

June 1, 2016

J. A. McDONALD, INC.

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**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.

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 and cribbing. 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 (up-station of abutment #1 at Station $\pm 11+75$ Left) and wood cribbing behind abutment #2 (Station $\pm 12+44$ Left). The temporary shoring tower and cribbing shall be located such that the bearing points of the NEXT Beams are consistent with the lifting loop locations. Both cranes will then 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.

Shoring tower analysis is by others (submitted separately).

Digitally signed by Andy
White
Date: 2016.06.02 05:50:01
-04'00'

CCS CONSTRUCTORS, INC.

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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		Grove GMK5275	
		Initial	Tower *	Final	Final
C-NB3	East Fascia Beam	59.42/40	59.42/40	29.71/40	29.71/50
C-NB2	Interior Beam	59.42/40	59.42/40	29.71/40	29.71/50
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

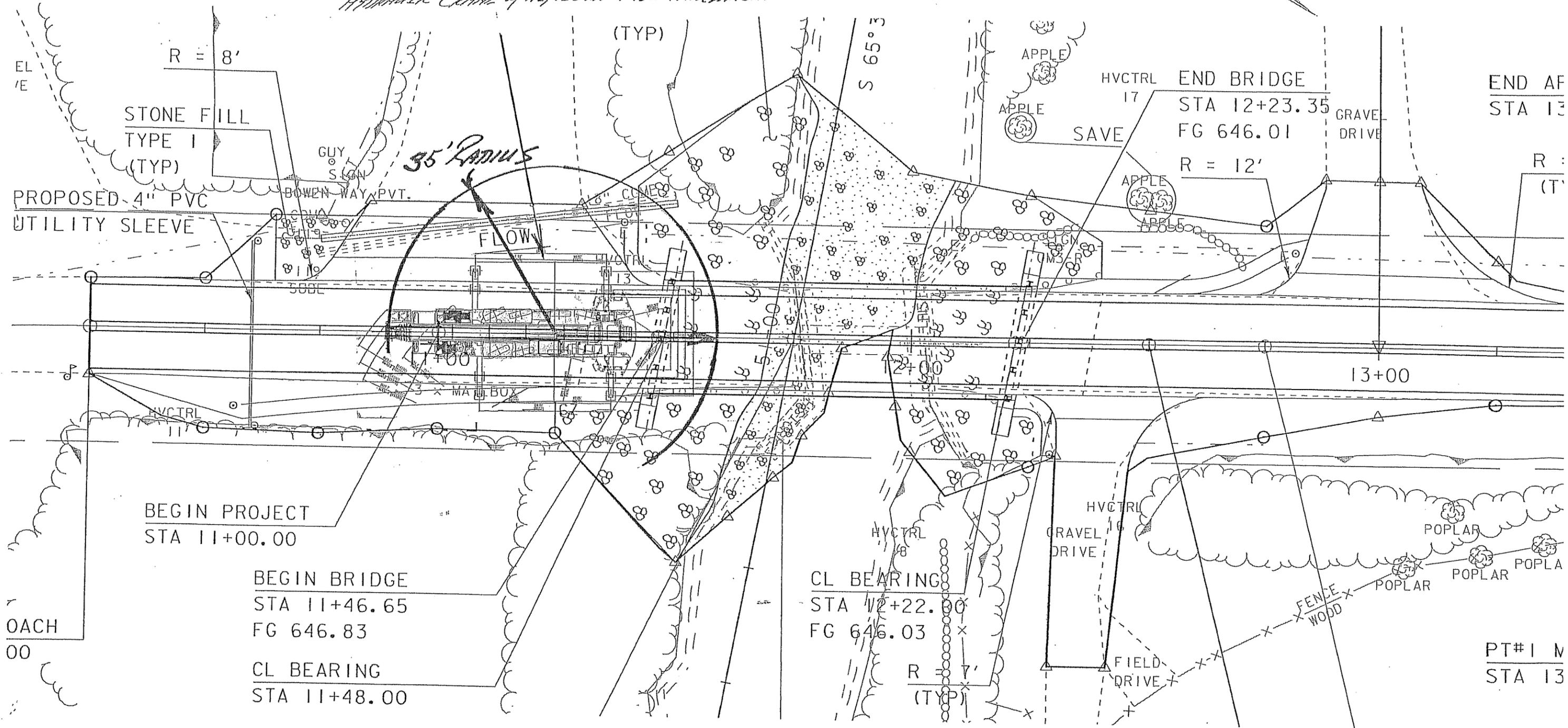
Mark	Description	Weight (Tons)	Crane Radius (Feet)	
C-AS1	Approach Slab	6.45	40	80' boom, capacity= 21.5 kips
C-AS2	Approach Slab	6.45	40	
C-AS3	Approach Slab	6.45	40	
C-AS4	Approach Slab	6.45	40	

