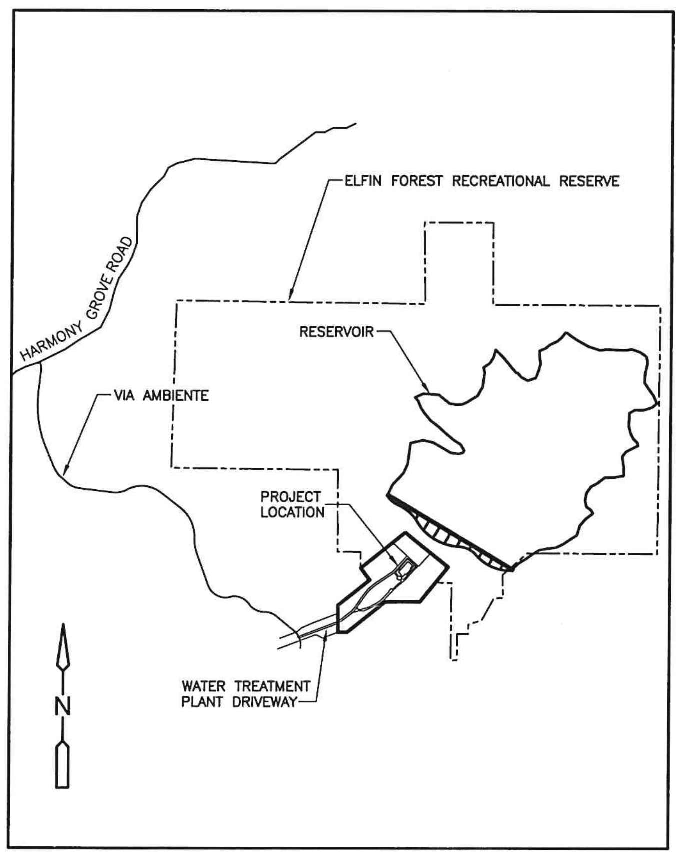
OLIVENHAIN
Municipal Water District

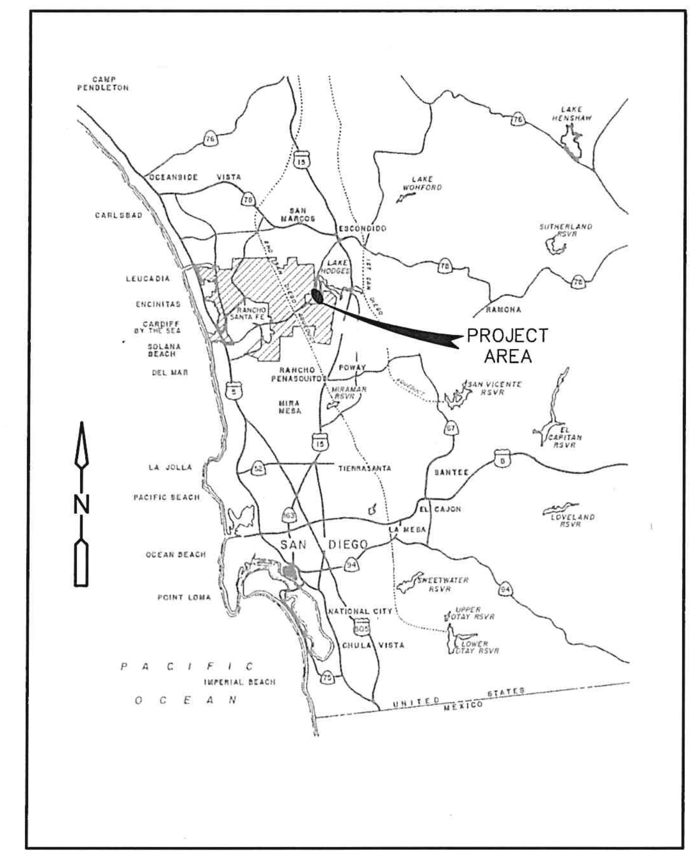
CONSTRUCTION PLANS FOR
DAVID C. McCOLLOM WATER TREATMENT PLANT
Ph CONTROL SYSTEM

DECEMBER 2020
OMWD PROJECT NO. D120068

OLIVENHAIN MUNICIPAL WATER DISTRICT
1966 OLIVENHAIN ROAD
ENCINITAS, CA, 92024
(760) 753-6466



LOCATION MAP
NO SCALE



VICINITY MAP
NO SCALE

JASON P. HUBBARD, P.E. R.C.E. 60317 9-2-2021
ENGINEERING MANAGER EXPIRES 6/30/2022 DATE

ORIGINAL SCALE IN INCHES

MARK	DATE	BY	REVISIONS

DESIGN BL DRAWN NH CHECK MM

PLANS PREPARED BY: DUDEK
BRANDON C. LACAP 12/29/20
ENGINEER P.E. DATE

SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

TITLE SHEET

SHEET 01 OF 28 SHEETS G-01
D120068

GENERAL NOTES

1. ALL WORK SHALL BE DONE IN CONFORMANCE WITH THESE PLANS, THE PROJECT TECHNICAL SPECIFICATIONS, AND THE MOST RECENT EDITION OF THE OLIVENHAIN MUNICIPAL WATER DISTRICT (OMWD OR DISTRICT)) STANDARD SPECIFICATIONS AND DRAWINGS FOR THE CONSTRUCTION OF THE WATER, RECYCLED WATER, AND SEWER FACILITIES (INCLUDING ALL AMENDMENTS ADOPTED PRIOR TO THE DISTRICT APPROVAL DATE ON THESE PLANS).

2. ALL OPERATIONS CONDUCTED ON THE PREMISES, INCLUDING THE WARMING UP, REPAIR, ARRIVAL, DEPARTURE OR RUNNING OF TRUCKS, CONSTRUCTION EQUIPMENT, AND ANY OTHER CONSTRUCTION ASSOCIATED VEHICLES SHALL BE LIMITED TO THE PERIOD STATED IN SPECIFICATIONS SECTION 01505.

3. CONTRACTOR SHALL COORDINATE WITH DISTRICT ALL ARRANGEMENTS FOR HIGH-LINING TEMPORARY SERVICES PRIOR TO SHUTDOWN OF ANY EXSITING TREATMENT PLANT PROCESSES. THE TIME AND DURATION OF ANY SHUTDOWNS OF EXISTING PROCESSES SHALL BE SUBJECT TO APPROVAL BY THE DISTRICT. NO SHUTDOWNS WILL BE SCHEDULED ON A MONDAY OR FRIDAY.

4. NO WORK MAY BEGIN OR PROCEED WITHOUT DIRECTION OF THE DISTRICT'S INSPECTOR. CONTRACTOR SHALL NOTIFY THE DISTRICT INSPECTIONS DEPARTMENT 48 HOURS PRIOR TO THE BEGINNING OF WORK TO ARRANGE FOR INSPECTION OF THE PROJECT.

5. ALL EXISTING FACILITIES WHICH MAY AFFECT PROJECT CONSTRUCTION, IINCLUDING BUT NOT LIMITED TO PIPELINE CROSSINGS, PARALLEL PIPING, PROPOSED CONNECTION POINTS, EXISTING PIPE SUPPORTS, CHEMICAL STORAGE BAY METAL ROOF SECTIONS, CHEMICAL STORAGE BAY PERIMETER FENCING, AND AREA LIGHTING, SHALL BE FIELD VERIFIED BY CONTRACTOR PRIOR TO CONSTRUCTION.

6. THE EXISTENCE AND LOCATION OF EXISTING UTILITIES, PIPING, AND FACILITIES SHOWN ON THESE PLANS IS APPROXIMATE AND WAS OBTAINED BY A SEARCH OF RECORDS MADE AVAILABLE BY OMWD. CERTAIN EXISTING PIPING, EQUIPMENT, AND STRUCTURES NOT DIRECTLY RELATED TO THE WORK PERFORMED UNDER THIS CONTRACT HAVE BEEN OMITTED FOR THE SAKE OF CLARITY. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY ALL DIMENSIONS AND LOCATIONS OF EXISTING PIPING, EQUIPMENT, STRUCTURES, ELECTRICAL CONDUITS, ELECTRICAL PANELS, HVAC DUCTS, ETC. AS REQUIRED FOR THE NEW CONSTRUCTION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROTECT IN PLACE OR REPAIR IMMEDIATELY ANY AND ALL FACILITIES ENCOUNTERED DURING THE COURSE OF THE WORK. THE CONTRACTOR SHALL TAKE PRECAUTIONARY MEASURES TO PROTECT ANY EXISTING UTILITY, PIPING, OR FACILITY SHOWN HEREON AND ANY OTHER WHICH IS NOT OF RECORD OR SHOWN ON THE DRAWINGS.

7. CONTRACTOR SHALL EXERCISE DUE CARE TO AVOID INJURY TO EXISTING IMPROVEMENTS, FACILITIES, AND ADJACENT PROPERTIES INCLUDING, BUT NOT LIMITED TO, LANDSCAPING, TREES, SHRUBBERY, HARDSCAPE, FENCES, WALLS, ETC. WHICH ARE NOT TO BE REMOVED. CONTRACTOR SHALL REPAIR OR REPLACE ANY DAMAGED PROPERTY AT NO ADDITIONAL COST TO OMWD

8. ALL DESIGN CHANGES SHALL BE APPROVED BY OMWD IN WRITING PRIOR TO CONSTRUCTION AND ACCEPTANCE OF THE CHANGE.

9. THE NEW CAUSTIC FEED SYSTEM SHALL BE PRESSURE TESTED IN ACCORDANCE WITH THE PROCEDURES INDICATED IN THE OMWD STANDARD SPECIFICATIONS.

10. ALL NEW PIPELINES, APPURTENANCES, AND EQUIPMENT THAT SHALL BE CONNECTED TO THE EXISTING TREATMENT PLANT DOMESTIC WATER SUPPLY SYSTEM SHALL BE DISINFECTED IN ACCORDANCE WITH SECTION 15051 OF THE OMWD STANDARD SPECIFICATIONS PRIOR TO TIE-IN.

11. CONTRACTOR SHALL MAINTAIN CURRENT REDLINE DRAWINGS DURING CONSTRUCTION NEATLY MARKED IN RED INK TO REFLECT THE AS-BUILT CONDITIONS. CONTRACTOR SHALL MAKE UPDATES TO THE AS-BUILT DRAWINGS ON A DAILY BASIS. AS-BUILT DOCUMENTS SHALL BE MAINTAINED ON SITE AT ALL TIMES. AS-BUILT DRAWINGS MUST BE SUBMITTED TO OMWD PRIOR TO FINAL ACCEPTANCE OF WORK. THE PLANS MUST PROVIDE CONSTRUCTION VERIFICATION OF THE LOCATION OF ALL NEW PIPES/TUBING, APPURTENANCES AND EQUIPMENT.

12. THE CONTRACTOR SHALL GUARANTEE ALL WORK FOR A PERIOD OF TWO (2) YEARS AFTER THE DATE OF ACCEPTANCE BY OMWD. ANY WORK THAT MAY PROVE DEFECTIVE IN WORKMANSHIP AND/OR MATERIALS WITHIN THE WARRANTY PERIOD SHALL BE REPAIRED OR REPLACED ALONG WITH ANY OTHER WORK WHICH MAY BE DAMAGED OR DISPLACED DURING THE PERFORMANCE OF WARRANTY WORK WITH NO ADDITIONAL EXPENSE TO OMWD.

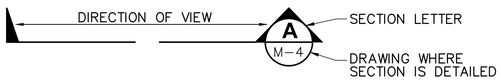
13. CONTRACTOR SHALL ASSUME SOLE AND COMPLETE RESPONSIBILITY FOR JOB SITE CONDITIONS DURING THE COURSE OF CONSTRUCTION INCLUDING SAFETY OF ALL PERSONS AND PROPERTY. THIS REQUIREMENT IS NOT LIMITED TO NORMAL WORKING HOURS. THE CONTRACTOR SHALL DEFEND, INDEMNIFY, AND HOLD OMWD AND THE ENGINEER HARMLESS FROM ANY AND ALL LIABILITY, REAL OR ALLEGED IN CONNECTION WITH THE PERFORMANCE OF THIS WORK, EXCEPTING LIABILITY ARISING FROM THE SOLE NEGLIGENCE OF OMWD OR THE ENGINEER.

14. CONTRACTOR SHALL COMPLY WITH THE REGULATIONS OF "GENERAL CONSTRUCTION SAFETY ORDERS", AND OTHER APPLICABLE ORDERS OF THE STATE OF CALIFORNIA; DEPARTMENT OF INDUSTRIAL RELATIONS, DIVISION OF OCCUPATIONAL HEALTH AND SAFETY (CAL-OSHA).

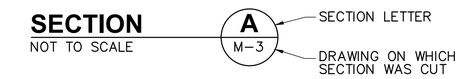
15. THE DEMOLITION, DISPOSAL, MODIFICATIONS, OR ALTERATIONS OF EXISTING FACILITIES, STRUCTURES, EQUIPMENT, AND PIPING SHALL BE PERFORMED IN ACCORDANCE WITH ALL APPLICABLE LOCAL AND STATE REGULATIONS AND CODES, AS WELL AS OMWD STANDARD SPECIFICATION SECTION 02050. ALL ITEMS TO BE DEMOLISHED SHALL BE REMOVED TO THE EXTENT SHOWN ON THE DRAWINGS AND AS REQUIRED TO PERFORM THE WORK.

CROSS REFERENCING SYSTEM

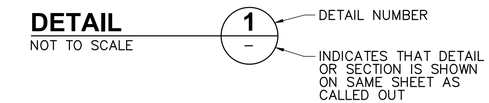
(1) A SECTION CUT ON DRAWING M-3 IS IDENTIFIED AS FOLLOWS:



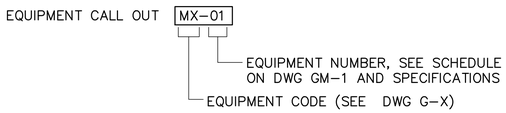
(2) ON DRAWING M-4 THE SECTION IS IDENTIFIED AS FOLLOWS:



(3) DETAILS ARE CROSS REFERENCED IN A SIMILAR MANNER TO THAT OF SECTIONS EXCEPT DETAILS ARE ASSIGNED NUMBERS RATHER THAN LETTERS.

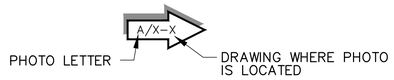


PIPE AND EQUIPMENT DESIGNATIONS



CHANGE IN PIPING MATERIAL

PHOTO CALLOUT ARE REFERENCED BY



PIPING SYMBOLS

EXISTING PIPE

NEW PIPE (ABOVE GROUND)

NEW PIPE (BELOW GROUND)

FITTING SYMBOLS

90° LONG RADIUS ELBOW DOUBLE CONTAINED

90° LONG RADIUS ELBOW

TEE DOUBLE CONTAINED

TEE DOUBLE CONTAINED

VALVE SYMBOLS

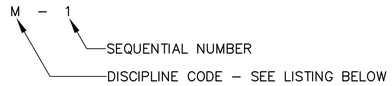
PLUG VALVE

BALL VALVE

GATE VALVE

DRAWING INDEX

DRAWING NUMBERING SYSTEM



DISCIPLINE CODE

G	GENERAL
D	DEMOLITION
M	MECHANICAL
E	ELECTRICAL
I	PROCESS AND INSTRUMENTATION

DESIGN BL | DRAWN NH | CHECK MM

MARK	DATE	BY	REVISIONS

PLANS PREPARED BY:
DUDEK
605 Third Street Encinitas, CA 92024
760.942.5147 Fax 760.632.0164

BRANDON C. LACAAP 12/29/20
ENGINEER P.E. DATE

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Municipal Water District
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Encinitas,CA 92024 (760)753-6466

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

DRAWING INDEX, GENERAL NOTES, SYMBOLS AND PIPE SCHEDULE

SHEET 02 / 28 OF SHEETS

G-02

D120068

ORIGINAL SCALE IN INCHES 0 1 2 3 4

DWG: P:\01.Engineering\Olivenhain MWD\12874 DOMWTP pH Control System\06.CAD\12874 SH02 G-2.dwg USER: blocap
DATE: Sep 01, 2021 4:01pm XREFS: 12874 X-TB

