J. A. McDONALD, INC.

P.O. Box 132, Lyndon Center, VT 05850 (802) 626-5201
E-Mail jamcdonaldinc@charter.net

IRASBURG STP CULV(30)
ERECTION PLAN BR6 & BR7

General Requirements and Sequence

The erection shall not be performed during windy or heavy rain conditions. A Grove GMK 5275 hydraulic truck crane outfitted with 169,700 lbs (BR6) and 112,000 lbs (BR7) of counterweights will be used for the erection of all precast box culvert components at each respective site. The crane is to be positioned as shown in the attached sketches (Phase I & II, BR6 and Phase I & II BR7).

Precast box culvert components are to arrive on-site delivered to the east side for BR6 and west side for BR7. Reference for information is made from CSI's precast shop drawings of the culvert and component designation noted on sheets 1A (BR6) and 1B (BR7). The maximum permissible crane radius for unloading and setting the precast box culvert components shown shall not be exceeded. The unloading area is to be behind the crane.

The precast box culvert components shall be picked and installed according to the manufacturer's requirements and project specifications. Each box culvert segment is to be picked from 4 locations as shown on the manufacture's shop drawings.

Reference attached sheets for component sequence, weights and permissible crane radius.

STATE OF VERMONT
ANDREW D. WHITE
NO. 9030
STRUCTURAL
LICENSED
PROFESSIONAL ENGINEER

Digitally signed by Andrew White
Date: 2015.08.10 10:30:56 -04'00'

J. A. McDONALD, INC.

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IRASBURG STP CULV(30)

ERECTION PLAN

Erection Sequence for BR6

	Mark	Description	Weight (Tons)	Crane Radius (Feet)
PHASE I				
	F4A	Cutoff/WW4 Footing	9.54	70
	F3A	Cutoff/WW3 Footing	10.10	48
	A3	Outlet Section	31.63	56
	WW4A	Wing Wall 4	15.07	73
	WW3A	Wing Wall 3	16.00	49
	A2-1	Box Section	31.79	54
	A2-2	Box Section	31.79	53
	A2-3	Box Section	31.79	52
	A2-4	Box Section	31.79	52
	A2-5	Box Section	31.79	52
	A2-6	Box Section	31.79	54
PHASE II				
	A2-7	Box Section	31.79	61 *
	A2-8	Box Section	31.79	60
	A2-9	Box Section	31.79	59
	F2A	Cutoff/WW2 Footing	9.25	71
	F1A	Cutoff/WW1 Footing	9.25	46
	A1	Inlet Section	32.56	58
	WW2A	Wing Wall 2	14.36	74
	WW1A	Wing Wall 1	14.36	44

* See Load Chart for Grove GMK5275

169,700 lbs counterweights required.

