

**SNOW MELT SCHEDULE BY PHASE**

**SNOW MELT SCHEDULE PHASE 1 (9" O.C.)**

ZONE	MANIFOLD	TYPE	AREA	BTU/SF	BTUH	TUBE SPACING	LF. 3/4" PEX	# LOOPS	LOOP LENGTH	FLOW (Gpm)	Gpm / Tube	HEAD-LOSS	VOLUME (Gal)
1A	MA-7	Conc.	1,054	160	168,640	9"	1,476	4	369	13	3	25.8	27
1A	MA-8	Conc.	1,204	160	192,640	9"	1,686	4	421	15	4	37.5	31
1B	MA-1	Conc.	2,587	160	413,920	9"	3,622	9	402	33	4	37.3	67
1C	MA-2	Conc.	2,079	160	332,640	9"	2,911	7	416	27	4	37.6	54
1D	MA-3	Conc.	2,273	160	363,680	9"	3,182	7	455	29	4	37.4	59
1E	MA-4	Conc.	990	160	158,400	9"	1,386	4	347	13	3	24.3	26
1E	MB-9	Conc.	1,943	160	310,880	9"	2,720	6	453	25	4	40.3	50
<b>TOTAL</b>			<b>12,130</b>		<b>1,940,800</b>		<b>16,982</b>		<b>41</b>				<b>312</b>

**SNOW MELT SCHEDULE PHASE 2 (9" O.C.)**

ZONE	MANIFOLD	TYPE	AREA	BTU/SF	BTUH	TUBE SPACING	LF. 3/4" PEX	# LOOPS	LOOP LENGTH	FLOW (Gpm)	Gpm / Tube	HEAD-LOSS	VOLUME (Gal)
2A	MB-6	Conc.	2,748	160	439,680	9"	3,847	9	427	35	4	38.0	71
2A	MB-7	Conc.	2,935	160	469,600	9"	4,109	10	411	38	4	40.0	76
2B	MB-4	Conc.	2,025	160	324,000	9"	2,835	7	405	26	4	36.0	52
2C	MB-8	Conc.	2,692	160	430,720	9"	3,769	9	419	34	4	37.3	69
2D	MB-5	Conc.	2,628	160	420,480	9"	3,679	9	409	34	4	36.4	68
2E	MB-1	Conc.	850	160	136,000	9"	1,190	3	397	11	4	38.5	22
2F	MA-5	Conc.	2,709	160	433,440	9"	3,793	9	421	35	4	37.5	70
2F	MA-6	Conc.	2,794	160	447,040	9"	3,912	9	435	36	4	38.7	72
<b>TOTAL</b>			<b>19,381</b>		<b>3,100,960</b>		<b>27,133</b>		<b>65</b>				<b>499</b>

**SNOW MELT SCHEDULE PHASE 3 (9" O.C.)**

ZONE	MANIFOLD	TYPE	AREA	BTU/SF	BTUH	TUBE SPACING	LF. 3/4" PEX	# LOOPS	LOOP LENGTH	FLOW (Gpm)	Gpm / Tube	HEAD-LOSS	VOLUME (Gal)
3A	MA-9	Conc.	1,666	160	266,560	9"	2,332	6	389	21	4	34.6	43
3A	MA-10	Conc.	1,484	160	237,440	9"	2,078	5	416	19	4	34.6	38
3B	MB-2	Conc.	2,889	160	462,240	9"	4,045	9	449	37	4	38.0	74
3B	MB-3	Conc.	2,485	160	397,600	9"	3,479	8	435	32	4	38.7	64
3E	MC-1	Conc.	2,097	160	335,520	9"	2,936	7	419	27	4	37.3	54
3E	MC-2	Conc.	2,014	160	322,240	9"	2,820	7	403	26	4	35.9	52
<b>TOTAL</b>			<b>12,635</b>		<b>2,021,600</b>		<b>17,689</b>		<b>42</b>				<b>325</b>

