



ADDENDUM NO. 3
for
13-0016-UT East WRF Influent Pump Station Rehabilitation
Clearwater, Florida

DATE: November 30, 2023

SUBJECT: Addendum No. 3

TO: Prospective Bidders and Others Concerned

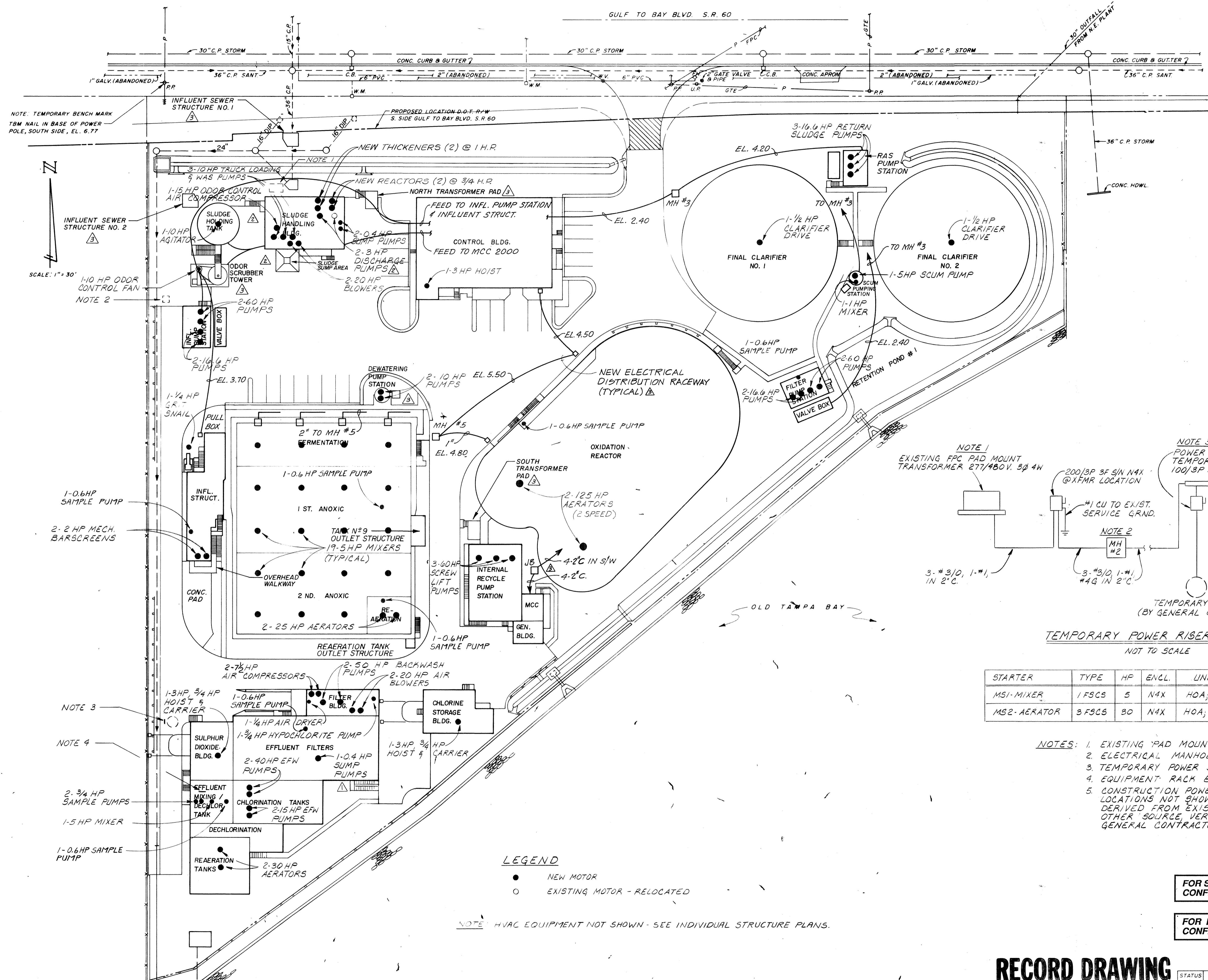
Bidders on the above project are hereby notified that the following Addenda are made to the Contract Documents:

1. Question:	Sheet E3:00: Note 5 reads to provide new disconnect switches, do we need to provide a new stand or can we re-use existing?
Answer:	Furnish and install a new aluminum support system for the entire electrical equipment.
2. Question:	Sheet E3:00: Note 13 reads to provide new 120v circuit from panel R2 in the sludge building. Do we have any information on existing infrastructure (ie duct banks or underground conduits) that provide an existing route to the Sludge building, or shall we assume installing new?
Answer:	Refer to Sheet C1.02 for known electrical line in the project area. Additional information is not available to provide. This will be a new installation.
3. Question	Sheet E3:00: Note 14 reads to provide new 8c #14awg cable to the PLC in the Main Electrical room. Do we have any information on existing infrastructure (ie duct banks or underground conduits) that provide an existing route to the Main Electrical room, or shall we assume installing new?
Answer:	Refer to Sheet C1.02 for known electrical line in the project area. Additional information is not available to provide. This will be a new installation.
4. Question	Sheet E3:00: If we are to install new conduits, is there a preferred routing path from the influent pump location to the sludge building and to the main electrical room?
Answer:	For the secondary valve enclosure panel, the new conduit will extend northwest behind the existing sludge holding tank, turn east and enter the west wall of the sludge handling building.
5. Question:	Sheet E4:00: Please confirm that new cabling is being called for from the source to the new pump disconnects etc? Per Notes 7, 8, 12, 13, 15, 24, 25 & 26.
Answer:	Correct, new cabling to be installed from the source (VFDs) to the new pump disconnect switches.

<p>6. Question:</p>	<p>Sheet E4:00: If cable replacement is being requested, we would need to know the existing routing from the influent pump station back to the source, ie MCC 1000. Are there existing drawings indicating the underground conduit routing etc so we know how much cable to approximate replacing? Are there existing underground electrical drawings to possibly provide this information.</p>
<p>Answer:</p>	<p>The existing conduit extends northwest behind the sludge holding tank, turns east and enters the west wall of the control building. The record drawing included in Appendix A shows the approximate existing underground routing.</p>
<p>7. Question:</p>	<p>Sheet C1:04: Sheet 8 of the plans (Note 1) calls for removal of the existing coatings inside the wetwell and then repair interior concrete. Can you please tell us what the existing coatings consist of as well as defining the required concrete repair (type, amount, etc)? Perhaps a sf amount or linear foot price could be added to the bid form for bidding purposes? Without a defined scope the bidders will only be guessing as to what is required here.</p>
<p>Answer:</p>	<p>The wet well was initially constructed in 1992. The existing coating and the interior concrete condition of the wet well is unknown. The removal, repair and repaint job applies to all the interior surfaces including the bottom floor of the wet well. Refer to Section 03350 Multi-Layered Wet Well Lining System and Section 03740 Modification and Repair to Concrete for the scope of work to be performed. An updated bid form will not be provided. Based on the information provided, bidders should use their judgement to best estimate the cost of the task.</p>
<p>8. Question:</p>	<p>Section 13300: We would like to request either a drawing or a picture of the inside of the panel that shows the current configuration of the PLC panel and associated components? We need to determine whether additional I/O's are required and if the existing CompactLogix PLC can support any needed addition to the current I/O's. We can only do this if we have information on the existing PLC panel configuration.</p>
<p>Answer:</p>	<p>Pictures of the existing pump PLC panel are included in Appendix B. Also included are the existing PLC panel's record documents.</p> <p>Ardurra would like to note that the existing PLC is SLC 5/05, not CompactLogix. The new I&C components should be compatible with the existing system. Therefore, in the bid documents, Replace All "CompactLogix PLC" with "SLC 5/05 PLC" for the existing system.</p>
<p>9. Question:</p>	<p>Section 13300: There are three references to Section 13300 (see below) that are important to understanding the scope for the I&C portion of the specs. There is no Section 13300 in the specifications provided. Can you please provide this section of the solicitation?</p>

	<p>a. Page 559 – All SCADA PLC controller programming and SCADA Operator Interface Terminal 12 (OIT) or Operator Workstation Station (OWS) graphics and programming shall be 13 performed as defined in Section 13300.</p> <p>b. Refer to Section 13300 “I & C - General Provisions.”</p> <p>c. Page 574 – General requirements for spare parts are specified in Section 13300.</p>
Answer:	Section 13300 Instrumentations and Controls – General Provisions is included in Appendix C . The I&C portion of the project scope is also included in Section 13300.
10. Question:	I am currently working on the electrical portion of the above referenced project bid and would like to gain access to the site tomorrow, 11/28, to research existing gear manufacturer and work area conditions. Please let me know what I need to do for that to happen.
Answer:	A public site visit can be accommodated if requested early in the bidding process. Since the bid opening is next week December 6 th , the City cannot arrange one on such a short notice.
11. Question:	Section 13567: I have no way of limiting the velocity in temporary force main to less than 5 ft/s. And if I did, through an 18” ID pipe, water would need to move in excess of 6.3 ft/s to achieve the 5,400 gpm peak flow required.
Answer:	According to Section 13567 1.01 E, the bypass pumping system should be designed for an average pumping rate of 1,500 gpm, a low flow pumping rate of 700 gpm and a peak hourly pumping rate of 5,400 gpm. During the peak flow, it is acknowledged and acceptable that the velocity will exceed 5 ft/s in the 18” ID pipe. Therefore, the following changes will be made to Section 13567 1.01 paragraph E: Delete the sentence that reads “Velocity in the temporary force main(s) shall not exceed 5 feet per second.”
12. Question:	Section 13567: I assume a level transducer operating an electric governed engine will suffice as a VFD, this transducer will speed up and down the engine as needed.
Answer:	This is correct provided that the transducer can operate within the designed pump range.
13. Question:	Section 13567: I cannot run both a transducer and float on a single pump. I will need to run a transducer on the primary pump and a float on the backup pump.
Answer:	Correct. The setup should run a transducer on the primary pump and a float on the backup pump.

Appendix A – Conduit Routing Record Drawing

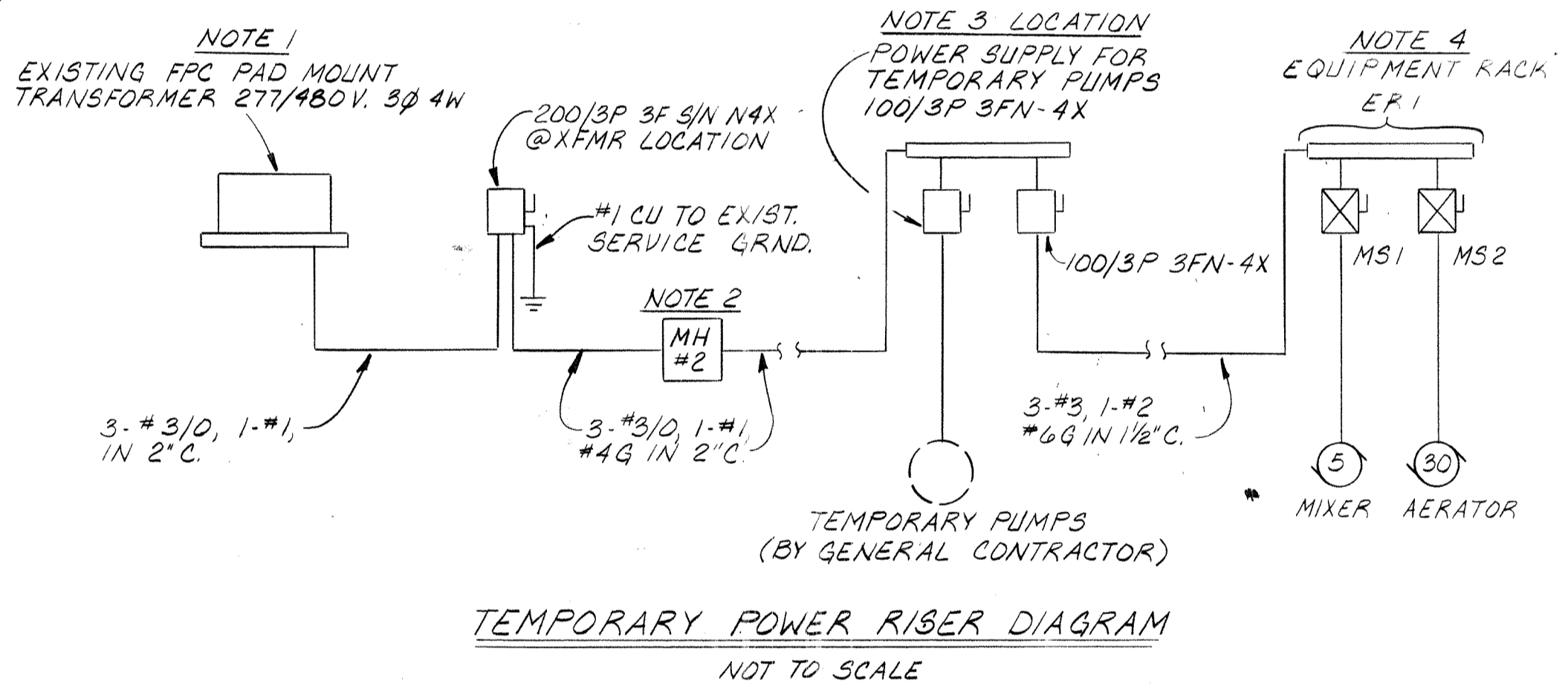


THIS RECORD DRAWING IS BASED IN PART ON INFORMATION FURNISHED BY OTHERS.

NOT PRINTED FROM ORIGINAL TRACING

THIS PRINT WAS MADE FROM A DUPLICATE REPRODUCIBLE OF AN ORIGINAL DRAWING PREPARED BY BRILEY, WILD AND ASSOCIATES, INC.

BRILEY, WILD AND ASSOCIATES, INC. HEREBY DISCLAIMS ANY RESPONSIBILITY OR LIABILITY FOR INFORMATION CONTAINED ON THIS PRINT DUE TO REVISIONS, CHANGES, MISREPRESENTATIONS, OR USE BY OTHERS.



STARTER	TYPE	HP	ENCL.	UNIT MOUNTED DEVICES
MS1-MIXER	1 FSCS	5	N4X	HOA, PR, FFT, X4
MS2-AERATOR	3 FSCS	30	N4X	HOA, PR, FFT, X4

- NOTES:
- EXISTING PAD MOUNT TRANSFORMER
 - ELECTRICAL MANHOLE #2
 - TEMPORARY POWER SUPPLY & FEED TO ER1
 - EQUIPMENT RACK ER1
 - CONSTRUCTION POWER SUPPLIES AND LOCATIONS NOT SHOWN. THOSE MAY BE DERIVED FROM EXISTING TRANSFORMER OR OTHER SOURCE. VERIFY REQUIREMENTS WITH GENERAL CONTRACTOR

LEGEND

- NEW MOTOR
- EXISTING MOTOR - RELOCATED

NOTE: HVAC EQUIPMENT NOT SHOWN - SEE INDIVIDUAL STRUCTURE PLANS.

FOR SHEET PILING SEAWALL CONFIGURATION SEE SHT. 6

FOR RETENTION POND NO. 1 CONFIGURATION SEE SHT. 6

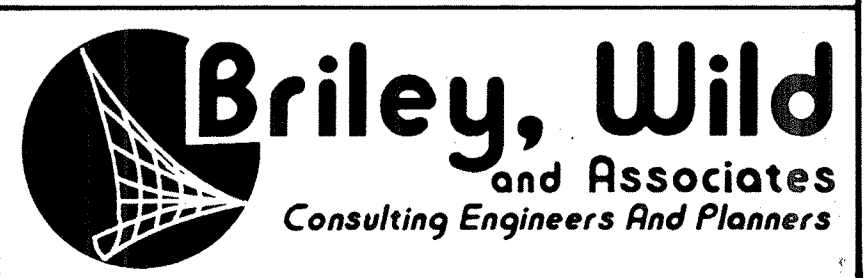
RECORD DRAWING

REV. NO.	DATE	REVISION DESCRIPTION	BY
1-31-94		INCORPORATED E.O. 009, 011 INTO SET AS RECORD DRAWING	WLS
2-28-90		REVISED SLUDGE HANDLING BLDG., ASPHALT PAVING & SLUDGE PUMP AREA AS PER E.O. 009	GIS
6-15-89		REVISED PER D.C.N. 006	KEM

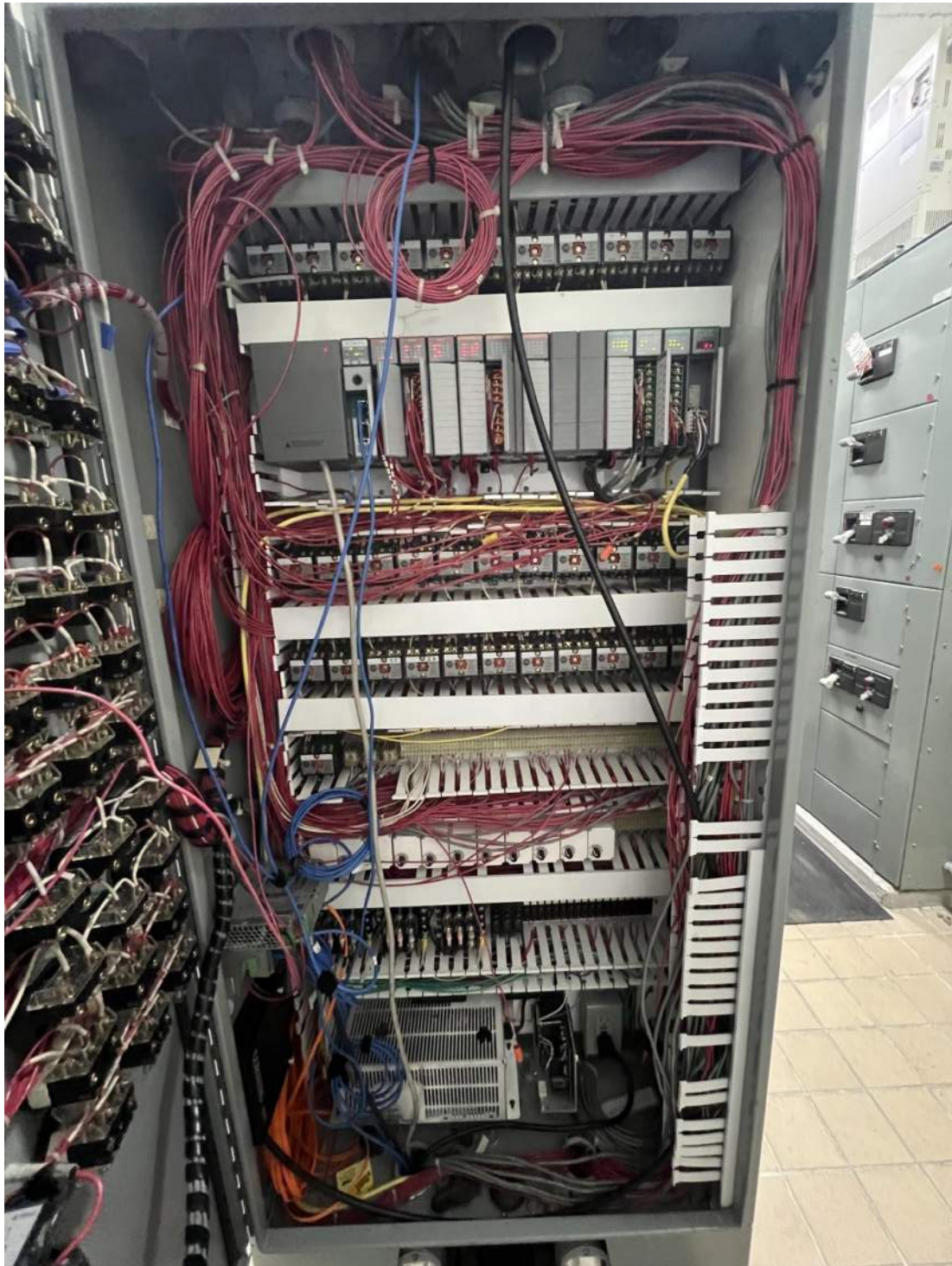
ENGINEER	
ACCEPTED	
COPYRIGHT © 1988 ALL RIGHTS RESERVED	
Briley, Wild and Associates, Inc.	

