

QUICKSILVER RESOURCES

TWINING
COMPRESSOR STATION
LSD 09-33-032-24 W4M
ISSUED FOR AS-BUILT

DRAWING NUMBER: A-9549-TIT-001
REVISION: 5
TYPE OF DRAWINGS: MECHANICAL/CIVIL/ELETRICAL
DATE: 08/31/11

DRAWING LIST																																																														
AREA OF DRAWING	DRAWING NUMBER	LSD LOCATION	DESCRIPTION	REVISION	DATE																																																									
C	9549-C-001		SITE PLAN	10																																																										
A	9549-CL-001		CAR SEAL/ LOCK VALVE LIST (SHT. 1 OF 2)	6																																																										
A	9549-CL-002		CAR SEAL/ LOCK VALVE LIST (SHT. 2 OF 2)	6																																																										
A	9549-LL-001		LINE LIST (SHT. 1 OF 3)	8																																																										
A	9549-LL-002		LINE LIST (SHT. 2 OF 3)	8																																																										
A	9549-LL-003		LINE LIST (SHT. 3 OF 3)	8																																																										
A	9549-PL-001		PSV LIST	6																																																										
B	9549-A-001		PROCESS FLOW DIAGRAM (1 OF 3)	8																																																										
B	9549-A-001A		PROCESS FLOW DIAGRAM (2 OF 3)	1																																																										
B	9549-A-002		PROCESS FLOW DIAGRAM (3 OF 3)	4																																																										
B	9549-B-000		TYPICAL SYMBOLOGY SHEET	0																																																										
B	9549-B-001		INLET/SALES AREA P&ID (ISSUED FOR INFORMATION)	5																																																										
B	9549-B-002		V-110 INLET SEPARATOR P&ID	6																																																										
B	9549-B-003		K-400 COMPRESSOR P&ID	7																																																										
B	9549-B-003A		K-500 COMPRESSOR ADDITION P&ID	3																																																										
B	9549-B-003B		K-600 COMPRESSOR ADDITION P&ID	1																																																										
B	9549-B-004		V-450 DEHYDRATION P&ID	6																																																										
B	9549-B-005		MCC/OFFICE P&ID	8																																																										
B	9549-B-006		PW TANK/VENT P&ID	6																																																										
C	9549-D-001		INLET/SALES AREA PIPING PLAN	3																																																										
C	9549-D-002		INLET SEPARATOR AREA PIPING PLAN	3																																																										
C	9549-D-003		COMP/DEHY AREA PIPING PLAN	5																																																										
C	9549-D-004		VENT K.O./STACK AREA PIPING PLAN	1																																																										
C	9549-D-005		MCC/OFFICE AREA PIPING PLAN	1																																																										
C	9549-D-006		PIPING SECTIONS	1																																																										
C	9549-D-007		PIPING SECTIONS	1																																																										
C	9549-D-008		PIPING SECTIONS	1																																																										
C	9549-D-009		PIPING SECTIONS	1																																																										
C	9549-D-010		PIPING SECTIONS	2																																																										
C	9549-D-011		PIPING SECTIONS	1																																																										
C	9549-D-012		K-500 COMPRESSOR ADDITION AREA PIPING PLAN	3																																																										
C	9549-D-013		K-500 COMPRESSOR ADDITION PIPING SECTIONS	0																																																										
D	9549-IL-001		INSTRUMENT LIST	5																																																										
C	9549-S-001A		LSD 09-33-032-24 W4M ELECTRICAL DRAWING LIST	8																																																										
C	9549-S-002A		STANDARD ELECTRICAL SYMOLS AND LEGENDS	6																																																										
C	9549-S-003A		GENERAL NOTES	4																																																										
C	9549-S-005A		SAFETY SYSTEM DIAGRAM SHEET 1 OF 4	1																																																										
C	9549-S-005B		SAFETY SYSTEM DIAGRAM SHEET 2 OF 4	1																																																										
C	9549-S-005C		SAFETY SYSTEM DIAGRAM SHEET 3 OF 5	1																																																										
C	9549-S-005D		SAFETY SYSTEM DIAGRAM SHEET 4 OF 4	1																																																										
C	9549-T-002A		MCP-900 MOTOR CONTROL CENTER SINGLE LINE DIAGRAM (SHEET 1 OF 2)	3																																																										
C	9549-T-002B		MCP-900 MOTOR CONTROL CENTER SINGLE LINE DIAGRAM (SHEET 2 OF 2)	6																																																										
C	9549-T-006A		MCP-900 MOTOR CONTROL CENTER ELEVATION	6																																																										
C	9549-T-011A		480VAC MOTOR CONTROL SCHEMATIC	1																																																										
C	9549-T-011B		480VAC MOTOR CONTROL SCHEMATIC	1																																																										
C	9549-T-011C		480VAC MOTOR CONTROL SCHEMATIC	6																																																										
C	9549-T-011D		480VAC MOTOR CONTROL SCHEMATIC	1																																																										
C	9549-T-011E		480VAC MOTOR CONTROL SCHEMATIC	1																																																										
NOTES:			ENGINEERING STAMP	<table><tr><th colspan="7">REVISIONS</th></tr><tr><th>NO.</th><th>DESCRIPTION</th><th>PROJECT</th><th>DATE</th><th>BY</th><th>CHK</th><th>ENG</th></tr><tr><td>1</td><td>ISSUED FOR REVIEW</td><td>-</td><td>2011-09-01</td><td>JFL</td><td>CD</td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td><td></td><td></td><td></td></tr><tr><td colspan="2">PROJECT NO.</td><td colspan="3">DWG. NO.</td><td colspan="2">REV.</td></tr><tr><td colspan="2">1 of 2</td><td colspan="3">A-0000-DL-001</td><td colspan="2">1</td></tr></table>			REVISIONS							NO.	DESCRIPTION	PROJECT	DATE	BY	CHK	ENG	1	ISSUED FOR REVIEW	-	2011-09-01	JFL	CD																							PROJECT NO.		DWG. NO.			REV.		1 of 2		A-0000-DL-001			1	
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DRAWING LIST

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Service: REGULAR TEMPERATURE SWEET Hydrocarbon Liquid - Gas - Glycol - Process Drains - LP Flare Systems - Instrument Air	MSP – “A” Class 150
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Design Code:	ASME B31.3	PWHT:	>19.1mm W.T. only
Pressure Range:	1,965 to 1,379 kPa	NDE:	10% RT on Buttwelds
Temperature Range:	-29°C to 204°C		10% RT on Socket welds
Corrosion Allowance:	1.6mm		10% MT on Fillet welds

48mm and below Threaded or Socket welded, 60mm and above Butt Welded (see note 1)

Item	Size (mm)	Description	ASTM Spec	Notes
Pipe	21 - 48 60 - 273	Sch 80 smls PE, TE STD Wall smls BE Calc W.T. above 273mm	A106 Gr. B	1,4
Flanges	21 - 48 60 - 610	150 ASME FS RF SW, TE 150 ASME FS RFWN Bore to match pipe.	A105N	1,2,3,4
Orifice Flanges	60 - 324	300 ASME FS RFWN c/w 21mm pressure taps, jack bolts, gaskets. Bore to match pipe	A105N	2
Fittings	21 - 48 60 - 610	Class 3000 FS SW, TE BW Schedule to match pipe.	A105N A234 WPB	1,2,4
Unions	21 - 48	Class 3000 FS SW, TE GJ integral. Seat	A105N	1,2
Nipples	21 - 48	Sch 160 Smls PE, TE No close nipples. Min. length 100mm	A106 Gr. B	1
Swages	21 - 48	Sch 160 Smls PE, TE	A106 Gr. B	1
O'lets	21 - 48	Class 3000 FS SW, TE	A105N	1,2
Weldolets	60 - 273	Bore to match pipe	A105N	2
Paddle & Spec Blinds	60 - 610	150 ASME RF	A516 70N	
Bolting		Studs: continuous thread Nuts: 2 heavy hex	A193 Gr. B7M A194 Gr. 2HM	
Gaskets		Class 150 spiral wound non asbestos 3.2mm (1/8") TKS	304/316 SS	

Notes on Piping Material:

- 89mm to 60mm threaded or socket welded pipe and fittings may be approved by the Project Engineer for some services. Pipe W.T. to be calculated.
- All forgings shall be normalized.
- Flanges over 610mm may be slip-on type with prior approval from the Project Engineer.
- Pipe and fittings over 12.7mm wall thickness must be A333 Gr.6 and A420 WPL6 respectively to maintain MDMT of -29°C.
- MTR's to be supplied for all materials.

PIPING NOMENCLATURE:- BE = Beveled End; PE = Plain End; TE = Threaded; BW = Butt Weld; SW = Socket Weld; FL = Flanged; WN = Weld Neck; RF = Raised Face; RJ = Ring Joint; PWHT = Post Weld Heat Treatment; FS = Forged Steel; TKS = Thickness; W.T. = Wall Thickness
NDE = Non Destructive Examination; RT = Radiography; MT = Magnetic Particle Inspection; UT = Ultrasonic Testing

Service: REGULAR TEMPERATURE SWEET Hydrocarbon Liquid - Gas - Glycol - Process Drains - LP Flare Systems - Instrument Air	MSP – “A” Class 150
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Valves Associated with Specification MSP-“A” Class 150. For Tag Details see Section 5.4 Valve Tag Coding

BALL VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BODY	BALL/ OPERATOR	TRIM API/BALL/SEALS	BOLTS NUTS	NOTES
21-48	2000	BA2003RT	TE	NO	A105N	RP	SPLIT	FLT/L	607/CrPVTFE	B7/2H	1,2
21-48	2000	BA2004RT	SW	NO	A105N	RP	SPLIT	FLT/L	607/CrPVTFE	B7/2H	1,2
60-168	150	BA0101RT	FL/RF	NO	A216 WCB	RP	SPLIT	FLT/L	607-608/CrPVTFE	B7/2H	1,2,4
60-168	150	BA0111RT	FL/RF	NO	A216 WCB	FP	SPLIT	FLT/L	607-608/CrPVTFE	B7/2H	1,2,4
219-610	150	BA0161RT	FL/RF	NO	A216 WCB	RP	SPLIT	TR/G	607-608/CrPVTFE	B7/2H	1,2
219-610	150	BA0171RT	FL/RF	NO	A216 WCB	FP	SPLIT	TR/G	607-608/CrPVTFE	B7/2H	1,2

CHECK VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	TYPE	COVER	TRIM	BOLTS NUTS	NOTES
21-48	800	CH0813RT	TE	NO	A105N	RP	PISTON	BOLTED	API 602, trim #8	B7/2H	
21-48	800	CH0814RT	SW	NO	A105N	RP	PISTON	BOLTED	API 602, trim #8	B7/2H	
60-610	150	CH0101RT	FL/RF	NO	A216 WCB	RP	SWING	BOLTED	API 600, trim #1	B7/2H	4
60-610	150	CH0121RT	FL/RF	NO	A216 WCB	FP	SWING	BOLTED	API 600, trim #1	B7/2H	4

GATE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	BONNET/ OPERATOR	TRIM	BOLTS NUTS	NOTES
21-48	800	GA0803RT	TE	NO	A105N	RP	OS&Y	BOLT'D/H	API 602, trim #8	B7/2H	2
21-48	800	GA0804RT	SW	NO	A105N	RP	OS&Y	BOLT'D/H	API 602, trim #8	B7/2H	2
60-324	150	GA0101RT	FL/RF	NO	A216 WCB	RP	OS&Y	BOLT'D/H	API 600, trim #8	B7/2H	2,4
60-324	150	GA0111RT	FL/RF	NO	A216 WCB	FP	OS&Y	BOLT'D/H	API 600, trim #8	B7/2H	2,4
356-610	150	GA0121RT	FL/RF	NO	A216 WCB	RP	OS&Y	BOLT'D/G	API 600, trim #8	B7/2H	2
356-610	150	GA0131RT	FL/RF	NO	A216 WCB	FP	OS&Y	BOLT'D/G	API 600, trim #8	B7/2H	2

GLOBE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	BONNET/ OPERATOR	TRIM	BOLTS NUTS	NOTES
21-48	800	GL0803RT	TE	NO	A105N	-	OS&Y	BOLT'D/H	API 602, trim #8	B7/2H	
21-48	800	GL0804RT	SW	NO	A105N	-	OS&Y	BOLT'D/H	API 602, trim #8	B7/2H	
60-168	150	GL0101RT	FL/RF	NO	A216 WCB	-	OS&Y	BOLT'D/H	API 600, trim #8	B7/2H	3,4

NEEDLE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	STEM	TRIM	BOLTS NUTS	NOTES
≤ 27	6000	NE6003RT	TE	NO	316 SS	-	-	316 SS	TFE/ V	-	
≤ 27	6000	NE6007RT	MxF/TE	NO	316 SS	-	-	316 SS	TFE/ V	-	

Notes on Valves:

- Consult manufacturer for recommendations on ball valves operating above 38°C or use gate valves
- All gate and ball valves are regular port unless otherwise noted on the P&ID
- Globe valves 219 and up, use gate valves
- 89mm to 60mm threaded or socket welded valves may be approved by the project engineer for some services.
- MTR's to be supplied for all materials.

VALVE NOMENCLATURE:- SW = Socket Weld; TE = Threaded Ends; MxF = Male x Female; FL = Flanged; RF = Raised Face; RJ = Ring Joint; CS = Carbon Steel; FS = Forged Steel; SS = Stainless Steel; RP = Regular Port; FP Full Port; OS&Y = Outside Screw & Yoke; Stel = Stellite; CrPl = Chrome Plated; N = Nylon; TFE = Teflon; V = Viton; FLT = Floating; TR = Trunnion; ENC = Electroless Nickel Coating;
VALVE OPERATORS - G = Gear; L = Lever; H = Hand wheel

Service: LOW TEMPERATURE SWEET	MSP – “AL”
Hydrocarbon Liquid - Gas - Glycol - Process Drains - LP Flare Systems	Class 150

Design Code: ASME B31.3	PWHT: >19.1mm W.T. only
Pressure Range: 1,965 to 1,379 kPa	NDE : 10% RT on Buttwelds
Temperature Range: - 45°C to 204°C	10% RT on Socket welds
Corrosion Allowance: 1.6mm	10% MT on Fillet welds

48mm and below Threaded or Socket Welded. 60mm and above Butt Welded (see note 1)

Item	Size (mm)	Description	ASTM Spec	Notes
Pipe	21 - 48	Sch 80 smls PE, TE	A333 Gr. 6	1
	60 - 273	STD Wall smls BE Calc. W.T. above 273mm		
Flanges	21 - 48	150 ASME FS RF SW, TE	A350 LF2 Cl. 1	1,2,3,5
	60 - 610	150 ASME FS RFWN Bore to match pipe.		
Orifice Flanges	60 - 324	300 ASME FS RFWN c/w 21mm pressure taps, jack bolts, gaskets. Bore to match pipe	A350 LF2 Cl. 1	2,5
Fittings	21 - 48	Class 3000 FS SW, TE	A350 LF2 Cl. 1 A420 WPL6	1,2,5
	60 - 610	BW Schedule to match pipe.		
Unions	21 - 48	Class 3000 FS SW, TE GJ integral. Seat	A350 LF2 Cl. 1	1,2,5
Nipples	21 - 48	Sch 160 Smls PE, TE No close nipples. Min length 100 mm	A333 Gr. 6	1
Swages	21 - 48	Sch 160 Smls PE, TE	A333 Gr. 6	1
O'lets	21 - 48	Class 3000 FS SW, TE	A350 LF2 Cl. 1	1,2,5
Weldolets	60 - 273	Bore to match pipe	A350 LF2 Cl. 1	2,5
Paddle & Spec Blinds	60 - 610	150 ASME RF	A516 70N	
Bolting		Studs: continuous thread Nuts: 2 heavy hex	A193 Gr. B7M A194 Gr. 2HM	
Gaskets		Class 150 spiral wound non asbestos 3.2mm (1/8") TKS	304/316 SS	

Notes on Piping Material:

- 89mm to 60mm threaded or socket welded pipe and fittings may be approved by the Project Engineer for some services. Pipe W.T. to be calculated.
- All forgings shall be normalized.
- Flanges over 610mm may be slip-on type with prior approval from the Project Engineer.
- MTR's to be supplied for all materials.
- A350 LF2 forgings to be Class 1 impact tested to minus 45°C.

PIPING NOMENCLATURE:- BE = Beveled End; PE = Plain End; TE = Threaded; BW = Butt Weld; SW = Socket Weld; FL = Flanged; WN = Weld Neck; RF = Raised Face; RJ = Ring Joint; PWHT = Post Weld Heat Treatment; FS = Forged Steel; TKS = Thickness; W.T. = Wall Thickness
NDE = Non Destructive Examination; RT = Radiography; MT = Magnetic Particle Inspection; UT = Ultrasonic Testing

Service: LOW TEMPERATURE SWEET	MSP – “AL”
Hydrocarbon Liquid - Gas - Glycol - Process Drains - LP Flare Systems	Class 150

Valves Associated with Specification MSP-“AL” Class 150. For Tag Details see Section 5.4 Valve Tag Coding

BALL VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BODY	BALL/ OPERATOR	TRIM API/BALL/SEALS	BOLTS NUTS	NOTES
21-48	2000	BA2003LT	TE	NO	A350 LF2	RP	SPLIT	FLT/L	607/CrPVTFE	B7M/2HM	1,2
21-48	2000	BA2004LT	SW	NO	A350 LF2	RP	SPLIT	FLT/L	607/CrPVTFE	B7M/2HM	1,2
60-168	150	BA0101LT	FL/RF	NO	A352 LCC	RP	SPLIT	FLT/L	607-608/CrPVTFE	B7M/2HM	1,2,4
60-168	150	BA0111LT	FL/RF	NO	A352 LCC	FP	SPLIT	FLT/L	607-608/CrPVTFE	B7M/2HM	1,2,4
219-610	150	BA0161LT	FL/RF	NO	A352 LCC	RP	SPLIT	TR/G	607-608/CrPVTFE	B7M/2HM	1,2
219-610	150	BA0171LT	FL/RF	NO	A352 LCC	FP	SPLIT	TR/G	607-608/CrPVTFE	B7M/2HM	1,2

CHECK VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	TYPE	COVER	TRIM	BOLTS NUTS	NOTES
21-48	800	CH0813LT	TE	NO	A350 LF2	RP	PISTON	BOLTED	API 602, trim #8	B7M/2HM	
21-48	800	CH0814LT	SW	NO	A350 LF2	RP	PISTON	BOLTED	API 602, trim #8	B7M/2HM	
60-610	150	CH0101LT	FL/RF	NO	A352 LCC	RP	SWING	BOLTED	API 600, trim #1	B7M/2HM	4
60-610	150	CH0121LT	FL/RF	NO	A352 LCC	FP	SWING	BOLTED	API 600, trim #1	B7M/2HM	4

GATE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	BONNET/ OPERATOR	TRIM	BOLTS NUTS	NOTES
21-48	800	GA0803LT	TE	NO	A350 LF2	RP	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	2
21-48	800	GA0804LT	SW	NO	A350 LF2	RP	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	2
60-324	150	GA0101LT	FL/RF	NO	A352 LCC	RP	OS&Y	BOLT'D/H	API 600, trim #8	B7M/2HM	2,4
60-324	150	GA0111LT	FL/RF	NO	A352 LCC	FP	OS&Y	BOLT'D/H	API 600, trim #8	B7M/2HM	2,4
356-610	150	GA0121LT	FL/RF	NO	A352 LCC	RP	OS&Y	BOLT'D/G	API 600, trim #8	B7M/2HM	2
356-610	150	GA0131LT	FL/RF	NO	A352 LCC	FP	OS&Y	BOLT'D/G	API 600, trim #8	B7M/2HM	2

GLOBE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	BONNET/ OPERATOR	TRIM	BOLTS NUTS	NOTES
21-48	800	GL0803LT	TE	NO	A350 LF2	-	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	
21-48	800	GL0804LT	SW	NO	A350 LF2	-	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	
60-168	150	GL0101LT	FL/RF	NO	A352 LCC	-	OS&Y	BOLT'D/H	API 600, trim #8	B7M/2HM	3,4

NEEDLE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	STEM	TRIM	BOLTS NUTS	NOTES
≤ 27	6000	NE6003LT	TE	NO	316 SS	-	-	316 SS	TFE/ V	-	
≤ 27	6000	NE6007LT	MxF/TE	NO	316 SS	-	-	316 SS	TFE/ V	-	

Notes on Valves:

- Consult manufacturer for recommendations on ball valves operating above 38°C or use gate valves
- All gate and ball valves are regular port unless otherwise noted on the P&ID
- Globe valves 219 and up, use gate valves
- 89mm to 60mm threaded or socket welded valves may be approved by the project engineer for some services.
- MTR's to be supplied for all materials.

VALVE NOMENCLATURE:- SW = Socket Weld; TE = Threaded Ends; MxF = Male x Female; FL = Flanged; RF = Raised Face; RJ = Ring Joint; CS = Carbon Steel; FS = Forged Steel; SS = Stainless Steel; RP = Regular Port; FP Full Port; OS&Y = Outside Screw & Yoke; Stel = Stellite; CrPl = Chrome Plated; N = Nylon; TFE = Teflon; V = Viton; FLT = Floating; TR = Trunnion; ENC = Electroless Nickel Coating;
VALVE OPERATORS - G = Gear; L = Lever; H = Hand wheel

Service: LOW TEMPERATURE SWEET Hydrocarbon Liquid - Gas - Glycol - HP Process Drains - HP Flare Systems	MSP – “CL” Class 600
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Design Code: ASME B31.3 PWHT: >19.1mm W.T. only
Pressure Range: 10,205 to 8,757 kPa NDE: 10% RT on Buttwelds
Temperature Range: - 45°C to 204°C 10% RT on Socket welds
Corrosion Allowance: 1.6mm 10% MT on Fillet welds

48mm and below Threaded or Socket Welded. 60mm and above Butt Welded (see note 1)

Item	Size (mm)	Description	ASTM Spec	Notes
Pipe	21 - 48	Sch 160 smls PE, TE	A333 Gr. 6	1
	60	Sch 80 smls BE		
	89	STD Wall smls BE		
	114 - 273	Sch 80 smls BE Calc W.T. above 273mm		
Flanges	21 - 48	600 ASME FS RF SW, TE	A350 LF2 Cl. 1	1,2,3,5
	60 - 610	600 ASME FS RFWN Bore to match pipe.		
Orifice Flanges	60 - 324	600 ASME FS RFWN c/w 21mm pressure taps, jack bolts, gaskets. Bore to match pipe	A350 LF2 Cl. 1	2,5
Fittings	21 - 48	Class 3000 FS SW, TE	A350 LF2 Cl. 1 A420 WPL6	1,2,5
	60 - 610	BW Schedule to match pipe.		
Unions	21 - 48	Class 3000 FS SW, TE GJ integral. Seat	A350 LF2 Cl. 1	1,2,5
Nipples	21 - 48	Sch 160 Smls PE, TE No close nipples. Min length 100 mm	A333 Gr. 6	1
Swages	21 - 48	Sch 160 Smls PE, TE	A333 Gr. 6	1
O'lets	21 - 48	Class 3000 FS SW, TE	A350 LF2 Cl. 1	1,2,5
Weldolets	60 - 273	Bore to match pipe	A350 LF2 Cl. 1	2,5
Paddle & Spec Blinds	60 - 610	600 ASME RF	A516 70N	
Bolting		Studs: continuous thread Nuts: 2 heavy hex	A193 Gr. B7M A194 Gr. 2HM	
Gaskets		Class 600 spiral wound non asbestos 3.2mm (1/8") TKS	304/316 SS	

Notes on Piping Material:

- 60mm threaded or socket welded pipe and fittings may be approved by the Project Engineer for some services. Pipe W.T. to be calculated.
- All forgings shall be normalized.
- Flanges over 610mm may be slip-on type with prior approval from the Project Engineer.
- MTR's to be supplied for all materials.
- A350 LF2 forgings to be Class 1 impact tested to minus 45°C.

PIPING NOMENCLATURE:- BE = Beveled End; PE = Plain End; TE = Threaded; BW = Butt Weld; SW = Socket Weld; FL = Flanged; WN = Weld Neck;
RF = Raised Face; RJ = Ring Joint; PWHT = Post Weld Heat Treatment; FS = Forged Steel; TKS = Thickness; W.T. = Wall Thickness
NDE = Non Destructive Examination; RT = Radiography; MT = Magnetic Particle Inspection; UT = Ultrasonic Testing

Service: LOW TEMPERATURE SWEET Hydrocarbon Liquid - Gas - Glycol - HP Process Drains - HP Flare Systems	MSP – “CL” Class 600
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Valves Associated with Specification MSP-“CL” Class 600. For Tag Details see Section 5.4 Valve Tag Coding

BALL VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BODY	BALL/ OPERATOR	TRIM API/BALL/SEALS	BOLTS NUTS	NOTES
21-48	3000	BA3003LT	TE	NO	A350 LF2	RP	SPLIT	FLT/L	607/CPVTFE	B7M/2HM	1,2
21-48	3000	BA3004LT	SW	NO	A350 LF2	RP	SPLIT	FLT/L	607/CPVTFE	B7M/2HM	1,2
60-89	600	BA0601LT	FLRF	NO	A352 LCC	RP	SPLIT	FLT/L	607-608/CPVTFE	B7M/2HM	1,2,4
60-89	600	BA0611LT	FLRF	NO	A352 LCC	FP	SPLIT	FLT/L	607-608/CPVTFE	B7M/2HM	1,2,4
114	600	BA0641LT	FLRF	NO	A352 LCC	RP	SPLIT	TR/L	607-608/CPVTFE	B7M/2HM	1,2
114	600	BA0651LT	FLRF	NO	A352 LCC	FP	SPLIT	TR/L	607-608/CPVTFE	B7M/2HM	1,2
168-610	600	BA0661LT	FLRF	NO	A352 LCC	RP	SPLIT	TR/G	607-608/CPVTFE	B7M/2HM	1,2
168-610	600	BA0671LT	FLRF	NO	A352 LCC	FP	SPLIT	TR/G	607-608/CPVTFE	B7M/2HM	1,2

CHECK VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	TYPE	COVER	TRIM	BOLTS NUTS	NOTES
21-48	800	CH0813LT	TE	NO	A350 LF2	RP	PISTON	BOLTED	API 602, trim #8	B7M/2HM	
21-48	800	CH0814LT	SW	NO	A350 LF2	RP	PISTON	BOLTED	API 602, trim #8	B7M/2HM	
60-610	600	CH0601LT	FLRF	NO	A352 LCC	RP	SWING	BOLTED	API 600, trim #1	B7M/2HM	4
60-610	600	CH0621LT	FLRF	NO	A352 LCC	FP	SWING	BOLTED	API 600, trim #1	B7M/2HM	4

GATE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	BONNET/ OPERATOR	TRIM	BOLTS NUTS	NOTES
21-48	800	GA0803LT	TE	NO	A350 LF2	RP	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	2
21-48	800	GA0804LT	SW	NO	A350 LF2	RP	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	2
60-114	600	GA0601LT	FLRF	NO	A352 LCC	RP	OS&Y	BOLT'D/H	API 600, trim #8	B7M/2HM	2,4
60-114	600	GA0611LT	FLRF	NO	A352 LCC	FP	OS&Y	BOLT'D/H	API 600, trim #8	B7M/2HM	2,4
168-610	600	GA0621LT	FLRF	NO	A352 LCC	RP	OS&Y	BOLT'D/G	API 600, trim #8	B7M/2HM	2
168-610	600	GA0631LT	FLRF	NO	A352 LCC	FP	OS&Y	BOLT'D/G	API 600, trim #8	B7M/2HM	2

GLOBE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	BONNET/ OPERATOR	TRIM	BOLTS NUTS	NOTES
21-48	800	GL0803LT	TE	NO	A350 LF2	-	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	
21-48	800	GL0804LT	SW	NO	A350 LF2	-	OS&Y	BOLT'D/H	API 602, trim #8	B7M/2HM	
60-168	600	GL0601LT	FLRF	NO	A352 LCC	-	OS&Y	BOLT'D/H	API 600, trim #8	B7M/2HM	3,4

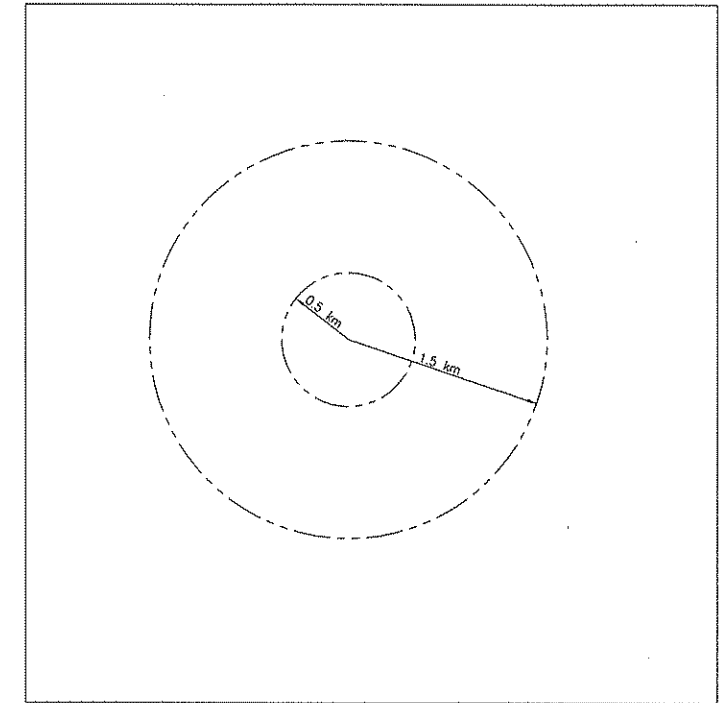
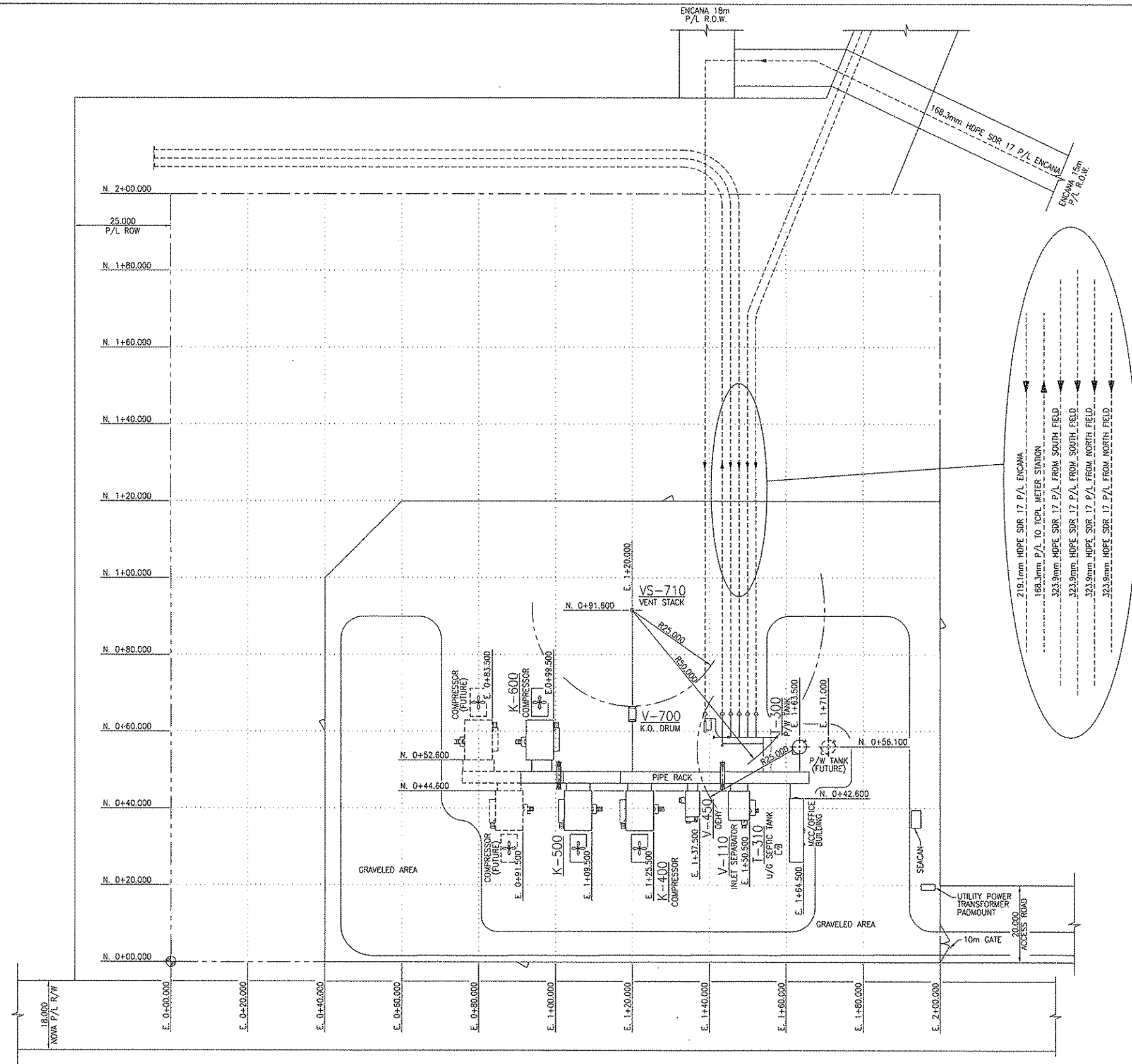
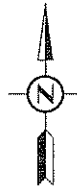
NEEDLE VALVES

SIZE- mm	CLASS	TAG #	ENDS	NACE	BODY ASTM	PORT	BONNET DESIGN	STEM	TRIM	BOLTS NUTS	NOTES
≤ 27	6000	NE6003LT	TE	NO	316 SS	-	-	316 SS	TFE/ V	-	
≤ 27	6000	NE6007LT	MxF/TE	NO	316 SS	-	-	316 SS	TFE/ V	-	

Notes on Valves:

- Consult manufacturer for recommendations on ball valves operating above 38°C or use gate valves
- All gate and ball valves are regular port unless otherwise noted on the P&ID
- Globe valves 219 and up, use gate valves
- 60mm threaded or socket welded valves may be approved by the project engineer for some services.
- MTR's to be supplied for all materials.

VALVE NOMENCLATURE:- SW = Socket Weld; TE = Threaded Ends; MxF = Male x Female; FL = Flanged; RF = Raised Face; RJ = Ring Joint;
CS = Carbon Steel; FS = Forged Steel; SS = Stainless Steel; RP = Regular Port; FP Full Port; OS&Y = Outside Screw & Yoke; Stel = Stellite;
CrPl = Chrome Plated; N = Nylon; TFE = Teflon; V = Viton; FLT = Floating; TR = Trunnion; ENC = Electroless Nickel Coating;
VALVE OPERATORS - G = Gear; L = Lever; H = Hand wheel



500m RADIUS AREA PLAN

LSD 09-33-032-24 W4M
SCALE: 1:24000
NEAREST RESIDENCE: B= 907m

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NOTES:
1. ALL DIMENSIONS & COORDINATES ARE IN METERS UNLESS NOTED OTHERWISE.

REFERENCE DRAWINGS			REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	
-	-	6	K-600 ADDITION, ISSUED FOR DEMOLITION	9549.02	08-11-28	DP	-	-	
-	-	7	K-600 ADDITION, ISSUED FOR APPROVAL	9549.02	08-11-28	DP	-	-	
-	-	8	K-600 ADDITION, ISSUED FOR CONSTRUCTION	9549.02	08-12-16	DP	KK	DK	
-	-	9	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS	9549.02	09-06-03	DP	-	-	
-	-	10	AS-BUILT (ENCANA HEADER)	-	06-18-10	JFL	CD	CD	
-	-	3A	K-500 ADDITION, ISSUED FOR REVIEW	9549.01	05-09-09	JB	-	-	
-	-	4	K-500 ADDITION, RE-ISSUED FOR CONSTRUCTION	9549.01	05-09-16	JB	KAB	RGW	
-	-	5	K-500 ADDITION, AS-BUILT	9549.01	06-03-06	JB	-	-	

ENGINEERING STAMP



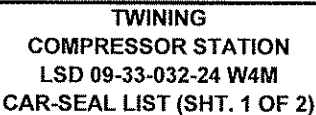
TWINING COMPRESSOR STATION
LSD 09-33-032-24 W4M
SITE PLAN

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	1:600	A-9549-C-001	10

CAR SEAL/LOCKED VALVE LIST										
TAG NUMBER	P&ID DRAWING NUMBER	LINE NUMBER	LOCATION	SIZE	CLASS	POSITION	COMMENTS	NOTES	REV.	
WORK TO BE PERFORMED IN THE YARD										
CSC-1000	9549-B-001	60-PG-A-109-25HE	YARD, ESDV-1000 BYPASS	60 mm	ASME 150	CLOSED	BALL VALVE	1,2	3	
CSO-1001	9549-B-001	324-PG-A-101-38HE	YARD, NORTH FIELD PIPELINE RISER 1	324 mm	ASME 150	OPEN	BALL VALVE	1,2	3	
CSO-1002	9549-B-001	324-PG-A-102-38HE	YARD, NORTH FIELD PIPELINE RISER 2	324 mm	ASME 150	OPEN	BALL VALVE	1,2	3	
CSO-1003	9549-B-001	324-PG-A-103-38HE	YARD, SOUTH FIELD PIPELINE RISER 1	324 mm	ASME 150	OPEN	BALL VALVE	1,2	3	
CSO-1004	9549-B-001	324-PG-A-104-38HE	YARD, SOUTH FIELD PIPELINE RISER 2	324 mm	ASME 150	OPEN	BALL VALVE	1,2	3	
LC-1004	9549-B-001	60-V-A-702-25HE	YARD, PIG RECEIVER BLOWDOWN	60 mm	ASME 150	CLOSED	BALL VALVE	1,2	3	
CSC-1200	9549-B-001	60-PG-CL-119	YARD, SALES GAS BUY-BACK	60 mm	ASME 600	CLOSED	BALL VALVE	1,2	3	
CSO-3000	9549-B-006	89-PW-A-405-25HE	YARD, T-300 PRODUCED WATER TANK INLET	89 mm	ASME 150	OPEN	BALL VALVE	1,2	3	
CSO-4000	9549-B-003	168-V-A-705-25HE	YARD, K-400 COMPRESSOR PACKAGE VENT LINE	114 mm	ASME 150	OPEN	BALL VALVE	1,2	3	
CSO-4001	9549-B-003	60-PW-A-403-25HE	YARD, K-400 COMP. PACKAGE LIQUID DUMP LINE	60 mm	ASME 600	OPEN	BALL VALVE	1,2	3	
CSC-9080	9549-B-005	60-SA-AL-551	YARD, V-908 AND PCV-9080 BYPASS	60 mm	ASME 150	CLOSED	BALL VALVE	1,2	3	
CSC-9100	9549-B-005	60-SA-AL-558	YARD, V-910 AND PCV-9100 BYPASS	60 mm	ASME 150	CLOSED	BALL VALVE	1,2	3	
WORK TO BE PERFORMED IN THE V-100 INLET SEPARATOR BUILDING										
CSO-1101	9549-B-002	LSHH-1100 BRIDLE	V-110 INLET SEPARATOR BUILDING	60 mm	ASME 150	OPEN	BALL VALVE	1,2	3	
CSO-1102	9549-B-002	LSHH-1100 BRIDLE	V-110 INLET SEPARATOR BUILDING	60 mm	ASME 150	OPEN	BALL VALVE	1,2	3	
CSO-1103	9549-B-002	LG/LIT-1100 BRIDLE	V-110 INLET SEPARATOR BUILDING	60 mm	ASME 150	OPEN	BALL VALVE	1,2	3	
CSO-1104	9549-B-002	LG/LIT-1100 BRIDLE	V-110 INLET SEPARATOR BUILDING	60 mm	ASME 150	OPEN	BALL VALVE	1,2	3	
CSC-1105	9549-B-002	P-121 BYPASS	V-110 INLET SEPARATOR BUILDING	60 mm	ASME 150	CLOSED	BALL VALVE	1,2	3	
CSO-1106	9549-B-002	UV-1100 INLET	V-110 INLET SEPARATOR BUILDING	33 mm	NPT	OPEN	BALL VALVE	1,2	3	
CSO-1107	9549-B-002	UV-1100 OUTLET	V-110 INLET SEPARATOR BUILDING	33 mm	NPT	OPEN	BALL VALVE	1,2	3	
CSC-1108	9549-B-002	UV-1100 BYPASS	V-110 INLET SEPARATOR BUILDING	33 mm	NPT	CLOSED	BALL VALVE	1,2	3	
CSC-1210	9549-B-002	T-112 PUMP-OUT	V-110 INLET SEPARATOR BUILDING	60 mm	NPT	CLOSED	BALL VALVE	1,2	3	
WORK TO BE PERFORMED IN THE K-400 COMPRESSOR BUILDING										
CSO-4150	9549-B-003	P-415 DISCHARGE	K-400 COMPRESSOR BUILDING	60 mm	NPT	OPEN	BALL VALVE	1,2	3	
CSC-4151	9549-B-003	P-415 BYPASS	K-400 COMPRESSOR BUILDING	48 mm	NPT	CLOSED	BALL VALVE	1,2	3	
CSC-4060	9549-B-003	V-406 DRAIN LINE	K-400 COMPRESSOR BUILDING	33 mm	2000 CWP	CLOSED	BALL VALVE	1,2	3	
CSC-4090	9549-B-003	V-409 DRAIN LINE	K-400 COMPRESSOR BUILDING	33 mm	2000 CWP	CLOSED	BALL VALVE	1,2	3	
CSC-4120	9549-B-003	V-412 DRAIN LINE	K-400 COMPRESSOR BUILDING	33 mm	2000 CWP	CLOSED	BALL VALVE	1,2	3	
CSO-4000	9549-B-003	VENT HEADER	K-400 COMPRESSOR BUILDING	114 mm	ASME 150	OPEN	BALL VALVE	1,2	3	
CSO-4001	9549-B-003	PRODUCED WATER HDR	K-400 COMPRESSOR BUILDING	60 mm	ASME 600	OPEN	BALL VALVE	1,2	3	
CSO-4002	9549-B-003	BDV-4000 INLET	K-400 COMPRESSOR BUILDING	48 mm	NPT	OPEN	BALL VALVE	1,2	3	
CSO-4003	9549-B-003	BDV-4000 OUTLET	K-400 COMPRESSOR BUILDING	48 mm	NPT	OPEN	BALL VALVE	1,2	6	
WORK TO BE PERFORMED IN THE V-450 DEHYDRATOR BUILDING										
CSC-4500	9549-B-004	V-450 DRAIN LINE	V-450 DEHYDRATOR BUILDING	33 mm	2000 CWP	CLOSED	GATE VALVE	1,2	3	
CSO-4501	9549-B-004	V-450 SKID DRAIN HDR.	V-450 DEHYDRATOR BUILDING	33 mm	2000 CWP	OPEN	BALL VALVE	1,2	3	
CSO-4502	9549-B-004	FUEL GAS HEADER	V-450 DEHYDRATOR BUILDING	60 mm	ASME 150	OPEN	BALL VALVE	1,2	3	
CSO-4510	9549-B-004	BDV-4510 INLET	V-450 DEHYDRATOR BUILDING	33 mm	2000 CWP	OPEN	BALL VALVE	1,2	3	
CSO-4511	9549-B-004	BDV-4510 OUTLET	V-450 DEHYDRATOR BUILDING	33 mm	2000 CWP	OPEN	BALL VALVE	1,2	3	
CSO-4540	9549-B-004	BDV-4500 INLET	V-450 DEHYDRATOR BUILDING	33 mm	2000 CWP	OPEN	BALL VALVE	1,2</		

1. MECHANICAL CONTRACTOR TO QUOTE ITEMIZED PRICING FOR SUPPLYING MATERIALS AND LABOUR FOR CAR-SEALING/LOCKING IN THE YARD AND IN EACH BUILDING. DEPENDING ON EQUIPMENT FABRICATION SCHEDULES, SOME OF THE CAR-SEALING MAY BE DONE BY EQUIPMENT VENDOR.
2. FOR SAFE OPERATION, THIS CAR-SEAL LIST MUST BECOME PART OF QUICKSILVER'S OPERATING PROCEDURES FOR THE TWINING COMPRESSOR STATION.
3. CSC 9080 ADDED FOR REV 1

GRB
ENGINEERING



6

CAR SEAL/LOCKED VALVE LIST

[illegible]

NOTES:

1. MECHANICAL CONTRACTOR TO QUOTE ITEMIZED PRICING FOR SUPPLYING MATERIALS AND LABOUR FOR CAR-SEALING/LOCKING IN THE YARD AND IN EACH BUILDING. DEPENDING ON EQUIPMENT FABRICATION SCHEDULES, SOME OF THE CAR-SEALING MAY BE DONE BY EQUIPMENT VENDOR.
2. FOR SAFE OPERATION, THIS CAR-SEAL LIST MUST BECOME PART OF QUICKSILVER'S OPERATING PROCEDURES FOR THE TWINING COMPRESSOR STATION.
3. CSC 9080 ADDED FOR REV 1

REVISIONS						
NO.	DESCRIPTION	PROJECT	DATE	BY	CHK	ENG
2A	K-500 ADDITION, ISSUED FOR REVIEW	9549.01	05-09-16	JB		
3	K-500 ADDITION, ISSUED FOR CONST.	9549.01	05-09-16	JB		
4	K-600 ADDITION, ISSUED FOR APPROVAL	9549.02	08-12-11	DS		
5	K-600 ADDITION, ISSUED FOR CONST.	9549.02	09-01-15	RC	KK	DK
6	K-600 ADDITION, AS-BUILT	9549.02	09-06-03	DP		



TWINING
COMPRESSOR STATION
LSD 09-33-032-24 W4M
CAR-SEAL LIST (SHT. 2 OF 2)

PROJECT NO.	DWG. NO.	REV.
9549.02	A-9549-CL-002	6

LINE LIST																																	
LINE DESIGNATION							DESIGN INFORMATION								LOCATION						OPERATING		DESIGN		TEST		FLOW						
SIZE (mm)	COMMODITY CODE	SPECIFICATION	LINE No.	INSULATION THICKNESS (mm)	INSULATION TYPE	TRACING	HOLD TEMP. °C	SCHEDULE	COAT/LINE	X-RAY MPI	PWHT	HARDNESS TESTING	CLEANING	DESIGN CODE	ORIGIN	TERMINATION	P&ID DRAWING NUMBER	NOTES	PRESSURE (kPag)	TEMP °C	PRESSURE (kPag)	TEMP °C	PRESSURE (kPag)	TEMP °C	MEDIUM	FLUID SERVICE (B31.3)	10³ x m³/d (Gas) or m³/h (Liquid)	VELOCITY, m/s	PRESS DROP (kPa/100)	FLUID PHASE	REVISION		
324	PG	A	101	38	H	E	-	STD	-	10%	NO	-	-	Z662	NORTH FIELD PIPELINE RISER 1	406-PG-A-106-38HE	9549-B-001	1,3,4	14	10	690	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	0			
324	PG	A	102	38	H	E	-	STD	-	10%	NO	-	-	Z662	NORTH FIELD PIPELINE RISER 2	406-PG-A-106-38HE	9549-B-001	1,3,4	14	10	690	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	0			
324	PG	A	103	38	H	E	-	STD	-	10%	NO	-	-	Z662	SOUTH FIELD PIPELINE RISER 3	406-PG-A-106-38HE	9549-B-001	1,3,4	14	10	690	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	0			
324	PG	A	104	38	H	E	-	STD	-	10%	NO	-	-	Z662	SOUTH FIELD PIPELINE RISER 4	406-PG-A-106-38HE	9549-B-001	1,3,4	14	10	690	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	0			
406	PG	A	106	38	H	E	-	STD	-	10%	NO	-	-	Z662	INLET HDR. TERMINATION (BLIND FLG.)	406 PIG RECEIVER	9549-B-001	1,3,4	14	10	690	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	0			
406	PG	A	107	38	H	E	-	STD	-	10%	NO	-	-	B31.3	406-PG-A-106-38HE	ESDV-1000	9549-B-001	1,4	14	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	0			
324	PG	A	108	38	H	E	-	STD	-	10%	NO	-	-	B31.3	406 PIG RECEIVER	406-PG-A-107-38HE	9549-B-001	1,4	14	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	0			
60	PG	A	109	25	H	E	-	STD	-	10%	NO	-	-	B31.3	406-PG-A-107-38HE	406-PG-A-110-38HE	9549-B-001	1,4	14	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	0			
406	PG	A	110	38	H	E	-	STD	-	10%	NO	-	-	B31.3	ESDV-1000	V-110 INLET SEPARATOR	9549-B-001,002	1,4	14	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	0			
406	PG	A	111	38	H	E	-	STD	-	10%	NO	-	-	B31.3	V-110 INLET SEPARATOR	COMP. INLET HDR. TERMINATION (B.F.)	9549-B-002,003	1,4	14	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	0			
273	PG	A	112	38	H	E	-	STD	-	10%	NO	-	-	B31.3	406-PG-A-111-38HE	K-400 COMPRESSOR PACKAGE	9549-B-003	1,4	14	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	0			
273	PG	A	123	38	H	E	-	STD	-	10%	NO	-	-	B31.3	406-PG-A-124-38HE	K-500 COMPRESSOR PACKAGE	9549-B-002,003A	1,4	14	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	3			
406	PG	A	124	38	H	E	-	STD	-	10%	NO	-	-	B31.3	LINE 406-PG-A-111-38HE	COMP. SUCTION HDR. BLIND FLANGE	9549-B-002	1,4	14	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	3			
406	PG	A	126	38	H	E	-	STD	-	10%	NO	-	-	B31.3	406-PG-A-124-38HE	COMP. SUCTION HDR. BLIND FLANGE	9549-B-002	1,4	14	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	8			
273	PG	A	127	38	H	E	-	STD	-	10%	NO	-	-	B31.3	406-PG-A-126-38HE	K-600 COMPRESSOR SUCTION	9549-B-002,003B	1,4	14	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	GAS	8			
89	PG	CL	113	-	-	-	-	STD	-	10%	NO	-	-	B31.3	K-400 COMPRESSOR PACKAGE	168-PG-CL-114 (DEHY. INLET HDR.)	9549-B-003,004	1,5	8800	43	10026	-45/49	15308	MEOH/H2O	NORMAL	-	-	-	GAS	0			
168	PG	CL	114	-	-	-	-	80	-	10%	NO	-	-	B31.3	89-PG-CL-113	168-PG-CL-115	9549-B-004	1,5	8800	43	10026	-45/49	15308	MEOH/H2O	NORMAL	-	-	-	GAS	0			
168	PG	CL	115	-	-	-	-	80	-	10%	NO	-	-	B31.3	168-PG-CL-114 (DEHY. INLET HDR.)	V-450 DEHYDRATION PACKAGE	9549-B-004	1,5	8800	43	10026	-45/49	15308	MEOH/H2O	NORMAL	-	-	-	GAS	0			
168	PG	CL	116	-	-	-	-	80	-	10%	NO	-	-	B31.3	V-450 DEHYDRATION PACKAGE	168-PG-CL-117	9549-B-001,004	1	8800	43	10026	-45/49	15308	MEOH/H2O	NORMAL	-	-	-	GAS	0			
168	PG	CL	117	-	-	-	-	80	-	10%	NO	-	-	B31.3	168-PG-CL-116	V-460 GLYCOL SEPARATOR	9549-B-001	1	8800	43	10026	-45/49	15308	MEOH/H2O	NORMAL	-	-	-	GAS	0			
168	PG	CL	118	-	-	-	-	80	-	10%	NO	-	-	B31.3	V-460 GLYCOL SEPARATOR	ESDV-1200	9549-B-001	1	8786	43	10026	-45/49	15308	MEOH/H2O	NORMAL	-	-	-	GAS	0			
60	PG	CL	119	-	-	-	-	80	-	10%	NO	-	-	B31.3	168-PG-CL-118	168-PG-CL-120	9549-B-001	1	8750	43	10026	-45/49	15308	MEOH/H2O	NORMAL	-	-	-	GAS	0			
168	PG	CL	120	-	-	-	-	80	-	10%	NO	-	-	Z662	ESDV-1200	168-PG-CL-121	9549-B-001	1,3	8750	43	9930	-45/49	15308	MEOH/H2O	NORMAL	-	-	-	GAS	0			
168	PG	CL	121	-	-	-	-	80	-	10%	NO	-	-	Z662	168-PG-CL-120	SALES GAS PIPELINE RISER 1	9549-B-001	1,3	8750	43	9930	-45/49	15308	MEOH/H2O	NORMAL	-	-	-	GAS	0			
89	PG	CL	122	-	-	-	-	STD	-	10%	NO	-	-	B31.3	K-500 COMPRESSOR PACKAGE	LINE 168-PG-CL-125	9549-B-003A,004	1,5	8800	43	10026	-45/49	15308	MEOH/H2O	NORMAL	-	-	-	GAS	3			
168	PG	CL	125	-	-	-	-	80	-	10%	NO	-	-	B31.3	COMP. DISCHARGE HDR. BLIND FLANGE	LINE 168-PG-CL-114	9549-B-004	1,5	8800	43	10026	-45/49	15308	MEOH/H2O	NORMAL	-	-	-	GAS	3			
89	PG	CL	128	-	-	-	-	STD	-	10%	NO	-	-	B31.3	K-600 COMPRESSOR DISCHARGE	168-PG-CL-129	9549-B-003B,004	1,5	8800	43	10026	-45/49	15308	MEOH/H2O	NORMAL	-	-	-	GAS	8			
168	PG	CL	129	-	-	-	-	80	-	10%	NO	-	-	B31.3	COMP. DISCHARGE HDR. BLIND FLANGE	168-PG-CL-125	9549-B-004	1,5	8800	43	10026	-45/49	15308	MEOH/H2O	NORMAL	-	-	-	GAS	8			
89	PW	A	400	25	H	E	-	STD	-	10%	NO	-	-	B31.3	PW HEADER START (BLIND FLG.)	PW HEADER TERMINATION (BLIND FLG.)	9549-B-006	1,4	70	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	LIQUID	0			
60	PW	A	402	25	H	E	-	STD	-	10%	NO	-	-	B31.3	V-110 INLET SEPARATOR	89-PW-A-400-25HE	9549-B-002,006	1,4	70	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	LIQUID	0			
60	PW	A	403	25	H	E	-	STD	-	10%	NO	-	-	B31.3	K-400 COMPRESSOR PACKAGE	89-PW-A-400-25HE	9549-B-003,006	1,4	70	25	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	LIQUID	0			
60	PW	A	404	25	H	E	-	STD	-	10%	NO	-	-	B31.3	V-450 DEHYDRATION PACKAGE	89-PW-A-400-25HE	9549-B-004,006	1,4	70	25	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	LIQUID	0			
89	PW	A	405	25	H	E	-	STD	-	10%	NO	-	-	B31.3	89-PW-A-400-25HE	T-300 PRODUCED WATER TANK	9549-B-006	1,4	70	25	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	LIQUID	0			
89	PW	A	406	25	H	E	-	STD	-	10%	NO	-	-	B31.3	T-300 PRODUCED WATER TANK	TRUCK-OUT CONNECTION	9549-B-006	1,4	70	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	LIQUID	0			
60	PW	A	407	25	H	E	-	STD	-	10%	NO	-	-	B31.3	K-500 COMPRESSOR PACKAGE	LINE 89-PW-A-406-25HE	9549-B-003A,006	1,4	70	25	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	LIQUID	3			
89	PW	A	408	25	H	E	-	STD	-	10%	NO	-	-	B31.3	PW HEADER BLIND FLANGE	LINE 89-PW-A-400-25HE	9549-B-006	1,4	70	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	LIQUID	3			
60	PW	A	409	25	H	E	-	STD	-	10%	NO	-	-	B31.3	K-600 PW OUTLET	89-PW-A-410-25HE	9549-B-003B,006	1,4	70	25	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	LIQUID	8			
89	PW	A	410	25	H	E	-	STD	-	10%	NO	-	-	B31.3	PW HEADER BLIND FLANGE	89-PW-A-408-25HE	9549-B-006	1,4	70	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	LIQUID	8			
48	PW	A	411	25	H	E	-	STD	-	10%	NO	-	-	B31.3	PIG RECEIVER	89-PW-A-400-25 HE	9549-B-001, 006	1, 4	70	10	1965	-29/38	2948	MEOH/H2O	NORMAL	-	-	-	LIQUID	8			
																												</					

LINE LIST																																
LINE DESIGNATION							DESIGN INFORMATION							LOCATION							OPERATING		DESIGN		TEST		FLOW					
SIZE (mm)	COMMODITY CODE	SPECIFICATION	LINE No.	INSULATION THICKNESS (mm)	INSULATION TYPE	TRACING	HOLD TEMP. °C	SCHEDULE	COAT/LINE	X-RAY 1 MPI	PWHT	HARDNESS TESTING	CLEANING	DESIGN CODE	ORIGIN	TERMINATION	PAID DRAWING NUMBER	NOTES	PRESSURE (kPag)	TEMP °C	PRESSURE (kPag)	TEMP °C	PRESSURE (kPag)	MEDIUM	FLUID SERVICE (B31.3)	10³ x m³/d (Gas) or m³/h (Liquid)	VELOCITY, m/s	PRESS DROP (kPa/100)	FLUID PHASE	REVISION		
60	FG	AL	540	-	-	-	-	STD	-	10%	NO	-	-	B31.3	FUEL GAS HEADER START (BLIND FLG.)	F.G. HDR. TERMINATION (BLIND FLG.)	9549-B-006	1	690	20	1965	-45/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
60	FG	AL	541	-	-	-	-	STD	-	10%	NO	-	-	B31.3	V-450 DEHYDRATION PACKAGE	60-FG-AL-540	9549-B-004,006	1	690	20	1965	-45/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
60	FG	AL	542	-	-	-	-	STD	-	10%	NO	-	-	B31.3	60-FG-AL-540	K-400 COMPRESSOR PACKAGE	9549-B-003,006	1	690	20	1965	-45/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
60	FG	AL	543	-	-	-	-	STD	-	10%	NO	-	-	B31.3	60-FG-AL-540	H-807 VENT KNOCKOUT DRUM HEATER	9549-B-006	1	690	20	1965	-45/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
33	FG	AL	544	-	-	-	-	STD	-	-	NO	-	-	B31.3	60-FG-AL-540	H-806 PRODUCED WATER TANK HTR.	9549-B-006	1	690	20	1965	-45/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
60	FG	AL	545	-	-	-	-	STD	-	10%	NO	-	-	B31.3	60-FG-AL-540	H-800A/B/C INLET SEPARATOR HEATER	9549-B-002,006	1	690	20	1965	-45/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
60	FG	AL	546	-	-	-	-	STD	-	10%	NO	-	-	B31.3	LINE 60-FG-AL-547	K-500 COMPRESSOR PACKAGE	9549-B-003A,006	1	690	20	1965	-45/38	2984	MEOH	NORMAL	-	-	-	GAS	3		
60	FG	AL	547	-	-	-	-	STD	-	10%	NO	-	-	B31.3	LINE 60-FG-AL-540	FG HEADER BLIND FLANGE	9549-B-006	1	690	20	1965	-45/38	2984	MEOH	NORMAL	-	-	-	GAS	3		
60	FG	AL	548	-	-	-	-	STD	-	10%	NO	-	-	B31.3	60-FG-AL-547	FG HEADER BLIND FLANGE	9549-B-006	1	690	20	1965	-45/38	2984	MEOH/H2O	NORMAL	-	-	-	GAS	8		
60	FG	AL	549	-	-	-	-	STD	-	10%	NO	-	-	B31.3	60-FG-AL-548	K-600 FG INLET	9549-B-006,003B	1	690	20	1965	-45/38	2984	MEOH/H2O	NORMAL	-	-	-	GAS	8		
273	V	A	700	38	H	E	-	STD	-	10%	NO	-	-	B31.3	VENT HEADER START (BLIND FLG.)	VENT HDR. TERM'N (BLIND FLG.)	9549-B-006	1,3	35	20	1965	-29/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
168	V	A	701	38	H	E	-	STD	-	10%	NO	-	-	B31.3	INLET SUB HDR. START (BLIND FLG.)	273-V-A-700-38HE	9549-B-001,006	1,3	35	20	1965	-29/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
60	V	A	702	25	H	E	-	STD	-	10%	NO	-	-	B31.3	406 PIG RECEIVER	168-V-A-701-38HE (SUB HEADER)	9549-B-001	1,3	35	10	1965	-29/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
89	V	A	703	25	H	E	-	STD	-	10%	NO	-	-	B31.3	406-PG-A-126-38HE	168-V-A-701-38HE (SUB HEADER)	9549-B-001	1,3	35	20	1965	-29/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
273	V	A	704	38	H	E	-	STD	-	10%	NO	-	-	B31.3	V-110 INLET SEPARATOR	273-V-A-700-38HE (HEADER)	9549-B-002,006	1,3	35	10	1965	-29/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
168	V	A	705	25	H	E	-	STD	-	10%	NO	-	-	B31.3	K-400 COMPRESSOR PACKAGE	273-V-A-700-38HE (HEADER)	9549-B-003,006	1,3	35	20	1965	-29/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
219	V	A	706	38	H	E	-	STD	-	10%	NO	-	-	B31.3	V-450 DEHYDRATION PACKAGE	273-V-A-700-38HE (HEADER)	9549-B-004,006	1,3	35	20	1965	-29/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
273	V	A	707	38	H	E	-	STD	-	10%	NO	-	-	B31.3	273-V-A-700-38HE (HEADER)	V-700 K.O. DRUM	9549-B-006	1,3	35	20	1965	-29/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
273	V	A	708	38	H	E	-	STD	-	10%	NO	-	-	B31.3	V-700 K.O. DRUM	VS-710 VENT STACK	9549-B-006	1,3	35	20	1965	-29/38	2984	MEOH	NORMAL	-	-	-	GAS	0		
168	V	A	709	25	H	E	-	STD	-	10%	NO	-	-	B31.3	K-500 COMPRESSOR PACKAGE	LINE 273-V-A-710-38HE	9549-B-003A,006	1	35	20	1965	-29/38	2984	MEOH	NORMAL	-	-	-	GAS	3		
273	V	A	710	38	H	E	-	STD	-	10%	NO	-	-	B31.3	LINE 273-V-A-700-38HE	VENT HEADER BLIND FLANGE	9549-B-006	1	35	20	1965	-29/38	2984	MEOH	NORMAL	-	-	-	GAS	3		
168	V	A	711	25	H	E	-	STD	-	10%	NO	-	-	B31.3	K-600 VENT NOZZLE	273-V-A-712-38HE	9549-B-003B,006	1	35	20	1965	-29/38	2984	MEOH/H2O	NORMAL	-	-	-	GAS	8		
273	V	A	712	38	H	E	-	STD	-	10%	NO	-	-	B31.3	273-V-A-710-38HE	VENT HDR. BLIND FLG	9549-B-003B,006	1	35	20	1965	-29/38	2984	MEOH/H2O	NORMAL	-	-	-	GAS	8		
89	SG	AL	552	-	-	-	-	STD	-	10%	NO	-	-	B31.3	SG HDR B.F.	89-SG-AL-556	9549-B-005	2,8	1034	25	1965	-45/38	2984	MEOH	NORMAL	-	-	-	GAS	8		
60	SG	AL	553	-	-	-	-	STD	-	10%	NO	-	-	B31.3	89-SG-AL-552	K-400 SG INLET	9549-B-005,003	2,8	1034	25	1965	-45/38	2984	MEOH	NORMAL	-	-	-	GAS	8		
60	SG	AL	555	-	-	-	-	STD	-	10%	NO	-	-	B31.3	89-SG-AL-556	K-500 SG INLET	9549-B-005,003A	2,8	1034	25	1965	-45/38	2984	MEOH	NORMAL	-	-	-	GAS	8		
89	SG	AL	556	-	-	-	-	STD	-	10%	NO	-	-	B31.3	89-SG-AL-552	89-SG-AL-560	9549-B-005	2,8	1034	25	1965	-45/38	2984	MEOH	NORMAL	-	-	-	GAS	8		
89	SG	AL	560	-	-	-	-	STD	-	10%	NO	-	-	B31.3	89-SG-AL-556	SG HEADER BLIND FLANGE	9549-B-005	2	1034	25	1965	-45/38	2984	MEOH/H2O	NORMAL	-	-	-	GAS	8		
60	SG	AL	561	-	-	-	-	STD	-	10%	NO	-	-	B31.3	60-FG-AL-541	89-SG-AL-563	9549-B-004,005	2	1034	25	1965	-45/38	2984	MEOH/H2O	NORMAL	-	-	-	GAS	8		
60	SG	AL	562	-	-	-	-	STD	-	10%	NO	-	-	B31.3	89-SG-AL-560	K-600 SG INLET	9549-B-005,003B	2	1034	25	1965	-45/38	2984	MEOH/H2O	NORMAL	-	-	-	GAS	8		
89	SG	AL	563	-	-	-	-	STD	-	10%	NO	-	-	B31.3	89-SG-AL-552	SG HEADER BLIND FLANGE	9549-B-005	2	1034	25	1965	-45/38	2984	MEOH/H2O	NORMAL	-	-	-	GAS	8		
NOTES:																																
1. USE A PROPER MIXTURE OF CLEAN WATER AND METHANOL FOR HYDRO-TESTS WHEN RISK OF FREEZING EXISTS. FOLLOW A.E. REQUIREMENTS FOR TEST MEDIUM DISPOSAL. 2. LEAK TEST ON INSTRUMENT AIR PIPING AND START AIR PIPING PER ASME B31.3 345.7. 3. USE ASME MATERIALS FOR CSA PIPING CONSTRUCTION PER CSA Z662-03 TABLE 5.3. 4. INSULATE AND ELECTRIC TRACE ABOVEGROUND OUTDOOR PIPING ONLY. USE FIBREGLASS INSULATION, ALUMINUM CLADDING, AND CONSTANT WATTAGE TAPES. 5. COMPRESSOR DISCHARGE PIPING TO BE LEFT BARE PER QUICKSILVER OPERATING PRACTICE. 6. MECH. CONTRACTOR TO SUBMIT AB-83 AND DOCUMENTATION FOR ABSA REGISTRATION. 7. SEE P.ENG. STAMPED VENDOR DRAWINGS FOR SKID PIPING SPECIFICATIONS. 8. COMMODITY CHANGE FROM START AIR TO START GAS.															REVISIONS							ENGINEERING STAMP										
															NO.	DESCRIPTION				PROJECT	DATE	BY	CHK	ENG	GRB ENGINEERING QUICKSILVER PEOPLE TWINING COMPRESSOR STATION LSD 09-33-032-24 W4M LINE LIST (SHT. 2 OF 3) PROJECT NO. 9549.02 DWG. NO. A-9549-LL-002 REV. 8							
															7	K-600 ADDITION, ISSUED FOR CONST.				9549.02	09-01-15	RC	KK	DK								
															8	K-600 ADDITION, AS-BUILT				9549.02	09-06-03	DP										
															1	RE-ISSUED FOR CONSTRUCTION				9549.00	05-05-09	RW										
															2A	K-500 ADDITION, ISSUED FOR REVIEW				9549.01	05-09-16	JB										
															3	K-600 ADDITION, RE-ISSUED FOR CONST.				9549.01	05-09-16	JB										
4	K-600 ADDITION, ISSUED FOR REVIEW				9549.02	08-11-21	RC																									
5	K-600 ADDITION, ISSUED FOR DEMOLITION				9549.02	08-12-10	DS																									
6	K-600 ADDITION, ISSUED FOR APPROVAL				9549.02	08-12-11	DS																									

[illegible]

1. USE A PROPER MIXTURE OF CLEAN WATER AND METHANOL FOR HYDRO-TESTS WHEN RISK OF FREEZING EXISTS. FOLLOW A.E. REQUIREMENTS FOR TEST MEDIUM DISPOSAL.
2. LEAK TEST ON INSTRUMENT AIR PIPING AND START AIR PIPING PER ASME B31.3 345.7.
3. USE ASME MATERIALS FOR CSA PIPING CONSTRUCTION PER CSA Z662-03 TABLE 5.3.
4. INSULATE AND ELECTRIC TRACE ABOVEGROUND OUTDOOR PIPING ONLY. USE FIBREGLASS INSULATION, ALUMINUM CLADDING, AND CONSTANT WATTAGE TAPES.
5. COMPRESSOR DISCHARGE PIPING TO BE LEFT BARE PER QUICKSILVER OPERATING PRACTICE.
6. MECH. CONTRACTOR TO SUBMIT AB-83 AND DOCUMENTATION FOR ABSA REGISTRATION.
- 7 SEE P.ENG. STAMPED VENDOR DRAWINGS FOR SKID PIPING SPECIFICATIONS.

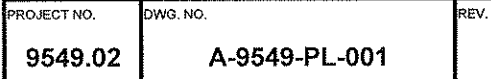
ENGINEERING STAMP

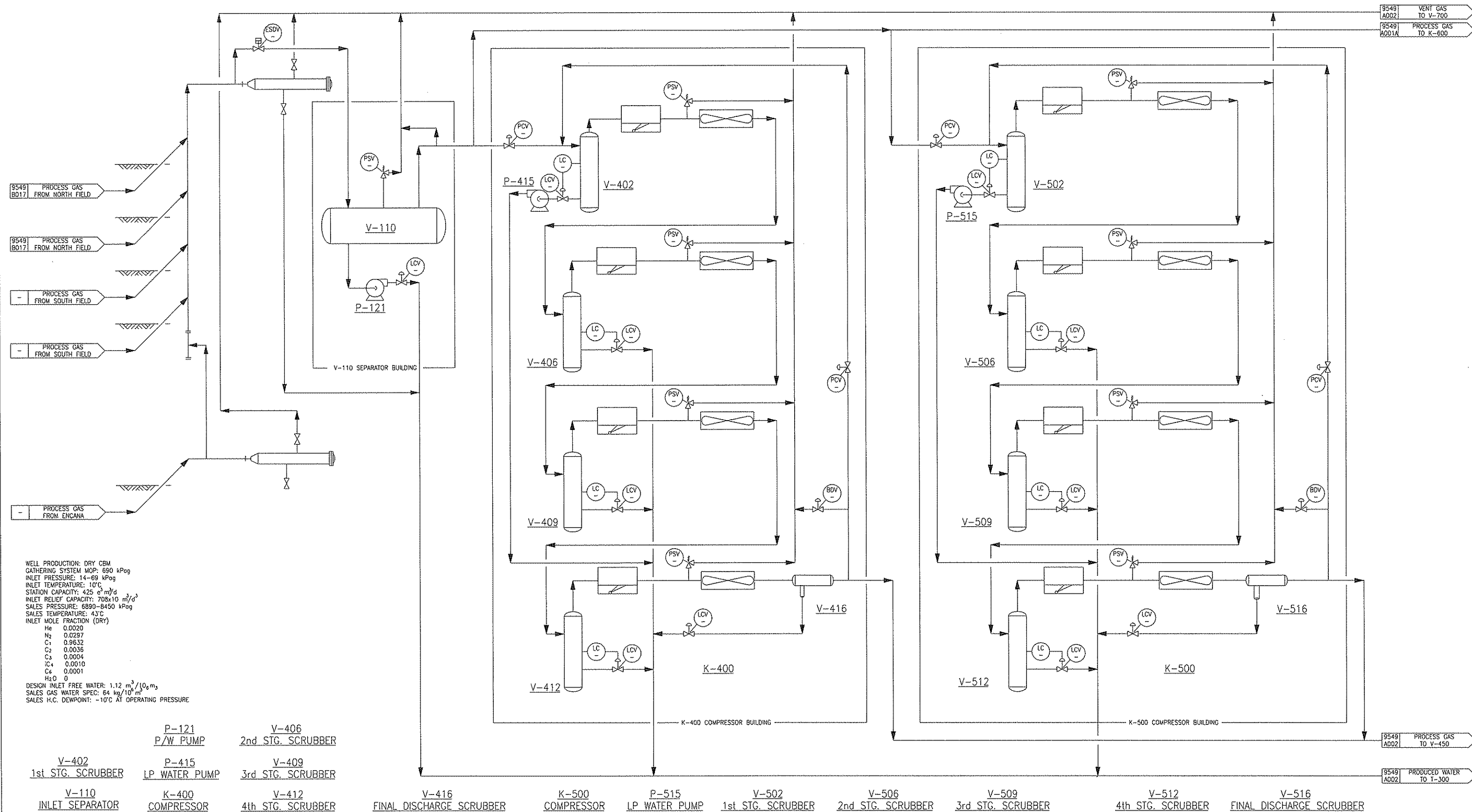
PROJECT NO.	DWG. NO.	REV.
9549.02	A-9549-LL-003	

[illegible]

1. PSV'S ARE SIZED AND SUPPLIED BY PACKAGED EQUIPMENT VENDORS. INFORMATION SHOWN ABOVE IS TAKEN FROM VENDOR DRAWINGS AND VENDOR CORRESPONDENCE.
2. BACK PRESSURES SHOWN ABOVE ARE ESTIMATED VALUES BASED ON SINGLE PSV OPENING AT TIME ZERO.
3. PSV - 9080 ADDED FOR REV 1
4. DELETED.
5. FIELD OPERATIONS TO CONFIRM THAT PSV IS SET TO 8450 kPag.

ENGINEERING STAMP





WELL PRODUCTION: DRY CBM
 GATHERING SYSTEM MOP: 690 kPag
 INLET PRESSURE: 14-69 kPag
 INLET TEMPERATURE: 10°C
 STATION CAPACITY: 425 c³/d
 INLET RELIEF CAPACITY: 708x10 m³/d³
 SALES PRESSURE: 6890-8450 kPag
 SALES TEMPERATURE: 43°C
 INLET MOLE FRACTION (DRY)

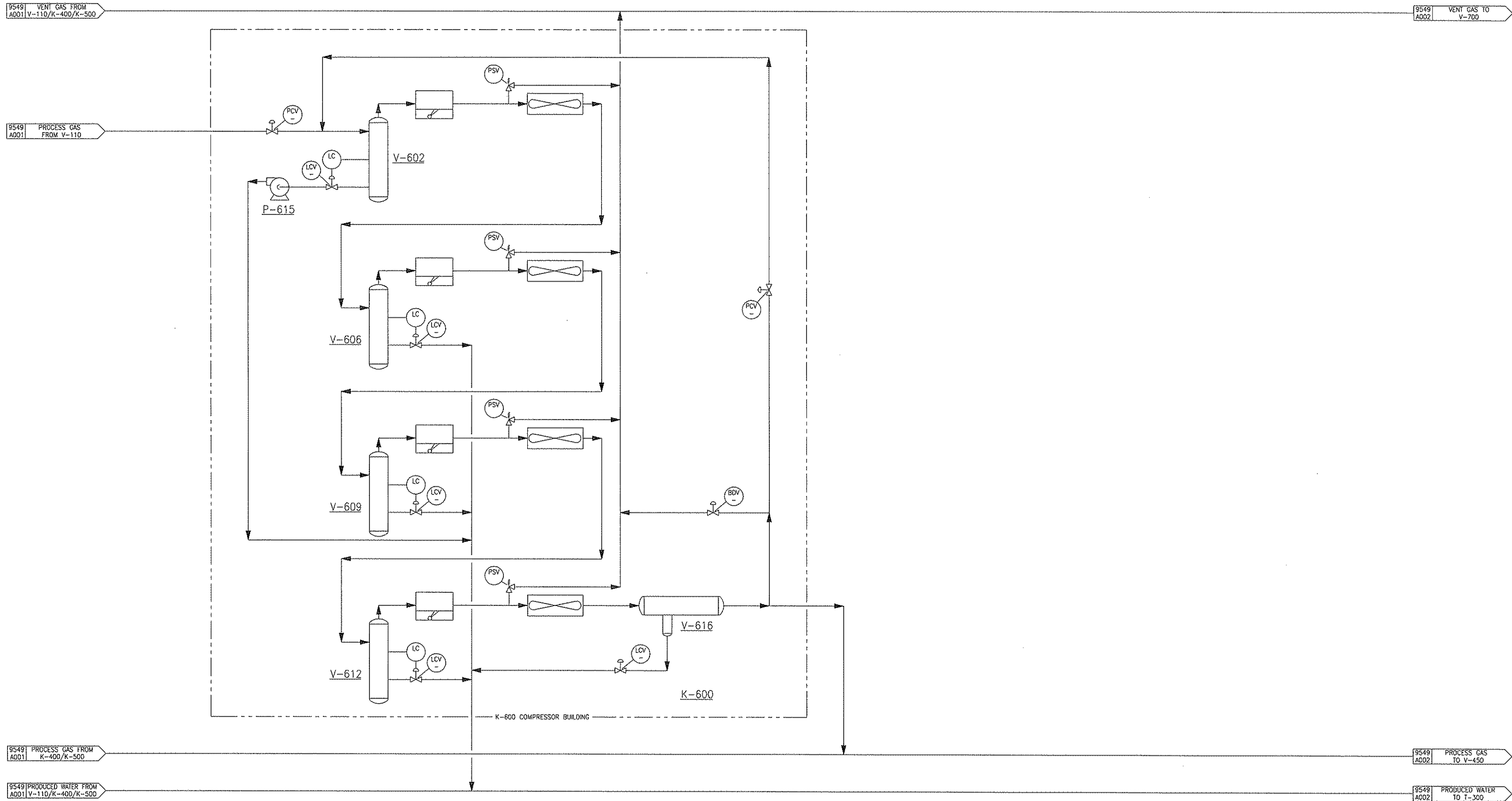
H ₂	0.0020
N ₂	0.0297
C ₁	0.9632
C ₂	0.0036
C ₃	0.0004
iC ₄	0.0010
C ₆	0.0001
H ₂ O	0

DESIGN INLET FREE WATER: 1.12 m³/10⁶ m³
 SALES GAS WATER SPEC: 54 kg/10⁶ m³
 SALES H.C. DEWPOINT: -10°C AT OPERATING PRESSURE

- NOTES:
- GATHERING SYSTEM MOP TO BE PROTECTED BY UPSTREAM WELLSITE PSV'S AND PIPELINE PSV'S.
 - H.C. DEWPOINT SPEC IS MET BY LEAN GAS COMPOSITION.
 - REVISIT THE ENTIRE STATION DESIGN IF DESIGN CONDITIONS CHANGE IN FUTURE.
 - DETAILED HEAT AND MATERIAL BALANCE NOT REQUIRED BY CLIENT.
 - DEHYDRATOR TURNDOWN RATIO 4:1.

REFERENCE DRAWINGS			REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	
-	-	6	K-600 ADDITION, ISSUED FOR CONSTRUCTION	9549.02	08-12-09	CR	KK	DK	
-	-	7	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS	9549.02	09-06-03	DP	-	-	
-	-	8	AS-BUILT (ENCANA)	-	06-18-10	JFL	CD	CD	
-	-	1	AS-BUILT	9549.00	05-08-26	NI	-	-	
-	-	2A	K-500 ADDITION, ISSUED FOR REVIEW	9549.01	05-09-02	JB	-	-	
-	-	3	K-500 ADDITION, RE-ISSUED FOR CONSTRUCTION	9549.01	05-09-15	JB	KAB	RGW	
-	-	4	K-500 ADDITION, AS-BUILT	9549.01	06-03-06	JB	-	-	
-	-	5	K-600 ADDITION, ISSUED FOR APPROVAL	9549.02	08-11-28	DP	-	-	

ENGINEERING STAMP				QUICKSILVER			
				TWINING COMPRESSOR STATION LSD 09-33-032-24 W4M PROCESS FLOW DIAGRAM			
PROJECT NO.	SCALE:	DWG. NO.	REV.				
9549.02	NTS	B-9549-A-001	8				



V-602 1st STAGE SCRUBBER V-606 2nd STAGE SCRUBBER V-609 3rd STAGE SCRUBBER V-612 4th STAGE SCRUBBER K-600 COMPRESSOR V-616 FINAL DISCHARGE SCRUBBER P-615 LP WATER PUMP

NOTES:

REFERENCE DRAWINGS			REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	
.	.	A	ISSUED FOR APPROVAL	9549.02	08-11-28	DP	.	.	
.	.	0	K-600 ADDITION, ISSUED FOR CONSTRUCTION	9549.02	08-12-09	CR	KK	DK	
.	.	1	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS	9549.02	09-06-03	DP	.	.	
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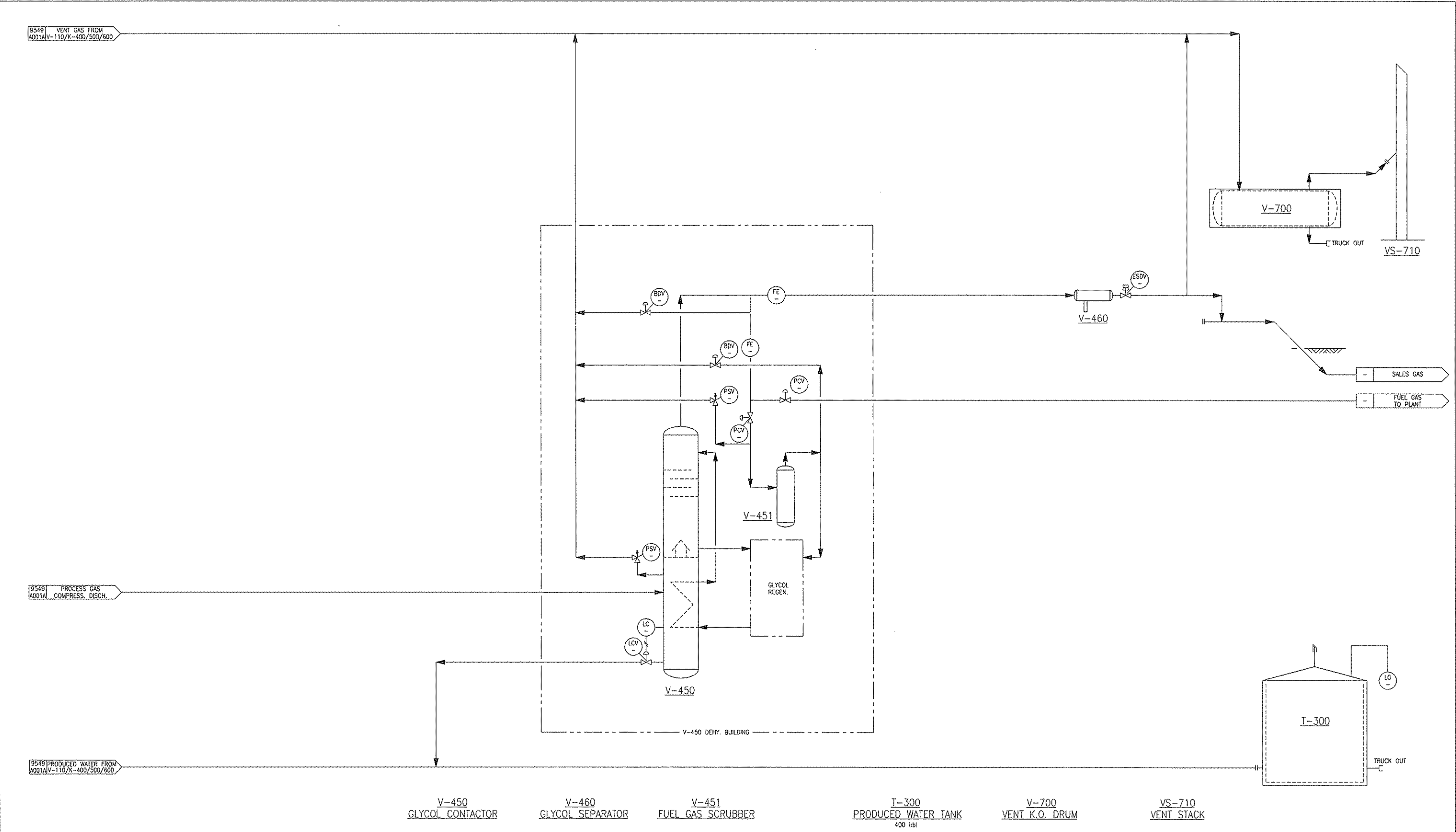
ENGINEERING STAMP

GRB
ENGINEERING

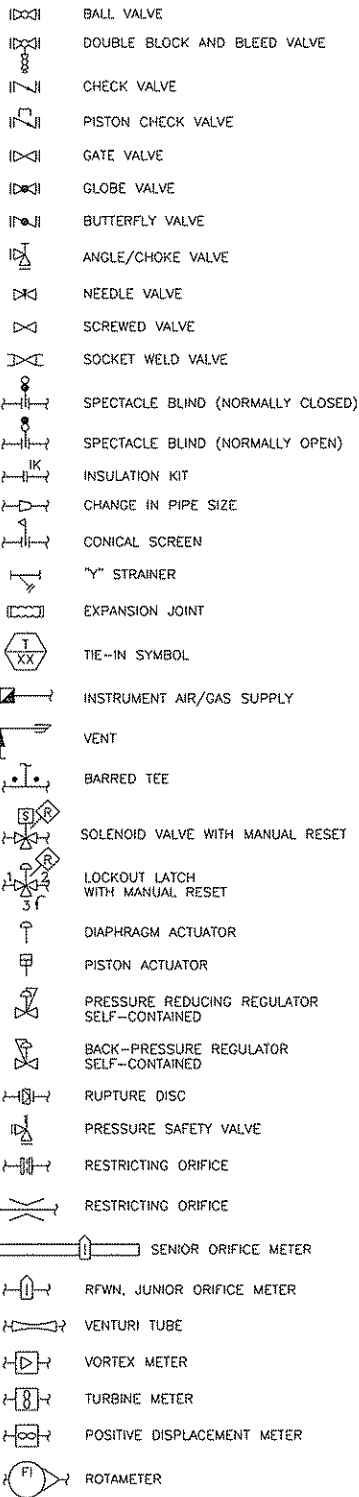
QUICKSILVER

TWINING COMPRESSOR STATION
LSD 09-33-032-24 W4M
PROCESS FLOW DIAGRAM

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	NTS	B-9549-A-001A	1



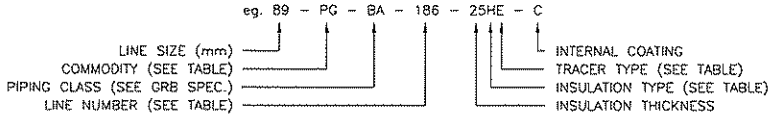
NOTES: 1. GATHERING SYSTEM MOP TO BE PROTECTED BY UPSTREAM WELLSITE PSV'S AND PIPELINE PSV'S. 2. H.C. DEWPOINT SPEC IS MET BY LEAN GAS COMPOSITION. 3. REVISIT THE ENTIRE STATION DESIGN IF DESIGN CONDITIONS CHANGE IN FUTURE. 4. DETAILED HEAT AND MATERIAL BALANCE NOT REQUIRED BY CLIENT. 5. DEHYDRATOR TURNDOWN RATIO 4:1.	REFERENCE DRAWINGS		REVISIONS							ENGINEERING STAMP		GRB ENGINEERING	QUICKSILVER TWINING COMPRESSOR STATION LSD 09-33-032-24 W4M PROCESS FLOW DIAGRAM			
	DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.							
	-	-	A	K-500 ADDITION, ISSUED FOR REVIEW	9549.01	05-09-02	JB	-	-	-	-					
	-	-	0	K-500 ADDITION, ISSUED FOR CONSTRUCTION	9549.01	05-09-16	JB	KAB	RGW	-	-					
	-	-	1	K-500 ADDITION, AS BUILT	9549.01	06-03-06	JB	-	-	-	-					
	-	-	2	K-600 ADDITION, ISSUED FOR APPROVAL	9549.02	08-11-28	DP	-	-	-	-					
	-	-	3	K-600 ADDITION, ISSUED FOR CONSTRUCTION	9549.02	08-12-09	CR	KK	DK	-	-					
	-	-	4	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS	9549.02	09-06-03	DP	-	-	-	-					
	-	-	-	-	-	-	-	-	-	-	-					
	-	-	-	-	-	-	-	-	-	-	-					
											ENGINEERING STAMP					
											PROJECT NO. 9549.02	SCALE: NTS	DWG. NO. B-9549-A-002	REV. 4		



COMMON ABBREVIATIONS

A-ALARM
CO-CHAIN OPERATED
CSC-CAR SEAL CLOSED
CSO-CAR SEAL OPEN
ESD-EMERGENCY SHUT DOWN
FC-FAIL CLOSED
FO-FAIL OPEN
FP-FULL PORT
HPV-HIGH POINT VENT
LC-LOCK CLOSED
LO-LOCK OPEN
LPD-LOW POINT DRAIN
M 3/H-CUBIC METRES PER HOUR
M 3/D-CUBIC METRES PER DAY
MCC-MOTOR CONTROL CENTER
NC-NORMALLY CLOSED
NO-NORMALLY OPEN
PLC-PROGRAMMABLE LOGIC CONTROL
RP-REDUCED PORT
SC-SAMPLE CONNECTION
SCFM-STANDARD CUBIC FEET PER MINUTE
SD-SHUT DOWN (INDIVIDUAL EQUIPMENT)
TH-THIEF HATCH

LINE NUMBER DESIGNATION



NPS/METRIC O.D.
PIPE SIZE CONVERSION

mm	NPS
14	1/4"
21	1/2"
27	3/4"
33	1"
42 **	1 1/4"
48	1 1/2"
60	2"
73 **	2 1/2"
89	3"
114	4"
141 **	5"
168	6"
219	8"
273	10"
324	12"
356	14"
406	16"
457	18"
508	20"
610	24"

NOTE:
ALL TUBING IS TO BE SPECIFIED
IN IMPERIAL UNITS ONLY.

