MEMJET® XPRESS
MEMBRANE BIOREACTOR (MBR)
MODEL 50K

REV	DESCRIPTION	DATE	DWN	CKD	APDV	ECN

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DESIGNER	JFR	DATE 03/19/07
CHECKER	VAK	DATE 03/19/07
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MANAGER		DATE
FILE:		
SCALE: NONE		

TITLE PIPING AND INSTRUMENTATION DIAGRAM
STANDARD MEMJET EXPRESS 50K

[redacted]

SIEMENS WATER TECHNOLOGIES
WAUKESHA, WI
262-547-0141

PROJECT	CODE	DRAWING	SHEET	REV
WWTP UPGRADE	6493B		1 OF 7	

STD: 1-0200-24X36D1 | INTL REF: | BAR = 1" AT PLOT SCALE

FLOWS AND LINES

- NEW MAIN FLOW
- EXISTING MAIN FLOW
- FUTURE MAIN FLOW
- NEW SECONDARY FLOW
- EXISTING SECONDARY FLOW
- FUTURE SECONDARY FLOW
- MATERIAL SPECIFICATION CHANGE (CS | SS)
- ( ) AVERAGE FLOW
- [ ] PEAK FLOW

ABBREVIATIONS

A TO C	–	AIR TO CLOSE
A TO O	–	AIR TO OPEN
AVG	–	AVERAGE
B/EL	–	BOTTOM ELEVATION
CL	–	CENTER LINE
CFM	–	CUBIC FEET PER MINUTE
CW	–	CITY WATER (POTABLE)
DIA	–	DIAMETER
DWG	–	DRAWING
EL	–	ELEVATION
F.C.	–	FAIL CLOSED
F.O.	–	FAIL OPEN
FRL	–	FILTER\REGULATOR\LUBRICATOR
GAL	–	GALLONS
GPD	–	GALLONS PER DAY
GPH	–	GALLONS PER HOUR
GPM	–	GALLONS PER MINUTE
HB	–	HOSE BIB
HG	–	INCHES OF MERCURY
HI	–	HIGH
HOA	–	HAND/OFF/AUTO
HP	–	HORSEPOWER
IA	–	INSTRUMENT AIR
ID	–	INSIDE DIAMETER
INV	–	INVERT
LO	–	LOW
MH	–	MANHOLE
MW	–	MANWAY
N.C.	–	NORMALLY CLOSED
N.O.	–	NORMALLY OPEN
OAL	–	OVERALL LENGTH
O.D.	–	OUTSIDE DIAMETER
PA	–	PLANT AIR
PSIG	–	POUNDS PER SQUARE INCH – GAUGE
PW	–	PLANT WATER
RED	–	REDUCER
RPM	–	REVOLUTIONS PER MINUTE
SCFM	–	STANDARD CUBIC FEET PER MINUTE
SCH	–	SCHEDULE
SG	–	SPECIFIC GRAVITY
SP	–	SETPOINT
SSH	–	STRAIGHT SIDE HEIGHT
STD	–	STANDARD
SW	–	SEAL WATER
SWD	–	SIDE WATER DEPTH
TDH	–	TOTAL DYNAMIC HEAD (FT OF FLUID)
T/EL	–	TOP ELEVATION
TYP	–	TYPICAL
VAC	–	VACUUM
VSD	–	VARIABLE SPEED DRIVE
WC	–	WATER COLUMN
WD	–	WATER DEPTH
WL	–	WATER LEVEL
WV	–	WORKING VOLUME (DOES NOT INCLUDE FREEBOARD)

INSTRUMENTATION AND RELATED ITEMS

- CAPILLARY TUBING
- ELECTRICAL
- HYDRAULIC
- PNEUMATIC
- DATA LINK
- FLUME
- MAGNETIC FLOW METER
- ROTAMETER
- SONIC FLOW METER
- TURBINE FLOW METER
- VENTURI
- WEIR
- VORTEX SENSOR
- ANNUBAR

VALVE SYMBOLS

- ANGLE
- BALL
- BUTTERFLY
- CHECK
- DIAPHRAGM
- GATE
- GLOBE
- KNIFE
- NEEDLE
- PINCH
- PLUG
- PRESSURE REDUCING
- RELIEF
- SQUEEZE
- THREE WAY
- FOUR WAY
- VACUUM BREAKER
- AIR RELEASE
- HOSE BIBB
- INTEGRAL BLOCK & BLEED
- RUPTURE DISK

