



CCS Constructors LLC

Supply & Erect Structural Steel and Precast
Crane Service Rigging Pile Driving Heavy Hauling



Erection Plan for Steel Bridge Girders Rochester, VT, Bridge No. 19 Project # ER - BRF 0162(18)

10/07/2014

Procedure

The erection will be performed utilizing two truck cranes: a 275-ton hydraulic Grove **GMK 5275**, and a 90-ton hydraulic Grove **TMS 900E**. Both cranes are to be outfitted with all of the manufacturer's supplied counterweights, and are to setup as shown on the layout drawing, drawing **No. 1**. The erection shall not be performed during windy conditions.

Rigging sizes shown are minimum; larger rigging is permissible. Crane radii are shown on layout drawing **No. 1** and shall not be exceeded without crane capacity verification. The **GMK5275** is to be used to pick and set girders. It shall be outfitted with 40' - 1 1/4" min. diameter cables and a 40' HSS8x8x1/4 spreader beam with 4- 25 ton shackles supporting 25-ton beam clamps at each end, as shown in **SK-1**.

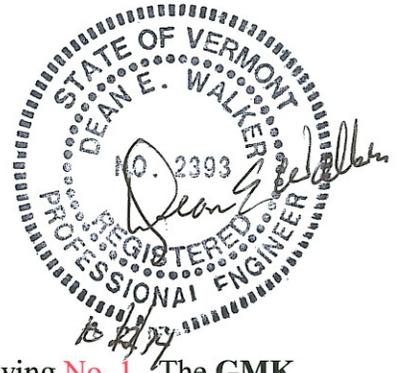
Bolts shall be installed and torqued according to the project specifications. All nuts at the anchor bolts, including the nuts above the bottom flange, shall be fully tightened before slackening hoist lines at the setting crane (**GMK 5275**).

Erection Plan Drawing Schedule:

- Drawing **No. 1** Crane and girder layout
- Sketch **SK-1** Rigging for girder pick
- Sketch **SK-2** Holding location and temporary top flange chain detail

STEP #1: Set Girder G102:

Girder **G102** is to be positioned next to the **GMK5275** as shown in drawing **No. 1**. The **GMK 5275** is to pick and set the girder **G102** using the rigging described above and shown in **SK-1**, and is to remain hooked on. The **TMS 900E** is to hook on to the top flange at 46'-0" from the abutment **1** end of the girder (45'-6" from the center of the abutment **1** bearing) with a single 25-ton beam clamp, as shown in **SK-2**. The top flange of girder **G102** is to be chained to the adjacent girder anchor bolts under the lower nuts at both ends (bearing locations) as shown in sketch **SK-2** for lateral stability. Once the holding crane has applied tension for maintaining the girder camber and the four chain binders are in place, the **GMK 5275** may unhook. The **TMS 900E** is to remain hooked on.





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STEP #2: Set Girder G101:

Girder **G101** is to be positioned next to crane as shown in drawing **No. 1**. The **GMK 5275** is to pick and set the girder **G1** using the same rigging described above and shown in **SK-1**, and is to remain hooked on. A telescoping forklift, large excavator (already on-site,) is to set three diaphragms minimum, which connect **G101** and **G102** together. (The machine used shall have capacity to lift over 300 lbs at the diaphragm installation location.) The diaphragms closest to the ends of the girders are required as well as either the center-span diaphragm (3 diaphragms total installed) or two other intermediate diaphragms (4 diaphragms total installed). Once all connection bolts at the required diaphragms have been installed snug-tight, both cranes may gradually and simultaneously slacken hoist lines and unhook. After the cranes unhook, the chain binders are no longer required and may be removed.

The remaining diaphragms between girders **G101** and **G102** shall be installed with all bolts snug-tight prior to ending work for the day or preceding onto the next step.

STEP #3: Set Girder G103:

Girder **G103** is to be positioned next to the **GMK5275** as shown in drawing **No. 1**. The **GMK 5275** is to pick and set the girder **G103** using the same rigging described above and shown in **SK-1**, and is to remain hooked on. The **TMS 900E** is to set three diaphragms minimum, which connect **G102** and **G103** together. Similarly to step #2, the diaphragms closest to the ends of the girders are required as well as either the center-span diaphragm (3 diaphragms total installed) or two other intermediate diaphragms (4 diaphragms total installed). Once all connection bolts at the required diaphragms have been installed snug-tight, the **GMK 5275** may unhook.