COMMODITY CODES

ABBREVIATION	DESCRIPTION
BD	BLOWDOWN
C	CONDENSATE
D	DRAIN
FG	FUEL GAS
GLR	GLYCOL RETURN
GLS	GLYCOL SUPPLY
IA	INSTRUMENT AIR
O	OIL
PG	PROCESS GAS
PGS	PROCESS GAS SOUR
PW	PRODUCED WATER
SA	START AIR
V	VENT

LINE NUMBERS

SERVICE CATEGORY	NUMBER SETS
MAJOR PROCESS FLUIDS	100-299
MINOR PROCESS FLUIDS (RECYCLE)	300-399
WATER	400-499
UTILITY VAPORS (FG)	500-599
UTILITY LIQUIDS (GLYCOL)	600-699
RELIEF	700-799
DRAINS	800-899
MISCELLANEOUS	900-999

INSTRUMENT OR FUNCTION SYMBOLS

	MAIN PANEL OR CONTROL ROOM	FIELD MOUNTED	AUXILIARY LOCATION			
DISCRETE INSTRUMENTS						
SHARED DISPLAY, SHARED CONTROL						
COMPUTER FUNCTION						
PROGRAMMABLE LOGIC CONTROL (PLC)						

INSTRUMENT IDENTIFICATION LETTERS

FIRST LETTER		SUCCEEDING LETTERS		
MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A ANALYSIS		ALARM		
B BURNER, COMBUSTION		USERS CHOICE	USERS CHOICE	USERS CHOICE
C USERS CHOICE			CONTROL	
D USERS CHOICE	DIFFERENTIAL			
E VOLTAGE EMF EMERGENCY		SENSOR PRIMARY ELEMENT		
F FLOW RATE	RATIO (FRACTION)			
G USERS CHOICE		GLASS VIEWING DEVICE		
H HAND (MANUAL)				HIGH
I CURRENT (ELECTRICAL)		INDICATE		
J POWER	SCAN			
K TIME OR TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L LEVEL		LIGHT (PILOT)		LOW
M USERS CHOICE	MOMENTARY			MIDDLE OR INTERMEDIATE
N USERS CHOICE		USERS CHOICE	USERS CHOICE	USERS CHOICE
O USERS CHOICE		ORIFICE RESTRICTION		
P PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q QUANTITY	INTEGRATE OR TOTALIZE			
R RADIATION		RECORD OR PRINT		
S SPEED, FREQUENCY, SHUTDOWN	SAFETY		SWITCH	
T TEMPERATURE			TRANSMIT	
U MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V VIBRATION MECH. ANALYSIS			VALVE DAMPER OR LOUVRE	
W WEIGHT OR FORCE		WELL		
X UNCLASSIFIED	X-AXIS	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y EVENT STATE OR PRESENCE	Y-AXIS		RELAY, COMPUTE, OR CONVERT	
Z POSITION, DIMENSION	Z-AXIS		DRIVE ACTUATE OR UNCLASSIFIED	

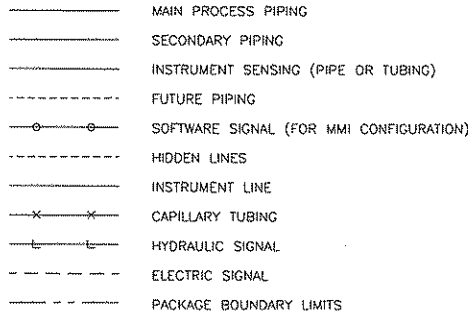
INSULATION TYPE

25	INSULATION THICKNESS (mm)
H	HOT INSULATION
C	COLD INSULATION
PP	PERSONNEL PROTECTION

TRACER TYPE

S	STEAM TRACED & INSUL.
E	ELECTRIC TRACE & INSUL.
G	GLYCOL TRACE & INSUL.

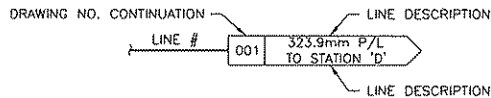
LINE LEGEND



EQUIPMENT CODE

B-BLOWER
C-COOLER/CONDENSER
D-DRIVER
E-EXCHANGER
F-FILTER
H-FIRED HEATER
K-COMPRESSOR
P-PUMP
T-STORAGE TANK
U-UTILITY EQUIPMENT
V-VESSEL
Z-PACKAGES

LINE CONTINUATION FLAG



NOTES:

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
0	ISSUED FOR PROJECT	9549.02	05-09-16	JB		

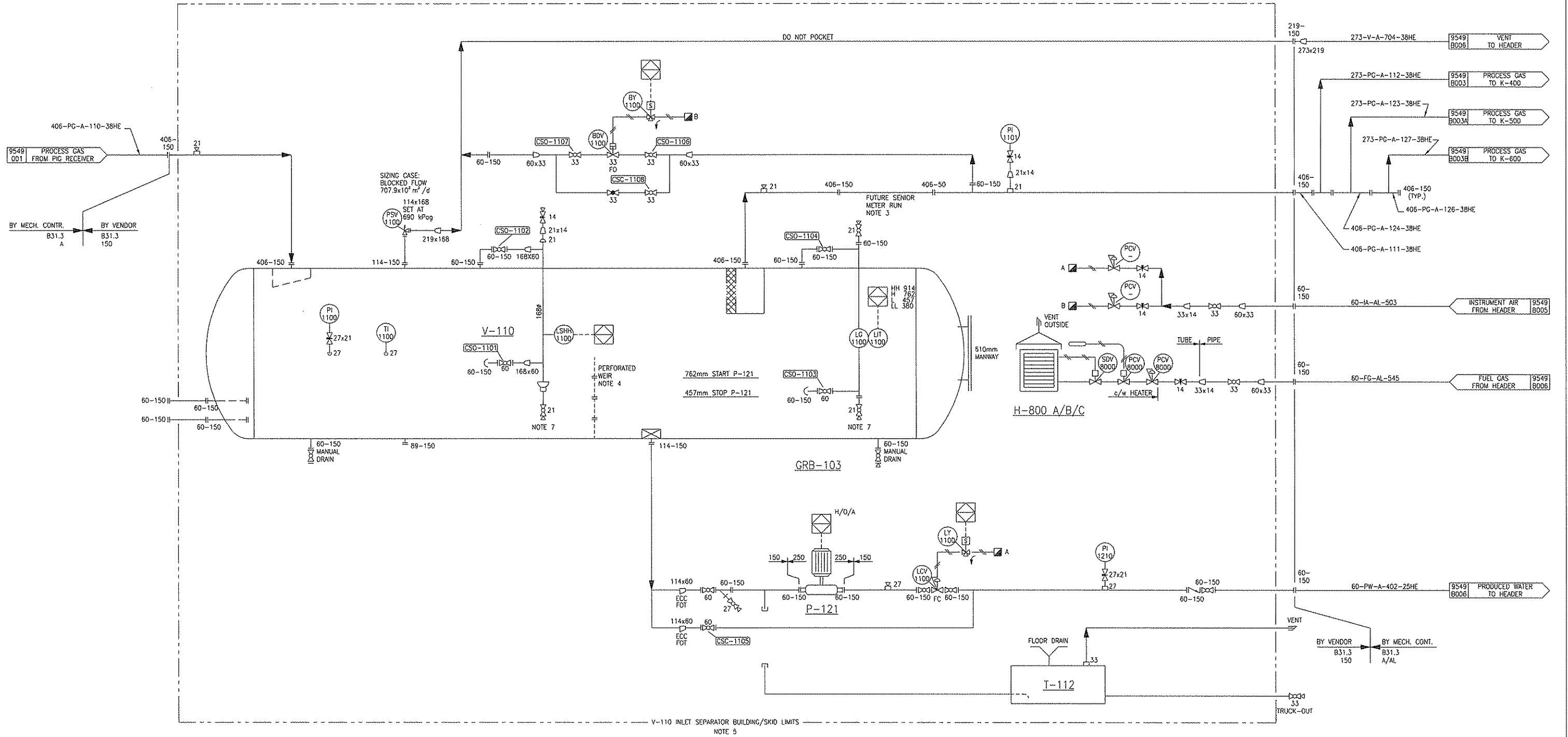
ENGINEERING STAMP

GRB
ENGINEERING

QUICKSILVER

TWINING COMPRESSOR STATION
LSD 09-33-032-24 W4M
TYPICAL SYMBOLOGY SHEET

PROJECT NO. 9549.02	SCALE: NTS	DWG. NO. B-9549-B-000	REV. 0
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**V-110
INLET SEPARATOR**
VENDOR: BROMLEY MECHANICAL
SIZE: 1829 O.D. x 6096 S/S
D.P.: 896 kPag AT 38°C FULL VACUUM
CA: 1.6mm

**P-121
P/W PUMP**
VENDOR: BROMLEY MECHANICAL
MAKE/MODEL: GRUNDFOS CR10-20
CAP.: 200 LPM AT 23m DIFF. HEAD
MOTOR: 1.5KW 480/3/60 XP

**H-800A/B/C
BUILDING HEATER**
VENDOR: BROMLEY MECHANICAL
MAKE/MODEL: CCI WX 24X48(H2448)
DUTY: 7 kW
START: 120V

**T-112
DRAIN TANK**
VENDOR: BROMLEY MECHANICAL
CAP.: 300 UTER

- NOTES:
1. CONTRACTOR TO SUPPLY/INSTALL HIGH POINT VENT & LOW POINT DRAINS ON YARD PIPING AS REQUIRED.
 2. ALL VALVES ARE REDUCED PORT UNLESS NOTED OTHERWISE.
 3. MAKE PROVISION FOR FUTURE SENIOR METER RUN.
 4. WEIR FOR FUTURE CONVERSION TO 3 PHASE.
 5. SEE VENDOR P&ID'S AND BOM FOR COMPLETE PACKAGE DESCRIPTION.
 6. PSV IS SIZED BY VENDOR. SEE PSV LIST FOR DETAILS.
 7. MGV OPERATIONS TO FOLLOW PROPER SAFETY PROCEDURES FOR MANUAL DRAINS.

REFERENCE DRAWINGS			REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	
-	-	6	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS	9549.02	09-06-03	DP	-	-	
-	-	8	ISSUED FOR REVIEW	9549.00	05-03-11	KL	KAB	AdP	
-	-	0	ISSUED FOR CONSTRUCTION	9549.00	05-04-20	KL	KAB	AdP	
-	-	1	AS-BUILT	9549.00	05-08-26	NI	-	-	
-	-	2A	K-500 ADDITION, ISSUED FOR REVIEW	9549.01	05-09-02	JB	-	-	
-	-	3	K-500 ADDITION, RE-ISSUED FOR CONSTRUCTION	9549.01	05-09-16	JB	KAB	RW	
-	-	4	K-600 ADDITION, ISSUED FOR APPROVAL	9549.02	08-11-28	DP	-	-	
-	-	5	K-600 ADDITION, ISSUED FOR CONSTRUCTION	9549.02	08-12-09	CR	KK	DK	

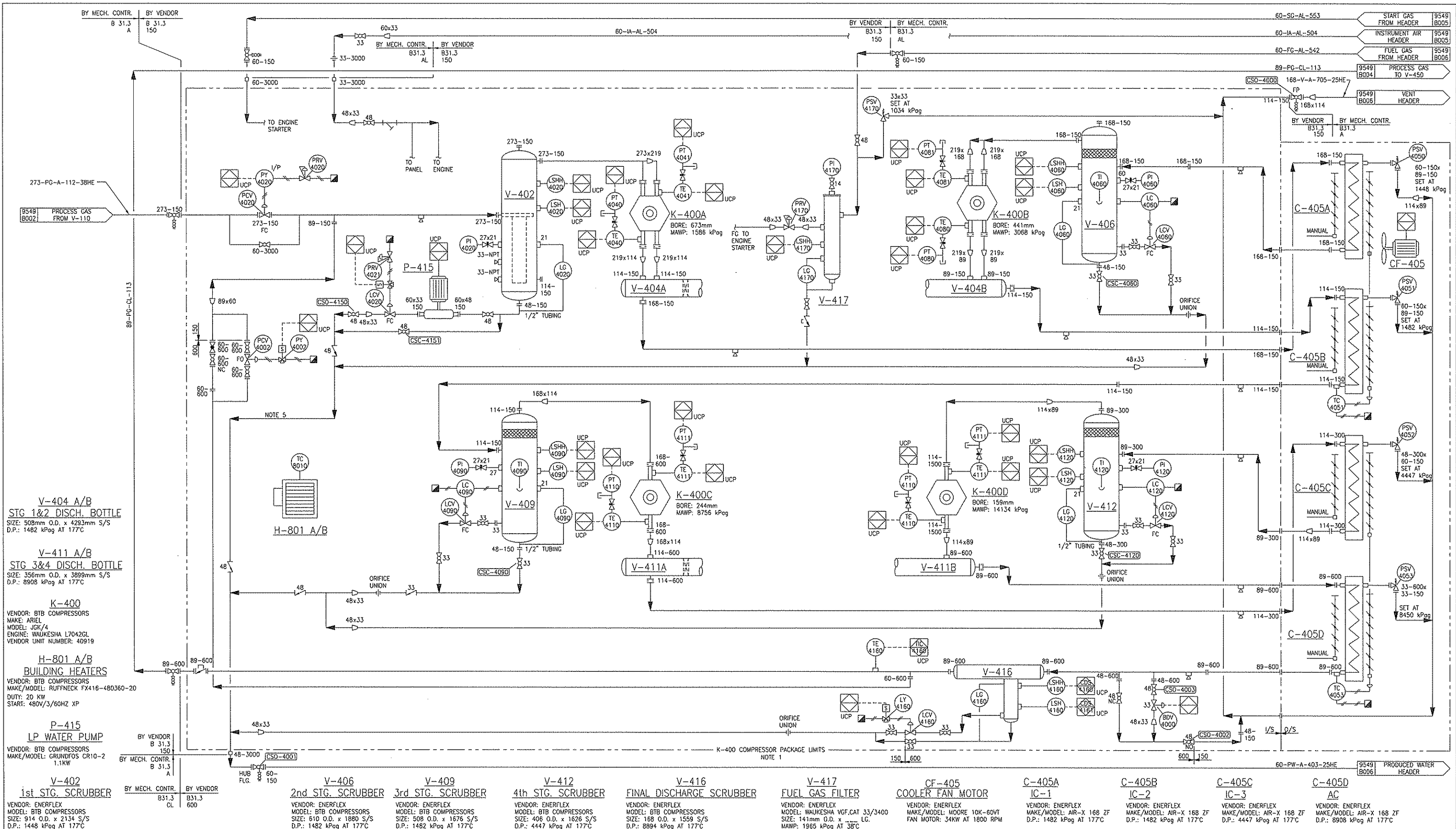
ENGINEERING STAMP

GRB
ENGINEERING

QUICKSILVER

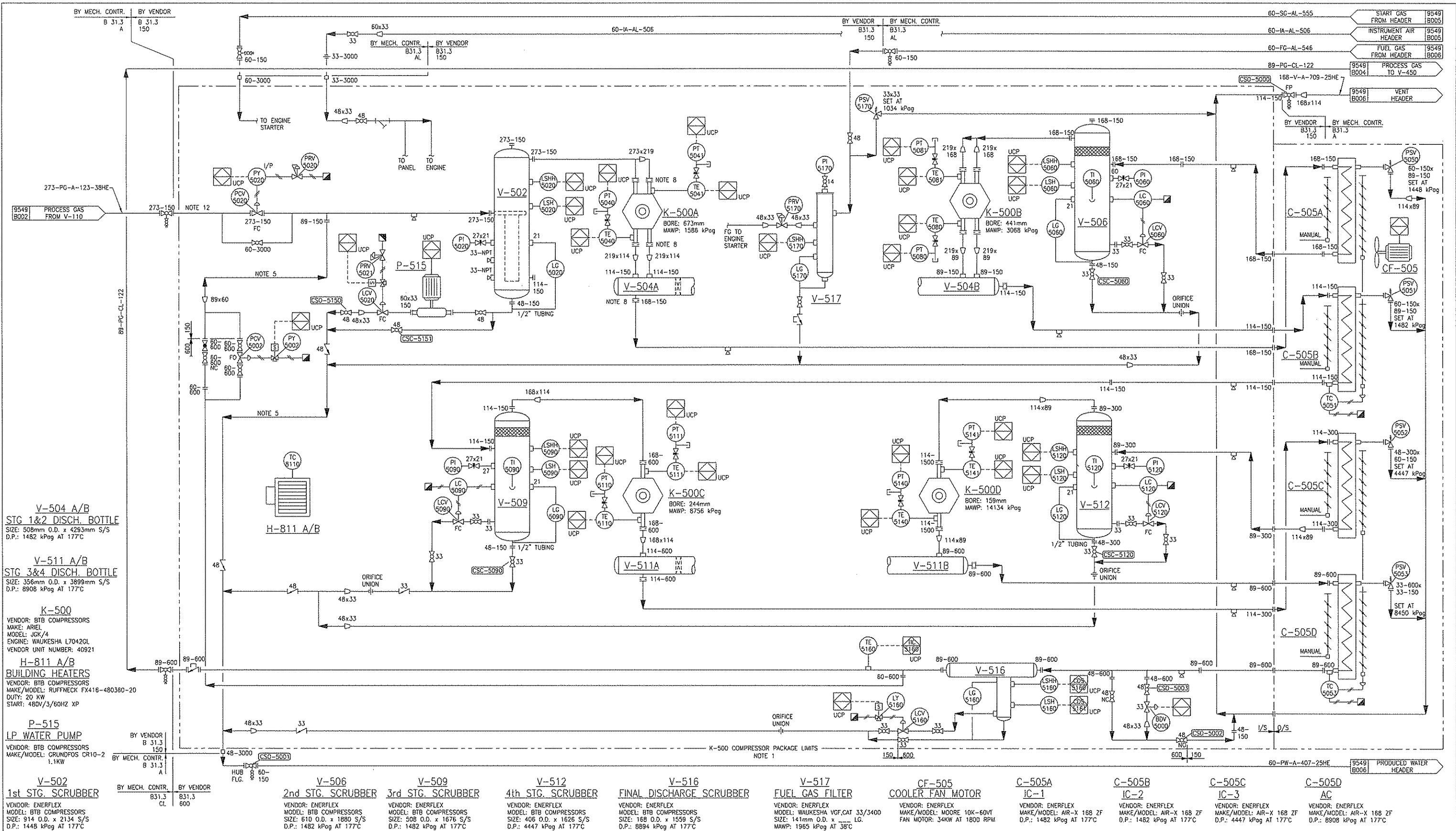
TWINING COMPRESSOR STATION
LSD 09-33-032-24 W4M
V-110 INLET SEPARATOR P&ID

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	NTS	B-9549-B-002	6



NOTES:		REFERENCE DRAWINGS		REVISIONS					ENGINEERING STAMP	
1.	SEE VENDOR P&ID'S AND BOM FOR COMPLETE PACKAGE DESCRIPTION.	DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
2.	PRESSURE INSTRUMENTS ARE EQUIPPED WITH ISOLATION VALVES.			6	ISSUED FOR CONSTRUCTION	9549.02	08-12-09	CR	KK	DK
3.	PSV'S ARE SIZED BY VENDOR. SEE PSV LIST FOR DETAILS.			7	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS	9549.02	09-06-03	DP	-	-
4.	CURRENT DEVELOPMENT INVOLVES THREE COMPRESSOR PACKAGES, CAPACITY EACH AT 141.6x10 ³ m ³ /d (5 MMSCFD).			0	ISSUED FOR CONSTRUCTION	9549.00	05-04-20	KL	KAB	RGW
5.	DO NOT OPERATE DRAIN LINES ABOVE 1482 kPag REGARDLESS OF SPEC BREAKS.			1	RE-ISSUED FOR CONSTRUCTION	9549.00	05-05-04	KL	KAB	RGW
6.	DELETED.			2	AS-BUILT	9549.00	05-08-26	NI	-	-
7.	UCP - UNIT CONTROL PANEL.			3A	K-500 ADDITION, ISSUED FOR REVIEW	9549.01	05-09-02	JB	-	-
8.	FIELD OPERATION TO CONFIRM SET POINT ON PSV 4053 IS SET TO 8450 kPag.			4	K-500 ADDITION, RE-ISSUED FOR CONSTRUCTION	9549.01	05-09-16	JB	KAB	RGW
				5	K-600 ADDITION, ISSUED FOR APPROVAL	9549.02	08-11-28	DP	-	-

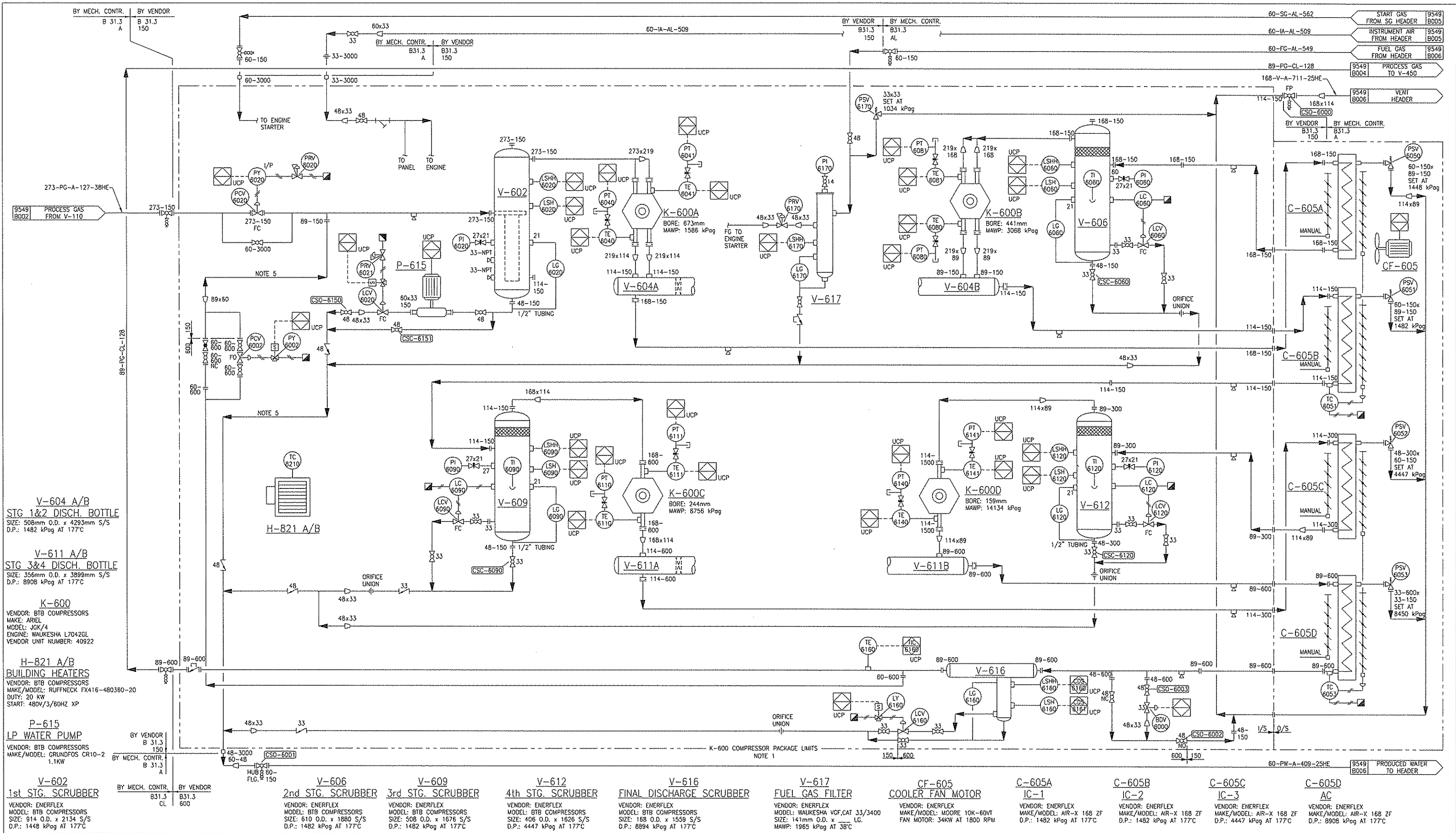
TWINING COMPRESSOR STATION LSD 09-33-032-24 W4M K-400 COMPRESSOR P&ID			
PROJECT NO. 9549.02	SCALE: NTS	DWG. NO. B-9549-B-003	REV. 7



- NOTES:
- SEE VENDOR P&ID'S AND BOM FOR COMPLETE PACKAGE DESCRIPTION.
 - PRESSURE INSTRUMENTS ARE EQUIPPED WITH ISOLATION VALVES.
 - PSV'S ARE SIZED BY VENDOR. SEE PSV LIST FOR DETAILS.
 - DELETED.
 - DO NOT OPERATE DRAIN LINES ABOVE 1482 kPag REGARDLESS OF SPEC BREAKS.
 - DELETED.
 - UCP - UNIT CONTROL PANEL.
 - RESTRICTION ORIFICE DETAIL AS PER ENERFLEX DETAIL DRAWINGS.
 - IC1 & IC2 CONTROLLED BY STAGE 2 DISCHARGE.
 - IC3 & 4C CONTROLLED BY STAGE 4 DISCHARGE.
 - ENGINEERING STAMP APPLIES TO OFFSKID AND CLOUDED MODIFICATIONS ONLY.
 - REMOVABLE SPOOL PIECE W/LIFTING LUG.
 - FIELD OPERATION TO CONFIRM SET POINT ON PSV 5053 IS SET TO 8450 kPag.

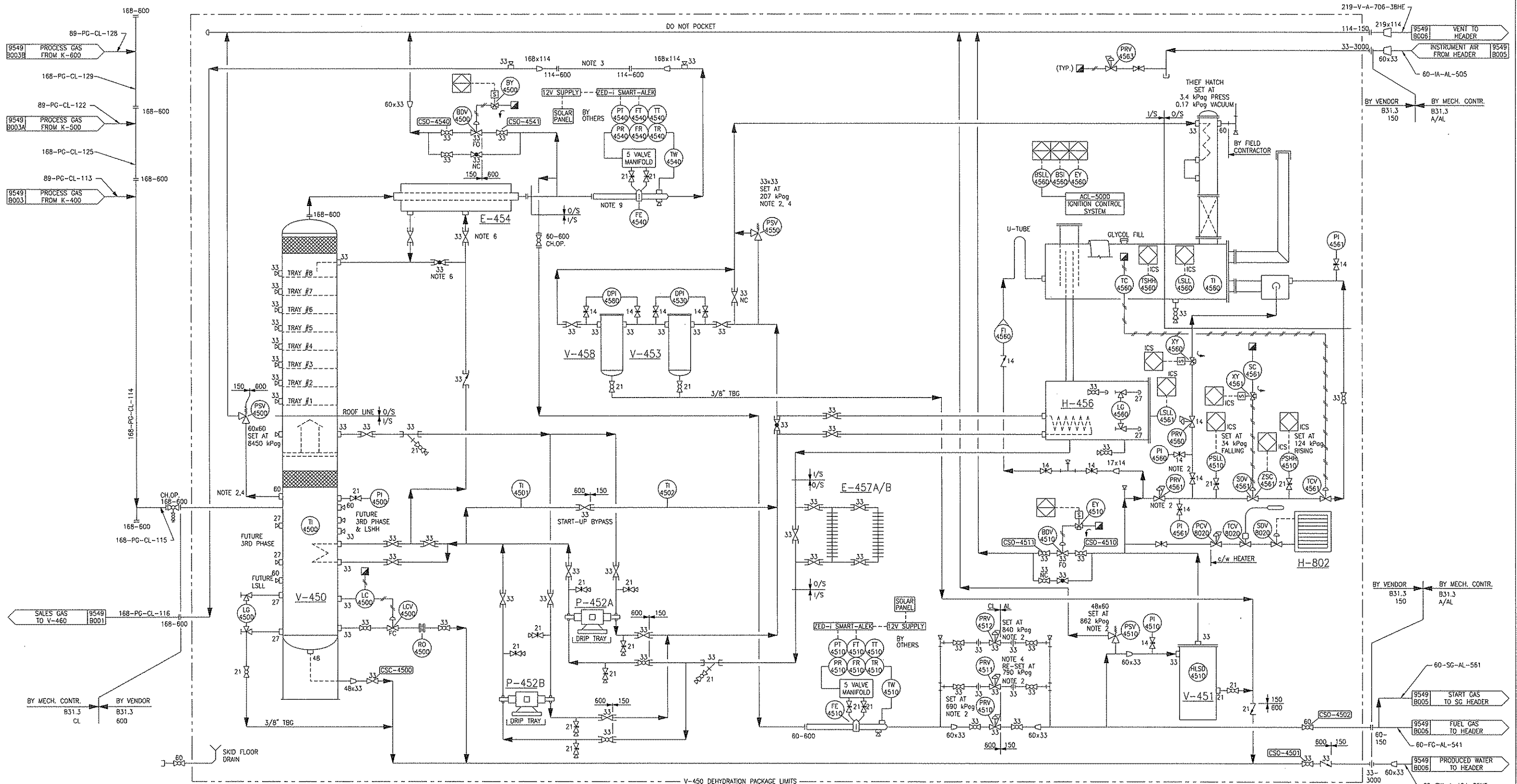
REFERENCE DRAWINGS		REVISIONS				
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY
-	-	A	K-500 ADDITION, ISSUED FOR REVIEW	9549.01	05-09-04	JB
-	-	0	K-500 ADDITION, ISSUED FOR CONSTRUCTION	9549.01	05-09-16	JB
-	-	1	K-600 ADDITION, ISSUED FOR APPROVAL	9549.02	08-11-28	DP
-	-	2	K-600 ADDITION, ISSUED FOR CONSTRUCTION	9549.02	08-12-09	CR
-	-	3	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS	9549.02	09-06-03	DP
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-
-	-	-	-	-	-	-

ENGINEERING STAMP		 GRB ENGINEERING		 QUICKSILVER	
		TWINING COMPRESSOR STATION LSD 09-33-032-24 W4M K-500 COMPRESSOR ADDITION P&ID			
PROJECT NO.	SCALE:	DWG. NO.	REV.		
9549.02	NTS	B-9549-B-003A	3		



NOTES: 1. SEE VENDOR P&ID'S AND BOM FOR COMPLETE PACKAGE DESCRIPTION. 2. PRESSURE INSTRUMENTS ARE EQUIPPED WITH ISOLATION VALVES. 3. PSV'S ARE SIZED BY VENDOR. SEE PSV LIST FOR DETAILS. 4. DO NOT OPERATE DRAIN LINES ABOVE 1482 kPag REGARDLESS OF SPEC BREAKS. 5. UCP = UNIT CONTROL PANEL. 6. IC1 & IC2 CONTROLLED BY STAGE 2 DISCHARGE. 7. IC3 & 4C CONTROLLED BY STAGE 4 DISCHARGE. 8. ENGINEERING STAMP APPLIES TO OFFSKID AND CLOUDED MODIFICATIONS ONLY. 9. CLOUDED MODIFICATIONS TO BE COMPLETED BY ENERFLEX.	REFERENCE DRAWINGS		REVISIONS							ENGINEERING STAMP		GRB ENGINEERING	 QUICKSILVER ***** TWINING COMPRESSOR STATION LSD 09-33-032-24 W4M K-600 COMPRESSOR ADDITION P&ID
	DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.				
	-	-	A	K-600 ADDITION, ISSUED FOR APPROVAL	9549.02	08-11-28	DP	-	-				
	-	-	O	K-600 ADDITION, ISSUED FOR CONSTRUCTION	9549.02	08-12-09	CR	KK	DK				
	-	-	1	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS	9549.02	09-06-03	DP	-	-				
	-	-	-	-	-	-	-	-	-				
	-	-	-	-	-	-	-	-	-				
	-	-	-	-	-	-	-	-	-				
	-	-	-	-	-	-	-	-	-				
	-	-	-	-	-	-	-	-	-				

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	NTS	B-9549-B-003B	1



V-450
GLYCOL CONTACTOR
VENDOR: OPSCO
SIZE: 914mm O.D. x 7925mm S/S
D.P.: 9894 kPag AT 54°C
C.A.: 1.6mm

E-454
GAS/GLYCOL EXCHANGER
SIZE: 168mm x 219mm PIPE IN PIPE
D.P.: 9928 kPag AT 54°C
C.A.: 1.6mm

P-452A/B
GLYCOL PUMPS
MAKE/MODEL: KIMRAY 21015 PV

E-457A/B
AIR/GLYCOL EXCHANGERS
SIZE: 25 x 3048 EACH

V-453
GLYCOL FILTER
MAKE/MODEL: CUNO 1B2
(c/w ELEMENT
JWACS-6)

V-458
GLYCOL FILTER
MAKE/MODEL: CUNO 1B2
CHARCOAL FILTRATION
(ELEMENT JWACS-6)

H-456
GLYCOL REGEN.
SIZE: 914mm O.D. x 4267mm S/S
DUTY: 750000 BTU/HR

V-451
FUEL GAS SCRUBBER
MAKE/MODEL: OPSCO SM1239
SIZE: 324mm O.D. x 981mm LG
D.P.: 1034 kPag AT 66°C
C.A.: 1.6mm

H-802
BUILDING HEATER
MAKE: CATADYNE
DUTY: 24000 BTU/HR
START: 120 VAC

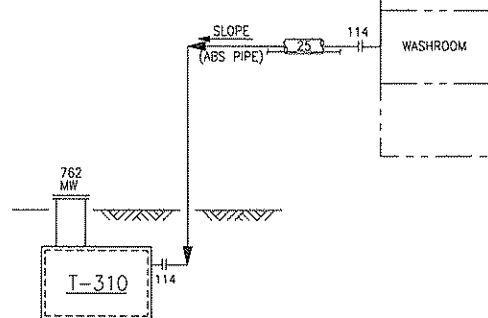
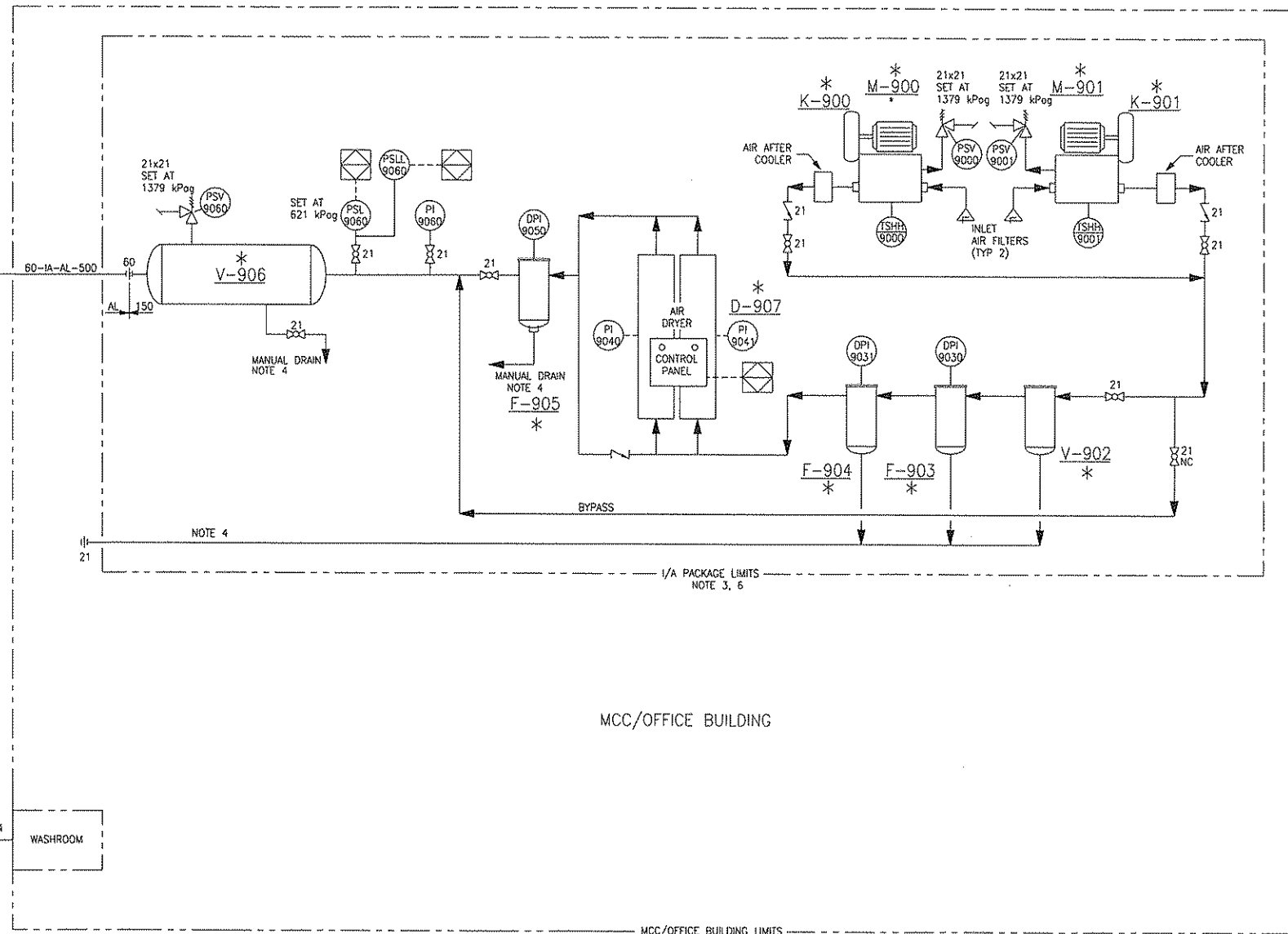
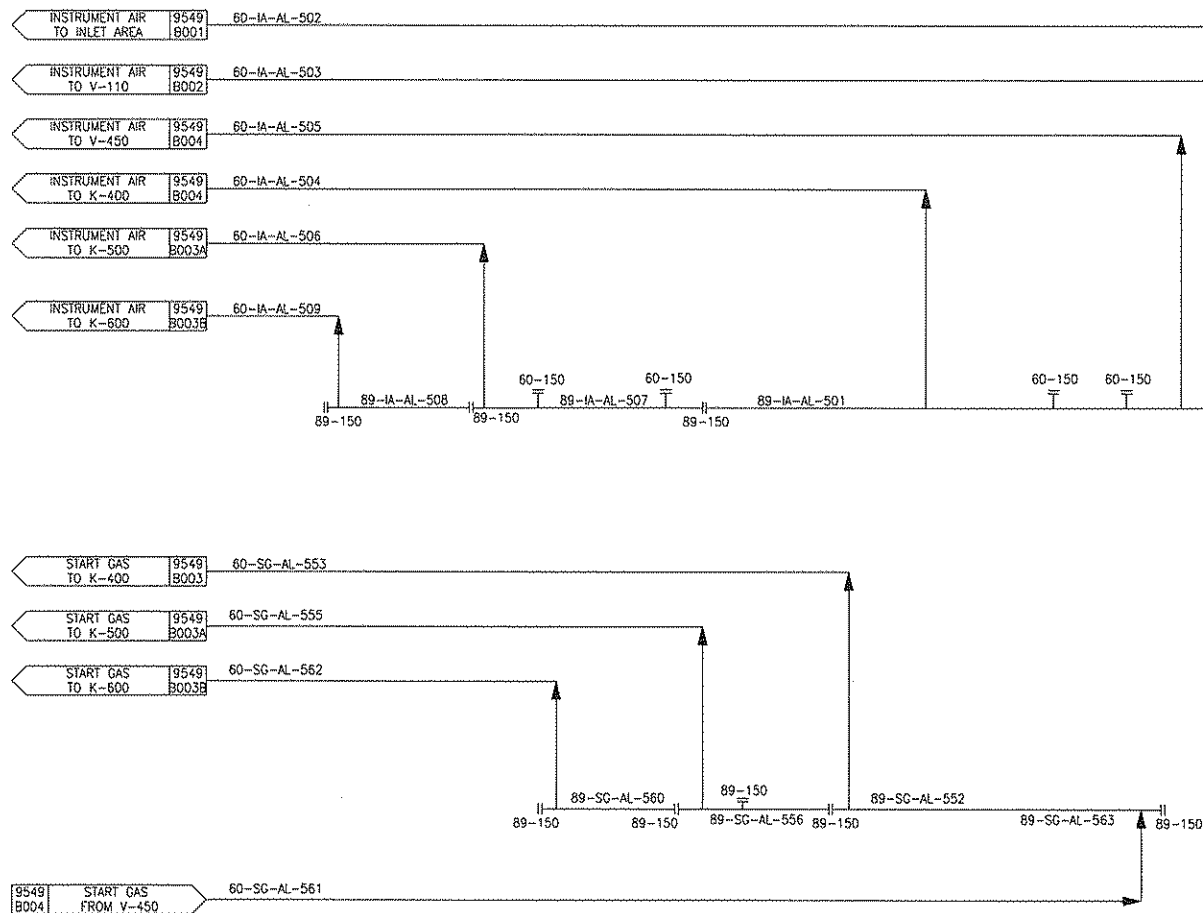
- NOTES:
- CONTRACTOR TO SUPPLY/INSTALL HIGH POINT VENTS & LOW POINT DRAINS ON YARD PIPING AS REQUIRED.
 - SET POINTS FOR ALL PRV'S, PSV'S AND TH ARE SPECIFIED BY VENDOR EXCEPT FOR PRV-4510, PRV-4511 AND PSV-4510.
 - SPOOLING FOR FUTURE BACK PRESSURE VALVE STATION AND PRESSURE CONTROLLER.
 - PSV'S ARE SIZED BY VENDOR. SEE PSV LIST FOR DETAILS.
 - VENDOR TO SIZE ALL EQUIPMENT AND PIPING UNLESS SPECIFIED IN THE DEHYDRATOR PACKAGE BID DOCUMENT.
 - E-454 BLOCK VALVE AND BYPASS TO BE ACCESSIBLE FROM FLOOR.
 - SEE VENDOR P&ID'S AND BOM FOR COMPLETE PACKAGE DESCRIPTION.
 - ICS - IGNITION CONTROL SYSTEM.
 - METER RUN PER AC-A2000

REFERENCE DRAWINGS		REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
6		6	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS	9549.02	09-06-03	DP	-	-
B		B	ISSUED FOR REVIEW	9549.00	05-03-11	KL	KAB	AdP
0		0	ISSUED FOR CONSTRUCTION	9549.00	05-04-20	KL	KAB	AdP
1		1	AS-BUILT	9549.00	05-08-26	NI	-	-
2A		2A	K-500 ADDITION, ISSUED FOR REVIEW	9549.01	05-09-04	JB	-	-
3		3	K-500 ADDITION, RE-ISSUED FOR CONSTRUCTION	9549.01	05-09-16	JB	KAB	RW
4		4	K-600 ADDITION, ISSUED FOR APPROVAL	9549.02	08-11-28	DP	-	-
5		5	K-600 ADDITION, ISSUED FOR CONSTRUCTION	9549.02	08-12-09	CR	KK	DK

ENGINEERING STAMP

TWINING COMPRESSOR STATION
LSD 09-33-032-24 W4M
V-450 DEHYDRATION P&ID

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	NTS	B-9549-B-004	6

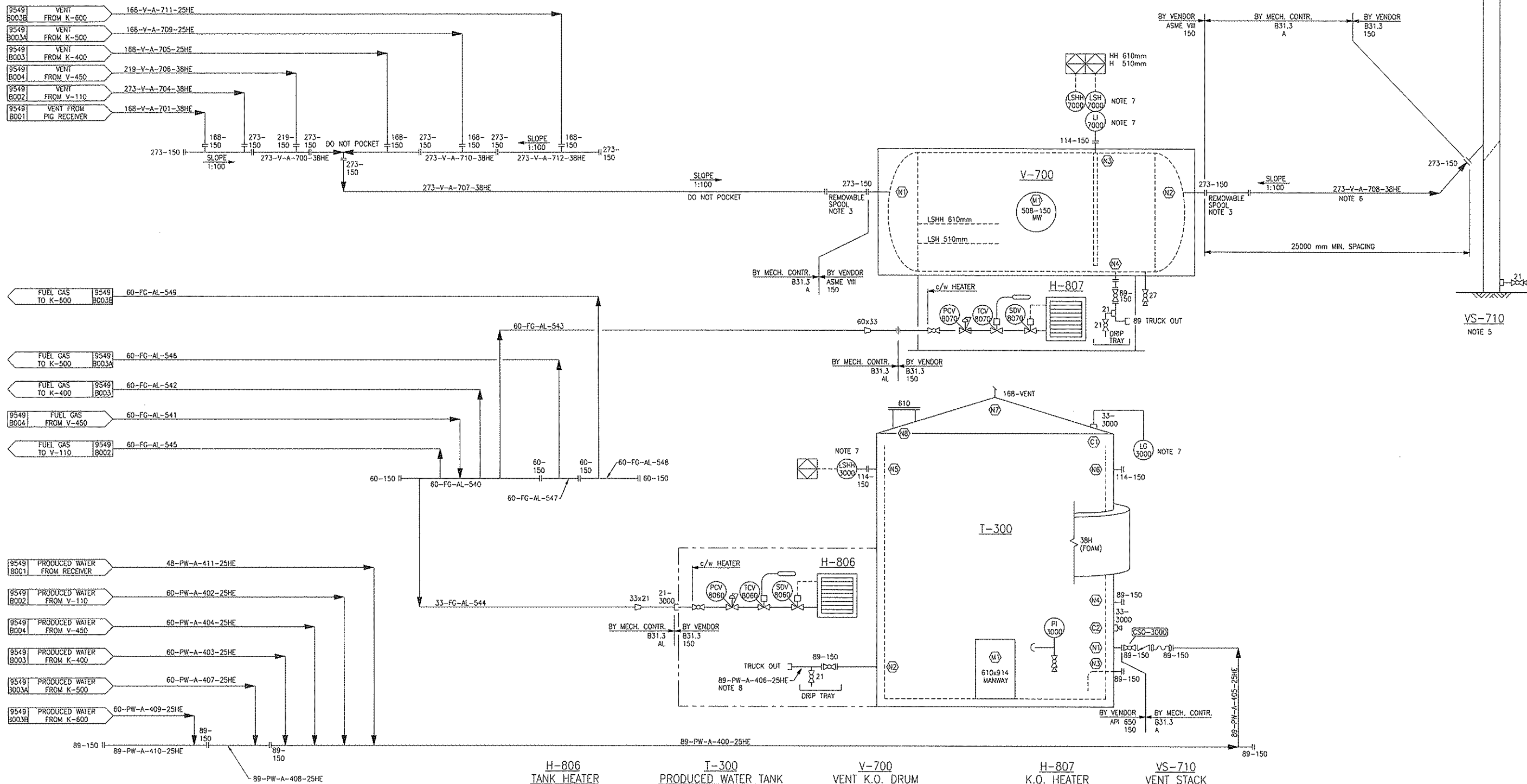


T-310 SEPTIC TANK VENDOR: BURCO CAP: 1000 GAL SIZE: 1889mm H x 2520mm L x1728mm W	K-900 INSTRUMENT AIR COMPRESSOR VENDOR: CHAMCO INDUSTRIES MAKE/MODEL: SULLAIR ES6-10XH AC/AC SCREW CAP.: 30 ACFM AT 1207 kPag	K-901 INSTRUMENT AIR COMPRESSOR VENDOR: CHAMCO INDUSTRIES MAKE/MODEL: SULLAIR ES6-10XH AC/AC SCREW CAP.: 30 ACFM AT 1207 kPag	M-900 COMPRESSOR MOTOR VENDOR: CHAMCO INDUSTRIES MAKE/MODEL: DUTY: 7.5 KW 1800 RPM 460/3/60	M-901 COMPRESSOR MOTOR VENDOR: CHAMCO INDUSTRIES MAKE/MODEL: DUTY: 7.5 KW 1800 RPM 460/3/60	V-902 WATER SEPARATOR VENDOR: CHAMCO INDUSTRIES MAKE/MODEL: SULLAIR MPF65N MAWP: 1600 kPag	F-903 1st STG PRE FILTER VENDOR: CHAMCO INDUSTRIES MAKE/MODEL: SULLAIR MPH65N CAP.: 64 SCFM AT 689 kPag MAWP: 1600 kPag	F-904 2nd STG PRE FILTER VENDOR: CHAMCO INDUSTRIES MAKE/MODEL: SULLAIR MPH65N CAP.: 64 SCFM AT 689 kPag MAWP: 1600 kPag	F-905 AFTER FILTER VENDOR: CHAMCO INDUSTRIES MAKE/MODEL: SULLAIR MPR-65N CAP.: 64 SCFM AT 689 kPag MAWP: 1600 kPag	V-906 DRY AIR RECEIVER VENDOR: CHAMCO INDUSTRIES MAKE/MODEL: STEEL FAB A10034 SIZE: 610mm O.D. x 1753mm S/S CAP.: 42 SCFM AT 689 kPag MAWP: 1379 kPag AT 232°C CAP.: 120 GAL (454 LITERS)	D-907 HEATLESS AIR DRYER VENDOR: CHAMCO INDUSTRIES MAKE/MODEL: SULLAIR SM42 CAP.: 42 SCFM AT 689 kPag -40°C DEWPOINT MAWP: 1600 kPag
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- NOTES:
- CONTRACTOR TO SUPPLY/INSTALL HIGH POINT VENTS & LOW POINT DRAINS AS REQUIRED.
 - ALL VALVES ARE REDUCED PORT UNLESS NOTED OTHERWISE.
 - SEE VENDOR P&ID AND BOM FOR COMPLETE PACKAGE DESCRIPTION AND DESIGN.
 - LIQUID DUMPS FROM DRYER SYSTEM TO BE COLLECTED BY INDOOR CONTAINER FOR PROPER DISPOSAL. DO NOT MIX WITH GROUND WATER.
 - PSVS ARE SIZED BY EQUIPMENT VENDOR.
 - MECH. CONTR. TO INSTALL AND CONNECT ALL EQUIPMENT, * INDICATES SUPPLIED BY EQUIPMENT VENDOR.

REFERENCE DRAWINGS			REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	
-	-	6	K-600 ADDITION, ISSUED FOR APPROVAL	9549.02	08-11-28	DP	-	-	
-	-	7	K-600 ADDITION, ISSUED FOR CONSTRUCTION	9549.02	08-12-16	DP	KK	DK	
-	-	8	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS	9549.02	09-06-03	DP	-	-	
-	-	1	RE-ISSUED FOR CONSTRUCTION	9549.00	05-05-04	KL	KAB	RGW	
-	-	2	AS-BUILT	9549.00	05-08-26	NI	-	-	
-	-	3A	K-500 ADDITION, ISSUED FOR REVIEW	9549.01	05-09-04	JB	-	-	
-	-	4	K-500 ADDITION, RE-ISSUED FOR CONSTRUCTION	9549.01	05-09-16	JB	KAB	RGW	
-	-	5	K-600 ADDITION, ISSUED FOR DEMOLITION	9549.02	08-11-27	RC	-	-	

ENGINEERING STAMP				PROJECT NO.				SCALE:				DWG. NO.				REV.			
GRB ENGINEERING				9549.02				NTS				B-9549-B-005				8			
QUICKSILVER				TWINING COMPRESSOR STATION				LSD 09-33-032-24 W4M				MCC/OFFICE P&ID							



H-806
TANK HEATER

VENDOR: BILTON
MAKE/MODEL: CATADYNE
SIZE: 12x24
START: 120V AC

T-300
PRODUCED WATER TANK

VENDOR: BILTON
DESIGN SPEC.: TO EUB G55
SIZE: 3607mm O.D. x 6096mm H
CAP: 63.6 m³ (400 BBL)
D.P.: 3.4 kPag PRESS/ 0.17 kPag VAC.
(8 oz. PRESS/0.4 oz. VAC.)
INT. COATING: DEVCO 253

V-700
VENT K.O. DRUM

VENDOR: BILTON
CAPACITY: 60 BBL A/C DOUBLE WALL TANK
SIZE: 1829mm Ø x 3048mm S/S
D.P.: NON-CODE

H-807
K.O. HEATER

VENDOR: BILTON
MAKE/MODEL: CATADYNE
SIZE: 12x24
START: 120 VAC

VS-710
VENT STACK

VENDOR: MACTRONIC
SIZE: 273mm x 12192mm
TYPE: FREESTANDING

NOTES:

- CONTRACTOR TO SUPPLY/INSTALL ALL HIGH POINT VENTS & LOW POINT DRAINS AS REQUIRED.
- ALL VALVES ARE REDUCED PORT UNLESS NOTED OTHERWISE.
- TO BE REMOVED BEFORE ENTERING V-700 FOR INSPECTION/REPAIRS.
- DELETED.
- VENT STACK DESIGN MEETS ACUB GUIDE 60 (1999 EDITION AND 2001 UPDATES) BUT NOT API 521 4.3.4.3 (1997 EDITION). RADIANT HEAT MAY EXCEED 3000 BTU/HR FT² WITHIN THE 25m CIRCLE IN THE HIGHLY UNLIKELY EVENT OF A FLAME ON THE VENT STACK TIP. OPERATING PROCEDURES TO ENFORCE THE USE OF PROPER PROTECTIVE EQUIPMENT BEFORE ENTERING THE CIRCLE.
- LINE NO. 273-V-A-708 IS DESIGNED TO ASME CODE FOR QA/QC PURPOSES. IT IS NOT INTENDED TO BE PRESSURE PIPING.
- SUPPLIED BY EQUIPMENT VENDOR.
- TEST PRESSURE IS ATMOSPHERIC.

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION
6	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS
8	ISSUED FOR REVIEW
0	ISSUED FOR CONSTRUCTION
1	AS-BUILT
2A	K-500 ADDITION, ISSUED FOR REVIEW
3	K-500 ADDITION, RE-ISSUED FOR CONSTRUCTION
4	K-600 ADDITION, ISSUED FOR APPROVAL
5	K-600 ADDITION, ISSUED FOR CONSTRUCTION

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
6	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS	9549.02	09-06-03	DP	-	-
8	ISSUED FOR REVIEW	9549.00	05-03-11	KL	KAB	AdP
0	ISSUED FOR CONSTRUCTION	9549.00	05-04-20	KL	KAB	AdP
1	AS-BUILT	9549.00	05-08-26	NI	-	-
2A	K-500 ADDITION, ISSUED FOR REVIEW	9549.01	05-09-04	JB	-	-
3	K-500 ADDITION, RE-ISSUED FOR CONSTRUCTION	9549.01	05-09-16	JB	KAB	RW
4	K-600 ADDITION, ISSUED FOR APPROVAL	9549.02	08-11-28	DP	-	-
5	K-600 ADDITION, ISSUED FOR CONSTRUCTION	9549.02	08-12-09	CR	KK	DK

ENGINEERING STAMP

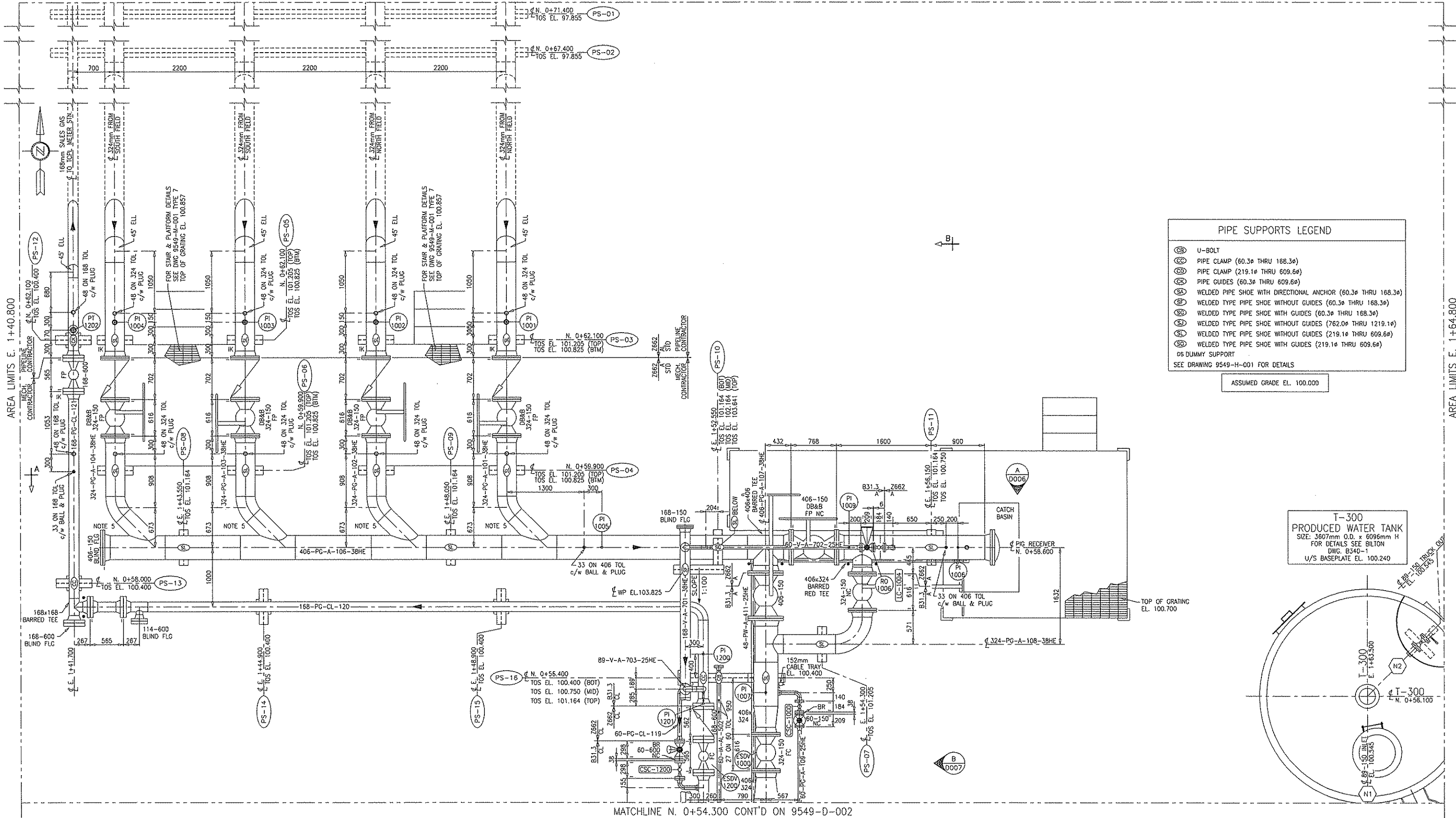
GRB
ENGINEERING

QUICKSILVER

TWINING COMPRESSOR STATION
LSD 09-33-032-24 W4M
PW TANK/VENT P&ID

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	NTS	B-9549-B-006	6

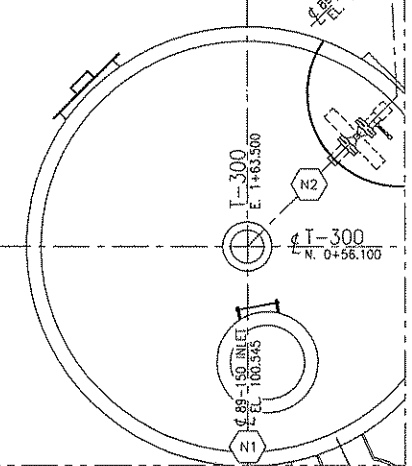
AREA LIMITS N. 0+71.600



PIPE SUPPORTS LEGEND	
U-BOLT	U-BOLT
PIPE CLAMP (60.3# THRU 168.3#)	PIPE CLAMP (60.3# THRU 168.3#)
PIPE CLAMP (219.1# THRU 609.6#)	PIPE CLAMP (219.1# THRU 609.6#)
PIPE GUIDES (60.3# THRU 609.6#)	PIPE GUIDES (60.3# THRU 609.6#)
WELDED PIPE SHOE WITH DIRECTIONAL ANCHOR (60.3# THRU 168.3#)	WELDED PIPE SHOE WITH DIRECTIONAL ANCHOR (60.3# THRU 168.3#)
WELDED TYPE PIPE SHOE WITHOUT GUIDES (60.3# THRU 168.3#)	WELDED TYPE PIPE SHOE WITHOUT GUIDES (60.3# THRU 168.3#)
WELDED TYPE PIPE SHOE WITH GUIDES (60.3# THRU 168.3#)	WELDED TYPE PIPE SHOE WITH GUIDES (60.3# THRU 168.3#)
WELDED TYPE PIPE SHOE WITHOUT GUIDES (762.0# THRU 1219.1#)	WELDED TYPE PIPE SHOE WITHOUT GUIDES (762.0# THRU 1219.1#)
WELDED TYPE PIPE SHOE WITHOUT GUIDES (219.1# THRU 609.6#)	WELDED TYPE PIPE SHOE WITHOUT GUIDES (219.1# THRU 609.6#)
WELDED TYPE PIPE SHOE WITH GUIDES (219.1# THRU 609.6#)	WELDED TYPE PIPE SHOE WITH GUIDES (219.1# THRU 609.6#)
DUMMY SUPPORT	DUMMY SUPPORT
SEE DRAWING 9549-H-001 FOR DETAILS	

ASSUMED GRADE EL. 100.000

T-300
PRODUCED WATER TANK
SIZE: 3607mm O.D. x 6096mm H
FOR DETAILS SEE BILTON
DWG. B340-1
U/S BASEPLATE EL. 100.240



- NOTES:
1. CONTRACTOR TO SUPPLY ALL HIGH POINT VENTS AND LOW POINT DRAINS.
 2. CONTRACTOR TO CONFIRM ALL DIMENSIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.
 3. ALL BALL VALVES ARE REDUCED PORT VALVES UNLESS NOTED OTHERWISE.
 4. ALL REDUCERS AND SWAGES ARE CONCENTRIC UNLESS NOTED OTHERWISE.
 5. USE Y-LATERALS WITH CRN NUMBERS FOR HEADER CONSTRUCTION.

REFERENCE DRAWINGS		REVISIONS	
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION
A	PRIMARY	1	ISSUED FOR REVIEW
B	ISSUED FOR REVIEW	2	ISSUED FOR CONSTRUCTION
0	ISSUED FOR CONSTRUCTION	3	AS-BUILT
1	AS-BUILT	4	ISSUED FOR CONSTRUCTION, K-600 ADDITION
2	ISSUED FOR CONSTRUCTION, K-600 ADDITION	5	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS
3	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS		

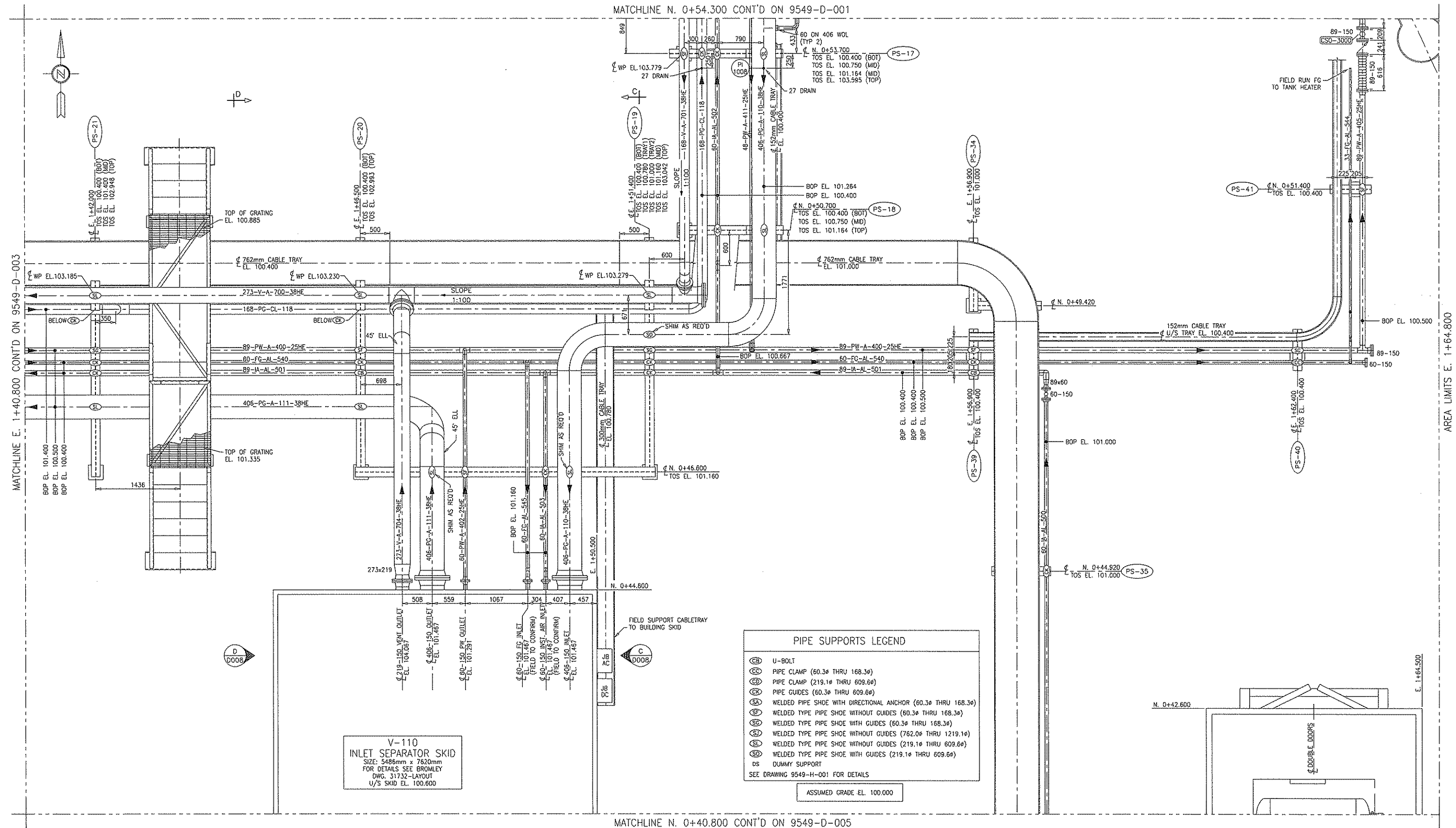
ENGINEERING STAMP

GRB
ENGINEERING

QUICKSILVER

TWINING COMPRESSOR STATION
LSD 09-33-032-24 W4M
INLET/SALES AREA PIPING PLAN

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	1:30	C-9549-D-001	3



NOTES:

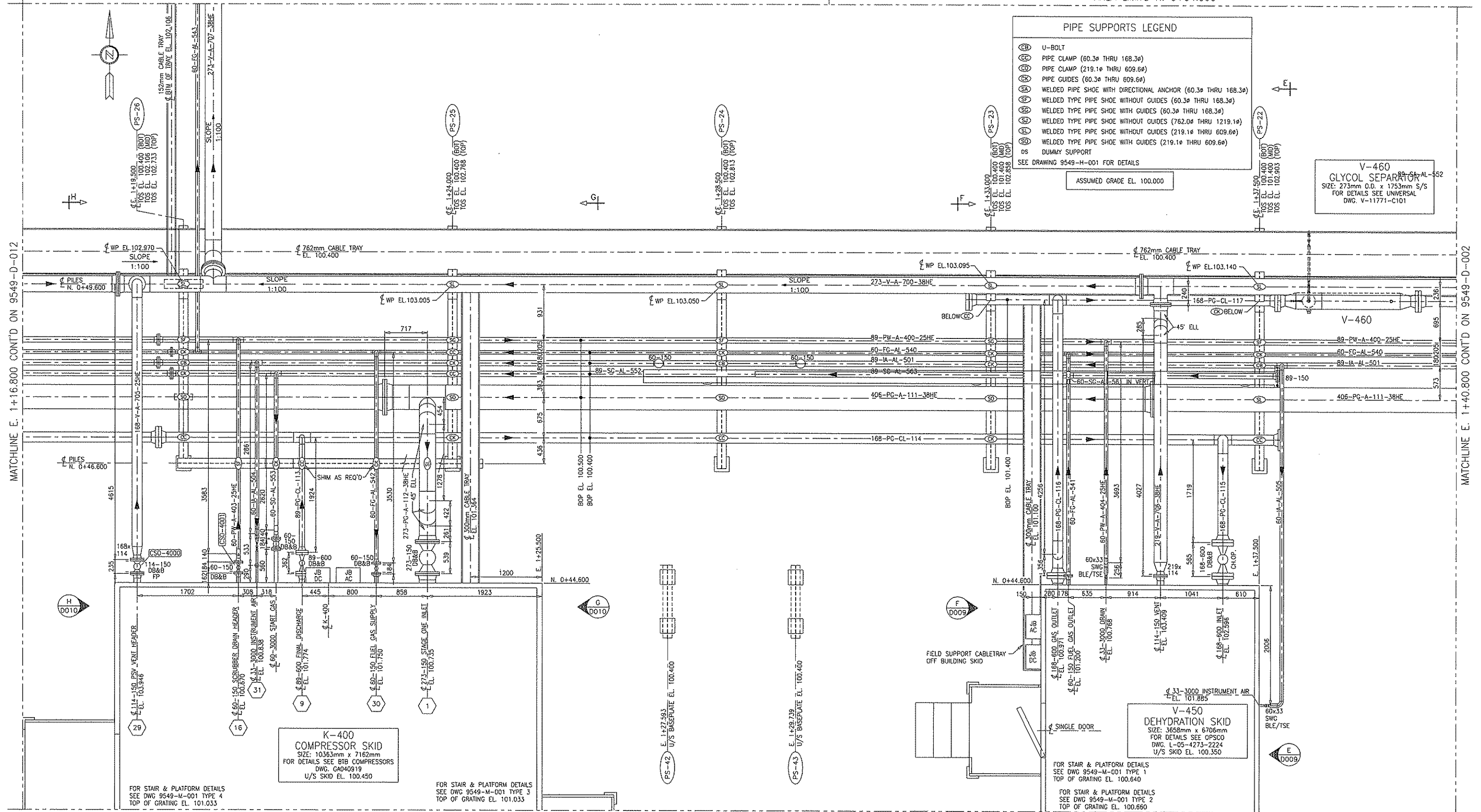
- CONTRACTOR TO SUPPLY ALL HIGH POINT VENTS AND LOW POINT DRAINS.
- CONTRACTOR TO CONFIRM ALL DIMENSIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.
- ALL BALL VALVES ARE REDUCED PORT VALVES UNLESS NOTED OTHERWISE.
- ALL REDUCERS AND SWAGES ARE CONCENTRIC UNLESS NOTED OTHERWISE.

REFERENCE DRAWINGS		REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
		A	PRELIMINARY	9549.00	05-02-05	KL	-	-
		B	ISSUED FOR REVIEW	9549.00	05-03-11	KL	KAB	ADP
		0	ISSUED FOR CONSTRUCTION	9549.00	05-04-20	KL	KAB	RGW
		1	AS-BUILT	9549.00	05-08-25	NI	-	-
		2	ISSUED FOR CONSTRUCTION, K-600 ADDITION	9549.02	09-01-15	DP	KK	DK
		3	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS	9549.02	09-06-03	DP	-	-

ENGINEERING STAMP			
TWINING COMPRESSOR STATION LSO 09-33-032-24 W4M INLET SEPARATOR AREA PIPING PLAN			
PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	1:30	C-9549-D-002	3

MATCHLINE N. 0+54.300 CONT'D ON 9549-D-004

AREA LIMITS N. 0+54.300



NOTES:

- CONTRACTOR TO SUPPLY ALL HIGH POINT VENTS AND LOW POINT DRAINS.
- CONTRACTOR TO CONFIRM ALL DIMENSIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.
- ALL BALL VALVES ARE REDUCED PORT VALVES UNLESS NOTED OTHERWISE.
- ALL REDUCERS AND SWAGES ARE CONCENTRIC UNLESS NOTED OTHERWISE.
- THE START AIR RECEIVER AND PIPING WILL BE INSTALLED IF THE ELECTRIC ENGINE STARTER DOES NOT WORK & WILL NOT BE INSTALLED AT THIS TIME.

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION
9549-D-001	GENERAL LAYOUT
9549-D-002	PIPE SUPPORTS
9549-D-003	PIPE GUIDES
9549-D-004	PIPE CLAMPS
9549-D-005	PIPE SHOES
9549-D-006	PIPE ANCHORS
9549-D-007	PIPE BRACKETS
9549-D-008	PIPE HANGERS
9549-D-009	PIPE CLAMP BRACKETS
9549-D-010	PIPE CLAMP BRACKET BRACKETS
9549-D-011	PIPE CLAMP BRACKET BRACKET BRACKETS
9549-D-012	PIPE CLAMP BRACKET BRACKET BRACKET BRACKETS
9549-D-013	PIPE CLAMP BRACKET BRACKET BRACKET BRACKET BRACKETS
9549-D-014	PIPE CLAMP BRACKET BRACKET BRACKET BRACKET BRACKET BRACKETS
9549-D-015	PIPE CLAMP BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKETS
9549-D-016	PIPE CLAMP BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKETS
9549-D-017	PIPE CLAMP BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKETS
9549-D-018	PIPE CLAMP BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKETS
9549-D-019	PIPE CLAMP BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKETS
9549-D-020	PIPE CLAMP BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKET BRACKETS

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
1	PRELIMINARY	9549.00	05-02-25	KL		
2	ISSUED FOR REVIEW	9549.00	05-03-11	KL	KAB	AdP
3	ISSUED FOR CONSTRUCTION	9549.00	05-04-20	KL	KAB	RGB
4	AS-BUILT	9549.00	05-08-26	NI		
5	RE-ISSUED FOR CONSTRUCTION	9549.01	05-09-16	JB	KAB	RW
6	ISSUED FOR DEMOLITION	9549.02	18-12-09	RC		
7	ISSUED FOR CONSTRUCTION, K-600 ADDITION	9549.02	09-01-15	DP	KK	DK
8	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS	9549.02	09-06-03	DP		

ENGINEERING STAMP

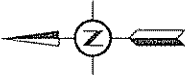
GRB
ENGINEERING

QUICKSILVER

TWINING COMPRESSOR STATION
 LSD 09-33-032-24 W4M
 COMP/DEHY AREA PIPING PLAN

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	1:30	C-9549-D-003	5

AREA LIMITS E. 1+30.300



AREA LIMITS N. 0+93.600

MATCHLINE N. 0+54.300 CONT'D ON 9549-D-003

PIPE SUPPORTS LEGEND

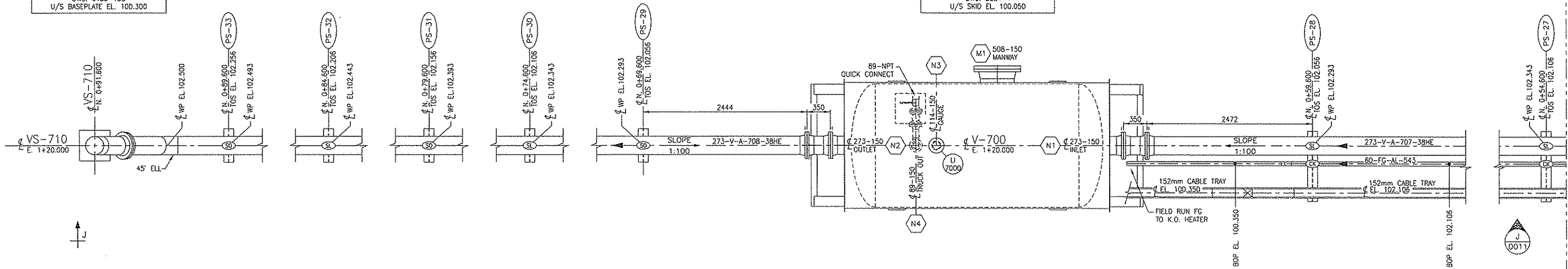
- U-BOLT
- PIPE CLAMP (60.3# THRU 168.3#)
- PIPE CLAMP (219.1# THRU 609.6#)
- PIPE GUIDES (60.3# THRU 609.6#)
- WELDED PIPE SHOE WITH DIRECTIONAL ANCHOR (60.3# THRU 168.3#)
- WELDED TYPE PIPE SHOE WITHOUT GUIDES (60.3# THRU 168.3#)
- WELDED TYPE PIPE SHOE WITH GUIDES (60.3# THRU 168.3#)
- WELDED TYPE PIPE SHOE WITHOUT GUIDES (762.0# THRU 1219.1#)
- WELDED TYPE PIPE SHOE WITHOUT GUIDES (219.1# THRU 609.6#)
- WELDED TYPE PIPE SHOE WITH GUIDES (219.1# THRU 609.6#)
- DUMMY SUPPORT

SEE DRAWING 9549-H-001 FOR DETAILS

ASSUMED GRADE EL. 100.000

VS-710
VENT STACK
SIZE: 273mm O.D. x 1219mm HIGH
FOR DETAILS SEE MACTRONIC
DWG. 6153-VSB
U/S BASEPLATE EL. 100.300

V-700
VENT K.O. DRUM
SIZE: 1829mm I.D. x 3048mm S/S
FOR DETAILS SEE BILTON
DWG. 8321-1
U/S SKID EL. 100.050



AREA LIMITS E. 1+16.800

- NOTES:
- CONTRACTOR TO SUPPLY ALL HIGH POINT VENTS AND LOW POINT DRAINS.
 - CONTRACTOR TO CONFIRM ALL DIMENSIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.
 - ALL BALL VALVES ARE REDUCED PORT VALVES UNLESS NOTED OTHERWISE.
 - ALL REDUCERS AND SWAGES ARE CONCENTRIC UNLESS NOTED OTHERWISE.

REFERENCE DRAWINGS		REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
-	-	A	PRELIMINARY	9549.00	05-02-25	KL	-	-
-	-	B	ISSUED FOR REVIEW	9549.00	05-03-11	KL	KAB	AdP
-	-	C	ISSUED FOR CONSTRUCTION	9549.00	05-04-20	KL	KAB	RGW
-	-	1	AS-BUILT	9549.00	05-08-26	NI	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
-	-	-	-	-	-	-	-	-
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ENGINEERING STAMP

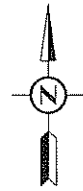
MGV ENERGY INC.
A QUICKSILVER RESOURCES INC. COMPANY

TWINING COMPRESSOR STATION
LSD 09-33-032-24 W4M
VENT K.O./STACK AREA PIPING PLAN

GRB ENGINEERING Ltd.

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.00	1:30	C-9549-D-004	1

MATCHLINE N. 0+40.800 CONT'D ON 9549-D-002



V-110
INLET SEPARATOR SKID
SIZE: 5486mm x 7620mm
FOR DETAILS SEE BROMLEY
DWG. 31732-LAYOUT
U/S SKID EL. 100.600

FOR STAIR & PLATFORM DETAILS
SEE DWG 9549-M-001 TYPE 3
TOP OF GRATING EL. 100.934

DOUBLE DOORS

FOR STAIR & PLATFORM DETAILS
SEE DWG 9549-M-001 TYPE 1
TOP OF GRATING EL. 100.934

SINGLE DOOR

PS-36
N. 0+40.420
TOS EL. 101.000

FIELD RUN 1A
PIPING FROM RECEIVER
AT FLOOR LEVEL.

EL. 100.855
(FIELD TO CONFIRM)

MCC/OFFICE
BUILDING
SIZE: 3658mm x 16459mm
FOR DETAILS SEE C&V PORTABLE
SERIAL NO. SCC25456
U/S SKID EL. 99.770

PS-37
N. 0+36.700
TOS EL. 101.000

PS-38
N. 0+33.000
TOS EL. 101.000

PIPE SUPPORTS LEGEND

- U-BOLT
- PIPE CLAMP (60.3# THRU 168.3#)
- PIPE CLAMP (219.1# THRU 609.6#)
- PIPE GUIDES (60.3# THRU 609.6#)
- WELDED PIPE SHOE WITH DIRECTIONAL ANCHOR (60.3# THRU 168.3#)
- WELDED TYPE PIPE SHOE WITHOUT GUIDES (60.3# THRU 168.3#)
- WELDED TYPE PIPE SHOE WITH GUIDES (60.3# THRU 168.3#)
- WELDED TYPE PIPE SHOE WITHOUT GUIDES (762.0# THRU 1219.1#)
- WELDED TYPE PIPE SHOE WITHOUT GUIDES (219.1# THRU 609.6#)
- WELDED TYPE PIPE SHOE WITH GUIDES (219.1# THRU 609.6#)
- DUMMY SUPPORT

SEE DRAWING 9549-H-001 FOR DETAILS

ASSUMED GRADE EL. 100.000

AREA LIMITS N. 0+27.300

- NOTES:
- CONTRACTOR TO SUPPLY ALL HIGH POINT VENTS AND LOW POINT DRAINS.
 - CONTRACTOR TO CONFIRM ALL DIMENSIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.
 - ALL BALL VALVES ARE REDUCED PORT VALVES UNLESS NOTED OTHERWISE.
 - ALL REDUCERS AND SWAGES ARE CONCENTRIC UNLESS NOTED OTHERWISE.