ACTUATORS

- CYLINDER
- DIAPHRAGM–SPRING
- ELECTRO HYDRAULIC
- ELECTRO PNEUMATIC
- MOTOR
- SOLENOID
- POSITIONER
  - * – TYPE

PIPING AND TURBINE MATERIALS

ABS	–	ACRYLONTRILE BUTADIENE STYRENE TRUSS PIPE
ALM	–	ALUMINUM PIPE OR TURBINE
ARP	–	ALUMINUM REINFORCED PLASTIC PIPE
BL	–	BLACK IRON PIPE
BPT	–	BRAIDED PLASTIC TURBINE–PVC
CI	–	CAST IRON PIPE
CISP	–	CAST IRON SOIL PIPE
CMCP	–	CORRUGATED METAL CULVERT PIPE
CMH	–	CHEMICAL HOSE
CMP	–	CORRUGATED METAL PIPE
COP	–	COPPER PIPE
CPVC	–	CHLORINATED POLYVINYL CHLORIDE PIPE
CS	–	CARBON STEEL PIPE
DI	–	DUCTILE CAST IRON PIPE
ERP	–	EPOXY RESIN PIPE
FRP	–	FIBERGLASS REINFORCED PLASTIC PIPE
GS	–	GALVANIZED STEEL PIPE
HOSE	–	FLEXIBLE HOSE
HSI	–	HIGH SILICON IRON PIPE
KLS	–	PVDF LINED STEEL PIPE (KYNAR ® LINED TYPICAL)
KYN	–	PVDF (KYNAR ® TYPICAL)
MI	–	CARBON STEEL PIPE W/MALLEABLE IRON FITTINGS
NEO	–	NEOPRENE HOSE
NI	–	NICKEL ALLOY PIPE
NLS	–	NEOPRENE LINED STEEL PIPE
PEP	–	POLYETHYLENE PIPE
PETB	–	POLYETHYLENE TURBINE
PLS	–	POLYPROPYLENE LINED STEEL PIPE
POP	–	POLYPROPYLENE PIPE
PRP	–	PHENOLIC RESIN PIPE
PVC	–	POLYVINYL CHLORIDE PIPE
PVC HOSE	–	POLYVINYL CHLORIDE HOSE
PVDF	–	POLYVINYLIDENE FLUORIDE PIPE
RBR	–	RUBBER HOSE
RCCP	–	REINFORCED CONCRETE CULVERT PIPE
RCP	–	REINFORCED CONCRETE PIPE
SAR	–	SARAN TUBING
SLH	–	SLUDGE HOSE
SLS	–	SARAN LINED STEEL PIPE
SS	–	STAINLESS STEEL PIPE OR TUBING
TEF	–	TEFLON TUBING
TI	–	TITANIUM ALLOY PIPE
TLS	–	TEFLON LINED STEEL PIPE
TYB	–	TYGON® TUBING–BRAIDED
TYG	–	TYGON® TUBING–UNBRAIDED

PIPING ACCESSORIES

- DIAPHRAGM SEAL
- DRESSER COUPLING
- EJECTOR/EDUCTOR
- EXPANSION JOINT
- FLANGED CONNECTION
- FLEXIBLE HOSE
- HOSE CONNECTION
- INSULATION
- INSTALLED PIPE WITH ELECTRIC HEAT TRACE
- INSTALLED PIPE WITH STEAM HEAT TRACE
- PIPE TO TUBING ADAPTER
- PULSATION DAMPENER
- QUICK DISCONNECT
- CONCENTRIC REDUCER
- ECCENTRIC REDUCER
- RUPTURE DISK
- ANNUBAR

INSTRUMENT SYMBOLS

	PRIMARY LOCATION ***NORMALLY ACCESSIBLE TO OPERATOR	FIELD MOUNTED	AUXILIARY LOCATION ***NORMALLY ACCESSIBLE TO OPERATOR
DISCRETE INSTRUMENTS	1 IP1**	2	3
SHARED DISPLAY, SHARED CONTROL	4	5	6
COMPUTER FUNCTION	7	8	9
PROGRAMMABLE LOGIC CONTROL	10	11	12

* SYMBOL SIZE MAY VARY ACCORDING TO THE USER'S NEEDS AND THE TYPE OF DOCUMENT. A SUGGESTED SQUARE AND CIRCLE SIZE FOR LARGE DIAGRAMS IS SHOWN ABOVE. CONSISTENCY IS RECOMMENDED.