ABBREVIATIONS

#	NUMBER
&	AND
<	ANGLE
@	AT
2S1W	TWO SPEED, ONE WINDING
2S2W	TWO SPEED, TWO WINDING
A	AIR (COMPRESSED)
A, AMP	AMPERE
A/C	AIR CONDITIONING
AA	AERATION AIR
AASHTD	AMERICAN ASSOCIATION OF STATE HIGHWAY AND TRANSPORTION OFFICIALS
AB	ANCHOR BOLT
ABA	AEROBIC BASIN AERATOR
ABC	ASBESTOS CEMENT, AGGREGATE BASE COURSE
ABDN	ABANDON
ABS	ACRYLONITE–BUTADIENE–STYRENE
ABV	ABOVE
AC	ALTERNATING CURRENT, ASPHALTIC CONCRETE
ACCU	AIR CONDITIONING CONDENSING UNIT
ACCV	AIR CUSHION CHECK VALVE
ACH	ALUMINUM CHLOROHYDRATE
ACMU	ACOUSTICAL MASONRY UNIT
ACP	ASBESTOS CEMENT PIPE
ACT	ACOUSTICAL TILE
ACU	AIR CONDITIONING UNIT
AD	ACCESS DOOR
ADDL	ADDITIONAL
ADH	ADHESIVE
ADJ	ADJUSTABLE, ADJUST
ADPT	ADAPTER
AFD	ADJUSTABLE FREQUENCY DRIVE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AGG	AGGREGATE
AHP	AIR HORSEPOWER
AHU	AIR HANDLING UNIT
AI	AIR INSTRUMENT, ANALOG INPUT
AL	ALUMINUM
AL VT	ALUM VENT
ALS	ALUM SOLUTION
ALSS	ALUM SYSTEM
ALT	ALTERNATE (ING), ALTITUDE
ALU	ALUMINUM SULFATE
ALUM	ALUM (CHEMICAL)
ANOD	ANODIZE
AO	ANALOG OUTPUT
AP	ACCESS PANEL
APPROX	APPROXIMATE (LY)
AR	ACID RESISTANT
ARCH	ARCHITECT (URAL) (URE)
ARND	AROUND
ARV	AIR RELEASE VALVE
AS	AIR SUPPLY
ASPH	ASPHALT
ASSOC	ASSOCIATION
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
ATC	AUTOMATIC TEMPERATURE CONTROL
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AUX	AUXILIARY
AV	ACID VENT
AVG	AVERAGE
AW	ACID WASTE
AWG	AMERICAN WIRE GAUGE
AWL	AVERAGE WATER LEVEL
AX	CURRENT TRANSDUCER
B TO B	BACK TO BACK
BA	BLOWER AIR
BCP	BLOWER CONTROL PANEL
BCV	BALL CHECK VALVE
BD	BOARD
BDD	BACKDRAFT DAMPER
BEL	BELOW
BEV	BEVEL (ED)
BF	BLIND FLANGE
BFP	BELT FILTER PRESS, BACKFLOW PREVENTER
BFV	BUTTERFLY VALVE
BGO	BURIED GEAR OPERATOR
BHP	BRAKE HORSEPOWER
BITUM	BITUMINOUS
BL	BASELINE
BLDG	BUILDING
BLK	BLOCK
BLKG	BLOCKING
BM	BENCHMARK
BO	BLOW–OFF
BOT	BOTTOM
BP	BOOSTER PUMP
BPRV	BACK PRESSURE REGULATING VALVE
BRG	BEARING
BRK	BRICK
BRS	BRASS
BRZ	BRONZE
BS	BLENDED SLUDGE, BOTH SIDES
BSMT	BASEMENT
BSP	BLACK STEEL PIPE
BTU	BRITISH THERMAL UNIT
BTWN	BETWEEN
BUR	BUILT UP ROOF (ING)
BV	BALL VALVE
BVC	BEGIN VERTICAL CURVE
BVP	BEGIN VERTICAL POINT
BWR	BACKWASH RETURN
BWS	BACKWASH SUPPLY
BWW	BACKWASH WASTE
BWWEQ	BACKWASH WASTE EQUALIZATION
BYP	BYPASS
C TO C	CENTER TO CENTER
CA	COMPRESSED AIR
CAB	CABINET
CAD	COMPRESSED AIR, DRIED
CAP	CAPACITY
CARP	CARPET
CATV	CABLE TV
CB	CATCH BASIN, CIRCUIT BREAKER
CC	CLOSED LOOP COOLING SYSTEM, COOLING COIL, CONTROL CONDUIT
CCC	CENTRAL CONTROL CONSOLE
CCP	CAUSTIC CIRCULATION PUMPS
CCS	CHLORINE CYLINDER SCALE
CCW	COUNTER CLOCKWISE
CD	CONDENSATE DRAIN
CDM	CLARIFIER DRIVE MECHANISMS
CEM	CEMENT
CEN	CENTRATE
CENT	CENTRIFUGAL
CF	COMPRESSIBLE FILLER, CATFLOC, COAGULANT FEED
CFM	CUBIC FEET PER MINUTE
CFS	CUBIC FEET PER SECOND
CG	CHLORINE GAS (PRESSURE)
CGFB	CEMENTITIOUS GLASS FIBER BOARD
CGV	CHLORINE GAS (VACUUM)
CH	CONCRETE HARDENER
CHAM	CHAMFER
CHAN	CHANNEL
CHKD	CHECKERED
CHL	CHLORINATOR
CH LK	CHAIN LINK
CHR	CHLOROPRENE RUBBER (NEOPRENE)
CI	CAST IRON
CIGL	CAST IRON PIPE GLASS LINED
CIP	CAST IN PLACE, CLEAN IN PLACE, CAST IRON PIPE
CIR	CIRCLE
CIRC	CIRCUMFERENTIAL
CISP	CAST IRON SOIL PIPE
CIU	CAST IRON PIPE UNLINED
CJ	CONSTRUCTION JOINT
CKT	CIRCUIT
CL or L^c	CENTERLINE, CLASS
CL2	CHLORINE SYSTEM
CL2G	CHLORINE (GAS)
CL2L	CHLORINE (LIQUID)
CL2S	CHLORINE SOLUTION
CL2V	CHLORINE VENT
CLF	CURRENT LIMITING FUSE
CLG	CEILING
CLJ	CONTROL JOINT
CLKG	CAULKING
CLR	CLEAR
CLW	CLARIFIED WATER (CLARIFIER EFFLUENT)
CM	CORRUGATED METAL, CEMENT MORTAR
CML&C	CEMENT MORTAR LINED AND COATED
CMON	CONCRETE MONUMENT
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNITS
CND	CONDUIT
CNR	CONDENSATE RETURN
CNS	CONDENSATE SUPPLY
CO	CLEAN OUT
COL	COLUMN
COMB	COMBINATION, COMBUSTION
COMP	COMPRESSIBLE
COMP JT	COMPRESSION JOINT
CONC	CONCRETE
COND	CONDUCTIVITY
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUOUS
COR	CORNER(S)
CORR	CORRUGATED
CP	CATHODIC PROTECTION
CPLG	COUPLING
CPOL	CATIONIC POLYMER
CPP	CONCRETE PRESSURE PIPE
CPT	CONTROL POWER TRANSFORMER
CPVC	CHLORINATED POLYVINYLCHLORIDE PIPE
CR	CHLORINE RESIDUAL, CONTROL RELAY
CRS	COURSE (S)
CS	CARBON STEEL, CONTROL SWITCH
CSK	COUNTERSINK
CSL	CONDITIONED SLUDGE
CSM	CHLORINE SULPHONILE POLYETHYLENE (HYPALON)
CSMP	CAUSTIC METERING PUMPS
CSTG	CASTING
CT	CERAMIC TILE, CURRENT TRANSFORMER
CTG	COATING
CTR	CENTER (ED)
CTU	CENTRAL TELEMETRY UNIT
CU	COPPER, CUBIC
CU FT	CUBIC FOOT (FEET)
CU YD	CUBIC YARD
CUH	CABINET UNIT HEATER
CUP	COPPER PIPE
CV	VALVE FLOW COEFFICIENT, CHECK VALVE
CV–A	CHECK VALVE (AIR CUSHION)
CV–H	CHECK VALVE (HYDRAULIC CUSHION)
CVR	CONVECTOR
CW	CLOCKWISE, POTABLE COLD WATER
CWA	SAN DIEGO COUNTY WATER AUTHORITY
CWO	CLEARWELL OVERFLOW
CWR	COOLING WATER RETURN
CWS	COOLING WATER SUPPLY
d	PENNY
DAF	DISSOLVED AIR FLOTATION
DAL	DISSOLVED ALUM
DAP	DIAPHRAGM AIR PURGE
DAV	DIAPHRAGM AIR VENT
DB	DECIBEL, DRY BULB
DC	DEWATERING CENTRIFUGES, DIRECT CURRENT
DCU	DISTRIBUTED CONTROL UNIT
DEMO	DEMOLITION
DEPT	DEPARTMENT
DET	DETAIL
DF	DRINKING FOUNTAIN
DG	DIGESTER GAS
DI	DIGITAL, DISCRETE INPUT, DUCTILE IRON, DRAIN INLET
DIA	DIAMETER
DIAG	DIAGONAL
DIFF	DIFFUSER
DIGL	DUCTILE IRON GLASS LINED
DIM	DIMENSION
DIP	DUCTILE IRON PIPE
DIR	DIRECTION
DISCH	DISCHARGE
DISP	DISPENSER
DIV	DIVISION
DIW	DEIONIZED WATER
DL	DEAD LOAD
DN	DOWN
DO	DISSOLVED OXYGEN, DITTO
DOI	DOOR INTERLOCK
DP	DAMPROOFING
DR	DRAIN, DRIVE, DIMENSION RATIO
DS	DIGESTED SLUDGE
DSCL	DEWATERED SLUDGE CAKE
DT	DRAIN TANK
DV	DIAPHRAGM VALVE
DW	DISTILLED WATER
DWG	DRAWING
DWL	DOWEL
DWTR	DEWATER(ED)
E	EMERGENCY WATER, ELECTRICAL, EAST
EAT	ENTERING AIR TEMPERATURE
EB	EXPANSION BOLT
EC	EMPTY CONDUIT
ECC	ECCENTRIC
ED–F	EQUIPMENT DRAIN (FLUSH TYPE)
ED–O	EQUIPMENT DRAIN (EXTENDED TYPE–OPEN)
ED–S	EQUIPMENT DRAIN (EXTENDED TYPE–SEALED)
EDH	ELECTRIC DUCT HEATER
EF	EACH FACE
EFF	EFFLUENT
EFM	EFFLUENT FLOW METER
EG	EMERGENCY GENERATION SYSTEM, EXHAUST GRILLE
EGC	EQUIPMENT GROUNDING CONDUCTOR
EGO	ELEVATED GEAR OPERATOR
EL	ELEVATION
ELEC	ELECTRIC(AL)
ELEV	ELEVATOR
EMERG	EMERGENCY
EMG	EMERGENCY GENERATOR
ENGR	ENGINEER
ENT	ENTERING, ENTRANCE
EOP	EDGE OF PAVEMENT
EP	ELECTRICAL PANEL, ELECTROPNEUMATIC
EPDM	ETHYLENE PROPYLENE RUBBER
EQ	EQUAL (LY)
EQPT	EQUIPMENT
EQUIV	EQUIVALENT
ER	EXHAUST REGISTER
ERT	ENERGY RECOVERY TURBINE
ES	EACH SIDE, ELECTRIC SUPPLY
ESMT	EASEMENT
ESP	EFFLUENT SAMPLE PUMPS
EST	ESTIMATE (D)
ETC	ETCETERA
EUH	ELECTRIC UNIT HEATER
EV	EVAPORATOR VENT
EVA	ELECTRICAL GEAR ACTUATOR
EVAP	EVAPORATOR (ION)
EVC	END VERTICAL CURVE
EW	EACH WAY
EWC	ELECTRIC WATER COOLER
EXA	EXHAUST AIR
EXH	EXHAUST
EXP	EXPANSION, EXPOSED
EXP JT	EXPANSION JOINT
EXST	EXISTING
EXT	EXTERIOR
EXTD	EXTENDED
EY	EPOXY
F	FAHRENHEIT OR FILTRATE
f'c	CONCRETE COMPRESSION STRESS
f'm	MASONRY PRISM STRESS
FAB	FABRICATE (OR, ED)
FAC	FACILITY, FLANGED ADAPTOR COUPLING
FAM	FIRST ANOXIC MIXERS
FAP	FILTRATE AIR PURGE
FB	FLOOR BOX (BUSHING TYPE)
FBO	FURNISHED BY OTHERS
FBR	FULL VOLTAGE REVERSING
FC	FAIL CLOSED, FLEX CONNECTION
FCC	FILTER CONTROL CONSOLE
FCV	FLOW CONTROL VALVE
FD	FLOOR DRAIN
FDMPR	FIRE DAMPER
FDN	FOUNDATION
FE	FILTER EFFLUENT, FIRE EXTINGUISHER
Fe CL3	FERRIC CHLORIDE
FES	FERROUS SULFATE
FF	FACTORY FINISH, FINISH FLOOR, FAR FACE
FG	FINISHED GRADE
FGL	FIBERGLASS
FH	FIRE HYDRANT
FHMS	FLATHEAD MACHINE SCREW
FHWS	FLATHEAD WOOD SCREW
FI	FILTER INFLUENT
FIG	FIGURE
FIN	FINISH(ED)
FINW	FINISHED WATER
FL	FIRE LINE, FLOW LINE, FLASHING, FLOOR
FLD	FUSIBLE LINK DAMPER
FLEX	FLEXIBLE
FLG	FLANGE(D), FLOORING
FLM	FLASH MIXER
FLP	FAIL LAST POSITION
FLR	FILLER
FLW	FILTERED WATER
FM	FORCE MAIN
FO	FAIL OPEN, FUEL OIL
FOB	FLAT ON BOTTOM
FOR	FUEL OIL RETURN
FOS	FUEL OIL SUPPLY
FOT	FLAT ON TOP
FOV	FUEL OIL VENT
FP	FILTER PRESS
FPM	FEET PER MINUTE
FPT	FEMALE PIPE THREAD
FR	FRAME
FRP	FIBERGLASS REINFORCED PLASTIC
FRR	FLOURINE RUBBER(VITON)
FS	FLOOR STAND, FINISH SURFACE
FT	FEET/FOOT
FTG	FOOTING/FITTING
FTR	FINNED TUBE RADIATION
FTW	FILTER TO WASTE
FU	FUSE
FURN	FURNISHED
FW	FINISHED WATER
FXD	FIXED
G	NATURAL GAS
GA	GAGE, GALVANIZED STEEL
GAC	GRANULAR ACTIVATED CARBON
GALV	GALVANIZED
GALVS	GALVANIZED STEEL
GALVSP	GALVANIZED STEEL PIPE
GC	GROOVED COUPLING (SHOULDERED ENDS)
GCR	GRIT CONCENTRATOR
GEC	GROUNDING ELECTRODE CONDUCT
GEN	GENERATOR
GFI	GROUND FAULT INTERRUPTER
GI	GALVANIZED IRON
GL	GLASS
GLB	GLASS BLOCK
GND	GROUND
GOV	GLOBE VALVE
GP	GLASS PIPE
GPD	GALLONS PER DAY
GPM	GALLONS PER MINUTE
GR	GRADE
GRAV	GRAVITY
GRS	GALVANIZED RIGID STEEL
GRTG	GRATING
GS	GALVANIZED STEEL
GSKT	GASKET
GT	GRAVITY THICKENERS
GV	GATE VALVE
GYP	GYPSUM
HAS	HEADED ANCHOR STUD
HB	HOSE BIBB
HC	HEATING COIL
HCL	HYDROCHLORIC ACID
HD	HEAVY DUTY
HDPE	HIGH DENSITY POLYETHYLENE
HDR	HEADER
HDWD	HARDWOOD
HDWR	HARDWARE
HEX	HEXAGON
HFAC	HARNESSED FLANGED ADAPTOR COUPLING
HFL	HYDROFLUOSILIC ACID
HGL	HYDRAULIC GRADE LINE
HGR	HANGER
HGT	HEIGHT
HH	HANDHOLE
HM	HOLLOW METAL
HOA	HAND–OFF–AUTO
HOR	HORIZONTAL
HP	HIGH POINT, HORSE POWER
HPA	HIGH PRESSURE AIR
HR	HANDRAIL
HS	HIGH SERVICE, HIGH STRENGTH
HSM	HIGH SERVICE MAIN
HTHW	HIGH TEMPERATURE HOT WATER
HVA	HYDRAULIC VALVE ACTUATOR
HVAC	HEATING, VENTILATING & AIR CONDITIONING
HW	POTABLE HOT WATER
HWA	HIGH WATER ALARM
HWL	HIGH WATER LEVEL
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY
HWW	HIGH PRESSURE WASHWATER
Hz	HERTZ
IA	INSTRUMENT AIR
IAW	IN ACCORDANCE WITH
ICV	IRRIGATION CONTROL VALVE
ID	INSIDE DIAMETER
IE	INVERT ELEVATION
IF	INSIDE FACE
IFM	INFLUENT FLOW METERS
IIR	ISOBUTENE ISOPRENE (BUTYL) RUBBER
IN	INCH
INF	INFLUENT
INSTR	INSTRUMENT (ATION)
INSUL	INSULATION
INT	INTERIOR
INT PS	INTERMEDIATE PUMP STATION
INVT	INVERT
IP	IRON PIPE
IPB	IRON PIPE BOUNDARY
IR	IRON ROD
IRB	IRON ROD BOUNDARY
IRP	INTERNAL RECYCLE PUMPS
IRR	IRRIGATION
ISOL	ISOLATOR, ISOLATION
JB	JUNCTION BOX
JC	JANITOR'S CLOSET
JCT	JUNCTION
JT	JOINT
JT FLR	JOINT FILLER
KGV	KNIFE GATE VALVE
KO	KNOCKOUT
L	LINE OR STRUCTURAL ANGLE DESIGNATION
LA	LIGHTNING ARRESTER
LAB	LABORATORY
LAD	LADDER
LAM	LAMINATED
LAT	LEAVING AIR TEMPERATURE
LAV	LAVATORY
LB	POUND
LBS	POUNDS
LCP	LOCAL CONTROL PANEL
LCW	LABORATORY COLD WATER
LF	LINEAL FEET
LG	LONG
LHW	LABORATORY HOT WATER
LIME	LIME, DRY
LKR	LOCKER
LLH	LONG LEG HORIZONTAL
LLV	LONG LEG VERTICAL
LNTL	LINTEL
LOC	LOCATION/LOCATED
LONG	LONGITUDINAL
LP	LIGHT POLE, LOW POINT, LOW PRESSURE
LPA	LOW PRESSURE AIR (FROM BLOWERS)
LPNL	LIGHTING PANEL
LPO	LIQUID POLYMER
LPV	LUBRICATED PLUG VALVE
LR	LONG RADIUS
LS	LIME SLURRY
LSM	LOW SERVICE MAIN
LSYS	LIME SYSTEM
LT	LEFT, LIGHT (S)
LV	LIME VENT
LVG	LEAVING
LW	LIGHTWEIGHT
LWA	LOW WATER ALARM
LWL	LOW WATER LEVEL
LWT	LEAVING WATER TEMPERATURE
MAS	MASONRY
MATL	MATERIAL
MAU	MAKE UP AIR UNIT
MAX	MAXIMUM
MB	MACHINE BOLTS
MBH	THOUSAND BTU PER HOUR
MC	STEEL MISCELLANEOUS CHANNEL
MCC	MOTOR CONTROL CENTER
MCJ	MASONRY CONTROL JOINT
ME	METHANOL
MEAS	MEASURE
MECH	MECHANICAL
MEMB	MEMBRANE
MEW	MOTORIZED EFFLUENT WEIRS
MF	MEMBRANE FACILITY
MFD	MANUFACTURED
MFG	MANUFACTURING
MFR	MANUFACTURER
MG/L	MILLIGRAMS PER LITER
MGD	MILLION GALLONS PER DAY
MH	MANHOLE
MHS	METAL HOSE
MIN	MINIMUM
MIS	MECHANICAL INFLUENT SCREEN
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
ML	MIXED LIQUOR
MO	MASONRY OPENING
MOD	MOTOR OPERATED DAMPER
MON	MONUMENT
MOT	MOTOR
MPH	MILES PER HOUR
MR	MOISTURE RESISTANT
MRPP	METAL REINFORCED PLASTIC PIPE
MSG	MOTORIZED SLUICE GATES
MTD	MOUNTED
MTG	MOUNTING
MTL	METAL
MTR	METER
MV	MUD VALVE
N	NORTH
N2	NITROGEN
NACL	SODIUM CHLORITE
NAOH	CAUSTIC SODA (SODIUM HYDRORIDE)
NBR	NITRILE RUBBER
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRIC CODE
NEUT	NEUTRAL
NF	NEAR FACE
NIC	NOT IN CONTRACT
NO	NORMALLY OPEN OR NUMBER
NOM	NOMINAL
NOS	NATIONAL OCEANOGRAPHIC SURVEY
NPOL	NONIONIC POLYMER
NPT	AMERICAN NATIONAL TAPER PIPE THREAD
NPW	(NON–POTABLE) RAW WATER
NR	NATURAL RUBBER
NRS	NON–RISING STEM
NSG	NON–SHRINK GROUT
NTS	NOT TO SCALE
O/E	OR EQUAL
O2	OXYGEN (GAS)
OA	OUTSIDE AIR
OC	ON CENTER, ODOR CONTROL
OD	OUTSIDE DIAMETER
OE	OVERHEAD ELECTRIC
OF	OUTSIDE FACE
OFF	OFFICE
OG	OZONE OFF GAS
OH	OVERHEAD (DOOR)
OL	OVERLOAD
OMWD	OLIVENHAIN MUNICIPAL WATER DISTRICT
OPER	OPERATOR
OPNG	OPENING
OPP	OPPOSITE
OPP HD	OPPOSITE HAND
OPT	OPTION(AL)
OS	OXIDIZED SLUDGE
OSD	OMWD STANDARD DRAWING
OT	OVERHEAD TELEPHONE
OTV	OVERHEAD TELEVISION
OV	OVER
OVF	OVERFLOW
OVHD	OVERHEAD
P	PROTECTED
PA	PLANT AIR
PA	POLYAMIDE
PAB	PROCESS AERATION BLOWERS
PAC	PLANT AIR COMPRESSOR
PAG	AIRGAP PROTECTED WATER
PB	POLYBUTYLENE PUSHBUTTON
PBAV	PLASTIC BALL VALVE
PBX	PULL BOX
PC	POINT OF CURVE (ATURE), POLYCARBONATE
PCC	POINT OF COMPLEX CURVATURE
PCCP	PRESSURE CONCRETE CYLINDER PIPE
PCF	POUND PER CUBIC FOOT
PCTFE	POLYCHLOROTRIFLUOROETHYLENE
PCV	PRESSURE CONTROL VALVE
PD	PUMP DISCHARGE
PE	PLAIN END, PLANT EFFLUENT
PED	PEDESTRIAN
PEFL	PRIMARY EFFLUENT
PEP	PLANT EFFLUENT PUMP
PERF	PERFORATED
PERIM	PERIMETER
PF	PHENOL–FORMALDEHYDE, POWER FACTOR
PFM	POWER FACTOR METER
PFU	POLYMER FEED UNIT
PGA	PURGE AIR (LIME SILOS)
pH	HYDROGEN ION CONCENTRATION
PH	PHASE
PHOS	PHOSPHATE
PHW	PROTECTED HOT WATER
PI	POINT OF INTERSECTION
PINF	PRIMARY INFLUENT
PIP	POLYETHYLENE PIPE
PJF	PREMOLDED JOINT FILLER
PL	PILOT LIGHT, PLATE, PLATE DESIGNATION, PROPERTY LINE
PLC	PROGRAMMABLE LOGIC CONTROLLER
PLK	PLANK
PLP	POLYPHOSPHATE
PLS	PLASTIC LINED STEEL
PLT	PLANT
PLW	PLANT WATER
PLYWD	PLYWOOD
PM	PRESSED METAL
PNL	PANEL
PO	POLYMER SOLUTION
POJ	PUSH ON JOINT
POLM	POLYMER
POLYE	POLYETHYLENE
POLYP	POLYPROPYLENE
POM	POLYOXYMETHYLENE
POT	POINT OF TANGENCY
POTW	POTABLE WATER
POTH	POTASSIUM HYDROXIDE
POTP	POTASSIUM PERMANGANATE
PP	POWER POLE
PPM	PARTS PER MILLION
PR	PRETREATED WATER SYSTEM, PAIR
PRC	POINT OF REVERSE CURVE
PRCST	PRECAST
PREFAB	PRE–FABRICATED
PRESS	PRESSURE
PREST	PRESSURE TREATED
PRIM	PRIMARY
PRMLD	PREMOLDED
PRV	PRESSURE RELIEF VALVE
PRW	PRESSURE WASTE
PS	PRIMARY SLUDGE, PUMP STATION
PSC	PRIMARY SCUM
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAGE
PSP	PLANT SITE PUMP
PT	POINT, POINT TANGENT, POTENTIAL TRANSFORMER
PTD	PAINTED
PTFE	POLYTETRAFLUOROETHYLENE
PTP	POLYMER TRANSFER PUMP
PUD	PERFORATED UNDERDRAIN
PV	PLUG VALVE
PVC	POLYVINYL CHLORIDE
PVI	POINT OF VERTICAL INTERSECTION
PVMT	PAVEMENT
PVRV	PRESSURE VACUUM RELIEF VALVE
PW	POTABLE WATER
PWD	PRIMARY WATER DRAIN
PWL	PEAK WATER LEVEL
PWM	POTABLE WATER METER
QTY	QUALITY OR QUANTITY
R	RISER(S)
R+S	BACKER ROD & SEALANT
R/W	RIGHT–OF–WAY
RA	RETURN AIR
RAD	RADIUS
RB	RUBBER BASE
RC	REINFORCED CONCRETE
RCCP	REINFORCED CONCRETE CYLINDER PIPE
RCP	REINFORCED CONCRETE PIPE
RCWM	RECLAIMED WATER MAIN
RD	ROOF DRAIN
RDWD	REDWOOD
RECT	RECEPTACLE
REF	REFERENCE/REFER, ROOF EXHAUST FAN
REG	REGISTER
REINF	REINFORCE (D, ING)
REQD	REQUIRED
RESID	RESIDUAL
REV	REVISION
RF	ROOF FAN
RFG	ROOFING
RG	RETURN GRILLE
RGH	ROUGH
RH	RELATIVE HUMIDITY, RESIDUAL HANDLING
RIS	RUBBER IN SHEAR
RJ	RESTRAINED JOINT, RUSTIFICATION JOINT
RL	RAIN LEADER
RLCI	RUBBER LINED CAST IRON
RLDI	RUBBER LINED DUCTILE IRON
RLG	RAILING
RM	ROOM
RMS	ROOT MEAN SQUARE
RND	ROUND
RO	ROUGH OPENING
ROT	ROTAMETER
RPBP	REDUCED PRESSURE BACKFLOW PREVENTOR
RPM	REVOLUTIONS PER MINUTE
RR	RAILROAD, RETURN REGISTER
RST	RIGID STEEL
RT	RIGHT, RUBBER TILE, RUNNING TIME METER
RTU	REMOTE THERMAL UNIT
RVNR	REDUCE VOLTAGE NON–REVERSING
RW	PLANT WATER (PROTECTED) REUSE WATER, RAW WATER
RWEQ	RAW WATER EQUALIZATION
RWL	RAIN WATER LEADER
RWW	RECYCLED WASHWATER
S	SOUNDING, SOUTH, STEEL S–SHAPE DESIGNATION, SEWER
S02G	SULFUR DIOXIDE (GAS)
S02S	SULFUR DIOXIDE SOLUTION
SA	SUPPLY AIR
SAM	SAMPLE
SAN	SANITARY
SAT	SUSPENDED ACOUSTICAL TILE
SB	SEAMLESS BASE, STONE MONUMENT, STONE MONUMENT BOUNDARY
SC	SCUM, SURGE CAPACITOR
SCH, SCHED	SCHEDULE
SCJ	SLAB CONTROL JOINT
SCL	SCRUBBING LIQUID
SCR	SILICON CONTROLLED RECTIFIER
SCRN	SCREEN(ED)
SCV	SILENT CHECK VALVE
SD	STORM DRAIN, SUPPLY DIFFUSER
SDRSD	SAN DIEGO REGIONAL STANDARD DRAWINGS
SE	SECONDARY
SEC	SECONDS
SECT	SECTION
SEF	SECONDARY EFFLUENT
SEJ	SLAB EXPANSION JOINT
SF	SEAMLESS FLOORING, SUPPLY FAN
SFP	SLUDGE FEED PUMP
SFR	SYNTHETIC FIBER REINFORCED
SG	SLUICE GATE, SUPPLY GRILLE
SG–C	SLUICE GATE – MANUAL CRANK OPERATOR
SG–HW	SLUICE GATE – HAND WHEEL OPERATOR
SG–M	SLUICE GATE – MOTOR OPERATOR
SGFT	STRUCTURAL GLAZED FACING TILE
SGR	SLUDGE GRINDER
SH	SHIELDED
SHC	SODIUM HYPOCHLORITE
SHT	SHEET
SIM	SIMILAR
SJ	SOLDERED JOINT
SK	SINK
SL	SIGNAL LINE, STREET LIGHT, SLUDGE
SLG	SLIDE GATE
SLG–C	SLIDE GATE – MANUAL CRANK OPERATOR
SLG–HW	SLIDE GATE – HAND WHEEL OPERATOR
SLG–M	SLIDE GATE – MOTOR
SLNT	SEALANT
SLV	SLEEVE
SMPP	SUMP PUMPS
SN	SOLID NEUTRAL OR SUPERNATANT
SOFL	SODIUM FLUORIDE
SOJ	SLIP ON JOINT
SOLN	SOLUTION
SOLV	SOLENOID VALVE
SP	SPACE (S, ED)
SPEC	SPECIFICATION, SPECIFIED
SPL	SAMPLE, SAMPLE LINE
SPR	SPRING, SPRINKLER LINE
SPTG	SEPTAGE
SPW	SPRAY WATER
SQ	SQUARE
SR	SLUDGE RETURN, SUPPLY REGISTER
SS	SANITARY SEWER
SSFL	SODIUM SILICO FLUORIDE
SSIL	SODIUM SILICATE
SSK	SERVICE SINK
SSL	SECONDARY SLUDGE
SSP	STAINLESS STEEL PIPE
SSPWC	STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION
SST	STAINLESS STEEL
ST PR	STATIC PRESSURE OR SPACE (D)
STA	STATION
STD	STANDARD
STIF	STIFFENER
STIR	STIRRUP (S)
STL	STEEL
STOR	STORAGE
STRUC	STRUCTURE (S, URAL)
STWY	STAIRWAY
SUP	SUPERNATANT
SUPT	SUPERINTENDENT
SUSP	SUSPENDED
SW	SWITCH
SWBD	SWITCHBOARD
SWD	SIDE WATER DEPTH
SWGR	SWITCHGEAR
SWK	SIDEWALK
SYM	SYMMETRICAL
t	THICKNESS
T	TREAD(S), TELEPHONE
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROOVE
TAN	TANGENCY
TC	TOP OF CURB
TD	TEMPERATURE DIFFERENCE, TRENCH DRAIN
TDC	TIME DELAY ON CLOSING
TDD	TIME DELAY AFTER DEENERGIZATION–OFF DELAY
TDE	TIME DELAY AFTER ENERGIZATION–ON DELAY
TDO	TIME DELAY ON OPENING
TECH	TECHNICAL
TEL	TELEPHONE
TEMP	TEMPERATURE, TEMPERED, TEMPORARY
TF	TOP FACE, TRANSFER FAN
TFP	TRANSFER PUMP
TG	TRANSFER GRILLE
THD	THREADED
THK	THICK(NESS)
THR	THRESHOLD
TKBD	TACKBOARD
TKD	TANK DRAIN
TM	TELEMETER OR TIME
TOB	TOP OF BERM/BANK
TOC	TOP OF CURB/CONCRETE
TOIL	TOILET
TOPG	TOPPING
TOS	TOP OF STEEL
TOW	TOP OF WALL
TP	TURNING POINT, TOP OF PIPE
TPRP	THERMOPLASTIC REINFORCED PIPE
TPS	THICKENED PRIMARY SLUDGE
TR	TRIANGULATION POINT
TRANS	TRANSFORMER
TRNSN	TRANSITION
TRNSV	TRANSVERSE
TS	STRUCTURAL TUBING (STEEL UNLESS NOTED), THICKENED SOLIDS
TSL	THICKENED SLUDGE, TOP OF SLAB
TSS	TOTAL SUSPENDED SOLIDS, THICKENED SLUDGE STORAGE
TUBV	TIME UNION BALL VALVE
TURB	TURBIDITY
TV	TELEVISION
TW	TOP OF WALL
TWF	THROUGH WALL FLASHING
TYP	TYPICAL
U	HEAT TRANSFER COEFFICIENT
UC	UNDERCUT
UD	UNDERDRAIN
UF	ULTRAFILTRATION
UFF	UF FEED
UFP	UF PERMEATE/PRODUCT
UFW	UF WASTE
UGND	UNDERGROUND
UGTC	UNDERGROUND TELEPHONE CABLE
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORY
UN	UNION
UNO	UNLESS NOTED OTHERWISE
UPVC	UN–PLASTICISED POLYVINYL CHLORIDE
UR	URINAL
V	VOLTS, VALVE
VA	VENT AIR
VA–H	HYDRAULIC VALVE OPERATOR
VA–M	MOTOR VALVE OPERATOR
VA–P	PNEUMATIC VALVE OPERATOR
VA–S	SOLENOID VALVE OPERATOR
VAC	VACUUM
VAR	VARIOUS/VARIABLE
VAV	VARIABLE AIR VOLUME
VB	VALVE BOX, VAPOR BARRIER
VBR	VACUUM BREAKER
VC	VICTAULIC COUPLING (SHOULDERED ENDS)
VC	VITRIFIED CLAY, VERTICAL CURVE
VCP	VITRIFIED CLAY PIPE
VD	VOLUME DAMPER
VE	VACUUM EXHAUST
VEL	VELOCITY
VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE
VIB	VIBRATION
VLT	VAULT
VNBA	VIRGIN N. BUTYL ACETATE
VOL	VOLUME
VS	VARIABLE SPEED
VSD	VARIABLE SPEED DRIVE
VT	VENT
VTR	VENT THRU ROOF
W	WEST, WATER, WIDE
W/	WITH
W/A	WHERE APPLICABLE
W/O	WITHOUT
WAP	WALL PIPE
WB	WET BULB
WBW	WASTE BACKWASH WATER
WC	WATER CLOSET
WD	WIDTH, WOOD
WDW	WINDOW
WF	WIDE FLANGE
WG	WASTE GAS
WH	WATER HEATER
WHDM	WATTHOUR DEMAND METER
WHDR	WATTHOUR DEMAND RECORDER
WHM	WATTHOUR METER
WJ	WELDED JOINT
WL	WATER LEVEL, WATER LINE
WM	WATER MAIN, WATTMETER
WNBA	WASTE N. BUTYL ACETATE
WNC	WASTE NON–CHLORINATED
WP	WELDED PIPE, WORKING POINT
WPG	WATERPROOFING
WR	WASHWATER RECOVERY
WS	WATER SURFACE OR WATERSTOP
WSD	WASHWATER DRAIN
WSEL	WATER SURFACE ELEVATION
WSH	WASHWATER
WSP	WELDED STEEL PIPE
WSV	WALL SLEEVE
WT	STEEL TEE–SHAPE DESIGNATION, WEIGHT
WTHPRF	WEATHERPROOF
WTP	WATER TREATMENT PLANT
WV	WATER VALVE
WW	WASTE WATER
WWF	WELDED WIRE FABRIC
WWP	WASHWATER PUMPS
WX	WATT TRANSDUCER
XFER	TRANSFER
XFMER	TRANSFORMER
XP	EXPLOSION PROOF
YD	YARD
YR	YEAR

MARK	DATE	BY	REVISIONS

DESIGN BL | DRAWN NH | CHECK MM

PROFESSIONAL ENGINEER ☆ BRANDON C. LACAP No. 87211 Exp. 09-30-21 CIVIL ☆ STATE OF CALIFORNIA ☆ REGISTERED

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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

ABBREVIATIONS

SHEET 03/28 OF SHEETS G-03

D120068

DWG: P:\101.Engineering\Olivenhain MWD\12874 DCMWTP pH Control System\06.CAD\12874 SH03 G-3.dwg USER: ccarr
DATE: Dec 29, 2020 3:52pm XREFS: 12874 X-TB

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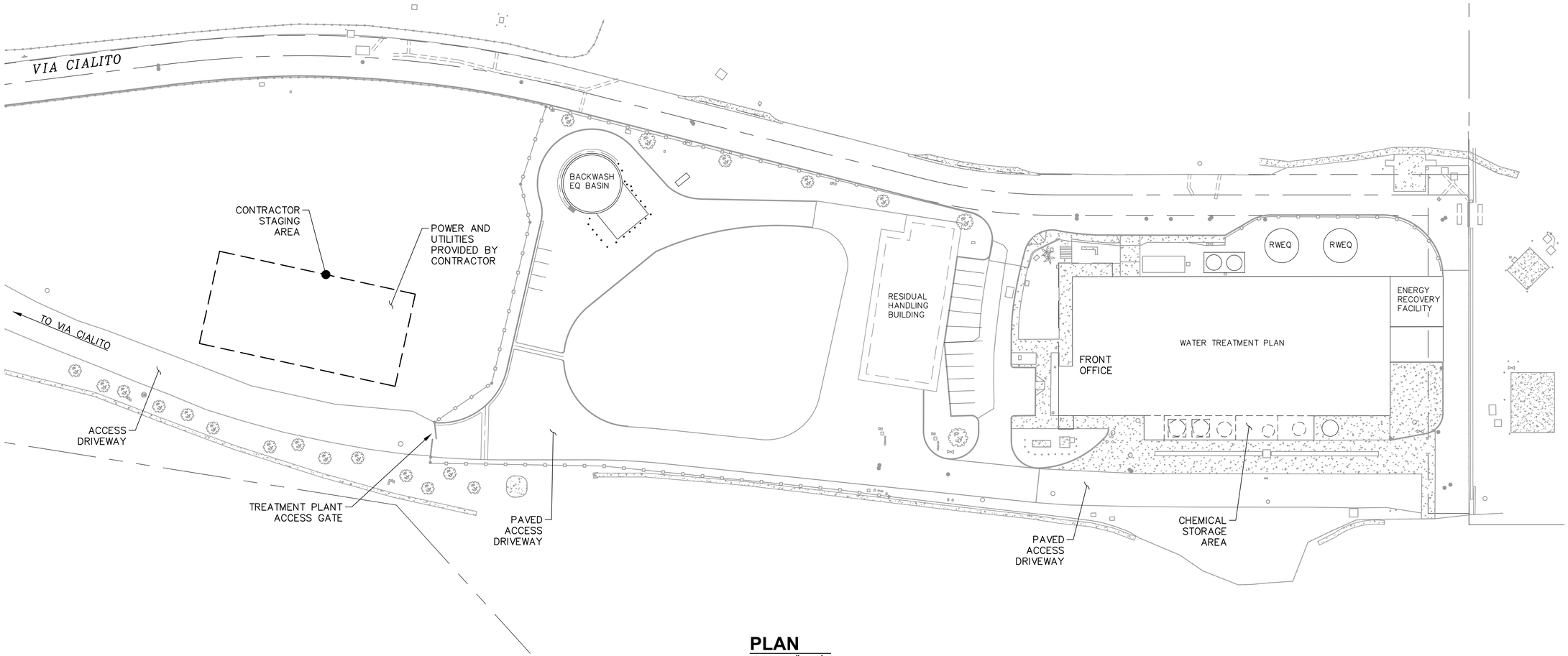

PLAN
SCALE: 1"=40'

GRAPHIC SCALE
0 40' 80'
SCALE: 1" = 40'

ORIGINAL SCALE IN INCHES
0 1 2 3 4

MARK	DATE	BY	REVISIONS

DESIGN BL | DRAWN NH | CHECK MM

PROFESSIONAL ENGINEER REGISTERED STATE OF CALIFORNIA
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SODIUM HYDROXIDE
CHEMICAL STORAGE AND
FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

AREA SITE PLAN
AND CONTRACTOR STAGING AREA

SHEET 04 / 28 OF SHEETS
G-04

D120068

DWG: P:\01.Engineering\Olivenhain MWD\12874 DO\WTP pH Control System\06.CAD\12874 SH04 G-4.dwg USER: ccarr
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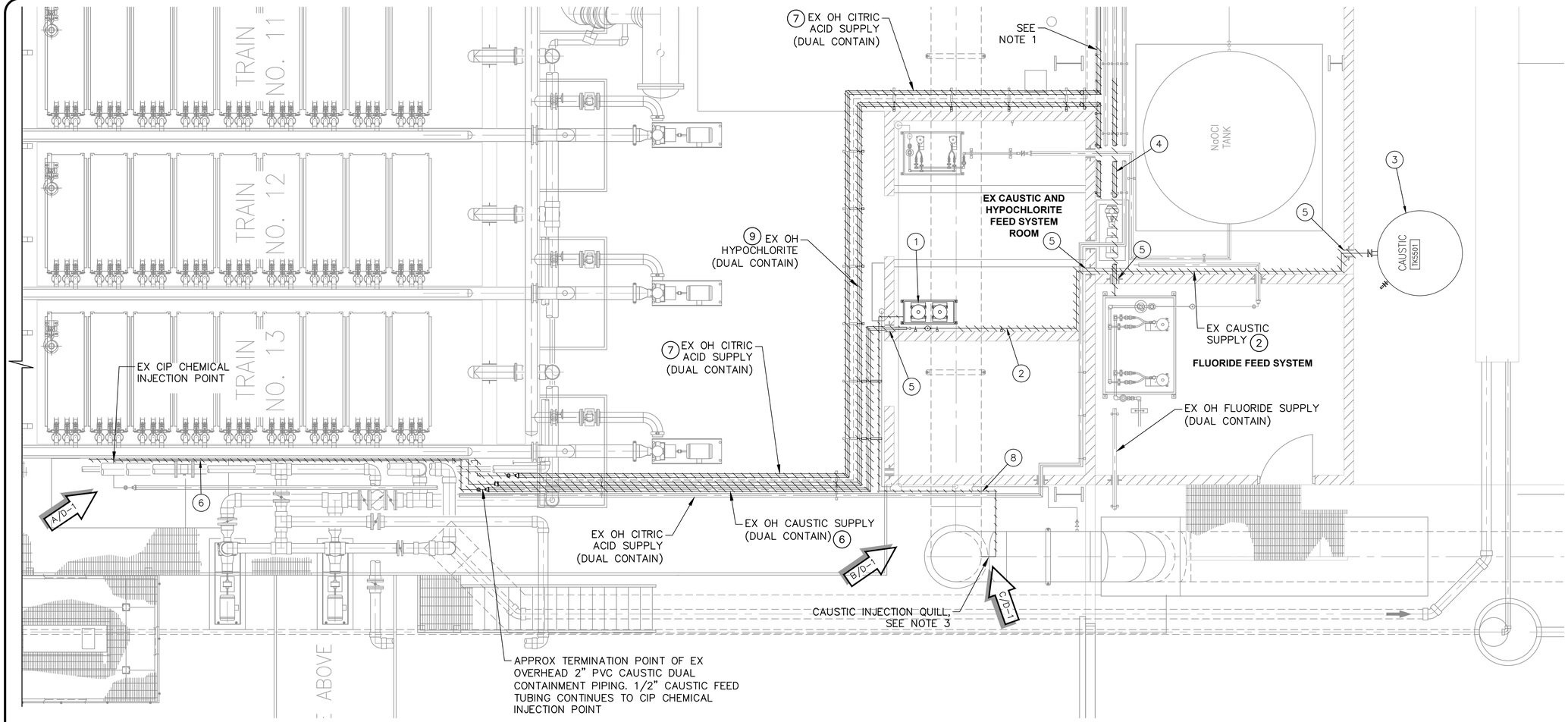

DEMOLITION LEGEND

1. RELOCATE EXISTING CAUSTIC FEED SKID AND ASSOCIATED VALVES AND APPURTENANCES. SEE DWG M-03
2. REMOVE AND DISPOSE OF APPROX 50-LF OF EXISTING 1" PVC CAUSTIC SUPPLY PIPING FROM EXISTING CAUSTIC STORAGE TANK TO EXISTING CAUSTIC FEED PUMP SKID.
3. PROTECT IN PLACE EXISTING CAUSTIC TANK (TK-5501). OMWD TO COORDINATE REMOVAL OF TANK.
4. REMOVE AND DISPOSE OF APPROX 20-LF OF 4" FLUORIDE DUAL CONTAINMENT PIPING AND FEED TUBING. SEE DWG M-02.
5. PATCH EXISTING WALL PENETRATION, SEE NOTE 4.
6. REMOVE AND DISPOSE OF APPROX 50-LF OF EXISTING OVERHEAD 2" PVC CAUSTIC DUAL CONTAINMENT PIPING. REMOVE AND DISPOSE OF APPROXIMATELY 85-LF OF 1/2" CAUSTIC FEED TUBING. SEE PHOTO A, THIS SHEET. SEE NOTE 2.
7. REMOVE AND DISPOSE OF APPROXIMATELY 130-LF OF EXISTING OVERHEAD 4" PVC CITRIC ACID DUAL CONTAINMENT PIPING. SEE NOTE 2.
8. REMOVE AND DISPOSE OF APPROXIMATELY 40-LF OF EXISTING 1/2" TEMPORARY CAUSTIC INJECTION LINE TUBING. SEE NOTE 2 AND 3.
9. REMOVE AND DISPOSE OF APPROXIMATELY 75-LF OF EXISTING OVERHEAD 4" PVC HYPOCHLORITE DUAL CONTAINMENT PIPING. SEE NOTE 2.

