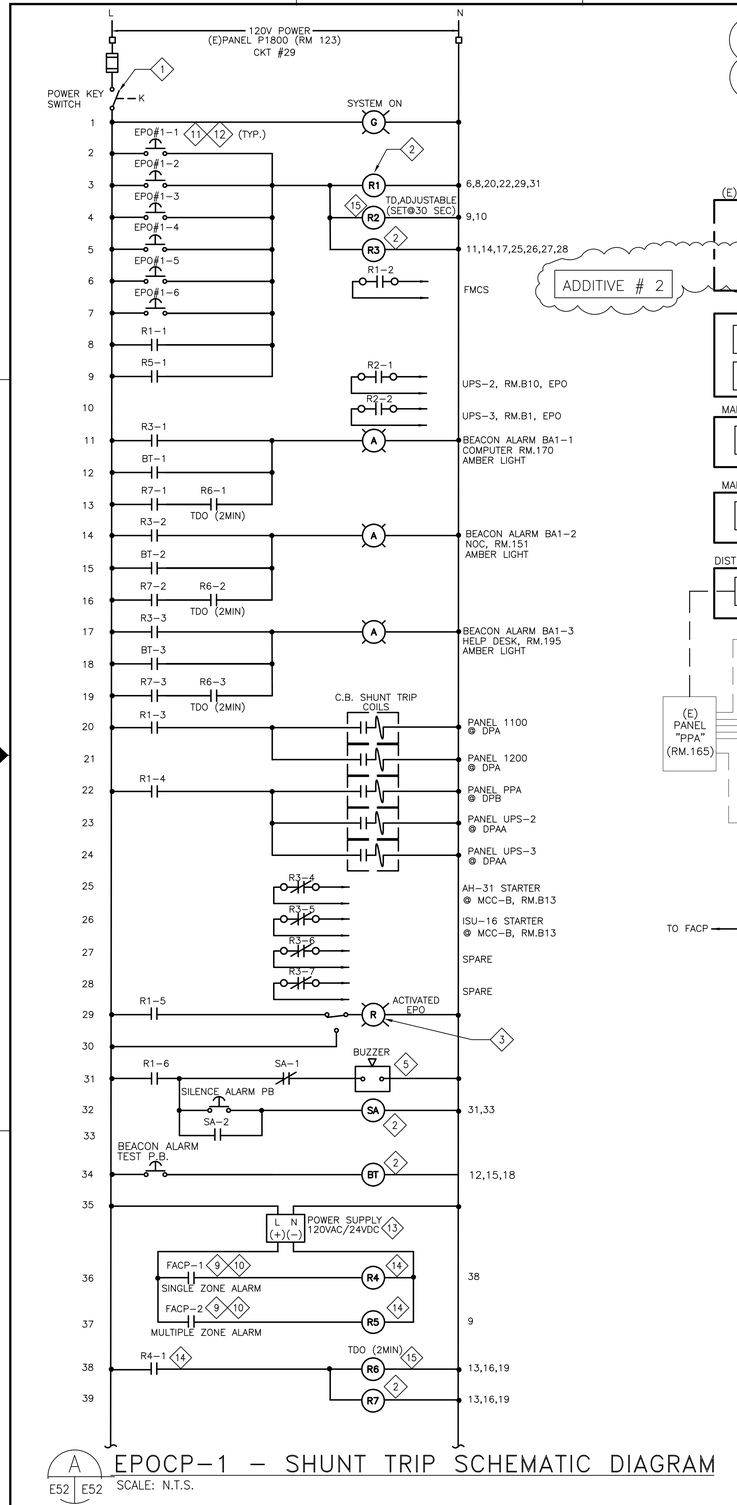
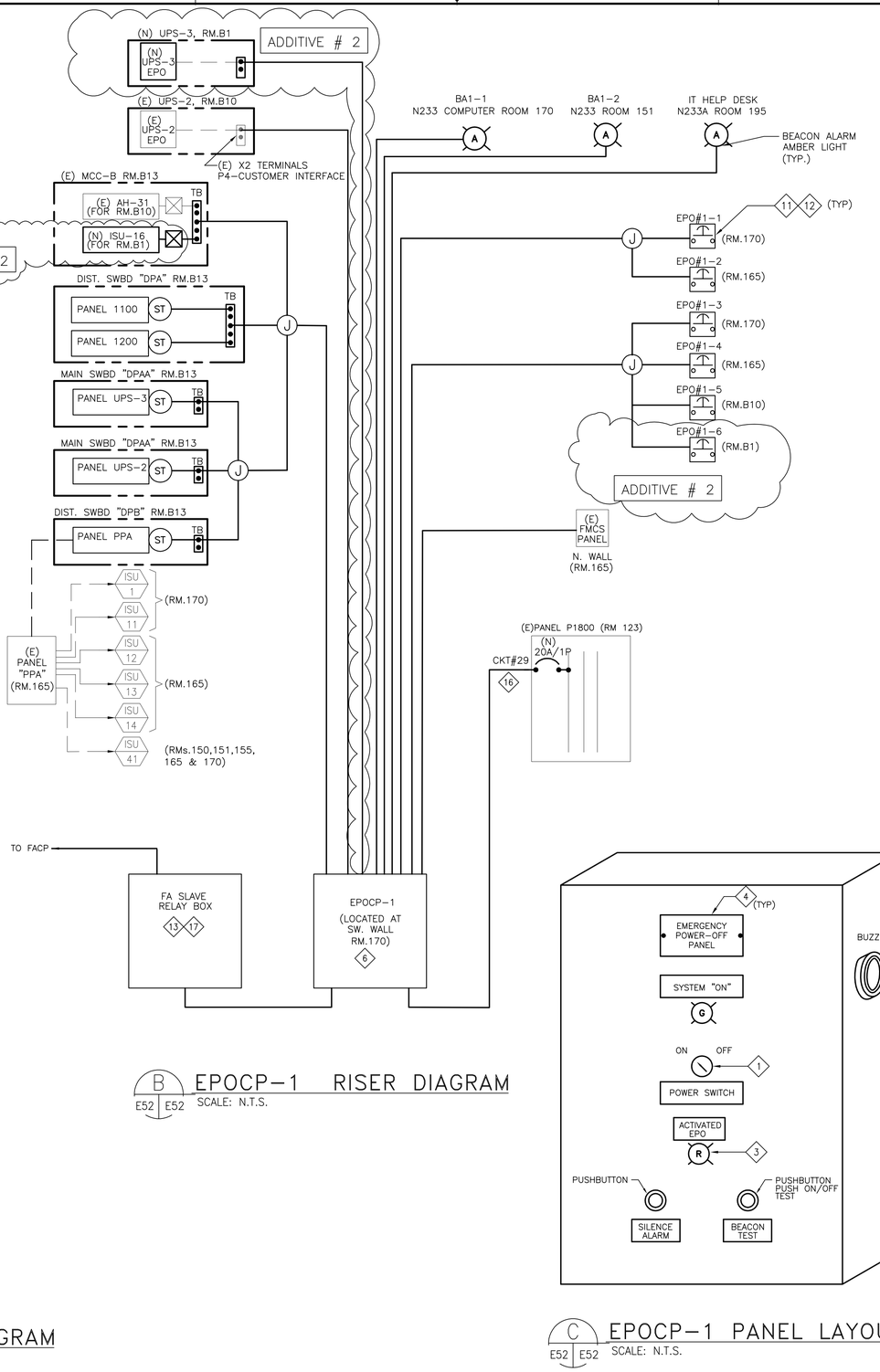


A E52 E52 EPOCP-1 — SHUNT TRIP SCHEMATIC DIAGRAM
SCALE: N.T.S.



B E52 E52 EPOCP-1 RISER DIAGRAM
SCALE: N.T.S.

C E52 E52 EPOCP-1 PANEL LAYOUT
SCALE: N.T.S.

SHEET NOTES

1. SEE DRAWING E1 FOR GENERAL ELECTRICAL NOTES, SYMBOLS AND ABBREVIATIONS.
2. PRIOR TO COMMENCING ELECTRICAL WORK, COORDINATE WITH ALL OTHER TRADES TO AVOID ANY CONFLICT OR INTERFERENCE WITH ELECTRICAL ITEMS THAT MAY BE AFFECTED BY ELECTRICAL DEMOLITION WORK.
3. PRIOR TO DISCONNECTION OF ANY CIRCUIT, CONTRACTOR SHALL FIELD VERIFY, TRACE, IDENTIFY, LOCK/TAG AND/OR CONFIRM ACTUAL CIRCUITING AND LOAD CONDITIONS OF EACH CIRCUIT TO BE USED IN NEW WORK. CONTRACTOR SHALL PROVIDE AS-BUILT CONDITIONS AND UPDATE IDENTIFICATION LABELS.
4. CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER TO SCHEDULE ANY POWER INTERRUPTION OR OUTAGE THAT MAY RESULT FROM PARTIAL CIRCUIT DEMOLITION.
5. SEE DRAWINGS E50, E51 FOR EPO SYSTEM PARTIAL BASEMENT AND FIRST FLOOR PLANS AND DWG E54 FOR DETAILS.

KEY NOTES

1. KEY TYPE, TWO POSITION SELECTOR SWITCH, MAINTAINED CONTACT, LEFT POSITION "ON", RIGHT POSITION-"OFF", KEY REMOVABLE IN "ON" POSITION.
2. RELAY, 120VAC, INDUSTRIAL TYPE WITH INTERCHANGEABLE CONTACTS RATED 10A, 125VAC/DC.
3. INDICATING LIGHT – RED LENS, PUSH-TO-TEST TYPE WITH LED LIGHTS.
4. NAMEPLATE SHALL BE BLACK WITH WHITE LETTERS, BOLTED ON THE CABINET.
5. BUZZER MOUNTED INSIDE THE PANEL, EDWARDS #340A-N5 (OR EQUAL), 120VAC. CABINET SHALL BE PROVIDED WITH ADEQUATE HOLE PERFORATIONS FOR PROPER ALARM SOUND EMISSION.
6. EPO PANEL ENCLOSURE SHALL BE NEMA-1 WITH HINGED COVER AND LOCKING PROVISION, SURFACE MOUNTED ON WALL. PROVIDE PANEL INSIDE FOR RELAY MOUNTING.
7. NOT USED.
8. NOT USED.
9. (E) FIRE ALARM CONTROL PANEL IS EDWARDS SYSTEM TECHNOLOGY LOCATED ON THE FIRST FLOOR. SEE KEY PLAN ON DRAWING E50 FOR LOCATION. THE FIRE ALARM CONTROL PANEL SHALL BE REPROGRAMMED TO PROVIDE TWO ADDITIONAL FIRE ALARM SIGNALS (FACP-1 AND FACP-2) FOR USE BY THE EPO SYSTEM. THESE SIGNALS SHALL BE PROGRAMMED TO RESPOND ONLY TO SMOKE DETECTORS IN ROOM 170 & 165 THAT ARE LOCATED ON THE CEILING AND BELOW THE RAISED FLOOR. ACTIVATION OF ONE SMOKE DETECTOR IN ROOM 165 OR 170 WILL TRIGGER THE FACP-1 SIGNAL, WHICH WILL TURN ON THE BEACON ALARM IN ROOMS 170, 151 AND 195. THE BEACON ALARMS WILL REMAIN "ON" FOR A PERIOD OF 2 MINUTES. IF WITHIN A PRESET TIME DELAY OF 2 MINUTES MULTIPLE ZONE ALARM OCCURS (FACP-2) OR IT CAN NOT BE VERIFIED THERE IS NO FIRE AND THE RESET HAS NOT BEEN ACTUATED WITH A KEY, THE CONTINUED ALARM CONDITION WILL ACTIVATE THE FIRE ALARM SYSTEM TO THE LOCAL FIRE DEPARTMENT AND POWER TO COMPUTERS AND AHU's WILL BE DISCONNECTED.
10. IT IS CONTRACTOR'S RESPONSIBILITIES TO CHECK IF SMOKE DETECTORS IN ROOMS 170 & 165 ARE CROSS-ZONED AND TO DO REPROGRAMMING OF (E) FIRE ALARM CONTROL PANEL IF THEY ARE NOT CROSS-ZONED IN ORDER TO MEET REQUIREMENTS FOR INSTALLATION OF EPO SYSTEM. SEE KEY NOTE 9.
11. PROVIDE EPO PUSHBUTTON, MUSHROOM HEAD, WITH N.O. CONTACTS, 10A, 125V AC/DC, TAMPER PROOF IN NEMA-1 ENCLOSURE WITH LIFT UP, TRANSPARENT POLYCARBONATE SHIELD OR COVER. PROVIDE SUITABLE LABELS ABOVE THE SWITCH. SEE DWG E54 FOR DETAILS.
12. THE EPO PUSH BUTTONS WILL INITIATE THE EPO ACTION, SHUT DOWN ALL AIR HANDLERS AND COMPUTER POWER IN ROOMS 165 & 170. TO RESET THE EPO SYSTEM AFTER AN EPO EVENT THE FOLLOWING STEPS ARE REQUIRED:
    1. TURN EPO POWER SWITCH TO "OFF" POSITION
    2. RESET TRIPPED CIRCUIT BREAKERS FOR COMPUTER POWER AND AIR HANDLERS.
    3. TURN THE EPO POWER SWITCH TO "ON" POSITION TO REACTIVATE THE EPO SYSTEM.
13. FA SLAVE RELAY BOX SHALL BE INSTALLED ADJACENT TO EPO CONTROL PANEL.
14. PAM-1 RELAY, 24VDC, FORM "C" CONTACTS RATED 10A @ 120VAC. RELAY SHALL BE INSTALLED IN THE FA SLAVE RELAY BOX.
15. TIME DELAY RELAY, 120VAC, INDUSTRIAL TYPE WITH INTERCHANGEABLE CONTACT, RATED 10A, 125V AC/DC, ADJUSTABLE TIME: 0-60SECS, 300SECS, CONTINUOUS AT INCREMENTS OF 1SEC AND MINUTES.
16. PROVIDE AND INSTALL 20A, 1P CIRCUIT BREAKER IN AVAILABLE SPACE # 29 OF (E) PANEL P1800 LOCATED IN ROOM 123 FOR CONNECTION OF EPOCP-1.
17. PROVIDE AND INSTALL 120VAC/24VDC POWER SUPPLY IN FA SLAVE RELAY BOX (NEMA-1 ENCLOSURE). PROVIDE AND INSTALL (2) FA MODULES COMPATIBLE WITH (E) FA CONTROL PANEL AND (2) RELAYS 'R4' & 'R5' IN THIS ENCLOSURE.

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

REVISIONS

DRAWN P.ALDEN	DATE
DESIGNED N.NIZAMOVA	DATE
CHECKED J.McCUSKER	DATE
PROJMGR N.NIZAMOVA	DATE
REQUESTER N.HSU	DATE
R&QA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE

Ames Research Center
Moffett Field, California

N233 ELECTRICAL RENOVATION PROJECT
ELECTRICAL

N233 EPOCP-1 ZONE #1 ROOMS 165/170 & B10 DIAGRAM – NEW WORK

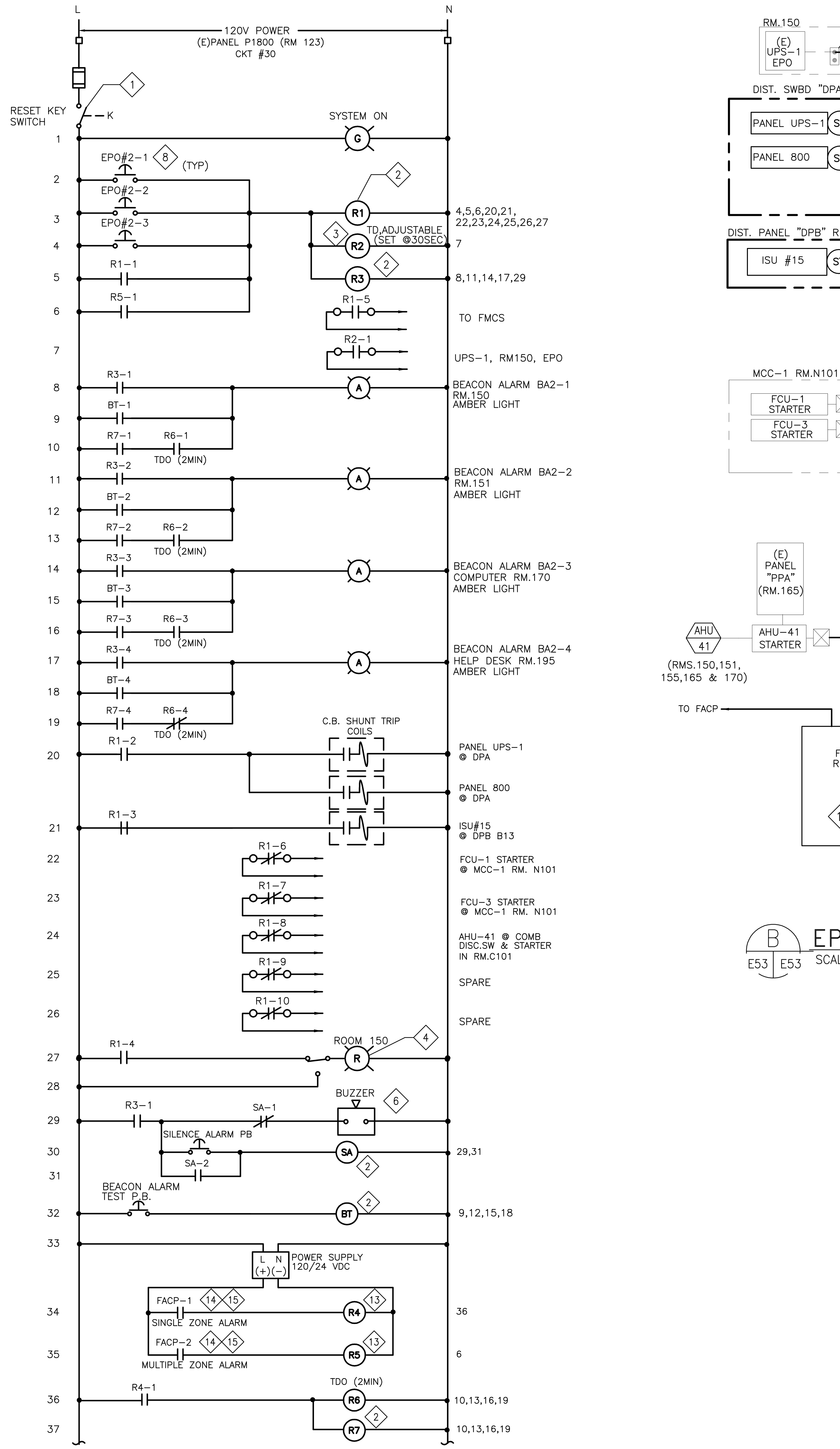
SIZE	CAGE CODE	DWG NO.	REV
D	25307	A233-0902-E52	A
SCALE	NONE	INDEX SHEET 1 OF 1	

FILE NAME: 233-E52_1.DWG 10-29-09

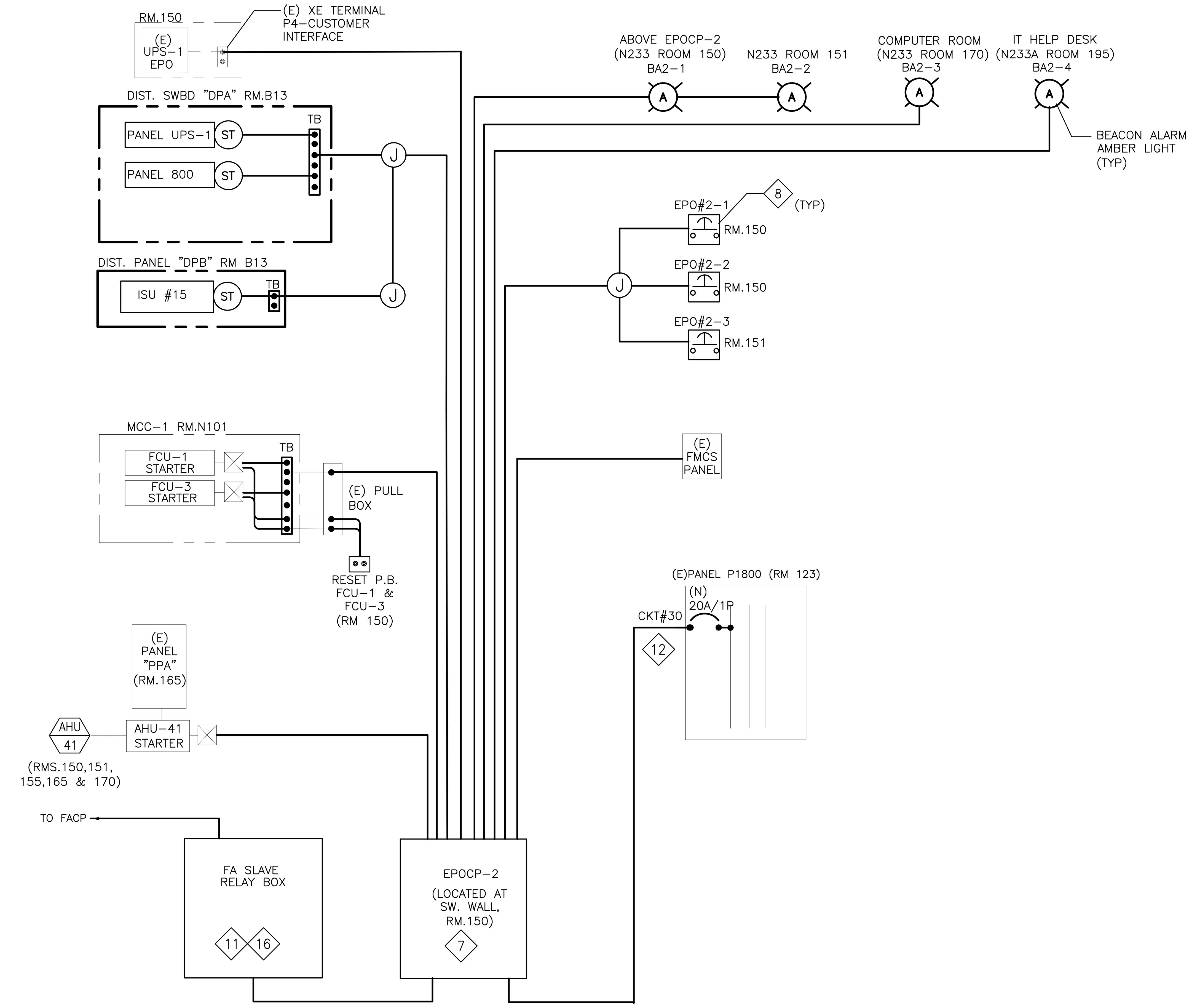
60098456.0001

DWG: \\N21fs2\proj\233\60098456.0001_N233 Electrical Upgrade\500_CAD_N233 Electrical Renovation Project - Final Issue_Drawings\233-E52_1.DWG Version: 17.1s (LMS Tech) User: polden
DATE: Aug 19, 2010 - 2:36:46 pm