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BR 6

load charts

44-223 ft. (13.3-68 m) | 169,700 lbs. (77,000 kg) | 100% 26'-7" spread | 360°

Pounds x 1000

Feet	43.7'	59.1'	74.3'	89.3'	104.2'	119.1'	133.4'	148.8'	164.0'	179.0'	193.9'	208.7'	223.1'
8	*550.0												
10	346.0	332.0	312.0	244.0									
15	272.0	270.0	260.0	242.0	185.0								
20	220.0	222.0	215.0	212.0	182.0	144.0	106.0						
25	184.0	185.0	181.0	181.0	166.0	140.0	106.0	86.0					
30	152.0	157.0	157.0	155.0	151.0	129.0	105.0	86.0	69.0	55.0	45.0		
35		136.0	136.0	135.0	136.0	118.0	96.0	86.0	69.0	55.0	45.0	36.4	
40		121.0	119.0	118.0	120.0	108.0	88.0	82.0	69.0	55.0	45.0	36.4	30.8
45		99.0	106.0	104.0	106.0	99.0	81.0	75.0	68.0	55.0	45.0	36.4	30.8
50			95.0	93.0	95.0	92.0	76.0	70.0	63.0	55.0	45.0	36.4	30.8
55			83.0	84.0	85.0	85.0	72.0	64.0	59.0	52.0	45.0	36.4	30.8
60				76.0	77.0	79.0	67.0	59.0	54.0	49.0	44.0	36.4	30.8
65				70.0	70.0	72.0	63.0	54.0	50.0	46.0	41.2	36.4	30.8
70				63.0	64.0	66.0	60.0	50.0	47.0	43.4	39.0	36.0	30.8
75				50.0	58.0	61.0	57.0	46.0	43.0	40.4	36.8	34.4	30.8
80					53.0	55.0	54.0	42.8	39.6	37.6	34.8	32.6	30.4
85					49.0	51.0	51.0	40.2	37.2	35.2	33.0	31.0	29.2
90					39.2	46.0	48.0	37.6	34.6	32.8	31.2	29.4	28.0
95						42.4	44.0	35.2	32.4	30.8	29.4	28.0	26.8
100						38.2	40.8	33.2	30.4	28.8	27.8	26.4	25.6
105							37.6	31.4	28.8	27.2	26.4	24.8	24.4
110							34.8	29.6	27.0	25.6	24.8	23.0	23.2
115							30.4	28.0	25.2	23.8	23.0	21.4	22.0
120								26.6	23.2	21.8	21.2	20.4	20.8
125								25.2	21.4	20.0	19.4	19.4	19.4
130								24.4	20.2	19.0	18.4	18.4	18.0
135									19.2	18.0	17.4	17.4	17.2
140									18.2	17.0	16.4	16.6	16.4
145									17.2	16.0	15.6	15.8	15.6
150									12.6	15.4	14.8	15.0	15.0
155										14.8	14.0	14.2	14.2
160										14.4	13.2	13.4	13.6
165											12.6	12.8	13.0
170											11.8	12.2	12.4
175											11.4	11.6	11.8
180												11.0	11.2
185												10.6	10.6
190												9.6	10.2
195													9.6
200													9.2

* Over the rear with special equipment
"Loads greater than 297,000 lb. can only be lifted with additional equipment"
"Loads greater than 335,000 lb. can only be lifted with special equipment"

GMK5275

THIS CHART IS ONLY A GUIDE AND SHOULD NOT BE USED TO OPERATE THE CRANE. The individual crane's load chart, operating instructions and other instructional plates must be read and understood prior to operating the crane.

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IRASBURG STP CULV(30)

ERECTION PLAN

Erection Sequence for BR7

	Mark	Description	Weight (Tons)	Crane Radius (Feet)
PHASE I				
	F3B	Cutoff Outlet	4.94	59
	B4	Outlet Section	24.12	58
	B3	Box Section/HW	32.52	55
	B2-1	Box Section	31.16	54
	B2-2	Box Section	31.16	53
	B2-3	Box Section	31.16	53
	B2-4	Box Section	31.16	53
	B2-5	Box Section	31.16	53
	B2-6	Box Section	31.16	55
PHASE II				
	F2B	Cutoff/WW 2 Footing	7.86	68
	F1B	Cutoff/WW 1 Footing	7.57	44
	B2-7	Box Section	31.16	55
	B1	Inlet Section	33.99	55 *
	WW2B	Wing Wall 2	10.91	70
	WW1B	Wing Wall 1	10.61	43

* See Load Chart for Grove GMK5275

112,400 lbs counterweights required.

STATE OF VERMONT
ANDREW D. WHITE
NO. 9030
STRUCTURAL
LICENSED
PROFESSIONAL ENGINEER

load charts

BR7

14

44-223 ft. (13.3-68 m) | 112,400 lbs. (51,000 kg) | 100% 26'-7" spread | 360°

Pounds (thousands)

