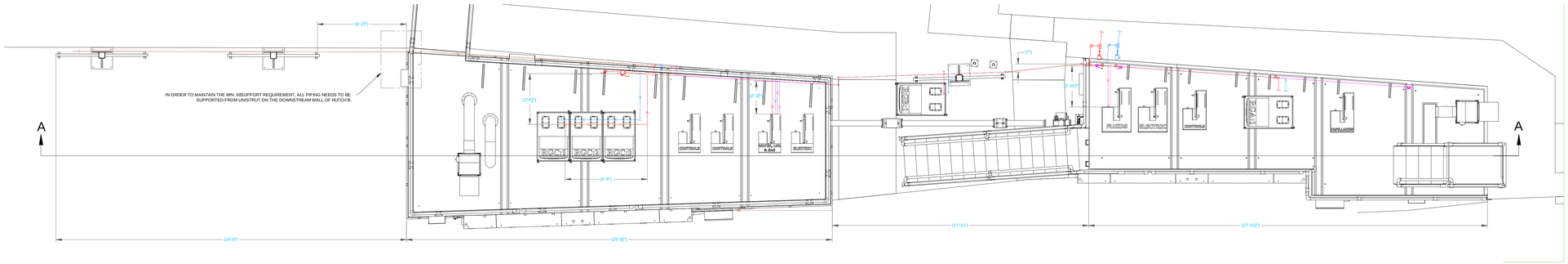
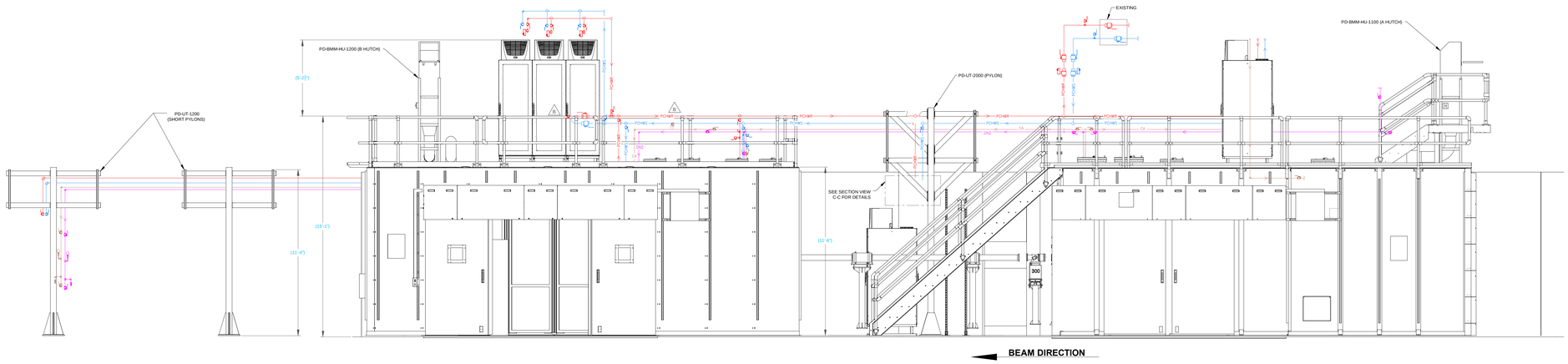
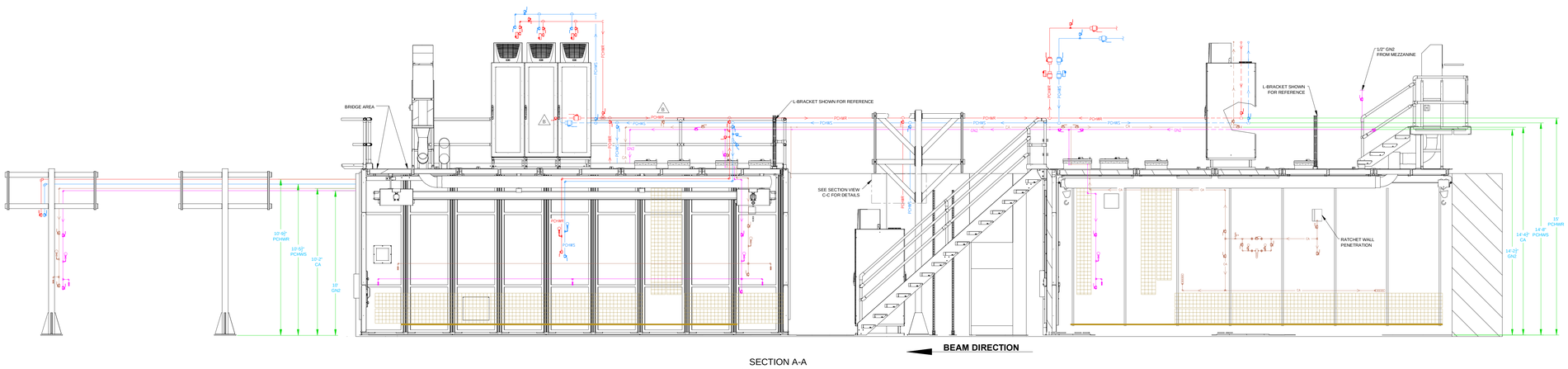
REVISION HISTORY					
REV	DESCRIPTION	DATE	DESIGNER	CHECKED BY	ENGINEER
A	RELEASED PER ECO-004331	7/2016	BJM/R.O.	C.A./C.S.	R. O'BRIEN
B	REVISED PER ECO-004588	11/2016	W.T./B.J.M.	C.A./C.S.	R. O'BRIEN







SECTION A-A
SCALE: ½" = 1'- 0"

OVERALL PIPING LAYOUT
SEE SEPARATE PIPING SHEETS FOR DETAILS

DI WATER SYSTEM INSIDE HUTCH 'A' IS SHOWN ON SHEET 2

NOTES:

1. ALL UTILITY PIPING TO BE RUN ON THE INBOARD SIDE OF PYLONS AND L-BRACKETS.
2. ENSURE THAT ALL VALVE HANDLES ARE OPERATIONAL AND ARE NOT IN CONFLICT WITH ANY ADJACENT PIPING OR VALVES.
3. MOUNTING FOR ALL PIPING IN PYLON AREAS WILL BE FIELD ERECTED UNISTRUT SUPPORT STRUCTURE.
4. ALL DIMENSIONS SHOWN ARE INTENDED TO CONVEY APPROXIMATE LOCATIONS. EXACT LOCATIONS ARE TO BE DETERMINED ACCORDING TO FIELD CONDITIONS AT TIME OF INSTALLATION.
5. INSTALL OWENS-CORNING 1.0" FIBERGLASS ASJ/SSL-II INSULATION ON PCHW SUPPLY AND RETURN INSIDE THE B-HUTCH AND ALL PCHW SUPPLY LINES OUTSIDE THE B-HUTCH. USE PRE-FABRICATED FITTING COVERS FROM JOHNS-MANVILLE AND SELF-SEALING FACING TABS WITH A MINIMUM OF 1 INCH JOINT OVERLAP.
6. COPPER TUBING SHALL BE ASTM B-88 TYPE L. SOLDERED JOINTS SHALL USE ASTM-B32 SOLDER, 95% TIN 5% ANTIMONY SOLDER (STAY BRITE #8) WITH WROUGHT COPPER FITTINGS IAW ASME B16.22.