** ABBREVIATIONS OF THE USER'S CHOICE SUCH AS IP1 (INSTRUMENT PANEL #1), IC2 (INSTRUMENT CONSOLE #2), CC3 (COMPUTER CONSOLE #3), ETC., MAY BE USED WHEN IT IS NECESSARY TO SPECIFY INSTRUMENT OR FUNCTION LOCATION.

*** NORMALLY INACCESSIBLE OR BEHIND–THE–PANEL DEVICES OR FUNCTIONS MAY BE USING THE SANE SYMBOL BUT WITH DASHED HORIZONTAL BARS, I.E.

- SIGHT FLOW INDICATOR
- STRAINER
- UNION
- STEAM TRAP
- AIR FILTER
- AIR LUBRICATOR
- AIR REGULATOR
- COMB. AIR FILTER/ REGULATOR W/GAUGE
- FLOW ORIFICE
- SIGHT FLOW STRAINER
- SPECTACLE BLIND (OPEN)
- SPECTACLE BLIND (CLOSE)
- PIGTAIL SIPHON
- USF – CLIENT

ISA INSTRUMENT IDENTIFICATION TABLE

	FIRST LETTER		SUCCEEDING LETTERS	
	PROCESS VARIABLE	MODIFIER (IF NEEDED)	READOUT OR COMPUTER FUNCTION	MODIFIER (IF NEEDED)
A	ANALYSIS		ALARM	
B	BURNER, COMBUSTION		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 (FRACTION)		
G	USER'S CHOICE		GLASS, VIEWING DEVICE	
H	HAND			HIGH
I	CURRENT (ELECTRICAL)		INDICATE	
J	POWER	SCAN		
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE	CONTROL STATION	
L	LEVEL		LIGHT	LOW
M	USER'S CHOICE	MOMENTARY		MIDDLE, INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE
O	USER'S CHOICE		ORIFICE (RESTRICTION)	
P	PRESSURE, VACUUM		POINT (TEST CONNECTION)	
Q	QUANTITY	INTEGRATE, TOTALIZER		
R	RADIATION		RECORD	
S	SPEED, FREQUENCY	SAFETY	SWITCH	
T	TEMPERATE		TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECH. ANALYSIS		VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL	
X	UNCLASSIFIED	X–AXIS	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE OR PRESENCE	Y–AXIS	RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z–AXIS	DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

LEGEND BASED ON ISA STANDARD S 5.1

INSTRUMENT TAG NUMBERS

TIC 103 – INSTRUMENTATION IDENTIFICATION OR TAG NUMBER
103 – LOOP NUMBER
TIC – FUNCTIONAL IDENTIFICATION
NOTE: HYPHENS ARE OPTIONAL AS SEPARATORS

ELECTRICAL AND RELATED ITEMS

- S – SELECTOR SWITCHES
- VFD – VARIABLE FREQUENCY DRIVE
- EM – EMERGENCY POWER
- I – INTERLOCK
- PILOT LIGHT

LINE NUMBER IDENTIFICATION

1"–PA–CS

- MATERIAL CLASS
- FLOW STREAM INDENTIFICATION
- LINE SIZE

LINE CONTINUATIONS

- INDICATES A LINE GOING TO OR COMING FROM BATTERY LIMITS (CONTRACT LIMITS)
- 5 A 2 – INDICATES CONTINUATION OF LINE IS ON SHEET NUMBER 5 (SAME DRAWING NUMBER) IN ZONE A 2
- SHT 5 – INDICATES CONTINUATION OF A SIGNALS IS ON SHEET NUMBER 5

EQUIPMENT TAG

BFV 5 53–1A

- EQUIPMENT NO. NUMBER DENOTES MULTIPLE DEVICES USED IN IDENTICAL DUPLICATE SYSTEMS. LETTER DISTINGUISHES MULTIPLE SIMILAR DEVICES IN THE SAME INSTRUMENT LOOP.
- MATERIAL CLASS
- FLOW STREAM INDENTIFICATION
- LINE SIZE

VALVE TAG

BFV 5 53–1A

- VALVE NO. NUMBER DENOTES MULTIPLE DEVICES USED IN IDENTICAL DUPLICATE SYSTEMS. LETTER DISTINGUISHES MULTIPLE SIMILAR DEVICES IN THE SAME INSTRUMENT LOOP.
- MATERIAL CLASS
- FLOW STREAM INDENTIFICATION
- LINE SIZE

