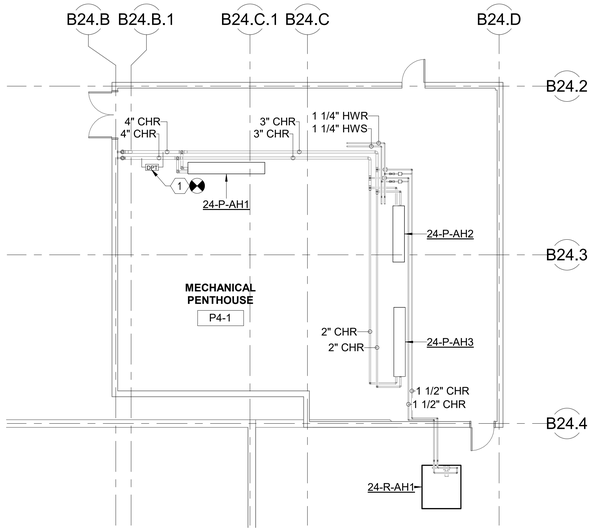
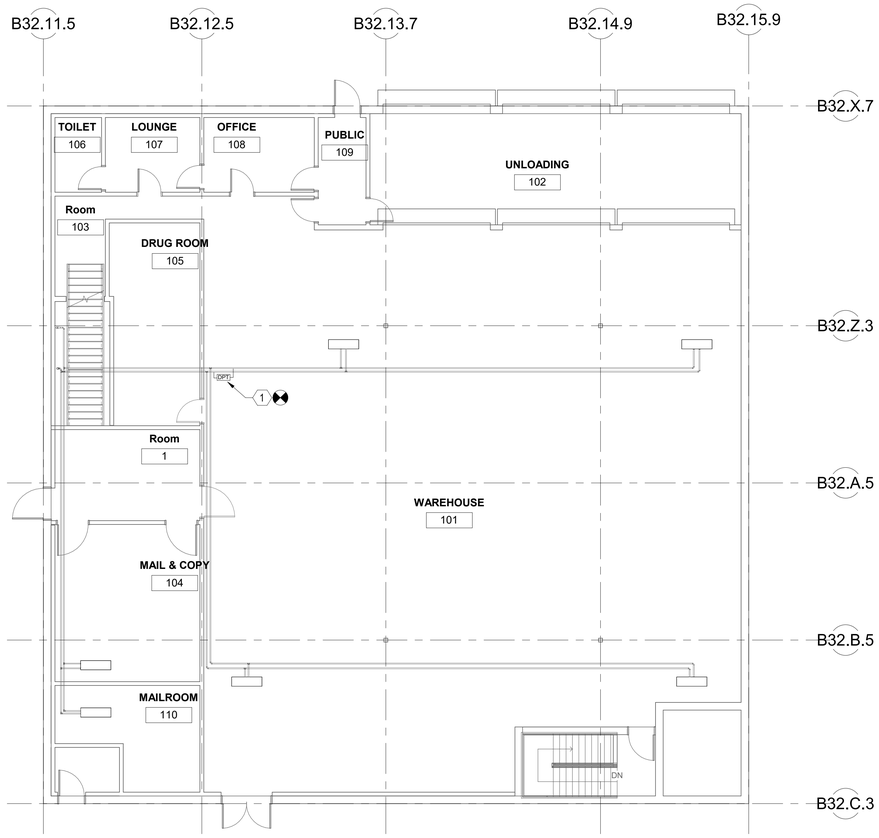


2 MECHANICAL PENTHOUSE PLAN - BUILDING 24 - PHASE 1

Scale: 1/8" = 1'-0"

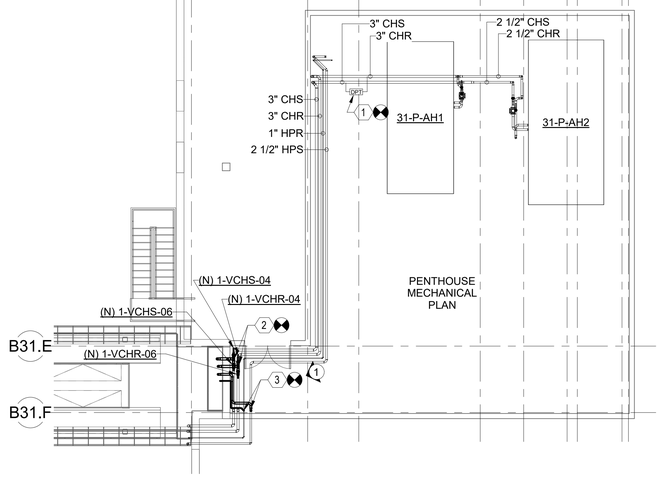
0' 4' 8' 16'



1 MECHANICAL FIRST FLOOR PIPING PLAN - BUILDING 32 - PHASE 1

Scale: 1/8" = 1'-0"

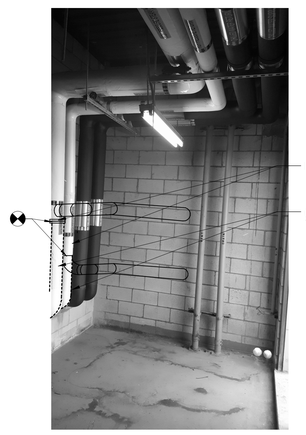
0' 4' 8' 16'



3 MECHANICAL PENTHOUSE PLAN - BUILDING 31 - PHASE 1

Scale: 1/8" = 1'-0"

0' 4' 8' 16'



1 PHOTO OF EXISTING CHS/R AND HPS/R INSIDE BUILDING 31 PENTHOUSE

KEYNOTES

1. PROVIDE NEW DIFFERENTIAL PRESSURE TRANSMITTER IN EXISTING CHILLED WATER PIPING. CONNECT TO METASYS/BMS. SEE DETAIL D6/M501.
2. CONNECT (N) 3" CHS AND CHR TO (E) 3" CHS AND CHR.
3. CONNECT (N) 2-1/2" HPS AND (N) 1" PC TO (E) 2-1/2" HPS AND (E) 1" HPR.

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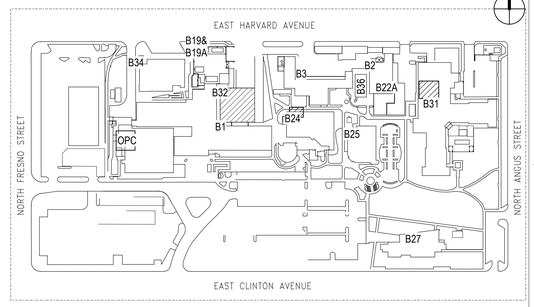
KEY PLAN



RECORD DRAWINGS

NO	REVISIONS	DATE

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BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: MECHANICAL PARTIAL PLANS OF BUILDINGS 24, 31 AND 32 - PHASE 1

Approved : Project Director

Project Title: **PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS**

Location: **2615 E CLINTON AVE, FRESNO, CA 93703**

Date: **10/10/2024** | Checked by: **R. REIF** | Drawn: **R. SCHAMP**

Project Number: **570-16-302**

Building Number

Drawing number: **M-104**

Office of Construction and Facilities Management

Department of Veterans Affairs

Autodesk Docs://570-16-302 VA Fresno Chiller Plant P2 10100516 VA Fresno Chiller Plant MPE_ADD_SERVICE.rvt
11/15/2024 10:31:14 AM

three inches = one foot

one and one-half inch = one foot

one inch = one foot

three-quarters inch = one foot

one-half inch = one foot

three-eighth inch = one foot

one-quarter inch = one foot

one-eighth inch = one foot

F1 CHILLER ANCHORAGE DETAIL
NTS

F3 PIPE SUPPORTS INSIDE WALKWAY ENCLOSURE
NTS

NOTES:

1. 2-PASS CONDENSER AND EVAPORATOR SHOWN. ACTUAL CHILLER PASSES MAY VARY, FITTING REQUIREMENTS ARE THE SAME.

F6 CHILLER PIPING DETAIL
NTS

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RECORD DRAWINGS

Autodesk Docs://570-16-302 VA Fresno Chiller Plant/P2 10\2616\VA Fresno Chiller Plant MPE_ADD_SERVICE.rvt
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BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: MECHANICAL DETAILS

Approved : Project Director

Project Title: **PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS**

Location: **2615 E CLINTON AVE, FRESNO, CA 93703**

Date: **10/10/2024** | Checked by: **R. REIF** | Drawn: **R. SCHAMP**

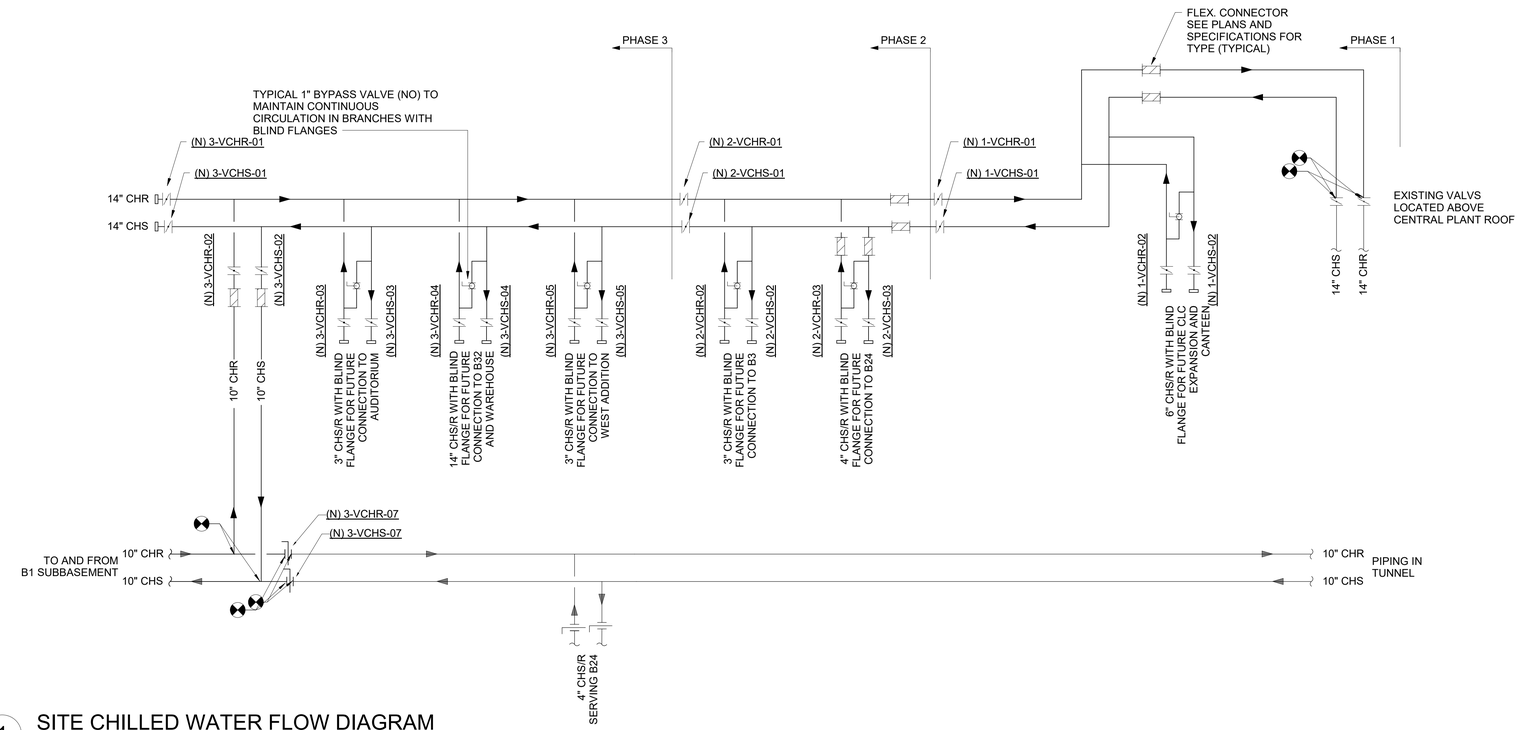
Project Number: **570-16-302**

Building Number:

Drawing number: **M-501**

Office of Construction and Facilities Management

Department of Veterans Affairs



1 SITE CHILLED WATER FLOW DIAGRAM
SCALE: NONE

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one inch = one foot
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three-eighth inch = one foot
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one-eighth inch = one foot

Autodesk Docs://570-16-302 VA Fresno Chiller Plant/P2 10\02616\VA Fresno Chiller Plant MPE_ADD_SERVICE.rvt
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NO	REVISIONS	DATE

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BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: MECHANICAL SITE CHW FLOW DIAGRAM

Approved : Project Director

Project Title: **PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS**

Location: **2615 E CLINTON AVE, FRESNO, CA 93703**

Date: **10/10/2024** | Checked by: **R. REIF** | Drawn: **R. SCHAMP**

Project Number: **570-16-302**

Building Number:

Drawing number: **M-602**

Office of Construction and Facilities Management

Department of Veterans Affairs

ALL SELECTIONS ARE BASED ON 308 FT. ABOVE SEA LEVEL.

CHILLED WATER VALVE SCHEDULE

SYMBOL	TYPE	SIZE	LOCATION	SYSTEM	COUNT
Phase 1					
(N) 3-VCHS-08				O	1
(N) 3-VCHS-09				O	1
(N) 1-VCHR-01	BUTTERFLY	14"	COLUMN D-32	CHR	1
(N) 1-VCHS-01	BUTTERFLY	14"	COLUMN D-32	CHS	1
(N) 1-VCHS-02	BUTTERFLY	6"	COLUMN D-6	CHS	1
(N) 1-VCHR-02	BUTTERFLY	6"	COLUMN D-6	CHR	1
(F) 1-VCHS-03	BUTTERFLY	8"	COLUMN N-2.5	CHR	1
(F) 1-VCHR-03	BUTTERFLY	8"	COLUMN N-2.5	CHS	1
(N) 1-VCHS-04	BUTTERFLY	3"	B31 PENTHOUSE	CHS	1
(N) 1-VCHR-04	BUTTERFLY	3"	B31 PENTHOUSE	CHR	1
(N) 1-VCHR-05	BALL	1"	COLUMN D-6	CHR	1
(N) 1-VCHS-06	BUTTERFLY	3"	B31 PENTHOUSE	CHS	1
(N) 1-VCHR-06	BUTTERFLY	3"	B31 PENTHOUSE	CHR	1
Phase 2					
(N) 3-VCHR-13				CHS	1
(N) 3-VCHR-14				CHR	1
(N) 2-VCHR-01	BUTTERFLY	14"	COLUMN Y-48	CHR	1
(N) 2-VCHS-01	BUTTERFLY	14"	COLUMN Y-48	CHS	1
(N) 2-VCHS-02	BUTTERFLY	4"	COLUMN Y-46		1
(N) 2-VCHR-02	BUTTERFLY	4"	COLUMN Y-46	CHR	1
(N) 2-VCHR-03	BUTTERFLY	3"	BUILDING 24	CHR	1
(N) 2-VCHS-03	BUTTERFLY	3"	BUILDING 24	CHS	1
(N) 2-VCHS-04	BALL	1"	COLUMN Y-46		1
Phase 3					
(N) 3-VCHR-11				CHR	1
(N) 3-VCHR-12				CHR	1
(N) 3-VCHS-01	BUTTERFLY	14"	COLUMN CC-63	CHS	1
(N) 3-VCHR-01	BUTTERFLY	14"	COLUMN CC-63	CHR	1
(N) 3-VCHS-02	BUTTERFLY	10"	COLUMN DD-63	CHR	1
(N) 3-VCHR-02	BUTTERFLY	10"	COLUMN DD-63	CHR	1
(N) 3-VCHS-03	BUTTERFLY	3"	AUDITORIUM	CHS	1
(N) 3-VCHR-03	BUTTERFLY	3"	AUDITORIUM	CHR	1
(N) 3-VCHR-04	BUTTERFLY	14"	COLUMN BB-60	CHR	1
(N) 3-VCHS-04	BUTTERFLY	14"	COLUMN BB-60	CHS	1
(N) 3-VCHS-05	BUTTERFLY	3"	COLUMN BB-59		1
(N) 3-VCHR-05	BUTTERFLY	3"	COLUMN BB-59	CHR	1
(N) 3-VCHS-06	BALL	1"	COLUMN CC-62	CHS	1
(N) 3-VCHS-07	BUTTERFLY	10"	COLUMN DD-63	CHS	1
(N) 3-VCHR-07	BUTTERFLY	10"	COLUMN DD-63	CHR	1
Grand total: 37					

STEAM AND CONDENSATE VALVE SCHEDULE

SYMBOL	TYPE	SIZE	LOCATION	SYSTEM	COUNT
Phase 1					
(F) 1-VHPS-01	GATE	3"	COLUMN E-6	HPS	1
(F) 1-VHPR-01	GATE	8"	COLUMN E-6	PC	1
(F) 1-VHPR-02	GATE	4"	COLUMN N-4	PC	1
(F) 1-VHPS-02	GATE	2"	COLUMN N-4	HPS	1
(F) 1-VHPS-03	GATE	4"	COLUMN E-6	HPS	1
(F) 1-VHPR-03	GATE	2"	COLUMN E-6	PC	1
(N) 1-VHPR-05	GATE	1"	B22 EQUIPMENT RM	HPR	1
(N) 1-VHPS-05	GATE	2-1/2"	B22 EQUIPMENT RM	HPS	1
Grand total: 8					

WATER COOLED CHILLER SCHEDULE

SYMBOL NO.	MANUFACTURER	MODEL NO.	NOMINAL CAPACITY (TONS)	LOCATION	COMPRESSOR TYPE	REFRIGERANT TYPE	REFRIGERANT CHARGE (LBS)	EVAPORATOR						
								DESIGN FLOW (GPM)	MIN FLOW GPM	EWT (DEG. F)	LWT (DEG. F)	PRESSURE DROP (FT. HD.)	FOULING FACTOR	NO. OF PASSES
(E) CH-3*	YORK	YMC2	600	BLDG 22A	MAGNETIC BEARING	R-134A	1400	1440	700	54	44	21.8	0.00010	2
(N) CH-4	YORK	YMC2	300	BLDG 22A	MAGNETIC BEARING	R-134A	630	720	520	54	44	8.74	0.00010	2

* CH-3, OWNER FURNISHED CHILLER INSTALLED BY OTHERS

WATER COOLED CHILLER SCHEDULE.

SYMBOL NO.	CONDENSER						ELECTRICAL							PHYSICAL DATA			
	FLOW (GPM)	EWT (DEG.F)	LWT (DEG. F)	PRESSURE DROP (FT. HD.)	FOULING FACTOR	NO. OF PASSES	VOLT	PHASE	HZ	FLA	MCA	MOP	NPLV	LENGTH (IN.)	WIDTH (IN.)	HEIGHT (IN.)	OPERATING WEIGHT (LBS.)
(E) CH-3 *	1800	83	95	12.1	0.00025	2	460	3	60	460	577	1000	0.3047	193.25	79	101.3	22,105
(N) CH-4	1800	85	89.65	9.71	0.00025	1	460	3	60	213	267	450	0.3508	163	70	84	14,800

* CH-3, OWNER FURNISHED CHILLER INSTALLED BY OTHERS

CHILLER NOTE:
DISASSEMBLY FOR RIGGING: DEPENDING ON THE MANUFACTURER SELECTED IT MAY BE NECESSARY TO DISASSEMBLE THE CHILLER IN ORDER TO RIG IT INTO PLACE. IF DISASSEMBLY IS NECESSARY:

A. AT THE TIME THAT CHILLER IS ORDERED NOTIFY THE MANUFACTURER THAT THE CHILLER MUST BE DISASSEMBLED FOR RIGGING.
B. MANUFACTURER SHALL SUBMIT DETAILED, WRITTEN INSTRUCTIONS FOR DISASSEMBLY, RE-ASSEMBLY, TIGHTNESS TESTING, CHARGING, STARTUP AND FUNCTIONAL TESTING TO VERIFY PROPER SYSTEM OPERATION. THESE ACTIVITIES MAY BE PERFORMED BY MANUFACTURER, MANUFACTURER'S REPRESENTATIVE, CONTRACTOR OR BY A THIRD PARTY, BUT MUST BE UNDER THE SUPERVISION OF MANUFACTURER'S REPRESENTATIVE.
C. ONCE CHILLER IS INSTALLED AND PLACED IN SERVICE MANUFACTURER'S REPRESENTATIVE SHALL SUBMIT A STARTUP REPORT STATING THAT:
   1. THE CHILLER IS PROPERLY INSTALLED, TESTED AND PLACED IN SERVICE PER THE MANUFACTURER'S RECOMMENDATIONS.
   2. THE MANUFACTURER'S WARRANTY IS IN FULL EFFECT.
D. THE OWNER RESERVES THE RIGHT TO TEST THE CHILLER TO VERIFY THAT ITS CAPACITY AND ENERGY AS INSTALLED MATCH THE SPECIFIED CONDITIONS OF SERVICE.

EXISTING SCHEDULE FOR REFERENCE ONLY.

COOLING TOWER SCHEDULE

MARK	LOCATION	SERVICE	TOWER TYPE	TOTAL NOMINAL CAPACITY		# CELLS	FLOW RATE EACH CELL		WPD		TEMPERATURE						FAN MOTOR						SUMP HEATER			MAX OPERATING WEIGHT/CELL		MAX HEIGHT W/HANDRAIL		REMARKS
											AMBIENT Wb		EWT		LWT		NO	POWER		PHASE	VOLT	RPM	SPEED CONTROL	TYPE	CAPACITY					
				TONS	[kW]		GPM	[L/s]	FT	[kPa]	°F	[°C]	°F	[°C]	°F	[°C]		HP/CELL	[kW]						BTUH	[W]	LB	[kg]	FT	[M]	
(E) CT-1	ROOF	CONDENSER WATER	COUNTER FLOW	600/CELL 1200 TOTAL	[170]	2	1800	[110]	5.36	[16]	74.7	[24]	95	[35]	85	[29]	2	30	[22]	3	460	1200	VARIABLE	ELECTRIC IMMERSION	82000	[24000]	20750	[38000]	20.8	[6]	ULTRA QUIET FAN SPLASH ATTENUATOR
(E) CT-2	ROOF	CONDENSER WATER	COUNTER FLOW	600/CELL 1200 TOTAL	[170]	2	1800	[110]	5.36	[16]	74.7	[24]	95	[35]	85	[29]	2	30	[22]	3	460	1200	VARIABLE	ELECTRIC IMMERSION	82000	[24000]	20750	[38000]	20.8	[6]	ULTRA QUIET FAN SPLASH ATTENUATOR

NOTES

1 SELECTION BASED ON MARLEY #MD5018SKF2L

2 PROVIDE SUMP OVERFLOW ALARM AND WIRE TO BMS

EXISTING SCHEDULE FOR REFERENCE ONLY.