Feet	43.7'	59.1'	74.3'	89.3'	104.2'	119.1'	133.4'	148.8'	164.0'	179.0'	193.9'	208.7'	223.1'
10	336.0	332.0	312.0	244.0									
15	262.0	260.0	258.0	242.0	185.0								
20	210.0	211.0	208.0	210.0	182.0	144.0	106.0						
25	176.0	177.0	176.0	175.0	166.0	140.0	106.0	86.0					
30	149.0	150.0	150.0	148.0	150.0	129.0	105.0	86.0	69.0	55.0	45.0		
35		132.0	130.0	127.0	124.0	118.0	96.0	86.0	69.0	55.0	45.0	36.4	
40		114.0	111.0	110.0	103.0	102.0	88.0	82.0	69.0	55.0	45.0	36.4	30.8
45		98.0	95.0	94.0	90.0	88.0	81.0	75.0	68.0	55.0	45.0	36.4	30.8
50			83.0	82.0	81.0	76.0	76.0	70.0	63.0	55.0	45.0	36.4	30.8
55			72.0	71.0	(72.0)	67.0	68.0	64.0	59.0	52.0	45.0	36.4	30.8
60				62.0	64.0	62.0	60.0	57.0	54.0	49.0	44.0	36.4	30.8
65				57.0	56.0	58.0	54.0	50.0	49.0	46.0	41.2	36.4	30.8
70				51.0	50.0	52.0	49.0	45.0	43.8	43.2	39.0	36.0	30.8
75				46.0	45.0	47.0	44.0	40.8	39.6	39.0	36.8	34.4	30.8
80					41.6	42.0	40.0	37.0	35.8	35.4	34.8	32.6	30.4
85					39.2	38.2	36.0	34.2	32.4	32.0	32.0	31.0	29.2
90					35.8	34.6	32.6	32.8	29.4	29.2	29.2	29.4	28.0
95						31.4	29.4	31.4	26.8	26.6	26.6	27.4	26.8
100						28.8	26.8	28.6	24.4	24.4	24.4	25.0	25.6
105							25.2	26.0	22.2	22.8	22.2	23.0	23.6
110							24.2	23.8	20.0	21.2	20.4	21.2	21.8
115							23.4	21.8	18.4	20.2	19.0	19.4	20.2
120								20.0	17.8	19.4	18.0	18.6	18.6
125								18.4	17.0	18.4	17.2	17.6	17.2
130								16.8	16.2	17.8	16.4	16.6	15.8
135									15.6	16.8	15.8	15.8	14.6
140									15.0	15.4	15.0	14.8	13.4
145										14.4	14.2	13.6	12.4
150										13.2	13.2	12.6	11.2
155										12.2	12.2	11.4	10.2
160										11.4	11.2	10.6	9.2
165											10.6	9.6	8.4
170											9.8	8.8	7.6
175											9.2	8.0	6.8
180												7.2	6.0
185												6.6	5.2
190												6.0	4.6
195													4.0
200													3.4

44-223 ft. (13.3-68 m) | 90,300 lbs. (41,000 kg) | 100% 26'-7" spread | 360°

Pounds (thousands)