NOTES:

1. EXISTING (DUAL CONTAINED) CITRIC ACID SUPPLY PIPING TO BE REMOVED AND DISPOSED OF CONTINUES APPROX 50-LF NORTH/EAST. SEE DWG D-02 FOR CONTINUATION OF PIPING.
2. PROTECT IN PLACE EXISTING OVERHEAD PIPE SUPPORTS AND PIPE HANGERS.
3. PROTECT IN PLACE EXISTING CAUSTIC INJECTION QUILL
4. REMOVE PIPE AND SEALS AS REQUIRED. FORM AND POUR NON-SHRINK GROUT MATCHING COLOR OF EXISTING WALL. FINISHED PRODUCT SHALL BE SMOOTH, NEAT IN APPEARANCE, AND MATCH THE SURROUNDING WALL SURFACE.

PLAN

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

DEMOLISH EX 1/2" CAUSTIC FEED TUBING UP TO EX BALL VALVE AT CIP CHEMICAL INJECTION POINT. PROTECT IN PLACE EX BALL VALVE AND INJECTION QUILL.

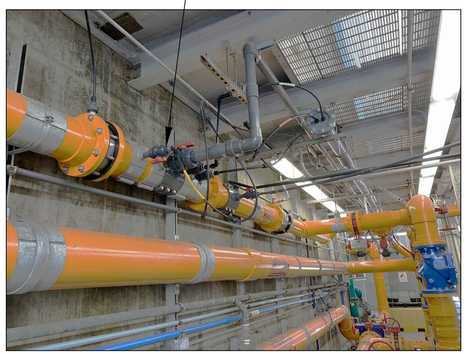

PHOTO A

PHOTO B

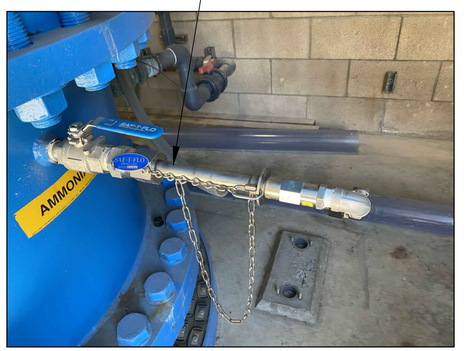

PHOTO C

DESIGN BL | DRAWN NH | CHECK MM

MARK	DATE	BY	REVISIONS

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ENGINEER P.E. DATE

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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

CHEMICAL AREA DEMOLITION PLAN

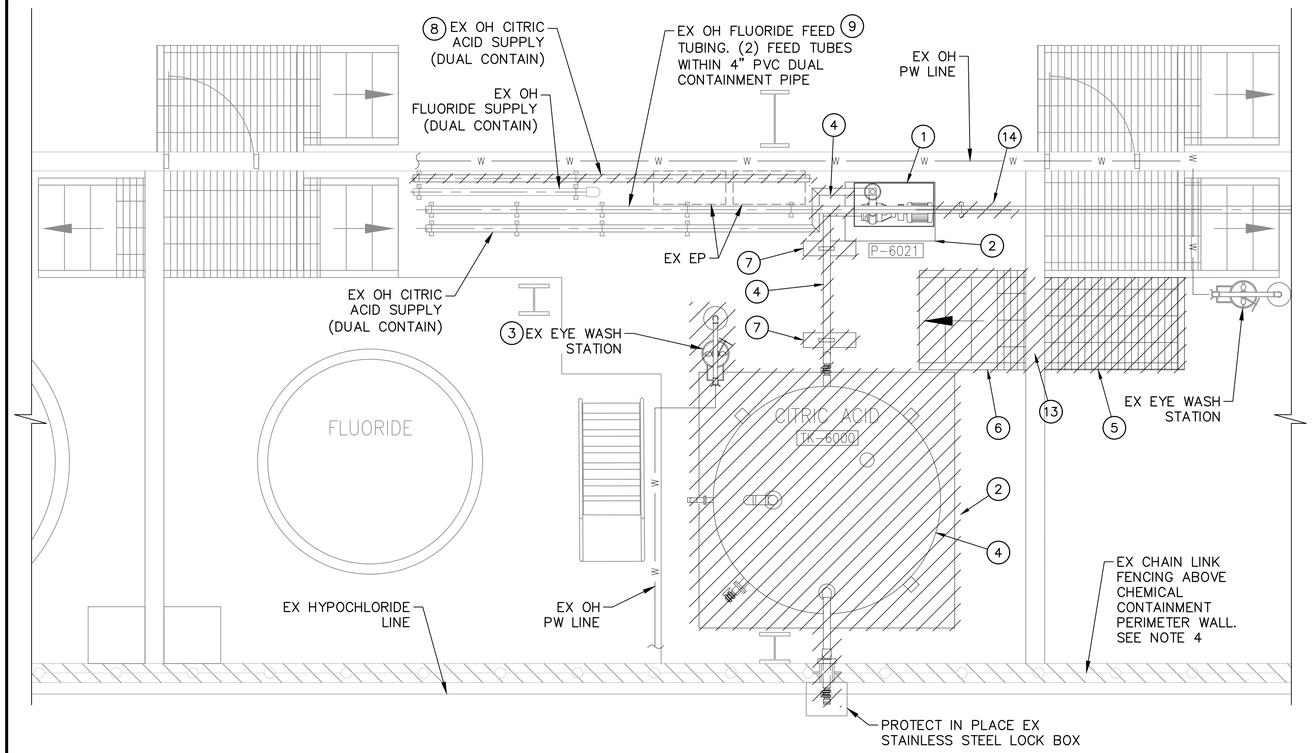
SHEET 05 / 28 OF SHEETS

D-01

D120068

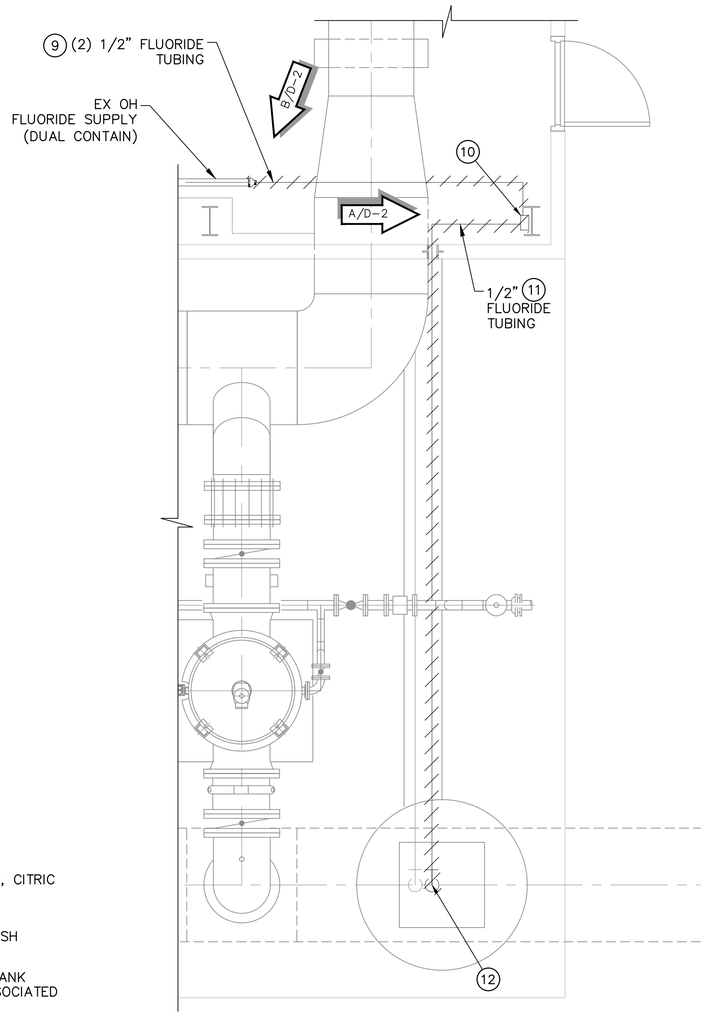
ORIGINAL SCALE IN INCHES 0 1 2 3 4

DWG: P:\101 Engineering\Olivenhin MWD\12874 DCMWTP pH Control System\06 CAD\12874 SH05 D-1.dwg USER: corr
DATE: Dec 29, 2020 3:53pm XREFS: 12874 X-1B 12874 X-EX-WTP



CITRIC ACID DEMO PLAN

SCALE: 3/8"=1'-0"



ENERGY RECOVERY ROOM DEMO PLAN

SCALE: 3/8"=1'-0"

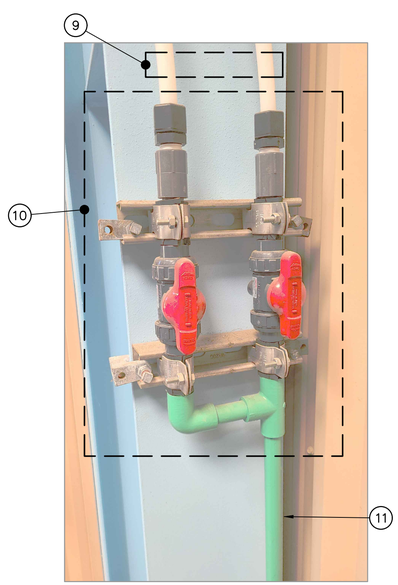


PHOTO A

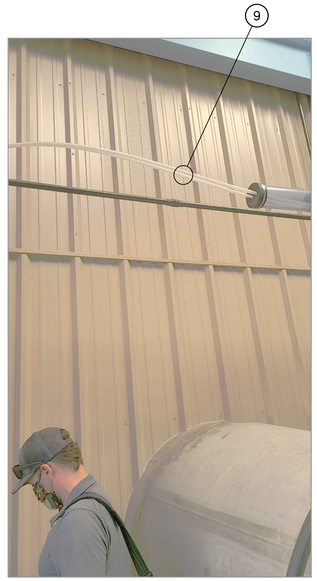


PHOTO B

CONSTRUCTION LEGEND

1. RELOCATE EX PUMP P-6021 PER DWG M-3
2. REMOVE AND DISPOSE OF EX 4" THICK CONCRETE PAD, CITRIC ACID TANK PAD APPROX 10' x 10', SEE NOTE 5
3. REMOVE AND DISPOSE OF EX EYE WASH STATION. CONNECT EX DOMESTIC WATER PIPING TO NEW EYE WASH STATION PER DWG M-03, SEE NOTE 5
4. REMOVE AND DISPOSE OF EX 2793 GAL CITRIC ACID TANK (TK-6000) AND ALL PIPING AND APPURTENANCES ASSOCIATED WITH TANK. SEE NOTE 4 & 5
5. REMOVE AND DISPOSE OF EXISTING ALUMINUM LANDING AND HANDRAILING. CONTRACTOR TO INSTALL NEW HANDRAIL AROUND REMAINING LANDING. SEE DWG M-03, SEE NOTE 5
6. REMOVE AND DISPOSE OF EX ALUMINUM ACCESS STAIR AND HANDRAILING, SEE NOTE 5
7. REMOVE AND DISPOSE OF EX CONCRETE SUPPORTS. APPROX 12" L x 8" W x 12" H, SEE NOTE 5
8. REMOVE AND DISPOSE OF APPROX 15-LF OF EXISTING 4" PVC CRITIC ACID PIPING
9. CONTRACTOR TO REMOVE AND DISPOSE OF TWO (2) APPROXIMATELY 275-LF LONG 1/2" FLUORIDE FEED TUBES (550-LF TOTAL) WITHIN EXISTING 4" PVC DUAL CONTAINMENT PIPING. PROTECT IN PLACE EXISTING 4" PVC DUAL CONTAINMENT PIPE TO BE REPURPOSED FOR CAUSTIC FEED SYSTEM AS INDICATED ON MECHANICAL DRAWINGS.
10. REMOVE AND DISPOSE OF EXISTING (2) 1/2" FLUORIDE FEED TUBES AND ASSOCIATED MANIFOLD
11. REMOVE AND DISPOSE OF APPROX 30-LF OF EXISTING 1/2" PVC FLUORIDE FEED PIPING
12. REMOVE AND DISPOSE OF EXISTING 1/2" INJECTION QUILL ASSEMBLY. SEE NOTE 2
13. RAISE CINDER BLOCK CAPSTONE AS NECESSARY TO MATCH THE EXISTING WALL. MATCH EPOXY COATING AS NECESSARY
14. GAP EXISTING FLUORIDE CONTAINMENT PIPE. CONTAINMENT PIPE TO BE REPURPOSED FOR CAUSTIC EFFLUENT. SEE NOTE 3 ON DWG M-03.

NOTES:

1. CONTRACTOR TO PROTECT IN PLACE ALL EXISTING OVERHEAD PIPE SUPPORTS AND PIPE HANGERS.
2. PRIOR TO REMOVAL OF AND REPALCEMENT OF INJECTION QUILL ASSEMBLY, CONTRACTOR TO COORDINATE PROCESS SHUTDOWN WITH OMWD OPERATIONS STAFF.
3. CERTAIN EXISTING PIPING, EQUIPMENT, AND STRUCTURES NOT DIRECTLY RELATED TO THE WORK PERFORMED UNDER THIS CONTRACT HAVE BEEN OMITTED FOR THE SAKE OF CLARITY. CONTRACTOR TO VERIFY ALL EXISTING UTILITIES ON SITE PRIOR TO DEMOLITION WORK.
4. REMOVAL AND REINSTALLATION OF EXISTING FENCING AROUND CHEMICAL STORAGE AREA MAY BE REQUIRED FOR REMOVAL OF EXISTING CITRIC ACID TANK. REMOVAL AND REINSTALLATION OF EXISTING METAL ROOF SECTIONS AND EXISTING AREA LIGHTING MAY ALSO BE REQUIRED FOR TANK REMOVAL AND INSTALLATION OF NEW CHEMICAL STORAGE TANKS. CONTRACTOR TO FIELD VERIFY LIMITS AND REQUIREMENTS OF EXISTING FENCE, ROOF, AND AREA LIGHTING REMOVAL PRIOR TO DEMOLITION WORK. CONTRACTOR TO SUBMIT A DEMOLITION PLAN FOR REMOVAL OF EXISTING CITRIC ACID TANK TO ENGINEER FOR APPROVAL PRIOR TO DEMOLITION WORK.
5. CONTRACTOR SHALL CUT EQUIPMENT ANCHOR BOLTS FLUSH WITH FLOOR. REPAIR AND PATCH EPOXY FLOOR COATING WITH TNEMEC V290 FLAXSEED UV RESISTANT EPOXY.

GRAPHIC SCALE

0 1' 2' 4' 6'

SCALE: 3/8"=1'-0"

ORIGINAL SCALE IN INCHES

0 1 2 3 4

MARK	DATE	BY	REVISIONS

DESIGN BL | DRAWN NH | CHECK MM

PROFESSIONAL ENGINEER — REGISTERED — STATE OF CALIFORNIA — No. 67211 — Exp. 06-30-21 — CIVIL

PLANS PREPARED BY:
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BRANDON C. LACAP 12/29/20
ENGINEER P.E. DATE

OLIVENHAIN
Municipal Water District
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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

CHEMICAL AREA AND ENERGY ROOM DEMOLITION PLANS

SHEET 06 / 28 OF SHEETS

D-02

D120068

DWG: P:\101.Engineering\Olivenhain MWD\12874 OCMWTP pH Control System\06.CAD\12874 SH06 D-2.dwg USER: ccorr
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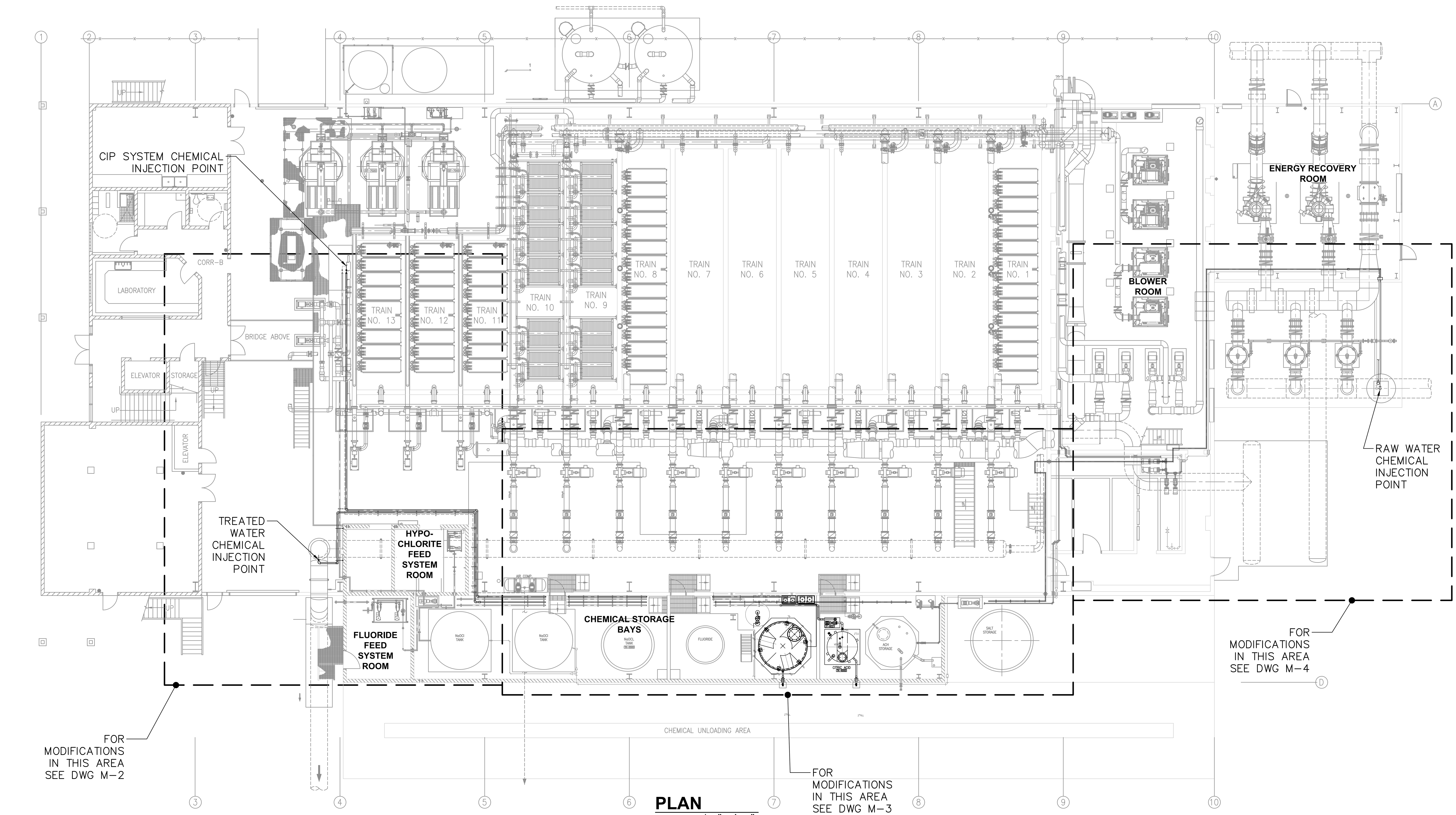

PLAN

SCALE: 3/32"=1'-0"

GENERAL MECHANICAL NOTES:

1. PROCESS EQUIPMENT DIMENSIONS, LOCATIONS AND PIPING SYSTEM LAYOUTS ARE BASED ON EQUIPMENT SELECTED AND SPECIFIED BY THE DESIGN ENGINEER. IF THE CONTRACTOR PROPOSES TO FURNISH EQUIPMENT THAT REQUIRES AN ARRANGEMENT OR SPACE DIFFEREING FROM THAT INDICATED ON THE DRAWINGS OR AS SPECIFIED, THE CONTRACTOR SHALL PREPARE AND SUBMIT TO THE ENGINEER FOR APPROVAL DETAILED MECHANICAL, STRUCTURAL, INSTRUMENTATION, AND ELECTRICAL DRAWINGS AND EQUIPMENT LISTS SHOWING ALL NECESSARY CHANGES AND EMBODYING ALL FEATURES OF THE EQUIPMENT AND/OR PROCESS SYSTEM PROPOSED. THIS INFORMATION SHALL INCLUDE BUT NOT BE LIMITED TO PLANS, SECTIONS, DETAILS AND SCHEMATICS OF ALL APPURTENANCES REQUIRED.

2. SIZES OF EQUIPMENT FOUNDATIONS AND EQUIPMENT PADS INDICATED ON THE DRAWINGS ARE APPROXIMATE. EXACT DIMENSIONS SHALL BE DETERMINED BY THE CONTRACTOR FOR THE EQUIPMENT FURNISHED. ALL FLOOR MOUNTED EQUIPMENT SHALL BE SET ON CONCRETE PADS CONFORMING TO DETAILS SHOWN ON THE MECHANICAL DRAWINGS, OR AS INDICATED IN THE SPECIFICATIONS.

3. DIELECTRIC COUPLINGS, FLANGES OR UNIONS SHALL BE INSTALLED AT ALL CONNECTIONS BETWEEN DISSIMILAR METALS.

4. MECHANICAL PLANS AND SECTIONS DO NOT SHOW ALL VALVES, GAUGES, SWITCHES, OPERATORS, DRAINS, VENTS, ETC. REQUIRED FOR THE COMPLETE SYSTEM. CERTAIN SMALL DIAMETER PROCESS PIPING RUNS MAY NOT BE SHOWN IN THEIR ENTIRETY. GENERALLY SMALL PIPING IS SHOWN DIAGRAMMATICALLY IN THE PROCESS SCHEMATICS. FIELD ROUTE TO AVOID INTERFERENCES, SUBJECT TO THE APPROVAL OF THE ENGINEER.

5. UNLESS OTHERWISE SHOWN ON THE MECHANICAL DRAWINGS, ALL WALL PENETRATIONS SHALL BE AS SHOWN ON THE PENETRATION DETAILS INCLUDED IN THE MECHANICAL DETAILS. IF APPROVED BY ENGINEER, THE CONTRACTOR MAY SUBSTITUTE ALTERNATE METHODS PROVIDING THEY MEET INTENDED DESIGN REQUIREMENTS.

6. CONTRACTOR SHALL DESIGN AND PROVIDE ALL PIPE SUPPORTS THAT ARE REQUIRED FOR A COMPLETE SYSTEM, BUT MAY NOT BE SHOWN ON THE DRAWINGS.

7. PIPING SHALL BE INSTALLED SO THAT ANY PIPE, LAYER OF PIPING OR EQUIPMENT CAN BE REMOVED WITHOUT DISTURBING REMAINING PIPES AND SUPPORTS.

8. THE NUMBER OF UNIONS AND OTHER TYPES OF DISMANTLING COUPLINGS SHOWN IS APPROXIMATE. THE CONTRACTOR SHALL PROVIDE UNIONS OR DISMANTLING COUPLINGS WHETHER THEY ARE SHOWN ON THE DRAWINGS OR NOT ON ALL PIPELINES WITH WELDED, THREADED, OR SOLVENT CEMENTED JOINTS: AT ALL EQUIPMENT CONNECTIONS, AT A MINIMUM OF EVERY 50 FEET, AND IN BRANCH LINES TO ALLOW CONVENIENT REMOVAL OF PIPING, EQUIPMENT AND APPURTENANCES.

9. ALL PIPING AND PROCESS SYSTEMS SHALL BE CAPABLE OF BEING VENTED AND DRAINED.

10. ALL TUBE IN TUBE STYLE CONTAINMENT PIPING MUST HAVE FLUSH AND DRAIN PORTS EVERY 50'.

11. CONTRACTOR SHALL PROVIDE A TEMPORARY CAUSTIC STORAGE, SUPPLY, AND FEED SYSTEM TO MAINTAIN/PROVIDE CURRENT CAUSTIC INJECTION REQUIREMENTS TO THE EXISTING TREATED WATER EFFLUENT STREAM DURING PROJECT CONSTRUCTION. CONTRACTOR SHALL SUBMIT A DETAILED TEMPORARY CAUSTIC FEED SYSTEM AND PHASING PLAN TO OMWD FOR APPROVAL PRIOR TO CONSTRUCTION. AT MINIMUM, TEMPORARY CAUSTIC FEED SYSTEM AND PHASING PLAN SHALL INCLUDE ALL TEMPORARY EQUIPMENT TO BE USED, LOCATION AND LAYOUT OF TEMPORARY EQUIPMENT, BYPASS PLAN, AND CONSTRUCTION PHASING SCHEDULE.

