

# J. A. McDONALD, INC.

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

## CLARENDON BRO 1443(48) BRIDGE #11 ERECTION PLAN General Requirements and Sequence

The erection shall not be performed during windy or heavy rain conditions. A Liebherr LTM1220-5.2, 220 Ton Hydraulic Crane outfitted with 163,100 lbs of counterweights and a Grove GMK5275 275 Ton Hydraulic Crane outfitted with 112,400 lbs of counterweights will be used for the erection of precast bridge abutments and NEXT Beams components. Approach slabs will be set by JA McDonald and a Link-Belt RTC 8050 50 Ton Hydraulic Crane. Cranes are to be positioned as shown in the attached sketches SK-1.0, 2.0, 3.0, & 4.0. Prior to crane mobilization, JA McDonald will meet with property owners to coordinate and ensure owner access as noted in the approved Traffic Control Plan.

The Liebherr will be set-up on the north side of the bridge behind proposed abutment #2 and set abutment designated in JP Carrara's shop drawings as C-AB2 (Reference Sketch SK-2.0). The Grove will set-up on the south side behind proposed abutment #1 and set abutment designated in JP Carrara's shop drawing as C-AB1 (Reference Sketch SK-1.0). Both cranes will be used to set the three NEXT beams designated as C-NB1, C-NB2 and C-NB3. The Liebherr will pick the NEXT beams off the transport trailer and set the beam on a preassembled XPS-60 shoring tower (as shown on Sketch 3.0).

The shoring tower will be installed following stream bed reconstruction, behind the Phase II Temporary Stream Relocation Barrier (refer to Temporary Stream Relocation Plan) Both cranes will then pick and set the NEXT beam onto the abutments in their final position (Reference Sketch SK-3.0).

Precast bridge abutment C-AB2, NEXT Beams C-NB1 thru C-NB3 will be delivered to the north side of Bridge 11. Precast bridge abutment C-AB1 will be delivered to the south side of Bridge 11. Approach slabs will be delivered to their respective side Reference for information and component designation is made from Carrara's precast shop drawings of the bridge abutments, Next Beams and approach slabs. The maximum permissible crane radius for unloading and setting the precast bridge components shown shall not be exceeded.

The precast bridge components shall be picked and installed according to the manufacturer's requirements and project specifications. Each prestressed NEXT beam and approach slabs is to be picked from 4 locations as shown on the manufacture's shop drawings.

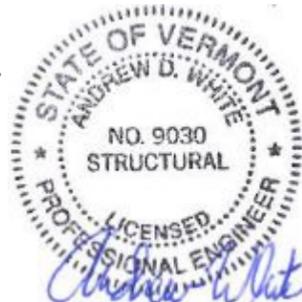
Prestressed NEXT beams shall be delivered to the north side of the bridge. Trailers will be backed into position adjacent to the Liebherr LTM1220-5.2 Crane. Rigging will be attached to the NEXT Beam prior to removal of the rigging securing the beam to the trailer. The crane will then pick the beam off the trailer allowing the tractor/trailer to pull away. The crane will swing and set the NEXT Beam on the preassembled XPS-60 shoring tower (as shown on Sketch SK-3.0, Station  $\pm 11+75$  Left) and wood cribbing behind abutment #2 (Station  $\pm 12+44$  Left). The temporary shoring tower and cribbing noted will be located such that the bearing points of the NEXT Beams are consistent with the lifting loops. Both cranes will pick and set the beam in its final position. This sequence will be repeated beginning with C-NB3, then C-NB2 and finishing with C-NB1.

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

Attached Shoring Tower analysis by AH Harris.

It is attached for convenience only; the shoring tower calculations are by others.

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## CLARENDON BRO 1443(48)

### ERECTION PLAN

Erection Sequence for Bridge #11  
Reference JP Carrara's Shop Drawings for "Mark" Designation



#### ABUTMENT #1 Grove GMK5275 Reference Sketch SK-1.0

Mark	Description	Weight (Tons)	Crane Radius (Feet)	
C-AB1	Abutment #1	57.71	35	104.2' boom, capacity= 124.0 kips

#### ABUTMENT #2 Liebherr LTM 1220-5.2 Reference Sketch SK-2.0

Mark	Description	Weight (Tons)	Crane Radius (Feet)	
C-AB2	Abutment #2	59.32	40	86' boom, capacity= 125.3 kips

#### PRESTRESSED NEXT BEAMS Reference Sketch SK-3.0

Mark	Description	Weight(TN)/Radius(FT)				
		Liebherr LTM1220-5.2 Initial	Liebherr LTM1220-5.2 Tower *	Liebherr LTM1220-5.2 Final	Grove GMK5275 Final	
C-NB3	East Fascia Beam	59.42/40	59.42/40	29.71/40	29.71/50	see SK3.1
C-NB2	Interior Beam	59.42/40	59.42/40	29.71/40	29.71/50	for crane usage
C-NB1	West Fascia Beam	59.42/40	59.42/40	29.71/40	29.71/50	

