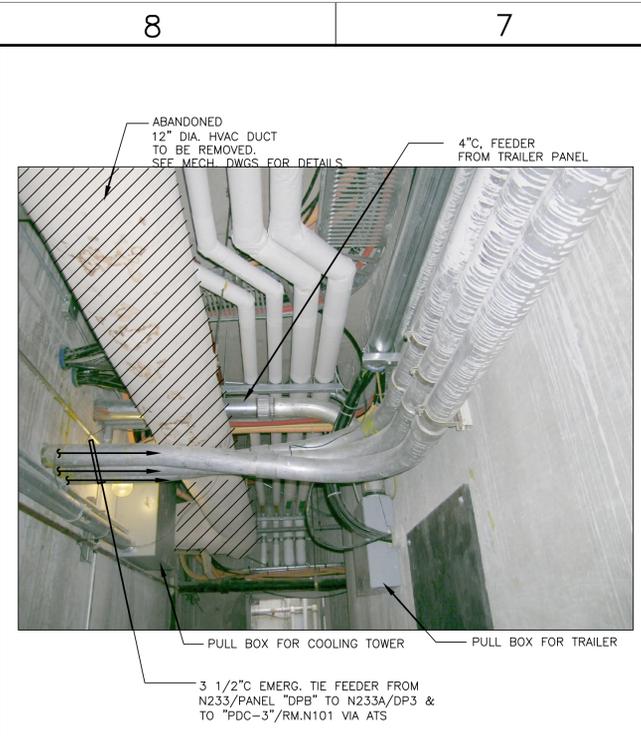


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 Version: 17.1s (LMS Tech) User: palden  
 DATE: Aug 19, 2010 - 2:34:46 pm

**SHEET NOTES**

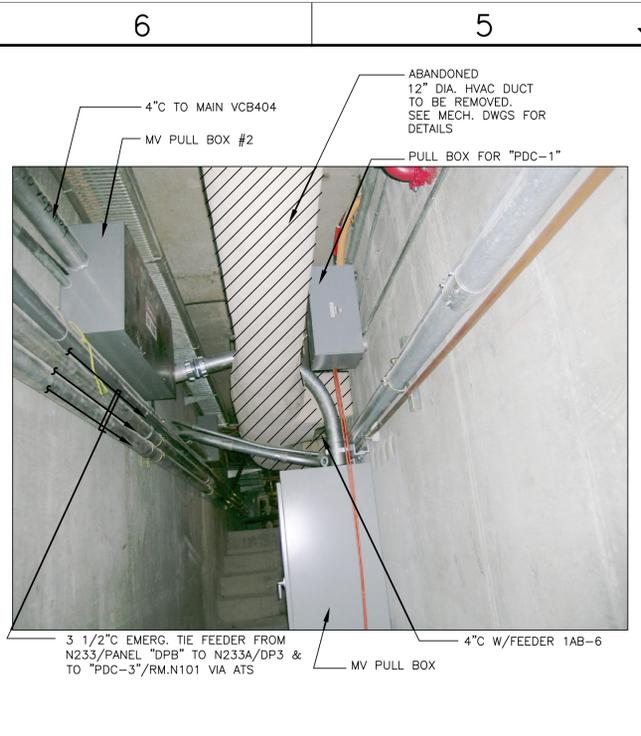
- CONTRACTOR SHALL FIELD VERIFY ALL MEASUREMENTS AT THE SITE AND SHALL BE RESPONSIBLE FOR THEIR ACCURACY PRIOR TO STARTING ANY WORK OR ORDERING ANY MATERIAL.
- HATCHED LINES INDICATE EXISTING MATERIAL/EQUIPMENT TO BE DEMOLISHED/ REMOVED. ALL ELECTRICAL ITEMS ARE EXISTING, U.O.N.
- ALL EXISTING CONDUITS & CONDUCTORS AFFECTED SHALL BE DISCONNECTED FROM (E) EQUIPMENT AND RECONNECTED TO THE (N) EQUIPMENT. CONTRACTOR SHALL DETERMINE IN FIELD AND SHALL PROVIDE PULL BOXES AND RELOCATE, EXTEND OR REPLACE (E) CONDUIT AND CONDUCTORS (MATCH EXISTING) TO COMPLETE CONNECTIONS TO NEW AND EXISTING EQUIPMENT.
- CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING VISITED THE SITE AND SATISFIED HIMSELF AS TO THE CONDITIONS UNDER WHICH THE WORK WILL BE PERFORMED. THE CONTRACTOR SHALL CHECK ALL EXISTING CONDITIONS WHICH MAY AFFECT HIS WORK. NO ALLOWANCE WILL BE MADE FOR ANY EXTRA EXPENSE WHICH MAY BE INCURRED DUE TO NEGLECT OR FAILURE TO EXAMINE THE SITE, EXISTING CONDITIONS, UTILITIES, ETC. THE SITE VISIT SHALL BE DURING THE BID WALK AND/OR PREARRANGED WITH THE CONTRACTING OFFICER.
- EXISTING GROUNDING TO REMAIN FOR RECONNECTION TO NEW WORK.
- REMOVE ALL ABANDONED WIRING AND ELECTRICAL EQUIPMENT PER CEC AS INDICATED ON THE DRAWING. SUCH ITEMS WILL EITHER BE STORED AT A PREDETERMINED LOCATION OR REMOVED FROM THE PREMISES AS DIRECTED BY THE CONTRACTING OFFICER.



