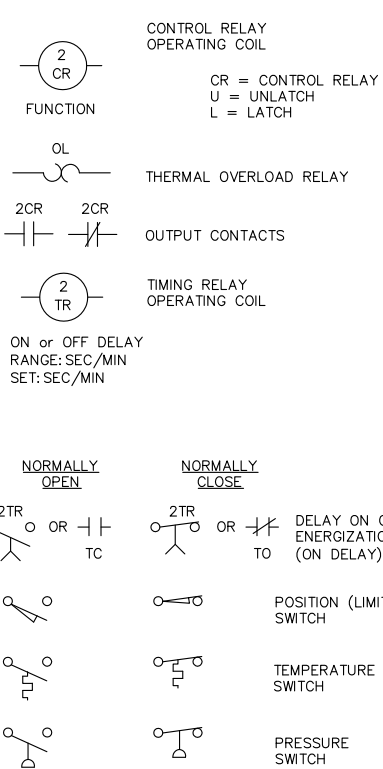
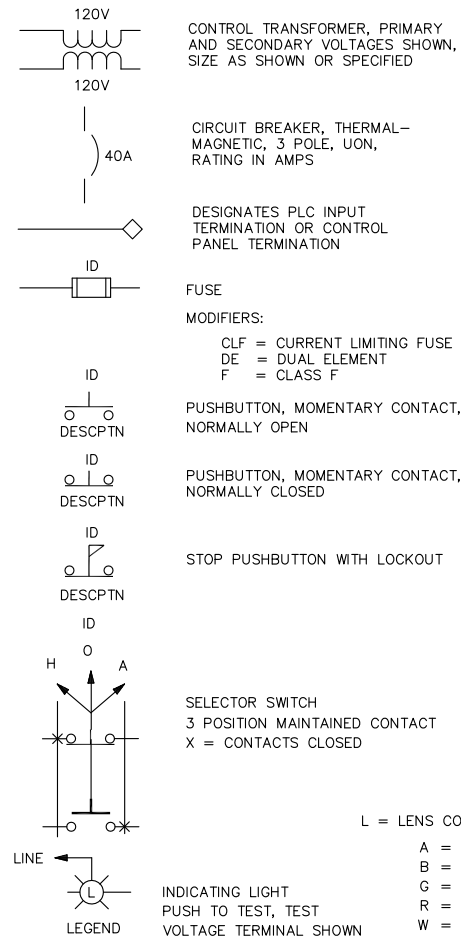
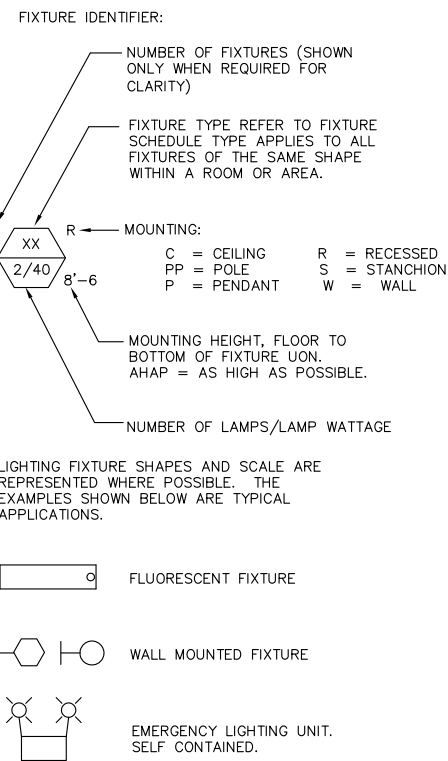