The remaining diaphragms between girders **G102** and **G103** shall be installed with all bolts snug-tight prior to ending work for the day or preceding on to the next step.

STEP #4: Set Girder G104 & G105:

Girder **G104** is to be positioned next to the **GMK5275** as shown in drawing **No. 1**. The **GMK 5275** is to pick and set the girder **G104** using the same rigging described above and shown in **SK-1**, and is to remain hooked on. The **TMS 900E** is to set three diaphragms minimum, which connect **G103** and **G104** together. Similarly to the previous steps, the diaphragms closest to the ends of the girders are required as well as either the center-span diaphragm (3 diaphragms total installed) or two other intermediate diaphragms (4 diaphragms total installed). Once all connection bolts at the required diaphragms have been installed snug-tight, the **GMK 5275** may unhook.

The remaining diaphragms between girders **G103**, **G104** and **G105** shall be installed with all bolts snug-tight prior to ending work for the day.

STEP #5: Complete installation of bolts:

See the project drawings and specifications for bolt torque requirements.

GIRDER WEB TO BE PLUMB AFTER ALL CONNECTIONS AND ADJUSTMENTS

$\# \frac{1}{2}$ " flange hook

2-ton chain binder typ.

BEARING STIFFENERS

SET BOLTS PLUMB

wrap around A.B. typ.

T.O. Abutment seat

GIRDER VIEW A-A

crane block

hold with TMS ROPE

≈ 20 lb. incl. block

2-ton chain binder (both sides)

25-ton br. clamp

2-ton chain binder (both sides)

Girder web

45'-6"

78'-6"

6" bearing Abutment 1

6" bearing Abutment 2

Girder Elevation: N.T.S.



* minimum, larger size permissible

CCS CONSTRUCTORS
138 MUNSON AVE.
MORRISVILLE, VT 05661
PH. 802-888-7701
FX. 802-888-4746

PROJECT NAME
Rochester

10/22/14

PROJECT NO.
BRF 0162(18)

Girder G2 top flg stabilization

DRAWING NO.

SCALE $\frac{1}{2}" = 10'$

DATE 10-17-2014

SK-2

Q M K 5275 Girder Pick : girder wt = 25.6 k

Rigging:

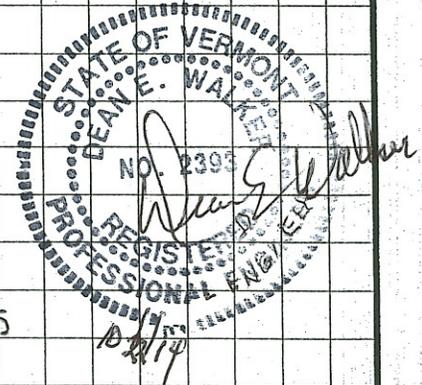
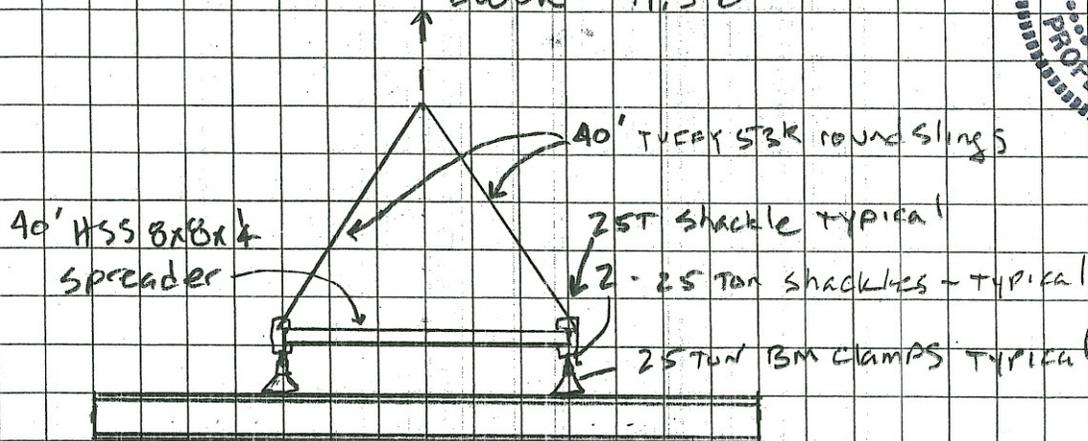
25 ton BM clamps 0.3k x 2 = 0.6 k
 25 ton shackles 0.03k x 6 = 0.2 k
 HSS 8x8x1/4 spreader 1.6 k
 40' x 53k Round slings .4 k