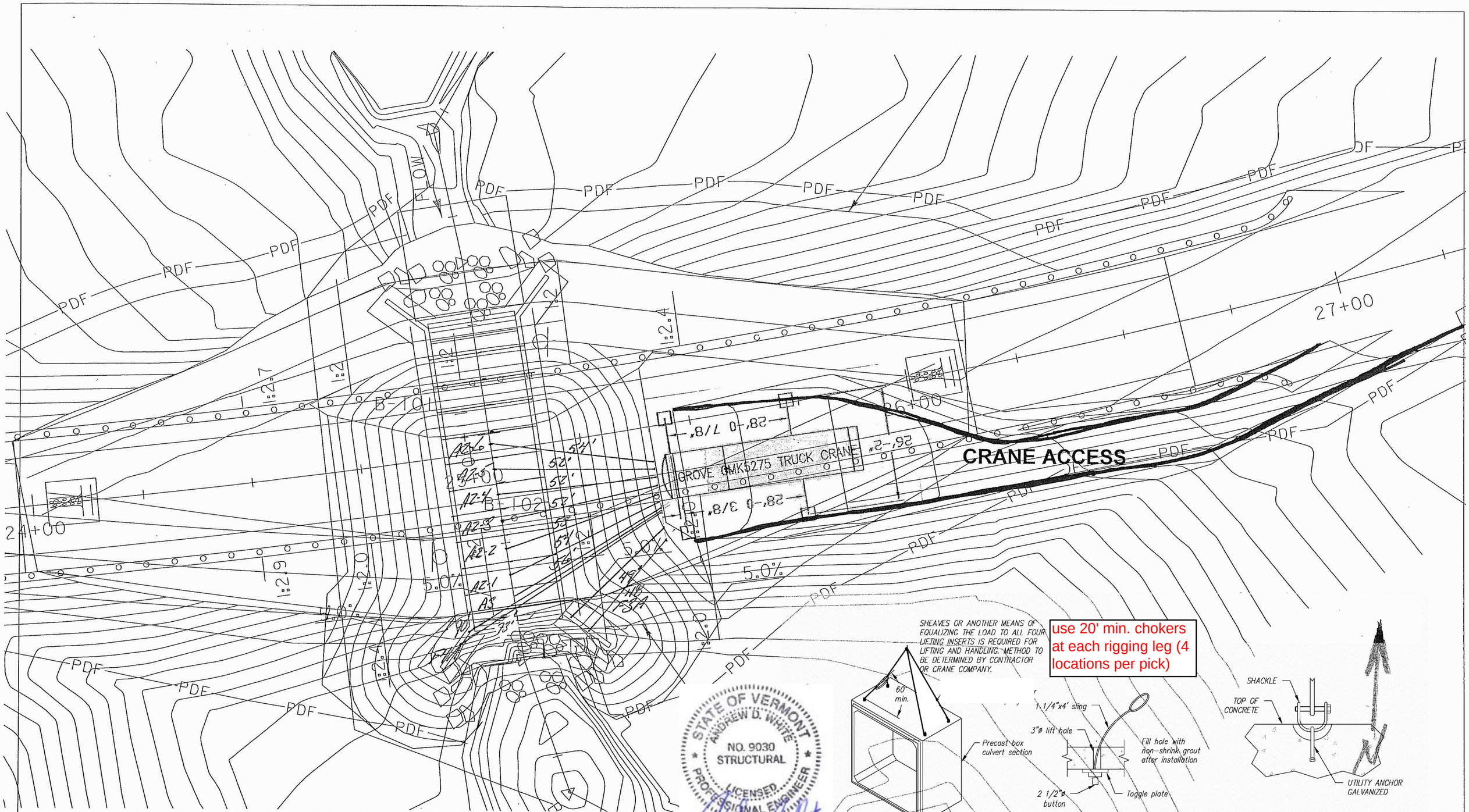
Feet	43.7'	59.1'	74.3'	89.3'	104.2'	119.1'	133.4'	148.8'	164.0'	179.0'	193.9'	208.7'	223.1'
10	332.0	328.0	312.0	244.0									
15	256.0	256.0	254.0	242.0	185.0								
20	207.0	208.0	206.0	206.0	182.0	144.0	106.0						
25	172.0	173.0	173.0	171.0	166.0	140.0	106.0	86.0					
30	146.0	149.0	146.0	138.0	131.0	128.0	105.0	86.0	69.0	55.0	45.0		
35		124.0	117.0	114.0	110.0	105.0	96.0	86.0	69.0	55.0	45.0	36.4	
40		102.0	101.0	95.0	94.0	88.0	87.0	82.0	69.0	55.0	45.0	36.4	30.8
45		84.0	85.0	81.0	80.0	76.0	75.0	71.0	68.0	55.0	45.0	36.4	30.8
50			72.0	72.0	70.0	70.0	65.0	61.0	59.0	55.0	45.0	36.4	30.8
55			64.0	64.0	61.0	62.0	57.0	54.0	52.0	51.0	45.0	36.4	30.8
60				55.0	56.0	55.0	51.0	47.0	46.0	45.0	44.0	36.4	30.8
65				49.0	51.0	49.0	45.0	42.0	40.6	40.0	39.6	36.4	30.8
70				43.6	45.0	44.0	40.6	39.8	36.2	35.6	35.4	36.0	30.8
75				38.4	40.6	39.4	36.4	37.6	32.4	32.0	31.8	32.4	30.8
80					36.6	35.4	33.0	34.0	29.0	29.4	29.2	30.2	29.8
85					33.0	31.6	30.0	31.0	26.4	28.2	27.8	28.6	27.0
90					29.8	28.6	28.6	28.4	25.0	27.0	26.2	26.6	24.6
95						25.8	27.4	25.6	23.2	25.6	24.6	24.4	22.4
100						23.4	25.2	23.2	21.2	24.0	23.0	22.4	20.4
105							22.8	21.0	20.4	22.2	20.8	20.6	18.6
110							21.0	19.0	19.4	20.4	19.8	18.8	17.0
115							19.2	17.2	18.4	18.6	18.4	17.4	15.6
120								16.0	17.8	17.0	17.0	16.0	14.2
125								15.2	17.0	15.8	16.0	14.6	13.0
130								14.6	15.8	15.0	14.6	13.4	11.8
135									14.6	14.2	13.4	12.2	10.6
140									13.4	13.0	12.2	11.2	9.6
145										12.0	11.2	10.0	8.8
150										11.0	10.2	9.0	7.8
155										10.2	9.2	8.2	7.0
160										9.4	8.4	7.4	6.0
165											7.6	6.6	5.2
170											7.0	5.8	4.6
175											6.2	5.2	3.8
180												4.4	3.2
185												3.8	
190												3.2	
195													
200													