EQIPMENT FUNCTIONAL IDENTIFICATION

BWR	BLOWER
M	MECHANICAL EQUIPMENT
MP	METERING PUMP
P	PUMP
PD	PULSATION DAMPENER
S	SUMP
STR	STRAINER
TK	TANK
CC	CALIBRATION COLUMN
IQ	INJECTION QUILL ASSEMBLY
ED	EDUCTOR

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WAUKESHA, WI
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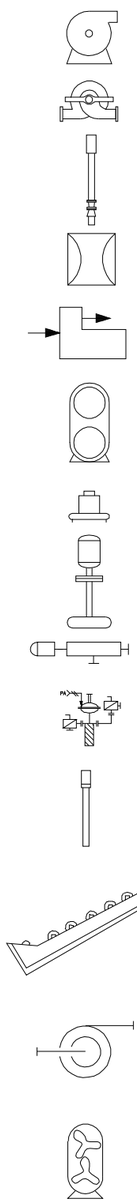
PROJECT	CODE	DRAWING	SHEET	REV
WWTP UPGRADE	6493B		2 OF 7	

STD: 1–0200–24X36D1 | INTL REF: | BAR = 1" AT PLOT SCALE

PUMPS



CENTRIFUGAL PUMP

DOUBLE SUCTION CENTRIFUGAL PUMP

VERTICAL TURBINE

AIR OPERATED DOUBLE DIAPHRAGM

METERING PUMP

GEAR PUMP

SUBMERSIBLE PUMP

SUMP PUMP

PROGRESSIVE CAVITY PUMP

AIR OPERATED SINGLE DIAPHRAGM

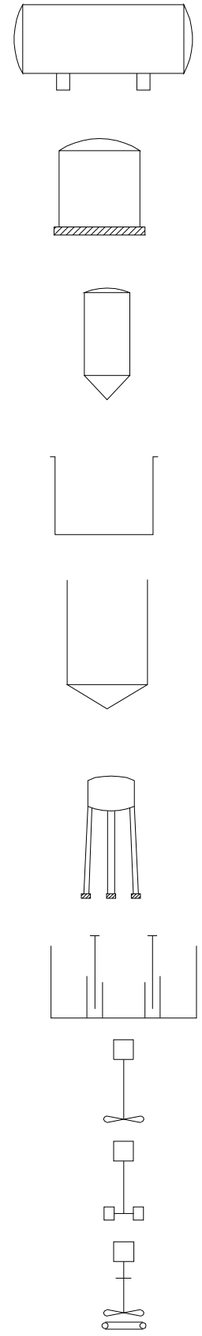
DRUM PUMP

SCREW PUMP

COMPRESSOR/VACCUM

ROTARY LOBE PUMP

TANKS AND ACCESSORIES



HORIZONTAL TANK

VERTICAL TANK – CLOSED

CONICAL BOTTOM TANK – CLOSED

VERTICAL TANK – OPEN

CONICAL BOTTOM TANK – OPEN

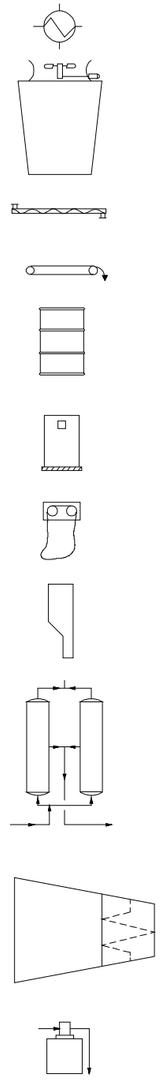
ELEVATED TANK

SPLITTER BOX

AGITATOR (PROPELLER)

AGITATOR (TURBINE)