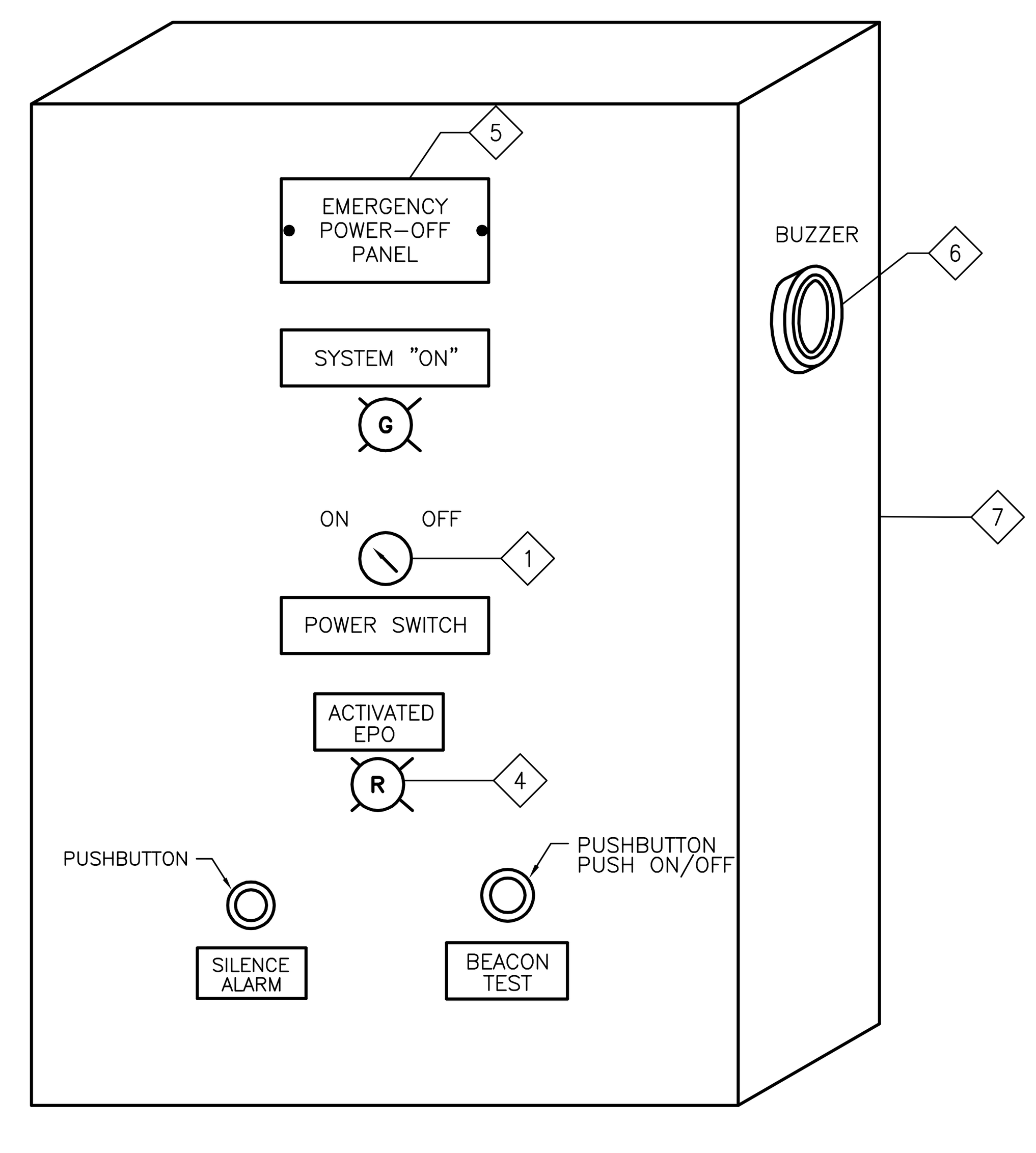
DWG NO. A233-0902-E53 | SH. | REV



A EPOCP-2 SHUNT TRIP SCHEMATIC DIAGRAM
E53 | E53 SCALE:N.T.S.



B EPOCP-2 RISER DIAGRAM
E53 | E53 SCALE:N.T.S.



C EPOCP-2 PANEL LAYOUT
E53 | E53 SCALE:N.T.S.

SHEET NOTES

1. SEE DRAWING E1 FOR GENERAL ELECTRICAL NOTES, SYMBOLS AND ABBREVIATIONS.
2. PRIOR TO COMMENCING ELECTRICAL WORK, COORDINATE WITH ALL OTHER TRADES TO AVOID ANY CONFLICT OR INTERFERENCE WITH ELECTRICAL ITEMS THAT MAY BE AFFECTED BY ELECTRICAL DEMOLITION WORK.
3. PRIOR TO DISCONNECTION OF ANY CIRCUIT, CONTRACTOR SHALL FIELD VERIFY, TRACE, IDENTIFY, LOCK/TAG AND/OR CONFIRM ACTUAL CIRCUITING AND LOAD CONDITIONS OF EACH CIRCUIT TO BE USED IN NEW WORK. CONTRACTOR SHALL PROVIDE AS-BUILT CONDITIONS AND UPDATE IDENTIFICATION LABELS.
4. CONTRACTOR SHALL NOTIFY THE CONSTRUCTION MANAGER TO SCHEDULE ANY POWER INTERRUPTION OR OUTAGE THAT MAY RESULT FROM PARTIAL CIRCUIT DEMOLITION.
5. SEE DRAWINGS E50, E51 FOR EPO SYSTEM PARTIAL BASEMENT AND FIRST FLOOR PLANS AND DWG E54 FOR DETAILS.

KEY NOTES

1. KEY TYPE TWO POSITION SELECTOR SWITCH, MAINTAINED CONTACT, LEFT POSITION "ON", RIGHT POSITION-"OFF". KEY REMOVABLE IN "ON" POSITION.
2. RELAY 120VAC, INDUSTRIAL TYPE WITH INTERCHANGEABLE CONTACT, RATED 10A, 125V AC/DC.
3. TIME DELAY RELAY, 120VAC, INDUSTRIAL TYPE WITH INTERCHANGEABLE CONTACT, RATED 10A, 125V AC/DC, ADJUSTABLE TIME: 0-60SECS, 300SECS, CONTINUOUS AT INCREMENTS OF 1SEC AND MINUTES.
4. INDICATING LIGHT - RED LENS, PUSH-TO-TEST TYPE WITH LED LIGHTS.
5. NAMEPLATE SHALL BE BLACK WITH WHITE LETTERS, BOLTED ON THE CABINET.
6. BUZZER SHALL BE 120VAC, MOUNTED INSIDE OF PANEL, EDWARDS #340A-N5 OR APPROVED EQUAL.
7. EPO PANEL ENCLOSURE SHALL BE NEMA-1 WITH HINGED COVER, LOCKABLE, RECESSED MOUNTED ON WALL. PROVIDE UNIVERSAL MOUNTING STRIP INSIDE FOR RELAY MOUNTING. PAINT TO MATCH THE SURROUNDING.
8. PROVIDE EPO PUSHBUTTON, MUSHROOM HEAD WITH N.O. CONTACT, 10A, 125V AC/DC, PUSH-IN TO MAINTAIN AND KEY-TURN TO RELEASE, TAMPER PROOF IN NEMA-1 ENCLOSURE, WITH LIFT-UP, TRANSPARENT POLYCARBONATE SHIELD OR COVER. PROVIDE SUITABLE LABELS ABOVE THE SWITCH, SEE DWG E54 FOR DETAILS.
9. EXTEND CIRCUIT CONDUIT WIRING VIA 3/4"C WITH 2#12 & 1#12G, AND ROUTE TO THE NEAREST 120V, 1PH, BUILDING POWER RECEPTACLE IN THE RESPECTIVE ROOM LOCATION, APPROXIMATELY 25 FEET AWAY. VERIFY ACTUAL LOCATION.
10. PROVIDE AND EXTEND VIA 3/4"C WITH 2#12 & 1#12G, AND CONNECT TO THE SAME CIRCUIT HOMERUN (B-42) OF ADJACENT BEACON ALARM IN RM.195.
11. PROVIDE AND INSTALL 120/24VDC POWER SUPPLY IN FA SLAVE RELAY BOX (NEMA-1 ENCLOSURE). PROVIDE AND INSTALL (2) FA MODULES COMPATIBLE WITH (E) FA CONTROL PANEL AND (2) RELAYS 'R4' & 'R5' IN THIS ENCLOSURE.
12. PROVIDE AND INSTALL 20A, 1P CIRCUIT BREAKER IN AVAILABLE SPACE # 30 OF (E) PANEL P1800 LOCATED IN ROOM 123 FOR CONNECTION OF EPOCP-1.
13. PAM-1 RELAY, 24VDC, FORM "C" CONTACTS RATED 10A @ 120VAC. RELAY SHALL BE INSTALLED IN THE FA SLAVE RELAY BOX.
14. (E) FIRE ALARM CONTROL PANEL IS EDWARDS SYSTEM TECHNOLOGY LOCATED ON THE FIRST FLOOR. SEE KEY PLAN ON DRAWING E50 FOR LOCATION. THE FIRE ALARM CONTROL PANEL SHALL BE REPROGRAMMED TO PROVIDE TWO ADDITIONAL FIRE ALARM SIGNALS (FACP-1 AND FACP-2) FOR USE BY THE EPO SYSTEM. THESE SIGNALS SHALL BE PROGRAMMED TO RESPOND ONLY TO SMOKE DETECTORS IN ROOM 150 & 151 THAT ARE LOCATED ON THE CEILING AND BELOW THE RAISED FLOOR. ACTIVATION OF ONE SMOKE DETECTOR IN ROOM 150 OR 151 WILL TRIGGER THE FACP-1 SIGNAL, WHICH WILL TURN ON THE BEACON ALARM IN ROOMS 150, 151, 170 AND 195. THE BEACON ALARMS WILL REMAIN "ON" FOR A PERIOD OF 2 MINUTES. IF WITHIN A PRESET TIME DELAY OF 2 MINUTES MULTIPLE ZONE ALARM OCCURS (FACP-2) OR IT CAN NOT BE VERIFIED THERE IS NO FIRE AND THE RESET HAS NOT BEEN ACTUATED WITH A KEY, THE CONTINUED ALARM CONDITION WILL ACTIVATE THE FIRE ALARM SYSTEM TO THE LOCAL FIRE DEPARTMENT AND POWER TO COMPUTERS AND AHU's WILL BE DISCONNECTED.
15. IT IS CONTRACTOR'S RESPONSIBILITIES TO CHECK IF SMOKE DETECTORS IN ROOMS 150 & 151 ARE CROSS-ZONED AND TO DO REPROGRAMMING OF (E) FIRE ALARM CONTROL PANEL IF THEY ARE NOT CROSS-ZONED IN ORDER TO MEET REQUIREMENTS FOR INSTALLATION OF EPO SYSTEM. SEE KEY NOTE 14.
16. FA SLAVE RELAY BOX SHALL BE INSTALLED ADJACENT TO EPO CONTROL PANEL.

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

REVISIONS

DRAWN P.ALDEN	DATE
DESIGNED N.NIZAMOVA	DATE
CHECKED J.McCUSKER	DATE
PROJMGR N.NIZAMOVA	DATE
REQUESTER N.HSU	DATE
R&QA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE
	DATE

Ames Research Center
Moffett Field, California

N233 ELECTRICAL RENOVATION PROJECT
ELECTRICAL

N233 EPOCS ZONE #2 ROOMS 150/151 DIAGRAM NEW WORK

SIZE D | CAGE CODE 25307 | A 233-0902-E53 | REV -
SCALE NONE | INDEX | SHEET 1 OF 1

FILE NAME: 233-E53_1.DWG 10-29-09

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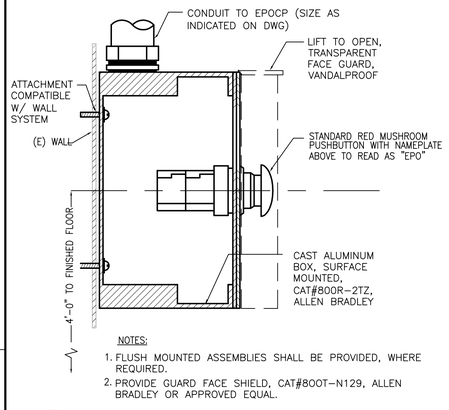
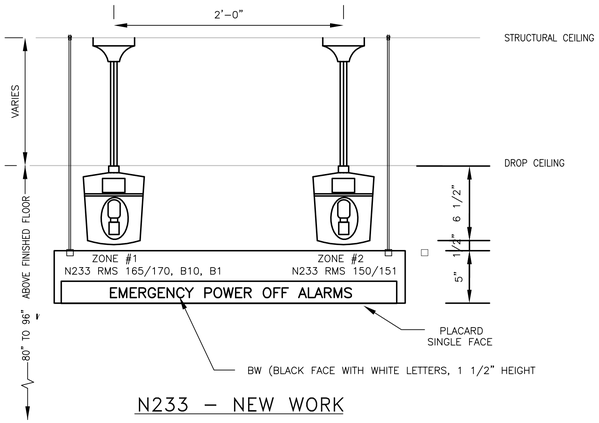
DWG NO.	SH.	REV
A233-0902-E54	1	–



NOTES:
1. FLUSH MOUNTED ASSEMBLIES SHALL BE PROVIDED, WHERE REQUIRED.
2. PROVIDE GUARD FACE SHIELD, CAT#B00T-N129, ALLEN BRADLEY OR APPROVED EQUAL.

A E54 | E54 — EPO – MOUNTING DETAIL
SCALE:N.T.S.



N233 – NEW WORK

B E54 | E54 — BEACON LIGHTS MOUNTING DETAILS IN RMS. 170 & 151
SCALE:N.T.S.

N233 – NEW WORK

C E54 | E54 — BEACON LIGHTS MOUNTING DETAILS IN HELP DESK RM 195 ZONES 1 & 2
SCALE:N.T.S.

SHEET NOTES

1. PRIOR TO FABRICATION, CONTRACTOR SHALL PROPOSE AND SUBMIT A SAMPLE PLACARD SIGNAGE STYLE FOR APPROVAL BY THE CONTRACTING OFFICER.

KEY NOTES

1 PROVIDE NAMEPLATE 1"x3"x1/16" THICK FORMICA WITH BEVELED EDGES, BLACK FACE WITH WHITE LETTERS, 3/8" HEIGHT TO READ AS: "EMERGENCY POWER-OFF, EPO#1-2" TYPICAL , AS INDICATED ON DRAWINGS.

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

REVISIONS

DRAWN P.ALDEN	DATE
DESIGNED N.NIZAMOVA	DATE
CHECKED J.McCUSKER	DATE
PROJMGR N.NIZAMOVA	DATE
REQUESTER N.HSU	DATE
R&QA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE
	DATE

