

ELECTRICAL SYMBOL LIST					
SYMBOL		DESCRIPTION	SYMBOL		DESCRIPTION
EXISTING	NEW		EXISTING	NEW	
		Street Light Standard, Single Luminaire Arm, See Schedule, Sheet E-11			Power Transformer
		Underpass Roadway Lighting Luminaire			Circuit Breaker
		Wall Mounted Roadway Lighting Luminaire			Fuse
					Meter Socket And Kilowatt Hour Meter
					Indicates Seperable Connector Feature For Fuse Assembly
					Normally Open (no) Contact
		Junction Box, Wall Mounted			Splice / Tap
		Junction Box, Size As Noted On Plans			
		Pad Mounted Transformer			
		Street Light Pullbox			Denotes Demolition/removal
		Utility Pole, Pole #16 Indicated			Detail Indicator: Top Half Denotes Detail Number, Left Denotes Sheet On Which Detail Shown
		Underground Ductline And Wiring			Duct Indicator, See Schedule, Sheet
		Conduit And Wiring Concealed In Concrete Barrier			
		Overhead Wiring			Note Indicator
		Exposed Conduit And Wiring			
		Liquid-Tight Flexible Conduit			Ground
					Hawaiian Electric Company
					Denotes Not In Contract
					Weatherproof

1. LIGHTING REQUIRED UNTIL NEW LIGHTING SYSTEM IS OPERATIONAL.
2. PROVIDE TEMPORARY WIRING TO ENERGIZE EXISTING AND NEW LIGHTS AS REQUIRED TO PROVIDE LIGHTING COVERAGE.
3. FOR SCHEDULE PHASING AND TEMPORARY WIRING, PLEASE SUBMIT FOR APPROVAL.

<u>LEGEND</u>		<u>DESCRIPTION</u>
1	121+93	← Station Number
2	MA-2, CKT #3, AB	← Street Light Pole Number, Circuit Number, Phase (verify Pole No. With D.O.T.)
3	14'	← Pole Clear Setback From Edge Of Pavement
4	15'	← Luminaire Arm Span In Feet
5	TB	← Pole Base Mounting Type
6	40'	← Luminaire Mounting Height Above Pavement



VINCENT K. MIYAGAWA
★
LICENSED
PROFESSIONAL
ENGINEER
★
No. 4534-E
HAWAII, U.S.A.

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PROJECT ENGINEER for ECS, Inc.

APRIL 30, 2004
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ELECTRICAL SYMBOL LIST

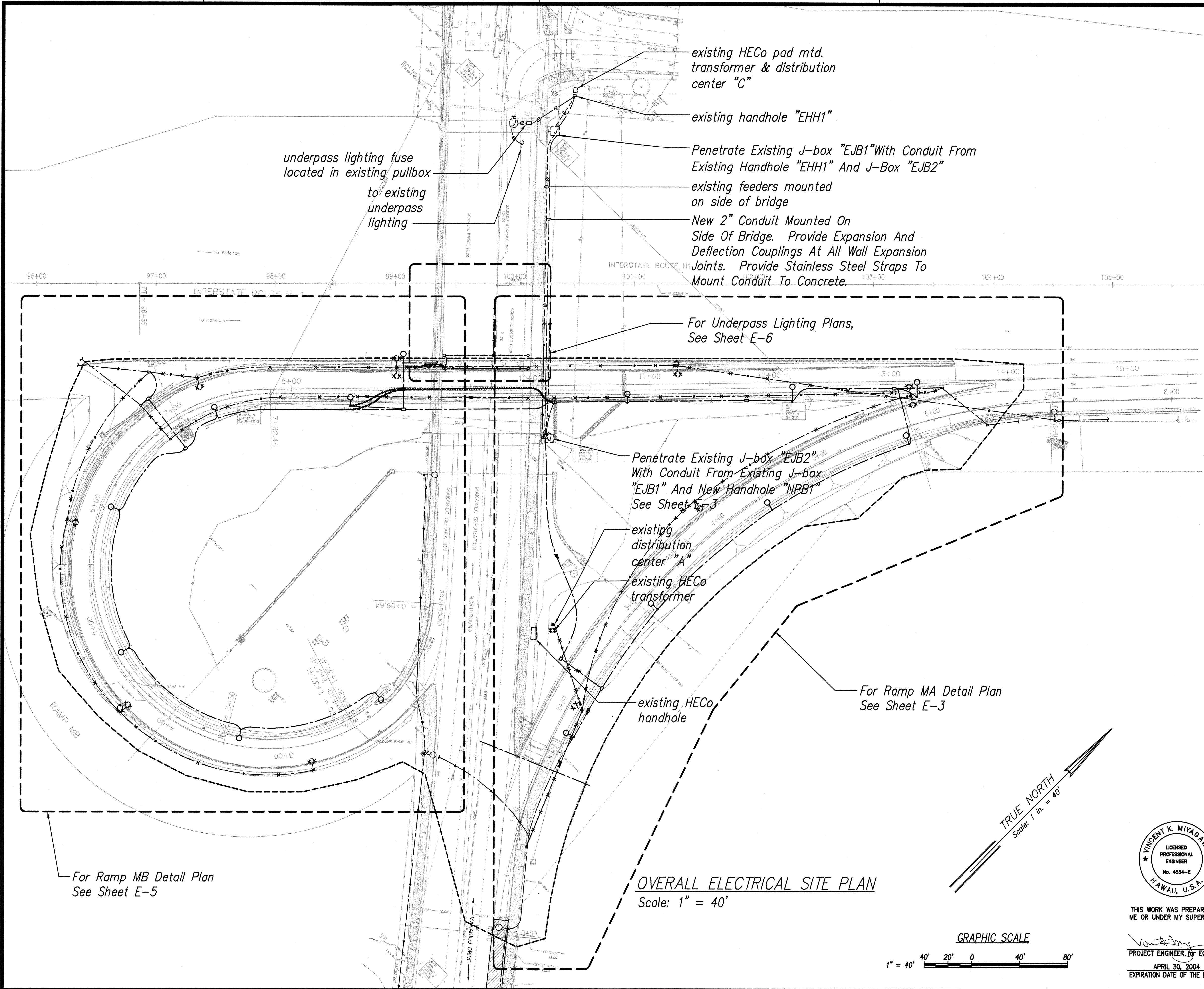
INTERSTATE ROUTE H-1 REHABILITATION
Vicinity Of Makakilo Interchange
Project No. H1A-01-02M

Scale: No Scale Date: April 2003

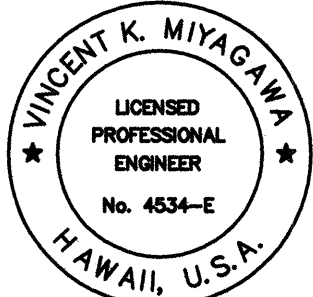
SHEET No. E-1 OF 16 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1A-01-02M	2003	74	88

LEGEND FOR AS-BUILT POSTING	
	deleted work
	deleted text and numerals
Roadway	Text for as-built posting
8/15/05	As Built
DATE	DESCRIPTION



SURVEY PLOTTED BY	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	



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APRIL 30, 2004

EXPIRATION DATE OF THE LICENSE

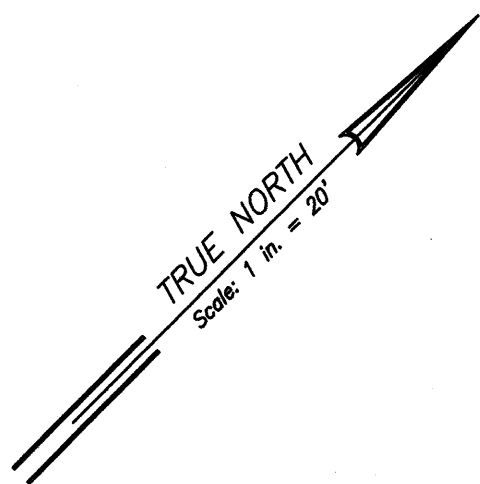
DATE	REV.	DESCRIPTION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION OVERALL ELECTRICAL SITE PLAN INTERSTATE ROUTE H-1 REHABILITATION Vicinity Of Makakilo Interchange Project No. H1A-01-02M Scale: As Noted Date: April 2003		

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1A-01-02M	2003	C.O.77	88

LEGEND FOR AS-BUILT POSTING	
	deleted work
	deleted text and numerals
Roadway	Text for as-built posting
8/15/05	As Built
DATE	DESCRIPTION

NOTES:

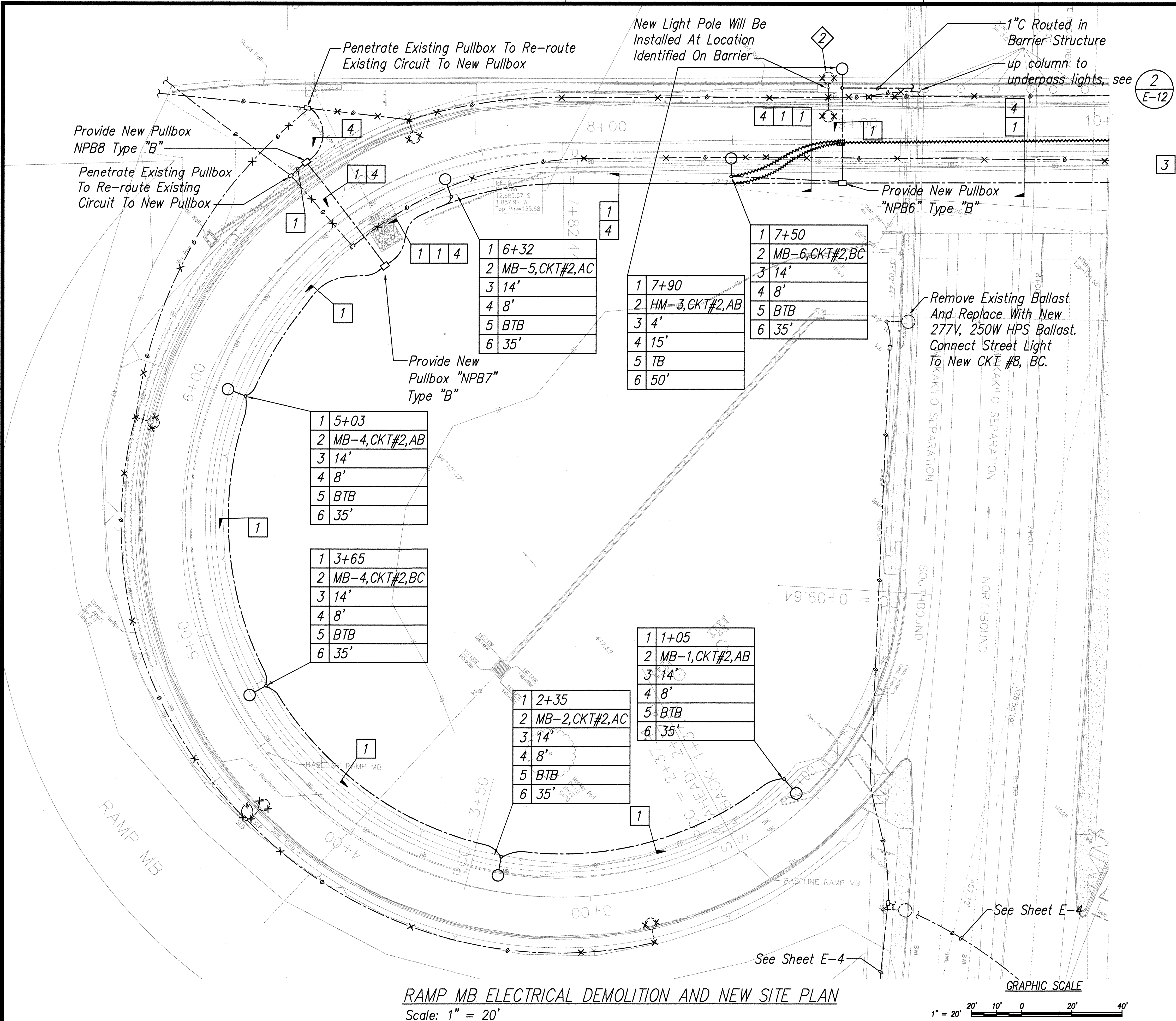
- Handholes Identified To Be Demolished Shall Be Demolished To 18" Below Grade. Backfill To Match Existing Grade.
- Salvage Existing Type IV Distribution Luminaires Located On 50' Poles. Clean Lenses And Provide New Lamps. Luminaires To Be Reinstalled On New 50' Poles. New 50' Poles Have Single Bracket Arm, Select Luminaires That Are In Best Condition.
- For Conduits Identified To Be Demolished, Remove All Conductors And Abandon Conduits In Place.



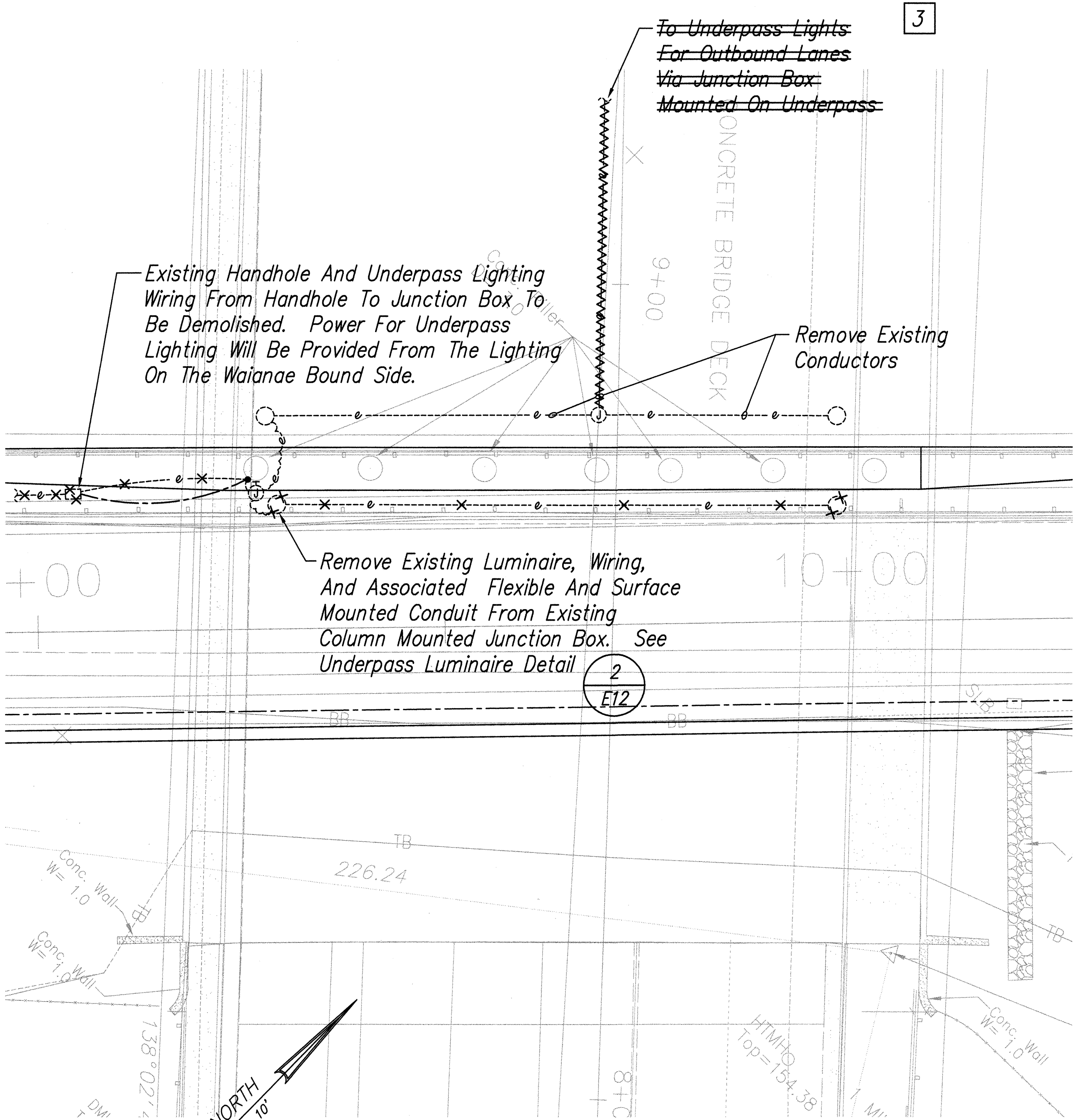
9/01/04	3	Revised Underpass Lighting
DATE	REV.	DESCRIPTION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION RAMP MB ELECTRICAL DEMOLITION AND NEW SITE PLAN INTERSTATE ROUTE H-1 REHABILITATION Vicinity Of Makakilo Interchange Project No. H1A-01-02M Scale: 1" = 20'-0" Date: April 2003		
SHEET No. E-5 OF 16 SHEETS		



