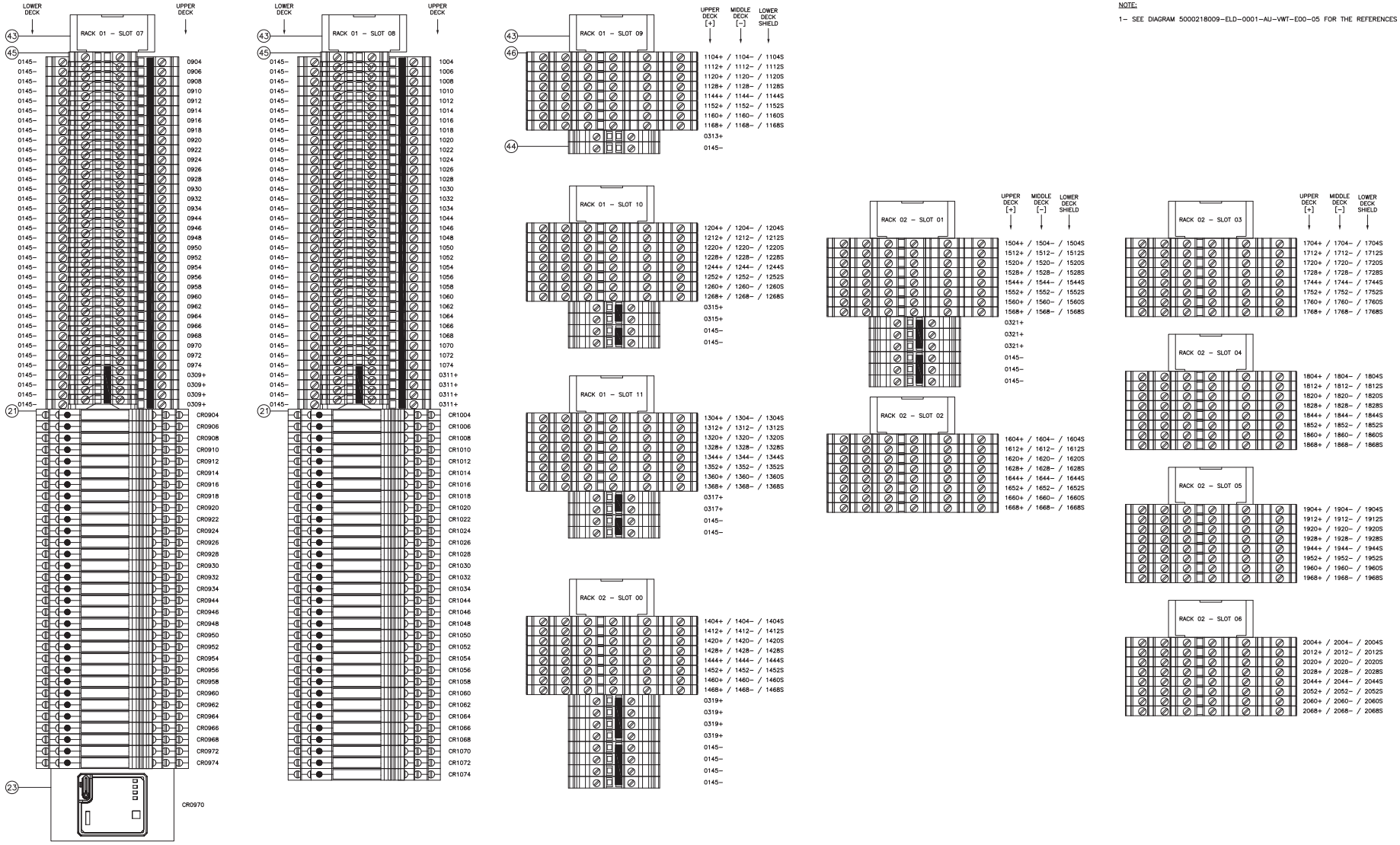


NOTE:

1– SEE DIAGRAM 5000218009–ELD–0001–AU–VWT–E00–05 FOR THE REFERENCES TO THE BILL OF MATERIAL.

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018–06–20	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC–001
TERMINAL DETAILS 2/2
–

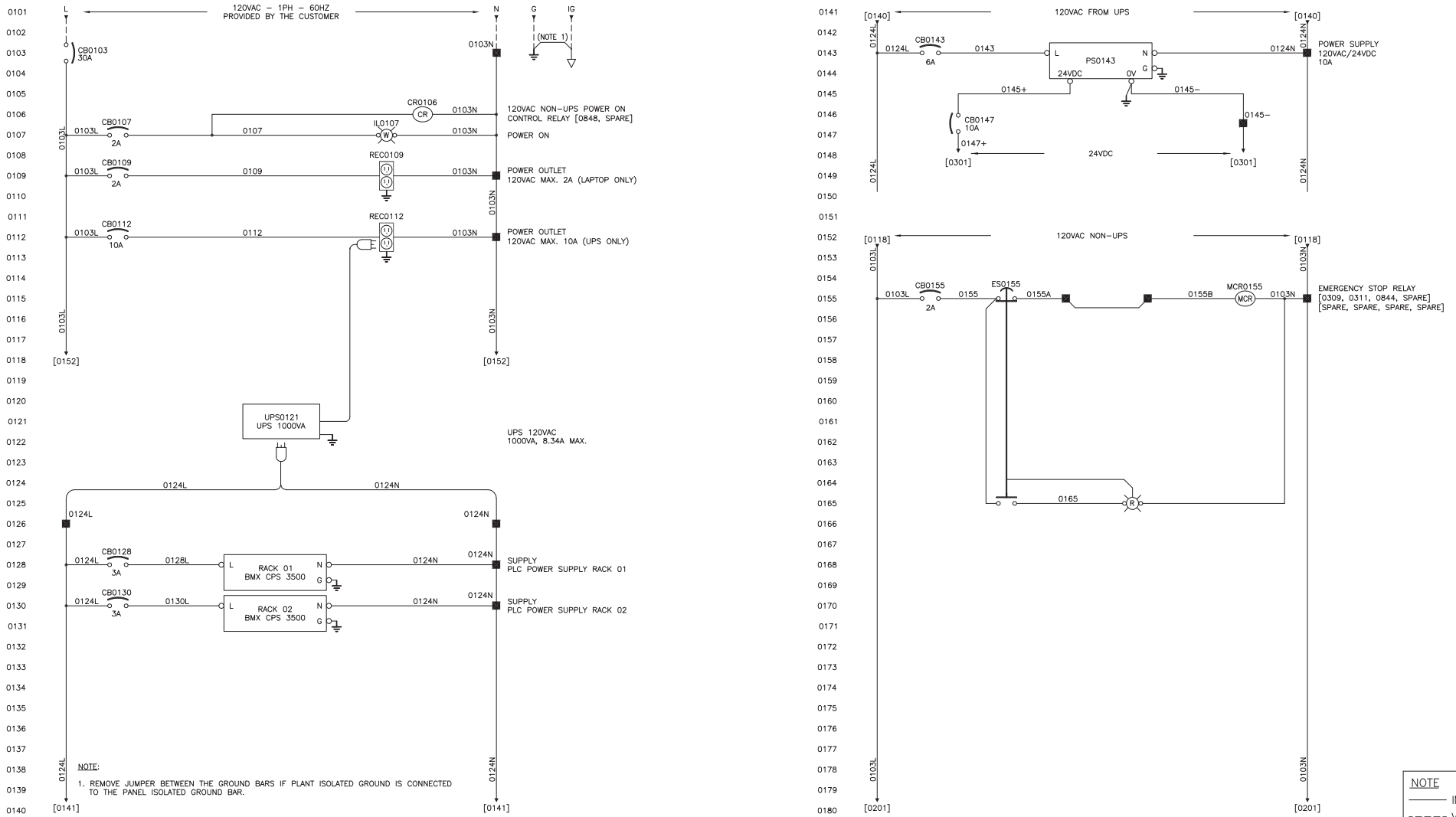
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC., 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0001–AU–VWT	E00	07 OF 07	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun. 20, 2018 13:58:00 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E00-07-1.dwg – a.lessard



REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE	–
CHECKER	–	DATE	–
ENGINEER	–	DATE	–
SCALE:	None		

TITLE: MAIN CONTROL PANEL PLC-001
SCHEMATIC DIAGRAM POWER DISTRIBUTION 120VAC
–

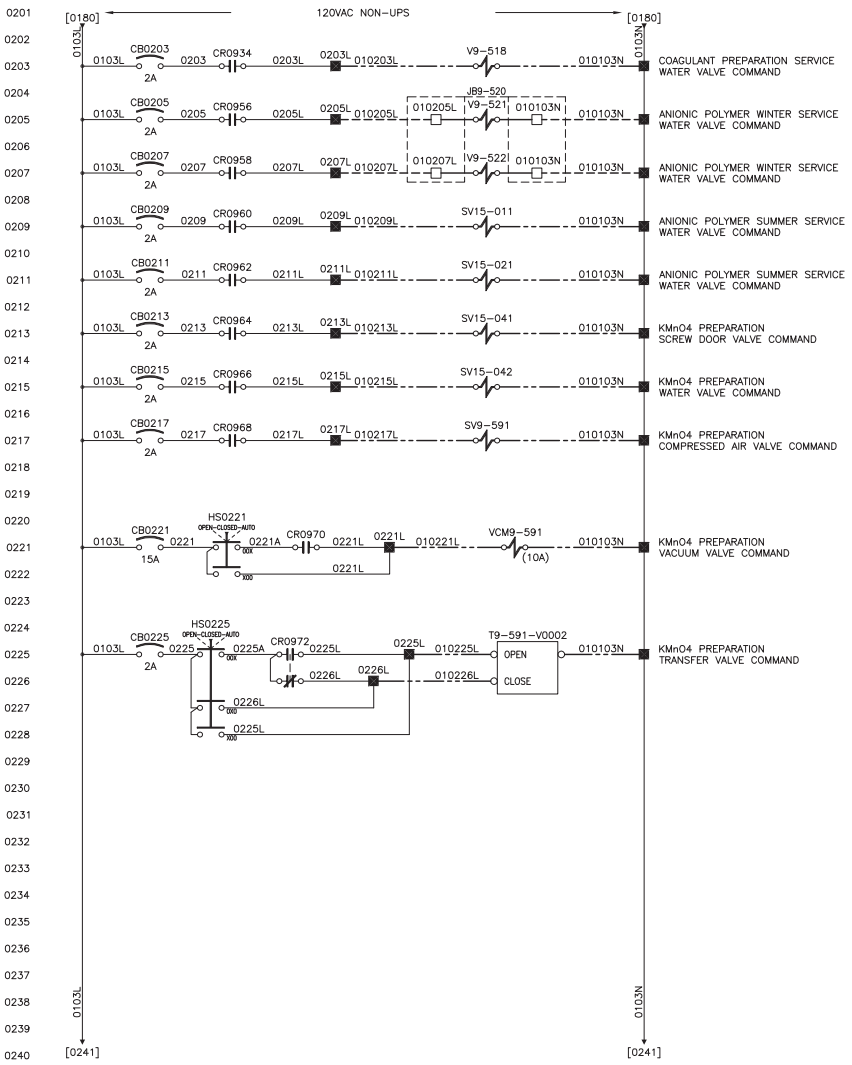
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

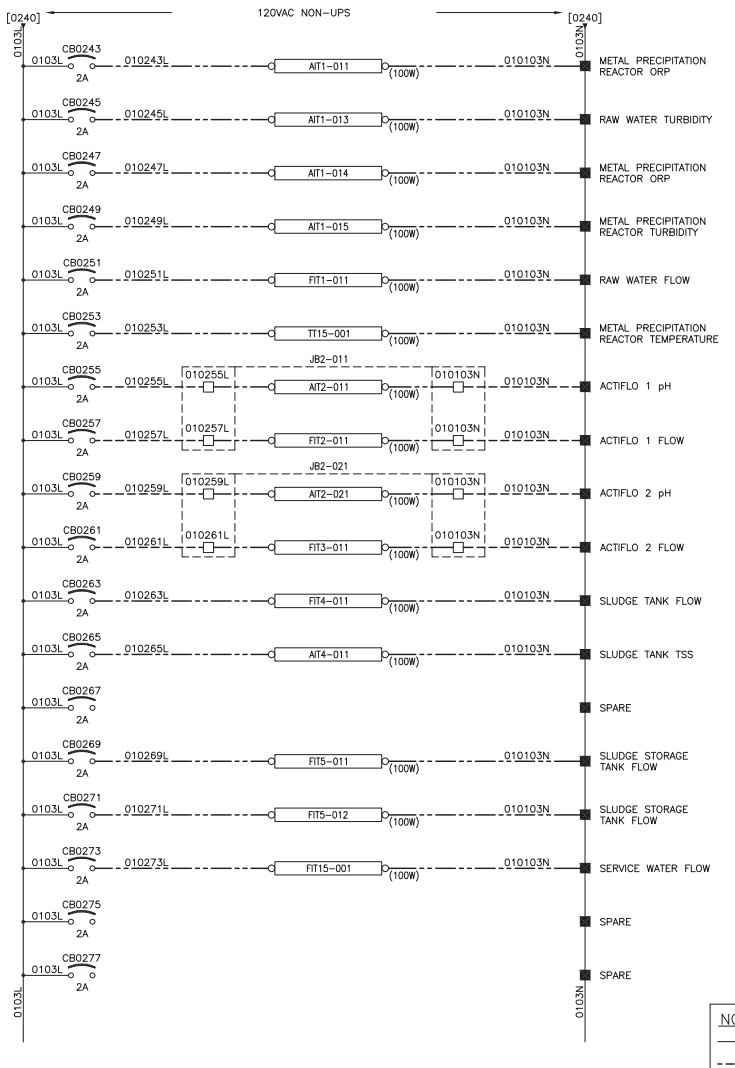
VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	01 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 13:58:05 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-01-1.dwg – a.lessard





NOTE
——— INTERNAL WIRING
- - - - - VEOLIA WIRING
—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	DATE
–	–
CHECKER	DATE
–	–
ENGINEER	DATE
–	–
SCALE:	None

TITLE
MAIN CONTROL PANEL PLC-001
SCHEMATIC DIAGRAM POWER DISTRIBUTION 120VAC
–

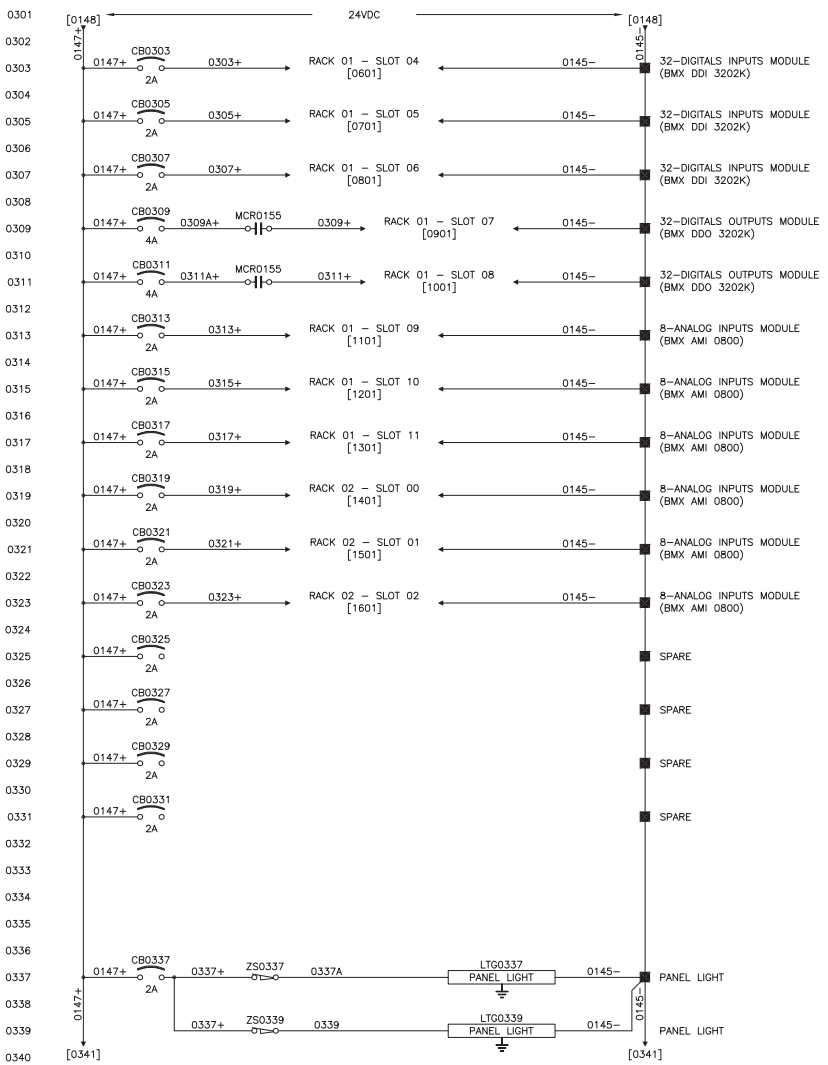
CLIENT
AEM AMARUQ
HUDSON BAY, NUNAVUT

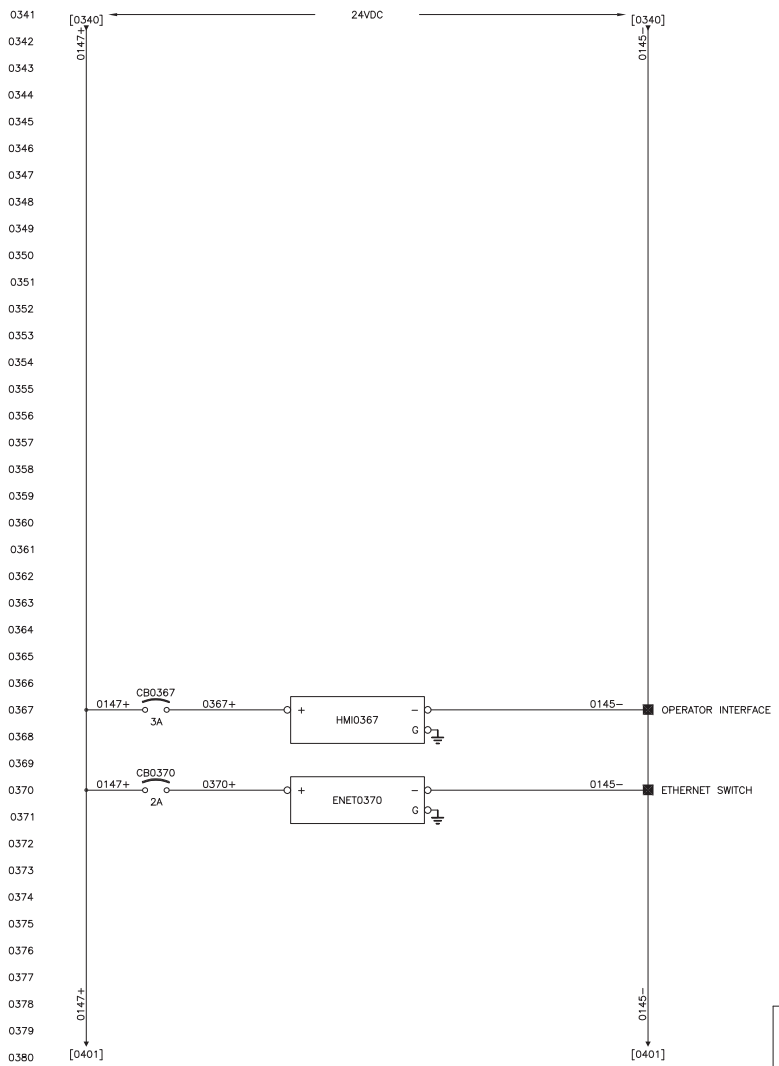
VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	02 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun. 20, 2018 - 13:58:10 - P:\CLIENTS\Veolia Waters - John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-02-1.dwg - a.lessard





NOTE
——— INTERNAL WIRING
– – – – – VEOLIA WIRING
—·—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018–06–20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC–001
SCHEMATIC DIAGRAM DISTRIBUTION 24VDC
–

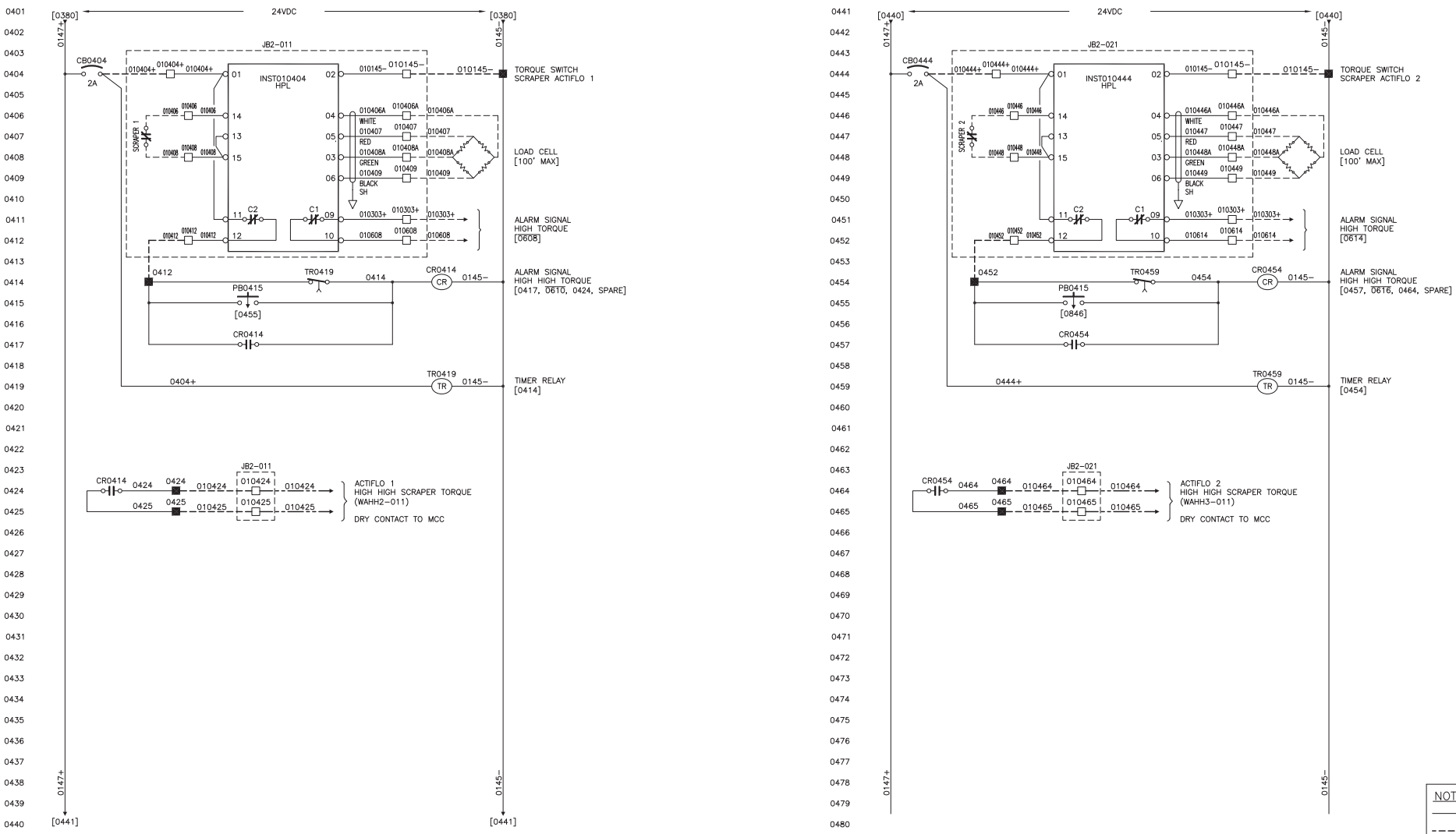
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0001–AU–VWT	E04	03 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 13:58:15 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC–001 CONTROL PANEL\5000218009–ELD–0001–AU–VWT–E04–03–1.dwg – a.lessard



NOTE

——— INTERNAL WIRING

- - - - - VEOLIA WIRING

—·—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC-001
SCHEMATIC DIAGRAM DISTRIBUTION 24VDC
–

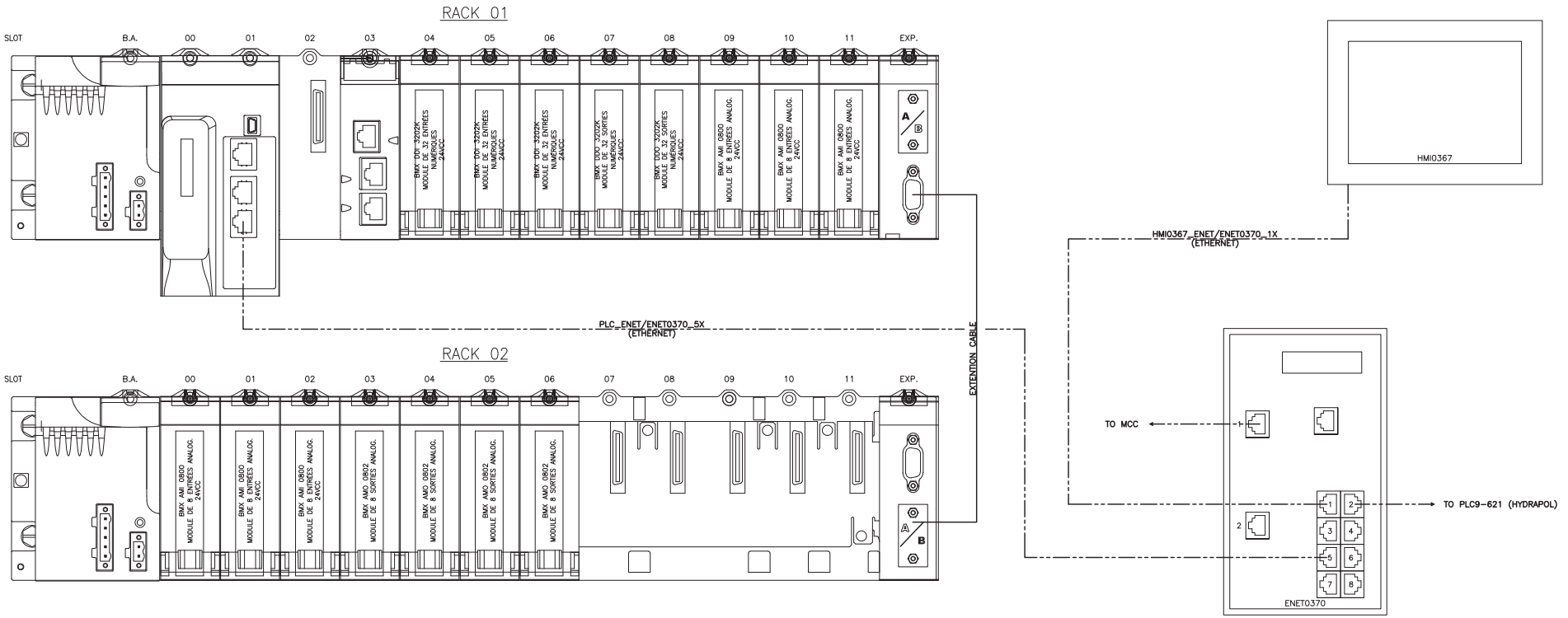
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	04 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 13:58:20 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-04-1.dwg – a.lessard



RACK 01

SLOT 04, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-06
SLOT 05, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-07
SLOT 06, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-08
SLOT 07, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-09
SLOT 08, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-10
SLOT 09, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-11
SLOT 10, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-12
SLOT 11, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-13

RACK 02

SLOT 00, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-14
SLOT 01, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-15
SLOT 02, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-16
SLOT 03, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-17
SLOT 04, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-18
SLOT 05, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-19
SLOT 06, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-20
SLOT 07, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-21
SLOT 08, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-22
SLOT 09, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-23
SLOT 10, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-24
SLOT 11, SEE DRAWING 5000218009-ELD-0001-AU-VWT-E04-25

NOTE
——— INTERNAL WIRING
- - - - - VEOLIA WIRING
—·—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	DATE
–	–
CHECKER	DATE
–	–
ENGINEER	DATE
–	–
SCALE:	None

TITLE: MAIN CONTROL PANEL PLC-001
PROGRAMMABLE CONTROLLER / NETWORK
–

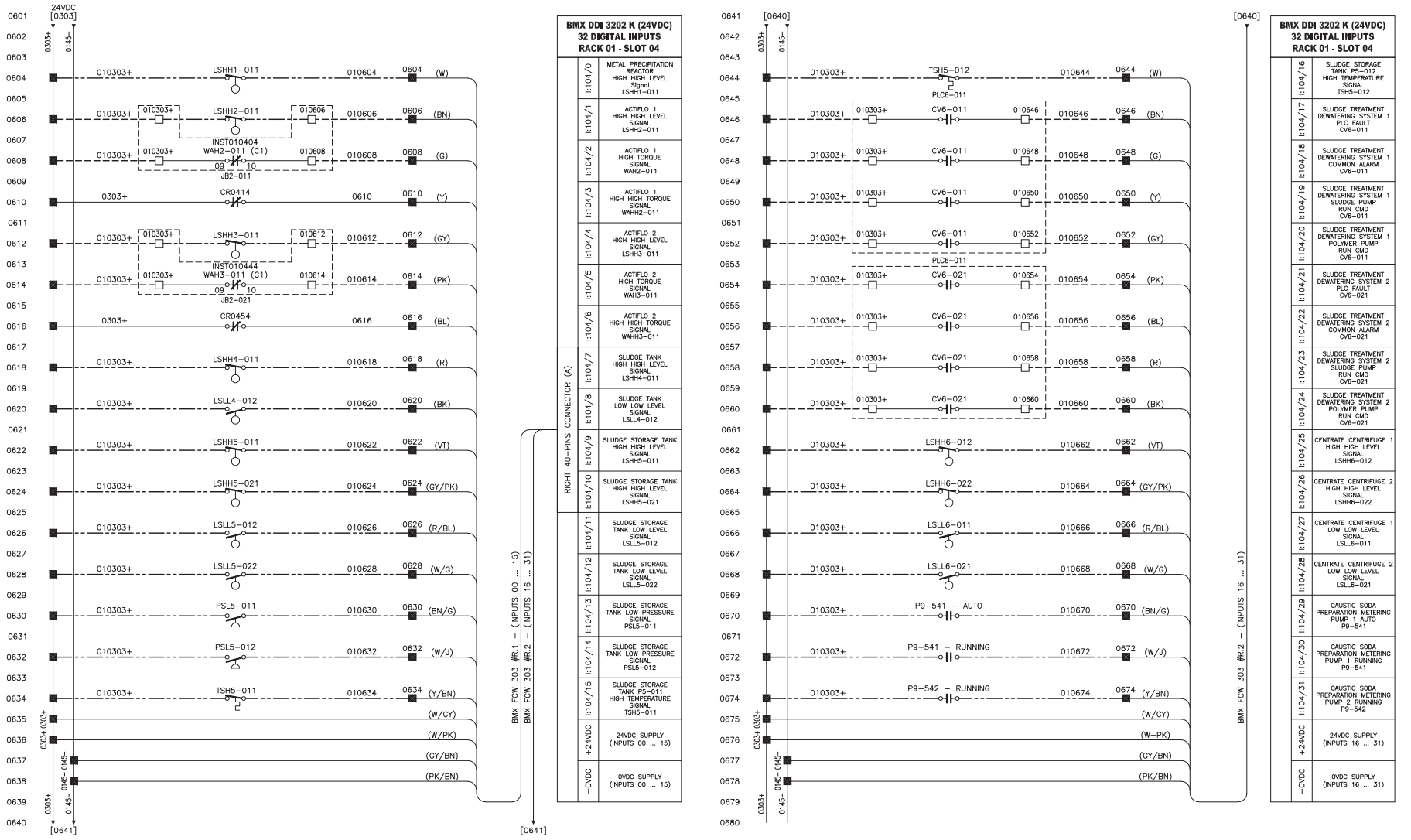
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT / DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	05 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 13:58:25 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-05-1.dwg – a.lessard



STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

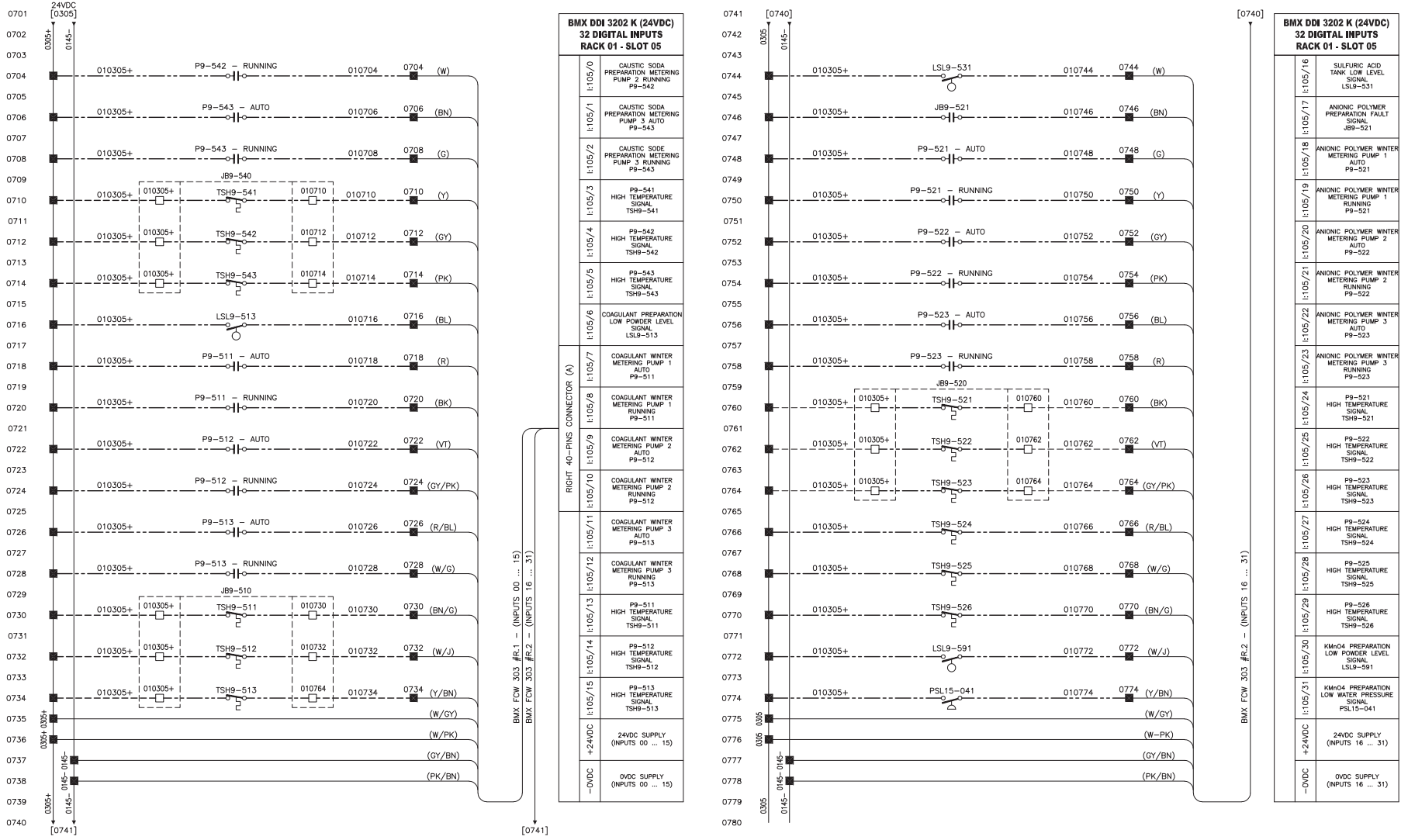
TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 01 SLOT 04]
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	06 OF 25	1

Jun. 20, 2018 - 13:58:30 - P:\CLIENTS\Veolia Waters - John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-06-1.dwg - a.lessard



BMX DDI 3202 K (24VDC) 32 DIGITAL INPUTS RACK 01 - SLOT 05		
RIGHT 40-PINS CONNECTOR (A)	I:105/0	CAUSTIC SODA PREPARATION METERING PUMP 2 RUNNING P9-542
	I:105/1	CAUSTIC SODA PREPARATION METERING PUMP 3 AUTO P9-543
	I:105/2	CAUSTIC SODE PREPARATION METERING PUMP 3 RUNNING P9-543
	I:105/3	P9-541 HIGH TEMPERATURE SIGNAL TSH9-541
	I:105/4	P9-542 HIGH TEMPERATURE SIGNAL TSH9-542
	I:105/5	P9-543 HIGH TEMPERATURE SIGNAL TSH9-543
	I:105/6	COAGULANT PREPARATION LOW POWDER LEVEL SIGNAL LSL9-513
	I:105/7	COAGULANT WINTER METERING PUMP 1 AUTO P9-511
	I:105/8	COAGULANT WINTER METERING PUMP 1 RUNNING P9-511
	I:105/9	COAGULANT WINTER METERING PUMP 2 AUTO P9-512
	I:105/10	COAGULANT WINTER METERING PUMP 2 RUNNING P9-512
	I:105/11	COAGULANT WINTER METERING PUMP 3 AUTO P9-513
	I:105/12	COAGULANT WINTER METERING PUMP 3 RUNNING P9-513
	I:105/13	P9-511 HIGH TEMPERATURE SIGNAL TSH9-511
	I:105/14	P9-512 HIGH TEMPERATURE SIGNAL TSH9-512
	I:105/15	P9-513 HIGH TEMPERATURE SIGNAL TSH9-513
+24VDC		24VDC SUPPLY (INPUTS 00 ... 15)
-0VDC		0VDC SUPPLY (INPUTS 00 ... 15)

BMX DDI 3202 K (24VDC) 32 DIGITAL INPUTS RACK 01 - SLOT 05		
	I:105/16	SULFURIC ACID TANK LOW LEVEL SIGNAL LSL9-531
	I:105/17	ANIONIC POLYMER PREPARATION FAULT SIGNAL JB9-521
	I:105/18	ANIONIC POLYMER WINTER METERING PUMP 1 AUTO P9-521
	I:105/19	ANIONIC POLYMER WINTER METERING PUMP 1 RUNNING P9-521
	I:105/20	ANIONIC POLYMER WINTER METERING PUMP 2 AUTO P9-522
	I:105/21	ANIONIC POLYMER WINTER METERING PUMP 2 RUNNING P9-522
	I:105/22	ANIONIC POLYMER WINTER METERING PUMP 3 AUTO P9-523
	I:105/23	ANIONIC POLYMER WINTER METERING PUMP 3 RUNNING P9-523
	I:105/24	P9-521 HIGH TEMPERATURE SIGNAL TSH9-521
	I:105/25	P9-522 HIGH TEMPERATURE SIGNAL TSH9-522
	I:105/26	P9-523 HIGH TEMPERATURE SIGNAL TSH9-523
	I:105/27	P9-524 HIGH TEMPERATURE SIGNAL TSH9-524
	I:105/28	P9-525 HIGH TEMPERATURE SIGNAL TSH9-525
	I:105/29	P9-526 HIGH TEMPERATURE SIGNAL TSH9-526
	I:105/30	KMnO4 PREPARATION LOW POWDER LEVEL SIGNAL LSL9-591
	I:105/31	KMnO4 PREPARATION LOW WATER PRESSURE SIGNAL PSL15-041
+24VDC		24VDC SUPPLY (INPUTS 16 ... 31)
-0VDC		0VDC SUPPLY (INPUTS 16 ... 31)

NOTE
——— INTERNAL WIRING
- - - - - VEOLIA WIRING
—·—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

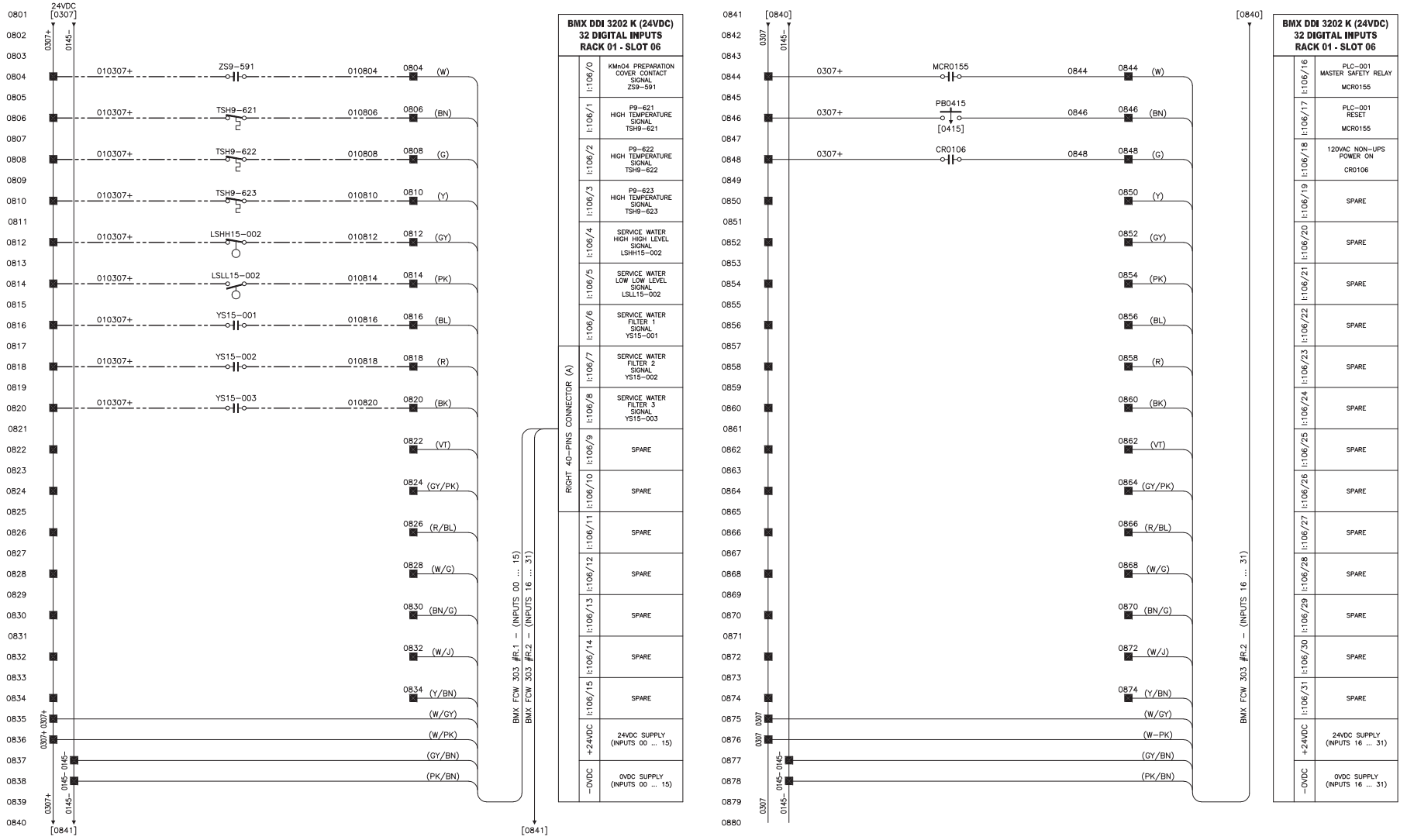
TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 01 SLOT 05]
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	07 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE



REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 01 SLOT 06]
–

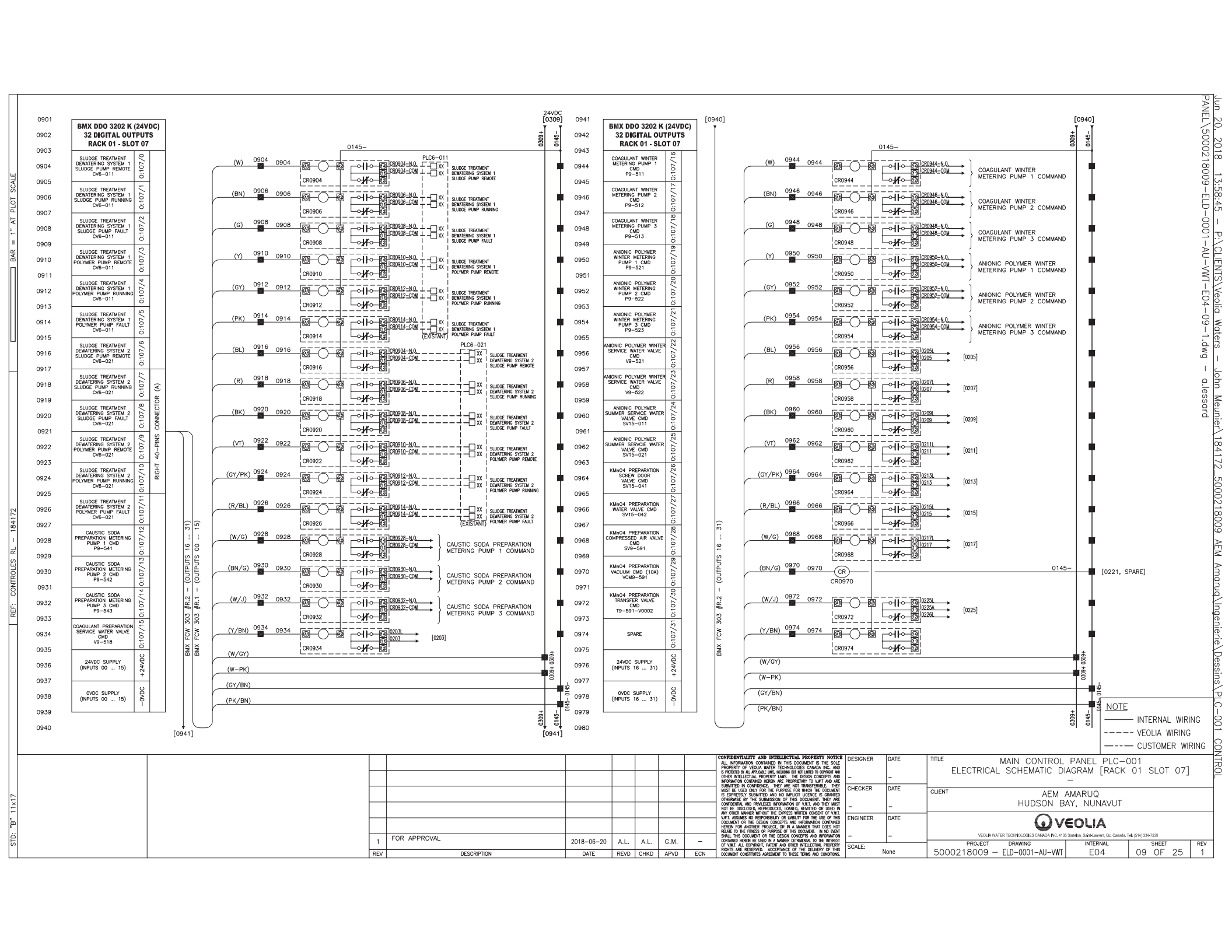
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	08 OF 25	1

STD: "B" 11x17 | BAR = 1" AT PLOT SCALE | REF: CONTROLES RL – 184172

Jun 20, 2018 13:58:40 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-08-1.dwg – a.lessard



REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 01 SLOT 07]
–

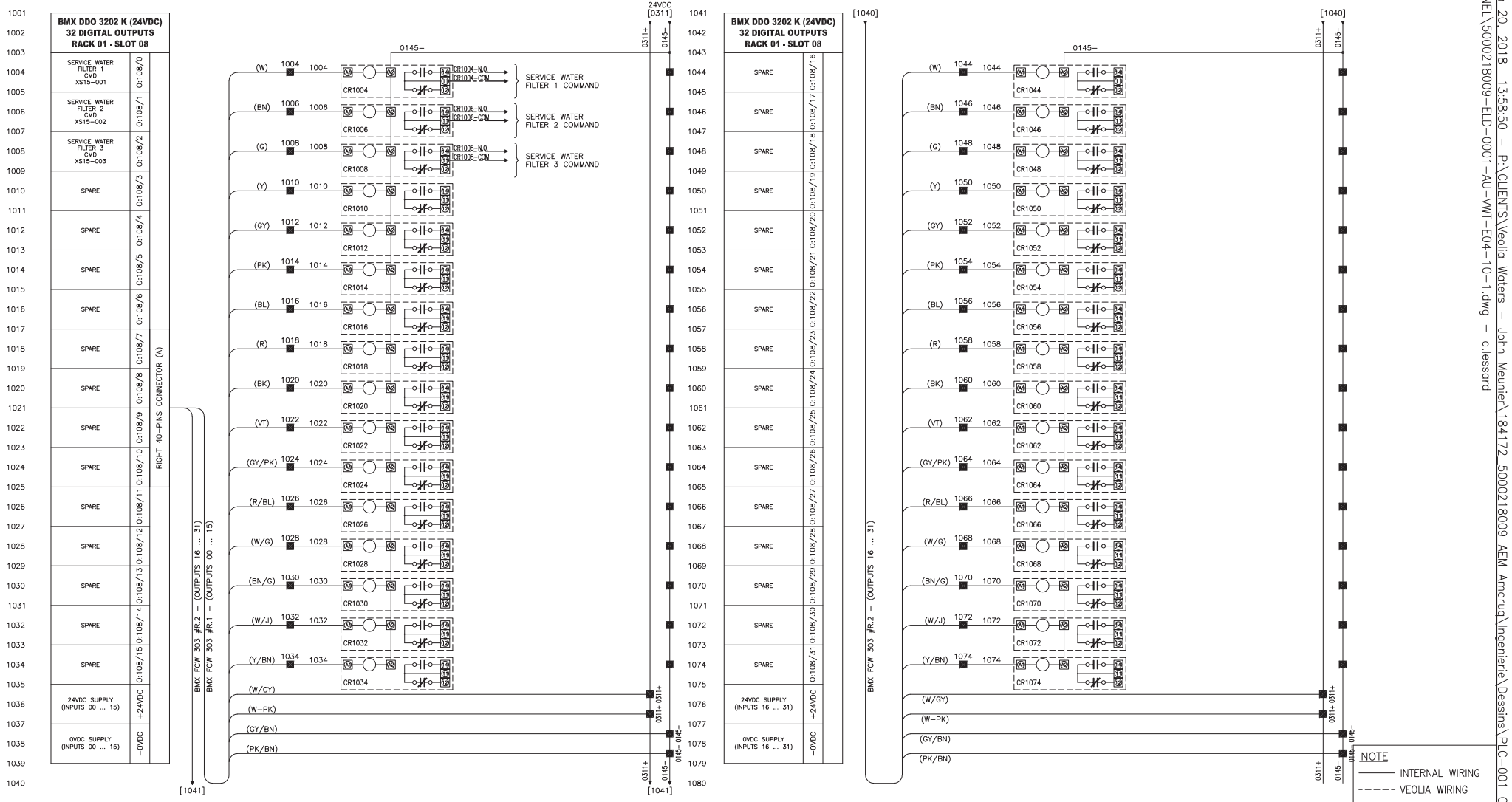
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	09 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun. 20, 2018 13:58:45 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-09-1.dwg – a.lessard



REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 01 SLOT 08]
–

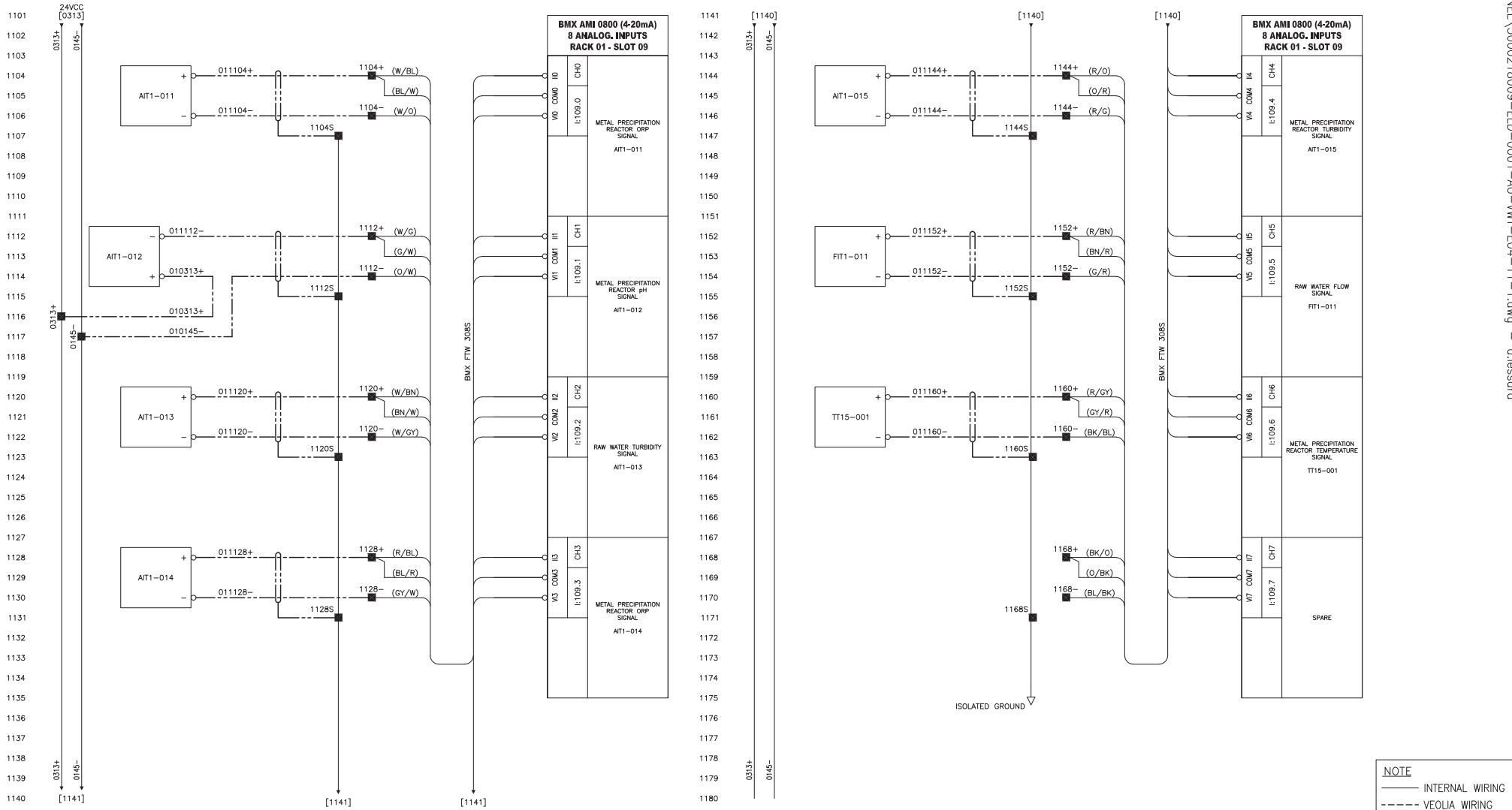
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	10 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun. 20, 2018 13:58:50 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-10-1.dwg – a.lessard



NOTE
——— INTERNAL WIRING
- - - - - VEOLIA WIRING
—·—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 01 SLOT 09]
–

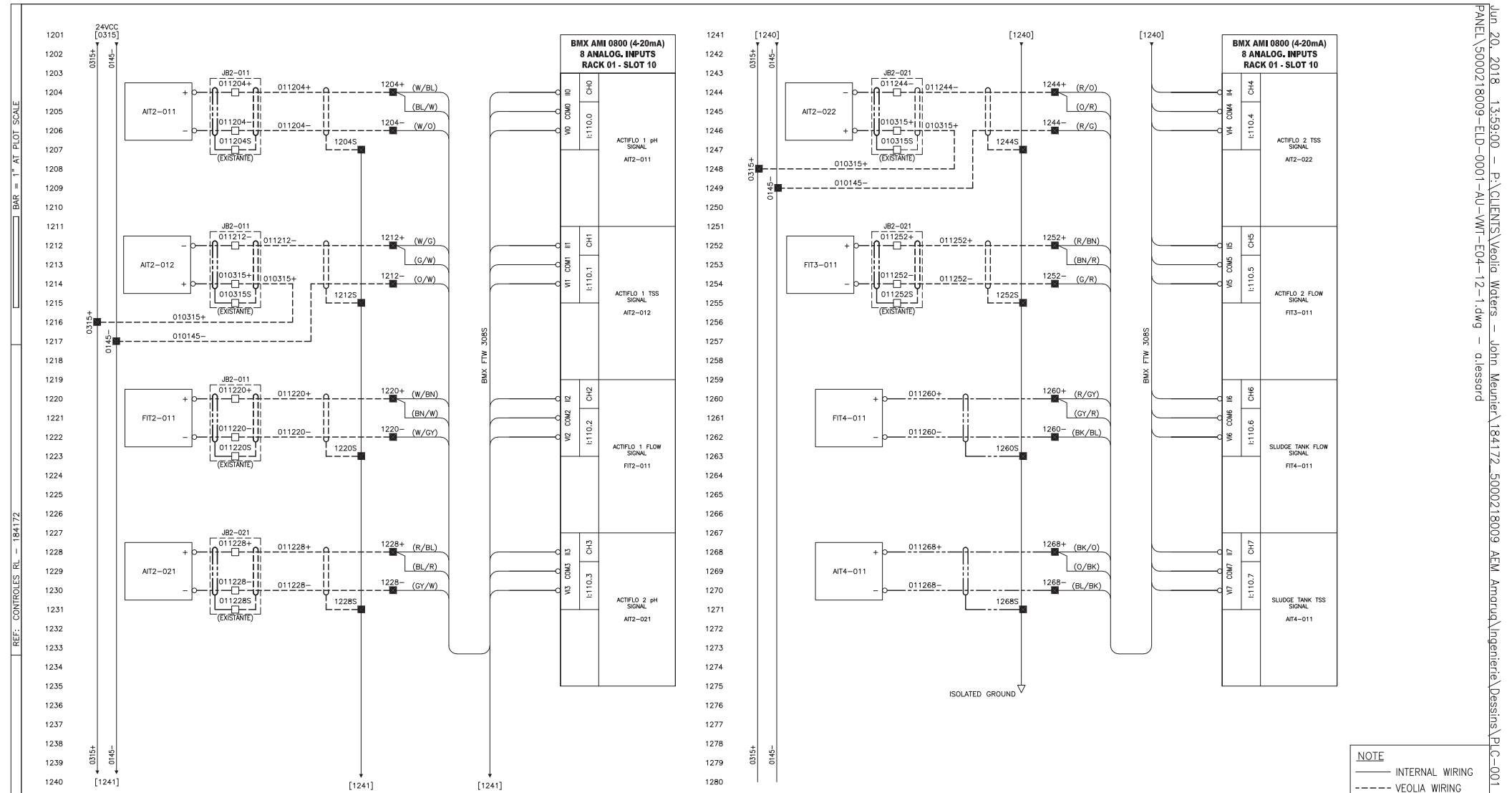
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	11 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 13:58:55 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-11-1.dwg – a.lessard



NOTE
——— INTERNAL WIRING
- - - - - VEOLIA WIRING
—·—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

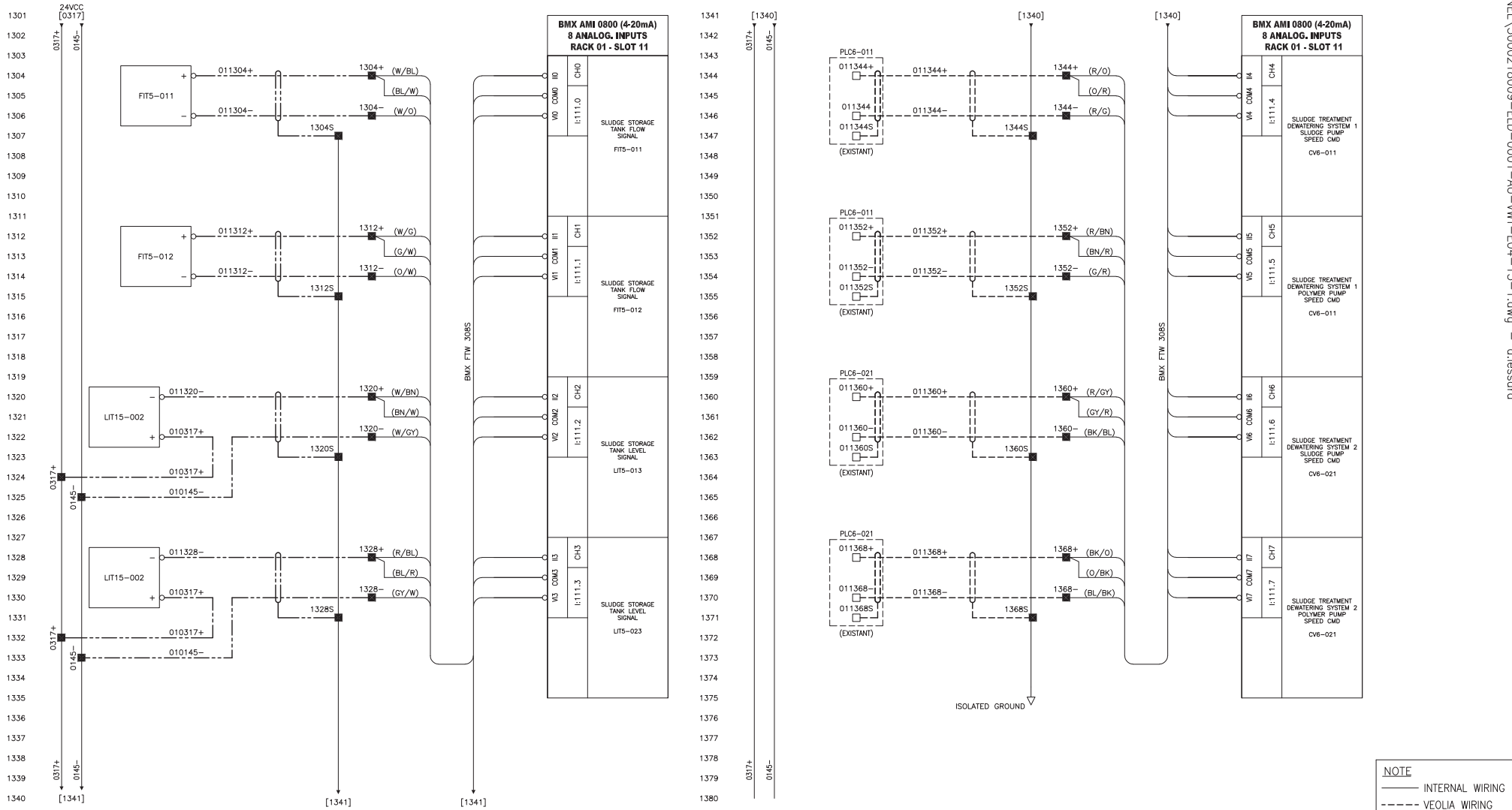
TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 01 SLOT 10]
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	12 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE



NOTE
——— INTERNAL WIRING
- - - - - VEOLIA WIRING
—·—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018–06–20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC–001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 01 SLOT 11]
–

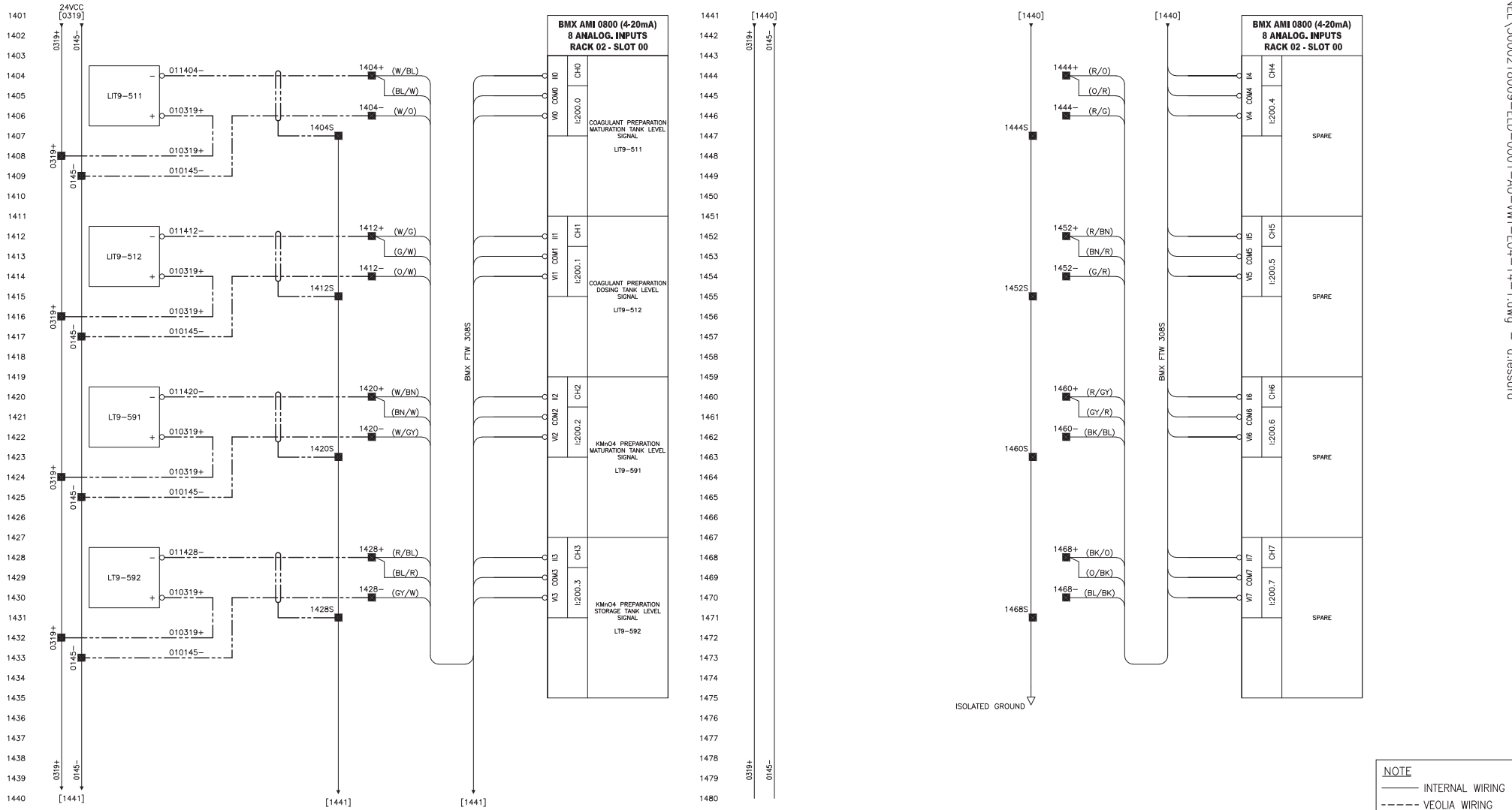
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0001–AU–VWT	E04	13 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun. 20, 2018 - 13:59:05 - P:\CLIENTS\Veolia Waters - John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-13-1.dwg - a.lessard



REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 02 SLOT 00]
–

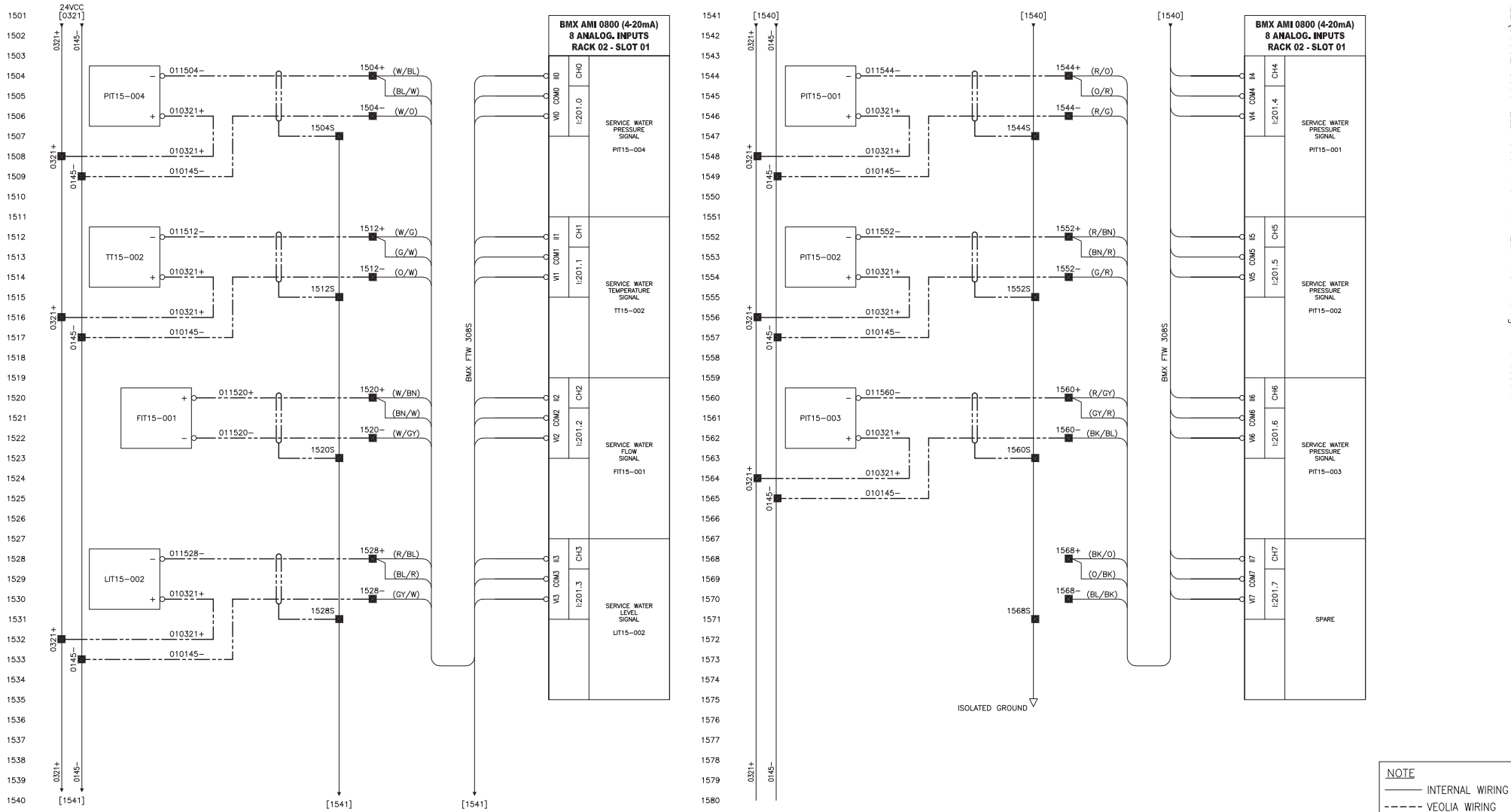
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	14 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 13:59:10 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-14-1.dwg – a.lessard



NOTE
- INTERNAL WIRING
- VEOLIA WIRING
- CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

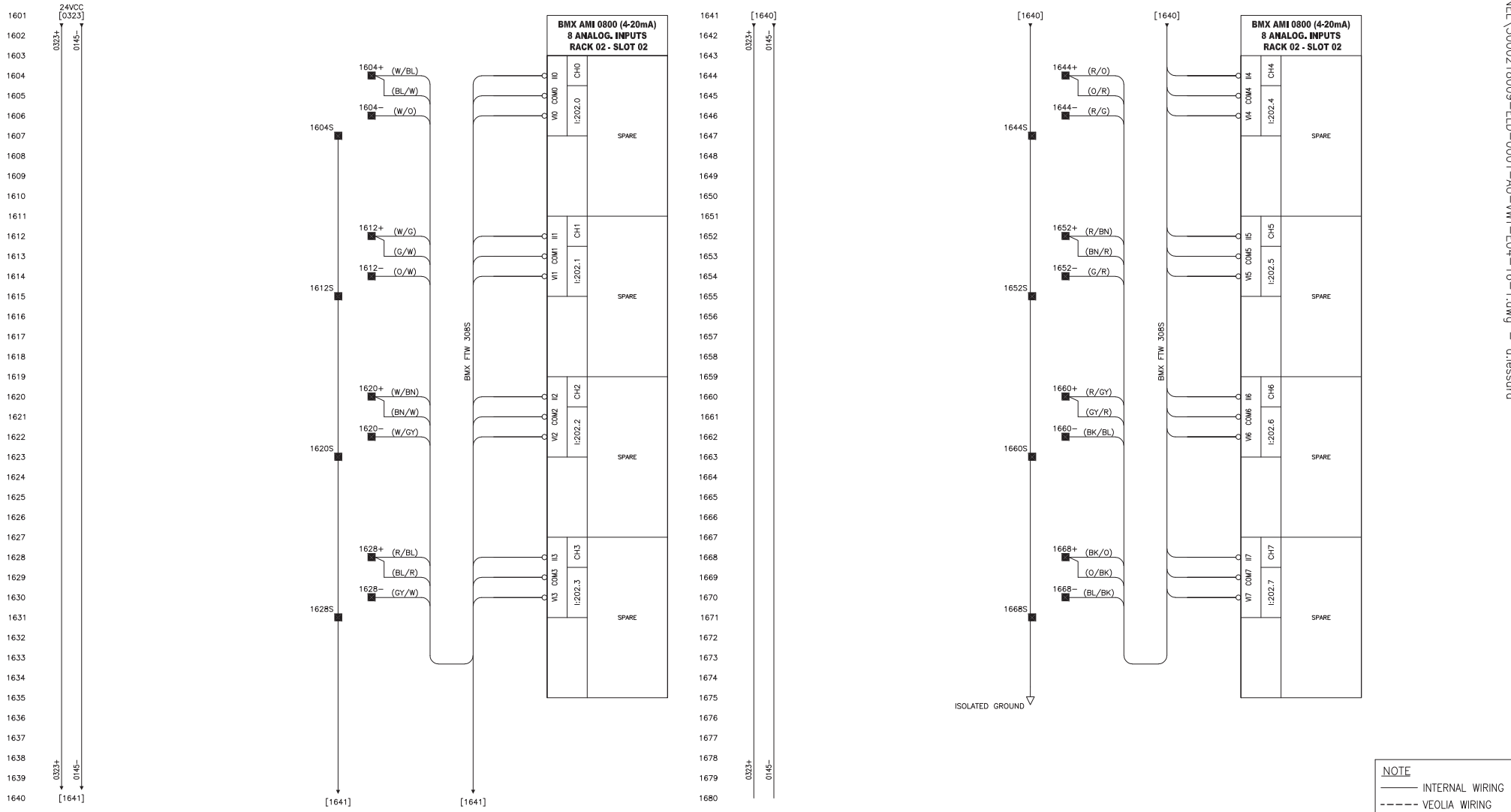
TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 02 SLOT 01]
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	15 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE



NOTE
——— INTERNAL WIRING
- - - - - VEOLIA WIRING
—·—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

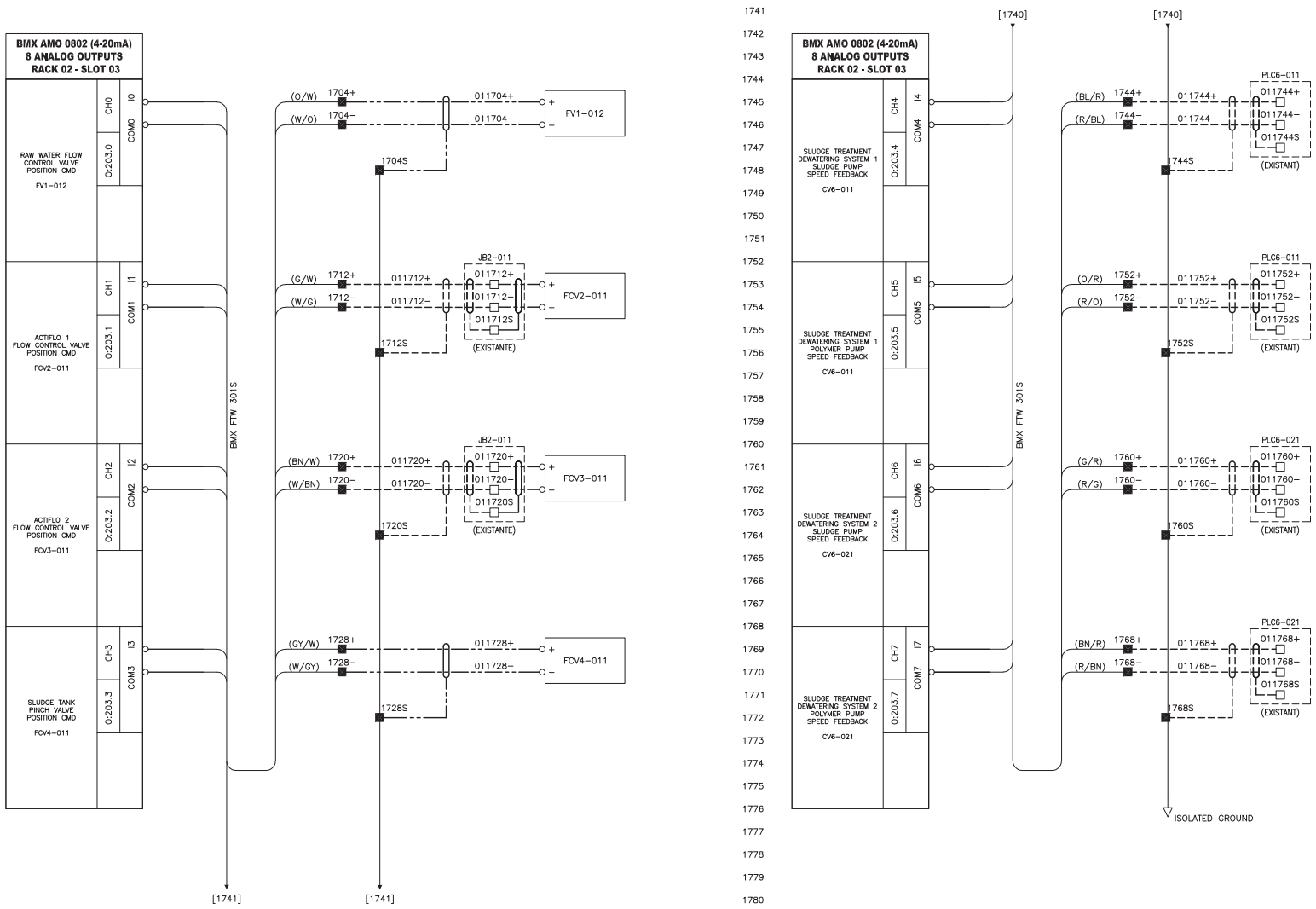
	DATE
DESIGNER	–
CHECKER	–
ENGINEER	–
SCALE:	None

TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 02 SLOT 02]
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	16 OF 25	1



NOTE
- INTERNAL WIRING
- VEOLIA WIRING
- CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 02 SLOT 03]
–

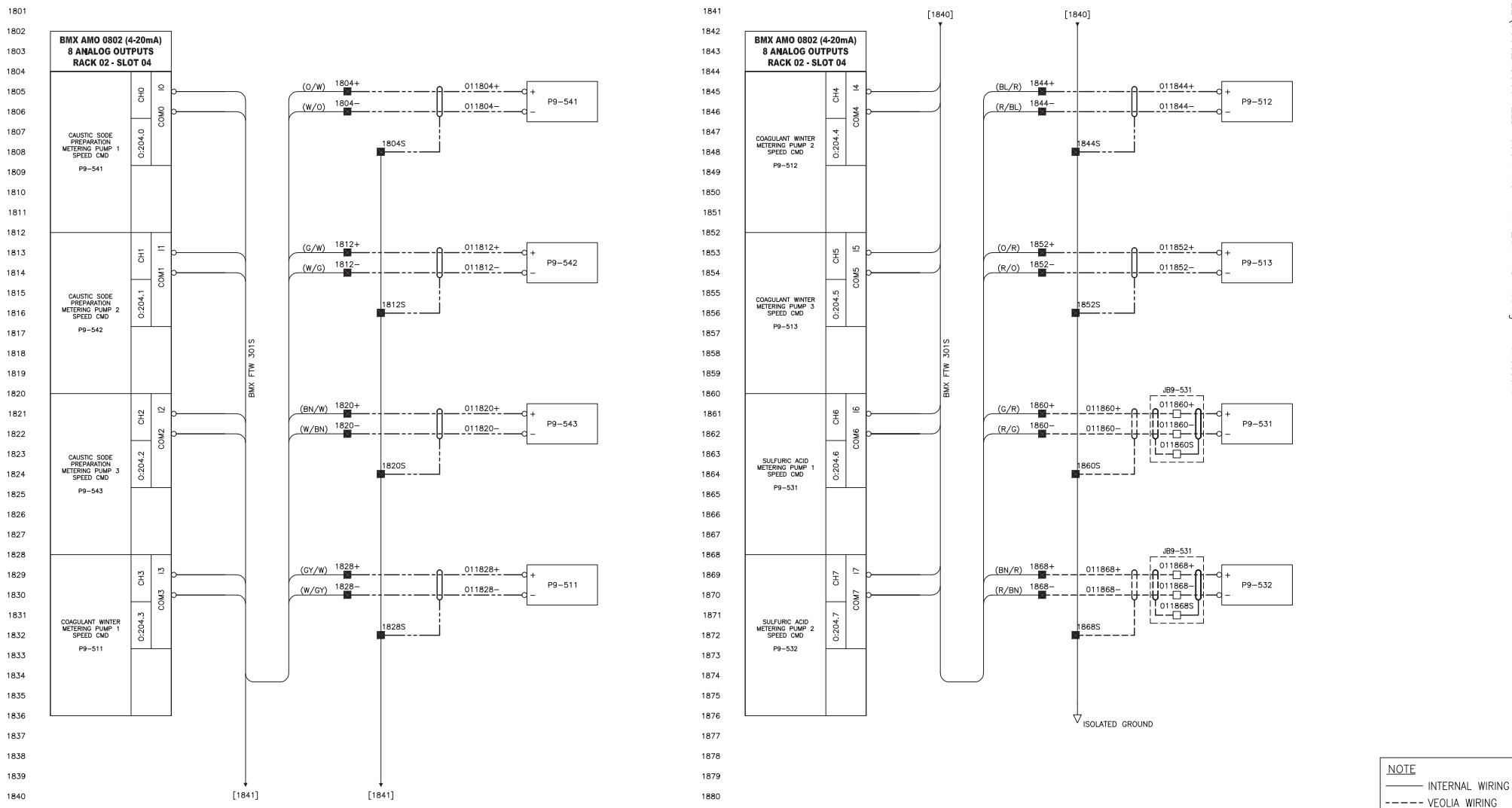
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	17 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun. 20, 2018 13:59:24 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-17-1.dwg – a.lessard



REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 02 SLOT 04]
–

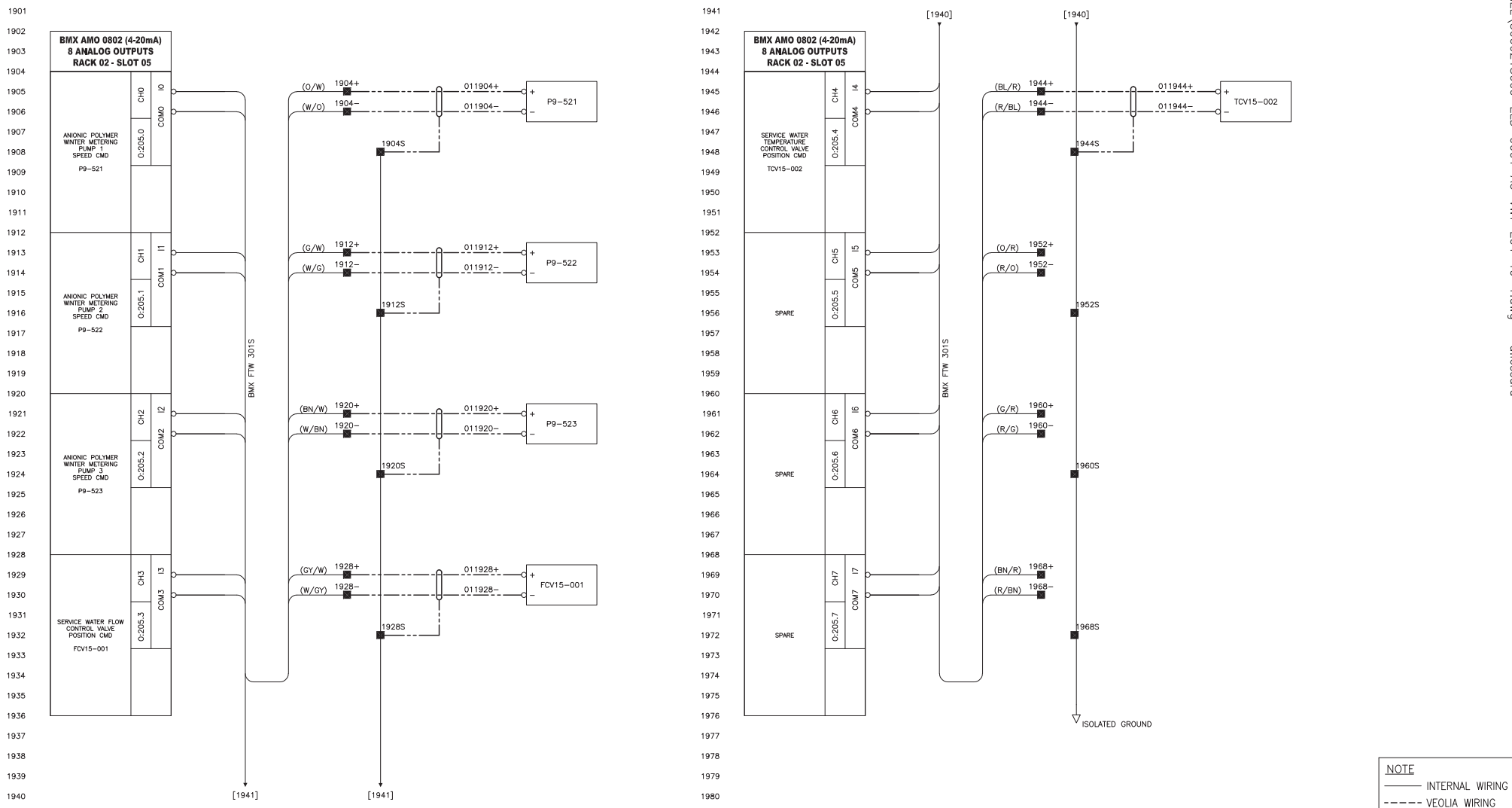
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	18 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 13:59:29 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-18-1.dwg – a.lessard



REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 02 SLOT 05]
–

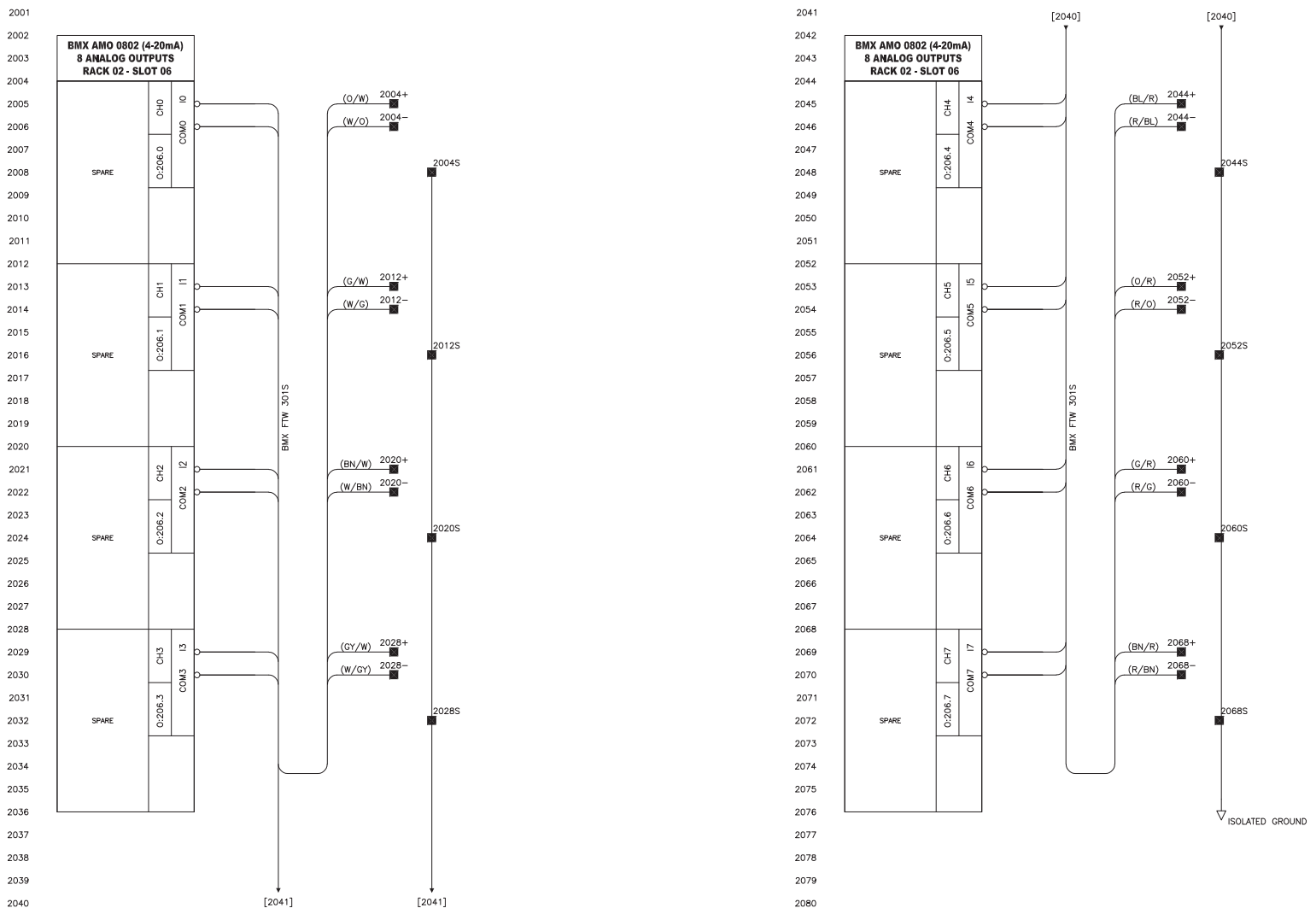
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	19 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 13:59:34 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-19-1.dwg – a.lessard



NOTE
——— INTERNAL WIRING
– – – – – VEOLIA WIRING
—·—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018–06–20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC–001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 02 SLOT 06]
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0001–AU–VWT	E04	20 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 13:59:39 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-20-1.dwg – a.lessard

RESERVED SPACE FOR RACK 02 SLOT 07

NOTE
——— INTERNAL WIRING
- - - - - VEOLIA WIRING
—·—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 02 SLOT 07]
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	21 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 13:59:44 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-21-1.dwg – a.lessard

RESERVED SPACE FOR RACK 02 SLOT 08

NOTE
——— INTERNAL WIRING
- - - - - VEOLIA WIRING
—·—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 02 SLOT 08]
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	22 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 13:59:49 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-22-1.dwg – a.lessard

RESERVED SPACE FOR RACK 02 SLOT 09

NOTE
——— INTERNAL WIRING
- - - - - VEOLIA WIRING
—·—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 02 SLOT 09]
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	23 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 13:59:54 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-23-1.dwg – a.lessard

RESERVED SPACE FOR RACK 02 SLOT 10

NOTE
INTERNAL WIRING
VEOLIA WIRING
CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 02 SLOT 10]
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	24 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 13:59:59 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-24-1.dwg – a.lessard

RESERVED SPACE FOR RACK 02 SLOT 11

NOTE
INTERNAL WIRING
VEOLIA WIRING
CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: MAIN CONTROL PANEL PLC-001
ELECTRICAL SCHEMATIC DIAGRAM [RACK 02 SLOT 11]
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0001-AU-VWT	E04	25 OF 25	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 14:00:04 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\5000218009-ELD-0001-AU-VWT-E04-25-1.dwg – a.lessard

JB9-521 SEEPEX JUNCTION BOX

PROJECT - 5000218009

DRAFT

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	-

		DATE
DESIGNER	-	-
CHECKER	-	-
ENGINEER	-	-

SCALE: None

TITLE: JB9-521 SEEPEX JUNCTION BOX
TITLE PAGE
-

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC., 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 - ELD-0002-AU-VWT	E00	01 OF 05	1

DRAWING INDEX

DESCRIPTION	DRAWING NUMBER
JB9–521 SEEPEX JUNCTION BOX	
TITLE PAGE	5000218009–ELD–0002–AU–VWT–E00–01
DRAWING LIST & LEGEND	5000218009–ELD–0002–AU–VWT–E00–02
ENCLOSURE LAYOUT	5000218009–ELD–0002–AU–VWT–E00–03
INSIDE PANEL LAYOUT & BILL OF MATERIAL	5000218009–ELD–0002–AU–VWT–E00–04
TERMINAL DETAILS	5000218009–ELD–0002–AU–VWT–E00–05
SCHEMATIC DIAGRAM [POWER DISTRIBUTION] 120VAC/24VDC	5000218009–ELD–0002–AU–VWT–E04–01

COLORS AND WIRINGS GAGES

120VCA POWER	BLACK	14AWG
120VCA CONTROL	RED	14AWG
NEUTRAL	WHITE	14AWG
DRY CONTACT	YELLOW	14AWG
24VCC	BLUE[+], BLUE/WHITE[–]	16AWG[0 À 9A] 14AWG[10A & +]
GROUND	GREEN	14AWG
ISOLATED GROUND	GREEN/YELLOW	14AWG
ANALOG I/O TWISTED PAIRS	BLACK[+], WHITE[–]	18AWG
DIGITAL I/O 120VAC	RED	16AWG
DIGITAL I/O 24VCC	BLUE	16AWG
LOW VOLTAGE [12, 24, 48VCC]	BLUE	16AWG[0 À 9A] 14AWG[10A & +]
CONTROL CIRCUIT 5 TO 60VDC	BLUE[+], BLUE/WHITE[–], VERT[GND]	16AWG[0 À 9A] 14AWG[10A & +]

COLORS AND WIRING GAGES

SUPPLY 600VAC (L1)	RED	12AWG
SUPPLY 600VAC (L2)	BLACK	12AWG
SUPPLY 600VAC (L3)	BLUE	12AWG
SUPPLY 120VAC (L)	BLACK	12AWG (22A)/14AWG (15A)
SUPPLY 120VAC (N)	WHITE	12AWG (22A)/14AWG (15A)
CONTROL 120VAC (L)	RED	14AWG (15A)/16AWG (9A)
CONTROL 120VAC (N)	WHITE	14AWG (15A)/16AWG (9A)
DRY CONTACT	YELLOW	12AWG (22A)/14AWG (15A)
24VDC	BLUE	14AWG (15A)/16AWG (9A)
0VDC	VIOLET	14AWG (15A)/16AWG (9A)
ANALOG I/O TWISTED PAIRS	BLACK(+), WHITE(–)	18AWG
DIGITAL I/O 120VAC	RED	16AWG
DIGITAL I/O 24VDC	BLUE	16AWG
LOW VOLTAGE (5 TO 60VDC)	BLUE(+), BLUE/WHITE(–)	14AWG (15A)/16AWG (9A)
GROUND	GREEN	14AWG
ISOLATED GROUND	GREEN/YELLOW	14AWG

WIRING IDENTIFICATION

XX XX XX XX

- POWER INDICATION (+/–/L/N/G)
- LINE NUMBER
- PAGE NUMBER
- (FIELD WIRING ONLY) 01 – PANEL #1, 02 – PANEL #2, ...

LEGEND

- PSL — LOW PRESSURE SWITCH
- PSH — HIGH PRESSURE SWITCH
- LSL — LOW LEVEL SWITCH
- LSH — HIGH LEVEL SWITCH
- LSNO — LIMIT SWITCH NO
- LSNC — LIMIT SWITCH NC
- FSL — LOW FLOW SWITCH
- FSH — HIGH FLOW SWITCH
- TSL — LOW TEMPERATURE SWITCH
- TSH — HIGH TEMPERATURE SWITCH
- OFF DELAY TIMER [NO]
- OFF DELAY TIMER [NC]
- ON DELAY TIMER [NC]
- ON DELAY TIMER [NO]
- NO — CONTACT NO
- NC — CONTACT NC
- GND — GROUND
- GND — ISOLATED GROUND
- TERMINAL OF PANEL
- TERMINAL OF OTHER PANEL
- DISCONNECT TERMINAL OF PANEL

- HS — MAINTAINED TWO POSITIONS SELECTOR
- HS — MAINTAINED THREE POSITIONS SELECTOR
- HS — THREE POSITIONS SELECTOR, BOTH RETURN
- HS — THREE POSITIONS SELECTOR, LEFT RETURN
- HS — THREE POSITIONS SELECTOR, RIGHT RETURN
- PBNO — PUSHBUTTON NO
- PBNC — PUSHBUTTON NC
- ES — EMERGENCY STOP PUSH BUTTON
- E.S — PULL–CORD E–STOP
- POT — POTENTIOMETER
- FU — FUSE
- CB — CIRCUIT BREAKER
- IL — PUSH–TO–TEST LIGHT
- IL — LIGHT
- CMR — CURRENT MONITORING RELAY
- AC / A/C — AIR CONDITIONER UNIT

- M — CONTACTOR COIL
- TR — TIMER RELAY COIL
- CR — CONTROL RELAY COIL
- MCR — MASTER CONTROL RELAY COIL
- CR — CONTROL RELAY COIL WITH SURGE SURPRESSOR
- FV — SOLENOID
- R — RESISTANCE
- HN — HORN
- F — FAN / VENTILATOR / BLOWER
- CT — CURRENT TRANSFORMER
- PC — 120VAC DUPLEX OUTLET
- AM — AMPEREMETER
- VM — VOLTMETER

- DISC — FUSED DISCONNECT SWITCH
- FU — 3PH FUSE HOLDER
- DISC — DISCONNECT SWITCH
- OL — MANUAL STARTER WITH THERMAL & MAGNETIC PROTECTION
- OL — MANUAL STARTER WITH MAGNETIC PROTECTION
- M — CONTACTOR
- OL — OVERLOAD
- MOLDED CASE CIRCUIT BREAKER

- TR (H1, H2, X1, X2) — TRANSFORMER
- TR (H1, H2, X1, X2, X3, X4) — MULTI–TAPS TRANSFORMER

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018–06–20	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

TITLE: JB9–521 SEEPEX JUNCTION BOX
DRAWING LIST & LEGEND
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0002–AU–VWT	E00	02 OF 05	1

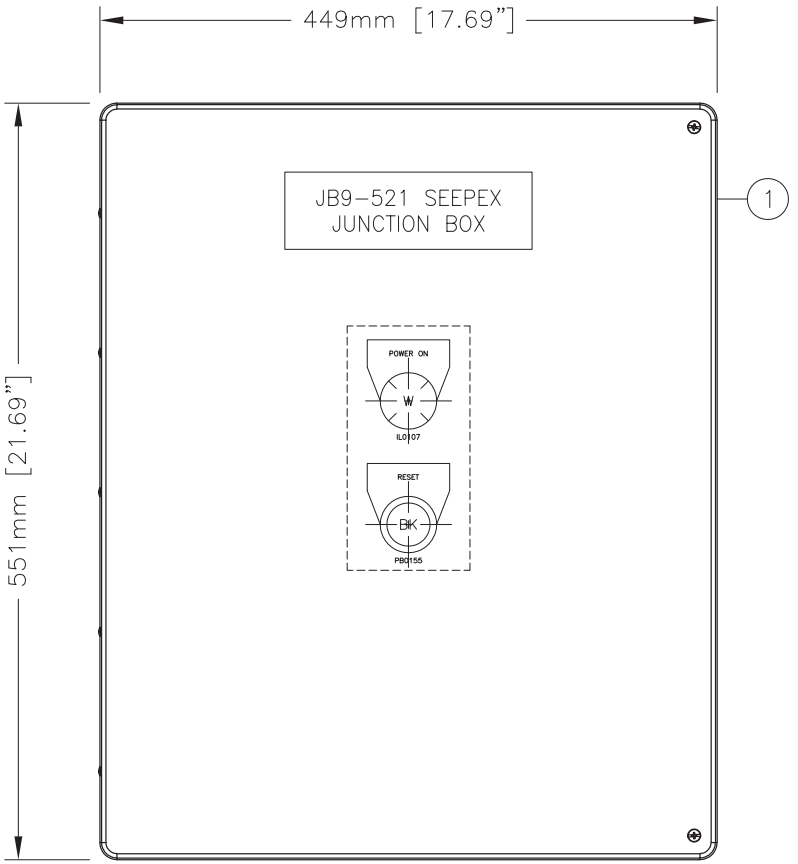
STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun. 20, 2018 14:00:15 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC–001 CONTROL PANEL\JUNCTION BOX\5000218009–ELD–0002–AU–VWT–E00–02–1_E.dwg – a.lessard

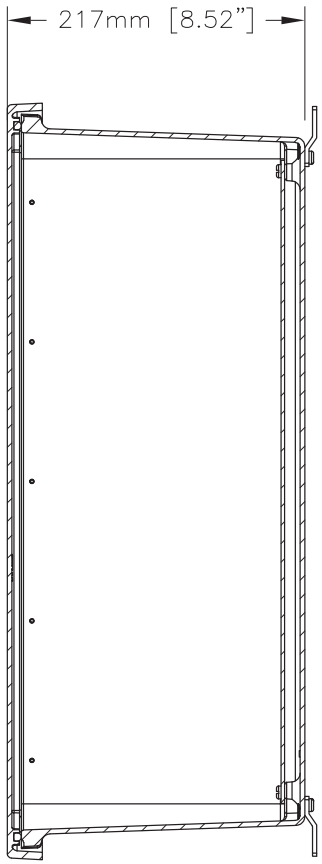
NOTES:

1- SEE DRAWING 5000218009-ELD-0002-AU-VWT-E00-04 FOR THE REFERENCES TO THE BILL OF MATERIAL.

