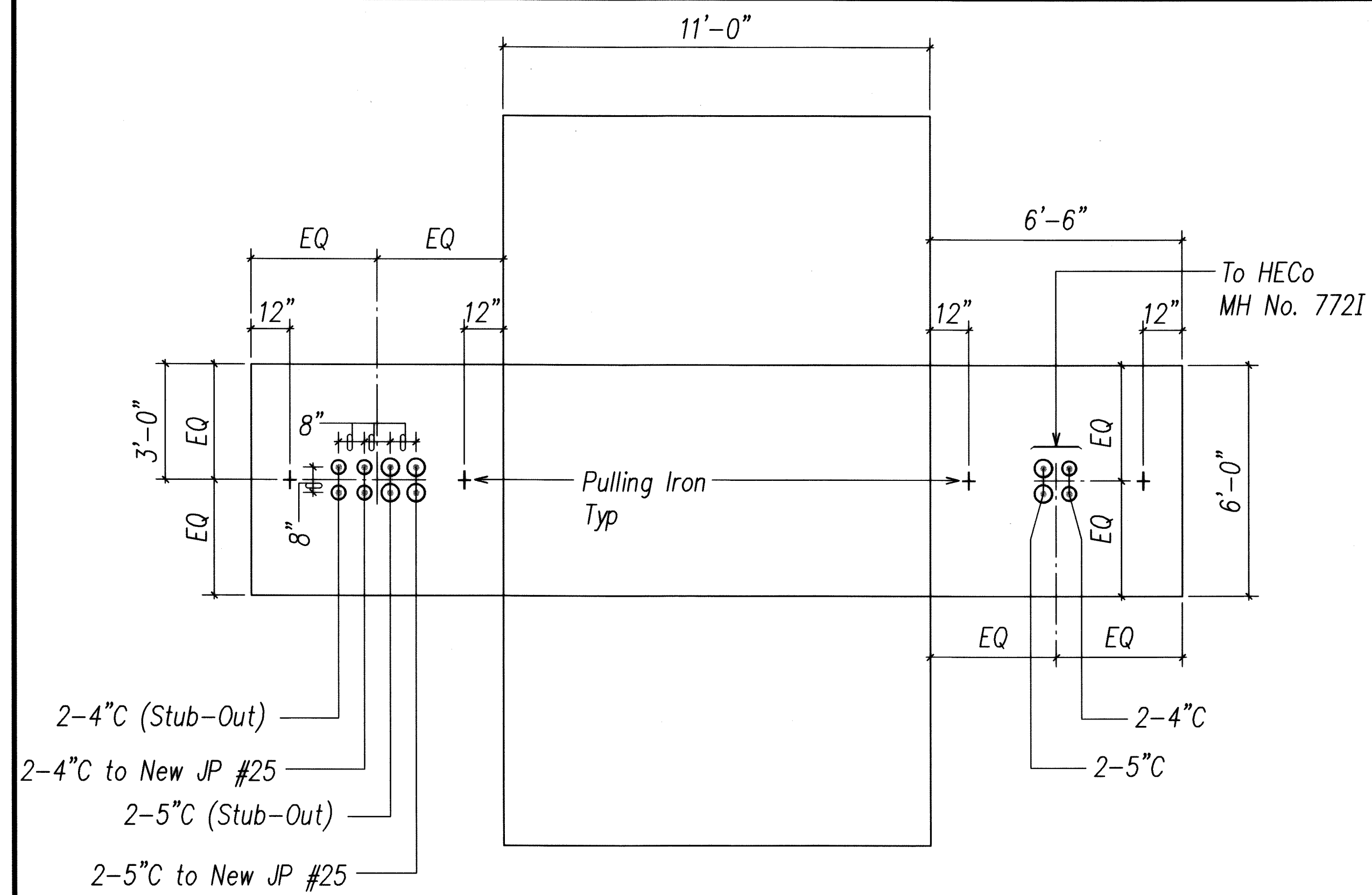
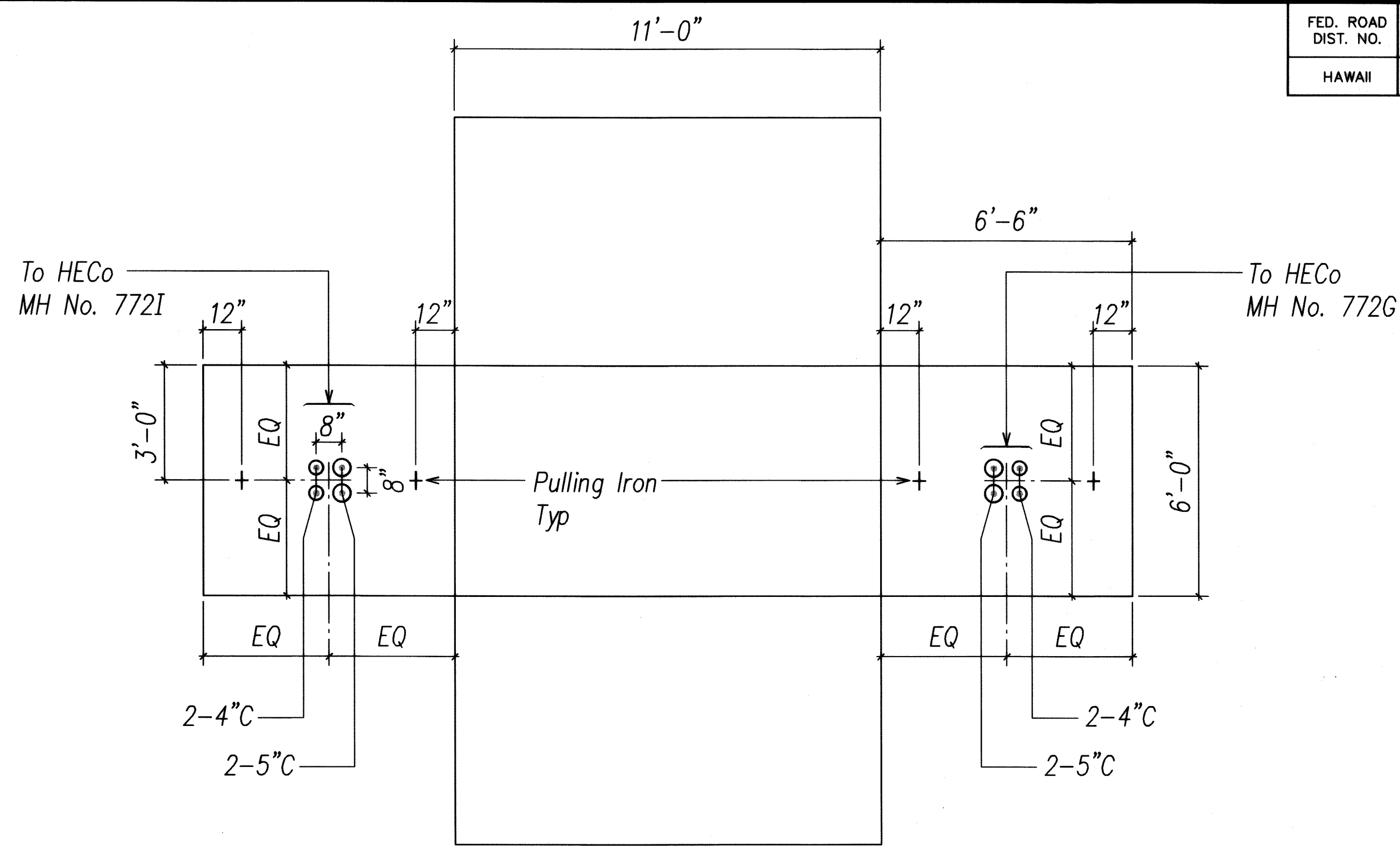


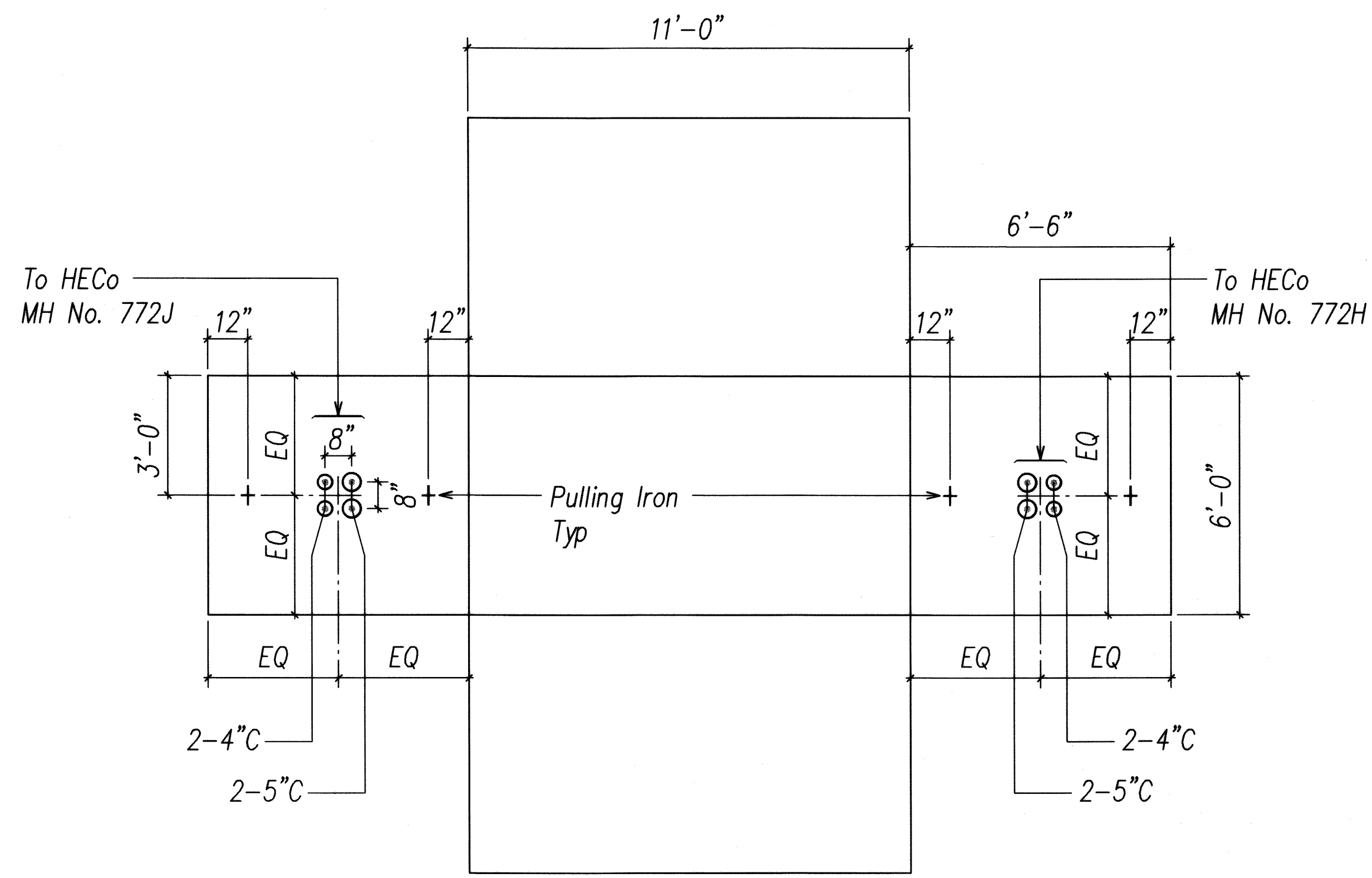
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1 (51)	2007	56	106



