MILLER CONSTRUCTION, INC.

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TRANSMITTAL

TO: Kristin M. Higgins, PE Project Manager Vermont Agency of Transportation	DATE	PROJECT NO.
	12/20/2013	Barnard ER BRF 0241 (39)

XX WE ENCLOSE THE FOLLOWING: _____ UNDER SEPARATE COVER WE ARE SENDING THE FOLLOWING

COPIES	NUMBER	DESCRIPTION	CODE
1		Lifting Loop Calculations Dated 11/11/13	H
1		Shop Drawings Dated 12/18/13	H
		Sheets C1, F1-F4, NB1-NB3, AS1-AS2, AB1-AB3, WW1, M1	

CODE:

A FOR INITIAL APPROVAL
B FOR FINAL APPROVAL
C APPROVED AS NOTED-RESUBMISSION REQUIRED
D APPROVED AS NOTED-RESUBMISSION NOT REQUIRED
E DISAPPROVED-RESUBMIT
F QUOTATION REQUESTED
G APPROVED
H FOR APPROVAL
I AS REQUESTED OR REQUIRED
J FOR USE IN ERECTION
K LETTER FOLLOWS
L FOR FIELD CHECK
M FOR YOUR USE

BY: Paul [illegible]

BARNARD BRIDGE
JPC # 23413-013

LIFTING LOAD & INSERT DESIGN CALCULATIONS
(WORK W/ CARRARA SHOP DWGS)

NEXT BEAMS (36D)

WT OF BEAM: 73.38 T

THERE ARE (4) LIFT POINTS AND ASSUME A 60° SLING ANGLE W/ THE HORIZONTAL

$$\text{LOAD/LIFT POINT} = \frac{73.38 \times 2}{0.866 \times 4} = 42.4^{k}$$

FROM ATTACHED PCI LITERATURE

USE (4) 0.600"φ X 270 KSI STRAND HAULOOPS PER LOCATION, MID EMBEDMENT = 34"

$$SWL = 1.1\left(\frac{41.0 + 29.0}{2}\right) \times \sqrt{\frac{8000}{3000}} = 62.9^{k} \quad \text{, O.K.}$$

AS $f'_{ci} = 8000$ PSI & $f'_c = 10000$ PSI

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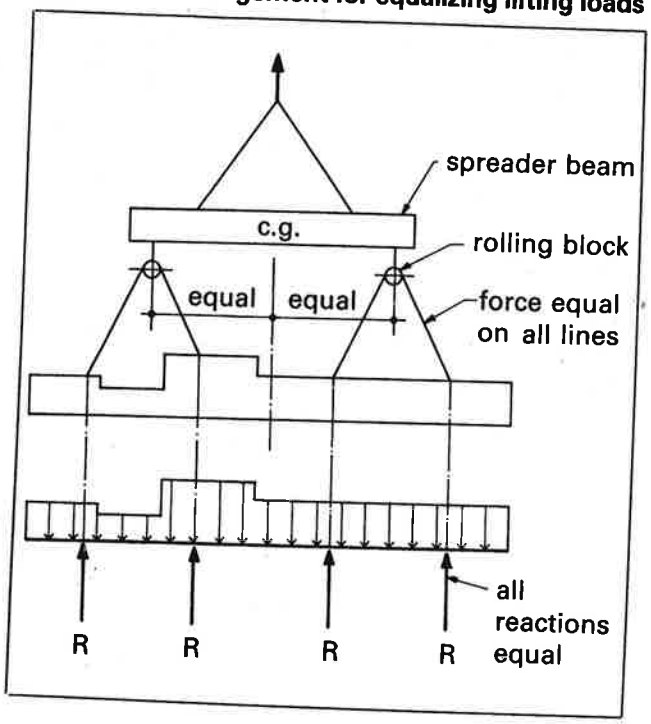
REGISTERED
PROFESSIONAL ENGINEER

Fig. 5.2.10 Arrangement for equalizing lifting loads



lines equal. The member can then be analyzed as a beam with varying load supported by equal reactions.

The force in inclined lift lines can be determined from Fig. 5.2.7.

5.2.8 Handling devices

The most common lifting devices are prestressing strand or cable loops projecting from the concrete, threaded inserts, or special proprietary devices.

Since lifting devices are subject to dynamic loads, ductility of the material is part of the design requirement. Deformed reinforcing bars should not be used since the deformations result in stress concentrations from the shackle pin. Also, reinforcing bars are often hard-grade or re-rolled rail steel with little ductility and low impact strength at cold temperatures. Smooth bars of a known steel grade may be used if adequate embedment or mechanical anchorage is provided. The diameter must be such that localized failure will not occur by bearing on the shackle pin.

Prestressing strand is often used for lifting loops. The variables involved make it almost impossible to calculate a capacity which can be used for all situations. Generally, producers will establish standard criteria for use in handling the standard products manufactured by that plant. Table 5.2.3 is an example which has been used successfully.

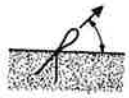
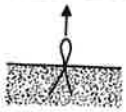
Reduced capacities for shorter embedment lengths may be suitable. In shallow products, providing a 90° bend can reduce the required embedment length significantly. Lightly rusted strand has better bond than bright strand.

The diameter of the bend of the loop should be at least 4 in. For smaller diameters, the loop capacities in Table 5.2.3 should be reduced to:

1 in. dia. — 70 %
2 in. dia. — 85 %
3 in. dia. — 90 %

The angle of incline of lifting has little effect on the strand lifting loop capacity if the angle from the horizontal is more than about 20°. Typical handling methods are usually such that this angle is no less than 60°.

Table 5.2.3 Capacity of ½ in. diameter, 270 ksi strands used as lifting loops

Lifting angle	Embedment length (in.)	Single loop (kips)	Double loop (kips)	Triple loop (kips)
45 degrees 	16	5	8.5	11.5
	22	8	13	17.5
	28	10	18	23
	34	11	23	29
Vertical 	16	7.5	12.5	16.5
	22	11.5	19	24.5
	28	15.5	25.5	33
	34	16	32.5	41

1. These values are limited by slippage rather than strand strength, with a factor of safety of 4. For other strand diameters, multiply table values by 0.75 for ⅜ in. diameter, 0.85 for 7/16 in. diameter, and 1.1 for 0.6 in. diameter.
2. Minimum f'_c = 3000 psi.
3. Multiple strand loops must be fabricated to ensure equal force on each strand.

APPROACH SLABS

$WT = 1.25 \times 20.0 \times 7.13 \times 150 / 1000 = 26.74^k$

THERE ARE (4) LIFTING C/S POINTS E.W.E

ASSUME 60° SLING ∠ WITH THE HORIZONTAL

LOAD/LIFTER = $\frac{26.74}{4 \times 0.866} = 7.72^k$

FROM ATTACHED PRODUCT LITERATURE

USE 4" x 7½, S.L. SWL (4:1 S.F.) = 8^k, OK

ALSO CHECK SLAB FLEXURE DURING HANDLING

LIFT POINTS ARE APPROX C/S POINTS

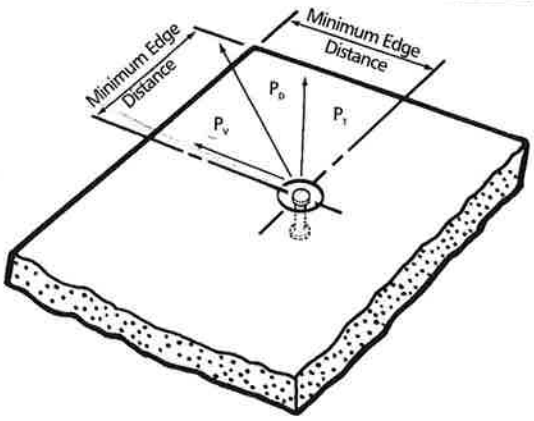
$M = 0.025\, wl^2 = 0.025 \times 1.3 \times 187.5 \times 20^2 = 2438$ LB-FT/FT

$S = bh^2/6 = 12 \times 15^2/6 = 450\ in^3$

$f = M/S = 2438 \times 12 / 450 = 65$ PSI << $5\sqrt{3500} = 296$ PSI, OK

[SLAB IS 20' LONG, 15" THICK & USE 1.3 HANDLING FACTOR]

P-52 Swift Lift® Anchor Tensile and Shear Capacity



When anchors are used in the face of thin concrete elements

The following table lists the P-52 Swift Lift Anchors that are currently manufactured. Other sizes and lengths are available on special order. However, the sizes and lengths of anchors shown will handle the majority of flat precast concrete elements.

When the P-52 Swift Lift Anchor is properly embedded in normal weight concrete, the tabulated working loads are applicable for any direction of load. This applies even if the direction of load is parallel to the axis of the anchor, perpendicular to it or at any other angle.

Minimum distance between anchors is twice the minimum edge distance.

It is critical to remember that in order to obtain the safe working loads listed in the table below, the normal weight concrete must have obtained the minimum concrete strength shown, prior to initial load application.

Swift Lift Anchor Ton x Length	Safe Working Load	Minimum Concrete Strength	Minimum Edge Distance
1 ton x 2-5/8"	1,700 lbs.	3,500 psi	8"
1 ton x 3-3/8"	2,000 lbs.	2,200 psi	10"
1 ton x 4-3/8"	2,000 lbs.	1,600 psi	10"
1 ton x 8"	2,000 lbs.	1,600 psi	10"
1 ton x 9-1/2"	2,000 lbs.	1,600 psi	10"
2 ton x 2-3/4"	2,100 lbs.	3,500 psi	8"
2 ton x 3-3/8"	2,900 lbs.	3,500 psi	10"
2 ton x 5-1/2"	4,000 lbs.	1,600 psi	13"
2 ton x 6"	4,000 lbs.	1,600 psi	13"
2 ton x 6-3/4"	4,000 lbs.	1,600 psi	13"
2 ton x 11"	4,000 lbs.	1,600 psi	14"
4 ton x 3-3/4"	4,000 lbs.	3,500 psi	12"
4 ton x 4-1/4"	4,900 lbs.	3,500 psi	13"
4 ton x 4-3/4"	5,800 lbs.	3,500 psi	14"
4 ton x 5-1/2"	7,400 lbs.	3,500 psi	17"
4 ton x 5-3/4"	7,900 lbs.	3,500 psi	17"
4 ton x 7-1/8"	8,000 lbs.	1,800 psi	20"
4 ton x 9-1/2"	8,000 lbs.	1,600 psi	17"
4 ton x 14"	8,000 lbs.	1,600 psi	18"
4 ton x 19"	8,000 lbs.	1,600 psi	20"
8 ton x 4-3/4"	6,400 lbs.	3,500 psi	16"
8 ton x 6-3/4"	11,200 lbs.	3,500 psi	21"
8 ton x 10"	16,000 lbs.	3,500 psi	19"
8 ton x 13-3/8"	16,000 lbs.	1,600 psi	23"
8 ton x 26-3/4"	16,000 lbs.	1,600 psi	27"
20 ton x 10"	25,000 lbs.	3,500 psi	24"
20 ton x 19-3/4"	40,000 lbs.	3,500 psi	31"

Safe Working Loads provide a factor of safety of approximately 4 to1 in normal weight concrete. Safe Working Load is based on anchor setback from face of concrete "X" dimension, as shown on page 26.

ABUTMENTS

WT OF HEAVIEST ABUTMENT 36.44^T

THERE ARE (2) LIFT POINTS AT TOP EDGE ASSUME A VERTICAL SLING ANGLE W/THE HORIZONTAL

LOAD/LIFT POINT = $36.44 \times 2 / 2 = 36.4^K$

FROM ATTACHED PRODUCT LITERATURE

USE (2) $20^T \times 19\frac{3}{4}'$ S.L.

SWL = 40^K / PAIR.

WING WALLS

WT = 10.22T

STRIPPING

THERE ARE (4) LIFTERS IN BACK FACE

LOAD/LIFTER = 10.22 X 2 / 4 = 5.11K

FROM ATTACHED PRODUCT LITERATURE,

USE 4" X 5½" S.L. SWL = 7400 LB > 5.11K, OK

ERECTION

THERE ARE (2) LIFTERS @ TOP EDGE & ROTATE PANEL AROUND BOTTOM EDGE

SINGLE LOAD/LIFTER = 10.22 X 2 / 2X2 = 5.11K

USE 8" X 13⅞" S.L. SWL = 21.2 / 4 = 5.3K > 5.11K, OK

(CONSIDERING INTO ¾" PLYWOOD)

d_e = 9" ∴ S.F. = 4.1

(BY ATTACHED PCI TABLE 4.20.7)

TENSION LOAD/LIFTER = 10.22X2 / 2 = 10.22K.

USE 8" X 13⅞ S.L. SWL = 16K d_e = 9"

O.K. (BY ATTACHED S.L. IN THIS WINGS CAPACITY CHART, SWL 13700 LB IN 12" THICK WALL > 10.22K).

CHECK FLEXURE DURING HANDLING – ROLL UP CONTROLS

$M = wl^2/8 = 1.3 \times 225 \times 9.5^2/8 = 3300$ LB-FT/FT

$S = bh^2/6 = 12 \times 18^2/6 = 648$ IN³/FT

$f = M/S = 3300 \times 12/648 = 61$ PSI $< 5\sqrt{3500} = 296$ PSI

[WALL IS 9'-6" HIGH, 18" THICK & USE 1.3 HANDLING FACTOR]

Table 6.20.7 Shear strength of welded headed studs and bolts

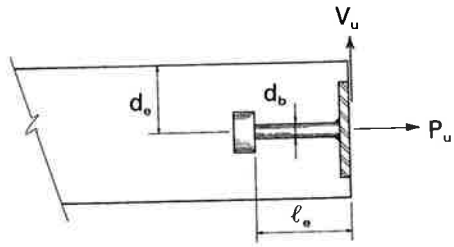


Table 6.20.7 Shear strength of welded headed studs and bolts

		Maximum Design Shear Strength, ϕV_c, Limited by Concrete Strength (kips)											
		Normal weight concrete (λ = 1.0)						Sand-lightweight concrete (λ = 0.85)					
		Diameter, d_b, in.						Diameter, d_b, in.					
f'_c	Edge dist., d_e	¼	⅜	½	⅝	¾	⅞	¼	⅜	½	⅝	¾	⅞
4000 psi	2	1.4	1.4	1.4	1.4	1.4	1.4	1.1	1.1	1.1	1.1	1.1	1.1
	3	2.1	3.0	3.0	3.0	3.0	3.0	1.8	2.6	2.6	2.6	2.6	2.6
	4	2.1	4.7	5.4	5.4	5.4	5.4	1.8	4.0	4.6	4.6	4.6	4.6
	5	2.1	4.7	8.4	8.4	8.4	8.4	1.8	4.0	7.2	7.2	7.2	7.2
	6	2.1	4.7	8.4	12.2	12.2	12.2	1.8	4.0	7.2	10.3	10.3	10.3
	7	2.1	4.7	8.4	13.2	16.5	16.5	1.8	4.0	7.2	11.2	14.1	14.1
	8	2.1	4.7	8.4	13.2	19.0	21.6	1.8	4.0	7.2	11.2	16.1	18.4
	9 or more	2.1	4.7	8.4	13.2	19.0	25.8	1.8	4.0	7.2	11.2	16.1	22.0
5000 psi	2	1.5	1.5	1.5	1.5	1.5	1.5	1.3	1.3	1.3	1.3	1.3	1.3
	3	2.4	3.4	3.4	3.4	3.4	3.4	2.0	2.9	2.9	2.9	2.9	2.9
	4	2.4	5.3	6.0	6.0	6.0	6.0	2.0	4.5	5.1	5.1	5.1	5.1
	5	2.4	5.3	9.4	9.4	9.4	9.4	2.0	4.5	8.0	8.0	8.0	8.0
	6	2.4	5.3	9.4	13.6	13.6	13.6	2.0	4.5	8.0	11.6	11.6	11.6
	7	2.4	5.3	9.4	14.7	18.5	18.5	2.0	4.5	8.0	12.5	15.7	15.7
	8	2.4	5.3	9.4	14.7	21.2	24.2	2.0	4.5	8.0	12.5	18.0	20.5
	9 or more	2.4	5.3	9.4	14.7	21.2	28.9	2.0	4.5	8.0	12.5	18.0	24.6
6000 psi	2	1.7	1.7	1.7	1.7	1.7	1.7	1.4	1.4	1.4	1.4	1.4	1.4
	3	2.6	3.7	3.7	3.7	3.7	3.7	2.2	3.2	3.2	3.2	3.2	3.2
	4	2.6	5.8	6.6	6.6	6.6	6.6	2.2	4.9	5.6	5.6	5.6	5.6
	5	2.6	5.8	10.3	10.3	10.3	10.3	2.2	4.9	8.8	8.8	8.8	8.8
	6	2.6	5.8	10.3	14.9	14.9	14.9	2.2	4.9	8.8	12.7	12.7	12.7
	7	2.6	5.8	10.3	16.2	20.3	20.3	2.2	4.9	8.8	13.7	17.2	17.2
	8	2.6	5.8	10.3	16.2	23.3	26.5	2.2	4.9	8.8	13.7	19.8	22.5
	9 or more	2.6	5.8	10.3	16.2	23.3	31.7	2.2	4.9	8.8	13.7	19.8	26.9