AERATOR W/SPARGE RING



HEAT EXCHANGER

COOLING TOWER

SCREW CONVEYOR

BELT CONVEYOR

DRUM

CHLORINATOR/ EVAPORATOR

OIL SKIMMER

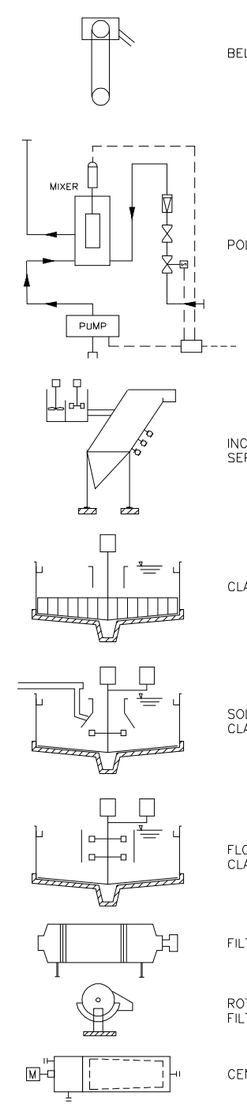
BAG FEEDER

AIR DRYER

AIR COMPRESSOR w/INTEGRAL DRYER

SAMPLER

MISCELLANEOUS EQUIPMENT



BELT SKIMMER

POLYMER FEED

INCLINED PLATE SEPARATOR

CLARIFIER

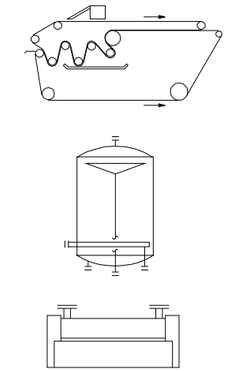
SOLIDS CONTACT CLARIFIER

FLOCCULATING CLARIFIER

FILTER PRESS

ROTARY VACUUM FILTER

CENTRIFUGE



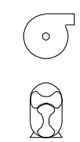
BELT FILTER PRESS

PRESSURE FILTER

UV UNIT

DESICCANT BREATHER

BLOWERS



CENTRIFUGAL BLOWER

ROTARY BLOWER

EQUIPMENT TEXT

T
TANK ID

DIA: X'–X"ID X X'–X"H
TOTAL CAP: XXX GALLON
OPR CAP: XXX GALLON
MATL:
INSULATION:

EQUIPMENT ID

SIZE:
TOTAL CAP:
OPR CAP:
MATL:
INSULATION:

P
POLYMER ID

DESIGN: xx GPM@ xx' TDH
SP GR =
NEAT: xx GPH
DILUTE: xx GPH
MATL:

P
CENTRIFUGAL ID

DESIGN: xx GPM@ xx' TDH
DRIVER: xx HP / xx' RPM
SP GR =
MATL:

P
AIR DIAPHGRAM ID

DESIGN: xx GPM@ xx' TDH
AIR PRESSURE: xx PSI @ xx SCFM
MATL:

B
BLOWER ID

DESIGN: xx GPM@ xx' TDH
DRIVER: xx HP / xx' RPM

M
MIXER ID

IMPELLER: XX"DIA/XX RPM
DRIVER: XX HP/XX RPM
SP GR =
MATL:

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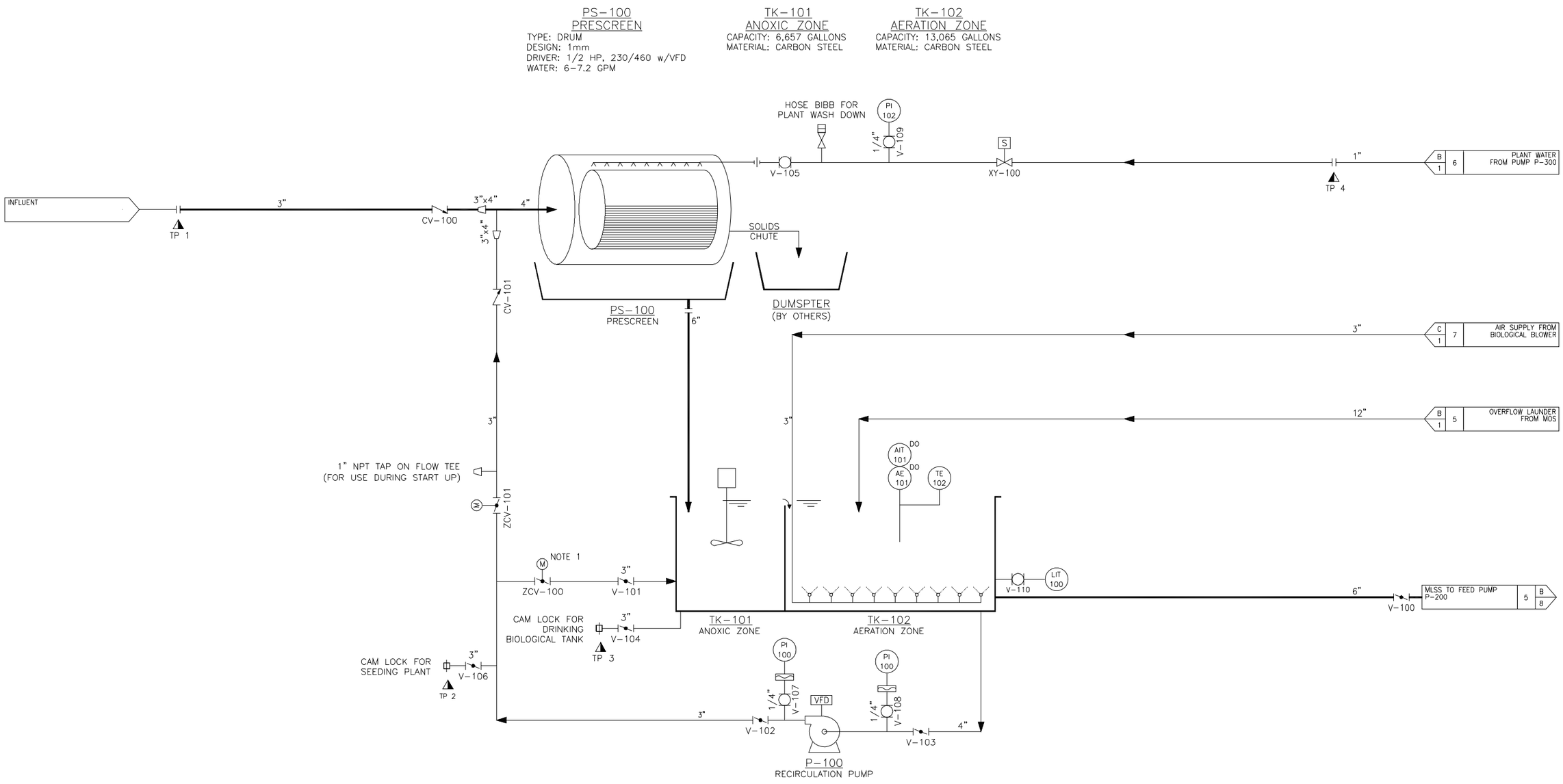
MANAGER	DATE	SIEMENS WATER TECHNOLOGIES WAUKESHA, WI 262-547-0141
FILE:		
SCALE: NONE		