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N233 ELECTRICAL RENOVATION PROJECT
ELECTRICAL

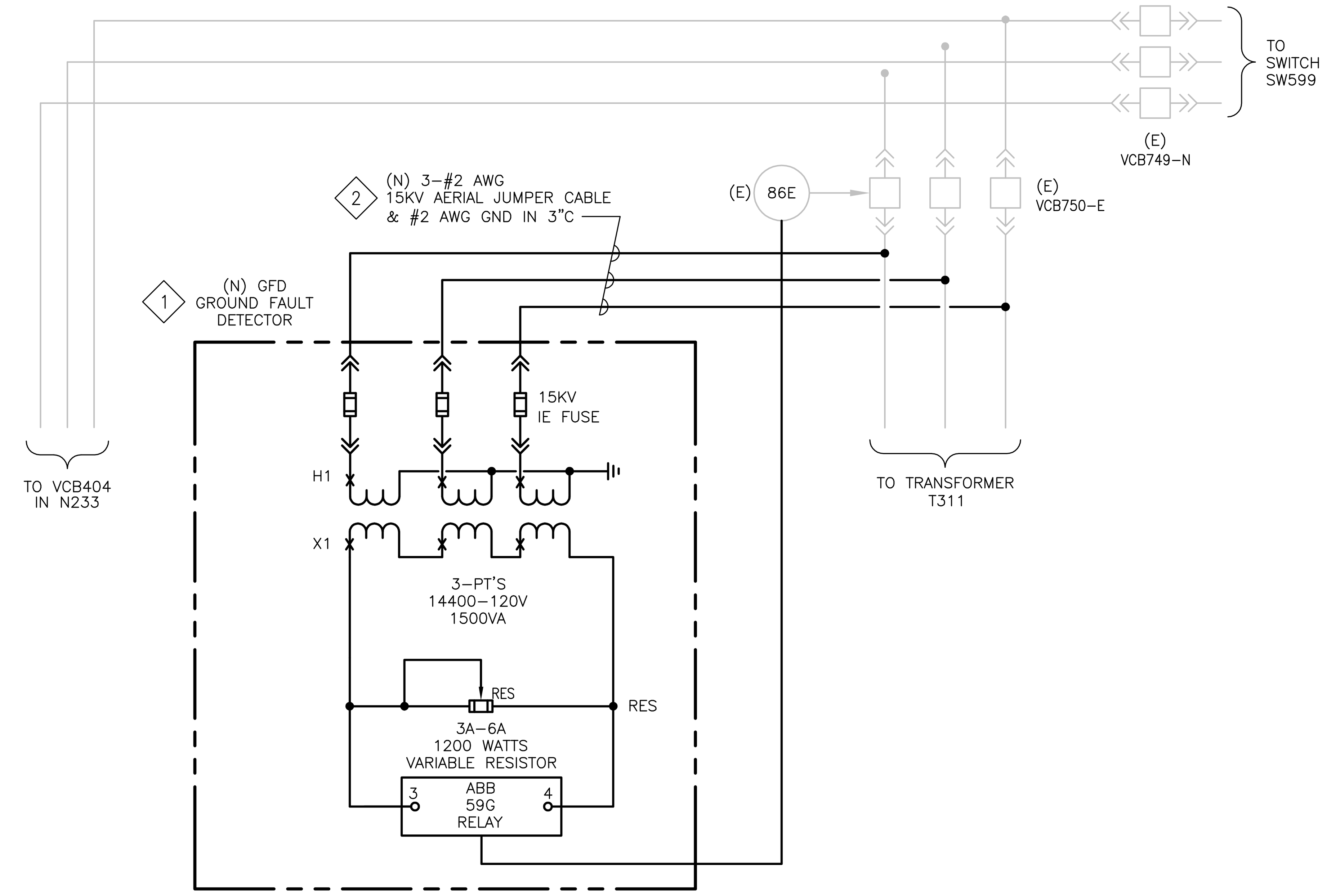
N233
MISCELLANEOUS DETAILS NEW WORK

SIZE	CAGE CODE	
D	25307	A 233-0902-E54 REV –
SCALE	NONE	INDEX SHEET 1 OF 1

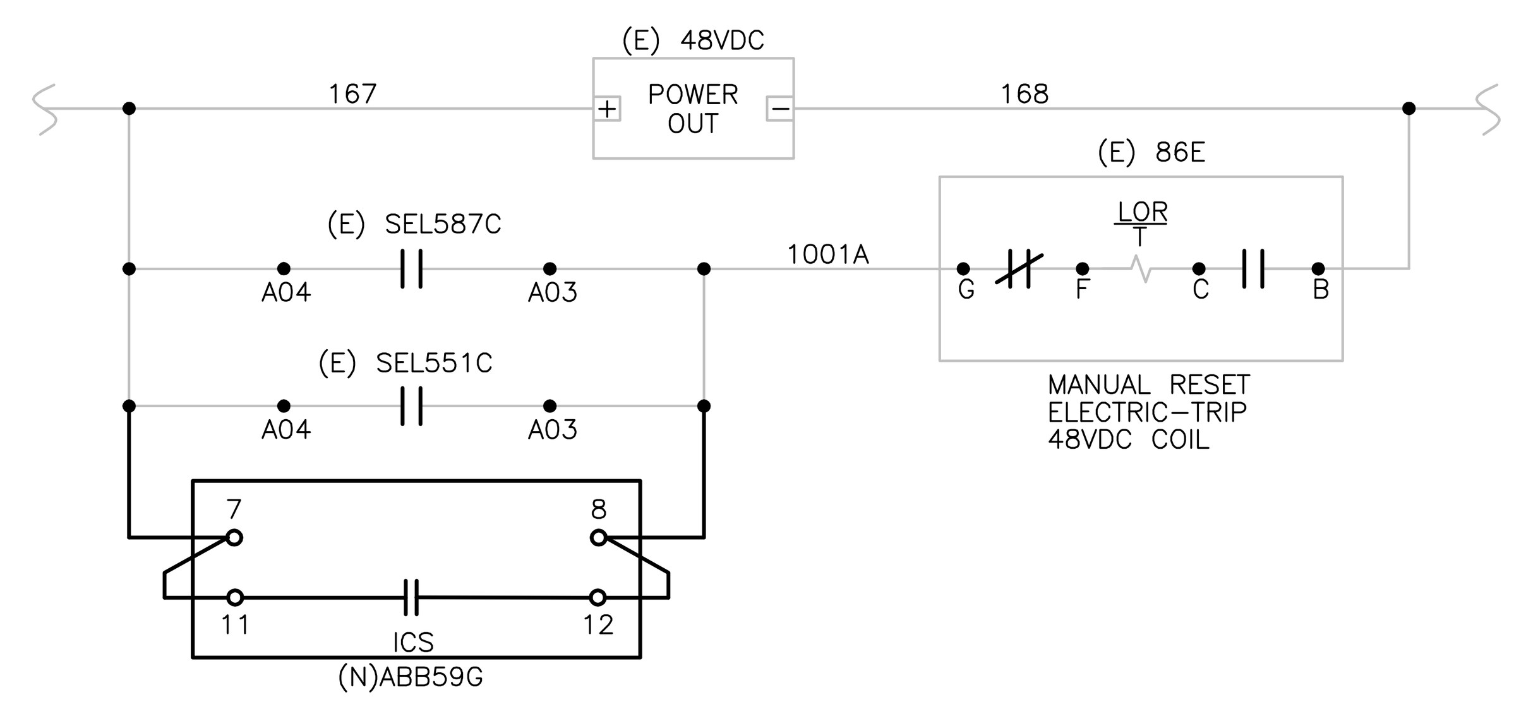
FILE NAME: 233-E54_1.DWG 10-29-09

60098456.0001

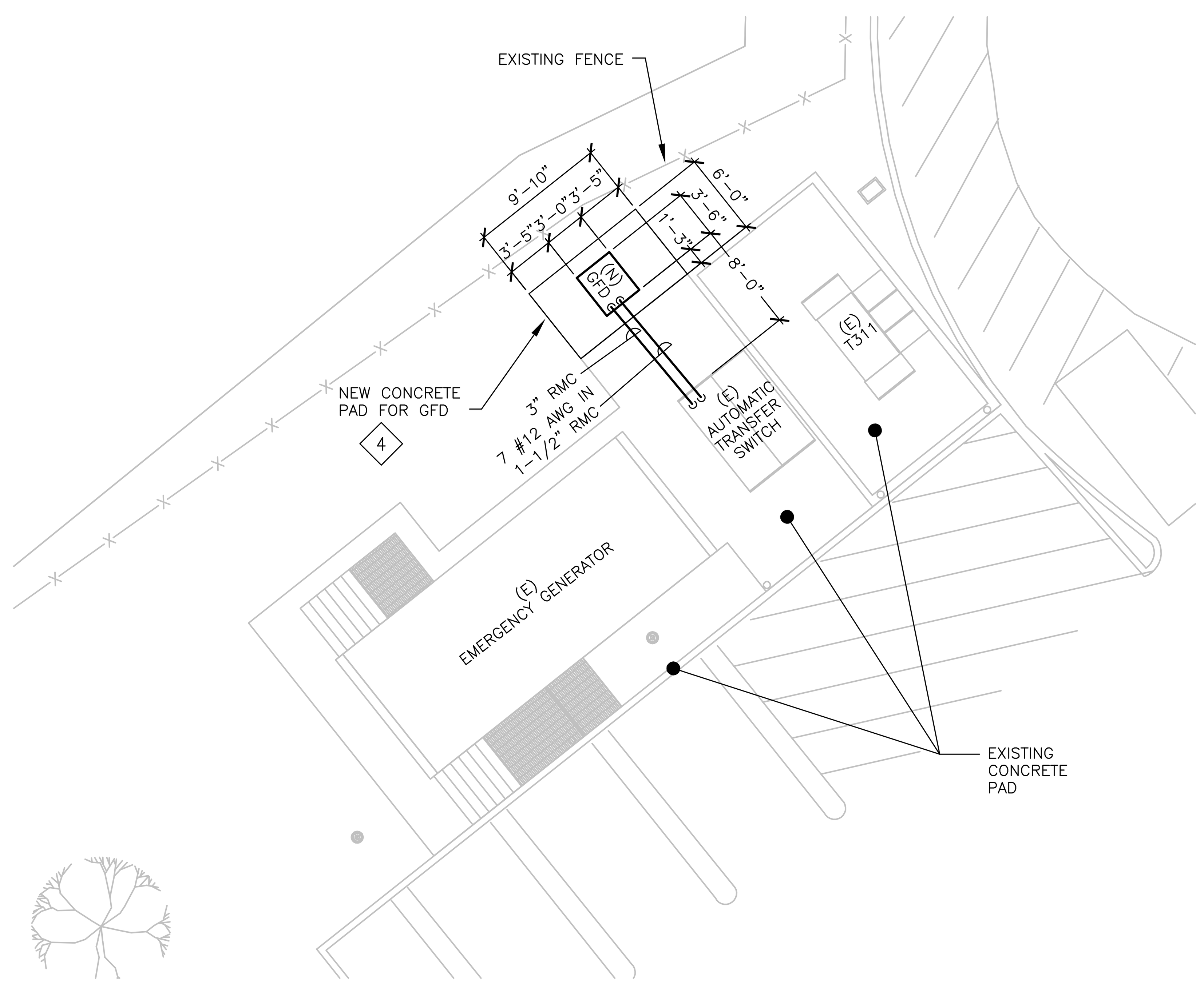
DWG NO. A233–0902–E55 | SH. | REV



1 GFD CONNECTION DIAGRAM
E55 | E55

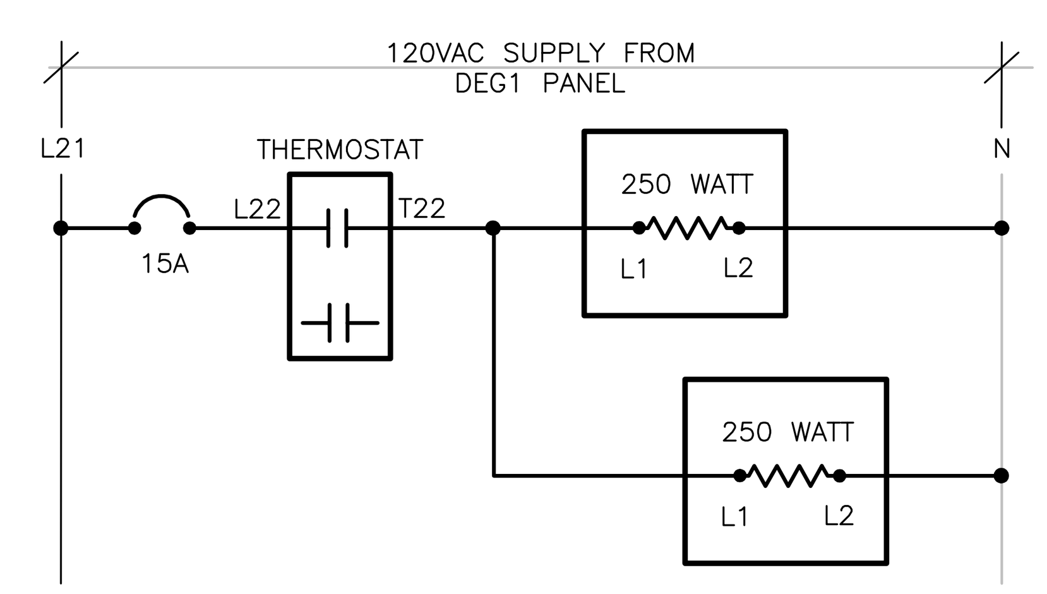


2 RELAY 59G SCHEMATIC DIAGRAM
E55 | E55



3 GROUND FAULT DETECTOR INSTALLATION PLAN
E55 | E55
SCALE: 1/8"=1'–0"

N



4 GFD ENCLOSURE SPACE HEATERS
E55 | E55

SHEET NOTES

KEY NOTES

1. SUPPLY & INSTALL GFD UNIT.
2. INSTALL & TERMINATE 13.8KV FEEDER CABLE FROM VCB750–E TO GFD UNIT.
3. CONNECT 59G TRIP CONNECT TO (E) 86E CONTROL DIAGRAM.
4. INSTALL A NEW CONCRETE PAD 9'–10"Wx6'–0"Lx8"D.

ADDITIVE #1

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

REVISIONS

DRAWN S.MAI	DATE
DESIGNED J.CHOI	DATE
CHECKED F.JONES	DATE
PROJMGR N.NIZAMOVA	DATE
REQUESTER N.HSU	DATE
R&QA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE
	DATE

Ames Research Center
Moffett Field, California

N233 ELECTRICAL RENOVATION PROJECT
ELECTRICAL

13.8KV EMERGENCY SYSTEM GROUND FAULT DETECTOR

SIZE D | CAGE CODE 25307 | A 233–0902–E55 | REV –
SCALE AS SHOWN | INDEX | SHEET 1 OF 1

FILE NAME: 233–E55_1.DWG 10–29–09

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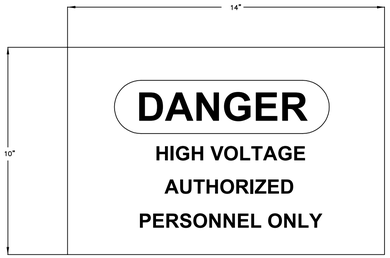
DWG: \\N213fs2\proj\233\60098456.0001_N233 Electrical Upgrade\500_CAD_N233 Electrical Renovation Project – Final Issue_Drawings\233–E55_1.dwg Version: 17.1s (LMS Tech) User: palden
DATE: Aug 19, 2010 – 2:36:56 pm

NAMEPLATE SCHEDULE

NO.	LINE 1	LINE 2	LINE 3	LINE SIZE	NP SIZE	COLOR CODE
N1	CIRCUIT BREAKER	CLOSED		3/16	1 x 3	BW
N2	CIRCUIT BREAKER	OPEN		3/16	1 x 3	BW
N3	AUTO-MANUAL	SELECTOR SWITCH	DEVICE 43	3/16	1 x 3	BW
N4	CIRCUIT BREAKER	CONTROL SW	DEVICE CS	3/16	1 x 3	BW
N5	LOCKOUT RELAY	HAND RESET	DEVICE 86	3/16	1 x 3	BW
N6	AMES POWER	MONITORING SYSTEM	APMS-148 *	3/16	1 x 3	BW
N7	PHASE & GROUND	OVERCURRENT RELAY	DEV. 50, 51, 50N, 51N, 50GS	3/16	1 x 3	BW
N8	CURRENT	TEST SWITCH	TS-1	3/16	1 x 3	BW
N9	VOLTAGE	TEST SWITCH	TS-2	3/16	1 x 3	BW
N10	SPECIAL NAMEPLATE, SEE DETAIL N10			3/8, 3/4	4 x 6	RW
N11	CIRCUIT BREAKER	VCB 692 *		1/4	1 x 3	BW
N12	INCOMING LINE	VOLTAGE	TRANSFORMER	3/16	1 x 3	BW
N13	CONTROL	POWER	TRANSFORMER	3/16	1 x 3	BW
N14	VCB692 *			1/4	1 x 3	BW
N15	SPECIAL NAMEPLATE, SEE DETAIL N15			VARY	4 x 6	RW

* TYPICAL - AS SHOWN ON DRAWINGS
ALL DIMENSIONS AND SIZES SHOWN ARE IN INCHES



DETAIL "N10"

DETAIL "N15"

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					

DRAWN R.BEDENAM	DATE
DESIGNED N.SRZAMOVA	DATE
CHECKED S.MCCASKEY A	DATE
PROJMGR N.NIZAMOVA	DATE
REQUESTER N.HSU	DATE
R&QA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE
	DATE

Ames Research Center
Moffett Field, California

N233 ELECTRICAL RENOVATION PROJECT

SIZE	CAGE CODE	REV
D	25307	A

SCALE | INDEX | SHEET OF

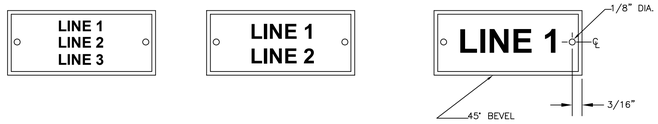
FILE NAME:

60098456.0001

DWG: \\N213s2\proj\233\60098456.0001_N233 Electrical Upgrade\500_CAD_N233 Electrical Renovation Project - Final Issue_Drawings\233-E60_1.dwg
DATE: Aug 19, 2010 - 2:37:02 pm
Version: 17.1s (LMS Tech) User: palden

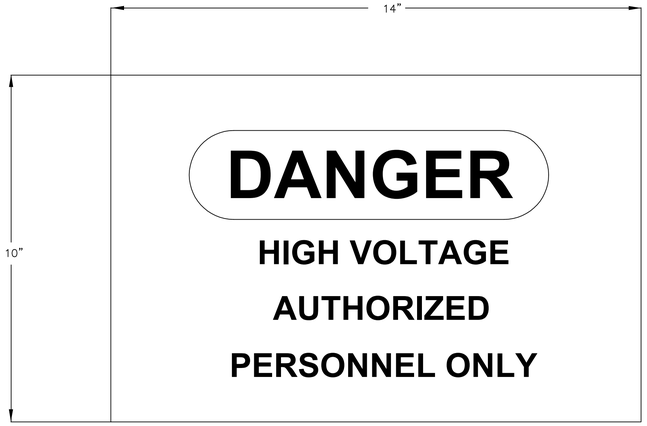
DWG NO. A233-0902-E60 | SH. 1 | REV –

NAMEPLATE SCHEDULE



NO.	LINE 1	LINE 2	LINE 3	LINE SIZE	NP SIZE	COLOR CODE
N1	CIRCUIT BREAKER	CLOSED		3/16	1 x 3	BW
N2	CIRCUIT BREAKER	OPEN		3/16	1 x 3	BW
N3	AUTO-MANUAL	SELECTOR SWITCH	DEVICE 43	3/16	1 x 3	BW
N4	CIRCUIT BREAKER	CONTROL SW	DEVICE CS	3/16	1 x 3	BW
N5	LOCKOUT RELAY	HAND RESET	DEVICE 86	3/16	1 x 3	BW
N6	AMES POWER	MONITORING SYSTEM	APMS-148 *	3/16	1 x 3	BW
N7	PHASE & GROUND	OVERCURRENT RELAY	DEV. 50, 51, 50N, 51N, 50GS	3/16	1 x 3	BW
N8	CURRENT	TEST SWITCH	TS-1	3/16	1 x 3	BW
N9	VOLTAGE	TEST SWITCH	TS-2	3/16	1 x 3	BW
N10	SPECIAL NAMEPLATE, SEE DETAIL N10			3/8, 3/4	4 x 6	RW
N11	CIRCUIT BREAKER	VCB 692 *		1/4	1 x 3	BW
N12	INCOMING LINE	VOLTAGE	TRANSFORMER	3/16	1 x 3	BW
N13	CONTROL	POWER	TRANSFORMER	3/16	1 x 3	BW
N14	VCB692 *			1/4	1 x 3	BW
N15	SPECIAL NAMEPLATE, SEE DETAIL N15			VARY	4 x 6	RW

* TYPICAL - AS SHOWN ON DRAWINGS
ALL DIMENSIONS AND SIZES SHOWN ARE IN INCHES



DETAIL "N10"

DETAIL "N15"

SHEET NOTES

1. MATERIAL 1/16 INCH THICK FORMICA WITH BEVELED EDGES.
2. FASTEN TO PANEL WITH 4–40x3/8" LONG STAINLESS SCREWS. DRILL PANEL WITH #39 DRILL & TAP.
3. ENGRAVED LINE TO BE 1/2" SHORTER THEN NP LENGTH. ALLOW 9 3/16" OR 6 1/4" CHARACTERS PER INCH
4. COLOR CODE NAMEPLATE:
   BW=BLACK FACE WITH WHITE LETTERS
   RW=RED FACE WITH WHITE LETTERS

KEY NOTES

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

REVISIONS

DRAWN P. ALDEN	DATE
DESIGNED N.NIZAMOVA	DATE
CHECKED J.McCUSKER	DATE
PROJMGR N.NIZAMOVA	DATE
REQUESTER N.HSU	DATE
R&QA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE

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N233 ELECTRICAL RENOVATION PROJECT
ELECTRICAL

EQUIPMENT
NAMEPLATE SCHEDULE

SIZE D | CAGE CODE 25307 | A 233-0902-E60 REV –
SCALE NONE | INDEX | SHEET 1 OF 1

FILE NAME: 233-E60_1.DWG 10-29-09

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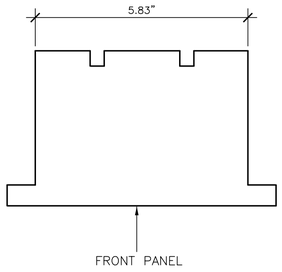
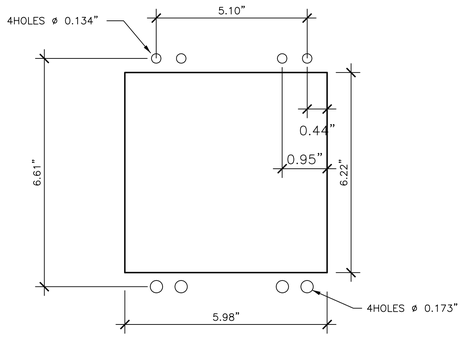
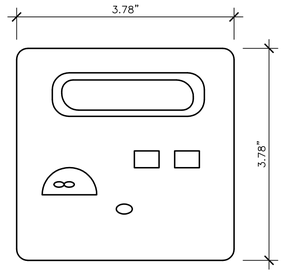
DWG NO. A233-0902-E61 | SH. 1 | REV



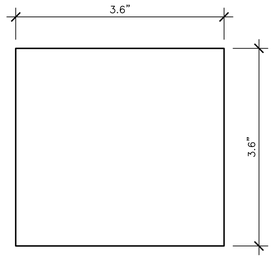
TOP VIEW



PANEL CUT-OUT



FRONT VIEW



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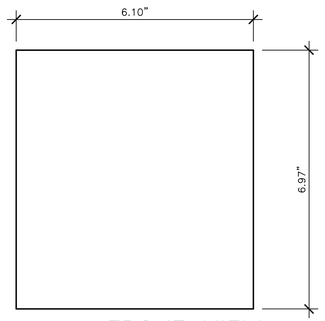
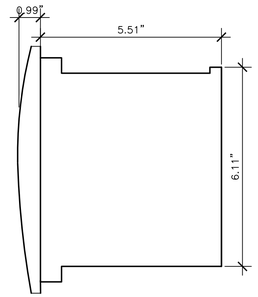
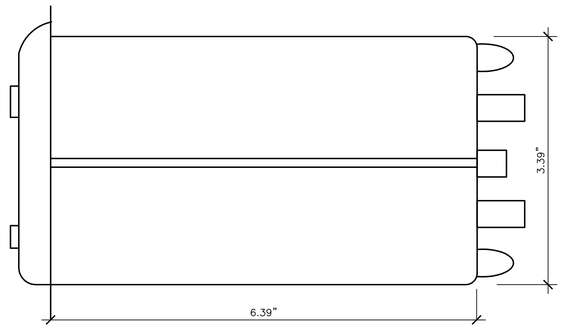


FRONT VIEW



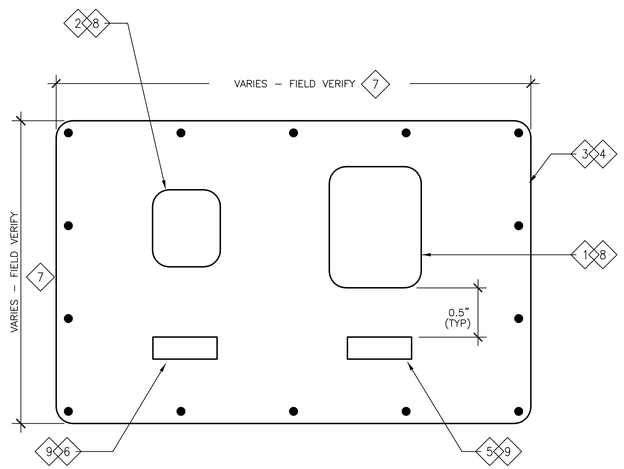
RIGHT SIDE VIEW



TOP VIEW

1 3-PHASE MICROPROCESSOR BASED ELECTRONIC RELAY INSTALLATION INFORMATION (FLUSH MOUNTING)
SCALE: NTS

2 DIGITAL 3-PHASE (SEE SHEET NOTE 3) POWER METER INSTALLATION INFORMATION (FLUSH MOUNTING)
SCALE: NTS



3 TYPICAL PANEL MOUNTING DETAILS (VERTICALLY MOUNTED)
SCALE: NTS

SHEET NOTES

1. THESE DRAWING DETAILS AND DIMENSIONS ARE SHOWN FOR GUIDANCE ONLY. CONTRACTOR SHALL BE RESPONSIBLE TO CONFIRM AND PROVIDE DETAILED DRAWINGS FROM EQUIPMENT MANUFACTURER BASED ON ACTUAL EQUIPMENT SUPPLIED BEFORE INSTALLATION INTO EXISTING AND NEW EQUIPMENT.
2. FOR NAMEPLATE SCHEDULE, SEE DRAWING E60.

KEY NOTES

1. OUTLINE OF NASA AMES STANDARD 3-PHASE MICROPROCESSOR BASED 50/51 ELECTRONIC RELAY UNIT, ALSTOM MICOM P124 (GOVERNMENT FURNISHED & CONTRACTOR INSTALLED EQUIPMENT).
2. OUTLINE OF NASA AMES STANDARD DIGITAL 3-PHASE POWER METER, PML ION7330 (GOVERNMENT FURNISHED AND CONTRACTOR INSTALLED EQUIPMENT).
3. PROVIDE NEW ONE-PIECE COVER PLATE WITH MOUNTING SCREWS, OF SUITABLE SIZE TO ADEQUATELY COVER THE EXISTING CUTOUT OPENINGS OF REMOVED RELAYS FROM THEIR RESPECTIVE EXISTING SWGR INSTRUMENT PANELS.
4. NEW COVER PLATE SHALL BE #10 GAUGE STEEL PLATE. PAINTED TO MATCH THE EXISTING OR NEW EQUIPMENT PAINT FINISH.
5. PROVIDE NEW IDENTIFICATION NAMEPLATE TO READ "3ø, 50/51 – 1, 2, 3 & N".
6. PROVIDE NEW IDENTIFICATION NAMEPLATE. SEE SPECIFICATION 26 23 00 FOR NAMEPLATE DETAILS.
7. EACH PIECE OF EXISTING EQUIPMENT IS DIFFERENT. CONTRACTOR SHALL FIELD VERIFY EACH PIECE OF EQUIPMENT TO DETERMINE COVER PLATE DIMENSIONS PRIOR TO FABRICATION. COVER PLATE SHALL BE LARGE ENOUGH TO COVER EXISTING RELAY OPENINGS OF REMOVED RELAYS AND ACCOMMODATE NEW DEVICES. COVER PLATE SHALL BE AS SYMMETRICAL AS POSSIBLE ON FRONT OF EQUIPMENT AND SHALL NOT HAVE ANY SHARP EDGES.
8. FOR NEW EQUIPMENT, CONTRACTOR SHALL PROVIDE NEW OPENINGS BASED ON DETAIL 1 AND 2 FOR DEVICE MOUNTING AND DEVICE NAMEPLATES.
9. EQUIPMENT/DEVICE NAMEPLATE SHALL BE IN ACCORDANCE WITH ELECTRICAL NOTE 11 ON DRAWING E1 SH.1.

