

## Appendix A

### De Nora Shop Drawings

PROJECT NAME: City of Winnipeg - Deacon Booster Pumping  
Station UV Disinfection System Upgrades  
CONTRACTOR: Calgon Carbon UV Technologies  
SUPPLIER/MANUFACTURER Calgon Carbon UV Technologies  
DRAWING SUBJECT: SD-001R2-Mechanical Submittal

PAGE 1 of 1  
PROJECT NO.: 60640642  
DATE:  
DATE RECEIVED: December 29, 2021

**\*\*THIS SHEET MUST REMAIN WITH SHOP DRAWING. DO NOT DETACH!!\*\***

<b>Distribution</b>	<b>JG</b>						
<b>Comments</b>							

**One copy of the following is attached for your review.**

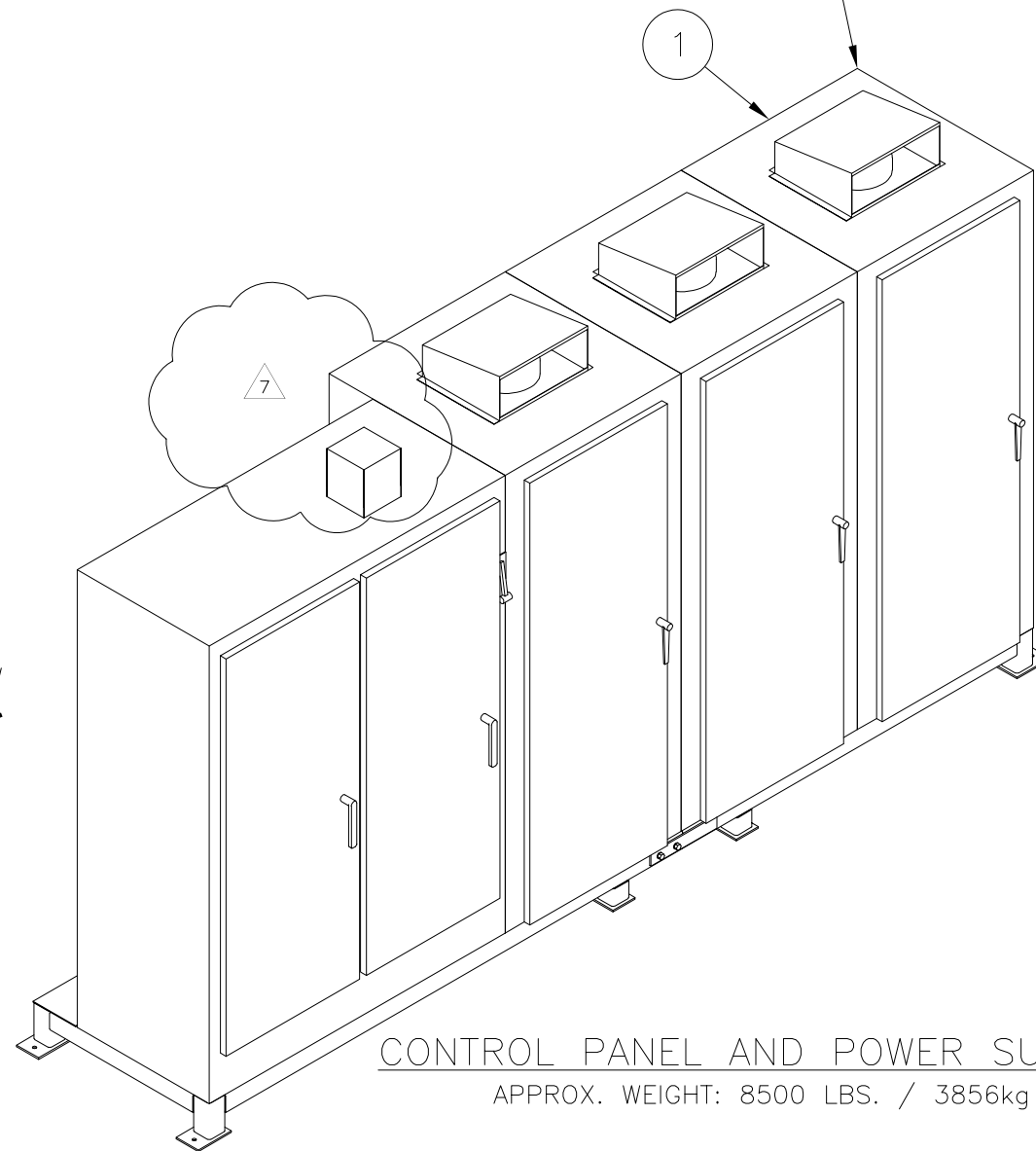
Submission No. : SD-001R2	<b>SUBMITTAL REVIEW</b> <b>AECOM</b>		
Project No. : 60640642	Discipline : Electrical		
<input checked="" type="checkbox"/> Reviewed - No Comment	<input type="checkbox"/> Reviewed - Revise and Resubmit		
<input type="checkbox"/> Reviewed - As Noted	<input type="checkbox"/> Review by Consultant Not Required		
Review is solely for general conformity with contract. The Consultant does not warrant or represent that information in this submittal is accurate or complete. Review does not relieve Contractor of responsibility for errors/omissions in designs, including this submittal, that are the Contractor's responsibility, and for conforming/correlating with all quantities/dimensions, performing the Work, selecting performance means/methods, coordinating with other parts of the Work/between trades, and performing the Work safely. Notwithstanding this review, Contractor remains solely responsible for contract compliance.			
By : J.G.		Date : Apr. 22, 2022	

PARTS LIST			
ITEM	QTY	NAME	DESCRIPTION
1	6	S100533	48"Ø, 9x20kW SENTINEL, POWER SUPPLY AND CONTROL PANEL SKID
2	6	S300612	48"Ø, 9x20kW SENTINEL, T/L REACTOR ASSEMBLY
3	2	450635	ANALYZER, UVT ONLINE 0-100%T
REPLACEMENT PARTS TO BE SUPPLIED WITH UPGRADE			
M	18	S301746	DRIVE SCREW, 1 1/4" ACME, 48" SN, PART DETAIL
M	18	S300445	DRIVE SCREW SLEEVE, PART DETAIL
M	18	S300736	UV SENSOR WINDOW, 13.78" INSERTION, ASSEMBLY DETAIL
M	36	S300737	UV SENSOR WINDOW, 7.35" INSERTION, ASSEMBLY DETAIL
M	54	S301640	UV SENSOR (0-1000 W/m2, 30 DEG.) MODIFICATION PART DETAIL
M	18	S301554	WIPER PLATE ASSEMBLY, 48" STAGGERED CONFIG., W/O WIPERS
M	18	S301207	BAFFLE - UPPER BOLTED SEG., 15" LG., PART DETAIL
E	54	154492	DC DRIVE, 240/120 VAC IN, 24/12VDC OUT, 5A
E	6	155908	DISPLAY, MAGELIS, 12" C/TFT, E-NET, 24 VDC
E	6	153878	E-NET RAIL SW., 5 PORT, 24 VDC
E	6	157001	PROCESSOR MODULE M580, LEVEL 1, DISTRIBUTED
E	6	157002	ETHERNET BACKPLANE, 12 SLOTS, (RACK X80)
E	6	157003	POWER SUPPLY MODULE, (MODICON X80)
E	12	157004	DIGITAL INPUT MODULE, 32-CH, ISOLATED, (MODICON X80)
E	12	157005	DIGITAL OUTPUT MODULE, 16-CH, RELAY, (MODICON X80)
E	18	157006	ANALOG INPUT MODULE, 8-CH, ISOLATED, (MODICON X80)
E	18	157007	ANALOG OUTPUT MODULE, 4-CH, ISOLATED, (MODICON X80)
E	12	157008	PREFORMED CORDSET, W/FLYING LEADS ON ONE END, (MODICON X80)
E	30	157009	REMOVABLE CONNECTION BLOCK, 20-WAY, (CAGE CLAMP TB)
E	18	157010	REMOVABLE CONNECTION BLOCK, 28-WAY, (CAGE CLAMP TB)

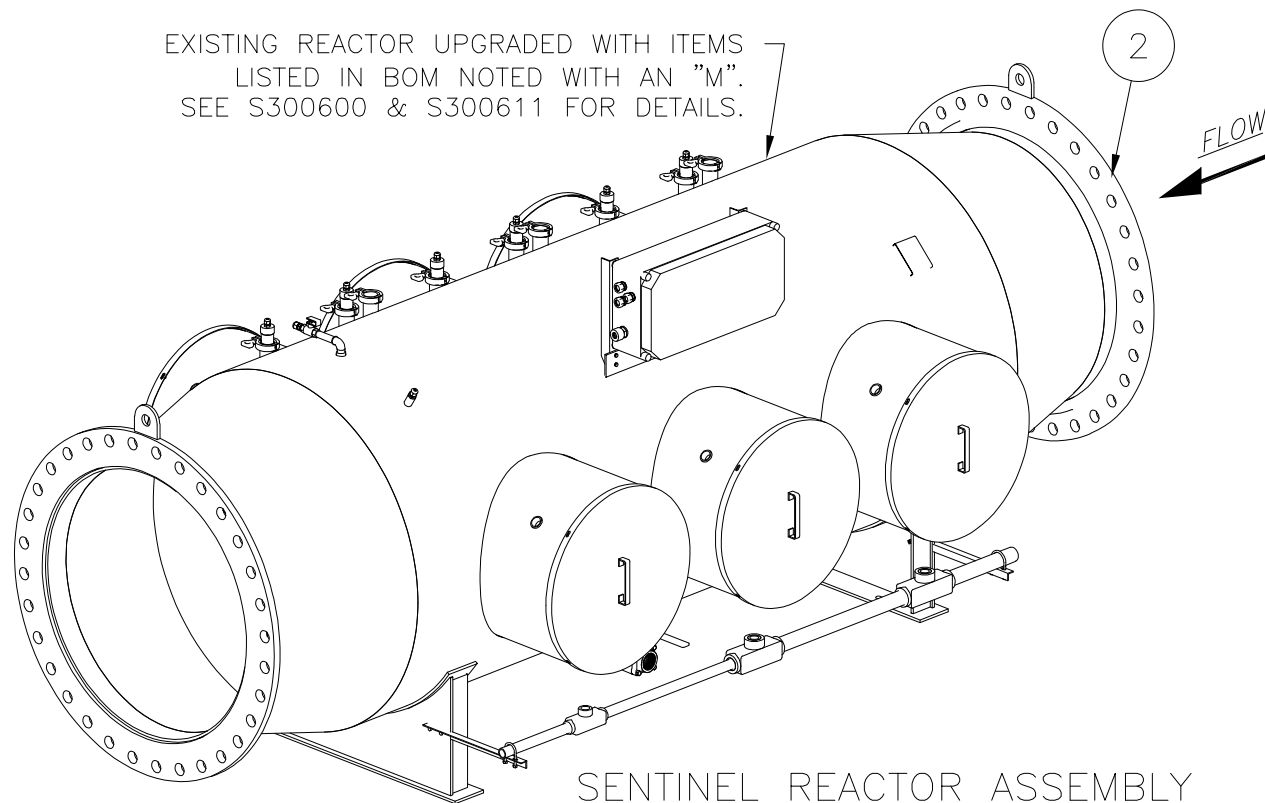
**NOTES:**

1. SENTINEL REACTOR PROVIDED WITH 36" 125 LB. FLAT FACE FLANGES.
2. INFLUENT AND EFFLUENT PIPING BY OTHERS.
3. CONTROL PANEL AND POWER SUPPLY MAY BE SEPARATED FROM THE SENTINEL REACTOR TO FACILITATE INSTALLATION BY NO MORE THAN 500 FEET / 150M OF CABLE.
4. ENTIRE FRONT AND TOP OF POWER SUPPLY CABINETS TO BE UNOBSTRUCTED FOR COOLING AIR FLOW.
5. REQUIRED CLEARANCE FOR LAMP REMOVAL OF 48" MAY BE PROVIDED ON EITHER SIDE OF THE REACTOR.
6. TOTAL HEAT REJECTION FROM ELECTRICAL CABINETS IS 49,000 BTU's.

EXISTING PS/CP UPGRADED WITH ITEMS LISTED IN BOM NOTED WITH AN "E". SEE ELECTRICAL DRAWINGS FOR DETAILS.



EXISTING REACTOR UPGRADED WITH ITEMS LISTED IN BOM NOTED WITH AN "M". SEE S300600 & S300611 FOR DETAILS.



**SENTINEL REACTOR ASSEMBLY**  
 APPROX. WEIGHT: 6000 LBS. / 2720kg  
 MATERIAL: 316L S.STL.

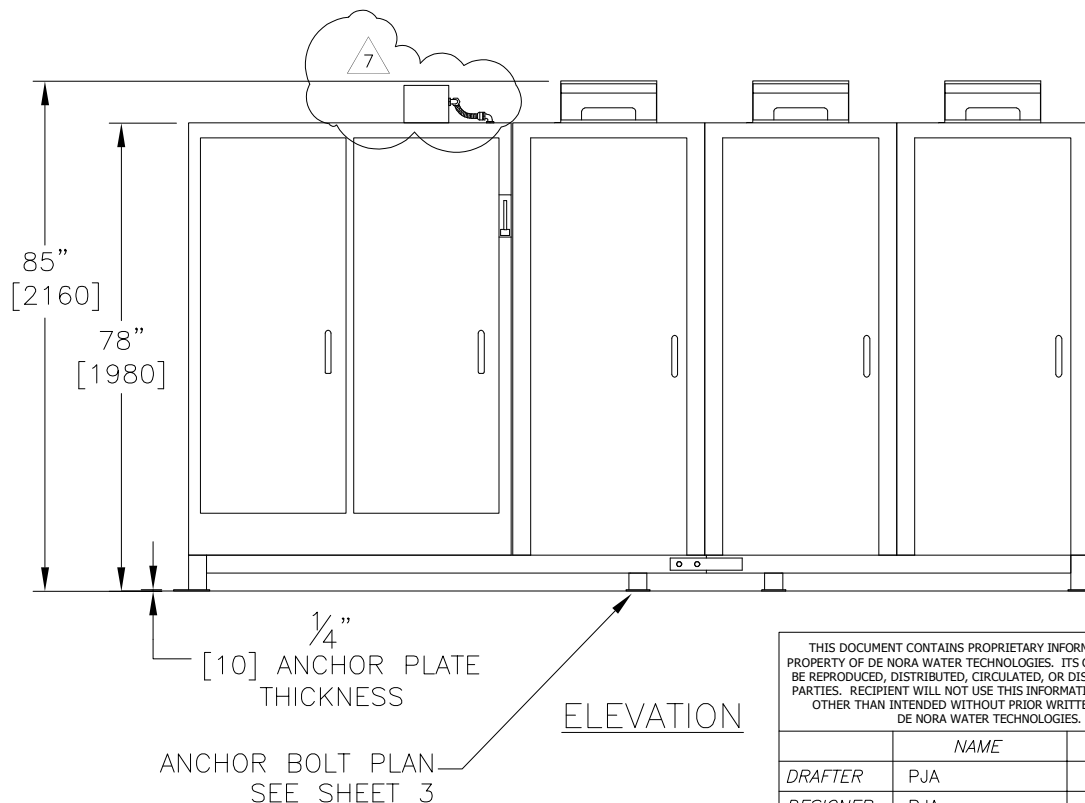
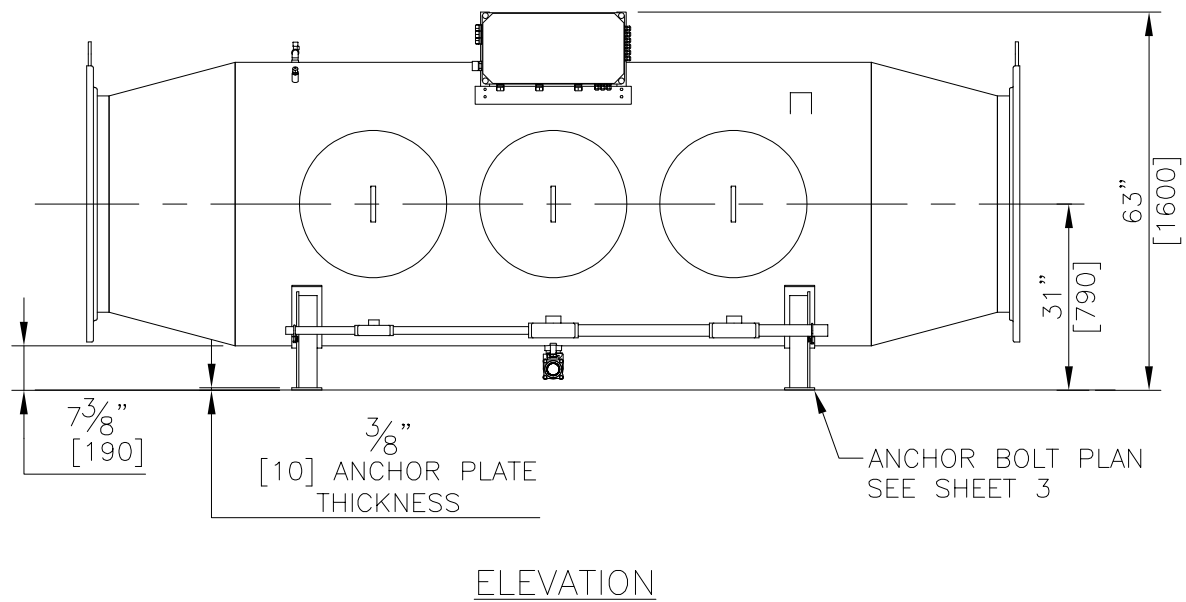
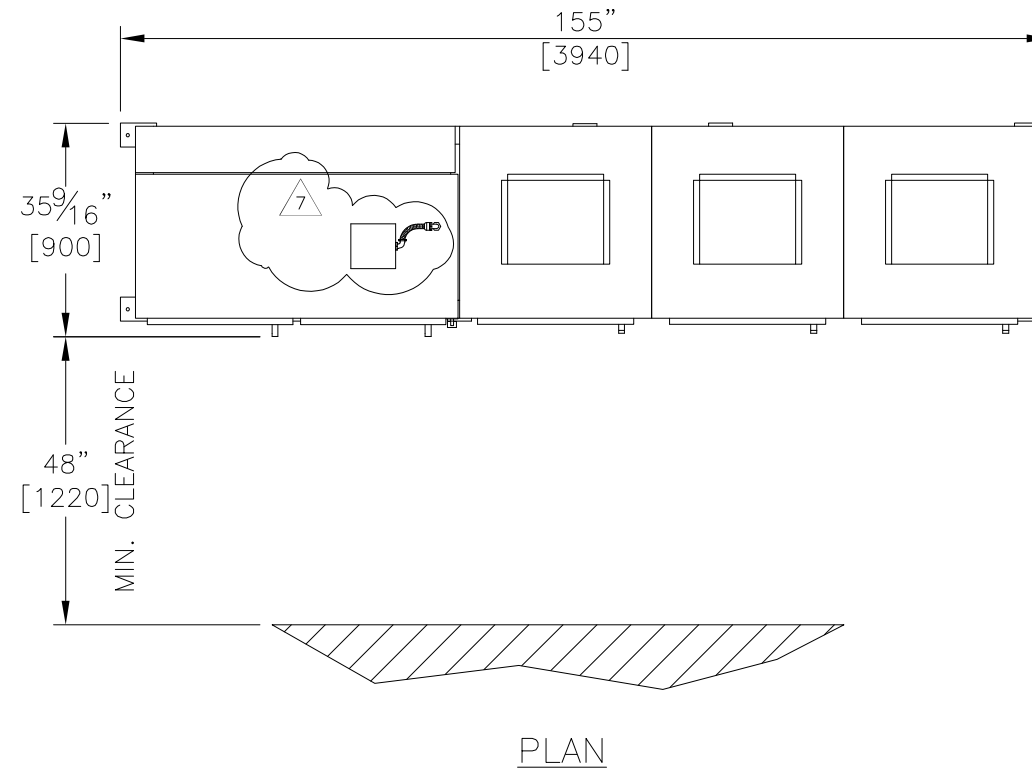
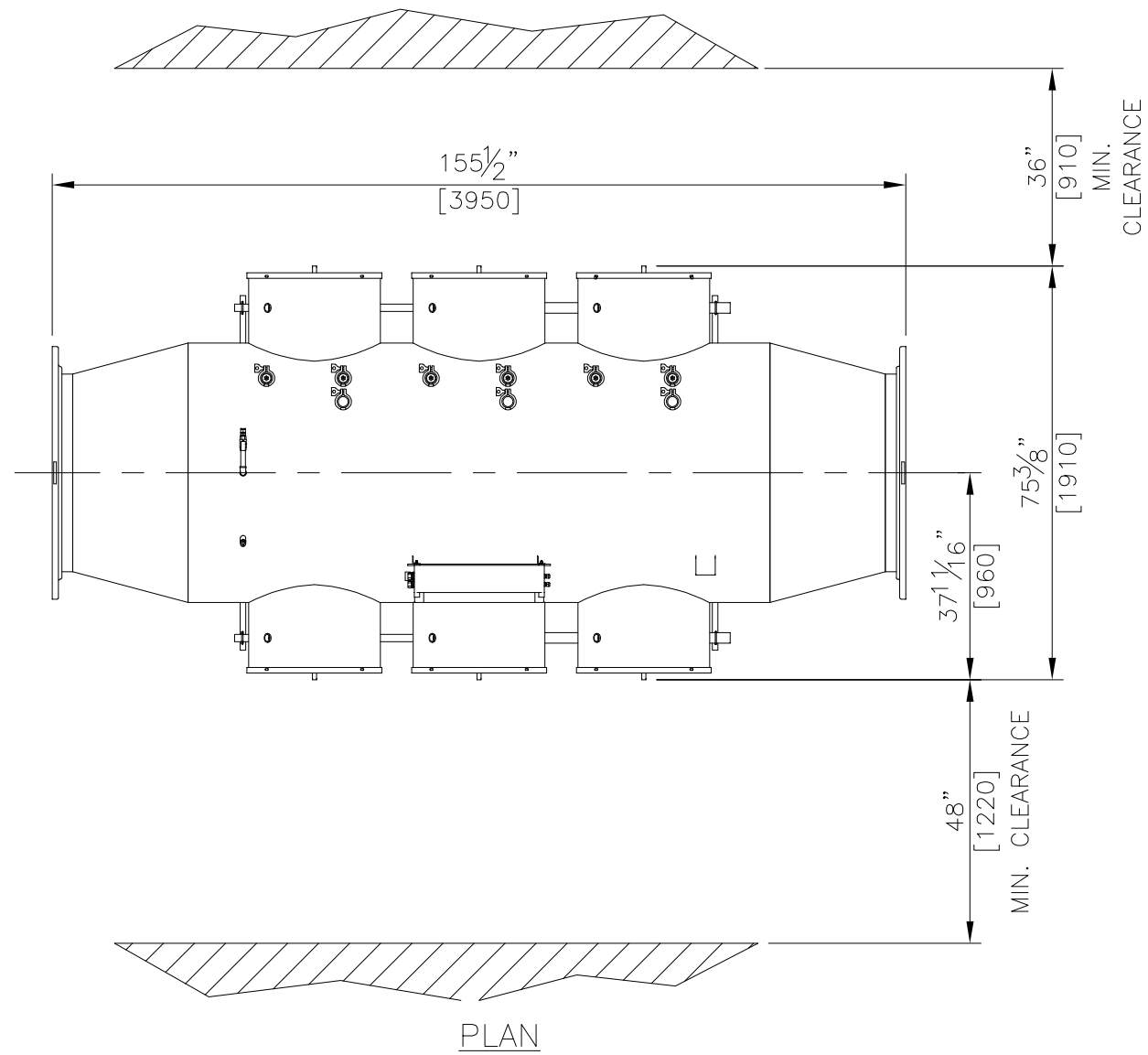
DESIGN CONDITIONS		
FLOW	21.6	MGD
UV TRANSMITTANCE (MIN)	75	%T
UV TRANSMITTANCE (MAX)	85	%T
PRESSURE	150	PSI
TEMPERATURE	77	*F
REACTOR CONFIGURATION	9 LAMP	STAGGERED

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	NAME	DATE
DRAFTER	PJA	9/15/03
DESIGNER	PJA	9/15/03
CHECKER		
APPROVAL		
PROJECT No.	US-03056.WINN	

7	REVISED WHERE NOTED	JLF	12/14/21
6	REVISED WHERE NOTED	JLF	11/10/21
5	REVISED BOM AS NOTED	JPT	8/13/21
REV	DESCRIPTION	APP	DATE
REVISIONS			

TOLERANCES (unless otherwise specified)			
ANGULAR	ADDED SPARE PARTS (2 PLACES)	±.010	
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005

 <b>DE NORA WATER TECHNOLOGIES, LLC</b>			
CLIENT	CITY OF WINNIPEG MANITOBA, CANADA		
TITLE	9x20kW SENTINEL EQUIPMENT LAYOUT ISOMETRIC VIEW		
DWG. Size	<b>B</b>	SHEET No. 1 OF 4	SCALE NTS
DWG. No.	S900113		REV. 7



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DESIGNER	PJA	9/15/03
CHECKER		
APPROVAL		
PROJECT No.	US-03056.WINN	

REV	DESCRIPTION	APP	DATE
7	REVISED WHERE NOTED	JLF	12/14/21
6	REVISED WHERE NOTED	JLF	11/10/21
5	REVISED BOM AS NOTED	JLF	08/13/21

REVISIONS

TOLERANCES (unless otherwise specified)

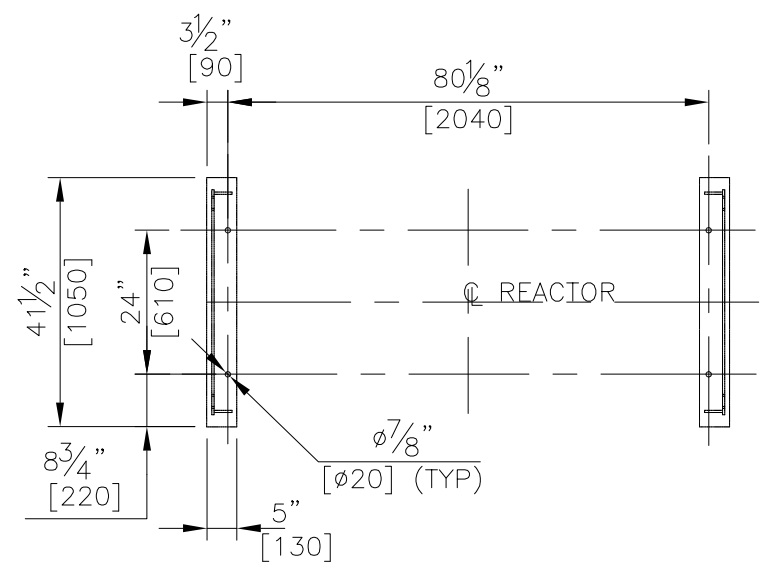
ANGULAR	ADDED SPARE PARTS (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES) ±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES) ±.0005

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DE NORA WATER TECHNOLOGIES, LLC

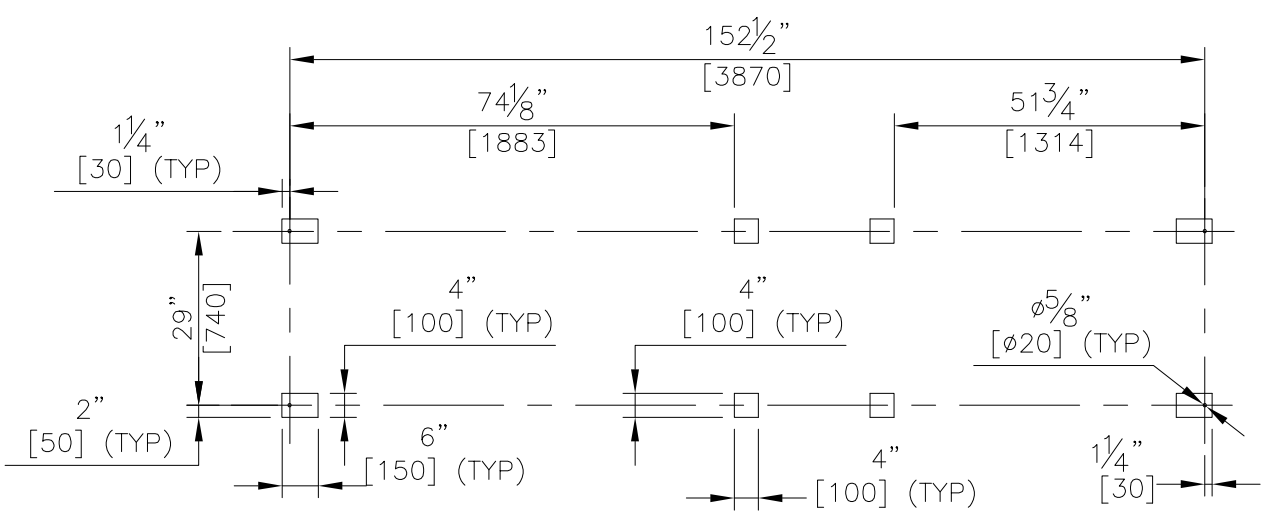
CLIENT: CITY OF WINNIPEG  
MANITOBA, CANADA

TITLE: 9x20kW SENTINEL  
EQUIPMENT LAYOUT  
PLAN AND ELEVATION

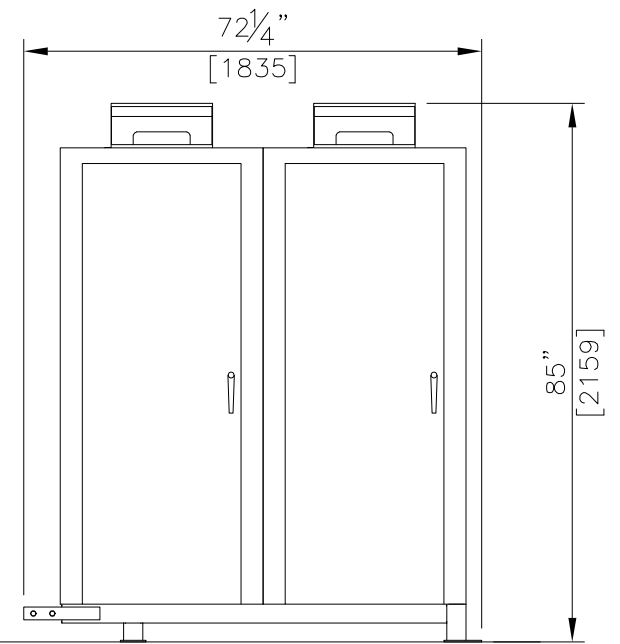
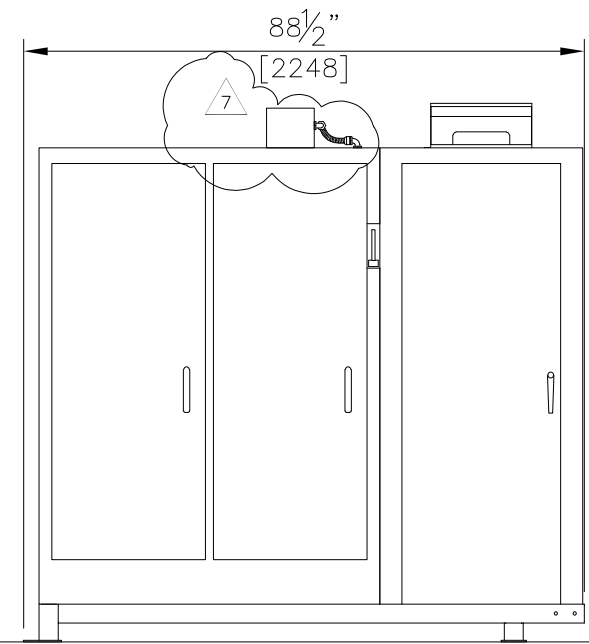
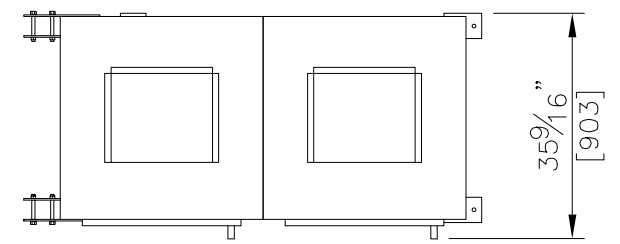
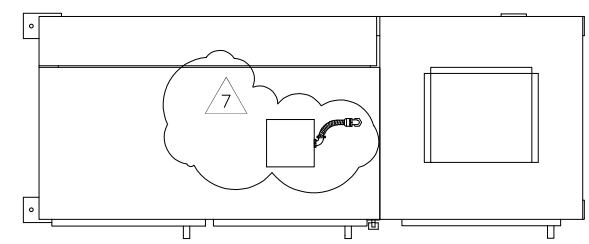
DWG. Size: **B** SHEET No.: 2 OF 4 SCALE: NTS  
DWG. No.: S900113 REV. 7



REACTOR  
ANCHOR BOLT PATTERN  
LAYOUT



CONTROL PANEL  
& POWER SUPPLY  
ANCHOR BOLT PATTERN  
LAYOUT



APPROX. WEIGHT: 3500 LBS. / 1588kg

APPROX. WEIGHT: 5000 LBS. / 2268kg

SHIPPING ARRANGEMENT

7	REVISED WHERE NOTED	JLF	12/14/21
6	REVISED WHERE NOTED	JLF	11/10/21
5	REVISED BOM AS NOTED	JLF	08/13/21
REV	DESCRIPTION	APP	DATE

REVISIONS

TOLERANCES (unless otherwise specified)

ANGULAR	ADDED SPARE PARTS (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES) ±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES) ±.0005

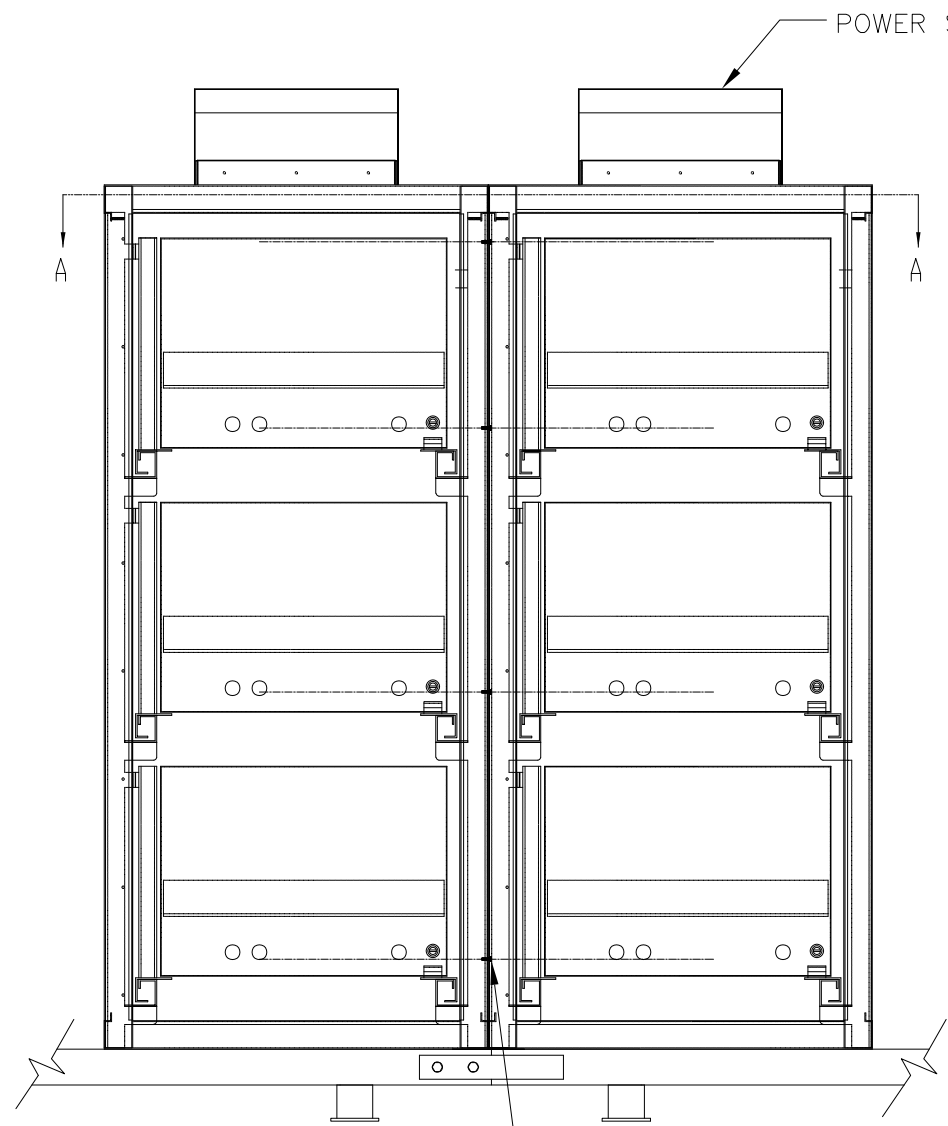


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	NAME	DATE
DRAFTER	PJA	9/15/03
DESIGNER	PJA	9/15/03
CHECKER		
APPROVAL		
PROJECT No.	US-03056.WINN	

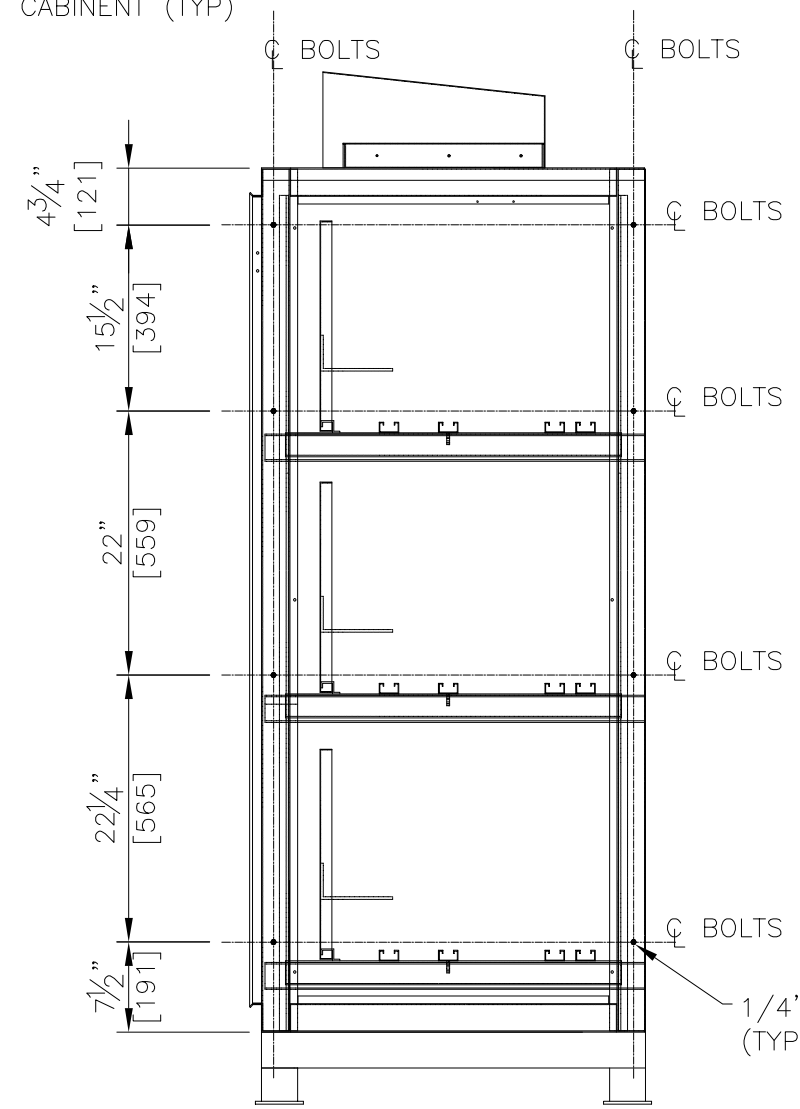
CLIENT	CITY OF WINNIPEG MANITOBA, CANADA	
TITLE	9x20kW SENTINEL EQUIPMENT LAYOUT PLAN AND ELEVATION	
DWG. Size	<b>B</b>	SHEET No. 3 OF 4
DWG. No.	S900113	SCALE NTS
		REV. 7



1/4" HEX HEAD BOLT W/NUT AND WASHERS  
(TYPICAL FRONT AND REAR)

FRONT VIEW

POWER SUPPLY CABINET (TYP)



1/4" HEX HEAD BOLT W/NUT AND WASHERS  
(TYPICAL 8-PLACES)

SIDE VIEW

7	REVISED WHERE NOTED	JLF	12/14/21
6	REVISED WHERE NOTED	JLF	11/10/21
5	REVISED BOM AS NOTED	JLF	08/13/21
REV	DESCRIPTION	APP	DATE
REVISIONS			

TOLERANCES (unless otherwise specified)			
ANGULAR	ADDED SPACERS (2 PLACES)	±.010	
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



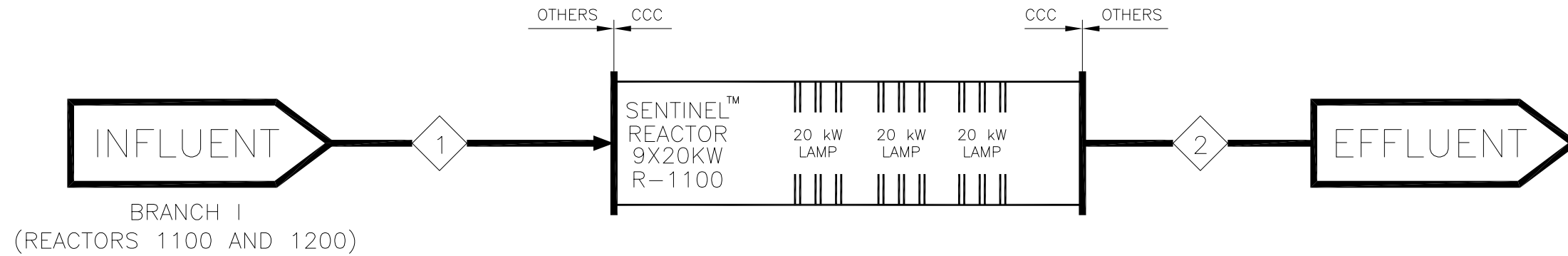
DE NORA WATER TECHNOLOGIES, LLC

CLIENT	CITY OF WINNIPEG MANITOBA, CANADA		
TITLE	9x20kW SENTINEL EQUIPMENT LAYOUT PLAN AND ELEVATION		
DWG. Size	<b>B</b>	SHEET No. 4 OF 4	SCALE NTS
DWG. No.	S900113	REV.	7

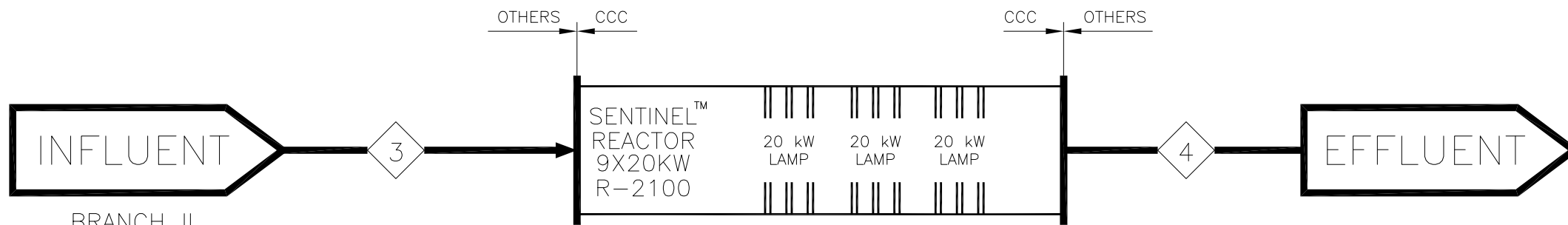
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	NAME	DATE
DRAFTER	PJA	9/15/03
DESIGNER	PJA	9/15/03
CHECKER		
APPROVAL		
PROJECT No.	US-03056.WINN	

R-1100  
 SENTINEL™ REACTOR  
 CAPACITY – 180 Kw  
 LAMP SET POINT – 20 Kw  
 DESIGN TEMP – 25°C  
 DESIGN PRESSURE – 150 PSI



BRANCH I  
 (REACTORS 1100 AND 1200)



BRANCH II  
 (REACTORS 2100 THRU 2400)

NOTES:

1. PIPE SUPPORTS, REDUCERS, BYPASS PIPING, ISOLATION VALVES, AND ALL INTERCONNECTING PIPING BY OTHERS.
2. LAMPS POSITIONED HORIZONTALLY IN REACTOR PERPENDICULAR TO FLOW.
3. REACTOR TO REMAIN FULL AT ALL TIMES.
4. ENSURE THAT ISOLATION VALVES, BY OTHERS, DO NOT INTRUDE SENTINEL REACTOR.
5. VALVES DOWNSTREAM OF REACTOR TO BE SLOW CLOSING TO PREVENT WATER HAMMER.