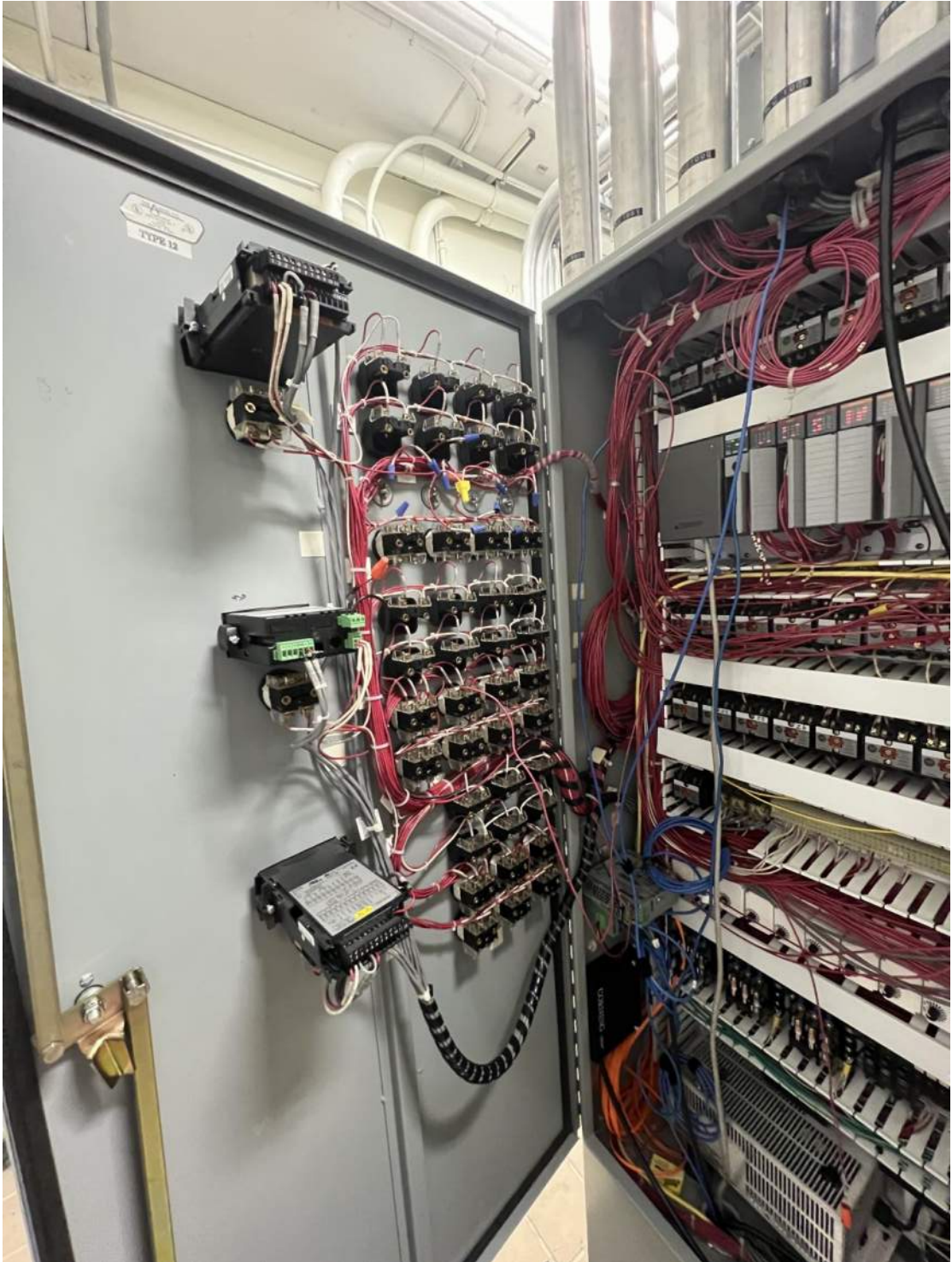
EAST ADVANCED POLLUTION CONTROL FACILITY
 SITE MOTOR LOCATION PLAN
 CLEARWATER, FLORIDA

DESIGNED	PME	PROJ. NO. 87072-2	STATUS	RD	ACTION DATE	1-31-92
DRAWN	GAB	DATE: OCT. 1988	SHEET NO. 175 OF 202			
CHECKED	PME	SCALE: 1" = 30'	FILE NO. 13321			



Appendix B – Existing PLC Pictures and Record Documents







**CITY OF CLEARWATER
EAST ADV. POLLUTION CONTROL FACILITY
MOTOR CONTROL UPGRADES**

**ELECTRICAL DRAWINGS BY:
SCANDIA TECHNOLOGIES**

DWG. NUMBER	DESCRIPTION
39253-000	STANDARD SYMBOLS & ABBREVIATIONS
39253-001	TABLE OF CONTENTS
39253-002	PS-CP PANEL LAYOUT
39253-003	PS-CP ENGRAVING LAYOUT
39253-004	PS-CP CONTROL WIRING A
39253-005	PS-CP CONTROL WIRING B
39253-006	PS-CP CONTROL WIRING C
39253-007	PS-CP CONTROL WIRING D
39253-008	PS-CP CONTROL WIRING E
39253-009	PS-CP CONTROL WIRING F
39253-010	LOOP DIAGRAM A
39253-011	LOOP DIAGRAM B
39253-012	LOOP DIAGRAM C
39253-013	LOOP DIAGRAM D
39253-014	LOOP DIAGRAM E
39253-015	LOOP DIAGRAM F
39253-016	POWER WIRING A
39253-017	POWER WIRING B
39253-018	POWER WIRING C
39253-019	NOT USED
39253-020	PS-CP CUST. CONNECTION TB3

DWG. NUMBER	DESCRIPTION
39253-021	PS-CP LOOP DIAGRAM E
39253-022	PC-CP LOOP DIAGRAM F
39253-023	PS-CP LOOP DIAGRAM G
39253-024	LEVEL TRANSMITTER PANEL LAYOUT
39253-025	NOT USED
39253-026	SURGE SUPPRESSION DETAILS
39253-027	DEVICENET WIRING DETAILS

THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THIS DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.



THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

TOLERANCES UNLESS OTHERWISE SPECIFIED
 0.0 = +/- .03 FINCTION = +/- 1/32"
 0.00 = +/- .010" ANGLE = +/- 0.5'
 0.000 = +/- .005"

REMOVE ALL BURRS AND SHARP EDGES

CONCENTRICITY: .005" T.I.R.

PERPENDICULARITY: .003 IN./IN.

PARALLELISM: .003 IN./IN.

MINIMUM MACHINED SURFACE FINISH: 12.5



communications

Scandia Technologies Division
 12340 88th Street North
 Largo, FL 33775

TITLE: **TABLE OF CONTENTS
XXX**

CUSTOMER: **CITY OF CLEARWATER**

DRAWING No: **39253-001**

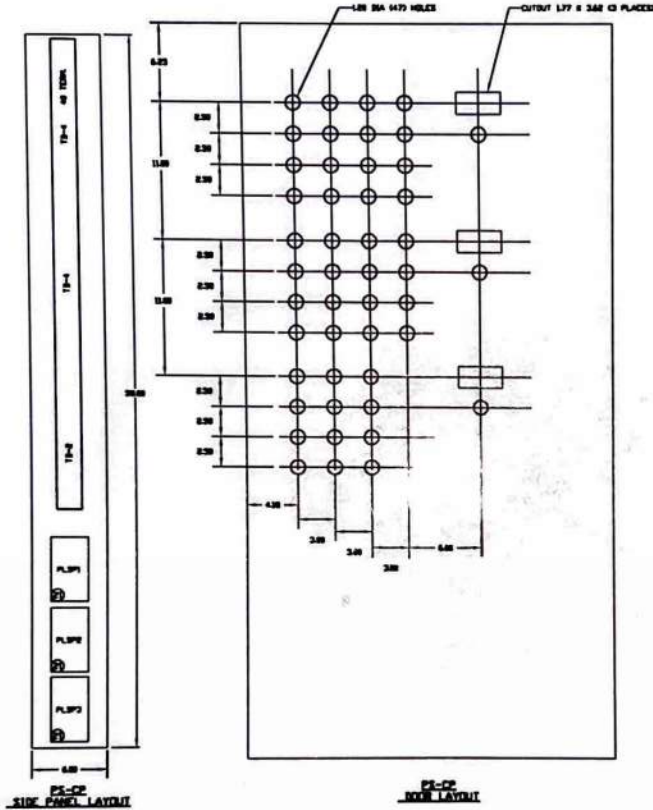
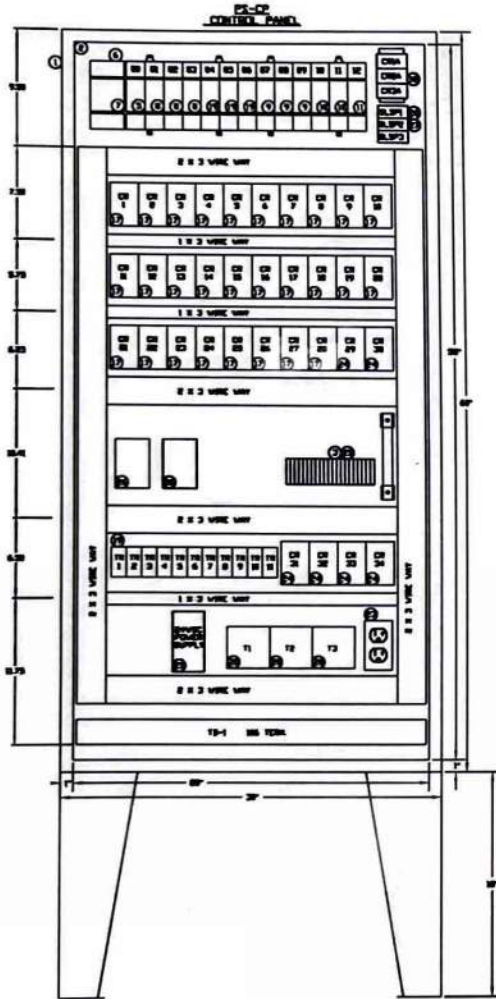
REV. **B**

REV.	DATE	BY	REVISION DESCRIPTION
B	2/17/03	CM	AS-BUILT
A	10/31/02	AA	REVISED-SUBMITTAL
0	7/27/02	DH	SUBMITTAL

CAD FORMAT: AUTOCAD 2000

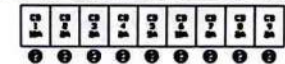
SCALE: XXXX

SHEET XXX OF XXX



ITEM		QTY	REV. No.	CAT. No.	DESCRIPTION
1	1				WATER IN E. 30 INCH PANEL
2	1				WATER IN E. 30 INCH PANEL
3	10				WATER IN E. 30 INCH PANEL
4	3				WATER IN E. 30 INCH PANEL
5	1				WATER IN E. 30 INCH PANEL
6	1				WATER IN E. 30 INCH PANEL
7	1				WATER IN E. 30 INCH PANEL
8	3				WATER IN E. 30 INCH PANEL
9	3				WATER IN E. 30 INCH PANEL
10	3				WATER IN E. 30 INCH PANEL
11	3				WATER IN E. 30 INCH PANEL
12	3				WATER IN E. 30 INCH PANEL
13	3				WATER IN E. 30 INCH PANEL
14	3				WATER IN E. 30 INCH PANEL
15	3				WATER IN E. 30 INCH PANEL
16	3				WATER IN E. 30 INCH PANEL
17	3				WATER IN E. 30 INCH PANEL
18	3				WATER IN E. 30 INCH PANEL
19	3				WATER IN E. 30 INCH PANEL
20	3				WATER IN E. 30 INCH PANEL
21	3				WATER IN E. 30 INCH PANEL
22	3				WATER IN E. 30 INCH PANEL
23	3				WATER IN E. 30 INCH PANEL
24	3				WATER IN E. 30 INCH PANEL
25	3				WATER IN E. 30 INCH PANEL
26	3				WATER IN E. 30 INCH PANEL
27	3				WATER IN E. 30 INCH PANEL
28	3				WATER IN E. 30 INCH PANEL
29	3				WATER IN E. 30 INCH PANEL
30	3				WATER IN E. 30 INCH PANEL
31	3				WATER IN E. 30 INCH PANEL
32	3				WATER IN E. 30 INCH PANEL
33	3				WATER IN E. 30 INCH PANEL
34	3				WATER IN E. 30 INCH PANEL
35	3				WATER IN E. 30 INCH PANEL
36	3				WATER IN E. 30 INCH PANEL
37	3				WATER IN E. 30 INCH PANEL
38	3				WATER IN E. 30 INCH PANEL
39	3				WATER IN E. 30 INCH PANEL
40	3				WATER IN E. 30 INCH PANEL
41	3				WATER IN E. 30 INCH PANEL
42	3				WATER IN E. 30 INCH PANEL
43	3				WATER IN E. 30 INCH PANEL
44	3				WATER IN E. 30 INCH PANEL
45	3				WATER IN E. 30 INCH PANEL
46	3				WATER IN E. 30 INCH PANEL
47	3				WATER IN E. 30 INCH PANEL
48	3				WATER IN E. 30 INCH PANEL
49	3				WATER IN E. 30 INCH PANEL
50	3				WATER IN E. 30 INCH PANEL
51	3				WATER IN E. 30 INCH PANEL
52	3				WATER IN E. 30 INCH PANEL
53	3				WATER IN E. 30 INCH PANEL
54	3				WATER IN E. 30 INCH PANEL
55	3				WATER IN E. 30 INCH PANEL
56	3				WATER IN E. 30 INCH PANEL
57	3				WATER IN E. 30 INCH PANEL
58	3				WATER IN E. 30 INCH PANEL
59	3				WATER IN E. 30 INCH PANEL
60	3				WATER IN E. 30 INCH PANEL
61	3				WATER IN E. 30 INCH PANEL
62	3				WATER IN E. 30 INCH PANEL
63	3				WATER IN E. 30 INCH PANEL
64	3				WATER IN E. 30 INCH PANEL
65	3				WATER IN E. 30 INCH PANEL
66	3				WATER IN E. 30 INCH PANEL
67	3				WATER IN E. 30 INCH PANEL
68	3				WATER IN E. 30 INCH PANEL
69	3				WATER IN E. 30 INCH PANEL
70	3				WATER IN E. 30 INCH PANEL
71	3				WATER IN E. 30 INCH PANEL
72	3				WATER IN E. 30 INCH PANEL
73	3				WATER IN E. 30 INCH PANEL
74	3				WATER IN E. 30 INCH PANEL
75	3				WATER IN E. 30 INCH PANEL
76	3				WATER IN E. 30 INCH PANEL
77	3				WATER IN E. 30 INCH PANEL
78	3				WATER IN E. 30 INCH PANEL
79	3				WATER IN E. 30 INCH PANEL
80	3				WATER IN E. 30 INCH PANEL
81	3				WATER IN E. 30 INCH PANEL
82	3				WATER IN E. 30 INCH PANEL
83	3				WATER IN E. 30 INCH PANEL
84	3				WATER IN E. 30 INCH PANEL
85	3				WATER IN E. 30 INCH PANEL
86	3				WATER IN E. 30 INCH PANEL
87	3				WATER IN E. 30 INCH PANEL
88	3				WATER IN E. 30 INCH PANEL
89	3				WATER IN E. 30 INCH PANEL
90	3				WATER IN E. 30 INCH PANEL
91	3				WATER IN E. 30 INCH PANEL
92	3				WATER IN E. 30 INCH PANEL
93	3				WATER IN E. 30 INCH PANEL
94	3				WATER IN E. 30 INCH PANEL
95	3				WATER IN E. 30 INCH PANEL
96	3				WATER IN E. 30 INCH PANEL
97	3				WATER IN E. 30 INCH PANEL
98	3				WATER IN E. 30 INCH PANEL
99	3				WATER IN E. 30 INCH PANEL
100	3				WATER IN E. 30 INCH PANEL

100% AC CONTROL POWER CIRCUIT BREAKER NUMBERING CHART



REV.	DATE	BY	REVISION DESCRIPTION
A	2/17/03	CM	AS-BUILT
0	7/27/02	DM	SUBMITAL

BY	NAME	DATE	USED ON ASSY:	REV.
DESIGNED	D.HAZELBAKER	7/27/02		
DETAILED	D.HAZELBAKER	7/27/02		
CHECKED				
APPROVED				

DO NOT SCALE DRAWING

TOLERANCES UNLESS OTHERWISE SPECIFIED

0.0 = +/- .03 FRACTION = +/- 1/32"
 0.00 = +/- .010" ANGLE = +/- 0.5°
 0.000 = +/- .005"

REMOVE ALL BURRS AND SHARP EDGES

CONCENTRICITY: .005" T.I.R.
 PERPENDICULARITY: .003 IN./IN.
 PARALLELISM: .003 IN./IN.
 MINIMUM MACHINED SURFACE FINISH: 12.5

communications

Scandia Technologies Division
 12340 66th Street North
 Largo, FL 33773

CAD FORMAT: AUTOCAD 2000

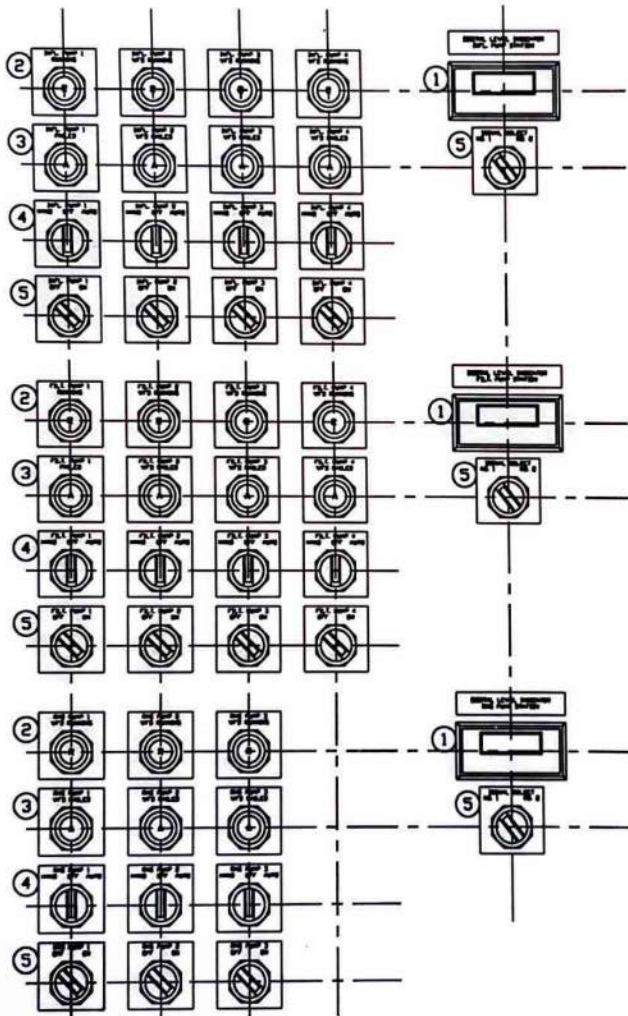
TITLE: PS-CP PANEL-LAYOUT

CUSTOMER: CITY-OF-CLEARWATER

DRAWING No: 39253-002

SCALE: XXXX SHEET XX OF XX

REV. A



MATERIAL LIST			
ITEM	QTY	DESC.	REF.
1	3	PLATE	1
2	12	SCREW	2
3	12	SCREW	3
4	12	SCREW	4
5	12	SCREW	5

REV.	DATE	BY	REVISION DESCRIPTION
A	2/17/03	CM	AS-BUILT
D	7/27/02	DH	SUBMITTAL

BY	NAME	DATE	USED ON ASSY:	REV.
DESIGNED	D.HAZELBAKER	7/27/02		
DETAILED	D.HAZELBAKER	7/27/02		
CHECKED				
APPROVED				

THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THE DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING
 TOLERANCES UNLESS OTHERWISE SPECIFIED
 0.0 = +/- .03 FRACTION = +/- 1/32"
 0.00 = +/- .010" ANGLE = +/- 0.5"
 0.000 = +/- .005"

REMOVE ALL BURRS AND SHARP EDGES
 CONCENTRICITY: .005" T.J.R.
 PERPENDICULARITY: .003 IN./IN.
 PARALLELISM: .003 IN./IN.
 MINIMUM MACHINED SURFACE FINISH: 125

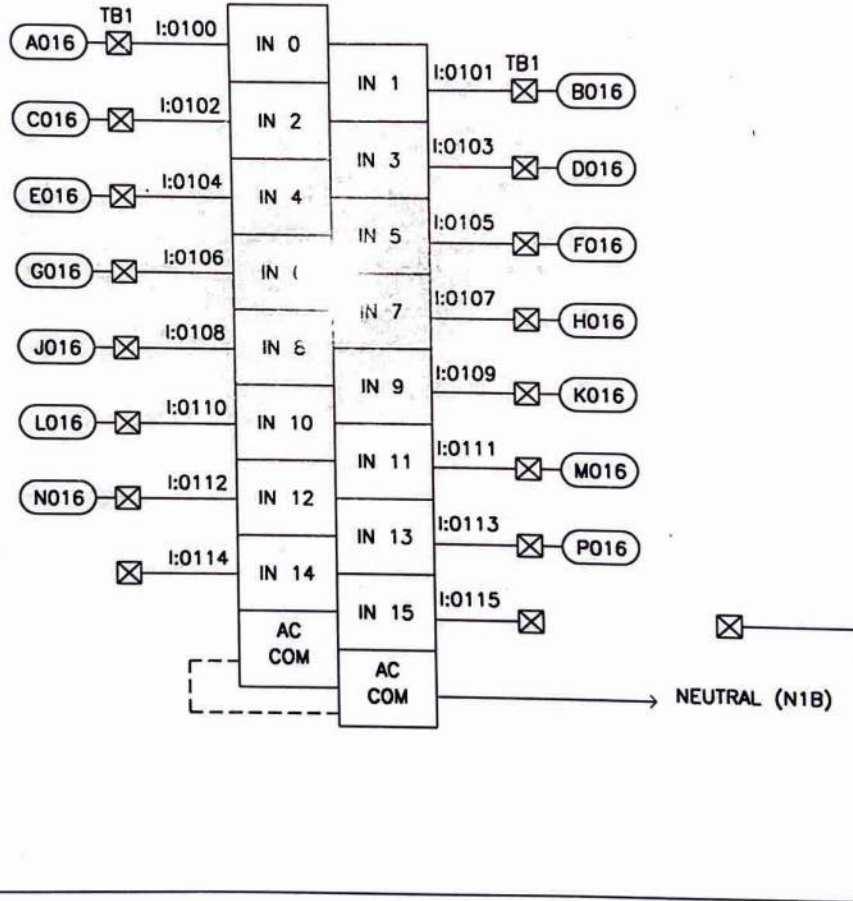
Scandia Technologic
 12340 66th Street North
 Largo, FL 33773