#### APPROACH SLABS Abutment #1 LinkBelt RTC8050 Reference Sketch SK-4.0

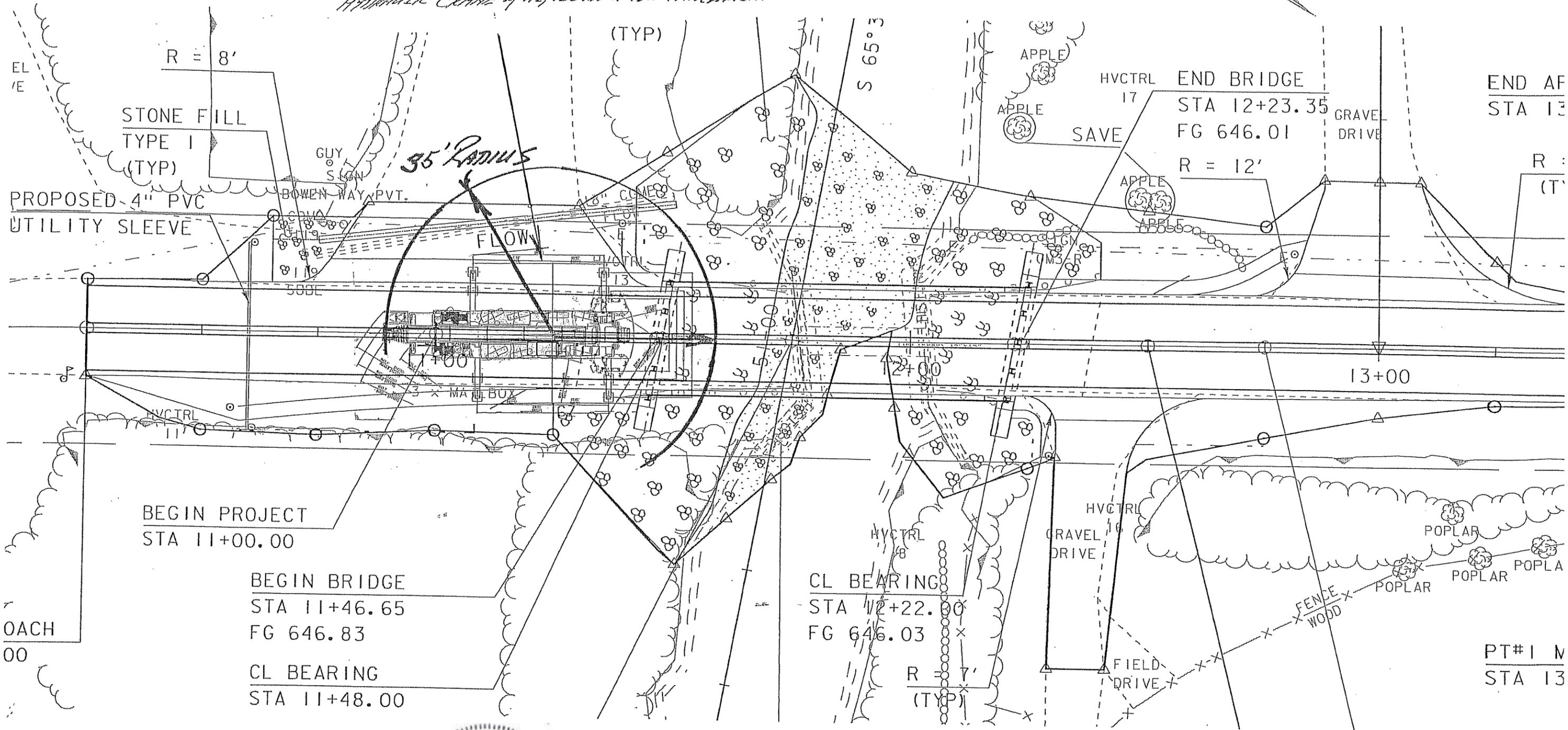
Mark	Description	Weight (Tons)	Crane Radius (Feet)	
C-AS1	Approach Slab	6.45	40	80' boom, capacity= 21.5 kips
C-AS2	Approach Slab	6.45	40	
C-AS3	Approach Slab	6.45	40	
C-AS4	Approach Slab	6.45	40	

#### APPROACH SLABS Abutment #2 LinkBelt RTC8050 Reference Sketch SK-4.0

Mark	Description	Weight (Tons)	Crane Radius (Feet)
C-AS1	Approach Slab	6.45	40
C-AS2	Approach Slab	6.45	40
C-AS3	Approach Slab	6.45	40
C-AS4	Approach Slab	6.45	40

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GROVE B.M. 5275  
 HYDRAULIC CRANE w/ 112,400 lbs of COUNTERWEIGHT