STREAM #	1	2	3	4
DESCRIPTION	SENTINEL™ R-1100 INFLUENT	SENTINEL™ R-1100 EFFLUENT	SENTINEL™ R-2100 INFLUENT	SENTINEL™ R-2100 EFFLUENT
FLOW MAX	82 MLD	82 MLD	82 MLD	82 MLD
FLOW MAX (FUTURE)	125 MLD	125 MLD	102 MLD	102 MLD
FLOW AVE	49 MLD	49 MLD	31.5 MLD	31.5 MLD
FLOW MIN	25 MLD	25 MLD	12.5 MLD	12.5 MLD
pH	7.4 – 8.0	7.4 – 8.0	7.4 – 8.0	7.4 – 8.0
%T @ 254nm <sup>2</sup>	90%	90%	90%	90%
TEMPERATURE	1.75° C – 23° C	1.75° C – 23° C	1.75° C – 23° C	1.75° C – 23° C
PRESSURE	50 – 100 PSI	50 – 100 PSI	50 – 100 PSI	50 – 100 PSI

REV	DESCRIPTION	APP	DATE
2	REVISED %T; REMOVED "FUTURE"	JLF	08/13/21
1	REVISED CLIENT ADDRESS SPELLING	JPT	09/14/05
0	REVISED CLIENT TITLE SPELLING	JPT	06/22/05

TOLERANCES (unless otherwise specified)

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005

**DE NORA**  
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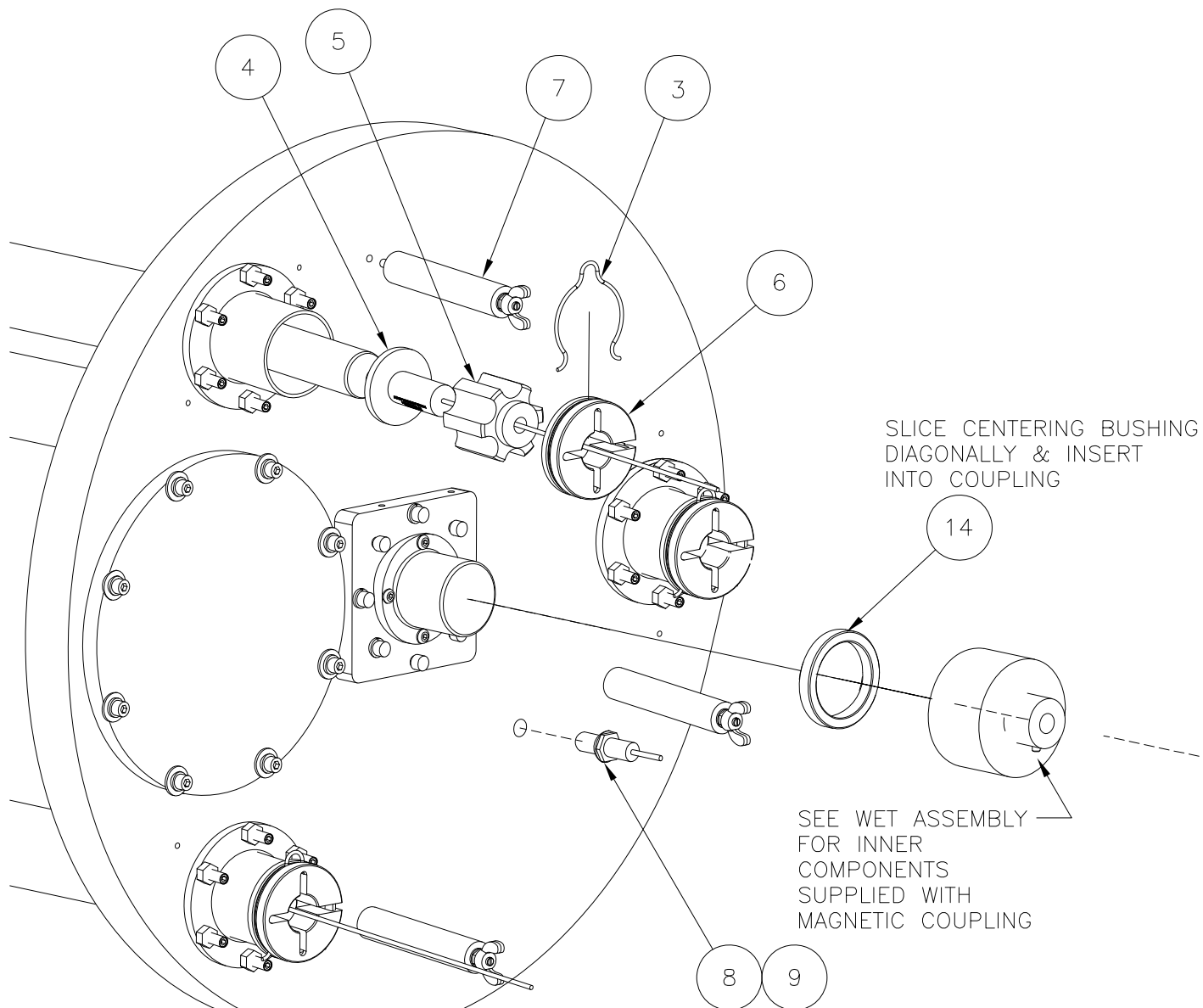
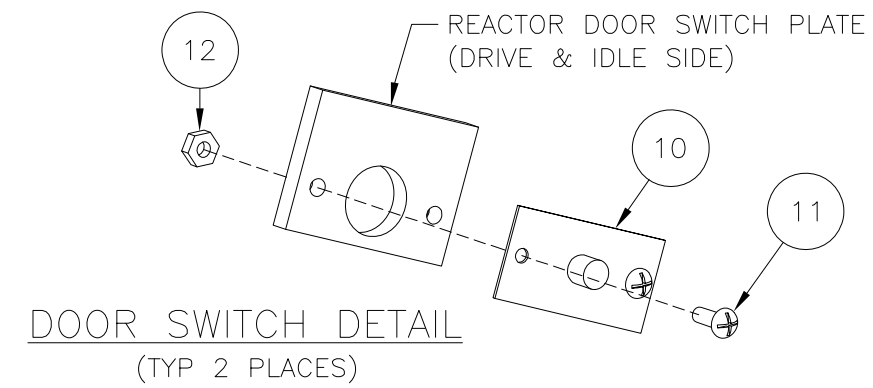
CLIENT: CITY OF WINNIPEG  
 MANITOBA, CANADA

TITLE: PROCESS FLOW  
 DIAGRAM  
 48", 9X20KW SENTINEL UNIT

DWG. Size: **B** SHEET No.: 1 OF 1 SCALE: NTS  
 DWG. No.: S500109 REV. 2

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	NAME	DATE
DRAFTER	PJA	09/15/03
DESIGNER		
CHECKER		
APPROVAL		
PROJECT No.	US-03056.WINN	

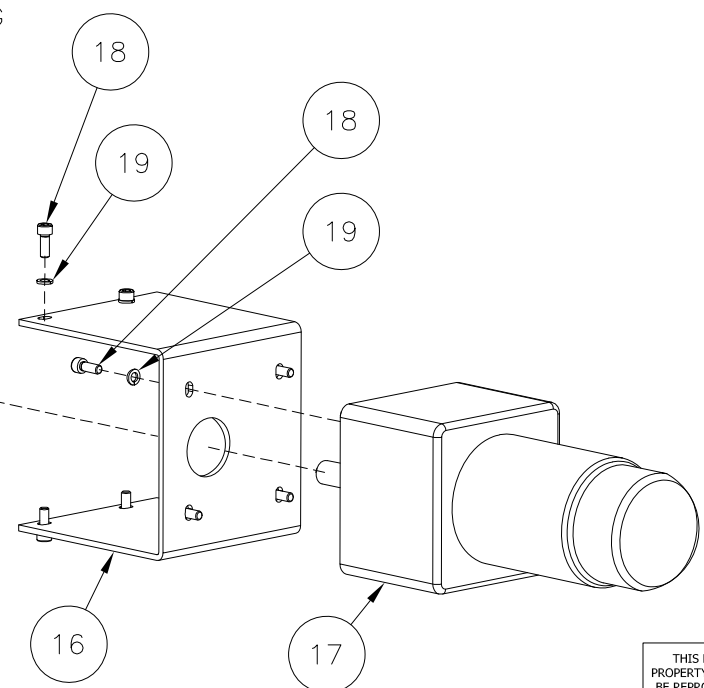


DRIVE SIDE END PLATE EXPLODED VIEW  
(FOR IDLE SIDE SEE SHT 2)

REACTOR DRIVE SIDE  
END PLATE (REF)

Parts List			
ITEM	QTY	NAME	DESCRIPTION
1	0	NOT USED	
2	0	NOT USED	
3	6	W300069	CLIP, QUARTZ SLEEVE END, C3500
4	3	S301288	LAMP, 20KW, RX, W/CERAMIC ENDS
5	6	S301983	LAMP SPACER, 48", 20kW SENTINEL, GEN II, PART DETAIL
6	6	S301121	QUARTZ END PLUG, 48", 20kW SENTINEL, CHEVRON, AOP, PART DETAIL
7	6	D300947	LAMP HOLDER STAND-OFF, 4" LG
8	2	153735	SNSR, MAG PROX, 12mmX1, DC OUT, N.O., NO CABLE
9	2	153736	CABEL, PVC, 5 METER, STRAIGHT CONNECTOR
10	2	150023	SW, DOOR PAN
11	4	650387	FSTN,S18.8, SCW,MCPNPHL, 8-32 X 1/2"LG
12	4	650463	FSTN, S18.8, NUT, FIN HEX, 8-32
13	0	NOT USED	
14	1	S300670	CENTERING BUSHING, PART DETAIL
15	0	NOT USED	
16	1	S300649	MOTOR MOUNTING FRAME, PART DETAIL
17	1	153806	MOTOR, 1/18 H.P., 57.5 RPM, GEAR REDUCTION
18	8	650081	FSTN, S18.8, SCW, SCCP, 10-32X1/2"LG
19	8	650131	FSTN, S18.8, WSH, LOCK MEDIUM, #10

- NOTES:
1. DRIVE SIDE SHOWN, FAR SIDE IS IDENTICAL EXCEPT THERE IS NO MOTOR OR MOTOR CONNECTIONS (ITEMS 13 THRU 19).
  2. ITEM 9 NOT SHOWN.
  3. ELECTRICAL FIELD DEVICES TO BE TAGGED WITH BRADY WIRE MARKERS.



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	NAME	DATE
DRAFTER	PJA	8/21/03
DESIGNER	PJA	8/21/03
CHECKER	M. ANTONETTI	12/1/03
APPROVAL		
PROJECT No.	STANDARD	

REV	DESCRIPTION	APP	DATE
5	DELETE UPGRADES; SITE COMPLETE	JLF	FA 11/10/21
4	REVISED WHERE NOTED	JLF	SE 8/27/21
3	DELETE ITEMS 13 & 15, REVISED ITEM 14	JPT	- 5/24/05

TOLERANCES (unless otherwise specified)

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005

**DE NORA**  
DE NORA WATER TECHNOLOGIES, LLC

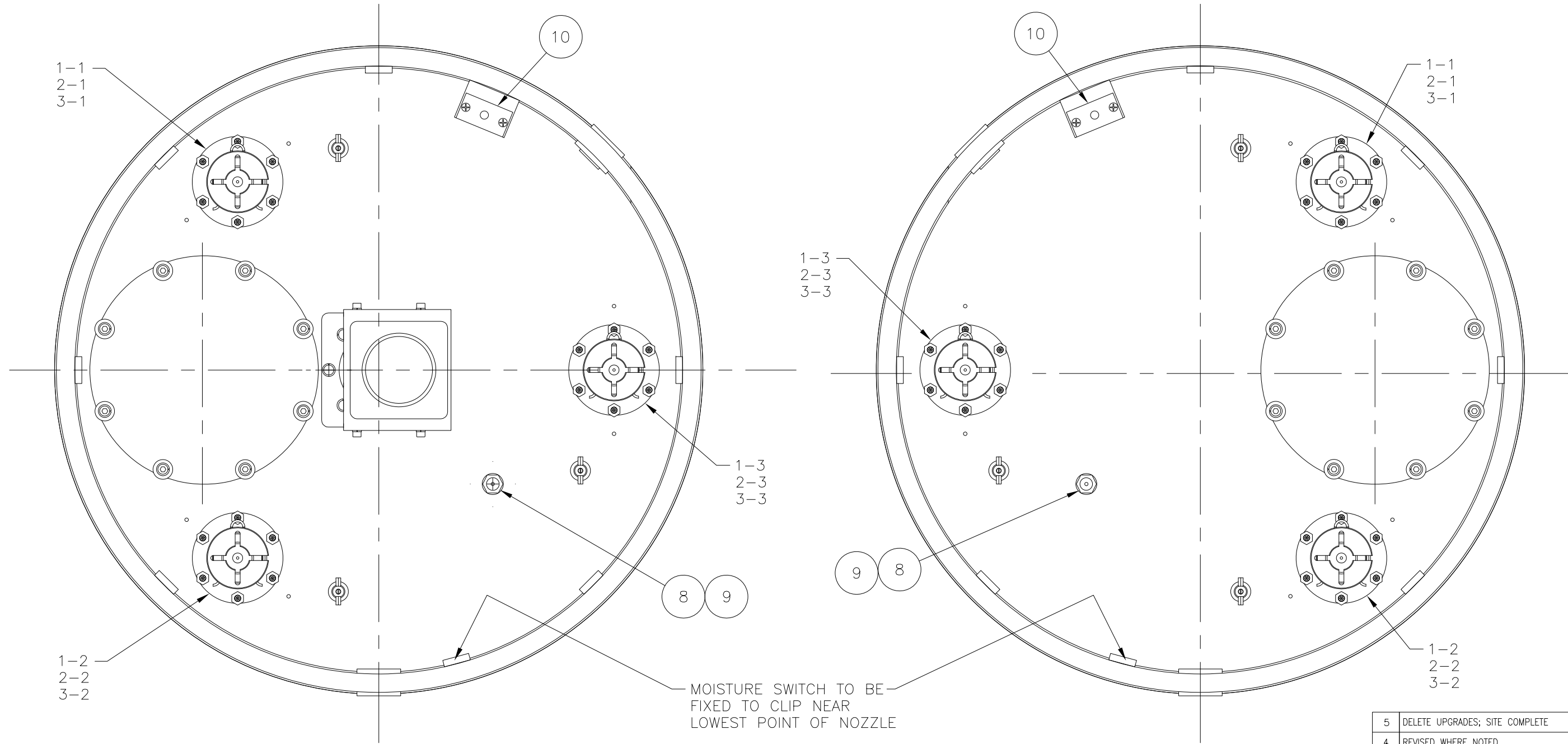
CLIENT: STANDARDS

TITLE: 20kW SENTINAL SYSTEM LAMP COMPONENT DETAIL ASSEMBLY DETAIL

DWG. Size: B SHEET No. 1 OF 2 SCALE: NONE

DWG. No.: S300600 REV. 5





DRIVE SIDE END PLATE

IDLE SIDE END PLATE

MOISTURE SWITCH TO BE FIXED TO CLIP NEAR LOWEST POINT OF NOZZLE

5	DELETE UPGRADES; SITE COMPLETE	JLF	FA	11/10/21
4	REVISED WHERE NOTED	JLF	SE	8/27/21
3	DELETE ITEMS 13 & 15, REVISED ITEM 14	JPT	-	5/24/05
REV	DESCRIPTION	APP	DATE	

REVISIONS

TOLERANCES (unless otherwise specified)

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



DE NORA WATER TECHNOLOGIES, LLC

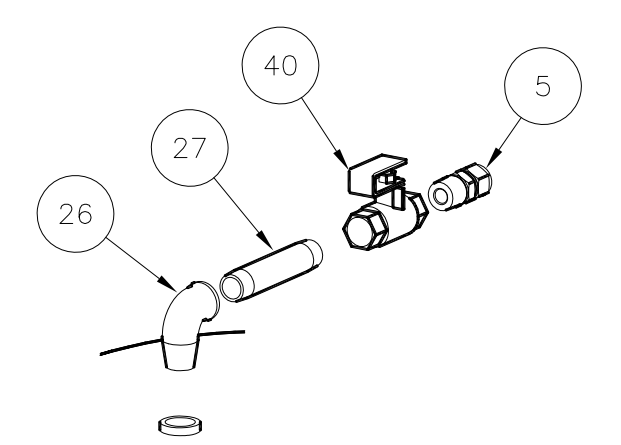
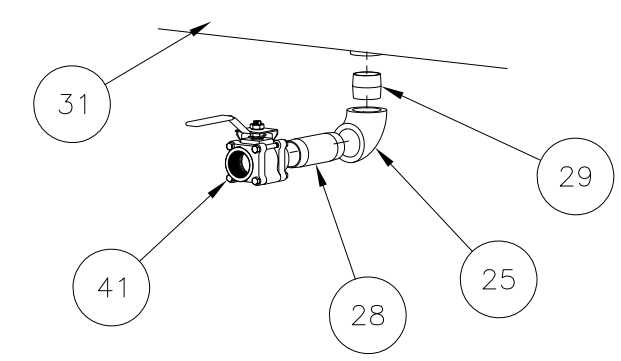
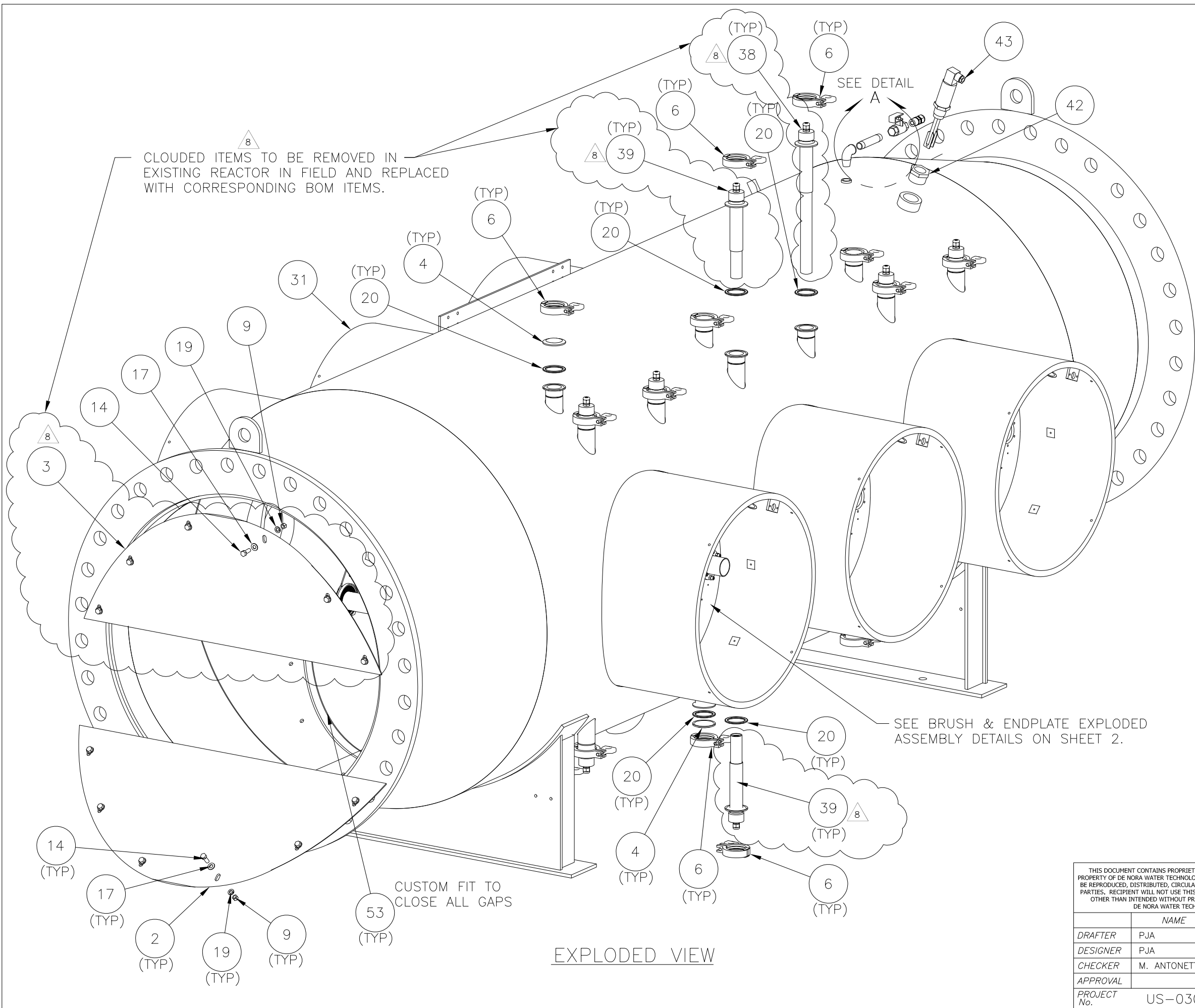
CLIENT STANDARDS

TITLE 20kW SENTINAL SYSTEM LAMP COMPONENT DETAIL ASSEMBLY DETAIL

DWG. Size **B** SHEET No. 2 OF 2 SCALE NONE  
 DWG. No. S300600 REV. 5

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	NAME	DATE
DRAFTER	PJA	8/21/03
DESIGNER	PJA	8/21/03
CHECKER	M. ANTONETTI	12/1/03
APPROVAL		
PROJECT No.	STANDARD	



NOTES:  
1. UV SENSOR WINDOW AND WELLS TO BE STAMPED WITH CORRESPONDING LAMP NUMBER.

8	REVISED WHERE NOTED	JLF	FA	11/10/21
7	REVISED WHERE NOTED	JLF	SE	8/27/21
6	REMOVED PART 651016	JLF	SE	06/13/13
REV	DESCRIPTION	CHG	APP	DATE
REVISIONS				

TOLERANCES (unless otherwise specified)

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



DE NORA WATER TECHNOLOGIES, LLC

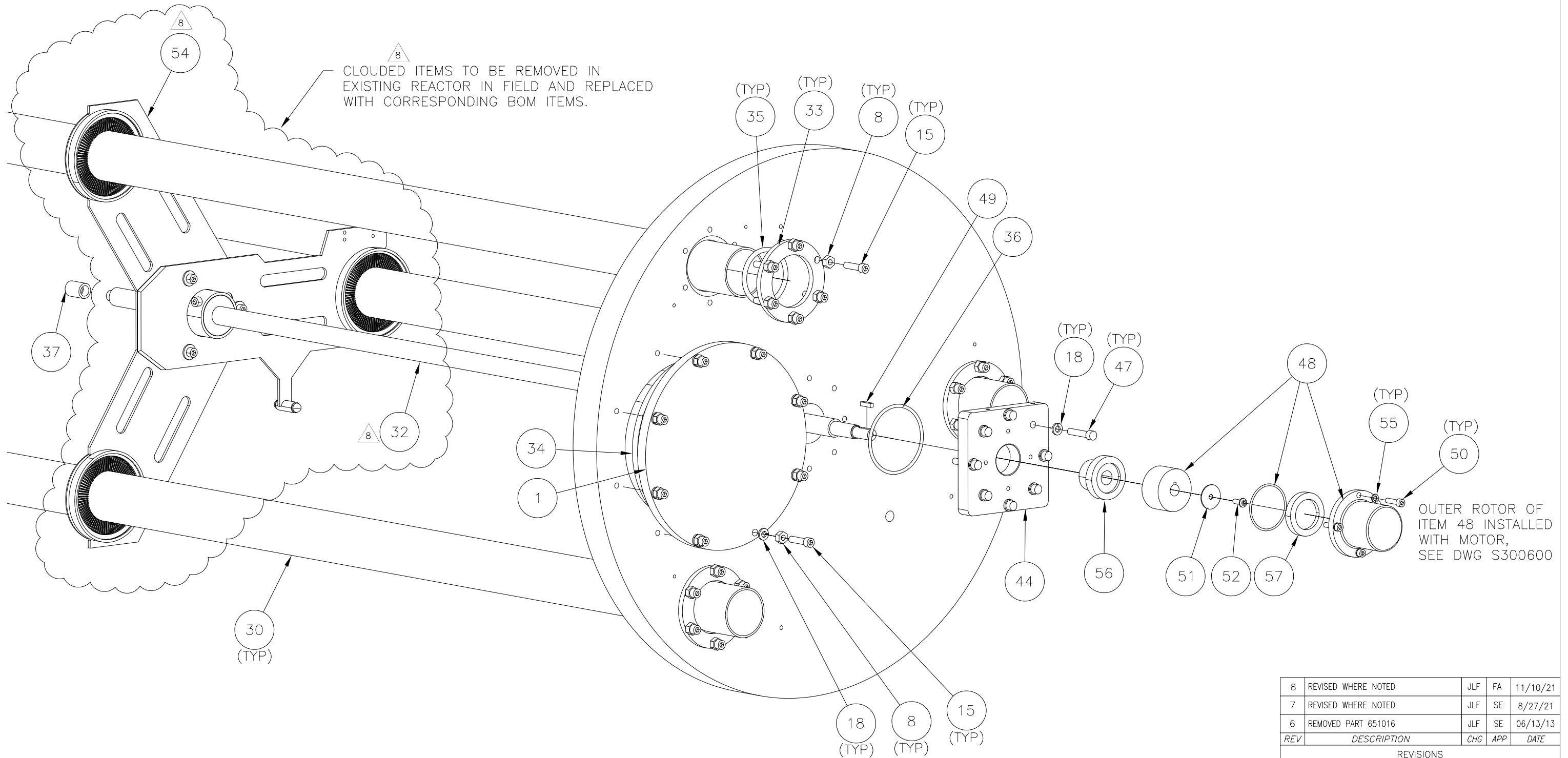
CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

TITLE  
9 x 20kW SENTINEL SYSTEM  
REACTOR WET ASSEMBLY  
ASSEMBLY DETAIL

DWG. Size	B	SHEET No.	1 OF 3	SCALE	NONE
DWG. No.	S300611	REV.	8		

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	NAME	DATE
DRAFTER	PJA	08/20/03
DESIGNER	PJA	08/20/03
CHECKER	M. ANTONETTI	12/01/03
APPROVAL		
PROJECT No.	US-03056.WINN	



EXPLODED ENDPLATE ASSEMBLY  
(TYP 3-PLS)

8	REVISED WHERE NOTED	JLF	FA	11/10/21
7	REVISED WHERE NOTED	JLF	SE	8/27/21
6	REMOVED PART 651016	JLF	SE	06/13/13
REV	DESCRIPTION	CHG	APP	DATE
REVISIONS				

TOLERANCES (unless otherwise specified)

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



DE NORA WATER TECHNOLOGIES, LLC

CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

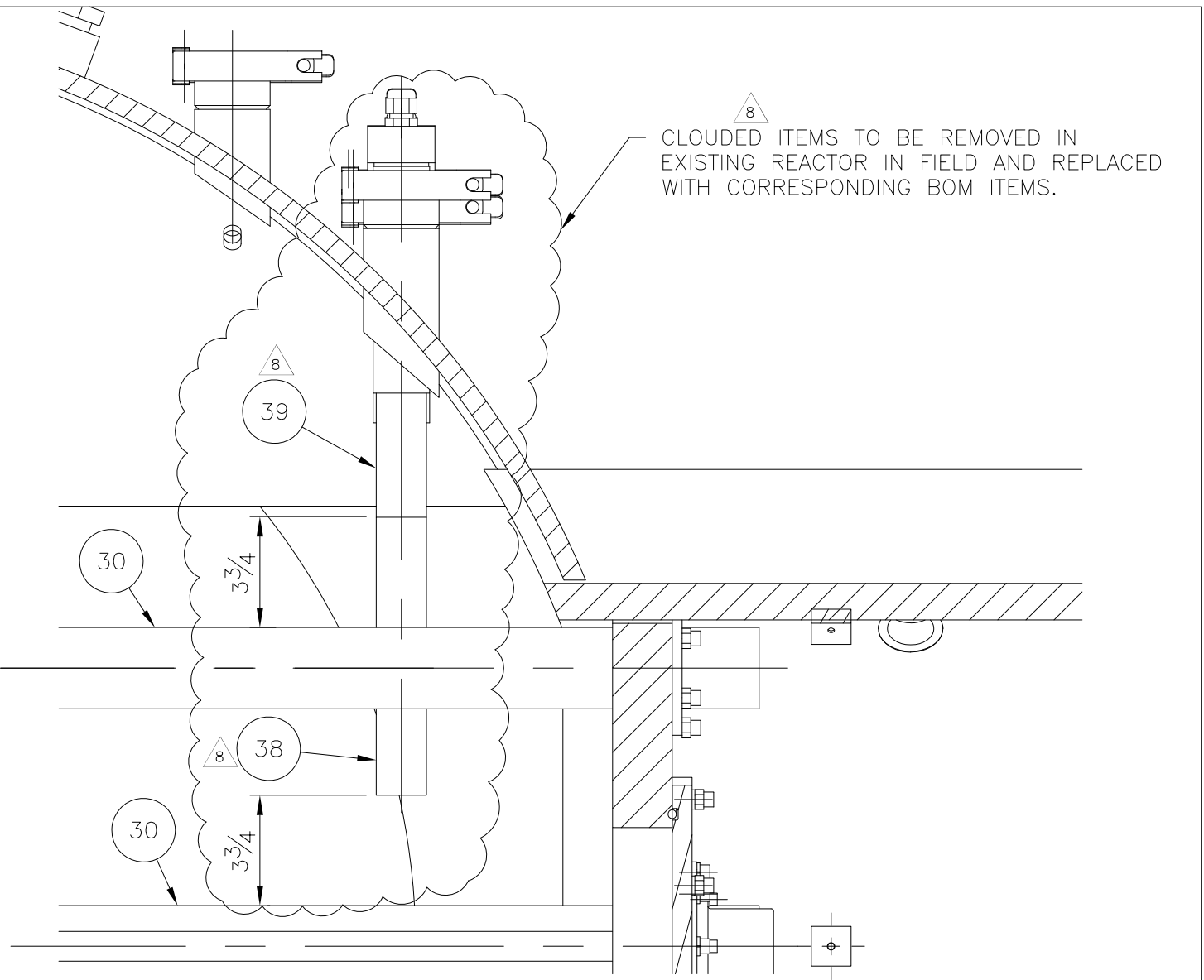
TITLE  
9 x 20kW SENTINEL SYSTEM  
REACTOR WET ASSEMBLY  
ASSEMBLY DETAIL

DWG. Size **B** SHEET No. 2 OF 3 SCALE NONE  
DWG. No. S300611 REV. 8

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DESIGNER	PJA	08/20/03
CHECKER	M. ANTONETTI	12/01/03
APPROVAL		
PROJECT No.	US-03056.WINN	

Parts List			
ITEM	QTY	NAME	DESCRIPTION
1	6	S300415	ACCESS COVER, PART DETAIL
2	3	S300410	BAFFLE – BOLTED SEG, 16–3/4” LG, PART DETAIL
3	3	S301207	BAFFLE – UPPER BOLTED SEG, 15” LG, PART DETAIL
4	6	551994	CAP, SANITARY, S316L, 2”
5	1	550339	CFIT, S316, NPT(F), 1/2”TU, 1/2”
6	15	1007278	2” SANITARY CLAMP, SS
7	0	NOT USED	
8	156	650112	FSTN, S18.8, NUT, FIN HEX, 1/4–28
9	36	650039	FSTN, S18.8, NUT, FIN HEX, 3/8–16
10	0	NOT USED	
11	0	NOT USED	
12	0	NOT USED	
13	0	NOT USED	
14	36	650059	FSTN, S18.8, SCW, HXCP, 3/8–16X1”LG
15	156	650111	FSTN, S18.8, SCW, SCCP, 1/4–28X1”LG
16	0	NOT USED	
17	36	650065	FSTN, S18.8, WSH, FLAT SAE, 3/8”
18	72	650154	FSTN, S18.8, WSH, LOCK MEDIUM, 1/4”
19	36	650041	FSTN, S18.8, WSH, LOCK MEDIUM, 3/8”
20	15	1007447	GASKET, SANITARY, TEFLON, 2”
21	0	NOT USED	
22	0	NOT USED	
23	0	NOT USED	
24	0	NOT USED	
25	1	551677	PPG, S316L, ELB, NPT(F), 90, 2”, 3000LB
26	1	551145	PPG, S316L, ELB, STRT, 1/2” NPT, 150 LB
27	1	550059	PPG, S316L, NPL, 1/2”NPT(M) X 4”LG
28	1	550110	PPG, S316L, NPL, 2”NPT(M) X 6”LG
29	1	550383	PPG, S316L, NPL, 2”NPT(M) X CLS
30	9	S300470	QUARTZ, 52.0mm, 52.5” LG.
31	1	S300610	REACTOR WELDED VESSEL, 48”x36”, 9 x 20KW SENTINEL, ASS’Y DETAIL
32	3	S301746	DRIVE SCREW, 1–1/4” ACME, 48” SENTINEL, STAGGERED/STACKED, PART DETAIL
33	18	C300002	SEAL RING, QTZ TUBE, 52.5mm DIA. PART DETAIL
34	6	350346	SEAL, ORNG, EPDM–NSF 6.98”IDx.21”W
35	18	350342	SEAL, ORNG, EPDM–NSF, 2.0”ID x 0.1875”
36	3	350331	SEAL, ORNG, EPDM–NSF, 2.625”ID x 0.125”
37	3	S300445	SLEEVE, 5/8” O.D, TEFLON, PART DETAIL
38	3	S300736	UV SENSOR ASSEMBLY, 13.78” INSERTION
39	6	S300737	UV SENSOR ASSEMBLY, 7.35” INSERTION
40	1	551600	VLV, 1/2” BALL, NPT(F), SS316, NSF C–HDL
41	1	551658	VLV, 2” BALL, NPT(F), S316, NSF
42	1	550530	PPG, 316L, BUSH., 1–1/2”NPT(M) x 1”NPT(F)
43	1	551509	SW, LIQUID LVL (S316) FORK TYPE 1”MNPT
44	3	S300870	SCREW DRIVE ADAPTER PLATE, PART DETAIL
45	0	NOT USED	
46	0	NOT USED	
47	24	650268	FSTN, S18.8, SCW, SCCP, 1/4–28X1–1/4”LG
48	3	350351	MAGNETIC COUPLING ASSEMBLY
49	3	650905	FSTN, S18.8, KEY STOCK, 4mm x 4mm
50	12	650184	FSTN, S18.8, SCW, SCCP, 10–32X3/4”LG
51	3	650976	FSTN, S316, WSH, FENDER, #10 x 1”O.D.
52	3	650977	FSTN, S316, SCW, BUTTON HD SCCP, 10–32x1/2”LG
53	6	S300682	WELDED BAFFLE BACKING PLATE
54	3	S301554	WIPER PLATE ASSEMBLY, 48” STAGGERED, NO WIPERS
55	12	650131	FSTN, S18.8, WSH, LOCK MEDIUM, #10
56	3	S300810	DRIVE PLATE SCREW BEARING
57	3	S300811	THRUST BEARING



**NOTES:**  
1. ITEMS 38 & 39 SELECTIONS BASED ON DESIGN CONDITIONS  
2. ITEMS 38 & 39 PROVIDE A SENSOR INSERTION DEPTH OF 2–3/4” FROM O.D. OF QUARTZ (ITEM 30) TO FACE OF SENSOR WINDOW.

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DESIGNER	PJA	08/20/03
CHECKER	M. ANTONETTI	12/01/03
APPROVAL		
PROJECT No.	US–03056.WINN	

8	REVISED WHERE NOTED	JLF	FA	11/10/21
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REV	DESCRIPTION	CHG	APP	DATE

TOLERANCES (unless otherwise specified)			
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**DE NORA**  
DE NORA WATER TECHNOLOGIES, LLC

CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

TITLE  
9 x 20kW SENTINEL SYSTEM  
REACTOR WET ASSEMBLY  
ASSEMBLY DETAIL

DWG. Size **B** SHEET No. 3 OF 3 SCALE NONE  
DWG. No. S300611 REV. 8

PROJECT NAME: City of Winnipeg - Deacon Booster Pumping  
Station UV Disinfection System Upgrades  
CONTRACTOR: Calgon Carbon UV Technologies  
SUPPLIER/MANUFACTURER Calgon Carbon UV Technologies  
DRAWING SUBJECT: SD-002R3-Electrical Submittal

PAGE 1 of 1  
PROJECT NO.: 60640642  
DATE:  
DATE RECEIVED: April 12, 2022

**\*\*THIS SHEET MUST REMAIN WITH SHOP DRAWING. DO NOT DETACH!!\*\***

<b>Distribution</b>	<b>JG</b>						
<b>Comments</b>							

**One copy of the following is attached for your review.**

Submission No. : SD-002R3	<b>SUBMITTAL REVIEW AECOM</b>	
Project No. : 60640642	Discipline : Electrical	
<input type="checkbox"/> Reviewed - No Comment	<input type="checkbox"/> Reviewed - Revise and Resubmit	
<input checked="" type="checkbox"/> Reviewed - As Noted	<input type="checkbox"/> Review by Consultant Not Required	
<p>Review is solely for general conformity with contract. The Consultant does not warrant or represent that information in this submittal is accurate or complete. Review does not relieve Contractor of responsibility for errors/omissions in designs, including this submittal, that are the Contractor's responsibility, and for conforming/correlating with all quantities/dimensions, performing the Work, selecting performance means/methods, coordinating with other parts of the Work/between trades, and performing the Work safely. Notwithstanding this review, Contractor remains solely responsible for contract compliance.</p>		
By : J.G.	Date : Apr 21, 2022	

**AECOM Comments:**

This review is limited to the information provided and assumes each UV system is 100% identical for all 6 UV systems.  
 \* \* The panel plate will need to be visible and affixed to the front door of each UV system control panel. The plate must comply with CSA C22.1 Rule 2-100 and accurately show the short circuit current rating (SCCR). A default value of 5kA is unacceptable, and if unsure, refer to the UL508A method for panel ratings. A snippet of the code rule has been attached to the last page of this submission.  
 \* De Nora to confirm the existing enclosures have the sufficient space for the proposed components/modifications.

The City desires re-use of their existing UVT instruments, please clarify DeNora' accuracy requirements.

On Re-submission for the Tender package, please include  
 \* The complete new drawing set  
 \* The complete old drawings set prior to this upgrade for the Contractor's reference. The drawing set provided via email on April 12, 2022 does not show control wiring; please turn on the linetype. This set should also include a note stating that the drawing package is typical for the 6 UV reactor systems.

See additional comments throughout this submission.

T:\UV Projects\2021\EX0.000034 Winnipeg Design Project\Drawings\Electrical\S100539\_014.dwg Apr 12, 2022 - 2:57pm

SENTINEL 20KW SYSTEMS ELECTRICAL DRAWINGS			
DRAWING	DWG. #	REV	
POWER SUPPLY & CONTROL PANEL SKID G.A.			
3 BAY ARRANGEMENT	S100488	REV 0	
2 BAY ARRANGEMENT	S100499	REV 0	
POWER SUPPLY FRONT VIEW & INTERNAL G.A.			
4 TRAY ASSEMBLY	S000000	REV 0	
3 TRAY ASSEMBLY	S000000	REV 0	
2 TRAY ASSEMBLY	S000000	REV 0	
POWER SUPPLY TRAY			
20KW TRAY PLAN	S100000	REV 0	
20KW SWING OUT DOOR	S100000	REV 0	
<input checked="" type="checkbox"/> INSTRUMENTATION SUBPANEL	S100492	REV 2	
POWER SUPPLY SCHEMATICS			
20KW 480V 9x20KW	S000000	REV 0	
20KW 480V 6x20KW	S000000	REV 0	
20KW 480V 3x20KW	S000000	REV 0	
CONTROL PANEL LAYOUT			
FRONT VIEW & PANEL DOOR	S000000	REV 0	
MICROLOGIX, 9x20KW VARIABLE	S000000	REV 0	
MICROLOGIX, 6x20KW VARIABLE	S000000	REV 0	
MICROLOGIX, 3x20KW VARIABLE	S000000	REV 0	
PLC CONFIGURATION DIAGRAM			
MICROLOGIX, 9x20KW VARIABLE	S000000	REV 0	
MICROLOGIX, 6x20KW VARIABLE	S000000	REV 0	
MICROLOGIX, 3x20KW VARIABLE	S000000	REV 0	
CABLE, MICROLOGIX TO TCP	X100187	REV 0	

SENTINEL 20KW SYSTEMS ELECTRICAL DRAWINGS			
DRAWING	DWG. #	REV	
CONTROL PANEL I/O SCHEMATICS			
MICROLOGIX, 9x20KW VARIABLE	S000000	REV 0	
MICROLOGIX, 6x20KW VARIABLE	S000000	REV 0	
MICROLOGIX, 3x20KW VARIABLE	S000000	REV 0	
TERMINAL BLOCK ARRANGEMENTS			
9x20 PANEL TERMINATIONS	S000000	REV 0	
6x20 PANEL TERMINATIONS	S000000	REV 0	
3x20 PANEL TERMINATIONS	S000000	REV 0	
FABRICATIONS			
3 BAY SKID DETAILS	D600260	REV 0	
2 BAY SKID DETAILS	D600044	REV 0	
<input checked="" type="checkbox"/> P/S CABINET DETAILS	S600054	REV 0	
<input checked="" type="checkbox"/> P/S CABINET END PANEL	S600055	REV 0	
<input checked="" type="checkbox"/> P/S CABINET TOP FAN COVER	S600058	REV 0	
<input checked="" type="checkbox"/> P/S CAB. TOP FAN MTG. PLATE	S600057	REV 0	
<input checked="" type="checkbox"/> XFMR. SHELF FABRICATION DETAILS	S600056	REV 0	
<input checked="" type="checkbox"/> COMPONENT MOUNTING PLATE	S600063	REV 0	
<input checked="" type="checkbox"/> DC BOARD POT. MTG. PLATE	S100330	REV 0	

PROJECT SPECIFIC ELECTRICAL DRAWINGS			
DRAWING	DWG. #	REV	
<input checked="" type="checkbox"/> EXTERNAL WIRING DIAGRAM	S100515	REV 3	
<input checked="" type="checkbox"/> P/S & C/P SKID G.A.	S100533	REV 0	
<input checked="" type="checkbox"/> P/S FRONT & INTERNAL VIEWS	S100534	REV 0	
<input checked="" type="checkbox"/> POWER SUPPLY SCHEMATIC	S100537	REV 9	
<input checked="" type="checkbox"/> CONTROL PANEL FRONT VIEW	S100519	REV 3	
<input checked="" type="checkbox"/> CONTROL PANEL SUBPANEL G.A.	S100520	REV 7	
<input checked="" type="checkbox"/> CONTROL PANEL SIDE PANEL G.A.	S100545	REV 5	
<input checked="" type="checkbox"/> PLC CONFIGURATION DIAGRAM	S100514	REV 2	
<input checked="" type="checkbox"/> NETWORK DIAGRAM	S100532	REV 5	
<input checked="" type="checkbox"/> CONTROL SCHEMATICS	S100513	REV 9	
<input checked="" type="checkbox"/> P/S SWING PANEL G.A. 20KW	S100535	REV 4	
<input checked="" type="checkbox"/> P/S XFMR. SHELF G.A. 20KW	S100536	REV 0	
<input checked="" type="checkbox"/> TERMINAL BLOCK ARRANGEMENTS	S100531	REV 7	
<input checked="" type="checkbox"/> ENGRAVED NAMEPLATES	S100538	REV 0	
<input checked="" type="checkbox"/> REACTOR JCT. BOX JB-1 SUBPNL	S100540	REV 2	
<input checked="" type="checkbox"/> CABLE, PLC TO TCP, RS-232	X100219	REV 0	
<input checked="" type="checkbox"/> PILOT DEVICE LEGEND PLATES	S100640	REV 2	
<input checked="" type="checkbox"/> SUPPLEMENTARY NAME PLATES	S100543	REV 0	
<input checked="" type="checkbox"/> 5 BAY SKID FABRICATION DETAILS	S600062	REV 0	
<input checked="" type="checkbox"/> SUPPLEMENTARY NAME PLATES	S100656	REV 0	
<input checked="" type="checkbox"/> ELECTRICAL DRAWING INDEX	S100539	REV 14	

13 14  
12  
13 14  
13 14  
13 14  
13 14  
13 14  
12  
13 14

AECOM: Add verbiage to Note 2.