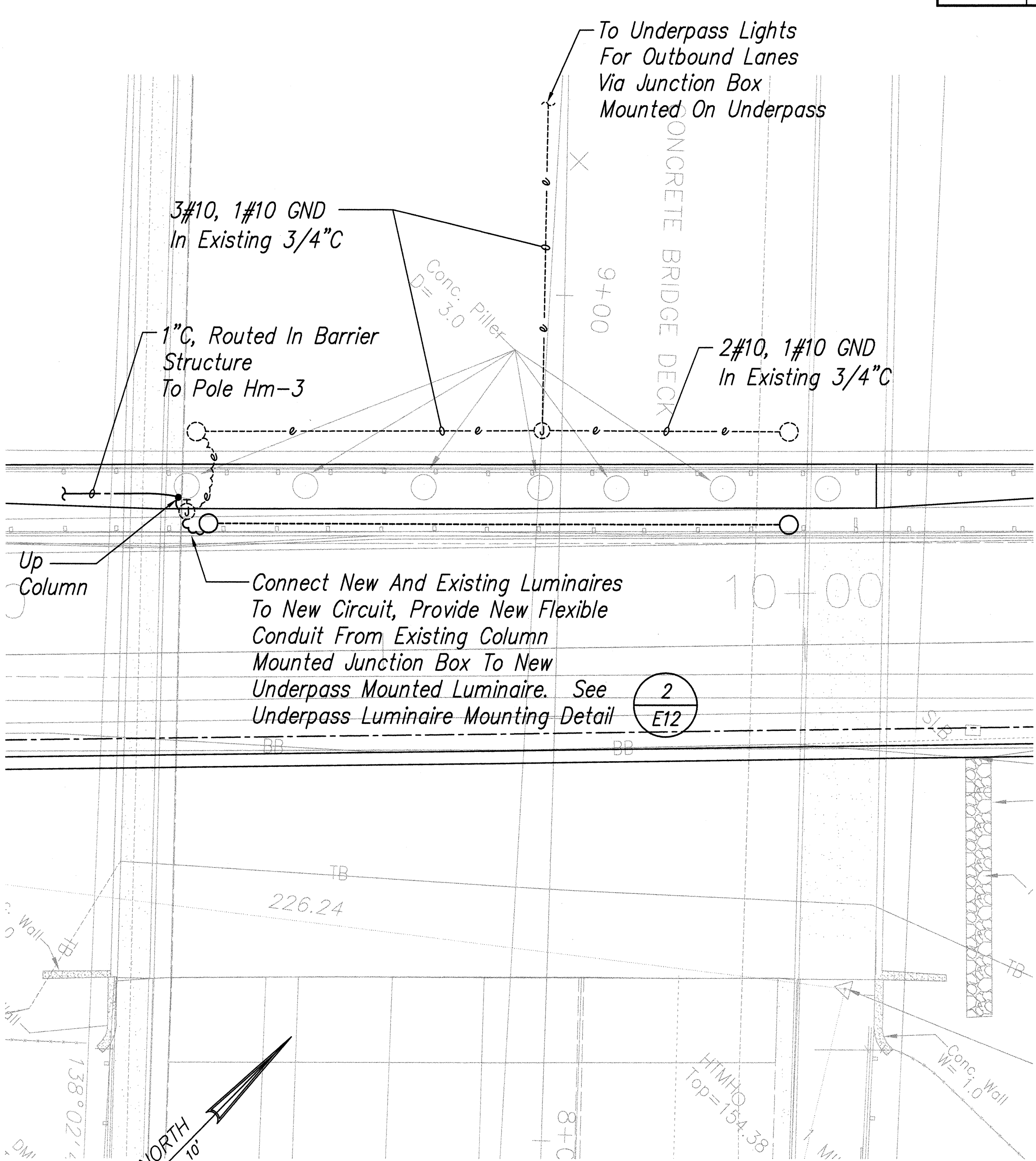
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APRIL 30, 2004
EXPIRATION DATE OF THE LICENSE



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1A-01-02M	2003	C.O.78	88

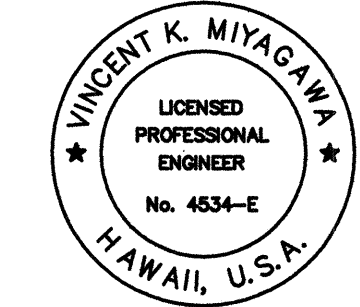
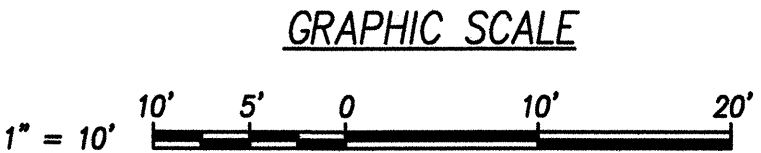


UNDERPASS LIGHTING DEMOLITION PLAN
Scale: 1" = 10'



NEW UNDERPASS LIGHTING PLAN
Scale: 1" = 10'

LEGEND FOR AS-BUILT POSTING	
	deleted work
	deleted text and numerals
	Text for as-built posting
DATE	DESCRIPTION
8/15/05	As Built

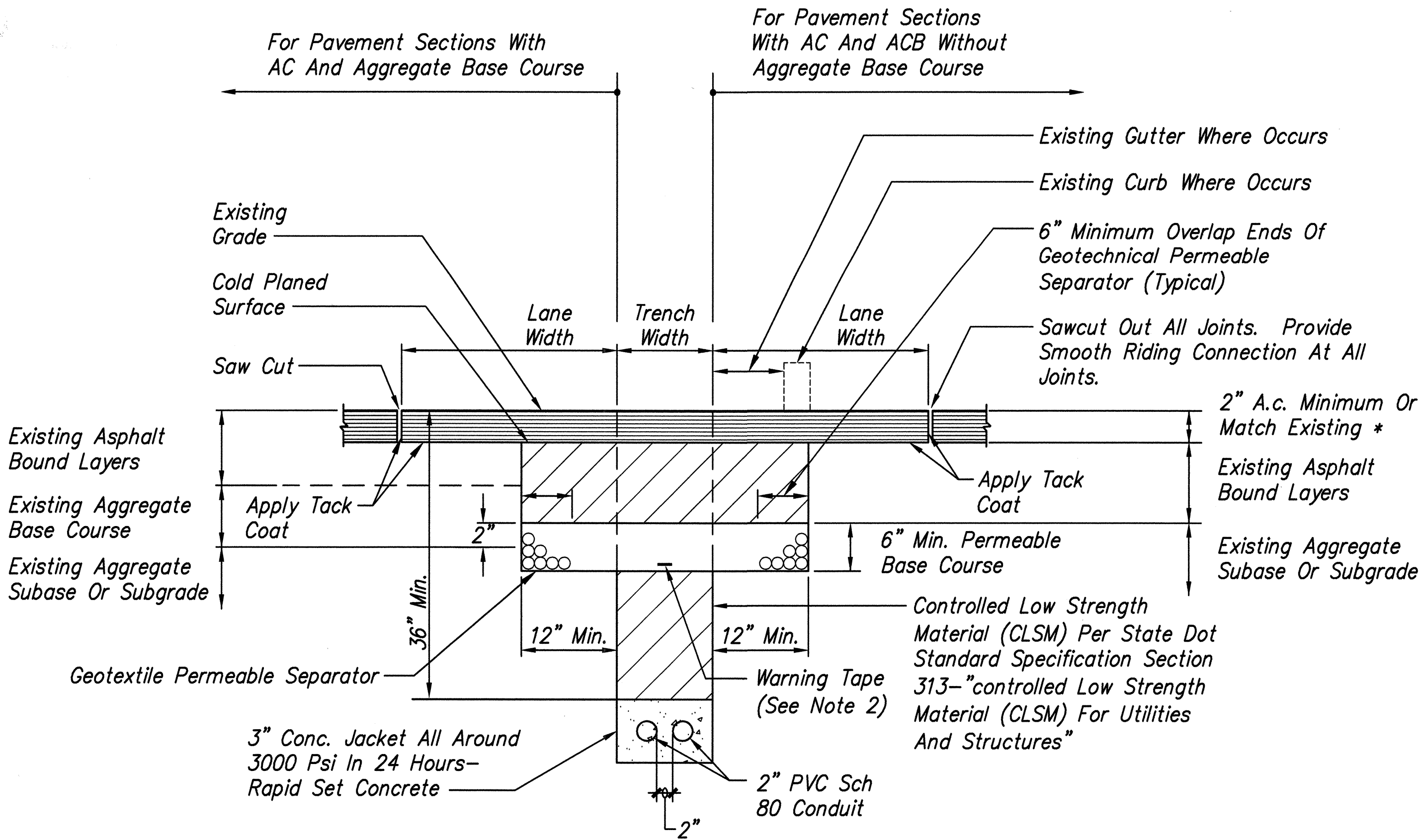


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APRIL 30, 2004
EXPIRATION DATE OF THE LICENSE

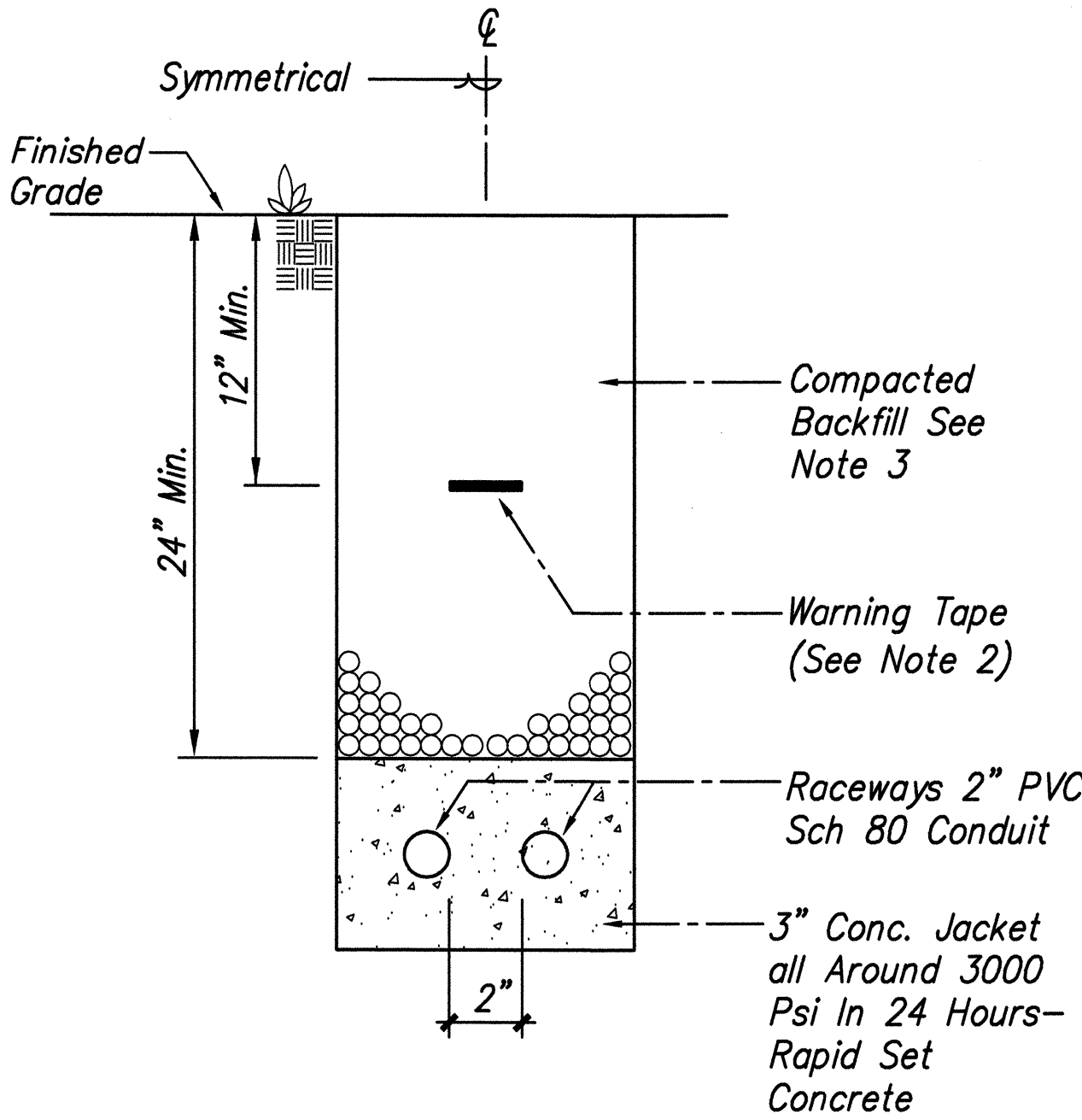
9/01/04	3	Revised Underpass Lighting
DATE	REV.	DESCRIPTION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION UNDERPASS LIGHTING DEMOLITION & NEW PLANS INTERSTATE ROUTE H-1 REHABILITATION Vicinity Of Makakilo Interchange Project No. H1A-01-02M Scale: 1" = 10'-0" Date: April 2003		
SHEET No. E-6 OF 16 SHEETS		