WATER COOLED CHILLER SCHEDULE

MARK	LOCATION	AREA AND/OR BLDG SERVED	TYPE	CAPACITY		MAX kW/TON	MIN COP	MAX IPLV (kW/TON)	EVAPORATOR							CONDENSER							ELECTRICAL				REMARKS
									FLOW		EWT		LWT		MAX WPD		FOULING FACTOR	FLOW		EWT		LWT		MAX WPD		FOULING FACTOR	POWER MCA	PHASE	VOLT	SPEED CONTROL	
				TONS	[kW]				GPM	[L/s]	°F	[°C]	°F	[°C]	FT	[kPa]		GPM	[L/s]	°F	[°C]	°F	[°C]	FT	[kPa]						
(E) CH-1	BLDG 22A	ALL BLDGS	CENTRIFUGAL	600	[170]	0.475	-	0.305	1440	[91]	54	[12]	44	[7]	12	[36]	0.00010	1800	[110]	85	[29]	95	[35]	22	[66]	0.00025	575	3	460	VARIABLE	SINGLE POINT POWER CONNECTION
(E) CH-2	BLDG 22A	ALL BLDGS	CENTRIFUGAL	600	[170]	0.475	-	0.305	1440	[91]	54	[12]	44	[7]	12	[36]	0.00010	1800	[110]	85	[29]	95	[35]	22	[66]	0.00025	575	3	460	VARIABLE	SINGLE POINT POWER CONNECTION

NOTES

1. "MAX kW/TON" AND "MIN COP" SPECIFIED ARE AT DESIGN CONDITION INDICATED.

2. SELECTION BASED ON YORK YMC2-S2110AB

EXISTING SCHEDULE FOR REFERENCE ONLY.

MARK	LOCATION	AREA AND/OR BLDG SERVED	SYSTEM AND/OR SERVICE	TYPE	CIRCULATING FLUID								MIN % EFF	ELECTRICAL MOTOR					REMARKS
					FLUID	FLOW		HEAD		NPSH AVAILABLE		TEMPERATURE		SP GR		NOMINAL POWER		PHASE	VOLT	MAX RPM	SPEED CONTROL	
						GPM	[L/s]	FT	[kPa]	FT	[kPa]	°F	[°C]			HP	[kW]					
(E)CHWP1	CHILLER PLANT	ALL BLDGS	SECONDARY CHILLED WATER	DOUBLE SUCTION SPLIT CASE	CHILLED WATER	2160	[140]	100	[1600]	50	[800]	45	[7]	1	76%	100	[75]	3	460	1800	ABB ACH550-01	BELL&GOSSETT #VSX
(E)CHWP2	CHILLER PLANT	ALL BLDGS	SECONDARY CHILLED WATER	DOUBLE SUCTION SPLIT CASE	CHILLED WATER	2160	[140]	100	[1600]	50	N/A	45	[7]	1	76%	100	[75]	3	460	1800	ABB ACH550-01	BELL&GOSSETT #VSX
(E)CHWP3	CHILLER PLANT	ALL BLDGS	SECONDARY CHILLED WATER	DOUBLE SUCTION SPLIT CASE	CHILLED WATER	2160	[140]	100	[1600]	50	N/A	45	[7]	1	76%	100	[75]	3	460	1800	ABB ACH550-01	BELL&GOSSETT #VSX
(E) CHP-1	CHILLER PLANT	ALL BLDGS	PRIMARY CHILLED WATER	DOUBLE SUCTION SPLIT CASE	CHILLED WATER	1440	[91]	30	[480]	20	N/A	45	[7]	1	76%	15	[11]	3	460	1180	NONE	BELL&GOSSETT #VSX
(E) CHP-2	CHILLER PLANT	ALL BLDGS	PRIMARY CHILLED WATER	DOUBLE SUCTION SPLIT CASE	CHILLED WATER	1440	[91]	30	[480]	20	N/A	45	[7]	1	76%	15	[11]	3	460	1180	NONE	BELL&GOSSETT #VSX
(E) CHP-3	CHILLER PLANT	ALL BLDGS	PRIMARY CHILLED WATER	DOUBLE SUCTION SPLIT CASE	CHILLED WATER	1440	[91]	30	[480]	20	N/A	45	[7]	1	76%	15	[11]	3	460	1180	NONE	BELL&GOSSETT #VSX
(E) CHP-4	CHILLER PLANT	ALL BLDGS	PRIMARY CHILLED WATER	DOUBLE SUCTION SPLIT CASE	CHILLED WATER	1440	[91]	30	[480]	20	-	45	[7]	-	76%	15	[11]	3	460	1150	NONE	BELL&GOSSETT #VSX
(E) CWP-1	CHILLER PLANT	ALL BLDGS	CONDENSER WATER	DOUBLE SUCTION SPLIT CASE	CONDENSER WATER	1800	[110]	55	[880]	50	N/A	85	[29]	1	73%	40	[30]	3	460	1800	NONE	BELL&GOSSETT #VSX
(E) CWP-2	CHILLER PLANT	ALL BLDGS	CONDENSER WATER	DOUBLE SUCTION SPLIT CASE	CONDENSER WATER	1800	[110]	55	[880]	50	N/A	85	[29]	1	73%	40	[30]	3	460	1800	NONE	BELL&GOSSETT #VSX
(E) CWP-3	CHILLER PLANT	ALL BLDGS	CONDENSER WATER	DOUBLE SUCTION SPLIT CASE	CONDENSER WATER	1800	[110]	55	[880]	50	N/A	85	[29]	1	73%	40	[30]	3	460	1800	NONE	BELL&GOSSETT #VSX
(E) CWP-4	CHILLER PLANT	ALL BLDGS	CONDENSER WATER	DOUBLE SUCTION SPLIT CASE	CONDENSER WATER	1680	[110]	55	[880]	50	N/A	85	[29]	1	70%	40	[30]	3	460	1800	NONE	BELL&GOSSETT #VSX

VARIABLE FREQUENCY DRIVE SCHEDULE

SYMBOL	MANUFACTURER	LOCATION	MIN. VFD HP CAPACITY	ELECTRICAL			COMMENTS
				VOLT	PHASE	HZ	
(N) VFD-CWP-1	ABB, Inc.	CHILLER PLANT B22A	40	460	3	60	PROVIDE COMBINATION DRIVE WITH INTEGRAL DISCONNECT
(N) VFD-CWP-2	ABB, Inc.	CHILLER PLANT B22A	40	460	3	60	PROVIDE COMBINATION DRIVE WITH INTEGRAL DISCONNECT
(N) VFD-CWP-3	ABB, Inc.	CHILLER PLANT B22A	40	460	3	60	PROVIDE COMBINATION DRIVE WITH INTEGRAL DISCONNECT
(N) VFD-CWP-4	ABB, Inc.	CHILLER PLANT B22A	40	460	3	60	PROVIDE COMBINATION DRIVE WITH INTEGRAL DISCONNECT

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PROJECT TEAM

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A MULTI-DISCIPLINE AE COMPANY

BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: MECHANICAL SCHEDULES

Approved : Project Director

Project Title: **PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS**

Location: **2615 E CLINTON AVE, FRESNO, CA 93703**

Date: **10/10/2024** | Checked by: **R. REIF** | Drawn: **R. SCHAMP**

Project Number: **570-16-302**

Building Number

Drawing number: **M-701**

Office of Construction and Facilities Management

Department of Veterans Affairs

Autodesk Docs://570-16-302 VA Fresno Chiller Plant/P2 10\20616\VA Fresno Chiller Plant MPE_ADD_SERVICE.rvt
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INSTRUMENTATION SOCIETY OF AMERICA TABLE

	FIRST LETTER		SUCCEEDING LETTERS (3)		
	MEASURING OR VARIABLE INITIATING	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER FLAME		USER CHOICE	USER CHOICE	USER CHOICE
C	CONDUCTIVITY		CONTROL (13)		
D	DENSITY	DIFFERENTIAL			
E	VOLTAGE		SENSOR PRIMARY ELEMENT		
F	FLOW RATE	RATIO FRACTION			
G	GAUGE		GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	MOTION	MOMENTARY			MIDDLE INTERMEDIATE
N	HUMIDITY		USER DEFINED	USER DEFINED	USER DEFINED
O	USER CHOICE		ORIFICE RESTRICTION		
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	TOTALIZE INTEGRATE,			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	VARIABLE		MULTI-FUNCTION	MULTI-FUNCTION	MULTI-FUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED	X-AXIS	UNCLASSIFIED		
Y	EVENT, STATE OR PRESENCE	Y-AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION DIMENSION	Z-AXIS		DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

INSTRUMENTATION TYPE ABBREVIATION LIST

CODE	DESCRIPTION
AA	ANALYTICAL ALARM
AE	ANALYTICAL ELEMENT
AET	ANALYTICAL ELEMENT TRANSMITTER
AI	ANALYTICAL INDICATOR
AC	ANALYTICAL CONTROLLER
AIC	ANALYTICAL INDICATING CONTROLLER
AT	ANALYTICAL TRANSMITTER
AIT	ANALYTICAL INDICATING CONTROLLER
ACV	ANALYTICAL CONTROL VALVE
AY	ANALYTICAL SIGNAL CONVERTER
EI	VOLTAGE INDICATOR
EA	VOLTAGE ALARM
ES	VOLTAGE SWITCH (CONTROL RELAY)
ESL	VOLTAGE SWITCH LOW (24 VAC OR LESS)
ET	VOLTAGE TRANSMITTER
EY	VOLTAGE SIGNAL CONVERTER
FA	FLOW ALARM
FCV	FLOW CONTROL VALVE
FE	FLOW ELEMENT
FET	FLOW ELEMENT\TRANSMITTER
FI	FLOW INDICATOR
FIT	FLOW INDICATING TRANSMITTER
FS	FLOW SWITCH
FT	FLOW TRANSMITTER
FY	FLOW SIGNAL CONVERTER
HK	MANUAL VARIABLE CONTROL
HS	HAND SWITCH
HSI	HAND SWITCH INDICATOR
II	CURRENT INDICATOR
IA	CURRENT ALARM
IS	CURRENT SWITCH
IT	CURRENT TRANSMITTER
IY	CURRENT SIGNAL CONVERTER
JIT	POWER INDICATING TRANSMITTER
JY	POWER SIGNAL CONVERTER
KC	TIME CLOCK

CODE	DESCRIPTION
LA	LEVEL ALARM
LC	LEVEL CONTROLLER (STAND ALONE)
LCV	LEVEL CONTROL VALVE
LE	LEVEL ELEMENT
LIC	LEVEL INDICATING CONTROLLER
LIT	LEVEL INDICATING TRANSMITTER
LS	LEVEL SWITCH
LT	LEVEL TRANSMITTER
LY	LEVEL SIGNAL CONVERTER
MV	MANUAL HAND VALVE
NT	HUMIDITY TRANSMITTER
PA	PRESSURE ALARM
PCV	PRESSURE CONTROL VALVE
PDI	PRESSURE DIFFERENTIAL INDICATOR
PDS	PRESSURE DIFFERENTIAL SWITCH
PDT	PRESSURE DIFFERENTIAL TRANSMITTER
PI	PRESSURE INDICATOR
PIS	PRESSURE INDICATING SWITCH
PIT	PRESSURE INDICATING TRANSMITTER
PS	PRESSURE SWITCH
PT	PRESSURE TRANSMITTER
PY	PRESSURE SIGNAL CONVERTER
SC	SPEED CONTROL
SCM	SPEED CONTROL MANUAL
TA	TEMPERATURE ALARM
TC	TEMPERATURE CONTROLLER
TCV	TEMPERATURE CONTROL VALVE
TE	TEMPERATURE ELEMENT
TET	TEMPERATURE ELEMENT TRANSMITTER
TI	TEMPERATURE INDICATOR
TIT	TEMPERATURE INDICATING TRANSMITTER
TIC	TEMPERATURE INDICATING CONTROLLER
TS	TEMPERATURE SWITCH
TSL	FREEZE STAT
TT	TEMPERATURE TRANSMITTER

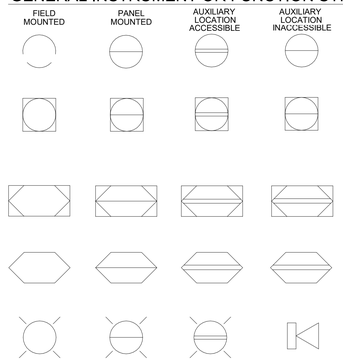
CODE	DESCRIPTION
VA	VIBRATION ALARM
VS	VIBRATION SWITCH
XV	SOLENOID VALVE
YA	EQUIPMENT ALARM
YI	EQUIPMENT STATUS
YCD	SMOKE DAMPER
YS	SMOKE DETECTOR
ZC	POSITION CONTROL
ZI	POSITION INDICATOR
ZS	POSITION SWITCH
VA	VIBRATION ALARM
VS	VIBRATION SWITCH

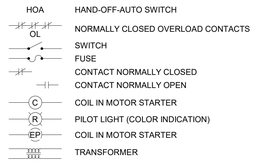
FMS SYSTEM OPERATING CONSTRAINTS

THE FMS CONTROL SYSTEM SHALL OPERATE WITHIN THE FOLLOWING SYSTEM CONSTRAINTS FOR CONTROL:

SUPPLY AIR DRYBULB TEMPERATURE	+/- 0.5°F OF SETPOINT WITH HUNTING OF < 5% OF THE CONTROL SIGNAL
MIXED AIR DRYBULB TEMPERATURE	+/- 0.5°F OF SETPOINT WITH HUNTING OF < 5% OF THE CONTROL SIGNAL
WATER TEMPERATURE	+/- 0.5°F OF SETPOINT WITH HUNTING OF < 5% OF THE CONTROL SIGNAL
DUCT STATIC PRESSURE	+/- 0.1" W.C. OF SETPOINT WITH HUNTING OF < 5% OF THE CONTROL SIGNAL
SUPPLY/ RETURN AIR VOLUME	+/- 2.5% OF SETPOINT WITH HUNTING OF < 5% OF THE CONTROL SIGNAL
OUTSIDE AIR/ RELIEF AIR VOLUME	+/- 2.5% OF SETPOINT WITH HUNTING OF < 5% OF THE CONTROL SIGNAL
BUILDING PRESSURE	+/- 0.01" W.C. OF SETPOINT WITH HUNTING OF < 5% OF THE CONTROL SIGNAL
ROOM TEMPERATURE	+/- 1.0°F OF SETPOINT WITH HUNTING OF < 5% OF THE CONTROL SIGNAL
ROOM AIR VOLUME	+/- 2.5% OF SETPOINT WITH HUNTING OF < 5% OF THE CONTROL SIGNAL
HUMIDITY LEVEL	+/- 2.5% R.H. OF SETPOINT WITH HUNTING OF < 5% OF THE CONTROL SIGNAL
WATER TEMPERATURE	+/- 1.0°F OF SETPOINT WITH HUNTING OF < 5% OF THE CONTROL SIGNAL
WATER DIFFERENTIAL PRESSURE	+/- 1.0 PSI OF SETPOINT WITH HUNTING OF < 5% OF THE CONTROL SIGNAL

GENERAL INSTRUMENT OR FUNCTION SYMBOLS





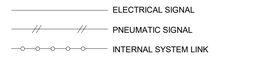
ABBREVIATIONS

IA	INSTRUMENTATION AIR
DDC	DIRECT DIGITAL CONTROL
C	COMMON VALVE PORT
F.O	FAIL OPEN
F.C	FAIL CLOSED
SR	SPRING RANGE
TR	THROTTLING RANGE
PH	PREHEAT
HR	HEAT RECOVERY
CPA	CONTROL POINT ADJUSTMENT
SPDT	SINGLE POLE DOUBLE THROW
DPDT	DOUBLE THROW DOUBLE POLE
DA	DIRECT ACTING
RA	REVERSE ACTING

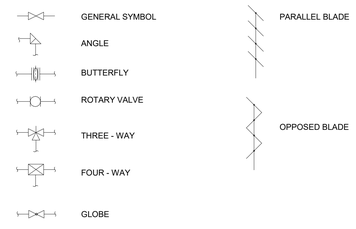
PROCESS CODES

TW	COOLING TOWER OR CONDENSER WATER
CHW	CHILLED WATER
SCHW	SECONDARY CHILLED WATER
HW	HOT WATER
SHW	SECONDARY HOT WATER
STM	STEAM

LINE LEGEND



CONTROL VALVE BODY/ DAMPER SYMBOLS



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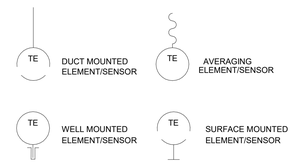
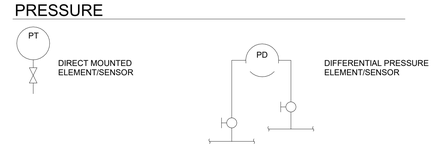
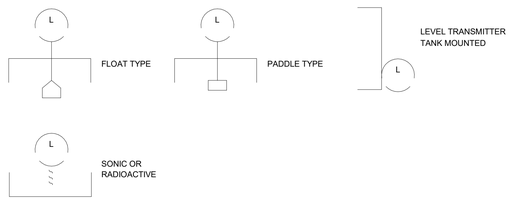


CURRENT

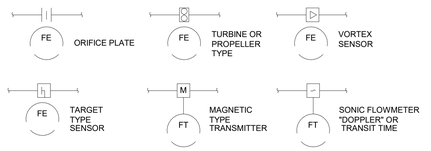
PRESSURE



LEVEL



FLOW



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RECORD DRAWINGS

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Project Number: **570-16-302**

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Drawing number: **M-801**

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Autodesk Docs://570-16-302 VA Fresno Chiller Plant/P2 10\20616\VA Fresno Chiller Plant MPE_ADD_SERVICE.rvt
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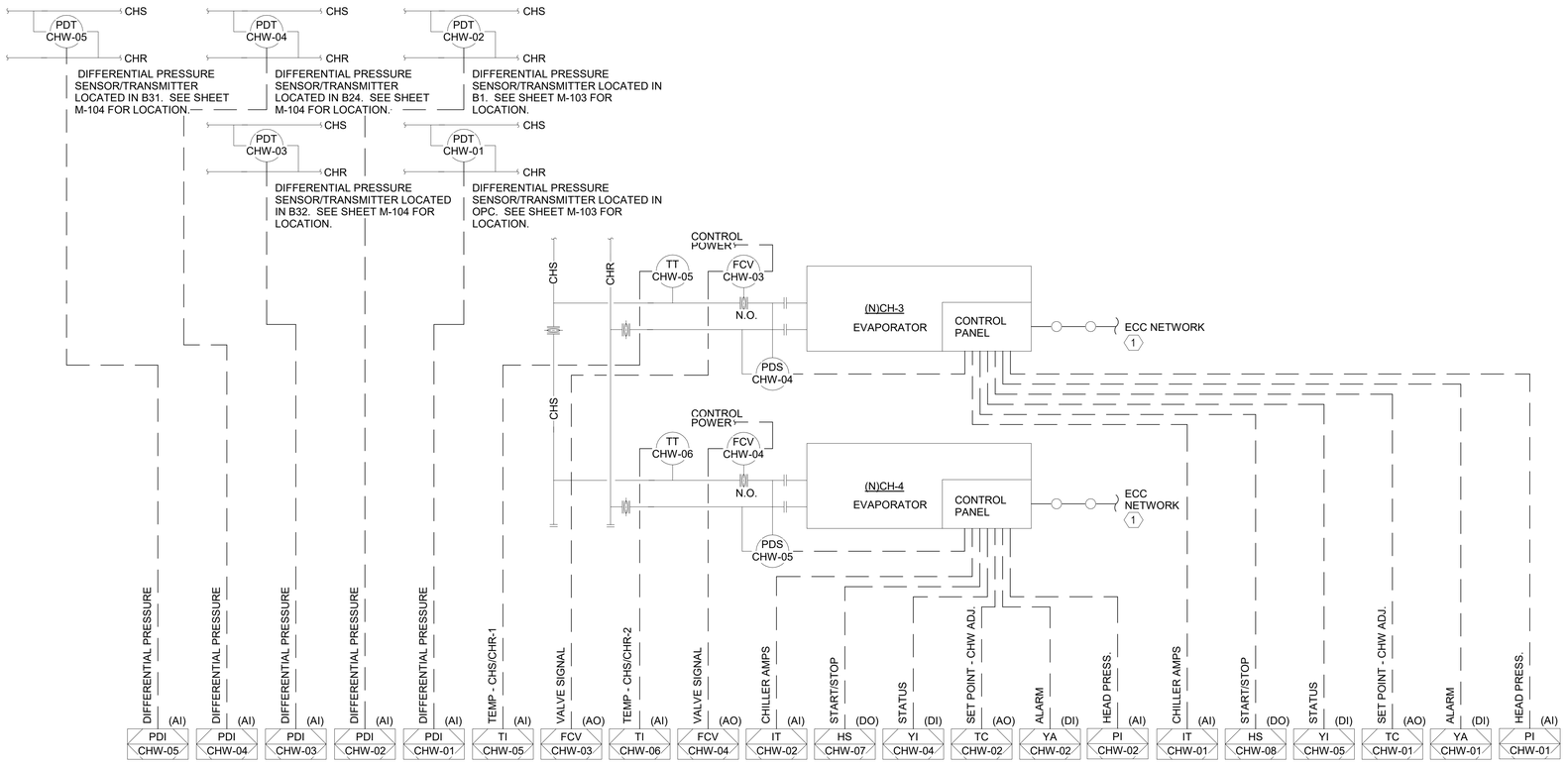
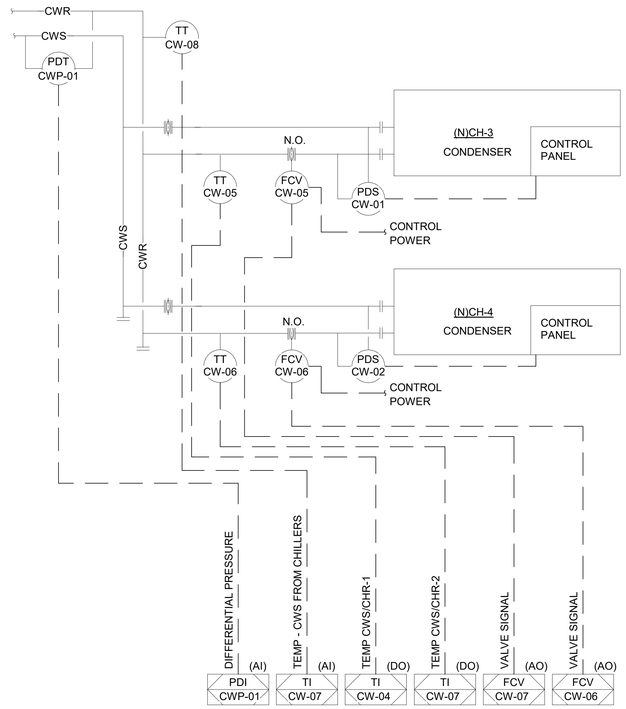


CHILLED WATER CONTROL DIAGRAM



CONDENSER WATER CONTROL DIAGRAM

GENERAL SHEET NOTES

A. ALL CONTROLS EQUIPMENT SHOWN ON DRAWING SHALL BE FURNISHED AND INSTALLED BY CONTROLS CONTRACTOR.

B. THE CONTROLS CONTRACTOR SHALL HAVE FULL ACCESS TO MANUFACTURER'S CONTROL PANEL TO SET UP ACTUATORS POSITIONS, ADJUST FREQUENCY, RESET WATER TEMPERATURE SETPOINTS, ETC. OR PROVIDE ALL CONNECTION POINTS AS SHOWN ON CONTROL DRAWINGS.