PROJECT	CODE	DRAWING	SHEET	REV
WWTP UPGRADE	6493B		3 OF 7	

STD: 1-0200-24X36D1 | INTL REF: | BAR = 1" AT PLOT SCALE



P-100
RECIRCULATION PUMP

TYPE: CENTRIFUGAL
DESICN: 174 GPM @ 10' TDH
DRIVER: 2 HP, 1800 RPM
MATERIAL: CI/BF

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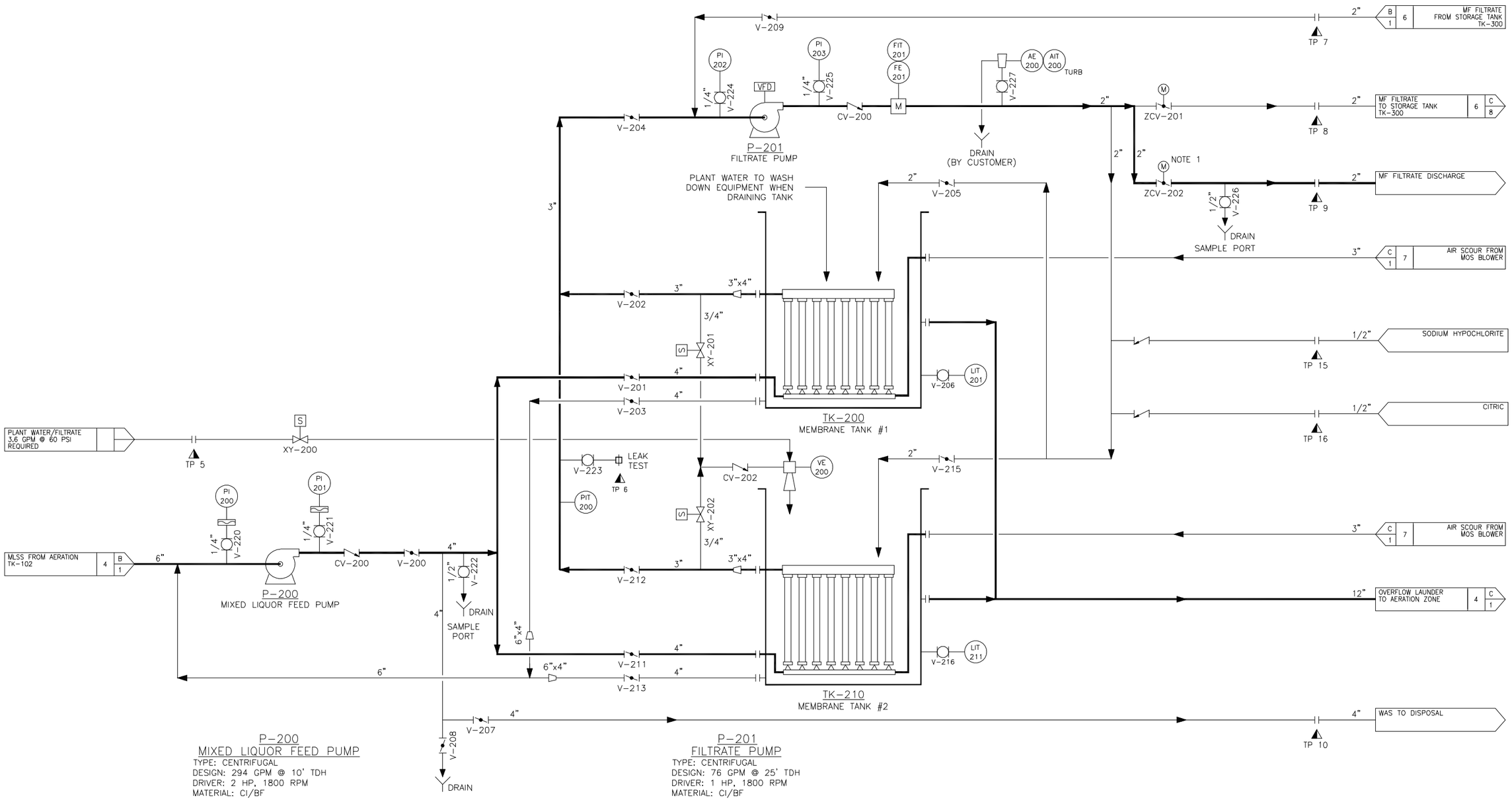