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

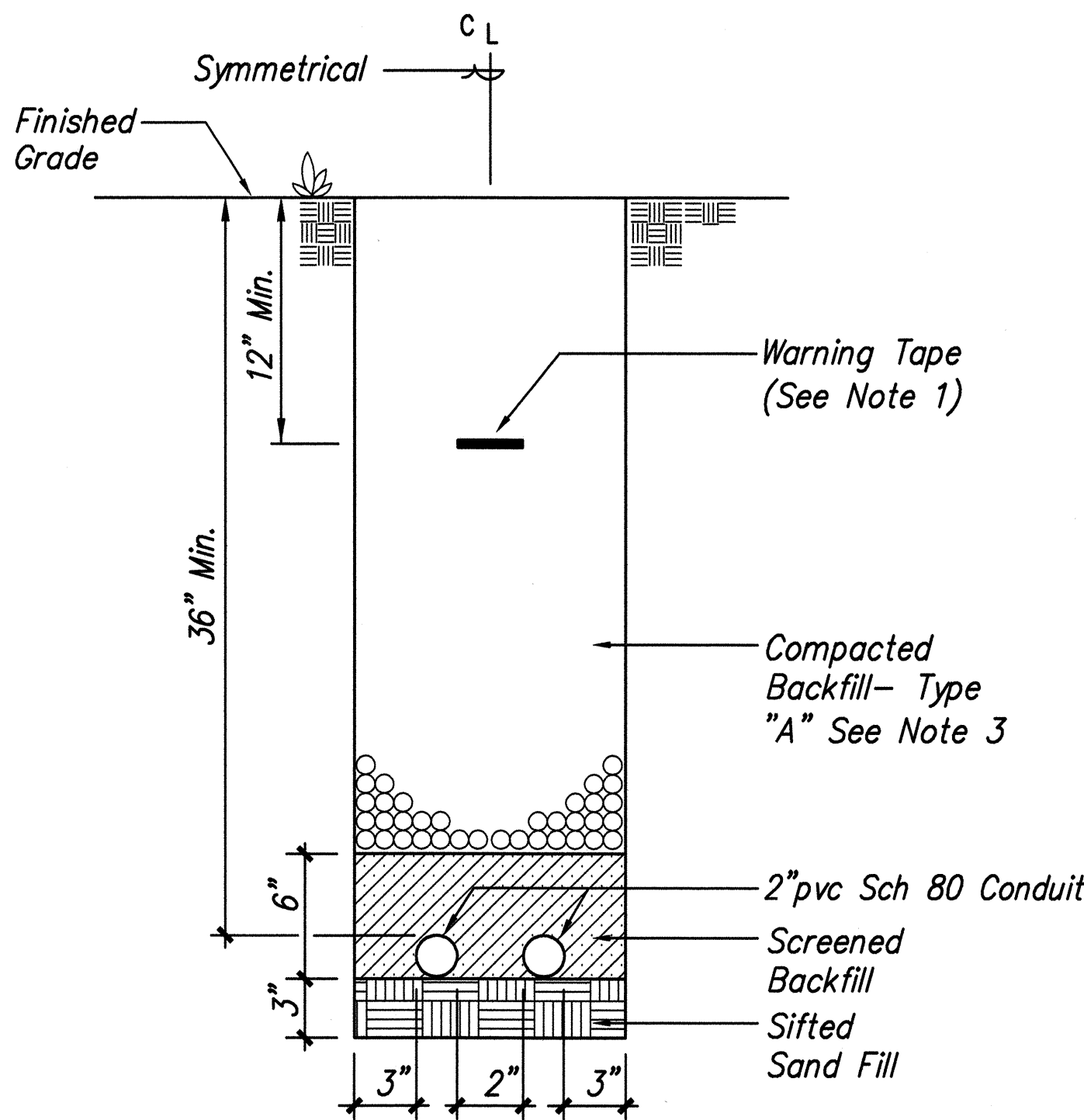
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1A-01-02M	2003	79	88



1 DUCT DETAIL – CONCRETE
E-7 ENCASED (ROADWAY AREAS)
Not To Scale



2 DUCT DETAIL – CONCRETE
E-7 ENCASED (NON ROADWAY AREAS)
Not To Scale



3 DUCT DETAIL
E-7 DIRECT BURIED
Not To Scale

NOTES:

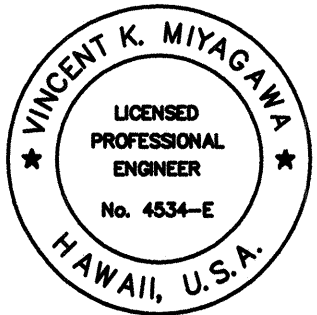
1. Tack Coat Faces Of Existing Ashalt Bound Materials Prior To Filling Excavation With New Asphalt Bound Materials.
2. 8 Mil Thick Red Colored Plastic Warning Tape. 3" Wide With Continuous Metallic Backing And Corrosion Resistant Foil Core Inscribed With: "Caution – Electrical Line Buried Below" In Black Lettering, Repeated At 36" Intervals.
3. Remove Existing Conductors From Existing Conduit. Pull Wire Brush, Swab And Mandrel Through Conduit. Existing Conduit Shall Be Free Of Debris And Obstructions Prior To Pulling New Conductors.
4. Type "A" Backfill: Beach, Sand, Earth Or Earth And Gravel Used. The Maximum Rock Size Shall Be 1" And The Mixture Shall Contain Not More Than 50% By Volume Of Rock Particles.

DUCT SCHEDULE	
NO.	DESCRIPTION
1	2" PVC Schedule 80, Concrete Encased, Ckt #2
2	2" PVC Schedule 80, Concrete Encased, Ckt #5
3	2" PVC Schedule 80, Concrete Encased, Ckt #6
4	2" PVC Schedule 80, Concrete Encased, Ckt #8

NOTE:

Duct Sections Are Generic. See Site Plan For Actual Number And Size Of Ducts.

SURVEY PLANNED BY	DATE
DRAWN BY	
TRACED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	



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APRIL 30, 2004
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

DUCT DETAILS

INTERSTATE ROUTE H-1 REHABILITATION
Vicinity Of Makakilo Interchange
Project No. H1A-01-02M

Scale: None Date: April 2003

SHEET No. E-7 OF 16 SHEETS

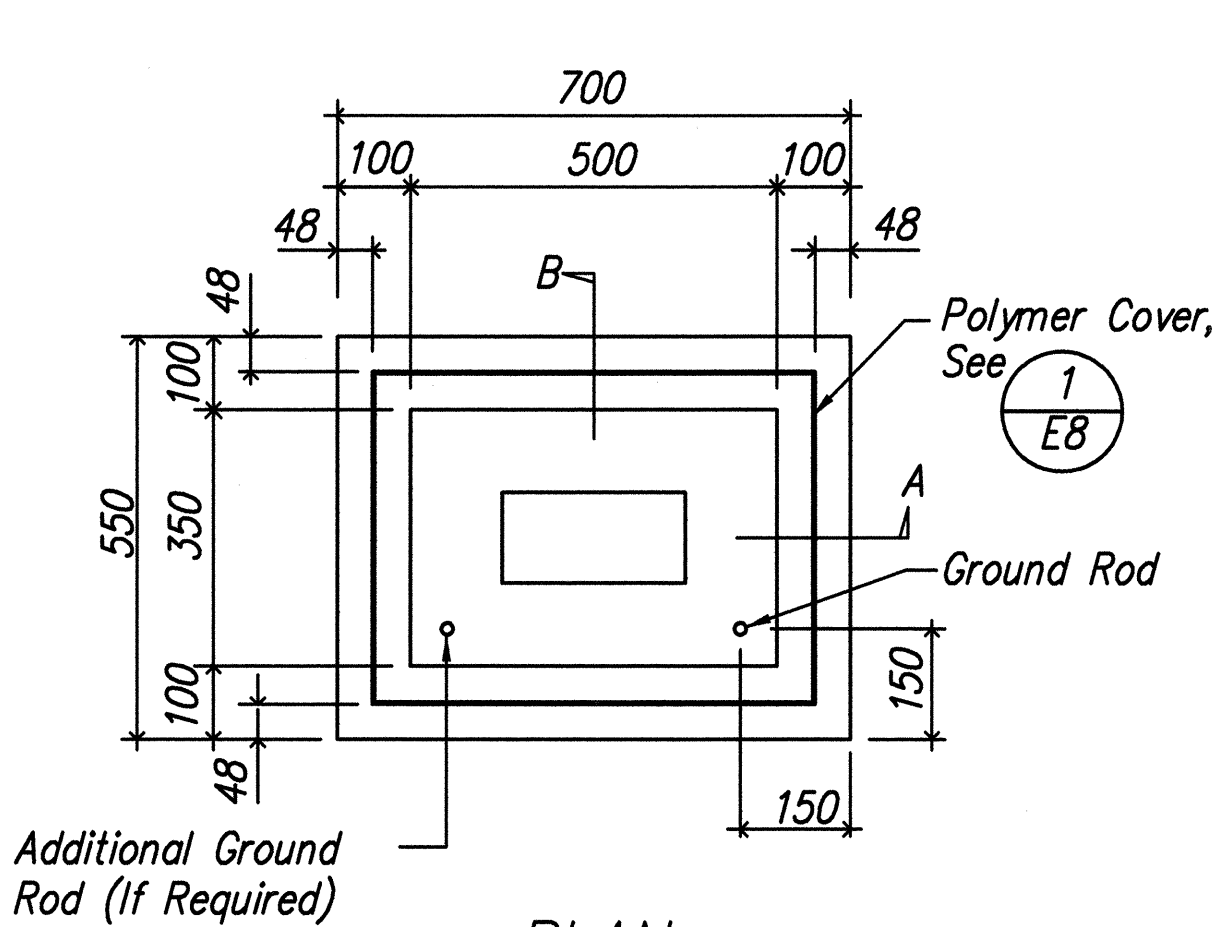
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1A-01-02M	2003	80	88

GENERAL PULLBOX NOTES:

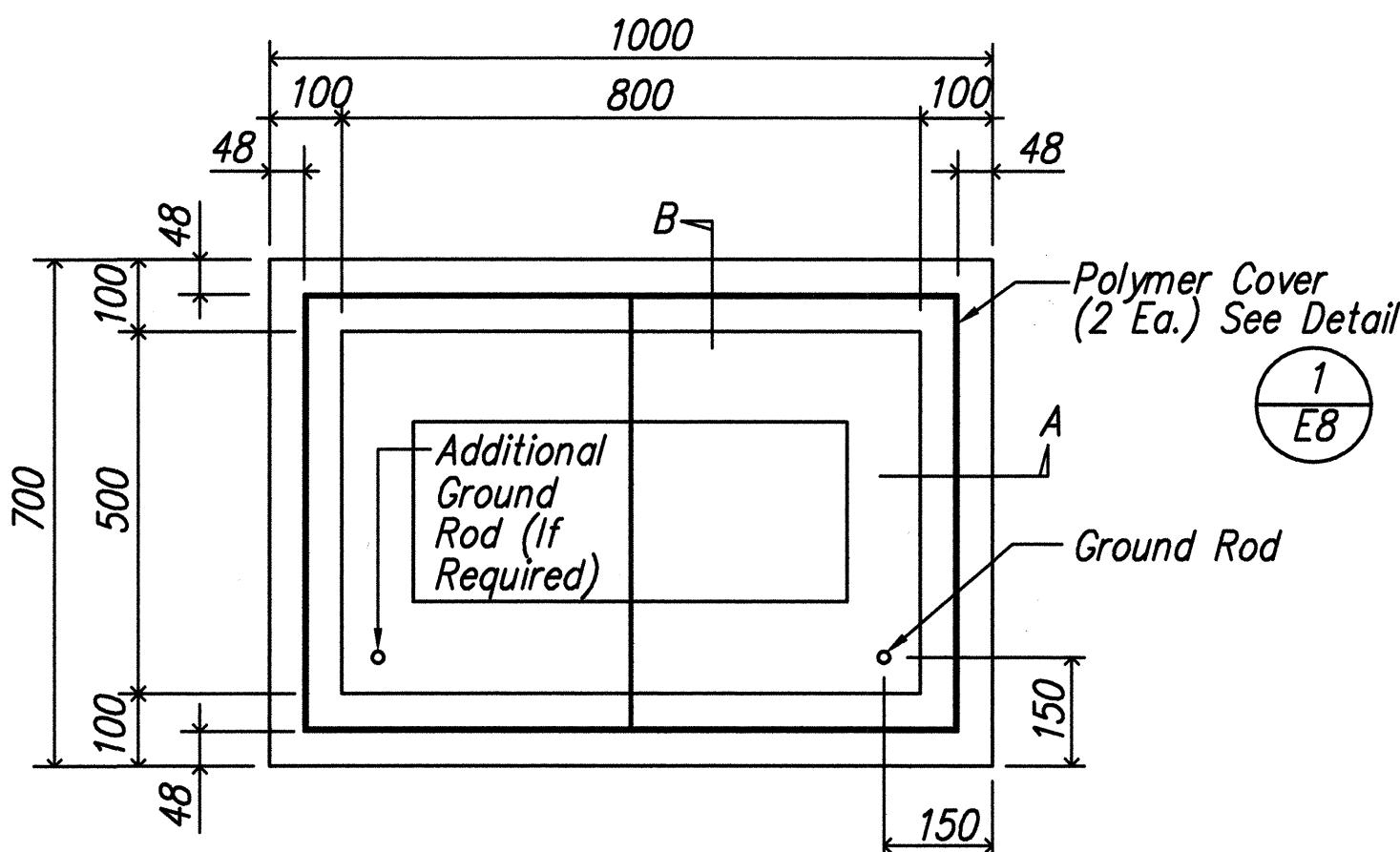
- Provide a minimum of one 19Ø x 3.0m copperclad ground rod in each pullbox. When directed by the traffic signal inspector/engineer, install additional ground rods. Cost of ground rods shall be incidental to the pullboxes.
- All pre-cast concrete pullboxes shall be manufactured in two pieces.
- The pullbox with cover shall be capable of supporting an MS 18 loading.
- The maximum weight of the pullbox cover shall not exceed 27 kilograms.
- The openings for the conduits on all pullboxes shall be pre-cast concrete knockouts.
- After installing the conduits in the openings of the pullboxes, the contractor shall fill the excess opening in the pre-cast knockouts with concrete mortar.
- Prior to installing the pullboxes, the contractor shall level the bottom of the trench and achieve a minimum of 95% relative compaction of the bottom of the trench.
- All concrete shall be class a (25MPa, min.)
- Rebars shall be grade 300 and all lapped splices shall be 360mm minimum.
- The #57 or #67 size aggregate shall conform to latest version of AASHTO M43 (ASTM D 448).
- Type "C" pullbox shall be installed in a location protected from vehicular traffic (i.e. Raised sidewalks, behind A.C. Curbs, traffic signal standards or pipe guards).

