INSTRUMENTATION IDENTIFICATION TABLE

(ISA–S5.1–1984)

LETTER	FIRST LETTER		SUCCEEDING LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS (2)		ALARM		
B	BURNER, COMBUSTION		(1)	CLOSE, STOP, DECREASE (1)	(1)
C	(1)			CONTROL	
D	(1)	DIFFERENTIAL		OPEN, START, INCREASE (1)	
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			FAIL (1)
G	(1)		GLASS, VIEWING DEVICE		
H	HAND				HIGH (OPENED)
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW (CLOSED)
M	MOTOR, MOTION (1)	MOMENTARY			MIDDLE OR INTERMEDIATE
N	(1)		(1)	(1)	ON OR OPERATE (1)
O	(1)		ORIFICE, RESTRICTION		OVERLOAD (1)
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY (2)	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE (2)		MULTIFUNCTION (2)	MULTIFUNCTION (2)	MULTIFUNCTION (2)
V	VIBRATION, MECHANICAL ANALYSIS			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED (2)	X AXIS	UNCLASSIFIED (2)	UNCLASSIFIED (2)	UNCLASSIFIED (2)
Y	EVENT, STATE, PRESENCE	Y AXIS		RELAY, COMPUTE, CONVERT	
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

(1) USER'S CHOICE
(2) WHEN USED, SYMBOL OR SIGNAL LINE IS ANNOTATED.

SIGNAL NOMENCLATURE

ESZ	= ANALOG INPUT
FE	= FLOW ELEMENT (METER)
FIT	= FLOW INDICATION TRANSMITTER
LE	= LEVEL ELEMENT (METER)
LIC	= LEVEL INDICATION CONTROLLER
LALL/LSLL	= LOW–LOW LEVEL
LAH/LSH	= HIGH LEVEL
LAHH/LSHH	= HIGH–HIGH LEVEL
LAL/LSL	= LOW LEVEL
MD	= MOTOR START/STOP
MF	= MOTOR FAULT/FAIL
MN	= EQUIPMENT RUN
MO	= MOTOR OVERLOAD
PI	= PRESSURE INDICATION
QE	= RUN TIME METER
SC	= SPEED CONTROL
SI	= MOTOR SPEED

PLC INDICATION

XXX

MODIFIER XXX LEGEND
PCP = PUMP CONTROL PANEL (PCP)

MISCELLANEOUS ABBREVIATIONS

4PDT	= 4 POLE, DOUBLE THROW
AI	= ANALOG INPUT (4–20 mA U.O.N.)
AO	= ANALOG OUTPUT (4–20 mA U.O.N.)
CB	= CIRCUIT BREAKER
COMM.	= COMMUNICATIONS
CPU	= CENTRAL PROCESSING UNIT
CSI	= CONTROL SYSTEM INTEGRATOR
CSP	= CONTROL SYSTEM PROGRAMMER
CT	= CURRENT TRANSFORMER
DI	= DIGITAL INPUT (120 VAC U.O.N.)
DO	= DIGITAL OUTPUT (120 VAC U.O.N.)
ENET	= ETHERNET
I/O	= INPUT/OUTPUT
LED	= LIGHT EMITTING DIODE
MANF.	= MANUFACTURER
MH	= MANHOLE
O/L	= OVERLOAD
PCP	= PUMP CONTROL PANEL
PSI	= POUNDS PER SQUARE INCH (GUAGE PRESSURE U.O.N.)
P/S	= POWER SUPPLY
RSP	= RAW SEWAGE PUMP
TB	= TERMINAL BLOCK
TYP.	= TYPICAL
UPS	= UNINTERRUPTIBLE POWER SUPPLY
U.O.N.	= UNLESS OTHERWISE NOTED
VFD	= VARIABLE FREQUENCY DRIVE
VM	= VIBRATION MODULE
VT	= VOLTAGE TRANSFORMER