Loads greater than 297,000 lb. can only be lifted with additional equipment
Loads greater than 335,000 lb. can only be lifted with special equipment

GMK5275

GROVE.

THIS CHART IS ONLY A GUIDE AND SHOULD NOT BE USED TO OPERATE THE CRANE. The individual crane's load chart, operating instructions and other instructional plates must be read and understood prior to operating the crane.



use 20' min. chokers at each rigging leg (4 locations per pick)

LIFTING HARDWARE DETAIL

Scale: N.T.S.

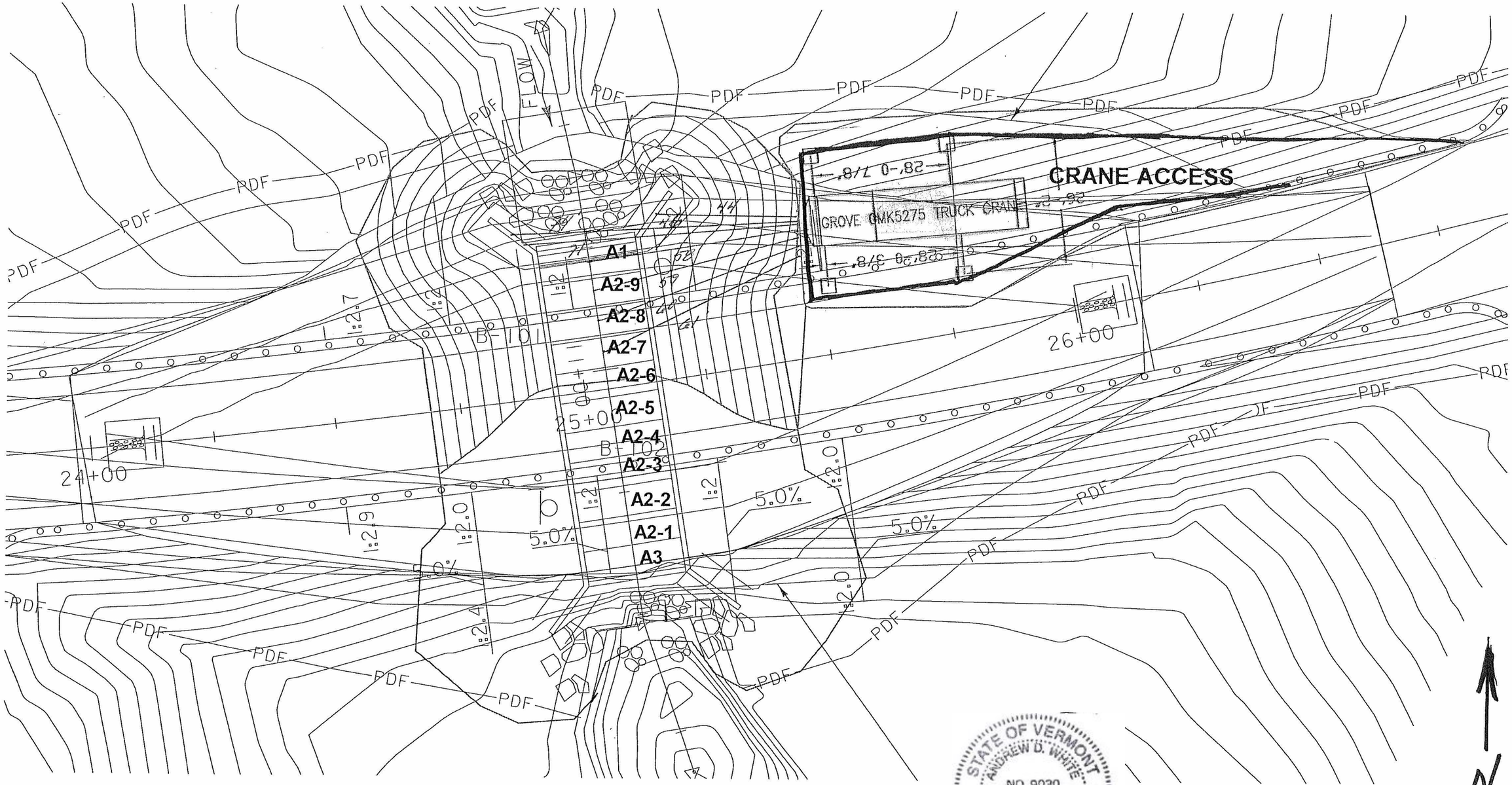
FOOTING LIFTING DETAIL

Scale: N.T.S.

IRASBURG STP CULV(30) BR6