UNLESS OTHERWISE SPECIFIED
ALL DIMENSIONS ARE IN INCHES
DIMENSIONS IN BRACKETS [xx.xx] (WHERE PRESENT) ARE MILLIMETERS AND ARE FOR REFERENCE ONLY
INTERPRET DRAWING AS PER ANSI Y14.5-1994 OR Y32.3-1975

DIMENSIONAL TOLERANCES	ANGULAR TOLERANCE
.X ± 0.060 .XX ± 0.030 .XXX ± 0.015 .XXXX ± 0.005	± .5°
BREAK EDGES & SHARP CORNERS 0.005 MIN. TO 0.030 MAX.	FINISH 125

NEXT ASSY:
PROJECT:
THIRD ANGLE PROJECTION
SCALE: N/A

BROOKHAVEN NATIONAL LABORATORY
BROOKHAVEN NATIONAL LABORATORY
UPTON, NEW YORK 11973
Exploring Life's Mysteries, Protecting the Future

NSLS II NATIONAL SYNCHROTRON LIGHT SOURCE II

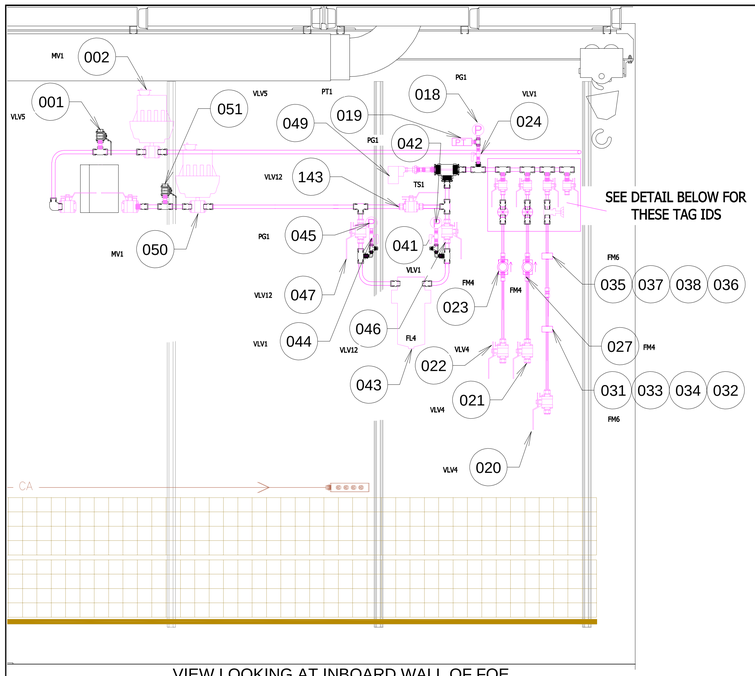
DRAWN BY	B. Mullany	4/2016
CHECKED BY	C.A./C.S.	4/2016
VACUUM APPROVAL	N/A	
RADIATION APPROVAL	R. O'Brien	4/2016
SUPERVISOR APPROVAL	J. Gosman	4/2016
ESH4 APPROVAL	L. STIEGLER	4/2016
QA APPROVAL	J. Zipper	4/2016

WBS# 7.03.04.02

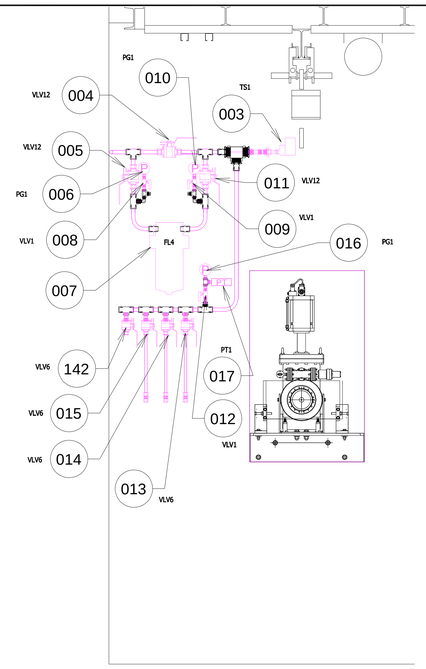
PHOTON DIVISION
BMM BEAMLINE, UTILITIES
UTILITIES INSTALLATION, 6-BM

SHEET SIZE: E
DRAWING/PART NUMBER: PD-BMM-UT-1500
REVISION: B
ESH&Q RISK LEVEL: A-2
SHEET 1 OF 8

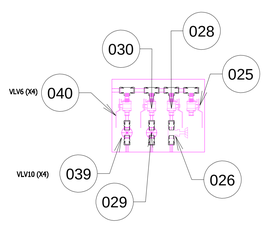
RELEASED – EFFECTIVE



VIEW LOOKING AT INBOARD WALL OF FOE



VIEW LOOKING AT UPSTREAM WALL OF FOE (RATCHET WALL)