TOWARDS SOUTH-WEST

**N233 CHASEWAY O/H CONDUIT FROM PNL "DPB" TO PNL "DP3" & "PDC-3" VIA ATS**

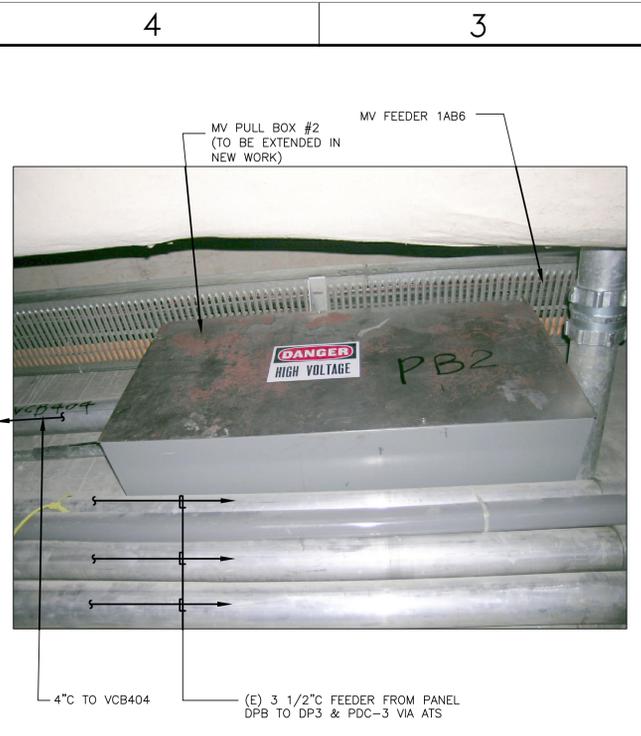
A  
E5,M3-1 | E21  
SCALE: NONE



TOWARDS NORTH-EAST

**N233 CHASEWAY O/H CONDUIT FROM PB #2 PNL "DPB" TO PNL DP3 & PDC-3 VIA ATS**

B  
E5,M3-1 | E21  
SCALE: NONE



NORTH-WEST WALL

**N233 CHASEWAY - 13.8 KV PULL BOX #2**

C  
E5 | E21  
SCALE: NONE



NORTH-WEST WALL

**N233 CHASEWAY 480V PULL BOX FOR COOLING TOWER**

D  
E5 | E21  
SCALE: NONE



TOWARDS SOUTH-WEST

**N233 CHASEWAY O/H CONDUIT FROM PANEL DPB TO PANEL DP3 & PDC-3 VIA ATS**

E  
E5,M3-1 | E21  
SCALE: NONE

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					
DRAWN	P. ALDEN	DATE			
DESIGNED	N. NIZAMOVA	DATE			
CHECKED	J. McCUSKER	DATE			
PROJ MGR	N. NIZAMOVA	DATE			
REQUESTER	N. HISU	DATE			
R&QA		DATE			
SAFETY		DATE			
SUPERVISOR	S. FRANKEL	DATE			
SIZE	D	CAGE CODE	25307	INDEX	233-0902-E21
SCALE	NONE	SHEET	1	OF	1
FILE NAME:		233-E21_1.DWG			
		10-29-09			

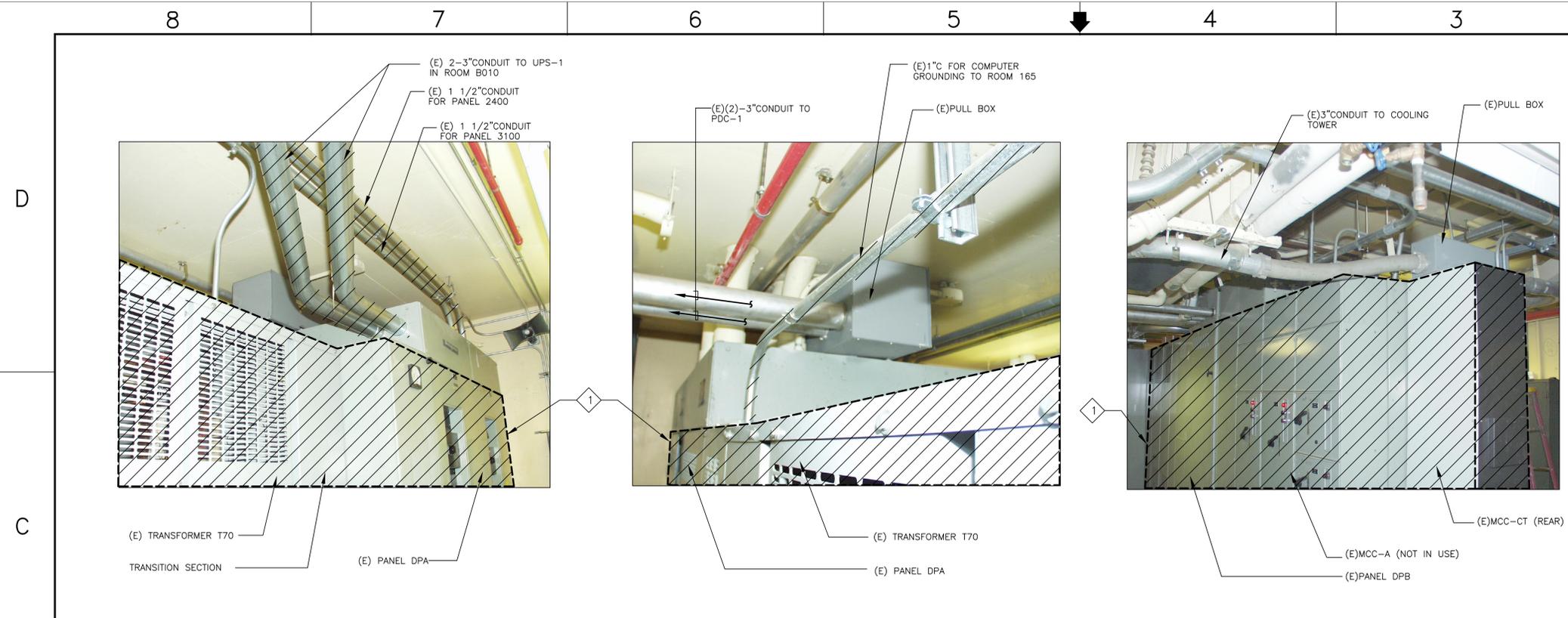
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DWG: \\N21362\proj\233\60098456\0001\_N233 Electrical Upgrade\500\_CAD\N233 Electrical Renovation Project - Final Issue\_Drawings\233-E22\_1.DWG  
 DATE: Aug 19, 2010 - 2:34:53 pm  
 Version: 17.1s (LMS Tech) User: palden