GRAPHIC SCALE

0 4' 8' 16' 24'

SCALE: 3/32"=1'-0"

DWG: P:\10.Engineering\Olivenhain MWD\12874 DCMWTP pH Control System\06.CAD\12874 SH07 M-1.dwg USER: ccorr
DATE: Dec 29, 2020 3:55pm XREFS: 12874 X-TB 12874 X-EX-WTP 12874 X-NEW CHEM PIPING

MARK	DATE	BY	REVISIONS

DESIGN BL — DRAWN NH — CHECK MM

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BRANDON C. LACAP 12/29/20
ENGINEER P.E DATE

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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

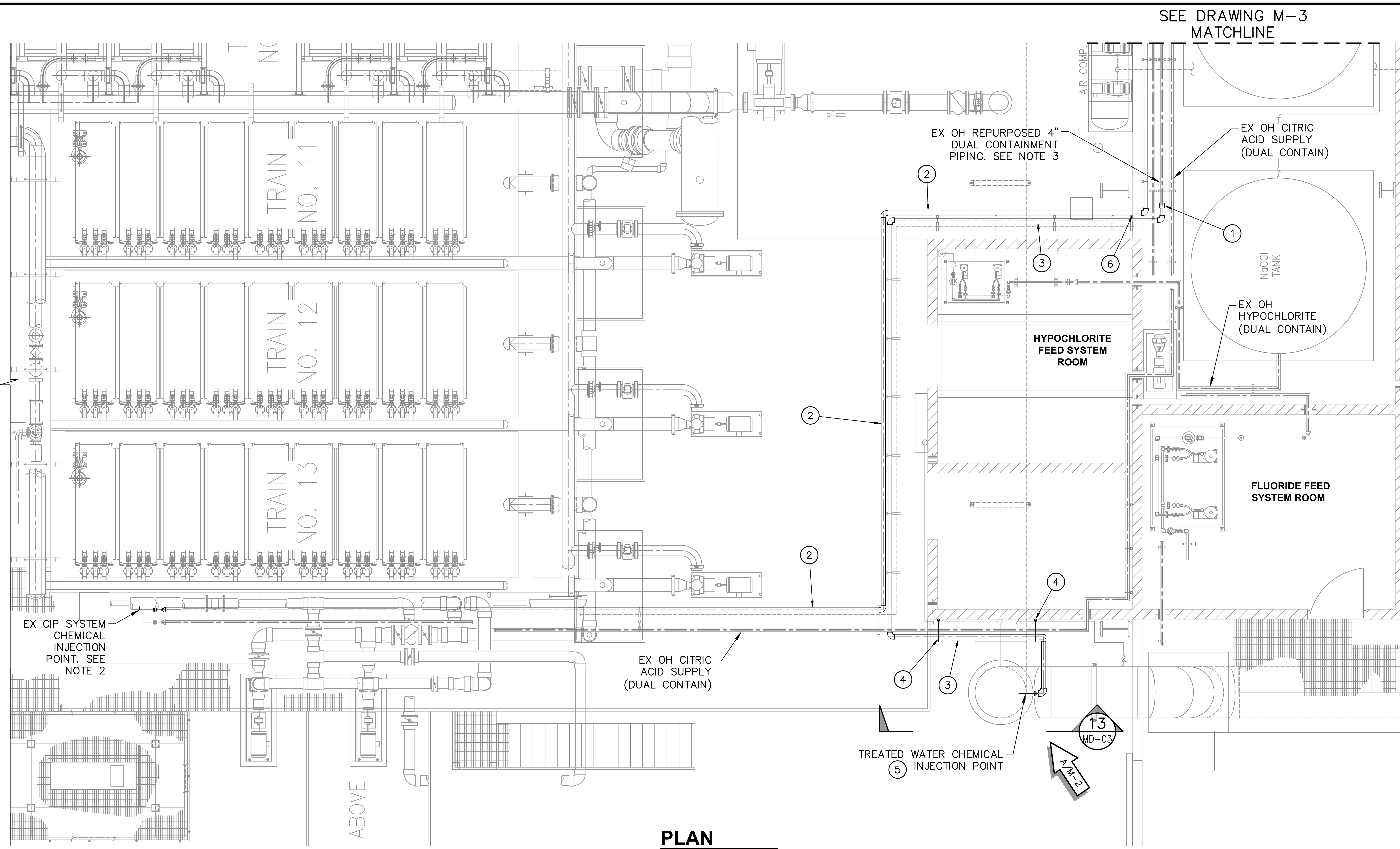
WTP OVERALL PLAN

SHEET 07 / 28 OF SHEETS

M-01

D120068

ORIGINAL SCALE IN INCHES



PLAN

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

CONSTRUCTION LEGEND

1. CONNECT NEW 4" CLEAR PVC DUAL CONTAINMENT PIPE TO EXISTING 4" CLEAR PVC DUAL CONTAINMENT PIPE USING 4" PVC COUPLING, SEE DETAIL 6, DWG MD-01.
2. (2) – 5/8" BLACK HDPE CAUSTIC FEED TUBES INSIDE 4" CLEAR PVC DUAL CONTAINMENT PIPING. USE EXISTING OVERHEAD PIPE SUPPORT STRUTS TO INSTALL NEW PIPING. SEE NOTE 4. NEW CAUSTIC FEED TUBES ROUTED FROM RELOCATED M3 CAUSTIC FEED PUMP SKID TO CIP CHEMICAL INJECTION POINT.
3. (2) – 5/8" BLACK HDPE CAUSTIC FEED TUBES INSIDE 4" CLEAR PVC DUAL CONTAINMENT PIPING. USE EXISTING OVERHEAD PIPE SUPPORT STRUTS TO INSTALL NEW PIPING. SEE NOTE 4. NEW CAUSTIC FEED TUBES ROUTED FROM NEW MD3 CAUSTIC FEED PUMP SKID TO TREATED WATER CHEMICAL INJECTION POINT.
4. SUPPORT NEW DUAL CONTAINMENT PIPING ON EXISTING OVERHEAD SUPPORT STRUTS.
5. CONNECT NEW CAUSTIC FEED PIPING TO EXISTING INJECTION QUILL ASSEMBLY PER DETAIL 13, DWG MD-03. EXISTING INJECTION QUILL ASSEMBLY SHOWN ON PHOTO A, THIS SHEET.
6. METAL WALL PENETRATION PER DETAIL 4, DWG MD-01

NOTES:

1. ALL NEW DUAL CONTAINMENT PIPING SHALL BE 4" CLEAR PVC. ALL BENDS IN DUAL CONTAINMENT PIPING SHALL BE LONG-RADIUS SWEEP ELBOWS. ALL DUAL CONTAINMENT PIPE JOINTS, COUPLINGS, AND FITTINGS SHALL BE WATER TIGHT.
2. CONNECT NEW 5/8" BLACK HDPE CAUSTIC FEED TUBE TO EXISTING 1/2" BALL VALVE USING 1/2" MNPT x 5/8" COMPRESSION "FAST & TITE" TUBE FITTING. CAP END OF SPARE 5/8" HDPE CAUSTIC FEED TUBE OUTSIDE OF 4" PVC DUAL CONTAINMENT PIPING. LABEL TUBES AS 'A' AND 'B' (SPARE).
3. CONTRACTOR TO REPURPOSE EXISTING 4" PVC FLUORIDE DUAL CONTAINMENT PIPING FOR NEW CAUSTIC FEED TUBING. CONTRACTOR TO PULL (2) – 5/8" BLACK HDPE CAUSTIC FEED TUBES THROUGH EXISTING REPURPOSED 4" PVC PIPING FROM LOCATION OF NEW CAUSTIC STORAGE AND FEED AREA TO CONNECTION POINT OF NEW CONTAINMENT PIPING.
4. PROVIDE NEW 316 STAINLESS STEEL STRUT-MOUNTED PIPE STRAPS AT EACH EXISTING OVERHEAD PIPE SUPPORT FOR NEW 4" DUAL CONTAINMENT PIPING EVERY 48" OF LINEAR PIPE. CONTRACTOR TO VERIFY EXISTING PIPE SUPPORT STRUT CHANNEL SIZE PRIOR TO FURNISHING PIPE STRAPS.
5. ALL TUBE IN TUBE STYLE CONTAINMENT PIPING MUST HAVE FLUSH AND DRAIN PORTS EVERY 50'.

PHOTO A

GRAPHIC SCALE

0 2' 4' 8'

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

REVISIONS | MARK | DATE | BY

DESIGN BL | DRAWN NH | CHECK MM

PLANS PREPARED BY: DUDEK
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BRANDON C. LACAP 12/29/20
ENGINEER P.E. DATE

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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP WATER TREATMENT PLANT

CHEMICAL AREA 1 PLAN

SHEET 08 / 28 OF SHEETS

M-02

D120068

ORIGINAL SCALE IN INCHES

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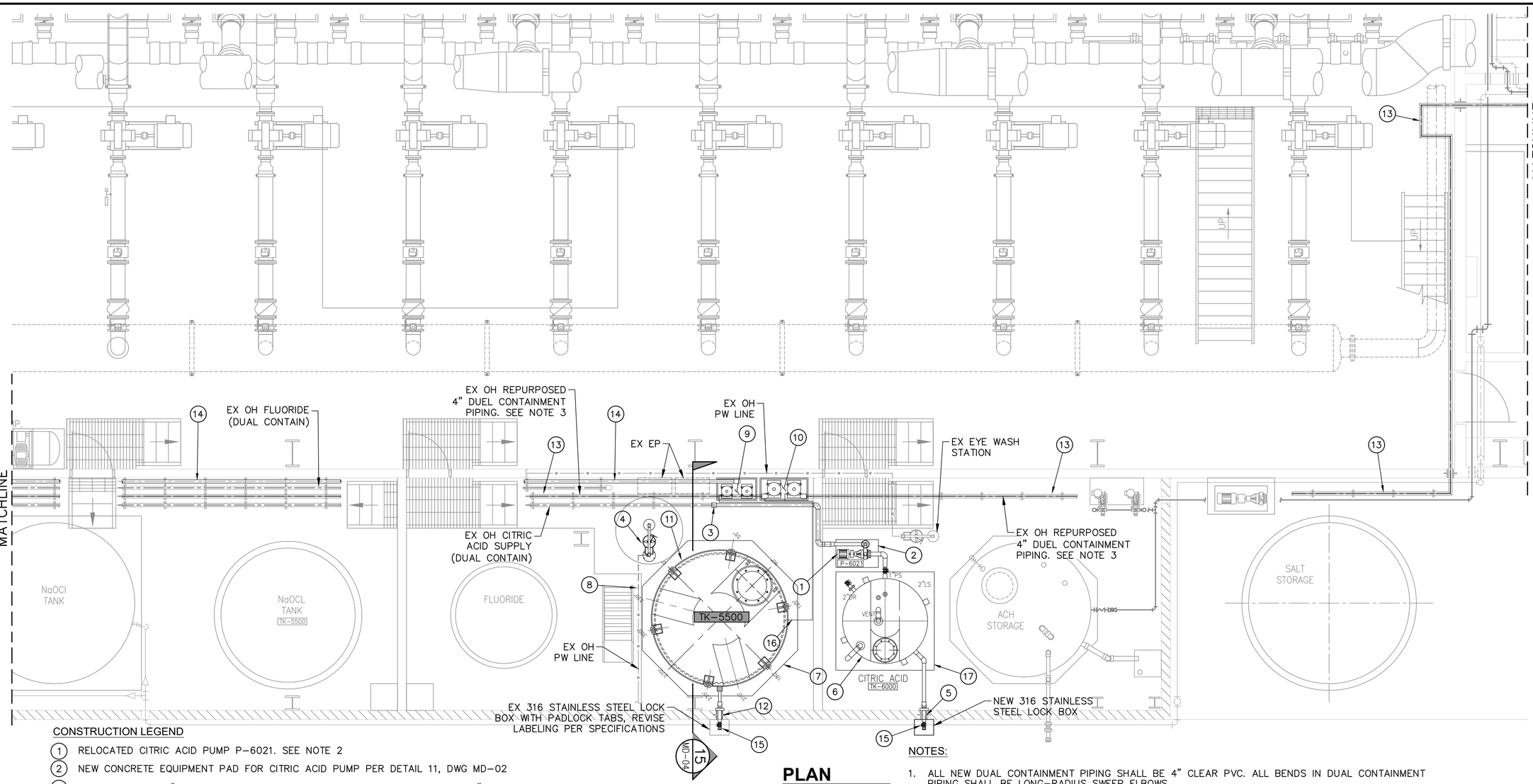

PLAN
SCALE: 1/4"=1'-0"

CONSTRUCTION LEGEND

1. RELOCATED CITRIC ACID PUMP P-6021. SEE NOTE 2
2. NEW CONCRETE EQUIPMENT PAD FOR CITRIC ACID PUMP PER DETAIL 11, DWG MD-02
3. CONNECT TO EX 4" CLEAR PVC CITRIC ACID DUAL CONTAINMENT PIPE USING 4" PVC COUPLING
4. NEW EYEWASH GUARDIAN G1950P
5. NEW WALL PENETRATION PER DTL 5 ON DWG MD-01
6. INSTALL 1550 GALLON CITRIC ACID TANK TK-6000 (TANK PROVIDED BY OMWD). CITRIC ACID TANK SHOP DRAWING INCLUDED AS AN APPENDIX TO THE TECHNICAL SPECIFICATIONS. PROVIDE FLEXIBLE/EXPANSION JOINTS ON TANK FILL PIPING, OVERFLOW PIPING, AND PUMP FEED PIPING.
7. NEW REINFORCED CONCRETE PAD FOR NEW CAUSTIC CHEMICAL STORAGE TANK
8. CONNECT TO EXISTING 1" DOMESTIC WATER LINE. PROVIDE APPROXIMATELY 10-LF OF NEW 1" SCH 80 COPPER WATER PIPING TO NEW EYEWASH STATION. PROVIDE 1" BRASS BALL VALVE AT CONNECTION TO EYEWASH STATION.
9. RELOCATED M3 CAUSTIC FEED PUMP SKID. SEE DWG MD-02 FOR CAUSTIC SKID PUMP AND DISCHARGE MANIFOLD DETAILS.
10. NEW MD3 CAUSTIC FEED PUMP SKID. SEE DWG MD-02 FOR CAUSTIC SKID PUMP AND DISCHARGE MANIFOLD DETAILS. PROVIDE NEW MD3 CAUSTIC FEED PUMP SKID PER SPECIFICATIONS.
11. NEW 10' NOMINAL DIAMETER 4400 GALLON CROSS-LINKED POLYETHLYENE, DOUBLE WALLED CHEMICAL STORAGE TANK TK-5500. SEE TANK DETAIL 15, DWG MD-04
12. EX WALL PENETRATION TO BE USED FOR NEW 3" FILL LINE
13. (2) - 5/8" HDPE CAUSTIC FEED TUBES INSIDE REPURPOSED EXISTING 4" CLEAR PVC DUAL CONTAINMENT PIPING. SEE NOTE 3.
14. (2) - 5/8" HDPE CAUSTIC FEED TUBES INSIDE 4" CLEAR PVC DUAL CONTAINMENT PIPING. USE EXISTING OVERHEAD PIPE SUPPORT STRUTS TO INSTALL NEW PIPING. SEE NOTE 4
15. 2" CITRIC ACID CHEMICAL FILL STATION ASSEMBLY, AND 3" CAUSTIC CHEMICAL FILL STATION ASSEMBLY, PER DTL 2 ON DWG MD-01
16. 1.5" PVC (SCH-80) CAUSTIC SUPPLY PIPING
17. NEW CITRIC ACID TANK CONCRETE PAD AND TANK RESTRAINT/ANCHORING SYSTEM SHALL BE IN ACCORDANCE WITH THE PROVIDED STRUCTURAL AND SEISMIC DESIGN CALCULATIONS INCLUDED AS AN APPENDICES TO THE TECHNICAL SPECIFICATIONS.

NOTES:

1. ALL NEW DUAL CONTAINMENT PIPING SHALL BE 4" CLEAR PVC. ALL BENDS IN DUAL CONTAINMENT PIPING SHALL BE LONG-RADIUS SWEEP ELBOWS.
2. EXISTING SEAL FLUSHING & DRAIN SYSTEM FOR CITRIC ACID PUMP TO BE REMOVED AND RELOCATED WITH CITRIC ACID PUMPING UNIT. CONTRACTOR RESPONSIBLE FOR RECONNECTION OF CITRIC ACID PUMP SEAL FLUSHING SYSTEM TO EXISTING SOURCE WATER AND DRAINAGE SYSTEMS. CONTRACTOR TO ENSURE SEAL FLUSHING SYSTEM IS OPERABLE AFTER INSTALLATION OF NEW CITRIC ACID STORAGE TANK. WALL PENETRATIONS TO BE GROUT SEALED AND EPOXIED PER SPECIFICATIONS.
3. CONTRACTOR TO REPURPOSE EXISTING 4" PVC FLUORIDE DUAL CONTAINMENT PIPING FOR NEW CAUSTIC FEED TUBING. CONTRACTOR TO PULL (2) - 5/8" BLACK HDPE CAUSTIC FEED TUBES THROUGH EXISTING REPURPOSED 4" PVC PIPING FROM LOCATION OF NEW CAUSTIC STORAGE AND FEED AREA TO NEW CAUSTIC FEED TUBE MANIFOLD LOCATED IN ENERGY RECOVERY ROOM (NEW MANIFOLD INDICATED ON DWG M-04).
4. PROVIDE NEW 316 STAINLESS STEEL STRUT-MOUNTED PIPE STRAPS AT EACH EXISTING OVERHEAD PIPE SUPPORT FOR NEW 4" DUAL CONTAINMENT PIPING, STRUT SPACING NOT TO EXCEED 48". CONTRACTOR TO VERIFY EXISTING PIPE SUPPORT STRUT CHANNEL SIZE PRIOR TO FURNISHING PIPE STRAPS.
5. CONTRACTOR TO REPURPOSE EXISTING 4" PVC FLUORIDE DUAL CONTAINMENT PIPING FOR NEW CAUSTIC FEED TUBING. CONTRACTOR TO PULL (2) - 5/8" BLACK HDPE CAUSTIC FEED TUBES THROUGH EXISTING REPURPOSED 4" PVC PIPING FROM LOCATION OF NEW CAUSTIC STORAGE AND FEED AREA TO TREATED WATER INJECTION POINT.
6. CONTRACTOR SHALL SUBMIT DESIGN OF NEW REINFORCED CONCRETE PAD (FOR NEW CAUSTIC STORAGE TANK) TO ENGINEER FOR APPROVAL. STRUCTURAL AND SEISMIC DESIGN CALCULATIONS SHALL BE STAMPED AND SIGNED BY A LICENSED STRUCTURAL ENGINEER IN THE STATE OF CALIFORNIA, AND INCLUDED IN THE SUBMITTAL FOR APPROVAL.
7. ALL TUBE IN TUBE STYLE CONTAINMENT PIPING MUST HAVE FLUSH AND DRAIN PORTS EVERY 50'.

GRAPHIC SCALE
0 2' 4' 8'
SCALE: 1/4"=1'-0"

ORIGINAL SCALE IN INCHES
0 1 2 3 4

MARK	DATE	BY	REVISIONS

DESIGN: BL | DRAWN: NH | CHECK: MM

PLANS PREPARED BY:
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BRANDON C. LACAP 12/29/20
ENGINEER P.E. DATE

OLIVENHAIN
Municipal Water District
1966 Olivenhain Road
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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

CHEMICAL AREA 2 PLAN

SHEET 09 / 28 OF SHEETS
M-03

D120068

DWG: P:\10\Engineering\Olivenhain MWD\12874 DCMWTP pH Control System\06CAD\12874 St108-10 M-2 to M-4.dwg USER: ccorr
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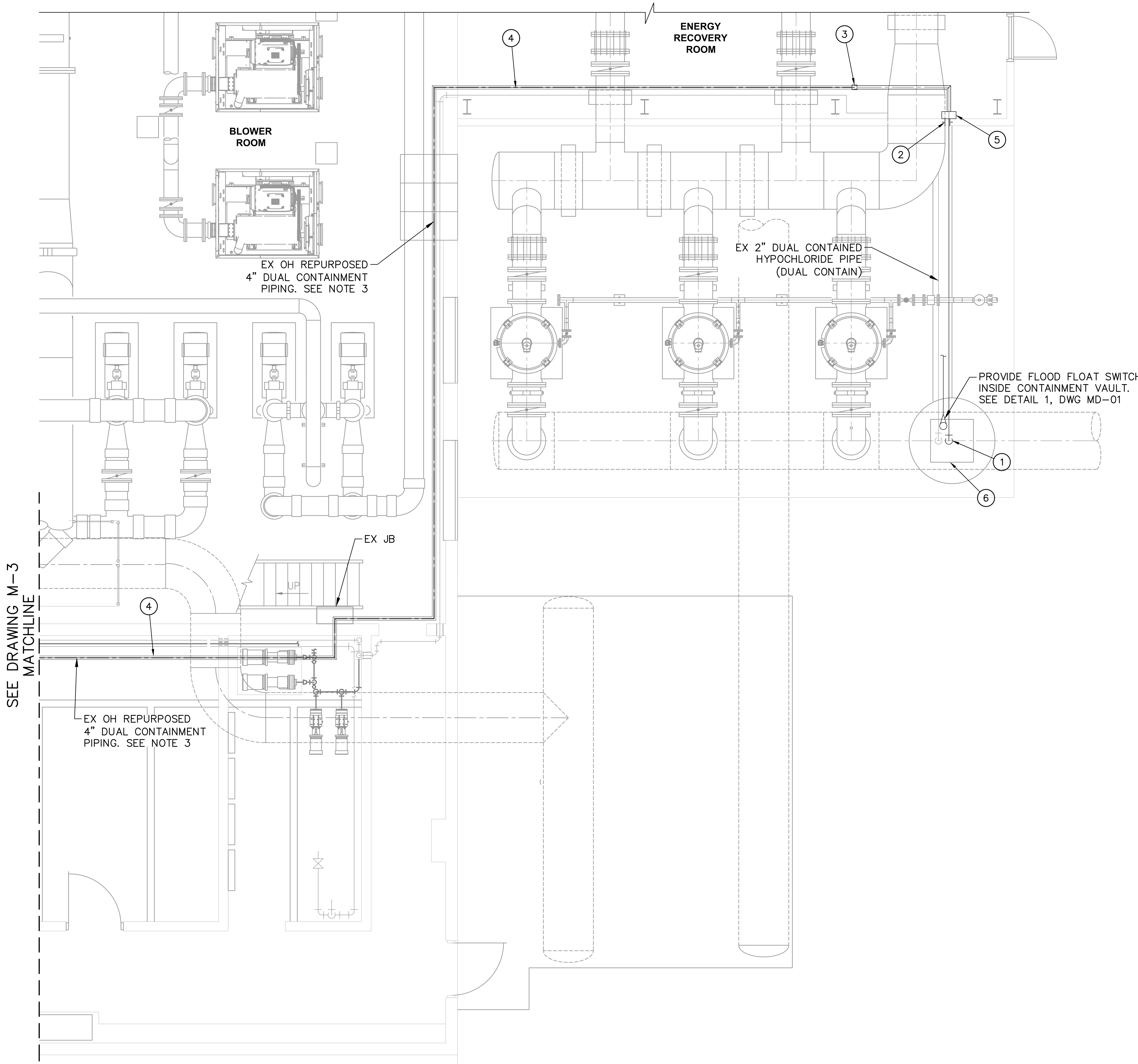

PLAN

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

CONSTRUCTION LEGEND

1. INJECTION QUILL ASSEMBLY PER DTL 1 ON DWG MD-01
2. METAL WALL PENETRATION PER DTL 4 ON DWG MD-01
3. CONNECT NEW 4" CLEAR PVC DUAL CONTAINMENT PIPE TO EXISTING 4" CLEAR PVC DUAL CONTAINMENT PIPE USING 4" PVC COUPLING, SEE NOTE 1.
4. (2) – 5/8" BLACK HDPE CAUSTIC FEED TUBES INSIDE REPURPOSED EXISTING 4" CLEAR PVC DUAL CONTAINMENT PIPING. SEE NOTES 2 AND 3.
5. CAUSTIC FEED TUBING MANIFOLD PER DTL 14 ON DWG MD-03.
6. GROUT/SEAL ALL OPENINGS IN BOTTOM OF EXISTING CONTAINMENT VAULT. EPOXY COAT ALL MASONRY SURFACES USING TNEMEC V290 FLAXSEED UV RESISTANT EPOXY.

NOTES:

1. ALL NEW DUAL CONTAINMENT PIPING SHALL BE 4" CLEAR PVC. ALL BENDS IN DUAL CONTAINMENT PIPING SHALL BE LONG-RADIUS SWEEP ELBOWS. ALL DUAL CONTAINMENT PIPE JOINTS, COUPLINGS, AND FITTINGS SHALL BE WATER TIGHT.
2. PROVIDE NEW 316 STAINLESS STEEL STRUT-MOUNTED PIPE STRAPS AT EACH EXISTING OVERHEAD PIPE SUPPORT FOR NEW 4" DUAL CONTAINMENT PIPING. CONTRACTOR TO VERIFY EXISTING PIPE SUPPORT STRUT CHANNEL SIZE PRIOR TO FURNISHING PIPE STRAPS.
3. CONTRACTOR TO REPURPOSE EXISTING 4" PVC FLUORIDE DUAL CONTAINMENT PIPING FOR NEW CAUSTIC FEED TUBING. CONTRACTOR TO PULL (2) – 5/8" BLACK HDPE CAUSTIC FEED TUBES THROUGH EXISTING REPURPOSED 4" PVC PIPING FROM LOCATION OF NEW CAUSTIC STORAGE AND FEED AREA TO NEW CAUSTIC FEED TUBE MANIFOLD LOCATED IN ENERGY RECOVERY ROOM.
4. ALL TUBE IN TUBE STYLE CONTAINMENT PIPING MUST HAVE FLUSH AND DRAIN PORTS EVERY 50'.

GRAPHIC SCALE

0 2' 4' 8'

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

MARK	DATE	BY	REVISIONS

DESIGN BL | DRAWN NH | CHECK MM

PLANS PREPARED BY: DUDEK
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760.942.5147 Fax 760.632.0164

BRANDON C. LACAP 12/29/20
ENGINEER P.E. DATE

OLIVENHAIN Municipal Water District
1966 Olivenhain Road
Encinitas, CA 92024 (760)753-6466

SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

CHEMICAL AREA 3
PLAN

SHEET 10 OF 28 SHEETS | M-04

D120068

ORIGINAL SCALE IN INCHES

DWG: P:\101.Engineering\Olivenhain MWD\12874 DCMWTP pH Control System\06.CAD\12874 SH08-10 M-2 to M-4.dwg USER: ccorr
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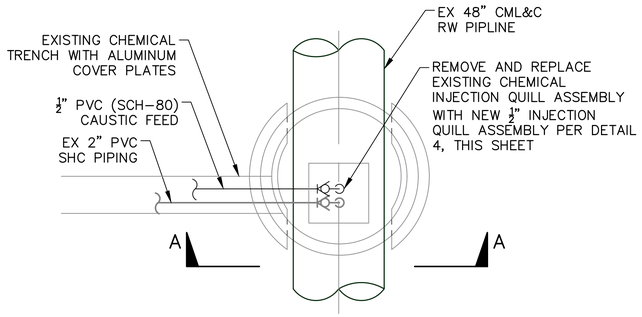
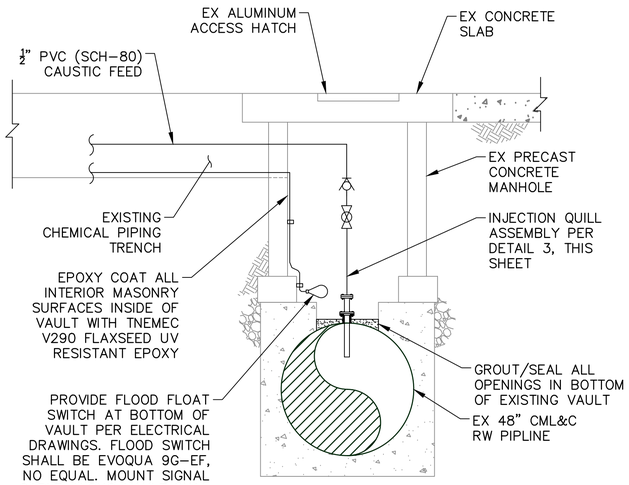


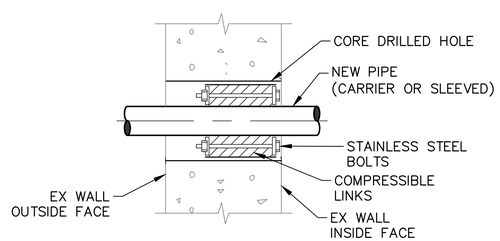
PLAN



SECTION A-A

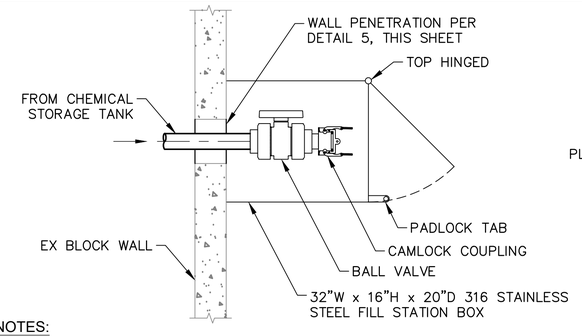
RAW WATER CHEMICAL INJECTION POINT

DETAIL 1 / M-04
NOT TO SCALE



WALL PENETRATION THROUGH EX. EXTERIOR CONCRETE OR CMU WALL

DETAIL 5 / –
NOT TO SCALE



NOTES:

1. CAMLOCK COUPLING MATERIALS OF CONSTRUCTION SHALL BE COMPATIBLE WITH THE ASSOCIATED CHEMICAL SERVICE.
2. PIPING, VALVE, AND CAMLOCK COUPLING SIZE SHALL BE AS INDICATED ON THE DRAWINGS.
3. PROVIDE WEATHER PROOF LABEL ON FILL STATION BOX, SPECIFYING CHEMICAL NAME ON FRONT OF LID. BOX MUST BE WELDED WITH NO BOLTS. WALL MOUNTING TABS MUST BE ON THE INSIDE OF THE BOX FOR SECURITY.

CHEMICAL TANK FILL STATION

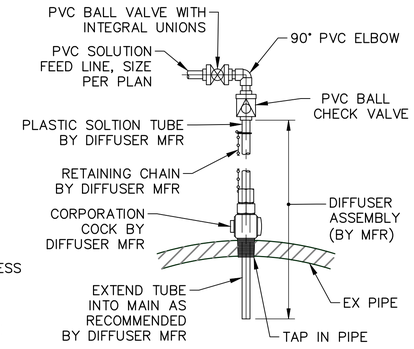
DETAIL 2 / M-03
NOT TO SCALE

PLAN VIEW

ELEVATION VIEW

CONTAINMENT PIPING TRANSITION
(FROM CHEMICAL STORAGE AREA PIPE STRUTS INTO BUILDING)

DETAIL 6 / M-2
NOT TO SCALE

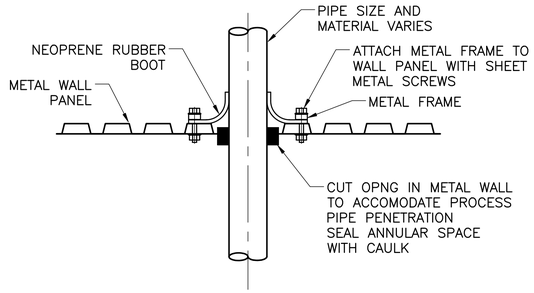


NOTES:

1. INJECTION QUILL ASSEMBLY SHALL BE ½" DIAMETER, CONSTRUCTED OF 316 STAINLESS STEEL, MANUFACTURED BY SAF-T-FLO, MODEL EB-155, NO EQUAL.