Maximum Design Shear Strength, V_s, of Studs Limited by Steel Strength (kips)*	Diameter	¼	⅜	½	⅝	¾	⅞
	V_s	2.2	5.0	8.8	13.8	19.9	27.1

*See Table 6.20.13 for bolts

DAYTON® SUPERIOR

Swift Lift® Anchor Effective Tensile Capacity in Thin Walls

Swift Lift Anchor Tons x Length	Effective Wall Thickness 2de	Actual Edge Distance de	Tensile Safe Working Load Per Anchor — Actual Corner Distance 12"	18"	24"	36"	45"
8 Tons x 13-3/8" Long	4-3/4"	2-3/8"	4,000 lbs.	4,800 lbs.	5,400 lbs.	6,000 lbs.	6,100 lbs.
	5"	2-1/2"	4,200 lbs.	5,100 lbs.	5,700 lbs.	6,300 lbs.	6,400 lbs.
	6"	3"	5,100 lbs.	6,100 lbs.	6,800 lbs.	7,500 lbs.	7,600 lbs.
	7"	3-1/2"	5,900 lbs.	7,100 lbs.	8,000 lbs.	8,800 lbs.	8,900 lbs.
	8"	4"	6,800 lbs.	8,100 lbs.	9,100 lbs.	10,100 lbs.	10,200 lbs.
	10"	5"	8,500 lbs.	10,200 lbs.	11,400 lbs.	12,600 lbs.	12,700 lbs.
	12"	6"	10,200 lbs.	12,200 lbs.	13,700 lbs.	15,100 lbs.	15,200 lbs.
8 Tons x 25-3/4" Long	4-3/4"	2-3/8"	5,800 lbs.	7,000 lbs.	8,000 lbs.	9,600 lbs.	11,200 lbs.
	5"	2-1/2"	6,100 lbs.	7,400 lbs.	8,500 lbs.	10,100 lbs.	11,800 lbs.
	6"	3"	7,300 lbs.	8,900 lbs.	9,500 lbs.	12,100 lbs.	14,100 lbs.
	7"	3-1/2"	8,500 lbs.	10,300 lbs.	11,800 lbs.	14,200 lbs.	16,000 lbs.
	8"	4"	9,700 lbs.	11,800 lbs.	13,500 lbs.	16,000 lbs.	16,000 lbs.
	10"	5"	12,100 lbs.	14,800 lbs.	16,000 lbs.	16,000 lbs.	16,000 lbs.
	12"	6"	14,500 lbs.	16,000 lbs.	16,000 lbs.	16,000 lbs.	16,000 lbs.

Safe Working Load provides a factor of safety of approximately 4 to 1 in 4,500 psi normal weight concrete.

Swift Lift Anchor Tons x Length	Effective Wall Thickness 2de	Actual Edge Distance de	Tensile Safe Working Load Per Anchor — Actual Corner Distance 10"	16"	24"	30"	42"
20 Tons x 19-3/4" Long	6-1/2"	3-1/4"	6,200 lbs.	7,500 lbs.	9,400 lbs.	10,300 lbs.	11,500 lbs.
	7"	3-1/2"	6,700 lbs.	8,100 lbs.	10,100 lbs.	11,100 lbs.	12,400 lbs.
	8"	4"	7,600 lbs.	8,900 lbs.	11,500 lbs.	12,600 lbs.	14,200 lbs.
	10"	5"	9,500 lbs.	11,600 lbs.	14,400 lbs.	15,800 lbs.	17,700 lbs.
	12"	6"	11,500 lbs.	14,000 lbs.	17,300 lbs.	19,000 lbs.	22,000 lbs.
	14"	7"	13,400 lbs.	16,300 lbs.	20,100 lbs.	22,100 lbs.	24,800 lbs.

Safe Working Load provides a factor of safety of approximately 4 to 1 in 4,500 psi normal weight concrete.

To recalculate the safe working load when the anchor is used in a lower strength concrete, multiply the tabulated Safe Working Load by the following reduction factors:

Concrete Strength	Reduction Factor
2,000 psi	.66
2,500 psi	.74
3,000 psi	.81
3,500 psi	.88
4,000 psi	.94
4,500 psi	1.00

ABUTMENT & WING WALL GENERAL NOTES

1. MIN. CONCRETE STRENGTH AT 28 DAYS SHALL BE 5,000 PSI.
2. MIN. CONCRETE STRENGTH AT STRESS TRANSFER SHALL BE 3,500 PSI.
3. REINFORCING STEEL SHALL BE GR-60, ASTM A-615 (AASHTO M31) LEVEL II (DUAL COATED) OR EPOXY COATED (AS NOTED ON SHOP DRAWINGS).
4. THE TOP OF ABUTMENTS SHALL RECEIVE A RAKE FINISH ROUGHENED TO 1/4" AMPLITUDE (UNLESS NOTED OTHERWISE).
5. THE TOP OF WING WALLS SHALL RECEIVE A SMOOTH FLOAT FINISH (UNLESS NOTED OTHERWISE).
6. SHEAR KEY SURFACES SHALL BE BLASTED CLEAN.
7. PRECAST CONCRETE UNITS SHALL BE HANDLED AND ERECTED USING THE LIFTING INSERTS ONLY. THE MINIMUM SLING ANGLE FROM THE HORIZONTAL SHALL BE 60°. NON-PRESTRESSED UNITS SHALL BE STORED & TRANSPORTED WITH TIMBER SUPPORTS AT 5th POINTS, UNLESS APPROVED BY J.P. CARRARA & SONS, INC.
8. MATERIAL SPECIFICATION AND MIX DESIGN SHALL CONFORM TO VERMONT SPEC. P510.02 AND P510.05 RESPECTIVELY.

   DESIGN MIX:

   WING WALLS: J.P.C. BRIDGE MIX #445MSCC
   APPROACH SLABS: J.P.C. BRIDGE MIX #445MSCC
   ABUTMENTS: J.P.C. BRIDGE MIX #445MSCC

9. QUALITY CONTROL PROCEDURES ARE IN ACCORDANCE WITH PCI REQUIREMENTS. J.P. CARRARA & SONS, INC. IS A PCI CERTIFIED PLANT.
10. CURING METHOD: AS SOON AS THE TOP OF PRECAST CONCRETE UNITS ARE FINISHED, A COVER OF RIGID INSULATION AND POLY WILL BE PLACED OVER THE UNIT. NATURAL CURE WITH NO EXTERNAL HEAT APPLIED.
11. ABUTMENT POST-TENSIONING SEQUENCE:
    A. ERECT PRECAST CONCRETE ABUTMENTS, AND POST-TENSION CENTER TENDON TO APPROXIMATELY 5,000 LBS.
    B. GROUT SHEAR KEY.
    C. ONCE SHEAR KEY GROUT HAS ATTAINED A MINIMUM COMPRESSIVE STRENGTH OF 3,000 PSI; POST-TENSION TENDONS TO 32,000 LBS.

NEXT BEAM GENERAL NOTES

1. MIN. CONCRETE STRENGTH AT 28 DAYS SHALL BE 10,000 PSI.
2. MIN. CONCRETE STRENGTH AT STRESS TRANSFER SHALL BE 8,000 PSI.
3. REINFORCING STEEL SHALL BE GR-60, ASTM A-615 (AASHTO M31) LEVEL II (DUAL COATED).
4. PRESTRESSING STRANDS SHALL CONFORM TO ASTM A-416 (AASHTO M203) AND SHALL CONSIST OF 0.60"Φ x 270 KSI 7-WIRE LOW RELAXATION STRANDS.
5. PRESTRESSING STRANDS SHALL EACH BE PULLED TO HAVE A NET TENSION OF **44.0** K AFTER ACCOUNTING FOR CHUCK SLIPPAGE. TENSION SHALL BE VERIFIED BY MEASURING STRAND ELONGATION. (SEE EXAMPLE ELONGATION CALCULATION AND TENSIONING PROCEDURE, THIS SHEET.)
6. ENDS OF PRESTRESSING STRANDS SHALL BE CUT FLUSH WITH END OF NEXT BEAM STEMS (UNLESS NOTED OTHERWISE) AND EPOXY PAINTED.
7. ALL EXPOSED CORNERS SHALL BE CHAMFERED 3/4".
8. THE TOP OF BEAMS SHALL RECEIVE A SMOOTH FLOAT FINISH (UNLESS NOTED OTHERWISE).
9. SHEAR KEY SURFACES SHALL RECEIVE A ROUGHENED SURFACE.
10. BEAMS SHALL BE HANDLED AND ERECTED USING THE LIFTING LOOPS ONLY. RIGGING SHALL BE CONFIGURED SUCH THAT EQUAL FORCES ARE APPLIED TO EACH OF THE TWO LIFTING LOOPS AT EACH END OF THE BEAM. **THE PINS OF THE SHACKLES SHALL BE PLACED THOUGH THE LIFTING LOOPS. SEE DETAIL, THIS SHEET.** BEAMS SHALL BE STORED AND TRANSPORTED WITH TIMBER SUPPORTS WITHIN 2'-0" OF THE BEAM ENDS, UNLESS APPROVED BY J.P. CARRARA & SONS, INC.
11. MATERIAL SPECIFICATION AND MIX DESIGN SHALL CONFORM TO VERMONT SPEC. P510.02 AND P510.05 RESPECTIVELY.

    DESIGN MIX: J.P.C. BRIDGE MIX #430M

12. QUALITY CONTROL PROCEDURES ARE IN ACCORDANCE WITH PCI REQUIREMENTS. J.P. CARRARA & SONS, INC. IS A PCI CERTIFIED PLANT.
13. CURING METHOD: AS SOON AS THE TOP OF BEAM IS FINISHED, A COVER OF INSULATED POLY. THE DESIRED CURING TEMPERATURE RANGE SHALL NOT DROP BELOW 70°F. THE TEMPERATURE SHALL BE RECORDED BY AUTOMATIC SENSOR INSTRUMENTS ON GRAPH CHARTS, SPACED NOT MORE THAN 100' APART AND WILL CONTINUE UNTIL RELEASE STRENGTH IS ACHIEVED. EACH CHART SHALL BE MARKED WITH THE CASTING DATED AND LOCATION OF THE RECORDER. IF NECESSARY TO MAINTAIN CASTING BED TEMPERATURE PRIOR TO CONCRETE PLACEMENT OR TO ACCELERATE EARLY AGE STRENGTH GAIN, EXTERNAL RADIANT HEAT MAY BE EMPLOYED VIA HOT WATER DUCTS BENEATH AND WITHIN THE PERIPHERY OF THE CASTING BED. MAXIMUM CURING TEMPERATURE SHALL NOT EXCEED PCI SPECIFIED LIMITS.
14. OWNER SHALL PROVIDE APPROPRIATE WATERPROOFING TO GROUTED AND/OR EPOXIED SHEAR KEYS. J.P. CARRARA & SONS, INC. SHALL NOT BE HELD LIABLE FOR PROBLEMS ASSOCIATED WITH MOISTURE INFILTRATING GROUTED AND/OR EPOXIED SHEAR KEYS.

DRAWING INDEX

SHT. #	DRAWING TITLE	REV. #	REV. DATE
C1	COVER SHEET		
F1	SUPERSTRUCTURE PLANS		
F2	ABUTMENT ELEVATIONS		
F3	ABUTMENT DETAILS		
F4	TRANSVERSE SECTIONS & DETAILS		
NB1	PRESTRESSED NEXT BEAM DETAILS "W-NB2"		
NB2	PRESTRESSED NEXT BEAM DETAILS "W-NB1"		
NB3	PRESTRESSED NEXT BEAM DETAILS "W-NB3"		
AS1	PRECAST APPROACH SLAB DETAILS "W-AS1"		
AS2	PRECAST APPROACH SLAB DETAILS "W-AS2" & "W-AS3"		
AB1	PRECAST ABUTMENT PLAN, SECTION & DETAILS		
AB2	PRECAST ABUTMENT DETAILS "W-AB2"		
AB3	PRECAST ABUTMENT DETAILS "W-AB1"		
WW1	PRECAST WING WALL DETAILS "W-WW1" & "W-WW2"		
M1	MATERIALS LIST		

DESIGN LIVE LOAD: HL-93

EXAMPLE PRESTRESSING STRAND ELONGATION CALC. AND TENSIONING

(NOT TO BE USED FOR CONSTRUCTION)

SIZE & GRADE: 0.60"Φ x 270 KSI
AREA: 0.217 IN^2
TENSION: 44,000 LB. EACH STRAND
GRIP-TO-GRIP: 252'-0" = 252.00'
Es = 28,600,000 PSI (ASSUMED FOR THESE CALCULATIONS; VALUE TO BE OBTAINED FOR STRAND SPOOL ACTUALLY USED)

EXAMPLE:

$$\Delta = \frac{PL}{AE} = \frac{(44{,}000 - 3{,}000) \times 252.00 \times 12}{0.217 \times 28{,}600{,}000} = 19.977"$$

THEREFORE: (TOLERANCES ± 5%)
Δ UPPER LIMIT = 1.05 x 19.977" = 20.98" = 21"
Δ LOWER LIMIT = 0.95 x 19.977" = 18.98" = 19"

EXTRA FORCE REQUIRED TO COMPENSATE FOR 1/2" CHUCK SLIPPAGE:

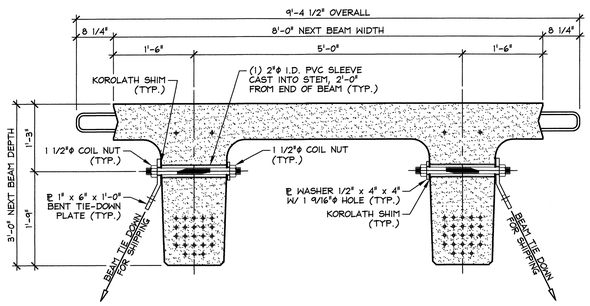
$$\Delta P = \frac{0.5 \times 41{,}000}{19.977} = 1{,}026 \text{ LBS.}$$

TOTAL TENSIONING FORCE = 44,000 + 1,026 = 45,026 LBS.

STRAND TENSIONING PROCEDURE:

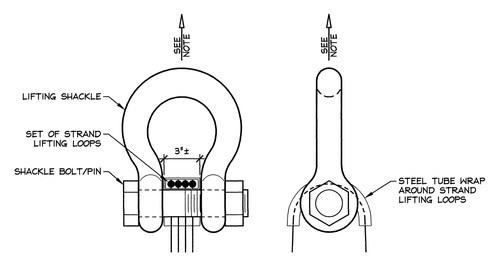
1. PULL EACH STRAND INITIALLY TO 3,000# LBS. AND MARK STRAND.
2. THEN PULL EACH STRAND TO A TOTAL TENSION OF 45,026# LBS. AND MEASURE ELONGATION AFTER SEATING. IT MUST BE BETWEEN 19"# AND 21"#.

   # NOTE: FORCES READ ON STRESSING JACK GAUGES MUST BE MADE TO CORRESPOND TO ABOVE VALUES BASED ON CALIBRATION DATA FOR SPECIFIC JACK USED.



NEXT BEAM 36D HOLD-DOWN DETAIL FOR SHIPPING

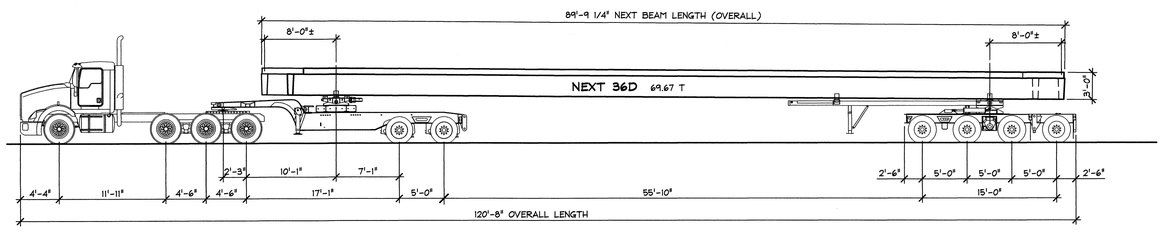
3/4" = 1'-0"



NOTE: BEAMS SHALL BE HANDLED AND ERECTED USING THE LIFTING LOOPS ONLY. RIGGING SHALL BE CONFIGURED SUCH THAT EQUAL FORCES ARE APPLIED TO EACH SET OF LIFTING LOOPS AT EACH END OF THE BEAM. SHACKLE BOLT/PIN SHALL BE PLACED UNDER LIFT LOOPS AS SHOWN. DESIGN AND CONFIGURATION OF RIGGING BY PURCHASER.

LIFTING SHACKLE DETAILS

N.T.S.



SHIPPING ELEVATION

N.T.S.