SEE VIEW ABOVE FOR LOCATION

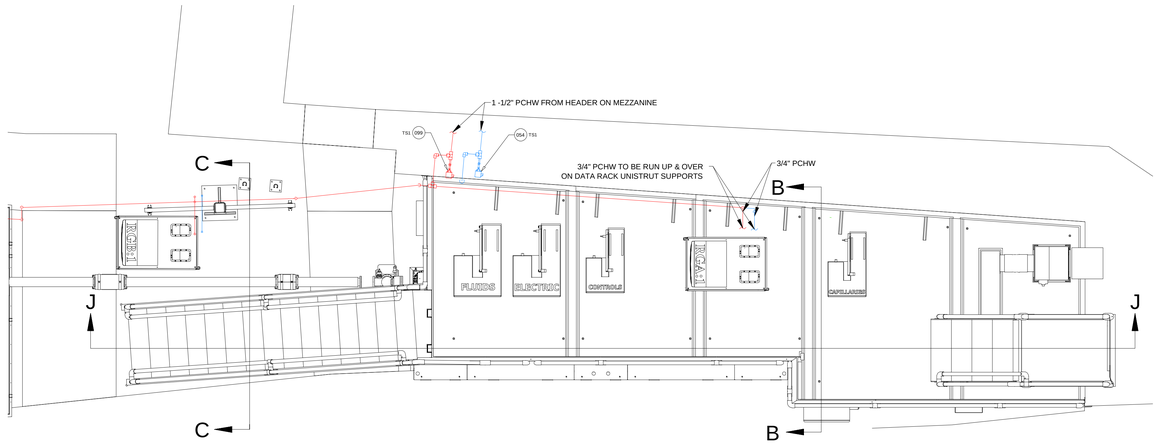
VALVES	ID#	ITEM DESCRIPTION	QTY	MAKE	MODEL NUMBER
	MV1	1" MOTORIZED ISOLATION VALVE	2	WORCESTER	3/4" 4466USE/1075WM2
	VLV5	1/2" FNPT BALL VALVE UHMWPE TRIM	2	SWAGELOK	SS-63EF8-JL
	VLV12	3/4" COMPRESSION ISOLATION VALVES UHMWPE TRIM	6	SWAGELOK	SS-65ES12-JL
	VLV1	1/4" INSTRUMENTATION VALVES (4 NOT SHOWN)	10	SWAGELOK	SS-43GEF4-LL
	VLV4	1/2" COMPRESSION ISOLATION VALVES UHMWPE TRIM	3	SWAGELOK	SS-63ES8-JL
	VLV6	1/2" FNPT X 1/2" COMPRESSION ISOLATION W/ UHMWPE TRIM	8	SWAGELOK	SS-63ES8-F8-JL
	VLV10	1/2" GLOBE VALVE	3	APOLLO	

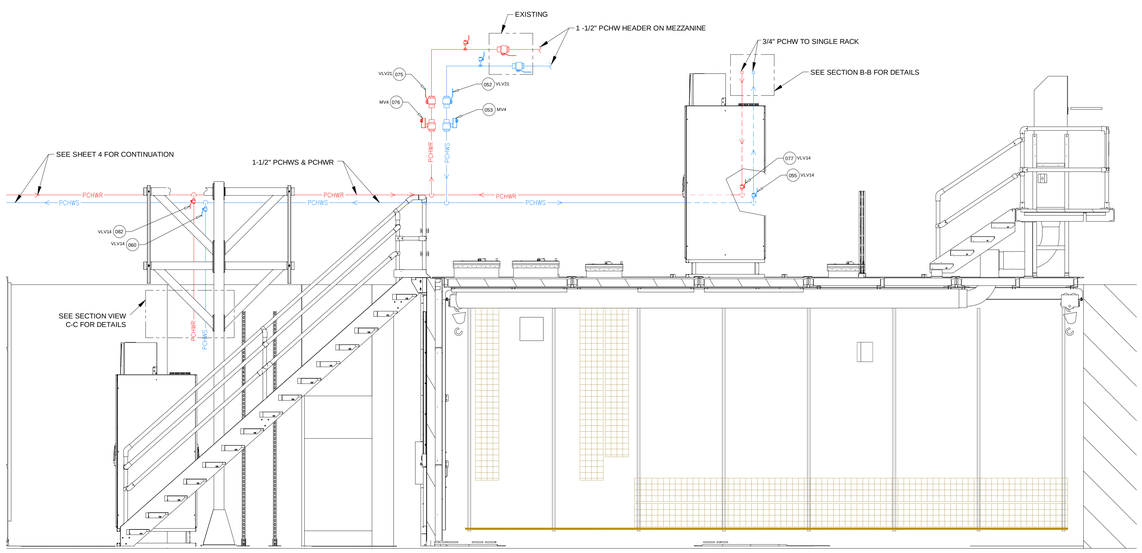
INSTRUMENTATION	ID#	ITEM DESCRIPTION	QTY	MAKE	MODEL NUMBER
	TS1	1/2" RTD WITH THERMOWELL	2	ROSEMOUNT	0078-D-21-N-00-A-030-T44-A-X8-Q4
	PT1	1/4" MNPT PRESSURE TRANSMITTERS	2	SETRA	0-150 PSIG = 4-20 MA
	PG1	PRESSURE GAUGES	6	NOSHOK	0-160 LIQUID FILLED EQUIVALENT
	FL4	10" FILTER HOUSINGS W/ 1" FNPT CONNECTIONS	2	FILTERSOURCE	OMG-10C-0.75
	FM4	1/2" KOBOLD VERTICAL FLOW METERS	2	KOBOLD	RCD-1290GN4C34P
	FM6	1/2" ORIPAC FLOW METERS	2	LAMBDA SQUARED	0.2658" BORE
	DPS2	SIEMENS TRANSMITTER (NOT SHOWN)	1	MILLER ENERGY	7MF4433-1EB22-1NC7-Z+A02+A40+B21+C11+H3+Y1+Y21
	DPS1	YOKOGAWA TRANSMITTER (NOT SHOWN)	1	MILLER ENERGY	EJA110E-JMS3G-B12EM-FU1/D1

DI WATER IN FOE

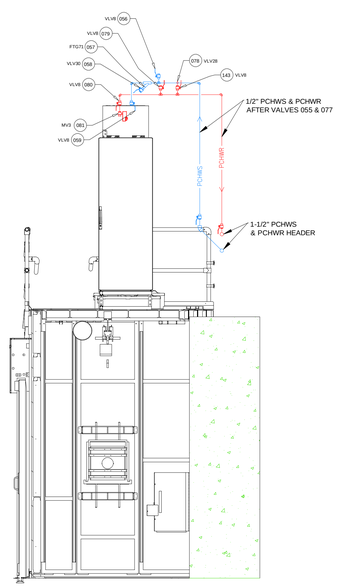
E	PD-BMM-UT-1500	B
SHEET SIZE	DRAWING/PART NUMBER	REVISION
ESH&Q RISK LEVEL A-2		SHEET 2 OF 8

RELEASED – EFFECTIVE

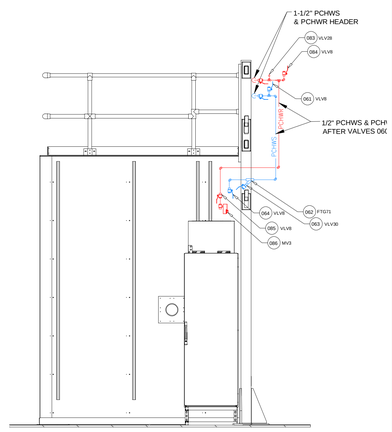




SECTION J-J
SCALE: ½" = 1'- 0"