Block 2.5 k
 Load line 0.6 k

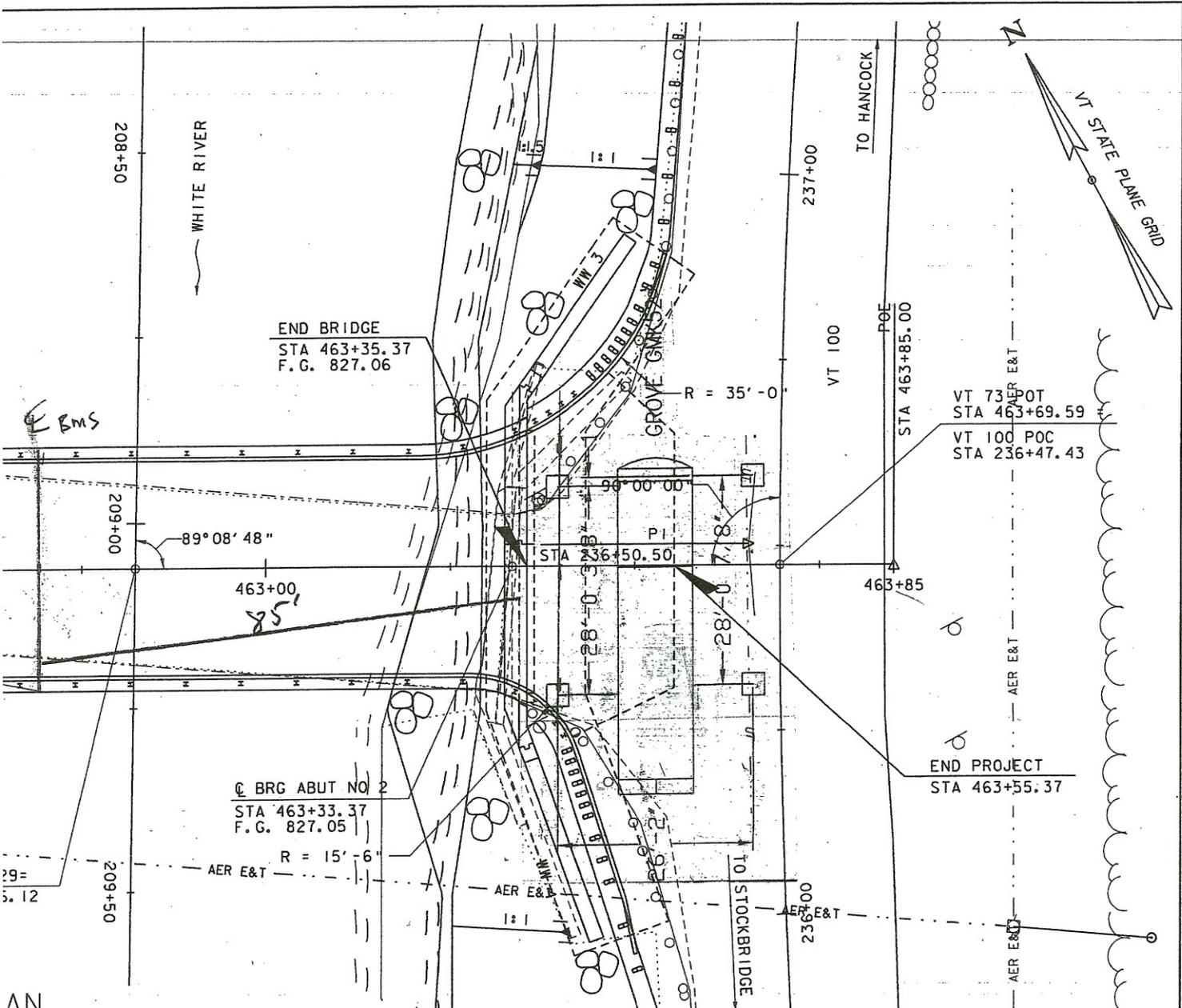
5.72 k

crane capacity @ 133.4' boom, 169,700 lb counterweights
 R = 95' = 44 k

Total
 Pick including
 Block = 41.3 k



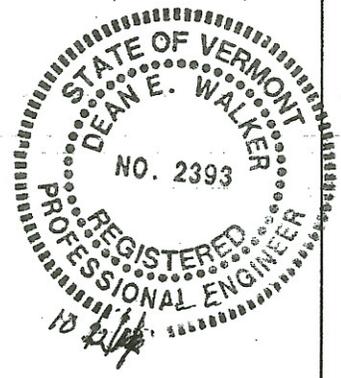
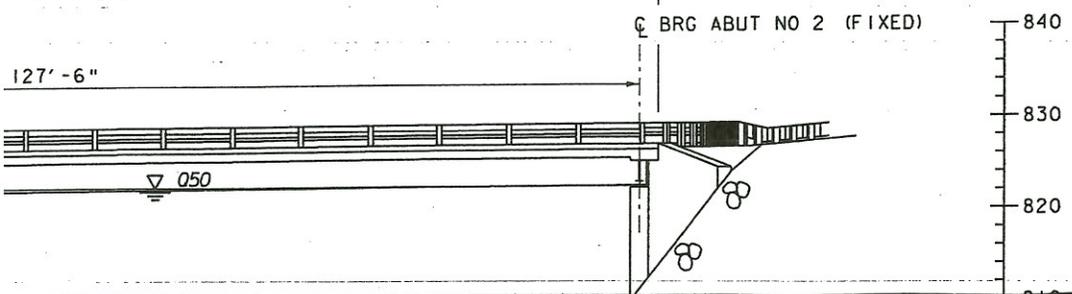
CCS CONSTRUCTORS 138 MUNSON AVE. MORRISVILLE, VT 05661 PH. 802-888-7701 FX. 802-888-4746	PROJECT NAME Rochester Bridge #19		PROJECT NO. BRFD162(18)
	Girder Pick Rigging		DRAWING NO. SK-1
	SCALE NTS	DATE 10-17-2014	