PHASE I ERECTION PLAN

0 20 40



STATE OF VERMONT
ANDREW D. WHITE
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PROFESSIONAL ENGINEER

IRASBURG STP CULV(30) **BR6**

PHASE II ERECTION PLAN

0 20 40

POE
STA 2+00.00
BLACK
RIVER
FLOW
PDF
PL
28'-0 3/8"
GROVE GMK5275 TRUCK CRANE
26'-2"
28'-0 7/8"
34+00
35+00
36+00
B-104
ANTICIPATED TOE OF SLOPE
FOR TRAFFIC CONTROL
PHASING
POB
STA 0+00.00
00+00
FLOW
UNNAMED
TRIBUT
N

STATE OF VERMONT
ANDREW D. WHITE
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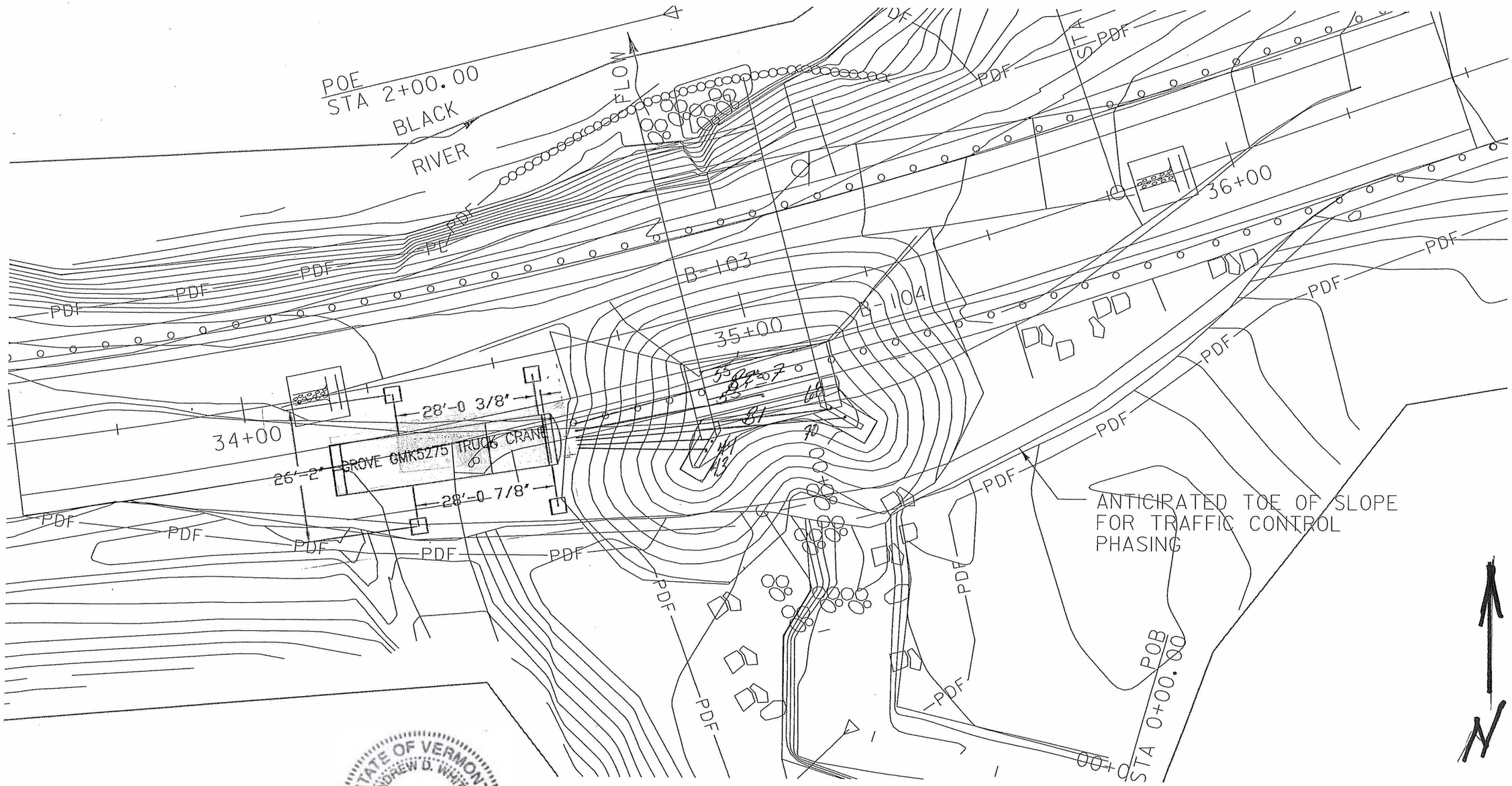
IRASBURG STP CULV(30) BR7