CAD FORMAT: AUTOCAD

TITLE:	PS-CP ENGRAVING-LAYOUT	
CUSTOMER:	CITY-OF-CLEARWATER	
DRAWING No:	39253-003	REV. A
SCALE: XXXX	SHEET XX OF XX	

RACK #1, SLOT #01
1746-IA16

- 1 INFL. PUMP 1
AUTO SELECTED
- 2 INFL. PUMP 1
FAILED
- 3 INFL. PUMP 2
VFD RUNNING
- 4 INFL. PUMP 2
MOISTURE ALARM
- 5 INFL. PUMP 3
AUTO SELECTED
- 6 INFL. PUMP 3
VFD FAILED
- 7 INFL. PUMP 4
VFD RUNNING
- 8 SPARE



- INFL. PUMP 1
RUNNING 9
- INFL. PUMP 2
AUTO SELECTED 10
- INFL. PUMP 2
VFD FAILED 11
- INFL. PUMP 2
THERMAL ALARM 12
- INFL. PUMP 3
VFD RUNNING 13
- INFL. PUMP 4
AUTO SELECTED 14
- INFL. PUMP 4
VFD FAILED 15
- SPARE 16

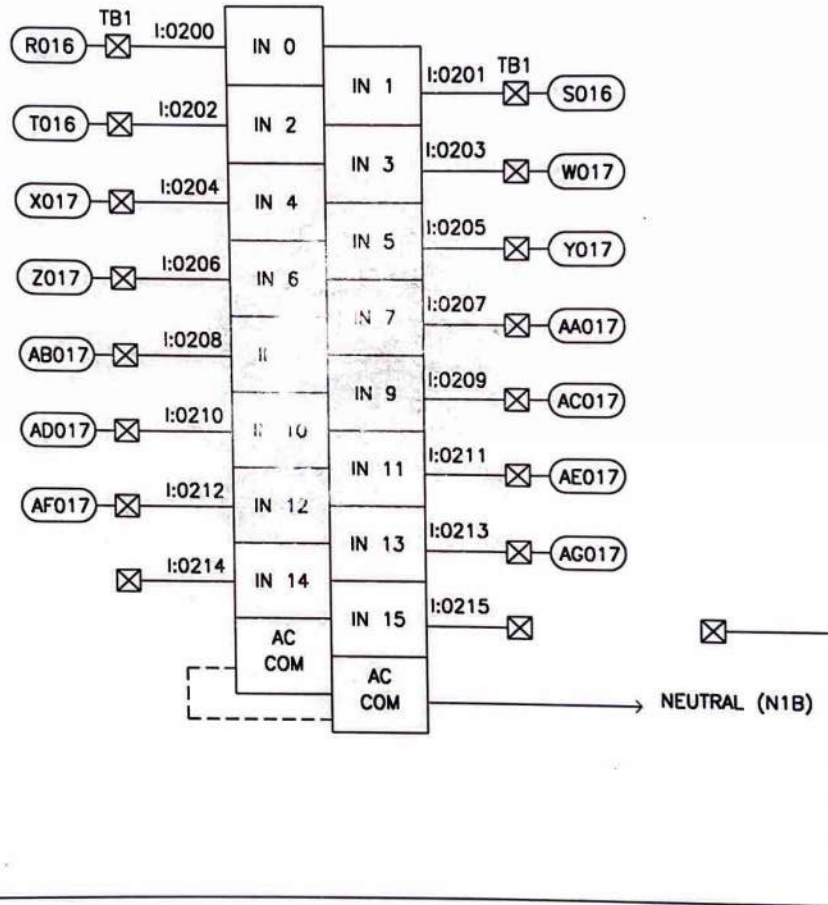
☒ TB1 FIELD TERMINAL (TERMINAL NUMBERS ARE SAME AS WIRE NUMBERS UNLESS NOTED OTHERWISE)
----- FIELD WIRING

H6 ← 120VAC

				THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THE DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.				DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED 0.0 = +/- .03 FRACTION = +/- 1/32" 0.00 = +/- .010" ANGLE = +/- 0.5° 0.000 = +/- .005"				 communications Scandia Technologies Division 12340 66th Street North Largo, FL 33773				TITLE: PS-CP CONTROL-WIRING-A			
				THIRD ANGLE PROJECTION												CUSTOMER: CITY-OF-CLEARWATER			
				REMOVE ALL BURRS AND SHARP EDGES								DRAWING No: 30253-004							
				CONCENTRICITY: .005" T.I.R. PERPENDICULARITY: .003 IN./IN. PARALLELISM: .003 IN./IN. MINIMUM MACHINED SURFACE FINISH: 125								REV. A SCALE: XXXX SHEET XX OF XX							
				BY: DESIGNED: D.HAZELBAKER DATE: 7/27/02 CHECKED: D.HAZELBAKER DATE: 7/27/02 APPROVED:								CAD FORMAT: AUTOCAD 2000							
REV. DATE BY REVISION DESCRIPTION																			

RACK #1, SLOT #02
1746-IA16

- 1 FILT. PUMP 1
AUTO SELECTED
- 2 FILT. PUMP 1
FAILED
- 3 FILT. PUMP 2
VFD RUNNING
- 4 FILT. PUMP 2
MOISTURE ALARM
- 5 FILT. PUMP 3
AUTO SELECTED
- 6 FILT. PUMP 3
VFD FAILED
- 7 FILT. PUMP 4
VFD RUNNING
- 8 SPARE



- 9 FILT. PUMP 1
RUNNING
- 10 FILT. PUMP 2
AUTO SELECTED
- 11 FILT. PUMP 2
VFD FAILED
- 12 FILT. PUMP 2
THERMAL ALARM
- 13 FILT. PUMP 3
VFD RUNNING
- 14 FILT. PUMP 4
AUTO SELECTED
- 15 FILT. PUMP 4
VFD FAILED
- 16 SPARE

☒ TB1 FIELD TERMINAL (TERMINAL NUMBERS ARE SAME AS WIRE NUMBERS UNLESS NOTED OTHERWISE)
----- FIELD WIRING

REV.	DATE	BY	REVISION DESCRIPTION
A	2/17/03	CM	AS-BUILT
0	7/27/02	DH	SUBMITTAL

THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THE DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.

BY	NAME	DATE	USED ON ASSY:	REV.
DESIGNED	D.HAZELBAKER	7/27/02		
DETAILED	D.HAZELBAKER	7/27/02		
CHECKED				
APPROVED				

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

TOLERANCES UNLESS OTHERWISE SPECIFIED

0.0 = +/- .03 FRACTION = +/- 1/32"
0.00 = +/- .010" ANGLE = +/- 0.5"
0.000 = +/- .005"

REMOVE ALL BURRS AND SHARP EDGES

CONCENTRICITY: .005" T.I.R.

PERPENDICULARITY: .003 IN./IN.

PARALLELISM: .003 IN./IN.

MINIMUM MACHINED SURFACE FINISH: 12.5

communications
Scandia Technologies Division
12340 66th Street North
Largo, FL 33773
CAD FORMAT: AUTOCAD 2000

FILE: PS-CP
CONTROL-WIRING-B

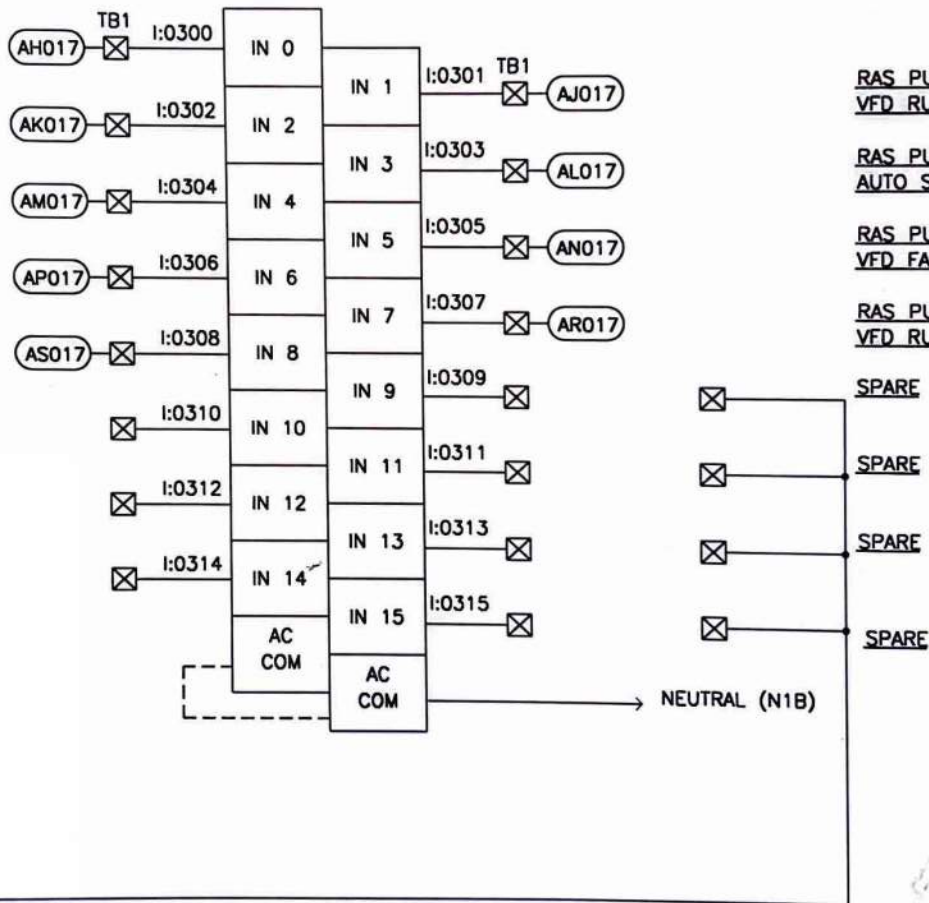
CUSTOMER: CITY-OF-CLEARWATER

DRAWING No: 39253-005 REV. A

SCALE: XXXX SHEET XX OF XX

RACK #1, SLOT #03
1746-IA16

- 1 RAS PUMP 1
AUTO SELECTED
- 2 RAS PUMP 1
VFD FAILED
- 3 RAS PUMP 2
VFD RUNNING
- 4 RAS PUMP 3
AUTO SELECTED
- 5 RAS PUMP 3
VFD FAILED
- 6 SPARE
- 7 SPARE
- 8 SPARE



- 9 RAS PUMP 1
VFD RUNNING
- 10 RAS PUMP 2
AUTO SELECTED
- 11 RAS PUMP 2
VFD FAILED
- 12 RAS PUMP 3
VFD RUNNING
- 13 SPARE
- 14 SPARE
- 15 SPARE
- 16 SPARE

☒ TB1 FIELD TERMINAL (TERMINAL NUMBERS ARE SAME AS WIRE NUMBERS UNLESS NOTED OTHERWISE)

----- FIELD WIRING

H8 ← 120VAC

THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THE DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.



DO NOT SCALE DRAWING

TOLERANCES UNLESS OTHERWISE SPECIFIED
0.0 = +/- .03 FRACTION = +/- 1/32"
0.00 = +/- .010" ANGLE = +/- 0.5°
0.000 = +/- .005"



communications

Scandia Technologies Division
12340 66th Street North
Largo, FL 33773

CAD FORMAT: AUTOCAD 2000

PS-CP
CONTROL-WIRING-C

CITY-OF-CLEARWATER

DRAWING No: 39253-006

REV. A

REV.	DATE	BY	REVISION DESCRIPTION
A	2/17/03	CM	AS-BUILT
O	7/27/02	DH	SUBMITTAL

BY	NAME	DATE	USED ON ASSY:	REV.
DESIGNED	D.HAZELBAKER	7/27/02		
DETAILED	D.HAZELBAKER	7/27/02		
CHECKED				
APPROVED				

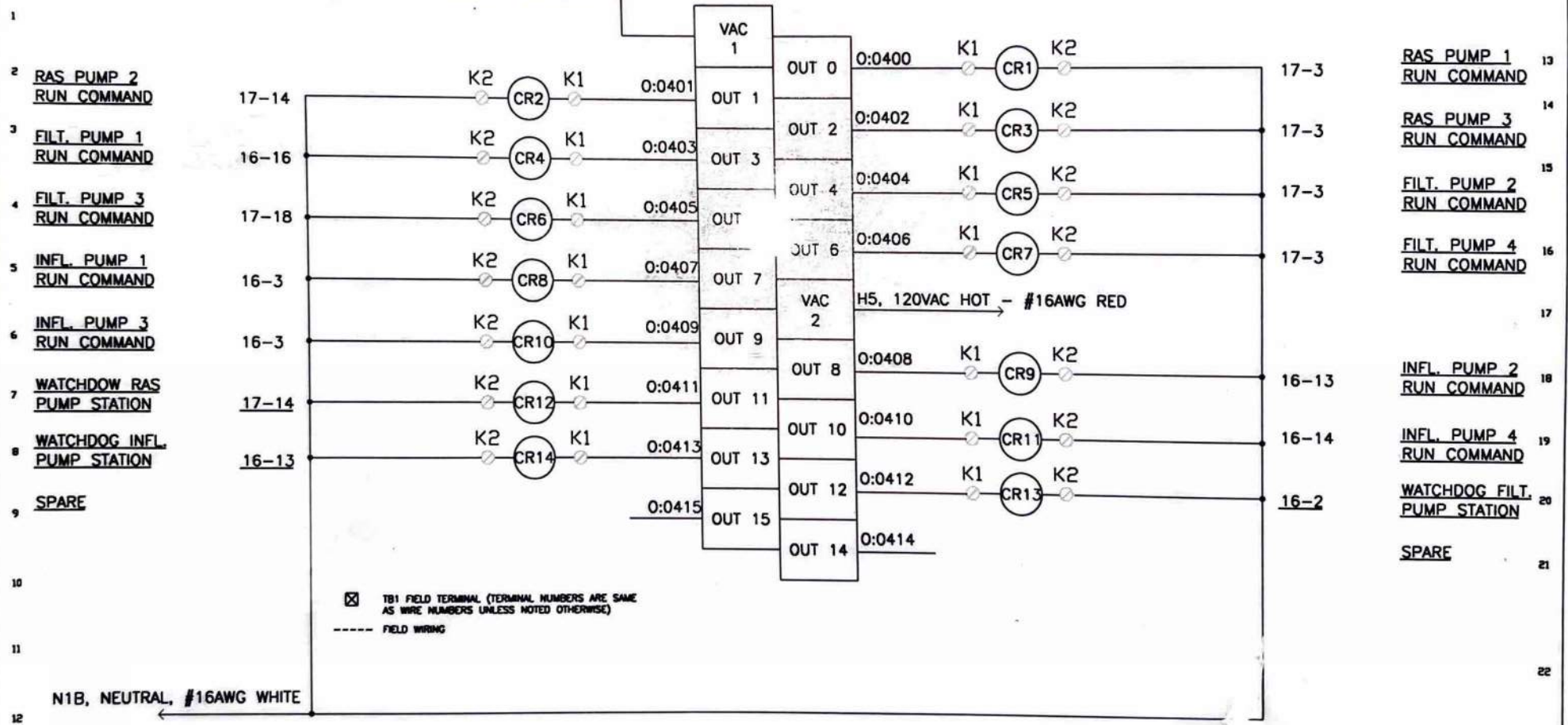
REMOVE ALL BURRS AND SHARP EDGES
CONCENTRICITY: .005" T.I.R.
PERPENDICULARITY: .003 IN./IN.
PARALLELISM: .003 IN./IN.
MINIMUM MACHINED SURFACE FINISH: 125

SCALE: XXXX

SHEET XX OF XX

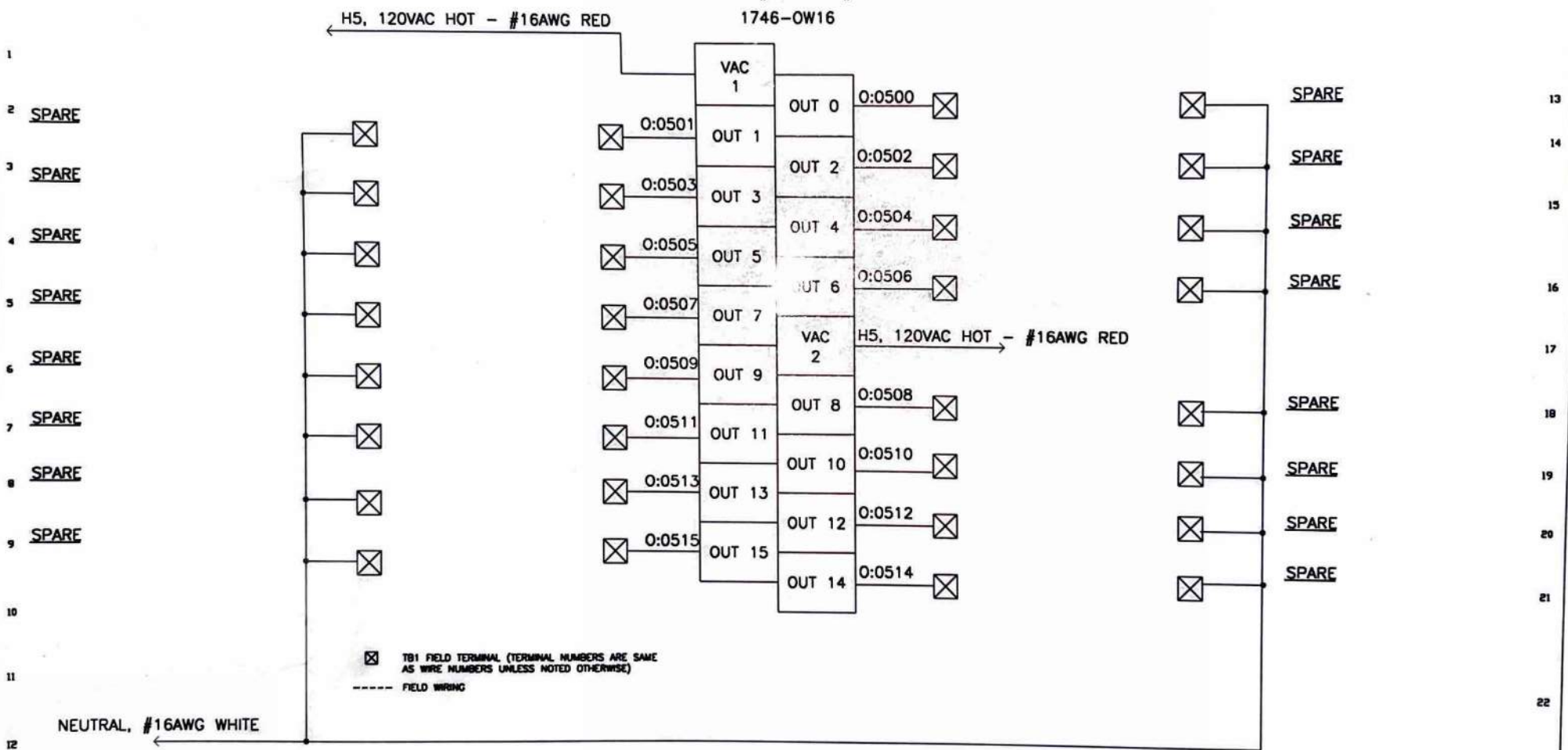
RACK #1, SLOT #04
1746-OW16

H5, 120VAC HOT - #16AWG RED



THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THIS DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.				DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED 0.0 = +/- .03 FRACTION = +/- 1/32" 0.00 = +/- .010" ANGLE = +/- 0.5° 0.000 = +/- .005"		Scandia Technologies 12340 86th Street NW Largo, FL 33777		TITLE: PS-CP CONTROL-WIRING-D	
BY NAME DATE USED ON ASSY: REV. REMOVE ALL BURRS AND SHARP EDGES				CONCENTRICITY: .005" T.I.R. PERPENDICULARITY: .003 IN./IN. PARALLELISM: .003 IN./IN. MINIMUM MACHINED SURFACE FINISH: 12.5		CUSTOMER: CITY-OF-CLEARWATER		DRAWING No: 39253-007	
DESIGNED D.HAZELBAKER 7/27/02 DETAILED D.HAZELBAKER 7/27/02 CHECKED APPROVED				CAD FORMAT: AUTO...		SCALE: XXXX		REV. B SHEET XX OF XX	
REVISION DESCRIPTION B 2/17/03 CM AS-BUILT A 10/25/02 AA SUBMITTAL-CORRECTIONS D 7/27/02 DH SUBMITTAL									