CSA special inspection required (by others) using DeNora provided components. Materials such as wire, misc shop materials, and AHF are provided by others. The work shall be performed per the De Nora drawings with direction/supervision from De Nora where required. After material upgrade of each UV system the Local PLC programming and commissioning shall be performed by De Nora, with the overall system integrator performing programming/commissioning of the UV master and SCADA systems.

PROJECT NOTES:

- 12 1. ONE SYSTEM SHOWN, SIX (6) SYSTEMS REQUIRED. FOR CUSTOMER NETWORK CONNECTIONS & NUMBERING TAGS SEE NETWORK DIAGRAM SHEET S100532
- 13 2. CSA APPROVAL REQUIRED (BY OTHERS)
- 3. 600 VOLT AC 60HZ INPUT POWER (EXISTING)
- 4. HEAT SHRINK TAGS ON ALL WIRE TERMINATIONS
- 5. SUBPANEL NAMEPLATES TO BE FASTENED WITH STAINLESS STEEL SCREWS
- 6. ALL I/O TO BE INDIVIDUALLY FUSED

- 7. The UV master (by Others), will require staging/coordination with each UV system upgrade (x6).
- 8. The contractor shall provide red-line drawings sets (x6) to De Nora to be incorporated into the final "As Constructed" drawing set. Once the red-lines have been incorporated into the "As Constructed" drawings these shall then be provided back to the contractor for CSA special inspection (coordinate as required), and for a paper copy to be left in each UV system control panel.

- DENOTES DRAWINGS INCLUDED FOR THIS PROJECT

11 CITY OF WINNIPEG WTP  
MANITOBA, CANADA  
US-03056.WINN  
9x20KW SENTINEL 48" REACTOR, 6 UNITS

REV	DESCRIPTION	APP	DATE
12	REVISIONS PER COMMENTS: SD-002	JBM	11/23/21
14	REVISIONS PER COMMENTS: SD-002R2	RSC	4/12/22
13	REVISIONS PER COMMENTS: SD-002R1	JBM	12/22/21

NAME	DATE
DRAFTER	RJP 10/15/03
DESIGNER	
CHECKER	
APPROVAL	
PROJECT No.	US-03056.WINN

TOLERANCES (unless otherwise specified)			
ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005

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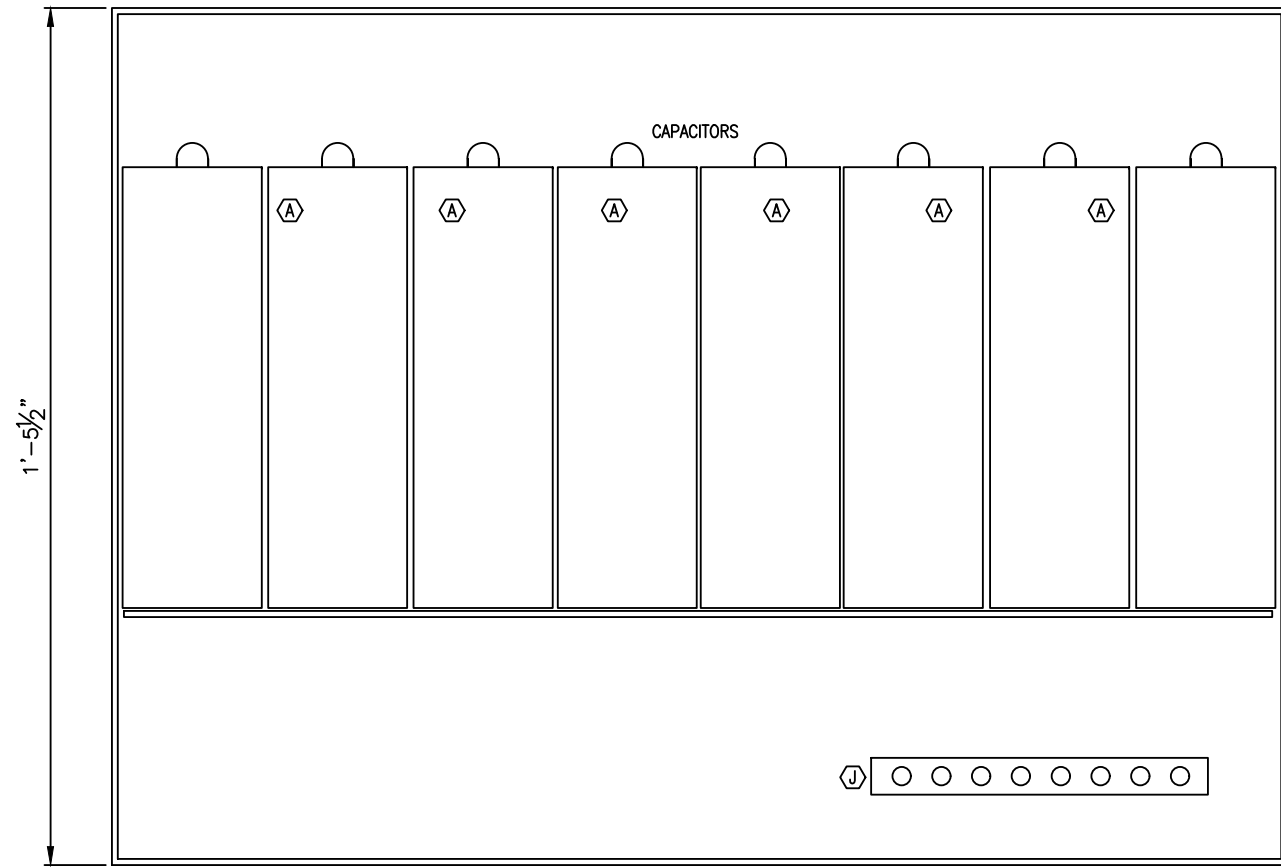
**DE NORA**  
DE NORA WATER TECHNOLOGIES, LLC

CLIENT CITY OF WINNIPEG MANITOBA, CANADA

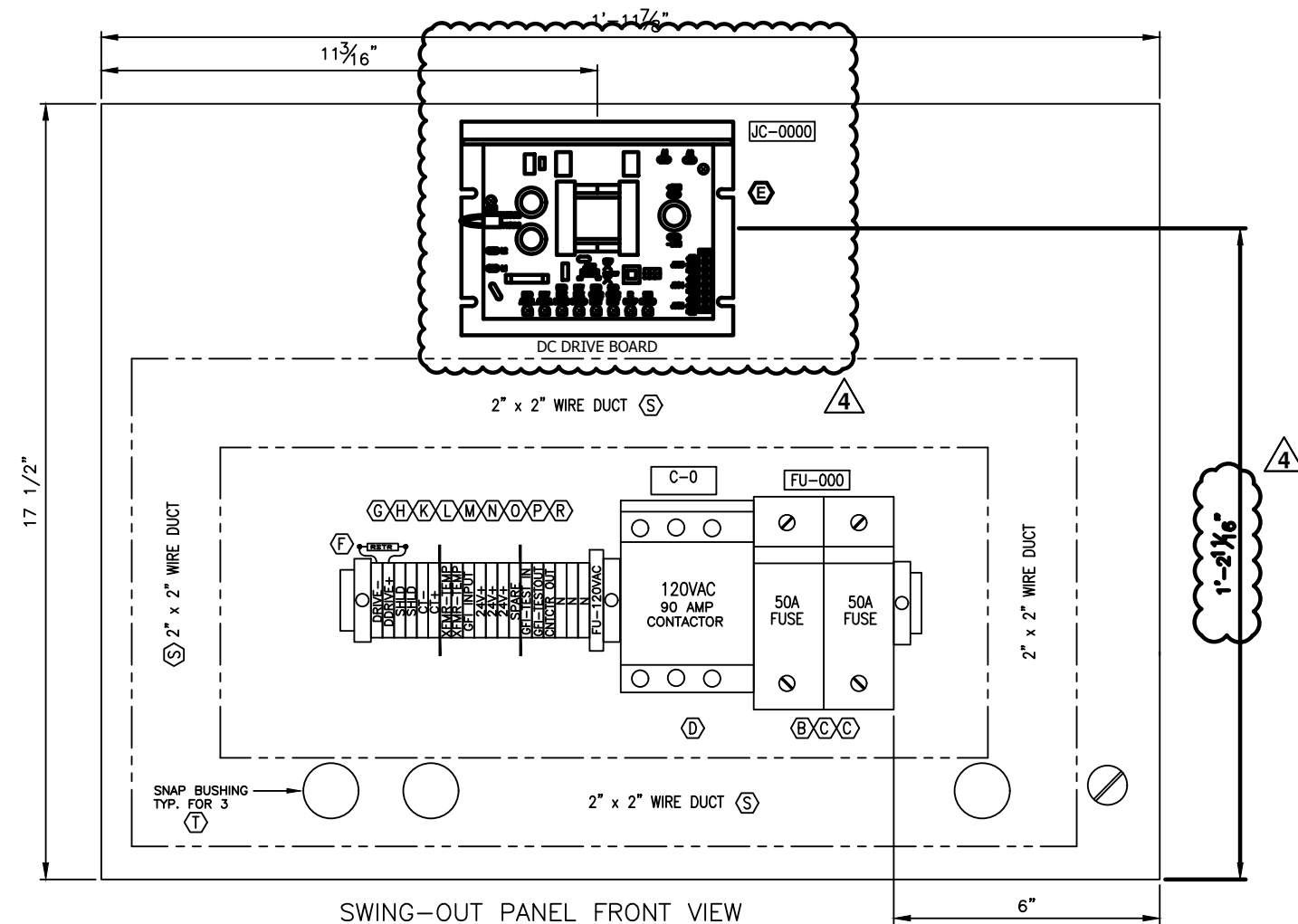
TITLE ELECTRICAL DRAWING INDEX

DWG. Size B SHEET No. 1 OF 1 SCALE NONE

DWG. No. S100539 REV. 14



SWING-OUT PANEL REAR VIEW



SWING-OUT PANEL FRONT VIEW

BILL OF MATERIAL

ITEM	SAP #	QTY	DESCRIPTION
(A)	153892	1 EA	CAPACITOR, 2.1uF, 4000V, W/INTERNAL RESISTOR CALGON CARBON CORP. (8 SUPPLIED W/153480)
(B)	153795	1 EA	FUSEHOLDER, 60A, 600V, 2 POLE, DEAD FRONT LITTLEFUSE #LPSJ60-21D
(C)	153800	2 EA	FUSE, 60 AMP, 600VAC, CLASS J LITTLEFUSE #JTD-60ID
(D)	153824	1 EA	CONTACTOR, 90A, 600V, 3P, 120VAC COIL NEMA ARB #A75N3-30-11-B4
(E)	154492	1 EA	DC DRIVE, 240/120VAC IN, 24/12VDC OUT, 5A MINARIK, #HTL-D-4Q
(F)	---	---	NOT USED
(G)	152773	1 EA	TERMINAL BLOCK FUSED, 120VAC, W/IND ALLEN-BRADLEY #1492-H4
(H)	152782	20 EA	TERMINAL BLOCK 300V, 25A ALLEN-BRADLEY #1492-F1
(J)	152581	1 EA	EQUIPMENT GROUND BAR SQUARE D #1130-PK9GTA
(K)	152784	2 EA	TERMINAL BLOCK, END ANCHOR A-B #1492-N23
(L)	152783	2 EA	TERMINAL BLOCK, END BARRIER A-B #1492-N18
(M)	152911	1 FT	TERMINAL BLOCK, MTG. RAIL, SCORED A-B #1492-N1
(N)	153826	1 EA	TERMINAL BLOCK, MARKING STRIP, UNPRINTED A-B #1492-N5
(O)	153827	1 EA	TERMINAL BLOCK JUMPER STRIP 50 POSITION A-B #1492-N24
(P)	152788	1 EA	TERMINAL BLOCK, FUSED, END BARRIER A-B #1492-N37
(R)	153019	1 EA	FUSE, 3 AMP, 250VAC, AGC STYLE LITTLEFUSE #312003
(S)	151192	4 FT	WIRE DUCT, 2"x2" WIELAND #DNGS0050
(T)	153779	3 EA	SNAP BUSHING, 1-1/4" I.D. HEYCO PRODUCTS #2201
(U)	S600065	1 EA	CAPACITOR TIE DOWN TO BE DEVELOPED BY ESP
(W)	152995	1 FT	TERMINAL BLOCK, MTG. RAIL, SCORED PHOENIX #08 01 73 3

NOTES:

1. WIRE LABELS SHALL BE WHITE HEAT SHRINK TYPE BRADY SERIES B-321 OR EQUAL.

REV	DESCRIPTION	APP	DATE
3	AS BUILT	RJP	08/24/04
2	REV CPCTR. SIZE, ADDED RESISTOR	RJP	05/19/04
4	2021 UPGRADES	JBM	09/16/21

TOLERANCES (unless otherwise specified)			
ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
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 CLIENT CITY OF WINNIPEG  
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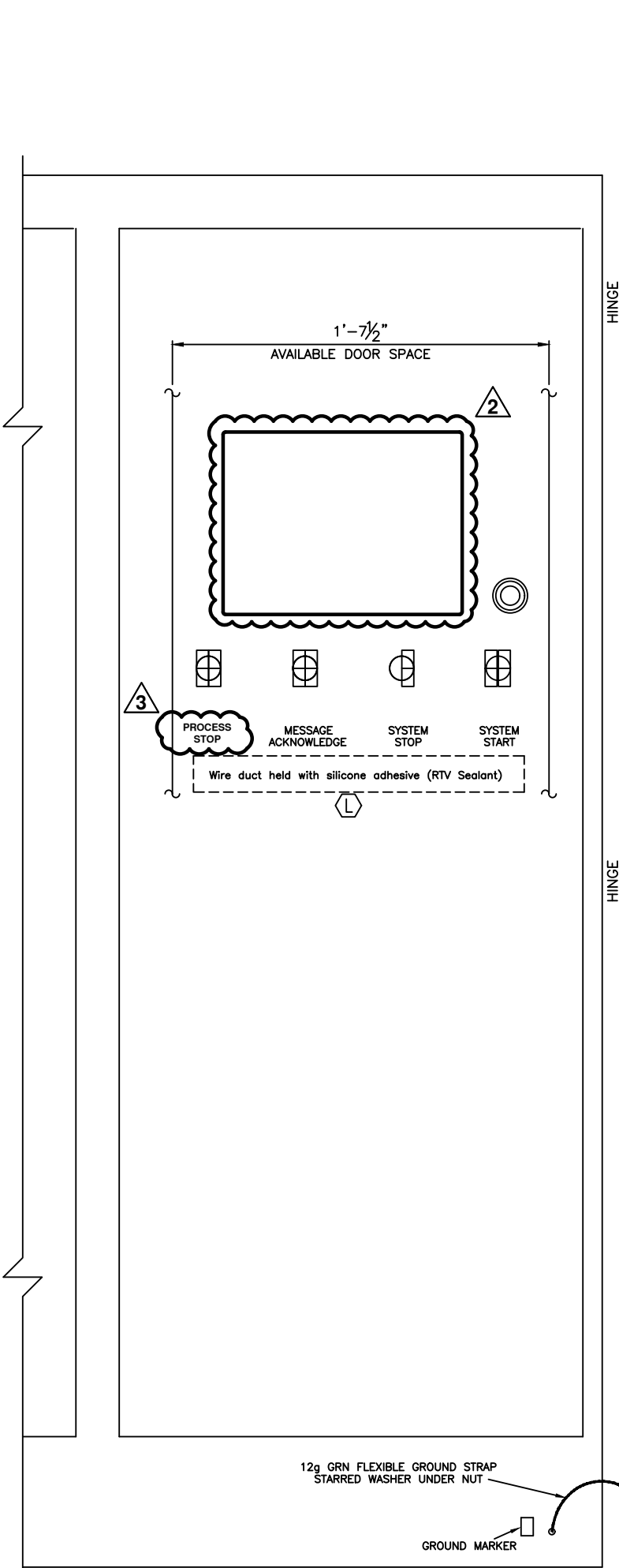
NAME	DATE
DRAFTER RJP	10/15/03
DESIGNER RJP	10/15/03
CHECKER	
APPROVAL	

PROJECT No. US-03065.WINN

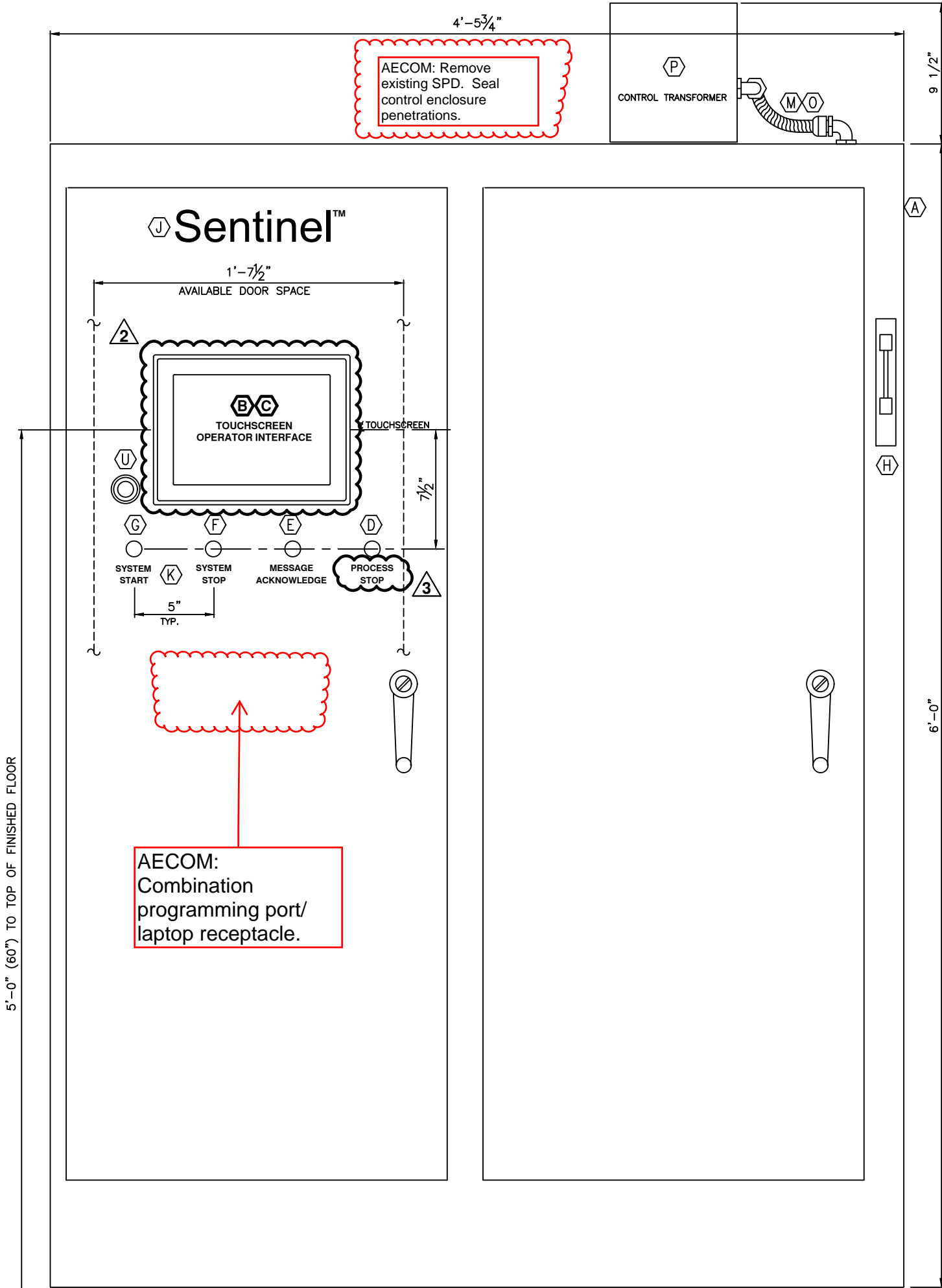
TITLE (6) 48"φ, 9 X 20KW SENTINEL  
 POWER SUPPLY SWING PANEL G.A.  
 20KW TRANSFORMER

DWG. No.	SHEET No.	SCALE	REV.
D	1 OF 1	1/2" = 12"	4

T:\UV Projects\2021\EXO.000034 Winnipeg Design Project\Drawings\Electrical\S100535\_004.dwg Feb 18, 2022 - 12:52pm



CONTROL PANEL DOOR REAR VIEW



CONTROL PANEL FRONT VIEW

BILL OF MATERIAL			
ITEM	SAP #	QTY	DESCRIPTION
A	153805	1 EA	ENCLOSURE 72"x53 3/4"x24" DP. NEMA 12 SAGINAW #SCF-72XM5424
B	155908	1 EA	DISPLAY, MAGELIS, 12" COLOR, TFT, W/E-NET, 24VDC MODICON, #HMIGTO6310
C	154822	1 EA	CABLE, PATCH, CAT5e, 10FT, (FOR ITEM B) LEVITON, #5D460-10S (GRAY)
D	153792	1 EA	PUSHBUTTON, E-STOP, LATCHING, MUSHRM. HD. ALLEN-BRADLEY #800H-FRXT6A1
E	152848	1 EA	PUSHBUTTON, MOMENTARY, BLACK, 1-N.O. CONTACT ALLEN-BRADLEY #800H-AR2D1
F	153807	1 EA	PUSHBUTTON, MOMENTARY, RED, 1-N.C. CONTACT ALLEN-BRADLEY #800H-BR6A
G	153731	1 EA	PUSHBUTTON, MNTY, ILLUM, GREEN, 1-N/O,1-N/C 24VDC, ALLEN-BRADLEY #800H-QRBH24B
H	153835	1 EA	CABLE OPERATOR, W/HANDLE, 3 FT. FLEX. CABLE ALLEN-BRADLEY #140U-K-FCX03
J	S100017	1 EA	LABEL 'SENTINEL' LOGO CALGON CARBON CORP
K	S100030	1 EA	LABEL 'CONTROL PB'S' LOGO CALGON CARBON CORP
L	151192	2 FT	DUCT, WIRING, 2"Wx2"H C/W COVER WEILAND
M	1007748	1 FT	LIQUIDTIGHT FLEXIBLE CONDUIT, 1/2" DIA. HUBBELL #G1050
N	153625	2 EA	CONNECTOR, LIQUIDTITE, 1/2" DIA. 90 DEG. SEALCON # ET16NA-BK
P	153823	1 EA	XFMR, CNTRL 5000VA 600-120VAC 60 HZ ENCLSD REX #CE-5000JA
S	S100520	1 EA	CONTROL PANEL SUBPANEL ASSEMBLY ASSEMBLED ITEM
T	S100545	1 EA	CONTROL PANEL END PANEL ASSEMBLY ASSEMBLED ITEM
U	150000	1 EA	ALARM BUZZER, 24VDC SONALERT #SC648D

- NOTES:
- SCRAPE PAINT AT BACK PANEL MOUNTING NUT AND ALL GROUND CONNECTIONS.
  - FOR ENGRAVED NAMEPLATES SEE TABLE 1 ON ENGRAVED NAMEPLATE DRAWING.

REV	DESCRIPTION	APP	DATE
3	REVISIONS PER COMMENTS: SD-002	JBM	11/23/21
2	2021 UPGRADES	JBM	09/16/21
1	AS BUILT	RJP	08/24/04

TOLERANCES (unless otherwise specified)

ANGULAR	±0'30"	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

TITLE  
(6) 48" Ø, 9 X 20KW SENTINEL CONTROL PANEL FRONT VIEW & DOOR REAR VIEW

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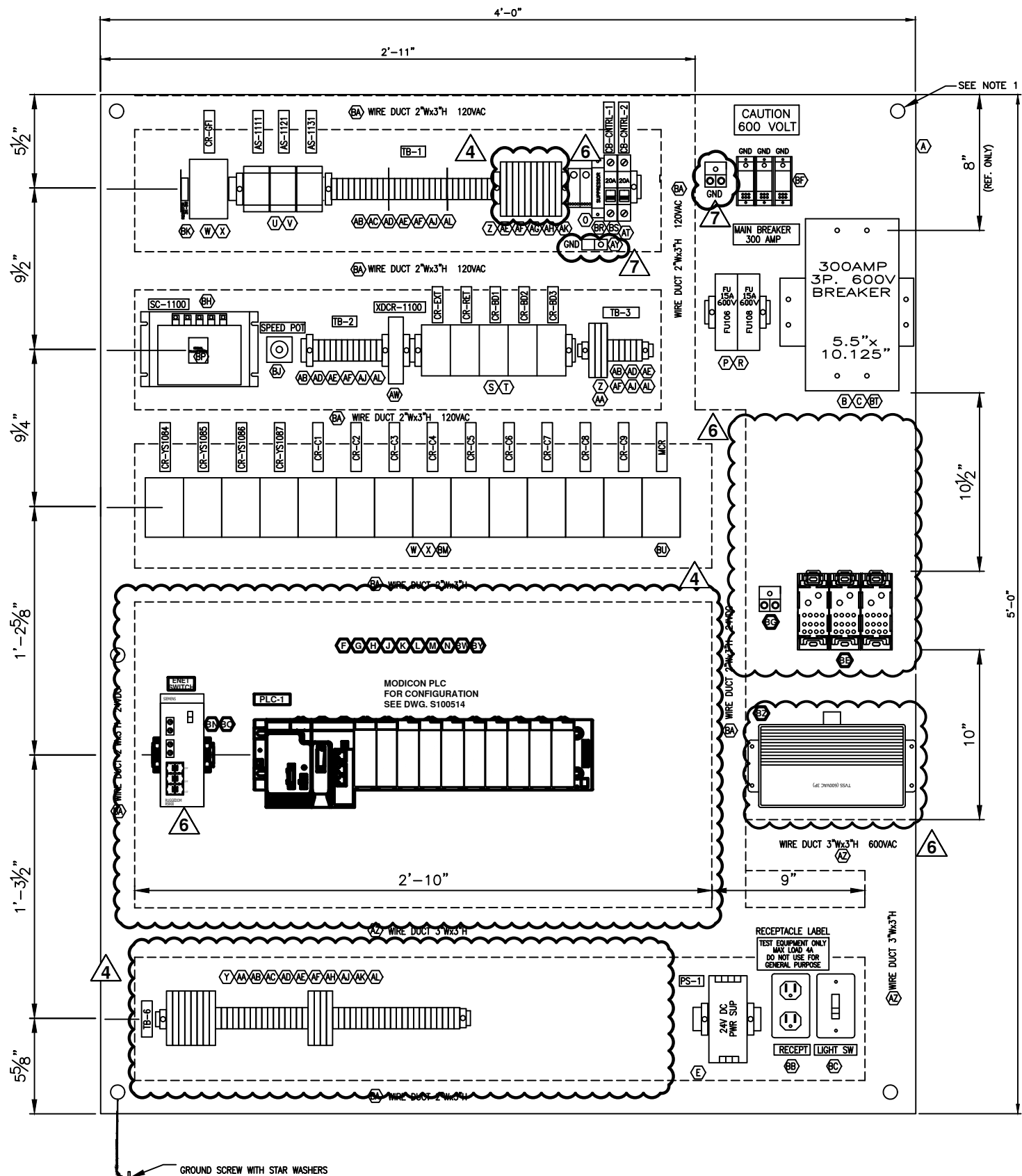
NAME	DATE
DRAFTER GTL	10/15/03
DESIGNER GTL	10/15/03
CHECKER RJP	10/28/03
APPROVAL	

PROJECT No. US.03056.WINN

DWG. No.	SHEET No.	SCALE	REV.
D	1 OF 1	1/4" = 12"	3

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CONTROL PANEL SUBPANEL FRONT VIEW

BILL OF MATERIAL			
ITEM	SAP #	QTY	DESCRIPTION
AG	152791	3.5 FT	TERMINAL BLOCK, DIN RAIL, 35MM, 1M LONG ALLEN-BRADLEY #199-DR1
AH	153432	4 EA	TERMINAL BLOCK FUSED, 10 POLE, SIDE JUMPER ALLEN-BRADLEY #1492-N49
AI	153827	1 EA	TERMINAL BLOCK, 50 POLE, SIDE JUMPER ALLEN-BRADLEY #1492-N24
AK	153851	2 EA	TERMINAL BLOCK FUSED, MARKING SYS, UNPRINTED ALLEN-BRADLEY #1492-SM8X12
AL	153826	2 EA	TERMINAL BLOCK, MARKING SYS, UNPRINTED ALLEN-BRADLEY #1492-N5
AM	152574	13 EA	FUSE, 0.5 AMP, 250 VOLT, AGC STYLE LITTLEFUSE #312.500
AN	153021	3 EA	FUSE, 1 AMP, 250 VOLT, AGC STYLE LITTLEFUSE #312001
AO	153020	3 EA	FUSE, 2 AMP, 250 VOLT, AGC STYLE LITTLEFUSE #312002
AP	153019	4 EA	FUSE, 3 AMP, 250 VOLT, AGC STYLE LITTLEFUSE #312003
AR	153439	2 EA	FUSE, 4 AMP, 250 VOLT, AGC STYLE LITTLEFUSE #312004
AS	153030	2 EA	FUSE, 5 AMP, 250 VOLT, AGC STYLE LITTLEFUSE #312005
AT	150148	2 EA	BREAKER, 1P, 20 AMP, 240VAC SQUARE D #MG24435
AW	153651	1 EA	TRANSDUCER, I/I, 1-5A IN 4-20MA OUT 24VDC PHOENIX #28 14 71 5
AY	150274	1 EA	GROUND LUG PANDUIT #LAMA-1/0-14-Q
AZ	150049	6 FT	DUCT, WIRING, 3\"/>

- NOTES:
- SCRAPE PAINT AT BACK PANEL MOUNTING NUT AND ALL GROUND CONNECTIONS.
  - SEE DWG. S100538 FOR NAMEPLATES
  - FASTEN NAMEPLATES WITH STAINLESS STEEL SCREWS
  - SEE DWG. S100531 FOR TERMINAL BLOCK ENGRAVING

BILL OF MATERIAL			
ITEM	SAP #	QTY	DESCRIPTION
A	-----	1 EA	SUBPANEL, 60" x 48", STEEL SAGINAW (INCL. W/ENCLOSURE)
B	153833	1 EA	CIRCUIT BREAKER, 600V, 300A, 3P ALLEN-BRADLEY #140U-K6D3-D30
C	153834	6 EA	LUGS FOR MAIN BREAKER ALLEN-BRADLEY #140U-K-TLA1
D	S100538	40 EA	LAMACOID IDENTIFICATION PLATES, BLACK LETTERS ON WHITE BACKGROUND
E	153785	1 EA	POWER SUPPLY, 24VDC, 4.8AMP PHOENIX #29 38 58 1
F	157001	1 EA	PROCESSOR MODULE, LEVEL 1, DISTRIBUTED MODICON M580, #BMEP581020
G	157003	1 EA	POWER SUPPLY MODULE MODICON X80, #BMXCPS4022
H	157004	2 EA	DIGITAL INPUT MODULE, 32-CH, ISOLATED MODICON X80, #BMXDDI3202K
J	157005	2 EA	DIGITAL OUTPUT MODULE, 16-CH, RELAY MODICON X80, #BMXDRA1605
K	157006	3 EA	ANALOG INPUT MODULE, 8-CH, ISOLATED MODICON X80, #BMXAMI0810
L	157007	3 EA	ANALOG OUTPUT MODULE, 4-CH, ISOLATED MODICON X80, #BMXAMO0410
M	157002	1 EA	ETHERNET BACKPLANE, 12 SLOTS, (RACK X80) MODICON, #BMEXBP1200
N	157008	2 EA	PREFORMED CORDSET, W/FLYING LEADS ON 1 END MODICON X80, #BMXFCW501
O	153846	1 EA	MINI DISTRIBUTION BLOCK, 2 POLE, 1 #2 IN/4 #10 OUT SQUARE D #LBA261104
P	153860	2 EA	FUSE, 15 AMP, 600V, CLASS J, TIME DELAY LITTLEFUSE #JTD-151D
R	153701	1 EA	FUSEHOLDER, 30 AMP, 2P, DEAD FRONT LITTLEFUSE #LPSJ30-21D
S	153512	5 EA	RELAY, DPST-NO, 5A @150VDC CNTCTS, 24VDC COIL POTTER-BRUMFIELD #KUEP-7D15-24
T	151392	5 EA	RELAY BASE, FOR PART 153512 RELECO #S5-S
U	150260	3 EA	RELAY, MOISTURE, 120 VAC COIL CARLO-GAVAZZI #S-195-166-115
V	350022	3 EA	RELAY, BASE, 11 PIN, FOR PART 150260 RELECO #793080
W	153849	15 EA	HEAVY-DUTY RELAYS, 10A CONTACTS, 24VDC COIL ALLEN-BRADLEY #700DC-P400Z24
X	151211	20 EA	SUPPRESSOR DIODE, 33V, ELECTRO SONIC #SOK525
Y	152978	13 EA	TERMINAL BLOCK FUSED, 24VDC, W/IND ALLEN-BRADLEY #1492-H5
Z	152773	14 EA	TERMINAL BLOCK FUSED, 120VAC, W/IND ALLEN-BRADLEY #1492-H4
AA	152788	5 EA	TERMINAL BLOCK FUSED, END BARRIER ALLEN-BRADLEY #1492-N37
AB	152782	90 EA	TERMINAL BLOCK 300V, 25A ALLEN-BRADLEY #1492-F1
AC	153825	24 EA	TERMINAL BLOCK, GROUND, GREEN ALLEN-BRADLEY #1492-F1G
AD	152783	10 EA	TERMINAL BLOCK, END BARRIER ALLEN-BRADLEY #1492-N18
AE	152784	12 EA	TERMINAL BLOCK, END STOP ALLEN-BRADLEY #1492-N23
AF	152911	6 FT	TERMINAL BLOCK, MTG RAIL, 3' SCORED A-B RAIL ALLEN-BRADLEY #1492-N1

6	REVISIONS PER COMMENTS: SD-002R1	JBM	12/22/21
5	REVISIONS PER COMMENTS: SD-002	JBM	11/23/21
7	REVISIONS PER COMMENTS: SD-002R2	RSC	4/12/22
REV	DESCRIPTION	APP	DATE

TOLERANCES (unless otherwise specified)			
ANGULAR	±0.30°	DECIMAL (2 PLACES)	±0.10
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±0.005
DECIMAL (1 PLACE)	±0.015	DECIMAL (4 PLACES)	±0.0005



DE NORA WATER TECHNOLOGIES, LLC  
 CLIENT: CITY OF WINNIPEG  
 MANITOBA, CANADA

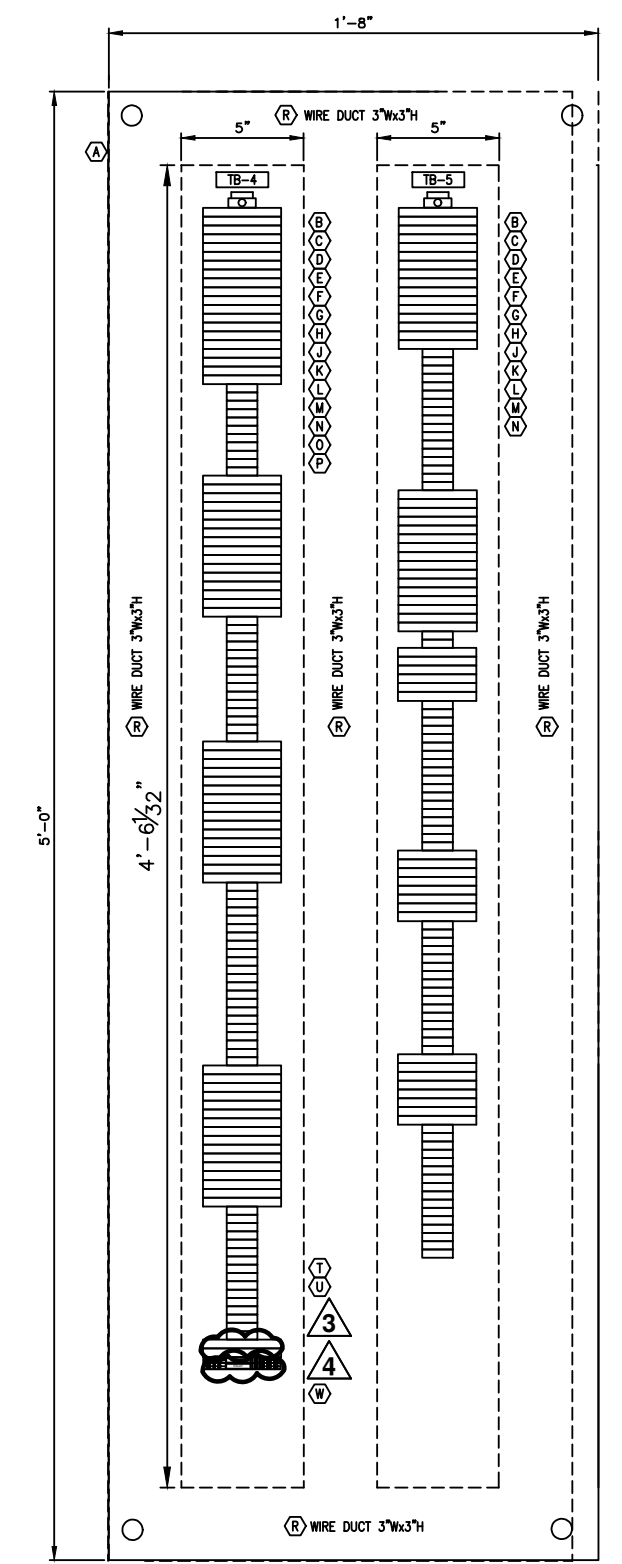
TITLE: (6) 48"Ø, 9 X 20K SENTINEL CONTROL PANEL SUBPANEL G. A. FRONT VIEW

DWG. Size	D	SHEET No.	1 OF 1	SCALE	1/4" = 12"
DWG. No.	S100520		REV.	7	

NAME	DATE
DRAFTER	GTL 9/22/03
DESIGNER	GTL 9/22/03
CHECKER	RJP 10/28/03
APPROVAL	
PROJECT No.	US-03056.WINN

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CONTROL PANEL SIDE PANEL

BILL OF MATERIAL			
ITEM	SAP #	QTY	DESCRIPTION
(A)	-----	1 EA	SUBPANEL, 60" x 20", STEEL SAGINAW (INCL. W/ENCLOSURE)
(B)	152978	126 EA	TERMINAL BLOCK FUSED, 24VDC, W/IND ALLEN-BRADLEY #1492-H5
(C)	152788	10 EA	TERMINAL BLOCK FUSED, END BARRIER ALLEN-BRADLEY #1492-N37
(D)	152782	135 EA	TERMINAL BLOCK 300V, 25A ALLEN-BRADLEY #1492-F1
(E)	152783	9 EA	TERMINAL BLOCK, END BARRIER ALLEN-BRADLEY #1492-N18
(F)	152784	8 EA	TERMINAL BLOCK, END STOP ALLEN-BRADLEY #1492-N23
(G)	152911	9 FT	TERMINAL BLOCK, MTG RAIL, 3' SCORED A-B RAIL ALLEN-BRADLEY #1492-N1
(H)	153432	6 EA	TERMINAL BLOCK FUSED, 10 POLE, SIDE JUMPER ALLEN-BRADLEY #1492-N49
(J)	153827	2 EA	TERMINAL BLOCK, 50 POLE, SIDE JUMPER ALLEN-BRADLEY #1492-N24
(K)	153851	2 EA	TERMINAL BLOCK FUSED, MARKING SYS, UNPRINTED ALLEN-BRADLEY #1492-SM8X12
(L)	153826	2 EA	TERMINAL BLOCK, MARKING SYS, UNPRINTED ALLEN-BRADLEY #1492-N5
(M)	152574	88 EA	FUSE, 0.5 AMP, 250 VOLT, AGC STYLE LITTLEFUSE #312.500
(N)	153021	36 EA	FUSE, 1 AMP, 250 VOLT, AGC STYLE LITTLEFUSE #312001
(O)	153019	3 EA	FUSE, 3 AMP, 250 VOLT, AGC STYLE LITTLEFUSE #312003
(P)	153439	2 EA	FUSE, 4 AMP, 250 VOLT, AGC STYLE LITTLEFUSE #312004
(R)	150049	14 FT	DUCT, WIRING, 3"Wx3"H C/W COVER WEILAND #DNG-75075
(S)	S100538	2 EA	LAMACOID IDENTIFICATION PLATES, BLACK LETTERS ON WHITE BACKGROUND
(T)	153115	2 EA	TB, FUSED, 24V DC, W/BI PHOENIX, #30 04 26 5 (UK6, 3-HESILED 24)
(U)	153020	1 EA	FUSE, 2A, 250V, STYLE AGC LITTLEFUSE #312002
(W)	155386	2 EA	RELAY, SPDT, 6A, 24V COIL, LED, W/BASE PHOENIX, #29 66 18 4 (PLC-RSC-24UC/21)

NOTES:

- SCRAPE PAINT AT BACK PANEL MOUNTING NUT AND ALL GROUND CONNECTIONS.
- SEE DWG. S100538 FOR NAMEPLATES
- SEE DWG. S100531 FOR TERMINAL BLOCK ENGRAVING

REV	DESCRIPTION	APP	DATE
3	2021 UPGRADES	JBM	09/16/21
2	AS BUILT	RJP	08/24/04
4	ADDED RELAYS FOR AHF	JBM	12/22/21

TOLERANCES (unless otherwise specified)			
ANGULAR	±0°30'	DECIMAL (2 PLACES)	±0.10
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±0.005
DECIMAL (1 PLACE)	±0.015	DECIMAL (4 PLACES)	±0.0005

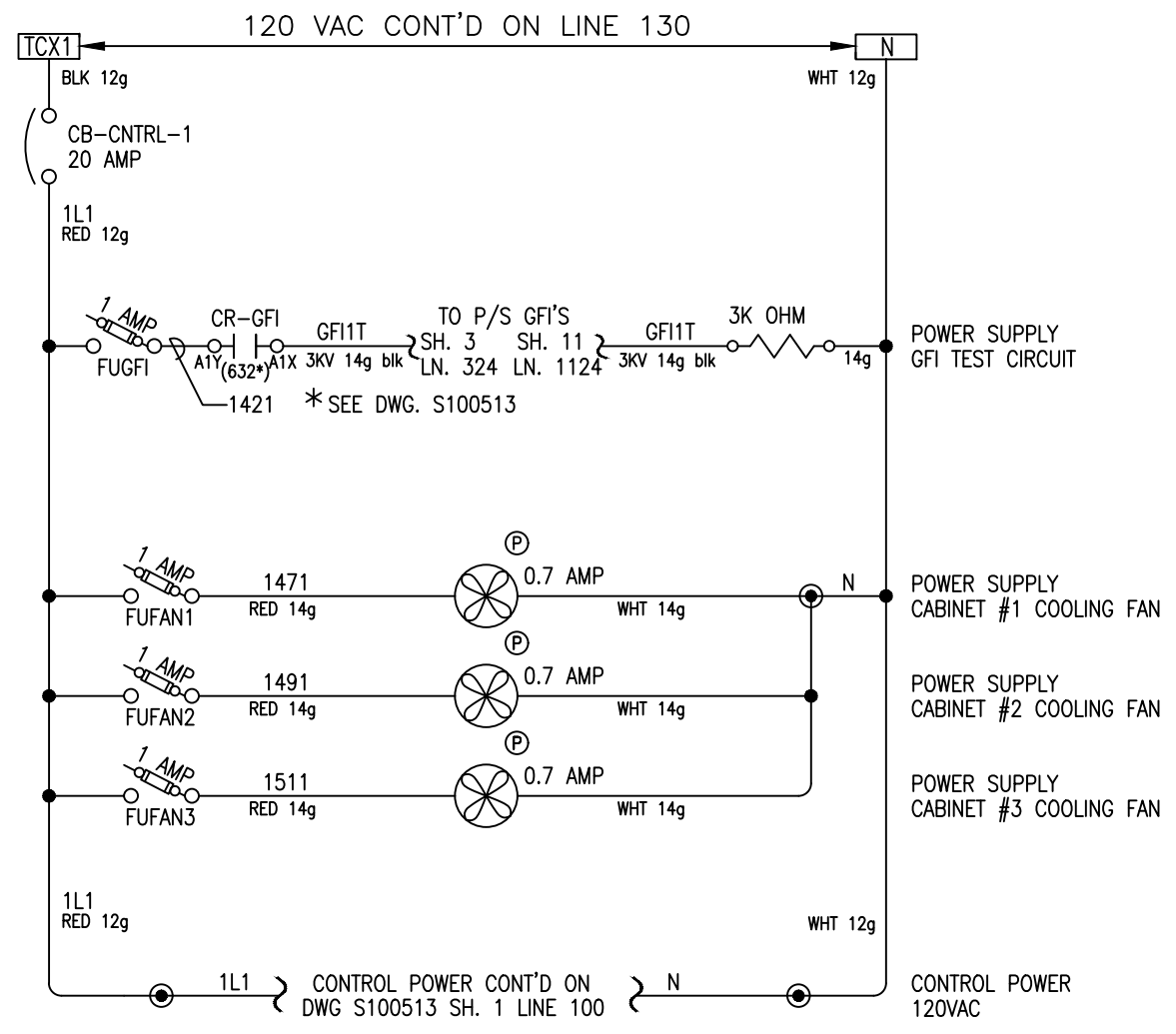
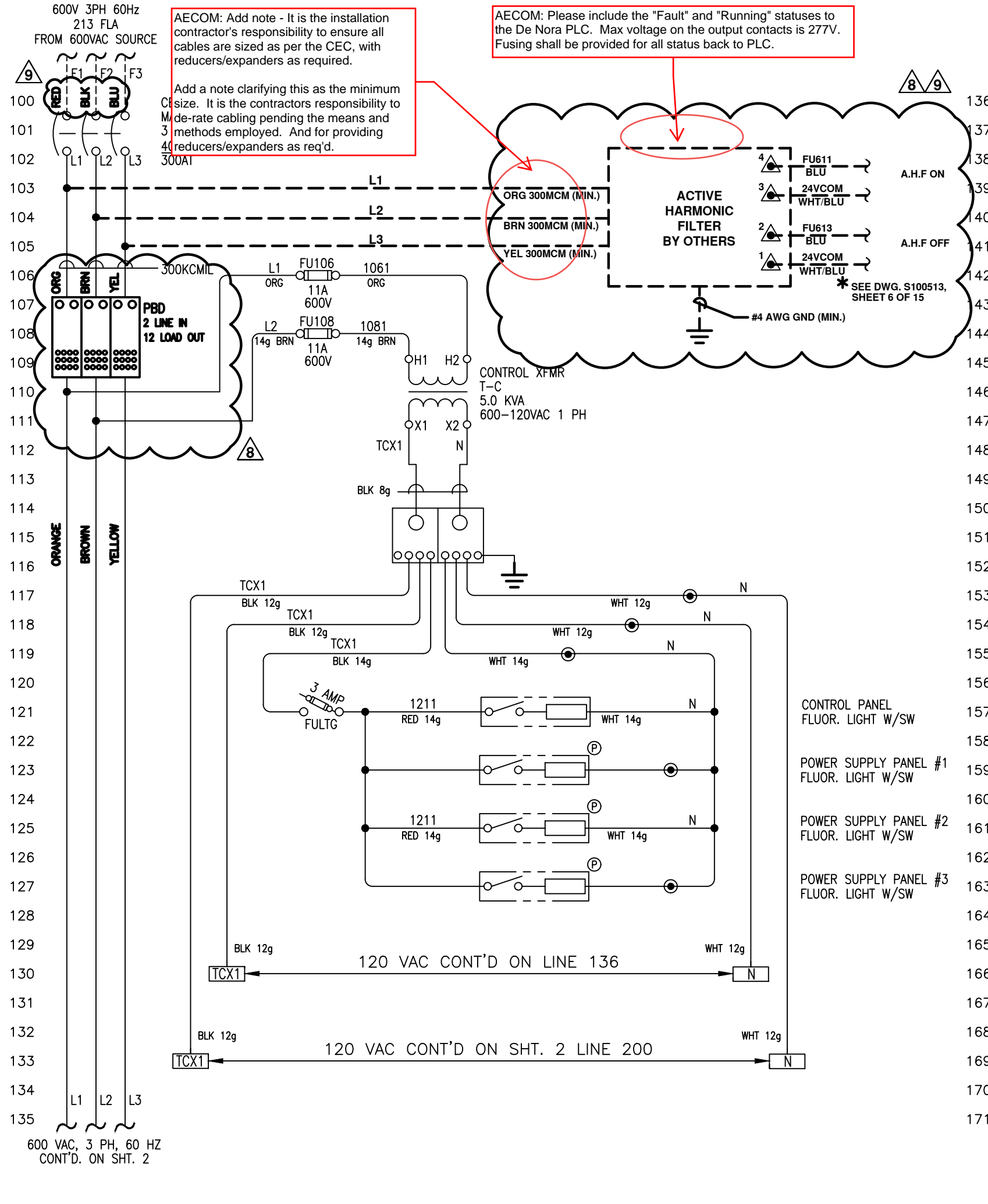


CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

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NAME	DATE
DRAFTER: GTL	10/17/03
DESIGNER: GTL	10/17/03
CHECKER: RJP	10/28/03
APPROVAL	
PROJECT No.	US-03056.WINN

TITLE	(6) 48"Ø, 9 X 20KW SENTINEL CONTROL PANEL SIDE PANEL G. A.
DWG. Size	D
SHEET No.	1 OF 1
SCALE	1/4" = 12"
DWG. No.	S100545
REV.	4

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**NOTE:**  
1. ALL DEVICES LOCATED IN CONTROL PANEL CABINET EXCEPT AS NOTED.