SECTION B-B
ROTATED FOR CLARITY

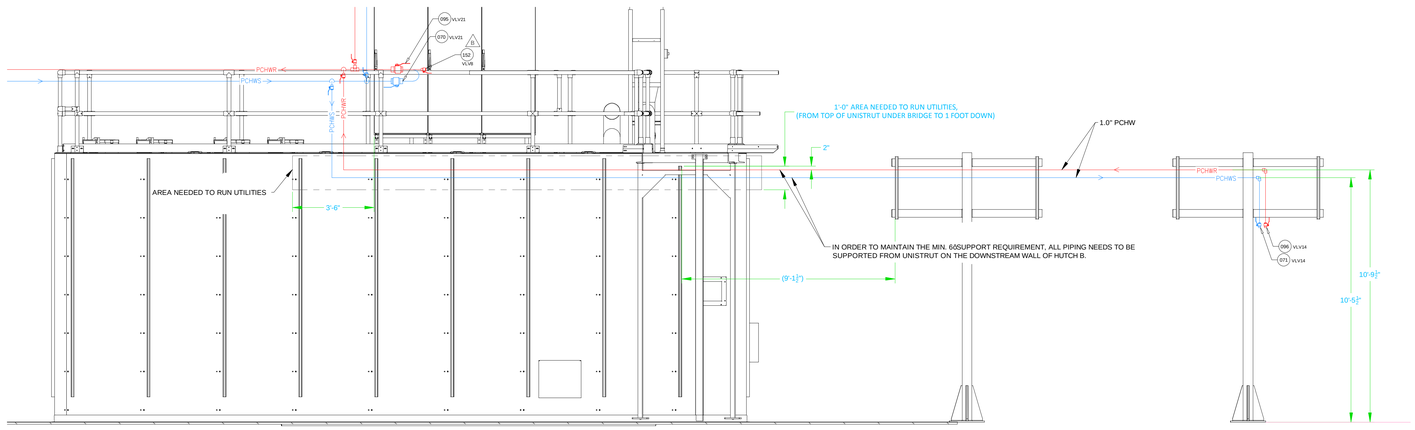


SECTION C-C
ROTATED FOR CLARITY

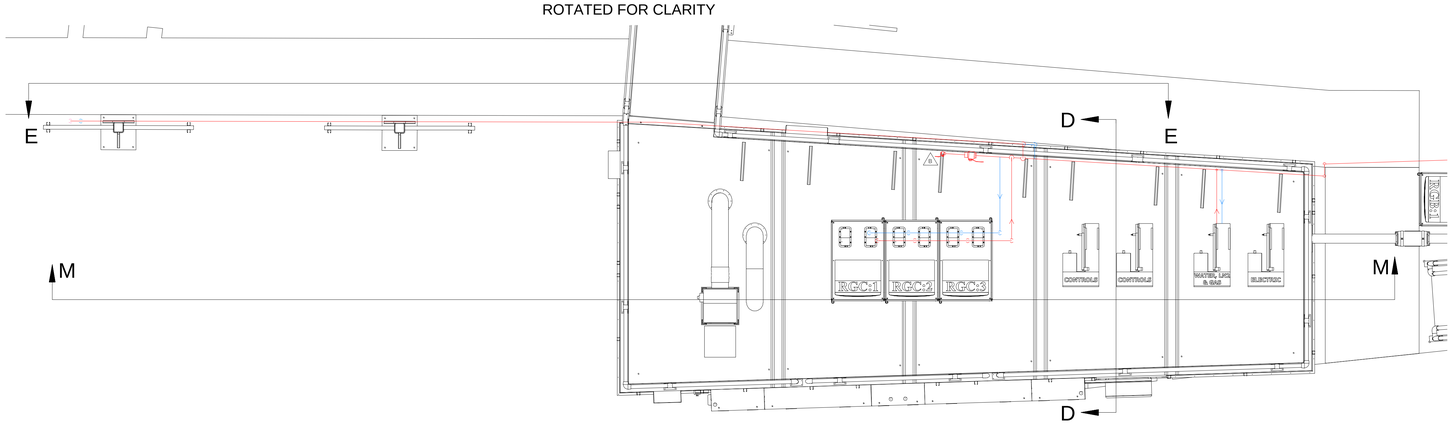
PCHW ON FOE AND FLOOR

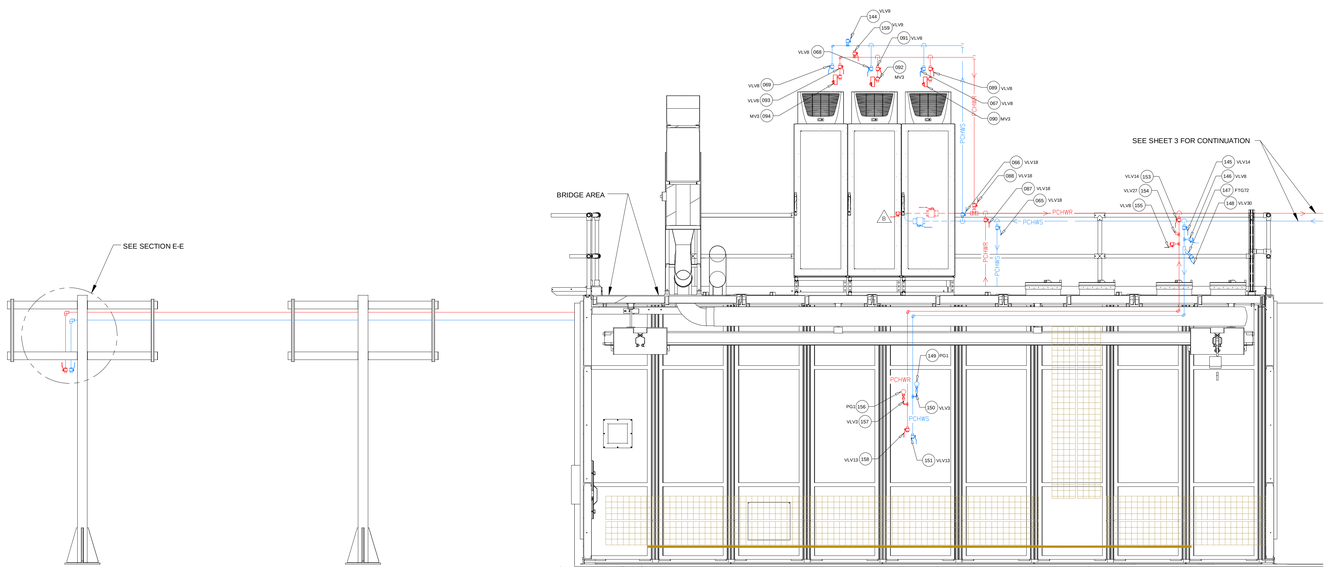
E SHEET SIZE	PD-BMM-UT-1500 DRAWING/PART NUMBER	B REVISION
ESH&Q RISK LEVEL A-2		SHEET 3 OF 8