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

CCS CONSTRUCTORS, INC.

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

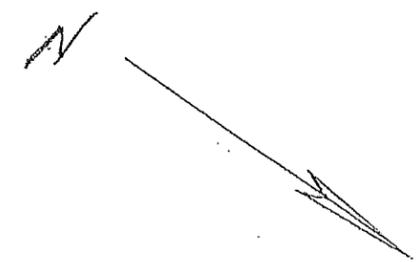
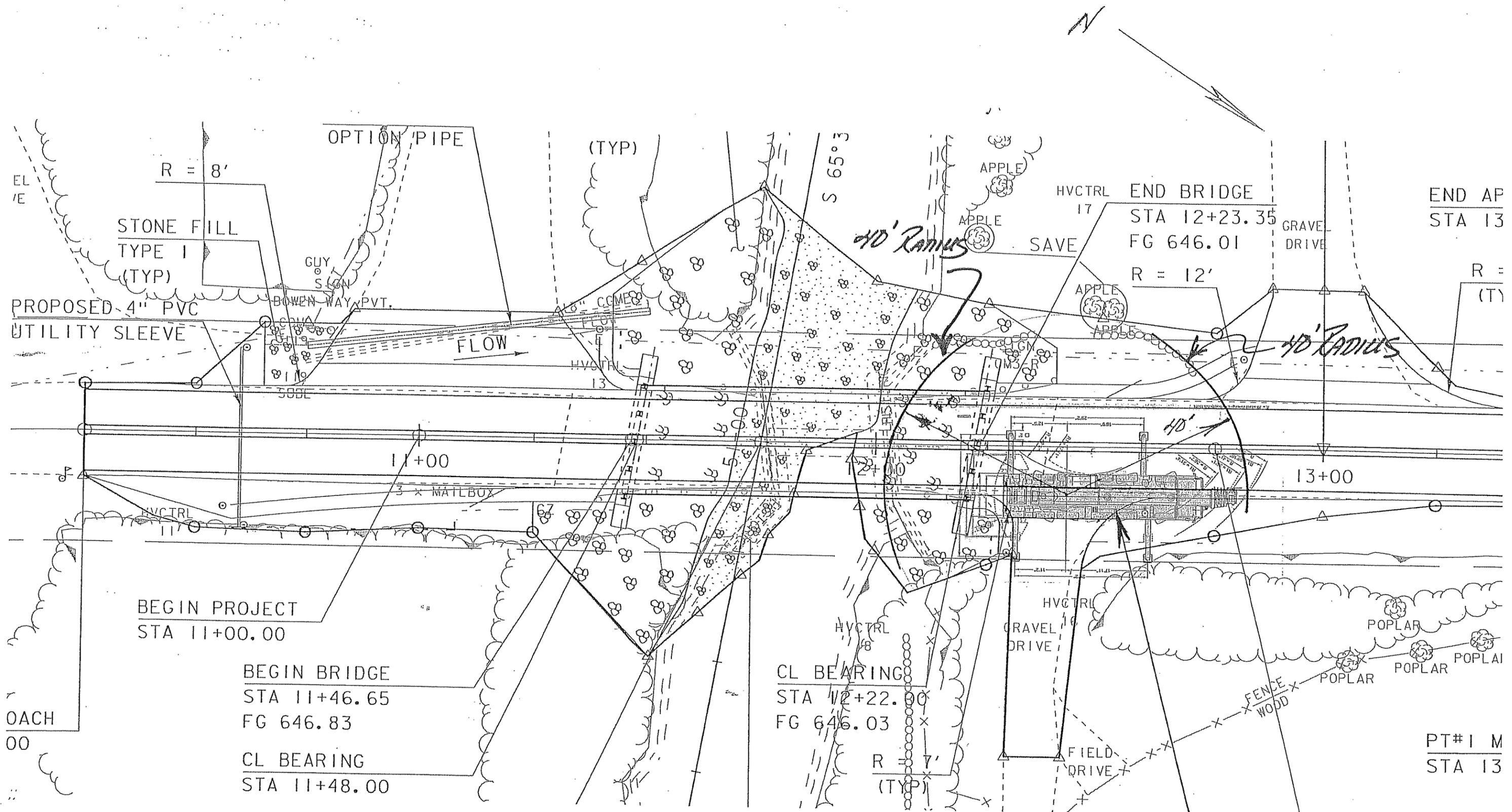
HVCTRL
 END BRIDGE
 STA 12+23.35
 FG 646.01
 R = 12'