C. REFER TO MECHANICAL PLANS AND DETAILS FOR EXACT VALVE CONFIGURATIONS AND PIPING.

D. GENERAL CONTRACTOR SHALL EMPLOY A CONTROLS ENGINEER TO ENSURE COMPLIANCE WITH COMMISSIONING AGENT REQUIREMENTS IS EFFICIENT AND COMPLETE

KEYNOTE

(1) IN ADDITION TO THE HARDWIRED POINTS SHWON, THE CHILLERS SHALL BE CONNECTED TO THE ECC THROUGH A BACNET NETWORK CONNECTION. THE FOLLOWING POINTS SHALL BE MONITORED OR CONTROLLED BY THE FMS:

A. LEAVING CHILLED WATER TEMPERATURE
B. ENTERING CHILLED WATER TEMPERATURE
C. LEAVING CONDENSER WATER TEMPERATURE
D. ENTERING CHILLED WATER TEMPERATURE
E. PERCENT RLA
F. EVAPORATOR REFRIGERANT PRESSURE
G. CONDENSER REFRIGERANT PRESSURE
H. COMPRESSOR DISCHARGE REFRIGERANT TEMPERATURE
I. EVAPORATOR REFRIGERANT TEMPERATURE
J. CONDENSER REFRIGERANT TEMPERATURE
K. OIL TEMPERATURE
L. OIL PRESSURE DIFFERENTIAL
M. CHILLED WATER FLOW RATE
N. CONDENSER FLOW RATE
O. COMPRESSOR POWER
P. PERCENT LOAD
Q. DEMAND LIMIT SETPOINT
R. CHILLER ENABLE/DISABLE
S. CHILLER STATUS
T. MANUAL RESET ALARMS
U. AUTO RESET ALARMS
V. COMMUNICATIONS STATE

CH-3 AND CH-4 SEQUENCE OF OPERATION

CHILLED WATER PLANT IS DESIGNED FOR N+1 REDUNDANCY. THE NEW CHILLERS CH-3 AND CH-4 SHALL OPERATE AS THE PRIMARY CHILLERS. THE OPERATOR SHALL SELECT THE LEAD/LAG ORDER CHILLERS IN THE SEQUENCE. (E) CH-1 AND (E) CH-2 IN BUILDING 22, ASSOCIATED PRIMARY, SECONDARY, AND CONDENSER WATER PUMPS, AND COOLING TOWER PUMPS ALL REMAIN. THEY PROVIDE PEAK DEMAND AND BACKUP CAPACITY.

FAILURE OF A SINGLE COMPONENT WILL ONLY DISABLE THAT COMPONENT, NOT RELATED COMPONENTS.

THE PLANT IS CONTROLLED THROUGH THE ENGINEERING CONTROL CENTER (ECC).

MAJOR COMPONENTS
CHILLER WITH MOTORIZED BUTTERFLY VALVES TO SHUT OFF CHILLED WATER AND CONDENSER WATER TO CHILLER WHEN NOT IN OPERATION ((E) CH-1, (E) CH-2, CH-3, AND CH-4).

PRIMARY CHILLED WATER PUMPS TO CIRCULATE CHILLED WATER THROUGH CHILLERS ((E)CHP-1, (E)CHP-2, (E)CHP-3, AND (E)CHP-4).

SECONDARY CHILLED WATER PUMPS TO CIRCULATE CHILLED WATER THROUGHOUT CAMPUS ((E)CHWP-1, (E)CHWP-2, AND (E)CHWP-3).

COOLING TOWERS TO REJECT CHILLER HEAT TO THE ENVIRONMENT, WITH MOTORIZED BUTTERFLY VALVES TO SHUT OFF CONDENSER WATER FLOW TO TOWER WHEN NOT IN OPERATION.

CONDENSER WATER PUMPS TO CIRCULATE CONDENSER WATER FROM THE CHILLER TO THE COOLING TOWER ((E)CWP-1, (E)CWP-2, (E)CWP-3, AND (E)CWP-4).

CHILLER STAGING SEQUENCE
ON SIGNAL FROM THE ECC, THE FIRST SECONDARY CHILLED WATER PUMP IS ENABLED. VARIABLE FREQUENCY DRIVE BRINGS PUMP UP TO SPEED THROUGH INTERNAL RAMP-UP RATE (180 SECONDS, ADJUSTABLE). PUMP IS SET TO MAINTAIN A DIFFERENTIAL SETPOINT BETWEEN SUPPLY AND RETURN HEADERS (REFER TO CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE SETPOINT SEQUENCE). IF FIRST PUMP IS UNABLE TO MAINTAIN PRESSURE DIFFERENTIAL, A SECOND PUMP IS STARTED AND RAMPED UP TO SAME SPEED AS OPERATING PUMP. ONCE EQUAL SPEED IS ACHIEVED, BOTH PUMPS SLOW DOWN TOGETHER TO MAINTAIN PRESSURE. WHEN PUMPS SLOW TO 60% SPEED, LEAD PUMP CYCLES OFF AND LAG PUMP BECOMES LEAD PUMP. ON NEXT PUMP CYCLE, SPARE PUMP BECOMES LAG PUMP. ON FAILURE OF A PUMP AS REPORTED BY VFD, PUMP IS LOCKED OUT AND TAKEN OUT OF THE ROTATION. ALARM IS REPORTED BY ECC.

FLOW METER ON CHILLED WATER MAIN HEADER PROVIDES DATA TO THE ECC TO DETERMINE THE TOTAL CHILLED WATER BEING SUPPLIED TO THE CAMPUS. PROVIDE TEMPERATURE SENSORS ON MAIN SUPPLY AND MAIN RETURN HEADERS. ECC CALCULATES THE TONNAGE BEING USED BY THE CAMPUS AND DETERMINES WHEN TO ADD OR REMOVE CHILLERS.

ON RISE IN CHILLED WATER SUPPLY HEADER ABOVE 45°F (ADJUSTABLE), ECC COMMANDS MOTORIZED BUTTERFLY VALVES ON FIRST CHILLER (CH-3 OR CH-4) CHILLED WATER CIRCUIT AND CONDENSER WATER CIRCUIT TO OPEN. THE VALVE TIMING SHALL BE ADJUSTABLE THROUGH THE ECC SO THAT THE VALVES OPEN SLOW ENOUGH TO PREVENT TRIPS ON LOW FLOW FOR THE OPERATING CHILLERS. AFTER PROOF OF FLOW IS RECEIVED, ECC COMMANDS ON FIRST PRIMARY CHILLED WATER PUMP AND FIRST CONDENSER WATER PUMP. FIRST COOLING TOWER ISOLATION BUTTERFLY VALVE IS OPENED. COOLING TOWER BYPASS VALVE OPERATES AS REQUIRED TO PROVIDE CONDENSER WATER RETURN TEMPERATURE OF 75°F (ADJUSTABLE) TO CHILLER. AFTER 30 SECONDS (ADJUSTABLE) CHILLER IS ENABLED. IF CHILLER SENSES PROPER CHILLED WATER AND CONDENSER WATER FLOW, CHILLER OPERATES THROUGH ITS INTERNALLY SUPERVISED SEQUENCE TO CONTROL DISCHARGE WATER TEMPERATURE TO 45 °F. VFD INTERNAL TO CHILLER ADJUSTS CHILLER SPEED TO ADJUSTS CHILLER SPEED TO ADJUST CHILLER CAPACITY. COOLING TOWER BYPASS VALVE CLOSES WHEN RETURN WATER REACHES 75°F (ADJUSTABLE). COOLING TOWER INTERNAL CONTROLS AND VFD ADJUST FAN SPEED TO MAINTAIN BASIN TEMPERATURE OF 85°F (ADJUSTABLE). IF COOLING TOWER IS OFF AND BASIN TEMPERATURE DROPS BELOW 35°F (ADJUSTABLE), ELECTRIC IMMERSION HEATER IS ENERGIZED.

ECC MONITORS CHILLER OUTPUT AND IF TONNAGE OF THE CHILLER IS AT 80% FOR 20 MINUTES AND DOES NOT SATISFY CAMPUS LOAD, SECOND CHILLED WATER PRIMARY PUMP IS STARTED AND AFTER PROOF OF OPERATION BY CURRENT SENSOR, SECOND CHILLER (CH-3 OR CH-4) CHILLED WATER ISOLATION BUTTERFLY VALVES ARE OPENED. SECOND CONDENSER WATER PUMP IS STARTED, AND AFTER PROOF OF OPERATION BY CURRENT SENSOR, SECOND CHILLER CONDENSER WATER ISOLATION BUTTERFLY VALVES ARE OPENED. SECOND COOLING TOWER ISOLATION BUTTERFLY VALVE IS ALSO OPENED. AFTER PROOF OF VALVES OPENING, CHILLER IS ENABLED. IF CHILLER SENSES PROPER CHILLED WATER AND CONDENSER WATER FLOW, CHILLER OPERATES THROUGH ITS INTERNALLY SUPERVISED SEQUENCE TO CONTROL DISCHARGE WATER TEMPERATURE TO 45°F. ON FAILLURE OF ANY COMPONENT TO OPERATE PROPERLY ON START UP, THE COMPONENT SHALL BE DISABLED AND NEXT AVAILABLE COMPONENT (PUMP, CHILLER, OR TOWER) IS BROUGHT INTO SERVICE TO ALLOW START SEQUENCE TO PROCEED. FAILED COMPONENTS ARE LOCKED-OUT AND ECC GENERATES ALARM. ON INCREASE IN LOAD BEYOND CHILLER 3 AND CHILLER 4 CAPACITY AT 80%, THIRD CHILLER GROUP (CH-1 OR CH-2) IS BROUGHT ON PER SEQUENCE.

ON DROP IN LOAD BELOW 40% OF THE 3 CHILLERS, THE THIRD CHILLER (CH-1 OR CH-2) IS COMMANDED OFF. AFTER SHUTDOWN SEQUENCE BY CHILLER IS COMPLETE, THE ASSOCIATED CHILLED WATER AND CONDENSER WATER MOTORIZED VALVES CLOSE, TOWER MOTORIZED VALVE SHUTS, AND ASSOCIATED CHILLED WATER AND CONDENSER WATER PUMPS SHUT OFF AFTER PROOF OF VALVE CLOSURE. FAILURE OF ANY COMPONENT TO PROPERLY CLOSE OR SHUT OFF ALARMS AT ECC. ON DROP IN LOAD BELOW 30% OF THE TWO CHILLER CAPACITY, SECOND CHILLER (CH-3 OR CH-4) IS COMMANDED OFF PER THE SEQUENCE ABOVE.

ROTATE ALL COMPONENTS TO BE BROUGHT ONLINE AS LOADS INCREASE.

REFRIGERANT ALARM:
REFRIGERANT ALARM SYSTEM MONITORS CHILLER ROOM. ON DETECTION OF REFRIGERANT IN THE ROOM, ECC IS NOTIFIED. ON RISE IN CONCENTRATION ABOVE 25,000 PPM, ALARM AT BUILDING IS TRIGGERED, EMERGENCY PURGE FAN IS STARTED, AND MOTORIZED OUTDOOR AIR LOUVERS ARE OPENED. CHILLERS ARE COMMANDED OFF THROUGH THE ECC, AND AFTER CHILLERS ARE SHUT DOWN THROUGH THEIR INTERNAL SEQUENCE, ALL CONDENSER AND CHILLED WATER PUMPS SHUT DOWN, AND MOTORIZED VALVES CLOSE.

CONDENSER WATER PUMP SPEED CONTROL
THE ECC SHALL MODULATE THE SPEED OF THE OPERATING PUMPS TOGETHER TO MAINTAIN THE CONDENSER WATER HEADER DIFFERENTIAL PRESSURE AT SETPOINT ANYTIME ANY OF THE PUMPS ARE OPERATING. THE DIFFERENTIAL PRESSURE SETPOINT SHALL BE ESTABLISHED BY THE TEST AND BALANCE CONTRACTOR TO MEET THE REQUIRED CONDENSER WATER FLOWRATE FOR EACH CHILLER.

PRIMARY CHILLED WATER PUMP
WHEN CH-4 IS STARTED THE ONLY PUMP THAT SHALL BE OPERATED WITH IT IS CHP-4. WHEN RUNNING WITH CH-4, PRIMARY CHILLED WATER PUMP CHP-4, THE ECC SHALL COMMAND THE CHP-4 TO RUN.

CHILLED WATER SYSTEM DIFFERENTIAL PRESSURE SETPOINT
THE ECC SHALL RESET THE SYSTEM DIFFERENTIAL PRESSURE SETPOINT FOR EACH OF THE FIVE DIFFERENTAIL PRESSURE SENSORS USING A TRIM AND RESPOND LOGIC WITHIN THE RANGE OF 5 PSIG TO 20 PSIG ONCE THE MAXIMUM CHILLED WATER TEMPERATURE SETPOINT IS REACHED. ONCE THE TEMPERATURE SETPOINT IS REACHED, THE DIFFERENTIAL PRESSURE SETPOINT FOR EACH OF THE FIVE ZONES SHALL BE RESET BASED ON THE VALVE POSITIONS IN EACH ZONE. EACH DIFFERENTAIL PRESSURE SETPOINT SHALL BE TRIMMED BY 0.1 PSIG EVERY TWO MINUTES UNTIL A VALVE IN EACH DIFFERENTIAL PRESSURE ZONE IS 50% OPEN. WHEN A VALVE IN THE ZONE RISES TO 80% OPEN, THE DIFFERENTIAL PRESSURE SETPOINT SHALL BE INCREASED BY 0.1 PSIG EVERY TWO MINUTES. ALL SETPOINTS SHALL BE ADJUSTABLE THROUGH THE OPERATOR WORKSTATION FOR EACH DIFFERENTIAL PRESSURE SENSOR. THE PUMPS SHALL BE CONTROLLED TO THE DIFFERENTIAL PRESSURE SENSOR WHICH IS FURTHEST BELOW SETPOINT.

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A MULTI-DISCIPLINE AE COMPANY

BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: MECHANICAL CONTROLS

Approved : Project Director

Project Title: **PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS**

Location: **2615 E CLINTON AVE, FRESNO, CA 93703**

Date: **10/10/2024** | Checked by: **R. REIF** | Drawn: **R. SCHAMP**

Project Number: **570-16-302**

Building Number:

Drawing number: **M-802**

Office of Construction and Facilities Management
Department of Veterans Affairs

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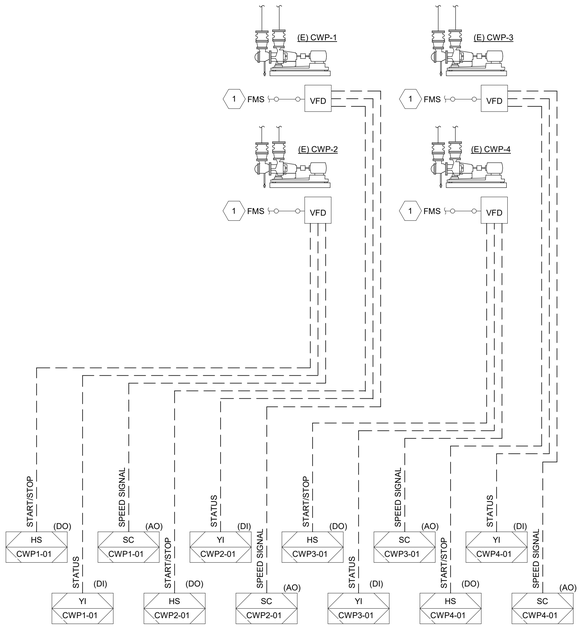

VARIABLE FREQUENCY DRIVE CONTROL DIAGRAM

GENERAL SHEET NOTES

A. ALL CONTROLS EQUIPMENT SHOWN ON DRAWING SHALL BE FURNISHED AND INSTALLED BY CONTROLS CONTRACTOR.

B. THE CONTROLS CONTRACTOR SHALL HAVE FULL ACCESS TO MANUFACTURER'S CONTROL PANEL TO SET UP ACTUATORS POSITIONS, ADJUST FREQUENCY, RESET WATER TEMPERATURE SETPOINTS, ETC. OR PROVIDE ALL CONNECTION POINTS AS SHOWN ON CONTROL DRAWINGS.

C. REFER TO MECHANICAL PLANS AND DETAILS FOR EXACT VALVE CONFIGURATIONS AND PIPING.

SHEET KEYNOTES

1. VFD'S SHALL BE CONNECTED TO THE FMS NETWORK THROUGH A DIRECT NETWORK CONNECTION AS WELL AS THROUGH THE HARDWIRED POINTS INDICATED. IT IS THE RESPONSIBILITY OF THE FMS CONTRACTOR TO COORDINATE AND ADAPT THE FMS NETWORK TO THE COMMUNICATIONS PROTOCOLS AVAILABLE FROM THE VFD MANUFACTURER. THE FOLLOWING POINTS SHALL BE INTEGRATED INTO THE FMS:
   - A. SPEED FEEDBACK
   - B. FREQUENCY OUTPUT
   - C. INPUT VOLTAGE/PHASE
   - D. CURRENT
   - E. TORQUE
   - F. POWER
   - G. UNDER VOLTAGE
   - H. OVER VOLTAGE
   - I. OUTPUT VOLTAGE
   - J. KWH COUNTER
   - K. DRIVE TEMPERATURE
   - L. FREQUENCY SETPOINTS (MIN & MAX)
   - M. MOTOR FLA
   - N. ROTATION DIRECTION
   - O. ALARMS
   - P. STATUSES

THESE AS BUILT OR RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED AND FURNISHED BY OTHERS. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THIS DOCUMENT AS A RESULT.

RECORD DRAWINGS

three inches = one foot
one and one-half inch = one foot
one inch = one foot
three-quarters inch = one foot
one-half inch = one foot
three-eighth inch = one foot
one-quarter inch = one foot
one-eighth inch = one foot

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NO	REVISIONS	DATE

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ELECTRICAL SYMBOL LEGEND (NOT ALL SYMBOLS APPLY TO THIS PROJECT)

UPDATED: 03/03/2014

ABBREVIATIONS

ABBREV.	DEFINITION
A	AMPS, AMPERE, AMPERAGE
AC	ABOVE COUNTER
A/C	ALTERNATING CURRENT
ADA	AMERICANS WITH DISABILITIES ACT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AIC	AVAILABLE INTERRUPTING CURRENT
AL	ALUMINUM
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
ATSC	AUTOMATIC TRANSFER SWITCH CONTROL
ATS	AUTOMATIC TRANSFER SWITCH
A/V	AUDIO/VISUAL
AWG	AMERICAN WIRE GAUGE
C	CONDUIT
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CKT	CIRCUIT
CL	CLOCK
CLF	CURRENT LIMITING FUSE
CO	CONDUIT ONLY
CU	COPPER
D	DIMMING
DC	DIRECT CURRENT
DL	DAY-LIGHTING
DIA	DIAMETER
E	EMERGENCY
EC	EMERGENCY, CRITICAL
EG	ENGINE GENERATOR
EL	EMERGENCY, LIFE SAFETY
EQ	EMERGENCY, EQUIPMENT
(F)	EXISTING
)	FUTURE
FA	FIRE ALARM
FAA	FIRE ALARM ANNUNCIATOR
FACP	FIRE ALARM CONTROL PANEL
FATC	FIRE ALARM TERMINAL CABINET
FC	FOOTCANDLES
FDR	FEEDER
FMS	FACILITY MANAGEMENT SYSTEM
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPTER
G OR GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFEP	GROUND FAULT EQUIPMENT PROTECTION
GFP	GROUND FAULT PROTECTION
GND	GROUND.
HOA	HAND-OFF-AUTOMATIC.
HP	HORSEPOWER
IEEE	INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS
IG	ISOLATED GROUND
KCMIL	THOUSAND CIRCULAR MILS
KV	KILOVOLT
KVA	KILOVOLT AMPS
KVAR	KILOVOLT AMPS REACTIVE
KW	KILOWATT
KWH	KILOWATT HOUR.
LSIG	LONG TIME, SHORT TIME, INSTANTANEOUS, AND GROUND FAULT PROTECTION
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MIN	MINIMUM
MH	MANHOLE
MM	MIXED MEDIA
MTS	MANUAL TRANSFER SWITCH
MVA	MEGAVOLT AMPS
(N)	NEW
N/A	NOT APPLICABLE
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NEUT	NEUTRAL
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NIC	NOT IN CONTRACT
NL	NORMAL
NM	NEW MEXICO
NO	NORMALLY OPEN
O/H	OVERHEAD
P	POLE
PA	PUBLIC ADDRESS
PC	PHOTOCELL
PH	PHASE
PMCS	POWER MONITORING AND CONTROL SYSTEM
R	REMOVED/REMOVAL
RC	ROOM CONTROLLER
RSC	RIGID STEEL CONDUIT
SEC	SECURITY
SPD	SURGE PROTECTIVE DEVICE
SW	SWITCH
TEMP	TEMPORARY
TTB	TELEPHONE TERMINAL BOARD
TV	TELEVISION
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSER
TYP.	TYPICAL
UC	UNDER COUNTER
U/G	UNDERGROUND
UGE	UNDERGROUND ELECTRIC
UL	UNDERWRITERS' LABORATORIES
UON	UNLESS OTHERWISE NOTED
UPS	UNINTERRUPTABLE POWER SUPPLY
V	VOLTS, VOLTAGE
VFD	VARIABLE FREQUENCY DRIVE
W	WALL MOUNTED
WG	WEATHERPROOF AND GFCI
WP	WEATHERPROOF
XFER	TRANSFER
XFMR (TRANSF)	TRANSFORMER

REFERENCE TAGS

SYMBOL	DEFINITION
⬡	KEYED NOTE REFERENCE
VAV-9	MECHANICAL EQUIPMENT REFERENCE
+44"	DENOTES MOUNTING HEIGHT AFF
▭	KITCHEN EQUIPMENT REFERENCE
⬭	MEDICAL EQUIPMENT REFERENCE

GENERAL DRAWING SYMBOLS

- A / E4 — SECTION/ELEVATION LETTER OR DETAIL NUMBER
- 6 / E4 — DRAWING NUMBER WHERE DETAILED
- 6 / E3 E4 — SECTION/ELEVATION LETTER OR DETAIL NUMBER
- A / E3 E4 — DRAWING NUMBER WHERE DETAILED
- DRAWING NUMBER WHERE TAKEN
- NORTH — NORTH ARROW OR MATCH ARCHITECT'S
- 0 10' 20' 40' 80' — SCALE BAR OR MATCH ARCHITECT'S
  1" = 40'-0"

EQUIPMENT NAMING CONVENTION

- 1, 2, 3, . . = SUBFED PANEL
- A, B, C, = SEQUENCE OF PANELS OF THIS TYPE
- 1, 2, 3, . . = FLOOR LEVEL (SB=SUB-BASEMENT, B=BASEMENT, M=MEZZANINE, P=PENTHOUSE)
- T = TRANSFORMER
  DB = DISTRIBUTION BOARD
  MSB= MAIN SWITCH BOARD
  MCC= MOTOR CONTROL CENTER
  I = ISOLATED PANELBOARD
  ATS = AUTOMATIC TRANSFER SWITCH
  PDU= POWER DISTRIBUTION UNIT
  UPS = UNINTERRUPTABLE POWER SUPPLY
  B = BUSWAY
- H = HIGH VOLTAGE PANELBOARD (480Y/277V)
  L = LOW VOLTAGE PANELBOARD (208Y/120V)
- BLANK FOR NORMAL POWER
  E = EMERGENCY
  EL = EMERGENCY-LIFE SAFETY-BRANCH
  EC = EMERGENCY-CRITICAL-BRANCH
  EQ = EMERGENCY-EQUIPMENT-BRANCH
- SES = SERVICE ENTRANCE SECTION NUMBER OR MAIN EMERG SWBD NUMBER

EXAMPLES:
A. SES1 (SERVICE ENTRANCE SECTION #1)
B. 1H1A (SERVED FROM SES#1, 480/277 NORMAL, LEVEL 1, FIRST BOARD)
C. 1EQH1A (SERVED FROM MAIN EMER SWBD #1, 480/277 EQUIP POWER, LEVEL 1, FIRST BOARD)

RACEWAY & CONDUCTORS

BRANCH CIRCUIT GENERAL INFORMATION:

BRANCH CIRCUITS FROM OVERCURRENT PROTECTION (20A) TO FURTHEST DEVICE SHALL NOT EXCEED 75 FEET FOR #12AWG COPPER AND 150 FEET FOR #10AWG COPPER MEASURED ALONG CONDUCTORS ROUTING PATH. BRANCH CIRCUITS EXCEEDING 150 FEET WILL BE SIZED SO THAT VOLTAGE DROP DOES NOT EXCEED 5%. 2% FOR FEEDERS AND 3% FOR BRANCH CIRCUITS. REF: CEC 210.19(A).