RELEASED – EFFECTIVE

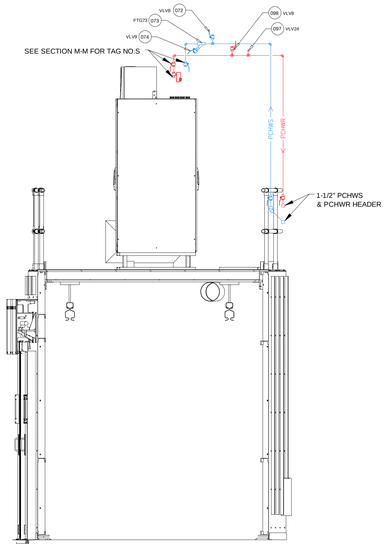


PARTIAL SECTION E-E
ROTATED FOR CLARITY





SECTION M-M
SCALE: ½" = 1'- 0"

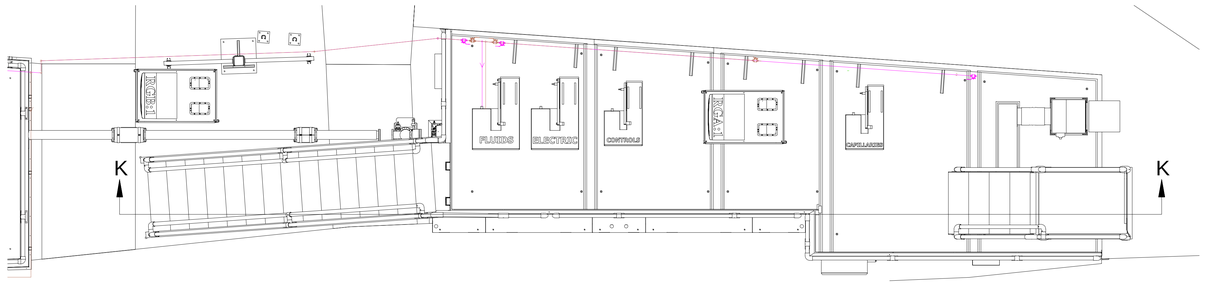


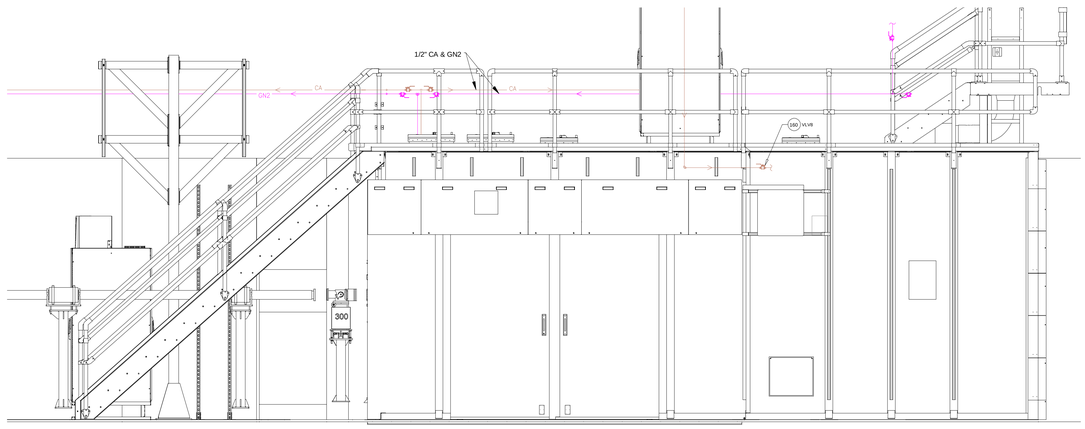
SECTION D-D
ROTATED FOR CLARITY

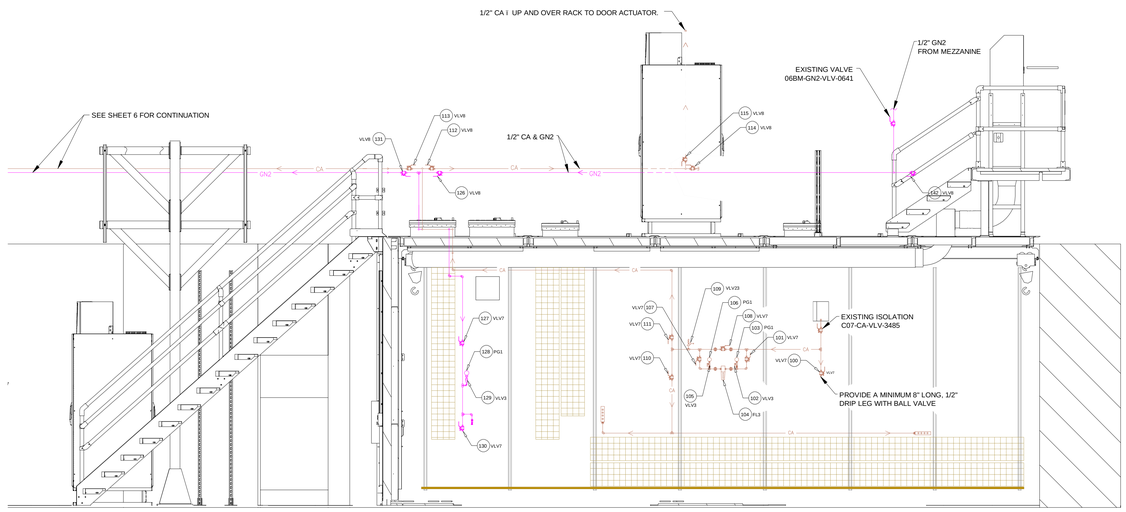
PCHW ON B-HUTCH AND FLOOR

E	PD-BMM-UT-1500	B
SHEET NUB	DRAWING/PART NUMBER	REVISION
ESH&Q RISK LEVEL A-2		SHEET 4 OF 8

RELEASED – EFFECTIVE







BEAM DIRECTION

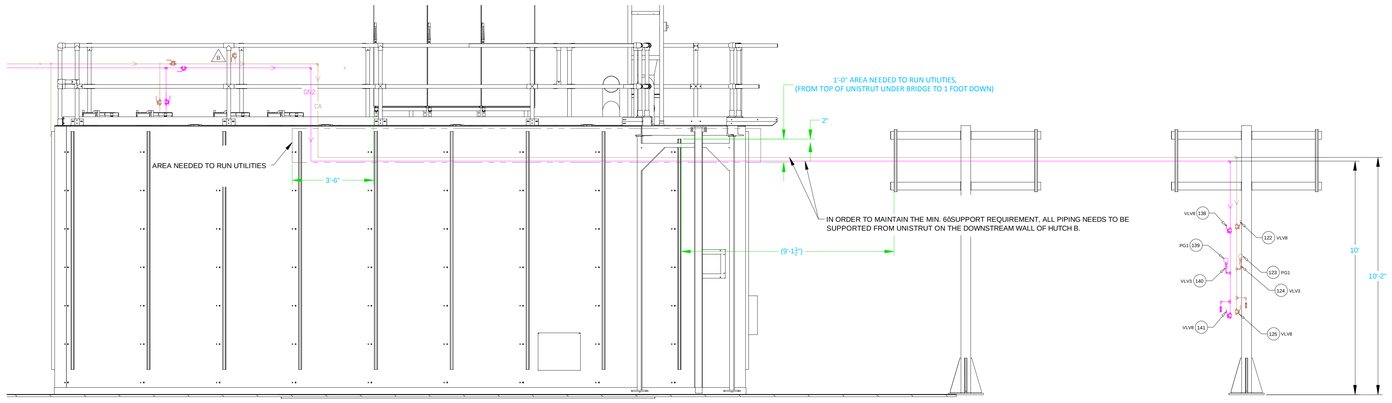
SECTION K-K
SCALE: $\frac{1}{2}$" = 1'- 0"

