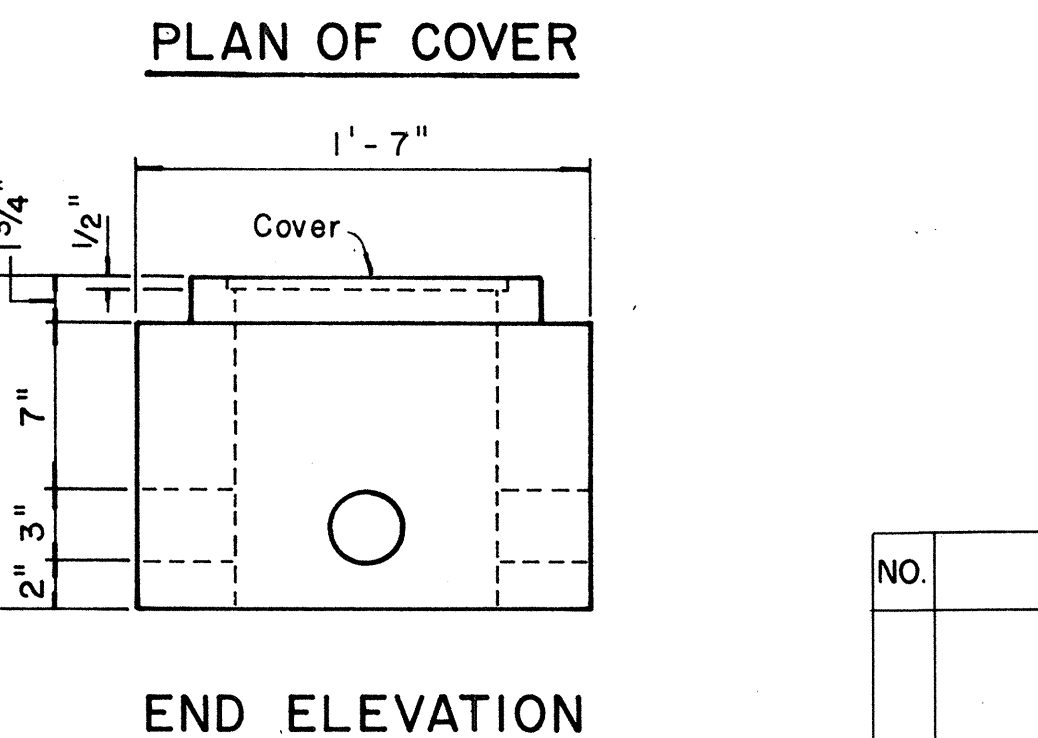
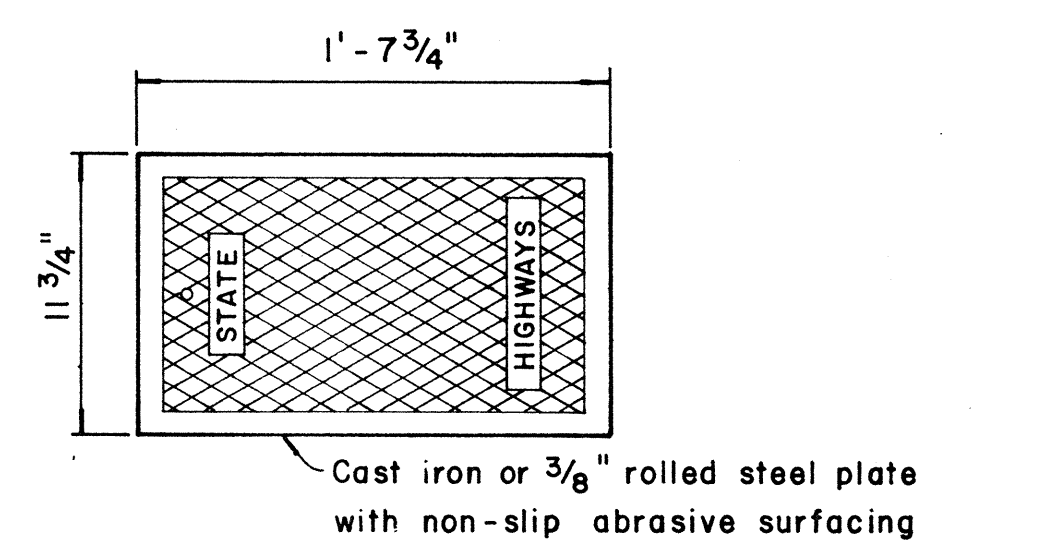


**TYPE "B" PULLBOX**  
Scale: 1 1/2" = 1'-0"



**TYPE "C" PULLBOX**  
Scale: 1 1/2" = 1'-0"

NOTE:  
Steel rim shall be welded to bottom of steel cover if necessary so that top of cover and frame are flush.



APPROVAL RECOMMENDED:  
*Erich Tanaka*  
TRAFFIC ENGINEER  
DATE: 12/29/69

APPROVED:  
*W. W. J. J.*  
ASSISTANT CHIEF, ENGINEERING  
DATE: 12-30-69

| NO. | REVISION | APPROVED BY | DATE |
|-----|----------|-------------|------|
|     |          |             |      |

1E-28

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**STANDARD DETAILS**  
**PULLBOXES**

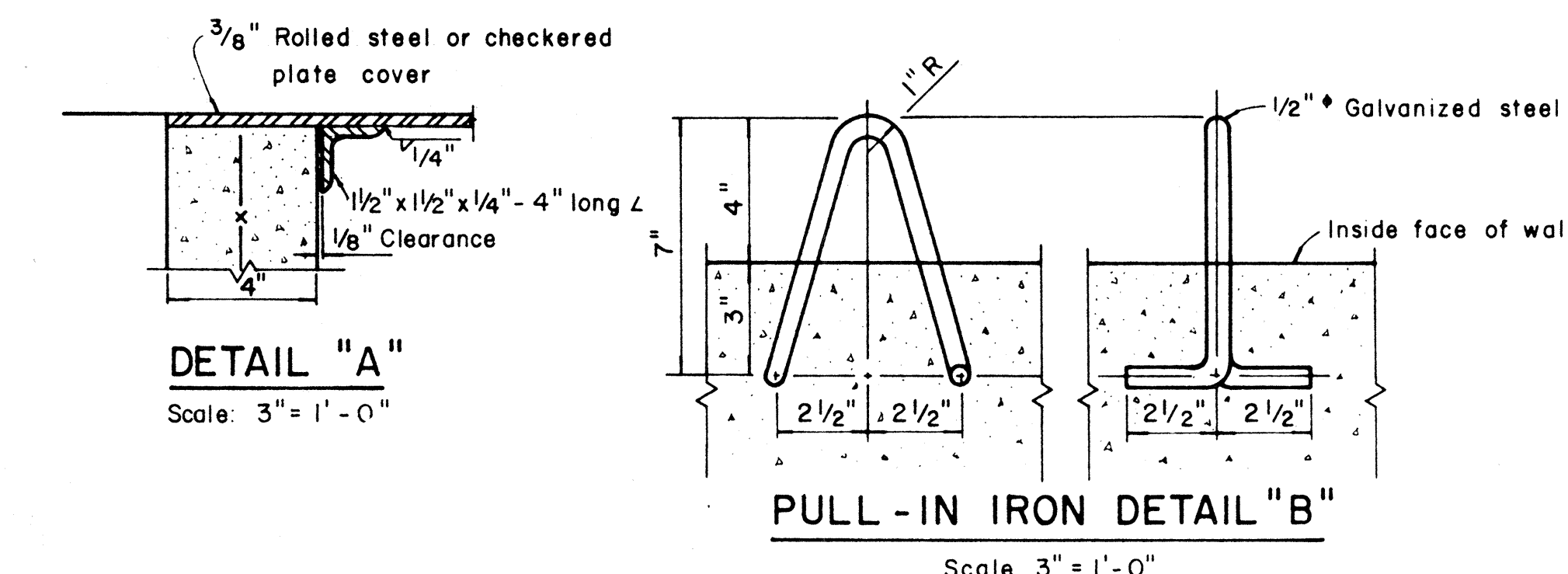
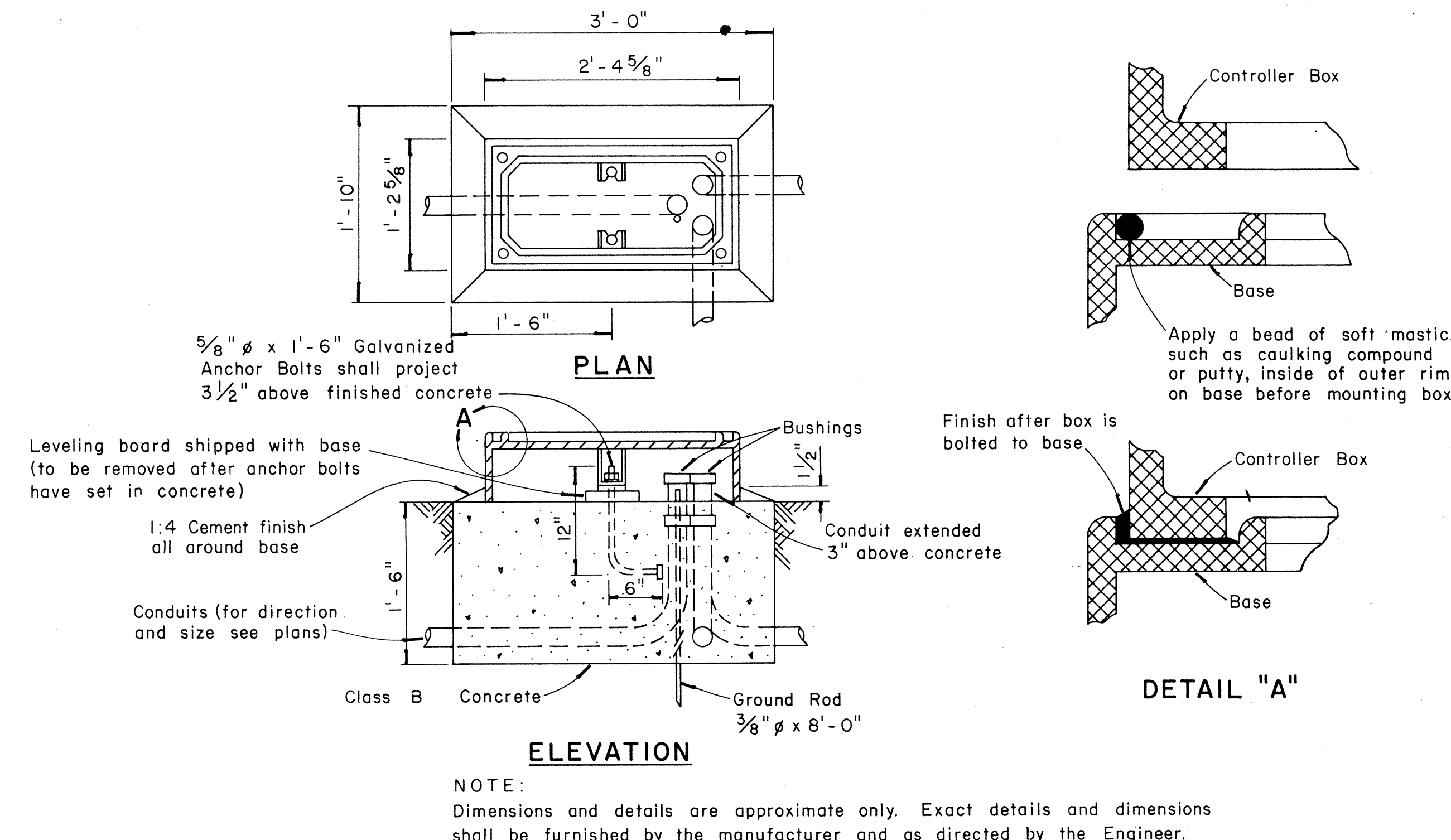
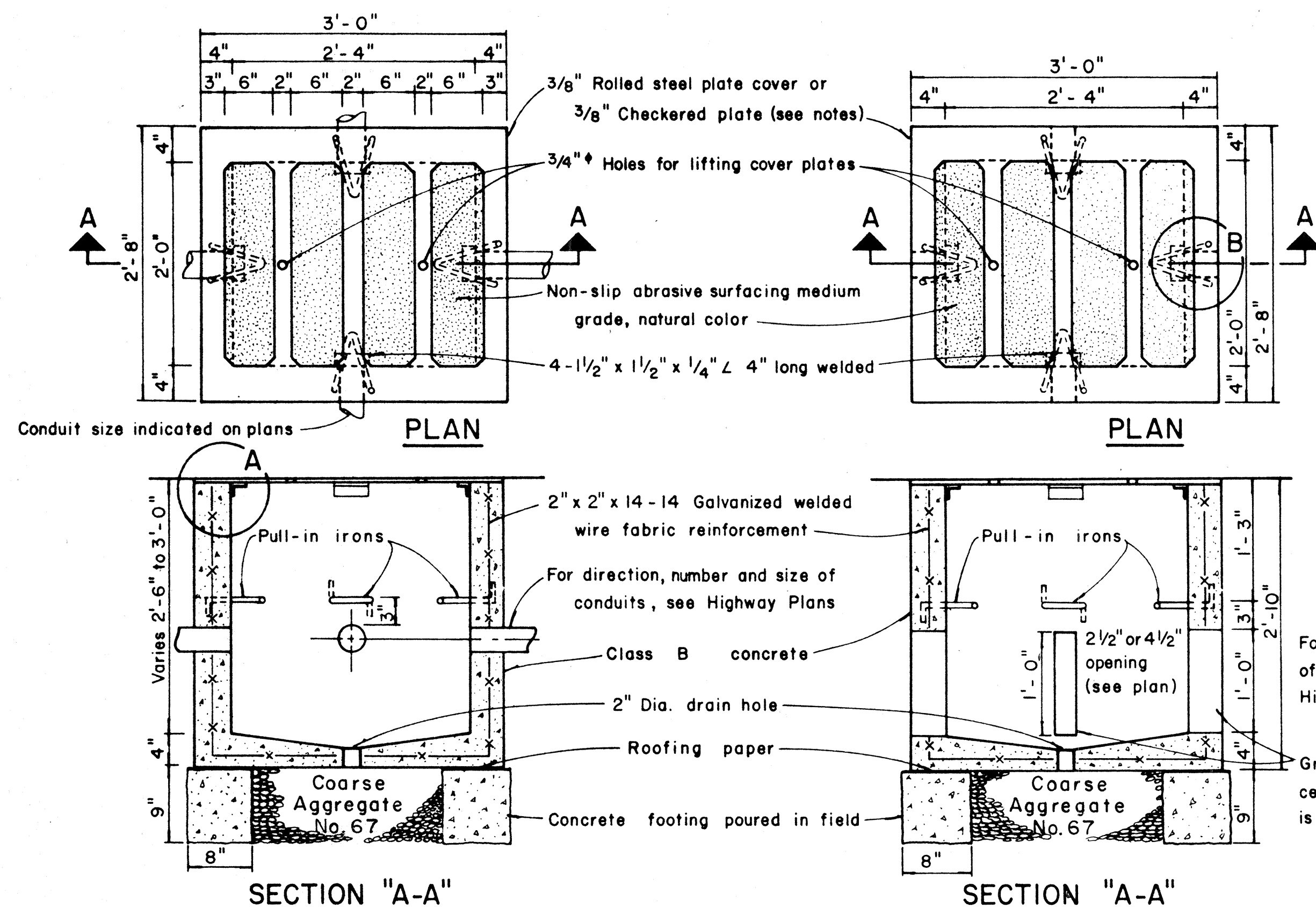
PEARL HARBOR INTERCHANGE  
F.A.I. PROJECT NO. J-11-1(III)14

Scale as noted Date

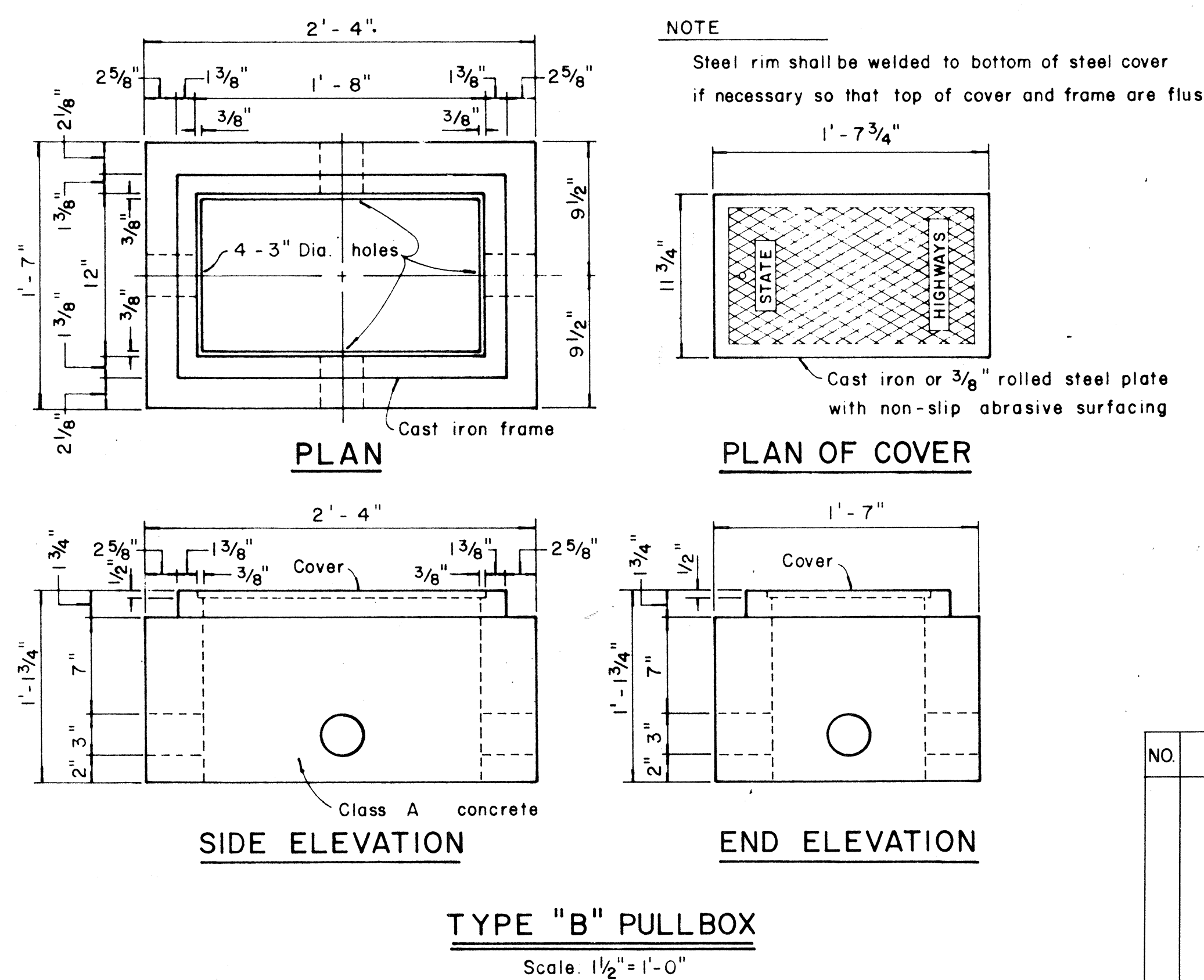
**SHEET No. E-28 OF 40 SHEETS DT 401**



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 111-11111          | 1974        | 143       | 234          |



- NOTES: (FOR TYPE "A" PULLBOX)
- 3/8" Rolled steel plate cover with non-slip abrasive surfacing medium grade, natural color shall be used on all pullboxes located on sidewalk areas where pedestrians are walking.
  - 3/8" Checkered plate cover shall be used on all pullboxes located in median areas and other locations where there are no pedestrians walking.
  - Pull irons shall be placed opposite each conduit slot.
  - Covers on all pullboxes located in sidewalk areas shall be set flush with the concrete sidewalk.
  - Each pullbox shall have a pair of pull irons opposite each other for lifting purposes.



NOTE: Steel rim shall be welded to bottom of steel cover if necessary so that top of cover and frame are flush.

APPROVAL RECOMMENDED: *Erich Tanaka* 12/29/69  
TRAFFIC ENGINEER DATE

APPROVED: *[Signature]* 12-30-69  
ASSISTANT CHIEF, ENGINEERING DATE

| NO. | REVISION | APPROVED BY | DATE |
|-----|----------|-------------|------|
|     |          |             |      |

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**STANDARD DETAILS**  
**PULLBOXES**  
AND  
**TYPE "M" CONTROLLER BOX**

Scale as noted Date: 12-29-69



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 111(III)14         | 1974        | 144       | 234          |

## GENERAL NOTES

- Excavation:** Excavate for manhole to accurate alignment, grades and dimensions as shown on drawings. All excavation must be approved by the Engineering Dept., H.E. Co., before any concrete is poured. All excess cuts shall be backfilled with concrete or approved aggregate.
- Backfill:** Remove all debris before backfilling. Backfill in accordance with latest specifications of Division of Highways, State of Hawaii.
- All work to be done in dry.
- Concrete shall be Class A conforming to the requirements of Section 601 of the State Standard Specification.
- Mixing:** Ready-Mixed A.S.T.M. C-94-47.
- Reinforcing:** Round deformed bars. (Clean and new).
- Splice:** Lap 30 bar diameters unless otherwise shown.
- Curing:** Keep concrete moist at least 7 days after pouring. (By approved method).
- Finish:** All surfaces smooth and free from defects.  
Top of manhole - wood floated.  
Manhole floor - steel trowelled.  
Inside wall and ceiling - cement washed.
- Install all inserts, including pulling irons, ground rods, and etc., before pouring concrete.
- Pouring:** Notify the H.E. Co., Contracting and Inspection Division, 24 hours before pouring any concrete. All concrete pouring shall be done in the presence of a H.E. Co., Engineer or Inspector.
- Forms:** Made of good sound lumber of sufficient strength, water tight and conforming to shape and dimensions indicated on drawings.
- The Contractor shall furnish and install for each manhole:  
A. 2-5/8"  $\phi$  x 8'-0" copperweld ground rods.  
B. Standard (H.E. Co.) 31" manhole frame and cover. (H.E. Co. Standard)
- Slope manhole floor down 1" toward sump.
- All work shall be subject to inspection by the H.E. Co. and/or Division of Highways, State of Hawaii, or Div. of Engineering, C & C of Honolulu.
- All materials shall be new and manufactured in the United States of America.**
- For number, size, and exact location of duct entrances and pulling irons, refer to project drawings.
- Water Stop shall conform to the requirements of Section 705.07 of the State Standard Specifications for Road and Bridge Construction.

## REFERENCE DRAWINGS

011327 & 011328 Standard H.E. Co. 31" Manhole Frame and Cover.  
20191 & 18585 U.G. Duct Line Construction Standards. (Transite Korducts)  
CS7001-0 Construction of Underground Facilities - Specifications

## REINFORCED CONCRETE QUANTITIES

### QUANTITY OF MATERIALS FOR DEPTH "D"

Total Concrete = 18 Cu. Yds.  
Total Reinforcing Steel = 2,579 Lbs.

### QUANTITY OF MATERIALS FOR ALTERNATE NECK "D"=1'-0"

Concrete = 0.29 Cu. Yds.  
Reinforcing Steel = 39 Lbs.

### MATERIALS FOR 6" DEPTH OF 8" AND 10" THICK WALL

Concrete = 0.66 Cu. Yds.  
Reinforcing Steel = 52.5 Lbs.

**E-30**

## APPROVED:

*R. S. Lauer* 4/30/74  
HAWAIIAN ELECTRIC Co. Inc. 4-26-74 DATE

FOR USE IN AREAS SUBJECT TO PRESENT AND FUTURE VEHICULAR TRAFFIC.

HE Co., Inc. Drawing Number

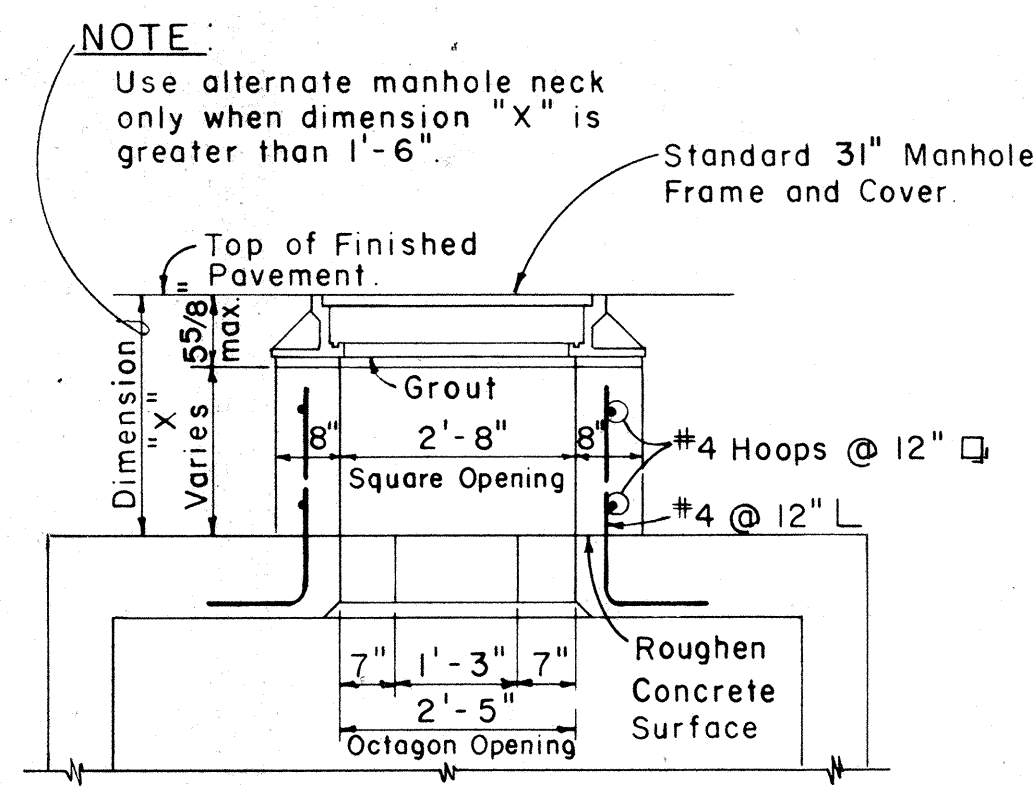
**15588**

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

STANDARD DETAILS  
MANHOLE TYPE No. 4  
(7'-2" x 16'-0")  
UNDERGROUND STANDARDS

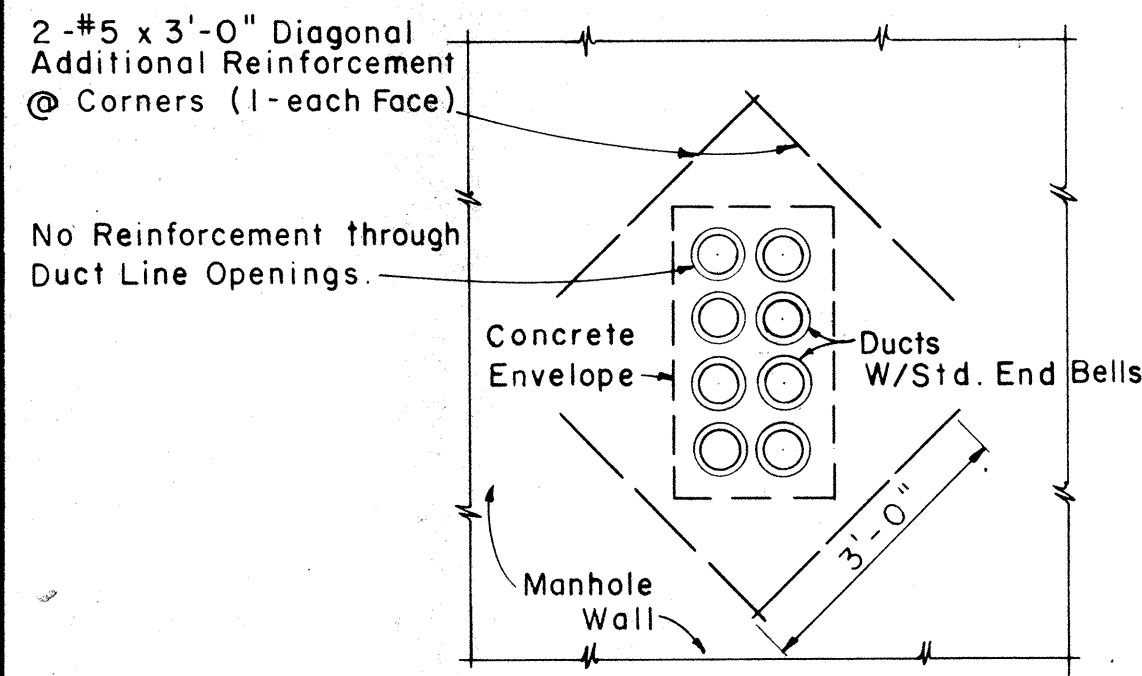
4/30/74 OBTAINED UTILITY  
DATE COMPANY SIGNATURE  
REVISIONS

SHEET No. E-30 OF 40 SHEETS



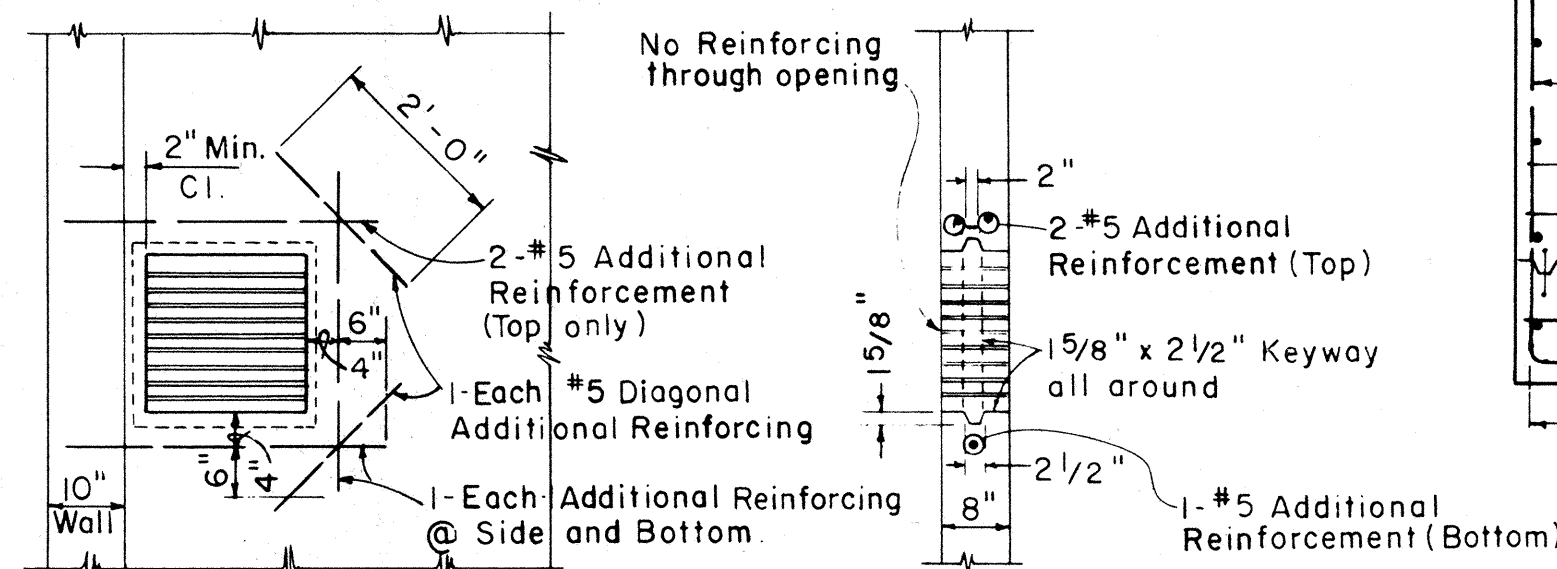
SECTION "E-E"

Scale: 1/2" = 1'-0"



REINFORCEMENT AT DUCT LINE ENTRANCES

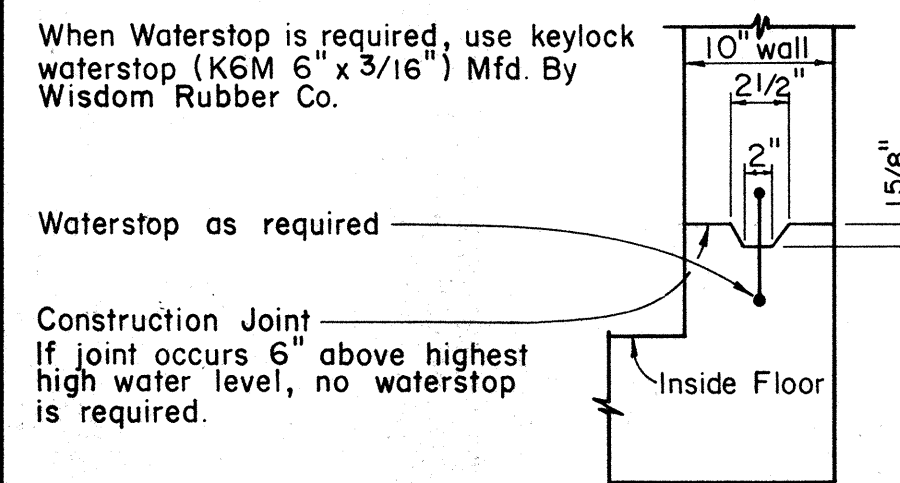
Scale: 1/2" = 1'-0"



NOTE: Provide opening for future duct line. Fill opening with bricks with mortar joints as required. (See Project Dwg. for Location)

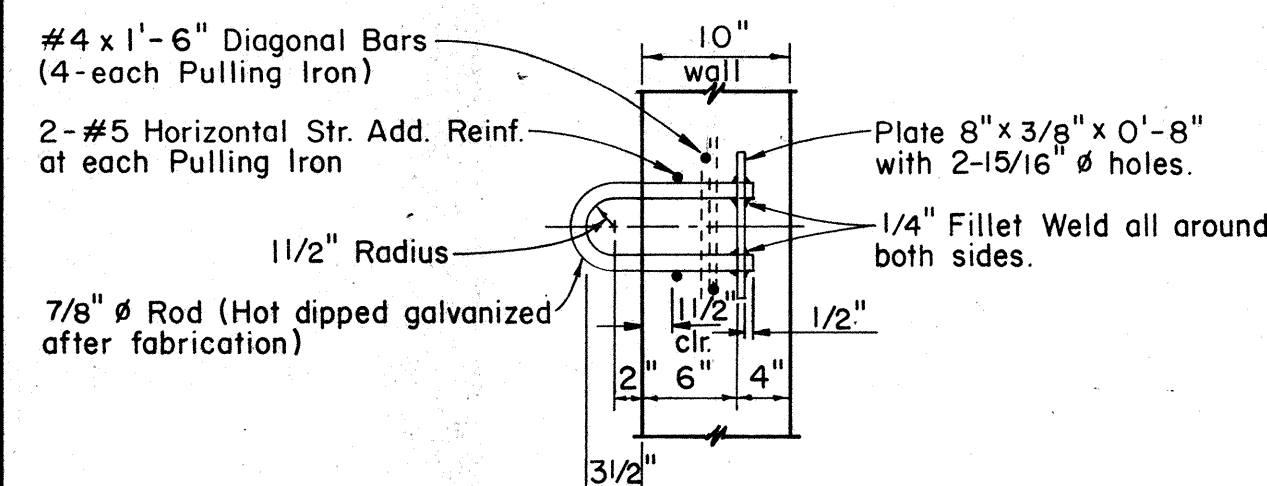
PART ELEVATION SECTION KNOCKOUT FOR FUTURE DUCT LINE

Scale: 1/2" = 1'-0"



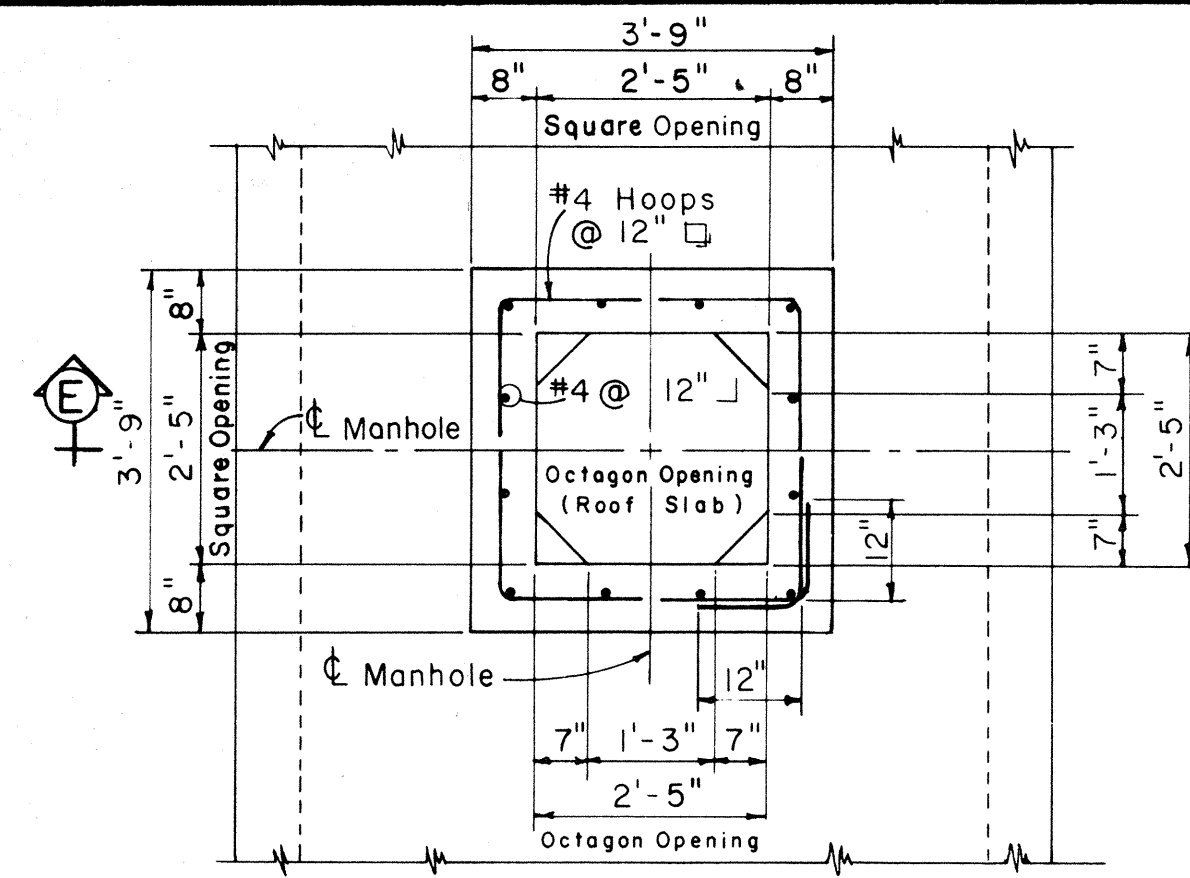
TYPICAL DETAIL OF CONSTRUCTION JOINT AND KEYWAY

