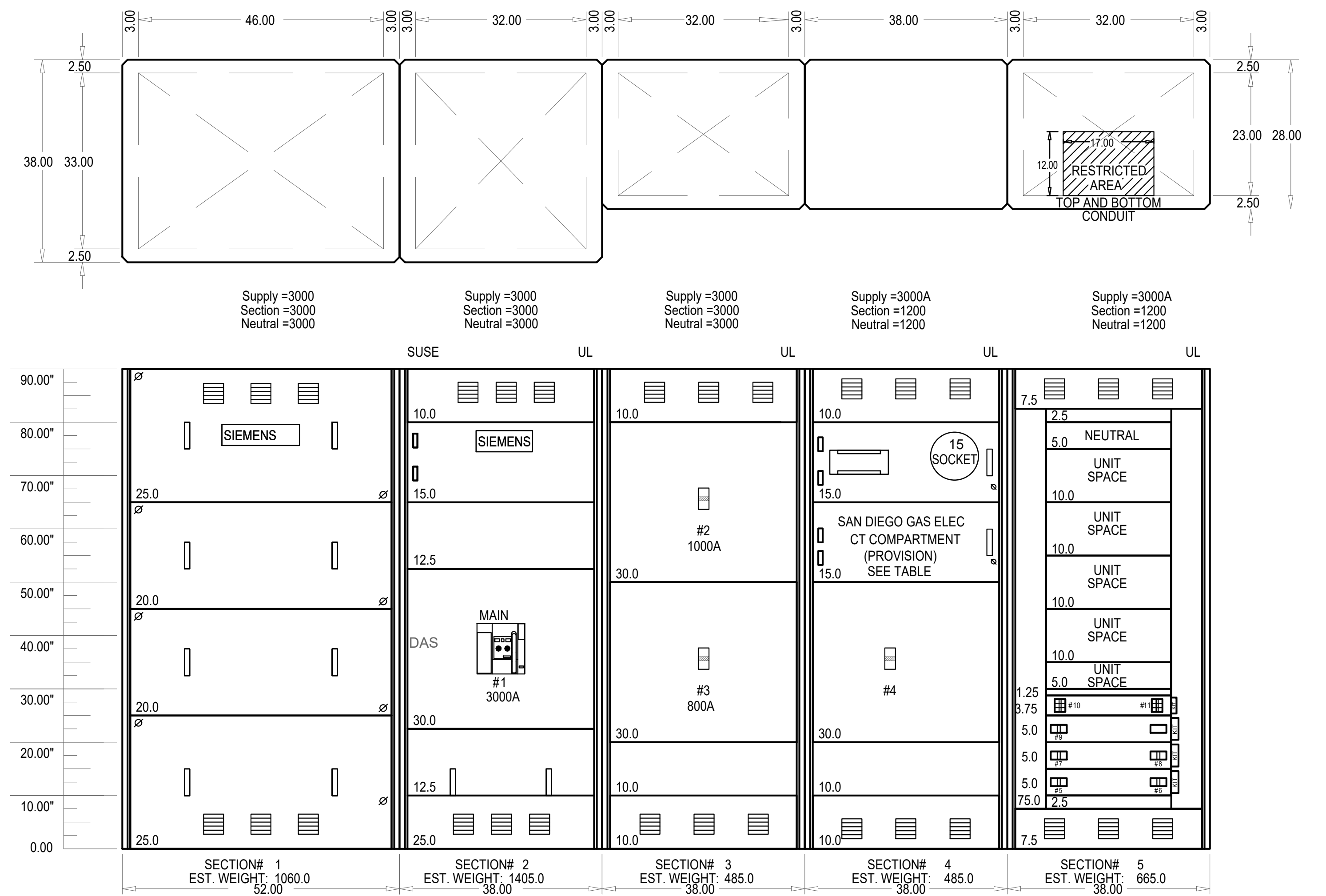


**SINGLE-LINE DIAGRAM KEYED NOTES**

- VERIFY WITH SERVICE PLANNER FOR AIC RATING AND ELECTRICAL INFORMATION BEFORE ISSUING ANY BID. NOTIFY ENGINEER IMMEDIATELY IF MAJOR DISCREPANCIES OCCURS.
- CONTRACTOR TO PROVIDE COORDINATION PERFORMS CALCULATIONS OF DOWNSTREAM CIRCUIT BREAKERS.
- OVERCURRENT DEVICE 1200AMP AND GREATER SHALL COMPLY WITH NEC 240.67. PROVIDE ERMS SWITCH WITH LOCAL STATUS INDICATED TO REDUCE ARC FLASH ENERGY. LABEL EQUIPMENT WITH THE ARC FLASH HAZARD.
- CONTRACTOR TO PROVIDE FULL ARC FLASH REPORT AND INSTALL LABELING OF THE ARC FLASH RATING ON ALL EQUIPMENT.
- PROVIDE SHUNT TRIP CIRCUIT BREAKER CONNECT TO POWER SHUT DOWN SWITCH IN ELEV RM CONNECT TO FIRE ALARM PANEL TO SHUT DOWN PRIOR TO SPRINKLER RELEASING.
- IF THE FAULT CURRENT AT THE ELEVATOR CONTROLLER EXCEEDS THE CONTROLLER'S RATED CAPACITY, THE ELEVATOR MANUFACTURER SHALL PROVIDE AN AUTOTRANSFORMER TO REDUCE THE FAULT CURRENT AT THE CONTROLLER.
- STUB UP CONDUIT FOR PV SYSTEM. PV SYSTEM SHALL BE SUBMITTED UNDER A SEPARATE PERMIT. ELECTRICAL CONTRACTOR SHALL COORDINATE WITH PV CONSULTANT FOR THE EXACT SIZE OF BREAKER, CONDUIT AND ALL ELECTRICAL REQUIREMENTS. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE TO SIZE THE BUS BAR OF PANEL PER NEC 705.12(D)(2)(3)(C).