BEGIN PROJECT  
 STA 11+00.00

BEGIN BRIDGE  
 STA 11+46.65  
 FG 646.83

CL BEARING  
 STA 11+48.00

CL BEARING  
 STA 12+22.00  
 FG 646.03

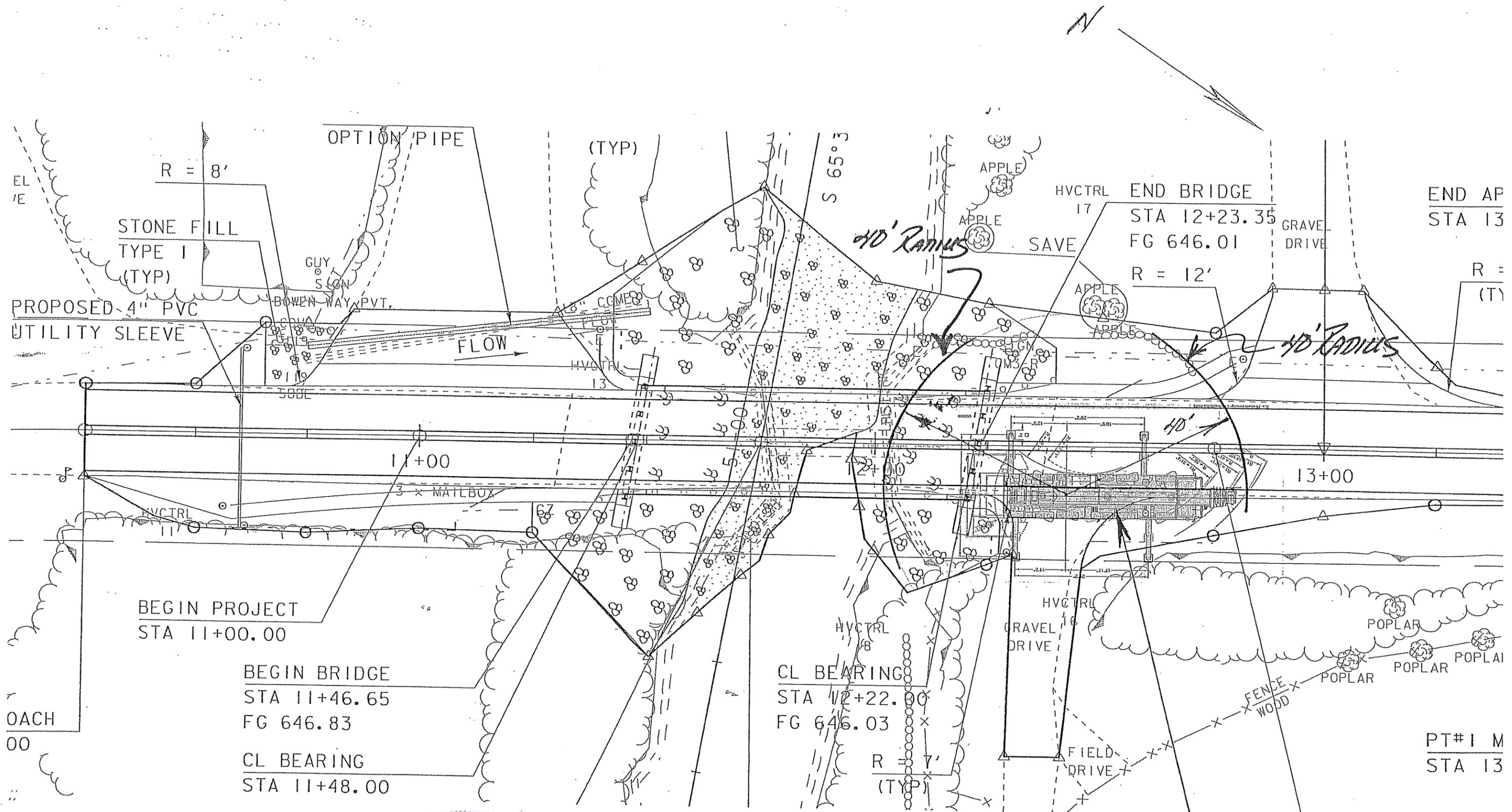
END BRIDGE  
 STA 12+23.35  
 FG 646.01  
 R = 12'

END OF  
 STA 13



SCALE 1" = 20'  
 CARRENDON BRO 1443 (HB) EROSION PLAN ABUTMENT #1

SK-1.0  
 CCS CONSTRUCTORS, INC.



BEGIN PROJECT  
STA 11+00.00

BEGIN BRIDGE  
STA 11+46.65  
FG 646.83

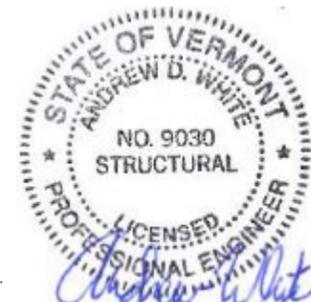
CL BEARING  
STA 11+48.00

CL BEARING  
STA 12+22.00  
FG 646.03

HVCTRL END BRIDGE  
STA 12+23.35  
FG 646.01  
R = 12'

END AP  
STA 13

PT#1 M  
STA 13



SCALE 1" = 20'

