

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	ADD.115	152

ELECTRICAL SYMBOLS



- Existing Post Light To Be Removed
- Post Light
- Existing Ceiling Luminaire To Be Removed
- Ceiling Luminaire
- Existing Wall Luminaire To Be Removed
- Wall Luminaire
- Ceiling Luminaire, Night Light
- Wall Luminaire, Night Light
- Existing Ceiling Fluorescent Luminaire To Be Removed
- Ceiling Fluorescent Luminaire
- Ceiling Fluorescent Luminaire With Emergency Battery Pack
- Existing Wall Fluorescent Luminaire To Be Removed
- Wall Fluorescent Luminaire
- Emergency Light
- Ceiling Exit Light, Blackened Segments Indicates Illuminated Sides And Arrows Indicates Direction
- Wall Exit Light, Blackened Segment Indicates Illuminated Side And Arrow Indicates Direction
- Existing Switch To Be Removed
- Switch, 1P20A, +4'-0"
- Existing Three Way Switch To Be Removed
- Switch, 3W20A, +4'-0"
- Switch, 4W20A, +4'-0"
- Existing Duplex Convenience Outlet To Be Removed
- Duplex Convenience Outlet, 3W20A, Grounding Type, +16" Unless Otherwise Noted.
- Duplex Convenience Outlet, 3W20A, Ground Fault Interrupter Type, +16" Unless Otherwise Noted
- Existing Special Outlet To Be Removed/Relocated
- Special Outlet, Size And Rating As Indicated
- Floor Outlet
- Tel/Data/Power Pole
- Existing Plugmold Duplex Convenience Outlet To Be Removed
- Plugmold Duplex Convenience Outlet, 2-Circuit, 3W20A, Grounding Type, Wiremold 2000 Or Equal
- Quadruplex Convenience Outlet, 3W20A, Grounding Type, +16" Unless Otherwise Noted.

- Equipment Connection
- Existing Clock Outlet To Be Removed
- Clock Outlet
- Wall Junction Box, 4-11/16" Square Minimum
- Ceiling Junction Box, 4-11/16" Square Minimum
- Large Junction Box
- Existing Transformer
- Transformer
- Existing Panelboard To Remain
- Existing Panelboard To Be Relocated
- Relocated Panelboard
- New Panelboard
- Existing Telephone Outlet To Be Removed
- Existing Telephone Outlet
- Telephone Outlet, +16"
- Telephone Outlet, +16" With Two (2) Separate Telephone Numbers
- Floor Telephone Outlet
- Data Outlet, +16"
- Floor Telephone/Data Outlet
- Existing Telephone Cabinet
- Time Switch
- Video Outlet, +16"
- Wall Card Key Junction Box, 4-11/16" Square Minimum
- Ceiling Security Camera Junction Box, 4-11/16" Square Minimum
- Ceiling Security Monitor Junction Box, 4-11/16" Square Minimum
- Wall Automatic Door Opener Junction Box, 4-11/16" Square Minimum
- Ceiling Automatic Door Opener Junction Box, 4-11/16" Square Minimum
- Fire Alarm Manual Station, +48"
- Fire Alarm Audio Visual Signal, +80"
- Fire Alarm Visual Signal, +80"
- Fire Alarm Automatic Smoke Detector
- Fire Sprinkler Flow Switch
- Fire Sprinkler Tamper Switch
- Fire Alarm Panel
- Duct Smoke Detector
- Door Release

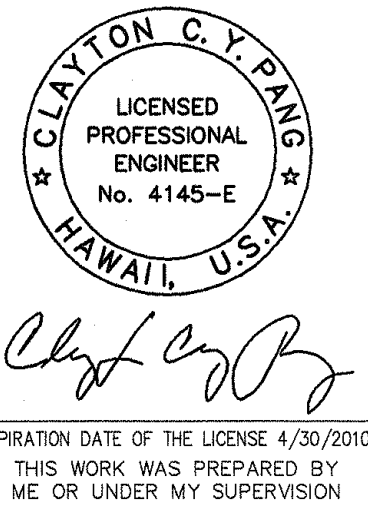
- Existing Motor Outlet
- Existing Motor Outlet To Be Relocated
- Relocated Motor Outlet
- Motor Outlet
- Existing Motor Controller
- Existing Motor Controller To Be Relocated
- Relocated Motor Controller
- Motor Controller
- Existing Safety Switch
- Existing Safety Switch To Be Relocated
- Relocated Safety Switch
- Safety Switch
- Weatherproof
- Luminaire Designation, Type "A" Indicated

- Wiring In Existing Raceway
- Wiring In Existing Raceway To Be Removed
- Wiring In Exposed Raceway
- Wiring In Raceway Concealed In Floor Or Below Grade
- Wiring In Raceway Concealed In Wall Or Ceiling
- Wiring In Flexible Raceway

- NOTES: 1. Any Circuit With No Further Designation Indicates A Two Wire Circuit. Circuits With Additional Wires Are Indicated As Follows: ~~2~~, 3 Wires: ~~3~~, 4 Wires, Etc.
2. Ground Wire Per National Electrical Code Indicated As Follows; ~~—~~.
3. All Exposed Conduit And Boxes Shall Be Painted To Match Adjacent Wall Or Ceiling Surrounding.

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

6/16/08	Added Post Light Symbol
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION ELECTRICAL SYMBOLS	
MATERIALS TESTING AND RESEARCH FACILITY RENOVATION Project No. HWY-L-06-06	
Scale: No Scale	Date: MAY 2008
SHEET No. E-100 OF 38 SHEETS	



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	117	152

PHASE 1 -
ADDITIVE ALTERNATE

PHASE 1 - BASE BID

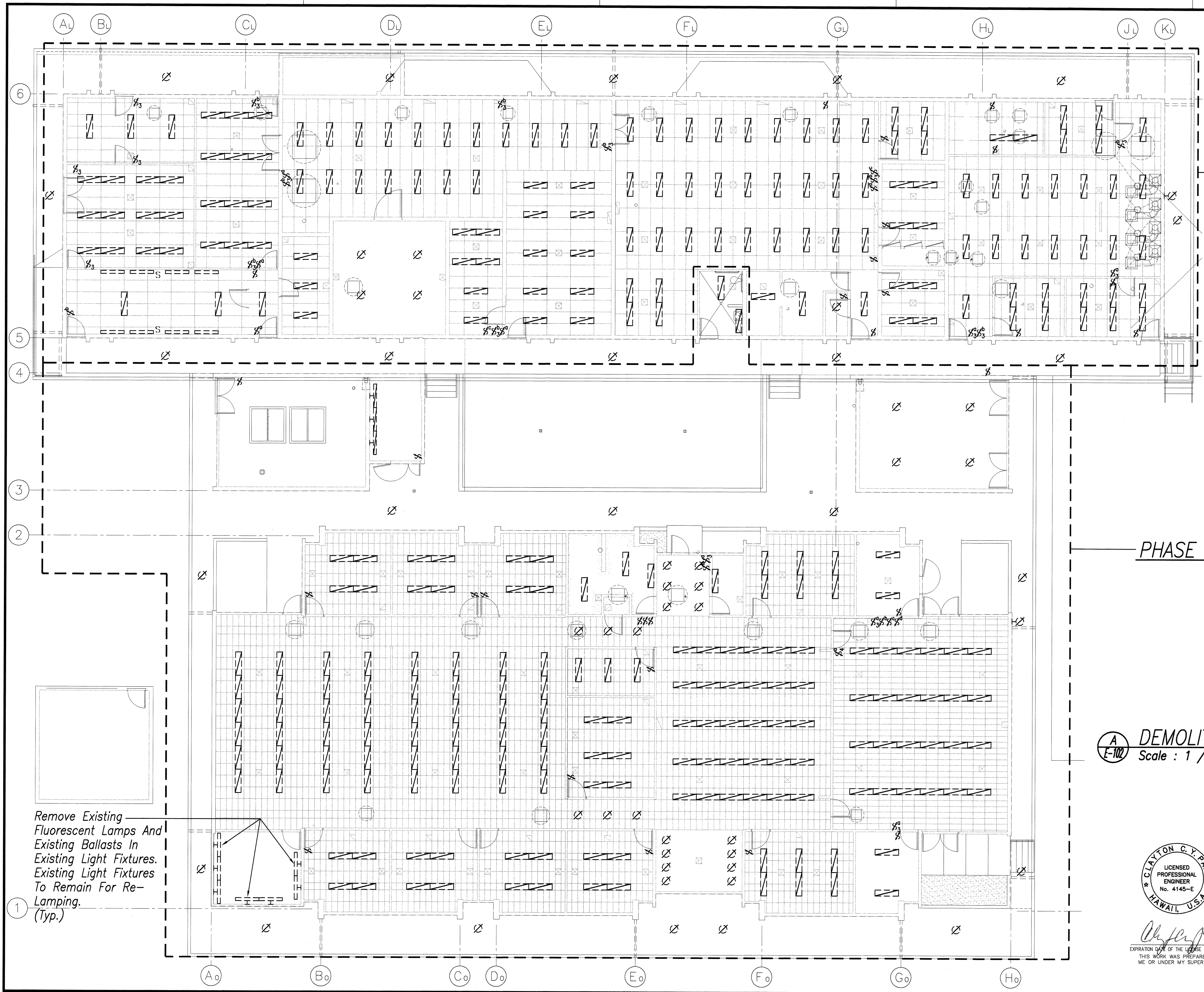
DEMOLITION LIGHTING PLAN
Scale: 1/8" = 1'-0"

Remove Existing
Fluorescent Lamps And
Existing Ballasts In
Existing Light Fixtures.
Existing Light Fixtures
To Remain For Re-
Lamping.
(Typ.)

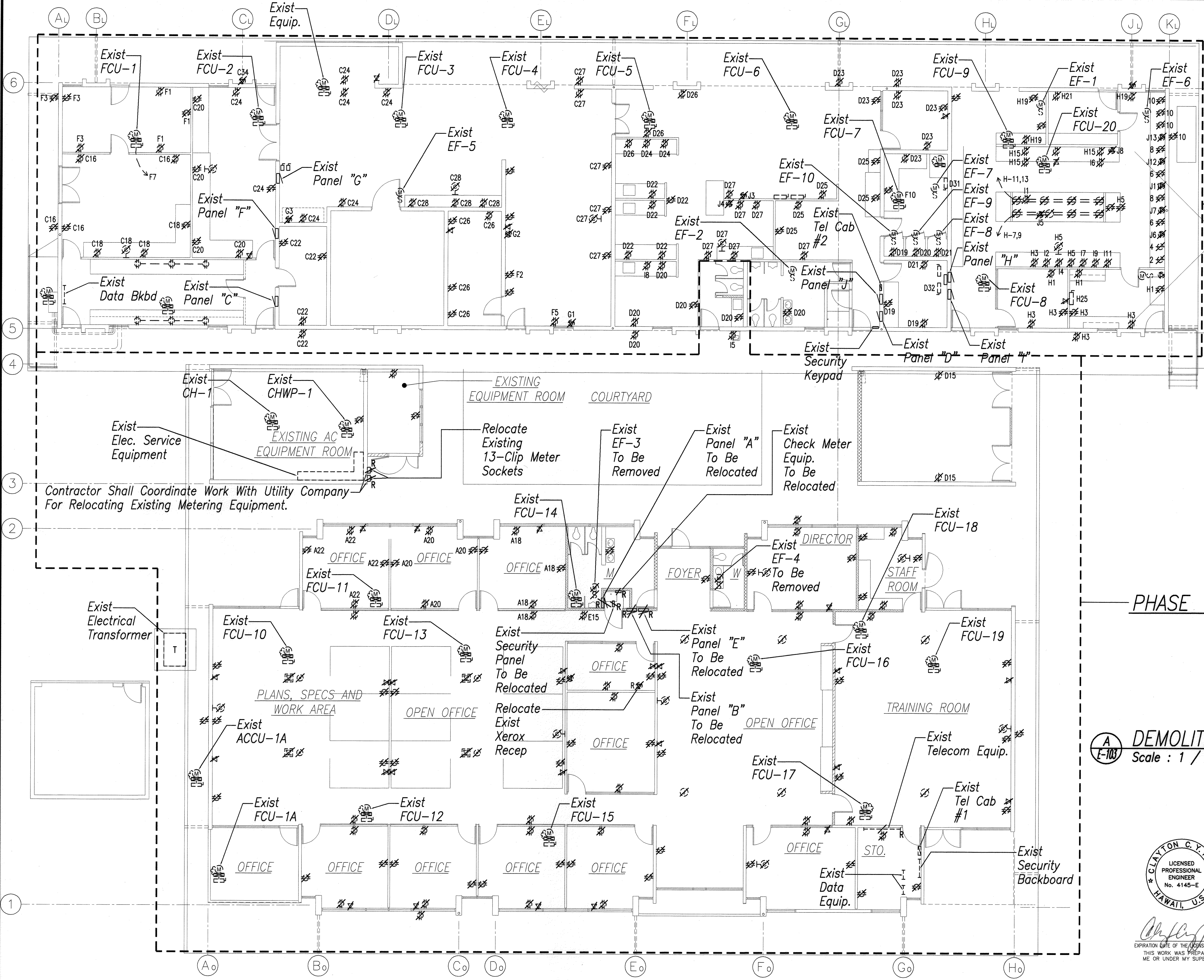


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**DEMOLITION
LIGHTING PLAN**
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06
Scale: 1/8" = 1'-0" Date: MAY 2008
SHEET No. E-102 OF 38 SHEETS

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



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	118	152



PHASE 1 -
ADDITIVE ALTERNATE

PHASE 1 - BASE BID

DEMOLITION POWER & SIGNAL PLAN
Scale : 1 / 8" = 1' - 0"



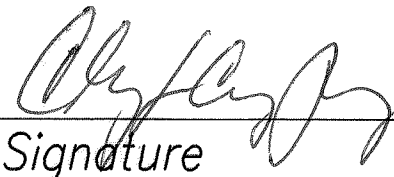
EXPIRATION DATE OF THE LICENSE 4/30/2010
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**DEMOLITION POWER
& SIGNAL PLAN**
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: 1/8" = 1'-0" Date: MAY 2008

REVISED ORDINANCES OF HONOLULU
CHAPTER 32
BUILDING ENERGY EFFICIENCY STANDARDS

The Building Energy Efficiency Standards Have Been
Reviewed And To The Best Of My Knowledge This Design
Substantially Conforms To Electrical And Lighting
Requirements Of Sections 5.3 And 6.3.

Signature  04/30/10
Exp. Date

Clayton C. Y. Pang, P. E.
Name (Print)

Principal
Title



BUILDING ENERGY EFFICIENCY STANDARDS CALCULATIONS

BUILDING TYPE AREA BUILDING
F Service Establishment 28633 sq ft DATE 3-7-08
NA 0 sq ft YEAR 1993
NA 0 sq ft
BUILDING DESIGN 28633 Gross sq ft
Interior Lighting Power 46368 W 1.619 W/Gross sq ft
Exterior Lighting Power 4066 W

PRESCRIPTIVE CRITERIA
Unit Lighting Power Allowance 1.650 W/Gross sq ft
Interior Lighting Power Allowance 47245 W

SYSTEM PERFORMANCE CRITERIA
Unit Power Density NA W/Gross sq ft
Interior Lighting Power Allowance NA W

EXTERIOR LIGHTING CRITERIA
Exterior Lighting Power Allowance 4698 W

***** PASSES *****

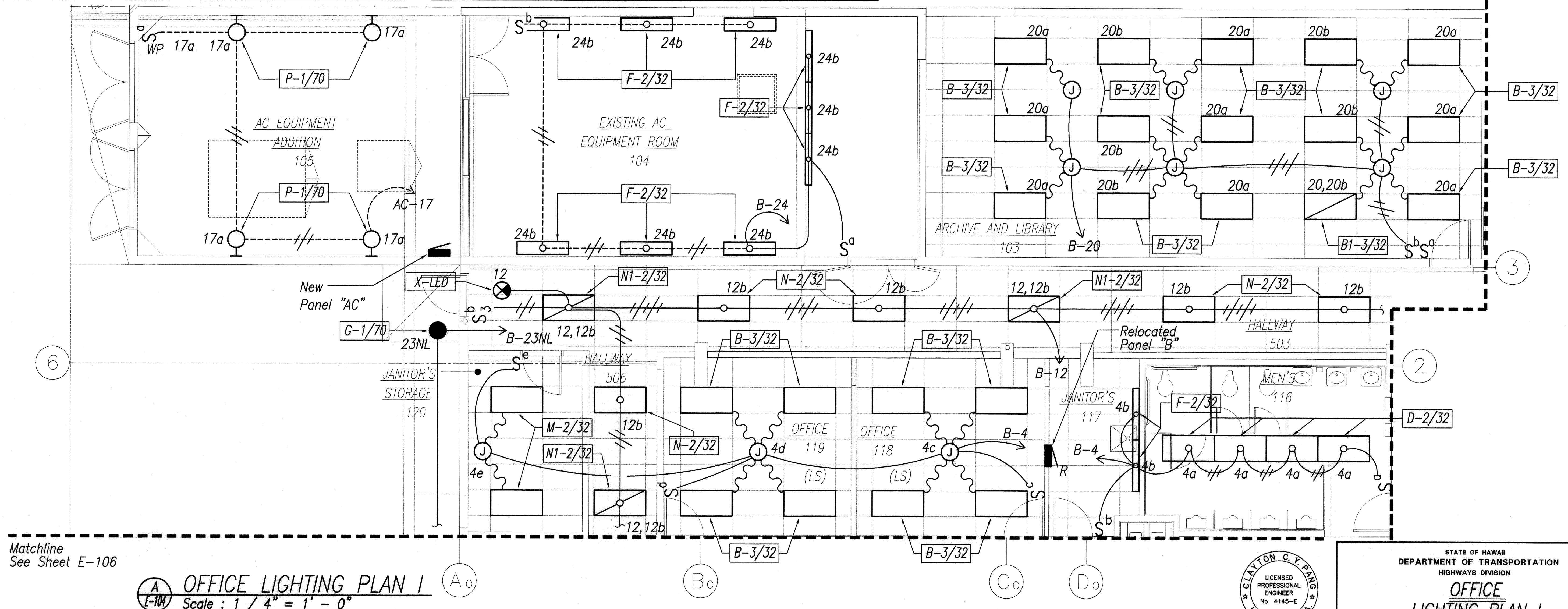
BUILDING ENERGY EFFICIENCY STANDARDS

Exterior Lighting Power Allowance 4,698 W Installed 4,066 W

Interior Lighting Power Allowance 47,245 W Installed 46,368 W

Method Used: Prescriptive ☒ System Performance ☐

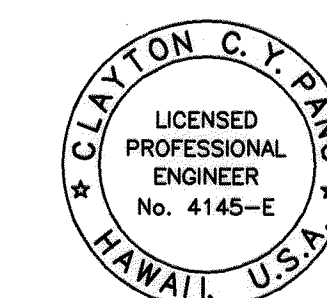
Calculations: Separate ☐ On Drawings ☒



OFFICE LIGHTING PLAN 1
Scale: 1/4" = 1'-0"

Note:

- Contractor Shall Verify Space Above Ceiling
Prior To Ordering Light Fixtures.

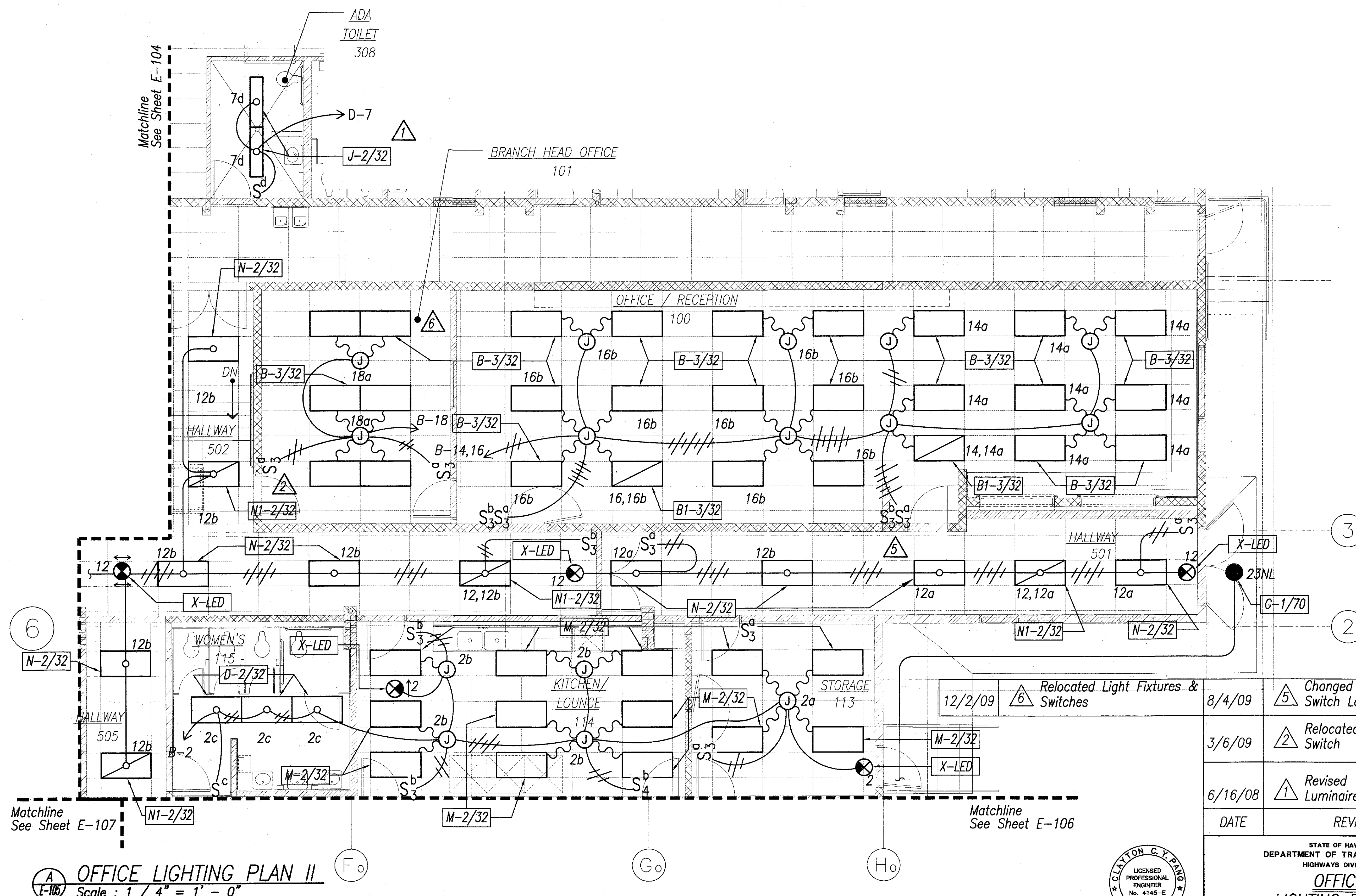


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
OFFICE
LIGHTING PLAN 1
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: 1/4" = 1'-0" Date: MAY 2008

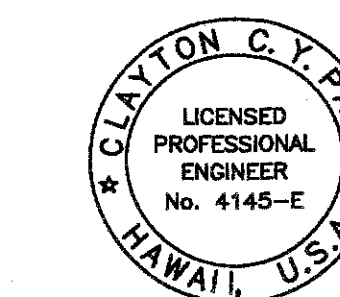
SHEET No. E-104 OF 38 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	C.O.ADD.120	152



OFFICE LIGHTING PLAN II
Scale : 1 / 4" = 1' - 0"

Note:
1. Contractor Shall Verify Space Above Ceiling Prior To Ordering Light Fixtures.