**CONTROL DIAGRAM SYMBOLS**



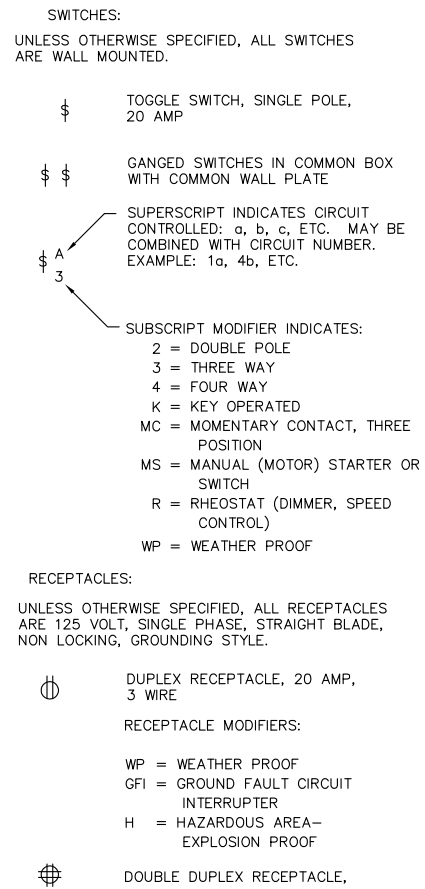
**LIGHTING**



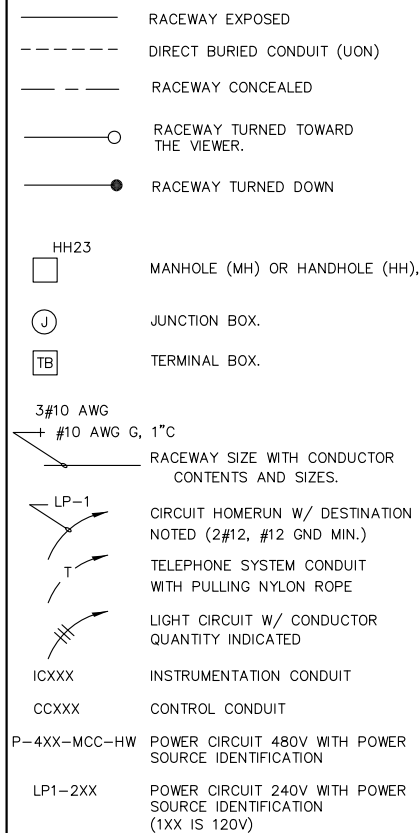
**STANDARD ABBREVIATIONS**

|            |  |
|------------|--|
| A          | AMMETER                                |
| ATS        | AUTOMATIC TRANSFER SWITCH              |
| BCW        | BARE COPPER WIRE                       |
| C          | CONDUIT                                |
| C.O.       | CONDUIT ONLY (EMPTY CONDUIT)           |
| CP         | CONTROL PANEL                          |
| CPT        | CONTROL POWER TRANSFORMER              |
| CS         | CONTROL SWITCH                         |
| CT         | CONTACTOR (HEAVY DUTY)                 |
| FS         | FLOAT SWITCH                           |
| G          | GROUND                                 |
| HZ         | HERTZ                                  |
| KVAR       | REACTIVE POWER                         |
| KW         | KILOWATT                               |
| KWHR       | KILOWATTHOUR                           |
| I/O        | INPUT/OUTPUT                           |
| LOS        | LOCKOUT STOP                           |
| MTS        | MANUAL TRANSFER SWITCH                 |
| MCC        | MOTOR CONTROL CENTER                   |
| MCP        | MOTOR CIRCUIT PROTECTOR                |
| MF         | MULTI-FUNCTION METER DISPLAY           |
| MIN        | MINIMUM                                |
| MSGR       | MAIN SWITCHGEAR                        |
| NC         | NORMALLY CLOSED                        |
| NO         | NOT IN CONTRACT                        |
| NTS        | NORMALLY OPEN                          |
| NTS        | NOT TO SCALE                           |
| PAIR OR PR | TWISTED, SHIELDED PAIRS                |
| PB         | PULL BOX                               |
| PLC        | PROGRAMMABLE LOGIC CONTROLLER          |
| QUAD       | TWISTED, SHIELDED 4-CONDUCTOR CABLE    |
| PP         | POWER POLE                             |
| RTD        | RESISTANCE THERMAL DETECTOR            |
| RTU        | REMOTE TERMINAL UNIT                   |
| SCADA      | SUPERVISORY CONTROL & DATA ACQUISITION |
| SSRS       | SOLID STATE REDUCED VOLTAGE STARTER    |
| SWGR       | SWITCHGEAR                             |
| THD        | HARMONIC DISTORTION                    |
| TS         | TEMPERATURE SWITCH                     |
| UON        | UNLESS OTHERWISE NOTED                 |
| V          | VOLTMETER                              |
| VFD        | VARIABLE FREQUENCY DRIVE               |
| WP         | WEATHER PROOF (NEMA 4X)                |
| XFMR       | TRANSFORMER                            |