- ### SHEET NOTES
- CONTRACTOR SHALL FIELD VERIFY ALL MEASUREMENTS AT THE SITE AND SHALL BE RESPONSIBLE FOR THEIR ACCURACY PRIOR TO STARTING ANY WORK OR ORDERING ANY MATERIAL.
  - HATCHED LINES INDICATE EXISTING MATERIAL/EQUIPMENT TO BE DEMOLISHED/ REMOVED. ALL ELECTRICAL ITEMS ARE EXISTING, U.O.N.
  - ALL EXISTING CONDUITS & CONDUCTORS AFFECTED SHALL BE DISCONNECTED FROM (E) EQUIPMENT AND RECONNECTED TO THE (N) EQUIPMENT. CONTRACTOR SHALL DETERMINE IN FIELD AND SHALL PROVIDE PULL BOXES AND RELOCATE, EXTEND OR REPLACE (E) CONDUIT AND CONDUCTORS (MATCH EXISTING) TO COMPLETE CONNECTIONS TO NEW AND EXISTING EQUIPMENT.
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### KEY NOTES

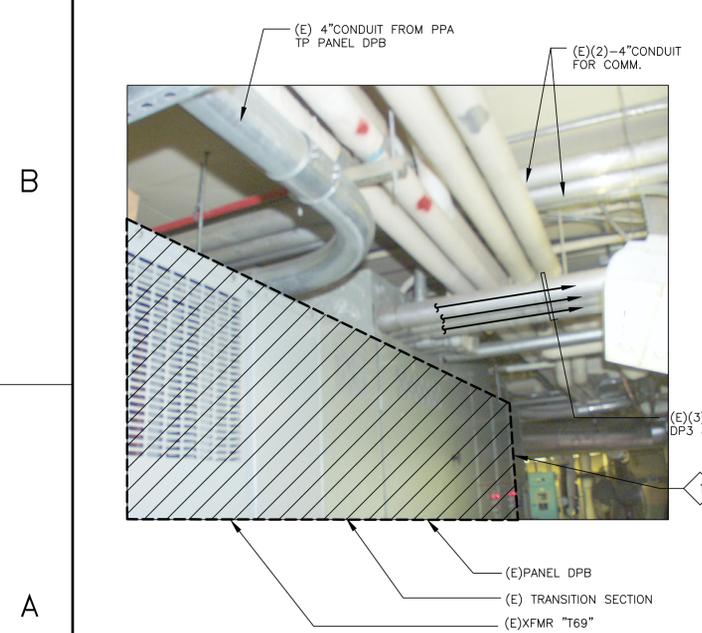
1 OUTLINE OF (E) EQUIPMENT TO BE DEMOLISHED.



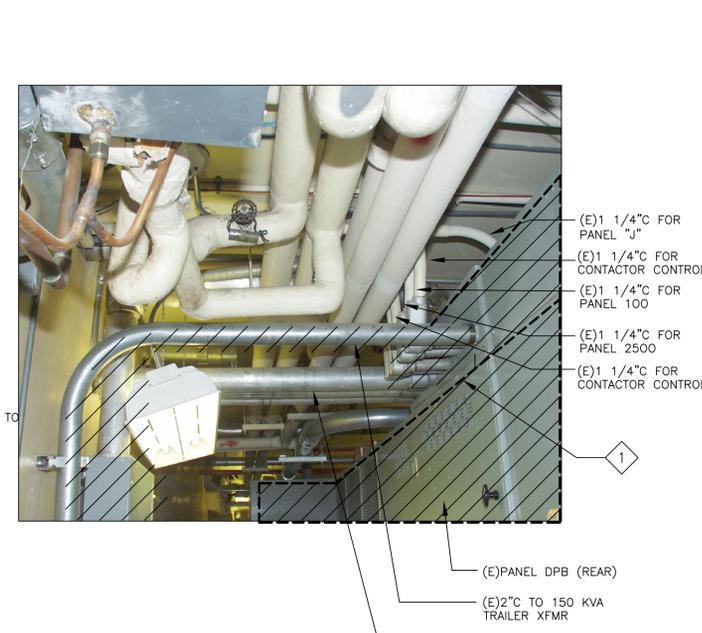
**A** N233 INDOOR SUBSTATION-PANEL DPA & TRANSFORMER T70-FRONT VIEW  
 E6 E22 SCALE: NONE

**B** N233 INDOOR SUBSTATION PANEL DPA & XFMR T70-REAR VIEW  
 E6 E22 SCALE: NONE

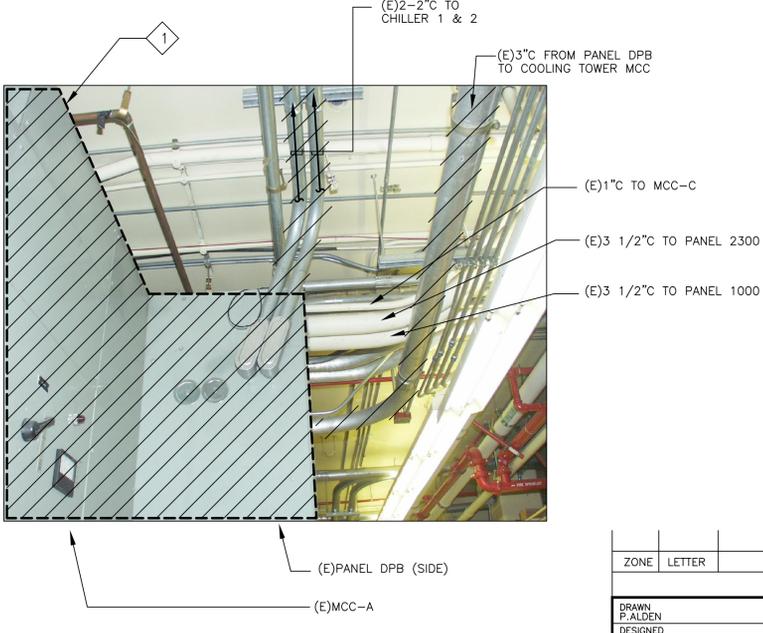
**C** PANEL DPB, MCC-A AND MCC-CT - REAR VIEW  
 E6 E22 SCALE: NONE



**D** N233 INDOOR SUBSTATION XFMR T69 AND DPB-REAR VIEW  
 E6 E22 SCALE: NONE



**E** N233 INDOOR SUBSTATION O/H CONDUIT-REAR VIEW  
 E6 E22 SCALE: NONE



**F** PANEL DPB AND MCC-A O/H CONDUIT-SIDE VIEW  
 E6 E22 SCALE: NONE

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					
DRAWN		P. ALDEN		DATE	
DESIGNED		N. NIZAMOVA		DATE	
CHECKED		J. McCUSKER		DATE	
PROJ MGR		N. NIZAMOVA		DATE	
REQUESTER		N. HSI		DATE	
SAFETY		S. FRANKEL		DATE	
SIZE	D	CAGE CODE	25307	INDEX	
SCALE	NONE	INDEX		SHEET	1 OF 1
FILE NAME:		233-E22_1.DWG			
		10-29-09			