**SNOW MELT SCHEDULE BY BOILER**

**SNOW MELT SCHEDULE BOILER "A" (9" O.C.)**

MANIFOLD	ZONE	TYPE	AREA	BTU/SF	BTUH	TUBE SPACING	LF. 3/4" PEX	# LOOPS	LOOP LENGTH	FLOW (Gpm)	Gpm / Tube	HEAD-LOSS	VOLUME (Gal)
MA-1	1B	Conc.	2,693	160	430,880	9"	3,770	9	419	34	4	37.3	69
MA-2	1D	Conc.	1,809	160	289,440	9"	2,533	6	422	23	4	37.6	47
MA-3	1D	Conc.	2,099	160	335,840	9"	2,939	7	420	27	4	37.4	54
MA-4	1E	Conc.	990	160	158,400	9"	1,386	4	347	13	3	24.3	26
MA-5	2F	Conc.	2,709	160	433,440	9"	3,793	9	421	35	4	37.5	70
MA-6	2F	Conc.	2,794	160	447,040	9"	4,068	9	452	36	4	38.7	75
MA-7	1A	Conc.	1,054	160	168,640	9"	1,476	4	369	13	3	25.8	27
MA-8	1A	Conc.	1,204	160	192,640	9"	1,686	4	421	15	4	37.5	31
MA-9	3A	Conc.	1,666	160	266,560	9"	2,332	6	389	21	4	34.6	43
MA-10	3A	Conc.	1,927	160	308,320	9"	2,698	7	385	25	4	34.6	50
MA-11	2F	Conc.	1,917	160	306,720	9"	2,684	4	394	12	3	35.6	24
<b>TOTAL</b>			<b>18,945</b>		<b>3,031,200</b>		<b>26,679</b>		<b>65</b>				<b>491</b>

**SNOW MELT SCHEDULE BOILER "B" (9" O.C.)**

MANIFOLD	ZONE	TYPE	AREA	BTU/SF	BTUH	TUBE SPACING	LF. 3/4" PEX	# LOOPS	LOOP LENGTH	FLOW (Gpm)	Gpm / Tube	HEAD-LOSS	VOLUME (Gal)
MB-1	2E	Conc.	919	160	147,040	9"	1,287	3	429	12	4	38.2	24
MB-2	3B	Conc.	2,447	160	391,520	9"	3,426	8	428	31	4	38.0	63
MB-3	3B	Conc.	2,485	160	397,600	9"	3,479	8	435	32	4	38.7	64
MB-4	2B	Conc.	2,025	160	324,000	9"	2,835	7	405	26	4	36.0	52
MB-5	2D	Conc.	2,628	160	420,480	9"	3,679	9	409	34	4	36.4	68
MB-6	2A	Conc.	2,748	160	439,680	9"	3,847	9	427	35	4	38.0	71
MB-7	2A	Conc.	2,874	160	459,840	9"	4,024	9	447	37	4	40.0	74
MB-8	2A	Conc.	2,692	160	430,720	9"	3,769	9	419	34	4	37.3	69
MB-9	1E	Conc.	1,943	160	310,880	9"	2,720	6	453	25	4	40.3	50
<b>TOTAL</b>			<b>20,761</b>		<b>3,321,760</b>		<b>29,068</b>		<b>68</b>				<b>535</b>

**SNOW MELT SCHEDULE BOILER "C" (9" O.C.)**

MANIFOLD	ZONE	TYPE	AREA	BTU/SF	BTUH	TUBE SPACING	LF. 3/4" PEX	# LOOPS	LOOP LENGTH	FLOW (Gpm)	Gpm / Tube	HEAD-LOSS	VOLUME (Gal)
MC-1	3E	Conc.	2,097	160	335,520	9"	2,936	7	419	27	4	37.3	54
MC-2	3E	Conc.	2,014	160	322,240	9"	2,820	7	403	26	4	35.9	52
<b>TOTAL</b>			<b>4,111</b>		<b>657,760</b>		<b>5,755</b>		<b>14</b>				<b>106</b>