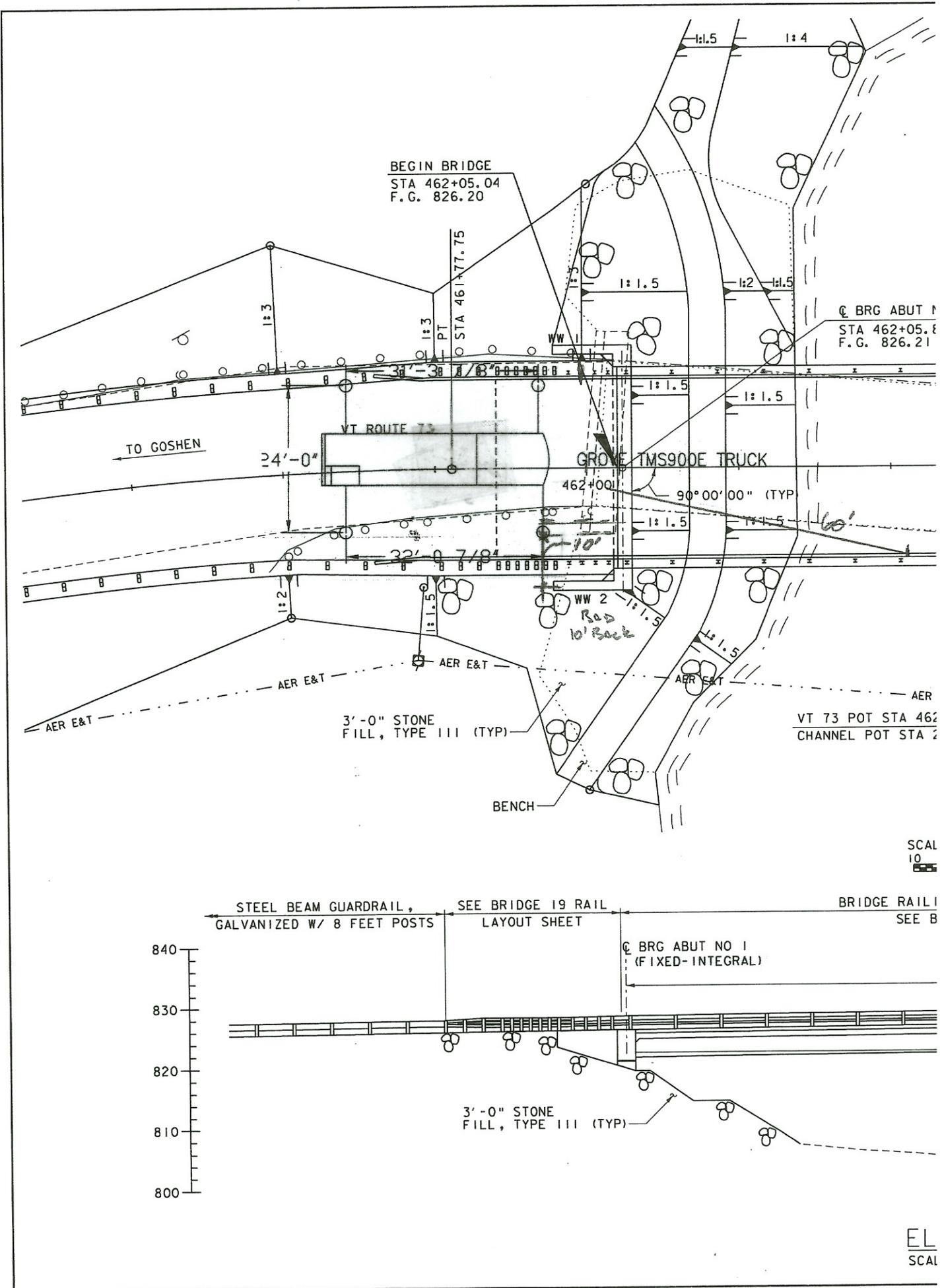
AN
= 10'-0"
10

ALVANIZED 2 RAIL BOX BEAM
19 RAIL LAYOUT SHEET

SEE BRIDGE 19 RAIL
LAYOUT SHEET



CCS CONSTRUCTORS 138 MUNSON AVE. MORRISVILLE, VT 05661 PH. 802-888-7701 FX. 802-888-4746	PROJECT NAME <i>Rochester BRIDGE 19</i>	PROJECT NO. <i>ER-BRE 0162CR</i>
	SCALE <i>NTS</i>	DATE <i>10-21-2014</i>



BEGIN BRIDGE
 STA 462+05.04
 F.G. 826.20

© BRG ABUT NO 1
 STA 462+05.8
 F.G. 826.21

TO GOSHEN

VT ROUTE 73

GROVE TMS900E TRUCK

462+00.0 90°00'00" (TYP)

WW 2
 Red
 10' Back

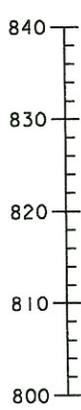
3'-0" STONE FILL, TYPE III (TYP)

VT 73 POT STA 462
 CHANNEL POT STA 2

BENCH

SCALE
 1" = 10'

STEEL BEAM GUARDRAIL, GALVANIZED W/ 8 FEET POSTS SEE BRIDGE 19 RAIL LAYOUT SHEET BRIDGE RAIL 1 SEE B



© BRG ABUT NO 1 (FIXED-INTEGRAL)

3'-0" STONE FILL, TYPE III (TYP)

EL
 SCALE

	Crane with 169 700 lbs (77 t) counterweight							
	Outrigger base - length 28.1 ft - width 26.6 ft							
	Main boom - fixed length in ft							
	117.1	117.2	118.0	119.1	132.0	132.4	133.4	134.5
Tel. sec. I	0.00	0.00	0.00	0.50	0.00	0.00	0.50	1.00
Tel. sec. II	0.00	0.00	0.50	0.50	0.00	0.50	0.50	0.50
Tel. sec. III	0.00	0.50	0.50	0.50	0.00	0.50	0.50	0.50