NOTES:

1. ACTUATED VALVE ZCV-202 REQUIRES TRAVEL STOPS.

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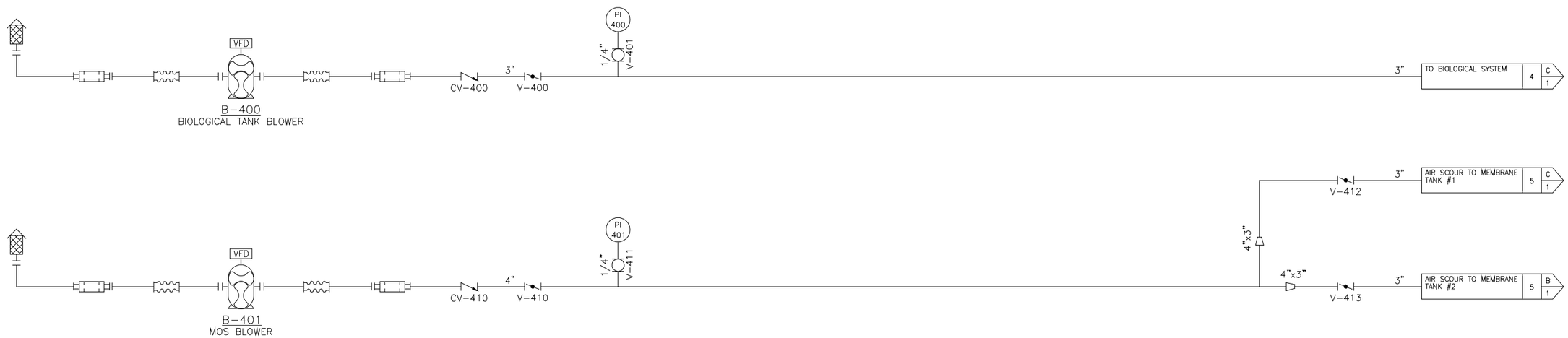

B-400
BIOLOGICAL TANK BLOWER

TYPE: POSITIVE DISPLACEMENT
DESIGN: 181 SCFM @ 5.0 PSIG
DRIVER: 7.5 HP
MATERIAL:

B-401
MOS BLOWER

TYPE: POSITIVE DISPLACEMENT
DESIGN: 128 SCFM @ 4.56 PSIG
DRIVER: 5 HP w/VFD
MATERIAL:

REV	DESCRIPTION	DATE	DWN	CKD	APDV	ECN

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ENGINEER MFP	03/19/07
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SCALE: NONE	