SYMBOL	DESCRIPTION
= GROUND = HOT/PHASE = NEUTRAL = SWITCH LEG	CONDUCTOR IDENTIFICATION SYMBOLS. REFER TO PLANS FOR COMBINATION USE. CONDUCTOR IDENTIFICATION MOSTLY USED IN HOMERUN LOCATION, BUT CAN ALSO BE USED IN BRANCH CIRCUITING WHERE APPLIED. GROUND CONDUCTORS WILL BE INSTALLED IN ALL RACEWAYS WHETHER SHOWN OR NOT.
LA-1	HOMERUN FROM EQUIPMENT LOCATION. THE CIRCUIT NUMBER ADJACENT TO HOMERUN INDICATES PANEL SOURCE AND INDIVIDUAL SINGLE POLE CIRCUIT BREAKER(S). CONDUCTOR IDENTIFICATION SYMBOL INDICATES NUMBER OF CONDUCTORS IN HOMERUN. MINIMUM #12 CONDUCTORS AND 3/4" RACEWAY PATH WILL BE PROVIDED IN HOMERUN UON. ALL HOMERUN FROM EQUIPMENT LOCATION. THE CIRCUIT
LA-1,3 LA-5,7,9	NUMBER ADJACENT TO HOMERUN INDICATES PANEL SOURCE AND INDIVIDUAL SINGLE POLE CIRCUIT BREAKER(S). SYMBOL REPRESENTS A MULTI-BRANCH CIRCUIT. NUMBER OF CONDUCTORS IN HOMERUN WILL INCLUDE A SEPERATE NEUTRAL FOR EACH CIRCUIT PHASE CONDUCTOR. MINIMUM #12 CONDUCTORS AND 3/4" RACEWAY PATH WILL BE PROVIDED IN HOMERUN UON. ALL HOMERUNS WILL INCLUDE GROUND CONDUCTOR.
LA-7 LA-13	HOMERUN FROM EQUIPMENT LOCATION. THE CIRCUIT NUMBER ADJACENT TO HOMERUN INDICATES PANEL SOURCE AND INDIVIDUAL TWO OR THREE POLE CIRCUIT BREAKERS. CONDUCTOR IDENTIFICATION SYMBOL INDICATES NUMBER OF CONDUCTORS IN HOMERUN. MINIMUM #12 CONDUCTORS AND 3/4" RACEWAY PATH WILL BE PROVIDED IN HOMERUN UON. NEUTRAL MAY BE USED WHERE INDICATED ON PLAN. ALL HOMERUNS WILL INCLUDE GROUND CONDUCTOR.
	CONCEALED RACEWAY BETWEEN DEVICES AND OR EQUIPMENT IN WALLS OR IN CEILING SPACE
	UNDERGROUND RACEWAY BETWEEN DEVICES AND OR EQUIPMENT
	EXPOSED RACEWAY BETWEEN DEVICES AND OR EQUIPMENT ON WALLS OR CEILINGS
DOWN UP	CONDUIT TURNS
	CONDUIT STUBBED AND CAPPED
B	BUSWAY
G	GROUNDING CONDUCTOR
T	CABLE TRAY - POWER AND TELECOMMUNICATIONS
D	TELECOMMUNICATIONS RACEWAY
V/D	DATA RACEWAY
FA	VOICE/DATA COMBINATION RACEWAY
	FIRE ALARM RACEWAY

EQUIPMENT

SYMBOL	DESCRIPTION
MSB	MAIN SWITCHBOARD. DASHED LINES INDICATE CLEARANCES.
DB	DISTRIBUTION BOARD. DASHED LINES INDICATE CLEARANCES.
H1A	FLUSH MOUNTED PANELBOARD. DASHED LINES INDICATE CLEARANCES.
L1A	SURFACE MOUNTED PANELBOARD. DASHED LINES INDICATE CLEARANCES.
MCC	MOTOR CONTROL CENTER. DASHED LINES INDICATE CLEARANCES.
T1A	DRY TYPE TRANSFORMER (15kVA OR ABOVE), WITH EQUIPMENT TAG (TAG INSIDE OR OUTSIDE, DEPENDING ON SIZE). IN MOST CASES, ACTUAL SIZE SHOWN ON PLANS (ELECTRICAL ROOMS).
T	DRY TYPE TRANSFORMER (LESS THAN 15kVA), WITH NO EQUIPMENT TAG. SIZE, TYPE AND LOCATION NOTED ON PLANS.
VF D	VARIABLE FREQUENCY DRIVE
UPS-A	UNINTERRUPTABLE POWER SUPPLY. DASHED LINES INDICATE CLEARANCES.
ATS-1	AUTOMATIC TRANSFER SWITCH. DASHED LINES INDICATE CLEARANCES.
G	GROUND BAR

DEMOLITION

SYMBOL	DESCRIPTION	NOTES
	DASHED SYMBOL INDICATES EXISTING DEVICE OR EQUIPMENT TO BE REMOVED	REFER TO DEMOLITION PLANS FOR ADDITIONAL INFORMATION
R	REMOVE EXISTING RACEWAY IN ALL ACCESSIBLE AREAS. CAPPED AND ABANDONED IF IN UNACCESSIBLE AREA	
	SOLID SYMBOL, LIGHTER IN COLOR INDICATES EXISTING DEVICE OR EQUIPMENT TO REMAIN	
EX	EXISTING CONDUIT TO BE REUSED	

DEVICES

DEVICE INDICATOR LETTER. "X" EQUALS DESIGNATION BELOW (TYPICAL FOR MOST RECEPTACLE TYPES):

- BLANK FOR NORMAL POWER
- G = GFCI RATED
- IG = ISOLATED GROUND
- T = TAMPERPROOF
- WG = WEATHERPROOF AND GFCI
- WP = WEATHERPROOF (IN-USE COVER)
- CL = CLOCK
- TV = TELEVISION

SYMBOL	DESCRIPTION	MOUNTING LOC.	MOUNTING HT.
X	IN FLOOR DUPLEX RECEPTACLE. CONFIGURATION AS INDICATED ON PLANS	FLOOR	VARIES
X	IN FLOOR DOUBLE DUPLEX (QUADPLEX) RECEPTACLE. CONFIGURATION AS INDICATED ON PLANS		
X	IN FLOOR EMERGENCY DUPLEX RECEPTACLE. CONFIGURATION AS INDICATED ON PLANS		
X	IN FLOOR EMERGENCY DOUBLE DUPLEX (QUADPLEX) RECEPTACLE. CONFIGURATION AS INDICATED ON PLANS		
X	COMBINATION DUPLEX RECEPTACLE AND COMMUNICATIONS FLOORBOX. DEVICE CONFIGURATION AS INDICATED ON PLANS.		
X	CEILING MOUNTED DUPLEX RECEPTACLE	CEILING	FLUSH
X	CEILING MOUNTED DOUBLE DUPLEX (QUADPLEX) RECEPTACLE		
X	CEILING MOUNTED EMERGENCY DUPLEX RECEPTACLE		
X	CEILING MOUNTED EMERGENCY DOUBLE DUPLEX (QUADPLEX) RECEPTACLE		
X	COMBINATION POWER/COMMUNICATION IN CEILING OUTLET. CONFIGURATION AS INDICATED ON PLANS		
X	SIMPLEX RECEPTACLE	WALL, UON	+18", UON
X	DUPLEX RECEPTACLE		
X	DOUBLE DUPLEX (QUADPLEX) RECEPTACLE		
X	EMERGENCY DUPLEX RECEPTACLE		
X	EMERGENCY DOUBLE DUPLEX (QUADPLEX) RECEPTACLE		
X	SPECIAL PURPOSE RECEPTACLE. NEMA CONFIGURATION AND AMPERAGE AS NOTED ON PLANS		
	MULTI-OULET ASSEMBLY (SURFACE MOUNTED RACEWAY)	VARIES SEE PLANS	VARIES SEE PLANS
	COMBINATION POWER/COMMUNICATION POLE. CONFIGURATION AS NOTED ON PLANS		
J	WALL MOUNTED CODE SIZE J-BOX	VARIES SEE PLANS	VARIES SEE PLANS
J	CODE SIZE JUNCTION BOX		
P	CODE SIZE PULLBOX (OR AS SIZED ON PLAN)		
•	PUSHBUTTON (EMERGENCY POWER OFF - EPO)		
PC	PHOTOCELL		
•	LIGHTNING PROTECTION AIR TERMINAL	ROOF	VARIES
T	THERMOSTAT	WALL	+44" UON
CB 30/3R	ENCLOSED CIRCUIT BREAKER. AMPERAGE/NEMA ENCLOSURE RATING, 3 POLE UON	VARIES	VARIES
30/1	NON-FUSED DISCONNECT SWITCH. AMPERAGE/NEMA ENCLOSURE RATING, 3 POLE UON		
30/3R	FUSED DISCONNECT SWITCH. AMPERAGE/NEMA ENCLOSURE RATING, 3 POLE UON		
0/1	MOTOR STARTER. STARTER SIZE INDICATED BY NUMBER/NEMA ENCLOSURE RATING, SINGLE SPEED UON		
1/30/3R	COMBINATION FUSIBLE DISCONNECT SWITCH AND MOTOR STARTER. NEMA STARTER SIZE/AMPERAGE/NEMA ENCLOSURE RATING, 3 POLE UON		
5	MOTOR. NUMBER INDICATES HORSEPOWER RATING FOR 1HP AND LARGER	N/A	N/A
F	MOTOR. "F" INDICATES FRACTIONAL HORSEPOWER		

UTILITIES

SYMBOL	DESCRIPTION
•	DISTRIBUTION POLE FOR OVERHEAD ELECTRICAL OR COMMUNICATIONS AS INDICATED ON PLAN.
X X X	OVERHEAD UTILITY AND OR SYSTEM DISTRIBUTION. 3PH = THREE PHASE 1PH = SINGLE PHASE P = ELECTRICAL PRIMARY S = ELECTRICAL SECONDARY T = TELECOMMUNICATION TV = TELEVISION E = EMERGENCY POWER ATSC = AUTOMATIC TRANSFER SWITCH CONTROL N = NEW EX = EXISTING
X X X	UNDERGROUND UTILITY AND OR SYSTEM DISTRIBUTION.
UT	UTILITY OR FACILITY TRANSFORMER
S	PAD MOUNTED SWITCH
CC	CONNECTION CABINET (UTILITY METER MOUNT)
PM	PRIMARY SITE METER ENCLOSURE
ME	METER ENCLOSURE. EITHER ON BUILDING OR ON UTILITY EQUIPMENT
CT	CT ENCLOSURE. EITHER ON BUILDING OR ON UTILITY EQUIPMENT
MH	MANHOLE - POWER OR COMMUNICATION
HH	HAND HOLE - POWER OR COMMUNICATION AS INDICATED ON PLANS
EG	ENGINE GENERATOR
TP	TELECOMMUNICATION PEDESTAL
TVP	TELEVISION PEDESTAL

LIGHTING

REFER TO LUMINAIRE SCHEDULE FOR ALL LUMINAIRE TYPES WHETHER WALL MOUNTED OR CEILING MOUNTED.

SYMBOL	DESCRIPTION	MOUNTING LOC.	MOUNTING HT.
	HATCHING INDICATES EMERGENCY LIGHTING. HATCH WILL BE MODIFIED FOR EACH LUMINAIRE TYPE. EMERGENCY LUMINAIRE DESIGNATED WITH "E" IN TYPE DESIGNATION.	VARIES	REFER TO LIGHTING SCHEDULE
3 A a	RECESSED MOUNTED LUMINAIRE. SMALL CASE "a" DENOTES SWITCHING, NUMBER "3" DENOTES BRANCH CIRCUITING. SYMBOL "A" DENOTES LUMINAIRE TYPE	CEILING	
	SURFACE MOUNTED LUMINAIRE. LUMINAIRE TYPE AS INDICATED ON PLANS		
	LINEAR DIRECT/INDIRECT LUMINAIRE. CABLE OR STEM MOUNTED		
	DOWN LIGHT LUMINAIRE; CEILING MOUNTED		
	WALL MOUNTED LUMINAIRES	WALL	
	TRACK MOUNTED LUMINAIRES	SURFACE	
	STRIP LUMINAIRE		
WALL / CEILING	EXIT LUMINAIRE. SHADED SIDE INDICATES FACE SIDE. PROVIDE DIRECTIONAL ARROW(S) AS INDICATED ON PLANS	VARIES	
WALL / CEILING	DOUBLE FACE EXIT LUMINAIRE. SHADED SIDE INDICATES FACE SIDE. PROVIDE DIRECTIONAL ARROW(S) AS INDICATED ON PLANS		
	EMERGENCY BATTERY PACK LUMINAIRE (BUG-EYE/FROG-EYE)		
	SINGLE HEAD, POLE MOUNTED LUMINAIRE	EXTERIOR	AS DETAILED
	DOUBLE HEAD, POLE MOUNTED LUMINAIRE		
$ X	DEVICE INDICATOR LETTER. "X" EQUALS DESIGNATION BELOW (TYPICAL FOR MOST SWITCH TYPES): a = SMALL CASE LETTER DENOTES SWITCHING CONTROL 2 = DOUBLE POLE TOGGLE SWITCH 3 = THREE-WAY TOGGLE SWITCH 4 = FOUR-WAY TOGGLE SWITCH P = PILOT LIGHT TOGGLE SWITCH M = MOMENTARY CONTACT SWITCH K = KEY OPERATED SWITCH WP = WEATHERPROOF TOGGLE SWITCH T = MANUAL MOTOR STARTER SWITCH WITH THERMAL OVERLOAD PROTECTION D = DIMMER SWITCH	WALL	
OS	WALL MOUNTED OCCUPANCY SENSOR; TYPE AS INDICATED ON PLANS		
OS	CEILING MOUNTED OCCUPANCY SENSOR; TYPE AS INDICATED ON PLANS	CEILING	SURFACE
DL	DAY-LIGHTING SENSOR; TYPE AS INDICATED ON PLANS		
RC	ROOM CONTROLLER; TYPE AS INDICATED ON PLANS		

ONE-LINE DIAGRAM

SYMBOL	DESCRIPTION
300/400	CIRCUIT BREAKER; TRIP SETTING/FRAME SIZE OR NO. OF POLES. SETTINGS AND PROTECTION AS NOTED ON PLANS
300/400	DRAWOUT CIRCUIT BREAKER (TRIP SETTING / FRAME SIZE)
300/400	MEDIUM VOLTAGE DRAWOUT CIRCUIT BREAKER (TRIP SETTING / FRAME SIZE)
T1A 75kVA K-4 — 208Y/120V, 480V	TRANSFORMER. TRANSFORMER NAME, TRANSFORMER kVA RATING, PRIMARY VOLTAGE AND WIRING CONFIGURATION, SECONDARY VOLTAGE, K RATING (IF APPLICABLE)
3000/5	CURRENT TRANFORMER, NUMBER "3000/5" DENOTES RATIO.
	POTENTIAL TRANSFORMER.
300A	DISCONNECT SWITCH. "300A" DENOTES AMPERAGE RATING
300A	FUSE. "300A" DENOTES AMPERAGE RATING
G	GROUND FAULT PROTECTION
ST	SHUNT TRIP OPERATOR
	GROUND CONNECTION
	TRANSFER SWITCH. SEE PLANS FOR TYPE OF SWITCH
	SURGE ARRESTOR
SPD	SURGE PROTECTIVE DEVICE
KW	KILOWATT METER
M	ELECTRONIC METER
K1	KIRK KEY INTERLOCK No.1
R1	RELAY No.1
AS	AMMETER SWITCH
A	AMMETER
VS	VOLTMETER SWITCH
V	VOLTMETER
	DELTA CONNECTED
	WYE CONNECTED
	GENERATOR
VF D	VFD CONNECTION
S	MOTOR CONNECTION
UPS	UPS

GENERAL NOTES

A GENERAL

A.01 CONTRACTOR SHALL INFORM HIMSELF OF ANY ELECTRICAL INFORMATION THAT MIGHT BE SHOWN IN OTHER DISCIPLINES OF THIS PROJECT AND NOT SHOWN IN ELECTRICAL DIVISION. COORDINATE ALL WORK DISCREPANCIES WITH ARCHITECT PRIOR TO BID. SHOULD COORDINATION NOT OCCUR, IT IS UNDERSTOOD THAT THE CONTRACTOR FOUND NO DISCREPANCIES AND SHALL PROVIDE AND INSTALL ELECTRICAL RACEWAY, CONDUCTORS, DEVICES, AND EQUIPMENT AT NO ADDITIONAL COST TO THE OWNER.

A.02 THE CONTRACTOR SHALL REFER TO DIVISION 26 SPECIFICATIONS FOR ADDITIONAL INFORMATION AND REQUIREMENTS. THE SPECIFICATIONS ARE A PART OF THE CONSTRUCTION DOCUMENT SET AND MAY CONTAIN INFORMATION NOT SHOWN ON THE DRAWING SET.

A.03 THESE DRAWINGS REFLECT INFORMATION ON EXISTING BUILDING SERVICES GATHERED BY SITE INSPECTION AND PREVIOUS CONSTRUCTION DRAWINGS. THE EXACT LOCATION, ARRANGEMENT, AND SIZES OF EXISTING DEVICES MAY BE DIFFERENT FROM THAT SHOWN ON THESE DRAWINGS. ALL BIDDERS ARE REQUIRED TO INVESTIGATE EXISTING BUILDING CONDITIONS PRIOR TO SUBMITTING THEIR BIDS AND PROVIDE ALL REQUIRED FILED MEASUREMENTS PRIOR TO ORDERING OF NEW COMPONENTS AND DEVICES.

A.04 THE WORD "PROVIDE" SHALL MEAN TO FURNISH AND INSTALL. EXCEPTIONS SHALL BE NOTED ON THE DRAWINGS OR IN THE SPECIFICATIONS.

A.05 DO NOT SCALE THE ELECTRICAL DRAWING TO DETERMINE THE LOCATIONS OF LUMINAIRIES, OUTLETS, OR EQUIPMENT. REFER TO THE ARCHITECTURAL DRAWINGS AND FIELD MEASUREMENTS FOR ALL PROJECT DIMENSIONS.

A.06 THE CONTRACTOR SHALL COORDINATE THE SHUTDOWN OF EXISTING BUILDING SERVICES FOR REMOVALS WITH OWNER AUTHORIZED REPRESENTATIVE AND SHALL CONFORM TO THEIR REQUIREMENTS.

A.07 THE CONTRACTOR SHALL COORDINATE ALL WORK WITH OTHER DISCIPLINES PRIOR TO START OF WORK AND INSTALLATION OF EQUIPMENT.

A.08 ALL EXPOSED CONDUIT, FITTING, BOXES, HANGERS, CLIPS, SUPPORTS, ETC. IN FINISHED AREAS SHALL BE PAINTED PER THE ENGINEERS INSTRUCTIONS.

A.09 ALL DEVICES, RACEWAY, CONDUCTORS AND LUMINAIRES ARE EXISTING AND SHALL REMAIN UNLESS INDICATED BOLDLY OR OTHERWISE INDICATED BY KEYED NOTE.

A.10 IN THE CASE OF CONFLICTS NOT CLARIFIED PRIOR TO THE BIDDING DEADLINE, USE THE MOST COSTLY ALTERNATIVE (BETTER QUALITY, GREATER QUANTITY, AND LARGER SIZE) IN PREPARING THE BID.

