

INSTRUMENT IDENTIFICATION LETTERS				
FIRST LETTER		SUCCEEDING LETTERS		
MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A		ALARM		
B		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C			CONTROL	
D	DIFFERENTIAL			
E		SENSOR (PRIMARY ELEMENT)		
F	RATIO (FRACTION)			
G		GLASS, VIEWING DEVICE		
H			HIGH	
I		INDICATE		
J	SCAN			
K	TIME OF CHANGE		CONTROL STATION	
L		LIGHT		LOW
M	MOMENTARY			MIDDLE OR INTERMEDIATE
N		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O		ORIFICE (RESTRICTION)		
P		POINT (TEST) CONNECTION		
Q	INTEGRATE, TOTALIZE			
R		RECORD		
S	SAFETY		SWITCH	
T			TRANSMIT	
U		MALFUNCTION	MALFUNCTION	MALFUNCTION
V			VALVE, DAMPER, OR LOUVER	
W		WELL		
X	X AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	Y AXIS		RELAY, COMPUTE, CONVERT	
Z	Z AXIS		DRIVER, ACTUATOR, UNCLASS FINAL CONT. ELEMENT	

STANDARD ABBREVIATIONS			
ADJ	ADJUSTABLE	N1	ARCNET LOCAL AREA NETWORK
AH	AIR HANDLER	N2	EIA STANDARD RS-485 COMMUNICATION BUS
AI	ANALOG INPUT	N	NEUTRAL
AO	ANALOG OUTPUT	NC	NORMALLY CLOSED
AUX	AUXILIARY	NCM	NETWORK CONTROL MODULE
AV	AIR VALVE	NCU	NETWORK CONTROL UNIT
AWG	AMERICAN WIRE GAUGE	NEU	NETWORK EXPANSION UNIT
BI	BINARY INPUT	NO	NORMALLY OPEN
BO	BINARY OUTPUT	NR	NETWORK REPEATER
C/C	COOLING COIL	O.A.	OUTSIDE AIR
CEB	COMMUNICATION EXPANSION BOARD	OL	OVERLOAD
CHWP	CHILLED WATER PUMP	PE	PRESSURE ELECTRIC TRANSDUCER
CHW	CHILLED WATER	PBH	BOILER HOUSE PUMP
CHWR	CHILLED WATER RETURN	PL	PILOT LIGHT
CHWS	CHILLED WATER SUPPLY	PMB	MATERIALS BUILDING PUMP
COM/C	COMMON COVERING	PRI	PRIMARY
CR	CURRENT RELAY/CONTROL RELAY	PS	PRESSURE SWITCH
CS	CURRENT SWITCH	PSIG	PRESSURE PER SQUARE INCH GAUGE
CT	CURRENT TRANSFORMER	PT	PRESSURE TRANSMITTER
CTP	COOLING TOWER PUMP	PWR	POWER
CTR	CURRENT TRANSMITTER	R	RELAY
CV	CONTROL VALVE	R.A.	RETURN AIR
CWR	CONDENSER WATER RETURN	RM	ROOM
CWS	CONDENSER WATER SUPPLY	RSS	REMOTE START STOP
D	DAMPER	S/S	START/STOP
D.A.	DISCHARGE AIR	SD	SMOKE DETECTOR
DA	DAMPER ACTUATOR	SEC	SECONDARY
DC	DIGITAL CONTROLLER	TB	TERMINAL BOARD
DCM	DIGITAL CONTROL MODULE	TC	TEMPERATURE CONTROLLER
DP	DIFFERENTIAL PRESSURE	TCC	TERMINAL CONTROL CONTACTOR
DSC	DIGITAL SYSTEM CONTROLLER	TE	TEMPERATURE ELEMENT
E.C.	ELECTRICAL CONTRACTOR	TEMP	TEMPERATURE
EN	ENCLOSURE	TF	TOWER FAN
EP	ELECTRIC-PNEUMATIC SWITCH (TRANSDUCER)	TFS	FUSED SWITCH
ES	END SWITCH	THHN	STRANDED WIRE TYPE USING HEAT-RESISTANT, FLAME RETARDANT THERMOPLASTIC INSULATION WITH A NYLON OR EQUIVALENT OUTER
F	DEGREE(S) FAHRENHEIT	TS	TEMPERATURE SWITCH
FEU	FIELD EQUIPMENT UNIT	TWR	TOWER WATER RETURN
FIC	FIELD INTERFACE CONTROLLER	TWS	TOWER WATER SUPPLY
FS	FLOW SWITCH	TX	TRANSFORMER
FT	FLOW TRANSMITTER	UH	UNIT HEATER
FTR	FLOW TRANSMITTER RECEIVER	UNT	UNITARY CONTROLLER
FTB	FIELD TERMINATION BOARD	V	VALVE
G/GRD	GROUND	VAC	VOLTS AC
GPM	GALLONS PER MINUTE	VDC	VOLTS DC
H	HOT	VFD	VARIABLE FREQUENCY DRIVE
HV	HEATING, VENTILATION UNIT	VSP	VARIABLE SPEED PUMP
ID	IDENTIFICATION	WC	WATER COLUMN
IV	ISOLATION VALVE	WK	EXPANSION KIT
J-BOX	JUNCTION BOX		
LS	LEVEL SENSOR		
MAX	MAXIMUM		
MCC	MOTOR CONTROL CENTER		
MIN	MINIMUM		
MS	MANUAL SWITCH/MOISTURE SEPARATOR		