NOTE:

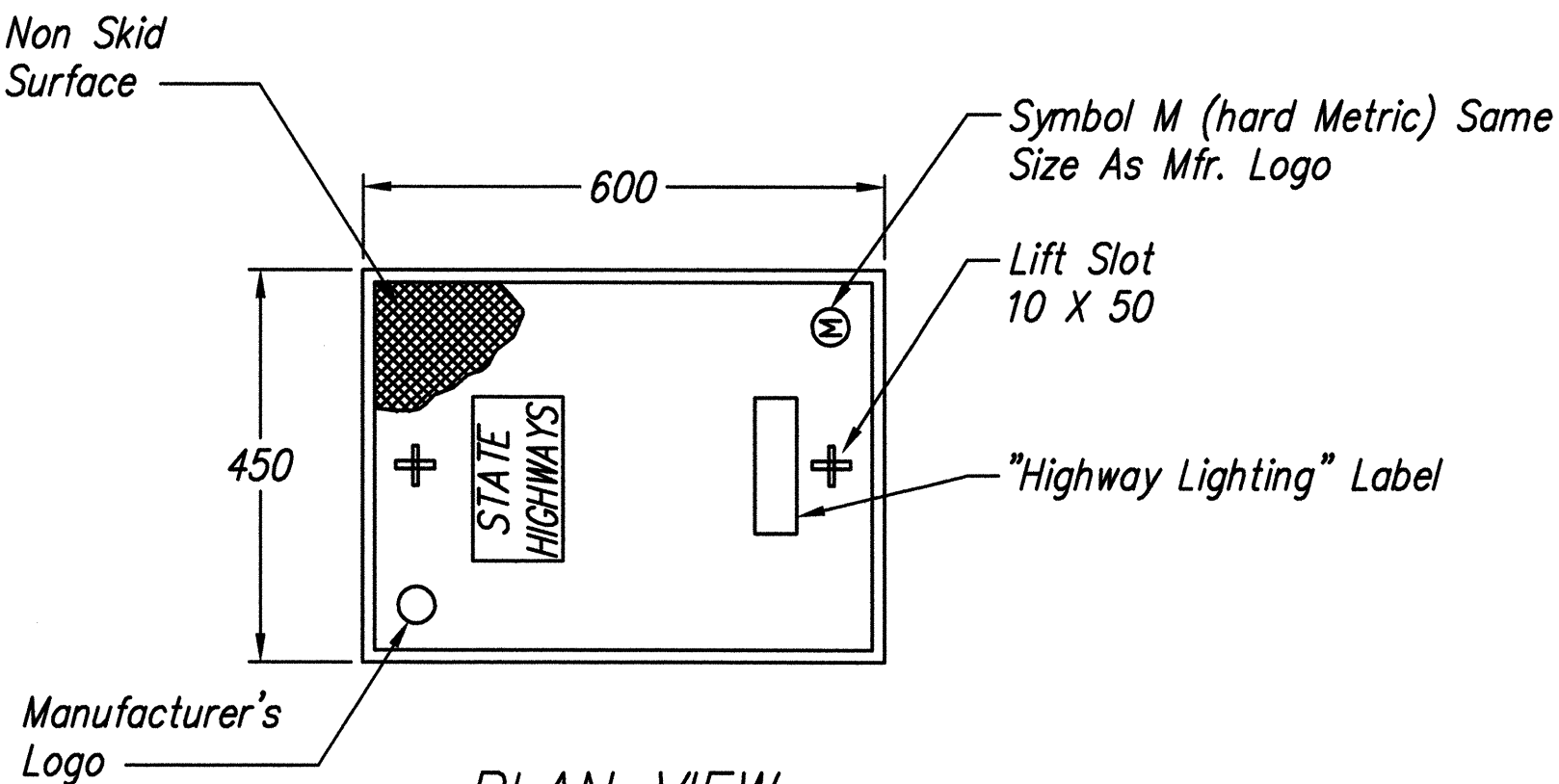
- All dimensions are in millimeters unless otherwise shown.
1 millimeter = 0.039 inch