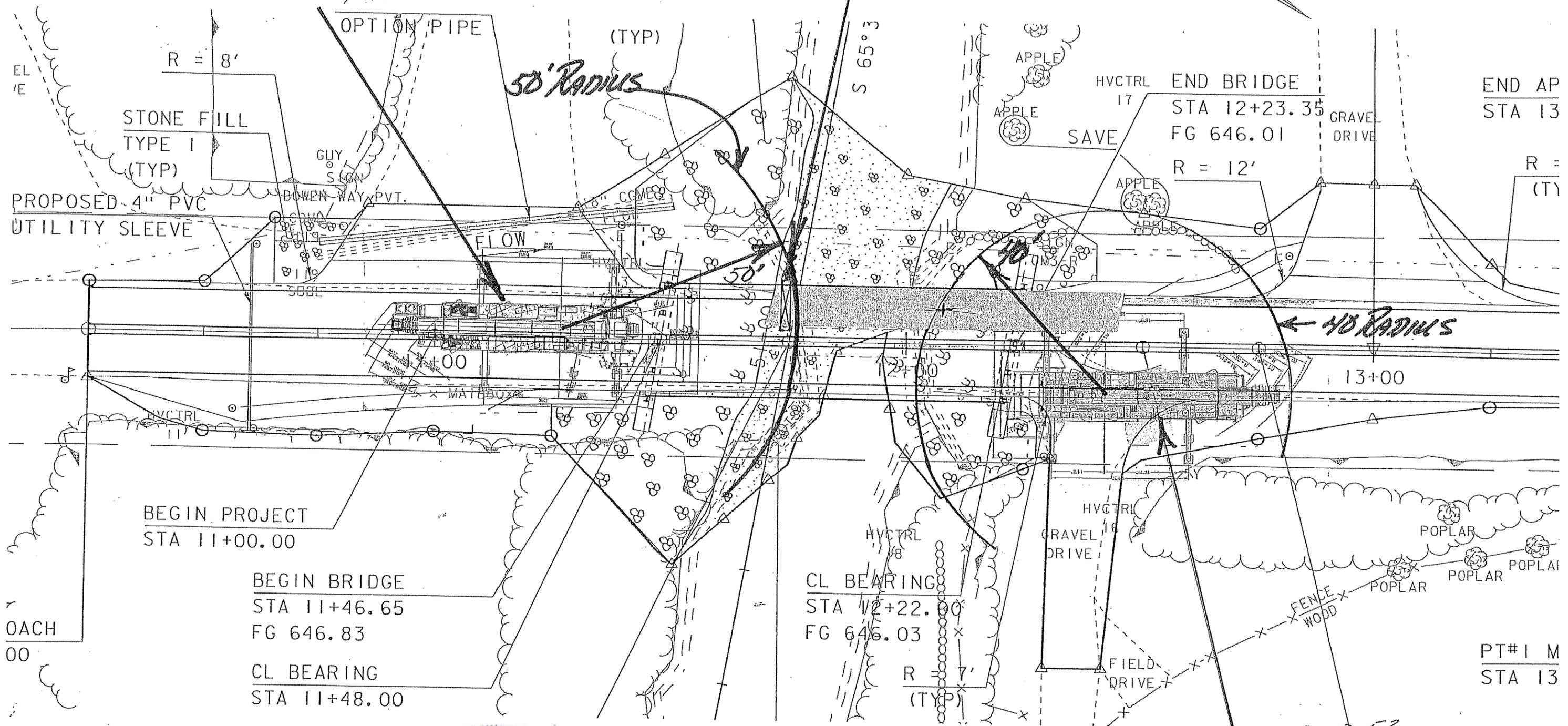
CHARLESTON BRD 1443(48) ERECTION PLAN AGREEMENT #2

LIEBHERR LTM 1220-5.2  
HYDRAULIC CRANE w/ 163,100 lbs of Counter-Weight

SK 2.0

GRADIE G/MK 5275  
HYDRAULIC CRANE w/ 112,000 lbs of COUNTERWEIGHT

XPS-60 SHORING TOWER



BEGIN PROJECT  
STA 11+00.00

BEGIN BRIDGE  
STA 11+46.65  
FG 646.83

CL BEARING  
STA 11+48.00

CL BEARING  
STA 12+22.00  
FG 646.03

R = 12'  
(TYP)

END AP  
STA 13

R = (T)

PT#1 M  
STA 13



SCALE 1" = 20'