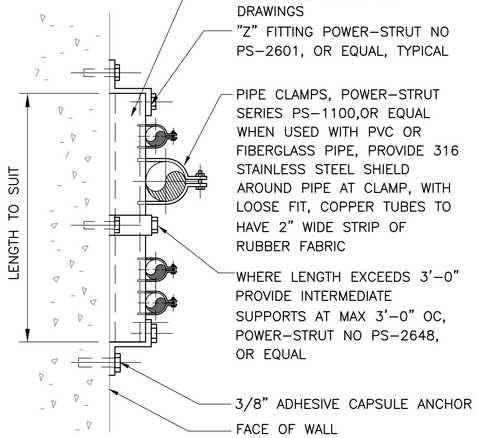
CHEMICAL SOLUTION FEED POINT

DETAIL 3 / –
NOT TO SCALE



PROCESS PIPE PENETRATION THROUGH METAL WALL

DETAIL 4 / M-2
NOT TO SCALE



NOTES:

1. SOME EXISTING UTILITIES IN THIS AREA ARE NOT SHOWN FOR CLARITY. CONTRACTOR TO FIELD VERIFY LOCATION OF ALL EXISTING UTILITIES IN THIS AREA PRIOR TO CONSTRUCTION.
2. ALL ELBOWS SHALL BE SCH 80 PVC LONG-RADIUS SWEEP ELBOWS.
3. ALL DUAL CONTAINMENT PIPE JOINTS, COUPLINGS, AND FITTINGS SHALL BE WATER TIGHT.

WALL MOUNTED PIPE SUPPORT STRUT

DETAIL 7 / TYP
NOT TO SCALE

MARK	DATE	BY	REVISIONS

DESIGN BL | DRAWN NH | CHECK MM

PLANS PREPARED BY:
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BRANDON C. LACAP 12/29/20
ENGINEER P.E. DATE

OLIVENHAIN
Municipal Water District
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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

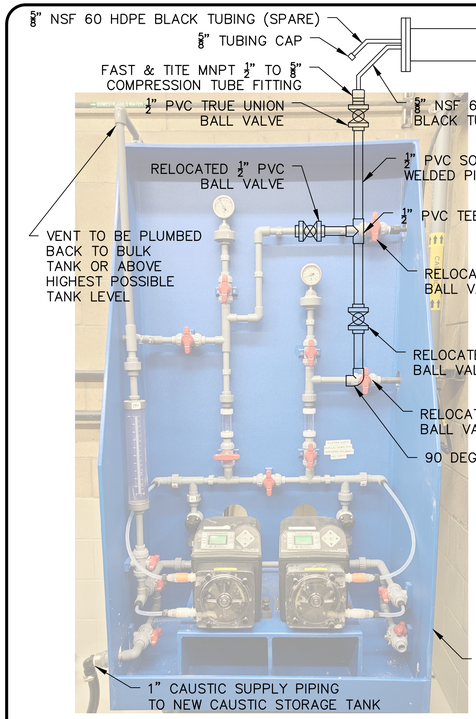
DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

MECHANICAL DETAILS – 1

SHEET 11 / 28 OF SHEETS
MD-01
D120068

ORIGINAL SCALE IN INCHES
0 1 2 3 4

DWG: P:\101.Engineering\Olivenhain MWD\12874 DCMWTP pH Control System\06.CAD\12874 Shtx MD-1 to MD-4.dwg USER: ccorr
DATE: Dec 29, 2020 3:57pm XREFS: 12874 X-TB

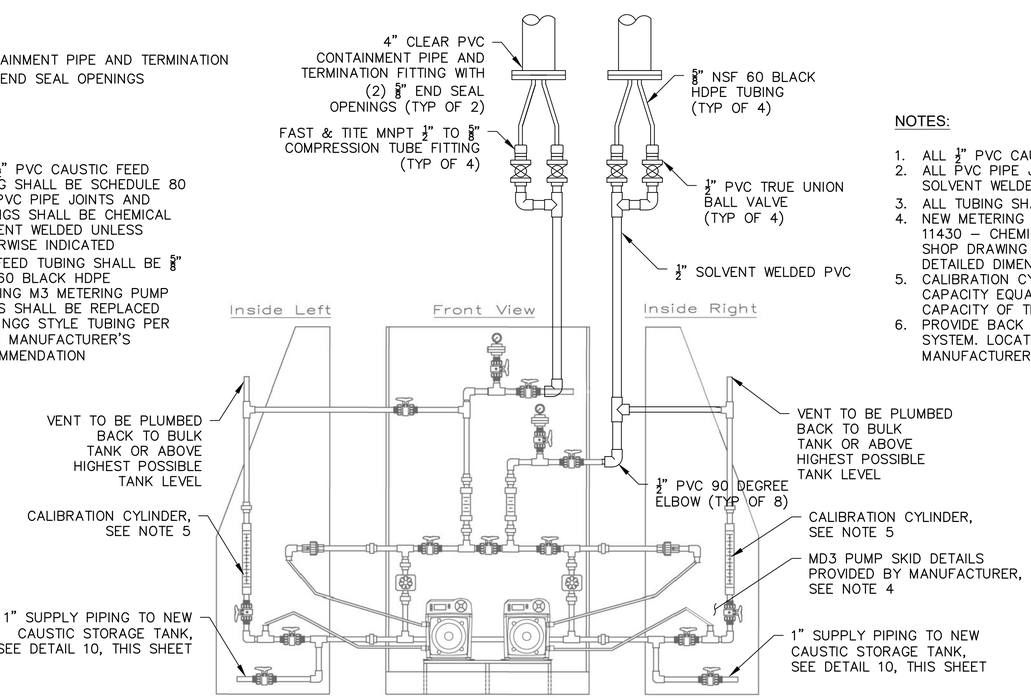


MODIFICATIONS TO EXISTING M3 SKID PIPING

NOTES:

1. ALL ½" PVC CAUSTIC FEED PIPING SHALL BE SCHEDULE 80
2. ALL PVC PIPE JOINTS AND FITTINGS SHALL BE CHEMICAL SOLVENT WELDED UNLESS OTHERWISE INDICATED
3. ALL FEED TUBING SHALL BE ⅝" NSF 60 BLACK HDPE
4. EXISTING M3 METERING PUMP TUBES SHALL BE REPLACED WITH NGG STYLE TUBING PER PUMP MANUFACTURER'S RECOMMENDATION

DETAIL 8 / –
NOT TO SCALE



NEW MD3 CAUSTIC FEED SYSTEM PUMP SKID AND DISCHARGE MANIFOLD

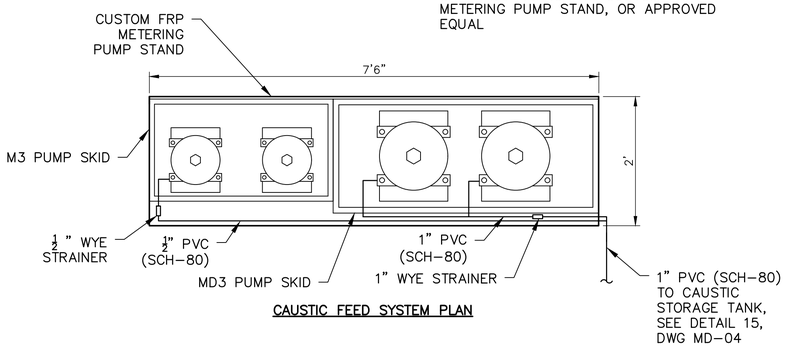
NOTES:

1. ALL ½" PVC CAUSTIC FEED PIPING SHALL BE SCHEDULE 80
2. ALL PVC PIPE JOINTS AND FITTINGS SHALL BE CHEMICAL SOLVENT WELDED UNLESS OTHERWISE INDICATED
3. ALL TUBING SHALL BE ⅝" NSF 60 BLACK HDPE
4. NEW METERING PUMP SKID PER SPECIFICATIONS SECTION 11430 – CHEMICAL FEED SYSTEMS. CONTRACTOR TO SUBMIT SHOP DRAWING OF NEW METERING PUMP SKID, INCLUDING DETAILED DIMENSIONS FOR APPROVAL
5. CALIBRATION CYLINDER SHALL HAVE A MINIMUM TOTAL CAPACITY EQUAL TO OR GREATER THAN THE RATED CAPACITY OF THE ASSOCIATED PUMP
6. PROVIDE BACK PRESSURE VALVE FOR EACH CAUSTIC FEED SYSTEM. LOCATION OF BACK PRESSURE VALVE PER PUMP MANUFACTURER'S RECOMMENDATION

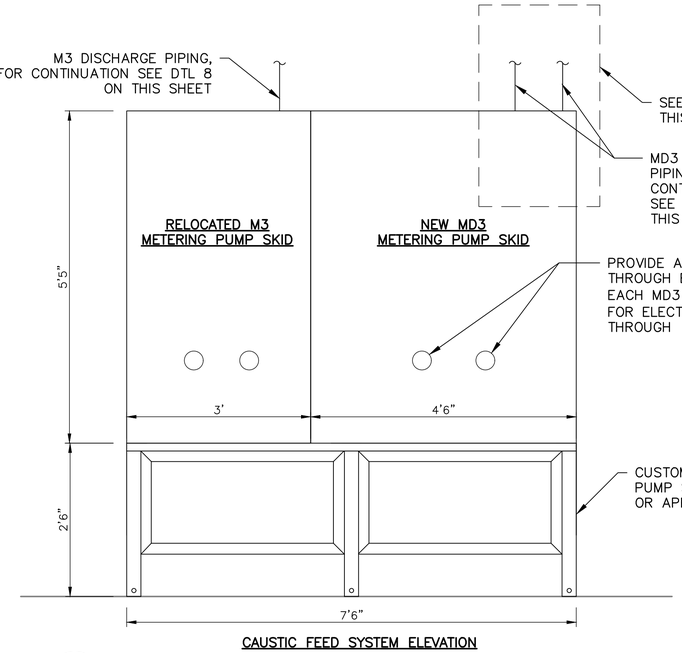
DETAIL 9 / –
NOT TO SCALE

NOTES:

1. CONTRACTOR TO FIELD VERIFY DIMENSIONS OF CUSTOM FRP METERING PUMP STAND PRIOR TO FABRICATION
2. CONTRACTOR TO SUBMIT SHOP DRAWINGS OF CUSTOM FRP METERING PUMP SUPPORT STAND, CHEMICAL PUMP SKID, AND DISCHARGE MANIFOLD WITH DETAILED DIMENSIONS TO ENGINEER FOR APPROVAL PRIOR TO FABRICATION
3. CUSTOM FRP METERING PUMP STAND SHALL BE FIBERGRATE CUSTOM FRP METERING PUMP STAND, OR APPROVED EQUAL



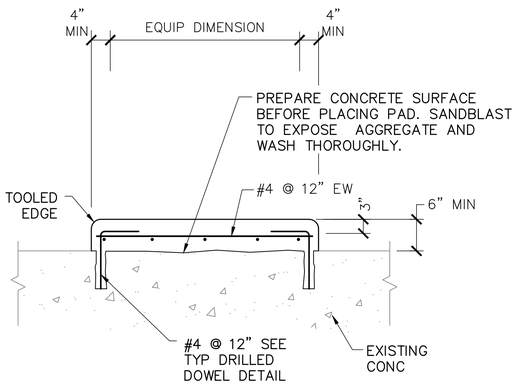
CAUSTIC FEED SYSTEM PLAN



CAUSTIC FEED SYSTEM ELEVATION

NEW CAUSTIC FEED SYSTEM

DETAIL 10 / M-03
NOT TO SCALE



CITRIC ACID PUMP CONC EQUIPMENT PAD

DETAIL 11 / D-01
NOT TO SCALE

ORIGINAL SCALE IN INCHES 0 1 2 3 4

MARK	DATE	BY	REVISIONS

DESIGN BL | DRAWN NH | CHECK MM

PLANS PREPARED BY:
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BRANDON C. LACAP 12/29/20
ENGINEER P.E. DATE

OLIVENHAIN MUNICIPAL WATER DISTRICT
Municipal Water District
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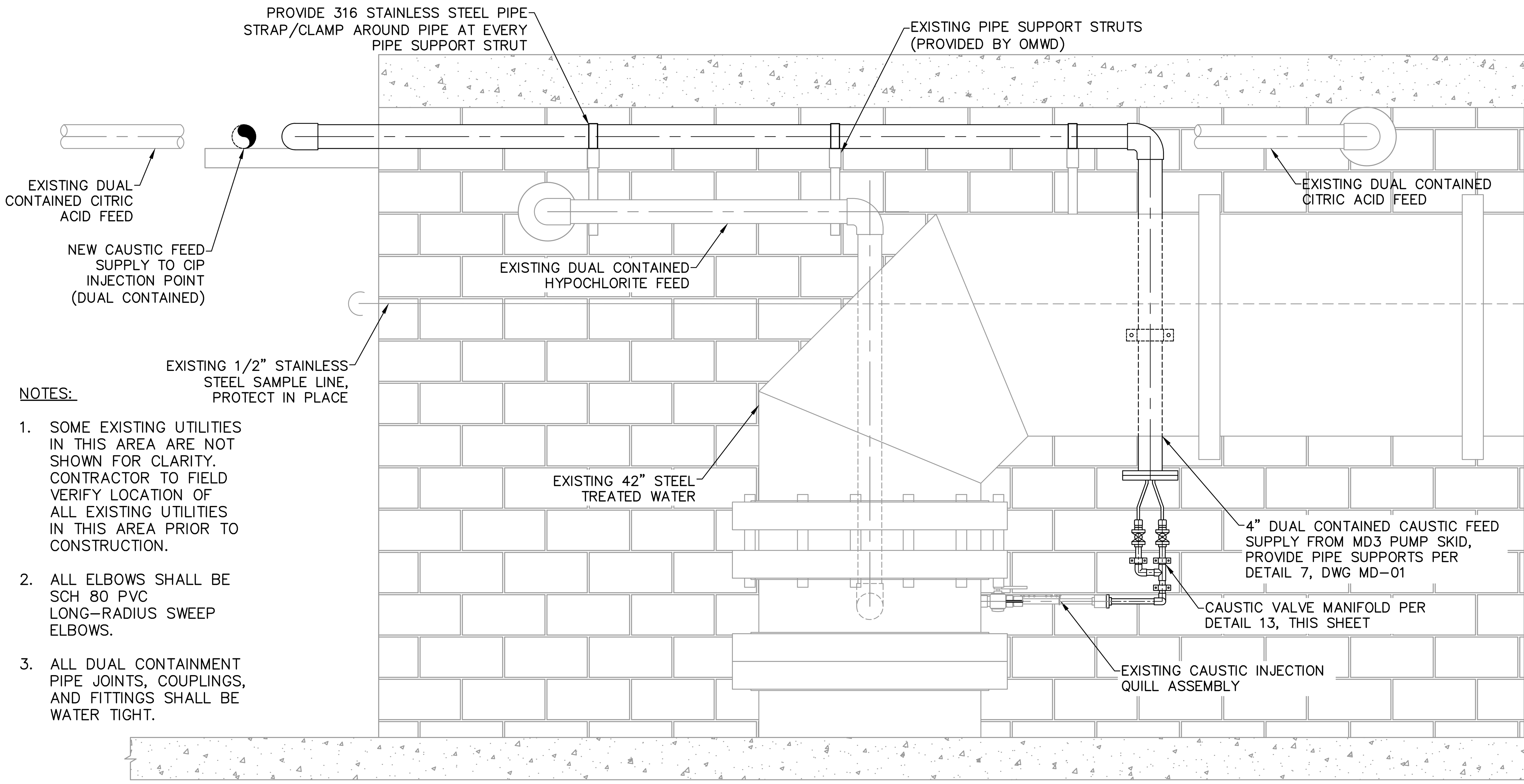
SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

MECHANICAL DETAILS – 2

SHEET 12 / 28 OF SHEETS
MD-02
D120068

DWG: \\dudek\data\Projects\101.Engineering\Olivenhain WMD\12874 DOMWTP pH Control System\06.CAD\12874 Shtx MD-1 to MD-4.dwg USER: ccarr
DATE: Dec 29, 2020 4:23pm XREFS: 12874 X-TB

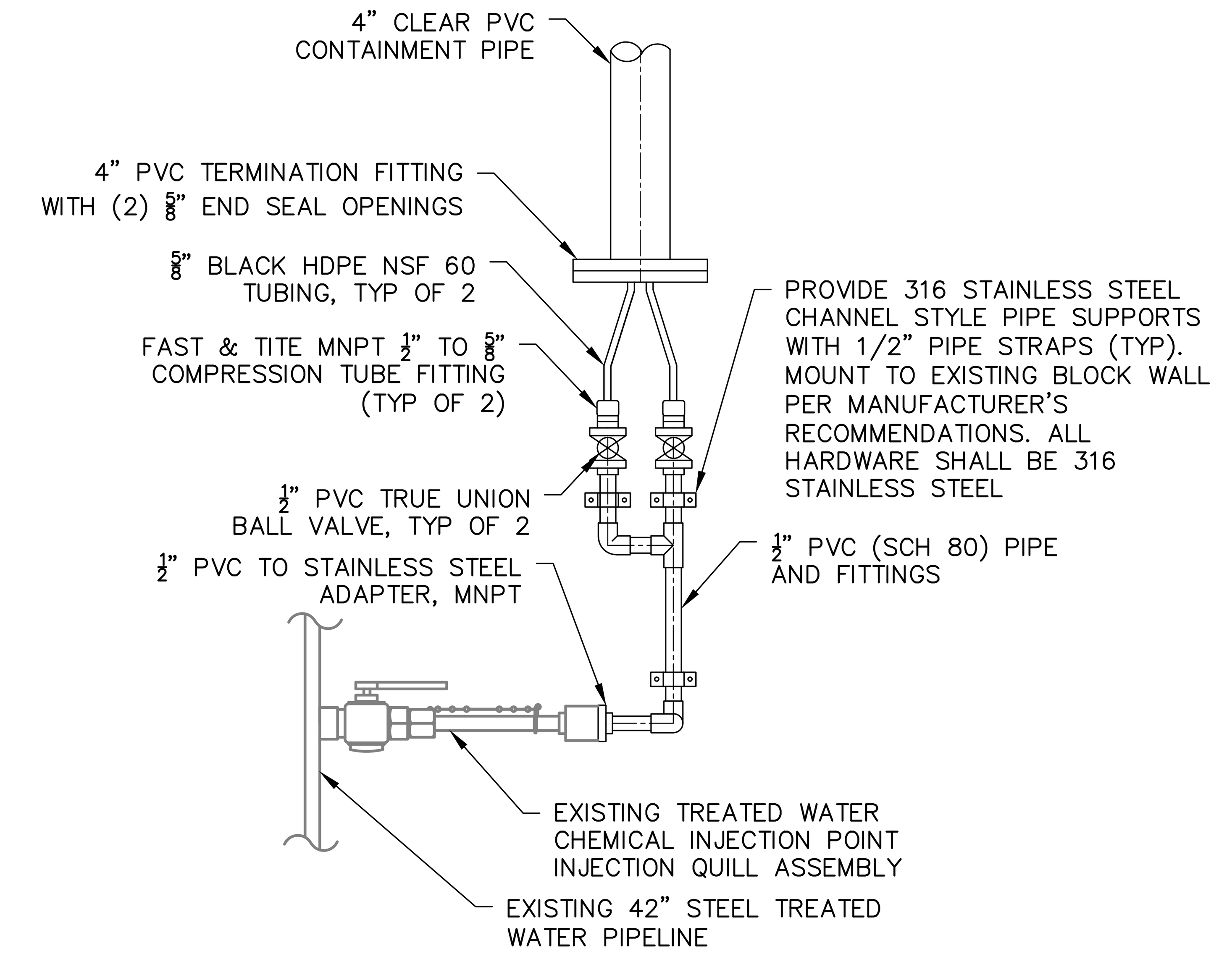


NOTES:

1. SOME EXISTING UTILITIES IN THIS AREA ARE NOT SHOWN FOR CLARITY. CONTRACTOR TO FIELD VERIFY LOCATION OF ALL EXISTING UTILITIES IN THIS AREA PRIOR TO CONSTRUCTION.
2. ALL ELBOWS SHALL BE SCH 80 PVC LONG-RADIUS SWEEP ELBOWS.
3. ALL DUAL CONTAINMENT PIPE JOINTS, COUPLINGS, AND FITTINGS SHALL BE WATER TIGHT.

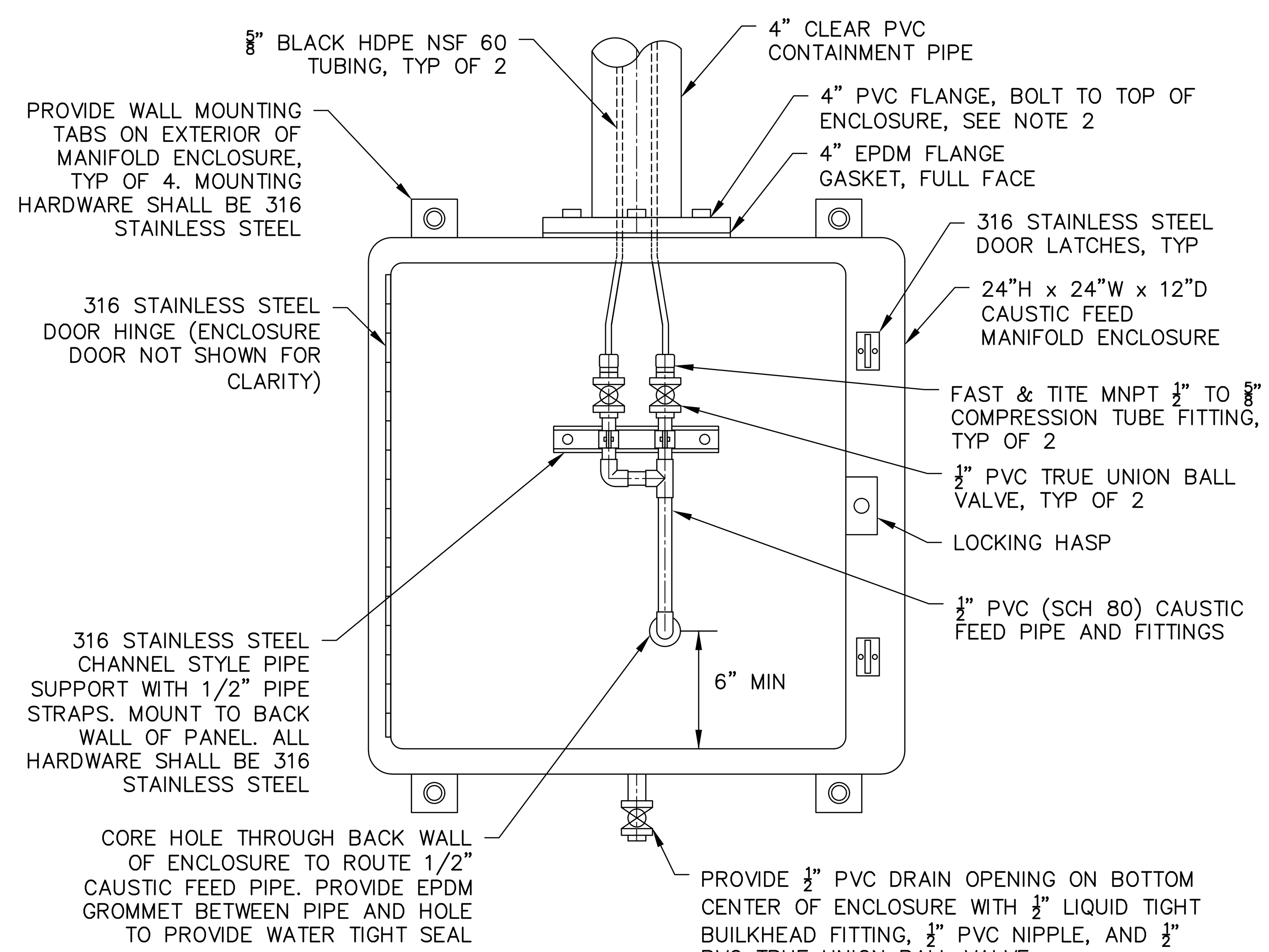
TREATED WATER CHEMICAL INJECTION POINT PIPING

DETAIL 12 / M-02
SCALE: 3/4" = 1'



TREATED WATER INJECTION POINT

DETAIL 13 / M-02
NOT TO SCALE



CAUSTIC FEED TUBING MANIFOLD AND ENCLOSURE

DETAIL 14 / M-04
NOT TO SCALE

NOTES:

1. MANIFOLD ENCLOSURE SHALL BE CONSTRUCTED OF HOT COMPRESSION MOLDED FIBERGLASS REINFORCED POLYESTER. MANUFACTURED BY STAHLIN ENCLOSURES, HWT CONFIGURATION, NO EQUAL.
2. CORE A 4" DIAMETER HOLE THROUGH TOP OF ENCLOSURE (CENTERED) FOR ROUTING CAUSTIC FEED TUBING.
3. ENCLOSURE DOOR SHALL HAVE POLYURETHANE SEAMLESS GASKET AROUND ENTIRE PERIMETER. ENCLOSURE DOOR SEAL SHALL BE LIQUID TIGHT WHEN DOOR IS CLOSED. ENCLOSURE DOOR SHALL INCLUDE 316 STAINLESS STEEL LATCHES

MARK | DATE | BY | REVISIONS

DESIGN BL | DRAWN NH | CHECK MM

PLANS PREPARED BY: DUDEK
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BRANDON C. LACAP 12/29/20
ENGINEER P.E. DATE

OLIVENHAIN Municipal Water District
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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

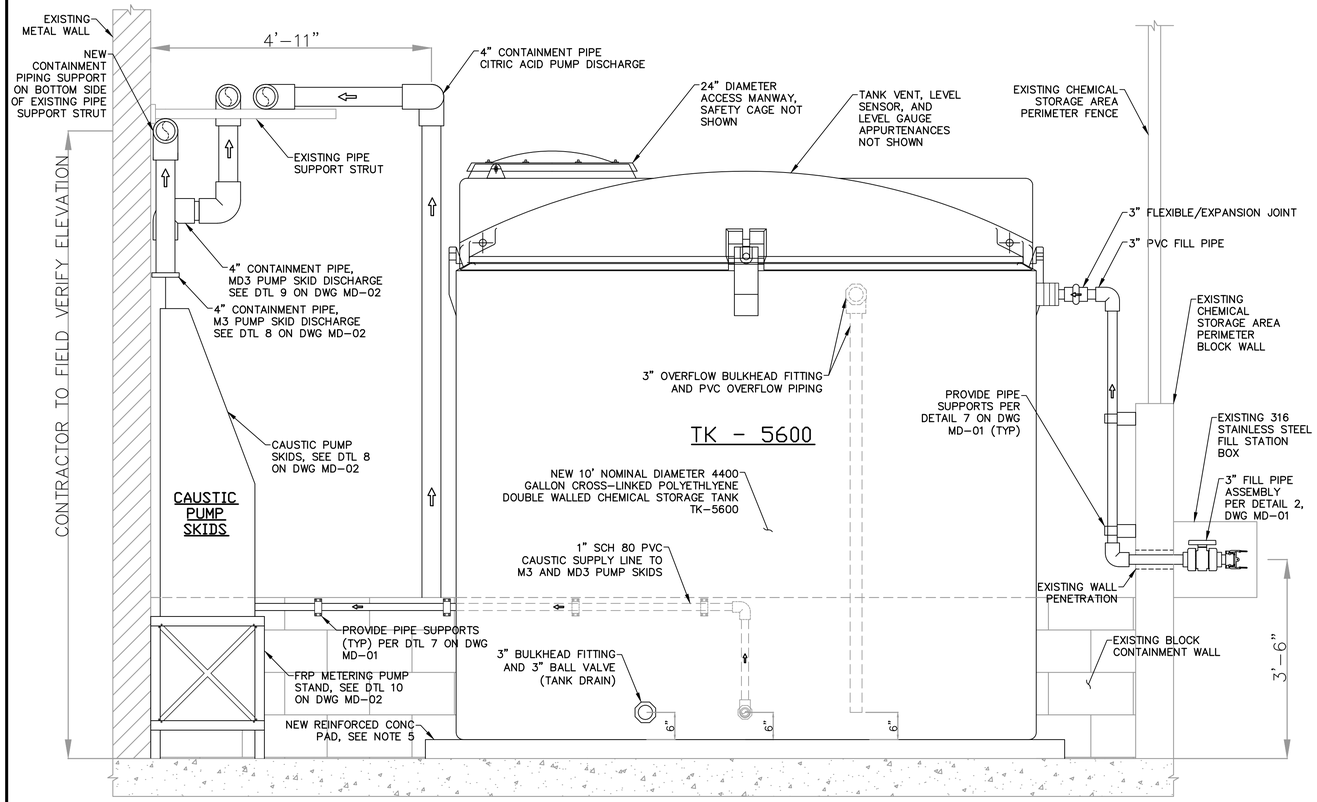
DAVID C. McCOLLOM WTP WATER TREATMENT PLANT

MECHANICAL DETAILS – 3

SHEET 13 OF 28 SHEETS
MD-03
D120068

ORIGINAL SCALE IN INCHES 0 1 2 3 4

DWG: \\dudek\data\Projects\101 Engineering\Olivenhain MWD\12874 DCMWTP pH Control System\06.CAD\12874 Shts MD-1 to MD-4.dwg USER: ccorr
DATE: Dec 29, 2020 4:23pm XREFS: 12874 X-TB

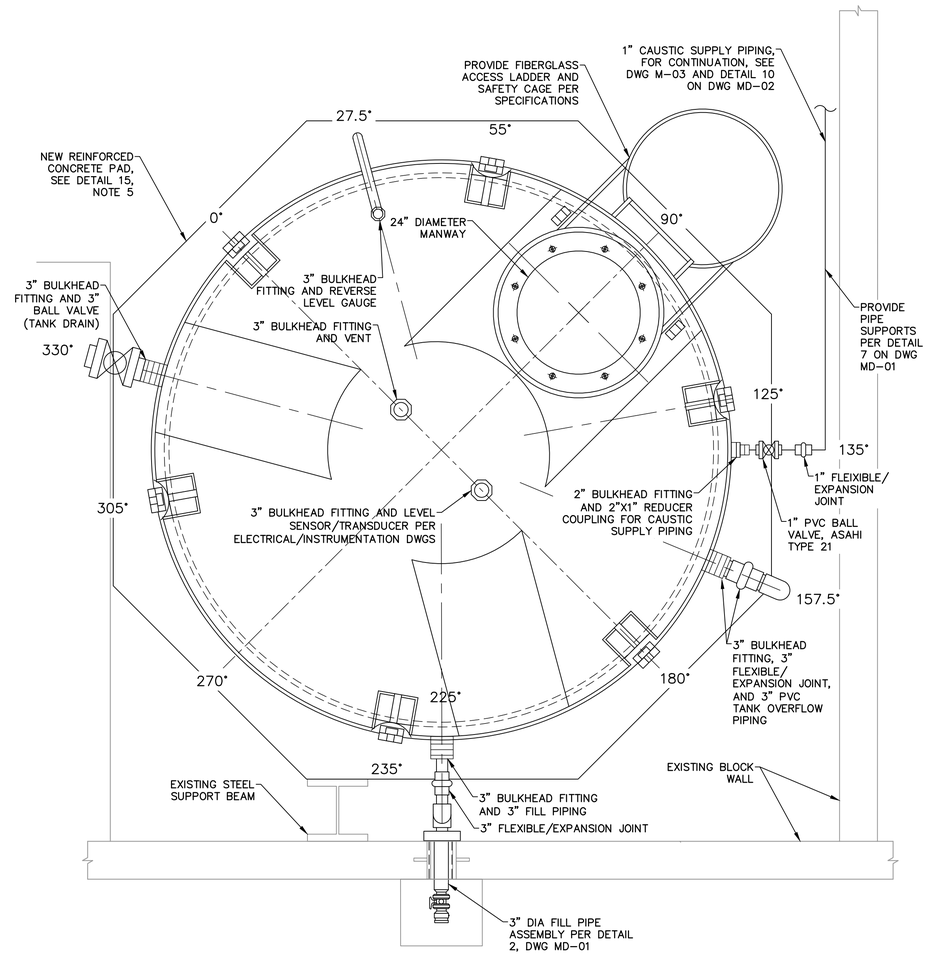


NOTES:

1. NEW CAUSTIC STORAGE TANK AND TANK APPURTENANCES SHALL BE IN ACCORDANCE WITH SPECIFICATIONS SECTION 11440.
2. SOME EXISTING UTILITIES IN THIS AREA ARE NOT SHOWN FOR CLARITY. CONTRACTOR TO FIELD VERIFY LOCATION OF ALL EXISTING UTILITIES IN THIS AREA PRIOR TO CONSTRUCTION.
3. ALL ELBOWS SHALL BE SCH 80 PVC LONG-RADIUS SWEEP ELBOWS.
4. ALL DUAL CONTAINMENT PIPE JOINTS, COUPLINGS, AND FITTINGS SHALL BE WATER TIGHT.
5. PRIOR TO CONSTRUCTION OF NEW REINFORCED CONCRETE PAD, CONTRACTOR SHALL SUBMIT DESIGN OF NEW REINFORCED CONCRETE PAD TO ENGINEER FOR APPROVAL. STRUCTURAL AND SEISMIC DESIGN CALCULATIONS SHALL BE STAMPED AND SIGNED BY A LICENSED PROFESSIONAL STRUCTURAL ENGINEER REGISTERED IN THE STATE OF CALIFORNIA, AND INCLUDED IN SUBMITTAL FOR APPROVAL. FOLLOWING CONSTRUCTION OF CONCRETE PAD, CONTRACTOR SHALL COAT PAD WITH TNEMEC V290 FLAXSEED UV RESISTANT EPOXY TO MATCH SURROUNDING FLOOR.