CABLE LEGEND

ELECTRONIC CONTROLS SIGNAL
FO FO FO — FIBER OPTIC COMMUNICATION
E E E — ETHERNET COMMUNICATION
C — COAXAL COMMUNICATION

INPUT & OUTPUT SIGNALS

ANALOG INPUT (4–20MA)
ANALOG OUTPUT (4–20MA)
ETHERNET COMMUNICATION
DIGITAL INPUT (120VAC)
DIGITAL OUTPUT (120VAC)

SYMBOL LEGEND - GENERAL

ANTENNA
HAND–OPERATED GATE VALVE
PLUG VALVE
CHECK VALVE
PUMP
MOTOR
MAGNETIC FLOW METER
CONTROL WIRING AND CONDUIT
VALVE ELECTRIC MOTOR ACTUATOR
SOLENOID VALVE
LOCAL PRESSURE GAUGE
COOLINGSTAT
THERMOSTAT
FREEZESTAT
E–STOP PUSHBUTTON
MAINTAINED PULL – MAINTAINED PUSH
GRINDER
TUNING FORK LEVEL SENSOR
LEVEL TRANSDUCER
LEVEL FLOAT
AUDIBLE ALARM

SENSOR
AB = INSTRUMENT SYMBOL
EX. LI = LEVEL INDICATOR
XXX = LOOP NUMBER

TRANSMITTER
ABT = INSTRUMENT SYMBOL
EX. FIT = FLOW INDICATING TRANSMITTER
XXX = LOOP NUMBER

SWITCH
AB = INSTRUMENT SYMBOL
EX. HS = HAND SWITCH
XXX = LOOP NUMBER

INDICATOR LIGHT
AB = INSTRUMENT SYMBOL
EX. LO = LOCK OUT
XXX = LOOP NUMBER

SECTION CALLOUT
A = SECTION DESIGNATION
X–X = DRAWING NUMBER

DETAIL CALLOUT
A = DETAIL DESIGNATION
X–X = DRAWING NUMBER

CONDUIT HOMERUN
X–XX
SEE GENERAL CIRCUIT/CONDUIT TAG IDENTIFICATION TABLE

SYMBOL LEGEND - ELEMENTARY CONTROL DIAGRAMS

FIELD WIRING
TRANSFORMER
TIMER CONTACT, NORMALLY OPEN, TIME DELAY TO CLOSE WHEN ENERGIZED, AND IMMEDIATELY OPENS WHEN DE–ENERGIZED
TIMER CONTACT, NORMALLY CLOSED, TIME DELAY TO OPEN WHEN ENERGIZED, AND IMMEDIATELY CLOSES WHEN DE–ENERGIZED
TIMER CONTACT, NORMALLY OPEN, IMMEDIATELY CLOSES WHEN ENERGIZED, AND TIME DELAYS TO OPEN WHEN DE–ENERGIZED
TIMER CONTACT, NORMALLY CLOSED, IMMEDIATELY OPENS WHEN ENERGIZED, AND THEN TIME DELAYS TO CLOSE WHEN DE–ENERGIZED
LIQUID LEVEL SWITCH, NORMALLY OPEN, CLOSES ABOVE SWITCH LEVEL/CLOSES BELOW SWITCH LEVEL
FUSE
LED PILOT LIGHT (R=RED, B=BLUE, G=GREEN, A=AMBER), PUSH–TO–TEST TYPE
PUSHBUTTON, MOMENTARY 1 NORMALLY OPEN CONTACT
PUSHBUTTON, MOMENTARY 1 NORMALLY CLOSED CONTACT
NORMALLY OPEN CONTACT
NORMALLY CLOSED CONTACT
TRX — TIMING RELAY COIL, 'X' IS THE RELAY DESIGNATION
CRX — CONTROL RELAY COIL, 'X' IS THE RELAY DESIGNATION
SOL — SOLENOID
ETM — ELAPSED TIME METER
2–POSITION SELECTOR SWITCH
3–POSITION SELECTOR SWITCH
4–POSITION SELECTOR SWITCH
OVERLOAD RELAY
MOLDED CASE SWITCH
CIRCUIT BREAKER
MOTOR
MAINTAINED PUSH–MAINTAINED PULL OPERATOR
PLC DISCRETE OUTPUT
CR — INTERPOSING RELAY
ENET SWITCH — ETHERNET SWITCH
F.O. PATCH PANEL (1 2 3 4 5 6) — FIBER OPTIC PATCH PANEL