**SNOW MELT PUMPS**

PUMP#	MODEL	IMPELLER SIZE	HP	PHASE	VOLT	FLOW	HEAD
P-1	2BC	9-1/2"	7-1/2 HP	3	208-230	194	80'
P-2	2BC	9-1/2"	7-1/2 HP	3	208-230	194	80'
P-3	2-1/2BB	9-1/2"	9-1/2 HP	3	208-230	227	82.9'
P-4	2-1/2BB	9-1/2"	9-1/2 HP	3	208-230	227	82.9'
P-5	1-1/2X7	6	1 HP	3	208-230	44	34.2'
P-6	1-1/2X7	6	1 HP	3	208-230	44	34.2'

**SNOW MELT MATERIALS PHASE 1**  
TOTAL AREA 11,507 SF

QTY.	PART #	DESCRIPTION
12,000	806018	WIRE TIES
7	1P0008	1-1/2" PRESSURE TEST KIT
6	1K0015	EMBEDDED INSTALL KIT-3/4"
3	BAM04-15-.75"	4-RUN MANIFOLD KIT
3	BAM06-15-.75"	6-RUN MANIFOLD KIT
1	BAM09-15-.75"	9-RUN MANIFOLD KIT
2	BDUA14	7/8" REPAIR COUPLERS
9	8006-55	55 GAL DRUM PROPYLENE GLYCOL
19	TPXB4CR10	3/4" x 1000' PEX W/0, TUBING
1	TPXB4CR5	3/4" x 500' PEX W/02 TUBING
7	5626	Manifold Boxes
7	414262	Manifold Box Covers

**SNOW MELT MATERIALS PHASE 2**  
TOTAL AREA 19,453 SF

QTY.	PART #	DESCRIPTION
10,000	806018	WIRE TIES
8	1P0008	1-1/2" PRESSURE TEST KIT
6	1K0015	EMBEDDED INSTALL KIT-3/4"
1	BAM03-15-.75"	3-RUN MANIFOLD KIT
1	BAM07-15-.75"	7-RUN MANIFOLD KIT
5	BAM09-15-.75"	9-RUN MANIFOLD KIT
1	BAM10-15-.75"	10-RUN MANIFOLD KIT
2	BDUA14	7/8" REPAIR COUPLERS
7	8006-55	55 GAL DRUM PROPYLENE GLYCOL
32	TPXB4CR10	3/4" x 1000' PEX W/0, TUBING
1	TPXB4CR5	3/4" x 500' PEX W/02 TUBING
8	5626	Manifold Boxes
8	414262	Manifold Box Covers

**SNOW MELT MATERIALS PHASE 3**  
TOTAL AREA 12,632 SF

QTY.	PART #	DESCRIPTION
9,000	806018	WIRE TIES
6	1P0008	1-1/2" PRESSURE TEST KIT
6	1K0015	EMBEDDED INSTALL KIT-3/4"
1	BAM06-15-.75"	6-RUN MANIFOLD KIT
3	BAM07-15-.75"	7-RUN MANIFOLD KIT
2	BAM08-15-.75"	8-RUN MANIFOLD KIT
2	BDUA14	7/8" REPAIR COUPLERS
6	8006-55	55 GAL DRUM PROPYLENE GLYCOL
21	TPXB4CR10	3/4" x 1000' PEX W/0, TUBING
1	TPXB4CR5	3/4" x 500' PEX W/02 TUBING
6	5626	Manifold Boxes
6	414262	Manifold Box Covers

**BOILER SCHEDULE**

BOILER #	BOILER LOCATION	MODEL #	TYPE	MBTHU	DIMENSIONS			FLOW RATES			PRESSURE DROPS						
					INPUT MAX	OUTPUT	INPUT MIN.	WIDTH	LENGTH	HEIGHT	MINIMUM FLOW	MAXIMUM FLOW	30°F				
A-1	MARQUIS HALL	MVB-2003	NATURAL GAS	1999	1739	500	30"	26"	81"	87	1809	40	116	31.9	30	116	31.9
A-2	MARQUIS HALL	MVB-2003	NATURAL GAS	1999	1739	500	30"	26"	81"	87	1809	40	116	31.9	30	116	31.9
B-1	HOEY HALL	MVB-2003	NATURAL GAS	1999	1739	500	30"	26"	81"	87	1809	40	116	31.9	30	116	31.9
B-2	HOEY HALL	MVB-2003	NATURAL GAS	1999	1739	500	30"	26"	81"	87	1809	40	116	31.9	30	116	31.9
C	GORDON HALL	MVB-735	NATURAL GAS	750	653	188	30"	26"	49"	33	1.9	40	100	13.8	13	44	3.1