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MILLER CONSTRUCTION, INC.
CONTRACTOR
BARNARD, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF WINDSOR

TOWN OF BARNARD
VT ROUTE 12, MAJOR COLLECTOR
BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)

COVER SHEET

DATE:	DEC. 18, 2013
SCALE:	NOTED
CHKD: -	DFTM: B.L.
JOB NO:	23413-013
DWG. NO:	C1

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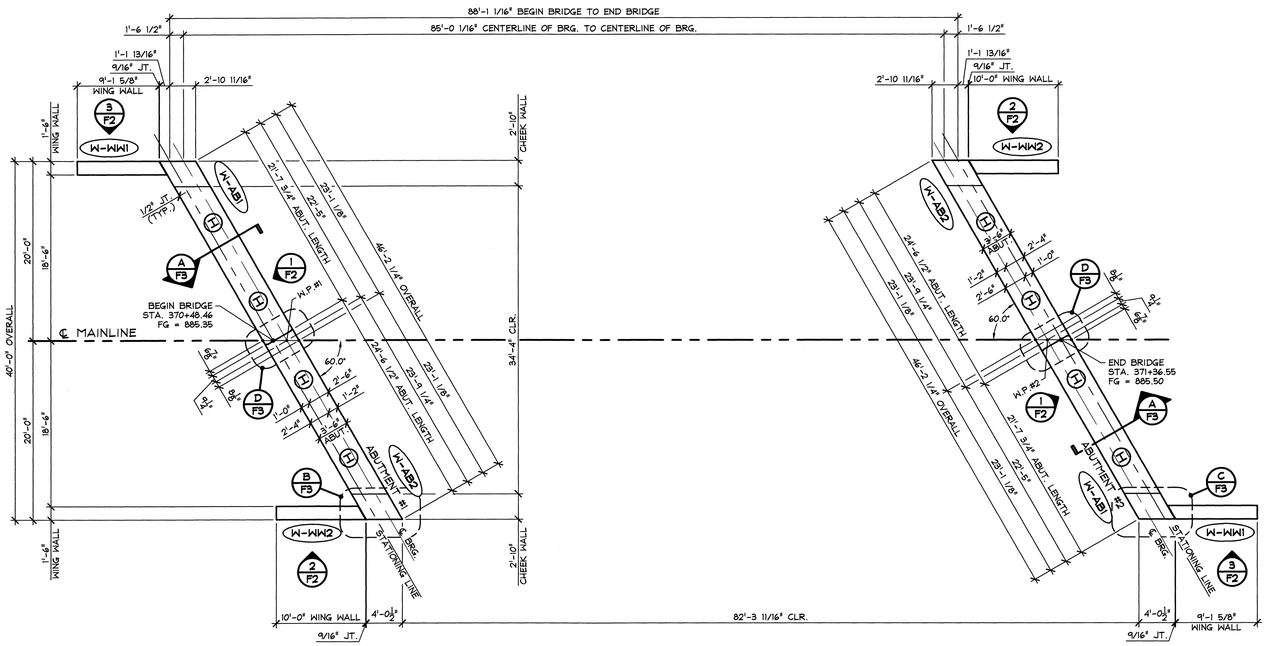
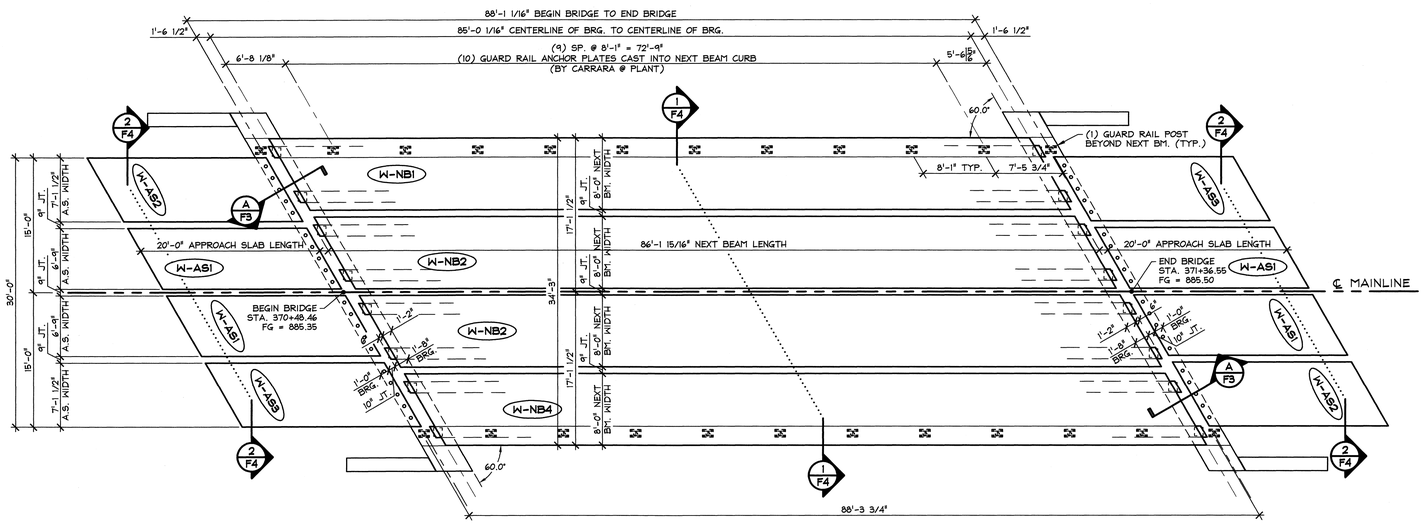


1 / F1 PRECAST CONCRETE ABUTMENT & WING WALL LAYOUT

1/8" = 1'-0"



2 / F1 PRESTRESSED APPROACH SLAB & NEXT BEAM LAYOUT

1/8" = 1'-0"

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COUNTY OF WINDSOR

TOWN OF BARNARD
VT ROUTE 12, MAJOR COLLECTOR
BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)

SUPERSTRUCTURE PLANS

DATE:	DEC. 18, 2013
SCALE:	NOTED
CHKD: -	DFTM: B.L.
JOB NO:	23413-013
DWG. NO:	F1

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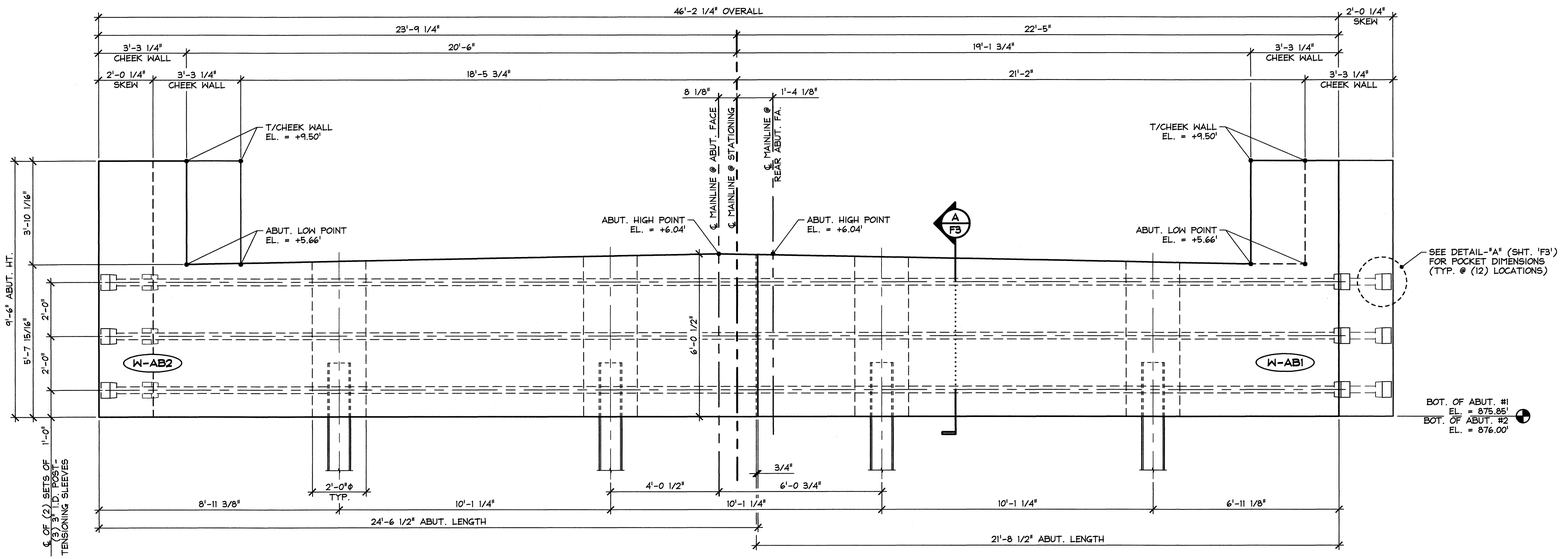
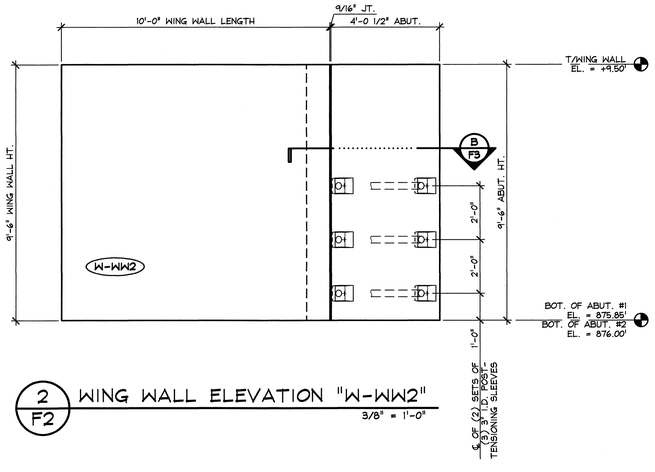


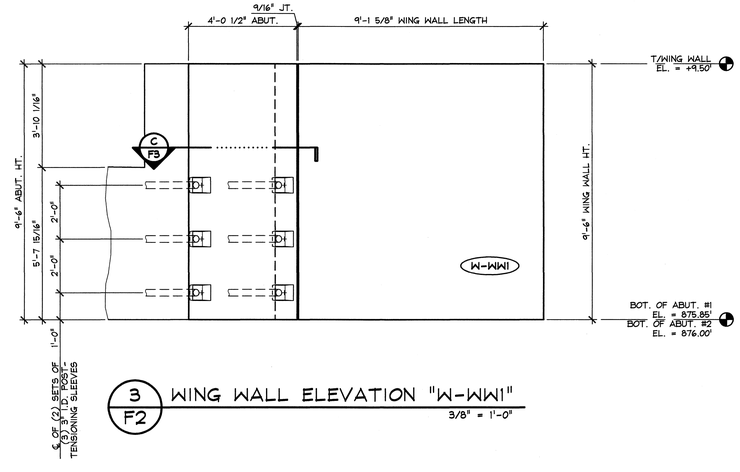
1 / F2 ABUTMENT #1 & #2 ELEVATION

3/8" = 1'-0"



2 / F2 WING WALL ELEVATION "W-WW2"

3/8" = 1'-0"



3 / F2 WING WALL ELEVATION "W-WW1"

3/8" = 1'-0"

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COUNTY OF WINDSOR

TOWN OF BARNARD
VT ROUTE 12, MAJOR COLLECTOR
BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)

ABUTMENT ELEVATIONS

DATE:	DEC. 18, 2013
SCALE:	NOTED
CHKD: -	DFTM: B.L.
JOB NO:	23413-013
DWG. NO:	F2

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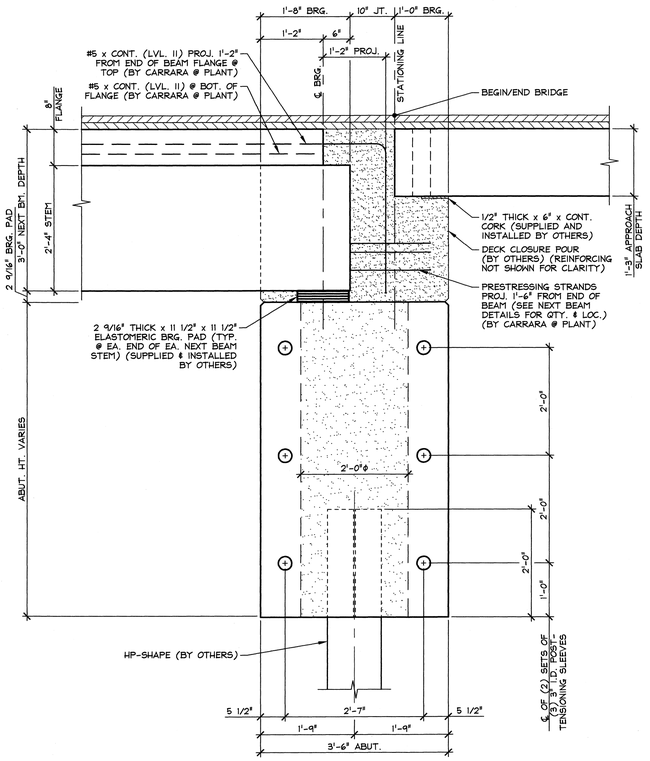
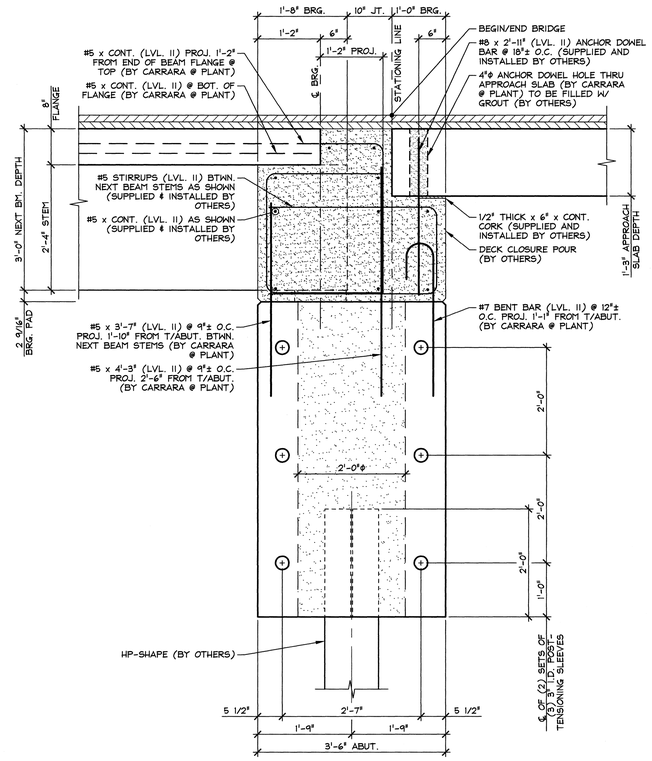
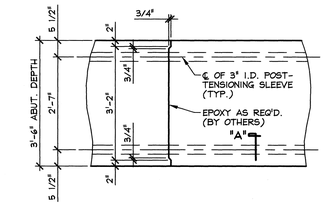


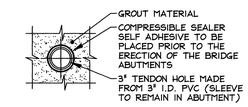
A F3 BEARING SECTION
NEXT BEAM STEM BEARING 3/4" = 1'-0"



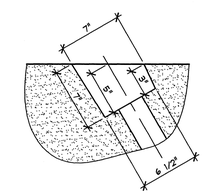
A.1 F3 BEARING SECTION
BETWEEN NEXT BEAM STEM BEARING 3/4" = 1'-0"



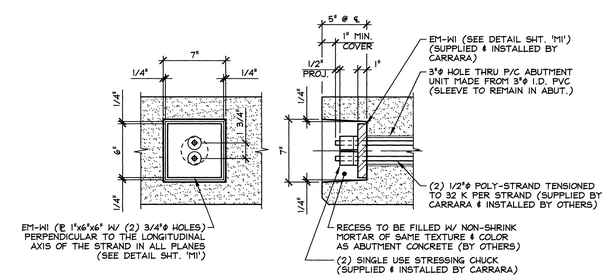
D F3 MATCH CAST SECTION @ P.T. SLEEVE 1/2" = 1'-0"



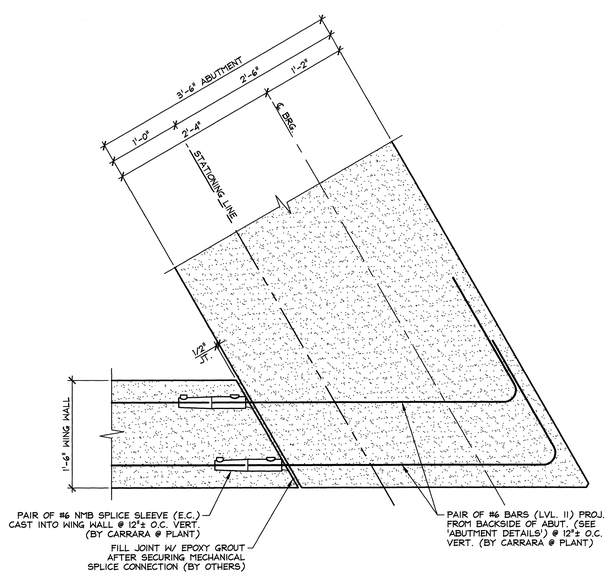
SECTION - "A"
1 1/2" = 1'-0"