CHANDLER BRO 1443 (48) ERECTION PLAN NEXT BEAMS SK 3.8

LIEBHERR LTM 1720-5.2  
HYDRAULIC CRANE w/ 112,000 lbs of  
COUNTERWEIGHT

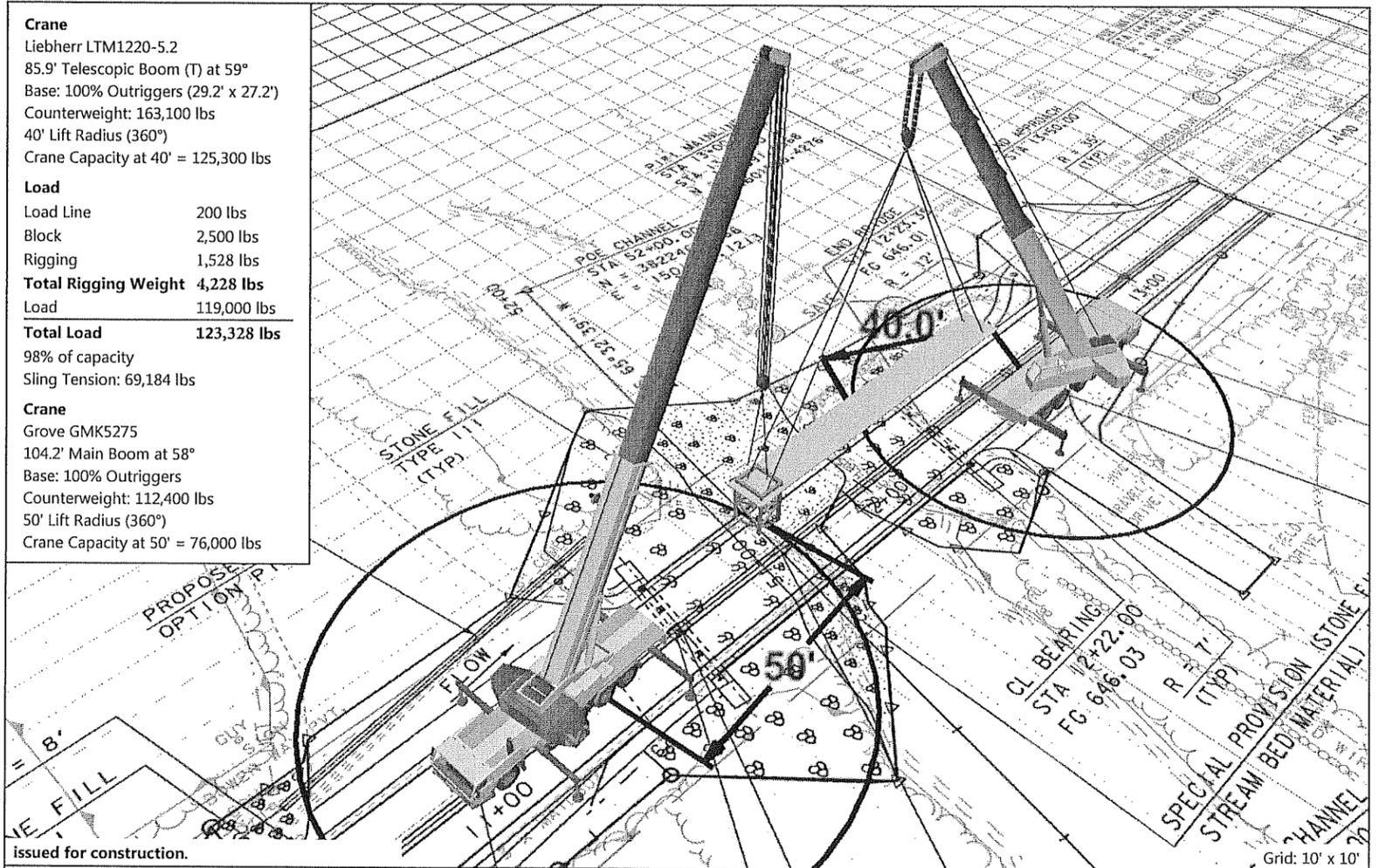
**Crane**  
 Liebherr LTM1220-5.2  
 85.9' Telescopic Boom (T) at 59°  
 Base: 100% Outriggers (29.2' x 27.2')  
 Counterweight: 163,100 lbs  
 40' Lift Radius (360°)  
 Crane Capacity at 40' = 125,300 lbs

**Load**

Load Line	200 lbs
Block	2,500 lbs
Rigging	1,528 lbs
<b>Total Rigging Weight</b>	<b>4,228 lbs</b>
Load	119,000 lbs
<b>Total Load</b>	<b>123,328 lbs</b>

98% of capacity  
 Sling Tension: 69,184 lbs

**Crane**  
 Grove GMK5275  
 104.2' Main Boom at 58°  
 Base: 100% Outriggers  
 Counterweight: 112,400 lbs  
 50' Lift Radius (360°)  
 Crane Capacity at 50' = 76,000 lbs



issued for construction.

Grid: 10' x 10'

SK3.1

Title	Lift Plan
Project	Clarendon
Customer	JAM
Description	Next Beams
Drawn By	Sam Davis
	06/06/2016