REFERENCE DRAWINGS			REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	
-	-	A	PRELIMINARY	9549.00	05-02-25	KL	-	-	
-	-	B	ISSUED FOR REVIEW	9549.00	05-03-11	KL	KAB	AdP	
-	-	D	ISSUED FOR CONSTRUCTION	9549.00	05-04-20	KL	KAB	RGW	
-	-	1	AS-BUILT	9549.00	05-08-18	NI	-	-	
-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	
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-	-	-	-	-	-	-	-	-	

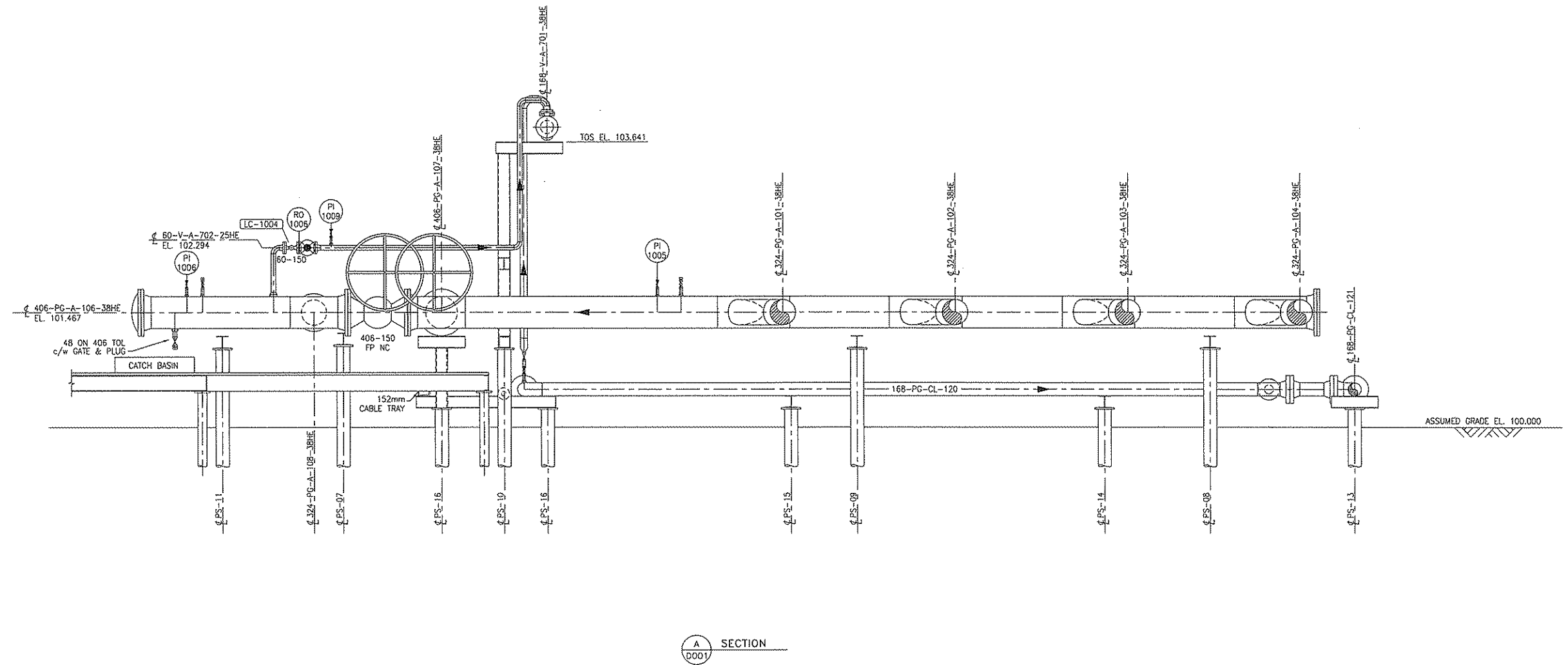
ENGINEERING STAMP

MGV ENERGY INC.
A QUICKSILVER RESOURCES INC. COMPANY

TWINING COMPRESSOR STATION
LSD 09-33-032-24 W4M
MCC/OFFICE AREA PIPING PLAN

GRB ENGINEERING Ltd.

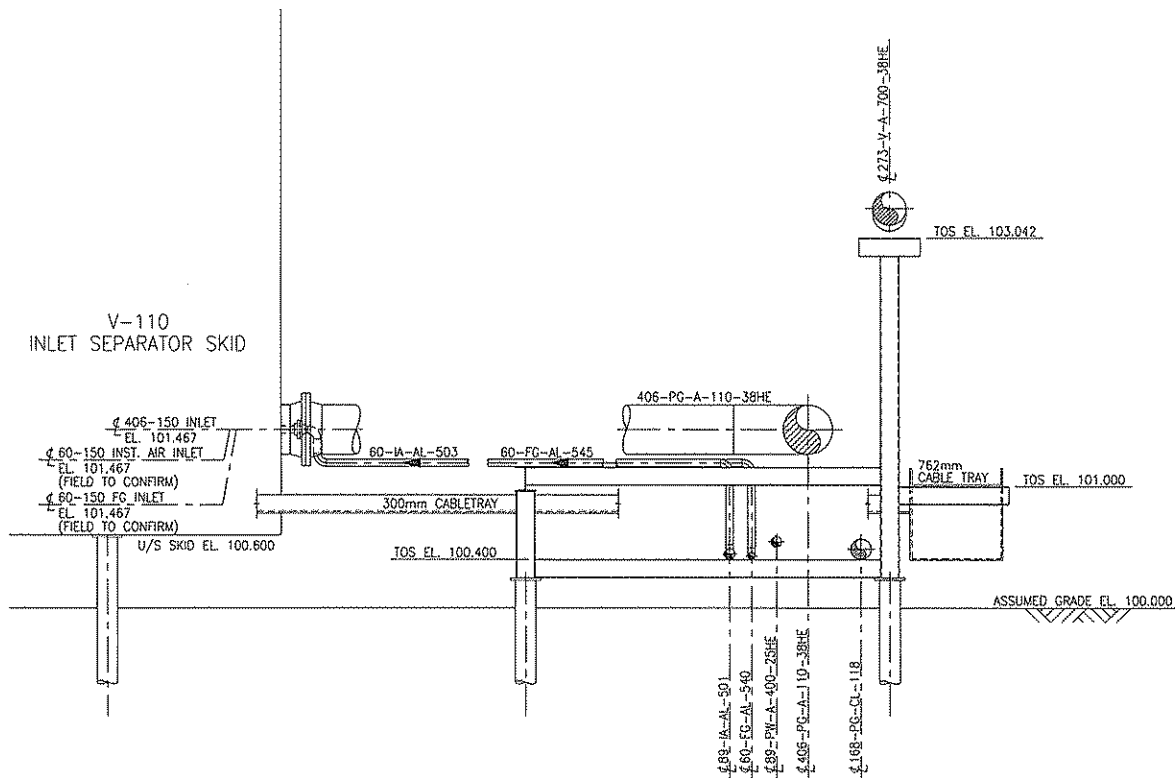
PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.00	1:30	C-9549-D-005	1



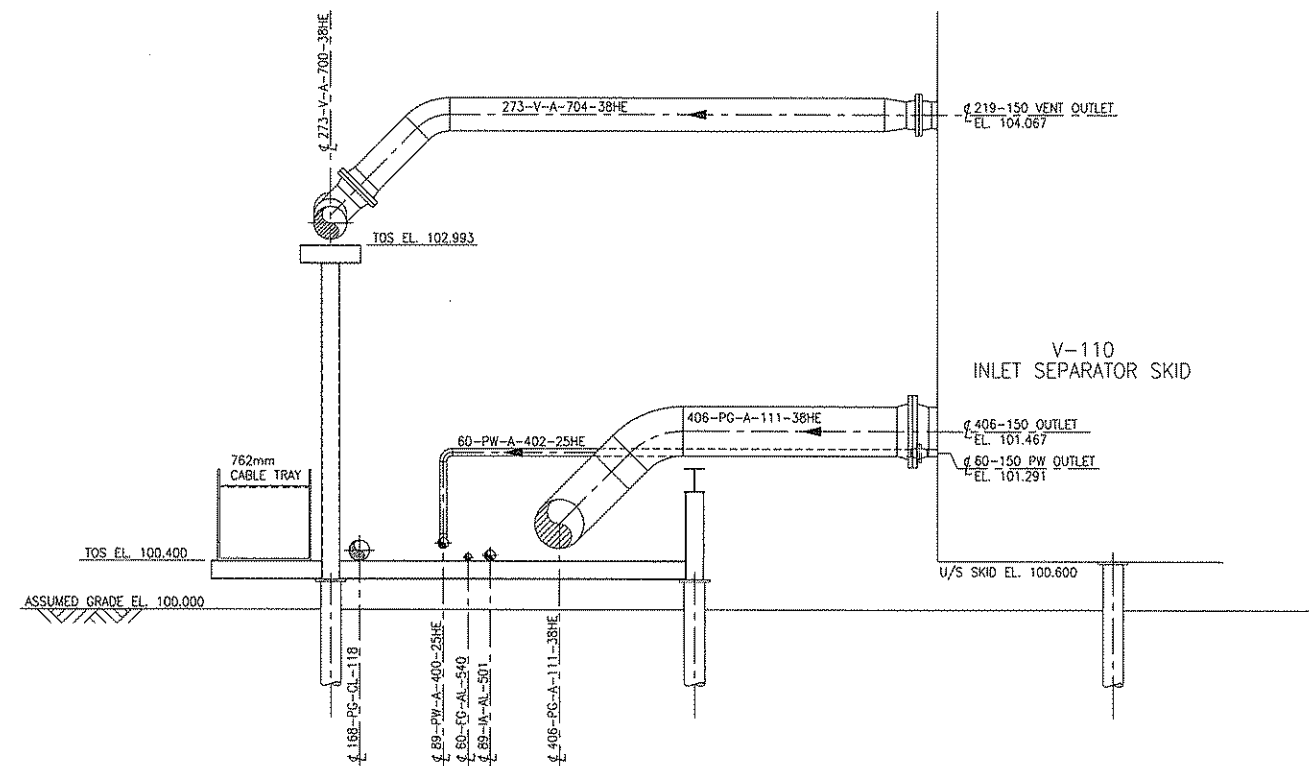
- NOTES:
1. CONTRACTOR TO SUPPLY ALL HIGH POINT VENTS AND LOW POINT DRAINS.
 2. CONTRACTOR TO CONFIRM ALL DIMENSIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.
 3. ALL BALL VALVES ARE REDUCED PORT VALVES UNLESS NOTED OTHERWISE.
 4. ALL REDUCERS AND SWAGES ARE CONCENTRIC UNLESS NOTED OTHERWISE.

REFERENCE DRAWINGS			REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	
9549-D-001	INLET/SALES AREA PIPING PLAN	A	PRELIMINARY	9549.00	05-02-28	KL	-	-	
.	.	B	ISSUED FOR REVIEW	9549.00	05-03-11	KL	KAB	AdP	
.	.	O	ISSUED FOR CONSTRUCTION	9549.00	05-04-20	KL	KAB	RGW	
.	.	1	AS-BUILT	9549.00	05-08-26	NI	-	-	
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ENGINEERING STAMP				MGV ENERGY INC.			
GRB Engineering Ltd.				TWINING COMPRESSOR STATION			
				LSD 09-33-032-24 W4M			
				PIPING SECTIONS			
PROJECT NO.	SCALE:	DWG. NO.	REV.				
9549.00	1:30	C-9549-D-006	1				



C SECTION
D002



D SECTION
D002

- NOTES:
1. CONTRACTOR TO SUPPLY ALL HIGH POINT VENTS AND LOW POINT DRAINS.
 2. CONTRACTOR TO CONFIRM ALL DIMENSIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.
 3. ALL BALL VALVES ARE REDUCED PORT VALVES UNLESS NOTED OTHERWISE.
 4. ALL REDUCERS AND SWAGES ARE CONCENTRIC UNLESS NOTED OTHERWISE.

REFERENCE DRAWINGS			REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	
9549-D-002	INLET SEPARATOR AREA PIPING PLAN	A	PRELIMINARY	9549.00	05-02-28	KL	-	-	
-	-	B	ISSUED FOR REVIEW	9549.00	05-03-11	KL	KAB	AdP	
-	-	O	ISSUED FOR CONSTRUCTION	9549.00	05-04-20	KL	KAB	RGW	
-	-	1	AS-BUILT	9549.00	05-08-26	NI	-	-	
-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	
-	-	-	-	-	-	-	-	-	
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-	-	-	-	-	-	-	-	-	

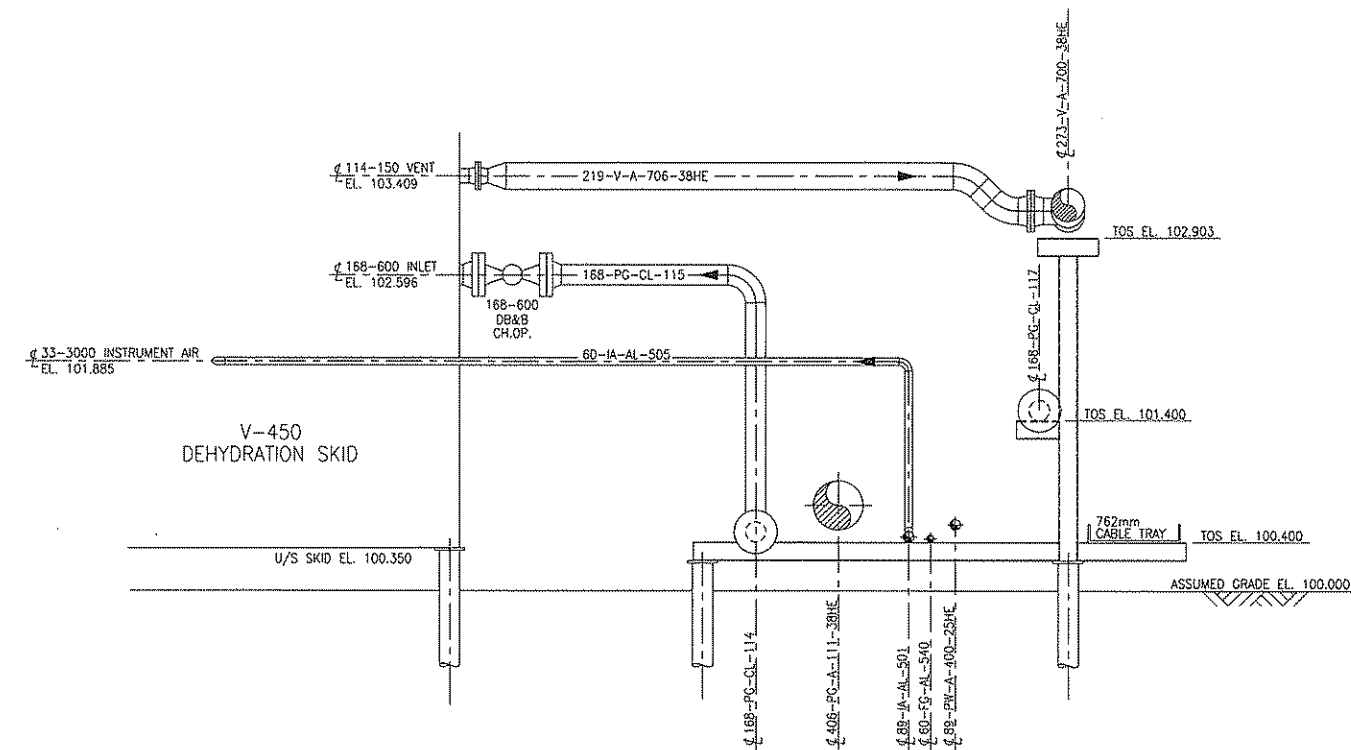
ENGINEERING STAMP

GRB ENGINEERING Ltd.

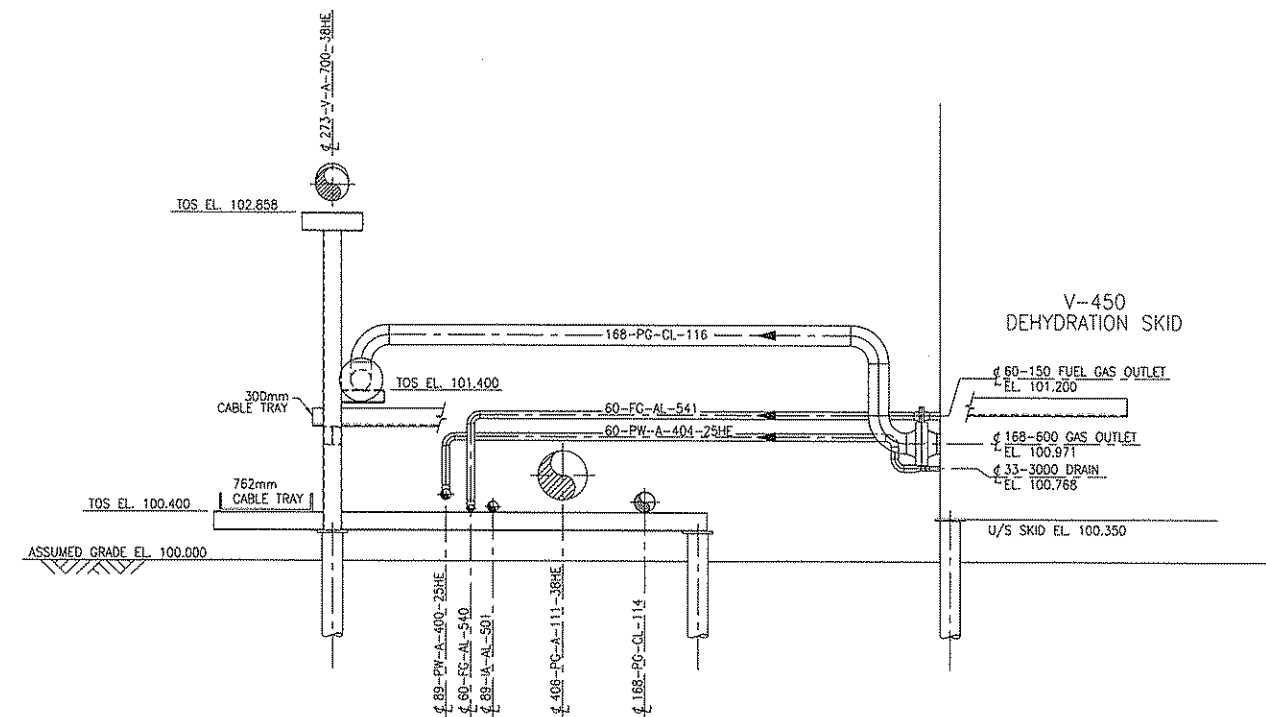
MGV ENERGY INC.

TWINING COMPRESSOR STATION
LSD 09-33-032-24 W4M
PIPING SECTIONS

PROJECT NO. 9549.00	SCALE: 1:30	DWG. NO. C-9549-D-008	REV. 1
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E
0003 SECTION



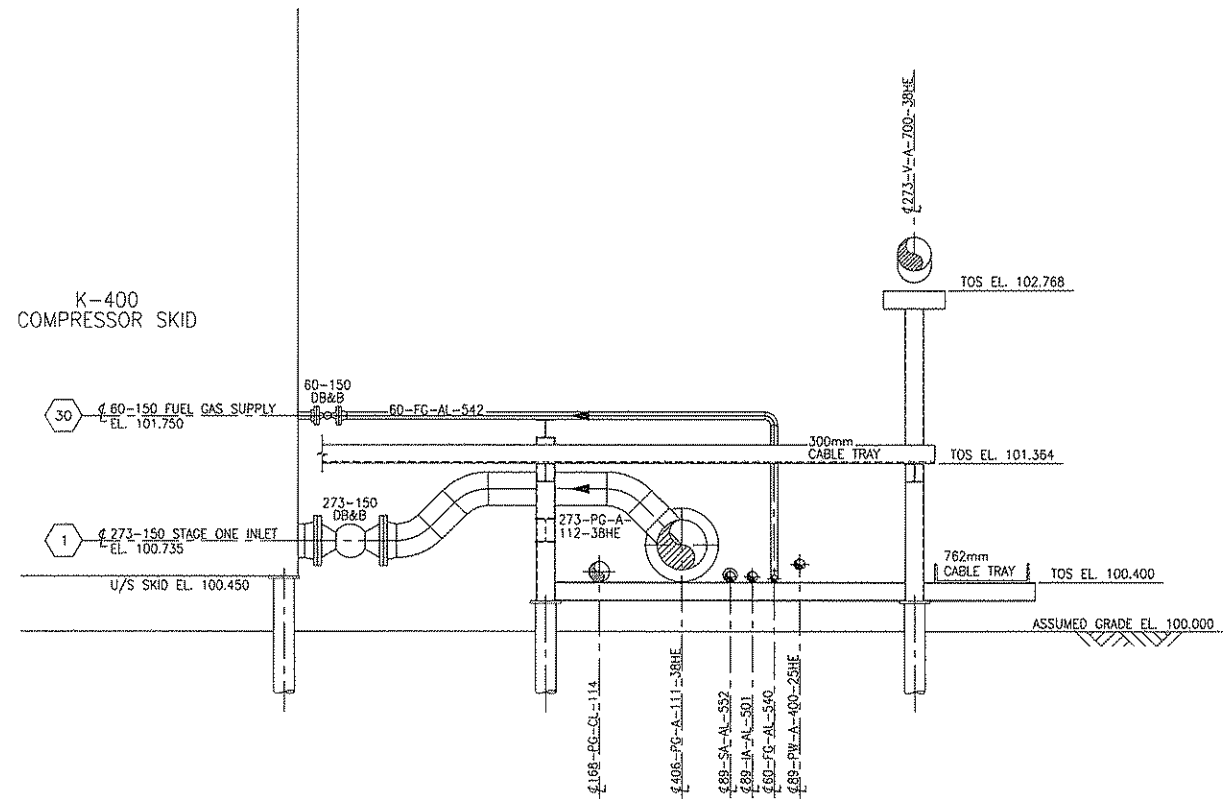
F
0003 SECTION

- NOTES:
1. CONTRACTOR TO SUPPLY ALL HIGH POINT VENTS AND LOW POINT DRAINS.
 2. CONTRACTOR TO CONFIRM ALL DIMENSIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.
 3. ALL BALL VALVES ARE REDUCED PORT VALVES UNLESS NOTED OTHERWISE.
 4. ALL REDUCERS AND SWAGES ARE CONCENTRIC UNLESS NOTED OTHERWISE.

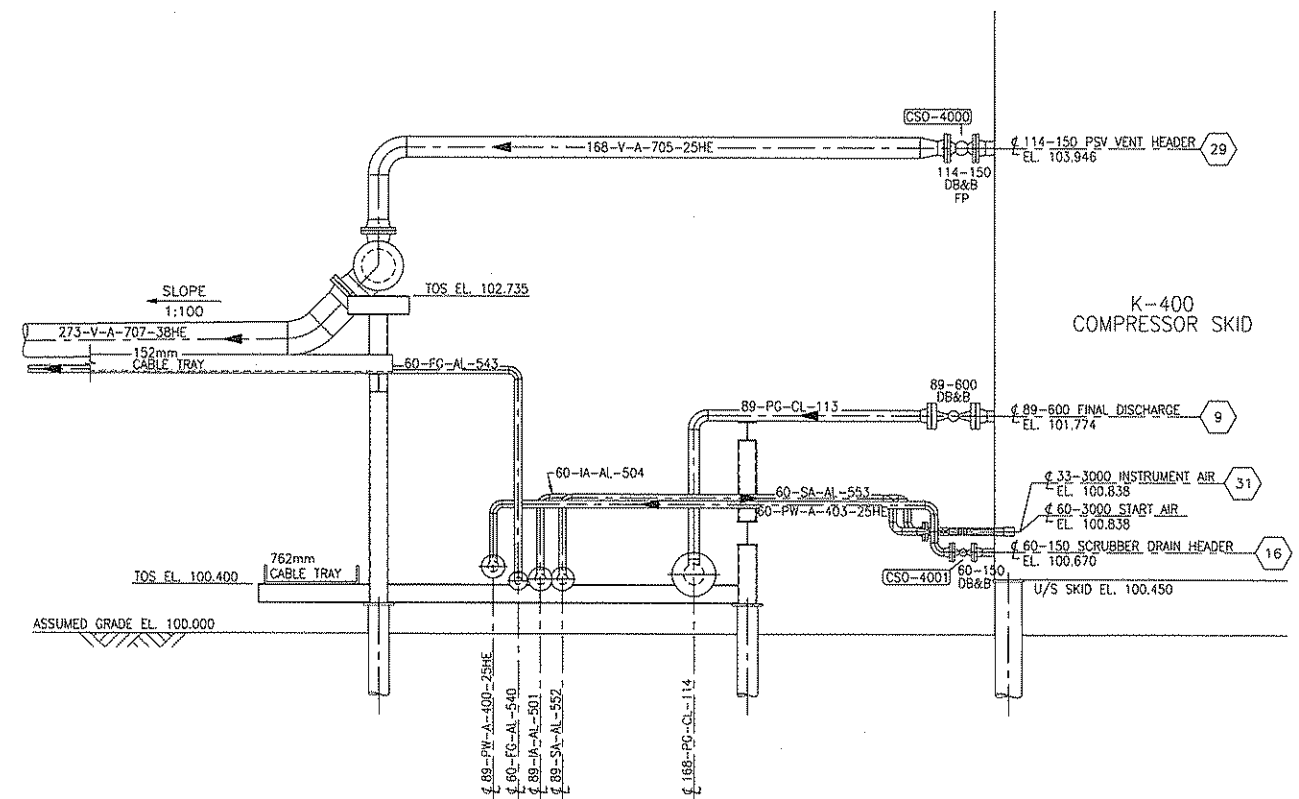
REFERENCE DRAWINGS		REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
9549-D-003	COMP/DEHY AREA PIPING PLAN	A	PRELIMINARY	9549.00	05-02-28	KL	-	-
-	-	B	ISSUED FOR REVIEW	9549.00	05-03-11	KL	KAB	AdP
-	-	C	ISSUED FOR CONSTRUCTION	9549.00	05-04-20	KL	KAB	RGW
-	-	1	AS-BUILT	9549.00	05-08-26	NI	-	-
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ENGINEERING STAMP			
TWINING COMPRESSOR STATION LSD 09-33-032-24 W4M PIPING SECTIONS			
PROJECT NO. 9549.00	SCALE: 1:30	DWG. NO. C-9549-D-009	REV. 1

GRB ENGINEERING Ltd.



G
0003 SECTION



H
0003 SECTION

- NOTES:
1. CONTRACTOR TO SUPPLY ALL HIGH POINT VENTS AND LOW POINT DRAINS.
 2. CONTRACTOR TO CONFIRM ALL DIMENSIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.
 3. ALL BALL VALVES ARE REDUCED PORT VALVES UNLESS NOTED OTHERWISE.
 4. ALL REDUCERS AND SWAGES ARE CONCENTRIC UNLESS NOTED OTHERWISE.

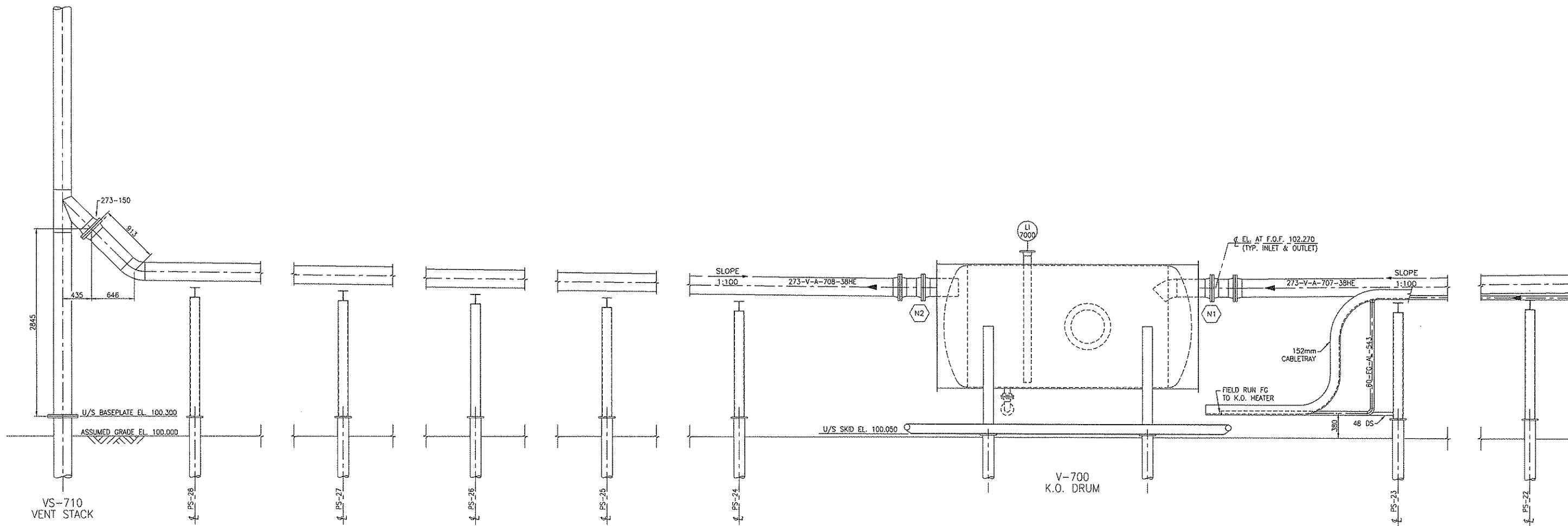
REFERENCE DRAWINGS	
DWG. NO.	DESCRIPTION
9549-D-003	COMP/DEHY AREA PIPING PLAN
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REVISIONS						
NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
A	PRELIMINARY	9549.00	05-02-28	KL	.	.
B	ISSUED FOR REVIEW	9549.00	05-03-11	KL	KAB	AdP
0	ISSUED FOR CONSTRUCTION	9549.00	05-04-20	KL	KAB	RGW
1	RE-ISSUED FOR CONSTRUCTION	9549.00	05-05-05	KL	KAB	RGW
2	AS-BUILT	9549.00	05-08-26	NI	.	.
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ENGINEERING STAMP

GRB ENGINEERING Ltd.

MGV ENERGY INC. A QUICKSILVER RESOURCES INC. COMPANY			
TWINING COMPRESSOR STATION LSD 09-33-032-24 W4M PIPING SECTIONS			
PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.00	1:30	C-9549-D-010	2



J
D004 SECTION

- NOTES:
1. CONTRACTOR TO SUPPLY ALL HIGH POINT VENTS AND LOW POINT DRAINS.
 2. CONTRACTOR TO CONFIRM ALL DIMENSIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.
 3. ALL BALL VALVES ARE REDUCED PORT VALVES UNLESS NOTED OTHERWISE.
 4. ALL REDUCERS AND SWAGES ARE CONCENTRIC UNLESS NOTED OTHERWISE.

REFERENCE DRAWINGS			REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	
9549-D-004	VENT K.O./STACK AREA PIPING PLAN	A	PRELIMINARY	9549.00	05-02-28	KL	.	.	
.	.	B	ISSUED FOR REVIEW	9549.00	05-03-11	KL	KAB	AdP	
.	.	C	ISSUED FOR CONSTRUCTION	9549.00	05-04-20	KL	KAB	RGW	
.	.	1	AS-BUILT	9549.00	05-08-26	NI	.	.	
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ENGINEERING STAMP

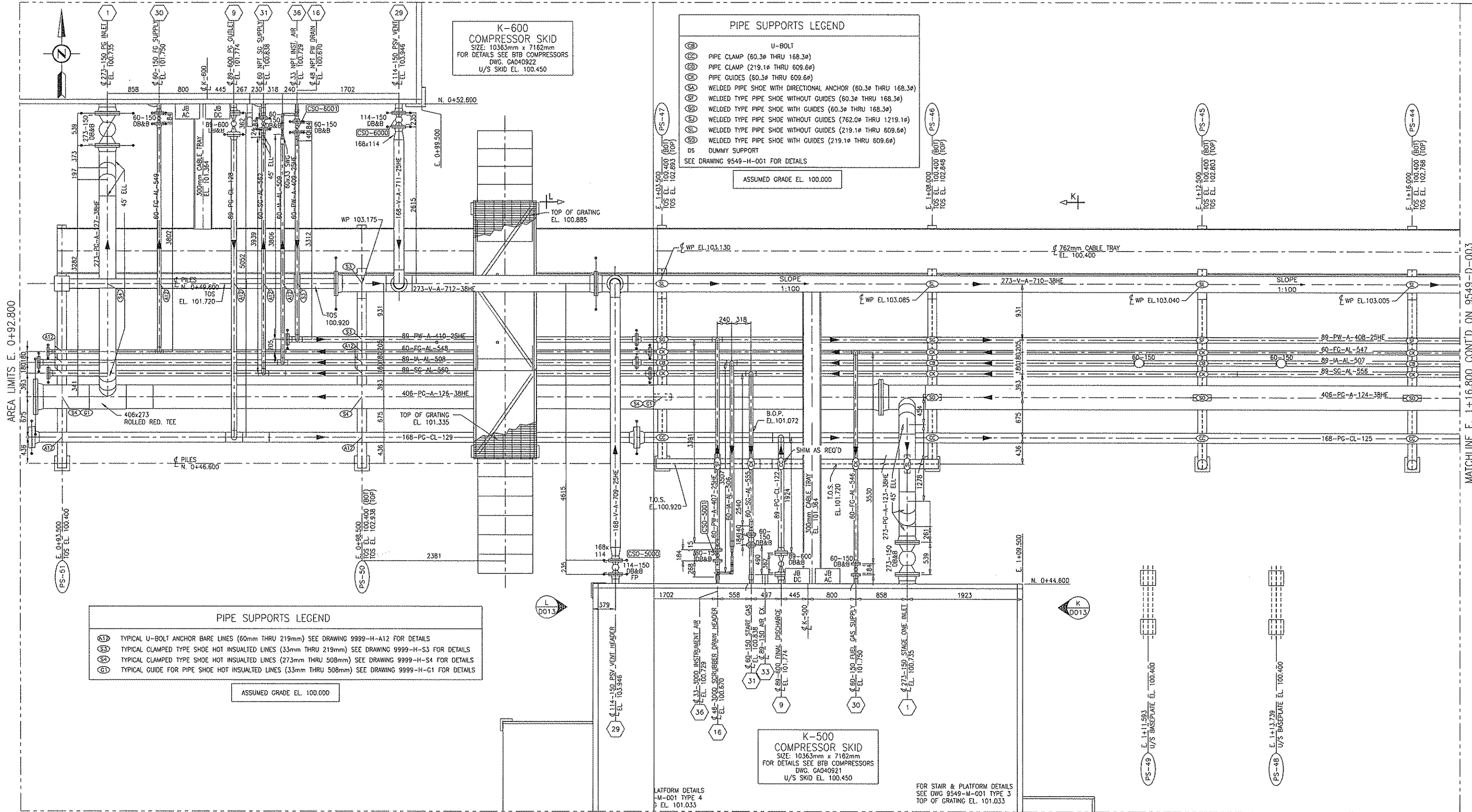
MGV ENERGY INC.

TWINING COMPRESSOR STATION
LSD 09-33-032-24 W4M
PIPING SECTIONS

GRB ENGINEERING Ltd.

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.00	1:30	C-9549-D-011	1

AREA LIMITS N. 0+54.300



AREA LIMITS N. 0+40.800

NOTES:

1. CONTRACTOR TO SUPPLY ALL HIGH POINT VENTS AND LOW POINT DRAINS.
2. CONTRACTOR TO CONFIRM ALL DIMENSIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.
3. ALL BALL VALVES ARE REDUCED PORT VALVES UNLESS NOTED OTHERWISE.
4. ALL REDUCERS AND SWAGES ARE CONCENTRIC UNLESS NOTED OTHERWISE.

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION	NO.
9549.01	PERLIMINARY	A
9549.02	ISSUED FOR CONSTRUCTION	0
9549.02	ISSUED FOR DEMOLITION	1
9549.02	ISSUED FOR CONSTRUCTION, K-600 ADDITION	2
9549.02	K-600 ADDITION, AS-BUILT PER FIELD MARK-UPS	3

REVISIONS

PROJECT	DATE	BY	CHK.	ENG.
9541.01	05-09-16	JB	-	-
9549.01	05-09-16	JB	KAB	RW
9549.02	08-12-04	RC	-	-
9549.02	09-01-15	DP	KK	DK
9549.02	09-06-03	DP	-	-

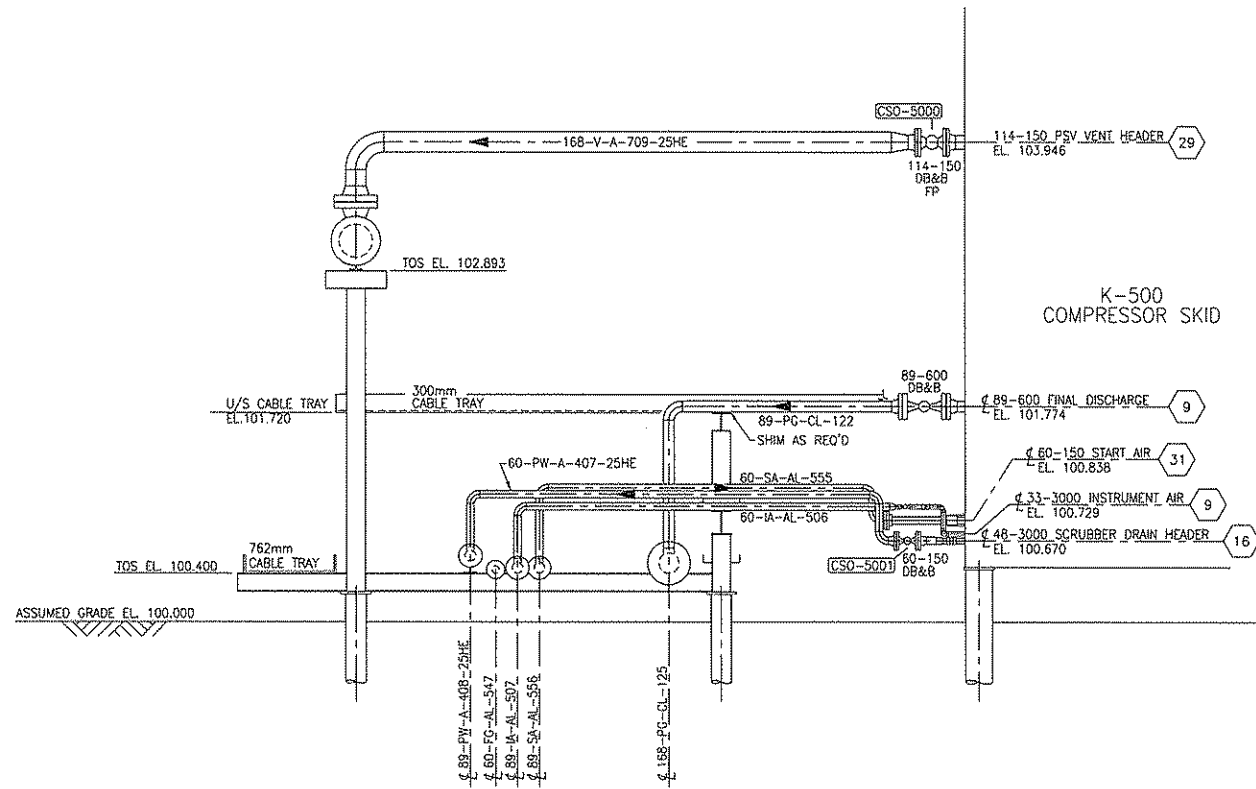
ENGINEERING STAMP

GRB
ENGINEERING

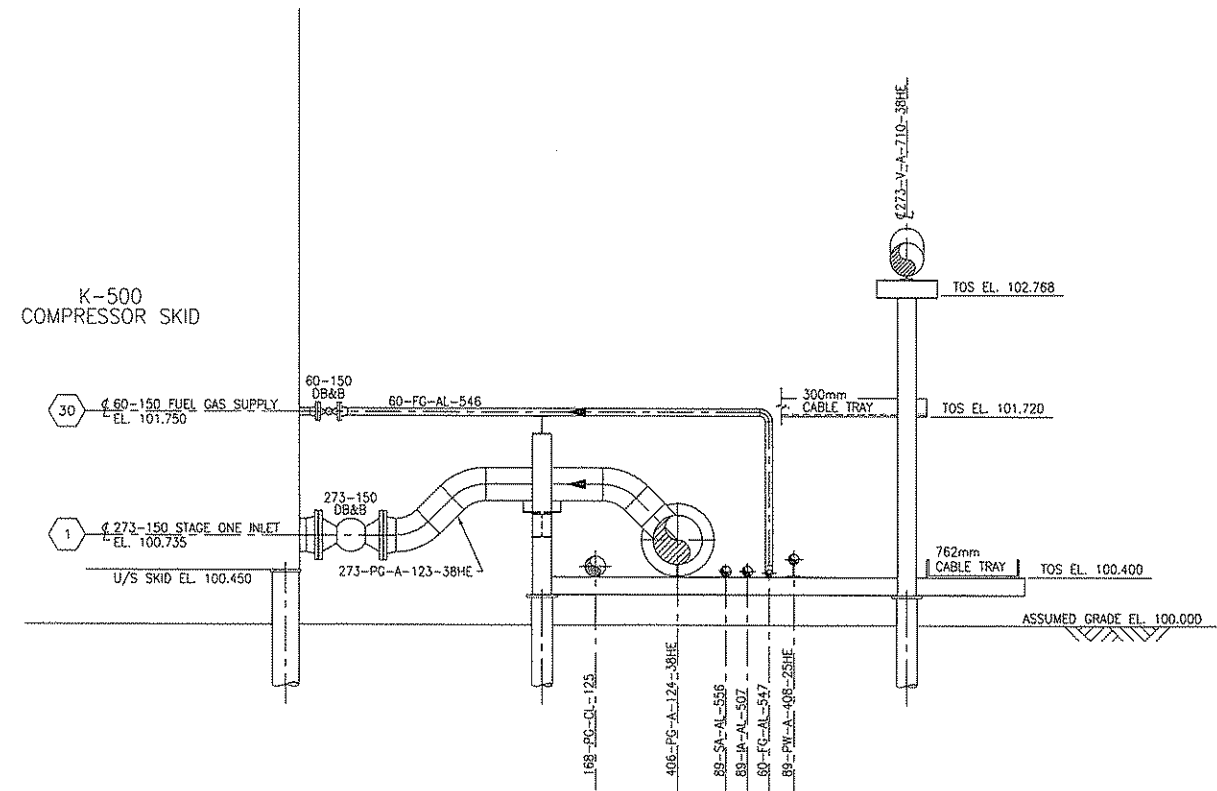
QUICKSILVER
CORPORATION

TWINING COMPRESSOR STATION
LSD 09-33-032-24 W4M
K-500 COMP. ADDITION AREA PIPING PLAN

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	1:30	C-9549-D-012	3



L
D012 SECTION



K
D012 SECTION

NOTES:

1. CONTRACTOR TO SUPPLY ALL HIGH POINT VENTS AND LOW POINT DRAINS.
2. CONTRACTOR TO CONFIRM ALL DIMENSIONS AND ELEVATIONS PRIOR TO ANY CONSTRUCTION.
3. ALL BALL VALVES ARE REDUCED PORT VALVES UNLESS NOTED OTHERWISE.
4. ALL REDUCERS AND SWAGES ARE CONCENTRIC UNLESS NOTED OTHERWISE.

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION	NO.	DESCRIPTION
9549-D-012	COMPRESSOR AREA PIPING PLAN	A	PRELIMINARY
-	-	0	ISSUED FOR CONSTRUCTION
-	-	-	-
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-	-	-	-

REVISIONS

PROJECT	DATE	BY	CHK.	ENG.
9549.01	05-09-16	JB	-	-
9549.01	05-09-16	JB	-	-
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ENGINEERING STAMP

GRB ENGINEERING Ltd.

MGV ENERGY INC.
A QUICKSILVER RESOURCES INC. COMPANY

TWINING COMPRESSOR STATION
LSD 09-33-032-24 W4M
K-500 COMP. ADDITION PIPING SECTIONS

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.01	1:30	C-9549-D-013	0

INSTRUMENT LIST													
TAG NUMBER	P&ID DRAWING NUMBER	LINE NUMBER	LOCATION	MAKE	MODEL	SIZE	CLASS	ACTUATOR	SERVICE	FAIL POSITION	COMMENTS	NOTES	REV.
PI-1001	9549-B-001	324-PG-A-101-38HE	NORTH FIELD PIPELINE RISER 1	-	-	21 mm	ASME 800	N/A	SWEET GAS	N/A	PIPELINE INSTRUMENT TO BE INSTALLED BY PIPELINER	1	3
PI-1002	9549-B-001	324-PG-A-102-38HE	NORTH FIELD PIPELINE RISER 2	-	-	21 mm	ASME 800	N/A	SWEET GAS	N/A	PIPELINE INSTRUMENT TO BE INSTALLED BY PIPELINER	1	3
PI-1003	9549-B-001	324-PG-A-103-38HE	SOUTH FIELD PIPELINE RISER 3	-	-	21 mm	ASME 800	N/A	SWEET GAS	N/A	PIPELINE INSTRUMENT TO BE INSTALLED BY PIPELINER	1	3
PI-1004	9549-B-001	324-PG-A-104-38HE	SOUTH FIELD PIPELINE RISER 4	-	-	21 mm	ASME 800	N/A	SWEET GAS	N/A	PIPELINE INSTRUMENT TO BE INSTALLED BY PIPELINER	1	3
PI-1005	9549-B-001	406-PG-A-106-38HE	INLET HEADER, 27 X 21 NEEDLE VALVE	-	-	21 mm	ASME 800	N/A	SWEET GAS	N/A	DUAL SCALE, RANGE 0-690 kPag	2	3
PI-1006	9549-B-001	-	406 PIG RECEIVER., 27X 21 NEEDLE VALVE	-	-	21 mm	ASME 800	N/A	SWEET GAS	N/A	DUAL SCALE, RANGE 0-690 kPag	2	3
PI-1007	9549-B-001	406-PG-A-107-38HE	ESDV-1000 INLET, 27 X 21 NEEDLE VALVE	-	-	21 mm	ASME 800	N/A	SWEET GAS	N/A	DUAL SCALE, RANGE 0-690 kPag	2	3
PI-1008	9549-B-001	406-PG-A-110-38HE	ESDV-1000 OUTLET, 27 X 21 NEEDLE VALVE	-	-	21 mm	ASME 800	N/A	SWEET GAS	N/A	DUAL SCALE, RANGE 0-690 kPag	2	3
PI-1009	9549-B-001	60-V-A-702-25HE	406 PIG RECEIVER., 27X 21 NEEDLE VALVE	-	-	21 mm	ASME 800	N/A	SWEET GAS	N/A	DUAL SCALE, RANGE 0-69 kPag	2	3
ESDV-1000	9549-B-001	406-PG-A-107-38HE	STATION INLET/OUTLET AREA	MERIDIAN	TB3-F12OR01LG-S2	324 mm	ASME 150	PNEUMATIC	SWEET GAS	CLOSED	MERIDIAN DW8SRLT ACTUATOR		5
ZSC-1000	9549-B-001	406-PG-A-107-38HE	ESDV-1000	TOPWORX	SSP-XPL2BYN00	-	-	N/A	SWEET GAS	N/A			5
ZSO-1000	9549-B-001	406-PG-A-107-38HE	ESDV-1000	TOPWORX	SSP-XPL2BYN00	-	-	N/A	SWEET GAS	N/A			5
EY-1000A	9549-B-001	406-PG-A-107-38HE	ESDV-1000, SOLENOID VALVE W/ MANUAL RESET	ASCO	EF-8320G202	-	-	N/A	SWEET GAS	N/A			5
EY-1000B	9549-B-001	406-PG-A-107-38HE	ESDV-1000, LOCKOUT LATCH W/ MANUAL RESET	AMOT	CP4057D025H2	-	-	N/A	SWEET GAS	N/A			5
PCV-1000	9549-B-001	60-IA-AL-502	INSTRUMENT AIR LINE TO ESDV VALVES	FISHER	67CFR	27 mm		N/A	INSTRUMENT AIR	CLOSED	SET AT 550 KPAG		5
PI-4600	9549-B-001	-	V-460 GLYCOL SEPARATOR, 21 mm NEEDLE VALVE	NUOVA FINA	3.5" DIAL FACE	21 mm	ASME 800	N/A	SWEET GAS/GLYCOL	N/A	DUAL SCALE	3	5
LG-4600	9549-B-001	-	V-460 GLYCOL SEPARATOR BOOT, 27 mm BALL	JERGO	T-20, SIZE 16	27 mm	ASME 800	N/A	SWEET GAS	N/A	C/W GAUGE VLVS., TWO (2) 3/4" NPT ISO'N VLVS. & DRAIN	3	5
ESDV-1200	9549-B-001	168-PG-CL-118	STATION INLET/OUTLET AREA	MERIDIAN	TB3-R40R06LHS1	168 mm	ASME 600	PNEUMATIC	SWEET GAS	CLOSED	MERIDIAN DW6SRLT ACTUATOR		5
ZSC-1200	9549-B-001	168-PG-CL-118	ESDV-1200	TOPWORX	SSP-XPM2BYN00	-	-	N/A	SWEET GAS	N/A			5
ZSO-1200	9549-B-001	168-PG-CL-118	ESDV-1200	TOPWORX	SSP-XPM2BYN00	-	-	N/A	SWEET GAS	N/A			5
EY-1200A	9549-B-001	168-PG-CL-118	ESDV-1200, SOLENOID VALVE W/ MANUAL RESET	ASCO	EF-8320G202	-	-	N/A	SWEET GAS	N/A			5
EY-1200B	9549-B-001	168-PG-CL-118	ESDV-1200, LOCKOUT LATCH W/ MANUAL RESET	AMOT	CP4057D025H2	-	-	N/A	SWEET GAS	N/A			5
PI-1200	9549-B-001	168-PG-CL-120	ESDV-1200 OUTLET, 27 X 21 NEEDLE VALVE	-	-	21 mm	ASME 800	N/A	SWEET GAS	N/A	DUAL SCALE, RANGE 0-10,200 kPag	2	3
PI-1201	9549-B-001	89-V-A-703-25HE	ESDV-1200 OUTLET, 27 X 21 NEEDLE VALVE	-	-	21 mm	ASME 800	N/A	SWEET GAS	N/A	DUAL SCALE, RANGE 0-10,200 kPag	2	3
PT-1202	9549-B-001	168-PG-CL-121	SALES PIPELINE RISER, 27 mm NEEDLE VALVE	ROSEMOUNT	NOTE 4	27 mm	ASME 800	N/A	SWEET GAS	N/A	MODEL 3051TG4A2B21AS5B4C6 C/W 2 VALVE MANIFOLD	2,4	5
PCV-9080	9549-B-005	60-SA-AL-550	V-908 START AIR RECEIVER INLET	FISHER	98H	33 mm	300 PSIG	N/A	INSTRUMENT AIR	N/A	SST BODY, METAL TRIM 21 DIAPHRAGM AND SEAT	6	5
PI-9100	9549-B-005	-	V-910 START AIR RECEIVER, 21 mm NEEDLE VALVE	BOURDOW	HAENNI	21 mm	ASME 800	N/A	INSTRUMENT AIR	N/A	RANGE 0-300 PSIG	3, 7	5
TI-9100	9549-B-005	-	V-910 START AIR RECEIVER	TELTRU	UT300	27 mm	ASME 800	N/A	INSTRUMENT AIR	N/A	RANGE 0-250 °F	3, 7	5
PRV-4512	9												

1. PIPELINE P/TS TO BE PURCHASED BY THE PIPELINE ENGINEER UNDER THE PIPELINE AFE.
2. NEEDLE VALVE RATING MAY BE 3000 CWP OR 6000 CWP.
3. LG(S), PI(S), AND TI(S) FOR THE GLYCOL SEPARATOR AND START AIR RECEIVER ARE PROVIDED BY PACKAGED EQUIPMENT VENDORS.
4. PT-1202 IS PURCHASED UNDER THE FACILITY AFE BUT WILL BE INSTALLED BY THE PIPELINE CONTRACTOR.
5. MECHANICAL CONTRACTOR TO INSTALL ALL IN-LINE INSTRUMENTS THAT ARE PART OF THE COMPRESSOR STATION. SEE P&ID FOR PIPELINE TERMINATION POINTS.
6. PCV 9080 ADDED FOR REV 1

ENGINEERING STAMP	 GRB ENGINEERING	 QUICKSILVER MERCURY		
		TWINING COMPRESSOR STATION LSD 09-33-032-24 W4M INSTRUMENT LIST		
		PROJECT NO.	DWG. NO.	REV.
		9549.02	D-9549-IL-001	5

ELECTRICAL DRAWING LIST														
DRAWING No.	REV	DESCRIPTION	DRAWING No.	REV	DESCRIPTION	DRAWING No.	REV	DESCRIPTION						
9549-S-000	-	TITLE PAGE	9549-V-001A	8	LIGHTING PANELS			VENDOR DRAWINGS - MOELLER						
9549-S-001A	7	ELECTRICAL DRAWING LIST	9549-V-002A	6	CONDUIT AND CABLE SCHEDULE - SHEET 1 OF 2	3WD-463M-21-05-2962-1	1	MOTOR CONTROL CENTRE - MCC 3000 NA						
9549-S-002A	6	STANDARD ELECTRICAL SYMBOLS AND LEGENDS	9549-V-002B	7	CONDUIT AND CABLE SCHEDULE - SHEET 2 OF 2	3WD-463-21-05-2962-1A	1	MCC NOTES						
9549-S-003A	4	GENERAL NOTES				3WD-463M-21-05-2962-2	1	MOTOR CONTROL CENTRE - MCC 3000 NA						
9549-S-005A	1	SAFETY SYSTEM DIAGRAM (SHEET 1 OF 4)	9549-W-000A	1	SYSTEM ARCHITECTURE - BLOCK DIAGRAM	3WD-463-21-05-2962-A	1	MAIN BRKR. & METERING						
9549-S-005B	1	SAFETY SYSTEM DIAGRAM (SHEET 2 OF 4)	9549-W-001A	6	CP-900 CONTROL PANEL - LAYOUT	3WD-463-21-05-2962-B	1	P-415 WATER TRANSFER PUMP						
9549-S-005C	1	SAFETY SYSTEM DIAGRAM (SHEET 3 OF 4)	9549-W-002A	6	CP-900 CONTROL PANEL - AC/DC POWER DISTRIBUTION	3WD-463-21-05-2962-C	1	COMBINATION FUSIBLE DISCONNECT VFD STARTER						
9549-S-005D	1	SAFETY SYSTEM DIAGRAM (SHEET 4 OF 4)	9549-W-003A	6	CP-900 CONTROL PANEL - MISCELLANEOUS SCHEMATICS	3WD-463-21-05-2962-D	1	EXTERIOR LIGHTING CONTACTOR COMPARTMENT						
			9549-W-010A	6	CP-900 CONTROL PANEL I/O CONTROL SCHEMATIC	3WD-463-21-05-2962-E	-	EXHAUST FAN CONTACTORS COMPARTMENT						
9549-T-002A	3	MCC-900 MOTOR CONTROL CENTER - SINGLE LINE DIAGRAM (SHEET 1 OF 2)	9549-W-010B	6	CP-900 CONTROL PANEL I/O CONTROL SCHEMATIC	3WD-463-21-04-2962-F	1	DUAL 42 CCT LIGHTING PANEL						
9549-T-002B	6	MCC-900 MOTOR CONTROL CENTER - SINGLE LINE DIAGRAM (SHEET 2 OF 2)	9549-W-010C	6	CP-900 CONTROL PANEL I/O CONTROL SCHEMATIC	3WD-463-21-05-2962-G	1	P-121 PRODUCED WATER PUMP						
9549-T-006A	6	MCC-900 MOTOR CONTROL CENTER - ELEVATION	9549-W-010D	7	CP-900 CONTROL PANEL I/O CONTROL SCHEMATIC	3WD-463-21-05-2962-H	1	SPARE						
9549-T-011A	1	480VAC MOTOR CONTROL - SCHEMATIC	9549-W-010E	6	CP-900 CONTROL PANEL I/O CONTROL SCHEMATIC	3WD-463-21-05-2962-I	-	K-400 COMPRESSOR ELECTRIC STARTER SCHEMATIC						
9549-T-011B	1	480VAC MOTOR CONTROL - SCHEMATIC	9549-W-010F	6	CP-900 CONTROL PANEL I/O CONTROL SCHEMATIC	3WD-463-21-05-2962A-A1	-	COMBINATION FUSIBLE DISCONNECT VFD STARTER						
9549-T-011C	6	480VAC MOTOR CONTROL - SCHEMATIC				3WD-463-21-05-2962A-01	-	MOTOR CONTROL CENTRE - MCC 3000 NA						
9549-T-011D	8	480VAC MOTOR CONTROL - SCHEMATIC	9549-X-001A	7	SHUTDOWN KEY	1	-	MOELLER EASY 719-AC-RC PROGRAM						
9549-T-011E	1	480VAC MOTOR CONTROL - SCHEMATIC				2	-	MOELLER EASY 719-AC-RC PROGRAM						
9549-T-020A	7	MCP-900 MOTOR CONTACTOR PANEL - 120VAC SCHEMATIC				3	-	MOELLER EASY 719-AC-RC PROGRAM						
9549-T-020A1	1	MCP-900 MOTOR CONTACTOR PANEL - 120VAC SCHEMATIC	9549-Y-001A	4	MISCELLANEOUS ELECTRICAL INSTALLATION DETAILS - GROUNDING (SHEET 1 OF 2)	4	-	MOELLER EASY 719-AC-RC PROGRAM						
9549-T-020B	7	MCP-900 MOTOR CONTACTOR PANEL - 120VAC SCHEMATIC	9549-Y-001B	4	MISCELLANEOUS ELECTRICAL INSTALLATION DETAILS - GROUNDING (SHEET 2 OF 2)	5	-	MOELLER EASY 719-AC-RC PROGRAM						
9549-T-021A	6	LCP-900 LIGHTING CONTACTOR PANEL - 120VAC SCHEMATIC	9549-Y-002A	4	MISCELLANEOUS ELECTRICAL INSTALLATION DETAILS - CABLE/TRAY	3WD-463-70-C09-01108-1	-	MOTOR CONTROL CENTRE - MCC 3000 NA						
9549-T-022A	6	HEAT TRACE SCHEDULE				3WD-463-70-C09-01108-1A	-	MCC NOTES						
					VENDOR DRAWINGS - SYNTECH	3WD-463-70-C09-01108-A	-	COMBINATION FUSIBLE DISCONNECT VFD STARTER						
9549-U-001A	7	SITE PLAN - ELECTRICAL LAYOUT AND GROUNDING	5190009-01	1	PANEL LAYOUT DRAWING	3WD-463-70-C09-01108-B	-	SIZE 1 COMBINATION BREAKER FVNR STARTER						
9549-U-001B	3	SITE PLAN - CABLE TRAY SYSTEM	5190009-02	1	I/O BOARD CABLE CONNECTION LAYOUT DRAWING	3WD-463-70-C09-01108-C	-	FEEDER BREAKER - DUAL						
9549-U-002A	7	SITE PLAN - HAZARDOUS AREA CLASSIFICATION	5190009-05	1	24 VDC POWER DISTRIBUTION LAYOUT DRAWING									
9549-U-002B	4	HAZARDOUS AREA CLASSIFICATION - SECTIONS AND DETAILS	5190009-10	1	IGNITION POWER DISTRIBUTION LAYOUT DRAWING									
9549-U-002C	3	HAZARDOUS LOCATION - WARNING SIGNS/LAMACOIDS	5190009-11	1	OUTPUT BOARD LAYOUT DRAWING									
9549-U-010A	7	MCC/OFFICE BUILDING - ELECTRICAL LAYOUT	5190009-12	1	OUTPUT BOARD cont' LAYOUT DRAWING									
9549-U-010B	1	MCC/OFFICE BUILDING - BUILDING ELEVATIONS	5190009-14	1	PNEUMATIC LAYOUT DRAWING									
9549-U-011A	7	T-300 PRODUCED TANK AREA - ELECTRICAL LAYOUT	5190009-15	1	INPUT BOARD #1 THERMOCOUPLE LAYOUT DRAWING									
9549-U-012A	1	V-110 INLET SEPARATOR BUILDING - ELECTRICAL LAYOUT	5190009-16	1	INPUT BOARD #2 THERMOCOUPLE LAYOUT DRAWING									
9549-U-012B	1	V-110 INLET SEPARATOR BUILDING - JUNCTION BOX LAYOUTS	5190009-17	1	INPUT BOARD #1 ANALOG/DISCRETE LAYOUT DRAWING									
9549-U-013A	6	V-450 DEHYDRATOR BUILDING - ELECTRICAL LAYOUT	5190009-18	1	INPUT BOARD #2 ANALOG/DISCRETE LAYOUT DRAWING									
9549-U-013B	1	V-450 DEHYDRATOR BUILDING - JUNCTION BOX LAYOUTS	5190009-01	2	PANEL LAYOUT DRAWING									
9549-U-014A	7	K-400 COMPRESSOR BUILDING - ELECTRICAL LAYOUT	5190009-05	2	24 VDC POWER DISTRIBUTION LAYOUT DRAWING									
9549-U-014B	2	K-400 COMPRESSOR BUILDING - JUNCTION BOX LAYOUTS	5190009-10	2	IGNITION POWER DISTRIBUTION LAYOUT DRAWING									
9549-U-015A	1	V-700 VENT K.O. DRUM AREA - ELECTRICAL LAYOUT	5190009-11	2	OUTPUT BOARD LAYOUT DRAWING									
9549-U-016A	5	K-500 COMPRESSOR BUILDING - ELECTRICAL LAYOUT	5190009-12	2	OUTPUT BOARD cont' LAYOUT DRAWING									
9549-U-016B	2	K-500 COMPRESSOR BUILDING - JUNCTION BOX LAYOUTS	5190009-14	2	PNEUMATIC LAYOUT DRAWING									
9549-U-017A	1	K-600 COMPRESSOR BUILDING - ELECTRICAL LAYOUT	5190009-15	2	INPUT BOARD #1 THERMOCOUPLE LAYOUT DRAWING									
9549-U-017B	1	K-600 COMPRESSOR BUILDING - JUNCTION BOX LAYOUTS	5190009-16	2	INPUT BOARD #2 THERMOCOUPLE LAYOUT DRAWING									
			5190009-17	2	INPUT BOARD #1 ANALOG/DISCRETE LAYOUT DRAWING									
			5190009-18	2	INPUT BOARD #2 ANALOG/DISCRETE LAYOUT DRAWING									
NOTES:		REFERENCE DRAWINGS		REVISIONS						ENGINEERING STAMP				
		DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	QUICKSILVER TWINING COMPRESSOR STATION LSD 09-33-032-24 W4M ELECTRICAL DRAWING LIST GRB ENGINEERING Ltd.			
				6B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW				
				7	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW				
				8	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	AMH	AFM	JMW				
				2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW				
				3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW				
				4	AS-BUILT AS PER EXHAUST FAN ADDITIONS	9549.01	07.05.18	YG	MSC	JMW				
				5	AS-BUILT FOR CATHODIC PROTECTION	9549.01	2008.02.15	KAW	MSC	JMW				
				6A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW				
											PROJECT NO.	SCALE:	DWG. NO.	REV.
											9549.02	N.T.S.	D-9549-S-001A	8

2010-02-19 14:58 FILE: J:\1000 - 1099\1072.01 QUICKSILVER ORCA OPERATIONS 2008\1500 - ELECTRICAL DRAWINGS\ELECTRICAL DRAWINGS FOR CLARK\TWINING\9549S001A.DWG MCHEN

SINGLE LINE DIAGRAMS		LAYOUT SYMBOLS		WIRING AND SCHEMATIC DIAGRAM SYMBOLS																									
FUSED LOAD INTERRUPTER SWITCH DISTRIBUTION TRANSFORMER PLUG - IN CONNECTION CURRENT TRANSFORMER FUSE CIRCUIT BREAKER AF - AMP FRAME AT - AMP TRIP RATING MAGNETIC TRIP (INSTANTANEOUS) CONTACTOR 1 - No. INDICATES CEMA SIZE THERMAL OVERLOAD HEATERS SQUIRREL CAGE INDUCTION MOTOR 3 - No. INDICATES HORSEPOWER RATING CAPACITOR PRESSURE SWITCH BREAKER SHUNT TRIP CONTROL STATION A - STOP/START P.B. D - HAND-OFF-AUTO G - GREEN PILOT LIGHT R - RED PILOT LIGHT S - LOCKOUT STOP B - ON/OFF 2-POS. SEL. SW. E - HAND-AUTO V - VARIABLE SPEED CONTROL PILOT LIGHT G - GREEN R - RED Y - YELLOW B - BLUE AMMETER SWITCH VOLTMETER SWITCH SYNCHRONIZING SWITCH FLOW SWITCH LIQUID LEVEL SWITCH LIMIT SWITCH PRESSURE SWITCH TEMPERATURE SWITCH VIBRATION SWITCH THERMOSTAT HAND/AUTO CONTROL STATION ON/OFF CONTROL STATION START/STOP CONTROL STATION HAND OFF AUTO CONTROL STATION STOP-LOCKOUT CONTROL STATION	TYPICAL RELAY OR DEVICE SYMBOL FUNCTIONS (*) ARE LISTED BELOW A AMMETER ETM ELAPSED TIME METER F FREQUENCY METER GD GROUND DETECTOR PFM POWER FACTOR METER SYN SYNCHROSCOPE TI TEMPERATURE INDICATOR VAM VOLT-AMP METER V VOLT METER WHM WATTHOUR METER 2 TIME-DELAY STARTING OR CLOSING RELAY 5 STOPPING DEVICE 20 ELECTRICALLY OPERATED VALVE 25 SYNCHRONIZING OR SYNCHRONISM-CHECK DEVICE 26 APPARATUS THERMAL DEVICE 27 UNDERVOLTAGE RELAY 30 ANNUNCIATOR RELAY 32 DIRECTIONAL POWER RELAY 33 POSITION SWITCH 40 FIELD RELAY 41 FIELD CIRCUIT BREAKER 43 MANUAL TRANSFER OR SELECTION DEVICE 46 REVERSE-PHASE OR PHASE-BALANCE, CURRENT RELAY 47 PHASE-SEQUENCE VOLTAGE RELAY 48 INCOMPLETE SEQUENCE RELAY 49 MACHINE OR TRANSFORMER, THERMAL RELAY 50 INSTANTANEOUS OVERCURRENT OR RATE-OF-RISE RELAY 50G INSTANTANEOUS GROUND OVERCURRENT RELAY 50N GROUND SENSING RELAY 51 A-C TIME OVERCURRENT RELAY 51G TIME DELAY GROUND FAULT PROTECTION 51N TIME OVERCURRENT RELAY, GROUND 51S A-C TIMED STALL OVERCURRENT RELAY 52 A-C CURRENT BREAKER 55 POWER FACTOR RELAY 59 OVERVOLTAGE RELAY 59G TIME OVERVOLTAGE RELAY, GROUND 60 VOLTAGE BALANCE RELAY 62 TIME DELAY STOPPING OR OPENING RELAY 63 LIQUID OR GAS PRESSURE, LEVEL OR FLOW RELAY 64 GROUND PROTECTIVE RELAY 65 GOVERNOR 67 A-C DIRECTIONAL OVERCURRENT RELAY 67N DIRECTIONAL OVERCURRENT RELAY, GROUND 69 PERMISSIVE CONTROL DEVICE 70 ELECTRICALLY OPERATED RHEOSTAT 74 ALARM RELAY 78 PHASE ANGLE MEASURING OR OUT-OF-STEP PROTECTIVE RELAY 79 A-C RECLOSING RELAY 81 FREQUENCY RELAY 83 AUTOMATIC SELECTIVE CONTROL OR TRANSFER RELAY 85 CARRIER OR PILOT WIRE, RECEIVER RELAY 86 LOCKING-OUT RELAY 87 DIFFERENTIAL PROTECTIVE RELAY 89 LINE SWITCH 90 REGULATING DEVICE 94 TRIPPING OR TRIP-FREE, RELAY	EXPOSED CONDUIT CABLE/CONDUIT UNDERGROUND OR HIDDEN CONDUIT UP CONDUIT DOWN FLEX CONNECTOR JUNCTION OR PULL BOX 'T' 'L' FITTING (HORIZONTAL) 'T' FITTING (VERTICAL) CONDUIT SEAL CONDUIT UNION CAPPED CONDUIT MOTOR, HORIZONTAL MOUNTING MOTOR, VERTICAL MOUNTING EXHAUST FAN (1/4 HP) SMOKE DETECTOR COMBUSTIBLE GAS DETECTOR HEAD FIRE DETECTOR HEAD HYDROGEN SULFIDE GAS DETECTOR HEAD RECEPTACLE (SINGLE OUTLET) RECEPTACLE (DUPLEX OUTLET) OVERHEAD LIGHT WALL MOUNTED FIXTURE FLUORESCENT FIXTURE THERMOSTAT ESD PUSHBUTTON STATION PHOTOCELL CONTROL STATION S/S - STOP/START P.B. HOA - HAND-OFF-AUTO STOP LO - LOCKOUT STOP O/O - ON/OFF 2-POS. SEL. SW. H/A - HAND-AUTO	SINGLE POLE SWITCH (LETTER INDICATES OUTLETS CONTROLLED) DOUBLE POLE SWITCH THREE WAY SWITCH MANUAL MOTOR STARTER L P LIGHTING PANEL LPA-1 LIGHTING PANEL "A" CIRCUIT No. 1 A LIGHTING FIXTURE LETTER DESIGNATES LIGHTING FIXTURE TYPE ALARM STROBE POLE MOUNTED LIGHT FIXTURES CONDUIT OR CABLE TAG CROSS SECTIONAL ARROW INDICATING DIRECTION OF SECTION AC CABLE ON REEL C/W PLUG	NOCONT - NORMALLY OPEN CONTACT NCCONT - NORMALLY CLOSED CONTACT SOV - SOLENOID NOPB - NORMALLY OPEN PUSH BUTTON NCPB - NORMALLY CLOSED PUSH BUTTON SWNO - TWO POSITION SWITCH (OPEN, CLOSED) FSH - NORMALLY CLOSED FLOW SWITCH FSL - NORMALLY OPEN FLOW SWITCH TSH - NORMALLY CLOSED TEMPERATURE SWITCH TSL - NORMALLY OPEN TEMPERATURE SWITCH PSH - NORMALLY CLOSED PRESSURE SWITCH PSL - NORMALLY OPEN PRESSURE SWITCH LSH - NORMALLY CLOSED LEVEL SWITCH LSL - NORMALLY OPEN LEVEL SWITCH VSH - NORMALLY CLOSED VIBRATION SWITCH TDNOE - TIME DELAY CONTACT ENERGIZED OPEN TDNCE - TIME DELAY CONTACT ENERGIZED CLOSED TDNOD - TIME DELAY CONTACT DEENERGIZED OPEN TDNCD - TIME DELAY CONTACT DEENERGIZED CLOSED HA - TWO POSITION SWITCH (HAND, AUTO) HOA - THREE POSITION SWITCH (HAND, OFF, AUTO) RELAY CONTACTOR LIGHTING CONTACTOR ANNUNCIATOR WINDOW BATTERY	CIRCUIT BREAKER FUSED TERMINAL CONTROL PANEL DISCONNECT TERMINAL CONTROL PANEL TERMINAL CONTROL PANEL TERMINAL CONTROL PANEL PLC TERMINAL MOTOR CONTROL CENTRE TERMINAL LOCAL PANEL TERMINAL FIELD JUNCTION BOX SHLD - SHIELD WIRE ALARM HORN																								
		GROUNDING LAYOUTS		CABLE & CONDUIT TAGGING SCHEME																									
		GROUND WIRE BURIED GROUND WIRE CONNECTION MECHANICAL GRD. CONNECTION BETWEEN CONDUCTOR AND EQUIPMENT GROUNDING ROD C/W GROUND WELL GROUNDING CLAMP		<table><tr><th>SERIES</th><th>AREA</th></tr><tr><td>000</td><td>YARD</td></tr><tr><td>100</td><td>V-110 INLET SEPARATOR BUILDING</td></tr><tr><td>200</td><td>SPARE</td></tr><tr><td>300</td><td>SPARE</td></tr><tr><td>400</td><td>K-400 COMPRESSOR BUILDING</td></tr><tr><td>450</td><td>V-450 DEHYDRATION BUILDING</td></tr><tr><td>500</td><td>K-500 COMPRESSOR BUILDING</td></tr><tr><td>600</td><td>K-600 COMPRESSOR BUILDING</td></tr><tr><td>700</td><td>SPARE</td></tr><tr><td>800</td><td>SPARE</td></tr><tr><td>900</td><td>MCC/OFFICE BUILDING</td></tr></table>		SERIES	AREA	000	YARD	100	V-110 INLET SEPARATOR BUILDING	200	SPARE	300	SPARE	400	K-400 COMPRESSOR BUILDING	450	V-450 DEHYDRATION BUILDING	500	K-500 COMPRESSOR BUILDING	600	K-600 COMPRESSOR BUILDING	700	SPARE	800	SPARE	900	MCC/OFFICE BUILDING
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		HEAT TRACE POWER KIT HEAT TRACE TEE CONNECTION HEAT TRACE L CONNECTION HEAT TRACE SPLICE KIT HEAT TRACE TAPE HEAT TRACE END SEAL KIT C/W INDICATING LIGHT																											
NOTES:		REFERENCE DRAWINGS		REVISIONS																									
		DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	ENGINEERING STAMP																		
				6	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW	TWINING COMPRESSOR STATION STANDARD ELECTRICAL SYMBOLS AND LEGENDS GRB Engineering Ltd.																		
				0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17	DAS	GMW	JMW																			
				1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW																			
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											PROJECT NO. 9549.02																		
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											DWG. NO. D-9549-S-002A																		
											REV. 6																		

1.0 GENERAL CONSTRUCTION NOTES:

- 1.1 ALL ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE DRAWINGS AND THE GENERAL REQUIREMENTS OF THE COMPANY'S SPECIFICATION FOR THE CONSTRUCTION OF THE COMPRESSOR STATIONS.
- 1.2 THE CONTRACTOR SHALL CONSULT WITH COMPANY CONSTRUCTION SUPERVISOR TO DETERMINE THE EXACT LOCATIONS OF BURIED CONDUITS/CABLES PRIOR TO TRENCHING. ELECTRICAL DRAWINGS SHALL INDICATE THE GENERAL LOCATION AND ROUTE TO BE FOLLOWED BY CONDUITS AND/OR CABLES, AND DO NOT SHOW ALL STRUCTURAL AND MECHANICAL DETAILS.
- 1.3 DELETED
- 1.4 THE CONTRACTOR SHALL BASE HIS QUOTATION ON THE INSTALLATION OF THE TOTAL REQUIRED QUANTITIES OF MATERIAL ACCORDING TO THE DRAWINGS AND OR DOCUMENTS. THE CONTRACTOR SHALL SUPPLY ALL REQUIRED MATERIALS AND EQUIPMENT, WHICH ARE NOT SPECIFICALLY NOTED AS COMPANY SUPPLIED. ALL ELECTRICAL MATERIAL USED SHALL BE NEW AND OF HIGH QUALITY, MANUFACTURED TO C.S.A. STANDARDS AND BEAR THE C.S.A. LABEL.
- 1.5 SUBSTITUTION OF MATERIAL DIFFERENT FROM THAT SPECIFIED, WILL NOT BE PERMITTED UNLESS WRITTEN APPROVAL IS OBTAINED FROM COMPANY WHERE "OR APPROVED EQUAL" (OR SIMILAR WORDING) IS SPECIFIED. MATERIAL MUST BE IDENTICAL IN ALL RESPECTS. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO PROVIDE EVIDENCE TO THE COMPANY THAT "OR APPROVED EQUAL" MATERIAL AND EQUIPMENT IS IN FACT EQUAL IN ALL RESPECTS TO THE MATERIAL OR EQUIPMENT BEING SUBSTITUTED. THE CONTRACTOR SHALL GIVE COMPANY OR AUTHORIZED REPRESENTATIVE SUFFICIENT TIME TO REVIEW REQUESTED SUBSTITUTIONS (MINIMUM 5 WORKING DAYS).
- 1.6 ALL LAMPS FOR LIGHTING FIXTURES SHALL BE SUPPLIED BY THE CONTRACTOR.
- 1.7 CONDUITS OR CABLES CROSSING GAS OR UTILITY PIPE SHALL BE INSTALLED WITH A MINIMUM CLEARANCE OF 800mm.
- 1.8 MOUNTING HEIGHT FOR DEVICES, WHERE POSSIBLE, SHALL BE:
CONTROLS (PUSH BUTTONS, SWITCHES, etc.) - 1250mm
RECEPTACLES IN COMPRESSOR BUILDING - 850mm
RECEPTACLES (GENERAL) - 350mm
RECEPTACLES (COUNTERS) - 1150mm
JUNCTION BOXES - 1800mm
- 1.9 THE MOUNTING HEIGHT OF EQUIPMENT SHALL BE MEASURED FROM THE FINISHED FLOOR OR GRADE TO THE TOP OF THE EQUIPMENT, UNLESS OTHERWISE SPECIFIED OR INDICATED.
- 1.10 WHERE DUCTS, CONDUITS OR TRAYS PASS THROUGH FIRE RATED WALLS, FIRE BARRIERS, RATED EQUAL TO, OR BETTER THAN THE WALLS, SHALL BE INSTALLED.
- 1.11 CONDUIT, TRAYS, SUPPORTS, PANELS, ETC. ARE SHOWN DIAGRAMMATICALLY ON THE DRAWINGS AND EXCEPT WHERE LOCATED BY DIMENSION, THE EXACT LOCATION SHALL BE DETERMINED IN THE FIELD ENSURING THAT THEY DO NOT INTERFERE WITH ACCESS TO PROCESS AREAS, OR WALKWAYS. THEY SHALL NOT PROTRUDE SO AS TO PRESENT TRIPPING OR SNAGGING HAZARDS, OR INTERFERE WITH THE REGULAR MAINTENANCE AND OPERATION OF OTHER EQUIPMENT.
- 1.12 NO EQUIPMENT, CONDUIT, CABLES, ETC. SHALL BE INSTALLED IN OR INTERFERE WITH COMPRESSOR BUILDING BLOWOUT WALL PANELS, REMOVABLE ACCESS PANELS OR VENTILATION LOUVERS.
- 1.13 THE CONTRACTOR SHALL SELECT, SUPPLY AND INSTALL APPROPRIATELY RATED OVER- LOAD HEATERS FOR ALL MANUAL MOTOR STARTERS AND MCC STARTERS.
- 1.14 THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL ELECTRICAL PERMITS AND ELECTRICAL INSPECTIONS AND SHALL ENSURE THAT ALL ELECTRICAL INSPECTION AUTHORITY APPROVALS ARE OBTAINED ON A TIMELY BASIS. A COPY OF ALL INSPECTION REPORTS SHALL BE FORWARDED TO COMPANY.
- 1.15 ALL INSTALLATIONS IN HAZARDOUS LOCATIONS, ZONE 1, GROUP IIA OR ZONE 2, GROUP IIA SHALL CONFORM TO ZONE 1, GROUP IIA TEMPERATURE CODE T1 REQUIREMENTS, EXCEPT FOR SPECIFIC EQUIPMENT AND SPECIFIC JUNCTION BOXES AS NOTED ON THE DRAWINGS.
- 1.16 ALL DIMENSIONS ON DRAWINGS ARE IN MILLIMETERS UNLESS NOTED OTHERWISE.
- 1.17 ALL JUNCTION TERMINAL BOXES SHALL BE SUPPLIED WITH WEIDMULLER WDU SERIES TERMINALS MOUNTED WITHIN THE BOX. A MINIMUM OF 10% (TWO TERMINALS MINIMUM) SPARES SHALL BE PROVIDED. TERMINALS SHALL BE TAGGED ACCORDING TO WIRING SCHEMATICS.
- 1.18 THE CONTRACTOR SHALL PROVIDE ALL STRUT, CHANNELS, BRACKETS, CLAMPS, FASTENING DEVICES AND MOUNTING PLATES FOR INSTALLATION OF CABLES, CONDUITS, FIXTURES, END DEVICES.
- 1.19 ALL ELECTRICAL DEVICES SUCH AS PUSH BUTTONS, TRANSMITTERS, SWITCHES, MOTORS, LIGHTS, DETECTORS, ETC. SHALL BE FITTED WITH UNIONS OR REMOVABLE TERMINATORS FOR FUTURE MAINTENANCE OR REPLACEMENT (WHEN DEVICES ARE OF THE SEALED TYPE, INSTALL THE UNION BETWEEN CONDUIT GU FITTING AND DEVICE).
- 1.20 ALL SURFACE-MOUNTED DEVICES, SUCH AS THERMOSTATS, MANUAL MOTOR STARTERS, SWITCHES ETC., IN NON-HAZARDOUS AREAS, SHALL BE INSTALLED IN FS TYPE CAST BOXES. SHEET METAL BOXES ARE NOT ACCEPTABLE.
- 1.21 ALL THERMOSTATS AND DETECTION DEVICES SHOWN ON DRAWINGS ARE FOR REPRESENTATION ONLY. THE FINAL LOCATION AND SETTINGS TO BE DETERMINED BY THE COMPANY.
- 1.22 SUPPORT CHANNEL FOR CONDUIT AND TRAY SHALL BE GALVANISED STEEL. THE MINIMUM HEIGHT OF SINGLE CHANNEL TYPE SHALL BE 1-5/8 INCHES, UNISTRUT P-1000. MINIMUM BACK-TO-BACK CHANNEL HEIGHT SHALL BE 3-1/4 INCHES, UNISTRUT P-1001.
- 1.23 CONNECTIONS TO ALL EQUIPMENT WHICH MAY SHIFT, MOVE, VIBRATE, OR WHICH REQUIRES ALIGNMENT OR AIMING SHALL BE MADE WITH CABLE OR FLEXIBLE CONDUIT (CSA APPROVED FOR THAT PARTICULAR AREA). THIS INCLUDES ALL MOTORS AND LOUVER ACTUATORS.
- 1.24 BURIED CABLE CONDUIT SHALL BE BURIED NO LESS THAN 800mm BELOW FINAL GRADE. ACTUAL CABLE/CONDUIT TO BE IMBEDDED IN 150mm OF SELECT FILL. LARGE STONES AND ROCKS SHALL BE REMOVED AND BACK FILL COMPACTED TO MINIMIZE SETTLING.
- 1.25 MINIMUM 38mm THICK AND 102mm WIDE, TREATED PLANKING SHALL BE INSTALLED 75mm ABOVE BURIED CABLE/CONDUIT. RED 6" WARNING TAPE SHALL PLACED 300mm ABOVE CABLE/CONDUIT. PLANKING AND RED WARNING TAPE SHALL RUN THE FULL LENGTH OF THE CABLE TRENCH.
- 1.26 PROCESS BUILDING EXTERIOR LIGHTS, JUNCTION BOXES AND CONTROL STATIONS SHALL BE MOUNTED AT LEAST 1500mm FROM EXHAUST VENTS, LOUVERS, INSTRUMENTS AND PROCESS VENTS.

2.0 TRAYS:

- 2.1 CABLE TRAYS AND FITTINGS SHALL BE C.S.A. CLASS E LOAD RATED ALUMINIUM TRAYS, WITH 152mm HIGH SIDE WALLS AND 225mm RUNG SPACING.
- 2.2 ALL HORIZONTAL AND VERTICAL FITTINGS SHALL HAVE A RADIUS OF 600mm, WHEREVER LARGE CABLES, WITH A MINIMUM BENDING RADIUS LARGER THAN 600mm ARE INSTALLED, THE RADIUS OF THOSE FITTINGS SHALL BE GREATER THAN THE MINIMUM BENDING RADIUS OF THE CABLE.

