

State of Vermont
PDD/Structures Design Section
National Life Building – Drawer 33
Montpelier, VT 05633-5001
www.aot.state.vt.us

Agency of Transportation

[phone] 802-828-01611
[fax] 802-828-3566
[ttd] 800-253-0191

May 27, 2015

J. P. Sicard, Inc.
PO Box 508
1369 Glover Road
Barton, VT 05822

Project Name: Barton BRO 1449(31)

Structure Identification: TH 2, Bridge 8

The precast fabrication drawings associated with Items 540.10 Precast Concrete Structure (Abutment #1), 540.10 Precast Concrete Structure (Abutment #2), 540.10 Precast Concrete Structure (Approach Slab #1), 540.10 Precast Concrete Structure (Approach Slab #2), and 900.640 Special Provision (Prestressed Concrete NEXT D Beams)(NEXT 32 D) have been reviewed and are being returned herewith.

Please incorporate all review comments and resubmit.

Sincerely,



Todd A. Sumner P.E.
Project Manager

cc Seth Hisman, Resident Engineer
Ron Gray, Regional Construction Engineer
J.P. Sicard, Contractor
Jeff Clark, Structural Steel Fabrication Inspector



PO Box 508
Barton, VT 05822
Phone: (802) 525-9506
Fax: (802) 525-4616
www.jpsicard.com

Submittal Data Sheet

Submittal #: 6

Submission #: 1

Date: 5/8/2015

Project Name: Barton BRO (1449) Bridge Replacement

Owner: Town of Barton, VT

Engineer: VTrans

Contractor: J.P. Sicard Inc.

Item Number(s): 540.10, 900.640

Supplier: J.P. Carrara

Description of Item: Fabrication Drawings: Pre-Cast Abutments, NEXT Beams and Approach Slabs

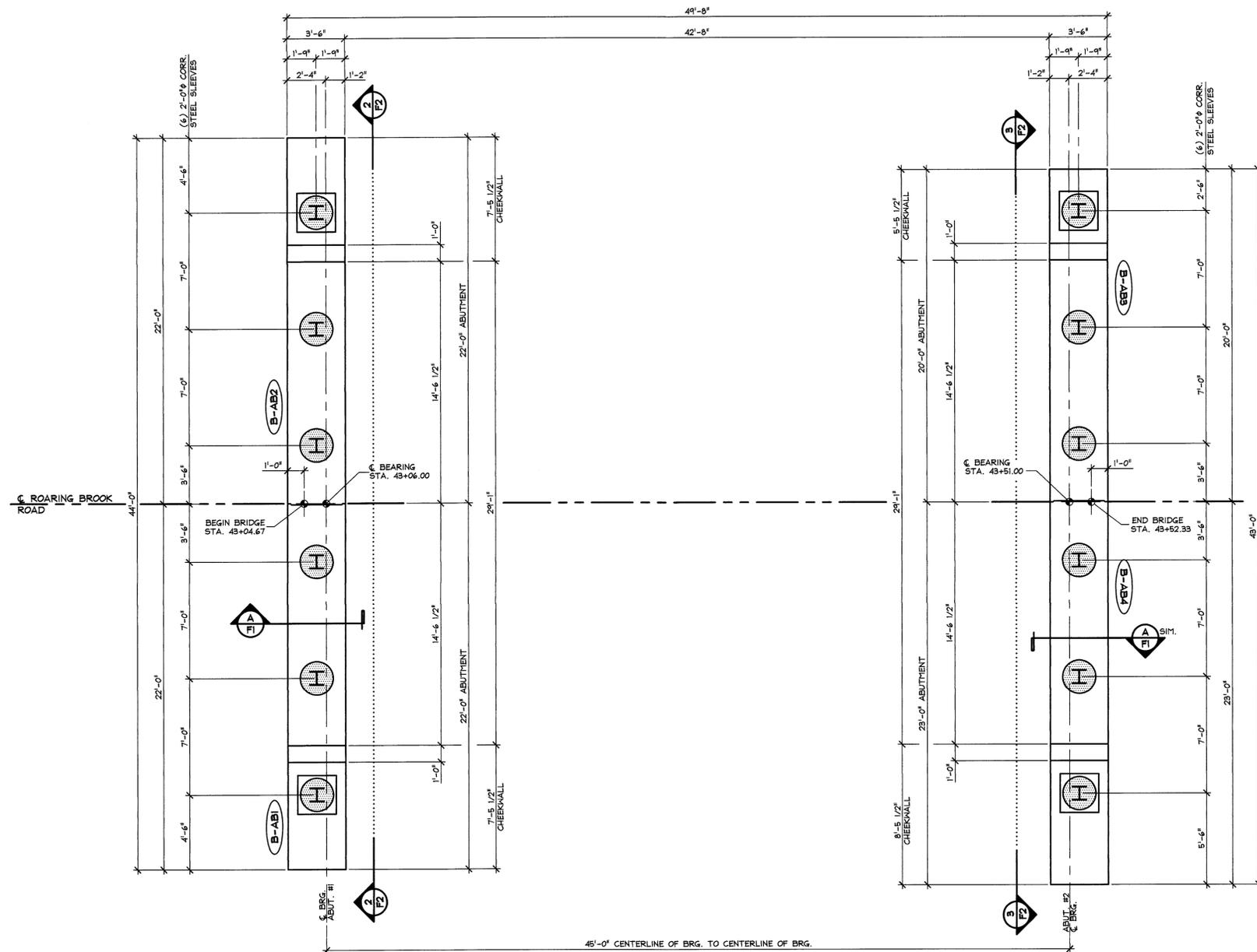
Substitution: NO

Engineers Review Comments: _____

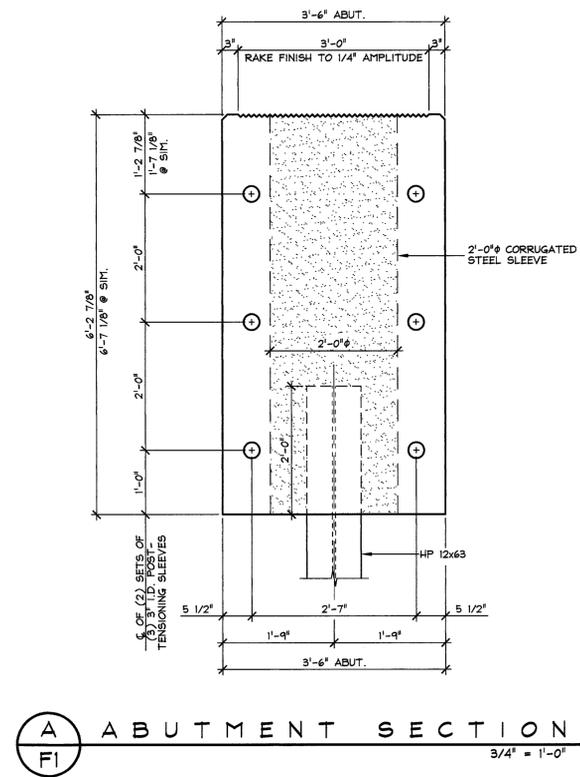
Submitted By: Brad Drake

Title: Project Manager

Company: JP Sicard Inc



1 PRECAST ABUTMENT LAYOUT
 1/4" = 1'-0"



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

Vermont Agency of Transportation
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 ON: **May 8, 2015**
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 BY: Todd A. Sumner DATE: 05/27/2015



SHOP DRAWING REVIEW

REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

REJECTED REVISE AND RESUBMIT APPROVED AS NOTED

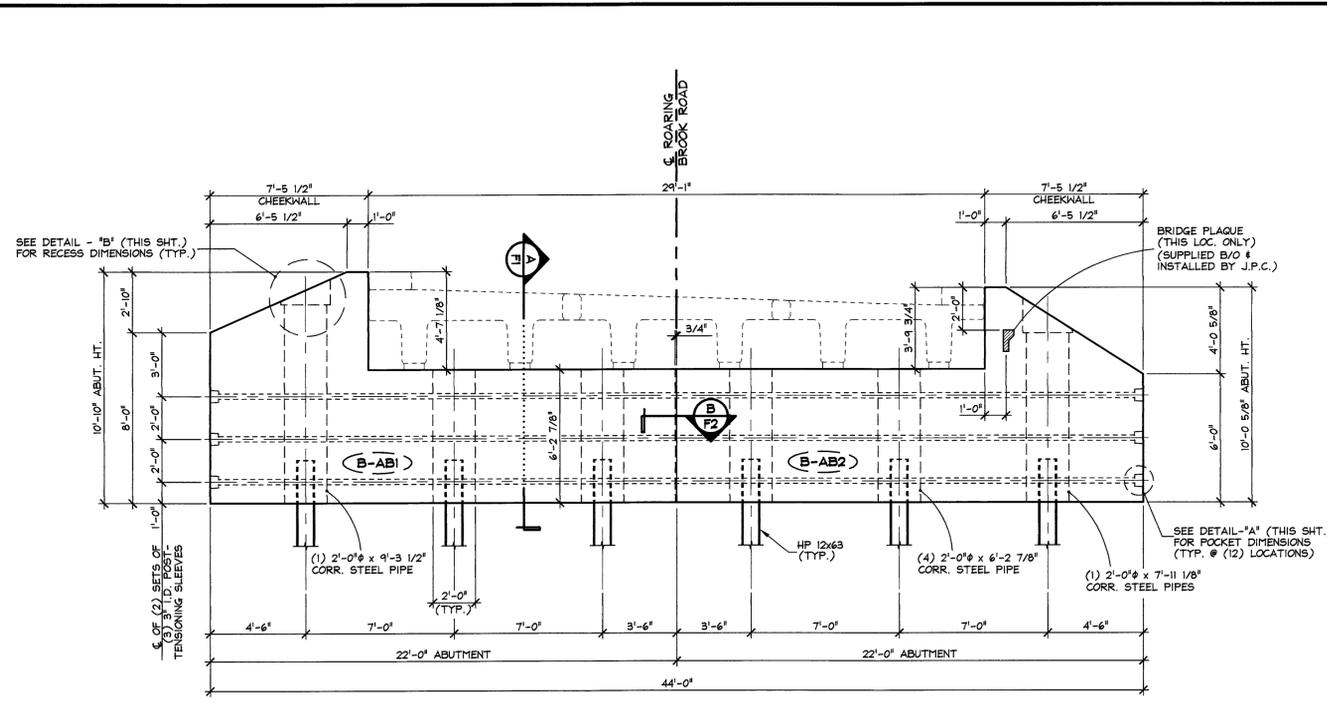
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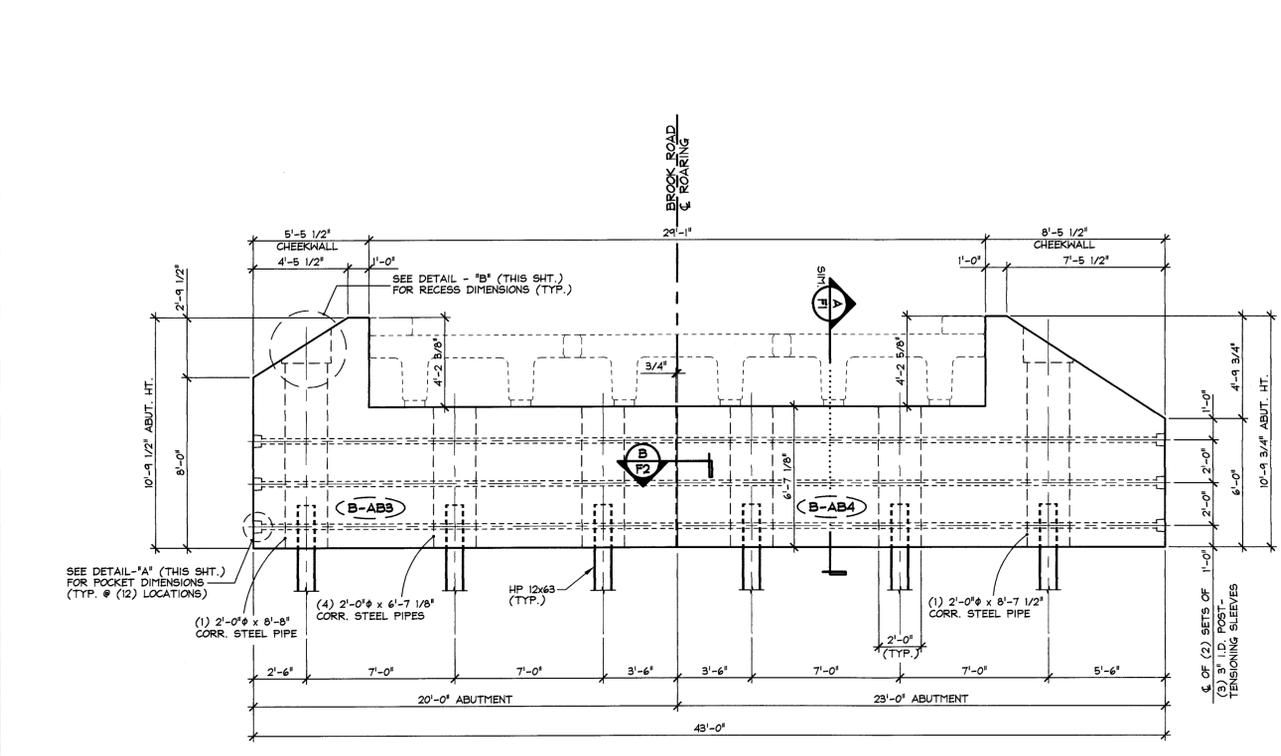
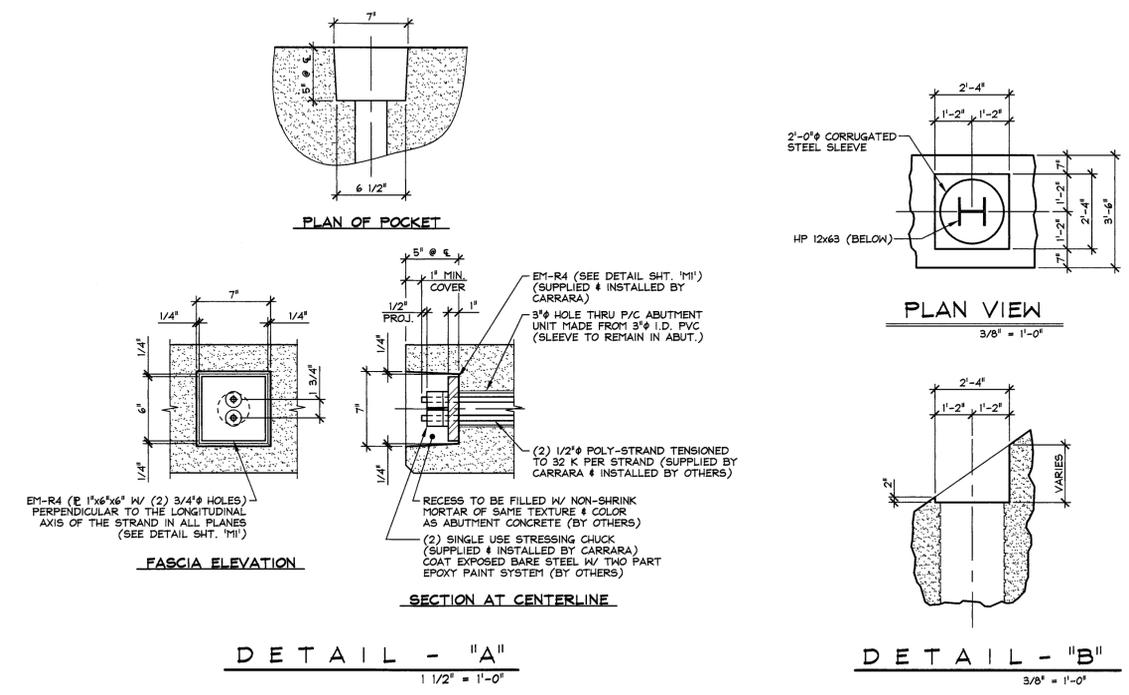
Job Number: 120174
 Reviewed by: SRB
 Date: 05/26/2015