Scale: NTS



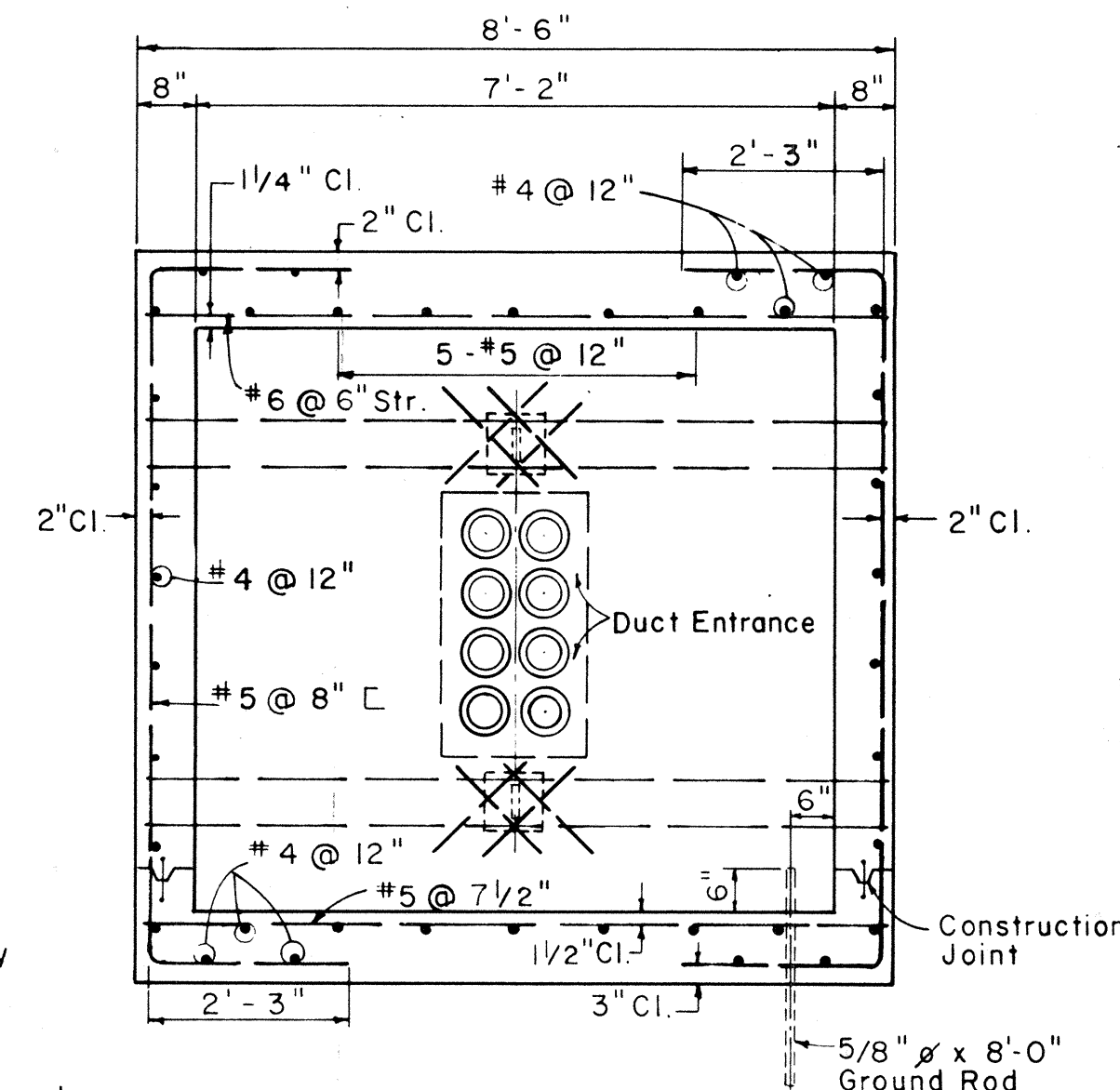
PULLING IRON DETAIL

Scale: NTS



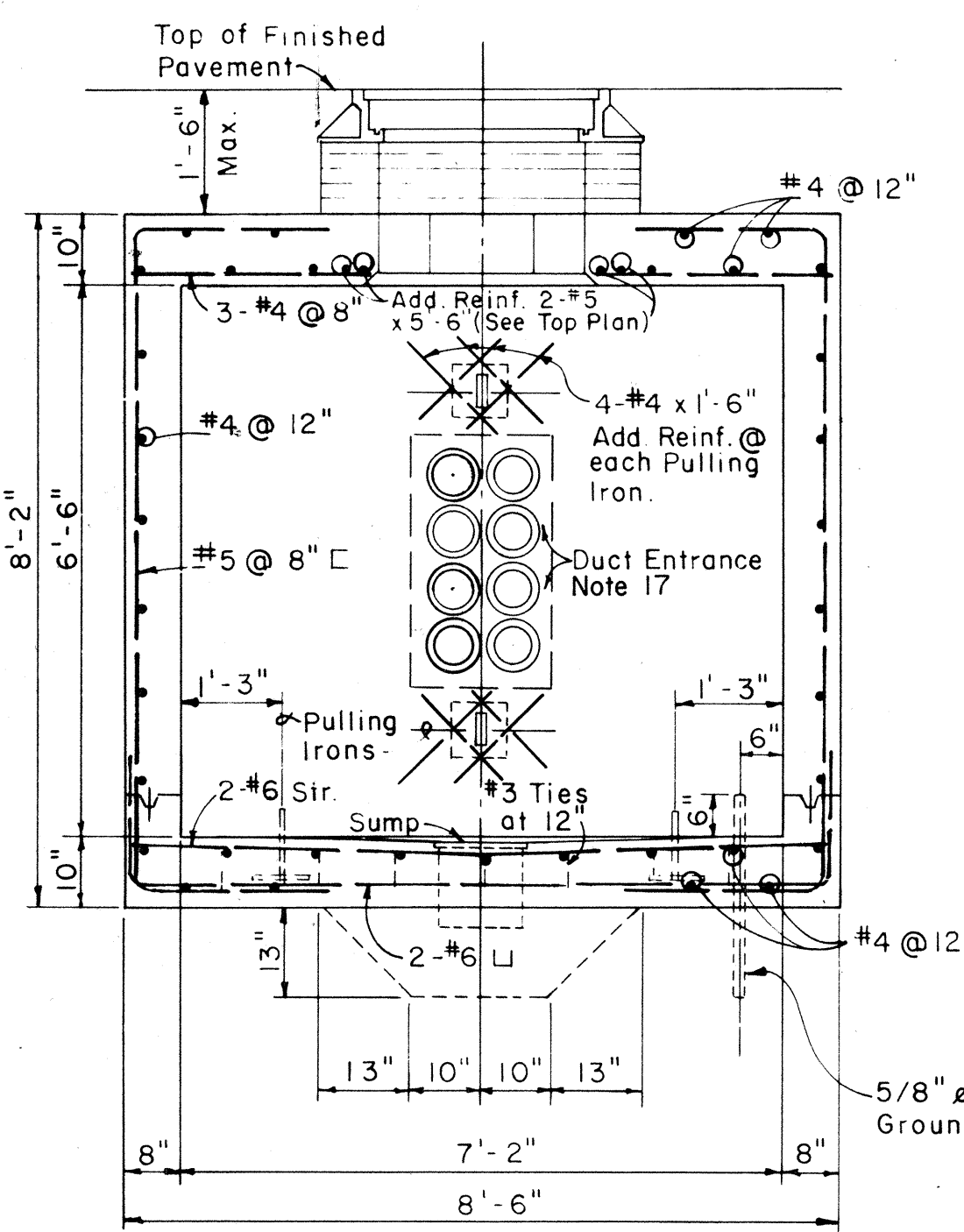
PLAN ALTERNATE MANHOLE NECK

Scale: 1/2" = 1'-0"



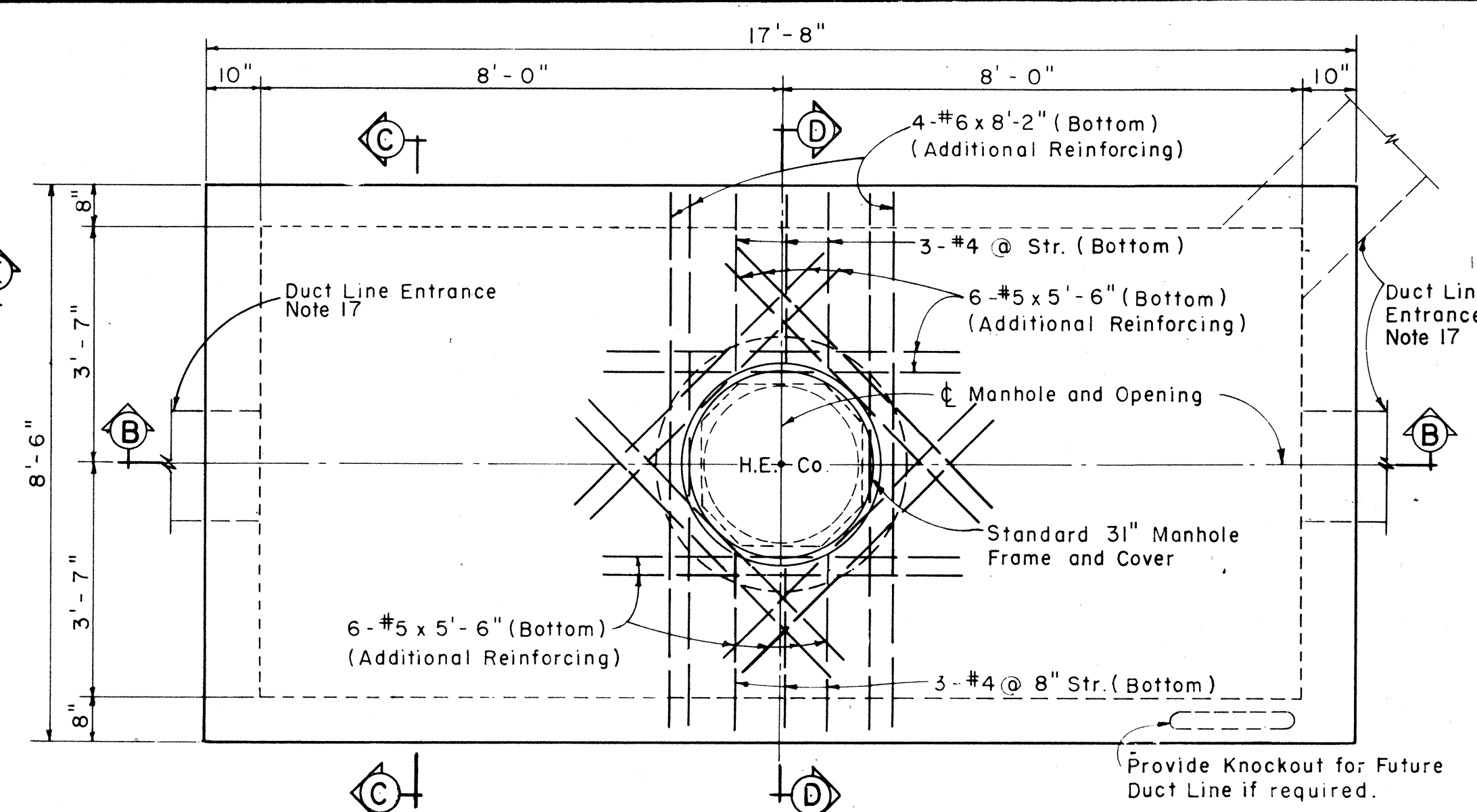
SECTION "C-C"

Scale: 1/2" = 1'-0"



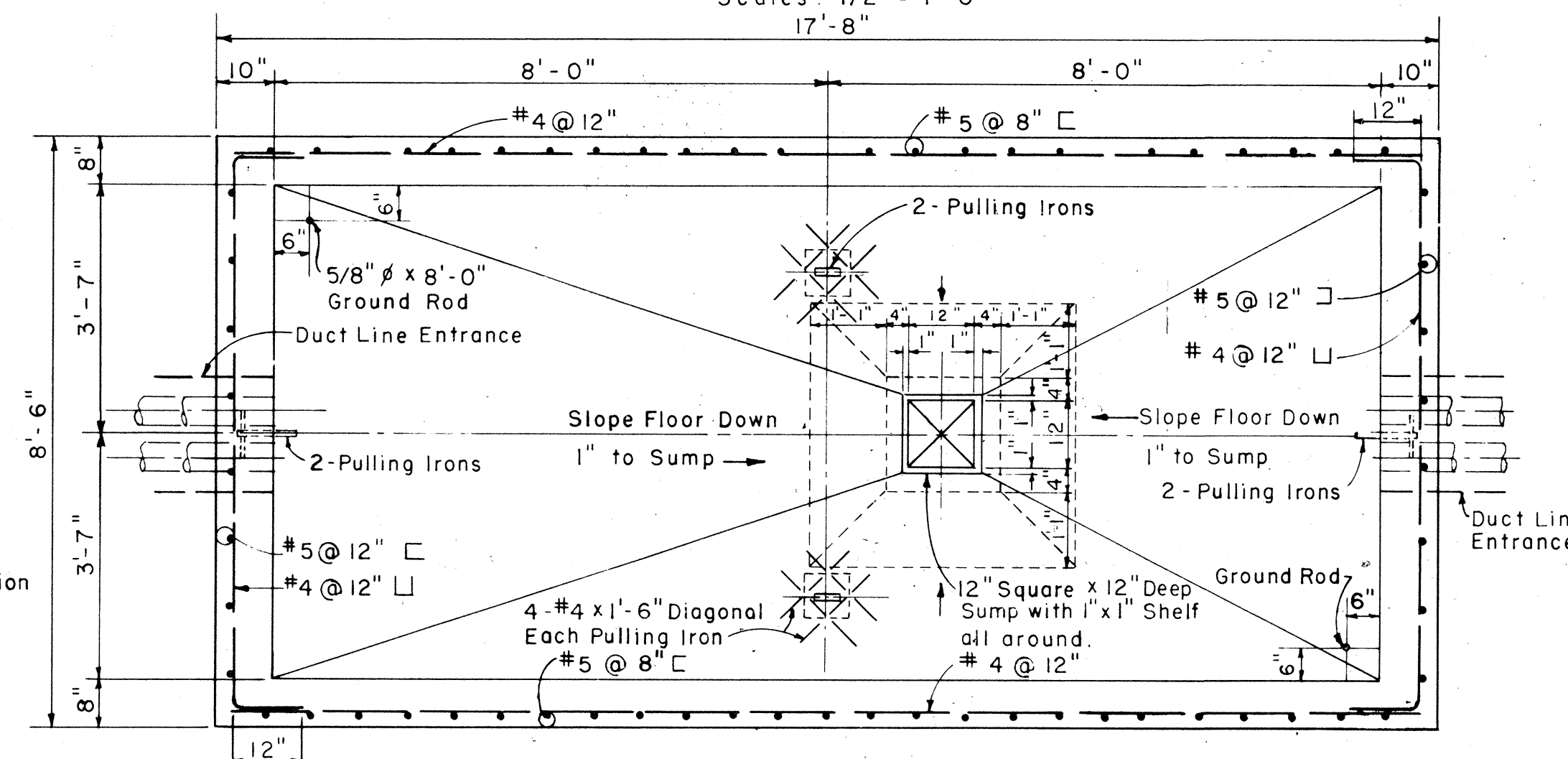
SECTION "D-D"

Scale: 1/2" = 1'-0"



TOP PLAN

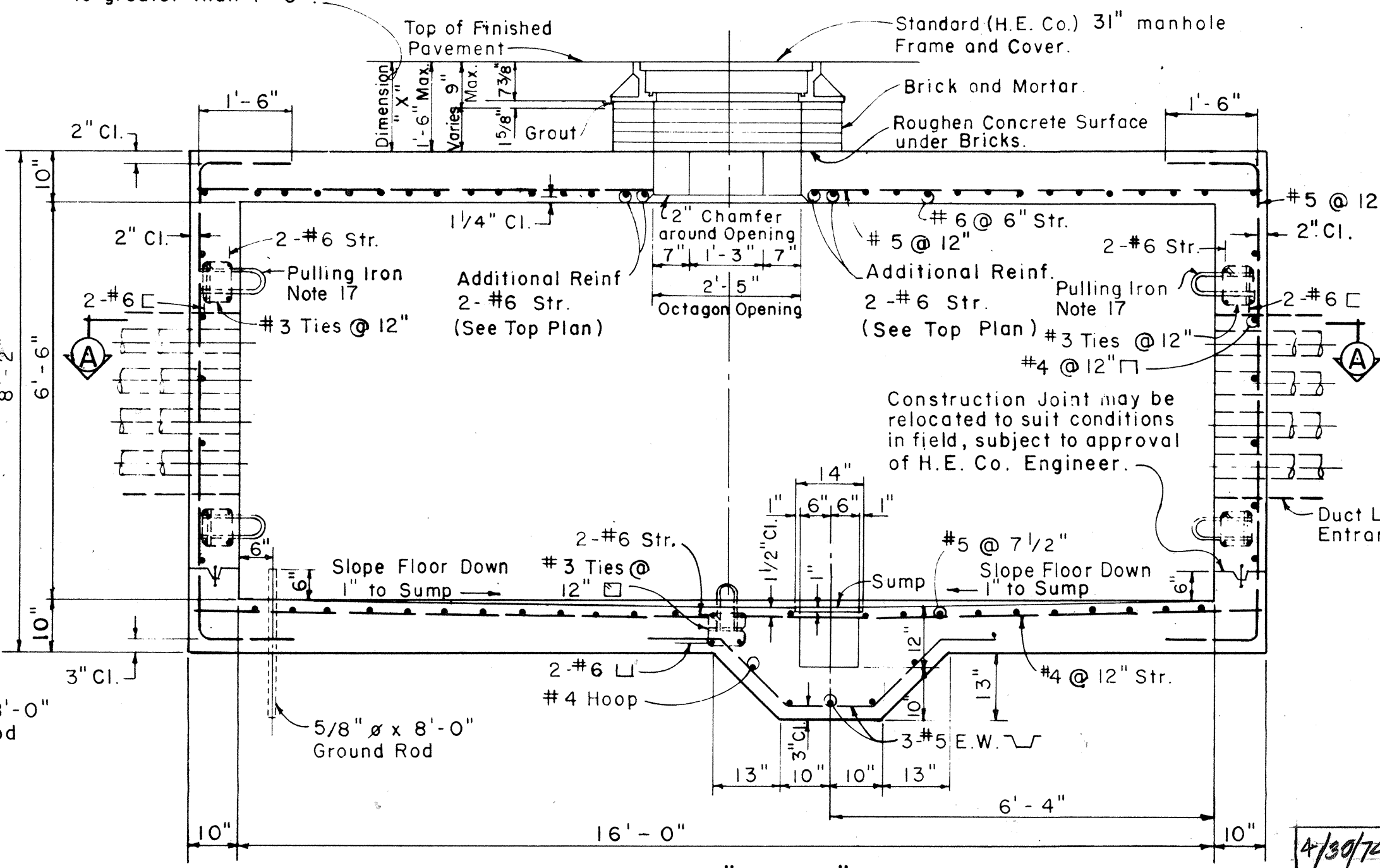
Scales: 1/2" = 1'-0"



SECTIONAL PLAN "A-A"

Scales: 1/2" = 1'-0"

NOTE: Use alternate manhole neck only when dimension "X" is greater than 1'-6".

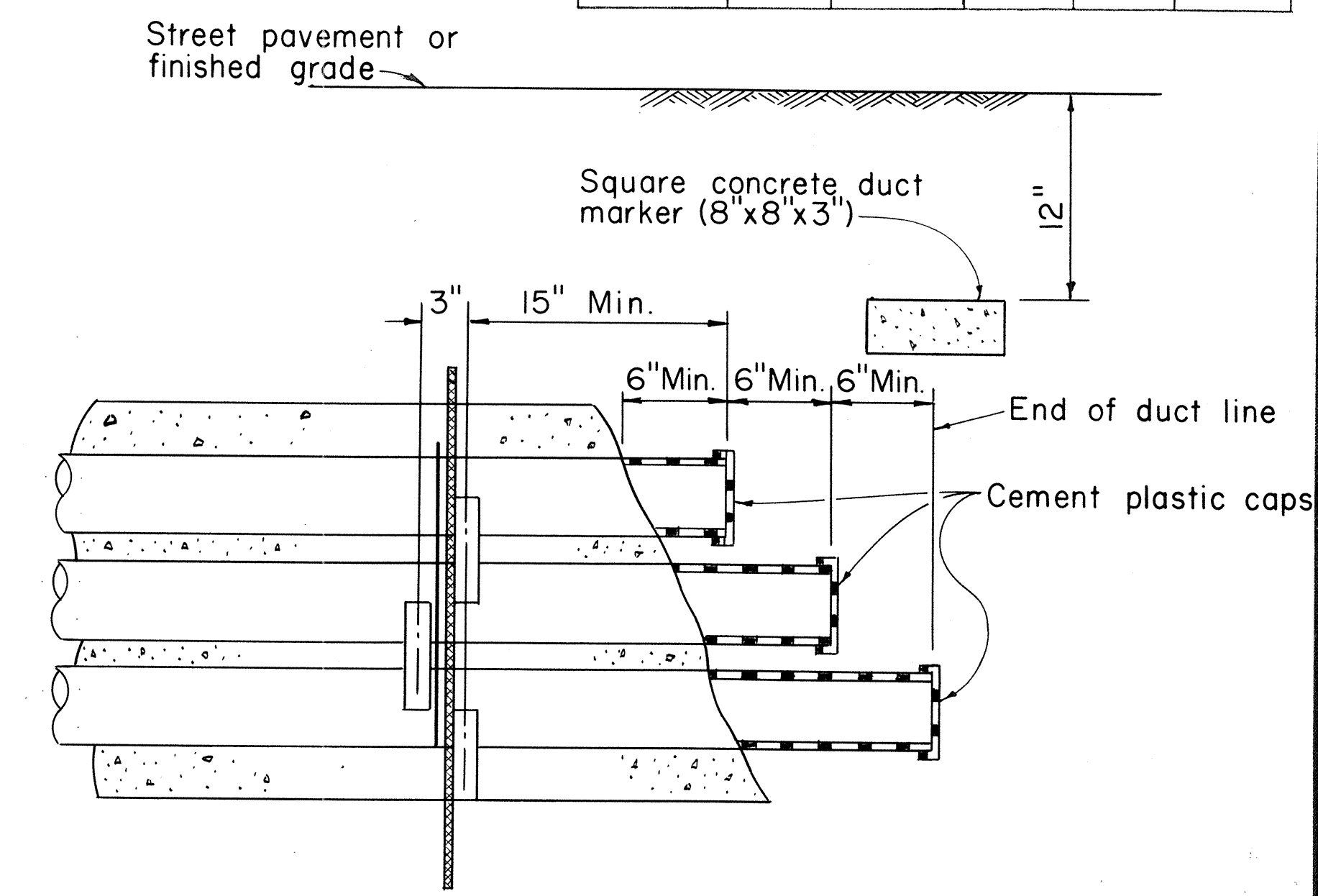
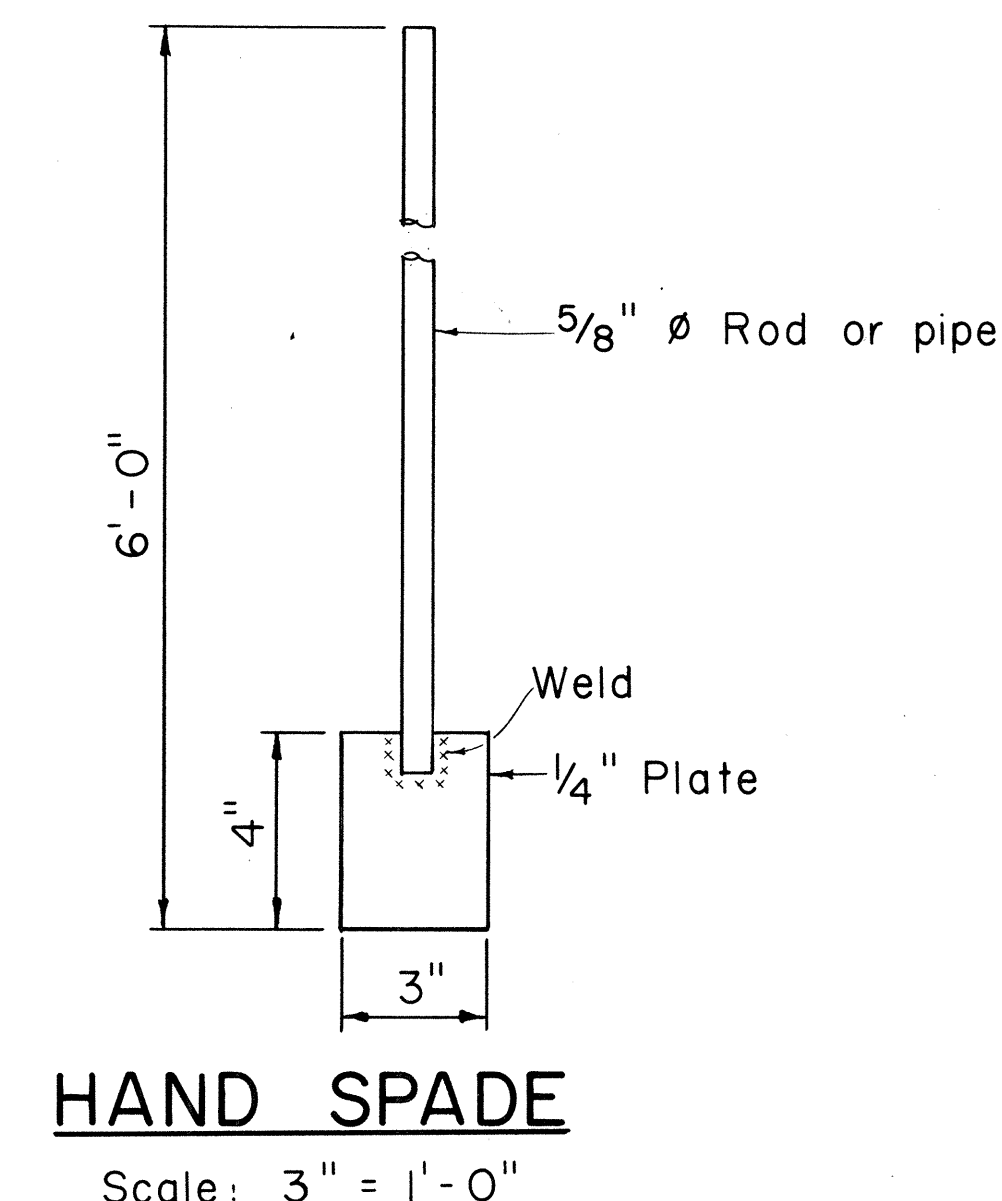
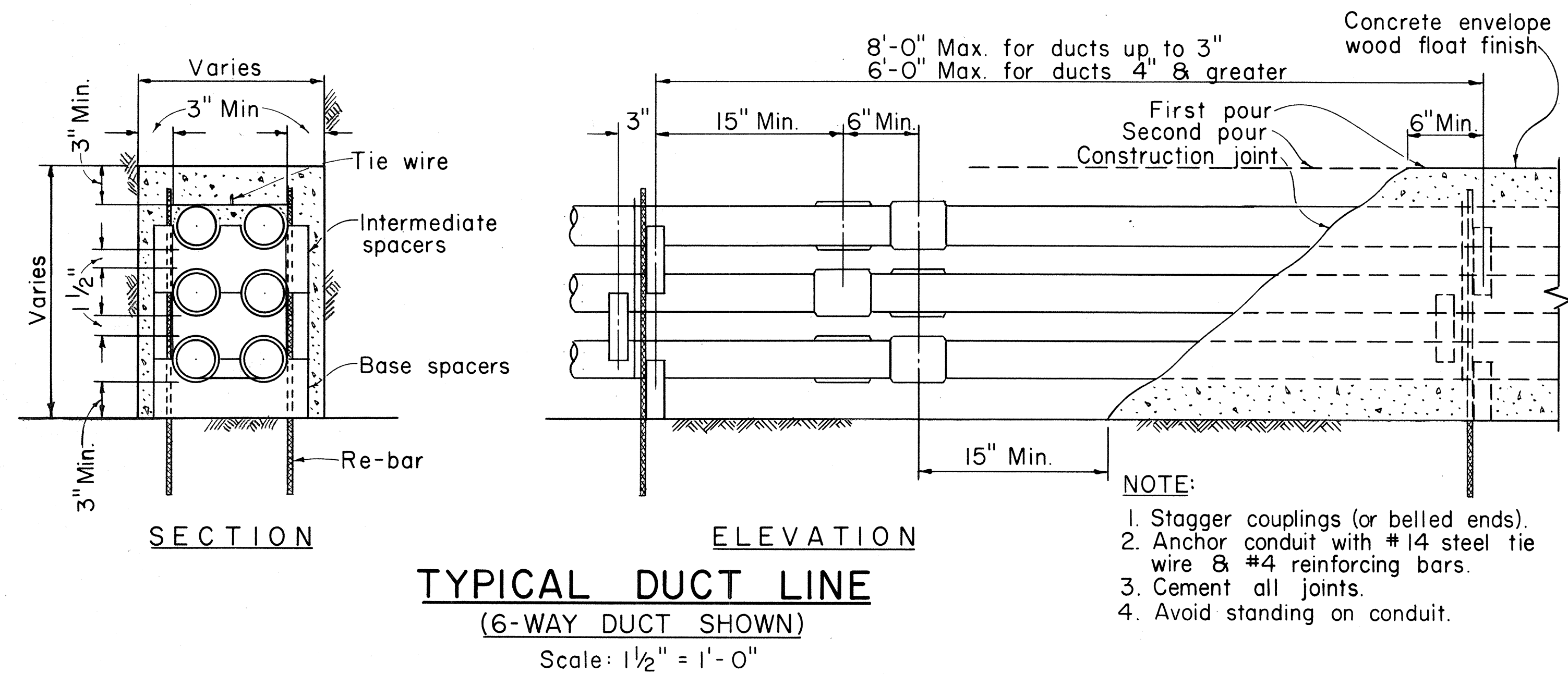


SECTION "B-B"

Scale: 1/2" = 1'-0"

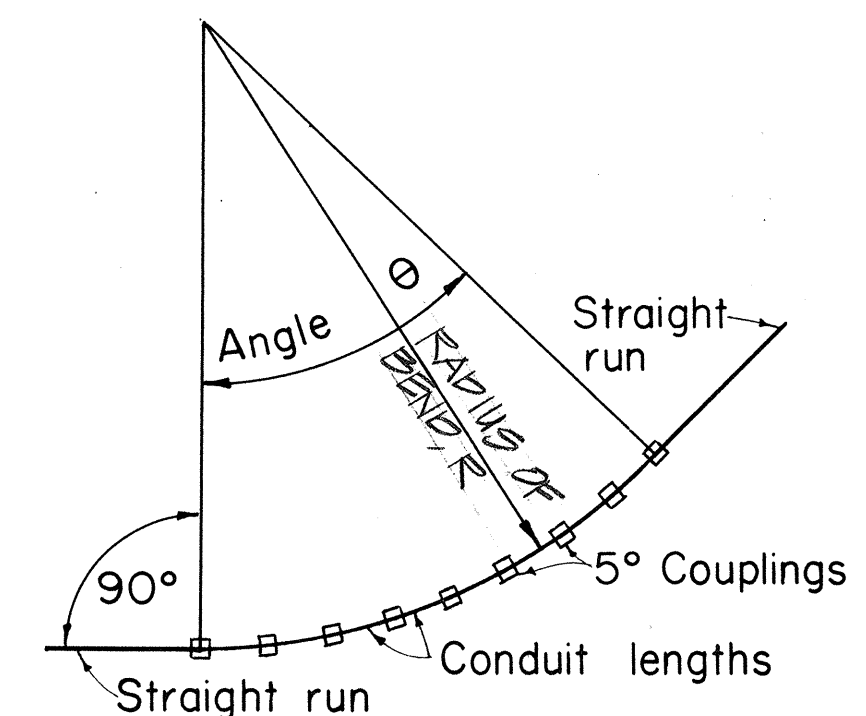
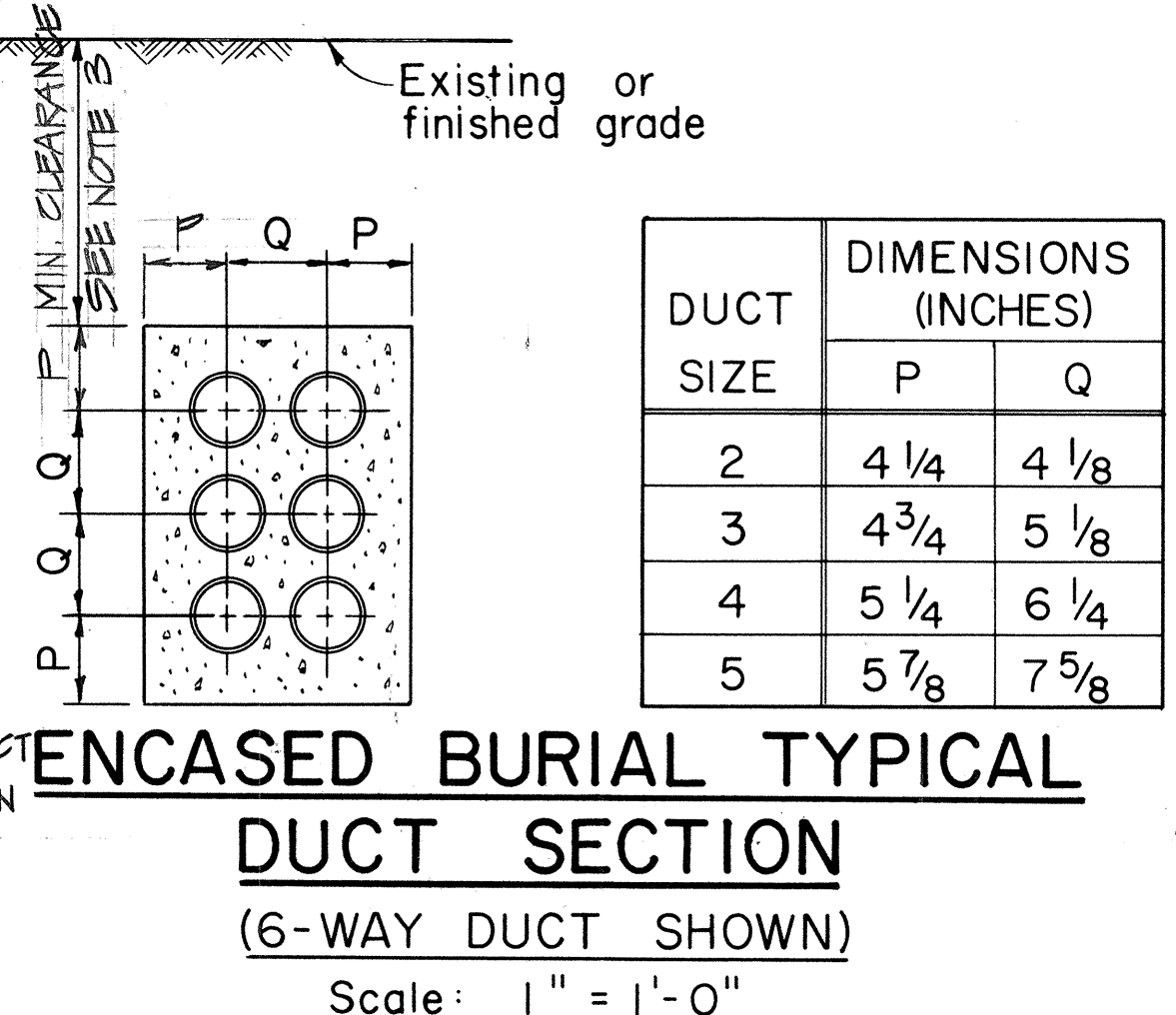


| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | HA-1(11)14         | 1974        | 145       | 234          |



**NOTE:**

1. Maintain 1 1/2" minimum spacing between conduit, 3" minimum concrete envelope around top, bottom & sides.
2. Dimensions are minimum dimensions.
3. MINIMUM CLEARANCE - FINISH GRADE TO TOP OF DUCT ENCLOSURE. PROVIDE OF STATES ACCOMMODATION POLICY SHALL GOVERN DUCTLINE CONSTRUCTION WITHIN ROAD RIGHT-OF-WAY.
4. THE BOTTOM ROW IN AN ENCASED DUCT BANK OF THREE OR MORE LAYERS SHALL BE TYPE DB DUCTS. THE REMAINING DUCTS SHALL BE TYPE EB.



**TABLE "A"**

| APPROX. RADIUS OF BEND, R | LENGTH OF EA. CONDUIT-FT. USING 5° BEND AT COUPL. |
|---------------------------|---------------------------------------------------|
| 11' - 6"                  | 1                                                 |
| 17' - 3"                  | 1.5                                               |
| 23' - 0"                  | 2                                                 |
| 28' - 9"                  | 2.5                                               |
| 34' - 6"                  | 3                                                 |
| 40' - 3"                  | 3.5                                               |
| 46' - 0"                  | 4                                                 |
| 51' - 9"                  | 4.5                                               |
| 57' - 6"                  | 5                                                 |
| 69' - 0"                  | 6                                                 |
| 80' - 6"                  | 7                                                 |
| 92' - 0"                  | 8                                                 |

**TABLE "B"**

| ANGLE OF BEND θ | NO. OF COUPLINGS | LENGTH OF CONDUIT |
|-----------------|------------------|-------------------|
| 15°             | 3                | 2                 |
| 30°             | 6                | 5                 |
| 45°             | 9                | 8                 |
| 60°             | 12               | 11                |
| 75°             | 15               | 14                |
| 90°             | 18               | 17                |

**METHOD OF FORMING CURVES:**

- There are 4 methods of forming curves with plastic conduit.
1. "Cold" bending: Limit trench formed radius sweeps to 25' minimum radius.
  2. "Heat" bending: Do not heat bend conduit.
  3. 5° angle couplings may be used as shown.
  4. Factory made elbows and sweeps may be used only when specified by Engineer.

**APPLICATION OF 5° COUPLING FOR LONG RADIUS BENDS**

**NOTE:**

THE MOST RESTRICTIVE CONDITION SHALL PREVAIL WHERE CONFLICT OCCURS BETWEEN HECO REQUIREMENTS, GENERAL ORDER NO. 10 OF THE STATE'S PUBLIC UTILITIES COMMISSION AND/OR THE STATE'S ACCOMMODATION POLICY.