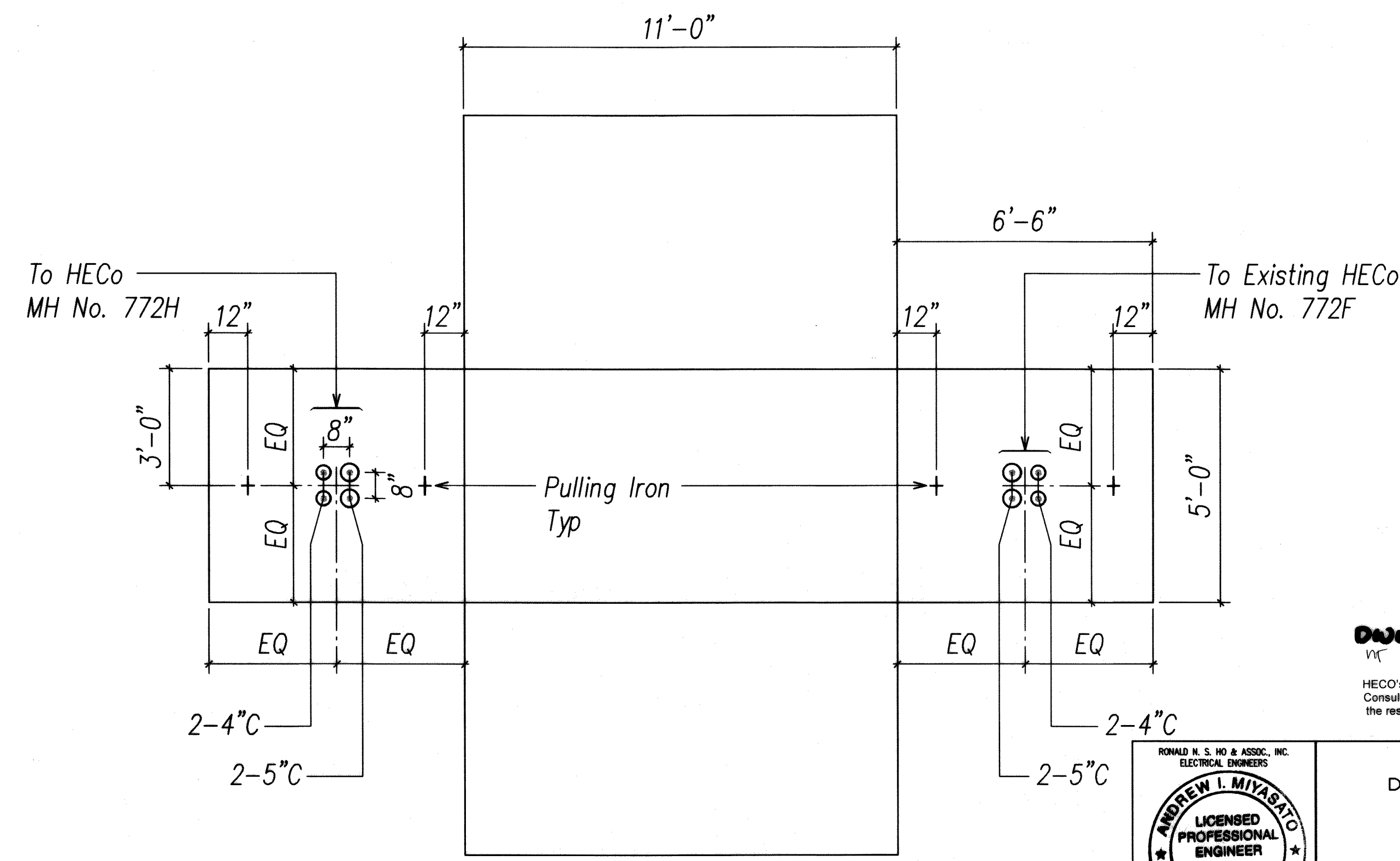
HECO MH NO. 772J (6' X 11')
SCALE: 3/8"=1'-0"



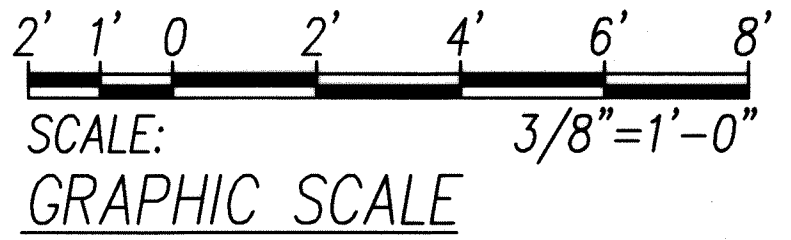
HECO MH NO. 772H (6' X 11')
SCALE: 3/8"=1'-0"



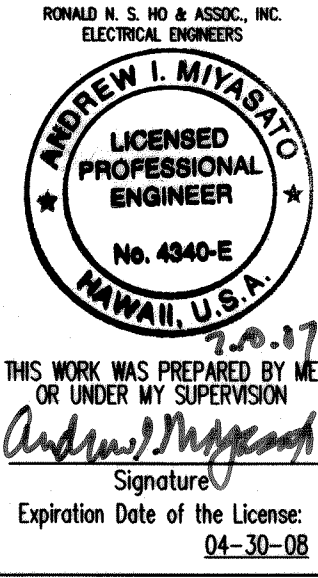
HECO MH NO. 772I (6' X 11')
SCALE: 3/8"=1'-0"



HECO MH NO. 772G (6' X 11')
SCALE: 3/8"=1'-0"



DRAWING REVIEW
Reviewed for HECO's Facilities Only
Date 7/25/07 By R. Miyamoto
Engineering Department
Hawaiian Electric Company, Inc.
HECO's review of these drawings shall in no way relieve the Customer, its Consultant, its Contractor or anyone acting on the Customer's behalf from the responsibility for engineering, design, materials and any other liability associated with this project.



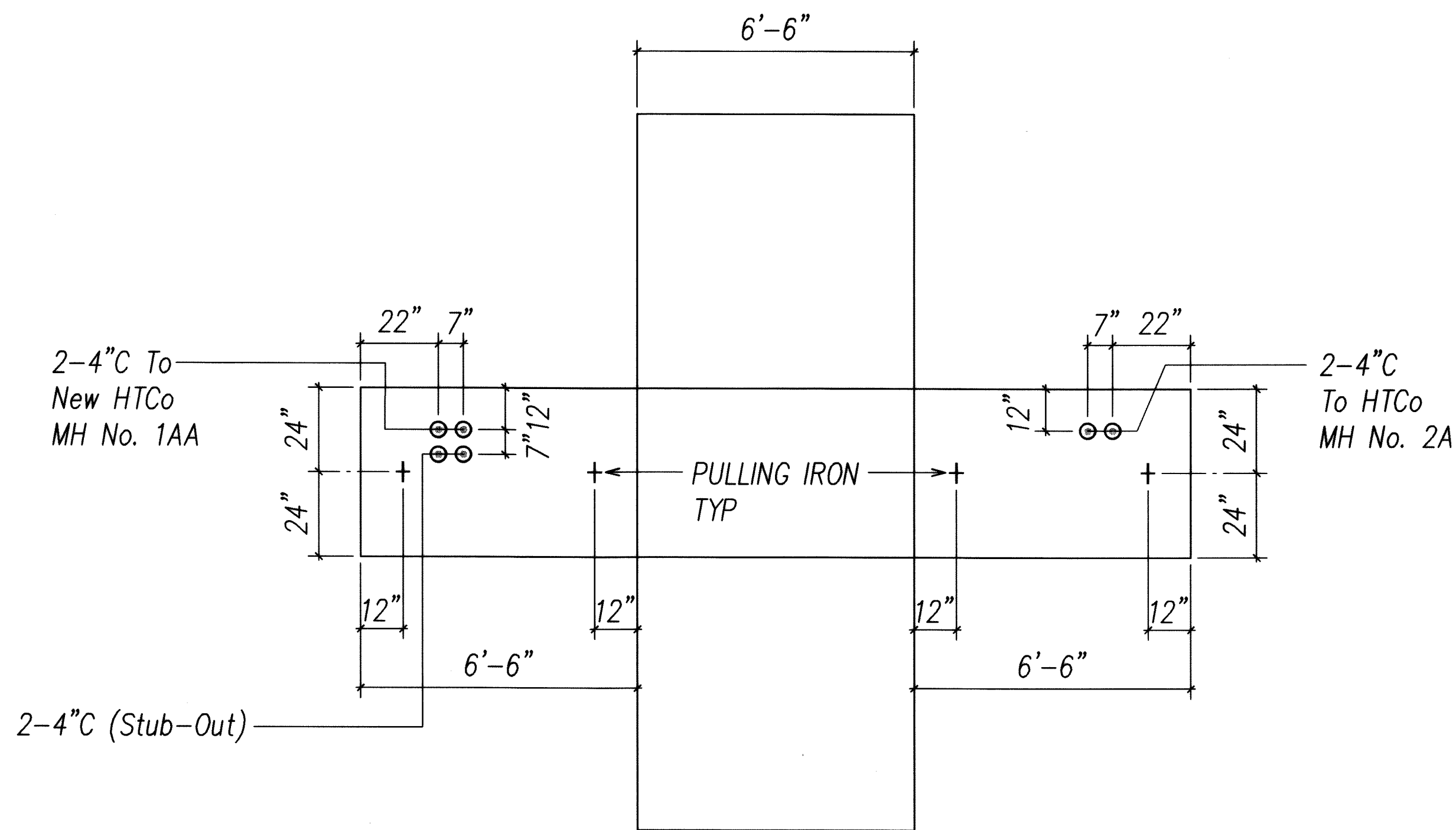
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HECO MANHOLE LAYOUTS
*Kalaniana'ole Highway Improvements
Retaining Wall at Makapuu, Oahu
Federal Aid Project No. NH-072-1 (51)*
SCALE: AS NOTED DATE: APR. 2007