APPROVAL STAMP:

J.P. CARRARA & SONS INC. Precast & Prestress Manufacturer 2464 CASE ST., MIDDLEBURY, VERMONT 05753 Phone: (802)388-6361 Fax: (802)388-9010		J.P. Sicard CONTRACTOR BARTON, VERMONT	
STATE OF VERMONT AGENCY OF TRANSPORTATION COUNTY OF ORLEANS		DATE: FEB. 25, 2015	SCALE: NOTED
TOWN OF BARTON ROARING BROOK ROAD TH #2, RURAL MINOR COLLECTOR BRIDGE NO.: 8 PROJECT NO.: BRO 1449(31)		CHKD:	DFTM: T.D.
PRECAST ABUTMENT LAYOUT		JOB NO: 23462-015	DWG. NO: F1

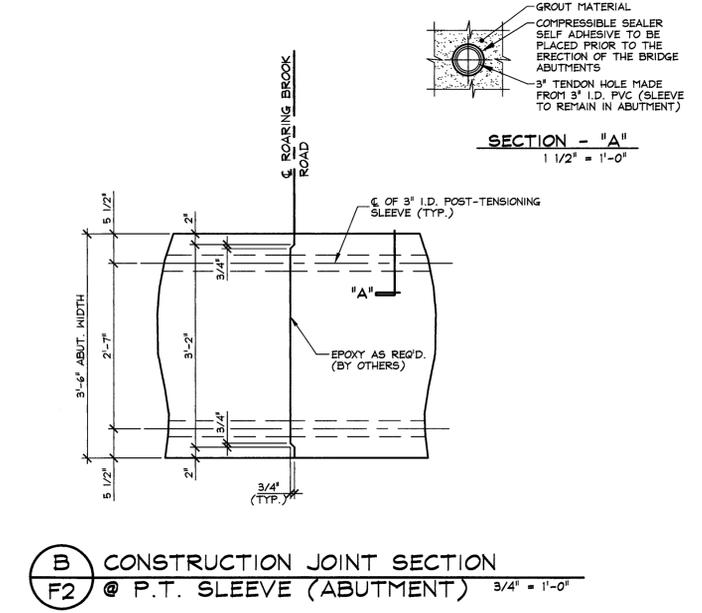


2 PRECAST ABUTMENT #1 ELEVATION
 1/4" = 1'-0"



3 PRECAST ABUTMENT #2 ELEVATION
 1/4" = 1'-0"

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B CONSTRUCTION JOINT SECTION
F2 @ P.T. SLEEVE (ABUTMENT)
 3/4" = 1'-0"

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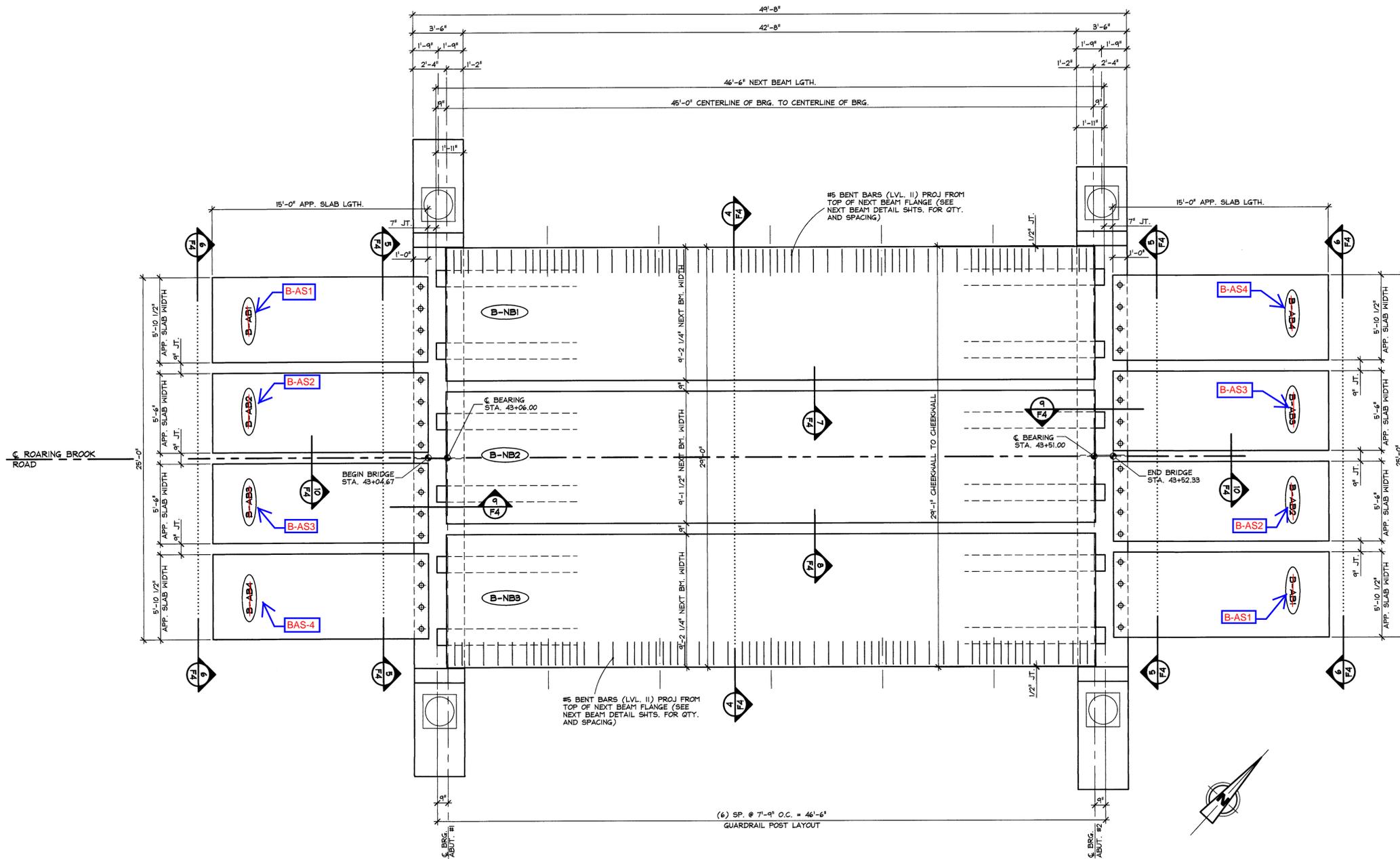
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 240 Commercial Street
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Job Number: **120174**
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PRECAST ABUTMENT ELEVATIONS & DETAILS		JOB NO: 23462-015	DWG. NO: F2



1 PRESTRESSED NEXT BEAM & APPROACH SLAB LAYOUT
 F3 1/4" = 1'-0"

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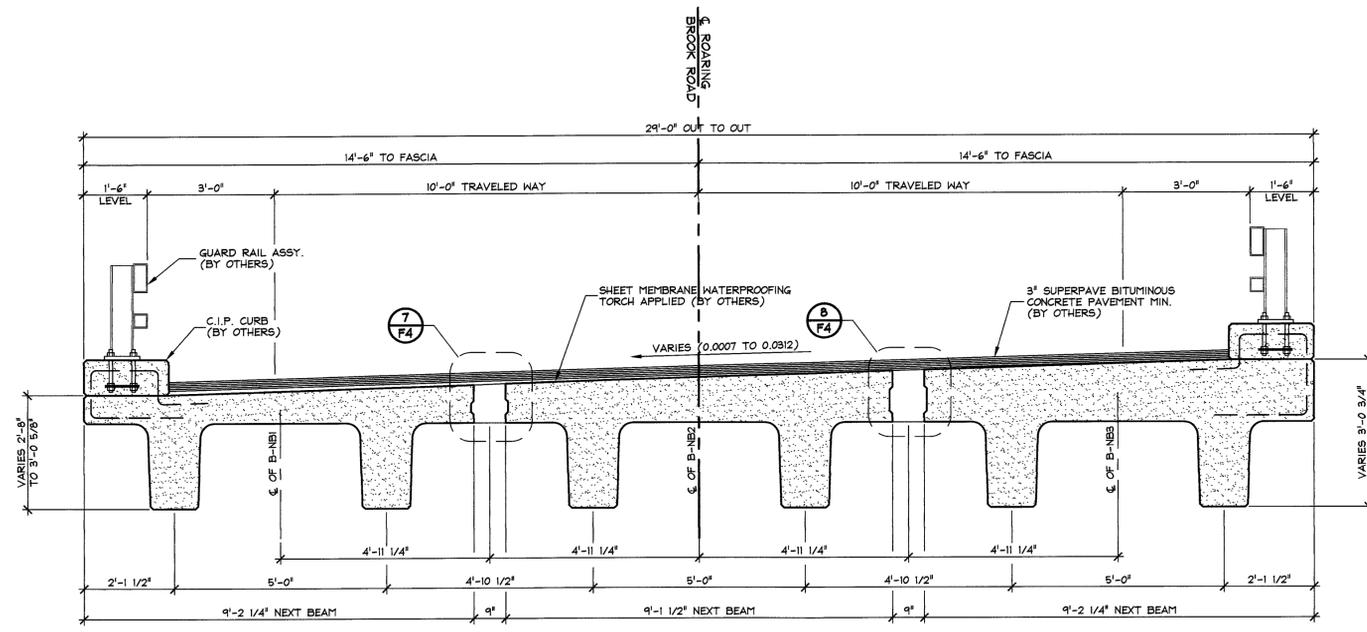
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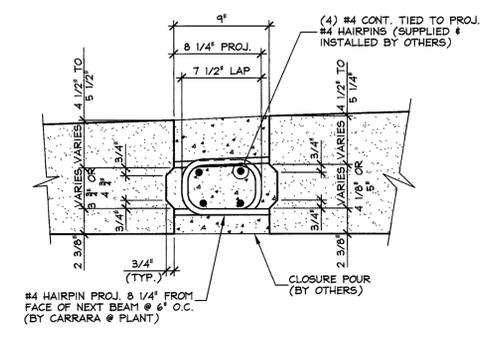
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	PRECAST NEXT BEAM & APPROACH SLAB LAYOUT		DWG. NO: F3

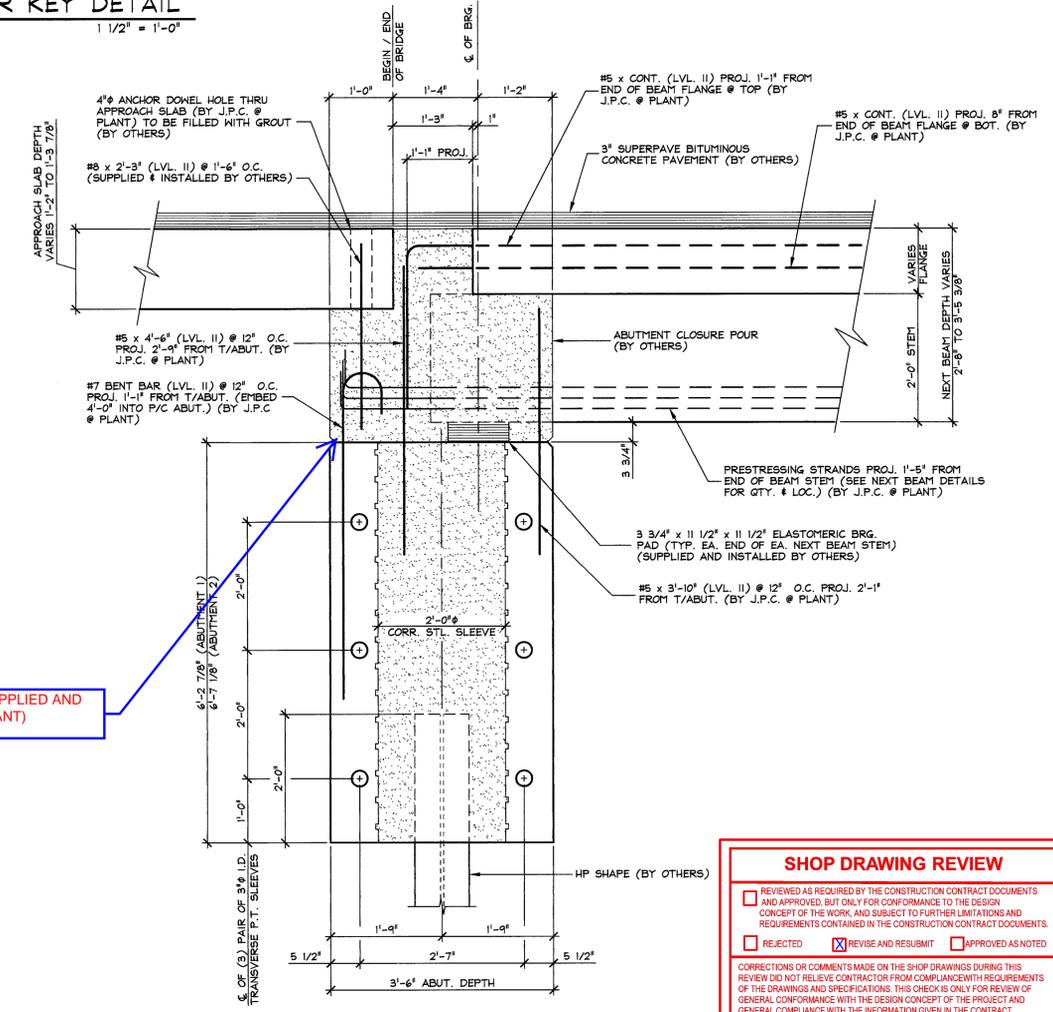
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4 TRANSVERSE SECTION THRU NEXT BEAMS
 F4 1/2" = 1'-0"