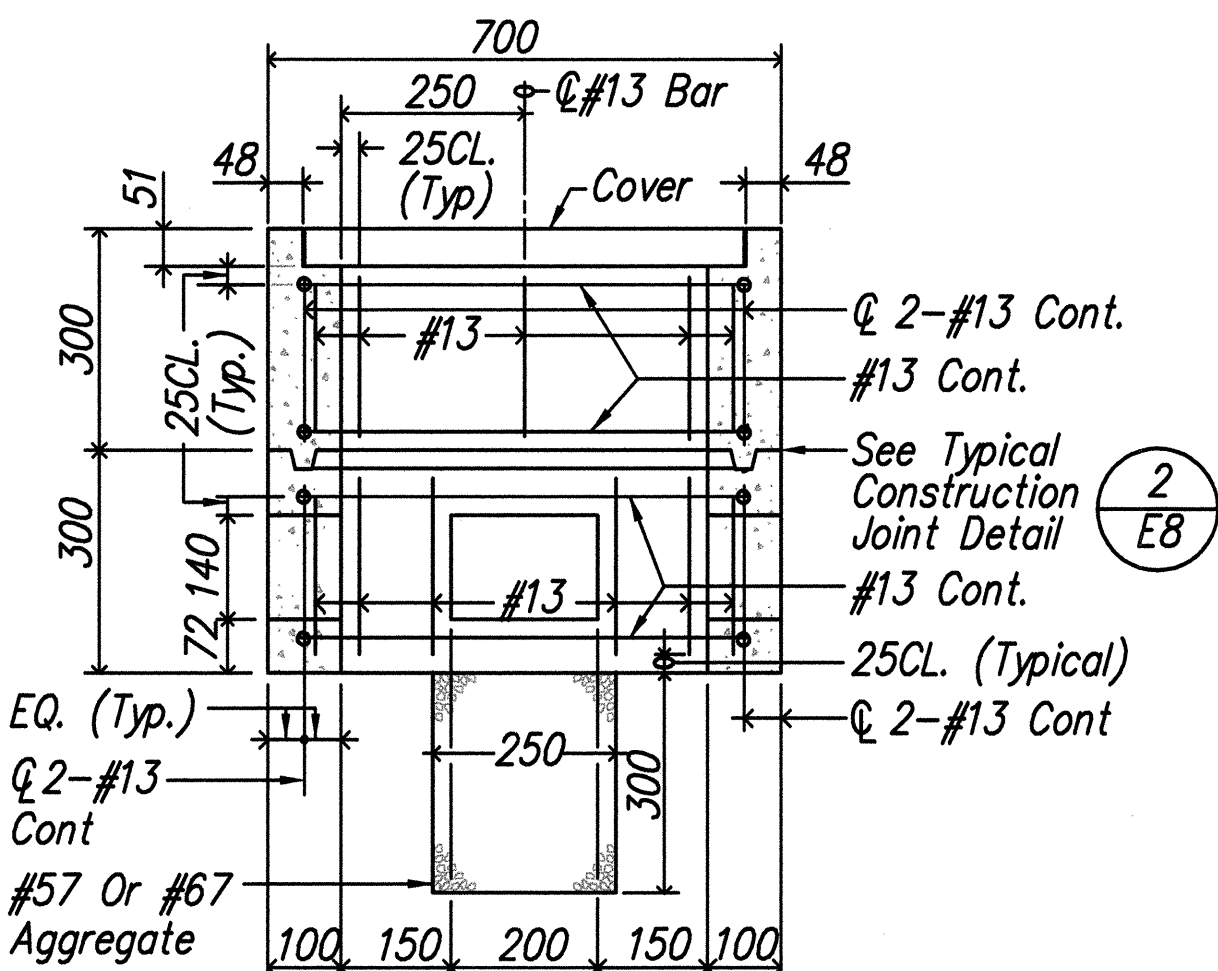
PLAN



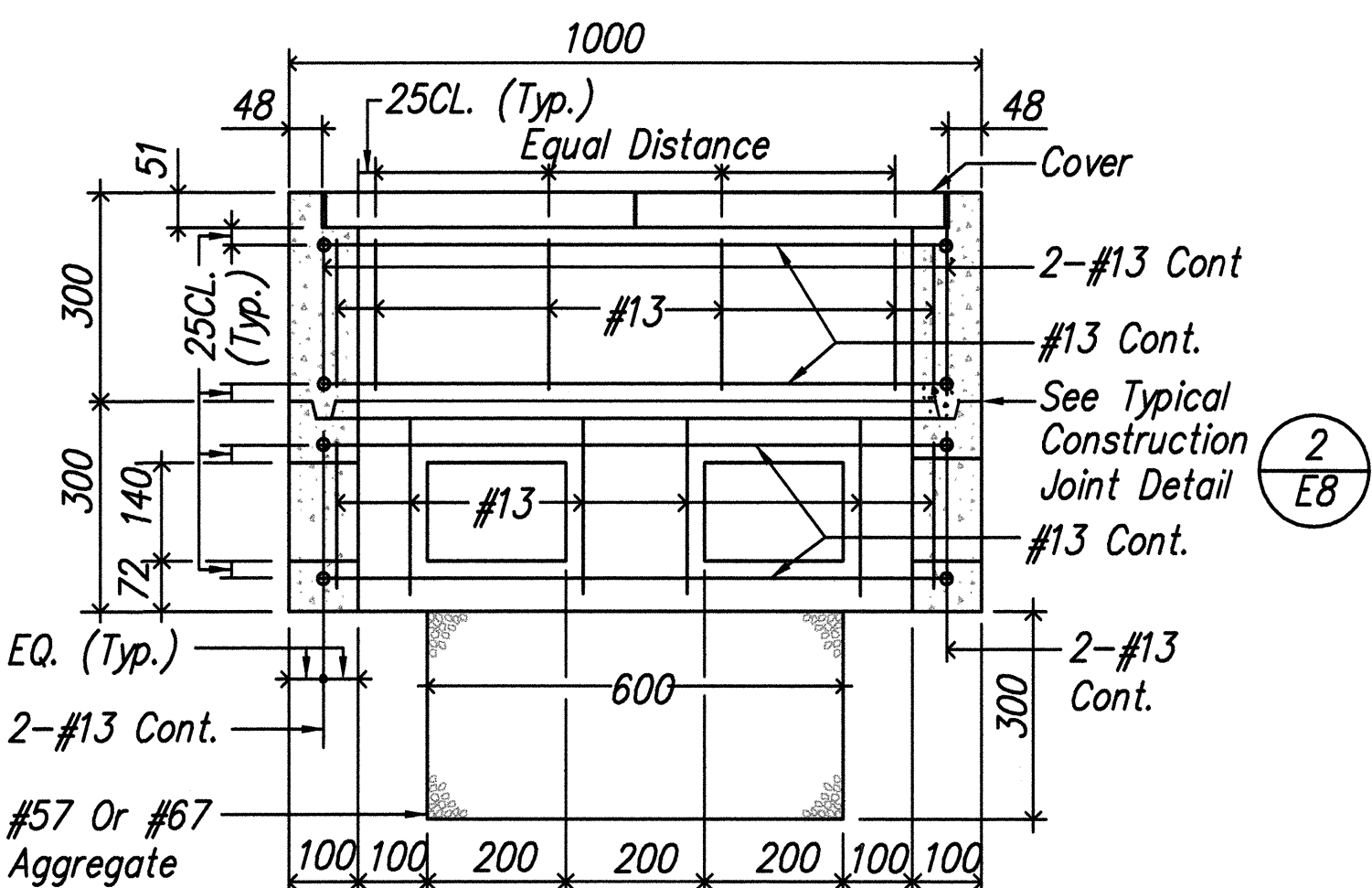
PLAN



PLAN VIEW



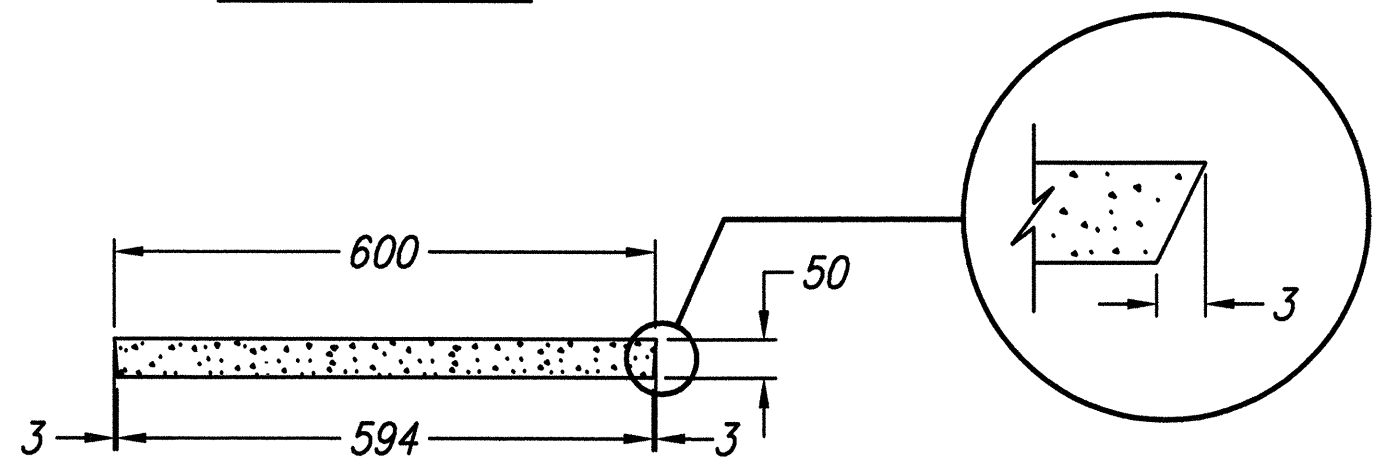
SECTION A-A



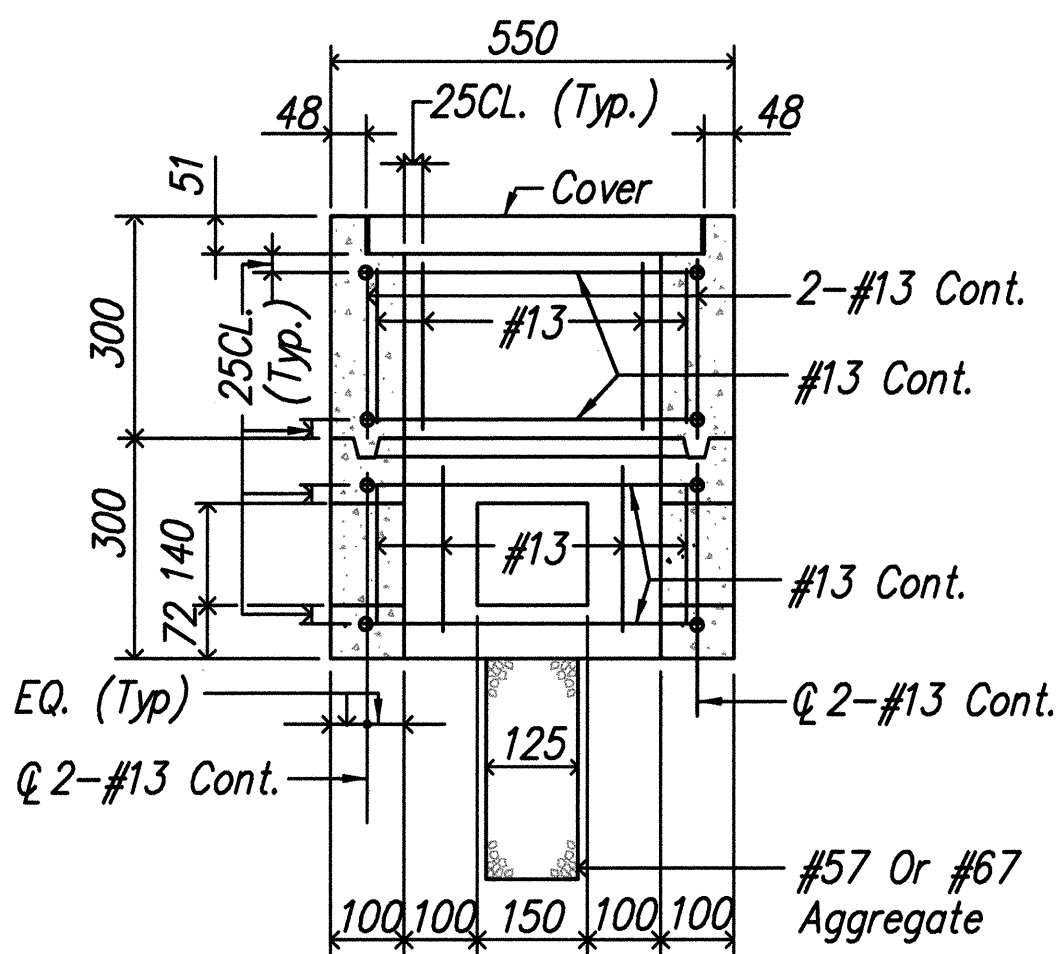
SECTION A-A

1 POLYMER CONCRETE COVER

Not To Scale



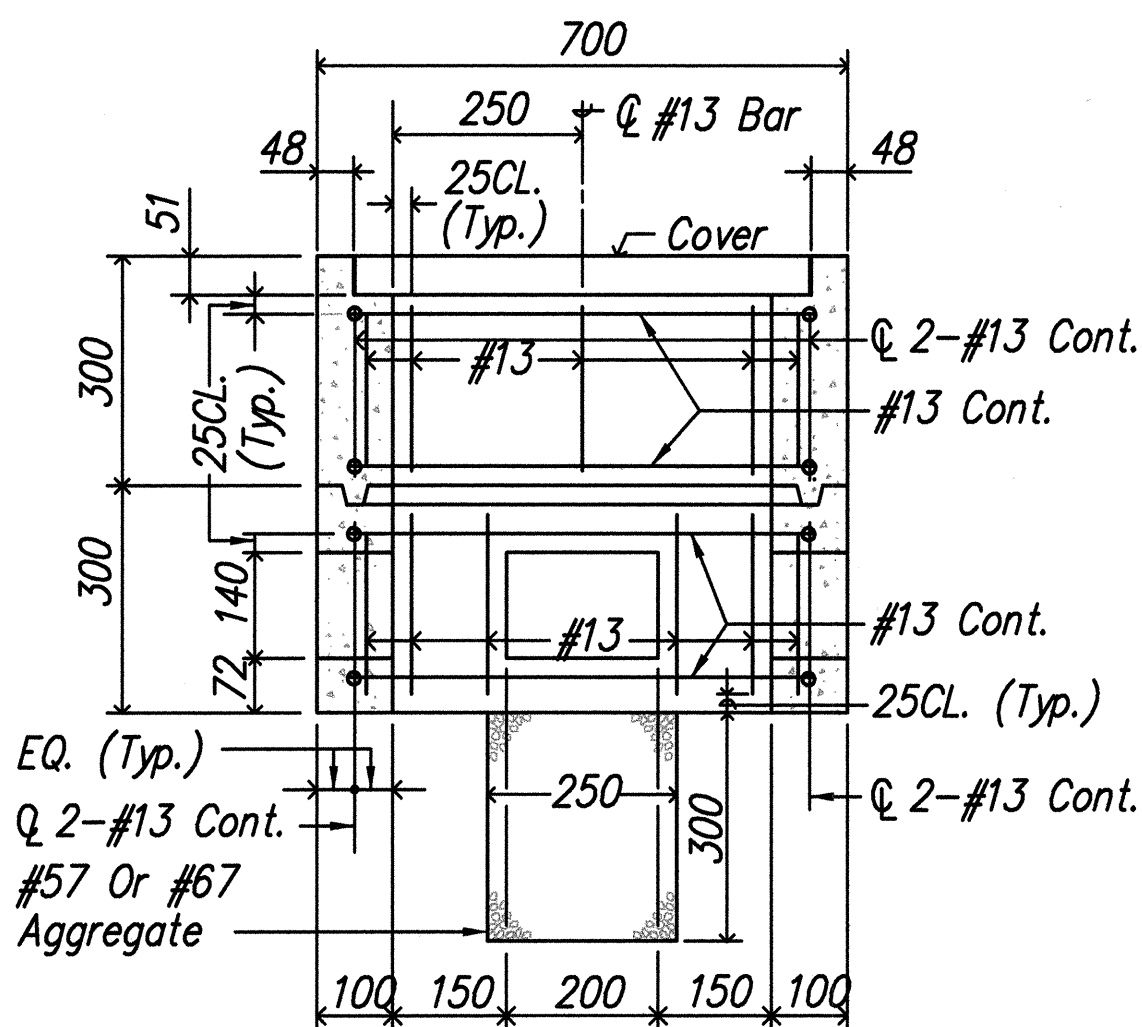
ELEVATION



SECTION B-B

TYPE "A" PULLBOX

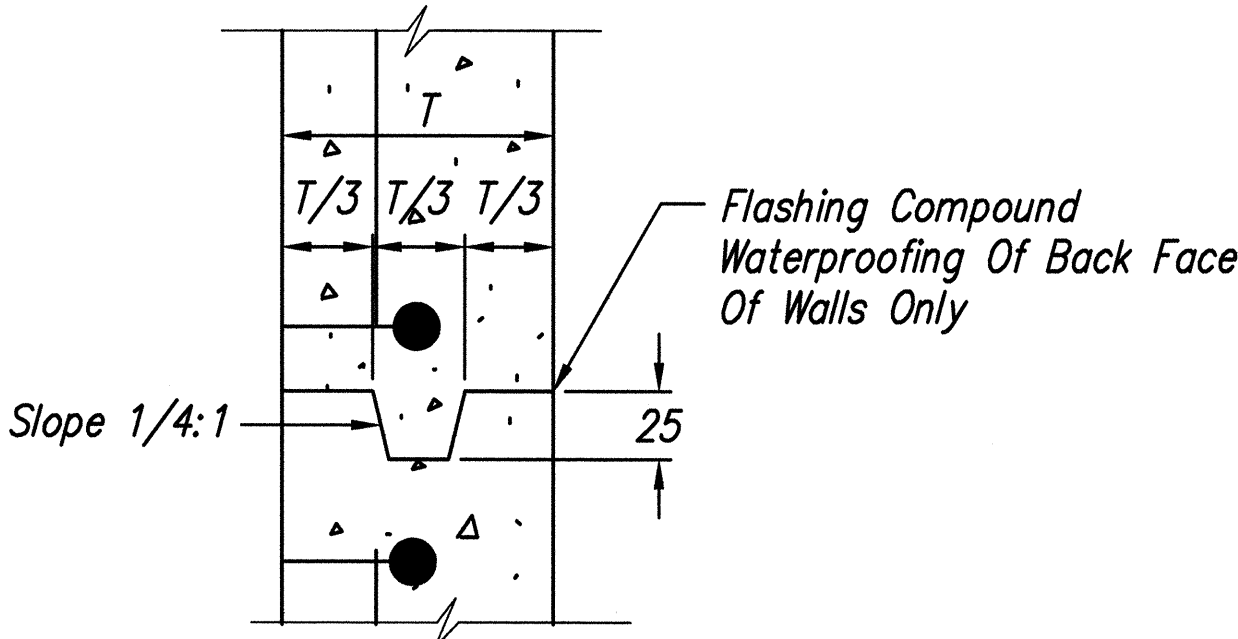
No Scale



SECTION B-B

TYPE "B" PULLBOX (OLD TYPE "C")

No Scale



2 TYPICAL CONSTRUCTION JOINT DETAIL

Not To Scale



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APRIL 30, 2004
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

PULLBOX DETAILS

INTERSTATE ROUTE H-1 REHABILITATION
Vicinity Of Makakilo Interchange
Project No. H1A-01-02M

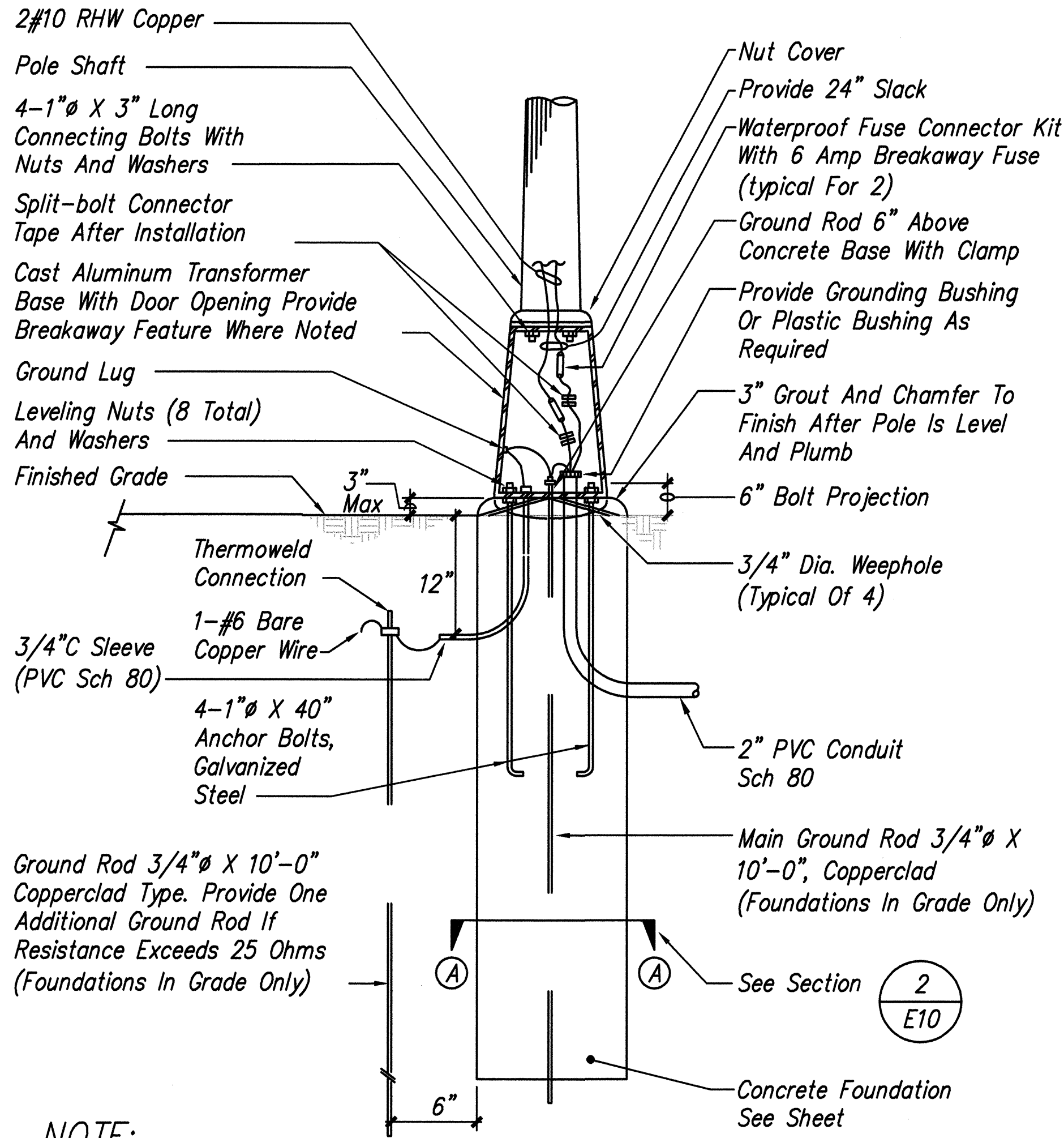
Scale: None

Date: April 2003

SHEET No. E-8 OF 16 SHEETS

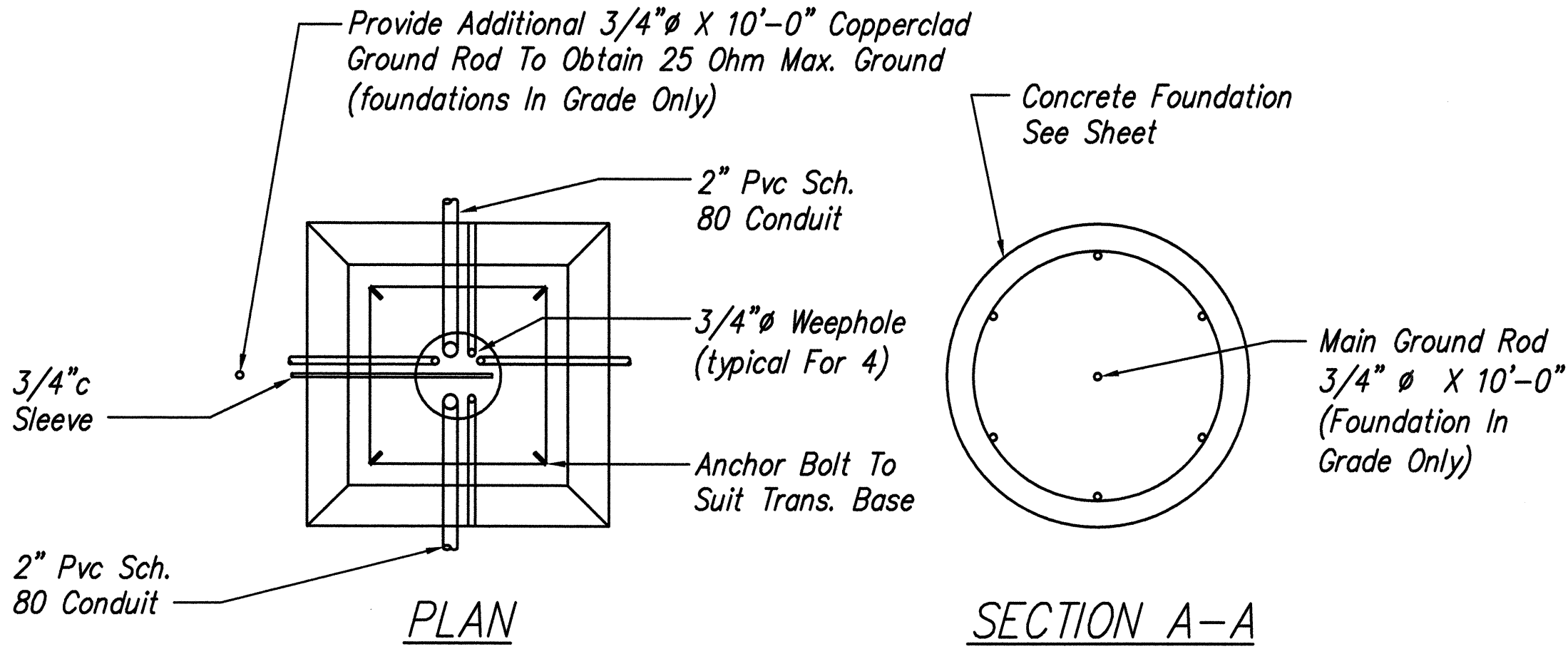
SURVEY PLANNED BY	DATE
DRAWN BY	
DESIGNED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1A-01-02M	2003	82	88



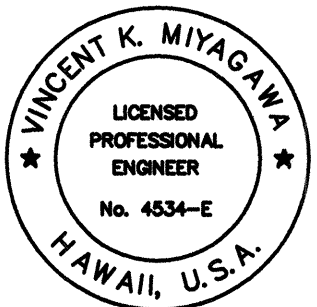
NOTE:
Foundation in grade shown.