EXPIRATION DATE OF THE LICENSE 4/30/2010
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

12/2/09	6 Relocated Light Fixtures & Switches	8/4/09	5 Changed Lights & Switch Location
3/6/09	2 Relocated Switch		
6/16/08	1 Revised Luminaire Type		
DATE	REVISION		

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
OFFICE LIGHTING PLAN II
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: 1/4" = 1'-0" Date: MAY 2008

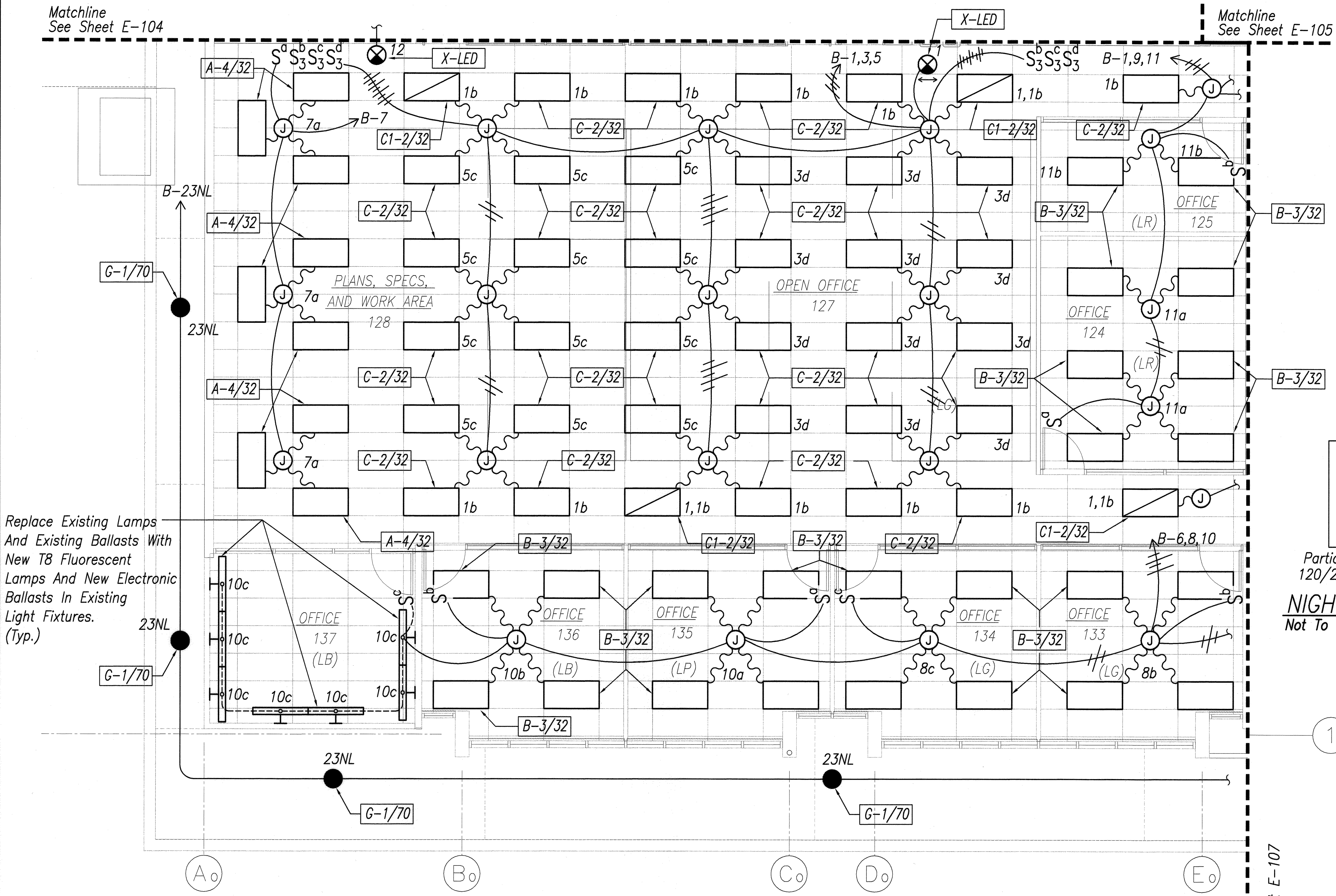
SHEET No. E-105 OF 38 SHEETS

C.O.ADD.120

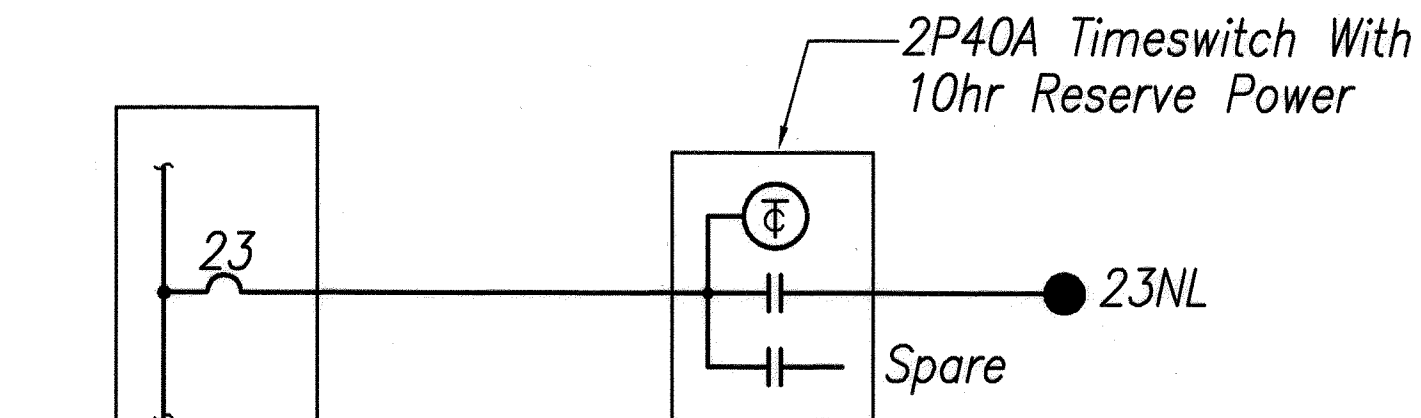
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	121	152

Matchline
See Sheet E-104

Matchline
See Sheet E-105



Replace Existing Lamps
And Existing Ballasts With
New T8 Fluorescent
Lamps And New Electronic
Ballasts In Existing
Light Fixtures.
(Typ.)



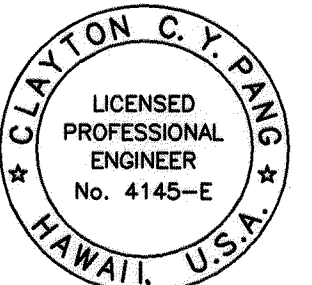
Partial Panel "B"
120/208V, 3Ø, 4W

NIGHT LIGHT CONTROL WIRING DIAGRAM
Not To Scale

A OFFICE LIGHTING PLAN III
Scale : 1 / 4" = 1' - 0"

Note:
1. Contractor Shall Verify Space Above Ceiling
Prior To Ordering Light Fixtures.

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



EXPIRATION DATE OF THE LICENSE 4/30/2010
THIS WORK WAS PREPARED BY
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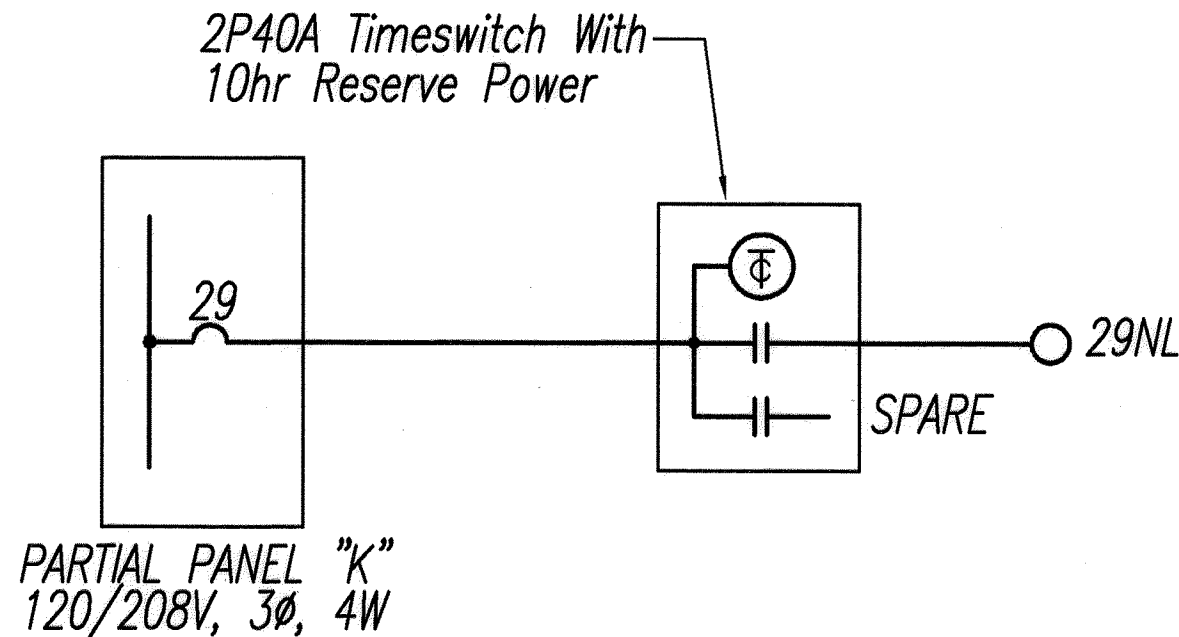
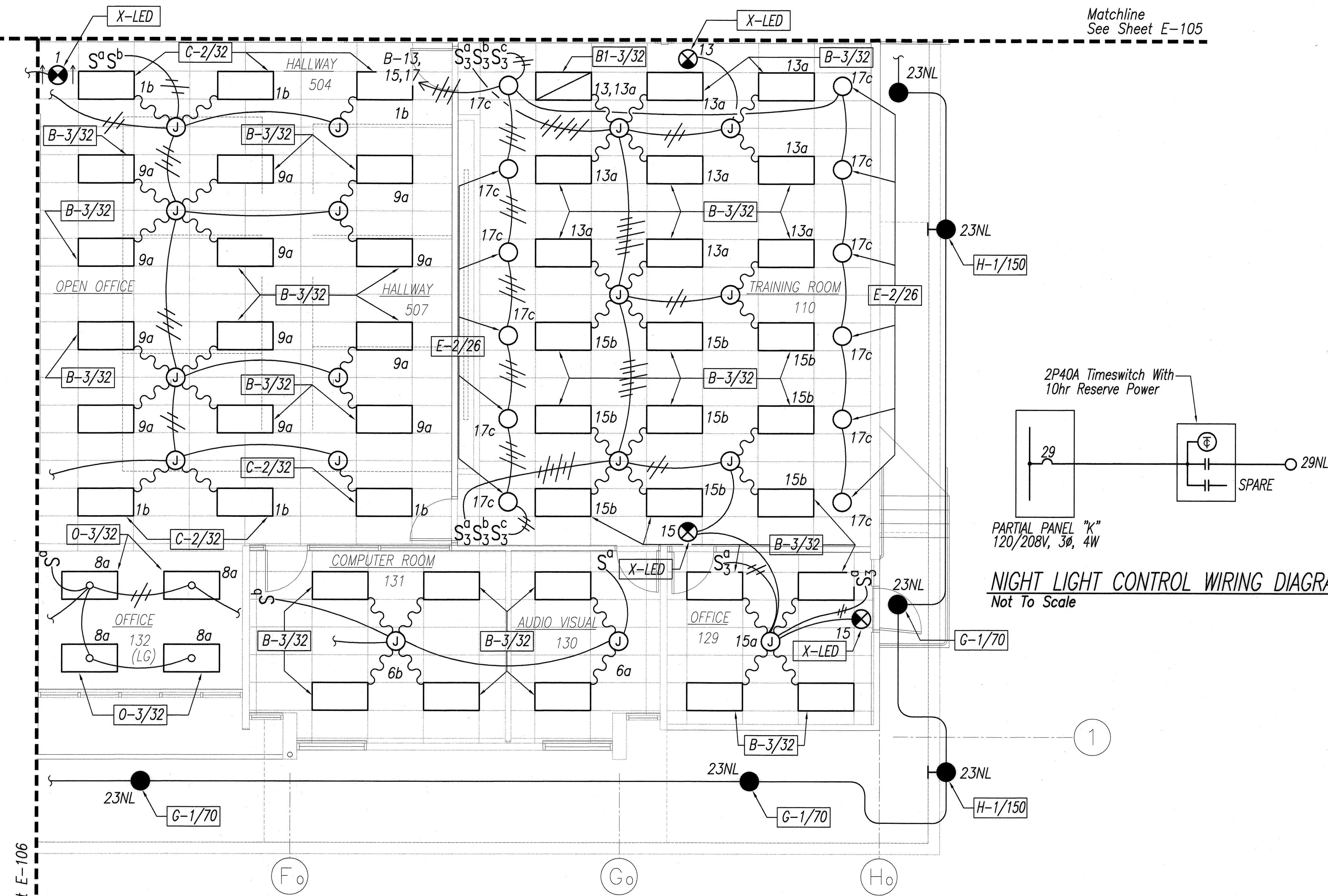
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**OFFICE
LIGHTING PLAN III**
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: 1/4" = 1'-0" Date: MAY 2008

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	122	152

Matchline
See Sheet E-104

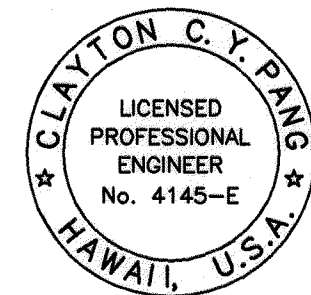
Matchline
See Sheet E-105



NIGHT LIGHT CONTROL WIRING DIAGRAM
Not To Scale

Note:
1. Contractor Shall Verify Space Above Ceiling
Prior To Ordering Light Fixtures.

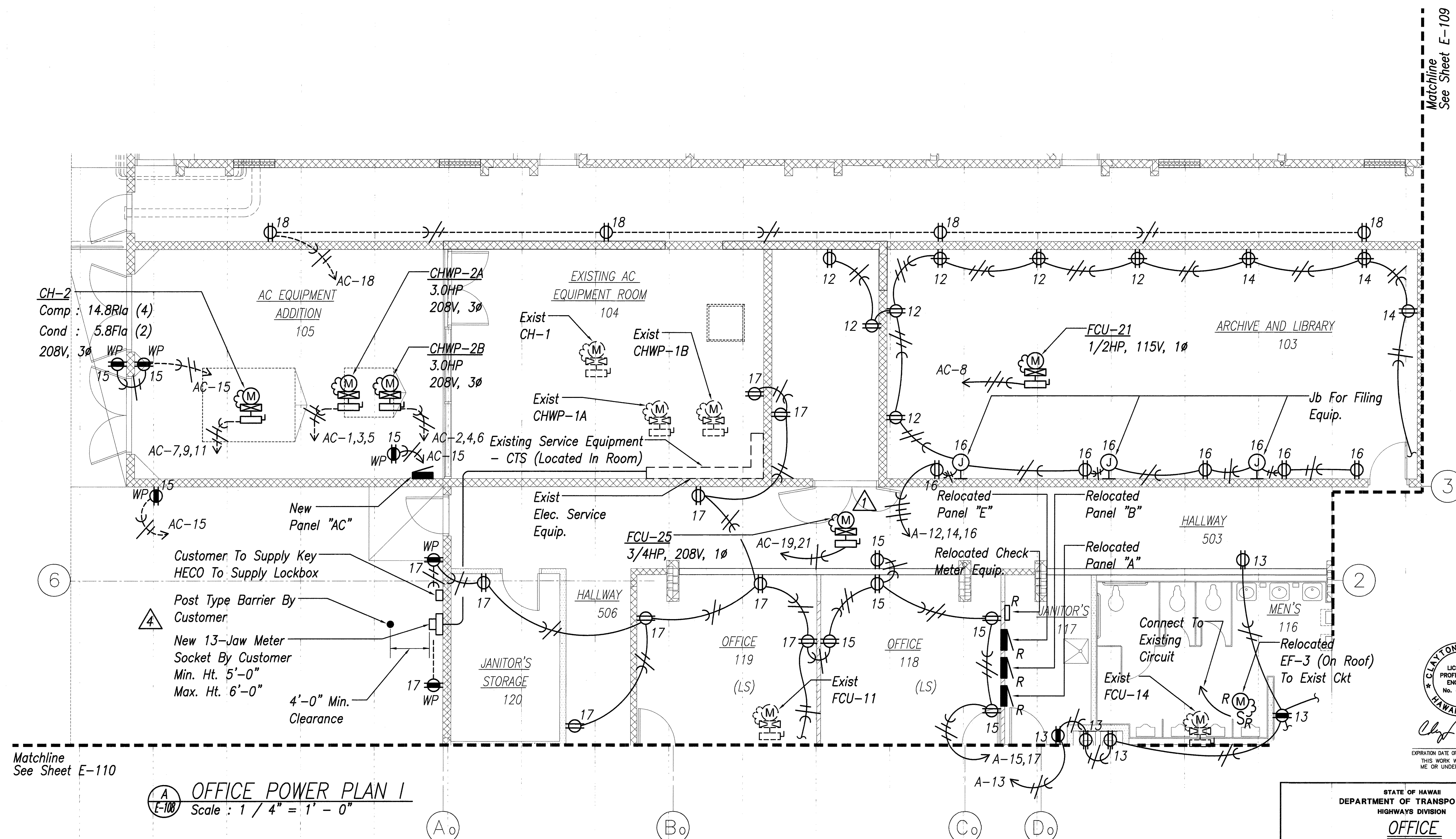
OFFICE LIGHTING PLAN IV
Scale : 1 / 4" = 1' - 0"



STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
OFFICE LIGHTING PLAN IV
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: 1/4" = 1'-0" Date: MAY 2008

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	C.O.ADD.123	152

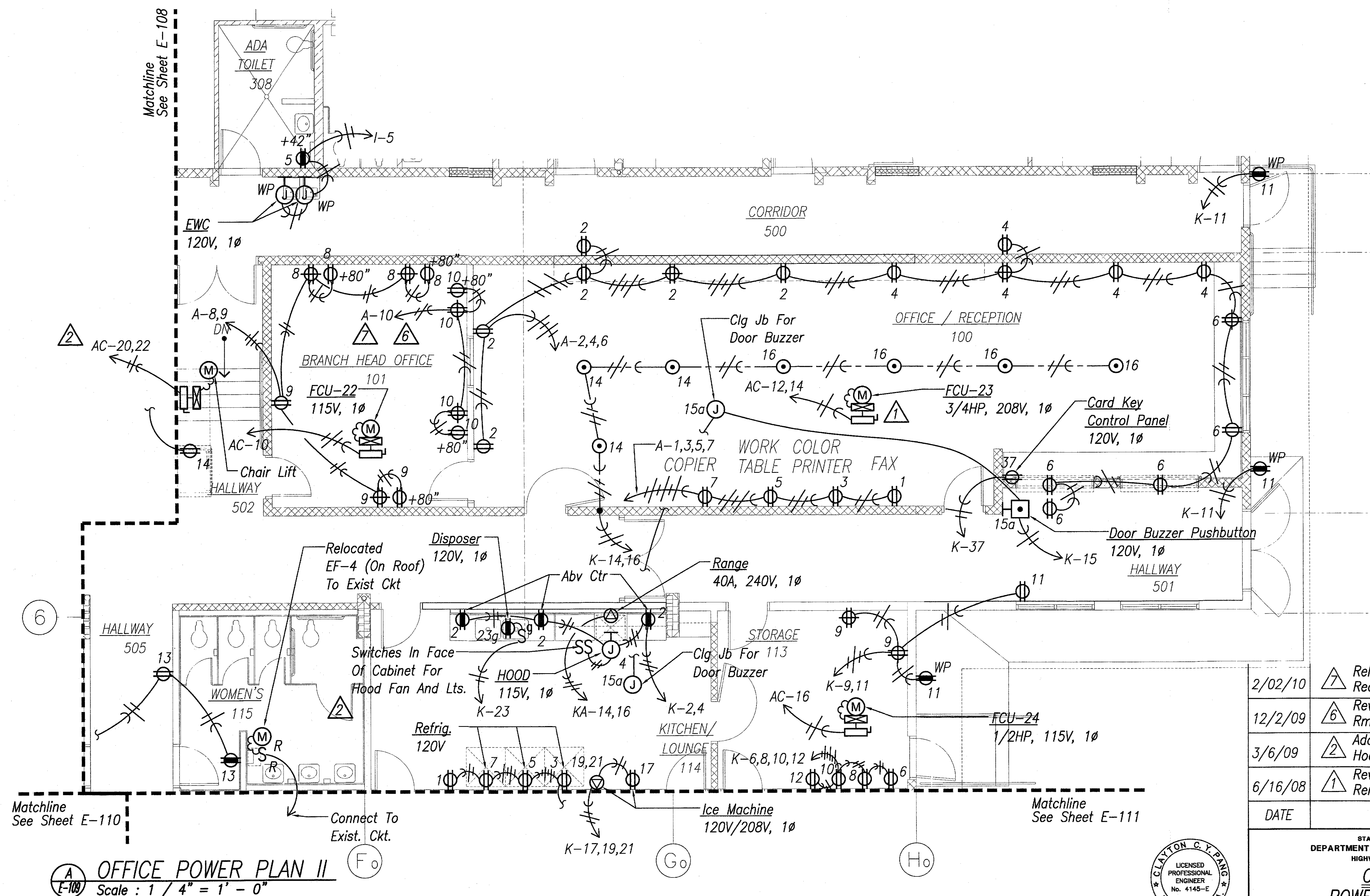


EXPIRATION DATE OF THE LICENSE 4/30/2010
THIS WORK WAS PREPARED BY
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STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION OFFICE POWER PLAN I MATERIALS TESTING AND RESEARCH FACILITY RENOVATION Project No. HWY-L-06-06 Scale: 1/4" = 1'-0" Date: MAY 2008 SHEET No. E-108 OF 38 SHEETS	
7/02/09	Revised Meter Socket Location Per HECO
6/16/08	Revised FCU-25
DATE	REVISION

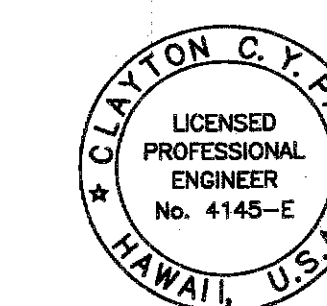
C.O.ADD.123

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	C.O.ADD.124	152



2/02/10	Relocated And Rearranged Receptacles In Rm. 101
12/2/09	Revised Receptacles in Rm. 101
3/6/09	Added Switches For Range Hood. Add Chair Lift Conn.
6/16/08	Revised FCU-23. Removed Floor Note

DATE	REVISION
------	----------



EXPIRATION DATE OF THE LICENSE 4/30/2010
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
OFFICE POWER PLAN II
MATERIALS TESTING AND RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: 1/4" = 1'-0" Date: MAY 2008