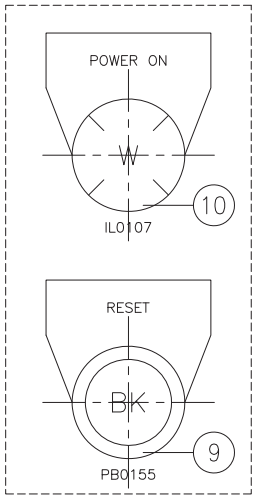
2- CSA APPROVAL.



EXTERNAL LAYOUT



SIDE LAYOUT



DOOR DETAILS

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

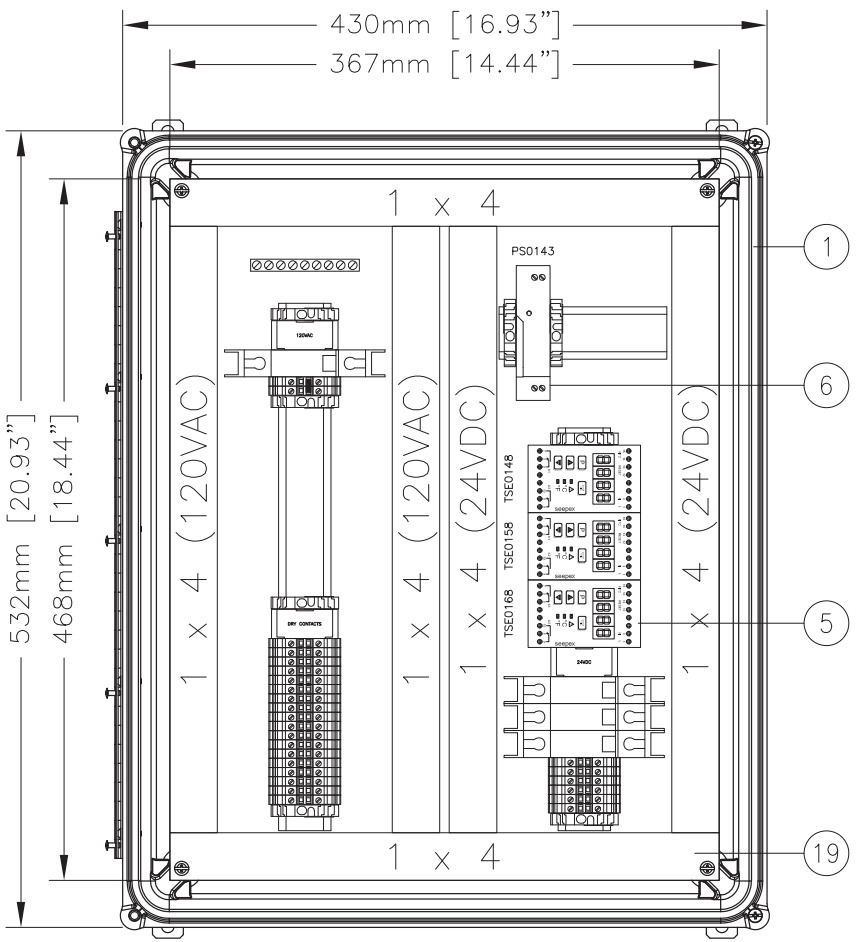
TITLE: JB9-521 SEEPEX JUNCTION BOX ENCLOSURE LAYOUT –

CLIENT: AEM AMARUQ HUDSON BAY, NUNAVUT

VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0002-AU-VWT	E00	03 OF 05	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE



INTERNAL LAYOUT

BILL OF MATERIALS [BOM]

#	QTY.	DESCRIPTION	MANUFACTURER	CATALOGUE N.	REMARK
①	1	PANEL NEMA 4X, WALLMOUNT, ONE DOOR DIM 551mm[H] x 449mm[W] x 217mm[D]	HAMMOND	PJ20168H	–
②	1	INNER PANEL, DIM 468mm[H] x 367mm[W]	HAMMOND	P2068	–
③	–	–	–	–	–
④	–	–	–	–	–
⑤	3	DRY-RUNNING PROTECTION DEVICE, 24VDC	SEEPEX	SGRTSE 24VDCB	–
⑥	1	POWER SUPPLY 120VAC/24VDC, 1.25A	PHOENIX CONTACT	2902991	–
⑦	1	"BRANCH PROOF" BREAKER, 1A, 1 POLE, 120VAC/24VDC	SCHNEIDER	60100	–
⑧	3	"BRANCH PROOF" BREAKER, 0.5A, 1 POLE, 120VAC/24VDC	SCHNEIDER	60101	–
⑨	1	NON-ILLUMINATED PUSH BUTTON, BLACK, MOMENTARY ACTION, 1N.O., 30.5mm	ALLEN BRADLEY	800H-R2D1	–
	1	CONTACT BLOCK, 2N.O.	ALLEN BRADLEY	800T-XA2	–
⑩	1	PILOT LIGHT OPERATOR, WHITE, LED TYPE, 12 ... 130VAC/VDC, 30.5mm	ALLEN BRADLEY	800H-QRH2W	–
⑪	–	–	–	–	–
⑫	3	IDENTIFICATION TERMINAL UBE/D	PHOENIX CONTACT	0800307	–
⑬	26/3	SIMPLE TERMINAL BLOCK, UT 4 EN C/W END PLATE	PHOENIX CONTACT	3044102/3047028	–
⑭	A.S.R.	END BARRIER, E/NS 35 N	PHOENIX CONTACT	0800886	–
⑮	–	–	–	–	–
⑯	–	–	–	–	–
⑰	A.S.R.	MOUNTING RAIL, TS35	WEIDMULLER	0383400000	–
⑱	1	NON-ISOLATED GROUND BAR	ILSCO	N174AS	–
⑲	A.S.R.	DUCT WIRING [1 x 4]	PANDUIT	–	–
⑳	–	–	–	–	–

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: JB9-521 SEEPEX JUNCTION BOX
INSIDE PANEL LAYOUT & BILL OF MATERIAL
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0002-AU-VWT	E00	04 OF 05	1

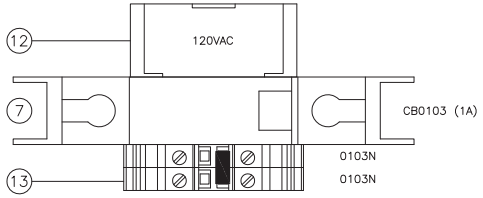
STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

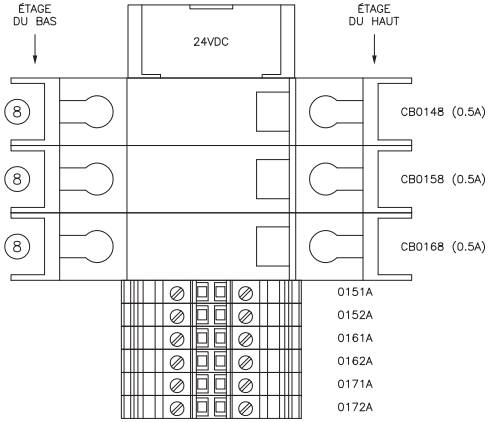
Jun 20, 2018 14:00:26 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\JUNCTION BOX\5000218009-ELD-0002-AU-VWT-E00-04-1_E.dwg – o.lessard

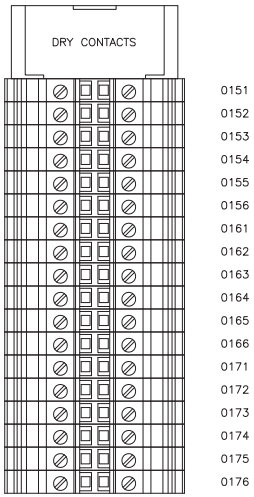
NOTES:

1- SEE DRAWING 5000218009-ELD-0002-AU-VWT-E00-04 FOR THE REFERENCES TO THE BILL OF MATERIAL.

2- CSA APPROVAL.







REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: JB9-521 SEEPEX JUNCTION BOX
TERMINAL DETAILS
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA

VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0002-AU-VWT	E00	05 OF 05	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

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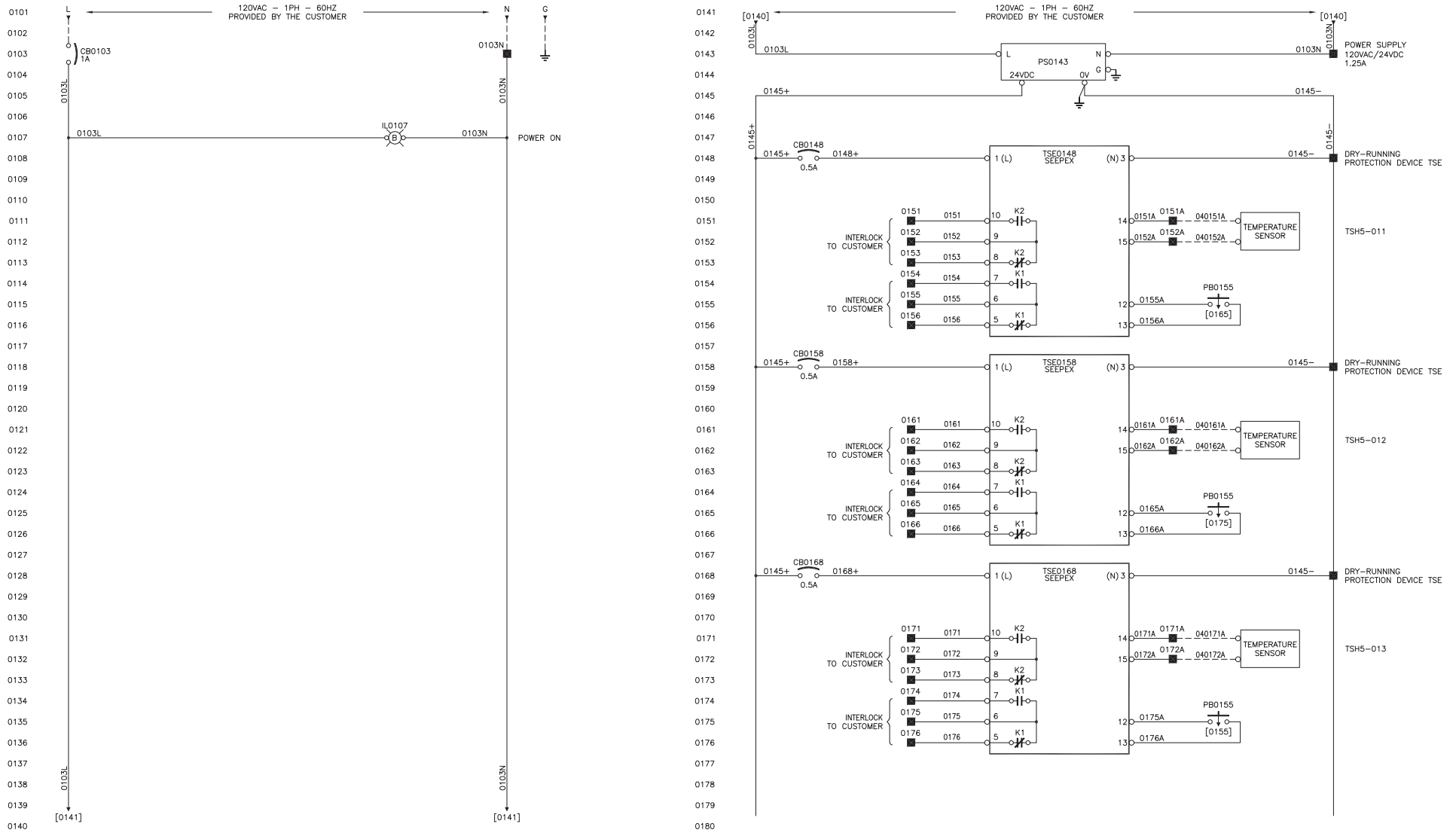


REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018–06–20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: JB9–521 SEEPEX JUNCTION BOX
SCHEMATIC DIAGRAM [POWER DISTRIBUTION] 120VAC/24VDC
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC., 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0002–AU–VWT	E04	01 OF 01	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

JB9-524 SEEPEX JUNCTION BOX

PROJECT - 5000218009

DRAFT

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

TITLE: JB9-524 SEEPEX JUNCTION BOX
TITLE PAGE
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0003-AU-VWT	E00	01 OF 05	1

DRAWING INDEX

DESCRIPTION	DRAWING NUMBER
JB9–524 SEEPEX JUNCTION BOX	
TITLE PAGE	5000218009–ELD–0003–AU–VWT–E00–01
DRAWING LIST & LEGEND	5000218009–ELD–0003–AU–VWT–E00–02
ENCLOSURE LAYOUT	5000218009–ELD–0003–AU–VWT–E00–03
INSIDE PANEL LAYOUT & BILL OF MATERIAL	5000218009–ELD–0003–AU–VWT–E00–04
TERMINAL DETAILS	5000218009–ELD–0003–AU–VWT–E00–05
SCHEMATIC DIAGRAM [POWER DISTRIBUTION] 120VAC/24VDC	5000218009–ELD–0003–AU–VWT–E04–01

COLORS AND WIRINGS GAGES

120VCA POWER	BLACK	14AWG
120VCA CONTROL	RED	14AWG
NEUTRAL	WHITE	14AWG
DRY CONTACT	YELLOW	14AWG
24VCC	BLUE[+], BLUE/WHITE[–]	16AWG[0 À 9A] 14AWG[10A & +]
GROUND	GREEN	14AWG
ISOLATED GROUND	GREEN/YELLOW	14AWG
ANALOG I/O TWISTED PAIRS	BLACK[+], WHITE[–]	18AWG
DIGITAL I/O 120VAC	RED	16AWG
DIGITAL I/O 24VCC	BLUE	16AWG
LOW VOLTAGE [12, 24, 48VCC]	BLUE	16AWG[0 À 9A] 14AWG[10A & +]
CONTROL CIRCUIT 5 TO 60VDC	BLUE[+], BLUE/WHITE[–], VERT[GND]	16AWG[0 À 9A] 14AWG[10A & +]

COLORS AND WIRING GAGES

SUPPLY 600VAC (L1)	RED	12AWG
SUPPLY 600VAC (L2)	BLACK	12AWG
SUPPLY 600VAC (L3)	BLUE	12AWG
SUPPLY 120VAC (L)	BLACK	12AWG (22A)/14AWG (15A)
SUPPLY 120VAC (N)	WHITE	12AWG (22A)/14AWG (15A)
CONTROL 120VAC (L)	RED	14AWG (15A)/16AWG (9A)
CONTROL 120VAC (N)	WHITE	14AWG (15A)/16AWG (9A)
DRY CONTACT	YELLOW	12AWG (22A)/14AWG (15A)
24VDC	BLUE	14AWG (15A)/16AWG (9A)
0VDC	VIOLET	14AWG (15A)/16AWG (9A)
ANALOG I/O TWISTED PAIRS	BLACK(+), WHITE(–)	18AWG
DIGITAL I/O 120VAC	RED	16AWG
DIGITAL I/O 24VDC	BLUE	16AWG
LOW VOLTAGE (5 TO 60VDC)	BLUE(+), BLUE/WHITE(–)	14AWG (15A)/16AWG (9A)
GROUND	GREEN	14AWG
ISOLATED GROUND	GREEN/YELLOW	14AWG

WIRING IDENTIFICATION

XX XX XX XX

- POWER INDICATION (+/–/L/N/G)
- LINE NUMBER
- PAGE NUMBER
- (FIELD WIRING ONLY) 01 – PANEL #1, 02 – PANEL #2, ...

LEGEND

- PSL — LOW PRESSURE SWITCH
- PSH — HIGH PRESSURE SWITCH
- LSL — LOW LEVEL SWITCH
- LSH — HIGH LEVEL SWITCH
- LSNO — LIMIT SWITCH NO
- LSNC — LIMIT SWITCH NC
- FSL — LOW FLOW SWITCH
- FSH — HIGH FLOW SWITCH
- TSL — LOW TEMPERATURE SWITCH
- TSH — HIGH TEMPERATURE SWITCH
- OFF DELAY TIMER [NO]
- OFF DELAY TIMER [NC]
- ON DELAY TIMER [NC]
- ON DELAY TIMER [NO]
- NO — CONTACT NO
- NC — CONTACT NC
- GND — GROUND
- GND — ISOLATED GROUND
- TERMINAL OF PANEL
- TERMINAL OF OTHER PANEL
- DISCONNECT TERMINAL OF PANEL

- HS — MAINTAINED TWO POSITIONS SELECTOR
- HS — MAINTAINED THREE POSITIONS SELECTOR
- HS — THREE POSITIONS SELECTOR, BOTH RETURN
- HS — THREE POSITIONS SELECTOR, LEFT RETURN
- HS — THREE POSITIONS SELECTOR, RIGHT RETURN
- PBNO — PUSHBUTTON NO
- PBNC — PUSHBUTTON NC
- ES — EMERGENCY STOP PUSH BUTTON
- E.S. — PULL–CORD E–STOP
- POT — POTENTIOMETER
- FU — FUSE
- CB — CIRCUIT BREAKER
- IL — PUSH–TO–TEST LIGHT
- IL — LIGHT
- CMR — CURRENT MONITORING RELAY
- AC A/C — AIR CONDITIONER UNIT

- M — CONTACTOR COIL
- TR — TIMER RELAY COIL
- CR — CONTROL RELAY COIL
- MCR — MASTER CONTROL RELAY COIL
- CR — CONTROL RELAY COIL WITH SURGE SURPRESSOR
- FV — SOLENOID
- R — RESISTANCE
- HN — HORN
- F — FAN / VENTILATOR / BLOWER
- CT — CURRENT TRANSFORMER
- PC — 120VAC DUPLEX OUTLET
- AM — AMPEREMETER
- VM — VOLTMETER

- DISC — FUSED DISCONNECT SWITCH
- FU — 3PH FUSE HOLDER
- DISC — DISCONNECT SWITCH
- OL — MANUAL STARTER WITH THERMAL & MAGNETIC PROTECTION
- OL — MANUAL STARTER WITH MAGNETIC PROTECTION
- M — CONTACTOR
- OL — OVERLOAD
- MOLDED CASE CIRCUIT BREAKER

- TR (H1, H2, X1, X2) — TRANSFORMER
- TR (H1, H2, X1, X2, X3, X4) — MULTI–TAPS TRANSFORMER

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018–06–20	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

TITLE: JB9–524 SEEPEX JUNCTION BOX
DRAWING LIST & LEGEND
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0003–AU–VWT	E00	02 OF 05	1

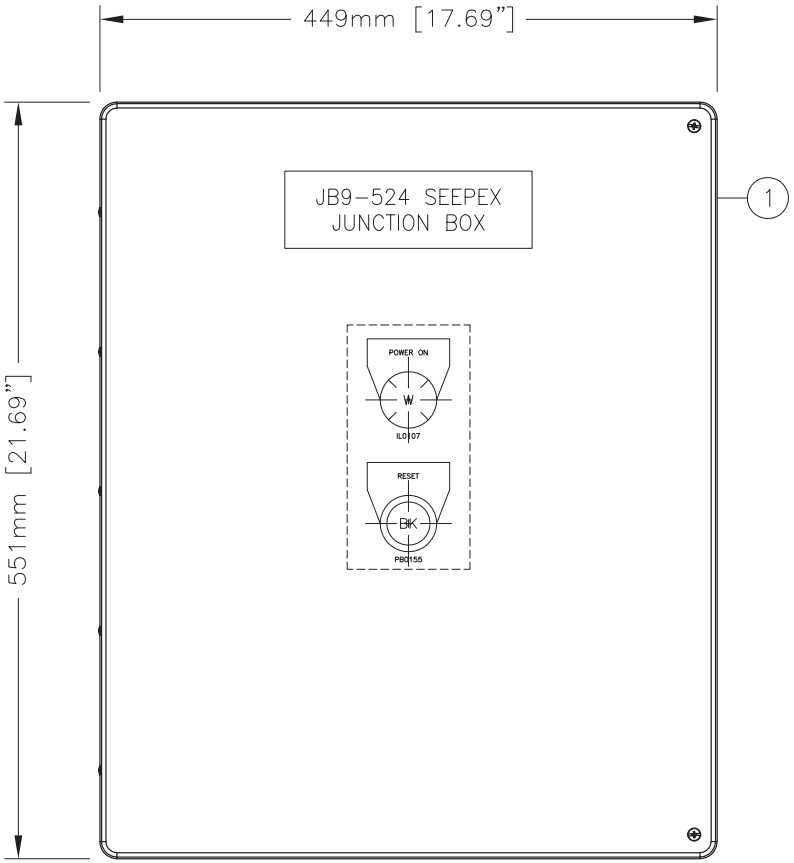
STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun. 20, 2018 14:00:45 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC–001 CONTROL PANEL\JUNCTION BOX\5000218009–ELD–0003–AU–VWT–E00–02–1_E.dwg – a.lessard

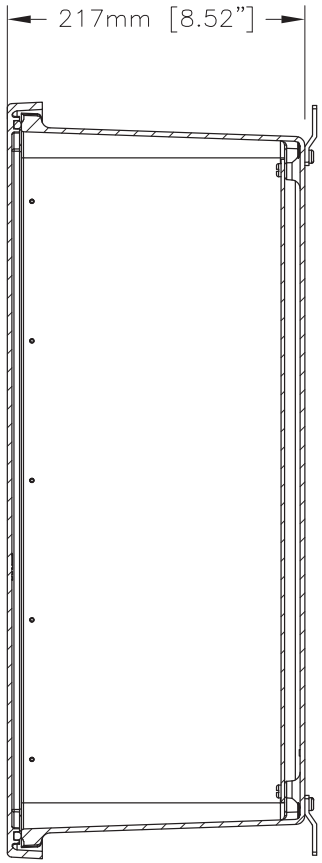
NOTES:

1- SEE DRAWING 5000218009-ELD-0003-AU-VWT-E00-04 FOR THE REFERENCES TO THE BILL OF MATERIAL.

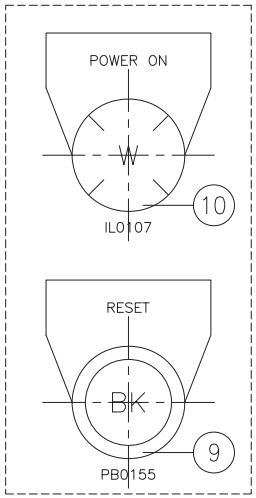
2- CSA APPROVAL.



EXTERNAL LAYOUT



SIDE LAYOUT



DOOR DETAILS

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: JB9-524 SEEPEX JUNCTION BOX ENCLOSURE LAYOUT –

CLIENT: AEM AMARUQ HUDSON BAY, NUNAVUT

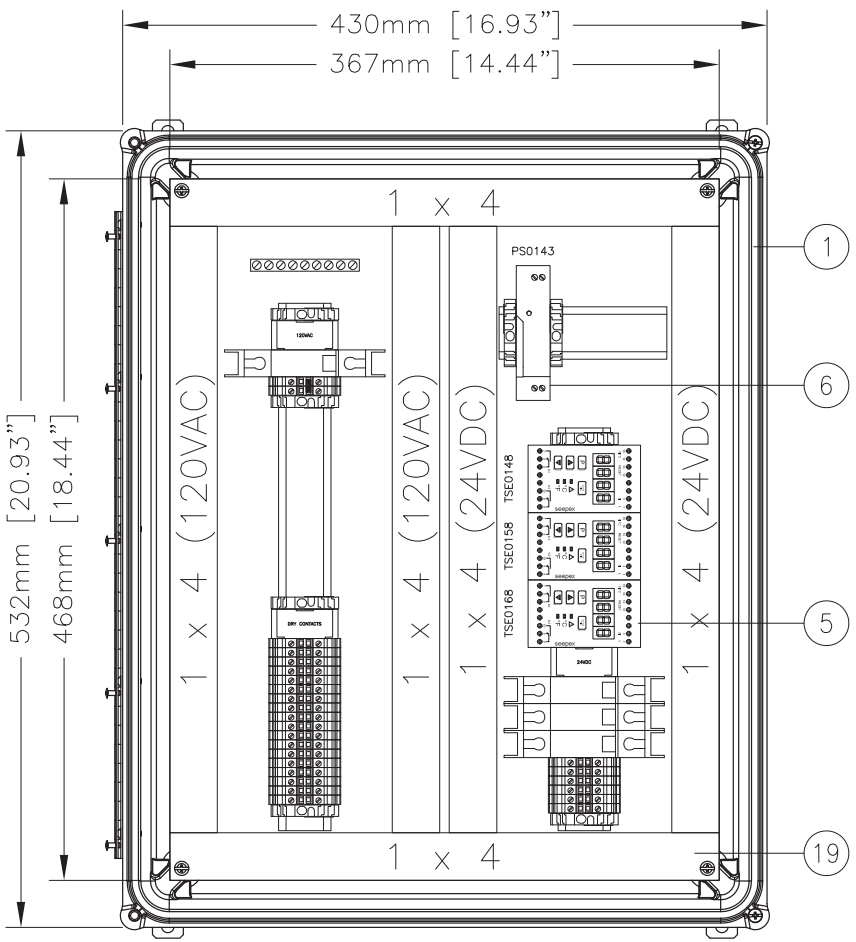
VEOLIA

VEOLIA WATER TECHNOLOGIES CANADA INC., 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0003-AU-VWT	E00	03 OF 05	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 14:00:50 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\JUNCTION BOX\5000218009-ELD-0003-AU-VWT-E00-03-1_E.dwg – a.lessard



INTERNAL LAYOUT

BILL OF MATERIALS [BOM]

#	QTY.	DESCRIPTION	MANUFACTURER	CATALOGUE N.	REMARK
1	1	PANEL NEMA 4X, WALLMOUNT, ONE DOOR5000218009– DIM 551mm[H] x 449mm[W] x 217mm[D]	HAMMOND	PJ20168H	–
2	1	INNER PANEL, DIM 468mm[H] x 367mm[W]	HAMMOND	P2068	–
3	–	–	–	–	–
4	–	–	–	–	–
5	3	DRY–RUNNING PROTECTION DEVICE, 24VDC	SEEPEX	SGRTSE 24VDCB	–
6	1	POWER SUPPLY 120VAC/24VDC, 1.25A	PHOENIX CONTACT	2902991	–
7	1	"BRANCH PROOF" BREAKER, 1A, 1 POLE, 120VAC/24VDC	SCHNEIDER	60100	–
8	3	"BRANCH PROOF" BREAKER, 0.5A, 1 POLE, 120VAC/24VDC	SCHNEIDER	60101	–
9	1	NON–ILLUMINATED PUSH BUTTON, BLACK, MOMENTARY ACTION, 1N.O., 30.5mm	ALLEN BRADLEY	800H–R2D1	–
	1	CONTACT BLOCK, 2N.O.	ALLEN BRADLEY	800T–XA2	–
10	1	PILOT LIGHT OPERATOR, WHITE, LED TYPE, 12 ... 130VAC/VDC, 30.5mm	ALLEN BRADLEY	800H–QRH2W	–
11	–	–	–	–	–
12	3	IDENTIFICATION TERMINAL UBE/D	PHOENIX CONTACT	0800307	–
13	26/3	SIMPLE TERMINAL BLOCK, UT 4 EN C/W END PLATE	PHOENIX CONTACT	3044102/3047028	–
14	A.S.R.	END BARRIER, E/NS 35 N	PHOENIX CONTACT	0800886	–
15	–	–	–	–	–
16	–	–	–	–	–
17	A.S.R.	MOUNTING RAIL, TS35	WEIDMULLER	0383400000	–
18	1	NON–ISOLATED GROUND BAR	ILSCO	N174AS	–
19	A.S.R.	DUCT WIRING [1 x 4]	PANDUIT	–	–
20	–	–	–	–	–

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018–06–20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: JB9–524 SEEPEX JUNCTION BOX
INSIDE PANEL LAYOUT & BILL OF MATERIAL
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0003–AU–VWT	E00	04 OF 05	1

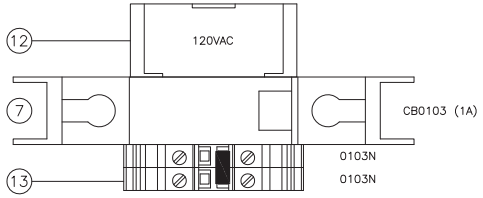
STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

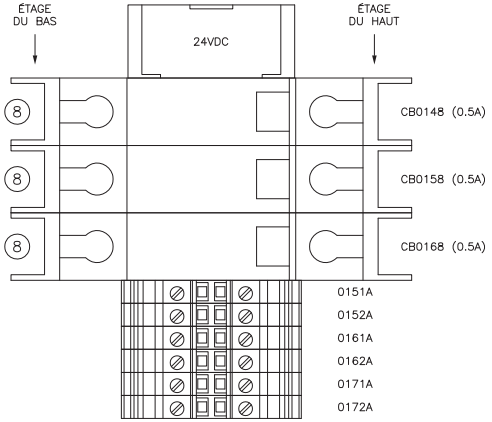
Jun. 20, 2018 14:00:55 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC–001 CONTROL PANEL\JUNCTION BOX\5000218009–ELD–0003–AU–VWT–E00–04–1_E.dwg – o.lessard

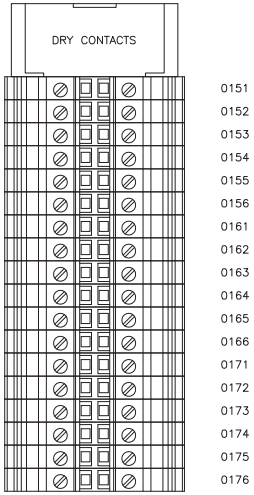
NOTES:

1- SEE DRAWING 5000218009-ELD-0003-AU-VWT-E00-04 FOR THE REFERENCES TO THE BILL OF MATERIAL.

2- CSA APPROVAL.







REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: JB9-524 SEEPEX JUNCTION BOX
TERMINAL DETAILS
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

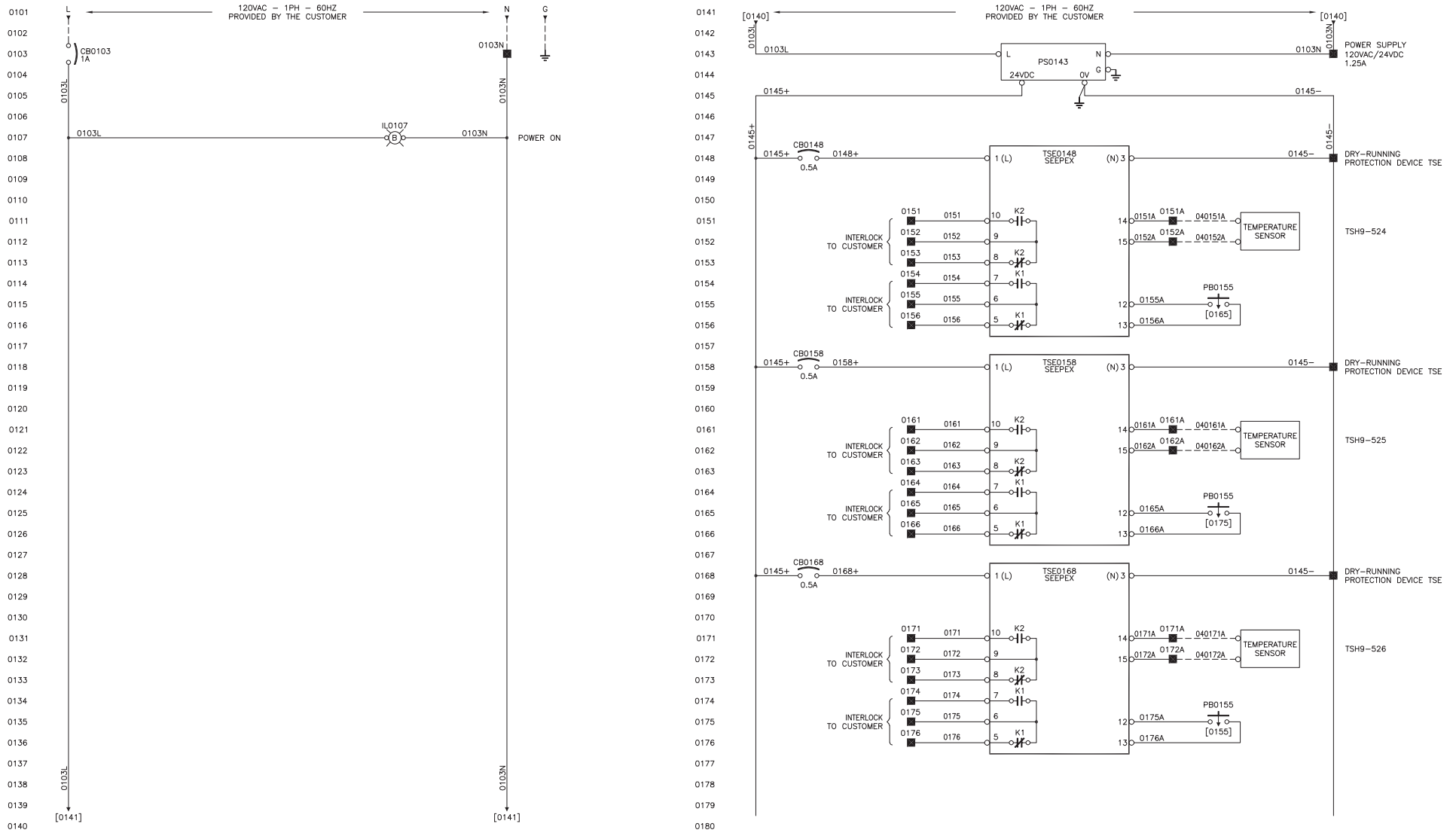
VEOLIA

VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0003-AU-VWT	E00	05 OF 05	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 14:01:00 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\JUNCTION BOX\5000218009-ELD-0003-AU-VWT-E00-05-1_E.dwg – a.lessard



REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018–06–20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: JB9–524 SEEPEX JUNCTION BOX
SCHEMATIC DIAGRAM [POWER DISTRIBUTION] 120VAC/24VDC
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC., 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0003–AU–VWT	E04	01 OF 01	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun. 20, 2018 – 14:01:05 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\JUNCTION BOX\5000218009-ELD-0003-AU-VWT-E04-01-1_E.dwg – d.lessard

JB9-620 SEEPEX JUNCTION BOX

PROJECT - 5000218009

DRAFT

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

TITLE: JB9-620 SEEPEX JUNCTION BOX
TITLE PAGE
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
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DRAWING INDEX

DESCRIPTION	DRAWING NUMBER
JB9-620 SEEPEX JUNCTION BOX	
TITLE PAGE	5000218009-ELD-0004-AU-VWT-E00-01
DRAWING LIST & LEGEND	5000218009-ELD-0004-AU-VWT-E00-02
ENCLOSURE LAYOUT	5000218009-ELD-0004-AU-VWT-E00-03
INSIDE PANEL LAYOUT & BILL OF MATERIAL	5000218009-ELD-0004-AU-VWT-E00-04
TERMINAL DETAILS	5000218009-ELD-0004-AU-VWT-E00-05
SCHEMATIC DIAGRAM [POWER DISTRIBUTION] 120VAC/24VDC	5000218009-ELD-0004-AU-VWT-E04-01

COLORS AND WIRINGS GAGES

120VCA POWER	BLACK	14AWG
120VCA CONTROL	RED	14AWG
NEUTRAL	WHITE	14AWG
DRY CONTACT	YELLOW	14AWG
24VCC	BLUE[+], BLUE/WHITE[-]	16AWG[0 À 9A] 14AWG[10A & +]
GROUND	GREEN	14AWG
ISOLATED GROUND	GREEN/YELLOW	14AWG
ANALOG I/O TWISTED PAIRS	BLACK[+], WHITE[-]	18AWG
DIGITAL I/O 120VAC	RED	16AWG
DIGITAL I/O 24VCC	BLUE	16AWG
LOW VOLTAGE [12, 24, 48VCC]	BLUE	16AWG[0 À 9A] 14AWG[10A & +]
CONTROL CIRCUIT 5 TO 60VDC	BLUE[+], BLUE/WHITE[-], VERT[GND]	16AWG[0 À 9A] 14AWG[10A & +]

COLORS AND WIRING GAGES

SUPPLY 600VAC (L1)	RED	12AWG
SUPPLY 600VAC (L2)	BLACK	12AWG
SUPPLY 600VAC (L3)	BLUE	12AWG
SUPPLY 120VAC (L)	BLACK	12AWG (22A)/14AWG (15A)
SUPPLY 120VAC (N)	WHITE	12AWG (22A)/14AWG (15A)
CONTROL 120VAC (L)	RED	14AWG (15A)/16AWG (9A)
CONTROL 120VAC (N)	WHITE	14AWG (15A)/16AWG (9A)
DRY CONTACT	YELLOW	12AWG (22A)/14AWG (15A)
24VDC	BLUE	14AWG (15A)/16AWG (9A)
0VDC	VIOLET	14AWG (15A)/16AWG (9A)
ANALOG I/O TWISTED PAIRS	BLACK(+), WHITE(-)	18AWG
DIGITAL I/O 120VAC	RED	16AWG
DIGITAL I/O 24VDC	BLUE	16AWG
LOW VOLTAGE (5 TO 60VDC)	BLUE(+), BLUE/WHITE(-)	14AWG (15A)/16AWG (9A)
GROUND	GREEN	14AWG
ISOLATED GROUND	GREEN/YELLOW	14AWG

WIRING IDENTIFICATION

XX XX XX XX

- POWER INDICATION (+/-/L/N/G)
- LINE NUMBER
- PAGE NUMBER
- (FIELD WIRING ONLY) 01 – PANEL #1, 02 – PANEL #2, ...

LEGEND

- PSL — LOW PRESSURE SWITCH
- PSH — HIGH PRESSURE SWITCH
- LSL — LOW LEVEL SWITCH
- LSH — HIGH LEVEL SWITCH
- LSNO — LIMIT SWITCH NO
- LSNC — LIMIT SWITCH NC
- FSL — LOW FLOW SWITCH
- FSH — HIGH FLOW SWITCH
- TSL — LOW TEMPERATURE SWITCH
- TSH — HIGH TEMPERATURE SWITCH
- OFF DELAY TIMER [NO]
- OFF DELAY TIMER [NC]
- ON DELAY TIMER [NC]
- ON DELAY TIMER [NO]
- NO — CONTACT NO
- NC — CONTACT NC
- GND — GROUND
- GND — ISOLATED GROUND
- TERMINAL OF PANEL
- TERMINAL OF OTHER PANEL
- DISCONNECT TERMINAL OF PANEL

- HS — MAINTAINED TWO POSITIONS SELECTOR
- HS — MAINTAINED THREE POSITIONS SELECTOR
- HS — THREE POSITIONS SELECTOR, BOTH RETURN
- HS — THREE POSITIONS SELECTOR, LEFT RETURN
- HS — THREE POSITIONS SELECTOR, RIGHT RETURN
- PBNO — PUSHBUTTON NO
- PBNC — PUSHBUTTON NC
- ES — EMERGENCY STOP PUSH BUTTON
- E.S. — PULL-CORD E-STOP
- POT — POTENTIOMETER
- FU — FUSE
- CB — CIRCUIT BREAKER
- IL — PUSH-TO-TEST LIGHT
- IL — LIGHT
- CMR — CURRENT MONITORING RELAY
- AC A/C — AIR CONDITIONER UNIT

- M — CONTACTOR COIL
- TR — TIMER RELAY COIL
- CR — CONTROL RELAY COIL
- MCR — MASTER CONTROL RELAY COIL
- CR — CONTROL RELAY COIL WITH SURGE SURPRESSOR
- FV — SOLENOID
- R — RESISTANCE
- HN — HORN
- F — FAN / VENTILATOR / BLOWER
- CT — CURRENT TRANSFORMER
- PC — 120VAC DUPLEX OUTLET
- AM — AMPEREMETER
- VM — VOLTMETER

- DISC — FUSED DISCONNECT SWITCH
- FU — 3PH FUSE HOLDER
- DISC — DISCONNECT SWITCH
- OL — MANUAL STARTER WITH THERMAL & MAGNETIC PROTECTION
- OL — MANUAL STARTER WITH MAGNETIC PROTECTION
- M — CONTACTOR
- OL — OVERLOAD
- MOLDED CASE CIRCUIT BREAKER

- TR (H1, H2, X1, X2) — TRANSFORMER
- TR (H1, H2, X1, X2, X3, X4) — MULTI-TAPS TRANSFORMER

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

TITLE: JB9-620 SEEPEX JUNCTION BOX
DRAWING LIST & LEGEND
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0004-AU-VWT	E00	02 OF 05	1

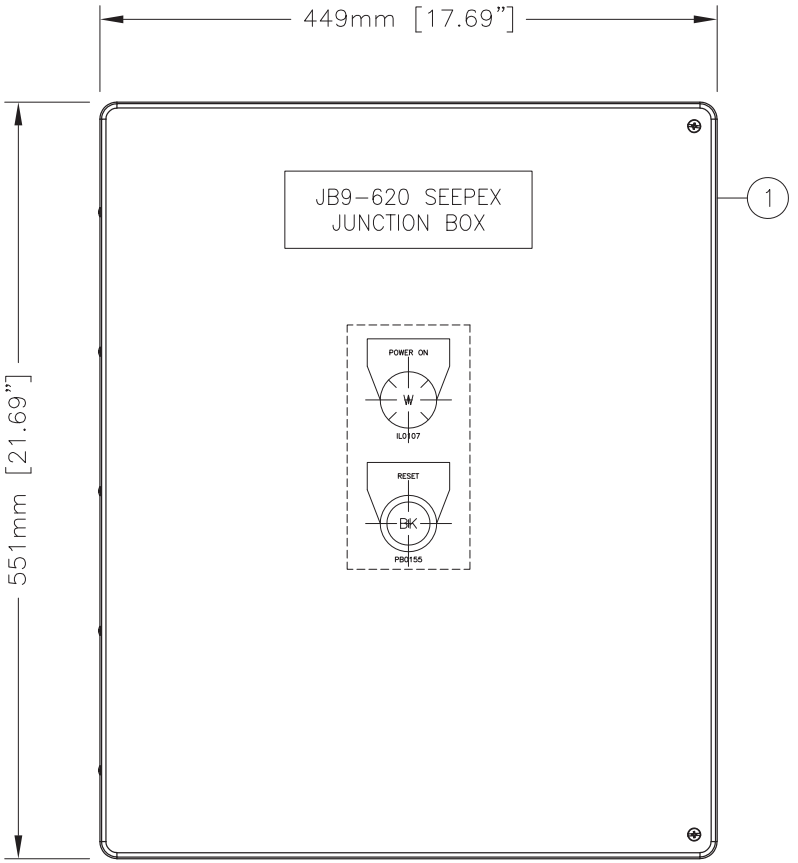
STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun. 20, 2018 14:01:15 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\JUNCTION BOX\5000218009-ELD-0004-AU-VWT-E00-02-1_E.dwg – a.lessard

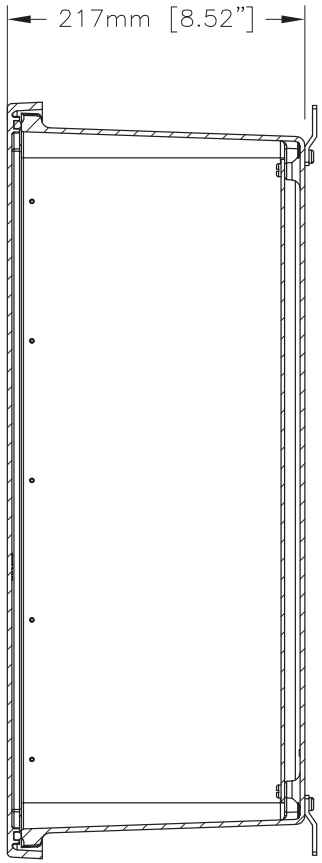
NOTES:

1- SEE DRAWING 5000218009-ELD-0004-AU-VWT-E00-04 FOR THE REFERENCES TO THE BILL OF MATERIAL.

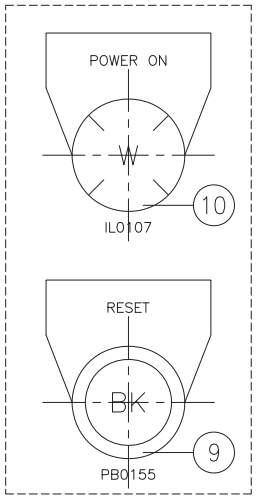
2- CSA APPROVAL.