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTEBOOK	DRAWN BY	
	DESIGNED BY	
	QUANTITIES BY	
	CHECKED BY	

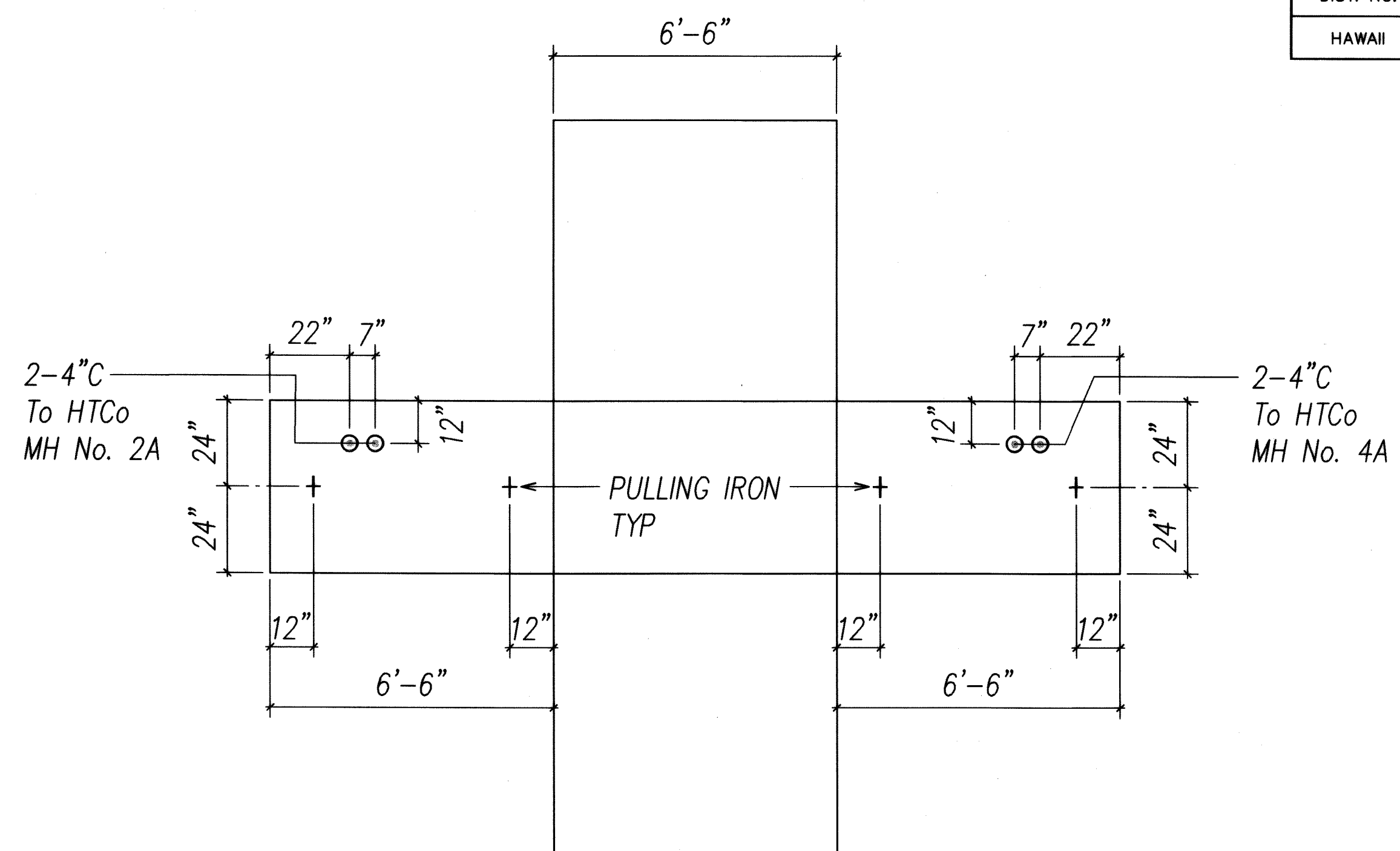
LAST DATE: 04/27/07 @ 12:35:35 BY: AM PLOT SC: 3/8"=1'-0"
HAWAIIAN ELECTRIC COMPANY (HECO) 4300 KALANIANA'OLE BLVD., SUITE 200, HONOLULU, HI 96813

APPROVED BY:
HAWAIIAN ELECTRIC COMPANY (HECO)
DATE:

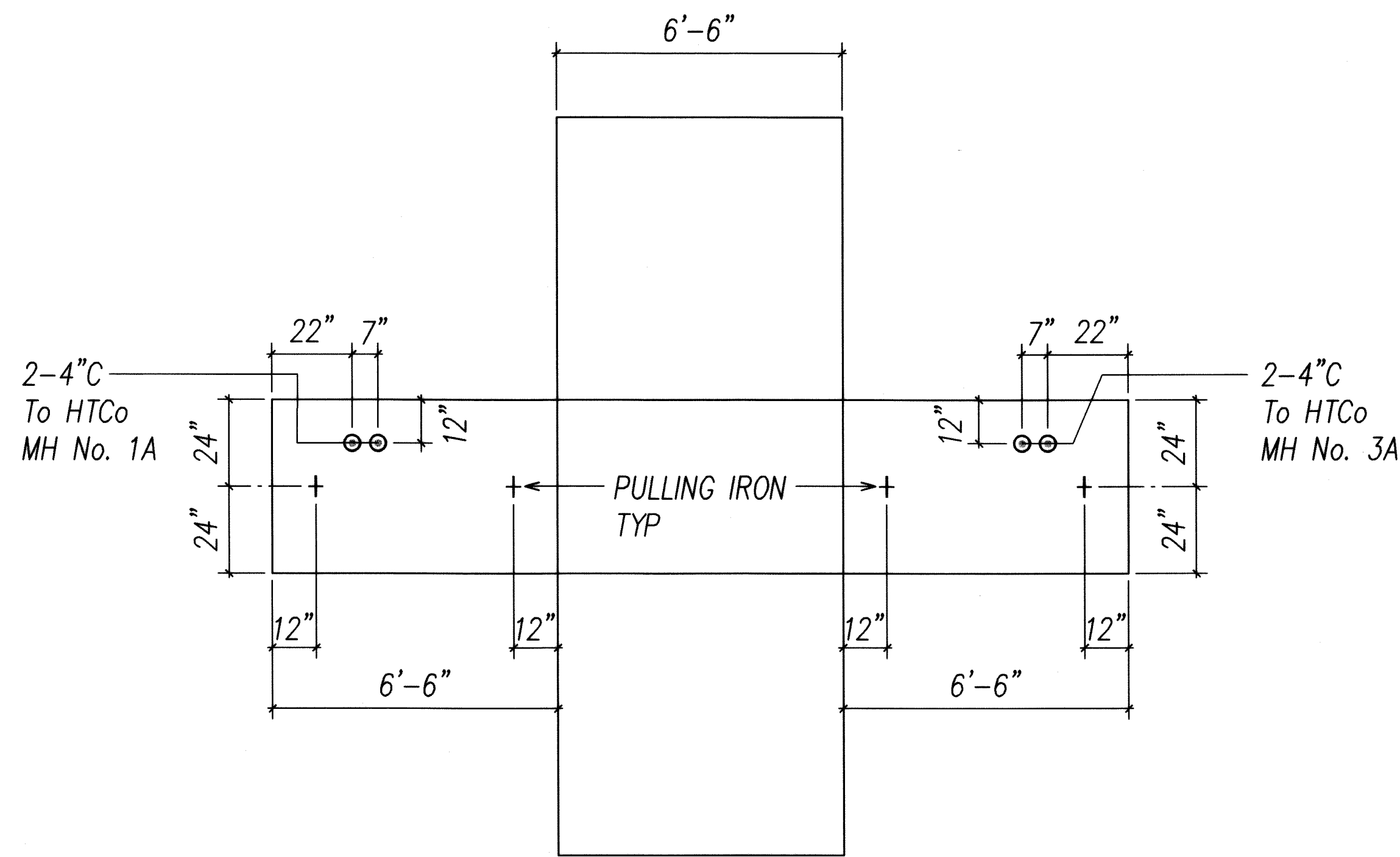
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1 (51)	2007	57	106



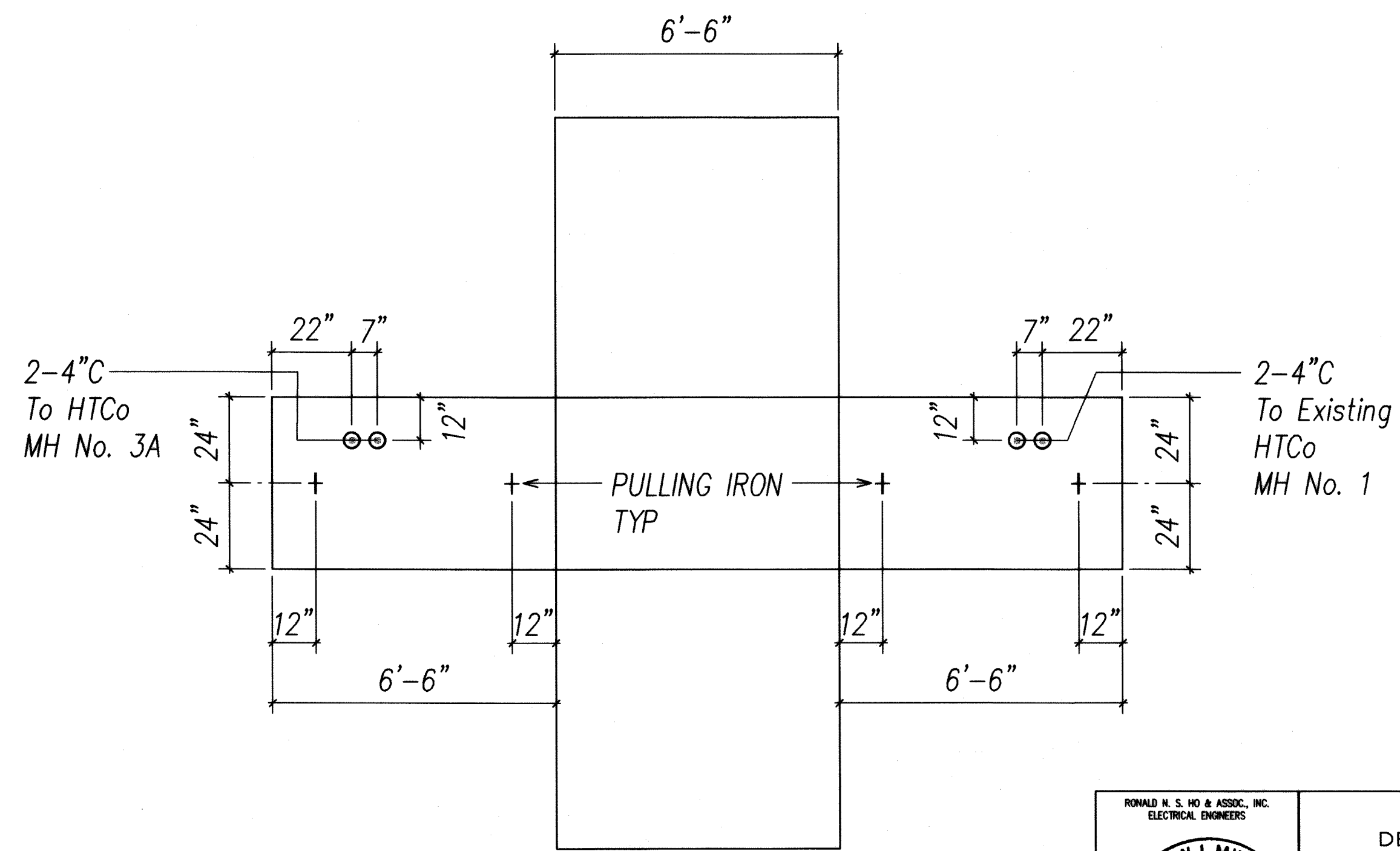
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SCALE: 3/8"=1'-0"



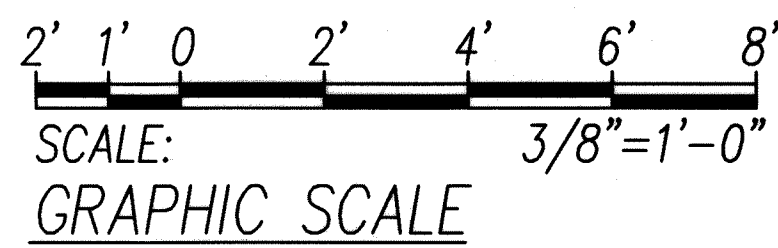
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SCALE: 3/8"=1'-0"