2.0 CONT'D

- 2.3 WHEREVER CONTINUOUS THREADED RODS ARE UTILISED FOR TRAPEZE HANGER SUPPORTS, THEY SHALL BE ZINC PLATED, AND A MINIMUM SIZE 3/8 INCHES DIAMETER.
- 2.4 ALL TRAY HARDWARE SHALL BE ZINC PLATED STEEL.
- 2.5 CABLE DROPOUTS SHALL BE USED TO SUPPORT CABLES DROPPING FROM THE TRAYS. END PLATES SHALL BE PROVIDED ON ALL DEAD END RUNS. EXPANSION GUIDES SHALL BE USED TO HOLD DOWN THE TRAYS.
- 2.6 THE MINIMUM VERTICAL DISTANCE BETWEEN MULTI-LAYER TRAYS SHALL BE 300mm.
- 2.7 ALL BURRS, RIDGES, ETC. ON CABLE TRAYS SHALL BE REMOVED. CUT EDGES SHALL BE TOUCHED UP WITH A SILVER ALUMINIUM BASED PAINT.
- 2.8 CABLE TRAYS SHALL BE INSTALLED LEVEL, SQUARE AND PARALLEL TO BUILDINGS OR STRUCTURES. TRAYS SHALL BE SUPPORTED AT INTERVALS SUITABLE FOR THE CLASS OF TRAY.
- 2.9 NO PIECE OF CABLE TRAY SHALL BE LEFT UNSUPPORTED. CABLE TRAY SECTIONS SHALL BE SUPPORTED EITHER AT THEIR MIDPOINT, OR AT BOTH ENDS. CABLE TRAY JOINTS SHALL BE WITHIN A QUARTER OF THE DISTANCE FROM THE SUPPORTS. CONTRACTORS SHALL PROVIDE ALL STRUTS, CHANNELS, BRACKETS, CLAMPS, FASTENING DEVICES, ROD HANGERS AND MOUNTING PLATES FOR THE INSTALLATION OF CABLE TRAYS.
- 2.10 DUCTS OR TRAYS PASSING THROUGH EXTERIOR WALLS SHALL BE MADE WEATHERPROOF AND AIRTIGHT WHEREVER THEY PASS THROUGH THE WALL UTILIZING HILTI FS 657 FIRE BLOCKS AND HILTI FS-ONE SEALANT. TO ENSURE PROPER INSTALLATION OF THE FIRE BLOCKS, THE CONTRACTOR SHALL ARRANGE FOR THE SERVICES OF A QUALIFIED INSULATION INSTALLER. ALL WORK SHALL BE MADE NEAT AND CLEAN.
- 2.11 MECHANICAL PROTECTION IN THE FORM OF TRAY COVERS, SHALL BE INSTALLED TO A MINIMUM OF 2000mm ABOVE GRADE AND WHEREVER FALLING MATERIAL, ICE, SNOW, ETC. MAY DAMAGE THE CABLES. THIS INCLUDES UNDER WALKWAYS AND BUILDING EAVES.

3.0 CONDUIT AND FITTINGS:

- 3.1 THE CONTRACTOR SHALL SIZE ALL CONDUITS ACCORDING TO WIRE FILL REQUIREMENTS AS INDICATED IN THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE.
- 3.2 ABOVE GRADE CONDUITS SHALL BE RIGID ALUMINIUM OR RIGID GALVANIZED STEEL (RGS). BELOW GRADE SHALL BE RIGID PVC EXCEPT TELEPHONE SYSTEM CONDUIT. ELECTRICAL METALLIC TUBING (EMT) OR BX MAY BE USED FOR CONCEALED WORK IN NON-HAZARDOUS AREAS. THE MINIMUM SIZE OF ABOVE GRADE CONDUIT AND EMT SHALL BE 3/4 INCHES. SHORT FINAL RUNS TO END DEVICES MAY BE 1/2 INCH. THE MINIMUM SIZE OF UNDERGROUND CONDUITS SHALL BE 1 INCH. CONDUITS SHALL BE SIZED FOR A MAXIMUM OF 40% FILL. ALUMINIUM CONDUIT SHALL NOT BE USED BELOW GRADE.
- 3.3 CONDUITS ENTERING ENCLOSURES OR END DEVICES IN HAZARDOUS AREAS SHALL BE SEALED. SEALS SHALL BE APPROVED FOR THE POSITION IN WHICH THEY ARE MOUNTED. SEALS SHALL NOT BE POURED UNTIL CHECKOUT IS COMPLETE, AND APPROVAL RECEIVED FROM THE COMPANY AFTER IT HAS BEEN POURED. THE SEALING COMPOUND SHALL BE KEPT BETWEEN 10°C AND 27°C FOR 24 HOURS. ALL SEALS SHALL BE PAINTED FLUORESCENT GREEN AFTER BEING POURED. ALL SEALS SHALL BE CROUSE-HINDS "SPEED-SEAL" TYPE.
- 3.4 ALL CONDUIT/CABLE CLAMPS SHALL BE ZINC PLATED STEEL, AND APPROVED FOR USE WITH RIGID GALVANIZED STEEL CONDUIT. ALUMINIUM CLAMPS ARE NOT ACCEPTABLE.
- 3.5 SUPPORT CHANNELS SHALL BE WELDED TO STRUCTURAL STEEL OR FASTENED TO RIBS IN SHEET METAL BUILDINGS. THEY SHALL BE HORIZONTAL OR VERTICAL. SUPPORTS FOR CONDUITS SHALL BE SPACED A MAXIMUM OF 1500mm APART. WHEREVER SUPPORT CHANNELS ARE SUSPENDED BY THE ENDS WITH SPANS OVER 1500mm, BACK-TO-BACK CHANNELS SHALL BE USED. IN NO CASE, SHALL THE UNSUPPORTED SPAN EXCEED 2000mm. WHEREVER SUPPORT CHANNELS ARE CANTILEVERED OVER 300mm, BACK-TO-BACK CHANNELS SHALL BE USED. IN NO CASE, SHALL THE SUPPORTS BE CANTILEVERED OVER 600mm. CANTILEVERED SUPPORTS SHALL BE SUITABLY BRACED. AN ADDITIONAL 25% OF USABLE SPACE OR 150mm, WHICHEVER IS GREATER, SHALL BE PROVIDED ON ALL CONDUIT SUPPORTS FOR FUTURE USE. END OF CHANNEL SUPPORTS SHALL BE TOUCHED UP WITH A SILVER ALUMINIUM BASE PAINT. STRUCTURAL STEEL SUPPORTS AND BRACKETS SHALL BE PRIMED WITH RED OXIDE PRIMER AND FINISHED WITH TWO COATS OF PAINT.
- 3.6 A DB2 CONDUIT SHALL BE PROVIDED FOR THE TELEPHONE COMPANY TO PULL THEIR CABLE FROM THE POLE LOCATED ACROSS THE ACCESS ROAD TO THE DISTRIBUTION MOUNTING BACKBOARD IN THE CONTROL BUILDING. THE CONTRACTOR SHALL CONFIRM LOCATIONS AND ALL REQUIREMENTS OF TELEPHONE CONNECTIONS WITH THE COMPANY'S CONSTRUCTION SUPERVISOR AND WITH THE TELEPHONE COMPANY PRIOR TO INSTALLATION. THE CONTRACTOR SHALL BE RESPONSIBLE FOR BUILDING AND COORDINATING OF THE TELEPHONE SYSTEM WIRING WITH THE TELEPHONE COMPANY AND ALL SUB-CONTRACTORS.

4.0 CABLE:

- 4.1 CABLES SHALL BE GROUPED INTO THE FOLLOWING CATEGORIES AND SEPARATED FROM OTHER GROUPS.
A) 480V POWER AND CONTROL, 208/120V LIGHTING WIRING.
B) INSTRUMENT AND LOGIC CONTROL WIRING (4-20 mA, 24VDC.)
C) INTRINSIC SAFE CABLING UNLESS INDICATED ON THE DRAWINGS.
NO CABLE GROUP SHALL BE INSTALLED IN A TRENCH OR TRAY RESERVED FOR ANOTHER GROUP. WHEREVER CABLE GROUPS OCCUPY THE SAME TRAY, SUITABLE BARRIERS SHALL BE INSTALLED TO MAINTAIN SEPARATION OF THE DISSIMILAR GROUPS.
- 4.2 CABLE RUNS SHALL BE INSTALLED PARALLEL TO OR AT RIGHT ANGLES TO EQUIPMENT, BEAMS, OR BUILDINGS, SO AS TO PRESENT A NEAT WORKMANSHIP APPEARANCE. PARALLEL CABLE RUNS AT BENDS SHALL FORM CONCENTRIC ARCS. CABLES SHALL BE ARRANGED TO MINIMIZE THE NUMBER OF CROSSOVER CABLES. POWER AND LIGHTING DE-RATED CABLES MAY BE ARRANGED IN MORE THAN ONE LAYER PER TRENCH. INSTRUMENTATION AND LOGIC CONTROL CABLES MAY BE ARRANGED IN MORE THAN ONE LAYER. WHEREVER CABLES ARE PULLED OR A SIGNIFICANT NUMBER OF BENDS ARE INVOLVED, ROLLERS ARE REQUIRED WHEN INSTALLING LONG RUNS. THE MAXIMUM PULLING TENSION OF THE CABLES SHALL NOT BE EXCEEDED.
- 4.3 CABLES IN VERTICAL RUN OF TRAYS SHALL BE TIE-WRAPPED TO THE TRAY AT 1000mm INTERVALS. MAIN FEEDER CABLES SHALL BE CLAMPED TO THE TRAY WITH ONE PIECE CLAMPS ON VERTICAL RUNS EVERY 1000mm AND ON HORIZONTAL RUNS EVERY 3 METRES. TIE-WRAPPS SHALL BE THE TYPE WHICH ARE NOT SUBJECT TO DETERIORATION WHEN EXPOSED TO ULTRAVIOLET LIGHT. CABLES SUPPORTED ON UNISTRUT, SHALL BE CLAMPED USING GALVANISED STEEL CLAMPS, UNISTRUT TYPE M-5000 OR EQUAL.
- 4.4 CABLES RISING FROM BELOW GRADE SHALL BE PROTECTED BY RGS CONDUIT SLEEVES AT EACH END, C/W BUSHING AT EACH END, INSTALLED TO A MINIMUM OF 300mm BELOW GRADE AND EXTENDING TO A MINIMUM OF 450mm ABOVE GRADE.
- 4.5 DIRECT BURIED CABLE SHALL BE INSTALLED IN THE SAME MANNER AS DIRECT BURIED CONDUITS. CABLES SHALL BE MEGGERED OR HI-POTED BEFORE AND AFTER BACK-FILLING. ALL BURIED CABLES SHALL HAVE SUFFICIENT SLACK (MINIMUM OF 1 METRE) TO ACCOMMODATE THE SETTling AND SHIFTING OF THE BACKFILL.

4.0 CONT'D

- 4.6 CABLES LEAVING ENCLOSURES FROM THE BOTTOM OR SIDES SHALL BE CLAMPED TO A SUPPORT WITHIN 450mm TO RELIEVE STRESS ON THE CONNECTOR.
- 4.7 WHERE CABLES EXIT A TRENCH TO ENTER BUILDINGS, THE BUILDING ENTRIES SHALL BE FILLED WITH COMPANY APPROVED AND SPECIFIED FIREPROOFING COMPOUND, SILICONE RTV FOAM SEMCO PR-885 OR EQUIVALENT. THE COMPOUND SHALL BE INSTALLED FLUSH WITH THE INSIDE AND THE OUTSIDE WALLS OF THE CABLE PENETRATION AND SHALL FILL ALL VOIDS TO PREVENT MOISTURE INGRESS. CABLES SHALL NOT BE BUNCHED TOGETHER, BUT SHALL BE SEPARATED FROM EACH OTHER.
- 4.8 CABLE TERMINATIONS IN HAZARDOUS AREAS SHALL UTILIZE CSA APPROVED "H.L. TECK CONNECTORS". CABLE TERMINATION'S IN NON-HAZARDOUS OUTDOOR AREAS SHALL UTILIZE CSA APPROVED SPIN-ON WEATHERPROOF TYPE CABLE CONNECTORS. CABLE TERMINATION IN NON-HAZARDOUS INDOOR AREAS SHALL UTILISE CSA APPROVED SPIN-ON TYPE CABLE CONNECTORS. CABLE TERMINATION TO GLAND PLATES IN THE BUILDING TRENCHES SHALL UTILIZE T & B TITE BITE (OR EQUAL) CSA APPROVED CABLE CONNECTORS. ALL CONNECTORS SHALL BE SIZED TO SUIT THE CABLE DIAMETER.
- 4.9 TECK CABLES WHICH ENTER EQUIPMENT SUCH AS MCC'S, ETC., SHALL HAVE THE INNER JACKET OF THE CABLE LEFT INTACT FROM THE CABLE TERMINATOR TO THE STARTER, BREAKER, ETC.
- 4.10 ALL CABLES SHALL BE TAGGED AT BOTH ENDS WITH STAINLESS STEEL TAGS FASTENED TO THE CABLES WITH STAINLESS STEEL WIRE.
- 4.11 CABLES SHALL BE SUPPORTED INDEPENDENT OF JUNCTION BOXES AND EQUIPMENT TO WHICH THEY ARE CONNECTED.
- 4.12 WHEN SEALING HL INSTRUMENT CABLE, THE SHIELDS SHALL NOT BE REMOVED UNLESS SPECIFICALLY REQUIRED BY THE ELECTRICAL INSPECTION AUTHORITY AND ONLY AFTER PERMISSION FROM THE COMPANY HAS BEEN GRANTED.
- 4.13 WHENEVER THE ARMOUR IS STRIPPED OFF SHIELDED CABLE AND THE CONDUCTORS ARE RUN INSIDE METALLIC CONDUIT OR IN TRAYS, THE SHIELDS SHALL BE INSULATED USING HEAT SHRINK PVC TUBING TYPE INSULATION.
- 5.0 WIRING:
- 5.1 WIRE AND CABLE SIZES SHALL BE IN STRICT ACCORDANCE WITH THOSE SHOWN ON THE PLANS AND SPECIFICATIONS. SIZES SHALL NOT BE SUBSTITUTED IN THE FIELD WITHOUT PRIOR COMPANY APPROVAL.
- 5.2 SHIELDS AND DRAINS FOR INSTRUMENTATION WIRING SHALL BE GROUNDED AT THE POWER SUPPLY END ONLY. AT JUNCTION BOXES, THE DRAIN WIRE SHALL BE TERMINATED ON ITS OWN TERMINAL AND CARRIED THROUGH TO THE END DEVICE. THE SHIELD SHALL BE CUT BACK AND COVERED WITH A HEAT SHRINK AT THE END DEVICE. BOTH SHIELD AND DRAIN WIRE SHALL BE CUT BACK AND TUBING COVERED WITH A HEAT SHRINK TUBING.
- 5.3 OVERALL SHIELD AND DRAIN WIRE ON MULTI-PAIR OR MULTI-TRIAD CABLES SHALL BE GROUNDED AT THE POWER SUPPLY END ONLY AND SHALL BE ISOLATED FROM INDIVIDUAL PAIR OR TRIAD SHIELDS AND DRAINS. LOOSE WIRES INSIDE PANELS OR ENCLOSURES, WHICH ARE NOT INSIDE WIRE DUCTS, SHALL BE NEATLY DRESSED AND BUNDLED WITH THOMAS AND BETTS "TY-RAP" OR EQUIVALENT. LOOSE WIRES TO MOVING PARTS OF PANELS, SUCH AS DOORS, SHALL BE SPIRAL WRAPPED.
- 5.4 ALL POWER AND CONTROL WIRING FROM THE CONTROL BUILDING TO THE YARD AND OTHER BUILDINGS SHALL BE TECK 90 HL INTERLOCKING ALUMINIUM ARMOR, FT4 RATED, SUNLIGHT RESISTANT AND PVC OVERALL JACKET WITH RW90 X-LINK MINIMUM 600V INSULATION. ALL POWER WIRING SHALL BE MINIMUM 12 AWG STRANDED COPPER AND ALL CONTROL WIRING SHALL BE MINIMUM 14 AWG STRANDED COPPER.
- 5.5 ALL INSTRUMENTATION ANALOG WIRING FROM THE CONTROL BUILDING TO THE YARD AND OTHER BUILDINGS SHALL BE HLX TYPE WITH INTERLOCKING ALUMINIUM ARMOR, FT4 RATED, SUNLIGHT RESISTANT, PVC OVERALL JACKET AND MINIMUM 300V INSULATION. INSTRUMENT CABLE, SHALL BE TIGHT-WOUND, TWISTED WITH AN OVERALL SHIELD AND INDIVIDUALLY SHIELDED PAIRS OR TRIADS. WIRES SHALL BE BELDEN TYPE (OR EQUAL) MINIMUM 16 AWG.
- 5.6 ALL WIRING SPLICES SHALL BE MADE WITH T & B "STA KON" COMPRESSION TYPE CONNECTORS, OR EQUAL.
- 5.7 ALL WIRES SHALL BE TAGGED WITH A PRE-PRINTED INDELIBLE HEAT SHRINK SLEEVE, WITH SEVEN (7) CHARACTERS ON AVERAGE. THE NUMBERS MUST CORRESPOND TO THOSE SHOWN ON THE DRAWINGS.
- 5.8 WIRING TERMINATION TO OWNER SUPPLIED EQUIPMENT AND DEVICES WILL BE MARKED UP ON THE VENDOR'S DRAWINGS AND ISSUED TO FIELD CONTRACTOR. FIELD CABLES ARE SHOWN ON THE CABLE SCHEDULE.

6.0 GROUNDING:

- 6.1 THE PLANT MAIN GROUND GRID SHALL CONSIST OF #2/0 TWH GREEN INSULATED COPPER CONDUCTOR, DIRECT BURIED AND/OR INSTALLED IN EACH CABLE TRENCH AND CABLE TRAY AS INDICATED ON THE DRAWINGS. TAPS SHALL BE #2 TWH GREEN INSULATED COPPER. ALL UNDERGROUND GROUNDING CONDUCTORS SHALL BE TWH. THE GROUND GRID SHALL BE A CLOSED LOOP SYSTEM WHEREBY BREAKAGE OF ONE GROUND WIRE DOES NOT DISRUPT THE GRID. THE STATION FENCE SHALL NOT BE GROUNDED TO THE STATION GROUND GRID.
- 6.2 GROUND RODS SHALL BE 19mm DIAMETER AND DRIVEN A MINIMUM OF 3 METRES INTO THE GROUND. RODS SHALL BE ENCLOSED IN GROUND WELLS. THE TOP OF THE GROUND WELL SHALL BE FLUSH WITH THE FINAL GRADE. WELLS SHALL BE LOCATED AWAY FROM HEAVY TRAFFIC AREAS AND LOW POINTS WHEREVER WATER MAY ACCUMULATE. THE BOTTOM OF THE GROUND WELL SHALL BE FILLED WITH COMPACTED CLAY AND/OR CARBON MIX, FOR A MINIMUM OF 150mm.
- 6.3 ALL ABOVE GROUND GROUNDING CONNECTIONS SHALL BE LUG TYPE (COMPRESSION OR BOLTED), BELOW GROUND GROUNDING CONNECTIONS TO BE THOMAS AND BETTS 'C' TAP COMPRESSION TYPE OR EQUIVALENT.
- 6.4 ALL EXPOSED COPPER SHALL BE COVERED WITH THREE COATS OF GLYPTOL. IN ADDITION, UNDERGROUND CONNECTIONS SHALL BE HAND TAPED WITH SCOTCH #33 TAPE FOR PROTECTION. ALL UNDERGROUND CONNECTIONS SHALL BE INSPECTED BEFORE AND AFTER TAPING.
- 6.5 GROUND WIRES COMING ABOVE GRADE SHALL BE SUITABLY PROTECTED BY A CONDUIT SLEEVE.
- 6.6 AN INSULATED GREEN #2 AWG TWH COPPER GROUND WIRE SHALL BE INSTALLED IN EACH TRAY RUN. IT SHALL BE TIED TO THE MAIN GROUND GRID AT BOTH ENDS, AND AS SHOWN ON THE DRAWINGS. EVERY SECOND TRAY AND EVERY SECOND STRUCTURAL STEEL SUPPORT SHALL BE CONNECTED TO THE GROUND WIRE. WHERE PARALLEL TRAYS ARE RUN, EVERY SECOND SECTION OF TRAY SHALL BE BONDED. IN THESE CASES, ONLY ONE #2 AWG TWH COPPER GROUND WIRE NEEDS TO BE INSTALLED FOR THE PARALLEL RUNS.

6.0 CONT'D

- 6.7 BEFORE ANY GROUNDING CONNECTION IS MADE, THE WIRE AND SURFACE SHALL BE CLEANED TO A BRIGHT METAL.
- 6.8 ALL BURIED GROUND CONDUCTORS SHALL HAVE SUFFICIENT SLACK (MINIMUM OF 1 METER) TO ACCOMMODATE THE SETTling AND SHIFTING IN THE BACKFILL.
- 6.9 THE DRAWINGS SHOW THE MAIN GROUNDING GRID ONLY. EACH PIECE OF ELECTRICAL EQUIPMENT SHALL BE GROUNDED INDIVIDUALLY ACCORDING TO THE CANADIAN ELECTRICAL CODE VIA THE GROUND WIRE IN THE CONDUIT OR CABLE WIRED TO THE EQUIPMENT.
- 6.10 GROUNDING FOR THE NON-CURRENT CARRYING PARTS OF ELECTRICAL EQUIPMENT SHALL BE INSTALLED AS REQUIRED BY THE LOCAL REGULATIONS AND CANADIAN ELECTRICAL CODE.
- 6.11 WHERE IT IS NECESSARY TO RUN GROUNDING CONDUCTORS THROUGH FOOTINGS, WALLS OR FLOORS, CONDUIT SLEEVES SHALL BE USED WITH BUSHINGS AT BOTH ENDS AND SEALED AGAINST WATER ENTRY WITH HIGH QUALITY RTV (SILICONE RUBBER SEALANT) APPLIED FROM BOTH SIDES.
- 6.12 ALL UNDERGROUND GROUNDING CONNECTIONS AND WIRING SHALL BE APPROVED BY THE COMPANY REPRESENTATIVE PRIOR TO BACKFILLING. THE CONTRACTOR SHALL MEASURE THE RESISTANCE OF THE GROUND SYSTEM AT ALL MAJOR EQUIPMENT AND STRUCTURE GROUNDING AND SHOW TO THE COMPANY REPRESENTATIVE THAT THE RESISTANCE MEETS THE CANADIAN ELECTRICAL CODE REQUIREMENTS. IN NO INSTANCE SHALL THE RESISTANCE TO GROUND EXCEED 10 OHMS. IF INSUFFICIENT, ADDITIONAL (OR LONGER) GROUND RODS SHALL BE INSTALLED.
- 6.13 CONDUITS SHALL NOT BE USED AS A GROUND. THE CONTRACTOR SHALL INSTALL A SEPARATE GROUND WIRE IN EACH CONDUIT SIZED ACCORDING TO THE CANADIAN ELECTRICAL CODE. NOTE THAT THESE GROUND WIRES MAY NOT NECESSARILY BE SHOWN ON THE DRAWINGS.
- 6.14 CONTRACTOR SHALL GROUND BUILDING PILES IN TWO LOCATIONS VIA THE MAIN GROUND GRID #2/0 AWG TWH GREEN INSULATED COPPER GROUND. PILES MAY SERVE AS AN ALTERNATIVE TO GROUNDING WELLS.
- 6.15 CONTRACTOR SHALL SUPPLY AND INSTALL TRUCK OUT/IN GROUND CABLE ON A RACK MOUNTED FIELD FABRICATED CHANNEL SUPPORT AT ALL TRUCK OUT/IN LOCATIONS. GROUND CABLE SHALL BE 8 METERS OF #2 AWG TEREX GROUND WIRE COMPLETE WITH WELDING TYPE GROUND CLAMP.
- 7.0 MINOR REVISIONS:
- 7.1 WIRE LABELS, JUMPERS BETWEEN TERMINALS, WIRING OR MOUNTING DETAILS, OR ROUTING OF CABLES AND/OR CONDUITS SHALL NOT INVOLVE AN INCREASE IN THE SCOPE, UNLESS THE WORK IS ALREADY COMPLETED AS PER PREVIOUSLY ISSUED DOCUMENTS.
- 8.0 INFORMATION NAMEPLATES:
- 8.1 ALL NAMEPLATES SHALL BE CONTRACTOR SUPPLIED. USING SELF TAPING SCREWS (ON NON-EXPLOSION PROOF EQUIPMENT), AND EPOXY TYPE CEMENT ON OTHERS. MOUNTING OF NAMEPLATES SHALL BE COMPLETED AFTER PAINTING IS COMPLETED.
- 9.0 INSTRUMENTATION:
- 9.1 THE CONTRACTOR SHALL SUPPLY AND INSTALL ALL MISCELLANEOUS MATERIALS AND EQUIPMENT REQUIRED TO COMPLETE THE INSTALLATION. THIS SHALL INCLUDE ALL MATERIAL AND LABOUR FOR SUPPORTS AND ANCHORS.
- 9.2 ALL INSTRUMENTATION, VALVES AND OTHER EQUIPMENT WITH NATURAL GAS VENT CONNECTIONS, LOCATED INSIDE A BUILDING OR ENCLOSURE, SHALL BE VENTED OUTSIDE UNDER BUILDING EAVE. CONTRACTOR SHALL SUPPLY AND INSTALL 316SS 1/2" TUBING AND FITTINGS AS REQUIRED. THESE VENT CONNECTIONS HAVE NOT NECESSARILY BEEN SHOWN ON THE DRAWINGS.
- 9.3 ALL TUBING SHALL BE ANNEALED, 316SS, ASTM A269 SEAMLESS. TUBE FITTINGS SHALL BE SWAGELOCK 316SS WITH SS FERRULES. MINIMUM TUBING SIZE SHALL BE 3/8" WITH MINIMUM WALL THICKNESS OF 0.035" FOR 3/8" TUBE AND MINIMUM WALL THICKNESS OF 0.049" FOR 1/2" TUBE.
- 9.4 TUBING SHALL BE CAREFULLY HANDLED TO PREVENT SCRATCHES FROM OCCURRING. TUBE ENDS SHALL BE DEBURRED.
- 9.5 ALL RUNS OF TUBING LONGER THAN 3'-6" SHALL BE SUPPORTED IN STAINLESS STEEL OR ALUMINIUM CHANNEL TO PREVENT SAGGING OR DAMAGE. THIS CHANNEL SHALL BE FIRMLY AFFIXED OR SUPPORTED. THE MANNER IN WHICH TUBING IS SUPPORTED AND THE LOCATION OF ALL SUPPORTS SHALL BE APPROVED BY THE OWNER.
- 9.6 THE RADIUS OF ALL TUBE BENDS SHALL BE NOT LESS THAN THAT RECOMMENDED BY TUBING MANUFACTURER, A MINIMUM STRAIGHT LENGTH OF 1" FROM END OF TUBE TO BEGINNING OF BEND SHALL BE PROVIDED.
- 9.7 ADEQUATE TUBE FITTINGS SHALL BE PROVIDED TO PERMIT REMOVAL OF SECTIONS OF TUBING THAT INTERFERE WITH THE MAINTENANCE AND REPAIR OF ANY EQUIPMENT IN THE BUILDING.
- 9.8 CONTRACTOR SHALL SIZE, SUPPLY AND INSTALL INSTRUMENT MOUNTING PLATES AS NECESSARY TO PROVIDE PROPER MOUNTING OF EQUIPMENT.
- 9.9 ALL INSTRUMENTS AND DEVICES SHALL BE TAGGED WITH METAL TAGS USING STAINLESS STEEL WIRE ACCORDING TO THE PROCESS AND INSTRUMENT DIAGRAMS AND PLC LOOP INTERCONNECTION DIAGRAMS.
- 9.10 CONTRACTOR SHALL INSTALL ALL NATURAL GAS POWERED VALVE ACTUATOR VENT TUBING UP (MINIMUM 7'-3" HIGHER THAN PERSONNEL STANDING AREA), FROM ALL PERSONNEL AREAS AND TO THE SATISFACTION OF OWNER PERSONNEL.
- 9.11 CONTRACTOR SHALL INSTALL TUBING INSULATORS ON ALL TUBING RUNS ATTACHED TO CATHODICALLY PROTECTED PIPING.
- 9.12 INSTRUMENTS SHALL BE ACCESSIBLE SO THAT PERSONNEL MAY SERVICE OR REMOVE ANY INSTRUMENT OR INSTRUMENT AUXILIARY WITHOUT DANGER OF FALLS, BURNS, OR HAZARDS BEYOND WHICH THE JOB NORMALLY ENTAILS. ACCESSIBILITY REQUIREMENTS ARE BASED ON HAVING EACH INSTRUMENT INSTALLED SO THAT IT MAY BE SERVICED BY ONE MAN, INSTRUMENT EQUIPMENT AND ASSOCIATED INSTALLATION SHALL BE ACCEPTABLE WHERE THEY ARE NOT MORE THAN 5 FEET ABOVE GRADE OR WALKWAY.
- 9.13 INSTRUMENTS SHALL BE MOUNTED LEVEL AND PLUMB, AND IN SUCH MANNER AS TO PROVIDE ACCESSIBILITY, PROTECTION FROM MECHANICAL DAMAGE, HEAT, SHOCK AND VIBRATION, AND SHALL NOT INTERFERE WITH OR BE INTERFERED WITH BY OTHER EQUIPMENT, PIPING OR ELECTRICAL WORK. INSTRUMENTS SHALL NOT BE INSTALLED UNTIL ALL HEAVY MECHANICAL WORK ADJACENT TO THEIR INSTALLATION HAS BEEN COMPLETED. INSTRUMENT SUPPORTS SHALL NOT BE MOUNTED ON PROCESS PIPING UNLESS APPROVED BY COMPANY.

NOTES:

REFERENCE DRAWINGS

REVISIONS

ENGINEERING STAMP

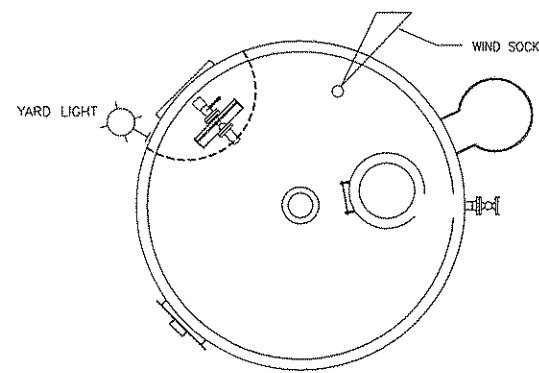
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		0	ISSUED FOR CONSTRUCTION	9549.00	05-05-17	DAS	GMW	JMW
		1	AS-BUILT	9549.00	06-01-17	LL	DPS	JMW
		2A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
		2B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW
		3	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW
		4	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW



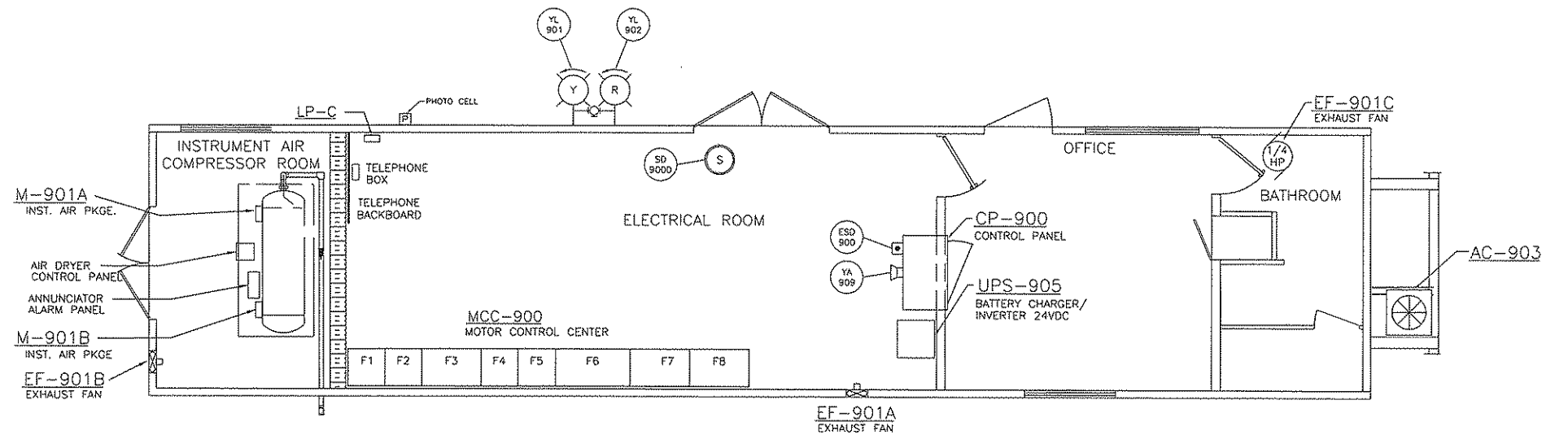
TWINNING COMPRESSOR STATION
GENERAL NOTES

GRB Engineering Ltd.

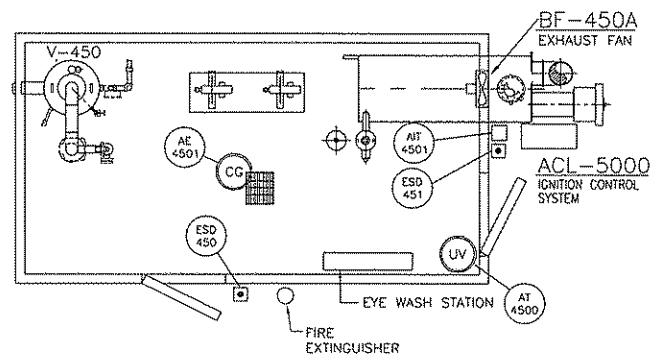
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9549.02	N.T.S.	D-9549-S-003A	4



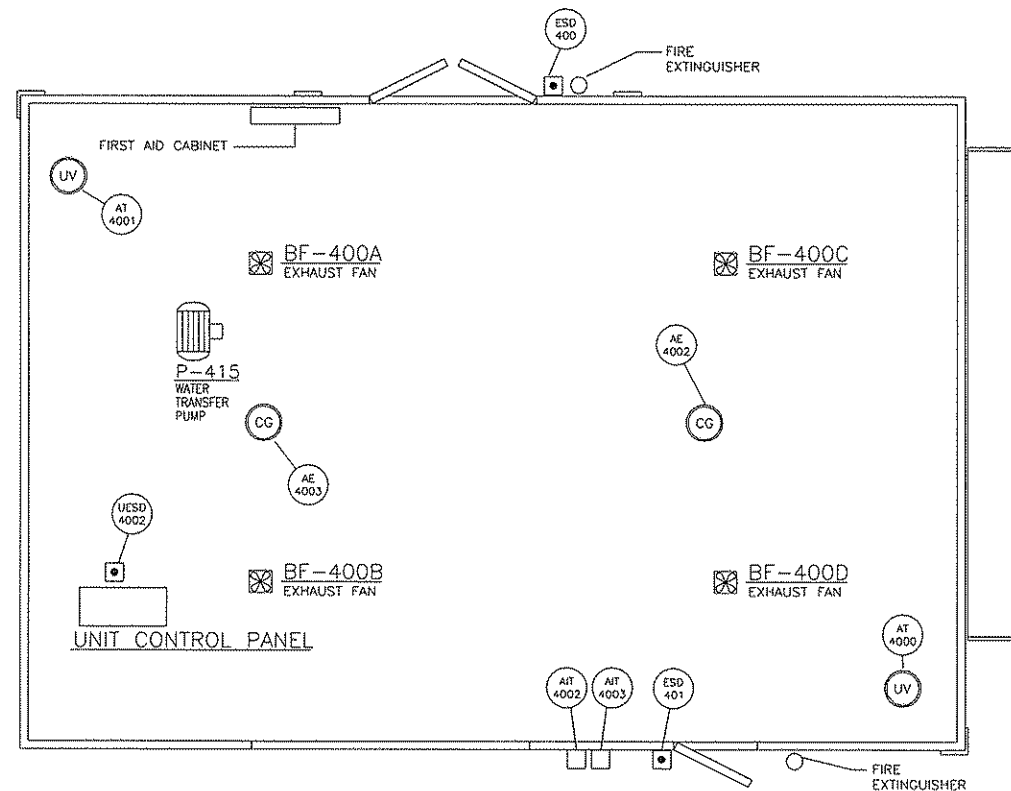
T-300 PRODUCED WATER TANK



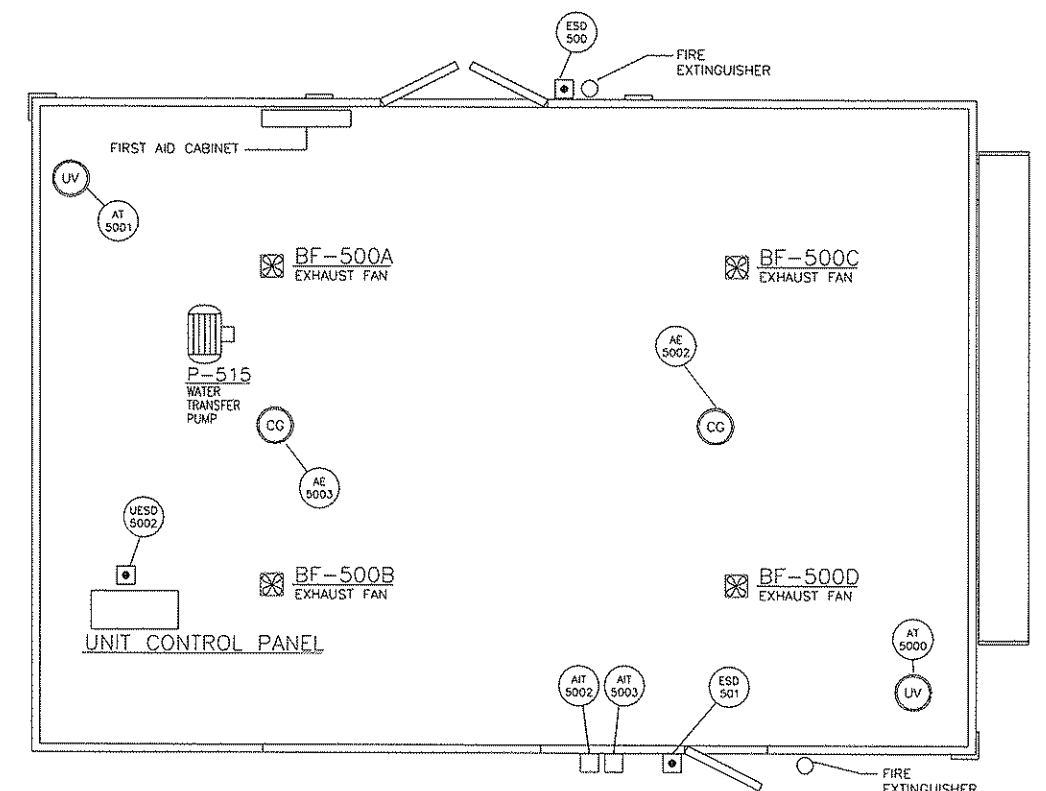
OFFICE/ELECTRICAL BUILDING



V-450 DEHY BUILDING



K-400 COMPRESSOR BUILDING



K-500 COMPRESSOR BUILDING

NOTES:

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		A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW	
		B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW	
		C	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW	
		1	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW	

ENGINEERING STAMP

GRB ENGINEERING Ltd.

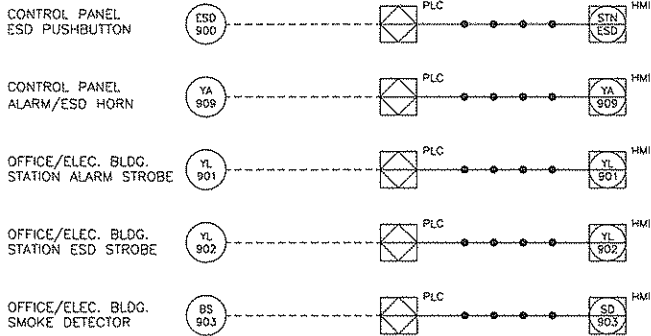
QUICKSILVER

TWINING COMPRESSOR STATION
SAFETY SYSTEM DIAGRAM
SHEET 1 OF 4

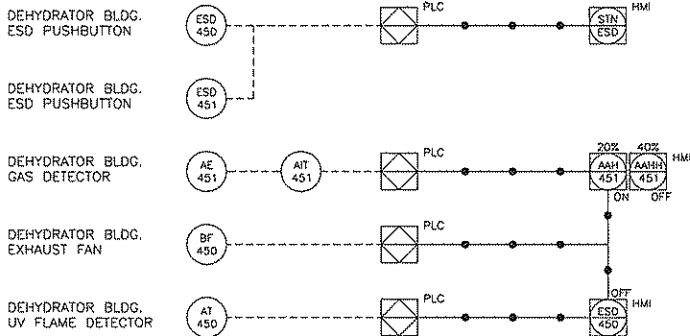
PROJECT NO. 9549.02	SCALE: 1:40	DWG. NO. D-9549-S-005A	REV. 1
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SYMBOLS	ISA MEANING	DESCRIPTION
	ANALYZER ELEMENT	COMBUSTIBLE GAS DETECTOR HEAD
	ANALYZER INDICATING TRANSMITTER	COMBUSTIBLE GAS DETECTOR TRANSMITTER
	ANALYZER TRANSMITTER	UV FLAME DETECTOR
	BURNER OR COMBUSTION SWITCH	SMOKE DETECTOR
	FIRE SHUTDOWN	FIRE ALARM PULL STATION
	TEMPERATURE SWITCH	THERMAL DETECTOR
	EMERGENCY SHUTDOWN	STATION ESD PUSHBUTTON
	EMERGENCY SHUTDOWN	COMPRESSOR UNIT ESD PUSHBUTTON
	EVENT ALARM	ALARM HORN
	EVENT LIGHT	ALARM INDICATING LIGHT (R=RED-ESD, Y=YELLOW-ALARM)
	ANALYZER ALARM HIGH	20% LEL GAS ALARM GENERATED BY PLC
	ANALYZER ALARM HIGH HIGH	40% LEL GAS SHUTDOWN GENERATED BY PLC
	MULTI-VARIABLE ALARM	ALARM OR CONTROL FUNCTION GENERATED IN PLC
	MULTI-VARIABLE RELAY	RELAY OUTPUTS FROM FIRE ALARM PANEL
	MULTI-VARIABLE ALARM	ALARM OR CONTROL FUNCTION GENERATED IN COMPRESSOR UNIT CONTROL PANEL
	EVENT ALARM	AUDIBLE ALARM
	EVENT LIGHT	ALARM LIGHT
	MULTI-VARIABLE ALARM	SHARED DISPLAY ALARM, HMI
	DATA LINK	SERIAL SIGNAL, LEASED TELEPHONE LINE, DIAL UP MODEM, OR SATELLITE MODEM
	ELECTRIC SIGNAL	HARDWIRED CONNECTIONS

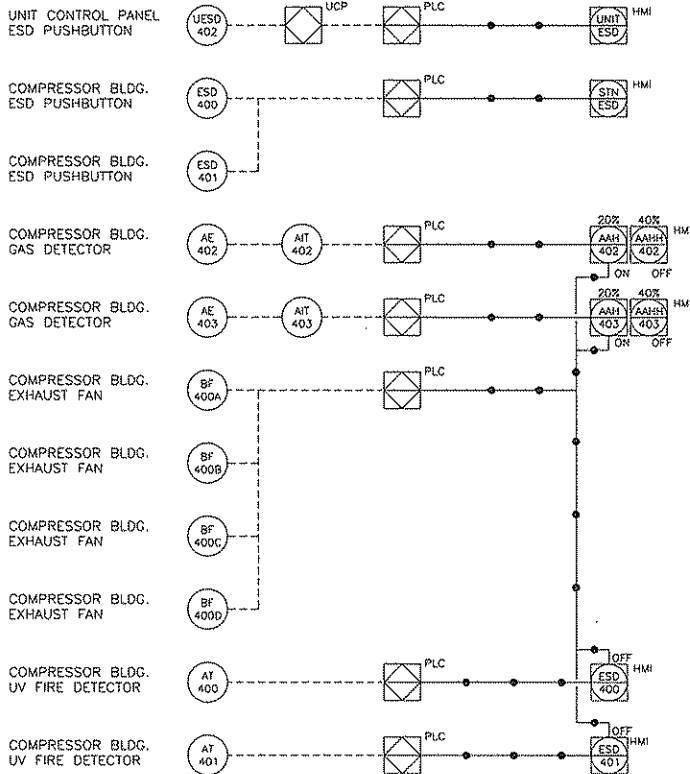
OFFICE/ELECTRICAL BUILDING



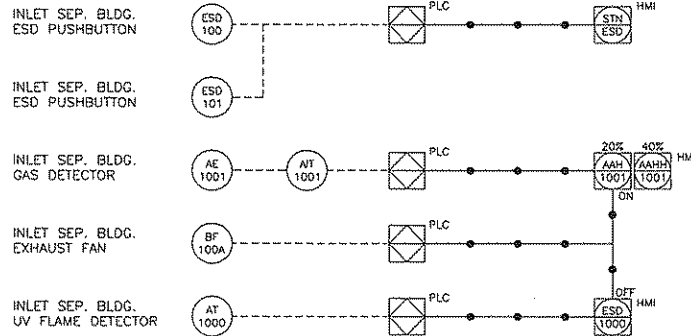
DEHYDRATOR BUILDING



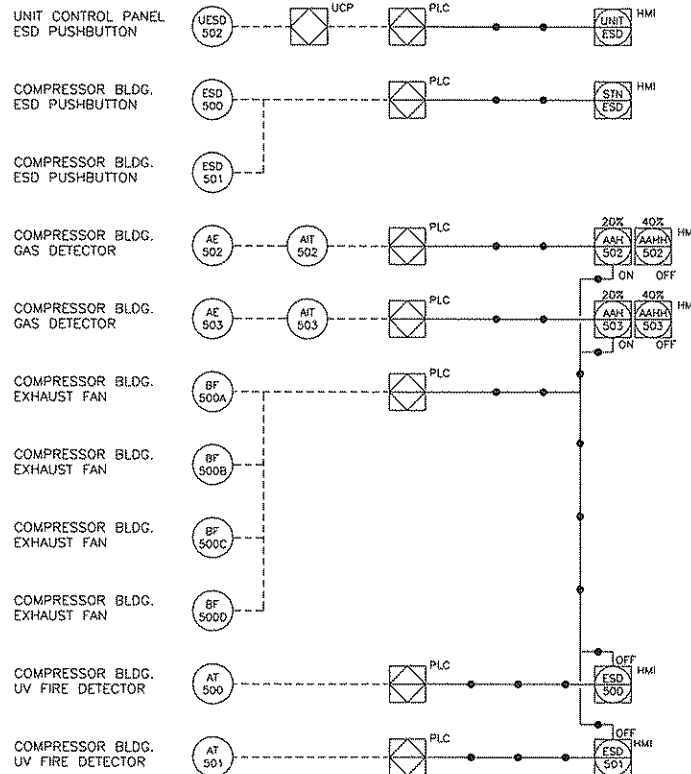
K-400 COMPRESSOR BUILDING



INLET SEPARATOR BUILDING



K-500 COMPRESSOR BUILDING



NOTES:

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
A	PRELIMINARY (K-500 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW
D	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW
1	AS BUILT PER FIELD MARK UPS	9459.02	2009.04.08	MXC	AFM	JMW

ENGINEERING STAMP

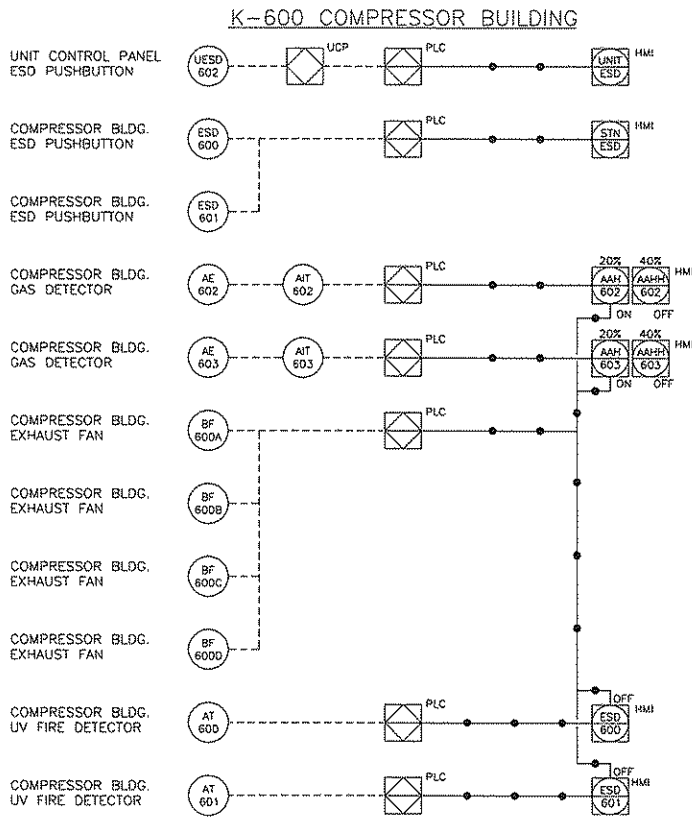
GRB ENGINEERING Ltd.



TWINING COMPRESSOR STATION
SAFETY SYSTEM DIAGRAM
SHEET 3 OF 4

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	N.T.S.	D-9549-S-005C	1

SYMBOLS	ISA MEANING	DESCRIPTION
	ANALYZER ELEMENT	COMBUSTIBLE GAS DETECTOR HEAD
	ANALYZER INDICATING TRANSMITTER	COMBUSTIBLE GAS DETECTOR TRANSMITTER
	ANALYZER TRANSMITTER	UV FLAME DETECTOR
	BURNER OR COMBUSTION SWITCH	SMOKE DETECTOR
	FIRE SHUTDOWN	FIRE ALARM PULL STATION
	TEMPERATURE SWITCH	THERMAL DETECTOR
	EMERGENCY SHUTDOWN	STATION ESD PUSHBUTTON
	EMERGENCY SHUTDOWN	COMPRESSOR UNIT ESD PUSHBUTTON
	EVENT ALARM	ALARM HORN
	EVENT LIGHT	ALARM INDICATING LIGHT (R=RED-ESD, Y=YELLOW-ALARM)
PLC	ANALYZER ALARM HIGH	20% LEL GAS ALARM GENERATED BY PLC
PLC	ANALYZER ALARM HIGH HIGH	40% LEL GAS SHUTDOWN GENERATED BY PLC
PLC	MULTI-VARIABLE ALARM	ALARM OR CONTROL FUNCTION GENERATED IN PLC
FP	MULTI-VARIABLE RELAY	RELAY OUTPUTS FROM FIRE ALARM PANEL
UCP	MULTI-VARIABLE ALARM	ALARM OR CONTROL FUNCTION GENERATED IN COMPRESSOR UNIT CONTROL PANEL
	EVENT ALARM	AUDIBLE ALARM
	EVENT LIGHT	ALARM LIGHT
HMI	MULTI-VARIABLE ALARM	SHARED DISPLAY ALARM, HMI
	DATA LINK	SERIAL SIGNAL, LEASED TELEPHONE LINE, DIAL UP MODEM, OR SATELLITE MODEM
	ELECTRIC SIGNAL	HARDWIRED CONNECTIONS



NOTES:

REFERENCE DRAWINGS

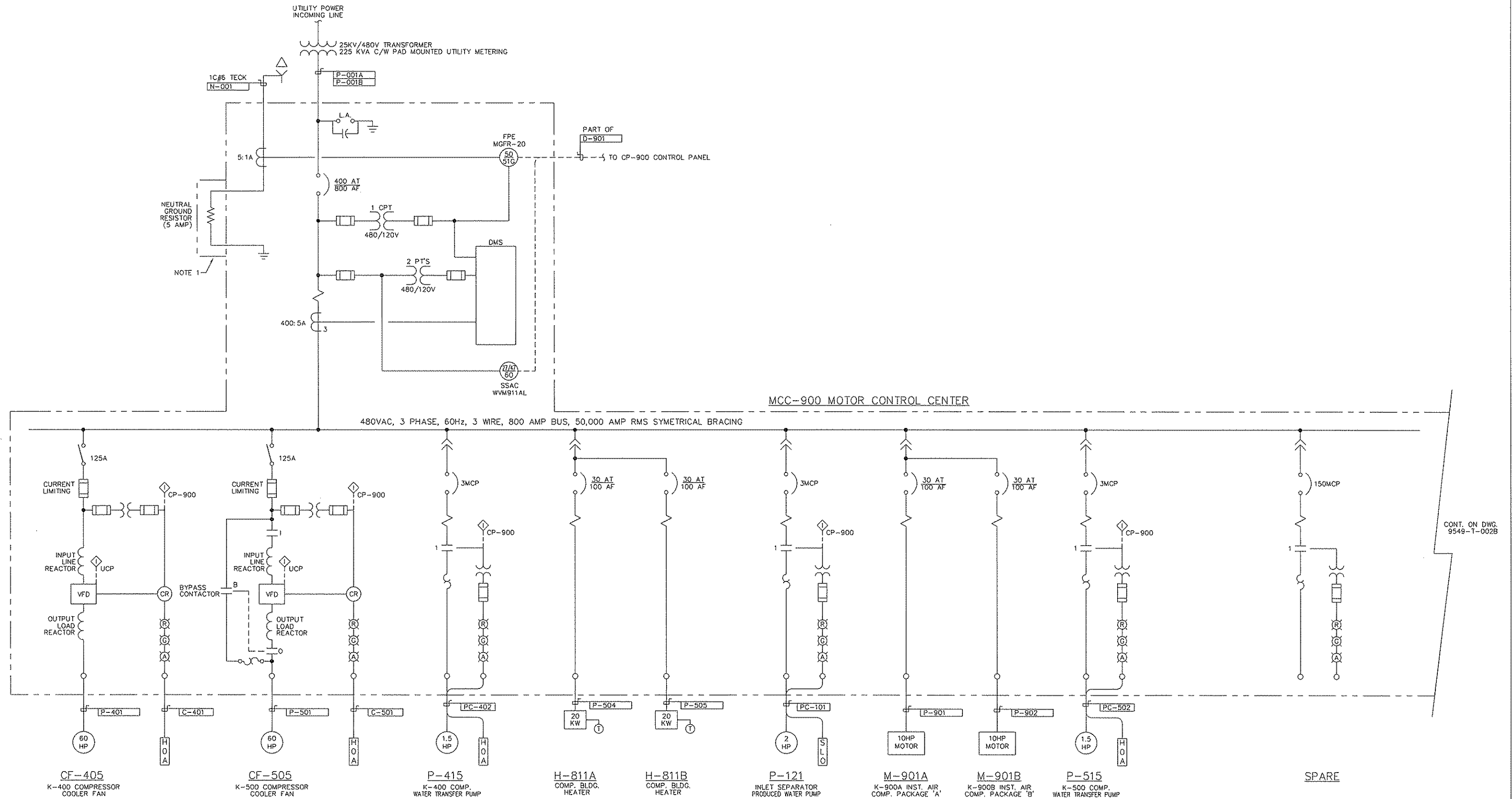
REVISIONS

ENGINEERING STAMP

DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
		A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
		B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW
		C	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW
		1	AS BUILT PER FIELD MARK UPS	9459.02	2009.04.08	MXC	AFM	JMW

TWINING COMPRESSOR STATION SAFETY SYSTEM DIAGRAM SHEET 4 OF 4			
PROJECT NO. 9549.02	SCALE: N.T.S.	DWG. NO. D-9549-S-005D	REV. 1

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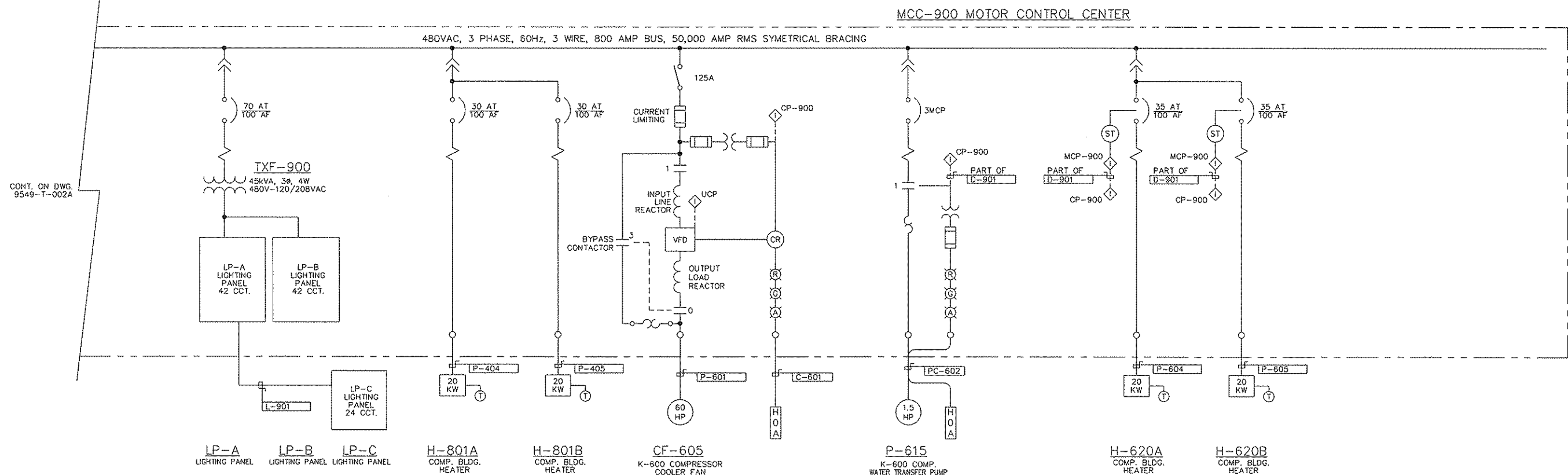
- NOTES:
1. NGR IS LOCATED IN A SELF-CONTAINED ENCLOSURE MOUNTED ON TOP OF MCC.
 2. REPLACE SPARE 7MCP WITH MCP, NZMH4-10-50-0V1 AND OVERLOAD 200-4 SUPPLIED BY MOELLER.

REFERENCE DRAWINGS	
DWG. NO.	DESCRIPTION

REVISIONS						
NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
A	PRELIMINARY	9549.00	05-03-15	DAS	JMW	JMW
0	ISSUED FOR CONSTRUCTION	9549.00	05-05-17	DAS	GMW	JMW
1	AS-BUILT	9549.00	05-08-16	LL	DPS	JMW
2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05-08-29	LL	MSC	JMW
3	AS-BUILT	9549.01	06-01-17	YG	DPS	JMW

ENGINEERING STAMP			
TWINING COMPRESSOR STATION MCC-900 MOTOR CONTROL CENTER SINGLE LINE DIAGRAM (SHEET 1 OF 2)			
PROJECT NO. 9549.01	SCALE: N.T.S.	DWG. NO. D-9549-T-002A	REV. 3

GRB ENGINEERING Ltd.



NOTES:

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
0	ISSUED FOR CONSTRUCTION	9549.00	05-05-17	DAS	GMW	JMW
1	AS-BUILT	9549.00	05-08-16	LL	DPS	JMW
2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05-08-29	LL	MSC	JMW
3	AS-BUILT	9549.01	06-01-17	YG	DPS	JMW
4A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
4B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW
5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW
6	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW

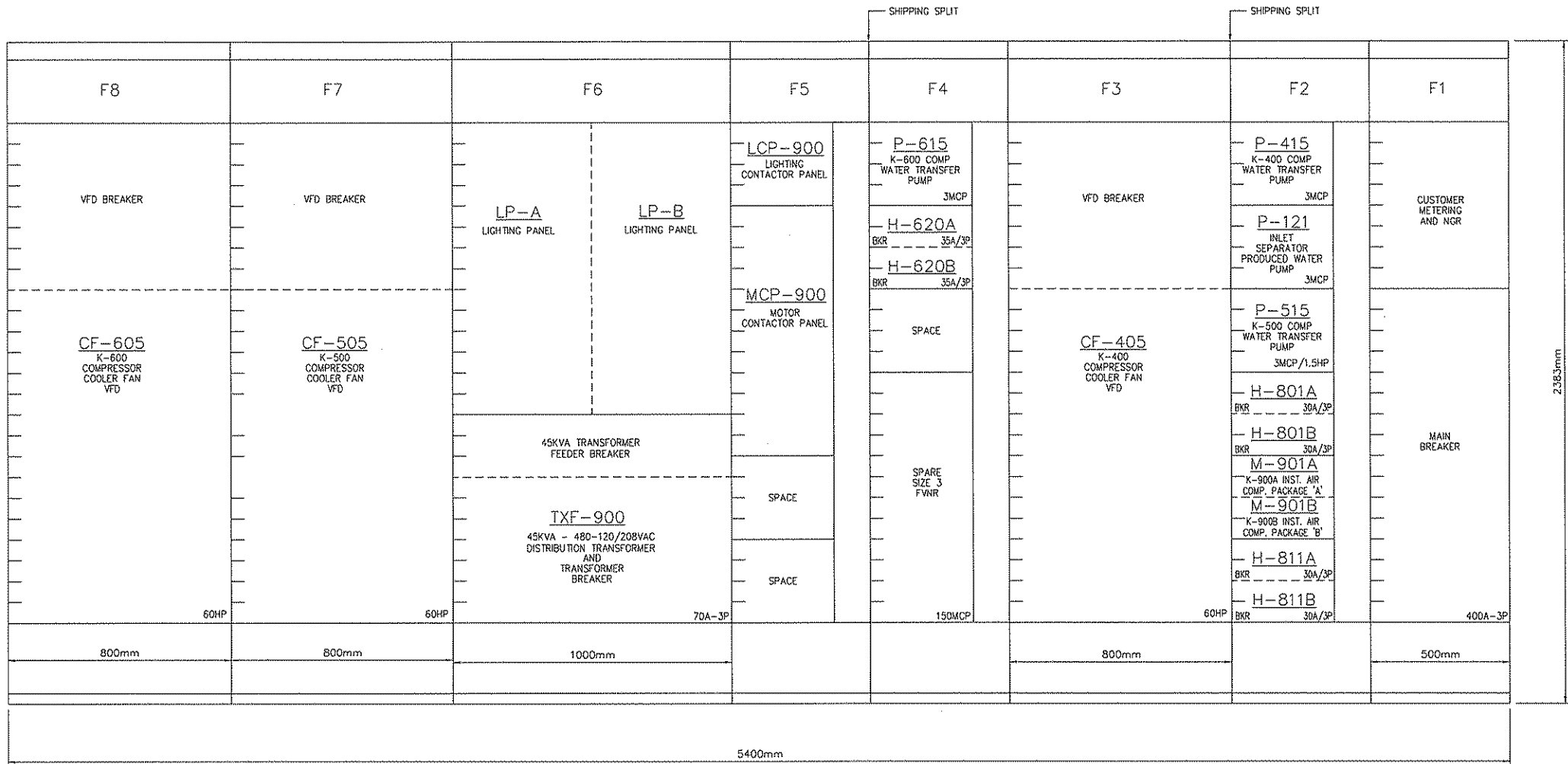
ENGINEERING STAMP



TWINING COMPRESSOR STATION
MCC-900 MOTOR CONTROL CENTER
SINGLE LINE DIAGRAM (SHEET 2 OF 2)

GRB ENGINEERING Ltd.

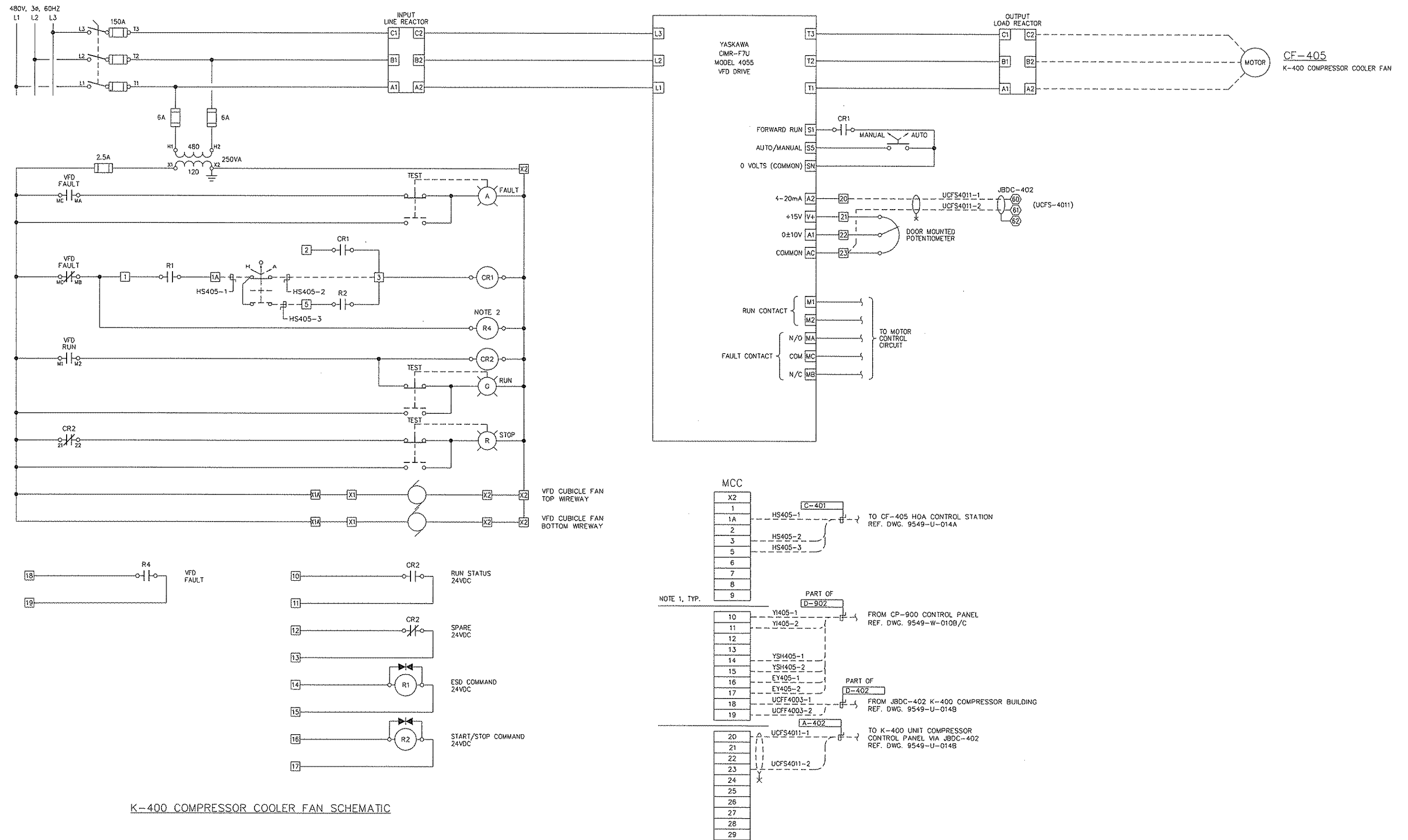
PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	N.T.S.	D-9549-T-002B	6

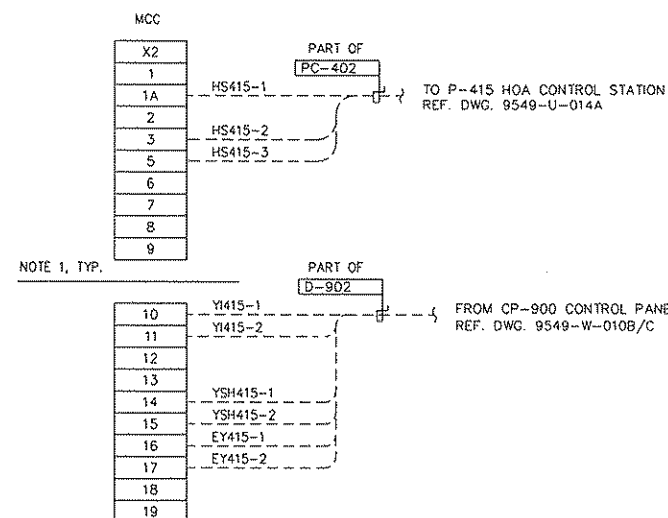
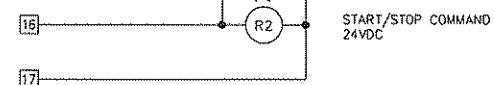
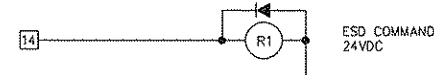
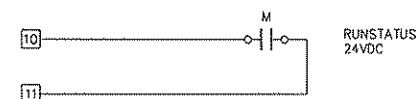
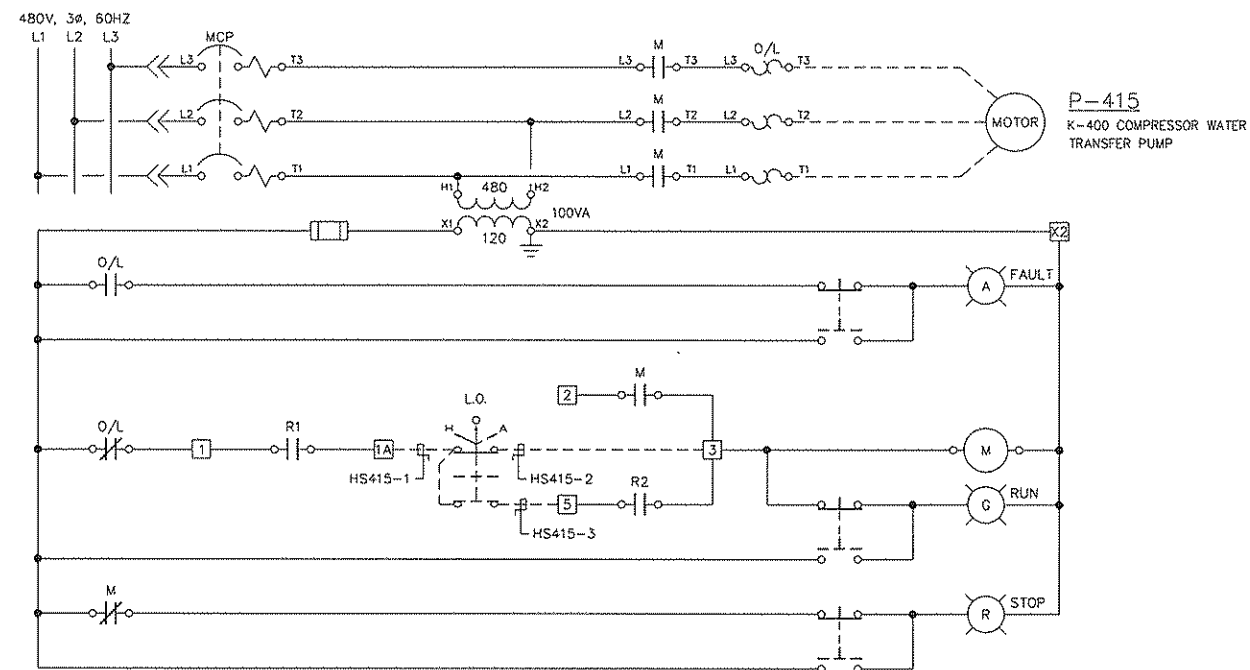


MCC-900 MOTOR CONTROL CENTER ELEVATION

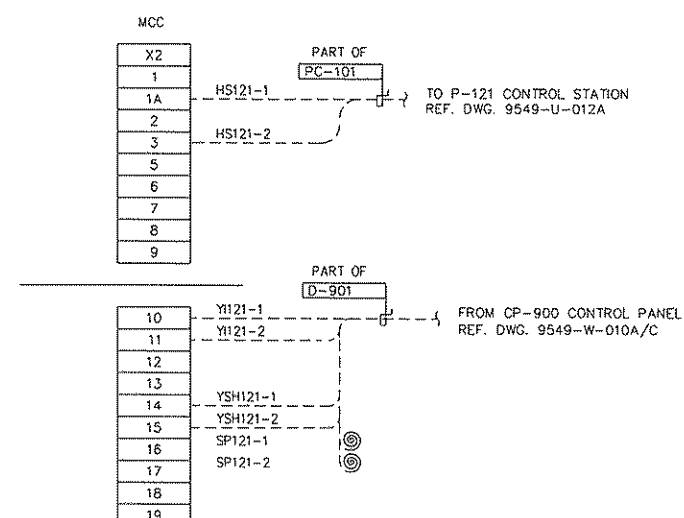
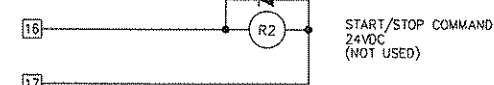
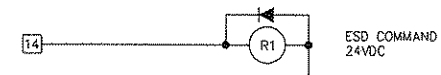
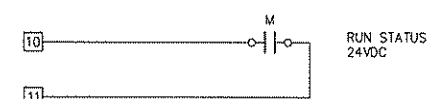
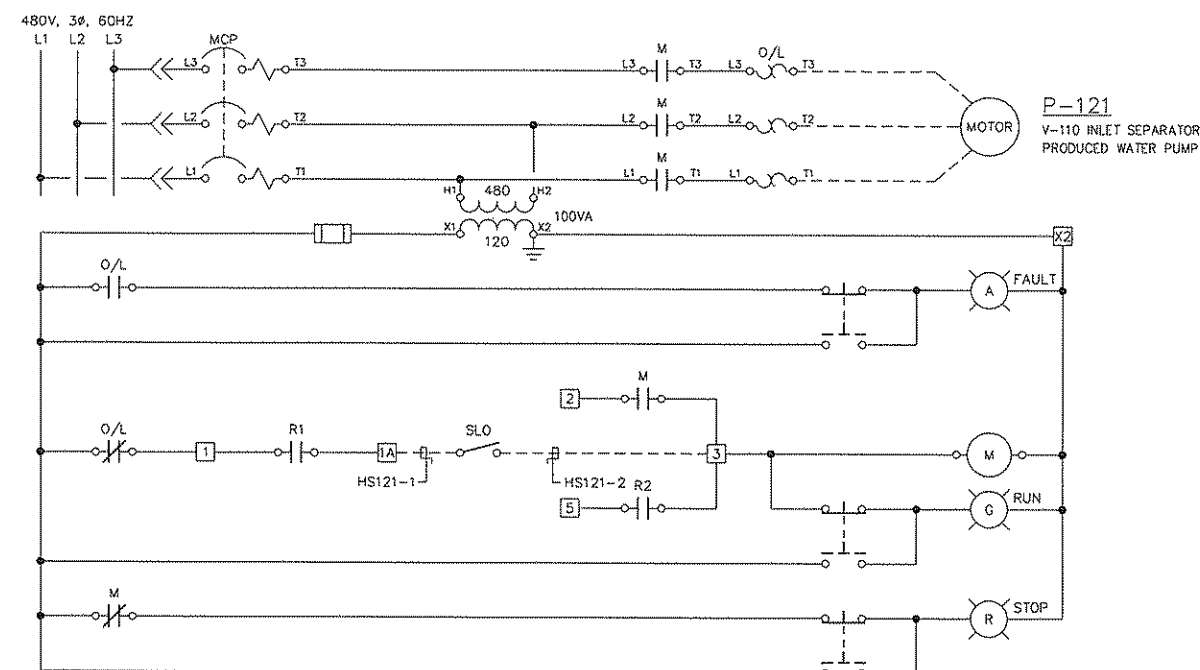
NOTES:

REFERENCE DRAWINGS			REVISIONS							ENGINEERING STAMP		 QUICKSILVER ***** TWINING COMPRESSOR STATION MCC-900 MOTOR CONTROL CENTER ELEVATION			
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.							
		6	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW	GRB ENGINEERING Ltd.						
		0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17	LL	GMW	JMW							
		1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW							
		2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW							
		3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW							
		4A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW							
		4B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW							
		5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW							
											PROJECT NO.	SCALE:	DWG. NO.	REV.	
											9549.02	1:10	D-9549-T-006A	6	





P-415 WATER TRANSFER PUMP SCHEMATIC



P-121 PRODUCED WATER PUMP SCHEMATIC

NOTES:

1. PROVIDE PHYSICAL BARRIER OR SPACE BETWEEN AC AND DC TERMINALS

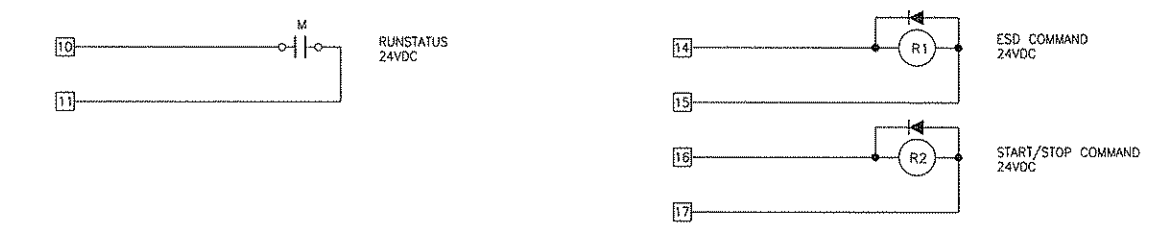
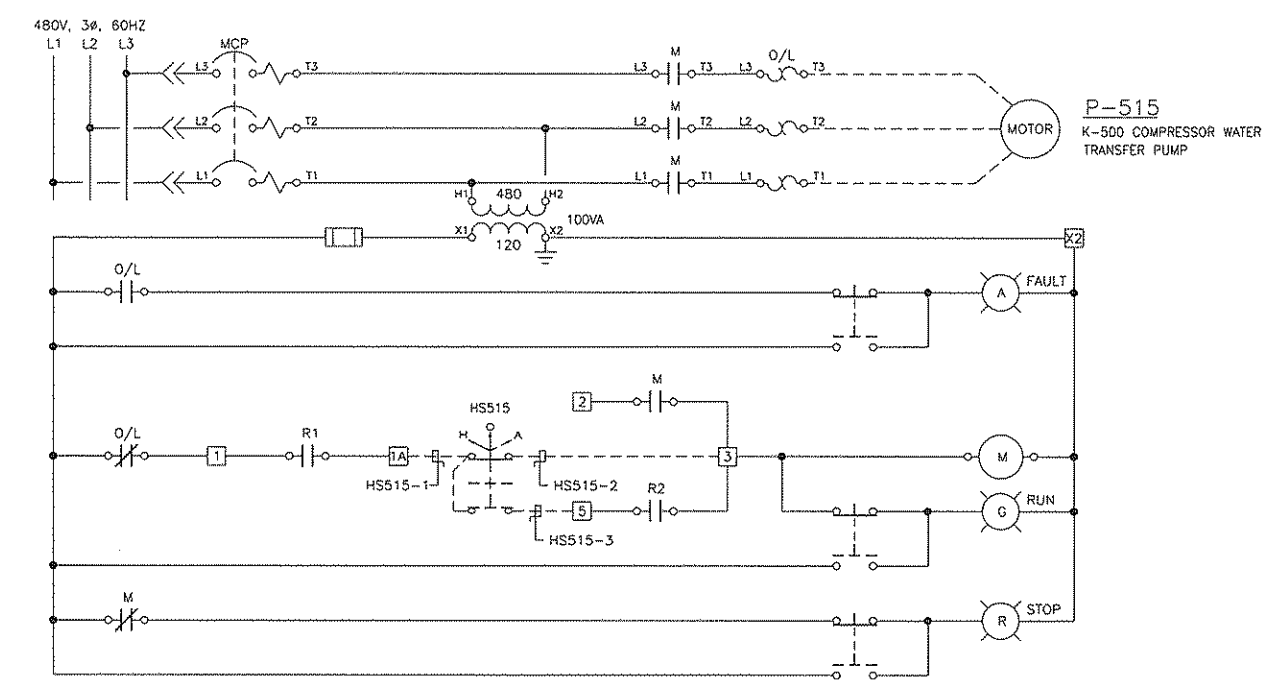
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QUICKSILVER

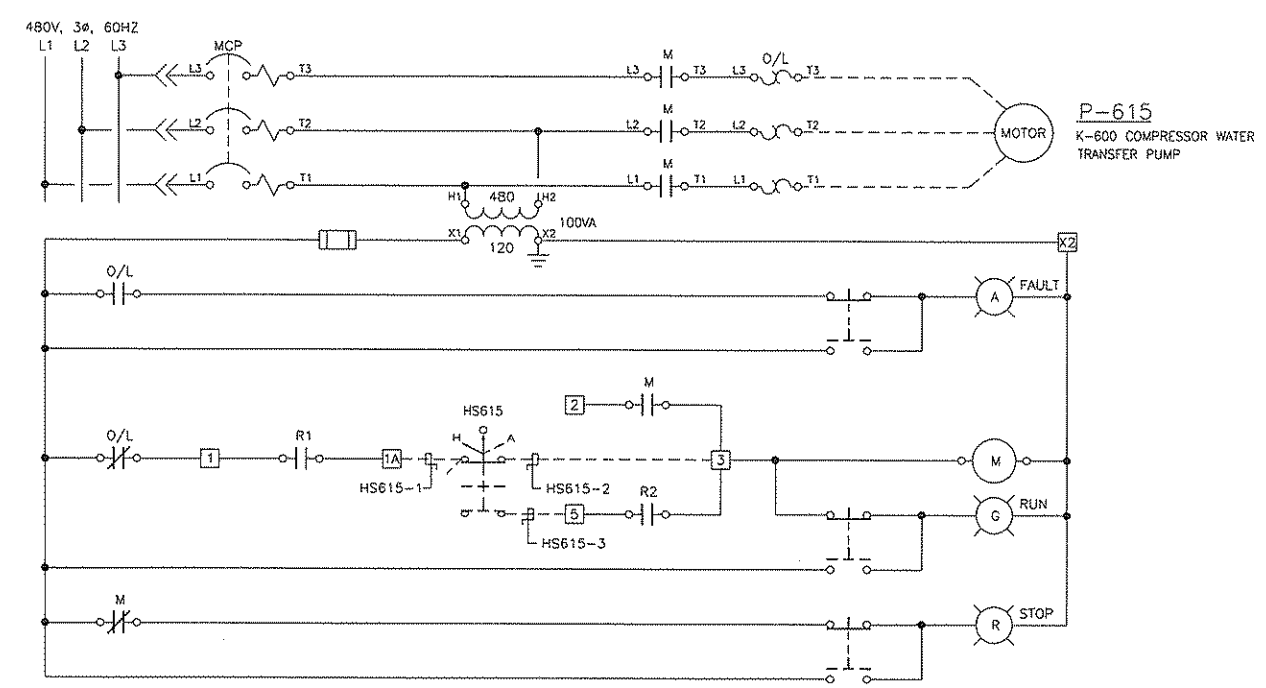
TWINING COMPRESSOR STATION 480VAC MOTOR CONTROL SCHEMATIC

GRB ENGINEERING LTD.