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

REVISIONS

DRAWN P.ALDEN	DATE
DESIGNED N.NIZAMOVA	DATE
CHECKED J.McCUSKER	DATE
PROJMGR N.NIZAMOVA	DATE
REQUESTER N.HSU	DATE
R&QA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE
	DATE

Ames Research Center
Moffett Field, California

N233 ELECTRICAL RENOVATION PROJECT
ELECTRICAL

TYPICAL RELAY UNITS PANEL MOUNTING DETAILS

SIZE	CAGE CODE	DWG NO.	REV
D	25307	A 233-0902-E61	-
SCALE NTS		INDEX	SHEET 1 OF 1

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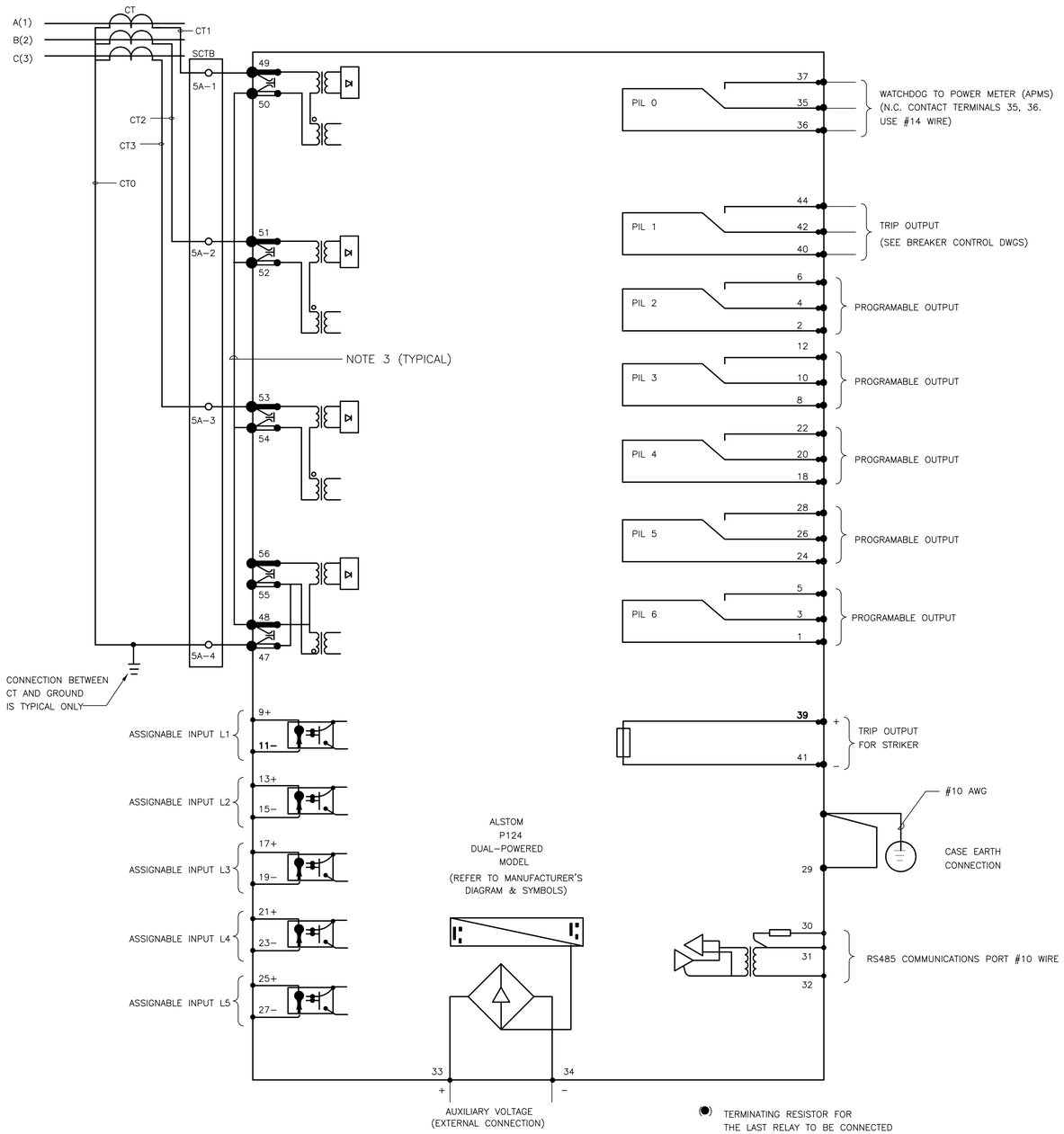
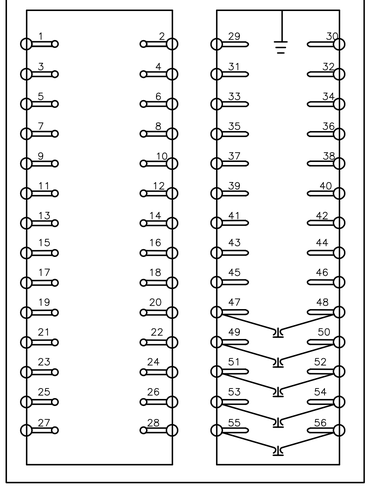


MODULE TERMINAL BLOCKS
VIEWED FROM REAR



SHEET NOTES

1. 50/51 RELAY SHALL BE GOVERNMENT FURNISHED & INSTALLED EQUIPMENT. THE RELAY SHALL BE THE NASA AMES STANDARD ALSTOM MODEL P124 MICROPROCESSOR BASED ELECTRONIC RELAY UNIT.
2. RELAY TO BE MOUNTED AT FRONT PANEL IN EXISTING AND NEW BREAKER CUBICLES, AS SHOWN ON THE DRAWINGS.
3. TERMINALS 1-48, 50, 52 AND 54 CURRENT INPUTS SHALL BE WIRED/JUMPERED EXTERNALLY BY THE CONTRACTOR.
4. WIRE NUMBERS SHALL CONSIST OF THE SUPPLY DEVICE/RELAY NUMBER AND A SEQUENCIAL NUMBER (1, 2, 3...) AS REQUIRED.

SHEET SYMBOLS

- CT SHORTING LINKS MAKE BEFORE (b) AND (C) DISCONNECT
- SHORT TERMINALS BREAK BEFORE (C)
- LONG TERMINALS
- PINS TERMINALS (pcb TYPE)

ALSTOM MICOM P124
50/51 RELAY WIRING DIAGRAM

1 SCALE: N.T.S.

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

REVISIONS

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CHECKED J.McCUSKER	DATE
PROJMGR N.NIZAMOVA	DATE
REQUESTER N.HSU	DATE
R&QA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE
	DATE

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Moffett Field, California

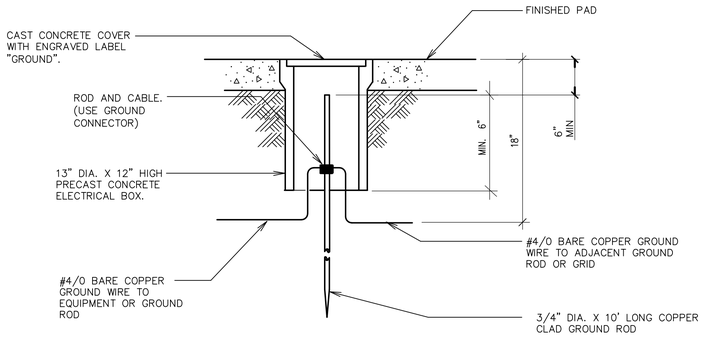
N233 ELECTRICAL RENOVATION PROJECT
ELECTRICAL
TYPICAL
50/51 RELAY WIRING AND INTERCONNECTION DIAGRAM

SIZE	CAGE CODE	REV
D	25307	A
SCALE AS NOTED	INDEX	SHEET 1 OF 1

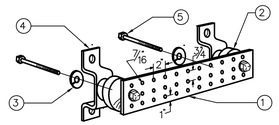
A 233-0902-E62

FILE NAME: 233-E62_1.DWG 10-29-09

60098456.0001



1 DETAIL–GROUND WELL
SCALE: N.T.S.



NOTES:

A. PROVIDED AND INSTALLED BY ELECTRICAL CONTRACTOR

(1) COPPER GROUND BAR,1/4"X 4"X 20", NEWTON INSTRUMENT CO. CAT. NO. B–6142 (OR EQUAL). HOLE CENTERS TO MATCH NEMA DOUBLE LUG CONFIGURATION.

(2) INSULATORS, NEWTON INSTRUMENT CAT. NO. 3061–4(OR EQUAL).

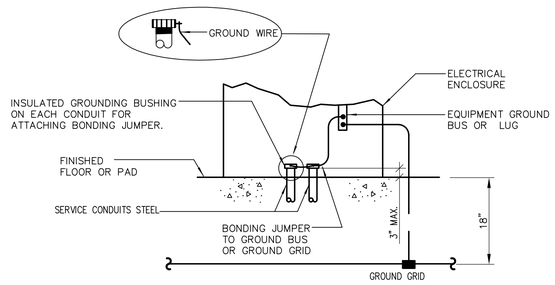
(3) 5/8" LOCKWASHERS, NEWTON INSTRUMENT CO. CAT. NO. 3015–8(OR EQUAL).

(4) WALL MOUNTING BRACKET, NEWTON INSTRUMENT CO. CAT NO. A–6056(OR EQUAL).

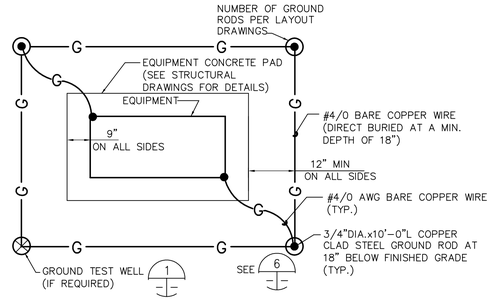
(5) 5/8–11 X 1" H.H.C.S.BOLTS, NEWTON INSTRUMENT CO. CAT NO. 3012–1(OR EQUAL).

B. PROVIDE #4/0 BARE CU. WIRE WITH NEMA 2–HOLE CONNECTOR FROM MAIN BUILDING GROUND (MBG) BUS BAR TO MAIN COMPUTER GROUND (MCG) BUS BAR.

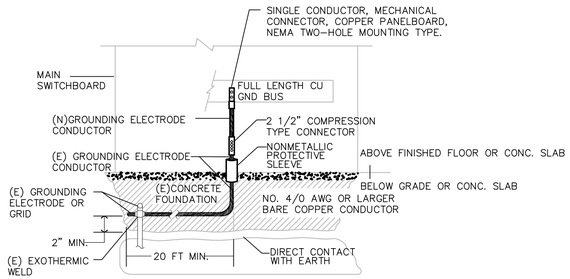
2 GROUND BUS BAR DETAIL
SCALE: N.T.S.



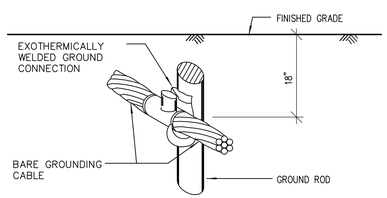
3 (TYPICAL FOR BOXES, CABINETS) CONDUIT GROUND CONNECTION DETAIL
SCALE: N.T.S.



4 TYPICAL – NEW PAD MOUNTED EQUIPMENT GROUNDING DETAILS
SCALE: N.T.S.



5 GROUND BUS BAR DETAIL
SCALE: N.T.S.



NOTES:
EXOTHERMICALLY WELDED GROUND CONNECTION SHALL BE SIZED ACCORDING TO THE MANUFACTURER'S SPECIFICATIONS FOR CABLE SIZE AND ROD USED, AS SHOWN ON PLANS.

6 DETAIL–GROUND CABLE CONNECTION TO GROUND ROD
SCALE: N.T.S.

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

REVISIONS

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DESIGNED N.NIZAMOVA	DATE
CHECKED J.McCUSKER	DATE
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REQUESTER N.HSU	DATE
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SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE
	DATE

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N233 ELECTRICAL RENOVATION PROJECT
ELECTRICAL

TYPICAL GROUNDING DETAILS

SIZE D | CAGE CODE 25307 | A 233-0902-E63 | REV
SCALE NONE | INDEX | SHEET 1 OF 1

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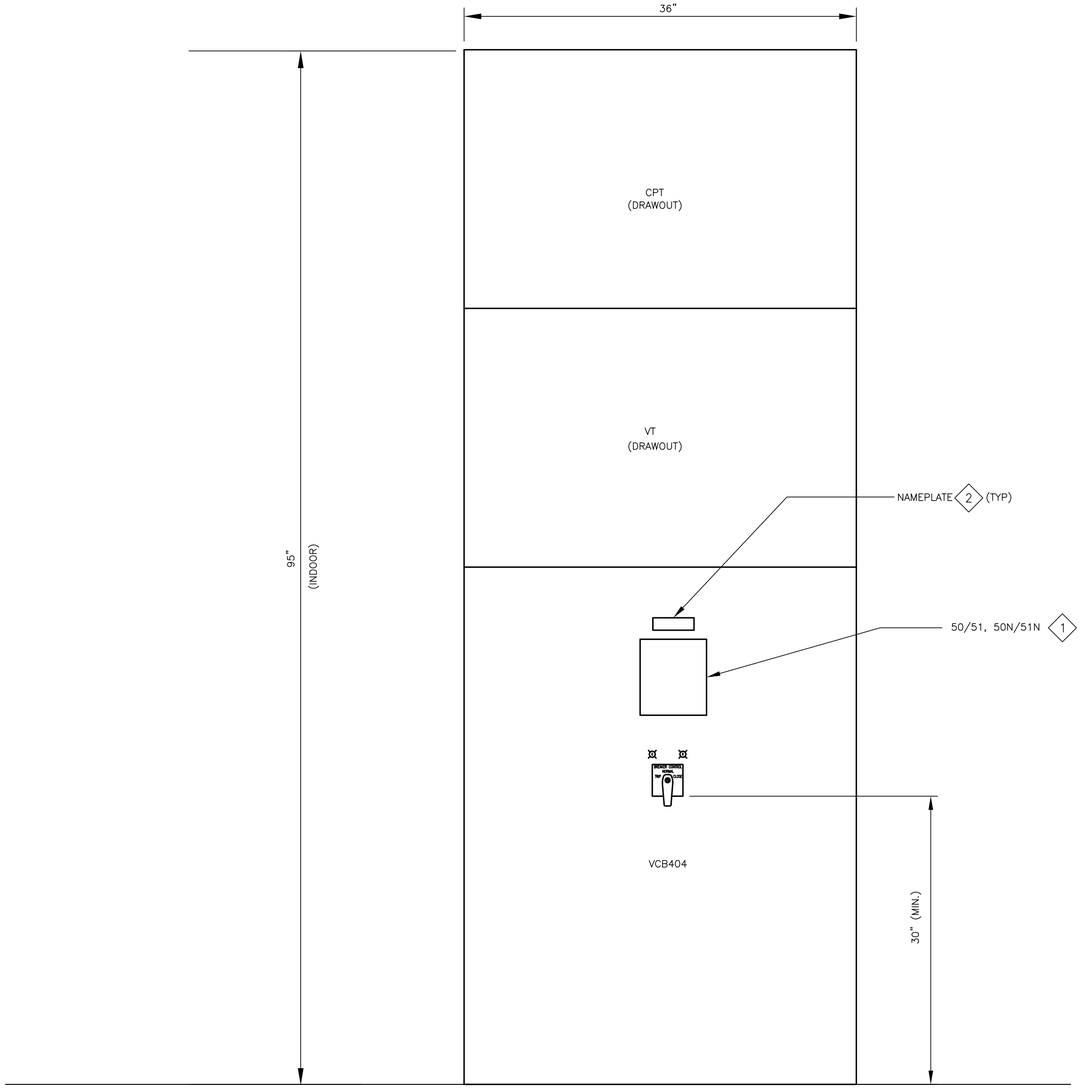
60098456.0001

SHEET NOTES

1. FOR GENERAL CONSTRUCTION NOTES AND SYMBOLS SEE DRAWING G4.

KEY NOTES

1. INSTALLATION OF GFE EQUIPMENT, TO BE MOUNTED ON SWITCHGEAR, SHALL BE IN ACCORDANCE WITH DRAWING E61.
2. EQUIPMENT/DEVICE NAMEPLATES SHALL BE IN ACCORDANCE WITH ELECTRICAL NOTE 11 ON DRAWING E1 AND PER DRAWING E60.



1 NEW SWITCHGEAR ELEVATION

SCALE: NTS (INTERIOR VIEW WITH WEATHERTIGHT DOOR OPEN.) (TYPICAL)

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

REVISIONS

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DESIGNED N.NIZAMOVA	DATE
CHECKED J.McCUSKER	DATE
PROJMGR N.NIZAMOVA	DATE
REQUESTER N.HSU	DATE
R&QA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE
	DATE

Ames Research Center
Moffett Field, California

N233 ELECTRICAL RENOVATION PROJECT
ELECTRICAL

TYPICAL MISCELLANEOUS INSTALLATION DETAILS

SIZE	CAGE CODE	DWG NO.	REV
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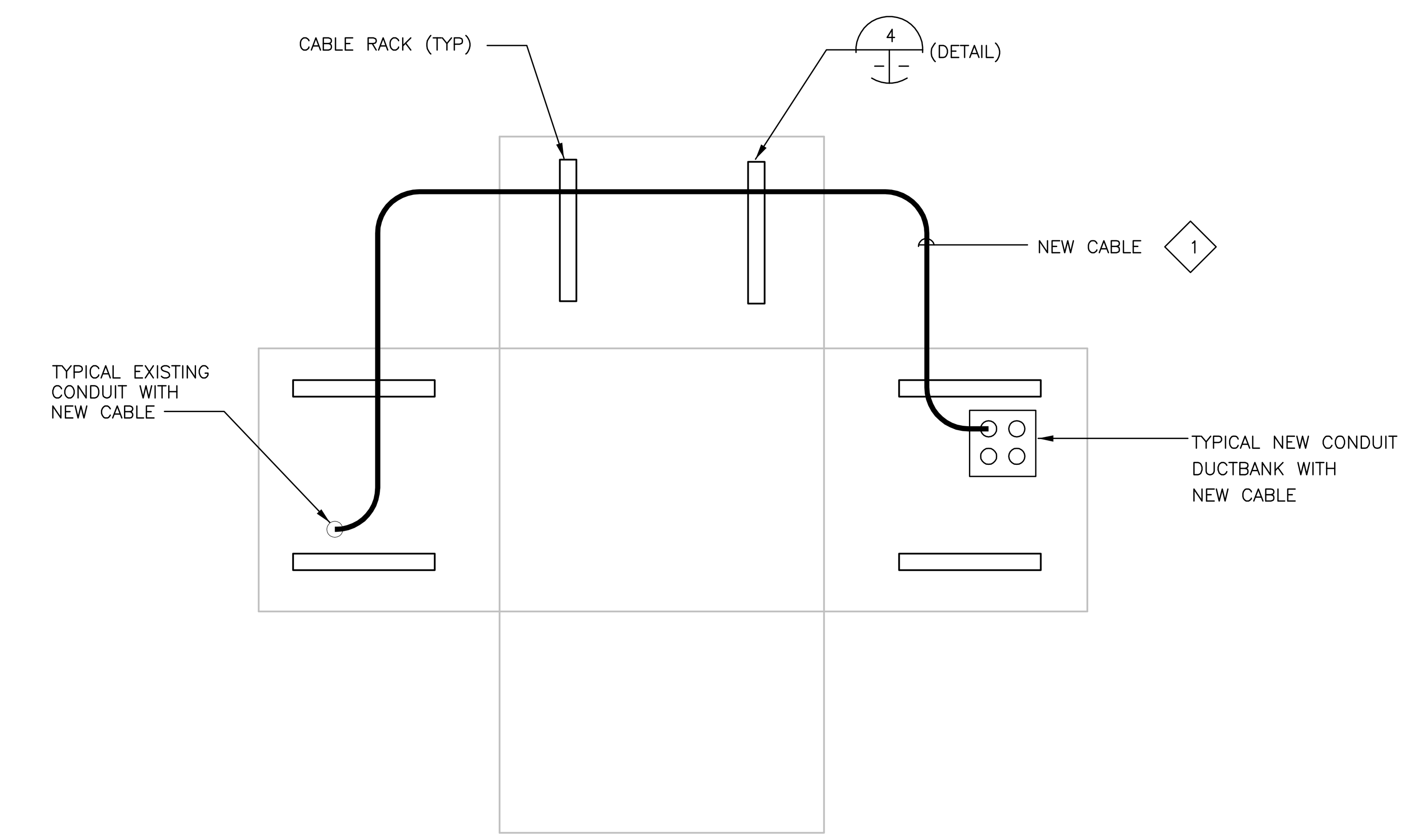
SHEET NOTES