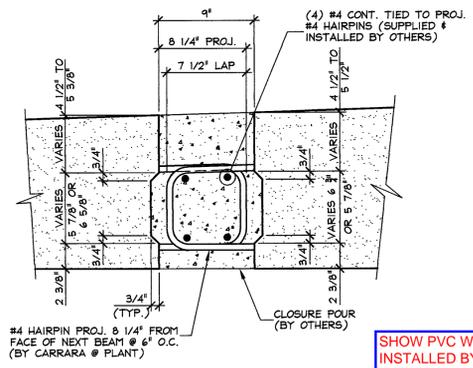


7 SHEAR KEY DETAIL
 F4 1 1/2" = 1'-0"

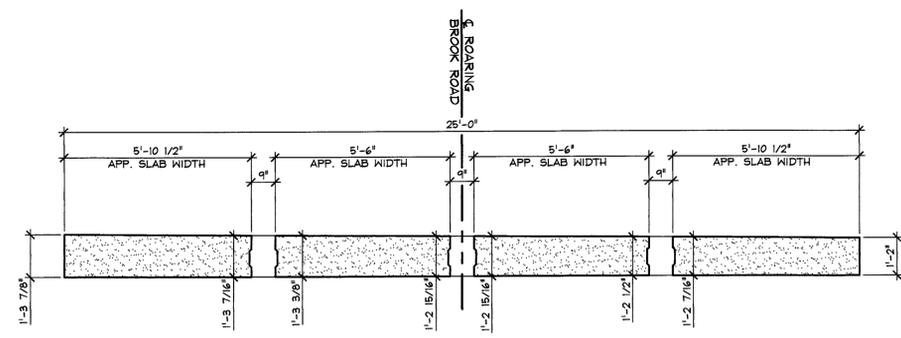


9 ABUTMENT SECTION
 F4 3/4" = 1'-0"

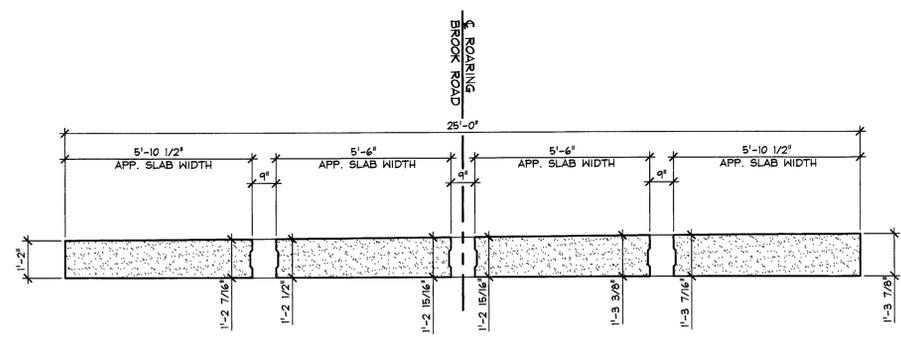
SHOW PVC WATERSTOP (SUPPLIED AND INSTALLED BY CARARRA PLANT)



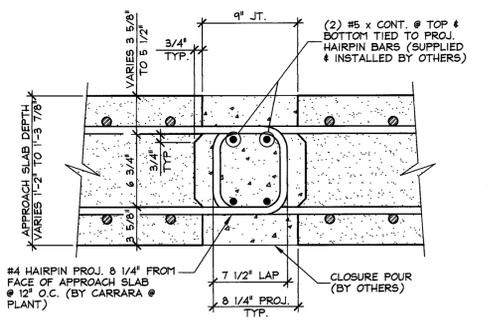
8 SHEAR KEY DETAIL
 F4 1 1/2" = 1'-0"



5 SECTION AT APPROACH SLABS
 F4 (ABUT. #1 & ABUT. #2) 3/8" = 1'-0"



6 SECTION AT APPROACH SLABS
 F4 (ABUT. #1 & ABUT. #2) 3/8" = 1'-0"



10 APPROACH SLAB CLOSURE POUR
 F4 1 1/2" = 1'-0"

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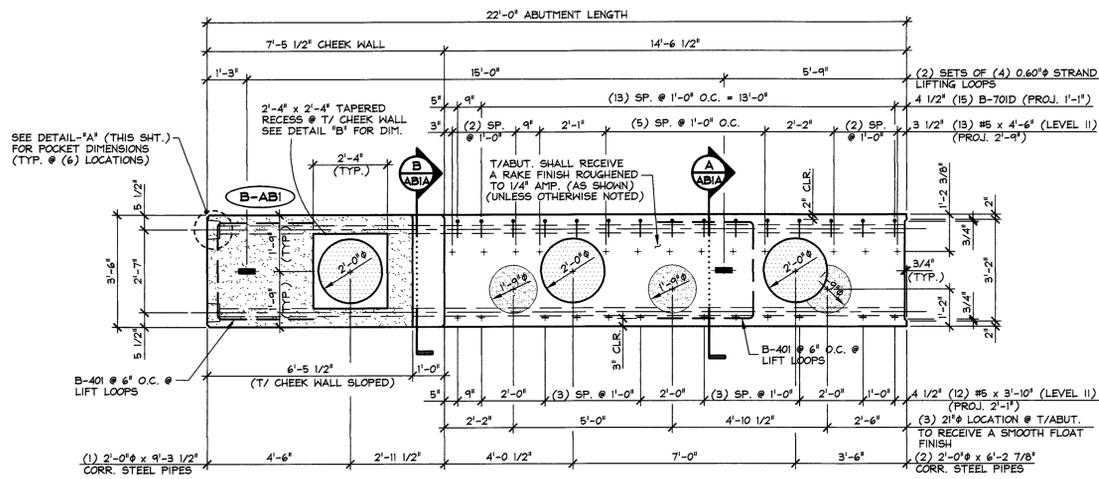
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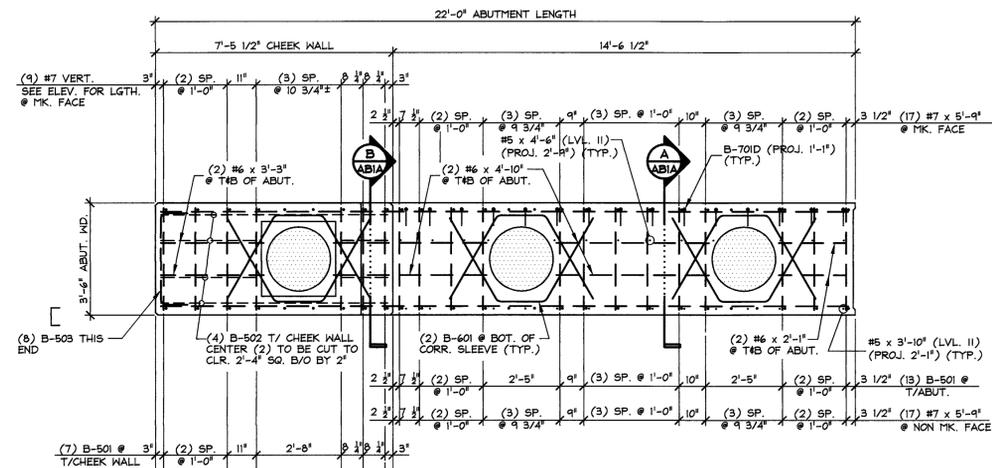
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 Date: 05/26/2015

APPROVAL STAMP:

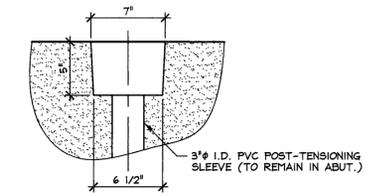
J.P. CARRARA & SONS INC. Precast & Prestress Manufacturer 244 OISE STR., MIDDLEBURY, VERMONT 05753 Phone: (802)388-6361 Fax: (802)388-9010	J.P. Sicard CONTRACTOR BARTON, VERMONT
STATE OF VERMONT AGENCY OF TRANSPORTATION COUNTY OF ORLEANS	DATE: FEB. 25, 2015 SCALE: NOTED
TOWN OF BARTON ROARING BROOK ROAD TH #2, RURAL MINOR COLLECTOR BRIDGE NO.: 8 PROJECT NO.: BRO 1449(31)	CHKD: DFTM: T.D. JOB NO: 23462-015
SECTIONS AND DETAILS	
DWG. NO: F4	



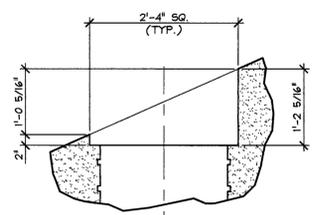
PLAN VIEW IN FORM



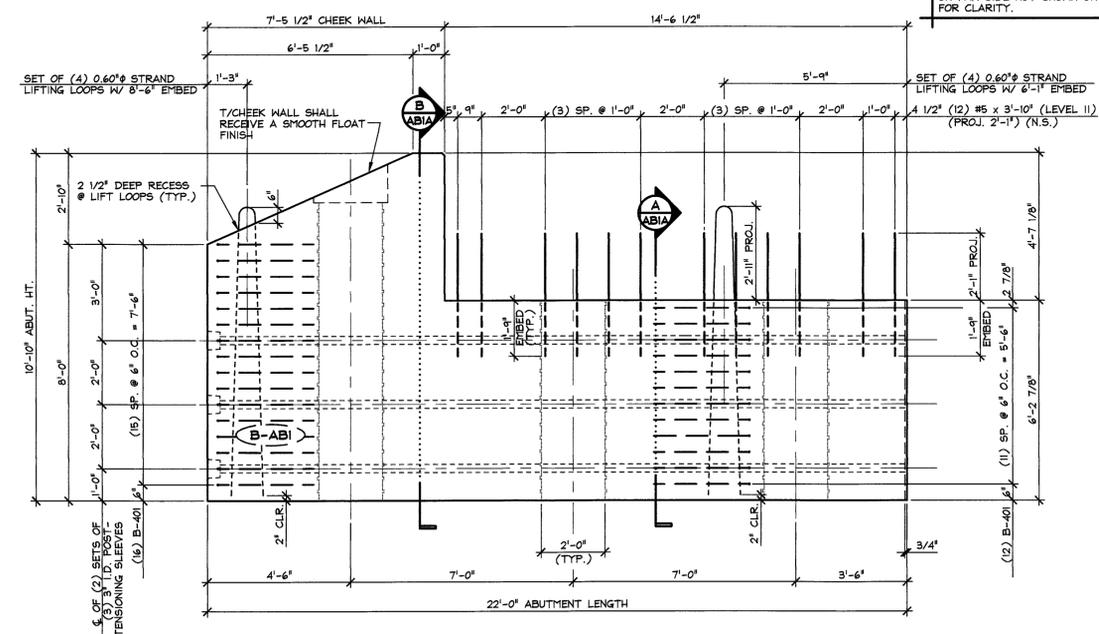
PLAN VIEW IN FORM



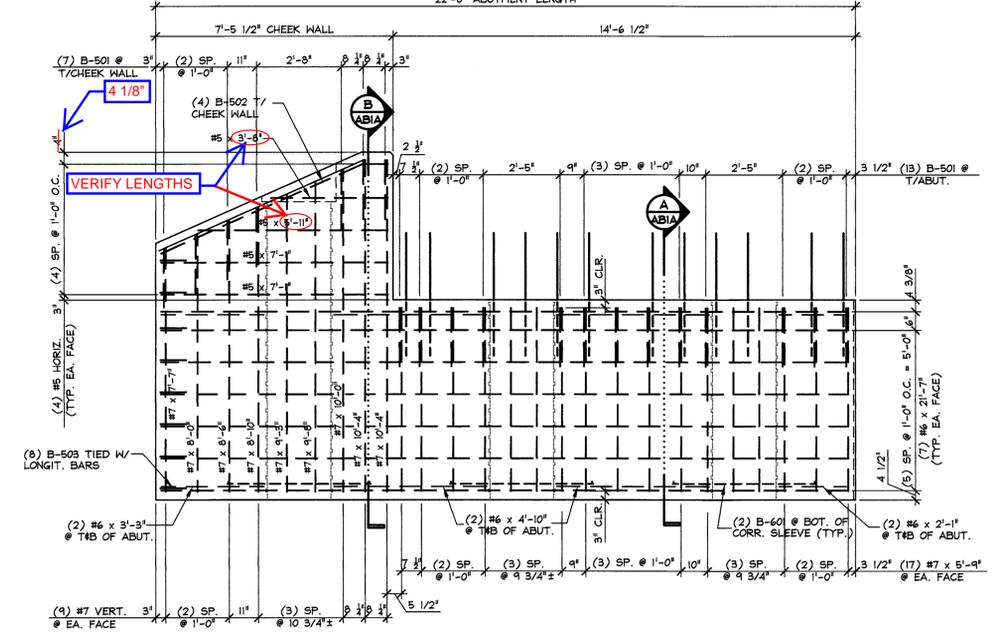
DETAIL - "A"
3/8" I.D. PVC POST-TENSIONING SLEEVE (TO REMAIN IN ABUT.)
3/4" x 1'-0"