A.11 CONTRACTORS SHALL VERIFY AND COORDINATE WITH EXACT MOUNTING HEIGHTS AND LOCATIONS OF ALL DEVICES WITH ARCHITECT PRIOR TO ROUGH-IN. ALL RACEWAYS FOR RECEPTACLES TO RUN CONCEALED BENEATH COUNTER AS REQUIRED.

A.12 ALL GROUNDING CABLE IN THE WHOLE ELECTRICAL DISTRIBUTION SYSTEM SHALL SHOW ZERO CURRENT (AFTER THE SYSTEM IS ENERGIZED) - IF ANY CURRENT IS FOUND IN THE SYSTEM, THEN THE CONTRACTOR IS RESPONSIBLE TO RESOLVE THE PROBLEM AND REMOVE OBJECTIONABLE CURRENT FROM THE GROUNDING SYSTEM.

B CIRCUITS

B.01 REFER TO GROUNDING DIAGRAM FOR GROUNDING INFORMATION.

B.02 ALL TERMINATIONS AT EQUIPMENT SHALL BE RATED AT 75 C MINIMUM. REFER TO SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.

C LIGHTING

C.01 THE LUMAIRE DESCRIPTION SHALL TAKE PRECEDENCE OVER A LUMINAIRE MANUFACTURER MODEL NUMBER SHOULD A CONFLICT OCCUR.

D EQUIPMENT

D.01 REFER TO MECHANICAL DRAWINGS FOR CONTROL DIAGRAMS AND/OR SEQUENCE OF OPERATION DESCRIPTIONS.

D.02 REFER TO MECHANICAL DRAWINGS FOR EQUIPMENT SCHEDULES.

D.03 SWITCHES CONTROLLING MECHANICAL EQUIPMENT SHALL BE LABELED FOR THE EQUIPMENT SERVED.

D.04 SIZE ALL FUSES PER THE EQUIPMENT MANUFACTURERS RECOMMENDATION.

D.05 PROVIDE FEEDERS BETWEEN THE VFD AND MECHANICAL EQUIPMENT SIZED PER THE HOMERUN.

D.06 PROVIDE FEEDERS BETWEEN THE STARTERS AND DISCONNECT SWITCHES SIZED PER THE HOMERUN.

D.07 THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH MECHANICAL AND PLUMBING DRAWINGS FOR EXACT LOCATION OF EQUIPMENT CONNECTIONS.

D.08 ALL NEW BREAKERS SHALL BE RATED WITH AN AIC RATING OF THE EXISTING PANELBOARD IN WHICH THEY WILL BE INSTALLED IN ACCORDANCE WITH NEC 110.3(B) AND 110.9.

ELECTRICAL SCOPE OF WORK:

CONTRACTOR IS TO PROVIDE NEW CONTROLS, LIGHTS AND OUTLETS AS IDENTIFIED IN THE DRAWINGS AND SPECIFICATIONS. ALL LIGHTING TO BE 5-7 FC ALONG WALKWAY. COORDINATE ALL SHUTDOWNS WITH THE COR 30 DAYS IN ADVANCE AND AGAIN 2 DAYS IN ADVANCE TO ENSURE ALL SAFETY PRECAUTIONS ARE IN PLACE AND OPERATIONAL IMPACTS ARE MINIMIZED. NIGHT AND WEEKEND WORK WILL BE REQUIRED FOR THIS CONTRACT.

THESE AS BUILT OR RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED AND FURNISHED BY OTHERS. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THIS DOCUMENT AS A RESULT.

RECORD DRAWINGS

NO	REVISIONS	DATE

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A MULTI-DISCIPLINE AE COMPANY

BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: ELECTRICAL LEGEND

Approved : Project Director

Project Title: PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS

Location: 2615 E Clinton Ave, Fresno, CA 93703

Date: 10/10/2024 | Checked by: J. MONTANO | Drawn: R. RIBA

Project Number: 570-16-302

Building Number:

Drawing number: E-001

Office of Construction and Facilities Management

Department of Veterans Affairs

Autodesk Docs://570-16-302 VA Fresno Chiller Plant/P2 101026/EVA Fresno Chiller Plant Elec.rvt
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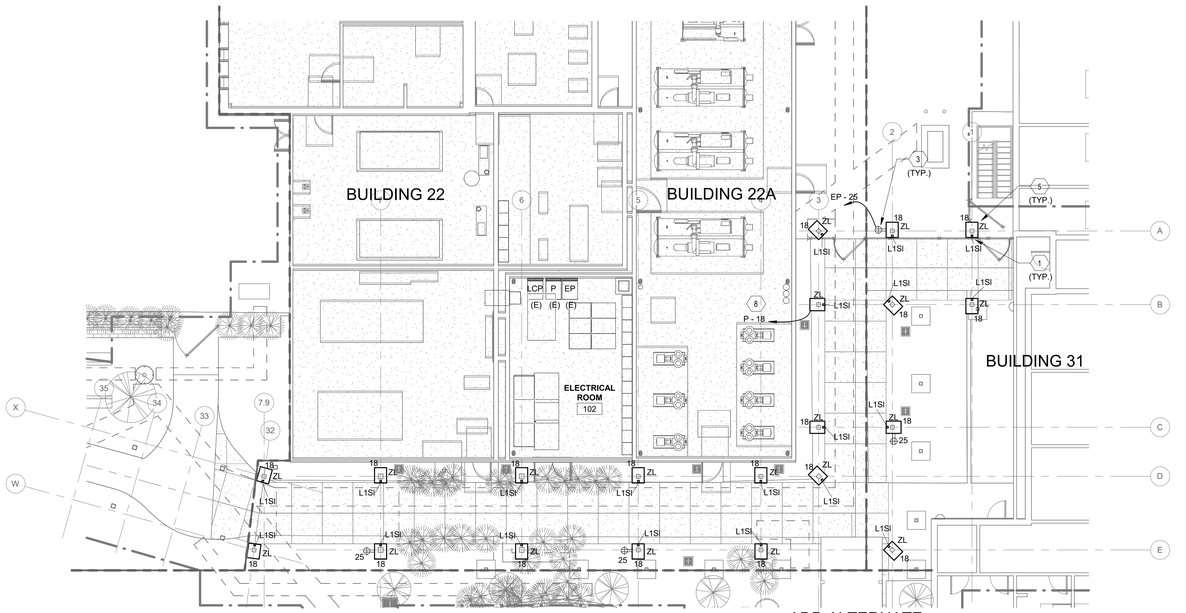
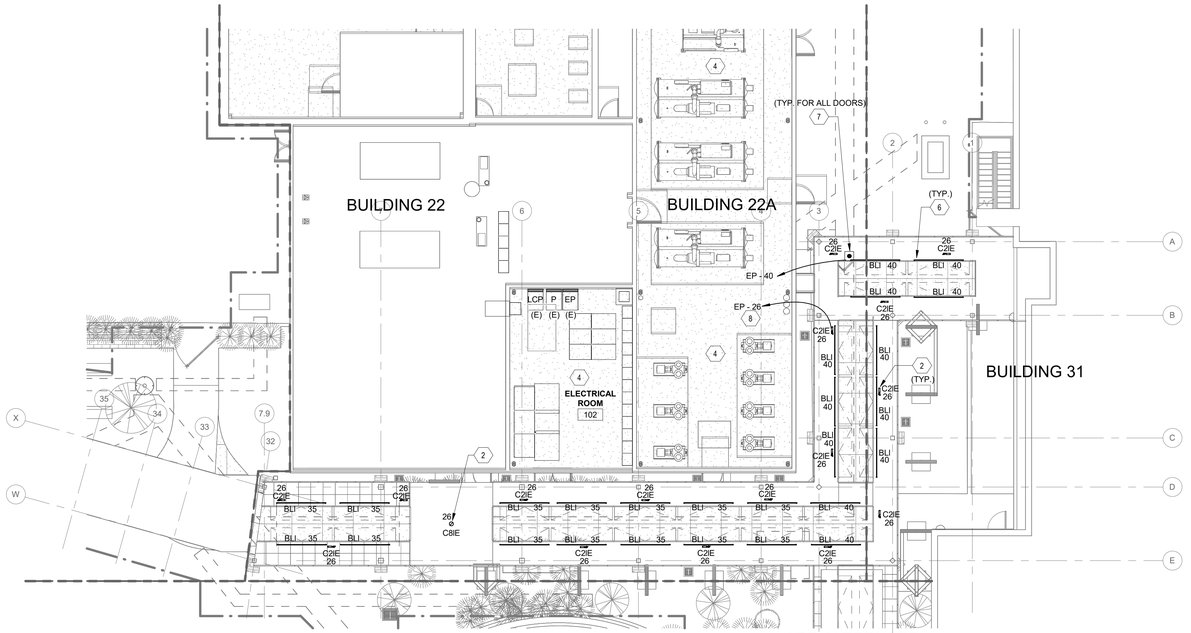


1 ELECTRICAL PATHWAY ACCENT LIGHTING SITE PLAN - PHASE 1

SCALE: 1" = 10'-0"

0' 5' 10' 20'



2 ELECTRICAL CANOPY LIGHTING SITE PLAN - PHASE 1

SCALE: 1" = 10'-0"

0' 5' 10' 20'

GENERAL SHEET NOTES

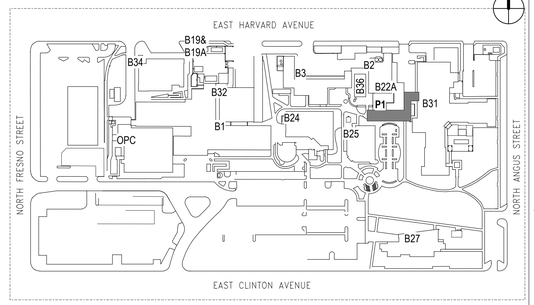
A. REFER TO SHEET E-001 FOR GENERAL NOTES.

KEYNOTES

1. PROVIDE RECESSED LINEAR LUMINAIRE WITH FLANGE (N). COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEET E-701 FOR ADDITIONAL INFORMATION.
2. PROVIDE RECESSED DOWNLIGHT (N). COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEET E-701 FOR ADDITIONAL INFORMATION.
3. PROVIDE GFCI RATED RECEPTACLE WITH "EXTRA DUTY" IN-USE WEATHERPROOF METAL COVER (N). COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN.
4. REFER TO SHEET EP101 FOR ADDITIONAL INFORMATION IN THIS AREA.
5. PROVIDE LED ROPE LIGHT (N) UNDER COLUMN. COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEETS E-701 AND A-502 FOR ADDITIONAL INFORMATION.
6. PROVIDE LED TAPE LUMINAIRE (N). MOUNT ON MIDDLE HSS STRUCTURAL FRAMING. COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEETS E-701, M-501 AND A-501 FOR ADDITIONAL INFORMATION.
7. PROVIDE PUSHBUTTON DOOR SWITCH (N) FOR LED TAPE LUMINAIRE. COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN.
8. ROUTE CIRCUIT THROUGH NEXT SPARE CONTACT ON LIGHTING CONTROL PANEL (LCP). SET TO "DUSK TO DAWN" UNLESS REQUIRED OTHERWISE BY OWNER.

THESE AS BUILT OR RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED AND FURNISHED BY OTHERS. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THIS DOCUMENT AS A RESULT.

KEY PLAN



RECORD DRAWINGS

NO	REVISIONS	DATE

PROJECT TEAM

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A MULTI-DISCIPLINE COMPANY

BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: ELECTRICAL PATHWAY ACCENT AND CANOPY LIGHTING SITE PLANS - PHASE 1

Approved : Project Director

Project Title: **PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS**

Location: **2615 E Clinton Ave, Fresno, CA 93703**

Date: **10/10/2024** | Checked by: **J. MONTANO** | Drawn: **R. RIBA**

Project Number: **570-16-302**

Building Number:

Drawing number: **ES101.1**

Office of Construction and Facilities Management

Department of Veterans Affairs

Autodesk Docs://570-16-302 VA Fresno Chiller Plant P2 10102616/VA Fresno Chiller Plant Elec.rvt
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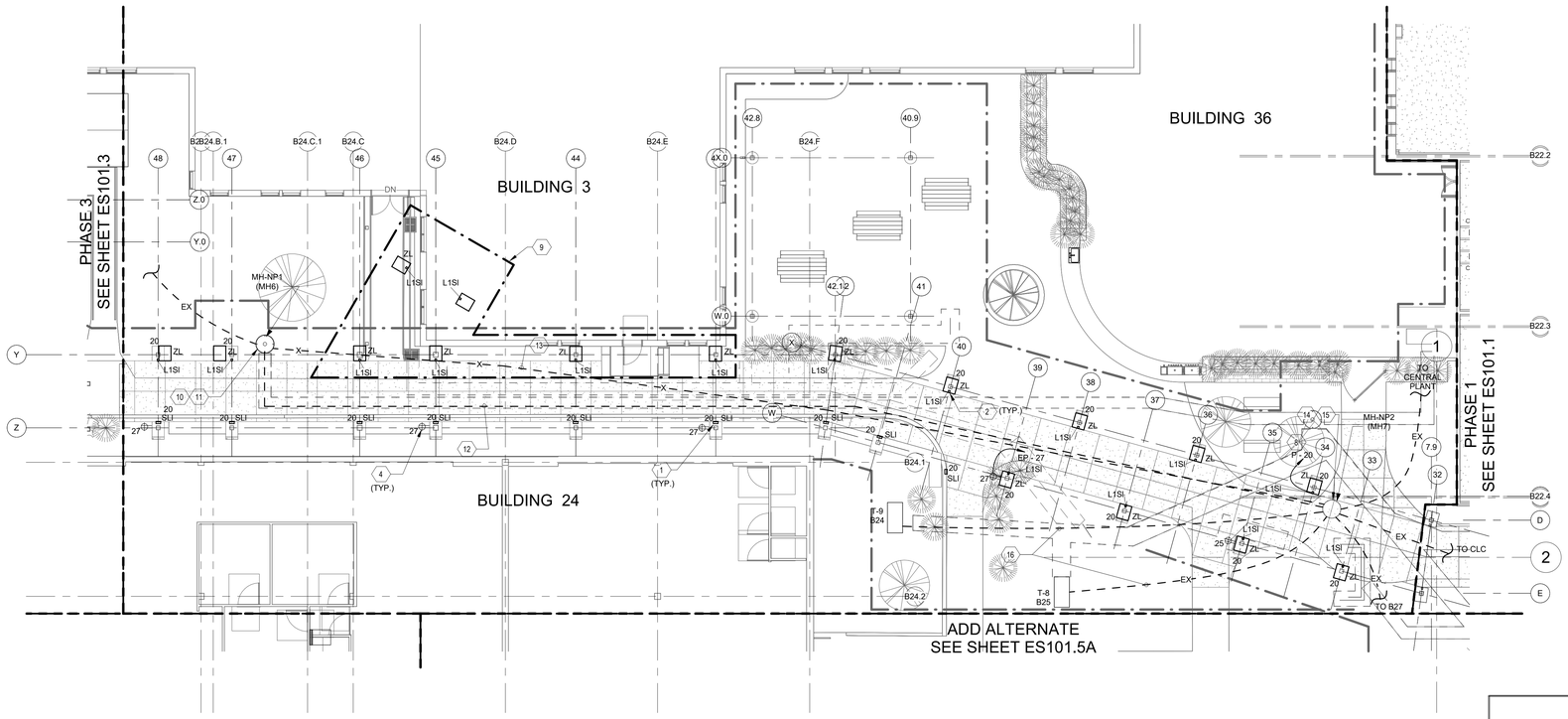
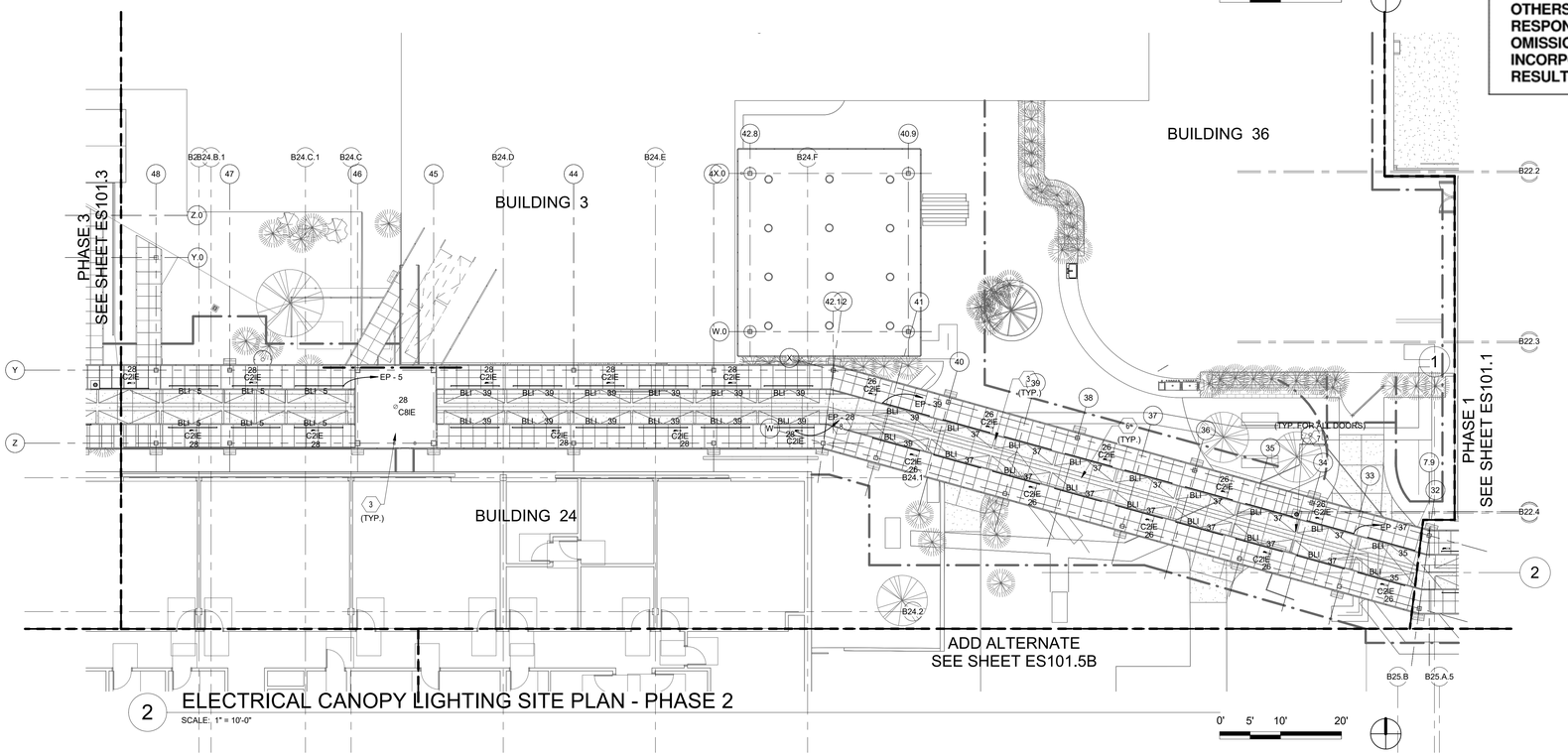


1 ELECTRICAL PATHWAY ACCENT LIGHTING SITE PLAN - PHASE 2

SCALE: 1" = 10'-0"

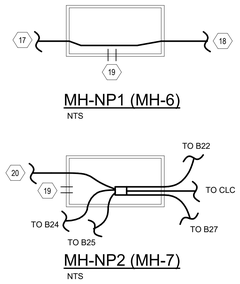
0' 5' 10' 20'



2 ELECTRICAL CANOPY LIGHTING SITE PLAN - PHASE 2

SCALE: 1" = 10'-0"

0' 5' 10' 20'



GENERAL SHEET NOTES

A. REFER TO SHEET E-001 FOR GENERAL NOTES.

KEYNOTES

1. PROVIDE RECESSED STEPLIGHT (N). COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEET E-701 FOR ADDITIONAL INFORMATION.
2. PROVIDE RECESSED LINEAR LUMINAIRE WITH FLANGE (N). COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEET E-701 FOR ADDITIONAL INFORMATION.
3. PROVIDE RECESSED DOWNLIGHT (N). COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEET E-701 FOR ADDITIONAL INFORMATION.
4. PROVIDE GFCI RATED RECEPTACLE WITH "EXTRA DUTY" IN-USE WEATHERPROOF METAL COVER (N). COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN.
5. PROVIDE LED ROPE LIGHT (N) UNDER COLUMN. COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEETS E-701, A-502, AND A-503 FOR ADDITIONAL INFORMATION.PROVIDE LED STRIP LINEAR LUMINAIRE (N). COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEETS E-701 AND A-501 FOR ADDITIONAL INFORMATION.
6. PROVIDE LED TAPE LUMINAIRE (N). MOUNT ON MIDDLE HSS STRUCTURAL FRAMING. COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEETS E-701, M-501 AND A-501 FOR ADDITIONAL INFORMATION.
7. PROVIDE PUSHBUTTON DOOR SWITCH (N) FOR LED TAPE LUMINAIRE. COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN.
8. ROUTE CIRCUIT THROUGH NEXT SPARE CONTACT ON LIGHTING CONTROL PANEL IN ELECTRICAL ROOM 102. REFER TO SHEET ES101.1 FOR ADDITIONAL INFORMATION. SET TO "DUSK TO DAWN" UNLESS REQUIRED OTHERWISE BY OWNER.
9. FUTURE CONSTRUCTION PHASE. REFER TO SHEET AS111.2 FOR ADDITIONAL INFORMATION.
10. DEDUCT ALTERNATE 2: EXISTING MANHOLE LOCATED SOUTH OF BUILDING 3 TO BE REPAIRED.
11. DEDUCT ALTERNATE 2: CORE DRILL EXISTING MANHOLE AND PROVIDE NEW 5" SLEEVES FOR ROUTING NEW CABLES.
12. DEDUCT ALTERNATE 2: PROVIDE NEW 15KV CABLE IN CONCRETE ENCASED DUCTBANK. CABLE SHALL BE INSTALLED PRIOR TO REMOVING EXISTING CABLE. SIZE TO MATCH EXISTING.
13. DEDUCT ALTERNATE 2: EXISTING 15KV CABLE SHALL BE REMOVED AFTER INSTALLATION OF NEW CABLE.
14. DEDUCT ALTERNATE 2: CORE DRILL EXISTING MANHOLE FOR NEW 15KV BYPASS FEEDER FROM MH-NP1.
15. DEDUCT ALTERNATE 2: MANHOLE TO BE REPAIRED.
16. DEDUCT ALTERNATE 2: CONTRACTOR TO FIELD VERIFY EXACT ROUTING OF EXISTING PRIMARY UNDERGROUND ELECTRICAL FEEDS. LOCATION TO BE VERIFIED WITH NEW COLUMN LOCATIONS.
17. DEDUCT ALTERNATE 2: PRIMARY CABLE FROM SITE SWITCHGEAR.
18. DEDUCT ALTERNATE 2: CABLE TO MH-NP2 (MH-7).
19. DEDUCT ALTERNATE 2: PROPOSED NEW COREDRILL.
20. DEDUCT ALTERNATE 2: CABLE TO MH-NP1 (MH-6).