NEW CAUSTIC STORAGE TANK ELEVATION

DETAIL 15
SCALE: 3/4" = 1' M-03



NOTES:

1. NEW CAUSTIC STORAGE TANK AND TANK APPURTENANCES SHALL BE IN ACCORDANCE WITH SPECIFICATIONS SECTION 11440.

CAUSTIC STORAGE TANK PLAN

DETAIL 16
NOT TO SCALE M-03

MARK	DATE	BY	REVISIONS

DESIGN BL | DRAWN NH | CHECK MM

PLANS PREPARED BY:
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BRANDON C. LACAP 12/29/20
ENGINEER P.E. DATE

OLIVENHAIN
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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

MECHANICAL DETAILS - 4

SHEET 14 / 28 OF SHEETS
MD-04

D120068

ORIGINAL SCALE IN INCHES
0 1 2 3 4

DWG: \\dudek\data\Projects\101.Engineering\Olivenhain WMD\12874 DCMWTP pH Control System\06.CAD\12874 Shtx MD-1 to MD-4.dwg USER: ccarr
DATE: Dec 29, 2020 4:23pm XREFS: 12874 X-TB

PLAN	DIAGRAM	DIAGRAM	DESCRIPTION
	50A 3P		CIRCUIT BREAKER. UPPER NUMBER IS TRIP RATING. LOWER NUMBER IS NUMBER OF POLES
			THREE POSITION SWITCH. MAINTAINED CONTACT FUNCTION MAY VARY AS NOTED ON DIAGRAMS. CENTER POSITION IS OFF
			TWO POSITION SWITCH. MAINTAINED CONTACT FUNCTION MAY VARY AS NOTED ON DIAGRAMS
			MOMENTARY CONTACT PUSHBUTTON. FUNCTION MAY VARY AS NOTED ON DIAGRAMS
LOS		LOS	MOMENTARY CONTACT PUSHBUTTON WITH PROVISION FOR LOCKOUT.
			LOCKABLE DISCONNECT SWITCH. RATING AND DETAILS AS NOTED ON DRAWINGS.
ZS			LIMIT SWITCH. NORMALLY OPEN
ZS			LIMIT SWITCH. NORMALLY CLOSED
		NOTO	TIME DELAY RELAY CONTACT. OFF DELAY, NORMALLY OPEN, TIME OPEN
		NCTC	TIME DELAY RELAY CONTACT. OFF DELAY, NORMALLY CLOSED, TIME CLOSED
		NOTC	TIME DELAY RELAY CONTACT. ON DELAY, NORMALLY OPEN, TIME CLOSED
		NCTO	TIME DELAY RELAY CONTACT. ON DELAY, NORMALLY CLOSED, TIME OPEN
SOV			SOLENOID OPERATED VALVE
			MOTOR CONTROL CENTER DRAWOUT STABS
	2		MOTOR STARTER WITH THERMAL OVERLOADS. NUMBER INDICATES NEMA SIZE
		OL	MOTOR OVERLOAD CONTACT
2	2	2	MOTOR, NUMBER INDICATES HORSEPOWER
		R	INDICATING LIGHT, PUSH-TO-TEST. LETTER INDICATES COLOR. R=RED B=BLUE G=GREEN A=AMBER W=WHITE
		M	CONTACTOR OR RELAY COIL. LETTER OR NUMBER IS DESIGNATION
		M	NORMALLY CLOSED CONTACT. LETTER OR NUMBER IS DESIGNATION
		M	NORMALLY OPEN CONTACT. LETTER OR NUMBER IS DESIGNATION
		RTM	RUNNING TIME METER, NON-RESETTABLE
	20A	5A	FUSE, NUMBER INDICATES RATING
			CONTROL TRANSFORMER. RATING AS NOTED ON DRAWINGS OR AS REQUIRED BASED ON LOAD SERVED.
	KW		KILOWATT METER
PS			PRESSURE SWITCH. CONTACT ACTION AS NOTED ON DRAWINGS

PLAN	DIAGRAM	DIAGRAM	DESCRIPTION
T			POWER TRANSFORMER. RATINGS AS NOTED ON DRAWINGS
			DUPLEX RECEPTACLE. 20A, SPEC GRADE GROUNDING TYPE. UNLESS OTHERWISE NOTED ON DRAWINGS.
			TELEPHONE OUTLET
J			JUNCTION BOX OR CONDUIT FITTING AS NOTED OR REQUIRED. (SHOWN WITH CONDUIT TURNING UP)
LS			LEVEL SWITCH, CONTACT ACTION AS NOTED ON DRAWINGS
			CONTROL PANEL OR EQUIPMENT AS NOTED
FS			FLOW SWITCH, CONTACT ACTION AS NOTED ON DRAWINGS
$			FLUSH TOGGLE SWITCH, SINGLE POLE, SINGLE THROW
$3			FLUSH TOGGLE SWITCH, THREE WAY
			FLUORESCENT FIXTURE. SEE LIGHTING SCHEDULE.
			LIGHTING FIXTURE, WALL MOUNTED SEE LIGHTING SCHEDULE
PB			MH-MANHOLE PB-PULLBOX HH-HANDHOLE OR AS NOTED ON DRAWINGS
T			TELEPHONE CONDUIT. SIZE AS NOTED
G			GROUNDING GRID OR GROUNDING CONDUCTOR SIZE AS REQUIRED OR AS NOTED ON DRAWINGS
G			GROUND PIGTAIL. SIZE AS NOTED ON DRAWINGS
G			EXOTHERMIC GROUND CONNECTION
G			BOLTED GROUND CONNECTION
			CONDUIT BENDING UP
			CONDUIT BENDING DOWN
			UNDERGROUND OR CONCEALED CONDUIT, 1" MINIMUM
			EXPOSED CONDUIT, 3/4" MINIMUM.
PB1 1,3,5			HOMERUN CONDUIT WITH 3 CONDUCTORS, NEUTRAL AND GROUND, CIRCUITS 1,3,5 PANEL PB1, NO HASHMARKS INDICATE 2 CONDUCTORS AND GROUND
			DRIVEN GROUND ROD/TEST WELL 3/4" X 10' Cu CLAD STEEL
			PANELBOARD OR AS NOTED ON DRAWING
			LIQUIDTIGHT FLEXIBLE CONDUIT
XXX	XXX		CONDUIT NUMBER 'XXX', REFER TO CONDUIT SCHEDULE FOR DESCRIPTION

PLAN	DIAGRAM	DIAGRAM	DESCRIPTION
$M			MANUAL MOTOR STARTER
			GROUND
			HEATER, RATING AS NOTED ON DRAWING
			HORN OR AUDIBLE SIGNAL
Ø	Ø	Ø	PHASE
			TERMINAL, INTERNAL WIRING
			TERMINAL, FIELD WIRING
DS			DOOR SWITCH
			CONDUIT STUB OUT
F XX	XX		DISCONNECT SWITCH, F = FUSED NF = NON-FUSED XX = AMP RATING

STANDARD ABBREVIATIONS

A	AMPERES
AC	ALTERNATING CURRENT
AF	AMPERE FRAME
AFC	ABOVE FINISHED CONCRETE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AUX	AUXILIARY
AUTO	AUTOMATIC
AWG	AMERICAN WIRE GAUGE
BC	BARE COPPER
BD	BOARD
BKR	BREAKER
C	CONDUIT
CAB	CABINET
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CLG	CEILING
C.O.	CONDUIT ONLY
COMPT	COMPARTMENT
COND	CONDUCTOR
CONT	CONTROL
CONTD	CONTINUED
CPT	CONTROL POWER TRANSFORMER
CP	CONTROL PANEL
CT	CURRENT TRANSFORMER
CU	COPPER
CR	CONTROL RELAY
DC	DIRECT CURRENT
DISC	DISCONNECT
DISC SW	DISCONNECT SWITCH
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
DWG	DRAWING
DS	DOOR SWITCH
EL,ELEV	ELEVATION
EMT	ELECTRICAL METALLIC TUBING
EO	ELECTRICALLY OPERATED
EXIST	EXISTING
FBO	FURNISHED BY OWNER
FDR	FEEDER
FIN	FINISHED
FLA	FULL LOAD AMPS
FLEX	FLEXIBLE
FM	FLOW METER
FS	FLOW SWITCH
FT OR '	FEET OR FOOT
FT	FLOW TRANSMITTER
FUT	FUTURE
FVNR	FULL VOLTAGE NON REVERSING
GALV	GALVANIZED
GD	GAS DETECTORS
GFI	GROUND FAULT INTERRUPTER
GFP	GROUND FAULT PROTECTION
GND OR G	GROUND
HH	HANDHOLE
HOA	HAND/OFF/AUTO
HTR	HEATER
IC	INTERRUPTING CURRENT
IJB	INSTRUMENTATION JUNCTION BOX
IN OR "	INCHES OR INCH
IND	INDICATING
INST	INSTANTANEOUS
INSTR	INSTRUMENT
INTLK	INTERLOCK
JB OR J	JUNCTION BOX, CONDULET OR FITTING AS REQUIRED BY NEC. UNLESS OTHERWISE NOTED
KW	KILOWATTS
LCL	LONG CONTINUOUS LOAD
LCP	LOCAL CONTROL PANEL
LEV	LEVEL
LIM	LIMIT
LR	LOCAL/REMOTE
LOS	LOCKOUT STOP STATION
LS	LEVEL OR LIMIT SWITCH
LSIG	LONG TIME, SHORT TIME, INSTANTANEOUS AND GROUND FAULT ADJUSTMENTS
LT	LIGHT
LTG	LIGHTING
LV	LOW VOLTAGE
MA	MILLIAMPERE
MAINT	MAINTAINED
MAN	MANUAL
MAX	MAXIMUM
MC	MAINTAINED CONTACT
MCC	MOTOR CONTROL CENTER
MCM	THOUSAND CIRCULAR MILS
MCP	MOTOR CIRCUIT PROTECTOR
MH	MANHOLE
MIN	MINIMUM OR MINUTE
MLO	MAIN LUGS ONLY
MOV	MOTOR OPERATED VALVE ACTUATOR
MPC	MINI POWER CENTER
MTG	MOUNTING
MTR	MOTOR
N	NEUTRAL
NA	NON-AUTOMATIC
NC	NORMALLY CLOSED
NCIO	NORMALLY CLOSED, INSTANTANEOUS OPEN
NCTC	NORMALLY CLOSED, TIME CLOSE
NCTO	NORMALLY CLOSE, TIME OPEN
NEC	NATIONAL ELECTRIC CODE
NIC	NOT IN CONTRACT
No	NUMBER
NO	NORMALLY OPEN
NOIC	NORMALLY OPEN, INSTANTANEOUS CLOSE
NOTC	NORMALLY OPEN, TIME CLOSE
NOTO	NORMALLY OPEN, TIME OPEN
NP	NAMEPLATE
NTS	NOT TO SCALE
OL	OVERLOAD
OTT	OVERTEMP SWITCH
PB	PUSHBUTTON
PB	PULLBOX
PC	PHOTOCELL
PCV	PUMP CONTROL VALVE
PMR	POWER MONITOR RELAY
PNL	PANEL
POS	POSITION
PR	PAIR
PRI	PRIMARY
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE
PVC/RGS	PVC JACKETED RIGID GALVANIZED STEEL CONDUIT
PW	PART WINDING
RECEP	RECEPTACLE
RCP	REMOTE CONTROL PANEL
RGS	RIGID GALVANIZED STEEL CONDUIT
RTU	REMOTE TERMINAL UNIT
RVAT	REDUCED VOLTAGE AUTO TRANSFORMER
RVYD	REDUCED VOLTAGE WYE DELTA
SCE	SOUTHERN CALIFORNIA EDISON
SEC	SECONDARY
SEL	SELECTOR
SP	SPARE
SPEC	SPECIFICATION
SS	STAINLESS STEEL
SSRV	SOLID STATE REDUCED VOLTAGE STARTER
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
ST	SHUNT TRIP
STA	STATION
STL	STEEL
STP	SHIELDED TWISTED PAIR
STR	STARTER
STT	SHIELDED TWISTED TRIPLET
SV	SOLENOID VALVE
SW	SWITCH
SWBD	SWITCHBOARD
TB	TERMINAL BOX
TEL	TELEPHONE
TEMP	TEMPERATURE
TERM	TERMINAL
TM	TELEMETRY
TS	TEMPERATURE SWITCH
TS2W	TWO SPEED TWO WINDING
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSOR
TW/SH	TWISTED SHIELDED
TYP	TYPICAL
UG	UNDERGROUND
UGPS	UNDERGROUND PULL SECTION
UON	UNLESS OTHERWISE NOTED
V	VOLTS
W	WATTS
W/	WITH
W/O	WITHOUT
WP	WEATHERPROOF
XFMR	TRANSFORMER
XP	EXPLOSION PROOF
ZS	POSITION SWITCH OR LIMIT SWITCH
ZT	POSITION TRANSMITTER
3W	THREE WIRE
4W	FOUR WIRE

ORIGINAL SCALE IN INCHES

0 1 2 3 4

MARK	DATE	BY	REVISIONS

DESIGN JM
DRAWN CAD
CHECK JM

REGISTERED PROFESSIONAL ENGINEER JOSEPH M. MORAES No. E11023 Exp. 6/30/21 ELECTRICAL STATE OF CALIFORNIA

PLANS PREPARED BY:
MPA
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JOSEPH M. MORAES — ENGINEER P.E — 12/28/20 DATE

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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

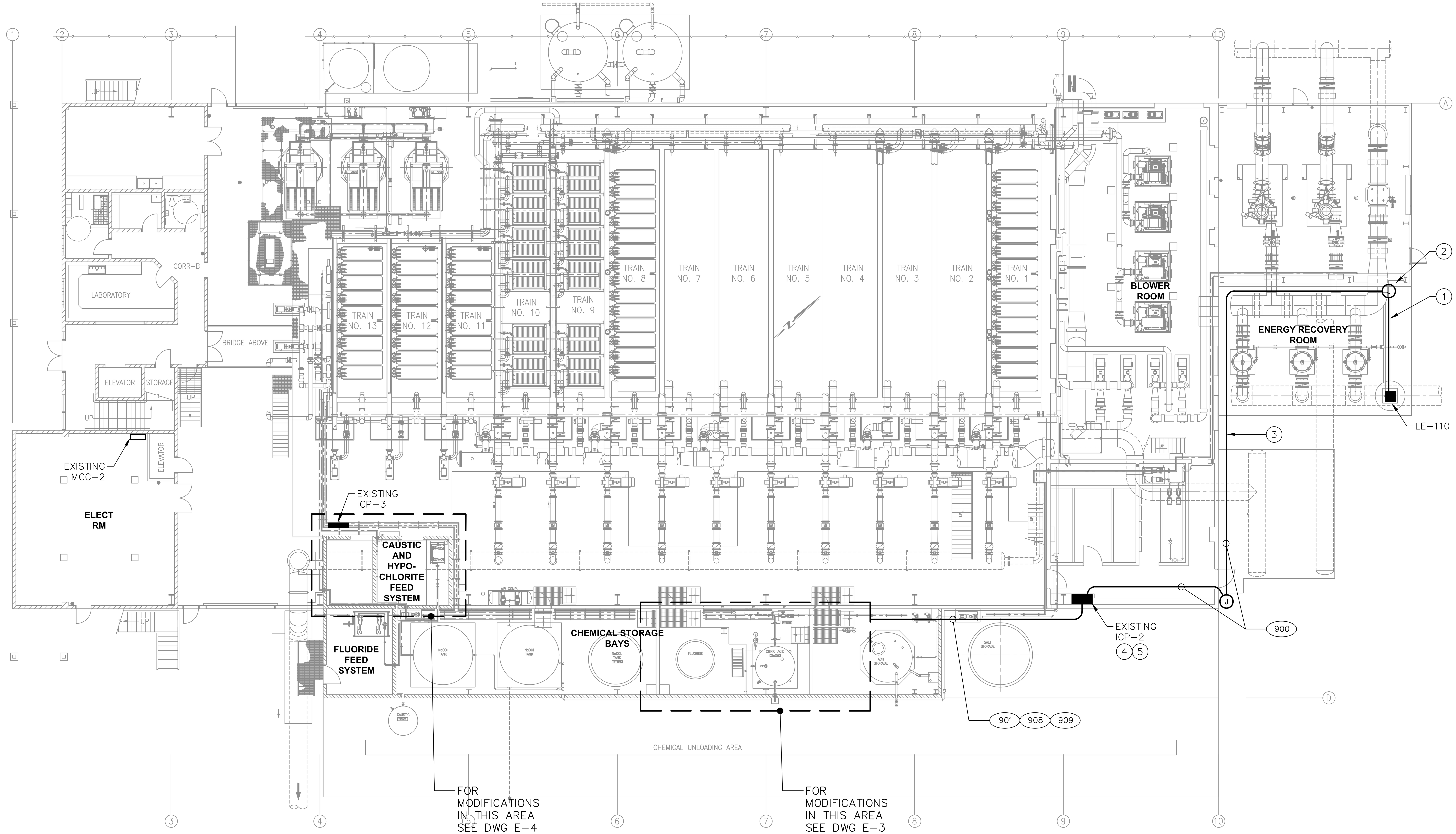
DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

ELECTRICAL SYMBOLS AND ABBREVIATIONS

SHEET 15 OF 28 SHEETS

E-01

D120068



PLAN

SCALE: 3/32"=1'-0"

NOTES:

1. ROUTE CONDUIT IN COVERED TRENCH. PROVIDE 316 SST STRUT AND CORD GRIP NEAR FLOAT.
2. PULLBOX ON WALL ABOVE PAD. TRANSITION FROM CORD TO CONDUCTORS USING 4-20ma SPLICE.
3. ROUTE CONDUIT ABOVE DOOR HEIGHT.
4. COIL AND LABEL CONDUCTORS/CABLES. TERMINATE PER FIELD DIRECTION. PROVIDE AND INSTALL ANALOG OUTPUT MODULE. MATCH EXISTING. PROVIDE STP CABLES FROM MODULE TO FIELD TERMINAL BLOCKS. PROVIDE ADDITIONAL TERMINAL BLOCKS AS REQUIRED.
5. PLC PROGRAMMING IS BY DISTRICT.

GRAPHIC SCALE

SCALE: 1"=1'-0"

REVISIONS			
MARK	DATE	BY	

DESIGN JM | DRAWN CAD | CHECK JM

REGISTERED PROFESSIONAL ENGINEER JOSEPH M. MORAES No. E11023 Exp. 6/30/21 ELECTRICAL STATE OF CALIFORNIA

PLANS PREPARED BY:

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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

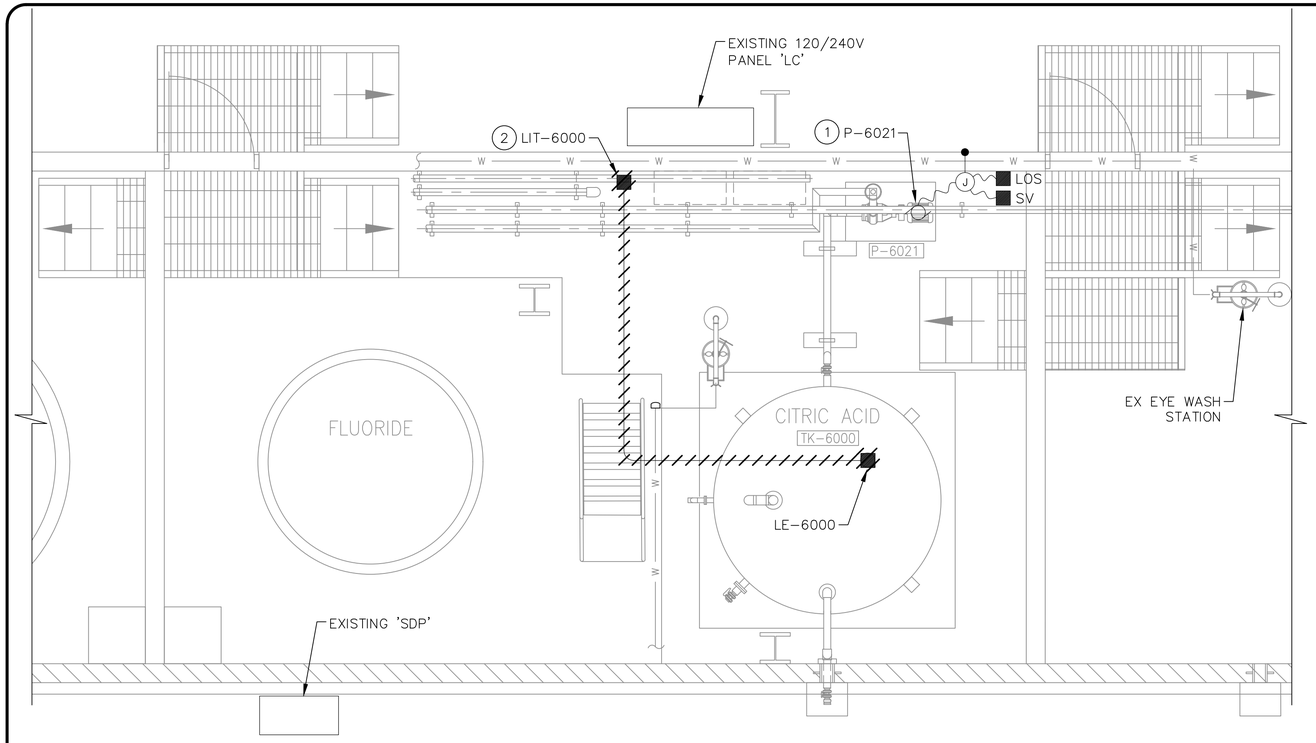
DAVID C. McCOLLOM WTP WATER TREATMENT PLANT

WTP OVERALL PLAN

SHEET 16 / 28 OF SHEETS — E-02

D120068

ORIGINAL SCALE IN INCHES



DEMO PLAN

SCALE: 3/8"=1'-0"

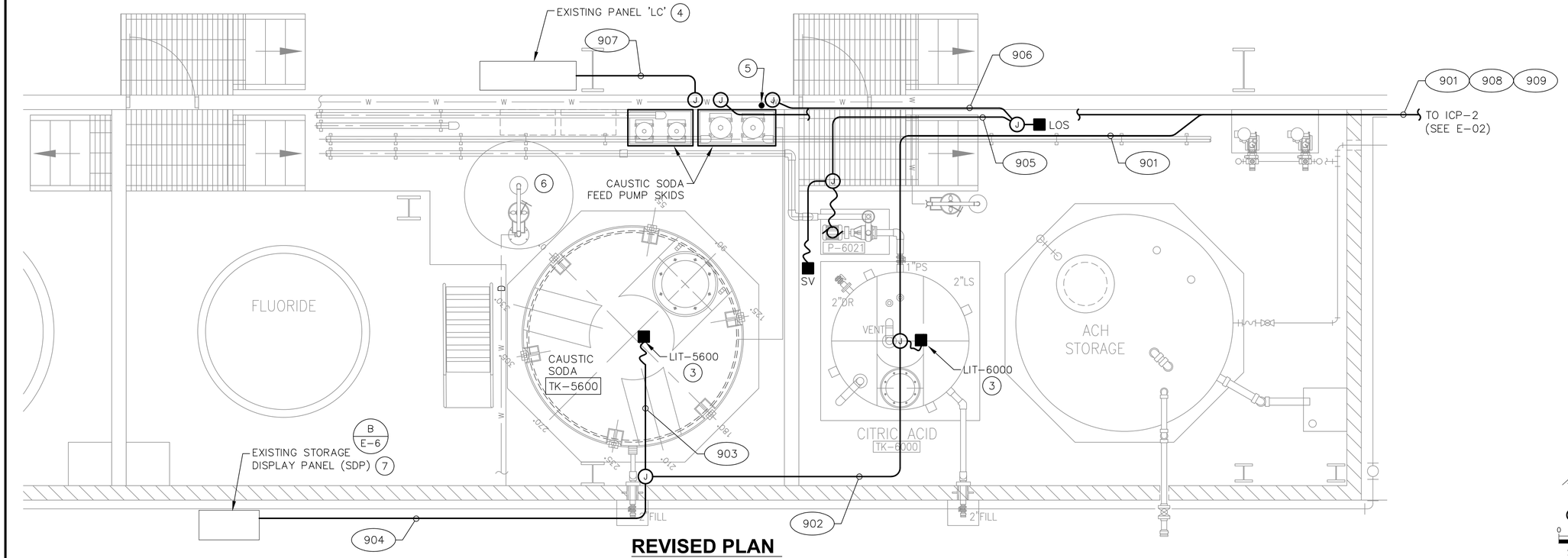
NOTES:

1. RELOCATE P-6021, SV AND LOS TO NEW LOCATION.
2. DEMO LIT-6000 AND LE-6000. REMOVE 120VAC CIRCUIT FROM 'LC'. LABEL BREAKER 'SPARE'. REMOVE ASSOCIATED SIGNAL CABLE.
3. LOOP-POWERED LIT. SIEMENS SITRANS PROBE LU240. NO SUBSTITUTIONS.
4. RE-TAG PANEL SCHEDULE CIRCUIT 8 TO 'M3' CAUSTIC FEED PUMP SKID'. RE-TAG CIRCUIT 10 TO 'MD3' CAUSTIC FEED PUMP SKID'.
5. INTERCEPT HOMERUN CONDUIT TO MCC-2 (ELECT ROOM). ADD JUNCTION BOX AND EXTEND TO NEW LOCATION. ROUTE CONDUIT ABOVE DOOR. PROVIDE SPLICES IN JUNCTION BOX.
6. PROVIDE 2 RECEPTACLES FOR EACH SKID WITH IN-SERVICE COVERS. PROVIDE CONTROL CORDS FROM J-BOX TO SKIDS.
7. RELABEL LEVEL INDICATORS AND ADD ONE NEW INDICATOR.