$\frac{1}{E-10}$ TYPICAL TRANSFORMER BASE DETAIL
Not To Scale



$\frac{2}{E-10}$ TYPICAL CONCRETE FOUNDATION & TRANSFORMER BASE DETAIL
Not To Scale

SURVEY PLANNED BY	DATE
DRAWN BY	
TRACED BY	
CHECKED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	



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Vincent K. Miyagawa
PROJECT ENGINEER FOR E.C.S., Inc.
APRIL 30, 2004
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

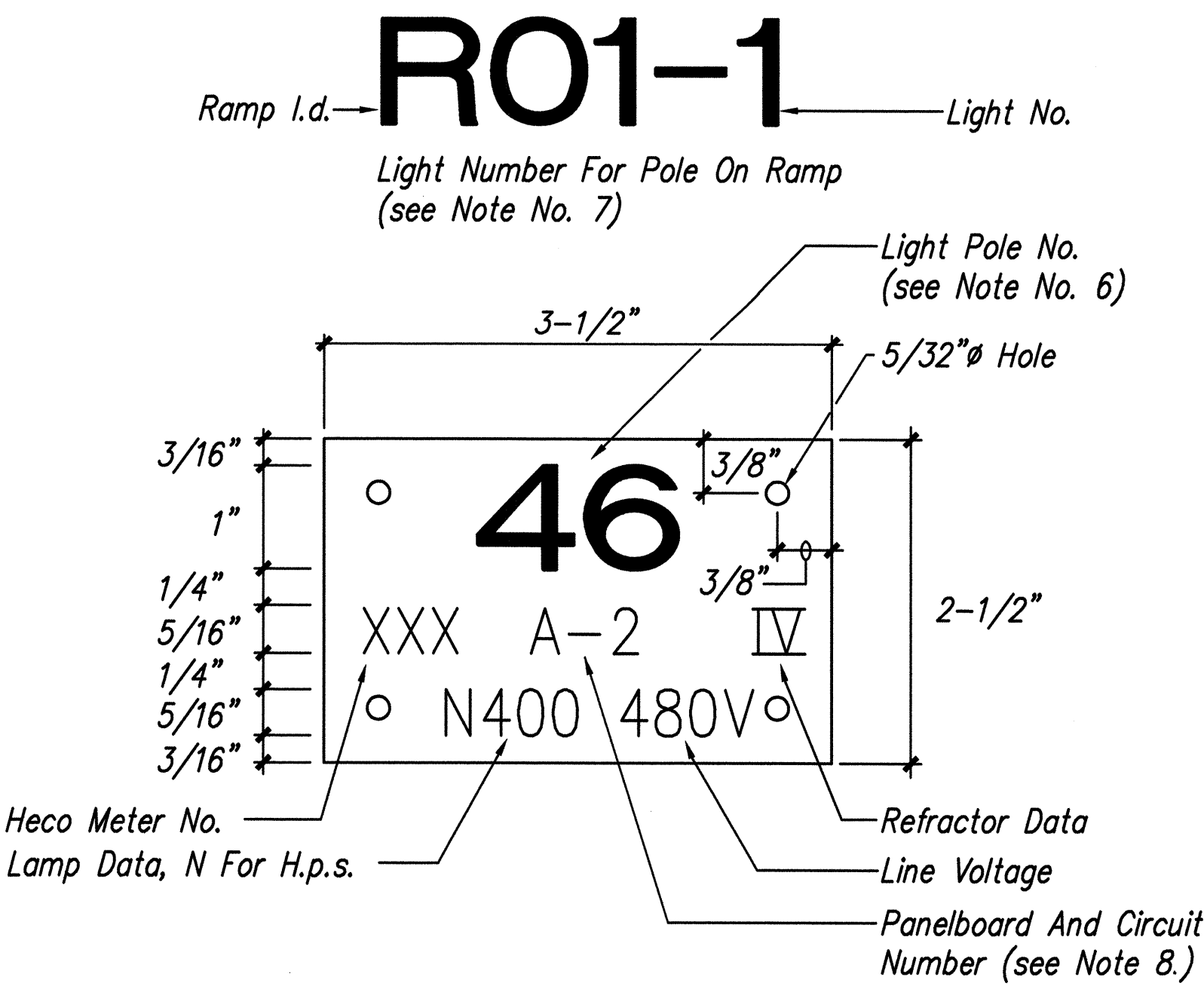
POLE BASE DETAILS
INTERSTATE ROUTE H-1 REHABILITATION
Vicinity Of Makakilo Interchange
Project No. H1A-01-02M

Scale: As Noted Date: April 2003

SHEET No. E-10 OF 16 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1A-01-02M	2003	83	88

LIGHTING POLE SCHEDULE						
POLE NO.	MOUNTING HEIGHT	ARM LENGTH	BASE TYPE	BASE SETBACK	LAMP WATTS (HPS)	DISTRIBUTION TYPE
MA-1	35'	8'	BTB	1'	250	II
MA-2	35'	8'	BTB	1'	250	II
MA-3	35'	8'	BTB	14'	250	II
MA-4	35'	8'	BTB	14'	250	II
MA-5	35'	8'	BTB	14'	250	II
MA-6	35'	8'	BTB	14'	250	II
HM-5	50'	15'	BTB	14'	400	IV
HM-3	50'	15'	BTB	4'	400	IV
MB-1	35'	8'	BTB	14'	250	II
MB-2	35'	8'	BTB	14'	250	II
MB-3	35'	8'	BTB	14'	250	II
MB-4	35'	8'	BTB	14'	250	II
MB-5	35'	8'	BTB	14'	250	II
MB-6	35'	8'	BTB	14'	250	II
MB-7	35'	8'	BTB	14'	250	II
MB-8	35'	8'	BTB	14'	250	II

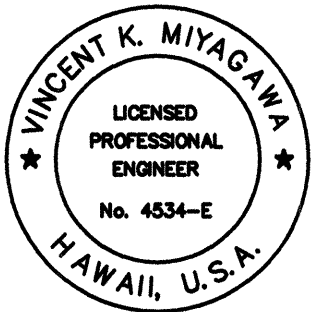


NOTES:

- Use 3 ply laminated flexible plastic black-white-black thickness black cap sheet-0.010", white base sheet-0.052", black base sheet-0.010".
- Light pole number size shall be 1" high and engraved 1/8" wide, white in color (number as required).
- Nomenclature size shall be 5/16" high and engraved 1/32" wide, white in color (heco vault number panel board and circuit number, line voltage, lamp data and refractor data as required).
- Attach to aluminum and steel post with no. 8 stainless steel, 1/2" long drive screws in 1/8" drill hole. Attach to wood poles with 4d aluminum nails.
- Numbers are inscribed by cutting through "black cap sheet" to expose "white letters".
- Light numbers shall be obtained from the state. Use an alphabet suffix to designate lights mounted on the same pole (e.g. 123a & 123b).
- For light poles installed on ramp, assign numbers to include ramp I.D. And light number. Legend may be less than one (1) inch in height.
- Nomenclature required for systems with two or more circuits (letter indicates panelboard, number indicates circuit).

1
E-11

HIGHWAY LIGHT POLE TAG
DETAIL METERED SYSTEM
Not To Scale



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APRIL 30, 2004
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ID TAG DETAILS

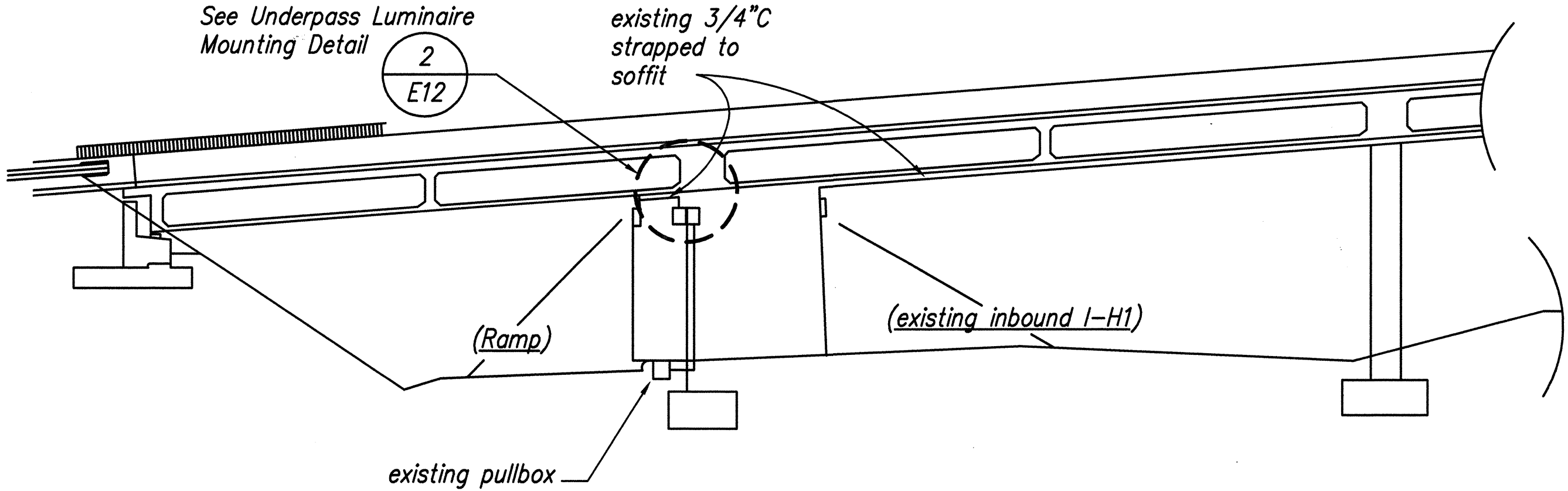
INTERSTATE ROUTE H-1 REHABILITATION
Vicinity Of Makakilo Interchange
Project No. H1A-01-02M

Scale: 1"=40'-0" Date: April 2003

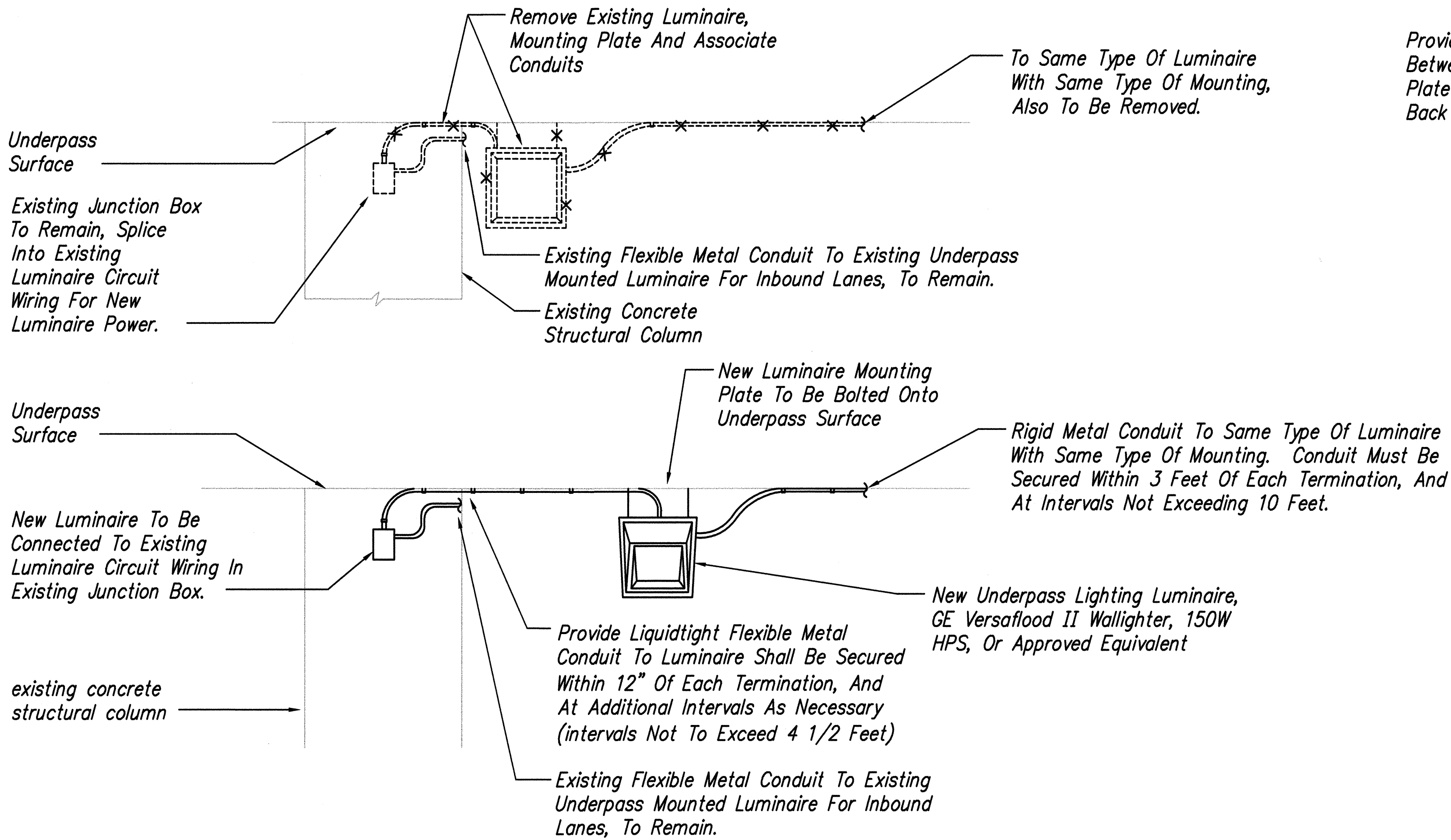
SHEET No. E-11 OF 16 SHEETS

ORIGINAL PLAN	SURVEY PLOTTED BY	DATE
NOTE BOOK	DRAWN BY	
No.	DESIGNED BY	
	CHECKED BY	

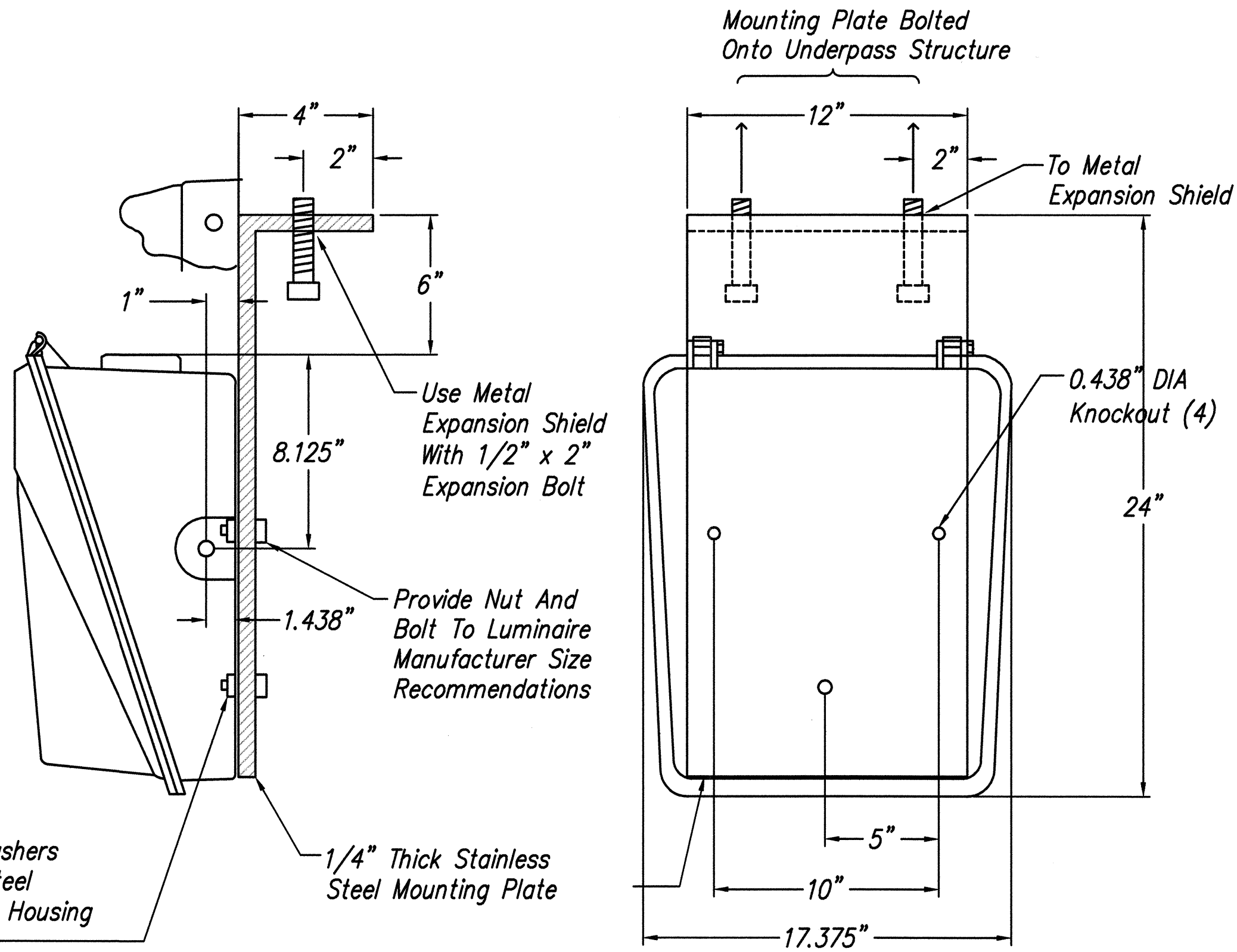
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1A-01-02M	2003	84	88