RACK #1, SLOT #05
1746-OW16



☒ TB1 FIELD TERMINAL (TERMINAL NUMBERS ARE SAME AS WIRE NUMBERS UNLESS NOTED OTHERWISE)
----- FIELD WIRING

NEUTRAL, #16AWG WHITE

REV.	DATE	BY	REVISION DESCRIPTION
B	2/17/03	CM	AS-BUILT
A	10/25/02	AA	SUBMITTAL-CORRECTIONS
O	7/27/02	DH	SUBMITTAL

BY	NAME	DATE	USED ON ASSY:	REV.
DESIGNED	D.HAZELBAKER	7/27/02		
DETAILED	D.HAZELBAKER	7/27/02		
CHECKED				
APPROVED				

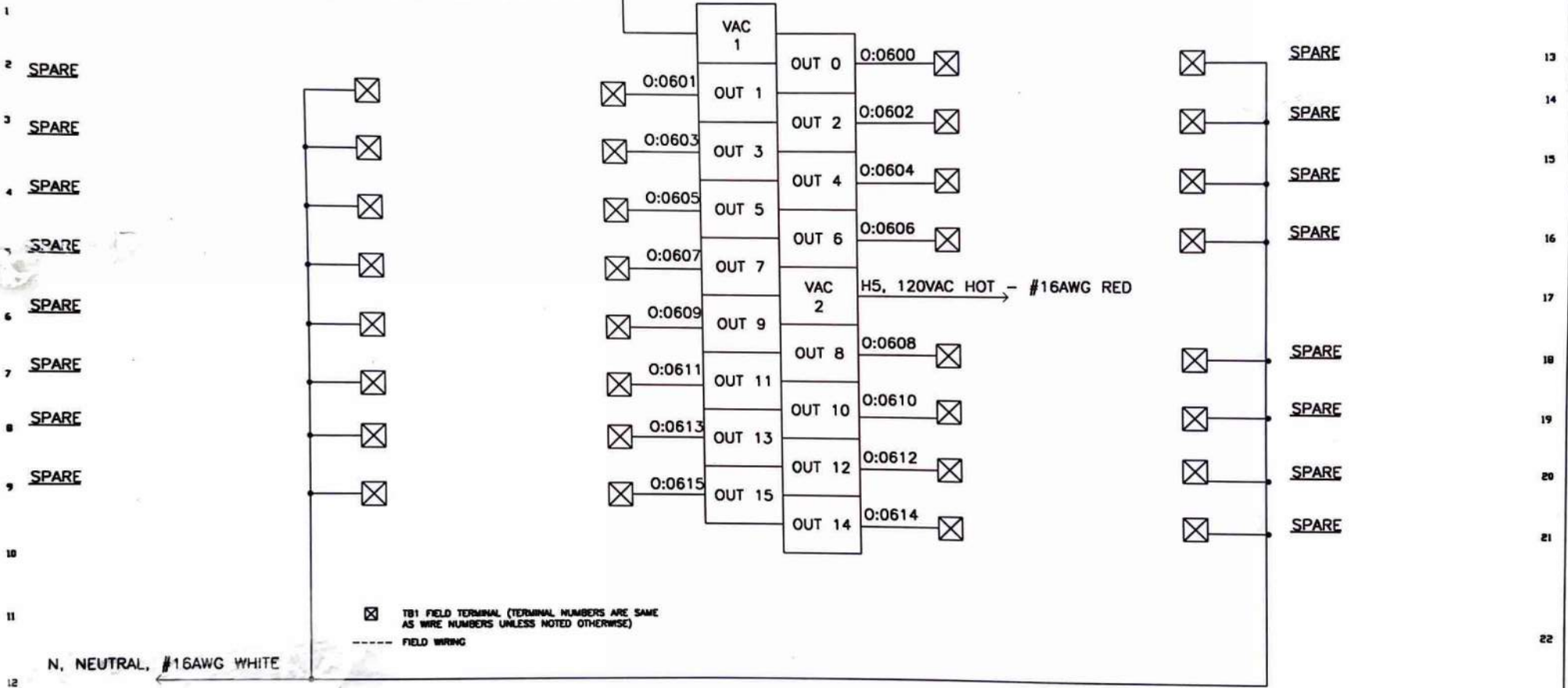
DO NOT SCALE DRAWING
 TOLERANCES UNLESS OTHERWISE SPECIFIED
 0.0 = +/- .03 FRACTION = +/- 1/32"
 0.00 = +/- .010" ANGLE = +/- 0.5°
 0.000 = +/- .005"
 REMOVE ALL BURRS AND SHARP EDGES
 CONCENTRICITY: .005" T.I.R.
 PERPENDICULARITY: .003 IN./IN.
 PARALLELISM: .003 IN./IN.
 MINIMUM MACHINED SURFACE FINISH: 12.5

communications
 Scandia Technologies Division
 12340 66th Street North
 Largo, FL 33773
 CAD FORMAT: AUTOCAD 2000

TITLE: PS-CP CONTROL-WIRING-E
 DRAWING No: 39253-008
 REV. B
 SHEET XX OF XX

RACK #1, SLOT #06
1746-OW16

H5, 120VAC HOT - #16AWG RED

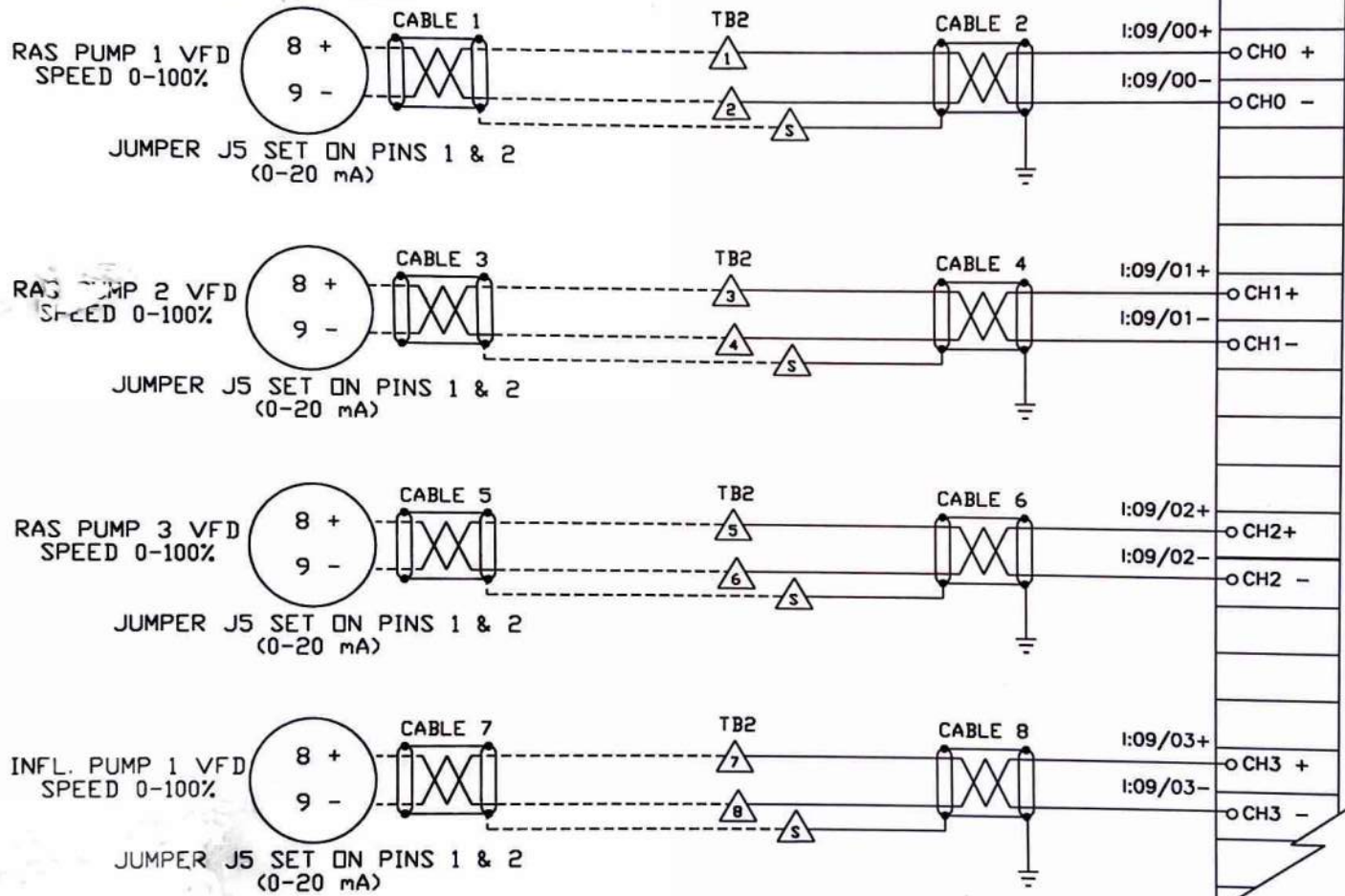


☒ TB1 FIELD TERMINAL (TERMINAL NUMBERS ARE SAME AS WIRE NUMBERS UNLESS NOTED OTHERWISE)
----- FIELD WIRING

N, NEUTRAL, #16AWG WHITE

THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THE DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.				<p>THIRD ANGLE PROJECTION</p>		<p>DO NOT SCALE DRAWING</p> <p>TOLERANCES UNLESS OTHERWISE SPECIFIED</p> <p>0.0 = +/- .03 FRACTION = +/- 1/32" 0.00 = +/- .010" ANGLE = +/- 0.5° 0.000 = +/- .005"</p>		<p>communications Scandia Technologies Division 12340 66th Street North Largo, FL 33773</p>		<p>TITLE: PS-CP CONTROL-WIRING-F</p>																						
<table border="1"> <thead> <tr> <th>BY</th> <th>NAME</th> <th>DATE</th> <th>USED ON ASSY:</th> <th>REV.</th> </tr> </thead> <tbody> <tr> <td>DESIGNED</td> <td>D.HAZELBAKER</td> <td>7/27/02</td> <td></td> <td></td> </tr> <tr> <td>DETAILED</td> <td>D.HAZELBAKER</td> <td>7/27/02</td> <td></td> <td></td> </tr> <tr> <td>CHECKED</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>APPROVED</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>				BY	NAME	DATE	USED ON ASSY:	REV.	DESIGNED	D.HAZELBAKER	7/27/02			DETAILED	D.HAZELBAKER	7/27/02			CHECKED					APPROVED					<p>REMOVE ALL BURRS AND SHARP EDGES</p> <p>CONCENTRICITY: .005" T.I.R.</p> <p>PERPENDICULARITY: .003 IN./IN.</p> <p>PARALLELISM: .003 IN./IN.</p> <p>MINIMUM MACHINED SURFACE FINISH: 12.5</p>		<p>CUSTOMER: CITY-OF-CLEARWATER</p>	
BY	NAME	DATE	USED ON ASSY:	REV.																												
DESIGNED	D.HAZELBAKER	7/27/02																														
DETAILED	D.HAZELBAKER	7/27/02																														
CHECKED																																
APPROVED																																
<table border="1"> <thead> <tr> <th>REV.</th> <th>DATE</th> <th>BY</th> <th>REVISION DESCRIPTION</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>2/17/03</td> <td>CM</td> <td>AS-BUILT</td> </tr> <tr> <td>0</td> <td>7/27/02</td> <td>DH</td> <td>SUBMITTAL</td> </tr> </tbody> </table>				REV.	DATE	BY	REVISION DESCRIPTION	A	2/17/03	CM	AS-BUILT	0	7/27/02	DH	SUBMITTAL	<p>CAD FORMAT: AUTOCAD 2000</p>		<p>DRAWING No: 39253-009 REV. A</p>														
REV.	DATE	BY	REVISION DESCRIPTION																													
A	2/17/03	CM	AS-BUILT																													
0	7/27/02	DH	SUBMITTAL																													
				SCALE: XXXX		SHEET XX OF XX																										

A-B 1336 PLUS II
(VFD'S BY OTHERS)



ANALOG INPUT
1746-N18
RACK 1, SLOT 10

- NOTES:
1. Use 2/C #16sh twisted shielded pair
 2. VFD ANALOG TERMINSL ON ANALOG INTERFACE BOARD

REV.	DATE	BY	REVISION DESCRIPTION
B	2/20/03	CM	AS-BUILT
A	10/31/02	AA	REVISED-SUBMITAL
O	7/27/02	DH	SUBMITAL

BY	NAME	DATE	USED ON ASSY:	REV.
DESIGNED	D.HAZELBAKER	7/27/02		
DETAILED	D.HAZELBAKER	7/27/02		
CHECKED				
APPROVED				

DO NOT SCALE DRAWING

TOLERANCES UNLESS OTHERWISE SPECIFIED

0.0 = +/- .03 FRACTION = +/- 1/32"
0.00 = +/- .010" ANGLE = +/- 0.5°
0.000 = +/- .005"

REMOVE ALL BURRS AND SHARP EDGES

CONCENTRICITY: .005" T.I.R.
PERPENDICULARITY: .003 IN./IN.
PARALLELISM: .003 IN./IN.
MINIMUM MACHINED SURFACE FINISH: 125

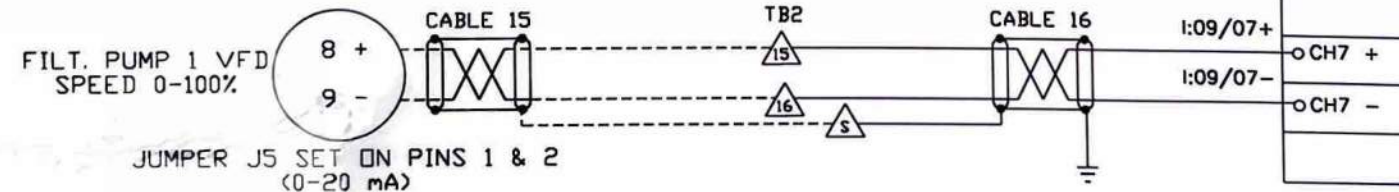
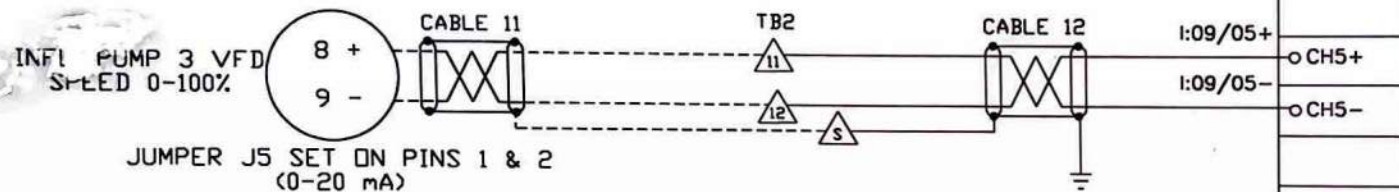
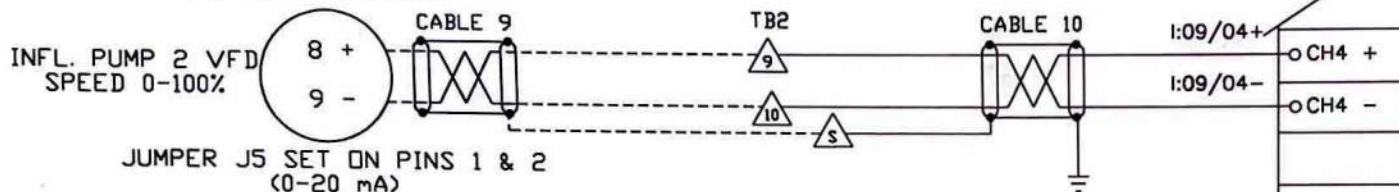
communications
Scandia Technologies Division
12340 68th Street North
Largo, FL 33773

CAD FORMAT: AUTOCAD 2000

TITLE: PS-CP LOOP-DIAGRAM-A	
CITY-OF-CLEARWATER	
DRAWING No: 39253-010	REV. B
SHEET XX	OF XX

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

A-B 1336 PLUS II
(VFD'S BY OTHERS)



ANALOG INPUT
1746-N18
RACK 1, SLOT 10

- NOTES:
1. Use 2/C #16sh twisted shielded pair
 2. VFD ANALOG TERMINSL ON ANALOG INTERFACE BOARD

REV.	DATE	BY	REVISION DESCRIPTION
B	2/20/03	CM	AS-BUILT
A	10/31/02	AA	REVISED-SUBMITTAL
0	7/27/02	DH	SUBMITTAL

THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THE DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.

BY	NAME	DATE	USED ON ASSY:	REV.
DESIGNED	D.HAZELBAKER	7/27/02		
DETAILED	D.HAZELBAKER	7/27/02		
CHECKED				
APPROVED				

DO NOT SCALE DRAWING
TOLERANCES UNLESS OTHERWISE SPECIFIED

0.0 = +/- .03 FRACTION = +/- 1/32"
0.00 = +/- .010" ANGLE = +/- 0.5°
0.000 = +/- .005"

THIRD ANGLE PROJECTION

REMOVE ALL BURRS AND SHARP EDGES

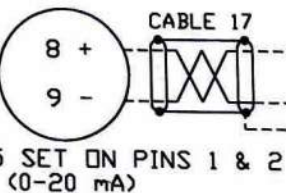
CONCENTRICITY: .005" T.I.R.
PERPENDICULARITY: .003 IN./IN.
PARALLELISM: .003 IN./IN.
MINIMUM MACHINED SURFACE FINISH: 16

communications
Scandia Technologies Division
12340 68th Street North
Largo, FL 33773
CAD FORMAT: AUTOCAD 2000

TITLE: PS-CP LOOP-DIAGRAM-B	
CUSTOMER: CITY-OF-CLEARWATER	
DRAWING No: 39253-011	REV. B
SCALE: XXXX	SHEET XX OF XX

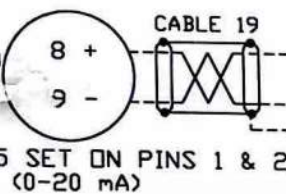
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

FILT. PUMP 2 VFD
SPEED 0-100%



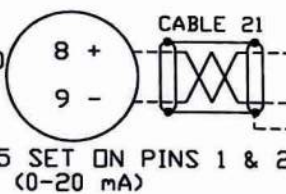
JUMPER J5 SET ON PINS 1 & 2
(0-20 mA)

FILT. PUMP 3 VFD
SPEED 0-100%



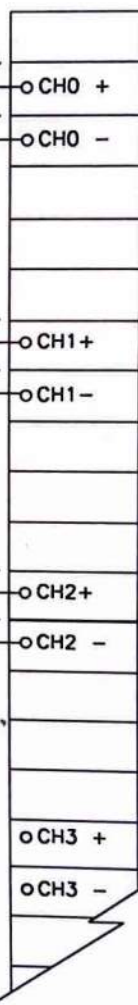
JUMPER J5 SET ON PINS 1 & 2
(0-20 mA)

FILT. PUMP 4 VFD
SPEED 0-100%



JUMPER J5 SET ON PINS 1 & 2
(0-20 mA)

SPARE



ANALOG INPUT
1746-N18
RACK 1, SLOT 11

NOTES:

1. See dwg. 026 for Edco SS65 series surge protection wiring details
2. Use 2/C #16sh twisted shielded pair
3. VFD ANALOG TERMINSL ON ANALOG INTERFACE BOARD

REV.	DATE	BY	REVISION DESCRIPTION
B	2/20/03	CM	AS-BUILT
A	10/31/02	AA	REVISED-SUBMITTAL
0	7/27/02	DH	SUBMITTAL

BY	NAME	DATE	USED ON ASSY:	REV.
DESIGNED	D.HAZELBAKER	7/27/02		
DETAILED	D.HAZELBAKER	7/27/02		
CHECKED				
APPROVED				

DO NOT SCALE DRAWING
TOLERANCES UNLESS OTHERWISE SPECIFIED
0.0 = +/- .03 FRACTION = +/- 1/32"
0.00 = +/- .010" ANGLE = +/- 0.5"
0.000 = +/- .005"
THIRD ANGLE PROJECTION
REMOVE ALL BURRS AND SHARP EDGES
CONCENTRICITY: .005" T.I.R.
PERPENDICULARITY: .003 IN./IN.
PARALLELISM: .003 IN./IN.
MINIMUM MACHINED SURFACE FINISH: 125

communications
Scandia Technologies Division
12340 66th Street North
Largo, FL 33773

TITLE: PS-CP LOOP-DIAGRAM-C	
CUSTOMER: CITY-OF-CLEARWATER	
DRAWING NO.: 39253-012	REV. B
CAD FORMAT: AUTOCAD 2000	SCALE: XXXX SHEET XX OF XX

SPARE

SPARE

SPARE

SPARE

I:10/07+ oCH4 +

I:10/07- oCH4 -

I:10/07+ oCH5+

I:10/07- oCH5-

I:10/07+ oCH6+

I:10/07- oCH6 -

I:10/07+ oCH7 +

I:10/07- oCH7 -

ANALOG INPUT
1746-NI8
RACK 1, SLOT 11

NOTES:

1. See dwg. 026 for Edco SS65 series surge protection wiring details
2. Use 2/C #16sh twisted shielded pair

REV.	DATE	BY	REVISION DESCRIPTION
A	2/20/03	CM	AS-BUILT
0	7/27/02	DH	SUBMITTAL

THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THE DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.			
BY	NAME	DATE	USED ON ASSY:
DESIGNED	D.HAZELBAKER	7/27/02	
DETAILED	D.HAZELBAKER	7/27/02	
CHECKED			
APPROVED			