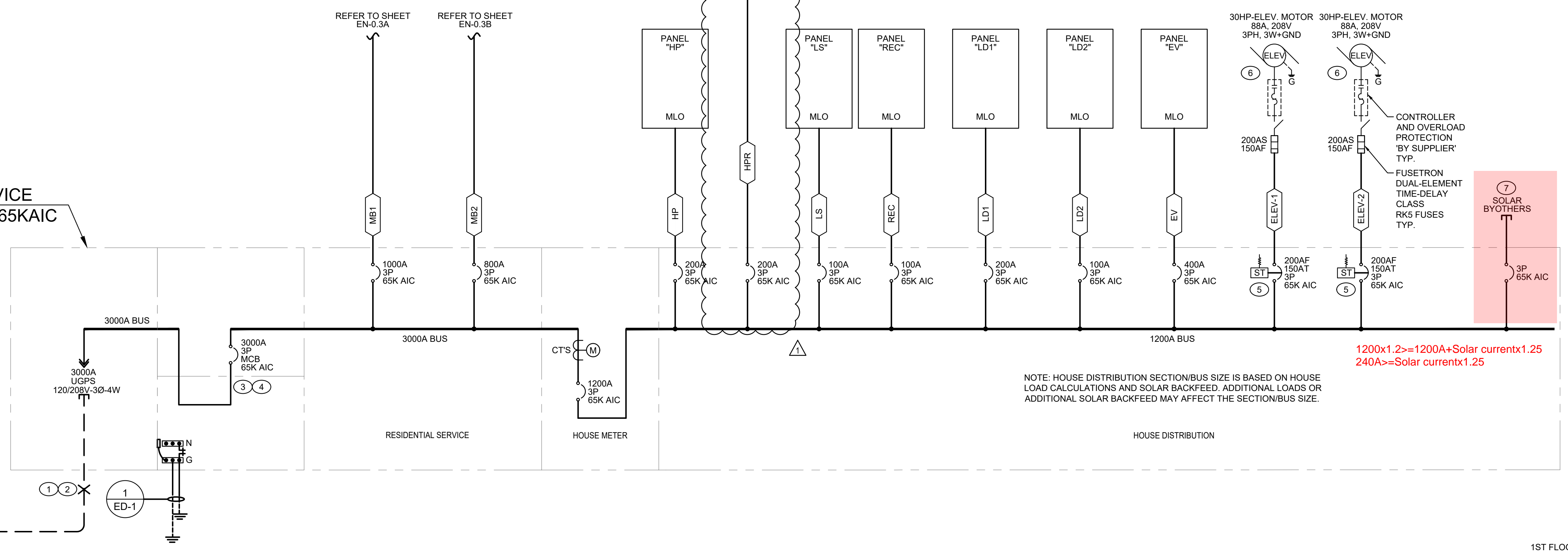
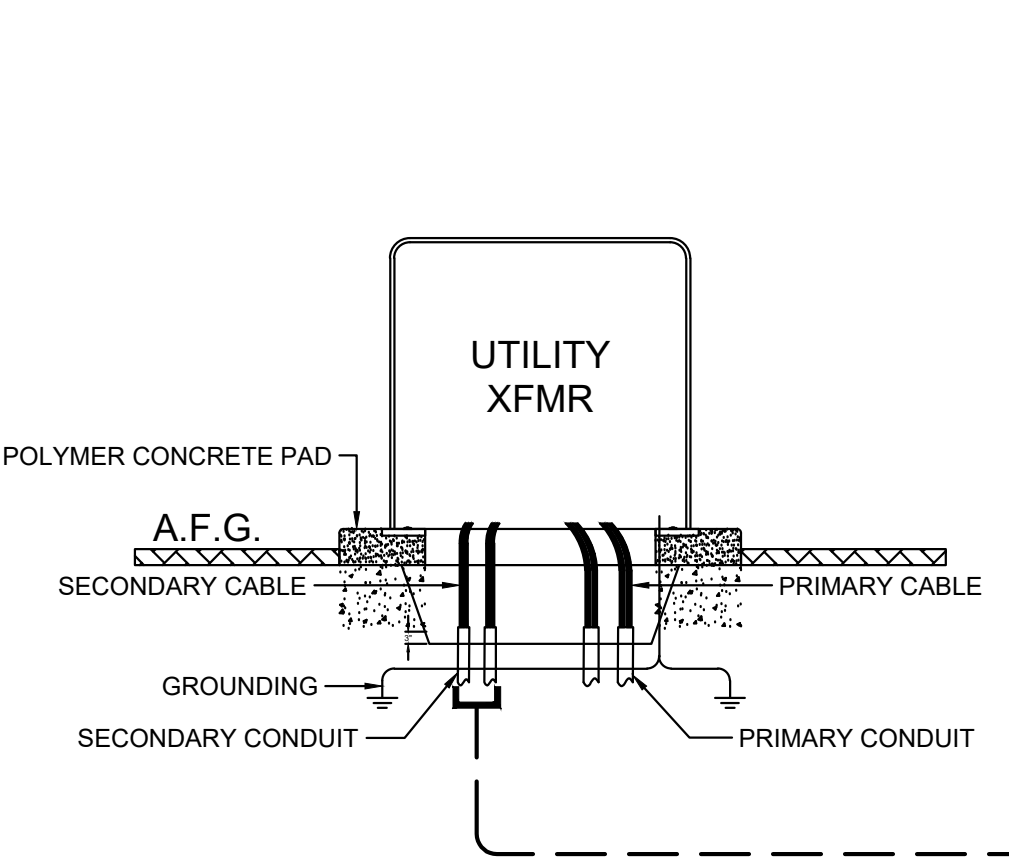
**SINGLE-LINE DIAGRAM GENERAL NOTES**