SHEET No. E-109 OF 38 SHEETS

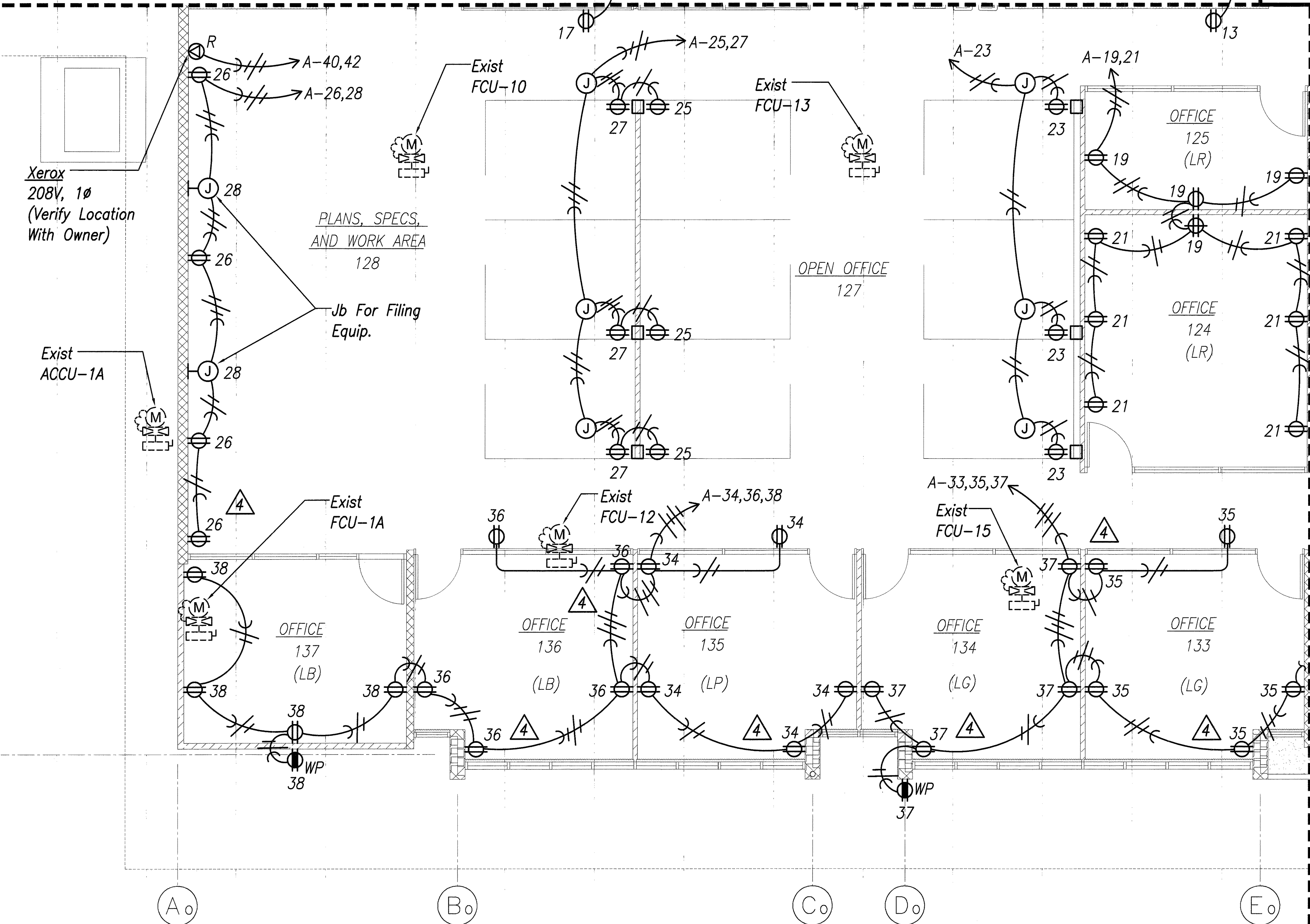
C.O.ADD.124

SURVEY PLATTED BY	DATE
DRAWN BY	
TRACED 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.	HWY-L-06-06	2008	C.O.125	152

Matchline
See Sheet E-108

Matchline
See Sheet E-109



OFFICE POWER PLAN III
Scale : 1 / 4" = 1' - 0"

SURVEY PLOTTED BY	DATE
DESIGNED BY	DATE
TRACED BY	DATE
NOTE BOOK	DATE
QUANTITIES BY	DATE
CHECKED BY	DATE



EXPIRATION DATE OF THE LICENSE 4/30/2010
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

7/02/09	4 Relocated Receptacles
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION OFFICE POWER PLAN III MATERIALS TESTING AND RESEARCH FACILITY RENOVATION Project No. HWY-L-06-06	
Scale: 1/4" = 1'-0"	Date: MAY 2008

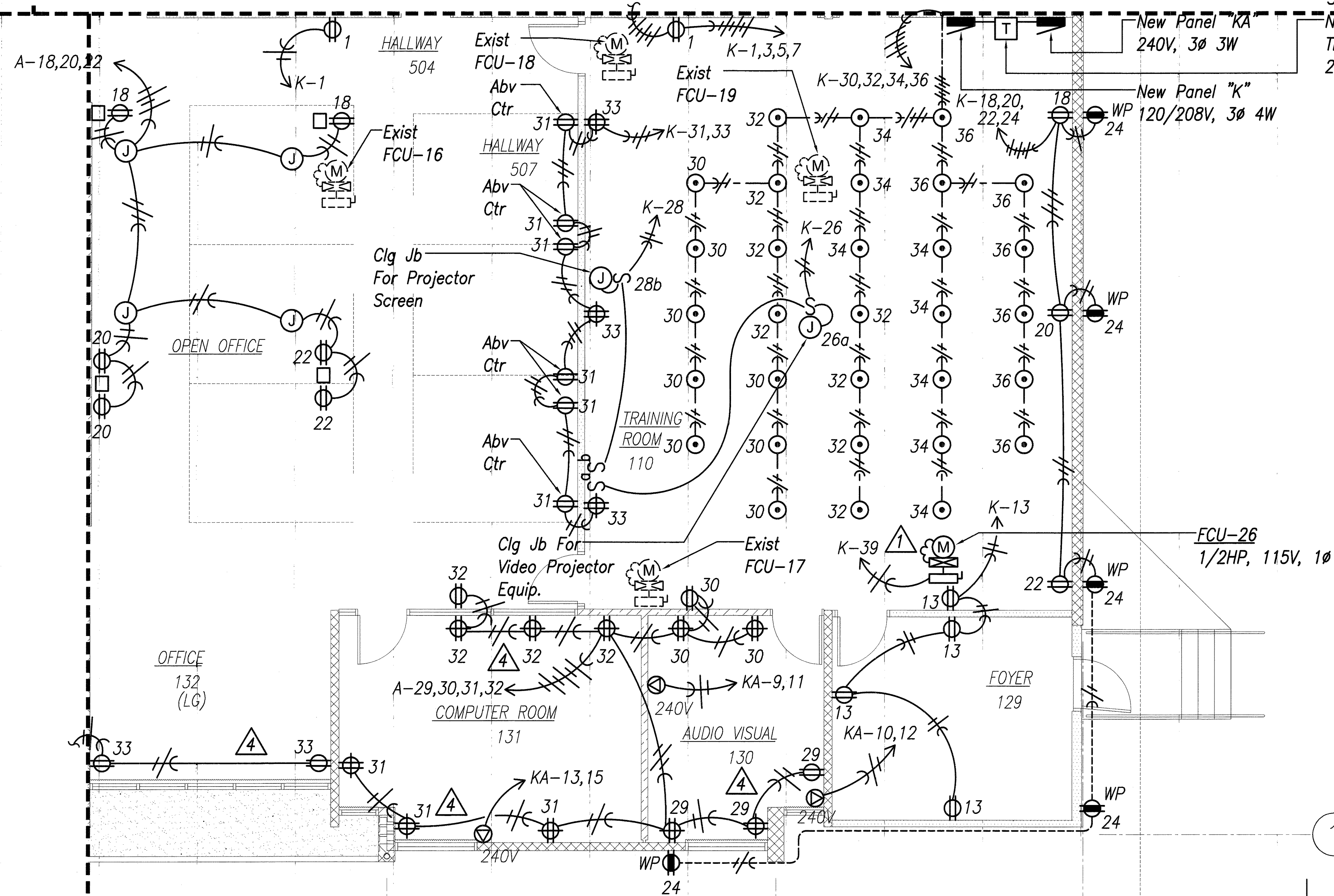
SHEET No. E-110 OF 38 SHEETS

C.O.125

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	C.O.ADD.126	152

Matchline
See Sheet E-108

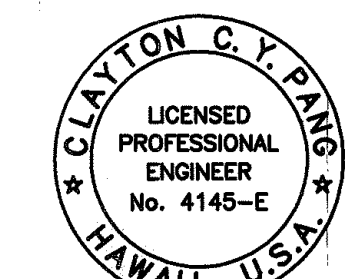
Matchline
See Sheet E-109
New Panel "K"
New Booster
Transformer
208-240V, 3Ø 3W



Matchline
See Sheet E-110

OFFICE POWER PLAN IV
Scale : 1/4" = 1' - 0"

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



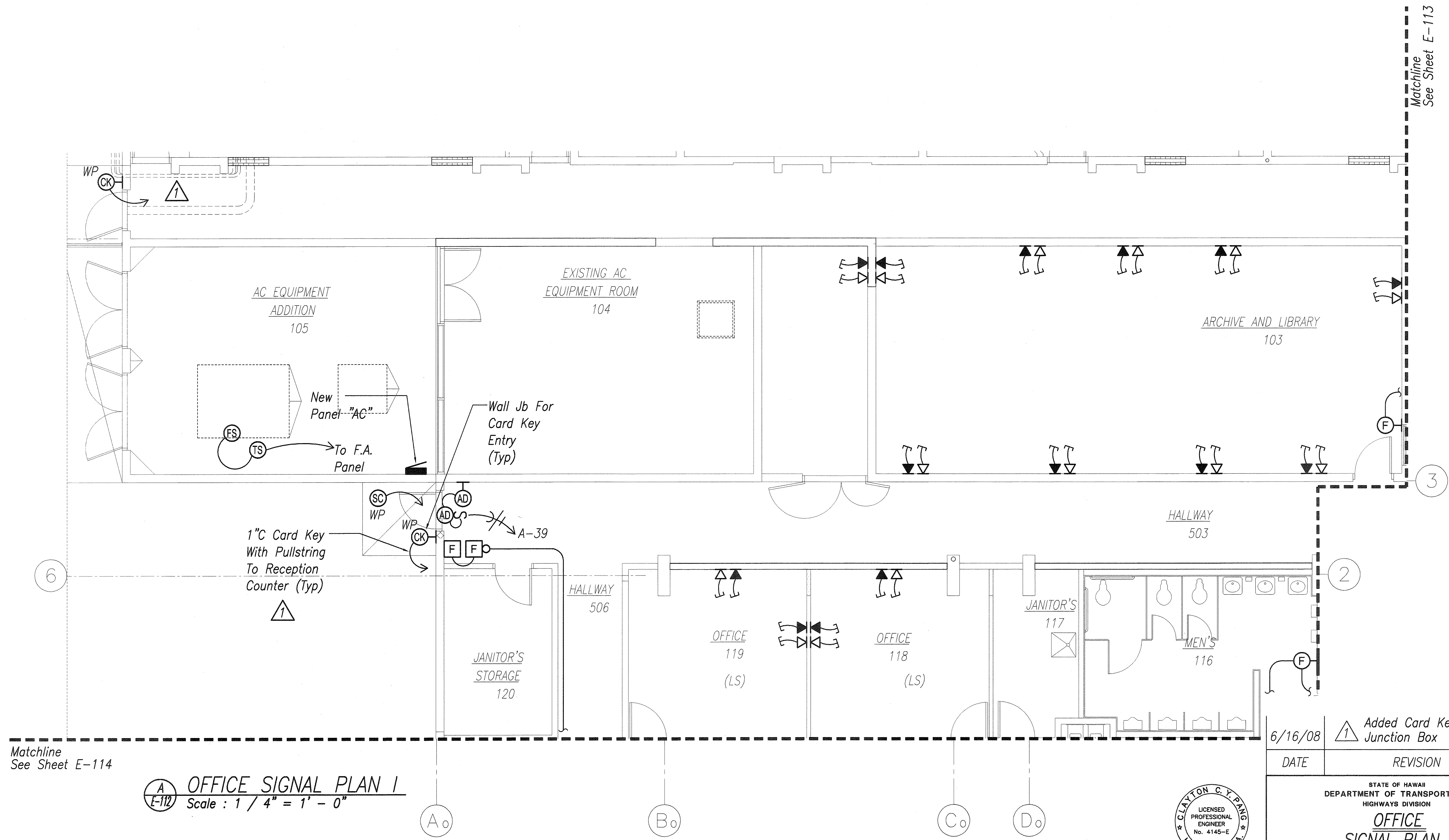
EXPIRATION DATE OF THE LICENSE 4/30/2010
THIS WORK WAS PREPARED BY
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7/02/09	△ Relocated Receptacles
6/16/08	△ Added FCU-26. Removed Floor Note
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION OFFICE POWER PLAN IV MATERIALS TESTING AND RESEARCH FACILITY RENOVATION Project No. HWY-L-06-06 Scale: 1/4" = 1'-0" Date: MAY 2008	

SHEET No. E-111 OF 38 SHEETS

C.O.ADD.126

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	ADD.127	152



Matchline
See Sheet E-114

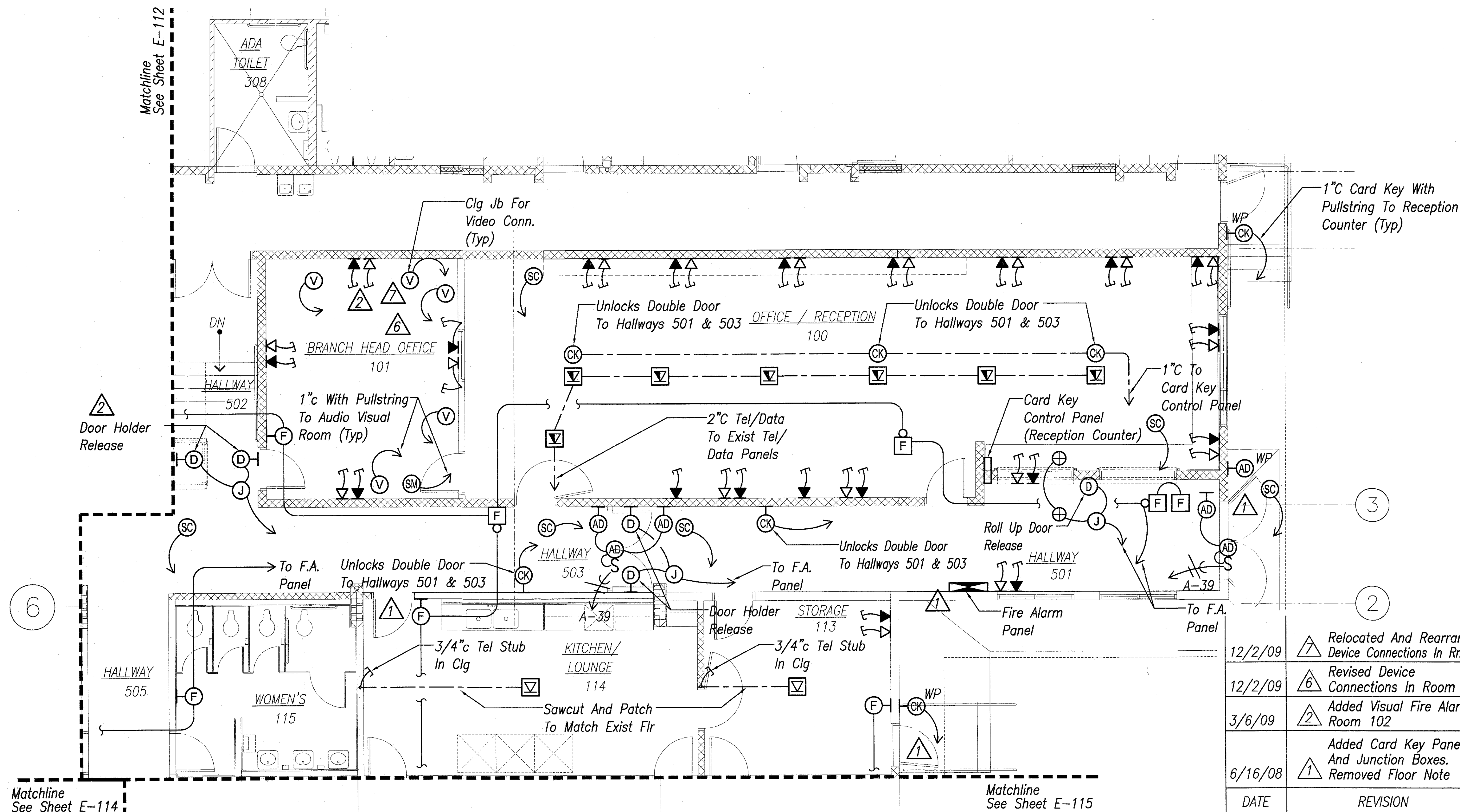
OFFICE SIGNAL PLAN I
Scale : 1 / 4" = 1' - 0"

6/16/08	Added Card Key Junction Box
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION OFFICE SIGNAL PLAN I MATERIALS TESTING AND RESEARCH FACILITY RENOVATION Project No. HWY-L-06-06 Scale: 1/4" = 1'-0" Date: MAY 2008	
SHEET No. E-112 OF 38 SHEETS	

CLAYTON C. Y. PAIG
 LICENSED PROFESSIONAL ENGINEER
 No. 4145-E
 HAWAII, U.S.A.
 THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

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.	HWY-L-06-06	2008	C.O.ADD.128	152



OFFICE SIGNAL PLAN II
 Scale : 1 / 4" = 1' - 0"

12/2/09	7	Relocated And Rearranged Device Connections In Rm 101
12/2/09	6	Revised Device Connections In Room 101
3/6/09	2	Added Visual Fire Alarm, Room 102
6/16/08	1	Added Card Key Panel And Junction Boxes. Removed Floor Note
DATE	REVISION	

STATE OF HAWAII

DEPARTMENT OF TRANSPORTATION

HIGHWAYS DIVISION

OFFICE

SIGNAL PLAN II

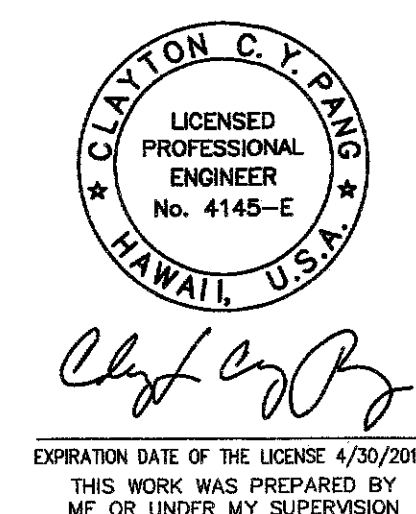
MATERIALS TESTING AND RESEARCH FACILITY RENOVATION

Project No. HWY-L-06-06

Scale: 1/4" = 1'-0"

Date: MAY 2008

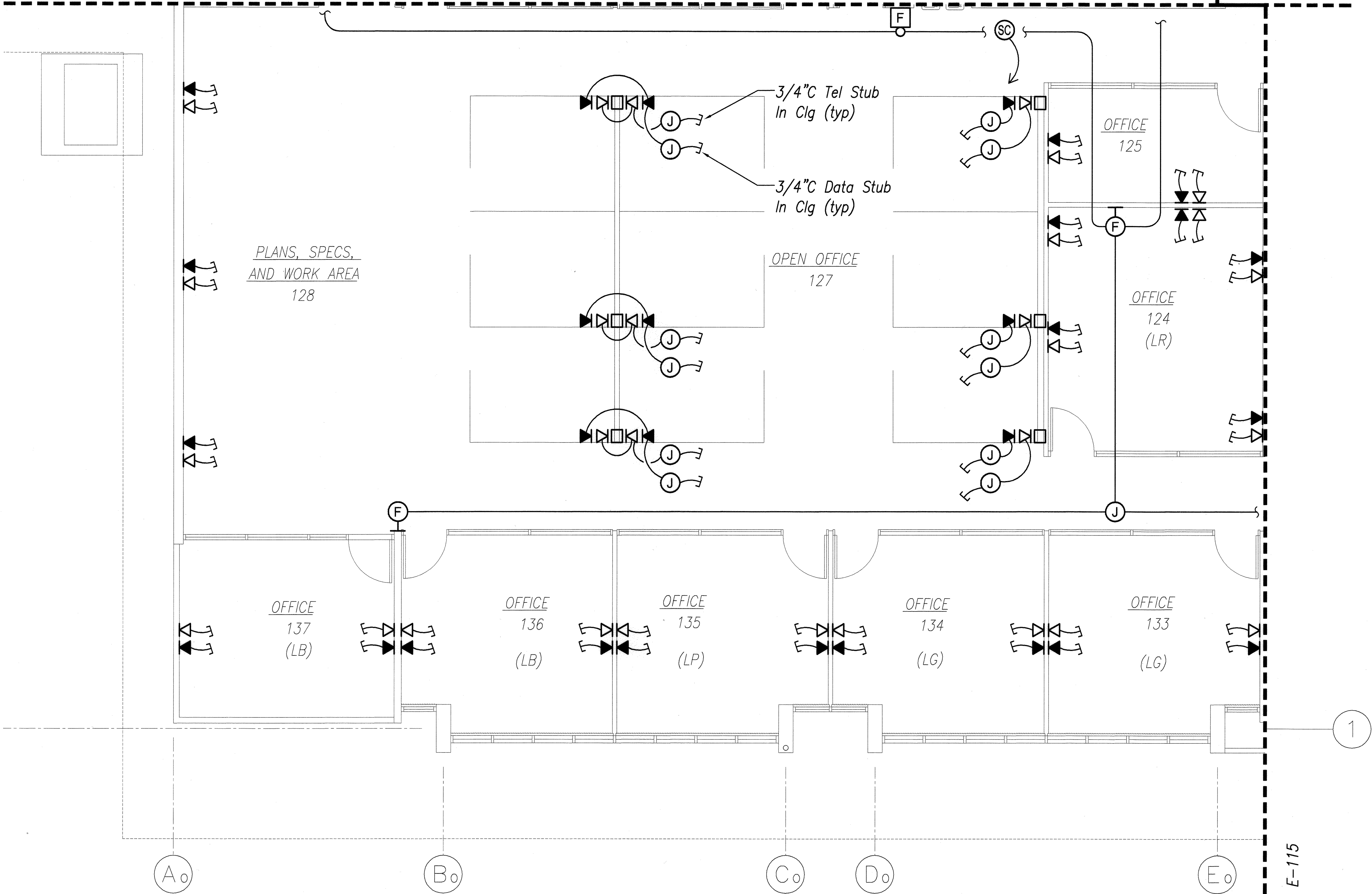
SURVEY PLATTED BY	DATE
DRAWN BY	
DESIGNED BY	
QUANTITIES BY	
CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	129	152

Matchline
See Sheet E-112

Matchline
See Sheet E-113



A OFFICE SIGNAL PLAN III
E-114 Scale : 1 / 4" = 1' - 0"

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



EXPIRATION DATE OF THE LICENSE 4/30/2010
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
OFFICE
SIGNAL PLAN III
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: 1/4" = 1'-0"
Date: MAY 2008

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	C.O.ADD.130	152

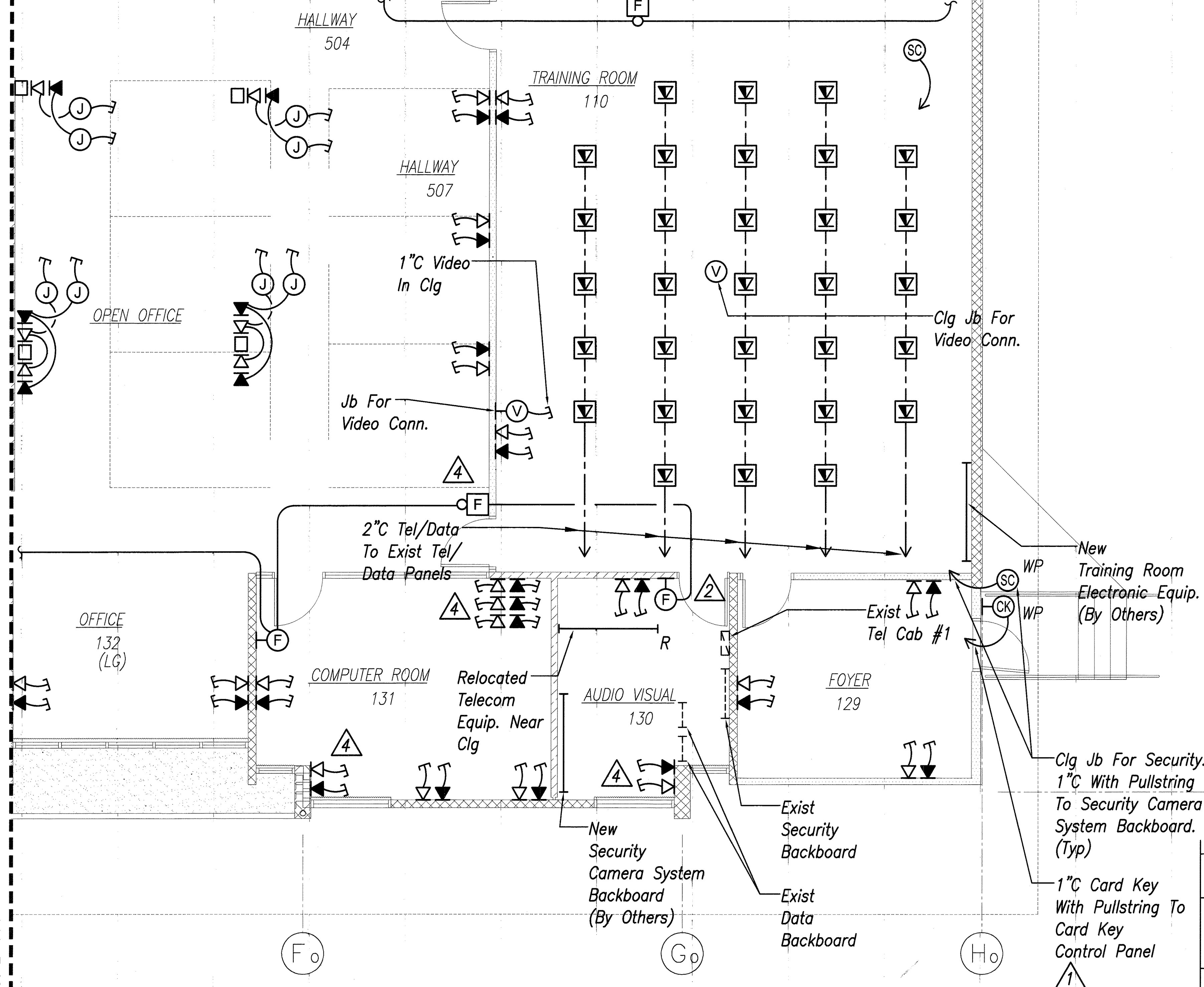
Matchline
See Sheet E-112

Matchline
See Sheet E-113

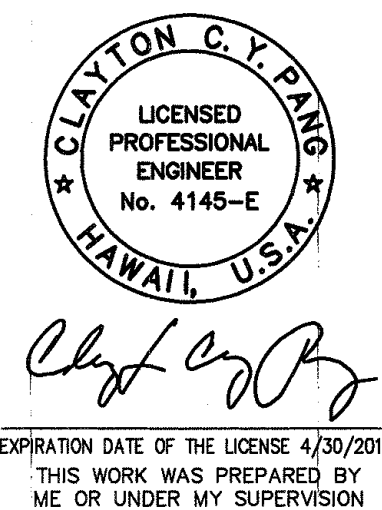
Matchline
See Sheet E-114

OFFICE SIGNAL PLAN IV
Scale : 1 / 4" = 1' - 0"

SURVEY PLOTTED BY	DATE
DRAWN BY	
CHECKED BY	
NOTED BY	
QUANTITIES BY	
CHECKED BY	
No.	