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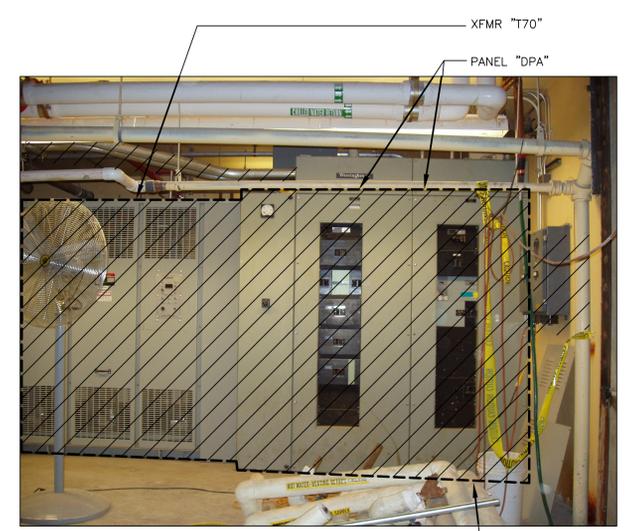
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 DATE: Aug 19, 2010 - 2:35:03 pm

**SHEET NOTES**

1. CONTRACTOR SHALL FIELD VERIFY ALL MEASUREMENTS AT THE SITE AND SHALL BE RESPONSIBLE FOR THEIR ACCURACY PRIOR TO STARTING ANY WORK OR ORDERING ANY MATERIAL.
2. HATCHED LINES INDICATE EXISTING MATERIAL/EQUIPMENT TO BE DEMOLISHED/ REMOVED. ALL ELECTRICAL ITEMS ARE EXISTING, U.O.N.
3. ALL EXISTING CONDUITS & CONDUCTORS AFFECTED SHALL BE DISCONNECTED FROM (E) EQUIPMENT AND RECONNECTED TO THE (N) EQUIPMENT. CONTRACTOR SHALL DETERMINE IN FIELD AND SHALL PROVIDE PULL BOXES AND RELOCATE, EXTEND OR REPLACE (E) CONDUIT AND CONDUCTORS (MATCH EXISTING) TO COMPLETE CONNECTIONS TO NEW AND EXISTING EQUIPMENT.
4. CONTRACTOR SHALL BE RESPONSIBLE FOR HAVING VISITED THE SITE AND SATISFIED HIMSELF AS TO THE CONDITIONS UNDER WHICH THE WORK WILL BE PERFORMED. THE CONTRACTOR SHALL CHECK ALL EXISTING CONDITIONS WHICH MAY AFFECT HIS WORK. NO ALLOWANCE WILL BE MADE FOR ANY EXTRA EXPENSE WHICH MAY BE INCURRED DUE TO NEGLIGENCE OR FAILURE TO EXAMINE THE SITE, EXISTING CONDITIONS, UTILITIES, ETC. THE SITE VISIT SHALL BE DURING THE BID WALK AND/OR PREARRANGED WITH THE CONTRACTING OFFICER.
5. EXISTING GROUNDING TO REMAIN FOR RECONNECTION TO NEW WORK.
6. REMOVE ALL ABANDONED WIRING AND ELECTRICAL EQUIPMENT PER CEC AS INDICATED ON THE DRAWING. SUCH ITEMS WILL EITHER BE STORED AT A PREDETERMINED LOCATION OR REMOVED FROM THE PREMISES AS DIRECTED BY THE CONTRACTING OFFICER.

**KEY NOTES**

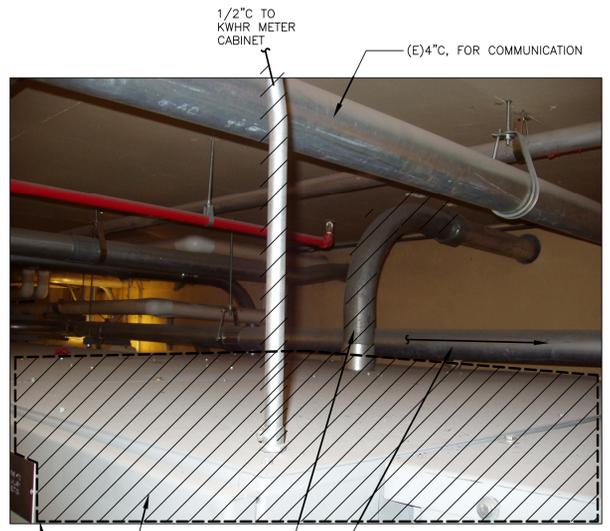
- 1 OUTLINE OF (E) EQUIPMENT TO BE DEMOLISHED.
- 2 (E) EQUIPMENT TO BE RELOCATED.



**A** N233 INDOOR SUBSTATION-PANEL "DPA" AND TRANSFORMER "T70"-FRONT VIEW  
 E6 E23 SCALE: NONE



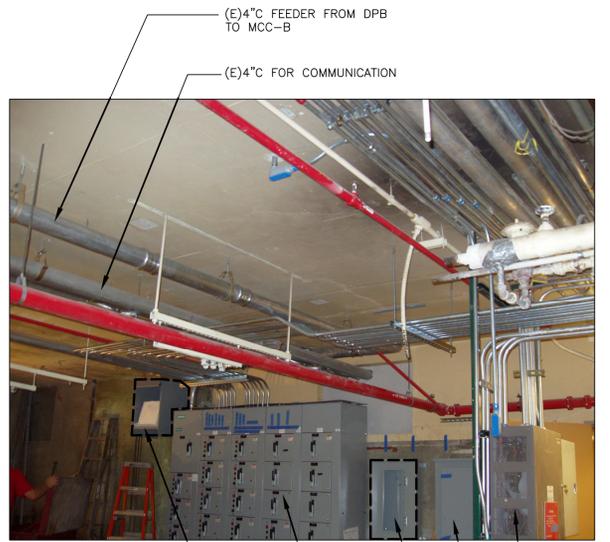
**B** N233 INDOOR SUBSTATION MAIN VCB404 AND "T70"- FRONT VIEW  
 E6 E23 SCALE: NONE