- THE MAXIMUM AVAILABLE FAULT CURRENT IS BASED ON WORST CASE FAULT CURRENT PUBLISHED BY THE UTILITY COMPANY. CONTRACTOR TO OBTAIN FAULT CURRENT LETTER FROM UTILITY COMPANY FOR EACH SERVICE BEFORE ORDERING SWITCHBOARD. IF AVAILABLE FAULT CURRENT IS HIGHER THAN SHOWN IN THE DRAWINGS, CONTACT ELECTRICAL ENGINEER IMMEDIATELY.
- LETTER FOR SHORT CIRCUIT CURRENT VALUE FROM UTILITY COMPANY SHALL BE AVAILABLE AT THE JOB SITE FOR INSPECTION.
- ELECTRICAL EQUIPMENT SHALL BE LISTED BY THE CITY, WHERE THE PROJECT IS LOCATED, RECOGNIZED ELECTRICAL TESTING LABORATORY OR APPROVED BY THE DEPARTMENT.
- ALL NEW CIRCUIT BREAKERS, FUSIBLE SWITCHES, AND ELECTRICAL EQUIPMENT SHALL BE FULLY RATED AND SHALL HAVE A SHORT-CIRCUIT (AIC) RATINGS EXCEEDING THE AVAILABLE SHORT-CIRCUIT CURRENT AT THE EQUIPMENT. SERIES-RATED IS ACCEPTABLE, PROVIDED THAT THE SERIES RATING CHART IS RECEIVED, REVIEWED, AND VERIFIED FOR ACCURACY AND COMPLIANCE. IF SERIES RATED COMPONENTS ARE USED THEY MUST BE INSTALLED AND MAINTAINED PER THE MANUFACTURER'S SERIES RATING CHART AND LABELED ACCORDINGLY PER NEC SECTION 110.22 AND 240.83(C). ELECTRICAL CONTRACTOR SHOULD ENSURE SPECIFIC MARKING ON EACH PIECE OF EQUIPMENT CONTAINING AN OVER CURRENT DEVICE USED IN THE SERIES COMBINATION. THIS MARKING SHOULD BE READILY VISIBLE AND STATE THE FOLLOWING: "CAUTION-SERIES COMBINATION SYSTEM RATED \_\_\_\_\_ AMPERES. IDENTIFIED REPLACEMENT COMPONENT REQUIRED".
- ALL SWITCHBOARDS AND DISTRIBUTION BOARDS SHALL HAVE:
  - TIN-PLATED ALUMINUM BUSSING WITH RECTANGULAR CROSS SECTION. HORIZONTAL AND VERTICAL BUSSING SHALL BE FULL LENGTH AND SHALL HAVE PROVISIONS FOR FUTURE EXTENSIONS. ALL BUSSING SHALL HAVE MINIMUM WITHSTAND RATING EQUAL TO THE AVAILABLE FAULT CURRENT INDICATED. ALL VERTICAL AND HORIZONTAL BUSSING SHALL BE RATED AT FULL CAPACITY IN ALL SWITCHBOARD AND DISTRIBUTION BOARD SECTIONS. PROVIDE 100% NEUTRAL BUSSING MINIMUM UNLESS OTHERWISE NOTED. PROVIDE FULL LENGTH GROUND BUS AND, WHERE INDICATED ON PLANS, ISOLATED GROUND BUSSING. PROVIDE REAR WIRE WAY IN ALL SWITCHBOARD SECTIONS.