PROJECT NO.	SCALE:	DWG. NO.	RE
9549.01	N.T.S.	D-9549-T-011B	

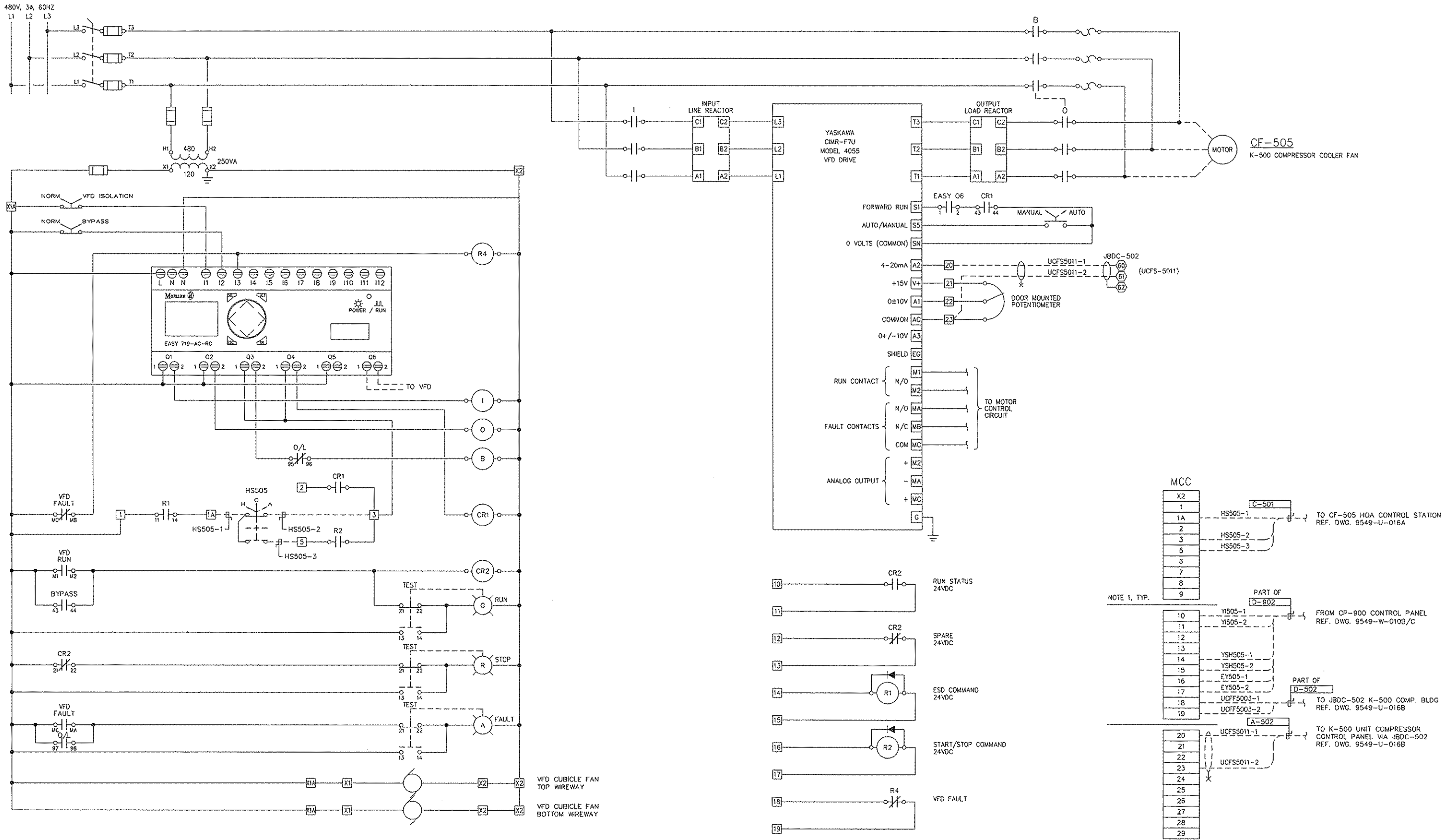


P-515 WATER TRANSFER PUMP SCHEMATIC



P-615 WATER TRANSFER PUMP SCHEMATIC

NOTES: 1. PROVIDE PHYSICAL BARRIER OR SPACE BETWEEN AC AND DC TERMINALS.	REFERENCE DRAWINGS		REVISIONS							ENGINEERING STAMP		 QUICKSILVER				
	DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	TWINING COMPRESSOR STATION 480VAC MOTOR CONTROL SCHEMATIC						
			6	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW	GRB ENGINEERING Ltd. PROJECT NO. 9549.02 SCALE: N.T.S. DWG. NO. D-9549-T-011C REV. 6						
			0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17	LL	GMW	JMW							
			1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW							
			2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW							
			3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW							
			4A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW							
			4B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW							
			5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW							



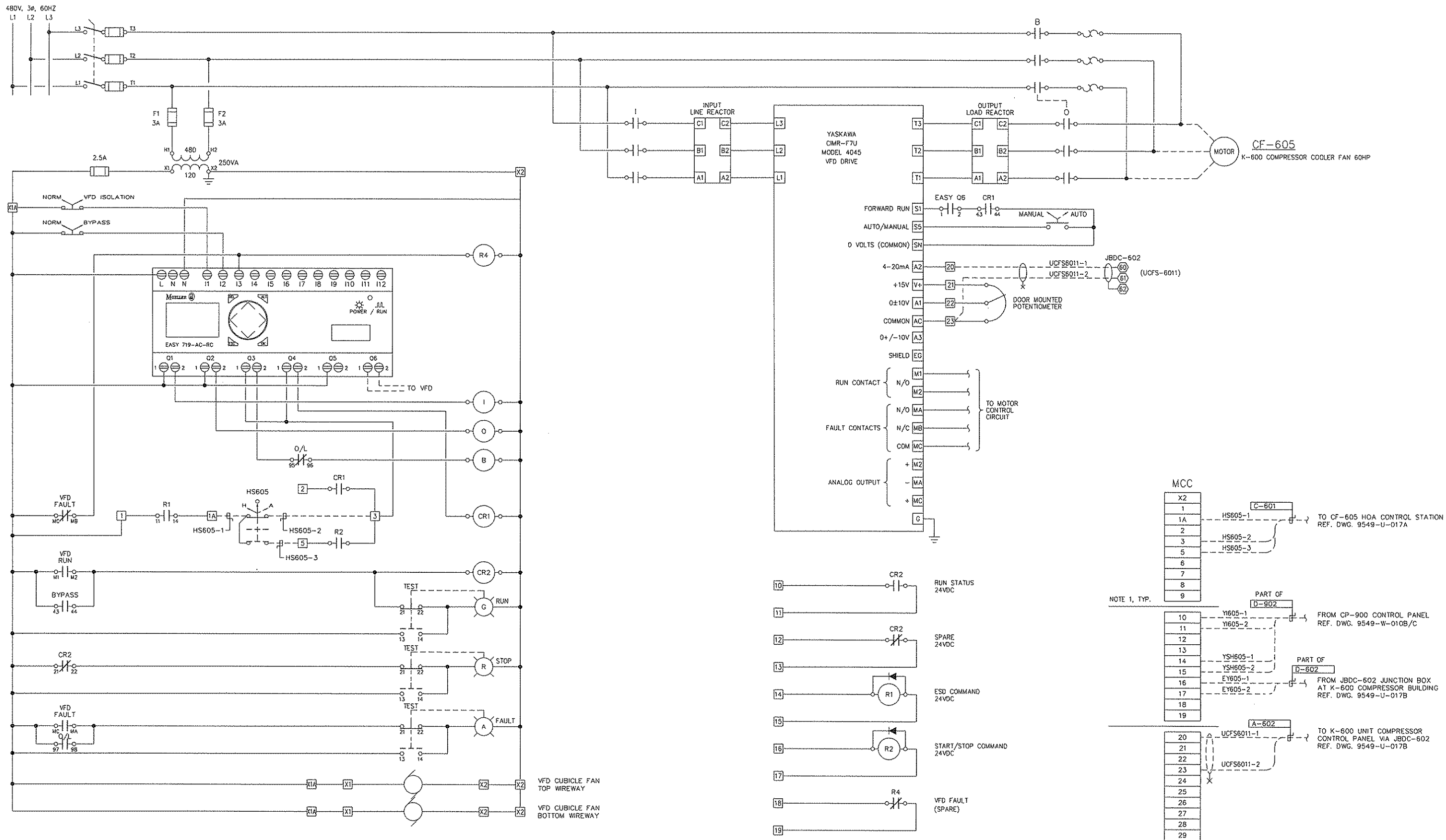
K-500 COMPRESSOR COOLER FAN SCHEMATIC

NOTES:
1. PROVIDE PHYSICAL BARRIER OR SPACE BETWEEN AC AND DC TERMINALS.

REFERENCE DRAWINGS		REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
		0	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05-08-29	LI	MSC	JMW
		1	AS-BUILT	9549.01	06-01-17	YG	DPS	JMW

ENGINEERING STAMP			
TWINING COMPRESSOR STATION 480VAC MOTOR CONTROL SCHEMATIC			
PROJECT NO. 9549.01	SCALE: N.T.S.	DWG. NO. D-9549-T-011D	REV. 1

GRB ENGINEERING Ltd.

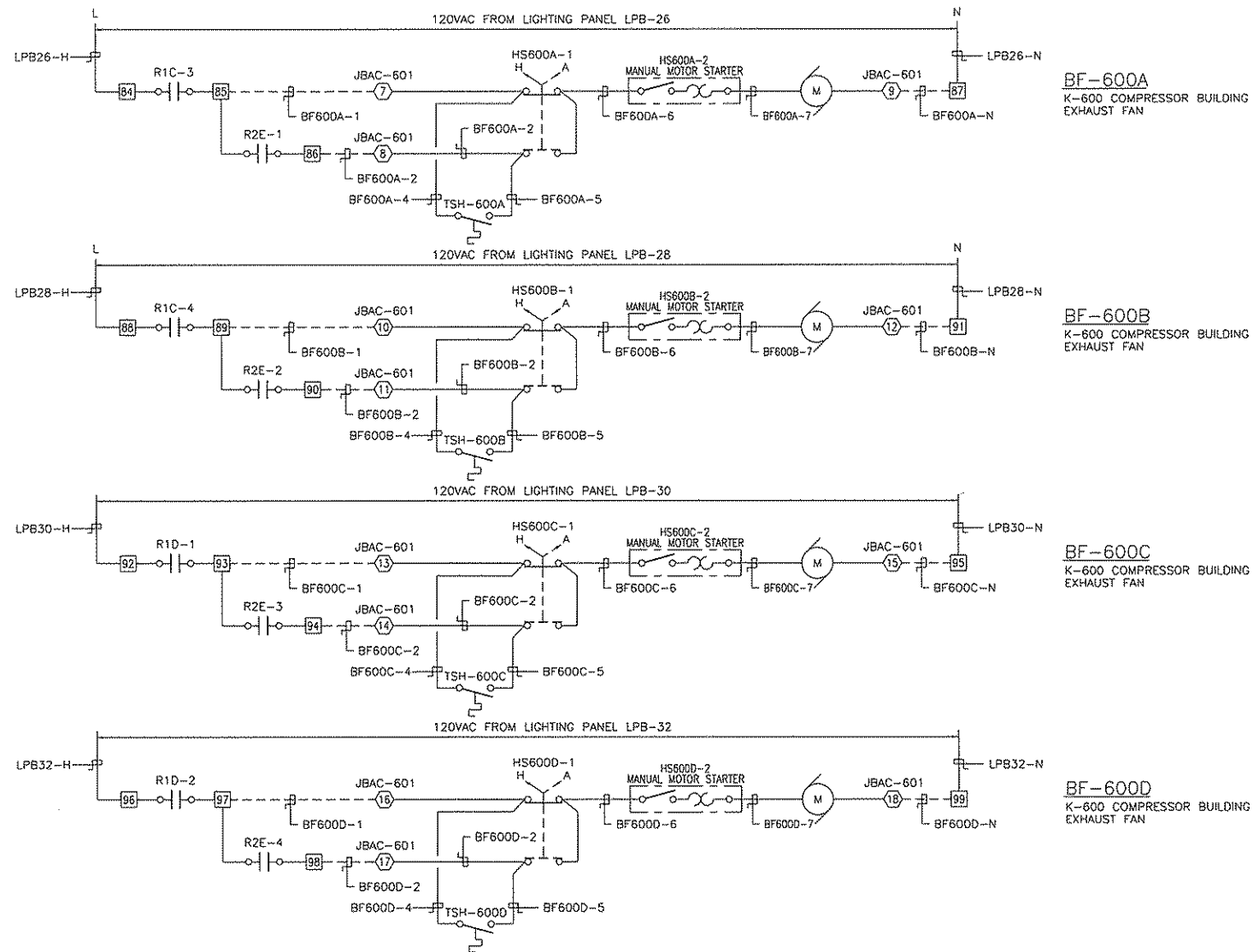


K-600 COMPRESSOR COOLER FAN SCHEMATIC

NOTES:	
1. PROVIDE PHYSICAL BARRIER OR SPACE BETWEEN AC AND DC TERMINALS.	

REFERENCE DRAWINGS		REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
		A	PRELIMINARY	9549.02	2008.12.03	GMK	AFM	JMW
		B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	GMK	AFM	JMW
		O	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW
		1	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW

ENGINEERING STAMP				QUICKSILVER			
				TWINING COMPRESSOR STATION 480VAC MOTOR CONTROL SCHEMATIC			
PROJECT NO.		SCALE:	DWG. NO.	REV.			
9549.02		N.T.S.	D-9549-T-011E	1			



NOTES:

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION

REVISIONS

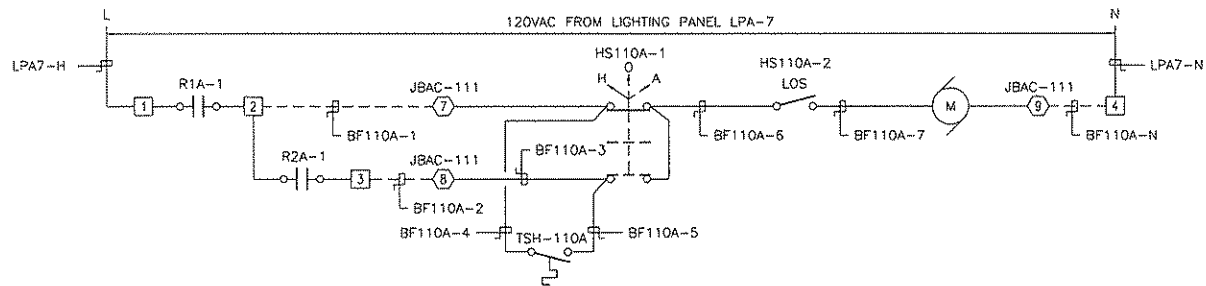
NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
A	PRELIMINARY	9549.02	2008.12.16	MXC	AFM	JMW
B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	MXC	AFM	JMW
C	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW
1	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW

ENGINEERING STAMP

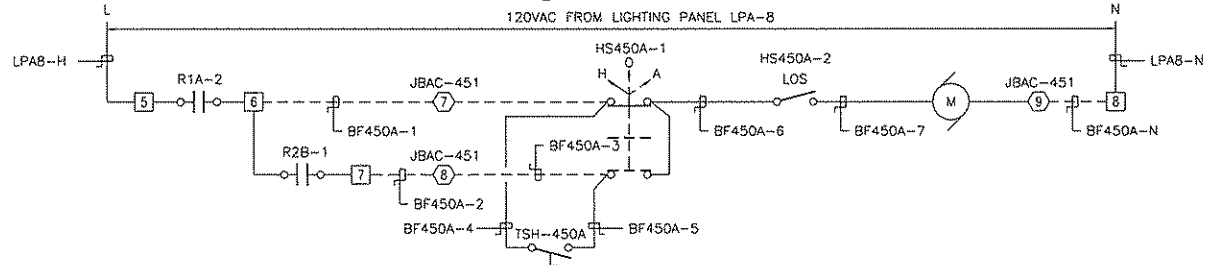


TWINING COMPRESSOR STATION
MCP-900 MOTOR CONTACTOR PANEL
120VAC SCHEMATIC

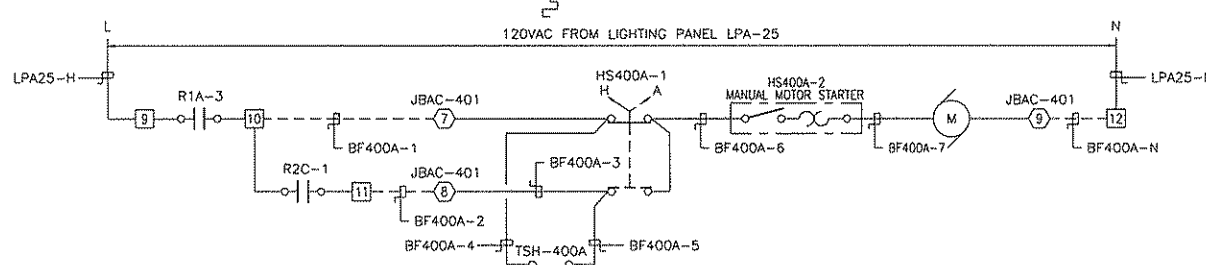
PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	N.T.S.	D-9549-T-020A1	1



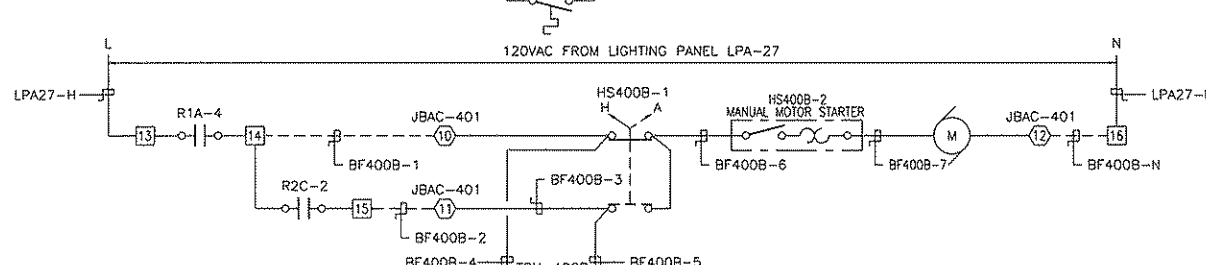
BF-110A
INLET SEPARATOR BUILDING
EXHAUST FAN



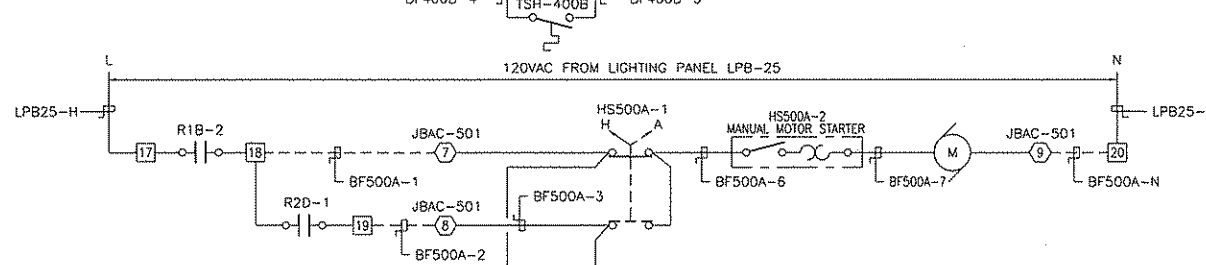
BF-450A
DEHYDRATION BUILDING
EXHAUST FAN



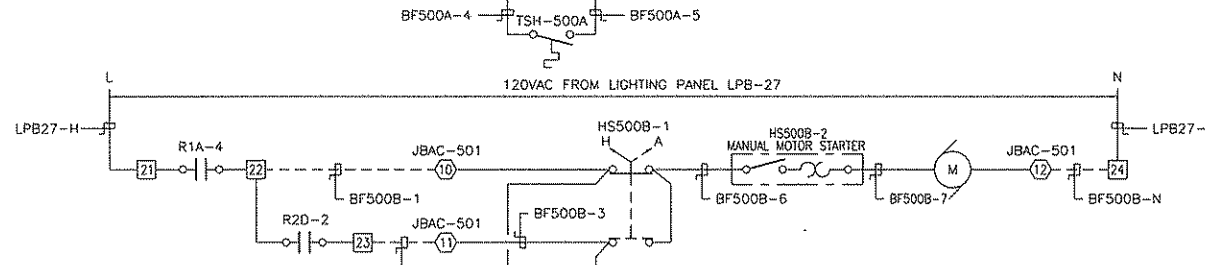
BF-400A
K-400 COMPRESSOR BUILDING
EXHAUST FAN



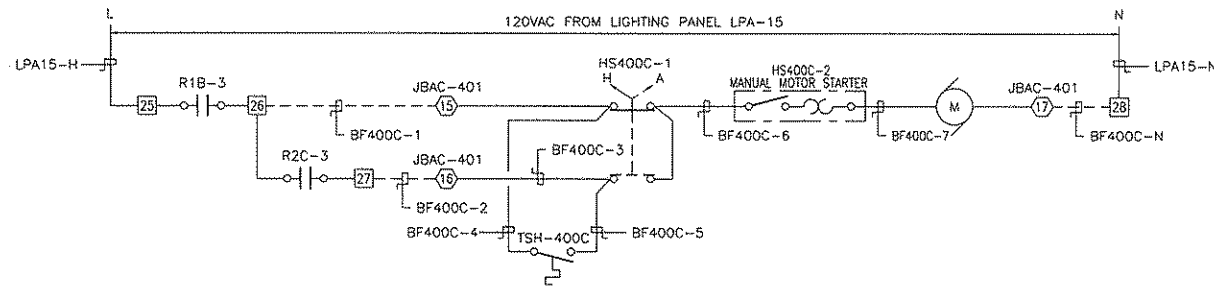
BF-400B
K-400 COMPRESSOR BUILDING
EXHAUST FAN



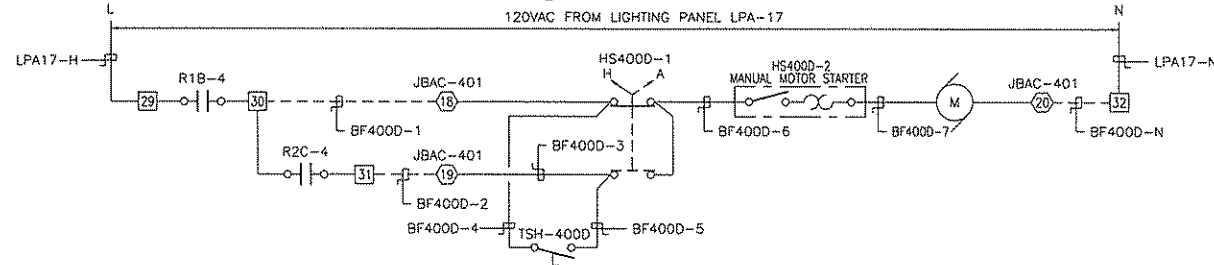
BF-500A
K-500 COMPRESSOR BUILDING
EXHAUST FAN



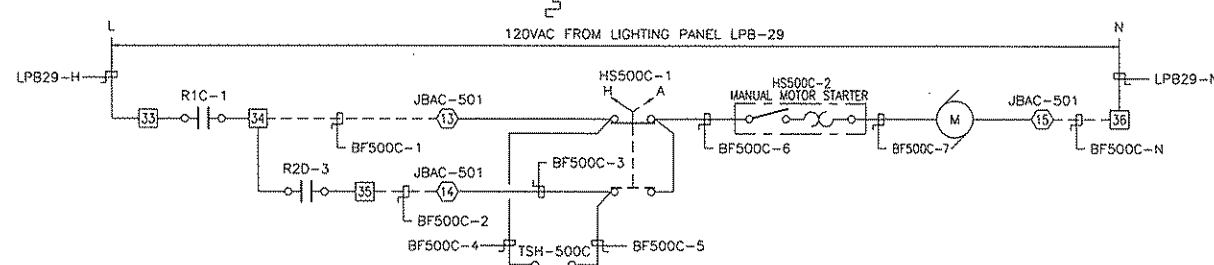
BF-500B
K-500 COMPRESSOR BUILDING
EXHAUST FAN



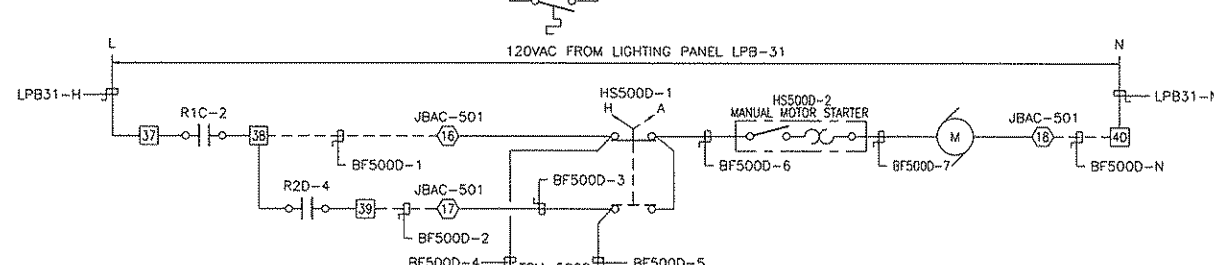
BF-400C
K-400 COMPRESSOR BUILDING
EXHAUST FAN



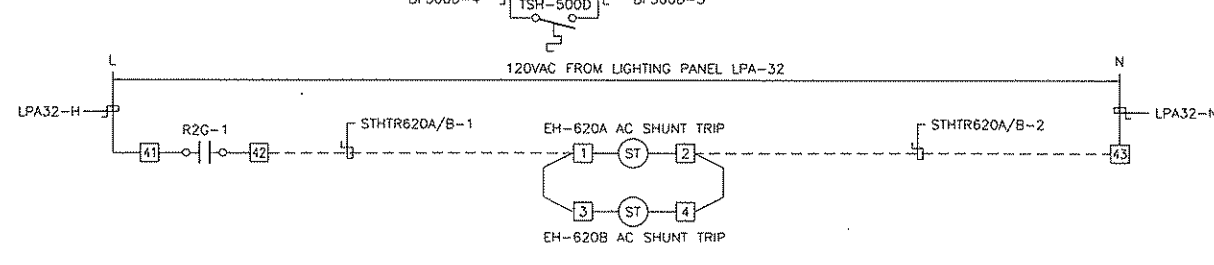
BF-400D
K-400 COMPRESSOR BUILDING
EXHAUST FAN



BF-500C
K-500 COMPRESSOR BUILDING
EXHAUST FAN



BF-500D
K-500 COMPRESSOR BUILDING
EXHAUST FAN



SHUNT TRIP "A"
K-600 COMPRESSOR
BUILDING HEATER

SHUNT TRIP "B"
K-600 COMPRESSOR
BUILDING HEATER

CONSTRUCTION NOTES:

1. FIELD CONTRACTOR TO VERIFY CONTACTOR NUMBERING IS CORRECT WITH REGARDS TO BUILDING FAN NUMBERING.

NOTES:

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION
6	ISSUED FOR CONSTRUCTION (K-600 ADDITION)
7	AS BUILT PER FIELD MARK UPS
1	AS-BUILT
2	K-500 COMPRESSOR BUILDING ADDITION
3	AS-BUILT
4	AS-BUILT AS PER EXHAUST FAN ADDITIONS
5A	PRELIMINARY (K-600 ADDITION)
5B	ISSUED FOR BID (K-600 ADDITION)

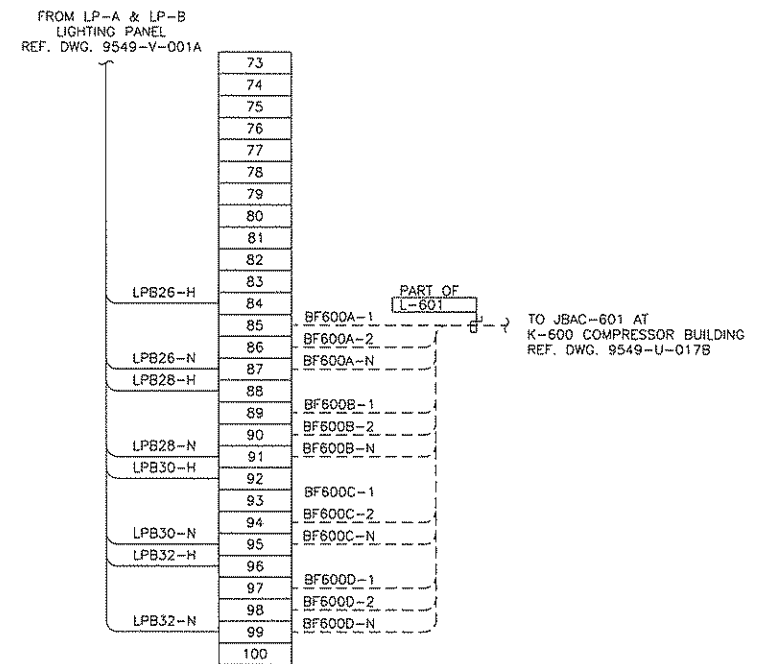
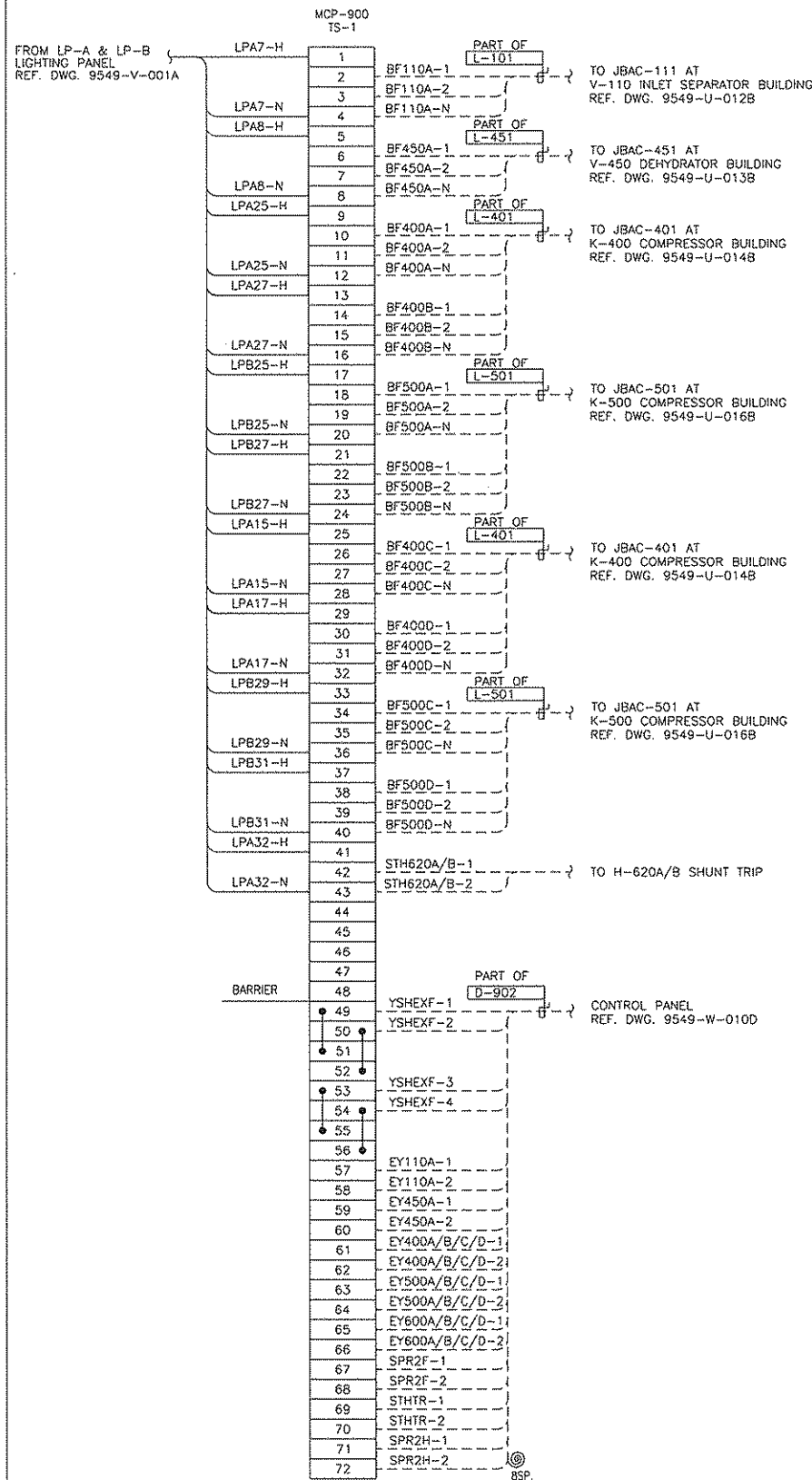
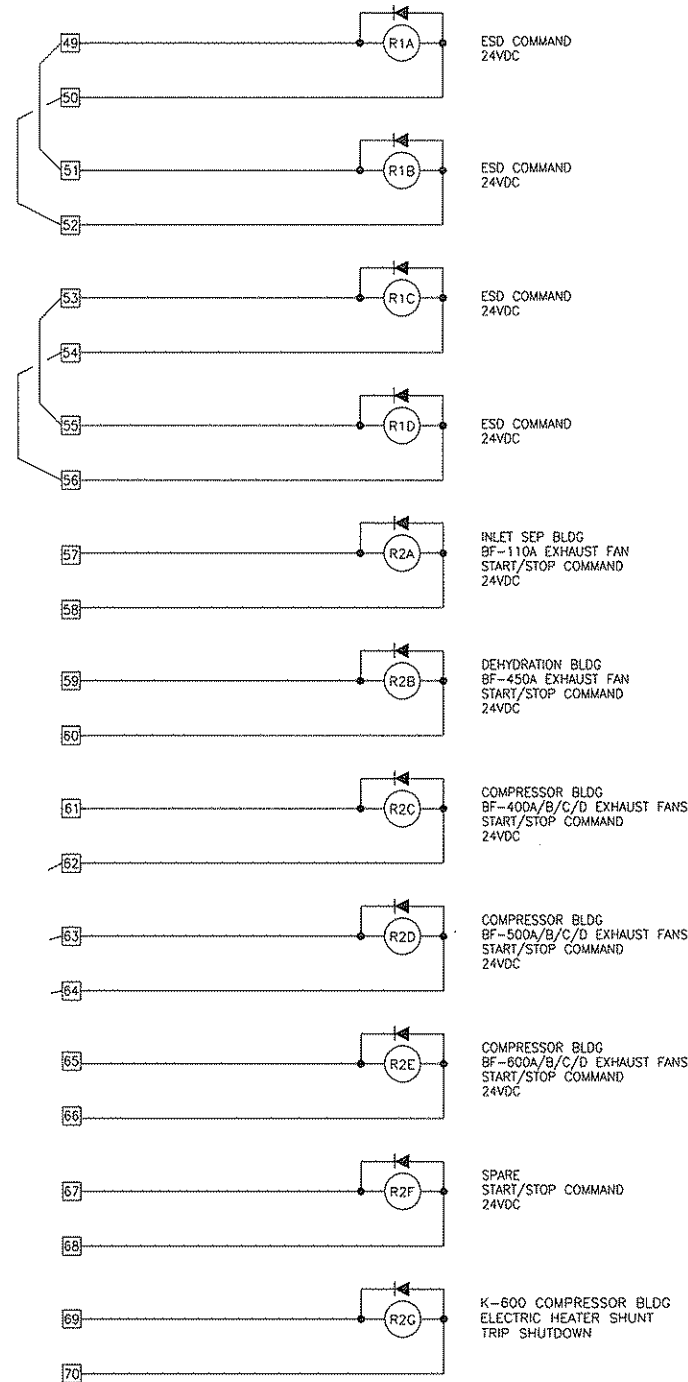
REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
6	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW
7	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW
1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW
2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW
3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW
4	AS-BUILT AS PER EXHAUST FAN ADDITIONS	9549.01	07.05.18	YG	MSC	JMW
5A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
5B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW

ENGINEERING STAMP

GRB ENGINEERING Ltd.

QUICKSILVER TWINING COMPRESSOR STATION MCP-900 MOTOR CONTACTOR PANEL 120VAC SCHEMATIC			
PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	N.T.S.	D-9549-T-020A	7

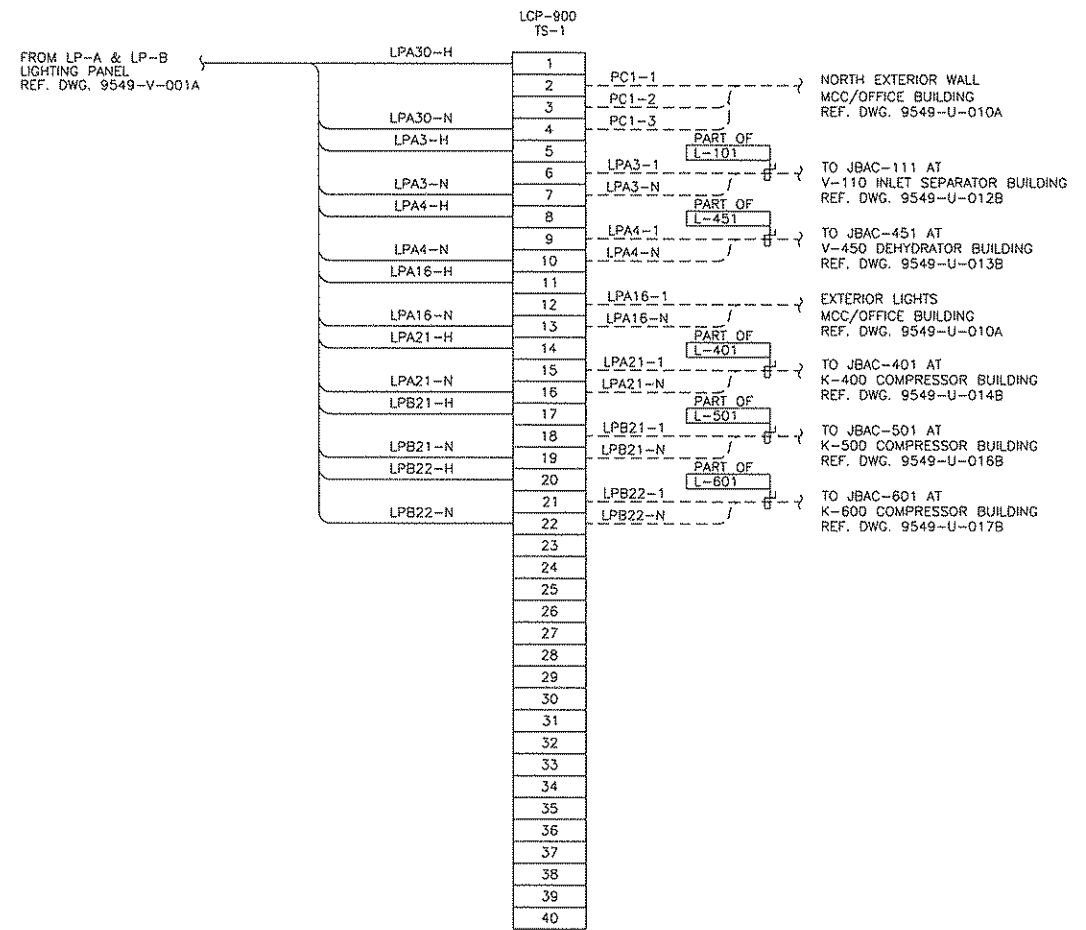
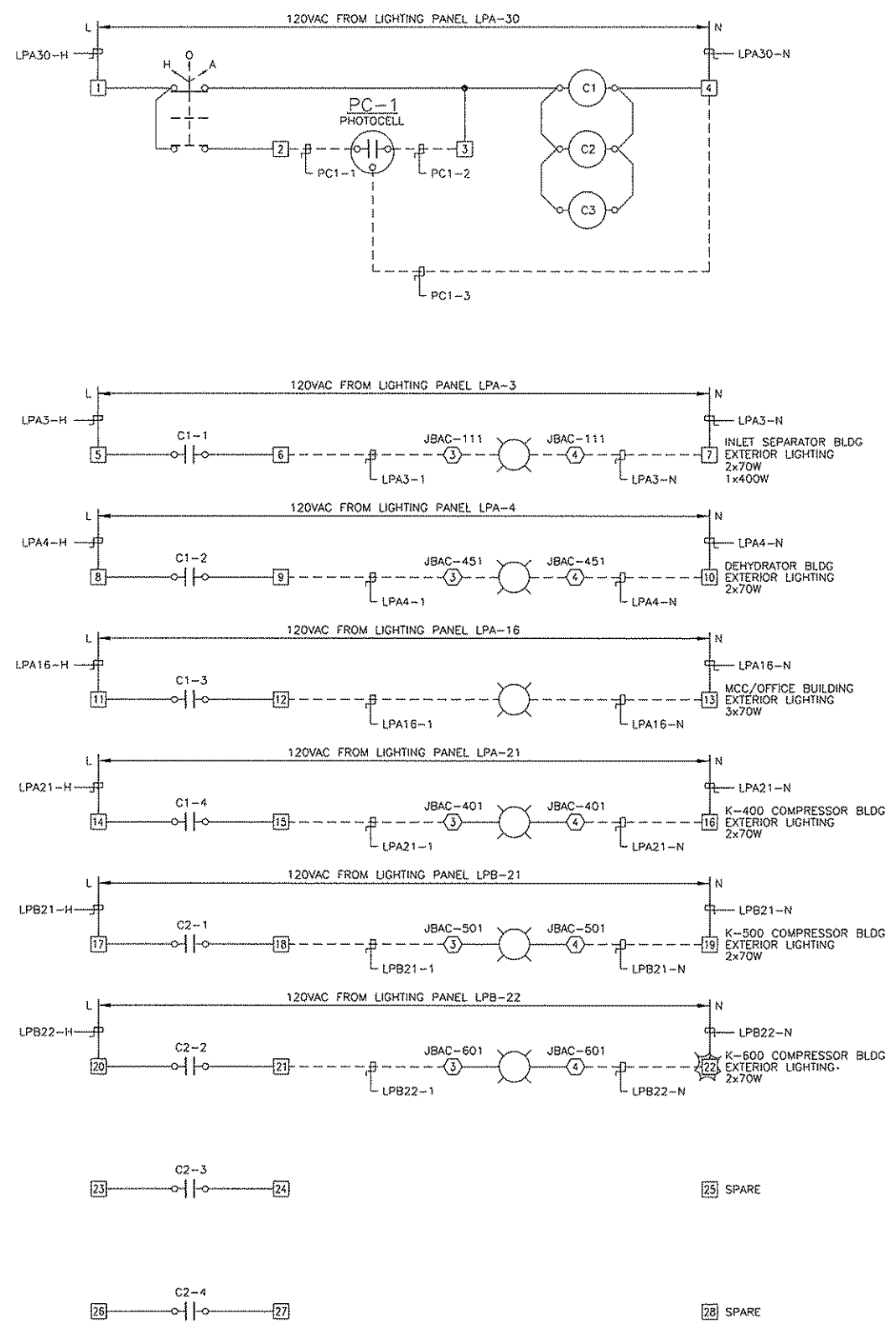


CONSTRUCTION NOTES:
1. FIELD CONTRACTOR SHALL REPLACE 3 POLE CONTACTORS AND SUPPLY AND INSTALL 4 POLE MOTOR CONTACTORS (ALLEN-BRADLEY, 1 HP RATED, CAT. NO. 100-C16ZJ400) R1D, R2E. CONTACTOR SHALL HAVE 24VDC COILS WITH 120VAC CONTACTS

NOTES:	REFERENCE DRAWINGS		REVISIONS							ENGINEERING STAMP		QUICKSILVER			
	DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.			TWINING COMPRESSOR STATION MCP-900 MOTOR CONTACTOR PANEL 120VAC SCHEMATIC			
			6	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW						
			7	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW						
			1	AS-BUILT	9549.00	05.08.15	LL	MSC	JMW						
			2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW						
			3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW						
			4	AS-BUILT AS PER EXHAUST FAN ADDITIONS	9549.01	07.05.18	YG	MSC	JMW						
			5A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW						
			5B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW						

GRB ENGINEERING Ltd.

PROJECT NO. 9549.02SCALE: N.T.S.DWG. NO. D-9549-T-020BREV. 7



NOTES:	REFERENCE DRAWINGS		REVISIONS							ENGINEERING STAMP		 QUICKSILVER ***** TWINING COMPRESSOR STATION LCP-900 LIGHTING CONTACTOR PANEL 120VAC SCHEMATIC			
	DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.						
			6	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW						
			0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17	LL	GMW	JMW						
			1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW						
			2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW						
			3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW						
			4A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW						
			4B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW						
			5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.26	GMK	AFM	JMW						
										GRB ENGINEERING Ltd.		PROJECT NO. 9549.02	SCALE: N.T.S.	DWG. NO. D-9549-T-021A	REV. 6

HEAT TRACE POWER KIT No.	CABLE No.	CIRCUIT No.	LINE No.	INSULATION	No. OF HEAT TRACE PASSES ON LINE	APPROXIMATE HEAT TRACE LENGTH (NOTE 1)	VOLTS	WATTS/FOOT	TOTAL WATTS	POWER CONNECTION KIT	TEE	END CONN. KIT C/W: IND LIGHT
EHT-001A	HT-101	LPB-1,3	60-PG-A-109-25HE 324-PG-A-101-38HE 324-PG-A-102-38HE 324-PG-A-103-38HE 324-PG-A-104-38HE 324-PG-A-108-38HE 406-PG-A-107-38HE 406-PG-A-106-38HE 406-PG-A-110-38HE	H	1 2 2 2 1 1 2 1 1	300 FEET	208VAC	8 WATTS/FOOT	2400 WATTS	1	-	1
EHT-001B	HT-101	LPB-5	60-PW-A-402-25HE 60-PW-A-404-25HE 89-PW-A-400-25HE 89-PW-A-405-25HE	H	1 1 1 1	160 FEET	120VAC	8 WATTS/FOOT	1280 WATTS	1	1	2
EHT-001C	HT-101	LPB-7	406-PG-A-111-38HE 273-PG-A-112-38HE	H	1 1	130 FEET	120VAC	8 WATTS/FOOT	1040 WATTS	1	-	1
EHT-001D	HT-101	LPB-2	273-V-A-704-38HE 273-V-A-700-38HE 168-V-A-701-38HE 60-V-A-702-25HE 219-V-A-706-38HE 89-V-A-703-25HE	H	1 1 1 1 1 1	150 FEET	120VAC	8 WATTS/FOOT	1200 WATTS	1	1	2
EHT-001E	HT-401	LPB-4	168-V-A-705-25HE 273-V-A-700-38HE 273-V-A-707-38HE	H	1 1 1	120 FEET	120VAC	8 WATTS/FOOT	960 WATTS	1	1	2
EHT-001F	HT-401	LPB-6	60-PW-A-403-25HE 89-PW-A-400-25HE	H	1 1	100 FEET	120VAC	8 WATTS/FOOT	800 WATTS	1	-	1
EHT-001G	HT-401A	LPB-8	273-V-A-708-38HE	H	1	100 FEET	120VAC	8 WATTS/FOOT	800 WATTS	1	-	1
EHT-001H	HT-501	LPB-10	406-PG-A-123-38HE 406-PG-A-124-38HE	H	1 2	100 FEET	120VAC	8 WATTS/FOOT	800 WATTS	1	-	1
EHT-001J	HT-501	LPB-12	60-PW-A-407-25HE 89-PW-A-408-25HE	H	1 2	110 FEET	120VAC	8 WATTS/FOOT	880 WATTS	1	-	1
EHT-001K	HT-501	LPB-14	168-V-A-709-25HE 273-V-A-710-38HE	H	1 2	110 FEET	120VAC	8 WATTS/FOOT	880 WATTS	1	-	1
EHT-001L	L-601	LPB-34	273-PG-A-127-38HE 406-PG-A-126-38HE	H	2 2	140 FEET	120VAC	8 WATTS/FOOT	1120 WATTS	1	-	1
EHT-001M	L-601	LPB-36	60-PW-A-409-25HE 89-PW-A-410-25HE	H	1 1	70 FEET	120VAC	8 WATTS/FOOT	560 WATTS	1	-	1
EHT-001N	L-601	LPB-36	168-V-A-711-25HE 273-V-A-712-38HE	H	1 2	70 FEET	120VAC	8 WATTS/FOOT	460 WATTS	1	-	1
EHT-001O	HT-401B	LPB-8	48PW-A411	H	1	60 FEET	120VAC	8 WATTS/FOOT	464 WATTS	1	-	1

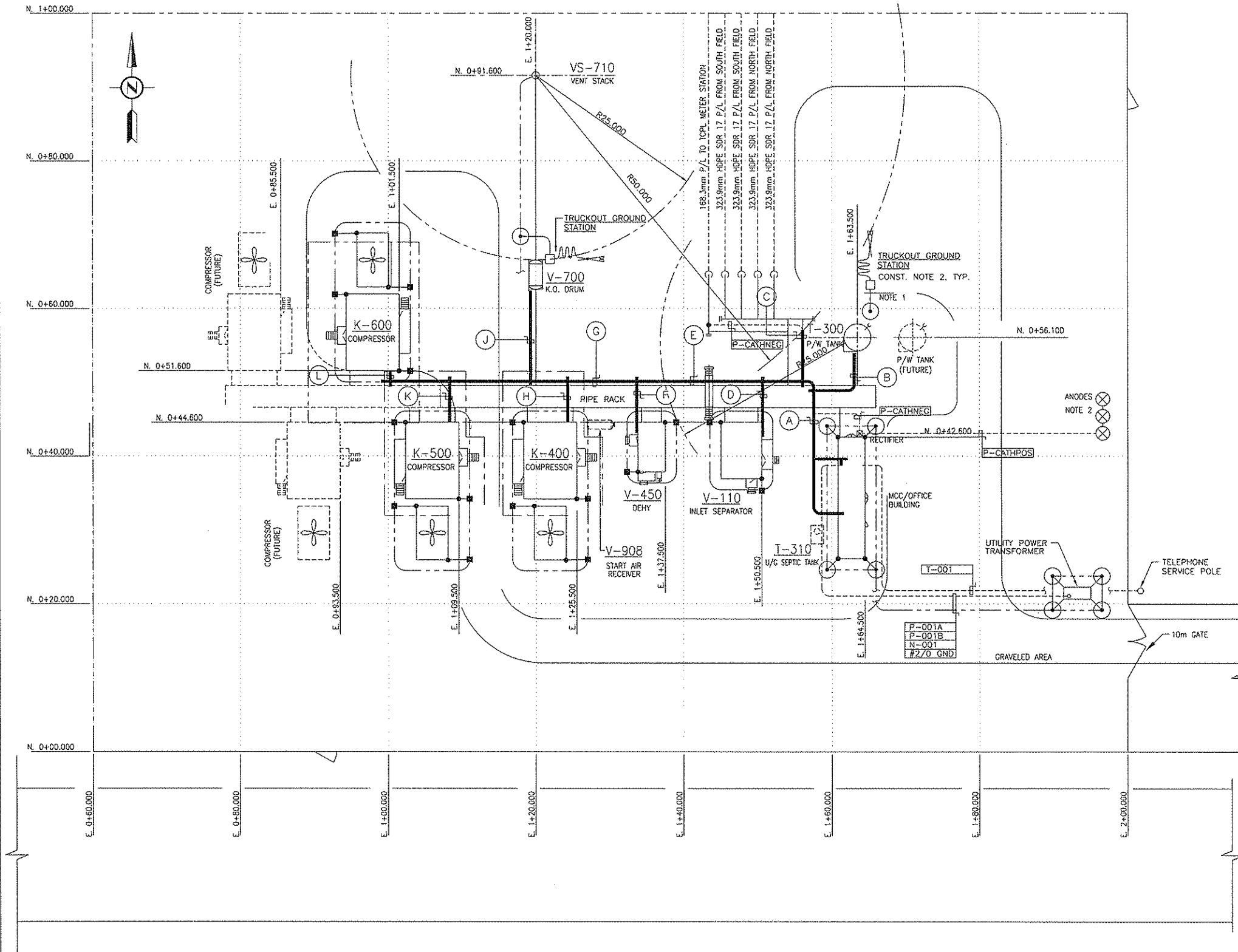
NOTES:
1. ELECTRICAL CONTRACTOR SHALL FIELD VERIFY ALL TRACER LENGTHS.
2. CONTRACTOR TO SUPPLY AND INSTALL ELECTRIC HEAT TRACING (8 WATTS/FOOT) C/W POWER CONNECTION KITS, TEES, AND END KITS. END CONNECTION KITS TO CONTAIN HEAT TRACING STATUS INDICATING LIGHTS, RAYCHEM TYPE "E100L1A" OR EQUAL. REFER TO MECHANICAL PIPING DRAWINGS AND P&ID'S FOR PIPING LAYOUTS AND PIPE LINE DESIGNATIONS.

REFERENCE DRAWINGS		REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
		6	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW
		0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17	GMW	GMW	JMW
		1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW
		2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW
		3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW
		4A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.1203	GMK	AFM	JMW
		4B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW
		5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW

ENGINEERING STAMP				QUICKSILVER			
				TWINING COMPRESSOR STATION HEAT TRACE SCHEDULE			
				PROJECT NO.	SCALE:	DWG. NO.	REV.
GRB Engineering Ltd.				9549.02	N.T.S.	D-9549-T-022A	6

CONSTRUCTION NOTES:

1. MAIN BURIED GROUND GRID AND CABLE TRAY GROUND GRID TO BE #2/O AWG TWH GREEN INSULATED GROUND. GROUND TAPS TO BE #2 AWG TWH GREEN INSULATED COPPER GROUND.
2. FIELD CONTRACTOR TO SUPPLY AND INSTALL TRUCK OUT GROUND CABLE ON A RACK MOUNTED ON FIELD FABRICATED CHANNEL SUPPORT. GROUNDING CABLE SHALL BE 8 METRES OF #4 AWG -40°C TEREK GROUND WIRE C/W WELDING TYPE GROUND CLAMP.
3. SEALS SHALL BE INSTALLED AS REQUIRED BY THE C.E.C.
4. ALL GROUNDING TO C.E.C. LATEST EDITION PART I, SECTION 10 AND AS PER THE DRAWINGS.
5. ALL UNDERGROUND CONNECTIONS SHALL BE 'CADWELL' TYPE OR APPROVED EQUAL.
6. GROUND WIRE SHALL BE LAID SLACK AT LEAST 450mm BELOW FINISHED GRADE.
7. ALL GROUND WIRE TO BE HARD DRAWN, STRANDED COPPER WIRE.
8. CLASS "D1" ALUMINUM CABLE TRAY SUPPLIED AND INSTALLED BY FIELD CONTRACTOR. THIS INCLUDES ALL NECESSARY SUPPORTS, FASTENERS AND MISCELLANEOUS MATERIAL REQUIRED TO INSTALL A COMPLETE TRAY SYSTEM. TRAY TO BE INSTALLED PER TRAY MANUFACTURER SPECIFICATIONS.
9. FIELD CONTRACTOR TO INSTALL METAL BARRIER IN CABLE TRAYS, AS REQUIRED, TO SEPARATE 480/208/120VAC POWER CABLES FROM 24VDC POWER, DISCRETE AND ANALOG CABLES.
10. ALL ELECTRICAL WORK TO BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE AND THE ALBERTA SAFETY CODES COUNCIL.



A 750mm TRAY
CONST. NOTE 8,9
TYP.

A-101
A-102
A-401
A-402
A-451
A-501
A-502
A-601
A-602
D-011
D-101
D-401
D-402
D-451
D-501
D-502
D-601
D-602
P-410
P-510
P-610
C-401
C-501
C-601
HT-101
HT-101A
L-101
L-401
L-451
L-501
L-601
P-401
P-404
P-405
P-406
P-501
P-601
P-604
P-605
P-606
PC-402
PC-502
PC-602
PC-CATHNEG
PC-101
PC-402
PC-502
PC-602
#2/O GND

B 150mm TRAY

D-011
BARRIER
#2/O GND

F 300mm TRAY

A-451
BARRIER
#2/O GND

J 150mm TRAY

D-401B
BARRIER
#2/O GND

C 150mm TRAY

A-102A
D-101A
P-CATHNEG
#2/O GND

G 750mm TRAY

A-401
A-402
A-501
A-502
A-601
A-602
D-401
D-402
D-501
D-502
D-601
D-602
P-410
P-510
P-610
C-401
C-501
C-601
HT-401
L-401
L-501
L-601
P-401
P-404
P-405
P-501
P-504
P-505
P-601
P-604
P-605
PC-402
PC-502
PC-602
#2/O GND

K 600mm TRAY

A-501
A-502
D-501
D-502
P-510
C-501
L-501
P-501
P-504
P-505
PC-502
#2/O GND

D 300mm TRAY

A-101
A-102
A-102A
D-101
D-101A
HT-101
L-101
PC-101
#2/O GND

L 600mm TRAY

A-601
A-602
D-601
D-602
P-610
P-601
P-604
P-605
PC-602
#2/O GND

E 750mm TRAY

A-401
A-402
A-451
A-501
A-502
A-601
A-602
D-401
D-402
D-451
D-501
D-502
D-601
D-602
P-410
P-510
P-610
C-401
C-501
C-601
HT-401
L-401
L-451
L-501
L-601
P-401
P-404
P-405
P-406
P-501
P-504
P-505
P-601
P-604
P-605
PC-402
PC-502
PC-602
#2/O GND

H 300mm TRAY

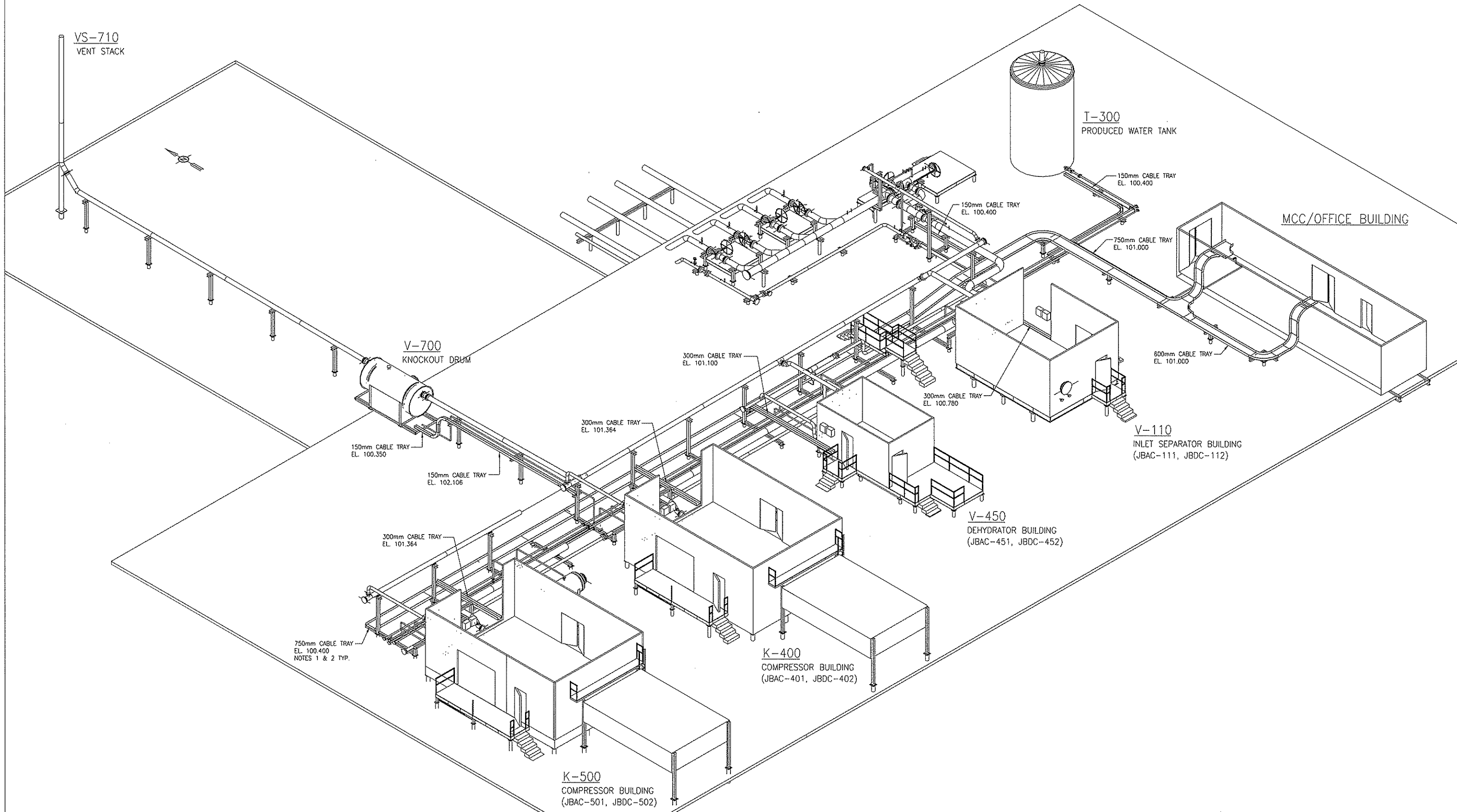
A-401
A-402
D-401
D-401B
D-402
P-410
C-401
HT-401
HT-401A
L-401
L-401A
P-401
P-404
P-405
P-406
PC-402
PC-502
PC-602
#2/O GND

NOTES:

1. SOIL CONDUCTIVITY AT 5' IS 1000 OHM/cm, 10' IS 770 OHM/cm, AND 15' IS 840 OHM/cm.
2. SOIL CONDUCTIVITY AT 5' IS 8700 OHM/cm, 10' IS 800 OHM/cm, AND 15' IS 690 OHM/cm.

REFERENCE DRAWINGS		REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
		6	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW
		7	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW
		1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW
		2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW
		3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW
		4	AS-BUILT FOR CATHODIC PROTECTION	9549.01	2008.02.15	KAW	MSC	JMW
		5A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
		5B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW

ENGINEERING STAMP				QUICKSILVER			
				TWINING COMPRESSOR STATION SITE PLAN ELECTRICAL LAYOUT AND GROUNDING			
PROJECT NO.	SCALE:	DWG. NO.	REV.				
9549.02	1:300	D-9549-U-001A	7				



NOTES:	
1.	FIELD CONTRACTOR SHALL INSTALL CABLE TRAY AS PER MANUFACTURER'S SPECIFICATION. REFER TO THE GENERAL NOTES DRAWING #9549-S-003A.
2.	FIELD CONTRACTOR SHALL INSTALL METAL BARRIER IN TRAY TO SEPARATE POWER & CONTROL CABLES FROM 24VDC INSTRUMENT CABLES.

REFERENCE DRAWINGS		REVISIONS	
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION
-	-	A	PRELIMINARY
-	-	0	ISSUED FOR CONSTRUCTION
-	-	1	AS-BUILT
-	-	2	K-500 COMPRESSOR BUILDING ADDITION
-	-	3	AS-BUILT
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-
-	-	-	-

PROJECT	DATE	BY	CHK.	ENG.
9549.00	05.04.27	LL	GMW	JMW
9549.00	05.05.17	LL	GMW	JMW
9549.00	05.08.16	LL	DPS	JMW
9549.01	05.10.12	YG	MSC	JMW
9549.01	06.01.17	YG	DPS	JMW
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
-	-	-	-	-
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-	-	-	-	-

ENGINEERING STAMP				
GRB ENGINEERING LTD.				

MGV ENERGY INC. A QUICKSILVER RESOURCES INC. COMPANY			
TWINING COMPRESSOR STATION SITE PLAN CABLE TRAY SYSTEM			
PROJECT NO. 9549.00	SCALE: N.T.S.	DWG. NO. D-9549-U-001B	REV. 3

LEGEND

- CLASS I, ZONE 0, GROUP IIA, TEMPERATURE CODE T2C
- CLASS I, ZONE 1, GROUP IIA, TEMPERATURE CODE T2C (CLASS I, DIVISION 1)
- CLASS I, ZONE 2, GROUP IIA, TEMPERATURE CODE T2C (CLASS I, DIVISION 2)
- CLASS I, ZONE 2, GROUP IIA, TEMPERATURE CODE T2C (CLASS I, DIVISION 2), TRANSIENT VAPOUR LEVEL 450mm ABOVE GRADE
- NON-HAZARDOUS

SITE PROCESS DETAIL

MEDIUM: NATURAL GAS WITH ENTRAINED WATER.
GAS/VAPOUR DETAIL: SWEET/LIGHT.

CONSTRUCTION NOTES:

- THIS AREA CLASSIFICATION IS BASED ON ALBERTA SAFETY CODES COUNCIL "CODE FOR ELECTRICAL INSTALLATIONS AT OIL AND GAS FACILITIES".
- GROUPING AND TEMPERATURE CODE BASED ON SITE PROCESS DETAIL AND MAY BE SUBJECT TO CHANGE, PENDING THE RESULTS OF A GAS COMPOSITION ANALYSIS.
- ALL DIMENSIONS AND COORDINATES ARE IN METERS UNLESS NOTED OTHERWISE.
- CLASS I, ZONE 0 AND ZONE 1 AREAS THAT TYPICALLY APPLY TO INSTRUMENT, PROCESS EQUIPMENT AND VENT VALVES (NOT NECESSARILY SHOWN ON THIS DRAWING) ARE CLASSIFIED AS PER THE HAZARDOUS AREA CLASSIFICATION DETAILS SHOWN ON DWG. 9549-U-002B.
- ANY FLANGES, MANIFOLDS, PUMP EQUIPMENT, ENVIROBOXES, THIEF HATCHES, METHANOL TANKS AND MANUAL/AUTOMATED VALVES LOCATED ON SITE OUTSIDE OF BUILDINGS, SUCH AS ON PIPE RACKS OR IN THE YARD, SHALL BE CLASSIFIED AS PER THE HAZARDOUS AREA CLASSIFICATION 9549-U-002B.
- EQUIPMENT SHALL BE LOCATED SUCH THAT A ROADWAY DOES NOT INFRINGE UPON ANY HAZARDOUS AREA, AS PER OH&S RULE 166(4) SUBJECT TO SECTION 169.
- THE OWNER MUST DEVELOP PROCEDURES AND PRECAUTIONARY MEASURES THAT WILL PREVENT THE IGNITION OF AN EXPLOSIVE ATMOSPHERE IN A LOCATION CLASSIFIED AS HAZARDOUS BASED ON THIS DRAWING, AS PER OH&S RULE 165(6).
- THE OWNER MUST ENSURE THAT (a) EQUIPMENT USED IN A HAZARDOUS LOCATION WILL NOT IGNITE A FLAMMABLE SUBSTANCE, AND (b) STATIC ELECTRICITY IS EFFECTIVELY CONTROLLED, AS PER OH&S RULE 163(3).
- THE OWNER MUST ENSURE THAT, IF A HAZARDOUS LOCATION IS A PARTICULAR WORK AREA AT A WORK SITE, THE BOUNDARIES OF THE HAZARDOUS LOCATION ARE (a) CLEARLY IDENTIFIED TO WARN WORKERS OF THE NATURE OF THE HAZARDS ASSOCIATED WITH THE PRESENCE OF THE FLAMMABLE SUBSTANCE IN THAT WORK AREA, OR (b) FENCED OFF TO PREVENT WORKERS OR EQUIPMENT FROM ENTERING THE AREA WITHOUT AUTHORIZATION, AS PER OH&S RULE 165(4).
- DURING LOADING AND UNLOADING, A 1.5m CLASS I, ZONE 1 AREA EXISTS AROUND TRUCK OUT CONNECTION, IN ADDITION TO THE CLASS I, ZONE 2 AREA SHOWN ON THIS DRAWING.
- FUGITIVE EMISSIONS STUDY FOR COMPRESSOR BUILDING K-600 IS ON FILE AT GRB ENGINEERING LTD (GRB PROJECT #9549.02)

NOTES:

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION
1	AS-BUILT
2	K-500 COMPRESSOR BUILDING ADDITION
3	AS-BUILT
4	AS-BUILT FOR CATHODIC PROTECTION
5A	PRELIMINARY (K-600 ADDITION)
5B	ISSUED FOR BID (K-600 ADDITION)

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
6	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW
7	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW
1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW
2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW
3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW
4	AS-BUILT FOR CATHODIC PROTECTION	9549.01	2008.02.15	KAW	MSC	JMW
5A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
5B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	ANH	AFM	JMW

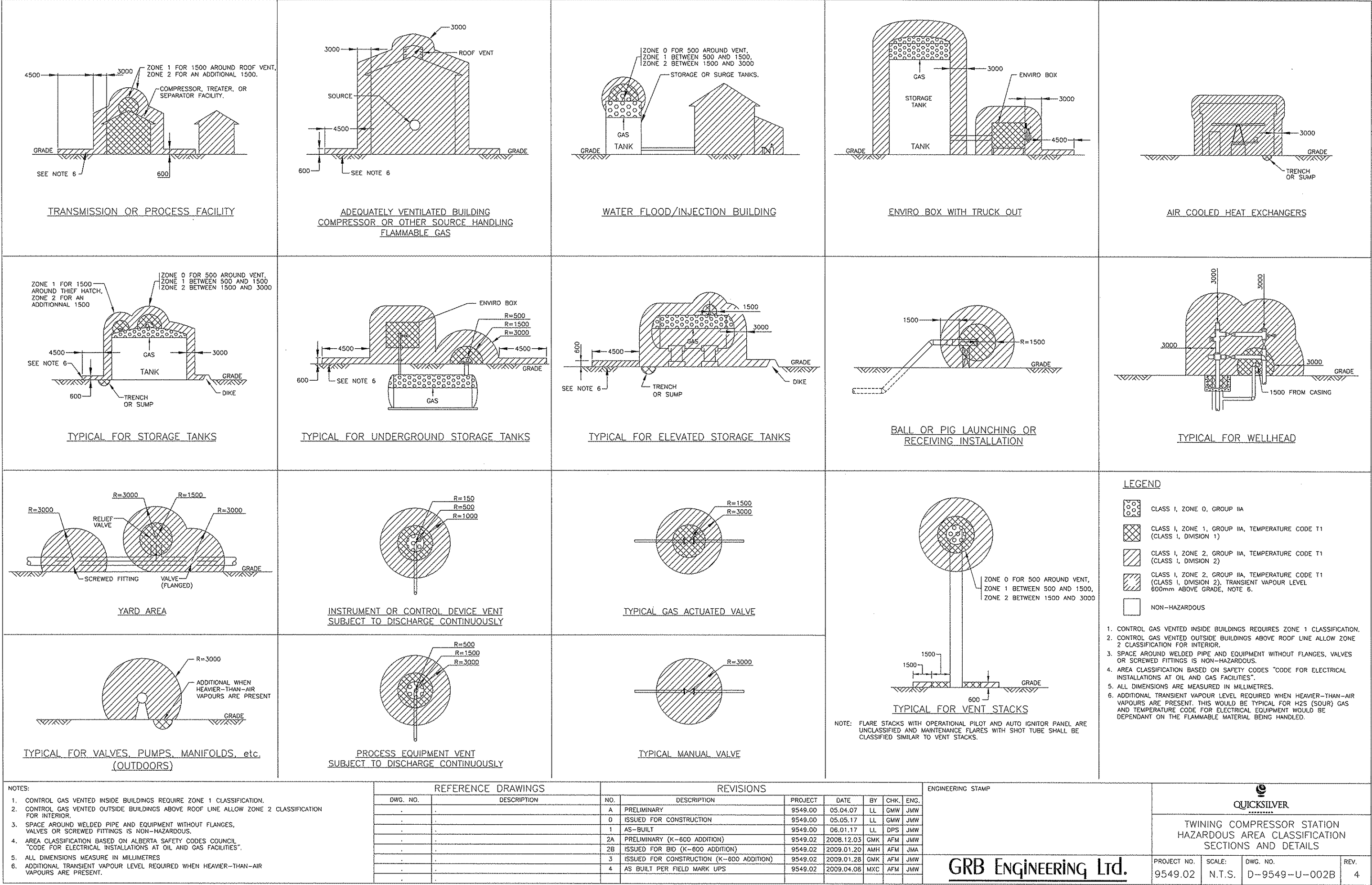
ENGINEERING STAMP



TWINING COMPRESSOR STATION
SITE PLAN
HAZARDOUS AREA CLASSIFICATION

GRB ENGINEERING Ltd.

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	1:300	D-9549-U-002A	7



CATHODIC PROTECTION

BEFORE ELECTRICAL OR PIPING IS REPLACED OR MODIFIED, CATHODIC PROTECTION SHALL BE TURNED OFF AND A TEMPERARY CATHODIC BYPASS CONDUCTOR, SIZED FOR THE MAXIMUM AVAILABLE CURRENT, SHALL BE INSTALLED. REFER TO CEC 80-012.

A

CATHODIC PROTECTION
WARNING LAMACOID

(CONST. NOTE 5)

CATHODIC PROTECTION

ONLY JOURNEYMAN ELECTRICIANS MAY ENTER, WORK ON OR MODIFY THIS CATHODIC PROTECTION RECTIFIER BOX AND ANY COMPONENTS ASSOCIATED WITH THE CATHODIC PROTECTION SYSTEM.

B

CATHODIC PROTECTION
WARNING LAMACOID

(CONST. NOTE 5)

HAZARDOUS LOCATION

THIS BUILDING IS CLASSIFIED AS CLASS 1, ZONE 2. AT LEAST ONE LOUVER MUST REMAIN OPEN IN ORDER TO MAINTAIN THE ZONE 2 CLASSIFICATION. OPERATION OF THIS LOUVER MECHANISM BY AUTHORIZED PERSONNEL ONLY.

C

CLASS 1, ZONE 2 BUILDING LOUVER
WARNING LAMACOID

(CONST. NOTE 6)

HAZARDOUS LOCATION

EXHAUST FAN CONTROL IS A CRITICAL FUNCTION TO THE OPERATION OF THE GAS DETECTION SYSTEM IN THIS BUILDING. THIS CONTROL STATION MUST REMAIN IN THE "AUTO" POSITION. OPERATION OF EXHAUST FAN CONTROLS BY AUTHORIZED PERSONNEL ONLY.

D

CLASS 1, ZONE 2 BUILDING – EXHAUST FAN/CONTROL
WARNING LAMACOID

(CONST. NOTE 7)

HAZARDOUS LOCATION

THIS BUILDING IS CLASSIFIED AS CLASS 1, ZONE 2. THIS RIDGE VENT MUST REMAIN OPEN IN ORDER TO MAINTAIN A ZONE 2 CLASSIFICATION. OPERATION OF THIS RIDGE VENT MECHANISM BY AUTHORIZED PERSONNEL ONLY.

E

CLASS 1, ZONE 2 BUILDING – RIDGE VENT
WARNING LAMACOID

(CONST. NOTE 8)

HAZARDOUS LOCATION

GAS DETECTION IS A CRITICAL FUNCTION REQUIRED TO MAINTAIN THE CLASS 1, ZONE 2 RATING OF THIS BUILDING. THE GAS DETECTION MUST BE KEPT FULLY FUNCTIONAL INCLUDING A CORRECT CALIBRATION SCHEDULE AS PER CLIENT SAFETY STANDARDS OR MANUFACTURERS SPECIFICATIONS. OPERATION OF GAS DETECTION BY AUTHORIZED PERSONNEL ONLY.

F

CLASS 1, ZONE 2 BUILDING – GAS DETECTION
WARNING LAMACOID

(CONST. NOTE 9)

HAZARDOUS LOCATION

THE INTERIOR OF THIS BUILDING AND A THREE METRE PERIMETER OUTSIDE THIS BUILDING IS CLASSIFIED AS CLASS 1, ZONE 2. FLAMMABLE AND HAZARDOUS GASES MAY BE PRESENT. BUILDING MUST BE MONITORED FOR THE PRESENCE OF GAS PRIOR TO ENTRY. AUTHORIZED PERSONNEL ACCESS ONLY.

G

CLASS 1, ZONE 2 BUILDING ENTRY
WARNING LAMACOID

HAZARDOUS LOCATION

A FUGITIVE EMISSIONS STUDY HAS BEEN COMPLETED FOR THIS BUILDING RECOGNIZING IT AS CLASS 1, ZONE 2. THIS STUDY IS BASED ON A CALCULATED QUANTITY OF VALVES, FLANGES, PUMPS, VENTS AND LOUVER OPENINGS. ANY SUCH MODIFICATIONS OR ADDITIONS TO THE PIPING OR VENTILATION COMPONENTS INSIDE THIS BUILDING SHALL VOID THIS STUDY, AND IN EFFECT, IT'S CLASS 1, ZONE 2 RATING. A NEW STUDY SHALL BE REQUIRED TO RE-CERTIFY THE ZONE 2 CLASSIFICATION OF THIS BUILDING.

H

CLASS 1, ZONE 2 BUILDING F.E.S.
WARNING LAMACOID

BILL OF MATERIALS		
QTY	SIGN/LAMACOID LETTER	DESCRIPTION
1	A	CATHODIC PROTECTION SYSTEM
1	B	CATHODIC PROTECTION SYSTEM
2	C	CLASS 1, ZONE 2 BUILDING LOUVER
4	D	CLASS 1, ZONE 2 BUILDING – EXHAUST FAN CONTROL
1	E	CLASS 1, ZONE 2 BUILDING – RIDGE VENT
1	F	CLASS 1, ZONE 2 BUILDING – GAS DETECTION
2	G	CLASS 1, ZONE 2 BUILDING ENTRY
1	H	CLASS 1, ZONE 2 BUILDING F.E.S.

CONSTRUCTION NOTES:

- ALL MATERIALS BY CONTRACTOR.
- WARNING LAMACOID TO BE RED TEXT ON WHITE BACKGROUND.
- LAMACOID TO BE AFFIXED MINIMUM 1200mm ABOVE FINISHED FLOOR IN VISIBLE LOCATION.
- PLASTIC LAMACOID SIGN TO BE MINIMUM 260mm x 200mm x 6mm.
- THIS LAMACOID MUST BE BESIDE THE RECTIFIER AND PLACED IN A CONSPICUOUS LOCATION.
- THIS LAMACOID SHOULD BE LOCATED AT EACH LOUVER CONTROL MECHANISM.
- THIS LAMACOID SHOULD BE LOCATED ABOVE EXHAUST FAN HOA CONTROL STATION.
- THIS LAMACOID SHOULD BE LOCATED AT EACH RIDGE VENT CONTROL MECHANISM.
- THIS LAMACOID SHOULD BE LOCATED ABOVE REMOTE MOUNTED GAS DETECTION MONITORS.

NOTES:

REFERENCE DRAWINGS		REVISIONS				ENGINEERING STAMP			
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	
-	-	0	AS-BUILT FOR CATHODIC PROTECTION	9549.01	2008.02.15	KAW	MSC	JMW	
-	-	1A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	AMH	AFM	JMW	
-	-	1B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW	
-	-	2	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW	
-	-	3	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW	
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GRB Engineering Ltd.

QUICKSILVER

TWINING COMPRESSOR STATION
HAZARDOUS LOCATION
WARNING SIGNS/LAMACOIDS

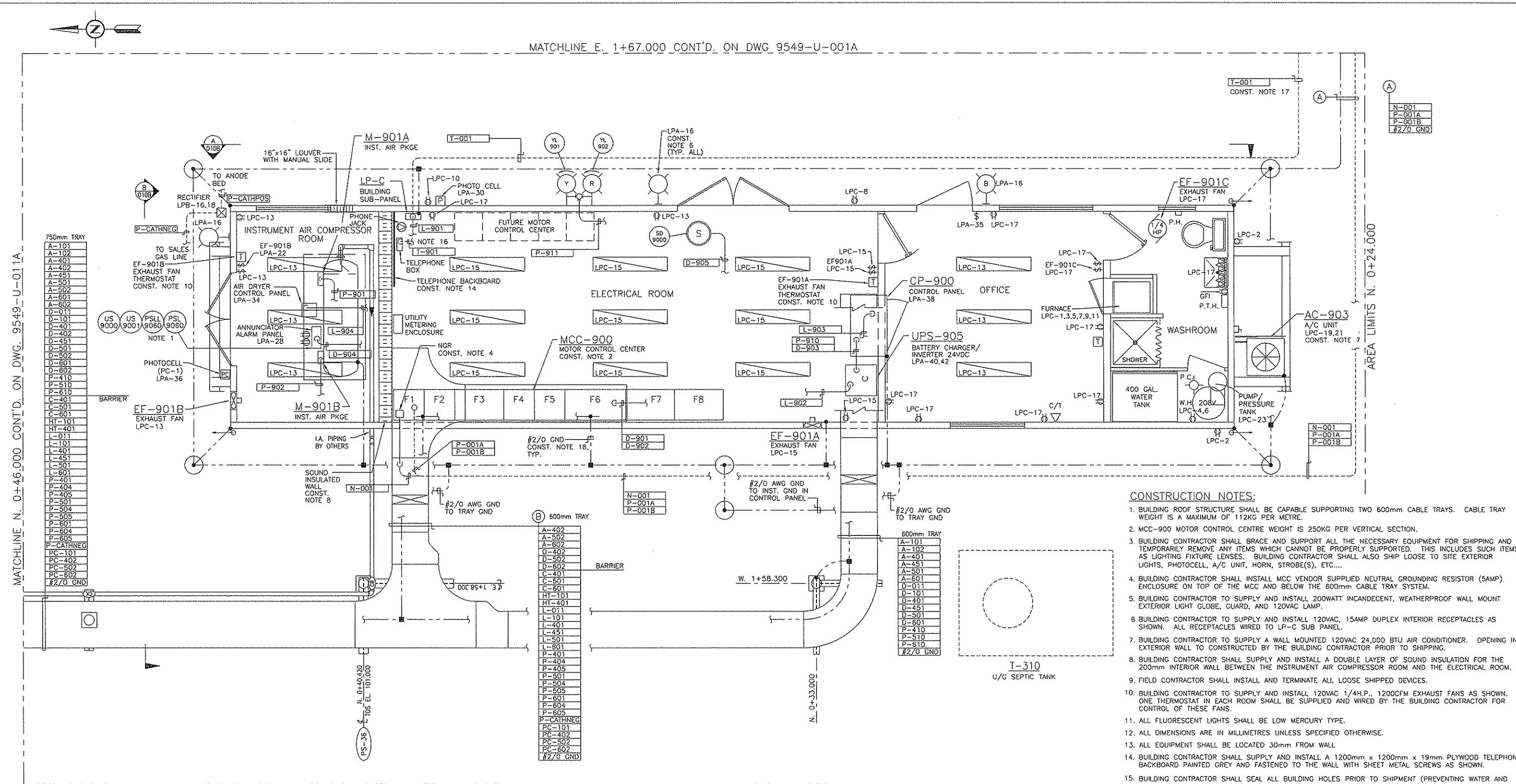
PROJECT NO.
9549.02

SCALE:
N.T.S.

DWG. NO.
D-9549-U-002C

REV.
3

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- CONSTRUCTION NOTES:**
- BUILDING ROOF STRUCTURE SHALL BE CAPABLE SUPPORTING TWO 600mm CABLE TRAYS. CABLE TRAY WEIGHT IS A MAXIMUM OF 112KG PER METRE.
 - MCC-900 MOTOR CONTROL CENTRE WEIGHT IS 250KG PER VERTICAL SECTION.
 - BUILDING CONTRACTOR SHALL BRACE AND SUPPORT ALL THE NECESSARY EQUIPMENT FOR SHIPPING AND TEMPORARILY REMOVE ANY ITEMS WHICH CANNOT BE PROPERLY SUPPORTED. THIS INCLUDES SUCH ITEMS AS LIGHTING FIXTURE LENSES. BUILDING CONTRACTOR SHALL ALSO SHIP LOOSE TO SITE EXTERIOR LIGHTS, PHOTOCELL, A/C UNIT, HORN, STROBE(S), ETC....
 - BUILDING CONTRACTOR SHALL INSTALL MCC VENDOR SUPPLIED NEUTRAL GROUNDING RESISTOR (5AMP) ENCLOSURE ON TOP OF THE MCC AND BELOW THE 600mm CABLE TRAY SYSTEM.
 - BUILDING CONTRACTOR TO SUPPLY AND INSTALL 200WATT INCANDESCENT, WEATHERPROOF WALL MOUNT EXTERIOR LIGHT GLOBE, GUARD, AND 120VAC LAMP.
 - BUILDING CONTRACTOR TO SUPPLY AND INSTALL 120VAC, 15AMP DUPLEX INTERIOR RECEPTACLES AS SHOWN. ALL RECEPTACLES WIRED TO LP-C SUB PANEL.
 - BUILDING CONTRACTOR TO SUPPLY A WALL MOUNTED 120VAC 24,000 BTU AIR CONDITIONER. OPENING IN EXTERIOR WALL TO CONSTRUCTED BY THE BUILDING CONTRACTOR PRIOR TO SHIPPING.
 - BUILDING CONTRACTOR SHALL SUPPLY AND INSTALL A DOUBLE LAYER OF SOUND INSULATION FOR THE 200mm INTERIOR WALL BETWEEN THE INSTRUMENT AIR COMPRESSOR ROOM AND THE ELECTRICAL ROOM.
 - FIELD CONTRACTOR SHALL INSTALL AND TERMINATE ALL LOOSE SHIPPED DEVICES.
 - BUILDING CONTRACTOR TO SUPPLY AND INSTALL 120VAC 1/4H.P., 1200CFM EXHAUST FANS AS SHOWN. ONE THERMOSTAT IN EACH ROOM SHALL BE SUPPLIED AND WIRED BY THE BUILDING CONTRACTOR FOR CONTROL OF THESE FANS.
 - ALL FLUORESCENT LIGHTS SHALL BE LOW MERCURY TYPE.
 - ALL DIMENSIONS ARE IN MILLIMETRES UNLESS SPECIFIED OTHERWISE.
 - ALL EQUIPMENT SHALL BE LOCATED 30mm FROM WALL.
 - BUILDING CONTRACTOR SHALL SUPPLY AND INSTALL A 1200mm x 1200mm x 19mm PLYWOOD TELEPHONE BACKBOARD PAINTED GREY AND FASTENED TO THE WALL WITH SHEET METAL SCREWS AS SHOWN.
 - BUILDING CONTRACTOR SHALL SEAL ALL BUILDING HOLES PRIOR TO SHIPMENT (PREVENTING WATER AND DUST ENTRY DURING TRANSIT).
 - THE FIELD CONTRACTOR SHALL SUPPLY AND INSTALL PHONE CABLE FROM THE TELEPHONE BACKBOARD TO THE PLC CONTROL PANEL FOR TELEPHONE CALLOUT SYSTEM.
 - FIELD CONTRACTOR TO INSTALL T-001 CONDUIT C/W PULL STRING IN SEPARATE TRENCH FROM P-001A/B UTILITY POWER CABLES. TELEPHONE COMPANY TO SUPPLY AND INSTALL CAT 5 CABLE AND TERMINATE BOTH ENDS.
 - FIELD CONTRACTOR SHALL GROUND MCC GROUND BUS AT EACH END VIA #2/0 AWG TWH GREEN INSULATED GROUND AS SHOWN.

NOTES:

- FIELD CONTRACTOR TO SUPPLY AND INSTALL A SECOND PRESSURE SWITCH AS DIRECTED BY OWNERS REPRESENTATIVE.