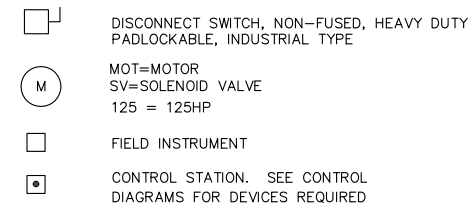
**WIRING DEVICES**



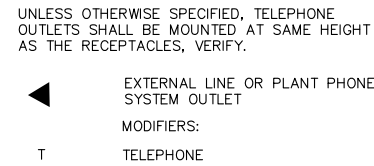
**CIRCUITS AND RACEWAYS**



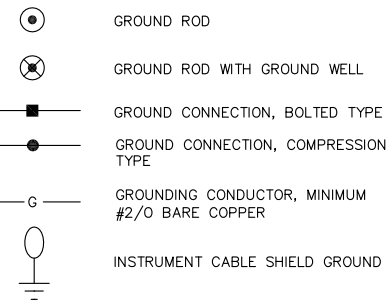
**MOTORS AND EQUIPMENT**



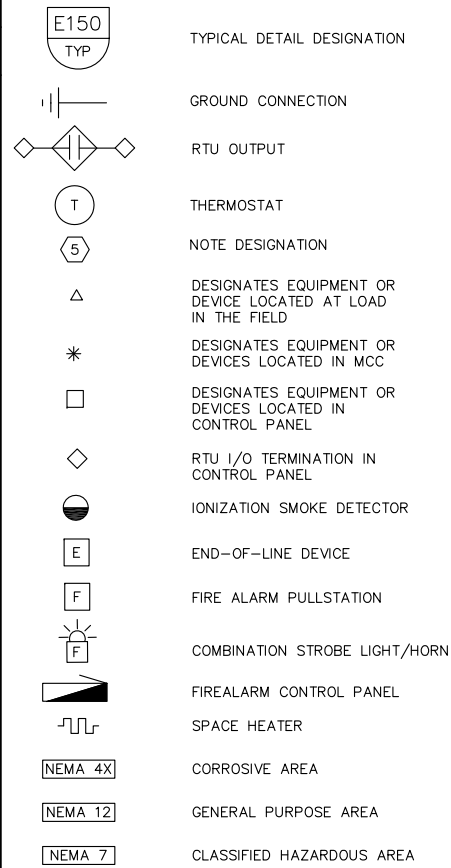
**TELEPHONE & COMMUNICATION SYSTEMS**



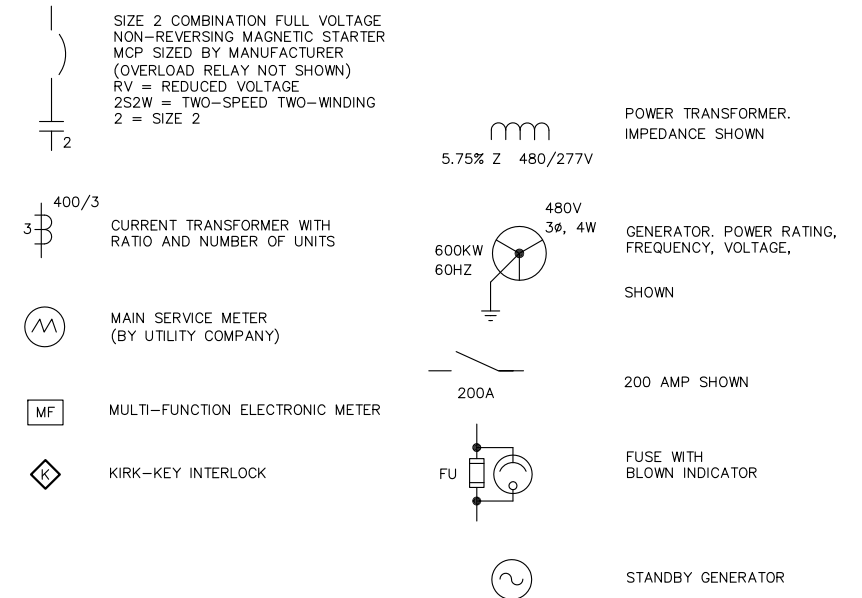
**GROUNDING**



**MISCELLANEOUS**



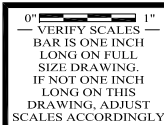
**ONE-LINE DIAGRAM SYMBOLS**



**GENERAL NOTES**

- THIS DRAWING IS GENERAL IN NATURE. SOME SYMBOLS SHOWN HEREON MAY NOT BE USED ON THE CONTRACT DRAWINGS.
- IDENTIFICATIONS (ID), SIZES, RATINGS, LOCATIONS AND SIMILAR INFORMATION SHOWN ASSOCIATED WITH SYMBOLS ARE OPTIONAL; EXAMPLES OF SUCH INFORMATION ARE SHOWN WITH SOME SYMBOLS FOR CLARITY.
- THE ELECTRICAL DRAWINGS USE THE ONE-LINE DIAGRAMS AND PANEL SCHEDULES IN CONJUNCTION WITH SHOWING THE LOCATION OF THE ELECTRICAL/INSTRUMENTATION SOURCES AND LOADS/DEVICES SHOWN ON THE PLAN DRAWINGS TO DEPICT THE WORK. THE CONTRACTOR SHALL USE THESE DOCUMENTS TO DETERMINE AND PROVIDE THE NECESSARY RACEWAY AND WIRING SYSTEM FOR EACH CIRCUIT. ALL INDOOR RACEWAY SHALL BE RUN EXPOSED, AND ROUTED BY THE CONTRACTOR, UNLESS OTHERWISE NOTED. THE TYPE OF RACEWAY AND WIRE USED SHALL BE AS SPECIFIED IN THE SPECIFICATIONS UNLESS OTHERWISE NOTED.
- THE LOCATION OF THE CONTROL STATIONS SHOWN ON THE PLAN DRAWINGS ARE DIAGRAMMATIC AND THE ACTUAL LOCATION SHALL BE COORDINATED IN THE FIELD WITH THE CONSTRUCTION MANAGER.
- THE EXACT LOCATION OF THE MOTORS AND ACCESSORIES ARE NOT SHOWN. THE CONTRACTOR SHALL COORDINATE THE STRUCTURAL AND MECHANICAL DRAWINGS FOR CONDUIT STUBOUT AND TERMINATION LOCATIONS.
- ALL EQUIPMENT SHALL BE LABELED WITH NAMEPLATES. DESCRIPTION OF EQUIPMENT SHALL BE IN ACCORDANCE WITH THE ONE-LINE DIAGRAM DESCRIPTION. A LIST OF THE NAMEPLATES SHALL BE SUBMITTED TO THE CONSTRUCTION MANAGER PRIOR TO ENGRAVING.
- UNLESS OTHERWISE NOTED, ALL CONVENIENCE OUTLETS SHALL BE MOUNTED AT 48-INCHES ABOVE FINISHED FLOOR. ALL LIGHT SWITCHES SHALL BE MOUNTED AT 54-INCHES ABOVE FINISHED FLOOR.
- EACH CONVENIENCE OUTLET AND LIGHTING CIRCUIT SHALL BE PROVIDED WITH A #12AWG GREEN GROUNDING CONDUCTOR
- FOR SPARE CONDUCTORS, AT EACH END, TAPE & COIL UP AND PROVIDE ENGRAVED TAG IDENTIFYING "FROM AND TO" DESTINATION.
- ALL EXTERIOR CONDUITS SHALL BE PVC COATED RIGID GALVANIZED STEEL. ALL OUTDOOR ENCLOSURES SHALL BE NEMA 4X.
- CONDUIT ENTERING OR LEAVING CLASSIFIED HAZARDOUS LOCATION SHALL BE PROVIDED WITH "EYS" SEALS PER NEC.
- ELECTRICAL DRAWINGS DO NOT SHOW ALL REQUIRED DEMOLITION. SEE MECHANICAL DRAWINGS FOR ADDITIONAL DEMOLITION.

**PRELIMINARY**



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| APPROVED: | RMC ENGR      |

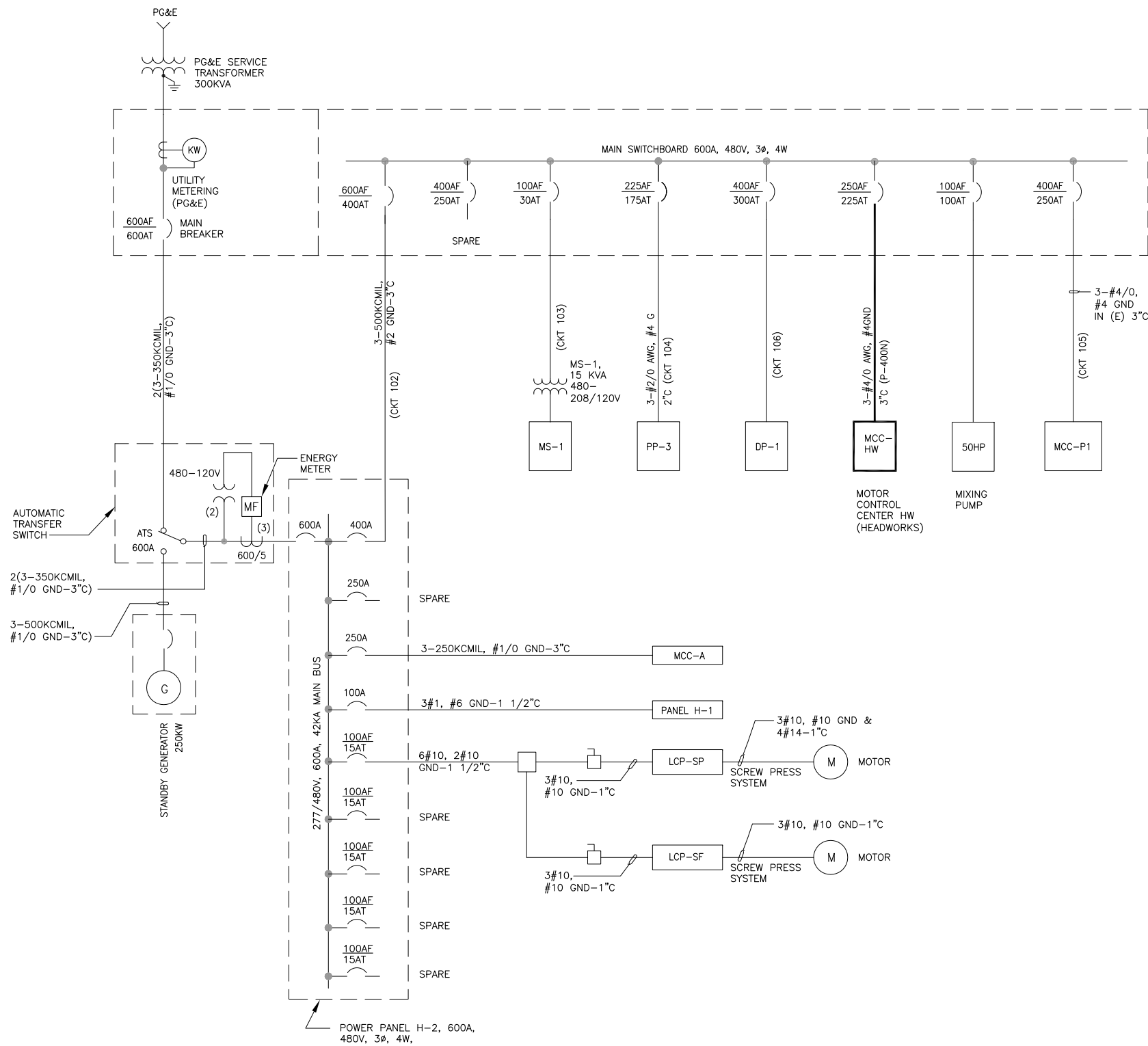
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| SAUSALITO - MARIN CITY SANITARY DISTRICT |  |
| LEGEND AND SYMBOLS                       |  |