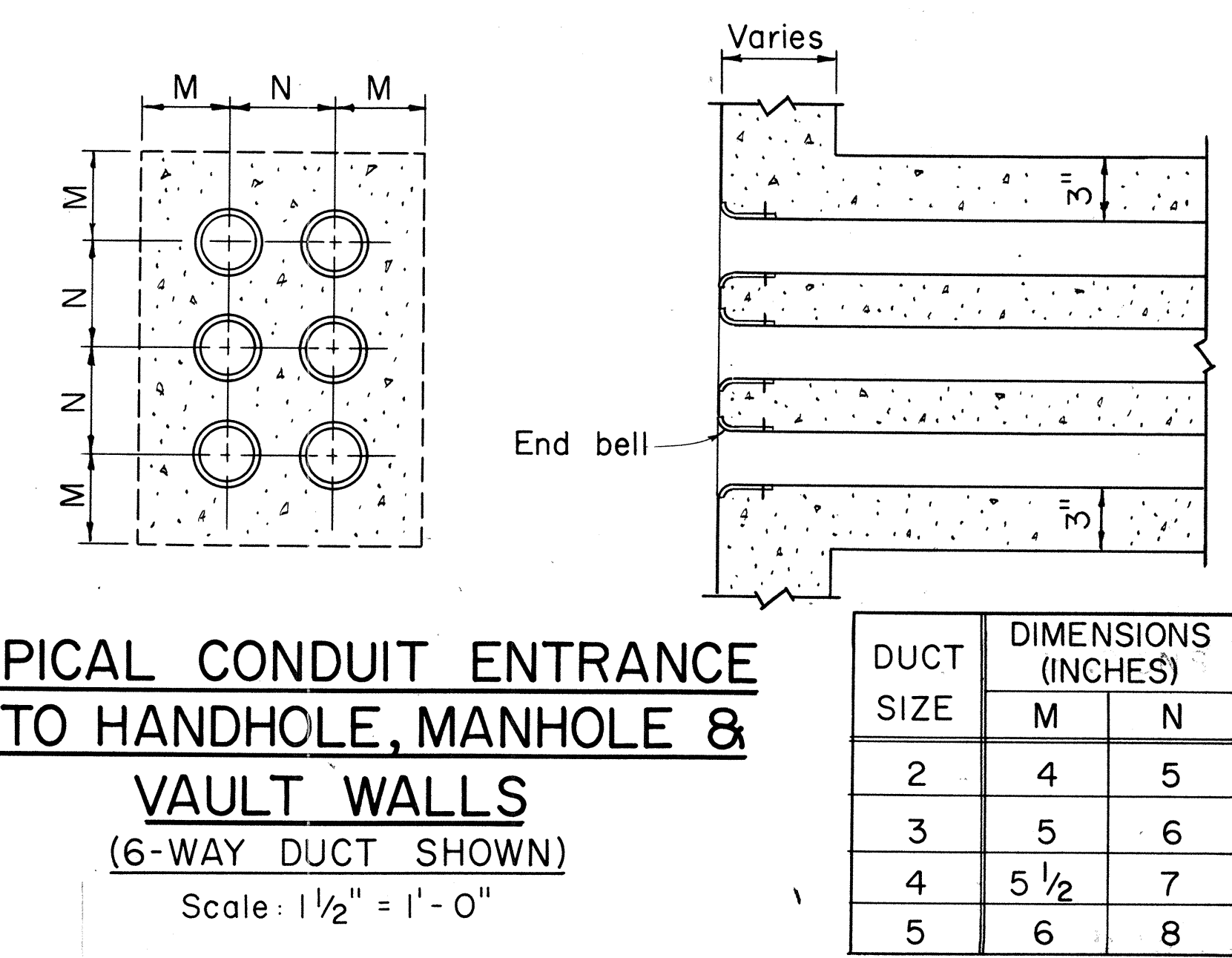
APPROVED: JK-2-26-74

*R. Shad*

Hawaiian Electric Co., Inc. Date 4/30/74

**TYPICAL CONDUIT ENTRANCE INTO HANDHOLE, MANHOLE & VAULT WALLS**  
(6-WAY DUCT SHOWN)

Scale: 1 1/2" = 1'-0"



HECo, Inc. Drawing Number

**20191**

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**CONSTRUCTION STANDARDS  
PLASTIC CONDUIT  
UNDERGROUND DUCT LINES**

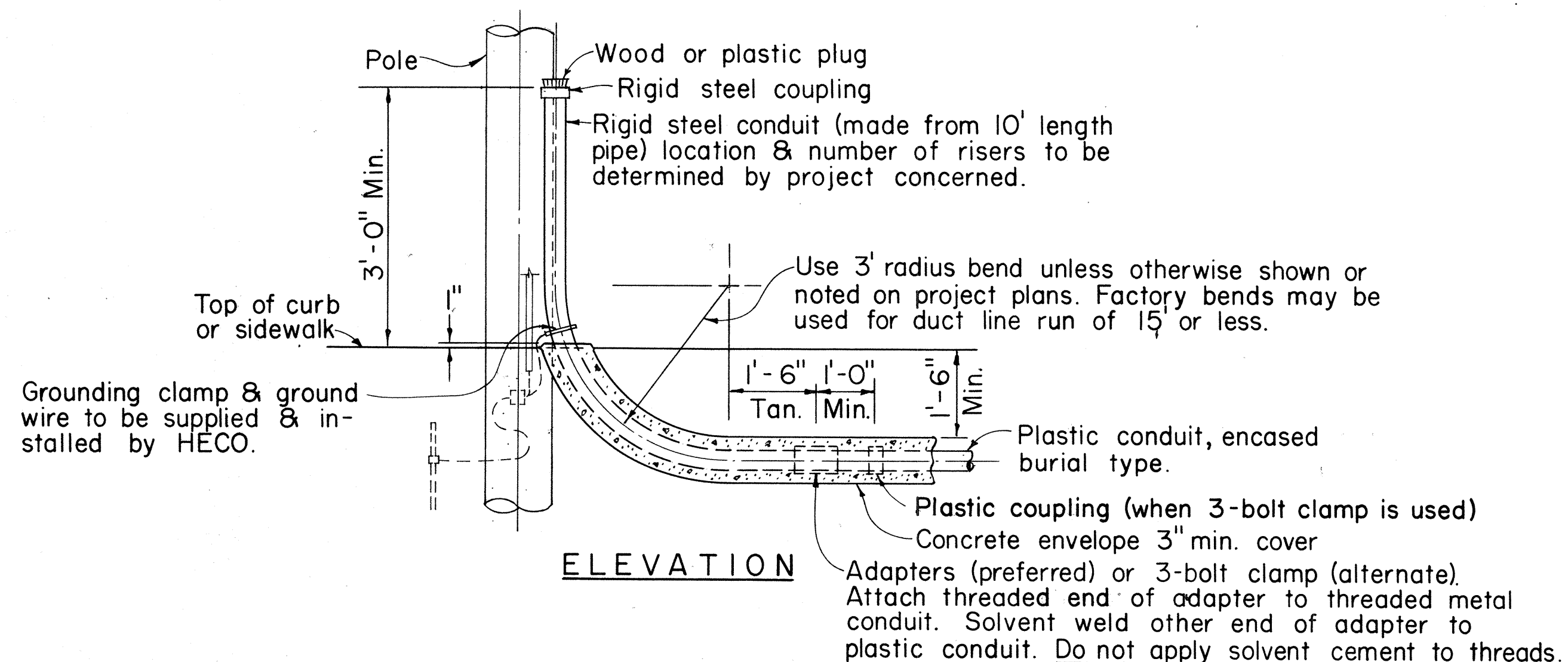
Scale as noted

SHEET No. E-31 OF 40 SHEETS

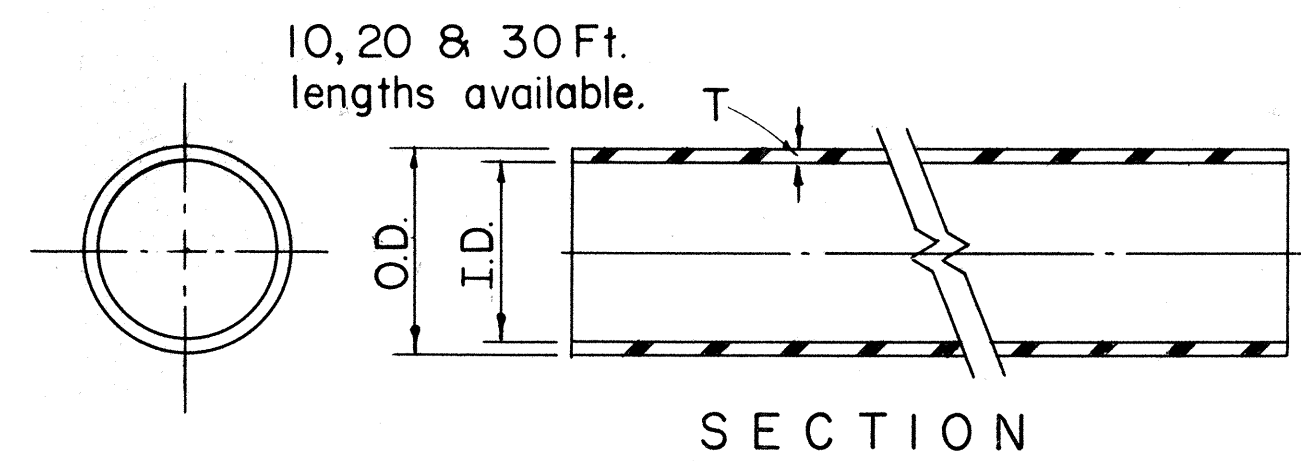
ORIGINAL PLAN  
DATE  
DESIGNED BY  
CHECKED BY  
NOTED BY  
QUANTITIES BY

**TYPICAL RISER DETAIL**  
(POLE RISER SHOWN)

Scale: 1/2" = 1'-0"



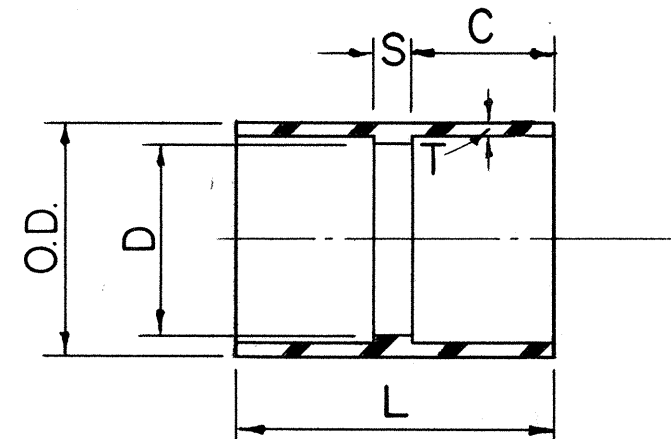
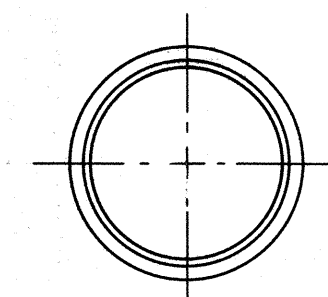




| CONDUIT<br>SIZE | E B (ENCASED BURIAL) |       |       |             |                                 |  | DB (DIRECT BURIAL) |       |      |             |                                 |  |
|-----------------|----------------------|-------|-------|-------------|---------------------------------|--|--------------------|-------|------|-------------|---------------------------------|--|
|                 | HECO<br>CODE         | O.D.  | I.D.  | T<br>(MIN.) | WEIGHT<br>#/10 <sup>2</sup> FT. |  | HECO<br>CODE       | O.D.  | I.D. | T<br>(MIN.) | WEIGHT<br>#/10 <sup>2</sup> FT. |  |
| 2               | 29002                | 2.375 | *2.25 | .060        | 21                              |  | 29010              | 2.375 | 2.15 | .110        | 38                              |  |
| 3               | 29004                | 3.500 | 3.35  | .075        | 39                              |  | 29012              | 3.500 | 3.25 | .125        | 64                              |  |
| 4               | 29006                | 4.500 | 4.31  | .095        | 63                              |  | 29014              | 4.500 | 4.18 | .160        | 104                             |  |
| 5               | 29008                | 5.563 | 5.36  | .100        | 82                              |  | 29016              | 5.563 | 5.20 | .180        | 146                             |  |

## CONDUIT

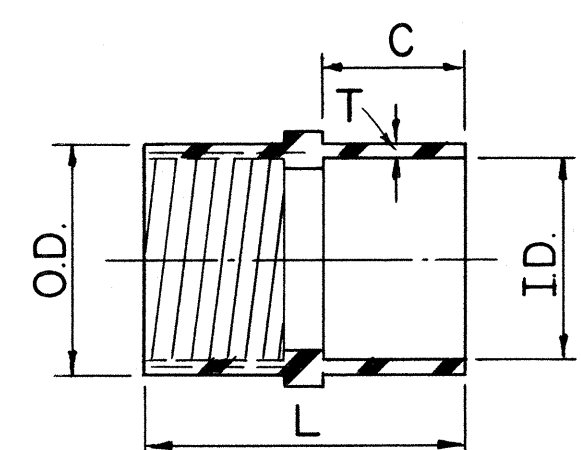
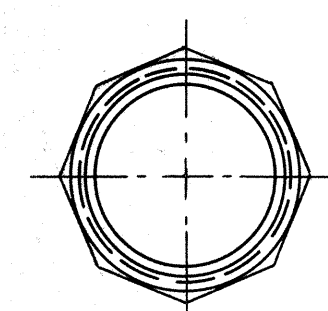
NOTE:  
Type EB & DB Conduits have same O.D. for a given size.  
All fittings which go over Conduits are DB type & fit both  
types of Conduits.



SECTION

## COUPLING

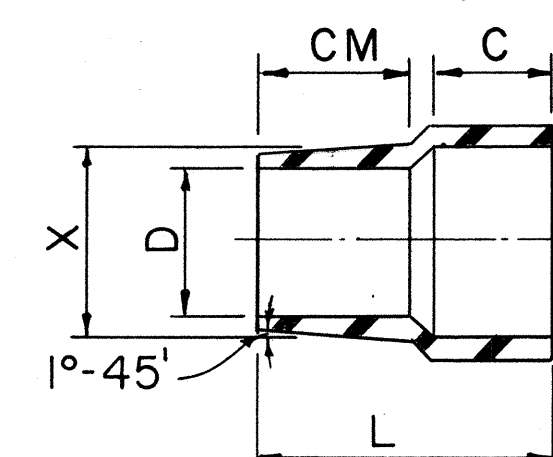
| SIZE | HECO<br>CODE | O.D.  | D     | L       | C    | S    | T    |
|------|--------------|-------|-------|---------|------|------|------|
| 2    | 29018        | 2.620 | 2.255 | 2 7/16  | 1.16 | .110 | .110 |
| 3    | 29020        | 3.780 | 3.350 | 3 3/8   | 1.63 | .120 | .125 |
| 4    | 29022        | 4.855 | 4.310 | 3 11/16 | 1.78 | .120 | .160 |
| 5    | 29024        | 5.965 | 5.363 | 4 3/32  | 1.97 | .160 | .180 |



SECTION

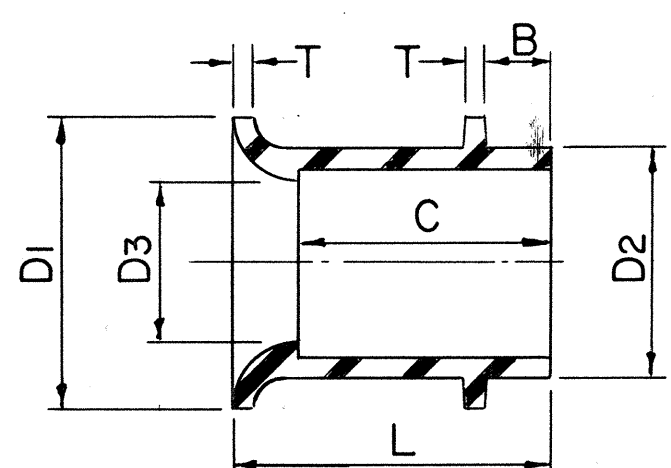
## ADAPTER - PLASTIC TO STEEL

| SIZE | HECO<br>CODE | O.D. | I.D. | L       | T       | C    |
|------|--------------|------|------|---------|---------|------|
| 2    | 29026        |      |      | 2 5/16  | 1 1/16  | 1.16 |
| 3    | 29028        |      |      | 3 7/16  | 1 5/8   | 1.63 |
| 4    | 29030        |      |      | 3 11/16 | 1 23/32 | 1.78 |
| 5    | 29032        |      |      | 4 1/16  | 1 27/32 | 1.97 |



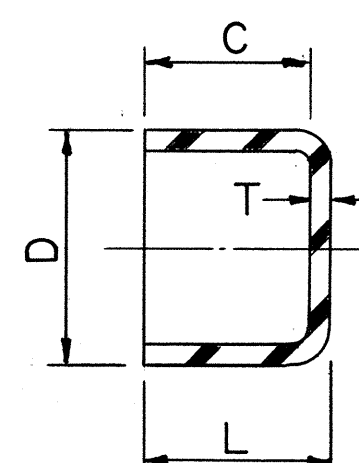
## ADAPTER - PLASTIC TO TRANSITE (ASBESTOS-CEMENT)

| SIZE | HECO<br>CODE | L       | X     | C.M.  | D    | C    |
|------|--------------|---------|-------|-------|------|------|
| 2    | 29034        | 3 1/16  | 2.580 | 1 3/4 | 2.18 | 1.16 |
| 3    | 29036        | 3 19/32 | 3.620 | 1 3/4 | 3.09 | 1.63 |
| 4    | 29038        | 4 1/32  | 4.620 | 2     | 4.03 | 1.78 |
| 5    | 29040        |         |       |       |      |      |



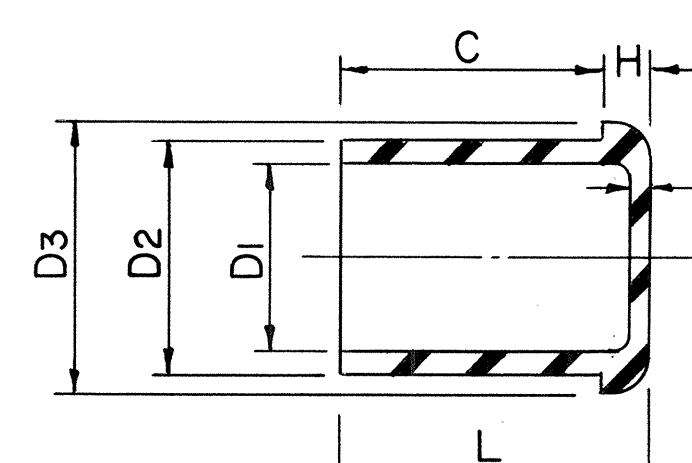
## END BELL

| SIZE | HECO<br>CODE | D1   | D2    | D3    | B    | C    | L    | T    |
|------|--------------|------|-------|-------|------|------|------|------|
| 2    | 29042        | 3.01 | 2.520 | 2.255 | .50  | 1.16 | 1.54 | .060 |
| 3    | 29044        | 4.10 | 3.680 | 3.350 | .75  | 1.63 | 2.00 | .075 |
| 4    | 29046        | 5.31 | 4.725 | 4.310 | .75  | 1.78 | 2.28 | .095 |
| 5    | 29048        | 6.36 | 5.805 | 5.363 | 1.00 | 1.97 | 2.47 | .100 |



## CAP (RIGID) - FOR SEMI-PERMANENT USE

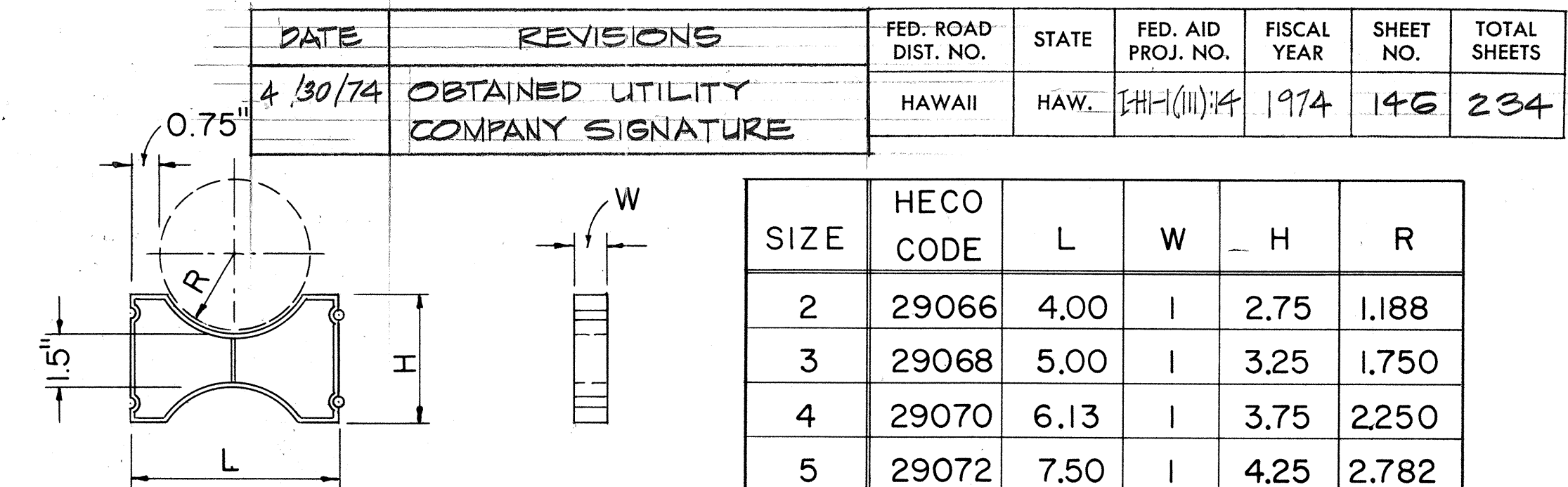
| SIZE | HECO<br>CODE | D     | C    | L    | T    |
|------|--------------|-------|------|------|------|
| 2    | 29050        | 2.52  | .59  | .65  | .060 |
| 3    | 29052        | 3.68  | .81  | .89  | .075 |
| 4    | 29054        | 4.725 | .91  | 1.01 | .095 |
| 5    | 29056        | 5.805 | 1.00 | 1.10 | .100 |



## CAP (TEMPORARY)

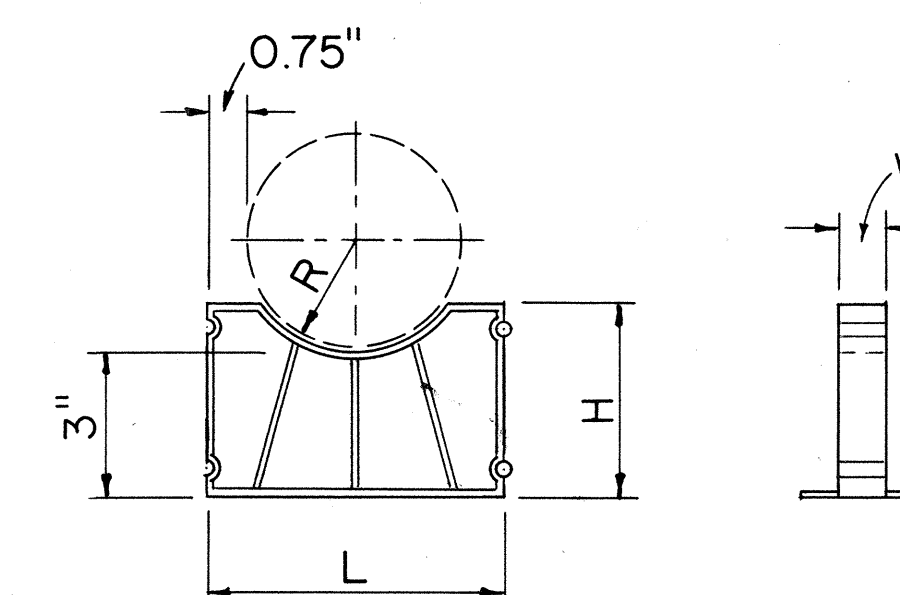
| SIZE | HECO<br>CODE | D1    | D2    | D3    | C     | H    | L     | T    |
|------|--------------|-------|-------|-------|-------|------|-------|------|
| 2    | 29058        | 2.260 | 2.375 | 2.500 | .593  | .125 | .718  | .060 |
| 3    | 29060        | 3.360 | 3.500 | 3.656 | .812  | .156 | .968  | .075 |
| 4    | 29062        | 4.320 | 4.500 | 4.687 | .906  | .187 | 1.092 | .095 |
| 5    | 29064        | 5.375 | 5.638 | 5.760 | 1.000 | .218 | 1.218 | .100 |

NOTE:  
Cap will go over conduit or  
"plug" the coupling.



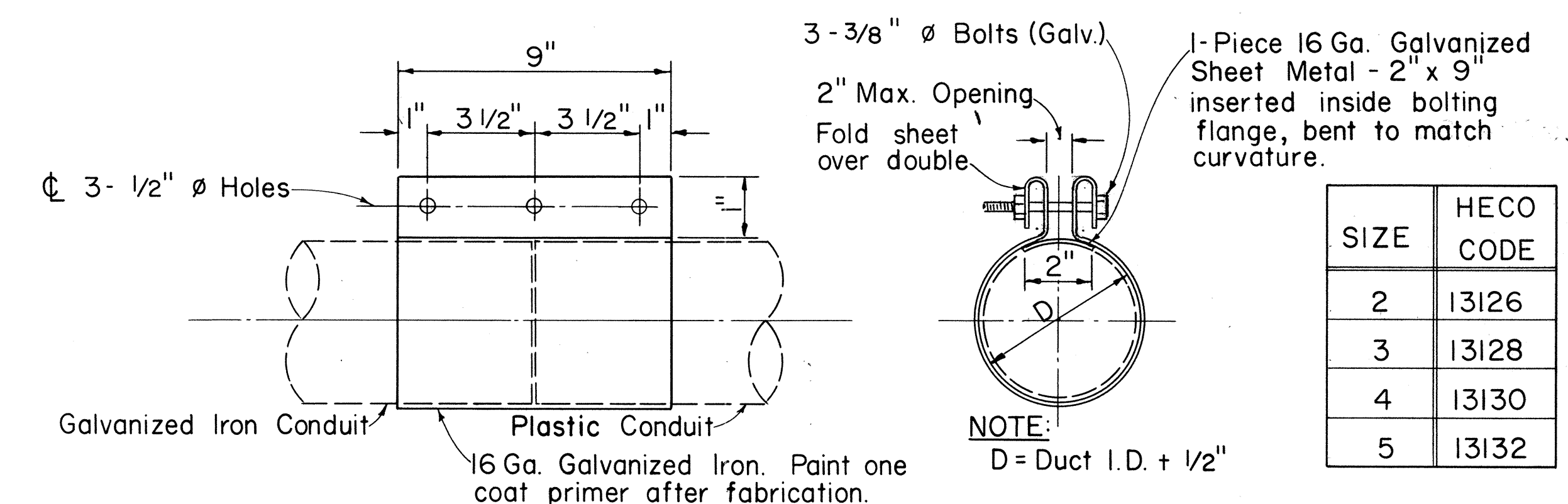
## INTERMEDIATE SPACER

| SIZE | HECO<br>CODE | L    | W | H    | R     |
|------|--------------|------|---|------|-------|
| 2    | 29066        | 4.00 | 1 | 2.75 | 1.188 |
| 3    | 29068        | 5.00 | 1 | 3.25 | 1.750 |
| 4    | 29070        | 6.13 | 1 | 3.75 | 2.250 |
| 5    | 29072        | 7.50 | 1 | 4.25 | 2.782 |



## BASE SPACER

| SIZE | HECO<br>CODE | L    | W | H    | R     |
|------|--------------|------|---|------|-------|
| 2    | 29074        | 4.00 | 1 | 3.63 | 1.188 |
| 3    | 29076        | 5.00 | 1 | 3.88 | 1.750 |
| 4    | 29078        | 6.13 | 1 | 4.13 | 2.250 |
| 5    | 29080        | 7.50 | 1 | 4.38 | 2.782 |



## 3 - BOLT CLAMP

NOTES:  
1. All dimensions in inches.  
2. Spacers shown are different than that used for transite.  
3. These accessories are to be used with ABS (Acrylonitrile-Butadiene - Styrene), or PVC (Poly-Vinyl Chloride) Plastic Conduit, per HECO purchase specification M7001-0.

APPROVED: *[Signature]* JK-4-26-74  
Hawaiian Electric Co., Inc. *[Signature]* 4/30/74 Date

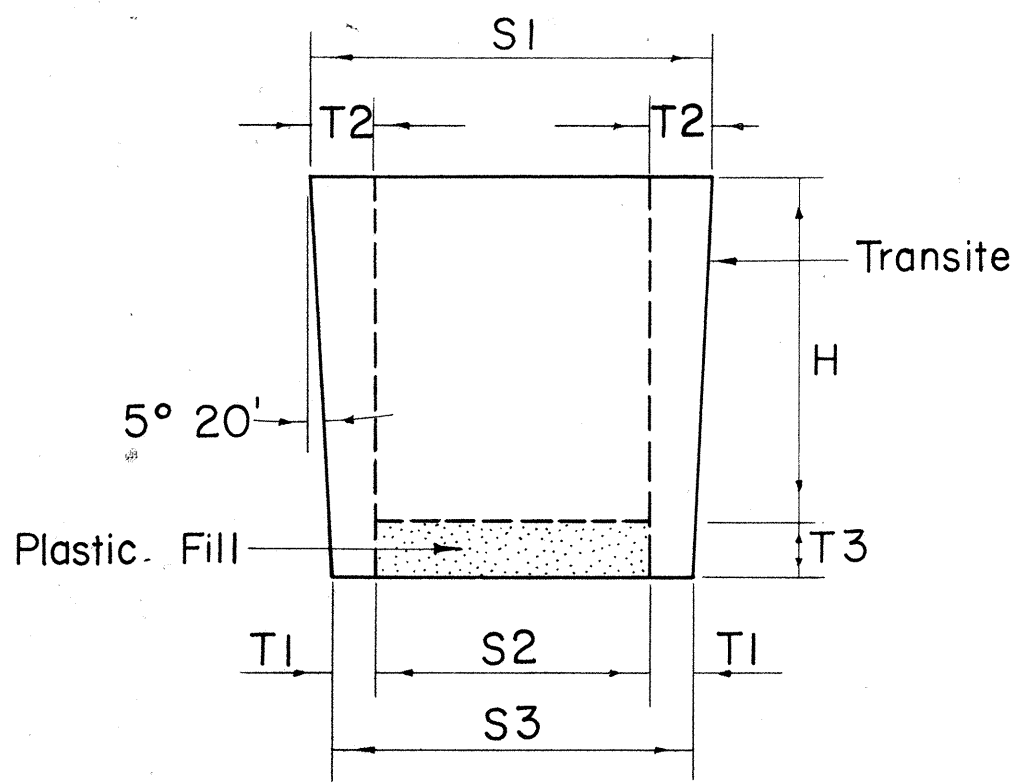
|                                                                                        |  |
|----------------------------------------------------------------------------------------|--|
| HECo., Inc. Drawing Number                                                             |  |
| 42276                                                                                  |  |
| STATE OF HAWAII<br>DEPARTMENT OF TRANSPORTATION<br>HIGHWAYS DIVISION                   |  |
| STANDARD DETAILS<br>ACCESSORY DETAILS FOR<br>PLASTIC CONDUIT<br>UNDERGROUND DUCT LINES |  |
| Scales: Not to Scale                                                                   |  |
| SHEET No. E-32 OF 40 SHEETS                                                            |  |





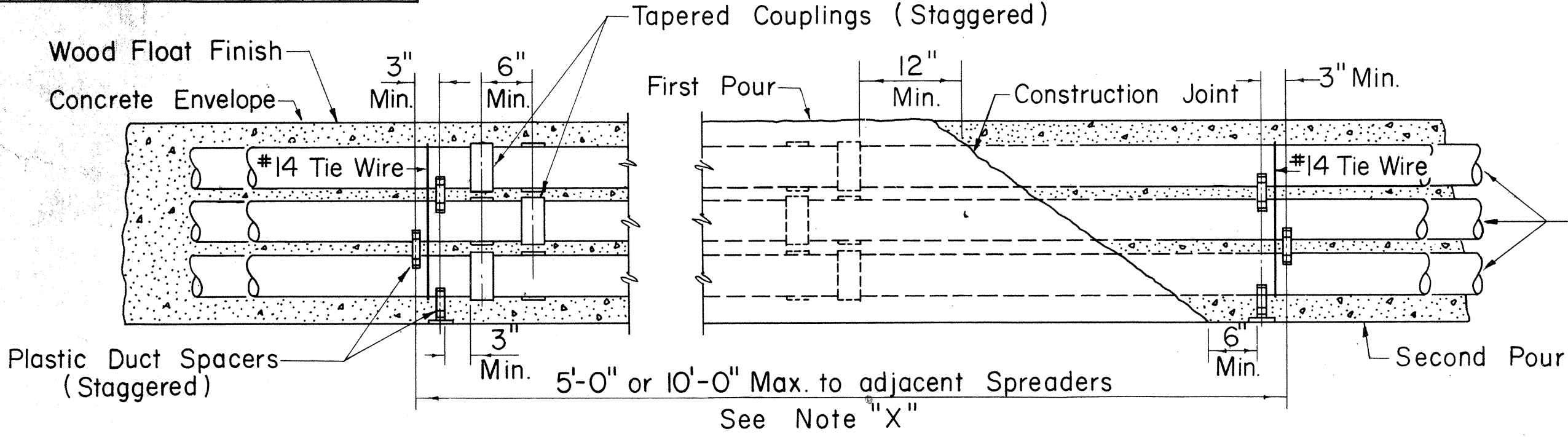


| FED. ROAD DIST. NO. | STATE  | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|--------|--------------------|-------------|-----------|--------------|
| HAWAII              | HAWAII | HA-11(111)14       | 1974        | 148       | 234          |

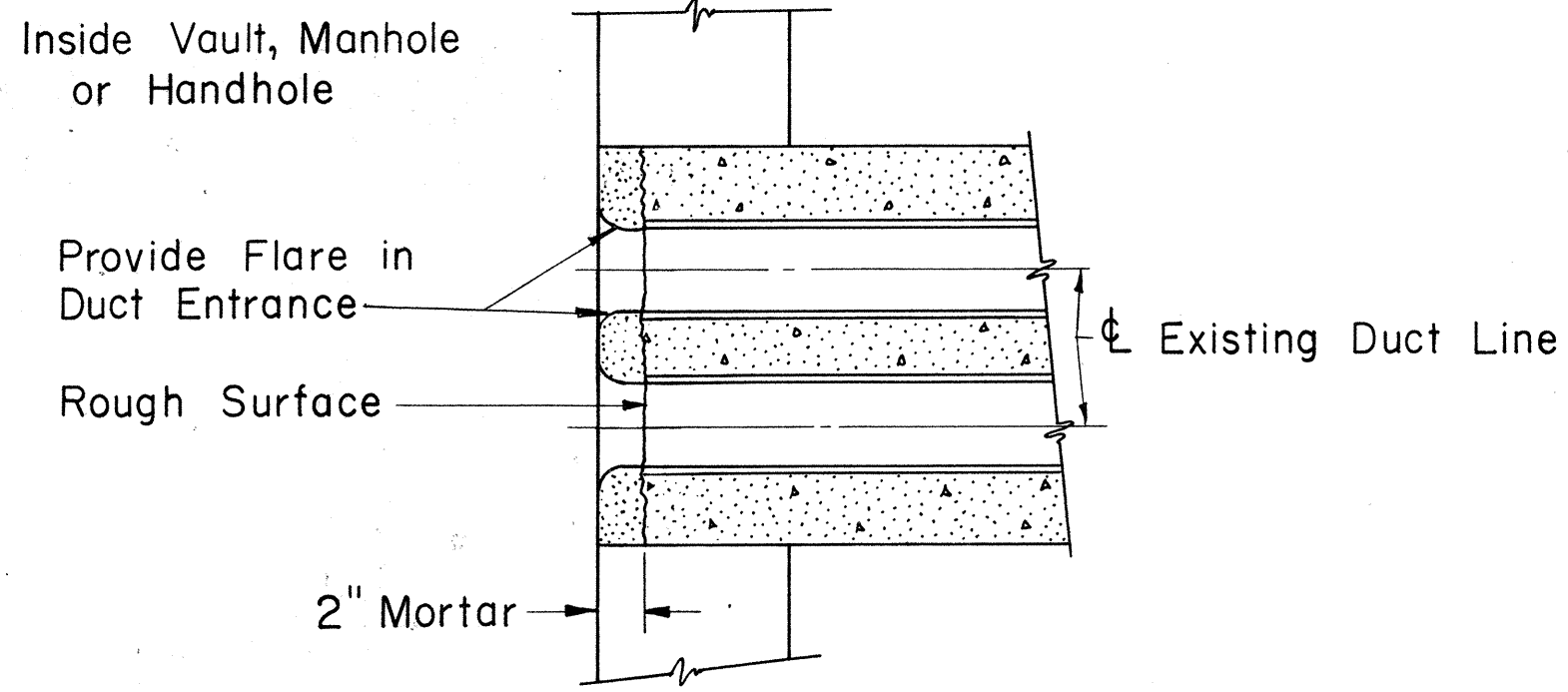


**PLUGS FOR TRANSITE KORDUCTS**  
Not to Scale

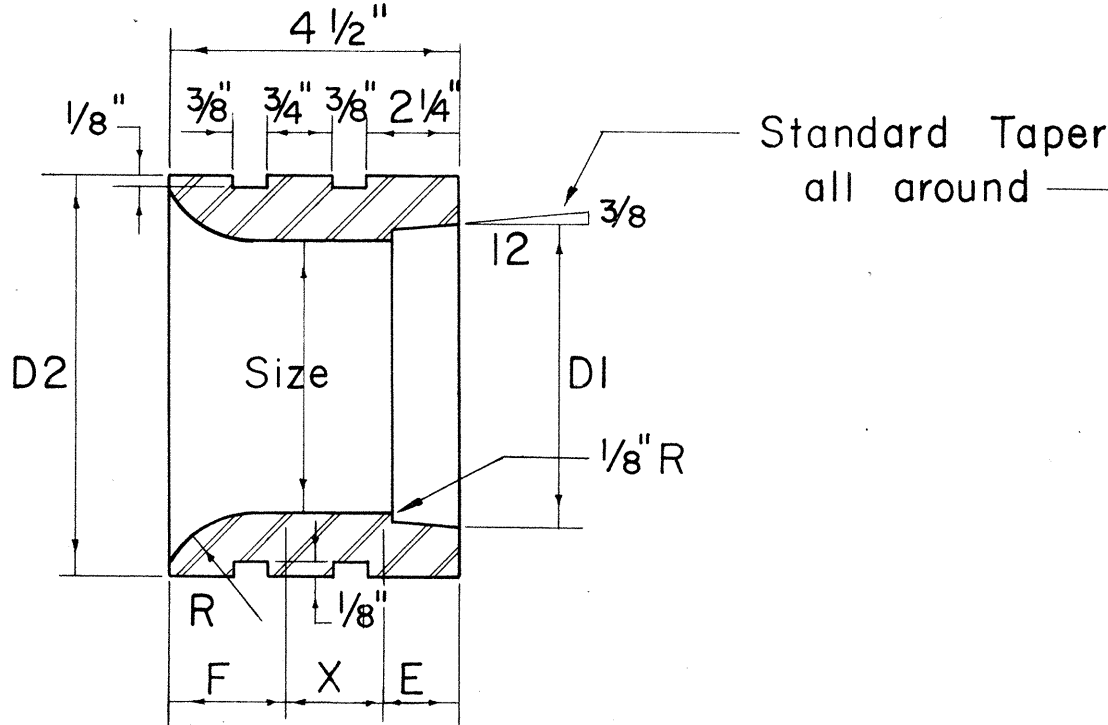
| SIZE   | H      | S1       | S2     | S3       | T1       | T2       | T3     |
|--------|--------|----------|--------|----------|----------|----------|--------|
| 3"     | 4"     | 3 3/8"   | 2"     | 2 5/8"   | 5 1/16"  | 11 1/16" | 3 3/4" |
| 4"     | 4 1/2" | 4 27/64" | 2 3/4" | 3 37/64" | 13 3/32" | 27 3/32" | 3 3/4" |
| 4 1/2" | 4 1/2" | 4 59/64" | 3"     | 4 5/64"  | 35 3/64" | 31 3/32" | 3 3/4" |
| 5"     | 4 1/2" | 5 27/64" | 3 1/2" | 4 37/64" | 35 3/64" | 31 3/32" | 3 3/4" |