EXTERNAL LAYOUT



SIDE LAYOUT



DOOR DETAILS

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: JB9-620 SEEPEX JUNCTION BOX ENCLOSURE LAYOUT –

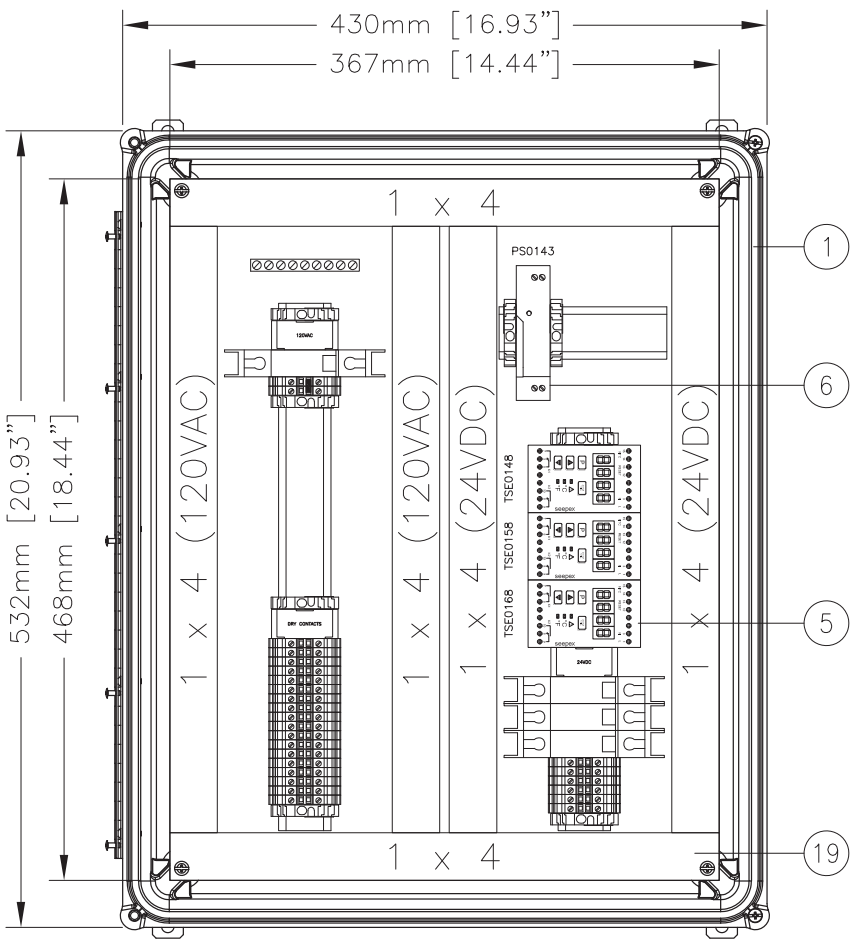
CLIENT: AEM AMARUQ HUDSON BAY, NUNAVUT

VEOLIA WATER TECHNOLOGIES CANADA INC., 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0004-AU-VWT	E00	03 OF 05	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 14:01:20 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\JUNCTION BOX\5000218009-ELD-0004-AU-VWT-E00-03-1_E.dwg – o.lessard



INTERNAL LAYOUT

BILL OF MATERIALS [BOM]

#	QTY.	DESCRIPTION	MANUFACTURER	CATALOGUE N.	REMARK
①	1	PANEL NEMA 4X, WALLMOUNT, ONE DOOR5000218009– DIM 551mm[H] x 449mm[W] x 217mm[D]	HAMMOND	PJ20168H	–
②	1	INNER PANEL, DIM 468mm[H] x 367mm[W]	HAMMOND	P2068	–
③	–	–	–	–	–
④	–	–	–	–	–
⑤	3	DRY–RUNNING PROTECTION DEVICE, 24VDC	SEEPEX	SGRTSE 24VDCB	–
⑥	1	POWER SUPPLY 120VAC/24VDC, 1.25A	PHOENIX CONTACT	2902991	–
⑦	1	"BRANCH PROOF" BREAKER, 1A, 1 POLE, 120VAC/24VDC	SCHNEIDER	60100	–
⑧	3	"BRANCH PROOF" BREAKER, 0.5A, 1 POLE, 120VAC/24VDC	SCHNEIDER	60101	–
⑨	1	NON–ILLUMINATED PUSH BUTTON, BLACK, MOMENTARY ACTION, 1N.O., 30.5mm	ALLEN BRADLEY	800H–R2D1	–
	1	CONTACT BLOCK, 2N.O.	ALLEN BRADLEY	800T–XA2	–
⑩	1	PILOT LIGHT OPERATOR, WHITE, LED TYPE, 12 ... 130VAC/VDC, 30.5mm	ALLEN BRADLEY	800H–QRH2W	–
⑪	–	–	–	–	–
⑫	3	IDENTIFICATION TERMINAL UBE/D	PHOENIX CONTACT	0800307	–
⑬	26/3	SIMPLE TERMINAL BLOCK, UT 4 EN C/W END PLATE	PHOENIX CONTACT	3044102/3047028	–
⑭	A.S.R.	END BARRIER, E/NS 35 N	PHOENIX CONTACT	0800886	–
⑮	–	–	–	–	–
⑯	–	–	–	–	–
⑰	A.S.R.	MOUNTING RAIL, TS35	WEIDMULLER	0383400000	–
⑱	1	NON–ISOLATED GROUND BAR	ILSCO	N174AS	–
⑲	A.S.R.	DUCT WIRING [1 x 4]	PANDUIT	–	–
⑳	–	–	–	–	–

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018–06–20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: JB9–620 SEEPEX JUNCTION BOX
INSIDE PANEL LAYOUT & BILL OF MATERIAL
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0004–AU–VWT	E00	04 OF 05	1

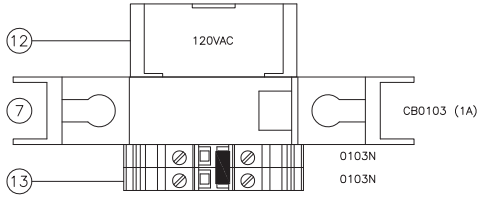
STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

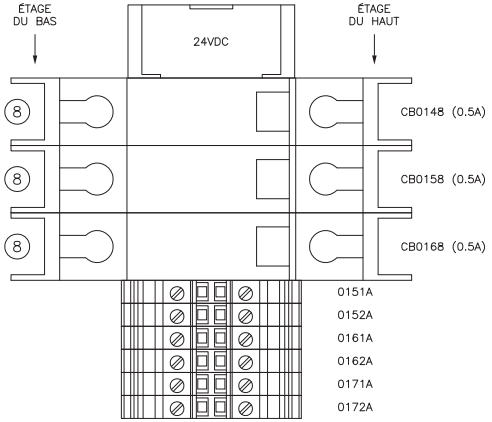
Jun. 20, 2018 14:01:25 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC–001 CONTROL PANEL\JUNCTION BOX\5000218009–ELD–0004–AU–VWT–E00–04–1_E.dwg – o.lessard

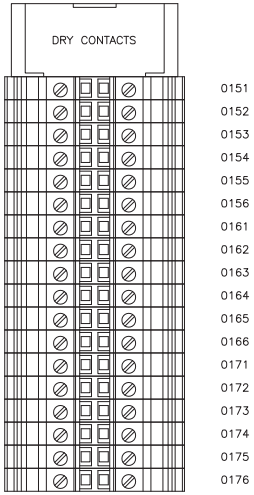
NOTES:

1- SEE DRAWING 5000218009-ELD-0004-AU-VWT-E00-04 FOR THE REFERENCES TO THE BILL OF MATERIAL.

2- CSA APPROVAL.







REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

TITLE: JB9-620 SEEPEX JUNCTION BOX
TERMINAL DETAILS
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

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5000218009 – ELD-0004-AU-VWT	E00	05 OF 05	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

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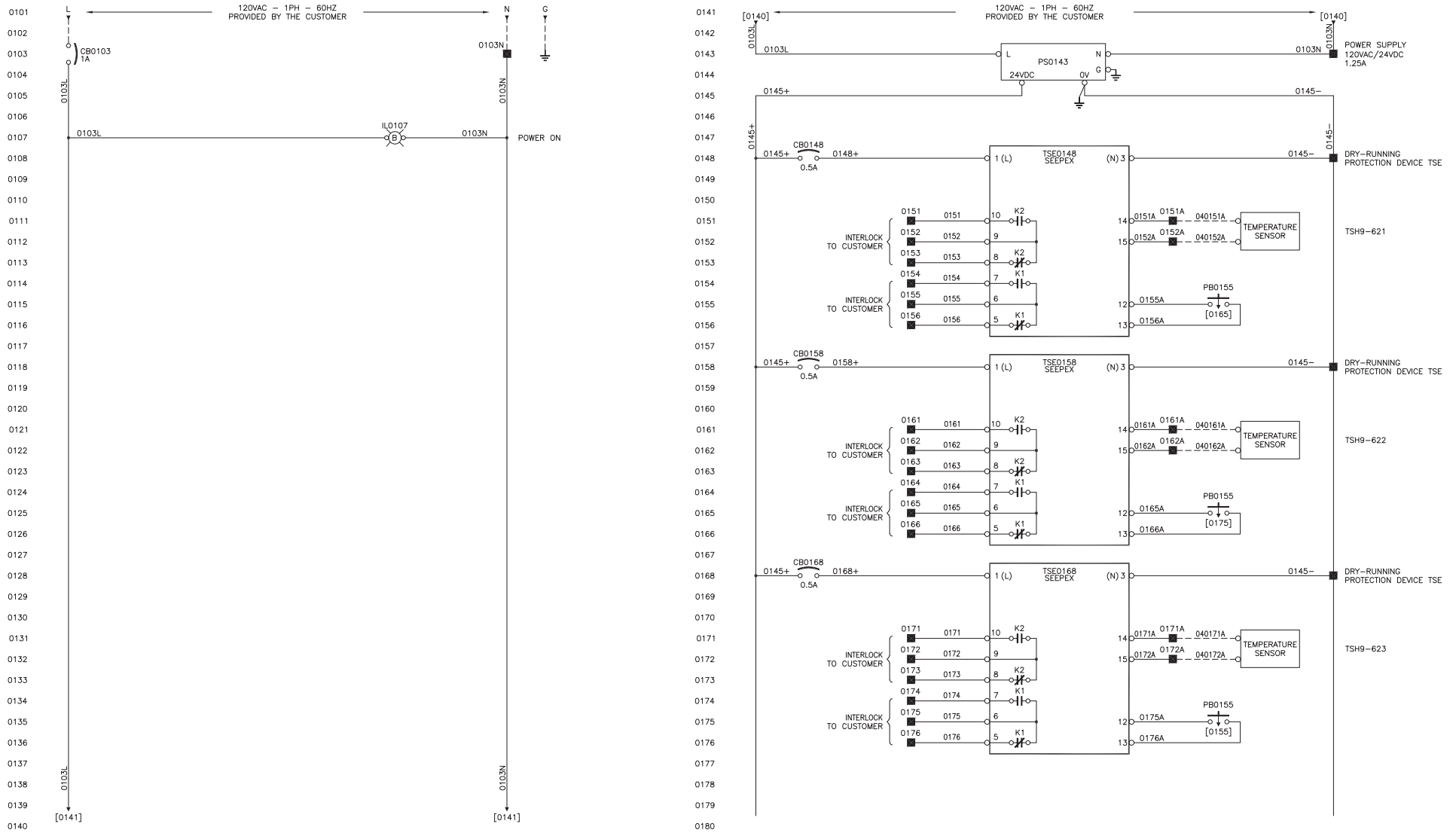

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1	FOR APPROVAL	2018–06–20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: JB9–620 SEEPEX JUNCTION BOX
SCHEMATIC DIAGRAM [POWER DISTRIBUTION] 120VAC/24VDC
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CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

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PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0004–AU–VWT	E04	01 OF 01	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

JB9-531 JUNCTION BOX

PROJECT - 5000218009

DRAFT

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
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		DATE
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CHECKER	–	–
ENGINEER	–	–
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TITLE: JB9-531 JUNCTION BOX
TITLE PAGE
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CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

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5000218009 – ELD-0005-AU-VWT	E00	01 OF 05	1

DRAWING INDEX

DESCRIPTION	DRAWING NUMBER
JB9-531 JUNCTION BOX	
TITLE PAGE	5000218009-ELD-0005-AU-VWT-E00-01
DRAWING LIST & LEGEND	5000218009-ELD-0005-AU-VWT-E00-02
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INSIDE PANEL LAYOUT & BILL OF MATERIAL	5000218009-ELD-0005-AU-VWT-E00-04
TERMINAL DETAILS	5000218009-ELD-0005-AU-VWT-E00-05

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LOW VOLTAGE (5 TO 60VDC)	BLUE(+), BLUE/WHITE(-)	14AWG (15A)/16AWG (9A)
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WIRING IDENTIFICATION

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- PAGE NUMBER
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- M — CONTACTOR
- OL — OVERLOAD
- MOLDED CASE CIRCUIT BREAKER

- TR (H1, H2, X1, X2) — TRANSFORMER
- TR (H1, H2, X1, X2, X3, X4) — MULTI-TAPS TRANSFORMER

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: JB9-531 JUNCTION BOX
DRAWING LIST & LEGEND
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0005-AU-VWT	E00	02 OF 05	1

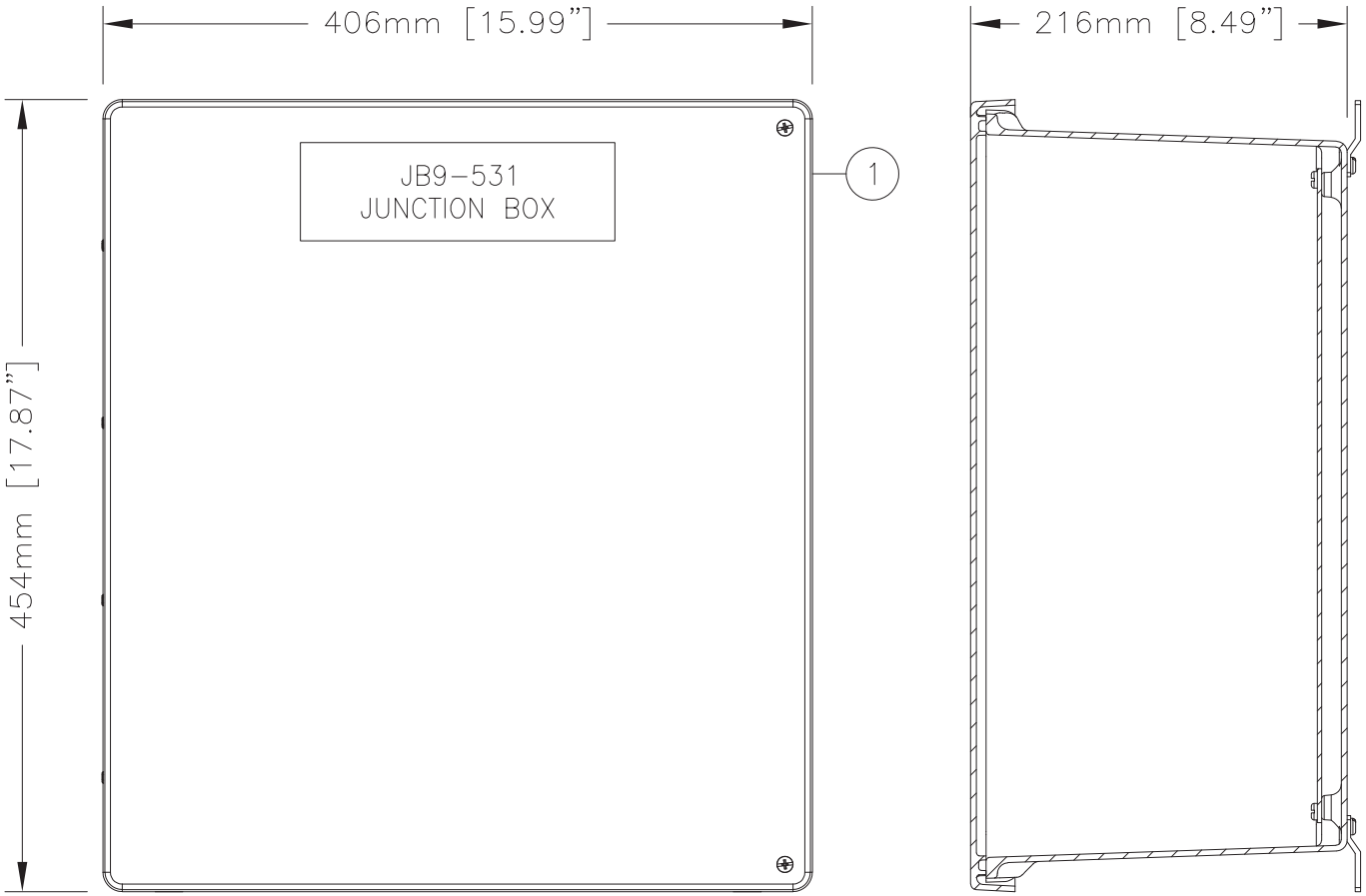
STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun. 20, 2018 14:01:44 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\JUNCTION BOX\5000218009-ELD-0005-AU-VWT-E00-02-1_E.dwg – a.lessard

NOTES:

1- SEE DRAWING 5000218009-ELD-0005-AU-VWT-E00-04 FOR THE REFERENCES TO THE BILL OF MATERIAL.

2- CSA APPROVAL.



EXTERNAL LAYOUT

SIDE LAYOUT

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

TITLE: JB9-531 JUNCTION BOX ENCLOSURE LAYOUT –

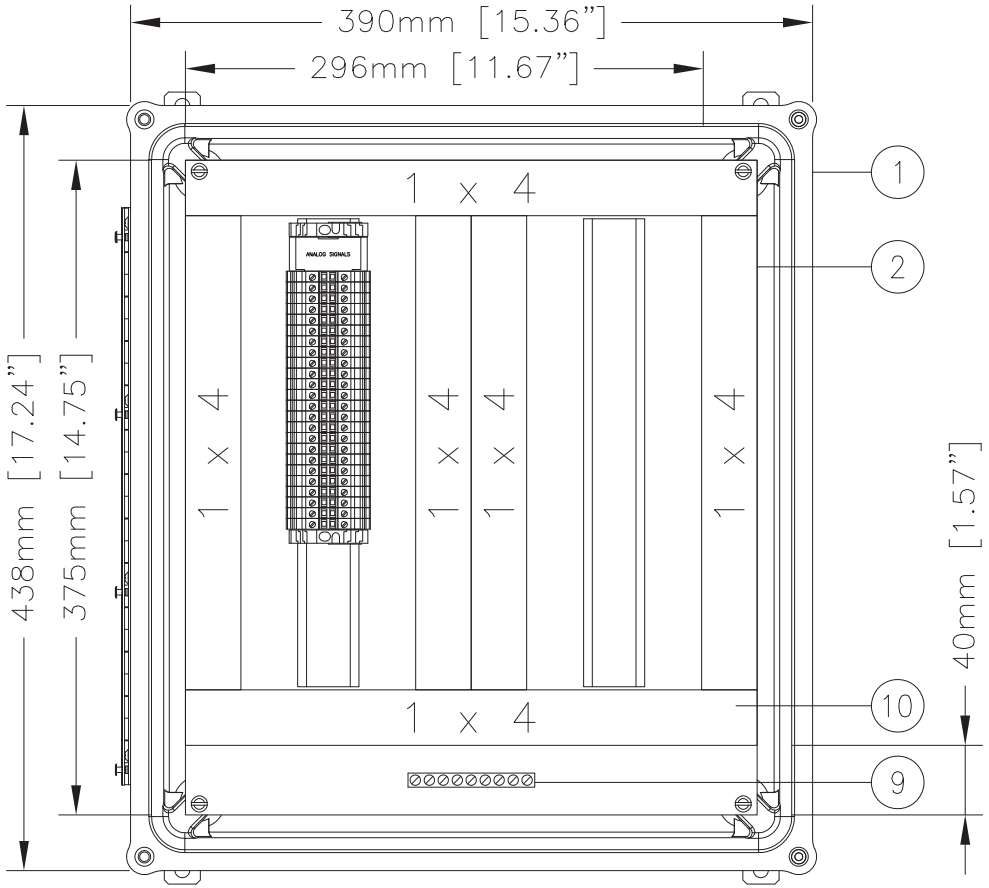
CLIENT: AEM AMARUQ HUDSON BAY, NUNAVUT

VEOLIA

VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0005-AU-VWT	E00	03 OF 05	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE



INTERNAL LAYOUT

BILL OF MATERIALS [BOM]

#	QTY.	DESCRIPTION	MANUFACTURER	CATALOGUE N.	REMARK
1	1	PANEL NEMA 4X, WALLMOUNT, ONE DOOR DIM 454mm[H] x 406mm[W] x 216mm[D]	HAMMOND	PJ16148H	–
2	1	INNER PANEL, DIM 375mm[H] x 327mm[W]	HAMMOND	14R1513	–
3	–	–	–	–	–
4	1	IDENTIFICATION TERMINAL UBE/D	PHOENIX CONTACT	0800307	–
5	24/1	SIMPLE TERMINAL BLOCK, UT 4 EN C/W END PLATE	PHOENIX CONTACT	3044102/3047028	–
6	A.S.R.	END BARRIER, E/NS 35 N	PHOENIX CONTACT	0800886	–
7	–	–	–	–	–
8	A.S.R.	MOUNTING RAIL, TS35	WEIDMULLER	0383400000	–
9	1	NON-ISOLATED GROUND BAR	ILSCO	N174AS	–
10	A.S.R.	DUCT WIRING [1 x 4]	PANDUIT	–	–

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

TITLE: JB9-531 JUNCTION BOX
INSIDE PANEL LAYOUT & BILL OF MATERIAL
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

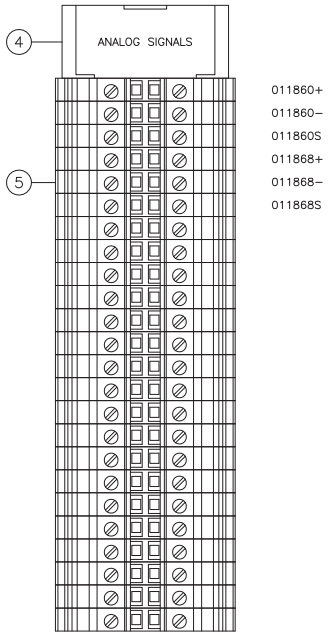
VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC., 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0005-AU-VWT	E00	04 OF 05	1

NOTES:

1- SEE DRAWING 5000218009-ELD-0005-AU-VWT-E00-04 FOR THE REFERENCES TO THE BILL OF MATERIAL.

2- CSA APPROVAL.



REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR APPROVAL	2018-06-20	A.L.	A.L.	G.M.	-

		DATE
DESIGNER	-	-
CHECKER	-	-
ENGINEER	-	-
SCALE:	None	

TITLE: JB9-531 JUNCTION BOX
TERMINAL DETAILS
-

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA

VEOLIA WATER TECHNOLOGIES CANADA INC., 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 - ELD-0005-AU-VWT	E00	05 OF 05	1

STD: "B" 11x17 | REF: CONTROLES RL - 184172 | BAR = 1" AT PLOT SCALE

Jun 20, 2018 14:02:01 - P:\CLIENTS\Veolia Waters - John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PLC-001 CONTROL PANEL\JUNCTION BOX\5000218009-ELD-0005-AU-VWT-E00-05-1_E.dwg - o.lessard

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HYDRAPOL CATIONIC
PLC9-621 CONTROL PANEL
PROJECT - 5000218009

DRAFT

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018-06-11	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

TITLE: HYDRAPOL CATIONIC – PLC9-621 CONTROL PANEL
TITLE PAGE
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada. Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0002-AU-VWT	E00	01 OF 06	1

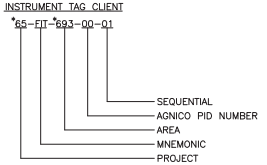
DRAWING INDEX

DESCRIPTION	DRAWING NUMBER
HYDRAPOL CATIONIC – PLC9–621 CONTROL PANEL	
TITLE PAGE	5000218009–ELD–0002–AU–VWT–E00–01
DRAWING LIST & LEGEND	5000218009–ELD–0002–AU–VWT–E00–02
OUTSIDE PANEL LAYOUT	5000218009–ELD–0002–AU–VWT–E00–03
INSIDE PANEL LAYOUT	5000218009–ELD–0002–AU–VWT–E00–04
BILL OF MATERIALS	5000218009–ELD–0002–AU–VWT–E00–05
TERMINAL DETAILS	5000218009–ELD–0002–AU–VWT–E00–06
SCHEMATIC DIAGRAM [POWER DISTRIBUTION] 600VAC/480VAC	5000218009–ELD–0002–AU–VWT–E04–01
SPARE SCHEMATIC DIAGRAM	5000218009–ELD–0002–AU–VWT–E04–02
SCHEMATIC DIAGRAM [POWER DISTRIBUTION] 120VAC/24VDC	5000218009–ELD–0002–AU–VWT–E04–03
SCHEMATIC DIAGRAM DISTRIBUTION 24VDC	5000218009–ELD–0002–AU–VWT–E04–04
SCHEMATIC DIAGRAM DISTRIBUTION 24VDC	5000218009–ELD–0002–AU–VWT–E04–05
PROGRAMMABLE CONTROLLER / NETWORK	5000218009–ELD–0002–AU–VWT–E04–06
ELECTRICAL SCHEMATIC DIAGRAM [RACK 00 SLOT 01]	5000218009–ELD–0002–AU–VWT–E04–07
ELECTRICAL SCHEMATIC DIAGRAM [RACK 00 SLOT 02]	5000218009–ELD–0002–AU–VWT–E04–08
ELECTRICAL SCHEMATIC DIAGRAM [RACK 00 SLOT 03]	5000218009–ELD–0002–AU–VWT–E04–09

COLORS AND WIRINGS GAGES

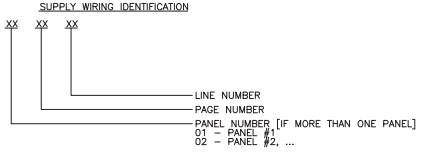
120VCA POWER	BLACK	14AWG
120VCA CONTROL	RED	14AWG
NEUTRAL	WHITE	14AWG
DRY CONTACT	YELLOW	14AWG
24VCC	BLUE[+], BLUE/WHITE[–]	16AWG[0 À 9A] 14AWG[10A & +]
GROUND	GREEN	14AWG
ISOLATED GROUND	GREEN/YELLOW	14AWG
ANALOG I/O TWISTED PAIRS	BLACK[+], WHITE[–]	18AWG
DIGITAL I/O 120VAC	RED	16AWG
DIGITAL I/O 24VCC	BLUE	16AWG
LOW VOLTAGE [12, 24, 48VCC]	BLUE	16AWG[0 À 9A] 14AWG[10A & +]
CONTROL CIRCUIT 5 TO 60VDC	BLUE[+], BLUE/WHITE[–], VERT(GND)	16AWG[0 À 9A] 14AWG[10A & +]

INSTRUMENT TAG CLIENT

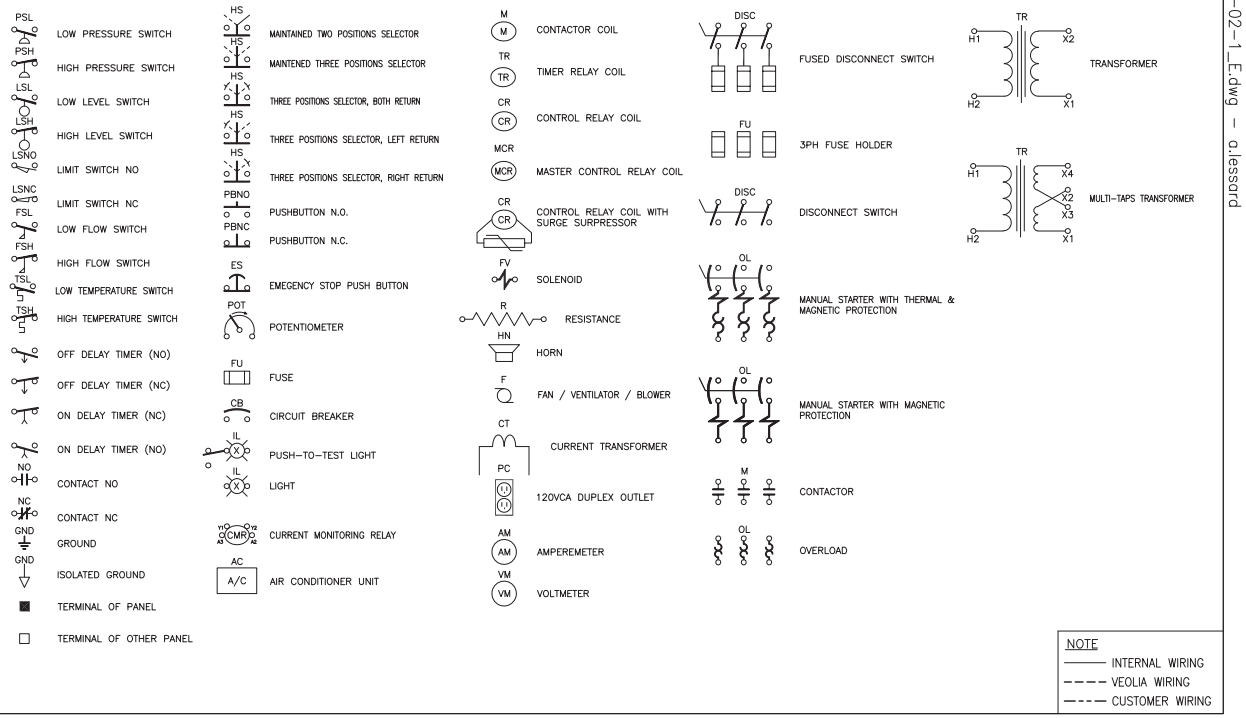


* IN THE ELECTRIC DRAWING, 65 & 693 ARE NOT INDICATED

SUPPLY WIRING IDENTIFICATION



LEGEND LIST



NOTE
——— INTERNAL WIRING
– – – – VEOLIA WIRING
– – – – CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018–06–11	A.L.	A.L.	G.M.	–

DESIGNER	DATE
–	–
CHECKER	DATE
–	–
ENGINEER	DATE
–	–
SCALE:	None

TITLE HYDRAPOL CATIONIC – PLC9–621 CONTROL PANEL
DRAWING LIST & LEGEND
–

CLIENT AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

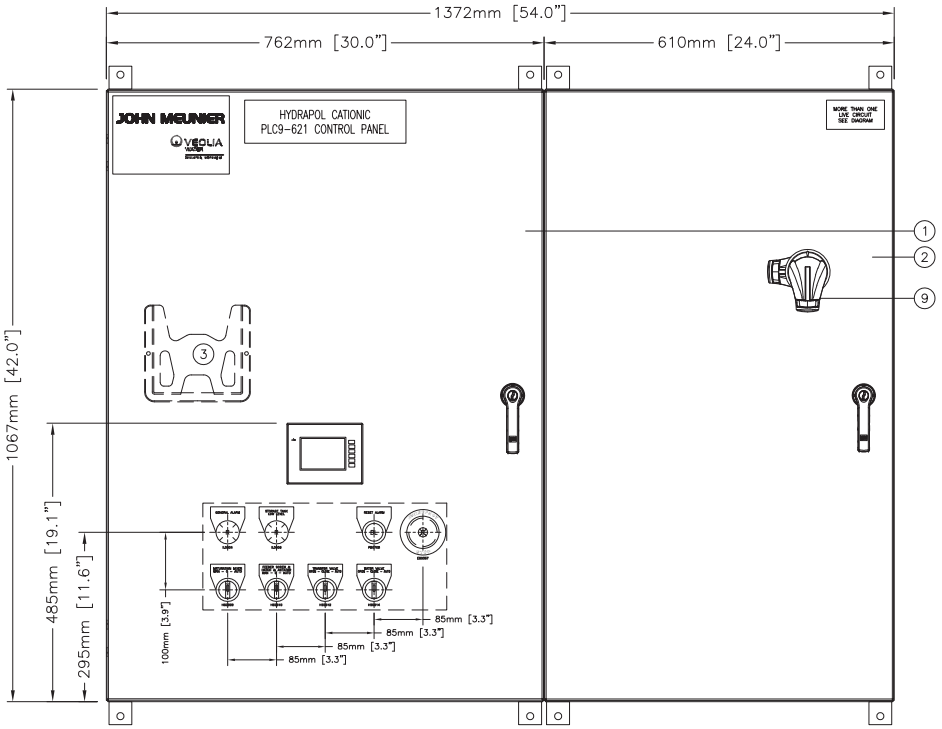
PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0002–AU–VWT	E00	02 OF 06	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

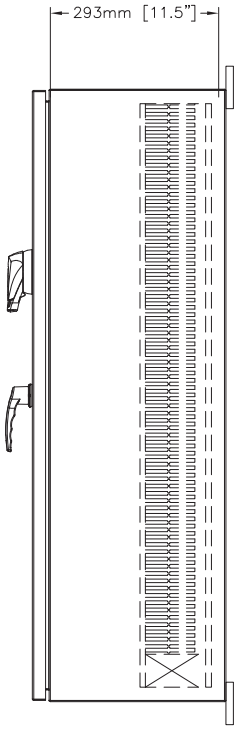
Jun. 11, 2018 12:32:38 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PCL9–621 (HYDRAPOL CATIONIC)\5000218009–ELD–0002–AU–VWT–E00–02–1_E.dwg – o.lessard

NOTE:

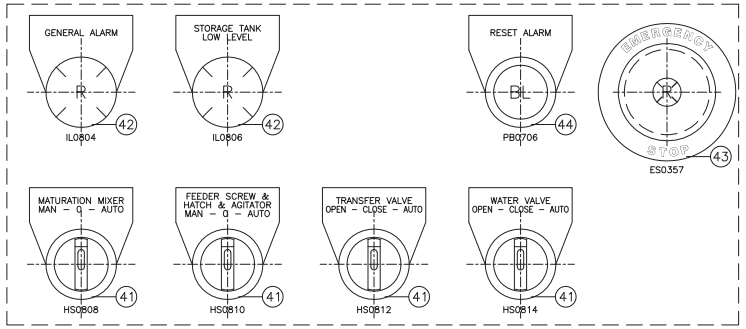
1- SEE DIAGRAM 5000218009-ELD-0002-AU-VWT-E00-05 FOR THE REFERENCES TO THE BILL OF MATERIAL.



EXTERNAL LAYOUT



SIDE LAYOUT



DOOR DETAILS

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018-06-11	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: HYDRAPOL CATIONIC – PLC9-621 CONTROL PANEL
OUTSIDE PANEL LAYOUT
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

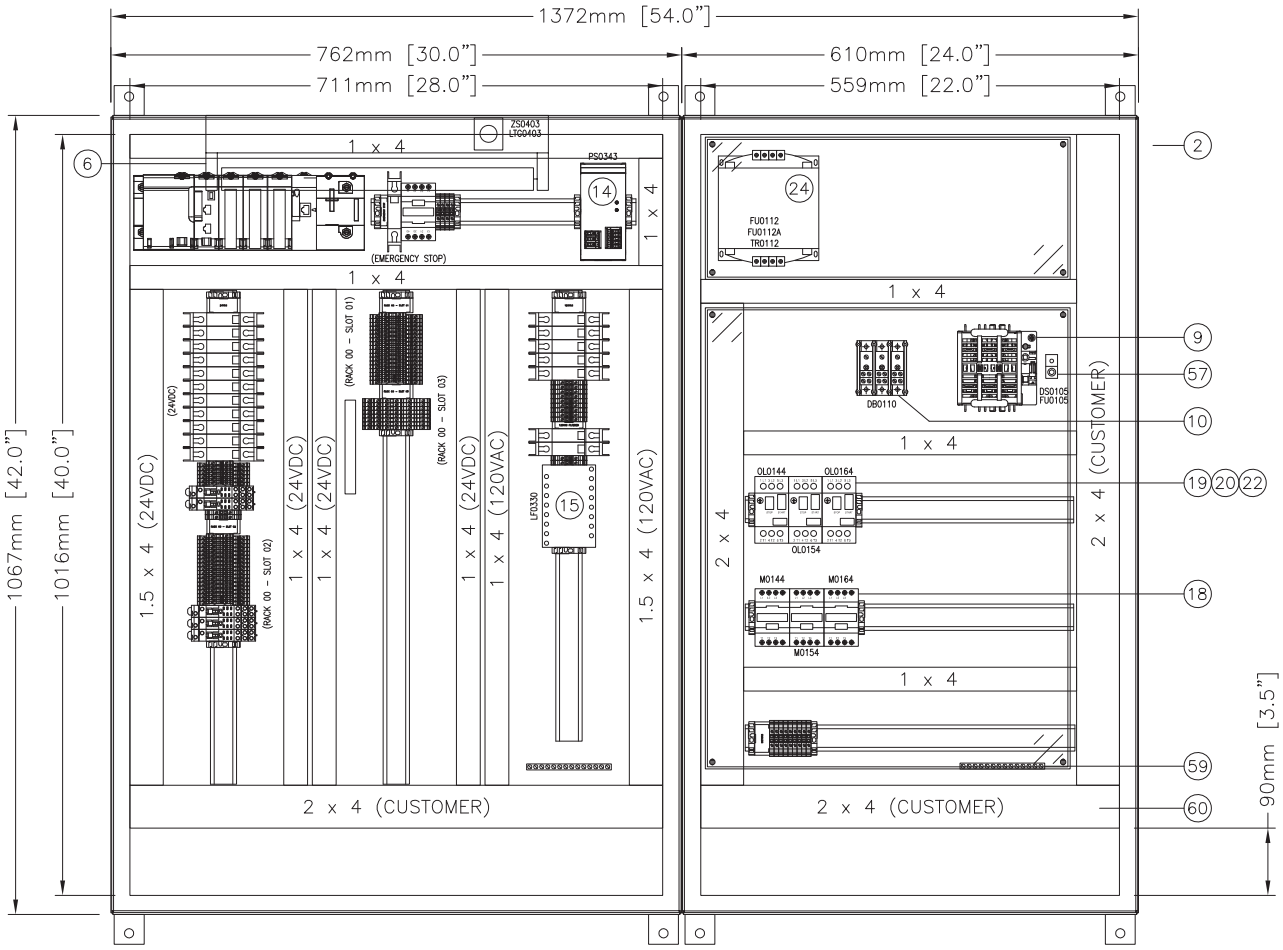
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0002-AU-VWT	E00	03 OF 06	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

NOTE:

1- SEE DIAGRAM 5000218009-ELD-0002-AU-VWT-E00-05 FOR THE REFERENCES TO THE BILL OF MATERIAL.
2- SEE DIAGRAM 5000218009-ELD-0002-AU-VWT-E04-06 FOR PLC DETAILS.



INSIDE LAYOUT

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018-06-11	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: HYDRAPOL CATIONIC – PLC9-621 CONTROL PANEL
INSIDE PANEL LAYOUT
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0002-AU-VWT	E00	04 OF 06	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

BILL OF MATERIALS [BOM]

#	QTY.	DESCRIPTION	MANUFACTURER	CATALOGUE N.	REMARK
1	1	NEMA 4 WALL MOUNT PANEL, ONE DOOR, DIM 1067mm[H] x 762mm[W] x 293mm[D]	EUROBEX	5412ES423012	–
2	1	NEMA 4 WALL MOUNT PANEL, ONE DOOR, DIM 1067mm[H] x 610mm[W] x 293mm[D]	EUROBEX	5412ES422412	–
3	1	DATA POCKET	EUROBEX	880PP	–
4	A.S.R.	PLEXIGLAS PROTECTION	CONTROLES RL	–	–
5	1	WALLMOUNT KIT	EUROBEX	885ESMF1	–
6	1	FIXTURE LED, 24VDC	HOFFMAN	LED24V15	–
	1	DOOR INTERRUPTER	HOFFMAN	AFLSWD	–
7	–	–	–	–	–
8	–	–	–	–	–
9	1	MAIN FUSED DISCONNECT SWITCH, 30A, 600VAC, FUSE TYPE J	SCHNEIDER	GS1DU3	–
	1	OPERATING HANDLES	SCHNEIDER	GS2AH420	–
	1	OPERATING SHAFT	SCHNEIDER	GS2AE81	–
	3	FUSE 15A, TYPE J, TIME DELAY	FERRAZ	AJT–15	–
10	1/3	DISTRIBUTION BLOCK, 3 POLES, (1 IN (2/0 ... 14), 4 OUT (4 ... 14)) C/W PROTECTION COVER, 135A	FERRAZ	MDPB63133/MDPBC6263	–
11	–	–	–	–	–
12	–	–	–	–	–
13	–	–	–	–	–
14	1	POWER SUPPLY 120VAC / 24VDC, 10A	PHOENIX CONTACT	2866323	–
15	1	LINE FILTER 120VAC, 5A	CUTLER HAMMER	AGPH12005	–
16	–	–	–	–	–
17	–	–	–	–	–
18	3	FULL VOLTAGE NO–REVERSING CONTACTOR, 3PH, 600VCA, 9A 1N.O., COIL 24VDC	SCHNEIDER	LC1D09BD	–
19	–	–	–	–	–
20	3	MANUAL STARTER, 600VCA, 3PH, 0.63A @ 1A	SCHNEIDER	GV2ME05	–
21	–	–	–	–	–
22	3	CONTACT BLOCK 2N.O., FRONT MOUNTING	SCHNEIDER	GVAE20	–
23	–	–	–	–	–
24	1	TRANSFORMER 1500VA, 600/120VAC	HAMMOND	SP1500ACP	–
	1	HOLDING KIT FOR FUSE HOLDER	HAMMOND	SPFBAK1	–
	1	FUSE HOLDER 3 POLES MIDGET	HAMMOND	L60030M3SQDIN	–
	1	PROTECTION COVER	HAMMOND	SPFG1	–
	2/1	FUSE 7A & 15A	FERRAZ	ATQR–7 / ATMR–15	–
25	–	–	–	–	–
26	1	ETHERNET COMM. MODULE	SCHNEIDER	BMX NOE 0100	–
27	1	6–SLOT CHASSIS, MODICON M340	SCHNEIDER	BMX XBP 0600	–
28	1	POWER SUPPLY M340, 100–240VAC	SCHNEIDER	BMX CPS 2000	–
29	1	M340 PROCESSOR, ETHERNET PORT MODBUS/TCP	SCHNEIDER	BMX P34 2020	–
30	1/1	32 NON–ISOLATED DIGITAL INPUTS CARD, 24VDC C/W CABLE (3m)	SCHNEIDER	BMXDDI3202K BMXFCW303	–
31	1/1	32 NON–ISOLATED DIGITAL OUTPUTS CARD, 24VDC C/W CABLE (3m)	SCHNEIDER	BMXDDO3202K BMXFCW303	–
32	1/1	8–ISOLATED ANALOG INPUTS CARD, 24VDC C/W CABLE (3m)	SCHNEIDER	BMXAMI0800 BMXFTW308S	–
33	–	–	–	–	–
34	–	–	–	–	–
35	1	OPERATOR INTERFACE, 24VDC	SCHNEIDER	HMISTU655	–
36	–	–	–	–	–
37	5	CONTROL RELAY SLIM 24VDC, SPDT	OMRON	G2R–1–SN–DC24 (S) P2RF–05–E	–
38	1	E–STOP CONTROL RELAY, 24VDC, 5N.O.	SCHNEIDER	CAD50BD	–
39	–	–	–	–	–
40	–	–	–	–	–
41	4	3–POSITIONS MAINTAINED SELECTOR, 12 ... 130VAC/VDC, 30.5mm	ALLEN BRADLEY	800T–J2B	–
42	2	PILOT LIGHT OPERATOR, RED, 12 ... 130VAC/VDC, 30.5mm	ALLEN BRADLEY	800T–QH2R	–

BILL OF MATERIALS [BOM]

#	QTY.	DESCRIPTION	MANUFACTURER	CATALOGUE N.	REMARK
43	1	ILLUMINATED E–STOP RED PUSH–BUTTON, 2N.O./2N.C., 12 ... 130VAC/VDC, 30.5mm	ALLEN BRADLEY	800T–FXTQH2RG1	–
44	1	MOMENTARY PUSH BUTTON, NON–ILLUMINATED, FLUSH, COLOR BLUE, 1N.O., 30.5mm	ALLEN BRADLEY	800T–A7D1	–
45	–	–	–	–	–
46	14	"BRANCH PROOF" BREAKER, 2A, 1 POLE, 120VAC/24VDC	SCHNEIDER	60103	–
47	1	"BRANCH PROOF" BREAKER, 3A, 1 POLE, 120VAC/24VDC	SCHNEIDER	60104	–
48	1	"BRANCH PROOF" BREAKER, 4A, 1 POLE, 120VAC/24VDC	SCHNEIDER	60105	–
49	1	"BRANCH PROOF" BREAKER, 5A, 1 POLE, 120VAC/24VDC	SCHNEIDER	60106	–
50	1	"BRANCH PROOF" BREAKER, 6A, 1 POLE, 120VAC/24VDC	SCHNEIDER	60107	–
51	1	"BRANCH PROOF" BREAKER, 10A, 1 POLE, 120VAC/24VDC	SCHNEIDER	60110	–
52	8/8	IDENTIFICATION TERMINAL UBE/D	PHOENIX CONTACT	0800307	–
53	26/5	SIMPLE TERMINAL BLOCK, UT 4 EN C/W END PLATE	PHOENIX CONTACT	3044102/3047028	–
54	42/3	DOUBLE TERMINAL BLOCK, UTTB 2,5 C/W END PLATE	PHOENIX CONTACT	3044636/3047293	–
55	8/1	TRIPLE TERMINAL BLOCK, UT 2.5–3L C/W END PLATE	PHOENIX CONTACT	3214259/3214314	–
56	A.S.R.	END BARRIER, E/NS 35 N	PHOENIX CONTACT	0800886	–
57	1	LUG	BURNDY	–	–
58	1	ISOLATED GROUND BAR	WEIDMULLER	–	–
59	2	NON–ISOLATED GROUND BAR	ILSCO	N–174	–
60	A.S.R.	WIRING DUCT [1 x 4, 1.5 x 4, 2 x 4]	PANDUIT	–	–

NOTES:

1. COMPONENTS NUMBERS MAY CHANGE ACCORDING TO THE REAL MOTORS FLA.
2. PANEL CERTIFIED CSA.

TRIPLE TERMINAL BLOCK, DLD 2.5 C/W END PLATE

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018–06–11	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

TITLE: HYDRAPOL CATIONIC – PLC9–621 CONTROL PANEL
BILL OF MATERIALS
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada. Tel: (514) 334-7230

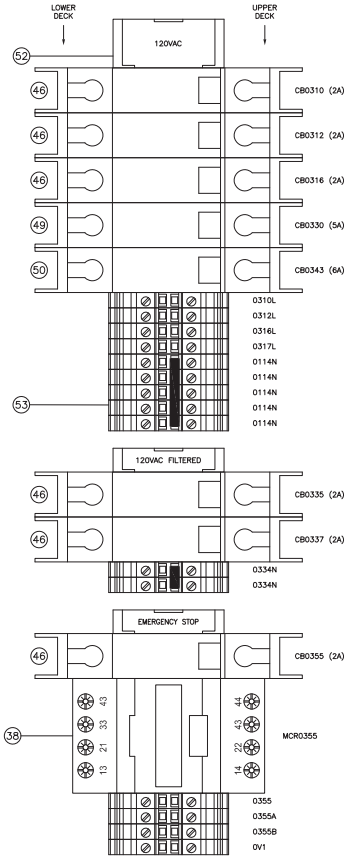
PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0002–AU–VWT	E00	05 OF 06	1

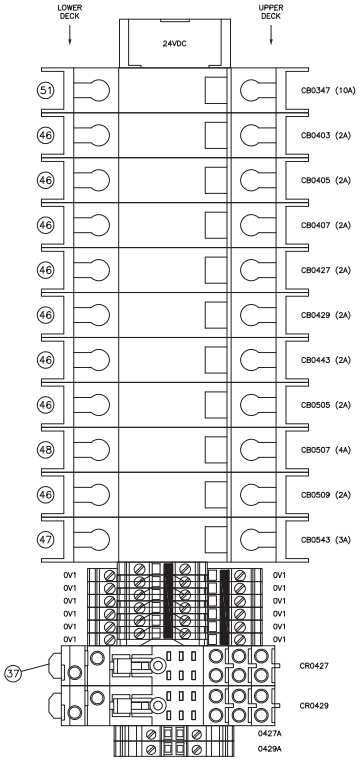
STD: "B" 11x17
REF: CONTROLES RL – 184172
BAR = 1" AT PLOT SCALE

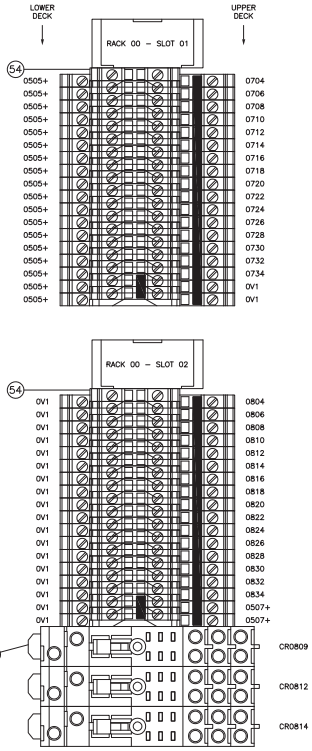
Jun. 11, 2018 12:32:53 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PCL9–621 (HYDRAPOL CATIONIC)\5000218009–ELD–0002–AU–VWT–E00–05–1_E.dwg – a.lessard

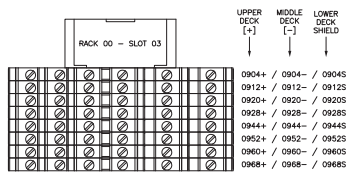
NOTE:

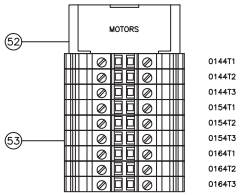
1- SEE DIAGRAM 5000218009-ELD-0002-AU-VWT-E00-05 FOR THE REFERENCES TO THE BILL OF MATERIAL.











REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018-06-11	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: HYDRAPOL CATIONIC – PLC9-621 CONTROL PANEL TERMINAL DETAILS
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

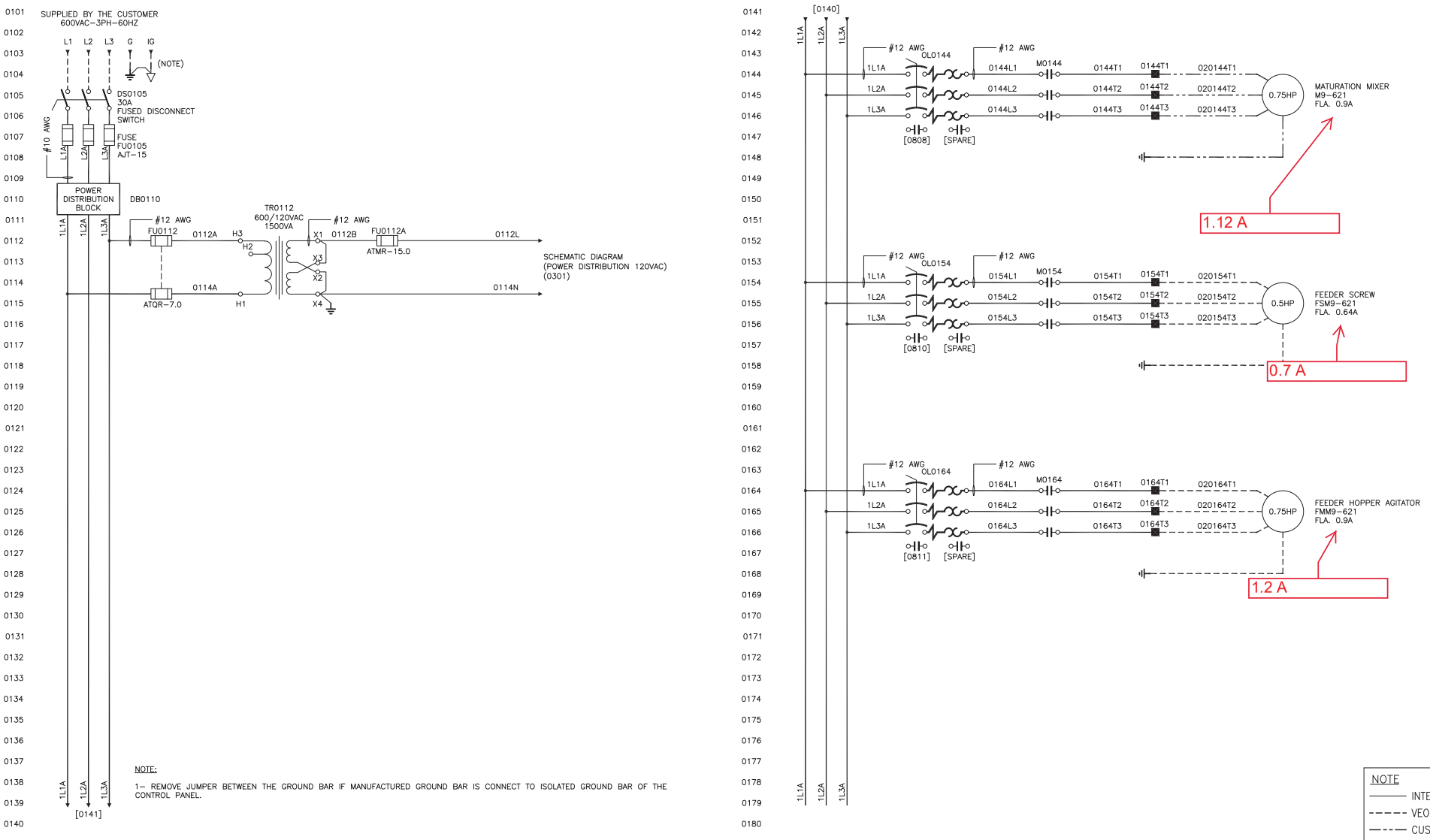
VEOLIA

VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0002-AU-VWT	E00	06 OF 06	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun. 11, 2018 - 12:32:58 - P:\CLIENTS\Veolia Waters - John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PCL9-621 (HYDRAPOL CATIONIC)\5000218009-ELD-0002-AU-VWT-E00-06-1_E.dwg - a.lessard



REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018–06–11	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

TITLE: HYDRAPOL CATIONIC – PLC9–621 CONTROL PANEL
SCHEMATIC DIAGRAM [POWER DISTRIBUTION] 600VAC/480VAC
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC., 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0002–AU–VWT	E04	01 OF 09	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun. 11, 2018 - 12:33:02 - P:\CLIENTS\Veolia Waters - John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PCL9-621 (HYDRAPOL CATIONIC)\5000218009-ELD-0002-AU-VWT-E04-01-1_E.dwg - a.lessard

0201 0202 0203 0204 0205 0206 0207 0208 0209 0210 0211 0212 0213 0214 0215 0216 0217 0218 0219 0220 0221 0222 0223 0224 0225 0226 0227 0228 0229 0230 0231 0232 0233 0234 0235 0236 0237 0238 0239 0240

0241 0242 0243 0244 0245 0246 0247 0248 0249 0250 0251 0252 0253 0254 0255 0256 0257 0258 0259 0260 0261 0262 0263 0264 0265 0266 0267 0268 0269 0270 0271 0272 0273 0274 0275 0276 0277 0278 0279 0280

NOTE
——— INTERNAL WIRING
- - - - - VEOLIA WIRING
—·—·— CUSTOMER WIRING

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018-06-11	A.L.	A.L.	G.M.	–

		DATE
DESIGNER	–	–
CHECKER	–	–
ENGINEER	–	–
SCALE:	None	

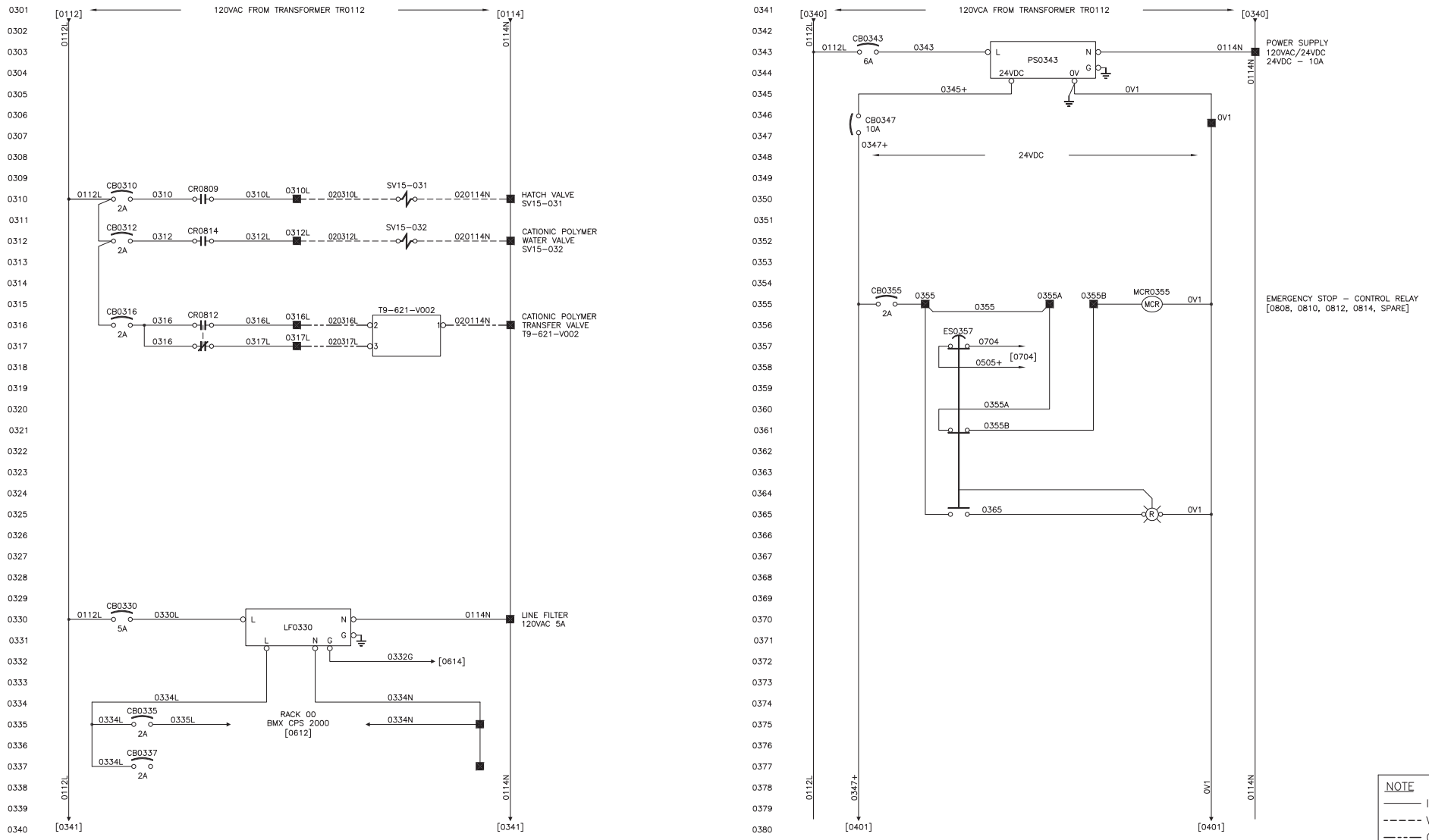
TITLE: HYDRAPOL CATIONIC – PLC9-621 CONTROL PANEL
SPARE SCHEMATIC DIAGRAM
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0002-AU-VWT	E04	02 OF 09	1

Jun 11, 2018 12:33:07 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PCL9-621 (HYDRAPOL CATIONIC)\5000218009-ELD-0002-AU-VWT-E04-02-1_E.dwg – o.lessard



REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018-06-11	A.L.	A.L.	G.M.	-

DESIGNER	-	DATE -
CHECKER	-	DATE -
ENGINEER	-	DATE -
SCALE:	None	

TITLE: HYDRAPOL CATIONIC - PLC9-621 CONTROL PANEL
SCHEMATIC DIAGRAM [POWER DISTRIBUTION] 120VAC/24VDC
-

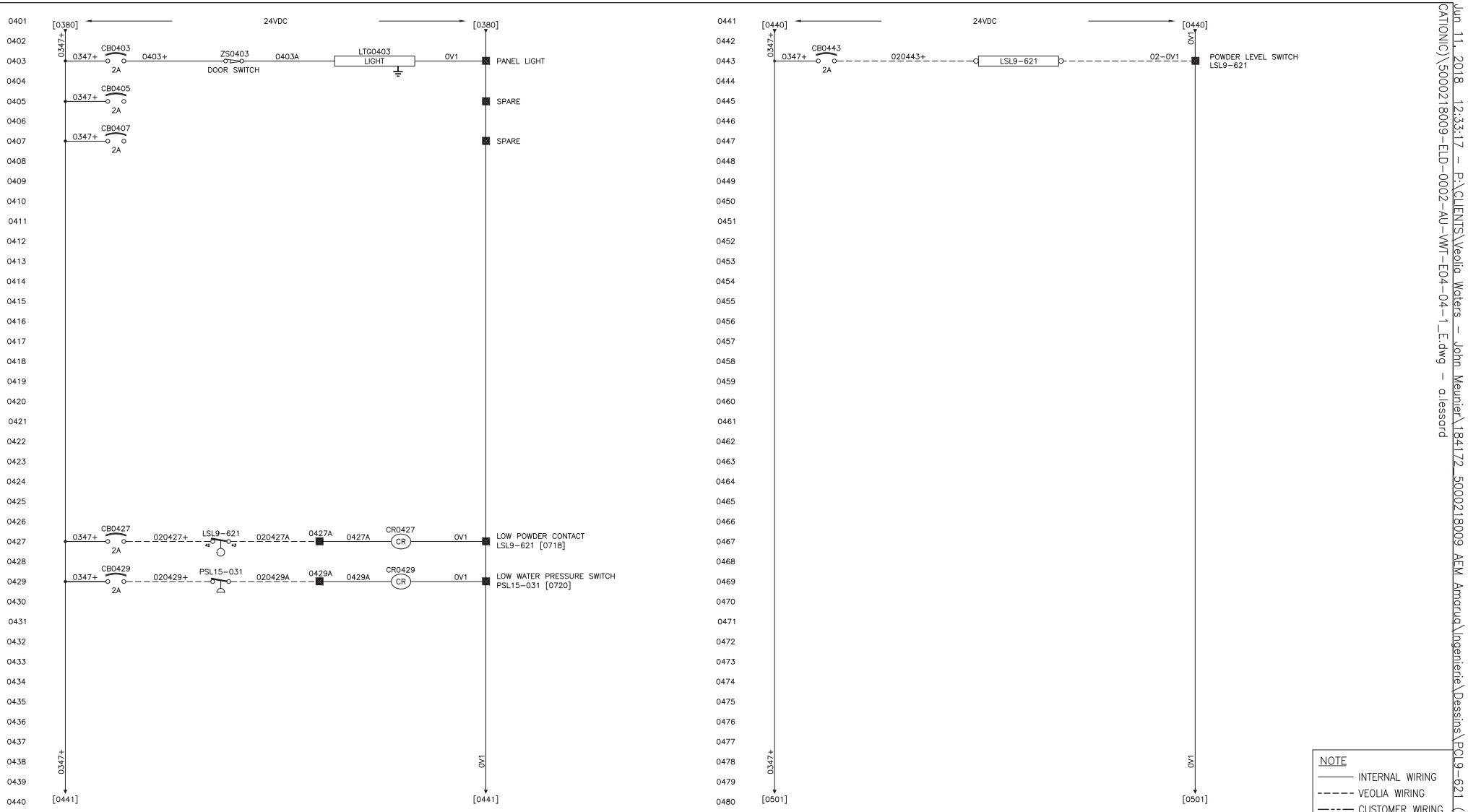
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 - ELD-0002-AU-VWT	E04	03 OF 09	1

STD: "B" 11x17 | REF: CONTROLES RL - 184172 | BAR = 1" AT PLOT SCALE

Jun 11, 2018 12:33:12 - P:\CLIENTS\Veolia Waters - John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PCL9-621 (HYDRAPOL CATIONIC)\5000218009-ELD-0002-AU-VWT-E04-03-1_E.dwg - a.lessard



REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018-06-11	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

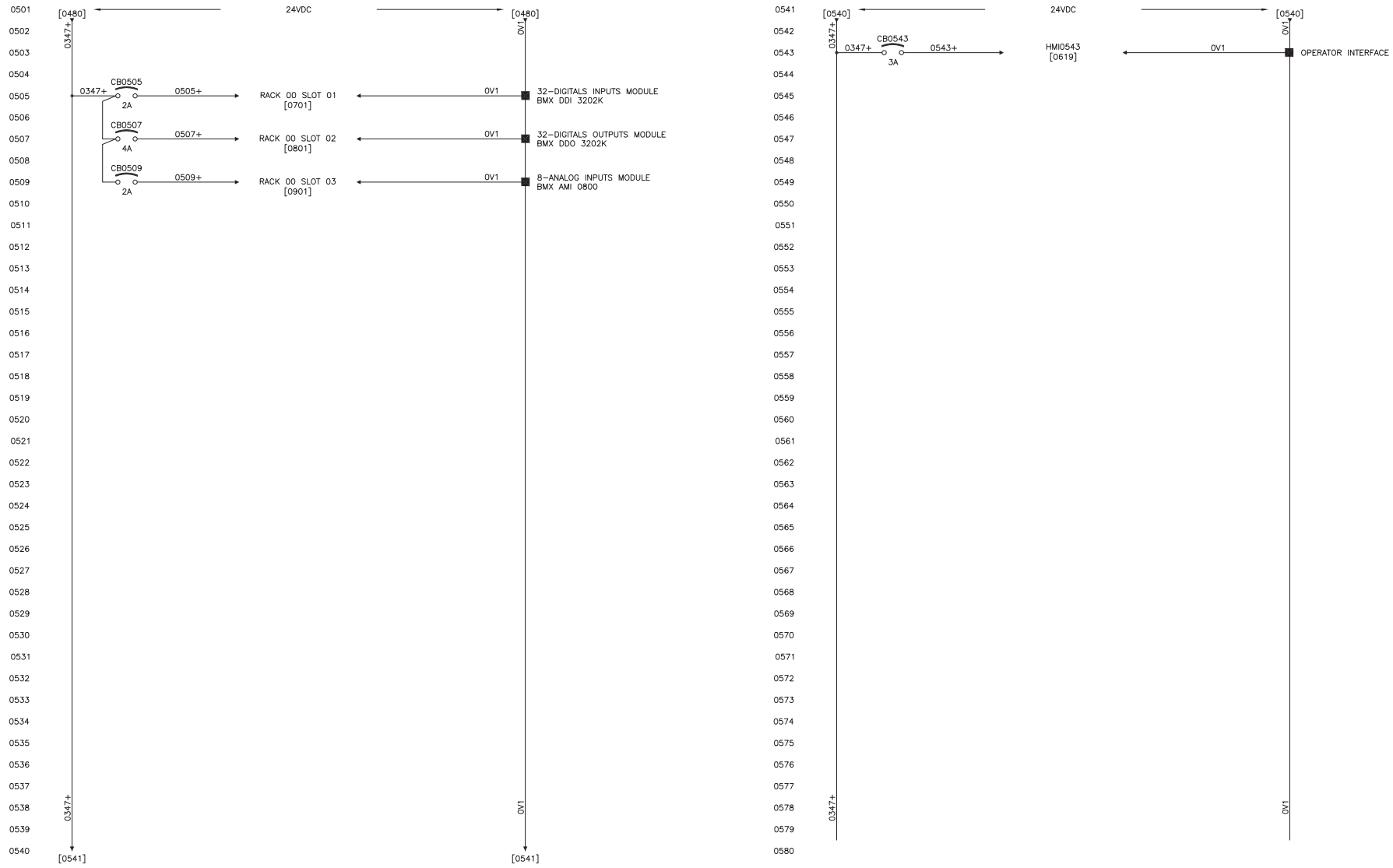
TITLE: HYDRAPOL CATIONIC – PLC9-621 CONTROL PANEL SCHEMATIC DIAGRAM DISTRIBUTION 24VDC
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC., 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0002-AU-VWT	E04	04 OF 09	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE



NOTE

——— INTERNAL WIRING

- - - - - VEOLIA WIRING

—·—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018-06-11	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

TITLE: HYDRAPOL CATIONIC – PLC9-621 CONTROL PANEL
SCHEMATIC DIAGRAM DISTRIBUTION 24VDC
–

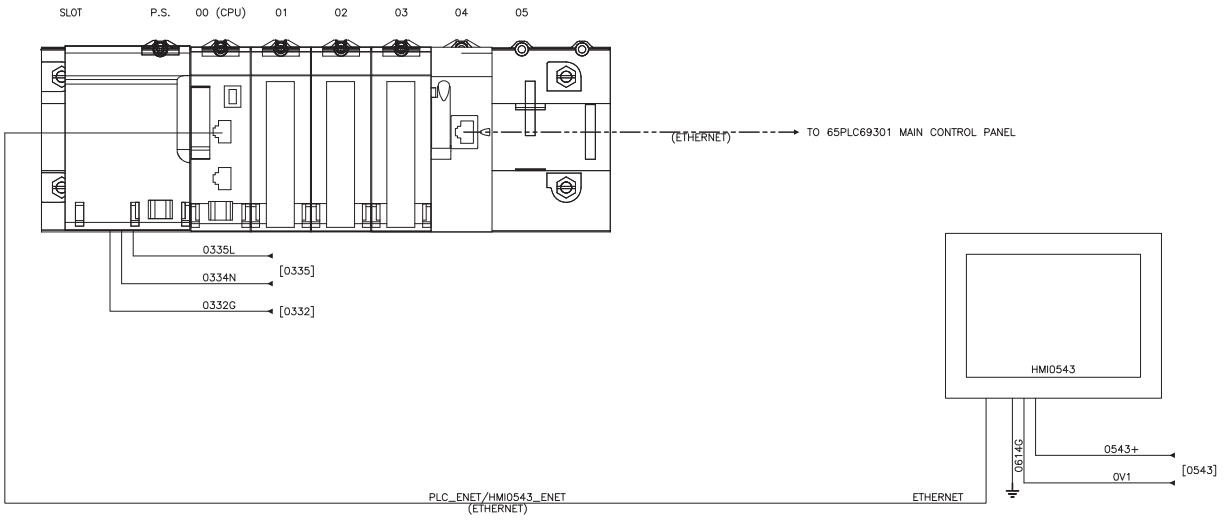
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA WATER TECHNOLOGIES CANADA INC., 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0002-AU-VWT	E04	05 OF 09	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

RACK 00



RACK 00
SLOT 01, SEE CONNECTING DETAIL DRAWING 5000216065-ELD-0002-AU-VWT-E04-07
SLOT 02, SEE CONNECTING DETAIL DRAWING 5000216065-ELD-0002-AU-VWT-E04-08
SLOT 03, SEE CONNECTING DETAIL DRAWING 5000216065-ELD-0002-AU-VWT-E04-09

NOTE
——— INTERNAL WIRING
- - - - - VEOLIA WIRING
—·—· CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018-06-11	A.L.	A.L.	G.M.	–

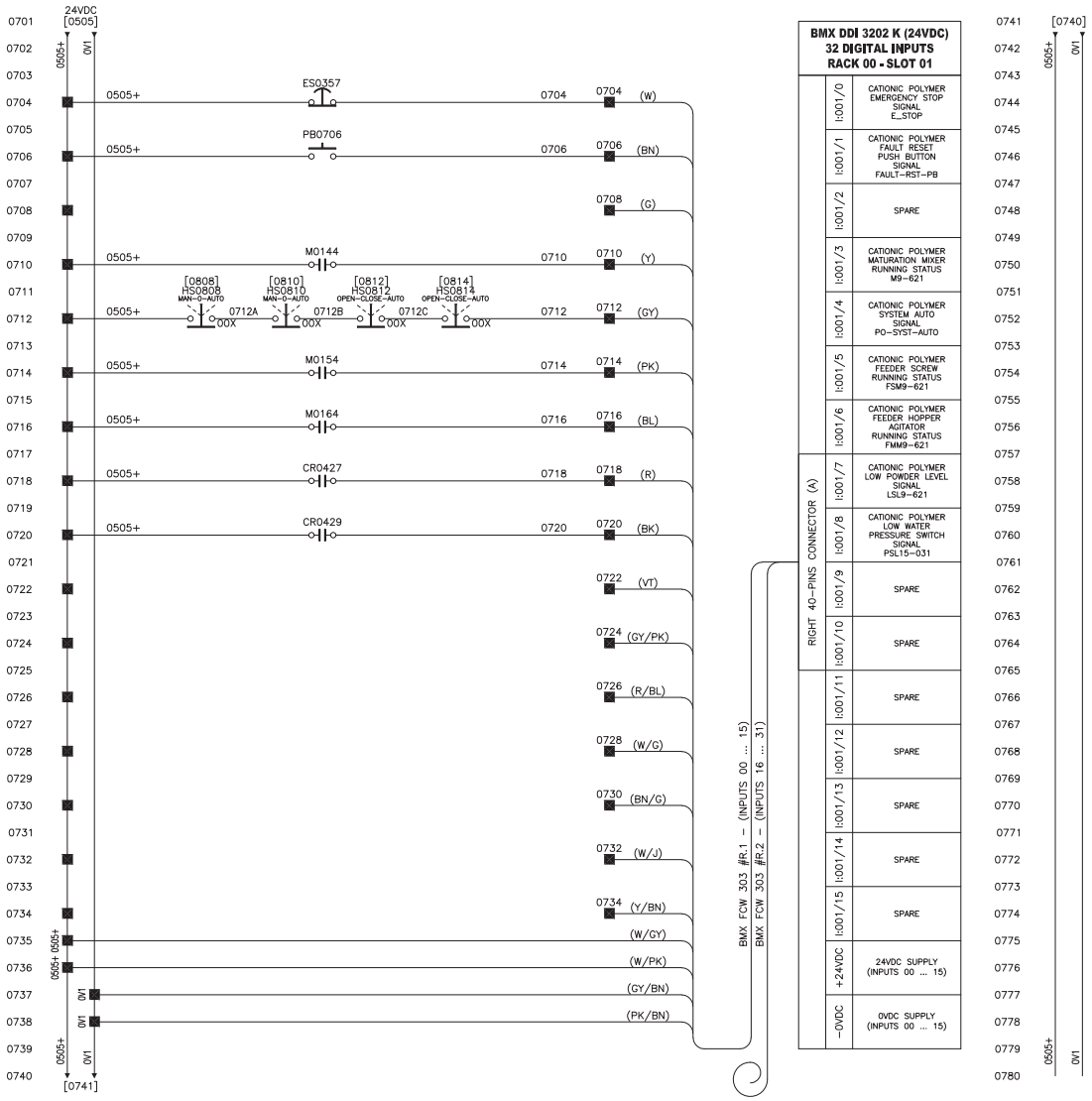
	DESIGNER	DATE
	–	–
	CHECKER	DATE
	–	–
	ENGINEER	DATE
	–	–
	SCALE: None	

TITLE: HYDRAPOL CATIONIC – PLC9-621 CONTROL PANEL
PROGRAMMABLE CONTROLLER / NETWORK
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC., 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000216065 – ELD-0002-AU-VWT	E04	06 OF 09	1



BMX DDI 3202 K (24VDC)
32 DIGITAL INPUTS
RACK 00 - SLOT 01

RIGHT 40–PINS CONNECTOR (A)	I:001/0	CATIONIC POLYMER EMERGENCY STOP SIGNAL E_STOP
	I:001/1	CATIONIC POLYMER FAULT RESET PUSH BUTTON SIGNAL FAULT–RST–PB
	I:001/2	SPARE
	I:001/3	CATIONIC POLYMER MATURATION MIXER RUNNING STATUS M9–621
	I:001/4	CATIONIC POLYMER SYSTEM AUTO SIGNAL PO–SYST–AUTO
	I:001/5	CATIONIC POLYMER FEEDER SCREW RUNNING STATUS FSM9–621
	I:001/6	CATIONIC POLYMER FEEDER HOPPER AGITATOR RUNNING STATUS FMM9–621
	I:001/7	CATIONIC POLYMER LOW POWDER LEVEL SIGNAL LSL9–621
	I:001/8	CATIONIC POLYMER LOW WATER PRESSURE SWITCH SIGNAL PSL15–031
	I:001/9	SPARE
	I:001/10	SPARE
	I:001/11	SPARE
	I:001/12	SPARE
	I:001/13	SPARE
	I:001/14	SPARE
	I:001/15	SPARE
	+24VDC	24VDC SUPPLY (INPUTS 00 ... 15)
	–0VDC	0VDC SUPPLY (INPUTS 00 ... 15)

BMX DDI 3202 K (24VDC)
32 DIGITAL INPUTS
RACK 00 - SLOT 01

	I:001/16	SPARE
	I:001/17	SPARE
	I:001/18	SPARE
	I:001/19	SPARE
	I:001/20	SPARE
	I:001/21	SPARE
	I:001/22	SPARE
	I:001/23	SPARE
	I:001/24	SPARE
	I:001/25	SPARE
	I:001/26	SPARE
	I:001/27	SPARE
	I:001/28	SPARE
	I:001/29	SPARE
	I:001/30	SPARE
	I:001/31	SPARE
	+24VDC	24VDC SUPPLY (INPUTS 16 ... 31)
	–0VDC	0VDC SUPPLY (INPUTS 16 ... 31)

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018–06–11	A.L.	A.L.	G.M.	–

DESIGNER	–	DATE –
CHECKER	–	DATE –
ENGINEER	–	DATE –
SCALE:	None	

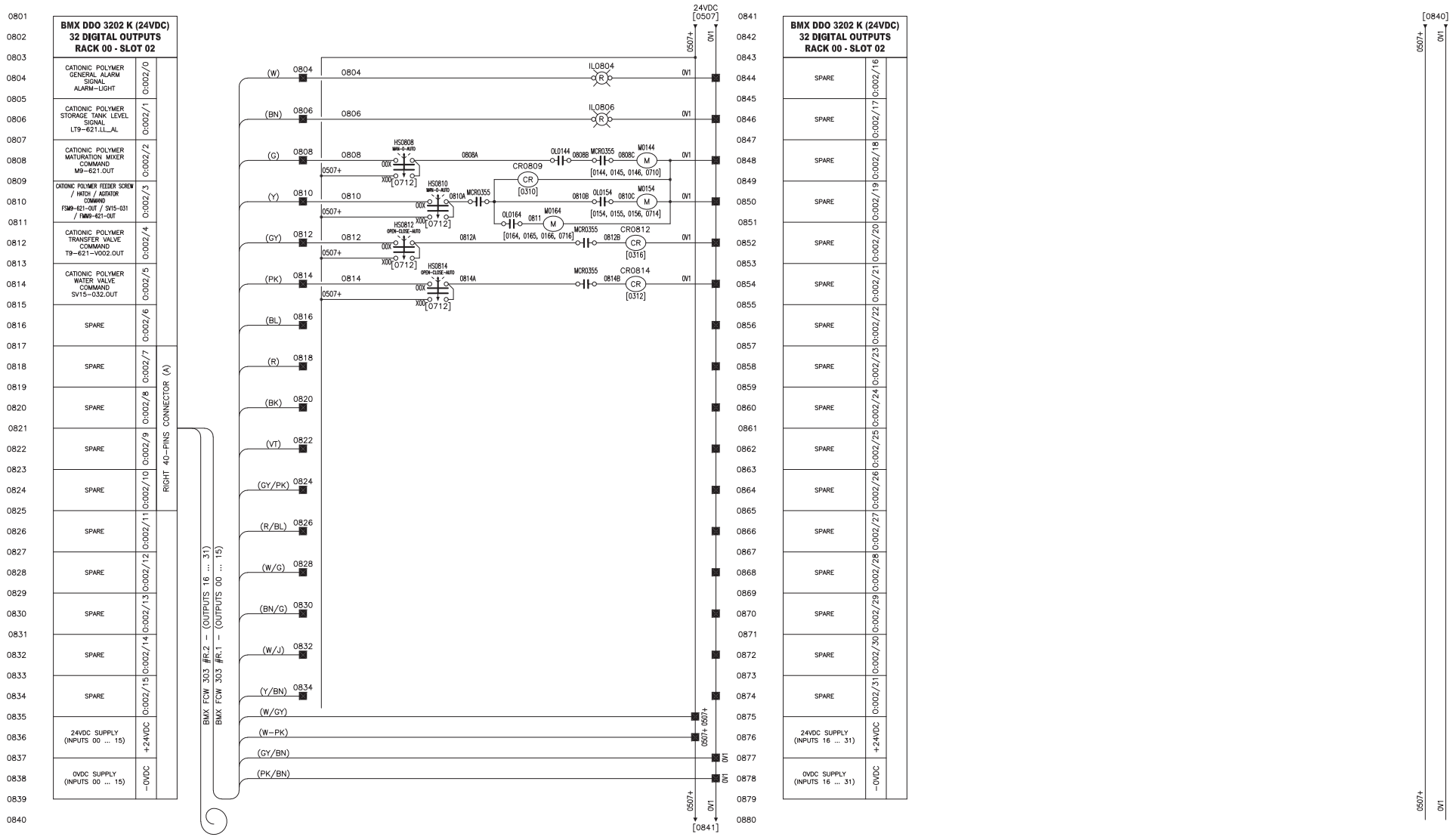
TITLE: HYDRAPOL CATIONIC – PLC9–621 CONTROL PANEL
ELECTRICAL SCHEMATIC DIAGRAM [RACK 00 SLOT 01]
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada. Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD–0002–AU–VWT	E04	07 OF 09	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE



REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018-06-11	A.L.	A.L.	G.M.	–

DESIGNER	DATE – –
CHECKER	DATE – –
ENGINEER	DATE – –
SCALE:	None

TITLE: HYDRAPOL CATIONIC – PLC9-621 CONTROL PANEL
ELECTRICAL SCHEMATIC DIAGRAM [RACK 00 SLOT 02]
–

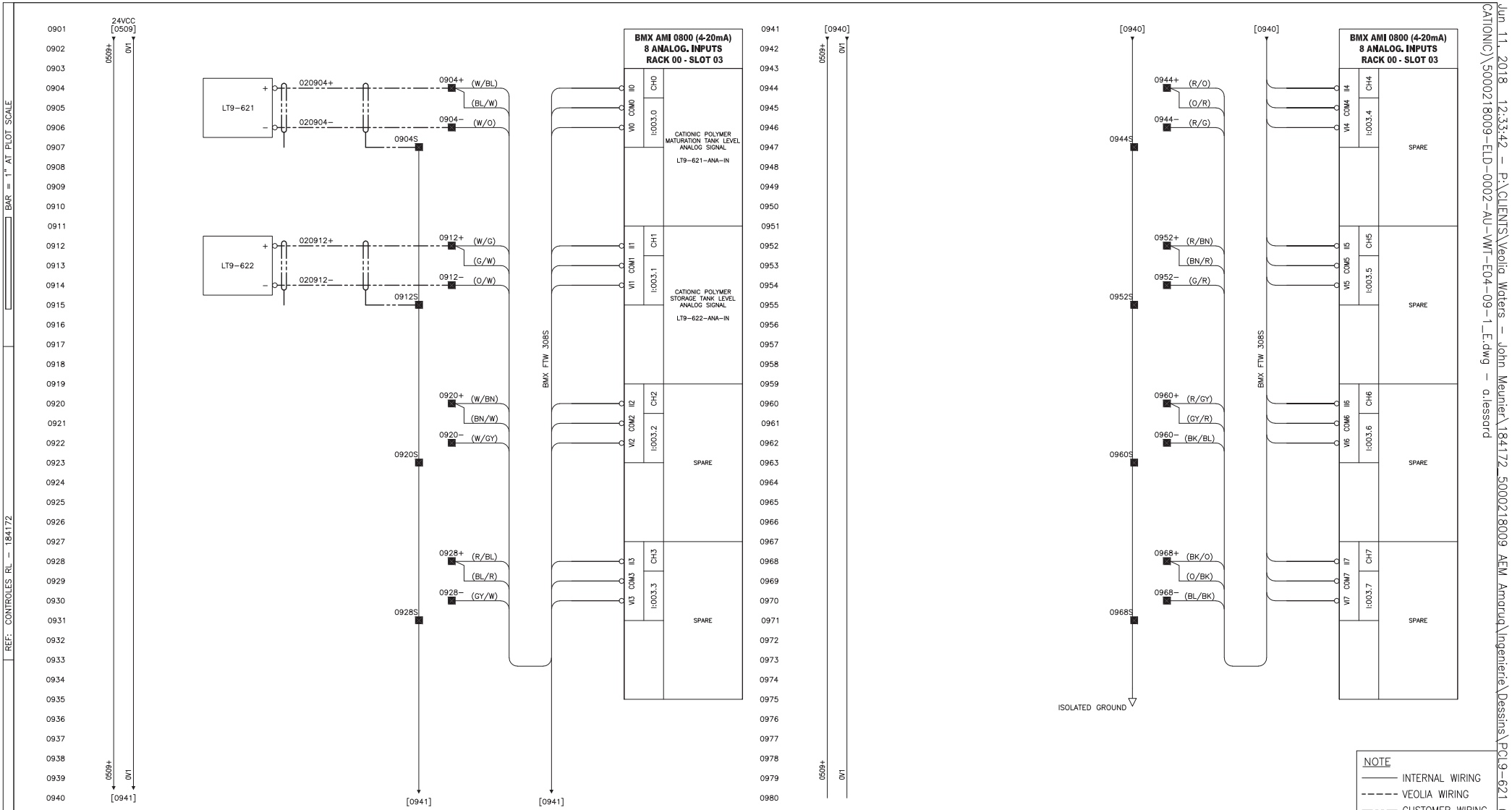
CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC. 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0002-AU-VWT	E04	08 OF 09	1

STD: "B" 11x17
REF: CONTROLES RL – 184172
BAR = 1" AT PLOT SCALE

Jun 11, 2018 12:33:37 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PCL9-621 (HYDRAPOL CATIONIC)\5000218009-ELD-0002-AU-VWT-E04-08-1_E.dwg – a.lessard



NOTE
——— INTERNAL WIRING
- - - - - VEOLIA WIRING
—·—·— CUSTOMER WIRING

REV	DESCRIPTION	DATE	REVD	CHKD	APVD	ECN
1	FOR INFORMATION	2018-06-11	A.L.	A.L.	G.M.	–

DESIGNER	DATE –
CHECKER	DATE –
ENGINEER	DATE –
SCALE:	None

TITLE: HYDRAPOL CATIONIC – PLC9-621 CONTROL PANEL ELECTRICAL SCHEMATIC DIAGRAM [RACK 00 SLOT 03]
–

CLIENT: AEM AMARUQ
HUDSON BAY, NUNAVUT

VEOLIA
VEOLIA WATER TECHNOLOGIES CANADA INC., 4105 Sartelon, Saint-Laurent, Qc, Canada, Tel: (514) 334-7230

PROJECT DRAWING	INTERNAL	SHEET	REV
5000218009 – ELD-0002-AU-VWT	E04	09 OF 09	1

STD: "B" 11x17 | REF: CONTROLES RL – 184172 | BAR = 1" AT PLOT SCALE

Jun. 11, 2018 - 12:33:42 – P:\CLIENTS\Veolia Waters – John Meunier\184172_5000218009 AEM Amaruq\Ingenierie\Dessins\PCL9-621 (HYDRAPOL CATIONIC)\5000218009-ELD-0002-AU-VWT-E04-09-1_E.dwg – o.lessard

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5 – ELECTRICITY AND CONTROL

5.3 – CONTROL ARCHITECTURE

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Cationic Polymer Preparation System
PLC9-621


PLC_XX
xxx.xxx.xxx.xxx


HMI_XX
xxx.xxx.xxx.xxx

ETH

Main Control Panel
PLC-001


PLC_XX
xxx.xxx.xxx.xxx


HMI_XX
xxx.xxx.xxx.xxx


ETH_XX
xxx.xxx.xxx.xxx

120 VAC Feed

120 VAC
(by others)

ETH

Coagulant Dosing
(Winter)

Coagulant Dosing
(Summer)

NaOH Dosing

HW HW HW

600 VAC Feed (3)

600 VAC Feed (2)

600 VAC Feed (3)

600 VAC Feed (3)

Centrifuge 1


PLC_XX
xxx.xxx.xxx.xxx


HMI_XX
xxx.xxx.xxx.xxx

HW

600 VAC Feed

HW

Precipitation Reactor
Actiflo/Multiflo 1
Actiflo/Multiflo 2

Sludge Extraction
Sludge Tanks
Sludge Storage Tank
Centifuge Feed Pumps
Centrate Sump Pumps

NaOH Preparation
Coagulant Preparation
KmNO4 Preparation
Lifting Pumps

Control : From Main Control Panel
Motors Starters and VFDs: From MCC

575 VAC Motor (41)

600VAC Feed (4)

Centrifuge 2


PLC_XX
xxx.xxx.xxx.xxx


HMI_XX
xxx.xxx.xxx.xxx

HW

600 VAC Feed

600 VAC Feed

600 VAC Feed (3)

600 VAC Feed (3)

600 VAC Feed (3)

600 VAC Feed (2)

HW HW HW HW HW HW HW

Anionic Polymer Preparation System

Anionic Polymer Dosing (Summer)

Anionic Polymer Dosing (Winter)

Cationic Polymer Dosing

KMnO4 Dosing

H2SO4 Dosing

120 VAC
(by others)

120 VAC Feed (2)

MCC / 600 VAC distribution
(by others)

575 VAC Motors Starters and VFDs (38)

M1-011 DOL	M5-011 DOL
M1-012 DOL	M5-012 DOL
M1-013 DOL	P5-011 VFD
M2-011 DOL	P5-012 VFD
M2-012 DOL	P5-013 VFD
M2-013 VFD	P6-011 DOL
S2-011 DOL	P6-021 DOL
P2-011 DOL	M9-541 DOL
P2-012 DOL	B9-513 DOL
P2-013 DOL	DF9-511 VFD
P2-014 DOL	M9-511 DOL
M2-021 DOL	P9-515 DOL
M2-022 DOL	VAC9-591 DOL
M2-023 VFD	FMM9-591 DOL
S2-021 DOL	FSM9-591 VFD
P2-021 DOL	M9-591 DOL
P2-022 DOL	PX-0XX
P2-023 DOL	PX-0XX
P4-011 DOL	
P4-021 DOL	

+ 600 VAC Feed (29)

See Motor List for details
* Additionnal equipment may be required
(to be specified by the client)

Electrical Container (by others)

NOTES :

All subnetmask are 255.255.255.0
All default gateway are xxx.xxx.xxx.xxx
All DNS: n/a

Veolia Scope
Existing
By Others

HW Hardwire
600 VAC 600 VAC Feed
575 VAC 575 VAC Motor
ETH Ethernet cable
Mod TCP Modbus TCP/IP

VEOLIA

TITLE: Control Architecture
Amaruq

CLIENT: Agnico Eagle Mines

DATE	REV'D	CHK'D	APV'D	PROJECT	DRAWING	SHEET	REV
2018-05-10	PLG	XM	-	5000218009	5000218009_CA_0001_AU_VWT	1 OF 1	2

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5 – ELECTRICITY AND CONTROL

5.4 – INPUT AND OUTPUT LIST

LEFT BLANK

AEM Amaruq

5000218009_IOLS_0001_AU_VWT

Liste des entrées et sorties

Project number 5000218009

Rev	By	Chckd	App	Revision date	Description
1	XM	AS	XM	2018-05-22	INITIAL RELEASE

Revision	Description	Signal description	Identification	Control pannel	Rack	Slot	IO number	Type	Voltage	Power	Starter	Selector	Disconnect	Relay	Contact type	Junction box	Comments
	BMEXBP1200			PLC-001	1	0		Rack									
	BMXCPS3500			PLC-001	1	0		PS									
	BMEP582040			PLC-001	1	0		PLC_CTRL									
	Spare			PLC-001	1	2											
	BMENOC0301			PLC-001	1	3		ETH_COM									
	BMXDDI3202K			PLC-001	1	4		DI									
1	METAL PRECIPITATION REACTOR HIGH HIGH LEVEL	Signal	LSHH1-011	PLC-001	1	4	1	DI							DCNC		
1	ACTIFLO 1 HIGH HIGH LEVEL	Signal	LSHH2-011	PLC-001	1	4	2	DI							DCNC	JB2-011	
1	ACTIFLO 1 HIGH TORQUE	Signal	WAH2-011	PLC-001	1	4	3	DI							DCNC	JB2-011	
1	ACTIFLO 1 HIGH HIGH TORQUE	Signal	WAHH2-011	PLC-001	1	4	4	DI							DCNC	JB2-011	
1	ACTIFLO 2 HIGH HIGH LEVEL	Signal	LSHH3-011	PLC-001	1	4	5	DI							DCNC	JB2-021	
1	ACTIFLO 2 HIGH TORQUE	Signal	WAH3-011	PLC-001	1	4	6	DI							DCNC	JB2-021	
1	ACTIFLO 2 HIGH HIGH TORQUE	Signal	WAHH3-011	PLC-001	1	4	7	DI							DCNC	JB2-021	
1	SLUDGE TANK HIGH HIGH LEVEL	Signal	LSHH4-011	PLC-001	1	4	8	DI							DCNC		
1	SLUDGE TANK LOW LOW LEVEL	Signal	LSLL4-012	PLC-001	1	4	9	DI							DCNC		
1	SLUDGE STORAGE TANK HIGH HIGH LEVEL	Signal	LSHH5-011	PLC-001	1	4	10	DI							DCNC		
1	SLUDGE STORAGE TANK HIGH HIGH LEVEL	Signal	LSHH5-021	PLC-001	1	4	11	DI							DCNC		
1	SLUDGE STORAGE TANK LOW LEVEL	Signal	LSLL5-012	PLC-001	1	4	12	DI							DCNC		
1	SLUDGE STORAGE TANK LOW LEVEL	Signal	LSLL5-022	PLC-001	1	4	13	DI							DCNC		
1	SLUDGE STORAGE TANK LOW PRESSURE	Signal	PSL5-011	PLC-001	1	4	14	DI							DCNC		
1	SLUDGE STORAGE TANK LOW PRESSURE	Signal	PSL5-012	PLC-001	1	4	15	DI							DCNC		
1	SLUDGE STORAGE TANK P5-011 HIGH TEMPERATURE	Signal	TSH5-011	PLC-001	1	4	16	DI							DCNC		
1	SLUDGE STORAGE TANK P5-012 HIGH TEMPERATURE	Signal	TSH5-012	PLC-001	1	4	17	DI							DCNC		
1	SLUDGE TREATMENT DEWATERING SYSTEM 1	PLC Fault	CV6-011	PLC-001	1	4	18	DI								PLC6-011	
1	SLUDGE TREATMENT DEWATERING SYSTEM 1	Common Alarm	CV6-011	PLC-001	1	4	19	DI								PLC6-011	
1	SLUDGE TREATMENT DEWATERING SYSTEM 1	Sludge Pump Run Cmd	CV6-011	PLC-001	1	4	20	DI								PLC6-011	
1	SLUDGE TREATMENT DEWATERING SYSTEM 1	Polymer Pump Run Cmd	CV6-011	PLC-001	1	4	21	DI								PLC6-011	
1	SLUDGE TREATMENT DEWATERING SYSTEM 2	PLC Fault	CV6-021	PLC-001	1	4	22	DI								PLC6-021	
1	SLUDGE TREATMENT DEWATERING SYSTEM 2	Common Alarm	CV6-021	PLC-001	1	4	23	DI								PLC6-021	
1	SLUDGE TREATMENT DEWATERING SYSTEM 2	Sludge Pump Run Cmd	CV6-021	PLC-001	1	4	24	DI								PLC6-021	
1	SLUDGE TREATMENT DEWATERING SYSTEM 2	Polymer Pump Run Cmd	CV6-021	PLC-001	1	4	25	DI								PLC6-021	
1	CENTRATE CENTRIFUGE 1 HIGH HIGH LEVEL	Signal	LSHH6-012	PLC-001	1	4	26	DI							DCNC		
1	CENTRATE CENTRIFUGE 2 HIGH HIGH LEVEL	Signal	LSHH6-022	PLC-001	1	4	27	DI							DCNC		
1	CENTRATE CENTRIFUGE 1 LOW LOW LEVEL	Signal	LSLL6-011	PLC-001	1	4	28	DI							DCNC		
1	CENTRATE CENTRIFUGE 2 LOW LOW LEVEL	Signal	LSLL6-021	PLC-001	1	4	29	DI							DCNC		
1	CAUSTIC SODE PREPARATION METERING PUMP 1	Auto	P9-541	PLC-001	1	4	30	DI									
1	CAUSTIC SODE PREPARATION METERING PUMP 1	Running	P9-541	PLC-001	1	4	31	DI									
1	CAUSTIC SODE PREPARATION METERING PUMP 2	Auto	P9-542	PLC-001	1	4	32	DI									
	BMXDDI3202K			PLC-001	1	5		DI									
1	CAUSTIC SODE PREPARATION METERING PUMP 2	Running	P9-542	PLC-001	1	5	1	DI									
1	CAUSTIC SODE PREPARATION METERING PUMP 3	Auto	P9-543	PLC-001	1	5	2	DI									
1	CAUSTIC SODE PREPARATION METERING PUMP 3	Running	P9-543	PLC-001	1	5	3	DI									
1	P9-541 HIGH TEMPERATURE	Signal	TSH9-541	PLC-001	1	5	4	DI							DCNC	JB9-540	
1	P9-542 HIGH TEMPERATURE	Signal	TSH9-542	PLC-001	1	5	5	DI							DCNC	JB9-540	
1	P9-543 HIGH TEMPERATURE	Signal	TSH9-543	PLC-001	1	5	6	DI							DCNC	JB9-540	
1	COAGULANT PREPARATION LOW POWDER LEVEL	Signal	LSL9-513	PLC-001	1	5	7	DI							DCNC		
1	COAGULANT WINTER METERING PUMP 1	Auto	P9-511	PLC-001	1	5	8	DI									
1	COAGULANT WINTER METERING PUMP 1	Running	P9-511	PLC-001	1	5	9	DI									
1	COAGULANT WINTER METERING PUMP 2	Auto	P9-512	PLC-001	1	5	10	DI									
1	COAGULANT WINTER METERING PUMP 2	Running	P9-512	PLC-001	1	5	11	DI									
1	COAGULANT WINTER METERING PUMP 3	Auto	P9-513	PLC-001	1	5	12	DI									
1	COAGULANT WINTER METERING PUMP 3	Running	P9-513	PLC-001	1	5	13	DI									
1	P9-511 HIGH TEMPERATURE	Signal	TSH9-511	PLC-001	1	5	14	DI							DCNC	JB9-510	
1	P9-512 HIGH TEMPERATURE	Signal	TSH9-512	PLC-001	1	5	15	DI							DCNC	JB9-510	
1	P9-513 HIGH TEMPERATURE	Signal	TSH9-513	PLC-001	1	5	16	DI							DCNC	JB9-510	
1	SULFURIC ACID TANK LOW LEVEL	Signal	LSL9-531	PLC-001	1	5	17	DI							DCNC		
1	ANIONIC POLYMER PREPARATION FAULT	Signal	JB9-521	PLC-001	1	5	18	DI							DCNC		

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Rev	By	Chckd	App	Revision date	Description
1	XM	AS	XM	2018-05-22	INITIAL RELEASE