REV	DESCRIPTION	APP	DATE
5	CORRECTED SPELLING	RJP	09/13/05
9	REVISIONS PER COMMENTS: SD-002R2	RSC	4/12/22
8	ADD PDB 2IN 12 OUT & AHF	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	NO CHANGE THIS SHEET	JBM	09/16/21

**LEGEND:**

- TB IN PROCESS PANEL
- Ⓟ LOC. IN POWER CABINET
- ▲ TB IN FIELD DEVICE
- TB IN POWER CABINET
- EXTERNAL WIRING
- FUSED TYPE T.B.

**COLOUR CODE:**

- blue 24 Vdc signal
- wht/blu 0 Vdc common
- red 120 Vac control
- white neutral
- green ground
- orange 600V Ph. 'A'
- brown 600V Ph. 'B'
- yellow 600V Ph. 'C'

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	NAME	DATE
DRAFTER	RJP	10/10/03
DESIGNER	RJP	10/10/03
CHECKER	GTL	10/28/03
APPROVAL		
PROJECT No.	US-03056.WINN	

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°40'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005

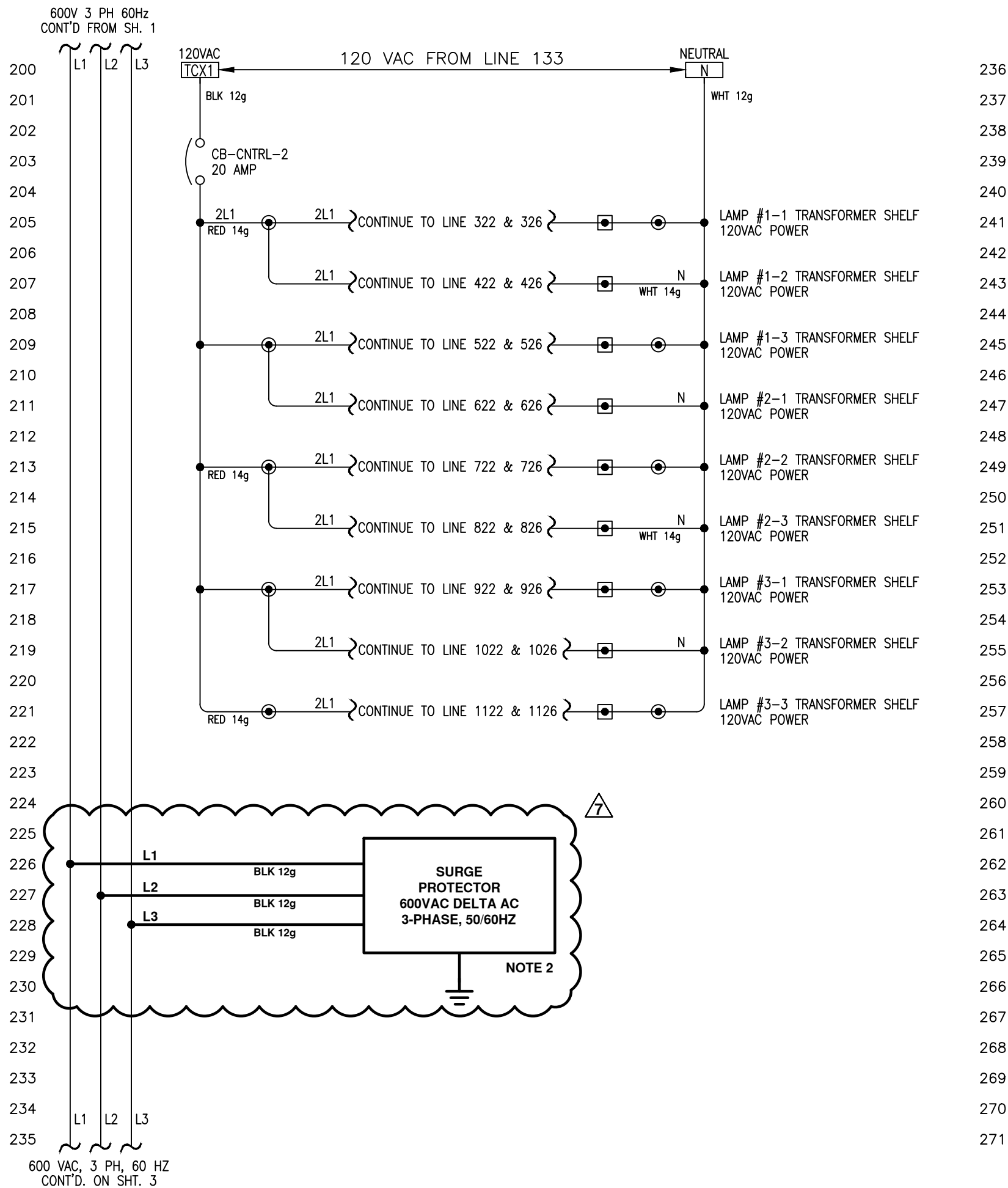
**DE NORA**  
DE NORA WATER TECHNOLOGIES, LLC

**CLIENT**  
CITY OF WINNIPEG  
MANITOBA, CANADA

**TITLE**  
(6) 48"ø, 9 X 20KW SENTINEL  
POWER SUPPLY SCHEMATIC

DWG. Size	<b>B</b>	SHEET No.	1 OF 11	SCALE	NONE
DWG. No.	S100537			REV.	9

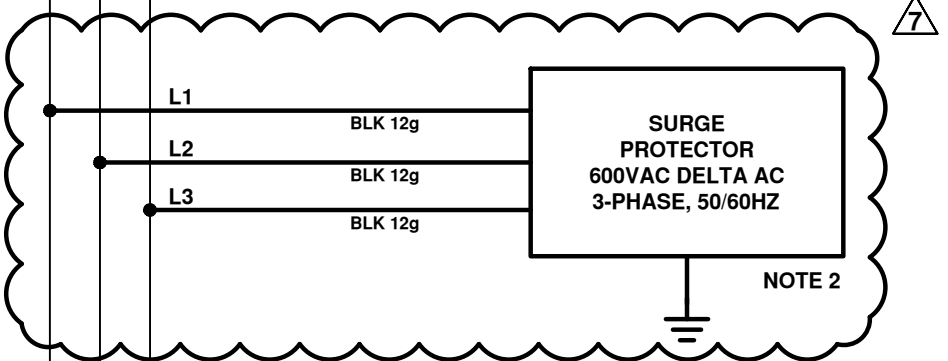
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**NOTE:**

- ALL DEVICES LOCATED IN CONTROL PANEL CABINET EXCEPT AS NOTED.
- DISCONNECT EXISTING 600V SPD AND REPLACE WITH NEW DIN MOUNTED UNIT. GROUND NEW UNIT TO MAIN GND LUG USING INSULATED GREEN CU CONDUCTOR SIZED AS DIRECTED BY DEVICE MANUFACTURER.



**LEGEND:**

- TB IN PROCESS PANEL
- Ⓟ LOC. IN POWER CABINET
- ⚠ TB IN FIELD DEVICE
- TB IN POWER CABINET
- EXTERNAL WIRING
- ⊕ FUSED TYPE T.B.

**All wiring #16g unless indicated otherwise.**

**COLOUR CODE:**

- blue 24 Vdc signal
- wht/blu 0 Vdc common
- red 120 Vac control
- white neutral
- green ground
- orange 600V Ph. 'A'
- brown 600V Ph. 'B'
- yellow 600V Ph. 'C'

REV	DESCRIPTION	APP	DATE
5	CORRECTED SPELLING	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	REVISIONS PER COMMENTS: SD-002	JBM	11/23/21
6	NO CHANGE THIS SHEET	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

ANGULAR	FRACTIONAL	DECIMAL (1 PLACE)	DECIMAL (2 PLACES)	DECIMAL (3 PLACES)	DECIMAL (4 PLACES)
±0°40'	±1/16"	±0.015	±0.010	±0.005	±0.0005

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	NAME	DATE
DRAFTER	RJP	10/10/03
DESIGNER	RJP	10/10/03
CHECKER	GTL	10/28/03
APPROVAL		
PROJECT No.	US-03056.WINN	

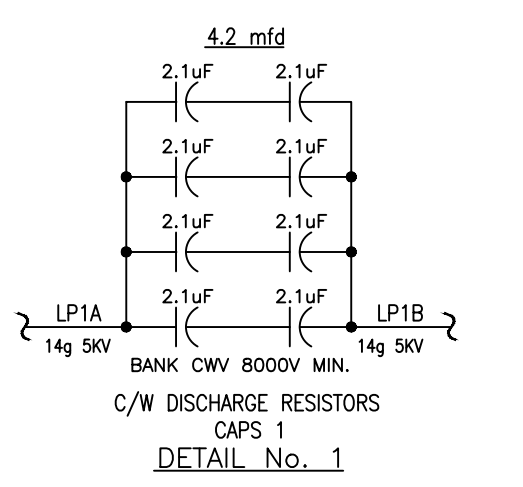
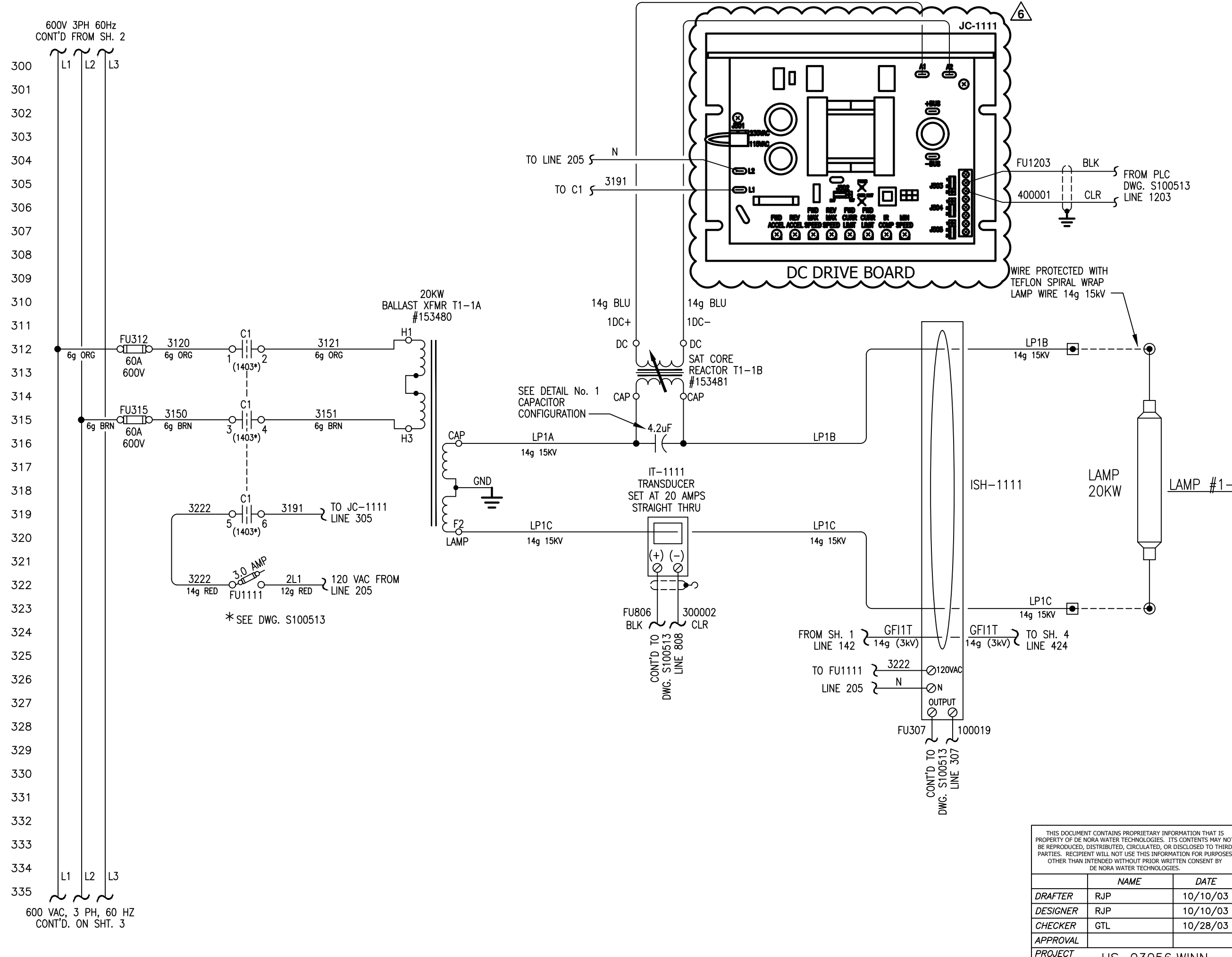
**DE NORA**  
DE NORA WATER TECHNOLOGIES, LLC

CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

TITLE  
(6) 48"φ, 9 X 20KW SENTINEL  
POWER SUPPLY SCHEMATIC

DWG. Size	B	SHEET No.	2 OF 11	SCALE	NONE
DWG. No.	S100537			REV.	9

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**NOTE:**  
 1. ALL DEVICES LOCATED IN POWER SUPPLY CABINET EXCEPT AS NOTED.

**LEGEND:**  
 HIGH VOLTAGE TERMINATIONS  
 [Symbol] LOCATED IN POWER SUPPLY  
 [Symbol] LAMP LEAD TERMINATION (POST)  
 --- DENOTES FIELD WIRING  
 [Symbol] DENOTES TAPE BACK SHIELD  
 [Symbol] LOC. IN CONTROL PANEL CABINET

REV	DESCRIPTION	APP	DATE
5	CORRECTED SPELLING	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°40'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



**DE NORA WATER TECHNOLOGIES, LLC**  
 CLIENT  
 CITY OF WINNIPEG  
 MANITOBA, CANADA

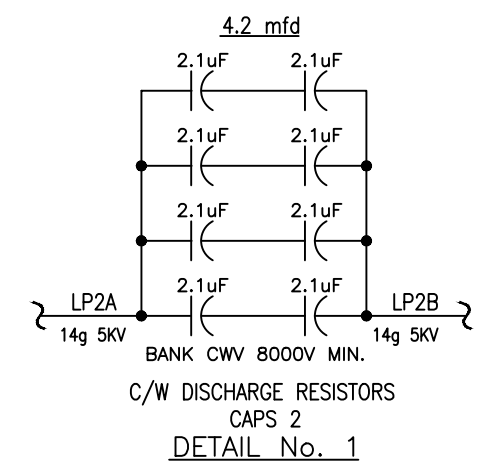
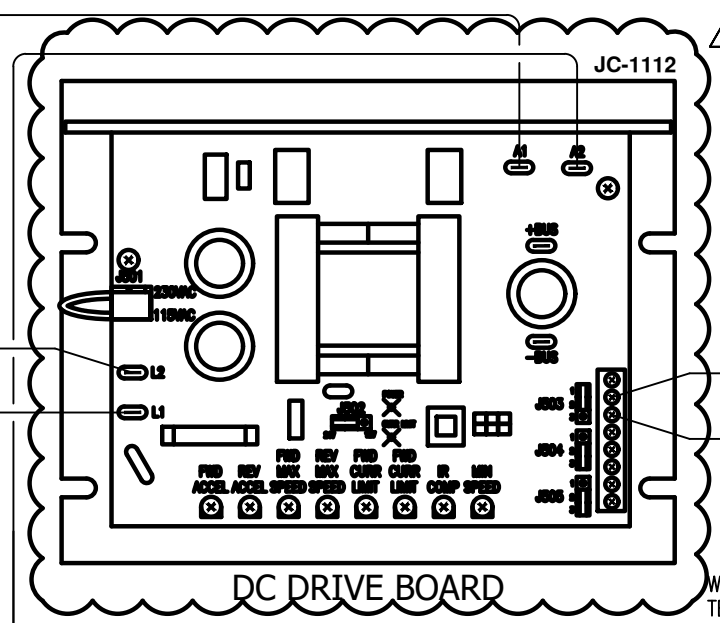
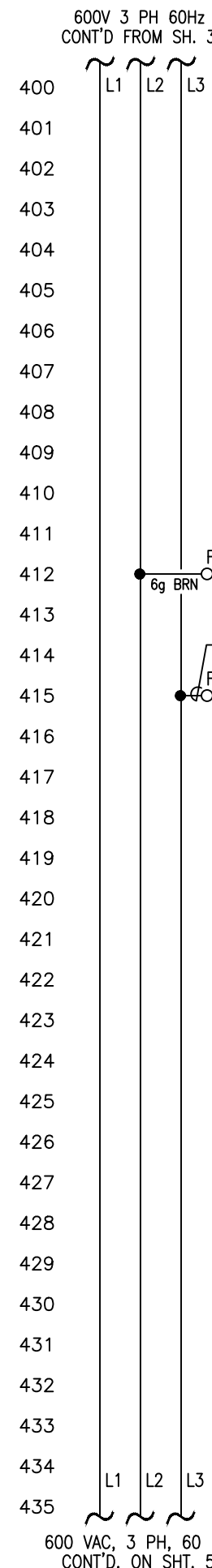
TITLE  
 (6) 48"Ø, 9 X 20KW SENTINEL  
 POWER SUPPLY SCHEMATIC

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	NAME	DATE
DRAFTER	RJP	10/10/03
DESIGNER	RJP	10/10/03
CHECKER	GTL	10/28/03
APPROVAL		
PROJECT No.	US-03056.WINN	

DWG. Size	<b>B</b>	SHEET No.	3 OF 11	SCALE	NONE
DWG. No.	S100537			REV.	9

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**NOTE:**  
1. ALL DEVICES LOCATED IN POWER SUPPLY CABINET EXCEPT AS NOTED.

**LEGEND:**  
HIGH VOLTAGE TERMINATIONS  
 LOCATED IN POWER SUPPLY  
 LAMP LEAD TERMINATION (POST)  
 --- DENOTES FIELD WIRING  
 - - - - DENOTES TAPE BACK SHIELD  
 © LOC. IN CONTROL PANEL CABINET

REV	DESCRIPTION	APP	DATE
5	CORRECTED SPELLING	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°40'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



DE NORA WATER TECHNOLOGIES, LLC  
 CLIENT  
 CITY OF WINNIPEG  
 MANITOBA, CANADA

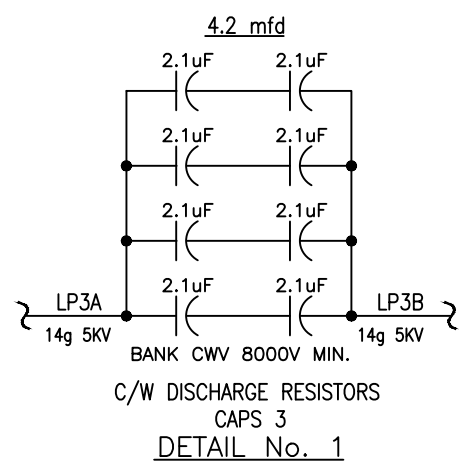
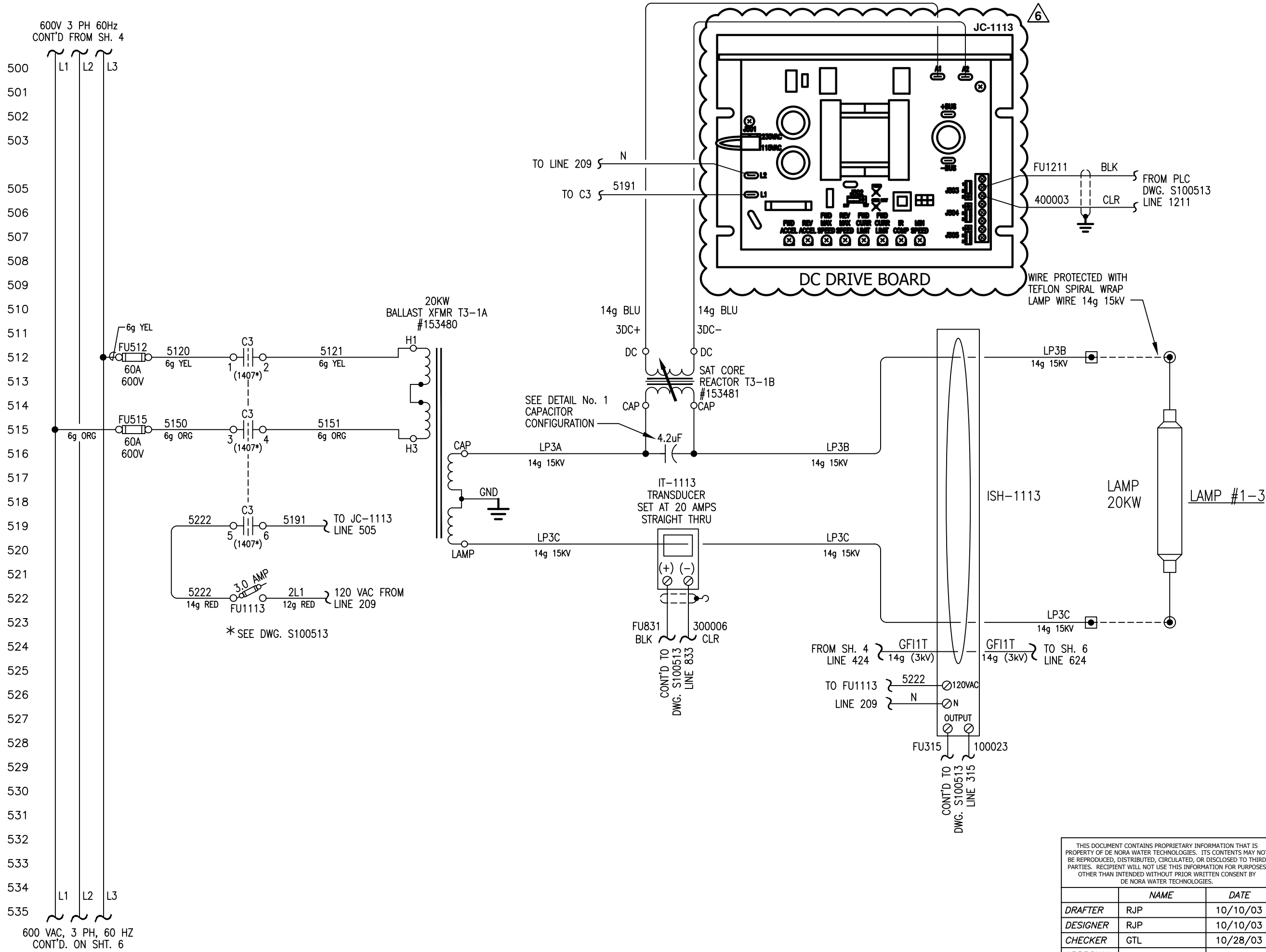
TITLE  
 (6) 48"Ø, 9 X 20KW SENTINEL  
 POWER SUPPLY SCHEMATIC

DWG. Size	B	SHEET No.	4 OF 11	SCALE	NONE
DWG. No.	S100537			REV.	9

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	NAME	DATE
DRAFTER	RJP	10/10/03
DESIGNER	RJP	10/10/03
CHECKER	GTL	10/28/03
APPROVAL		
PROJECT No.	US-03056.WINN	

T:\UV Projects\2021\EXO.000034 Winnipeg Design Project\Drawings\Electrical\S100537\_009.dwg Apr 12, 2022 - 2:57pm



**NOTE:**  
1. ALL DEVICES LOCATED IN POWER SUPPLY CABINET EXCEPT AS NOTED.

- LEGEND:**
- HIGH VOLTAGE TERMINATIONS
  - LOCATED IN POWER SUPPLY
  - ⊙ LAMP LEAD TERMINATION (POST)
  - DENOTES FIELD WIRING
  - DENOTES TAPE BACK SHIELD
  - Ⓢ LOC. IN CONTROL PANEL CABINET

REV	DESCRIPTION	APP	DATE
5	CORRECTED SPELLING	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°40'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



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CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

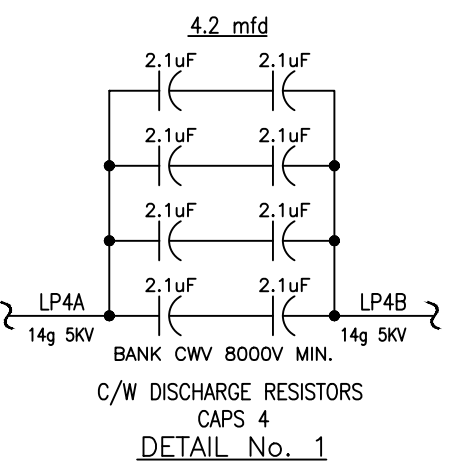
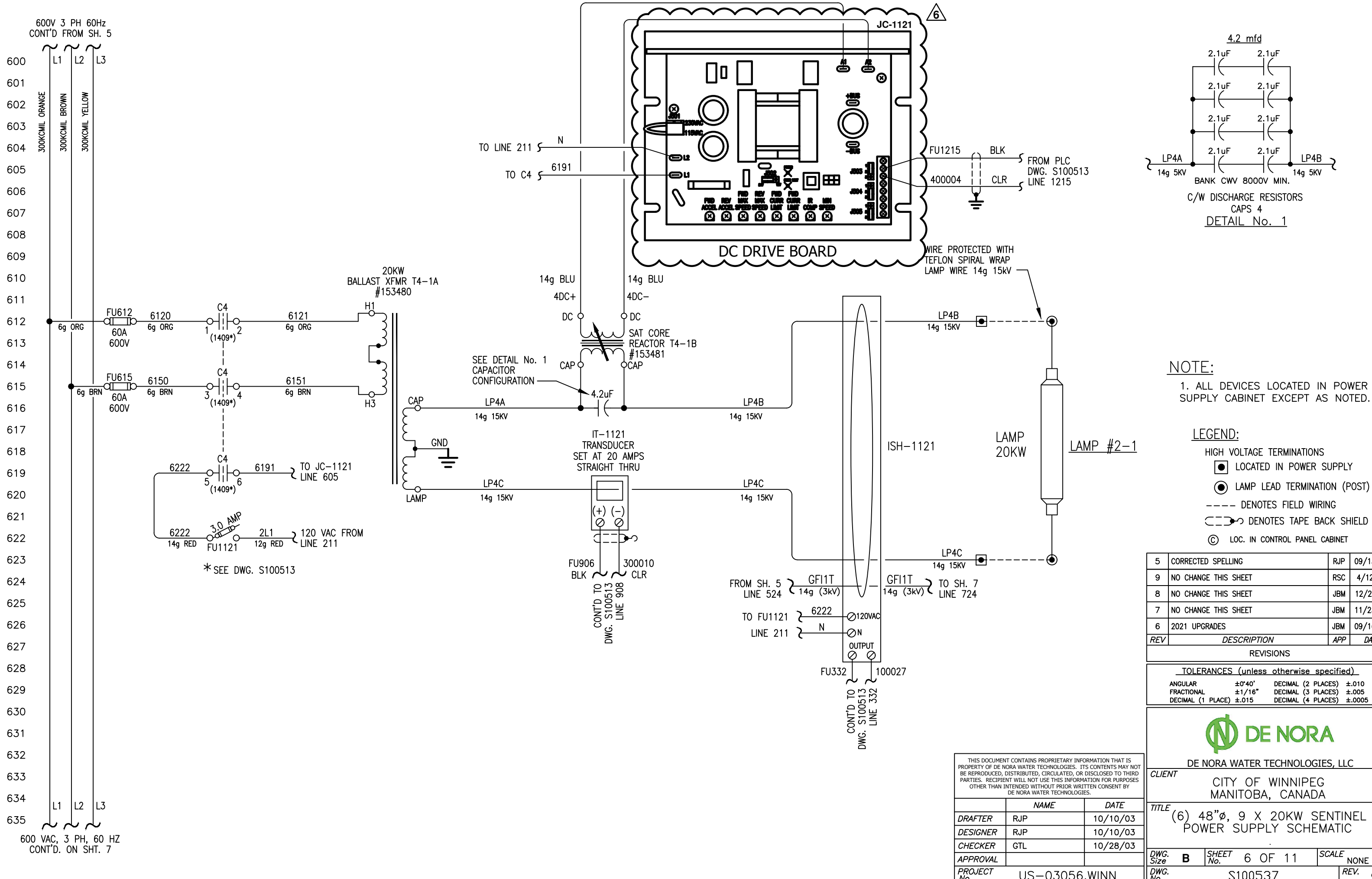
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(6) 48"φ, 9 X 20KW SENTINEL  
POWER SUPPLY SCHEMATIC

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	NAME	DATE
DRAFTER	RJP	10/10/03
DESIGNER	RJP	10/10/03
CHECKER	GTL	10/28/03
APPROVAL		
PROJECT No.	US-03056.WINN	

DWG. Size	B	SHEET No.	5 OF 11	SCALE	NONE
DWG. No.	S100537			REV.	9

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**NOTE:**  
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- LEGEND:**
- HIGH VOLTAGE TERMINATIONS
  - LOCATED IN POWER SUPPLY
  - LAMP LEAD TERMINATION (POST)
  - DENOTES FIELD WIRING
  - - - - DENOTES TAPE BACK SHIELD
  - Ⓢ LOC. IN CONTROL PANEL CABINET

REV	DESCRIPTION	APP	DATE
5	CORRECTED SPELLING	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

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FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



DE NORA WATER TECHNOLOGIES, LLC

CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

TITLE  
(6) 48"Ø, 9 X 20KW SENTINEL  
POWER SUPPLY SCHEMATIC

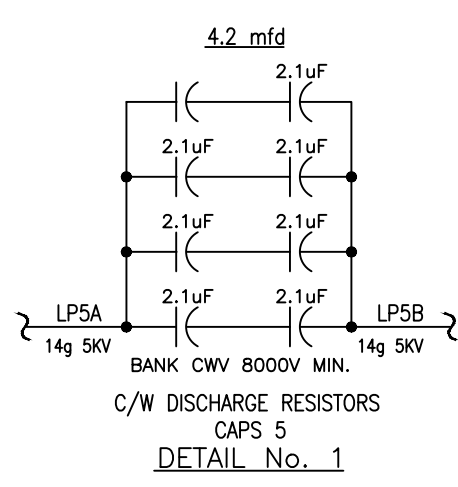
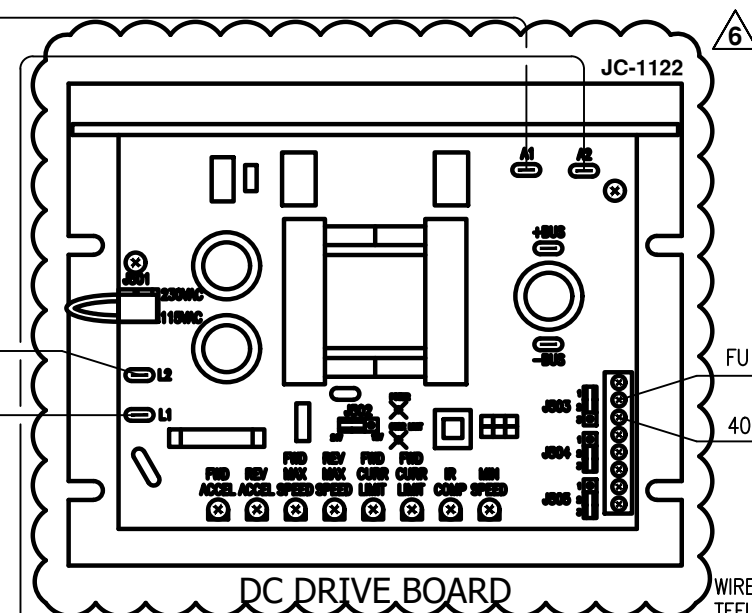
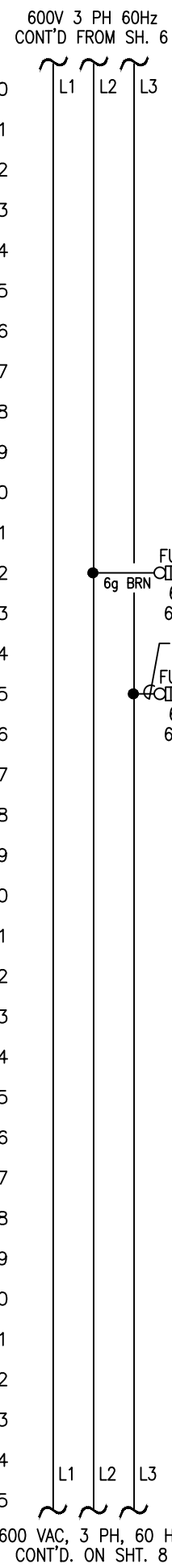
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DRAFTER	RJP	10/10/03
DESIGNER	RJP	10/10/03
CHECKER	GTL	10/28/03
APPROVAL		
PROJECT No.	US-03056.WINN	

DWG. Size	B	SHEET No.	6 OF 11	SCALE	NONE
DWG. No.	S100537			REV.	9



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**NOTE:**  
1. ALL DEVICES LOCATED IN POWER SUPPLY CABINET EXCEPT AS NOTED.