PHASE I ERECTION PLAN

0 20 40



STATE OF VERMONT
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IRASBURG STP CULV(30) BR7

PHASE II ERECTION PLAN

0 20 40

CCS Constuctors, Inc.

Munson Avenue
Morrisville, Vermont 05661
(802) 888-7701

JOB NAME: Irasburg STP CULV(30) Br6, Br7

SHEET NO. 1 of 1

DATE: August 7, 2015

BY Sam Davis

Footer,Wing Wall Rigging	QTY	Wt Each	Total Wt.
WW3A	1	32.00 k	32.000 k
17T Shackles	4	0.017 k	0.069 k
20' -1.25" Steel Chokers	4	0.05 k	0.200 k
Load Line	1	0.8 k	0.800 k
Load Block	1	2.5 k	2.500 k
Total Weight:			**35.569 k**

Culvert Sections			
B3	1	65.04 k	65.040 k
17T Shackles	4	0.017 k	0.069 k
20' -1.25" Steel Chokers	4	0.05 k	0.200 k
Load Line	1	0.8 k	0.800 k
Load Block	1	2.5 k	2.500 k
Total Weight:			**68.609** k

Grove GMK5275 119.1' Boom 72 kip x 65' radius

STATE OF VERMONT
ANDREW D. WHITE
NO. 9030
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Tuffy web products

FLEXI-GRIP® ROUND SLINGS

FLEXI-GRIP ROUND SLING RATED CAPACITIES

		INCHES	LBS/FT	VERTICAL	CHOKER	BASKET	60° BASKET*	45° BASKET*	30° BASKET
FG0600	PURPLE	0.60	0.30	2,600	2,100	5,200	4,500	3,600	2,600
FG0800	GREEN	0.80	0.40	5,300	4,200	10,600	9,100	7,400	5,300
FG1000	YELLOW	1.00	0.50	8,400	6,700	16,800	14,500	11,800	8,400
FG1200	TAN	1.20	0.60	10,600	8,500	21,200	18,300	15,000	10,600
FG1300	RED	1.30	0.80	13,200	10,600	26,400	22,800	18,600	13,200
FG1400	WHITE	1.40	0.90	16,800	13,400	33,600	29,100	23,700	16,800
FG1550	BLUE	1.55	1.20	21,200	17,000	42,400	36,700	29,900	21,200
FG1750	ORANGE	1.75	1.50	25,000	20,000	50,000	43,300	35,300	25,000
FG1950	ORANGE	1.95	2.00	31,000	24,800	62,000	53,600	43,800	31,000
FG2350	BLACK	2.35	2.80	40,000	32,000	80,000	69,200	56,500	40,000
FG3150	BLACK	3.15	3.60	53,000	42,400	106,000	91,600	74,800	53,000
FG3950	BLACK	3.95	4.60	66,000	52,800	132,000	114,400	93,400	66,000
FG4800	BLACK	4.80	5.80	90,000	72,000	180,000	155,800	127,200	90,000

1 part mechanical splice IPS IWRC 6x9 & 6x37 - Rated capacities in lbs.