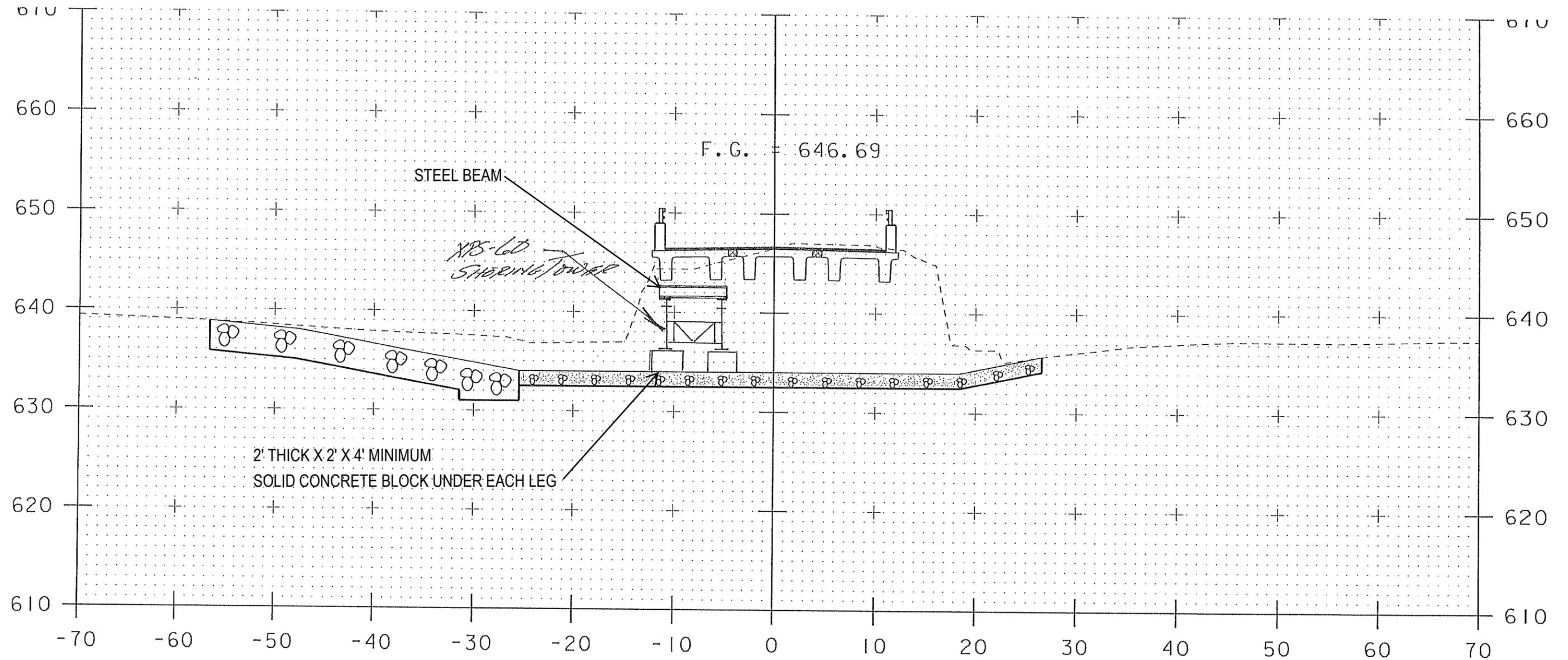
Created with 3D Lift Plan www.3dliftplan.com

*SK3.1*  
 CCS CONSTRUCTORS, INC.



<http://www.3dliftplan.com/Print/LiftPlan.aspx>





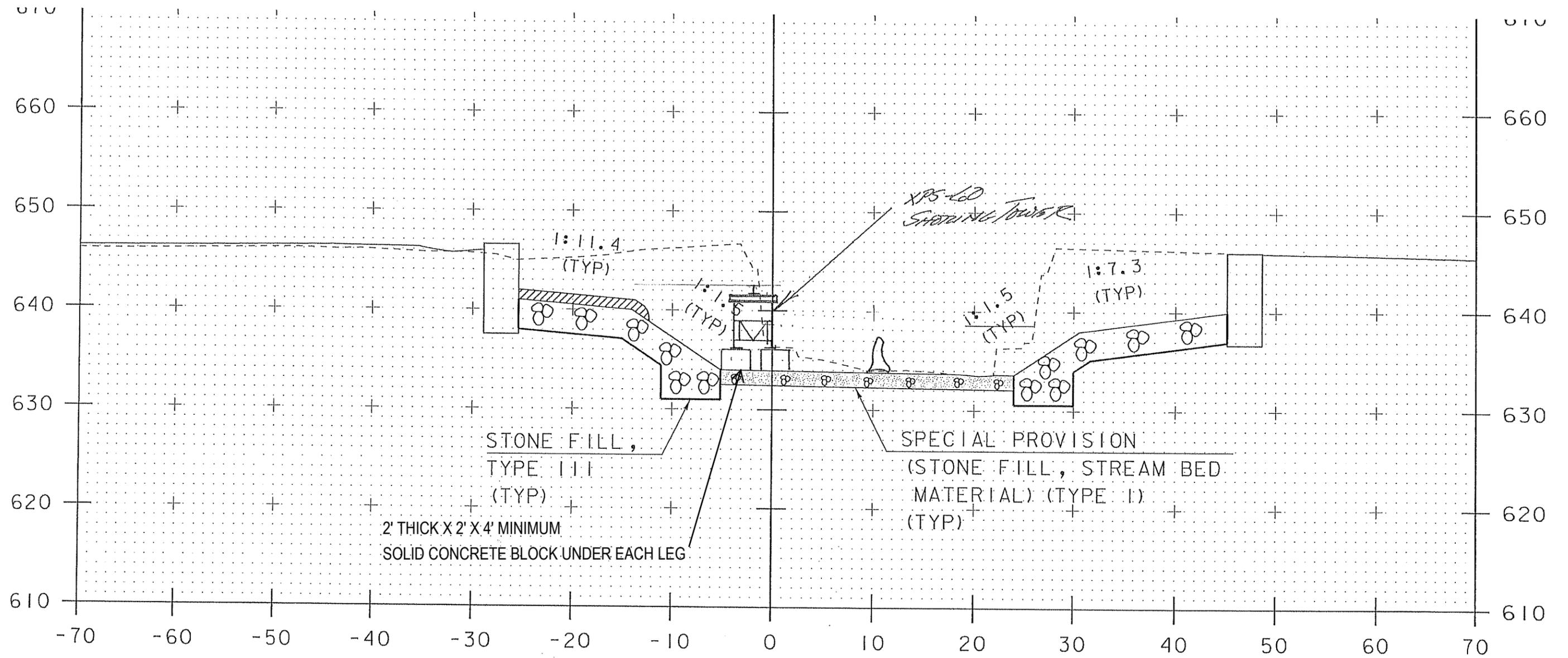
NOTE: FOUR SHORING TOWER FOUNDATION BLOCKS SHALL BE LEVEL  
AND SHORING TOWER SHALL BE PLUMB FOR SUPPORTING NEXT BEAM WEIGHT.