DATE	REVISION
7/02/09	4 Relocated Tel/Data Outlet And Fire Alarm Device
3/6/09	2 Added Visual Fire Alarm, Room 130
6/16/08	1 Added Card Key Junction Box. Removed Floor Note

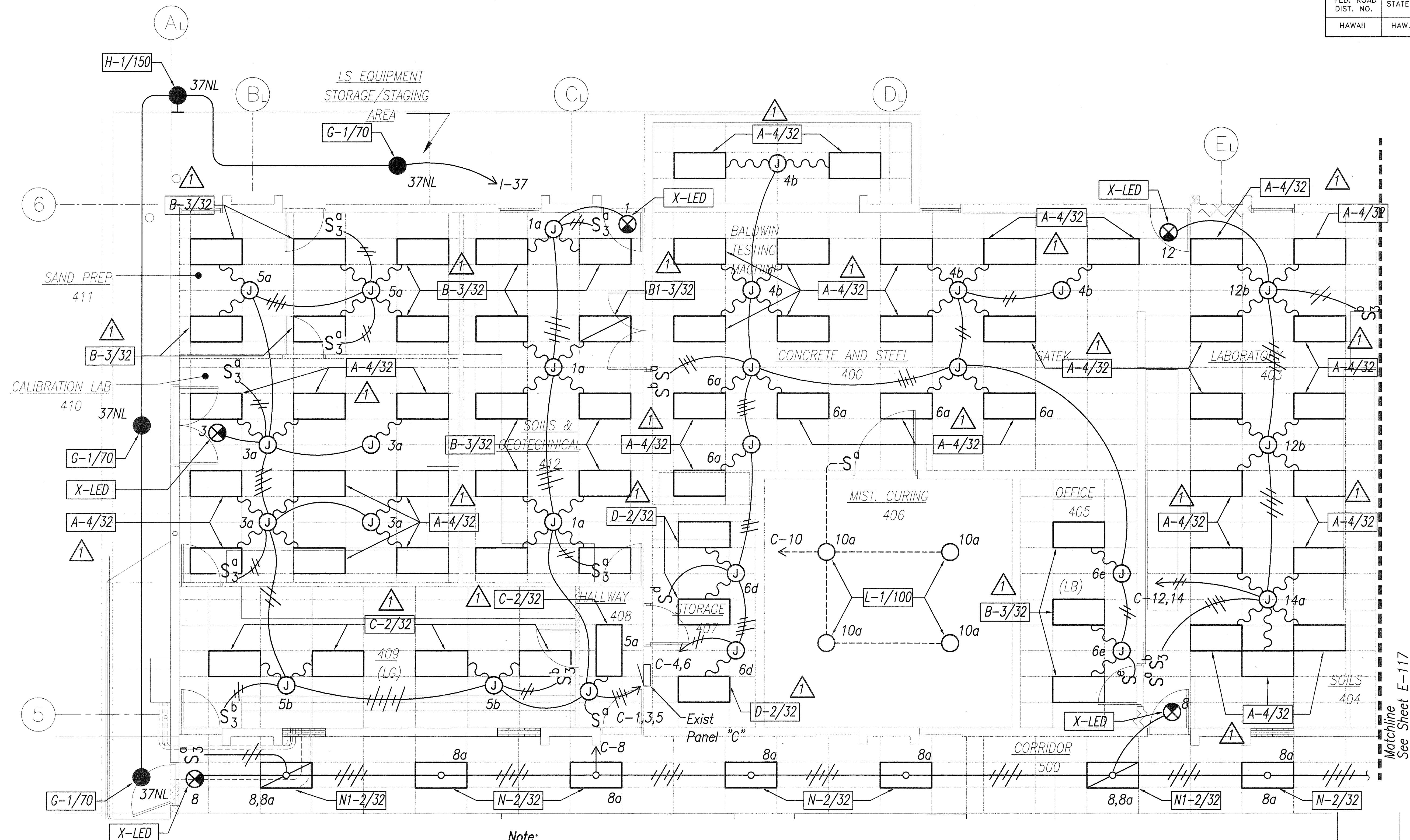


STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

OFFICE
SIGNAL PLAN IV
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

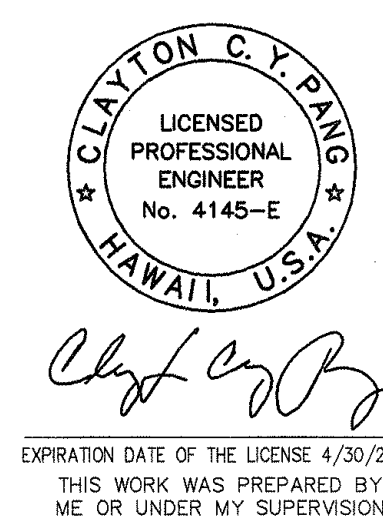
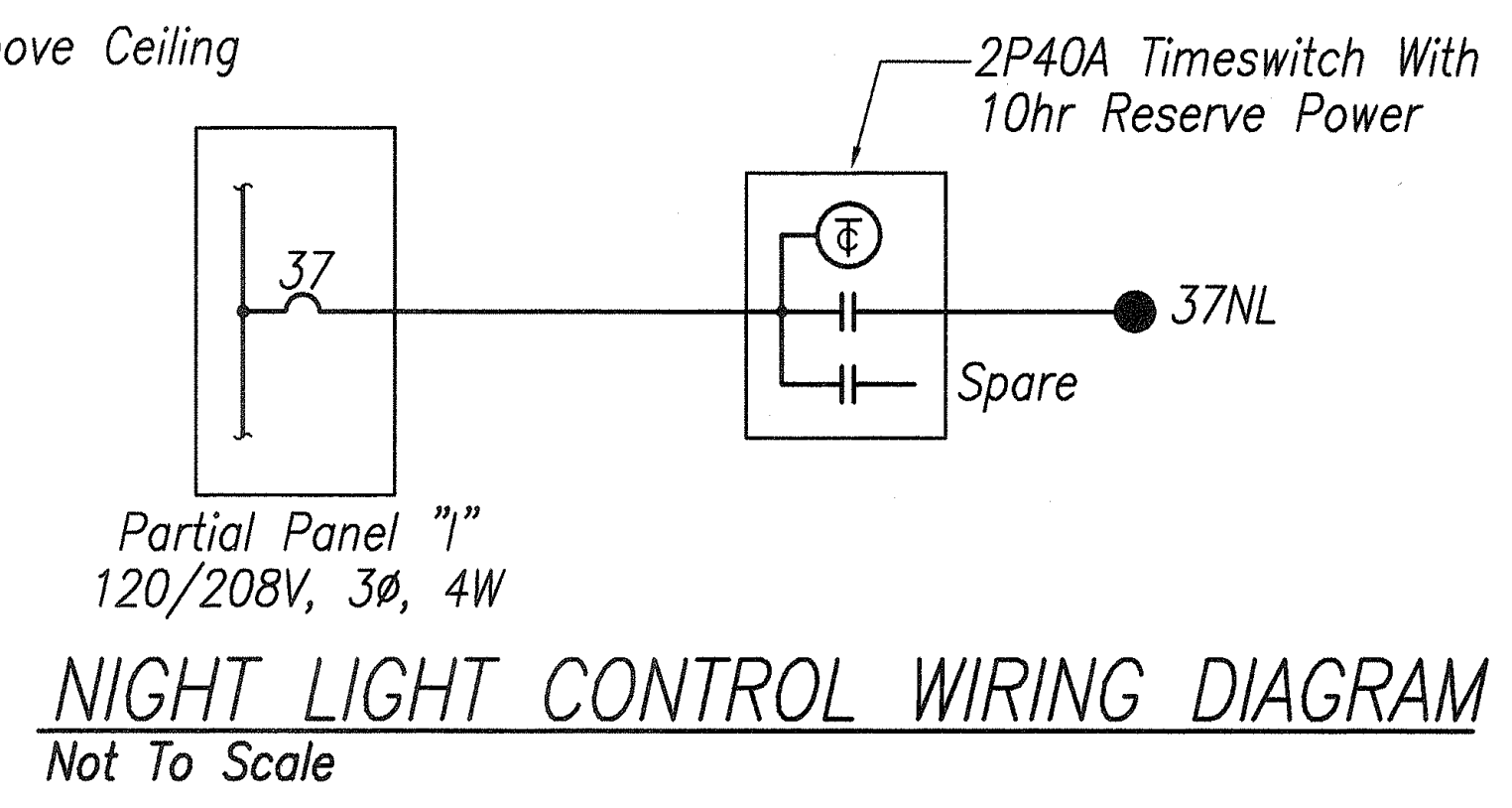
Scale: 1/4" = 1'-0" Date: MAY 2008

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	ADD.131	152



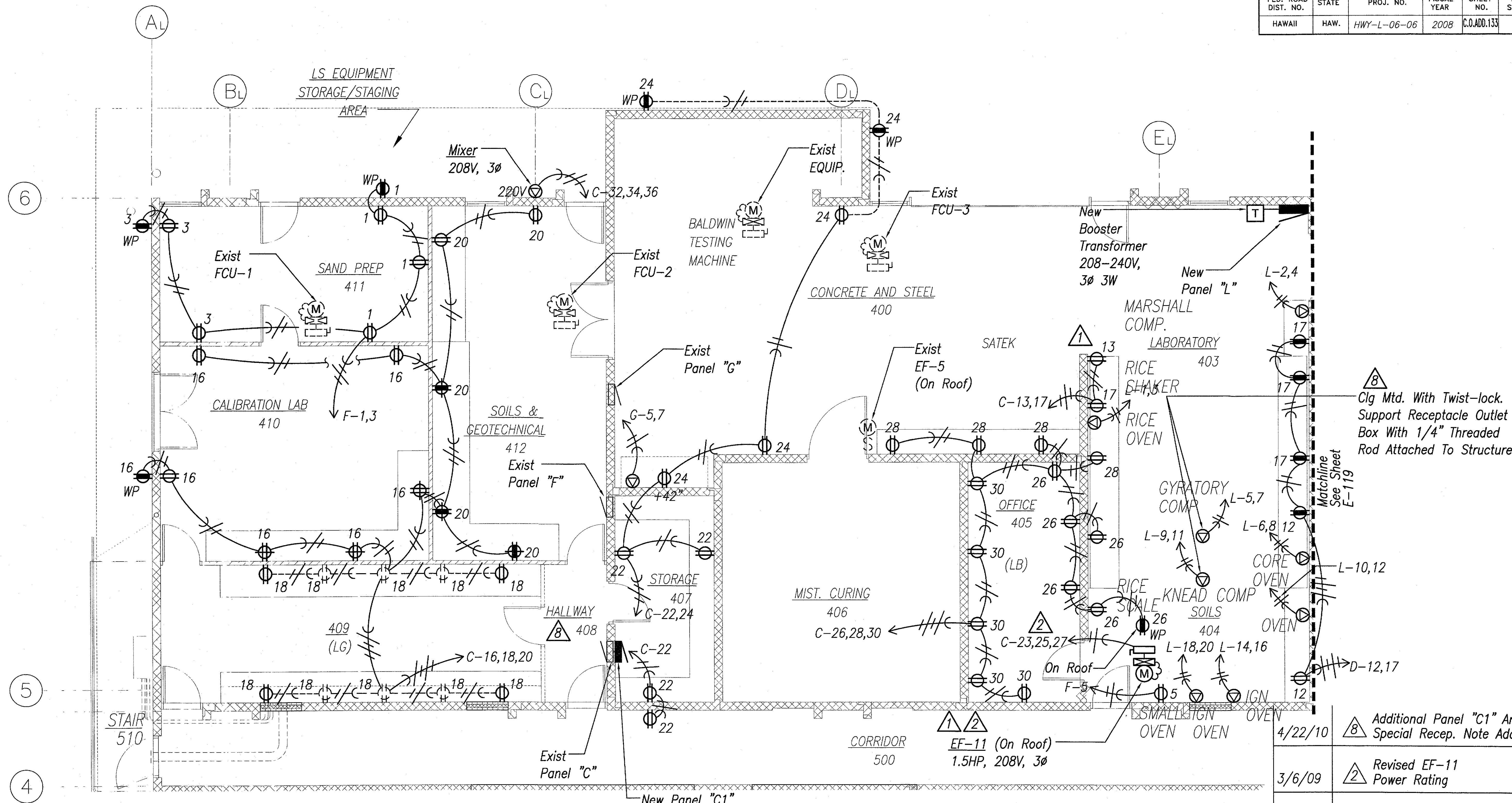
LABORATORY LIGHTING PLAN I
 Scale : 1 / 4" = 1' - 0"

Note:
 1. Contractor Shall Verify Space Above Ceiling Prior To Ordering Light Fixtures.



6/16/08	Revised Luminaire Type
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION LABORATORY LIGHTING PLAN I MATERIALS TESTING AND RESEARCH FACILITY RENOVATION Project No. HWY-L-06-06 Scale: 1/4" = 1'-0" Date: MAY 2008	
SHEET No. E-116 OF 38 SHEETS	

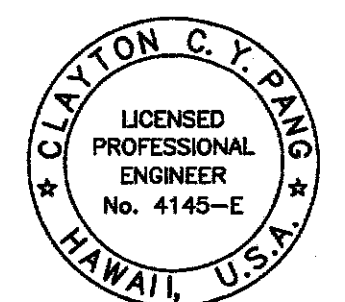
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	C.O.ADD.133	152



LABORATORY POWER PLAN I
 Scale : 1 / 4" = 1' - 0"

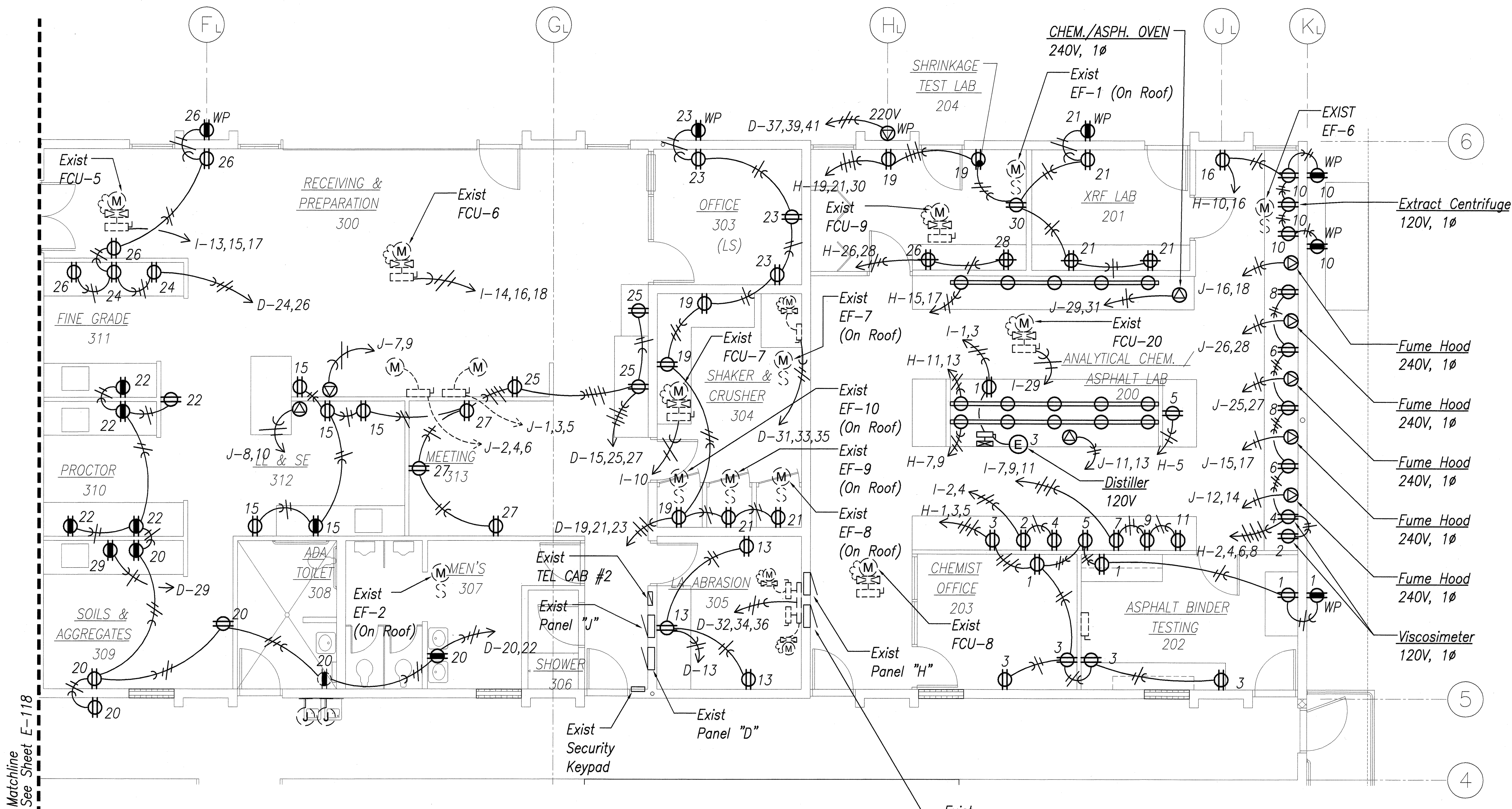
New Panel "C1"
 225A Main Lugs Only.
 Branch Bkr I.C. 10,000 Amps
 208Y/120V 3Ø 4W
 Surface Mtd. 18 Ckts.
 Connect 4#1/0, 1#6Gnd
 To Exist Panel "C" Bus

4/22/10	8	Additional Panel "C1" And Special Recep. Note Added
3/6/09	2	Revised EF-11 Power Rating
6/16/08	1	Added EF-11. Relocated Marshall Comp. Recep
DATE		REVISION



STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
LABORATORY POWER PLAN I
 MATERIALS TESTING AND RESEARCH FACILITY RENOVATION
 Project No. HWY-L-06-06
 Scale: 1/4" = 1'-0" Date: MAY 2008

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	134	152



LABORATORY POWER PLAN II
Scale : 1 / 4" = 1' - 0"

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



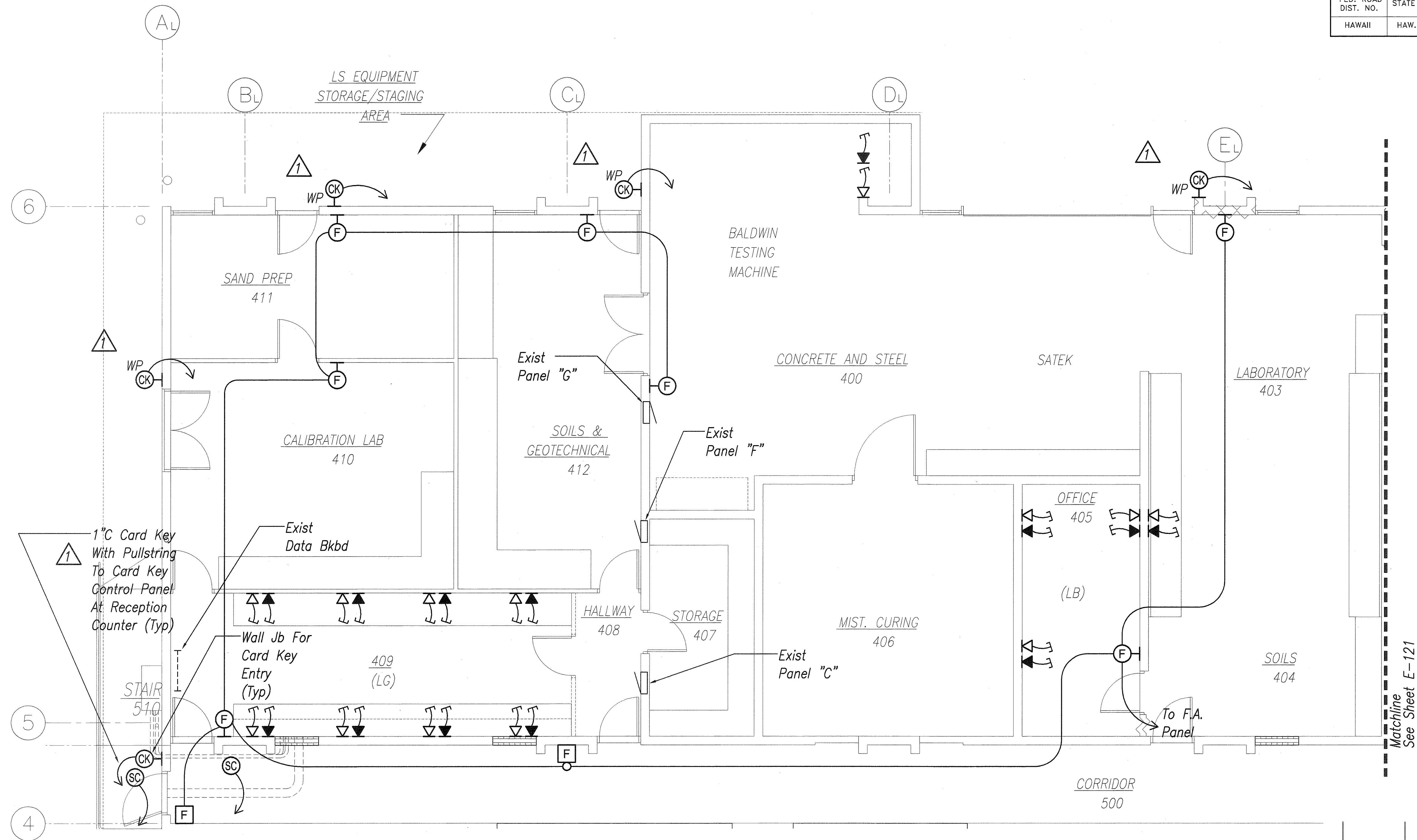
CLAYTON C. Y. PANG
LICENSED PROFESSIONAL ENGINEER
No. 4145-E
HAWAII, U.S.A.