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SCALE: 3/8"=1'-0"

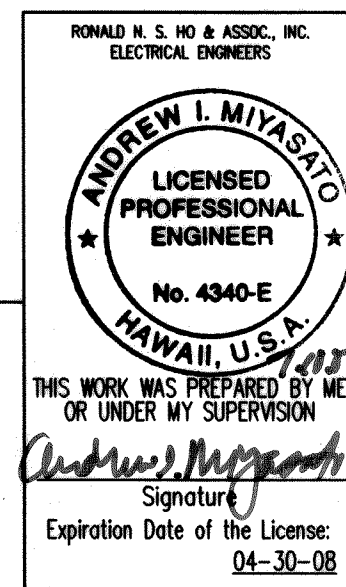


HTCo MH NO. 4A (4' X 6'-6")
SCALE: 3/8"=1'-0"



ORIGINAL PLAN	DATE
NOTED BY	
DESIGNED BY	
CHECKED BY	
IN CHARGE	

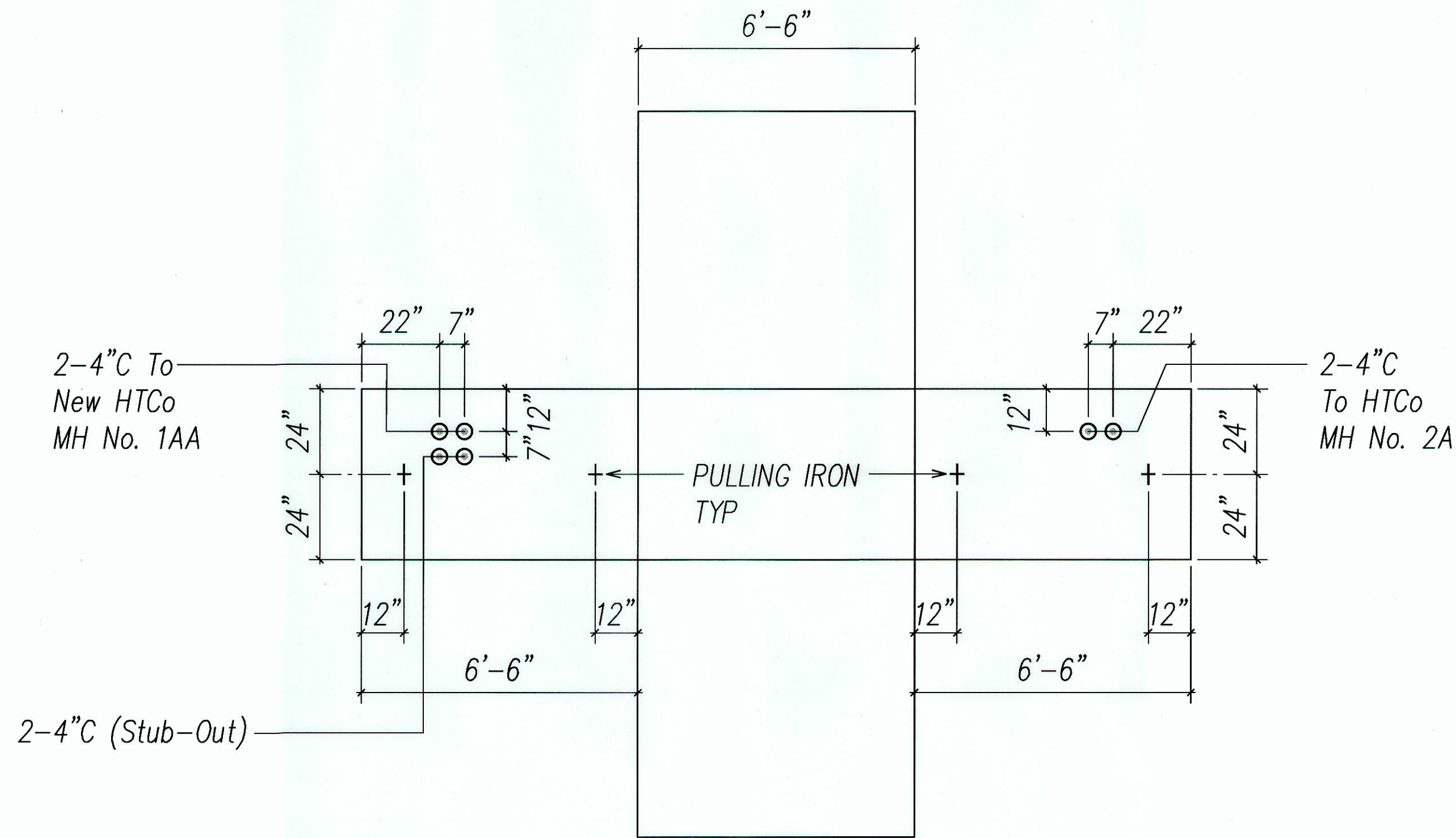
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KALANIANA'OLE HIGHWAY IMPROVEMENTS RETAINING WALL AT MAKAPUU, OAHU



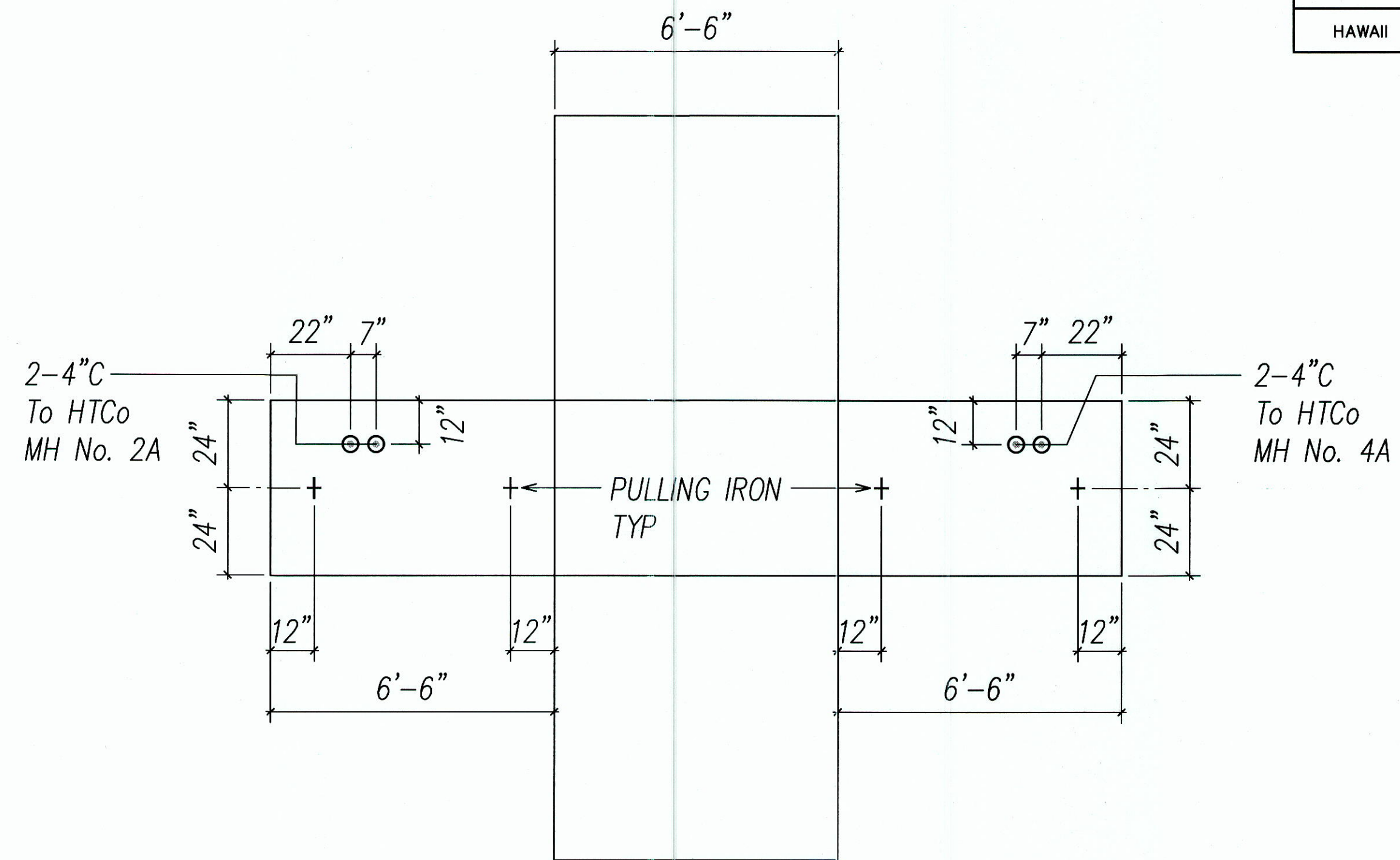
APPROVED BY: *[Signature]*
HAWAIIAN TELECOM (HTCo)
DATE: 8/8/07

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HTCo MANHOLE LAYOUTS
*Kalaniana'ole Highway Improvements
Retaining Wall at Makapuu, Oahu*
Federal Aid Project No. NH-072-1 (51)
SCALE: AS NOTED DATE: APR. 2007
SHEET No. E-17 OF 18 SHEETS