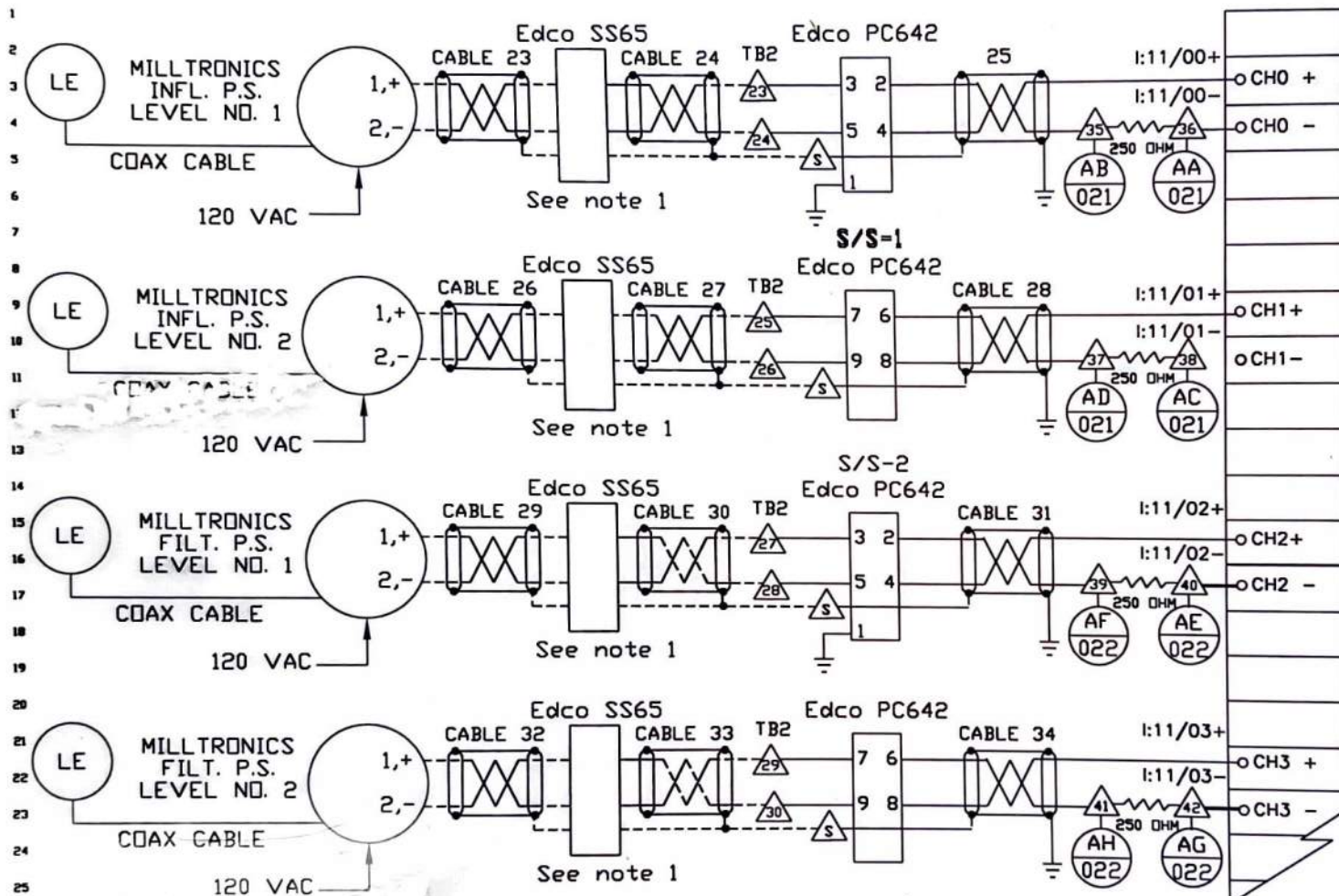
DO NOT SCALE DRAWING	
TOLERANCES UNLESS OTHERWISE SPECIFIED	
0.0 = +/- .03	FRACTION = +/- 1/32"
0.00 = +/- .010"	ANGLE = +/- 0.5°
0.000 = +/- .005"	
REMOVE ALL BURRS AND SHARP EDGES	
CONCENTRICITY: .005" T.I.R.	
PERPENDICULARITY: .003 IN./IN.	
PARALLELISM: .003 IN./IN.	
MINIMUM MACHINED SURFACE FINISH: 125	



Scandia Communications
Scandia Technologies Division
12340 68th Street North
Largo, FL 33773

CAD FORMAT: AUTOCAD 2000

TITLE: PS-CP LOOP-DIAGRAM-D	
CUSTOMER: CITY-OF-CLEARWATER	
DRAWING No: 39253-013	REV. A
SCALE: XXXX	SHEET XX OF XX

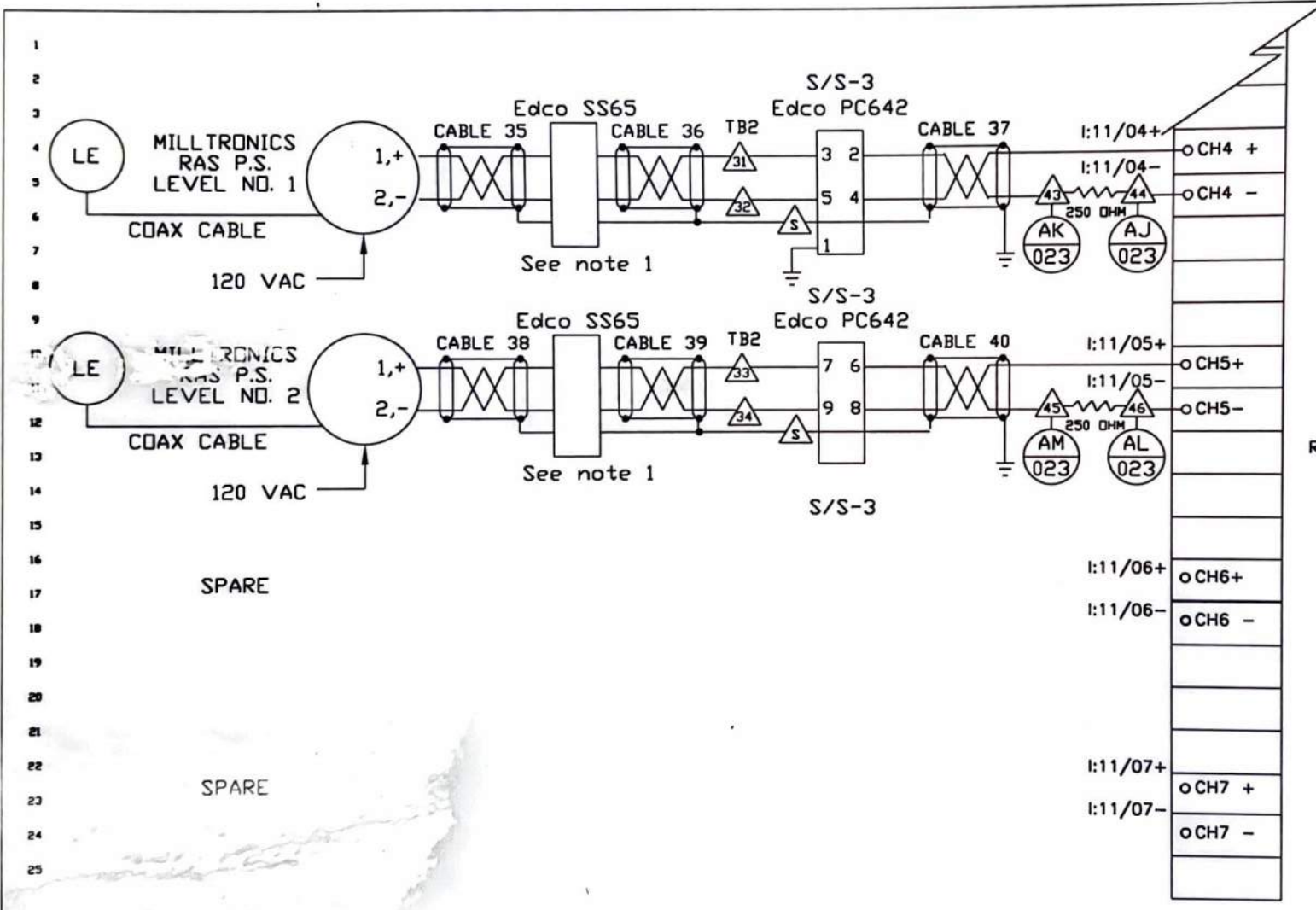


ANALOG INPUT
1746-N18
RACK 1, SLOT 12

NOTES:

1. See dwg. 026 for Edco SS65 series surge protection wiring details
2. Use 2/C #16sh twisted shielded pair

THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THIS DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.				 THIRD ANGLE PROJECTION		DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED 0.0 = +/- .03 FRACTION = +/- 1/32" 0.00 = +/- .010" ANGLE = +/- 0.5" 0.000 = +/- .005"		 communications Scandia Technologies Division 12340 66th Street North Largo, FL 33773		TITLE: PS-CP LOOP-DIAGRAM-E	
BY NAME DATE USED ON ASSY: REV. DESIGNED D.HAZELBAKER 7/27/02 DETAILED D.HAZELBAKER 7/27/02				REMOVE ALL BURRS AND SHARP EDGES CONCENTRICITY: .005" T.I.R. PERPENDICULARITY: .003 IN./IN. PARALLELISM: .003 IN./IN. MINIMUM MACHINED SURFACE FINISH: 125		CUSTOMER: CITY-OF-CLEARWATER		DRAWING No: 39253-014		REV. A	
REV. DATE BY REVISION DESCRIPTION A 2/20/03 CM AS-BUILT 0 10/31/02 AA SUBMITTAL				CAD FORMAT: AUTOCAD 2000		SCALE: XXXX		SHEET XX OF XX			



ANALOG INPUT
1746-NI8
RACK 1, SLOT 12

- NOTES:
1. See dwg. 026 for Edco SS65 series surge protection wiring details
 2. Use 2/C #16sh twisted shielded pair

REV.	DATE	BY	REVISION DESCRIPTION
A	2/20/03	CM	AS-BUILT
0	10/31/02	AA	SUBMITTAL

THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THIS DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.

BY	NAME	DATE	USED ON ASSY	REV.
DESIGNED	D.HAZELBAKER	7/27/02		
DETAILED	D.HAZELBAKER	7/27/02		
CHECKED				
APPROVED				

DO NOT SCALE DRAWING

TOLERANCES UNLESS OTHERWISE SPECIFIED

0.0 = +/- .03 FRACTION = +/- 1/32"
0.00 = +/- .010" ANGLE = +/- 0.5°
0.000 = +/- .005"

REMOVE ALL BURRS AND SHARP EDGES

CONCENTRICITY: .005" T.I.R.
PERPENDICULARITY: .003 IN./IN.
PARALLELISM: .003 IN./IN.
MINIMUM MACHINED SURFACE FINISH: 125

communications
Scandia Technologies Division
12340 86th Street North
Largo, FL 33773

CAD FORMAT: AUTOCAD 2000

TITLE: PS-CP LOOP-(DIAGRAM-F

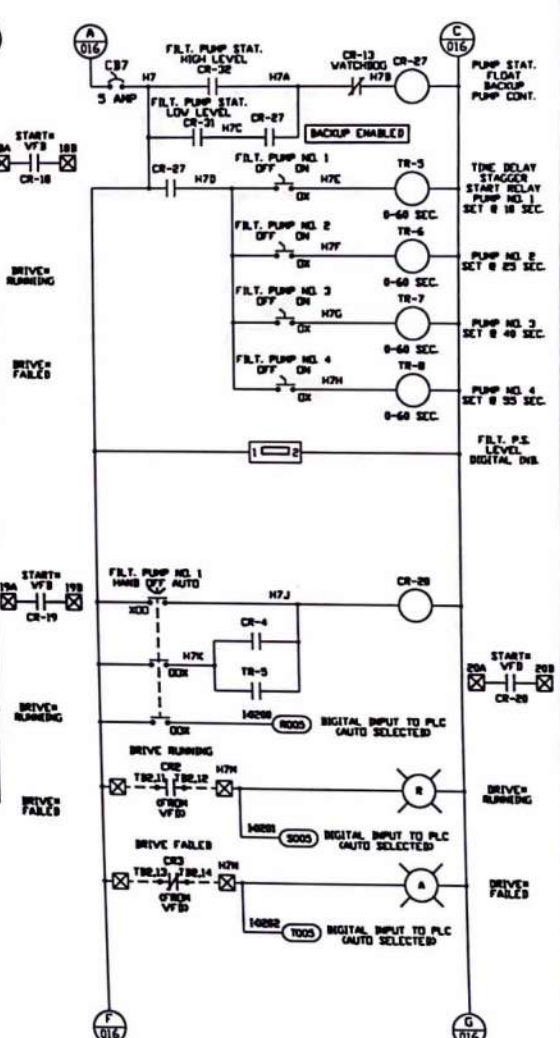
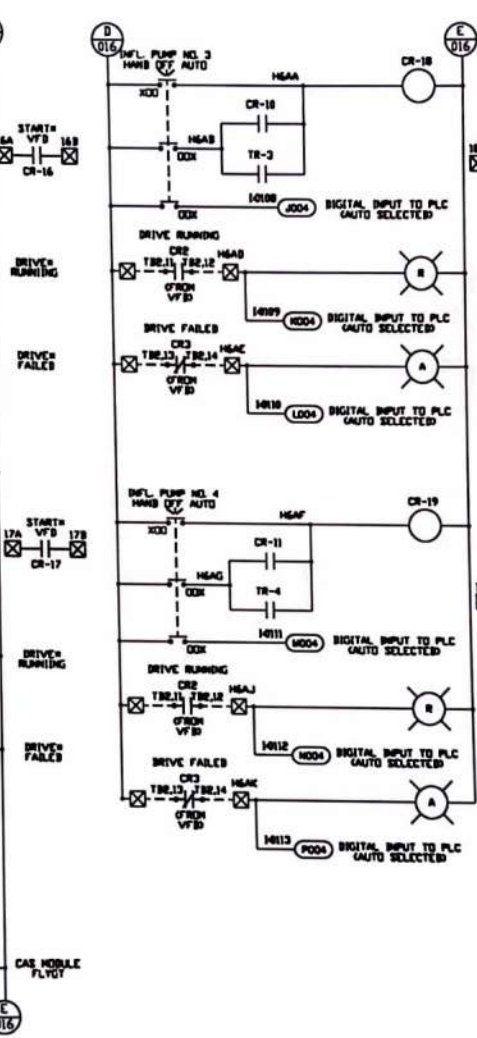
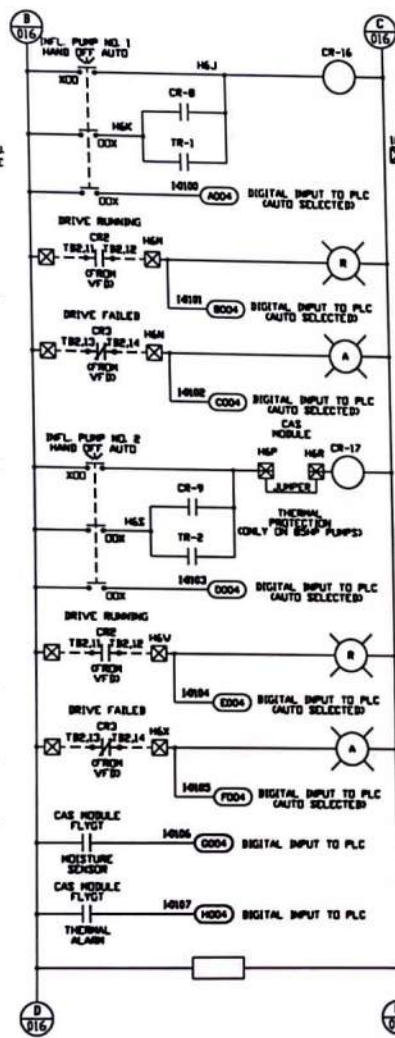
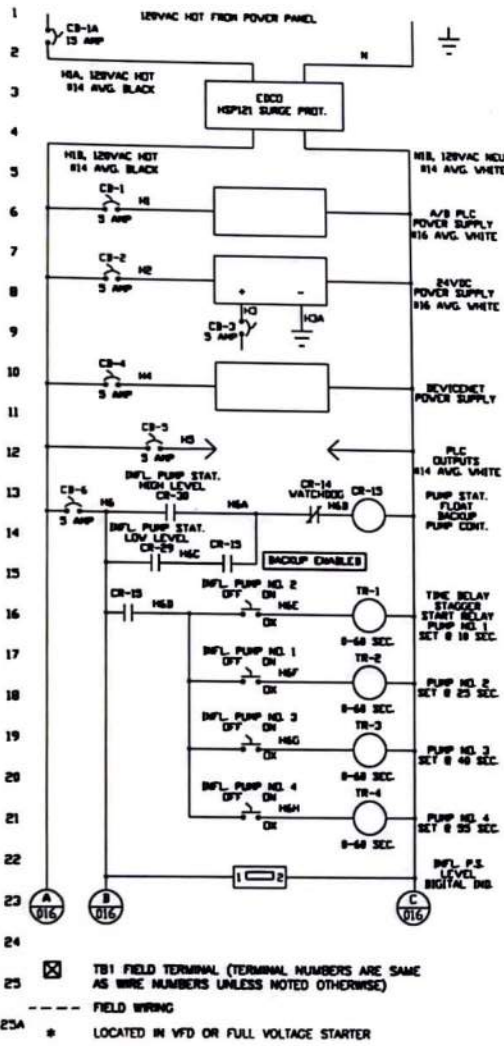
CUSTOMER: CITY-CLEARWATER

DRAWING No: 3903-015

REV. A

SCALE: XXXX

SHEET XX OF XX



☒ TB1 FIELD TERMINAL (TERMINAL NUMBERS ARE SAME AS WIRE NUMBERS UNLESS NOTED OTHERWISE)
 - - - - - FIELD WIRING
 * LOCATED IN VFD OR FULL VOLTAGE STARTER

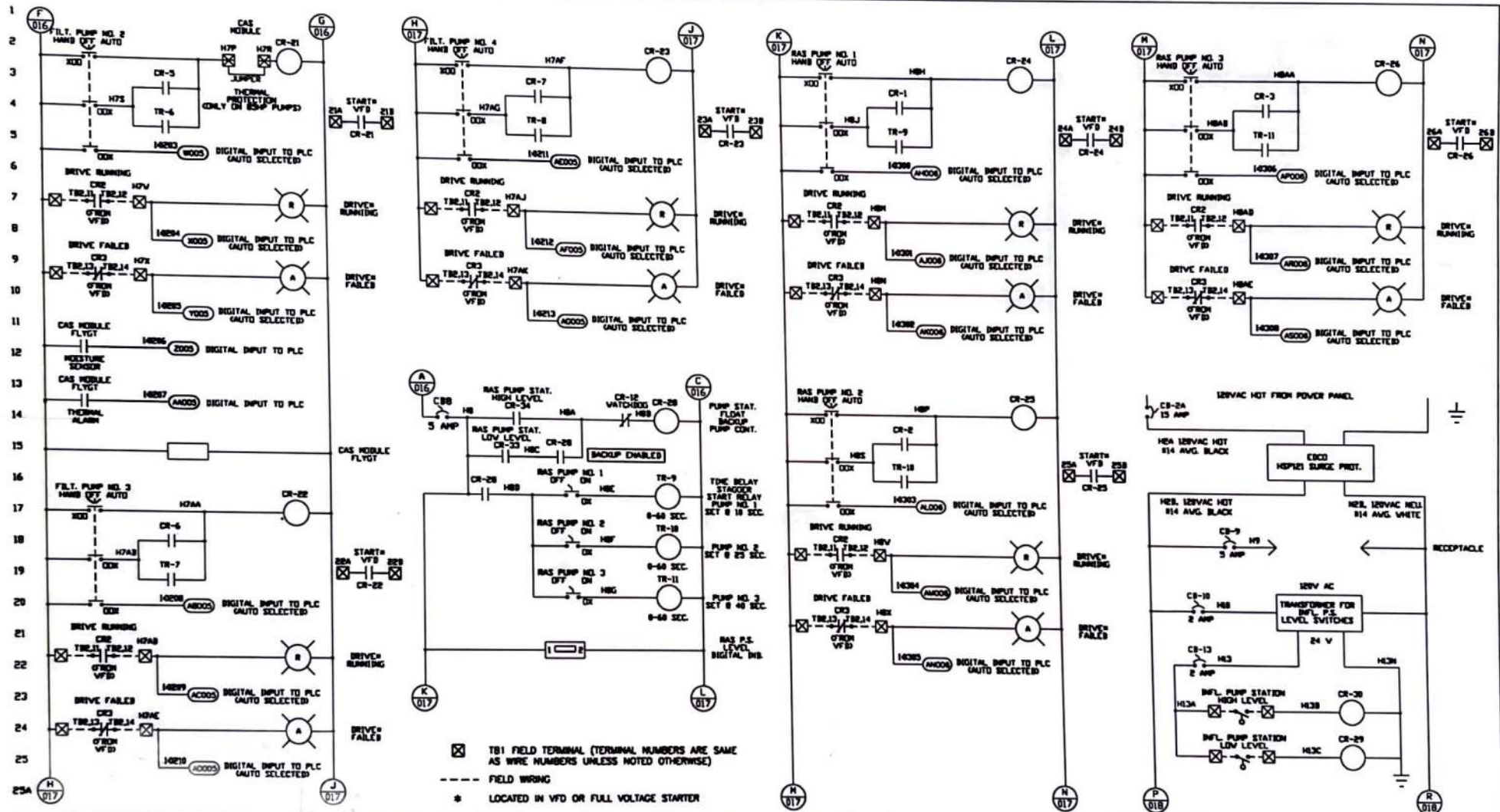
REV.	DATE	BY	REVISION DESCRIPTION
A	2/20/03	CM	AS-BUILT
O	7/27/02	DM	SUBMITTAL

BY	NAME	DATE	USED ON ASSY:	REV.
DESIGNED	D.HAZELBAKER	7/27/02		
DETAILED	D.HAZELBAKER	7/27/02		
CHECKED				
APPROVED				

DO NOT SCALE DRAWING
 TOLERANCES UNLESS OTHERWISE SPECIFIED
 0.0 = +/- .03 FRACTION = +/- 1/32
 0.00 = +/- .010" ANGLE = +/- 0.5°
 0.000 = +/- .005"
 REMOVE ALL BURRS AND SHARP EDGES
 CONCENTRICITY: .005" T.I.R.
 PERPENDICULARITY: .003 IN./IN.
 PARALLELISM: .003 IN./IN.
 MINIMUM MACHINED SURFACE FINISH: 125


communications
 Scandia Technologies Division
 12340 66th Street North
 Largo, FL 33773
 CAD FORMAT: AUTOCAD 2000

TITLE:	CONTROL-PANEL POWER-WIRING-A	
CUSTOMER:	CITY-OF-CLEARWATER	
DRAWING No:	39253-016	REV. A
SCALE:	XXXX	SHEET XX OF XX



THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THE DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.