**LEGEND:**  
 HIGH VOLTAGE TERMINATIONS  
 ● LOCATED IN POWER SUPPLY  
 ○ LAMP LEAD TERMINATION (POST)  
 --- DENOTES FIELD WIRING  
 - - - DENOTES TAPE BACK SHIELD  
 ⊙ LOC. IN CONTROL PANEL CABINET

REV	DESCRIPTION	APP	DATE
5	CORRECTED SPELLING	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°40'	DECIMAL (2 PLACES)	±.010
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DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



DE NORA WATER TECHNOLOGIES, LLC  
 CLIENT CITY OF WINNIPEG  
 MANITOBA, CANADA

TITLE (6) 48"Ø, 9 X 20KW SENTINEL  
 POWER SUPPLY SCHEMATIC

DWG. Size	B	SHEET No.	7 OF 11	SCALE	NONE
DWG. No.	S100537			REV.	9

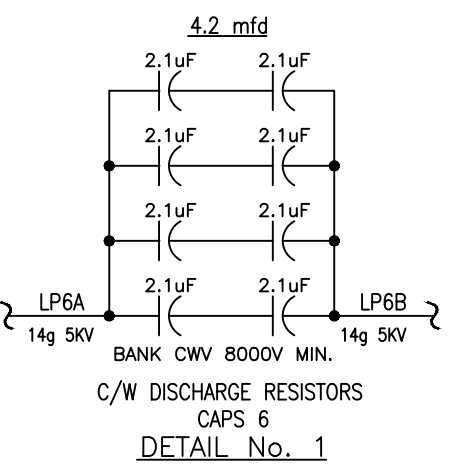
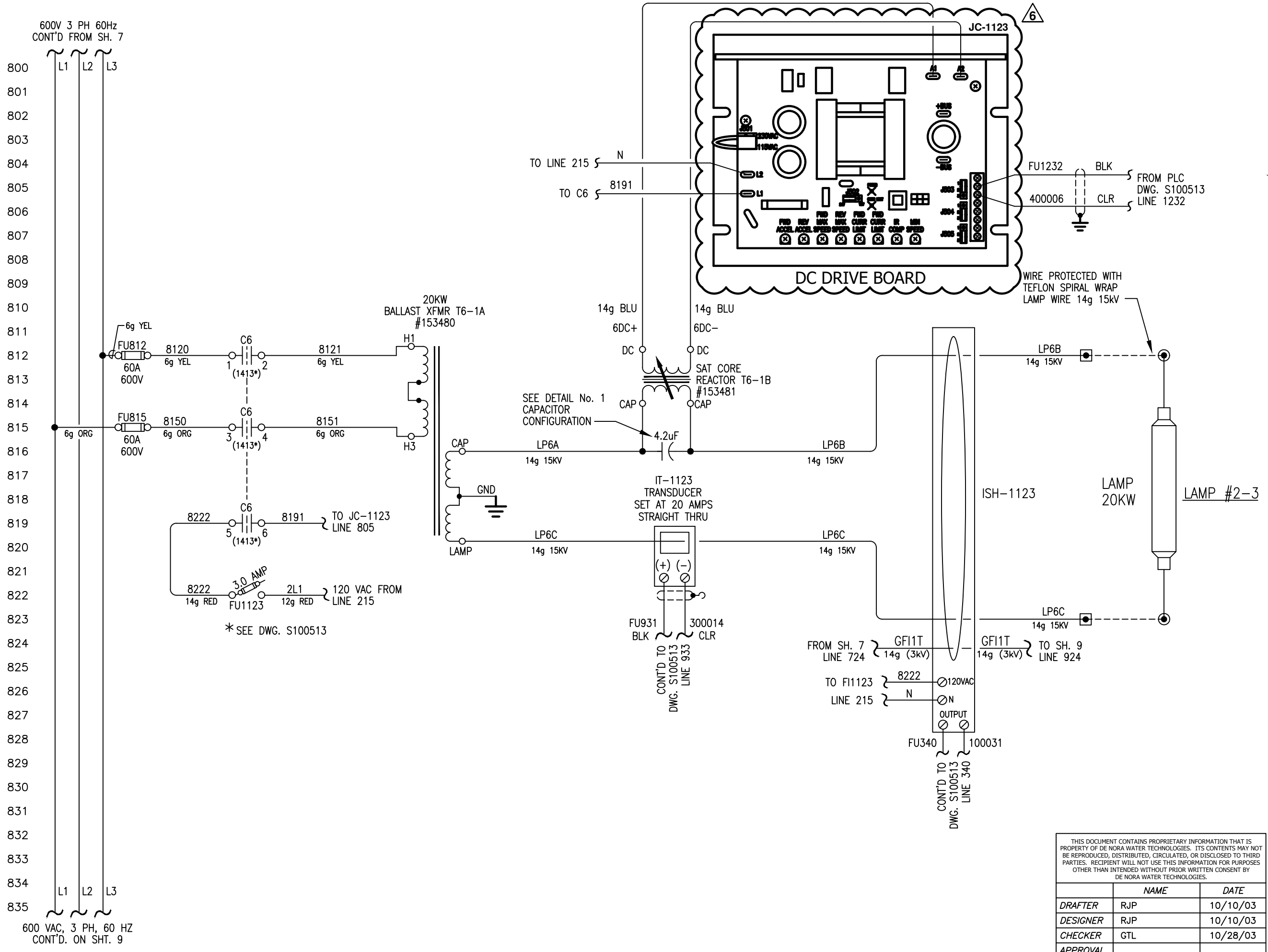
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	NAME	DATE
DRAFTER	RJP	10/10/03
DESIGNER	RJP	10/10/03
CHECKER	GTL	10/28/03
APPROVAL		
PROJECT No.	US-03056.WINN	

600 VAC, 3 PH, 60 HZ  
CONT'D. ON SHT. 8

600V 3 PH 60Hz  
CONT'D FROM SH. 6

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**NOTE:**  
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**LEGEND:**  
HIGH VOLTAGE TERMINATIONS  
● LOCATED IN POWER SUPPLY  
⊙ LAMP LEAD TERMINATION (POST)  
--- DENOTES FIELD WIRING  
--- DENOTES TAPE BACK SHIELD  
Ⓢ LOC. IN CONTROL PANEL CABINET

REV	DESCRIPTION	APP	DATE
5	CORRECTED SPELLING	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

TOLERANCES (unless otherwise specified)			
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DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



DE NORA WATER TECHNOLOGIES, LLC

CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

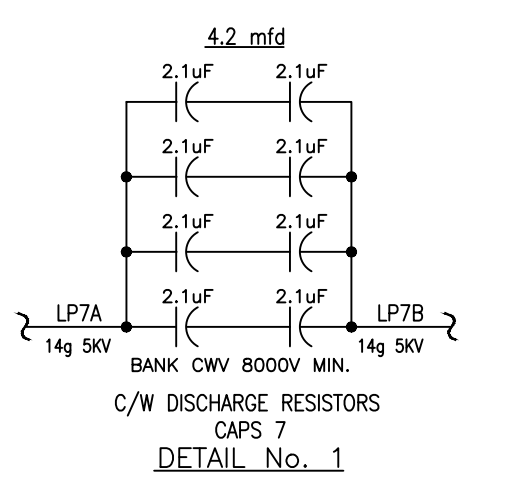
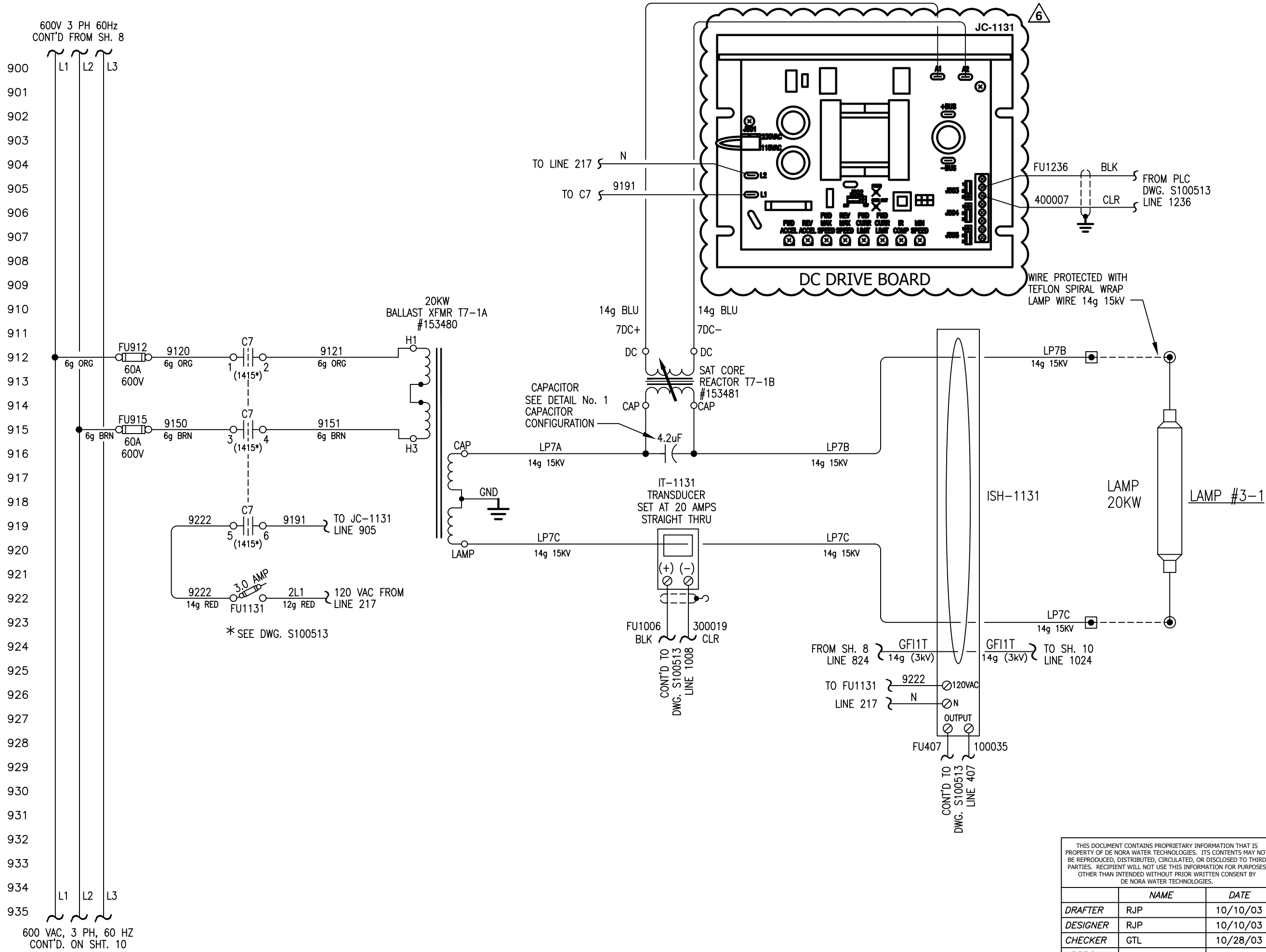
TITLE  
(6) 48"φ, 9 X 20KW SENTINEL  
POWER SUPPLY SCHEMATIC

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	NAME	DATE
DRAFTER	RJP	10/10/03
DESIGNER	RJP	10/10/03
CHECKER	GTL	10/28/03
APPROVAL		
PROJECT No.	US-03056.WINN	

DWG. Size	B	SHEET No.	8 OF 11	SCALE	NONE
DWG. No.	S100537			REV.	9

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**NOTE:**  
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**LEGEND:**  
 HIGH VOLTAGE TERMINATIONS  
 ● LOCATED IN POWER SUPPLY  
 ⊙ LAMP LEAD TERMINATION (POST)  
 - - - DENOTES FIELD WIRING  
 ⊞ DENOTES TAPE BACK SHIELD  
 ⊙ LOC. IN CONTROL PANEL CABINET

REV	DESCRIPTION	APP	DATE
5	CORRECTED SPELLING	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
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6	2021 UPGRADES	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

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DE NORA WATER TECHNOLOGIES, LLC

CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

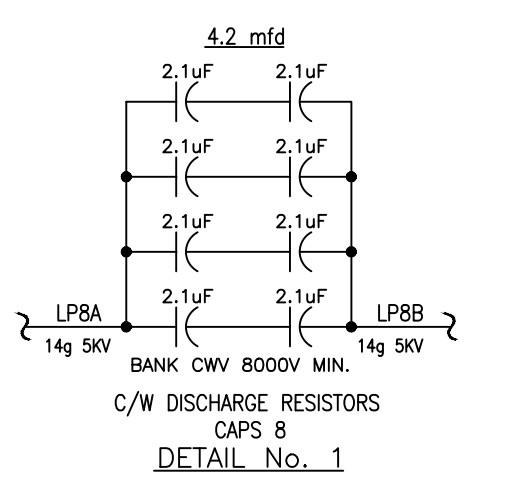
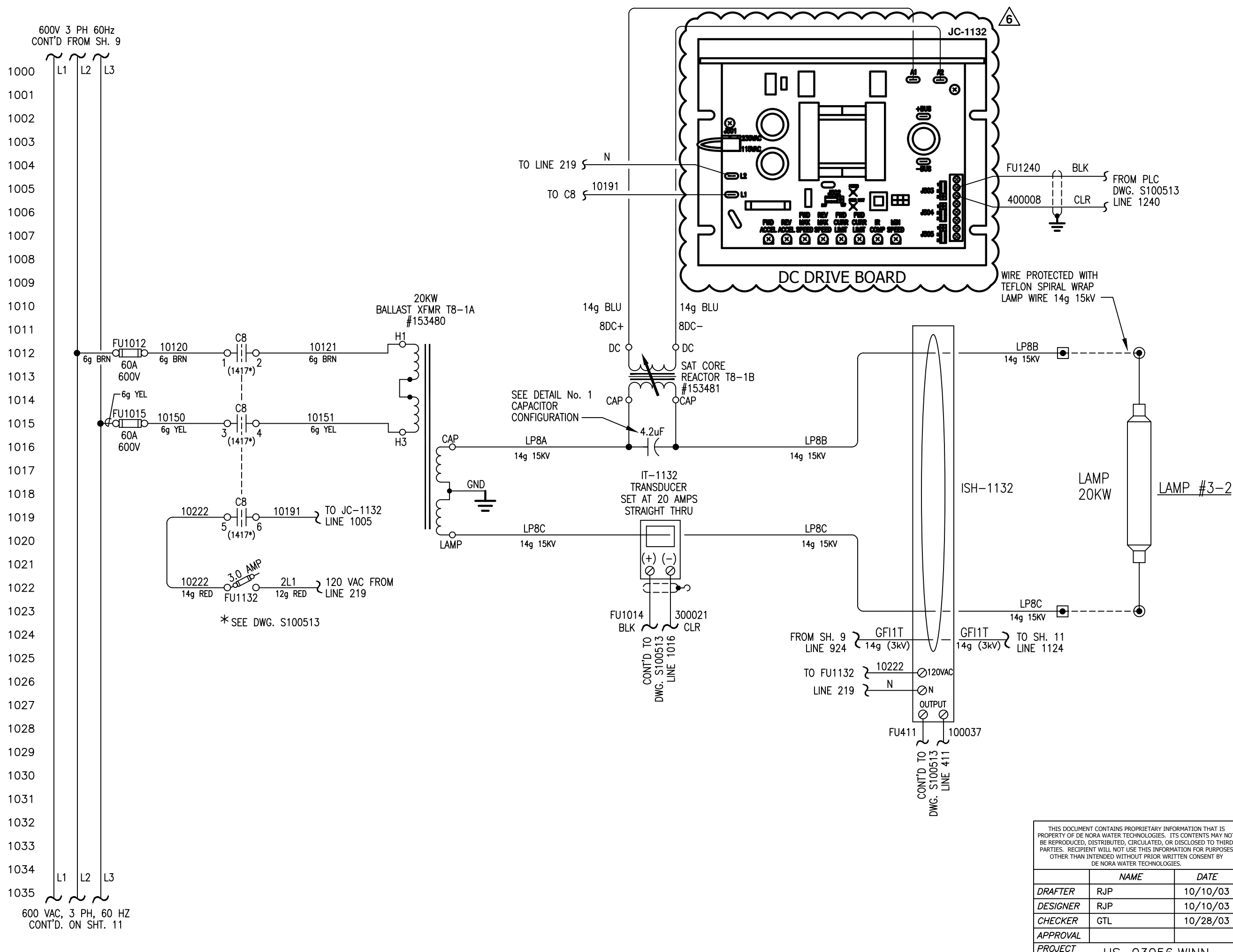
TITLE  
(6) 48"φ, 9 X 20KW SENTINEL  
POWER SUPPLY SCHEMATIC

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	NAME	DATE
DRAFTER	RJP	10/10/03
DESIGNER	RJP	10/10/03
CHECKER	GTL	10/28/03
APPROVAL		
PROJECT No.	US-03056.WINN	

DWG. Size	<b>B</b>	SHEET No.	9 OF 11	SCALE	NONE
DWG. No.	S100537			REV.	9

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NOTE:  
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LEGEND:  
HIGH VOLTAGE TERMINATIONS  
● LOCATED IN POWER SUPPLY  
⊙ LAMP LEAD TERMINATION (POST)  
--- DENOTES FIELD WIRING  
--- DENOTES TAPE BACK SHIELD  
Ⓢ LOC. IN CONTROL PANEL CABINET

REV	DESCRIPTION	APP	DATE
5	CORRECTED SPELLING	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

REVISIONS

TOLERANCES (unless otherwise specified)

ANGULAR	±0°40'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005

**DE NORA**

DE NORA WATER TECHNOLOGIES, LLC

CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

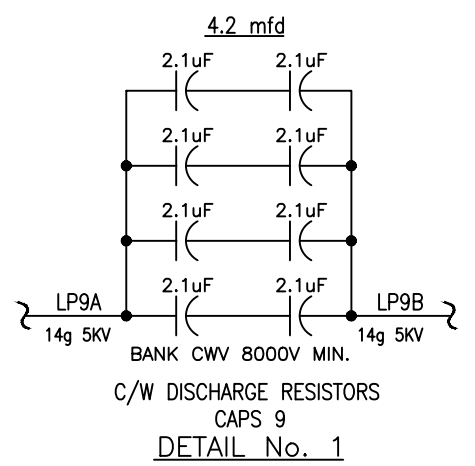
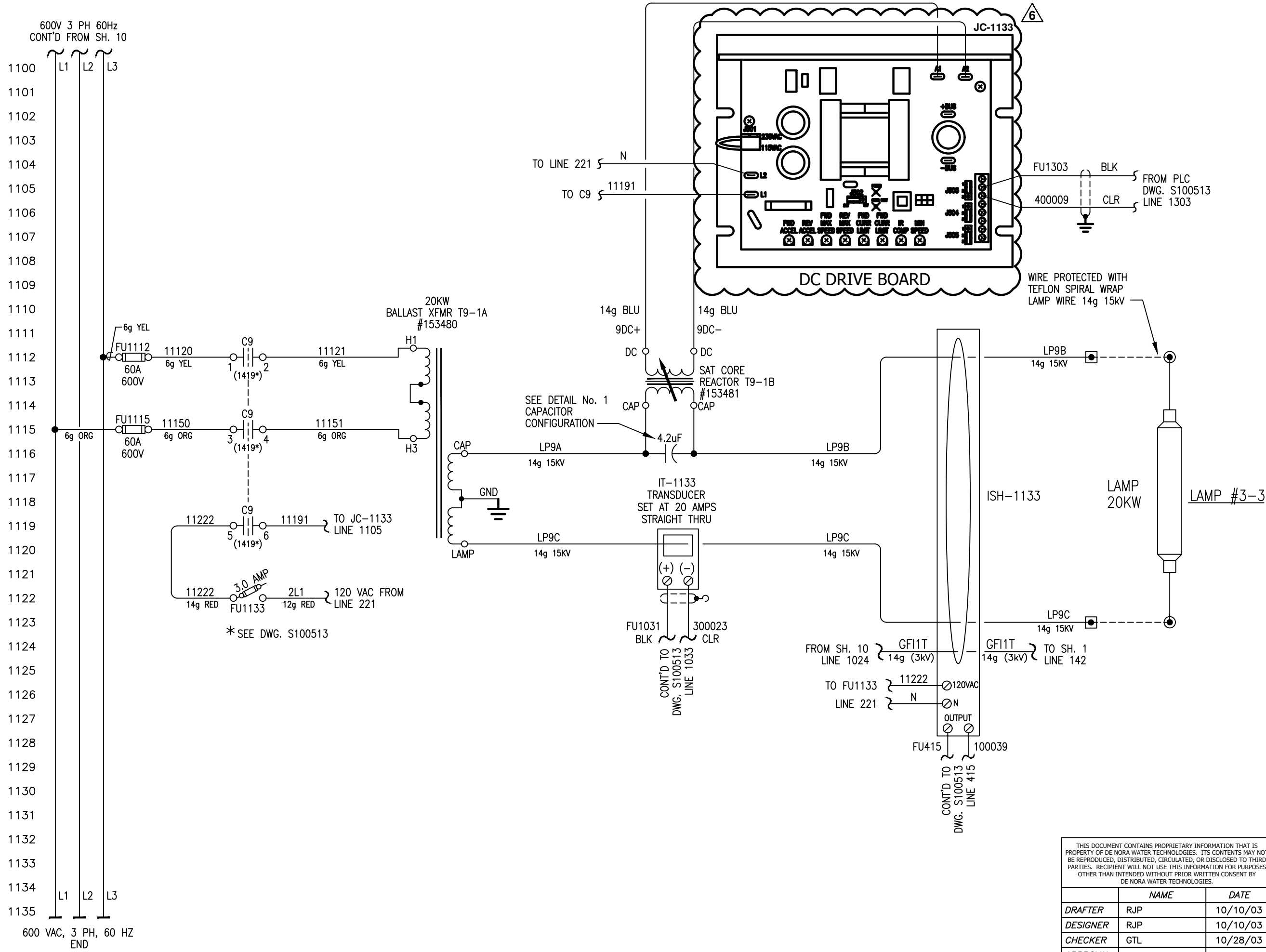
TITLE  
(6) 48"Ø, 9 X 20KW SENTINEL  
POWER SUPPLY SCHEMATIC

DWG. Size	<b>B</b>	SHEET No.	10 OF 11	SCALE	NONE
DWG. No.	S100537			REV.	9

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	NAME	DATE
DRAFTER	RJP	10/10/03
DESIGNER	RJP	10/10/03
CHECKER	GTL	10/28/03
APPROVAL		
PROJECT No.	US-03056.WINN	

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NOTE:  
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LEGEND:  
HIGH VOLTAGE TERMINATIONS  
● LOCATED IN POWER SUPPLY  
⊙ LAMP LEAD TERMINATION (POST)  
--- DENOTES FIELD WIRING  
--- DENOTES TAPE BACK SHIELD  
Ⓢ LOC. IN CONTROL PANEL CABINET

REV	DESCRIPTION	APP	DATE
5	CORRECTED SPELLING	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

TOLERANCES (unless otherwise specified)  
ANGULAR ±0°40' DECIMAL (2 PLACES) ±.010  
FRACTIONAL ±1/16" DECIMAL (3 PLACES) ±.005  
DECIMAL (1 PLACE) ±.015 DECIMAL (4 PLACES) ±.0005

**DE NORA**  
DE NORA WATER TECHNOLOGIES, LLC

CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

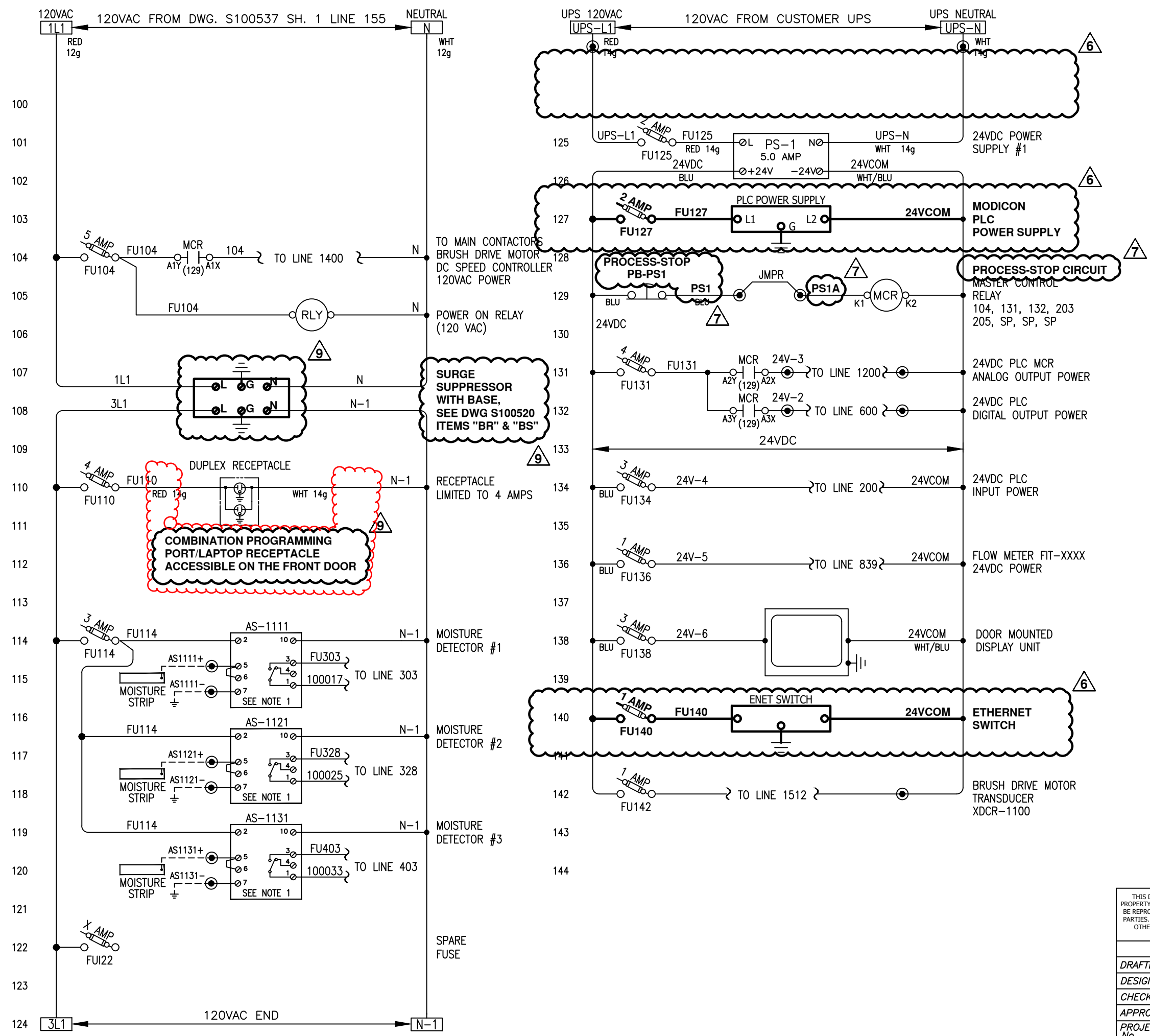
TITLE  
(6) 48"Ø, 9 X 20KW SENTINEL  
POWER SUPPLY SCHEMATIC

DWG. Size **B** SHEET No. 11 OF 11 SCALE NONE  
DWG. No. S100537 REV. 9

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	NAME	DATE
DRAFTER	RJP	10/10/03
DESIGNER	RJP	10/10/03
CHECKER	GTL	10/28/03
APPROVAL		
PROJECT No.	US-03056.WINN	

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**NOTES:**

1. ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
2. DRAWING SET IS FOR 6 SENTINEL SYSTEMS.
3. MOISTURE SWITCH SET TO "IN"
4. THE MODIFICATIONS/UPGRADES AS SHOWN SHALL BE REPRODUCED FOR ALL 6 SENTINEL SYSTEMS.

**LEGEND:**

- ⊙ TB IN CONTROL PANEL
- Ⓟ LOC. IN POWER CABINET
- ⚠ TB IN FIELD DEVICE
- Ⓧ TB IN POWER CABINET
- EXTERNAL WIRING
- FUSED TYPE TERM. BLK. (FUSES RATED 250V)

All wiring #16g unless indicated otherwise.  
**COLOUR CODE:**  
 blue 24VDC signal  
 wht/blu 0 Vdc common  
 red 120VAC control  
 white neutral  
 green ground

REV	DESCRIPTION	APP	DATE
5	ADDED PLC TO UPS FEEDER , PWR. ON RLY	RJP	09/13/05
9	REVISIONS PER COMMENTS: SD-002R2	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	REVISIONS PER COMMENTS: SD-002	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
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DE NORA WATER TECHNOLOGIES, LLC  
 CLIENT CITY OF WINNIPEG  
 MANITOBA, CANADA

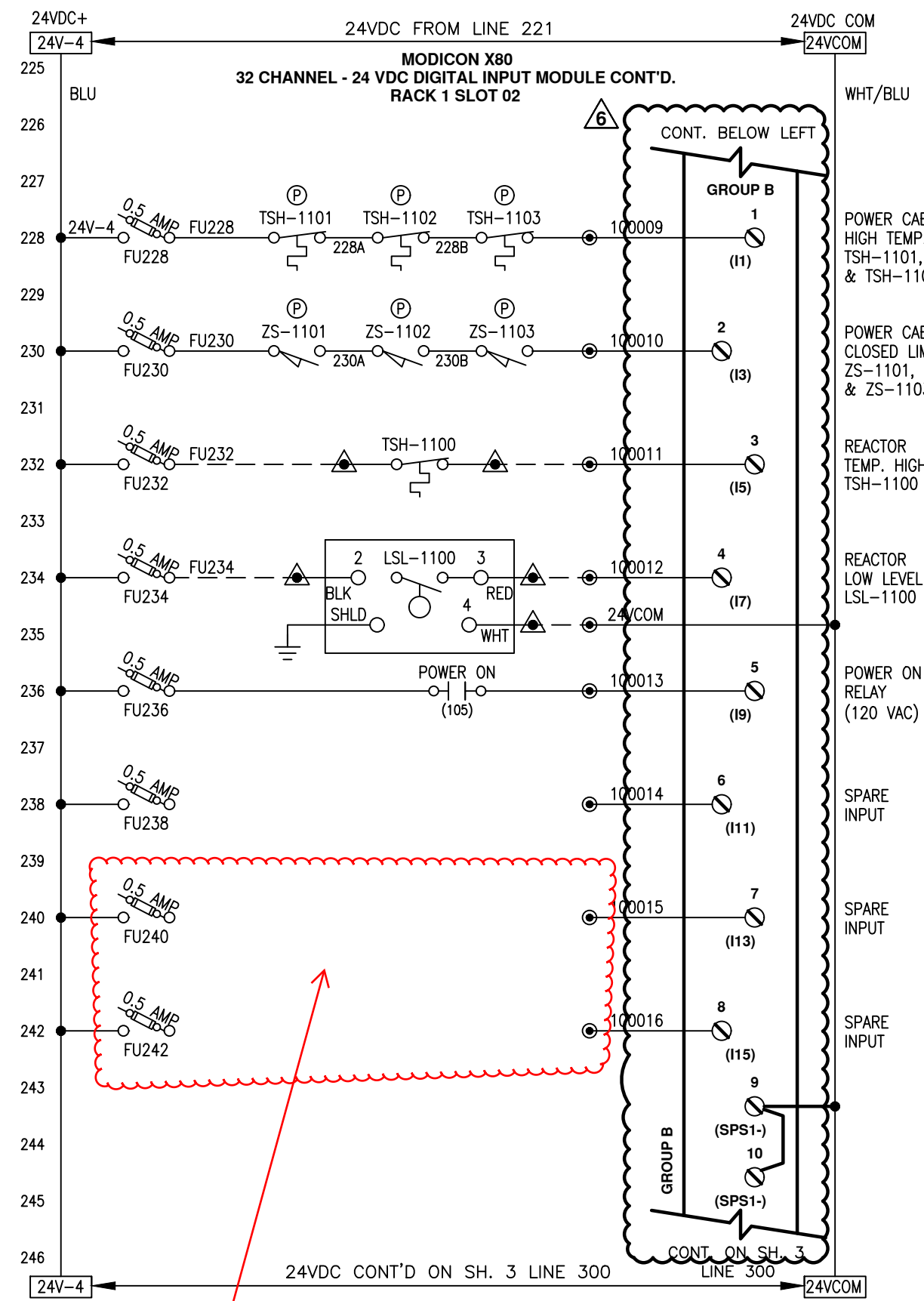
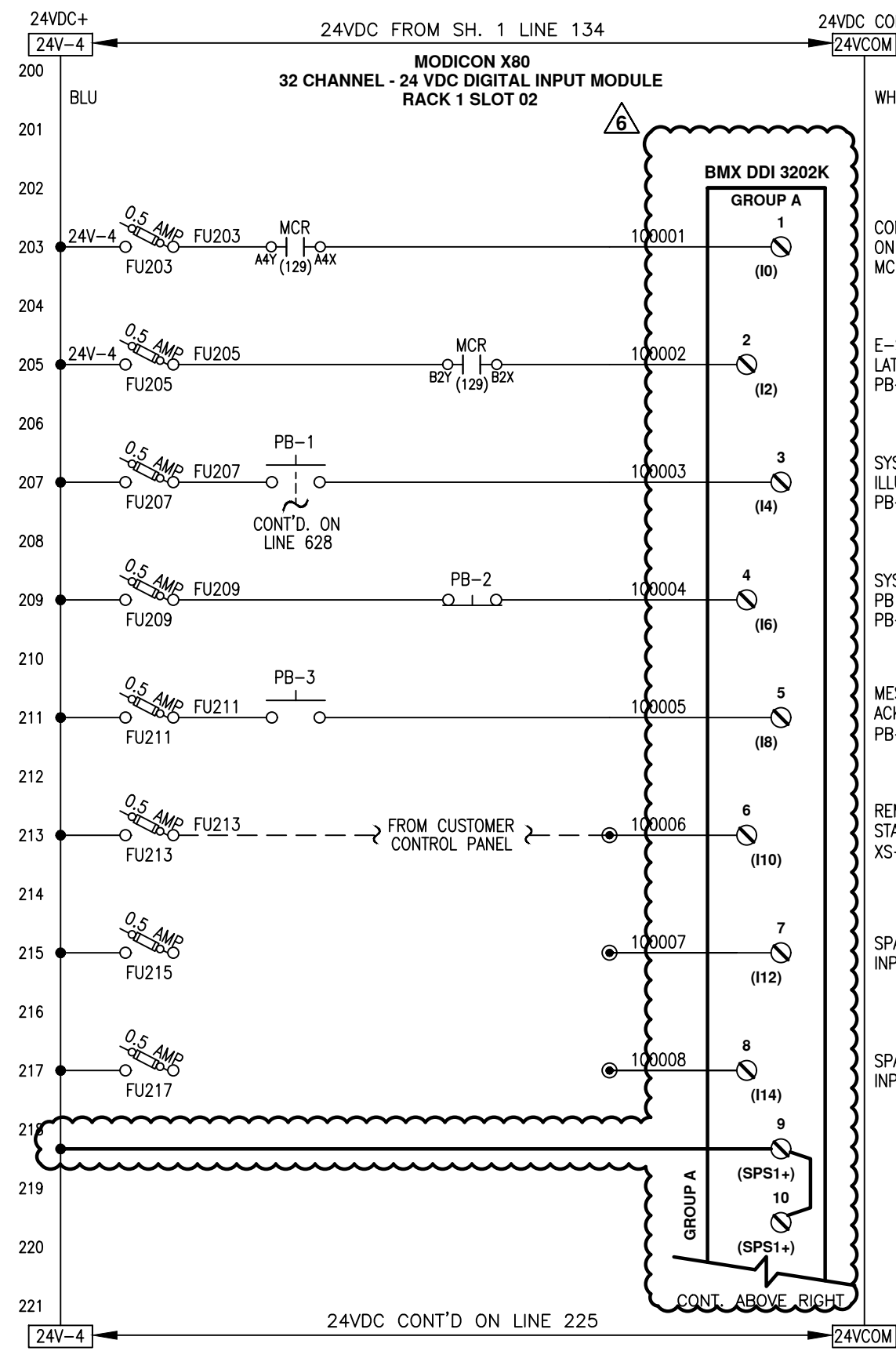
TITLE (6) 48"φ, 9 X 20KW SENTINEL  
 MAIN CONTROL PANEL  
 POWER DISTRIBUTION DIAGRAM

DWG. Size	B	SHEET No.	1 OF 15	SCALE	NTS
DWG. No.	S100513			REV.	9

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	NAME	DATE
DRAFTER	GTL	9/15/03
DESIGNER	GTL	9/15/03
CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	

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- NOTES:**
- ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
  - DRAWING SET IS FOR 6 SENTINEL SYSTEMS.

**LEGEND:**

●	TB IN CONTROL PANEL	●	TB IN POWER CABINET
Ⓟ	LOC. IN POWER CABINET	▲	TB IN FIELD DEVICE
▲	TB IN FIELD DEVICE	○	FUSED TYPE TERM. BLK. (FUSES RATED 250V)
○	FUSED TYPE TERM. BLK. (FUSES RATED 250V)	---	EXTERNAL WIRING

**COLOUR CODE:**  
 blue 24VDC signal  
 wht/blu 0 Vdc common  
 red 120VAC control  
 white neutral  
 green ground

REV	DESCRIPTION	APP	DATE
5	ADDED PLC TO UPS FEEDER, PWR. ON RLY	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
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ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
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DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005

**DE NORA**  
 DE NORA WATER TECHNOLOGIES, LLC

**CLIENT**  
 CITY OF WINNIPEG  
 MANITOBA, CANADA

**TITLE**  
 (6) 48"ø, 9 X 20KW SENTINEL  
 MAIN CONTROL PANEL  
 PLC I/O SCHEMATICS

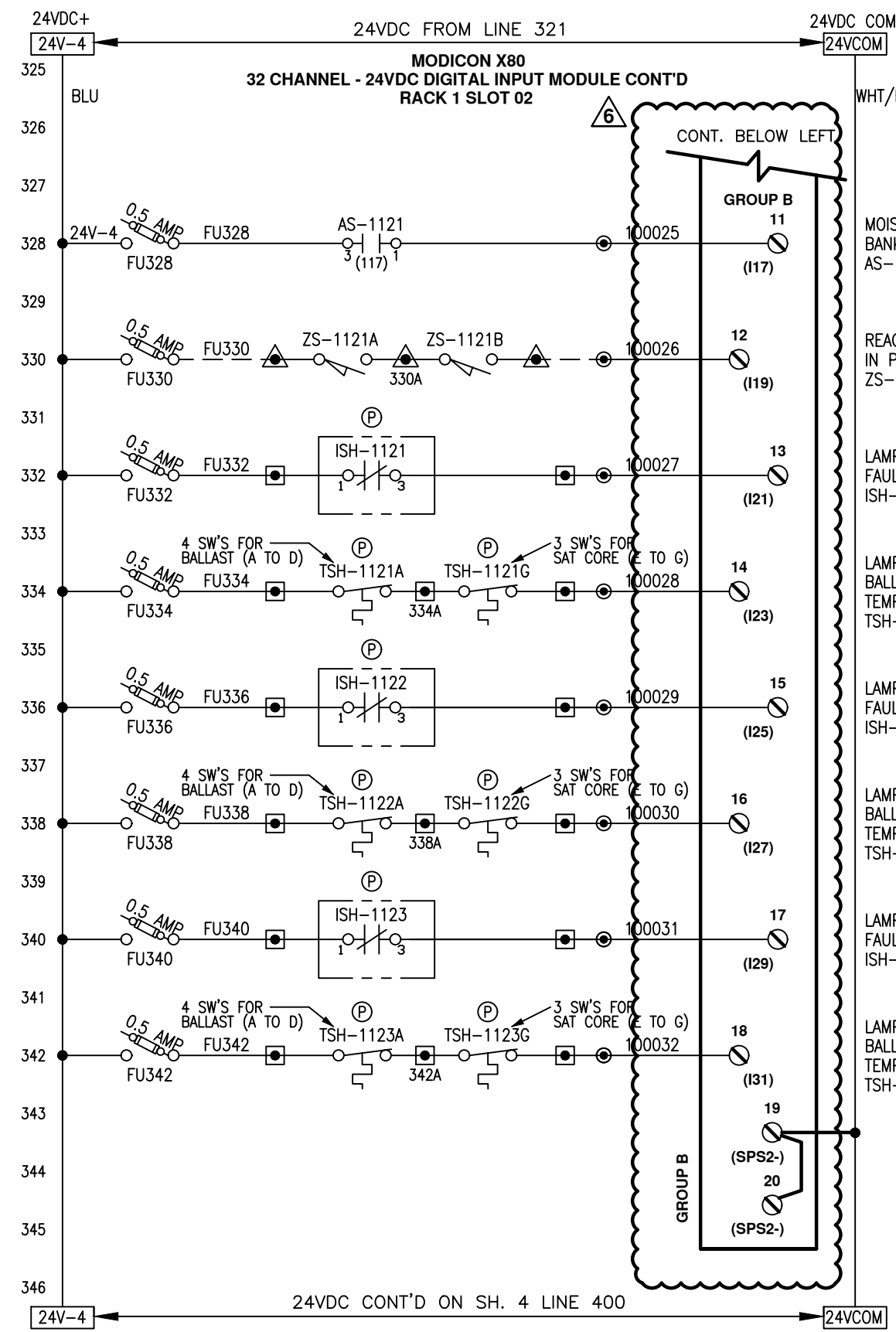
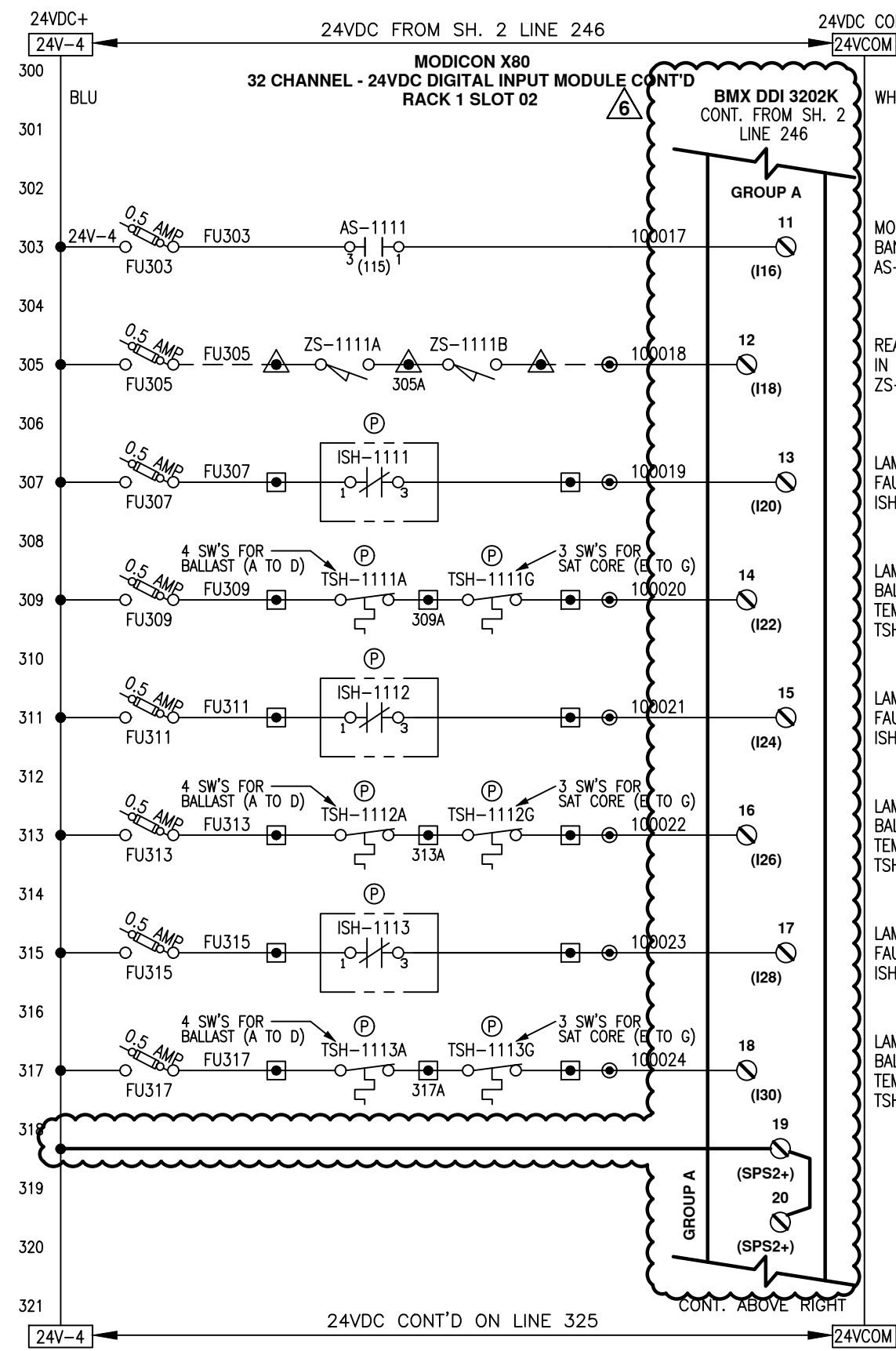
**DWG. Size** B **SHEET No.** 2 OF 15 **SCALE** NTS

**DWG. No.** S100513 **REV.** 9

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	NAME	DATE
DRAFTER	GTL	9/15/03
DESIGNER	GTL	9/15/03
CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	

AECOM: Please include the "Fault" and "Running" statuses from the AHF (dry contact) to the De Nora PLC. Fusing shall be provided for all status back to PLC. See comment on earlier drawing.



- NOTES:**
1. ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
  2. DRAWING SET IS FOR 6 SENTINEL SYSTEMS.
  3. MOISTURE SWITCH SET TO "IN"

**LEGEND:**

- TB IN CONTROL PANEL
- Ⓟ LOC. IN POWER CABINET
- ▲ TB IN FIELD DEVICE
- TB IN POWER CABINET
- EXTERNAL WIRING
- FUSED TYPE TERM. BLK. (FUSES RATED 250V)

All wiring #16g unless indicated otherwise.