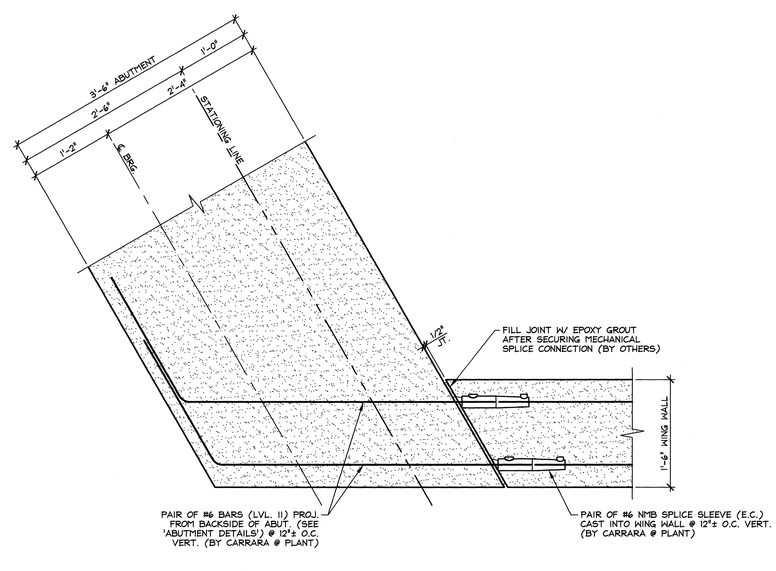
PLAN OF POCKET



DETAIL - "A"
1 1/2" = 1'-0"



B F3 WING WALL CONNECTION DETAIL
1" = 1'-0"



C F3 WING WALL CONNECTION DETAIL
1" = 1'-0"

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MILLER CONSTRUCTION, INC.
CONTRACTOR
BARNARD, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF WINDSOR

TOWN OF BARNARD
VT ROUTE 12, MAJOR COLLECTOR
BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)

ABUTMENT DETAILS

DATE:	DEC. 18, 2013
SCALE:	NOTED
CHKD: -	DFTM: B.L.
JOB NO:	23413-013
DWG. NO:	F3

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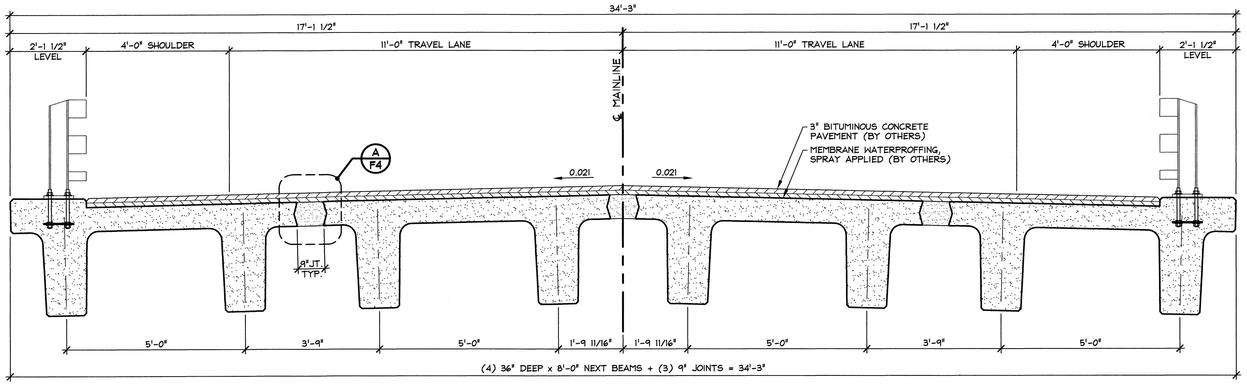
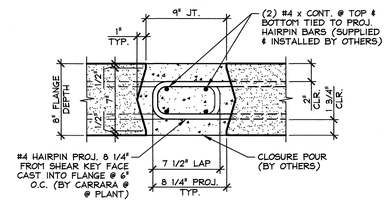


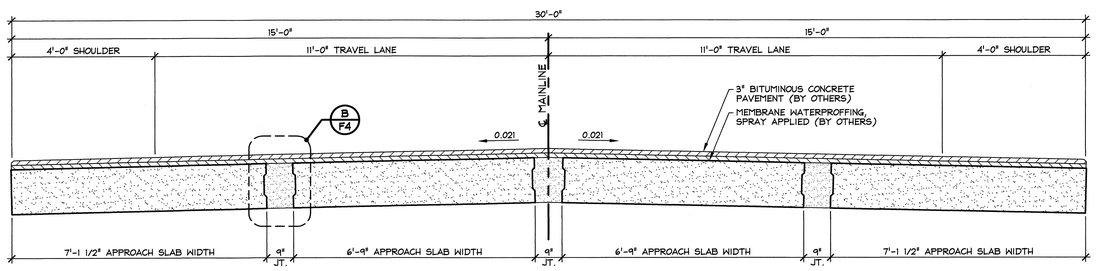
1 / F4 NEXT BEAM TRANSVERSE SECTION

1/2" = 1'-0"



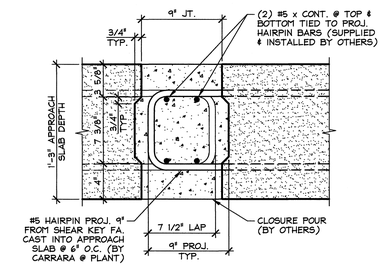
A / F4 NEXT BEAM CLOSURE POUR

1 1/2" = 1'-0"



2 / F4 APPROACH SLAB TRANSVERSE SECTION

1/2" = 1'-0"



B / F4 APPROACH SLAB CLOSURE POUR

1 1/2" = 1'-0"

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COUNTY OF WINDSOR

TOWN OF BARNARD
VT ROUTE 12, MAJOR COLLECTOR
BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)

TRANSVERSE SECTION & DETAILS

DATE:	DEC. 18, 2013
SCALE:	NOTED
CHKD: -	DFTM: B.L.
JOB NO:	23413-013
DWG. NO:	F4

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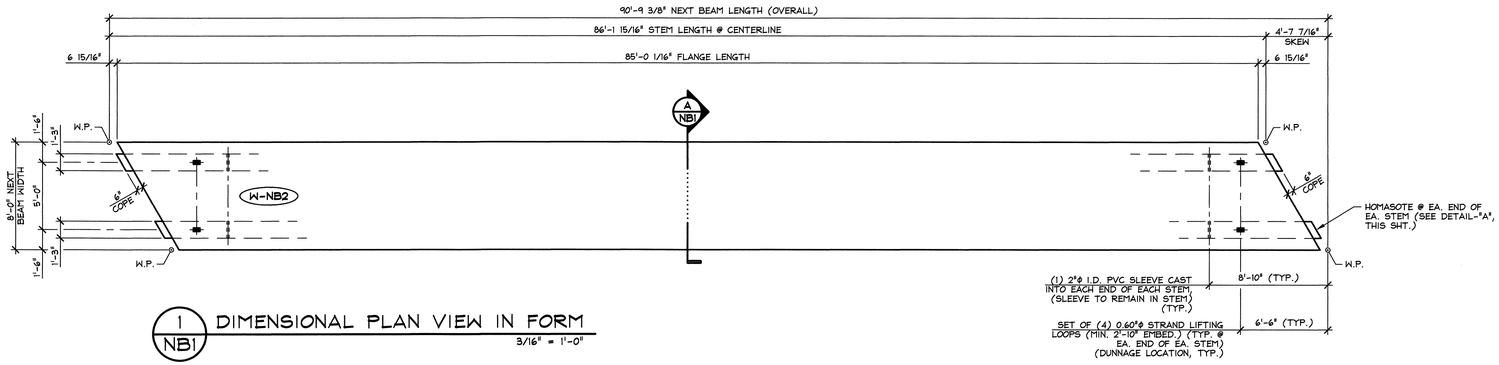
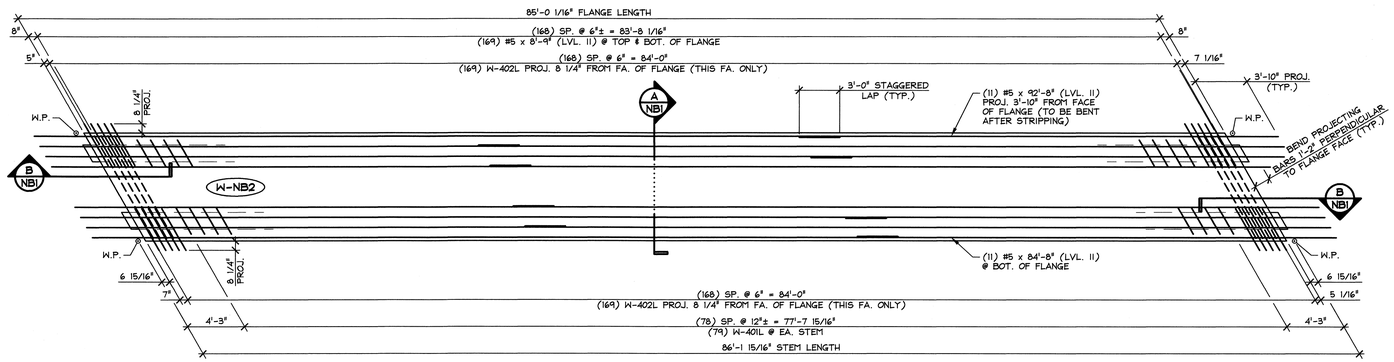


1 NBI DIMENSIONAL PLAN VIEW IN FORM

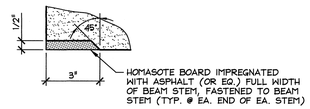
3/16" = 1'-0"



2 NBI REINFORCING PLAN VIEW IN FORM

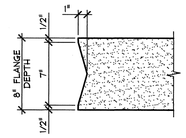
ALL DIMENSIONS INDICATED ARE PARALLEL OR PERPENDICULAR TO ℄ OF STEMS (U.N.O.)

3/16" = 1'-0"



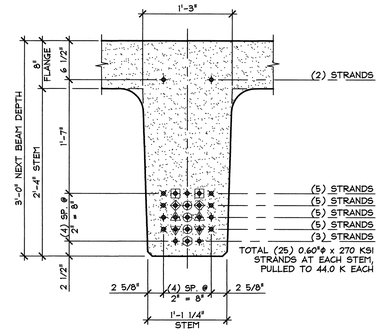
DETAIL - "A"

3" = 1'-0"



DETAIL - "B"

1 1/2" = 1'-0"

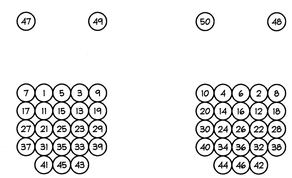


PRESTRESSING NOTATIONS

- ✦ DENOTES STRAIGHT STRANDS TO BE CUT FLUSH WITH EA. END OF EA. STEM
- ✖ DENOTES STRAIGHT STRANDS TO PROJECT 1'-6" FROM EA. END OF EA. STEM
- ⊕ DENOTES STRAIGHT STRANDS TO BE DEBONDED 6" FROM EA. END OF EA. STEM
- ⊞ DENOTES STRAIGHT STRANDS TO BE DEBONDED 10'-0" FROM EA. END OF EA. STEM
- ◈ DENOTES STRAIGHT STRANDS TO BE DEBONDED 14'-0" FROM EA. END OF EA. STEM
- ▲ DENOTES STRAIGHT STRANDS TO BE DEBONDED 16'-0" FROM EA. END OF EA. STEM
- ▼ DENOTES STRAIGHT STRANDS TO BE DEBONDED 18'-0" FROM EA. END OF EA. STEM
- ⊕ DENOTES STRAIGHT STRANDS TO BE DEBONDED 20'-0" FROM EA. END OF EA. STEM

DETAIL - "C" (STEM STRAND PATTERN)

1" = 1'-0"



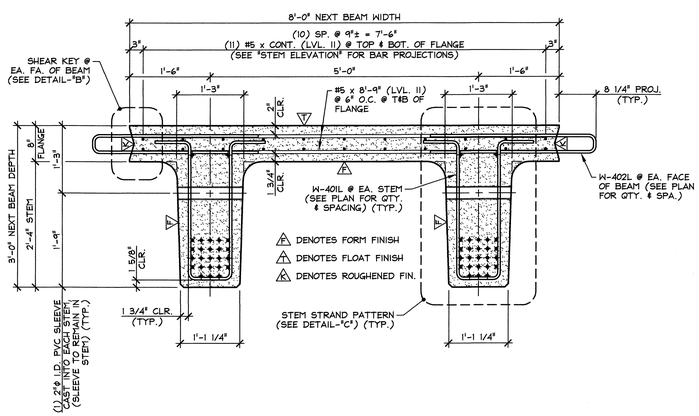
DETENSIONING SCHEDULE

N.T.S.

MARK: W-NB2	QTY.: 2	WT.: 69.67 T	VOL.: 34.41 cy

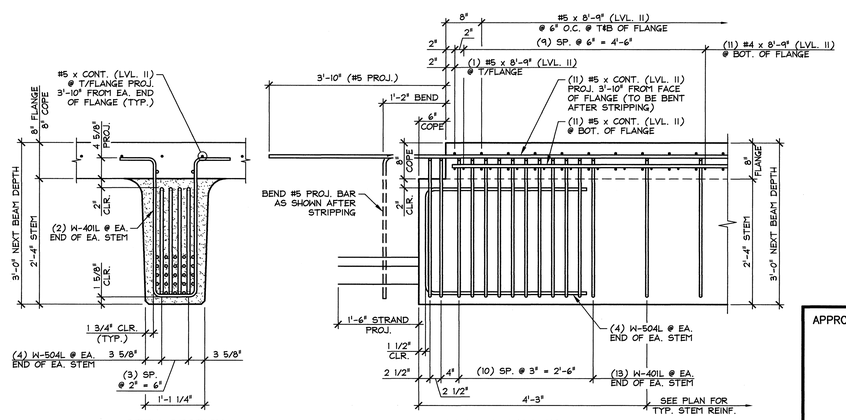
MATERIAL LIST / NEXT BEAM

ITEM	MARK	DESCRIPTION	QTY.
1	W-401L	#4 BENT BAR (LEVEL II, DUAL COATED)	210
2	W-402L	#4 BENT BAR (LEVEL II, DUAL COATED)	338
3		#4 x 8'-9" (LEVEL II, DUAL COATED)	22
4			
5	W-504L	#5 BENT BAR (LEVEL II, DUAL COATED)	16
6		#5 x 8'-9" (LEVEL II, DUAL COATED)	340
7		#5 x 92'-8" (W/ (1) 2'-6" STAGGERED LAP) (LVL. II, DUAL COATED)	11
8		#5 x 84'-8" (W/ (1) 2'-6" STAGGERED LAP) (LVL. II, DUAL COATED)	11
9			
10			
11			
12			
13			
14		SET OF (4) 0.60"ϕ x 270 KSI STRAND LIFTING LOOPS	4
15			



A NBI DIMENSIONAL & REINFORCING SECTION

3/4" = 1'-0"



B NBI END BLOCK STEM REINFORCING DETAILS

3/4" = 1'-0"

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COUNTY OF WINDSOR

TOWN OF BARNARD
VT ROUTE 12, MAJOR COLLECTOR
BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)

PRESTRESSED NEXT BEAM DETAILS

DATE:	DEC. 18, 2013
SCALE:	NOTED
CHKD: -	DFTM: B.L.
JOB NO:	23413-013
DWG. NO:	NB1

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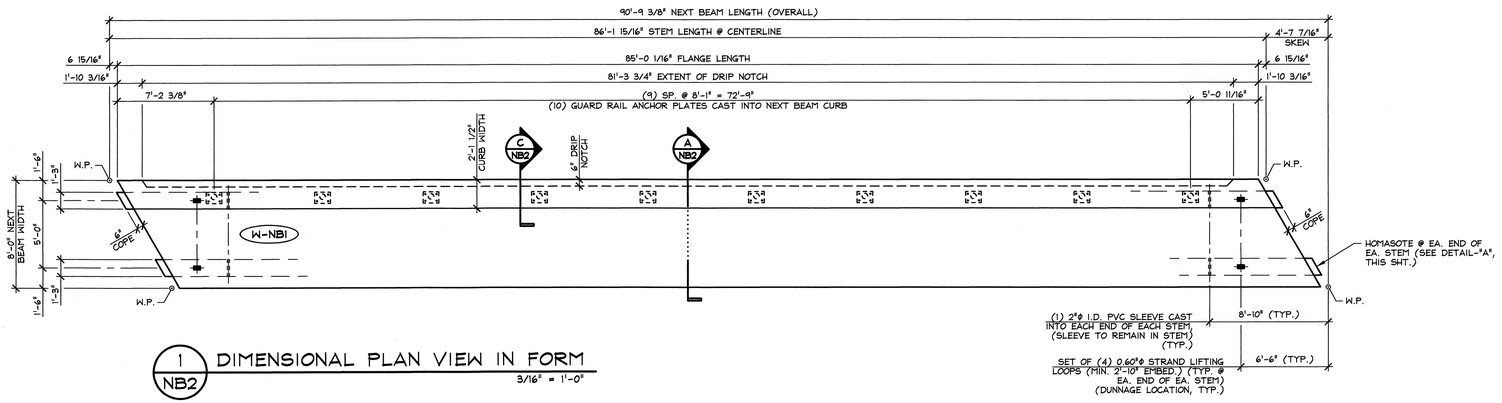
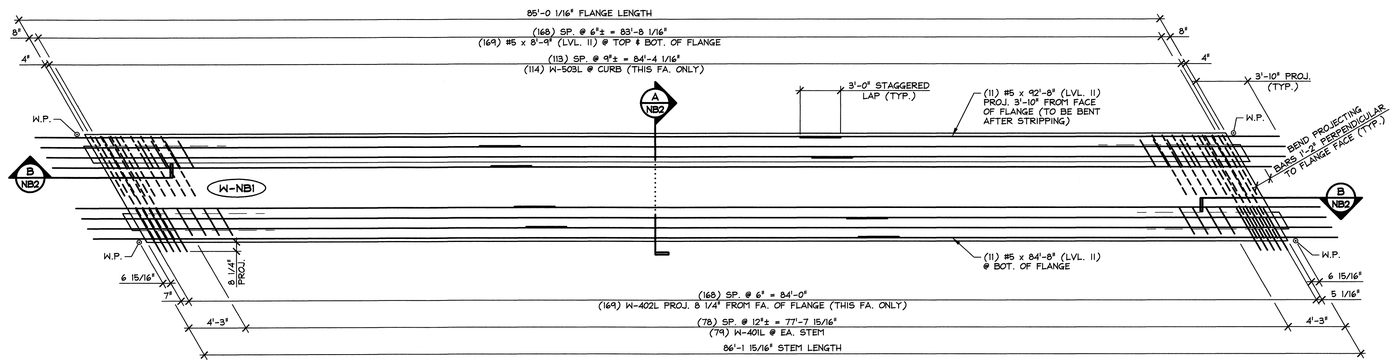


1 NB2 DIMENSIONAL PLAN VIEW IN FORM

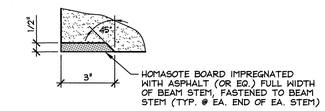
3/16" = 1'-0"



2 NB2 REINFORCING PLAN VIEW IN FORM

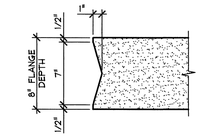
ALL DIMENSIONS INDICATED ARE PARALLEL OR PERPENDICULAR TO ℄ OF STEMS (U.N.O.)