BY	NAME	DATE	USED ON ASSY:	REV.
DESIGNED	D.HAZELBAKER	7/27/02		
DETAILED	D.HAZELBAKER	7/27/02		
CHECKED				
APPROVED				

DO NOT SCALE DRAWING

TOLERANCES UNLESS OTHERWISE SPECIFIED

0.0 = +/- .03 FRACTION = +/- 1/32"
 0.00 = +/- .010" ANGLE = +/- 0.5°
 0.000 = +/- .005"

REMOVE ALL BURRS AND SHARP EDGES

CONCENTRICITY: .005" T.I.R.

PERPENDICULARITY: .003 IN./IN.

PARALLELISM: .003 IN./IN.

MINIMUM MACHINED SURFACE FINISH: 12.5

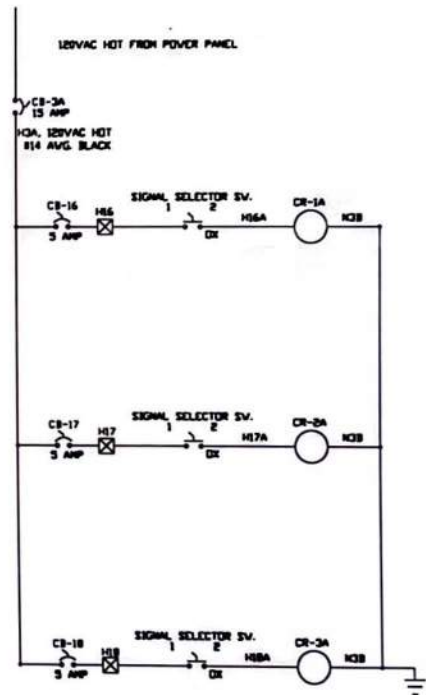
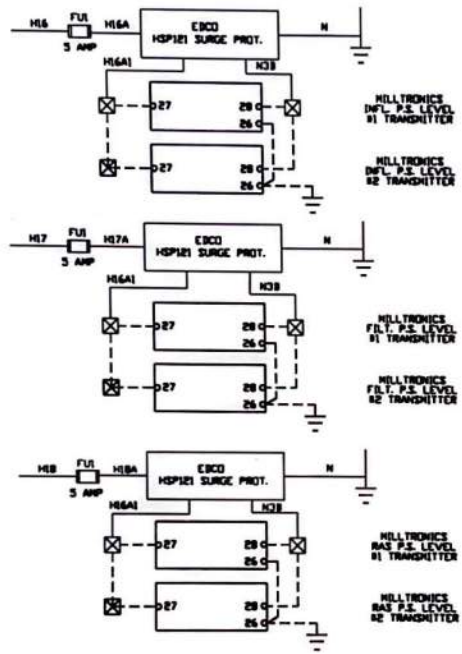
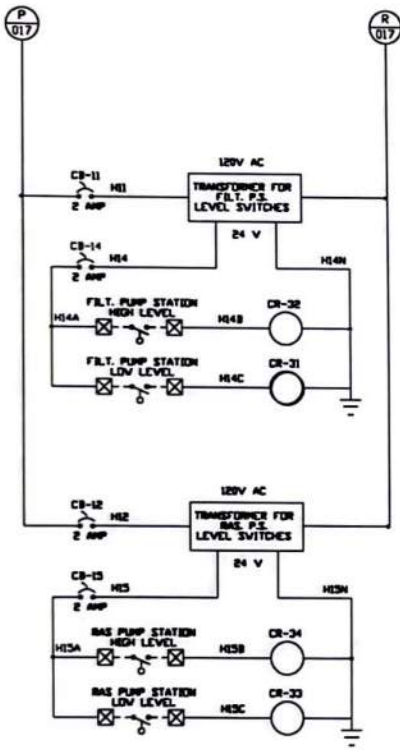
communications
 Scandia Technologies Division
 12340 66th Street North
 Largo, FL 33773

CAD FORMAT: AUTOCAD 2000

TITLE: CONTROL-PANEL POWER-WIRING-B	
CUSTOMER: CITY-OF-CLEARWATER	
DRAWING No: 39253-017	REV. A
SCALE: XXXX	SHEET XX OF XX

REV.	DATE	BY	REVISION DESCRIPTION
A	2/20/03	CM	AS-BUILT
D	7/27/02	DH	SUBMITTAL

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24



☒ T81 FIELD TERMINAL (TERMINAL NUMBERS ARE SAME AS WIRE NUMBERS UNLESS NOTED OTHERWISE)
 - - - - FIELD WIRING
 * LOCATED IN WFD OR FULL VOLTAGE STARTER

THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THE DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.

THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING
 TOLERANCES UNLESS OTHERWISE SPECIFIED
 0.0 = +/- .03 FRACTION = +/- 1/32"
 0.00 = +/- .010" ANGLE = +/- 0.5°
 0.000 = +/- .005"



TITLE: CONTROL-PANEL POWER-WIRING-C
 CUSTOMER: CITY-OF-CLEARWATER
 DRAWING No: 39253-018
 SCALE: XXXX SHEET XX OF XX

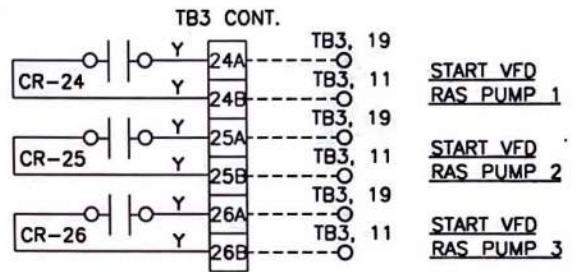
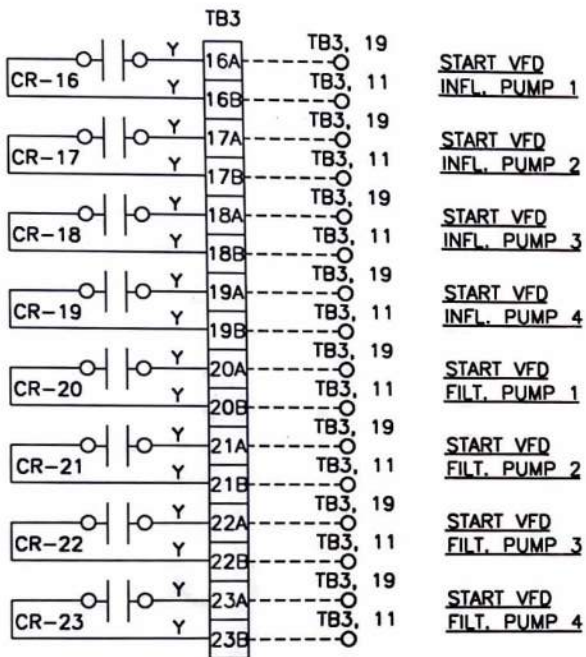
REV.	DATE	BY	REVISION DESCRIPTION
A	2/20/03	CM	AS-BUILT
D	7/27/02	DH	SUBMITTAL

BY	NAME	DATE	USED ON ASSY:	REV.
DESIGNED	D.HAZELBAKER	7/27/02		
DETAILED	D.HAZELBAKER	7/27/02		
CHECKED				
APPROVED				

REMOVE ALL BURRS AND SHARP EDGES
 CONCENTRICITY: .005" T.I.R.
 PERPENDICULARITY: .003 IN./IN.
 PARALLELISM: .003 IN./IN.
 MINIMUM MACHINED SURFACE FINISH: 125

CAD FORMAT: AUTOCAD 2000

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
25A



Y: DENOTES #16 AWG YELLOW WIRE

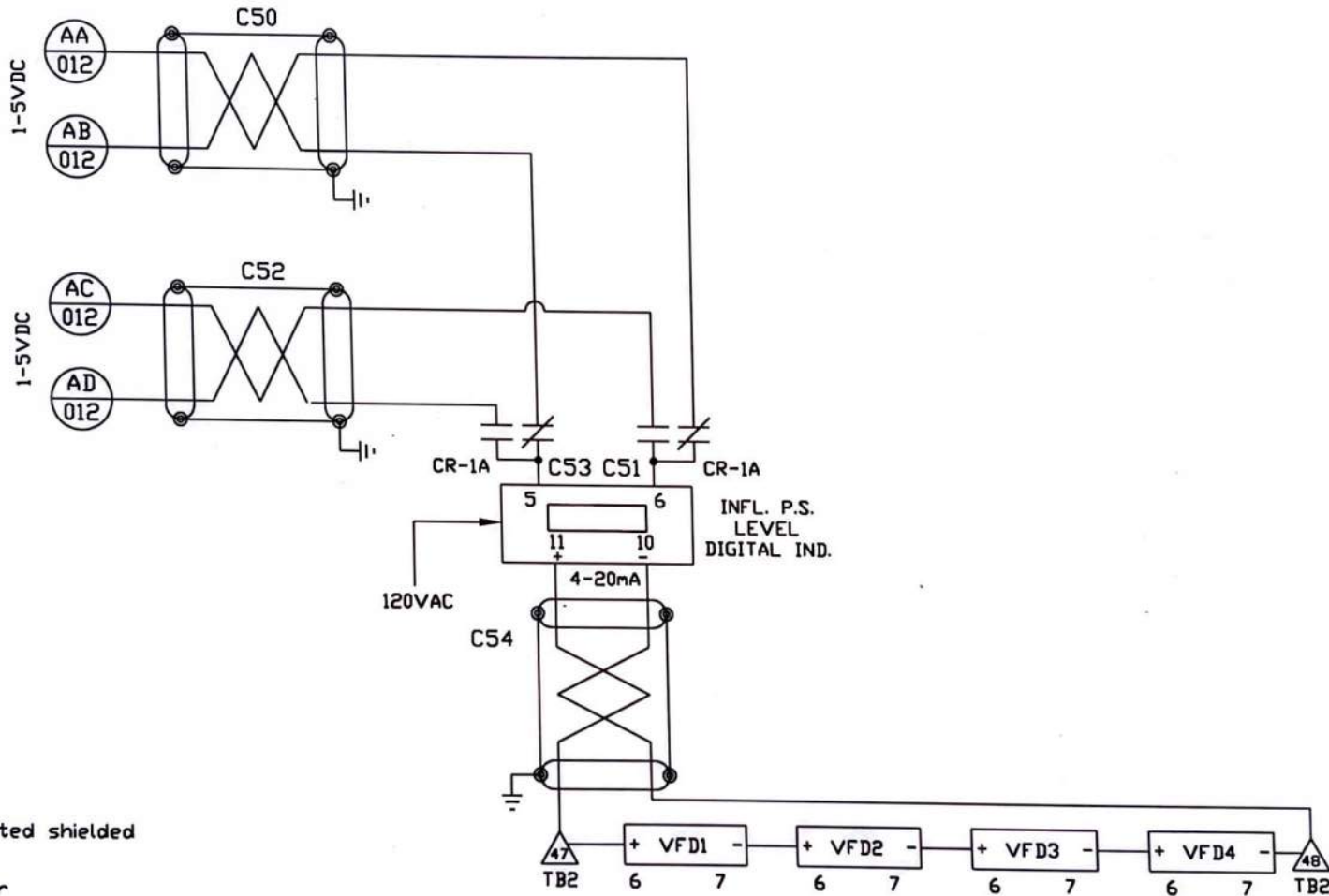
○ Denotes terminals in VFD

TB3, inputs 20, 24, and 30 must be present for VFD to start.

				THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THIS DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.		 THIRD ANGLE PROJECTION		DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED 0.0 = +/- .03 FRACTION = +/- 1/32" 0.00 = +/- .010" ANGLE = +/- 0.5" 0.000 = +/- .005"		 communications Scandia Technologies Division 12340 66th Street North Largo, FL 33773		TITLE: PS-CP CUSTOMER-CONNECTION-TB3	
				REMOVE ALL BURRS AND SHARP EDGES CONCENTRICITY: .005" T.I.R. PERPENDICULARITY: .003 IN./IN. PARALLELISM: .003 IN./IN. MINIMUM MACHINED SURFACE FINISH: 125		CUSTOMER: CITY-OF-CLEARWATER		DRAWING No: 39253-020				REV. B	
BY	NAME	DATE	USED ON ASSY:	REV.							SCALE: XXXX SHEET XX OF XX		
B	2/20/03	CM	AS-BUILT	DESIGNED	D.HAZELBAKER	7/27/02							
A	10/25/02	AA	SUBMITTAL-CORRECTIONS	DETAILED	D.HAZELBAKER	7/27/02							
O	7/27/02	DH	SUBMITTAL	CHECKED									
REV.	DATE	BY	REVISION DESCRIPTION	APPROVED									

INFL. P. S.
LEVEL NO. 1

INFL. P.S.
LEVEL NO. 2



NOTES:

1. Use 2/C #16sh twisted shielded pair
2. CXX is cable number
3. VFD ANALOG TERMINSL ON ANALOG INTERFACE BOARD

REV.	DATE	BY	REVISION DESCRIPTION
C	3/28/03	CM	ENG-CHANGE
B	2/20/03	CM	AS-BUILT
A	10/31/02	AA	REVISED-SUBMITAL
D	7/27/02	DH	SUBMITAL

THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THE DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.

BY	NAME	DATE	USED ON ASSY:	REV.
DESIGNED	D.HAZELBAKER	7/27/02		
DETAILED	D.HAZELBAKER	7/27/02		
CHECKED				
APPROVED				



THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING
 TOLERANCES UNLESS OTHERWISE SPECIFIED
 0.0 = +/- .03 FRACTION = +/- 1/32"
 0.00 = +/- .010" ANGLE = +/- 0.5"
 0.000 = +/- .005"
 REMOVE ALL BURRS AND SHARP EDGES
 CONCENTRICITY: .005" T.I.R.
 PERPENDICULARITY: .003 IN./IN.
 PARALLELISM: .003 IN./IN.
 MINIMUM MACHINED SURFACE FINISH: 125

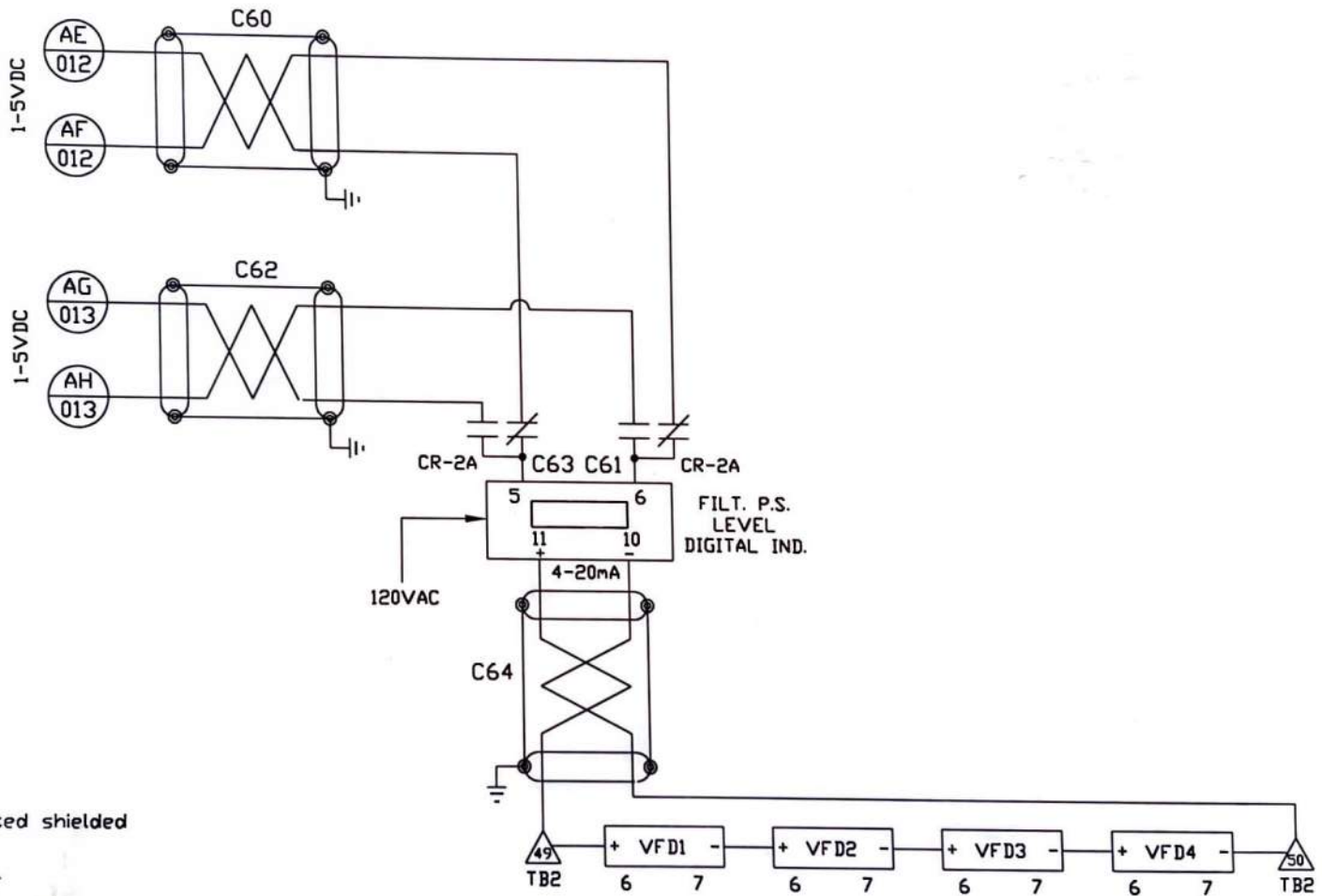
communications
 Scandia Technologies Division
 12340 86th Street North
 Largo, FL 33773

TITLE:	PS-CP LOOP-DIAGRAM-E	
CUSTOMER:	CITY-OF-CLEARWATER	
DRAWING No:	39253-021	REV. C
SCALE:	XXXX	SHEET XX OF XX

CAD FORMAT: AUTOCAD 2000

FILT. P. S.
LEVEL NO. 1

FILT. P. S.
LEVEL NO. 2



NOTES:

1. Use 2/C #16sh twisted shielded pair
2. CXX is cable number
3. VFD ANALOG TERMINSE ON ANALOG INTERFACE BOARD

THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THIS DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.



DO NOT SCALE DRAWING
TOLERANCES UNLESS OTHERWISE SPECIFIED
0.0 = +/- .03 FRACTION = +/- 1/32"
0.00 = +/- .010" ANGLE = +/- 0.5"
0.000 = +/- .005"
REMOVE ALL BURRS AND SHARP EDGES
CONCENTRICITY: .003" T.I.R.
PERPENDICULARITY: .003 IN./IN.
PARALLELISM: .003 IN./IN.
MINIMUM MACHINED SURFACE FINISH: 125



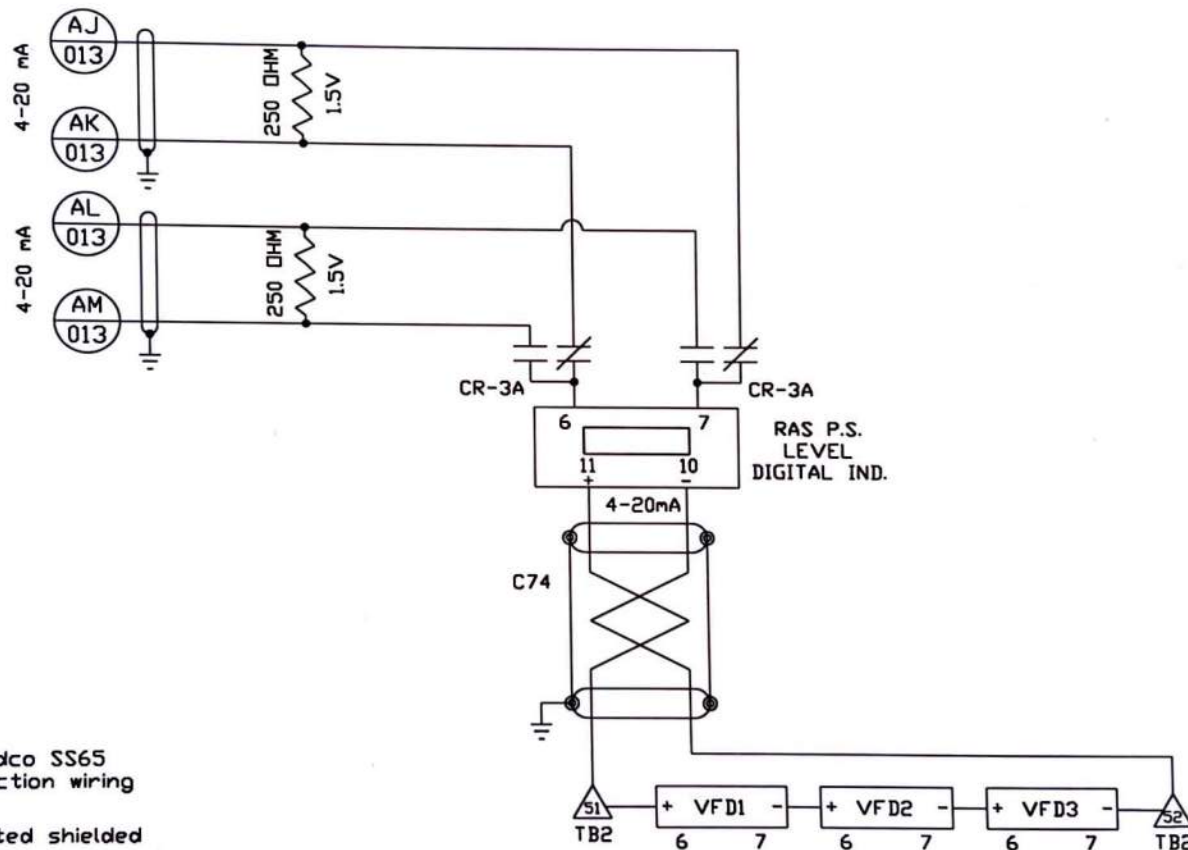
TITLE: PS-CP LOOP-DIAGRAM-F
CUSTOMER: CITY-OF-CLEARWATER
DRAWING No: 39253-022
REV. C
SCALE: XXXX SHEET XX OF XX

REV.	DATE	BY	REVISION DESCRIPTION
C	3/28/03	CM	ENG-CHANGE
B	2/20/03	CM	AS-BUILT
A	10/31/02	AA	REVISED-SUBMITTAL
O	7/27/02	DH	SUBMITTAL
BY			
DESIGNED	D.HAZELBAKER	7/27/02	
DETAILED	D.HAZELBAKER	7/27/02	
CHECKED			
APPROVED			

CAD FORMAT: AUTOCAD 2000

RAS P. S.
LEVEL NO. 1

RAS P. S.
LEVEL NO. 2



NOTES:

1. See dwg. XXX for Edco SS65 series surge protection wiring details
2. Use 2/C #16sh twisted shielded pair
3. VFD ANALOG TERMINSL ON ANALOG INTERFACE BOARD

REV.	DATE	BY	REVISION DESCRIPTION
C	3/28/03	CM	ENG-CHANGE
B	2/20/03	CM	AS-BUILT
A	10/31/02	AA	REVISED-SUBMITTAL
D	7/27/02	DH	SUBMITTAL

THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THIS DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.