END AF
 STA 13

PT#1 M
 STA 13

SCALE 1" = 20'

CARRINGTON BRD 1443(HB) ERECTION PLAN ABUTMENT #1 SK-1.0



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

LIEBHERR LTM 1220-5.2
HYDRAULIC CRANE w/ 16,500 lbs AT COUNTER-WEIGHT

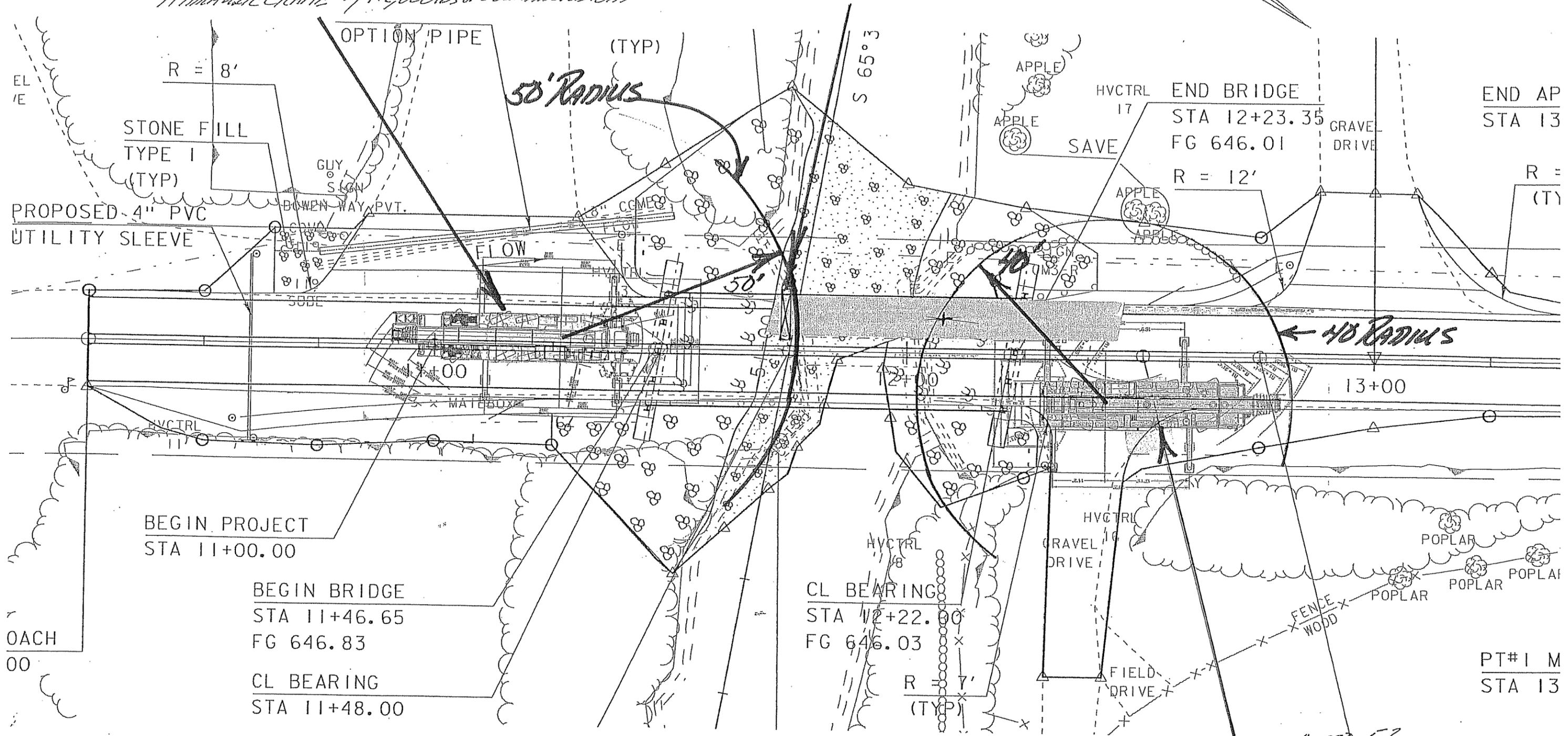
SCALE 1" = 20'