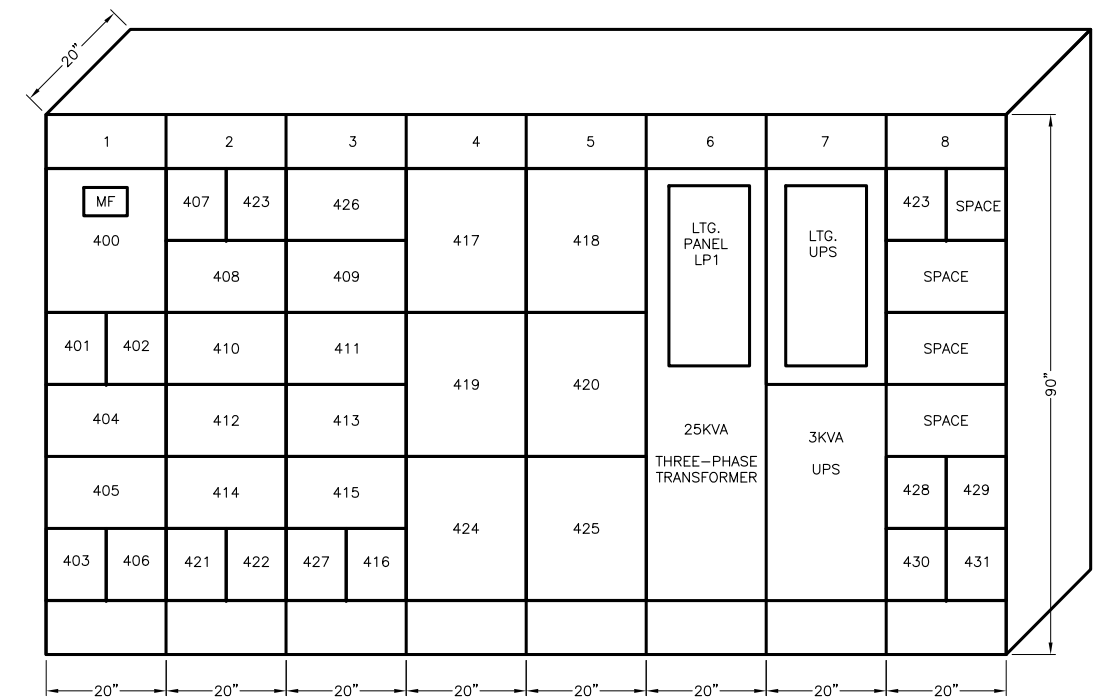
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| SHEET NO | X OF        |
| PROJ NO  | 055-003     |
| DATE     | AUGUST 2011 |

SHEET NOTES:

1 xx



**MAIN SINGLE-LINE DIAGRAM** A  
SCALE: NTS



**MCC-HW ELEVATION** B  
SCALE: NTS

**PRELIMINARY**

FILENAME: 286-E02 8-31-11 03:08pm Eloy XREFS: X-SMCSO-TBLK <--->

0" 1"  
VERIFY SCALES  
BAR IS ONE INCH  
LONG ON FULL  
SIZE DRAWING.  
IF NOT ONE INCH  
LONG ON THIS  
DRAWING, ADJUST  
SCALES ACCORDINGLY

**ENGINEERS, INC.**  
Oakland, San Francisco, Orange County, CA

**RMC**  
Water and Environment

| REV | DATE | BY | APVD | DESCRIPTION |
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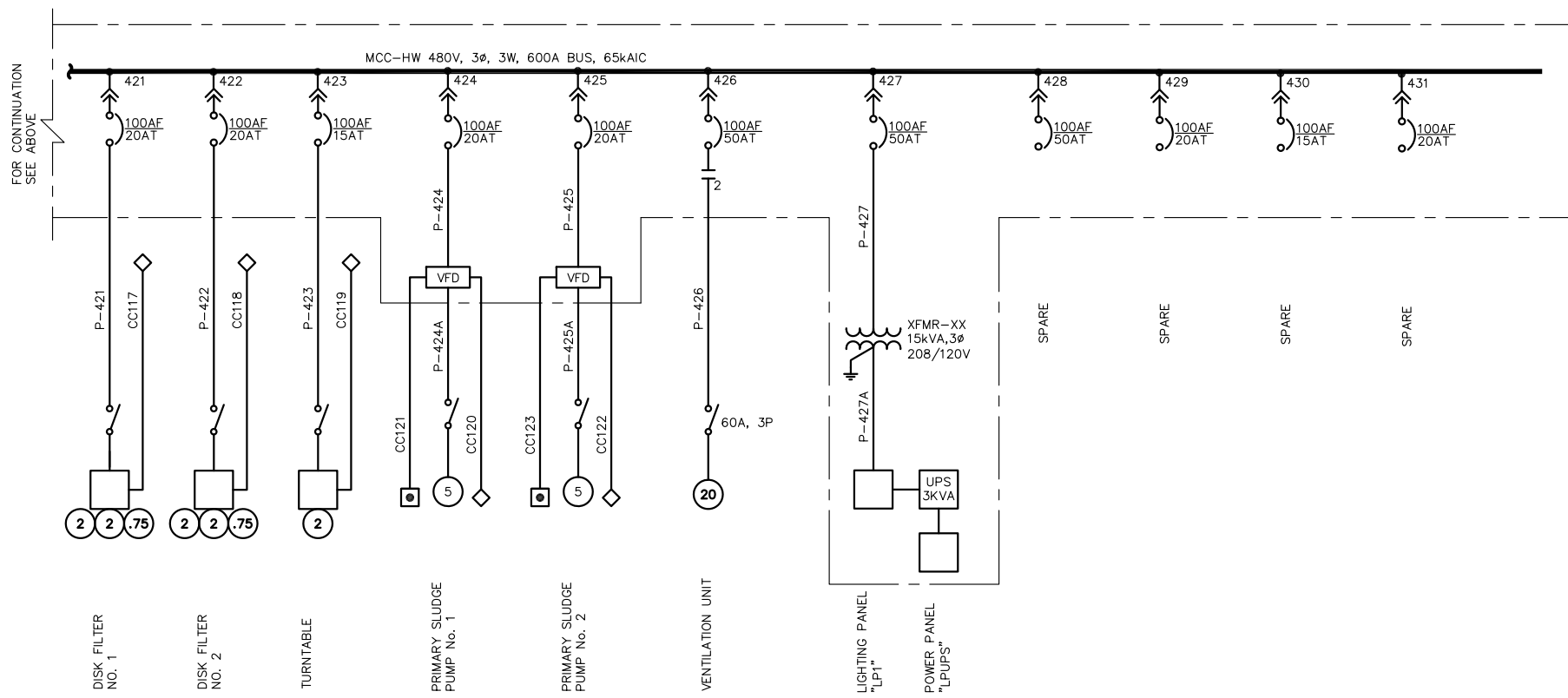
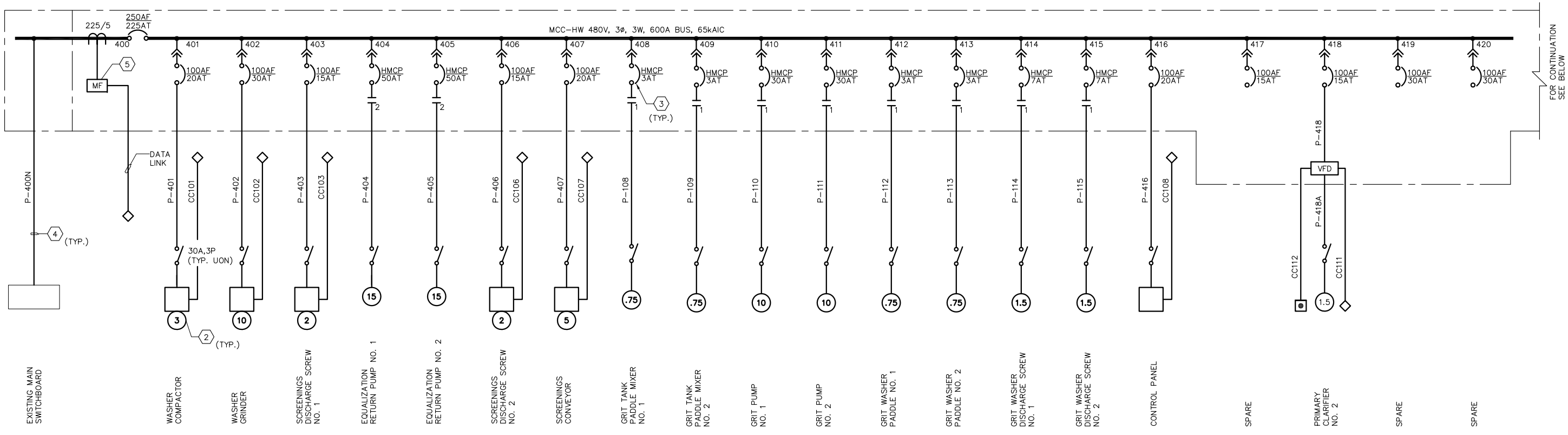
DESIGNED TN  
DRAWN EA  
CHECKED DN