**C** N233 INDOOR SUBSTATION O/H CONDUIT-MAIN VCB404  
 E6 E23 SCALE: NONE



**D** MCC-CT, "MCC-A" AND PANEL "DPB"-FRONT VIEW  
 E6 E23 SCALE: NONE



**E** "MCC-B" AND FMCS PANEL O/H CONDUIT-FRONT VIEW  
 E6 E23 SCALE: NONE



**F** N233 INDOOR SUBSTATION O/H CONDUIT-SIDE VIEW  
 E6 E23 SCALE: NONE

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					
 <b>Ames Research Center</b> Moffett Field, California					
N233 ELECTRICAL RENOVATION PROJECT ELECTRICAL <b>N233 INDOOR SUBSTATION</b> <b>MISCELLANEOUS VIEWS/PHOTOS</b> <b>EXIST/DEMO WORK</b>					
DRAWN	P. ALDEN	DATE			
DESIGNED	N. NIZAMOVA	DATE			
CHECKED	J. McCUSKER	DATE			
PROJ MGR	N. NIZAMOVA	DATE			
REQUESTER	N. HISU	DATE			
R&QA		DATE			
SAFETY		DATE			
SUPERVISOR	S. FRANKEL	DATE			
SIZE	D	CAGE CODE	25307	INDEX	233-0902-E23
SCALE	NONE	INDEX		SHEET	1 OF 1
FILE NAME: 233-E23_1.DWG 10-29-09					

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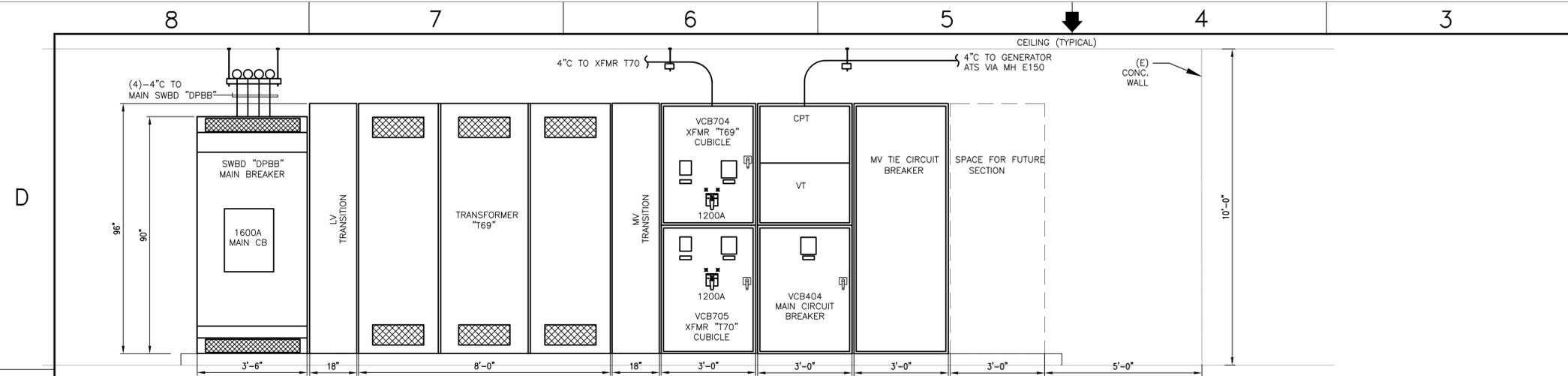
DWG: \\N21362\proj\233\60098456\0001\_N233\_Electrical\_Upgrade\500\_CAD\N233\_Electrical\_Renovation\_Project - Final Issue\_Drawings\233-E24-1.DWG Version: 17.1s (LMS Tech) User: palden  
 DATE: Aug 19, 2010 2:35:15 pm

SHEET NOTES

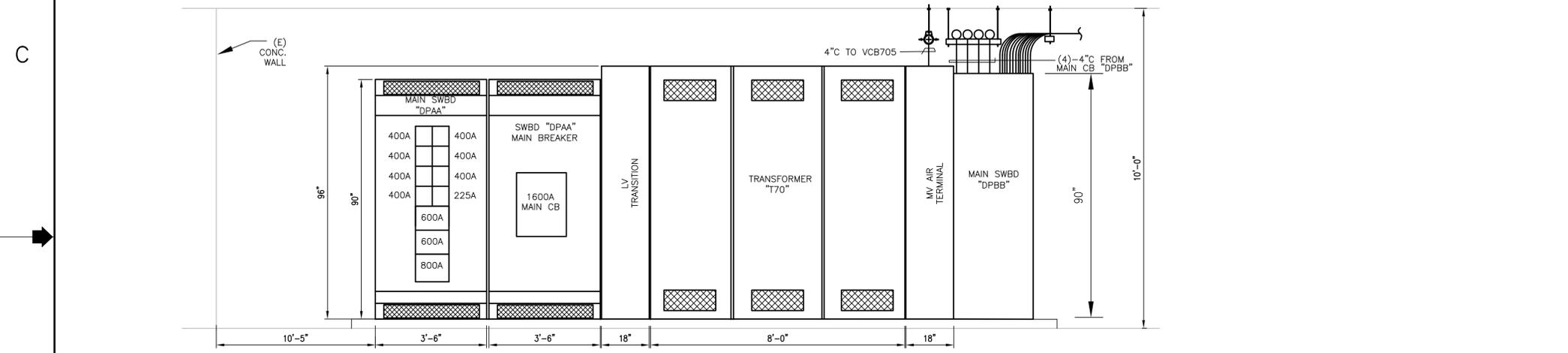
1. DARK OR HEAVY LINES INDICATE NEW WORK AND MATERIAL/EQUIPMENT TO BE PROVIDED, UON.
2. CONTRACTOR SHALL FIELD VERIFY ALL MEASUREMENTS AT THE SITE AND SHALL BE RESPONSIBLE FOR THEIR ACCURACY PRIOR TO STARTING ANY WORK OR ORDERING ANY MATERIAL.
3. ELECTRICAL EQUIPMENT AND FEEDERS SHALL BE SUPPORTED AND/OR ANCHORED IN ACCORDANCE WITH CALIFORNIA BUILDING CODE SEISMIC REQUIREMENTS. SEE DRAWING E1 NOTE B.
4. CONTRACTOR SHALL FIELD VERIFY ALL EQUIPMENT RATINGS PRIOR TO ORDERING ANY MATERIALS.