**TYPICAL DUCT ENVELOPE ELEVATION**  
(6 WAY DUCT LINE SHOWN)  
Not to Scale



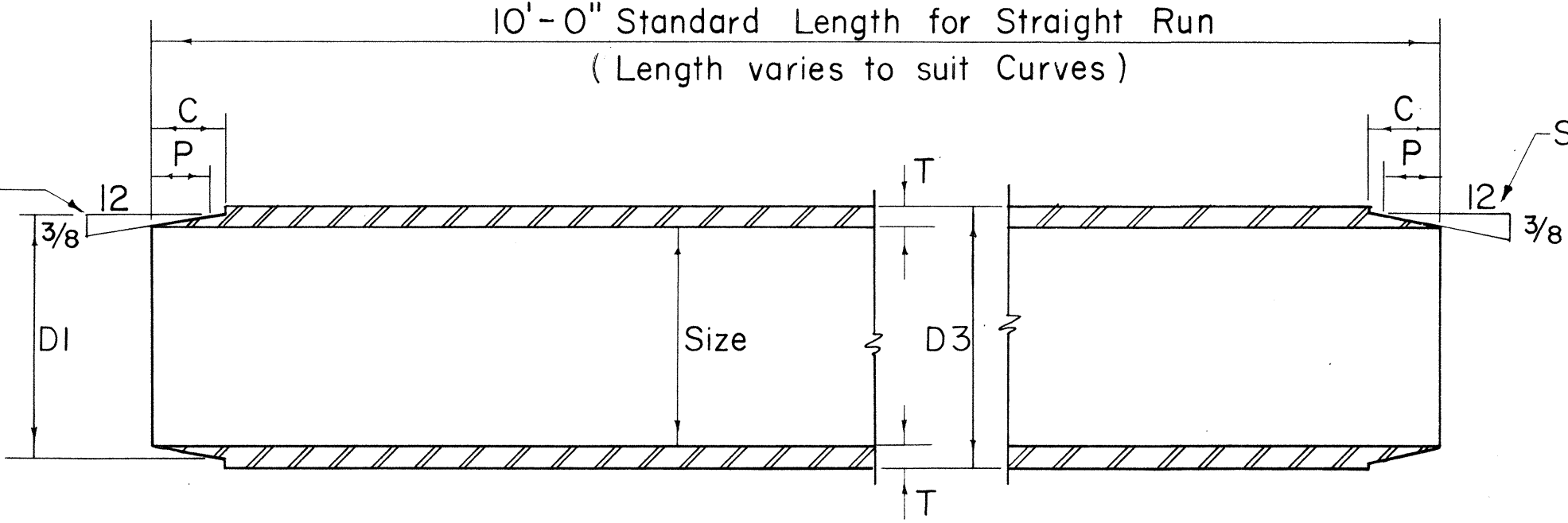
**DUCT LINE ENTRANCE AT EXISTING DUCT LINE**  
Scale: 1 1/2" = 1'-0"



**STANDARD END BELLS**  
Not to Scale

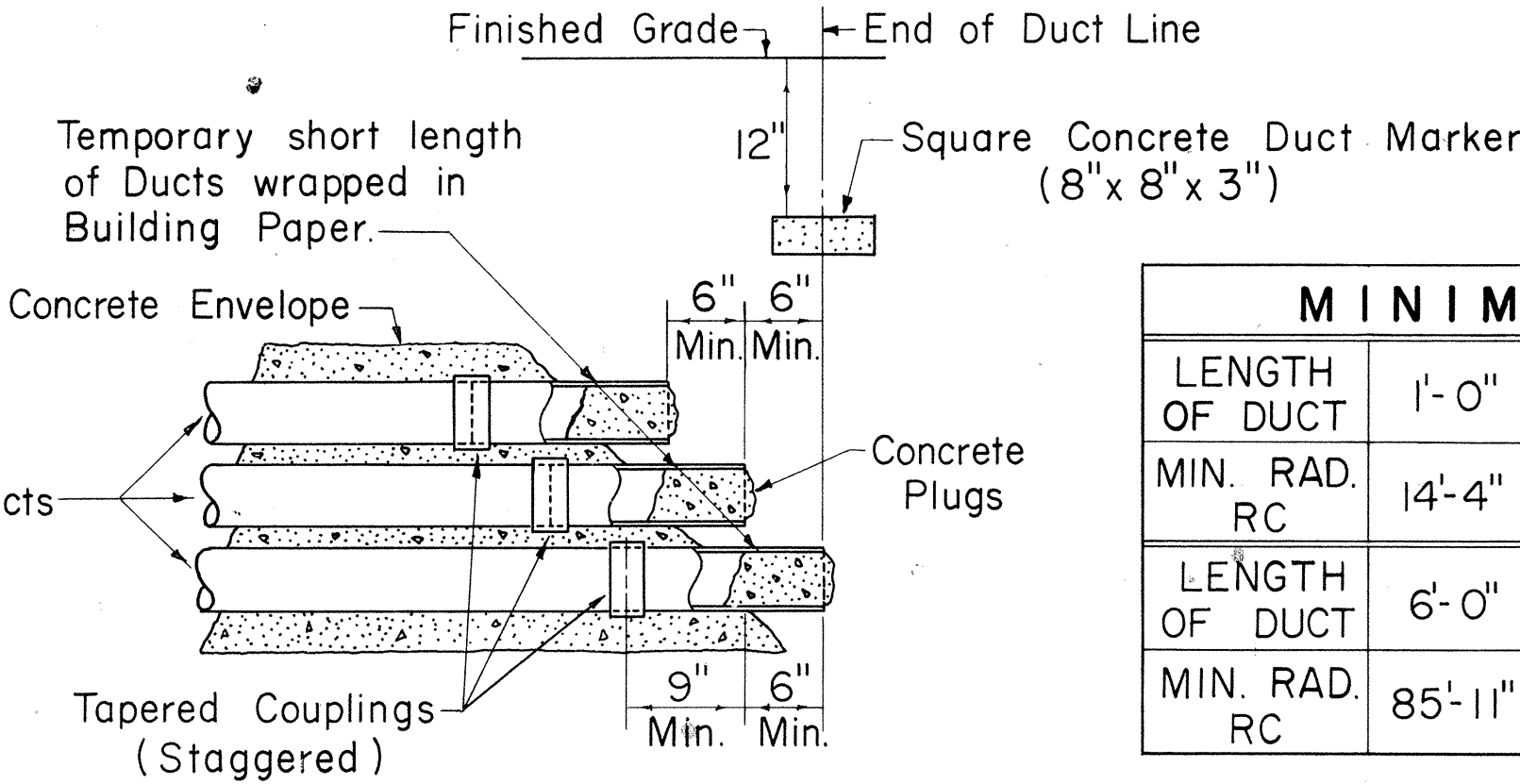
| SIZE   | D1       | D2     | F       | X        | E      | R      |
|--------|----------|--------|---------|----------|--------|--------|
| 3"     | 3 25/64" | 4 1/2" | 1 1/32" | 1 29/32" | 1 1/4" | 1 3/4" |
| 4"     | 4 25/64" | 5 3/4" | 1 9/16" | 1 9/16"  | 1 3/8" | 2"     |
| 4 1/2" | 4 57/64" | 6 1/4" | 1 9/16" | 1 9/16"  | 1 3/8" | 2"     |
| 5"     | 5 29/64" | 7"     | 1 9/16" | 1 7/16"  | 1 1/2" | 2"     |

Note "X"  
Provide one set of Spacers  
(a) 10 Ft. straight run for 4 Ducts high or less.  
(b) 5 Ft. straight run for 5 Ducts high or more.



**TRANSITE KORDUCTS**  
Not to Scale

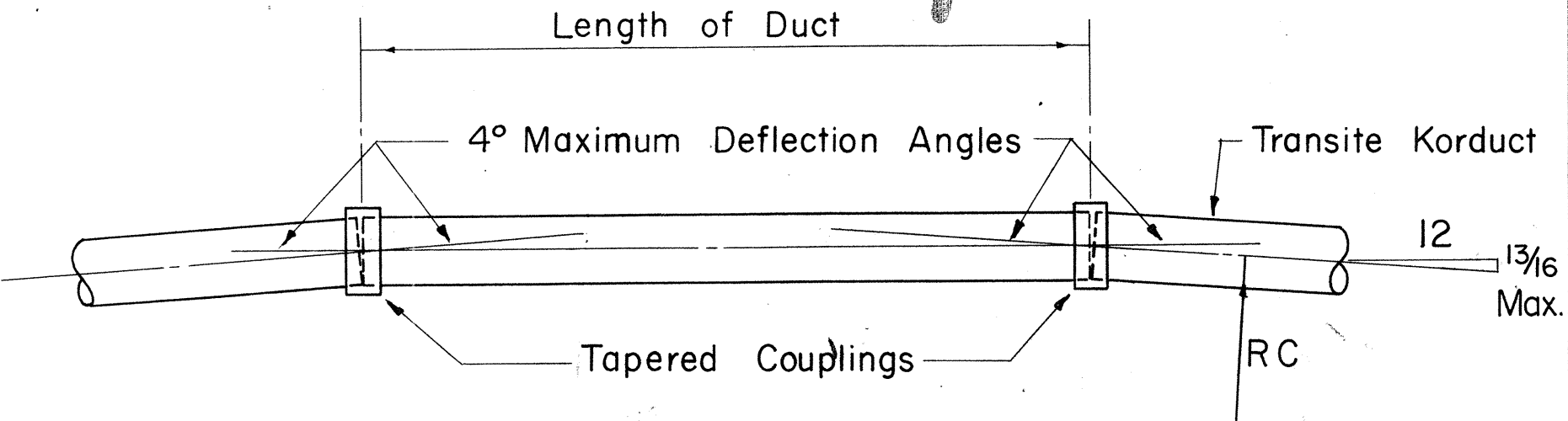
| SIZE   | D1       | D3       | C        | P      | T        |
|--------|----------|----------|----------|--------|----------|
| 3"     | 3 25/64" | 3 35/64" | 1 1/8"   | 7 7/8" | 17 1/64" |
| 4"     | 4 25/64" | 4 35/64" | 1 1/4"   | 1"     | 17 1/64" |
| 4 1/2" | 4 57/64" | 5 3/64"  | 1 1/4"   | 1"     | 17 1/64" |
| 5"     | 5 29/64" | 5 39/64" | 1 25/64" | 1 1/8" | 19 1/64" |



**TYPICAL STUB OUT DETAIL**  
Not to Scale

**TAPERED COUPLINGS**  
Not to Scale

| SIZE   | D1       | D2       | L      |
|--------|----------|----------|--------|
| 3"     | 3 25/32" | 4 11/64" | 2 1/4" |
| 4"     | 4 25/64" | 5 3/16"  | 2 1/2" |
| 4 1/2" | 4 57/64" | 5 49/64" | 2 1/2" |
| 5"     | 5 29/64" | 6 21/64" | 2 3/4" |



**METHOD OF FORMING CURVES**  
Not to Scale

|                | MINIMUM RADIUS TO FORM CURVES |        |         |         |         |         |          |         |         |        |
|----------------|-------------------------------|--------|---------|---------|---------|---------|----------|---------|---------|--------|
| LENGTH OF DUCT | 1'-0"                         | 1'-6"  | 2'-0"   | 2'-6"   | 3'-0"   | 3'-6"   | 4'-0"    | 4'-6"   | 5'-0"   | 5'-6"  |
| MIN. RAD. RC   | 14'-4"                        | 21'-6" | 28'-8"  | 35'-10" | 42'-11" | 50'-1"  | 57'-3"   | 64'-5"  | 71'-7"  | 78'-9" |
| LENGTH OF DUCT | 6'-0"                         | 6'-6"  | 7'-0"   | 7'-6"   | 8'-0"   | 8'-6"   | 9'-0"    | 9'-6"   | 10'-0"  |        |
| MIN. RAD. RC   | 85'-11"                       | 93'-1" | 100'-3" | 107'-5" | 114'-7" | 121'-8" | 128'-10" | 136'-0" | 143'-2" |        |

|         |                                    |
|---------|------------------------------------|
| 4/30/74 | OBTAINED UTILITY COMPANY SIGNATURE |
| DATE    | REVISIONS                          |

15-34

HECo., Inc. Drawing Number

18585 SHEET No. 2 OF 2 SHEETS

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

STANDARD DETAILS

CONSTRUCTION STANDARDS  
TRANSITE KORDUCTS  
UNDERGROUND DUCT LINES

Scales: As Noted Date

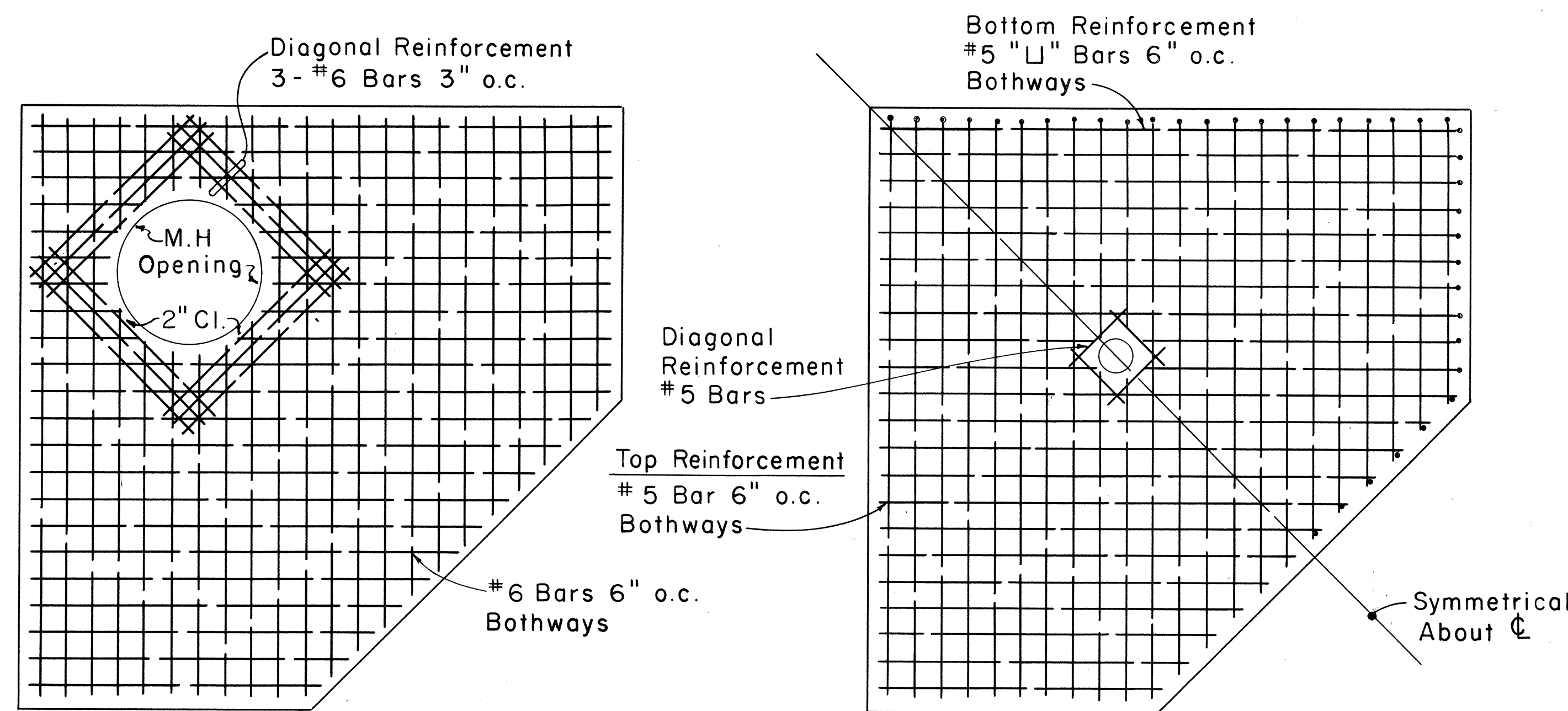
SHEET NO. E-34 OF 40 SHEETS

APPROVED:  
*[Signature]*  
HAWAIIAN ELECTRIC CO., INC. 4/30/74  
DATE



# GENERAL NOTES:

- Design Data  
 $f_s = 20,000$  psi  
 $f'_c = 3,000$  psi  
 $f_c = 12,000$  psi  
 $n = 10$   
 $w =$  Equiv. Fluid Pressure  $30\#/Ft^2$
- Minimum overlap for a Lapped Splice shall be 24 Bar Dia. but not less than 12". Lap of Adjacent Bars shall not be in same location.
- Unless otherwise indicated, for Vertical Location of Duct Windows see Profile Sheet.
- Manhole Walls shall be Doubled Formed.
- All Concrete shall be cured by an Impervious Liquid Membrane Compound.
- Concrete shall not be loaded, except by its own weight, until 28 Days have passed since placement
- All Construction Joints shall be Waterproofed with Two Applications of Thoro-Seal or equal.
- Cap all Ducts and Stubouts.
- Concrete shall be Class A and shall have a Compressive Strength of 3000 psi in 28 Days with a Slump of 3".
- Concrete Admixture shall be  $2\frac{1}{2}$  Lbs. "Tricosol Normal" per Cubic Yard.
- For Details "A", "B", "C", Sections "D-D", "E-E", "F-F" and other Miscellaneous Manhole Construction Details see Supplement Sheet to A-1, A-2, and A-3 Telephone Manholes.

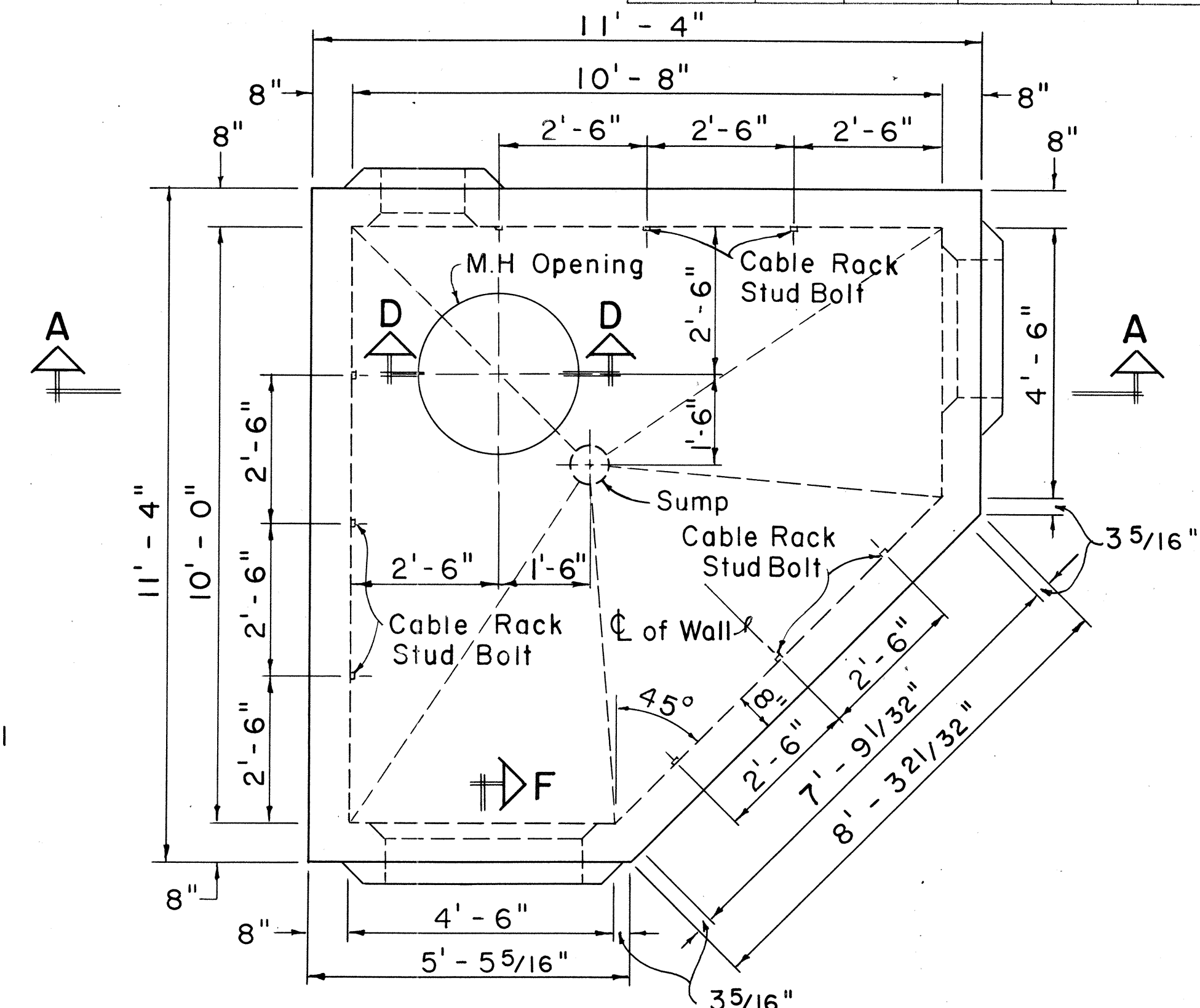


ROOF SLAB REINF. PLAN

Scale:  $1/2" = 1'-0"$

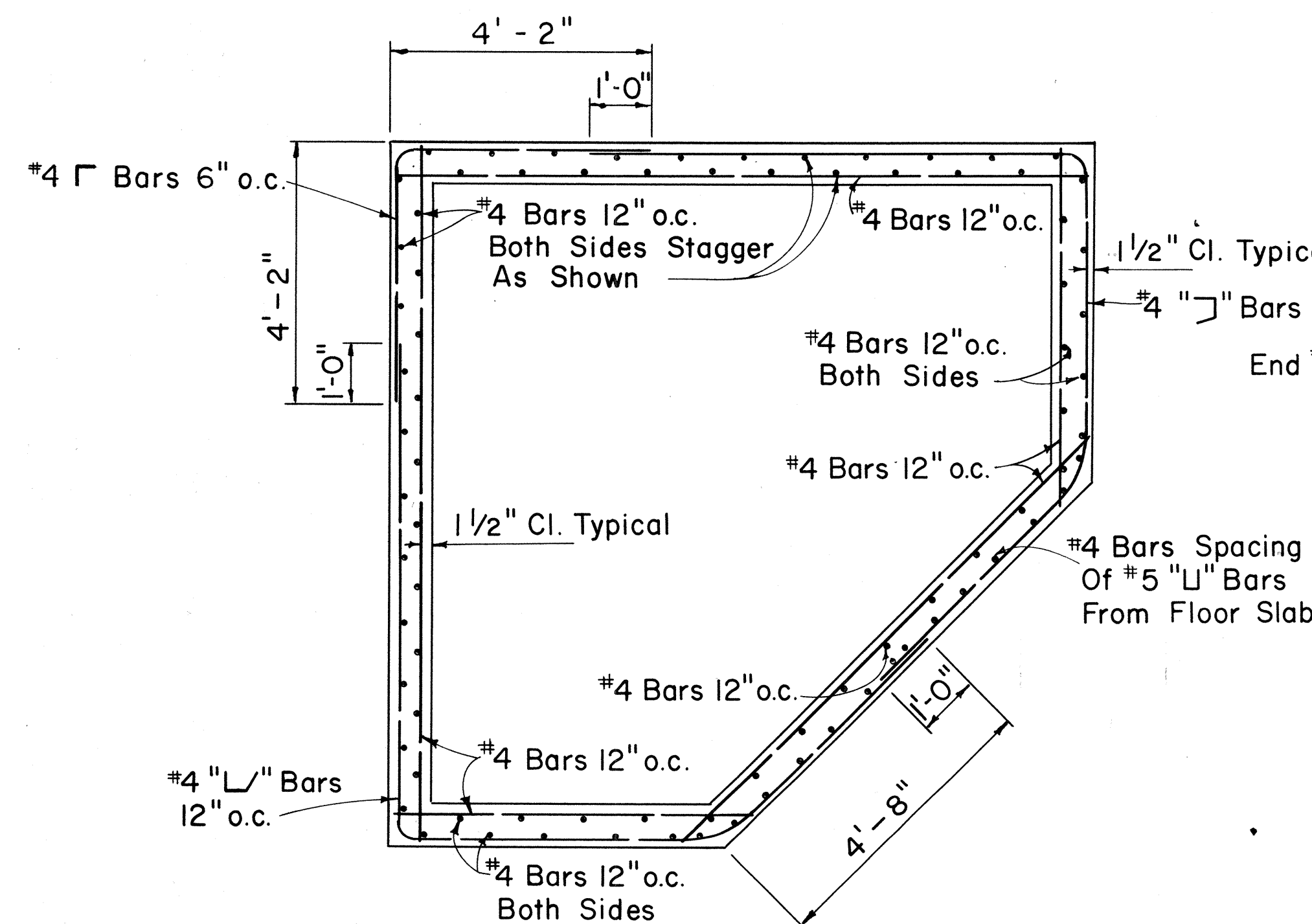
FLOOR SLAB REINF. PLAN

(Showing Top & Bottom Reinf.)  
 Scale:  $1/2" = 1'-0"$



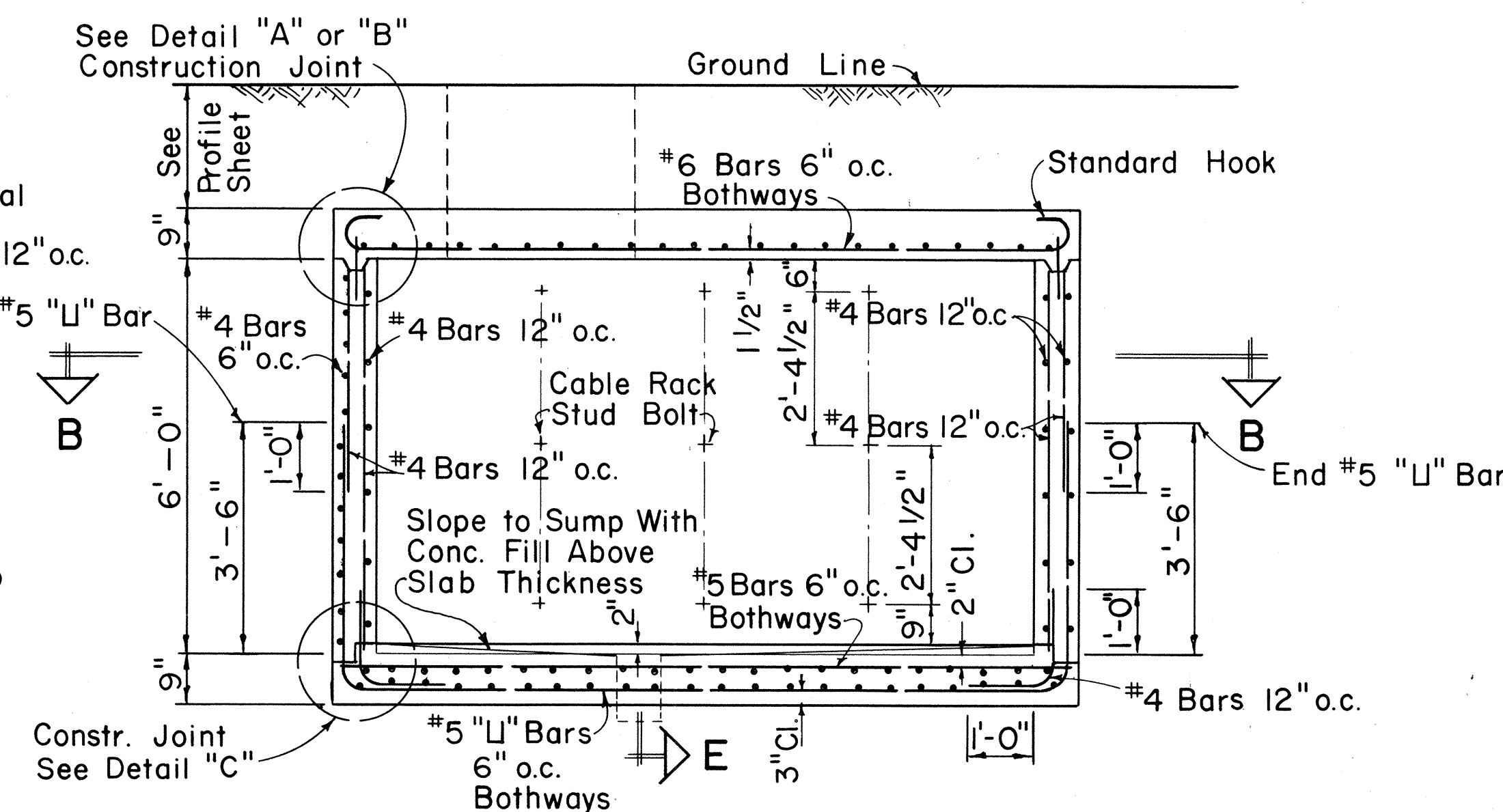
PLAN

Scale:  $1/2" = 1'-0"$



SECTION "B-B"

Scale:  $1/2" = 1'-0"$



SECTION "A-A"

Scale:  $1/2" = 1'-0"$

E-35

APPROVED:

*R. Man* 10-21-74  
 Hawaiian Telephone Co., Ltd. Date  
 H. T. Co., Ltd. Drawing No. 34034

STATE OF HAWAII  
 DEPARTMENT OF TRANSPORTATION  
 HIGHWAYS DIVISION

STANDARD CORNER  
 LARGE TYPE MANHOLE

Scale: As Noted Date:

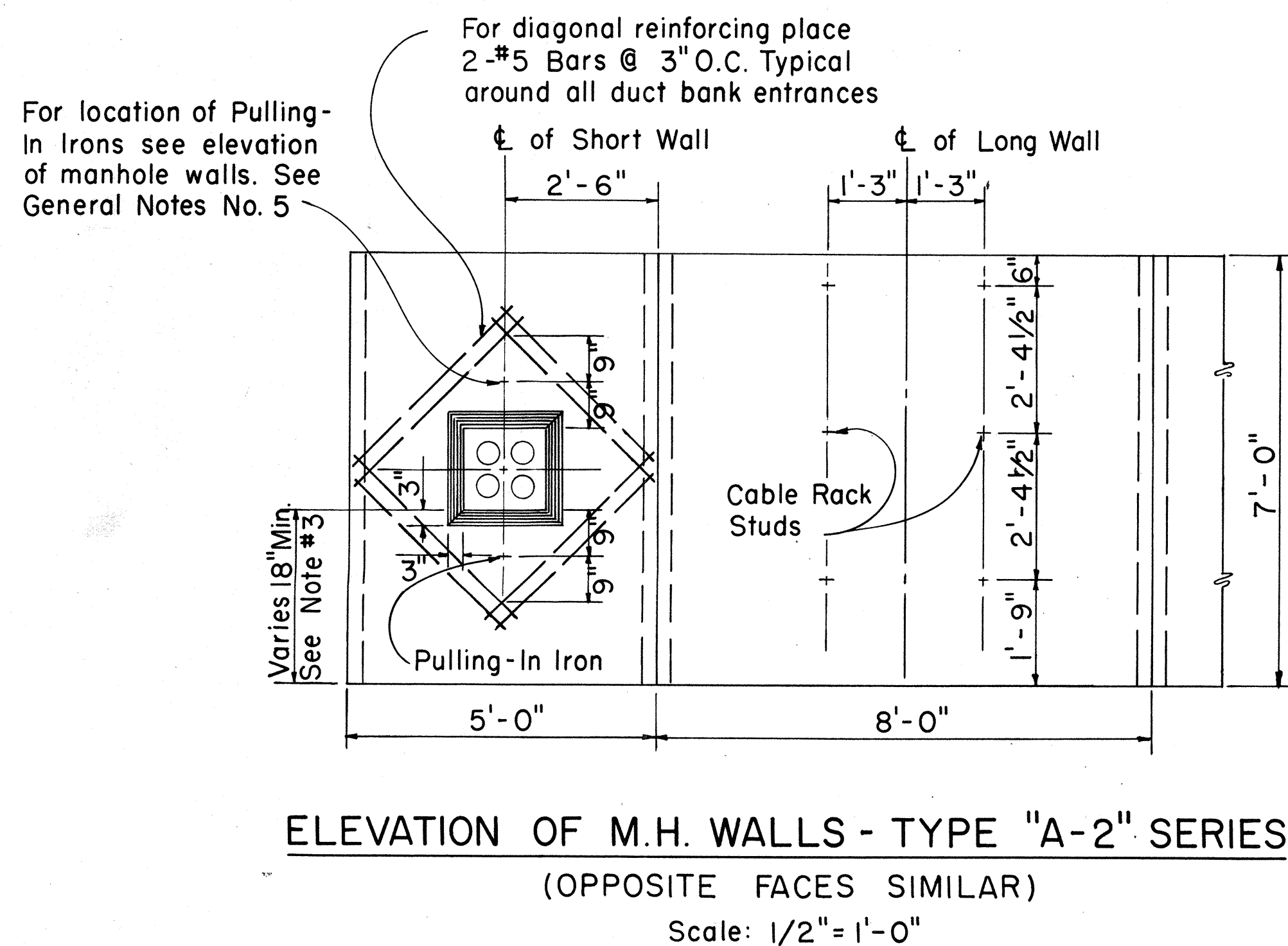
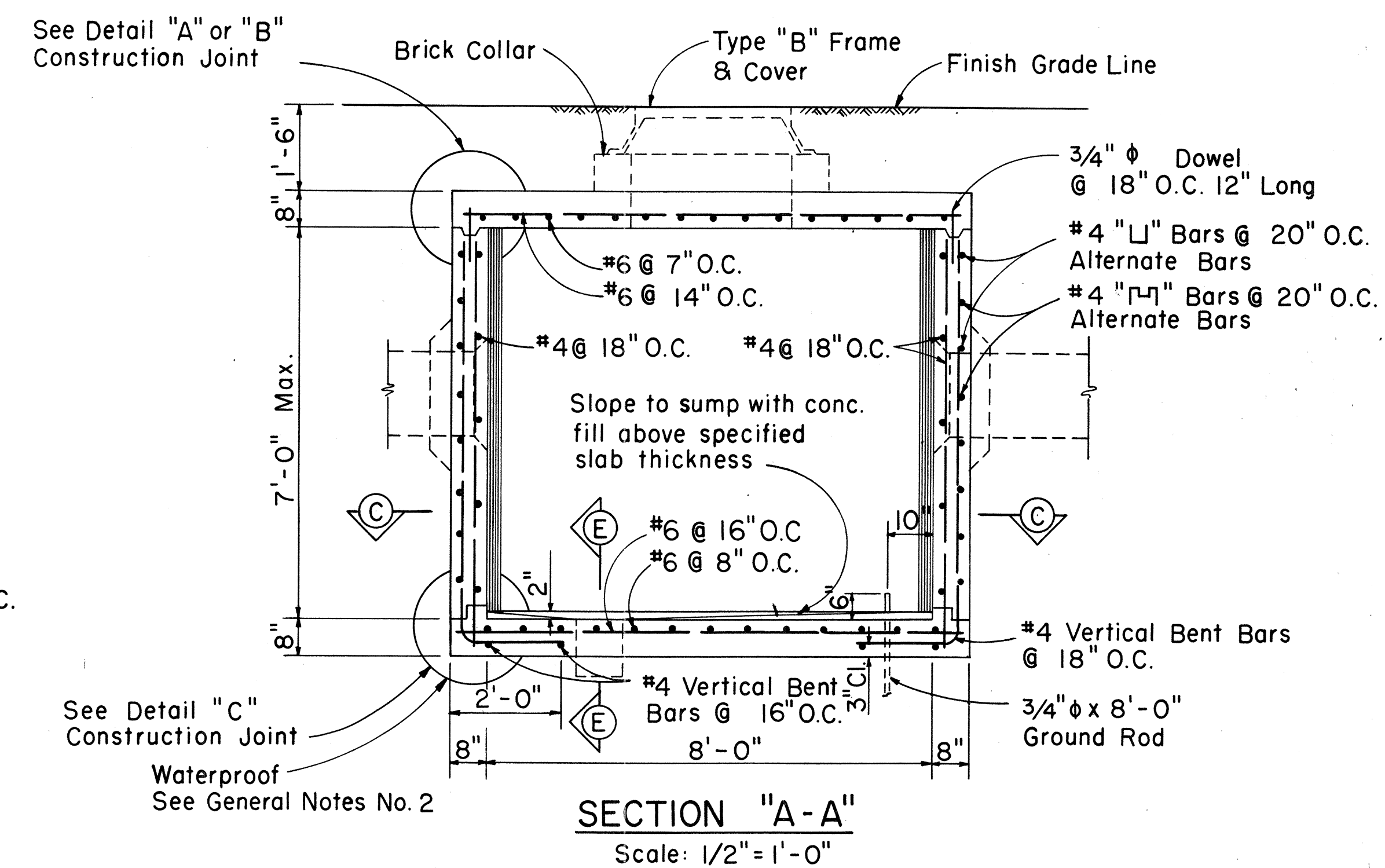
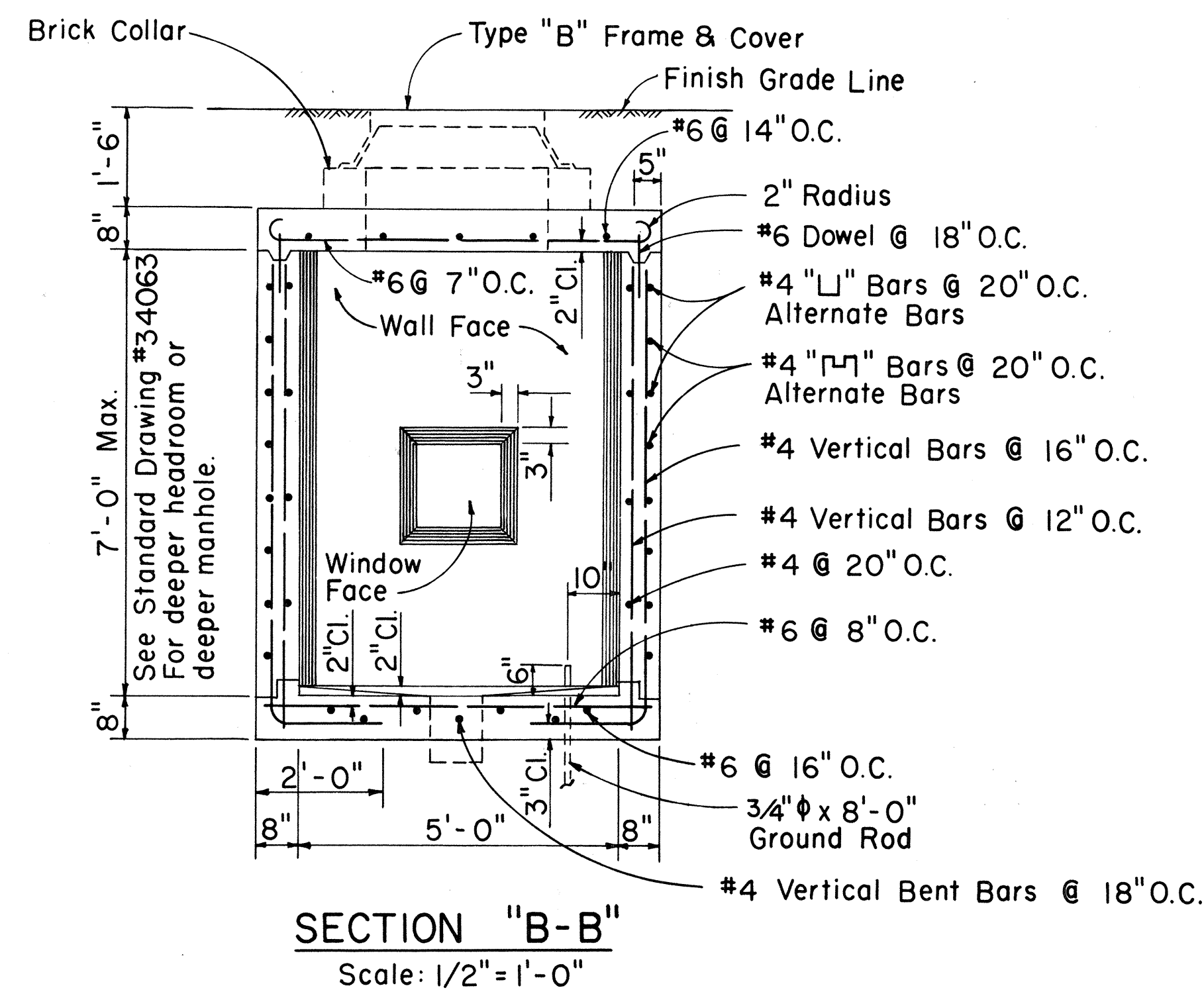
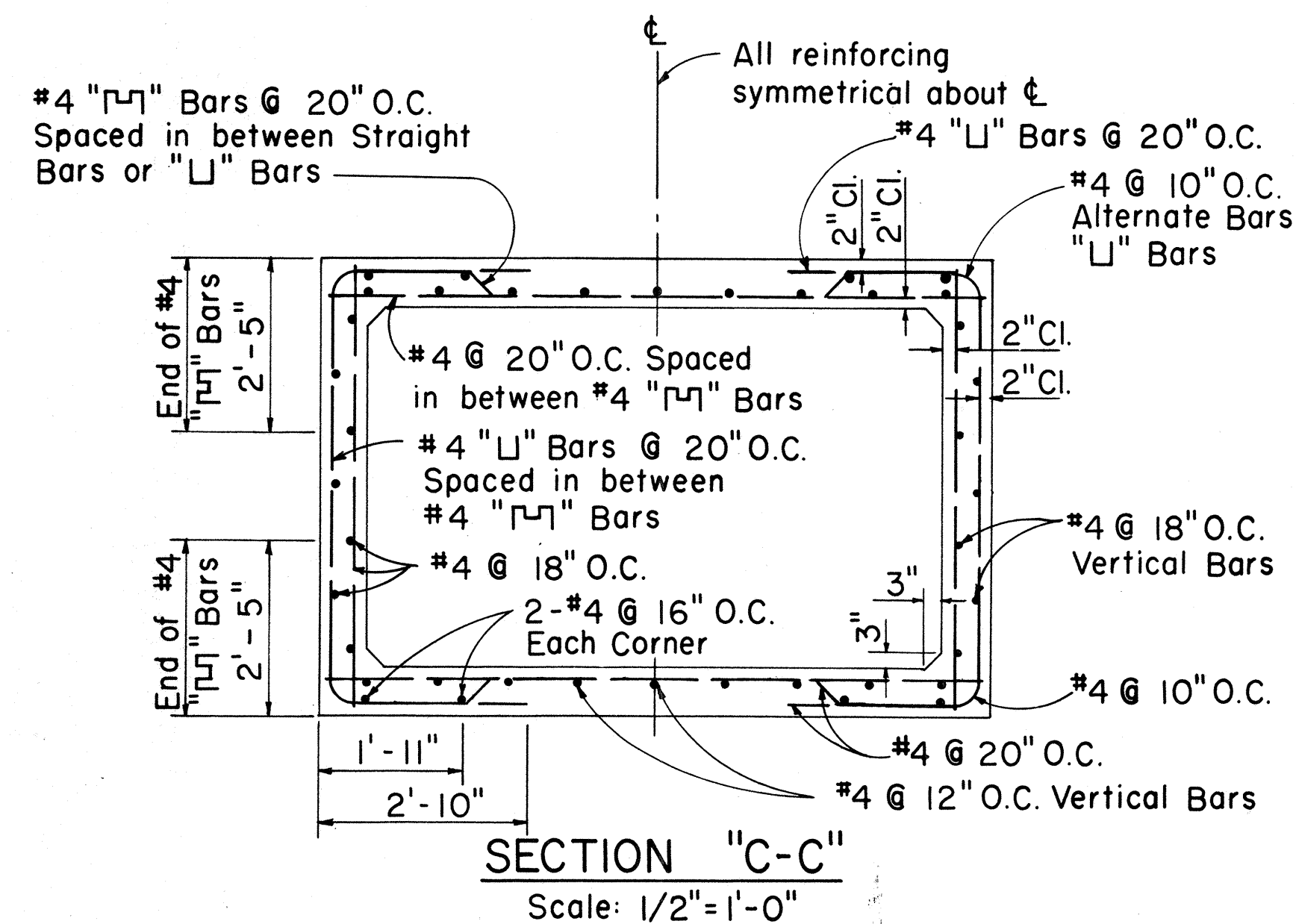
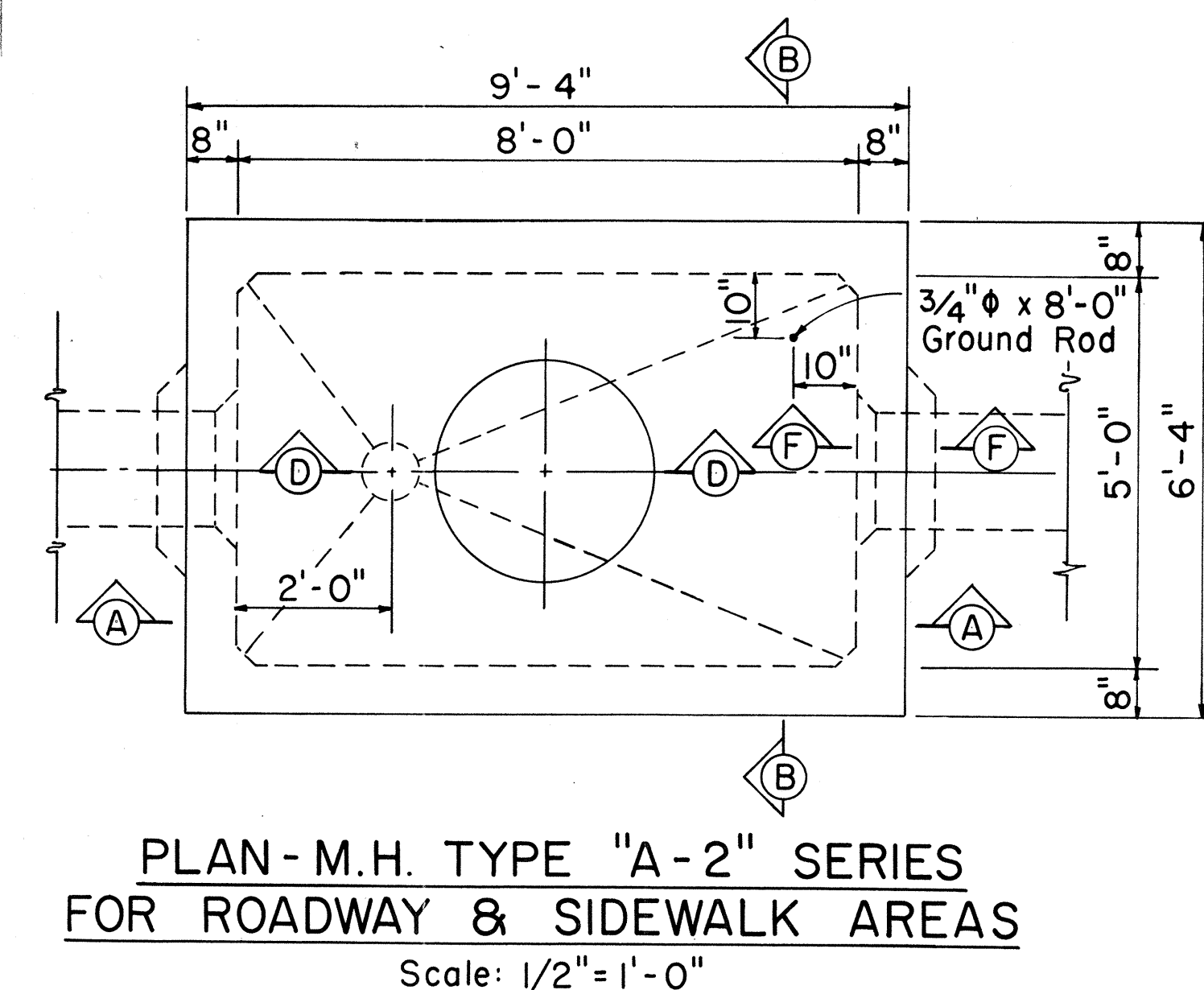
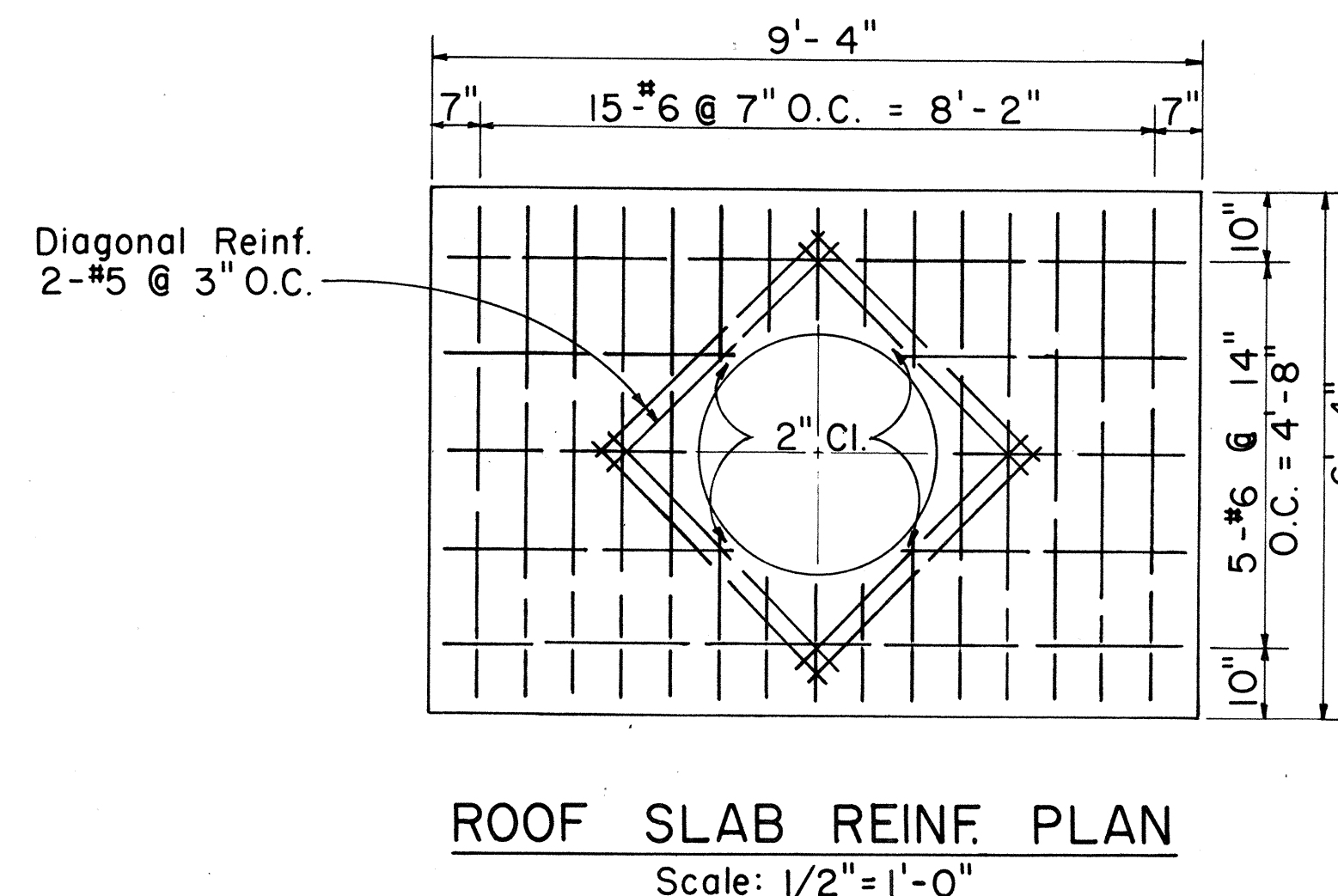
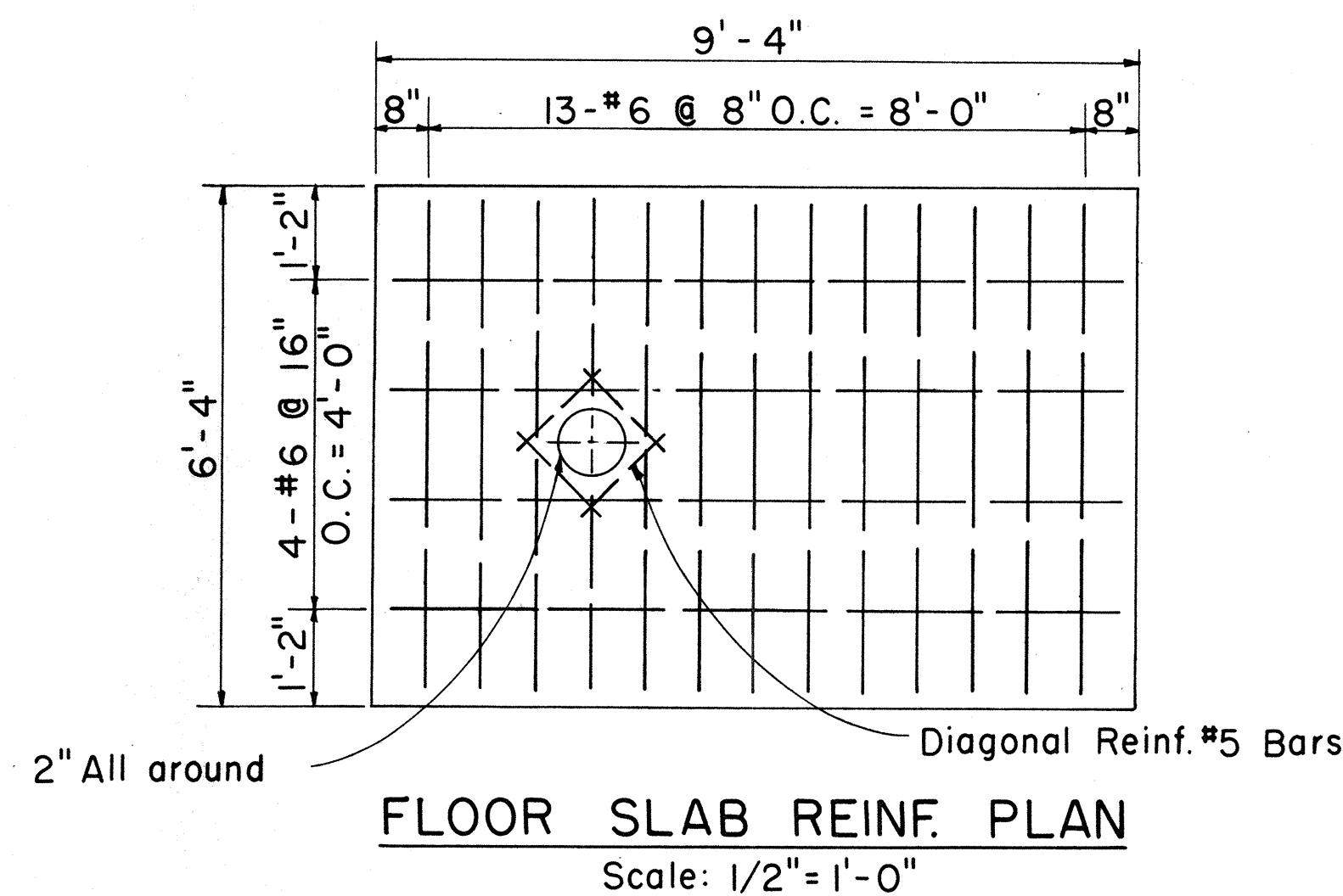
SHEET No. E-35 OF 40 SHEETS

10/21/74 OBTAINED UTILITY COMPANY  
 SIGNATURE  
 DATE REVISIONS

149R



| DATE     | REVISIONS                          | FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|----------|------------------------------------|---------------------|-------|--------------------|-------------|-----------|--------------|
| 10/21/74 | OBTAINED UTILITY COMPANY SIGNATURE | HAWAII              | HAW.  | 11-1(III)-14       | 1974        | 150       | 234          |



#### GENERAL NOTES:

- Design Data:  
fs = 20,000 psi; fc = 3,000 psi; fc = 1,350 psi; n = 10  
w = Equivalent Fluid Pressure: 30#/ft<sup>2</sup>
- All Construction Joints shall be waterproofed with two applications of Thoro Seal or equal.
- For Duct Window location see Plan Profile Sheets for Elevations.
- Duct Window to suit - See Plan & Profile & Standard Detail Sheets for Location & Details.
- For Details "A", "B", "C", Sections "D-D", "E-E", "F-F" and other miscellaneous Manhole Construction Details see Supplement Sheet to Type "A-1", "A-2" and "A-3" Telephone Manholes.

Manhole Classification  
Width & Length Designation "2" = 5.0' x 8.0'  
Manhole Headroom

TYPE "A-2"-6.0'  
6.5'  
7.0'

APPROVED:  
*R. Mau*  
Hawaiian Telephone Co., Ltd. Date: 10-21-74

H.T. Co., Ltd. Drawing No. 34062

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

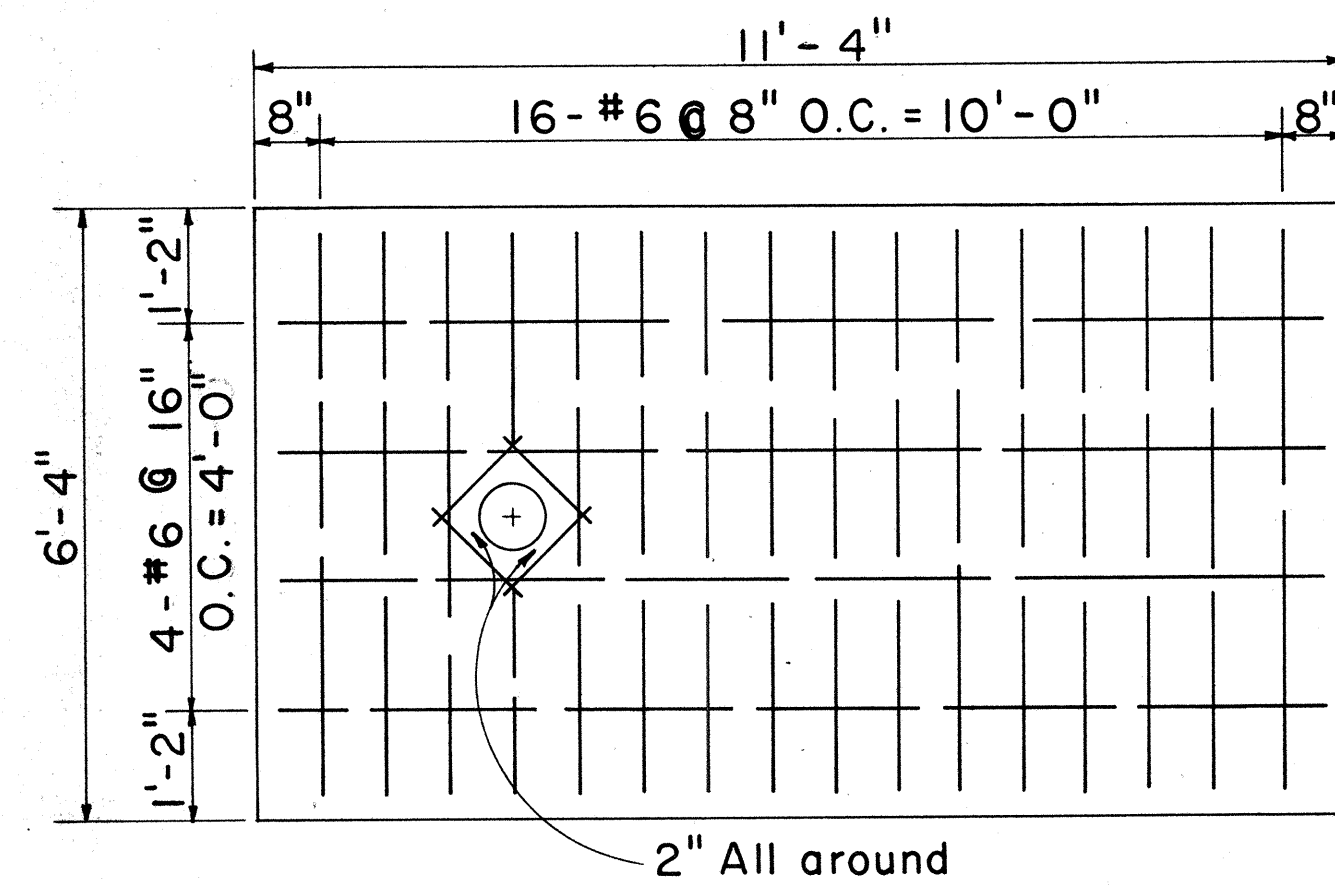
**TYPE "A-2" MANHOLES  
FOR 6.0' TO 7.0'  
HEADROOM**

Scale: As Noted Date:

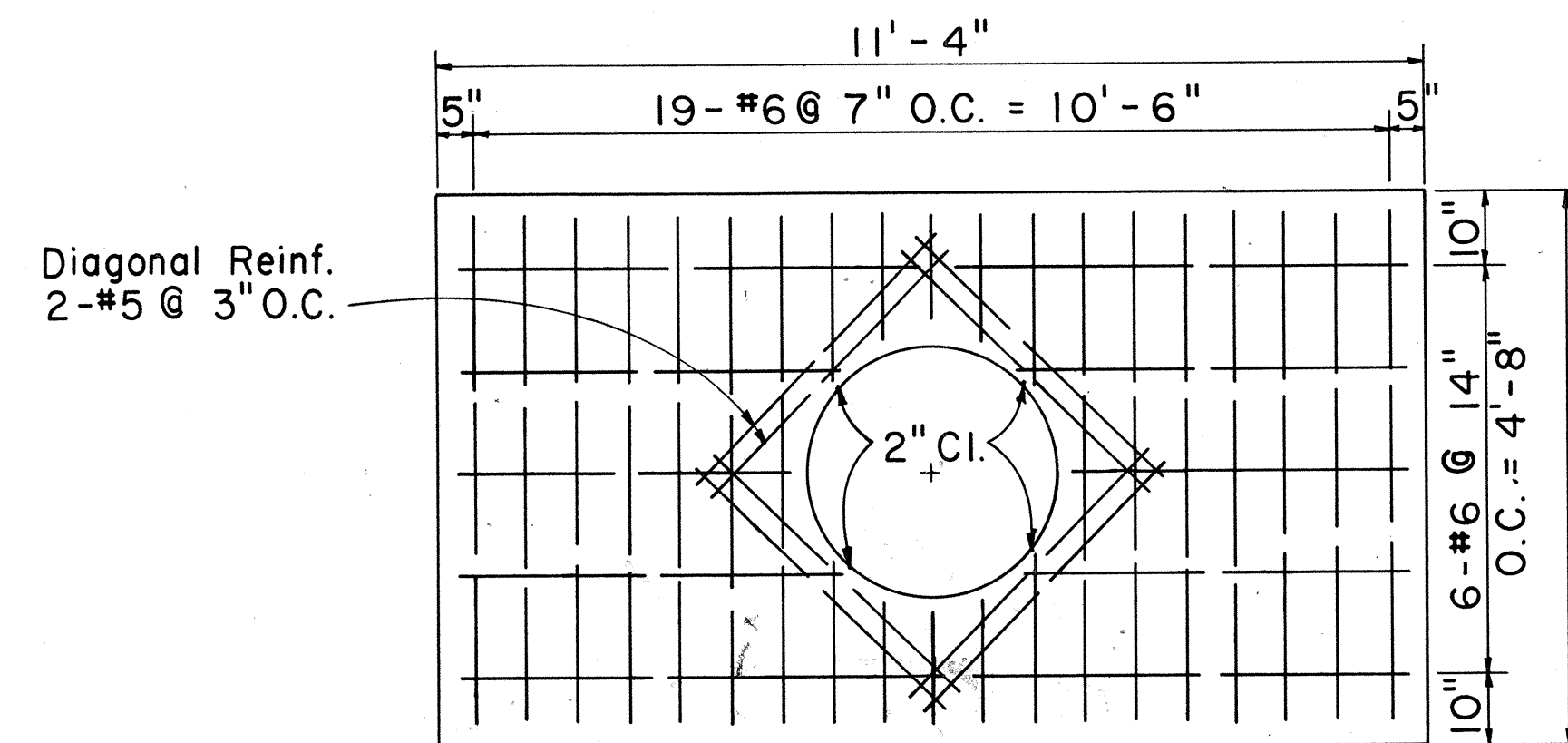
SHEET No. E-36 OF 40 SHEETS

**E-36**



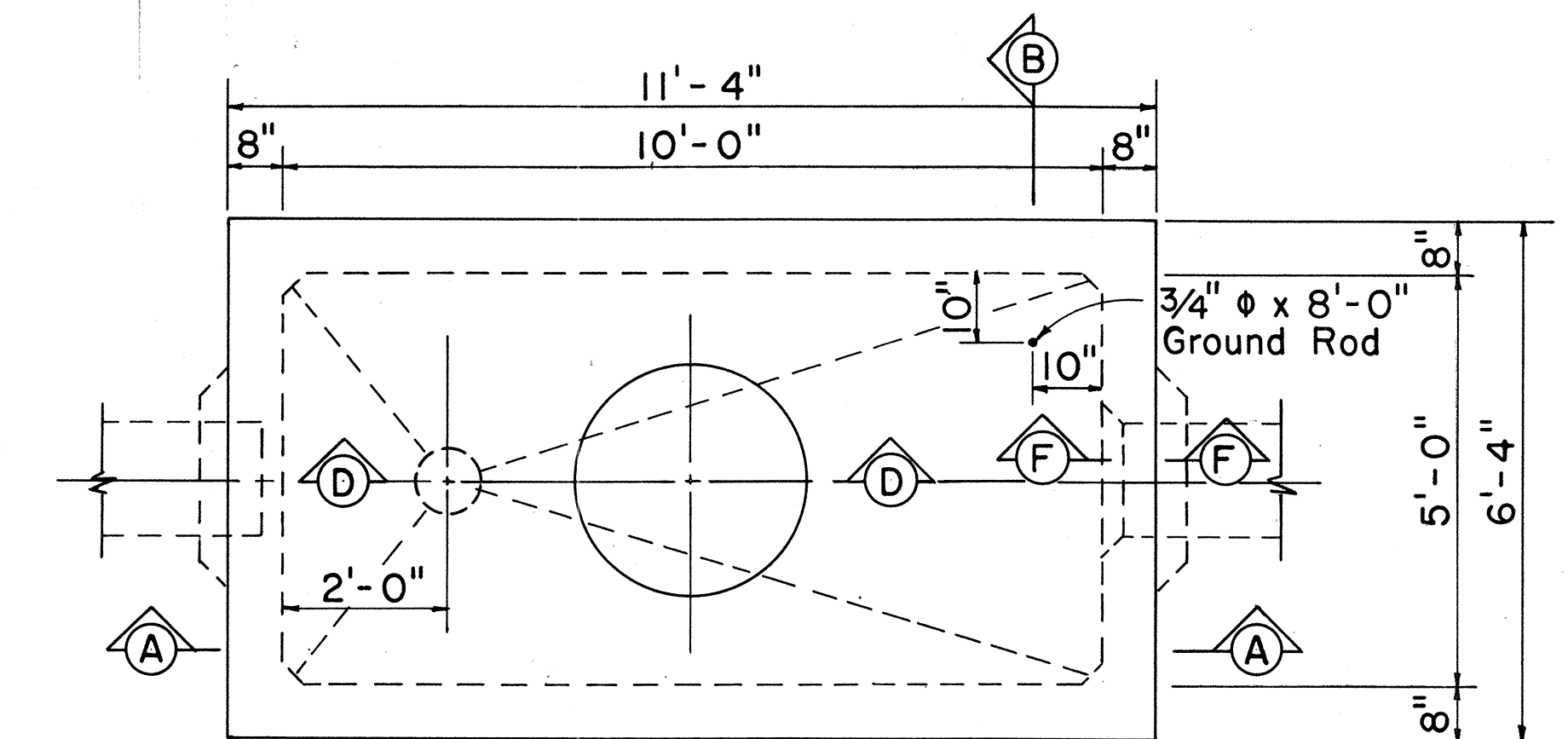


**FLOOR SLAB REINF. PLAN**  
Scale: 1/2" = 1'-0"

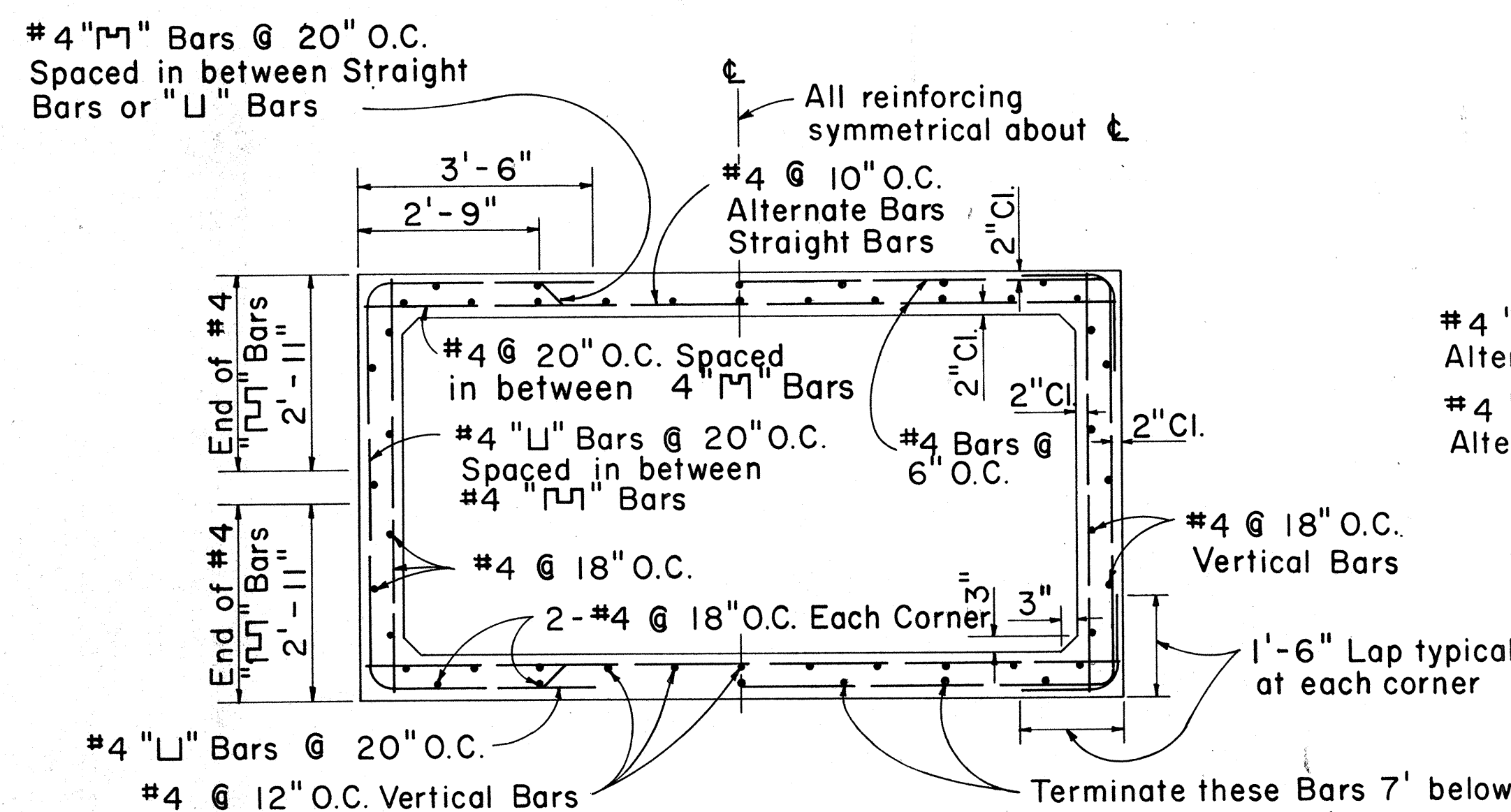


**ROOF SLAB REINF. PLAN**  
Scale: 1/2" = 1'-0"

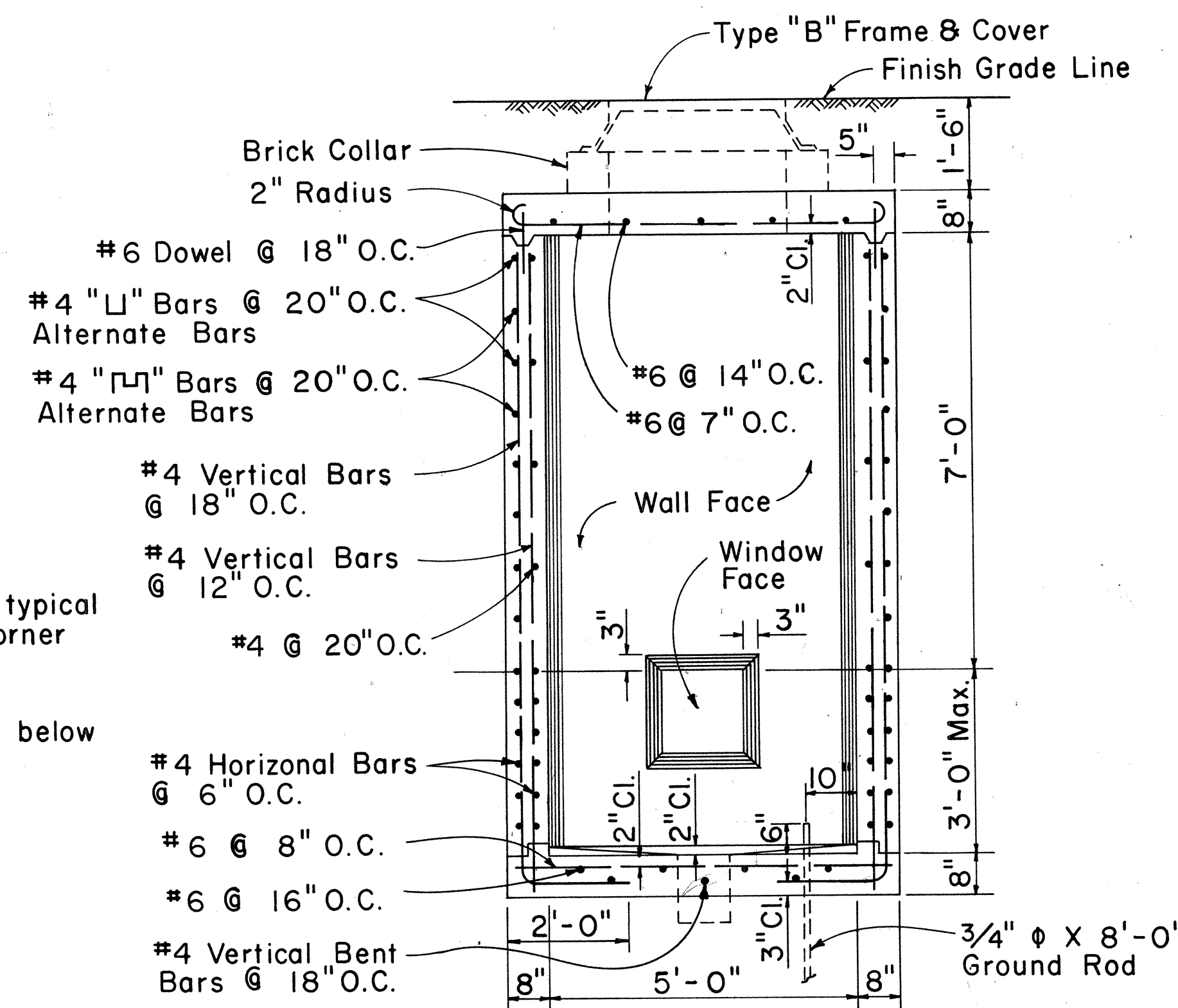
| DATE     | REVISIONS                          | FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|----------|------------------------------------|---------------------|-------|--------------------|-------------|-----------|--------------|
| 10/21/74 | OBTAINED UTILITY COMPANY SIGNATURE | HAWAII              | HAW.  | 10-10-14           | 1974        | 151       | 234          |