CA & GN2 ON ROOF AND INSIDE FOE

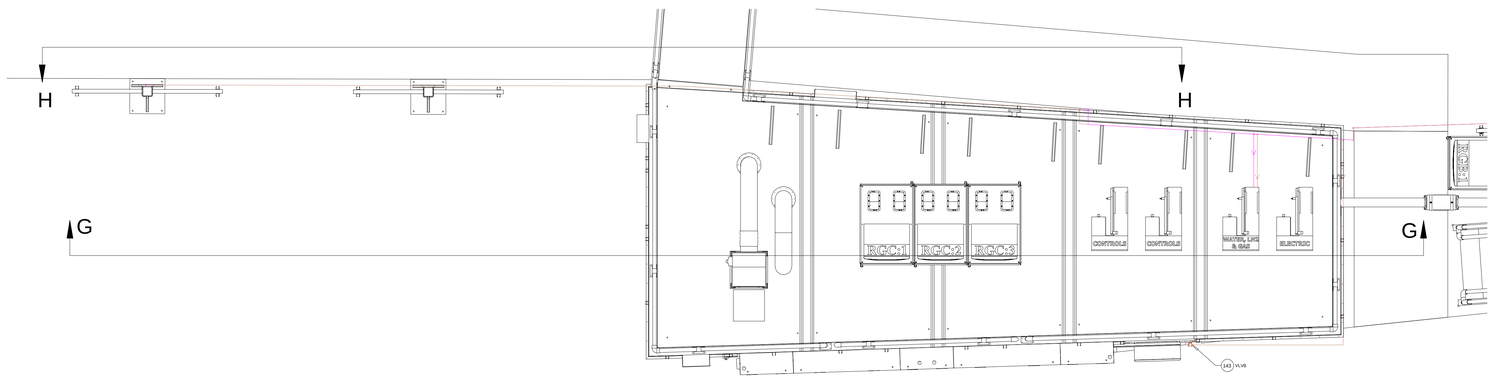
ALL PIPING INSIDE FOE TO BE INSTALLED ON INBOARD WALL SUPPORTED ONE UNISTRUT DEPTH OFF WALL .

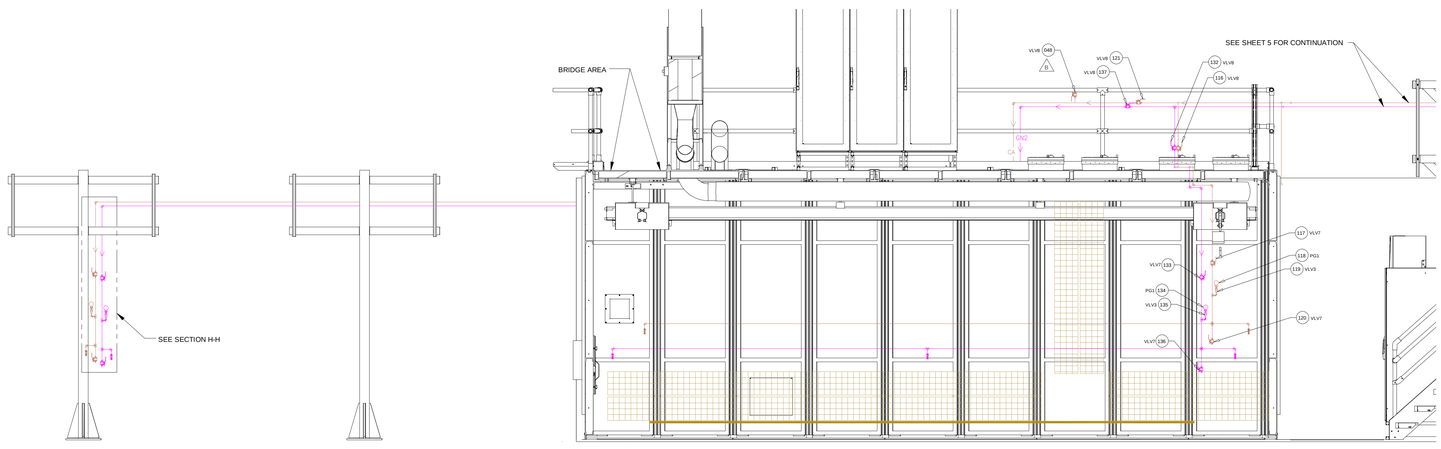
E SHEET SIZE	PD-BMM-UT-1500 DRAWING/PART NUMBER	B REVISION
ESH&Q RISK LEVEL A-2		SHEET 5 OF 8

RELEASED – EFFECTIVE



SECTION H-H
ROTATED FOR CLARITY





SECTION G-G
SCALE: ½" = 1'- 0"

CA & GN2 ON ROOF, INSIDE B-HUTCH AND ON FLOOR
ALL PIPING INSIDE THE B-HUTCH TO BE INSTALLED ON INBOARD WALL SUPPORTED ON EXISTING UNISTRUT .