SUBMITTED:  
RMC PROJ ENGR  
APPROVED:  
RMC ENGR

SAUSALITO - MARIN CITY SANITARY DISTRICT  
PLANT SINGLE - LINE DIAGRAM AND  
MCC HW ELEVATION

DWG NO E-2  
SHEET NO X OF  
PROJ NO 055-003  
DATE AUGUST 2011

FILENAME: 286-EO3 8-31-11 03:10pm Eloy || REF: X-SMSD-TBLK 12-11-11



| LOADS TABULATIONS   |           |               |       |
|---|-----------|---------------|-------|
|   | HP OR KVA | CURRENT @480V | NOTES |
| TOTAL LOADS   | 136       | 163.59        |       |
| DEMAND LOADS  | 87        | 104.69        |       |
| LOAD FACTOR = $\frac{\text{DEMAND LOADS}}{\text{TOTAL LOADS}} = \frac{\text{KVA}}{\text{KVA}} = 64\%$ |           |               |       |
| 125% OF LARGEST LOAD = $20 \times 1.25 = 25\text{KVA}$  |           |               |       |
| MCC SIZING:<br>136KVA + 25KVA = 161KVA  |           |               |       |

- SHEET NOTES:**
- 1 THE MCC SHALL BE LOCATED IN THE GENERAL PURPOSE, NON-CLASSIFIED LOCATION.
  - 2 ALL MOTORIZED EQUIPMENT SHOWN ARE LOCATED IN CLASSIFIED HAZARDOUS LOCATIONS AND SHALL BE EXPLOSION PROOF. REFER TO SPECIFIC FLOOR PLANS FOR SPECIFIC CLASSIFICATION OF THE HAZARDOUS LOCATION.
  - 3 ALL BREAKERS SHOWN ARE THREE-POLE U.O.N.
  - 4 REFER TO CABLE AND CONDUIT SCHEDULES SHOWN ON DRAWING E-XX FOR CONDUIT AND CABLE DETAILS.
  - 5 PROVIDE REQUIRED PT'S AND CT'S FOR COMPLETE FUNCTIONS OF THE MULTI-FUNCTION ELECTRONIC METER.
  - 6 ALL POWER CIRCUITS SHALL HAVE SUBFIX "MCC-HW". SEE CABLE AND CONDUIT SCHEDULE ON DRAWING E-XX.

**SINGLE-LINE DIAGRAM - MOTOR CONTROL CENTER MCC-HW** (A) (1) (6)

SCALE: NTS

**PRELIMINARY**

0" 1" VERIFY SCALES - BAR IS ONE INCH LONG ON FULL SIZE DRAWING. IF NOT ONE INCH LONG ON THIS DRAWING, ADJUST SCALES ACCORDINGLY

**ENGINEERS, INC.**  
National, San Francisco, Orange County, CA



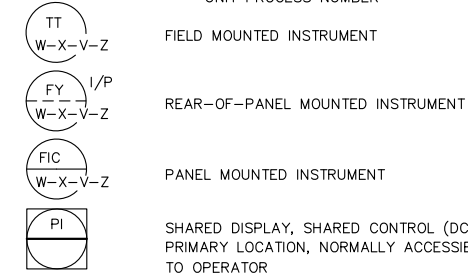
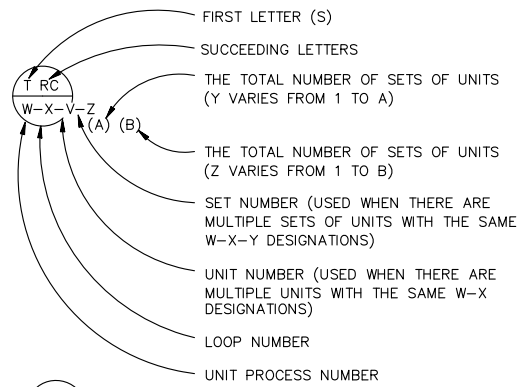
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| DRAWN     | EA |                             |
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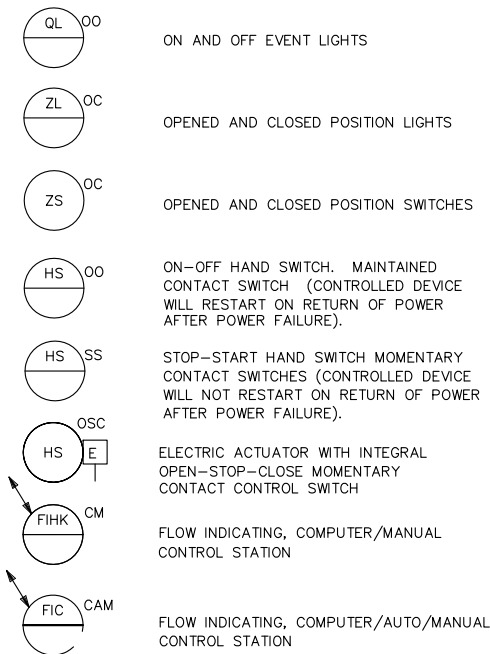
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| SAUSALITO - MARIN CITY SANITARY DISTRICT |  | DWG NO   | E-3         |
| SINGLE LINE DIAGRAM MCC-HW               |  | SHEET NO | X OF        |
|  |  | PROJ NO  | 055-003     |
|  |  | DATE     | AUGUST 2011 |