  - LUGS SUITABLE FOR USE WITH COPPER OR ALUMINUM CONDUCTORS LISTED FOR USE WITH 75 DEGREE CELSIUS AMPACITY CONDUCTORS.
  - PERMANENT PLACARD(S) MARKED PER THE SPECIFICATIONS AND PER NEC (OR CEC-WHERE ADOPTED) SECTIONS 225.37, 230.2(E), 690.56, 692.56, 700.7, 701.7, 702.7, AND 705.10 DENOTING THE PRESENCE OF ADDITIONAL SERVICES, PHOTOVOLTAIC SYSTEMS, FUEL CELLS, EMERGENCY OR STANDBY POWER SOURCES AS APPLICABLE.
  - SINGLE LINE DIAGRAM SHOWN IS A "FULLY RATED SYSTEM" UNLESS NOTED OTHERWISE.
  - THE MAXIMUM COMBINED VOLTAGE DROP ON BOTH INSTALLED FEEDER CONDUCTORS AND BRANCH CONDUCTORS TO THE FARTHEST CONNECTED LOAD OR OUTLET SHALL NOT EXCEED 5 PERCENT.
  - ALL ELECTRICAL EQUIPMENT SHALL BE LABELED, LISTED, OR CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LABORATORY ACCREDITED BY THE UNITED STATES OCCUPATIONAL SAFETY HEALTH ADMINISTRATION.
  - A WRITTEN RECORD OF PERFORMANCE TESTING OF THE GROUND-FAULT PROTECTION OF EQUIPMENT MUST BE PROVIDED TO THE FIELD INSPECTOR PRIOR TO APPROVAL OF FINAL INSPECTION. SEE THE 2022 CALIFORNIA ELECTRICAL CODE ARTICLE 230.95 (C) PERFORMANCE TESTING. FOR APPLICABLE SERVICES THAT ARE MORE THAN 150 VOLTS TO GROUND BUT NOT EXCEEDING 1000 VOLTS PHASE-TO-PHASE ONLY.



**A ELECTRICAL EQUIPMENT ELEVATION**  
SCALE: 3/4" = 1'-0"

**BUILDING A - 'MSA' SERVICE**  
3000A 120/208V, 3φ, 4W, 65KAIC



NOTE: HOUSE DISTRIBUTION SECTION/BUS SIZE IS BASED ON HOUSE LOAD CALCULATIONS AND SOLAR BACKFEED. ADDITIONAL LOADS OR ADDITIONAL SOLAR BACKFEED MAY AFFECT THE SECTION/BUS SIZE.