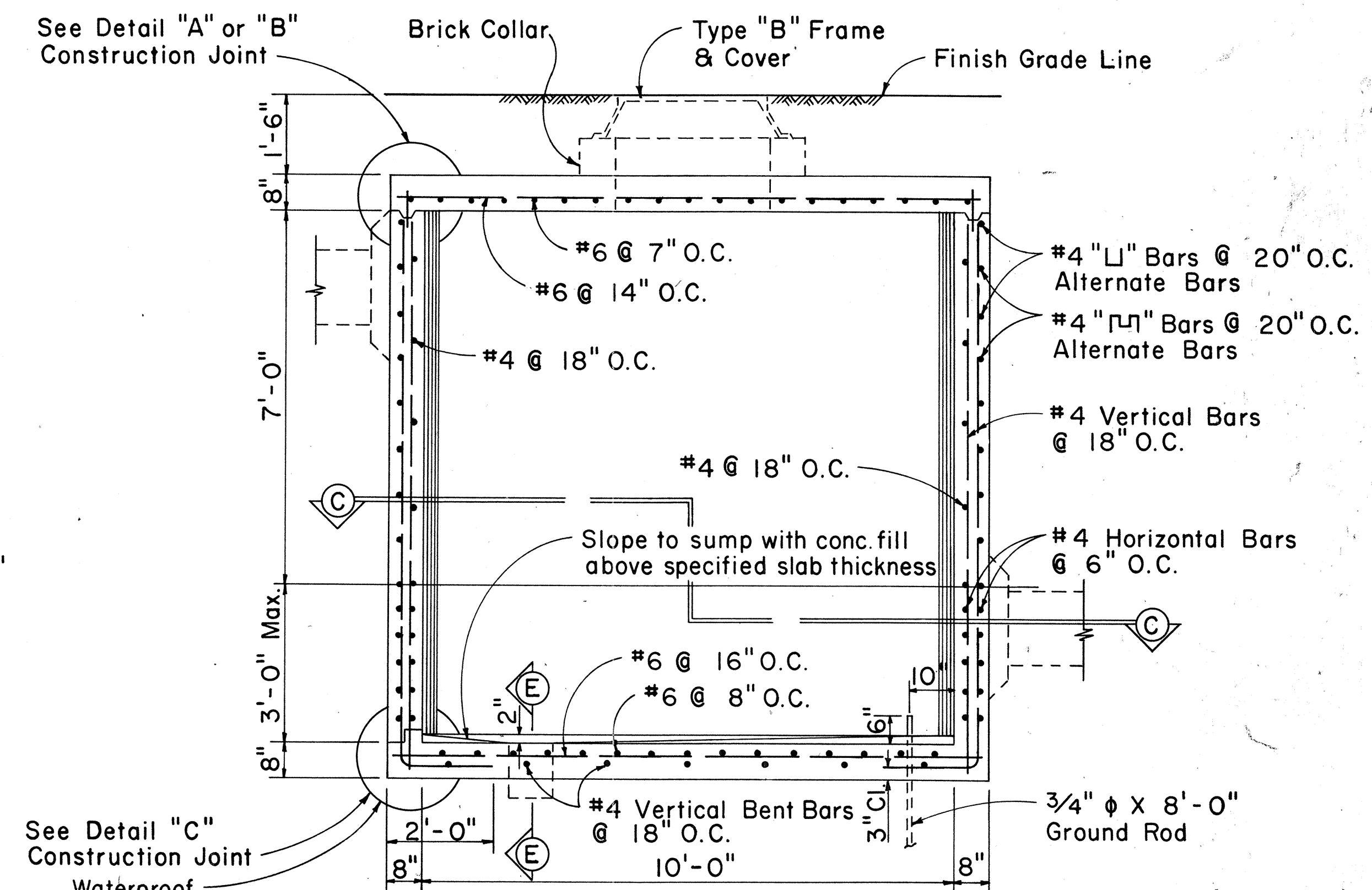
**PLAN-M.H. TYPE "A-3" SERIES  
FOR ROADWAY & SIDEWALK AREAS**  
Scale: 1/2" = 1'-0"



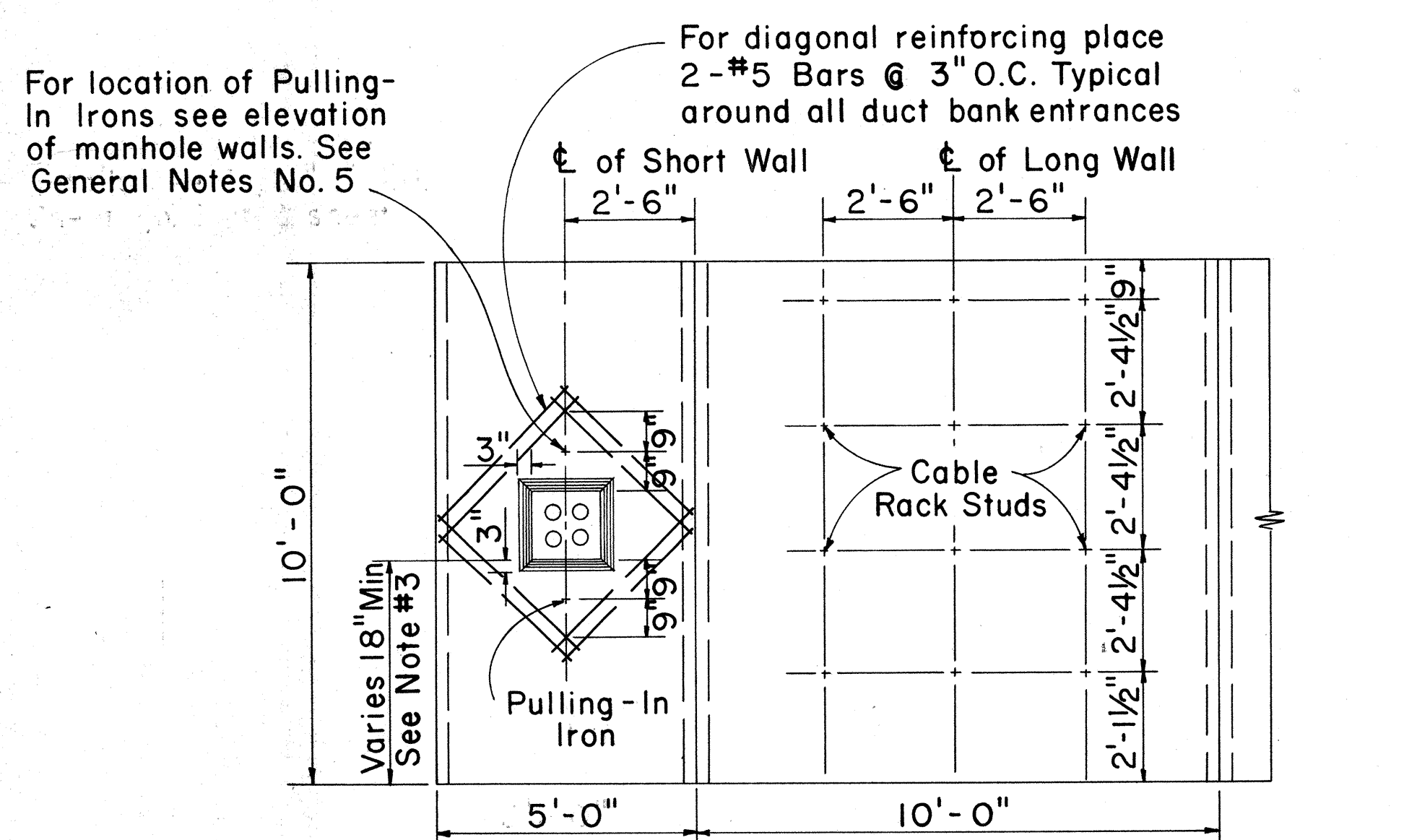
**SECTION "C-C"**  
Scale: 1/2" = 1'-0"



**SECTION "B-B"**  
Scale: 1/2" = 1'-0"



**SECTION "A-A"**  
Scale: 1/2" = 1'-0"



**ELEVATION OF M.H. WALLS - TYPE "A-3" SERIES**  
(OPPOSITE FACES SIMILAR)  
Scale: 3/8" = 1'-0"

# **GENERAL NOTES:**

- Design Data:  
fs = 20,000 psi; fc = 3,000 psi; fc = 1,350 psi; n = 10  
w = Equivalent Fluid Pressure: 30#/ft<sup>2</sup>
- All Construction Joints shall be waterproofed with two applications of Thoro Seal or equal.
- For Duct Window location see Plan Profile Sheets for Elevations.
- Duct Window to suit - See Plan & Profile & Standard Detail Sheets for Location & Details.
- For Details "A", "B", "C", Sections "D-D", "E-E", "F-F" and other miscellaneous Manhole Construction Details see Supplement Sheet to Type "A-1", "A-2" and "A-3" Telephone Manholes.
- Step and Ladder required only in Manholes with Headroom of 9.0' or more. Step and Ladder to be furnished by H.T.CO.

Manhole Classification  
Width & Length Designation "3" = 5.0' x 10.0'  
Manhole Headroom

TYPE "A-3"-7.5'  
8.0  
8.5  
9.0  
9.5  
10.0

APPROVED:  
*R. Man*  
Hawaiian Telephone Co., Ltd. Date: 10-21-74

H.T. Co., Ltd. Drawing No. 34065

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

**TYPE "A-3" MANHOLES  
FOR 7.5' TO 10.0'  
HEADROOM**

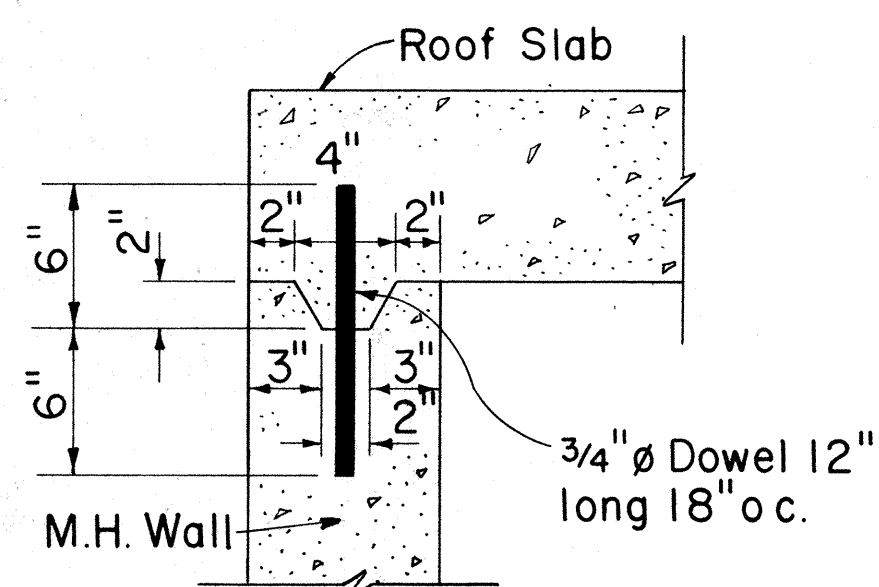
Scale: As Noted Date:

**SHEET No. E-37 OF 40 SHEETS**

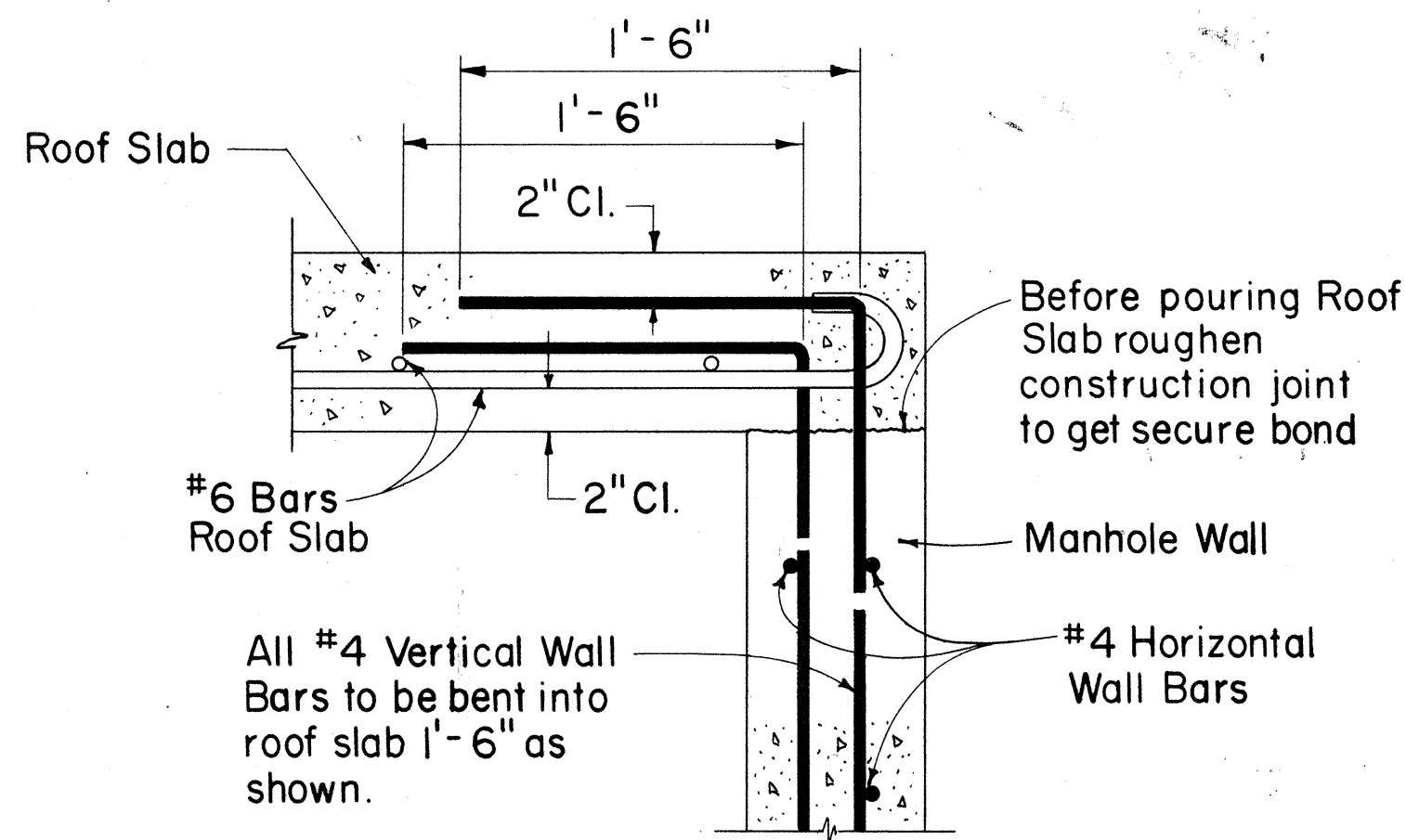
| DATE     | REVISIONS                          |
|----------|------------------------------------|
| 10/21/74 | OBTAINED UTILITY COMPANY SIGNATURE |



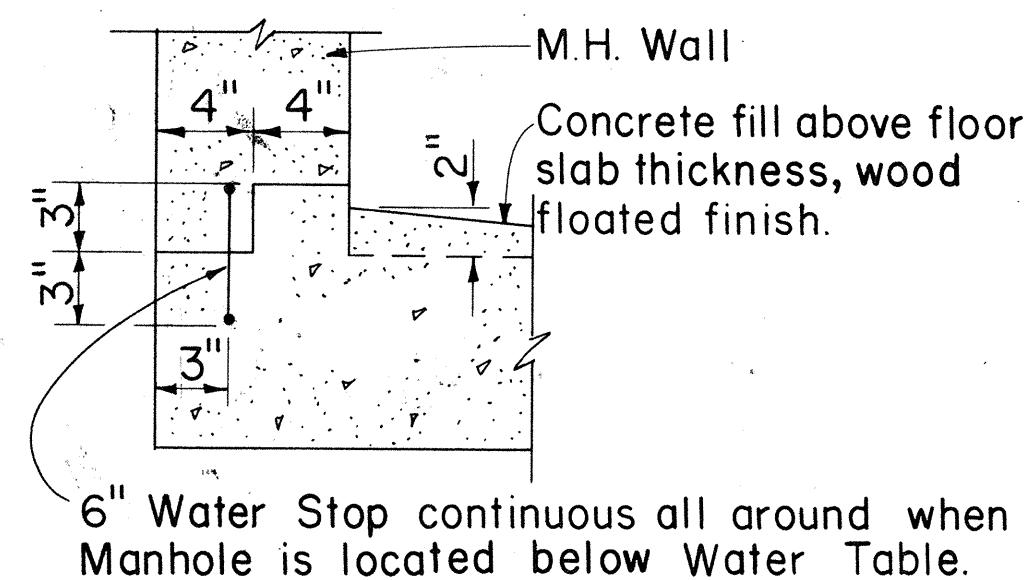
| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO.                 | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|------------------------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 141(111)14                         | 1974        | 152       | 234          |
| DATE                |       | REVISIONS                          |             |           |              |
| 10/21/74            |       | OBTAINED UTILITY COMPANY SIGNATURE |             |           |              |



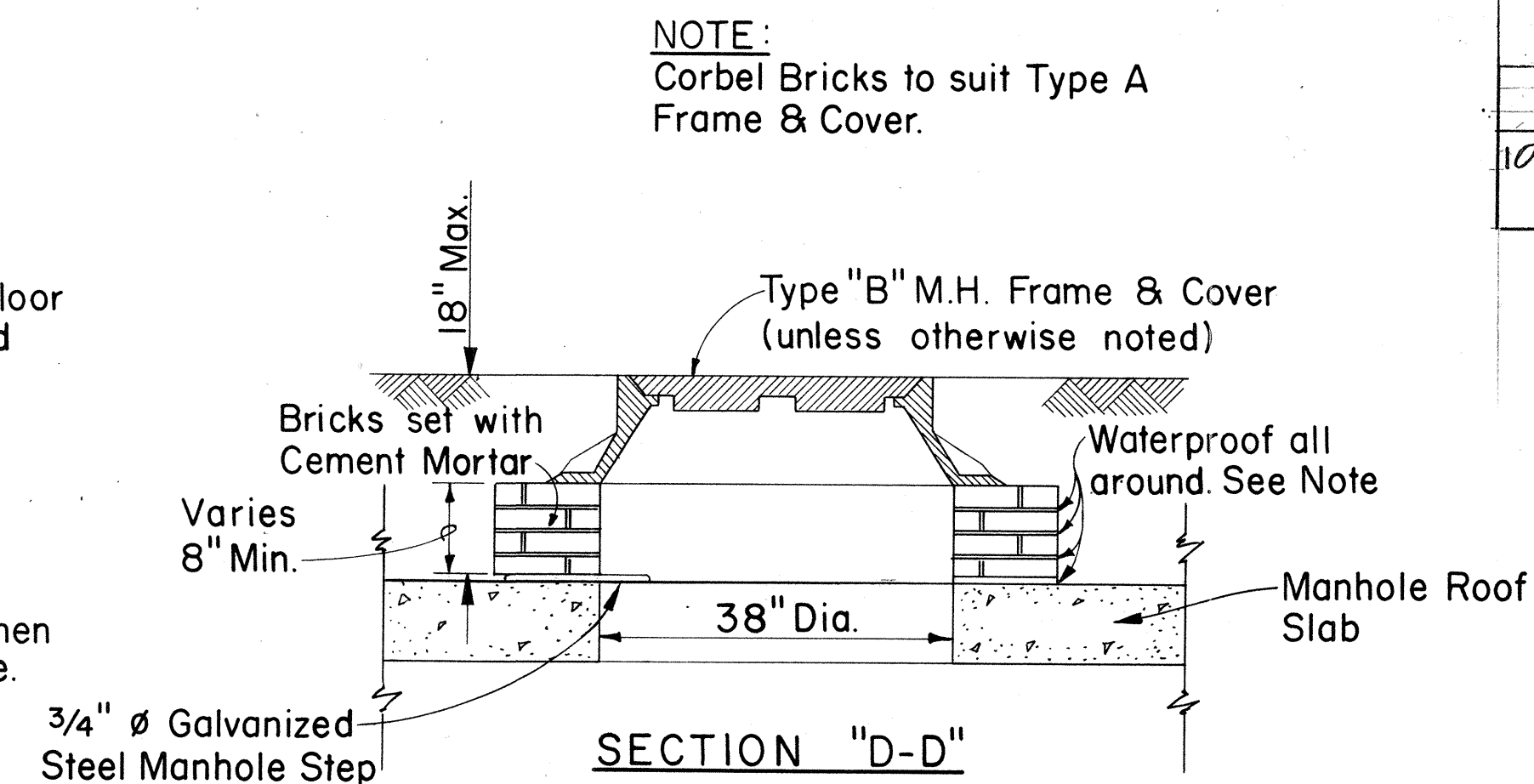
**DETAIL "A"**  
TOP CONSTRUCTION JOINT  
Scale: 1 1/2" = 1'-0"  
(Optional for cast-in-place construction)  
(Required for precast construction)



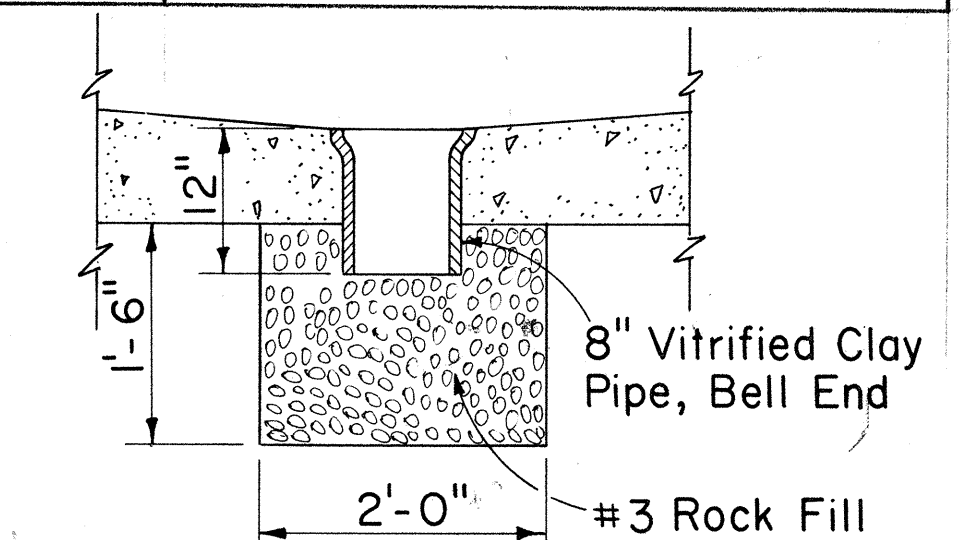
**DETAIL "B"**  
(USED FOR CAST-IN-PLACE CONSTRUCTION)  
Scale: 1 1/2" = 1'-0"



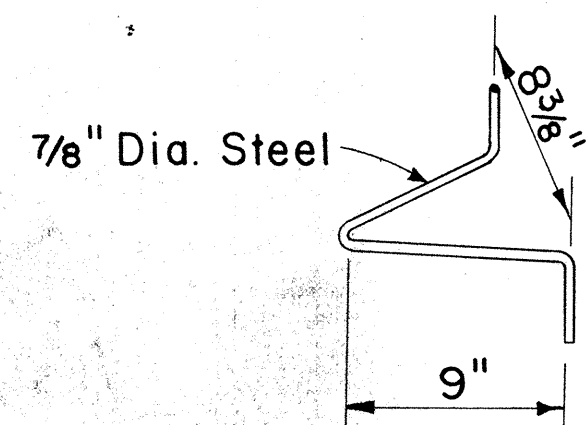
**DETAIL "C"**  
BOTTOM CONSTRUCTION JOINT  
Scale: 1 1/2" = 1'-0"



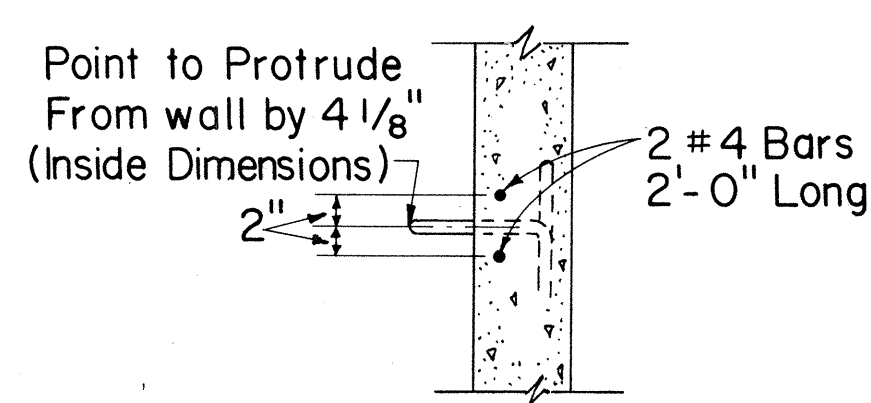
**SECTION "D-D"**  
M.H. COVER DETAIL  
Scale: 3/4" = 1'-0"



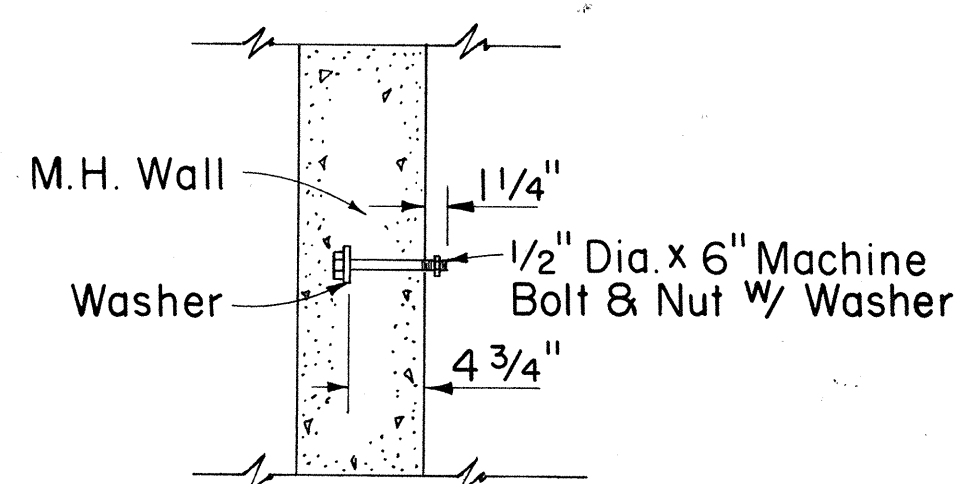
**SECTION "E-E"**  
M.H. SUMP DETAIL  
Scale: 3/4" = 1'-0"  
Note: See Section "E<sub>1</sub>-E<sub>1</sub>" Below



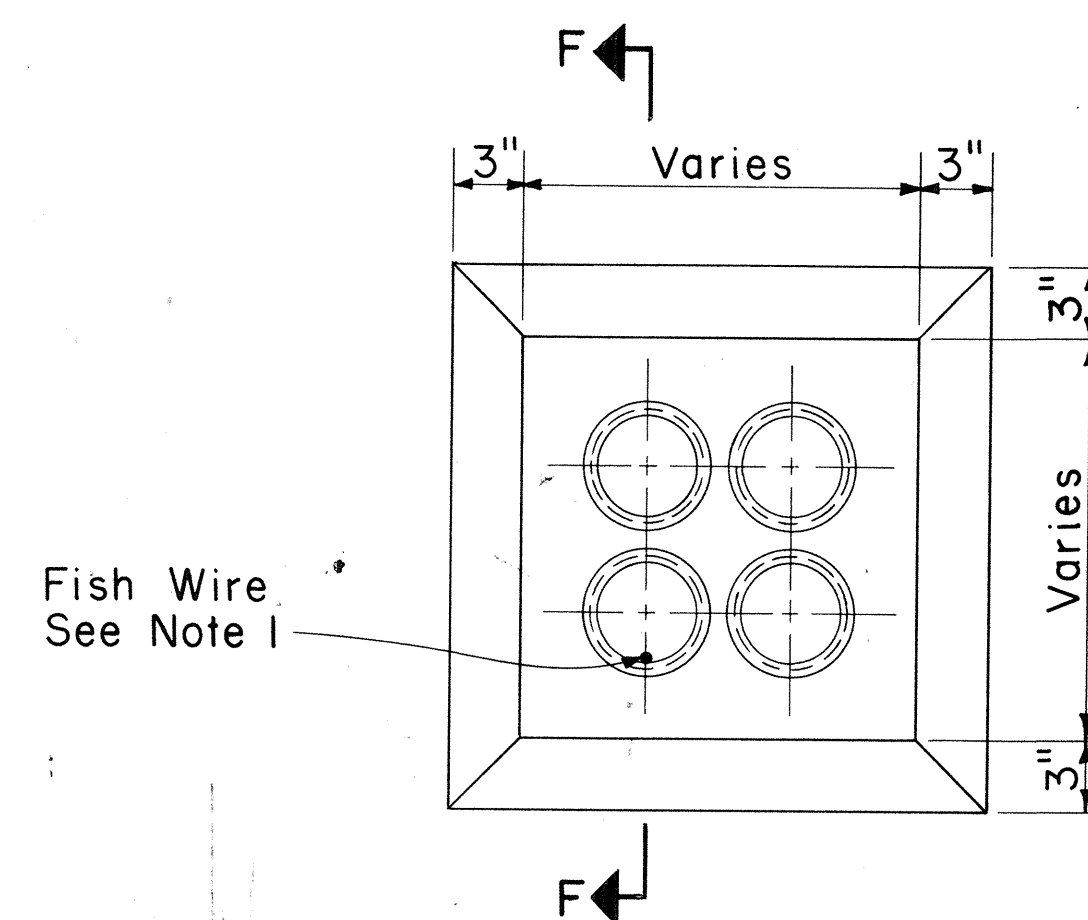
**PULLING-IN IRON**



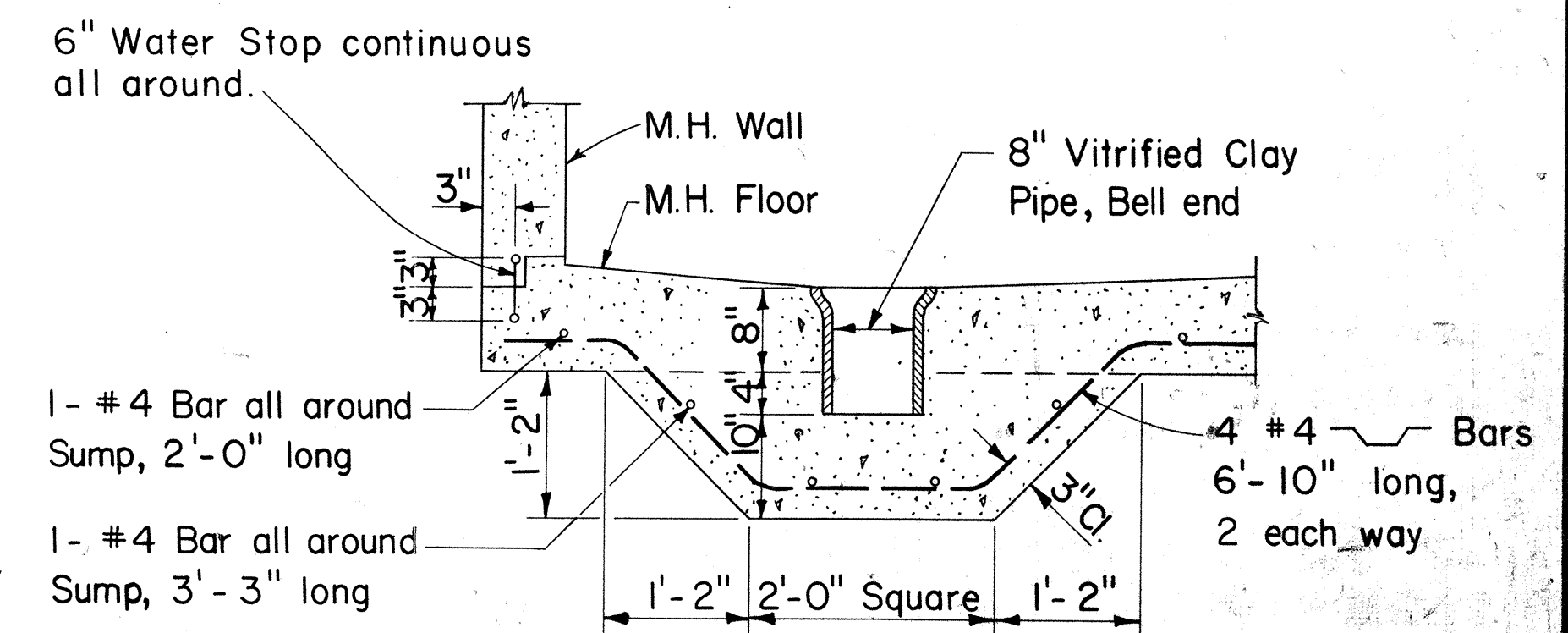
**SECTIONAL VIEW OF PULLING-IN IRON**  
Scale: 3/4" = 1'-0"