**COLOUR CODE:**

- blue 24VDC signal
- wht/blu 0 Vdc common
- red 120VAC control
- white neutral
- green ground

REV	DESCRIPTION	APP	DATE
5	ADDED PLC TO UPS FEEDER, PWR. ON RLY	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

REVISIONS

**TOLERANCES (unless otherwise specified)**

ANGULAR	FRACTIONAL	DECIMAL (1 PLACE)	DECIMAL (2 PLACES)	DECIMAL (3 PLACES)	DECIMAL (4 PLACES)
±0°30'	±1/16"	±0.015	±0.010	±0.005	±0.0005



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CITY OF WINNIPEG  
MANITOBA, CANADA

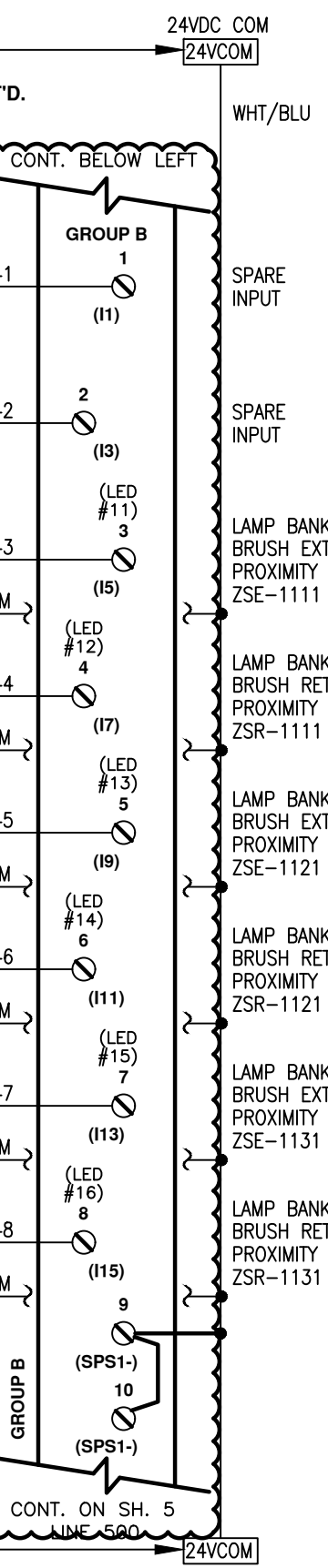
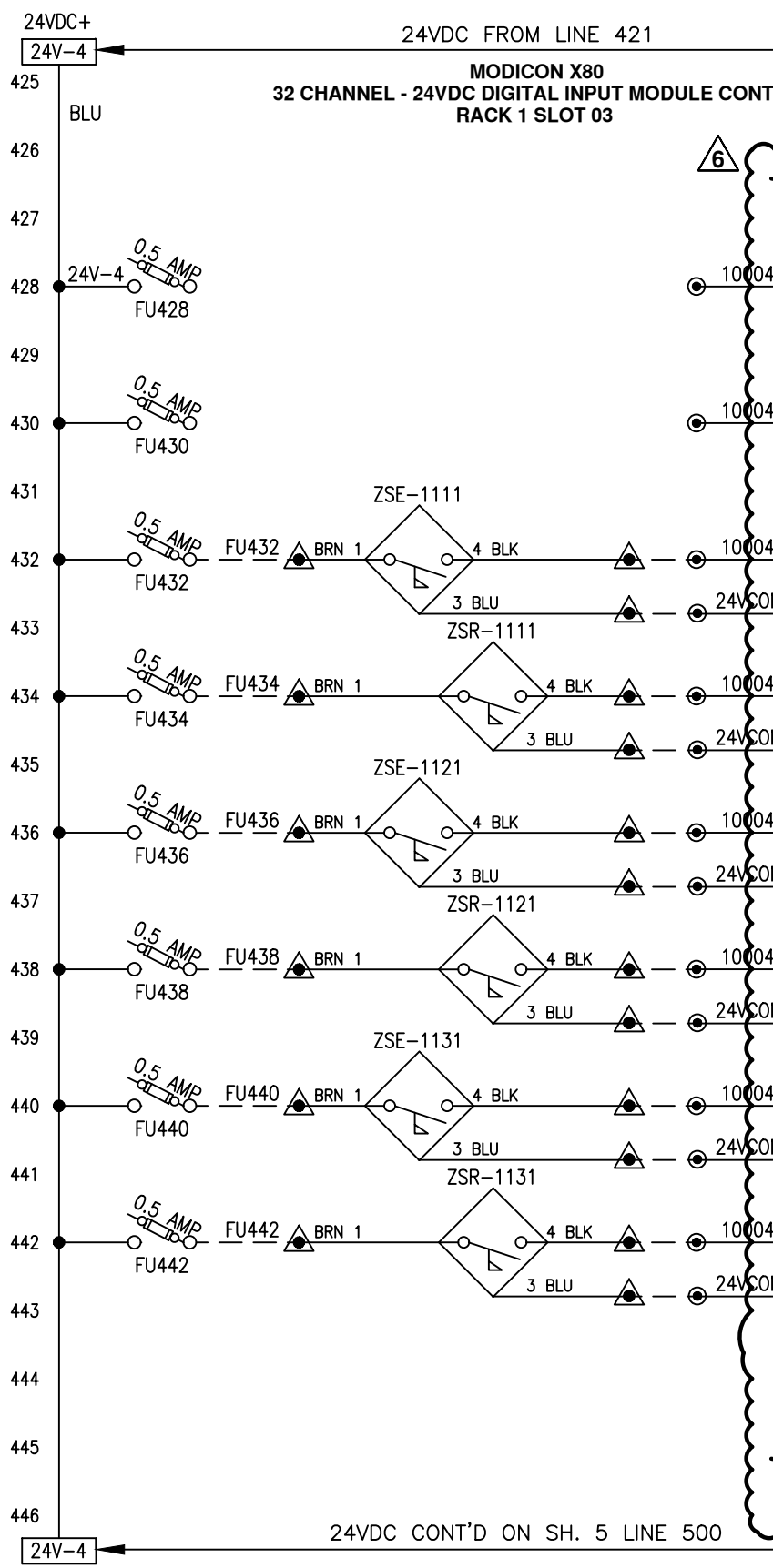
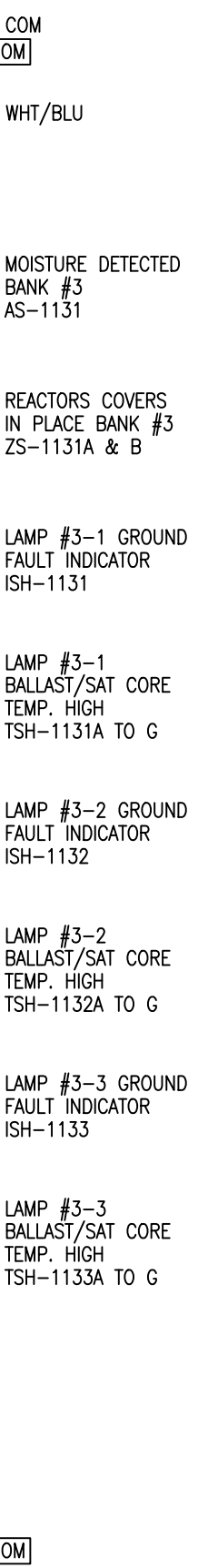
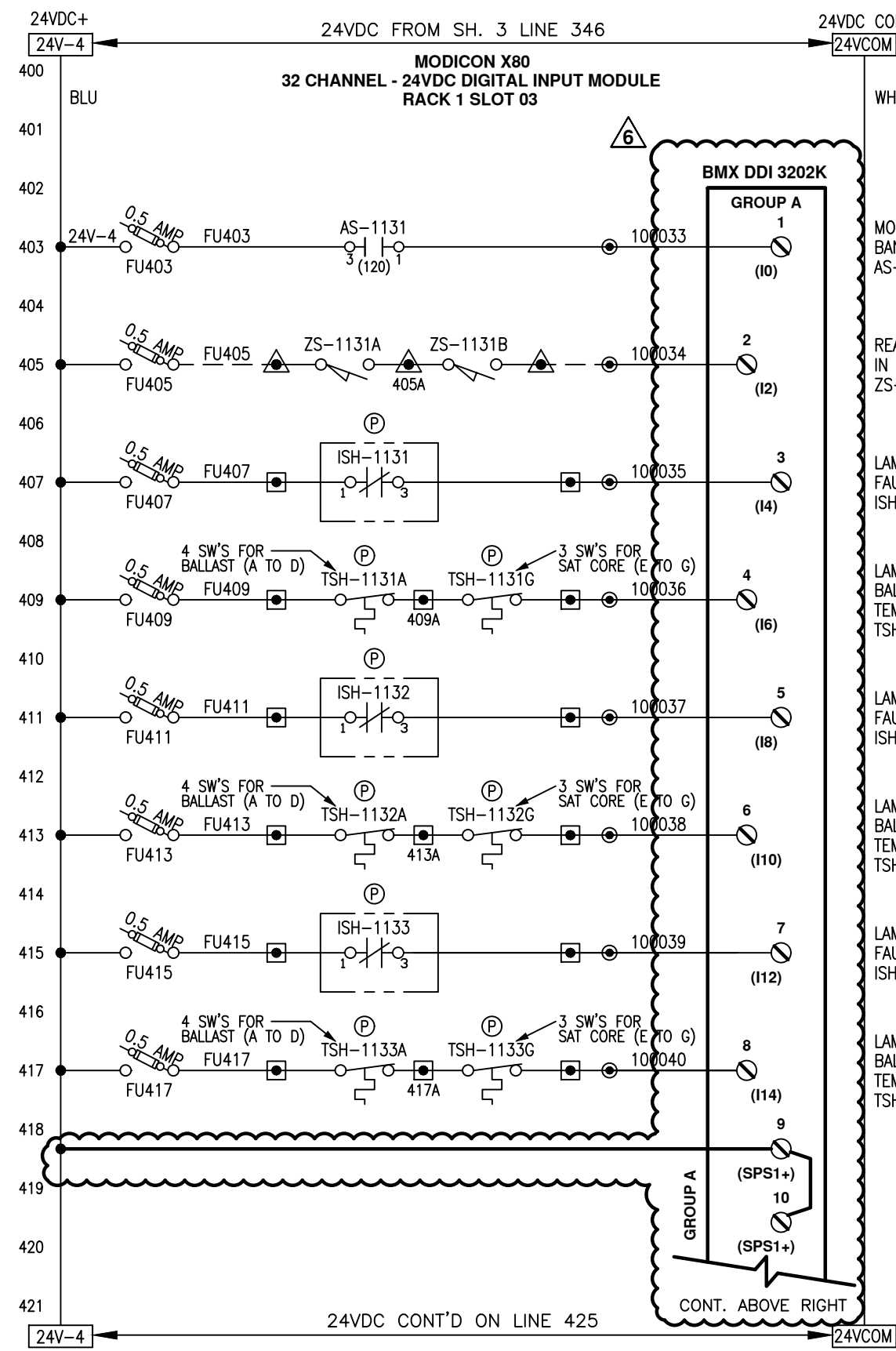
TITLE  
(6) 48"φ, 9 X 20KW SENTINEL  
MAIN CONTROL PANEL  
PLC I/O SCHEMATICS

DWG. Size	B	SHEET No.	3 OF 15	SCALE	NTS
DWG. No.	S100513			REV.	9

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DRAFTER	GTL	9/15/03
DESIGNER	GTL	9/15/03
CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	





- NOTES:**
1. ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
  2. DRAWING SET IS FOR 6 SENTINEL SYSTEMS.
  3. MOISTURE SWITCH SET TO "IN"

**LEGEND:**

●	TB IN CONTROL PANEL	⊙	LOC. IN POWER CABINET	▲	TB IN FIELD DEVICE	■	TB IN POWER CABINET	---	EXTERNAL WIRING	○	FUSED TYPE TERM. BLK. (FUSES RATED 250V)
		<b>COLOUR CODE:</b>									
		blue		24VDC signal		wht/blu		0 Vdc common		red	
		red		120VAC control		white		neutral		green	
		green		ground							

REV	DESCRIPTION	APP	DATE
5	ADDED PLC TO UPS FEEDER, PWR. ON RLY	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



DE NORA WATER TECHNOLOGIES, LLC

CLIENT CITY OF WINNIPEG  
MANITOBA, CANADA

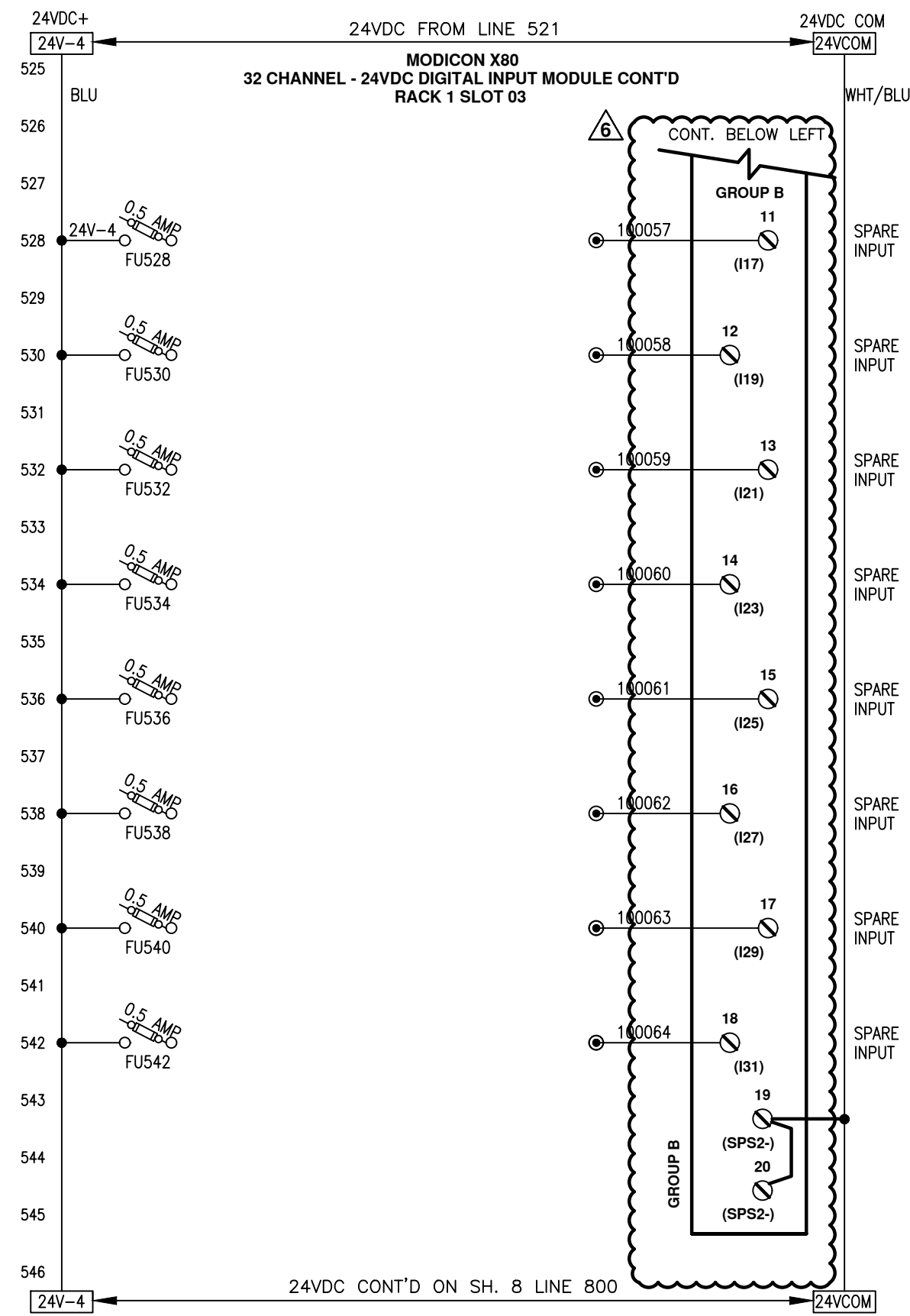
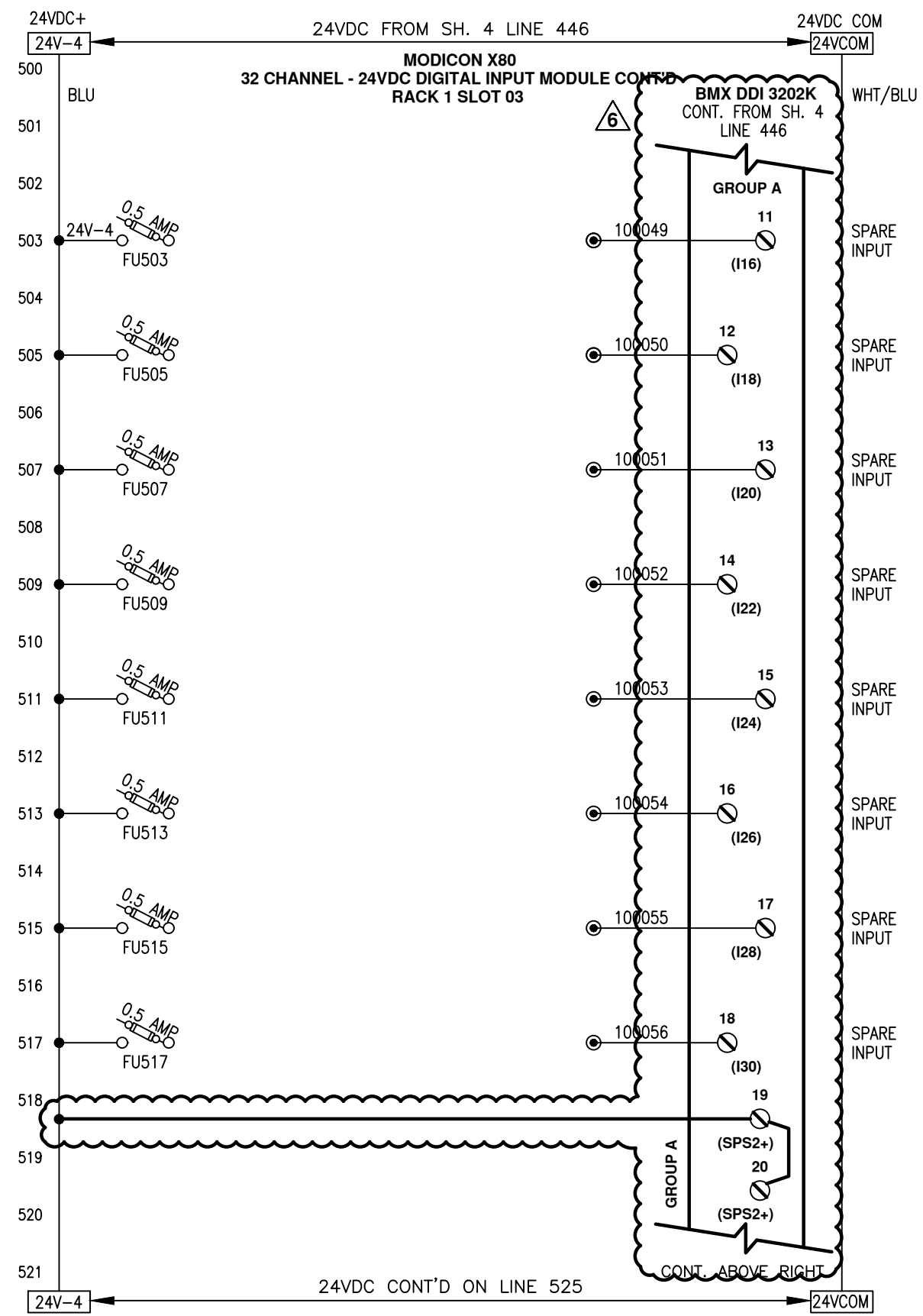
TITLE (6) 48"ø, 9 X 20KW SENTINEL  
MAIN CONTROL PANEL  
PLC I/O SCHEMATICS

DWG. Size B SHEET No. 4 OF 15 SCALE NTS  
DWG. No. S100513 REV. 9

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	NAME	DATE
DRAFTER	GTL	9/15/03
DESIGNER	GTL	9/15/03
CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	

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- NOTES:**
1. ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
  2. DRAWING SET IS FOR 6 SENTINEL SYSTEMS.

**LEGEND:**

- TB IN CONTROL PANEL
- ⊙ LOC. IN POWER CABINET
- △ TB IN FIELD DEVICE
- TB IN POWER CABINET
- EXTERNAL WIRING
- FUSED TYPE TERM. BLK. (FUSES RATED 250V)

**COLOUR CODE:**

- blue 24VDC signal
- wht/blu 0 Vdc common
- red 120VAC control
- white neutral
- green ground

All wiring #16g unless indicated otherwise.

REV	DESCRIPTION	APP	DATE
5	ADDED PLC TO UPS FEEDER, PWR. ON RLY	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

ANGULAR	FRACTIONAL	DECIMAL (1 PLACE)	DECIMAL (2 PLACES)	DECIMAL (3 PLACES)	DECIMAL (4 PLACES)
±0°30'	±1/16"	±0.05	±0.010	±0.005	±0.0005



DE NORA WATER TECHNOLOGIES, LLC  
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 MANITOBA, CANADA

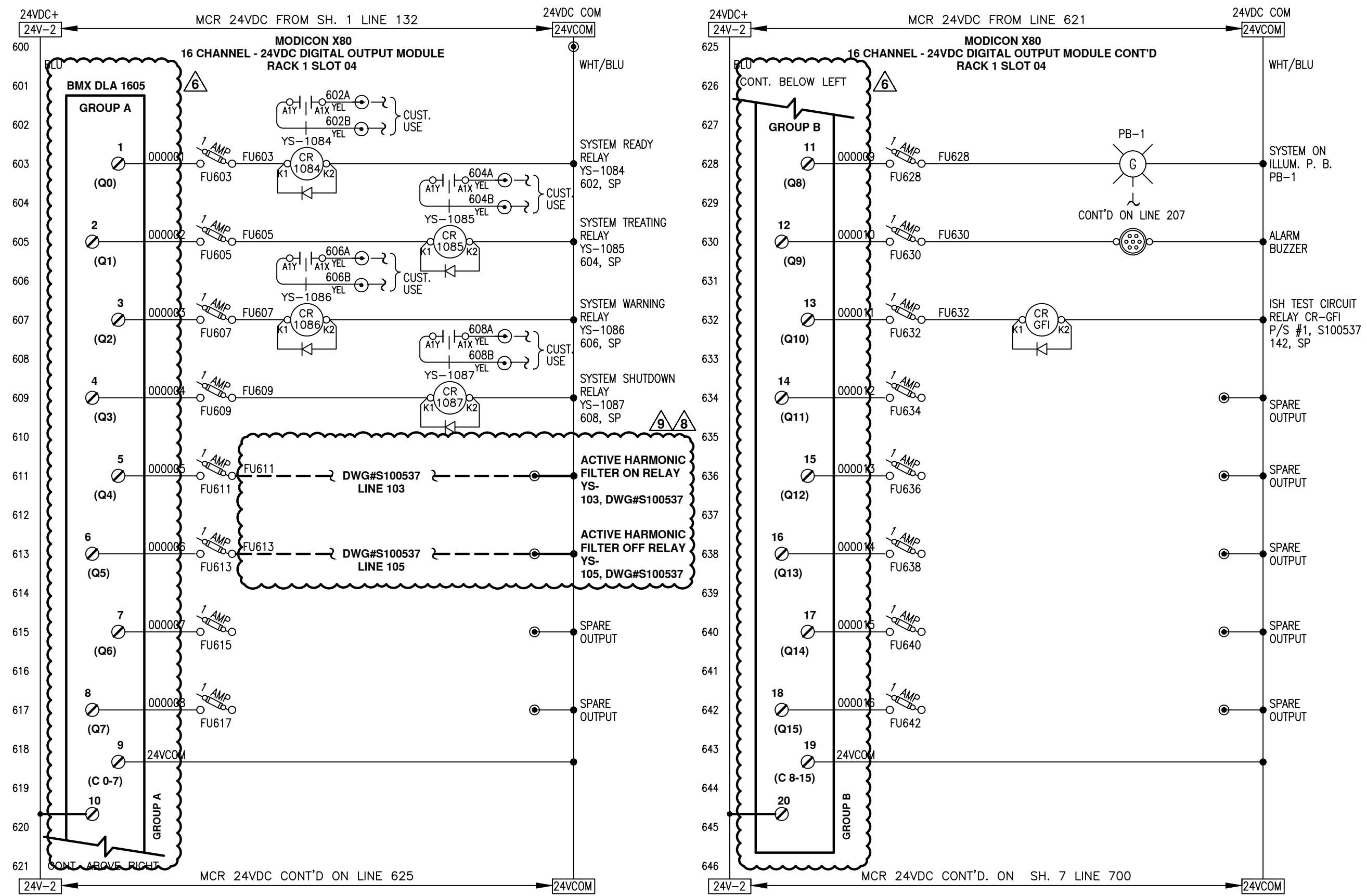
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	NAME	DATE
DRAFTER	GTL	9/15/03
DESIGNER	GTL	9/15/03
CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	

TITLE (6) 48"φ, 9 X 20KW SENTINEL MAIN CONTROL PANEL PLC I/O SCHEMATICS

DWG. Size	B	SHEET No.	5 OF 15	SCALE	NTS
DWG. No.	S100513	REV.	9		

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- NOTES:**
1. ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
  2. DRAWING SET IS FOR 6 SENTINEL SYSTEMS.

**LEGEND:**

- TB IN CONTROL PANEL
- Ⓟ LOC. IN POWER CABINET
- ▲ TB IN FIELD DEVICE
- TB IN POWER CABINET
- EXTERNAL WIRING
- FUSED TYPE TERM. BLK. (FUSES RATED 250V)

All wiring #16g unless indicated otherwise.

**COLOUR CODE:**

- blue 24VDC signal
- wht/blu 0 Vdc common
- red 120VAC control
- white neutral
- green ground

REV	DESCRIPTION	APP	DATE
5	ADDED PLC TO UPS FEEDER, PWR. ON RLY	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	ADDED RELAYS FOR AHF	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005

**DE NORA**

DE NORA WATER TECHNOLOGIES, LLC

CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

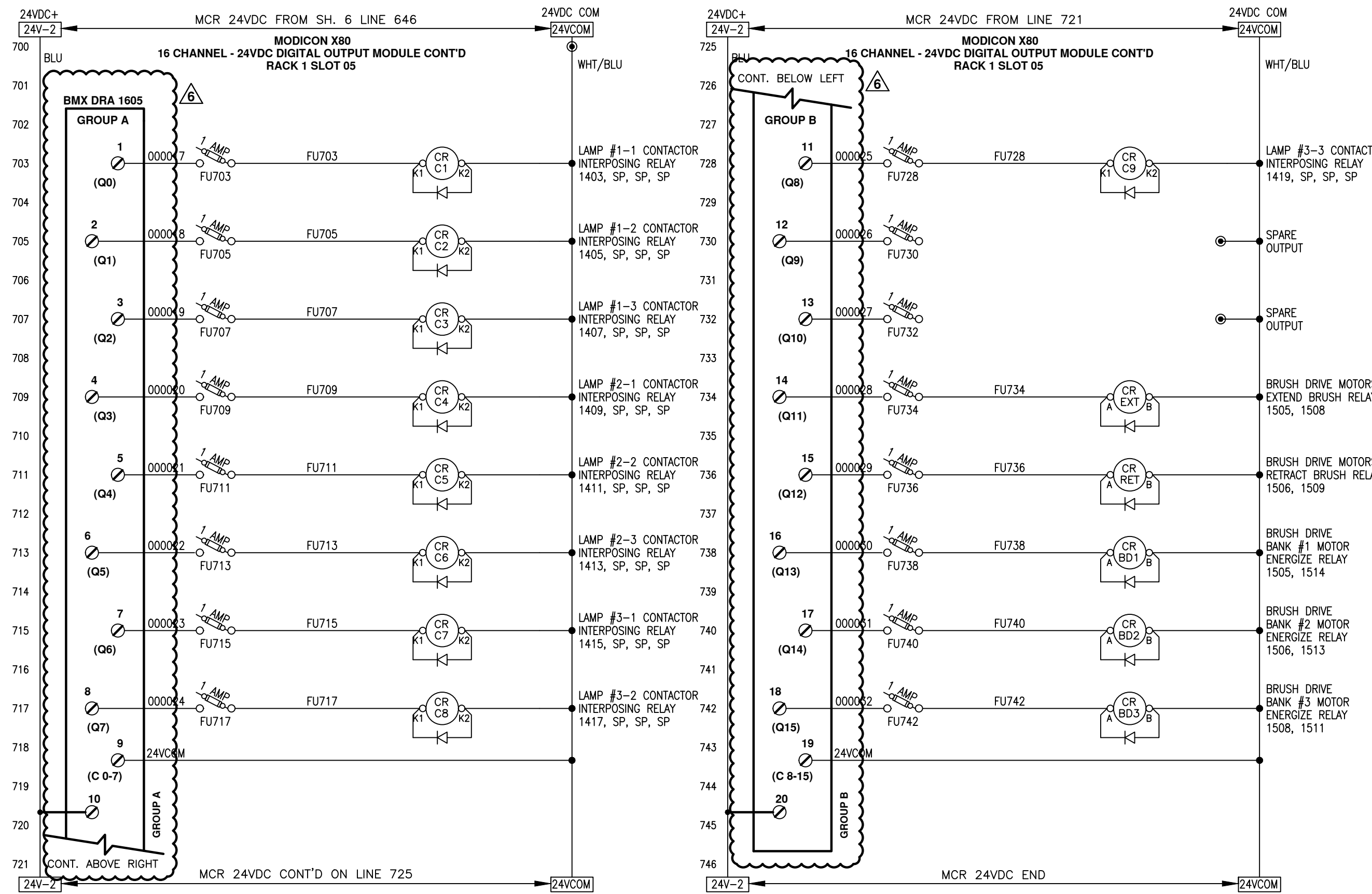
TITLE  
(6) 48"φ, 9 X 20KW SENTINEL  
MAIN CONTROL PANEL  
PLC I/O SCHEMATICS

DWG. Size **B** SHEET No. 6 OF 15 SCALE NTS  
DWG. No. S100513 REV. 9

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	NAME	DATE
DRAFTER	GTL	9/15/03
DESIGNER	GTL	9/15/03
CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	

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- NOTES:**
1. ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
  2. DRAWING SET IS FOR 6 SENTINEL SYSTEMS.

**LEGEND:**

- TB IN CONTROL PANEL
- ⊙ LOC. IN POWER CABINET
- ▲ TB IN FIELD DEVICE
- TB IN POWER CABINET
- EXTERNAL WIRING
- ⊗ FUSED TYPE TERM. BLK. (FUSES RATED 250V)

**All wiring #16g unless indicated otherwise.**

**COLOUR CODE:**

- blue 24VDC signal
- wht/blu 0 Vdc common
- red 120VAC control
- white neutral
- green ground

REV	DESCRIPTION	APP	DATE
5	ADDED PLC TO UPS FEEDER, PWR. ON RLY	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



DE NORA WATER TECHNOLOGIES, LLC

CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

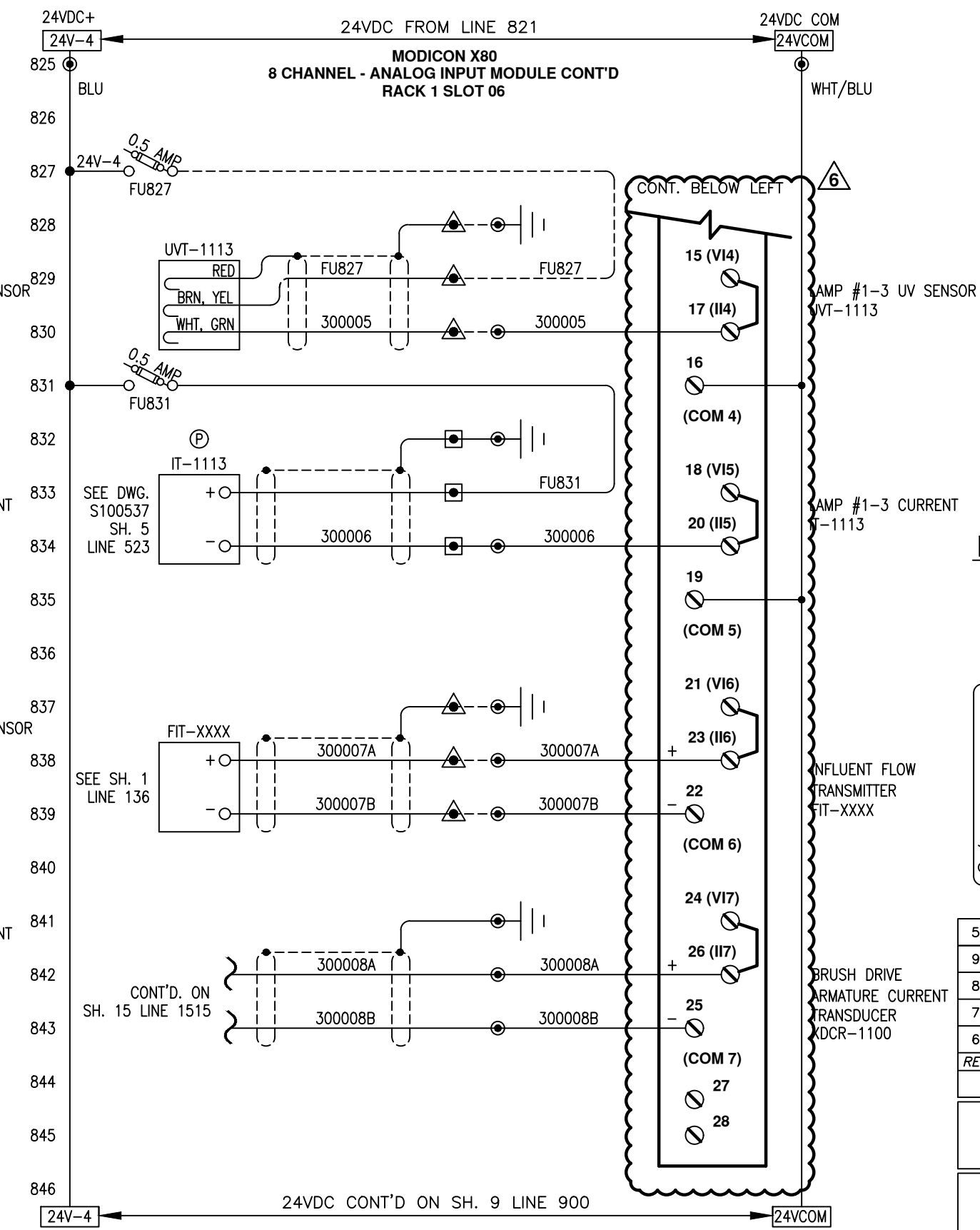
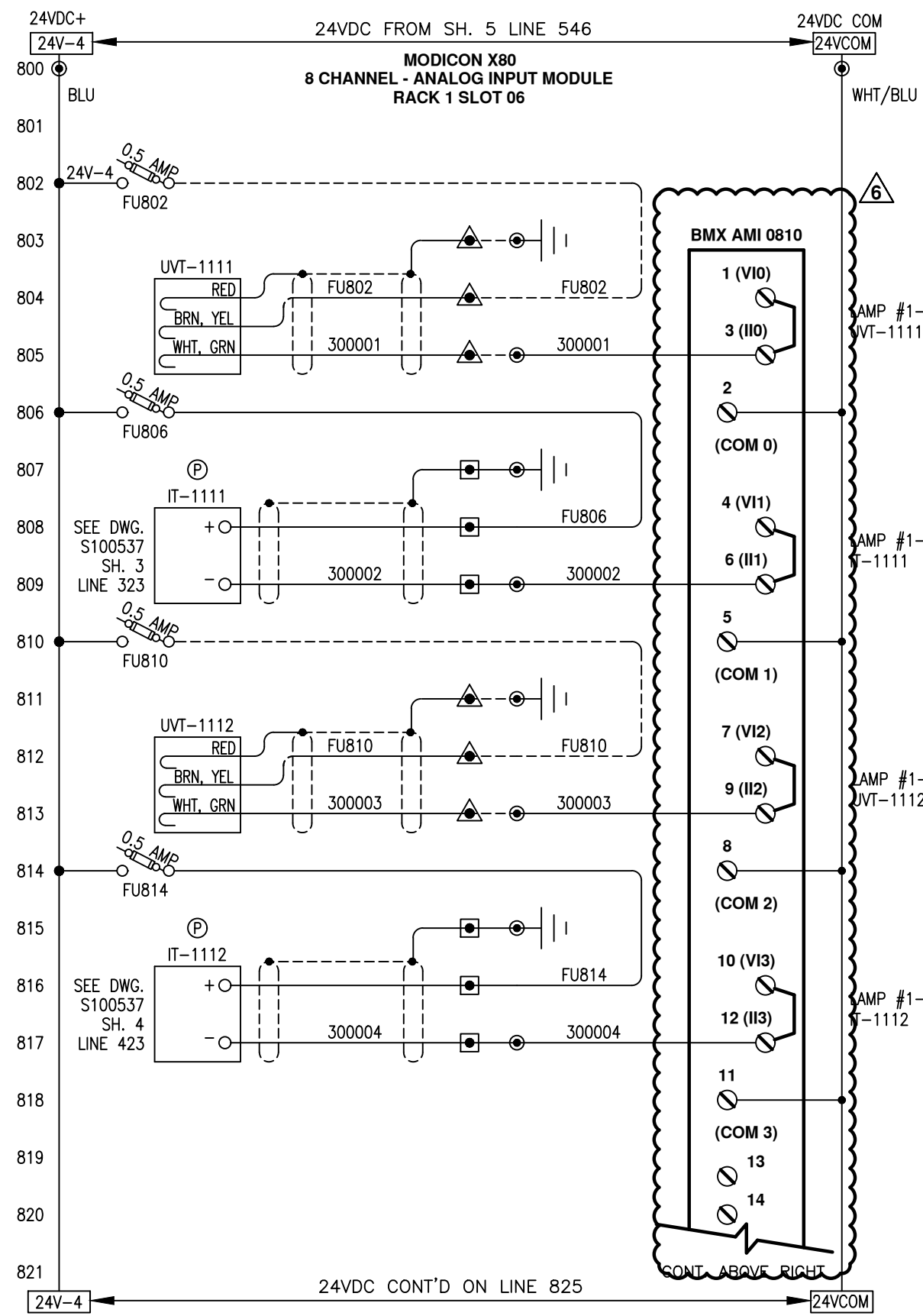
TITLE  
(6) 48"φ, 9 X 20KW SENTINEL  
MAIN CONTROL PANEL  
PLC I/O SCHEMATICS

DWG. Size	<b>B</b>	SHEET No.	7 OF 15	SCALE	NTS
DWG. No.	S100513			REV.	9

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	NAME	DATE
DRAFTER	GTL	9/15/03
DESIGNER	GTL	9/15/03
CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	

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- NOTES:**
1. ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
  2. DRAWING SET IS FOR 6 SENTINEL SYSTEMS.

**LEGEND:**

- TB IN CONTROL PANEL
- Ⓟ LOC. IN POWER CABINET
- ▲ TB IN FIELD DEVICE
- TB IN POWER CABINET
- EXTERNAL WIRING
- FUSED TYPE TERM. BLK. (FUSES RATED 250V)

**All wiring #16g unless indicated otherwise.**

**COLOUR CODE:**

- blue 24VDC signal
- wht/blu 0 Vdc common
- red 120VAC control
- white neutral
- green ground

REV	DESCRIPTION	APP	DATE
5	ADDED PLC TO UPS FEEDER, PWR. ON RLY	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

ANGULAR	FRACTIONAL	DECIMAL (1 PLACE)	DECIMAL (2 PLACES)	DECIMAL (3 PLACES)	DECIMAL (4 PLACES)
±0°30'	±1/16"	±0.015	±0.010	±0.005	±0.0005

**DE NORA**  
DE NORA WATER TECHNOLOGIES, LLC

**CLIENT**  
CITY OF WINNIPEG  
MANITOBA, CANADA

**TITLE**  
(6) 48"φ, 9 X 20KW SENTINEL  
MAIN CONTROL PANEL  
PLC I/O SCHEMATICS

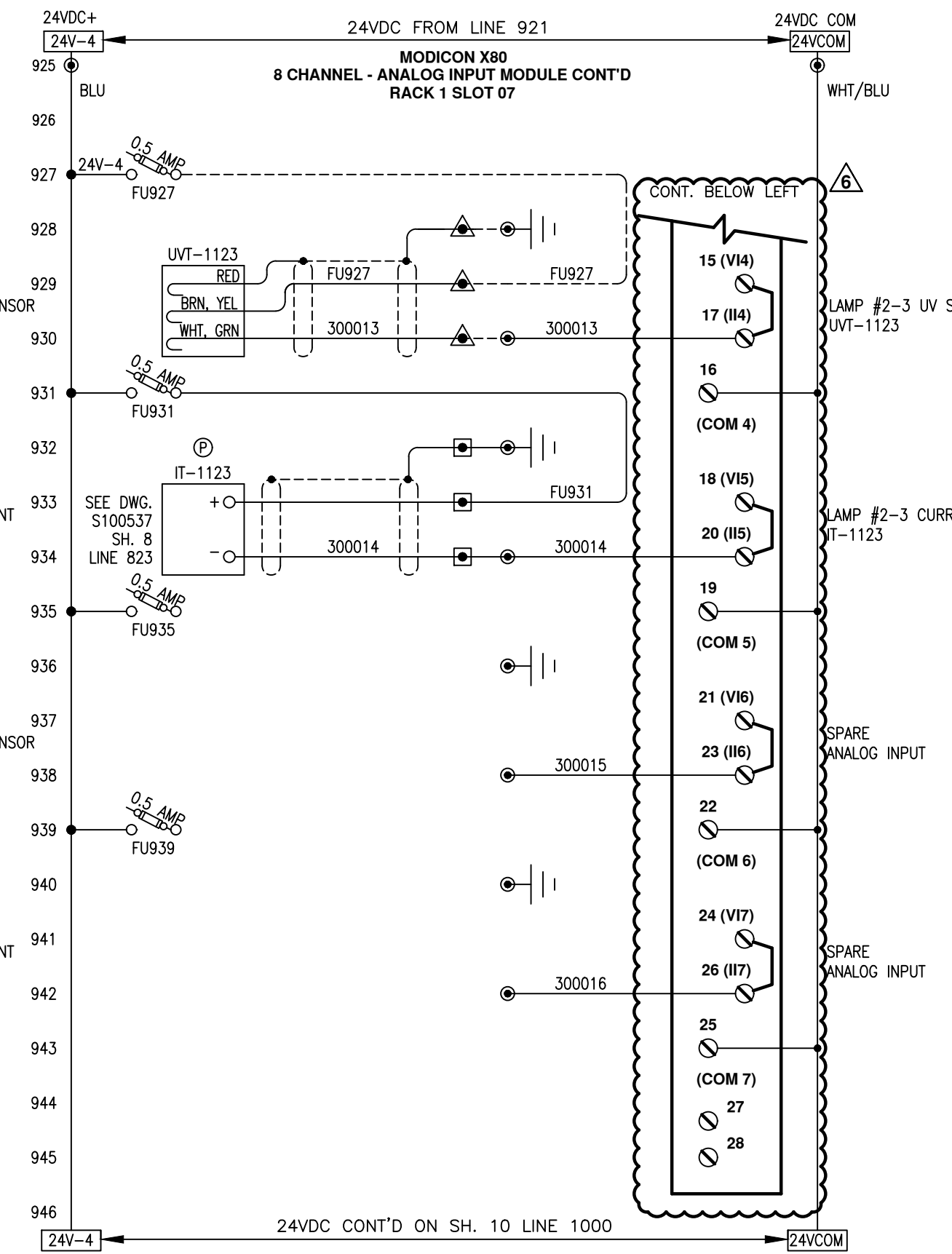
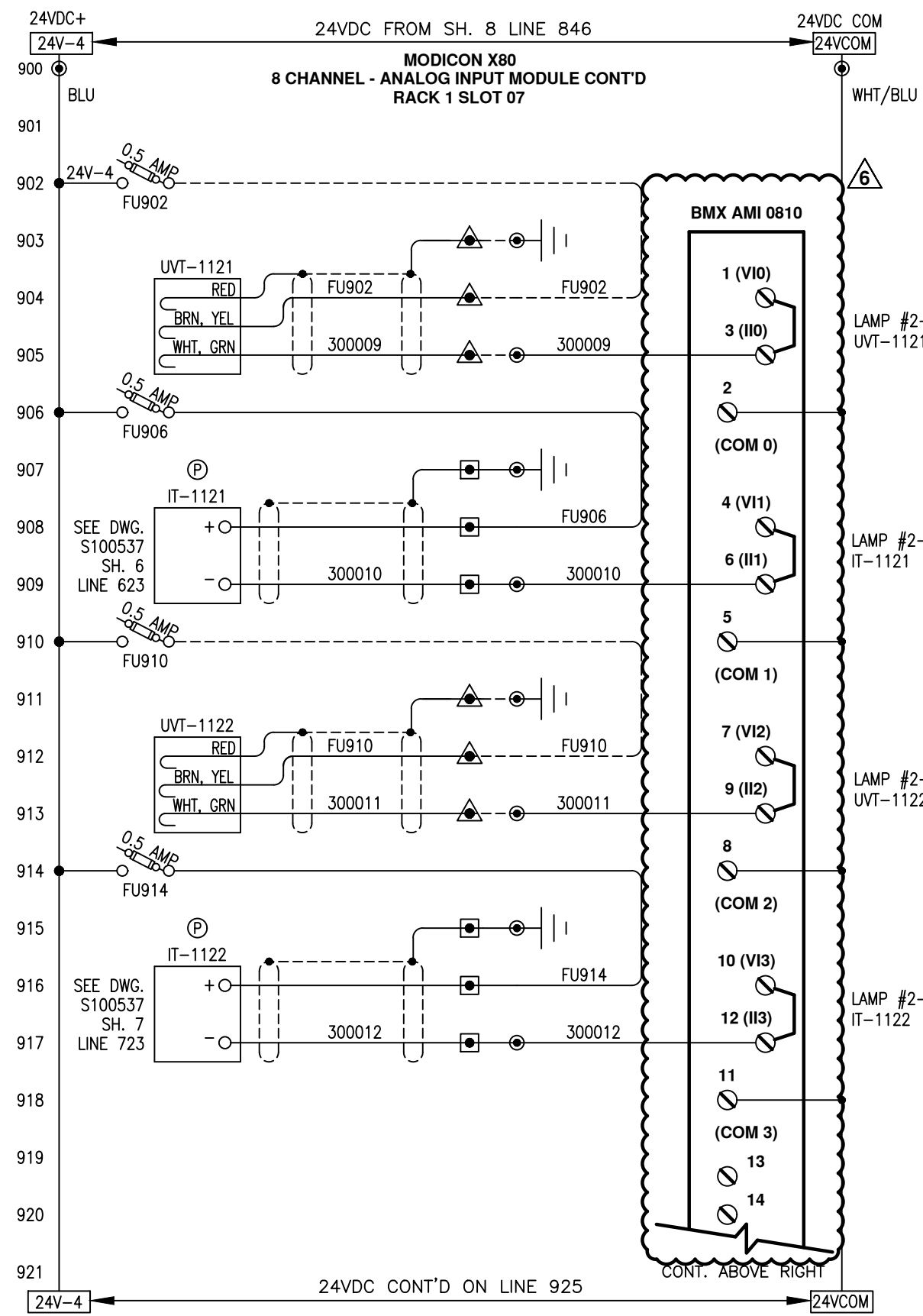
**DWG. Size** B **SHEET No.** 8 OF 15 **SCALE** NTS

**DWG. No.** S100513 **REV.** 9

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DESIGNER	GTL	9/15/03
CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	

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- NOTES:**
1. ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
  2. DRAWING SET IS FOR 6 SENTINEL SYSTEMS.

**LEGEND:**

- TB IN CONTROL PANEL
- Ⓟ LOC. IN POWER CABINET
- ▲ TB IN FIELD DEVICE
- TB IN POWER CABINET
- EXTERNAL WIRING
- FUSED TYPE TERM. BLK. (FUSES RATED 250V)

All wiring #16g unless indicated otherwise.