EXISTING

NEW

DEMO



REVISED PLAN

SCALE: 3/8"=1'-0"

GRAPHIC SCALE

0 1' 2' 4' 6'

SCALE: 3/8"=1'-0"

ORIGINAL SCALE IN INCHES

0 1 2 3 4

MARK	DATE	BY	REVISIONS

DESIGN JM | DRAWN CAD | CHECK JM

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SODIUM HYDROXIDE
CHEMICAL STORAGE AND
FEED SYSTEMS PROJECT

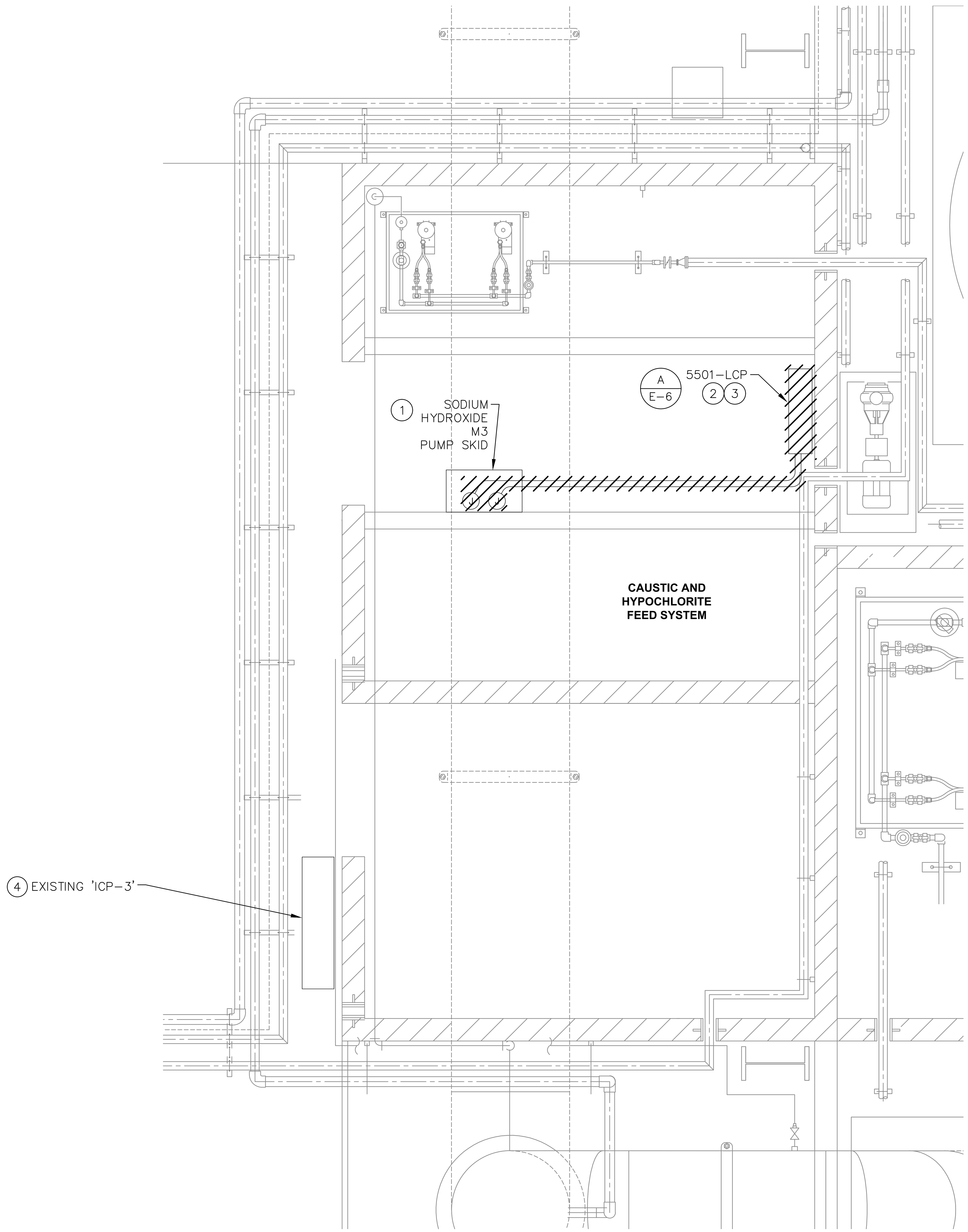
DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

CHEMICAL AREA AND ENERGY ROOM
DEMOLITION PLAN

SHEET 17 / 28 OF SHEETS

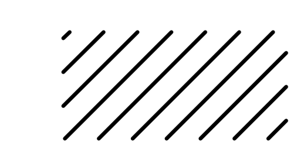
E-03

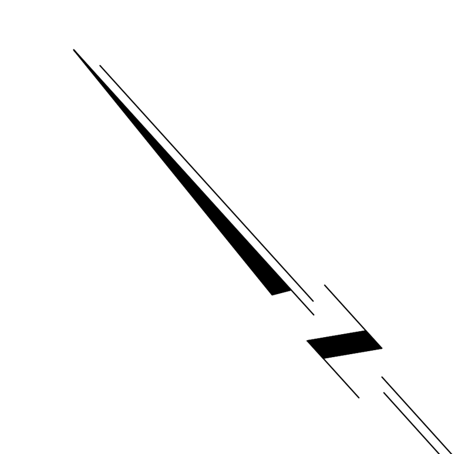
D120068



NOTES:

1. RELOCATE TO CAUSTIC SODA STORAGE AREA.
2. DEMO PANEL AND WIRING AND CAP CONDUITS.
3. REMOVE CONDUCTORS FROM 5501-LCP TO PANEL 'LC' AND 'ICP-3'.
4. PLC PROGRAMMING IS BY DISTRICT.





GRAPHIC SCALE

SCALE: 1/2"=1'-0"

MARK	DATE	BY	REVISIONS

DESIGN JM | DRAWN CAD | CHECK JM

REGISTERED PROFESSIONAL ENGINEER JOSEPH M. MORAES No. E11023 Exp. 6/30/21 ELECTRICAL STATE OF CALIFORNIA

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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP WATER TREATMENT PLANT

CHEMICAL AREA 1 PLAN

SHEET 18 / 28 OF SHEETS

E-04

D120068

ORIGINAL SCALE IN INCHES

CONDUIT NO.	CONDUIT SIZE	FROM	TO	CABLE QTY.	CABLE SIZE	CABLE GND. *	VOLTAGE		REMARKS
900	3/4"	ICP-2	LE-110	2	#14	#14	120V	CONTROL	
901	1"	ICP-2	J-BOX	2	#18STP	–	24V	SIGNAL	LIT-6000, LIT-5600
902	1"	LIT-6000	J-BOX	2	#18STP	–	24V	SIGNAL	
903	3/4"	J-BOX	LIT-5600	1	#18STP	–	24V	SIGNAL	
904	1"	J-BOX	SDP	2	#18STP	–	24V	SIGNAL	
905	3/4"	J-BOX	P-6021	3	#12	#12	480V	POWER	
				2	#14	–	120V	CONTROL	SV
906	3/4"	J-BOX	J-BOX	3	#12	#12	480V	POWER	P-6021
				4	#14	–	120V	CONTROL	SV, LOS
907	3/4"	PANEL 'LC'	CAUSTIC SODA SKIDS	4	#12	#12	120V	POWER	LC-8,10
908	1.5"	ICP-2	CAUSTIC SODA SKIDS	24	#14	#14	120V	CONTROL	
909	2"	ICP-2	CAUSTIC SODA SKIDS	8	#18STP	–	24V	SIGNAL	
–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–
–	–	–	–	–	–	–	–	–	–

*-ONE GROUND CONDUCTOR PER CONDUIT

ORIGINAL SCALE IN INCHES 0 1 2 3 4

MARK	DATE	BY	REVISIONS

DESIGN JM | DRAWN CAD | CHECK JM

REGISTERED PROFESSIONAL ENGINEER JOSEPH M. MORAES No. E11023 ELECTRICAL 6/30/21 STATE OF CALIFORNIA

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SODIUM HYDROXIDE
CHEMICAL STORAGE AND
FEED SYSTEMS PROJECT

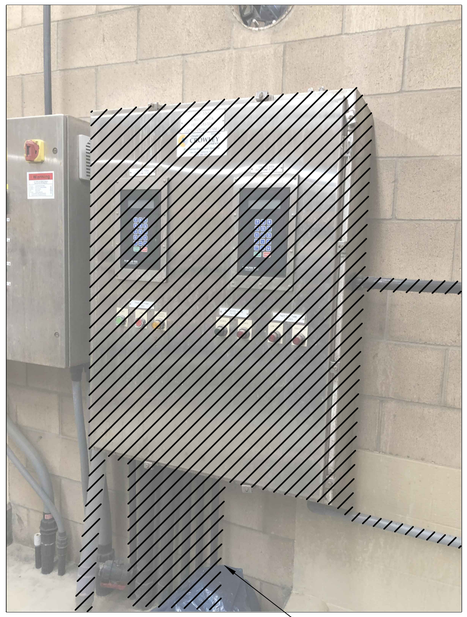
DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

SCHEDULES / DETAILS

SHEET 19 / 28 OF SHEETS

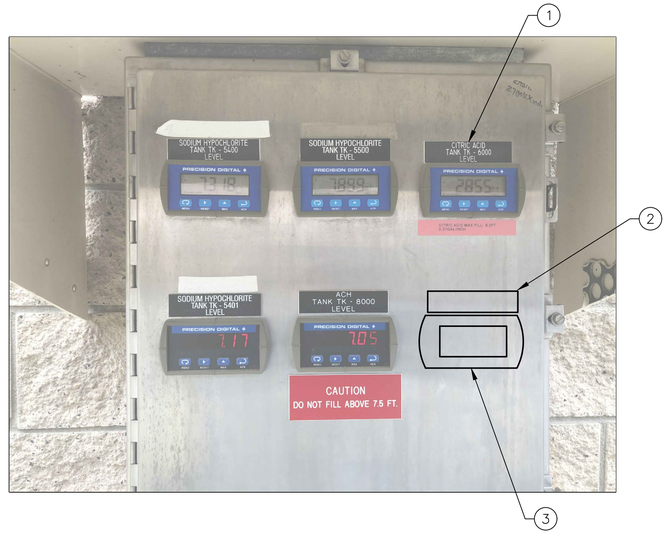
E-05

D120068



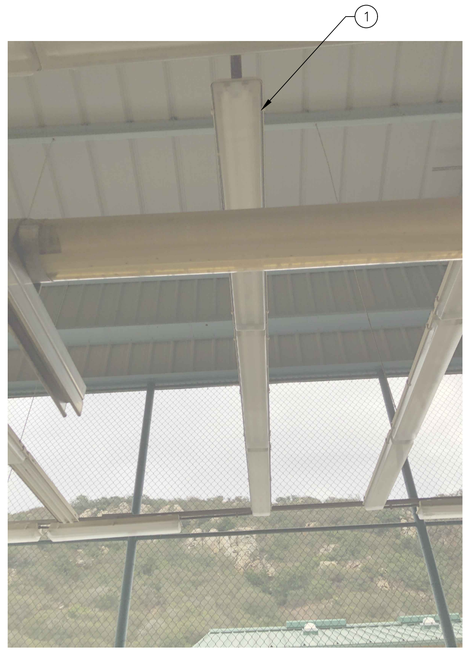
A E-6 **5501-LCP**
SCALE: NTS

1. REMOVE CONDUITS TO FIRST CONNECTION ABOVE GRADE.



B E-6 **STORAGE DISPLAY PANEL (SDP)**
SCALE: NTS

1. PROVIDE NEW NAMEPLATE TO REPLACE EXISTING 'CAUSTIC SODA TANK TK-5600 LEVEL'.
2. PROVIDE NEW NAMEPLATE 'CITRIC ACID TANK TK-6000 LEVEL'.
3. PROVIDE AND INSTALL LOOP-POWERED METER 'LI-6000'. MATCH EXISTING PRECISION DIGITAL MODEL: PD683-OKO (NO SUBSTITUTIONS).
4. CALIBRATE METERS FOR TANKS TO BE INSTALLED.



C E-6 **LIGHTS**
SCALE: NTS

1. REMOVE LIGHTS TO ALLOW TANK INSTALLATION. RE-INSTALL LIGHTS IN ACCESSIBLE LOCATION AFTER TANK INSTALLATION

DEMO

ORIGINAL SCALE IN INCHES
0 1 2 3 4

MARK	DATE	BY	REVISIONS

DESIGN JM | DRAWN CAD | CHECK JM

REGISTERED PROFESSIONAL ENGINEER JOSEPH M. MORAES No. E11023 ELECTRICAL 6/30/21 STATE OF CALIFORNIA

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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

PHOTOS

SHEET 20 / 28 OF SHEETS

E-06

D120068

PIPE LINE SYMBOLS

- PIPE UNION
- FLEXIBLE BELLOWS TYPE COUPLING
- FLEXIBLE COUPLING (GENERAL SYMBOL)
- QUICK CONNECT TYPE COUPLING
- HOSE CONNECTION
- Y-STRAINER
- REDUCER/ENLARGER
- BLIND FLANGE
- CONTINUED PIPE
- DIAPHRAGM ISOLATOR
- OPEN EQUIPMENT DRAIN
- DIFFUSER
- BASKET STRAINER
- FILTER
- PULSATION DAMPNER
- MAJOR PROCESS LINE
- MINOR PROCESS LINE
- DOUBLE WALLED PIPE
- E (S) — ELECTRIC (OR STEAM) TRACING
- DWG NO. TO/FROM LOCATION — DRAWING INTERFACE FLAG

TYPICAL PIPE TAG NUMBERS & DESIGNATION

6"-RW-DI

- FLOW DIRECTION
- SPEC SEE G-4 OR I-2 FOR LIST OF ABBREVIATIONS
- SERVICE SEE G-4 OR I-2 FOR LIST OF ABBREVIATIONS
- SIZE

VALVE SYMBOLS

- GATE VALVE (GV)
- PLUG VALVE (PV)
- BUTTERFLY VALVE (BFV)
- BALL VALVE (BV)
- GLOBE VALVE (GLV)
- PINCH VALVE (PCHV)
- DIAPHRAGM VALVE (DV)
- SWING CHECK VALVE (CV)
- BALL CHECK VALVE (BCV)
- SOLENOID VALVE (SV)
- NEEDLE VALVE (NV)
- KNIFE VALVE (KNV)
- MUD VALVE (MV)
- PRESSURE REGULATING VALVE (PREGV)
- BACK PRESSURE REGULATING VALVE (BPV)
- DIFFERENTIAL PRESSURE REGULATING VALVE W/ EXTERIOR TAPS
- SELF-CONTAINED DIFFERENTIAL PRESSURE REGULATING VALVE
- SELF-CONTAINED DIFFERENTIAL PRESSURE REGULATING VALVE (SOLENOID OPERATED)
- PRESSURE RELIEF VALVE (PRV)
- VACUUM RELIEF VALVE (VRV)
- BLOCK AND BLEED VALVE

TYPICAL EQUIPMENT TAG NUMBERS & DESIGNATION

P-1000-1A

- WHEN USED, LETTER DISTINGUISHES BETWEEN MULTIPLE, SIMILAR DEVICES.
- USED WHEN MULTIPLE TRAINS ARE USED AND REPRESENTS THE TRAIN NUMBER.
- EQUIPMENT IDENTIFICATION (FIRST TWO DIGITS DENOTE ASSOCIATED AREA)
- EQUIPMENT TYPE

VALVE ACTUATORS

- HAND (MANUALLY) OPERATED
- DIAPHRAGM, SPRING OPPOSED
- DIAPHRAGM, PRESSURE-BALANCED
- ROTARY MOTOR. (SHOWN TYPICALLY WITH ELECTRIC SIGNAL. MAY BE HYDRAULIC OR PNEUMATIC)
- SOLENOID
- ELECTROHYDRAULIC
- HYDRAULICALLY ACTUATED
- CYLINDER, SINGLE-ACTING, SPRING OPPOSED WITHOUT POSITIONER OR PILOT.
- CYLINDER, DOUBLE ACTING, WITHOUT POSITIONER OR PILOT
- EXAMPLE OF CYLINDER WITH POSITIONER
- ANY CYLINDER THAT IS ASSEMBLED WITH A PILOT SO THAT ASSEMBLY IS ACTUATED BY ONE CONTROLLED INPUT. PILOT MAY BE POSITIONER, SOLENOID VALVE, SIGNAL CONVERTER, etc.
- FLOAT ACTUATOR

GATE SYMBOLS

- SLUICE GATE (SLG)
- SLIDE GATE (SG)
- WEIR SLIDE GATE (WSG)
- BUTTERFLY GATE
- BULK HEAD GATE
- WICKET GATE

PROCESS EQUIPMENT

PARTIAL LIST
ADDITIONAL SYMBOLS MAY BE SHOWN ON THE FLOW DIAGRAMS

- CENTRIFUGAL PUMP
- PLUNGER / POSITIVE DISPLACEMENT PUMP
- PROGRESSING CAVITY PUMP
- DIAPHRAGM METERING PUMP
- AIR OPERATED DIAPHRAGM PUMP
- ROTARY PUMP
- ROTARY BLOWER
- CENTRIFUGAL BLOWER
- BELT CONVEYOR
- SCREW CONVEYOR
- GRINDER
- MIXER
- SUBMERSIBLE PUMP
- VERTICAL TURBINE PUMP
- STATIC MIXER
- MEHCANICAL SCREEN
- CALIBRATION COLUMN
- CLARIFIER

GENERAL NOTES

1. REFER TO SHEET I-2 FOR ADDITIONAL NOTES

MARK	DATE	BY	REVISIONS

DESIGN JM | DRAWN CAD | CHECK JM

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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

INSTRUMENTION LEGEND I

SHEET 21/28 OF SHEETS — I-1

D120068

ORIGINAL SCALE IN INCHES
0 1 2 3 4

GENERAL INSTRUMENT OR FUNCTION SYMBOLS

	LOCATION NORMALLY ACCESSIBLE TO OPERATOR	FIELD MOUNTED	LOCATION NORMALLY NOT ACCESSIBLE TO OPERATOR
PRIMARY LOCATION OR CONTROL PANEL			
SECONDARY LOCATION OR CONTROL PANEL			

INSTRUMENTS SHARING COMMON HOUSING

PILOT LIGHT

MISCELLANEOUS SYMBOLS

- MOTOR (CONSTANT SPEED)
- MOTOR (VARIABLE SPEED)
- MCC — INDICATES INTERLOCK OR LOGIC IN A MOTOR CONTROL CENTER
- I — INDICATES GENERAL OR MISCELLANEOUS HARDWIRED INTERLOCK
- MS — MOTOR STARTER
- SCR — SILICONE CONTROL RECTIFIER
- VFD — VARIABLE FREQUENCY DRIVE
- P — PURGE OR FLUSHING DEVICE
- MISC. DEVICE NOT PROVIDED BY DIV. 13

TYPICAL TAG NUMBERS & DESIGNATION

HS 1000 1A (HOA, 16)

- INSTRUMENT TYPE SEE "INSTRUMENTATION FUNCTIONAL CODE" TABLE
- ADDITIONAL INSTRUMENT IDENTIFICATION SEE "HAND SWITCH ABBREVIATIONS"
- INSTRUMENT IDENTIFICATION (FIRST TWO DIGITS DENOTE ASSOCIATED AREA)
- USED TO DENOTE THE DIVISION THE INSTRUMENT IS SUPPLIED UNDER OR IF THE INSTRUMENT IS EXISTING OR FUTURE. (HATCH USED TO FURTHER DISTINGUISH INSTRUMENTS NOT PROVIDED BY DIV 13.)
- WHEN USED, LETTER DISTINGUISHES BETWEEN MULTIPLE, SIMILAR DEVICES.
- USED WHEN MULTIPLE TRAINS ARE USED AND REPRESENTS THE TRAIN NUMBER.

HAND SWITCH ABBREVIATIONS

AO = AUTO/OFF
AM = AUTO/MANUAL
CM = COMPUTER/MANUAL
CL = COMPUTER/LOCAL
ES = EMERGENCY STOP
FR = FORWARD/REVERSE
FOR = FORWARD/OFF/REVERSE
FS = FAST/SLOW
FOS = FAST/OFF/SLOW
HOA = HAND/OFF/AUTO
LLS = LEAD/LAG/STANDBY
LOC = LOCAL/OFF/COMPUTER
LOR = LOCAL/OFF/REMOTE
LOS = LOCKOUT/STOP
LA = LOCAL/AUTO
LR = LOCAL/REMOTE
MAO = MANUAL/OFF/AUTO
OC = OPEN/CLOSE
OCA = OPEN/CLOSE/AUTO
OO = ON/OFF
OOA = ON/OFF/AUTO
OOR = ON/OFF/REMOTE
OSC = OPEN/STOP/CLOSE
RSL = RAISE/STOP/LOWER
SS = START/STOP
SOR = START/OFF/RESET

INSTRUMENTATION FUNCTIONAL CODE

	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE			CONTROL	
D	USER'S CHOICE	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO			
G	USER'S CHOICE		GLASS OR VIEWING DEVICE		
H	HAND (MANUAL)				HIGH (OPENED)
I	CURRENT		INDICATE		
J	POWER	SCAN			
K	TIME	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		PILOT LIGHT		LOW (CLOSED)
M	MOISTURE	MOMENTARY		USER'S CHOICE	MIDDLE OR INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE		USER'S CHOICE
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q	QUANTITY	INTEGRATE OR TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY OR SOLENOID	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE (1)		MULTIFUNCTION (1)	MULTIFUNCTION (1)	MULTIFUNCTION (1)
V	VIBRATION, MECH ANAL.			VALVE, DAMPER OR LOUVER	
W	WEIGHT OR FORCE		WELL		
X	STATUS OR UNCLASSIFIED	X-AXIS			
Y	EVENT, STATE OR PRESENCE	Y-AXIS		RELAY, COMPUTE OR CONVERT	
Z	POSITION	Z-AXIS		DRIVE, ACTUATE OR UNCLASSIFIED FINAL ELEMENT	

TABLE NOTES:
(1) WHEN USED SYMBOL OR SIGNAL LINE IS ANNOTATED.

INSTRUMENT LINE SYMBOLS

- ELECTRICAL SIGNAL
- TELEPHONE SIGNAL
- ELECTROMAGNETIC OR SONIC SIGNAL (GUIDED)
- ELECTROMAGNETIC OR SONIC SIGNAL (UNGUIDED)
- PNEUMATIC SIGNAL
- CAPILLARY TUBE
- HYDRAULIC SUPPLY
- VENDOR SUPPLIED CABLE
- SOFTWARE I/O
- COMMUNICATION CABLE
- FIBER-OPTIC CABLE

ELECTRICAL / AIR SOURCES

- UPS — UPS POWER VIA PCSS PROVIDED UPS DIRECT CONNECTION
- UPS — UPS POWER VIA PCSS PROVIDED UPS LIGHTING PANEL
- 120VAC — PCSS SUPPLIED PANEL ELECTRICAL SOURCE
- ES — VENDOR SUPPLIED PANEL ELECTRICAL SOURCE
- ES — NON-PCSS SUPPLIED PANEL ELECTRICAL SOURCE
- IA — INSTRUMENT AIR SOURCE

NOTE 1: ALL POWER SOURCES ARE 120 VAC UNLESS OTHERWISE STATED ON THE DRAWINGS
NOTE 2: REFER TO UPS SPECIFICATIONS FOR POWER REQUIREMENTS OF PANEL
NOTE 3: REFER TO OTHER SPECIFICATION SECTIONS FOR POWER REQUIREMENTS OF INSTRUMENTS

I/O SIGNALS

MEASURED VARIABLE OR OUTPUT FUNCTION FROM "INSTRUMENTATION FUNCTIONAL CODE" TABLE.

- ANALOG INPUT (AI)
- ANALOG OUTPUT (AO)
- DIGITAL INPUT (DI) — X: BLANK = CLOSE ON ACTIVATION; O = OPEN ON ALARM
- DIGITAL OUTPUT (DO) — X: BLANK = MAINTAINED (ELECTRICALLY HELD); M = MOMENTARY; L = LATCHED

PRIMARY ELEMENTS

- FE — MAGNETIC FLOW METER
- FE — TURBINE OR PROPELLER FLOW METER
- FE — AVERAGING PITOT TUBE
- FE — ULTRASONIC FLOW METER
- FE — ROTAMETER
- FE — WEIR
- FE — ORIFICE PLATE
- FE — VENTURI TUBE
- FE — FLUME
- FE X — GENERAL INSERTION FLOW METER (IM=INSERT MAG; TM=THERMAL MASS)
- LE — FLOAT SWITCH
- LE — ULTRASONIC LEVEL SENSOR
- LE — RADAR LEVEL SENSOR
- LE — CAPACITANCE LEVEL SENSOR
- PI — PRESSURE GAUGE
- DPI — DIFFERENTIAL PRESSURE GAUGE
- TI — TEMPERATURE GAUGE
- AE X — GENERAL ANALYZER

pH=pH
DO=DISSOLVED OXYGEN
H2S=HYDROGEN SULFIDE
LEL=% LOWER EXPLOSIVE LIMIT
O2=OXYGEN
O3=OZONE
NH3=NITRATE
TSS=TOTAL SUSPENDED SOLID
SC=STREAMING CURRENT
CL=CHLORINE

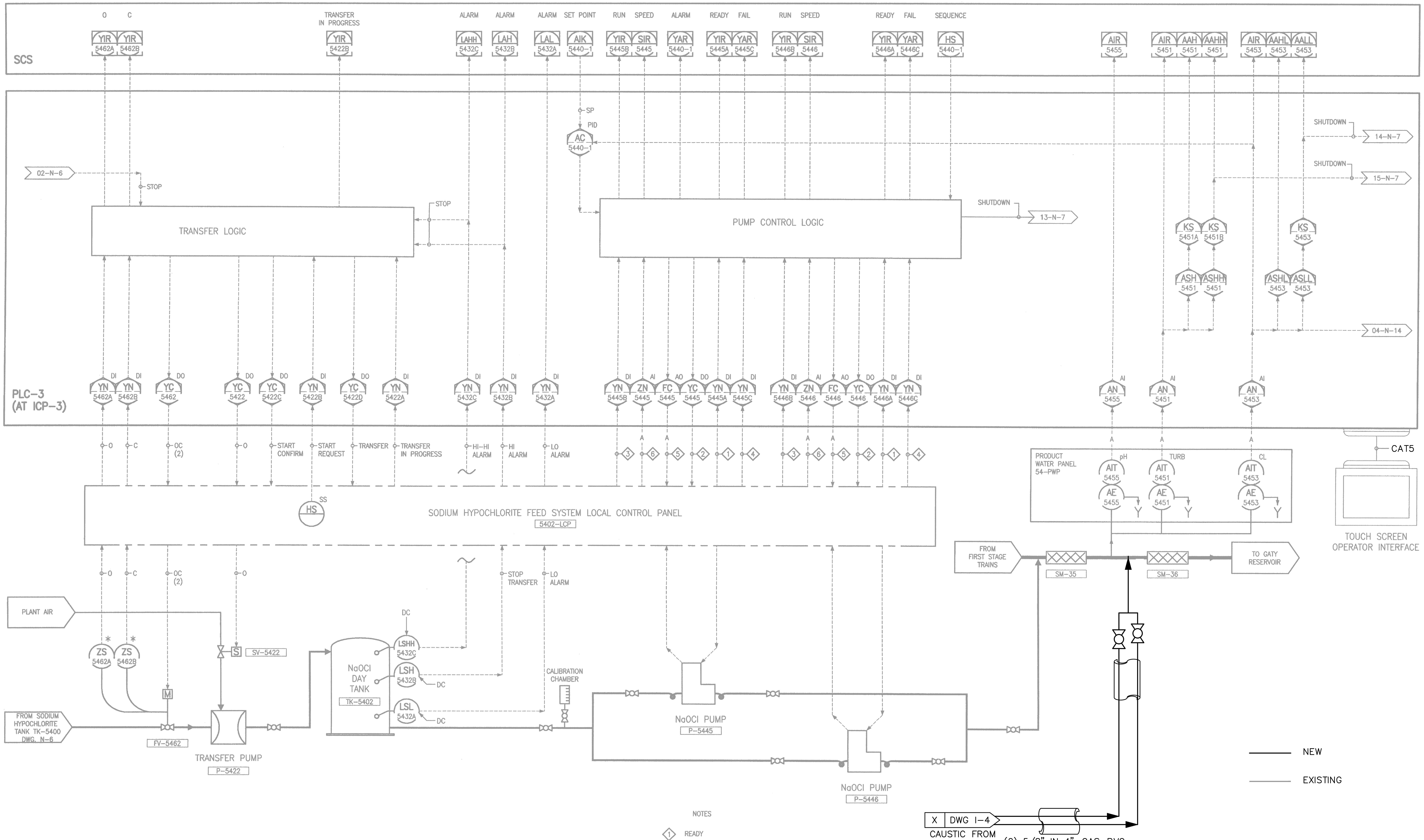
GENERAL NOTES

1. THIS LEGEND APPLIES TO P&IDS ONLY AND MAY DIFFER FROM LEGENDS FOR OTHER SHEETS.
2. IN GENERAL THIS LEGEND SHEET AND THE P&IDS ARE BASED ON INTERNATIONAL SOCIETY OF AUTOMATION (ISA) STANDARDS FOR PRACTICES FOR INSTRUMENTATION. SOME MODIFICATIONS, ADDITIONS AND ALTERATIONS HAVE BEEN MADE AS REQUIRED TO ACCOMODATE PROJECT REQUIREMENTS.
3. SOME PROCESS ITEMS, SUCH AS EQUIPMENT ISOLATION VALVES, BYPASS LINES, ETC., WHICH ARE NOT CRITICAL FOR AN UNDERSTANDING OF THE INSTRUMENTATION FUNCTIONS ARE NOT SHOWN ON THE P&IDS.
4. SEE ELECTRICAL AND MECHANICAL SHEETS AND SPECIFICATIONS FOR ADDITIONAL CONTROL AND INTERLOCK REQUIREMENTS
5. LIGHTER WEIGHT LINES, SHOWN AS ———, INDICATE EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE EXISTING. WEIGHTED LINES, SHOWN AS ———, OR HEAVIER ———, INDICATE EQUIPMENT, INSTRUMENTS OR PIPING THAT ARE NEW.