REFERENCE DRAWINGS		REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
		6	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW
		7	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW
		1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW
		2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW
		3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW
		4	ISSUED FOR CATHODIC PROTECTION CONSTRUCTION	9549.01	2007.11.14	KAW	MSC	JMW
		5A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
		5B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW

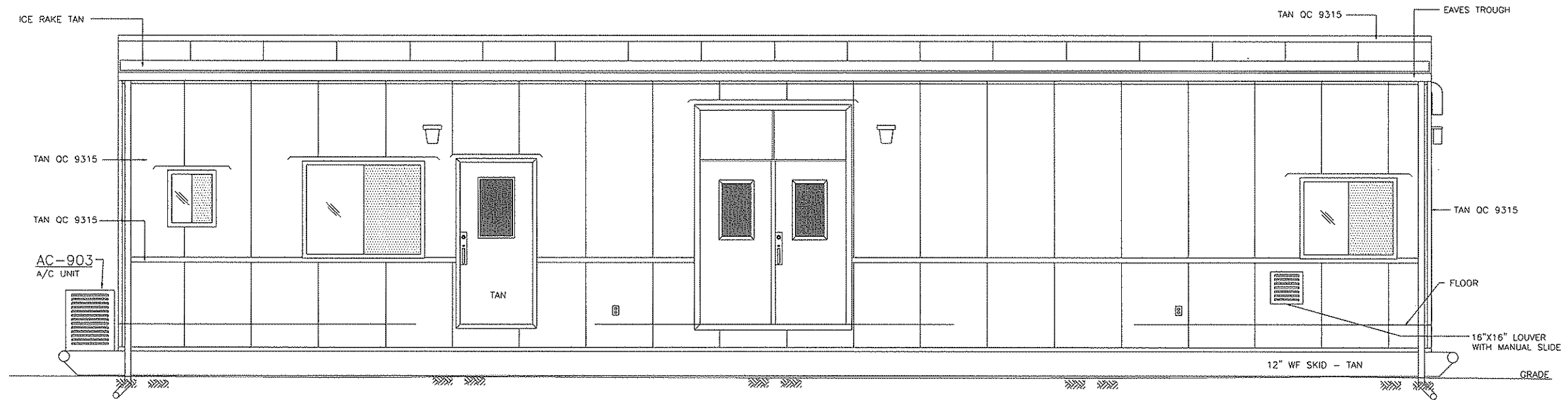
ENGINEERING STAMP

QUICKSILVER

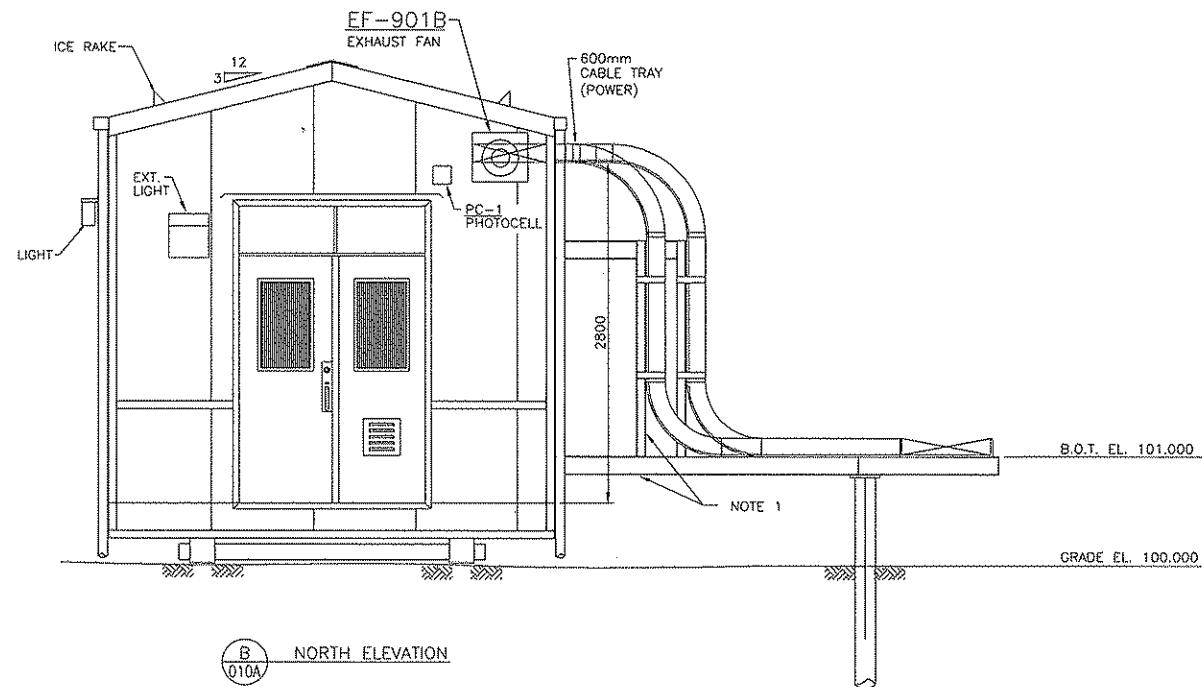
TWINNING COMPRESSOR STATION
MCC/OFFICE BUILDING
ELECTRICAL LAYOUT

GRB Engineering Ltd.

PROJECT NO. 9549.02 SCALE: 1:30 DWG. NO. D-9549-U-010A REV. 7



A
010A EAST ELEVATION



B
010A NORTH ELEVATION

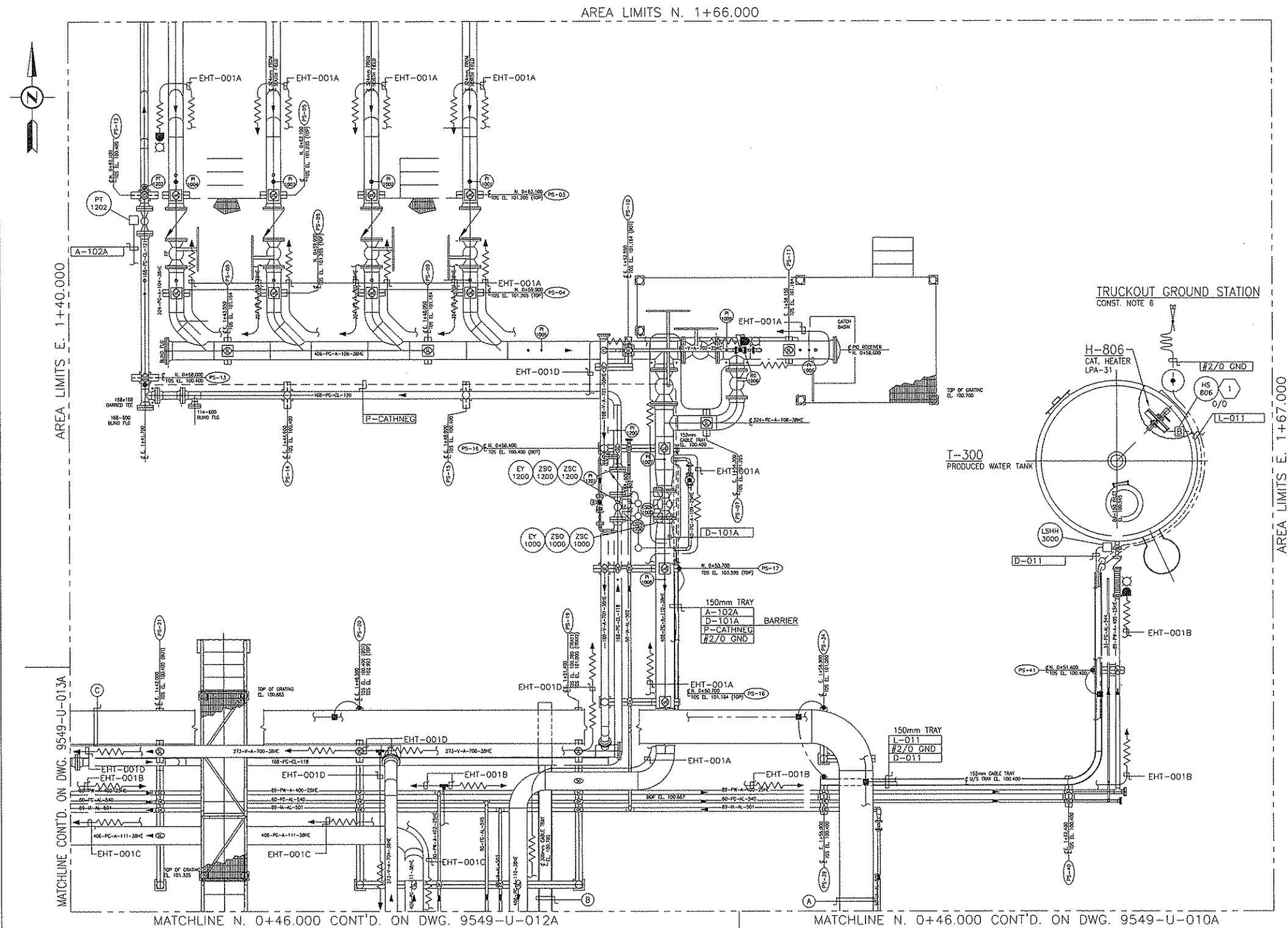
NOTES:
1. FIELD CONTRACTOR TO PROVIDE SUPPORT FOR CABLE TRAY VIA UNISTRUT ASSEMBLY AS REQUIRED BY CABLE TRAY MANUFACTURER.

REFERENCE DRAWINGS			REVISIONS					
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
-	-	A	PRELIMINARY	9549.00	05-03-30	DAS	GMW	JMW
-	-	0	ISSUED FOR CONSTRUCTION	9549.00	05-05-17	DAS	GMW	JMW
-	-	1	AS-BUILT	9549.00	06-01-17	LL	DPS	JMW
-	-							
-	-							
-	-							
-	-							
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-	-							

ENGINEERING STAMP

GRB ENGINEERING Ltd.

TWINING COMPRESSOR STATION MCC/OFFICE BUILDING BUILDING ELEVATIONS			
PROJECT NO. 9549.01	SCALE: 1:30	DWG. NO. D-9549--U-010B	REV. 1



CONSTRUCTION NOTES:

- ALL ELECTRICAL WORK TO BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE AND THE LOCAL ELECTRICAL PROTECTION BRANCH.
- MAIN GROUND GRID IN TRAY TO BE #2/0 AWG TWH GREEN INSULATED GROUND. GROUND TAPS TO BE #2 AWG TWH GREEN INSULATED COPPER GROUND.
- FIELD CONTRACTOR TO INSTALL LAMACOID CENTERED ABOVE CATADYNE HEATER ON/OFF SWITCH, WHITE LETTERS ON RED BACKGROUND TO READ:
CATADYNE HEATER
IMPORTANT: SWITCH ON
(20 MIN. MAX.) AT ANY TIME.
- HEAT TRACE ROUTING ON LAYOUT IS SHOWN DIAGRAMATICALLY ONLY. REFER TO HEAT TRACE SCHEDULE ON DWG. 9549-T-022A FOR COMPLETE LISTING OF LINE DESIGNATIONS, NUMBER OF PASSES REQUIRED ON EACH LINE AND APPROXIMATE LENGTHS FOR EACH HEAT TRACE CIRCUIT. FIELD CONTRACTOR SHALL VERIFY ALL HEAT TRACE LENGTHS IN FIELD.
- FIELD CONTRACTOR TO SUPPLY AND INSTALL ELECTRIC HEAT TRACING (8 WATTS/FOOT) C/W POWER CONNECTION KITS, TEES AND END KITS. END CONNECTION KITS TO CONTAIN HEAT TRACING STATUS INDICATING LIGHTS, RAYCHEM TYPE #E100L1A OR EQUAL. REFER TO MECHANICAL PIPING DRAWINGS AND P&ID'S FOR PIPING LAYOUTS AND PIPE LINE DESIGNATIONS.
- FIELD CONTRACTOR TO SUPPLY AND INSTALL TRUCK OUT GROUND CABLE ON A RACK MOUNTED ON FIELD FABRICATED CHANNEL SUPPORT. GROUNDING CABLE SHALL BE 8 METRES OF #4 AWG -40°C TEREK GROUND WIRE C/W WELDING TYPE GROUND CLAMP.
- FIELD CONTRACTOR TO INSTALL METAL BARRIER IN CABLE TRAYS, AS REQUIRED, TO SEPARATE 480/208/120VAC POWER CABLES FROM 24VDC POWER, DISCRETE AND ANALOG CABLES.

A 750mm TRAY CONST. NOTE 7, TYP.		B 300mm TRAY		C 750mm TRAY	
A-101		A-101		A-401	
A-102		A-102		A-402	
A-401		A-401		A-501	
A-402		D-101		A-502	
A-451		D-101A		D-101	
A-501		HT-101		A-601	
A-502		L-101		A-602	
A-601		PC-101		D-401	
A-602		#2/0 GND		D-402	
D-011				D-451	
D-101				D-501	
D-401				D-502	
D-402				D-601	
D-451				D-602	
D-501				P-410	
D-502				P-510	
D-601				P-610	
D-602				C-401	
P-410				C-501	
P-510				C-601	
P-610				HT-401	
C-401				L-401	
C-501				L-451	
C-601				L-501	
HT-101				L-601	
L-101				P-401	
L-401				P-404	
L-451				P-405	
L-501				P-501	
L-601				P-504	
P-401				P-505	
P-404				P-601	
P-405				P-604	
P-501				P-605	
P-504				P-CATHNEC	
P-505				PC-101	
P-601				PC-402	
P-604				PC-502	
P-605				PC-602	
P-CATHNEC				#2/0 GND	
PC-101					
PC-402					
PC-502					
PC-602					
#2/0 GND					

NOTES:

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION
6	ISSUED FOR CONSTRUCTION (K-600 ADDITION)
7	AS BUILT PER FIELD MARK UPS
1	AS-BUILT
2	K-500 COMPRESSOR BUILDING ADDITION
3	AS-BUILT
4	AS-BUILT FOR CATHODIC PROTECTION
5A	PRELIMINARY (K-600 ADDITION)
5B	ISSUED FOR BID (K-600 ADDITION)

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
6	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW
7	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW
1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW
2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW
3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW
4	AS-BUILT FOR CATHODIC PROTECTION	9549.01	2008.02.15	KAW	MSC	JMW
5A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
5B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW

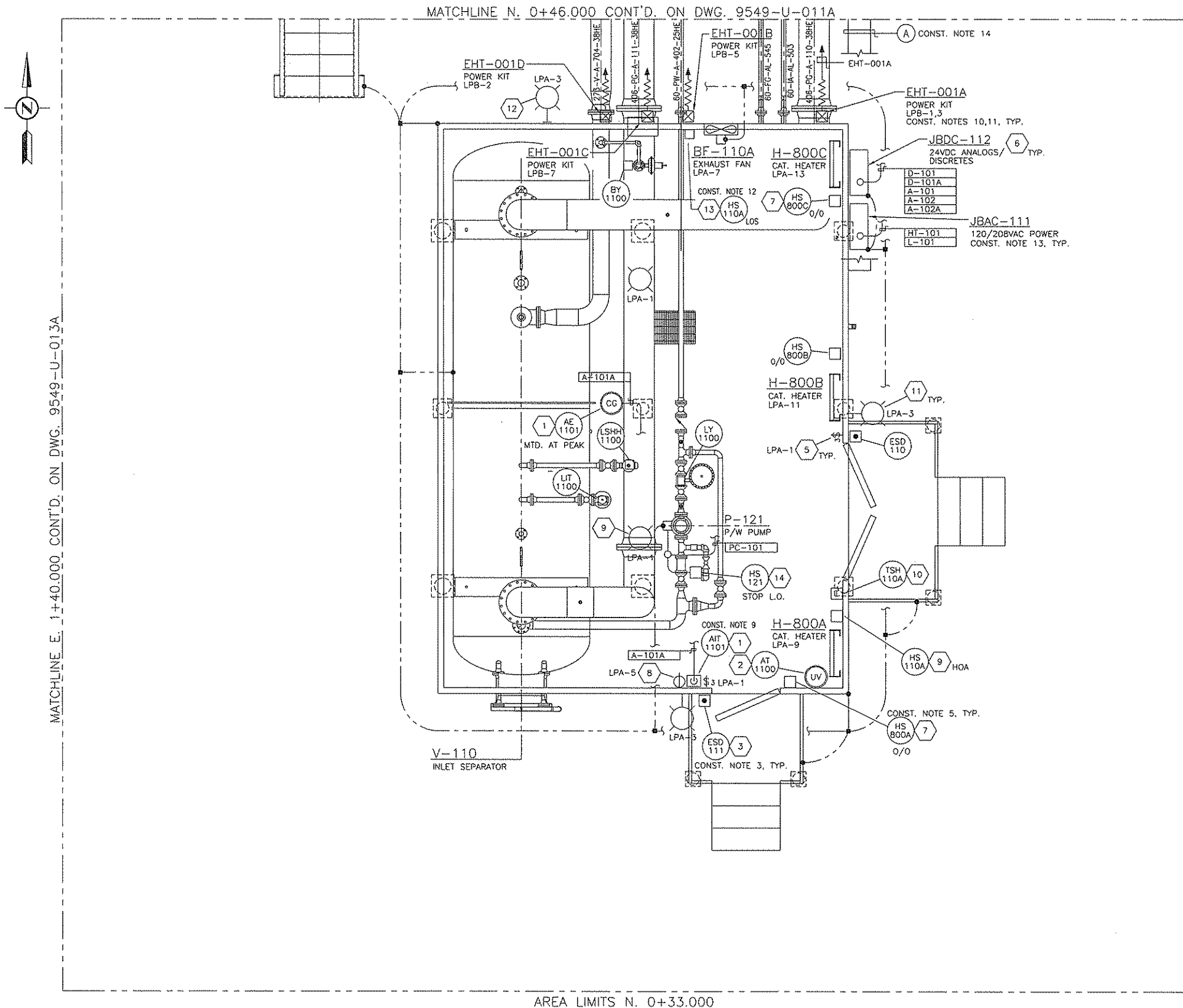
ENGINEERING STAMP



TWINING COMPRESSOR STATION
T-300 PRODUCED WATER TANK AREA
ELECTRICAL LAYOUT

GRB ENGINEERING Ltd.

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	1:50	D-9549-U-011A	7



BILL OF MATERIALS				
ITEM	QTY	DESCRIPTION	MANUFACTURER	SUPPLIED BY
1	1	COMBUSTIBLE GAS DETECTOR, 24VDC, REMOTE MOUNTED SENSOR, C/W SPLASH GUARD	NET SAFETY MLP-A-SC1100	OWNER
2	1	FIRE DETECTOR, 24VDC, INITIALIZED ULTRA-VIOLET C/W TL-UV-KIT UV TEST LAMP KIT	NET SAFETY UVS-A	OWNER
3	2	ESD PUSHBUTTON, 24VDC, MAINTAINED, RED MUSHROOM HEAD FACT. SEALED, C/W #800H-1H24R TYPE 4X, CL 1, DIV. 2 ENCL.	ALLEN BRADLEY 800H-FR16D4	BLDG. CONTRACTOR
4	2	INTERIOR LIGHTING, CLASS 1, DIVISION 1 175W, 120 VAC, METAL HALIDE	CROUSE HINDS EVLPA192171	BLDG. CONTRACTOR
5	2	SWITCH, 3-WAY, 120VAC, 20A, FACTORY SEALED CLASS 1, DIVISION 1 RATED	CROUSE HINDS EDCS2130	BLDG. CONTRACTOR
6	2	JUNCTION BOX, NEMA4X ENCLOSURE C/W TS35 DIN RAIL, AND WEIDMULLER TERMINALS	HOFFMAN A24H2008GQRLP	BLDG. CONTRACTOR
7	3	CATADYNE ON/OFF SWITCH, SINGLE POLE, 120VAC, 20A, C/W DSD948 PILOT LIGHT, EDCS272 ENCLOSURE, CLASS 1, DIVISION 1	CROUSE HINDS DSD933	BLDG. CONTRACTOR
8	1	RECEPTACLE, 120VAC, 20A, EXPLOSION PROOF CLASS 1, DIVISION 1 RATED	CROUSE HINDS CPS152R	BLDG. CONTRACTOR
9	1	EXHAUST FAN H-O-A, EXPLOSION PROOF FACTORY SEALED, CLASS 1, DIVISION 1	CROUSE HINDS EDCS21273	BLDG. CONTRACTOR
10	1	EXHAUST FAN THERMOSTAT, CLOSE ON RISE	RUFFNECK XT311	BLDG. CONTRACTOR
11	2	EXTERIOR LIGHTING, CLASS 1, DIVISION 2, C/W INTEGRAL BALLAST, GUARD AND LAMP, 70W HPS, 120VAC	CROUSE HINDS VMVSJ070GP/BG	BLDG. CONTRACTOR
12	1	EXTERIOR FLOOD LIGHTING, CLASS 1, DIVISION 2, 400W, HPS, 120VAC C/W WALL MOUNT BRACKET	CROUSE HINDS HPWR65T	BLDG. CONTRACTOR
13	1	EXHAUST FAN LOCK OFF SWITCH, SINGLE POLE, 120VAC, CLASS 1, DIVISION 1	CROUSE HINDS	BLDG. CONTRACTOR
14	1	LOCK-OFF SWITCH, SINGLE POLE, 120VAC, CLASS 1, DIVISION 1	CROUSE HINDS	FIELD CONTRACTOR

- CONSTRUCTION NOTES:**
- ALL ELECTRICAL WORK TO BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE AND THE ALBERTA SAFETY CODES COUNCIL.
 - FIELD CONTRACTOR TO GROUND INLET SEPARATOR BUILDING PILES IN TWO LOCATIONS AS SHOWN VIA #2/0 AWG TWH GREEN INSULATED COPPER GROUND. PILES SERVE AS ALTERNATIVE TO GROUNDING WELLS. ALL OTHER GROUND TAPS ARE #2 AWG TWH GREEN INSULATED COPPER GROUND.
 - BUILDING CONTRACTOR TO SUPPLY AND INSTALL PLEXIGLASS WEATHERPROOF SHROUD OVER TOP OF THE ESD PUSHBUTTON. PUSHBUTTON TO BE ACCESSIBLE FROM THE FRONT.
 - MAIN GROUND GRID IN TRAY TO BE #2/0 AWG TWH GREEN INSULATED GROUND. GROUND TAPS TO BE #2 AWG TWH GREEN INSULATED COPPER GROUND.
 - BUILDING CONTRACTOR TO INSTALL LAMACOID CENTERED ABOVE EACH CATADYNE HEATER ON/OFF SWITCH, WHITE LETTERS ON RED BACKGROUND TO READ:
CATADYNE HEATER
IMPORTANT: SWITCH ON
(20 MIN. MAX.) AT ANY TIME.
 - FIELD CONTRACTOR TO SUPPLY AND INSTALL SUITABLE MEANS OF SUPPORT FOR CABLES BETWEEN JUNCTION BOX AND CABLE TRAY.
 - INSTRUMENTATION LISTED BELOW IS SUPPLIED AS PART OF THE SEPARATOR SKID.

LY-1100	LEVEL CONTROL VALVE SOLENOID
LIT-1100	INLET SEPARATOR LEVEL TRANSMITTER
LSHH-1100	INLET SEPARATOR LEVEL SWITCH
BY-1100	BLOWDOWN VALVE SOLENOID
 - ALL BUILDING ELECTRICAL SHALL BE BY BUILDING CONTRACTOR UNLESS SPECIFIED OTHERWISE.
 - BUILDING CONTRACTOR SHALL SUPPLY AND INSTALL 1/4" SS TUBING FROM GAS SENSOR TO REMOTE MOUNTED DETECTOR.
 - HEAT TRACE ROUTING ON LAYOUT IS SHOWN DIAGRAMATICALLY ONLY. REFER TO HEAT TRACE SCHEDULE ON DWG. 9549-T-022A FOR COMPLETE LISTING OF LINE DESIGNATIONS, NUMBER OF PASSES REQUIRED ON EACH LINE AND APPROXIMATE LENGTHS FOR EACH HEAT TRACE CIRCUIT. FIELD CONTRACTOR SHALL VERIFY ALL HEAT TRACE LENGTHS IN FIELD.
 - FIELD CONTRACTOR TO SUPPLY AND INSTALL ELECTRIC HEAT TRACING (8 WATTS/FOOT) C/W POWER CONNECTION KITS, TEES AND END KITS. END CONNECTION KITS TO CONTAIN HEAT TRACING STATUS INDICATING LIGHTS, RAYCHEM TYPE #E1001A OR EQUAL. REFER TO MECHANICAL PIPING DRAWINGS AND P&ID'S FOR PIPING LAYOUTS AND PIPE LINE DESIGNATIONS.
 - BUILDING CONTRACTOR SHALL INSTALL LOCK OFF SWITCH ADJACENT TO FAN, OPPOSITE OF MOTOR TERMINAL BOX.
 - CABLE ENTRY INTO JUNCTION BOX SHALL BE IN BOTTOM ONLY.
 - FIELD CONTRACTOR TO INSTALL METAL BARRIER IN CABLE TRAYS, AS REQUIRED, TO SEPARATE 480/208/120VAC POWER CABLES FROM 24VDC POWER, DISCRETE AND ANALOG CABLES.

NOTES:

REFERENCE DRAWINGS		REVISIONS								ENGINEERING STAMP		 QUICKSILVER TWINING COMPRESSOR STATION V-110 INLET SEPARATOR BUILDING ELECTRICAL LAYOUT			
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.							
.	.	A	PRELIMINARY	9549.00	05.04.08	DAS	GMW	JMW							
.	.	0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17	DAS	GMW	JMW							
.	.	1	AS-BUILT	9549.00	06.01.17	LL	DPS	JMW							
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GRB Engineering Ltd.

PROJECT NO. 9549.01	SCALE: 1:30	DWG. NO. D-9549-U-012A	REV. 1
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2009_10_17_00:06_PLT-110-001-ELECTRICAL-0549U-012A.DWG - CHK:DAVID.P

1	LPA-1H	1	LPA-1H	} INTERIOR LIGHTING
2	LPA-1N	2	LPA-1N	
3	LPA-3H	3	LPA-3H	
4	LPA-3N	4	LPA-3N	} EXTERIOR LIGHTING
5	LPA-5H	5	LPA-5H	
6	LPA-5N	6	LPA-5N	} RECEPTACLE
7	BF110A-1	7	BF110A-1	
8	BF110A-2	8	BF110A-2	} EXHAUST FAN (BF-110A)
9	BF110A-N	9	BF110A-N	
10	LPA-9H	10	LPA-9H	} CATADYNE HEATER (H-800A)
11	LPA-9N	11	LPA-9N	
12	LPA-11H	12	LPA-11H	} CATADYNE HEATER (H-800B)
13	LPA-11N	13	LPA-11N	
14	LPA-13H	14	LPA-13H	} CATADYNE HEATER (H-800C)
15	LPA-13N	15	LPA-13N	
16	SPARE	16		
17	SPARE	17		
18	SPARE	18		
19	SPARE	19		
20	SPARE	20		
21	SPARE	21		
22	SPARE	22		
23	SPARE	23		
24	SPARE	24		
25	SPARE	25		
1	LPB-1H	26	LPB-1H	} HEAT TRACE (EHT-001A) NOTE 4, TYP.
2	LPB-3H	27	LPB-3H	
3	LPB-5H	28	LPB-5H	
4	LPB-5N	29	LPB-5N	} HEAT TRACE (EHT-001B)
5	LPB-7H	30	LPB-7H	
6	LPB-7N	31	LPB-7N	} HEAT TRACE (EHT-001C)
7	LPB-2H	32	LPB-2H	
8	LPB-2N	33	LPB-2N	} HEAT TRACE (EHT-001D)
9	SPARE	34		
10	SPARE	35		
11	SPARE	36		
12	SPARE	37		
		38		
		39		
		40		

L-101 HT-101

1	ESD110-1	1	ESD110-1		
2	ESD111-2	2	ESD110-2	}	ESD-110 ESD P.B.
3	LSHH1100-1	3	ESD111-1		
4	LSHH1100-2	4	ESD111-2	}	ESD-111 ESD P.B.
5	BY1100-1	5	LSHH1100-1		
6	BY1100-2	6	LSHH1100-2	}	LSHH-1100
7	LY1100-1	7	BY1100-1		
8	LY1100-2	8	BY1100-2	}	BY-1100
9	EY1000A-1	9	LY1100-1		
10	EY1000A-2	10	LY1100-2	}	LY-1100
11	ZSO/ZSC1000-1	11	EY1000A-1		
12	ZSO/ZSC1000-2	12	EY1000A-2	}	EY-1000A
13	ZSO/ZSC1000-3	13	ZSO1000-1		
14	EY1200A-1	14	ZSO1000-2	}	ZSO-1000
15	ZSO/ZSC1200-1	15	ZSC1000-1		
16	ZSO/ZSC1200-2	16	ZSC1000-2	}	ZSC-1000
17	ZSO/ZSC1200-3	17	EY1200A-1		
18	SPARE	18	EY1200A-2	}	EY-1200A
19	SPARE	19	ZSO1200-1		
20	SPARE	20	ZSO1200-2	}	ZSO-1200
21	SPARE	21	ZSC1200-1		
22	SPARE	22	ZSC1200-2	}	ZSC-1200
23	SPARE	23			
24	SPARE	24			
25	SPARE	25			
1TR (W) AT1100+24V		31	AT1100+24V (W)	}	FIRE DETECTION CONTROLLER AT-1100
(R) AT1100-SIG		32	AT1100-SIG (R)		
(B) AT1100-COM		33	AT1100-COM (B)		
2TR (W) AT1101+24V		34			
(R) AT1101-SIG		35	AT1101+24V (W)	}	GAS DETECTION CONTROLLER AT-1101
(B) AT1101-COM		36	AT1101-SIG (R)		
		37	AT1101-COM (B)		
3TR (W) SPARE		38			
(R) SPARE		39			
(B) SPARE		40			
4TR (W) SPARE		41			
(R) SPARE		42			
(B) SPARE		43			
1PR (W) LIT1100+24V		44			
(B) LIT1100-SIG		45			
2PR (W) PT1202+24V		46			
(B) PT1202-SIG		47	LIT1100+24V (W)	}	LIT-1100
3PR (W) SPARE		48	LIT1100-SIG (B)		
(B) SPARE		49			
4PR (W) SPARE		50	PT1202+24V (W) 1PR	}	PT-1202
(B) SPARE		51	PT1202-SIG (B)		
		52			
		53			
		54			
		55			
		56			
		57			
		58			
		59			
		60			

TO PT-1202 AT INLET/SALES AREA
REF. DWG 9549-U-011A

2008-10-17 09:30 FILE: I:\9549\ELECTRICAL\9549U0128.DWG GKRAWCHUK

MATCHLINE E. 1+4.000 CONT'D. ON DWG. 9549-U-011A

MATCHLINE E. 1+4.000 CONT'D. ON DWG. 9549-U-012A

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	MANUFACTURER	SUPPLIED BY
1	1	COMBUSTIBLE GAS DETECTOR, 24VDC, REMOTE MOUNTED SENSOR, C/W SPLASH GUARD	NET SAFETY MLP-AS-SC1100	OWNER
2	1	FIRE DETECTOR, 24VDC, INITIALIZED ULTRA-VIOLET C/W TL-UV-KIT UV TEST LAMP KIT	NET SAFETY UVS-A	OWNER
3	2	ESD PUSHBUTTON, 24VDC, MAINTAINED, RED MUSHROOM HEAD FACT. SEALED, C/W #800H-1H24R TYPE 4X, CL 1, DIV. 2 ENCL	ALLEN BRADLEY 800H-FRXT6D4	BLDG. CONTRACTOR
4	2	INTERIOR LIGHTING, CLASS 1, DIVISION 1 175W, 120 VAC, METAL HALIDE	CROUSE HINDS EVLPA192171	BLDG. CONTRACTOR
5	2	SWITCH, 3-WAY, 120VAC, 20A, FACTORY SEALED CLASS 1, DIVISION 1 RATED	CROUSE HINDS EDSC2130	BLDG. CONTRACTOR
6	2	JUNCTION BOX, NEMA4X ENCLOSURE C/W TS35 DIN RAIL, AND WEIDMULLER TERMINALS	HOFFMAN A24H2008GRLP	BLDG. CONTRACTOR
7	1	CATADYNE ON/OFF SWITCH, SINGLE POLE, 120V, 20A C/W DSD948 PILOT LIGHT, EDSC272 ENCLOSURE, CLASS 1, DIVISION 1	CROUSE HINDS DSD933	BLDG. CONTRACTOR
8	1	RECEPTACLE, 120VAC, 20A, EXPLOSIONPROOF CLASS 1, DIVISION 1 RATED	CROUSE HINDS CPS152R	BLDG. CONTRACTOR
9	1	EXHAUST FAN H-O-A, EXPLOSION PROOF FACTORY SEALED, CLASS 1, DIVISION 1	CROUSE HINDS EDSC21273	BLDG. CONTRACTOR
10	1	EXHAUST FAN THERMOSTAT CLOSE ON TEMPERATURE RISE	RUFFNECK XT311	BLDG. CONTRACTOR
11	2	EXTERIOR LIGHTING, CLASS 1, DIVISION 2, C/W INTEGRAL BALLAST, GUARD AND LAMP, 70W HPS, 120VAC	CROUSE HINDS VMVSJ070GP/BG	BLDG. CONTRACTOR
12	1	DEHY COMBUSTION CONTROLLER C/W IGNITION WIRING HARNESS	ACL 5000	OWNER
13	1	EXHAUST FAN LOCK OFF SWITCH, 120VAC EXPLOSION PROOF FACTORY SEALED, CLASS 1, DIVISION 1	CROUSE HINDS	BLDG. CONTRACTOR

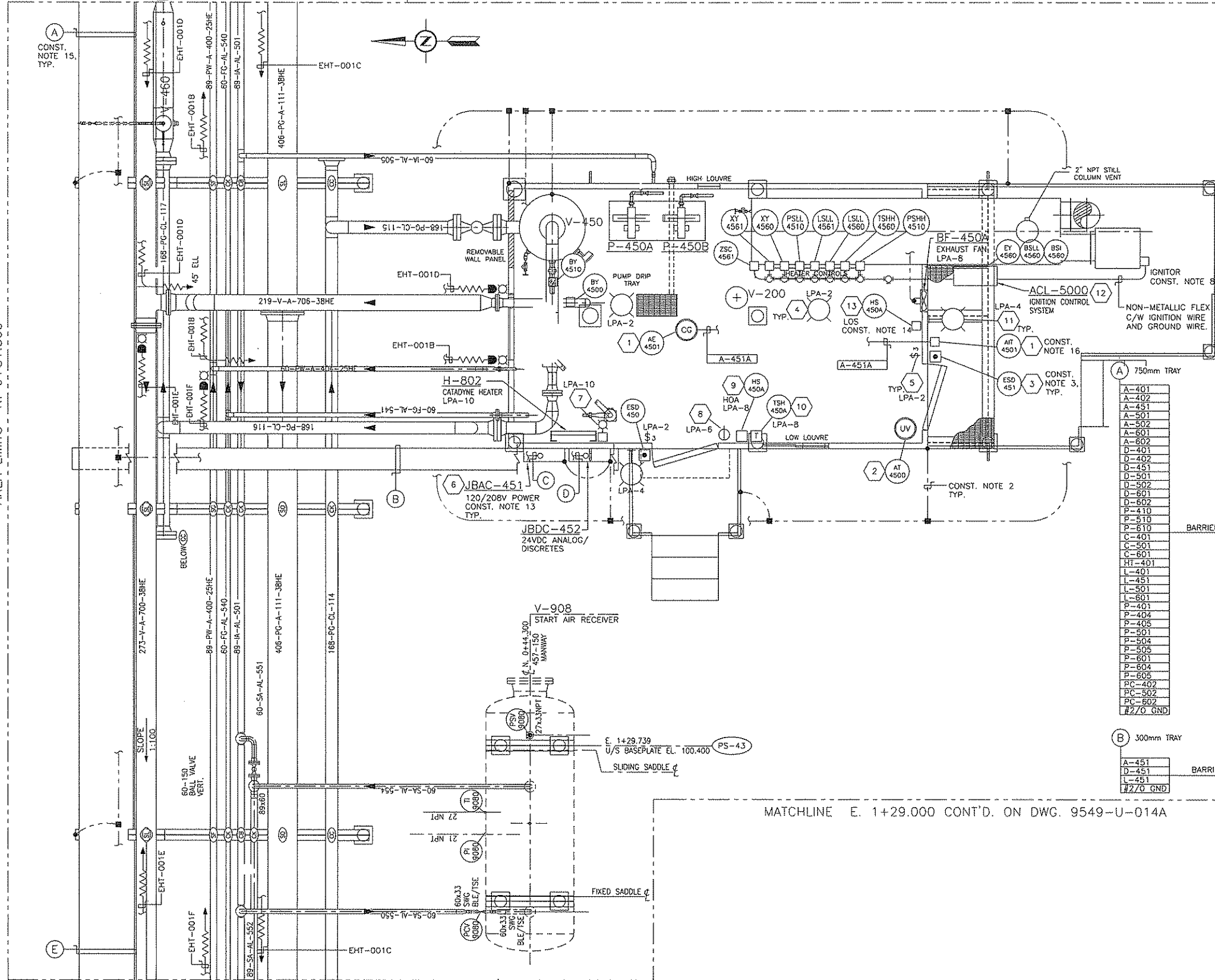
CONSTRUCTION NOTES:

- ALL ELECTRICAL WORK TO BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE AND THE ALBERTA SAFETY CODES COUNCIL.
- FIELD CONTRACTOR TO GROUND DEHYDRATOR BUILDING PILES IN TWO LOCATIONS AS SHOWN VIA #2/0 AWG TWH GREEN INSULATED COPPER GROUND. PILES SERVE AS ALTERNATIVE TO GROUNDING WELLS. ALL OTHER GROUND TAPS ARE #2 AWG TWH GREEN INSULATED COPPER GROUND.
- BUILDING CONTRACTOR TO SUPPLY AND INSTALL PLEXIGLASS WEATHERPROOF SHROUD OVER TOP OF THE ESD PUSHBUTTON. PUSHBUTTON TO BE ACCESSIBLE FROM THE FRONT.
- MAIN GROUND GRID IN TRAY TO BE #2/0 AWG TWH GREEN INSULATED GROUND. GROUND TAPS TO BE #2 AWG TWH GREEN INSULATED COPPER GROUND.
- BUILDING CONTRACTOR TO INSTALL LAMACOID CENTERED ABOVE CATADYNE HEATER ON/OFF SWITCH, WHITE LETTERS ON RED BACKGROUND TO READ:
CATADYNE HEATER
IMPORTANT: SWITCH ON
(20 MIN. MAX.) AT ANY TIME.
- FIELD CONTRACTOR TO SUPPLY AND INSTALL SUITABLE MEANS OF SUPPORT FOR CABLES BETWEEN JUNCTION BOX AND CABLE TRAY.
- INSTRUMENTATION LISTED BELOW IS SUPPLIED AS PART OF THE DEHYDRATOR SKID.

BY-4500	BDV4500 BLOWDOWN VALVE SOLENOID
BY-4510	BDV4510 FUEL GAS BLOWDOWN VALVE SOLENOID
PSLL-4510	DEHY FUEL GAS LOW PRESSURE SWITCH
PSHH-4510	DEHY FUEL GAS HIGH PRESSURE SWITCH
LSLL-4560	REBOILER LOW LEVEL SWITCH
LSLL-4561	ACCUMULATOR LOW LEVEL SWITCH
TSHH-4560	REBOILER HIGH TEMPERATURE SWITCH
XY-4560	REBOILER PILOT GAS SHUTOFF SOLENOID
XY-4561	REBOILER FUEL GAS SHUTOFF SOLENOID
PC-602	VALVE POC SWITCH
- IGNITOR, IGNITION WIRE AND NON-METALLIC FLEX SUPPLIED AS PART OF IGNITION CONTROL SYSTEM AND INSTALLED BY BUILDING CONTRACTOR.
- ALL BUILDING ELECTRICAL SHALL BE BY BUILDING CONTRACTOR UNLESS SPECIFIED OTHERWISE.
- BUILDING CONTRACTOR SHALL SUPPLY AND INSTALL 1/4" SS TUBING FROM GAS SENSOR TO REMOTE MOUNTED DETECTOR.
- HEAT TRACE ROUTING ON LAYOUT IS SHOWN DIAGRAMMATICALLY ONLY. REFER TO HEAT TRACE SCHEDULE ON DWG. 9549-T-022A FOR COMPLETE LISTING OF LINE DESIGNATIONS, NUMBER OF PASSES REQUIRED ON EACH LINE AND APPROXIMATE LENGTHS FOR EACH HEAT TRACE CIRCUIT. FIELD CONTRACTOR SHALL VERIFY ALL HEAT TRACE LENGTHS IN FIELD.
- FIELD CONTRACTOR TO SUPPLY AND INSTALL ELECTRIC HEAT TRACING (8 WATTS/FOOT) C/W POWER CONNECTION KITS, TEES AND END KITS. END CONNECTION KITS TO CONTAIN HEAT TRACING STATUS INDICATING LIGHTS. RAYCHEM TYPE #E100L1A OR EQUAL. REFER TO MECHANICAL PIPING DRAWINGS AND P&ID'S FOR PIPING LAYOUTS AND PIPE LINE DESIGNATIONS.
- CABLE ENTRY INTO JUNCTION BOX SHALL BE IN BOTTOM ONLY.
- BUILDING CONTRACTOR SHALL INSTALL LOCK OFF SWITCH ADJACENT TO FAN, OPPOSITE OF MOTOR TERMINAL BOX.
- FIELD CONTRACTOR TO INSTALL METAL BARRIER IN CABLE TRAYS, AS REQUIRED, TO SEPARATE 480/208/120VAC POWER CABLES FROM 24VDC POWER, DISCRETE AND ANALOG CABLES.
- FIELD CONTRACTOR TO RE-LOCATE GAS DETECTION MONITOR TO OUTSIDE WALL NEXT TO DOOR AS SHOWN.

AREA LIMITS N. 0+33.000

AREA LIMITS N. 0+51.500



MATCHLINE E. 1+26.500 CONT'D. ON DWG. 9549-U-014A

MATCHLINE E. 1+29.000 CONT'D. ON DWG. 9549-U-014A

NOTES:

REFERENCE DRAWINGS

REVISIONS

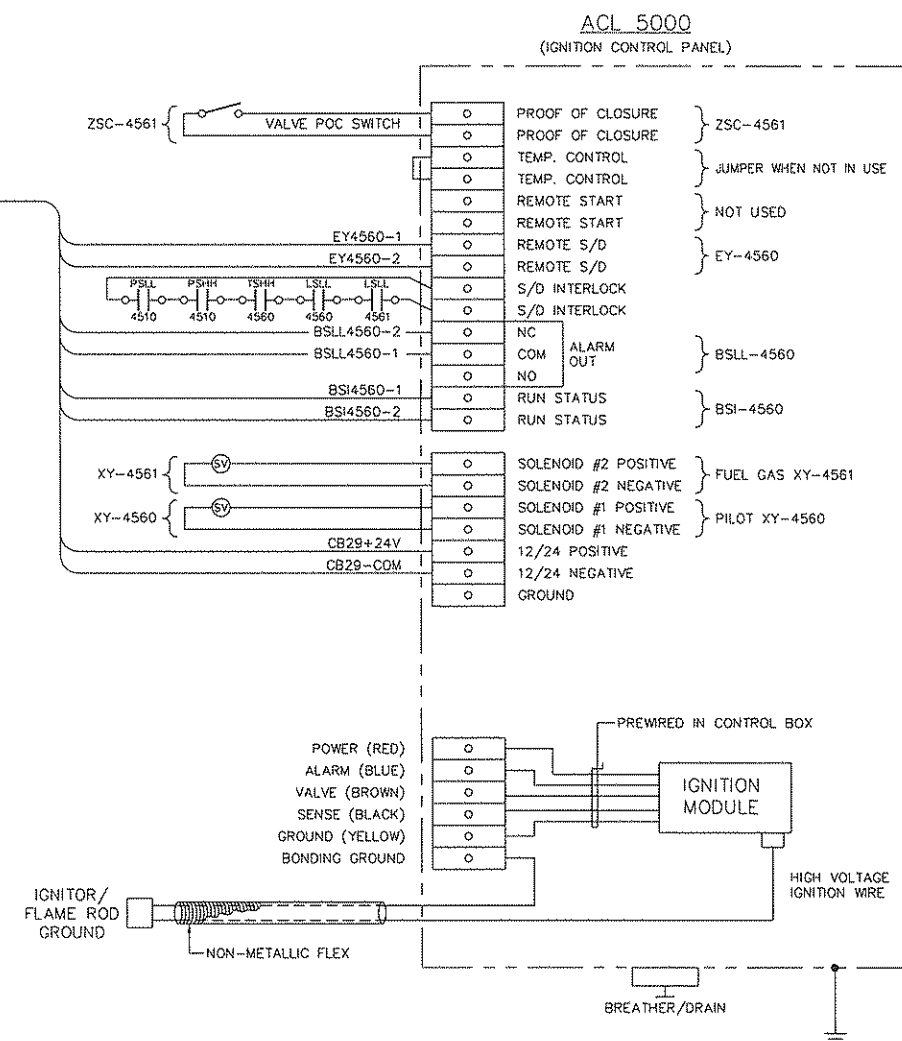
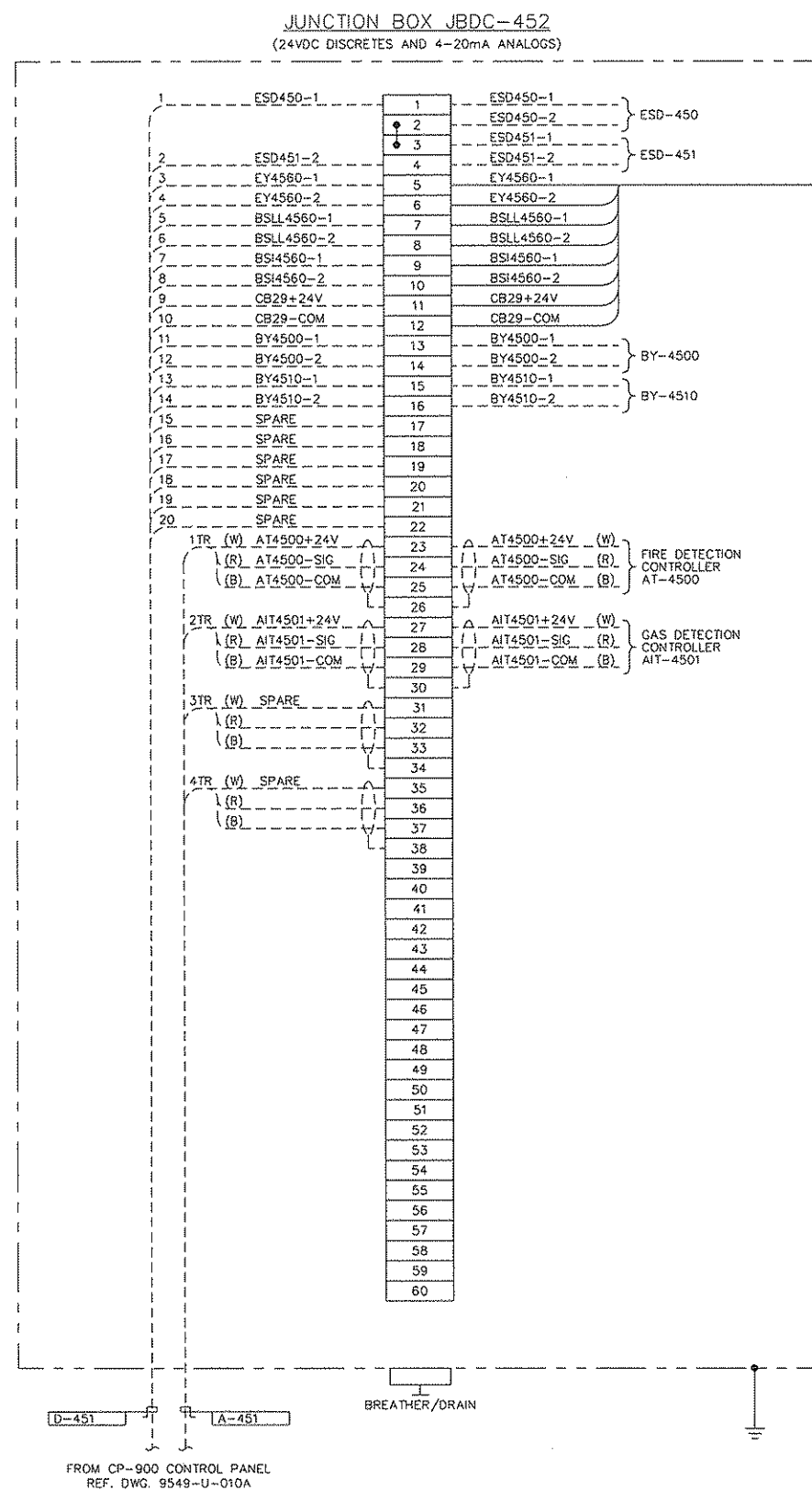
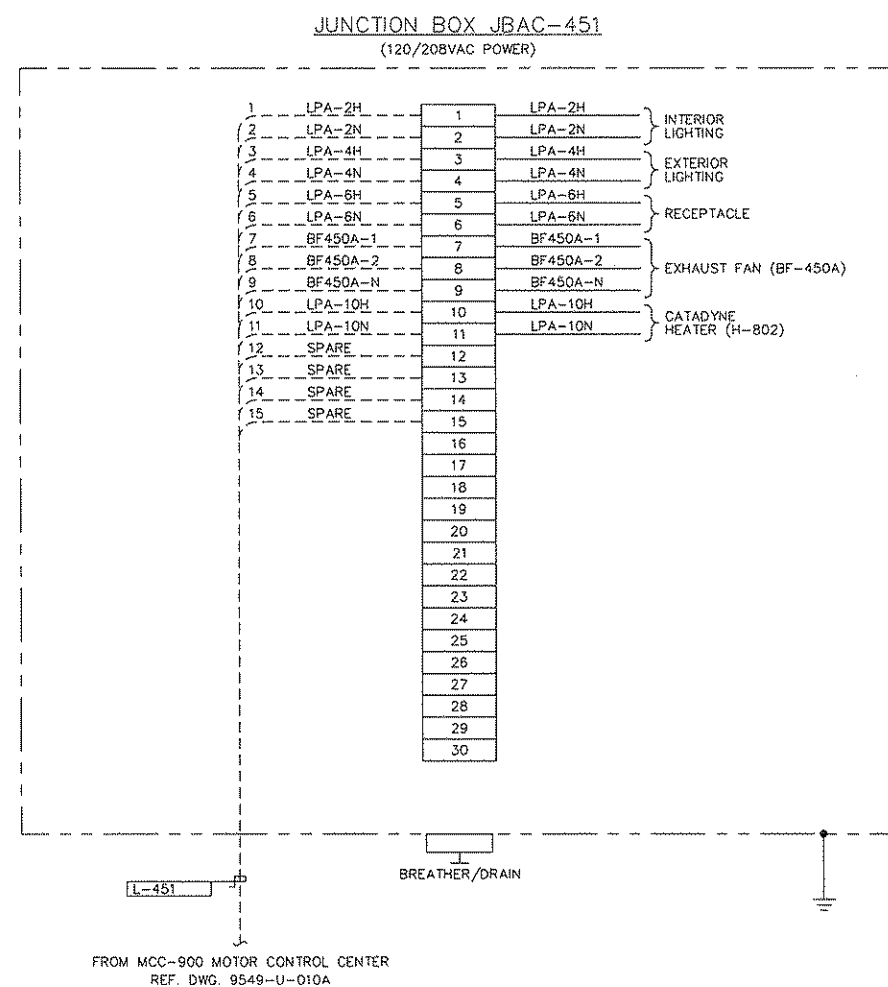
ENGINEERING STAMP

DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
6	AS BUILT PER FIELD MARK UPS	6	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW
0	ISSUED FOR CONSTRUCTION	0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17	DAS	GMW	JMW
1	AS-BUILT	1	AS-BUILT	9549.00	05.08.16	KK	DPS	JMW
2	K-500 COMPRESSOR BUILDING ADDITION	2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW
3	AS-BUILT	3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW
4A	PRELIMINARY (K-600 ADDITION)	4A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
4B	ISSUED FOR BID (K-600 ADDITION)	4B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW
5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW

GRB Engineering Ltd.

TWINNING COMPRESSOR STATION
V-450 DEHYDRATOR BUILDING
ELECTRICAL LAYOUT

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	1:30	D-9549-U-013A	6



NOTES:

[illegible]

ENGINEERING STAMP

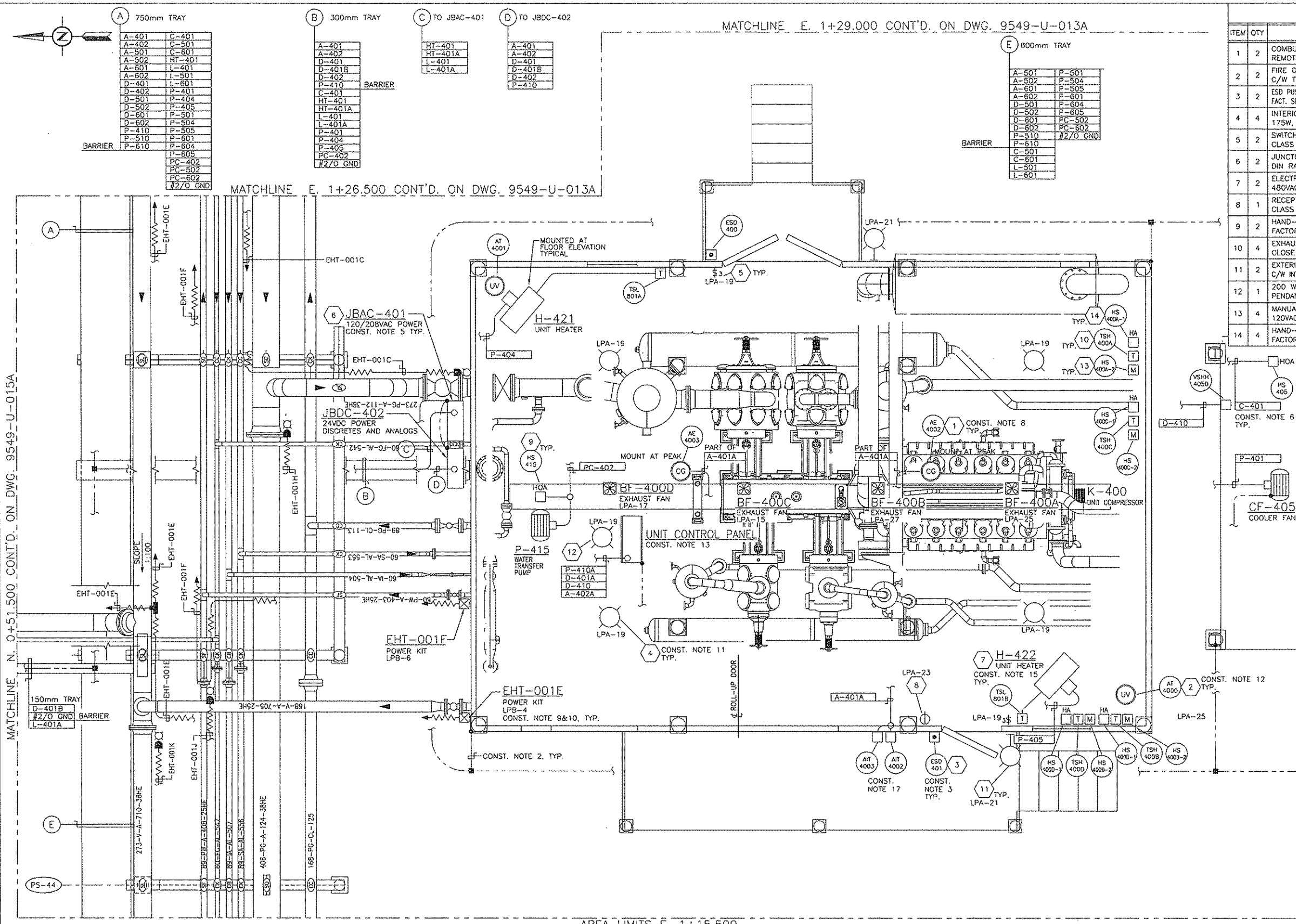


QUICKSILVER

TWINING COMPRESSOR STATION
V-450 DEHYDRATOR BUILDING
JUNCTION BOX LAYOUTS

GRB ENGINEERING LTD.

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.01	N.T.S.	D-9549-U-013B	



BILL OF MATERIALS				
ITEM	QTY	DESCRIPTION	MANUFACTURER	SUPPLIED BY
1	2	COMBUSTIBLE GAS DETECTOR, 24VDC, C/W REMOTE MOUNTED SENSOR AND SPLASH GUARD	NET SAFETY MLP-ARS-SC1100	OWNER
2	2	FIRE DETECTOR, 24VDC, UNITIZED ULTRA-VIOLET C/W TL-UV-KIT UV TEST LAMP KIT	NET SAFETY UVS-AR	OWNER
3	2	ESD PUSHBUTTON, 24VDC, MAINTAINED, RED MUSHROOM HEAD FACT. SEALED, C/W #800H-1H4ZR TYPE 4X, CL. 1, DR. 2 ENCL.	ALLEN BRADLEY 800H-FRXT6D4	BLDG. CONTRACTOR
4	4	INTERIOR LIGHTING, CLASS I, DIVISION 1 175W, 120 VAC, METAL HALIDE	CROUSE HINDS EVLPA192171	BLDG. CONTRACTOR
5	2	SWITCH, 3-WAY, 120VAC, 20A, FACTORY SEALED CLASS I, DIVISION 1 RATED	CROUSE HINDS EDSC2130	BLDG. CONTRACTOR
6	2	JUNCTION BOX, NEMA4X ENCLOSURE C/W TS35 DIN RAIL, AND WEIDMULLER TERMINALS	HOFFMAN A24H2008GQRLP	BLDG. CONTRACTOR
7	2	ELECTRIC HEATERS, CLASS I, DIVISION 1 480VAC, 3Ph, 60Hz, 20kW	RUFFNECK FX416-480360-20	BLDG. CONTRACTOR
8	1	RECEPTACLE, 120VAC, 20A, EXPLOSION PROOF CLASS I, DIVISION 1 RATED	CROUSE HINDS CPS152R	BLDG. CONTRACTOR
9	2	HAND-OFF-AUTO, EXPLOSION PROOF, 120VAC FACTORY SEALED, CLASS I, DIVISION 1	CROUSE HINDS EDSC21273	FIELD CONTRACTOR
10	4	EXHAUST FAN THERMOSTAT CLOSE ON TEMPERATURE RISE	RUFFNECK XT311	FIELD CONTRACTOR
11	2	EXTERIOR LIGHTING, CLASS I, DIVISION 2, C/W INTEGRAL BALLAST, GUARD AND LAMP, 70W HPS, 120VAC	CROUSE HINDS VMVSJ070CP/BC	BLDG. CONTRACTOR
12	1	200 WATT INCANDESCENT CLASS I, DIVISION 1, PENDANT MOUNT C/W GLOBE, GUARD & 120VAC LAMP	CROUSE HINDS EVA210	BLDG. CONTRACTOR
13	4	MANUAL MOTOR STARTER LOCKABLE, SINGLE POLE, 120VAC, CLASS I, ZONE 1, GROUP IIA	CROUSE HINDS EDSC2119	FIELD CONTRACTOR
14	4	HAND-AUTO, SELECTOR SWITCH, EXPLOSION PROOF, FACTORY SEALED, CLASS I, DIVISION 1	CROUSE HINDS EDSC21271	FIELD CONTRACTOR

- CONSTRUCTION NOTES:**
- ALL ELECTRICAL WORK TO BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE AND THE ALBERTA SAFETY CODES COUNCIL.
 - FIELD CONTRACTOR TO GROUND COMPRESSOR BUILDING PILES IN TWO LOCATIONS AS SHOWN VIA #2/0 AWG TWH GREEN INSULATED COPPER GROUND. ALL OTHER GROUND TAPS ARE #2 AWG TWH GREEN INSULATED COPPER GROUND.
 - BUILDING CONTRACTOR TO SUPPLY AND INSTALL PLEXIGLASS WEATHERPROOF SHROUD OVER TOP OF THE ESD PUSHBUTTON. PUSHBUTTON TO BE ACCESSIBLE FROM THE FRONT.
 - MAIN GROUND GRID IN TRAY TO BE #2/0 AWG TWH GREEN INSULATED GROUND. GROUND TAPS TO BE #2 AWG TWH GREEN INSULATED COPPER GROUND.
 - CABLE ENTRY INTO JUNCTION BOX SHALL BE IN BOTTOM ONLY.
 - FIELD CONTRACTOR TO SUPPLY AND INSTALL SUITABLE MEANS OF SUPPORT FOR CABLES BETWEEN JUNCTION BOX AND CABLE TRAY.
 - ALL BUILDING ELECTRICAL SHALL BE BY BUILDING CONTRACTOR UNLESS SPECIFIED OTHERWISE.
 - BUILDING CONTRACTOR SHALL SUPPLY AND INSTALL 1/4" SS TUBING FROM GAS SENSOR TO REMOTE MOUNTED DETECTOR.
 - HEAT TRACE ROUTING ON LAYOUT IS SHOWN DIAGRAMMATICALLY ONLY. REFER TO HEAT TRACE SCHEDULE ON DWG. 9549-T-022A FOR COMPLETE LISTING OF LINE DESIGNATIONS, NUMBER OF PASSES REQUIRED ON EACH LINE AND APPROXIMATE LENGTHS FOR EACH HEAT TRACE CIRCUIT. FIELD CONTRACTOR SHALL VERIFY ALL HEAT TRACE LENGTHS IN FIELD.
 - FIELD CONTRACTOR TO SUPPLY AND INSTALL ELECTRIC HEAT TRACING (8 WATTS/FOOT) C/W POWER CONNECTION KITS, TEES AND END KITS. END CONNECTION KITS TO CONTAIN HEAT TRACING STATUS INDICATING LIGHTS. RAYCHEM TYPE #E100L1A OR EQUAL. REFER TO MECHANICAL PIPING DRAWINGS AND P&ID'S FOR PIPING LAYOUTS AND PIPE LINE DESIGNATIONS.
 - BUILDING CONTRACTOR TO ENSURE THAT INTERIOR LIGHTING DOES NOT INTERFERE WITH THE OPERATION OF THE OVERHEAD CRANE.
 - UV FIRE SENSOR HEADS SHALL BE MOUNTED IN SUCH A WAY THAT THE OVERHEAD CRANE DOES NOT IMPEDE THEIR PERFORMANCE.
 - COMPRESSOR SKID INSTRUMENTATION IS PREWIRED TO CONTROL PANEL BY COMPRESSOR VENDOR.
 -
 - BUILDING CONTRACTOR SHALL WIRE HEATER THERMOSTATS DIRECTLY TO ELECTRIC HEATERS. ELECTRIC HEATERS SHALL BE MOUNTED NEAR FLOOR LEVEL.
 - LIGHT MOUNT IN LOCATION TO ILLUMINATE AREA AROUND UNIT CONTROL PANEL.
 - FIELD CONTRACTOR TO RE-LOCATE GAS DETECTION MONITOR TO OUTSIDE WALL NEXT TO DOOR AS SHOWN.

NOTES:	REFERENCE DRAWINGS		REVISIONS							ENGINEERING STAMP	
	DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.		
			6	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW		
			7	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW		
			1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW	TWINING COMPRESSOR STATION K-400 COMPRESSOR BUILDING ELECTRICAL LAYOUT	
			2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW		
			3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW	GRB ENGINEERING Ltd.	
			4	AS-BUILT AS PER EXHAUST FAN ADDITIONS	9549.01	07.05.18	YG	MSC	JMW		
			5A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW	PROJECT NO.	SCALE:
			5B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW	9549.02	1:30
										DWG. NO.	REV.
										D-9549-U-014A	7

JUNCTION BOX JBAC-401

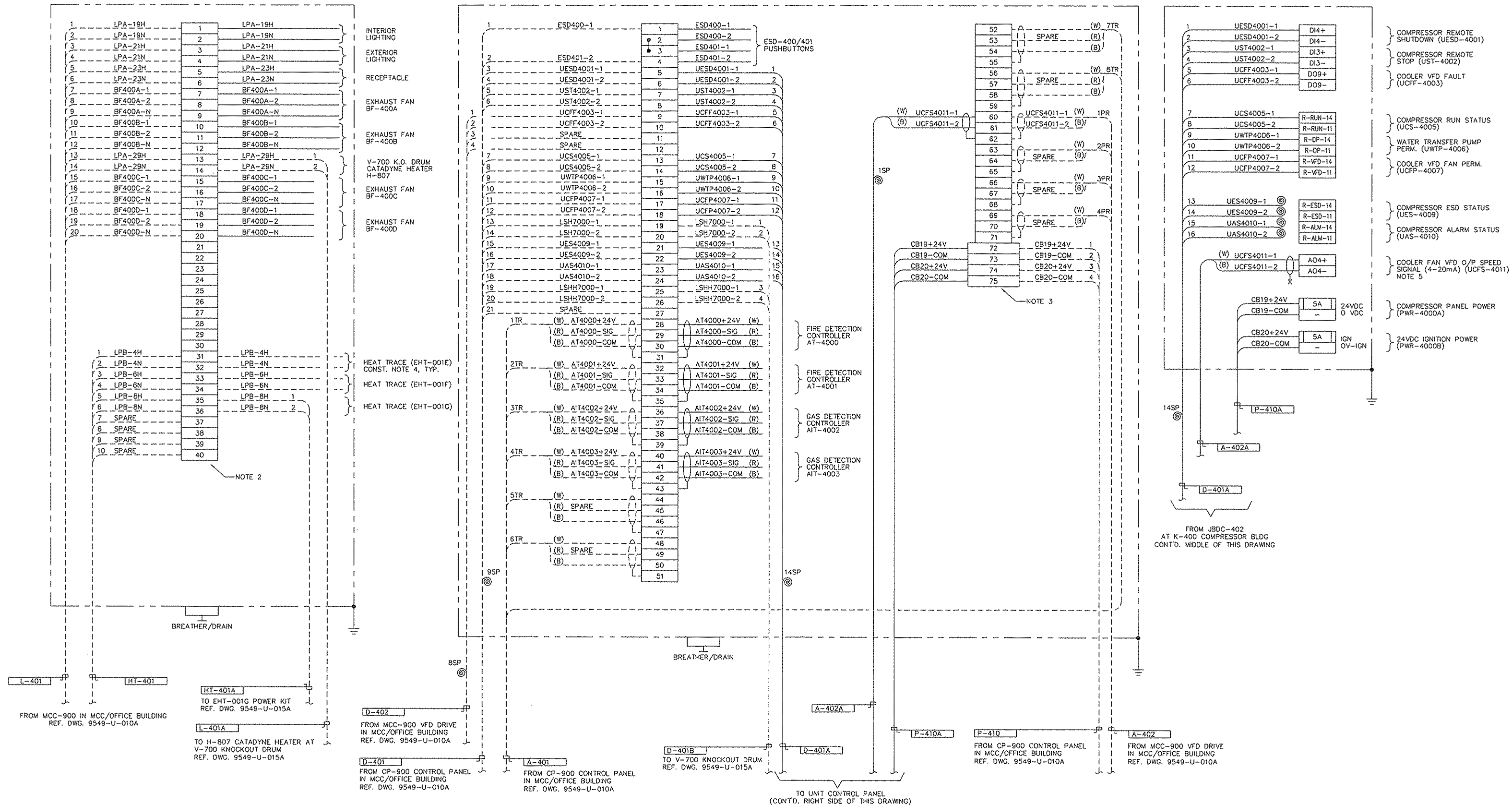
(120/208VAC POWER)
NOTES 1 AND 5

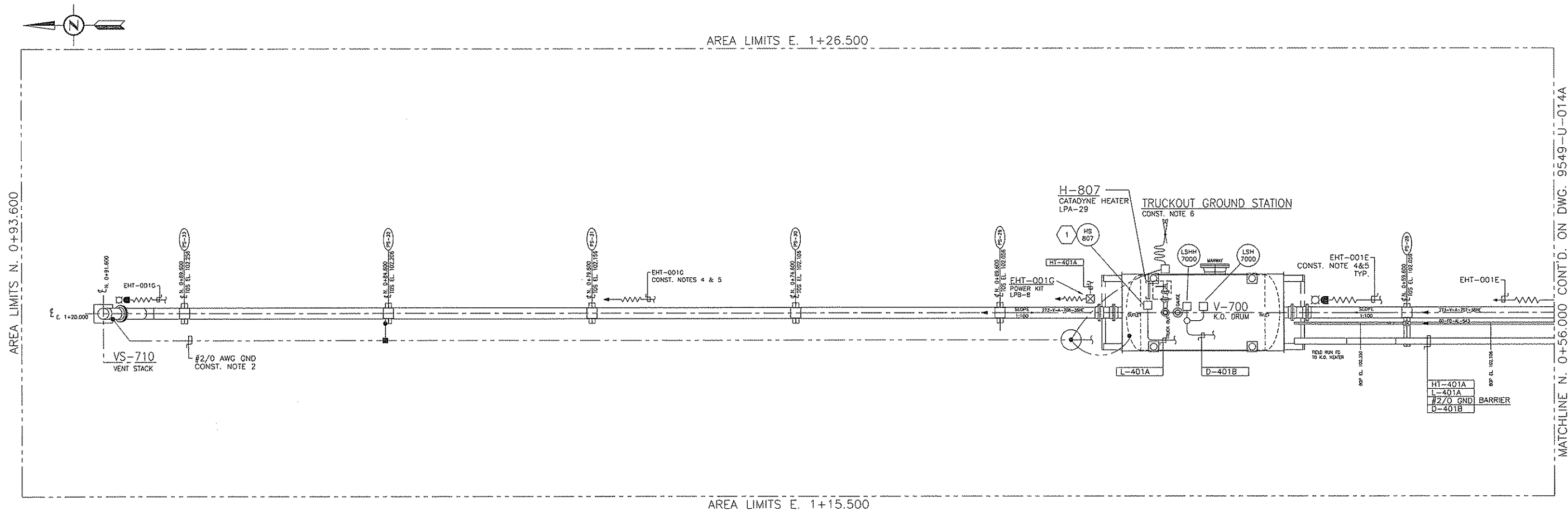
JUNCTION BOX JBDC-402

(24VDC DISCRETES & ANALOGS)
NOTE 1

COMPRESSOR CONTROL PANEL

(LOCATED ON K-400 COMPRESSOR SKID)





CONSTRUCTION NOTES:

- ALL ELECTRICAL WORK TO BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE AND THE SAFETY CODES COUNCIL.
- MAIN GROUND GRID IN TRAY TO BE #2/0 AWG TWH GREEN INSULATED GROUND. GROUND TAPS TO BE #2 AWG TWH GREEN INSULATED COPPER GROUND.
- FIELD CONTRACTOR TO INSTALL LAMACOID CENTERED ABOVE CATADYNE HEATER ON/OFF SWITCH, WHITE LETTERS ON RED BACKGROUND TO READ:
CATADYNE HEATER
IMPORTANT: SWITCH ON
(20 MIN. MAX.) AT ANY TIME.
- FIELD CONTRACTOR SHALL FIELD VERIFY ALL TRACER LENGTHS.
- FIELD CONTRACTOR TO SUPPLY AND INSTALL ELECTRIC HEAT TRACING (8 WATTS/FOOT) C/W POWER CONNECTION KITS, TEES AND END KITS. END CONNECTION KITS TO CONTAIN HEAT TRACING STATUS INDICATING LIGHTS, RAYCHEM TYPE #E100L1A OR EQUAL. REFER TO MECHANICAL PIPING DRAWINGS AND P&ID'S FOR PIPING LAYOUTS AND PIPE LINE DESIGNATIONS.
- FIELD CONTRACTOR TO SUPPLY AND INSTALL TRUCK OUT GROUND CABLE ON A RACK MOUNTED ON FIELD FABRICATED CHANNEL SUPPORT. GROUNDING CABLE SHALL BE 8 METRES OF #4 AWG -40°C TEREX GROUND WIRE C/W WELDING TYPE GROUND CLAMP.
- FIELD CONTRACTOR TO INSTALL METAL BARRIER IN CABLE TRAYS, AS REQUIRED, TO SEPARATE 480/208/120VAC POWER CABLES FROM 24VDC POWER, DISCRETE AND ANALOG CABLES.

BILL OF MATERIALS

ITEM	QTY	DESCRIPTION	MANUFACTURER	SUPPLIED BY
1	1	CATADYNE ON/OFF SWITCH, SINGLE POLE, 120V, 20A C/W DSD948 PILOT LIGHT, EDSC272 ENCLOSURE, CLASS 1, DIVISION 1	CROUSE HINDS DSD933	BLDG. CONTRACTOR
-	-	-	-	-

NOTES:

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
A	PRELIMINARY	9549.00	05.04.07	LL	GMW	JMW
0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17	DAS	GMW	JMW
1	AS-BUILT	9549.00	06.01.17	LL	DPS	JMW

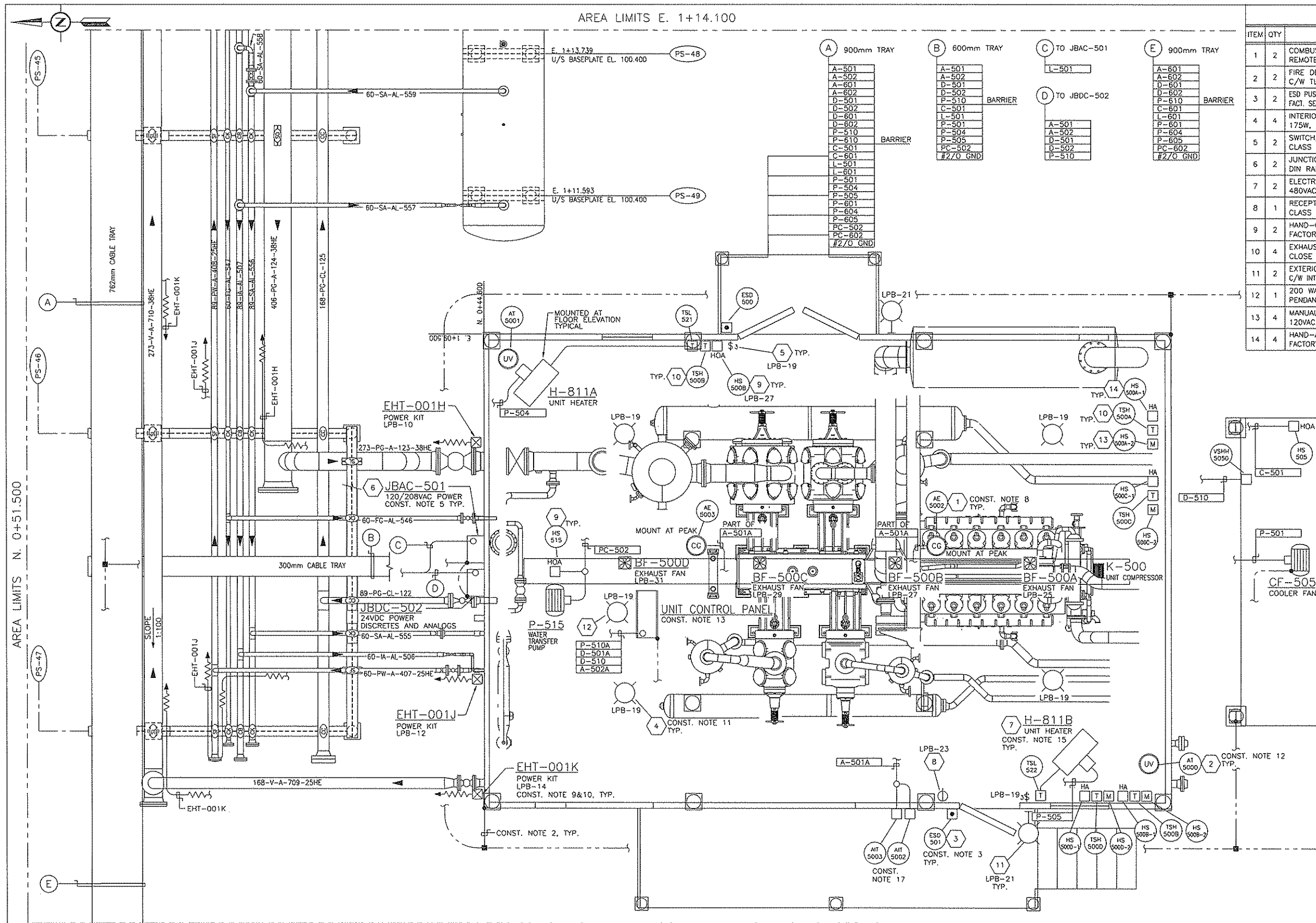
ENGINEERING STAMP

GRB ENGINEERING Ltd.



TWINNING COMPRESSOR STATION
V-700 K.O. DRUM AREA
ELECTRICAL LAYOUT

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.01	1:50	D-9549-U-015A	1

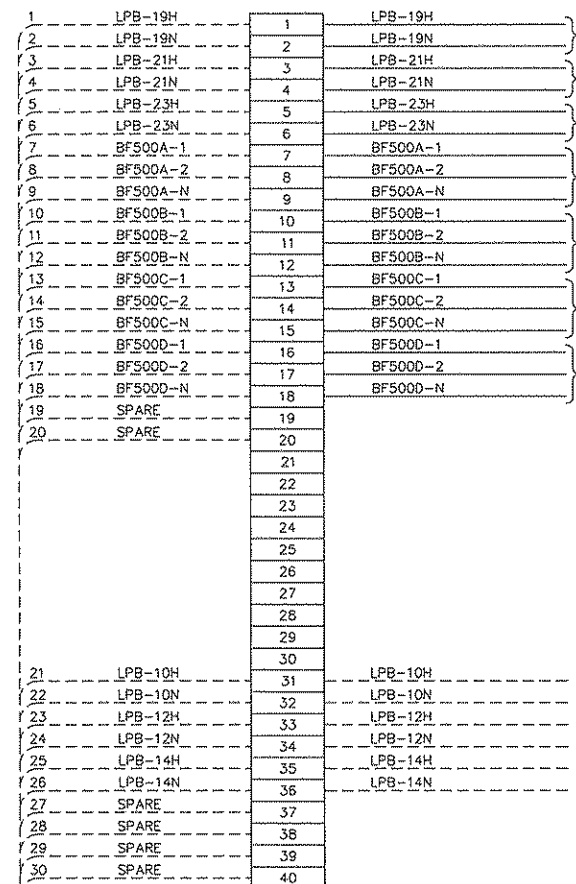


BILL OF MATERIALS				
ITEM	QTY	DESCRIPTION	MANUFACTURER	SUPPLIED BY
1	2	COMBUSTIBLE GAS DETECTOR, 24VDC, C/W REMOTE MOUNTED SENSOR AND SPLASH GUARD	NET SAFETY MLP-ARS-SC1100	OWNER
2	2	FIRE DETECTOR, 24VDC, INITIALIZED ULTRA-VIOLET C/W TL-UV-KIT UV TEST LAMP KIT	NET SAFETY UVS-AR	OWNER
3	2	ESD PUSHBUTTON, 24VDC, MAINTAINED, RED MUSHROOM HEAD FACT. SEALED, C/W #800H-1HZ4R TYPE 4X, CL. 1, DR. 2 ENCL.	ALLEN BRADLEY 800H-FRXT604	BLDG. CONTRACTOR
4	4	INTERIOR LIGHTING, CLASS 1, DIVISION 1 175W, 120 VAC, METAL HALIDE	CROUSE HINDS EVLPA192171	BLDG. CONTRACTOR
5	2	SWITCH, 3-WAY, 120VAC, 20A, FACTORY SEALED CLASS 1, DIVISION 1 RATED	CROUSE HINDS EDCS2130	BLDG. CONTRACTOR
6	2	JUNCTION BOX, NEMA4X ENCLOSURE C/W TS35 DIN RAIL, AND WEIDMULLER TERMINALS	HOFFMAN A24H2008CQRLP	BLDG. CONTRACTOR
7	2	ELECTRIC HEATERS, CLASS 1, DIVISION 1 480VAC, 3PH, 60Hz, 20kW	RUFFNECK FX416-480360-20	BLDG. CONTRACTOR
8	1	RECEPTACLE, 120VAC, 20A, EXPLOSION PROOF CLASS 1, DIVISION 1 RATED	CROUSE HINDS CPS152R	BLDG. CONTRACTOR
9	2	HAND-OFF-AUTO, EXPLOSION PROOF, 120VAC FACTORY SEALED, CLASS 1, DIVISION 1	CROUSE HINDS EDCS21273	FIELD CONTRACTOR
10	4	EXHAUST FAN THERMOSTAT CLOSE ON TEMPERATURE RISE	RUFFNECK XT311	FIELD CONTRACTOR
11	2	EXTERIOR LIGHTING, CLASS 1, DIVISION 2, C/W INTEGRAL BALLAST, GUARD AND LAMP, 70W HPS, 120VAC	CROUSE HINDS VMVSJ070GP/BG	BLDG. CONTRACTOR
12	1	200 WATT INCANDESCENT CLASS 1, DIVISION 1, PENDANT MOUNT C/W GLOBE, GUARD & 120VAC LAMP	CROUSE HINDS EYA210	BLDG. CONTRACTOR
13	4	MANUAL MOTOR STARTER LOCKABLE, SINGLE POLE, 120VAC, CLASS 1, ZONE 1, GROUP IIA	CROUSE HINDS EDCS2119	FIELD CONTRACTOR
14	4	HAND-AUTO, SELECTOR SWITCH, EXPLOSION PROOF, FACTORY SEALED, CLASS 1, DIVISION 1	CROUSE HINDS EDCS21271	FIELD CONTRACTOR

- CONSTRUCTION NOTES:**
- ALL ELECTRICAL WORK TO BE DONE IN ACCORDANCE WITH THE LATEST EDITION OF THE CANADIAN ELECTRICAL CODE AND THE ALBERTA SAFETY CODES COUNCIL.
 - FIELD CONTRACTOR TO GROUND COMPRESSOR BUILDING PILES IN TWO LOCATIONS AS SHOWN VIA #2/0 AWG TWH GREEN INSULATED COPPER GROUND. ALL OTHER GROUND TAPS ARE #2 AWG TWH GREEN INSULATED COPPER GROUND.
 - BUILDING CONTRACTOR TO SUPPLY AND INSTALL PLEXIGLASS WEATHERPROOF SHROUD OVER TOP OF THE ESD PUSHBUTTON. PUSHBUTTON TO BE ACCESSIBLE FROM THE FRONT.
 - MAIN GROUND GRID IN TRAY TO BE #2/0 AWG TWH GREEN INSULATED GROUND. GROUND TAPS TO BE #2 AWG TWH GREEN INSULATED COPPER GROUND.
 - CABLE ENTRY INTO JUNCTION BOX SHALL BE IN BOTTOM ONLY.
 - FIELD CONTRACTOR TO SUPPLY AND INSTALL SUITABLE MEANS OF SUPPORT FOR CABLES BETWEEN JUNCTION BOX AND CABLE TRAY.
 - ALL BUILDING ELECTRICAL SHALL BE BY BUILDING CONTRACTOR UNLESS SPECIFIED OTHERWISE.
 - BUILDING CONTRACTOR SHALL SUPPLY AND INSTALL 1/4" SS TUBING FROM GAS SENSOR TO REMOTE MOUNTED DETECTOR.
 - HEAT TRACE ROUTING ON LAYOUT IS SHOWN DIAGRAMATICALLY ONLY. REFER TO HEAT TRACE SCHEDULE ON DWG. 9549-T-022A FOR COMPLETE LISTING OF LINE DESIGNATIONS, NUMBER OF PASSES REQUIRED ON EACH LINE AND APPROXIMATE LENGTHS FOR EACH HEAT TRACE CIRCUIT. FIELD CONTRACTOR SHALL VERIFY ALL HEAT TRACE LENGTHS IN FIELD.
 - FIELD CONTRACTOR TO SUPPLY AND INSTALL ELECTRIC HEAT TRACING (8 WATTS/FOOT) C/W POWER CONNECTION KITS, TEES AND END KITS. END CONNECTION KITS TO CONTAIN HEAT TRACING STATUS INDICATING LIGHTS. RAYCHEM TYPE #E100L1A OR EQUAL. REFER TO MECHANICAL PIPING DRAWINGS AND P&ID'S FOR PIPING LAYOUTS AND PIPE LINE DESIGNATIONS.
 - BUILDING CONTRACTOR TO ENSURE THAT INTERIOR LIGHTING DOES NOT INTERFERE WITH THE OPERATION OF THE OVERHEAD CRANE.
 - UV FIRE SENSOR HEADS SHALL BE MOUNTED IN SUCH A WAY THAT THE OVERHEAD CRANE DOES NOT IMPEDE THEIR PERFORMANCE.
 - COMPRESSOR SKID INSTRUMENTATION IS PREWIRED TO CONTROL PANEL BY COMPRESSOR VENDOR.
 -
 - BUILDING CONTRACTOR SHALL WIRE HEATER THERMOSTATS DIRECTLY TO ELECTRIC HEATERS. ELECTRIC HEATERS SHALL BE MOUNTED NEAR FLOOR LEVEL.
 - LIGHT MOUNT IN LOCATION TO ILLUMINATE AREA AROUND UNIT CONTROL PANEL.