GENERAL CIRCUIT/CONDUIT TAG IDENTIFICATION

TAG	CONDUIT SIZE	CONDUCTORS	NOTES
C–X	3/4" (X=2 THRU 18) 1" (X=19 THRU 30) 2" (X=31 THRU 100)	X–#18, 1–#16G	STRANDED THHN WIRE
P–X	3/4" (X=2 THRU 14) 1" (X=15 THRU 24) 2" (X=25 THRU 80)	X–#16, 1–#16G	STRANDED THHN WIRE
STP–X	3/4" (X=1,2) 1" (X=3,4) 2" (X=5 THRU 16)	X–#18 SHIELDED TWISTED PAIR	STRANDED WIRE
C.F.O–X		(X) STRANDS MULTIMODE FIBER OPTIC CABLE	
C.F.O–J		(2) STRANDS MULTIMODE FIBER OPTIC JUMPER CABLE	WITH TERMINATION AS REQUIRED
ETH–X	3/4" (X=1–3)	CAT 6 SHIELDED, 4 PAIR	WITH TERMINATION AS REQUIRED
I–M(X)	3/4" (X=1–3)	CABLE AS PROVIDED OR RECOMMENDED BY EQUIPMENT MANUFACTURER. COORDINATE CONDUIT AND INSTALLATION REQUIREMENTS WITH MANUFACTURER.	

NOTES:

1. THIS IS A GENERALIZED LEGEND SHEET. THIS CONTRACT MAY NOT USE ALL INFORMATION SHOWN.
2. INFORMATION SHOWN MAY NOT BE ALL INCLUSIVE. ALSO SEE ISA S5.1, S5.3 AND S7.3.
3. INSTRUMENTS MARKED WITH ASTERISK ARE FURNISHED WITH EQUIPMENT.
4. REFER TO ISA RP7.7 FOR INSTRUMENT AIR SUPPLY QUALITY STANDARDS.
5. REFER TO "E" DRAWINGS FOR ADDITIONAL ELECTRICAL REQUIREMENTS.
6. CONTRACTOR SHALL VERIFY DIMENSIONS AND INSTALLATION CONSTRAINTS TO COMPLY WITH CODE REQUIREMENTS.

STATE OF MARYLAND — WILLIAM GREGORY KENNEDY — No. 25378 — PROFESSIONAL ENGINEER
8/16/2016

"PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 25378 , EXPIRATION DATE: 07/14/2018 ."

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Aug 16, 2016 - 4:39pm

CITY OF CUMBERLAND MARYLAND

ENGINEERING DEPARTMENT

PROJECT TITLE
PHASE I
CSO STORAGE FACILITY AT THE WASTEWATER TREATMENT PLANT

Whitman, Requardt & Associates, LLP
801 South Caroline Street, Baltimore, Maryland 21231

DRAWING TITLE
I & C
SYMBOLS, LEGENDS, & ABBREVIATIONS

GRAPHIC SCALE

FOR LIST OF DRAWINGS SEE SHEET 2. FOR GENERAL LEGEND AND ABBREVIATIONS SEE SHEET 3 AND REFER TO NOTE 23.

REVISION	No.	DATE

REFERENCE DRAWING	No.