BY	NAME	DATE	USED ON ASSY:	REV.
DESIGNED	D.HAZELBAKER	7/27/02		
DETAILED	D.HAZELBAKER	7/27/02		
CHECKED				
APPROVED				

DO NOT SCALE DRAWING

TOLERANCES UNLESS OTHERWISE SPECIFIED

0.0 = +/- .03 FRACTION = +/- 1/32"
 0.00 = +/- .010" ANGLE = +/- 0.5°
 0.000 = +/- .005"

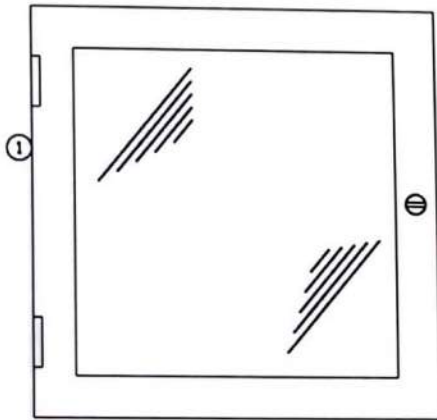
REMOVE ALL BURRS AND SHARP EDGES

CONCENTRICITY: .005" T.I.R.
 PERPENDICULARITY: .003 IN./IN.
 PARALLELISM: .003 IN./IN.
 MINIMUM MACHINED SURFACE FINISH: 125

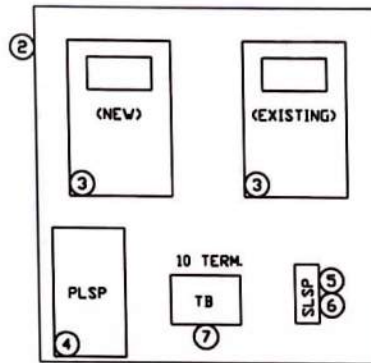
communications
 Scandia Technologies Division
 12340 66th Street North
 Largo, FL 33773

CAD FORMAT: AUTOCAD 2000

TITLE: PS-CP LOOP-DIAGRAM-G	
CUSTOMER: CITY-OF-CLEARWATER	
DRAWING No: 39282-023	REV. C
SCALE: XXXX	SHEET XX OF XX



DOOR LAYOUT



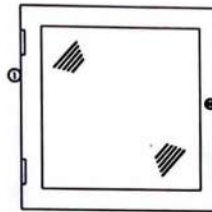
BACK PANEL LAYOUT

TYPICAL OF THREE

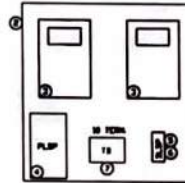
MATERIAL LIST		
ITEM NO.	QTY	DESCRIPTION
1	2	DOOR
2	2	DOOR HANDLE
3	2	DOOR LOCK
4	2	DOOR LOCK
5	2	DOOR LOCK
6	2	DOOR LOCK
7	2	DOOR LOCK
8	2	DOOR LOCK
9	2	DOOR LOCK
10	2	DOOR LOCK

				THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THE DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.		 THIRD ANGLE PROJECTION		DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED 0.0 = +/- .03 FRACTION = +/- 1/32" 0.00 = +/- .010" ANGLE = +/- 0.5" 0.000 = +/- .005"		 communications Scandia Technologies Division 12340 66th Street North Largo, FL 33773		TITLE: LEVEL-TRANSMITTER PANEL-LAYOUT	
				REMOVE ALL BURRS AND SHARP EDGES CONCENTRICITY: .005" T.I.R. PERPENDICULARITY: .003 IN./IN. PARALLELISM: .003 IN./IN. MINIMUM MACHINED SURFACE FINISH: 125		CUSTOMER: CITY-OF-CLEARWATER		DRAWING No: 39253-024				REV. A	
				BY NAME DATE USED ON ASSY: REV.				CAD FORMAT: AUTOCAD 2000		SCALE: XXXX		SHEET XX OF XX	
A 2/20/03 CM AS-BUILT				DESIGNED D.HAZELBAKER 7/27/02									
O 7/27/02 DH SUBMITTAL				DETAILED D.HAZELBAKER 7/27/02									
REV. DATE BY REVISION DESCRIPTION				CHECKED									
				APPROVED									

MATERIAL LIST		
ITEM NO.	QTY.	DESCRIPTION
1	2	SCANDIA OFFICE WATER PUMP OR FIBERGLASS EQUIVALENT
2	2	ALUMINUM OFFICE PUMP PANEL
3	2	HYDROPHOBIC BALANCE VIALS (NONMETAL)
4	2	HYDROPHOBIC VIAL TIGHTENING SCREWS
5	2	PHENOLIC VIAL TIGHTENING SCREWS
6	2	PHENOLIC VIAL TIGHTENING SCREWS
7	2	PHENOLIC VIAL TIGHTENING SCREWS



FRONT LAYOUT



BACK PANEL LAYOUT

TYPICAL OF THREE



THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THIS DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.



THIRD ANGLE PROJECTION

DO NOT SCALE DRAWING

TOLERANCES UNLESS OTHERWISE SPECIFIED
 0.0 = +/- .03 FRACTION = +/- 1/32"
 0.00 = +/- .010" ANGLE = +/- 0.5°
 0.000 = +/- .005"



communications
 Scandia Technologies Division
 12340 66th Street North
 Largo, FL 33773

TITLE: LEVEL-TRANSDUCER PANEL-LAYOUT	
CUSTOMER: CITY-OF-CLEARWATER	
DRAWING No: 39253-025	REV. 0
SCALE: XXXX	SHEET XX OF XX

REV.	DATE	BY	REVISION DESCRIPTION
0	7/27/02	DH	SUBMITTAL

BY	NAME	DATE	USED ON ASSY:	REV.	REVISION DESCRIPTION
DESIGNED	D.HAZELBAKER	7/27/02			REMOVE ALL BURRS AND SHARP EDGES
DETAILED	D.HAZELBAKER	7/27/02			CONCENTRICITY: .005" T.I.R.
CHECKED					PERPENDICULARITY: .003 IN./IN.
APPROVED					PARALLELISM: .003 IN./IN.
					MINIMUM MACHINED SURFACE FINISH: 12.5

CAD FORMAT: AUTOCAD 2000

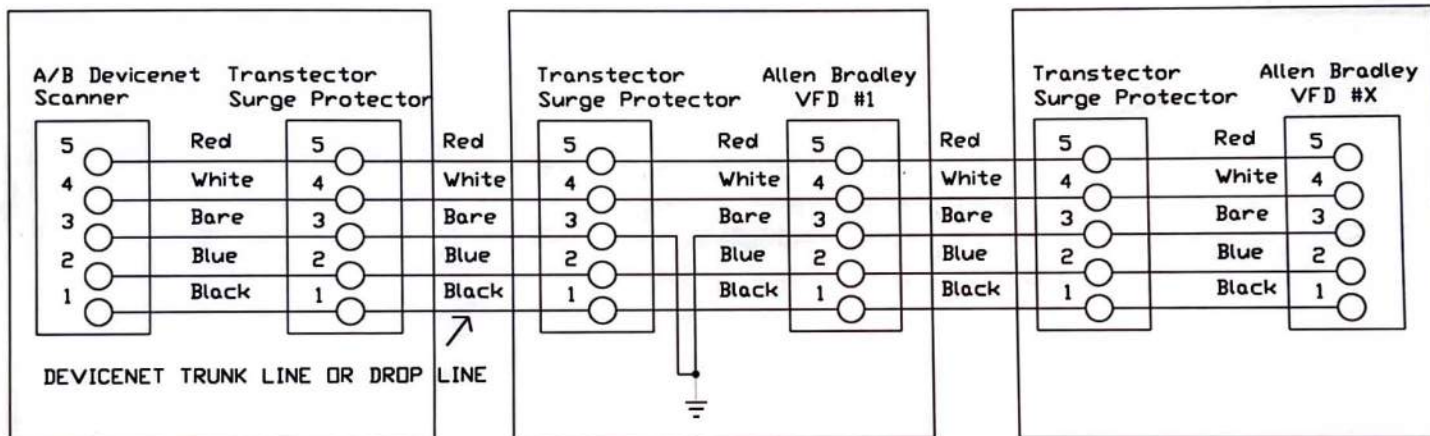
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

TERM.	COLOR	SIGNAL	FUNCTION
5	Red	VDC+	Power
4	White	CAN_H	Sig. High
3	Bare	SHIELD	SHIELD
2	Blue	CAN_L	Sig. Low
1	Black	COMM	Common

DEVICENET SCANNER IN PS-CP

Allen Bradley
VFD #1 enclosure

Allen Bradley
VFD #X enclosure



- Note 1. The ground wire shall be as close to the first VFD in the network as possible.
For each DeviceNet network with multiple devices, only one device must be grounded.
- Note 2. Install resistor between terminal 2 and terminal 4 on each end of devicenet network

THIS DRAWING AND ALL INFORMATION ON IT IS THE PROPERTY OF SCANDIA TECHNOLOGIES, INC. NEITHER THIS DRAWING NOR ANY INFORMATION CONCERNING THE DRAWING MAY BE REPRODUCED, EXHIBITED, OR FURNISHED WITHOUT THE CONSENT OF SCANDIA TECHNOLOGIES, INC.				 THIRD ANGLE PROJECTION		DO NOT SCALE DRAWING TOLERANCES UNLESS OTHERWISE SPECIFIED 0.0 = +/- .03 FRACTION = +/- 1/32" 0.00 = +/- .010" ANGLE = +/- 0.5" 0.000 = +/- .005"		 communications Scandia Technologies Division 12340 86th Street North Largo, FL 33773		TITLE: DEVICENET-WIRING DETAILS	
BY: NAME: DATE: USED ON ASSY: REV:				REMOVE ALL BURRS AND SHARP EDGES		CUSTOMER: CITY-OF-CLEARWATER		DRAWING No: 39253-027		REV: A	
DESIGNED: D.HAZELBAKER 7/27/02				CONCENTRICITY: .005" T.I.R.		CAD FORMAT: AUTOCAD 2000		SCALE: XXXX		SHEET XX OF XX	
DETAILED: D.HAZELBAKER 7/27/02				PERPENDICULARITY: .003 IN./IN.							
CHECKED:				PARALLELISM: .003 IN./IN.							
APPROVED:				MINIMUM MACHINED SURFACE FINISH: 12.5							
REV.	DATE	BY	REVISION DESCRIPTION								
A	2/20/03	CM	AS-BUILT								
O	7/27/02	DH	SUBMITTAL								

**Appendix C – Section 13300 Instrumentations and Controls –
General Provisions**

1 SECTION 13300

2 INSTRUMENTATION AND CONTROLS – GENERAL PROVISIONS

3
4
5 PART 1 GENERAL

6
7 1.01 SCOPE OF WORK

- 8
9 A. The existing PLC located in the administration building is an Allen Bradley SLC-
10 5/05 PLC. All new I/O as part of this project shall be connected to this existing
11 PLC.
12
13 B. The Contractor shall procure the services of a Process Control System Supplier
14 (PCSS) to furnish and install all materials, equipment, labor and services,
15 required to achieve a fully integrated and operational system as specified herein,
16 in the Specification Sections listed below, and in related drawings, except for
17 those services and materials specifically noted.

18
19

Section No.	Title
13305	Control Descriptions
13340	Process Instrumentation and Equipment

- 20
21 C. The PCSS shall supply, install and configure all the instruments specified in
22 Division 13 and as shown on the Drawings.
23
24 D. An Applications Engineering Services Supplier (AESS) shall modify and
25 configure the existing Programmable Logic Controller (PLC) and Human Machine
26 Interface (HMI) programming to integrate the modifications as described in the
27 Contract Documents and as shown on the Drawings into the existing SCADA
28 system. The AESS shall provide configuration of the existing SCADA Historian
29 software and Reporting software as per Owner requirements.
30
31 E. It is considered acceptable for the PCSS and AESS to be the same company.
32
33 F. Provide instruments for process control as shown on the P&IDs except for those
34 identified as vendor provided instruments.
35
36 G. Furnish all labor, materials, equipment and incidentals required to complete the
37 testing of all devices and systems furnished and installed as detailed on the
38 Drawings.
39
40 H. Auxiliary and accessory devices necessary for system operation or performance,
41 such as transducers, relays, signal amplifiers, intrinsic safety barriers, signal
42 isolators, software, and drivers to interface with existing equipment or equipment
43 provided by others under other Sections of these specifications, shall be included
44 whether they are shown on the Drawings or not.

- 1
2 I. All equipment and installations shall satisfy applicable Federal, State and local
3 codes.
4
5 J. Use the equipment, instrument, and loop numbering scheme shown on the
6 Drawings and specifications in the development of the submittals. Do not deviate
7 from or modify the numbering scheme without the Engineer's approval.
8

9 1.02 MEASUREMENT AND PAYMENT

- 10
11 A. No separate payment will be made for work performed under this Section.
12 Include the cost for this work in the lump sum Base Bid Item.
13

14 1.03 RELATED WORK

- 15
16 A. Instrumentation and Controls conduit systems are specified in Division 16.
17
18 B. Instrumentation signal cable and alarm and status wiring are specified Division
19 16.
20
21 C. Relevant equipment Sections in Divisions 11, 13, 15, and 16 with specific
22 requirements called out.
23

24 1.04 SUBMITTALS

25
26 A. General Requirements:

- 27
28 1. Refer to Section 01300 for general submittal requirements.
29
30 2. Shop drawings shall demonstrate that the equipment and services to be
31 furnished comply with the provisions of these specifications and shall provide
32 a complete record of the equipment as manufactured and delivered.
33
34 3. Submittals shall be complete; giving equipment specifications, details of
35 connections, wiring, ranges, installation requirements, and specific
36 dimensions. Submittals consisting of only general sales literature shall not be
37 acceptable.
38
39 4. Substitutions on functions or type of equipment specified shall not be
40 acceptable unless specifically noted.
41
42 5. Separate submittals shall be made for each submittal listed below.
43

44 B. Project Plan, Deviation List, and Schedule Submittal:
45

- 1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
1. Submit, within 45 calendar days after Notice to Proceed, a Project plan. The Project Plan shall be submitted and approved before further submittals shall be accepted. The Project Plan shall, at a minimum, contain the following:
 - a. Understanding of the project work, interfaces to other systems, schedule, startup, and coordination. A discussion of startup, replacement of existing equipment with new, switchover (Maintaining Plant Operations during system transition), approach to testing and training, and other tasks as required by these specifications shall be included as applicable.
 - b. Project personnel and organization including the PCSS project manager, project engineer, and lead project technicians. Include resumes of each these individuals and specify in writing their commitment to this project.
 - c. Sample formats of the shop drawings to be submitted and in conformance with the requirements of the Specifications. At a minimum include samples of panel fabrication drawings, loop, and I/O wiring diagrams.
 2. Exceptions to the Specifications or Drawings shall be clearly defined in a Deviation List. The Deviation List shall consist of a paragraph-by-paragraph review of the Specifications indicating acceptance or any proposed deviations, the reason for exception, the exact nature of the exception and the proposed substitution so that an evaluation may be made by the Engineer. If no exceptions are taken to the specifications or drawings the PCSS shall make a statement as such. If there is no statement by the PCSS, then it is acknowledged that no exceptions are taken.
 3. Project schedule shall be coordinated with the General Contractor. A schedule prepared in Gantt chart format clearly showing task linkages for all tasks and identifying critical path elements. PCSS schedule must be based on the General Contractor schedule and must meet all field installation, testing, and start-up milestones in that schedule. The project schedule shall illustrate I&C related major project milestones including the following:
 - a. Schedule for all subsequent project submittals. Include the time required for Contractor submittal preparation, Engineer's review time, and a minimum of two complete review cycles.
 - b. Proposed dates for all project coordination meetings.
 - c. Hardware purchasing, fabrication, and assembly (following approval of related submittals).
 - d. Shipment of instrument and control system equipment.

- e. Installation of instrument and control system equipment.
- f. Testing: Schedule for all testing.
- g. Schedule for system cutover and startup.
- h. Schedule for all training including submittal and approval of O&M manuals and site training.

C. Input/Output (I/O) List Submittal:

1. Submit, within 60 days after Notice to Proceed, a complete system Input/Output (I/O) address list for equipment connected to the control system under this Contract.
2. I/O list shall be based on the Drawings, the design I/O list (if included), and requirements in the Specifications.
3. The I/O list shall be submitted in both a Microsoft Excel readable electronic file format and an 8-1/2 inch by 11-inch hard copy.
4. The I/O list shall reflect all active and spare I/O points. Add points to accommodate spare I/O as required in the specifications.
5. The I/O list shall be arranged such that each control panel has a dedicated worksheet. At a minimum, I/O worksheet shall include the following information:
 - a. DESCRIPTION: A description of the function of the device (text that includes signal source, control function, etc.) Include the text "Spare Points" for all I/O module points that are not connected to equipment.
 - b. PHYSICAL LOCATION: The Control Panel designation of where the I/O point is wired to.
 - c. Physical POINT ADDRESS: Rack, Slot, and Point (or Channel) assignment for each I/O point.
 - d. I/O TYPE: use DO - Discrete Output, DI - Discrete Input, AO - Analog Output, AI - Analog Input, PI - Pulse Input, or PO - Pulse Output.
 - e. RANGE/STATE: The range in engineering units corresponding to an analog 4-20 mA signal, or, the state at which the value of the discrete points are "1."

- 1 f. ENGINEERING UNITS: The engineering units associated with the
2 Analog I/O.
3
- 4 g. ALARM LIMITS: Include alarm limits based on the control descriptions
5 and the Drawings.
6
- 7 6. The I/O list shall be sorted in order by:
8
9 a. Physical location.
10
11 b. I/O Type.
12
- 13 7. Once the I/O list is approved, the PLC I/O addresses shall not be modified
14 without approval by the Engineer.
15
- 16 D. Field Instruments Submittal:
17
18 1. Refer to the Instruments section for submittal requirements.
19
- 20 E. Hardware and Software Packages Submittal:
21
22 1. For each hardware and software packages component specified in the
23 sections above, submit a cover page that lists, at a minimum, date,
24 specification number, product name, manufacturer, model number,
25 Location(s), and power required. Preferred format for the cover page is ISA-
26 TR20.00.01-2001 (updated in 2004-2006), general data sheet; however,
27 other formats will be acceptable provided they contain all required
28 information.
29
- 30 F. Testing Submittals - Submit, in one submittal, the following testing related
31 documents:
32
33 1. Status signoff forms:
34
35 a. Develop and submit project specific I/O Status and Automatic Control
36 Strategy signoff forms to be used during factory and field testing to
37 organize and track each loop's inspection, adjustment, calibration,
38 configuration, and testing status and sign off. Include sign-off forms for
39 each testing phase showing all loops. Submit testing forms prior to start
40 of testing.
41
- 42 2. Testing Procedures:
43
44 a. Submit detailed procedures proposed to be followed for each of the tests
45 specified herein. The test procedures shall serve as the basis for the

1 execution of the required tests to demonstrate that the system meets and
2 functions as specified.

3
4 b. Documents shall be structured in an orderly and easy to follow manner
5 to facilitate an efficient and comprehensive test.

6
7 c. Test procedures shall indicate all pre-testing setup requirements, all
8 required test equipment, and simulation techniques to be used.

9
10 d. Test procedures shall be structured in a cause-and-effect manner where
11 the inputs are indicated, and the outputs are recorded.

12
13 e. Test procedures shall include the demonstration and validation under
14 normal operating conditions and under various failure scenarios as
15 specified in Contract Documents.

16
17 f. Testing may not start until Testing Submittal has been approved.

18
19 G. Test Documentation:

- 20
21 1. Upon completion of each required test, document the test by submitting a
22 copy of the signed off Testing Status forms. Testing shall not be considered
23 complete until the signed-off forms have been submitted and approved.
24 Submittal of other test documentation, including "highlighted" wiring
25 diagrams with field technician notes, are not acceptable substitutes for the
26 formal test documentation.