**INSTRUMENT IDENTIFICATION**

EXAMPLE SYMBOLS



SPECIAL CASES



**INTERNATIONAL SOCIETY FOR AUTOMATION (ISA) TABLE**

| LETTER | FIRST LETTER (S)               |              | SUCCEEDING LETTERS          |  |                   |
|--------|--------------------------------|--------------|-----------------------------|--|-------------------|
|        | PROCESS OR INITIATING VARIABLE | MODIFIER     | READOUT OR PASSIVE FUNCTION | OUTPUT FUNCTION                                      | MODIFIER          |
| A      | ANALYSIS (+)                   |              | ALARM                       |  |                   |
| B      | BURNER FLAME                   |              | USERS CHOICE (+)            | USERS CHOICE (+)                                     | USERS CHOICE (+)  |
| C      | CONDUCTIVITY                   |              |                             | CONTROL  |                   |
| D      | DENSITY (S.G)                  | DIFFERENTIAL |                             |  |                   |
| E      | VOLTAGE                        |              | PRIMARY ELEMENT             |  |                   |
| F      | FLOW RATE                      | RATIO        |                             |  |                   |
| G      | GAUGE                          |              | GLASS                       | GATE   |                   |
| H      | HAND (MANUAL)                  |              |                             |  | HIGH              |
| I      | CURRENT                        |              | INDICATE                    |  |                   |
| J      | POWER                          | SCAN         |                             |  |                   |
| K      | TIME OR SCHEDULE               |              |                             | CONTROL STATION                                      |                   |
| L      | LEVEL                          |              | LIGHT (PILOT)               |  | LOW               |
| M      | MOTION                         |              |                             |  | MIDDLE            |
| N      | USERS CHOICE (+)               |              | USERS CHOICE (+)            | USERS CHOICE (+)                                     | USERS CHOICE (+)  |
| O      | USERS CHOICE (+)               |              | ORIFICE                     |  |                   |
| P      | PRESSURE (OR VACUUM)           |              | POINT (TEST CONNECTION)     |  |                   |
| Q      | QUANTITY OR EVENT(+)           | INTEGRATE    | INTEGRATE                   |  |                   |
| R      |                                |              | RECORD OR PRINT             |  |                   |
| S      | SPEED OR FREQUENCY             | SAFETY       |                             | SWITCH   |                   |
| T      | TEMPERATURE                    |              |                             | TRANSMIT   |                   |
| U      | MULTIVARIABLE (+)              |              | MULTIFUNCTION (+)           | MULTIFUNCTION (+)                                    | MULTIFUNCTION (+) |
| V      | VISCOSITY                      |              |                             | VALVE OR DAMPER                                      |                   |
| W      | WEIGHT OR FORCE                |              | WELL                        |  |                   |
| X      | UNCLASSIFIED (+)               |              | UNCLASSIFIED (+)            | UNCLASSIFIED (+)                                     | UNCLASSIFIED (+)  |
| Y      | USERS CHOICE (+)               |              |                             | RELAY OR COMPUTE (+)                                 |                   |
| Z      | POSITION                       |              |                             | DRIVE, ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT |                   |

(+) WHEN USED, EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL. SEE ABBREVIATIONS AND LETTER SYMBOLS.

**TRANSDUCERS**

|   |           |    |                 |
|---|-----------|----|-----------------|
| A | ANALOG    | I  | CURRENT         |
| D | DIGITAL   | P  | PNEUMATIC       |
| E | VOLTAGE   | PF | PULSE FREQUENCY |
| F | FREQUENCY | PD | PULSE DURATION  |
| H | HYDRAULIC | R  | RESISTANCE      |

**EXAMPLE:**

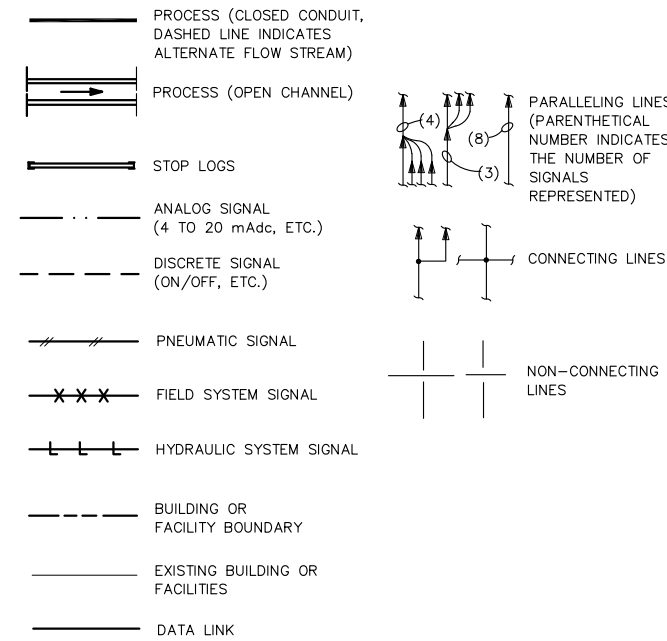


**SELF CONTAINED VALVE & EQUIPMENT TAG NUMBERS**

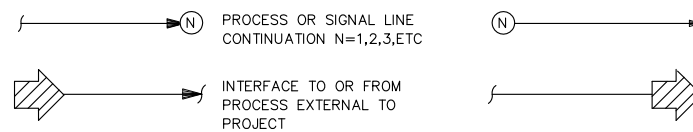
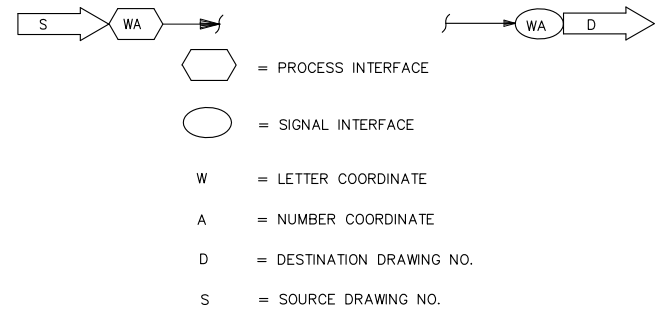
- PA: PLANT ABBREVIATION  
W: UNIT PROCESS NUMBER  
D: ARV = AIR RELEASE VALVE  
AVRV = AIR AND VACUUM RELEASE VALVE  
E = EJECTOR  
FCV = FLOW CONTROL VALVE  
G = GATE  
LCV = LEVEL CONTROL VALVE  
M = MECHANICAL EQUIPMENT  
P = PUMP  
PCV = PRESSURE CONTROL VALVE  
VRV = VACUUM RELIEF VALVE  
PSV = PRESSURE RELIEF VALVE  
T = TANK  
TCV = TEMPERATURE CONTROL VALVE  
AHU = AIR HANDLING UNIT  
X: LOOP NUMBER  
Y: UNIT NUMBER



**LINE LEGEND**



**INTERFACE SYMBOLS**



**GENERAL NOTES**

- P & ID'S ARE FOR INFORMATION ON CONTROL CONCEPTS AND INSTRUMENTATION ONLY. REFER TO PLANS AND SPECIFICATIONS FOR DETAILS: PIPING: VALVING: PACKAGED EQUIPMENT CONTROLS AND MISCELLANEOUS ITEMS.
- THIS IS A STANDARD LEGEND. THEREFORE, NOT ALL OF THE SYMBOLS ARE USED IN THIS PROJECT.