3/16" = 1'-0"



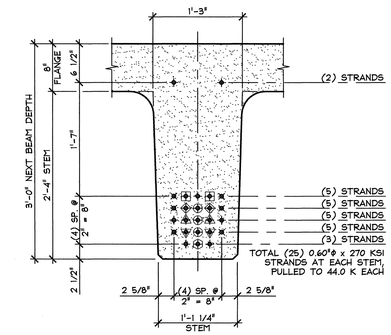
DETAIL - "A"

3" = 1'-0"



DETAIL - "B"

1 1/2" = 1'-0"

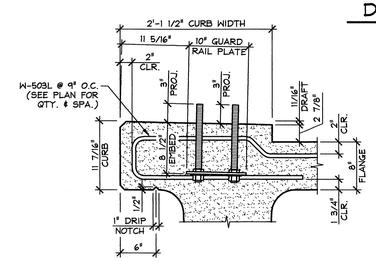


PRESTRESSING NOTATIONS

- ✦ DENOTES STRAIGHT STRANDS TO BE CUT FLUSH WITH EA. END OF EA. STEM
- ✖ DENOTES STRAIGHT STRANDS TO PROJECT 1'-6" FROM EA. END OF EA. STEM
- ⊕ DENOTES STRAIGHT STRANDS TO BE DEBONDED 6" FROM EA. END OF EA. STEM
- ⊞ DENOTES STRAIGHT STRANDS TO BE DEBONDED 10'-0" FROM EA. END OF EA. STEM
- ◈ DENOTES STRAIGHT STRANDS TO BE DEBONDED 14'-0" FROM EA. END OF EA. STEM
- ♣ DENOTES STRAIGHT STRANDS TO BE DEBONDED 16'-0" FROM EA. END OF EA. STEM
- ♥ DENOTES STRAIGHT STRANDS TO BE DEBONDED 18'-0" FROM EA. END OF EA. STEM
- ⊕ DENOTES STRAIGHT STRANDS TO BE DEBONDED 20'-0" FROM EA. END OF EA. STEM

DETAIL - "C" (STEM STRAND PATTERN)

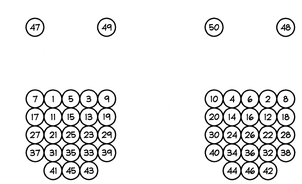
1" = 1'-0"



C NB2 CURB & GUARD RAIL ANCHOR PLATE SECTION

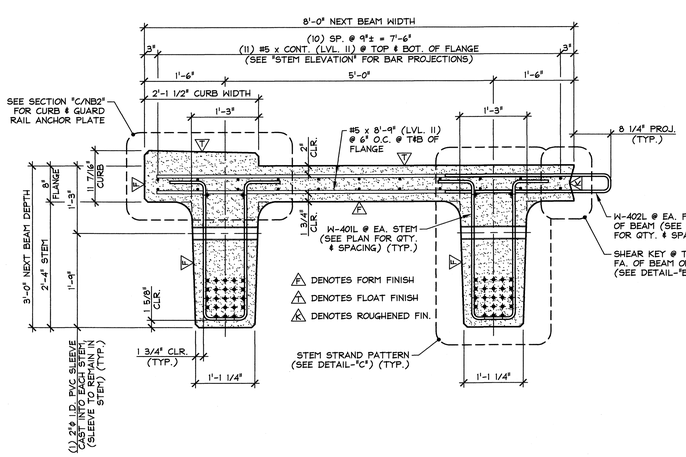
TYP. BEAM REINF. NOT SHOWN FOR CLARITY

1" = 1'-0"



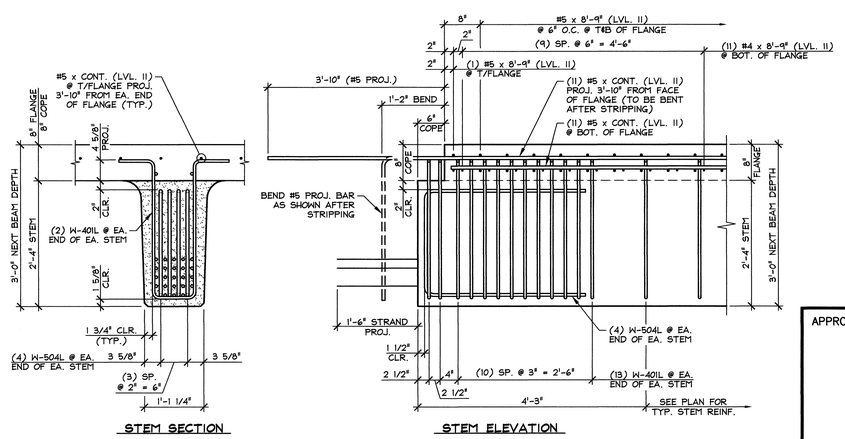
DETENSIONING SCHEDULE

N.T.S.



A NB2 DIMENSIONAL & REINFORCING SECTION

3/4" = 1'-0"



B NB2 END BLOCK STEM REINFORCING DETAILS

3/4" = 1'-0"

MARK: W-NB1	QTY.: 1	WT.: 73.38 T	VOL.: 36.24 cy

MATERIAL LIST / NEXT BEAM

ITEM	MARK	DESCRIPTION	QTY.
1	W-401L	#4 BENT BAR (LEVEL II, DUAL COATED)	210
2	W-402L	#4 BENT BAR (LEVEL II, DUAL COATED)	169
3		#4 x 8'-9" (LEVEL II, DUAL COATED)	22
4			
5	W-503L	#5 BENT BAR (LEVEL II, DUAL COATED)	114
6	W-504L	#5 BENT BAR (LEVEL II, DUAL COATED)	16
7		#5 x 8'-9" (LEVEL II, DUAL COATED)	340
8		#5 x 92'-8" (W/ (1) 2'-6" STAGGERED LAP) (LVL. II, DUAL COATED)	11
9		#5 x 84'-8" (W/ (1) 2'-6" STAGGERED LAP) (LVL. II, DUAL COATED)	11
10			
11			
12			
13		GUARD RAIL ANCHOR PLATE (GALV.) (SUPPLIED BY OTHERS)	10
14		SET OF (4) 0.60"ϕ x 270 KSI STRAND LIFTING LOOPS	4
15			

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2484 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

MILLER CONSTRUCTION, INC.
CONTRACTOR
BARNARD, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF WINDSOR

TOWN OF BARNARD
VT ROUTE 12, MAJOR COLLECTOR
BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)

PRESTRESSED NEXT BEAM DETAILS

DATE: DEC. 18, 2013
SCALE: NOTED
CHKD: - DFTM: B.L.
JOB NO: 23413-013
DWG. NO: NB2

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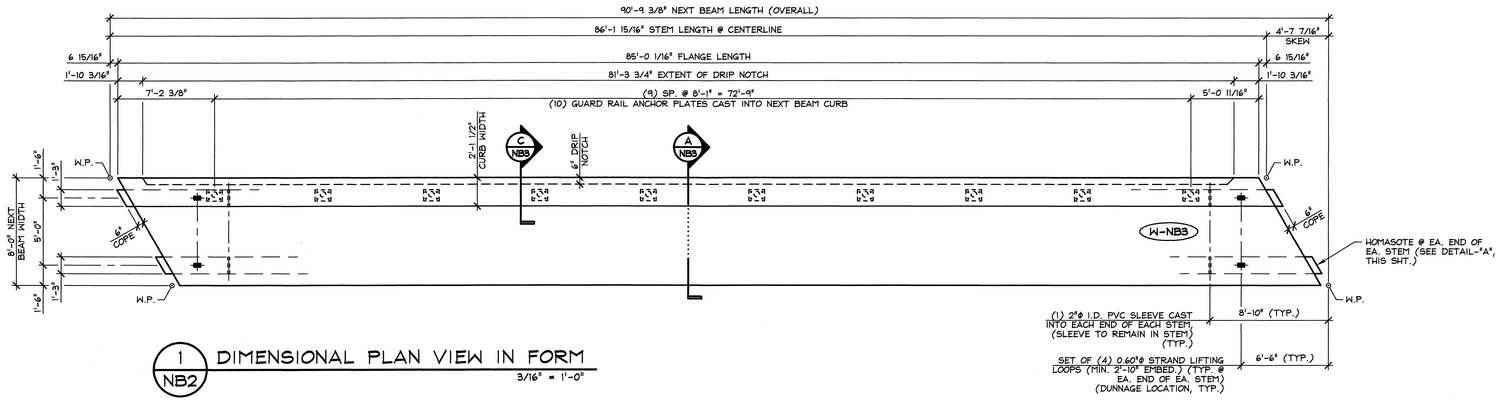
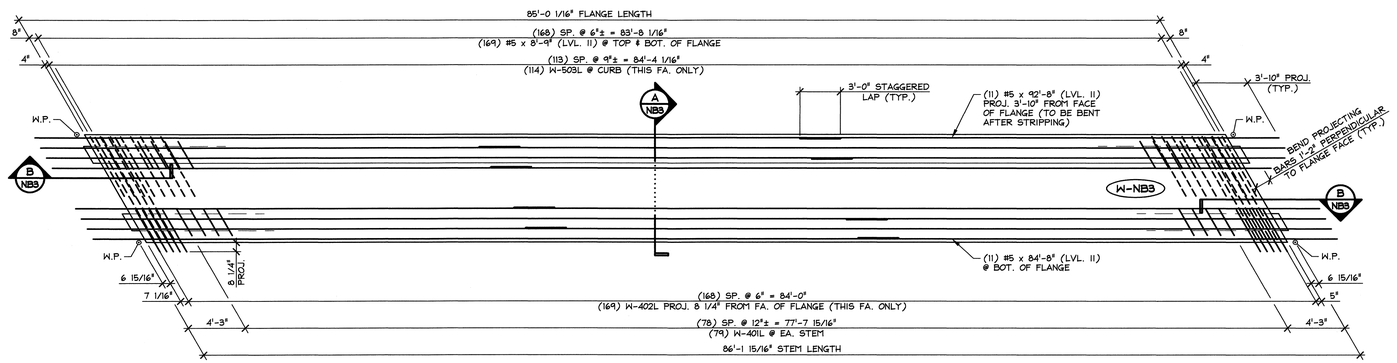
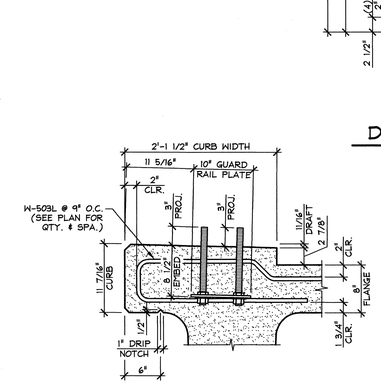


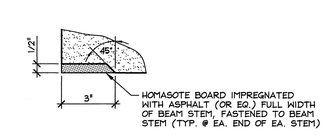
1 NB2 DIMENSIONAL PLAN VIEW IN FORM
3/16" = 1'-0"



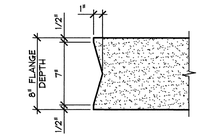
2 NB3 REINFORCING PLAN VIEW IN FORM
ALL DIMENSIONS INDICATED ARE PARALLEL OR PERPENDICULAR TO ℄ OF STEMS (U.N.O.)
3/16" = 1'-0"



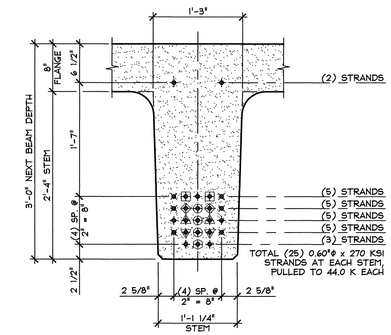
C NB3 CURB & GUARD RAIL ANCHOR PLATE SECTION
TYP. BEAM REINF. NOT SHOWN FOR CLARITY
1" = 1'-0"



DETAIL - "A"
3" = 1'-0"



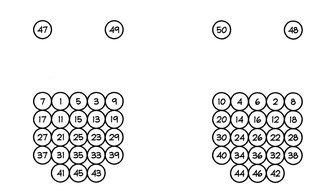
DETAIL - "B"
1 1/2" = 1'-0"



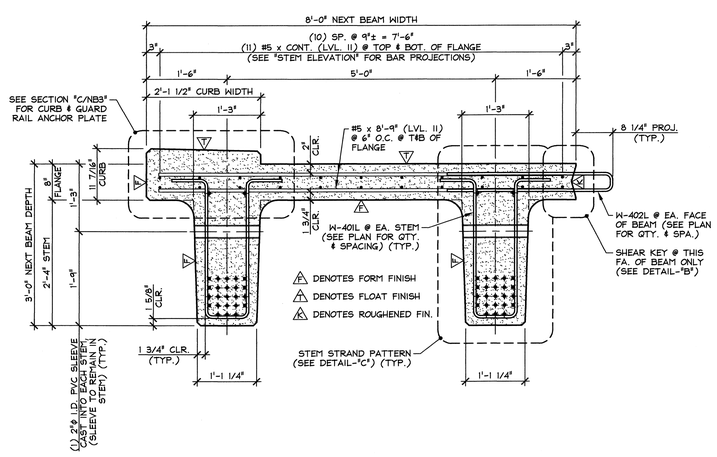
PRESTRESSING NOTATIONS

- ✦ DENOTES STRAIGHT STRANDS TO BE CUT FLUSH WITH EA. END OF EA. STEM
- ✖ DENOTES STRAIGHT STRANDS TO PROJECT 1'-6" FROM EA. END OF EA. STEM
- ⊕ DENOTES STRAIGHT STRANDS TO BE DEBONDED 6" FROM EA. END OF EA. STEM
- ⊞ DENOTES STRAIGHT STRANDS TO BE DEBONDED 10'-0" FROM EA. END OF EA. STEM
- ◈ DENOTES STRAIGHT STRANDS TO BE DEBONDED 14'-0" FROM EA. END OF EA. STEM
- ◈ DENOTES STRAIGHT STRANDS TO BE DEBONDED 16'-0" FROM EA. END OF EA. STEM
- ⊕ DENOTES STRAIGHT STRANDS TO BE DEBONDED 18'-0" FROM EA. END OF EA. STEM
- ⊕ DENOTES STRAIGHT STRANDS TO BE DEBONDED 20'-0" FROM EA. END OF EA. STEM

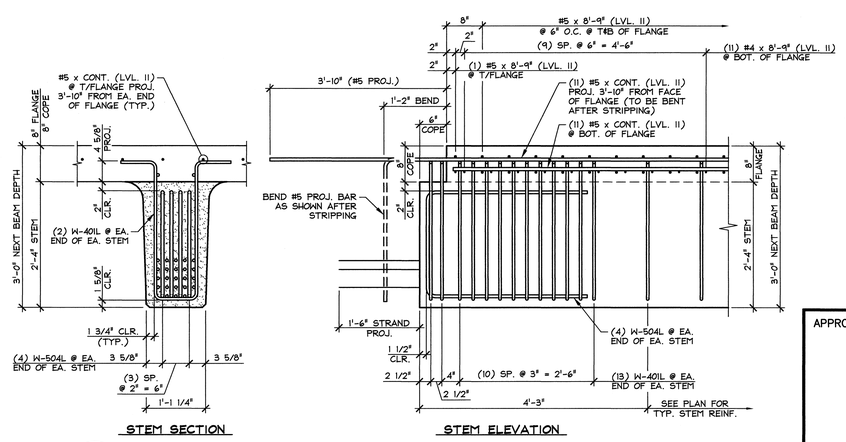
DETAIL - "C" (STEM STRAND PATTERN)
1" = 1'-0"



DETENSIONING SCHEDULE
N.T.S.