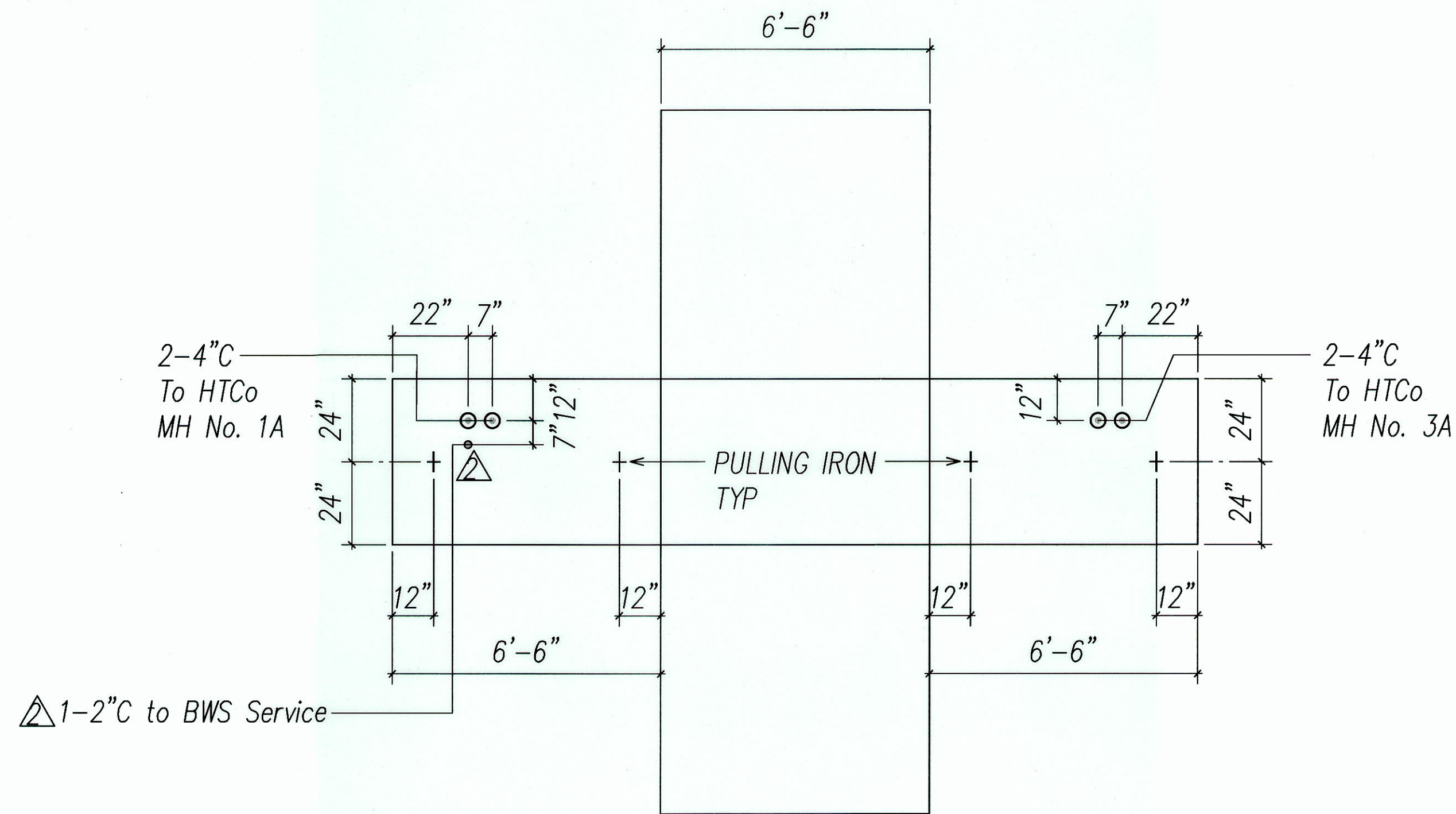
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1 (51)	2007	C.O. 57	106



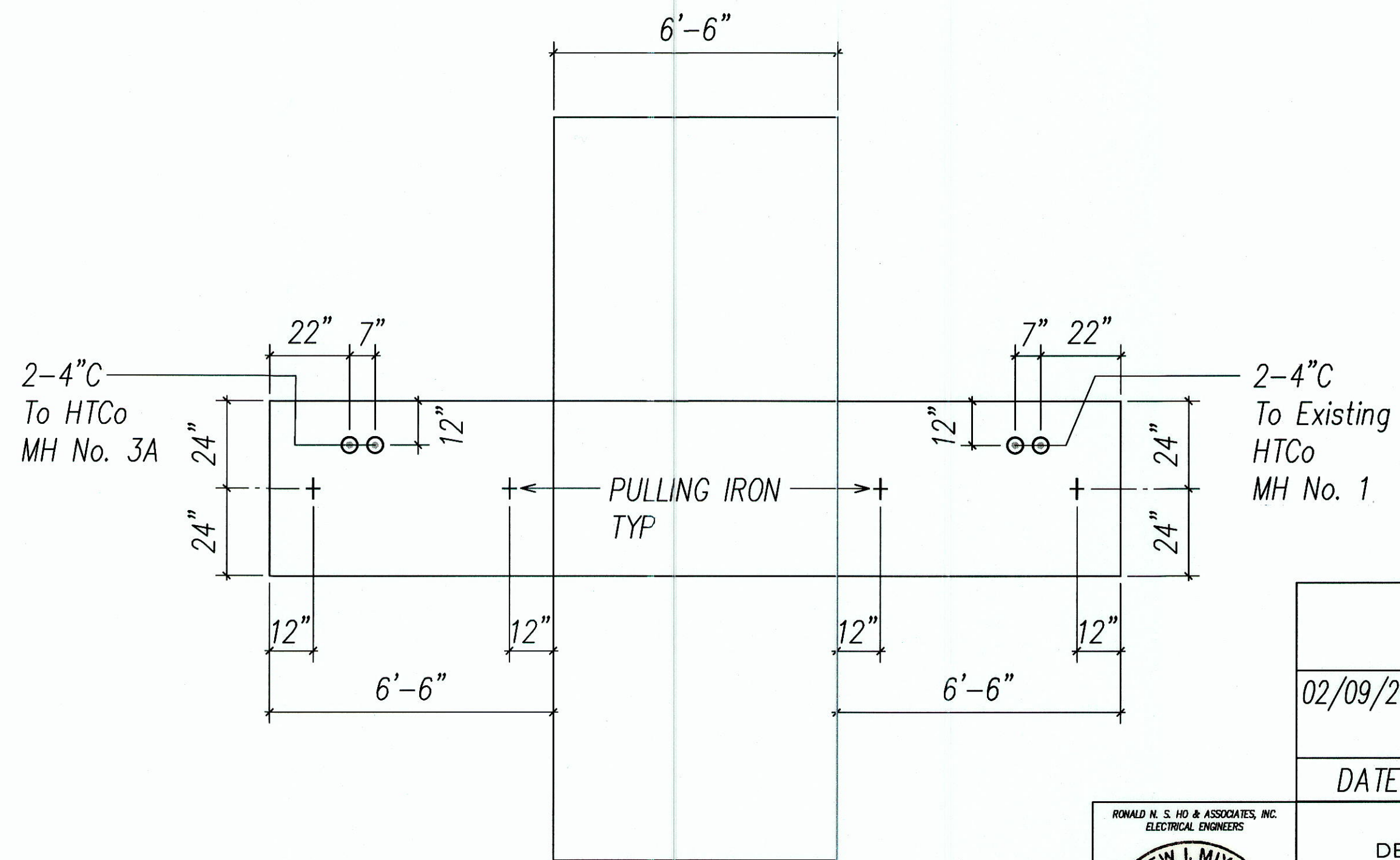
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SCALE: 3/8"=1'-0"



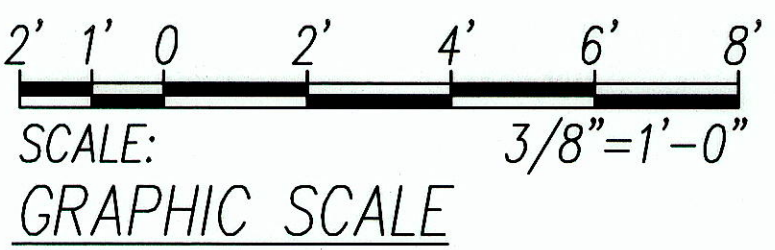
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SCALE: 3/8"=1'-0"



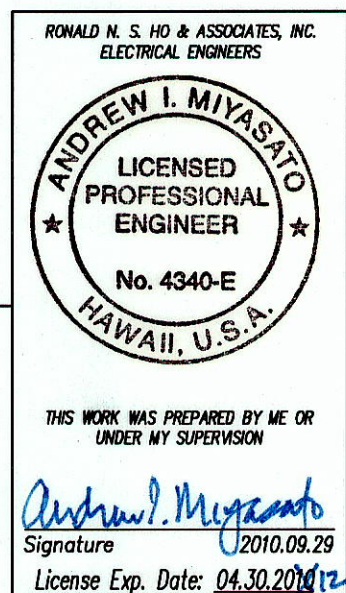
HTCo MH NO. 2A (4' X 6'-6")
SCALE: 3/8"=1'-0"



HTCo MH NO. 4A (4' X 6'-6")
SCALE: 3/8"=1'-0"