Tel. sec. IV	0.50	0.50	0.50	0.50	1.00	0.50	0.50	0.50
Tel. sec. V	1.00	0.50	0.50	0.50	1.00	0.50	0.50	0.50
Tel. sec. VI	1.00	1.00	0.50	0.00	1.00	1.00	0.50	0.00
Slewing range	360°							
Radius in feet	Lifting capacities in 1000 lbs							
20.0	62.0	76.0	116.0	144.0	61.0	78.0	106.0	106.0
25.0	55.0	67.0	108.0	140.0	56.0	71.0	106.0	106.0
30.0	49.0	60.0	98.0	129.0	51.0	64.0	101.0	105.0
35.0	43.6	55.0	90.0	118.0	46.0	58.0	94.0	96.0
40.0	38.8	50.0	82.0	108.0	41.2	53.0	87.0	88.0
45.0	35.6	46.0	76.0	99.0	38.0	49.0	81.0	80.0
50.0	32.8	41.8	71.0	92.0	35.2	45.0	76.0	73.0
55.0	30.2	38.6	66.0	85.0	32.6	42.0	72.0	67.0
60.0	28.0	36.0	62.0	79.0	30.4	39.4	67.0	61.0
65.0	26.2	33.8	58.0	72.0	28.6	37.0	63.0	56.0
70.0	24.6	32.0	55.0	66.0	26.8	35.0	60.0	52.0
75.0	22.6	30.2	51.0	61.0	25.0	33.2	57.0	48.0
80.0	20.6	28.6	48.0	55.0	23.2	31.4	54.0	45.0
85.0	19.4	27.2	46.0	51.0	20.8	30.0	51.0	41.0
90.0	18.4	25.8	42.6	46.0	19.4	28.6	48.0	38.4
95.0	17.4	24.8	40.2	42.4	18.4	27.4	44.0	36.2
100.0	16.6	23.4	38.2	37.2	17.4	26.2	40.8	34.0
105.0					16.4	25.2	37.6	32.0
110.0					15.6	24.2	34.8	30.2
115.0					14.8	23.4	30.4	28.0
SLI Code	2200							
Max. permitted windspeed	14 m/s		11 m/s	9 m/s	12 m/s		9 m/s	