**LIABILITY**  
 This drawing and our recommendations and suggestions, are intended to assist our customers. Our design represents our best judgment based on our experience and the best facts provided to us, any use thereof is at the sole risk of the customer.  
 It is assumed that the customer will install the THAW-PAK system in compliance with all local, state and national codes.

**GOYETTE MECHANICAL**  
 32905 INDUSTRIAL ROAD, LYONIA, IL 60465  
 OFFICE: (708) 948-6500 FAX: (708) 948-6510  
 PH: (815) 742-9885 FAX: (815) 742-9900

**THAW-PAK**  
 RADIANT HEATING & SNOW MELTING SYSTEMS  
 32905 INDUSTRIAL ROAD, LYONIA, IL 60465  
 OFFICE: (708) 948-6500 FAX: (708) 948-6510  
 www.performanceengineering.com

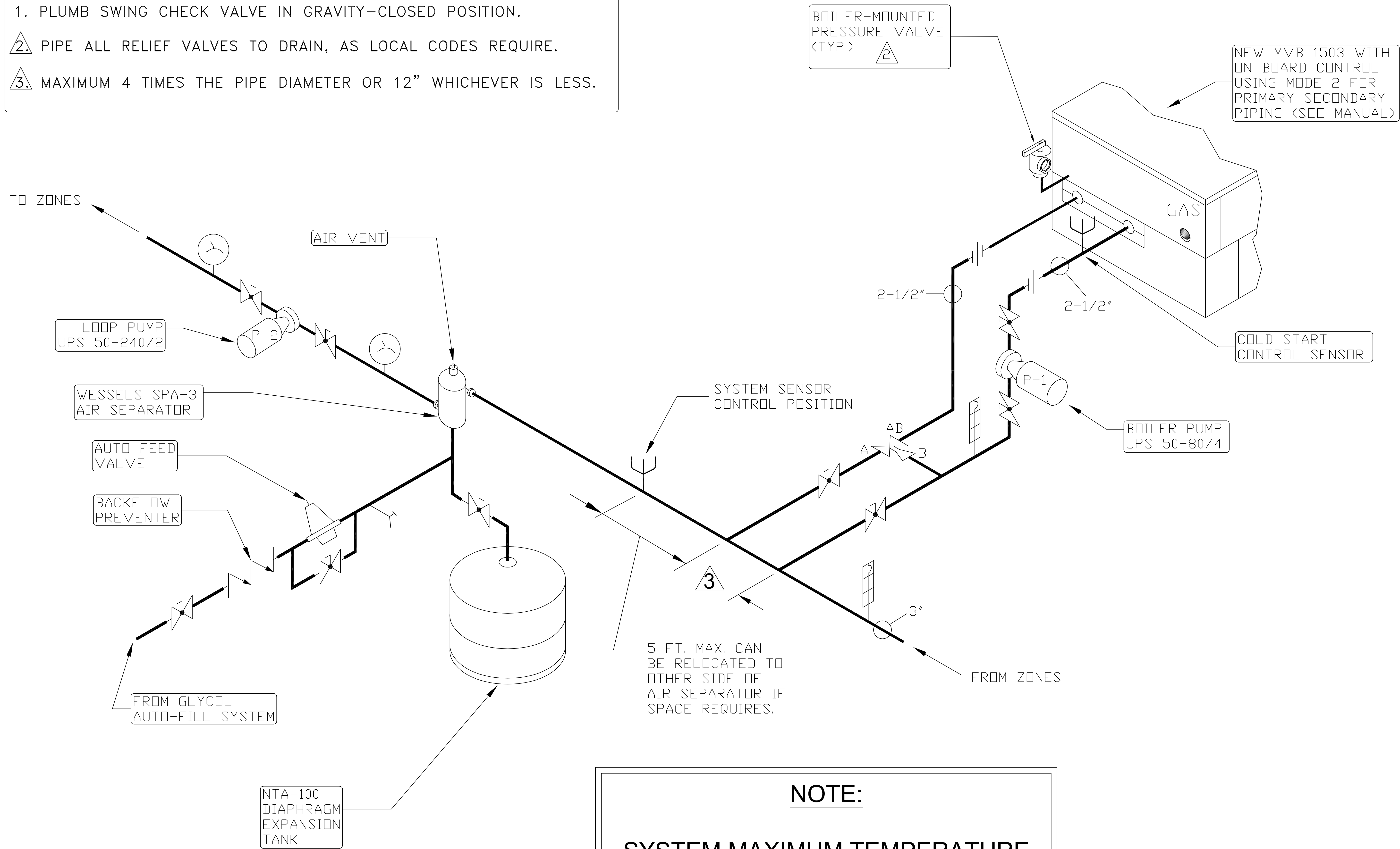
**Cranbrook Quad and Thompson Oval Restoration**  
 THOMPSON OVAL RESTORATION  
 BLOOMFIELD HILLS MICHIGAN