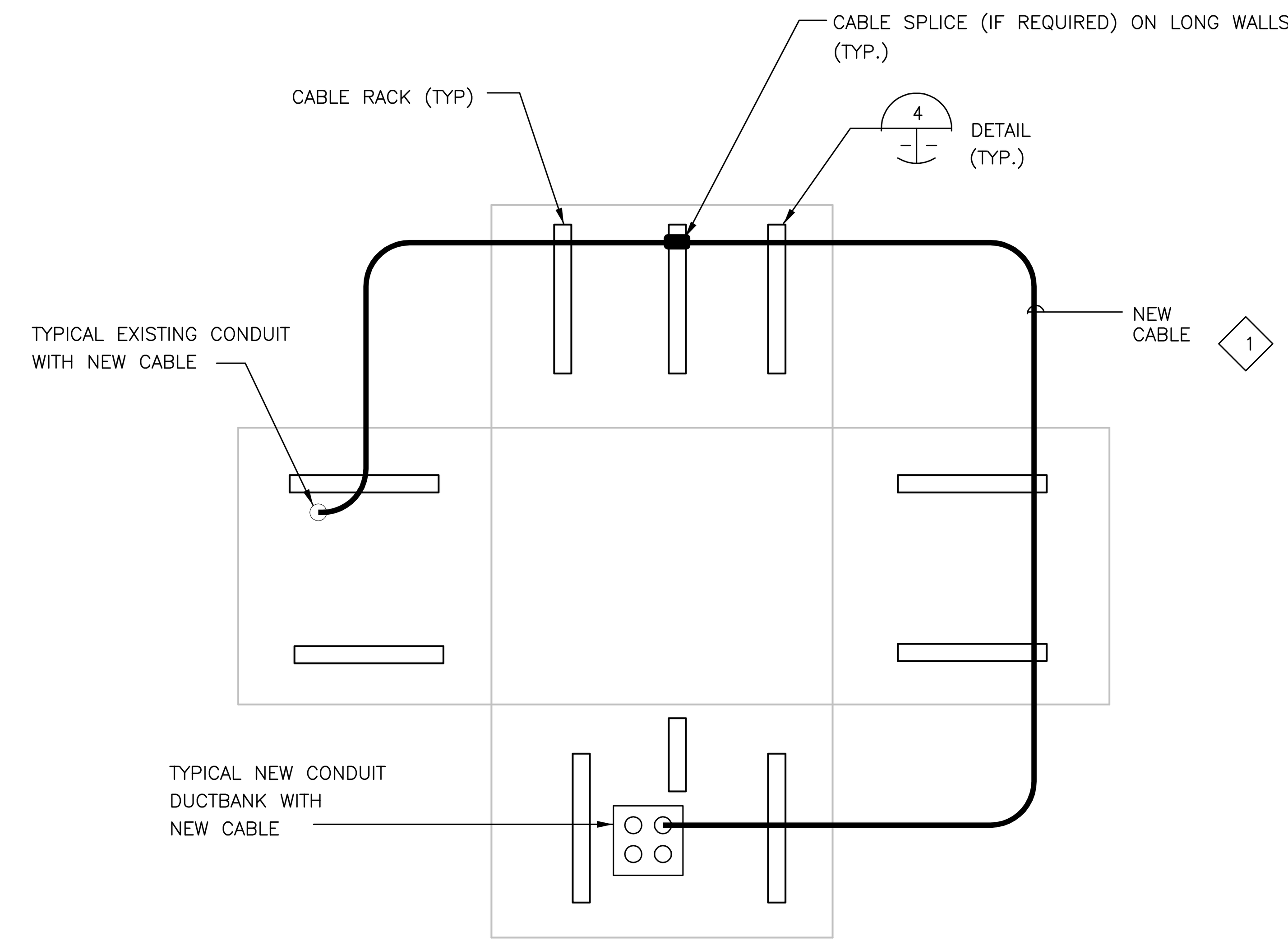
1. PROVIDE CABLE RACKS, CABLE RACK ARMS AND CABLE INSULATORS IN EACH MANHOLE AND/OR VAULT FOR SUPPORT OF NEW CABLE. THE EXACT NUMBER AND CONFIGURATION OF RACKS REQUIRED TO BE DETERMINED BY THE CONTRACTOR IN THE FIELD BASED ON EXISTING CONDITIONS. CABLE RACKS SHALL BE INSTALLED AT LEAST (2) ON EACH SIDE, OR (3) EACH WHEREVER A CABLE SPLICE IS MADE OR ON LONGER WALL (HORIZONTALLY).

KEY NOTES

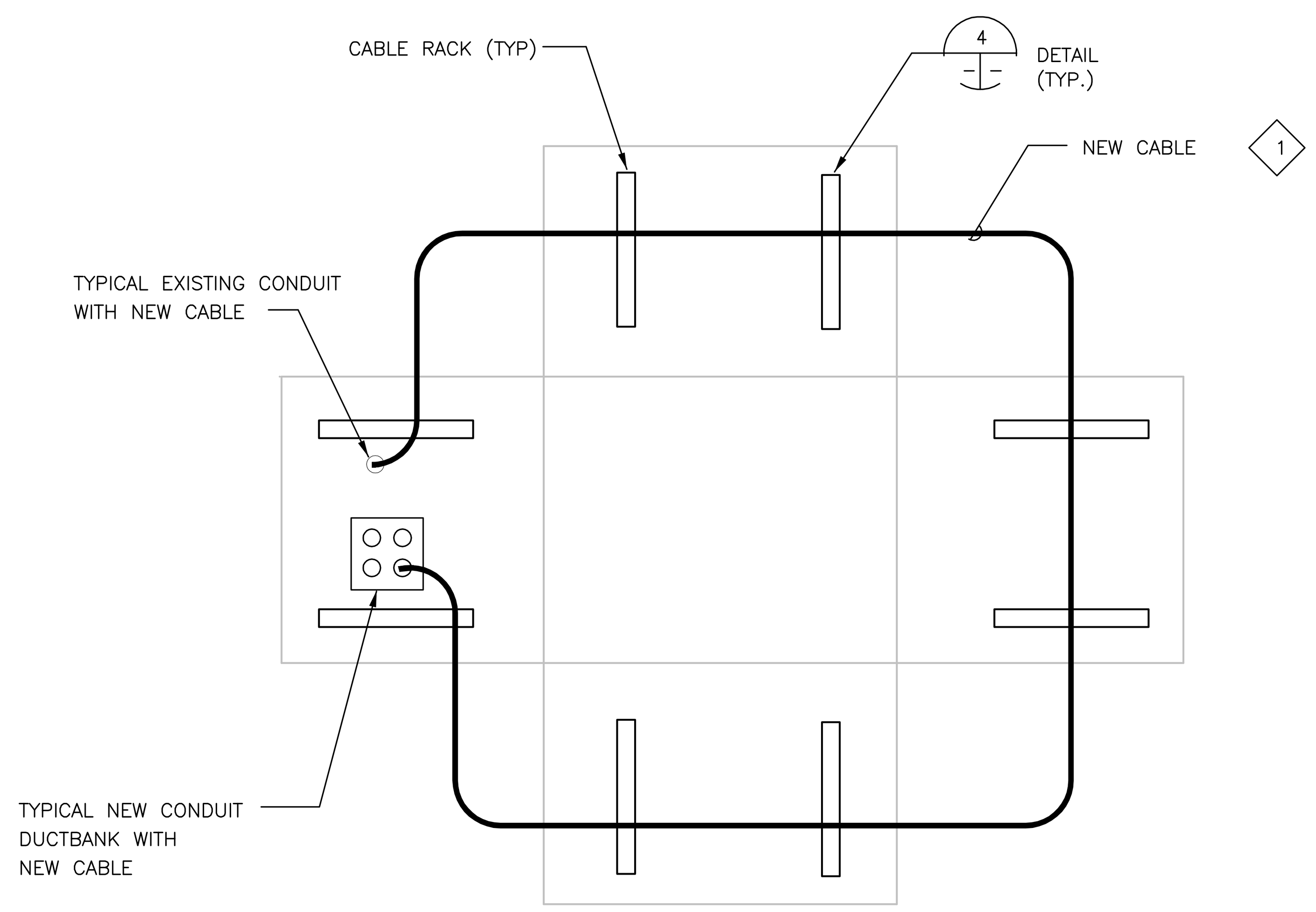
1. ROUTE NEW CABLE THE LONG DISTANCE AROUND THE MANHOLE TAKING ADVANTAGE OF THE MINIMUM INTERFERENCE FROM EXISTING CABLES, SPLICES AND EQUIPMENT WITHIN THE MANHOLE.
2. PROVIDE 2" CABLE RACK CHANNELS.
3. EACH CABLE INSULATOR SHOWN REPRESENTS SPACE ALLOCATION FOR 3–1/C #500KCMIL AND 1 #4/0 GND OR 3–1/C #350KCMIL AND 1 #4/0 GND AS SHOWN ON THE LAYOUT DRAWINGS.



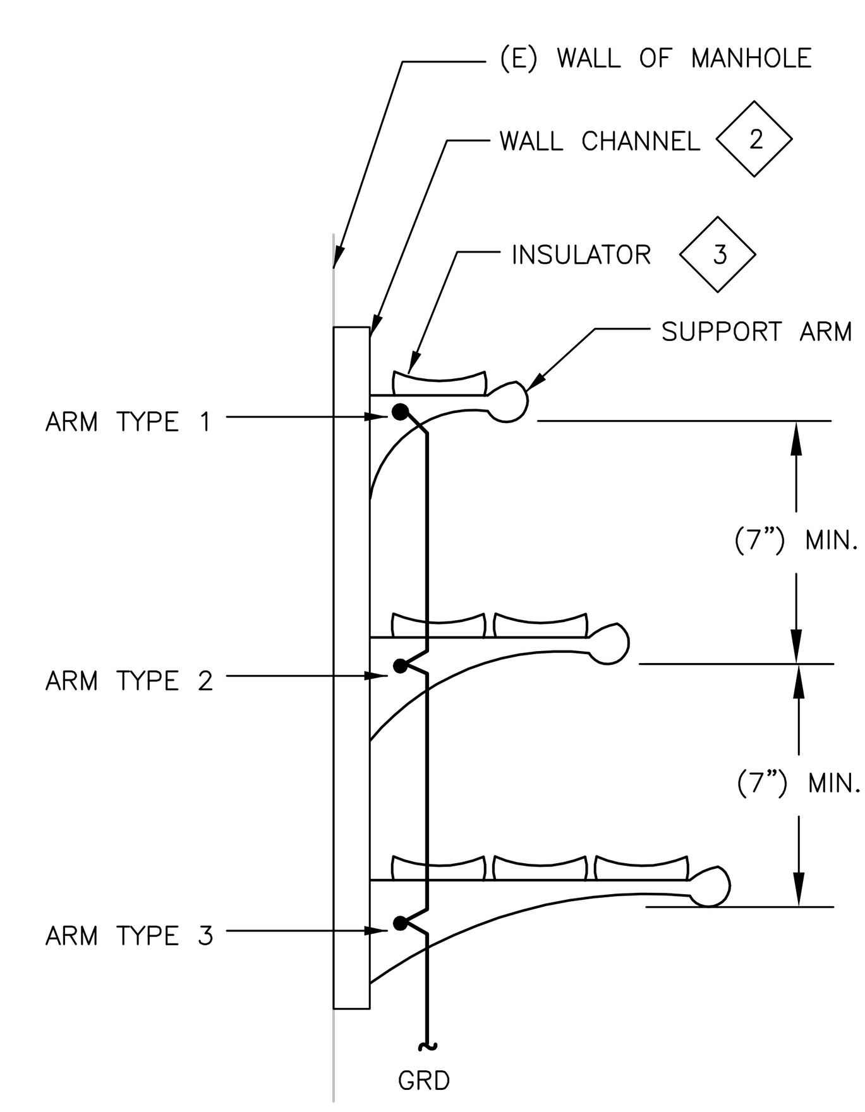
1 TYPICAL MH STRAIGHT CABLE ROUTING
SCALE: NTS



2 TYPICAL MH 270° CABLE ROUTING
SCALE: NTS



3 TYPICAL MH 360° CABLE ROUTING
SCALE: NTS



4 TYPICAL MULTIPLE CABLE RACK INSTALLATION
SCALE: NTS (SEE NOTE 1)

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

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	DATE

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N233 ELECTRICAL RENOVATION PROJECT
ELECTRICAL

TYPICAL CABLE ROUTING DETAILS

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DATE: Aug 19, 2010 – 2:37:14 pm

DWG NO. A233-0902-S1 | SH. | REV

STRUCTURAL GENERAL NOTES

1. ALL WORK SHALL BE IN ACCORDANCE WITH ALL FEDERAL, STATE AND LOCAL BUILDING CODES AND SAFETY ORDINANCES IN EFFECT AT THE TIME AND PLACE OF BUILDING.
2. ANY CONFLICTS OR DISCREPANCIES BETWEEN THE DRAWINGS AND SITE CONDITIONS SHALL BE IMMEDIATELY BROUGHT TO THE ATTENTION OF THE ENGINEER AND CORRECTED AS DIRECTED BY THE ENGINEER.
3. CONTRACTOR AGREES THAT HE SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT . INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT SHALL APPLY CONTINUOUSLY AND SHALL NOT BE LIMITED TO NORMAL WORKING HOURS.
4. NO PIPES OR SLEEVES SHALL PASS THROUGH STRUCTURAL MEMBERS WITHOUT APPROVAL OF CONTRACTING OFFICER UNLESS SHOWN ON STRUCTURAL DRAWINGS.
5. CONCRETE SUB CONTRACTOR SHALL PROVIDE TEMPORAY SHORING AS REQUIRED TO INSURE VERTICAL & LATERAL STABILITY OF SOIL FOR FOUNDATION DURING CONSTRUCTION.

REINFORCEMENT STEEL

1. REINFORCING BARS SHALL BE IN ACCORDANCE WITH REQUIREMENTS OF ASTM A615, GRADE 60. DEFORMED BARS, EXCEPT #3 BAR GRADE 40.

2. LAP SPLICE LENGTH SCHEDULE:

F'c = 4,000 PSI

	BASIC LAP	TOP BAR LAP*
#4	28 IN.	37 IN.
#5	36 IN.	46 IN.
#6	43 IN.	56 IN.
#7	62 IN.	81 IN.

* TOP BAR LAPS OCCUR IN HORIZONTAL BARS OF FOOTINGS, SLABS AND WALLS WHERE MORE THAN ONE FOOT OF WET CONCRETE IS PLACED BELOW THE GIVEN REINFORCEMENT BAR.

3. CONCRETE COVER:

UNLESS OTHERWISE NOTED, CONCRETE COVERAGE OF REINFORCING BARS SHALL BE AS FOLLOWS:

3" – ALL BARS WHERE CONCRETE IS DEPOSITED DIRECTLY AGAINST EARTH.

2" – FOR #6 AND LARGER BARS WHERE CONCRETE IS EXPOSED TO EARTH AND/OR WEATHER BUT DEPOSITED AGAINST FORMS.

1-1/2" – FOR #5 AND SMALLER BARS FOR SLABS, WALLS, BEAMS, COLUMNS AND EXTERIOR SURFACES EXPOSED TO EARTH OR WEATHER BUT DEPOSITED AGAINST FORMS.

4. ALL REINFORCING STEEL AND EMBEDMENTS TO BE HELD SECURELY IN PLACE PRIOR TO PLACING CONCRETE. PROVIDE SUFFICIENT SUPPORTS TO ALLOW WALKING ON REINFORCEMENT. NO BRICK OR POROUS MATERIAL SHALL BE USED TO SUPPORT REINFORCING.

STRUCTURAL ABBREVIATIONS

℄	CENTER LINE
A.B.	ANCHOR BOLT
B.PL	BASE PLATE
BOT	BOTTOM
B.O.S	BOTTOM OF STEEL
CLR	CLEAR
COL	COLUMN
CONT	CONTINUOUS
COTR	CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE
DET	DETAIL
DWL	DOWEL
DWG	DRAWING
(E)	EXISTING
EA	EACH
E.F.	EACH FACE
EMBED	EMBEDMENT
EQ	EQUAL
E.W.	EACH WAY
F.S.	FAR SIDE
F.F.	FINISH FLOOR
FTG	FOOTING
GA	GAUGE
GALV	GALVANIZED
H.R.	HAND RAIL
HORIZ	HORIZONTAL
HSS	HOLLOW STRUCTURAL SECTION
HT	HEIGHT
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
MAX	MAXIMUM
MIN	MINIMUM
(N)	NEW
N.S.	NEAR SIDE
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
OEM	ORIGINAL EQUIPMENT MANUFACTURER
OPNG	OPENING
OPP	OPPOSITE
PL	PLATE
PLCS.	PLACES
PS	PIPE SUPPORT
REINF	REINFORCING
REQ'D	REQUIRED
SIM	SIMILAR
SPEC	SPECIFICATION
SPC	SPACING
STL	STEEL
SYMM	SYMMETRICAL
T&B	TOP AND BOTTOM
TBM	TEMPORARY BENCH MARK
THK	THICK
T.O.	TOP OF
T.O.F	TOP OF FOOTING
T.O.S	TOP OF STEEL
T.O.C	TOP OF CONCRETE
TYP	TYPICAL
UNO	UNLESS NOTED OTHERWISE
VERT	VERTICAL
V.I.F.	VERIFY IN FIELD
W.W.F.	WELDED WIRE FABRIC
W.P.	WORK POINT

FOUNDATIONS

1. UNDERLYING BASE OF NATIVE SOIL SHALL BE COMPACTED TO AT LEAST 90 PERCENT OF THE MAXIMUM DRY DENSITY.
2. NO CONCRETE SHALL BE POURED IN ANY FOUNDATION UNTIL EXCAVATION HAS BEEN INSPECTED AND APPROVED BY COTR.
3. FOUNDATION DESIGN IS BASED ON CALIFORNIA BUILDING CODE 2007, CHAPTER 18 TABLE 1804.2, TYPE 4.

DESIGN CRITERIA

1. APPLICABLE CODE 2007 CALIFORNIA BUILDING CODE, ASCE 7-05
2. SEISMIC DESIGN NON-STRUCTURAL COMPONENTS.

$$F_p = \frac{0.4\ a_p S_{DS} W_p}{\left(\frac{R_p}{I_p}\right)}\left(1 + 2\frac{Z}{h}\right)$$

W_p = WEIGHT

S_{DS} = 1

a_p = 1

I_p = 1

R_p = 2.5

Z = 0

h = 12.0'

$F_{p_{min}} = 0.3\ S_{DS} I_p W_p$

3. WIND DESIGN PER CBC SECTION 1609 OR ASCE 7 CHAPTER 6

$F_w = q_z G\ C_f$

$q_z = 0.00256\ K_z K_{zt}\ Kd\ V^2 I$

G = 0.85

C_f = 1.58

K_z = 0.85

K_{zt} = 1

K_d = 0.85

I = 1

EXPOSURE C

V= 85 mph

OCCUPANCY CATEGORY II

STRUCTURAL STEEL

1. FABRICATION AND CONSTRUCTION SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION, MANUAL OF STEEL CONSTRUCTION. ALLOWABLE STRESS DESIGN, SPECIFICATIONS AND CODES, 13TH EDITION.
2. STRUCTURAL STEEL SHAPES, EXCEPT W-SHAPES, BARS AND ROD SHALL CONFORM TO ASTM A36.
3. ALL STEEL PIPES SHALL BE STANDARD PIPE, SCHEDULE 40 (UNLESS INDICATED). CONFORMING TO ASTM A53, GRADE B Fy = 35 KSI
4. BOLT HOLES IN STEEL SHALL BE 1/16" LARGER THAN BOLTS, UNLESS OTHERWISE NOTED ON PLANS. ALL BOLT HOLES TO BE DRILLED OR PUNCHED. BURNING OF HOLES SHALL NOT BE PERMITTED.
5. ALL SHOP AND FIELD WELDING PER AWS, D1.1, STRUCTURAL WELDING CODE. WELDING ELECTRODE – E70XX, OR EQUIVALENT, SHALL BE USED AT ALL STRUCTURAL STEEL CONNECTIONS.
6. DEFECTIVE WELDS SHALL BE GROUND OUT, REPAIRED, AND RE-TESTED AT CONTRACTORS EXPENSE.
7. ALL STEEL EXPOSED TO WEATHER SHALL BE HOT-DIPPED GALVANIZED.
8. ANY VENT HOLES OR LIFTING HOLES DUE TO GALVANIZING, SHALL BE REPAIRED (FILLED OUT) AFTER GALVANIZING.
9. FURNISH COPIES OF MILL TEST REPORTS OF ALL STEEL MATERIALS TO THE GOVERNMENT SHOWING CONFORMANCE WITH SPECIFIED ASTM DESIGNATIONS PRIOR TO FABRICATION OF ANY WORK. CERTIFIED LOTS SHALL BE SO IDENTIFIED.
10. HOLLOW STRUCTURAL SECTION (HSS) SHALL BE ASTM A500 GRADE B. Fy=46ksi.

QUALITY CONTROL

1. INSPECTIONS AND TESTING SHALL COMPLY WITH SPECIFICATIONS.
2. ALL INSPECTIONS INCLUDING SPECIAL INSPECTIONS AND CONTINUOUS INSPECTION SHALL BE DONE BY A QUALIFIED TESTING AGENCY AND QUALIFIED INSPECTORS AT THE EXPENSE OF THE CONTRACTOR. GOVERNMENT SHALL BE NOTIFIED IN ADVANCE TO WITNESS ALL THE TESTS. ALL TEST RESULTS DOCUMENTATIONS SHALL BE SUBMITTED TO THE GOVERNMENT.
3. SPECIAL INSPECTION SHALL COMPLY WITH 2007 CBC, CHAPTER 17. SPECIAL INSPECTION SHALL BE PROVIDED FOR THE FOLLOWING USE:

A) WELDING – WELDING SHALL BE DONE IN AN GOVERNMENT APPROVED SHOP. APPROVED FABRICATORS SHALL CONFORM TO CBC 1701. ALL FIELD WELDING SHALL HAVE CONTINUOUS INSPECTION.

B) EPOXY TYPE ANCHOR BOLTS.

C) REINFORCING STEEL PLACEMENT.

D) ALL CONCRETE WORK.

CONCRETE

1. CONCRETE SHALL DEVELOP THE FOLLOWING MINIMUM COMPRESSIVE STRENGTH OF 3000 PSI AT 28 DAYS (MINIMUM F'C) WHEN TESTED IN ACCORDANCE WITH ASTM C39.
2. PORTLAND CEMENT SHALL CONFORM TO ASTM C-150 TYPE II LOW ALKALI.
3. PRIOR TO PLACING CONCRETE. THE CONTRACTOR SHALL ENSURE THAT ALL EMBEDMENTS. INCLUDING ANCHOR BOLTS, ARE PROPERLY LOCATED AND SECURELY TIED IN PLACE.
4. DIMENSIONAL TOLERANCE FOR ALL CONCRETE WORK SHALL BE WITHIN ±1/8" OF DIMENSION SHOWN ON DRAWINGS. TOP OF FOOTING ELEVATIONS SHALL BE WITHIN ±1/16 OF ELEVATIONS SHOWN ON DRAWINGS. U.O.N.