DETAIL - "B"
2'-4" SQ. (TYP.)
3/4" x 1'-0"



NON MARK FACE ELEVATION



NON MARK FACE ELEVATION

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

MARK: B-ABI QTY.: 1 WT.: 37.33 T VOL.: 18.21 cy

MATERIAL LIST / ABUTMENT			
ITEM	MARK	DESCRIPTION	QTY.
1	B-401	#4 BENT BAR (LEVEL I)	28
2	B-501	#5 BENT BAR (LEVEL I)	20
3	B-502	#5 BENT BAR (LEVEL I)	4
4	B-503	#5 BENT BAR (LEVEL I)	8
5	B-601	#6 BENT BAR (LEVEL I)	6
6	B-701D	#5 BENT BAR (LEVEL II, DUAL COATED)	15
7		#5 x 3'-10" (LEVEL II, DUAL COATED)	12
8		#5 x 4'-6" (LEVEL II, DUAL COATED)	13
9		#5 (3'-8") (LEVEL I) VERIFY LENGTHS	2
10		#5 (5'-11") (LEVEL I) VERIFY LENGTHS	2
11		#5 x 7'-1" (LEVEL I)	4
12		#6 x 2'-1" (LEVEL I)	4
13		#6 x 3'-3" (LEVEL I)	4
14		#6 x 4'-10" (LEVEL I)	8
15		#6 x 2'-7" (LEVEL I)	14
16		#7 x 5'-9" (LEVEL I)	34
17		#7 x 7'-7" (LEVEL I)	2
18		#7 x 8'-0" (LEVEL I)	2
19		#7 x 8'-6" (LEVEL I)	2
20		#7 x 8'-10" (LEVEL I)	2
21		#7 x 10'-0" (LEVEL I)	2
22		#7 x 10'-4" (LEVEL I)	4
23		#7 x 9'-3" (LEVEL I)	2
24		#7 x 9'-8" (LEVEL I)	2
25		SET OF (4) 0.60" STRAND LIFTING LOOPS	2
26		2'-0" x 6'-2 7/8" CORRUGATED STEEL PIPE (GALV.)	2
27		2'-0" x 9'-3 1/2" CORRUGATED STEEL PIPE (GALV.)	1

1 ABUTMENT DIMENSIONAL DETAILS
3/8" = 1'-0"

SHOP NOTE:
28 DAYS = 5,000 PSI
RELEASE = 5,000 PSI

MIX DESIGN:
MIX NO. 425M-NO DCI
APPROVED 3-21-2015

2 ABUTMENT REINFORCING DETAILS
3/8" = 1'-0"

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460 Commercial Street
Manchester, NH 03101
603-888-8223

Job Number: 120174
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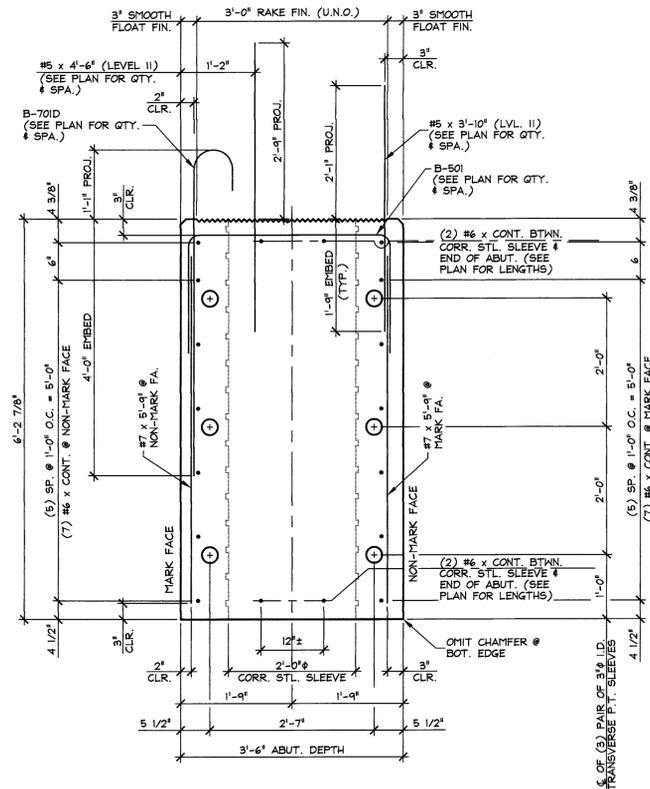
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J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2444 GEE STR., MIDDLEBURY, VERMONT 05753 Phone: (802)388-6361 Fax: (802)388-8010

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORLEANS

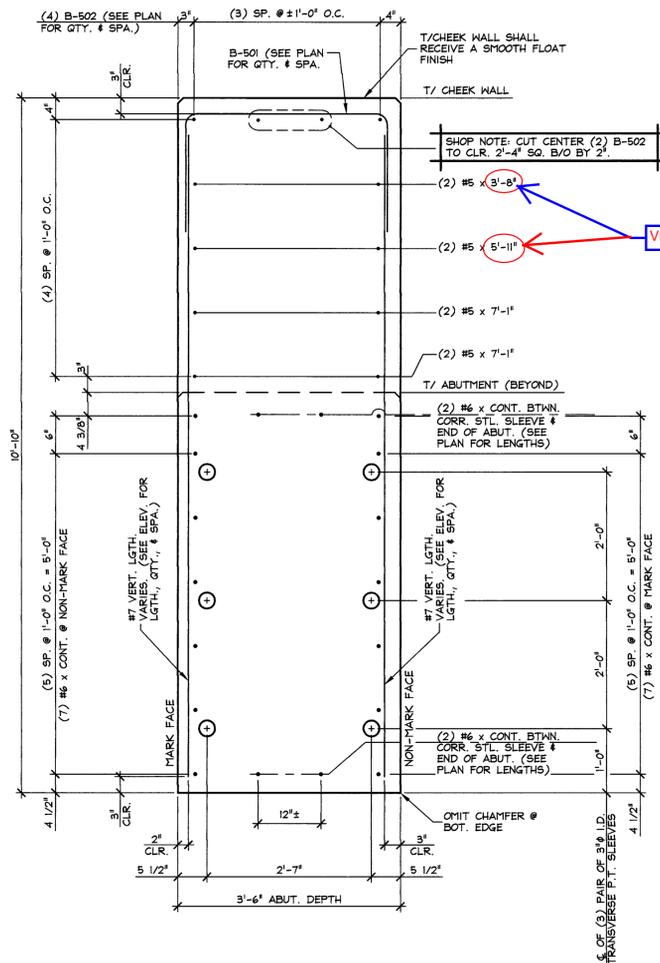
TOWN OF BARTON
ROARING BROOK ROAD TH #2, RURAL MINOR COLLECTOR
BRIDGE NO.: 8 PROJECT NO.: BRO 1449(31)

DATE: FEB. 25, 2015
SCALE: NOTED
CHKD: DFTM: T.D.
JOB NO: 23462-015
DWG. NO: **ABI**



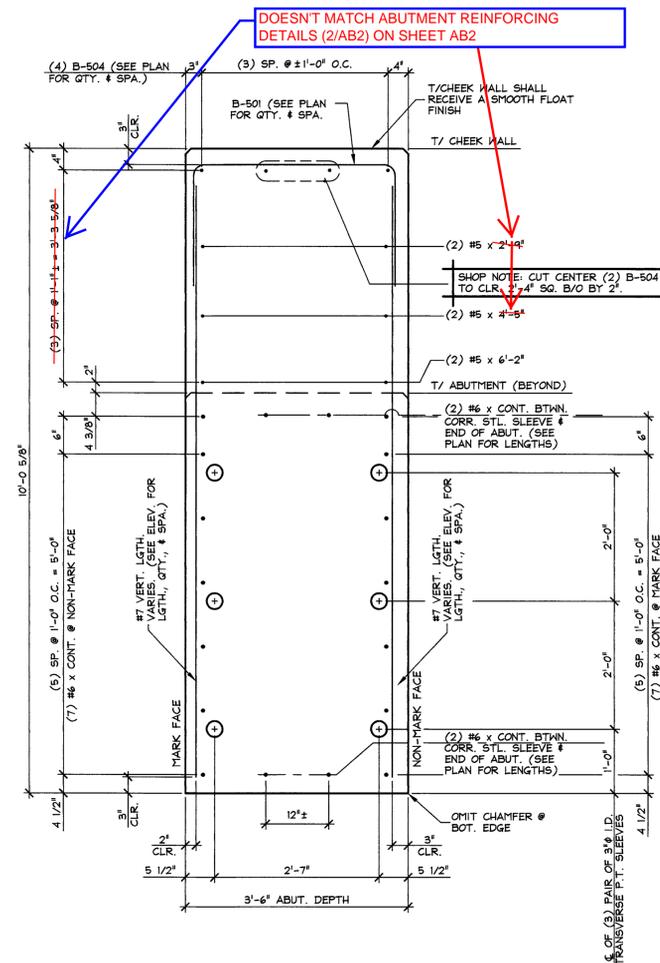
A ABUTMENT SECTION
 AB1A (B-AB1 & B-AB2) 3/4" = 1'-0"

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



B ABUTMENT SECTION
 AB1A (B-AB1) 3/4" = 1'-0"

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



C ABUTMENT SECTION
 AB1A (B-AB2) 3/4" = 1'-0"

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

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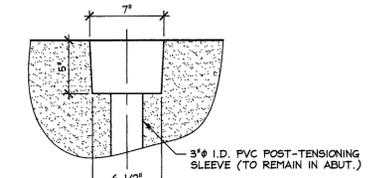
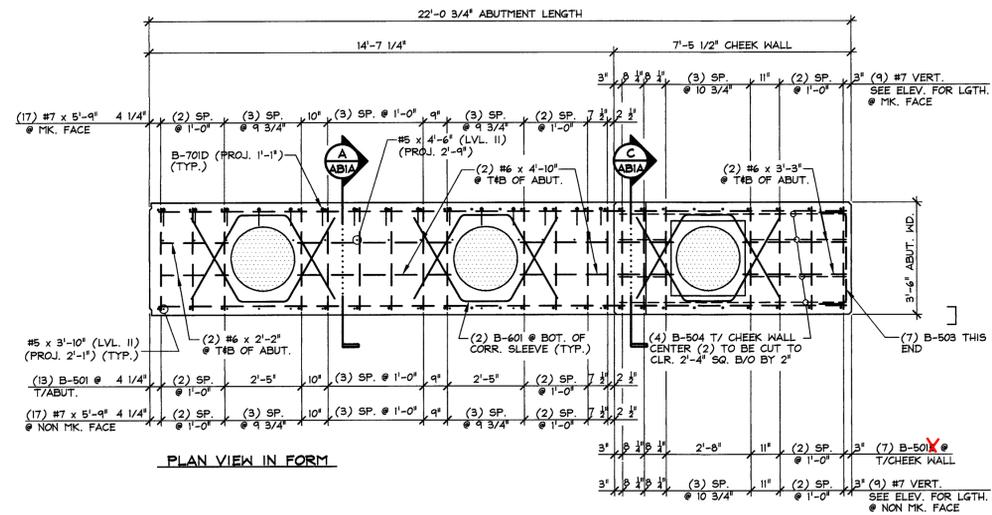
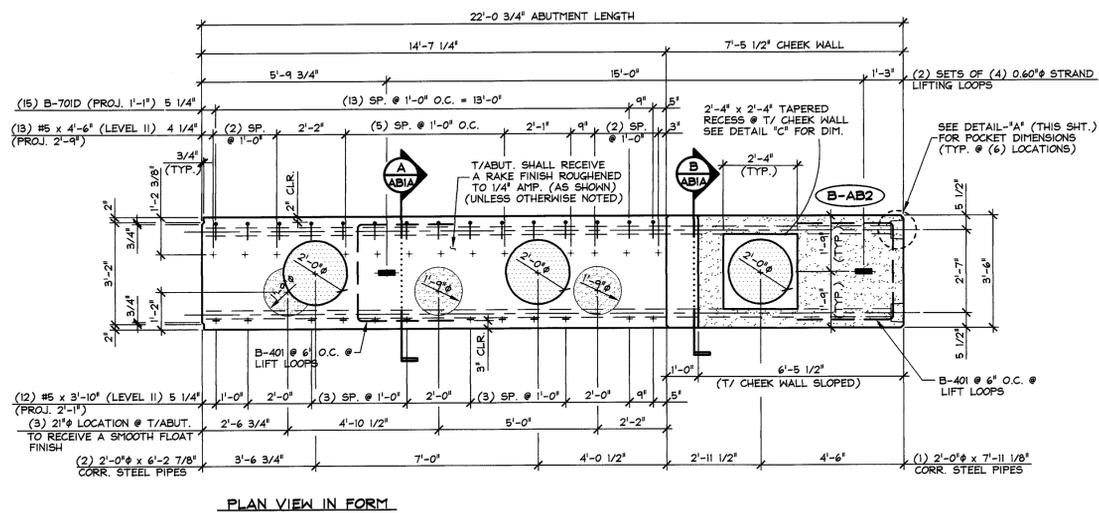
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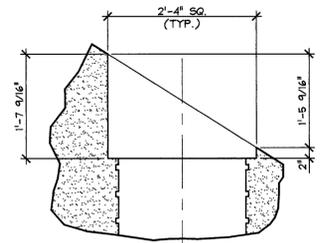
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	PRECAST ABUTMENT SECTIONS DWG. NO: AB1A	