2
E-12
MAKAKILO UNDERPASS LIGHTING
NOT TO SCALE



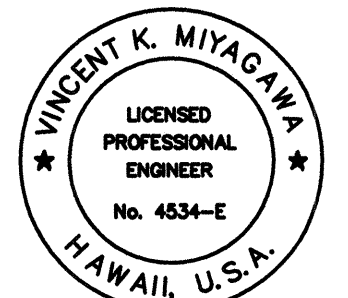
2
E-12
UNDERPASS LIGHTING MOUNTING DETAIL
NOT TO SCALE



SIDE VIEW

BACK VIEW

1
E-12
UNDERPASS LIGHTING MOUNTING PLATING DETAIL
NOT TO SCALE

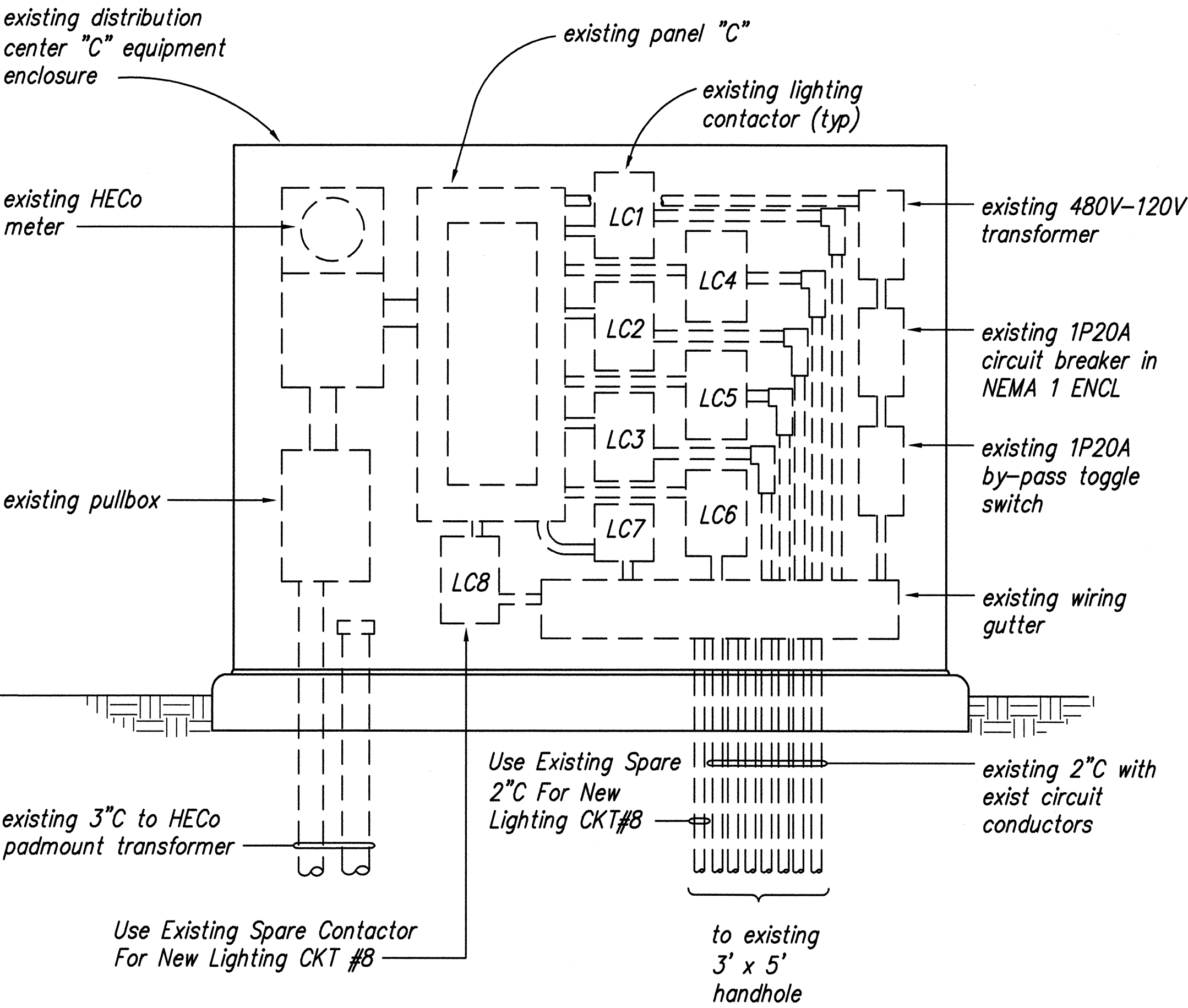
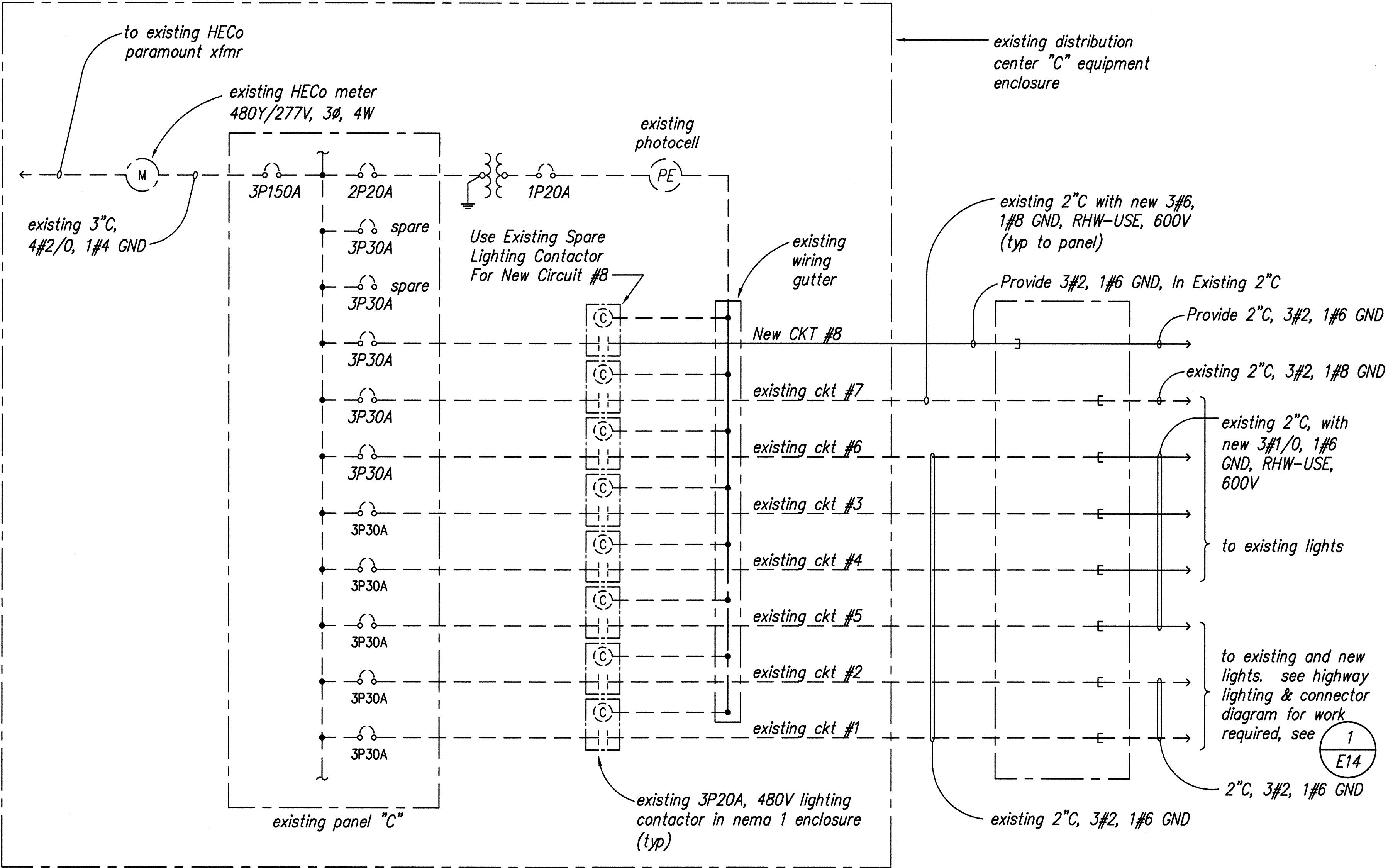


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APRIL 30, 2004
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**UNDERPASS LUMINAIRE
MOUNTING DETAILS**
INTERSTATE ROUTE H-1 REHABILITATION
Vicinity Of Makakilo Interchange
Project No. H1A-01-02M
Scale: As Noted Date: April 2003
SHEET No. E-12 OF 16 SHEETS

SURVEY PLATTED BY	DATE
DRAWN BY	
TRACED BY	
DESIGNED BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

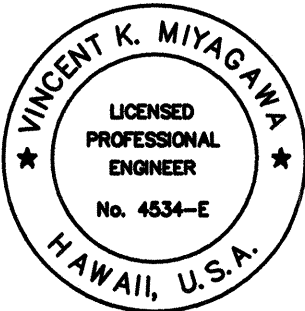
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1A-01-02M	2003	85	88



EXISTING DISTRIBUTION CENTER "C"
EQUIPMENT ELEVATION
Not To Scale

DISTRIBUTION CENTER "C" ONE-LINE DIAGRAM
WITH MODIFICATIONS
Not To Scale

ORIGINAL PLAN	DATE
DRAWN BY	
TRACED BY	
QUANTITIES BY	
CHECKED BY	
No.	



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PROJECT ENGINEER: *[Signature]* ECS, Inc.
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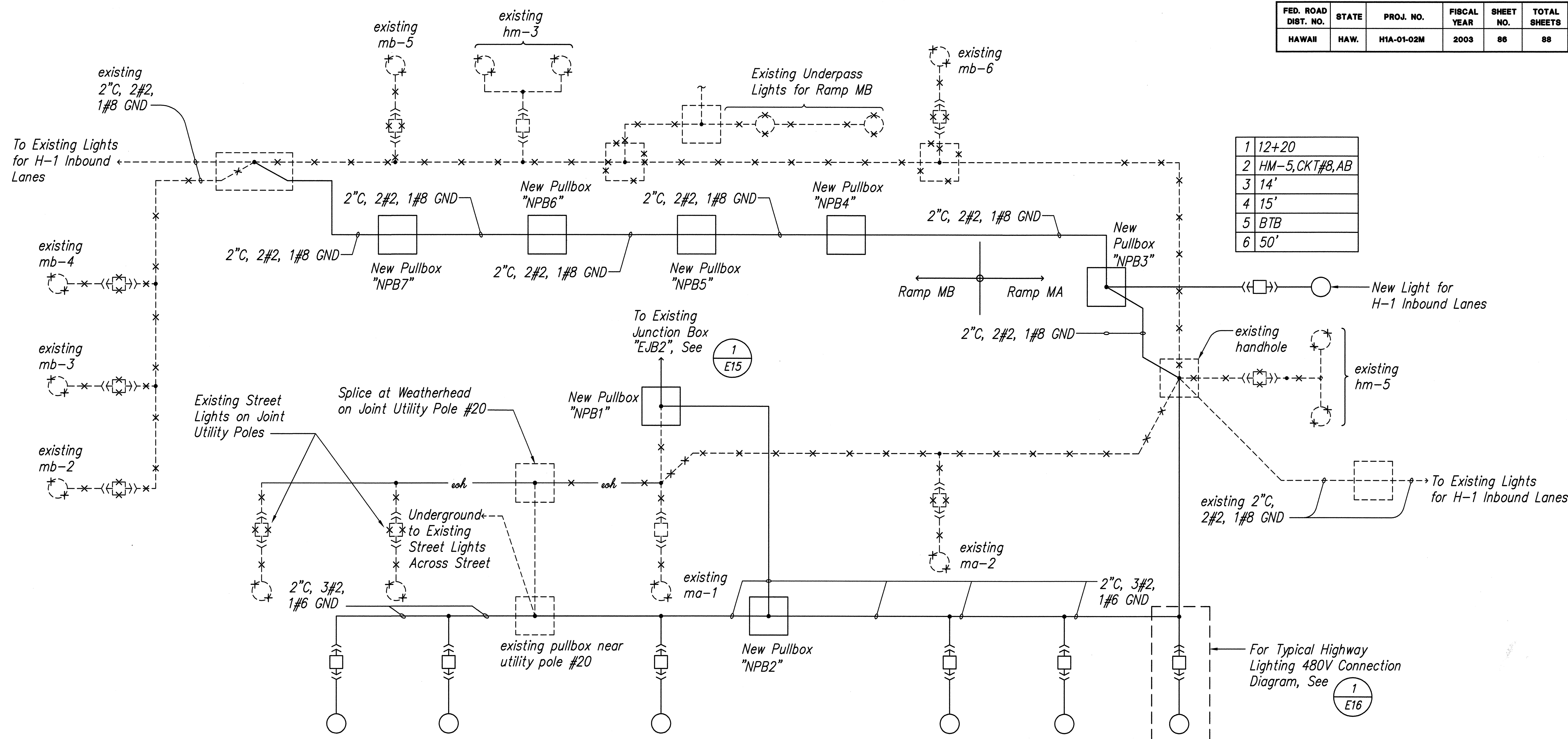
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

ONE-LINE DIAGRAMS
INTERSTATE ROUTE H-1 REHABILITATION
Vicinity Of Makakilo Interchange
Project No. H1A-01-02M

Scale: As Noted Date: April 2003

SHEET No. E-13 OF 16 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1A-01-02M	2003	86	88



1	12+20
2	HM-5, CKT #8, AB
3	14'
4	15'
5	BTB
6	50'

1	2+65
2	MA-1, CKT #8, AB
3	1'
4	8'
5	BTB
6	35'

1	0+00
2	MA-2, CKT #8, BC
3	1'
4	8'
5	BTB
6	35'