27
28 H. Training Plan Submittals:

- 29
30 1. Submit a Training Plan submittal, which outlines of each training course
31 including course objectives and target audience, resumes of instructors,
32 prerequisite requirements for each class, and samples of handouts for
33 review.

34
35 I. Spares, Expendables, and Test Equipment Lists Submittal:

- 36
37 1. Submit a list of, and descriptive literature for, spares, expendables, and test
38 equipment.
39
40 2. Submit a list of, and descriptive literature for, additional spares, expendables,
41 and test equipment recommended by the manufacturer.
42
43 3. Submit unit and total costs for the additional spare items specified or
44 recommended for each subsystem.

45
46 J. Operations and Maintenance (O&M) Manuals:

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46

1. Submit in accordance with Section 01700.
2. The operations and maintenance manuals shall, at a minimum, contain the following information:
 - a. Table of Contents:
 - 1) A Table of Contents shall be provided for the entire manual with the specific contents of each volume clearly listed. The complete Table of Contents shall appear in each volume.
 - b. Instrument and Equipment Lists:
 - 1) The following lists shall be developed in Microsoft Excel format and provided not only as a hardcopy in O&M but also electronically.
 - 2) An instrument list for all devices supplied including tag number, description, specification section and paragraph number, manufacturer, model number, serial number, range, span, location, manufacturer phone number, local supplier name, local supplier phone number, completion year replacement cost, and any other pertinent data.
 - 3) An equipment list for all non-instrument devices supplied listing description, specification section and paragraph number, manufacturer, model number, serial number, location, manufacturer phone number, local supplier name, local supplier phone number, completion year replacement cost, and any other pertinent data.
 - c. Equipment Operations and Maintenance Information:
 - 1) ISA-TR20.00.01-2001(updated in 2004-2006) data sheets shall be provided for all field instruments. For non-field instrumentation devices, provide a cover page for each device, piece of equipment, and OEM software that lists date, specification number, product name, manufacturer, model number, Location(s), and power required. Preferred format for the cover page is ISA-TR20.00.01-2001(updated in 2004-2006), general data sheet; however, other formats will be acceptable provided they contain all required information.
 - 2) Vendor O&M documentation for each device, piece of equipment, or OEM software shall be either new documentation written specifically for this project or modified standard vendor documentation. All standard vendor documentation furnished shall have all portions that

1 apply clearly indicated with arrows or circles. All portions that do not
2 apply shall be neatly lined out or crossed out. Groups of pages that
3 do not apply at all to the specific model supplied shall be removed.
4

5 d. As-Built Drawings:
6

- 7 1) Complete as-built drawings, including all drawings and diagrams
8 specified in this section under the "Submittals" section. These
9 drawings shall include all termination points on all equipment the
10 system is connected to, including terminal points of equipment not
11 supplied by the PCSS.
12
13 2) As built documentation shall include information from submittals, as
14 described in this Specification, updated to reflect the as-built system.
15 Errors in or modifications to the system resulting from the Factory
16 and/or Functional Acceptance Tests shall be incorporated in this
17 documentation.
18

19 e. Electronic O&M Information:
20

- 21 1) In addition to the hard copy of O&M data, provide an electronic
22 version of all equipment manuals and data sheets, along with any
23 software back-up of configuration files. Electronic documents shall
24 be supplied in Portable Document Format.
25
26 2) Provide electronic files for all custom-developed manuals including
27 training manuals. Text shall be supplied in both Microsoft Office
28 format and Adobe Acrobat format.
29
30 3) Provide electronic files for all drawings produced. Drawings shall be
31 in AutoCAD ".dwg" format and in Adobe Acrobat format. Drawings
32 shall be provided using the AutoCAD eTransmit feature to bind
33 external references, pen/line styles, fonts, and the drawing file into
34 individual zip files.
35
36 4) If specified in the training section, provide digital copies of all training
37 videos. Videos shall be in a format that is readable by standard DVD
38 players and by standard PC DVD drives. Format shall be a minimum
39 of 800 by 600 pixels and shall include sound.
40

- 41 3. The cover and edge of each volume shall contain the information as specified
42 in Section 01700.
43

1 1.05 COORDINATION MEETINGS

2
3 A. Schedule the mandatory coordination meetings as described herein. The
4 meetings shall be held at the Owner's designated location and shall include
5 attendance by the Owner, the Engineer, the Contractor, and the PCSS's Project
6 Engineer. Other Division 13 specifications may require additional meetings.
7 Prepare and distribute an agenda for this meeting a minimum of one week before
8 the scheduled meeting date. Meeting shall be scheduled a minimum of one week
9 before the requested meeting date.

10
11 1. A project kickoff coordination meeting shall be held within two weeks after
12 submitting the Project Plan. The purpose of the meeting shall be to discuss
13 the PCSS's Project Plan, to summarize the PCSS's understanding of the
14 project; discuss any proposed substitutions or alternatives; schedule testing
15 and delivery deadline dates; provide a forum to coordinate hardware and
16 software related issues; and request any additional information required from
17 the Owner. The meeting will last up to one business day.

18
19 2. A submittal review coordination meeting shall be held after the Hardware,
20 Panel Drawing, and Loop Drawing Submittal package has been reviewed by
21 the Engineer and returned to the PCSS. The purpose of this meeting shall be
22 to review comments made on the submittal package; to refine scheduled
23 deadline dates; coordinate equipment installation activities. The meeting will
24 last up to one business day.

25
26 3. Regular on-site meetings when the PCSS staff is at the plant site.

27
28 1.06 REFERENCE STANDARDS

29
30 A. Publications are referred to in the text by basic designation only. Where a date is
31 given for reference standards, that edition shall be used. Where no date is given
32 for reference standards, the latest edition in effect at the time of bid opening shall
33 apply.

34
35 B. International Society of Automation (ISA):

36
37 1. ISA S5.2, Binary Logic Diagrams for Process Operations.

38
39 2. ISA S5.3, Graphic Symbols for Distributed Control/Shared Display

40
41 3. Instrumentation Logic and Computer Systems.

42
43 4. ISA S5.4, Instrument Loop Diagrams.

44
45 5. ISA S20, Specification Forms for Process Measurement and Control
46 Instruments, Primary Elements and Control Valves.

- 6. ISA RP60.3, Human Engineering for Control Centers.
- 7. ISA RP60.6, Nameplates, Labels, and Tags for Control Centers.
- 8. ISA-99, Industrial Automation and Control Systems Security.

C. National Electrical Manufacturers Association (NEMA).

D. National Fire Protection Agency (NFPA):

- 1. NFPA 70, National Electrical Code (NEC).
- 2. NFPA 79, Industrial Control Equipment.

E. Underwriters Laboratories, Inc. (UL):

- 1. UL 508 - Industrial Control Equipment - for custom fabricated equipment.
- 2. A nationally recognized testing laboratory, as approved by the Authority having jurisdiction, may substitute for UL listing on commercial off the shelf products.

1.07 QUALITY ASSURANCE

A. The Process Control System Supplier (PCSS) shall be a "systems integrator" regularly engaged in the design and the installation of instrumentation systems and their associated subsystems as they are applied to the municipal water and wastewater industry. For the purposes of this Specification Section, a "systems integrator" shall be interpreted to mean an organization that complies with all of the following criteria:

- 1. Employs personnel on this project who have successfully completed ISA or manufacturers training courses on general process instrumentation and configuration and implementation of the specific programmable controllers, computers, and software proposed for this project. Key personnel shall hold ISA CCST Level 1 certification or have a minimum of 10 years of verifiable plant startup experience. Key personnel shall include, as a minimum, the lead field technician.
- 2. Has successfully completed work of similar or greater complexity on at least three previous projects within the last five years. Successful completion shall be defined as a finished project completed on time, without any outstanding claims or litigation involving the PCSS. Potential references shall be for projects where the PCSS's contract was of similar size to this project.

1 3. Has been actively engaged in the type of work specified in this Section for a
2 minimum of five years.

3
4 B. The PCSS shall maintain a permanent, fully staffed and equipped service facility
5 within 200 miles of the project site with full time employees capable of designing,
6 fabricating, installing, calibrating, and testing the systems specified herein. At a
7 minimum, the PCSS shall be capable of responding to on-site problems within 12
8 hours of notice. Provide an on-site response within 4 hours of notification starting
9 at two months before scheduled startup to two months after startup completion.

10
11 C. PCSS shall hold a valid UL-508 certification for their panel fabrication facility.

12
13 D. Actual installation of the instrumentation system need not be performed by the
14 PCSS's employees; however, the PCSS as a minimum shall be responsible for
15 the technical supervision of the installation by providing on site supervision to the
16 installers of the various components.

17
18 E. Being listed in this specification does not relieve any potential PCSS from
19 meeting the qualifications specified in this Section. The listed PCSS may have to
20 submit a qualifications submittal at the request of the County.

21
22 1.08 DELIVERY, STORAGE AND HANDLING

23
24 A. Delivery, storage, and handling shall be in accordance with Section 01600.

25
26 B. Shipping Precautions:

27
28 1. After completion of shop assembly, factory test and approval of all
29 equipment, cabinets, panels and consoles shall be packed in protective
30 crates and enclosed in heavy duty (5 mil) polyethylene envelopes or secured
31 sheeting to provide protection from damage, dust and moisture.
32 Dehumidifiers shall be placed inside the polyethylene coverings. The
33 equipment shall then be skid-mounted for final transport. Lifting rings shall be
34 provided for moving without removing protective covering. Boxed weights
35 shall be shown on shipping tags together with instructions for unloading,
36 transporting, storing and handling at the job site.

37
38 2. Manufacturer's special instructions for field handling, storage and installation
39 required for protection, shall be securely attached to the packaging for each
40 piece of equipment prior to shipment. The instructions shall be stored in
41 resealable plastic bags or other means of protection.

42
43 3. If any apparatus has been damaged, such damage shall be repaired at no
44 additional cost to the Owner.
45

1 1.09 WARRANTY

- 2
3 A. Provide warranty per Section 01740, Warranties and Bonds, and as specified
4 herein.

5
6 1.10 PROJECT/SITE REQUIREMENTS

- 7
8 A. Environmental Requirements. Refer to Section 16010 and Electrical Drawings for
9 specific environmental and hazardous area classifications.

- 10
11 B. Elevation: Equipment shall be designed to operate at the project ground
12 elevation.

- 13
14 C. Temperature:

15
16 1. Outdoor areas' equipment shall operate between -30 to 50°C degrees
17 ambient.

18
19 2. Equipment located in indoor locations shall operate between 10 to 35°C
20 degrees ambient minimum.

21
22 3. Storage temperatures shall range from 0 to 50°C degrees ambient minimum.

23
24 4. Additional cooling or heating shall be furnished if required by the equipment
25 as specified herein.

- 26
27 D. Relative Humidity. Air conditioned area equipment shall operate between 20 to
28 95 percent relative, non-condensing humidity. All other equipment shall operate
29 between 5 to 100 percent relative, condensing humidity.

30
31 PART 2 PRODUCTS

32
33 2.01 GENERAL

- 34
35 A. All instrumentation and electronic equipment shall be of the manufacturer's latest
36 design, utilizing printed circuitry and epoxy or equal coating to prevent
37 contamination by dust, moisture and fungus. The field mounted equipment and
38 system components shall be designed for installation in dusty, humid and slightly
39 corrosive service conditions.

- 40
41 B. All instruments shall be provided with mounting hardware and floor stands, wall
42 brackets, or instrument racks unless otherwise noted. Fasteners for securing
43 control panels and enclosures to walls and floors shall be either hot-dipped
44 galvanized after fabrication or stainless steel. Provide stainless steel fasteners
45 only in corrosive areas rated NEMA 4X on the Drawings or as defined under
46 Division 16. Provide minimum size anchor of 3/8-inch.

- 1
2 C. All indicators shall be linear in process units, unless otherwise noted. All
3 transmitters shall be provided with indicators in process units, accurate to two
4 percent or better.
5
6 D. All equipment, cabinets and devices furnished shall be heavy-duty type, designed
7 for continuous industrial service. The system shall contain similar products of a
8 single manufacturer, and shall consist of equipment models, which are currently
9 in production. All equipment provided shall be of modular construction and shall
10 be capable of field expansion.
11
12 E. All electronic/digital equipment shall be provided with radio frequency
13 interference protection.
14
15 F. Electrical:
16
17 1. Equipment shall operate on a 60 Hertz alternating current power source at a
18 nominal 120 volts, plus or minus 10 percent, except where specifically noted.
19 Regulators and power supplies required for compliance with the above shall
20 be provided between power supply and interconnected instrument loop.
21 Where equipment requires voltage regulation, constant voltage transformers
22 shall be supplied.
23
24 2. With the exception for field device network connected devices, all electronic
25 instrumentation shall utilize linear transmission signals of isolated 4 to 20 mA
26 DC (milliampere direct current) capable of driving a load up to 750 ohms,
27 unless specified otherwise. However, signals between instruments within the
28 same panel or cabinet may be 1-5 VDC (volts direct current).
29
30 3. Outputs of equipment that are not of the standard signals as outlined, shall
31 have the output immediately raised and/or converted to compatible standard
32 signals for remote transmission. No zero based signals will be allowed.
33
34 4. All switches shall have double-pole, double-throw contacts rated at a
35 minimum of 600 VA, unless noted otherwise.
36
37 5. Switches and/or signals indicating an alarm, failure or upset condition shall
38 be wired in a fail-safe manner. A fail-safe condition is an open circuit when in
39 an alarm state.
40
41 6. Materials and equipment shall be UL approved whenever such approved
42 equipment and materials are available.
43
44 7. All equipment furnished shall be designed and constructed so that in the
45 event of power interruption, the systems specified herein shall go through an

1 orderly shutdown with no loss of memory, and shall resume normal operation
2 without manual resetting when power is restored, unless otherwise noted.
3

4 2.02 ELECTRICAL SURGE PROTECTION

- 5
- 6 A. General - Surge protection shall be provided to protect the electronic
7 instrumentation system from induced surges propagating along the signal and
8 power supply lines from lightning, utility, or the plant electrical system. The
9 protection systems shall be such that the protective level shall not interfere with
10 normal operation but shall be lower than the instrument surge withstand level.
11 Protection shall be maintenance free and self-restoring. Devices shall have a
12 response time of less than 50 nanoseconds and be capable of handling a
13 discharge surge current (at an 8x20µs impulse waveform) of at least 8 kA.
14 Ground wires for all instrumentation device surge protectors shall be connected
15 to a low resistance ground in accordance with Section 16452.
16
- 17 B. Provide protection of all analog signal (4-20 mA) circuits where any part of the
18 circuit is outside of the building envelope. Circuits shall be protected at both the
19 transmitter and the control system end of the circuit. Protection devices located
20 near the transmitter shall be mounted in a separate NEMA 4X stainless steel
21 enclosure (plastic is not acceptable) or conduit mounted, and shall be Phoenix
22 Contact PT Series, MTL Surge Technologies (Telematic) TP48, Citel TSP-10
23 series, or equal. Substitution of a single device to protect both 120 VAC and 4-
24 20 mA wires to an instrument is acceptable. Protection devices in control panels
25 shall be MTL Surge Technologies (Telematic) SD Series, Phoenix Contact PT
26 Series, Citel DLA series, or equal.
27
- 28 C. Provide protection of all 120 VAC power feeds into control panels, instruments,
29 and control room equipment. Surge arresters shall be Transtector ACP-100BW
30 Series, Phoenix Contact "Mains-PlugTrab", MCG Surge Protection 400 Series,
31 Citel DS40 series, or equal.
32
- 33 D. Non-Fiber Based Data Highway or Communications Circuits - Provide protection
34 on all communication and data highway circuits that leave a building or are routed
35 external to a building. Circuit protection shall be provided at both ends of the line.
36 Surge protection devices shall be Phoenix Contact PlugTrab Series, Transtector
37 FSP Series, MTL Surge Technologies (Telematic) NP Series, Citel DLA series or
38 MJ8 series, or equal.
39
- 40 E. RF Coaxial Cable - Provide protection on communication cables between radios
41 and antennas, mounted either inside the panel, or in the wall of the enclosure in
42 accordance with NEMA and UL standards. Surge protection devices shall be Citel
43 P8AX series, Polyphaser, or equal.
44

- 1 F. Inductive Loads - Provide coil surge suppression devices, such as varistors or
2 interposing relays, on all process controller outputs or switches rated 120 VA or
3 less that drive solenoid, coil, or motor loads.
4
- 5 G. Telephone Circuits - At a minimum, provide Telephone Company approved line
6 protection units for all telephone lines used for telemetry or SCADA system use
7 under this Contract.
8

9 2.03 I/O MODULES

- 10
- 11 A. The existing PLC located in the administration building is an Allen Bradley SLC-
12 5/05 PLC with two spare (unused) slots. If necessary, the PCSS shall furnish
13 and install the necessary I/O modules into the existing SLC-5/05 PLC in order to
14 incorporate the new I/O signals as part of the project. The AESS shall be
15 responsible for performing programming and configuring of PLC and SCADA HMI
16 to incorporate the new I/O signals as part of the project.
17

18 2.04 SPARE PARTS

- 19
- 20 A. All spare parts shall be wrapped in bubble wrap, sealed in a polyethylene bag
21 complete with dehumidifier, then packed in cartons and labeled with indelible
22 markings. Complete ordering information including manufacturer's contact
23 information (address and phone number), part name, part number, part ordering
24 information, and equipment name and number(s) for which the part is to be used
25 shall be supplied with the required spare parts. The spare parts shall be delivered
26 and stored in a location directed by the Owner or Engineer.
27
- 28 B. Furnish one of each type of installed Surge protection devices.
29
- 30 C. Other spare parts are specified in each section. An overview follows:
31
 - 32 1. Instrument related Spare Parts - see the Instrument section(s).
33
- 34 D. I/O Cards: Provide spares for each unique I/O module type installed. Provide two
35 or 10 percent of installed quantity, whichever is greater.
36

37 2.05 TEST EQUIPMENT

- 38
- 39 A. Provide all test equipment, instruction manuals, carrying/storage cases, unit
40 battery charger, special tools, calibration fixtures, cord extenders, patch cords,
41 test leads, and miscellaneous items for checking field operation of all supplied
42 equipment.
43
- 44 B. All test equipment shall be wrapped in bubble wrap, sealed in a polyethylene bag
45 with a dehumidifier, then packed in cartons and labeled with indelible markings.
46 Complete ordering information including manufacturer's part number, and

1 equipment name shall be supplied. The test equipment shall be delivered and
2 stored in a location directed by the Engineer.

3
4 PART 3 EXECUTION

5
6 3.01 GENERAL INSTALLATION

7
8 A. Instrumentation and accessory equipment shall be installed in accordance with
9 manufacturer instructions. The indicated locations of equipment, transmitters,
10 alarms and similar devices indicated are approximate only. Exact locations of all
11 devices shall be as approved by the Engineer during construction. Obtain in the
12 field, all information relevant to the placing of process control equipment and in
13 case of interference with other work, proceed as directed by the Engineer and
14 furnish all labor and materials necessary to complete the work in an approved
15 manner at no additional cost to the Owner.

16
17 B. Provide brackets and hangers required for mounting of equipment.

18
19 C. The shield on each process instrumentation cable shall be continuous from
20 source to destination and be grounded at only one ground point for each shield.

21
22 D. Investigate each space in the building through which equipment must pass to
23 reach its final location. If necessary, ship material in sections sized to permit
24 passing through restricted areas in the building. Provide on-site service to
25 oversee the installation, the placing and location of system components, their
26 connections to the process equipment panels, cabinets and devices, subject to
27 the Engineer's approval. Certify that field wiring associated with the equipment is
28 installed in accordance with best industry practice. Coordinate work under this
29 Section with that of the electrical work specified under applicable sections of
30 Division 16.

31
32 E. Provide sunshades for equipment mounted outdoors in direct sunlight.
33 Sunshades shall include standoffs to allow air circulation around the cabinet.
34 Orient equipment outdoors to face to the North or as required to minimize the
35 impact of glare and ultraviolet exposure on digital readouts.

36
37 3.02 TESTING

38
39 A. Results of all testing shall be tracked on a project specific status sign off form or
40 similar document. PCSS shall be responsible for maintaining the sheet.

41
42 B. Wherever possible, perform tests using actual process variables, equipment, and
43 data. Where it is not practical to test with real process variables, equipment, and
44 data, provide all special testing materials and equipment required for a suitable
45 means of simulation.

- 1 C. PCSS shall coordinate all required testing with Contractor, affected
2 Subcontractors, Engineer, and Owner.
3
4 D. Deficiencies in workmanship and/or items not meeting specified testing
5 requirements shall be corrected to meet specification requirements at no
6 additional cost to Owner.
7
8 E. Testing, as specified herein, shall be repeated after correction of deficiencies is
9 made until specified requirements are met. This work shall be performed at no
10 additional cost to the owner.
11
12 F. Following tests shall be performed:
13
14 1. Instrument calibration, configuration, and set-up.
15
16 2. Input/Output (I/O) Testing to HMI and OITs.
17
18 3. Testing of control strategies.
19
20 G. Following successful completion of all tests, PCSS shall submit a Certification of
21 Installation for system in accordance with Section 01625.
22

23 3.03 TRAINING

- 24
25 A. Provide training for the Owner's personnel in the operation, maintenance,
26 troubleshooting, of the PLC and HMI programming changes provided as part of
27 this project. The training shall be held before the testing, but not more than two
28 months before.
29
30 B. Provide manufacturer's training for the instruments provided as part of this
31 project. The training shall be provided for maintenance staff and shall be of
32 minimum 2 hours duration.
33

34 END OF SECTION