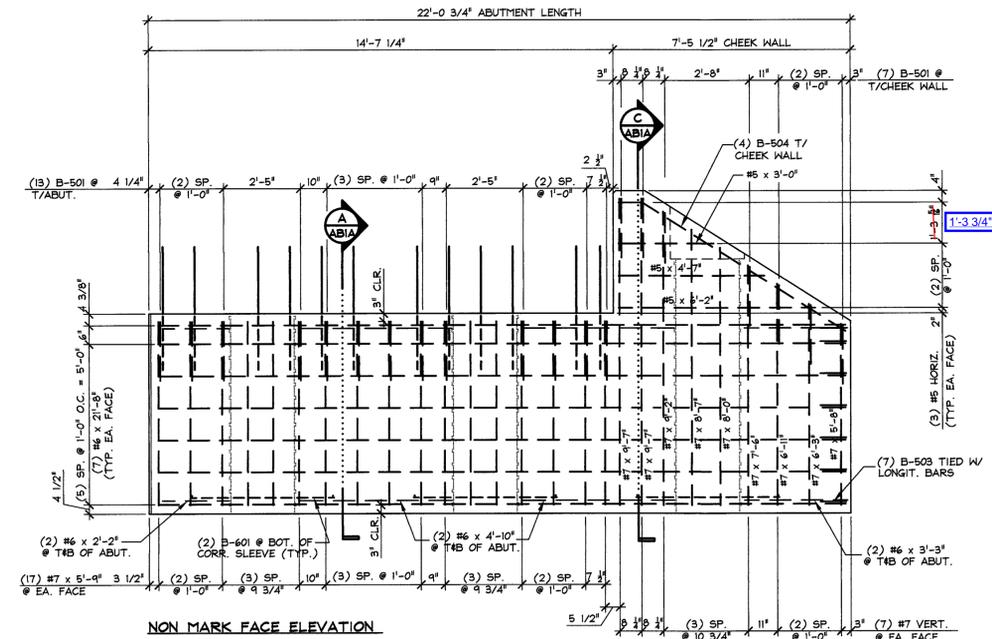
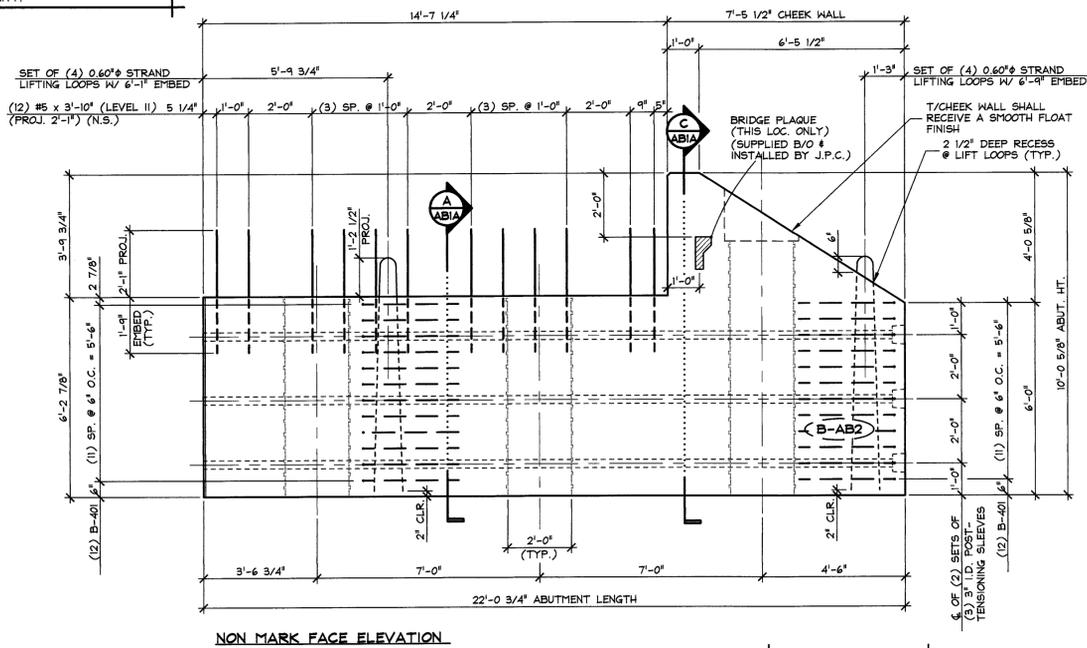


DETAIL - "A"
1 1/2" = 1'-0"



DETAIL - "C"
3/4" = 1'-0"

SHOP NOTE: B-701D & #5 PROJ. 2'-9" ON FAR SIDE NOT SHOWN ON THIS VIEW FOR CLARITY.



SHOP NOTE:
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3	B-504	#5 BENT BAR (LEVEL I)	4
4	B-503	#5 BENT BAR (LEVEL I)	7
5	B-601	#6 BENT BAR (LEVEL I)	6
6	B-701D	#5 BENT BAR (LEVEL II, DUAL COATED)	15
7		#5 x 3'-10" (LEVEL II, DUAL COATED)	12
8		#5 x 4'-6" (LEVEL II, DUAL COATED)	13
9		#5 x 3'-0" (LEVEL I)	2
10		#5 x 4'-7" (LEVEL I)	2
11		#5 x 6'-2" (LEVEL I)	2
12		#6 x 2'-2" (LEVEL I)	4
13		#6 x 3'-3" (LEVEL I)	4
14		#6 x 4'-10" (LEVEL I)	8
15		#6 x 21'-6" (LEVEL I)	14
16		#7 x 5'-9" (LEVEL I)	34
17		#7 x 5'-8" (LEVEL I)	2
18		#7 x 6'-3" (LEVEL I)	2
19		#7 x 6'-11" (LEVEL I)	2
20		#7 x 7'-6" (LEVEL I)	2
21		#7 x 9'-2" (LEVEL I)	2
22		#7 x 9'-7" (LEVEL I)	4
23		#7 x 8'-7" (LEVEL I)	2
24		#7 x 8'-0" (LEVEL I)	2
25		SET OF (4) 0.60" STRAND LIFTING LOOPS	2
26		2'-0" x 6'-2 7/8" CORRUGATED STEEL PIPE (GALV.)	2
27		2'-0" x 7'-11 1/8" CORRUGATED STEEL PIPE (GALV.)	1

1 ABUTMENT DIMENSIONAL DETAILS
3/8" = 1'-0"

SHOP NOTE:
28 DAYS = 5,000 PSI
RELEASE = 5,000 PSI

MIX DESIGN:
MIX NO. 425M-NO DCI
APPROVED 3-21-2015

2 ABUTMENT REINFORCING DETAILS
3/8" = 1'-0"

Vermont Agency of Transportation
RECEIVED
ON: **May 8, 2015**
and Checked for
CONFORMANCE
BY: **Todd A. Sumner** DATE: **05/27/2015**

SHOP DRAWING REVIEW

REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

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CJD Consulting Engineers
540 Commercial Street
Manchester, NH 03101
603-888-8223

Job Number: 120174
Reviewed by: SRB
Date: 05/26/2015

APPROVAL STAMP:

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

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORLEANS

DATE: FEB. 25, 2015

SCALE: NOTED

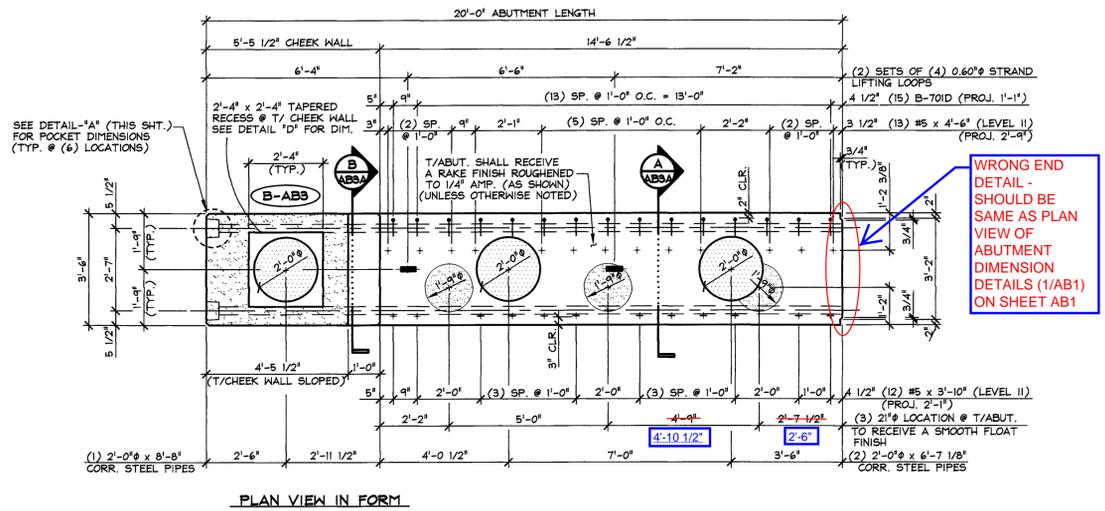
TOWN OF BARTON
ROARING BROOK ROAD TH #2, RURAL MINOR COLLECTOR
BRIDGE NO.: 8 PROJECT NO.: BRO 1449(31)

CHKD: DFTM: T.D.

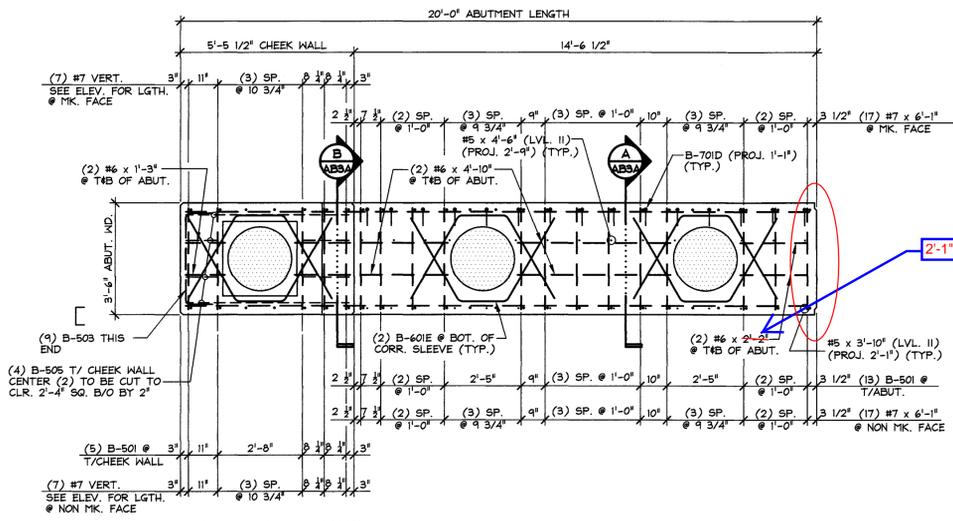
JOB NO: 23462-015

PRECAST ABUTMENT DETAILS

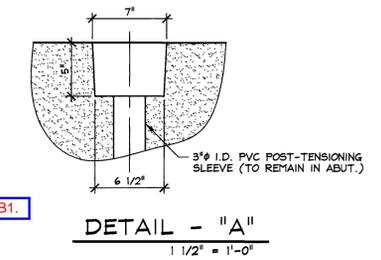
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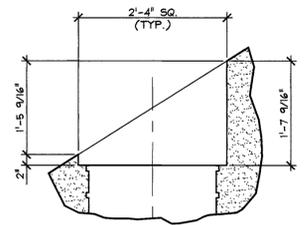
PLAN VIEW IN FORM