**ABBREVIATIONS & LETTER SYMBOLS**

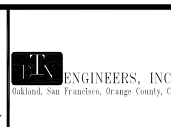
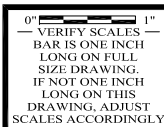
|        |   |                  |  |
|--------|---|------------------|--|
| AI     | ANALOG INPUT  | FR               | FORWARD-REVERSE                        |
| AM     | AUTO-MANUAL   | FS               | FAST - SLOW                            |
| AO     | ANALOG OUTPUT   | GBT              | GRAVITY BELT THICKENER                 |
| CAM    | COMPUTER-AUTO-MANUAL  | H <sub>2</sub> S | HYDROGEN SULFIDE                       |
| CM     | COMPUTER-MANUAL   | HOA              | HAND-OFF-AUTO                          |
| CP-X   | CONTROL PANEL NO. X   | HOR              | HAND-OFF-REMOTE                        |
| CG     | COMBUSTIBLE GAS   | LA               | LOCAL-AUTO                             |
| CO     | CARBON MONOXIDE   | LP/DCS           | LOCAL PANEL-DISTRIBUTED CONTROL SYSTEM |
| CTEL   | CONNECT TO EXISTING LINE  | LOC              | LOCAL (AT FIELD DEVICE)                |
| CP/DCS | CONTROL PANEL/DCS   | LOS              | LOCKOUT STOP                           |
| DSRSD  | DUBLIN SAN RAMON SERVICES DISTRICT                                      | LP               | LOCAL PANEL                            |
| DCS    | DISTRIBUTED CONTROL SYSTEM  | L/S              | LEAD-STANDBY                           |
| DCU    | DISTRIBUTED CONTROL UNIT  | LR               | LOCAL-REMOTE                           |
| DI     | DISCRETE INPUT  | MA               | MANUAL-AUTO                            |
| DO     | DISCRETE OUTPUT   | MCC-X            | MOTOR CONTROL CENTER NO. X             |
| (E)    | EXISTING  | MW               | MOTOR WINDINGS                         |
| ES     | EMERGENCY STOP  | NS               | NORTH-SOUTH                            |
| FLP    | FAIL IN LAST POSITION   | O <sub>2</sub>   | OXYGEN                                 |
| FBM    | FIELD BUS MODULE  | OC               | OPEN-CLOSE (D)                         |
| FM     | FORCE MAIN  | OCA              | OPEN-CLOSE-AUTO                        |
| FOR    | FORWARD-OFF-REVERSE   | OCR              | OPEN-CLOSE-REMOTE                      |
| FP-W-X | FIELD PANEL NO. WX WHERE<br>W = UNIT PROCESS NUMBER<br>X = PANEL NUMBER | OCU              | ODOR CONTROL UNIT                      |
|        |   | OO               | ON-OFF - RTU REMOTE TERMINAL UNIT      |
|        |   | OOA              | ON-OFF-AUTO                            |
|        |   | OOR              | ON-OFF-REMOTE                          |
|        |   | ORP              | OXIDATION REDUCTION POTENTIAL          |
|        |   | OSC              | OPEN-STOP-CLOSE                        |
|        |   | REV              | REVERSE                                |
|        |   | SBD              | SODIUM BISULFITE DRAIN                 |
|        |   | SHD              | SODIUM HYPOCHLORITE DRAIN              |
|        |   | SLOS             | START-LOCKOUT-STOP                     |
|        |   | S/D              | SEDIMENTATION-DEWATERING               |
|        |   | S/D/C            | SEDIMENTATION-DEWATERING-CLOSED        |
|        |   | SS               | START-STOP                             |
|        |   | SSC              | SUPERVISORY SET POINT CONTROL          |
|        |   | VFD              | VARIABLE FREQUENCY DRIVE               |
|        |   | VHC              | VOLATILE HYDROCARBON                   |
|        |   | *                | PROVIDED AS PACKAGED EQUIPMENT         |

**RTU TERMINATIONS**

- △ DISCRETE INPUT
- ▽ DISCRETE OUTPUT
- ▲ ANALOG INPUT
- ▼ ANALOG OUTPUT

**PRELIMINARY**

FILENAME: 286-101 8-31-11 03:11pm Eloy XREFS: X-SMCSO-IB,K I<<--



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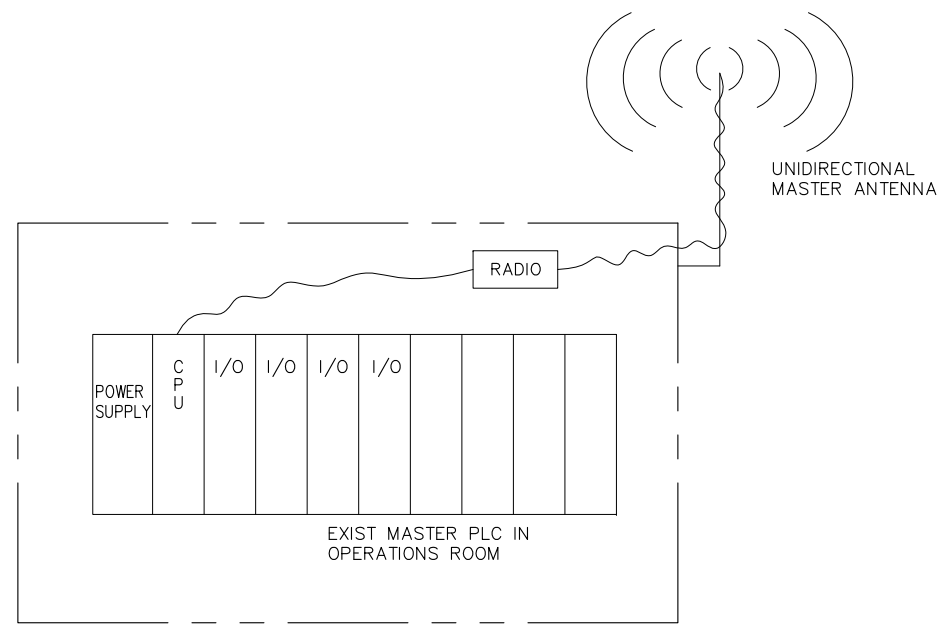
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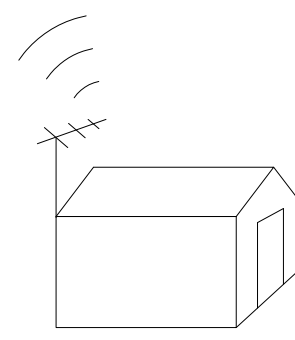
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| INSTRUMENTATION LEGEND                   |  |