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
LABORATORY POWER PLAN II
MATERIALS TESTING AND RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: 1/4" = 1'-0" Date: MAY 2008

SHEET No. E-119 OF 38 SHEETS

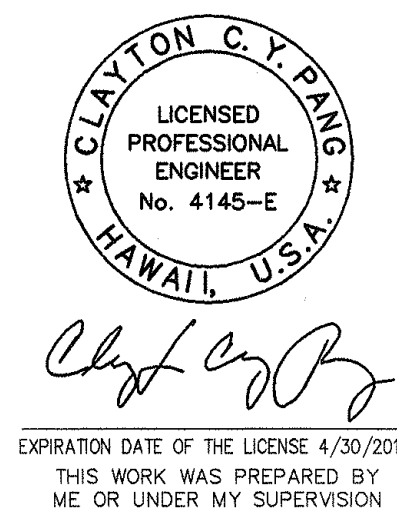
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	ADD.135	152



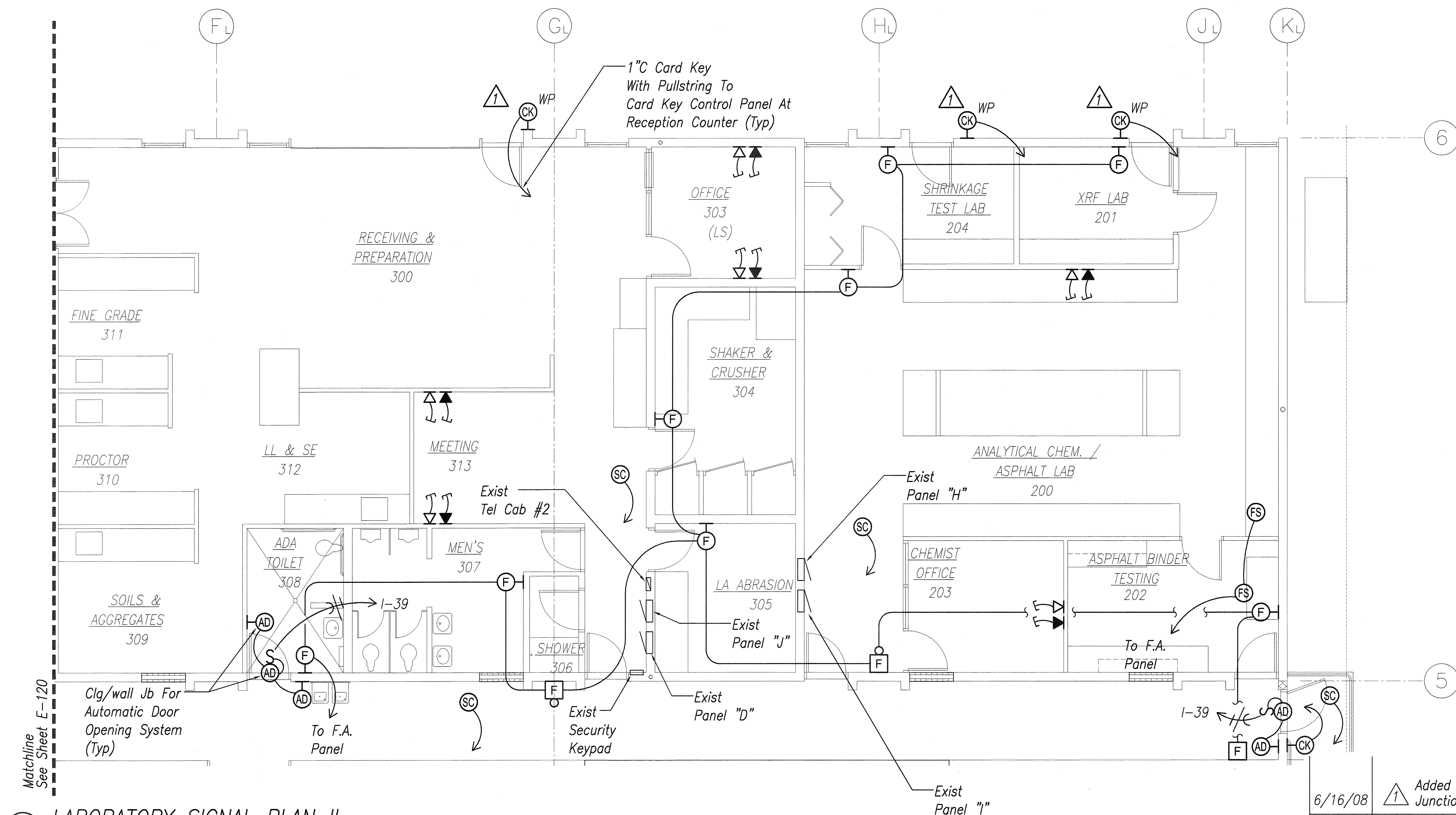
A LABORATORY SIGNAL PLAN 1
 E-120 Scale : 1 / 4" = 1' - 0"

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

6/16/08	1 Added Card Key Junction Boxes
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION LABORATORY SIGNAL PLAN 1 MATERIALS TESTING AND RESEARCH FACILITY RENOVATION Project No. HWY-L-06-06 Scale: 1/4" = 1'-0" Date: MAY 2008	
SHEET No. E-120 OF 38 SHEETS	

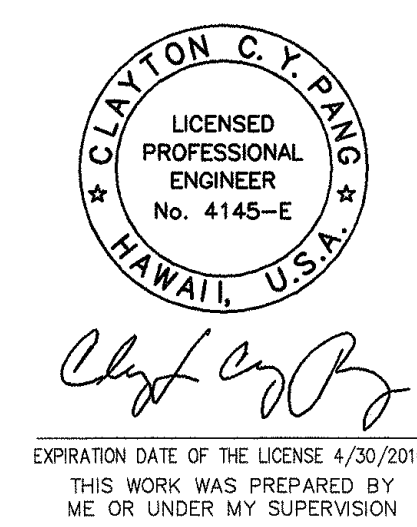


FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	ADD.136	152



LABORATORY SIGNAL PLAN II
 Scale : 1 / 4" = 1' - 0"

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



6/16/08	Added Card Key Junction Boxes
DATE	REVISION

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

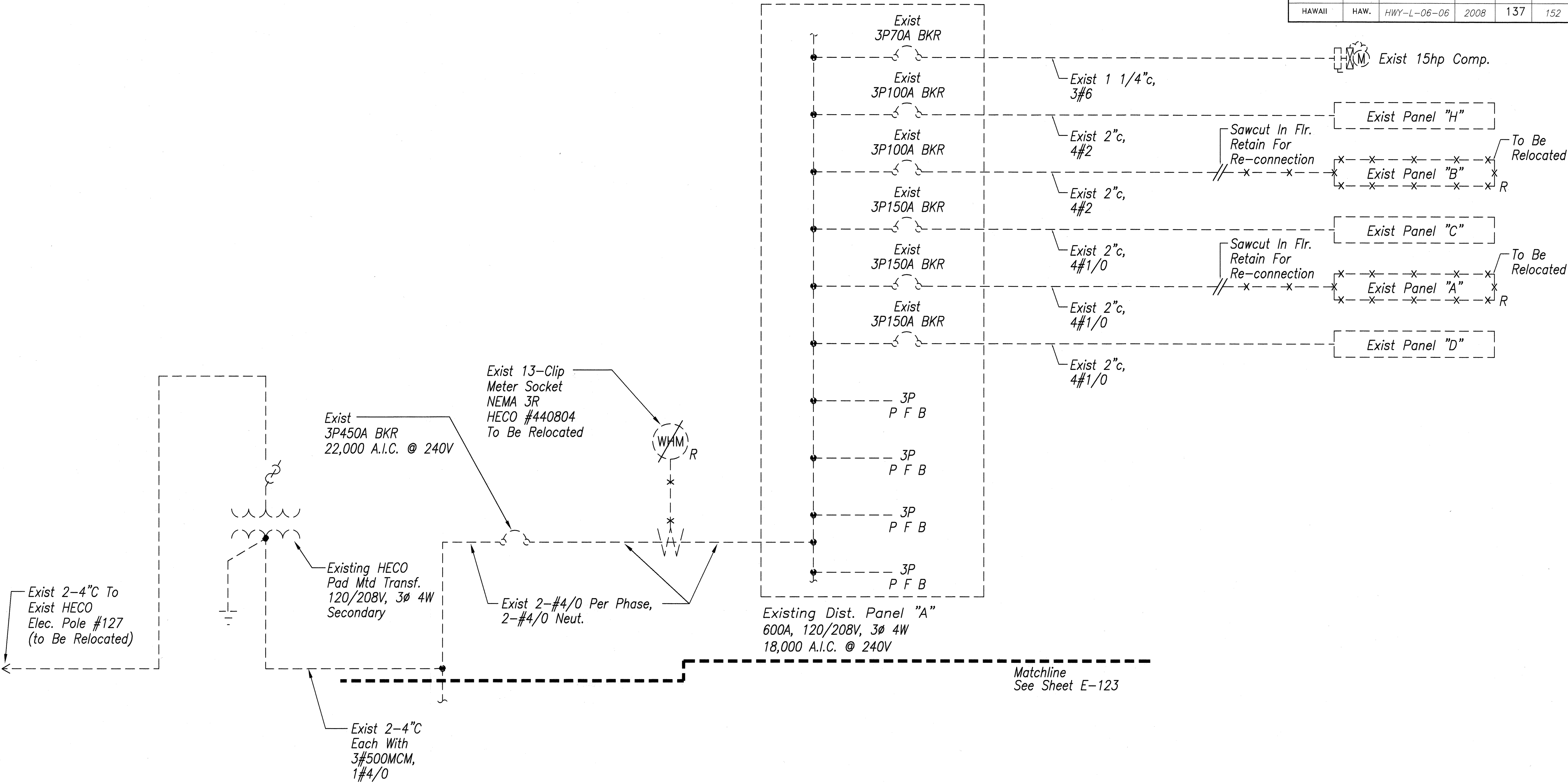
**LABORATORY
 SIGNAL PLAN II**

MATERIALS TESTING AND
 RESEARCH FACILITY RENOVATION
 Project No. HWY-L-06-06

Scale: 1/4" = 1'-0" Date: MAY 2008

SHEET No. E-121 OF 38 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	137	152



A SINGLE LINE DIAGRAM – DEMOLITION WORK I
 Scale : Not To Scale

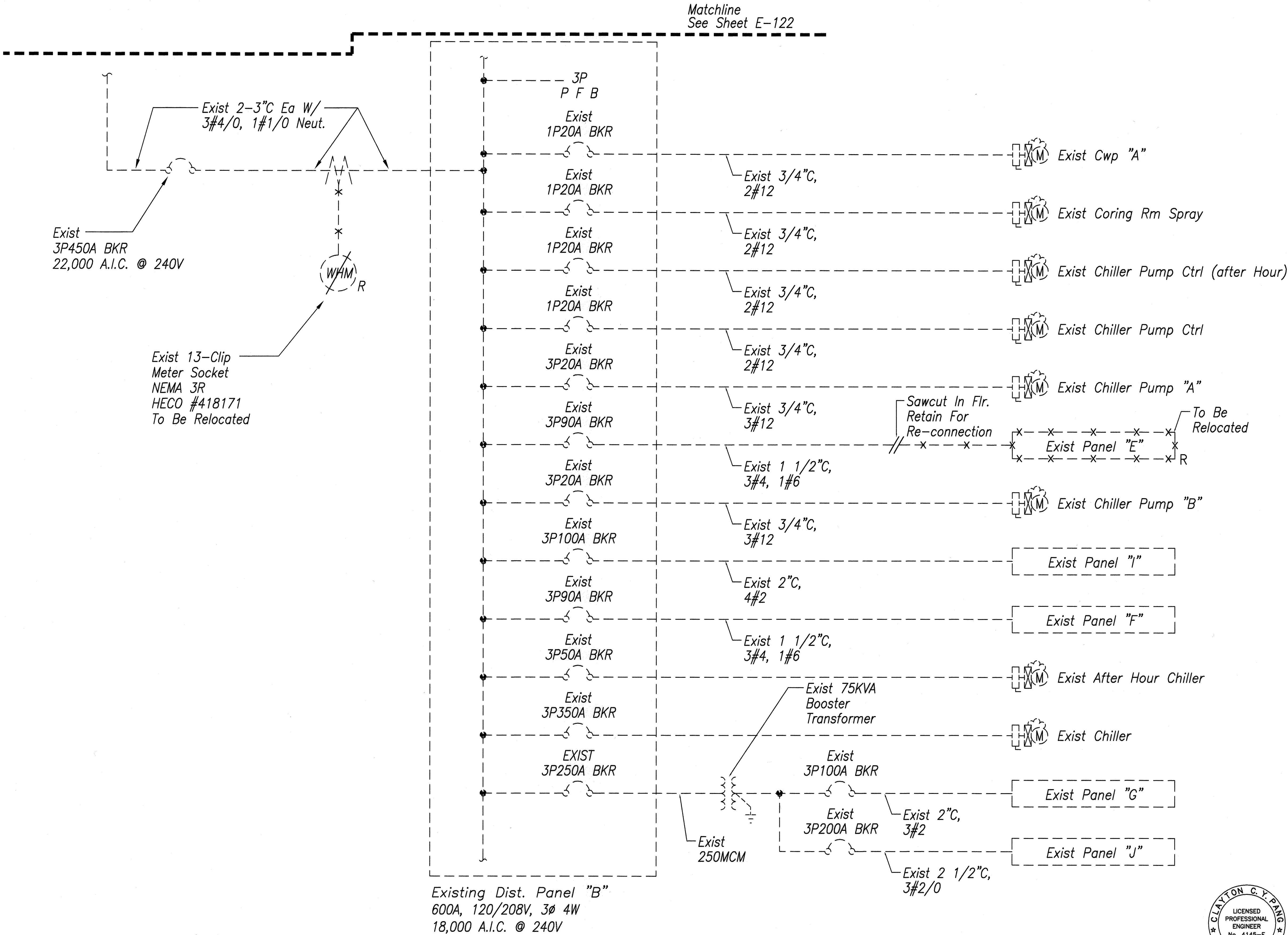
SURVEY PLOTTED BY	DATE
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CHECKED BY	
ORIGINAL PLAN	
NOTE BOOK	
No.	



EXPIRATION DATE OF THE LICENSE 4/30/2016
 THIS WORK WAS PREPARED BY
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STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION
SINGLE LINE DIAGRAM
DEMOLITION WORK I
 MATERIALS TESTING AND
 RESEARCH FACILITY RENOVATION
 Project No. HWY-L-06-06
 Scale: Not To Scale Date: MAY 2008

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	138	152



SINGLE LINE DIAGRAM – DEMOLITION WORK II
 Scale : Not To Scale

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

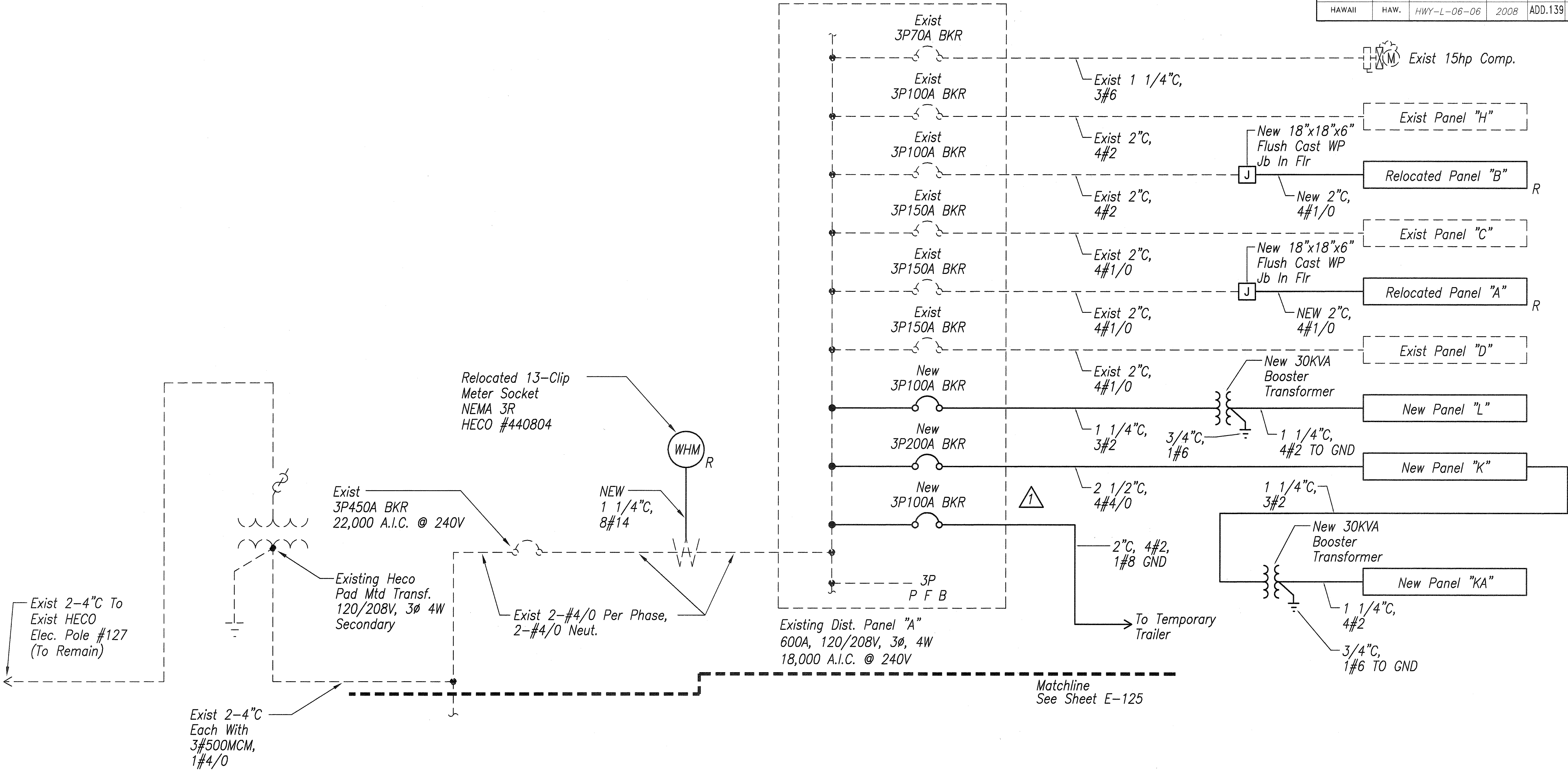


EXPIRATION DATE OF THE LICENSE 4/30/2010
 THIS WORK WAS PREPARED BY
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STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
SINGLE LINE DIAGRAM
DEMOLITION WORK II
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

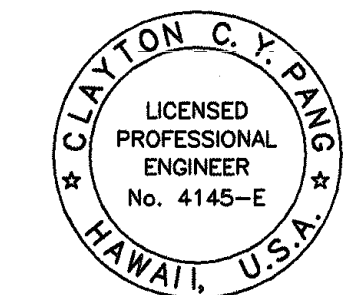
Scale: Not To Scale
Date: MAY 2008

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	ADD.139	152



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

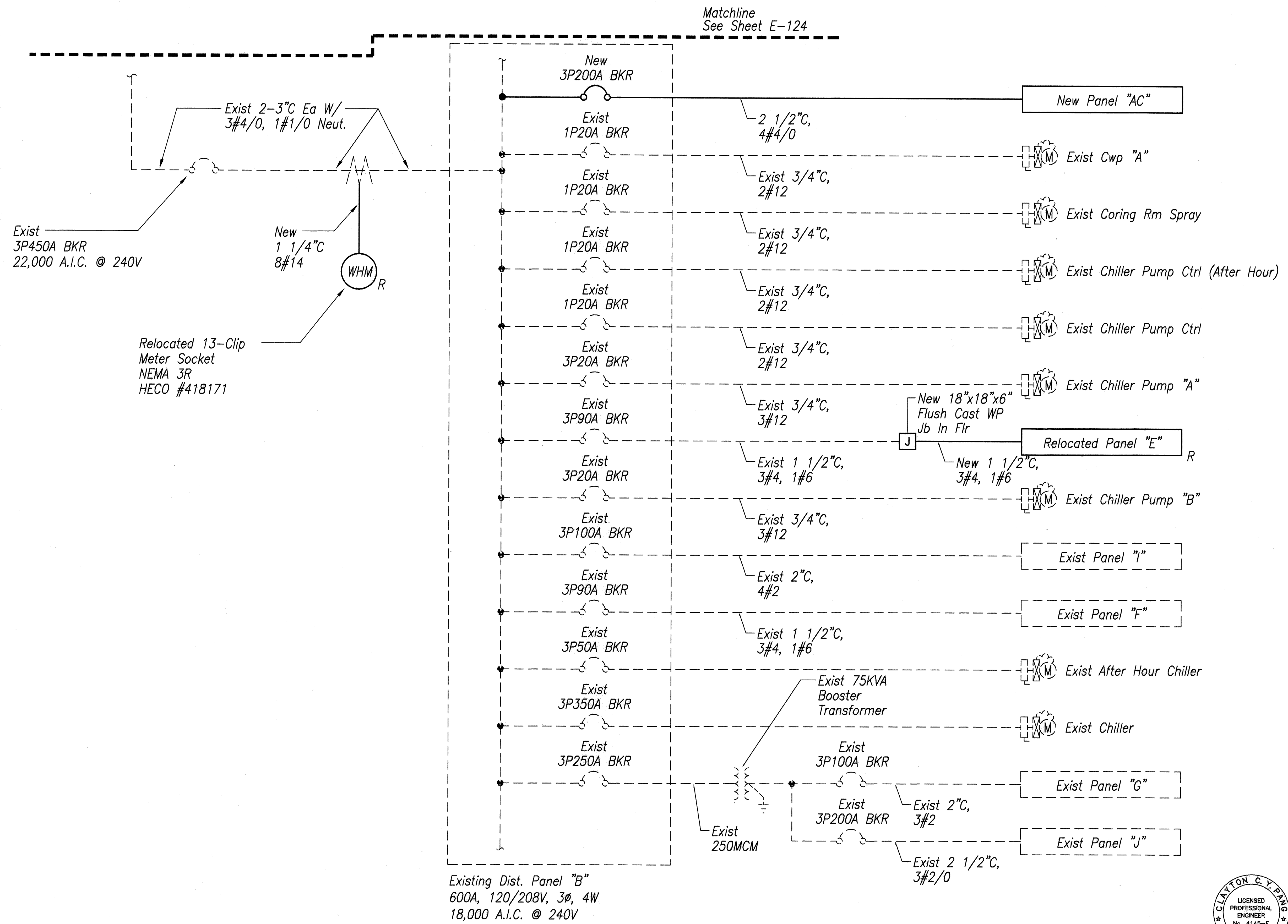
A SINGLE LINE DIAGRAM – NEW WORK 1
Scale : Not To Scale



EXPIRATION DATE OF THE LICENSE 4/30/2010
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

6/16/08	Added New Panel "T" For Temporary Trailer
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION SINGLE LINE DIAGRAM NEW WORK 1 MATERIALS TESTING AND RESEARCH FACILITY RENOVATION Project No. HWY-L-06-06 Scale: Not To Scale Date: MAY 2008	

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	140	152



SINGLE LINE DIAGRAM - NEW WORK II
Scale : Not To Scale

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



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ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