Revision	Description	Signal description	Identification	Control pannel	Rack	Slot	IO number	Type	Voltage	Power	Starter	Selector	Disconnect	Relay	Contact type	Junction box	Comments
1	ANIONIC POLYMER WINTER METERING PUMP 1	Auto	P9-521	PLC-001	1	5	19	DI									
1	ANIONIC POLYMER WINTER METERING PUMP 1	Running	P9-521	PLC-001	1	5	20	DI									
1	ANIONIC POLYMER WINTER METERING PUMP 2	Auto	P9-522	PLC-001	1	5	21	DI									
1	ANIONIC POLYMER WINTER METERING PUMP 2	Running	P9-522	PLC-001	1	5	22	DI									
1	ANIONIC POLYMER WINTER METERING PUMP 3	Auto	P9-523	PLC-001	1	5	23	DI									
1	ANIONIC POLYMER WINTER METERING PUMP 3	Running	P9-523	PLC-001	1	5	24	DI									
1	P9-521 HIGH TEMPERATURE	Signal	TSH9-521	PLC-001	1	5	25	DI							DCNC	JB9-520	
1	P9-522 HIGH TEMPERATURE	Signal	TSH9-522	PLC-001	1	5	26	DI							DCNC	JB9-520	
1	P9-523 HIGH TEMPERATURE	Signal	TSH9-523	PLC-001	1	5	27	DI							DCNC	JB9-520	
1	P9-524 HIGH TEMPERATURE	Signal	TSH9-524	PLC-001	1	5	28	DI							DCNC		
1	P9-525 HIGH TEMPERATURE	Signal	TSH9-525	PLC-001	1	5	29	DI							DCNC		
1	P9-526 HIGH TEMPERATURE	Signal	TSH9-526	PLC-001	1	5	30	DI							DCNC		
1	KMnO4 PREPARATION LOW POWDER LEVEL	Signal	LSL9-591	PLC-001	1	5	31	DI							DCNC		
1	KMnO4 PREPARATION LOW WATER PRESSURE	Signal	PSL15-041	PLC-001	1	5	32	DI							DCNC		
	BMXDDI3202K			PLC-001	1	6		DI									
1	KMnO4 PREPARATION COVER CONTACT	Signal	ZS9-591	PLC-001	1	6	1	DI							DCNC		
1	P9-621 HIGH TEMPERATURE	Signal	TSH9-621	PLC-001	1	6	2	DI							DCNC		
1	P9-622 HIGH TEMPERATURE	Signal	TSH9-622	PLC-001	1	6	3	DI							DCNC		
1	P9-623 HIGH TEMPERATURE	Signal	TSH9-623	PLC-001	1	6	4	DI							DCNC		
1	SERVICE WATER HIGH HIGH LEVEL	Signal	LSHH15-002	PLC-001	1	6	5	DI							DCNC		
1	SERVICE WATER LOW LOW LEVEL	Signal	LSLL15-002	PLC-001	1	6	6	DI							DCNC		
1	SERVICE WATER FILTER 1	Signal	YS15-001	PLC-001	1	6	7	DI							DCNC		
1	SERVICE WATER FILTER 2	Signal	YS15-002	PLC-001	1	6	8	DI							DCNC		
1	SERVICE WATER FILTER 3	Signal	YS15-003	PLC-001	1	6	9	DI							DCNC		
				PLC-001	1	6	10	DI									
				PLC-001	1	6	11	DI									
				PLC-001	1	6	12	DI									
				PLC-001	1	6	13	DI									
				PLC-001	1	6	14	DI									
				PLC-001	1	6	15	DI									
				PLC-001	1	6	16	DI									
				PLC-001	1	6	17	DI									
				PLC-001	1	6	18	DI									
				PLC-001	1	6	19	DI									
				PLC-001	1	6	20	DI									
				PLC-001	1	6	21	DI									
				PLC-001	1	6	22	DI									
				PLC-001	1	6	23	DI									
				PLC-001	1	6	24	DI									
				PLC-001	1	6	25	DI									
				PLC-001	1	6	26	DI									
				PLC-001	1	6	27	DI									
				PLC-001	1	6	28	DI									
				PLC-001	1	6	29	DI									
				PLC-001	1	6	30	DI									
				PLC-001	1	6	31	DI									
				PLC-001	1	6	32	DI									
	BMXDDO3202K			PLC-001	1	7		DO									
1	SLUDGE TREATMENT DEWATERING SYSTEM 1	Sludge Pump Remote	CV6-011	PLC-001	1	7	1	DO								PLC6-011	
1	SLUDGE TREATMENT DEWATERING SYSTEM 1	Sludge Pump Running	CV6-011	PLC-001	1	7	2	DO								PLC6-011	
1	SLUDGE TREATMENT DEWATERING SYSTEM 1	Sludge Pump Fault	CV6-011	PLC-001	1	7	3	DO								PLC6-011	
1	SLUDGE TREATMENT DEWATERING SYSTEM 1	Polymer Pump Remote	CV6-011	PLC-001	1	7	4	DO								PLC6-011	
1	SLUDGE TREATMENT DEWATERING SYSTEM 1	Polymer Pump Running	CV6-011	PLC-001	1	7	5	DO								PLC6-011	
1	SLUDGE TREATMENT DEWATERING SYSTEM 1	Polymer Pump Fault	CV6-011	PLC-001	1	7	6	DO								PLC6-011	
1	SLUDGE TREATMENT DEWATERING SYSTEM 2	Sludge Pump Remote	CV6-021	PLC-001	1	7	7	DO								PLC6-021	
1	SLUDGE TREATMENT DEWATERING SYSTEM 2	Sludge Pump Running	CV6-021	PLC-001	1	7	8	DO								PLC6-021	
1	SLUDGE TREATMENT DEWATERING SYSTEM 2	Sludge Pump Fault	CV6-021	PLC-001	1	7	9	DO								PLC6-021	

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Revision	Description	Signal description	Identification	Control pannel	Rack	Slot	IO number	Type	Voltage	Power	Starter	Selector	Disconnect	Relay	Contact type	Junction box	Comments
1	SLUDGE TREATMENT DEWATERING SYSTEM 2	Polymer Pump Remote	CV6-021	PLC-001	1	7	10	DO								PLC6-021	
1	SLUDGE TREATMENT DEWATERING SYSTEM 2	Polymer Pump Running	CV6-021	PLC-001	1	7	11	DO								PLC6-021	
1	SLUDGE TREATMENT DEWATERING SYSTEM 2	Polymer Pump Fault	CV6-021	PLC-001	1	7	12	DO								PLC6-021	
1	CAUSTIC SODE PREPARATION METERING PUMP 1	Cmd	P9-541	PLC-001	1	7	13	DO									
1	CAUSTIC SODE PREPARATION METERING PUMP 2	Cmd	P9-542	PLC-001	1	7	14	DO									
1	CAUSTIC SODE PREPARATION METERING PUMP 3	Cmd	P9-543	PLC-001	1	7	15	DO									
1	COAGULANT PREPARATION SERVICE WATER VALVE	Cmd	V9-518	PLC-001	1	7	16	DO	120V					1			
1	COAGULANT WINTER METERING PUMP 1	Cmd	P9-511	PLC-001	1	7	17	DO									
1	COAGULANT WINTER METERING PUMP 2	Cmd	P9-512	PLC-001	1	7	18	DO									
1	COAGULANT WINTER METERING PUMP 3	Cmd	P9-513	PLC-001	1	7	19	DO									
1	ANIONIC POLYMER WINTER METERING PUMP 1	Cmd	P9-521	PLC-001	1	7	20	DO									
1	ANIONIC POLYMER WINTER METERING PUMP 2	Cmd	P9-522	PLC-001	1	7	21	DO									
1	ANIONIC POLYMER WINTER METERING PUMP 3	Cmd	P9-523	PLC-001	1	7	22	DO									
1	ANIONIC POLYMER WINTER SERVICE WATER VALVE	Cmd	V9-521	PLC-001	1	7	23	DO	120V					1		JB9-520	
1	ANIONIC POLYMER WINTER SERVCIE WATER VALVE	Cmd	V9-522	PLC-001	1	7	24	DO	120V					1		JB9-520	
1	ANIONIC POLYMER SUMMER SERVICE WATER VALVE	Cmd	SV15-011	PLC-001	1	7	25	DO	120V					1			
1	ANIONIC POLYMER SUMMER SERVCIE WATER VALVE	Cmd	SV15-021	PLC-001	1	7	26	DO	120V					1			
1	KMnO4 PREPARATION SCREW DOOR VALVE	Cmd	SV15-041	PLC-001	1	7	27	DO	120V					1			
1	KMnO4 PREPARATION WATER VALVE	Cmd	SV15-042	PLC-001	1	7	28	DO	120V					1			
1	KMnO4 PREPARATION COMPRESSED AIR VALVE	Cmd	SV9-591	PLC-001	1	7	29	DO	120V					1			
1	KMnO4 PREPARATION VACUUM	Cmd	VCM9-591	PLC-001	1	7	30	DO	120v	10A		SFP		1			
1	KMnO4 PREPARATION TRANSFER VALVE		T9-591-V0002	PLC-001	1	7	31	DO	120V			SFP		1			motorized valve 120V OPEN, 120V CLOSE
1				PLC-001	1	7	32	DO									
	BMXDDO3202K			PLC-001	1	8		DO									
1	SERVICE WATER FILTER 1	Cmd	XS15-001	PLC-001	1	8	1	DO									
1	SERVICE WATER FILTER 2	Cmd	XS15-002	PLC-001	1	8	2	DO									
1	SERVICE WATER FILTER 3	Cmd	XS15-003	PLC-001	1	8	3	DO									
				PLC-001	1	8	4	DO									
				PLC-001	1	8	5	DO									
				PLC-001	1	8	6	DO									
				PLC-001	1	8	7	DO									
				PLC-001	1	8	8	DO									
				PLC-001	1	8	9	DO									
				PLC-001	1	8	10	DO									
				PLC-001	1	8	11	DO									
				PLC-001	1	8	12	DO									
				PLC-001	1	8	13	DO									
				PLC-001	1	8	14	DO									
				PLC-001	1	8	15	DO									
				PLC-001	1	8	16	DO									
				PLC-001	1	8	17	DO									
				PLC-001	1	8	18	DO									
				PLC-001	1	8	19	DO									
				PLC-001	1	8	20	DO									
				PLC-001	1	8	21	DO									
				PLC-001	1	8	22	DO									
				PLC-001	1	8	23	DO									
				PLC-001	1	8	24	DO									
				PLC-001	1	8	25	DO									
				PLC-001	1	8	26	DO									
				PLC-001	1	8	27	DO									
				PLC-001	1	8	28	DO									
				PLC-001	1	8	29	DO									
				PLC-001	1	8	30	DO									
				PLC-001	1	8	31	DO									
				PLC-001	1	8	32	DO									
	BMXAMI0800			PLC-001	1	9		AI									

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Revision	Description	Signal description	Identification	Control pannel	Rack	Slot	IO number	Type	Voltage	Power	Starter	Selector	Disconnect	Relay	Contact type	Junction box	Comments
1	METAL PRECIPITATION REACTOR ORP	Signal	AIT1-011	PLC-001	1	9	1	AI	120V	100 W							
1	METAL PRECIPITATION REACTOR pH	Signal	AIT1-012	PLC-001	1	9	2	AI	24 VDC Loop								
1	RAW WATER TURBIDITY	Signal	AIT1-013	PLC-001	1	9	3	AI	120V	100 W							
1	METAL PRECIPITATION REACTOR ORP	Signal	AIT1-014	PLC-001	1	9	4	AI	120V	100 W							
1	METAL PRECIPITATION REACTOR TURBIDITY	Signal	AIT1-015	PLC-001	1	9	5	AI	120V	100 W							
1	RAW WATER FLOW	Signal	FIT1-011	PLC-001	1	9	6	AI	120V	100 W							
1	METAL PRECIPITATION REACTOR TEMPERATURE	Signal	TT15-001	PLC-001	1	9	7	AI	120V	100 W							
1				PLC-001	1	9	8	AI									
	BMXAMI0800			PLC-001	1	10		AI									
1	ACTIFLO 1 pH	Signal	AIT2-011	PLC-001	1	10	1	AI	120V	100 W						JB2-011	
1	ACTIFLO 1 TSS	Signal	AIT2-012	PLC-001	1	10	2	AI	24 VDC Loop							JB2-011	
1	ACTIFLO 1 FLOW	Signal	FIT2-011	PLC-001	1	10	3	AI	120V	100 W						JB2-011	
1	ACTIFLO 2 pH	Signal	AIT2-021	PLC-001	1	10	4	AI	120V	100 W						JB2-021	
1	ACTIFLO 2 TSS	Signal	AIT2-022	PLC-001	1	10	5	AI	24 VDC Loop							JB2-021	
1	ACTIFLO 2 FLOW	Signal	FIT3-011	PLC-001	1	10	6	AI	120V	100 W						JB2-021	
1	SLUDGE TANK FLOW	Signal	FIT4-011	PLC-001	1	10	7	AI	120V	100 W							
1	SLUDGE TANK TSS	Signal	AIT4-011	PLC-001	1	10	8	AI	120V	100 W							
	BMXAMI0800			PLC-001	1	11		AI	120V	100 W							
1	SLUDGE STORAGE TANK FLOW	Signal	FIT5-011	PLC-001	1	11	1	AI	120V	100 W							
1	SLUDGE STORAGE TANK FLOW	Signal	FIT5-012	PLC-001	1	11	2	AI	120V	100 W							
1	SLUDGE STORAGE TANK LEVEL	Signal	LIT5-013	PLC-001	1	11	3	AI	24 VDC Loop								
1	SLUDGE STORAGE TANK LEVEL	Signal	LIT5-023	PLC-001	1	11	4	AI	24 VDC Loop								
1	SLUDGE TREATMENT DEWATERING SYSTEM 1	Sludge Pump Speed Cmd	CV6-011	PLC-001	1	11	5	AI								PLC6-011	
1	SLUDGE TREATMENT DEWATERING SYSTEM 1	Polymer Pump Speed Cmd	CV6-011	PLC-001	1	11	6	AI								PLC6-011	
1	SLUDGE TREATMENT DEWATERING SYSTEM 2	Sludge Pump Speed Cmd	CV6-021	PLC-001	1	11	7	AI								PLC6-021	
1	SLUDGE TREATMENT DEWATERING SYSTEM 2	Polymer Pump Speed Cmd	CV6-021	PLC-001	1	11	8	AI								PLC6-021	
	BMEXBP1200			PLC-001	2	0		Rack									
	BMXAMI0800			PLC-001	2	0		AI									
1	COAGULANT PREPARATION MATURATION TANK LEVEL	Signal	LIT9-511	PLC-001	2	0	1	AI	24 VDC Loop								
1	COAGULANT PREPARATION DOSING TANK LEVEL	Signal	LIT9-512	PLC-001	2	0	2	AI	24 VDC Loop								
1	KMnO4 PREPARATION MATURATION TANK LEVEL	Signal	LT9-591	PLC-001	2	0	3	AI	24 VDC Loop								
1	KMnO4 PREPARATION STORAGE TANK LEVEL	Signal	LT9-592	PLC-001	2	0	4	AI	24 VDC Loop								
				PLC-001	2	0	5	AI									
				PLC-001	2	0	6	AI									
				PLC-001	2	0	7	AI									
				PLC-001	2	0	8	AI									
	BMXAMI0800			PLC-001	2	1		AI									
1	SERVICE WATER PRESSURE	Signal	PIT15-004	PLC-001	2	1	1	AI	24 VDC Loop								
1	SERVICE WATER TEMPERATURE	Signal	TT15-002	PLC-001	2	1	2	AI	24 VDC Loop								
1	SERVICE WATER FLOW	Signal	FIT15-001	PLC-001	2	1	3	AI	120V	100 W							
1	SERVICE WATER LEVEL	Signal	LIT15-002	PLC-001	2	1	4	AI	24 VDC Loop								
1	SERVICE WATER PRESSURE	Signal	PIT15-001	PLC-001	2	1	5	AI	24 VDC Loop								
1	SERVICE WATER PRESSURE	Signal	PIT15-002	PLC-001	2	1	6	AI	24 VDC Loop								
1	SERVICE WATER PRESSURE	Signal	PIT15-003	PLC-001	2	1	7	AI	24 VDC Loop								
				PLC-001	2	1	8	AI									
	BMXAMI0800			PLC-001	2	2		AI									
				PLC-001	2	2	1	AI									
				PLC-001	2	2	2	AI									
				PLC-001	2	2	3	AI									
				PLC-001	2	2	4	AI									
				PLC-001	2	2	5	AI									
				PLC-001	2	2	6	AI									
				PLC-001	2	2	7	AI									
				PLC-001	2	2	8	AI									
	BMXAMO0802			PLC-001	2	3		AO									
1	RAW WATER FLOW CONTROL VALVE	Position Cmd	FV1-012	PLC-001	2	3	1	AO	24 VDC								
1	ACTIFLO 1 FLOW CONTROL VALVE	Position Cmd	FCV2-011	PLC-001	2	3	2	AO	24 VDC							JB2-011	

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Revision	Description	Signal description	Identification	Control pannel	Rack	Slot	IO number	Type	Voltage	Power	Starter	Selector	Disconnect	Relay	Contact type	Junction box	Comments
1	ACTIFLO 2 FLOW CONTROL VALVE	Position Cmd	FCV3-011	PLC-001	2	3	3	AO	24 VDC							JB2-021	
1	SLUDGE TANK PINCH VALVE	Position Cmd	FCV4-011	PLC-001	2	3	4	AO	24 VDC								
1	SLUDGE TREATMENT DEWATERING SYSTEM 1	Sludge Pump Speed Feedback	CV6-011	PLC-001	2	3	5	AO								PLC6-011	
1	SLUDGE TREATMENT DEWATERING SYSTEM 1	Polymer Pump Speed Feedback	CV6-011	PLC-001	2	3	6	AO								PLC6-011	
1	SLUDGE TREATMENT DEWATERING SYSTEM 2	Sludge Pump Speed Feedback	CV6-021	PLC-001	2	3	7	AO								PLC6-021	
1	SLUDGE TREATMENT DEWATERING SYSTEM 2	Polymer Pump Speed Feedback	CV6-021	PLC-001	2	3	8	AO								PLC6-021	
	BMXAMO0802			PLC-001	2	4		AO									
1	CAUSTIC SODE PREPARATION METERING PUMP 1	Speed Cmd	P9-541	PLC-001	2	4	1	AO									
1	CAUSTIC SODE PREPARATION METERING PUMP 2	Speed Cmd	P9-542	PLC-001	2	4	2	AO									
1	CAUSTIC SODE PREPARATION METERING PUMP 3	Speed Cmd	P9-543	PLC-001	2	4	3	AO									
1	COAGULANT WINTER METERING PUMP 1	Speed Cmd	P9-511	PLC-001	2	4	4	AO									
1	COAGULANT WINTER METERING PUMP 2	Speed Cmd	P9-512	PLC-001	2	4	5	AO									
1	COAGULANT WINTER METERING PUMP 3	Speed Cmd	P9-513	PLC-001	2	4	6	AO									
1	SULFURIC ACID METERING PUMP 1	Speed Cmd	P9-531	PLC-001	2	4	7	AO								JB9-531	
1	SULFURIC ACID METERING PUMP 2	Speed Cmd	P9-532	PLC-001	2	4	8	AO								JB9-531	
	BMXAMO0802			PLC-001	2	5		AO									
1	ANIONIC POLYMER WINTER METERING PUMP 1	Speed Cmd	P9-521	PLC-001	2	5	1	AO									
1	ANIONIC POLYMER WINTER METERING PUMP 2	Speed Cmd	P9-522	PLC-001	2	5	2	AO									
1	ANIONIC POLYMER WINTER METERING PUMP 3	Speed Cmd	P9-523	PLC-001	2	5	3	AO									
1	SERVICE WATER FLOW CONTROL VALVE	Position Cmd	FCV15-001	PLC-001	2	5	4	AO	24 VDC								
1	SERVICE WATER TEMPERATURE CONTROL VALVE	Position Cmd	TCV15-002	PLC-001	2	5	5	AO	24 VDC								
				PLC-001	2	5	6	AO									
				PLC-001	2	5	7	AO									
				PLC-001	2	5	8	AO									
	BMXAMO0802			PLC-001	2	6		AO									
				PLC-001	2	6	1	AO									
				PLC-001	2	6	2	AO									
				PLC-001	2	6	3	AO									
				PLC-001	2	6	4	AO									
				PLC-001	2	6	5	AO									
				PLC-001	2	6	6	AO									
				PLC-001	2	6	7	AO									
				PLC-001	2	6	8	AO									
	Spare			PLC-001	2	7											
	Spare			PLC-001	2	8											
	Spare			PLC-001	2	9											
	Spare			PLC-001	2	10											
	Spare			PLC-001	2	11											

NOTE

1- Client standard

2- Provide POWER ON pilot light

3- Provide all internal Ethernet cables

4- Observe the minimum clearance required by manufacturers

5- Provide 120 Vac outlet for laptop connection

6- Provide internal lighting

7- Provide control panel identification on front door

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5 – ELECTRICITY AND CONTROL

5.5 – MOTOR LIST

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Motor List

Project : AMARUQ
Project # 5000218009
By : GP
Checked
Appvd

Revision 2
Date 2018-05-10
Par BB

Rev	Description	Process Block	Tag	Existing / New / Future	Service	Voltage	Fed by	HP	Required Power	VFD (Y/N)	MCC DOL / MCC VFD / MCC Feeder	FLA	P&ID	HOA	IP
	PANEL	Main Control Panel	PLC-001	New	duty (year)	120/1/60	Distribution Board	xx AMPS		N/A	N/A	TBC	Not shown	N/A	N/A
	MIXER	Unit 0101 - RX75-3 Mixer	M1-011	New	duty (year)	575/3/60	MCC	5 HP		N	DOL	TBC	PI001 SHEET 01	MCC	
	MIXER	Unit 0101 - RX75-3 Mixer	M1-012	New	duty (year)	575/3/60	MCC	5 HP		N	DOL	TBC	PI001 SHEET 01	MCC	
	MIXER	Unit 0101 - RX75-3 Mixer	M1-013	New	duty (year)	575/3/60	MCC	5 HP		N	DOL	TBC	PI001 SHEET 01	MCC	
	MIXER	Unit 0201 - Coagulation Mixer	M2-011	Existing	duty (year)	575/3/60	MCC			N	DOL	TBC	PI001 SHEET 02	MCC	
	MIXER	Unit 0201 - Injection Mixer	M2-012	Existing	duty (year)	575/3/60	MCC			N	DOL	TBC	PI001 SHEET 02	MCC	
	MIXER	Unit 0201 - Maturation Mixer	M2-013	Existing	duty (year)	575/3/60	MCC			Y	VFD	TBC	PI001 SHEET 02	MCC	
	SCRAPER	Unit 0201 - Scraper	S2-011	Existing	duty (year)	575/3/60	MCC			N	DOL	TBC	PI001 SHEET 02	MCC	
	PUMP	Actiflo Recirculation Pump	P2-011	New	duty (summer)	575/3/60	MCC	15 HP		N	DOL	TBC	PI001 SHEET 02	Local	
	PUMP	Actiflo Recirculation Pump	P2-012	New	duty (summer)	575/3/60	MCC	15 HP		N	DOL	TBC	PI001 SHEET 02	Local	
	PUMP	Clarified Water Pump	P2-013	Existing	duty (year)	575/3/60	MCC			N	DOL	TBC	PI001 SHEET 02	MCC	
	PUMP	Multiflo Extraction Pump	P2-014	New	duty (winter)	575/3/60	MCC	10 HP		N	DOL	TBC	PI001 SHEET 02	Local	
	MIXER	Unit 0301 - Coagulation mixer	M2-021	Existing	duty (year)	575/3/60	MCC			N	DOL	TBC	PI001 SHEET 03	MCC	
	MIXER	Unit 0301 - Injection mixer	M2-022	Existing	duty (year)	575/3/60	MCC			N	DOL	TBC	PI001 SHEET 03	MCC	
	MIXER	Unit 0301 - Maturation mixer	M2-023	Existing	duty (year)	575/3/60	MCC			Y	VFD	TBC	PI001 SHEET 03	MCC	
	SCRAPER	Unit 0301 - Scraper	S2-021	Existing	duty (year)	575/3/60	MCC			N	DOL	TBC	PI001 SHEET 03	MCC	
	PUMP	Actiflo Recirculation Pump	P2-021	New	duty (summer)	575/3/60	MCC	15 HP		N	DOL	TBC	PI001 SHEET 03	Local	
	PUMP	Actiflo Recirculation Pump	P2-022	New	duty (summer)	575/3/60	MCC	15 HP		N	DOL	TBC	PI001 SHEET 03	Local	
	PUMP	Multiflo Extraction Pump	P2-023	New	duty (winter)	575/3/60	MCC	10 HP		N	DOL	TBC	PI001 SHEET 03	Local	
	PUMP	Splitter Box Sludge Extraction Pump	P4-011	Existing	duty (year)	575/3/60	MCC			N	DOL	TBC	PI001 SHEET 04	MCC	
	PUMP	Splitter Box Sludge Extraction Pump	P4-021	Existing	standby (year)	575/3/60	MCC			N	DOL	TBC	PI001 SHEET 04	MCC	
	MIXER	Unit 0501 - RX75-2 Mixer	M5-011	New	duty (year)	575/3/60	MCC	5 HP		N	DOL	TBC	PI001 SHEET 05	MCC	
	MIXER	Unit 0501 - RX75-2 Mixer	M5-012	New	duty (year)	575/3/60	MCC	5 HP		N	DOL	TBC	PI001 SHEET 05	MCC	
	PUMP	Centrifuge Feed Pump	P5-011	New	duty (year)	575/3/60	MCC	7.5 HP		Y	VFD	TBC	PI001 SHEET 05	MCC (VFD Keypad)	
	PUMP	Centrifuge Feed Pump	P5-012	New	duty (year)	575/3/60	MCC	7.5 HP		Y	VFD	TBC	PI001 SHEET 05	MCC (VFD Keypad)	
	PUMP (FUTURE)	Supernatant Pump (FUTURE)	P5-013	Future	duty (year)	575/3/60	MCC	7.5 HP		Y	VFD	TBC	PI001 SHEET 05	MCC (VFD Keypad)	
	CENTRIFUGE #1 - PANEL	Centrifuge Control Panel	PLC6-011	New	duty (year)	575/3/60	MCC	60 AMPS		N/A	Feeder	TBC	PI001 SHEET 06	N/A	N/A
	CENTRIFUGE #2 - PANEL	Centrifuge Control Panel	PLC6-021	New	duty (year)	575/3/60	MCC	60 AMPS		N/A	Feeder	TBC	PI001 SHEET 06	N/A	N/A
	CENTRIFUGE #3 - PANEL (FUTURE)	Centrifuge Control Panel (FUTURE)	PLC6-031	Future	duty (year)	575/3/60	MCC	60 AMPS		N/A	Feeder	TBC	Not shown	N/A	N/A
	CENTRIFUGE #1 - SUMP PUMP	Centrifuge Pit Sump Pump	P6-011	New	duty (year)	575/3/60	MCC	1.5 HP		N	DOL	TBC	PI001 SHEET 06	MCC	
	CENTRIFUGE #2 - SUMP PUMP	Centrifuge Pit Sump Pump	P6-021	New	duty (year)	575/3/60	MCC	1.5 HP		N	DOL	TBC	PI001 SHEET 06	MCC	
	PUMP	Treated Water Lifting Pump	PX-0XX	Existing	duty (year)	575/3/60	MCC					TBC	PI001 SHEET 07	MCC	
	PUMP	Treated Water Lifting Pump	PX-0XX	Existing	duty (year)	575/3/60	MCC					TBC	PI001 SHEET 07	MCC	
	MIXER	Caustic Soda Preparation Mixer	M9-541	Existing	duty (year)	575/3/60	MCC			N	DOL	TBC	PI001 SHEET 08	MCC	
	JUNCTION BOX	Caustic Soda TSE feed, HOA and reset button	JB9-540	Existing	duty (year)	120/1/60	PLC-001			N/A	N/A	TBC	PI001 SHEET 18	N/A	N/A
	PUMP	Caustic Soda Dosing Pump	P9-541	Existing	2 duty (year) - 1 stand by	575/3/60	MCC			Y (Local)	Feeder	TBC	PI001 SHEET 08	Local (On Local JB)	N/A
	PUMP	Caustic Soda Dosing Pump	P9-542	Existing		575/3/60	MCC			Y (Local)	Feeder	TBC	PI001 SHEET 08	Local (On Local JB)	N/A
	PUMP	Caustic Soda Dosing Pump	P9-543	Existing		575/3/60	MCC			Y (Local)	Feeder	TBC	PI001 SHEET 08	Local (On Local JB)	N/A
	HOIST	Coagulant Hoist	M09-512	Existing	duty (year)	575/3/60	MCC			N/A	Feeder	TBC	PI001 SHEET 09	Local	N/A
	TROLLEY	Coagulant Trolley	M09-511	Existing	duty (year)	575/3/60	MCC			N/A	Feeder	TBC	PI001 SHEET 09	Local	N/A
	BLOWER	Coagulant Preparation Blower	B9-513	Existing	duty (year)	575/3/60	MCC			N	DOL	TBC	PI001 SHEET 09	MCC	
	VOLUMETRIC FEEDER	Coagulant Preparation Volumetric Feeder	DF9-511	Existing	duty (year)	575/3/60	MCC			Y	VFD	TBC	PI001 SHEET 09	MCC (VFD Keypad)	
	MIXER	Coagulant Preparation Mixer	M9-511	Existing	duty (year)	575/3/60	MCC			N	DOL	TBC	PI001 SHEET 09	MCC	
	PUMP	Coagulant Preparation Transfer Pump	P9-515	Existing	duty (year)	575/3/60	MCC			N	DOL	TBC	PI001 SHEET 09	MCC	
	PUMP	Skid 1001 - Coagulant Metering Pump	P9-514	New	duty (summer) - 1 duty/1 stand by	575/3/60	MCC	1 HP		Y (Local)	Feeder	TBC	PI001 SHEET 10	Local (VFD Keypad)	N/A
	PUMP	Skid 1001 - Coagulant Metering Pump	P9-513	New		575/3/60	MCC	1 HP		Y (Local)	Feeder	TBC	PI001 SHEET 10	Local (VFD Keypad)	N/A
	JUNCTION BOX	Coagulant TSE feed, HOA and reset button	JB9-510	Existing	duty (winter)	120/1/60	PLC-001			N/A	N/A	TBC	PI001 SHEET 11	N/A	N/A
	PUMP	Coagulant Dosing Pump	P9-511	Existing	2 duty (winter) - 1 stand by	575/3/60	MCC			Y (Local)	Feeder	TBC	PI001 SHEET 11	Local (On Local JB)	N/A
	PUMP	Coagulant Dosing Pump	P9-512	Existing		575/3/60	MCC			Y (Local)	Feeder	TBC	PI001 SHEET 11	Local (On Local JB)	N/A
	PUMP	Coagulant Dosing Pump	P9-513	Existing		575/3/60	MCC			Y (Local)	Feeder	TBC	PI001 SHEET 11	Local (On Local JB)	N/A
	PUMP	Skid 1201 - H2SO4 metering pump	P9-531	New	duty (year) - 2 duty/1 stand by	120/1/60	Distribution Board	1 Amp		N/A	N/A	TBC	PI001 SHEET 12	Local (Pump Keypad)	N/A
	PUMP	Skid 1201 - H2SO4 metering pump	P9-532	New		120/1/60	Distribution Board	1 Amp		N/A	N/A	TBC	PI001 SHEET 12	Local (Pump Keypad)	N/A
	PANEL	Anionic Polymer Preparation System	JB9-521	Existing	duty (winter)	575/3/60	MCC			N/A	Feeder	TBC	PI001 SHEET 13	N/A	N/A
	VACUM CONVEYOR	Anionic Polymer Vacum Conveyor	M09-521	Existing	duty (winter)	575/3/60	JB9-521			N	N/A	TBC	PI001 SHEET 13	On JB9-521	N/A
	VOLUMETRIC FEEDER	Anionic Polymer Volumetric Feeder	DF9-521	Existing	duty (winter)	575/3/60	JB9-521			N	N/A	TBC	PI001 SHEET 13	On JB9-521	N/A
	MIXER	Anionic Polymer Tank Mixer	M9-521	Existing	duty (winter)	575/3/60	JB9-521			N	N/A	TBC	PI001 SHEET 13	On JB9-521	N/A
	JUNCTION BOX	Anionic Polymer TSE feed, HOA and reset button	JB9-520	Existing	duty (winter)	120/1/60	PLC-001			N/A	N/A	TBC	PI001 SHEET 14	N/A	N/A
	PUMP	Anionic polymer metering pump	P9-521	Existing	duty (winter) - 2 duty/1 stand by	575/3/60	MCC			Y (Local)	Feeder	TBC	PI001 SHEET 14	Local (On Local JB)	N/A
	PUMP	Anionic polymer metering pump	P9-522	Existing		575/3/60	MCC			Y (Local)	Feeder	TBC	PI001 SHEET 14	Local (On Local JB)	N/A
	PUMP	Anionic polymer metering pump	P9-523	Existing		575/3/60	MCC			Y (Local)	Feeder	TBC	PI001 SHEET 14	Local (On Local JB)	N/A
	JUNCTION BOX	Skid 1401 - TSE feed and reset buttons	JB9-524	New	duty (summer)	120/1/60	PLC-001	-		N/A	N/A	TBC	PI001 SHEET 15	N/A	N/A
	PUMP	Skid 1401 - Anionic polymer metering pump	P9-524	New	duty (summer) - 2 duty/1 stand by	575/3/60	MCC	2 HP		Y (Local)	Feeder	TBC	PI001 SHEET 15	Local (VFD Keypad)	N/A
	PUMP	Skid 1401 - Anionic polymer metering pump	P9-525	New		575/3/60	MCC	2 HP		Y (Local)	Feeder	TBC	PI001 SHEET 15	Local (VFD Keypad)	N/A
	PUMP	Skid 1401 - Anionic polymer metering pump	P9-526	New		575/3/60	MCC	2 HP		Y (Local)	Feeder	TBC	PI001 SHEET 15	Local (VFD Keypad)	N/A
	VACUM CONVEYOR	KMnO4 Vacum Conveyor Motor	VAC9-591	New	duty (year)	575/3/60	MCC	2.5 HP		N	DOL	TBC	PI001 SHEET 16	MCC	
	AGITATOR	KMnO4 Feeder Hopper Agitator	FMM9-591	New	duty (year)	575/3/60	MCC	0.75 HP		N	DOL	TBC	PI001 SHEET 16	MCC	
	VOLUMETRIC FEEDER	KMnO4 Volumetric Feeder	FSM9-591	New	duty (year)	575/3/60	MCC	0.5 HP		Y	VFD	TBC	PI001 SHEET 16	MCC (VFD Keypad)	
	MIXER	KMnO4 Preparation Mixer	M9-591	New	duty (year)	575/3/60	MCC	0.33 HP		N	DOL	TBC	PI001 SHEET 16	MCC	
	PUMP	Skid 1601 - KMnO4 Metering pump	P9-591	New	duty (year) - 1 duty/1 stand by	575/3/60	MCC	1 HP		Y (Local)	Feeder	TBC	PI001 SHEET 17	Local (VFD Keypad)	N/A
	PUMP	Skid 1601 - KMnO4 Metering pump	P9-592	New		575/3/60	MCC	1 HP		Y (Local)	Feeder	TBC	PI001 SHEET 17	Local (VFD Keypad)	N/A
	PANEL	Cationic Polymer Preparation Control Panel	PLC9-621	New	duty (year)	575/3/60	MCC	30 Amp		N/A	Feeder	TBC	PI001 SHEET 18	N/A	N/A
	VOLUMETRIC FEEDER	Cationic Polymer Feeder Hopper Agitator	FSM9-621	New	duty (year)	575/3/60	PLC9-621	0.5 HP		N	N/A	TBC	PI001 SHEET 18	On PLC9-621	N/A
	AGITATOR	Cationic Polymer Hopper Agitator	FMM9-621	New	duty (year)	575/3/60	PLC9-621	0.75 HP		N	N/A	TBC	PI001 SHEET 18	On PLC9-621	N/A
	MIXER	Cationic Polymer Preparation Mixer	M9-621	New	duty (year)	575/3/60	PLC9-621	0.75 HP		N	N/A	TBC	PI001 SHEET 18	On PLC9-621	N/A
	JUNCTION BOX	Skid 1801 - TSE feed and reset buttons	JB9-621	New	duty (year)	120/1/60	PLC-001	-		N	N/A	TBC	PI001 SHEET 19	N/A	N/A
	PUMP	Cationic Polymer Dosing Pump	P9-621	New	duty (summer) - 2 duty/1 stand by duty (winter) - 1 duty/2 stand by	575/3/60	MCC	2 HP		Y (Local)	Feeder	TBC	PI001 SHEET 19	Local (VFD Keypad)	N/A
	PUMP	Cationic Polymer Dosing Pump	P9-622	New		575/3/60	MCC	2 HP		Y (Local)	Feeder	TBC	PI001 SHEET 19	Local (VFD Keypad)	N/A
	PUMP	Cationic Polymer Dosing Pump	P9-623	New		575/3/60	MCC	2 HP		Y (Local)	Feeder	TBC	PI001 SHEET 19	Local (VFD Keypad)	N/A

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6 – OPERATION AND MAINTENANCE

6.1 – ACTIFLO

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VEOLIA

Installation, Operation and Maintenance Manual

Actiflo® Package Plant

Document No: IOM_0001_ACP

Révision: 01 -- Date: October 2016

WATER TECHNOLOGIES

TABLE OF CONTENTS

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1 INTRODUCTION

This document describes the functions of the various components of the Actiflo® Package Plant clarifier, describes the procedures for the installation, start-up and standard operation of the system. It also plans preventive maintenance measures and describe procedures for the regular maintenance of the equipment.

The components of the Actiflo® Package Plant clarifier are supplied by Veolia Water Technologies Canada (VWTC). This equipment of superior quality and proven design will insure years of operation without problems. However, in order to maintain peak efficiency and performance of the system, it is imperative to take into consideration the preventive measures and procedures described in this manual. These measures include the operation and maintenance of its components.

To obtain any additional information regarding characteristics, operation or maintenance of this equipment, or if a problem persists, please do not hesitate to contact us.

The Actiflo® system is manufactured in Canada by:

Veolia Water Technologies Canada
4105, Sartelon
Saint-Laurent, Qc.
Canada H4S 2B3
Phone: 514-334-7230
Fax: 514-334-5070

For technical support or service needs, for spare parts or to get assistance during your warranty period, you may contact us at the following number during regular business hours or write us at:

Veolia Water Technologies Canada – After Sales Support
1-844-SER-VWT9 | 1-844-737-8989 | vwtservicecanada@veolia.com

Our business hours are from
Monday to Friday
8:30am to 5pm EST

1.1 OBJECTIVES OF THIS MANUAL

- Describe the installation of the unit and its ancillary components.
- Describe and explain the functions of the various components of the Actiflo® clarifier and reaction tanks, if installed.
- Describe the procedure for the start-up and standard operation of the system.
- Plan preventive maintenance measures and describe procedures for the regular maintenance of the equipment.

1.2 SAFETY

Operation of the Actiflo® system should be done by qualified personnel only.

It is imperative to ensure the security of all operators during the operation and maintenance of all mechanical equipment. In order to avoid accidents, it is important to determine the correct way to proceed and conveniently select appropriate clothing for the job. All workers having access to the equipment must scrupulously respect all the standard rules of safety as well as the precautions described in this manual.

Workers, which are directly responsible for the operation and maintenance of the equipment, must be aware of standard rules of safety.

The following safety rules should be followed:

- Safety devices such as handrail and belt guards should be installed and inspected regularly.
- Access to the building should be limited to authorize personnel only.
- Non-authorized personnel must never approach rotating shafts, connections, etc., in order to avoid injuries.
- The owner should implement a safety program and provide training for operation staff.
- Material Safety Data Sheets (MSDS) should be available for each chemical product.
- Appropriate protective gear including safety glasses, hard hat, boots, gloves, and ear protection should be worn at all times.

Protection systems or any other type of safety device supplied by the manufacturer must be carefully installed. If these are not supplied by the manufacturer, the user must supply and install the safety devices necessary for the protection of employees responsible for the operation of the equipment.

WARNING: The lamella pack is pre-installed in the settling tank section of the Actiflo® clarifier. It is made of a very flammable material. Do not expose it to open flames or sparks. Do not allow any welding works nearby unless special precautions have been taken.

WARNING: The operation staff should be aware that coagulant is highly corrosive and polymer solution can be very slippery. Spills should be cleaned immediately according to the MSDS instructions.

WARNING: The microsand may contains fine particles of silica. Therefore, it must be handle safely and with caution by qualified staff. Consult the MSDS for further instructions.

1.3 STANDARDS

Unless specified otherwise, the equipment described in this manual is consistent with the most recent construction standards that are applicable, including:

American Society of Mechanical Engineers	ASME
Canadian Standards Association	CSA
Canadian Electrical Manufacturers Association	CEMA
National Electrical Manufacturers Association	NEMA
American Society for Testing and Materials	ASTM
American National Standard Institute	ANSI

Table 1: List of applicable standards

1.4 MODIFICATIONS DONE BY THE CLIENT

Please note that it is mandatory to contact Veolia Water Technologies Canada Inc. before undertaking any modification work to the equipment supplied in this project. In fact, any alteration made to any equipment (mechanical, control, computers, etc.) without prior notification and consent by VWTC voids the warranty of the mentioned equipment. Furthermore, the client is responsible for any additional cost necessary to restore the equipment to its original state.

1.5 FIELD INSTALLATION – PAINT PROTECTION

IMPORTANT NOTE TO CONTRACTORS

You are about to install Actiflo® Package Plant unit and is related equipment. Veolia Water Technologies Canada Inc. wants to warn you about potential problems related to installation of large steel units protected against corrosion by paint.

VWTC maintains a comprehensive quality program to prevent equipment from being affected by corrosion. Our fabrication methods are specially adapted to manufacturing of painted equipment. Every step of our fabrication and assembly process is checked to reduce corrosion issues. Each unit is also delivered under strict measures, meant to reduce potential corrosion problems and long product life.

However, we have identified that handling unit at job site is a key element of corrosion protection process. This operation completely escapes our control and is your responsibility. Consequently, we invite you to perform a thorough review of your installation procedures before handling VWTC products. Protecting units during and after installation is paramount to maintain corrosion risks to a bare minimum.

Likewise, after installation of units, you must insure complete equipment protection from working environment before unit is put into service. This will prevent damages caused by work not related to VWTC products taking place on site. Contractor is responsible for installation of any additional protection necessary at job site.

In order to maintain quality products free of defects, VWTC requests from contractor, that he takes all necessary measures to reduce risks of paint or equipment damage leading to steel corrosion. Among most important protection measures of paint protection, here are the principal ones:

- Making all men, working close to units, conscious of paint fragility and potential corrosion problems. Please encourage them to act with extreme care while working around installation.
- Protecting units from weld projection or falling debris, by covering unit with adequate plastic or cardboard hoods and padding.
- Protecting unit's tank bottom when installing mixers or other equipment inside unit.
- Keeping area and unit clean at all times.

All measures taken by contractor to insure paint protection will assure transfer to client of a quality product and will benefit to all.

1.6 WARRANTY

All equipment manufactured by **Veolia Water Technologies Canada Inc.** (herein defined as "Veolia Canada") is guaranteed to be free from defects in material and workmanship for a period of twelve (12) months from the date at which unit is placed in service, eighteen (18) months from the date of shipment, whichever occurs first. All equipment found with defects during this period will be replaced at

no extra charge when shipped prepaid FOB to the manufacturer's shop. All parts sold by Veolia Canada are warranted the same way for a period of three (3) months from date of shipment.

If the customer promptly notifies Veolia Canada in writing of a claimed defect in the equipment and said equipment is found not to be in conformity with this warranty, Veolia Canada will, at its option and expenses, repair or replace such defective part, prepaid FOB to the manufacturer's shop.

Veolia Canada must be given notice of such defect, and, where requested, such material must be returned to the manufacturer's shop, transportation charges prepaid, with written approval for the shipment by Veolia Canada

This warranty shall be void if start-up of equipment is not authorized by Veolia Canada, or if repairs and/or alterations are made without a written authorization by Veolia Canada. If the equipment or parts supplied by Veolia Canada are altered in any way without Veolia Canada consent, the present warranty will not be valid and have no effect.

The customer will use only Veolia Canada parts for all labour covered by this warranty.

The foregoing warranty excludes responsibility or liability for:

(a) Failures not reported promptly within the warranty period, above specified.
(b) Damage due to accident, abuse, shipment, improper installation or operation, or abnormal operation condition.
(c) Damage caused by client's replacement, repair or inspection of parts.
(d) Lesion or personal accidents, material damage or any direct or indirect expenses or loss of profit related to this warranty.
(e) Damage, loss, expenses, lesion or personal accidents directly or indirectly related to the installation, the operation or the failure of the equipment supplied by Veolia Canada

The foregoing warranty is exclusive and replaces all other warranties, expressed or implied, including but not limited to any warranty of bargaining or modification for a particular purpose.

This warranty does not cover the following:

(a) Costs of repair, modification or other work done or requested by the customer or the management and all indirect costs.
(b) All expenses related to regular maintenance of parts as prescribed in the operation and maintenance manuals supplied by Veolia Canada
(c) Costs of dismantling, installation, transportation and insurance.
(d) Travelling and living expenses for the personnel carrying out the repair under such warranty.
(e) This warranty is not a performance or production warranty.

Veolia Canada has the right to examine or to ask for details about defects before empowering the present warranty.

2 RECEIVING

Preliminary field-testing, inspection, and checkout of the unit, following installation, shall be performed by a qualified representative of both the supplier and the general contractor. Tests shall be conducted to demonstrate to the engineer that all system components furnished by the equipment supplier are fully operational, that all connecting piping is leak proof and properly anchored, and that the entire system furnished by the supplier is ready for continuous safe operation. The purpose of the checkout shall be to ensure that each individual system component has been correctly installed, shall operate fully in the manner intended, and is ready to perform its function as part of an integrated system when placed in continuous operation.

MISSING EQUIPMENT/SHIPPING DAMAGE NOTIFICATION

The condition of all delivered equipment must be verified by the responsible party upon arrival at site. Verification that all equipment has been delivered as per contract must also be done upon arrival at site. Notification of missing or damaged items must be sent to Veolia Water Technologies Canada (VWTC) within 10 days of receipt of equipment. If there is no documented notification of missing or damaged parts within 10 days, VWTC is not responsible for replacement of any items found to be missing or damaged at the time of installation and start-up of the supplied equipment. It is the responsibility of the party receiving the equipment to ensure all packaging is opened at the time of receipt to uncover and document any and all damages to the Freight Company and VWTC.

Photographs and written documentation should be provided on all damaged equipment.

2.1 STORAGE

The following instructions outline the duties and responsibilities of the responsible party for equipment storage. The responsible party shall assume responsibility for the equipment upon arrival at the project site. These instructions shall define the minimum expectations for storage of all equipment.

While this storage specification taken into account common environmental issues that may affect the system during storage, common sense should be the overriding factory in determining the best method to ensure the integrity and proper storage of the VWTC equipment.

Should it be necessary to delay installation and subsequent operation of a unit for more than one month from date of shipment, special precautions must be taken. If possible, all equipment should be stored indoors in a dry and sheltered environment having a relatively constant temperature (especially for gear reducers, motors, bearings, etc.).

Air may contain excessive moisture, pollutants, microorganisms, and other particulates that accelerate the deterioration of some materials. Humidity and pollutants can produce an aggressive atmosphere.

The storage environment into which a system is placed can have a dramatic effect on the long-term usefulness of some spare parts. Key environmental factors are:

1) Temperature
2) Relative Humidity
3) Pollutants

The environmental indoor conditions should not exceed the following ranges:

Min/Max Temperature Range between:	8°- 28°C (46°- 82°F)
Relative Humidity Range between:	40% +/- 5% (RH)

A. OUTDOOR STORAGE:

Pre mounted settling or filtering tanks can be stored outside with the following storage specifications:

1) Drain water completely with special attention for sections without drain on lower point.
2) Remove all motored, electronic equipment and instruments and store them indoor (heated and ventilated area).
3) Tanks must be stored with adequate support underneath to prevent distortion and to raise equipment above any undesirable ground or floor conditions. It will also prevent flooding damages.
4) Completely cover the equipment with a tarp or similar protections shield to prevent direct exposure to the elements (dust, rain, snow, etc.). The tarp should fit tightly around the equipment to prevent accumulation beneath tarp.
5) Make sure that the plastic tarp is in perfect condition. Repair plastic tarp if needed.
6) Remove all snow, dust or water accumulation from the top of the units.

B. INDOOR STORAGE:

All other equipment have to be stored indoors in a climate controlled environment under a clean dust free non-aggressive and dry environment, including but not limited to electrical enclosures, spare parts, etc.

1) The equipment should be stored in a manner to be kept free from allowing insects, rodents, etc. from entering the equipment.
2) Cover the equipment with a tarp or similar protective shield to prevent direct exposure to dust or any other contamination. However, never enclose the unit or components totally in plastic covers; always leave adequate ventilation of air to prevent condensation.
3) Storage volume depends on the size of the project.
4) Equipment must be checked on a weekly basis for tarp/wrap integrity and accumulation.
5) To avoid damage, do NOT stack crates.
6) To avoid damage, do NOT stack enclosures.
7) Do not store spares in barns, equipment sheds or any other building without the capacity for heating and cooling as needed.

C. SPECIAL MAINTENANCE REQUIREMENTS DURING STORAGE:

Mixers, Scraper and Recirculation Pumps

Long term storage methods must be applied to the unit including complete fill with lubricant. Protect machined surfaces and rotate shafts periodically (every month). Five (5) complete rotations of the output shafts are recommended each time.

Periodic checks should be made to ensure that no rusting or other damage has occurred. Should such be noted, corrective action should be quickly initiated. Prior to putting unit into service, drain lubricant and refill to proper level as determined by the mounting position. Refer to manufacturer documentation.

All motors must be removed and store indoor (in a heated and ventilated area). All motors must be run every 3 month as a preventive measure against the formation of corrosion.

Instrumentation

All instruments must be store inside. Refer to manufacturer documentation.

Electrical Equipment and Spare Parts

It is required that all electrical equipment is stored indoors in a climate controlled environment under a clean dust free non-aggressive and dry environment, including but not limited to electrical enclosures, spare parts, etc.

1) The electrical equipment should be stored in a manner to be kept free from allowing insects/rodents from entering the equipment.
2) Completely cover the equipment with a tarp or similar protective shield to prevent direct exposure to dust or any other contamination.
3) Storage volume depends on the size of the project.
4) Equipment should be checked on a weekly basis for tarp/wrap integrity and accumulation.
5) To avoid damage, do not stack crates.
6) To avoid damage, do not stack enclosures.
7) Do not store spares in barn, equipment sheds or any other building without the capacity for heating and cooling as needed.

Others Equipments

It is recommended that tanks and pumps be stored indoors and on a raised surface to avoid flooding however if this cannot be done, they must be places on secure, high ground and meet all other specifications provided in this document. The responsible party must be sure to elevate the equipment off of the ground.

If the equipment are stored outdoor they must be kept on a high ground not susceptible to flooding and elevate the equipment at least 10 inches (250 mm) of the ground. If there is reason known to the responsible party that more than 10 inches of elevation is required, appropriate measures should be taken. Completely cover the equipment with a tarp or similar protections shield to prevent direct

exposure to the elements (dust, rain, snow, etc.). The tarp should fit tightly around the equipment to prevent accumulation beneath tarp. Equipment to be checked on a weekly basis for tarp integrity and accumulation.

To avoid possible module damage, do not stack module crates.