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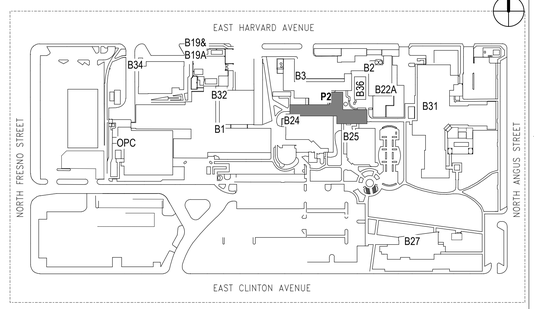
KEY PLAN



RECORD DRAWINGS

NO	REVISIONS	DATE

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BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: ELECTRICAL PATHWAY ACCENT AND CANOPY LIGHTING SITE PLANS - PHASE 2

Approved : Project Director

Project Title: **PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS**

Location: **2615 E Clinton Ave, Fresno, CA 93703**

Date: **10/10/2024** | Checked by: **J. MONTANO** | Drawn: **R. RIBA**

Project Number: **570-16-302**

Building Number:

Drawing number: **ES101.2**

Office of Construction and Facilities Management

Department of Veterans Affairs

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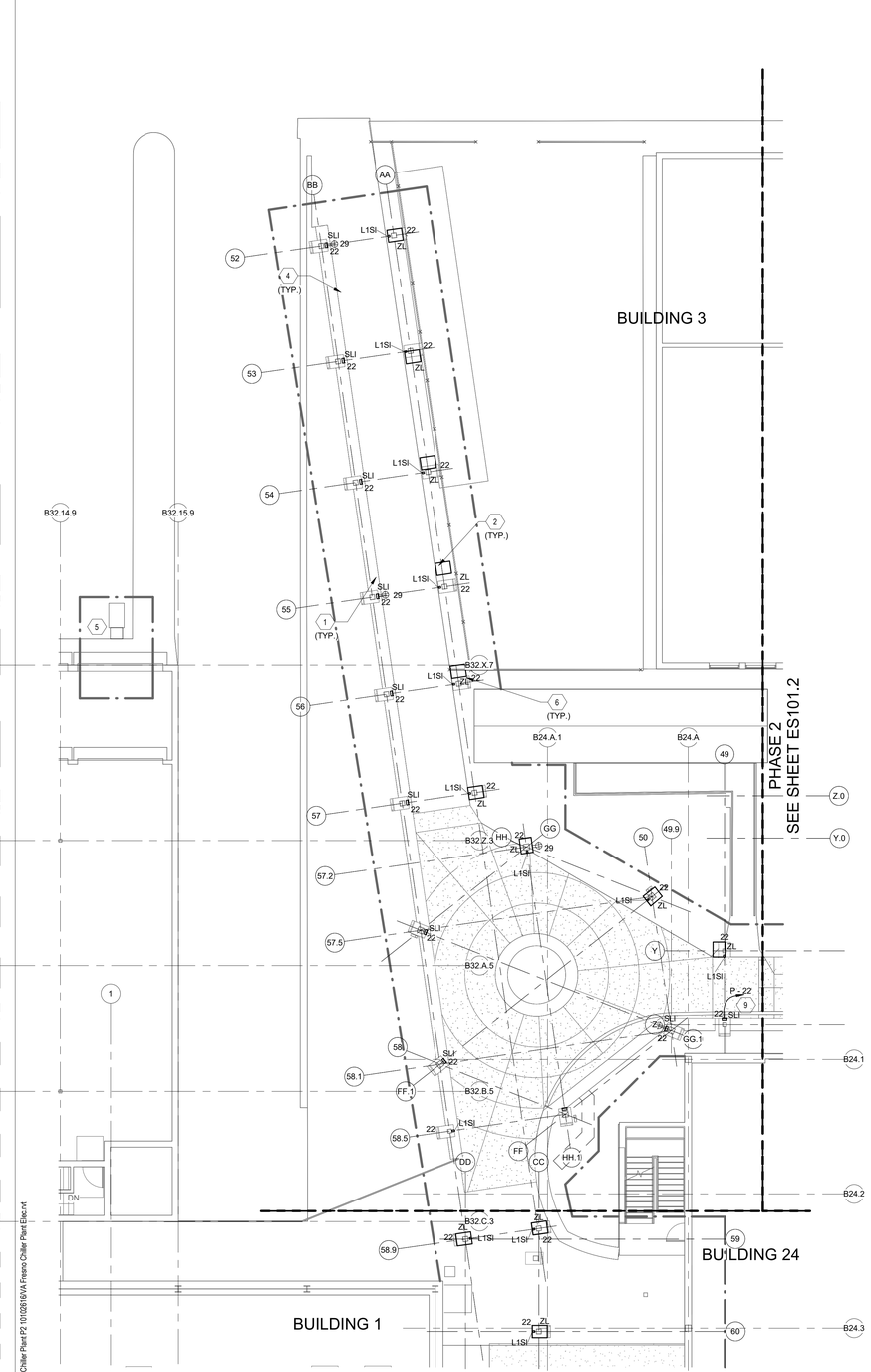
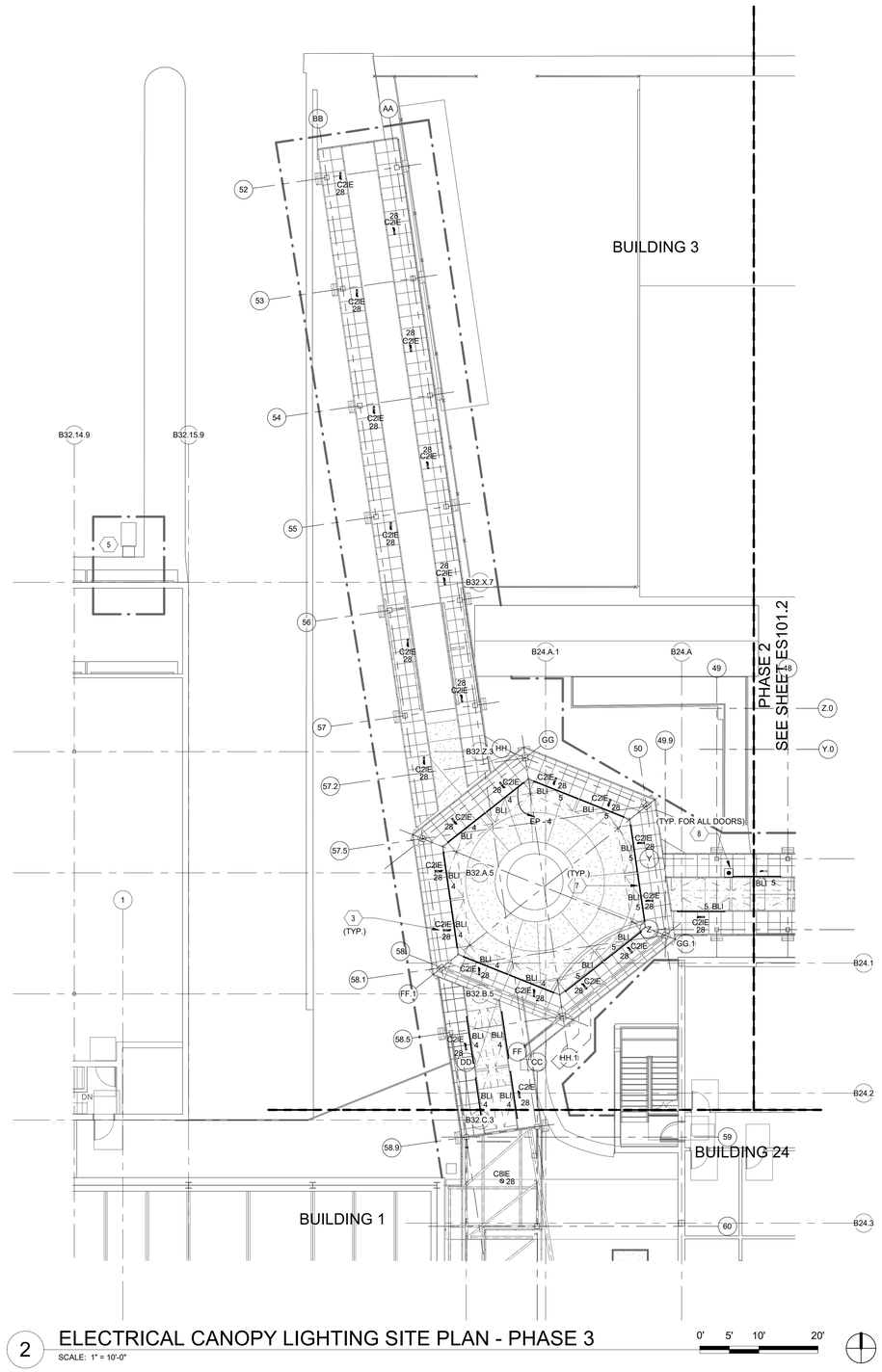


1 ELECTRICAL PATHWAY ACCENT LIGHTING SITE PLAN - PHASE 3

SCALE: 1" = 10'-0"

0' 5' 10' 20'



2 ELECTRICAL CANOPY LIGHTING SITE PLAN - PHASE 3

SCALE: 1" = 10'-0"

0' 5' 10' 20'

GENERAL SHEET NOTES

A. REFER TO SHEET E-001 FOR GENERAL NOTES.

KEYNOTES

1. PROVIDE RECESSED STEPLIGHT (N). COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEET E-701 FOR ADDITIONAL INFORMATION.
2. PROVIDE RECESSED LINEAR LUMINAIRE WITH FLANGE (N). COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEET E-701 FOR ADDITIONAL INFORMATION.
3. PROVIDE RECESSED DOWNLIGHT (N). COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEET E-701 FOR ADDITIONAL INFORMATION.
4. PROVIDE GFCI RATED RECEPTACLE WITH "EXTRA-DUTY" IN-USE WEATHERPROOF METAL COVER (N). COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN.
5. EXISTING CONTROL BOARD TO REMAIN.
6. PROVIDE LED ROPE LIGHT (N) UNDER COLUMN. COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEETS E-701 AND A-502 FOR ADDITIONAL INFORMATION.
7. PROVIDE LED TAPE LUMINAIRE (N). MOUNT ON MIDDLE HSS STRUCTURAL FRAMING. COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN. REFER TO SHEETS E-701, M-501 AND A-501 FOR ADDITIONAL INFORMATION.
8. PROVIDE PUSHBUTTON DOOR SWITCH (N) FOR LED TAPE LUMINAIRE. COORDINATE WITH ARCHITECT FOR EXACT LOCATION PRIOR TO ROUGH-IN.
9. ROUTE CIRCUIT THROUGH NEXT SPARE CONTACT ON LIGHTING CONTROL PANEL IN ELECTRICAL ROOM 102. REFER TO SHEET ES101.1 FOR ADDITIONAL INFORMATION. SET TO "DUSK TO DAWN" UNLESS REQUIRED OTHERWISE BY OWNER.

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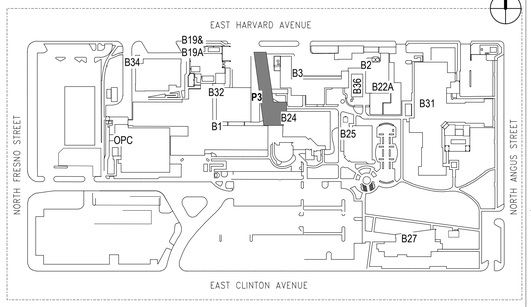
KEY PLAN



RECORD DRAWINGS

three inches = one foot
one and one-half inch = one foot
one inch = one foot
three-quarters inch = one foot
one-half inch = one foot
three-eighth inch = one foot
one-quarter inch = one foot
one-eighth inch = one foot

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NO	REVISIONS	DATE

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BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: ELECTRICAL PATHWAY ACCENT AND CANOPY LIGHTING SITE PLANS - PHASE 3

Approved : Project Director

Project Title: **PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS**

Location: **2615 E Clinton Ave, Fresno, CA 93703**

Date: **10/10/2024** | Checked by: **J. MONTANO** | Drawn: **R. RIBA**

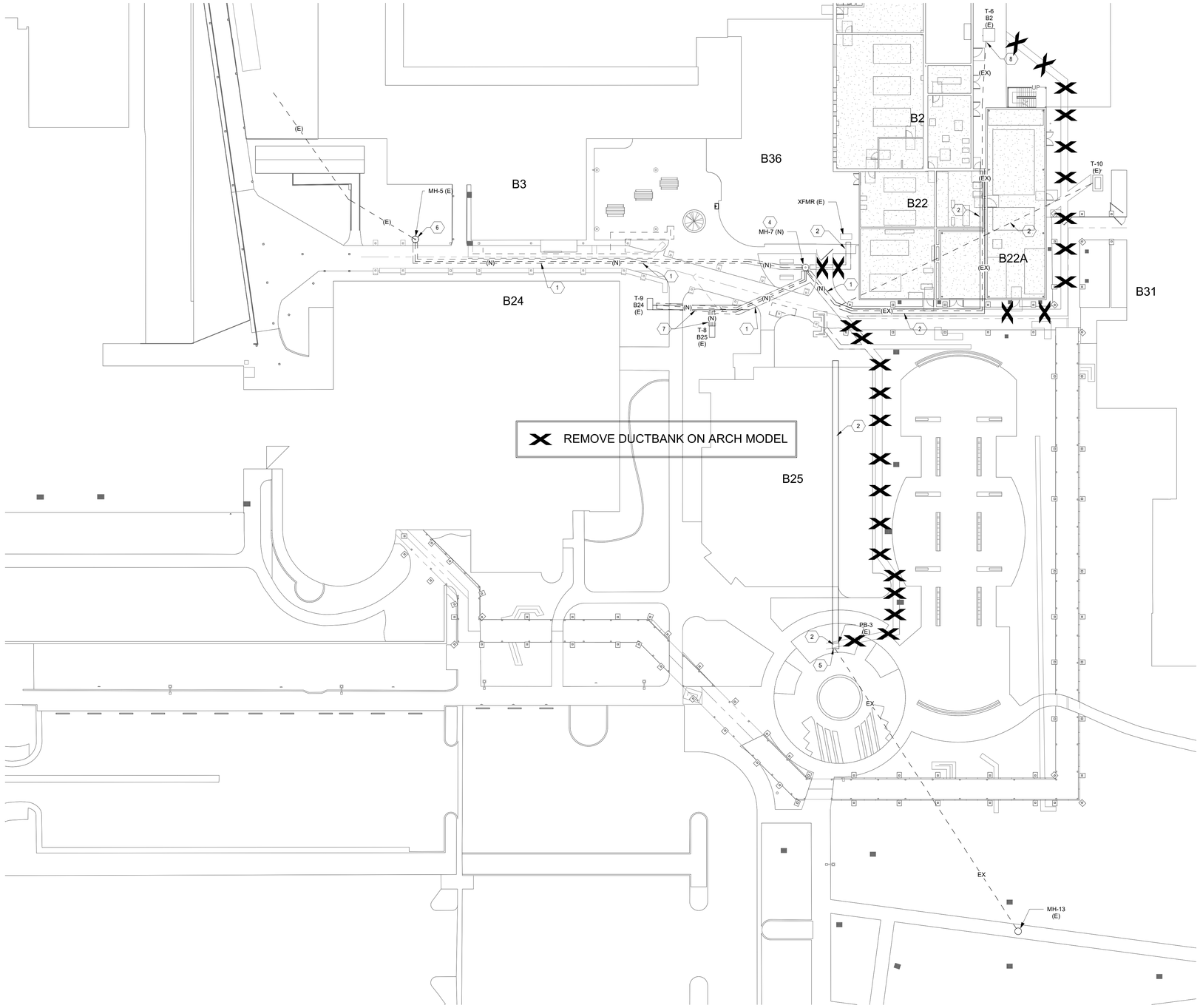
Project Number: **570-16-302**

Building Number:

Drawing number: **ES101.3**

Office of Construction and Facilities Management

Department of Veterans Affairs



1 ELECTRICAL 15kV UNDERGROUND SITE PLAN - NEW

SCALE: 1" = 20'-0"

GENERAL SHEET NOTES

A. 12.47KV CABLE INSTALLATION WILL REQUIRE ELECTRICAL SHUTDOWNS. THE FOLLOWING BUILDINGS WILL BE AFFECTED: B2, B22, B22A, B24, B25, B27, CLC

B. TEMPORARY GENERATORS SHALL BE PROVIDED AT EACH BUILDING AFFECTED BY THE SHUTDOWN DURING CABLE SWITCHOVER.

KEYNOTES

1. PROVIDE CONCRETE ENCASED DUCTBANK AND 12.47KV CABLE. REFER TO SHEET E501 FOR ADDITIONAL INFORMATION.
2. EXISTING DUCTBANK TO REMAIN.
3. PROVIDE NEW LOAD BREAKS AND CONNECT TO 12.47KV CABLE. REFER TO SHEET E501 FOR ADDITIONAL INFORMATION.
4. PROVIDE NEW MANHOLE. REFER TO MANHOLE 7 DEATIL ON SHEET E501 FOR ADDITIONAL INFORMATION.
5. REFER TO PB-3 DETAIL ON SHEET E501 FOR ADDITIONAL INFORMATION.
6. REFER TO MH-5 DETAIL ON SHEET E501 FOR ADDITIONAL INFORMATION.
7. REUSE DUCTBANK AND CONDUIT. PROVIDE NEW 12.47KV CABLE.
8. RETERMINATE EXISTING 12.47KV CABLE TO T-6.

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RECORD DRAWINGS

three inches = one foot
one and one-half inch = one foot
one inch = one foot
three-quarters inch = one foot
one-half inch = one foot
three-eighth inch = one foot
one-quarter inch = one foot
one-eighth inch = one foot

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NO	REVISIONS	DATE

PROJECT TEAM

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ARCHITECTS/ENGINEERS

TRIPLE C - THE A&E GROUP
A MULTI-DISCIPLINE AE COMPANY

BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: ELECTRICAL UNDERGROUND SITE PLAN - NEW

Approved : Project Director

Project Title: PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS

Location: 2615 E Clinton Ave, Fresno, CA 93703

Date: 10/10/2024 | Checked by: J. MONTANO | Drawn: R. RIBA

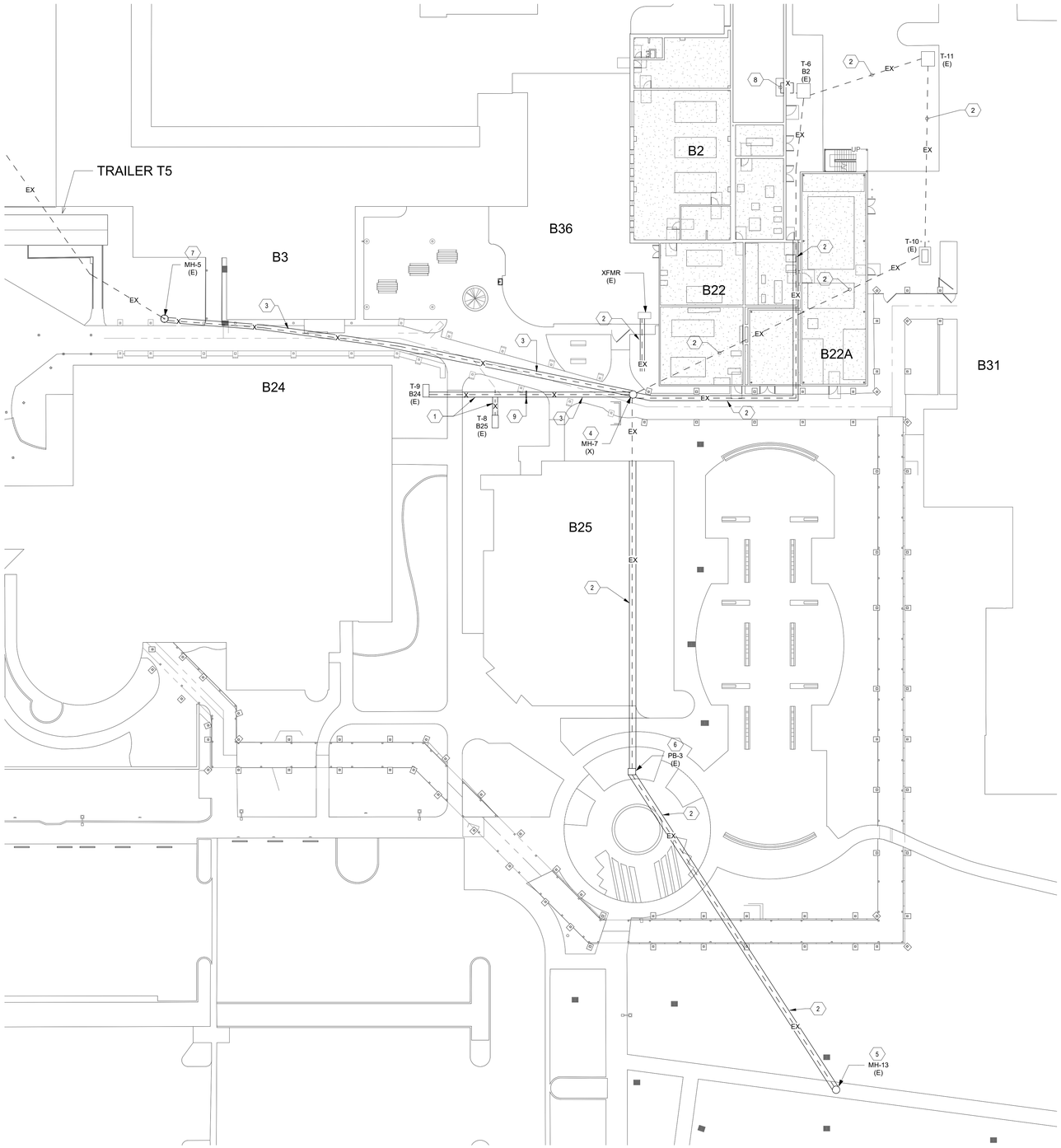
Project Number: 570-16-302

Building Number:

Drawing number: ES201

Office of Construction and Facilities Management

Department of Veterans Affairs



1 ELECTRICAL 15kV UNDERGROUND SITE PLAN - DEMOLITION

SCALE: 1" = 20'-0"

GENERAL SHEET NOTES

A. REFER TO SHEET E701 FOR MANHOLE AND DUCTBANK DETAILS.
B. TEMPORARY GENERATORS SHALL BE PROVIDED AT EACH BUILDING AFFECTED BY THE SHUTDOWN DURING CABLE SWITCHOVER.