SINGLE LINE DIAGRAM
NEW WORK II

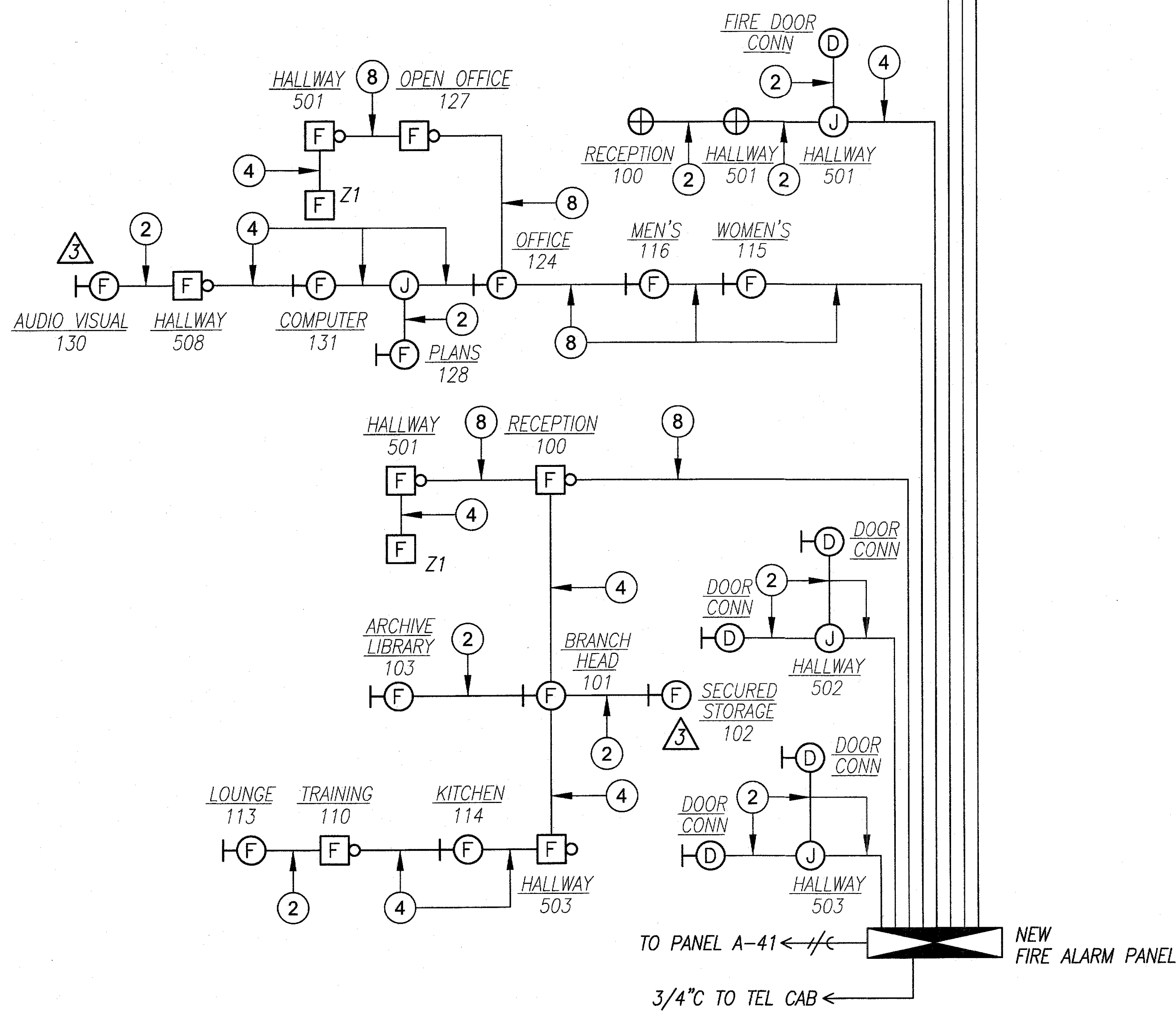
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: Not To Scale Date: MAY 2008

SHEET No. E-125 OF 38 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	C.O.141	152

Matchline
See Sheet E-127



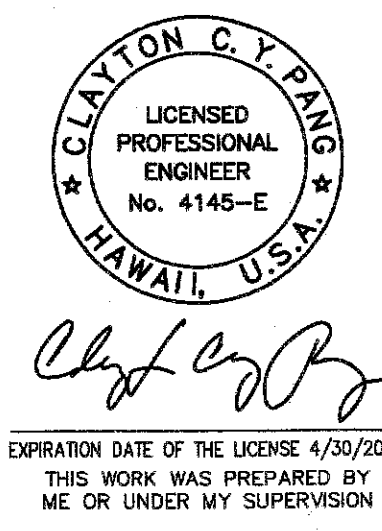
FIRE ALARM NOTES:

1. Verify Wiring And Junction Box Sizes With Equipment Supplier Prior To Bid.
2. All Wires Shall Be No. 14 THWN Minimum.
3. All Equipment Shall Be U.I. Approved.
4. Fire Alarm System Shall Be Electrically Supervised.
5. Conduit Shall Be 3/4" Minimum.
6. ② - Indicates Number Of #14 Wires, 2-Wires Indicated.
7. Fire Alarm System Shall Conform With UFC Article 10, Nfpa 72 And UFC 1997.
8. All Equipment Shall Be A.D.A. Compliant.
9. Fire Alarm Device Quantity To Be Determined By Code.
10. Verify All Wire Counts And Type With Equipment Supplier And Provide Additional Wiring And Devices As Required For A Complete And Operable System.
11. Upon Fire Alarm Activation, System Shall Sound A General Alarm Throughout The Building. Panel Shall Use Dact To Contact A Remote Monitor Station. Also, All Fire/Smoke Dampers Shall Close.
12. All Flashing Lights Shall Have Synchronized Modules To Ensure All Flashing Lights Are Synchronized.
13. Fire Safety During Construction, Alteration Or Demolition Shall Be In Accordance With Article 87, UFC 1997 As Amended.
14. Call Fire Department Plans At 523-4186 To Schedule A Fire Alarm Acceptance Test.
15. The Fire Alarm System Shall Be Designed, Installed And Maintained In Accordance With The 1997 Uniform Fire Code, The 1997 UFC Standard 10-2, And Article 10 Section 1007 Of The 1997 Uniform Fire Code.
16. Design Standards - Fire Alarm Systems, Automatic Fire Detectors, Emergency Voice Alarm Communication Systems And Notification Devices Shall Be Designed, Installed And Maintained In Accordance With UFC Standard 10-2 And Other Nationally Recognized Standards. 1997 UFC Section 1007.3.1.
17. Audibility. The Alarm Signal Shall Be A Distinctive Sound. Which Is Not Used For Any Other Purpose Other Than The Fire Alarm. Alarm-Signaling Devices Shall Produce A Sound That Exceeds The Prevailing Equivalent Sound Level In A Room Or Space By 15 Decibels Minimum, Or Exceeds Any Maximum Sound Level With A Duration Of 60 Seconds Minimum By 5 Decibels Minimum, Whichever Is Louder. Sound Levels For Alarm Signals Shall Be 120 Decibels Maximum. 1997 UFC Section 1007.3.3.3 As Amended.
18. Acceptance Test. Upon Completion Of The Installation, A Satisfactory Test Of The Entire System Shall Be Made In The Presence Of The Chief. All Functions Of The System Or Alteration Shall Be Tested. 1997 UFC Section 1007.3.4.1.

OFFICE BUILDING

A FIRE ALARM RISER DIAGRAM 1
Scale : Not To Scale

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



3/6/09	② Added Visual Fire Alarm, Rooms 102 and 130
DATE	REVISION

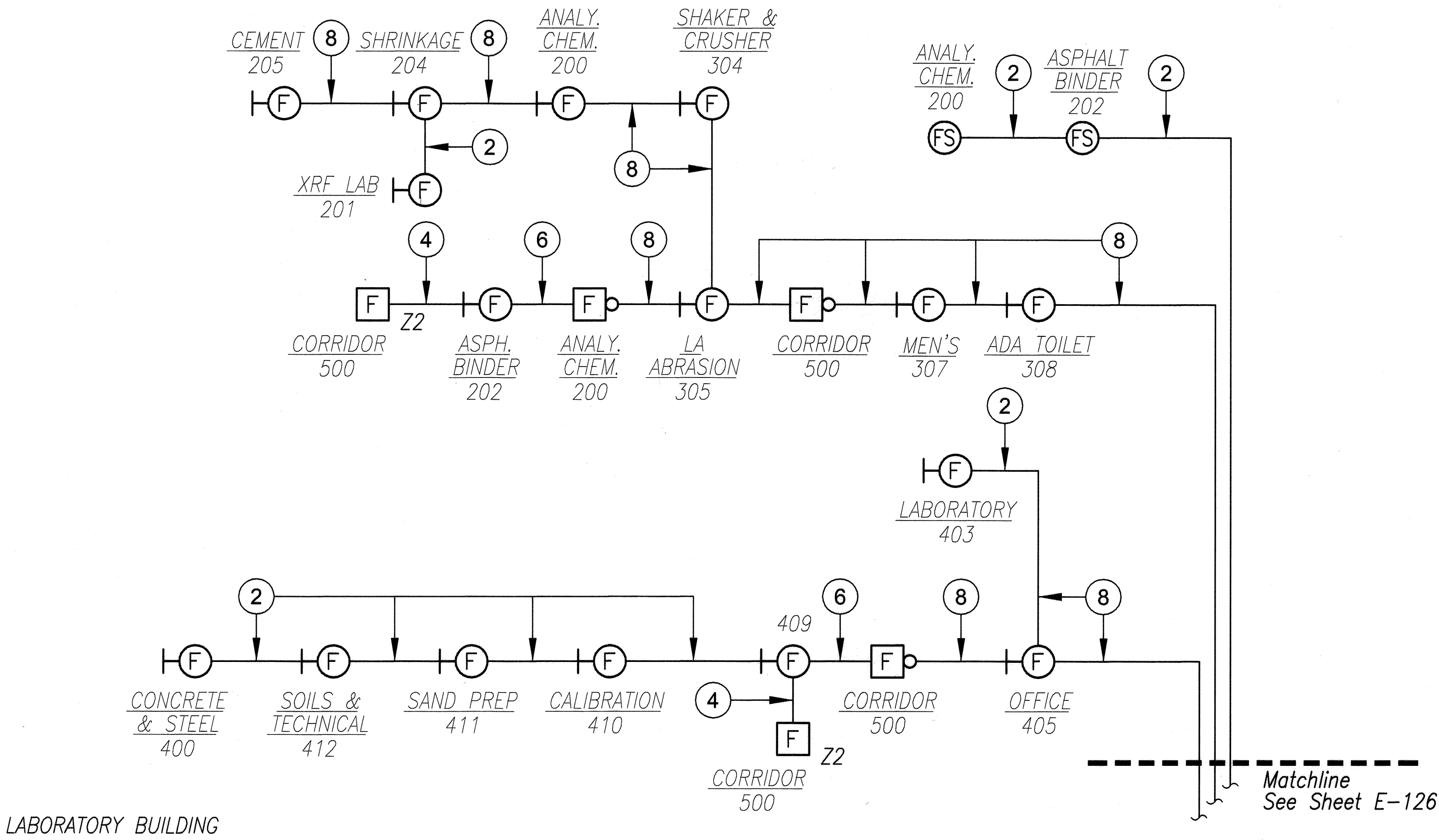
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

**FIRE ALARM RISER
DIAGRAM 1**

MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: Not To Scale Date: MAY 2008

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	142	152



LABORATORY BUILDING

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

FIRE ALARM RISER DIAGRAM II
Scale : Not To Scale



EXPIRATION DATE OF THE LICENSE 4/30/2010
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
**FIRE ALARM RISER
DIAGRAM II**
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: Not To Scale Date: MAY 2008

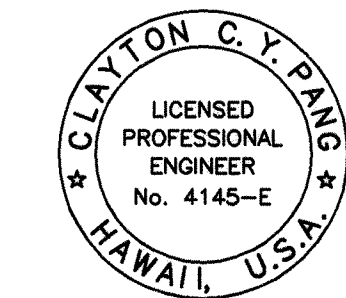
SHEET No. E-127 OF 38 SHEETS

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	143	152

Exist Panel "A"		120/208 Volts		3Ø, 4WSN		
3P150A Main Bkr		Branch Bkr I.C.		10,000 Amps		
Flush				GE Type Nlab		
CKT NO.	BKR	L O A D	KVA			WIRE
			A	B	C	
1	1P20A	RECEP – FAX (OFF. 100)	1.0			12
2		– OFFICE/RECEPTION 100	1.0			
3		– COLOR PRINTER (OFF. 100)		1.0		
4		– OFFICE/RECEPTION 100		1.0		
5		– WORK TABLE (OFF. 100)			1.0	
6		– OFFICE/RECEPTION 100			1.0	
7		– COPIER (OFF. 100)	1.0			
8		– BR. HEAD OFF./SECUR. STOR.	1.0			
9		– BRANCH HEAD OFFICE		1.0		
10		– BRANCH HEAD OFFICE		1.0		
11		– BRANCH HEAD OFFICE			1.0	
12		– BRANCH HEAD OFFICE			1.0	
13		– EWC/MEN/WOMEN/JAN.	1.0			
14		– ARCHIVE AND LIB. 103	1.0			
15		↓ – OFFICE 118		1.0		
16		JB – ARCHIVE AND LIB. 103		1.0		
17		RECEP – OFFICE 119/JAN. 120			1.0	
18		– OFFICE 121			1.0	
19		– OFFICE 125	1.0			
20		– OFFICE 122	1.0			
21		– OFFICE 126		1.0		
22		– OFFICE 123		1.0		
23		– OPEN OFFICE 127			1.0	
24		– OFFICE 124			1.0	
25		– OPEN OFFICE 127	1.0			
26		– PLANS, SPECS & WORK 128	1.0			
27		↓ – OPEN OFFICE 127		1.0		
28		JB – PLANS, SPECS & WORK 128		1.0		
29		RECEP – AUDIO VISUAL 130			1.0	
30		– AUDIO VISUAL 130			1.0	
31		– COMPUTER ROOM 131	1.0			
32		– COMPUTER ROOM 131	1.0			
33		– OFFICE 132		1.0		
34		– OFFICE 135		1.0		
35		– OFFICE 133			1.0	
36		– OFFICE 136			1.0	
37		– OFFICE 134	1.0			
38		↓ – OFFICE 137	1.0			
39	↓	AUTOMATIC DOOR OPENER		1.0		↓
40,42	2P30A	RECEP – XEROX MACHINE		2.0	2.0	10
41	1P20A	FIRE ALARM PANEL			1.0	12
T O T A L			14.0	15.0	15.0	

Exist Panel "B"		120/208 Volts		3Ø, 4WSN		
3P100A Main Bkr		Branch Bkr I.C.		10,000 Amps		
Flush				GE Type Nlab		
CKT NO.	BKR	L O A D	KVA			WIRE
			A	B	C	
1	1P20A	L T S – HALLWAY and OPEN OFFICE	1.5			12
2		– LOUNGE/KITCHEN/WOMEN'S	1.2			
3		– OPEN OFFICE		1.4		
4		– OFFICE 118,119/JAN./MEN'S		1.5		
5		– OPEN OFFICE			1.4	
6		– AUDIO VISUAL/COMPUTER			0.7	
7		– PLANS/SPECS	1.4			
8		– OFFICE 132,133,134	1.4			
9		– OPEN SPACE		1.4		
10		– OFFICE 135,136,137		1.4		
11		– OFFICE 124,125,126			0.9	
12		– MAIN HALLWAY			1.5	
13		– TRAINING ROOM	1.0			
14		– OFFICE/RECEPTION	1.0			
15	*	– TRAINING ROOM		1.0		
16	*	– OFFICE/RECEPTION		1.0		
17		– TRAINING ROOM			0.6	
18	↓	↓ – BRANCH HEAD OFFICE/STOR.			0.7	↓
19	1P	P F B				
20	1P20A	L T S – ARCHIVE and LIBRARY	1.7			
21	1P	P F B				
22		SPARE				
23	1P20A *	L T S – NL			1.0	12
24	1P20A *	L T S – A.C. EQUIPMENT ROOMS			0.9	12
		*Provide New Breaker In Existing Space. Size And Rating As Indicated				
T O T A L			9.2	7.7	7.7	

SURVEY PLOTTED BY	DATE
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ORIGINAL PLAN	
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EXPIRATION DATE OF THE LICENSE 4/30/2010
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
PANEL
SCHEDULES I
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: Not To Scale Date: MAY 2008

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	C.O.ADD.144	152

Exist Panel "E"		120/208 Volts	3ø, 4WSN			
225A Main Lugs Only		Branch Bkr I.C.	10,000 Amps			
Flush			GE Type Nlab			
CKT NO.	BKR	L O A D	KVA			WIRE
			A	B	C	
1,3,5	3P15A	EXIST FCU-10	1.0	1.0	1.0	12
2,4,6	3P15A	EXIST FCU-13	1.0	1.0	1.0	12
7,9,11	3P15A	EXIST FCU-15	1.0	1.0	1.0	12
8,10,12	3P15A	EXIST FCU-16	1.0	1.0	1.0	12
13,15,17	3P15A	EXIST A/C	1.0	1.0	1.0	12
14	1P30A	EXIST CU-1	1.0			12
16	1P20A	EXIST OAF-1		1.0		12
18	1P	P F B				
19,21	2P20A	EXIST XEROX	1.0	1.0		12
20	1P	P F B				
22	1P	P F B				
23,25	2P20A	EXIST COPIER	1.0		1.0	12
24,26	2P20A	EXIST FCU-17	1.0		1.0	12
27	1P	P F B				
28	1P15A	EXIST FCU-11		1.0		12
29	1P	P F B				
30	1P20A	EXIST FCU-14			1.0	12
31	1P15A	EXIST FCU-12	1.0			12
32	1P20A	EXIST FCU-18	1.0			12
33	1P20A	EXIST EWC		1.0		12
34	1P	P F B				
35	↓	↓				
36	↓	↓				
T O T A L			11.0	9.0	8.0	

New Panel "AC"		120/208 Volts	3ø, 4WSN			
225A Main Lugs Only		Branch Bkr l.c.	10,000 Amps			
Surface, 20" Wide Cabinet, Industrial-Bolted			NEMA 4X SS			
CKT NO.	BKR	L O A D	KVA			WIRE
			A	B	C	
1,3,5	3P20A	CHWP-2A	1.3	1.3	1.3	12
2,4,6	3P20A	CHWP-2B	1.3	1.3	1.3	12
7,9,11	3P80A	CH-2	8.5	8.5	8.5	4
8	1P20A	FCU-21	1.0			12
10	1P20A	FCU-22		1.0		12
12,14	2P20A	FCU-23	0.8		0.8	12
13	1P20A	SPARE				
15	1P20A	RECEP		0.2		12
16	1P20A	FCU-24		1.0		12
17	1P20A	L T S - AC EQUIP. ADD. 105			1.0	12
18	1P20A	RECEP - CORRIDOR 500			1.0	12
19,21	2P20A	FCU-25	0.8	0.8		12
20,22	2P20A	CHAIR LIFT	1.7	1.7		12
23	1P	P F B				
24						
25						
26						
27						
28						
29						
30						
31						
32						
33						
34						
35						
36						
37						
38						
39						
40						
41						
42	↓	↓				
T O T A L			15.4	15.8	13.9	

2

1

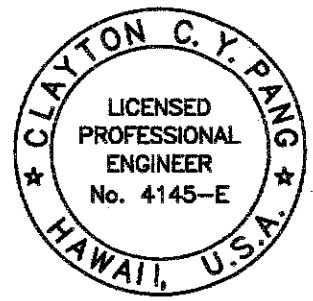
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2

1

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

3/6/09	2 Revised CH-2 BKR Rating
6/16/08	1 Revised FCU Circuits
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION PANEL SCHEDULES II MATERIALS TESTING AND RESEARCH FACILITY RENOVATION Project No. HWY-L-06-06 Scale: Not To Scale Date: MAY 2008	



EXPIRATION DATE OF THE LICENSE 4/30/2010
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	ADD.145	152

New Panel "K"		120/208 Volts		3Ø, 4WSN		
225A Main Lugs Only		Branch Bkr I.C.		10,000 Amps		
Surface, 20" Wide Cabinet, Industrial-Bolted						
CKT NO.	BKR	L O A D	KVA			WIRE
			A	B	C	
1	1P20A	RECEP – KITCHEN 114	1.0			12
2		– KITCHEN 114	1.0			
3		↓ – REFRIG.		1.0		
4		HOOD		1.0		
5		RECEP – REFRIG.			1.0	
6		– LOUNGE 113			1.0	
7		– REFRIG.	1.0			
8		– LOUNGE 113	1.0			
9		– LOUNGE 113		1.0		
10		– LOUNGE 113		1.0		
11		– WP			1.0	
12		– LOUNGE 113			1.0	
13		↓ – OFFICE 129	1.0			
14		FLOOR RECEP – OFFICE/RECEPTION	1.0			
15		DOOR BUZZER		1.0		
16		FLOOR RECEP – OFFICE/RECEPTION		1.0		
17		RECEP – ICE MACHINE			1.0	
18	↓	RECEP – TRAINING ROOM 110			1.0	
19,21	2P20A *	RECEP – ICE MACHINE	1.0	1.0		
20	1P20A	RECEP – TRAINING ROOM 110	1.0			↓
22	1P20A	RECEP – TRAINING ROOM 110		1.0		12
23		RECEP – DISPOSER			1.0	
24		RECEP – WP			1.0	
25		RECEP – TRAINING ROOM 110	1.0			
26		CLG JB – VIDEO PROJECTOR	1.0			
27		GATE ENTRANCE		1.0		
28		CLG JB – PROJECTOR SCREEN		1.0		
29		POLE LIGHTS			1.0	
30		FLR RECEP – TRAINING ROOM 110			1.0	
31		RECEP – HALLWAY 507	1.0			
32		FLR RECEP – TRAINING ROOM 110	1.0			
33		RECEP – TRAINING ROOM 110		1.0		
34		FLR RECEP – TRAINING ROOM 110		1.0		↓
35		SPARE				
36		FLR RECEP – TRAINING ROOM 110			1.0	12
37	↓	CARD KEY CONTROL PANEL	1.0			12
38,40,42	3P100A	NEW PANEL "KA"	10.0	10.0	10.0	2
39	1P20A	FCU-26		1.1		12
41	1P	P F B				
		*Verify Bkr Size And Rating With Equip. Manuf. Prior To Installation.				
T O T A L			20.0	22.1	22.0	

New Panel "KA"		240 Volts	3Ø, 3WSN			
3P100a Main Bkr		Branch Bkr I.C.	10,000 Amps			
Surface, 20" Wide Cabinet, Industrial-Bolted						
CKT NO.	BKR	L O A D	KVA			WIRE
			A	B	C	
1	1P	P F B				
2						
3						
4						
5						
6						
7						
8						
9,11	2P30A *	RECEP - AUDIO VISUAL 130		2.0	2.0	10
10,12	2P30A *	RECEP - AUDIO VISUAL 130		2.0	2.0	10
13,15	2P30A *	RECEP - COMPUTER ROOM 131	2.0	2.0		10
14,16	2P40A *	RECEP - RANGE	3.0	3.0		8
17	1P	P F B				
18						
19						
20						
21						
22						
23						
24						
		*Verify Bkr Size And Rating With Equip. Manuf. Prior To Installation.				
T O T A L			5.0	9.0	4.0	

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

6/16/08	 Added FCU-26
DATE	REVISION

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

PANEL
SCHEDULES III
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: Not To Scale Date: MAY 2008

SHEET No. E-130 OF 38 SHEETS

CLAYTON C. Y. PANG
★ LICENSED PROFESSIONAL ENGINEER ★
No. 4145-E
HAWAII, U.S.A.