NOTES:	REFERENCE DRAWINGS		REVISIONS						ENGINEERING STAMP		QUICKSILVER			
	DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	TWINING COMPRESSOR STATION K-500 COMPRESSOR BUILDING ELECTRICAL LAYOUT				
			0	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW	GRB ENGINEERING Ltd.	PROJECT NO.	SCALE:	DWG. NO.	REV.
			1	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW		9549.02	1:30	D-9549-U-016A	5
			2	AS-BUILT AS PER EXHAUST FAN ADDITIONS	9549.01	07.05.18	YG	MSC	JMW					
			3A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW					
			3B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW					
			4	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	GMK	AFM	JMW					
			5	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	MXC	AFM	JMW					

(120/208VAC POWER)
NOTES 1 AND 5



~~NOTE~~ NOTE 2

BREATHING/DRAIN

FROM MCC-900 IN MCC/OFFICE BUILDING
REF. DWG. 9549-U-010A

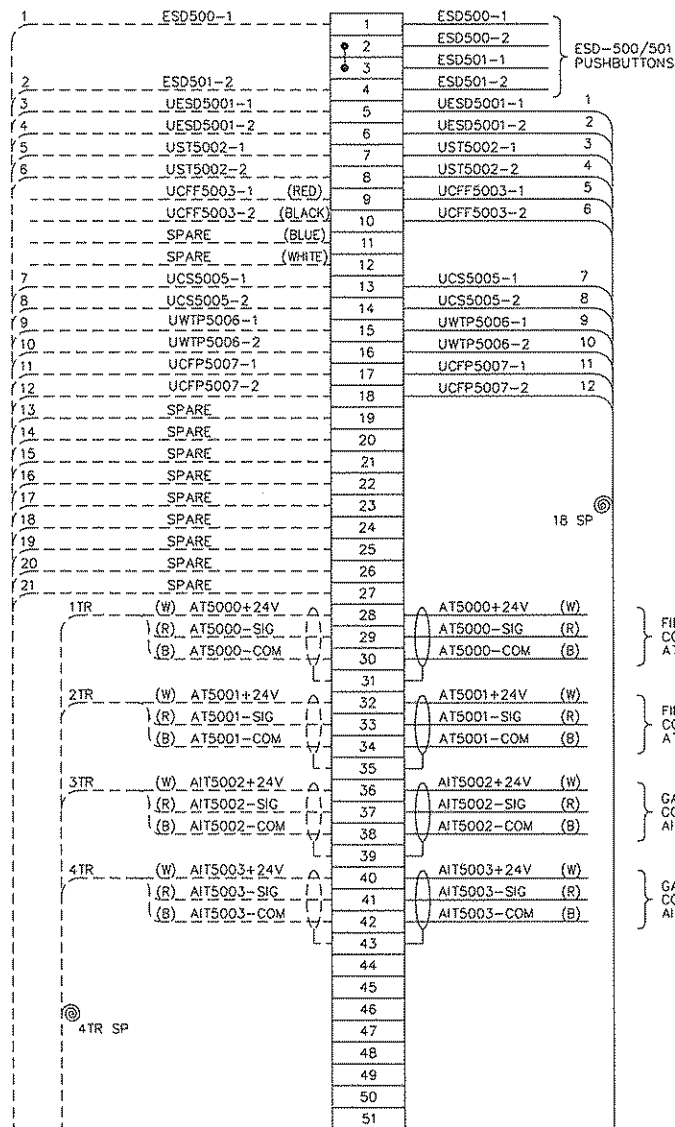
D-502

FROM MCC-900 VFD DRIVE
IN MCC/OFFICE BUILDING
REF. DWG. 9549-U-010A

D-501
FROM CP-900 CONTROL PANEL
IN MCC/OFFICE BUILDING
REF. DWG. 9549-U-010A

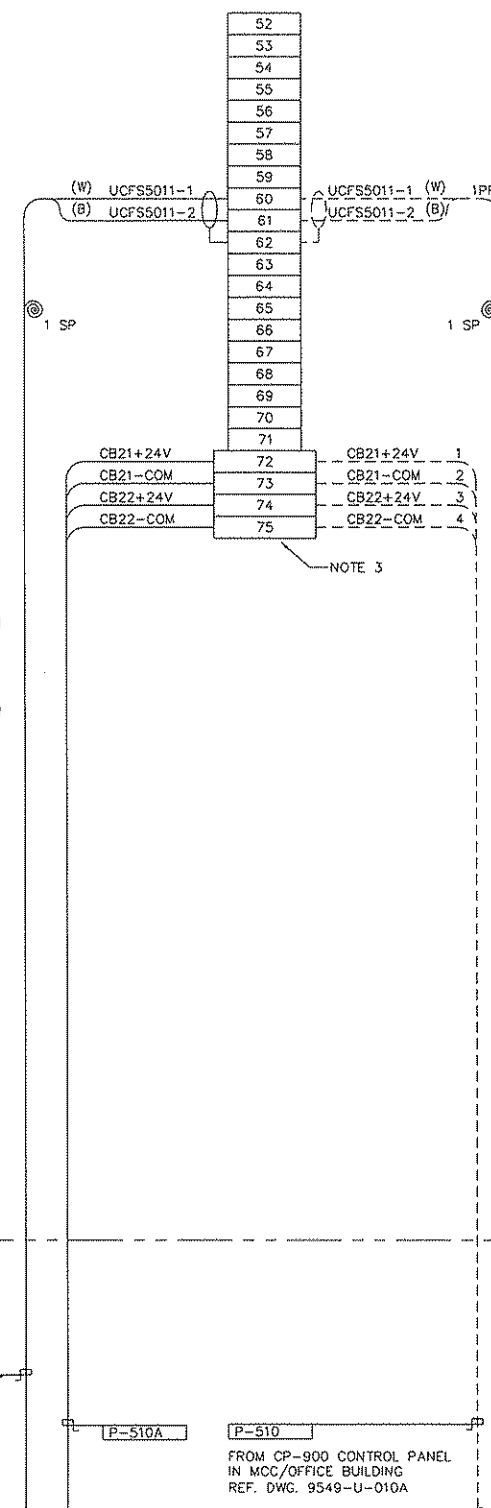
FROM CP-900 CONTROL PANEL
IN MCC/OFFICE BUILDING
REF. DWG. 9549-U-010A

(24VDC DISCRETES & ANALOGS)
NOTE 1



BREATHING/DRAIN

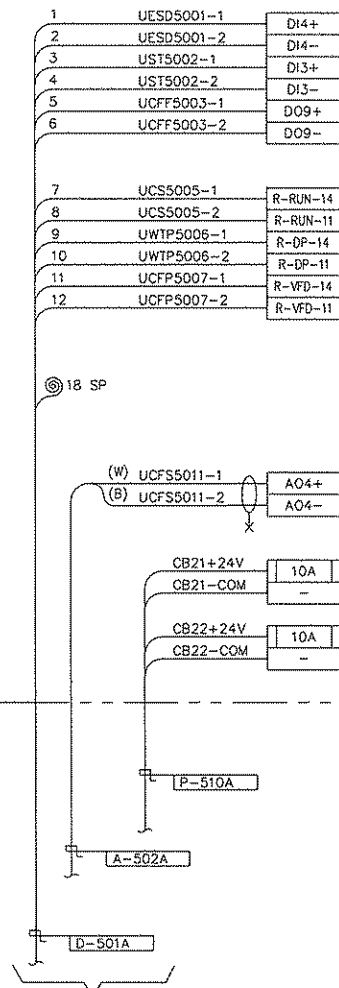
TO UNIT CONTROL PANEL
(CONT'D. RIGHT SIDE OF THIS DRAWING)



FROM CP-900 CONTROL PANEL
IN MCC/OFFICE BUILDING
REF. DWG. 9549-U-010A

FROM MCC-900 VFD DRIVE
IN MCC/OFFICE BUILDING
REF. DWG. 9549-U-010A

(LOCATED ON K-500 COMPRESSOR SKID)



FROM JBDC-502
AT K-500 COMPRESSOR BLDG
CONT'D. MIDDLE OF THIS DRAWING

COMPRESSOR REMOTE SHUTDOWN (UESD-5001)

COMPRESSOR REMOTE COOL STOP (UST-5002)

COOLER VFD FAULT (UCFF-5003)

COMPRESSOR RUN STATUS
(UCS-5005)

WATER TRANSFER PUMP
PERM. (UWTP-5006)

COOLER VFD FAN PERM.
(UCFP-5007)

} COOLER FAN VFD O/P SPEED
SIGNAL (4-20mA) (UCFS-5011)
NOTE 5

COMPRESSOR PANEL POWER
(PWR-5000A)

24VDC IGNITION POWER
(PWR-5000B)

- NOTES:
1. ALL FIELD JUNCTION BOXES TO BE FIBERGLASS TYPE 4X, HOFFMAN MODEL A-24H2008GORLP C/W/ A-24P20 BACK PANEL.
 2. CONTRACTOR SHALL SIZE, SUPPLY AND INSTALL BUILDING CONDUIT ACCORDING TO THE CANADIAN ELECTRICAL CODE.
 3. TERMINALS 72 TO 75 SHALL BE WEIDMULLER SAK10. WIRING FROM JBDC-502 TO COMPRESSOR PANEL SHALL BE #12 AWG.
 4. FIELD CONTRACTOR SHALL SUPPLY AND INSTALL MINIMUM #10 AWG WIRING TO HEAT TRACE POWER KITS MOUNTED ON EXTERIOR WALL OF COMPRESSOR BUILDING.
 5. FIELD CONTRACTOR TO ASBUID WIRE TAGS TO MATCH AS SHOWN.

[illegible]

ENGINEERING STAMP



QUICKSILVER

TWINING COMPRESSOR STATION
K-500 COMPRESSOR BUILDING
JUNCTION BOX LAYOUTS

GRB ENGINEERING LTD.

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.01	N.T.S.	D-9549-U-016B	2

JUNCTION BOX JBAC-601

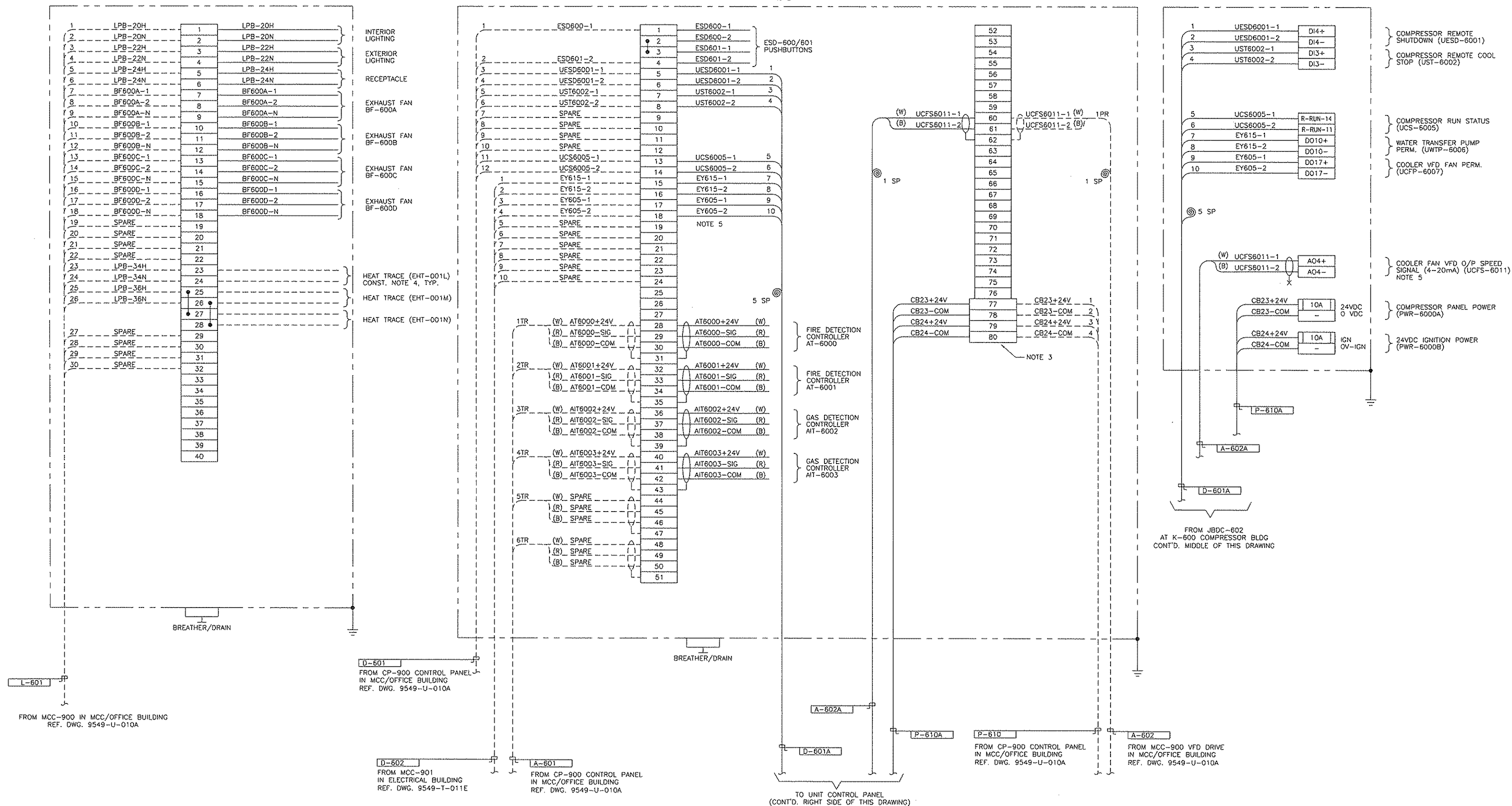
(120/208VAC POWER)
NOTES 1 AND 5

JUNCTION BOX JBDC-602

(24VDC DISCRETES & ANALOGS)
NOTE 1

COMPRESSOR CONTROL PANEL

(LOCATED ON K-600 COMPRESSOR SKID)



120/208 VOLTS		LP-A										MCC-900 MOUNTING	
60 HZ		LOCATION ELECTRICAL BUILDING										225A AMP BUS	
4 WIRE												100A AMP MAIN CB	
DESIGNATION	LOAD (WATTS)			BKR AMPS	CCT NO	PHASE A B C	CCT NO	BKR AMPS	LOAD (WATTS)			DESIGNATION	
	A	B	C						A	B	C		
INLET SEPARATOR BUILDING INTERIOR LIGHTING	300			15	1	●	2	15	300			DEHYDRATOR BUILDING INTERIOR LIGHTING	
INLET SEPARATOR BUILDING EXTERIOR LIGHTING		670		15	3	●	4	15		140		DEHYDRATOR BUILDING EXTERIOR LIGHTING	
INLET SEPARATOR BUILDING RECEPTACLE			250	15	5	●	6	15			250	DEHYDRATOR BUILDING RECEPTACLE	
INLET SEPARATOR BUILDING EXHAUST FAN (BF-110A)	700			15	7	●	8	15	700			DEHYDRATOR BUILDING EXHAUST FAN (BF-450A)	
INLET SEPARATOR BUILDING CATADYNE HEATER (H-800A)		800		15	9	●	10	15		1200		DEHYDRATOR BUILDING CATADYNE HEATER (H-802)	
INLET SEPARATOR BUILDING CATADYNE HEATER (H-800B)			800	15	11	●	12	15			-	SPARE	
INLET SEPARATOR BUILDING CATADYNE HEATER (H-800C)	800			15	13	●	14	15	-			SPARE	
K-400 COMPRESSOR BUILDING EXHAUST FAN (BF-400C)		350		20	15	●	16	15		210		MCC/OFFICE BUILDING EXTERIOR LIGHTS	
K-400 COMPRESSOR BUILDING EXHAUST FAN (BF-400D)			350	20	17	●	18	15			-	SPARE	
K-400 COMPRESSOR BUILDING INTERIOR LIGHTING	800			15	19	●	20	15	-			SPARE	
K-400 COMPRESSOR BUILDING EXTERIOR LIGHTING		180		15	21	●	22	15		-		SPARE	
K-400 COMPRESSOR BUILDING RECEPTACLE			250	15	23	●	24	15			-	SPARE	
K-400 COMPRESSOR BUILDING EXHAUST FAN (BF-400A)	350			15	25	●	26	15	-			SPARE	
K-400 COMPRESSOR BUILDING EXHAUST FAN (BF-400B)		350		15	27	●	28	15		-		SPARE	
VENT K.O. DRUM V-700 CATADYNE HEATER (H-807)			800	15	29	●	30	15			100	PHOTOCELL (PC-1)	
WATER STORAGE TANK T-300 CATADYNE HEATER (H-806)	800			15	31	●	32	15	-			K-600 COMPRESSOR 480V HEATERS SHUNT TRIP	
SPARE		-		20	33	●	34	15		800		INSTRUMENT AIR COMP. ROOM AIR DRYER PANEL + ANNUNCIATOR	
SPARE			-	20	35	●	36	15			-	SPARE	
LP-C LIGHTING PANEL FEED	7570			100 3P	37	●	38	15	300			CONTROL PANEL (CP-900)	
		7570			39	●	40	20		1456		BATTERY CHARGER / INVERTER (UPS-905)	
			7570		41	●	42	2P			1456		
SUB-TOTAL WATTS (LEFT SIDE)	11320	9920	10020							1300	3806	1806	SUB-TOTAL WATTS (RIGHT SIDE)
TOTAL WATTS (LEFT SIDE)	31260									6912			TOTAL WATTS (RIGHT SIDE)
LIGHTING PANEL TOTAL WATTS (*)													38172
REMARKS:													
CIRCUIT LOADS ARE BASED ON DESIGN INFORMATION ONLY. CONTRACTOR TO ASBUILD PER ACTUAL EQUIPMENT LOADS.													

120/208 VOLTS				LP-B				MCC-900 MOUNTING							
60 HZ				LOCATION ELECTRICAL BUILDING				225A AMP BUS							
4 WIRE								100A AMP MAIN CB							
DESIGNATION		LOAD (WATTS)			BKR AMPS	CCT NO	PHASE A B C	CCT NO	BKR AMPS	LOAD (WATTS)			DESIGNATION		
		A	B	C						A	B	C			
HEAT TRACE EHT-001A (INLET SEPARATOR BUILDING)	**	1200			20 2P GFI	1	●	2	20 GFI	1200			HEAT TRACE EHT-001D (INLET SEPARATOR BUILDING)	**	
			1200			3	●	4	20 GFI		960		HEAT TRACE EHT-001E (K-400 COMPRESSOR BUILDING)**	**	
HEAT TRACE EHT-001B (INLET SEPARATOR BUILDING)	**			1280	20 GFI	5	●	6	20 GFI		800		HEAT TRACE EHT-001F (K-400 COMPRESSOR BUILDING)**	**	
HEAT TRACE EHT-001C (INLET SEPARATOR BUILDING)	**	1040			20 GFI	7	●	8	20 GFI	800			HEAT TRACE EHT-001G/001O (VENT K.O. DRUM)	**	
SPARE	**		-		20 GFI	9	●	10	20 GFI	800			HEAT TRACE EHT-001H (K-500 COMPRESSOR BUILDING)**	**	
SPARE	**			-	20 2P GFI	11	●	12	20 GFI		880		HEAT TRACE EHT-001J (K-500 COMPRESSOR BUILDING)**	**	
		-				13	●	14	20 GFI	880			HEAT TRACE EHT-001K (K-500 COMPRESSOR BUILDING)**	**	
SPARE	**		-		20 2P GFI	15	●	16	20 2P GFI	640			SPARE		
				-		17	●	18			-				
K-500 COMPRESSOR BUILDING INTERIOR LIGHTING		800				15	19	●	20	15	800			K-600 COMPRESSOR BUILDING INTERIOR LIGHTING	
K-500 COMPRESSOR BUILDING EXTERIOR LIGHTING			180			15	21	●	22	15		140		K-600 COMPRESSOR BUILDING EXTERIOR LIGHT	
K-500 COMPRESSOR BUILDING RECEPTACLE				250		15	23	●	24	20 GFI			250	K-600 COMPRESSOR BUILDING RECEPTACLE	
K-500 COMPRESSOR BUILDING EXHAUST FAN (BF-500A)		350				15	25	●	26	15	350			K-600 COMPRESSOR BUILDING EXHAUST FAN BF-600A	
K-500 COMPRESSOR BUILDING EXHAUST FAN (BF-500B)			350			15	27	●	28	15		350		K-600 COMPRESSOR BUILDING EXHAUST FAN BF-600B	
K-500 COMPRESSOR BUILDING EXHAUST FAN (BF-500C)				350		15	29	●	30	15			350	K-600 COMPRESSOR BUILDING EXHAUST FAN BF-600C	
K-500 COMPRESSOR BUILDING EXHAUST FAN (BF-500D)		350				15	31	●	32	15	350			K-600 COMPRESSOR BUILDING EXHAUST FAN BF-600D	
SPARE			-			15	33	●	34	20 GFI	1120			HEAT TRACE EHT-001L (K-600 COMPRESSOR BUILDING)**	
SPARE				-		15	35	●	36	20 GFI		1120		HEAT TRACE EHT-001M/N (K-600 COMPRESSOR BUILDING)	
SPARE			-			15	37	●	38	20 GFI	-			SPARE	
SPARE				-		15	39	●	40	15		-		SPARE	
SPARE				-		15	41	●	42	15		640		CATHODE PROTECTION RECTIFIER SYSTEM	
SUB-TOTAL WATTS (LEFT SIDE)		3740	1730	1880						4380	4010	3400	SUB-TOTAL WATTS (RIGHT SIDE)		
TOTAL WATTS (LEFT SIDE)		7350								11790			TOTAL WATTS (RIGHT SIDE)		
LIGHTING PANEL TOTAL WATTS (*)														18780	
REMARKS:															
CIRCUIT LOADS ARE BASED ON DESIGN INFORMATION ONLY. CONTRACTOR TO ASBUILD PER ACTUAL EQUIPMENT LOADS.															
** HEAT TRACE CIRCUIT BREAKERS TO BE GROUND FAULT TYPE WITH 30mA SENSITIVITY. FIELD CONTRACTOR SHALL REPLACE OWNER SUPPLIED CIRCUIT BREAKERS WITH GFI TYPE BREAKERS AS INDICATED.															
* RECEPTACLE CIRCUIT BREAKERS TO BE GROUND FAULT TYPE WITH 5mA SENSITIVITY. FIELD CONTRACTOR SHALL REPLACE OWNER SUPPLIED CIRCUIT BREAKERS WITH GFI TYPE BREAKERS AS INDICATED.															

120/208 VOLTS

60 HZ

4 WIRE

LP-C

LOCATION ELECTRICAL BUILDING

WALL MOUNTING

225A AMP BUS

100A AMP MAIN CB

DESIGNATION	LOAD (WATTS)			BKR AMPS	CCT NO	PHASE A B C	CCT NO	BKR AMPS	LOAD (WATTS)			DESIGNATION
	A	B	C						A	B	C	
FURNACE	4230			3P 60	1	●	2	15	250			MCC/OFFICE BUILDING EXTERIOR RECEPTACLE SOUTH
					3		4	2P	1550			WATER HEATER
		5040			5	●	6	20		1550		
					7		8	15		250		MCC/OFFICE BUILDING EXTERIOR RECEPTACLE EAST
			4230		9	●	10	15			250	MCC/OFFICE BUILDING EXTERIOR RECEPTACLE EAST (FRONT RIGHT)
				11	●	12	15			-	SPARE	
AIR COMP. ROOM + OFFICE ROOM LIGHTS AND EF-901B	720			15	13	●	14	15	-			SPARE
ELECTRICAL ROOM EF-901A, LIGHTS AND RECEPTACLES	890			15	15	●	16	15	-			SPARE
OFFICE ROOM RECEPTACLE WASHROOM LIGHTS AND EF-901C		470		15	17	●	18	15	-			SPARE
MCC/OFFICE BUILDING		1440		2P	19	●	20	15	-			SPARE
AIR CONDITIONER (AC-903)			1440	20	21	●	22	15			-	SPARE
WASHROOM WATER PUMP			400	15	23	●	24	15			-	SPARE
SUB-TOTAL WATTS (LEFT SIDE)	5840	6950	6070						1800	1800	250	SUB-TOTAL WATTS (RIGHT SIDE)
TOTAL WATTS (LEFT SIDE)	18860								3850			TOTAL WATTS (RIGHT SIDE)
LIGHTING PANEL TOTAL WATTS (*)				22710								
REMARKS:												
CIRCUIT LOADS ARE BASED ON DESIGN INFORMATION ONLY. CONTRACTOR TO ASBUILD PER ACTUAL EQUIPMENT LOADS.												

NOTES:

REFERENCE DRAWINGS

REVISIONS

ENGINEERING STAMP



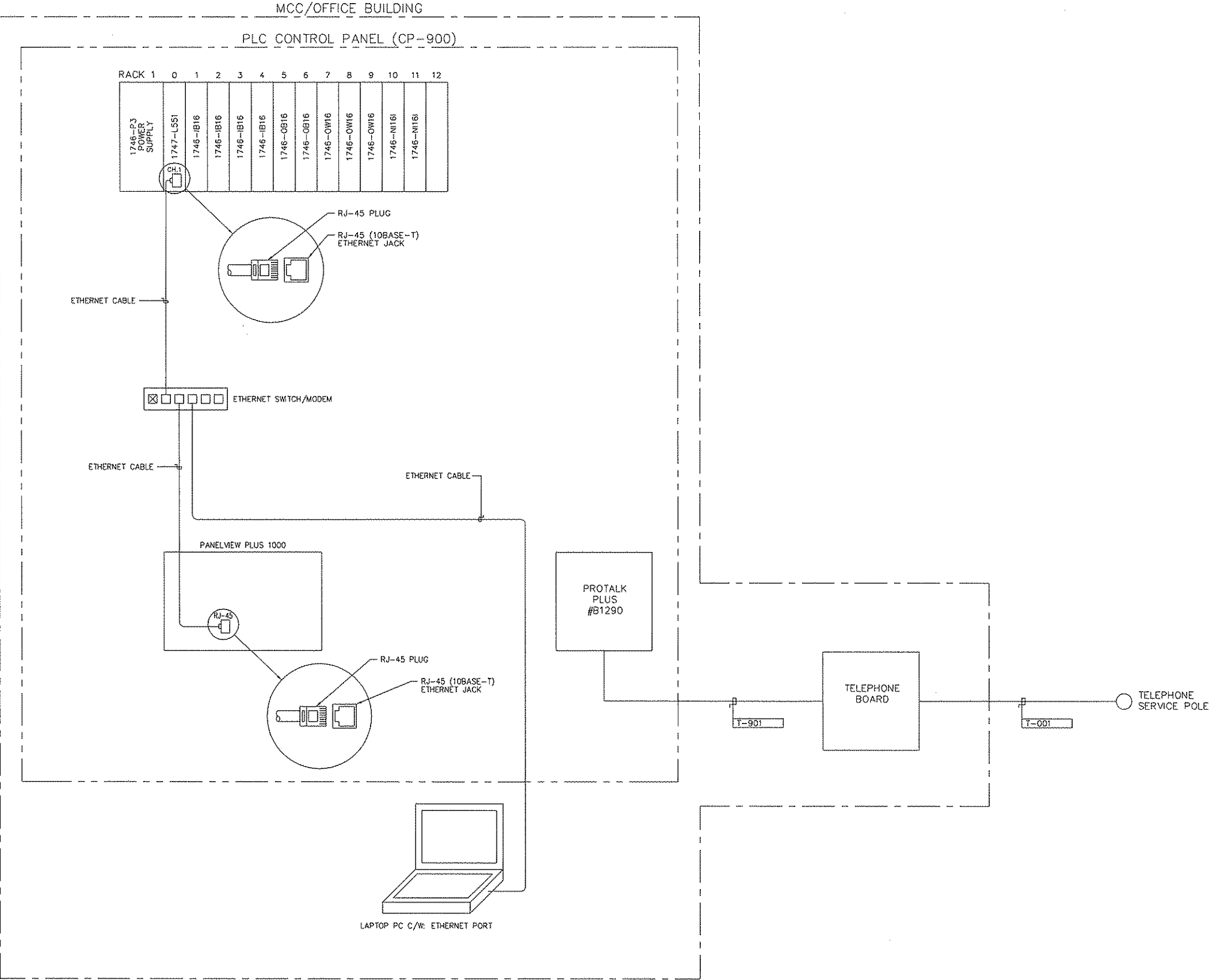
TWINING COMPRESSOR STATION
LIGHTING PANELS

GRB Engineering Ltd.

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	N.T.S.	D-9549-V-001A	8

CONDUIT/CABLE			CONDUCTORS					LOAD		RUN				REMARKS	CONDUIT/CABLE			CONDUCTORS					LOAD		RUN				REMARKS		
TAG	SIZE	APPROX LENGTH M.	SIZE (AWG OR MCM)	TOTAL NUMBER	NUMBER OF SPARES	TYPE OF INSULATION	INSULATION VOLTAGE	HP OR KVA	WORKING VOLTAGE	FROM	VIA	TO	TAG		SIZE	APPROX LENGTH M.	SIZE (AWG OR MCM)	TOTAL NUMBER	NUMBER OF SPARES	TYPE OF INSULATION	INSULATION VOLTAGE	HP OR KVA	WORKING VOLTAGE	FROM	VIA	TO					
A-101	INST. TECK	-	16	4TR	2TR	PVC	300		4-20 mA	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	JBDC-112 AT V-110 INLET SEPARATOR BUILDING		D-904	19mm EMT	-	14	20	2	RW90X	600		24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	SURFACE	INSTRUMENT AIR ALARM PANEL IN MCC/OFFICE BUILDING	BY BUILDING CONTRACTOR				
A-101A	19mm RA	-	16	1TR	-	PVC	300		4-20 mA	AIT-1101A GAS TRANSMITTER IN V-110 INLET SEPARATOR BUILDING	SURFACE	AE-1101A GAS SENSOR IN V-110 INLET SEPARATOR BUILDING		D-905	TECK90 HL	-	14	8	4	RW90X	600		24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	SURFACE	SMOKE DETECTOR IN MCC/OFFICE BUILDING	BY BUILDING CONTRACTOR				
A-102	INST. TECK	-	16	4PR	2PR	PVC	300		4-20 mA	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	JBDC-112 AT V-110 INLET SEPARATOR BUILDING																			
A-102A	INST. TECK	-	16	2PR	1PR	PVC	300		4-20 mA	JBDC-112 AT V-110 INLET SEPARATOR BUILDING	TRAY	PT-1202 TRANSMITTER AT INLET/SALES AREA		HT-101	TECK90 HL	-	10	12	4	RW90X	600	-	208	MCC-900 IN MCC/OFFICE BUILDING	TRAY	JBAC-111 AT V-110 INLET SEPARATOR BUILDING					
A-401	INST. TECK	-	16	8TR	4TR	PVC	300		4-20 mA	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	JBDC-402 AT K-400 COMPRESSOR BUILDING		HT-401	TECK90 HL	-	10	10	4	RW90X	600	-	120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	JBAC-401 AT K-400 COMPRESSOR BUILDING					
A-401A	25mm RA	-	16	2TR	-	PVC	300		4-20 mA	AIT-4002/3 GAS TRANSMITTERS IN K-400 COMPRESSOR BUILDING	SURFACE	AE-4002/3 GAS SENSORS IN K-400 COMPRESSOR BUILDING	BY BUILDING CONTRACTOR	HT-401A	TECK90 HL	-	10	2	-	RW90X	600	-	120	JBAC-401 AT K-400 COMPRESSOR BUILDING	TRAY	EHT-001G POWER KIT V-700 KNOCKOUT DRUM					
A-402	INST. TECK	-	16	4PR	3PR	PVC	300		4-20 mA	MCC-900 IN MCC/OFFICE BUILDING	TRAY	JBDC-402 AT K-400 COMPRESSOR BUILDING																			
A-402A	19mm RA	-	16	2PR	1PR	PVC	300		4-20 mA	JBDC-402 AT K-400 COMPRESSOR BUILDING	SURFACE	UNIT CONTROL PANEL IN K-400 COMPRESSOR BUILDING	BY BUILDING CONTRACTOR	L-011	TECK90 HL	-	10	3	1	RW90X	600		120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	H-806 CATADYNE HEATER AT T-300 PRODUCED WATER TANK					
A-451	INST. TECK	-	16	4TR	2TR	PVC	300		4-20 mA	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	JBDC-452 AT V-450 DEHY BUILDING		L-101	TECK90 HL	-	10	25	10	RW90X	600	-	120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	JBAC-111 AT V-110 INLET SEPARATOR BUILDING					
A-451A	19mm RA	-	16	1TR	-	PVC	300		4-20 mA	AIT-4501 GAS TRANSMITTER IN V-450 DEHY BUILDING	SURFACE	AE-4501 GAS SENSOR IN V-450 DEHY BUILDING	BY BUILDING CONTRACTOR	L-401	TECK90 HL	-	10	20	6	RW90X	600	-	120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	JBAC-401 AT K-400 COMPRESSOR BUILDING					
A-501	INST. TECK	-	16	8TR	4TR	PVC	300		4-20 mA	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	JBDC-502 AT K-500 COMPRESSOR BUILDING		L-401A	TECK90 HL	-	10	3	1	RW90X	600	-	120	JBAC-401 AT K-400 COMPRESSOR BUILDING	TRAY	H-807 CATADYNE HEATER AT V-700 KNOCKOUT DRUM					
A-501A	25mm RA	-	16	2TR	-	PVC	300		4-20 mA	AIT-5002/5003 GAS TRANSMITTERS IN K-500 COMPRESSOR BUILDING	SURFACE	AE-421A/B GAS SENSORS IN K-500 COMPRESSOR BUILDING	BY BUILDING CONTRACTOR	L-451	TECK90 HL	-	10	15	4	RW90X	600	-	120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	JBAC-451 AT V-450 DEHY BUILDING					
A-502	INST. TECK	-	16	2PR	1PR	PVC	300		4-20 mA	MCC-900 IN MCC/OFFICE BUILDING	TRAY	JBDC-502 AT K-500 COMPRESSOR BUILDING		L-501	TECK90 HL	-	10	30	12	RW90X	600	-	120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	JBAC-501 AT K-500 COMPRESSOR BUILDING					
A-502A	19mm RA	-	16	2PR	1PR	PVC	300		4-20 mA	JBDC-502 AT K-500 COMPRESSOR BUILDING	SURFACE	UNIT CONTROL PANEL IN K-500 COMPRESSOR BUILDING	BY BUILDING CONTRACTOR	L-601	TECK90 HL	-	10	30	12	RW90X	600	-	120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	JBAC-601 AT K-600 COMPRESSOR BUILDING					
A-601	INST. TECK	-	16	6TR	2TR	PVC	300		4-20 mA	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	JBDC-602 AT K-600 COMPRESSOR BUILDING		L-901	32mm EMT	-	2	4	-	RW90X	1000 20 KVA	208	MCC-900 IN MCC/OFFICE BUILDING	SURFACE	LP-C LIGHTING PANEL IN MCC/OFFICE BUILDING	BY BUILDING CONTRACTOR					
A-601A	25mm RA	-	16	2TR	-	PVC	300		4-20 mA	AIT-6002/6003 GAS TRANSMITTERS IN K-600 COMPRESSOR BUILDING	SURFACE	AE-6002/3 GAS SENSORS IN K-600 COMPRESSOR BUILDING	BY BUILDING CONTRACTOR	L-902	19mm EMT	-	10	3	1	RW90X	600 3 KVA	208	MCC-900 IN MCC/OFFICE BUILDING	SURFACE	UPS-905 BATTERY CHARGER IN MCC/OFFICE BUILDING	BY BUILDING CONTRACTOR					
A-602	INST. TECK	-	16	2PR	1PR	PVC	300		4-20 mA	MCC-900 IN MCC/OFFICE BUILDING	TRAY	JBDC-602 AT K-600 COMPRESSOR BUILDING		L-903	TECK90 HL	-	12	3	1	RW90X	600	-	120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	BY BUILDING CONTRACTOR				
A-602A	19mm RA	-	16	2PR	1PR	PVC	300		4-20 mA	JBDC-602 AT K-600 COMPRESSOR BUILDING	SURFACE	UNIT CONTROL PANEL IN K-600 COMPRESSOR BUILDING	BY BUILDING CONTRACTOR	L-904	19mm EMT	-	10	3	1	RW90X	600		120	MCC-900 IN MCC/OFFICE BUILDING	SURFACE	INSTRUMENT AIR DRYER PANEL IN MCC/OFFICE BUILDING	BY BUILDING CONTRACTOR				
C-401	TECK90 HL	-	14	3	-	RW90X	600		120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	CF-405 COOLER FAN HOA AT K-400 COMPRESSOR BUILDING		CONDUIT/CABLE DESIGNATIONS P - POWER C - CONTROL PC - POWER AND CONTROL L - LIGHTING HT - HEAT TRACE D - DISCRETE SIGNAL A - ANALOG SIGNAL I - COMMUNICATION (MOD BUS, DATA HIGHWAY, ETC.) T - TELEPHONE TC - THERMOCOUPLE (SPECIFY TYPE) RGS - RIGID GALVANIZED STEEL RA - RIGID ALUMINUM EMT - ELECTRICAL MAGNETIC TUBING																	
C-501	TECK90 HL	-	14	3	-	RW90X	600		120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	CF-505 COOLER FAN HOA'S AT K-500 COMPRESSOR BUILDING																			
C-601	TECK90 HL	-	14	3	-	RW90X	600		120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	CF-605 COOLER FAN HOA'S AT K-500 COMPRESSOR BUILDING																			
D-011	TECK90 HL	-	14	4	2	RW90X	600		24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	LSHH-3000 AT T-300 PRODUCED WATER TANK																			
D-101	TECK90 HL	-	14	25	8	RW90X	600	-	24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	JBDC-112 AT V-110 INLET SEPARATOR BUILDING																			
D-101A	TECK90 HL	-	14	15	3	RW90X	600		24	JBDC-112 AT V-110 INLET SEPARATOR BUILDING	TRAY	ESDV-1000/ESDV-1200 AT INLET/SALES AREA																			
D-401	TECK90 HL	-	14	30	10	RW90X	600		24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	JBDC-402 AT K-400 COMPRESSOR BUILDING																			
D-401A	25mm RA	-	14	30	14	RW90X	600		24	JBDC-402 AT K-400 COMPRESSOR BUILDING	SURFACE	UNIT CONTROL PANEL IN K-400 COMPRESSOR BUILDING	BY BUILDING CONTRACTOR																		
D-401B	TECK90 HL	-	14	6	2	RW90X	600		24	JBDC-402 AT K-400 COMPRESSOR BUILDING	TRAY	LSH-7000/LSHH-7000 AT V-700 KNOCKOUT DRUM																			
D-402	TECK90 HL	-	14	10	8	RW90X	600		24	MCC-900 IN MCC/OFFICE BUILDING	TRAY	JBDC-402 AT K-400 COMPRESSOR BUILDING																			
D-410	TECK90 HL	-	14	4	2	RW90X	600	-	24	UNIT CONTROL PANEL IN K-400 COMPRESSOR BUILDING	SURFACE	VSHH-4050 VIBRATION SWITCH AT CF-400 COOLER FAN																			
D-451	TECK90 HL	-	14	20	6	RW90X	600	-	24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	JBDC-452 AT V-450 DEHY BUILDING																			
D-501	TECK90 HL	-	14	30	18	RW90X	600		24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	JBDC-502 AT K-500 COMPRESSOR BUILDING																			
D-501A	25mm RA	-	14	30	18	RW90X	600		24	JBDC-502 AT K-500 COMPRESSOR BUILDING	SURFACE	UNIT CONTROL PANEL IN K-500 COMPRESSOR BUILDING																			
D-502	TECK90 HL	-	14	4	2	RW90X	600		24	MCC-900 IN MCC/OFFICE BUILDING	TRAY	JBDC-502 AT K-500 COMPRESSOR BUILDING																			
D-510	-	-	14	4	2	RW90X	600	-	24	UNIT CONTROL PANEL IN K-500 COMPRESSOR BUILDING	SURFACE	VSHH-505 VIBRATION SWITCH AT CF-505 COOLER FAN	CONST. NOTE 2																		
D-601	TECK90 HL	-	14	12	4	RW90X	600		24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	JBDC-602 AT K-600 COMPRESSOR BUILDING																			
D-601A	25mm RA	-	14	15	3	RW90X	600		24	JBDC-602 AT K-600 COMPRESSOR BUILDING	SURFACE	UNIT CONTROL PANEL IN K-600 COMPRESSOR BUILDING	BY BUILDING CONTRACTOR																		
D-602	TECK90 HL	-	14	10	6	RW90X	600		24	MCC-900 IN MCC/OFFICE BUILDING	TRAY	JBDC-602 AT K-600 COMPRESSOR BUILDING																			
D-605	TECK90 HL	-	14	4	2	RW90X	600	-	24	UNIT CONTROL PANEL IN K-600 COMPRESSOR BUILDING	SURFACE	VSHH-605 VIBRATION SWITCH AT CF-605 COOLER FAN	CONST. NOTE 2																		
D-901	TECK90 HL	-	14	30	14	RW90X	600		24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	MCC-900 IN MCC/OFFICE BUILDING	BY BUILDING CONTRACTOR																		
D-902	TECK90 HL	-	14	40	6	RW90X	600		24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	MCC-900 IN MCC/OFFICE BUILDING	BY BUILDING CONTRACTOR																		
D-903	19mm EMT	-	14	6	4	RW90X	600		24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	SURFACE	UPS-905 BATTERY CHARGER IN MCC/OFFICE BUILDING	BY BUILDING CONTRACTOR																		
NOTES:											REFERENCE DRAWINGS				REVISIONS								ENGINEERING STAMP				QUICKSILVER TWINING COMPRESSOR STATION CONDUIT AND CABLE SCHEDULE SHEET 1 OF 2				
											DWG. NO.	DESCRIPTION			NO.	DESCRIPTION			PROJECT	DATE	BY	CHK.	ENG.								
														6	AS BUILT PER FIELD MARK UPS			9549.02	2009.04.08	MXC	AFM	JMW									
														0	ISSUED FOR CONSTRUCTION			9549.00	05.05.17	DAS	GMW	JMW									
														1	AS-BUILT			9549.00	05.08.16	LL	DPS	JMW									
														2	K-500 COMPRESSOR BUILDING ADDITION			9549.01	05.08.29	LL	MSC	JMW									
														3	AS-BUILT			9549.01	06.01.17	YG	DPS	JMW									
														4A	PRELIMINARY (K-600 ADDITION)			9549.02	2008.12.03	GMK	AFM	JMW									
														4B	ISSUED FOR BID (K-600 ADDITION)			9549.02	2009.01.20	AMH	AFM	JMW									
														5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)			9549.02	2009.01.28	GMK	AFM	JMW									
											GRB Engineering Ltd.											PROJECT NO.	SCALE:	DWG. NO.	REV.						
																						9549.02	N.T.S.	D-9549-V-002A	6						

CONDUIT/CABLE			CONDUCTORS				LOAD		RUN			REMARKS	CONDUIT/CABLE			CONDUCTORS				LOAD		RUN			REMARKS							
TAG	SIZE	APPROX LENGTH M.	SIZE (AWG OR MCM)	TOTAL NUMBER	NUMBER OF SPARES	TYPE OF INSULATION	INSULATION VOLTAGE	HP OR KVA	WORKING VOLTAGE	FROM	VIA		TO	TAG	SIZE	APPROX LENGTH M.	SIZE (AWG OR MCM)	TOTAL NUMBER	NUMBER OF SPARES	TYPE OF INSULATION	INSULATION VOLTAGE	HP OR KVA	WORKING VOLTAGE	FROM		VIA	TO					
N-001	TECK90 HL	-	6	1	-	RW90X	1000	-	-	UTILITY TRANSFORMER SOUTH EAST OF MCC/OFFICE BUILDING	U/G	MCC-900 NEUTRAL BUS IN MCC/OFFICE BUILDING																				
P-001A	TECK90 HL	-	500 MCM	3	-	RW90X	1000	500 kVA	480	UTILITY TRANSFORMER SOUTH EAST OF MCC/OFFICE BUILDING	U/G	MCC-900 MAIN BREAKER IN MCC/OFFICE BUILDING	480VAC MAIN SERVICE																			
P-001B	TECK90 HL	-	500 MCM	3	-	RW90X	1000	500 kVA	480	UTILITY TRANSFORMER SOUTH EAST OF MCC/OFFICE BUILDING	U/G	MCC-900 MAIN BREAKER IN MCC/OFFICE BUILDING	480VAC MAIN SERVICE																			
P-401	TECK90 HL	-	2/0	3	-	RW90X	600	60 HP	480	MCC-900 IN MCC/OFFICE BUILDING	TRAY	CF-405 COOLER FAN AT K-400 COMPRESSOR BUILDING																				
P-404	TECK90 HL	-	8	3	-	RW90X	1000	20 kW	480	MCC-900 IN MCC/OFFICE BUILDING	TRAY	H-801A UNIT HEATER IN K-400 COMPRESSOR BUILDING																				
P-405	TECK90 HL	-	8	3	-	RW90X	1000	20 kW	480	MCC-900 IN MCC/OFFICE BUILDING	TRAY	H-801B UNIT HEATER IN K-400 COMPRESSOR BUILDING																				
P-410	TECK90 HL	-	8	4	-	RW90X	1000	-	24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	JBDC-402 AT K-400 COMPRESSOR BUILDING																				
P-410A	19mm RA	-	12	4	-	RW90X	600	-	24	JBDC-402 AT K-400 COMPRESSOR BUILDING	SURFACE	UNIT CONTROL PANEL IN K-400 COMPRESSOR BUILDING	BY BUILDING CONTRACTOR																			
P-501	TECK90 HL	-	2/0	3	-	RW90X	600	60 HP	480	MCC-900 IN MCC/OFFICE BUILDING	TRAY	CF-505 COOLER FAN AT K-500 COMPRESSOR BUILDING																				
P-504	TECK90 HL	-	8	3	-	RW90X	1000	20 kW	480	MCC-900 IN MCC/OFFICE BUILDING	TRAY	H-521 UNIT HEATER IN K-500 COMPRESSOR BUILDING																				
P-505	TECK90 HL	-	8	3	-	RW90X	1000	20 kW	480	MCC-900 IN MCC/OFFICE BUILDING	TRAY	H-522 UNIT HEATER IN K-500 COMPRESSOR BUILDING																				
P-510	TECK90 HL	-	8	4	-	RW90X	1000	-	24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	JBDC-502 AT K-500 COMPRESSOR BUILDING																				
P-510A	19mm RA	-	12	4	-	RW90X	600	-	24	JBDC-502 AT K-500 COMPRESSOR BUILDING	SURFACE	UNIT CONTROL PANEL IN K-500 COMPRESSOR BUILDING	BY BUILDING CONTRACTOR																			
P-601	TECK90 HL	-	2/0	3	-	RW90X	600	60 HP	480	MCC-900 IN MCC/OFFICE BUILDING	TRAY	CF-605 COOLER FAN AT K-600 COMPRESSOR BUILDING																				
P-604	TECK90 HL	-	8	3	-	RW90X	1000	20 kW	480	MCC-900 IN MCC/OFFICE BUILDING	TRAY	H-620A UNIT HEATER IN K-600 COMPRESSOR BUILDING																				
P-605	TECK90 HL	-	8	3	-	RW90X	1000	20 kW	480	MCC-900 IN MCC/OFFICE BUILDING	TRAY	H-620B UNIT HEATER IN K-600 COMPRESSOR BUILDING																				
P-610	TECK90 HL	-	6	4	-	RW90X	1000	-	24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	TRAY	JBDC-602 AT K-600 COMPRESSOR BUILDING																				
P-610A	19mm RA	-	12	4	-	RW90X	600	-	24	JBDC-602 AT K-600 COMPRESSOR BUILDING	SURFACE	UNIT CONTROL PANEL IN K-600 COMPRESSOR BUILDING	BY BUILDING CONTRACTOR																			
P-901	TECK90 HL	-	8	3	-	RW90X	1000	10 HP	480	MCC-900 IN MCC/OFFICE BUILDING	TRAY	M-901A AIR COMPRESSOR PANEL IN MCC/OFFICE BUILDING	BY BUILDING CONTRACTOR																			
P-902	TECK90 HL	-	8	3	-	RW90X	1000	10 HP	480	MCC-900 IN MCC/OFFICE BUILDING	TRAY	M-901B AIR COMPRESSOR PANEL IN MCC/OFFICE BUILDING	BY BUILDING CONTRACTOR																			
P-910	25mm EMT	-	6	2	-	RW90X	1000	1 kW	24	UPS-905 BATTERY CHARGER IN MCC/OFFICE BUILDING	SURFACE	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	BY BUILDING CONTRACTOR																			
P-911	19mm EMT	-	14	4	-	RW90X	600		24	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	SURFACE	ALARM STROBES ON EXTERIOR WEST MCC/OFFICE BUILDING WALL																				
PC-101	TECK90 HL	-	12 / 14	3 / 3	-	RW90X	600	2 HP / 120	480 / 120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	P-121 PRODUCED WATER PUMP IN V-110 INLET INLET SEPARATOR BUILDING																				
PC-402	TECK90 HL	-	12 / 14	3 / 3	-	RW90X	600	1.5 HP / 120	480 / 120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	P-415 WATER TRANSFER PUMP IN K-400 COMPRESSOR BUILDING																				
PC-502	TECK90 HL	-	12 / 14	3 / 3	-	RW90X	600	1.5 HP / 120	480 / 120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	P-515 WATER TRANSFER PUMP IN K-500 COMPRESSOR BUILDING																				
PC-602	TECK90 HL	-	12 / 14	3 / 3	-	RW90X	600	1.5 HP / 120	480 / 120	MCC-900 IN MCC/OFFICE BUILDING	TRAY	P-615 WATER TRANSFER PUMP IN K-600 COMPRESSOR BUILDING																				
T-001	51mm DBII	-	-	-	-	-	-	-	-	SERVICE POLE AT LEASE BOUNDARY	U/G	TELEPHONE BOARD IN MCC/OFFICE BUILDING	CAT. 5, CONST. NOTE 1																			
T-901	38mm EMT	-	22	4PR	-	-	-	-	-	TELEPHONE BOARD IN MCC/OFFICE BUILDING	SURFACE	CP-900 CONTROL PANEL IN MCC/OFFICE BUILDING	CAT. 3																			
P-CATHNEG	TECK90 HL	-	8	2	-	RW90X	600		60	RECTIFIER OUTSIDE OFFICE/MCC BUILDING	TRAY	SALES PIPELINE	SUPPLIED BY OWNER																			
P-CATHPOS	MDPE	-	6	1	-	MDPE	600		60	RECTIFIER OUTSIDE OFFICE/MCC BUILDING	U/G	ANODE BED	SUPPLIED BY OWNER																			
P-RECTIFIER	TECK90 HL	-	10	3	1	RW90X	600		120	MCC LIGHTING PANELS IN MCC/OFFICE BUILDING	SURFACE	RECTIFIER OUTSIDE OFFICE/MCC BUILDING																				
NOTES:										REFERENCE DRAWINGS				REVISIONS						ENGINEERING STAMP				QUICKSILVER TWINING COMPRESSOR STATION CONDUIT AND CABLE SCHEDULE SHEET 2 OF 2 GRB Engineering Ltd. PROJECT NO. 9549.02SCALE: N.T.S.DWG. NO. D-9549-V-002BREV. 7								
										DWG. NO.	DESCRIPTION		NO.	DESCRIPTION		PROJECT	DATE	BY	CHK.	ENG.												
													6	ISSUED FOR CONSTRUCTION (K-600 ADDITION)		9549.02	2009.01.28	GMK	AFM	JMW												
													7	AS BUILT PER FIELD MARK UPS		9549.02	2009.04.08	MXC	AFM	JMW												
													1	AS-BUILT		9549.00	05.08.16	LL	DPS	JMW												
													2	K-500 COMPRESSOR BUILDING ADDITION		9549.01	05.08.29	LL	MSC	JMW												
													3	AS-BUILT		9549.01	06.01.17	YG	DPS	JMW												
													4	AS-BUILT FOR CATHODIC PROTECTION		9549.01	2008.02.15	KAW	MSC	JMW												
													5A	ISSUED FOR CONSTRUCTION (K-600 ADDITION)		9549.02	2008.12.03	GMK	AFM	JMW												
													5B	ISSUED FOR BID (K-600 ADDITION)		9549.02	2009.01.20	AMH	AFM	JMW												



- NOTES:
1. FIELD CONTRACTOR TO SUPPLY AND INSTALL AN ARMORED COMMUNICATION CABLE (BELDEN 9842).
 2. FIELD CONTRACTOR TO INSTALL JUMPERS AS SHOWN FOR 2 WIRE RS485 COMMUNICATION MODE. REFER TO ENERFLEX DRAWINGS.

REFERENCE DRAWINGS		REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
		A	ISSUED FOR PANEL FABRICATION	9549.00	05-03-15	DAS	JMW	JMW
		0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17	LL	GMW	JMW
		1	AS-BUILT	9549.00	06.01.17	LL	DPS	JMW

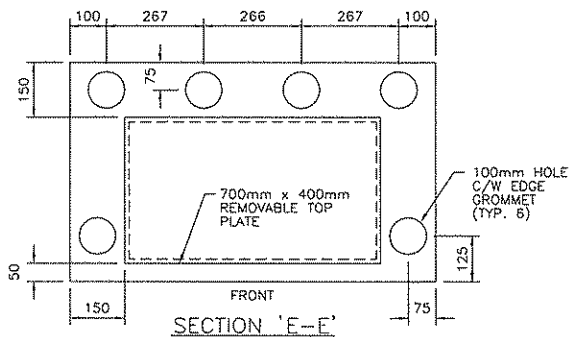
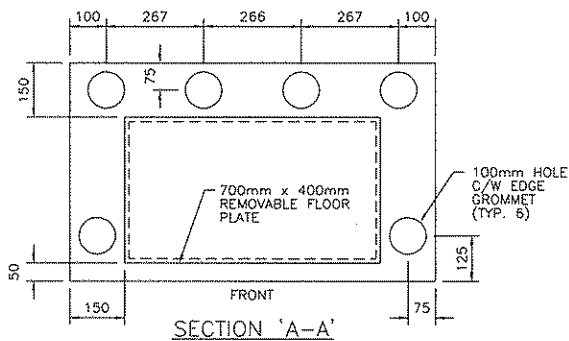
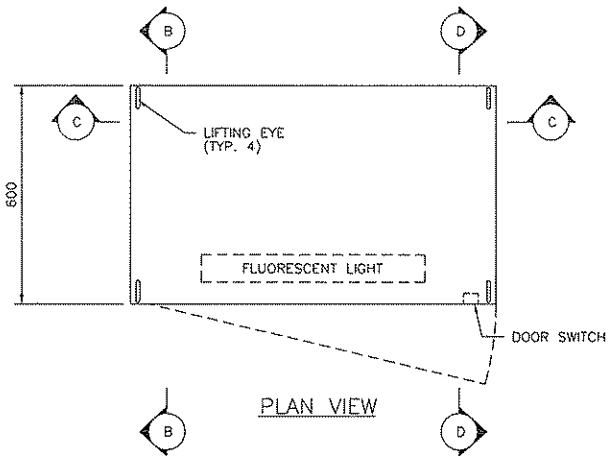
ENGINEERING STAMP



TWINING COMPRESSOR STATION
SYSTEM ARCHITECTURE
BLOCK DIAGRAM

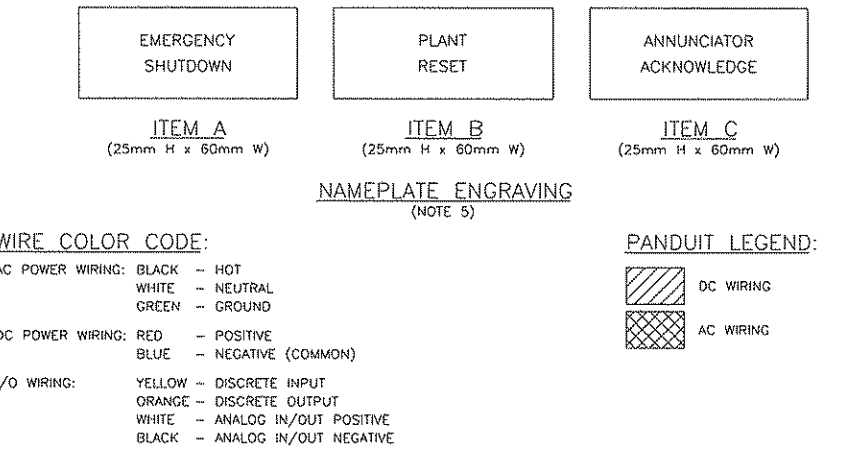
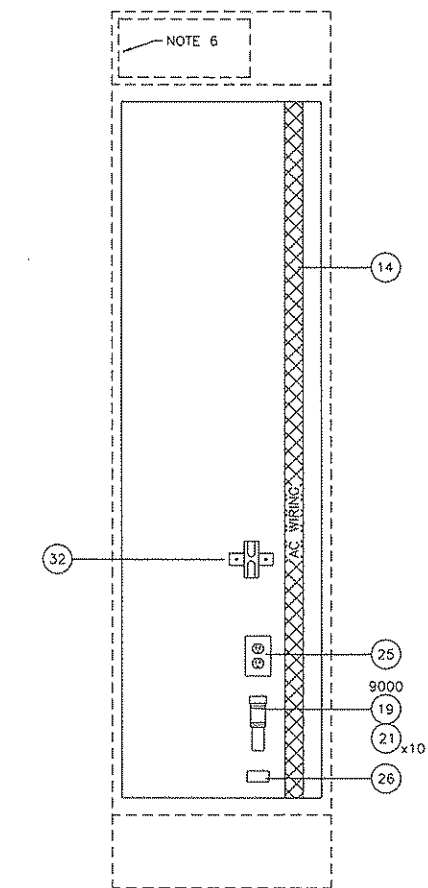
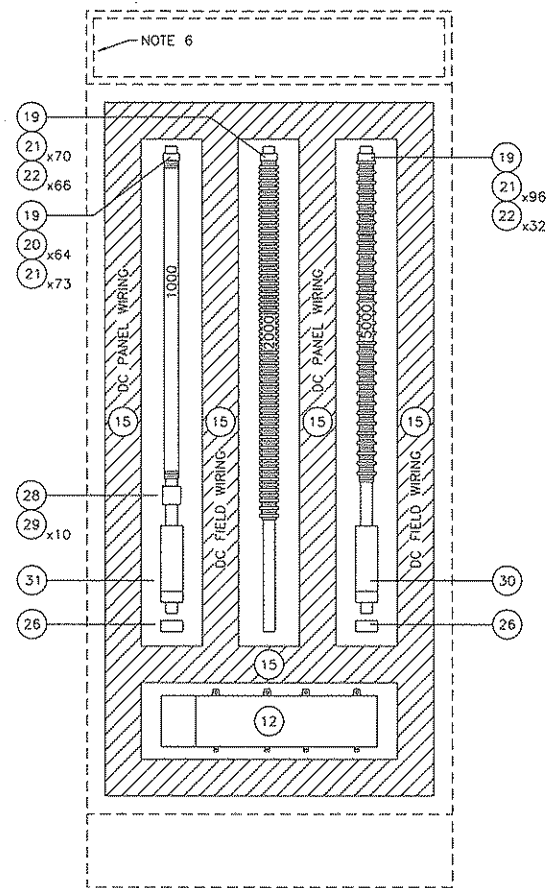
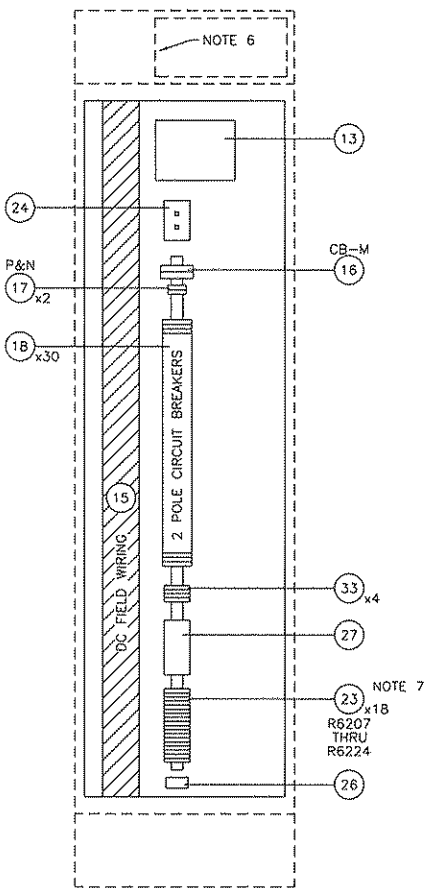
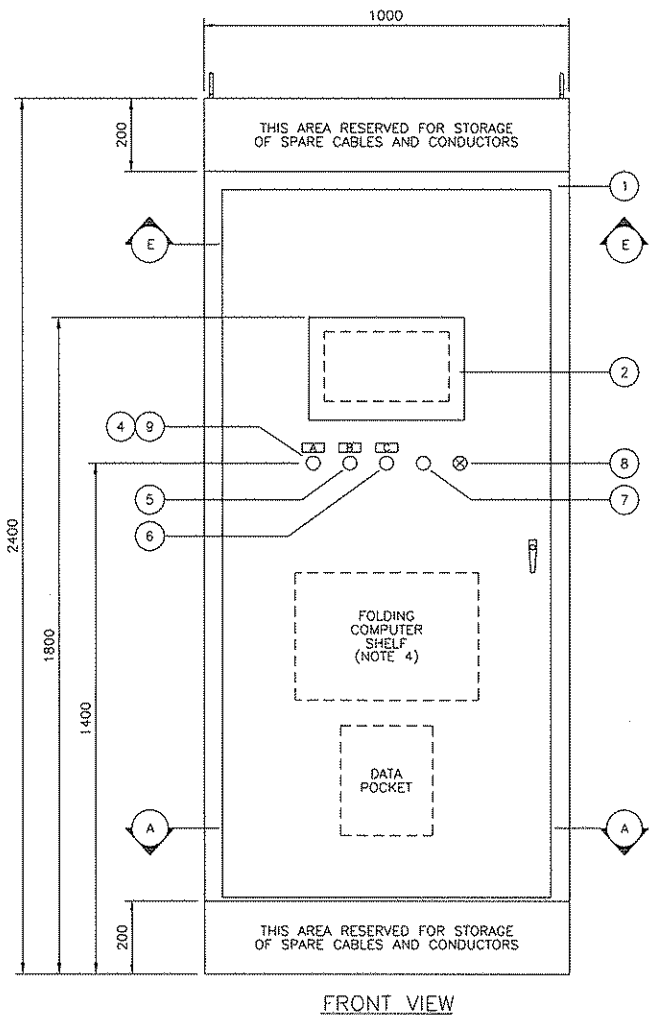
GRB ENGINEERING Ltd.

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.01	N.T.S.	D-9549-W-000A	1



BILL OF MATERIALS			
ITEM	QTY	DESCRIPTION	SUPPLIER
1	1	FREESTANDING CONTROL PANEL ENCLOSURE, EEMAC 1, 2400mm(H) x 1000mm(W) x 600mm(D) C/W THE FOLLOWING: - INTERNAL REAR SUBPANEL - INTERNAL SIDE SUBPANELS - 3-POINT LATCHING, FLUSH SWING HANDLE - DOOR STOP KIT - LARGE DATA POCKET - LIFTING EYES - 200mm PLINTH BASE & TOP C/W GLAND PLATE - FLUORESCENT LIGHT AND DOOR SWITCH - FOLDING COMPUTER SHELF	PANEL VENDOR
2	1	OPERATOR INTERFACE DISPLAY / BASE	ALLEN-BRADLEY PANELVIEW PLUS 1000 MODEL 2711P-K10C4D1
3	-	-	-
4	1	PUSHBUTTON, MOMENTARY CONTACT, RED OPERATOR C/W 1-N.O. AND 1-N.C. CONTACT BLOCK	ALLEN-BRADLEY 800T-D6A
5	1	ILLUMINATED PUSHBUTTON, MOMENTARY CONTACT, 24VDC C/W 1-N.O. AND 2-N.C. CONTACT BLOCK AND RED LENS	ALLEN-BRADLEY 800T-QB24R
6	1	PUSHBUTTON, MOMENTARY CONTACT, BLACK OPERATOR C/W 1-N.O. AND 1-N.C. CONTACT BLOCK	ALLEN-BRADLEY 800T-A2A
7	1	CLOSING BUTTON	ALLEN-BRADLEY 800T-N1
8	1	ALARM HORN, 24VDC	SONALERT
9	1	MUSHROOM PUSHBUTTON GUARD	ALLEN-BRADLEY 800T-N129
10	-	-	-
11	-	-	-

BILL OF MATERIALS			
ITEM	QTY	DESCRIPTION	SUPPLIER
12	1	PROGRAMMABLE LOGIC CONTROLLER SYSTEM C/W: 1 @ SLC-5/05 PROCESSOR 1 @ 15 SLOT I/O CHASSIS 1 @ POWER SUPPLY 4 @ DISCRETE INPUT MODULE 2 @ DISCRETE OUTPUT MODULE 3 @ RELAY OUTPUT MODULE 2 @ ANALOG INPUT MODULE 1 @ BLANK CARD SLOT FILLER 1 @ PROSOFT RS485 MODULE	ALLEN-BRADLEY 1747-L551 1746-A13 1746-PS 1746-IB16 1746-OB16 1746-OW16 1746-N161 1746-N2 PROSOFT #MV46-MCM
13	1	ALARM REPORTING UNIT	PROTALK PLUS B1290
14	AS REQ'D	WIREWAY, 50mm(W) x 100mm(H) C/W COVER	PANDUIT
15	AS REQ'D	WIREWAY, 100mm(W) x 100mm(H) C/W COVER	PANDUIT
16	1	RAIL MOUNT THERMAL MAGNETIC 40AMP 2POLE CIRCUIT BREAKER C/W MOUNTING HARDWARE	WEIDMULLER #992578
17	2	TERMINAL BLOCK C/W MOUNTING HARDWARE	WEIDMULLER WDU16
18	30	RAIL MOUNT THERMAL MAGNETIC 2P CIRCUIT BREAKER C/W MOUNTING HARDWARE, SIZE AS PER DRAWINGS	WEIDMULLER 4201 SERIES
19	4	GROUP MARKING CARRIER	WEIDMULLER SCHT5
20	64	KNIFE SWITCH DISCONNECT TERMINAL BLOCK C/W MOUNTING HARDWARE	WEIDMULLER WTR4
21	249	FEED-THROUGH TERMINAL BLOCK C/W MOUNTING HARDWARE	WEIDMULLER WDU4
22	98	FUSED TERMINAL BLOCK C/W 1 AMP FUSE AND MOUNTING HARDWARE	WEIDMULLER ASK1
23	18	RELAY, 24VDC, 1 POLE, N.O. CONTACT C/W LED INDICATING LIGHT AND MOUNTING HARDWARE	WEIDMULLER RS-30
24	1	DUPLEX RJ-11 TELEPHONE WALL JACK	-
25	1	DUPLEX RECEPTACLE (IVRY)	-
26	4	GROUND LUG	BELL SBT-100
27	1	VOLTAGE SENSING RELAY DROP-OUT SET @ 20.5VDC, PICK-UP SET @ 25.5VDC	HAYLEY DVS-24VDC
28	1	SPARE FUSE HOLDER, RAIL MOUNT	WEIDMULLER #7914760001
29	10	MINIATURE FUSE, 1AMP	BUSSMAN GMA-1A
30	1	ISOLATED GROUND BUS (SIZE AS REQ'D) FOR INSTRUMENT ANALOG SHIELDS C/W: 2/O GND LUG	-
31	1	NON-ISOLATED GROUND BUS (SIZE AS REQ'D) C/W: 2/O GROUND LUG	-
32	1	ETHERNET SWITCH / MODEM	ALLEN-BRADLEY #9300-RADES
33	4	FEED THROUGH TERMINAL BLOCK C/W MOUNTING HARDWARE	WEIDMULLER WDU16
34	-	-	-



NOTES:
1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. TERMINAL BLOCKS SHALL BE MOUNTED ON TS35 MOUNTING RAIL WITH SH2 SUPPORT BLOCKS.
3. AC PANDUIT SHALL BE GREY, DC PANDUIT SHALL BE WHITE.
4. FOLDING COMPUTER SHELF TO BE MINIMUM 500mm(W) x 350mm(D).
5. LAMICOID NAMEPLATES SHALL BE WHITE WITH 3mm HIGH BLACK LETTERING.
6. TOP-HAT SHALL HAVE REMOVABLE SIDE AND BACK PLATES FOR ACCESS AND INSTALLATION OF CABLE CONNECTORS.
7. FIELD CONTRACTOR TO SUPPLY AND INSTALL (2) WEIDMULLER RS-30 RELAYS.

REFERENCE DRAWINGS		REVISIONS	
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION
6	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08
0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17
1	AS-BUILT	9549.00	05.08.16
2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29
3	AS-BUILT	9549.01	06.01.17
4A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03
4B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20
5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28

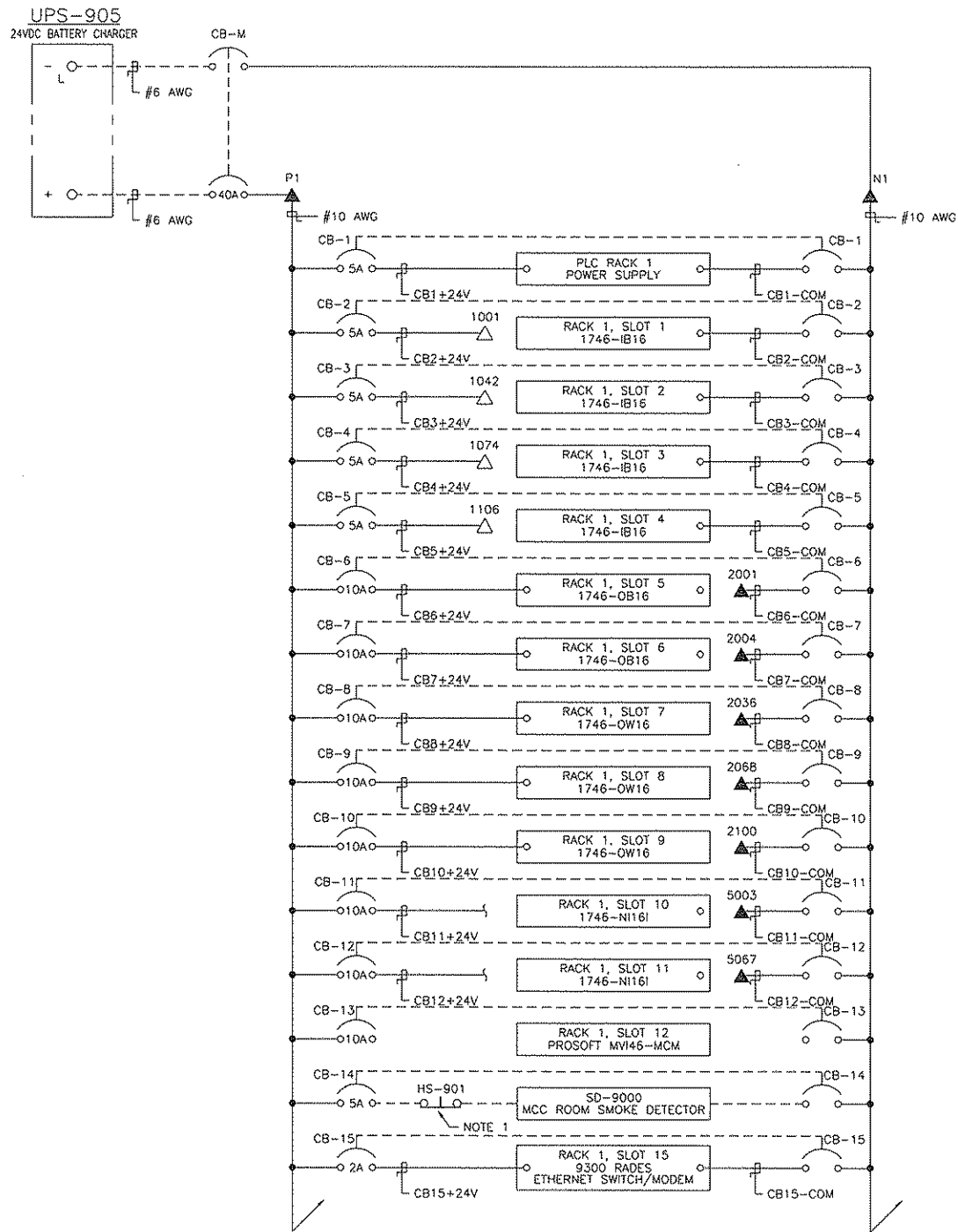
ENGINEERING STAMP

QUICKSILVER

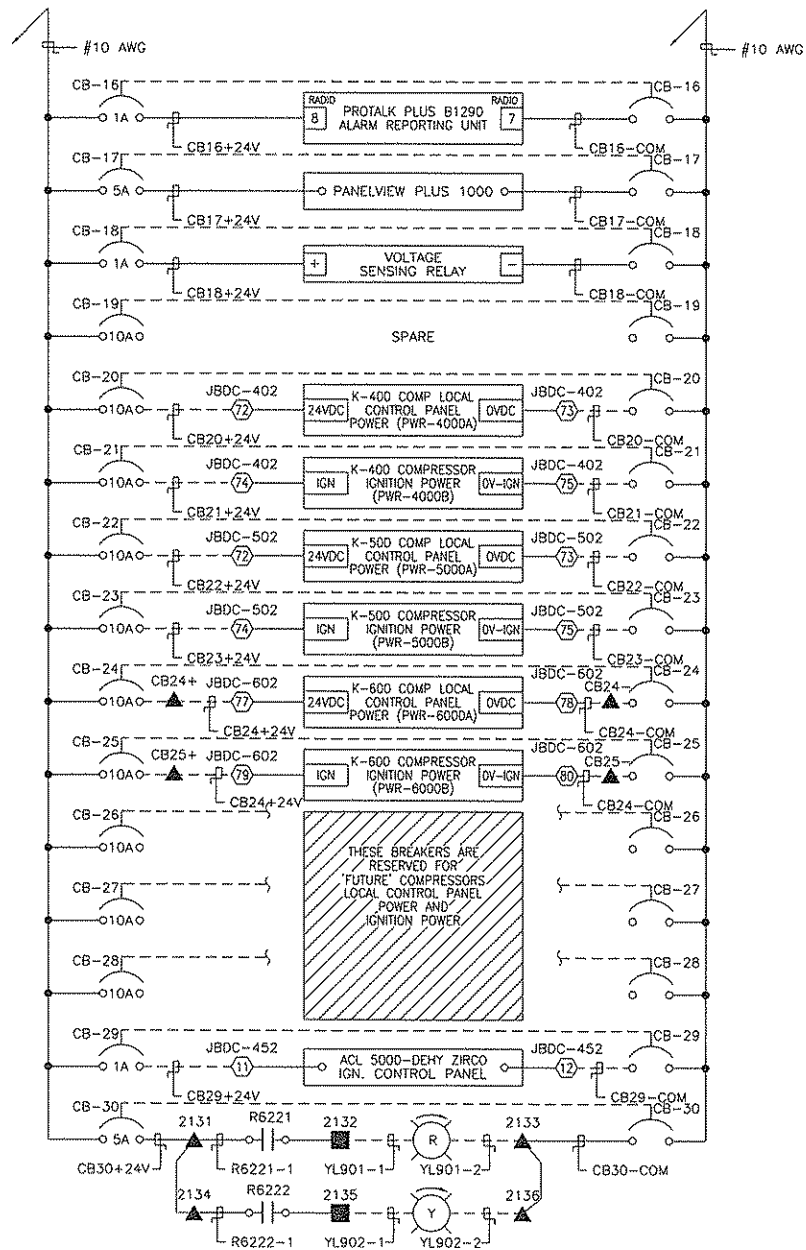
TWINING COMPRESSOR STATION
CP-900 CONTROL PANEL
LAYOUT

GRB ENGINEERING Ltd.

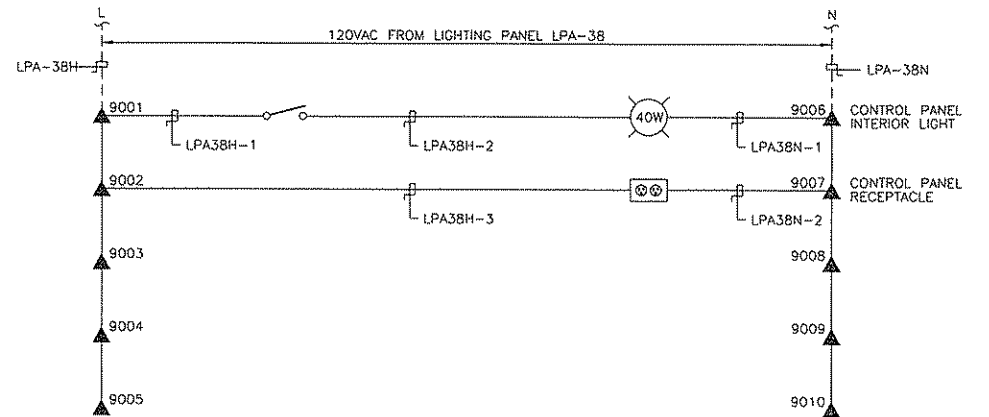
PROJECT NO. 9549.02 SCALE: 1:10 DWG. NO. D-9549-W-001A REV. 6



24VDC POWER DISTRIBUTION



24VDC POWER DISTRIBUTION



120VAC POWER DISTRIBUTION

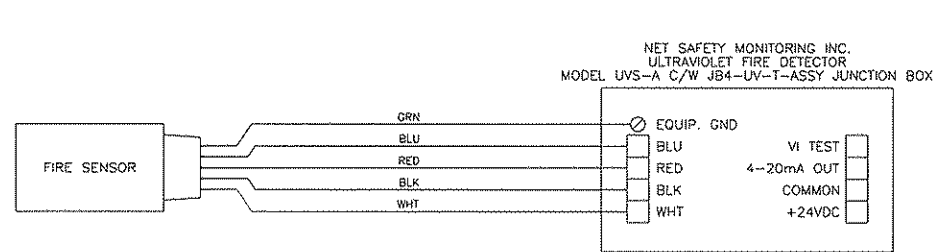
NOTES:
1. FIELD ELECTRICAL CONTRACTOR TO ADD 1-N.C. CONTACT BLOCK TO PLANT RESET P.B. (HS-902) ON PLC PANEL AND WIRE TO SMOKE DETECTOR.

REFERENCE DRAWINGS		REVISIONS	
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION
		6	AS BUILT PER FIELD MARK UPS
		0	ISSUED FOR CONSTRUCTION
		1	AS-BUILT
		2	K-500 COMPRESSOR BUILDING ADDITION
		3	AS-BUILT
		4A	PRELIMINARY (K-600 ADDITION)
		4B	ISSUED FOR BID (K-600 ADDITION)
		5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)

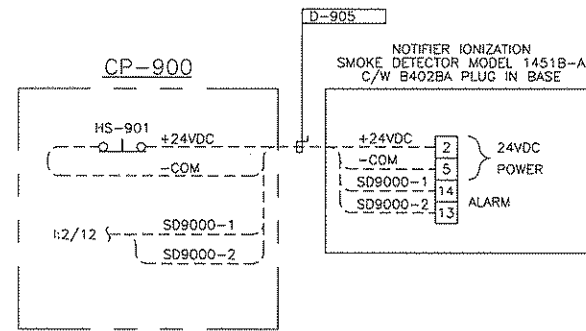
ENGINEERING STAMP

GRB ENGINEERING Ltd.