11+75



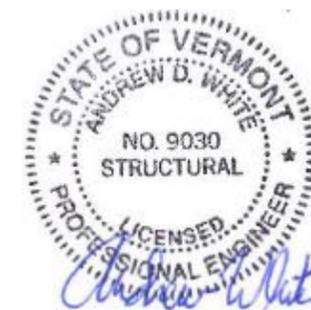
SK-5

CCS CONSTRUCTORS, INC.



NOTE: FOUR SHORING TOWER FOUNDATION BLOCKS SHALL BE LEVEL  
AND SHORING TOWER SHALL BE PLUMB FOR SUPPORTING NEXT BEAM WEIGHT.

51+10



SK-6  
CCS CONSTRUCTORS, INC.

# Rigging List

Project Clarendon  
 Customer JAM  
 Description Abutments

## Grove GMK5275

104.2' Main Boom at 67.4°  
 Base: 100% Outriggers  
 Counterweight: 112,400 lbs  
 35' Lift Radius (360°)  
 Crane Capacity at 35' = 124,000 lbs

Item	Capacity	Weight	Qty	Total Weight
Hoist Line		200 lbs	1	200 lbs
Block		2,500 lbs	1	2,500 lbs
Hook			1	
Tuffly Flexi-Grip 40' Black V-90000#	45 t	194 lbs	2	387 lbs
Crosby Shackle G-209 2"	35 t	45 lbs	2	90 lbs
<b>Total Rigging Weight</b>				<b>3,177 lbs</b>
Load				115,400 lbs
<b>Total Load</b>				<b>118,577 lbs</b>

96% of capacity



CCS CONSTRUCTORS, INC.

# Rigging List

Project Clarendon  
 Customer JAM  
 Description Abutments

## Liebherr LTM 1220-5.2

85.9' Telescopic Boom (T) at 59°  
 Base: 100% Outriggers (29.2' x 27.2')  
 Counterweight: 163,100 lbs  
 40' Lift Radius (360°)  
 Crane Capacity at 40' = 125,300 lbs

Item	Capacity	Weight	Qty	Total Weight
Hoist Line		200 lbs	1	200 lbs
Block		2,500 lbs	1	2,500 lbs
Hook			1	
Tuffly Flexi-Grip 40' Black V-90000#	45 t	194 lbs	2	387 lbs
Crosby Shackle G-209 2"	35 t	45 lbs	2	90 lbs
<b>Total Rigging Weight</b>				<b>3,177 lbs</b>
Load				118,640 lbs
<b>Total Load</b>				<b>121,817 lbs</b>

97% of capacity



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# Rigging List

Project Clarendon  
 Customer JAM Description Next Beams

## Liebherr LTM 1220-5.2

85.9' Telescopic Boom (T) at 59° Base: 100%  
 Outriggers (29.2' x 27.2') Counterweight: 163,100 lbs  
 40' Lift Radius (360°)  
 Crane Capacity at 40' = 125,300 lbs

Item	Capacity	Weight	Qty	Total Weight
Hoist Line		200 lbs	1	200 lbs
Block		2,500 lbs	1	2,500 lbs
Tuffy Flexi-Grip 40' Black V-53000#	26.5 t	118 lbs	4	471 lbs
Crosby Shackle G-209 2"	35 t	45 lbs	4	180 lbs
Crosby Link A-342 1-3/4"	42.45 t	25 lbs	4	101 lbs
Crosby Shackle G-209 2"	35 t	45 lbs	4	180 lbs
1.5" x 25' Steel Chokers	74t	104	4	416
Crosby Shackle G-209 2"	35T	45	4	180
<b>Total Rigging Weight</b>				<b>4,228 lbs</b>
Load				119,000 lbs
<b>Total Load</b>				<b>123,328 lbs</b>

99% of capacity

<http://www.3dliftplan.com/Print/RiggingList.aspx>

5/23/2016



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# Rigging List

Project Clarendon  
 Customer JAM  
 Description Next Beams

## Grove GMK5275

119.1' Main Boom at 62.7°  
 Base: 100% Outriggers  
 Counterweight: 112,000 lbs  
 42' Lift Radius (360°)  
 Crane Capacity at 42' = 88,000 lbs