**Performance Engineering Group, Inc.**

**DRAWN BY:**  
Douglas Riley  
**REVIEWED BY:**  
  
**APPROVED BY:**  
  
**ISSUED FOR:**  
 11/11/08 REVISION  
 08/18/09 REVISION  
 11/17/09 FIELD CHANGES  
 01/05/11 REVISIONS TO ZONE

**NOTES:**

1. PLUMB SWING CHECK VALVE IN GRAVITY-CLOSED POSITION.
2. PIPE ALL RELIEF VALVES TO DRAIN, AS LOCAL CODES REQUIRE.
3. MAXIMUM 4 TIMES THE PIPE DIAMETER OR 12" WHICHEVER IS LESS.



**NOTE:**  
**SYSTEM MAXIMUM TEMPERATURE CANNOT EXCEED 140° TO PROTECT THE HDPE MAINS**

KEY	
PRESSURE RELIEF	
UNION	
BALL VALVE	
FLD-CHECK VALVE	
THERMOMETER	
BALANCING VALVE	
DRAIN VALVE	
PRESSURE GAUGE	
SUCTION DEFUSER	SD
TRIPLE DUTY VALVE	TD
STOP VALVE	SV
PUMP	

**LIABILITY**  
 This drawing and our recommendations and suggestions, are intended to assist our customers. Our design represents our best judgment based on our experience and the best facts provided to us, any use thereof is at the sole risk of the customer.  
 It is assumed that the customer will install the THAW-PAK system in compliance with all local, state and national codes.

**ADDITIONAL BOILER PIPING PLAN**

SCALE: NONE

CONSULTANTS: **GOYETTE** MICHIGAN  
**thawPAK** Heating, Cooling & Refrigeration Systems  
 PROJECT NAME: **CRANBROOK SPUD COURT AND STEPS** MICHIGAN  
 BLOOMFIELD HILLS  
 THAW-PAK DISTRIBUTOR: **PERFORMANCE engineering group**  
 DRAWN BY: **Gordon Faustich**  
 REVIEWED BY: **AD**  
 APPROVED BY: **AD**  
 ISSUED FOR:  
 04/09/15 APPROVAL  
 08/13/15 ADDRESS COURT MAINS  
 10/20/15 MOVED SM-1  
 10/28/15 REVISED SM-10  
 12/21/15 6 & 12 CENTERS  
 01/08/15 ADDED PIPING AND CONTROLS  
 01/08/15 SPOUTED MAINS & PUMPING  
 PROPERTY OF THAW-PAK  
 This drawing is the property of THAW-PAK. It has been prepared to assist in the installation of our system. Customer agrees to keep confidential and not disclose this drawing or copies thereof without our written consent.  
 DRAWING NO. **PEG15-004S\_E**  
 SHEET NO. **M6**