KEY NOTES

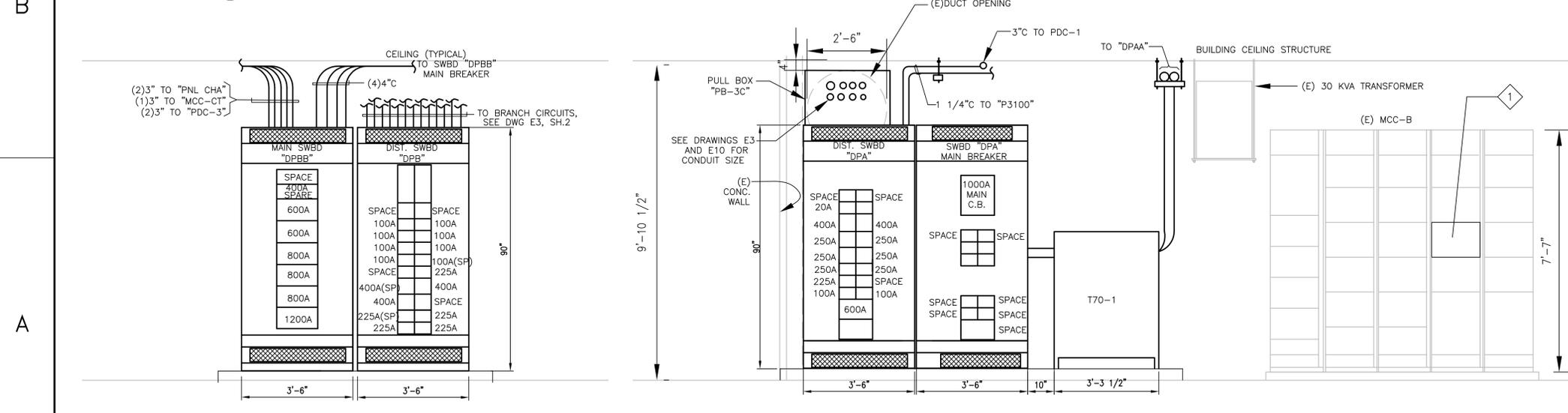
- 1 PROVIDE 30A CIRCUIT BREAKER AND ALL NECESSARY COMPONENTS FOR CONNECTION OF (N) ISU-16. SEE DRAWING E10 FOR (E) MCC-B AND (N) ISU-16 LOCATION, CONDUIT AND WIRE SIZE. SEE MECHANICAL DRAWINGS FOR CONTROL DIAGRAM AND EQUIPMENT SCHEDULE. SEE DRAWING E5 FOR EPO INTERLOCK.



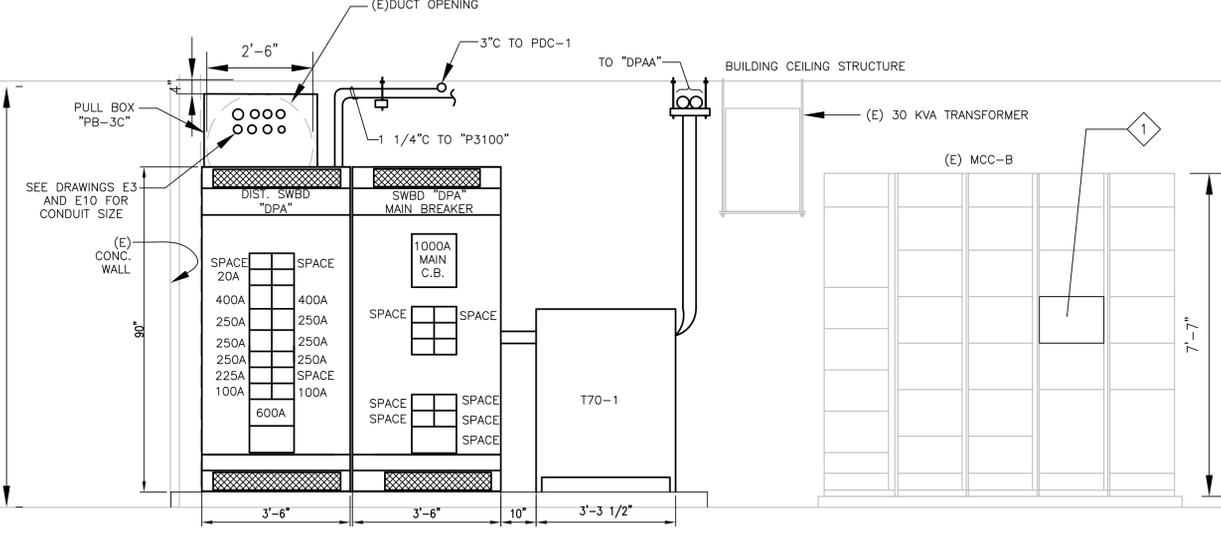
**A** N233 INDOOR SUBSTATION DETAILS – NEW WORK  
 E10-1 E24 SCALE: 1/2"=1'-0"