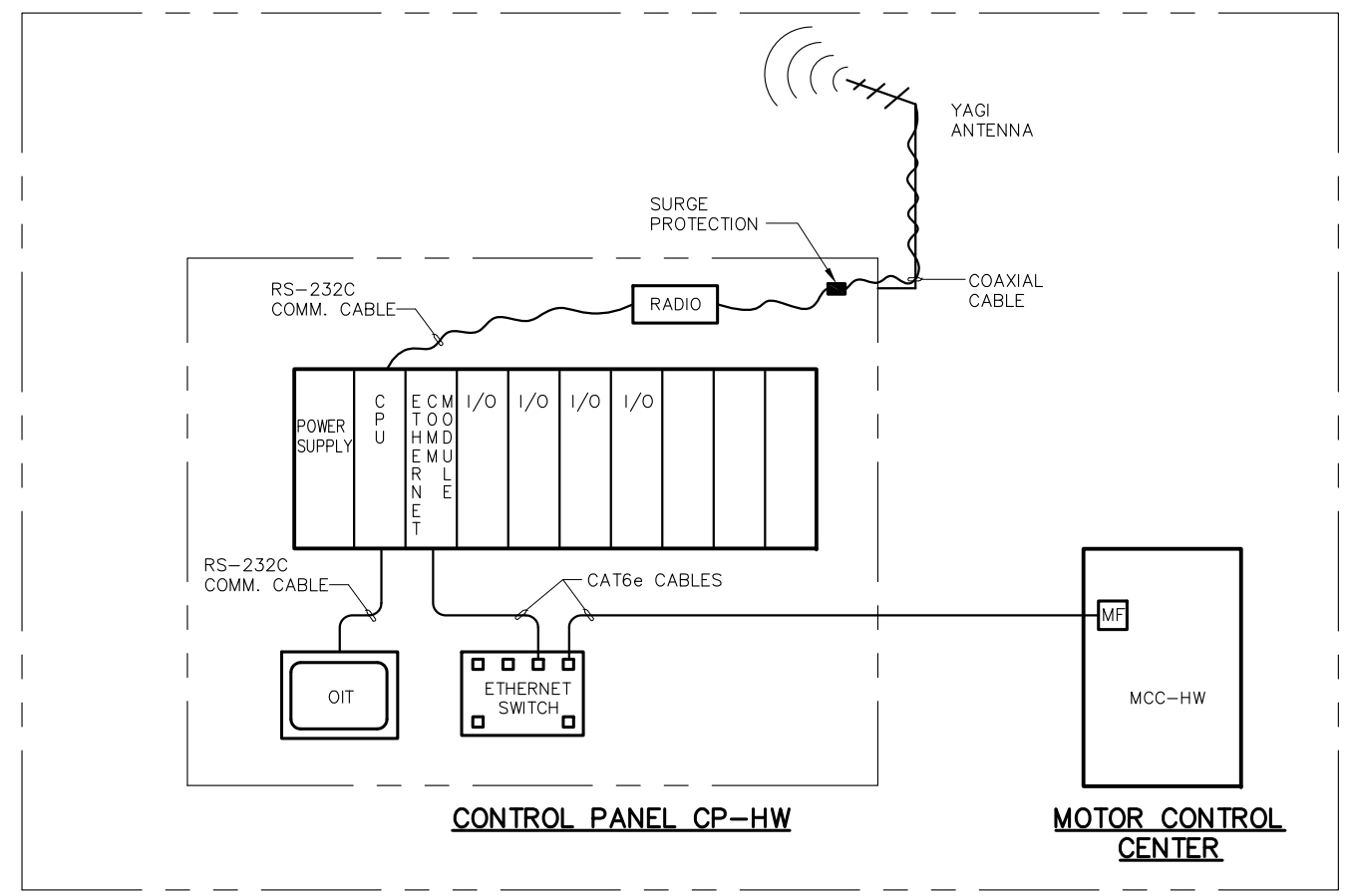
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| PROJ NO  | 055-003     |
| DATE     | AUGUST 2011 |



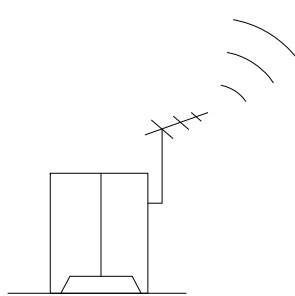
**EXISTING CONTROL BUILDING**



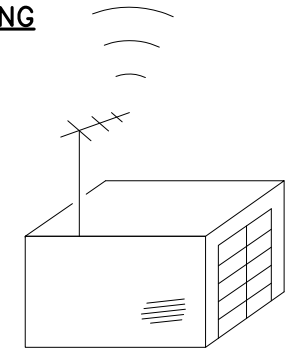
**REMOTE STATION (TYPICAL)**



**HEADWORKS**

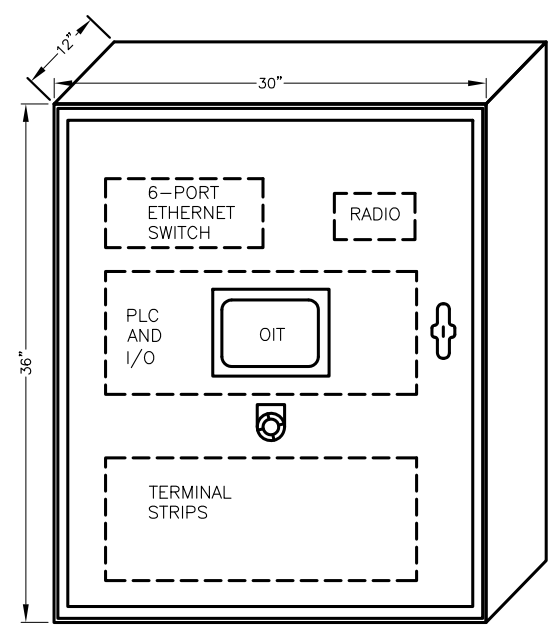


**EXISTING SLUDGE CONTROL PANEL**



**EXISTING BUILDING (TYPICAL)**

**PARTIAL SCADA SYSTEM BLOCK DIAGRAM (A)**  
SCALE: NTS



**CONTROL PANEL CP-HW (B)**  
SCALE: NTS

**PRELIMINARY**

FILENAME: 286-102-8-31-11-03:11pm Eloy XREFS: X=SMCSD=IBLK K<<--

0" 1"  
VERIFY SCALES  
BAR IS ONE INCH  
LONG ON FULL  
SIZE DRAWING.  
IF NOT ONE INCH  
LONG ON THIS  
DRAWING, ADJUST  
SCALES ACCORDINGLY

| REV | DATE | BY | APVD | DESCRIPTION |
|-----|------|----|------|-------------|
|     |      |    |      |             |
|     |      |    |      |             |
|     |      |    |      |             |

|           |    |                             |
|-----------|----|-----------------------------|
| DESIGNED  | TN | SUBMITTED:<br>RMC PROJ ENGR |
| DRAWN     | EA |                             |
| CHECKED   | DN |                             |
| APPROVED: |    | RMC ENGR                    |

|  |  |
|--|--|
| SAUSALITO - MARIN CITY SANITARY DISTRICT |  |
| SCADA SYSTEM DIAGRAM                     |  |

|          |             |
|----------|-------------|
| DWG NO   | I-2         |
| SHEET NO | X OF        |
| PROJ NO  | 055-003     |
| DATE     | AUGUST 2011 |