CLARENDAIN BRD 1443(48) ERECTION PLAN AGREEMENT #2

SK 2.0

*CRANE GMK 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

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

END AP
STA 13

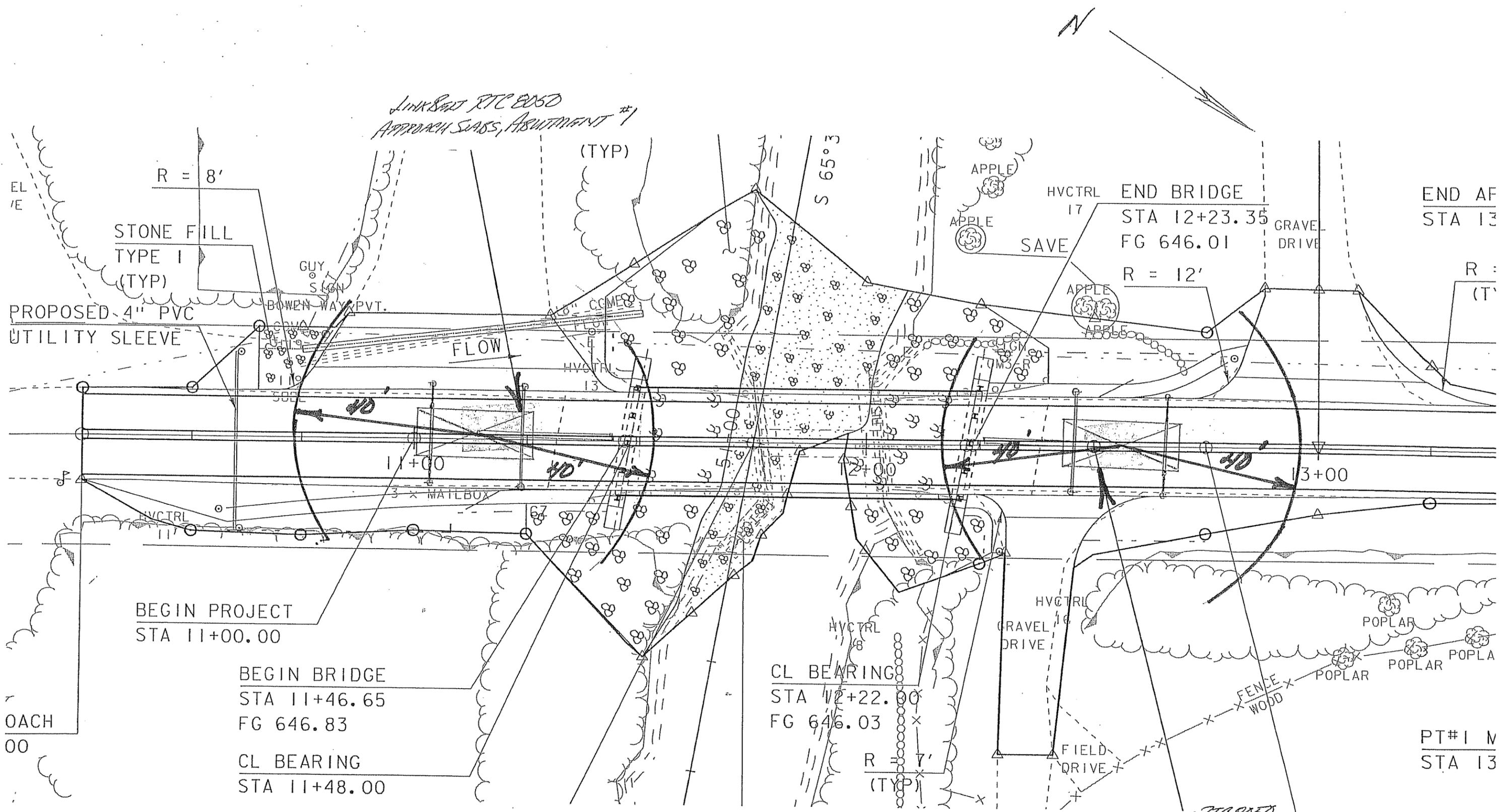
PT#1 M
STA 13

00

SCALE 1" = 20'

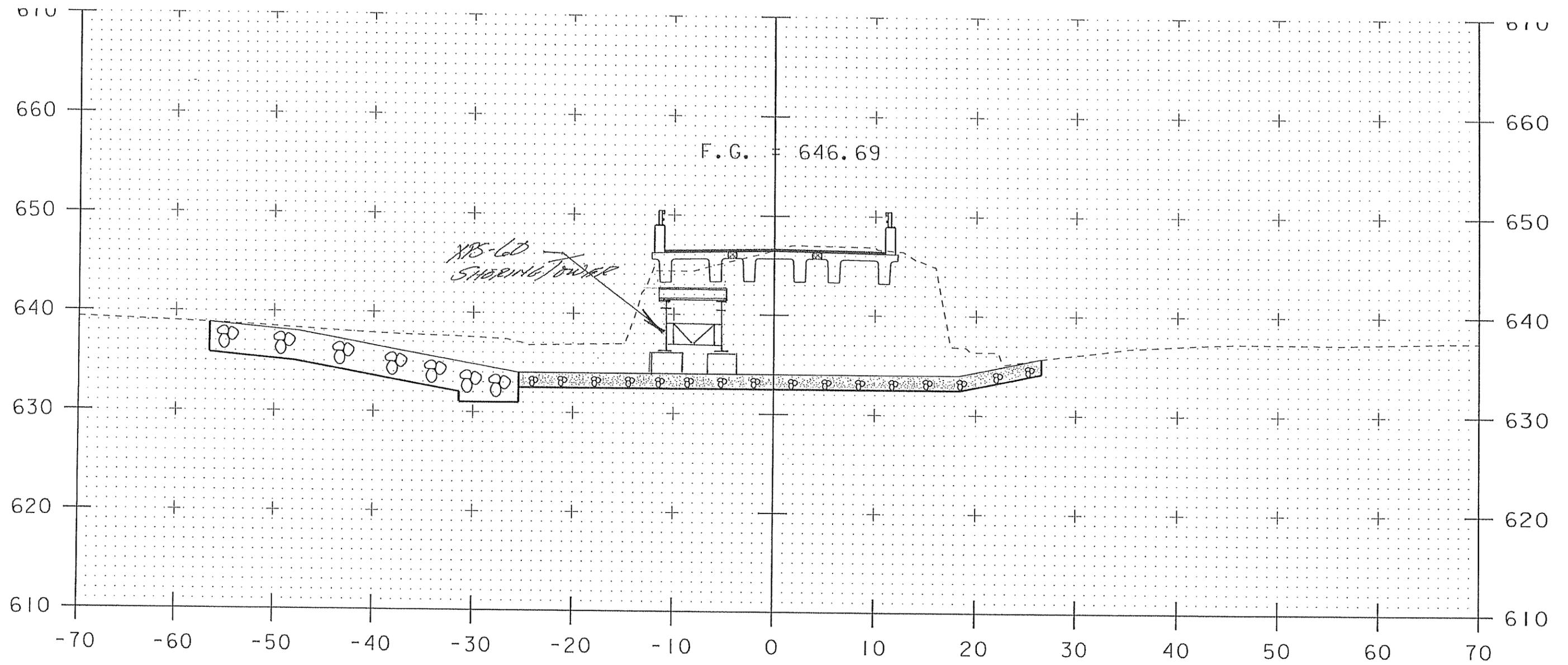
CHANDLER BRD 1443 (42) ERECTION PLAN NEXT BEAMS SK 3.0