Clayton C. Y. Pang

EXPIRATION DATE OF THE LICENSE 4/

THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

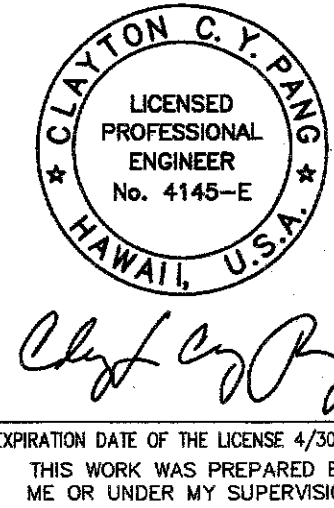
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	C.O.ADD.146	152

Exist Panel "C"		120/208 Volts		3ø, 4WSN		
3P150A Main Lugs Only		Branch Bkr I.C.		10,000 Amps		
Flush				GE Type Nlab		
CKT NO.	BKR	L O A D	KVA			WIRE
			A	B	C	
1	1P20A	L T S – SOILS and GEOTECHNICAL	1.6			12
2		SPARE				
3		L T S – CALIBRATION LAB		1.4		12
4		– CONCRETE and STEEL		1.7		
5		– SAND PREP/409			1.7	
6		– CONCRETE and STEEL			1.4	
7		– EQUIPMENT WASHDOWN	0.7			
8		↓ – CORRIDOR	1.2			↓
9		SPARE				
10		L T S – MIST. CURING		1.2		12
11		SPARE				
12		L T S – LABORATORY/SOILS			1.2	12
13		RECEP – MARSHALL COMP.	1.0			12
14		L T S – LABORATORY/SOILS	0.8			12
15		EXIST CIRC. PUMP		1.0		EXIST
16		RECEP – CALIBRATION		1.0		12
17		RECEP – RICE SHAKER			1.0	
18		RECEP – CALIBRATION/TOOLS & STOR.			1.0	↓
19		EXIST TRIAXIAL MACHINE	1.0			EXIST
20		RECEP – SOILS & GEOTECHNICAL	1.0			12
21		EXIST MIXER, VERSA TESTER		1.0		EXIST
22	↓	RECEP – STORAGE 407		1.0		12
23,25,27	3P20A *	EF-11 (LAB 403)	0.8	0.8	0.8	10
24	1P20A	RECEP – CONCRETE & STEEL			1.0	12
26	1P20A	RECEP – OFFICE 405	1.0			12
28	1P20A	RECEP – CONCRETE & STEEL		1.0		12
29,31	2P15A	EXIST GYRO COMP.	1.0		1.0	EXIST
30	1P20A	RECEP – OFFICE 405			1.0	12
32,34,36	3P20A	EXIST MIXER, MASONRY SAW SHOP	1.0	1.0	1.0	EXIST
33,35	2P20A	EXIST LOAD		1.0	1.0	EXIST
37,39,41	3P30A	EXIST KNEADING COMPACTOR	2.0	2.0	2.0	EXIST
38,40,42	3P70A	EXIST VACUUM PUMP/RHIELE BALDWIN	4.0	4.0	4.0	EXIST
	</					

New Panel "L"		240 Volts	3ø, 3WSN			
3P100A Main Bkr		Branch Bkr I.C.	10,000 Amps			
Surface, 20" Wide Cabinet, Industrial-Bolted						
CKT NO.	BKR	L O A D	KVA			WIRE
			A	B	C	
1,3	2P30A *	RECEP - RICE OVEN	2.0	2.0		10
2,4	2P30A *	RECEP - SPT	2.0	2.0		10
5,7	2P20A *	RECEP - GYRATORY COMP.	1.0		1.0	12
6,8	2P30A *	RECEP - CORE OVEN	2.0		2.0	10
9,11	2P20A *	RECEP - KNEAD COMP.		1.0	1.0	12
10,12	2P60A *	RECEP - GYR OVEN		4.0	4.0	6
13,15,17	2P30A *	RECEP - HAMBURG	2.0	2.0	2.0	10
14,16	2P30A *	RECEP - IGN OVEN	2.0	2.0		10
18,20	2P30A *	RECEP - IGN OVEN	2.0		2.0	10
19	1P	P F B				
21	1P	P F B				
22	↓	↓				
23						
24	↓	↓				
		*Verify Bkr Size And Rating With Equip. Manuf. Prior To Installation.				
T O T A L			13.0	13.0	12.0	

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

3/6/09	△ 2 Revised EF-1 Bkr Rating
6/16/08	△ 1 Revised Oven Hood Circuit
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION PANEL SCHEDULES IV MATERIALS TESTING AND RESEARCH FACILITY RENOVATION Project No. HWY-L-06-06	
Scale: Not To Scale	Date: MAY 2008



FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	147	152

Exist Panel "F"		120/208 Volts	3ø, 4WSN			
3P100A Main Bkr		Branch Bkr I.C.	10,000 Amps			
Flush			GE Type Nlab			
CKT NO.	BKR	L O A D	KVA			WIRE
			A	B	C	
1	1P20A	EXIST HEATERS	1.0			EXIST
2		EXIST ELEC. SCALE	1.0			
3		EXIST HEATERS		1.0		
4		EXIST DDC CONTROLLER		1.0		
5		EXIST SMALL OVEN			1.0	
6	↓	EXIST LOAD			1.0	
7,9	2P15A	EXIST FCU-1	1.0	1.0		
8,10	2P15A	EXIST A/C UNIT	1.0	1.0		↓
11,13,15	3P15A	EXIST A/C UNIT	1.0	1.0	1.0	EXIST
12,14	2P30A	EXIST A/C	1.0		1.0	EXIST
16,18,20	3P15A	EXIST AHU 4	1.0	1.0	1.0	EXIST
17,19	2P30A	EXIST NCAT	1.0		1.0	EXIST
21,23	2P20A	EXIST ACCU		1.0	1.0	EXIST
22,24	2P20A	EXIST FCU		1.0	1.0	EXIST
T O T A L			8.0	8.0	8.0	

Exist Panel "G"		240 Volts	3ø, 3WSN			
100A Main Lugs Only		Branch Bkr I.C.	10,000 Amps			
Flush			GE Type Nlab			
CKT NO.	BKR	L O A D	KVA			WIRE
			A	B	C	
1,3	2P20A	EXIST SAMPLE EXTRUDER	1.0	1.0		EXIST
2,4,6	3P50A	EXIST QC RM OVEN	4.0	4.0	4.0	EXIST
5,7	2P20A	EXIST CAP CMPND/WARMING POT/TIMER		2.0	2.0	EXIST
8,10	2P60A	EXIST IGNITION OVEN	4.0	4.0		EXIST
9,11	2P20A	EXIST LARGE OVEN		1.0	1.0	EXIST
12	1P	P F B				
T O T A L			9.0	12.0	7.0	

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



EXPIRATION DATE OF THE LICENSE 4/30/2016
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
PANEL
SCHEDULES V
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06
Scale: Not To Scale Date: MAY 2008
SHEET No. E-132 OF 38 SHEETS

Exist Panel "D"		120/208 Volts		3Ø, 4WSN		
3P150A Main Lugs Only		Branch Bkr I.C.		10,000 Amps		
Flush				GE Type Nlab		
CKT NO.	BKR	L O A D	KVA			WIRE
			A	B	C	
1	1P20A	L T S - SOILS&AGG./LL&SE/MEETING	1.8			12
2		- ANALYT. CHEM/ASPH. LAB	1.6			
3		- RECEIVING and PREP.		1.8		
4		- ANALYT. CHEM/ASPH. LAB		1.7		
5		- PROCTOR/FINE GRADE			1.7	
6		- CHEMIST OFF./ASPH. BINDER TEST			1.2	
7		- ADA TLT/MEN'S/SHOWER	0.5			
8		↓ - XRF/SHRINK TEST/CEMENT LABS	1.8			
9		SPARE				↓
10		SPARE				
11		L T S - LA ABRASION			1.7	12
12		RECEP - LABORATORY 403			1.0	
13		RECEP - LA ABRASION	1.0			
14		EXIST EXH FANS 7,8,9,10	1.0			
15		RECEP - LL & SE/SMALL OVEN		1.0		↓
16		SPARE				
17		RECEP - LABORATORY 403			1.0	12
18		SPARE				
19		RECEP - SHAKERS	1.0			12
20		RECEP - MICROWAVE OVEN/SPG LAMPS	1.0			
21		RECEP - SHAKERS		1.0		
22		EXIST PROC. SCALE		1.0		
23		RECEP - OFFICE 303			1.0	
24		EXIST SHAKERS - 1 & 2 (RO-TAP)			1.0	
25		RECEP - RECEIVING & PREP	1.0			
26		EXIST SHAKER - 3 (RO-TAP)	1.0			
27	↓	RECEP - MEETING		1.0		↓
28,30	2P30A	EXIST LOAD		2.0	2.0	EXIST
29	1P20A *	RECEP			1.0	12
31,33,35	3P20A	EXIST CRUSHER, 2HP	0.8	0.8	0.8	12
32,34,36	3P20A	EXIST LA ABRASION, 2HP	0.8	0.8	0.8	12
37,39,41	3P20A	EXIST MIXER	0.5	0.5	0.5	12
38,40,42	3P20A	EXIST MASONRY SAW	0.8	0.8	0.8	12
		*Provide New Breaker In Existing Space. Size And Rating As Indicated				
T O T A L			14.6	11.6	14.5	



SHEET No. *E-133* OF *38* SHEETS

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

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	149	152

Exist Panel "H"		120/208 Volts	3Ø, 4WSN			
225A Main Lugs Only		Branch Bkr I.C.	10,000 Amps			
Flush			GE Type Nlab			
CKT NO.	BKR	L O A D	KVA			WIRE
			A	B	C	
1	1P20A	RECEP – OVEN	1.0			12
2	1P20A	VISCOSIMETER & FUME HOOD #2	1.0			12
3	1P30A *	DISTILLER		2.6		10
4	1P20A	VISCOSIMETER & FUME HOOD #1		1.0		12
5		RECEP – ANALY. CHEM. WATER BATH			1.0	
6		RECEP & LT – FUME HOOD #3			1.0	
7		RECEP – ASPH. LAB	1.0			
8		RECEP & LT – FUME HOOD #4	1.0			
9		RECEP – ASPH. LAB		1.0		
10		RECEP – EXTRACT CENTRIFUGE		1.0		
11		RECEP – ANALY. CHEM.			1.0	
12		EXIST LOAD			1.0	
13		RECEP – ANALY. CHEM.	1.0			
14		EXIST LOAD	1.0			
15		RECEP – ANALY. CHEM.		1.0		
16		– CHEM LAB		1.0		
17	↓	RECEP – ANALY. CHEM.			1.0	↓
18,20	2P20A	EXIST EF-6 AHU A/C MUF-2	1.0		1.0	EXIST
19	1P20A	RECEP – SHRINKAGE TEST LAB	1.0			12
21	1P20A	RECEP – XRF LAB		1.0		12
22,24	2P20A	EXIST LOAD		1.0	1.0	EXIST
23	1P20A	EXIST LOAD			1.0	EXIST
25	1P20A	EXIST LOAD	1.0			EXIST
26	1P20A *	RECEP – SHRINKAGE TEST LAB	1.0			12
27	1P20A	EXIST LOAD		1.0		EXIST
28	1P20A *	RECEP – SHRINKAGE TEST LAB		1.0		12
29	1P20A					
30	1P20A *	RECEP – SHRINKAGE TEST LAB			1.0	12
31	1P20A					
32	1P20A	EXIST LOAD	1.0			EXIST
33	1P	P F B				
34	1P20A	EXIST LOAD		1.0		EXIST
35	1P20A	EXIST LOAD			1.0	EXIST
36	1P20A	EXIST LOAD			1.0	EXIST
		*Remove Existing Bkr And Replace With New Breaker In Existing Space. Size And Rating As Indicated				
T O T A L			12.0	13.6	12.0	

Exist Panel "I"		120/208 Volts	3ø, 4WSN			
225A Main Lugs Only		Branch Bkr I.C.	10,000 Amps			
Flush			GE Type Nlab			
CKT NO.	BKR	L O A D	KVA			WIRE
			A	B	C	
1	1P20A	EXIST OVEN	1.2			EXIST
2		EXIST OVEN	1.0			EXIST
3		EXIST DISTILLER		1.0		EXIST
4		EXIST THIN FILM OVEN		1.0		EXIST
5		ELECTRIC WATER COOLER			1.0	12
6		EXIST FURNACE			1.0	EXIST
7		RECEP	1.0			12
8		EXIST CKE OVEN	1.0			EXIST
9		EXIST PENETROMETER		1.0		EXIST
10		EXIST FCU-7		1.0		EXIST
11		RECEP			1.0	12
12	↓	EXIST A/C			1.0	EXIST
13,15,17	3P15A	EXIST FCU-5	1.0	1.0	1.0	EXIST
14,16,18	3P15A	EXIST FCU-6	1.0	1.0	1.0	EXIST
19,21,23	3P15A	EXIST FCU-9	1.0	1.0	1.0	EXIST
20	1P	P F B				
22,24	2P50A	EXIST LOAD		4.0	4.0	EXIST
25,27	2P20A	EXIST LOAD	1.0	1.0		EXIST
26,28	2P20A	EXIST LOAD	1.0	1.0		EXIST
29	1P15A	EXIST FCU-20			1.0	EXIST
30,32,34	3P20A	EXIST RH-1 (RE-HEAT COIL)	1.0	1.0	1.0	EXIST
31,33	2P15A	EXIST THIN FILM OVEN	1.0	1.0		EXIST
35	1P20A *	EQUIP. STOR. - 600/601			1.0	12
36	1P	P F B				
37	1P20A *	NL	1.0			12
38	1P	P F B				
39	1P20A *	AUTOMATIC DOOR OPENER		1.0		12
40	1P	P F B				
41	1P	P F B				
42	1P	P F B				
		*Provide New Bkr In Existing Space. Size And Rating As Required				
T O T A L			13.2	17.0	16.0	

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



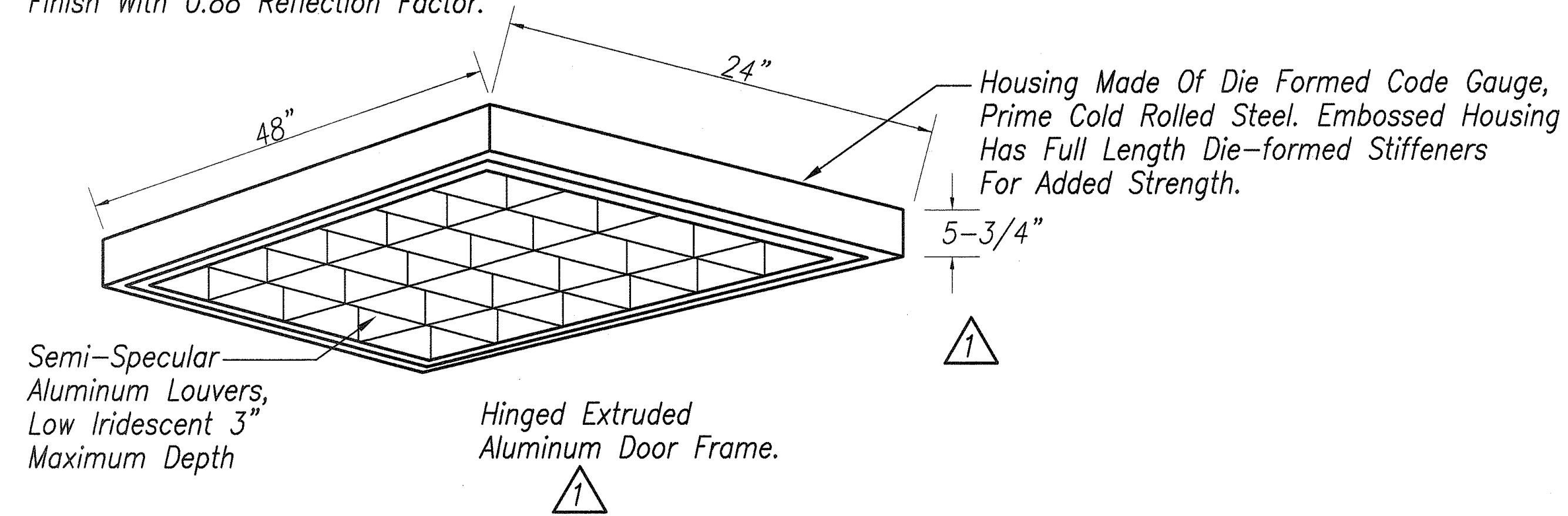
EXPIRATION DATE OF THE LICENSE 4/30/2010
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION
PANEL SCHEDULES VII
MATERIALS TESTING AND RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: Not To Scale Date: MAY 2008

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	ADD.150	152

One Piece Die Formed And Embossed 22 Gauge CRS With Baked White Enamel Finish With 0.88 Reflection Factor.



Unpainted Parts – Zinc Plated Or Stainless Steel. Cut Edges Of Metal To Be Primed And Painted Similar To Body Painting.

Body To Be Embossed Top And Ends To Assure Rigidity. Corners To Be Folded And Wrapped To Eliminate Open Seams.

Door Frame Can Be Hinged Or Latched From Either Side.

Door Frame Corners Screwed Together For Rigidity– Ensures Tight Fit And Easy Lens Replacement.

All Electrical Components To Be Easily Accessible Without Removal Of Troffer From Ceiling. Ballast To Be Bolted To Chassis With Bolts And Self-locking Nuts.

Provide Gaskets To Prevent Light Leaks.

Electronic Ballast, 120V.

LUMINAIRE TYPE "A" – SURFACE MOUNT PARABOLIC
4-32WT8 – FLUORESCENT LAMPS – 24 CELLS

LUMINAIRE TYPE "A1" – SIMILAR TO TYPE "A"
EXCEPT WITH EMERGENCY BATTERY PACK

LUMINAIRE TYPE "B" – SURFACE MOUNT PARABOLIC
3-32WT8 – FLUORESCENT LAMPS – 18 CELLS

LUMINAIRE TYPE "B1" – SIMILAR TO TYPE "B"
EXCEPT WITH EMERGENCY BATTERY PACK

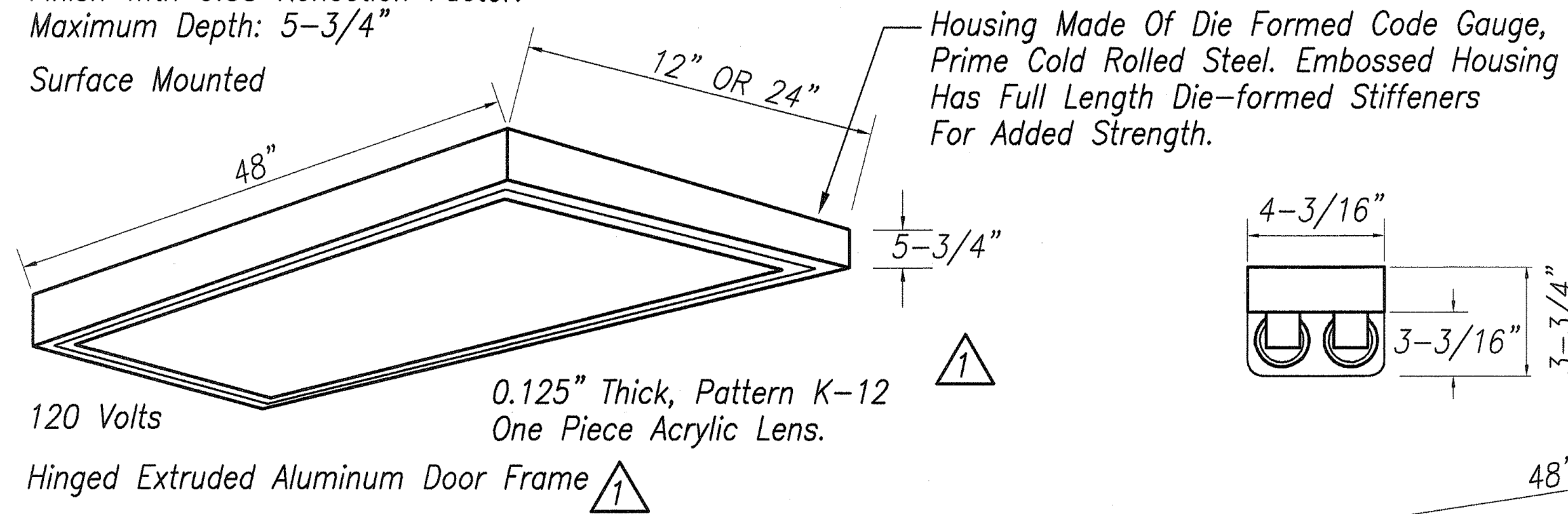
LUMINAIRE TYPE "C" – SURFACE MOUNT PARABOLIC
2-32WT8 – FLUORESCENT LAMPS – 12 CELLS

LUMINAIRE TYPE "C1" – SIMILAR TO TYPE "C"
EXCEPT WITH EMERGENCY BATTERY PACK

LUMINAIRE TYPE "C" – SURFACE MOUNT PARABOLIC
2-32WT8 – FLUORESCENT LAMPS – 12 CELLS

One Piece Die Formed And Embossed 22 Gauge CRS With Baked White Enamel Finish With 0.88 Reflection Factor. Maximum Depth: 5-3/4"

Surface Mounted



Unpainted Parts – Zinc Plated Or Stainless Steel. Cut Edges Of Metal To Be Primed And Painted Similar To Body Painting.

Body To Be Embossed Top And Ends To Assure Rigidity. Corners To Be Folded And Wrapped To Eliminate Open Seams.

Door Frame Can Be Hinged Or Latched From Either Side.

Door Frame Corners Screwed Together For Rigidity– Ensures Tight Fit And Easy Lens Replacement.

All Electrical Components To Be Easily Accessible Without Removal Of Troffer From Ceiling. Ballast To Be Bolted To Chassis With Bolts And Self-locking Nuts. Provide Gaskets To Prevent Light Leaks.

LUMINAIRE TYPE "D" 2'x4' – SURFACE MOUNT
2-32WT8 – FLUORESCENT LAMPS

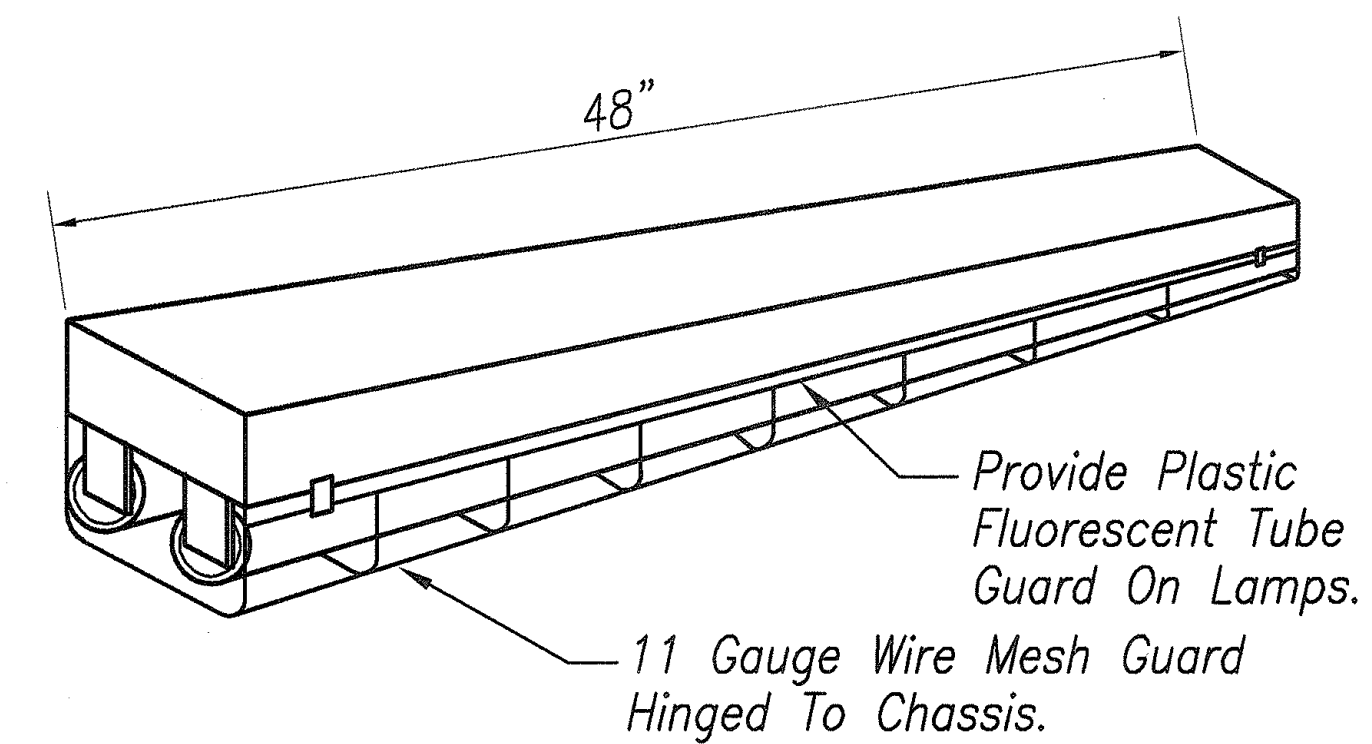
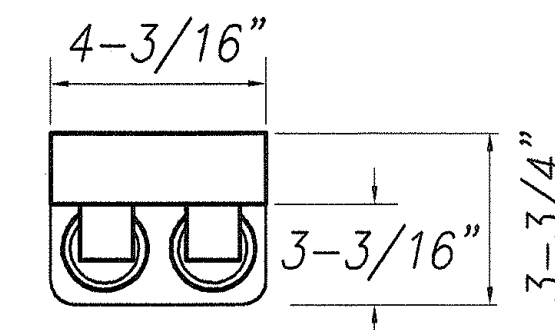
LUMINAIRE TYPE "J" 1'x4' – SURFACE MOUNT
2-32WT8 – FLUORESCENT LAMPS

LUMINAIRE TYPE "M" 2'x4' – SURFACE MOUNT
2-32WT8 – FLUORESCENT LAMPS

LUMINAIRE TYPE "M1" – SIMILAR TO TYPE "M"
EXCEPT WITH EMERGENCY BATTERY PACK

LUMINAIRE TYPE "N" 2'x4' – SURFACE MOUNT
2-32WT8 – FLUORESCENT LAMPS

LUMINAIRE TYPE "N1" – SIMILAR TO TYPE "N"
EXCEPT WITH EMERGENCY BATTERY PACK



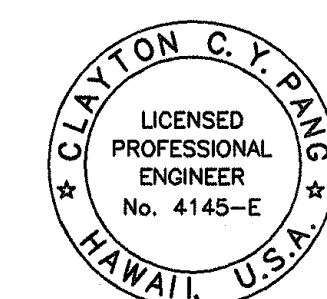
High Gloss Baked White Enamel Finish On 20 Gauge Cold Rolled Steel Phosphetized And Five Stage Painting.