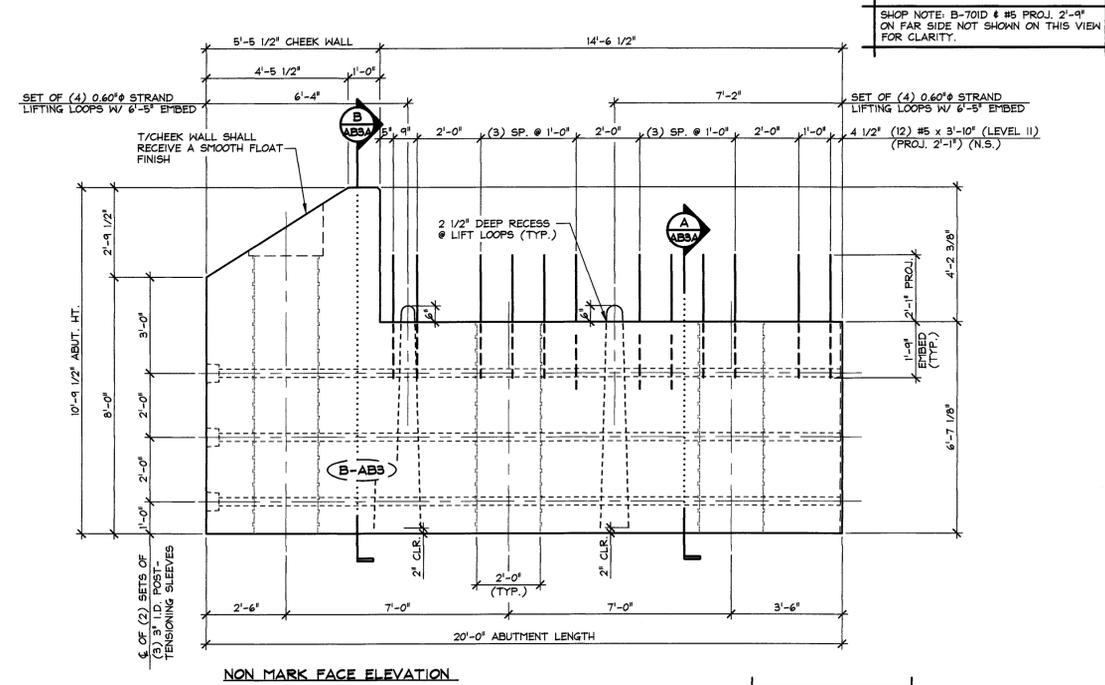
PLAN VIEW IN FORM



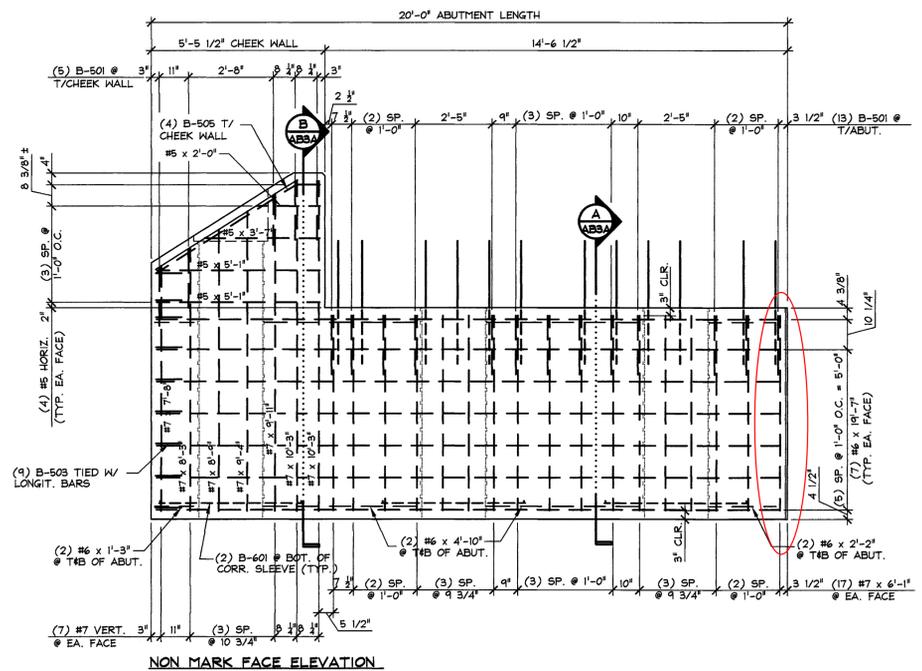
DETAIL - "A"
1 1/2" = 1'-0"



DETAIL - "D"
3/4" = 1'-0"



NON MARK FACE ELEVATION



NON MARK FACE ELEVATION

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

MATERIAL LIST / ABUTMENT			
ITEM	MARK	DESCRIPTION	QTY.
1			
2	B-501	#5 BENT BAR (LEVEL I)	18
3	B-505	#5 BENT BAR (LEVEL I)	4
4	B-503	#5 BENT BAR (LEVEL I)	9
5	B-601	#6 BENT BAR (LEVEL I)	6
6	B-701D	#5 BENT BAR (LEVEL II, DUAL COATED)	15
7		#5 x 3'-10" (LEVEL II, DUAL COATED)	12
8		#5 x 4'-6" (LEVEL II, DUAL COATED)	13
9		#5 x 2'-0" (LEVEL I)	2
10		#5 x 3'-7" (LEVEL I)	2
11		#5 x 5'-1" (LEVEL I)	4
12		#6 x 2'-2" (LEVEL I) 2-1	4
13		#6 x 1'-3" (LEVEL I)	4
14		#6 x 4'-10" (LEVEL I)	8
15		#6 x 1'-1" (LEVEL I)	14
16		#7 x 6'-1" (LEVEL I)	34
17		#7 x 7'-8" (LEVEL I)	2
18		#7 x 8'-3" (LEVEL I)	2
19		#7 x 9'-11" (LEVEL I)	2
20		#7 x 10'-3" (LEVEL I)	4
21		#7 x 8'-9" (LEVEL I)	2
22		#7 x 9'-4" (LEVEL I)	2
23		SET OF (4) 0.60" STRAND LIFTING LOOPS	2
24		2'-0" x 6'-7 1/8" CORRUGATED STEEL PIPE (GALV.)	2
25		2'-0" x 8'-8" CORRUGATED STEEL PIPE (GALV.)	1

1 ABUTMENT DIMENSIONAL DETAILS
AB3 3/8" = 1'-0"

SHOP NOTE:
28 DAYS = 5,000 PSI
RELEASE = 5,000 PSI

MIX DESIGN:
MIX NO. 425M-NO DCI
APPROVED 3-21-2015

2 ABUTMENT REINFORCING DETAILS
AB3 3/8" = 1'-0"

Vermont Agency of Transportation
RECEIVED
ON: **May 8, 2015**
and Checked for
CONFORMANCE
BY: **Todd A. Sumner** DATE: **05/27/2015**

SHOP DRAWING REVIEW

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CLD Consulting Engineers
540 Commercial Street
Manchester, NH 03101
603-888-8223

Job Number: 120174
Reviewed by: SRB
Date: 05/26/2015

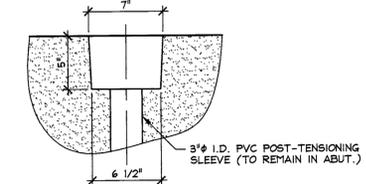
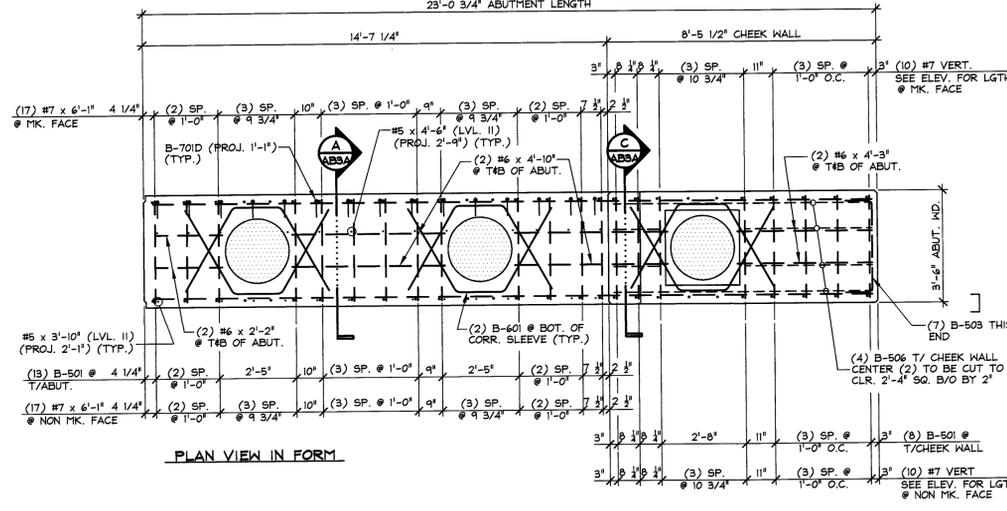
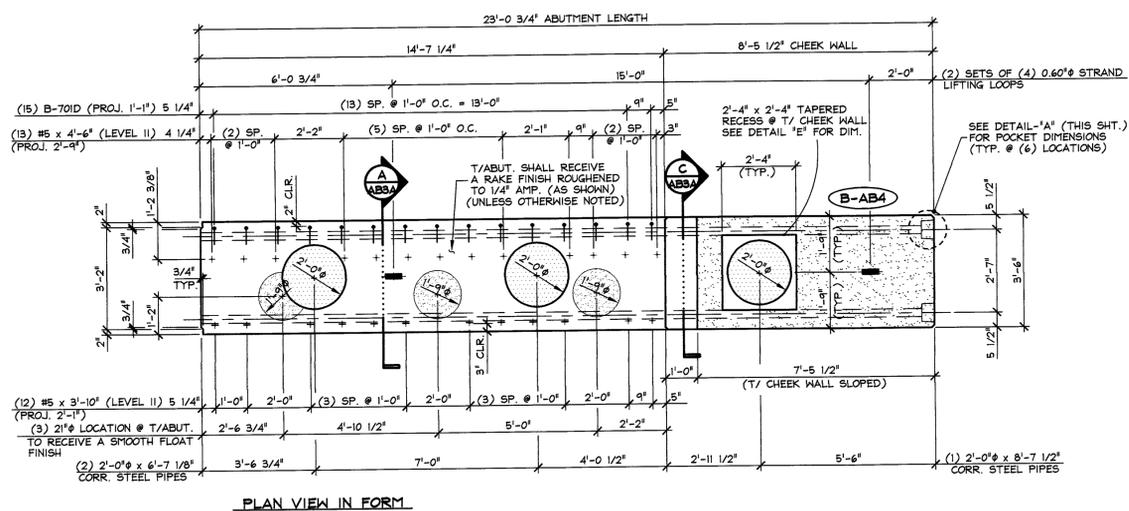
APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
284 GEE STR., WOODBURY, VERMONT 05253 Phone: (802)388-4361 Fax: (802)388-9010

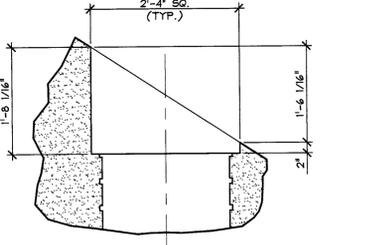
STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORLEANS

TOWN OF BARTON
ROARING BROOK ROAD TH #2, RURAL MINOR COLLECTOR
BRIDGE NO.: 8 PROJECT NO.: BRO 144A(31)

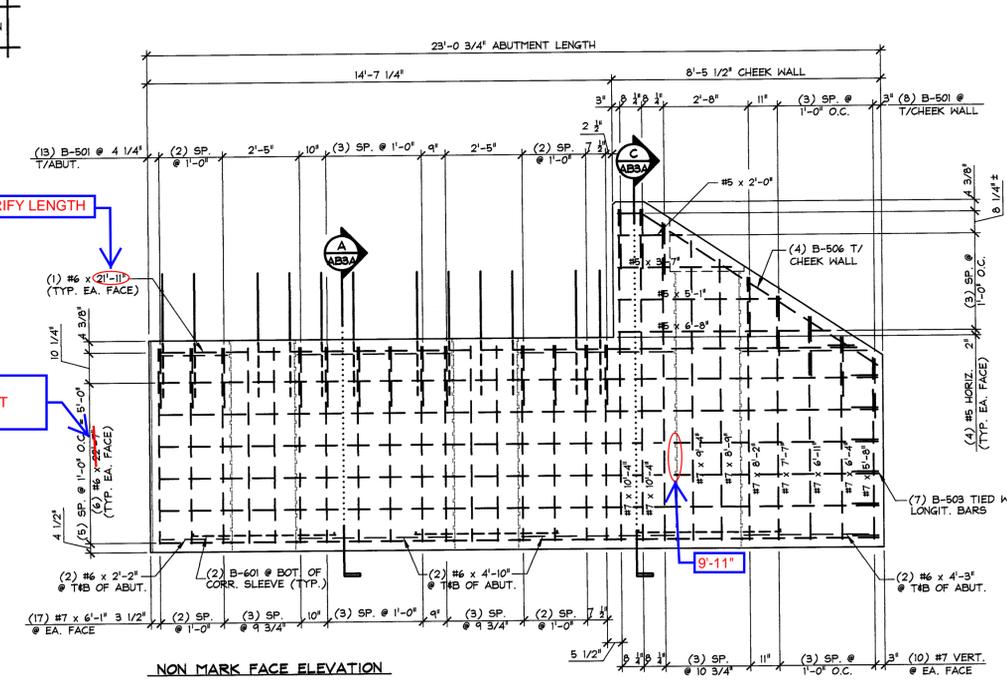
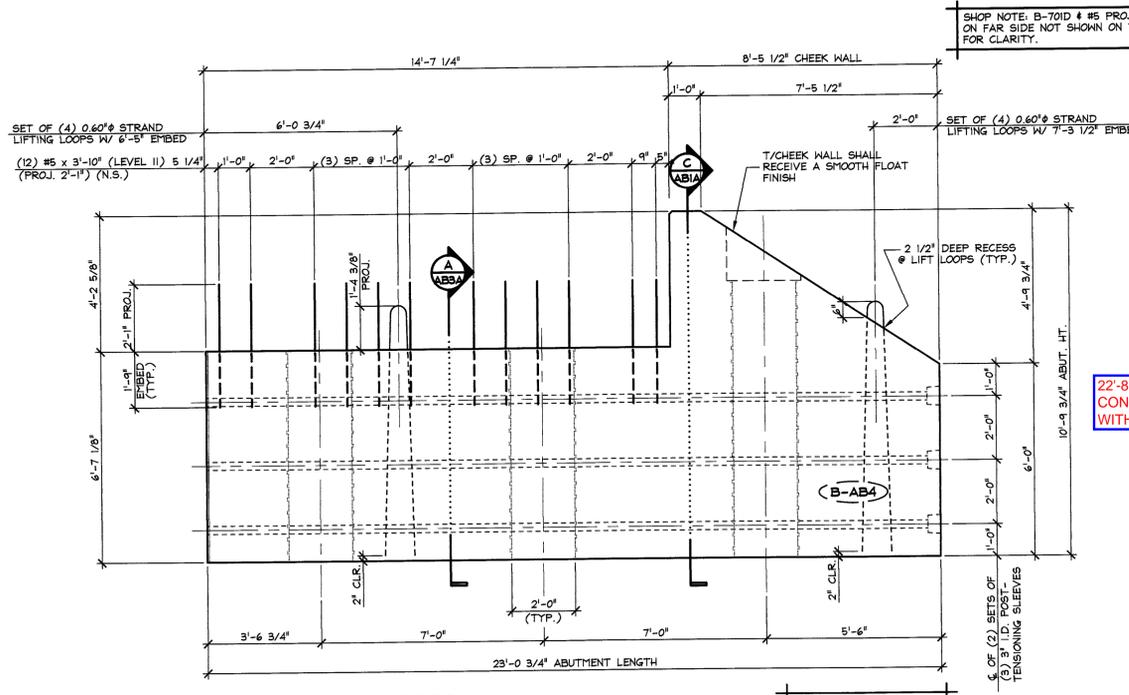
DATE: FEB. 25, 2015
SCALE: NOTED
CHKD: DFTM: T.D.
JOB NO: 23462-015
DWG. NO: AB3