DATE	REVISION
02/09/2010	Added 2"C for BWS Service



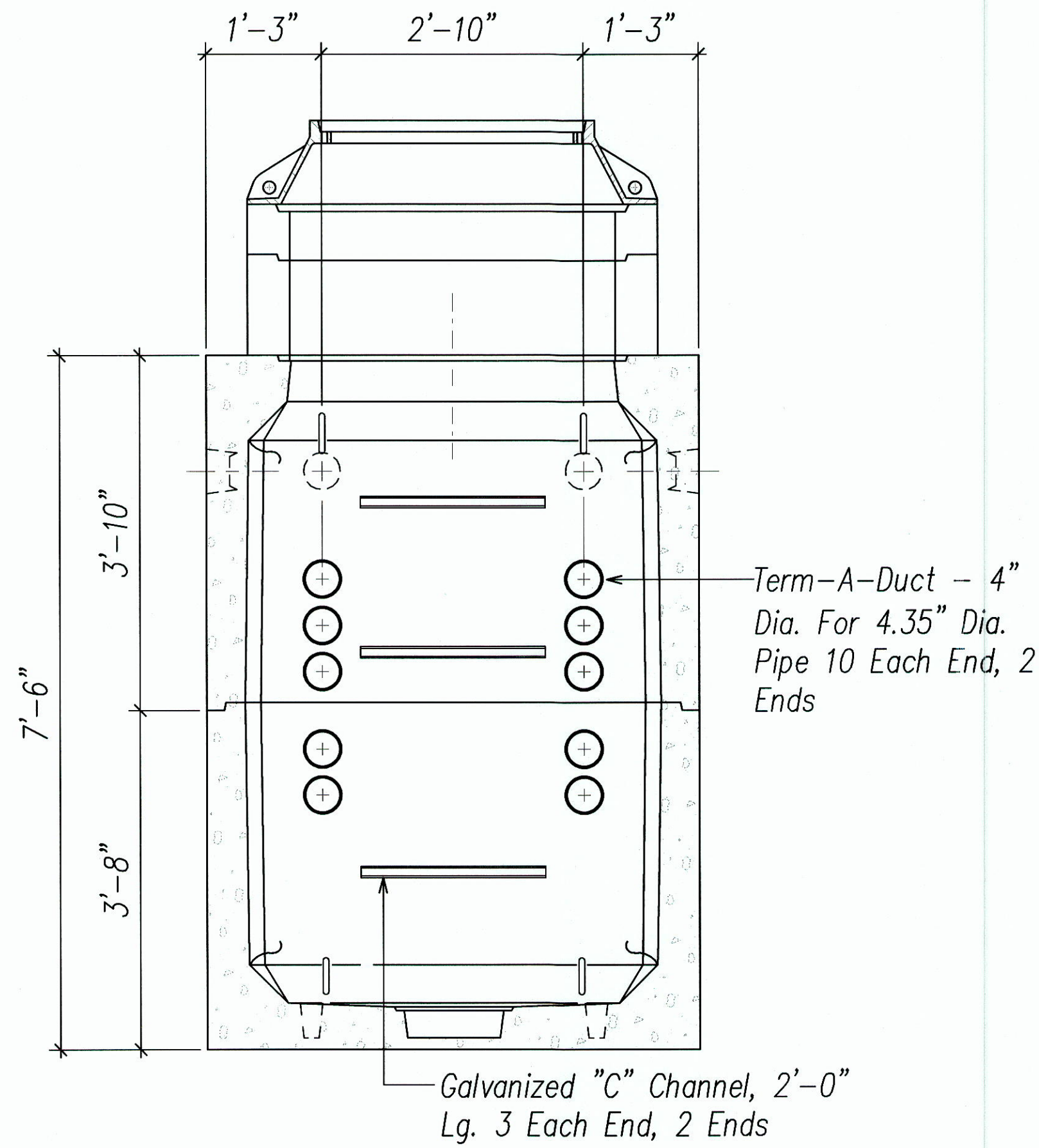
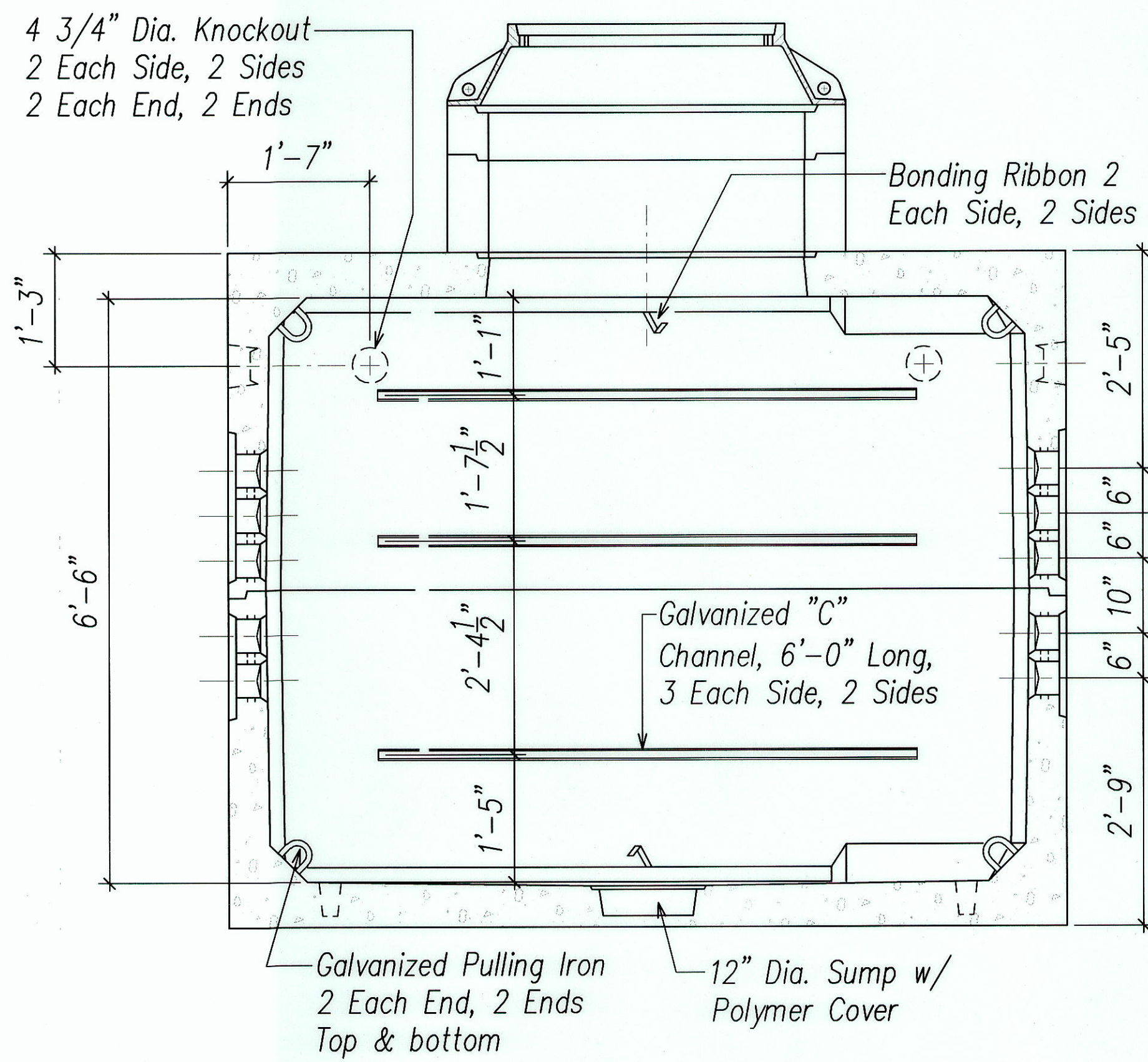
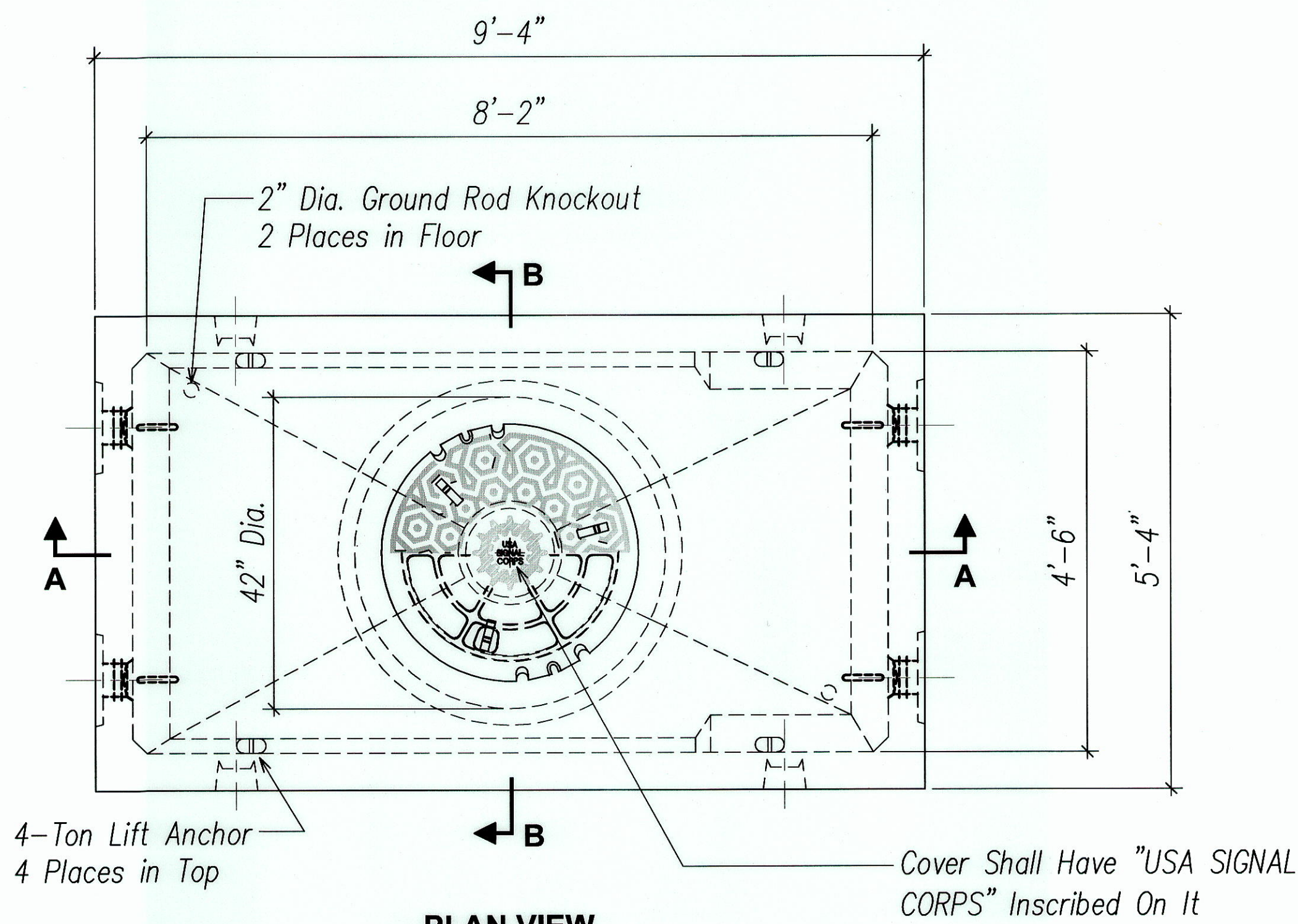
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HTCo MANHOLE LAYOUTS
*Kalaniana'ole Highway Improvements
Retaining Wall at Makapuu, Oahu*
Federal Aid Project No. NH-072-1 (51)
SCALE: AS NOTED DATE: APR. 2007
SHEET No. E-17 OF 18 SHEETS

APPROVED BY:
HAWAIIAN TELCOM (HTCo)
DATE: 04/30/2010

Signature
2010.08.29
License Exp. Date: 04/30/2012

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTED	DRAWN BY	
	DESIGNED BY	
	CHECKED BY	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1 (51)	2007	C.O. 58 S-1	106



- STRUCTURAL NOTES**
- CONCRETE: 28 Day Compressive Strength $f_c = 7000$ psi
 - REBAR: ASTM A-615 Grade 60
 - MESH: ASTM A-185 Grade 65
 - DESIGN: ACI-318-05 Building Code
 - LOADS: AASHTO HS-20 Truck Wheel, $P = 16.0$ kip. Specials up to 150 kip.
ASTM C-857 "Minimum structural design loading for underground precast concrete utility structures"
ASTM C-858 "Underground Precast Utility Structures"
30% impact for less than 2 ft. soil cover
Soil density 120 pcf
40 pcf E.F.P. Lateral soil pressure above watertable
80 pcf E.F.P. Lateral soil pressure below watertable
80 psf Lateral live load surcharge for less than 8'-0" soil depth
Top of vault 5'-0" below finished grade
Watertable 5'-0" below finished grade
 - Manufactured by Utility Vault Company or Approved Equal.

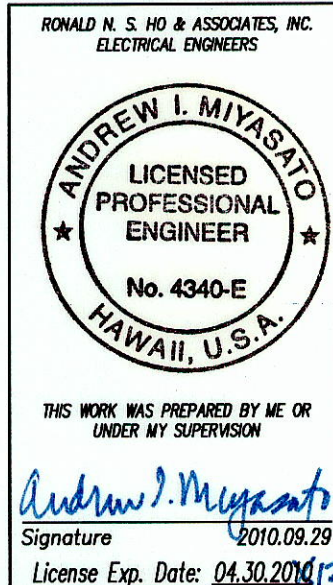
ORIGINAL PLAN	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
NO.	