Equipment Cleaning

VWTC is not responsible for cleaning of any equipment prior to installation and start-up due to the storage of the equipment. This is the complete responsibility of others.

The cleaning of the equipment, if necessary, must be completed prior to the VWTC start-up technician arriving at site.

Handling

Equipment will arrive at the project site in several different shipments, from various freight companies and in several different packaging containers. Typically a flatbed truck is used which requires a fork lift or a crane to remove the various items.

Control panels are shipped in a separate crate or wrapped for protection and should be removed from the flat bed with a fork lift along with all other items. Weight dependent upon system configuration.

3 GENERAL INSTALLATION

The Actiflo® package plant may be pre-mounted. However, for freight purpose and practical reasons, the installation of some items must be completed on site by the contractor. Please find below the list of tasks that need to be performed by the contractor at job site:

- Installation should be performed by qualified contractors.
- The contractor must ensure that the necessary lifting equipment is available on site to carry out the installation.
- All nuts & bolts need to be verified, accounted for and tightened.

WARNING:	The settling tubes are very flammable, do not use any open flames near it and do not allow any welding works in the nearby area unless safety precautions have been taken. Once the settling tubes are submerged in water (normal use), this warning is no longer applicable.

- Refer to all field installation drawings for the installation of each Actiflo® unit.
- If any paint touch-ups are required, refer to documentation for recommended paint preparation and application instructions.
- After installation completion, clean the tank sections of all debris and objects that could damage the rotating mechanisms, damage pumps or clog the recirculation line.
- Microsand is supplied in 50 lbs. bags in quantities required for the first fill. Sand will be added to the maturation tank during process start up. Sand should be poured slowly once tank is filled with water. Initial sand loading should be performed with supervision of start-up personnel.

4 UNIT HANDLING

- Install each unit at the designated location at site. Lifting lugs are on top of each unit to facilitate handling and shall be removed after proper installation of Actiflo® unit in order to install the handrails.
- For equipment handling please refer to the following sketch and pictures for proper handling of the tank.
- The general contractor is responsible for the equipment unloading and handling.

WARNING: Do not use the welded lugs on Actiflo® package unit sides to lift the tank. These are for transportation purpose only.

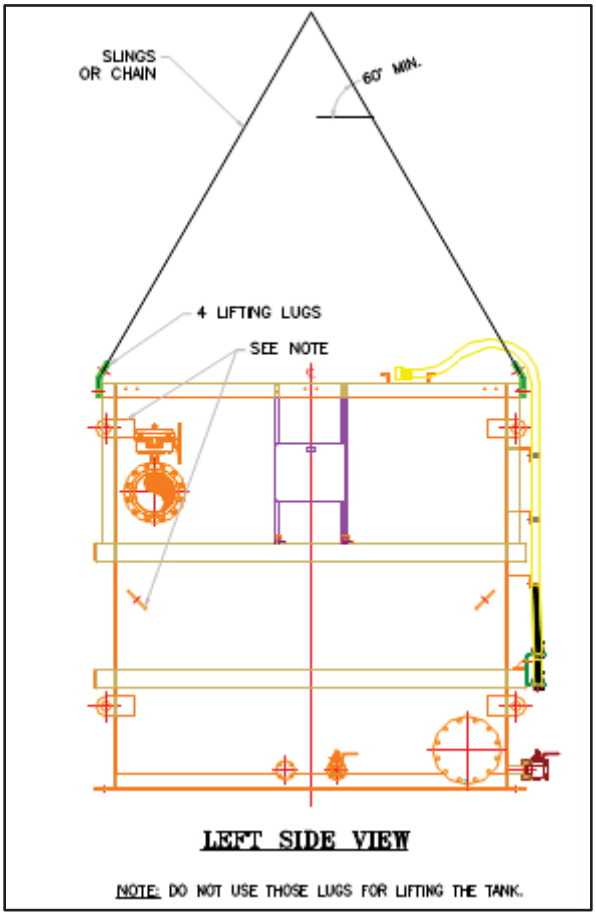


Figure 1: Actiflo® lifting lugs location

ATTENTION: DO NOT LIFT THIS WAY

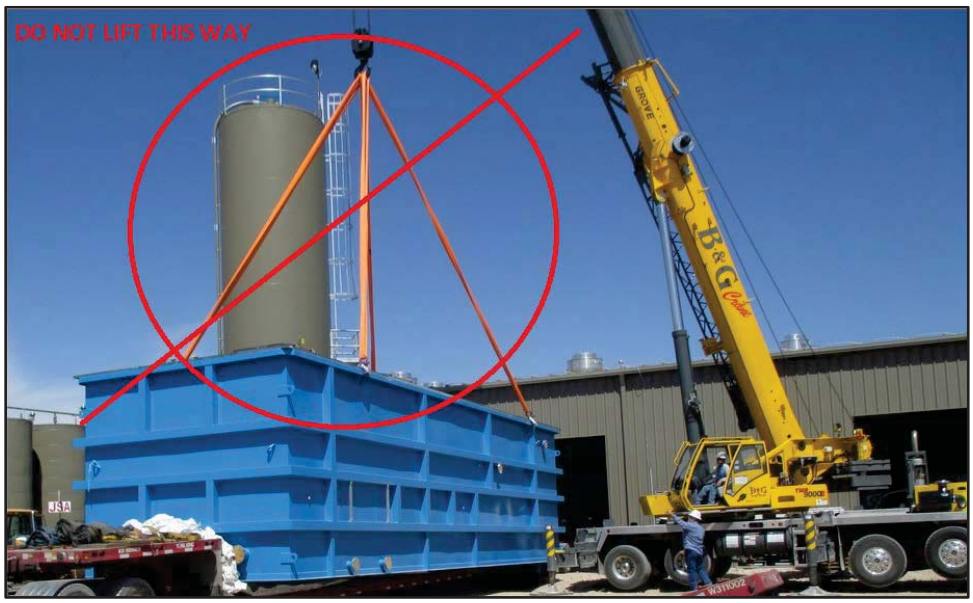


Figure 2: Actiflo® lifting (1)

PROPER LIFTING: ALWAYS HAVE AT LEAST TWO LIFTING POINTS

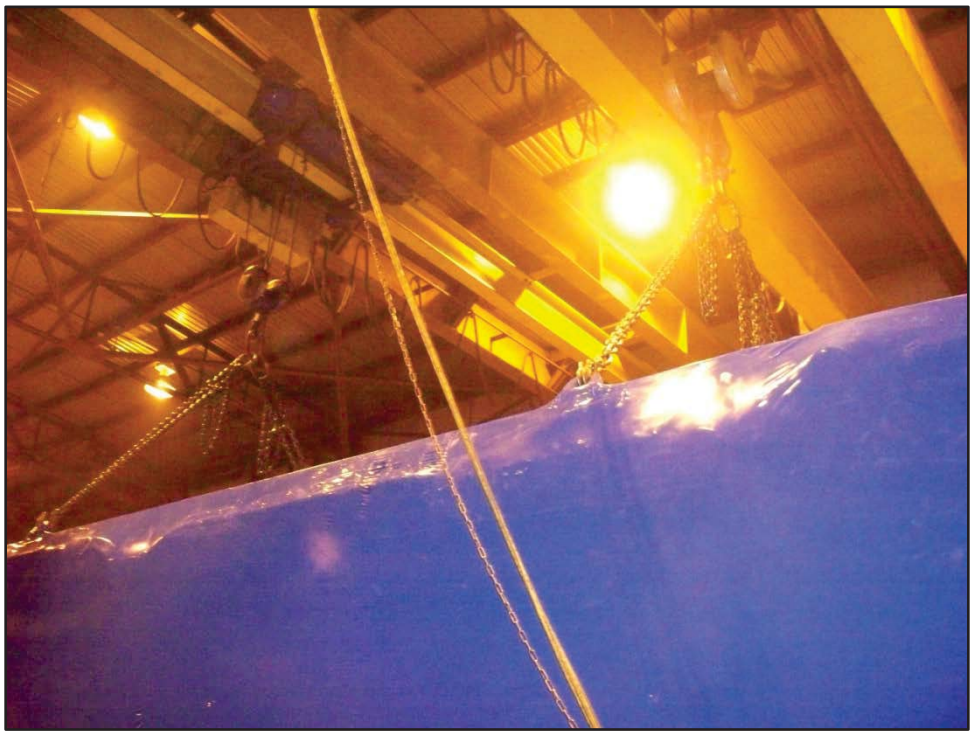


Figure 3: Actiflo® lifting (2)

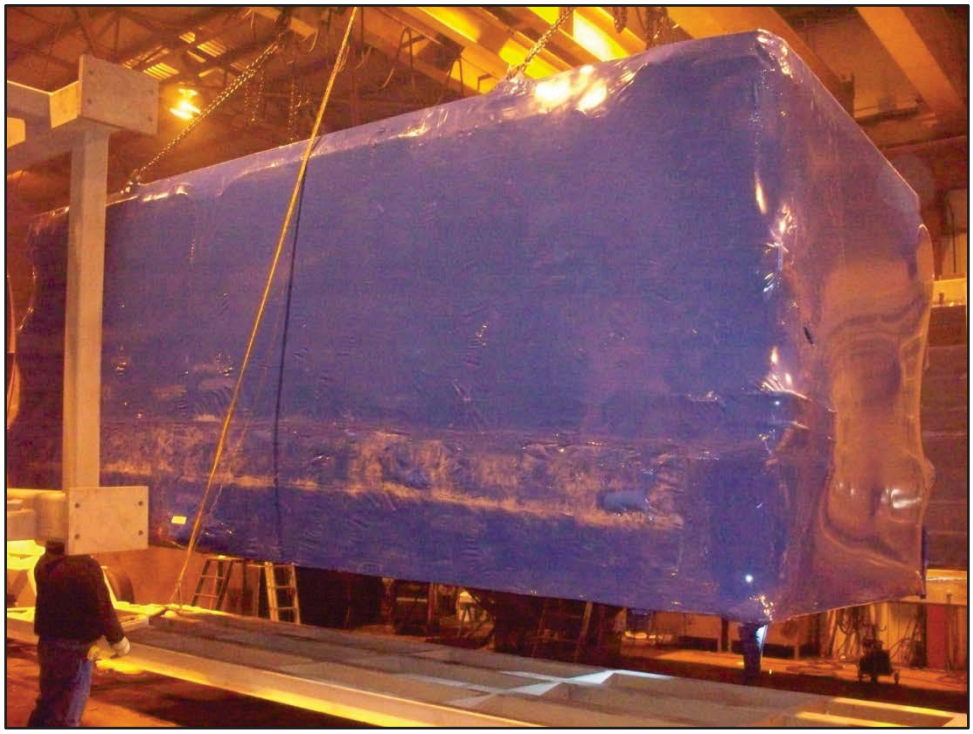


Figure 4: Actiflo® lifting (3)

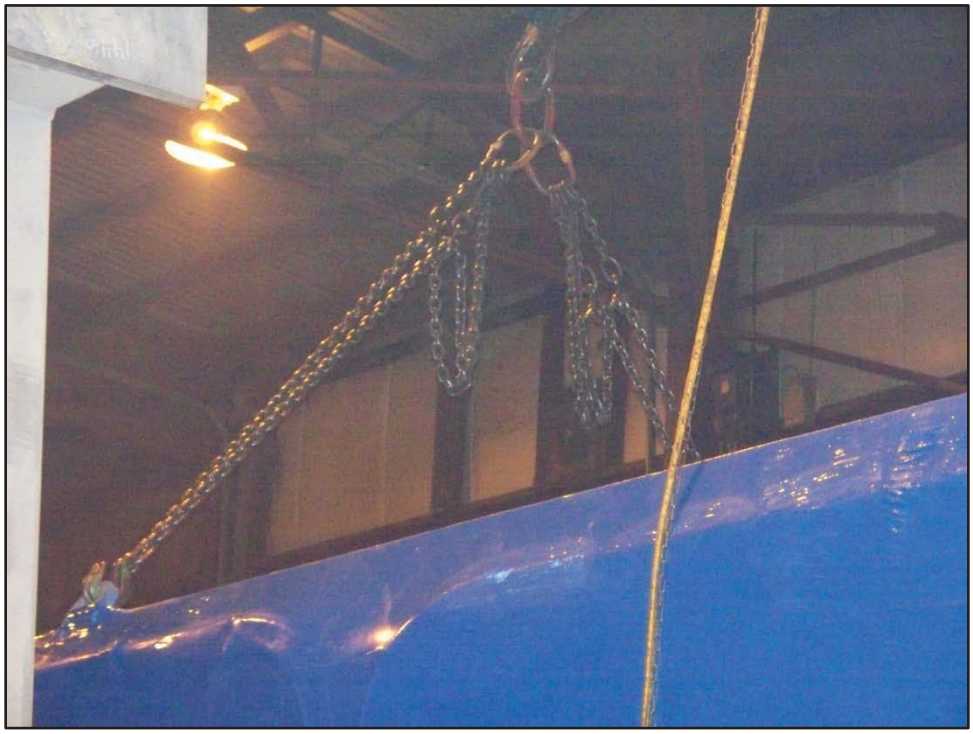


Figure 5: Actiflo® lifting (4)

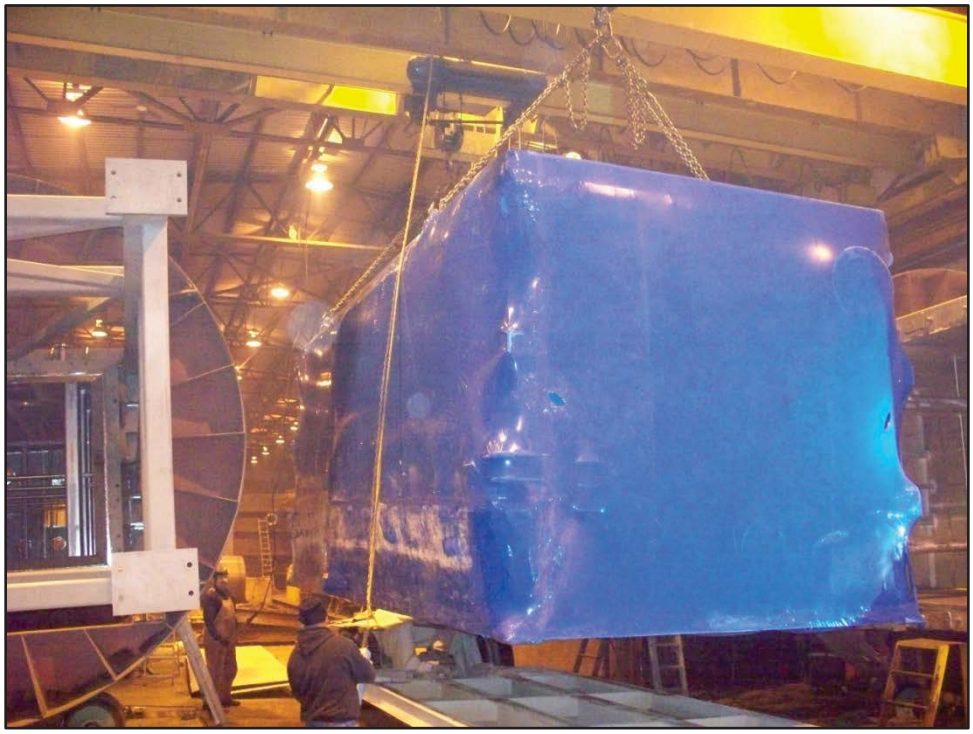


Figure 6: Actiflo® lifting (5)

4.1 LEVELING

- Unit base frame must be leveled within proper tolerance (max. 1/8” every 15 ft).

4.2 ANCHORING TO CONCRETE FLOOR

- Refer to field installation drawing for tank anchors location.
- Drill appropriate holes in concrete support piers, in line with the anchoring holes of the Actiflo® base and fasten the tank structure with anchors (may be provided by others).
- Add leveling/finishing grout under the base frame where required.

4.3 UNWRAPPING

- Unwrap the equipment and remove any temporary supports and plywood protections from the unit. Be cautious when removing instrumentation protection.

5 MECHANICAL INSTALLATION

5.1 GRATING

- Install grating on each unit. The grating may already be mounted as part of shop assembly.

5.2 HANDRAIL

- Install hand railing on each unit at the site. Please refer to the field installation drawings.

5.3 SETTLING SECTION

- Lamella packs are already installed in settling section.
- If required, be very cautious when manipulating the lamella packs in cold temperatures. They become very brittle and may break easily.

Warning: Lamella pack is highly flammable. Submerge with water as soon as possible.

5.4 TROUGH

- The troughs already installed in the settling section should be leveled using the adjustment nuts. All troughs must be at the same elevation. Tolerance should be 1/8”, so that water is distributed evenly within settling section.

5.5 SCRAPER DRIVE INSTALLATION

- Remove the transportation plate from the rake assembly.
- Lower the shaft of the rake using the eyebolt.
- Connect the rake drive to the shaft.
- Remove the eyebolt from the rake shaft.
- Add the lubricant in the primary gear box. Use Chevron lubricating oils FM Grade ISO 460 or equivalent FDA approved. Please be careful about the amount of oil that is put in the scraper drive assembly as too much oil may overflow into the tank. The oil level should correspond to about half of the height of the gear.
- Rectify alignment if necessary.
- All electrical connections must be completed.
- Rotation of the rake must be clockwise (CW).
- Ensure that there is no contact between the rake arm and the bottom of the hopper.
- Clean the tank sections of all debris and objects that could damage the rotating mechanisms.

- Inspect the recirculation inlet pipe. It should be free of any debris.

Note:	Pay particular attention to remove temporary material (wood, cardboard) at the bottom of the scraper that was used to prevent movement during transport.

5.6 HYDROCYCLONE SUPPORT

- Refer to the field installation drawings for proper hydrocyclone installation.
- Install the hydrocyclone assembly support on the maturation tank with supplied screws, nuts and washers at the site.
- Install the piping connections. It is important to drop one (1) meter (approximately 3 feet) at the sludge outlet of each hydrocyclone, to avoid backflow through hydrocyclone. Discharge of sludge pipe must not be submerged.

Note:	Disruption in hydrocyclone pressure distribution will potentially affect separations performances, hence adequate return of microsand to the process.

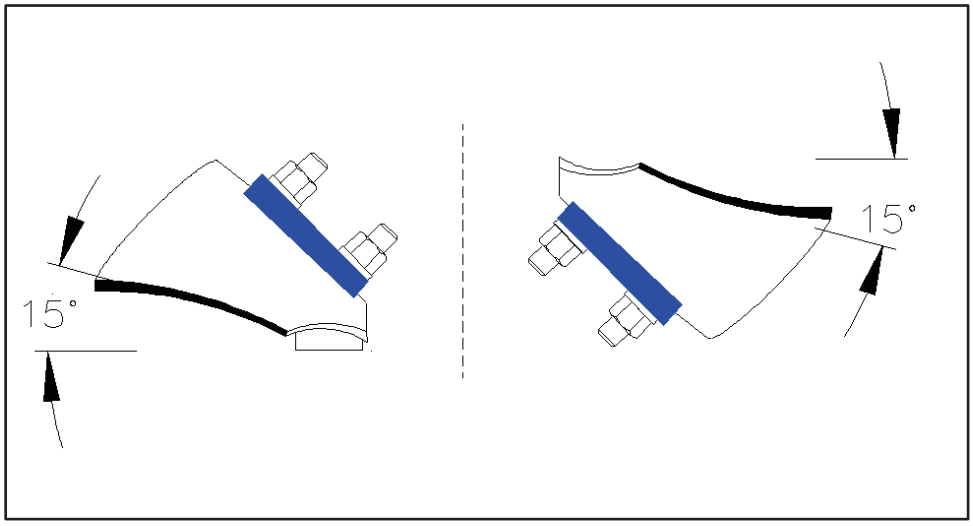
5.7 COAGULATION / INJECTION / MATURATION TANK MIXER

- Refer to field installation drawings for proper mixers installation.
- The mixers are delivered separately. The shafts are already assembled to the gear box. The contractor must assemble the impellers on the shafts at job site.
- Install the motor on the appropriate tank mixer following instructions given in the supplier's equipment manual.
- Verify the mixer blade installation and orientation.
- Verify that set screws are well tightened to secure the hub onto the shaft.
- Follow manufacturer recommendations for oil check and fill up procedure (manufacturer manual).
- All electrical connections must be completed.
- Refer to the following sketches for proper hubs installation in section 5.8.

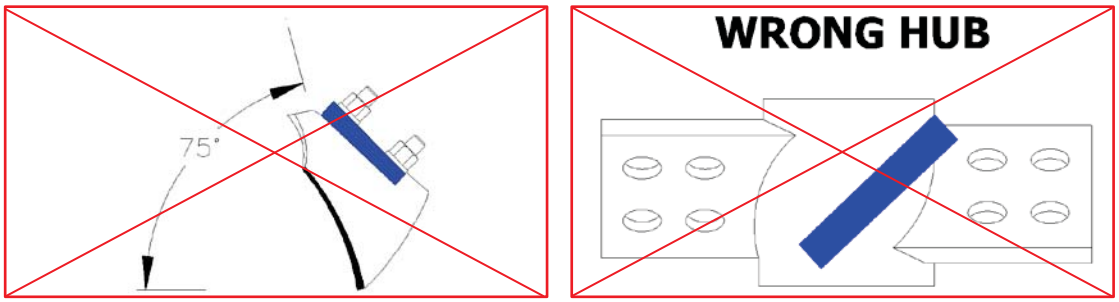
5.8 IMPELLER INSTALLATION

WARNING:

- Ensure the use of a right hub (\ ) in the tanks.
- The leading edge of the blade shall be at 15° from horizontal and not at 75°.
- The screws and nuts must be installed on the wing with nuts on the opposite side from the blade or with screw head contacting blade or on blade side.



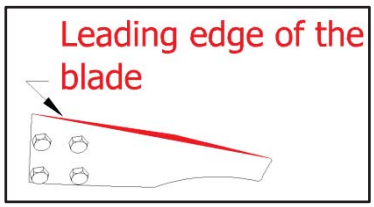
INSTALLATION: TWO POSSIBLE CHOICES



WRONG HUB INSTALLATION

Figure 7: Mixer hub installation

LEGEND	
CW-UP	Clockwise – Up
CW-DWN	Clockwise – Down
CCW-UP	Counterclockwise – Up
CCW-DWN	Counterclockwise – Down



POSSIBLE MIXER INSTALLATION:

Refer to the field installation drawings for your particular application.

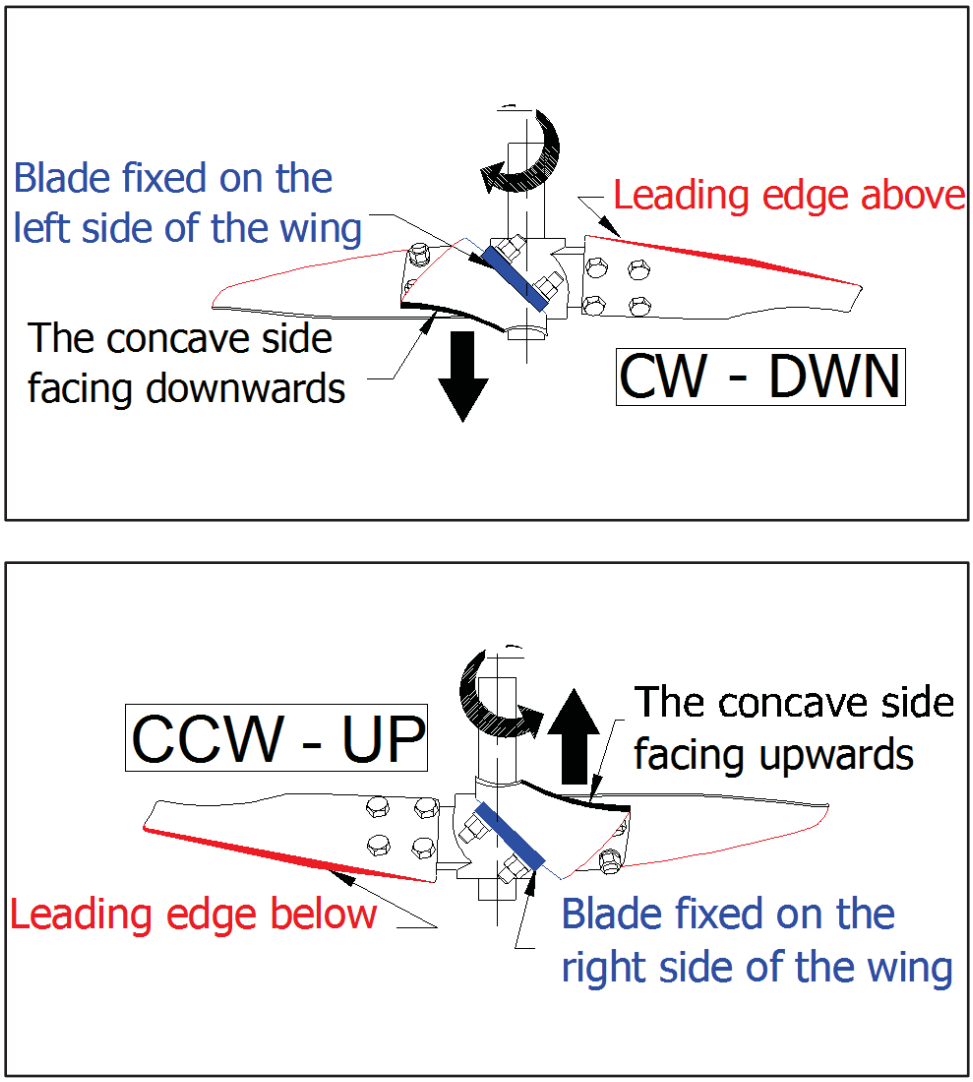


Figure 8: Mixer blade installation

5.9 STAIRS (Optional)

- Refer to field installation drawings for proper stairs installation.
- The stairs are delivered separately. The contractor must assemble and install the stairs at job site. Grout may be used underneath stairs legs to make sure that top of grating on tank matches stairs elevation.

5.10 LADDER AND SAFETY GATE (Optional)

- Install the ladder in place and fasten to unit at job site. Install the safety gate (optional) in the access opening of the ladder with the supplied screws and nuts. Refer to the field installation drawings.

6 PERIPHERAL EQUIPMENT INSTALLATION

6.1 MICROSAND RECIRCULATION PUMP SYSTEM

- Refer to field installation drawings for proper microsand recirculation pump system location and installation.
- Pump base frame must be leveled within proper tolerance.
- Drill appropriate holes in concrete floor and fasten the pump and flexible pipe supports with anchors.
- Connect the drip pan to a drain to avoid any leakage on the floor.

6.2 COAGULATION pH METER

- Refer to field installation drawings for proper coagulation pH meter installation.
- Install the coagulation pH meter with probe mounted to handrail on the settling tank side using supplied screws, nuts and washers. Refer to field installation drawings for proper location and installation.

6.3 CLARIFIED WATER TURBIDIMETER

FOR 1720E

- Install on a support on the effluent side of the tank. Refer to field installation drawings and manufacturer installation recommendations, for proper location and installation.

FOR SOLITAX

- Install the turbidimeter with probe mounted to handrail on the settling tank side using supplied screws, nuts and washers. Refer to field installation drawings and manufacturer installation recommendations, for proper location and installation.

6.4 RAW WATER TURBIDIMETER (Optional)

FOR SS7

- Install on a support beside the raw water valve. Refer to field installation drawings for proper location and installation.
- The connection and installation in the inlet piping to the sample port are by others and should respect manufacturer recommendations.

FOR SOLITAX

- Install in line pipe. Refer to field installation drawings and manufacturer installation recommendations, for proper location and installation.
- The connection and installation are by others.

6.5 RAW WATER FLOWMETER (Optional)

- Follow manufacturer installation recommendations (refer to manufacturer manual), to ensure adequate operation.

6.6 CLARIFIED WATER FLOWMETER (Optional)

- Follow manufacturer installation recommendations (refer to manufacturer manual), to ensure adequate operation.

6.7 PRESSURE SWITCH (Optional)

- Install on a support on the same side of the tank as the recirculation pump. Refer to field installation drawings and manufacturer installation recommendations, for proper location and installation.

6.8 PRESSURE TRANSMITTER (Optional)

- Install on the piping at the outlet of each recirculation pump. Refer to field installation drawings for proper location and installation.

7 PIPING CONNECTION

Note: Remove the flange protecting grease prior to the installation of the valves and pipes.

7.1 WATER COLLECTOR

- Install a pipe from the Actiflo® unit effluent flange to the clarified water collector.

7.2 TANK DRAIN

- Install a pipe from the tank drain valves to the trench drain.

7.3 SETTLED WATER TANK PARTIAL DRAIN

- Install a pipe from the pre-installed partial drain valve, located on Actiflo® effluent side, to the trench drain.

7.4 HYDROCYCLONE SLUDGE OUTLET

- Install a pipe from the hydrocyclone chamber sludge outlet flange to the trench drain.

Important: Provide sufficient pipe slope and size to prevent any backflow to the hydrocyclone chamber. It is important to drop one (1) meter (approximately 3 feet) at the sludge outlet of each hydrocyclone to avoid backflow through hydrocyclone. Discharge of sludge pipe must not be submerged.

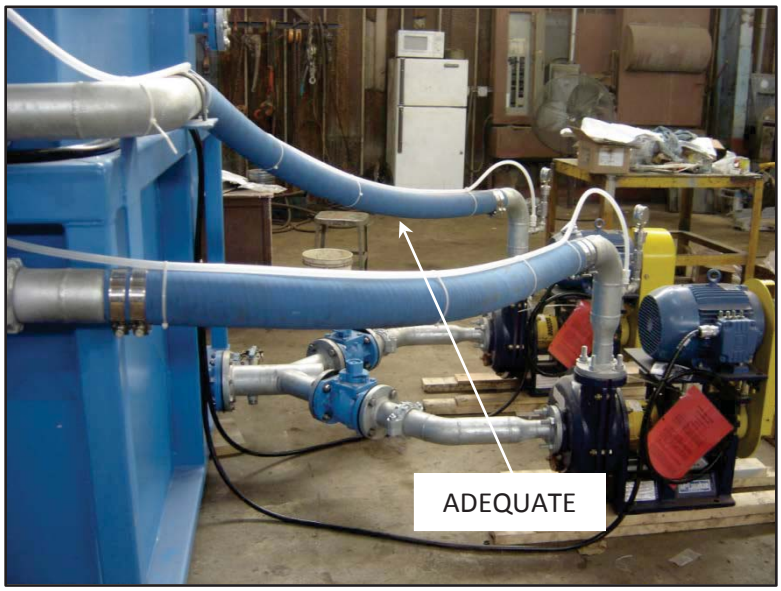
7.5 POLYMER FEEDING

- Connect the supplied polymer injection tubing from the Actiflo® maturation and injection reservoirs to the appropriate hydrocyclone assembly support polymer distributor outlet.
- Supply polymer feeding pipe from the polymer metering pump skid outlet to the hydrocyclone assembly support polymer distributor inlet for the Actiflo® unit.

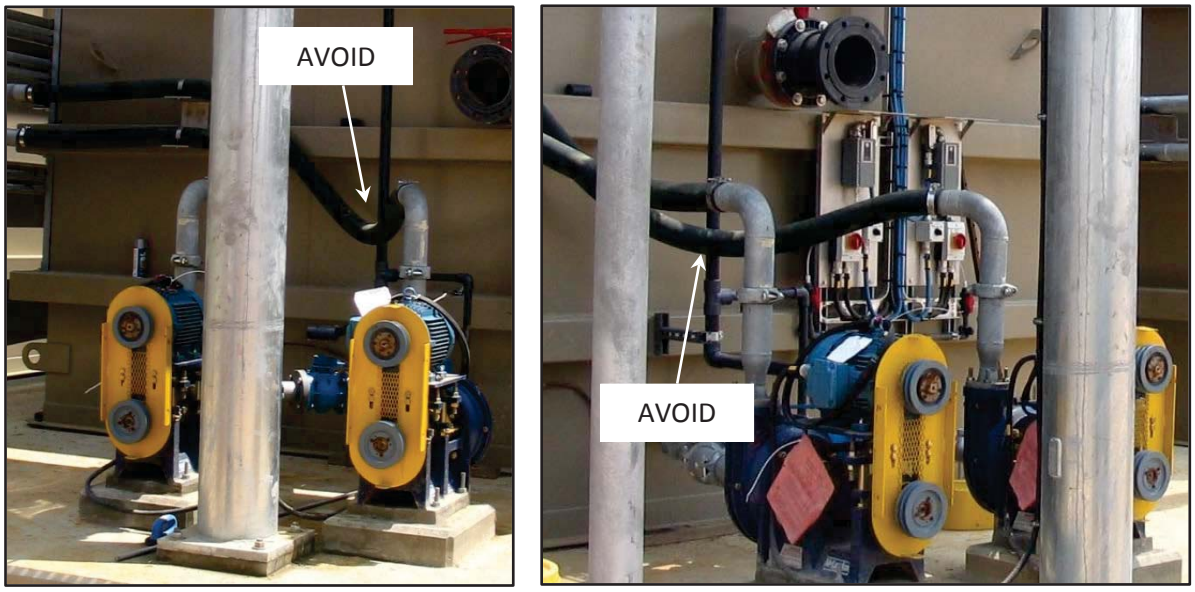
7.6 RECIRCULATION FLEXIBLE PIPE

- Refer to field installation drawings for proper recirculation pipe installation.
- Inspect the recirculation inlet pipe. It should be free of any debris.
- Connect the flexible pipe section using the connections provided.

- Pipe straps are supplied on the unit to secure the pipe along the tank wall. Install the recirculation flexible pipe in order to avoid any pipe drop that could cause sand accumulation and vibrations.
- Refer to the following pictures for proper installation.



MICROSAND RECIRCULATION PUMP ADEQUATE HOSE INSTALLATION



MICROSAND RECIRCULATION PUMP INCORRECT HOSE INSTALLATION

Figure 9: Microsand recirculation pump hose installation

7.7 CLARIFIED WATER TURBIDIMETER

FOR SS7

- Pipe the clarified water turbidimeter to an appropriate drain.
- Complete piping, if necessary, from the coupling located on the unit to the turbidimeter sampling inlet.

Important:	Provide sufficient slope to ensure correct draining. If connected to another drain line, make sure to avoid any backflow to the instrument. To avoid turbidimeter clogging, sample water piping must be connected prior to any coagulant or other viscous chemical product addition.

FOR SOLITAX

- N/A

7.8 RAW WATER TURBIDIMETER (Optional)

FOR SS7

- Pipe the raw water turbidimeter to an appropriate drain.
- Pipe the raw water turbidimeter bubble trap to appropriate sampling point connection.

FOR SOLITAX

- Refer to pipe orientation for supplied bracket to be mounted on inlet piping.

7.9 LAMELLA CLEANING SYSTEM (Optional)

- Refer to field installation drawings for proper system location and installation.
- Close all valves situated on the cleaning system conduct.
- Inspect the pipe inlet; it should be free of any debris.
- Connect the compressed air supply to pipe.
- Before feeding the system with air, reopen valves and refer to operation and maintenance manual.

8 TORQUE VALUES

BOLT	304 STAINLESS STEEL		316 STAINLESS STEEL	
SIZE	DRY	LUBRICATED	DRY	LUBRICATED
	in-lbs	in-lbs	in-lbs	in-lbs
1/4-20	75	64	79	67
1/4-28	94	80	99	84
5/16-18	132	112	138	117
5/16-24	142	121	147	125
3/8-16	236	201	247	210
3/8-24	259	220	271	230
7/16-14	376	320	393	334
7/16-20	400	340	418	355
	ft-lbs	ft-lbs	ft-lbs	ft-lbs
1/2-13	43	37	45	38
1/2-20	45	38	47	40
9/16-12	56	48	59	50
9/16-18	62	53	65	55
5/8-11	92	78	96	82
5/8-18	103	88	108	92
3/4-10	127	108	131	111
3/4-16	124	105	129	110
7/8-9	194	165	202	172
7/8-14	193	164	201	171
1 -8	286	243	299	254
1 -14	259	220	270	230
1-1/8 -7	413	351	432	367
1-1/8 -12	390	332	408	347
1-1/4 -7	523	445	546	464
1 1/4 -12	480	408	504	428
1-1/2 -6	888	755	930	791
1-1/2 -12	703	598	732	622

Table 2: Torque values for 304 and 316 stainless steel bolt

Notes:

1) Suggested maximum torque values is a guide based upon lab testing on dry or near dry fasteners wiped clean.
2) The use of this information is at sole risk of the user.
3) Values through 7/16" diameters are stated in inch-pounds; 1/2" diameter and over are stated in foot-pounds.

9 ELECTRICAL INSTALLATION

Note: Electrical work should be performed by a qualified contractor. Refer to control panel and electrical diagram for proper wiring installation.

9.1 GROUNDING

- Connect tanks earthing lugs in order to ground the tank.

9.2 CONTROL PANEL

- Supply wiring between unit (junction box optional) and the control panel.
- Supply power (575V or 460V / 3 ph / 60 Hz) to the control panel. Refer to technical datasheet.
- Before permanently wire the control panel, verify the rotation of each motor (clockwise or counter clockwise).

9.3 TANK MIXER

- Connect each mixer motor to control panel or junction box.

Warning: Never run a mixer without the tank being completely filled with water.

9.4 SCRAPER

- Connect scraper motor to control panel or junction box.

9.5 RECIRCULATION PUMP

- Connect each recirculation pump motor.

9.6 CLARIFIED WATER TURBIDIMETER

- Recommended supplier wiring instructions are given in the supplier manual.

Warning: Never cut the original cable between turbidimeter unit and its power supply unit. This cable must remain at full length.

9.7 COAGULATION pH METER

- Connect coagulation pH meter to junction box.

9.8 WATER LEVEL SWITCH

- Complete connection if any.
- Recommended supplier wiring instructions are given in the supplier manual.

9.9 RAW WATER FLOWMETER (Optional)

- Supply wiring between unit and control panel.
- Complete connection if any.
- Recommended supplier wiring instructions are given in the supplier manual.

9.10 RAW WATER TURBIDIMETER (Optional)

- Supply wiring between unit and control panel.
- Complete connection if any.
- Recommended supplier wiring instructions are given in the supplier manual.

9.11 PRESSURE TRANSMITTER (Optional)

- Supply wiring between unit and control panel.
- Complete connection if any.
- Recommended supplier wiring instructions are given in the supplier manual.

9.12 PRESSURE SWITCH (Optional)

- Supply wiring between unit and control panel.
- Complete connection if any.
- Recommended suppliers wiring instructions are given in the supplier manual.

10 ACTIFLO® CLARIFICATION PROCESS

10.1 GENERAL INFORMATION

The Actiflo® process is a compact system that will provide quality clarified water by a flocculation and high rate settling process.

Suspended particles and dissolved solids, previously destabilized with the injection of a coagulant in the raw water, are fixed to the microsand with the help of a flocculant (polyelectrolyte) added to the water. The floc being formed is subsequently separated from the water by counter-current lamellar settling with an ascending hydraulic flux.

Excellent efficiency of the Actiflo® process is reached using two proven techniques:

- Injection of microsand serves as support to the ballasted flocs and works as weight in order to create a very dense floc, thus providing a very high rate of settling.
- Lamellar settling allows increased settling surface in a reduced tank volume by using a set of inclined parallel tubes.

10.2 OPERATION PRINCIPLES

Raw water goes through four (4) successive steps that are part of the Actiflo® treatment process:

10.2.1 COAGULATION

Raw water is mixed with a coagulant using a rotating mixer in a rectangular-shaped tank. This insures a homogeneous diffusion of the coagulant in the water. The standard hydraulic retention time for this step is approximately two (2) minutes at nominal flow rate.

10.2.2 INJECTION

A precise amount of microsand and flocculant (polyelectrolyte) are added and mixed in the water using a rotating mixer in a rectangular-shaped tank. The energy induced by the mixer accelerates the contact between the flocs, the polyelectrolyte and microsand, thereby ensuring the formation of ballasted flocs. The standard hydraulic retention time for this step is approximately two (2) minutes at nominal flow rate.

10.2.3 MATURATION

The flocs previously formed are then maintained in suspension for a certain time in a large rectangular tank with the help of a rotating mechanical mixer. The smooth agitation of the water insures a gradual increase in floc size, reaching floc maturation. The standard hydraulic retention time for this step is approximately six (6) minutes at nominal flow rate.

10.2.4 COUNTER-CURRENT LAMELLAR SETTLING

Ballasted flocs precipitate to the bottom of a hopper and the clarified water is collected at the surface using troughs. The sludge is drawn out of the hopper by a pump and is directed toward a series of hydrocyclones. The hydrocyclones located above the injection tank separate the microsand from the sludge. The microsand is recirculated into the system via the underflow of the hydrocyclones while the sludge is evacuated through the overflow. The hydraulic retention time for the settling step is about three (3) minutes at nominal flow rate.

10.3 CHARACTERISTICS AND PERFORMANCES

By combining ballasted flocculation with lamellar settling, the Actiflo® process allows the system to operate at increased loading rates. This design feature can be very beneficial when raw water turbidity and flow rate vary greatly.

The Actiflo® process also accepts activated carbon dosages aimed at reducing taste and odours.

While at design flow, the time to complete all three (3) stages of treatment, i.e. coagulation / injection / maturation, is only 10 minutes. This very short hydraulic retention time enables the process to respond quickly to adjustments in chemical dosages. Ballasted flocculation produces high quality clarified water, even when operating under difficult conditions, such as very cold and/or very coloured waters or waters with a high turbidity.

Actiflo® pilot plant tests have demonstrated the efficiency of this process as well as its ability to rapidly respond to changes in raw water flow rate and/or characteristics.

11 DESCRIPTION OF COMPONENTS

11.1 ACTIFLO® CLARIFIERS

11.1.1 GENERAL DESCRIPTION

An Actiflo® clarifier is composed of coagulation, injection and maturation tanks, a lamellar settling tank with a hopper, a series of lamellar tubes and troughs for the collection of clarified water, a microsand recirculation circuit, piping and a control panel.

11.1.2 COAGULATION TANK

Raw water enters the Actiflo® at the bottom of the coagulation tank. Coagulant is added upstream of this tank to improve contact time.

The coagulation tank is equipped with a mechanical mixer composed of a shaft and a four-bladed propeller made of stainless steel. The mixer is vertically mounted and the induced water flow direction is downward.

The mixer is driven by a motor and a helical gear speed reducer. It is a totally enclosed fan cooled motor (TEFC) and operates at a constant speed. In case of thermo-mechanical overload, the motor stops automatically and an alarm warns the operator.

A manual drainage valve, located in the coagulation tank, allows draining this tank through the existing draining network.

11.1.3 INJECTION TANK

Coagulated water enters the top portion of the injection tank by going over a flooded overflow, which communicates directly with the coagulation tank. An accurate amount of microsand and polymer is added at the tank water surface. The polymer may also be directly added in the bottom injection or maturation tanks.

The injection tank is equipped with a mechanical mixer composed of a shaft and a four-bladed propeller made of stainless steel. The mixer is vertically mounted and the induced water flow direction is upward.

The mixer is driven by a motor and a helical gear speed reducer. It is a totally enclosed fan cooled motor (TEFC) and operates at a constant speed. In case of thermo-mechanical overload, the motor stops automatically and an alarm warns the operator.

A manual drainage valve, located in the injection tank, allows draining this tank and the maturation tank through the existing draining network.

11.1.4 MATURATION TANK

Water and flocculated solids originating from the injection tank enter at the bottom of the maturation tank through a common opening.

The maturation tank is equipped with a mechanical mixer composed of a shaft and a four-bladed propeller made of stainless steel. The mixer is vertically mounted and the induced water flow direction is downward. The maturation tank is equipped with baffles to insure better mixing.

The mixer is driven by a motor and a helical gear speed reducer. It is a totally enclosed fan cooled motor (TEFC) and may operate at a constant or variable speed. An adjustment to the rotating speed can be proven necessary when the incoming water flow rate is greatly reduced. In this case, it might be advantageous to compensate for losses in hydraulic energy by increasing the speed of rotation of the maturation mixer. In case of thermo-mechanical overload, the motor stops automatically and an alarm warns the operator. The unit automatic shutdown sequence is also initiated.

A manual drainage located, in the injection tank, allows draining the maturation tank through the existing draining network.

11.1.5 SETTLING TANK

The settling tank is composed of a set of lamella tubes, a sludge collection system and a clarified water collector.

The water coming from the maturation tank contains a suspension of microsand-ballasted flocs and enters the settling tank after going through a vertical baffle. The solids settle in the hopper while clarified water flows through the lamella pack to the clarified water troughs.

11.1.5.1 Lamella Pack

The lamella pack consists of several polystyrene tubes positioned at an angle of 60° from horizontal plane. They are disposed in such a way that they form hexagonal-shaped cells (honeycomb). Smaller solids that did not settle directly in the hopper will deposit on the lamella pack surface and subsequently settle in the sludge collection hopper by their own weight. Clarified water flows upwards to the collection troughs and out of the clarifier.

Warning: The lamella pack is installed in the settling tank section of the Actiflo® clarifier. It is made of a very flammable material. Do not expose it to open flames or sparks. Do not allow any welding works nearby unless special precautions have been taken.

11.1.5.2 Sludge Collection Hopper

The collection of sludge takes place within a pyramidal hopper located at the base of settling tank where the settling solids are pumped to the hydrocyclones.

11.1.5.3 Circular Scraper

The settling tank has a circular scraper equipped with a stainless steel drive shaft and scrapers. Rubber scrapers are fitted onto the metal support. The scraper is mounted vertically. The scraper moves the microsand that has settled at the bottom of the hopper to its center where a basin captures the accumulated sludge. The scraper is powered by a gear motor combination. This motor is totally enclosed fan cooled (TEFC).

11.1.5.4 Clarified Water Troughs

Clarified water is collected above the lamella modules by stainless steel troughs. The dimension and position of the square-edged notches are designed in order to obtain an optimal hydraulic distribution of the flow rate inside the settling tank.

11.1.5.5 Partial Drainage

A manual valve, installed below the settling lamellas, allows for partial draining of the settling tank to facilitate the preventive maintenance of the lamellar plates.

11.1.5.6 Complete Drainage

There is two (2) ways to achieve a complete drainage of the clarifier:

1) By opening the coagulation, injection and hopper drain manual valves.
2) By opening the coagulation and injection manual drainage valves and turning the recirculation pump on.

Warning: It is important that the recirculation pump does not operate without water.

11.1.6 MICROSAND RECIRCULATION PIPING

11.1.6.1 Collection of Sludge and Microsand

Sludge containing microsand is collected in the hopper and pumped to the hydrocyclones through galvanized steel pipes and flexible non-abrasive pipes that can withstand highly abrasive conditions.

In case of clogging, a clean-out assembly is provided to backwash and flush the suction line by connecting a pressurized service water hose.

11.1.6.2 Microsand Recirculation Pumps

The clarifier is provided with a centrifugal pump (second pump optional) equipped with a pulley and drive belt arrangement. A backup pump is also supplied. The backup pump may be used to supplement the first pump if higher influent solids are experienced. The impeller and the inside of the volute are coated with a material (usually natural rubber) resistant to microsand abrasion. The motor is totally enclosed fan cooled (TEFC). In case of a thermo-mechanical overload, the motor will automatically shut down and an alarm will warn the operator.

The recirculation pump operates at a constant pressure. An increase in pressure may be caused by an obstruction of the discharge pipe and a decrease in pressure may be caused by unpriming of the pump or an obstruction of the inlet pipe. An optional pressure switch/pressure transmitter could be located at the pump discharge. If the measured pressure becomes too low, the pump stops and an alarm will warn the operator.

11.1.6.3 Hydrocyclones

The sludge and microsand are pumped by the recirculation pump to a dedicated hydrocyclone where the microsand is separated from the sludge particles. This process allows the recycling of clean microsand back into the system. Sludge-microsand separation is accomplished by a vortex effect exerting a centrifugal force on the mixture of particles.

The microsand grains, more dense than sludge particles, descend along the internal surface of the hydrocyclone, while the sludge particles ascend. The microsand is returned to the injection tank while the sludge is evacuated out of the system through the hydrocyclone overflow piping.

11.1.7 MICROSAND

The recycling of microsand into the injection tank along with the polyelectrolyte solution (polymer), serves as support for the flocs formation. The floc, ballasted with the microsand grain, becomes considerably heavier and therefore can settle more rapidly. The microsand has the following characteristics:

- Effective size: 85 µm or 135 µm (refer to technical datasheet)
- Uniformity coefficient: < 1.6
- Available in bags of 22.7 kg (50 lbs)

A small portion of the microsand is lost in the process; therefore periodic addition of microsand in the system is required. Microsand is available from VWTC.

Warning: The microsand may contains fine particles of silica. Therefore, it must be handle safely and with caution by qualified staff. Consult the MSDS for further instructions.

11.1.8 COAGULANT

The coagulant to be used can either be alum $Al_2(SO_4)_3 \bullet 14\ H_20$, PASS (Poly Aluminum Silicate Sulphate) or PAC (Poly Aluminum Chloride). It is injected at the head of the process directly into the pipe leading to the tank.

By reacting with the alkaline components of the water, the coagulant forms a precipitate, which sticks to the colloidal particles in suspension and organic components in the raw water, thereby producing a floc. In some cases, an alkali (i.e. caustic soda) must be added to the water upstream of the clarifier, prior to the addition of coagulant.

The coagulant gets rapidly dispersed in the water when it is introduced into the coagulation tank.

Warning: The operation staff should be aware that coagulant is highly corrosive. Spills should be cleaned immediately according to the MSDS instructions.

11.1.9 FLOCCULANT (POLYELECTROLYTE)

The polyelectrolyte is a white powder generally sold in 50 lbs bags. The powder is naturally hygroscopic so it must be stored in a dry environment.