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



DETAIL - "E"
3/4" x 1'-0"



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

MARK: B-AB4 QTY.: 1 WT.: 39.78 T VOL.: 19.65 cy

MATERIAL LIST / ABUTMENT			
ITEM	MARK	DESCRIPTION	QTY.
1	B-501	#5 BENT BAR (LEVEL I)	21
2	B-502	#5 BENT BAR (LEVEL I)	4
3	B-503	#5 BENT BAR (LEVEL I)	7
4	B-601	#6 BENT BAR (LEVEL I)	6
5	B-701D	#5 BENT BAR (LEVEL II, DUAL COATED)	15
6		#5 x 3'-10" (LEVEL II, DUAL COATED)	12
7		#5 x 4'-6" (LEVEL II, DUAL COATED)	15
8		#5 x 2'-0" (LEVEL I)	2
9		#5 x 3'-7" (LEVEL I)	2
10		#5 x 5'-1" (LEVEL I)	2
11		#5 x 6'-8" (LEVEL I)	2
12		#6 x 2'-2" (LEVEL I)	4
13		#6 x 4'-3" (LEVEL I)	4
14		#6 x 4'-10" (LEVEL I)	8
15		#6 x 22'-7" (LEVEL I) 22'-8"	12
16		#6 x (2'-11") (LEVEL I) VERIFY LENGTH	2
17		#7 x 6'-1" (LEVEL I)	34
18		#7 x 5'-8" (LEVEL I)	2
19		#7 x 6'-4" (LEVEL I)	2
20		#7 x 6'-11" (LEVEL I)	2
21		#7 x 7'-7" (LEVEL I)	2
22		#7 x 8'-2" (LEVEL I)	2
23		#7 x 9'-11" (LEVEL I)	2
24		#7 x 10'-4" (LEVEL I)	4
25		#7 x 8'-9" (LEVEL I)	2
26		#7 x 9'-4" (LEVEL I)	2
27			
28		SET OF (4) 0.60" STRAND LIFTING LOOPS	2
29		2'-0" x 6'-7 1/8" CORRUGATED STEEL PIPE (GALV.)	2
30		2'-0" x 8'-7 1/2" CORRUGATED STEEL PIPE (GALV.)	1

1 ABUTMENT DIMENSIONAL DETAILS
3/8" = 1'-0"

2 ABUTMENT REINFORCING DETAILS
3/8" = 1'-0"

SHOP NOTE:
28 DAYS = 5,000 PSI
RELEASE = 5,000 PSI

MIX DESIGN:
MIX NO. 425M-NO DCI
APPROVED 3-21-2015

Vermont Agency of Transportation
RECEIVED
ON: **May 8, 2015**
and Checked for
CONFORMANCE
BY: Todd A. Sumner DATE: 05/27/2015

SHOP DRAWING REVIEW

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CLD Consulting Engineers
140 Commercial Street
Manchester, NH 03101
603.698.9222

Job Number: 120174
Reviewed by: SRB
Date: 05/26/2015

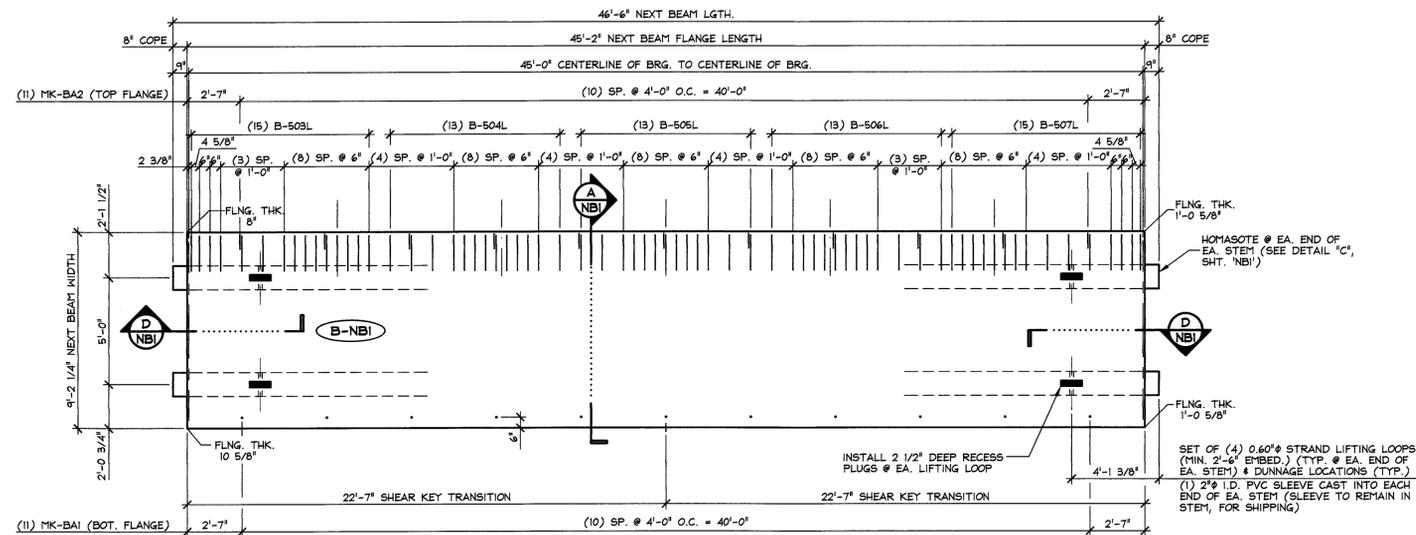
APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
2464 OISE STR., WOODSBURY, VERMONT 05753 Phone: (802) 388-6261 Fax: (802) 388-9010

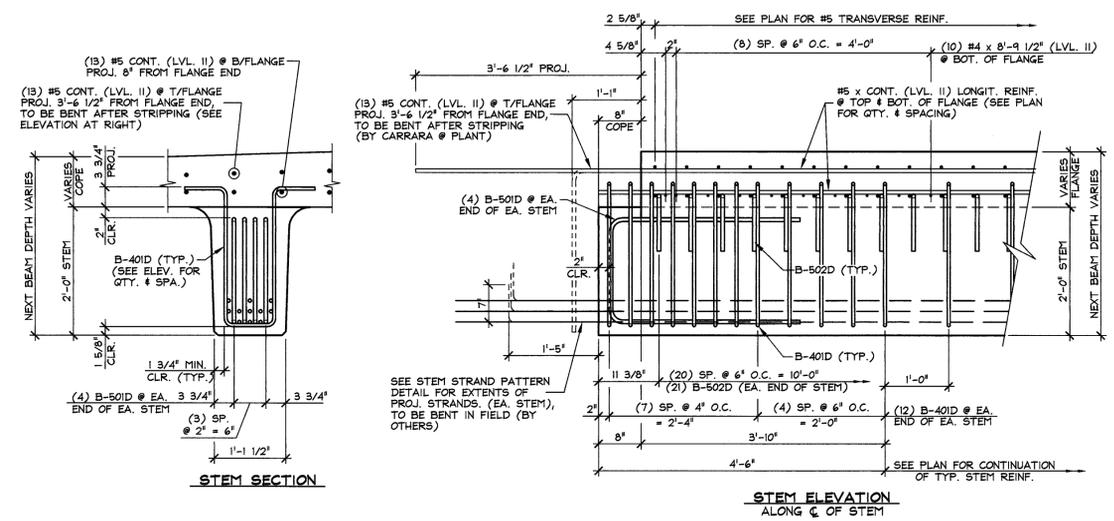
STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORLEANS

TOWN OF BARTON
ROARING BROOK ROAD TH #2, RURAL MINOR COLLECTOR
BRIDGE NO.: 8 PROJECT NO.: BRO 1449(31)

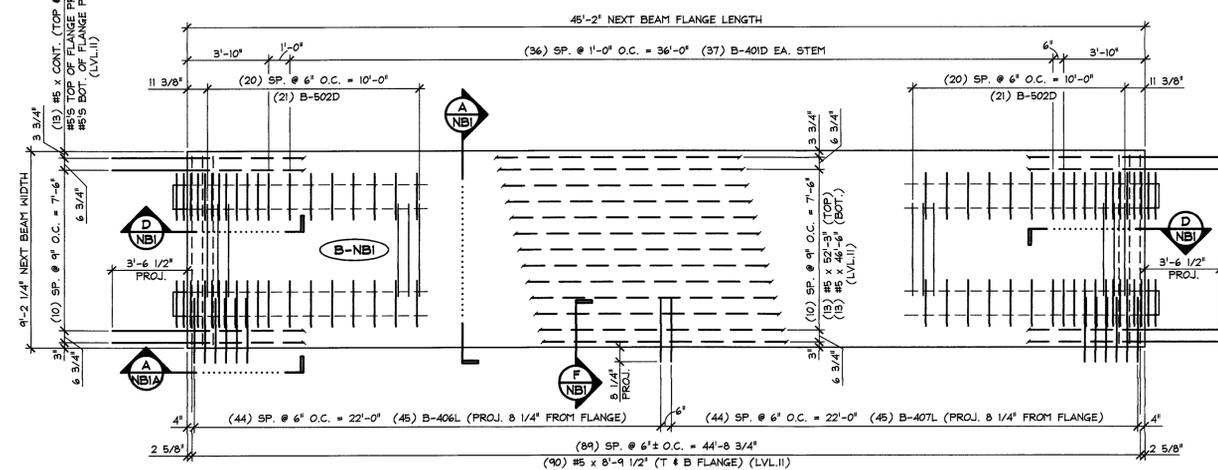
DATE: FEB. 25, 2015
SCALE: NOTED
CHKD: DFTM: T.D.
JOB NO: 23462-015
DWG. NO: AB4



1 DIMENSIONAL PLAN VIEW IN FORM
NBI
1/4" = 1'-0"

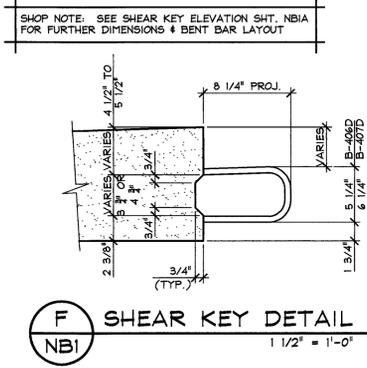


D END BLOCK STEM REINFORCING DETAILS
NBI
3/4" = 1'-0"



2 REINFORCING PLAN VIEW IN FORM
NBI
1/4" = 1'-0"

Vermont Agency of Transportation
RECEIVED
ON: **May 8, 2015**
and Checked for
CONFORMANCE
BY: **Todd A. Sumner** DATE: **05/27/2015**



F SHEAR KEY DETAIL
NBI
1/2" = 1'-0"

SHOP DRAWING REVIEW

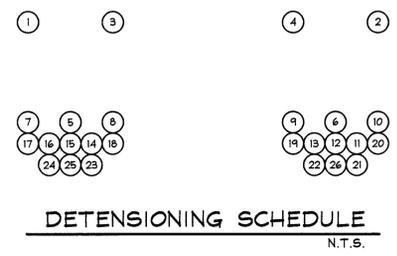
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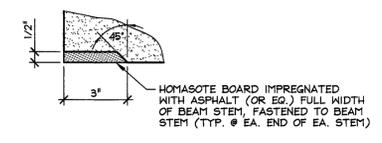
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603-688-6229

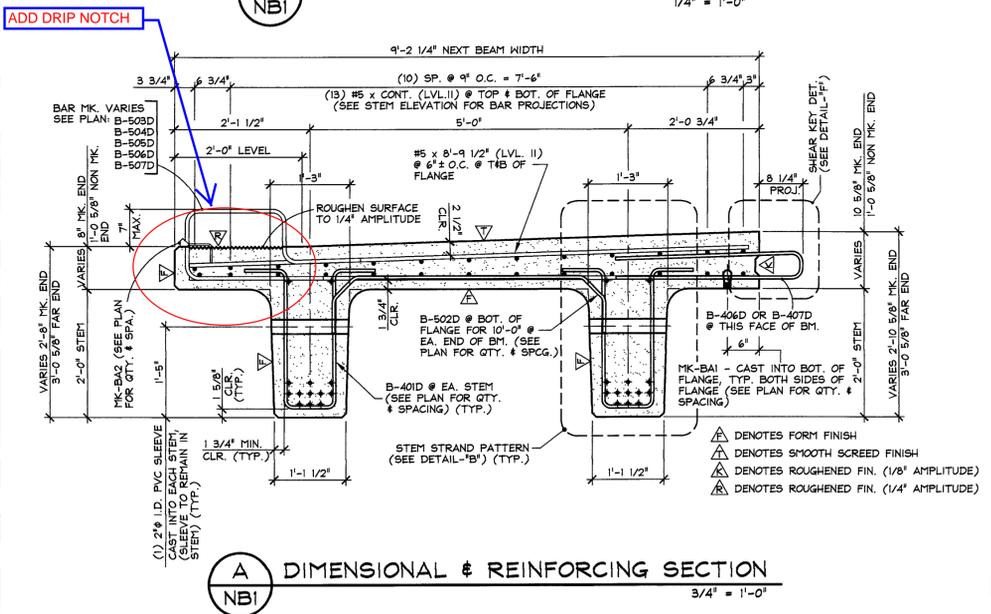
Job Number: 120174
Reviewed by: SRB
Date: 05/26/2015



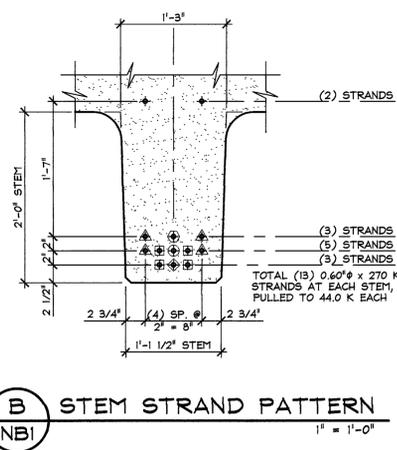
DETENSIONING SCHEDULE
N.T.S.