SECTION AA

SECTION BB

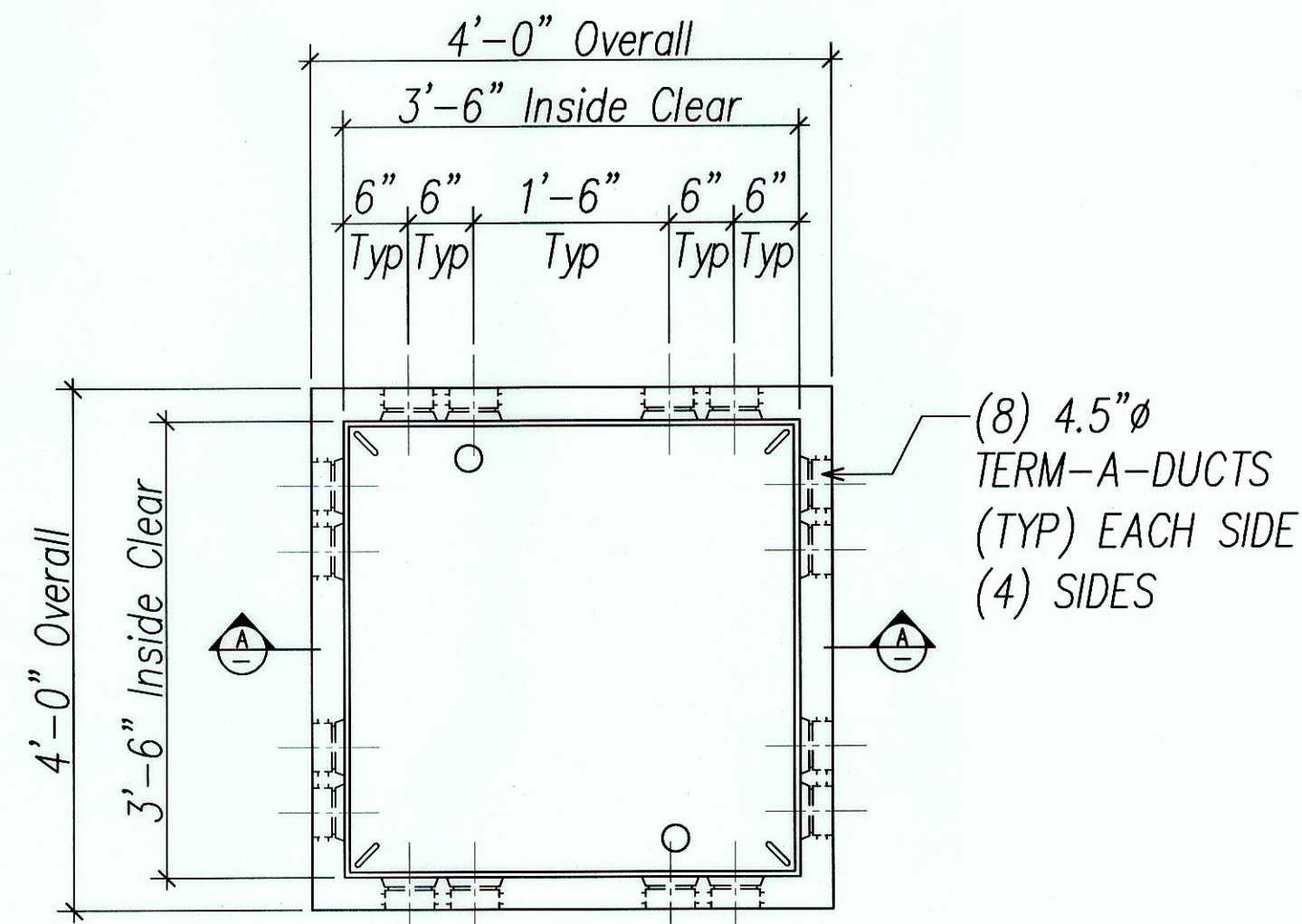
JTS MANHOLE TYPE 38Y-4686-TA SPLICING VAULT DETAILS

NOT TO SCALE

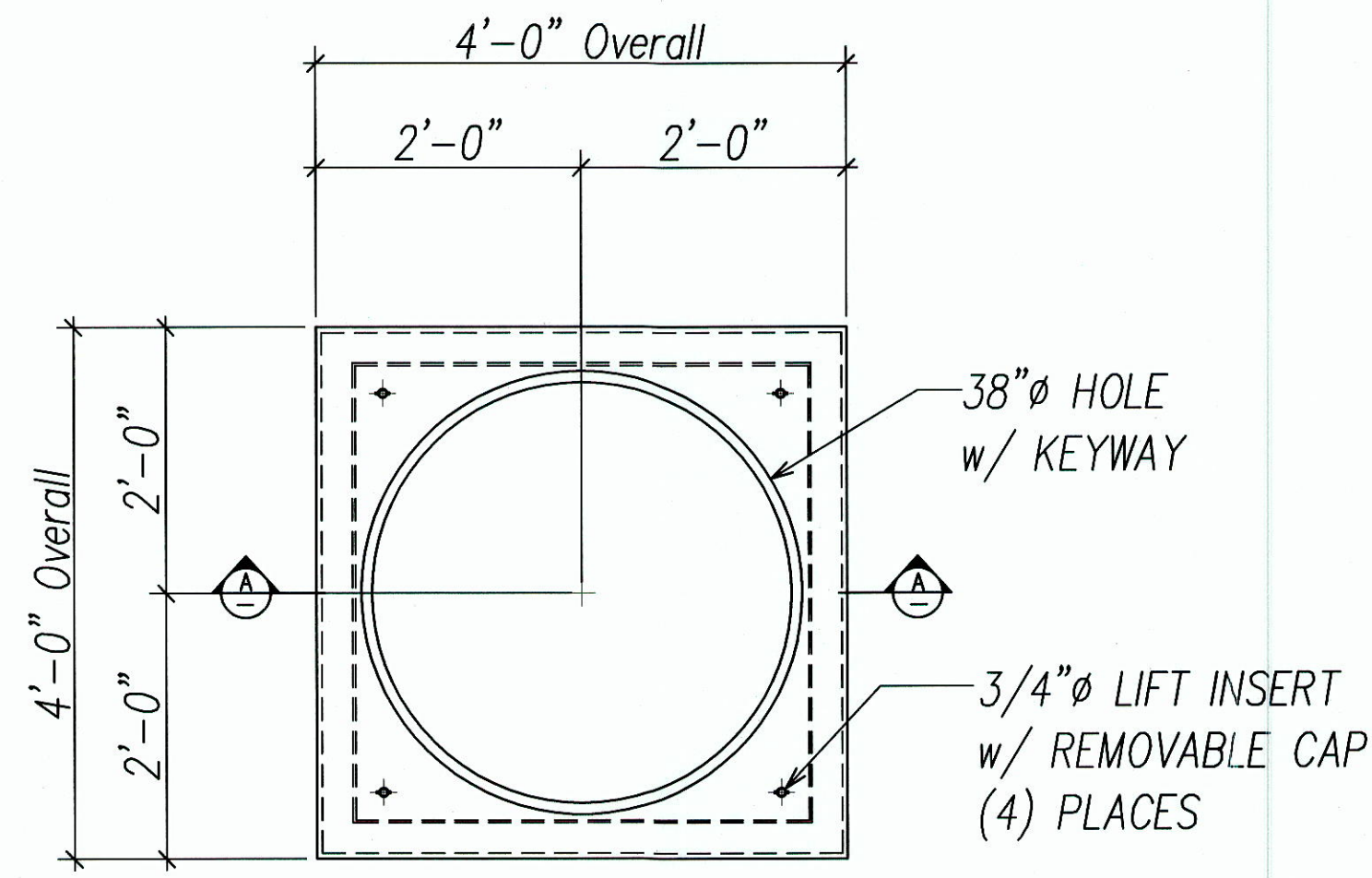


02/09/2010	Added New Sheet (JTS Manhole Details)
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION	
JTS MANHOLE DETAILS I	
Kalaniana'ole Highway Improvements Retaining Wall at Makapuu, Oahu Federal Aid Project No. NH-072-1 (51)	
SCALE: AS NOTED	DATE: APR. 2007
SHEET No. E-184 OF 18 SHEETS	

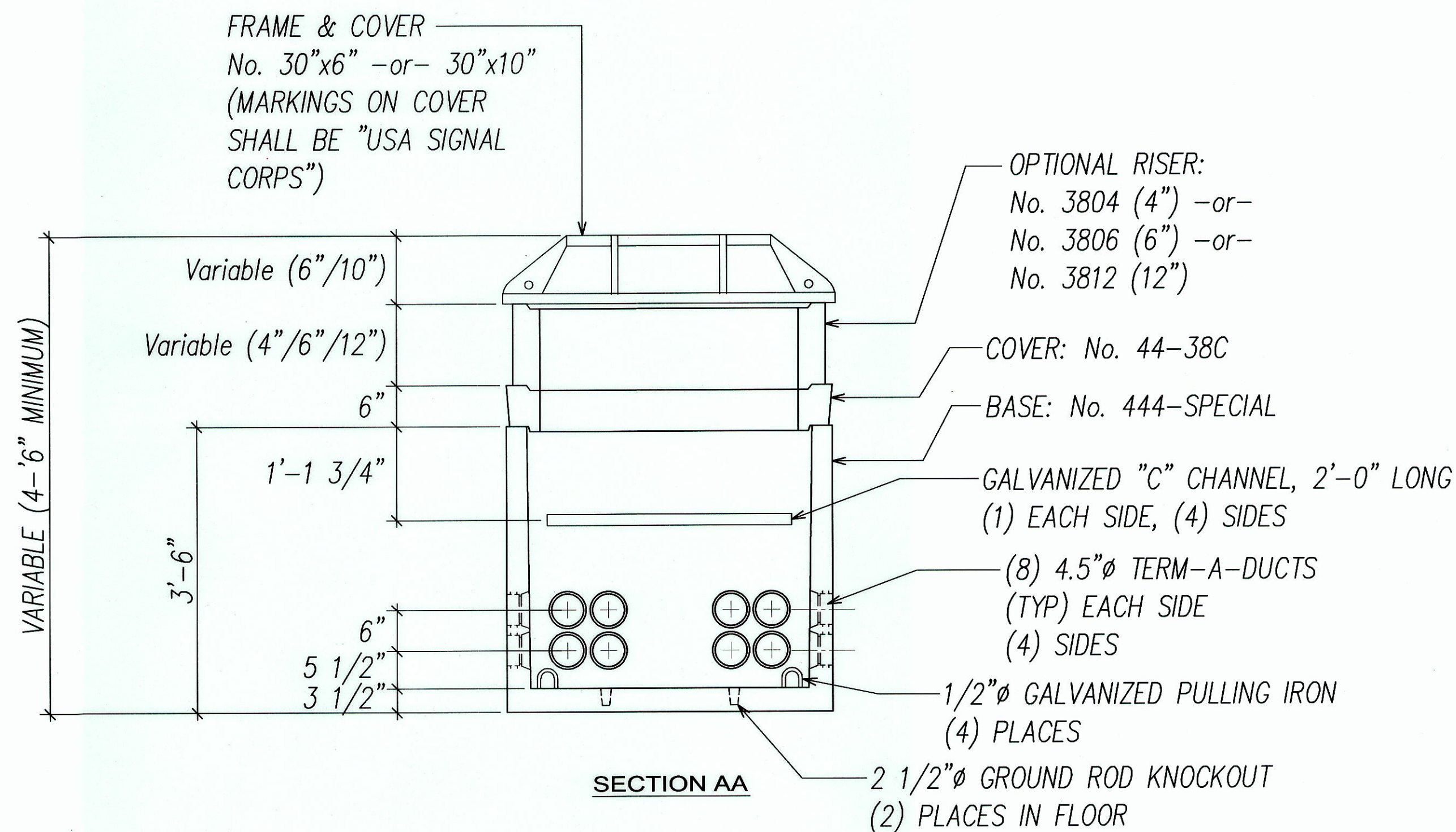
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1 (51)	2007	C.O. 58 S-2	106



PLAN VIEW
SPECIAL BASE SECTION



PLAN VIEW
STANDARD TOP SECTION
(No. 44-38C)

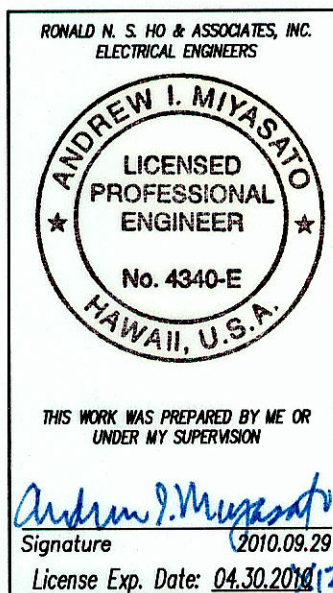


JTS MANHOLE TYPE 444 DETAILS
NOT TO SCALE

STRUCTURAL NOTES

- CONCRETE - 28 DAY COMPRESSIVE STRENGTH $f'_c = 4500$ psi
 - REBAR - ASTM A-615 GRADE 60
 - MESH - ASTM A-185 GRADE 65
 - DESIGN - ACI-318-99 BUILDING CODE
 - LOADS - H-20 TRUCK WHEEL
- ASTM C-857 "MINIMUM STRUCTURAL DESIGN LOADING FOR UNDERGROUND PRECAST CONCRETE UTILITY STRUCTURES"
30% IMPACT FOR LESS THAN 3 FT. SOIL COVER
120 pcf SOIL DENSITY
40 pcf E.F.P. LATERAL SOIL PRESSURE ABOVE WATERTABLE
80 pcf E.F.P. LATERAL SOIL PRESSURE BELOW WATERTABLE
80 psf LIVE LOAD SURCHARGE
TOP OF COVER MAXIMUM 5'-0" BELOW GRADE
WATERTABLE 5'-0" BELOW GRADE FOR DESIGN OF WALLS
- Manufactured by Utility Vault Company or Approved Equal.