CONTROLS DRAWING LIST	
DRAWING NUMBER	DRAWING DESCRIPTION
1011	CONTROLS LEGEND AND INDEX
1012	ELECTRICAL CONDUIT AND CABLE SCHEDULE
1013	RTU PANEL EXTERIOR LAYOUT
1014	RTU PANEL INTERIOR LAYOUT
1015	RTU PANEL TERMINAL STRIP LAYOUT
1016	RTU PANEL PLC RACK LAYOUT
1017	RTU PANEL POWER DISTRIBUTION
1018	RTU PANEL PLC I/O SCHEMATICS
1019	RTU PANEL PLC I/O SCHEMATICS
1020	RTU PANEL PLC I/O SCHEMATICS
1021	LIFT STATION RTU PANEL COMMUNICATION DIAGRAM
1022	LEVEL CONTROL PANEL LAYOUT
1023	LEVEL CONTROL PANEL WIRING DIAGRAM
1024	CONTROLS INSTALLATION DETAILS

**PUMP CONTROL PANEL**

- THE PUMP MANUFACTURER SHALL FURNISH THE PUMP CONTROL PANEL. THE FOLLOWING IS A LIST OF REQUIREMENTS FOR THIS CONTROL PANEL.
1. THE PUMPS SHALL BE CONTROLLED FROM THE FOUR (4) RELAY OUTPUTS ON THE PAC 2 CONTROLLER (CSI CONTROLS). THE SIGNALS MADE AVAILABLE FROM THE LEVEL CONTROLLER ARE LOW, LEAD, LAG, AND HIGH-HIGH.
  2. FLOAT SWITCHES WILL WIRE INTO THE PUMP CONTROL PANEL AND WILL BE USED FOR LEVEL ALARMING (LOW, HIGH, & HIGH-HIGH). THE HIGH-HIGH FLOAT WILL SERVE AS A BACKUP TO THE PAC 2 CONTROLLER FOR PUMP START AND THE LOW LEVEL FLOAT FOR SHUTDOWN. EACH FLOAT SHALL WIRE INTO INTERPOSING RELAYS WITH A SPARE CONTACT WIRED TO TERMINALS MADE AVAILABLE FOR THE PLC IN THE RTU PANEL.
  3. A 3-POSITION SEQUENCE SELECTOR SWITCH "AUTO/1-2/2-1" SHALL BE PROVIDED ON THE INNER DOOR OF THE PUMP CONTROL PANEL.
  4. A 3-POSITION TEST SWITCH AND INDICATOR LIGHT SHALL BE PROVIDED FOR LOW, LEAD, LAG, AND HIGH-HIGH LEVELS TO SIMPLIFY TROUBLESHOOTING.
  5. ALL SWITCHES AND LIGHTS ARE TO BE MOUNTED ON THE INNER DOOR OF THE PUMP CONTROL PANEL.

**PLC/HMI AND TELEMETRY**

TELEMETRY MUST BE ESTABLISHED TO THE FILTER PLANT AND ALL HMI AND PLC PROGRAMMING MUST BE COMPLETED PRIOR TO THE STATION BEING PUT INTO SERVICE. FILTER PLANT STAFF MUST BE GIVEN 30 DAYS NOTICE TO COMPLETE THIS WORK. A SIGNAL STRENGTH TEST (-90dB OR BETTER, -80dB to -85dB IS DESIRABLE) MUST BE PERFORMED TO DETERMINE PROPER ANTENNA HEIGHT.

SANITARY SEWER LIFT STATION AND FORCE MAIN  
**BOTANICA - THE WICHITA GARDENS**  
STREETS AND UTILITIES

**CONTROLS  
LEGEND  
AND INDEX**  
SHEET TITLE  
468-84683  
PROJECT NUMBER

**JTW**  
DESIGN BY  
**MRT**  
DRAWN BY  
**GSS**  
CHECKED BY

ISSUED  
**July 2010**  
REVISED

SHEET NO.  
**11 of 29**