E	PD-BMM-UT-1500	B
SHEET SIZE	DRAWING/PART NUMBER	REVISION
ESH&Q RISK LEVEL A-2	SHEET 6 OF 8	

RELEASED – EFFECTIVE

BMM BEAMLINE, 6-BM MECHANICAL UTILITIES

DRAWING ID	DEVICE ID	COMMENT
1001	6BM A - CUS - VLV - 1001	
1002	6BM A - CUS - MV - 1002	
1003	6BM A - CUS - TS - 1003	
1004	6BM A - CUS - VLV - 1004	
1005	6BM A - CUS - VLV - 1005	
1006	6BM A - CUS - PG - 1006	
1007	6BM A - CUS - FL - 1007	
1008	6BM A - CUS - VLV - 1008	
1009	6BM A - CUS - VLV - 1009	
1010	6BM A - CUS - PG - 1010	
1011	6BM A - CUS - VLV - 1011	
1012	6BM A - CUS - VLV - 1012	
1013	6BM A - CUS - VLV - 1013	
1014	6BM A - CUS - VLV - 1014	
1015	6BM A - CUS - VLV - 1015	
1016	6BM A - CUS - PG - 1016	
1017	6BM A - CUS - PT - 1017	
1018	6BM A - CUR - PG - 1018	
1019	6BM A - CUR - PT - 1019	
1020	6BM A - CUR - VLV - 1020	
1021	6BM A - CUR - VLV - 1021	
1022	6BM A - CUR - VLV - 1022	
1023	6BM A - CUR - FM - 1023	
1024	6BM A - CUR - VLV - 1024	
1025	6BM A - CUR - VLV - 1025	
1026	6BM A - CUR - VLV - 1026	
1027	6BM A - CUR - FM - 1027	
1028	6BM A - CUR - VLV - 1028	
1029	6BM A - CUR - VLV - 1029	
1030	6BM A - CUR - VLV - 1030	
1031	6BM A - CUR - FM - 1031	
1032	6BM A - CUR - DPS - 1032	YOKOGAWA DP
1033	6BM A - CUR - VLV - 1033	HIGH SIDE CAPILLARY VALVE
1034	6BM A - CUR - VLV - 1034	LOW SIDE CAPILLARY VALVE
1035	6BM A - CUR - FM - 1035	
1036	6BM A - CUR - DPS - 1036	SIEMENS DP
1037	6BM A - CUR - VLV - 1037	HIGH SIDE CAPILLARY VALVE
1038	6BM A - CUR - VLV - 1038	LOW SIDE CAPILLARY VALVE
1039	6BM A - CUR - VLV - 1039	
1040	6BM A - CUR - VLV - 1040	
1041	6BM A - CUR - VLV - 1041	
1042	6BM A - CUR - PG - 1042	
1043	6BM A - CUR - FL - 1043	
1044	6BM A - CUR - VLV - 1044	
1045	6BM A - CUR - PG - 1045	
1046	6BM A - CUR - VLV - 1046	
1047	6BM A - CUR - VLV - 1047	
1048	6BM R - CA - VLV - 1048	B
1049	6BM A - CUR - TS - 1049	
1050	6BM A - CUR - MV - 1050	
1051	6BM R - CUR - VLV - 1051	
1052	6BM R - PCHWS - VLV - 1052	
1053	6BM R - PCHWS - MV - 1053	
1054	6BM R - PCHWS - TS - 1054	
1055	6BM R - PCHWS - VLV - 1055	
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1057	6BM R - PCHWS - STR - 1057	
1058	6BM R - PCHWS - VLV - 1058	
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1074	6BM R - PCHWS - VLV - 1074	
1075	6BM R - PCHWR - VLV - 1075	
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1077	6BM R - PCHWR - VLV - 1077	
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1096	6BM F - PCHWR - VLV - 1096	
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1099	6BM R - PCHWR - TS - 1099	
1100	6BM A - CA - VLV - 1100	
1101	6BM A - CA - VLV - 1101	
1102	6BM A - CA - VLV - 1102	
1103	6BM A - CA - PG - 1103	
1104	6BM A - CA - FL - 1104	
1105	6BM A - CA - VLV - 1105	
1106	6BM A - CA - PG - 1106	
1107	6BM A - CA - VLV - 1107	
1108	6BM A - CA - VLV - 1108	
1109	6BM A - CA - PRV - 1109	
1110	6BM A - CA - VLV - 1110	
1111	6BM A - CA - VLV - 1111	
1112	6BM R - CA - VLV - 1112	
1113	6BM R - CA - VLV - 1113	
1114	6BM R - CA - VLV - 1114	
1115	6BM R - CA - VLV - 1115	
1116	6BM R - CA - VLV - 1116	
1117	6BM B - CA - VLV - 1117	
1118	6BM B - CA - PG - 1118	
1119	6BM B - CA - VLV - 1119	
1120	6BM B - CA - VLV - 1120	
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1122	6BM F - CA - VLV - 1122	
1123	6BM F - CA - PG - 1123	
1124	6BM F - CA - VLV - 1124	
1125	6BM F - CA - VLV - 1125	
1126	6BM R - GN2 - VLV - 1126	
1127	6BM A - GN2 - VLV - 1127	
1128	6BM A - GN2 - PG - 1128	
1129	6BM A - GN2 - VLV - 1129	
1130	6BM A - GN2 - VLV - 1130	
1131	6BM R - GN2 - VLV - 1131	
1132	6BM R - GN2 - VLV - 1132	
1133	6BM B - GN2 - VLV - 1133	
1134	6BM B - GN2 - PG - 1134	
1135	6BM B - GN2 - VLV - 1135	
1136	6BM B - GN2 - VLV - 1136	
1137	6BM R - GN2 - VLV - 1137	
1138	6BM F - GN2 - VLV - 1138	
1139	6BM F - GN2 - PG - 1139	
1140	6BM F - GN2 - VLV - 1140	
1141	6BM F - GN2 - VLV - 1141	
1142	6BM R - GN2 - VLV - 1142	
1143	6BM R - CA - VLV - 1143	
1144	6BM R - PCHWS - VLV - 1144	
1145	6BM R - PCHWS - VLV - 1145	
1146	6BM R - PCHWS - VLV - 1146	
1147	6BM R - PCHWS - STR - 1147	
1148	6BM R - PCHWS - VLV - 1148	
1149	6BM B - PCHWS - PG - 1149	
1150	6BM B - PCHWS - VLV - 1150	
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1153	6BM R - PCHWR - VLV - 1153	
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1155	6BM R - PCHWR - VLV - 1155	
1156	6BM B - PCHWR - PG - 1156	
1157	6BM B - PCHWR - VLV - 1157	
1158	6BM B - PCHWR - VLV - 1158	
1159	6BM B - PCHWR - VLV - 1159	
1160	6BM R - CA - VLV - 1160	

E	PD-BMM-UT-1500	B
SHEET SIZE	DRAWING/PART NUMBER	REVISION
ESH&Q RISK LEVEL A-2	SHEET 7 OF 8	

RELEASED – EFFECTIVE

TAG LEGEND

BEAMLINE LOCATION	
BEAMLINE NO.	1BM/1ID THROUGH 30BM/30ID
HUTCH DESIGNATION	A = HUTCH A (FOE) B = HUTCH B C = HUTCH C D = HUTCH D F = FLOOR MOUNTED R = HUTCH ROOF MOUNTED
DEVICE TYPE	
ABBREVIATION	DEVICE
AV	AIR VENT
DPS	DIFFERENTIAL SENSOR
FL	FILTER
FM	FLOW METER
PG	PRESSURE GAUGE
PRG	PRESSURE REGULATOR
PRV	PRESSURE RELIEF VALVE
PT	PRESSURE TRANSMITTER
MV	MOTORIZED VALVE
TI	TEMPERATURE INDICATOR
TS	TEMPERATURE SENSOR
VLV	MANUAL VALVE
SYSTEM DESIGNATION	
ABBREVIATION	SYSTEM
CA	COMPRESSED AIR
PCHWS	PROCESS CHILLED WATER SUPPLY
PCHWR	PROCESS CHILLED WATER RETURN
CUS	COPPER SKID DE-IONIZED WATER SUPPLY
CUR	COPPER SKID DE-IONIZED WATER RETURN
GN2	GASEOUS NITROGEN