1	1+80
2	MA-3, CKT #8, AC
3	14'
4	8'
5	BTB
6	35'

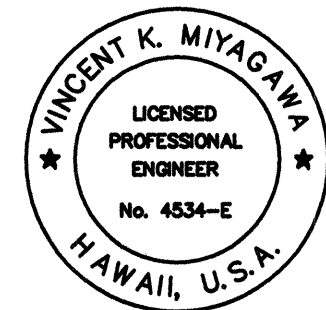
1	3+10
2	MA-4, CKT #8, AB
3	14'
4	8'
5	BTB
6	35'

1	4+40
2	MA-5, CKT #8, BC
3	14'
4	8'
5	BTB
6	35'

1	5+70
2	MA-6, CKT #8, AC
3	14'
4	8'
5	BTB
6	35'

SURVEY PLANNED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	

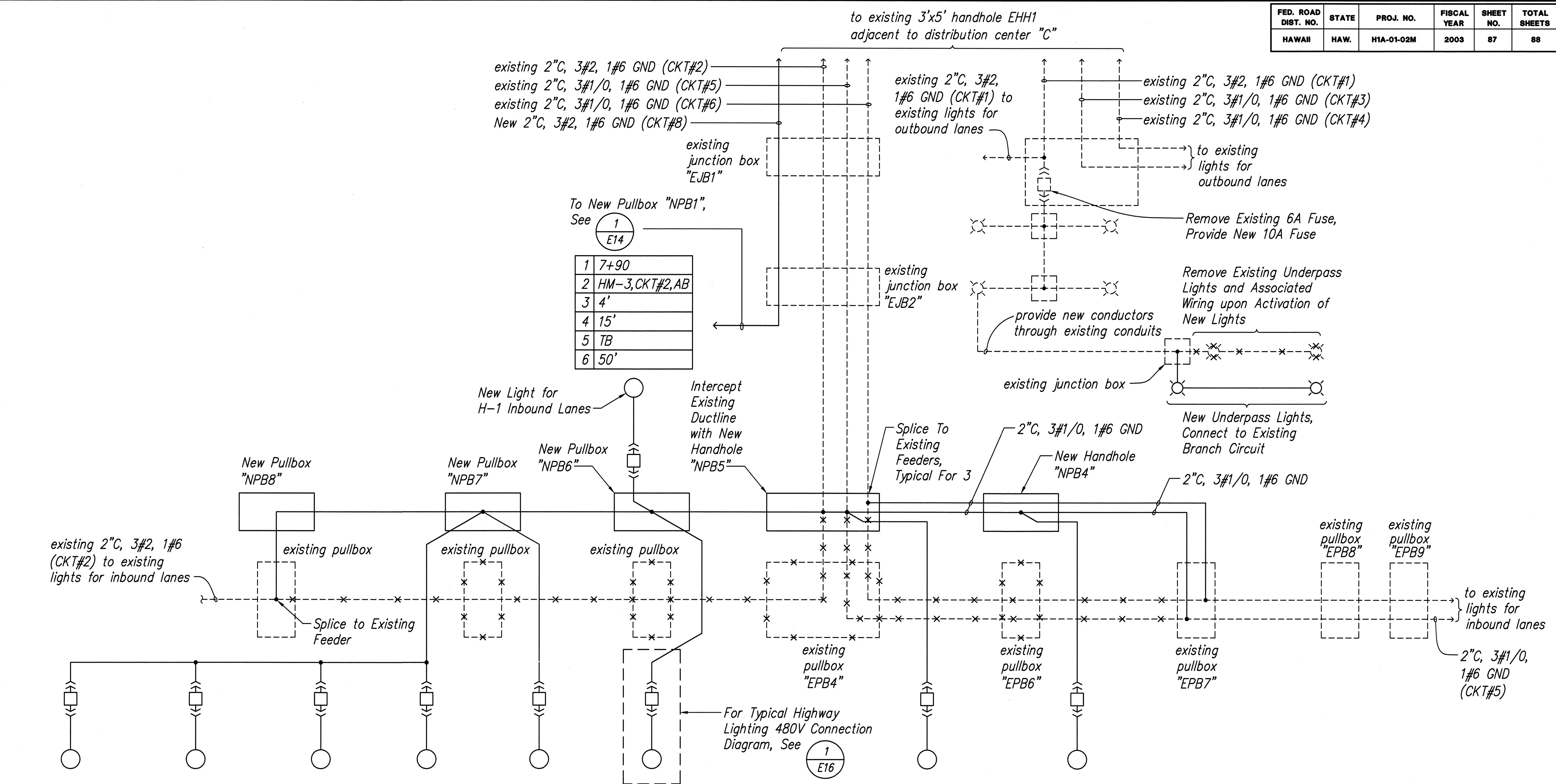
1
E-14 RAMP MA & MAKAKILO DRIVE LIGHTING
CONNECTION DIAGRAM
Not To Scale



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ME OR UNDER MY SUPERVISION.
PROJECT ENGINEER for EGS, Inc.
APRIL 30, 2004
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
RAMP MA & MAKAKILO DRIVE
LIGHTING CONNECTION DIAGRAM
INTERSTATE ROUTE H-1 REHABILITATION
Vicinity Of Makakilo Interchange
Project No. H1A-01-02M
Scale: As Noted Date: April 2003
SHEET No. E-14 OF 16 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1A-01-02M	2003	87	88



1 1+05	1 2+35	1 3+65	1 5+03	1 6+32	1 7+50
2 MB-1, CKT#2, AB	2 MB-2, CKT#2, AC	2 MB-3, CKT#2, BC	2 MB-4, CKT#2, AB	2 MB-5, CKT#2, AC	2 MB-6, CKT#2, BC
3 14'	3 14'	3 14'	3 14'	3 14'	3 14'
4 8'	4 8'	4 8'	4 8'	4 8'	4 8'
5 BTB	5 BTB	5 BTB	5 BTB	5 BTB	5 BTB
6 35'	6 35'	6 35'	6 35'	6 35'	6 35'

1 9+82	1 11+22
2 MB-7, CKT#5, AC	2 MB-8, CKT#5, BC
3 14'	3 14'
4 8'	4 8'
5 BTB	5 BTB
6 35'	6 35'

1 RAMP MB AND HIGHWAY LIGHTING
E-15 CONNECTION DIAGRAM
Not To Scale

VINCENT K. MIYAGAWA
LICENSED PROFESSIONAL ENGINEER
No. 4534-E
HAWAII, U.S.A.

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PROJECT ENGINEER, for ECS, Inc.
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EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

RAMP MB AND HIGHWAY LIGHTING CONNECTION DIAGRAM
INTERSTATE ROUTE H-1 REHABILITATION
Vicinity Of Makakilo Interchange
Project No. H1A-01-02M

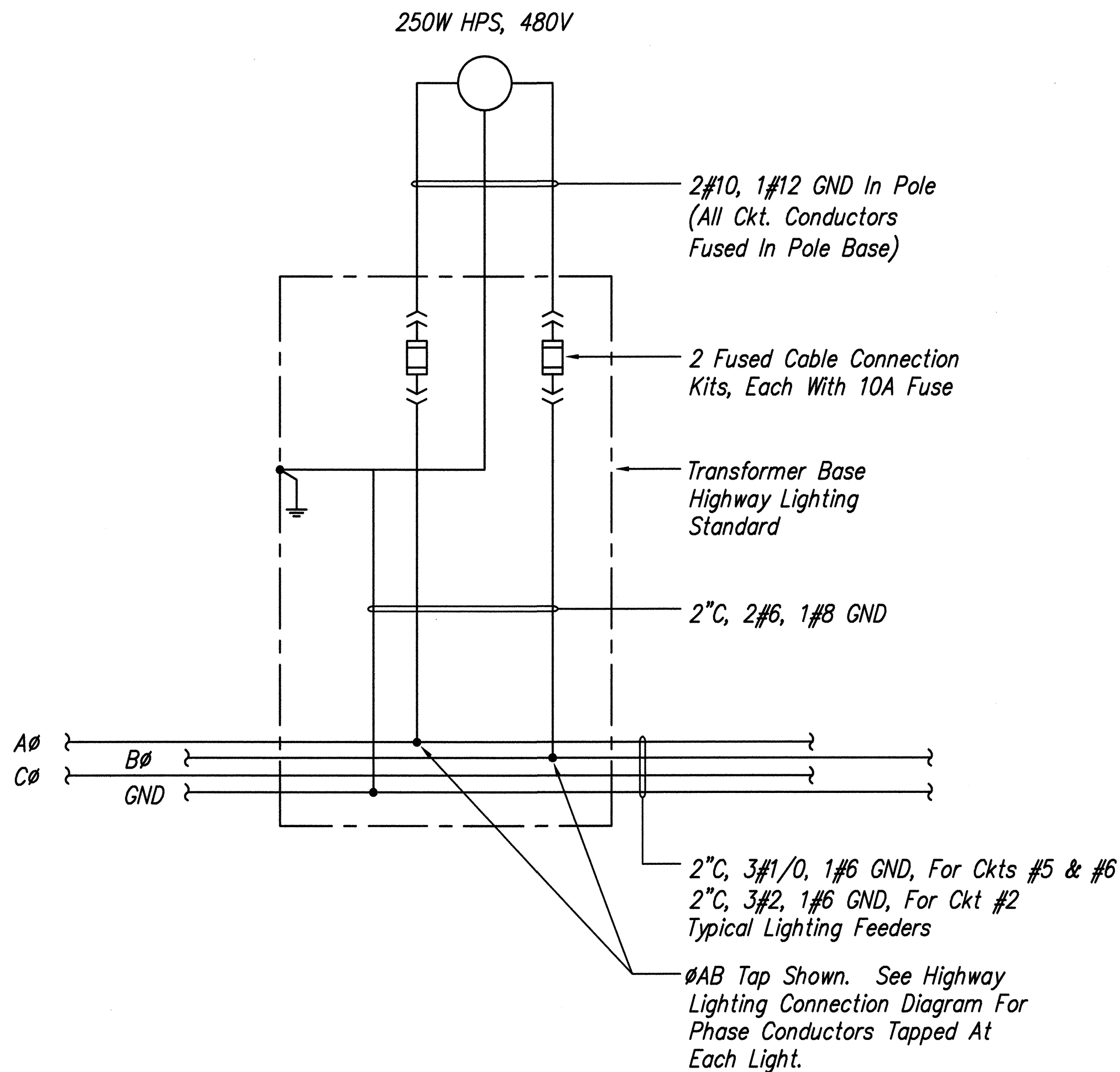
Scale: As Noted Date: April 2003

SHEET No. E-15 OF 16 SHEETS

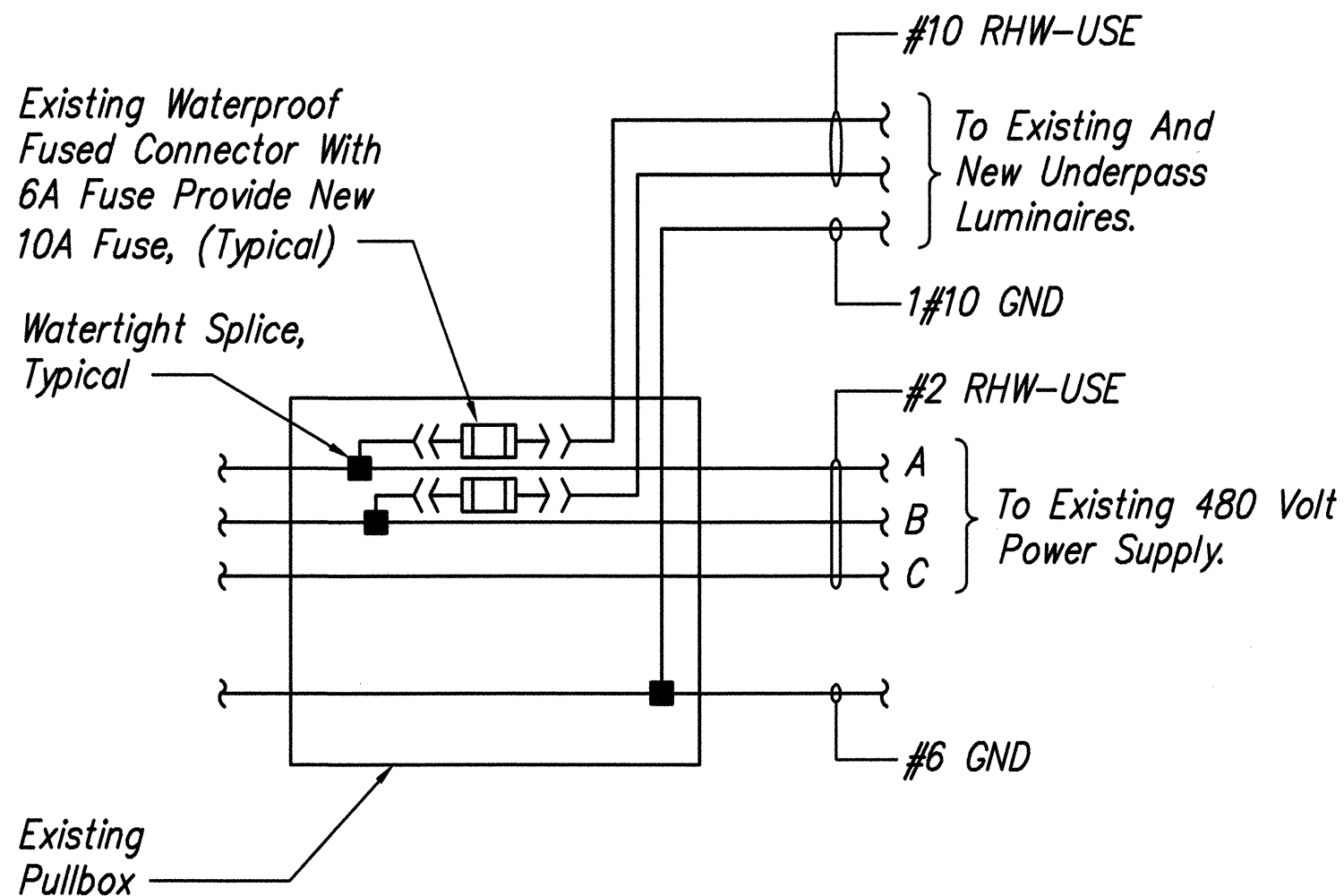
DATE
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TRACED BY
DESIGNED BY
QUANTITIES BY
CHECKED BY

ORIGINAL PLAN
NOTE BOOK
No.

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	H1A-01-02M	2003	88	88



1
E-16 TYPICAL 480VOLT HIGHWAY
LIGHTING WIRING DIAGRAM
Not To Scale



Note:
Extend Wiring From Existing Underpass Luminaires
Illuminating H-1 Inbound And Outbound Lanes To
New Underpass Luminaires Illuminating Ramp MB

2
E-16 EXISTING UNDERPASS LIGHTING
WIRING DIAGRAM
Not To Scale

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



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PROJECT ENGINEER for BCS, Inc.
APRIL 30, 2004
EXPIRATION DATE OF THE LICENSE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
HIGHWAY LIGHTING
WIRING DIAGRAMS
INTERSTATE ROUTE H-1 REHABILITATION
Vicinity Of Makakilo Interchange
Project No. H1A-01-02M
Scale: As Noted
Date: April 2003
SHEET No. E-16 OF 16 SHEETS

88