load charts

 37 - 142 ft
 31,500 lbs
 100%
 360°
 Fixed lengths 24'-0"

Feet	36.8	49.9	63.0	76.1	89.3	102.4	115.5	128.6	141.8
8	*180,000								
10	155,000	136,000	129,000	123,000	81,000				
15	116,000	112,000	105,000	99,000	81,000	59,000			
20	88,700	90,350	89,000	84,000	81,000	57,000	42,400	34,000	
25	69,950	72,200	72,400	71,150	71,000	51,000	42,400	34,000	26,600
30		56,350	57,000	58,150	56,950	46,000	39,600	33,800	26,600
35		46,600	47,550	47,400	46,200	41,600	35,800	32,000	26,600
40			39,750	39,600	38,450	38,200	32,200	29,400	26,600
45			33,550	33,500	32,600	33,600	29,400	27,000	24,800
50			28,300	28,300	29,400	28,600	26,600	24,800	22,800
55				24,250	25,350	24,600	24,800	22,800	21,200
60				22,000	22,150	21,450	21,750	20,300	19,800
65				19,550	19,550	19,400	19,100	18,800	18,200
70					17,300	17,600	16,900	16,750	16,200
75					15,400	15,750	15,200	14,900	14,350
80						14,100	13,750	13,350	12,750
85						12,700	12,350	11,950	11,400
90						11,500	11,150	10,850	10,300
95							10,100	9,770	9,250
100							9,140	8,810	8,290
105								7,950	7,430
110								7,180	6,670
115								6,480	5,980
120									5,340
125									4,760
130									4,230

* Requires special equipment

 37 - 142 ft
 31,500 lbs
 100%
 360°
 Telescoping 24'-0"

Feet	36.8 - 49.9	49.9 - 63.0	63.0 - 76.1	76.1 - 89.3	89.3 - 102.4	102.4 - 115.5	115.5 - 128.6	128.6 - 141.8
10	74,000	68,000	63,000	62,000				
15	72,000	65,000	60,000	57,000	54,000			
20	70,000	63,000	57,000	52,000	50,000	37,400	28,600	
25	67,000	59,000	55,000	50,000	46,000	37,400	28,600	22,400
30	55,000	55,000	53,000	48,000	41,600	34,000	28,600	20,800
35	45,000	46,000	47,400	46,000	37,800	31,000	27,400	18,800
40		38,850	39,600	38,450	34,600	28,200	25,400	16,800
45		33,200	33,500	32,600	31,800	26,000	23,200	15,200
50		28,300	28,300	27,750	28,600	24,000	21,200	14,000
55			24,250	23,750	24,600	22,600	19,800	12,800
60			21,050	22,150	21,450	20,800	18,400	11,800
65			18,600	19,550	18,800	19,100	17,000	10,800
70				17,300	16,650	16,900	16,000	10,200
75				15,400	15,550	15,050	14,900	9,600
80					13,950	13,450	13,350	9,000
85					12,700	12,100	11,950	8,400
90					11,500	10,900	10,850	8,000
95						9,850	9,770	7,600
100						8,890	8,810	7,200
105							7,950	6,800
110							7,180	6,400
115							6,480	5,980
120								5,340
125								4,760
130								4,230

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.