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

REVISIONS

DRAWN K.GRAHAM	DATE
DESIGNED K.GRAHAM	DATE
CHECKED S.KOLANKAYA	DATE
PROJMGR N.NIZAMOVA	DATE
REQUESTER N.HSU	DATE
R&QA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE
	DATE

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Moffett Field, California

N233 ELECTRICAL RENOVATION PROJECT
STRUCTURAL

STRUCTURAL NOTES

SIZE	CAGE CODE	REV
D	25307	A
SCALE AS SHOWN	INDEX	SHEET OF

A 233-0902-S1

FILE NAME: 233-S01_1.DWG 12-1-09

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DATE: Aug 19, 2010 - 2:37:16 pm User: palden Version: 17.1s (LMS Tech)

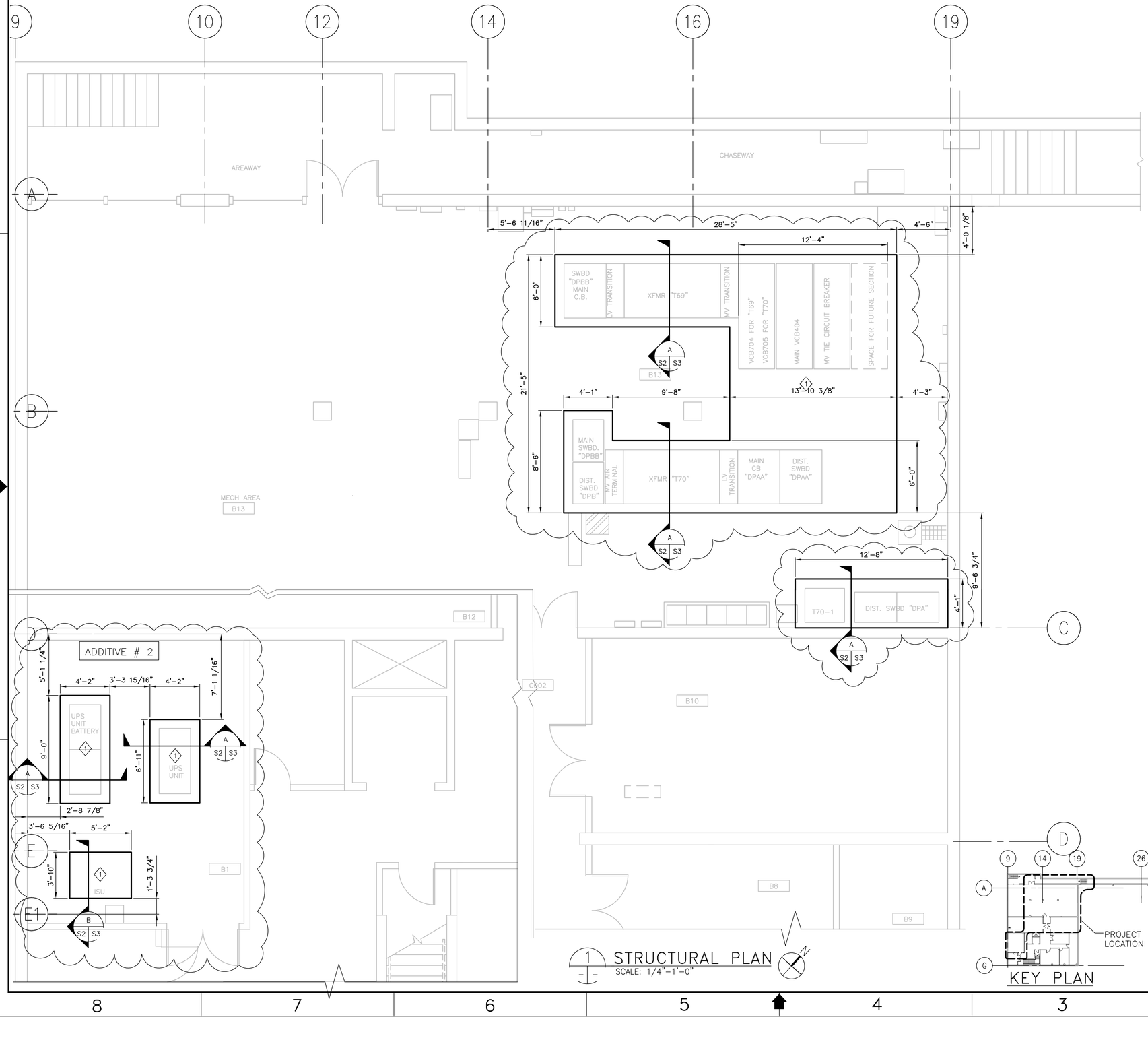
DWG NO.	SH.	REV
A233-0902-S2	1	

SHEET NOTES

1. DARK OR HEAVY LINES INDICATE NEW WORK AND MATERIAL/EQUIPMENT TO BE PROVIDED. LIGHT LINES INDICATE EXISTING CONDITION AND RELEVANT BACKGROUND INFORMATION, UON.

KEY NOTES

1 CONCRETE EQUIPMENT PAD, TYP. SAW CUT (E) 8" SLAB ON GRADE AND DISPOSE OF DEBRIS. SEE SHEET S3 FOR TYPICAL SECTION.



1 STRUCTURAL PLAN
SCALE: 1/4"=1'-0"

KEY PLAN

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
		REVISIONS			

DRAWN K.GRAHAM	DATE	
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R&QA	DATE	
SAFETY	DATE	
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	DATE	

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STRUCTURAL PLAN

SIZE	CAGE CODE	REV
D	25307	A 233-0902-S2
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FILE NAME: 233-E02_1.DWG 10-29-09

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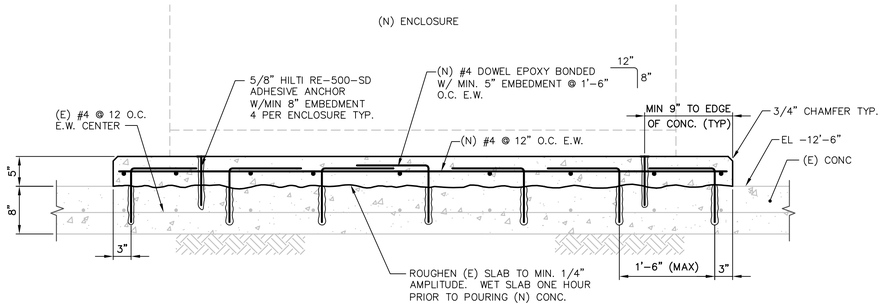
DWG NO.	SH.	REV
A233-0902-S3	1	

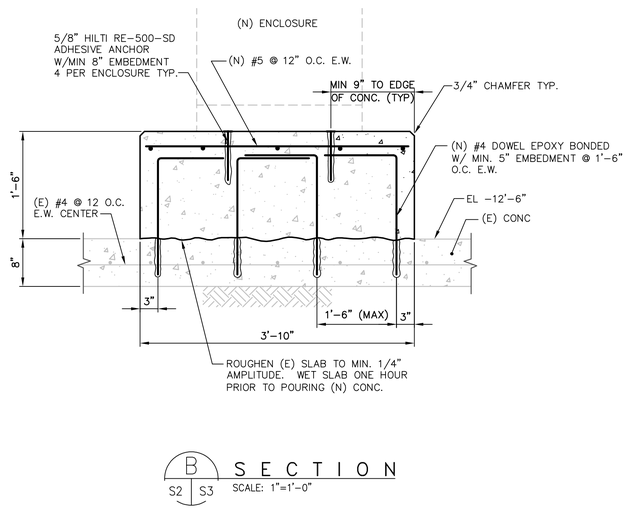
SHEET NOTES

1. FOR STRUCTURAL GENERAL NOTES SEE SHEET S1.
2. THERE ARE 18 NEW ENCLOSURES. PLEASE SEE ELECTRICAL DRAWINGS FOR ENCLOSURE'S LAYOUT.

KEY NOTES



A SECTION
S2 | S3 SCALE: NTS



B SECTION
S2 | S3 SCALE: 1"=1'-0"

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
		REVISIONS			

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DESIGNED K.GRAHAM	DATE	
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REQUESTER N.HSU	DATE	
R&QA	DATE	
SAFETY	DATE	
SUPERVISOR S.FRANKEL	DATE	
	DATE	

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STRUCTURAL

TYPICAL SECTION

SIZE	CAGE CODE	REV
D	25307	
SCALE AS SHOWN		A_233-0902-S3
INDEX	SHEET 1 OF 1	

FILE NAME: 233-S3_1.DWG 10-29-09

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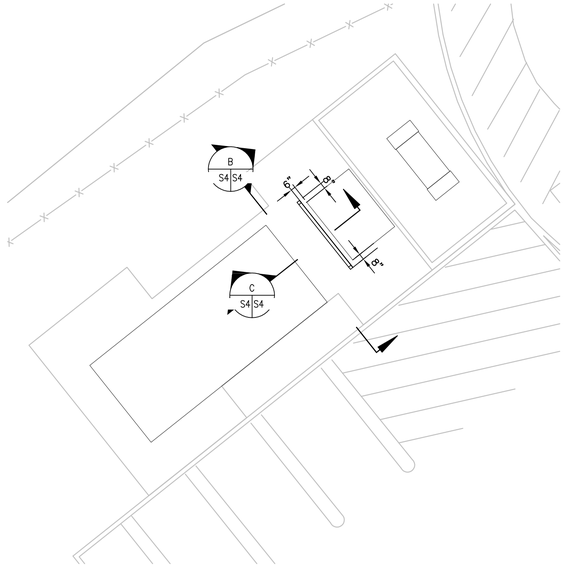
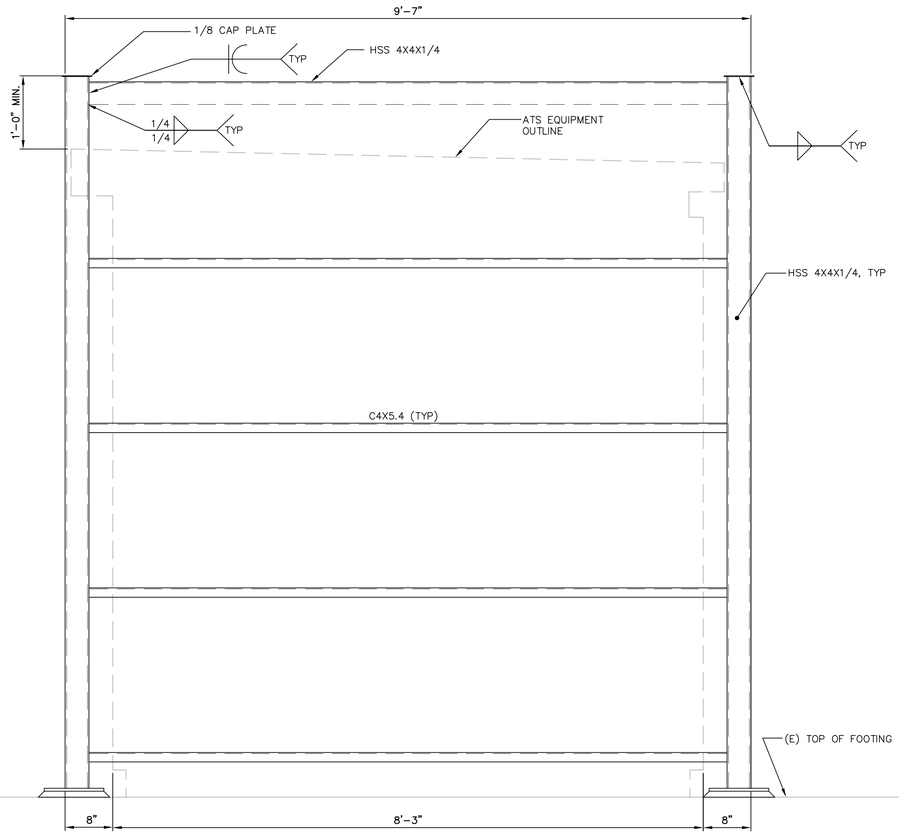
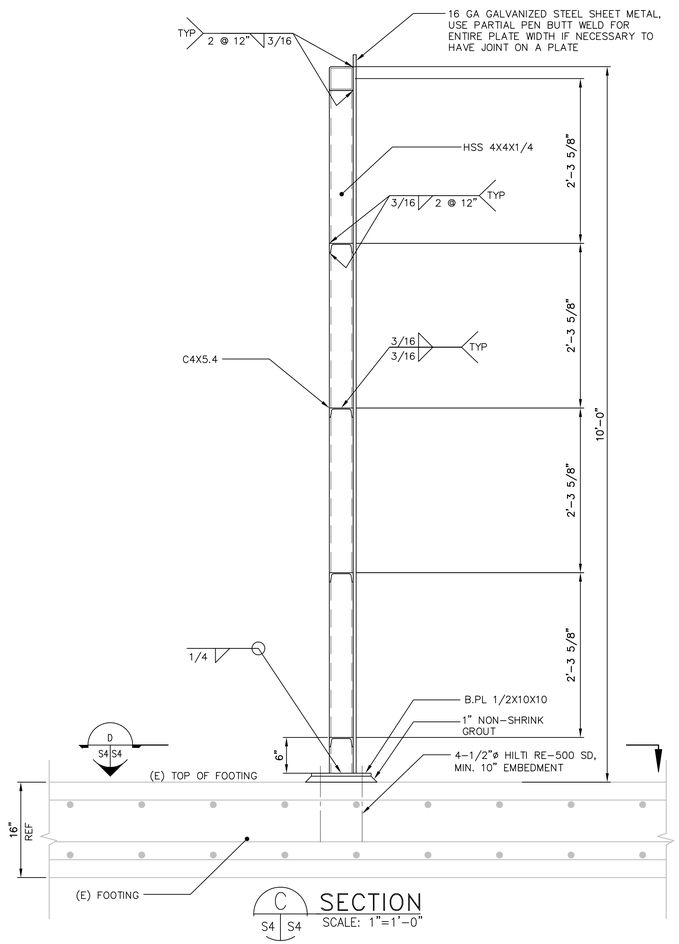
A233-0902-S4	1	–



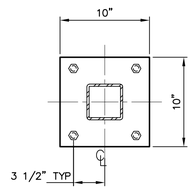
A SITE PLAN
S4 S4 SCALE: 1/8"=1'-0"



B ELEVATION
S4 S4 SCALE: 1"=1'-0"



C SECTION
S4 S4 SCALE: 1"=1'-0"



D SECTION
S4 S4 SCALE: 1 1/2"=1'-0"

ADDITIVE #1

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
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R&QA –	DATE
SAFETY –	DATE
SUPERVISOR S.FRANKEL	DATE
	DATE

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N233 ELECTRICAL RENOVATION PROJECT
ELECTRICAL

ATS PROTECTED SHIELD

SIZE	CAGE CODE	REV
D	25307	–
SCALE AS NOTED	INDEX	SHEET 1 OF 1

FILE NAME: 233-S04_1.DWG 12-1-09

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DATE: Aug 19, 2010 – 2:37:28 pm

DWG NO. A233-0902-M1 | SH. 1 | REV

HVAC GENERAL NOTES

1. MECHANICAL WORK SHALL CONFORM TO NASA AMES STANDARD CONSTRUCTION SPECIFICATIONS (ASCS) DATED AUGUST 2, 2006. ALL WORK SHALL BE NEW, UNLESS OTHERWISE INDICATED.
2. SUBMIT WORK SCHEDULE WITH PROPOSED SHUTDOWNS TO COTR FOR APPROVAL.
3. EXISTING MECHANICAL: EXISTING DUCTWORK AND PIPING ARE SHOWN ONLY WHERE NECESSARY TO ESTABLISH RELATIONSHIPS OR CONNECTION POINTS WITH NEW WORK. NOT ALL EXISTING DUCTS, PIPES AND EQUIPMENT ARE SHOWN. VERIFY EXACT SIZE AND LOCATION OF EXISTING SERVICES AT PROJECT SITE. VERIFY REQUIRED CLEARANCES TO EXISTING MECHANICAL AND ELECTRICAL EQUIPMENT.
4. AS-BUILTS: MAINTAIN RECORDED "AS-BUILT" INFORMATION ON ALL EXISTING SERVICES UNCOVERED DURING CONSTRUCTION, AND ALL NEW SERVICES BEING INSTALLED. "AS-BUILT" INFORMATION SHALL BE CLEARLY MARKED IN COLOR ON A REPRODUCIBLE PRINT OF CONTRACT DRAWINGS. AT THE COMPLETION OF THE CONTRACT, SUBMIT RECORDED "AS-BUILT" INFORMATION TO THE GOVERNMENT.
5. CUTTING, DRILLING OR MODIFYING ANY EXISTING STRUCTURAL MEMBERS, BEAMS OR WALLS IS FORBIDDEN WITHOUT PRIOR APPROVAL FROM THE COTR.
6. FIRESTOP ALL PENETRATIONS THROUGH RATED AND NON-RATED WALLS, FLOORS AND CEILINGS. INSTALL CHROME PLATED ESCUTCHEONS AROUND EXPOSED PIPE PENETRATIONS.
7. SUPPORT AND BRACE ALL NEW DUCTWORK PER SMACNA "SEISMIC RESTRAINT MANUAL GUIDELINES FOR MECHANICAL SYSTEMS", LATEST EDITION. DESIGN TO SEISMIC HAZARD LEVEL B. (APPLICABLE TO NEW WORK ONLY)
8. DUCTWORK AND ACCESSORIES: GALVANIZED SHEET STEEL. ERECT, CONSTRUCT AND SUPPORT ALL DUCTWORK IN ACCORDANCE WITH SMACNA HVAC DUCT CONSTRUCTION STANDARDS. CONSTRUCT DUCTWORK PER SMACNA DUCT PRESSURE CLASS OF 1" WITH GAUGE AND REINFORCEMENT APPROPRIATE FOR 8 FOOT SPACING. SEAL ALL LONGITUDINAL AND TRANSVERSE JOINTS AIR TIGHT WITH DUCT MASTIC PER SMACNA SEAL CLASS B. PROVIDE MANUAL BALANCING DAMPERS IN ALL BRANCH DUCTS TO AIR OUTLETS OR INLETS, REGARDLESS OF WHETHER THERE IS A REGISTER SHOWN FOR AIR OUTLET OR INLET. LOCATE BALANCING DAMPER AS FAR AS POSSIBLE FROM AIR OUTLET OR INLET. PROVIDE TURNING VANES IN ALL SQUARE ELBOWS. RADIUS ELBOWS SHALL HAVE A CENTERLINE RADIUS OF 1.5 TIMES DUCT WIDTH. ALL DIMENSIONS ARE SHOWN IN INCHES. ALL SIZES ARE CLEAR INSIDE DIMENSIONS. RECTANGULAR DUCT FIRST DIMENSION IS SIDE VIEWED, SECOND DIMENSION IS PERPENDICULAR TO VIEW. PROVIDE ACCESS DOORS WHERE REQUIRED FOR SERVICE OR INSPECTION. TEST DUCT LEAKAGE ACCORDING TO SMACNA DUCT LEAKAGE TEST MANUAL, AND REPORT RESULTS.
9. INSTALLATION: COORDINATE WITH OTHER TRADES, AND INSTALL AND CLEAR OF OTHER EQUIPMENT, WALLS AND STRUCTURES, ETC. INSTALL ALL EQUIPMENT IN ACCORDANCE WITH MANUFACTURER'S WRITTEN INSTRUCTIONS AND RECOMMENDATIONS, ACCORDING TO IT'S LISTING REQUIREMENTS, AND WITH ALL REQUIRED CLEARANCES FOR SERVICING AND REPAIR.
10. DEMOLITION: REMOVE FROM THE PREMISES AND PROPERLY DISPOSE OF ALL ITEMS IDENTIFIED TO BE REMOVED OR DEMOLISHED, UNLESS OTHERWISE NOTED.
11. TESTING AND BALANCING: BALANCE AIR SUPPLY, RETURN AND EXHAUST AIR SYSTEMS TO AIR FLOW QUANTITIES SHOWN ON PLAN WITH ALL ASSOCIATED EQUIPMENT OPERATING UNDER NORMAL CONDITIONS TO THESE TOLERANCES: -0% TO +10% IN ACCORDANCE WITH AABC OR NEBB STANDARDS. SUBMIT TEST AND BALANCE REPORT.
12. DUCT INSULATION: INSULATE NEW SUPPLY DUCTS PER TITLE 24 REQUIREMENTS. INSULATION PRODUCT SHALL BE CERTIFIED BY STATE OF CALIFORNIA.
13. PIPING INSULATION: AP ARMAFLEX BY ARMACELL, OR EQUAL, ELASTOMERIC CLOSED CELL PRE-FORMED PIPE INSULATION, THERMAL CONDUCTIVITY=0.27 BTUH-IN/SF/°F AT 75°F, WATER VAPOR PERMEABILITY=0.08 PERM-IN, FM APPROVED, FLAME SPREAD/SMOKE DEVELOPED <25/50, ACCEPTED FOR USE IN AIR PLENUMS PER NFPA 90A AND 90B, MANUFACTURED WITHOUT CFC'S, HFC'S OR HCFC'S. USE ARMAFIX IPH OR NPH PRE-INSULATED PIPE SUPPORT INSERTS, OR EQUAL. USE MFR RECOMMENDED ADHESIVE TO COMPLETELY SEAL ALL JOINTS AND SEAMS. DO NOT APPLY LAQUER VAPOR FILM COATING. PROVIDE ALUMINUM JACKET FOR OUTDOOR INSULATION.
    INSULATION THICKNESS SHALL BE AS LISTED BELOW:
    CHILLED WATER (LARGER THAN 2" PIPE): 1" THICKNESS.
    CHILLED WATER (2" OR SMALLER PIPE): ½" THICKNESS.
    CONDENSATE WASTE WATER: NO INSULATION.
14. COMPLY WITH TITLE 24 APPLIANCE EFFICIENCY REQULATIONS.
15. PRIOR TO DEMOLITION OR CONSTRUCTION, INSTALL AN APPROVED WIRE GUARD ON ALL PENDENT AUTOMATIC SPRINKLER HEADS THAT ARE SUBJECT TO PHYSICAL IMPACT DURING CONSTRUCTION. WIRE GUARDS MAY BE RETAINED PERMANENTLY AFTER COMPLETION OF PROJECT.