02/09/2010	Added New Sheet (JTS Manhole Details)
DATE	REVISION



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

JTS MANHOLE DETAILS II

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

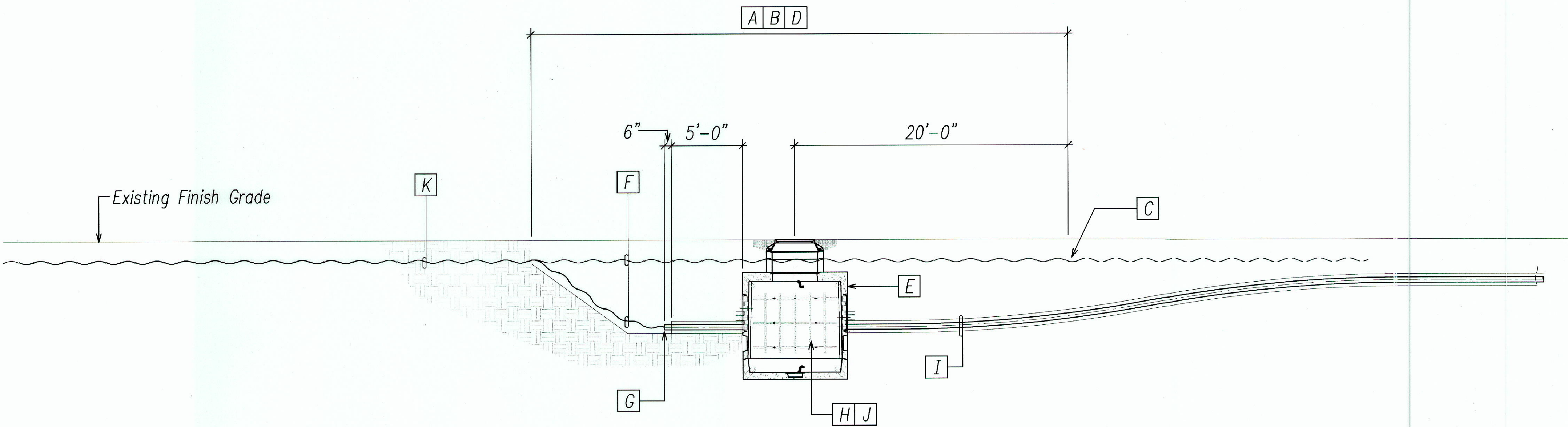
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SHEET No. E-188 OF 18 SHEETS

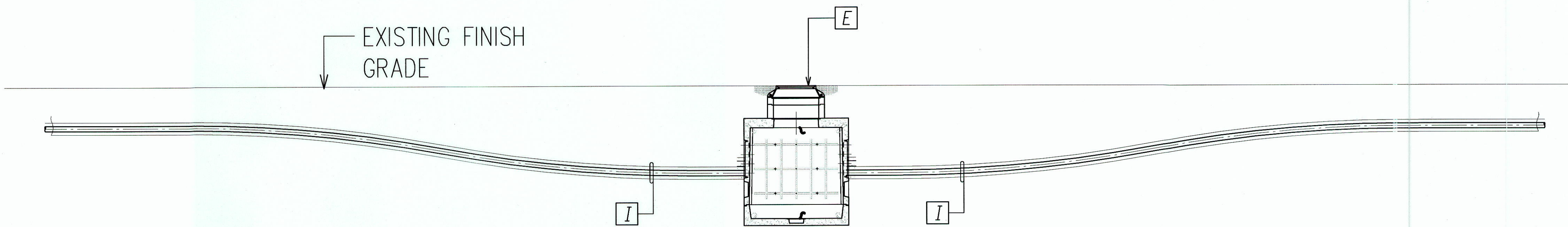
C.O. 58 S-2

SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTED	
No.	

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1 (51)	2007	C.O. 58 S-3	106



TYPICAL DETAIL FOR JTS MANHOLE INSTALLATION AND EXISTING JTS CABLES
Not To Scale



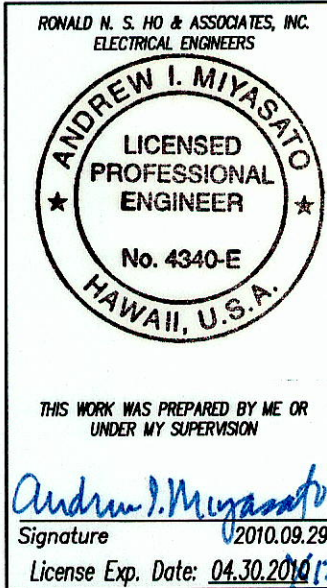
TYPICAL DETAIL FOR INTERMEDIATE JTS MANHOLE INSTALLATION
Not To Scale

PLAN NOTES FOR RECONNECTING EXISTING JTS CABLES TO NEW JTS CABLES

- A** TRENCH EXISTING GRADE TO EXPOSE EXISTING DIRECT BURIED JOINT TRUNKING SYSTEM (JTS) CABLE FOR RELOCATION INTO NEW INTERCEPT TYPE COMMUNICATON MANHOLE.
- B** EXPOSE DIRECT BURIED JTS CABLES.
- C** CUT JTS CABLES.
- D** CAREFULLY PULL BACK EXISTING JTS CABLES.
- E** INSTALL NEW COMMUNICATON MANHOLE AND ASSOCIATED CONCRETE ENCASED DUCTLINES.
- F** INSTALL EXISTING JTS CABLES INTO NEW COMMUNICATION MANHOLE THROUGH NEW CONCRETE ENCASED DUCT.
- G** STUB DUCTS +6" BEYOND CONCRETE ENCASEMENT; PROVIDE DUCT SEAL AFTER EXISTING JTS CABLES INSTALLED AND PROVIDE CAP OVER SPARE DUCT.
- H** COIL EXISTING JTS CABLES WITHIN MANHOLE ON CABLE RACKS.
- I** INSTALL NEW JTS CABLES BETWEEN NEW COMMUNICATIONS MANHOLES, WITH A MINIMUM OF 15FT. SLACK CABLES.
- J** SPLICE EXISTING JTS CABLES TO NEW JTS CABLES TO MAINTAIN EXISTING CIRCUIT CONTINUITY.
- K** EXISTING DIRECT BURIED JTS CABLE TO REMAIN.

02/09/2010	Added New Sheet (JTS Manhole/Ductline Installation Details)
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DATE REVISION



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**TYPICAL DETAILS FOR JTS
MANHOLE INSTALLATION**

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

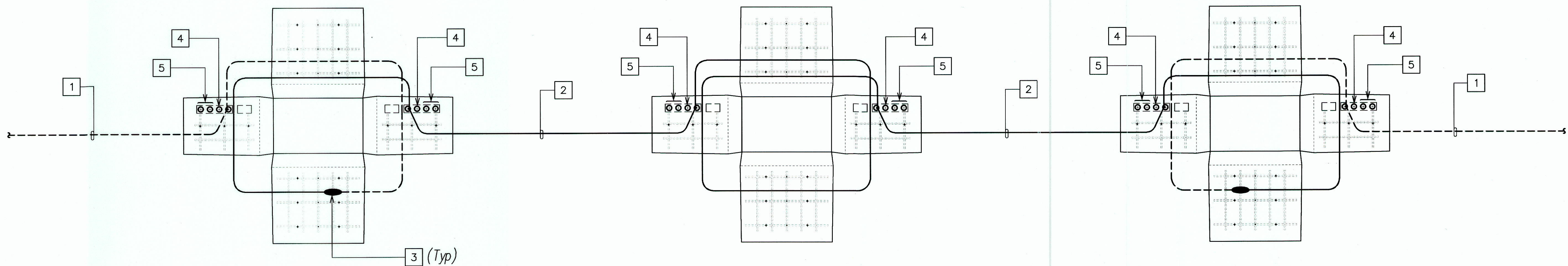
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SHEET No. E-18C OF 18 SHEETS

C.O. 58 S-3

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTED	DRAWN BY	
DESIGNED BY	TRACED BY	
CHECKED BY	QUANTITIES BY	
No.		

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	NH-072-1 (51)	2007	C.O. 58 S-1	106



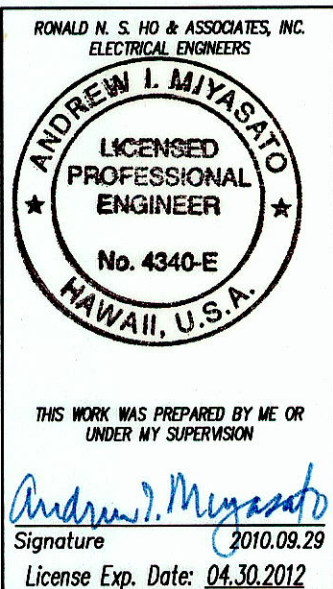
TYPICAL JTS MANHOLES DEVELOPMENT PLAN
No Scale

NOTES:

- 1 ONE (1) EXISTING JTS CABLE, (19 AWG/50 PAIRS COPPER), IN NEW 4" C.
- 2 ONE (1) NEW JTS CABLE (19 AWG/50 PAIRS COPPER, TO MATCH EXISTING JTS CABLES), IN NEW 4" C.
- 3 NEW CABLE SPLICE FOR SPLICING EXISTING JTS CABLE TO NEW JTS CABLE.
- 4 SPARE 4" C, CAPPED.
- 5 SPARE 4" END BELLS, CAPPED.

SURVEY PLOTTED BY	DATE
DRAWN BY	
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CHECKED BY	
NOTED BY	
NO.	

02/09/2010	Added New Sheet (JTS Manhole Development Details)
DATE	REVISION



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**TYPICAL JTS MANHOLES
DEVELOPMENT PLAN**

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

SCALE: AS NOTED DATE: APR. 2007

SHEET No. E-180 OF 18 SHEETS

C.O. 58 S-4