Chassis To Be Fabricated And Painted After Fabrication. All Surfaces And Edges To Be Painted Or Galvanized. Chassis Prepainted Prior To Fabrication Will Not Be Allowed.

120 Volts.

LUMINAIRE TYPE "F" –
2-32WT8 FLUORESCENT LAMPS

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



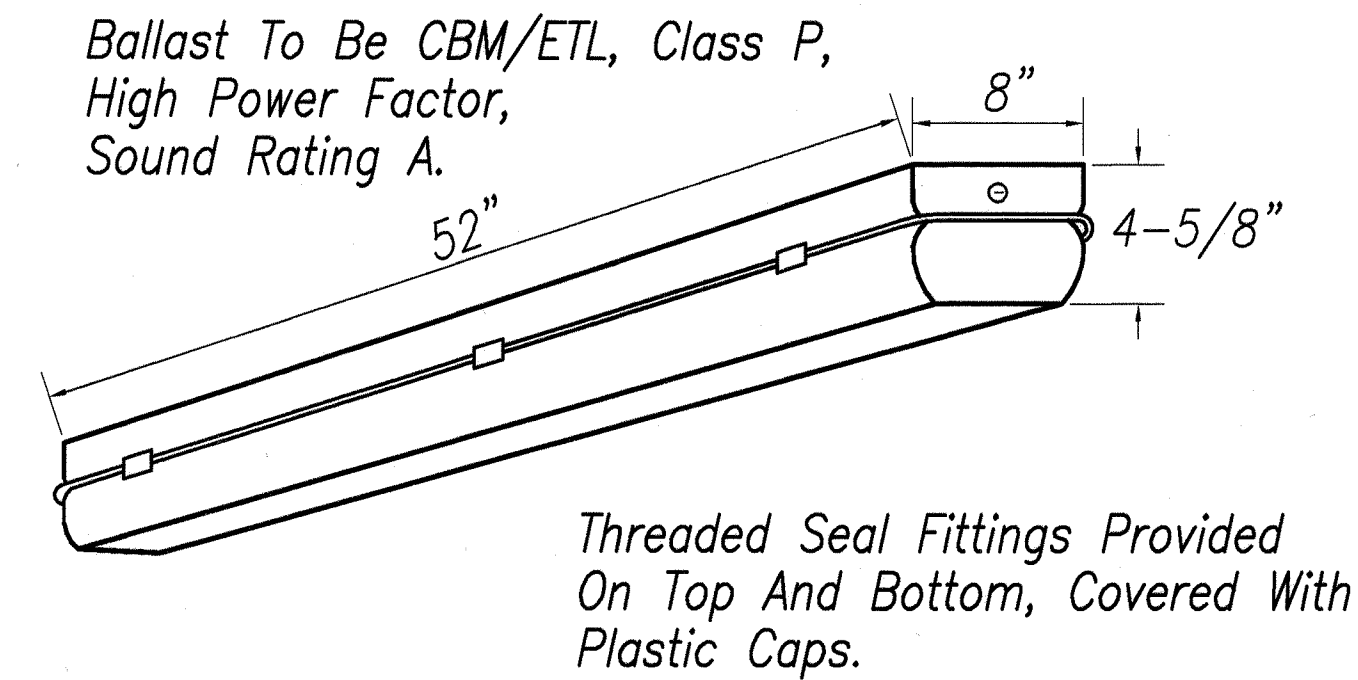
EXPIRATION DATE OF THE LICENSE 4/30/2010
THIS WORK WAS PREPARED BY
ME OR UNDER MY SUPERVISION

6/16/08	Revised Luminaire To Surface Mount
DATE	REVISION
STATE OF HAWAII DEPARTMENT OF TRANSPORTATION HIGHWAYS DIVISION LUMINAIRE DETAIL 1 MATERIALS TESTING AND RESEARCH FACILITY RENOVATION Project No. HWY-L-06-06	
Scale: Not To Scale	Date: MAY 2008

SHEET No. E-135 OF 38 SHEETS

ADD.150

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.	HWY-L-06-06	2008	151	152

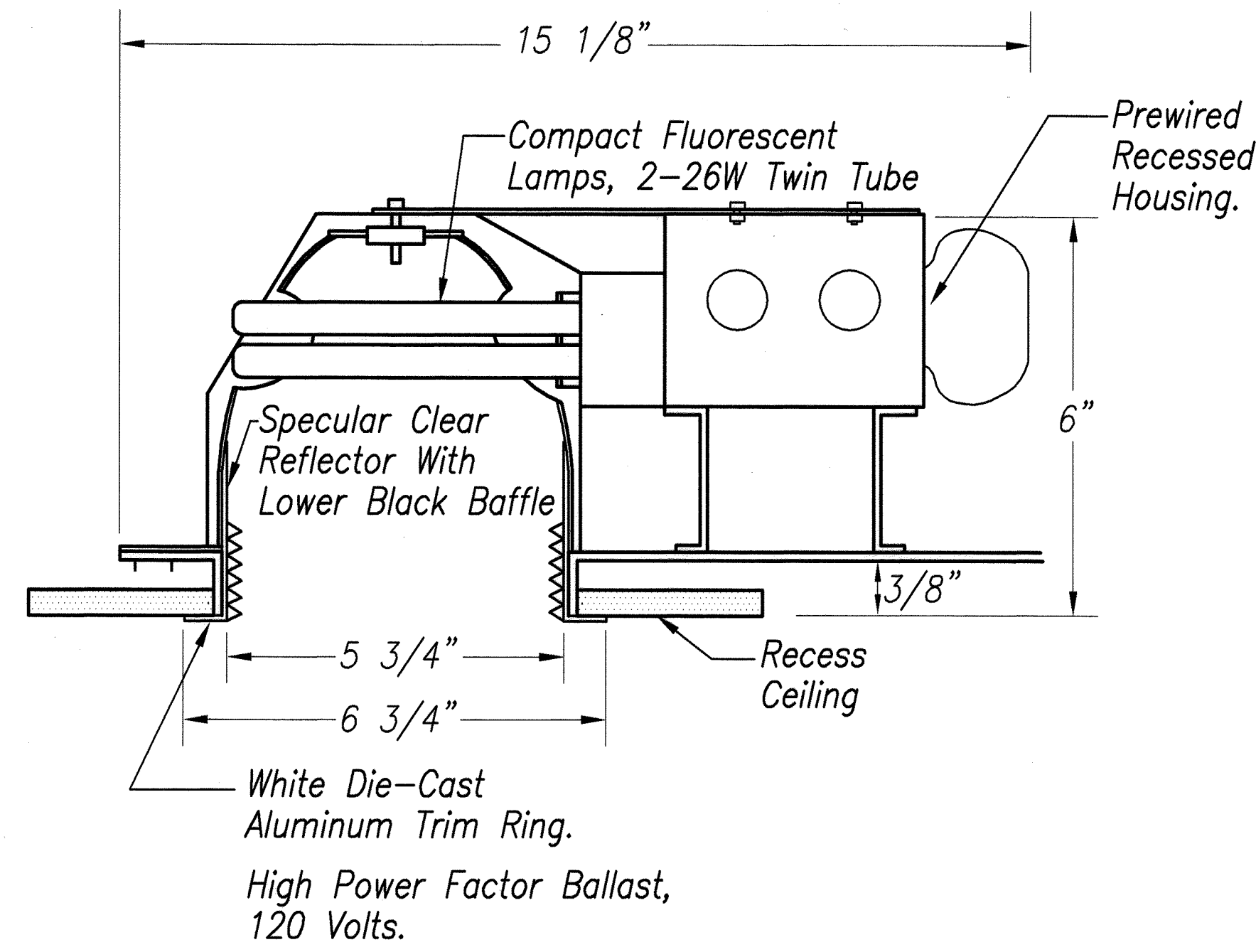


High Impact, 0.125" Clear Acrylic Enclosure. One Piece Neoprene Gasket. High Impact Plastic Body Suitable For Wet Locations Per NEC. Gasket To Be 0.125" Continuous Compressible Neoprene. Internal Metal Wiring Compartment Treated With 5-stage Zinc Phosphate And Hot-bonded Enamel Paint. Reflecting Surfaces Finished With High-Reflectance White Enamel. Electronic Ballast.

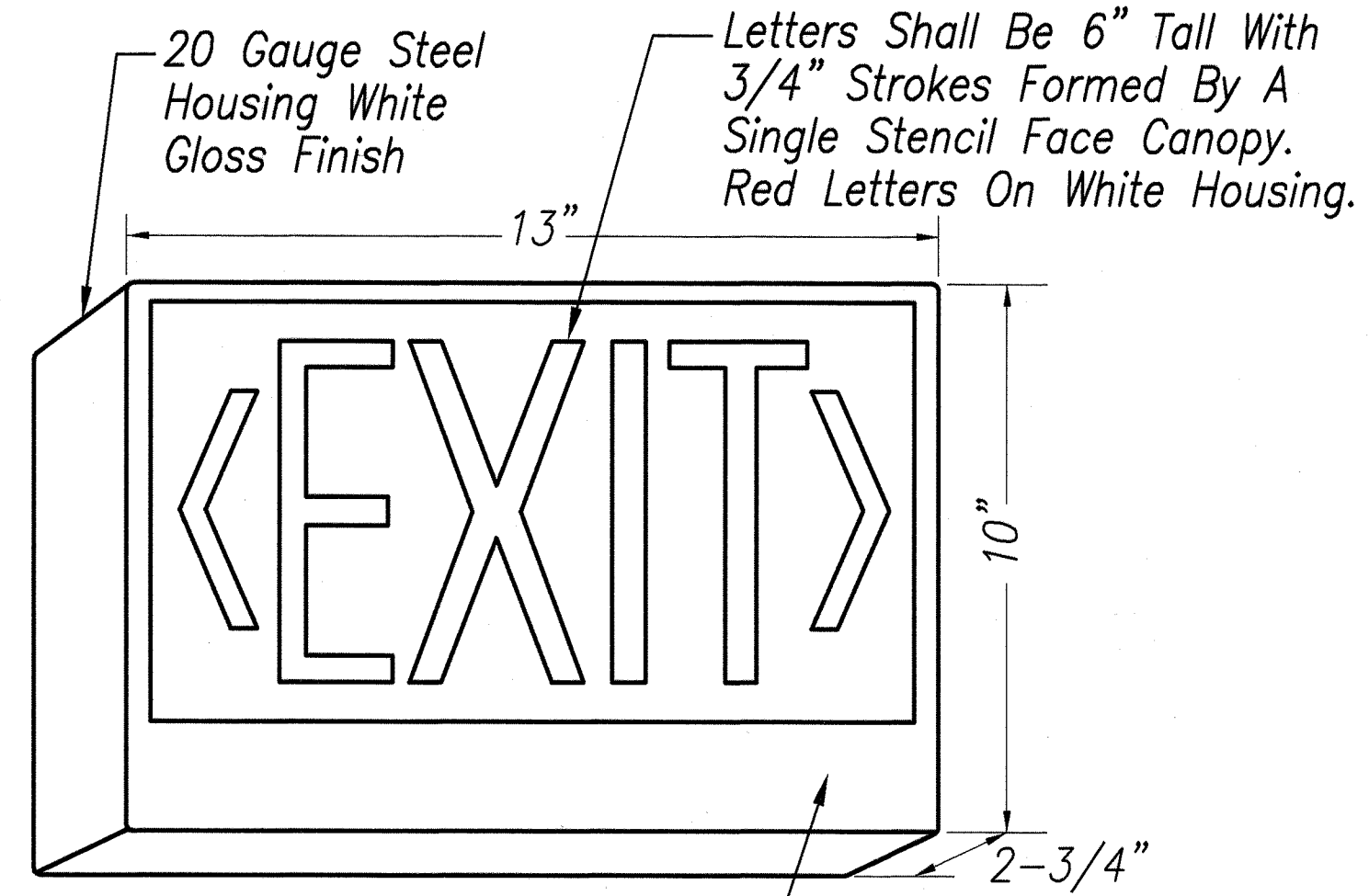
Fixture Shall Be Suitable For Wet Locations.

120 Volts.

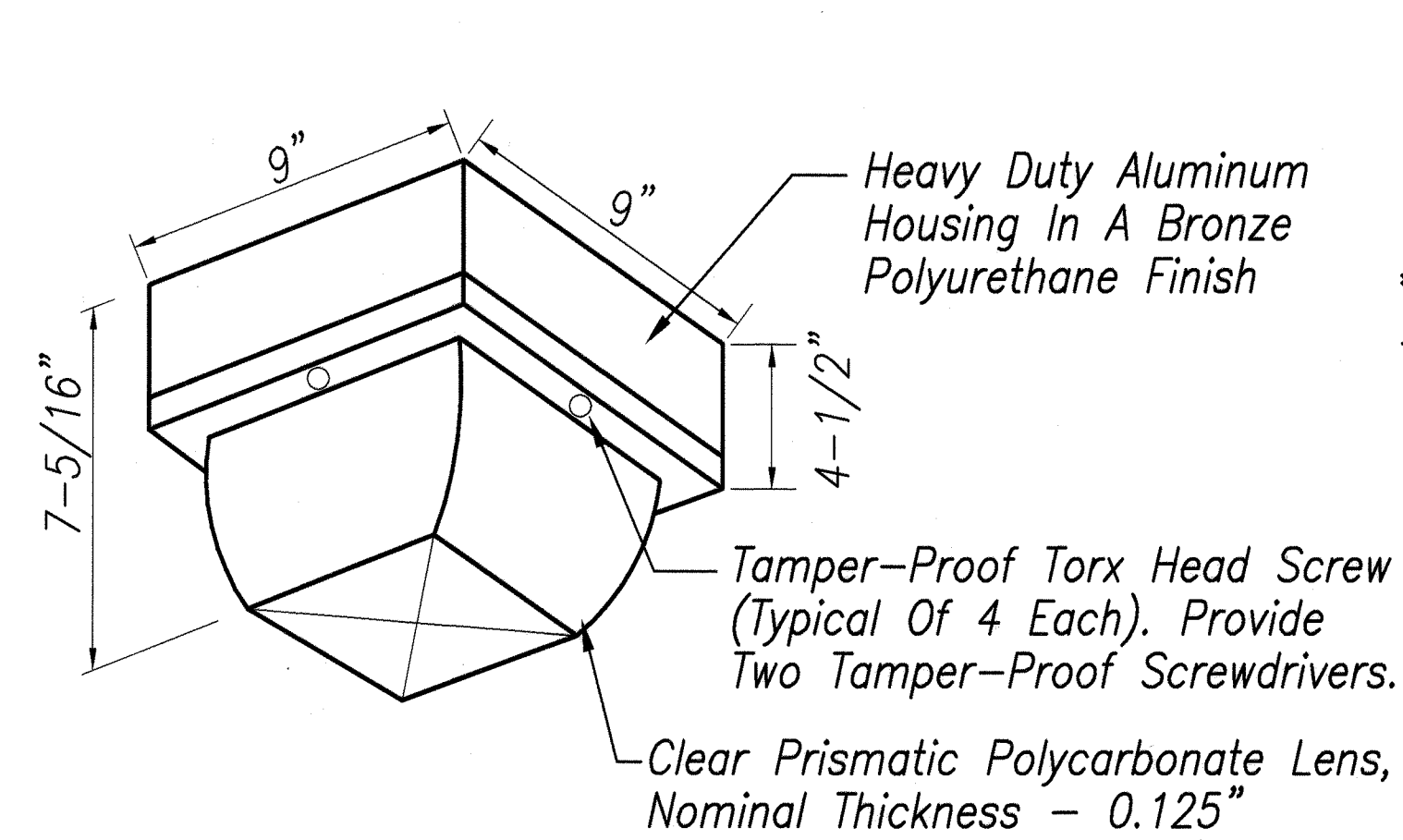
LUMINAIRE TYPE "I" - 2-32WT8 FLUORESCENT LAMPS



LUMINAIRE TYPE "E" - 2-26W FLUORESCENT LAMPS



LUMINAIRE TYPE "X" - LED LAMPS



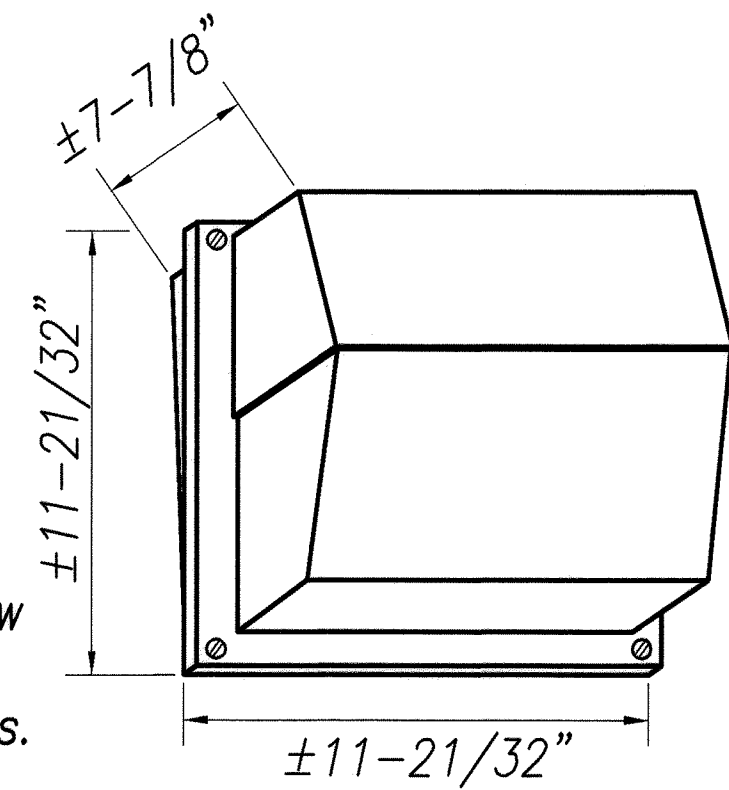
Shock Absorbing, Spring Steel Bracket.

U.L. Listed For Damp/Wet Locations.

Aluminum Reflector.

120 Volts.

LUMINAIRE TYPE "G" - 70W HIGH PRESSURE SODIUM



LUMINAIRE TYPE "H" - 150W HIGH PRESSURE SODIUM

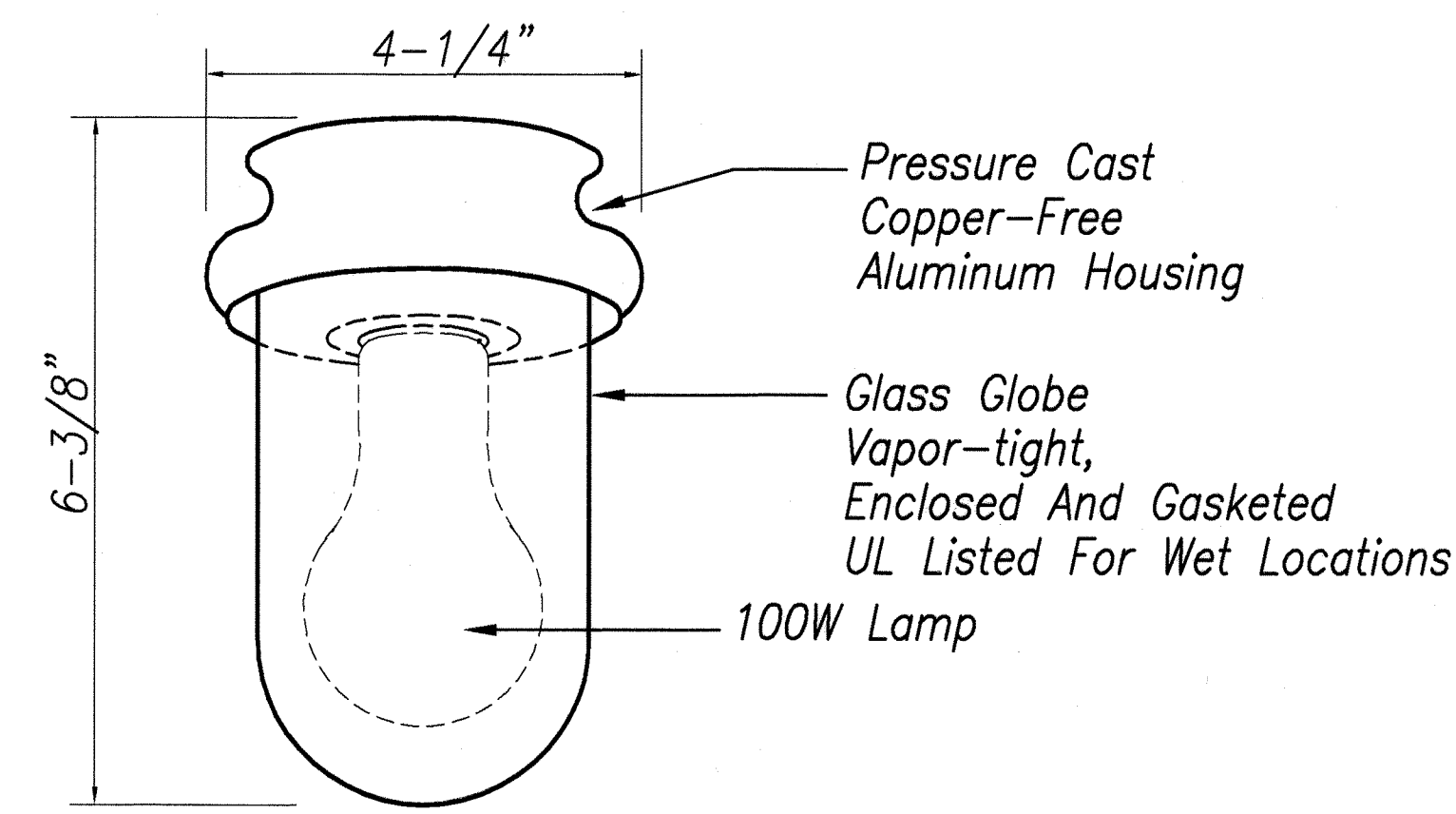
LUMINAIRE TYPE "P" - 70W HIGH PRESSURE SODIUM

Rear Housing Is Rugged, Lightweight Corrosion-Resistant, Die-Cast Aluminum. Stainless Steel External Hardware Includes Slotted And Tamper-Proof Fasteners.

Reflector Is White Painted Aluminum. Front Housing And Reflector Are One-Piece, Injection-Molded UV-Stabilized Polycarbonate Dark-Bronze Finish.

Hydroformed Specular Reflector.

Fluted Clear Prismatic Lens.

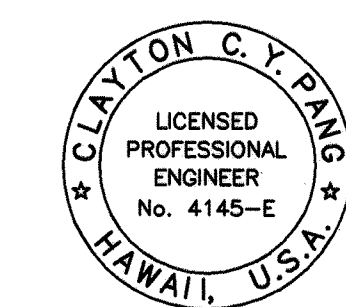


Fixture Shall Be Suitable For Wet Locations.

120 Volts.

LUMINAIRE TYPE "L" - 100W INCANDESCENT LAMP

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



EXPIRATION DATE OF THE LICENSE 4/1/2010
THIS WORK WAS PREPARED BY ME OR UNDER MY SUPERVISION

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
LUMINAIRE
DETAIL II
MATERIALS TESTING AND
RESEARCH FACILITY RENOVATION
Project No. HWY-L-06-06

Scale: Not To Scale
Date: MAY 2008