*LIESHNER LTM 1720-5.2
HYDRAULIC CRANE w/ 160,000 lbs of Counterweight*



Link Street RTCE 0050
 APPROACH SLABS, ABUTMENT #2

SCALE 1" = 20'
 CARRINGTON RD 1443(48) ERECTION PLAN APPROACH SLABS SK-410



11+75

SK-5

Rigging List

Project Clarendon
 Customer JAM
 Description Abutments

Grove GMK5275

104.2' Main Boom at 66.8°
 Base: 100% Outriggers
 Counterweight: 169,700 lbs
 35' Lift Radius (360°)
 Crane Capacity at 35' = 136,000 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-90000#	26.5 t	200 lbs	2	400 lbs
Crosby Shackle G-209 2" Total	35 t	35 lbs	2	70 lbs
Rigging Weight				2,874 lbs
Load C-AB2				118,640 lbs
Total Load				121,514 lbs

89% of capacity

Rigging List

Project Clarendon
 Customer JAM
 Description Abutments

Liebherr LTM 1220-5.2

86' Telescopic Boom (T) at 64.5°
 Base: 100% Outriggers (29.2' x
 27.2') Counterweight: 172,000 lbs
 39' 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	
Tuffy Flexi-Grip 40' Black V-90000#	77.45 t	200 lbs	2	400 lbs
Crosby Shackle G-209 2" Total	35 t	35 lbs	2	70 lbs
Rigging Weight	25 t	28 lbs	4	470 lbs
Load				115,400 lbs
Total Load				118,170 lbs

94% of capacity

Rigging List

Project Clarendon
 Customer JAM
 Description Next Beams

Grove GMK5275

102.9' Main Boom at 62.7°
 Base: 100% Outriggers
 Counterweight: 169,700 lbs
 42' Lift Radius (360°)
 Crane Capacity at 42' = 70,000 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
Total Rigging Weight				2,874 lbs
Load				59,500 lbs
Total Load				62,374 lbs

89% of capacity

Rigging List

Project Clarendon
 Customer JAM Description Next Beams

Liebherr LTM 1220-5.2

100' Telescopic Boom (T) at 64.5°
 Base: 100% Outriggers (29.2' x 27.2')
 Counterweight: 163,100 lbs
 39' Lift Radius (360°)
 Crane Capacity at 39' = 122,100 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
Total Rigging Weight				4,228 lbs
Load				119,000 lbs
Total Load				123,328 lbs

99% of capacity

<http://www.3dliftplan.com/Print/RiggingList.aspx>
 5/23/2016

Main Boom Lift Capacity Charts - Imperial

Fully Extended Outriggers - 360° Rotation (All Capacities Are Listed In Pounds)										
Radius (ft)	Boom Length (ft)									Radius (ft)
	35.6	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	17,300	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

→ LINK-BELL RTC 8050 APPROX 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.)						Crosby DT 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.

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.

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

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	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	1.08	.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		