Hitch Type

Diameter	Vertical	Choke	Basket	60°	45°	30°
1/2	4,400	3,200	8,800	7,600	6,200	4,400
5/8	6,800	5,000	13,600	11,800	9,600	6,800
3/4	9,800	7,200	19,400	16,800	13,800	9,800
7/8	13,200	9,600	26,000	22,000	18,600	13,200
1	17,000	12,600	34,000	30,000	24,000	17,000
1-1/8	20,000	15,800	42,000	36,000	30,000	20,000
1-1/4	26,000	19,200	52,000	44,000	36,000	26,000
1-3/8	30,000	24,000	62,000	54,000	44,000	30,000
1-1/2	36,000	28,000	74,000	64,000	52,000	36,000
1-3/4	50,000	38,000	98,000	86,000	70,000	50,000
2	64,000	48,000	128,000	110,000	90,000	64,000
		Multiplier → → → →		1.00	.75	.60

Sling length formula / Distance between pick points x Multiplier = Sling Length

Crosby® Screw Pin Shackles

G-209 / S-209 Screw Pin Anchor Shackles

Nominal Size (in.)	Working Load Limit (t)*	Stock No.		Weight Each (lbs.)	Dimensions (in.)											Tolerance + / -	
		G-209	S-209		A	B	C	D	E	F	G	H	L	M	P	C	A
3/16	1/3	1018357	–	.06	.38	.25	.88	.19	.60	.56	.98	1.47	.16	1.14	.19	.06	.06
1/4	1/2	1018375	1018384	.10	.47	.31	1.13	.25	.78	.61	1.28	1.84	.19	1.43	.25	.06	.06
5/16	3/4	1018393	1018400	.18	.53	.38	1.22	.31	.84	.75	1.47	2.09	.22	1.71	.31	.06	.06
3/8	1	1018419	1018428	.31	.66	.44	1.44	.38	1.03	.91	1.78	2.49	.25	2.02	.38	.13	.06
7/16	1-1/2	1018437	1018446	.38	.75	.50	1.69	.44	1.16	1.06	2.03	2.91	.31	2.37	.44	.13	.06
1/2	2	1018455	1018464	.72	.81	.63	1.88	.50	1.31	1.19	2.31	3.28	.38	2.69	.50	.13	.06
5/8	3-1/4	1018473	1018482	1.37	1.06	.75	2.38	.63	1.69	1.50	2.94	4.19	.44	3.34	.69	.13	.06
3/4	4-3/4	1018491	1018507	2.35	1.25	.88	2.81	.75	2.00	1.81	3.50	4.97	.50	3.97	.81	.25	.06
7/8	6-1/2	1018516	1018525	3.62	1.44	1.00	3.31	.88	2.28	2.09	4.03	5.83	.50	4.50	.97	.25	.06
1	8-1/2	1018534	1018543	5.03	1.69	1.13	3.75	1.00	2.69	2.38	4.69	6.56	.56	5.13	1.06	.25	.06
1-1/8	9-1/2	1018552	1018561	7.41	1.81	1.25	4.25	1.16	2.91	2.69	5.16	7.47	.63	5.71	1.25	.25	.06
1-1/4	12	1018570	1018589	9.50	2.03	1.38	4.69	1.29	3.25	3.00	5.75	8.25	.69	6.25	1.38	.25	.06
1-3/8	13-1/2	1018598	1018605	13.53	2.25	1.50	5.25	1.42	3.63	3.31	6.38	9.16	.75	6.83	1.50	.25	.13
1-1/2	17	1018614	1018623	17.20	2.38	1.63	5.75	1.54	3.88	3.63	6.88	10.00	.81	7.33	1.62	.25	.13
1-3/4	25	1018632	1018641	27.78	2.88	2.00	7.00	1.84	5.00	4.19	8.86	12.34	1.00	9.06	2.25	.25	.13
2	35	1018650	1018669	45.00	3.25	2.25	7.75	2.08	5.75	4.81	9.97	13.68	1.22	10.35	2.40	.25	.13
2-1/2	55	1018678	1018687	85.75	4.13	2.75	10.50	2.71	7.25	5.69	12.87	17.84	1.38	13.00	3.13	.25	.25