BUILDING	TEMPORARY GENERATOR SIZE
2	750kVA
22	OLD CHILLER ROOM
24	500kVA
25	225kVA
27	500kVA
31	225kVA

KEYNOTES

1. REMOVE 12.47KV CABLE AND ADD PULLWIRE IN EXISTING CONCRETE ENCASED DUCTBANK. ABANDON CONDUIT AND DUCTBANK IN PLACE.
2. EXISTING 12.47KV CABLE AND DUCTBANK TO REMAIN.
3. REMOVE EXISTING 12.47KV CABLE AND DUCTBANK.
4. REMOVE MANHOLE IN ITS ENTIRETY.
5. EXISTING MANHOLE TO REMAIN.
6. EXISTING PULLBOX TO REMAIN. REFER TO SHEET ES201 FOR ADDITIONAL INFORMATION.
7. EXISTING MANHOLE TO REMAIN. EXISTING 15KV CABLE TO BE SPLICED.
8. REMOVE 12.47KV LOOP INTO OLD SES. LEAVE ADEQUATE LENGTH FOR CONNECTION TO T-6. REFER TO NEW PLAN FOR ADDITIONAL INFORMATION.
9. INTERCEPT EXISTING DUCTBANK AND CONDUIT AT THIS POINT. REFER TO NEW SITE PLAN, SHEET ES201 FOR ADDITIONAL INFORMATION.

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RECORD DRAWINGS

three inches = one foot
one and one-half inch = one foot
one inch = one foot
three-quarters inch = one foot
one-half inch = one foot
three-eighth inch = one foot
one-quarter inch = one foot
one-eighth inch = one foot

Autodesk Docs://570-16-302 VA Fresno Chiller Plant P2 10105116/VA Fresno Chiller Plant Elec.rvt
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NO	REVISIONS	DATE

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A MULTI-DISCIPLINE A&E COMPANY

BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: ELECTRICAL 15kV UNDERGROUND SITE PLAN - DEMOLITION

Approved : Project Director

Project Title: **PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS**

Location: **2615 E Clinton Ave, Fresno, CA 93703**

Date: **10/10/2024** | Checked by: **Checker** | Drawn: **R. RIBA**

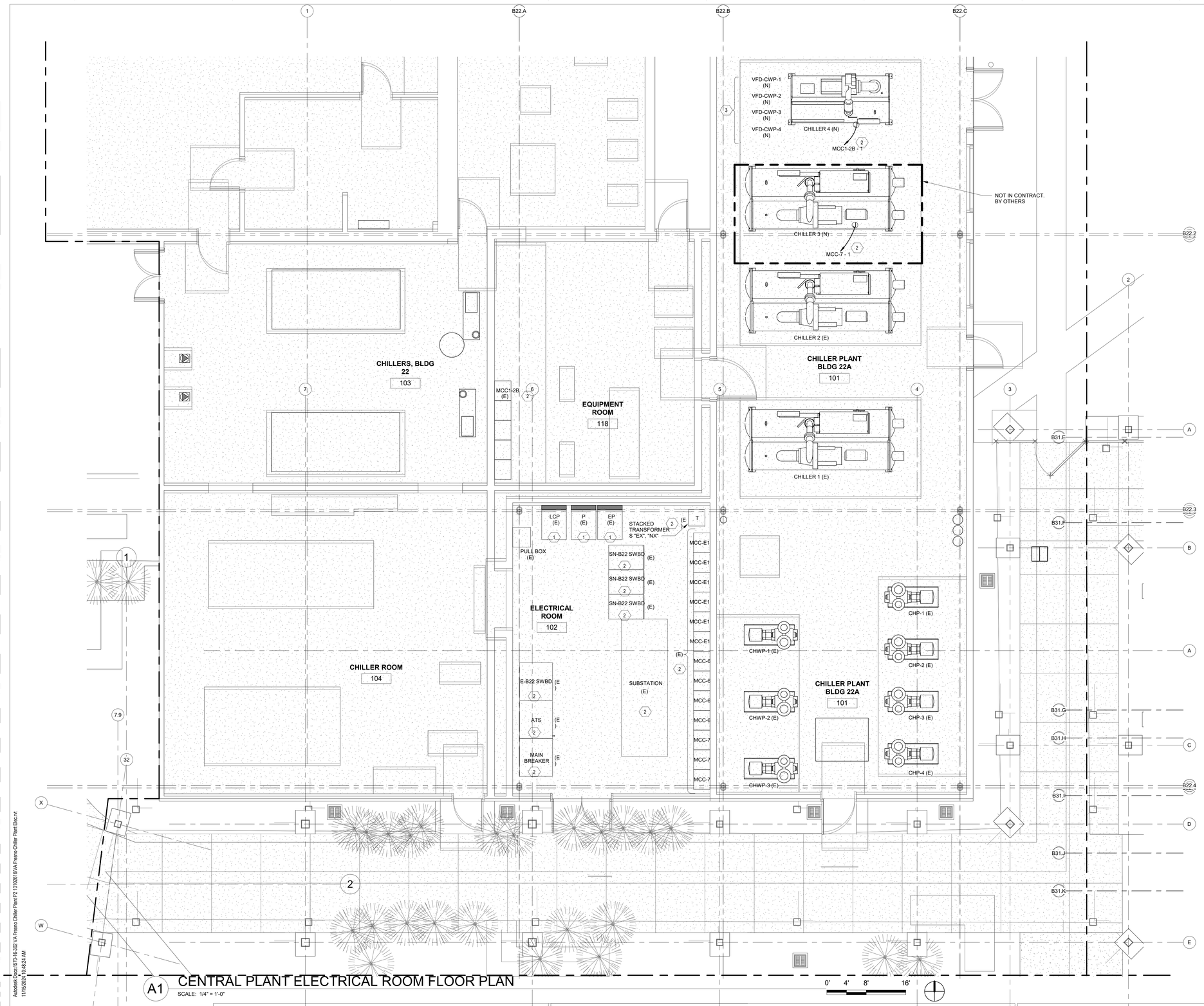
Project Number: **570-16-302**

Building Number

Drawing number: **ESD201**

Office of Construction and Facilities Management

Department of Veterans Affairs



A1 CENTRAL PLANT ELECTRICAL ROOM FLOOR PLAN

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

GENERAL SHEET NOTES

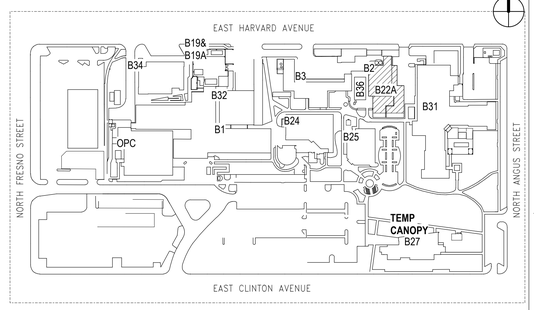
A. REFER TO SHEET E-001 FOR GENERAL NOTES.

KEYNOTES

1. EXISTING PANEL TO REMAIN. REFER TO SHEET E-701 FOR ADDITIONAL INFORMATION.
2. REFER TO SHEET E-601 FOR ADDITIONAL INFORMATION.
3. REFER TO SHEET E-601 AND MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.

THESE AS BUILT OR RECORD DRAWINGS HAVE BEEN PREPARED, IN PART, ON THE BASIS OF INFORMATION COMPILED AND FURNISHED BY OTHERS. THE ENGINEER WILL NOT BE RESPONSIBLE FOR ANY ERRORS OR OMISSIONS WHICH HAVE BEEN INCORPORATED INTO THIS DOCUMENT AS A RESULT.

KEY PLAN



RECORD DRAWINGS

NO	REVISIONS	DATE

PROJECT TEAM

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BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: CENTRAL PLANT ELECTRICAL ROOM FLOOR PLAN

Approved : Project Director

Project Title: **PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS**

Location: **2615 E Clinton Ave, Fresno, CA 93703**

Date: **10/10/2024** | Checked by: **J. MONTANO** | Drawn: **R. RIBA**

Project Number: **570-16-302**

Building Number:

Drawing number: **EP101**

Office of Construction and Facilities Management

Department of Veterans Affairs

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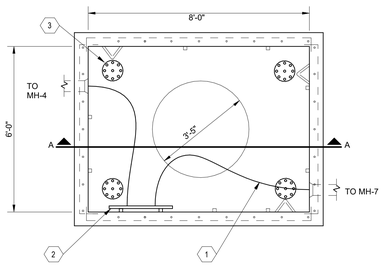
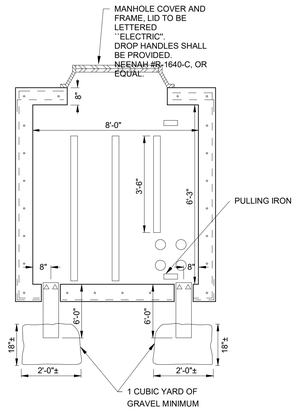


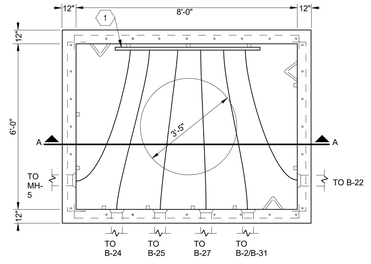


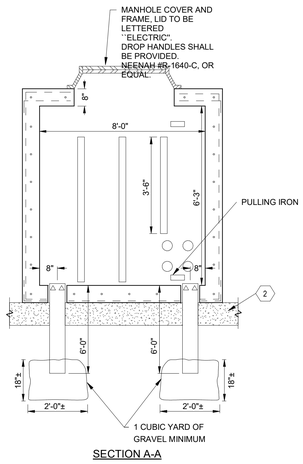
MH-5 PLAN

SECTION A-A

1. NEW 12.47 KV CABLE FROM MANHOLE 7.
2. PROVIDE NEW LOAD BREAK JUNCTION AND LOAD BREAK ELBOWS FOR CABLE.
3. MANHOLE 5: PROVIDE 4" COREDRILL AT BOTTOM OF MANHOLE. PROVIDE METAL GRATE AT TOP OF HOLES. TYPICAL OF 4.

1 SINGLE MANHOLE MH-5 MODIFICATIONS
N.T.S.



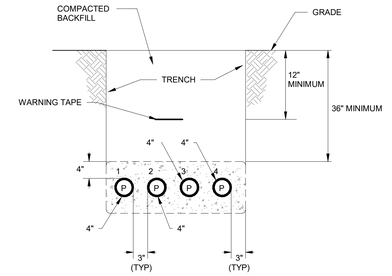


MH-7 NEW WORK PLAN

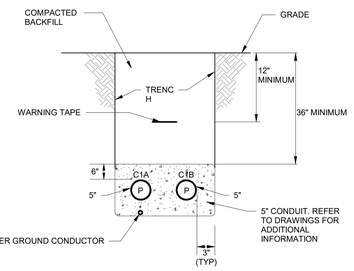
SECTION A-A

1. PROVIDE NEW LOAD BREAK JUNCTION AND LOAD BREAK ELBOWS FOR CABLE.
2. PROVIDE 12'' THICK AGGREGATE BASE ROCK.

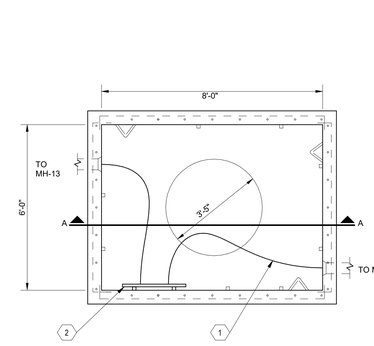
4 SINGLE MANHOLE MH-7 NEW WORK
N.T.S.

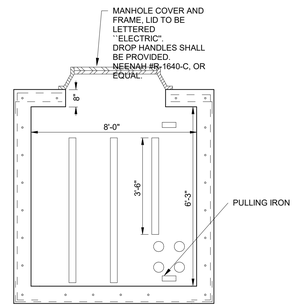


6 PRIMARY DUCT BANK
N.T.S.



2 PRIMARY LOOPING DUCTBANK SECTION
N.T.S.





PB-3 PLAN

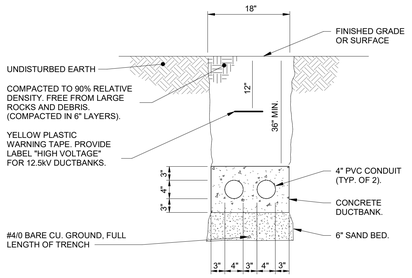
SECTION A-A

1. NEW 12.47 KV CABLE FROM MANHOLE 7.
2. PROVIDE NEW LOAD BREAK JUNCTION AND LOAD BREAK ELBOWS FOR CABLE.

5 SINGLE MANHOLE PB-3
N.T.S.

ADDED

7 PRIMARY DUCT BANK
N.T.S.



3 PRIMARY DUCT BANK
N.T.S.

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RECORD DRAWINGS

NO	REVISIONS	DATE

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TRIPLE C - THE A&E GROUP
A MULTI-DISCIPLINE AE COMPANY

BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: ELECTRICAL DETAILS

Approved : Project Director

Project Title: **PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS**

Location: **2615 E Clinton Ave, Fresno, CA 93703**

Date: **10/10/2024**

Checked by: **J. MONTANO**

Drawn: **R. RIBA**

Project Number: **570-16-302**

Building Number

Drawing number: **E501**

Office of Construction and Facilities Management

Department of Veterans Affairs

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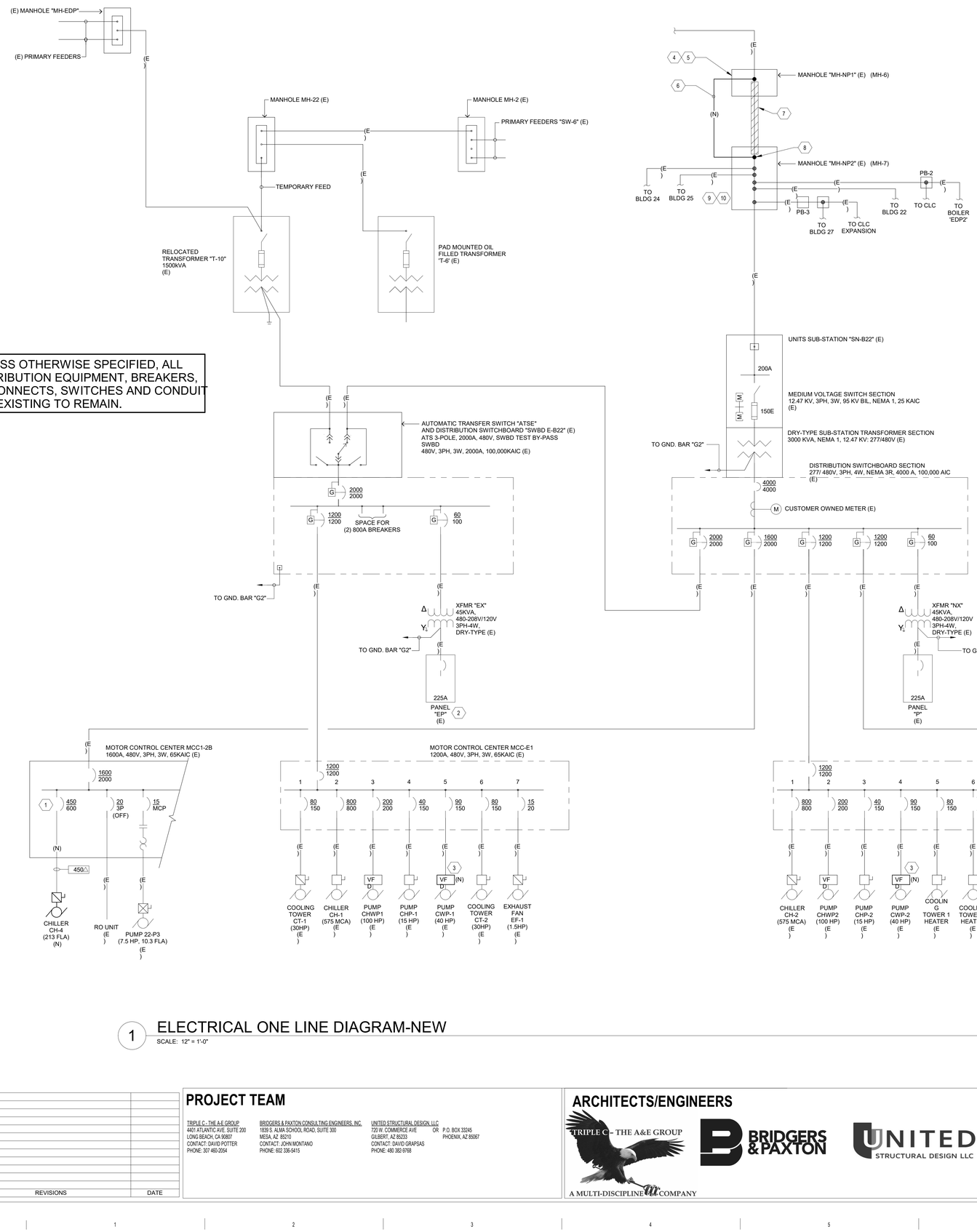

UNLESS OTHERWISE SPECIFIED, ALL DISTRIBUTION EQUIPMENT, BREAKERS, DISCONNECTS, SWITCHES AND CONDUIT ARE EXISTING TO REMAIN.

1 ELECTRICAL ONE LINE DIAGRAM-NEW

SCALE: 12" = 1'-0"

INFORMATION BELOW TAKEN FROM AS-BUILT DRAWINGS, PROJECT NUMBER 570-13-300, DATED 4-17-2015

EMERGENCY MOTORS LOADS			
MOTOR	RATED HP	NEC FULL LOAD CURRENT AT 480V, 3PH (AMPS)	CALCULATED kVA AT 480V, 3PH
COOLING TOWER CT-1		40	31.9
CHILLER CH-1		575	460
PUMP CHWP-1	100	124	98.8
PUMP CHP-1	15	21	16.7
PUMP CWP-1	40	52	41.4
COOLING TOWER CT-2	30	40	31.9
TOTAL LOAD CONCEPT C-3			680.7

NORMAL MOTORS LOADS			
MOTOR	RATED HP	NEC FULL LOAD CURRENT AT 480V, 3PH (AMPS)	CALCULATED kVA AT 480V, 3PH
CHILLER CH-4		213	177
CHILLER CH-2		575	460
PUMP CHWP2	100	124	98.8
PUMP CHP-2	15	21	16.7
PUMP CWP-2	40	52	41.4
COOLING TOWER 1 HEATER		40	31.9
COOLING TOWER 2 HEATER		40	31.9
CHILLER CH-3		575	460
PUMP CHWP3	100	124	98.8
PUMP CHP-3	15	21	16.7
PUMP CWP-3	40	52	41.4
PUMP CWP-4	40	52	41.4
FAN COIL FC-1	1	1.8	1.4
FAN COIL FC-2	3	4.8	3.8
TOTAL LOAD CONCEPT C-3			1521.2

MOTORS LOAD SUMMARY	
EXISTING MOTORS LOAD ON MCC1-2B	325.4 kVA
EMERGENCY MOTOR LOADS	680.7 kVA
NORMAL MOTOR LOADS	1,521.2 kVA
TOTAL MOTOR LOADS ON DSB-B22	2,527.3 kVA

GENERAL SHEET NOTES

A. REFER TO SHEET E-001 FOR GENERAL NOTES.
B. REFER TO SHEET E-701 FOR FEEDER SCHEDULE.
C. 15KV CABLE BYPASS INSTALLATION WILL REQUIRE ELECTRICAL SHUTDOWNS. THE FOLLOWING BUILDINGS WILL BE AFFECTED: BLDG 24, BLDG 25, BLDG 22, BLDG 22 BOILER, BLDG 27, CLC. BUILDING 24 AND BUILDING 25 WILL REQUIRE TEMPORARY GENERATORS DURING THE OUTAGE. THE OTHER BUILDINGS LISTED HAVE EXISTING GENERATOR BACKUP TO BE USED.

KEYNOTES

1. REMOVE AND REPLACE EXISTING 450A CIRCUIT BREAKER AND STARTER. PROVIDE (N) 450A/3P CIRCUIT BREAKER AS INDICATED. LOCATE IN MCC1-2B AS INDICATED AND SPECIFIED BY VA.
2. CONTRACTOR TO PROVIDE LOAD MONITORING OF PANEL AND REPORT FINDINGS TO ENGINEER PRIOR TO ANY WORK.
3. REMOVE AND REPLACE EXISTING DISCONNECT WITH NEW VFD. RECONNECT TO EXISTING CIRCUIT. REFER TO MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
4. EXISTING MANHOLE LOCATED SOUTH OF BUILDING 3 TO BE REPAIRED.
5. CORE DRILL EXISTING MANHOLE AND PROVIDE NEW 5" SLEEVES FOR ROUTING NEW CABLES.
6. PROVIDE NEW 15KV CABLE IN CONCRETE ENCASED DUCTBANK. CABLE SHALL BE INSTALLED PRIOR TO REMOVING EXISTING CABLE. SIZE TO MATCH EXISTING.
7. EXISTING 15KV CABLE SHALL BE REMOVED AFTER INSTALLATION OF NEW CABLE.
8. SPLICE CABLE AND RECONNECT WITH EXISTING MANHOLE.
9. CORE DRILL EXISTING MANHOLE FOR NEW I5KV BYPASS FEEDER FROM MH-NP1.
10. MANHOLE TO BE REPAIRED.