A NB3 DIMENSIONAL & REINFORCING SECTION
3/4" = 1'-0"



B NB3 END BLOCK STEM REINFORCING DETAILS
3/4" = 1'-0"

MARK: W-NB3	QTY.: 1	WT.: 73.38 T	VOL.: 36.24 cy

MATERIAL LIST / NEXT BEAM

ITEM	MARK	DESCRIPTION	QTY.
1	W-401L	#4 BENT BAR (LEVEL II, DUAL COATED)	210
2	W-402L	#4 BENT BAR (LEVEL II, DUAL COATED)	169
3		#4 x 8'-9" (LEVEL II, DUAL COATED)	22
4			
5	W-503L	#5 BENT BAR (LEVEL II, DUAL COATED)	114
6	W-504L	#5 BENT BAR (LEVEL II, DUAL COATED)	16
7		#5 x 8'-9" (LEVEL II, DUAL COATED)	340
8		#5 x 92'-8" (W/ (1) 2'-6" STAGGERED LAP) (LVL. II, DUAL COATED)	11
9		#5 x 84'-8" (W/ (1) 2'-6" STAGGERED LAP) (LVL. II, DUAL COATED)	11
10			
11			
12			
13		GUARD RAIL ANCHOR PLATE (GALV.) (SUPPLIED BY OTHERS)	10
14		SET OF (4) 0.60"ϕ x 270 KSI STRAND LIFTING LOOPS	4
15			

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

MILLER CONSTRUCTION, INC.
CONTRACTOR
BARNARD, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF WINDSOR

TOWN OF BARNARD
VT ROUTE 12, MAJOR COLLECTOR
BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)

PRESTRESSED NEXT BEAM DETAILS

DATE: DEC. 18, 2013
SCALE: NOTED
CHKD: - DFTM: B.L.
JOB NO: 23413-013
DWG. NO: NB3

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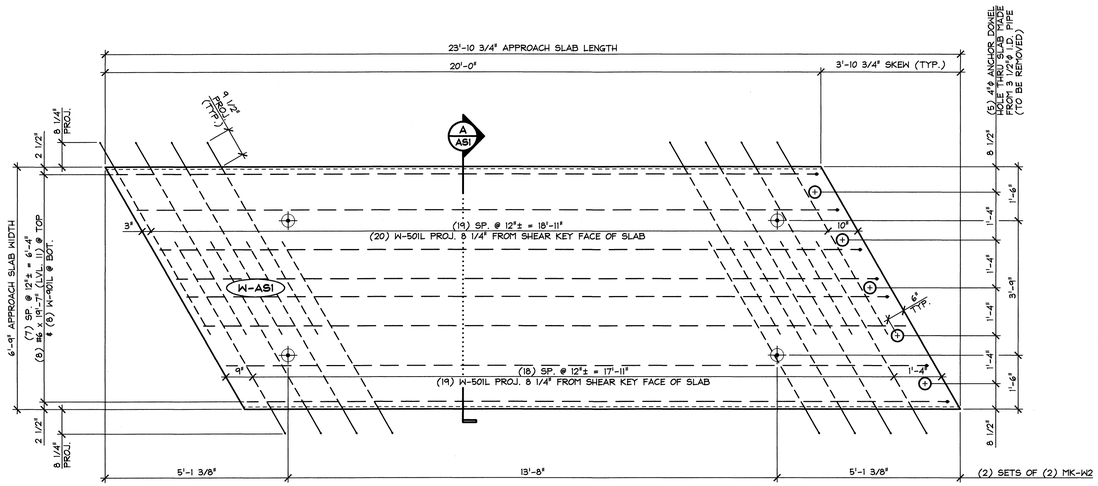
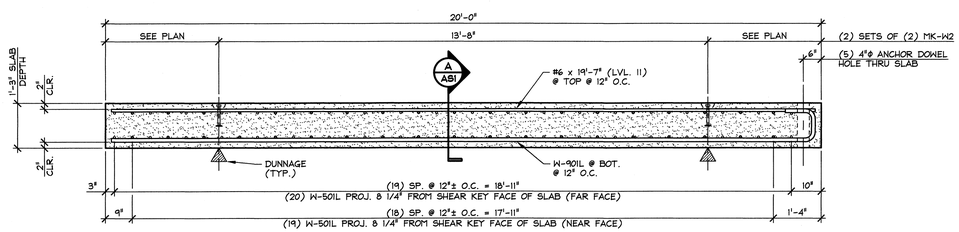


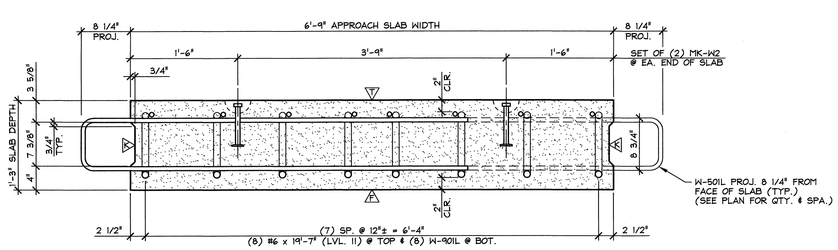
1 / AS1 PLAN VIEW IN FORM

1/2" = 1'-0"



2 / AS1 LONGITUDINAL SECTION

1/2" = 1'-0"



A / AS1 APPROACH SLAB SECTION

1" = 1'-0"

△ DENOTES FORM FINISH

△ DENOTES FLOAT FINISH

△ DENOTES ROUGHENED FINISH

MARK: W-AS1	QTY.: 4	WT.: 12.46 T	VOL.: 6.16 cy
MARK: -	QTY.: -	WT.: -	VOL.: -

MATERIAL LIST / APPROACH SLAB

ITEM	MARK	DESCRIPTION	QTY./SLAB W-AS1	QTY./SLAB -
1	W-501L	#5 BENT BAR (LEVEL II, DUAL COATED)	39	
2				
3		#6 x 19'-7" (LEVEL II, DUAL COATED)	8	
4				
5	W-901L	#9 BENT BAR (LEVEL II, DUAL COATED)	8	
6				
7				
8	MK-W2	4T x 7 1/8" SWIFT LIFT LIFTER	4	
9				
10				

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

MILLER CONSTRUCTION, INC.
CONTRACTOR
BARNARD, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF WINDSOR

DATE: DEC. 18, 2013
SCALE: NOTED

TOWN OF BARNARD
VT ROUTE 12, MAJOR COLLECTOR
BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)

CHKD: - DFTM: B.L.
JOB NO: 23413-013

PRECAST APPROACH SLAB DETAILS

DWG. NO: AS1

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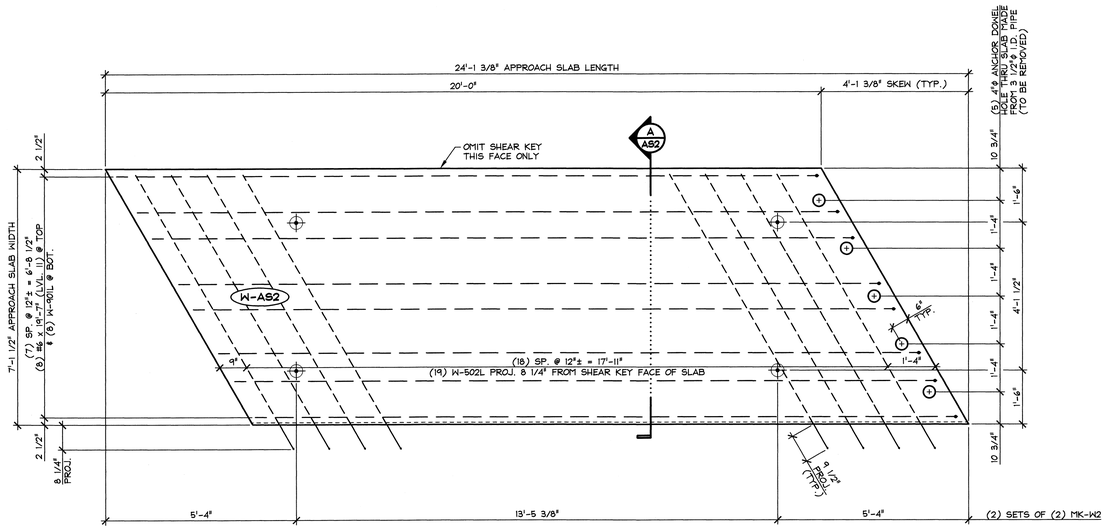
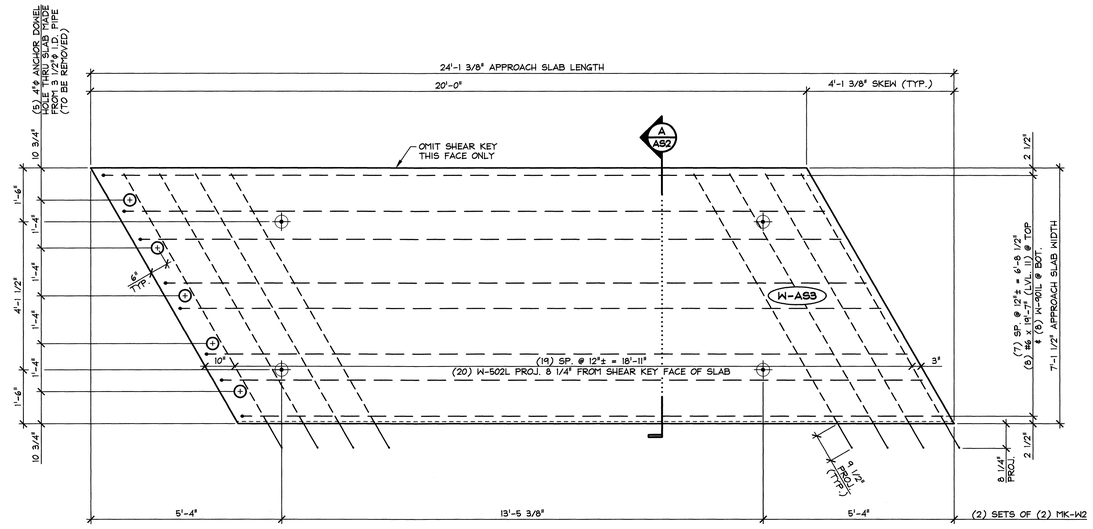
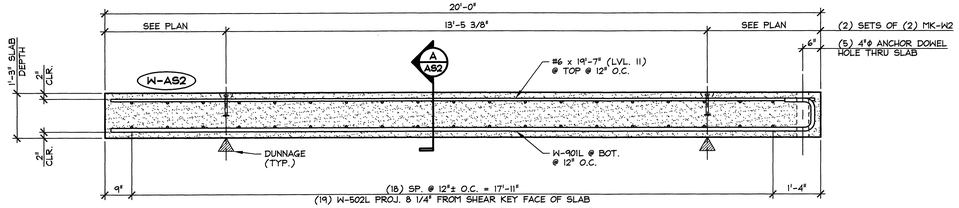


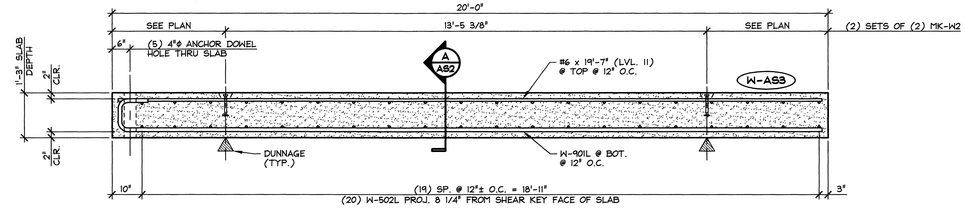
1 AS2 PLAN VIEW IN FORM
1/2" = 1'-0"



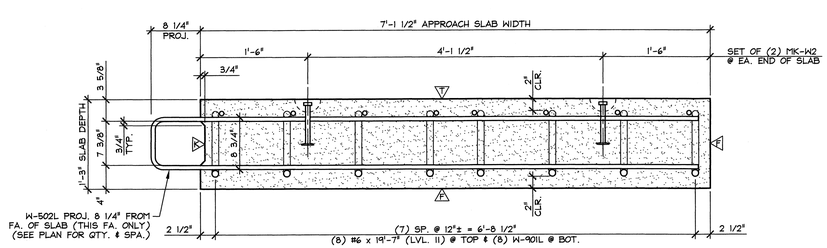
3 AS2 PLAN VIEW IN FORM
1/2" = 1'-0"



2 AS2 LONGITUDIAL SECTION
1/2" = 1'-0"



4 AS2 LONGITUDIAL SECTION
1/2" = 1'-0"



A AS2 APPROACH SLAB SECTION
1" = 1'-0"

F DENOTES FORM FINISH
FL DENOTES FLOAT FINISH
FR DENOTES ROUGHENED FINISH

MARK: W-AS2		QTY.: 2		WT.: 13.26 T		VOL.: 6.55 cy	
MARK: W-AS3		QTY.: 2		WT.: 13.26 T		VOL.: 6.55 cy	
MATERIAL LIST / APPROACH SLAB							
ITEM	MARK	DESCRIPTION			QTY./SLAB		
					W-AS2	W-AS3	
1	W-502L	#5 BENT BAR (LEVEL II, DUAL COATED)			19	20	
2							
3		#6 x 19'-7" (LEVEL II, DUAL COATED)			8	8	
4							
5	W-901L	#9 BENT BAR (LEVEL II, DUAL COATED)			8	8	
6							
7							
8	MK-W2	4T x 7 1/8" SWIFT LIFT LIFTER			4	4	
9							
10							

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

MILLER CONSTRUCTION, INC.
CONTRACTOR
BARNARD, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF WINDSOR

TOWN OF BARNARD
VT ROUTE 12, MAJOR COLLECTOR
BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)

PRECAST APPROACH SLAB DETAILS

DATE: DEC. 18, 2013
SCALE: NOTED
CHKD: - DFTM: B.L.
JOB NO: 23413-013
DWG. NO: AS2

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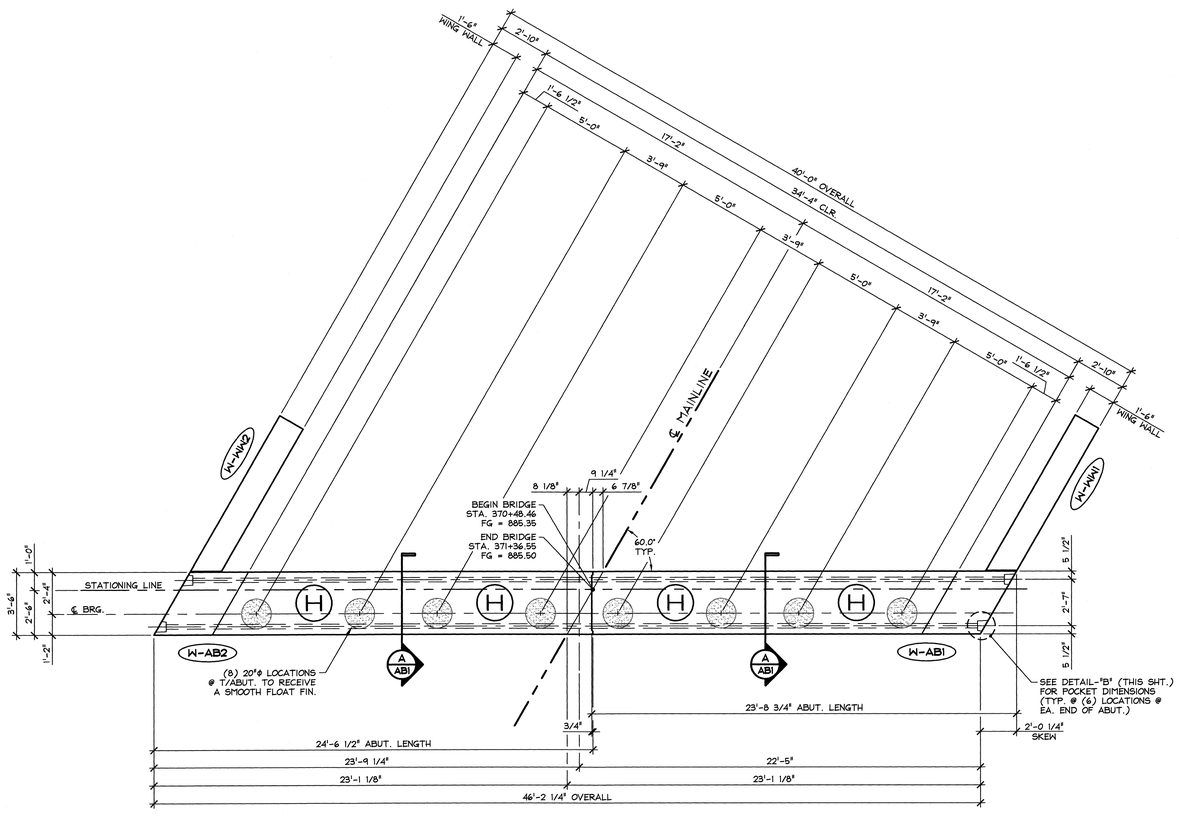
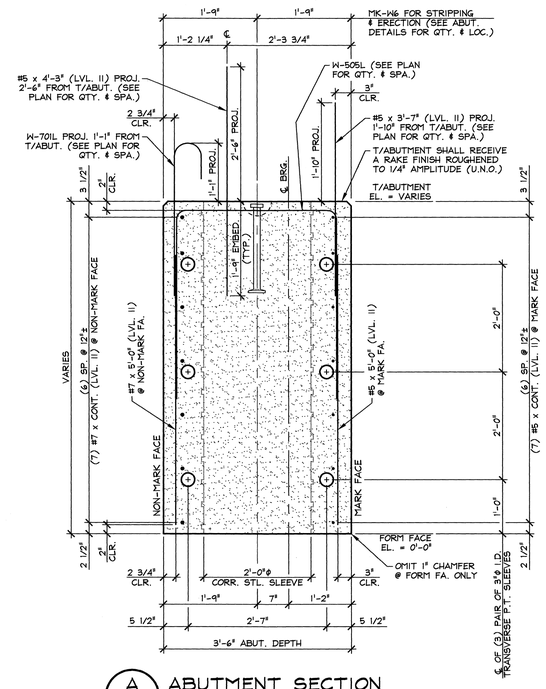
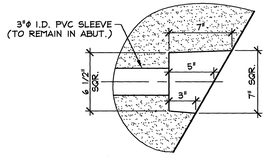


1 / AB1 ABUTMENT ASSEMBLY PLAN
1/4" = 1'-0"



A / AB1 ABUTMENT SECTION
3/4" = 1'-0"

SHOP NOTE:
ALL EDGES OF ABUTMENT SHALL RECEIVE A 1" CHAMFER (U.N.O.)