Polyelectrolyte is pumped into the injection and maturation tank along with the microsand. It forms a coating on the microsand particles in order to activate them and facilitate fixing of the floc onto the sand particle surface. Other injection points of polymer can also be used, that is, at the inlet of the maturation tank and at various locations inside the maturation tank.

Warning: The operation staff should be aware that polymer solution could be very slippery. Spills should be cleaned immediately according to the MSDS instructions.

11.1.10 CONTROL PANEL

The Actiflo® clarifier operation is fully automated but manual control is possible from the control panel interface. The control panel normally includes but is not limited to components such as fuses, starters, selectors, warning lights, PLC (Programmable Logic Controller) and operator interface.

The electrical circuit of the control panel performs the necessary functions for a fully automatic operation and equipment protection of the Actiflo® unit. The control panel gives the operator access to every mechanical component of the system. In addition, all the alarms are channelled through the control panel, which in turn warns the operator in the event of equipment malfunction.

Refer to the functional description of control system in the «Electricity and Control» section of the complete operation and maintenance manual for a control panel detailed description.

12 START-UP & OPERATION

12.1 START-UP

12.1.1 PRELIMINARY VERIFICATION

Before starting the Actiflo®, the following points must be checked:

- Remove any debris from the settling tank to prevent hydrocyclone clogging.
- Every section of the Actiflo® must be filled with water.
- Valves configuration on the microsand recirculation lines is adequate.
- Chemical metering systems must be ready to operate.
- Chemical storage tanks must be full.
- Chemical metering pumps must be calibrated and set for the desired dosage. These can however be adjusted once that the system is operational.
- All the field instruments must be calibrated (flowmeter, pressure transmitter).
- Verify the oil level in the mixers gear reducers and the grease in the recirculation pumps.
- Verify the rotation of each mixer.
- Verify the rotation of each recirculation pump; remove the belt to prevent impeller unscrewing if the rotation is the wrong way.
- Verify the proper installation of the mixer impellers, especially the height above tank floor (refer to technical sheet and field installation drawing).
- Adjust motor overload protection to the proper value as indicated on each motor nameplate.
- Record the pressure at the hydrocyclone inlet gauge. Refer to technical datasheet.

Once all these conditions have been checked, the system can be put into operation.

12.1.2 INITIAL MICROSAND LOADING

The standard microsand load in an Actiflo® clarifier is approximately 2000 lbs per MGD of design or 5 kg per m^3/h, flow rating of unit.

The addition of microsand is done by pouring it directly in the injection tank until the required concentration is reached. It is preferable to begin by adding a small quantity of microsand and measure the resulting microsand concentration in the hydrocyclone underflow after a whole recirculation cycle has been completed (15 to 20 minutes). The quantity of microsand should be increased until the optimal concentration in the underflow is reached (typically 80 to 200 ml/litre).

Warning: The microsand may contains fine particles of silica. Therefore, it must be handle safely and with caution by qualified staff. Consult the MSDS for further instructions.

12.1.3 AUTOMATIC START-UP

Refer to the functional description of control system of the «Electricity and Control» section of the complete operation and maintenance manual to start the Actiflo® system in automatic mode.

12.2 NORMAL OPERATION

Note:	In the case of a discrepancy between this section of the manual and the functional description of control system, the latest shall prevail.

12.2.1 ACTIFLO® CLARIFIERS

12.2.1.1 Microsand Monitoring

Although a minor amount of microsand is constantly discharged out of the process and a sand concentration between 5 and 15 g/L is sufficient for satisfactory operation of the Actiflo® process, the microsand concentration should always be maintained at recommended levels (5 to 15 g/L). This insures that the system is always prepared to treat the worst possible raw water conditions. Therefore, the operators should monitor the microsand concentration 2-3 times per day. The concentration can easily be estimated using the following methods.

A. Sampling from Hydrocyclone Inlet Sampling Valve

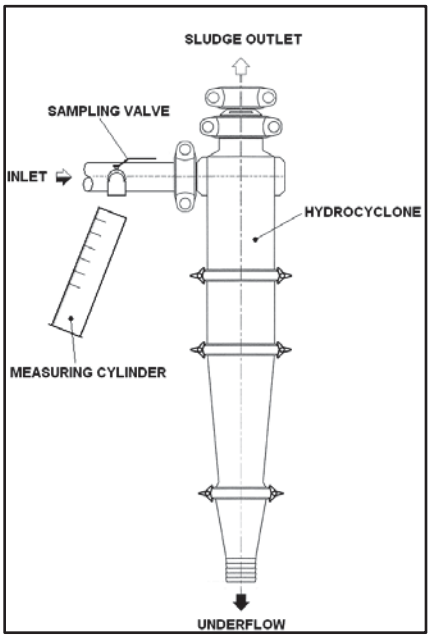
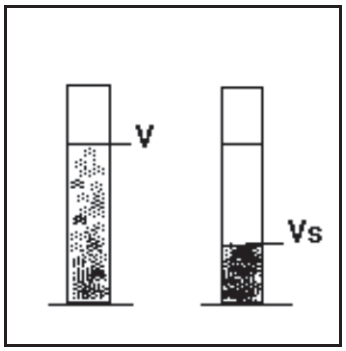


Figure 10: Microsand sampling from hydrocyclone inlet sampling valve

a. Verify that each operating hydrocyclone has an uninterrupted conical discharge. If you have a splashguard covering the apex tip, place it in the up position to verify this and make sure it stays in that position.
b. Obtain a 1000-2000 ml graduated cylinder to take the hydrocyclone inlet sample.
c. Open the ball valve located at the inlet piping of the hydrocyclone and fill the cylinder as close to the 1000 ml or 2000 ml mark as possible without over spilling. Caution: the 1000 ml cylinder may fill quickly and with force.
d. Allow the sample to settle for 3 minutes.
e. Record the volume of the settled sand (Vs) in ml along with the total sample volume (V) in ml. Refer to next figure.



f. Repeat steps c) through e) on the same hydrocyclone two (2) more times.
g. Use the same sampling procedure as you did on the first hydrocyclone and repeat steps c) through f) for all hydrocyclones in operation on the system. For example, if you have two hydrocyclones operating on a given system you should have six (6) values for Vs and six (6) values for V.
h. To determine the concentration of sand in the entire system you must next average all collected values of Vs. Also, average all collected values of V. Now you can use the following two (2) equations to first determine Cs (microsand concentration in the hydrocyclone inlet) and lastly Cm (microsand concentration in the Actiflo® system).

Note: For the most accurate determination of microsand in any given system the sampling procedure above should be performed three (3) times throughout a 24 hour period. Three (3) separate values of Cm should be averaged to determine one final microsand concentration for the day. It is also important to record and trend the final daily value of Cm to give indication of microsand loss over an extended period of time.

B. Sampling from Hydrocyclone Underflow

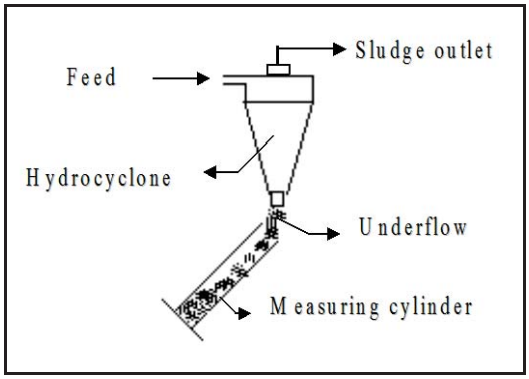
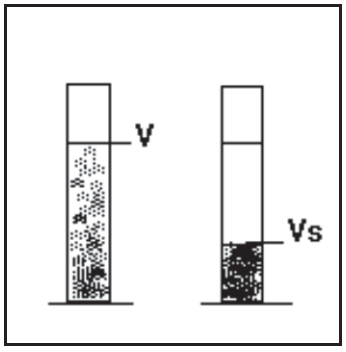


Figure 11: Microsand sampling from hydrocyclone underflow

a. Verify that each operating hydrocyclone has an uninterrupted conical discharge. If you have a splashguard covering the apex tip, place it in the up position to verify this. After verification the splashguard should be returned to the down position prior to sampling.
b. Obtain a 1000-2000 ml graduated cylinder to take the hydrocyclone underflow sample. The underflow discharge must be sampled entirely and not partially. However, it is important to be consistent and obtain the sample from the identical section of the underflow discharge every time a grab is taken. If the underflow discharge is constantly or periodically roping, the underflow discharge should be sampled with a swirling motion that catches the outer and center portions of the underflow in each sample.
c. Fill the cylinder as close to the 1000 ml or 2000 ml mark as possible without over filling/spilling. Caution: the 1000 ml cylinder may fill quickly and with force.
d. Allow the sample to settle for 3 minutes.
e. Record the volume of the settled sand (Vs) in ml along with the total sample volume (V) in ml. Refer to next figure.



f. Repeat steps c) through e) on the same hydrocyclone two (2) more times.
g. Use the same sampling procedure as you did on the first hydrocyclone and repeat steps c) through f) for all hydrocyclones in operation on the system. For example if you have two (2) hydrocyclones operating on a given system you should have six (6) values for Vs and six (6) values for V.

h. To determine the concentration of sand in the entire system you must next average all collected values of Vs. Also, average all collected values of V. Now you can use the following two (2) equations to first determine Cs (microsand concentration in the hydrocyclone underflow) and lastly Cm (microsand concentration in the Actiflo® system).

C. Sand Concentration of Hydrocyclone Inlet

The microsand concentration of the hydrocyclone entrance is calculated with the following formula:

$$C_S = \frac{1000}{V} \times V_S \times 1.5$$

Where:
C_s: Microsand concentration in the hydrocyclone entrance (g/l)
V: Sample volume taken in a graduated cylinder (ml)
V_s Volume of the settled microsand after settling for 3 minutes (ml)
1.5: Density of the settled microsand (kg/l)

System Sand Concentration

Knowing the flow rate of the hydrocyclone entrance (gpm) and the microsand concentration (g/l) of the hydrocyclone entrance, the microsand concentration (g/l) in the Actiflo® system is determined using the following formula:

$$C_m = \frac{Q_{Hydro} \times N \times C_S}{Q_{in}}$$

Where:
C_m: Microsand concentration in the Actiflo® system (g/l)
C_s: Microsand concentration in the hydrocyclone entrance (g/l)
Q_{Hydro}: Hydrocyclone entrance flowrate (gpm)
N: No. of hydrocyclones in operation
Q_{in}: Influent flow rate (gpm)

D. Sand Concentration of Hydrocyclone Underflow

The microsand concentration of the hydrocyclone underflow is calculated with the following formula:

$$C_S = \frac{1000}{V} \times V_S \times 1.5$$

Where:
C_s: Microsand concentration in the hydrocyclone underflow (g/l)
V: Sample volume taken in a graduated cylinder (ml)
V_s: Volume of the settled microsand after settling for 3 minutes (ml)
1.5: Density of the settled microsand (kg/l)

System Sand Concentration

Knowing the flow rate of the hydrocyclone underflow (gpm) and the microsand concentration (g/l) of the hydrocyclone underflow, the microsand concentration (g/l) in the Actiflo® system is determined using the following formula:

$$C_m = \frac{UF \times N \times C_s}{Q_{in}}$$

Where:
C_m: Microsand concentration in the Actiflo® system (g/l)
C_s: Microsand concentration in the hydrocyclone underflow (g/l)
UF: Hydrocyclone underflow flowrate (gpm)
N: No. of hydrocyclones in operation
Q_{in}: Influent flow rate (gpm)

E. Microsand Addition

Some microsand is lost at the hydrocyclone overflow and at the Actiflo® effluent. Periodic microsand addition is required to compensate for these losses (in typical conditions, normal loss is from 3 to 6 g/m^3). The addition of microsand is done directly in the flocculation tank. Since microsand contains a small proportion of very fine particles, the turbidity of the clarified water could increase slightly for a short period following the addition of microsand.

In standard operation mode, if a sustained increase of the raw water turbidity happens, it may be necessary to increase the concentration of microsand in the system to maintain the removal efficiency.

12.2.1.2 Microsand Recirculation Pumps

Each Actiflo® has one (1) or two (2) recirculation pumps and associated piping. It is essential that a recirculation pump be in operation continuously. When the pump stops, sludge and microsand accumulate in the hopper; this may clog the recirculation line. When the recirculation pump needs to be stopped, the mixer in the maturation tank must be stopped first, followed by the scraper. The scraper will operate for a short period of time before stopping the pump. This allows the hopper to be emptied before stopping the pump. The duration may be adjusted by the operator on the control panel.

Recirculation Pumps Options:

If the pumps are protected by a pressure switch (optional) / pressure transmitter (optional), alarms will be issued in any of the following situations:

- Thermo-mechanical overload of the pump: this is normally a sign of overheating of the pump motor and can be caused by a mechanical breakdown or a pressure surge. The operator must correct this problem by verifying the pump and motor as well as the outlet piping and then reactivate the overload relay located inside the control panel.

- Low pressure at the pump outlet: this can be caused by incomplete priming of the pump or closed isolation valve or clogging of the pump suction line. The operator must make sure that there is no obstruction at the inlet of the pump and in such case, the sludge suction piping must be cleaned according to the following procedure:

    - Stop the pump.
    - Close the valve on the pump suction side.
    - Connect a service water hose to the clean-out outlet.
    - Open the service water valve.
    - Let the service water run for approximately five (5) minutes.
    - Put the equipment back into normal operation.
    - Restart the pump.

The low pressure alarm set point is adjustable via the low pressure switch and is usually set at 3 to 5 psi below the normal operating pressure of the pump. When an alarm is activated, the pump stops automatically and the alarm light blinks on the control panel. The operator must acknowledge the alarm by pressing the ALARM ACKNOWLEDGE button located on the control panel, fix the problem and then reset the system by pressing the ALARM RESET button. The pump will restart automatically.

12.2.1.3 Hydrocyclones

The operator must make sure that the hydrocyclone outlets are free of obstruction at all times. Debris, as small as 13 mm (1/2"), can clog the underflow.

Waste sludge is evacuated from the Actiflo® at the hydrocyclone overflow (70% to 90% of the hydrocyclone flow rate). A small amount of microsand is lost at the overflow. It is important to check on a daily basis if the loss is higher than normal. This can be verified by collecting a 1 L sample of the overflow into an *Imhoff* cone and measuring the volume of settled microsand after 2 or 3 minutes. Record the value and compare it with past measurements. Refer to troubleshooting section.

The same procedure is used to measure the concentration of sand at the hydrocyclone underflow (10% to 30% of the hydrocyclone flow rate):

- Collect a 1 L sample from the underflow (mixture of microsand and water).
- Allow the sample to settle for 2 or 3 minutes and then measure the volume of settled microsand.
- The volume of microsand should range between 80 and 200 ml/L of water (5 to 15 g/L).

Warning:	It is important to keep the cone underflow of the hydrocyclone at all times during operation of the Actiflo®. In absence of this cone, a premature wear of the tank wall may occur due to the sandblasting of the hydrocyclone.

12.2.1.4 Mixers

The mixers all have a specific rotation direction and speed. In the event of a mixer motor overload, the mixer automatically stops and an alarm warns the operator. The operator must press the ALARM ACKNOWLEDGE button, correct the problem and then reset the system by pressing ALARM RESET button. If the operator cannot correct the problem, the Actiflo® should be shut down, as it is impossible to produce clarified water with a mixer out of service.

12.2.1.5 Circular Scraper

When an overload occurs to the scraper motor or when a very high torque is detected, the motor shuts down automatically and an alarm warns the operator and the Actiflo® will stop as per the stop sequence.

12.2.1.5.1 SGT90 and Moeller Easy Relay Configuration (UNITED STATES)

a) Scraper Load Cell Adjustment (HIGH TORQUE)

Procedure to adjust the HIGH TORQUE alarm set point on the Moeller Easy Relay

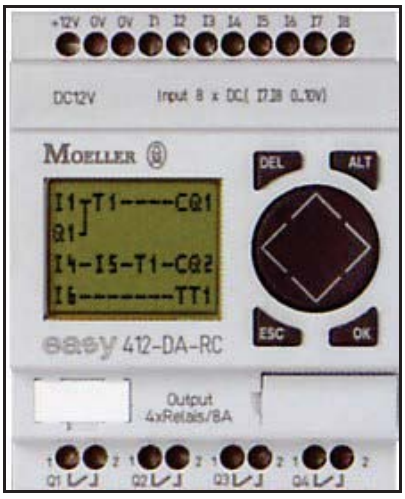


Figure 12: Moeller Easy Relay

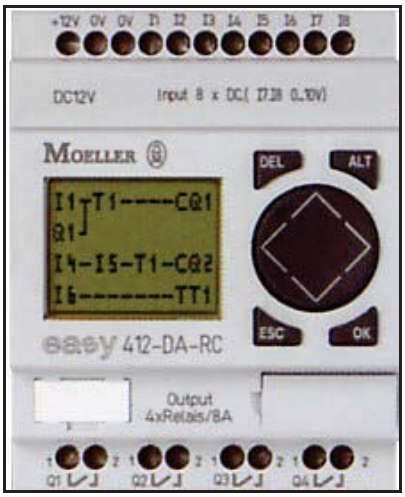
In normal operation, the display indicates the values of inputs/output. To change the values of alarm set points:

Press:	**OK**	
Press:	▼	
Press:	▼	
Press:	**OK**	(On Parameter)
Press:	▼	(Cursor on A1)
Press:	**OK**	(On A1)
Press:	▼	(Cursor on I2)

Press: **OK** (Edit I2)
Press: ◄►▲▼ (to modify the HIGH TORQUE alarm set point)
Press: **OK**
Press: **ESC**
Press: **ESC**
Press: **ESC**

b) Scraper Load Cell Adjustment (HIGH HIGH TORQUE)

Procedure to adjust the HIGH HIGH TORQUE alarm set point on the Moeller Easy Relay



In normal operation, the display indicates the values of inputs/output. To change the values of alarm set points:

Press: **OK**
Press: ▼
Press: ▼
Press: **OK** (On Parameter)
Press: ▼ (Cursor on A2)
Press: **OK** (On A2)
Press: ▼ (Cursor on I2)
Press: **OK** (Edit I2)
Press: ◄►▲▼ (to modify the HIGH HIGH TORQUE alarm set point)
Press: **OK**
Press: **ESC**
Press: **ESC**
Press: **ESC**

12.2.1.5.2 HPL 220 Configuration (CANADA)

Mode	Function	Parameter	▼	▲	Display	Default
Meas'mt	Display measurement		Min. peak	Max. peak	Meas'mt [%]	
Limits	Limit 1 prog./display	Off,5-100%	Decrease	Increase	Limit 1	80
Limits	Limit 2 prog./display	Off,5-100%	Decrease	Increase	Limit 2	Off
Ts [S]	Start timer	0.0-25.0 Sec.	Decrease	Increase	Ts [Sec]	2.0 Sec.
Tr [S]	Alarm reaction timer 1	0.0-25.0 Sec.	Decrease	Increase	Tr [Sec]	0.1 Sec.
Tr [S]	Alarm reaction timer 2	0.0-25.0 Sec.	Decrease	Increase	Tr [Sec]	0.1 Sec.
Hyst's	Hysteresis 1	5-50%	Decrease	Increase	Hyst's [%]	10
Hyst's	Hysteresis 2	5-50%	Decrease	Increase	Hyst's [%]	10
Units						
Full scale	Max. input	20-100%	Decrease	Increase	'Full scale'	100
Offset	Offset adjustment ±	±10%(F.S.)	Decrease	Increase	Meas'mt [%]	---
Input	Input select	Vdiff, 10V, 20mA	Vdiff-10V-20mA	20mA-10V-Vdiff	"Inp"	Vdiff

Figure 13: HPL 220 Configuration parameters

a) Typical Adjustment

- Limits 1: Refer to the technical product data sheet
- Limits 2: Refer to the technical product data sheet
- Ts: 0
- Tr 1: 0
- Tr 2: 0
- Hyst's 1: 5
- Hyst's 2: 5
- Full Scale: 30 mV (with 500 N load cell and 10 VDC)
- Offset: 0
- Input: Vdiff

b) Limit 1 & 2 Adjustment

The limit 1 and 2 values can be adjusted by 0.5% increment and need to be set in the range from 0.5% to 100% of the load cell total value.

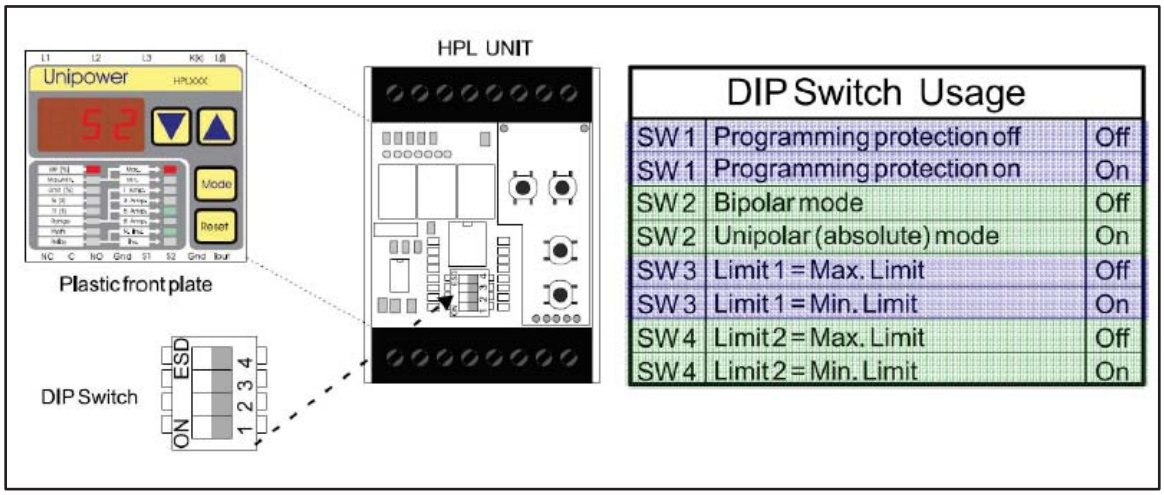
For example: The load should be limited at 238 N and the load cell can accept up to 500 N.

$$HPL_{Limit} = \frac{F_{Required}}{F_{Full\ Load}} \times 100$$

$$HPL_{Limit} = \frac{238}{500} \times 100 = 47.6\% \approx 48\%$$

The percentage value remain between the 0, 5% to 100% which is acceptable.

c) Dip Switch



DIP Switch Usage		
SW 1	Programming protection off	Off
SW 1	Programming protection on	On
SW 2	Bipolar mode	Off
SW 2	Unipolar (absolute) mode	On
SW 3	Limit 1 = Max. Limit	Off
SW 3	Limit 1 = Min. Limit	On
SW 4	Limit 2 = Max. Limit	Off
SW 4	Limit 2 = Min. Limit	On

Figure 14: HPL 220 DIP Switch settings

1) Turn-off the HPL 220
2) Remove the cover
3) Set the dip switches according to the following:
   - SW1: **OFF**
   - SW2: **ON**
   - SW3: **OFF**
   - SW4: **OFF**
4) Reassemble the HPL 220

12.2.2 DOSAGE OF CHEMICALS

12.2.2.1 Coagulant

The coagulant is injected into the raw water feed line.

In either case, the dosage to be used varies according to the characteristics of the raw water. An increase in turbidity of the raw water must signify an increase in product dosage. The proper dosage is determined by a jar test.

The concentration of coagulant at the inlet of the system is calculated from the flow rate of the raw water and metering pumps:

$$Coagulant\ Concentration\ (mg/L) = \frac{Metering\ Pump\ Rate\ (mg/h)}{Raw\ Water\ Flow\ Rate\ (L/h)}$$

12.2.2.2 Flocculant (polyelectrolyte)

The polyelectrolyte is used in solution with a concentration ranging from 0.5 to 2.5 g/L, the produced solution is viscous. In order to obtain a high quality polymer, it is recommended to use non chlorinated filtered water for its preparation and transport. The concentration of polyelectrolyte in the clarifier should be between 0.40 to 0.90 mg/L. Depending on the quality of the raw water, this concentration can be increased or decreased. The polyelectrolyte concentration in the system is calculated from the flow rate of the raw water and metering pumps:

$$Polyelectrolyte\ Concentration\ (mg/L) = \frac{Metering\ Pump\ Rate\ (mg/h)}{Raw\ Water\ Flow\ Rate\ (L/h)}$$

The ideal dosage of polyelectrolyte can be determined with a jar test (refer to the jar test procedure in this manual).

Insufficient polymer dosage will cause free flocs to appear that are not ballasted by the microsand and which will not be correctly eliminated in the settling tank. The clarified water might have a higher turbidity and/or color, and an important aluminum concentration.

However, excess in polyelectrolyte dosage can produce very sticky sludge, which is difficult to recycle.

12.2.2.3 Alkali, pH Adjustment

The water pH is the most important factor to consider in a coagulation process. When using alum, maximum coagulation efficiency is reached when pH readings are between 5.5 and 7.0. If the raw water has a low pH, it is important to increase it by adding an alkaline product (ex. caustic soda, etc.) to the water upstream of the coagulation step.

Upstream of the coagulation step, the hydraulic residence time of the alkali must be long enough, allowing time for it to completely dissolve in the water, increasing the precision in the adjustment of the water pH.

13 SURVEY OF OPERATIONS

In order to insure a reliable survey of the Actiflo® system operation and to provide the operators with a useful data bank, we suggest to the operators to record the following parameters:

ON A HOURLY BASIS:

- Turbidity, raw water
- Color, raw water
- pH, raw water
- Turbidity, clarified water
- Color, clarified water
- PH, clarified water

EVERY EIGHT HOURS:

- Flow rate, raw water
- Flow rate, coagulant metering pump and calculated concentration
- Flow rate, polyelectrolyte metering pump and calculated concentration
- Flow rate, alkali metering pump and calculated concentration
- Alkalinity, clarified water
- Pressure at the recirculation pump outlet
- Pressure at the hydrocyclones inlet
- Microsand concentration at the hydrocyclone underflow

ON A DAILY BASIS:

- Total quantity of clarified water
- Mixers speed
- Electric current drawn by the mixers
- Other parameters of interest: dissolved iron and manganese, total organic carbon, etc.
- Alkalinity, raw water
- Average raw water flow

ON A WEEKLY BASIS:

- Flow rate of the hydrocyclone underflow
- Flow rate of the hydrocyclone overflow

13.1 AUTOMATION

Refer to the functional description of control system in the «Electricity and Control» section of the complete operation and maintenance manual.

13.2 SHUT DOWN

In manual mode, when the microsand recirculation pump needs to be stopped, the following procedure must be followed in order to prevent possible clogging problems:

- Stop the mixer in the maturation tank. This allows the microsand to settle in the maturation tank instead of in the hopper.
- After approximately 30 minutes, verify that the underflow of the hydrocyclone does not contain any microsand.
- The microsand recirculation pump can then be stopped without any risk of clogging the recirculation line.

13.3 TROUBLESHOOTING

13.3.1 INCREASE IN CLARIFIED WATER TURBIDITY

If the turbidity of the clarified water should increase suddenly, verify the following parameters:

- The flow rate of raw water: if it is greatly increased or diminished, dosage flow rate of coagulant and polyelectrolyte should be adjusted in consequence.
- The flow rate of coagulant and polyelectrolyte: the metering pumps must inject an accurate dosage of these chemicals, such that the desired concentrations in the system can be obtained.
- The quality of raw water: if the turbidity, colour and/or the alkalinity of the raw water are increased or decreased, it is normally necessary to adjust the concentration of coagulant in the system. This dosage can be predetermined with the help of a jar test. However, a change in the quality of the raw water does not usually require an adjustment in polyelectrolyte concentration.
- The concentration of microsand in the underflow of the hydrocyclone: this must approach a value between 80 and 200 ml/L (5 to 15 g/L). Deterioration in the raw water quality can necessitate an increase in the quantity of microsand in the system.
- Sludge-sand recirculation rates: these flow rate generated by the recirculation pump must be kept constant.
- Maturation mixer rotation speed: mixer speed can be read directly on the display of the corresponding variable frequency drive.

13.3.2 INCREASE IN CLARIFIED WATER COLOUR

Clarified water color (apparent and true) is one of the parameters to follow since it indicates the performance of the Actiflo® process and the proper dosage of coagulant and pH adjustment. The next figure shows the troubleshooting guide if clarified water color increases and actions to take.

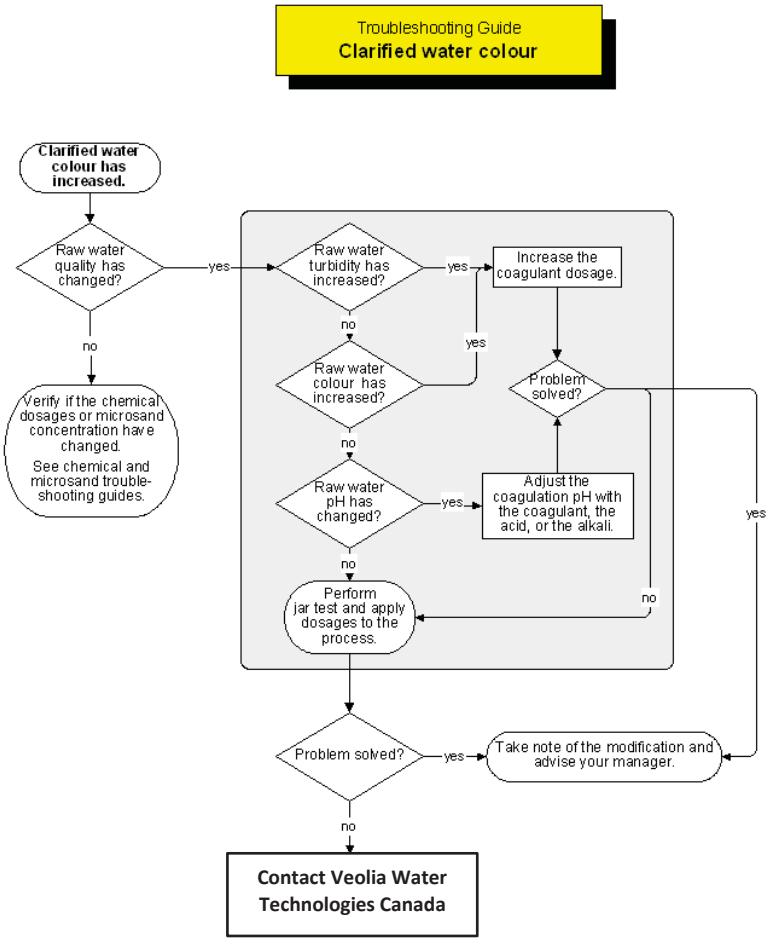


Figure 15: Clarified water colour - Troubleshoothing guide

13.3.3 STOPPING OF MICROSAND RECIRCULATION PUMP

In manual mode, when the microsand recirculation pump needs to be stopped, one must, in order to prevent possible clogging problems, proceed as follow:

- Stop the mixer in the maturation tank. This allows the microsand to settle in this tank instead of in the hopper.
- After approximately 30 minutes, verify that the underflow of the hydrocyclone does not contain any more sand.
- Afterwards, one can stop the pumping of sand without any risks of clogging the microsand recirculation circuit.

13.3.4 POWER FAILURE

Refer to the functional description of control system in the «Electricity and Control» section of the complete operation and maintenance manual.

14 JAR TEST PROCEDURE

14.1 INTRODUCTION

In order to simulate the Actiflo® process, a modified jar test procedure was developed. The procedure can be useful for optimizing process chemistry (pH, chemical dosages, etc.), which will produce settled water low in turbidity and with a high filterability index. Furthermore, the modified jar test procedure has the capability to evaluate or predict process performances of an existing Actiflo® unit and bring accurate diagnosis on operating troubleshooting.

14.2 MATERIAL REQUIRED

- Phipps & Bird jar test apparatus or equivalent lab stirrer allowing up to 300 RPM rotational speed
- Circular beakers (1 litre)
- Microsand
- Polymer (Allied Colloids, serial LT or equivalent)
- Coagulant (Alum, ferric chloride, PAC, PASS 100 or equivalent)
- Acid or base for pH and alkalinity adjustment (NaOH, aluminates, HCl, H_2SO_4, lime, carbonate, bicarbonate, CO_2, or equivalent)
- Turbidimeter (Hach 2100AN or equivalent)
- pH-meter (serial Hach EC or equivalent) and calibration solutions (pH=4, pH=7 and pH=10)
- Chronometer or stopwatch
- Micro pipettes 5 ml-1000 ml
- Disposable syringes 1 ml-5 ml

14.3 LABORATORY PROCEDURES

1. Record settled and raw water parameters values at the plant (turbidity, colour, dissolved aluminum, etc.) if the purpose of this test is to simulate the full scale unit.
2. Fill up the beakers with raw water.
3. Set the beakers on the bench.
4. Make sure raw water temperature corresponds to the desired temperature.
5. Set the paddle between 0.5 and 1.0 cm from the bottom of the beaker.
6. Start mixing and adjust rotation speed to 150 rpm.
7. If needed, add acid, base or equivalent and adjust at the optimum coagulation pH.
8. Add coagulant simultaneously in all beakers with micro-syringes from 0, 0.5, 1.0, 2.0 or 5 minutes after reaching the right pH in accordance with contact times simulated.
9. “A” minutes after adding coagulant (“A” corresponding to full-scale plant retention time in coagulation tank at the desired flow), add all microsand and half the quantity of polymer using a syringe.

10. After a delay of “B” minutes (“B” corresponding to full-scale plant retention time in injection tank at the desired flow), add the rest of polymer.
11. After a maturation contact time of “C” minutes (“C” corresponding to full-scale plant retention time in maturation at the desired flow), stop stirring and allow the water to settle for the next 3 minutes.
12. Sample settled water from 5 to 10 cm below the supernatant surface using a 100 ml syringe. Proceed slowly. Make required analysis.

Note: Contact times “A”, “B” and “C” will be explained and a table given for various flow conditions, during operator training sessions. Values for operation at typical design rate of 40 m/h are as follows: A: 2 min.; B: 2 min.; C: 6 min.

14.4 ANALYSIS

Turbidity, colour and other parameters.

1. Measure turbidity (NTU) using a turbidimeter.
2. Measure apparent colour (ACU) using a spectrometer.
3. Measure pH using pH meter.
4. Measure any other required parameters.

15 MAINTENANCE

15.1 ACTIFLO® CLARIFIER

15.1.1 LAMELLA PACK

WARNING

- Comply with all safety rules and policies if you need to access the settling tank.
- If you must go under the lamellas, make sure of the support beams integrity and the cleanliness of the lamellas.
- Before lowering the water under the lamellas, make sure you have removed some of the accumulated sludge in the lamellas (visible from the top of the clarifier) to reduce the supported weight.
- In the case of excessive plugging, the sludge weight can damage the lamellas and in extreme cases, collapse and cause serious injury to anyone under the modules.
- If lamellas are exposed to very cold temperatures, do not proceed with dewatering the lamellas because the cold makes them too fragile. It is then cleaned by keeping a layer of water above and uses the water jet to create pulsations in the lamella cells to loosen sludge.

15.1.1.1 Lamellas fouling

To maintain the Actiflo® performance, the lamellas should be cleaned regularly. The nature of the raw water, the quality of the clarified water produced and the flow rates handled are factors influencing the fouling. The lamellas fouling can be of two types:

- Visible (observable fouling from above lamellas)
- Invisible (fouling in the lower area of the lamellas)

The visible fouling may be an indicator of an invisible fouling in the lower area. In the case of significant invisible fouling, the lamellas can be damaged.

15.1.1.2 Cleaning frequency

There is a need for a regular cleaning of the lamella modules, by water jet or air jet, to maintain the Actiflo® clarifier performance. The recommended cleaning frequency is once every week. This may be more or less spaced according to the fouling rate observed. The cleaning frequency interval is the operator responsibility, although a minimum frequency is recommended.

15.1.1.3 Required equipment

Depending on whether the cleaning is carried out by air or water, it is suggested to use a PVC pipe fitted at its upstream end of a hose connector and elbow, nozzle or sprayer at its downstream end to direct water or air along the inclined axis of the lamellas. The length of PVC pipe should be sufficient for it to be handled from the top of the Actiflo® unit while allowing access to the bottom of the modules.

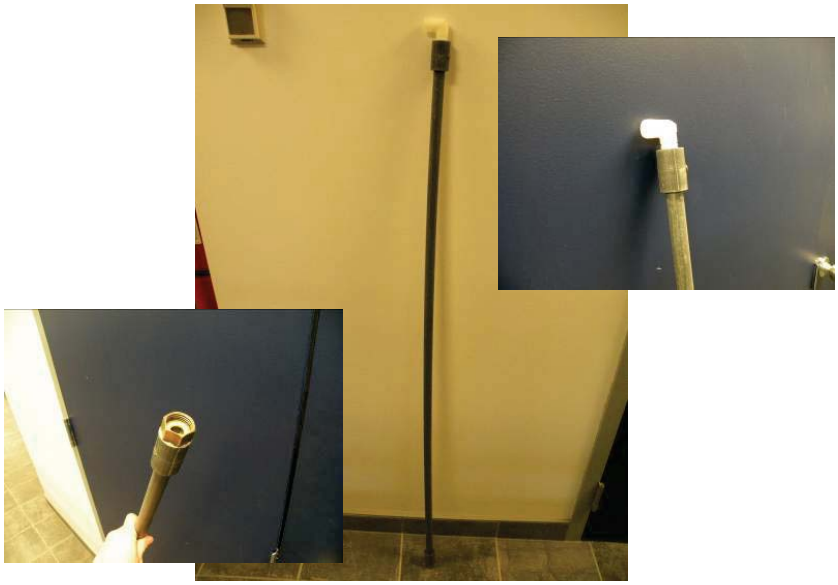


Figure 16: Suggested material for lamella cleaning

15.1.1.4 Lamella cleaning procedure

Lamellas cleaning can be achieved in 3 ways:

- Manual cleaning with water;
- Manual cleaning with air;
- Automatic cleaning with integrated system under the lamella modules (optional).

15.1.1.5 Manual cleaning with water

The cleaning procedure with water is:

1. Stop the Actiflo® unit according to the normal procedure;
2. Start the microsand recirculation system, in manual mode, including the scraper, if necessary, to assist in the disposal of cleaning sludge;
3. Slowly drain the basin using the partial drain located under the lamellas so as to have a lowering rate of 2 to 5 cm/min and start cleaning during emptying;
4. Open water jet on a wall of the decanter to prevent damage to the lamellas;

5. Clean the lamellas with a low pressure water jet (approximately 20 to 25 psi) using a cleaning tool (refer to previous figure). Repeat to clean every lamella. The water jet should be directed parallel to the lamella axis to clean the entire length;
6. With the aid of a high intensity light beam, validate the quality of the cleaning. When the lamellas are properly cleaned, it is possible to see through them;
7. Once completed, close the water jet on a wall of the decanter to prevent damage to the lamellas;
8. Finally, return the Actiflo® unit to service, to the sewer or to production depending on the quality of clarified water to be produced.

15.1.1.6 Manual cleaning with air

The cleaning procedure with air is:

1. Stop the Actiflo® unit according to the normal procedure;
2. Start the microsand recirculation system, in manual mode, including the scraper, if necessary, to assist in the disposal of cleaning sludge;
3. Insert the cleaning tool through the lamellas so that it goes below the lamella module and then inject air. Repeat to clean every lamella section;
4. Slowly drain the basin using the partial drain located under the lamellas so as to have a lowering rate of 2 to 5 cm/min;
5. Clean the lamellas with a low pressure water jet (approximately 20 to 25 psi) using a cleaning tool (refer to previous figure). Repeat to clean every lamella. The water jet should be directed parallel to the lamella axis to clean the entire length;
6. With the aid of a high intensity light beam, validate the quality of the cleaning. When the lamellas are properly cleaned, it is possible to see through them;
7. Once cleaning is completed, return the Actiflo® unit to service, to the sewer or to production depending on the quality of clarified water to be produced.

15.1.1.7 Automatic Cleaning with Integrated System under the Lamella Modules (Optional)

Please contact Veolia Water Technologies Canada to validate if this option is applicable. Refer to section 1 for contact.

The automatic cleaning system will clean the lamella modules according to a programmed sequence. The variation of the water level and air injection will be used for cleaning.

- The partial drain valve: used to drain the settling tank of the Actiflo® unit down to a few inches under the lamella.
- Backwash air valve: inject air under the lamellas with proper flow rate and pressure. Refer to technical datasheet.

Manual backwash sequence:

- Stop the Actiflo® unit according to the normal procedure.
- Open the partial drain valve to lower the level under the through.
- Open the backwash air valve and continue lowering the water level.
- Close the backwash air valve.
- Continue draining for a short time (with partial drain).
- Close the partial drain valve.
- Restart the Actiflo® unit.

Note:	Open confirmation from partial drain valve is needed to allow the opening of the air valve. Close confirmation from partial drain valve is needed to allow Actiflo® to restart.

15.1.1.8 Severe Obstruction

If the lamellas are severely obstructed or if the cleaning system is temporally down. It is recommended, every week, to stop the unit and partially drain the clarifier such that the lamellas are exposed (with the partial drain valve on the hopper). The lamellas can then be cleaned using a garden hose at 30 to 40 psi (maximum pressure). Remove any substance that is stuck to the settling module and which could interfere with the process efficiency.

15.1.2 MIXERS

For each mixer:

- Make sure that the gearbox remains clean.
- Check on a regular basis the oil level in the gearbox.
- Change the oil in the gearbox.
- Refer to the mixer manufacturer manual for complete inspection and maintenance requirements.

15.1.3 MICROSAND RECIRCULATION PUMPS

- Every day, proceed to a visual inspection of the packing adjustment.
- Every 1000 hours of service (every 6 weeks at 24 hr/day), lubricate the bearings and check belt tension.
- Twice a year, proceed to an inspection of the pump: dry seal, impeller, rubber coating, bearings, etc.
- Refer to the pump manufacturer manual for complete inspection and maintenance requirements.

15.1.4 HYDROCYCLONES

- After the first year, inspect the inside surface. Replace worn sections if needed. The first inspection will determine the frequency of replacement.
- Refer to the hydrocyclone manufacturer manual for complete inspection and maintenance requirements.

15.1.5 SCRAPER

- Every 8700 hours of operation, change the oil in the gear motor.
- Refer to the gear motor manufacturer manual for complete inspection and maintenance requirements.

15.2 CONTROL PANEL

For each panel, including junction boxes:

- Replace fuses when needed.
- In case of an electrical problem other than a fuse, contact a certified electrician and verify the circuits.
- Refer to the electrical drawings.

15.3 INSTRUMENTATION

For each instrument equipped with a controller/transmitter:

- Calibrate instrument on a regular basis.
- Refer to the manufacturer manual for calibration instructions and maintenance requirements.

15.4 VALVES

15.4.1 MANUAL VALVES

- No preventive maintenance required.
- Refer to the manufacturer manual, if needed.

15.4.2 AUTOMATIC VALVES

- Refer to the manufacturer manual for complete inspection and maintenance requirements.

15.5 PERIPHERAL EQUIPMENT

- Any other peripheral equipment needing maintenance should be inspected on a regular basis.
- Refer to the manufacturer manual for complete inspection and maintenance requirements.

15.6 PAINT INSPECTION

To maintain the life expectancy or life-cycle of Sherwin Williams Macropoxy 646 PW or Duraplate UHS coating system applied as an internal lining system for potable or fresh water tank, a well-planned inspection schedule is required. When the coating system is applied adequately to properly prepare steel substrate, it can last up to 15 years or more.

The recommend inspection schedule is:

- Inspect after 12 months following the initial application of the coating system. If the substrate is exposed, if the surface is damage or require repairs, perform spot repairs according to the coating system manufacturer instructions specified in the following section.
- Repeat inspection every 3 years and repair.

15.7 PAINT REPAIR PROCEDURE

This procedure applies to Sherwin Williams Macropoxy 646 PW or Duraplate UHS coating system applied as an internal lining system for potable or fresh water tank.

If the painted surface is damage or require repairs perform the following:

1. Clean the surface with solvent according to surface preparation standard SSPC SP1 to remove any contamination.
2. Perform abrasive blasting of the surface according to surface preparation standard SSPC SP10 or perform power tool cleaning to bare metal as per SSPC SP11.
3. Surface preparation must create or expose existing profile to meet the minimum requirement set in the Sherwin Williams product data sheet.
4. Lessen the unevenness between the existing coating and steel by sanding the edges of the existing coating to a smoother transition.
5. Sand 5 to 10 cm on the existing coating surrounding the repair area in order to obtain a matte and rough surface.
6. Clean again the surface according to SSPC SP1 to remove any contamination or dust.
7. Apply Macropoxy 646 PW or Duraplate UHS, depending on the paint type used in the project, to restore specified dry film thickness (DFT) measurement.

15.8 LUBRICATION

- Refer to the following table for the lubrication schedule.
- Refer to the manufacturer equipment manual for complete lubrication, inspection and maintenance requirements.

15.8.1 LUBRICATION SCHEDULE

Equipment to be serviced	Component serviced	Type of lubrication	Lubricant manufacturer	Lubricant brand name	Quantity of lubricant	Lubrication schedule	Comments
Scraper (SEW Eurodrive)	Reducer box (Applicable for ACP-400R and up)	Food grade oil	Chevron	FM Grade ISO 460 or equivalent	8 - 14 L (2.1 - 3.7 gallons)	Change oil every 8700 hours of continuous operation	Fill by the glass window up to the oil level plug or to about half of the height of the slewing ring (10L approx.)
	Gearmotor	Food grade oil	Klüberoil	4UH1-460 N	1.9 L (0.5 gallon) for primary gear reducer and 14.0 L (3.7 gallons) for secondary reducer	Check oil and oil level every 6 months Change oil every 3 years	When changing oil, also replace oil seal (do not install it in the same track).
	Gearmotor bearings	Food grade grease	Aral	Aralube BAB EP2	Low RPM bearings: Fill the cavities between the rolling elements one-third full with grease High RPM bearings: Fill the cavities between the rolling elements two-third full with grease	Replace anti-friction bearing grease every 3 years	Regreasing recommended at the same time as changing the oil or replacing bearings
	Motor bearings	Food grade grease	Aral	Aralube BAB EP2		Every 10000 hours of operation, check ball bearings and change if necessary	The motor anti-friction bearings are covered on both sides and cannot be regreased

Table 3: Lubrication schedule

Equipment to be serviced	Component serviced	Type of lubrication	Lubricant manufacturer	Lubricant brand name	Quantity of lubricant	Lubrication schedule	Comments
Mixers (Envirequip)	Motor bearings						The bearings are sealed for life. No additional lubrication required.
	Reducer box	Food grade oil	Chevron	FM ISO FM 220	5.4 L (1.4 gallons)	Check oil and oil level every 6 months Change oil every 2 years or 10000 hours	
	Reducer box bearings	Food grade grease	Mobil	Grease FM 222 (NLGI 2)	The bearing cavity should be packed to approximately 1/3 full with grease	Regrease bearings every 6 months	
Mixers (PMSL) (Food Grade)	Motor bearings	Grease	Esso	Alvania R3	0.14 oz - 0.32 oz (4.0 g - 9.0 g) (refer to manufacturer's instruction)	Regrease bearings every 12000 hours	Motors are not equipped with grease fittings. Lubrication is carried out during periodical overhauls when the motor is taken apart.
	Reducer box	Food grade oil	Chevron	Lubricating Oil FM	19 L (5 gallons) Except ACP2-75: 26.5 L (7 gallons)	Check oil level weekly (mixer must be off) Change oil in mixer drive every 6 months or 2500 hours.	After the initial break-in period, two weeks of operation, the oil should be changed while the equipment is at operating temperature.
	Reducer box bearings	Food grade grease	Bell Ray	No-Tox HD Grease #2		Add grease to all bearings, couplings, and seals every 6 months or 2500 hours.	

Table 3: Lubrication schedule

Equipment to be serviced	Component serviced	Type of lubrication	Lubricant manufacturer	Lubricant brand name	Quantity of lubricant	Lubrication schedule	Comments
Mixers (PMSL) (Synthetic)	Motor bearings	Grease	Esso	Alvania R3	0.14 oz - 0.32 oz (4.0 g - 9.0 g) (refer to manufacturer's instruction)	Regrease bearings every 12000 hours of operation	Motors are not equipped with grease fittings. Lubrication is carried out during periodical overhauls when the motor is taken apart.
	Reducer box	Synthetic grade oil	Chevron	Tegra 320	19 L (5 gallons) Except ACP2-75 : 26.5 L (7 gallons)	Check oil level weekly (mixer must be stopped) Change oil in mixer drive every 6 months or 2500 hours.	After initial start-up, sample the oil after the first 100 hours or three months of operation; thereafter, take samples for analysis every 2500 hours of operation or six months, whichever occurs first. Note that the initial oil analysis results may show remnants of the factory preservative oil.
	Reducer box bearings	Food grade grease	Chevron	Black Pearl EP (NLGI 2)		Add grease to all bearings, couplings and seals every 6 months or 2500 hours.	
Recirculation pump (McLanahan)	Pump	Grease	Shell	Alvania Grease 3 (NLGI 2)	Inject grease by six strokes of a regular size grease gun (2" diameter body)	Regrease bearings every 1000 hours of operation	
	Motor bearings	Grease	Esso	Polyrex® EM (NLGI 2)			Does not require lubrication as bearing life is 20000 hours
Recirculation pump (Seepex)	Pump	Grease	Please refer to manufacturer's operation and maintenance manual				
	Motor bearings	Grease	Esso	Polyrex EM (NLGI 2)	0.61 oz (17.3 g)	Regrease bearings every 4750 hours of operation	

Table 3: Lubrication schedule

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6 – OPERATION AND MAINTENANCE

6.2 – HYDRA-POL POLYMER PREPARATION SYSTEM

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