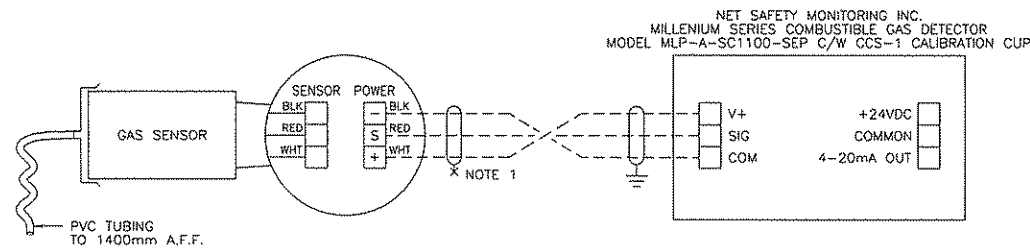
QUICKSILVER			
TWINING COMPRESSOR STATION CP-900 CONTROL PANEL AC/DC POWER DISTRIBUTION			
PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	N.T.S.	D-9549-W-002A	6



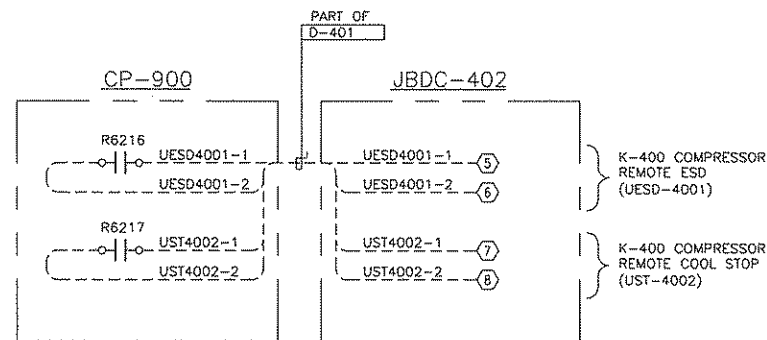
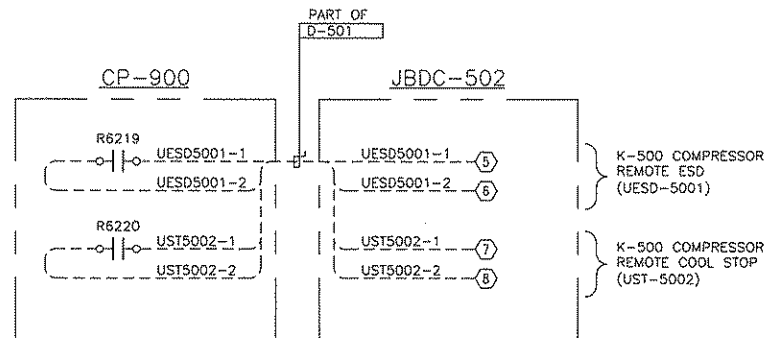
TYPICAL FIRE DETECTION SCHEMATIC



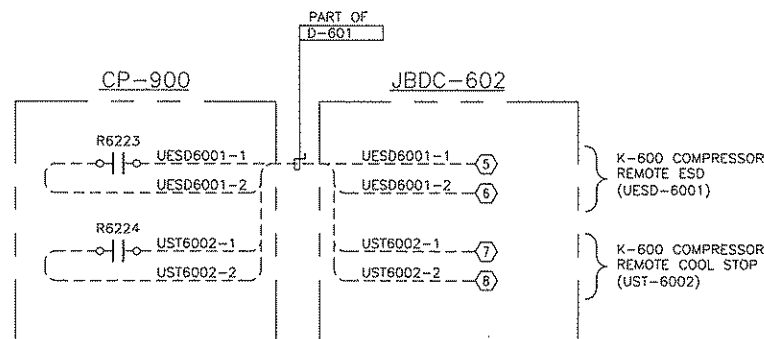
TYPICAL IONIZED SMOKE DETECTION SCHEMATIC



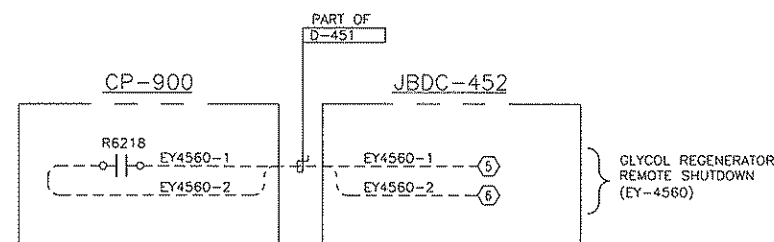
TYPICAL COMBUSTIBLE GAS DETECTION SCHEMATIC



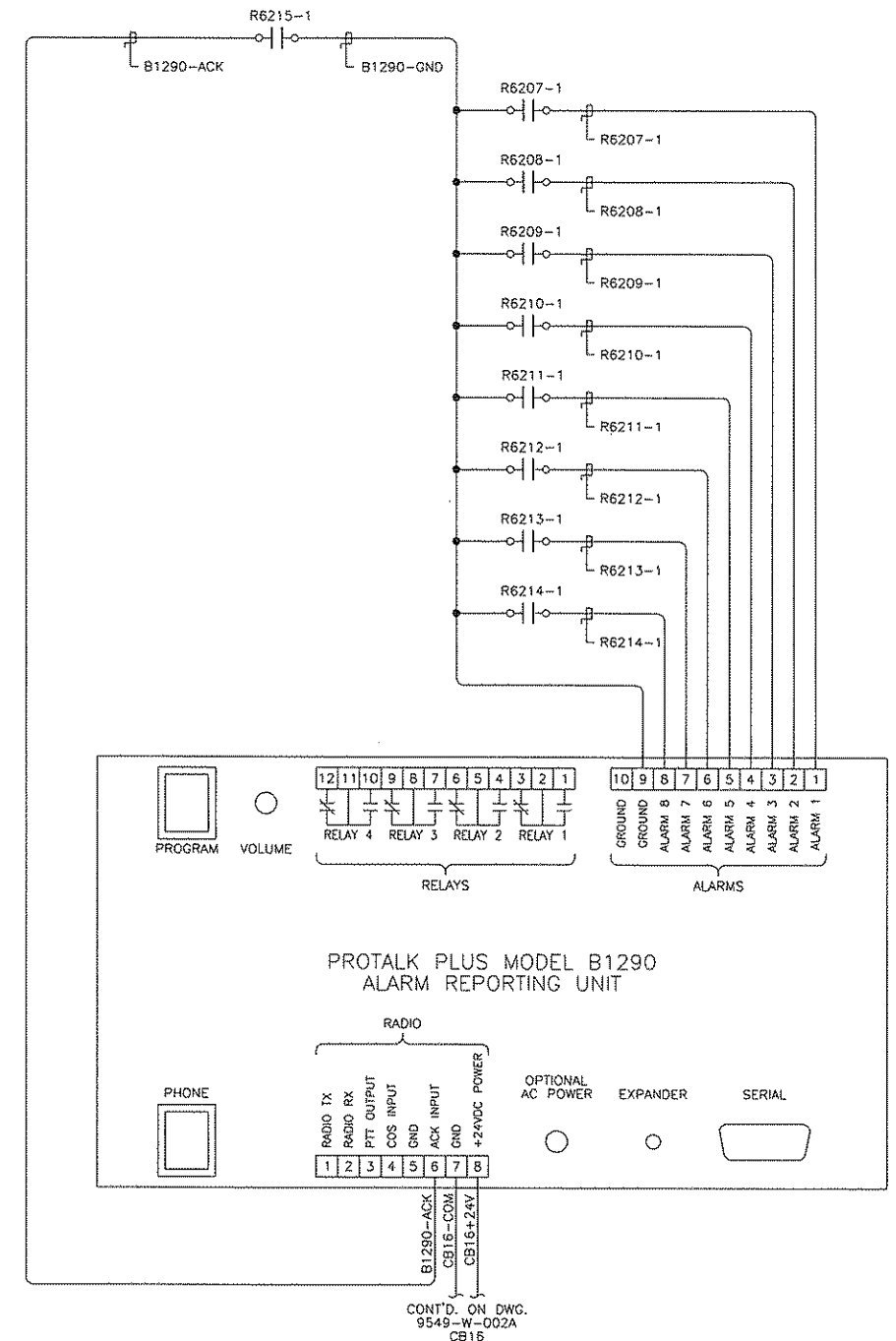
PLANT TO UNIT SIGNALS



PLANT TO UNIT SIGNALS



PLANT TO BURNER CONTROL PANEL SIGNALS

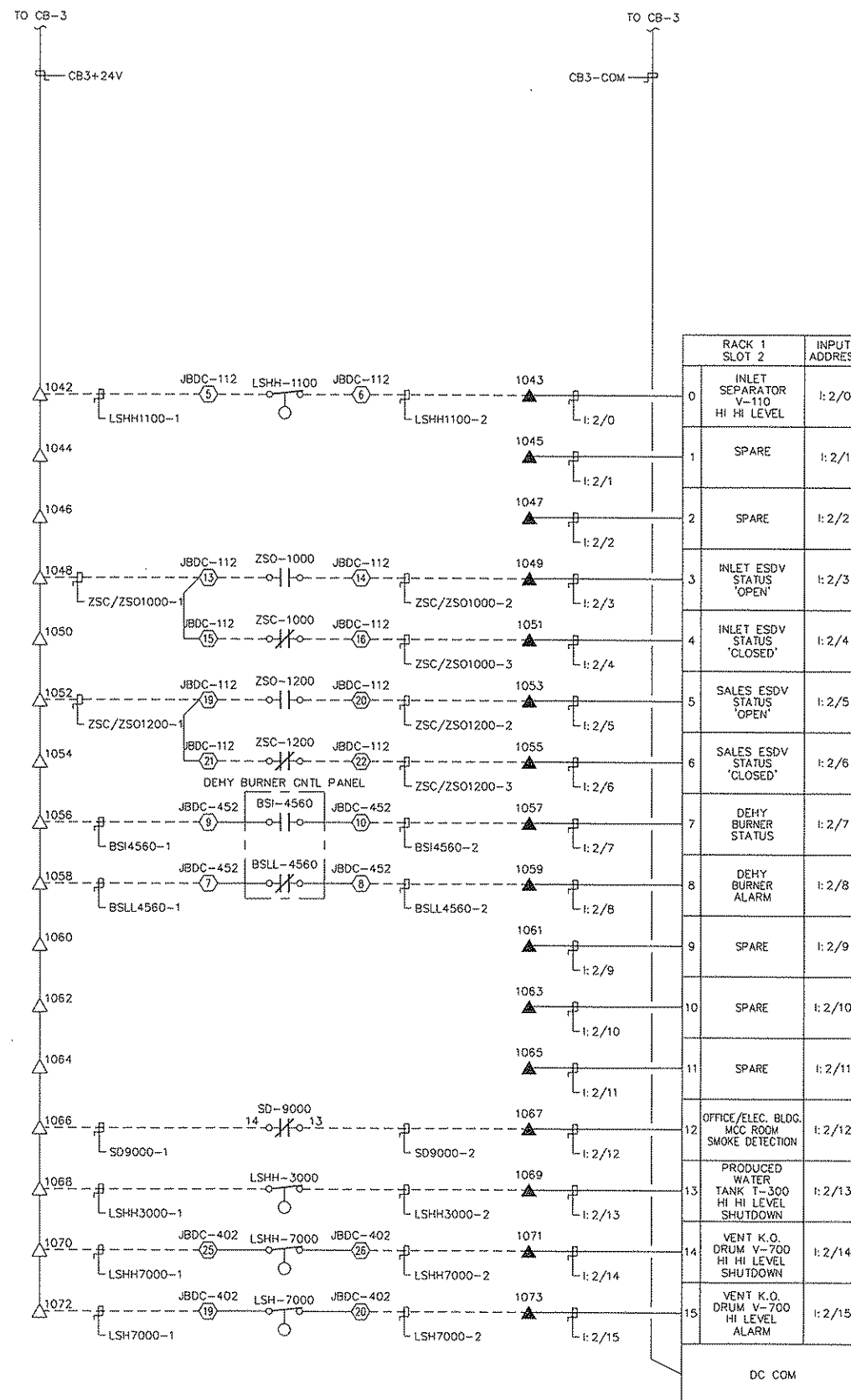
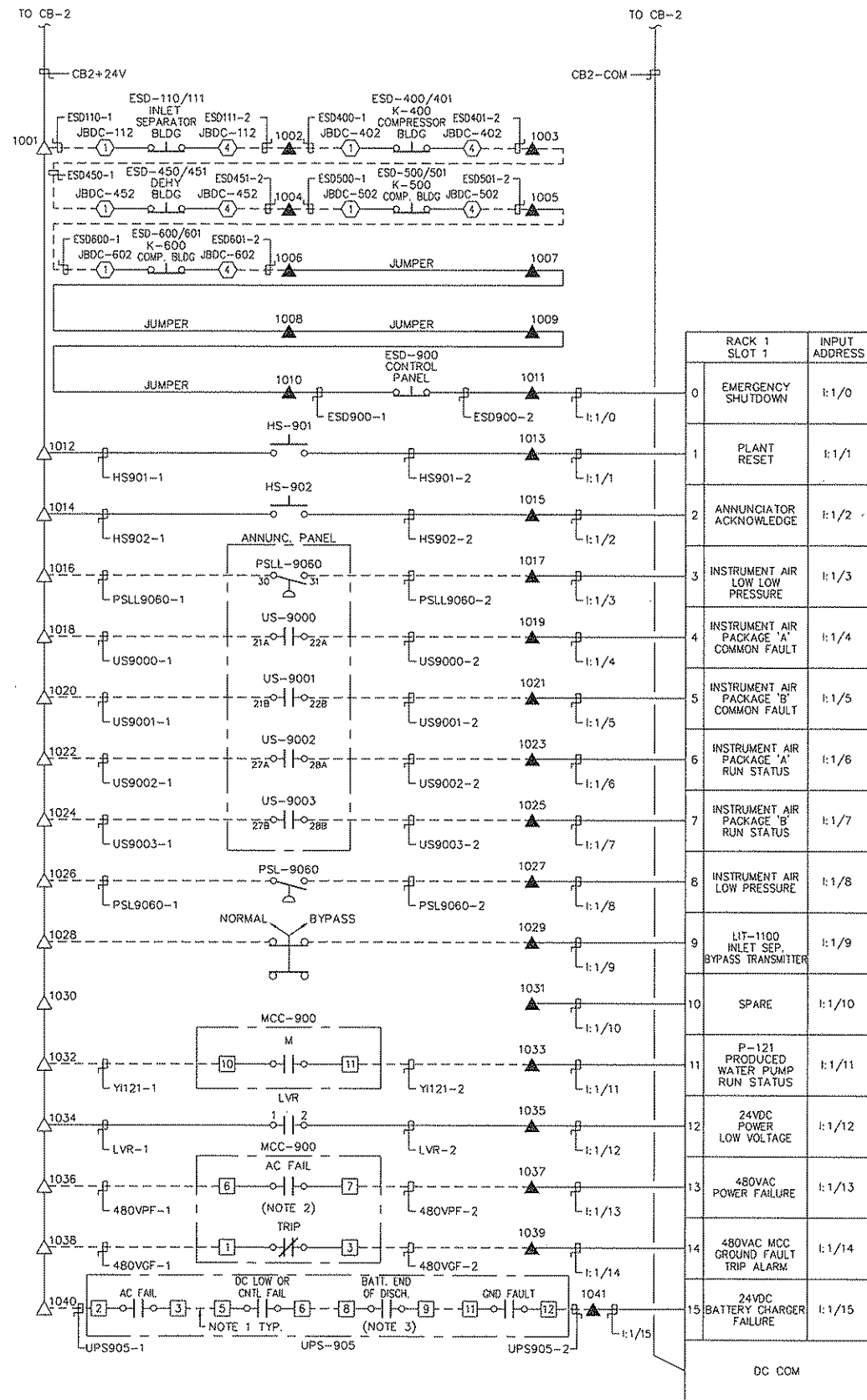


NOTES:
1. SHIELD TO BE CUT AND TAPED AT SENSOR.

REFERENCE DRAWINGS		REVISIONS					ENGINEERING STAMP			
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.		
		6	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	AMH	AFM	JMW		
		0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17	LL	GMW	JMW		
		1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW		
		2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW		
		3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW		
		4A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW		
		4B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW		
		5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	AFM	AFM	JMW		

GRB ENGINEERING Ltd.

ENGINEERING STAMP			
QUICKSILVER			
TWINING COMPRESSOR STATION CP-900 CONTROL PANEL MISCELLANEOUS SCHEMATICS			
PROJECT NO. 9549.02	SCALE: N.T.S.	DWG. NO. D-9549-W-003A	REV. 6



RACK 1	0	1	2	3	4	5	6	7	8	9	10	11	12
POWER SUPPLY 1746-PS	1747-L551	1748-L61C	1749-L61B	1746-LB16	1746-LB16	1746-LB16	1746-LB16	1746-LB16	1746-LB16	1746-LB16	1746-LB16	1746-LB16	1746-LB16

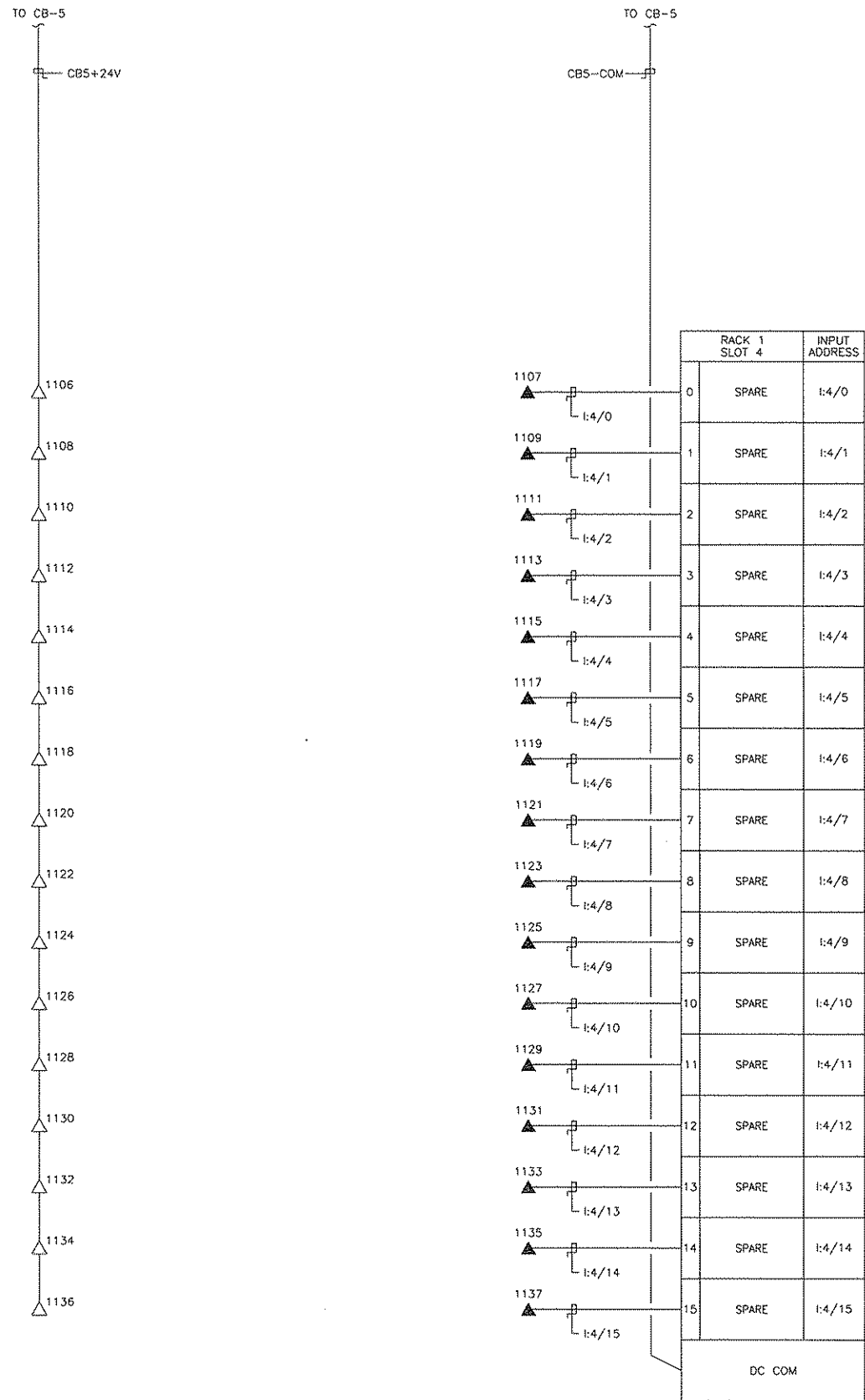
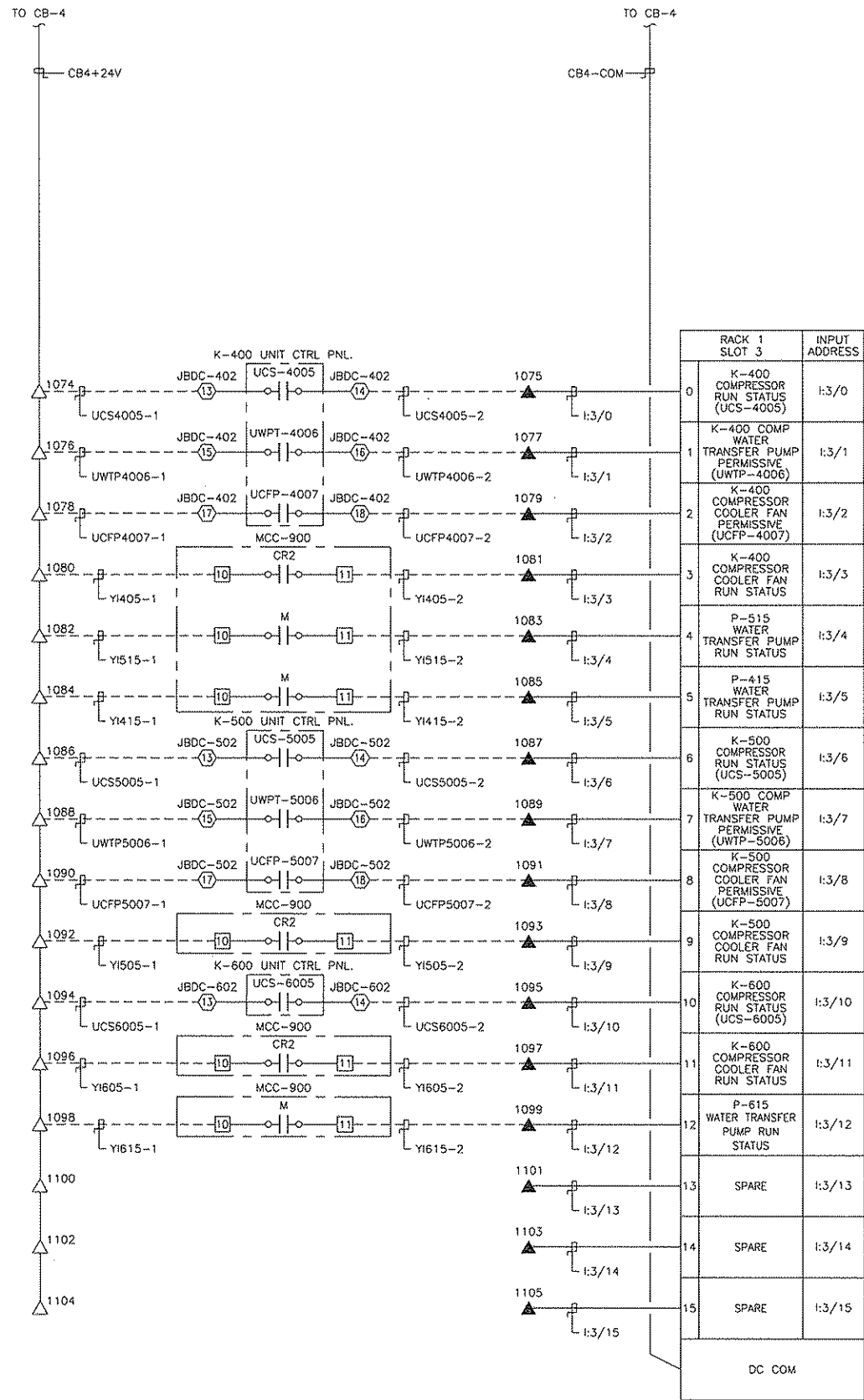
KEY PLAN

- NOTES:
- FIELD CONTRACTOR TO ADD JUMPERS BETWEEN CONTROLS WITHIN BATTERY CHARGER CABINET.
 - THIS ALARM INCLUDES PHASE REVERSAL, OVER VOLTAGE, UNDER VOLTAGE PHASE LOSS OR UNBALANCE. LED'S ON POWER MONITOR IN MCC INDICATE ALARM CONDITIONS.
 - BATTERY END OF DISCHARGE ALARM IS SET AT 21VDC.

REFERENCE DRAWINGS		REVISIONS		ENGINEERING STAMP				
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
		6	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	AMH	AFM	JMW
		0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17	LL	GMW	JMW
		1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW
		2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW
		3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW
		4A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	AFM	AFM	JMW
		4B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW
		5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	AFM	AFM	JMW

GRB ENGINEERING Ltd.

ENGINEERING STAMP				QUICKSILVER			
				TWINING COMPRESSOR STATION CP-900 CONTROL PANEL I/O CONTROL SCHEMATIC			
PROJECT NO.	SCALE:	DWG. NO.	REV.	PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.01	N.T.S.	D-9549-W-010A	6	9549.01	N.T.S.	D-9549-W-010A	6



RACK 1	0	1	2	3	4	5	6	7	8	9	10	11	12
POWER SUPPLY 1746-P3	1747-L551	1748-IB16	1748-IB16	1748-IB16	1748-IB16	1748-IB16	1748-IB16	1748-IB16	1748-IB16	1748-IB16	1748-IB16	1748-IB16	1748-IB16

KEY PLAN

NOTES:

REFERENCE DRAWINGS

REVISIONS

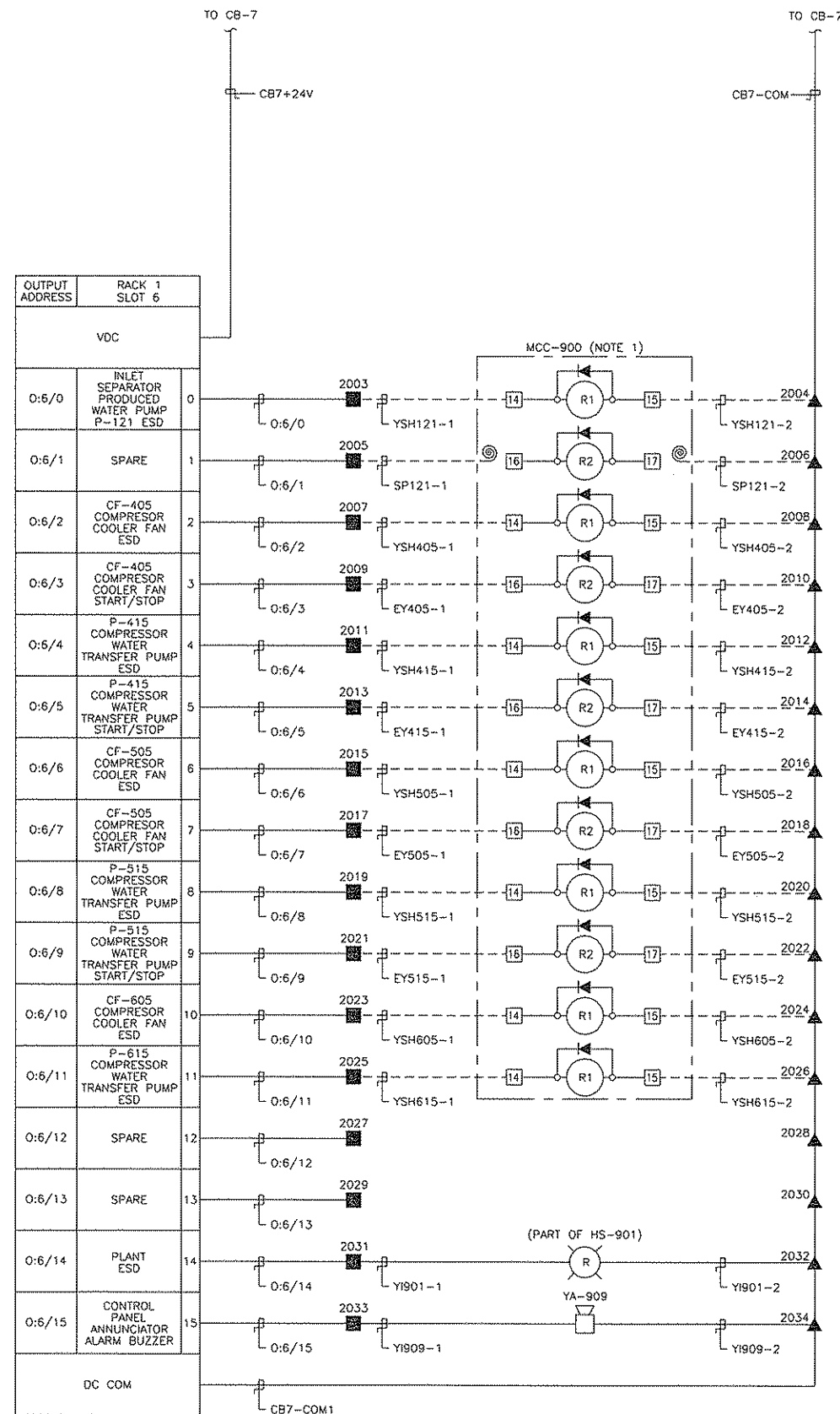
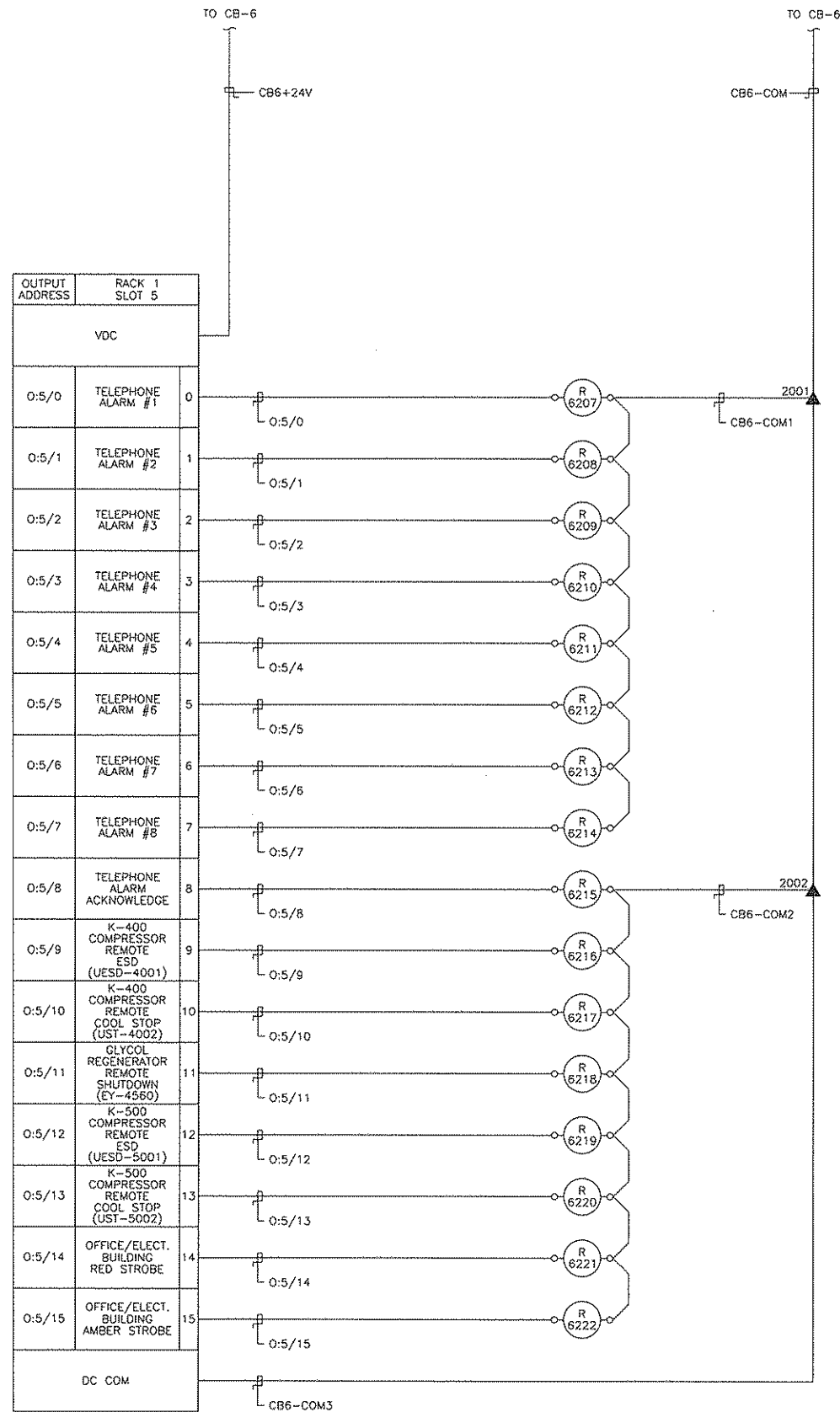
ENGINEERING STAMP

QUICKSILVER

TWINING COMPRESSOR STATION
CP-900 CONTROL PANEL
I/O CONTROL SCHEMATIC

GRB ENGINEERING Ltd.

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	N.T.S.	D-9549-W-010B	6



RACK 1	0	1	2	3	4	5	6	7	8	9	10	11	12
POWER SUPPLY 1746-P3	1747-L551	1748-B16	1749-B16	1749-B16	1749-B16	1749-B16	1749-B16	1749-B16	1749-B16	1749-B16	1749-B16	1749-B16	1749-B16

KEY PLAN

NOTES:
1. RELAYS R1 AND R2 ARE LOCATED INSIDE THEIR RESPECTIVE MOTOR STARTER CABINETS IN THE MOTOR CONTROL CENTRE (MCC-900).

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION
6	AS BUILT PER FIELD MARK UPS
0	ISSUED FOR CONSTRUCTION
1	AS-BUILT
2	K-500 COMPRESSOR BUILDING ADDITION
3	AS-BUILT
4A	PRELIMINARY (K-600 ADDITION)
4B	ISSUED FOR BID (K-600 ADDITION)
5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
6	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	AMH	AFM	JMW
0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17	LL	GMW	JMW
1	AS-BUILT	9549.00	05.08.16	LL	OPS	JMW
2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW
3	AS-BUILT	9549.01	06.01.17	YG	OPS	JMW
4A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
4B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW
5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	AFM	AFM	JMW

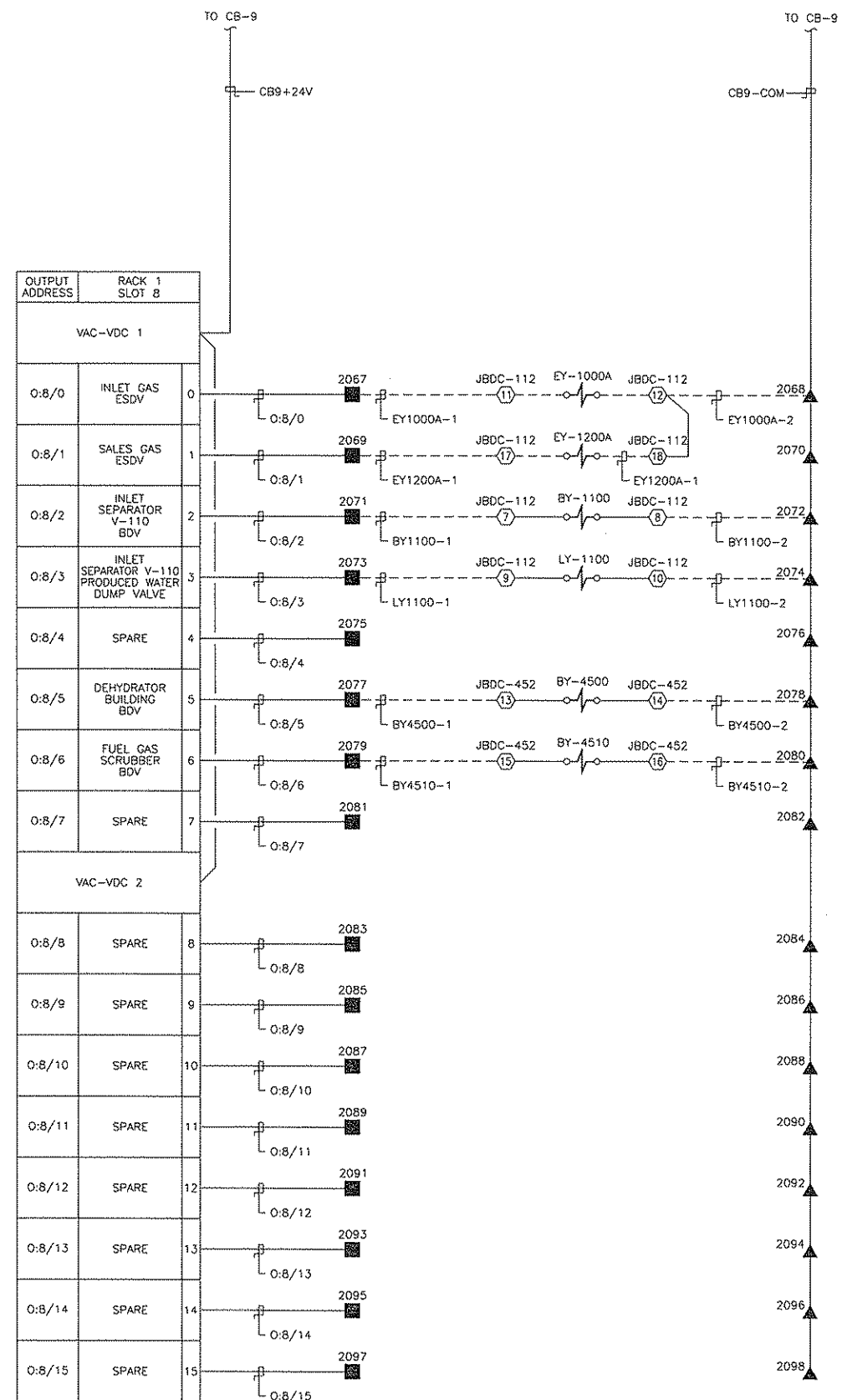
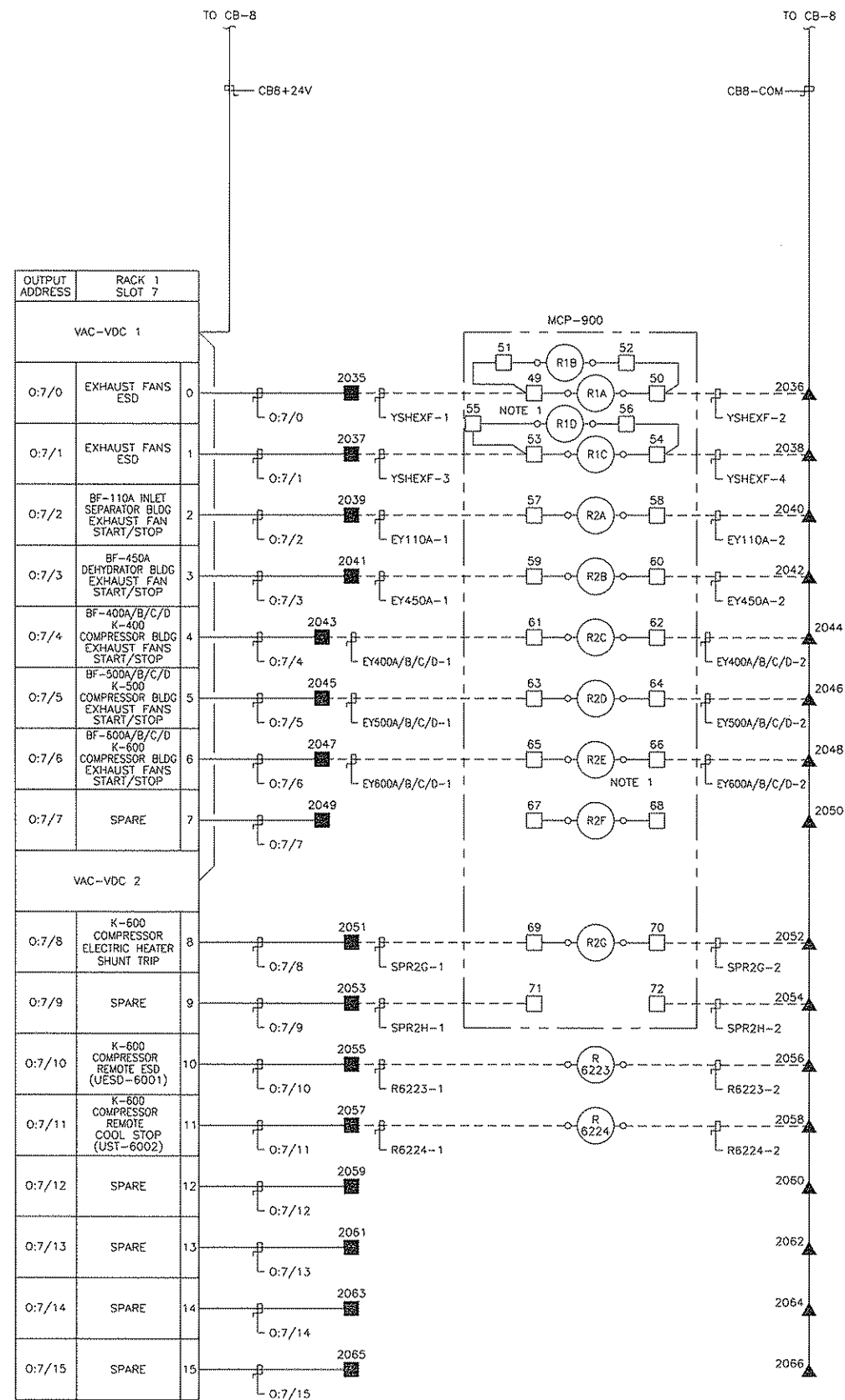
ENGINEERING STAMP

GRB Engineering Ltd.



TWINING COMPRESSOR STATION
CP-900 CONTROL PANEL
I/O CONTROL SCHEMATIC

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	N.T.S.	D-9549-W-010C	6



CONSTRUCTION NOTES:

1. FIELD CONTRACTOR SHALL REPLACE 3 POLE CONTACTORS AND SUPPLY AND INSTALL 4 POLE MOTOR CONTACTORS (ALLEN-BRADLEY, 1 HP RATED, CAT. NO. KO-C1605400) R1D, R2E. CONTACTOR SHALL HAVE 24VDC COILS WITH 120VAC CONTACTS

RACK 1	0	1	2	3	4	5	6	7	8	9	10	11	12
POWER SUPPLY 1746-P3	1747-L551	1746-B16	1746-B16	1746-B16	1746-B16	1746-B16	1746-B16	1746-B16	1746-B16	1746-B16	1746-B16	1746-B16	1746-B16

KEY PLAN

NOTES:

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION
6	ISSUED FOR CONSTRUCTION (K-600 ADDITION)
7	AS BUILT PER FIELD MARK UPS
1	AS-BUILT
2	K-500 COMPRESSOR BUILDING ADDITION
3	AS-BUILT
4	AS-BUILT AS PER EXHAUST FAN ADDITIONS
5A	PRELIMINARY (K-600 ADDITION)
5B	ISSUED FOR BID (K-600 ADDITION)

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
6	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	AFM	AFM	JMW
7	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	AMH	AFM	JMW
1	AS-BUILT	9549.00	05-08-16	LL	DPS	JMW
2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05-08-29	LL	MSC	JMW
3	AS-BUILT	9549.01	06-01-17	YG	DPS	JMW
4	AS-BUILT AS PER EXHAUST FAN ADDITIONS	9549.01	07-05-18	YG	MSC	JMW
5A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
5B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW

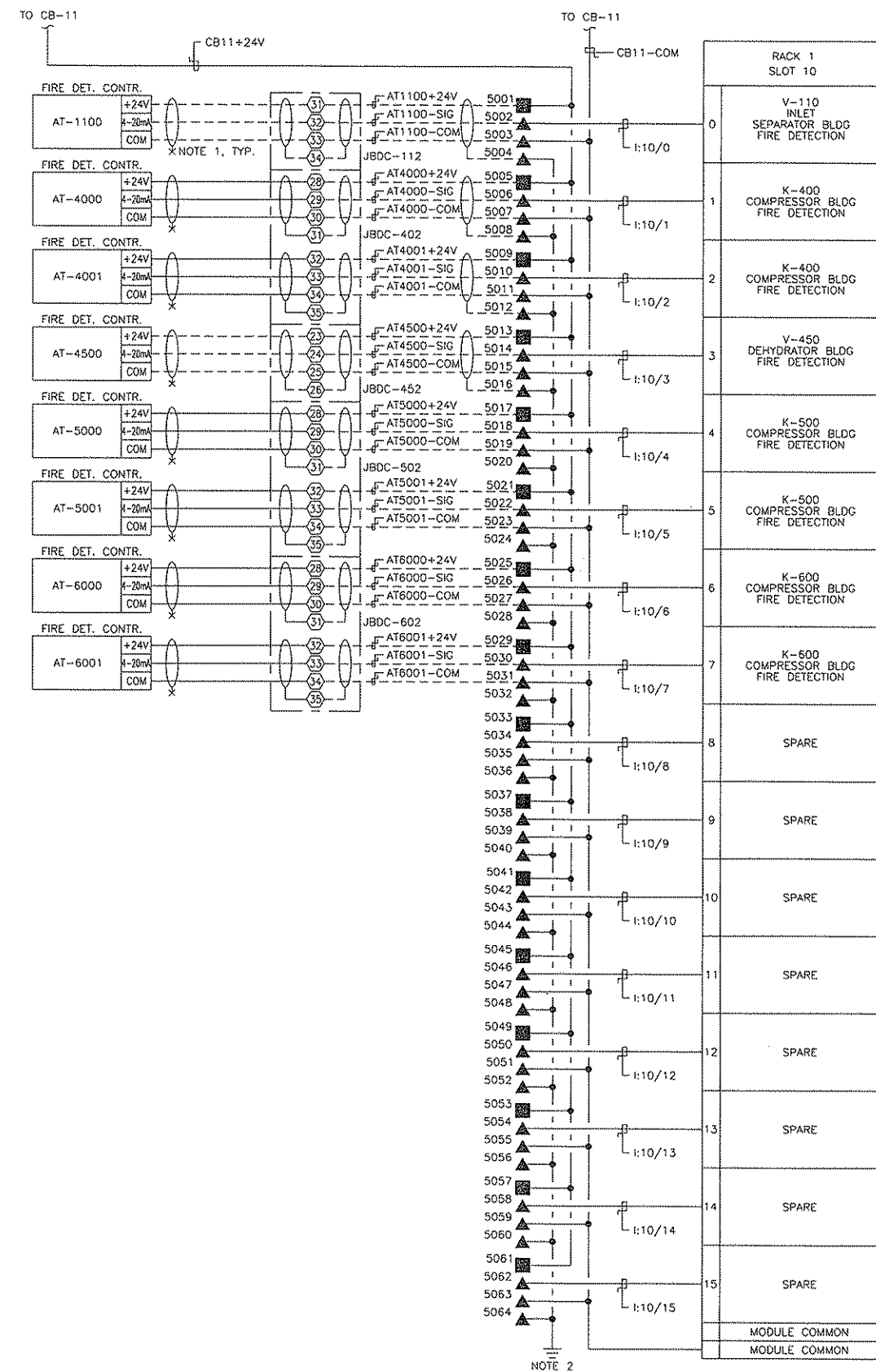
ENGINEERING STAMP

GRB ENGINEERING Ltd.



TWINING COMPRESSOR STATION
CP-900 CONTROL PANEL
I/O CONTROL SCHEMATIC

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	N.T.S.	D-9549-W-010D	7



RACK	1	0	1	2	3	4	5	6	7	8	9	10	11	12
POWER Supply 1746-P3		1747-L551		1746-IB16		1746-IB16		1746-IB16		1746-OB16		1746-OB16		1746-OB16

KEY PLAN

REFERENCE DRAWINGS			REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	
		6	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	AMH	AFM	JMW	
		0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17	DAS	GMW	JMW	
		1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW	
		2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	WSC	JMW	
		3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW	
		4A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW	
		4B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW	
		5	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	AFM	AFM	JMW	

ENGINEERING STAMP

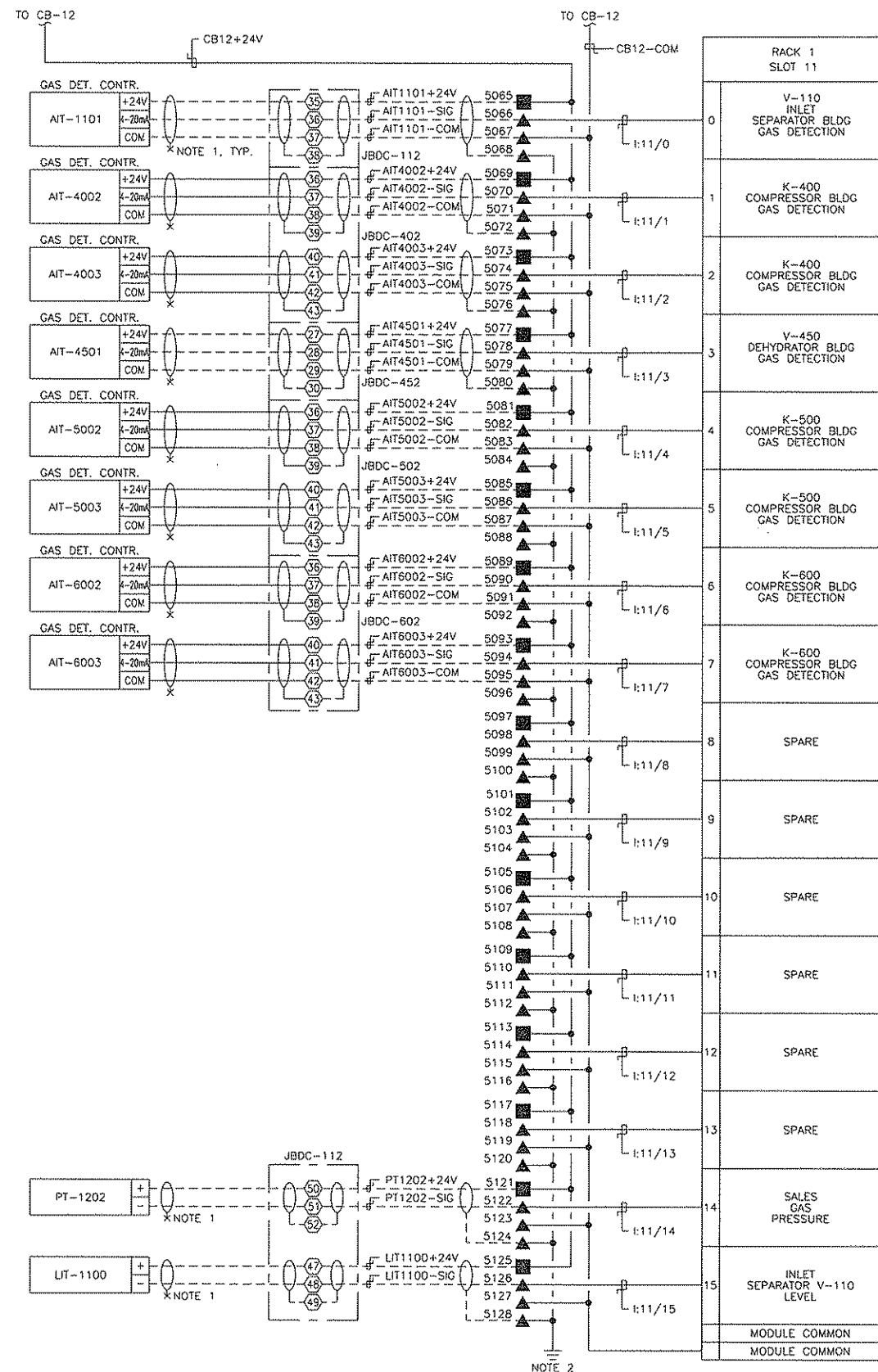


QUICKSILVER

TWINING COMPRESSOR STATION
CP-900 CONTROL PANEL
I/O CONTROL SCHEMATIC

GRB ENGINEERING LTD.

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	N.T.S.	D-9549-W-010E	6



RACK 1	0	1	2	3	4	5	6	7	8	9	10	11	12
POWER SUPPLY 1746-P3	1747-L551	1748-B16	1748-B16	1748-B16	1748-B16	1748-B16	1748-B16	1748-B16	1748-B16	1748-B16	1748-B16	1748-B16	1748-B16

KEY PLAN

- NOTES:
 1. SHIELD TO BE CUT AND TAPED AT CONTROLLER.
 2. INSTRUMENT SHIELDS TO BE GROUNDED AT ISOLATED INSTRUMENT SHIELD GROUND BUS.

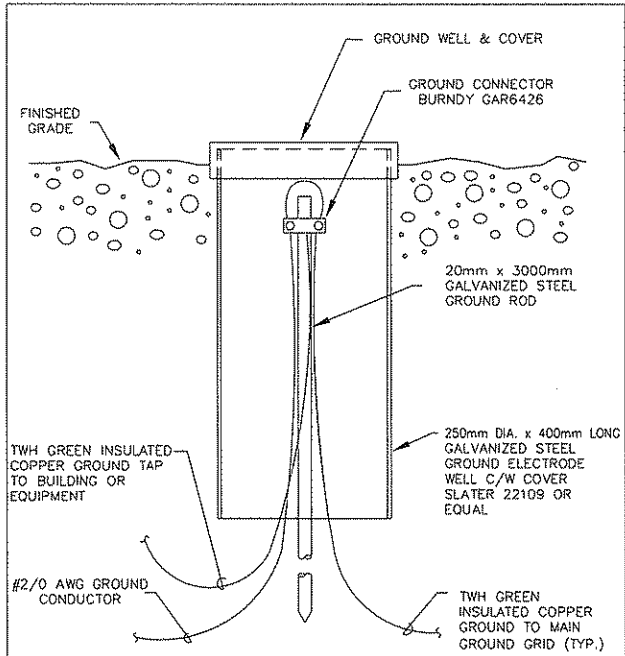
REFERENCE DRAWINGS		REVISIONS						
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
		6	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	AMH	AFM	JMW
		0	ISSUED FOR CONSTRUCTION	9549.00	05.05.17	DAS	GMW	JMW
		1	AS-BUILT	9549.00	05.08.16	LL	DPS	JMW
		2	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05.08.29	LL	MSC	JMW
		3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW
		4A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
		4B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW
		5	ISSURE FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	AFM	AFM	JMW

ENGINEERING STAMP			
TWINING COMPRESSOR STATION CP-900 CONTROL PANEL I/O CONTROL SCHEMATIC			
PROJECT NO. 9549.02	SCALE: N.T.S.	DWG. NO. D-9549-W-010F	REV. 6

GRB ENGINEERING Ltd.

LOCATION

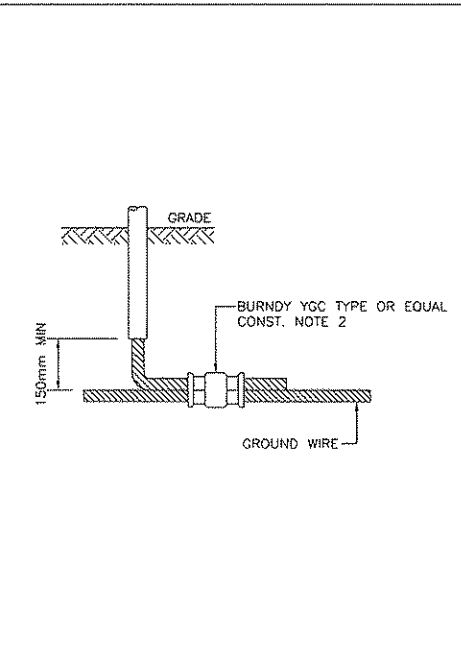
NOTES: ESD ALARM HORN – CONTINUOUS UNTIL ACKNOWLEDGED. GAS DETECTION HORN – ALTERNATING OFF/ON UNTIL ACKNOWLEDGED. GENERAL ALARM HORN – ALTERNATING 3 TIMES ONLY OR UNTIL ACKNOWLEDGED. ALARM AFTER 120 SECONDS. P-121 TO START 3 SECONDS AFTER DUMP VALVE IS OPENED ON HI WATER LEVEL (LAH-1100). AT 42% DUMP VALVE TO CLOSE 3 SECONDS AFTER P-110 STOPS DUE TO LO WATER LEVEL (LAL-1100). AT 25% BATTERY CHARGER FAILURE CAN BE A RESULT OF AC FAIL, DC LOW OR CNTL FAIL, BATTERY END OF DISCHARGE, AND/OR GND FAULT. 30 SECOND TIME DELAY FOR INSTRUMENT AIR PACKAGE FAULT. FIRE AND GAS DETECTION CAN BE ACTIVATED FOR ONE HOUR AND IS LOCATED ON THE HMI. A HIGH LEVEL SWITCH BYPASS CAN BE ACTIVATED FOR ONE HOUR AND IS LOCATED ON THE CONTROL PANEL DOOR. THIS BYPASSES LSHH-1100, LSHH-3000 AND LSHH-7000.	REFERENCE DRAWINGS		REVISIONS							ENGINEERING STAMP		 QUICKSILVER ***** TWINING COMPRESSOR STATION SHUTDOWN KEY			
	DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.	GRB Engineering Ltd.		PROJECT NO.	SCALE:	DWG. NO.	REV.
			6	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	AFM	AFM	JMW			—	NONE	D-9549-X-001A	9
			7	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	AMH	AFM	JMW						
			8	AS-BUILT AS PER SHUTDOWN KEY REVIEW	—	10-04-27	JFL	CD	CD						
			9	AS-BUILT AS PER SHUTDOWN KEY REVIEW	—	10-09-09	JFL	CD	CD						
			3	AS-BUILT	9549.01	06.01.17	YG	DPS	JMW						
			4	AS-BUILT PER FIELD MARK-UP	9549.01	06-04-07	EBD	DPS	JMW						
			5A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW						
			5B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW						



CONSTRUCTION NOTES:

1. ALL MATERIALS SHALL BE CONTRACTOR SUPPLIED.
2. IN CORROSIVE LOCATIONS, BARE COPPER CONNECTIONS SHALL BE COATED WITH SILICONE.

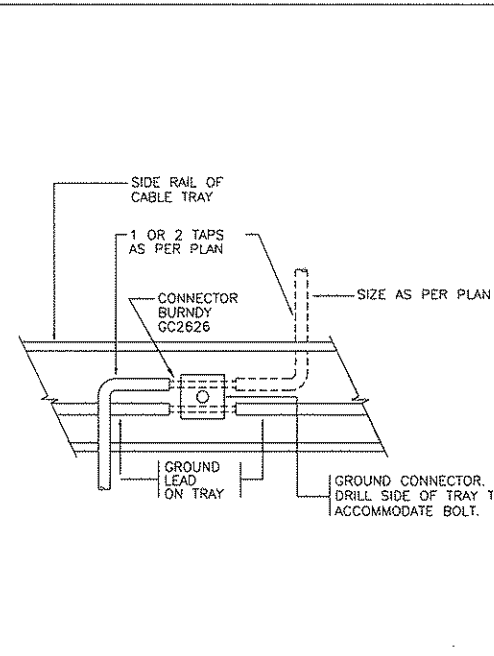
GROUND WELL CONNECTION



CONSTRUCTION NOTES:

1. ALL MATERIALS SHALL BE CONTRACTOR SUPPLIED.
2. SPRAY CONNECTION WITH GLYTAL, WRAP WITH TWO LAYERS OF RUBBER TAPE AND TWO LAYERS OF SCOTCH 88 TAPE.

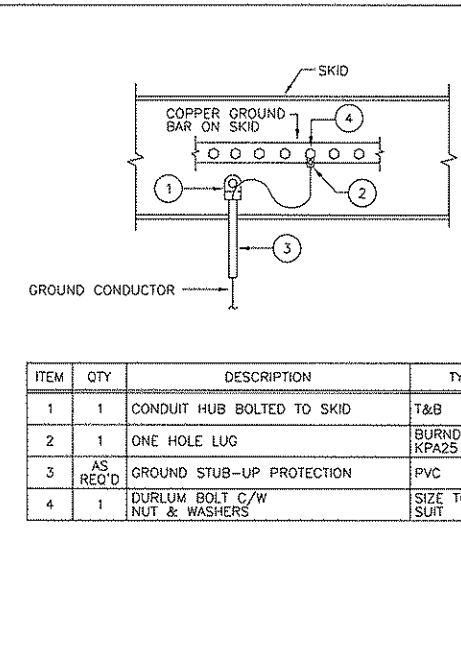
TYPICAL GROUND TAP CONNECTION



CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED

TAP FROM GROUND
LEAD ON CABLE TRAY

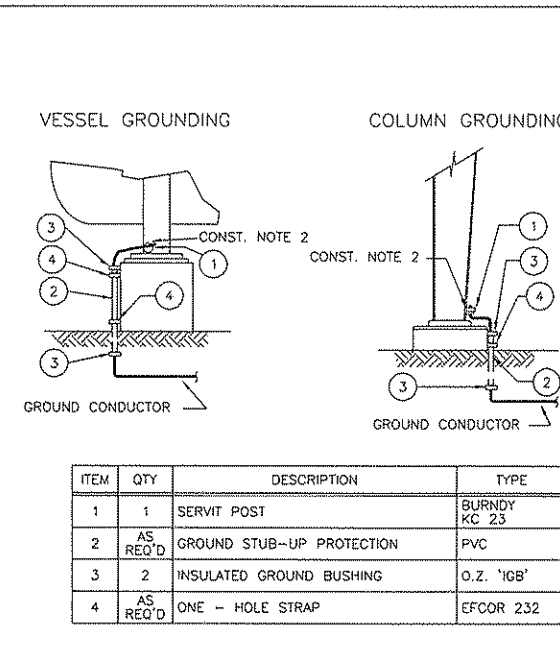


ITEM	QTY	DESCRIPTION	TYPE
1	1	CONDUIT HUB BOLTED TO SKID	T&B
2	1	ONE HOLE LUG	BURNDY KPA25
3	AS REQ'D	GROUND STUB-UP PROTECTION	PVC
4	1	DURLUM BOLT C/W NUT & WASHERS	SIZE TO SUIT

CONSTRUCTION NOTES:

1. ALL EXPOSED SURFACES SHALL BE PAINTED W/ GLYPTOL.
2. ALL MATERIAL CONTRACTOR SUPPLIED

SKID GROUNDING

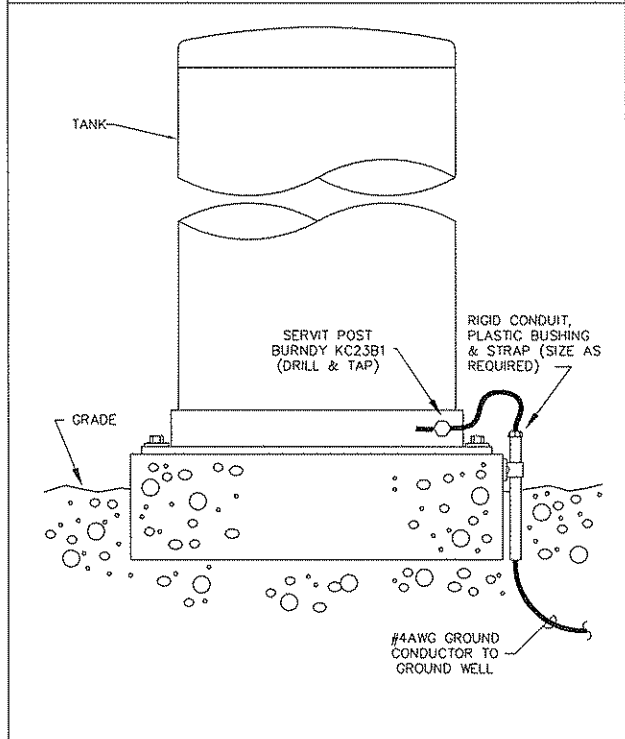


ITEM	QTY	DESCRIPTION	TYPE
1	1	SERVIT POST	BURNDY KC 23
2	AS REQ'D	GROUND STUB-UP PROTECTION	PVC
3	2	INSULATED GROUND BUSHING	O.Z. 'IGB'
4	AS REQ'D	ONE - HOLE STRAP	EFCOR 232

CONSTRUCTION NOTES:

1. ALL EXPOSED SURFACES SHALL BE PAINTED WITH GLYPTOL.
2. DRILL & TAP-5/16" DRILL, 3/8" TAP.
3. ALL MATERIALS ARE CONTRACTOR SUPPLIED.

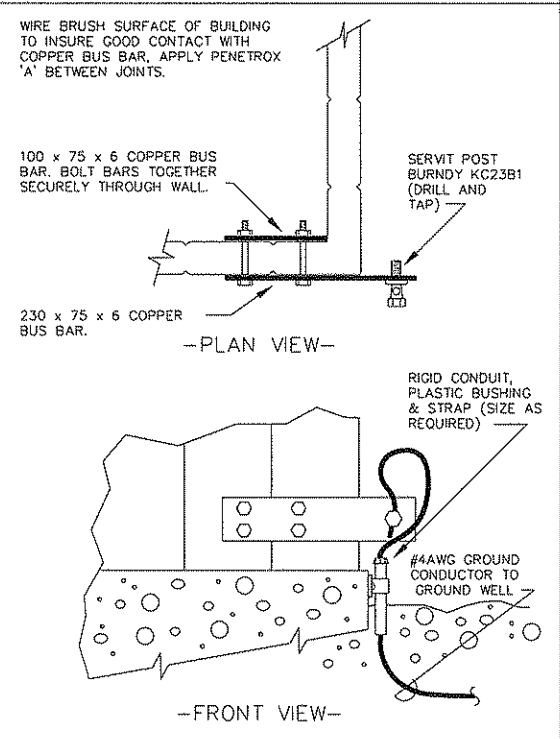
COLUMN AND VESSEL GROUNDING



CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED

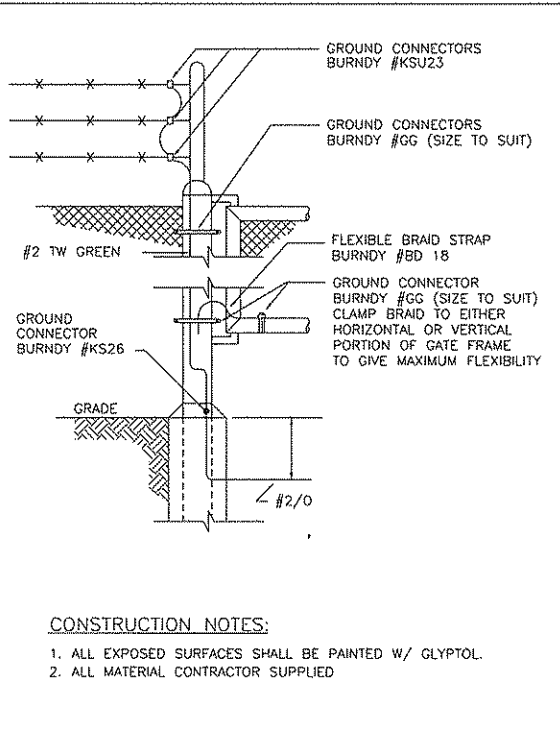
TANK GROUND CONNECTION



CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED

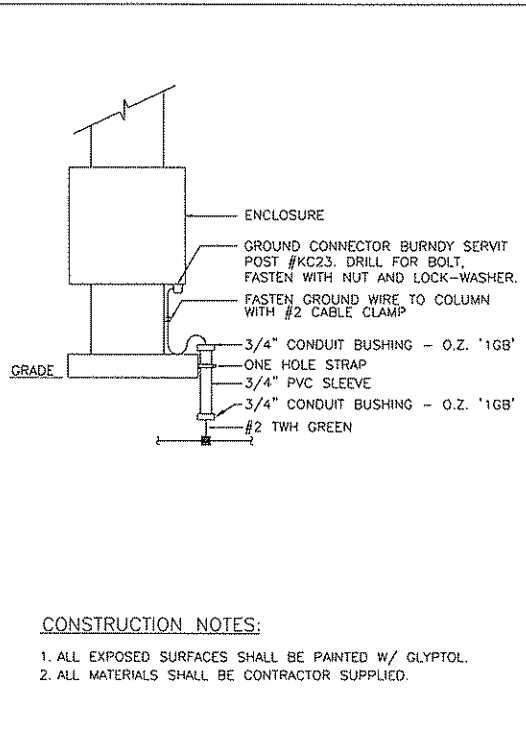
FRAMELESS BUILDING GROUND



CONSTRUCTION NOTES:

1. ALL EXPOSED SURFACES SHALL BE PAINTED W/ GLYPTOL.
2. ALL MATERIAL CONTRACTOR SUPPLIED

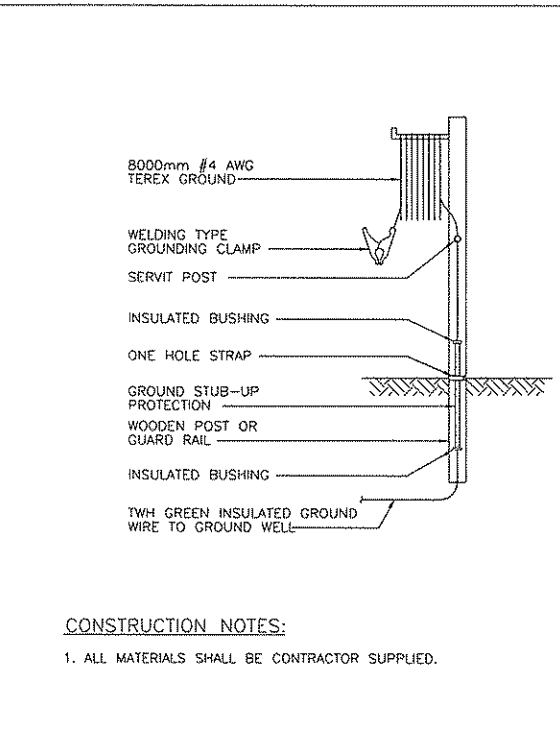
GROUND CONNECTION FOR FENCE AND GATE



CONSTRUCTION NOTES:

1. ALL EXPOSED SURFACES SHALL BE PAINTED W/ GLYPTOL.
2. ALL MATERIALS SHALL BE CONTRACTOR SUPPLIED.

GROUNDING FOR ELECTRICAL ENCLOSURES



CONSTRUCTION NOTES:

1. ALL MATERIALS SHALL BE CONTRACTOR SUPPLIED.

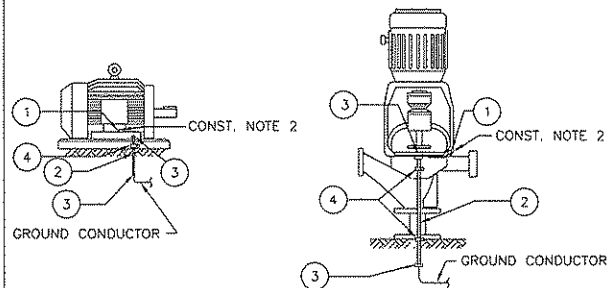
TRUCK GROUNDING REEL

NOTES:

REFERENCE DRAWINGS		REVISIONS		ENGINEERING STAMP	
DWG. NO.	DESCRIPTION	NO.	DESCRIPTION	PROJECT	DATE
		0	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05-08-29
		1	AS-BUILT	9549.01	06-01-17
		2A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03
		2B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20
		3	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28
		4	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08

ENGINEERING STAMP			
QUICKSILVER			
MISCELLANEOUS ELECTRICAL INSTALLATION DETAILS GROUNDING (SHEET 1 OF 2)			
PROJECT NO. 9549.02	SCALE: N.T.S.	DWG. NO. D-9549-Y-001A	REV. 4

GRB ENGINEERING Ltd.

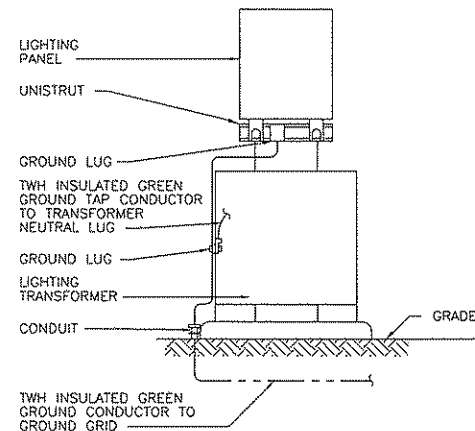


ITEM	QTY	DESCRIPTION	TYPE
1	1	SERVIT POST	BURNDY KC 23
2	AS REQ'D	GROUND STUB-UP PROTECTION	PVC
3	2	INSULATED GROUND BUSHING	1/2" O.Z. 1GB
4	AS REQ'D	ONE - HOLE STRAP	EFCOR 232

CONSTRUCTION NOTES:

1. GROUND WIRES INSTALLED IN MOTOR CONDUITS TO BE GROUNDED IN MOTOR J.B.
2. DRILL AND TAP - 5/16 DRILL 3/8" TAP.
3. ALL EXPOSED SURFACES SHALL BE PAINTED WITH GLYPHTOL.
4. STYLE OF MOTOR MAY VARY.
5. ALL MATERIALS ARE CONTRACTOR SUPPLIED.

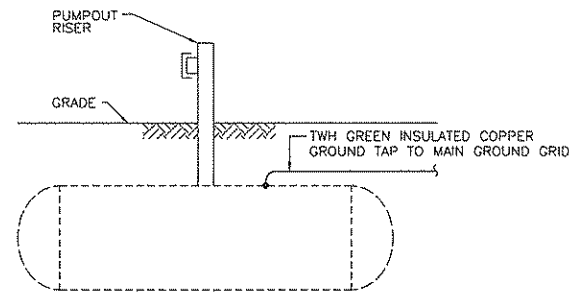
MOTOR GROUNDING



CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED.

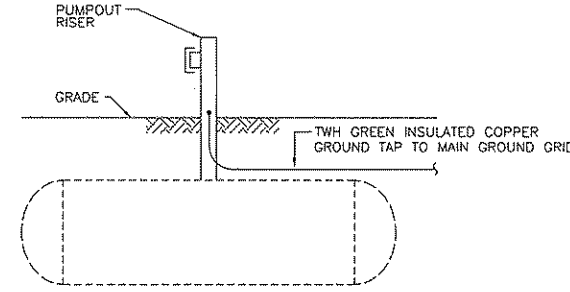
LIGHTING PANEL AND TRANSFORMER GROUNDING



CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED.

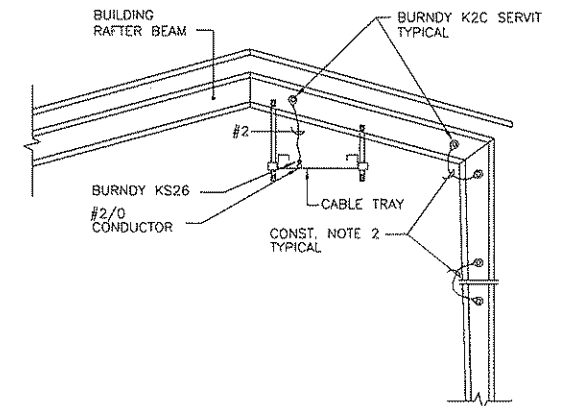
UNDERGROUND STEEL TANK GROUNDING



CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED

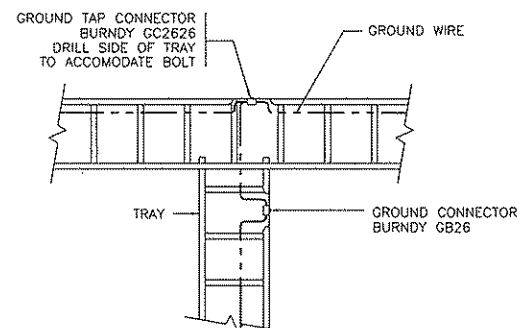
UNDERGROUND FIBREGLASS TANK GROUNDING



CONSTRUCTION NOTES:

1. IN AREAS WITH NO CABLE TRAY, GROUND CONDUCTOR SHALL BE RUN ALONG PEAK OF BUILDING AND CLAMPED TO UNDERSIDE OF ROOF.
2. INSTALL A #2 AWG BOND ACROSS ALL BOLTED RAFTER AND/OR COLUMN CONNECTIONS.
3. ALL MATERIAL CONTRACTOR SUPPLIED.

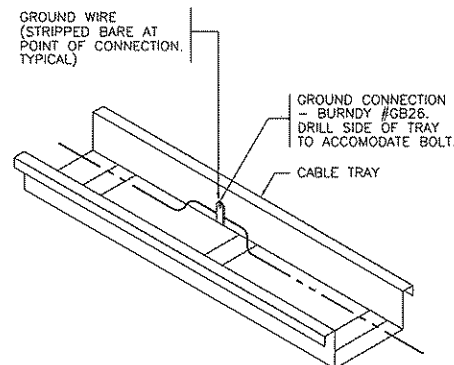
BUILDING RAFTER AND COLUMN GROUNDING



CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED.

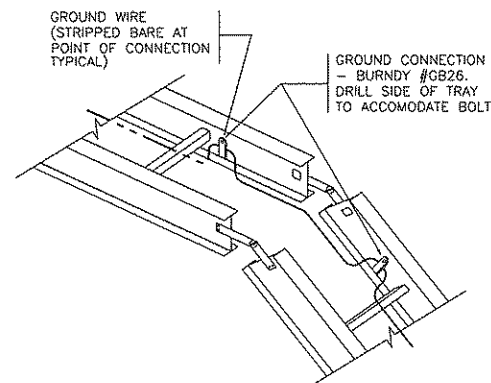
GROUNDED TEE CONNECTION



CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED.

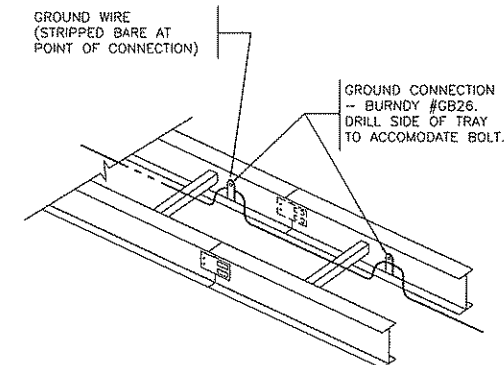
CABLE TRAY GROUNDING



CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED.

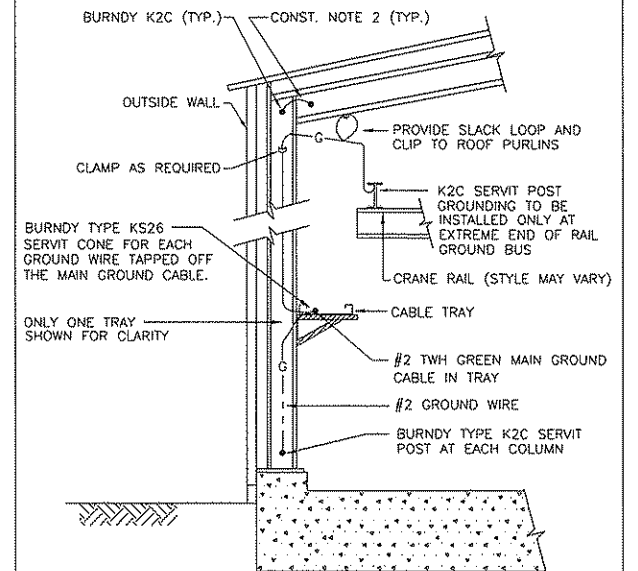
GROUNDING AT TRAY VERTICAL ADJUSTABLE ELBOW



CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED

GROUNDING AT TRAY EXPANSION JOINT



CONSTRUCTION NOTES:

1. ALL MATERIALS ARE CONTRACTOR SUPPLIED UNLESS OTHERWISE INDICATED.
2. INSTALL A #2 AWG BOND ACROSS ALL BOLTED COLUMNS AND/OR RAFTER CONNECTIONS.

COMPRESSOR BUILDING AND CRANE RAIL GROUNDING

NOTES:

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
0	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05-08-29	LL	MSC	JMW
1	AS-BUILT	9549.01	06-01-17	YG	DPS	JMW
2A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
2B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW
3	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	AFM	AFM	JMW
4	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	AMH	AFM	JMW

ENGINEERING STAMP

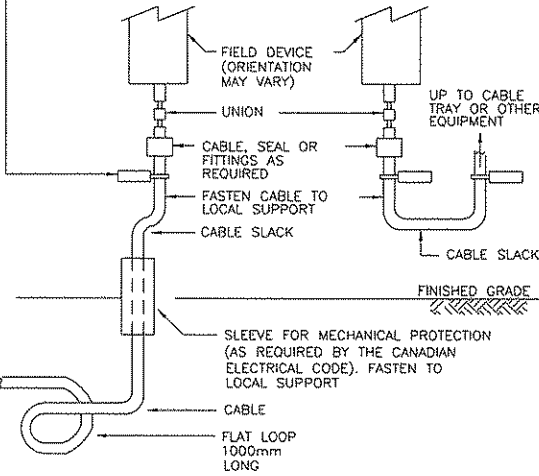
GRB ENGINEERING Ltd.

QUICKSILVER

MISCELLANEOUS ELECTRICAL
INSTALLATION DETAILS
GROUNDING (SHEET 2 OF 2)

PROJECT NO.	SCALE:	DWG. NO.	REV.
9549.02	N.T.S.	D-9549-Y-001B	4

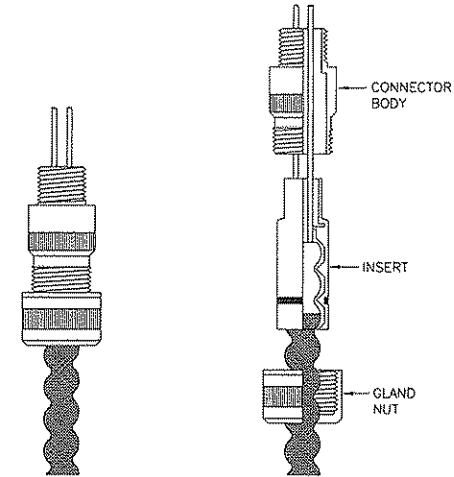
UNISTRUT SUPPORT, FABRICATE AS REQUIRED, FASTEN TO LOCAL STRUCTURES IF AVAILABLE. OTHERWISE FABRICATE STRUCTURES USING CONCRETE PILE AND 2" PIPE RISER. DO NOT FASTEN TO PIPE OR FITTINGS, UNLESS SPECIFICALLY NOTED ON THE DRAWINGS. SUPPORTS SHALL BE APPROVED BY THE ENGINEER PRIOR TO COMMENCING WORK.



CONSTRUCTION NOTES:

1. UNION MAY BE AN INTEGRAL PART TO THE CABLE SEAL CONNECTOR.

CABLE CONNECTION TO EQUIPMENT



GLAND ASSEMBLED

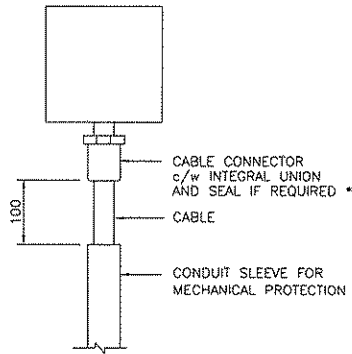
EXPLODED VIEW

ZONE 1 AND 2 AREAS

CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED.

TECK CABLE SEALING GLAND KIT

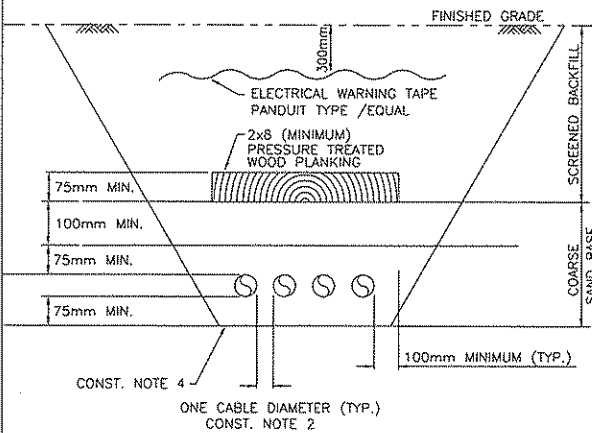


- * SEAL IS ALWAYS REQUIRED WHEN LEAVING A HAZARDOUS AREA.

CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED.

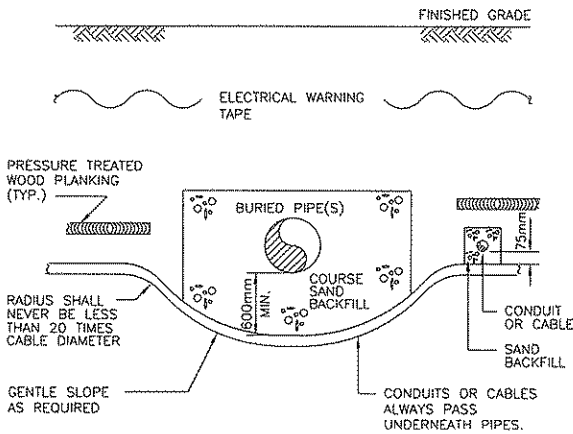
SLEEVE TO CABLE CONNECTOR SPACING



CONSTRUCTION NOTES:

1. SCREENED BACK FILL SHALL CONTAIN NO FROZEN MATERIAL. SAND BED AND BACK FILL SHALL BE COMPACTED AS PER SPECIFICATIONS.
2. CABLES MAY BE PLACED CLOSER IF DERATING IS NOT A FACTOR IN SIZING (I.E. CONTROL CABLES OR POWER CABLES HAVE BEEN DERATED.)
3. BURIAL DEPTHS SHOWN ARE FOR VOLTAGES OF 750 VOLTS OR LESS. FOR ABOVE 750 VOLTS. REFER TO TABLE 53 OF "CANADIAN ELECTRICAL CODE"
4. ALL CONDUIT AND CABLE MUST REST ON UNDISTURBED SOIL.

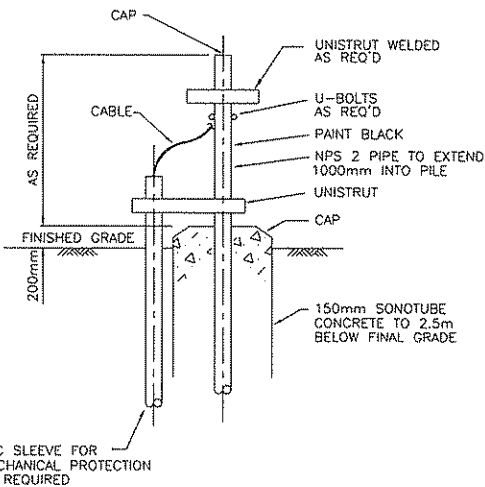
BURIED CABLE



CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED.

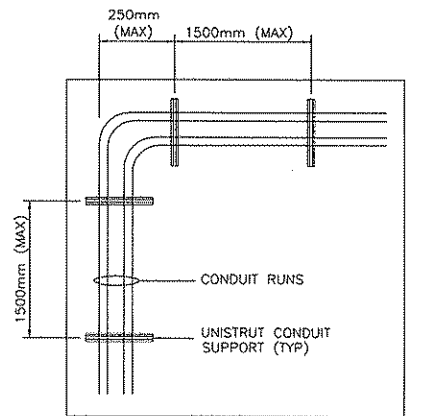
PIPE/CABLE/CONDUIT SEPARATION



CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED.

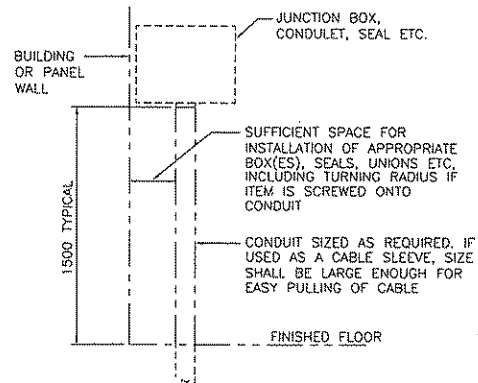
YARD EQUIPMENT SUPPORT



CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED.

CONDUIT SUPPORT SPACING



CONSTRUCTION NOTES:

1. ALL MATERIAL CONTRACTOR SUPPLIED.

CONDUIT, CABLE SLEEVE STUB-UP SPACINGS

NOTES:

REFERENCE DRAWINGS

DWG. NO.	DESCRIPTION
0	K-500 COMPRESSOR BUILDING ADDITION
1	AS-BUILT
2A	PRELIMINARY (K-600 ADDITION)
2B	ISSUED FOR BID (K-600 ADDITION)
3	ISSUED FOR CONSTRUCTION (K-600 ADDITION)
4	AS BUILT PER FIELD MARK UPS

REVISIONS

NO.	DESCRIPTION	PROJECT	DATE	BY	CHK.	ENG.
0	K-500 COMPRESSOR BUILDING ADDITION	9549.01	05-08-29	LL	MSC	JMW
1	AS-BUILT	9549.01	06-01-17	YG	DPS	JMW
2A	PRELIMINARY (K-600 ADDITION)	9549.02	2008.12.03	GMK	AFM	JMW
2B	ISSUED FOR BID (K-600 ADDITION)	9549.02	2009.01.20	AMH	AFM	JMW
3	ISSUED FOR CONSTRUCTION (K-600 ADDITION)	9549.02	2009.01.28	AFM	AFM	JMW
4	AS BUILT PER FIELD MARK UPS	9549.02	2009.04.08	AMH	AFM	JMW

ENGINEERING STAMP

GRB Engineering Ltd.

QUICKSILVER			
MISCELLANEOUS ELECTRICAL INSTALLATION DETAILS CABLE/TRAY			
PROJECT NO. 9549.02	SCALE: N.T.S.	DWG. NO. D-9549-Y-002A	REV. 4