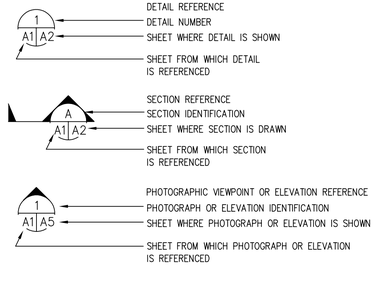
FIRE PROTECTION GENERAL NOTES

1. DESIGN AND INSTALL FIRE SPRINKLER SYSTEM PER NFPA 13 TO ORDINARY HAZARD GROUP 1 CLASSIFICATION, AND NASA AMES STANDARD CONSTRUCTION SPECIFICATIONS (ASCS) DATED AUGUST 2, 2006. PIPING LAYOUT AND SIZES INDICATED ON DRAWINGS ARE SCHEMATIC. LAYOUT OF FIRE SPRINKLER MODIFICATIONS SHALL BE PERFORMED BY A CONTRACTOR WITH CURRENT CALIFORNIA C-16 LICENSE. AVOID EXISTING STRUCTURAL AND OTHER OBSTRUCTIONS. PROVIDE ALL OFFSETS, SUPPORTS AND APPURTENANCES AS REQUIRED FOR A COMPLETE INSTALLATION.
2. DESIGN SPRINKLER SYSTEM MODIFICATIONS TO PROTECT AREA INDICATED. DO NOT INSTALL ANY PIPING WITHIN DEDICATED WORKING SPACE ABOVE EQUIPMENT IN ACCORDANCE WITH NATIONAL ELECTRIC CODE. RE-ROUTE PIPING AROUND NEW AND EXISTING ELECTRICAL EQUIPMENT IN BASEMENT. REMOVE EXISTING PIPING WHICH IS NOT INTENDED TO BE RE-USED IN PLACE.
3. FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS PRIOR TO ORDERING MATERIALS AND CONSTRUCTION. EXISTING WORK IS SHOWN FOR INFORMATION ONLY, AND MAY NOT BE DRAWN TO SCALE. GOVERNMENT DOES NOT GUARANTEE ACCURACY OF EXISTING LAYOUT.
4. PERFORM FLOW TEST, WITNESSED BY THE GOVERNMENT, TO VERIFY ACTUAL STATIC AND RESIDUAL PRESSURES PRIOR TO DESIGN. SUBMIT HYDRAULIC CALCULATIONS BASED ON STATIC AND RESIDUAL PRESSURES 10% LESS THAN RECORDED PRESSURES FROM FLOW TEST. MEASURE RESIDUAL PRESSURE AT A MINIMUM FLOW OF 1000 GPM AT THE POINT OF CONNECTION TO THE SPRINKLER SERVICE MAIN. INCLUDE PRESSURE LOSS FOR THE BACKFLOW PREVENTER ASSEMBLY IN THE HYDRAULIC CALCULATIONS.
5. SUBMIT SHOP DRAWINGS OF PROPOSED SPRINKLER AND PIPING INSTALLATION FOR APPROVAL. DO NOT COMMENCE WORK UNTIL DRAWINGS AND CALCULATIONS ARE APPROVED.
6. REPLACE OR REPAIR ANY WALLS, FLOORS OR CEILINGS DAMAGED DURING CONSTRUCTION. PERFORM PATCHING AND PAINTING BY WORKERS QUALIFIED IN THOSE TRADES.
7. SUPPORT AND BRACE FIRE SPRINKLER PIPING TO RESIST SEISMIC FORCES PER NFPA 13 SEISMIC HAZARD AREA 4. ALL PIPE HANGERS, SUPPORTS AND ANCHORS SHALL HAVE UL LISTING PER NFPA-13, AND APPROVAL.
8. PIPE PAINTING: PRIME AND PAINT PIPING IN UTILITY SPACES AND CONCEALED PIPING WITH FINISH COAT OF RED, AND IDENTIFY PER NASA ASCS. MATCH BACKGROUND COLOR FOR PIPING EXPOSED IN FINISHED AREAS.
9. SPRINKLER HEADS: ORDINARY TEMPERATURE RATED STANDARD RESPONSE UPRIGHT TYPE, UNLESS OTHERWISE NOTED. ALL HEADS TO BE INSTALLED SHALL BE NEW. DO NOT RE-USE EXISTING HEADS.
10. HYDROSTATICALLY TEST COMPLETED FIRE SPRINKLER SYSTEM MODIFICATIONS PRIOR TO CONNECTION TO (E) SYSTEM. ARRANGE FOR NASA FIRE SAFETY INSPECTOR AND COTR TO WITNESS TEST AND INSPECT INSTALLATION PER ASCS SECTION 15514. SUBMIT MATERIALS AND TEST CERTIFICATE PER NFPA 13.
11. COORDINATE CONNECTIONS TO EXISTING SPRINKLER SYSTEMS SO THAT EXISTING FIRE SPRINKLER SYSTEM WILL BE OPERATIONAL AT THE END OF THE WORK DAY, OR PROVIDE A FIRE WATCH DURING ALL NASA NON-BUSINESS HOURS.
12 SUBMIT SCHEDULE WITH TIME AND DURATION FOR REQUIRED SHUTDOWN OF EACH FIRE SPRINKLER PIPING SECTION. NOTIFY COTR 48 HOURS IN ADVANCE OF PROPOSED SHUTDOWN. GOVERNMENT WILL SHUTDOWN SYSTEM AND MAKE THE REQUIRED NOTIFICATIONS.

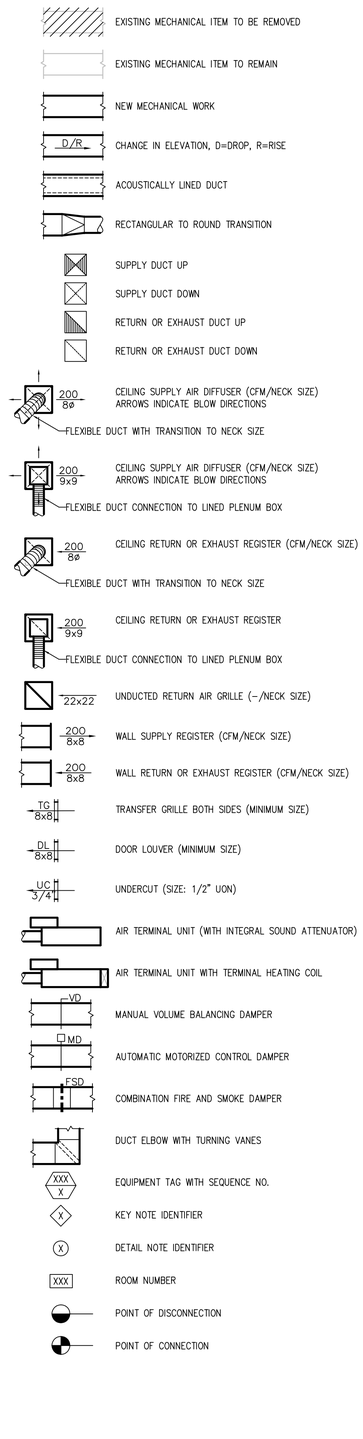
ABBREVIATIONS (NOT ALL ABBREVIATIONS HAVE BEEN USED)

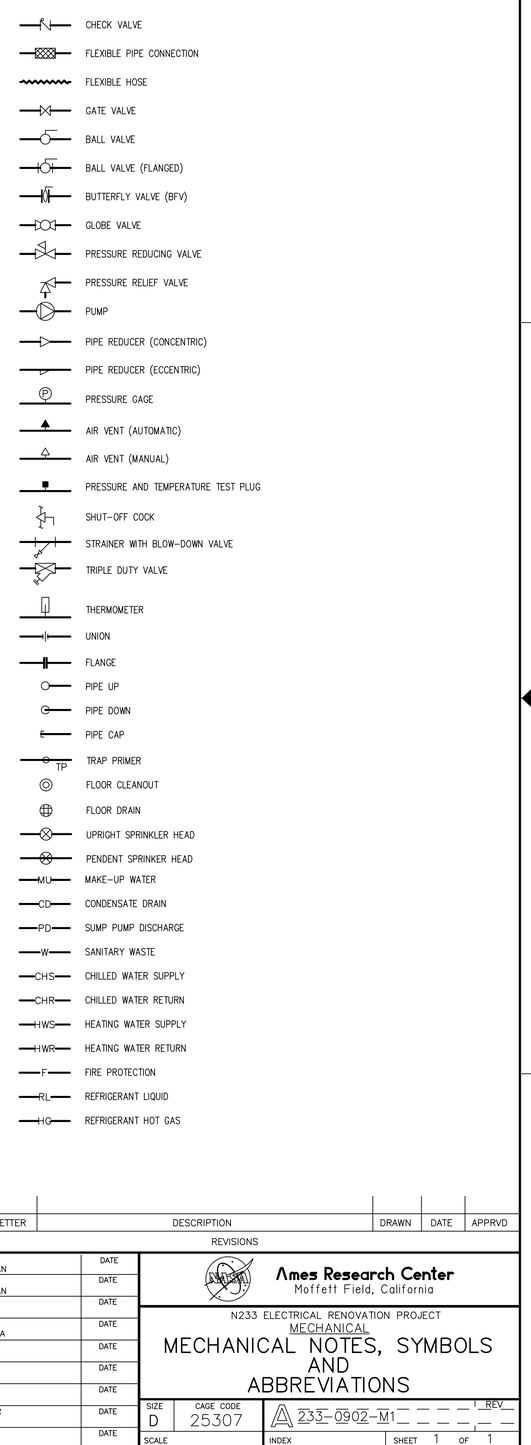
AABC	ASSOCIATED AIR BALANCE COUNCIL
ACM	ASBESTOS CONTAINING MATERIAL
AHU	AIR HANDLING UNIT
AI	ANALOG INPUT
AMP	AMPERE
AO	ANALOG OUTPUT
ASCS	AMES STANDARD CONSTRUCTION SPECIFICATION
AVA	AIR VENT (AUTOMATIC)
BF	BOILER FEED
BFP	BACKFLOW PREVENTER ASSEMBLY
BOD	BOTTOM OF DUCT
CA	COMPRESSED AIR
CAP	CAPACITY
CER	CEILING EXHAUST REGISTER
CC	COOLING COIL
CFF	CAP FOR FUTURE CONNECTION
CFM	CUBIC FOOT PER MINUTE
CG	CEILING GRILLE
CG	CEILING GRILLE
CH	CHILLER
CHW	CHILLED WATER
CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
CO	CLEAN OUT
CONC.	CONCRETE
COTR	CONTRACTING OFFICER'S TECHNICAL REPRESENTATIVE
CW	DOMESTIC COLD WATER
CWP	CHILLED WATER PUMP
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROL
DEFL	DEFLECTION
DI	DI-IONIZED WATER
DIA	DIAMETER
DO	DIGITAL OUTPUT
DN	DOWN
DP	DIFFERENTIAL PRESSURE
DPT	DIFFERENTIAL PRESSURE TRANSDUCER
DPU	DIGITAL POINT UNIT
DSD	DUCT SMOKE DETECTOR
DW	DEIONIZED WATER
DX	DIRECT EXPANSION
(E)	EXISTING
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EF	EXHAUST FAN
EG	EXHAUST GRILLE
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EWT	ENTERING WATER TEMPERATURE
F	FIRE SPRINKLER LINE
F&T	FLOAT & THERMOSTATIC STEAM TRAP
FA	FROM ABOVE
FACP	FIRE ALARM CONTROL PANEL
FAI	FRESH AIR INTAKE
FB	FROM BELOW
FC	FLEXIBLE CONNECTION
FCCCHR	FOUNDATION FOR CROSS-CONNECTION CONTROL HYDRAULIC RESEARCH
FCO	FLOOR CLEAN OUT
FD	FLOOR DRAIN, FIRE DAMPER
FLA	FULL LOAD AMPERE
FLEX	FLEXIBLE
FLR	FLOOR
FMCS	FACILITY MANAGEMENT CONTROL SYSTEM
FSP	FAN STATIC PRESSURE
FTG	FITTING
G	GAS LINE
GFE	GOVERNMENT FURNISHED EQUIPMENT
GCO	GROUND CLEAN OUT
GFCI	GOVERNMENT FURNISHED CONTRACTOR INSTALLED
GSM	GALVANIZED SHEET METAL
GWP	GLOBAL WARMING POTENTIAL
HDT	HORIZONTAL DRAW THRU
HG	REFRIGERANT HOT GAS
HSPF	HEATING SEASONAL PERFORMANCE FACTOR
HW	DOMESTIC HOT WATER
HWP	HOT WATER PUMP
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
IVB	INVERTED BUCKET STEAM TRAP
IFW	IN FURRED WALL
IGV	INLET GUIDE VANES
ISU	IN-SPACE AIR CONDITIONING UNIT
kW	KILOWATT
LPS	LOW PRESSURE STEAM SUPPLY
LPR	LOWER PRESSURE CONDENSATE RETURN
LRA	LOCKED ROTOR AMPERE
LWT	LEAVING WATER TEMPERATURE
MAX	MAXIMUM
m	METER
mm	MILLIMETER
m/s	METERS PER SECOND
MCA	MINIMUM CIRCUIT AMP
MCC	MOTOR CONTROL CENTER
MER	MECHANICAL EQUIPMENT ROOM
MIN	MINIMUM
MHP	MOTOR HORSEPOWER
MOCP	MAXIMUM OVER CURRENT PROTECTION
MS	MOTOR STARTER
MTD	MOUNTED
(N)	NEW
NEBB	NATIONAL ENVIRONMENTAL BALANCING BUREAU
N.I.C.	NOT IN CONTRACT
N.O.	NORMALLY OPEN
NRC	NOISE REDUCTION COEFFICIENT
N.T.S.	NOT TO SCALE
ODC	OZONE DEPLETING COMPOUND
ODP	OZONE DEPLETION POTENTIAL
OBD	OPPOSED BLADE DAMPER
OSA	OUTSIDE AIR
Pa	PASCAL
PD	PRESSURE DIFFERENTIAL
PRV	PRESSURE REDUCING VALVE
(R)	RELOCATED
RF	RETURN FAN
RG	RETURN AIR GRILLE
RH	RELATIVE HUMIDITY
RL	REFRIGERANT LIQUID
RPM	REVOLUTION PER MINUTE
SCH	SCHEDULE
S.D	SMOKE DETECTOR
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SF	SUPPLY FAN
SENS	SENSIBLE
SG	SUPPLY AIR GRILLE
SH	SPRINKER HEAD
SM	SHEET METAL
SP	STATIC PRESSURE
SR	SUPPLY REGISTER
SS	SANITARY SEWER DRAIN
ST	SOUND TRAP
STC	SOUND TRANSMISSION COEFFICIENT
T	THERMOSTAT
TEC	TERMINAL EQUIPMENT CONTROLLER
TCC	TOTAL COOLING CAPACITY
THC	TOTAL HEATING CAPACITY
TP	TRAP PRIMER
TYP	TYPICAL
UF	UNDER RAISED FLOOR
UG	UNDERGROUND
USC	UNIVERSITY OF SOUTHERN CALIFORNIA
V	VENT PIPING
VAC	VACUUM PIPING
VAV	VARIABLE AIR VOLUME
VB	VACUUM BREAKER
VD	VOLUME DAMPER
VFD	VARIABLE FREQUENCY DRIVE
VTR	VENT THROUGH ROOF
W	SANITARY WASTE
WB	WET BULB
WC	WATER CLOSET
WCO	WALL CLEAN OUT
WH	WATER HEATER

GENERAL SYMBOLS



SYMBOLS





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Moffett Field, California

N233 ELECTRICAL RENOVATION PROJECT
MECHANICAL
MECHANICAL NOTES, SYMBOLS AND ABBREVIATIONS

SIZE D | CAGE CODE 25307 | A 233-0902-M1 REV
SCALE | INDEX | SHEET 1 OF 1

FILE NAME: 233-M01.DWG 12-22-09

60098456.0001

DWG: \\N213fs2\pro\233\60098456.0001_N233 Electrical Upgrade\500_CAD_N233 Electrical Renovation Project - Final Issue_Drawings\233-M01.dwg Version: 17.1s (LMS Tech) User: polden
DATE: Aug 19, 2010 - 2:37:31 pm

COMPUTER ROOM (IN-SPACE) AIR CONDITIONING UNIT(ISU)

UNIT MARK	SUPPLY FAN (BLOWERS)					COOLING COIL (MAX FACE VELOCITY = 450 FPM)												FILTERS	HUMIDIFIER		REHEAT	UNIT ELECTRICAL POWER				UNIT DIMENSIONS L" x W" x H"	UNIT WEIGHT LBS	MFR & MODEL NO.	REMARKS
	CFM	MIN OSA	ESP	BLOWERS	MHP	EDB °F	EWB °F	LDB °F	TCC MBH	GPM	EWT °F	ROWS	FPI	WPD PSI	CHS/R CONN	CHS/R PIPE	CD SIZE	VALVE Cv	NO./SIZE	KW	LB/HR	KW	VOLTS/PHASE	FLA	MCA	MOCP				
ISU 16	4,000	NONE	1.4"	ONE	1 @ 5	72.0°	60.0°	55°	91.5	35	50°	6	–	6.5	1½"	2½"	¾"	19	2 / 20"x25"	–	–	15	460V / 3ø	23	29	30	43" x 34.5" x 72.0"	900	DATA AIRE DACU-13	GFE

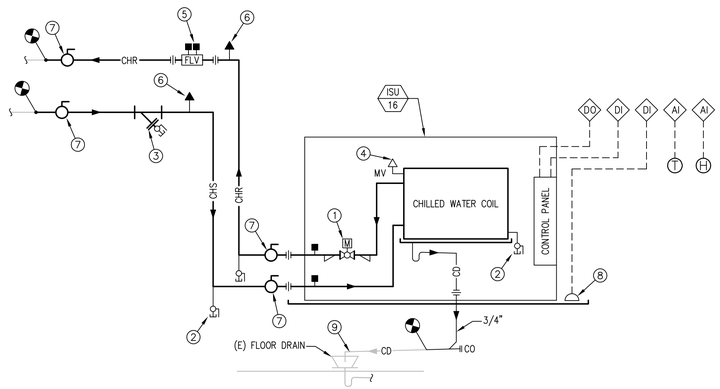


DIAGRAM NOTES:
1. CONTROL VALVE: PROVIDED BY UNIT MFR. REFER TO EQUIPMENT SCHEDULE FOR FLOW COEFFICIENT.
2. CAPPED DRAIN VALVE WITH HOSE ADAPTOR REQUIRED AT ALL LOW POINTS FOR DRAINAGE, TYPICAL.
3. LINE-SIZE STRAINER WITH CAPPED HOSE ADAPTOR ON BLOWDOWN VALVE.
4. MANUAL AIR VENT.
5. FLOW LIMITING VALVE: GRISWOLD, B&G, FLOW CONTROL, OR APPROVED EQUAL. PRESSURE INDEPENDENT. REFER TO EQUIPMENT SCHEDULE FOR DESIGN GPM.
6. AUTOMATIC AIR VENT REQUIRED AT HIGH POINTS, TYPICAL.
7. LINE-SIZE SERVICE SHUT-OFF VALVE: SEE EQUIPMENT SCHEDULE FOR CHW PIPE SIZE
8. WATER DETECTOR AT SECONDARY DRAIN CONNECTION.
9. SLOPE CD PIPE TOWARD DRAIN, AND TERMINATE AT APPROVED PLUMBING RECEPTOR WITH AIR BREAK.

DISCRETE PIPING COMPONENTS MAY BE COMBINED IN AVAILABLE KITS.

1 / M2 FLOW & CONTROL DIAGRAM – COMPUTER (IN-SPACE) ROOM UNIT
SCALE: NONE

CONTROL LEGEND

—— A ——	CONTROL AIR SUPPLY
----------	ELECTRICAL WIRING
M	CONTROL AIR MAIN
E	ELECTRICAL POWER CONNECTION
D	DATA CABLE LINK
M	ELECTRICAL MOTOR
DI	FMCS DIGITAL INPUT
DO	FMCS DIGITAL OUTPUT
AI	FMCS ANALOG INPUT
AO	FMCS ALALOG OUPUT
T	WALL TEMPERATURE SENSOR
H	WALL TEMPERATURE SENSOR
CO2	CARBON DIOXIDE SENSOR (2% ACCURACY)
T	DUCT TEMPERATURE SENSOR
T	WATER TEMPERATURE SENSOR IN WELL
SD	DUCT SMOKE DETECTOR
M	3-WAY CONTROL VALVE
M	2-WAY CONTROL VALVE
S	SOLENOID VALVE
	CALIBRATED BALANCING VALVE (CIRCUIT SETTER)
FLV	AUTOMATIC FLOW LIMITING VALVE (PRESSURE INDEPENDENT)
FLV	AUTOMATIC FLOW LIMITING VALVE WITH READOUT PORTS (CIRCUIT SENTRY)
AFLV	ADJUSTABLE AUTOMATIC FLOW LIMITING VALVE WITH PRESSURE PORTS (ULTRASET)
MS	MOTOR STARTER
VFD	VARIABLE FREQUENCY DRIVE
DS	ELECTRICAL DISCONNECT SWITCH
HOA	MANUAL HAND-OFF-AUTOMATIC SWITCH
BPT	MANUAL BYPASS TIMER
DM	AUTOMATIC DAMPER MOTOR (ACTUATOR)
DPI	DIFFERENTIAL PRESSURE INDICATOR
DPS	DIFFERENTIAL PRESSURE SWITCH
SP	DUCT STATIC PRESSURE SENSOR
FS	FLOW SENSOR
CS	CURRENT SENSOR
R	CONTROL RELAY
S	MANUAL SWITCH
V	VELOCITY SENSOR
XFMR	STEP-DOWN CONTROLS TRANSFORMER
FACP	FIRE ALARM CONTROL PANEL

SHEET NOTES

1. CONTROL DIAGRAMS ONLY INDICATE THE CONTROL CONCEPT. IT IS NOT THE INTENT TO SHOW ALL THE CONTROL COMPONENTS, WIRING AND INSTRUMENT AIR LINES. CONTROL CONTRACTOR SHALL PROVIDE WIRING TO ALL INSTRUMENTS, CONTROLS, AND VALVE AND DAMPER ACTUATORS.