**CABLE RACK STUD BOLT DETAIL**  
Scale: 1" = 1'-0"

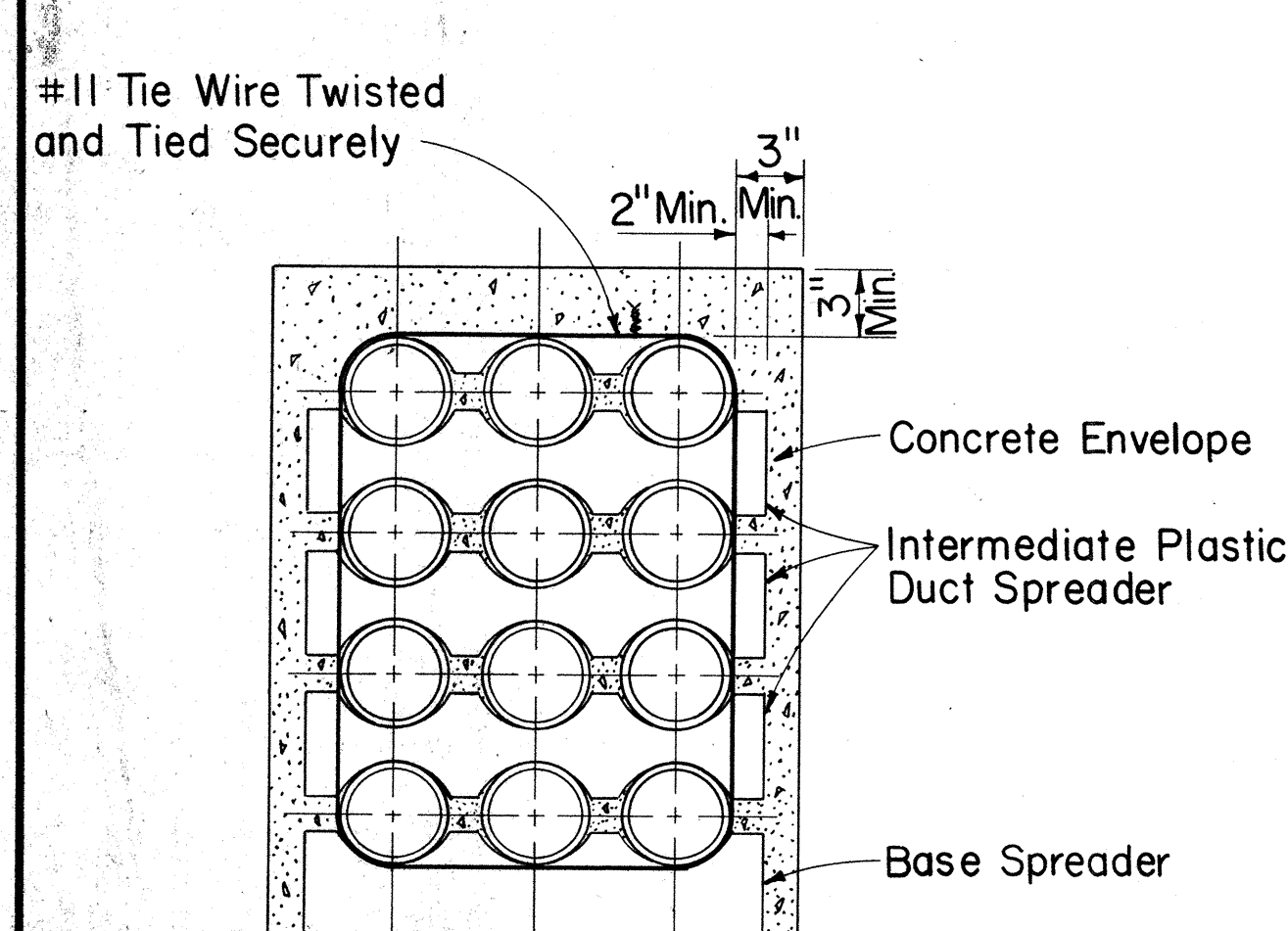


**TYPICAL MANHOLE DUCT WINDOW**  
Scale: 1 1/2" = 1'-0"

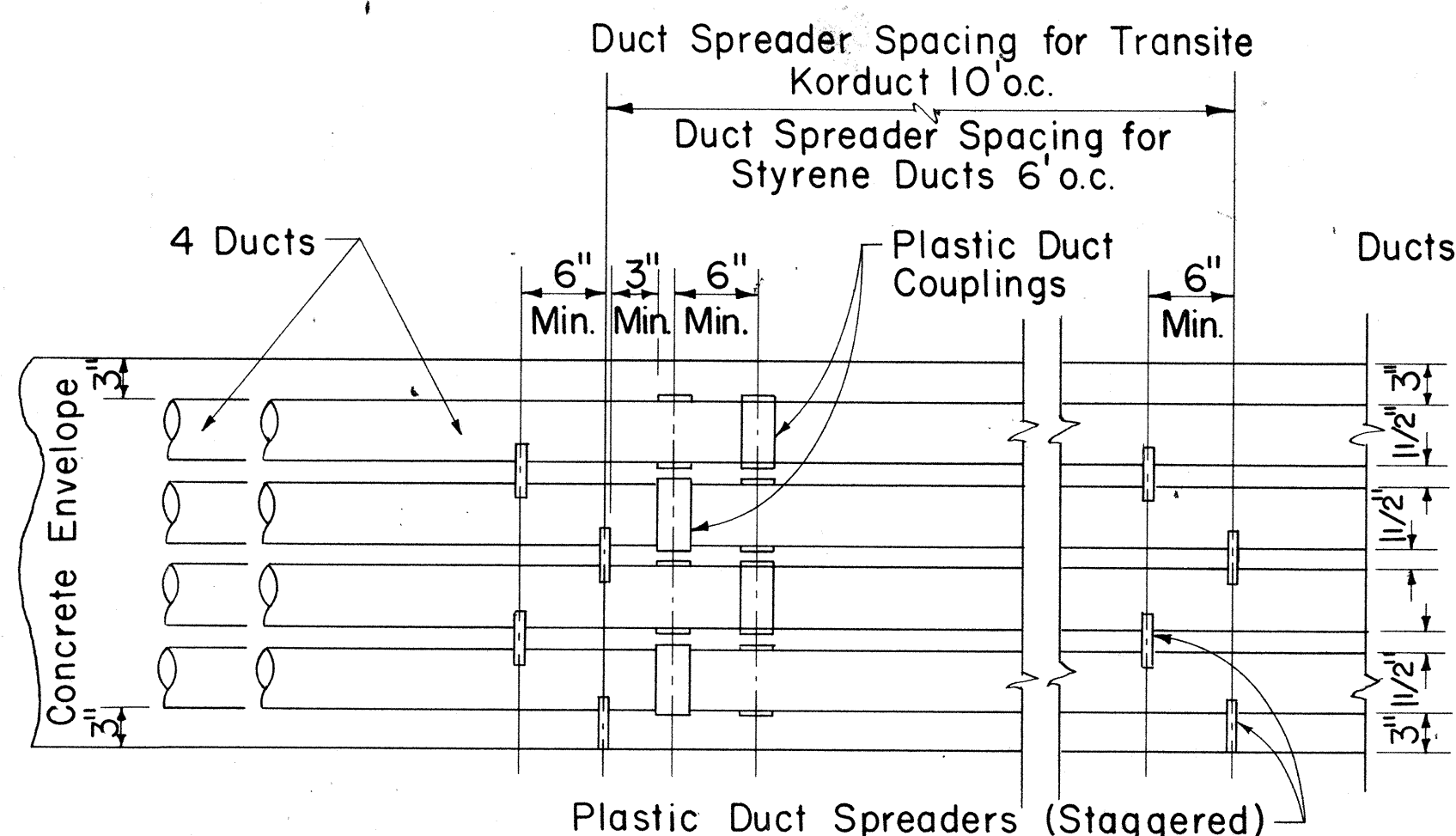


Note: Only for manholes located below water table

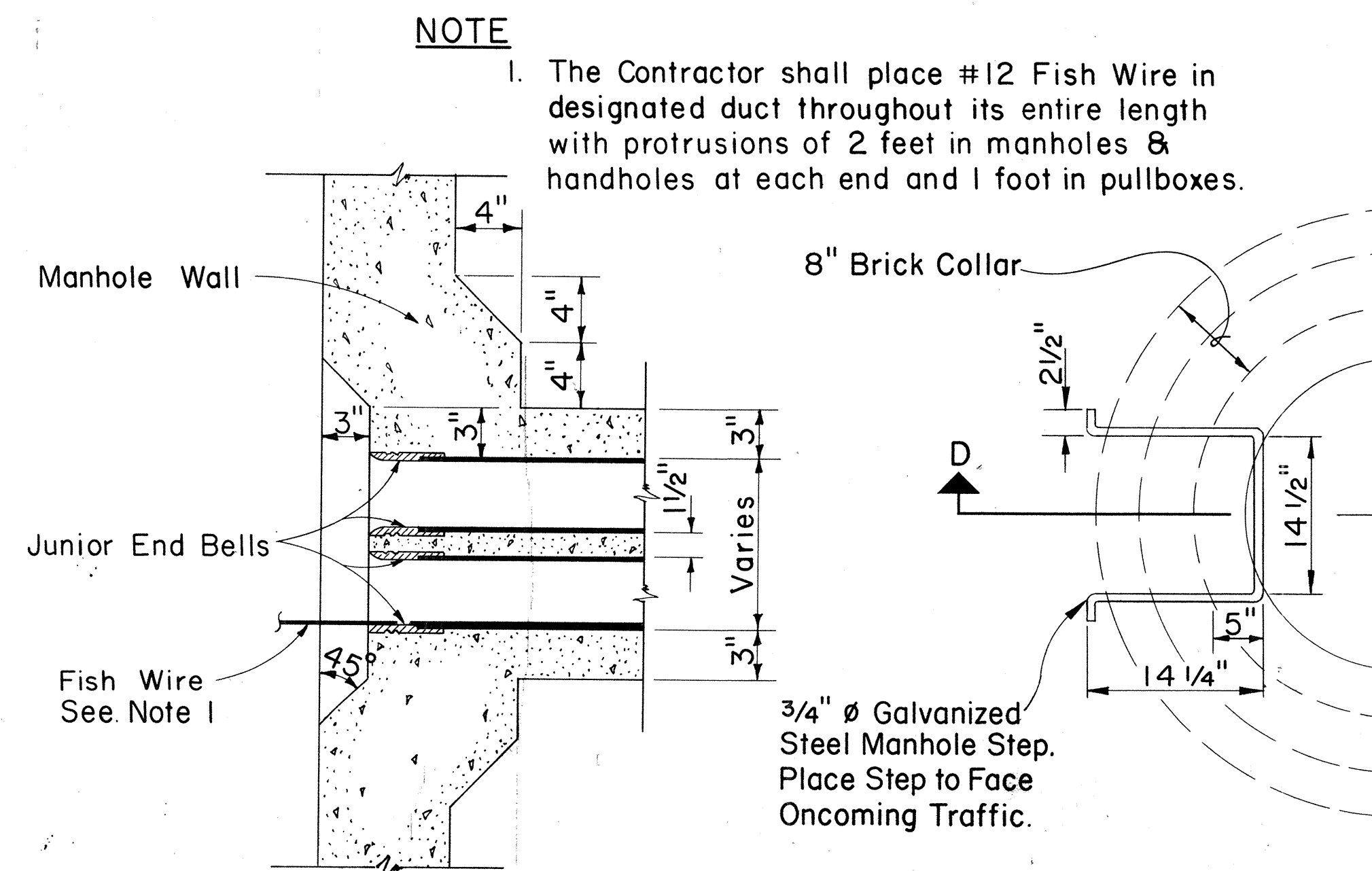
**SECTION "E<sub>1</sub>-E<sub>1</sub>"**  
MANHOLE SUMP DETAIL  
Scale: 3/4" = 1'-0"



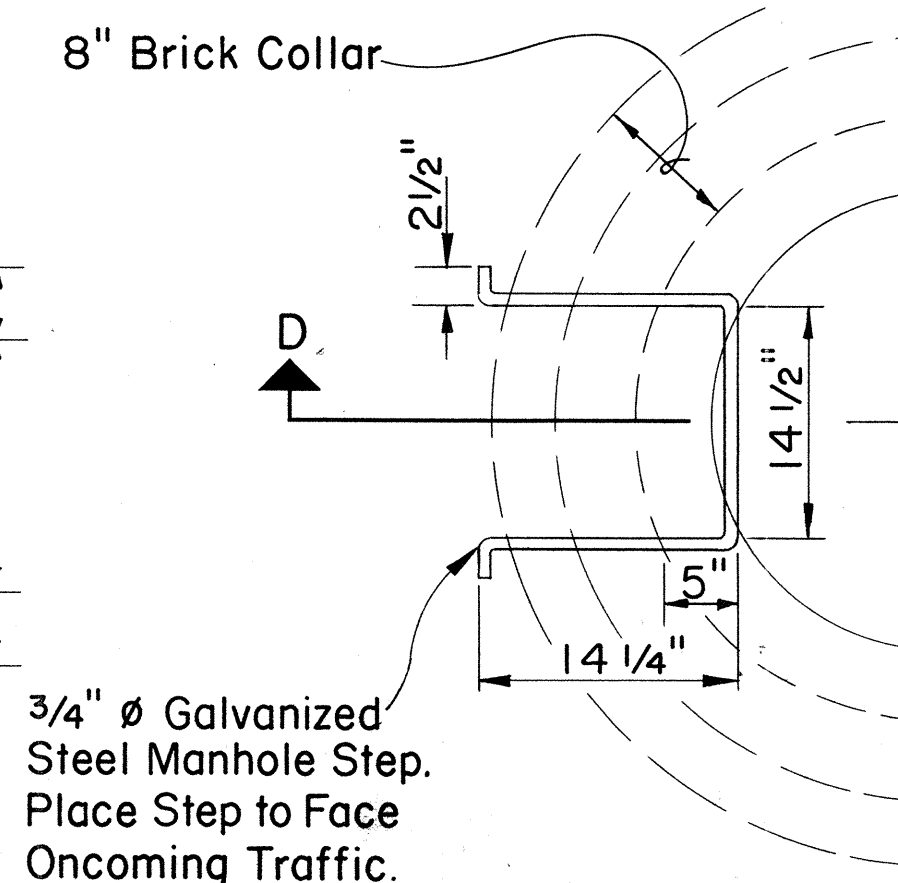
**SECTION SHOWING SPACERS**



**TYPICAL DUCT ENVELOPE ELEVATION**  
ARRANGEMENT OF COUPLING & PLASTIC SPACERS  
Scale: 1" = 1'-0"



**SECTION "F-F"**  
TYPICAL WINDOW DETAIL & JUNIOR END BELL  
Scale: 1 1/2" = 1'-0"



**PART-PAN MANHOLE STEP**  
Scale: 1" = 1'-0"

- NOTE**
- The Contractor shall place #12 Fish Wire in designated duct throughout its entire length with protrusions of 2 feet in manholes & handholes at each end and 1 foot in pullboxes.

**IE-38**

Supplement Sheet to Type "A-1" (Drawing Nos. 34060 & 34061), Type "A-2" (Drwg. Nos. 34062 & 34063) and Type "A-3" (Drwg. Nos. 34064 & 34065) Telephone M.H.

APPROVED:

*R. Man* 10-21-74  
Hawaiian Telephone Co., Ltd. Date

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION

STANDARD DETAILS

TYPE "A" MANHOLE  
AND MISCELLANEOUS  
TELEPHONE DETAILS

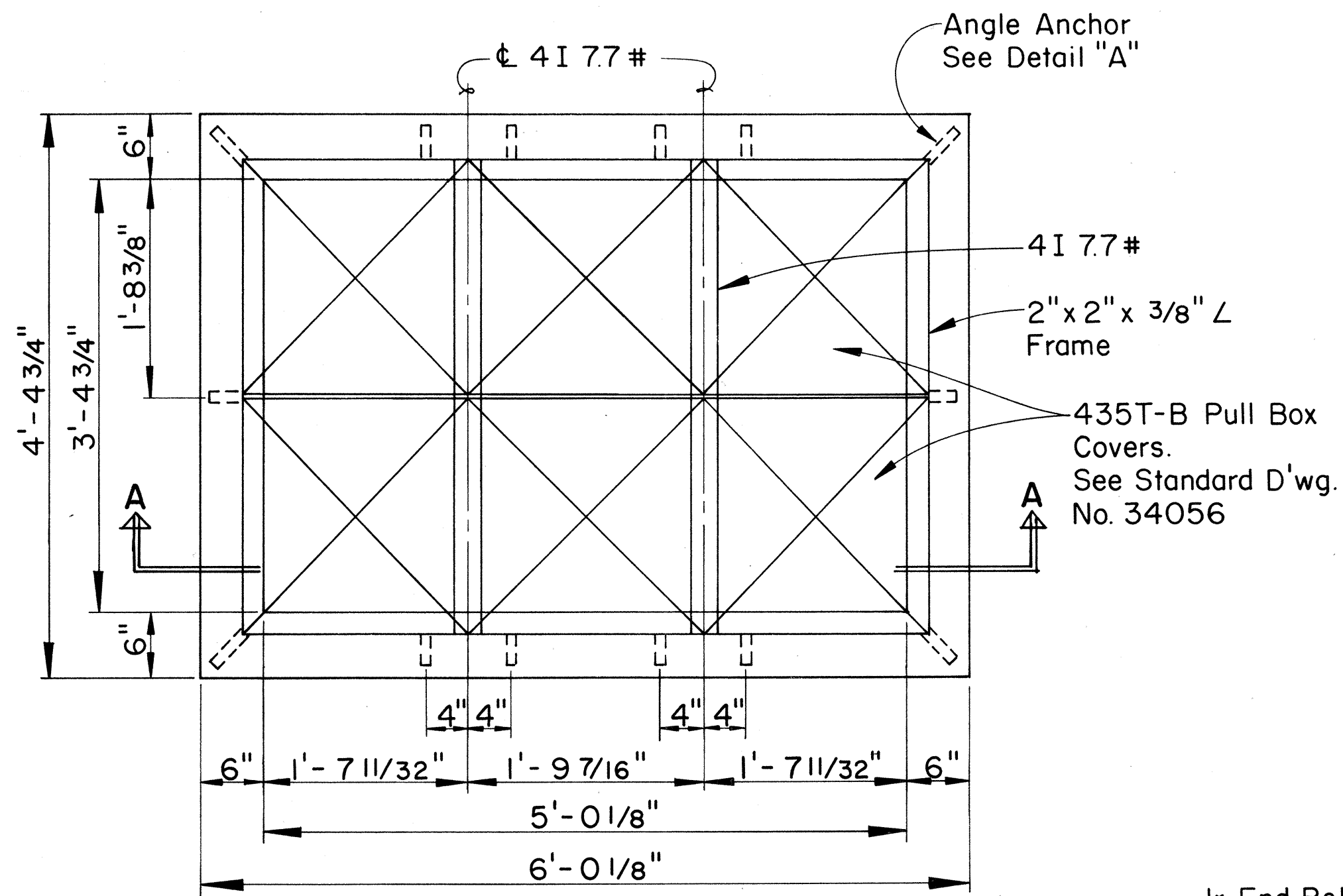
Scale: As Noted Date:

SHEET No. E-38 OF 40 SHEETS

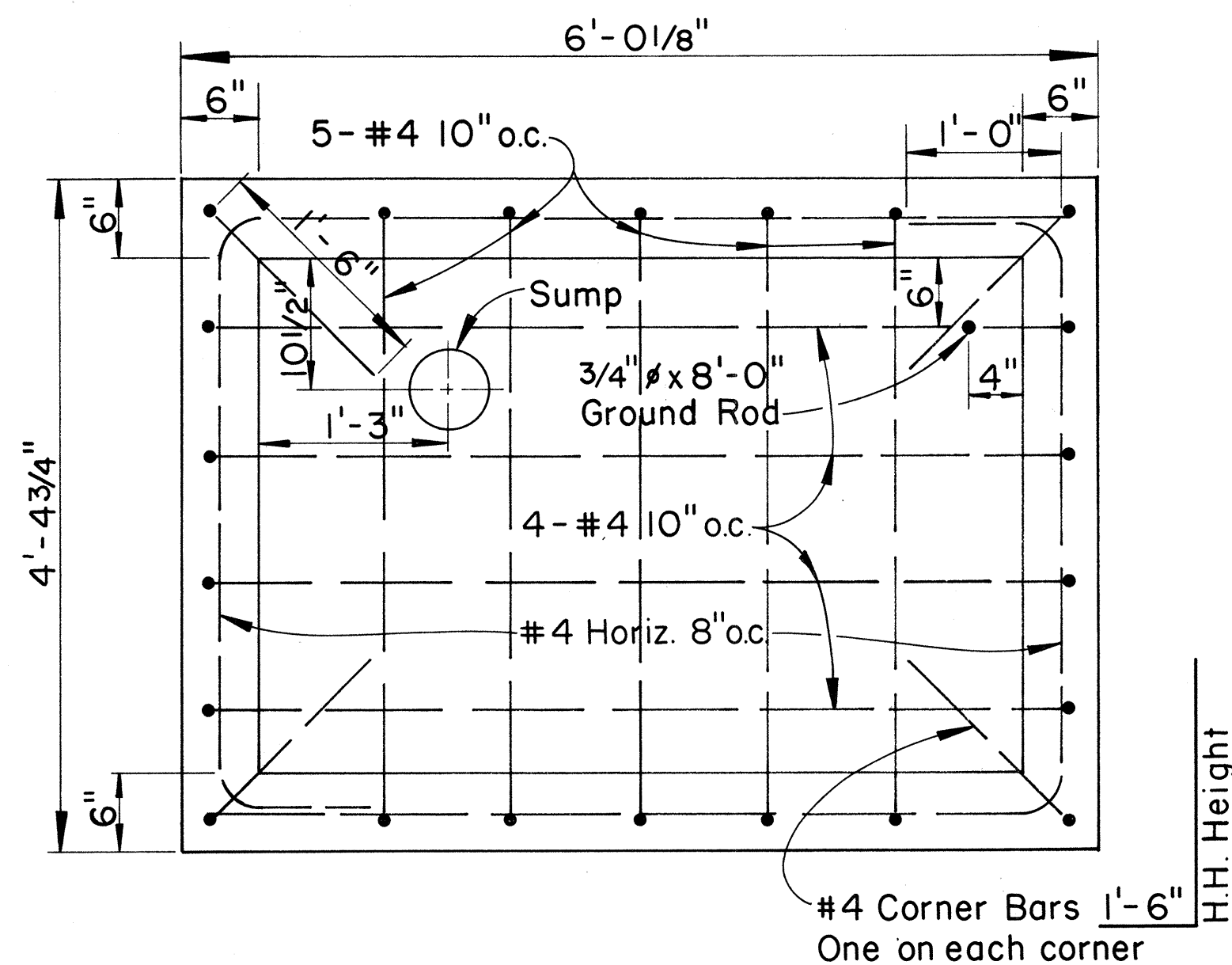
152R



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO.                 | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|------------------------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | 1-1-1-1-1-1                        | 1974        | 153       | 234          |
| DATE                |       | REVISIONS                          |             |           |              |
| 10/21/74            |       | OBTAINED UTILITY COMPANY SIGNATURE |             |           |              |



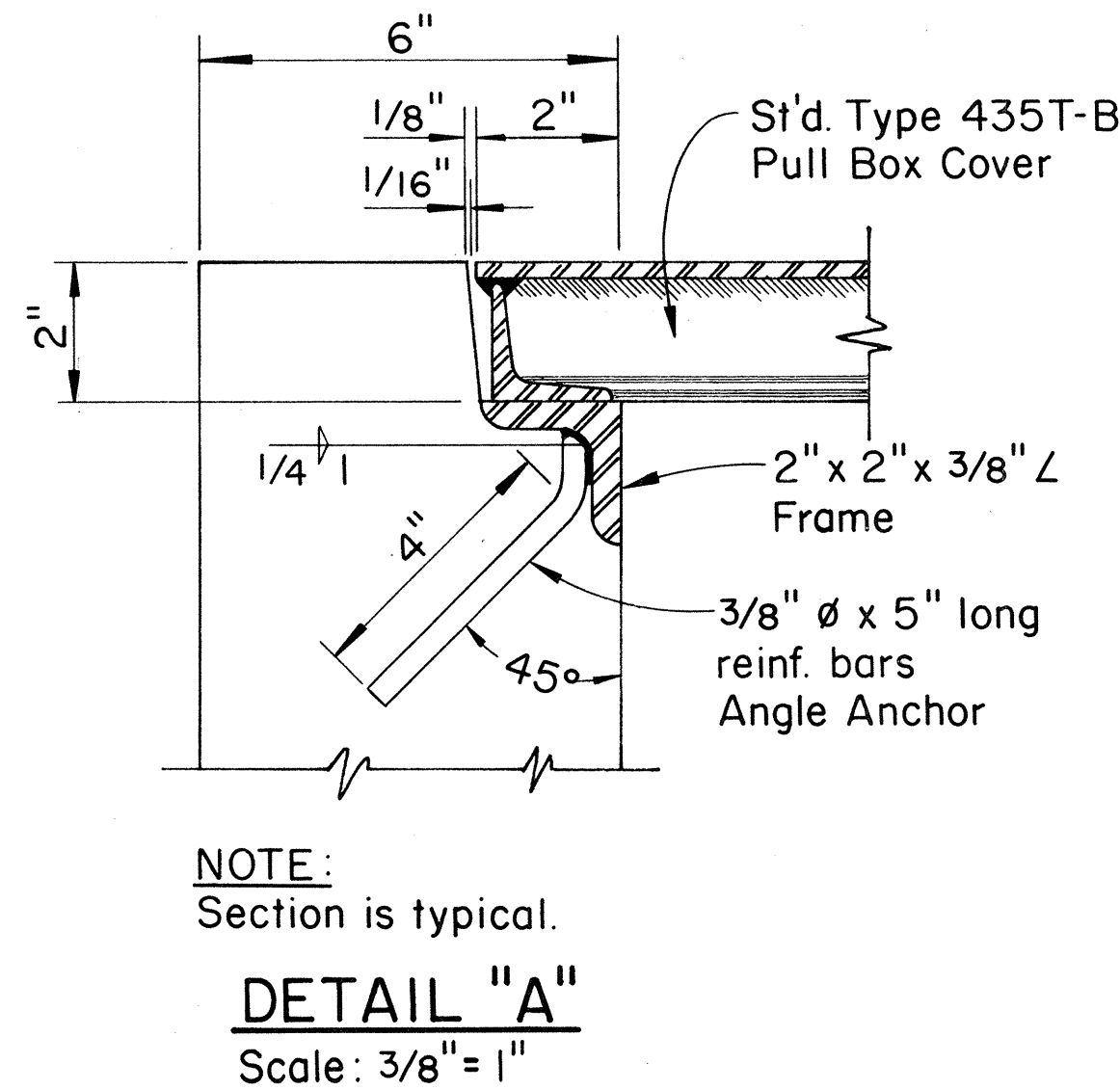
**TOP PLAN**  
Scale: 1" = 1'-0"



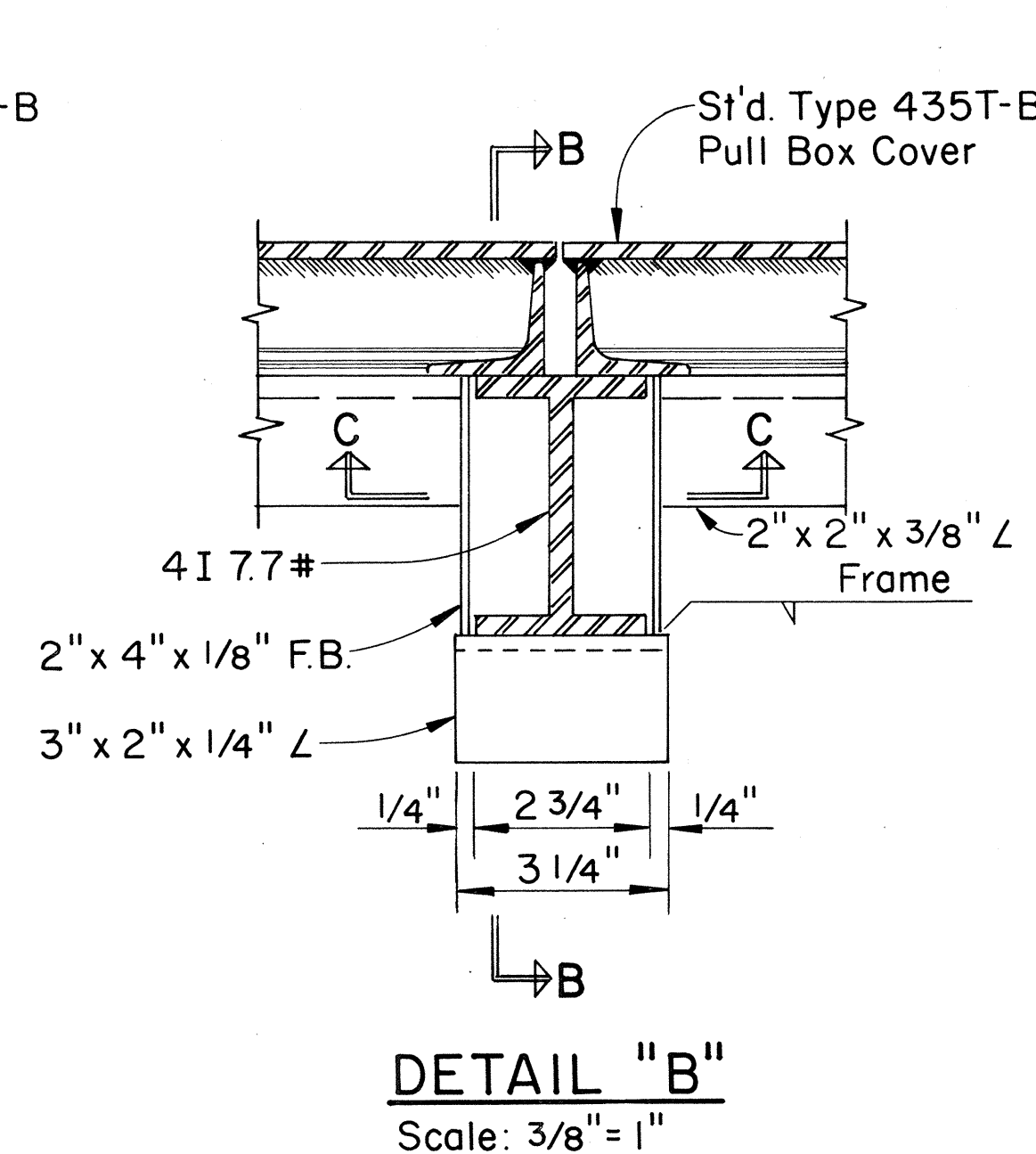
**FLOOR PLAN**  
Scale: 1" = 1'-0"

**GENERAL NOTES:**

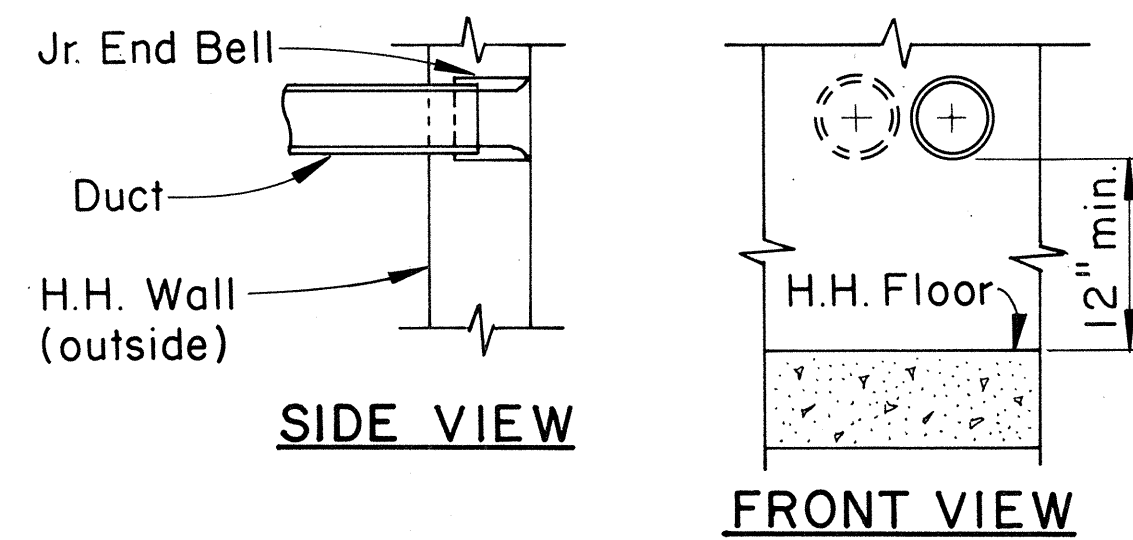
- Concrete finish: floors-wood floated finish-exposed wall surfaces and edges-smooth and free from defects.
- Concrete to develop compressive strength-3000 p.s.i. in 28 days.
- Steel work all structural steel shall be hot dip galvanized after fabrication.
- For duct line construction standards, see st'd. dwg. No. 34028.
- These handholes are designed for installation in areas other than roadways.



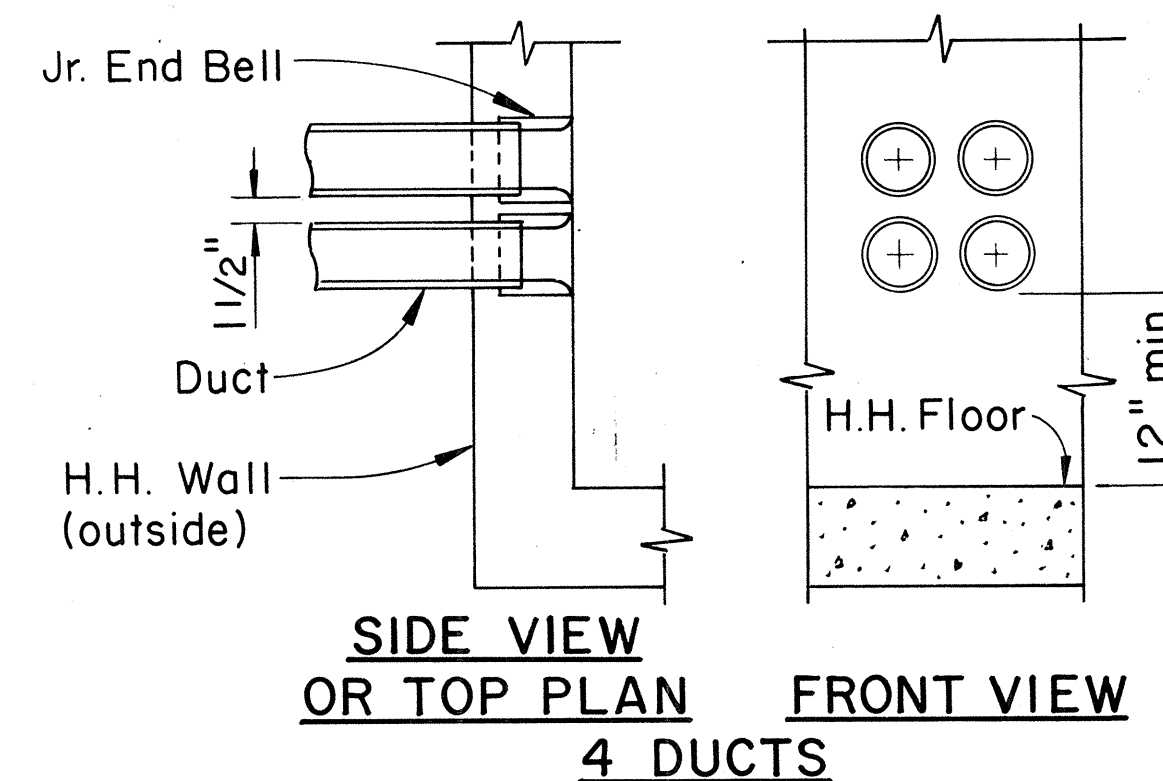
NOTE:  
Section is typical.  
**DETAIL "A"**  
Scale: 3/8" = 1"



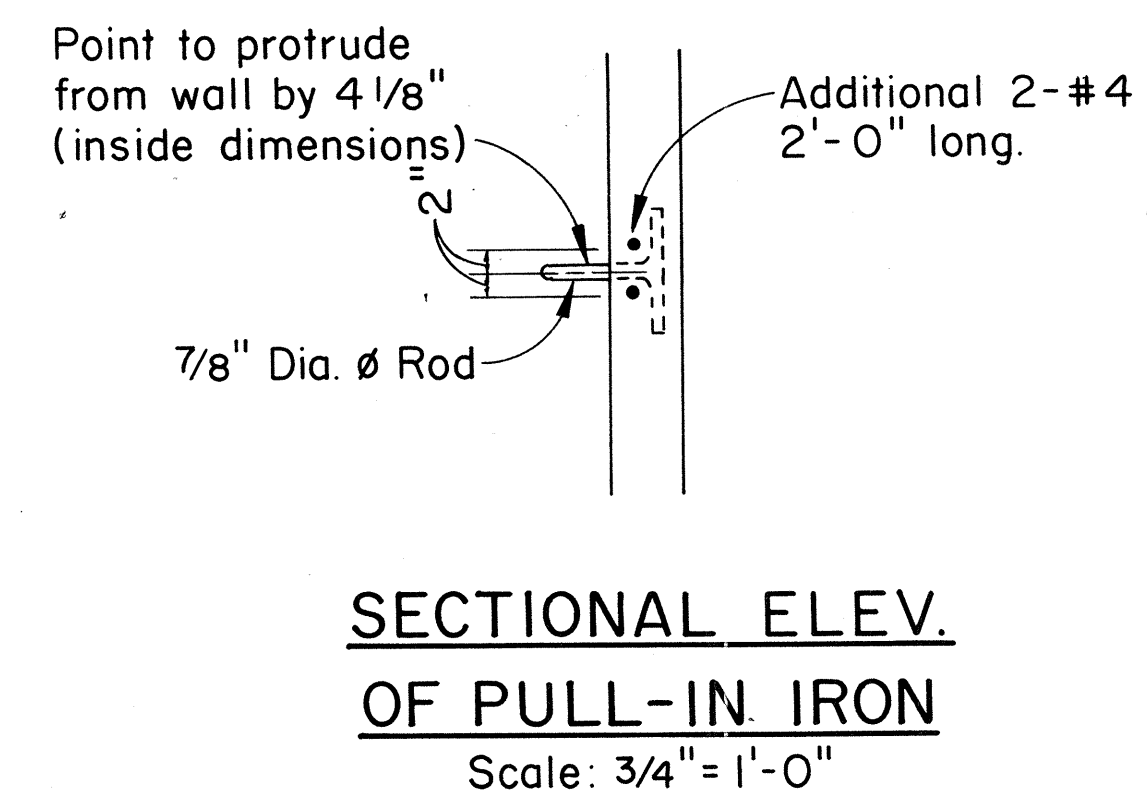
**DETAIL "B"**  
Scale: 3/8" = 1"



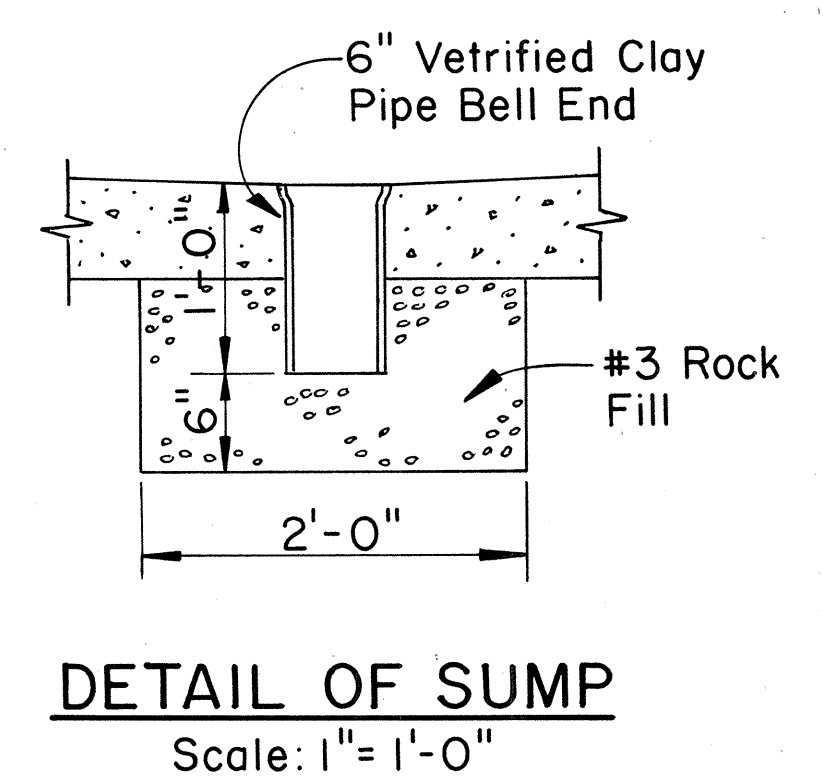
**1 OR 2 DUCTS**  
Scale: 1" = 1'-0"



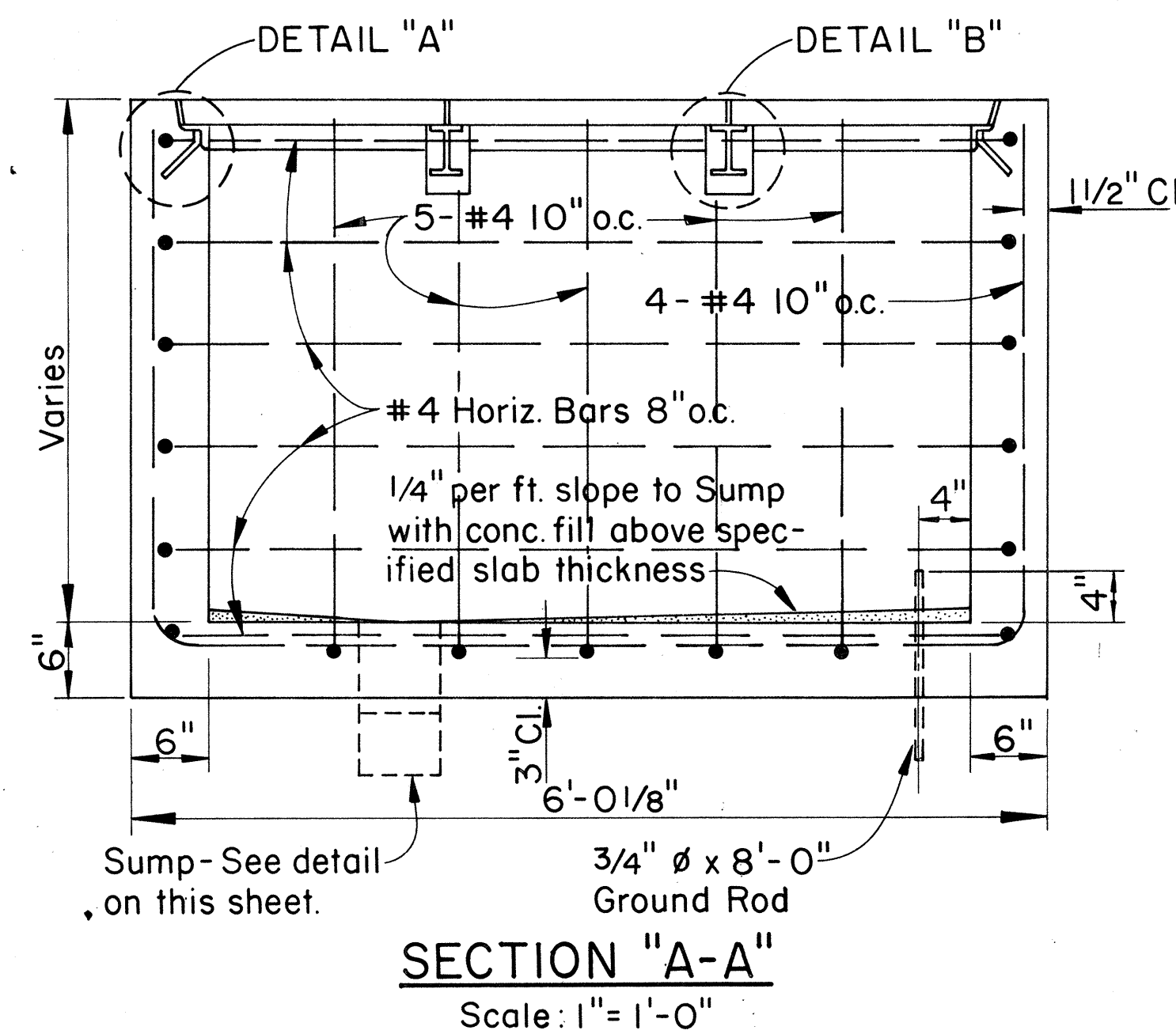
**DUCT ENTRANCE DETAILS**  
Scale: 1" = 1'-0"