DETAIL - "B"
1 1/2" = 1'-0"

APPROVAL STAMP:

J.P. CARRARA & SONS INC. Precast & Prestress Manufacturer 2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010	MILLER CONSTRUCTION, INC. CONTRACTOR BARNARD, VERMONT	
STATE OF VERMONT AGENCY OF TRANSPORTATION COUNTY OF WINDSOR	DATE: DEC. 18, 2013	
	SCALE: NOTED	
TOWN OF BARNARD VT ROUTE 12, MAJOR COLLECTOR BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)	CHKD: -	DFTM: B.L.
	JOB NO: 23413-013	
PRECAST ABUTMENT PLAN, SECTION & DETAILS	DWG. NO: AB1	

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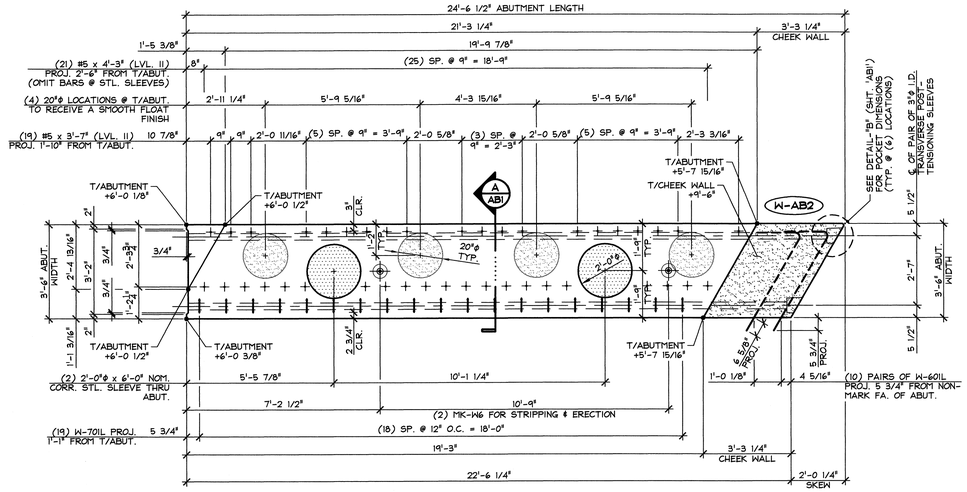
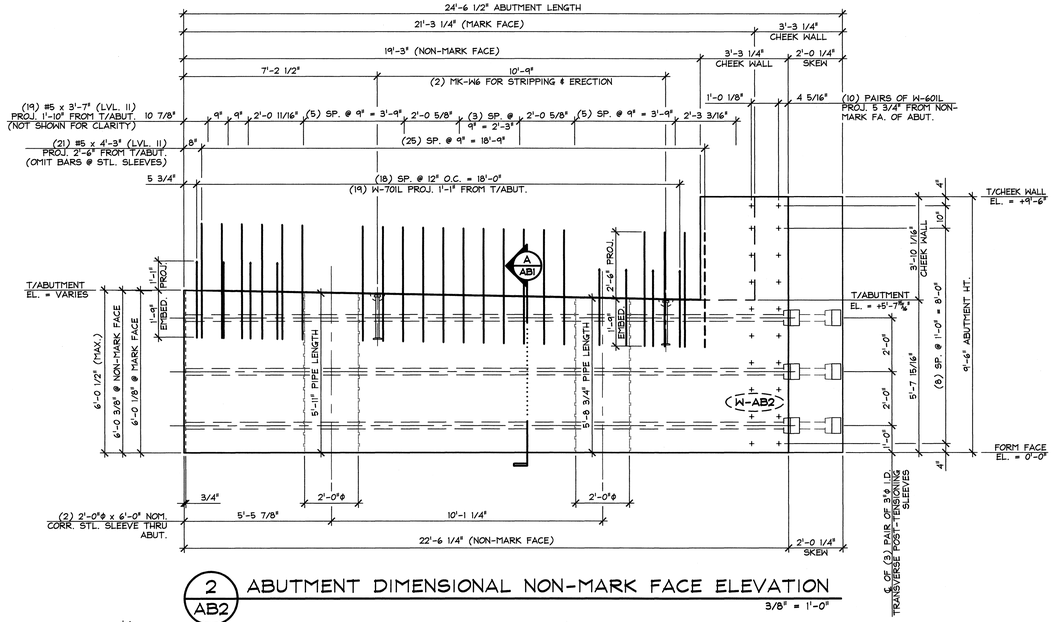


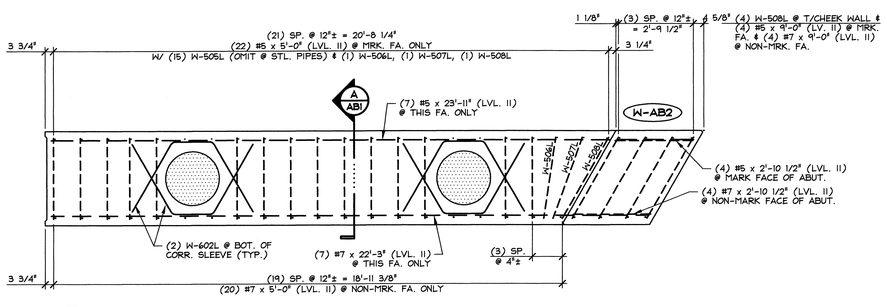
1 / AB2 ABUTMENT DIMENSIONAL PLAN VIEW IN FORM

3/8" = 1'-0"



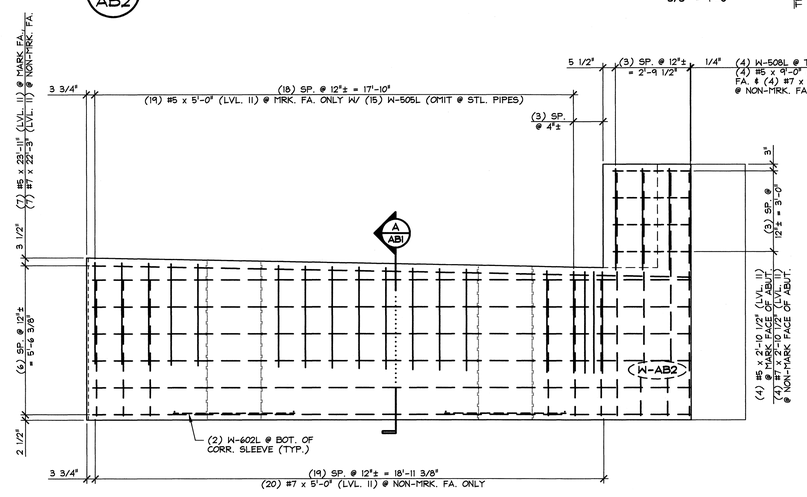
2 / AB2 ABUTMENT DIMENSIONAL NON-MARK FACE ELEVATION

3/8" = 1'-0"



3 / AB2 ABUTMENT REINFORCING PLAN VIEW IN FORM

3/8" = 1'-0"



4 / AB2 ABUTMENT REINFORCING NON-MARK FACE ELEVATION

3/8" = 1'-0"

SHOP NOTE:
ALL EDGES OF ABUTMENT SHALL RECEIVE A 1" CHAMFER (U.N.O.)

MARK: W-AB2	QTY.: 2	WT.: 36.44 T	VOL.: 18.0 cy

MATERIAL LIST / ABUTMENT

ITEM	MARK	DESCRIPTION	QTY.
1	W-505L	#5 BENT BAR (LEVEL II, DUAL COATED)	15
2	W-506L	#5 BENT BAR (LEVEL II, DUAL COATED)	1
3	W-507L	#5 BENT BAR (LEVEL II, DUAL COATED)	1
4	W-508L	#5 BENT BAR (LEVEL II, DUAL COATED)	5
5		#5 x 3'-7" (LEVEL II, DUAL COATED)	19
6		#5 x 4'-3" (LEVEL II, DUAL COATED)	21
7		#5 x 5'-0" (LEVEL II, DUAL COATED)	22
8		#5 x 9'-0" (LEVEL II, DUAL COATED)	4
9		#5 x 23'-11" (LEVEL II, DUAL COATED)	7
10		#5 x 2'-10 1/2" (LEVEL II, DUAL COATED)	4
11			
12	W-601L	#6 BENT BAR (LEVEL II, DUAL COATED)	20
13	W-602L	#6 BENT BAR (LEVEL II, DUAL COATED)	4
14			
15	W-701L	#7 BENT BAR (LEVEL II, DUAL COATED)	19
16		#7 x 5'-0" (LEVEL II, DUAL COATED)	20
17		#7 x 9'-0" (LEVEL II, DUAL COATED)	4
18		#7 x 22'-3" (LEVEL II, DUAL COATED)	7
19		#7 x 2'-10 1/2" (LEVEL II, DUAL COATED)	4
20			
21		2'-0"Φ x 5'-8 3/4" CORRUGATED STEEL PIPE (GALV.)	1
22		2'-0"Φ x 5'-11" CORRUGATED STEEL PIPE (GALV.)	1
23	MK-W6	20T x 19 3/4" SWIFT LIFT LIFTER	2

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

MILLER CONSTRUCTION, INC.
CONTRACTOR
BARNARD, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF WINDSOR

DATE: DEC. 18, 2013
SCALE: NOTED

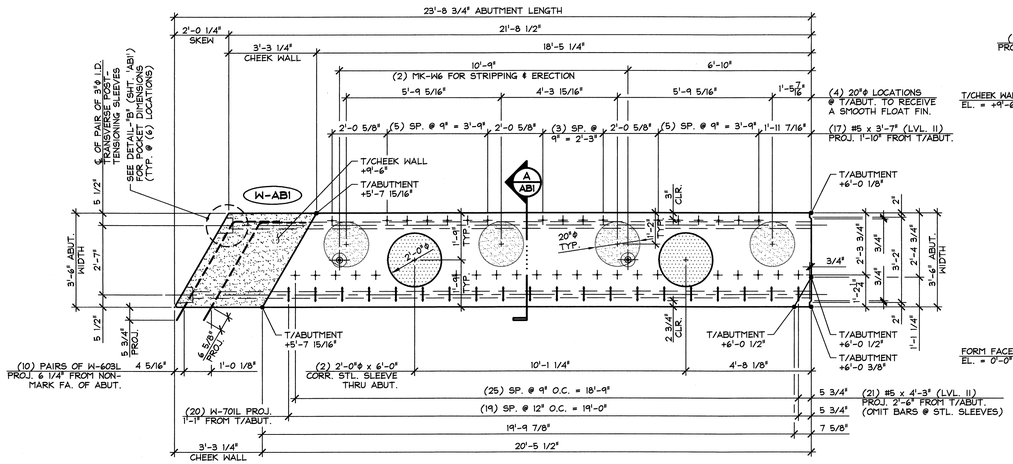
TOWN OF BARNARD
VT ROUTE 12, MAJOR COLLECTOR
BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)

CHKD: - DFTM: B.L.
JOB NO: 23413-013

PRECAST ABUTMENT DETAILS

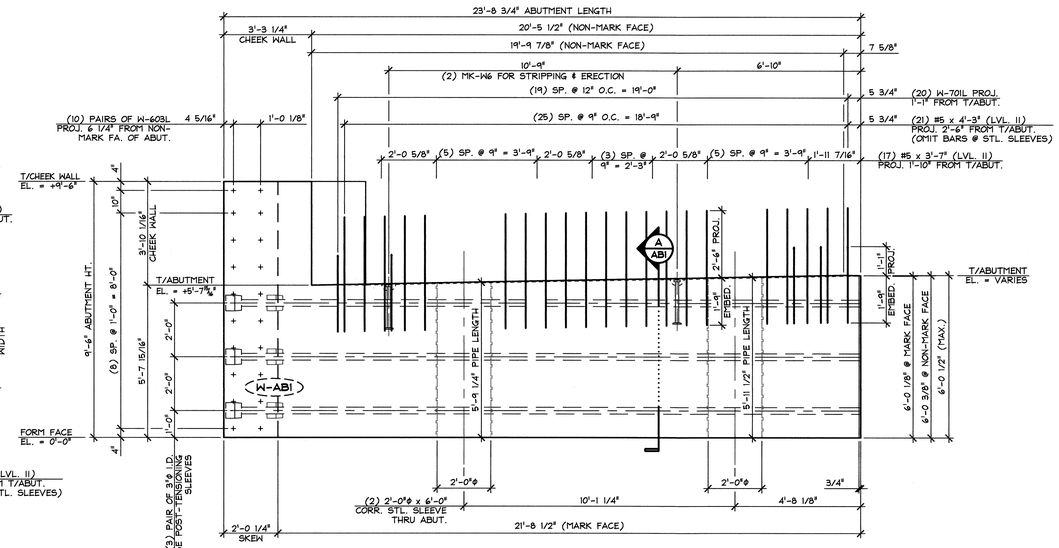
DWG. NO: AB2

F:\VT-Bridges\23413-13 Barnard\23413-AB2.dwg, 12/18/2013 4:04:49 PM



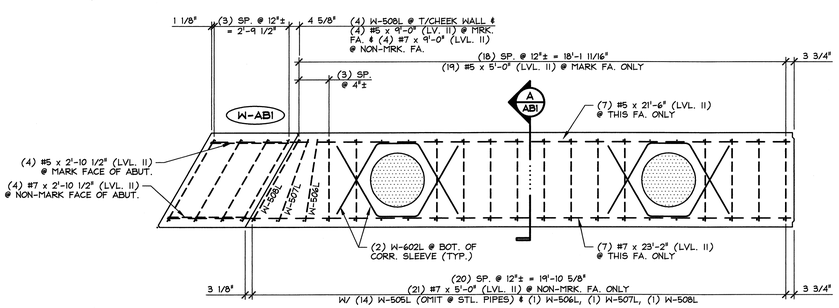
1 AB3 ABUTMENT DIMENSIONAL PLAN VIEW IN FORM

3/8" = 1'-0"



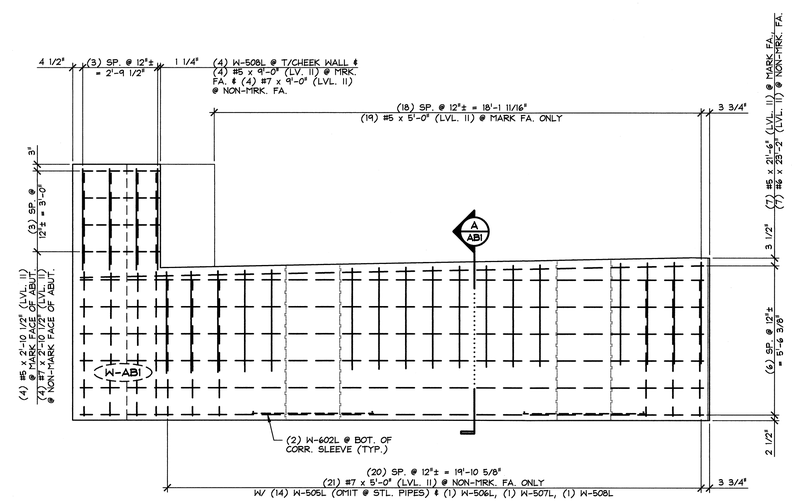
2 AB3 ABUTMENT DIMENSIONAL NON-MARK FACE ELEVATION

3/8" = 1'-0"



3 AB3 ABUTMENT REINFORCING PLAN VIEW IN FORM

3/8" = 1'-0"



4 AB3 ABUTMENT REINFORCING NON-MARK FACE ELEVATION

3/8" = 1'-0"

SHOP NOTE:
ALL EDGES OF ABUTMENT SHALL RECEIVE A 1" CHAMFER (U.N.O.)