**B** N233 SWITCHBOARD AND TRANSFORMER ELEVATION DETAILS-NEW WORK  
 E10-1 E24 SCALE: 1/2"=1'-0"



**C** N233 INDOOR SWITCHBOARD EL.-NEW WORK  
 E10-1 E24 SCALE: 1/2"=1'-0"



**D** N233 INDOOR SWITCHBOARD AND T70-1 ELEVATION DETAILS-NEW WORK  
 E10-1 E24 SCALE: 1/2"=1'-0"

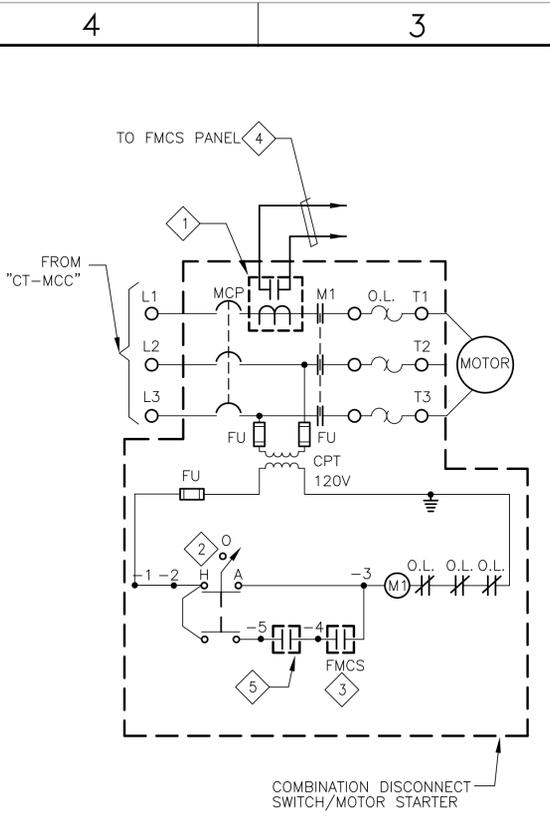
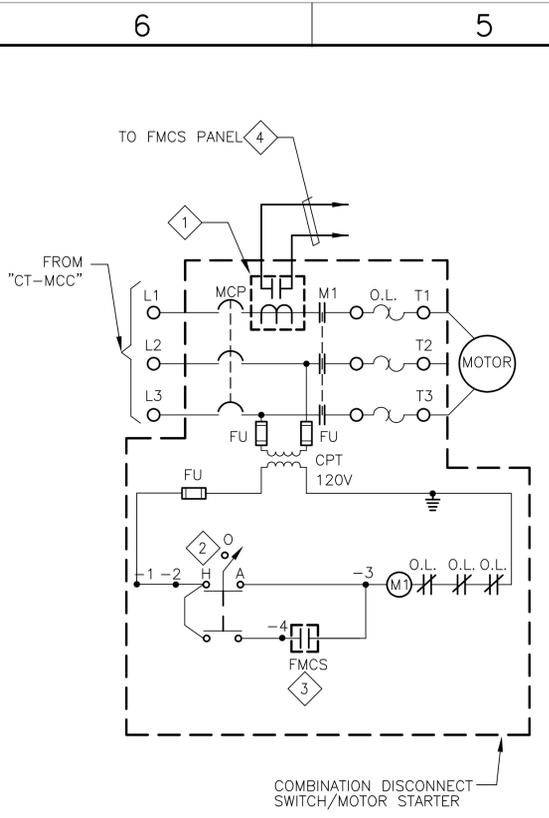
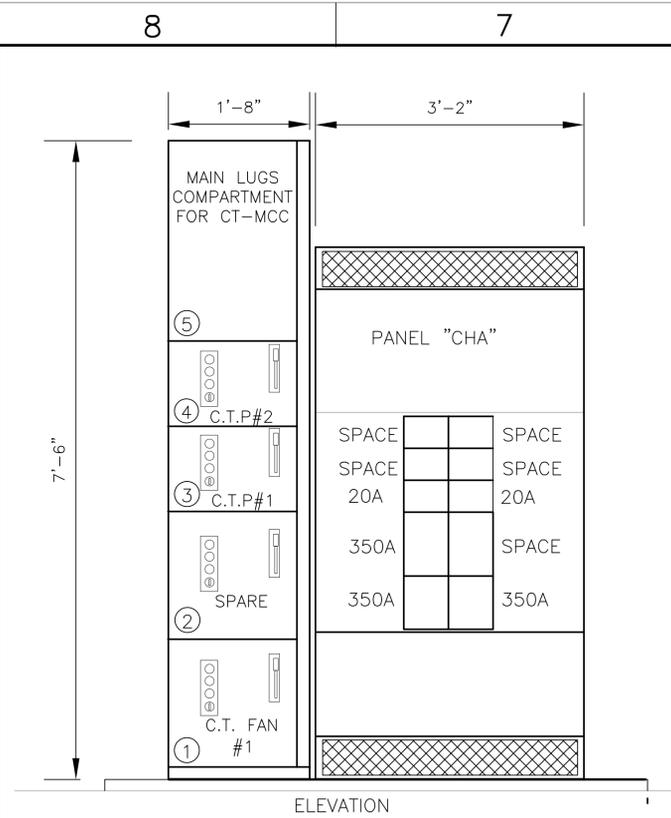
ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					
 <b>Ames Research Center</b> Moffett Field, California					
N233 ELECTRICAL RENOVATION PROJECT ELECTRICAL <b>N233 INDOOR SUBSTATION            ELEVATIONS &amp; DETAILS            NEW WORK</b>					
DRAWN	P. ALDEN	DATE			
DESIGNED	N. NIZAMOVA	DATE			
CHECKED	J. McCUSKER	DATE			
PROJ MGR	N. NIZAMOVA	DATE			
REQUESTER	N. HISU	DATE			
R&QA		DATE			
SAFETY		DATE			
SUPERVISOR	S. FRANKEL	DATE			
SIZE	D	CAGE CODE	25307	INDEX	1
SCALE	AS SHOWN	INDEX		SHEET	1 OF 1

**SHEET NOTES**

- CONTRACTOR SHALL FIELD VERIFY ALL MEASUREMENTS AT THE SITE AND SHALL BE RESPONSIBLE FOR THEIR ACCURACY PRIOR TO STARTING ANY WORK OR ORDERING ANY MATERIAL.
- ELECTRICAL EQUIPMENT AND FEEDERS SHALL BE SUPPORTED AND/OR ANCHORED IN ACCORDANCE WITH CALIFORNIA BUILDING CODE SEISMIC REQUIREMENTS. SEE DRAWING E1 NOTE 8.
- ALL FMCS CIRCUIT CONDUIT, FITTINGS, CONDUIT BODY AND BOX COVERS FITTINGS SHALL BE PAINTED BLUE TO IDENTIFY THAT IT IS PART OF THE FMCS SYSTEM. ALL FMCS RELATED WORK SHALL BE COORDINATED WITH THE CONTRACTING OFFICER PRIOR TO START OF WORK. FMCS WIRING AND TERMINATION SHALL BE DONE BY OTHERS.