Item	Capacity	Weight	Qty	Total Weight
Hoist Line		200 lbs	1	200 lbs
Block		2,500 lbs	1	2,500 lbs
Hook			1	
Tuffy Flexi-Grip 20' Black V-53000#	26.5 t	59 lbs	2	118 lbs
Crosby Shackle G-209 1-3/4"	25 t	28 lbs	2	56 lbs
<b>Total Rigging Weight</b>				<b>2,874 lbs</b>
Load				59,500 lbs
<b>Total Load</b>				<b>62,374 lbs</b>

89% of capacity



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# Main Boom Lift Capacity Charts - Imperial

Fully Extended Outriggers - 360° Rotation (All Capacities Are Listed In Pounds)										
Radius (ft)	Boom Length (ft)									Radius (ft)
	35.5	40	50	60/60.3	70	80	90	100	110	
10	100,000	78,400	72,600							10
12	73,900	73,100	65,600	50,900	37,900					12
15	63,200	63,000	57,500	46,900	37,900	35,400				15
20	50,900	50,100	47,600	39,200	37,900	34,700	28,900			20
25	39,000	38,900	38,500	37,900	37,900	34,200	28,200	24,000	19,500	25
30		31,300	31,900	32,300	32,500	30,300	24,800	22,500	19,500	30
35			26,100	26,500	26,700	26,900	22,000	19,900	18,300	35
40			20,800	21,200	21,400	21,500	19,700	17,800	16,400	40
45				17,100	17,900	17,400	17,500	15,900	14,600	45
50				13,900	14,200	14,300	14,400	14,400	13,200	50
55					11,900	12,100	12,200	12,200	12,100	55
60					10,000	10,200	10,300	10,300	10,400	60
65						8,600	8,700	8,800	8,900	65
70						7,300	7,500	7,500	7,600	70
75							6,400	6,500	6,500	75
80							5,400	5,500	5,600	80
85								4,700	4,800	85
90								4,000	4,100	90
95									3,500	95
100									2,900	100

80' boom,  
capacity= 21.5 kips

→ LINK-BELL RTC 8050 APPROACH SLABS

This information is not for crane operation. Operator must refer to the in-cab information for crane operation. Rated lifting capacities shown on fully extended outriggers do not exceed 85% of the tipping loads and on tires do not exceed 75% of the tipping loads.

**CHAIN SLING CAPACITIES (LBS.) - CHAIN GR-8 - ASME B30.9 DESIGN FACTOR 4/1**

CHAIN SIZE (IN.)						<b>Crosby</b> QT ALLOY	
	VERTICAL (SINGLE LEG)	TWO LEG OR BASKET HITCH	60 DEGREE SLING ANGLE	45 DEGREE SLING ANGLE	30 DEGREE SLING ANGLE	SINGLE LEG MASTER LINK SIZE (IN.)	DOUBLE LEG MASTER LINK SIZE (IN.)
1/4 - (9/32)	3500	7000	6050	4900	3500	1/2	1/2
3/8	7100	14200	12200	10000	7100	3/4	3/4
1/2	12000	24000	20750	16950	12000	7/8	1
5/8	18100	36200	31350	25500	18100	1	1-1/4
3/4	28300	56600	49000	40000	28300	1-1/4	1-1/2
7/8	34200	68400	59200	48350	34200	1-1/2	1-3/4
1	47700	95400	82600	67150	47700	—	—
1-1/4	72300	144600	125200	102200	72300	—	—

A CHAIN GRAB HOOK APPLICATION WILL RESULT IN A 20% REDUCTION OF CHAIN CAPACITY OF A SINGLE LEG. THE HORIZONTAL ANGLE MUST BE GREATER THAN 30 DEGREES.

HORIZONTAL ANGLE	CAPACITY % OF SINGLE LEG
90	200%
60	170%
45	140%
30	100%

TRIPLE LEG SLINGS HAVE 50% MORE CAPACITY THAN DOUBLE LEG ONLY IF THE CENTER OF GRAVITY IS IN CENTER OF CONNECTION POINT AND LEGS ARE ADJUSTED PROPERLY (EQUAL SHARE OF THE LOAD).

QUAD LEG SLINGS OFFER IMPROVED STABILITY BUT DO NOT PROVIDE INCREASED LIFTING CAPACITY.

**Endless Round Slings / Polyester Type - Capacities rated in (lbs).**

Color	Vertical	Choker	Basket
Purple	2600	2100	5200
Green	5300	4200	10600
Yellow	8400	6700	16800
Tan	10600	8500	21200
Red	13200	10600	26400
White	16800	13400	33600
Blue	21200	17000	42400
Grey	31000	24800	62000
Brown	53000	42400	106000
Olive	66000	52800	132000

**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	.36	.25	.86	.19	.60	.56	.80	1.47	.16	1.14	.19	.06	.06		
1/4	1/2	1018375	1018394	.10	.47	.31	1.13	.25	.78	.61	1.28	1.84	.19	1.43	.25	.06	.06		
5/16	3/4	1018393	1018400	.16	.53	.38	1.22	.31	.84	.75	1.47	2.09	.22	1.71	.31	.06	.06		
3/8	1	1018419	1018426	.21	.68	.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	4.59	.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	2.68	2.00	7.00	1.64	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	12.67	17.94	1.38	13.00	3.13	.25	.25		