**SECTIONAL ELEV. OF PULL-IN IRON**  
Scale: 3/4" = 1'-0"

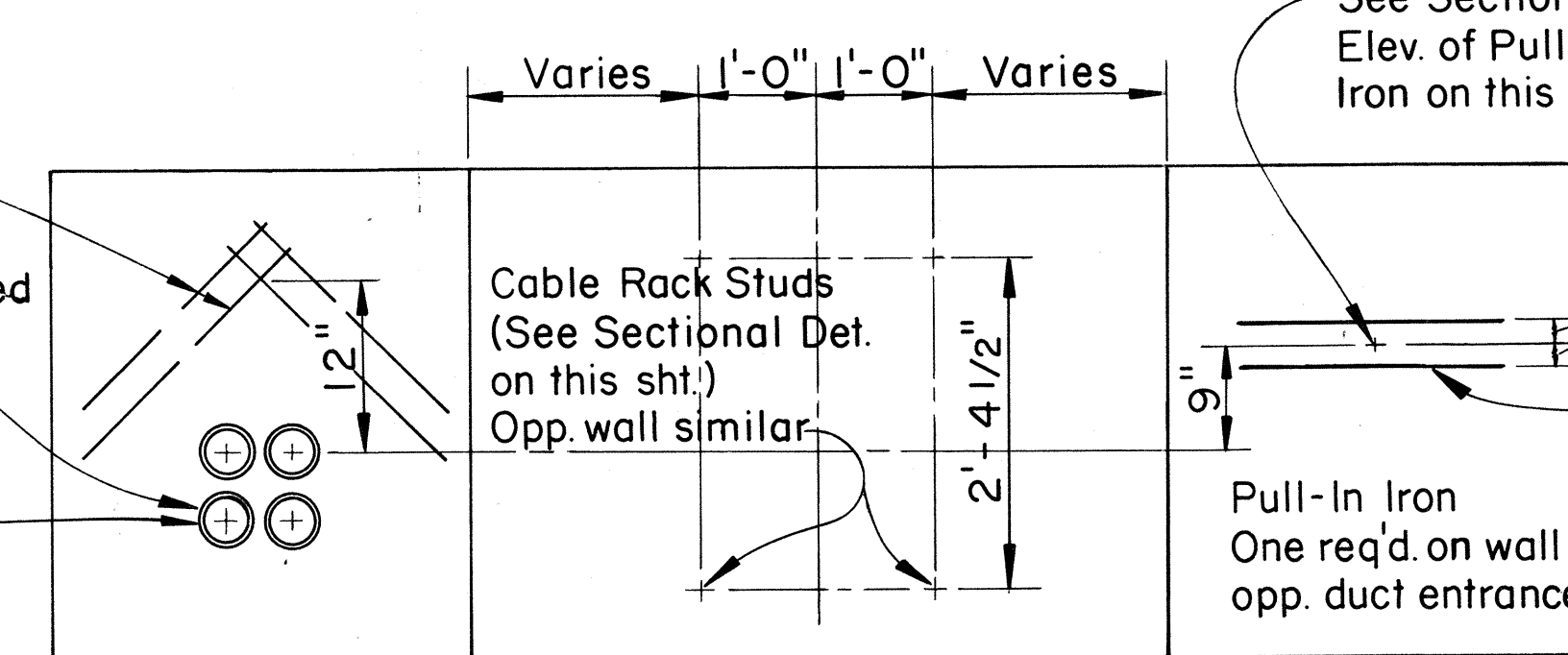


**DETAIL OF SUMP**  
Scale: 1" = 1'-0"

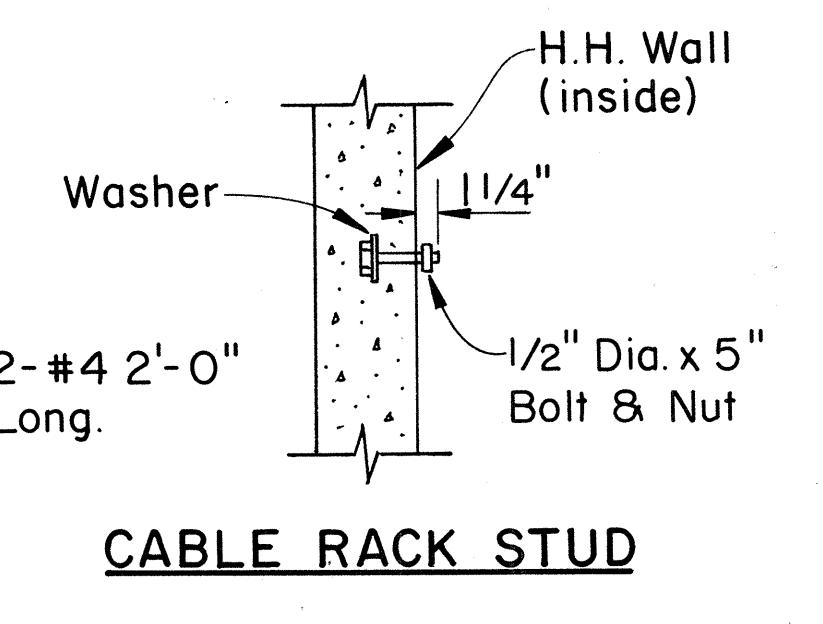


**SECTION "A-A"**  
Scale: 1" = 1'-0"

Diag. Reinf. 2- #5 at 3" o.c. over Duct Entrance.  
No. of Ducts & Location shall be determined by the project.  
See Duct Entrance Details this sheet.



**ELEV. OF INSIDE WALLS - H.H. TYPE I**  
Scale: 3/4" = 1'-0"



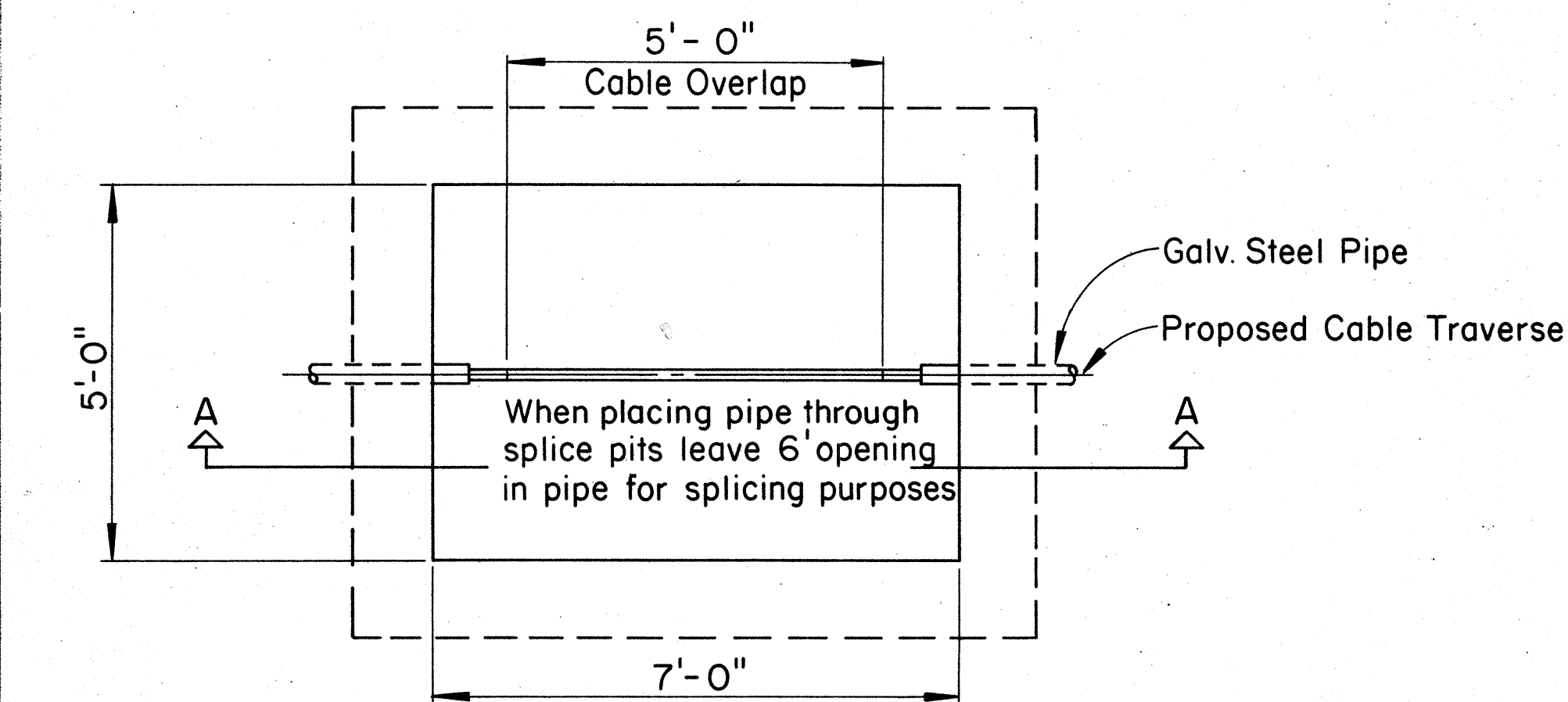
**BOLT DETAIL**  
Scale: 1" = 1'-0"

APPROVED:  
*R. Man*  
HAWAIIAN TELEPHONE CO., LTD. 10-21-74  
DATE

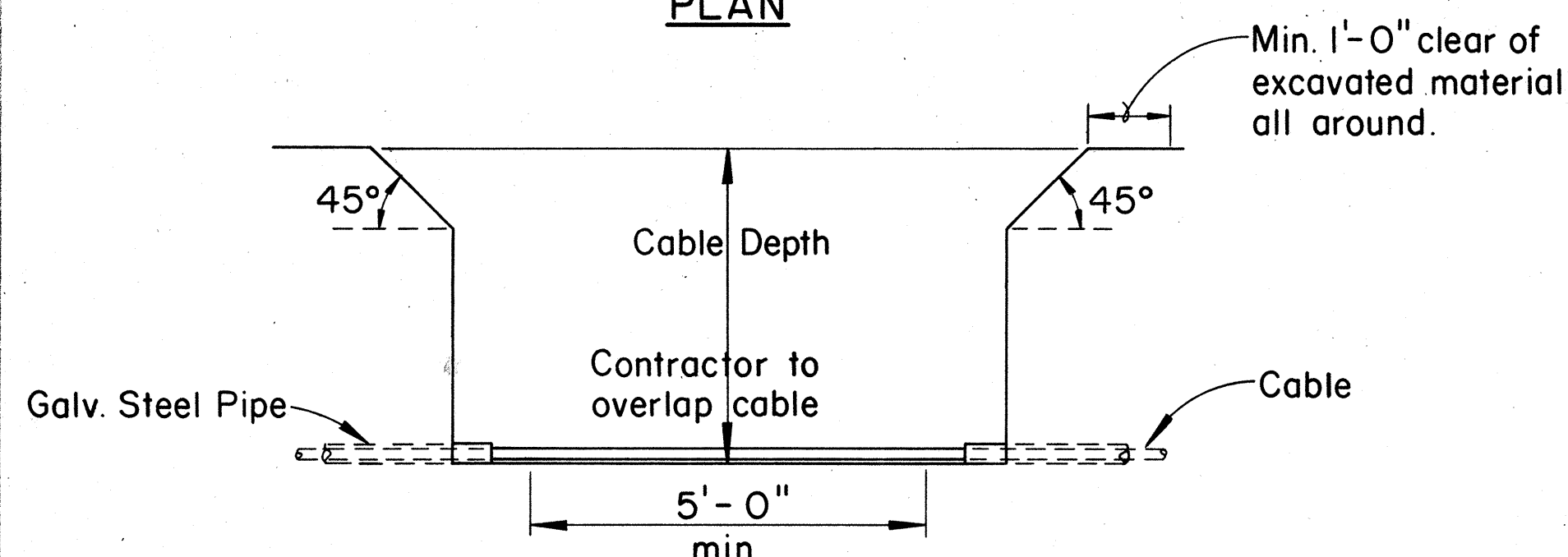
STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
**STANDARD HANDHOLE  
TYPE #1 USING TYPE  
435T-B PULLBOX COVERS**  
Scale: As Shown Date:  
SHEET No. 153 OF 234 SHEETS



| FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO.                 | FISCAL YEAR | SHEET NO. | TOTAL SHEETS |
|---------------------|-------|------------------------------------|-------------|-----------|--------------|
| HAWAII              | HAW.  | I-H-1(11)14                        | 1974        | 154       | 234          |
| DATE                |       | REVISIONS                          |             |           |              |
| 10/21/74            |       | OBTAINED UTILITY COMPANY SIGNATURE |             |           |              |



PLAN

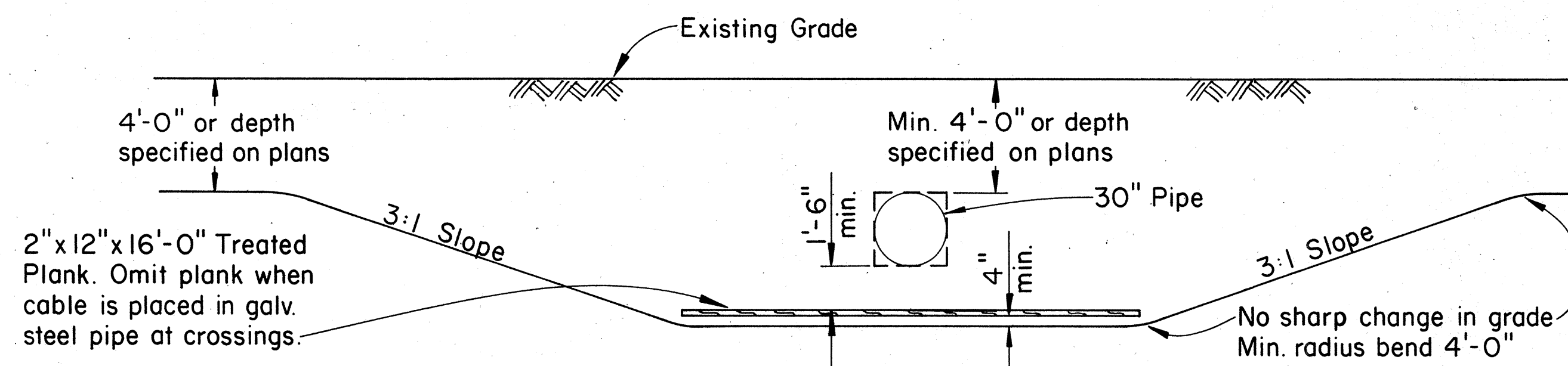


SECTION A-A

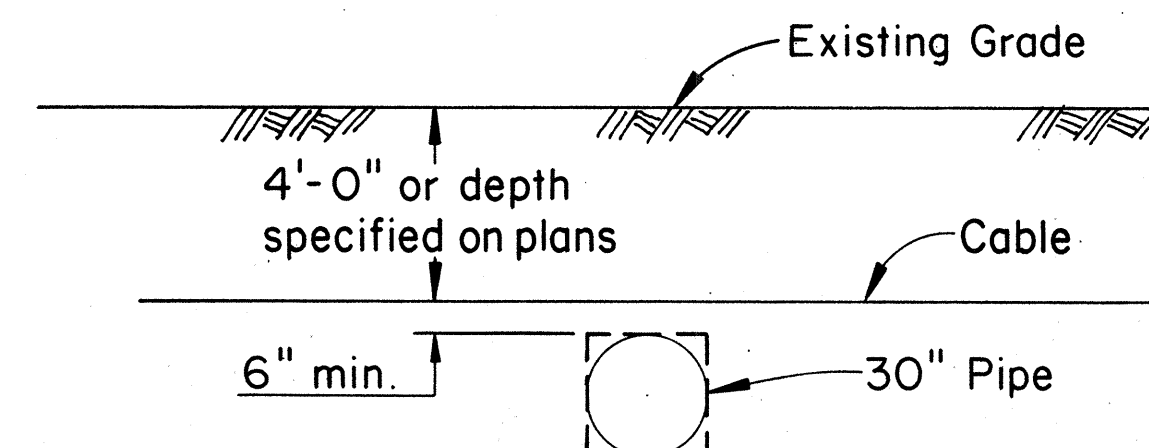
### TYPICAL SPLICING PITS FOR BURIED CABLE

#### NOTES:

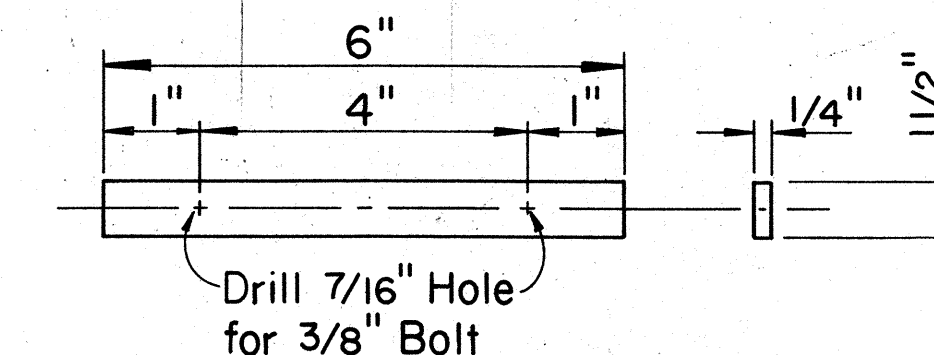
1. The Contractor shall dig pits at specified locations.
2. One face of pit shall be kept free of excavated material.
3. Where pits are located on sloping or irregular ground, the excavated material shall be placed in such a manner as to prevent surface water from draining into the pit.
4. Provide a fence around the pit at any location where stock have access to the route, and pits near farm homes to keep out small animals and pets.



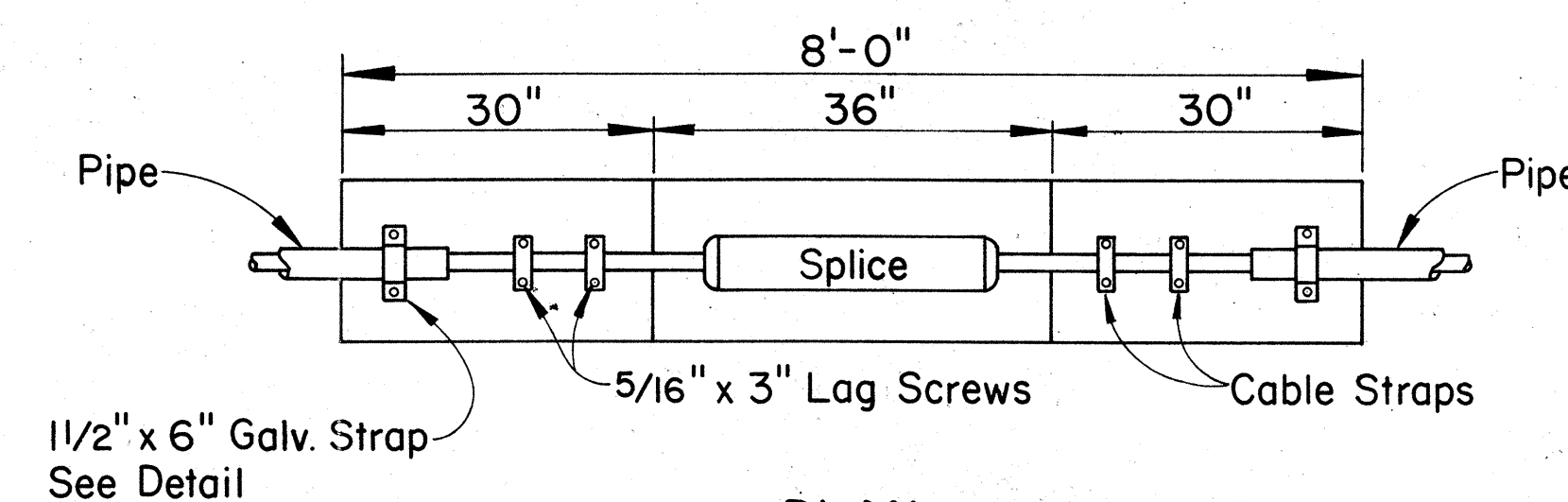
### DETAIL OF CABLE CROSSING UNDER STORM CULVERTS-IRRIGATION PIPES, OTHER UTILITIES, OR FOREIGN PIPES



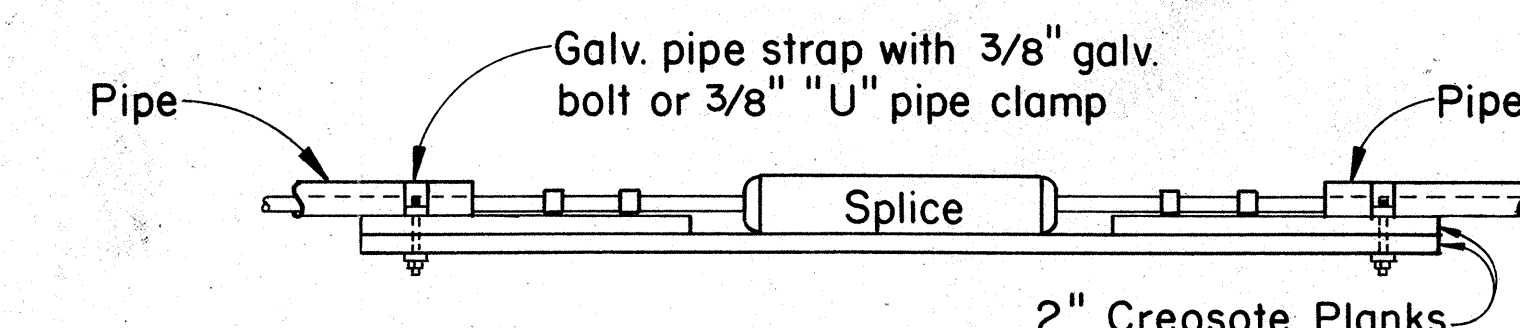
### DETAIL OF CABLE CROSSING OVER STORM CULVERTS-IRRIGATION PIPES, OTHER UTILITIES, OR FOREIGN PIPES



### GALVANIZED STRAP DETAIL



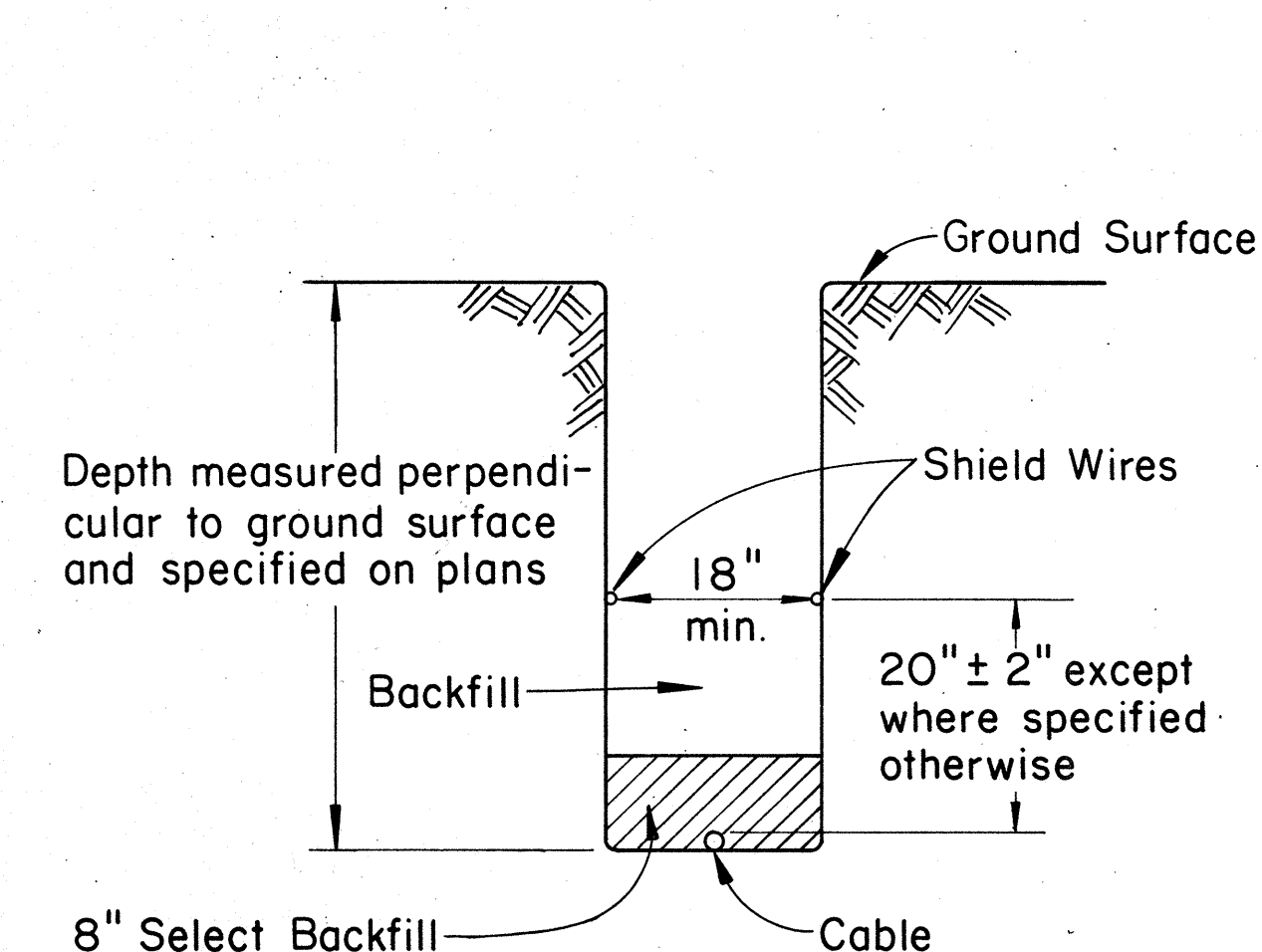
PLAN



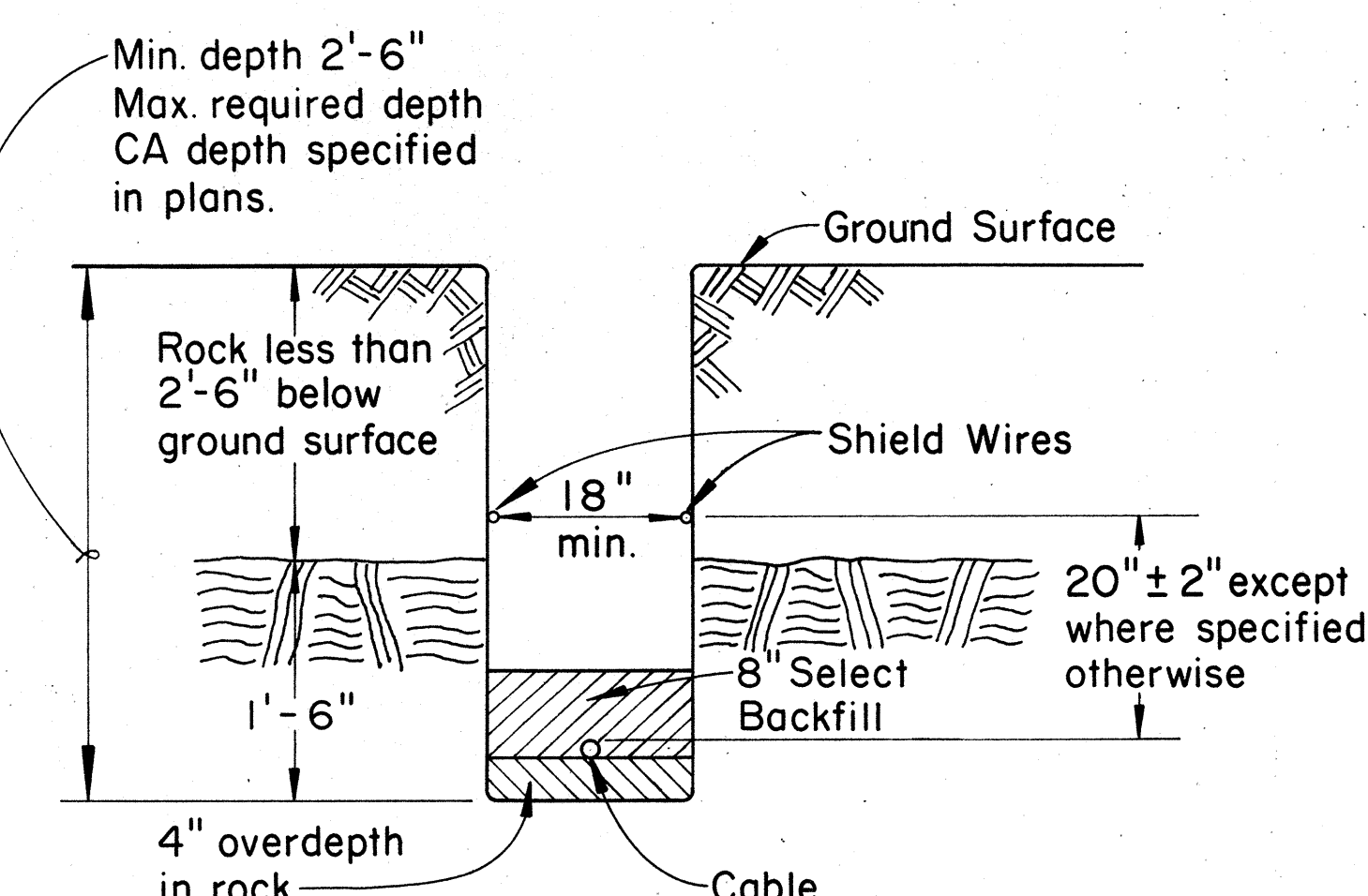
NOTE:  
Galv. Strap may be substituted with pipe clamp.

ELEVATION

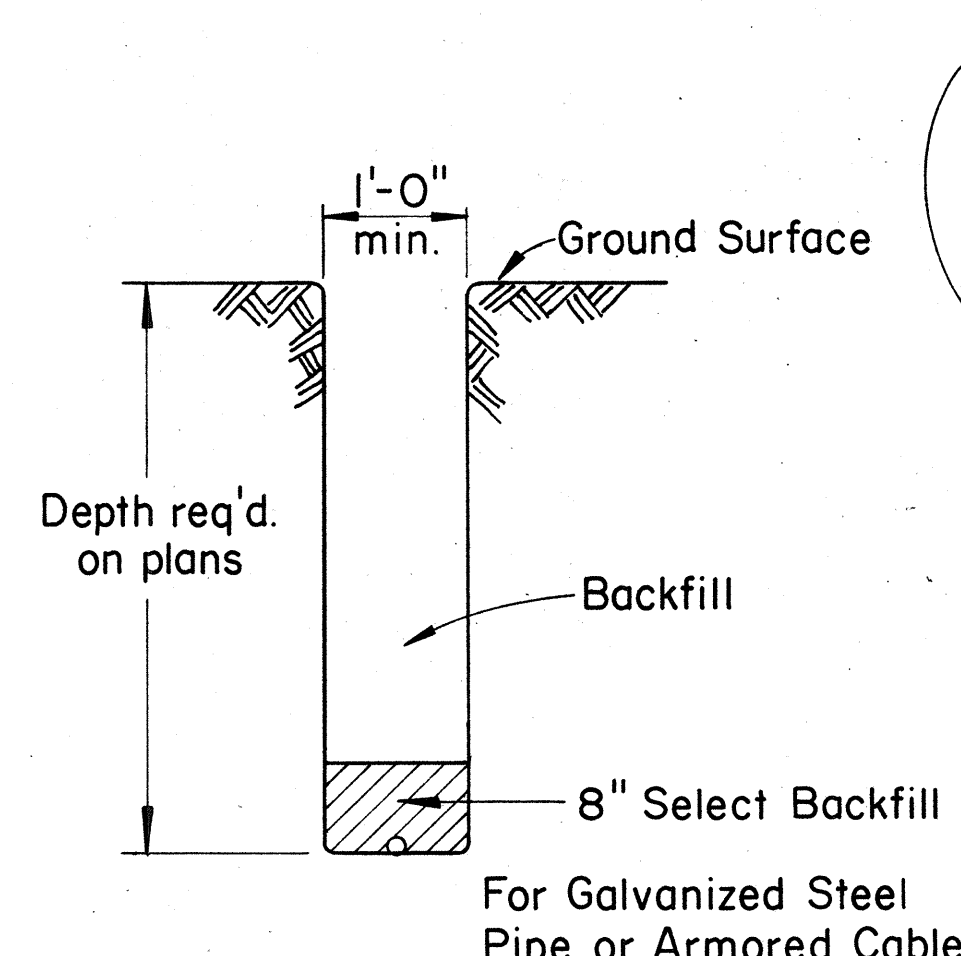
### DETAIL OF SPLICE SUPPORT BETWEEN PIPE SECTIONS



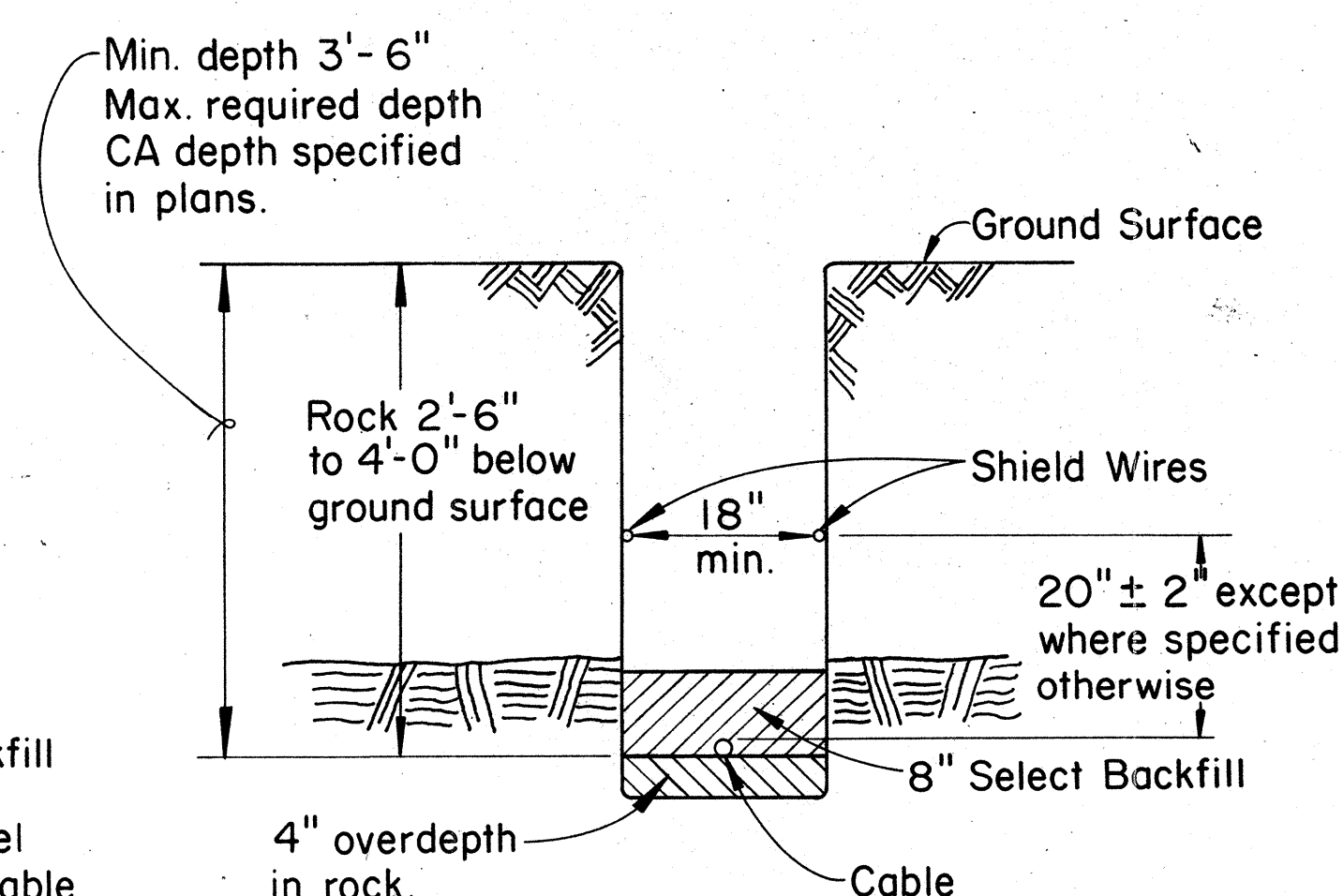
### TYPICAL SECTION THROUGH NORMAL TRENCH



### TYPICAL SECTION THROUGH TRENCH WITH ROCK LESS THAN 2'-6" BELOW SURFACE



### TYPICAL SECTION FOR TRENCH WHERE NO SHIELD WIRE IS REQUIRED



### TYPICAL SECTION THROUGH TRENCH WITH ROCK 2'-6" TO 4'-0" BELOW SURFACE

APPROVED:  
R. Man  
Hawaiian Telephone Co., Ltd. 10-21-74  
Date

H.T. Co., Ltd. Drawing Nos. 34047  
34048

STATE OF HAWAII  
DEPARTMENT OF TRANSPORTATION  
HIGHWAYS DIVISION  
STANDARD DETAILS  
SPLICING PITS AND  
STANDARD TRENCHING DETAILS  
FOR BURIED COAXIAL CABLE

Scale: Not to Scale  
SHEET No. E-40 OF 40 SHEETS

E-40