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RECORD DRAWINGS

NO	REVISIONS	DATE

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TRIPLE C - THE A&E GROUP
A MULTI-DISCIPLINE COMPANY

BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: ELECTRICAL ONE-LINE DIAGRAM-NEW

Approved : Project Director

Project Title: PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS

Location: 2615 E Clinton Ave, Fresno, CA 93703

Date: 10/10/2024 | Checked by: J. MONTANO | Drawn: R. RIBA

Project Number: 570-16-302

Building Number:

Drawing number: E-601

Office of Construction and Facilities Management

Department of Veterans Affairs

Autodesk Docs://570-16-302 VA Fresno Chiller Plant P2 10102651 6VA Fresno Chiller Plant Elec.rvt
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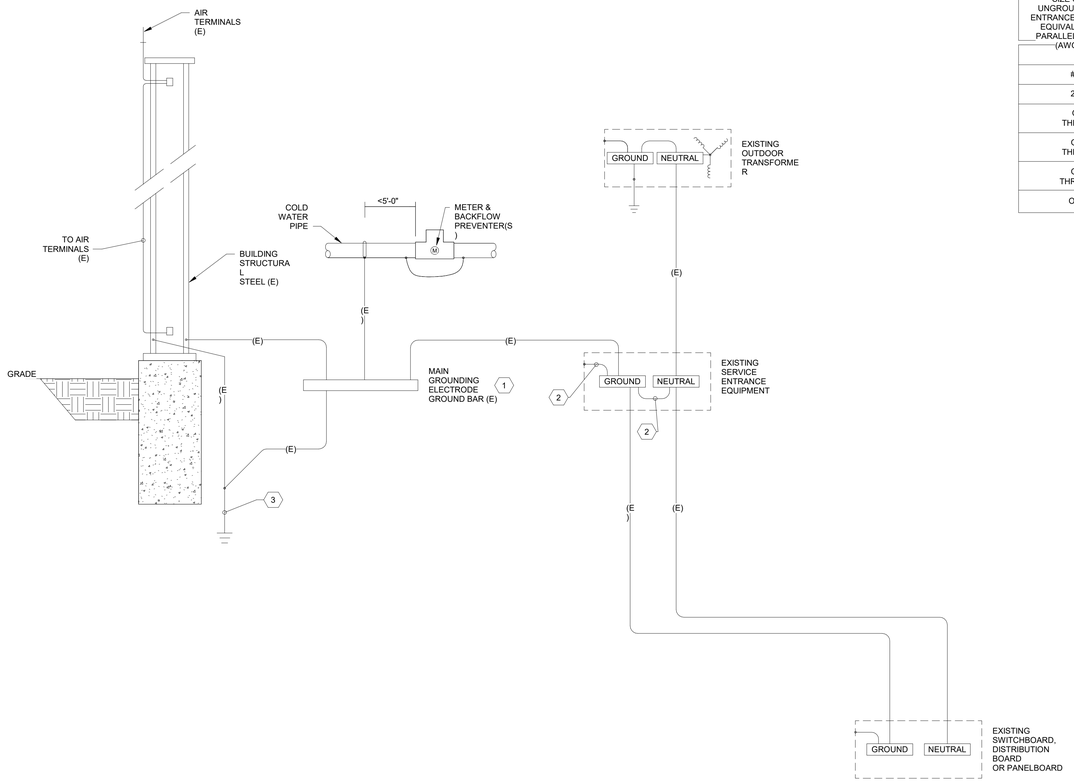

NEC TABLE 250.66

NOTE: ALL CONDUCTORS ARE COPPER.

SIZE OF LARGEST UNGROUNDED SERVICE-ENTRANCE CONDUCTOR OR EQUIVALENT AREA FOR PARALLEL CONDUCTORS. (AWG OR kCMIL)	SIZE OF GROUNDING ELECTRODE CONDUCTOR (AWG)
<= #2	8
#1 OR 1/0	6
2/0 OR 3/0	4
OVER 3/0 THROUGH 350	2
OVER 350 THROUGH 600	1/0
OVER 600 THROUGH 1100	2/0
OVER 1100	3/0

GENERAL SHEET NOTES

A. INSTALL GROUNDING CONNECTIONS TO BUILDING STRUCTURE AND WATER PIPES AT LOCATIONS THAT ARE VISIBLE AND ACCESSIBLE FOR INSPECTION, MAINTENANCE, AND TESTING.
B. BOND ELECTRICAL EQUIPMENT ENCLOSURES TO GROUND BAR USING SAME SIZE CONDUCTOR AS FEEDER EQUIPMENT GROUND CONDUCTOR OR FACTORY PROVIDED GREEN SCREW.
C. CLEAN COATED RE-BAR PRIOR TO PERFORMING ELECTRICAL CONNECTION.

KEYNOTES

1 EXISTING 1/4" X 4" X 12" "MAIN GROUNDING ELECTRODE GROUND BAR" FOR SINGLE POINT GROUNDING.
2 EXISTING BONDING JUMPER SIZED PER GROUNDING ELECTRODE CONDUCTOR SCHEDULE THIS SHEET
3 EXISTING LIGHTNING PROTECTION GROUND ROD.

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RECORD DRAWINGS

NO	REVISIONS	DATE

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ARCHITECTS/ENGINEERS

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A MULTI-DISCIPLINE AE COMPANY
BRIDGERS & PAXTON
UNITED STRUCTURAL DESIGN LLC

Drawing Title: GROUNDING DIAGRAM

Approved : Project Director

Project Title: **PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS**

Location: **2615 E Clinton Ave, Fresno, CA 93703**

Date: **10/10/2024** | Checked by: **J. MONTANO** | Drawn: **R. RIBA**

Project Number: **570-16-302**

Building Number:

Drawing number: **E-602**

Office of Construction and Facilities Management
Department of Veterans Affairs

Autodesk Docs://570-16-302 VA Fresno Chiller Plant P2 10102616 VA Fresno Chiller Plant Elec.rvt
11/15/2024 10:48:20 AM

Branch Panel: EP

(1)

Location: ELECTRICAL ROOM 102 - BLDG B22
Supply From:
Mounting: Surface
Enclosure: Type 1

Volts: 120/208 Wye
Phases: 3
Wires: 4
Spaces: 42

A.I.C. Rating:
Mains Type:
Mains Rating: 225 A
MCB Rating: 125 A

Notes:

CKT	Circuit Description	Notes	Trip	Poles	A	B	C	Poles	Trip	Notes	Circuit Description	CKT
1	BMS PNL		20 A	1	200 VA	200 VA		1	20 A		COOLING TOWER LIGHTS	2
3	BMS PNL		20 A	1		200 VA	360 VA	1	20 A		**LTG - CANOPY DOOR**	4
5	**LTG - CANOPY DOOR**		20 A	1			504 VA	200 VA	1	20 A		ELECT. RM	6
7	ALARM CONTROL PNL		20 A	1	200 VA	200 VA			1	20 A		LIGHTS CHILLER AREA	8
9	ALARM CONTROL PNL		20 A	1		200 VA	200 VA		1	20 A		WALL PACKS	10
11	CONTROL PNL CT-1		20 A	1			200 VA	1200...	1	20 A		SUBSTATION XFMR HEATERS	12
13	CONTROL PNL CT-1		20 A	1	200 VA	200 VA			1	20 A		SUBSTATION XFMR ALARM PNL	14
15	ROOF REC		20 A	1		360 VA	200 VA		1	20 A		CHEMICAL FEED	16
17	Space		--	1			--	200 VA	1	20 A		"ON"	18
19	Space		--	1	--	1200...			1	20 A		SUBSTATION HEATER	20
21	ELEC RM REC		20 A	1		360 VA	200 VA		1	20 A		"ON"	22
23	"ON"		20 A	1			200 VA	200 VA	1	20 A		"ON"	24
25	**REC - CANOPY WALKWAY**		**20 A**	**1**	900 VA	480 VA			**1**	**20 A**		**LTG - CANOPY WALKWAY**	26
27	**REC - CANOPY WALKWAY**		**20 A**	**1**		720 VA	637 VA		**1**	**20 A**		**LTG - CANOPY WALKWAY**	28
29	**REC - CANOPY WALKWAY**		**20 A**	**1**			720 VA	901 VA	**1**	**20 A**		**LTG - CANOPY WALKWAY - ADD ALT**	30
31	**REC - ADD ALT**		**20 A**	**1**	900 VA	504 VA			**1**	**20 A**		**LTG - CANOPY DOOR - ADD ALT**	32
33	**REC - ADD ALT**		**20 A**	**1**		360 VA	504 VA		**1**	**20 A**		**LTG - CANOPY DOOR - ADD ALT**	34
35	**LTG - CANOPY DOOR**		**20 A**	**1**			576 VA	252 VA	**1**	**20 A**		**LTG - CANOPY DOOR - ADD ALT**	36
37	**LTG - CANOPY DOOR**		**20 A**	**1**	504 VA	200 VA			1	20 A		SMOKE DAMPER	38
39	**LTG - CANOPY DOOR**		**20 A**	**1**		504 VA	432 VA		**1**	**20 A**		**LTG - CANOPY DOOR**	40
41	LCP		20 A	1			200 VA	100 VA	1	20 A		FIRE BELL	42
				Total Load:	5888 VA		5237 VA		5453 VA				
				Total Amps:	49 A		44 A		46 A				

(2) (2)

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Other	6095 VA	100.00%	6095 VA		
REC	3600 VA	100.00%	3600 VA	**Total Conn. Load:**	16578 VA
				Total Est. Demand:	16578 VA
				Total Conn. Current:	46 A
				Total Est. Demand Current:	46 A

Notes:

Branch Panel: P

(1)

Location: ELECTRICAL ROOM 102 - BLDG B22
Supply From:
Mounting: Surface
Enclosure: Type 1

Volts: 120/208 Wye
Phases: 3
Wires: 4
Spaces: 42

A.I.C. Rating:
Mains Type:
Mains Rating: 225 A
MCB Rating: 125 A

Notes:

CKT	Circuit Description	Notes	Trip	Poles	A	B	C	Poles	Trip	Notes	Circuit Description	CKT
1	RECEPTS - TOWER PLATFORM		20 A	1	540 VA	300 VA		1	20 A		LIGHTS - TOWER PLATFORM	2
3	RECEPTS - ROOF		20 A	1		360 VA	550 VA	1	20 A		LIGHTS - ROOF	4
5	RECEPTS - ROOF		20 A	1			360 VA	534 VA	1	20 A		LIGHTS - ELECTRICAL ROOM	6
7	RECEPTS - ROOF		20 A	1	360 VA	1600...			1	20 A		LIGHTS - CHILLER ROOM	8
9	RECEPTS - CHILLER ROOM		20 A	1			720 VA	450 VA	1	20 A		LIGHTS - EXTERIOR	10
11	RECEPTS -CHILLER ROOM		20 A	1				900 VA	600 VA	1	20 A	BACKDRAFT DAMPERS	12
13	"ON"		20 A	1	200 VA	200 VA				1	20 A	MOD BUS CONVERTER	14
15	RECEPTS - MECH ALARM PANEL		20 A	1			200 VA	200 VA		1	20 A	"ON"	16
17	**REC - CANOPY WALKWAY**		**20 A**	**1**				540 VA	844 VA	**1**	**20 A**	**LTG - CANOPY WALKWAY - ACCENT...**	18
19	**REC - CANOPY WALKWAY**		**20 A**	**1**	540 VA	905 VA				**1**	**20 A**	**LTG - CANOPY WALKWAY - ACCENT...**	20
21	Space		--	1			--	653 VA		**1**	**20 A**	**LTG - CANOPY WALKWAY - ACCENT...**	22
23	Space		--	1					--	1182...	**1**	**20 A**	**LTG - CANOPY ACCENT - ADD ALT**	24
25	Space		--	1	--	--					1	--	Space	26
27	Space		--	1			--	--			1	--	Space	28
29	Space		--	1					--	--	1	--	Space	30
31	Space		--	1	--	--					1	--	Space	32
33	Space		--	1			--	--			1	--	Space	34
35	Space		--	1					--	--	1	--	Space	36
37	Space		--	1	--	--					1	--	Space	38
39	Space		--	1			--	--			1	--	Space	40
41	Space		--	1					--	--	1	--	Space	42
				Total Load:	4645 VA		3133 VA		4960 VA					
				Total Amps:	41 A		26 A		43 A					

(2) (2)

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Other	240 VA	100.00%	240 VA		
CON	1144 VA	100.00%	1144 VA	**Total Conn. Load:**	12738 VA
REC	1080 VA	100.00%	1080 VA	**Total Est. Demand:**	13288 VA
LTG	2200 VA	125.00%	2750 VA	**Total Conn. Current:**	35 A
				Total Est. Demand Current:	37 A

Notes:

LUMINAIRE SCHEDULE - *7595.01*

NOTES

1. **MANUFACTURERS CATALOG NUMBERS REPRESENT MANUFACTURER SERIES. SHOP DRAWING SUBMITTALS WILL INCLUDE ALL PART NUMBERS REPRESENTING ALL ITEMS OF THIS LUMINAIRE SCHEDULE. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ORDER LUMINAIRES TO INCLUDE ALL PARTS INDICATED ON SCHEDULE FOR EACH LUMINAIRE. SUBMITTAL WILL CALL OUT EACH PART CLEARLY.**
2. **LUMINAIRE REQUIRES MOUNTING COORDINATION WITH ARCHITECT PRIOR TO COMMENCEMENT OF ANY WORK. THIS LUMINAIRE MAY REQUIRE A HIGHER OR LOWER MOUNTING FROM THAT PROVIDED ON THIS SCHEDULE OR NOTES ON PLAN DUE TO ARCHITECTURAL REQUIREMENTS OR CONSTRUCTION CONDITIONS.**
3. **ALL LUMINAIRES ON THIS LUMINAIRE SCHEDULED ARE APPROVED FOR BID ON THIS PROJECT. IF A LUMINAIRE IS SUBMITTED THAT IS NOT ON THIS SCHEDULE IT WILL BE REJECTED.**

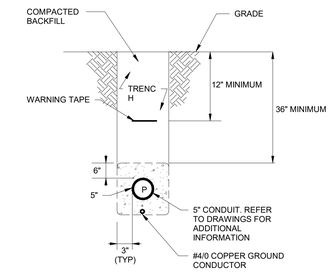
TYPE	DESCRIPTION	VOLT	MOUNTING	LAMPS	BALLAST	EM BAT. PK.	LENS	MANUFACTURER/MODEL NO.	NOTES
BLIE	LED TAPE STRIP W/ ALUMINUM MOUNTING CHANNEL, 24VDC - 120V POWER SUPPLY. WET LOCATION AND UL LISTED.	120V	SURFACE	LED 4000K	LED DRIVER	-	-	**LUMINII #**LL54WET SERIES **TIVOLI #**TPL-HO-O SERIES	**1,2,3**
C2LE	2" ROUND LED DOWN LIGHT FIXTURE WITH SEMI-SPECULAR CLEAR REFLECTOR, ADJUSTABLE OPTICS, SELF FLANGED, DAMP LOCATION AND UL LISTED.	120V-277V	RECESSED	LED 4000K 900 LUMENS	LED DRIVER	-	-	**GOTHAM #**ICO-2-ADJL SERIES **PRESCOLITE #**A2LED SERIES	**1,2,3**
C8LE	8" ROUND LED DOWN LIGHT FIXTURE WITH SEMI-SPECULAR CLEAR REFLECTOR, AND WHITE TRIM RING. WET LOCATION AND UL LISTED.	120-277V	RECESSED	LED 4000K	LED DRIVER	-	-	**INDY #SD8** 11LUM SERIES **PRESCOLITE #**LC8SL SERIES	**1,2,3**
L1SI	6 FOOT LONG x 3.75" x 4.5" SQUARE ALUMINUM HOUSING, DIRECT, LENSED LED LUMINAIRE. WET LOCATION AND UL LISTED.	120-277V	RECESSED	LED 4000K	LED DRIVER	-	FLAT	**A-LIGHT #**SD5-6 SERIES **PINNACLE #**EX3-WET SERIES	**1,2,3**
SLI	13" LONG LED STEPLIGHT. COORDINATE WITH ARCHITECT FOR COLOR. WET LOCATION AND UL LISTED.	120-277V	RECESSED	LED 4000K	LED DRIVER	-	FROSTY GLASS	**LUMUX #**SL650L SERIES **WINONA #**STEP 13 WL 9LONG SERIES	**1,2,3**
ZL	LED FLEX TUBE, 24VDC - 120V POWER SUPPLY, WET LOCATION AND UL LISTED.	120V	SURFACE	LED	LED DRIVER	-	-	**ANTROX LIGHTING SOLUTIONS #**LSV-10-OPAL SERIES **I LIGHT TECHNOLOGIES #**T24 SERIES	**1,2,3**

COPPER FEEDER SCHEDULE

NOTE: ALL CONDUCTORS ARE COPPER, TYPE THWN/THHN UNLESS OTHERWISE NOTED.

DESIGNATION	CONDUCTORS	GROUND	CONDUIT	NOTES
THREE PHASE THREE WIRE & GROUND FEEDER				
20Δ	3#12	12	3/4"	
25Δ	3#10	10	3/4"	
30Δ	3#10	10	3/4"	
35Δ	3#8	10	3/4"	
40Δ	3#8	10	3/4"	
45Δ	3#8	10	3/4"	
50Δ	3#8	10	3/4"	
60Δ	3#6	10	1"	
70Δ	3#4	8	1 1/4"	
80Δ	3#4	8	1 1/4"	
90Δ	3#2	8	1 1/4"	
100Δ	3#2	8	1 1/4"	
125Δ	3#1	6	1 1/2"	
150Δ	3#1/0	6	1 1/2"	
175Δ	3#2/0	6	2"	
200Δ	3#3/0	6	2"	
225Δ	3#4/0	4	2 1/2"	
250Δ	3-250 KCMIL	4	3"	
300Δ	3-350 KCMIL	4	3"	
350Δ	3-500 KCMIL	2	4"	
400Δ	3-600 KCMIL	2	4"	
450Δ	(2) 3#4/0	(2) 2	(2) 2 1/2"	
500Δ	(2) 3-250 KCMIL	(2) 2	(2) 3"	
600Δ	(2) 3-350 KCMIL	(2) 1	(2) 3"	
700Δ	(2) 3-500 KCMIL	(2) 1	(2) 4"	
800Δ	(2) 3-600 KCMIL	(2) 1/0	(2) 4"	
1000Δ	(3) 3-400 KCMIL	(3) 2/0	(3) 3"	
1200Δ	(3) 3-600 KCMIL	(3) 3/0	(3) 4"	
1600Δ	(4) 3-600 KCMIL	(4) 4/0	(4) 4"	
2000Δ	(5) 3-600 KCMIL	(5)250 KCMIL	(5) 4"	
2500Δ	(6) 3-600 KCMIL	(6)350 KCMIL	(6) 4"	
3000Δ	(8) 3-500 KCMIL	(8)400 KCMIL	(8) 4"	
4000Δ	(10) 3-600 KCMIL	(10)500 KCMIL	(10) 4"	
THREE PHASE FOUR WIRE & GROUND FEEDER				
20Y	4#12	12	3/4"	
25Y	4#10	10	3/4"	
30Y	4#10	10	3/4"	
35Y	4#8	10	3/4"	
40Y	4#8	10	3/4"	
45Y	4#8	10	3/4"	
50Y	4#8	10	3/4"	
60Y	4#6	10	1"	
70Y	4#4	8	1 1/4"	
80Y	4#4	8	1 1/4"	
90Y	4#2	8	1 1/4"	
100Y	4#2	8	1 1/4"	
125Y	4#1	6	1 1/2"	
150Y	4#1/0	6	2"	
175Y	4#2/0	6	2"	
200Y	4#3/0	6	2"	
225Y	4#4/0	4	2 1/2"	
250Y	4-250 KCMIL	4	3"	
300Y	4-350 KCMIL	4	3"	
350Y	4-500 KCMIL	2	4"	
400Y	4-600 KCMIL	2	4"	
450Y	(2) 4#4/0	(2) 2	(2) 2 1/2"	
500Y	(2) 4-250 KCMIL	(2) 2	(2) 3"	
600Y	(2) 4-350 KCMIL	(2) 1	(2) 3"	
700Y	(2) 4-500 KCMIL	(2) 1	(2) 4"	
800Y	(2) 4-600 KCMIL	(2) 1/0	(2) 4"	
1000Y	(3) 4-400 KCMIL	(3) 2/0	(3) 3"	
1200Y	(3) 4-600 KCMIL	(3) 3/0	(3) 4"	
1600Y	(4) 4-600 KCMIL	(4) 4/0	(4) 4"	
2000Y	(5) 4-600 KCMIL	(5) 250 KCMIL	(5) 4"	
2500Y	(6) 4-600 KCMIL	(6) 350 KCMIL	(6) 4"	
3000Y	(8) 4-500 KCMIL	(8) 400 KCMIL	(8) 4"	
4000Y	(10) 4-600 KCMIL	(10) 500 KCMIL	(10) 4"	
5000Y	(12) 4-600 KCMIL	(12) 700 KCMIL	(12) 4"	
EQUIPMENT BONDING JUMPER FOR SEPARATELY DERIVED SYSTEMS PER NEC 250.66 (PROVIDE CONDUCTOR GROUND BELOW INSTEAD OF FEEDER GROUND FOR THREE PHASE, 4-WIRE SYSTEMS INDICATED ABOVE)				
DESIGNATION		GROUND		
20YS THRU 100YS		8		
125YS THRU 150YS		6		
175YS THRU 200YS		4		
225YS THRU 300YS		2		
350YS THRU 500YS		1/0		
600YS THRU 700YS		2/0		
800YS THRU 5000YS		3/0		
THREE PHASE FOUR WIRE 200% NEUTRAL & GROUND FEEDER				
100Y-E	3#2, 1#4/0 NEUTRAL	8	2"	
150Y-E	3#2/0, 2#2/0 NEUT.	6	2"	
225Y-E	3-250 KCMIL 2-250 KCMIL NEUT.	4	2 1/2"	
350Y-E	(2) 3#3/0, (2) 2#3/0 NEUT.	(2) 2	(2) 2 1/2"	
400Y-E	(2) 3#4/0, (2) 2#4/0 NEUT.	(2) 2	(2) 2 1/2"	
500Y-E	(2) 3-350 KCMIL (2) 2-350KCMIL NEUT.	(2) 2	(2) 3"	

(1) COPPER FEEDER SCHEDULE
NONE



(2) PRIMARY RADIAL DUCTBANK SECTION
N.T.S.

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GENERAL SHEET NOTES

A. REFER TO SHEET E-001 FOR GENERAL NOTES.
B. REFER TO SHEET A-904 FOR IMAGES OF LIGHT FIXTURES.

KEYNOTES

1. EXISTING PANEL TO REMAIN.
2. PROVIDE (N) 20A/1P CIRCUIT BREAKER IN SPACE INDICATED. UPDATE PANEL INDEX ACCORDINGLY.

KEYPLAN

RECORD DRAWINGS

NO	REVISIONS	DATE

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A MULTI-DISCIPLINE COMPANY

BRIDGERS & PAXTON

UNITED STRUCTURAL DESIGN LLC

Drawing Title: ELECTRICAL SCHEDULES

Approved : Project Director

Project Title: **PHASE 2 CHILLER INFRASTRUCTURE ON FRESNO CAMPUS**

Location: **2615 E Clinton Ave, Fresno, CA 93703**

Date: **10/10/2024**
Checked by: **J. MONTANO**
Drawn: **R. RIBA**

Project Number: **570-16-302**
Building Number:
Drawing number: **E-701**

Office of Construction and Facilities Management
Department of Veterans Affairs

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