**COLOUR CODE:**

- blue 24VDC signal
- wht/blu 0 Vdc common
- red 120VAC control
- white neutral
- green ground

5	ADDED PLC TO UPS FEEDER, PWR. ON RLY	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21
REV	DESCRIPTION	APP	DATE

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



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CLIENT  
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MANITOBA, CANADA

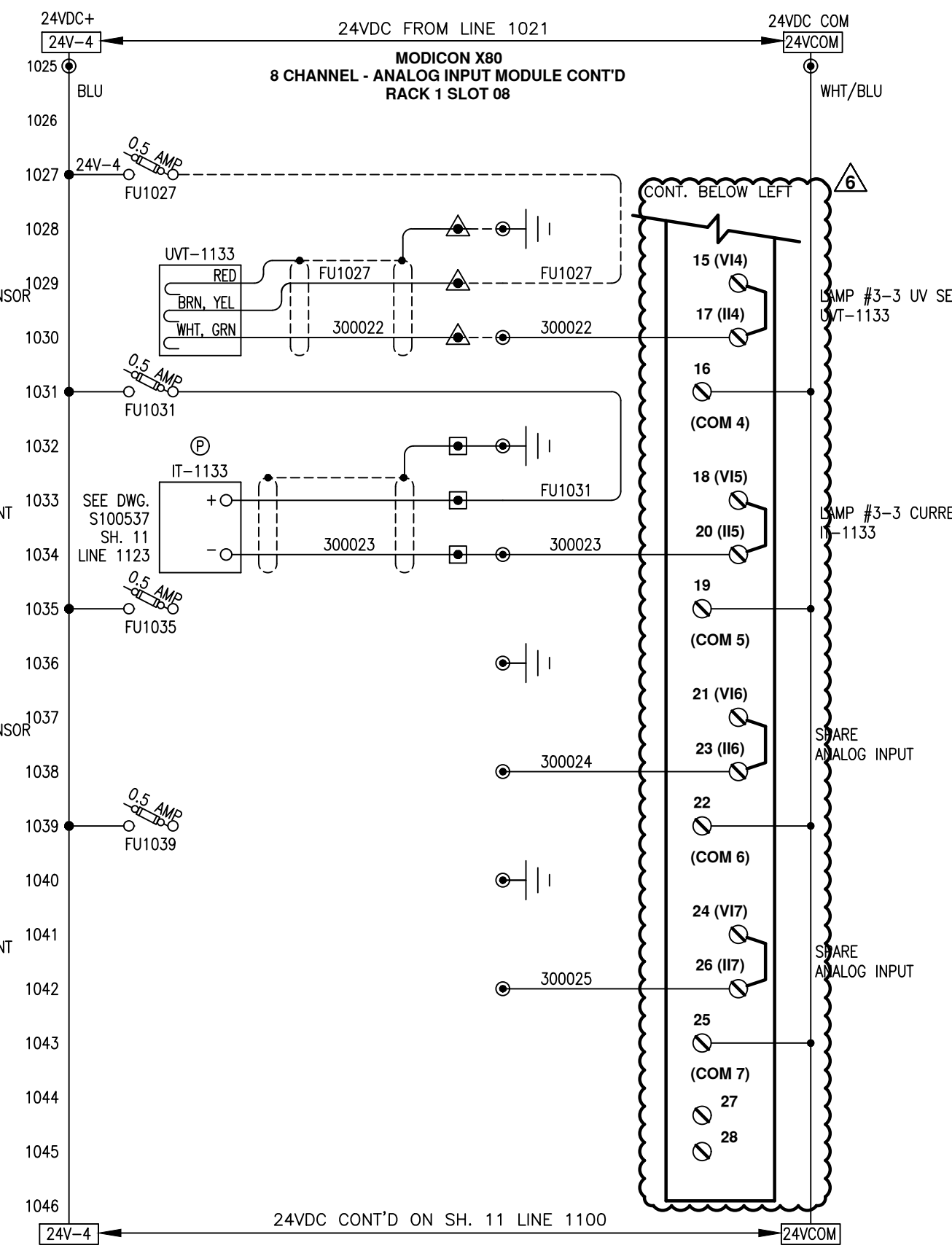
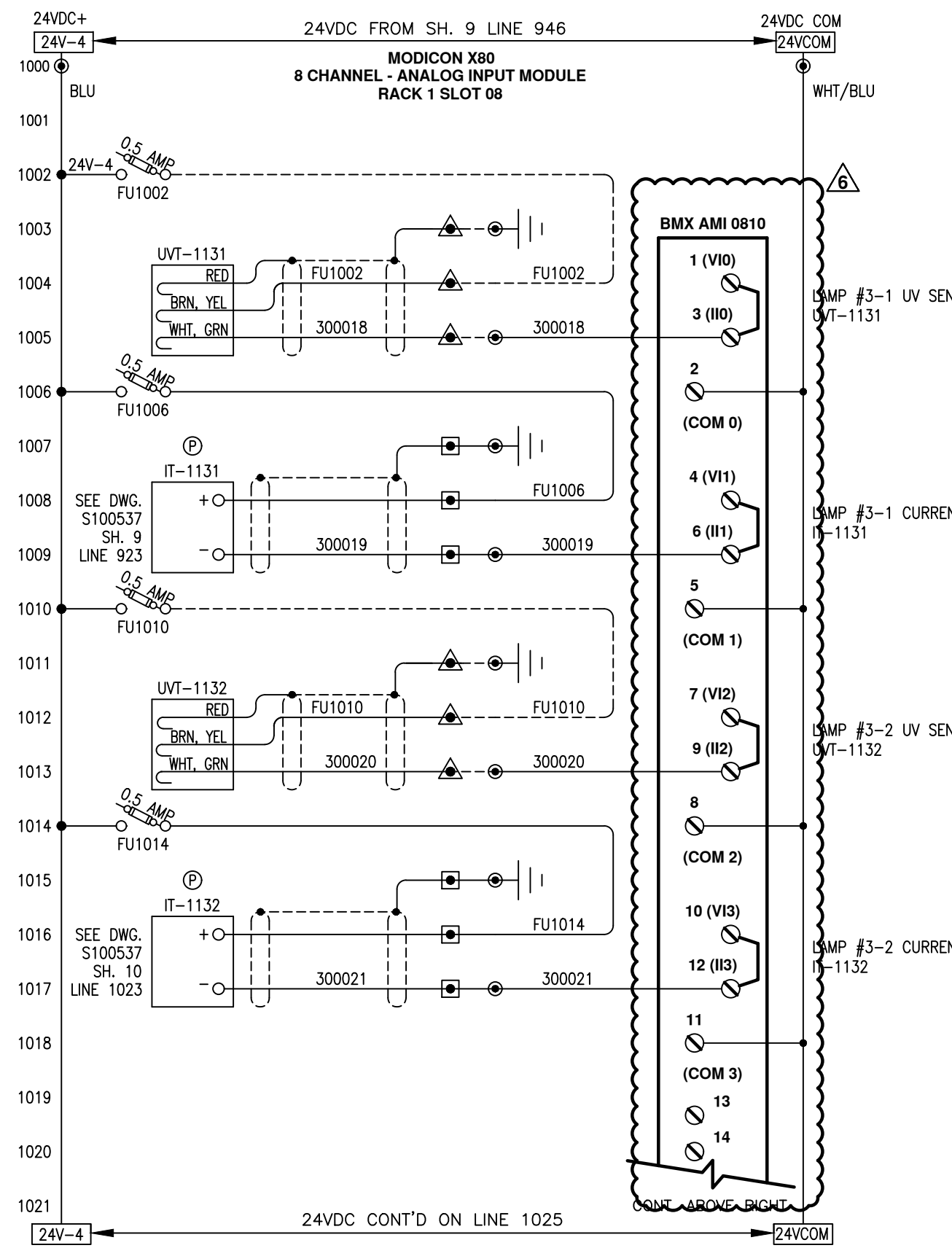
TITLE  
(6) 48"φ, 9 X 20KW SENTINEL  
MAIN CONTROL PANEL  
PLC I/O SCHEMATICS

DWG. Size	B	SHEET No.	9 OF 15	SCALE	NTS
DWG. No.	S100513			REV.	9

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CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	

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- NOTES:**
1. ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
  2. DRAWING SET IS FOR 6 SENTINEL SYSTEMS.

**LEGEND:**

- TB IN CONTROL PANEL
- Ⓟ LOC. IN POWER CABINET
- ▲ TB IN FIELD DEVICE
- TB IN POWER CABINET
- EXTERNAL WIRING
- FUSED TYPE TERM. BLK. (FUSES RATED 250V)

All wiring #16g unless indicated otherwise.

**COLOUR CODE:**

- blue 24VDC signal
- wht/blu 0 Vdc common
- red 120VAC control
- white neutral
- green ground

5	ADDED PLC TO UPS FEEDER, PWR. ON RLY	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21
REV	DESCRIPTION	APP	DATE

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
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 CLIENT CITY OF WINNIPEG  
 MANITOBA, CANADA

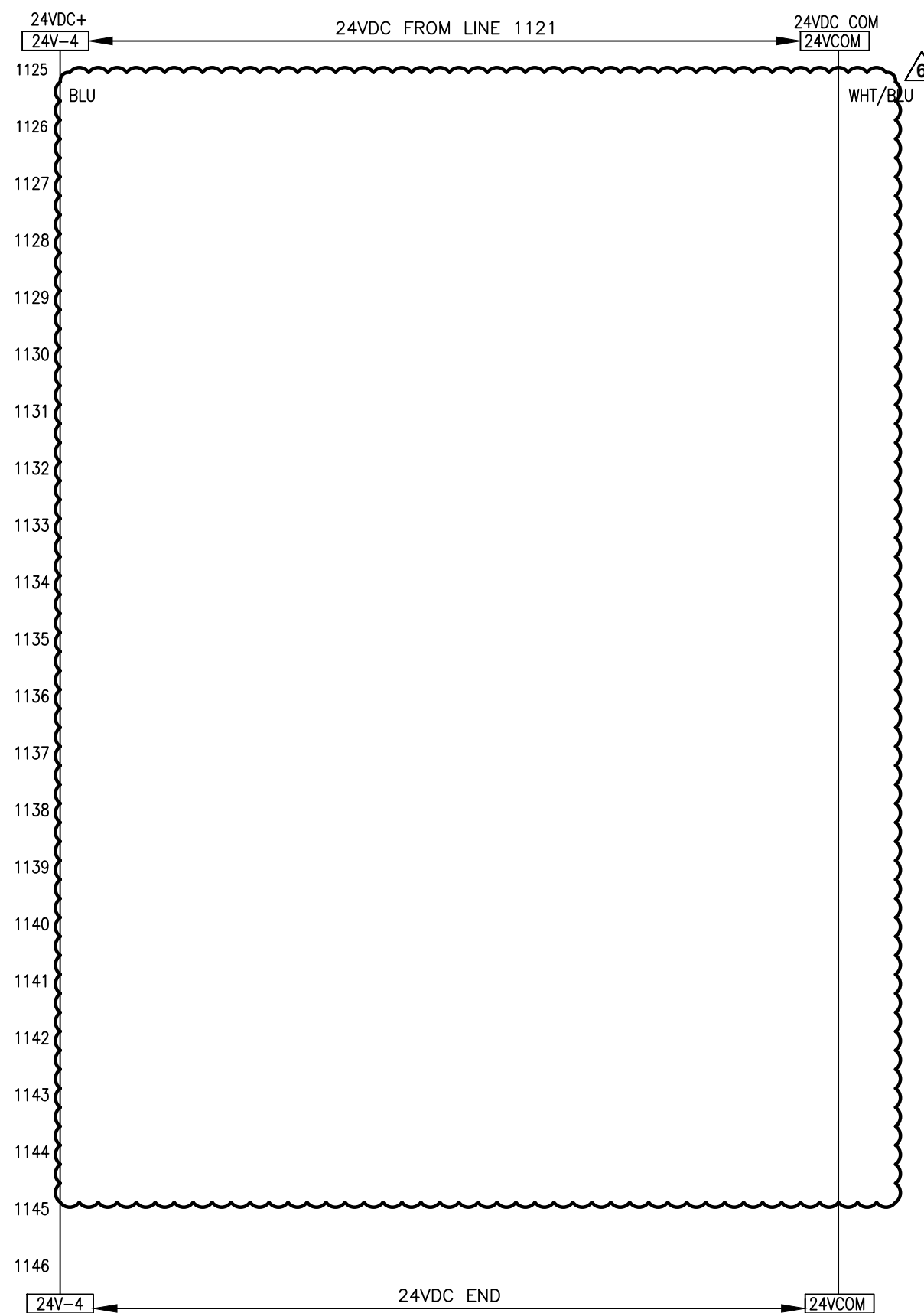
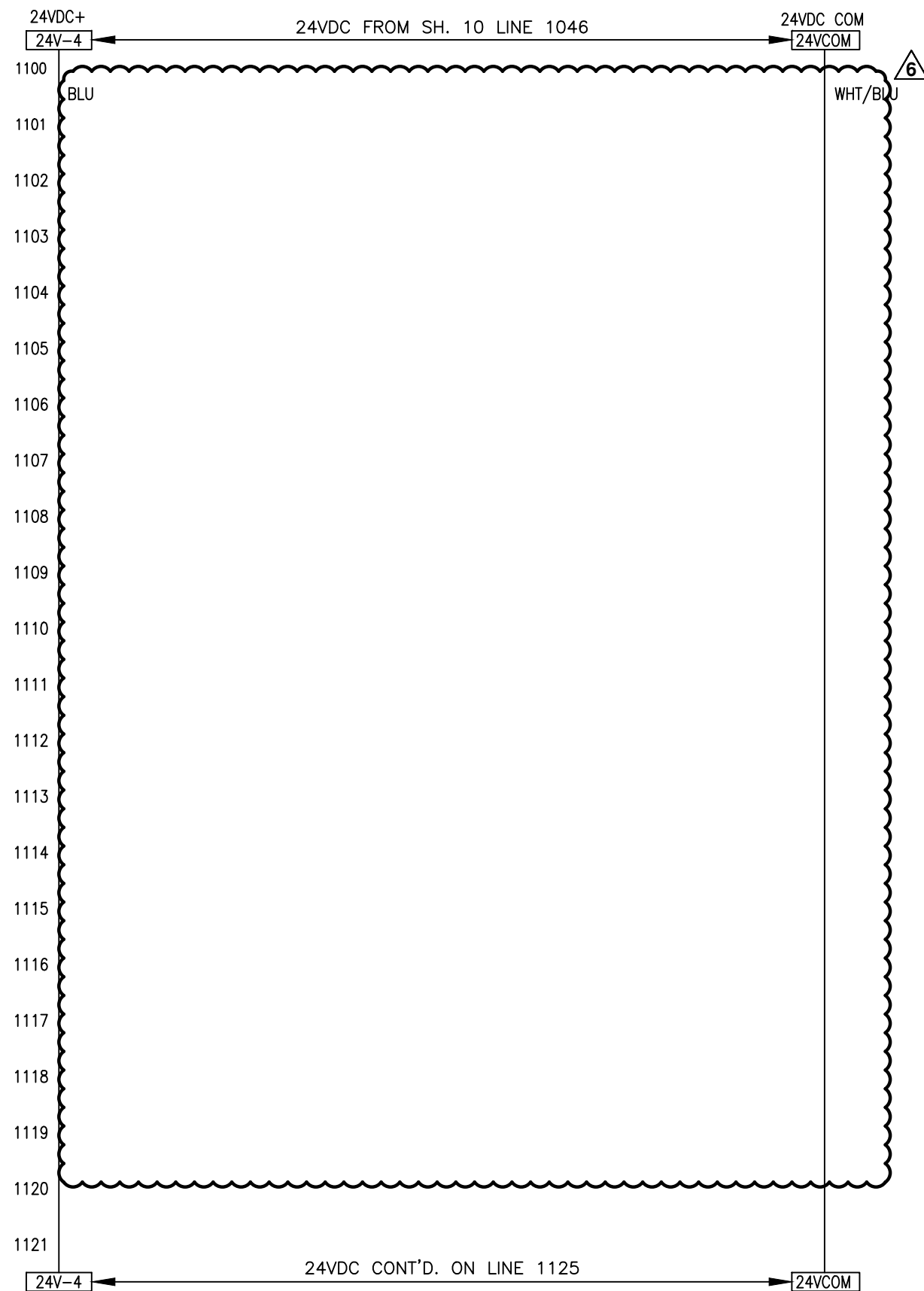
TITLE (6) 48"Ø, 9 X 20KW SENTINEL  
 MAIN CONTROL PANEL  
 PLC I/O SCHEMATICS

DWG. Size B SHEET No. 10 OF 15 SCALE NTS  
 DWG. No. S100513 REV. 9

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DESIGNER	GTL	9/15/03
CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	

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- NOTES:**
1. ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
  2. DRAWING SET IS FOR 6 SENTINEL SYSTEMS.

**LEGEND:**

●	TB IN CONTROL PANEL	All wiring #16g unless indicated otherwise.
⊙	LOC. IN POWER CABINET	
▲	TB IN FIELD DEVICE	COLOUR CODE: blue 24VDC signal wht/blu 0 Vdc common red 120VAC control white neutral green ground
■	TB IN POWER CABINET	
---	EXTERNAL WIRING	
○	FUSED TYPE TERM. BLK. (FUSES RATED 250V)	

REV	DESCRIPTION	APP	DATE
5	ADDED PLC TO UPS FEEDER, PWR. ON RLY	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

REVISIONS

TOLERANCES (unless otherwise specified)

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



DE NORA WATER TECHNOLOGIES, LLC

CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

TITLE  
(6) 48"Ø, 9 X 20KW SENTINEL  
MAIN CONTROL PANEL  
PLC I/O SCHEMATICS

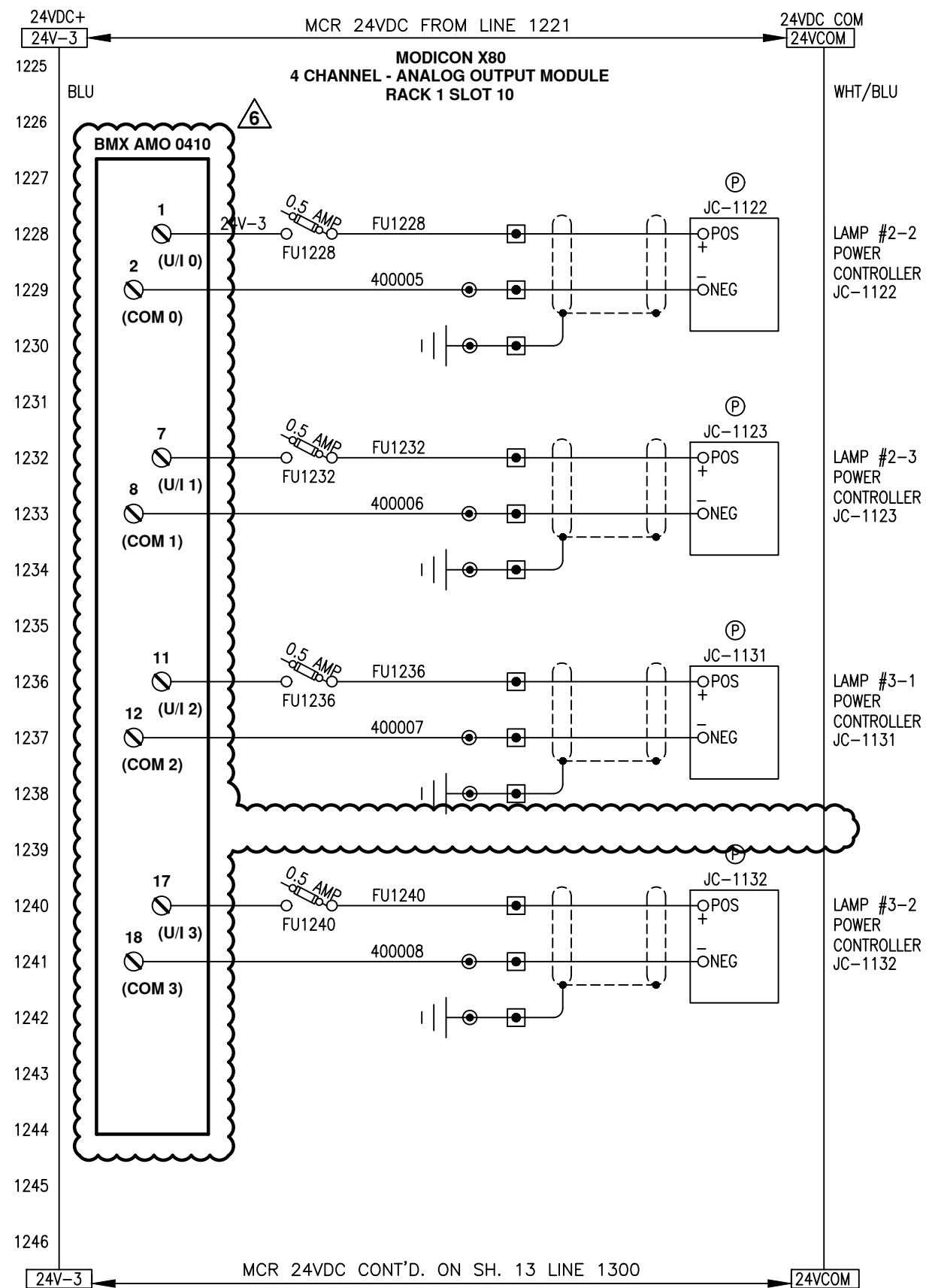
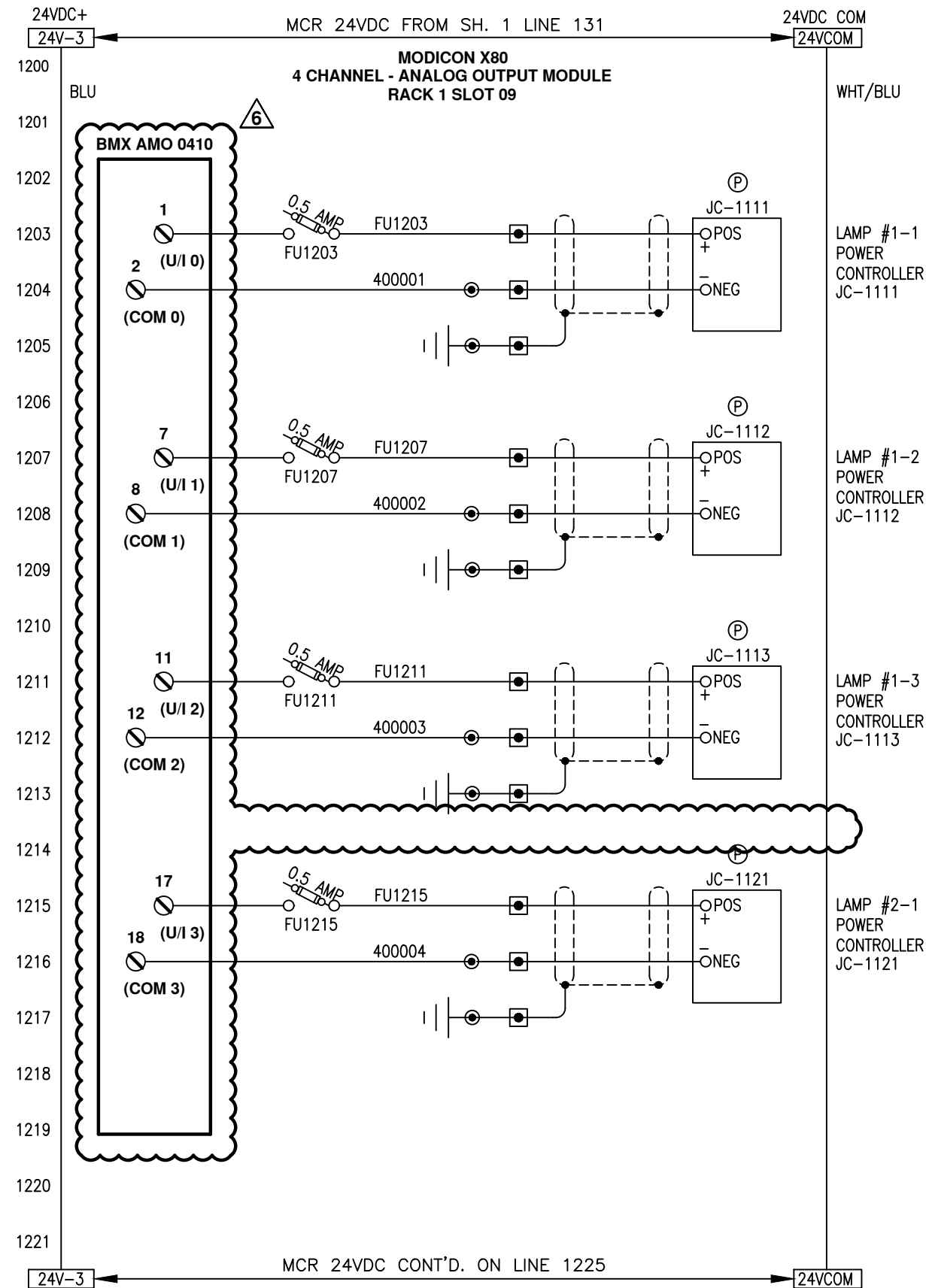
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DESIGNER	GTL	9/15/03
CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	

DWG. Size	B	SHEET No.	11 OF 15	SCALE	NTS
DWG. No.	S100513			REV.	9



T:\UV Projects\2021\EX0.000034 Winnipeg Design Project\Drawings\Electrical\S100513\_009.dwg Apr 12, 2022 - 2:55pm



- NOTES:**
- ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
  - DRAWING SET IS FOR 6 SENTINEL SYSTEMS.

**LEGEND:**

●	TB IN CONTROL PANEL	⊙	LOC. IN POWER CABINET	▲	TB IN FIELD DEVICE	■	TB IN POWER CABINET	---	EXTERNAL WIRING	○	FUSED TYPE TERM. BLK. (FUSES RATED 250V)
		<b>COLOUR CODE:</b>									
		blue								24VDC signal	
		wht/blu								0 Vdc common	
		red								120VAC control	
		white								neutral	
		green								ground	

5	ADDED PLC TO UPS FEEDER, PWR. ON RLY	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21
REV	DESCRIPTION	APP	DATE

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



DE NORA WATER TECHNOLOGIES, LLC  
 CLIENT CITY OF WINNIPEG  
 MANITOBA, CANADA

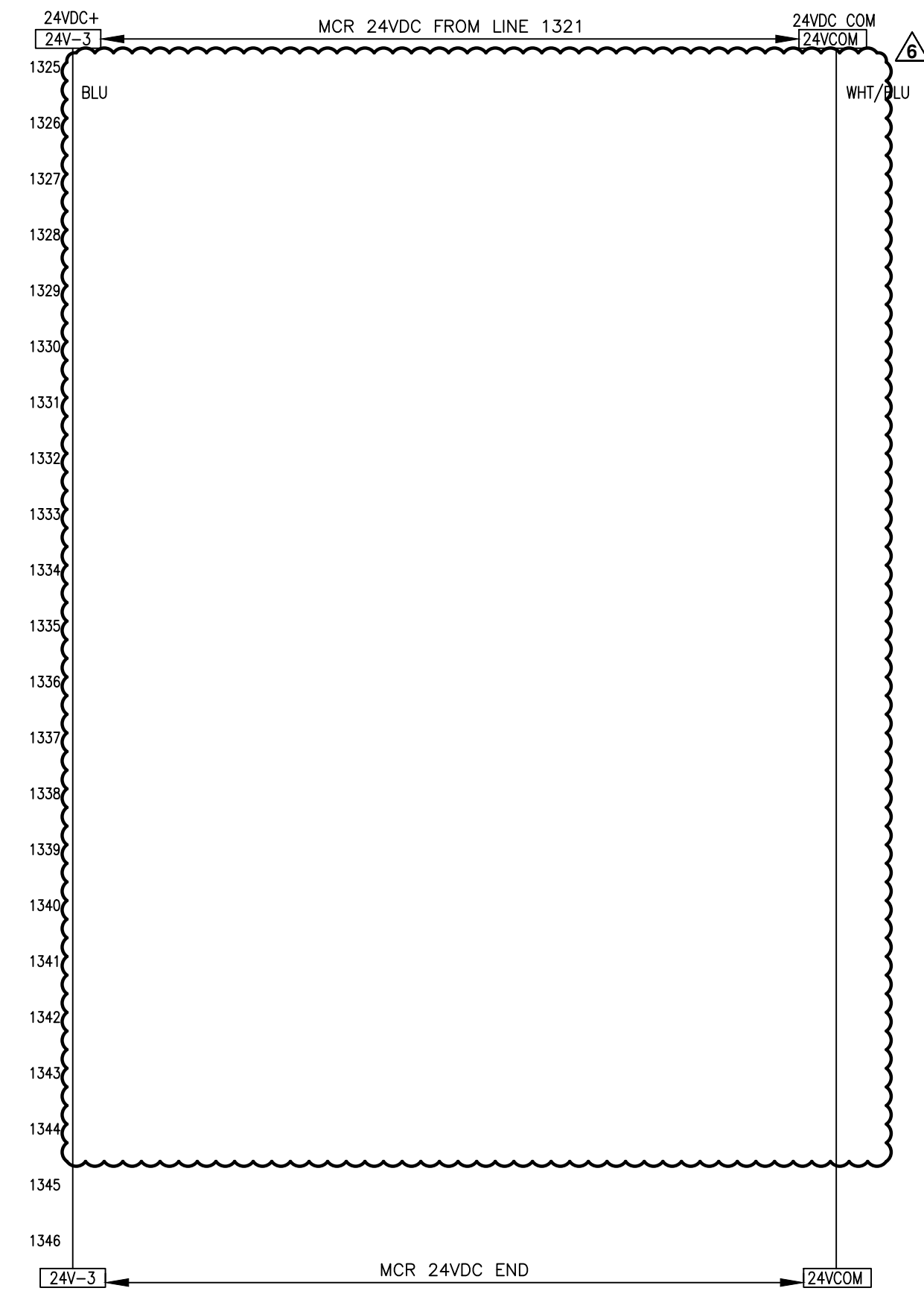
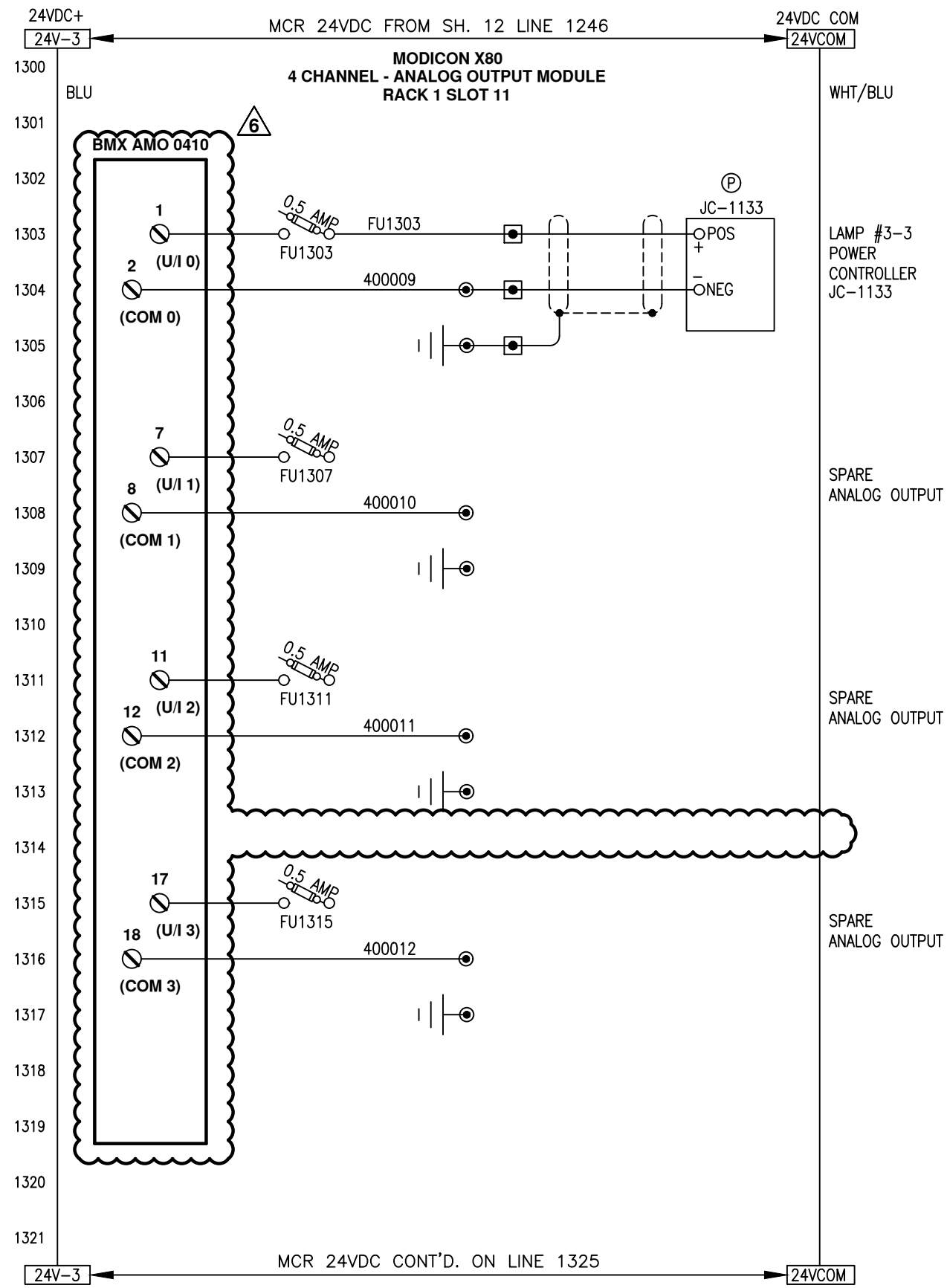
TITLE (6) 48"Ø, 9 X 20KW SENTINEL  
 MAIN CONTROL PANEL  
 PLC I/O SCHEMATICS

DWG. Size	B	SHEET No.	12 OF 15	SCALE	NTS
DWG. No.	S100513			REV.	9

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	NAME	DATE
DRAFTER	GTL	9/15/03
DESIGNER	GTL	9/15/03
CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	

T:\UV Projects\2021\EXO.000034 Winnipeg Design Project\Drawings\Electrical\S100513\_009.dwg Apr 12, 2022 - 2:56pm



- NOTES:**
1. ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
  2. DRAWING SET IS FOR 6 SENTINEL SYSTEMS.

**LEGEND:**

●	TB IN CONTROL PANEL	⊕	LOC. IN POWER CABINET	▲	TB IN FIELD DEVICE	■	TB IN POWER CABINET	---	EXTERNAL WIRING	○	FUSED TYPE TERM. BLK. (FUSES RATED 250V)
			<b>COLOUR CODE:</b>								
			blue	24VDC signal							
			wht/blu	0 Vdc common							
			red	120VAC control							
			white	neutral							
			green	ground							

REV	DESCRIPTION	APP	DATE
5	ADDED PLC TO UPS FEEDER, PWR. ON RLY	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	2021 UPGRADES	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



DE NORA WATER TECHNOLOGIES, LLC

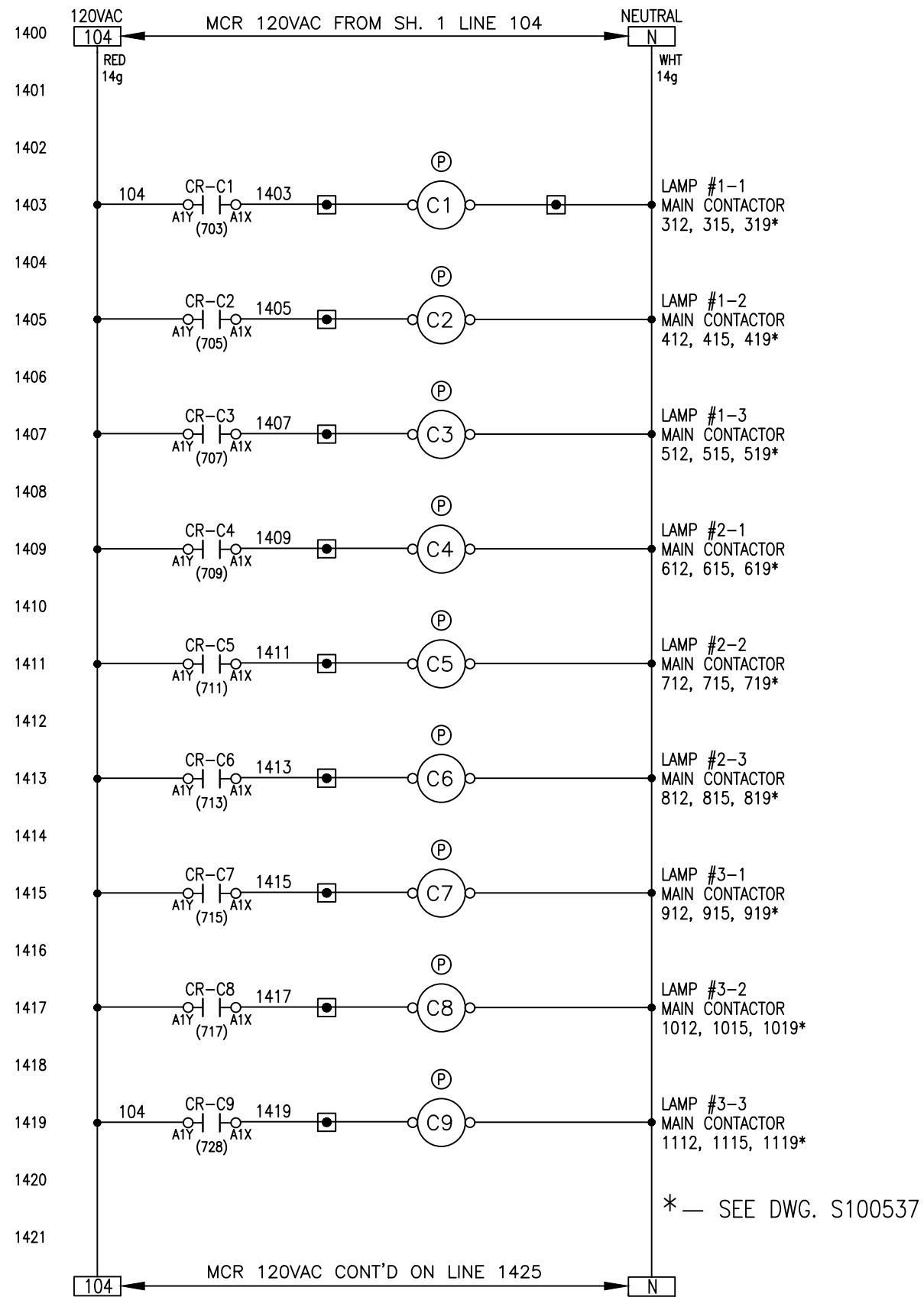
CLIENT CITY OF WINNIPEG  
MANITOBA, CANADA

TITLE (6) 48"φ, 9 X 20KW SENTINEL  
MAIN CONTROL PANEL  
PLC I/O SCHEMATICS

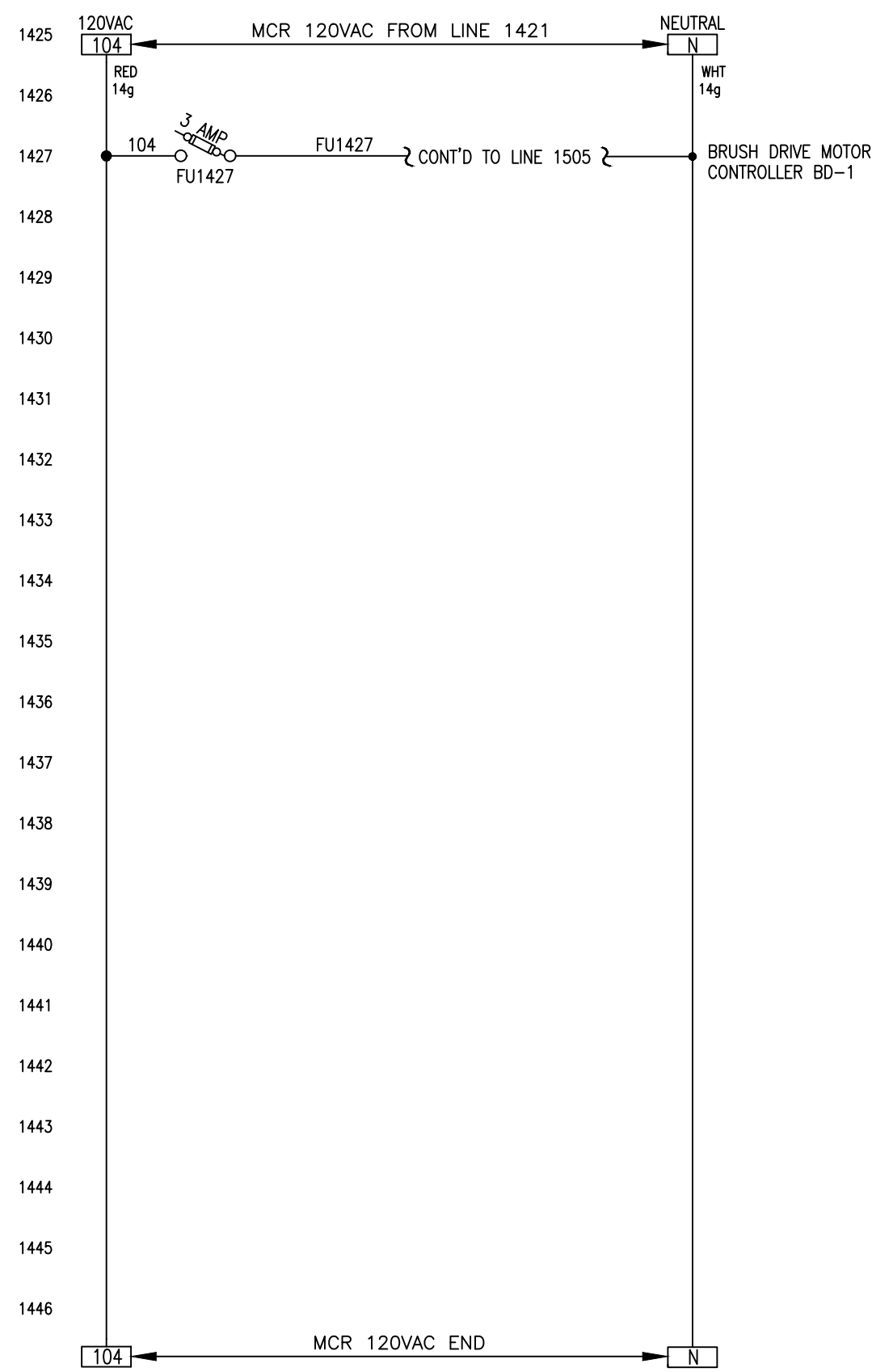
DWG. Size **B** SHEET No. 13 OF 15 SCALE NTS  
DWG. No. S100513 REV. 9

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	NAME	DATE
DRAFTER	GTL	9/15/03
DESIGNER	GTL	9/15/03
CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	



\* — SEE DWG. S100537



- NOTES:**
1. ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
  2. DRAWING SET IS FOR 6 SENTINEL SYSTEMS.