**KEY NOTES**

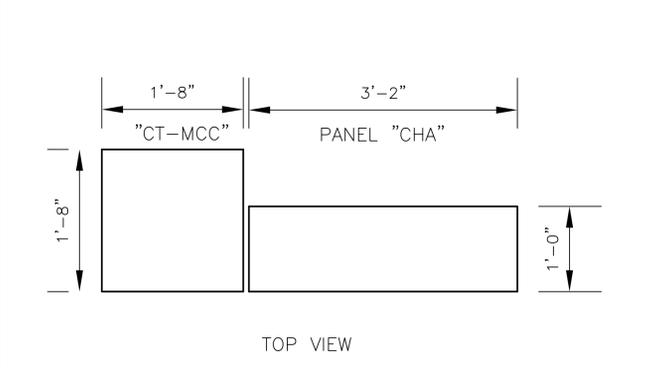
- CURRENT SWITCH SHALL BE PROVIDED BY CONTRACTOR AND TERMINATED BY OTHERS.
- HAND-OFF-AUTO SELECTOR SWITCH SHALL BE PROVIDED WITH THE STARTER.
- CONTACTS FROM FMCS SHALL BE DETERMINED AND COORDINATED WITH CONTRACTING OFFICER. CONTRACTOR SHALL PROVIDE FINAL CONNECTION TO STARTER.
- CONDUIT FROM CURRENT SWITCH TO FMCS PANEL SHALL BE PROVIDED BY CONTRACTOR. WIRING BY OTHERS.
- TO EXISTING HVAC CONTROL. COORDINATE WITH NASA CONTRACTING OFFICER PRIOR TO FINAL CONNECTION.



**A** PANEL "CHA" & "CT-MCC" ELEVATION  
E10 E25 SCALE: 1/2" = 1'-0"

**D** MOTOR CONTROL DIAGRAM #1  
E25 E25 SCALE: N.T.S.

**E** MOTOR CONTROL DIAGRAM #2  
E25 E25 SCALE: N.T.S.



**B** PANEL "CHA" & "CT-MCC" PLAN VIEW  
E25 E25 SCALE: 1/2" = 1'-0"

FEEDER SCHEDULE - PANEL "CHA", 600A, 480V, 3-PHASE, 60HZ											
FEEDER NUMBER	EQUIPMENT ID	EQUIPMENT DESCRIPTION / ROOM	MOTOR HP	CIRCUIT BREAKER	STARTER SIZE	CONDUIT SIZE	CONDUCTOR # AND SIZE	DISCONNECT AT MOTOR	ACCESSORIES	FMCS	REMARKS
CHA-1	CH-1	CHILLER #1	150	350A, 3P	-	2"	3 #4/0 & 1 #3(G)	-	-	3/4"C	-
CHA-2	CH-2	CHILLER #2	150	350A, 3P	-	2"	3 #4/0 & 1 #3(G)	-	-	3/4"C	-
CHA-3	CH-3 (FUT.)	CHILLER #3	150	350A, 3P	-	-	-	-	-	-	-
CHA-4	SPARE	-	-	20A, 3P	-	-	-	-	-	-	-
CHA-5	SPARE	-	-	20A, 3P	-	-	-	-	-	-	-
CHA-6	SPACE	-	-	-	-	-	-	-	-	-	-
CHA-7	SPACE	-	-	-	-	-	-	-	-	-	-
CHA-8	SPACE	-	-	-	-	-	-	-	-	-	-
CHA-9	SPACE	-	-	-	-	-	-	-	-	-	-
CHA-10	SPACE	-	-	-	-	-	-	-	-	-	-

FEEDER SCHEDULE - "CT-MCC", 600A, 480V, 3-PHASE, 60HZ													
FEEDER NUMBER	EQUIPMENT ID	EQUIPMENT DESCRIPTION / ROOM	MOTOR HP	CIRCUIT BREAKER	STARTER SIZE	CONDUIT SIZE	CONDUCTOR # AND SIZE	DISCONNECT AT MOTOR	CONTROLS AT MCC	CONTROLS AT MOTOR	CONTROL DIAGRAM	FMCS	POINT OF CONNECTION
CT-MCC -1	CTF-1	COOLING TOWER FAN #1	40	100A, 3P	3	3"C	3 #4 1 #8(G)	100A, 3P	H-O-A & PILOT LIGHT	-	#1	3/4"C	J-BOX
CT-MCC -2	SPARE	-	40	100A, 3P	3	-	3 #4 1 #8(G)	100A, 3P	H-O-A & PILOT LIGHT	-	-	-	-
CT-MCC -3	CTP-1	COOLING TOWER PUMP #1	20	60A, 3P	2	-	3 #6 1 #10(G)	60A, 3P	H-O-A & PILOT LIGHT	-	#2	3/4"C	J-BOX
CT-MCC -4	CTP-2	COOLING TOWER PUMP #2	20	60A, 3P	2	-	3 #6 1 #10(G)	60A, 3P	H-O-A & PILOT LIGHT	-	#2	3/4"C	J-BOX
CT-MCC -5	MAIN FEEDER	MAIN LUGS COMPARTMENT	-	-	-	-	3#500 KCMIL 1 #3(G)	-	-	-	-	-	-

**C** PANEL "CHA" & "CT-MCC" SCHEDULE  
E25 E25 SCALE: N.T.S.

ZONE	LETTER	DESCRIPTION	DRAWN	DATE	APPRVD
REVISIONS					
DRAWN	P. ALDEN	DATE			
DESIGNED	N. NIZAMOVA	DATE			
CHECKED	J. McCUSKER	DATE			
PROJ MGR	N. NIZAMOVA	DATE			
REQUESTER	N. NISU	DATE			
R&QA		DATE			
SAFETY		DATE			
SUPERVISOR	S. FRANKEL	DATE			

**Ames Research Center**  
Moffett Field, California

N233 ELECTRICAL RENOVATION PROJECT  
ELECTRICAL

**N233 INDOOR SUBSTATION  
ELEVATION, DETAILS &  
SCHEDULES-NEW WORK**

SIZE	D	CAGE CODE	25307	INDEX	233-0902-E25	REV	1
SCALE	AS SHOWN	SHEET	1	OF	1		

DWG: \\N213162\proj\233\60098456\0001\_N233 Electrical Upgrade\500\_CAD\N233 Electrical Renovation Project - Final Issue\_Drawings\233-E25\_1.DWG  
 DATE: Aug 19, 2010 2:35:17 pm  
 Version: 17.1s (LMS Tech) User: palden