$1200 \times 1.25 = 1500 \text{A}$   
 $1500 \text{A} + \text{Solar current} \times 1.25 = 2400 \text{A}$

WORST CASE VD		
ITEM	DESCRIPTION	VD %
1	FEEDER 'MB1'	0.76
2	FEEDER '300'	2.23
Sub Total for Feeder		2.99
3	HEAT PUMP TO ROOF	1.5
Sub Total For Branch		1.50
TOTAL FOR FEEDER AND BRANCH		4.49

WORST CASE VD		
ITEM	DESCRIPTION	VD %
1	FEEDER 'MB2'	0.74
2	FEEDER '310'	2.23
Sub Total for Feeder		2.97
3	HEAT PUMP TO ROOF	1.5
Sub Total For Branch		1.50
TOTAL FOR FEEDER AND BRANCH		4.47

Voltage Drop and Short Circuit Calculation																			
CABLE NAME	PANEL NAME	UNIT/ CIRCUIT	VOLTS	PHASE	DEMAND AMPS	AMPS	FEEDER			CONDUIT			FAULT CURRENT						
							PARALLEL RUNS	PHASE CONDUCTOR	EQUIPMENT GROUNDING CONDUCTOR	CONDUCTOR MATERIAL	CONDUCTOR INSULATION	CONDUIT TYPE	CONDUIT SIZE	FILL% (<40%)	DISTANCE (FT) 'L'	%VD	FAULT CURRENT	Isc	AIC
HPR	HPR	HPR	208	3	200	200	1	250	4	ALUM	THHN	EMT	2 1/2	28.51%	30	0.5	65000	27784	42000
LS	LS	LS	208	3	100	100	1	40	1	ALUM	THHN	EMT	2 1/2	24.77%	257	2.35	65000	4699	10000
REC	REC	REC	208	3	100	100	1	40	1	ALUM	THHN	EMT	2 1/2	24.77%	200	2.66	65000	4163	10000
LD1	LD1	LD1	208	3	200	200	1	250	4	ALUM	THHN	EMT	2 1/2	28.51%	108	1.8	65000	11164	22000
LD2	LD2	LD2	208	3	100	100	1	250	10	ALUM	THHN	EMT	2 1/2	30.27%	342	2.85	65000	3995	10000
EV	EV	EV	208	3	400	400	2	250	1	ALUM	THHN	EMT	2 1/2	29.77%	25	0.42	65000	41717	42000
ELEV-1	ELEV-1	ELEV-1	208	3	200	200	1	30	6	CU	THHN	EMT	2	33.44%	38	0.6	65000	24987	42000
ELEV-2	ELEV-2	ELEV-2	208	3	200	200	1	30	6	CU	THHN	EMT	2	33.44%	233	3.69	65000	6008	10000
MB1	MB1	MB1	208	3	941	1000	3	600	40	ALUM	THHN	EMT	3 1/2	32.86%	50	0.76	65000	44860	65000
MB2	MB2	MB2	208	3	730	800	3	400	30	ALUM	THHN	EMT	3	29.54%	50	0.74	65000	42177	65000

NOTE: THE VOLTAGE DROP IN THE ABOVE TABLE IS AN ESTIMATED LENGTH THE CONTRACTOR SHALL REVISE THE FEEDER SCHEDULE BASED ON THE ACTUAL LENGTH IN THE FIELD, AND INCREASE OR DECREASE THE FEEDER SIZE TO ACCOMMODATE THE VOLTAGE DROP. PER NEC 2022.19(A) AND 215.2(A)(1)(b) THE FEEDER AND BRANCH CIRCUIT SHALL BE SIZED TO PREVENT VOLTAGE DROP NOT EXCEEDING 3% AND TOTAL VOLTAGE DROP FOR BRANCH CIRCUIT AND FEEDER SHALL NOT EXCEED 5%.

PROJECT:  
El Camino  
Real Apartments

LOCATION:  
Oceanside  
San Diego  
CA

SINGLE LINE DIAGRAM

PROJECT NUMBER:  
66621  
ENGINEER:  
DRAFTER:  
SHEET NUMBER:

**EN-0.3**