GENERAL ABBREVIATIONS

ACH	ALUMINUM CHLOROHYDRATE
AI	ANALOG IN
AO	ANALOG OUT
CA	CITRIC ACID
CAS	CAUSTIC
CIP	CLEAN-IN-PLACE
CPU	CENTRAL PROCESSOR UNIT
DI	DIGITAL OR DISCRETE INPUT
DO	DIGITAL OUTPUT
DR	DRAIN
FC	FAIL CLOSED
FO	FAIL OPEN OR FIBER OPTIC
HDV	HYDRAULICALLY ACTUATED VALVE
HMI	HUMAN MACHINE INTERFACE
MCC	MOTOR CONTROL CENTER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN
PER	PERMEATE
PLC	PROGRAMMABLE LOGIC CONTROLLER
RW	RAW WATER
SBI	SODIUM BISULFITE
SHC	SODIUM HYPOCHLORITE
UPS	UNINTERRUPTIBLE POWER SUPPLY
VFD	VARIABLE FREQUENCY DRIVE
RIO	REMOTE INPUT/OUTPUT RACK
UPS	UNINTERRUPTIBLE POWER SUPPLY
VFD	VARIABLE FREQUENCY DRIVE

REVISIONS | MARK | DATE | BY
DESIGN JM | DRAWN CAD | CHECK JM
REGISTERED PROFESSIONAL ENGINEER — JOSEPH M. MORAES — No. E11021 — EXP. 6/30/21 — ELECTRICAL — STATE OF CALIFORNIA
PLANS PREPARED BY: MPA — Moraes/Pham & Associates, 2131 Palomar Airport Rd #120, Carlsbad, CA 92011
JOSEPH M. MORAES, ENGINEER P.E. — 12/28/20 DATE
OLIVENHAIN Municipal Water District, 1966 Olivenhain Road, Encinitas, CA 92024 (760)753-6466
SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT
DAVID C. McCOLLOM WTP WATER TREATMENT PLANT
INSTRUMENTATION LEGEND II
SHEET 22 OF 28 SHEETS — I-2
D120068



NOTES

1. READY
2. CALL
3. RUN
4. FAIL
5. SPEED (COMMAND)
6. SPEED (FEEDBACK)
7. SIMPLIFIED DIAGRAM. SEE DWG. P-7 FOR DETAILS.

SODIUM HYPOCHLORITE FEED SYSTEM (PROCESS 54-2)
(SH)

REVISIONS			
MARK	DATE	BY	

DESIGN JM | DRAWN CAD | CHECK JM

REGISTERED PROFESSIONAL ENGINEER — JOSEPH M. MORAES — No. E16023 — Exp. 6/30/21 — ELECTRICAL — STATE OF CALIFORNIA

PLANS PREPARED BY:
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JOSEPH M. MORAES
ENGINEER P.E.
12/28/20
DATE

OLIVENHAIN
Municipal Water District
1966 Olivenhain Road
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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

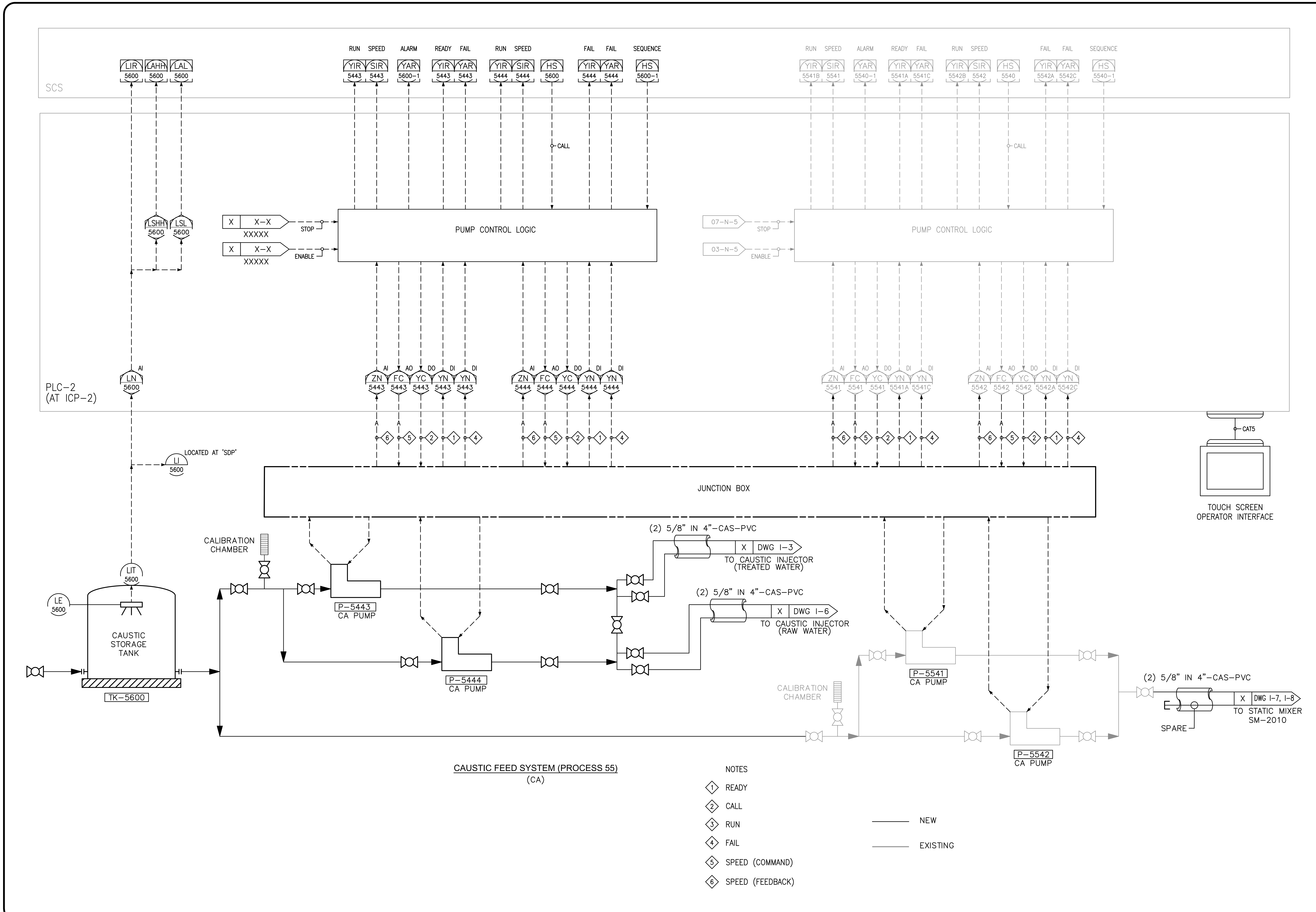
SODIUM HYPOCHLORITE SYSTEM

SHEET 23 OF 28 SHEETS

I-3

D120068

ORIGINAL SCALE IN INCHES 0 1 2 3 4



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DESIGN JM | DRAWN CAD | CHECK JM

REGISTERED PROFESSIONAL ENGINEER — JOSEPH M. MORAES — E11021 — EXP. 6/30/21 — ELECTRICAL — STATE OF CALIFORNIA

PLANS PREPARED BY:
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JOSEPH M. MORAES
ENGINEER P.E.
12/28/20
DATE

OLIVENHAIN
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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP WATER TREATMENT PLANT

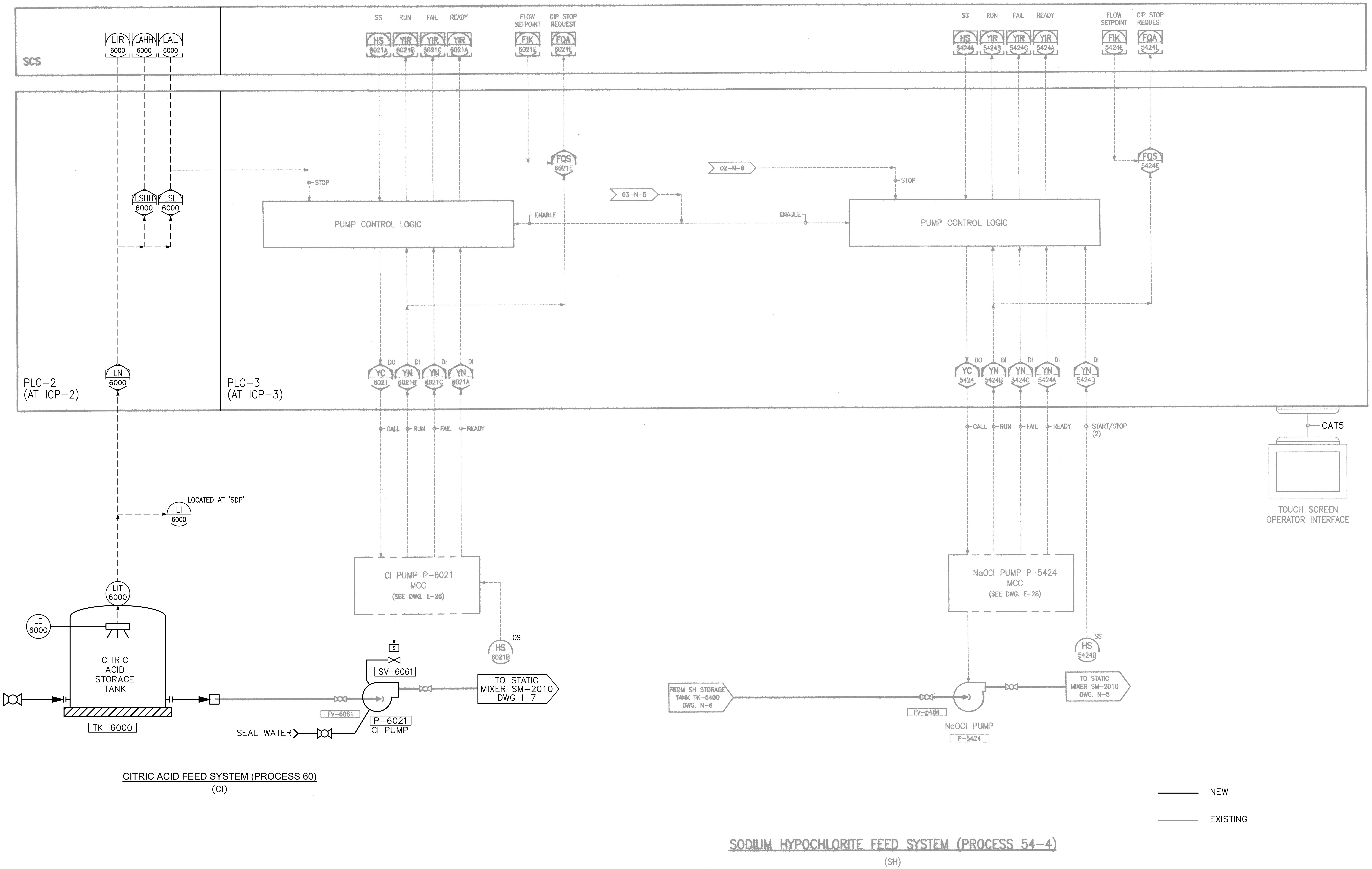
CAUSTIC FEED SYSTEM

SHEET 24 OF 28 SHEETS

I-4

D120068

ORIGINAL SCALE IN INCHES



CITRIC ACID FEED SYSTEM (PROCESS 60)
(CI)

SODIUM HYPOCHLORITE FEED SYSTEM (PROCESS 54-4)
(SH)

REVISIONS
MARK DATE BY

DESIGN JM
DRAWN CAD
CHECK JM

PLANS PREPARED BY:
MORAES/PHAM & ASSOCIATES
2131 Palomar Airport Rd. #120
Carlsbad, CA 92011
JOSEPH M. MORAES ENGINEER P.E. 12/28/20 DATE

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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

CIP FEED SYSTEM

SHEET 25 OF 28 SHEETS
I-5
D120068

ORIGINAL SCALE IN INCHES
0 1 2 3 4

RIO – MBR

TYPICAL FOR 3: REMOTE, OPENED, CLOSED, CLOSE COMMAND, OPEN COMMAND

TYPICAL FOR 3: POWER ON, BACKWASH IN PROGRESS, HIGH DIFFERENTIAL PRESSURE ALARM, REMOTE, REMOTE INITIATION SEQUENTIAL BW

PRESSURE (1)

PRESSURE, FLOW, TOTALIZER

ICP–2

PLAHH 110 DI

LE 110

CAUSTIC INJECTION POINT INTO RAW WATER

RAW WATER — 48"–RW–STL

1I–3 — 2"–SHC–PVC — SODIUM HYPOCHLORITE

(2) 5/8" IN 4"–CAS–PVS

CAUSTIC FROM DWG I–4

PIT 110 — HV–110

48"X24"

24"–RW–STL

ZSC 111 / ZSO 111 / HS 111 B (O/C) / HS 111 A (L/R)

MOV–111

PI 111 — BV–111–1

PDS 111

STR–111
500 MICRON
SELF–CLEANING STRAINER 1

PI 111 — 2 — BV–111–2

FV–111 — 3"

24"–RW–SS — BFV–111 — 24"X48"

PIT 115 — HV–115

48"–RW–SS — 1I–2 — TO ERT

BV–110

3"–SD–STL

LCP–111
SELF–CLEANING STRAINER
LOCAL CONTROL PANEL
(TYPICAL OF 3)

- YL 111A — POWER ON
- YL 111B — BACKWASH IN PROGRESS
- QY 111 — BW TIMER
- HS 111A — HOA STRAINER
- PAH 111 — HIGH DIFF PRESS ALARM
- HS 111C — SILENCE
- HS 111B — HOA VALVE
- UA 111D — HORN

ZSC 112 / ZSO 112 / HS 112 B (O/C) / HS 112 A (L/R)

MOV–112

PI 112 — BV–112–1

PDS 112

STR–112
500 MICRON
SELF–CLEANINIG STRAINER 2

PI 112 — 2 — BV–112–2

FV–112 — 3"

24"–RW–SS — BFV–112 — 24"X48"

48"–RW–STL

ZSC 113 / ZSO 113 / HS 113 B (O/C) / HS 113 A (L/R)

MOV–113

PI 113 — BV–113–1

PDS 113

STR–113
500 MICRON
SELF–CLEANING STRAINER 3

PI 113 — 2 — BV–113–2

FV–113 — 3"

24"–RW–SS — BFV–113 — 24"X48"

120VAC — FIT 110 — FE 110

AIR VACUUM/ AIR RELEASE

GV–110

4"–SD–STL — STORM DRAIN

NEW

EXISTING

INTERLOCK:

(I) PIT–110 AND PIT–115 SHALL BE USED TO CALCULATE THE DIFFERENTIAL PRESSURE ACROSS STRAINER.

KEY NOTES :

(1) PROVIDED BY MANUFACTURER REFER TO SPECIFICATION 11337 FOR ALL PARTS & APPURTENANCES UNLESS OTHERWISE NOTED

ORIGINAL SCALE IN INCHES 0 1 2 3 4

MARK	DATE	BY	REVISIONS

DESIGN JM | DRAWN CAD | CHECK JM

REGISTERED PROFESSIONAL ENGINEER JOSEPH M. MORAES No. E11023 ELECTRICAL STATE OF CALIFORNIA 6/30/21

PLANS PREPARED BY:
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Municipal Process Advantages
2334 Palomar Airport Rd. #120
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JOSEPH M. MORAES — ENGINEER P.E. — 12/28/20 DATE

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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

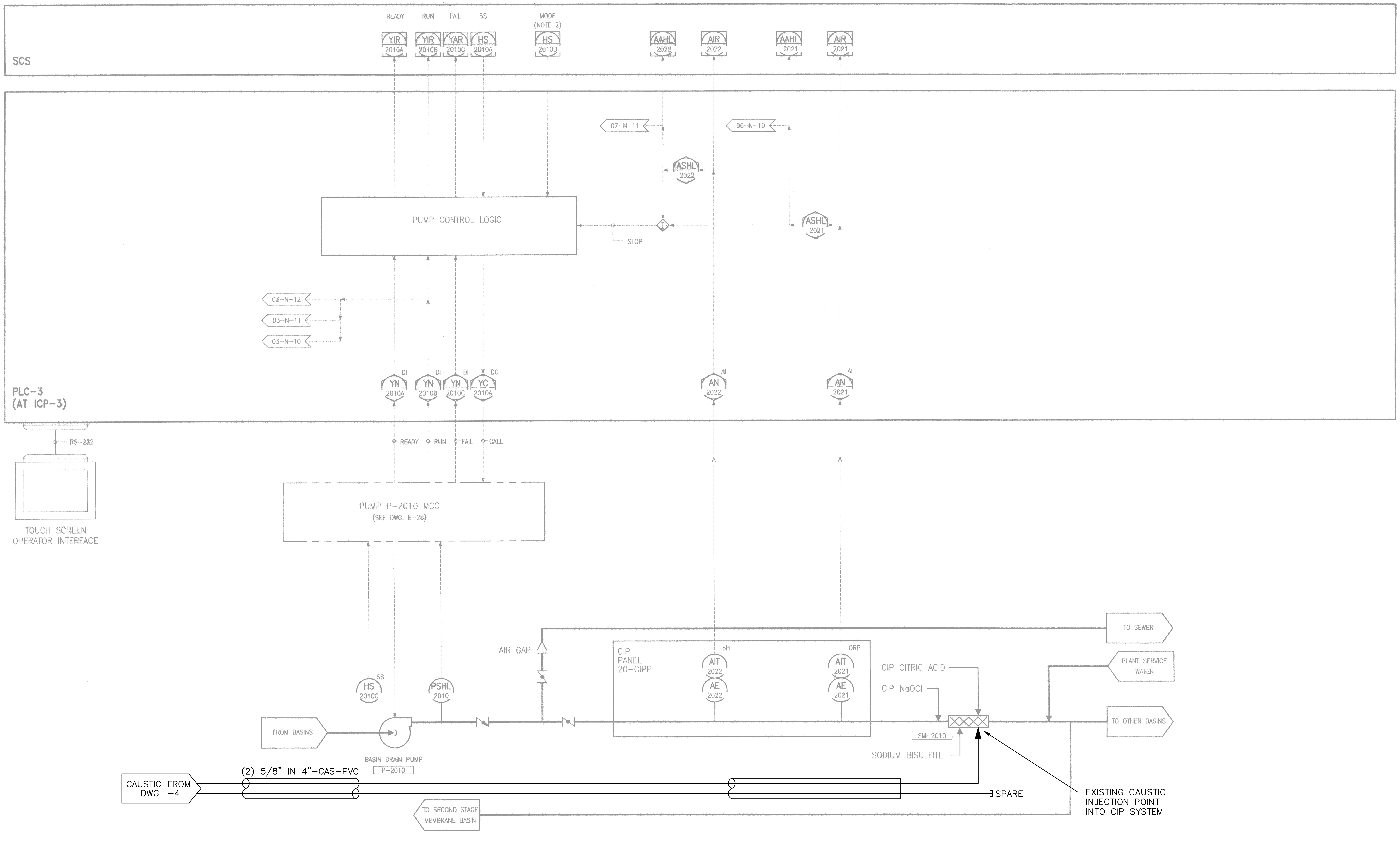
DAVID C. McCOLLOM WTP
WATER TREATMENT PLANT

ENERGY RECOVERY STRAINERS
PROCESS AND INSTRUMENTATION DIAGRAM

SHEET 26 / 28 OF SHEETS

I–6

D120068



NEW

EXISTING

CIP/NEUTRALIZATION SYSTEM

ORIGINAL SCALE IN INCHES

0 1 2 3 4

MARK	DATE	BY	REVISIONS

DESIGN JM DRAWN CAD CHECK JM

REGISTERED PROFESSIONAL ENGINEER JOSEPH M. MORAES E10231 EXP. 6/30/21 ELECTRICAL STATE OF CALIFORNIA

PLANS PREPARED BY:

MPA

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Carlsbad, CA 92011

JOSEPH M. MORAES 12/28/20
ENGINEER P.E. DATE

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SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

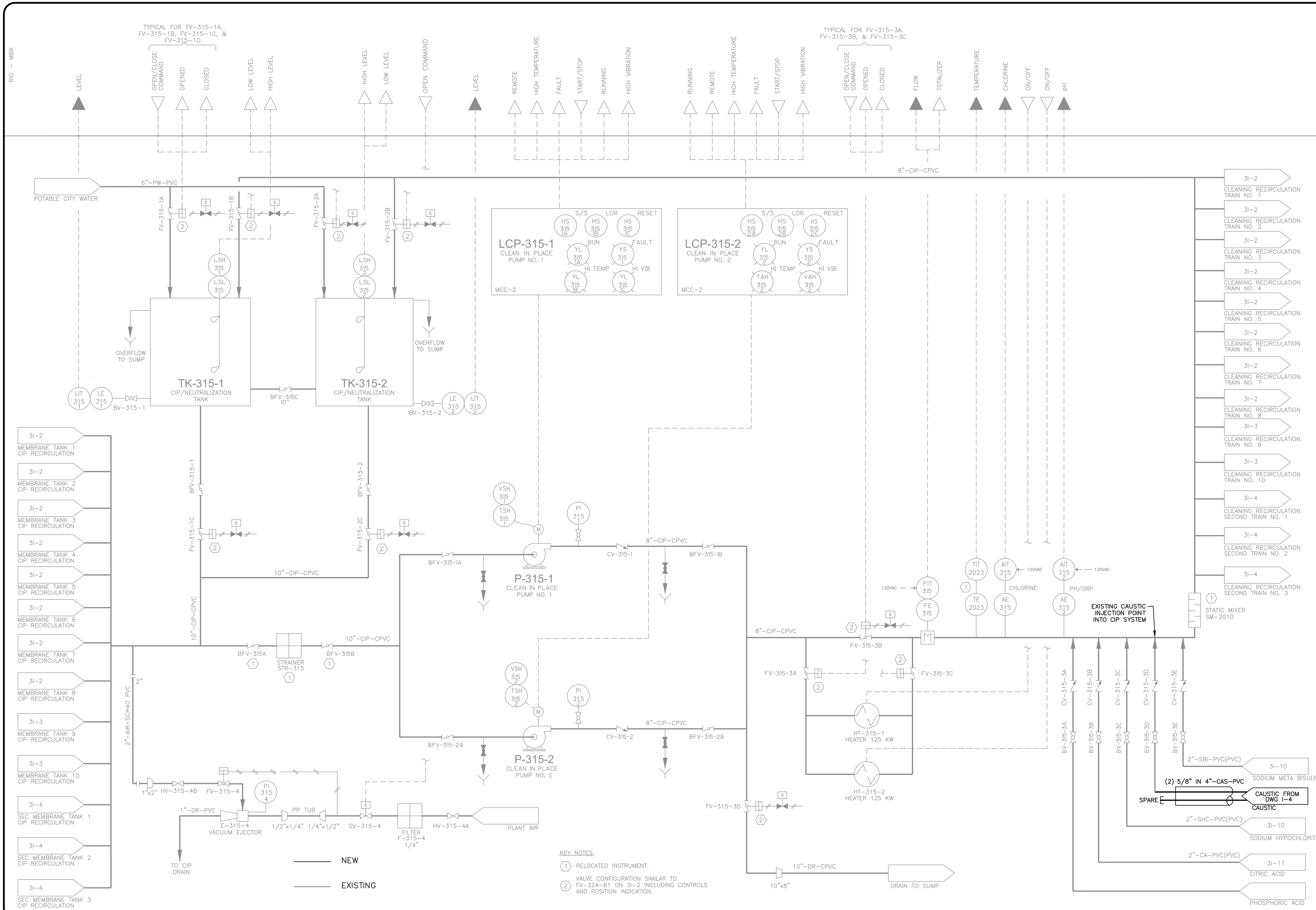
DAVID C. McCOLLOM WTP WATER TREATMENT PLANT

NEUTRALIZATION PROCESS

SHEET 27 OF 28 SHEETS

I-7

D120068



RIO - MBR
LEVEL
TYPICAL FOR FV-315-1A, FV-315-1B, FV-315-1C, & FV-315-1D
OPEN/CLOSE COMMAND
OPENED
CLOSED
LOW LEVEL
HIGH LEVEL
LOW LEVEL
OPEN COMMAND
REMOTE
HIGH TEMPERATURE
FAULT
START/STOP
RUNNING
HIGH VIBRATION
TYPICAL FOR FV-315-3A, FV-315-3B, & FV-315-3C
FLOW
TOTALIZER
TEMPERATURE
CHLORINE
ON/OFF
PH
6"-PW-PVC
POTABLE CITY WATER
8"-CIP-CPVC
FV-315-1A
FV-315-1B
FV-315-2A
FV-315-2B
LCP-315-1
CLEAN IN PLACE PUMP NO. 1
LCP-315-2
CLEAN IN PLACE PUMP NO. 2
S/S
LOR
RESET
RUN
FAULT
HI TEMP
HI VIB
MCC-2
TK-315-1
CIP/NEUTRALIZATION TANK
TK-315-2
CIP/NEUTRALIZATION TANK
OVERFLOW TO SUMP
BFV-315C
10"
BV-315-1
BV-315-2
CLEANING RECIRCULATION TRAIN NO. 1
CLEANING RECIRCULATION TRAIN NO. 2
CLEANING RECIRCULATION TRAIN NO. 3
CLEANING RECIRCULATION TRAIN NO. 4
CLEANING RECIRCULATION TRAIN NO. 5
CLEANING RECIRCULATION TRAIN NO. 6
CLEANING RECIRCULATION TRAIN NO. 7
CLEANING RECIRCULATION TRAIN NO. 8
CLEANING RECIRCULATION TRAIN NO. 9
CLEANING RECIRCULATION TRAIN NO. 10
CLEANING RECIRCULATION SECOND TRAIN NO. 1
CLEANING RECIRCULATION SECOND TRAIN NO. 2
CLEANING RECIRCULATION SECOND TRAIN NO. 3
MEMBRANE TANK 1 CIP RECIRCULATION
MEMBRANE TANK 2 CIP RECIRCULATION
MEMBRANE TANK 3 CIP RECIRCULATION
MEMBRANE TANK 4 CIP RECIRCULATION
MEMBRANE TANK 5 CIP RECIRCULATION
MEMBRANE TANK 6 CIP RECIRCULATION
MEMBRANE TANK 7 CIP RECIRCULATION
MEMBRANE TANK 8 CIP RECIRCULATION
MEMBRANE TANK 9 CIP RECIRCULATION
MEMBRANE TANK 10 CIP RECIRCULATION
SEC MEMBRANE TANK 1 CIP RECIRCULATION
SEC MEMBRANE TANK 2 CIP RECIRCULATION
SEC MEMBRANE TANK 3 CIP RECIRCULATION
BFV-315-1
BFV-315-2
FV-315-1C
FV-315-2C
10"-CIP-CPVC
10"-CIP-CPVC
BFV-315A
STRAINER STR-315
BFV-315B
P-315-1
CLEAN IN PLACE PUMP NO. 1
P-315-2
CLEAN IN PLACE PUMP NO. 2
BFV-315-1A
CV-315-1
BFV-315-1B
BFV-315-2A
CV-315-2
BFV-315-2B
2"-AIR-SCH40 PVC
1"x2"
HV-315-4B
FV-315-4
1"-DR-PVC
E-315-4
VACUUM EJECTOR
1/2"x1/4"
PP TUB
1/4"x1/2"
SV-315-4
FILTER F-315-4 1/4"
HV-315-4A
PLANT AIR
TO CIP DRAIN
NEW
EXISTING
KEY NOTES:
1 RELOCATED INSTRUMENT.
2 VALVE CONFIGURATION SIMILAR TO FV-324-B1 ON 3I-2 INCLUDING CONTROLS AND POSITION INDICATION.
8"-CIP-CPVC
FV-315-3B
FV-315-3A
FV-315-3C
HT-315-1 HEATER 125 KW
HT-315-2 HEATER 125 KW
FV-315-3D
10"-DR-CPVC
10"x8"
DRAIN TO SUMP
120VAC
CHLORINE
PH/ORP
EXISTING CAUSTIC INJECTION POINT INTO CIP SYSTEM
STATIC MIXER SM-2010
CV-315-3A
CV-315-3B
CV-315-3C
CV-315-3D
CV-315-3E
BV-315-3A
BV-315-3B
BV-315-3C
BV-315-3D
BV-315-3E
2"-SBI-PVC(PVC)
SODIUM META BISULFITE
(2) 5/8" IN 4"-CAS-PVC
CAUSTIC FROM DWG I-4
SPARE
CAUSTIC
2"-SHC-PVC(PVC)
SODIUM HYPOCHLORITE
2"-CA-PVC(PVC)
CITRIC ACID
PHOSPHORIC ACID

MARK | DATE | BY | REVISIONS

DESIGN JM | DRAWN CAD | CHECK JM

PLANS PREPARED BY: MPA Moraes/Pham & Associates 2131 Palomar Airport Rd #120 Carlsbad, CA 92011

JOSEPH M. MORAES
ENGINEER P.E.
12/28/20
DATE

OLIVENHAIN Municipal Water District 1966 Olivenhain Road Encinitas, CA 92024 (760)753-6466

SODIUM HYDROXIDE CHEMICAL STORAGE AND FEED SYSTEMS PROJECT

DAVID C. McCOLLOM WTP WATER TREATMENT PLANT

CLEAN-IN-PLACE SYSTEM PROCESS AND INSTRUMENTATION DIAGRAM

SHEET 28 OF 28 SHEETS

I-8

D120068

ORIGINAL SCALE IN INCHES