HVAC CONTROL NOTES

1. DESIGN AND INSTALL CONTROL SYSTEM TO PERFORM AND FUNCTION AS REQUIRED BY SEQUENCE OF OPERATION. DESIGN AND INSTALLATION SHALL CONFORM TO ACCS SECTION 15900. PROVIDE ALL EQUIPMENT, COMPONENTS, WIRING, CONDUIT, CONNECTIONS AND PROGRAMMING NECESSARY FOR A FULLY FUNCTIONAL SYSTEM.
2. INSTALL ALL WIRING AND CABLES IN CONDUIT, AS SPECIFIED IN DIVISION 16. MINIMUM CONDUIT SIZE IS 3/4". LOW VOLTAGE POWER, SIGNAL AND DATA WIRING AND CABLES. SEE ELECTRICAL DRAWINGS FOR RELATED WORK.
3. COORDINATE NEW CONTROLS WITH EXISTING FMCS SYSTEM. SUBMIT CUT SHEETS FOR ALL PROPOSED FMCS EQUIPMENT, INCLUDING WIRING DIAGRAMS AND CONTROL DETAILS.
4. PROGRAM EXISTING FMCS AS REQUIRED BY SEQUENCE OF OPERATION. COORDINATE FMCS PROGRAMING WITH GOVERNMENT FMCS COORDINATOR. PROGRAMMING MUST BE DONE BY SEIMENS.
5. USE (E) FMCS SPARE CAPACITY TO MAXIMUM EXTENT POSSIBLE. PROVIDE NEW FMCS PANELS AND ENCLOSURES AS NEEDED TO ACCOMMODATE ALL SPECIFIED POINTS. PAINT PANEL AND JUNCTION BOX COVERS, AND CONDUIT FITTINGS AND CONNECTORS "FMCS BLUE" FOR FMCS-RELATED CONTROL WIRING AND FIELD DEVICES. "FMCS BLUE" IS FULLER O'BRIAN ROYAL BLUE NO. RFK 505-S4, OR APPROVED EQUAL. SUBMIT SAMPLE FOR APPROVAL PRIOR TO APPLICATION.
6. MAINTAIN (E) FMCS SYSTEM IN SERVICE. COORDINATE REQUIRED SYSTEM SHUTDOWN SCHEDULE AND SHUTDOWN DURATION WITH COTR.
7. ALL CONTROL DEVICES, WIRING AND CONDUIT SHALL BE NEW. SPLICING OF WIRES IS NOT ACCEPTABLE.
8. PROVIDED PROTECTED POWER TO ALL CONTROL PANELS AND DEVICES. EXTEND 24 VAC POWER TO ALL LOW VOLTAGE CONTROL DEVICES FROM LOCAL PANEL OR CONTROLLER.
9. SENSORS AND INDICATING DEVICES MONITORED BY FMCS: 4-20mA OUTPUT.
10. GROUND LOW VOLTAGE ANALOG TSP CABLE SHIELD IN LOCAL PANEL. GROUND LOW VOLTAGE TSP CABLE FOR DIGITAL CONTROLS AT FIELD DEVICE.
11. REFER TO EQUIPMENT SCHEDULES FOR DESIGN OPERATING CONDITIONS. DESIGN SET POINTS WILL APPROXIMATE THESE CONDITIONS. OPERATING SET POINTS SHALL BE ADJUSTED AND TUNED TO PROVIDE STABLE OPERATION.
12. ALL VFD'S MUST BE ABLE TO COMMUNICATE THROUGH FLN CABLE.

HVAC SEQUENCE OF OPERATION

COMPUTER ROOM (IN-SPACE) AIR CONDITIONING UNIT:

1. IN-SPACE UNIT MUST BE AVAILABLE TO OPERATE AT ANY TIME (24 HR/7 DAYS A WEEK). UNIT OPERATING AND SAFETY FUNCTIONS ARE CONTROLLED BY FACTORY CONTROLS. ENABLE AND DISABLE UNIT BY FMCS CONTROL. MAINTAIN ROOM TEMPERATURE BELOW SET POINT (ADJUSTABLE). NOTIFY FMCS WHEN SPACE TEMPERATURE EXCEEDS SET POINT BY MORE THAN 3°F. MAINTAIN ROOM HUMIDITY BELOW HIGH LIMIT SET POINT (ADJUSTABLE). NOTIFY FMCS WHEN SPACE HUMIDITY EXCEEDS HIGH LIMIT OR LOW LIMIT. VERIFY DESIRED SET POINTS WITH USER. NOTIFY FMCS WHEN NORMAL AC UNIT FUNCTIONS FAIL (SUMMARY ALARM). NOTIFY FMCS AND SOUND AUDIBLE ALARM WHEN LEAK IS DETECTED.

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

REVISIONS

DRAWN M.CALLAHAN	DATE
DESIGNED M.CALLAHAN	DATE
CHECKED J.XIANG	DATE
PROJMGR N.NIZAMOVA	DATE
REQUESTER N.HSU	DATE
R&QA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE
	DATE

Ames Research Center
Moffett Field, California

N233 ELECTRICAL RENOVATION PROJECT
MECHANICAL

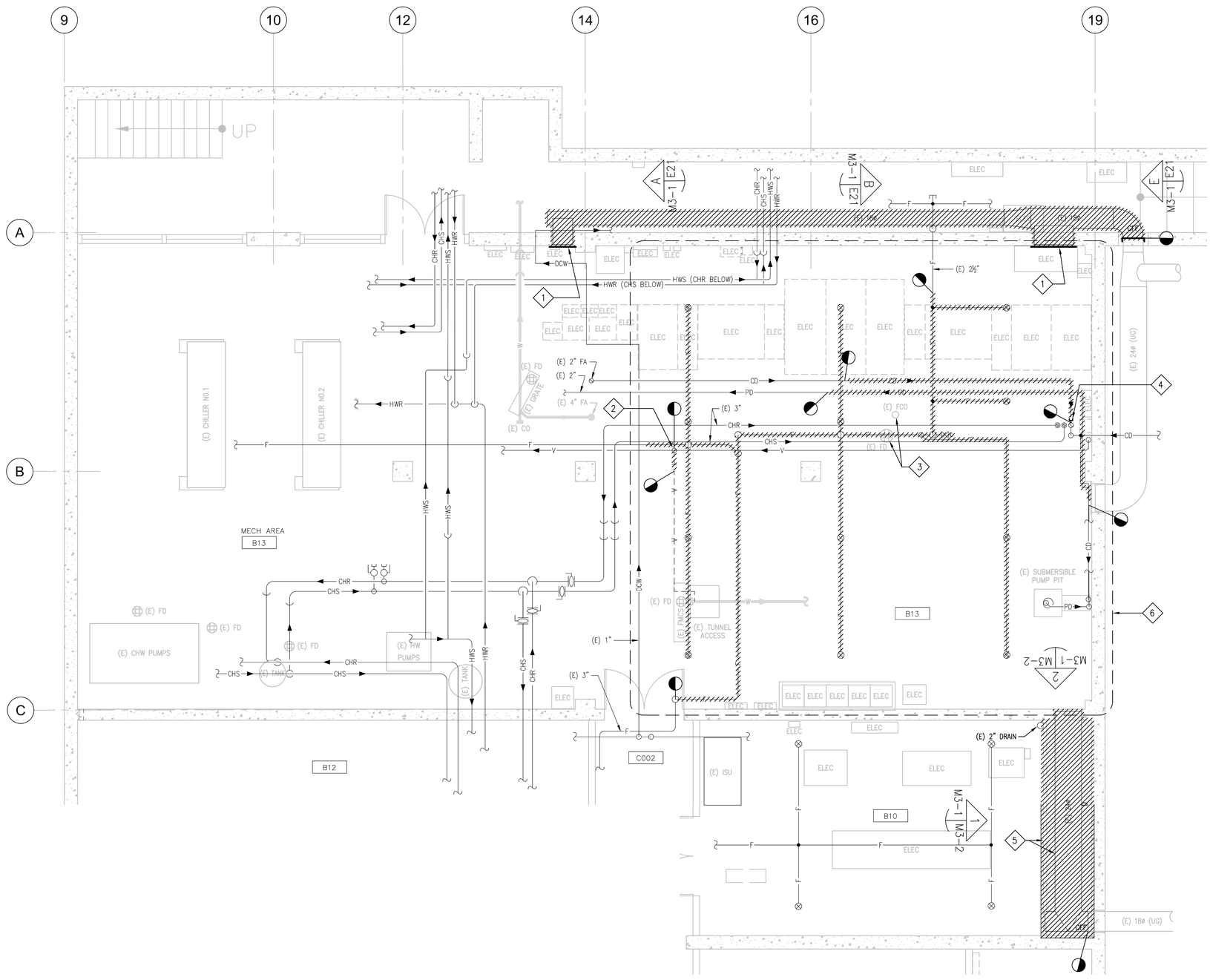
DETAILS, CONTROL DIAGRAMS AND EQUIPMENT SCHEDULES

SIZE	CAGE CODE	REV
D	25307	A 233-0902-M2
SCALE	AS SHOWN	INDEX SHEET 1 OF 1

FILE NAME: 233-M02.DWG 12-22-09

60098456.0001

DWG NO.	SH.	REV
A233-0902-M3	1	



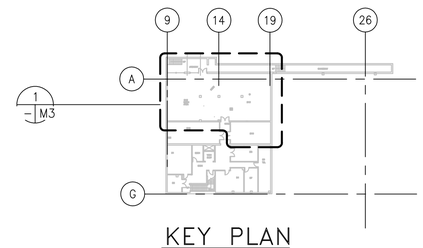
1 – M3 PARTIAL PLAN – BASEMENT DEMOLITION
SCALE: 1/4"=1'-0"

SHEET NOTES

1. SEE ELECTRICAL DWGS. FOR ELECTRICAL WORK.

KEY NOTES

1. COVER WALL OPENINGS WITH 18 GA. SHEET METAL ANCHORED TO WALL.
2. REMOVE EXISTING VENT RISER AND PLUG (E) TEE.
3. REMOVE GRATE AND FILL EXISTING FLOOR DRAIN AND ADJACENT CLEANOUT WITH CONCRETE.
4. DISCONNECT (E) 2" CD AND INSTALL CLEANOUT PLUG.
5. REMOVE (E) DUCT AND EXCLOSURE.
6. REVISE AUTOMATIC FIRE SPRINKLER COVERAGE IN THIS AREA TO AVOID PIPING OVER ELECTRICAL EQUIPMENT. SEE FIRE PROTECTION NOTES ON SHEET M1 FOR ADDITIONAL INFORMATION. REMOVE EXISTING PIPING AND HEADS WHICH WILL NOT BE RE-USED.



KEY PLAN

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
		REVISIONS			

DRAWN M.CALLAHAN	DATE
DESIGNED M.CALLAHAN	DATE
CHECKED J.XIANG	DATE
PROJMGR N.NIZAMOVA	DATE
REQUESTER N.HSU	DATE
R&QA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE
	DATE

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N233 ELECTRICAL RENOVATION PROJECT
MECHANICAL

PARTIAL PLAN
BASEMENT DEMOLITION

SIZE	CAGE CODE	
D	25307	A 233-0902-M3 REV --
SCALE AS SHOWN	INDEX	SHEET 1 OF 2

FILE NAME: 233-M03_1.DWG 12-22-09

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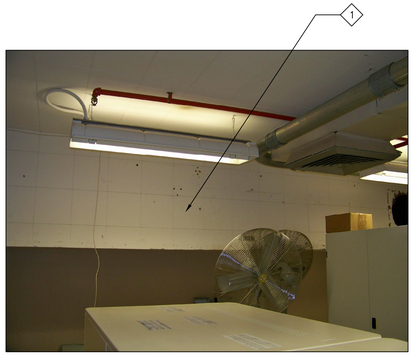
DWG NO. A233-0902-M03 | SH. 2 | REV –



1 M3-1 | M3-2 GYPSUM BOARD DUCT ENCLOSURE IN RM B12
SCALE: NTS

2 M3-1 | M3-2 RM B13 DUCT OPENING PHOTO
SCALE: NTS

SHEET NOTES

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KEY NOTES

1. REMOVE (E) DUCT ENCLOSURE AND DUCT INSIDE.
2. REMOVE DUCT. COVER WALL OPENING WITH 18 GAUGE GALVANIZED SHEET METAL PLATE.

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

REVISIONS

DRAWN J.XIANG	DATE
DESIGNED J.XIANG	DATE
CHECKED M.CALLAHAN	DATE
PROJMGR N.NIZAMOVA	DATE
REQUESTER N.HSU	DATE
R&QA	DATE
SAFETY	DATE
SUPERVISOR S.FRANKEL	DATE
	DATE

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N233 ELECTRICAL RENOVATION PROJECT
MECHANICAL

DEMOLITION PHOTOS

SIZE D | CAGE CODE 25307 | A 233-0902-M3 | REV –
SCALE AS SHOWN | INDEX | SHEET 2 OF 2
FILE NAME: 233-M03_2.DWG | 12-22-09

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DWG: \\N213s2\proj\233\60098456.0001_N233 Electrical Upgrade\500_CAD_N233 Electrical Renovation Project – Final Issue_Drawings\233-M03_2.DWG Version: 17.1s (LMS Tech) User: palden
DATE: Aug 19, 2010 – 2:37:44 pm

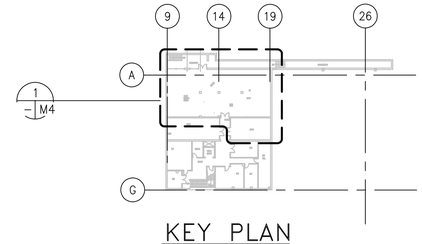
DWG NO.	SH.	REV
A233-0902-M4	1	

SHEET NOTES

1. SEE ELECTRICAL DWGS. FOR ELECTRICAL WORK.

KEY NOTES

1. FIRESTOP ANNULAR SPACE AROUND DUCT
2. RECONNECT VENT UNDER SLAB TO NEW VENT RISER AT COLUMN.
3. TERMINATE CD WITH AIR BREAK OVER (E) FLOOR DRAIN.
4. ROUTE CD THROUGH (E) 4"ø WALL OPENING NEAR FLOOR.
5. CONNECT DRAIN TO (E) PUMPED DISCHARGE.
6. REVISE AUTOMATIC FIRE SPRINKLER COVERAGE IN THIS AREA TO AVOID PIPING OVER ELECTRICAL EQUIPMENT. SEE FIRE PROTECTION NOTES ON SHEET M1 FOR ADDITIONAL INFORMATION. NEW PIPING SHOWN IS CONCEPTUAL ONLY, AND DOES NOT IMPLY THAT PIPE ROUTE WILL AVOID EXISTING OBSTRUCTIONS WITHOUT ADDITIONAL OFFSETS WHICH ARE NOT SHOWN.



KEY PLAN

MATCHLINE – SEE DRAWING M5

1 / M4 PARTIAL PLAN – BASEMENT (ROOMS B10 AND B13)
SCALE: 1/4"=1'-0"

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
		REVISIONS			

DRAWN M.CALLAHAN	DATE
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R&QA	DATE
SAFETY	DATE
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	DATE

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N233 ELECTRICAL RENOVATION PROJECT
MECHANICAL

BASEMENT PARTIAL PLAN

SIZE	CAGE CODE	REV
D	25307	A
SCALE AS SHOWN	INDEX	SHEET 1 OF 1

FILE NAME: 233-M04.DWG 12-22-09

60098456.0001

DWG: \\N21fs2\proj\233\60098456.0001_N233 Electrical Upgrade\500_CAD_N233 Electrical Renovation Project - Final Issue_Drawings\233-M04.DWG Version: 17.1s (LMS Tech) User: palden
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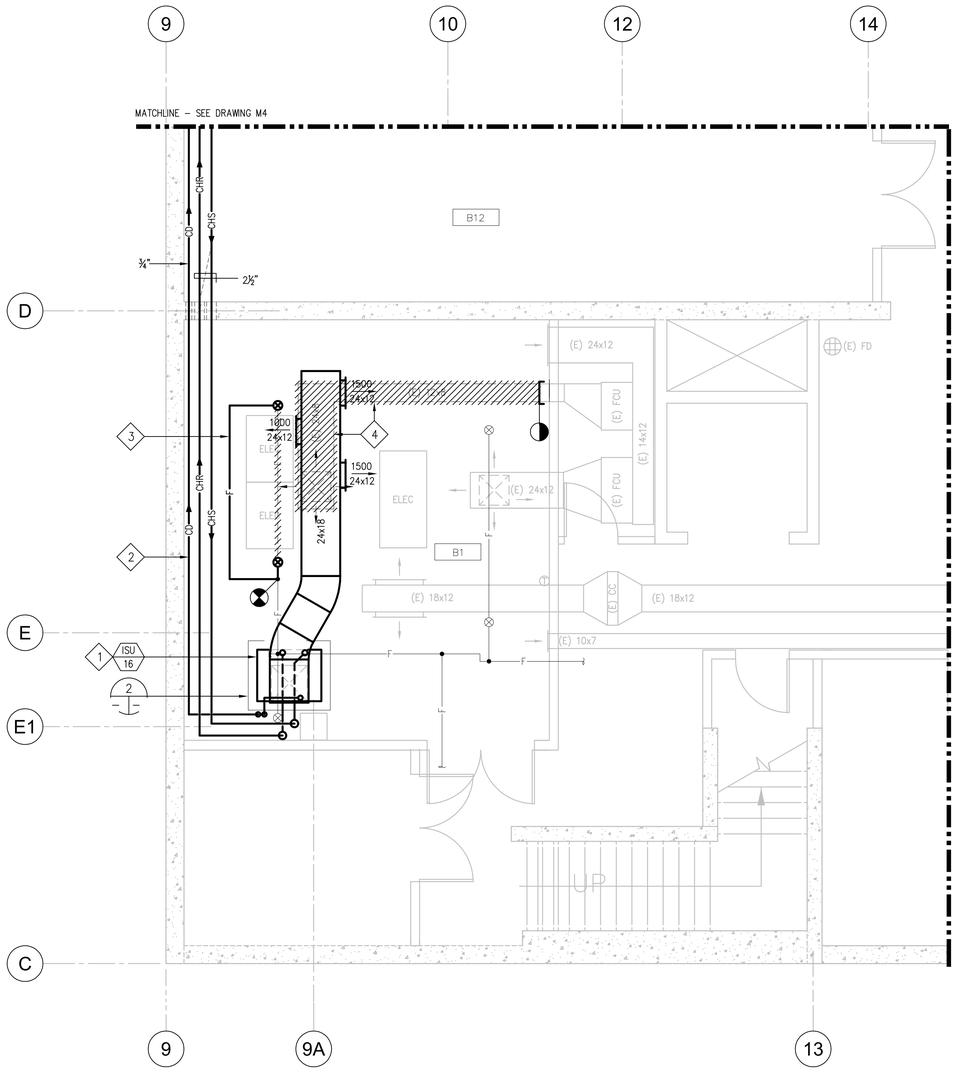


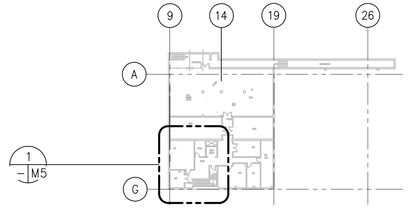
4 PARTIAL PLAN – BASEMENT (ROOM B1)
– M5 SCALE: 1/4"=1'–0"

SHEET NOTES

1. SEE SHEET M1 FOR GENERAL NOTES, LEGEND AND ABBREVIATIONS.

KEY NOTES

1. COMPUTER (IN–SPACE) UNIT: GFE. MOVE UNIT FROM BASEMENT OF N233A. MOUNT ON 18" HIGH FOUNDATION PAD. CONNECT CHS, CHR, CD, AND MU PIPING PER DETAIL 1/M2. SEE SCHEDULE FOR PERFORMANCE.
2. ROUTE CONDENSATE DRAIN LINE ALONG WALL.
3. ROUTE SPRINKLER PIPE AROUND ELECTRICAL EQUIPMENT TO LAST HEAD. REVISE AUTOMATIC FIRE SPRINKLER COVERAGE IN THIS ROOM TO AVOID PIPING OVER ELECTRICAL EQUIPMENT. SEE FIRE PROTECTION NOTES ON SHEET M1 FOR ADDITIONAL INFORMATION. NEW PIPING SHOWN IS CONCEPTUAL ONLY, AND DOES NOT IMPLY THAT PIPE ROUTE WILL AVOID EXISTING OBSTRUCTIONS WITHOUT ADDITIONAL OFFSETS WHICH ARE NOT SHOWN.
4. REMOVE (E) DUCTWORK.



KEY PLAN

ADDITIVE #2

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD

REVISIONS

DRAWN J.XIANG	DATE	
DESIGNED J.XIANG	DATE	
CHECKED M.CALLAHAN	DATE	
PROJMGR N.NIZAMOVA	DATE	
REQUESTER N.HSU	DATE	
R&DA	DATE	
SAFETY	DATE	
SUPERVISOR S.FRANKEL	DATE	
	DATE	

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N233 ELECTRICAL RENOVATION PROJECT
MECHANICAL

BASEMENT PARTIAL PLAN

SIZE	CAGE CODE	DWG NO.	REV
D	25307	A 233–0902–M5	
SCALE AS SHOWN		INDEX	SHEET 1 OF 1

FILE NAME: 233–M05.DWG 12–22–09

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DWG: \\N21is2\proj\233\60098456.0001_N233 Electrical Upgrade\500_CAD_N233 Electrical Renovation Project – Final Issue_Drawings\233–M05.DWG Version: 17.1s (LMS Tech) User: palden
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