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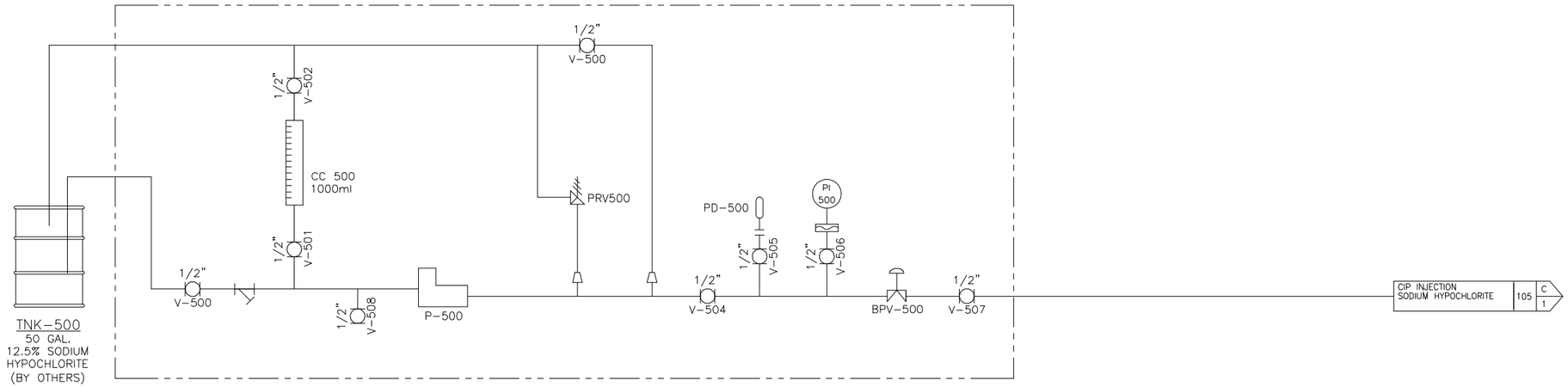
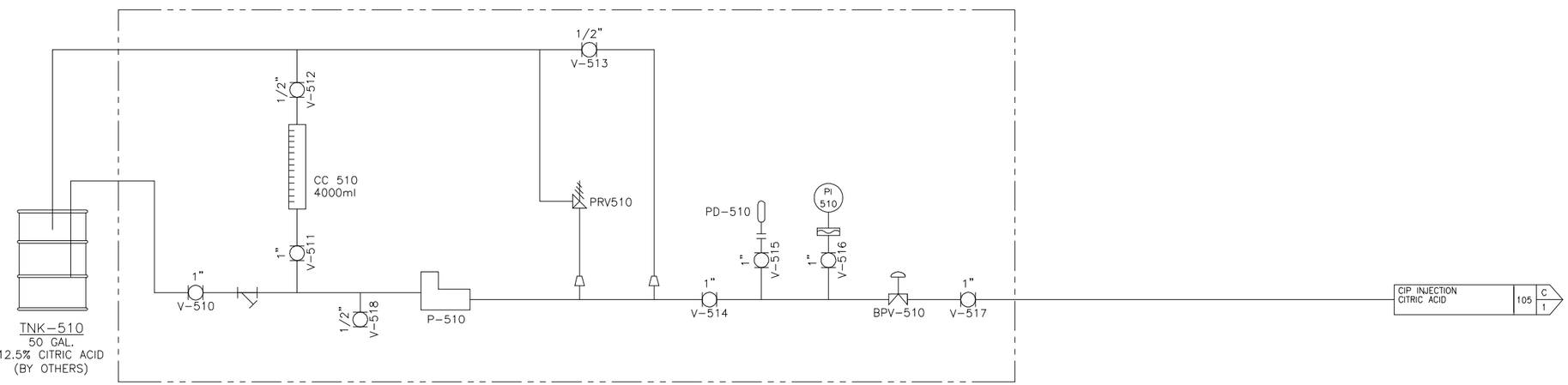
PROJECT	CODE	DRAWING	SHEET	REV
WWTP UPGRADE	6493B		6 OF 7	

STD: 1-0200-24X36D1 | INTL REF: | BAR = 1" AT PLOT SCALE

P-500
SODIUM HYPOCHLORITE DOSING PUMP
TYPE: MOTER DRIVEN DIAPHRAGM
DESIGN: 46 GPH @ 30 PSIG
DRIVER: X.X HP
MATERIAL: PVC PUMP HEAD

P-510
CITRIC ACID DOSING PUMP
TYPE: MOTER DRIVEN DIAPHRAGM
DESIGN: 156 GPH @ 30 PSIG
DRIVER: X.X HP
MATERIAL: PVC PUMP HEAD





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