MARK: W-ABI	QTY.: 2	WT.: 35.25 T	VOL.: 17.41 cy

MATERIAL LIST / ABUTMENT

ITEM	MARK	DESCRIPTION	QTY.
1	W-505L	#5 BENT BAR (LEVEL II, DUAL COATED)	14
2	W-506L	#5 BENT BAR (LEVEL II, DUAL COATED)	1
3	W-507L	#5 BENT BAR (LEVEL II, DUAL COATED)	1
4	W-508L	#5 BENT BAR (LEVEL II, DUAL COATED)	5
5		#5 x 2'-10 1/2" (LEVEL II, DUAL COATED)	4
6		#5 x 3'-7" (LEVEL II, DUAL COATED)	17
7		#5 x 4'-3" (LEVEL II, DUAL COATED)	21
8		#5 x 5'-0" (LEVEL II, DUAL COATED)	19
9		#5 x 9'-0" (LEVEL II, DUAL COATED)	4
10		#5 x 21'-6" (LEVEL II, DUAL COATED)	7
11			
12	W-602L	#6 BENT BAR (LEVEL II, DUAL COATED)	4
13	W-603L	#6 BENT BAR (LEVEL II, DUAL COATED)	20
14			
15	W-701L	#7 BENT BAR (LEVEL II, DUAL COATED)	20
16		#7 x 2'-10 1/2" (LEVEL II, DUAL COATED)	4
17		#7 x 5'-0" (LEVEL II, DUAL COATED)	21
18		#7 x 9'-0" (LEVEL II, DUAL COATED)	4
19		#7 x 23'-2" (LEVEL II, DUAL COATED)	7
20			
21		2'-0"ϕ x 5'-9 1/4" CORRUGATED STEEL PIPE (GALV.)	1
22		2'-0"ϕ x 5'-11 1/2" CORRUGATED STEEL PIPE (GALV.)	1
23	MK-W6	20T x 19 3/4" SWIFT LIFT LIFTER	2

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010

MILLER CONSTRUCTION, INC.
CONTRACTOR
BARNARD, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF WINDSOR

DATE: DEC. 18, 2013
SCALE: NOTED
CHKD: - DFTM: B.L.
JOB NO: 23413-013

TOWN OF BARNARD
VT ROUTE 12, MAJOR COLLECTOR
BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)

PRECAST ABUTMENT DETAILS

DWG. NO: AB3

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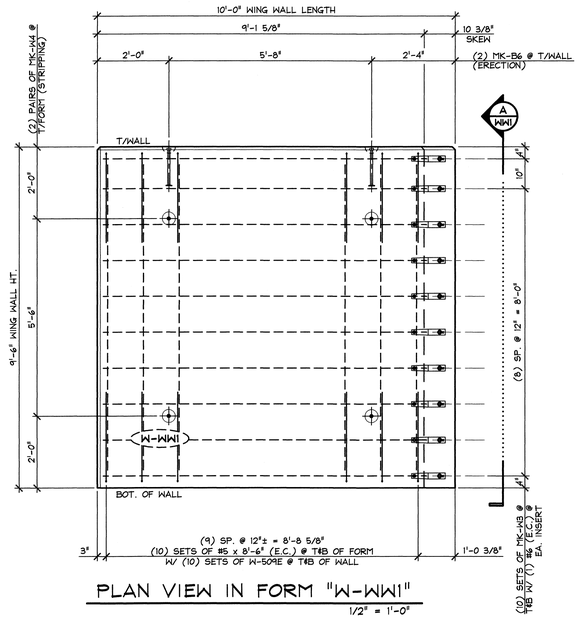
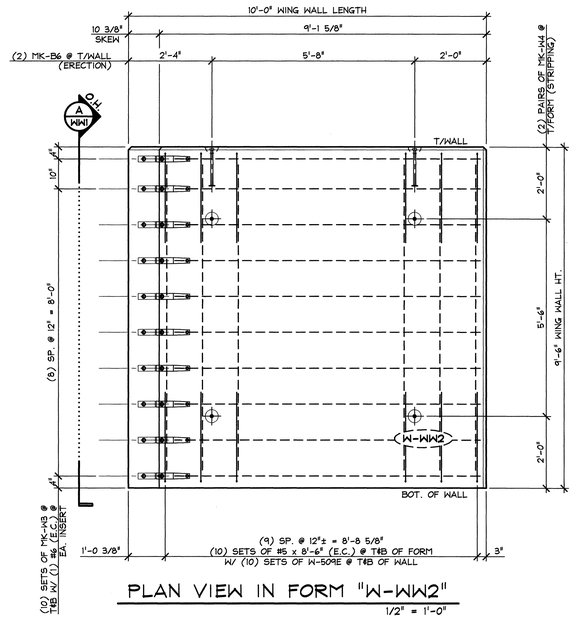


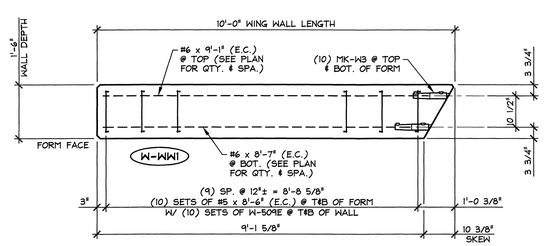
PLAN VIEW IN FORM "W-WW1"

1/2" = 1'-0"



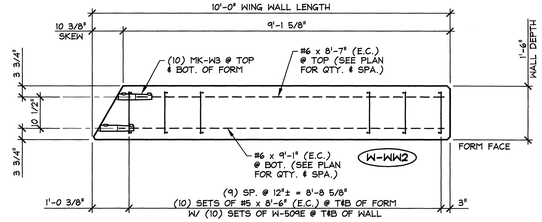
PLAN VIEW IN FORM "W-WW2"

1/2" = 1'-0"



WING WALL BOTTOM ELEVATION

1/2" = 1'-0"



WING WALL BOTTOM ELEVATION

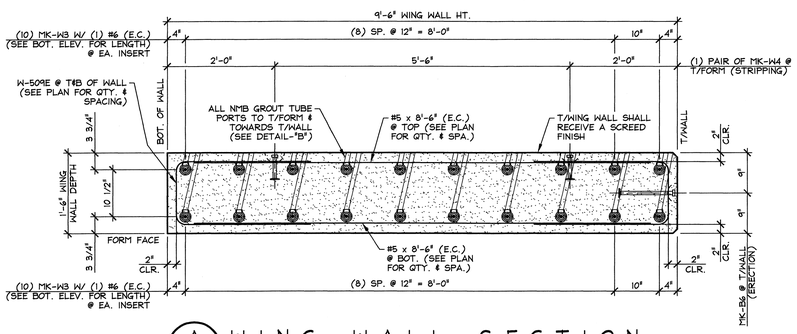
1/2" = 1'-0"

SHOP NOTE:
ALL EDGES OF WING WALLS, FORM FACE & T/WALL FACE, SHALL RECEIVE A 1" CHAMFER (UNLESS NOTED OTHERWISE)

MARK:	W-WW1	QTY.:	2	WT.:	10.22 T	VOL.:	5.05 cy
MARK:	W-WW2	QTY.:	2	WT.:	10.22 T	VOL.:	5.05 cy

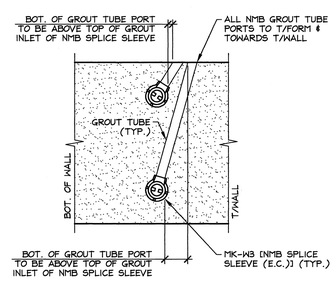
MATERIAL LIST / WING WALL

ITEM	MARK	DESCRIPTION	QTY./WING WALL W-WW1	QTY./WING WALL W-WW2
1	W-509E	#5 BENT BAR (EPOXY COATED)	20	20
2		#5 x 8'-6" (EPOXY COATED)	20	20
3				
4		#6 x 8'-7" (EPOXY COATED)	10	10
5		#6 x 9'-1" (EPOXY COATED)	10	10
6				
7	MK-W3	NMB SPLICE SLEEVE 6U-X(PG) (EPOXY COATED)	20	20
8	MK-W4	4T x 5 1/2" SWIFT LIFT LIFTER	4	4
9	MK-W5	8T x 13 3/8" SWIFT LIFT LIFTER	2	2
10				



A WW1 WING WALL SECTION

3/4" = 1'-0"



DETAIL - "B"

3/4" = 1'-0"

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BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)

PRECAST WING WALL DETAILS

DATE: DEC. 18, 2013
SCALE: NOTED
CHKD: - DFTM: B.L.
JOB NO: 23413-013
DWG. NO: WW1

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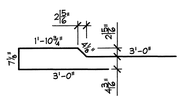
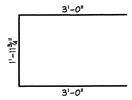
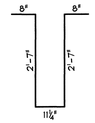


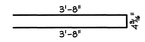
W-503L
#5 BENT BAR
LEVEL II (DUAL COATED)
USE 2 3/4"Φ [70 mm] PIN
(228) REQ'D.



W-504L
#5 BENT BAR
LEVEL II (DUAL COATED)
USE 2 3/4"Φ [70 mm] PIN
(64) REQ'D.

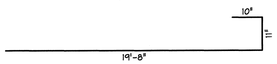


W-401L
#4 BENT BAR
LEVEL II (DUAL COATED)
USE 2"Φ [50 mm] PIN
(840) REQ'D.

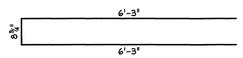


W-402L
#4 BENT BAR
LEVEL II (DUAL COATED)
USE 2"Φ [50 mm] PIN
(1,014) REQ'D.

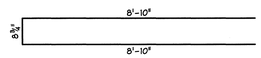
PRESTRESSED NEXT BEAMS



W-901L
#9 BENT BAR
LEVEL II (DUAL COATED)
USE 6"Φ PIN
(64) REQ'D.

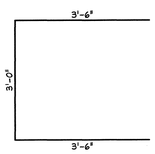


W-501L
#5 BENT BAR
LEVEL II (DUAL COATED)
USE 2 3/4"Φ [70 mm] PIN
(156) REQ'D.

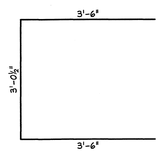


W-502L
#5 BENT BAR
LEVEL II (DUAL COATED)
USE 2 3/4"Φ [70 mm] PIN
(78) REQ'D.

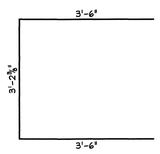
PRECAST APPROACH SLABS



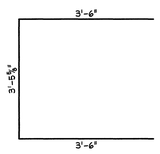
W-505L
#5 BENT BAR
LEVEL II (DUAL COATED)
USE 2 3/4"Φ [70 mm] PIN
(58) REQ'D.



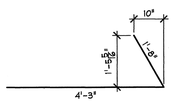
W-506L
#5 BENT BAR
LEVEL II (DUAL COATED)
USE 2 3/4"Φ [70 mm] PIN
(4) REQ'D.



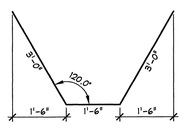
W-507L
#5 BENT BAR
LEVEL II (DUAL COATED)
USE 2 3/4"Φ [70 mm] PIN
(4) REQ'D.



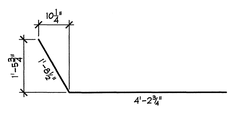
W-508L
#5 BENT BAR
LEVEL II (DUAL COATED)
USE 2 3/4"Φ [70 mm] PIN
(20) REQ'D.



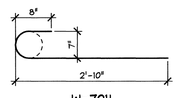
W-601L
#6 BENT BAR
LEVEL II (DUAL COATED)
USE 4"Φ [100 mm] PIN
(40) REQ'D.



W-602L
#6 BENT BAR
LEVEL II (DUAL COATED)
USE 4"Φ [100 mm] PIN
(16) REQ'D.

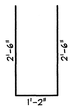


W-603L
#6 BENT BAR
LEVEL II (DUAL COATED)
USE 4"Φ [100 mm] PIN
(40) REQ'D.



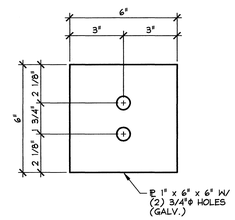
W-701L
#7 BENT BAR
LEVEL II (DUAL COATED)
USE 5"Φ PIN
(78) REQ'D.

PRECAST ABUTMENTS



W-509E
#5 BENT BAR
EPOXY COATED
USE 2 3/4"Φ [70 mm] PIN
(80) REQ'D.

PRECAST WING WALLS



E M - W 1
3" = 1'-0"

MISCELLANEOUS MATERIALS

ITEM	MARK	QTY.	DESCRIPTION	REMARKS	
1		88	#4 x 8'-9" (LEVEL II, DUAL COATED)		PRESTRESSED NEXT BEAMS
2					
3		1,360	#5 x 8'-9" (LEVEL II, DUAL COATED)		
4		44	#5 x 92'-8" (W/ (1) 2'-6" STAGGERED LAP) (LVL. II, DUAL COATED)		
5		44	#5 x 84'-8" (W/ (1) 2'-6" STAGGERED LAP) (LVL. II, DUAL COATED)		
6					
7					
8		20	GUARD RAIL ANCHOR PLATE (GALV.)	SUPPLIED BY OTHERS	
9		16	SET OF (4) 0.60"Φ x 270 KSI STRAND LIFTING LOOPS		
10					
11	MK-W2	32	4T x 7 1/8" SWIFT LIFT LIFTER		PRECAST APPROACH SLABS
12					
13		64	#6 x 19'-7" (LEVEL II, DUAL COATED)		
14					
15					
16					
17					
18					
19					
20					
21		72	#5 x 3'-7" (LEVEL II, DUAL COATED)		PRECAST ABUTMENTS
22		84	#5 x 4'-3" (LEVEL II, DUAL COATED)		
23		82	#5 x 5'-0" (LEVEL II, DUAL COATED)		
24		16	#5 x 9'-0" (LEVEL II, DUAL COATED)		
25		16	#5 x 2'-10 1/2" (LEVEL II, DUAL COATED)		
26		14	#5 x 21'-6" (LEVEL II, DUAL COATED)		
27		14	#5 x 23'-11" (LEVEL II, DUAL COATED)		
28					
29		82	#7 x 5'-0" (LEVEL II, DUAL COATED)		
30		16	#7 x 9'-0" (LEVEL II, DUAL COATED)		
31		16	#7 x 2'-10 1/2" (LEVEL II, DUAL COATED)		
32		14	#7 x 22'-3" (LEVEL II, DUAL COATED)		
33		14	#7 x 23'-2" (LEVEL II, DUAL COATED)		
34					
35		2	2'-0"Φ x 5'-11 1/2" CORRUGATED STEEL PIPE (GALV.)		
36		2	2'-0"Φ x 5'-11" CORRUGATED STEEL PIPE (GALV.)		
37		2	2'-0"Φ x 5'-9 1/4" CORRUGATED STEEL PIPE (GALV.)		
38		2	2'-0"Φ x 5'-8 3/4" CORRUGATED STEEL PIPE (GALV.)		
39	MK-W6	8	20T x 19 3/4" SWIFT LIFT LIFTER		
40					
41					
42	EM-W1	24	PL 1" x 6" x 6" W/ (2) 3/4"Φ HOLES (GALV.)	FOR ERECTION; SEE DETAIL THIS SHEET	
43		24	1/2"Φ x 49'-0" POLY-STRAND	FOR ERECTION	
44		48	1/2"Φ SINGLE USE STRESSING CHUCK	FOR ERECTION	
45		12	COMPRESSIBLE SEALER SELF ADHESIVE	FOR ERECTION	
46		80	#5 x 8'-6" (EPOXY COATED)		PRECAST WING WALLS
47					
48		40	#6 x 8'-7" (EPOXY COATED)		
49		40	#6 x 9'-1" (EPOXY COATED)		
50					
51	MK-W3	80	NMB SPLICE SLEEVE 7U-X(PG) (EPOXY COATED) W/ GROUT TUBES	GROUT TUBE LENGTH AS REQ'D.	
52	MK-W4	16	4T x 5 1/2" SWIFT LIFT LIFTER		
53	MK-W5	8	8T x 13 3/8" SWIFT LIFT LIFTER		
54					
55					

APPROVAL STAMP:

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VT ROUTE 12, MAJOR COLLECTOR
BRIDGE NO.: 25 PROJECT NO.: ER BRF 0241(39)

MATERIALS LIST

DATE: DEC. 18, 2013
SCALE: NOTED
CHKD: - DFTM: B.L.
JOB NO: 23413-013
DWG. NO: M1

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