FIELD BOOK REF.	BOOK	PAGE

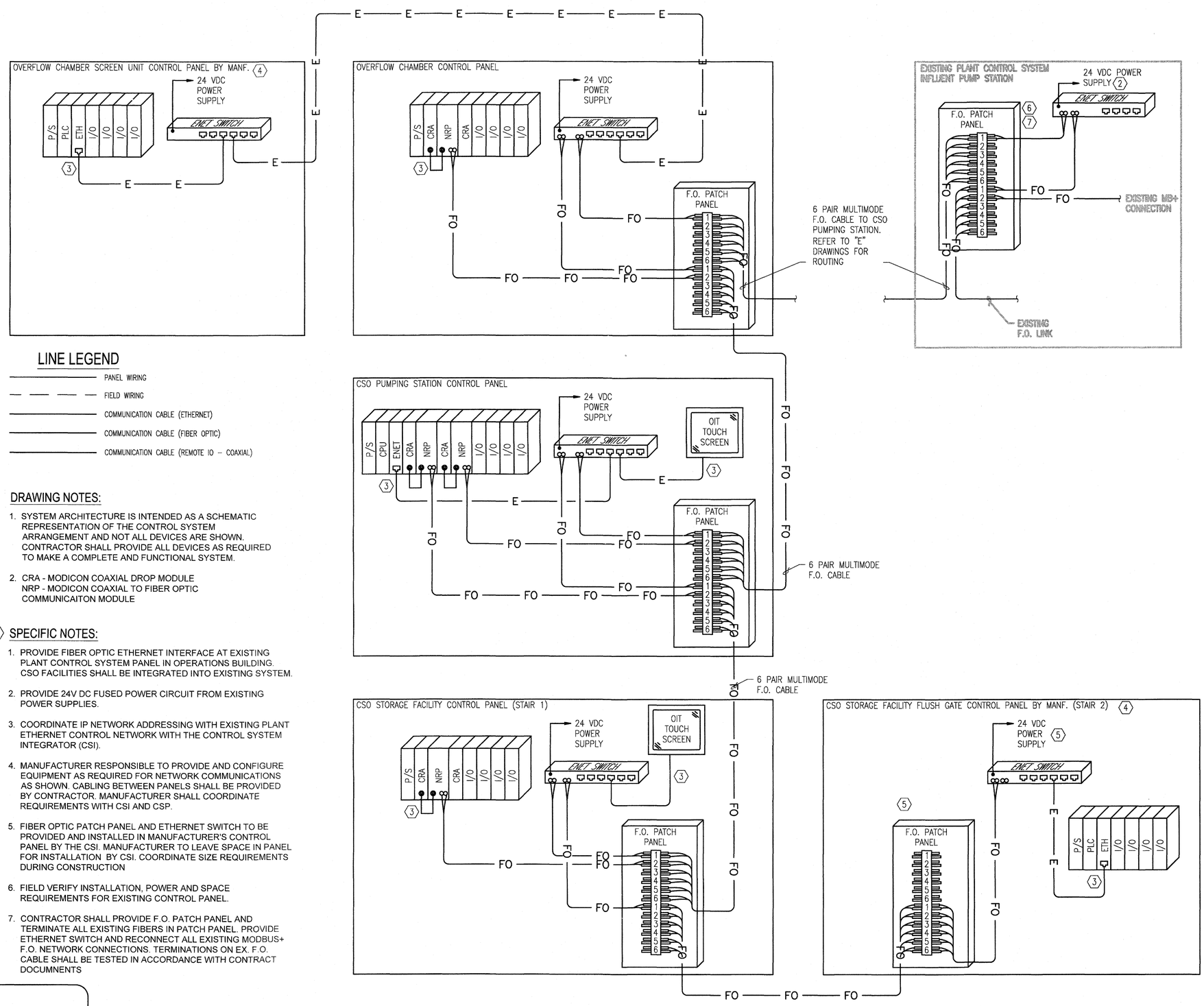
DESIGNED BY: SKB
DRAWN BY: SKB
CHECKED BY: PG
SURVEYED BY:
FIELD BOOK No.:
TRACED BY:

SCALE
HORIZONTAL:
VERTICAL:

DATE: JULY 2016
DWG.: I00.01

CITY PROJ. No. 01-10-WWTP
SHEET 114 OF 136

CITY DRAWING REFERENCE NUMBER: C2509



LINE LEGEND

- PANEL WIRING
- FIELD WIRING
- COMMUNICATION CABLE (ETHERNET)
- COMMUNICATION CABLE (FIBER OPTIC)
- COMMUNICATION CABLE (REMOTE IO – COAXIAL)

DRAWING NOTES:

1. SYSTEM ARCHITECTURE IS INTENDED AS A SCHEMATIC REPRESENTATION OF THE CONTROL SYSTEM ARRANGEMENT AND NOT ALL DEVICES ARE SHOWN. CONTRACTOR SHALL PROVIDE ALL DEVICES AS REQUIRED TO MAKE A COMPLETE AND FUNCTIONAL SYSTEM.
2. CRA - MODICON COAXIAL DROP MODULE
   NRP - MODICON COAXIAL TO FIBER OPTIC COMMUNICAITON MODULE

(X) SPECIFIC NOTES:

1. PROVIDE FIBER OPTIC ETHERNET INTERFACE AT EXISTING PLANT CONTROL SYSTEM PANEL IN OPERATIONS BUILDING. CSO FACILITIES SHALL BE INTEGRATED INTO EXISTING SYSTEM.
2. PROVIDE 24V DC FUSED POWER CIRCUIT FROM EXISTING POWER SUPPLIES.
3. COORDINATE IP NETWORK ADDRESSING WITH EXISTING PLANT ETHERNET CONTROL NETWORK WITH THE CONTROL SYSTEM INTEGRATOR (CSI).
4. MANUFACTURER RESPONSIBLE TO PROVIDE AND CONFIGURE EQUIPMENT AS REQUIRED FOR NETWORK COMMUNICATIONS AS SHOWN. CABLING BETWEEN PANELS SHALL BE PROVIDED BY CONTRACTOR. MANUFACTURER SHALL COORDINATE REQUIREMENTS WITH CSI AND CSP.
5. FIBER OPTIC PATCH PANEL AND ETHERNET SWITCH TO BE PROVIDED AND INSTALLED IN MANUFACTURER'S CONTROL PANEL BY THE CSI. MANUFACTURER TO LEAVE SPACE IN PANEL FOR INSTALLATION BY CSI. COORDINATE SIZE REQUIREMENTS DURING CONSTRUCTION
6. FIELD VERIFY INSTALLATION, POWER AND SPACE REQUIREMENTS FOR EXISTING CONTROL PANEL.
7. CONTRACTOR SHALL PROVIDE F.O. PATCH PANEL AND TERMINATE ALL EXISTING FIBERS IN PATCH PANEL. PROVIDE ETHERNET SWITCH AND RECONNECT ALL EXISTING MODBUS+ F.O. NETWORK CONNECTIONS. TERMINATIONS ON EX. F.O. CABLE SHALL BE TESTED IN ACCORDANCE WITH CONTRACT DOCUMNENTS

STATE OF MARYLAND
CRAIG WILLIAM GRAY
No. 25378
PROFESSIONAL ENGINEER
8/9/2016

"PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 25378 , EXPIRATION DATE: 07/14/2018 ."

1 / I00.02 CONTROL SYSTEM NETWORK ARCHITECTURE
NOT TO SCALE

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Aug 09, 2016 - 2:27pm

CITY OF CUMBERLAND MARYLAND

ENGINEERING DEPARTMENT

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PHASE I
CSO STORAGE FACILITY AT THE WASTEWATER TREATMENT PLANT

WRA
Whitman, Requardt & Associates, LLP
801 South Caroline Street, Baltimore, Maryland 21231

DRAWING TITLE
CONTROL SYSTEM NETWORK ARCHITECHTURE

GRAPHIC SCALE

FOR LIST OF DRAWINGS SEE SHEET 2. FOR GENERAL LEGEND AND ABBREVIATIONS SEE SHEET 3 AND REFER TO NOTE 23.

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CITY PROJ. No. 01-10-WWTP — SHEET 115 OF 136

CITY DRAWING REFERENCE NUMBER: C2509