PIPE IDENTIFICATION LABEL FORMAT

SYSTEM	LABEL TEXT	LABEL FIELD COLOR	COLOR OF LETTERS
COMPRESSED AIR	COMPRESSED AIR	BLUE	WHITE
PROCESS CHILLED WATER	PROCESS CHILLED WATER SUPPLY PROCESS CHILLED WATER RETURN	GREEN	WHITE
COPPER SKID DE-IONIZED WATER	COPPER DI SUP COPPER DI RET	GREEN	WHITE
GASEOUS NITROGEN	GASEOUS NITROGEN	PURPLE	WHITE

EQUIPMENT SCHEDULE (NOT INCLUDING DI WATER SYSTEM)

VALVES

ID	#	SIZE	TYPE	MATERIAL	CONNECTION	TRIM	MANUFACTURER	PART NUMBER	DESCRIPTION	USE	QTY
VLV	3	1/4"	BALL	BRONZE	NPT	UHMWPE	APOLLO	70-141-21-27	1/4", LEVER LOCKING, STAINLESS BALL & STEM	INSTRUMENTATION ON PCHW, GN2, OR CA - INSIDE OF HUTCHES	
VLV	7	1/2"	BALL	BRONZE	NPT	UHMWPE	APOLLO	70-143-21-27	1/2", LEVER LOCKING, STAINLESS BALL & STEM	PCHW, GN2, OR CA - INSIDE OF HUTCHES	
VLV	8	1/2"	BALL	BRONZE	SWEAT	STANDARD	APOLLO	70-243-27	1/2", LEVER LOCKING, STAINLESS BALL & STEM	PCHW, GN2, OR CA - OUTSIDE OF HUTCHES	
VLV	9	1/2"	BALL	BRONZE	NPT	STANDARD	APOLLO	70-143-27	1/2", LEVER LOCKING, STAINLESS BALL & STEM	PCHW, GN2, OR CA - OUTSIDE OF HUTCHES	
VLV	13	3/4"	BALL	BRONZE	SWEAT	UHMWPE	WORCESTER	3/4" K4416U-TE	3/4", LEVER LOCKING, STAINLESS BALL & STEM	PCHW OR CA - INSIDE OF HUTCHES	
VLV	14	3/4"	BALL	BRONZE	SWEAT	STANDARD	APOLLO	70-244-27	3/4", LEVER LOCKING, STAINLESS BALL & STEM	PCHW OR CA - OUTSIDE OF HUTCHES	
VLV	18	1"	BALL	BRONZE	SWEAT	STANDARD	APOLLO	70-245-27	1", LEVER LOCKING, STAINLESS BALL & STEM	PCHW OR CA - OUTSIDE OF HUTCHES	
VLV	21	1-1/2"	BALL	BRONZE	SWEAT	STANDARD	APOLLO	70-247-27	1-1/2", LEVER LOCKING, STAINLESS BALL & STEM	PCHW OR CA - OUTSIDE OF HUTCHES	
VLV	23	1/2"	RELIEF	BRONZE	NPT	STANDARD	KINGSTON	118CS5	85 PSIG POP PRESSURE; ASME 'NB' STAMPED	COMPRESSED AIR SAFETY VALVE	
VLV	24	1"	AUTO AIR VENT	BRASS	NPT	STANDARD	SPIROTHERM SPIROVENT	VJR100TM	THREADED MODEL IN HORIZONTAL	PCHW	
VLV	27	3/4"	AUTO AIR VENT	BRASS	NPT	STANDARD	SPIROTHERM SPIROVENT	VJV075FT	THREADED MODEL IN VERTICAL	PCHW	
VLV	28	1/2"	AUTO AIR VENT	BRASS	NPT	STANDARD	SPIROTHERM SPIROTOP	VTP050FT	THREADED MODEL IN HALF INCH	PCHW	
VLV	30	3/8"	BALL	BRONZE	NPT	STANDARD	APOLLO	70-142-27	3/8", LEVER LOCKING, STAINLESS BALL & STEM	PCHW STRAINER BLOW DOWNS	
MV	3	1/2"	MOTORIZED	BRONZE	NPT	STANDARD	BELLIMO	B209+TR24-SR-T	NICKEL PLATED BODY, CHARACTERIZED SS BALL, FAIL IN PLACE	CHILLER TEMPERATURE CONTROL	
MV	4	1-1/2"	MOTORIZED	BRONZE	NPT	STANDARD	BELLIMO	B240+ARB24-3-S	NICKEL PLATED BODY, CHARACTERIZED SS BALL, FAIL IN PLACE	PCHW ON/OFF VALVE	

COPPER FITTINGS

ID	#	SIZE	TYPE	MATERIAL	SPECIFICATION	DESCRIPTION	USE	QTY
FTG	71	1/2"	STRAINER	BRONZE	KECKLEY STYLE E-150	1/2" 1SJY-BCM20M34-FTI-E	3/8" BLOW DOWN; SWEAT SOCKET - PCHW SUPPLY LINES	
FTG	72	3/4"	STRAINER	BRONZE	KECKLEY STYLE E-150	3/4" 1SJY-BCM20M34-FTI-E	3/8" BLOW DOWN; SWEAT SOCKET - PCHW SUPPLY LINES	
FTG	73	1"	STRAINER	BRONZE	KECKLEY STYLE E-150	1" 1SJY-BCM20M34-FTI-E	1/2" BLOW DOWN; SWEAT SOCKET - PCHW SUPPLY LINES	

FILTERS & INSTRUMENTATION

ID	#	SIZE	TYPE	MATERIAL	CONNECTION	MANUFACTURER	PART NUMBER	DESCRIPTION	USE	QTY
FL	3	1/2"	FILTER/REGULATOR COMBO	ACETAL	NPT	PARKER	FB11-04WGC-SS	5 MICRON MESH	COMPRESSED AIR	
PG	1	1/4"	PRESSURE GAUGE	STAINLESS	NPT	NISCO	G252562L12	0-160 PSIG NEEDLE GAUGE	DIW/HCA/CA/GN2	
TS	1	1/2"	TEMPERATURE SENSORS	STAINLESS	NPT	ROSEMOUNT	0078-D-21-N-00-A-030-T44-A-X8-Q4	PLATINUM RTD W/THERMOWELL	DI WATER & PCHW HEADER	

E SHEET SIZE	PD-BMM-UT-1500 DRAWING/PART NUMBER	B REVISION
ESH&Q RISK LEVEL A-2		SHEET 8 OF 8

RELEASED – EFFECTIVE