**LEGEND:**

●	TB IN CONTROL PANEL	○	FUSED TYPE TERM. BLK. (FUSES RATED 250V)
Ⓟ	LOC. IN POWER CABINET	△	TB IN FIELD DEVICE
■	TB IN POWER CABINET	---	EXTERNAL WIRING

**All wiring #16g unless indicated otherwise.**

**COLOUR CODE:**  
 blue 24VDC signal  
 wht/blu 0 Vdc common  
 red 120VAC control  
 white neutral  
 green ground

REV	DESCRIPTION	APP	DATE
5	ADDED PLC TO UPS FEEDER, PWR. ON RLY	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	NO CHANGE THIS SHEET	JBM	09/16/21

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



DE NORA WATER TECHNOLOGIES, LLC

CLIENT CITY OF WINNIPEG  
MANITOBA, CANADA

TITLE (6) 48"φ, 9 X 20KW SENTINEL  
MAIN CONTROL PANEL  
PLC I/O SCHEMATICS

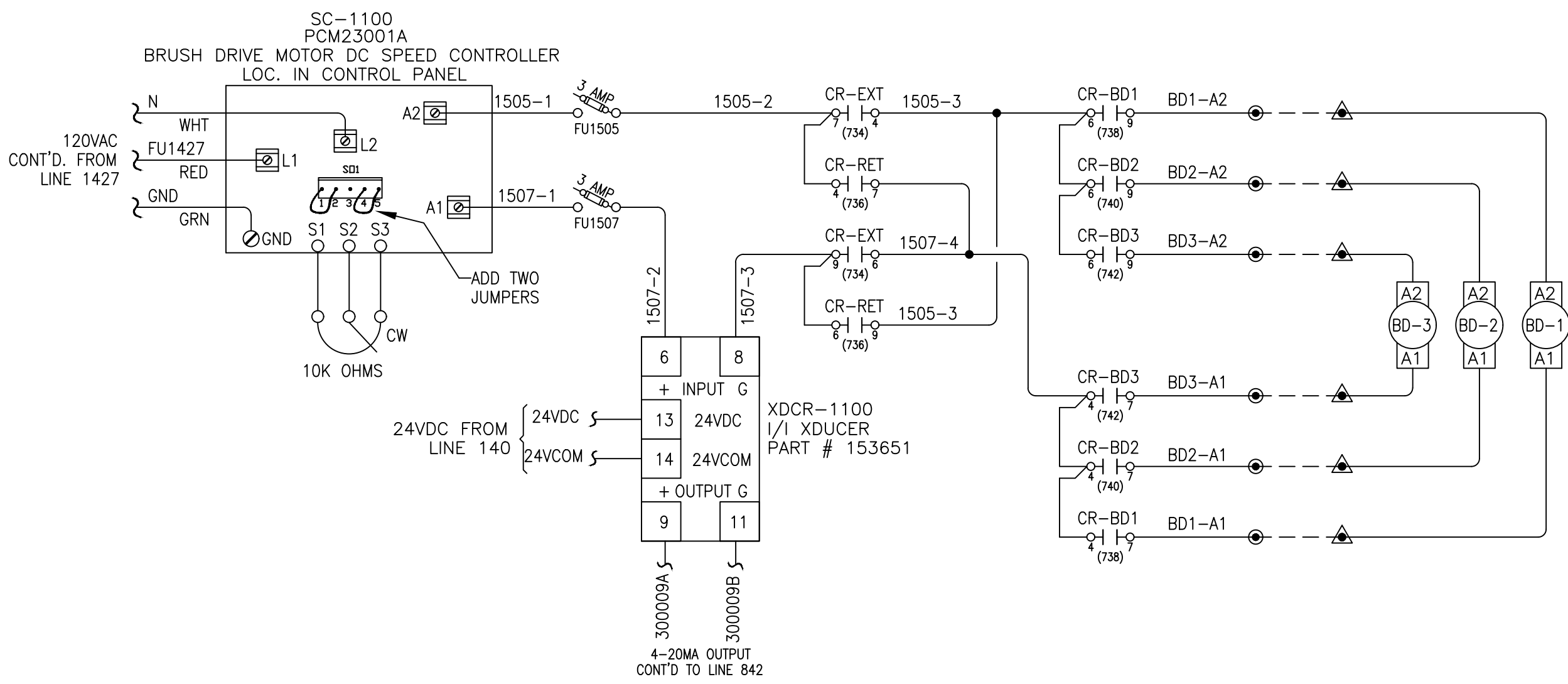
DWG. Size	B	SHEET No.	14 OF 15	SCALE	NTS
DWG. No.	S100513			REV.	9

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	NAME	DATE
DRAFTER	GTL	9/15/03
DESIGNER	GTL	9/15/03
CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	

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1500  
1501  
1502  
1503  
1504  
1505  
1506  
1507  
1508  
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1513  
1514  
1515  
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1517  
1518  
1519  
1520  
1521



BRUSH DRIVE MOTORS LOC. ON REACTOR

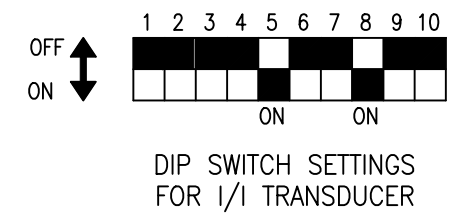
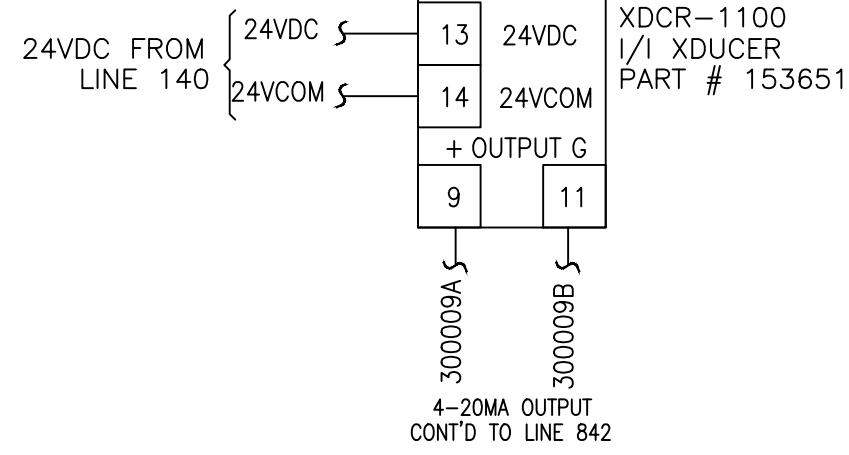
**LEGEND:**

●	TB IN CONTROL PANEL	○	FUSED TYPE TERM. BLK. (FUSES RATED 250V)
⊙	LOC. IN POWER CABINET	△	TB IN FIELD DEVICE
⊠	TB IN POWER CABINET	---	EXTERNAL WIRING

**All wiring #16g unless indicated otherwise.**

**COLOUR CODE:**

blue	24VDC signal
wht/blu	0 Vdc common
red	120VAC control
white	neutral
green	ground



- NOTES:**
- ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
  - DRAWING SET IS FOR 6 SENTINEL SYSTEMS.
  - WIRING SHALL BE 1/C #16 BLUE COLOUR, EXCEPT AS NOTED.

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	NAME	DATE
DRAFTER	GTL	9/15/03
DESIGNER	GTL	9/15/03
CHECKER	RJP	10/23/03
APPROVAL		
PROJECT No.	US-03056.WINN	

REV	DESCRIPTION	APP	DATE
5	ADDED PLC TO UPS FEEDER, PWR. ON RLY	RJP	09/13/05
9	NO CHANGE THIS SHEET	RSC	4/12/22
8	NO CHANGE THIS SHEET	JBM	12/22/21
7	NO CHANGE THIS SHEET	JBM	11/23/21
6	NO CHANGE THIS SHEET	JBM	09/16/21

REVISIONS

**TOLERANCES (unless otherwise specified)**

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005

**DE NORA**

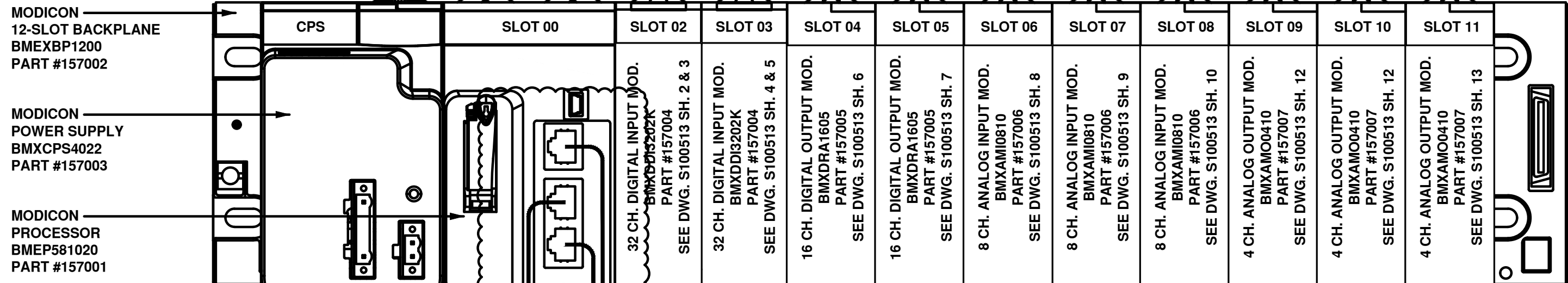
DE NORA WATER TECHNOLOGIES, LLC

CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

TITLE  
(6) 48"φ, 9 X 20KW SENTINEL  
MAIN CONTROL PANEL  
BRUSH DRIVE SCHEMATIC

DWG. Size	B	SHEET No.	15 OF 15	SCALE	NTS
DWG. No.	S100513			REV.	9

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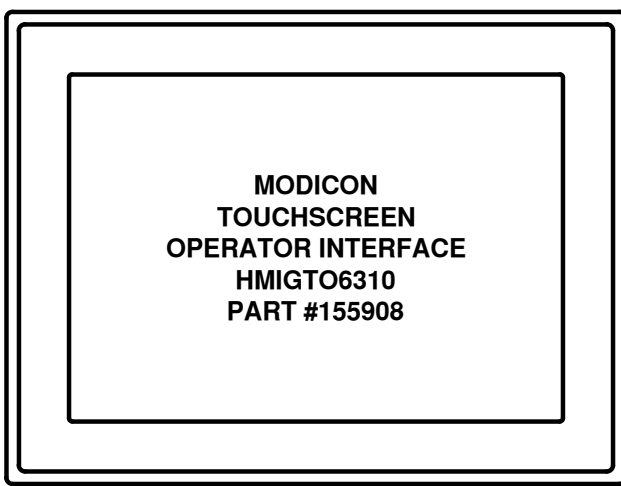


**PLC I/O RACK 1**

24 VDC  
DWG S100513  
LINE 127

FU127  
24VCOM  
GND

4-PR UTP CABLE  
PART #154821



24 VDC  
DWG. S100513  
LINE 138

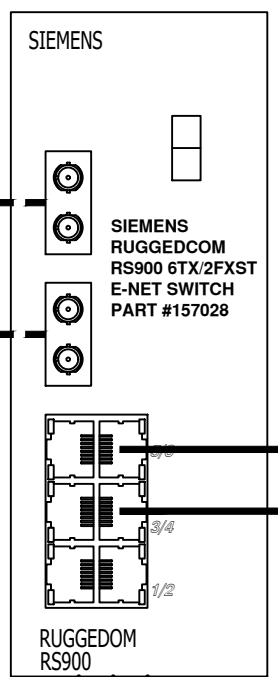
24V-6  
24VCOM  
GND

4-PR UTP CABLE  
PART #154822

FIBER CABLE AND CONNECTIONS TO BE PROVIDED/PERFORMED BY OTHERS. FIBER WILL BE MULTIMODE OM3 WITH ST CONNECTORS. REFER TO AECOM DRAWING D-8429 FOR NETWORK CONFIGURATION BETWEEN PANELS, AND DE NORA SHEET 1 OF 2, DRAWING S100532

OM3 MULTIMODE FIBER OPTIC CABLE

OM3 MULTIMODE FIBER OPTIC CABLE



24 VDC  
DWG S100513  
LINE 140

FU140  
24VCOM  
GND

4-PR UTP CABLE  
PART #154821

**NOTES:**

1. ALL DEVICES LOCATED IN CONTROL PANEL EXCEPT AS NOTED.
2. DRAWING SET IS FOR 6 SENTINEL SYSTEMS.

REV	DESCRIPTION	APP	DATE
3	REVISIONS PER COMMENTS: SD-002R2	RSC	4/12/22
2	REVISED ETHERNET SWITCH	JBM	12/22/21
1	2021 UPGRADES	JBM	09/16/21

TOLERANCES (unless otherwise specified)			
ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



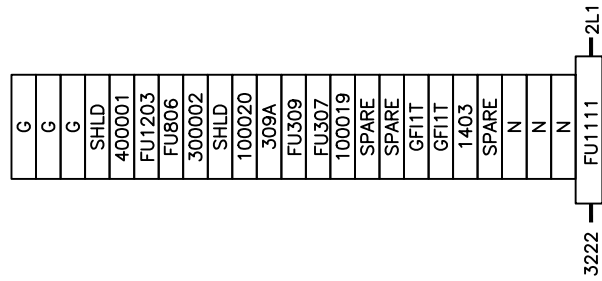
DE NORA WATER TECHNOLOGIES, LLC	
CLIENT	CITY OF WINNIPEG MANITOBA, CANADA
TITLE	(6) 48"φ, 9 X 20KW SENTINEL MAIN CONTROL PANEL PLC CONFIGURATION DIAGRAM
DWG. Size	B
SHEET No.	1 OF 1
SCALE	NTS
DWG. No.	S100514
REV.	3

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NAME	DATE	
DRAFTER	GTL	9/22/03
DESIGNER	GTL	9/22/03
CHECKER	MB	10/28/03
APPROVAL		
PROJECT No.	US-03056.WINN	

2/3

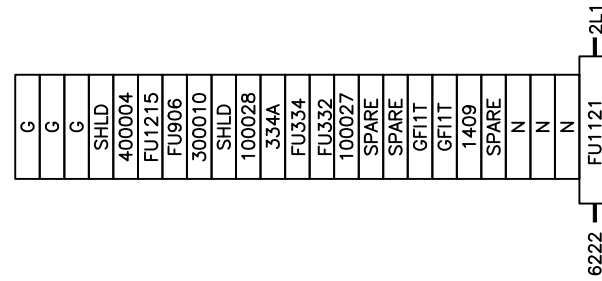
1

POWER SUPPLY MODULE #1-1 110VAC/24VDC



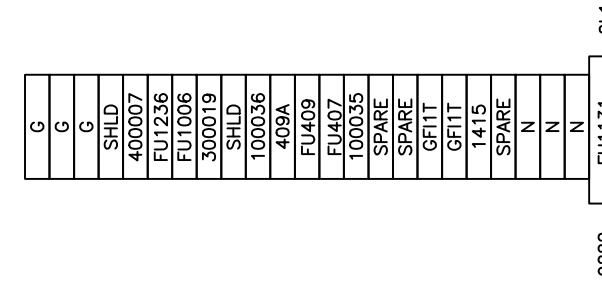
1 FUSE, 20 SINGLES, 3 GROUNDS

POWER SUPPLY MODULE #2-1 110VAC/24VDC



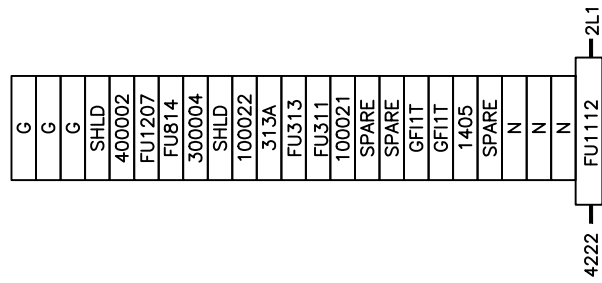
1 FUSE, 20 SINGLES, 3 GROUNDS

POWER SUPPLY MODULE #3-1 110VAC/24VDC



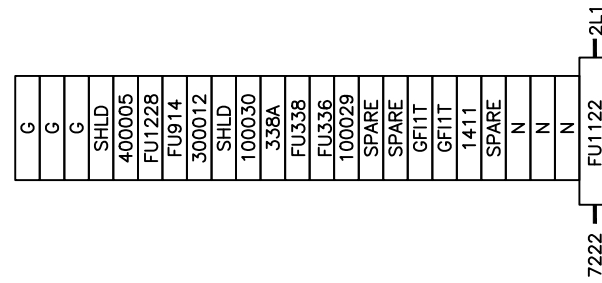
1 FUSE, 20 SINGLES, 3 GROUNDS

POWER SUPPLY MODULE #1-2 110VAC/24VDC



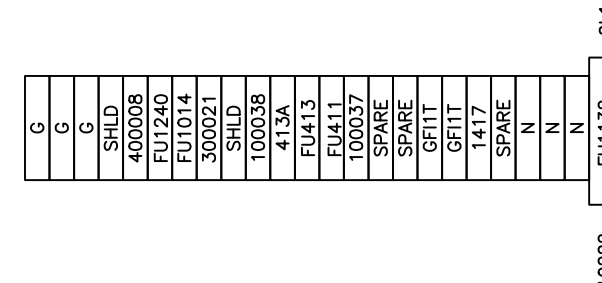
1 FUSE, 20 SINGLES, 3 GROUNDS

POWER SUPPLY MODULE #2-2 110VAC/24VDC



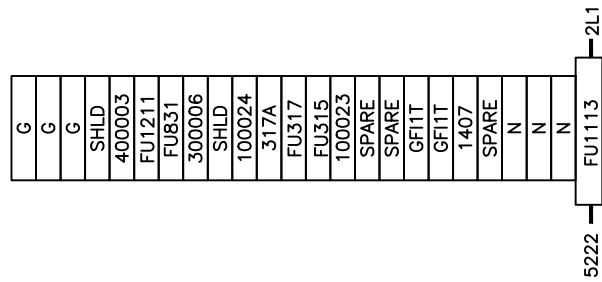
1 FUSE, 20 SINGLES, 3 GROUNDS

POWER SUPPLY MODULE #3-2 110VAC/24VDC



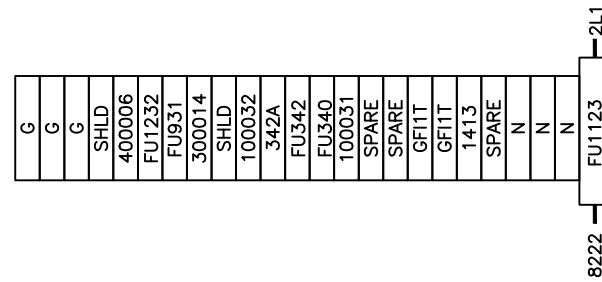
1 FUSE, 20 SINGLES, 3 GROUNDS

POWER SUPPLY MODULE #1-3 110VAC/24VDC



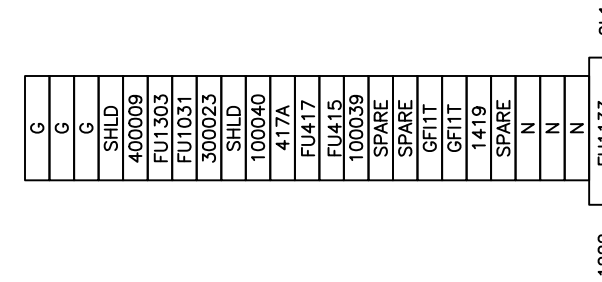
1 FUSE, 20 SINGLES, 3 GROUNDS

POWER SUPPLY MODULE #2-3 110VAC/24VDC



1 FUSE, 20 SINGLES, 3 GROUNDS

POWER SUPPLY MODULE #3-3 110VAC/24VDC



1 FUSE, 20 SINGLES, 3 GROUNDS

NOTES:

1. ALL TERMINAL BLOCKS ALLEN-BRADLEY 1492-F1 UNLESS NOTED. QUANTITY OF TWO (2) MARKERS REQUIRED PER BLOCK.
2. ALL FUSED TERMINAL BLOCKS ALLEN-BRADLEY 1492-H4 (120VAC) AND 1492-H5 (24VDC). FUSES (FUXXX) REQUIRE TWO (2) MARKERS PER FUSE. ONE MARKER ON THE LOAD SIDE AND A DIFFERENT MARKER ON THE LINE SIDE AS INDICATED.
3. WIRE LABELS SHALL BE WHITE HEAT SHRINK TYPE BRADY SERIES B-321 OR EQUAL.

4	AS BUILT	RJP	08/24/04
7	NO CHANGE THIS SHEET	RSC	4/12/22
6	NO CHANGE THIS SHEET	JBM	12/22/21
5	NO CHANGE THIS SHEET	JBM	09/16/21
REV	DESCRIPTION	APP	DATE

TOLERANCES (unless otherwise specified)			
ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005



CLIENT  
CITY OF WINNIPEG  
MANITOBA, CANADA

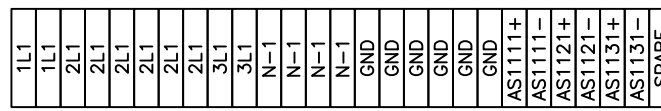
TITLE  
CONTROL PANEL & POWER SUPPLIES  
TERMINAL BLOCK ARRANGEMENT

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	NAME	DATE	
DRAFTER	GTL	9/24/03	
DESIGNER	GTL	9/24/03	
CHECKER	RJP	10/28/03	
APPROVAL			
PROJECT No.	US-03056.WINN		

DWG. Size	D	SHEET No.	1 OF 2	SCALE	NONE
PROJECT No.	S100531		REV.	7	

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CONTROL PANEL  
120VAC TB-1

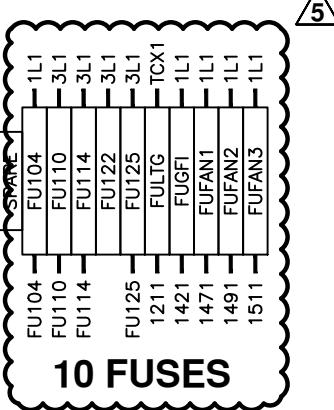


21 SINGLES, 7 GROUNDS

CONTROL PANEL  
120VAC TB-2

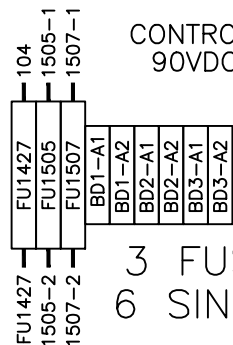


12 SINGLES



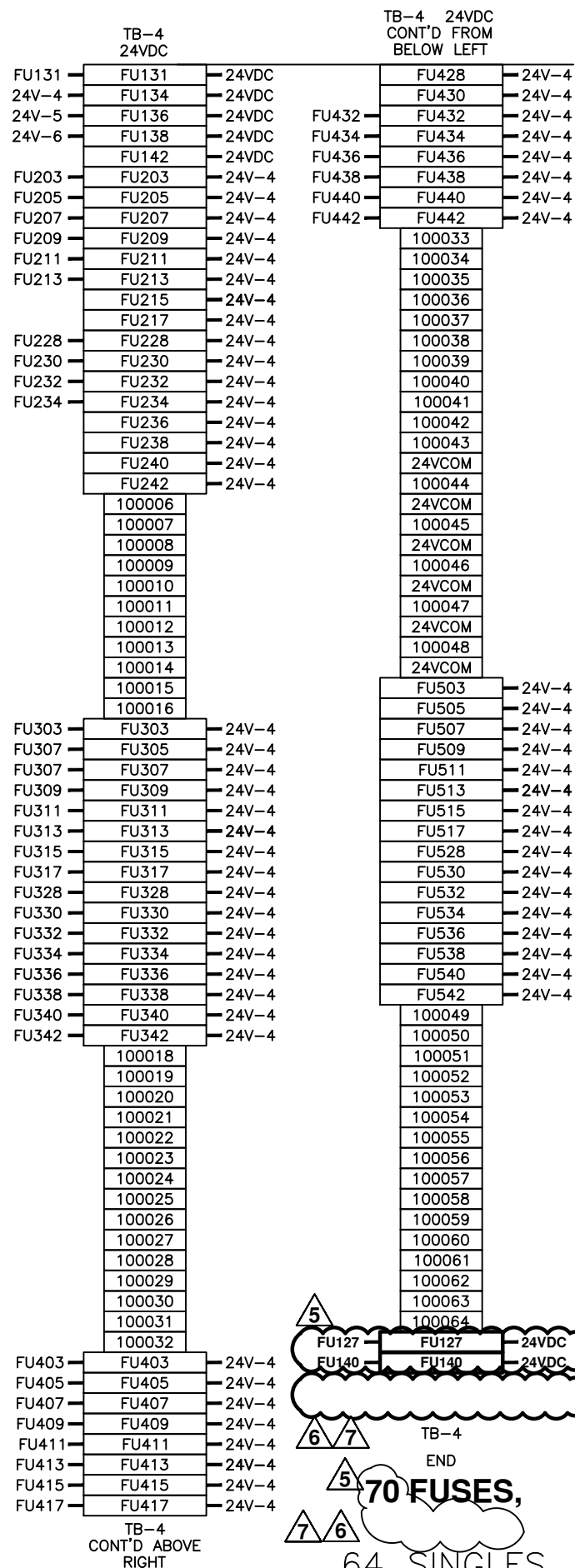
10 FUSES

CONTROL PANEL  
90VDC TB-3



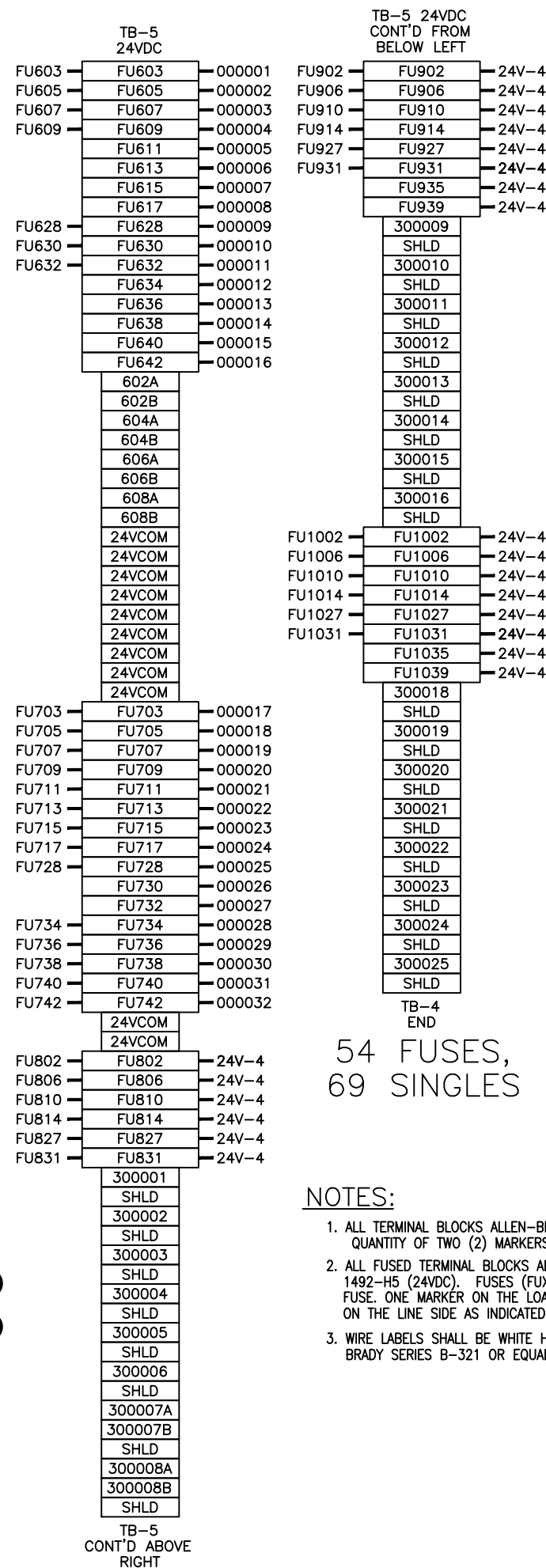
3 FUSES,  
6 SINGLES

CONTROL PANEL 24VDC TB-4



70 FUSES,  
64 SINGLES

CONTROL PANEL 24VDC TB-5

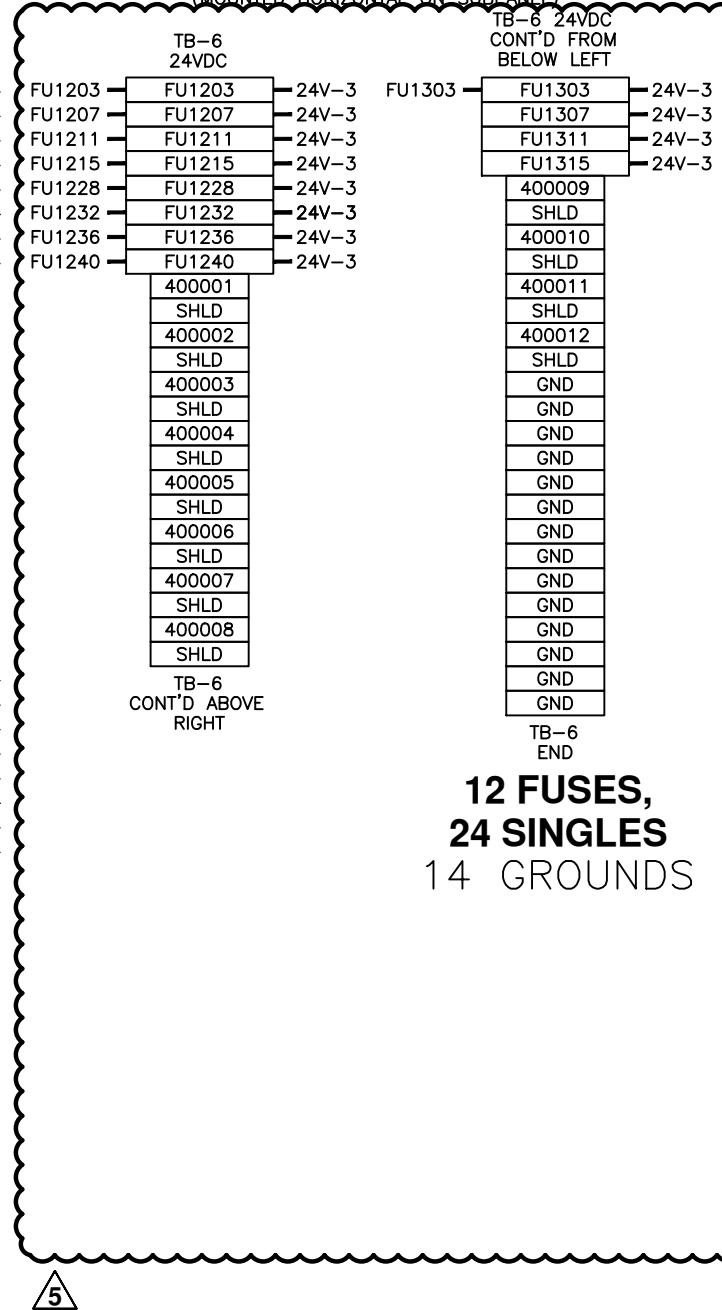


54 FUSES,  
69 SINGLES

NOTES:

- ALL TERMINAL BLOCKS ALLEN-BRADLEY 1492-F1 UNLESS NOTED. QUANTITY OF TWO (2) MARKERS REQUIRED PER BLOCK.
- ALL FUSED TERMINAL BLOCKS ALLEN-BRADLEY 1492-H4 (120VAC) AND 1492-H5 (24VDC). FUSES (FUXXX) REQUIRE TWO (2) MARKERS PER FUSE. ONE MARKER ON THE LOAD SIDE AND A DIFFERENT MARKER ON THE LINE SIDE AS INDICATED.
- WIRE LABELS SHALL BE WHITE HEAT SHRINK TYPE BRADY SERIES B-321 OR EQUAL.

CONTROL PANEL 24VDC TB-6  
(MOUNTED HORIZONTAL ON SUBPANEL)



12 FUSES,  
24 SINGLES  
14 GROUNDS

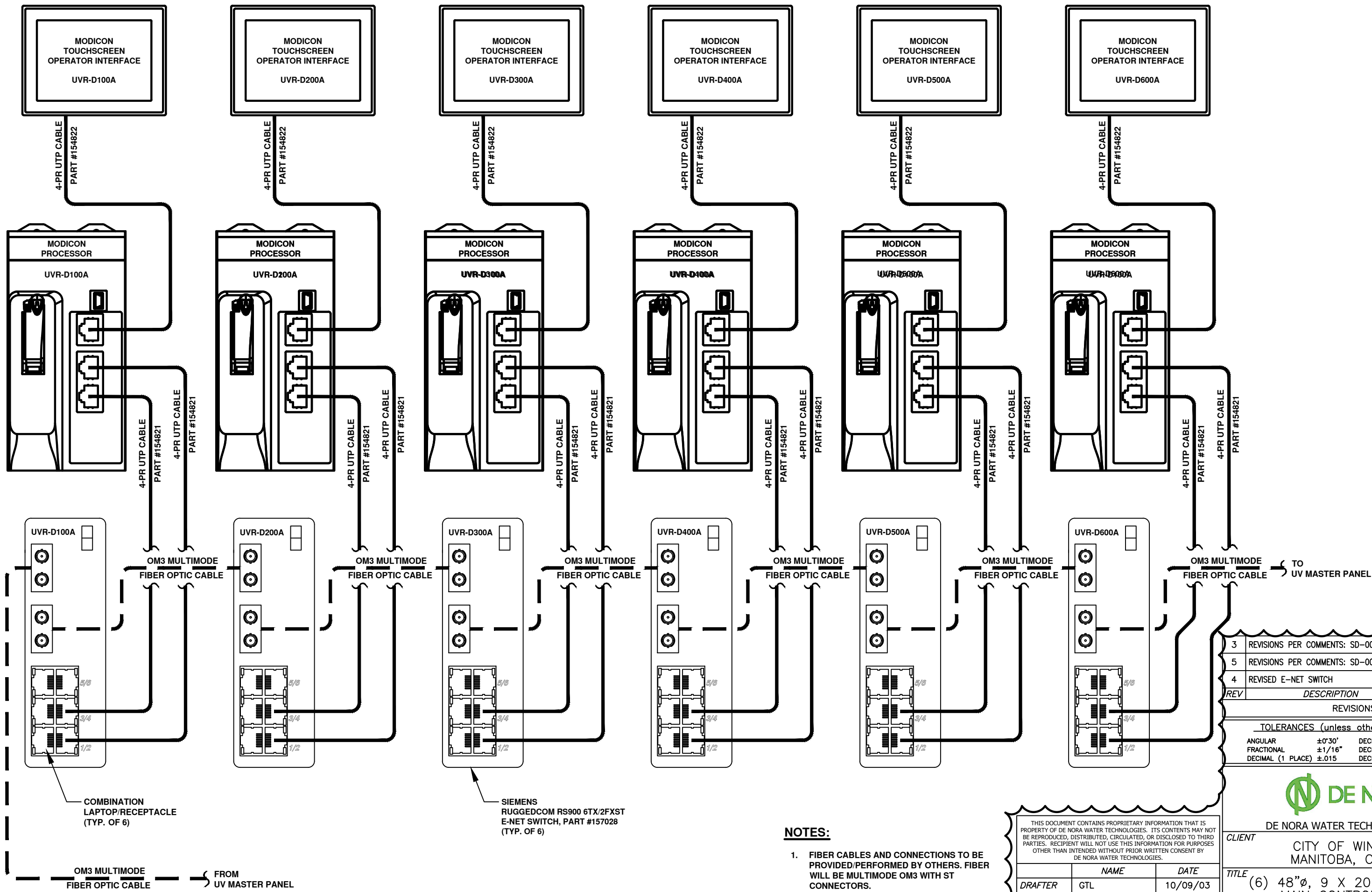
4	AS BUILT	RJP	08/24/04
7	REVISIONS PER COMMENTS: SD-002R2	RSC	4/12/22
6	ADDED RELAY FOR AHF	JBM	12/22/21
5	2021 UPGRADES	JBM	09/18/21
REV	DESCRIPTION	APP	DATE

TOLERANCES (unless otherwise specified)			
ANGULAR	±0°30'	DECIMAL (2 PLACES)	±0.01
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±0.005
DECIMAL (1 PLACE)	±0.015	DECIMAL (4 PLACES)	±0.0005



DE NORA WATER TECHNOLOGIES, LLC	
CLIENT	CITY OF WINNIPEG MANITOBA, CANADA
TITLE	CONTROL PANEL & POWER SUPPLIES TERMINAL BLOCK ARRANGEMENT
DWG. No.	US-03056.WINN
SHEET No.	2 OF 2
SCALE	NONE
REV.	7

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NAME	DATE	
DRAFTER	GTL	9/24/03
DESIGNER	GTL	9/24/03
CHECKER	RJP	10/28/03
APPROVAL		



REV	DESCRIPTION	APP	DATE
3	REVISIONS PER COMMENTS: SD-002	JBM	11/23/21
5	REVISIONS PER COMMENTS: SD-002R2	RSC	4/12/22
4	REVISED E-NET SWITCH	JBM	12/22/21

REVISIONS			
TOLERANCES (unless otherwise specified)			
ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±0.015	DECIMAL (4 PLACES)	±.0005



DE NORA WATER TECHNOLOGIES, LLC

CLIENT	CITY OF WINNIPEG MANITOBA, CANADA		
TITLE	(6) 48"Ø, 9 X 20KW SENTINEL MAIN CONTROL PANEL NETWORK. DIAGRAM		
DWG. Size	B	SHEET No.	1 OF 2
DWG. No.	S100532	SCALE	NTS
PROJECT No.	US-03056.WINN	REV.	5

**NOTES:**

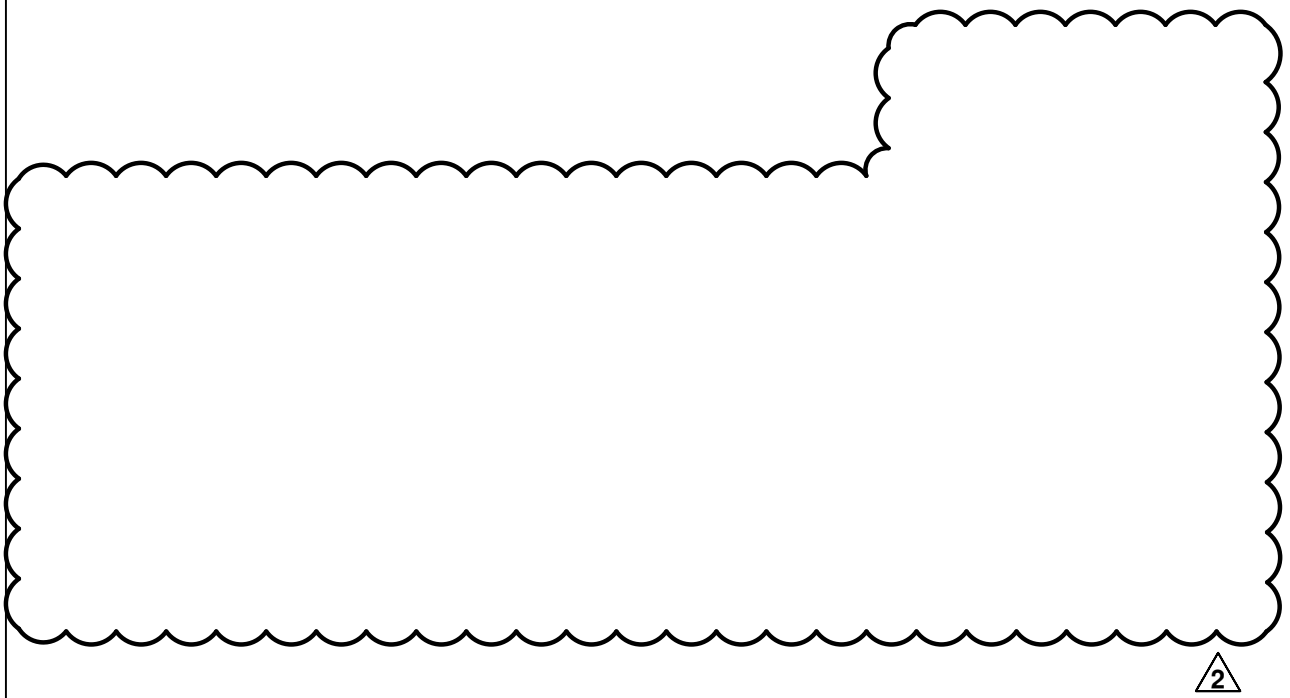
1. FIBER CABLES AND CONNECTIONS TO BE PROVIDED/PERFORMED BY OTHERS. FIBER WILL BE MULTIMODE OM3 WITH ST CONNECTORS.
2. REFER TO AECOM DRAWING D-8429 FOR NETWORK CONFIGURATION BETWEEN PANELS.

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	NAME	DATE
DRAFTER	GTL	10/09/03
DESIGNER	GTL	10/09/03
CHECKER	MB	10/28/03
APPROVAL		



T:\UV Projects\2021\EX0.000034 Winnipeg Design Project\Drawings\Electrical\S100532\_005.dwg Apr 12, 2022 - 2:56pm



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2

3

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DESIGNER	GTL	10/09/03
CHECKER	MB	10/28/03
APPROVAL		
PROJECT No.	US-03056.WINN	

REV	DESCRIPTION	APP	DATE
3	REVISIONS PER COMMENTS: SD-002	JBM	11/23/21
5	NO CHANGE THIS SHEET	RSC	4/12/22
4	NO CHANGE THIS SHEET	JBM	12/22/21

REVISIONS

TOLERANCES (unless otherwise specified)

ANGULAR	±0°30'	DECIMAL (2 PLACES)	±.010
FRACTIONAL	±1/16"	DECIMAL (3 PLACES)	±.005
DECIMAL (1 PLACE)	±.015	DECIMAL (4 PLACES)	±.0005

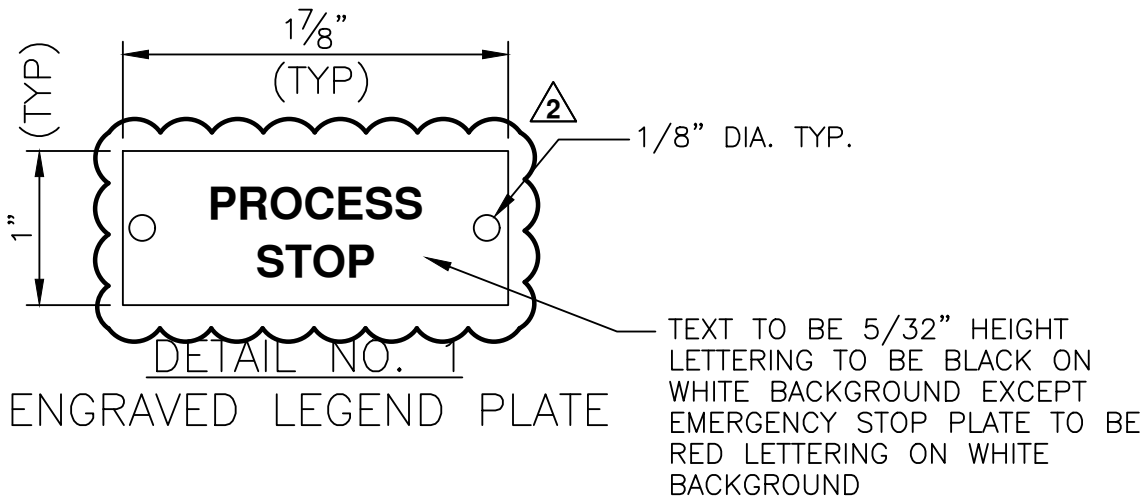


DE NORA WATER TECHNOLOGIES, LLC	
CLIENT	CITY OF WINNIPEG MANITOBA, CANADA
TITLE	(6) 48"ø, 9 X 20KW SENTINEL MAIN CONTROL PANEL NETWORK DIAGRAM
DWG. Size	<b>B</b>
SHEET No.	2 OF 2
SCALE	NTS
DWG. No.	S100532
REV.	5

# LEGEND PLATE ENGRAVING

②

ITEM	SIZE	LETTER SIZE	LINE 1	LINE 2
①	SEE DET. #1	STNRD	<b>PROCESS</b>	STOP
②	SEE DET. #1	STNRD	SYSTEM	START
③	SEE DET. #1	STNRD	SYSTEM	STOP
④	SEE DET. #1	STNRD	MESSAGE	ACKNOWLEDGE



SIX (6) SETS REQUIRED



DE NORA WATER TECHNOLOGIES, LLC

CLIENT STANDARD

TITLE ENGRAVED LEGEND PLATE CONTROL PANEL STANDARD

DWG. Size **A** SHEET No. 1 OF 1 SCALE NONE

DWG. No. S100640 REV. 2

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	NAME	DATE
DRAFTER	RJP	03/15/04
DESIGNER	RJP	03/15/04
CHECKER		
APPROVAL		

PROJECT No. STANDARD

REV	DESCRIPTION	APP	DATE
3			
2	REVISIONS PER COMMENTS: SD-002	JBM	11/23/21
1	REV. CONFIGURATION	RJP	03/22/04

REVISIONS

AECOM: The enclosure panel plate shall comply with CSA C22.1 Rule 2-100:

**2-100 Marking of equipment** (see Appendix B)

- 1) Each piece of electrical equipment shall bear those of the following markings necessary to identify the equipment and ensure that it is suitable for the particular installation:
  - a) the maker's name, trademark, or other recognized symbol of identification;
  - b) catalogue number or type;
  - c) voltage;
  - d) rated load amperes;
  - e) watts, volt amperes, or horsepower;
  - f) whether for ac, dc, or both;
  - g) number of phases;
  - h) frequency in hertz;
  - i) rated load speed in revolutions per minute;
  - j) designation of terminals;
  - k) whether for continuous or intermittent duty;
  - l) short-circuit current rating or withstand rating;
  - m) evidence of approval; or
  - n) other markings necessary to ensure safe and proper operation.
- 2) At the time of installation, each service box shall be marked in a conspicuous, legible, and permanent manner, to indicate clearly the maximum rating of the overcurrent device that may be used for this installation.
- 3) At each distribution point, circuit breakers, fuses, and switches shall be marked, adjacent thereto, in a conspicuous and legible manner to indicate clearly
  - a) which installation or portion of installation they protect or control; and
  - b) the maximum rating of overcurrent device that is permitted.
- 4) Where the maximum continuous load allowed on a fused switch or circuit breaker as determined in accordance with Rule 8-104 5) and 6) is less than the continuous operating marking of the fused switch or circuit breaker, a permanent, legible caution marking shall be field applied adjacent to the fused switch or circuit breaker nameplate to indicate the maximum continuous loading permitted for connection to the fused switch or circuit breaker.
- 5) The marking on electrical equipment shall not be added to, or changed, to indicate a use under this Code for which the equipment has not been approved.