C HOMASOTE DETAIL
NBI
3" = 1'-0"



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



B STEM STRAND PATTERN
NBI
1" = 1'-0"

- PRESTRESSING NOTATIONS**
- ▲ DENOTES STRAIGHT STRANDS TO BE DEBONDED 6" FROM EA. END OF EA. STEM
 - DENOTES FULLY BONDED STRAIGHT STRANDS EXTENDED 2'-0" FROM EA. END OF EA. STEM
 - ◆ DENOTES STRAIGHT STRANDS TO BE DEBONDED 8'-0" FROM EA. END OF EA. STEM
 - DENOTES STRAIGHT STRANDS TO BE DEBONDED 4'-0" FROM EA. END OF EA. STEM
 - ⬤ DENOTES FULLY BONDED STRAIGHT STRANDS TO BE CUT FLUSH W/ EA. END OF EA. STEM

APPROVAL STAMP:

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

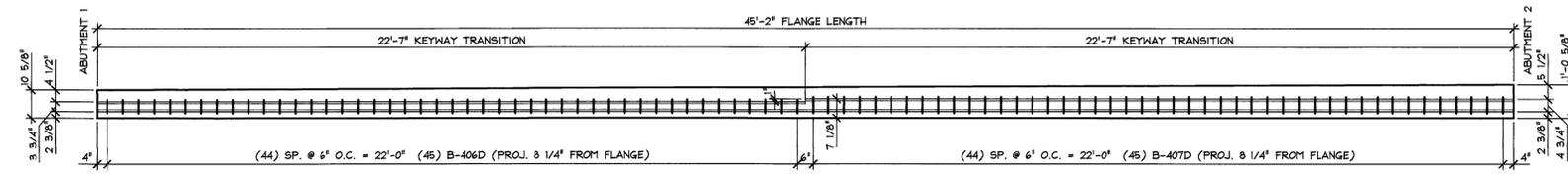
J.P. Sicard
CONTRACTOR
BARTON, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORLEANS

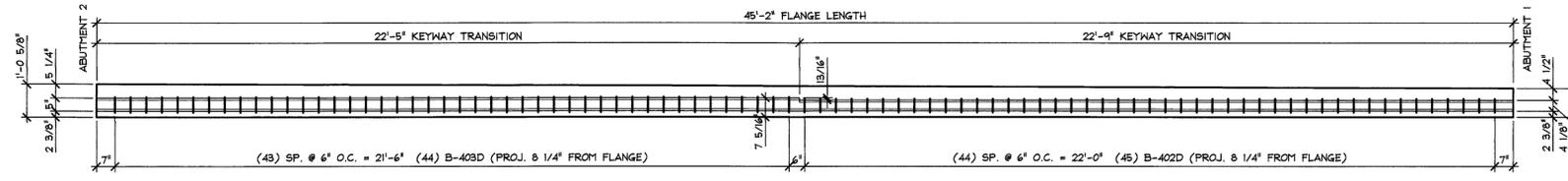
TOWN OF BARTON
ROARING BROOK ROAD TH #2, RURAL MINOR COLLECTOR
BRIDGE NO.: 8 PROJECT NO.: BRO 1449(31)

DATE: FEB. 25, 2015
SCALE: NOTED
CHKD: - DFTM: T.D.
JOB NO: 23462-015
DWG. NO: **NBI**

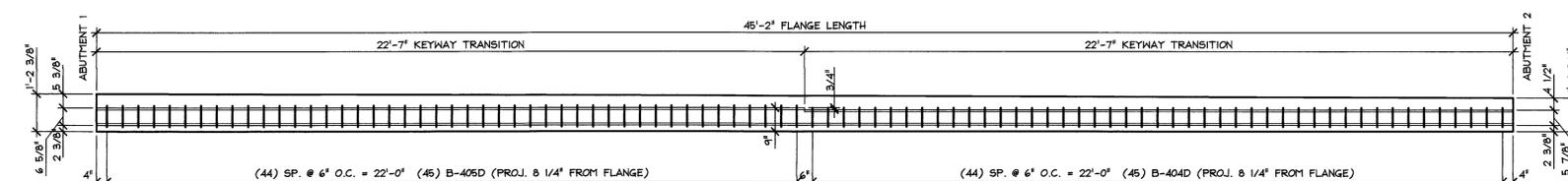
MATERIAL LIST / NEXT BEAM			
ITEM	MARK	DESCRIPTION	QTY.
1	MK-BA1	3/4" F42 FERRULE INSERT (GALV.)	11
2	MK-BA2	DAYTON C-24 TYPE 4-APR DECK FORM HANGER (GALV.)	11
3			
4	B-401D	#4 BENT BAR (LEVEL II, DUAL COATED)	122
5	B-406D	#4 BENT BAR (LEVEL II, DUAL COATED)	45
6	B-407D	#4 BENT BAR (LEVEL II, DUAL COATED)	45
7	B-501D	#5 BENT BAR (LEVEL II, DUAL COATED)	16
8	B-502D	#5 BENT BAR (LEVEL II, DUAL COATED)	42
9	B-503D	#5 BENT BAR (LEVEL II, DUAL COATED)	15
10	B-504D	#5 BENT BAR (LEVEL II, DUAL COATED)	13
11	B-505D	#5 BENT BAR (LEVEL II, DUAL COATED)	13
12	B-506D	#5 BENT BAR (LEVEL II, DUAL COATED)	13
13	B-507D	#5 BENT BAR (LEVEL II, DUAL COATED)	15
14		#4 x 8'-9 1/2" (LEVEL II, DUAL COATED)	20
15		#5 x 8'-9 1/2" (LEVEL II, DUAL COATED)	180
16		#5 x 46'-6" (LEVEL II, DUAL COATED)	13
17		#5 x 52'-3" (LEVEL II, DUAL COATED)	13
18		SET OF (4) 0.60" STRAND LIFTING LOOPS	4



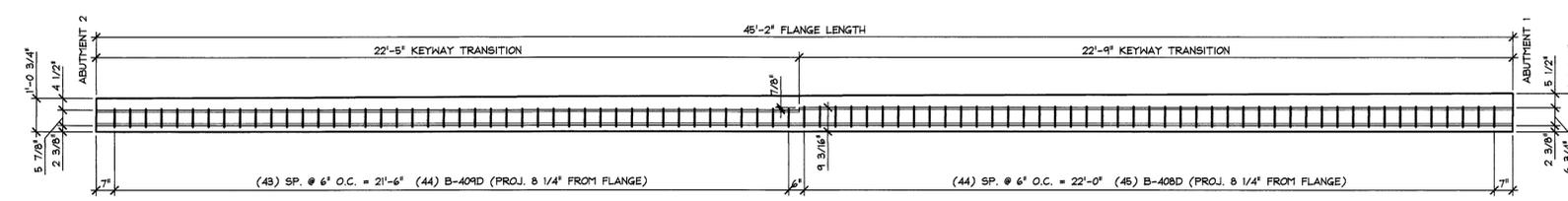
KEY ELEVATION - "A"
3/8" = 1'-0"



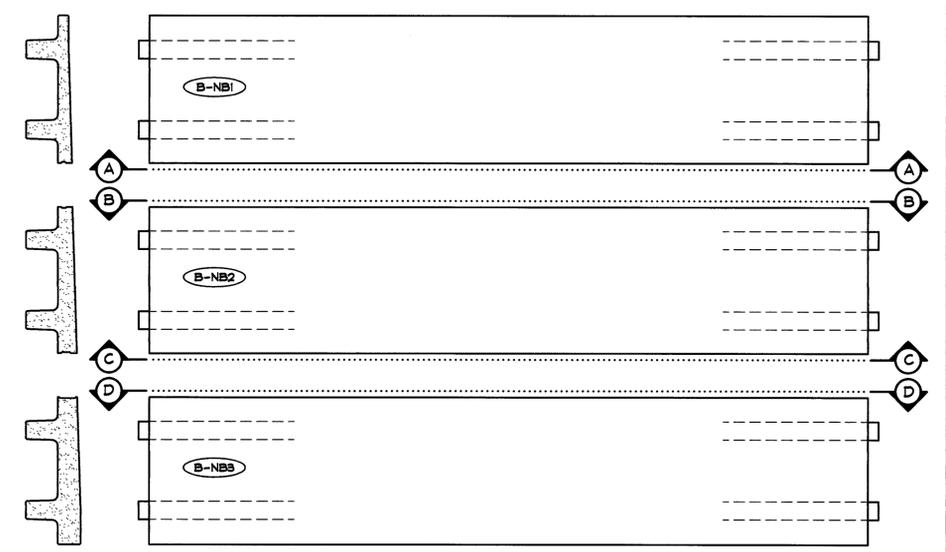
KEY ELEVATION - "B"
3/8" = 1'-0"



KEY ELEVATION - "C"
3/8" = 1'-0"



KEY ELEVATION - "D"
3/8" = 1'-0"



SCHMATIC PLAN VIEW OF NEXT BEAMS
N.T.S.

Vermont Agency of Transportation
RECEIVED
 ON: **May 8, 2015**
 and Checked for
CONFORMANCE
 BY: **Todd A. Sumner** DATE: **05/27/2015**

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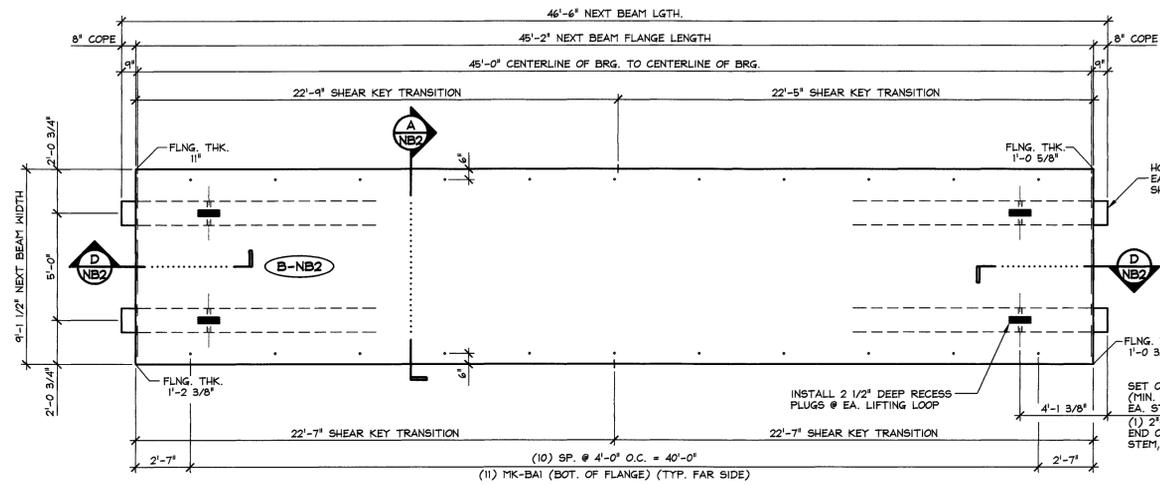
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CLD Consulting Engineers
 240 Commercial Street
 South Ferris, NH 03101
 603-888-8223

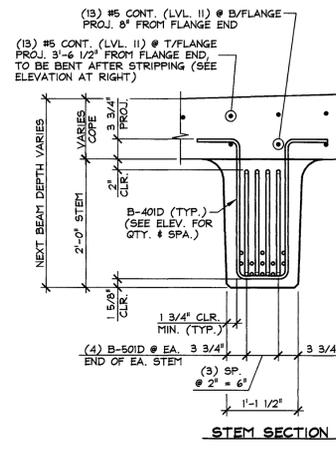
Job Number: **120174**
 Reviewed by: **SRB**
 Date: **05/26/2015**

APPROVAL STAMP:	J.P. CARRARA & SONS INC. Precast & Prestress Manufacturer <small>2484 CASE ST., MIDDLEBURY, VERMONT 05753 Phone:(802)388-6361 Fax:(802)388-9010</small>		J.P. Sicard CONTRACTOR BARTON, VERMONT	
	STATE OF VERMONT AGENCY OF TRANSPORTATION COUNTY OF ORLEANS		DATE: FEB. 25, 2015	
	TOWN OF BARTON ROARING BROOK ROAD TH #2, RURAL MINOR COLLECTOR BRIDGE NO.: 8 PROJECT NO.: BRO 1449(31)		SCALE: NOTED	CHKD: DFTM: T.D.
	SHEAR KEY ELEVATIONS		JOB NO: 23462-015 DWG. NO: NB1A	

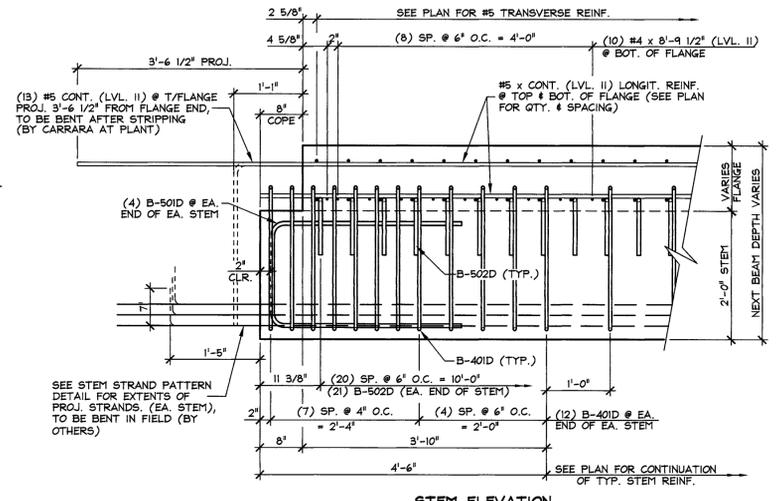


1 DIMENSIONAL PLAN VIEW IN FORM
NB2
1/4" = 1'-0"

SHOP NOTE: SEE DWG. N81A FOR SHEAR KEY ELEVATIONS

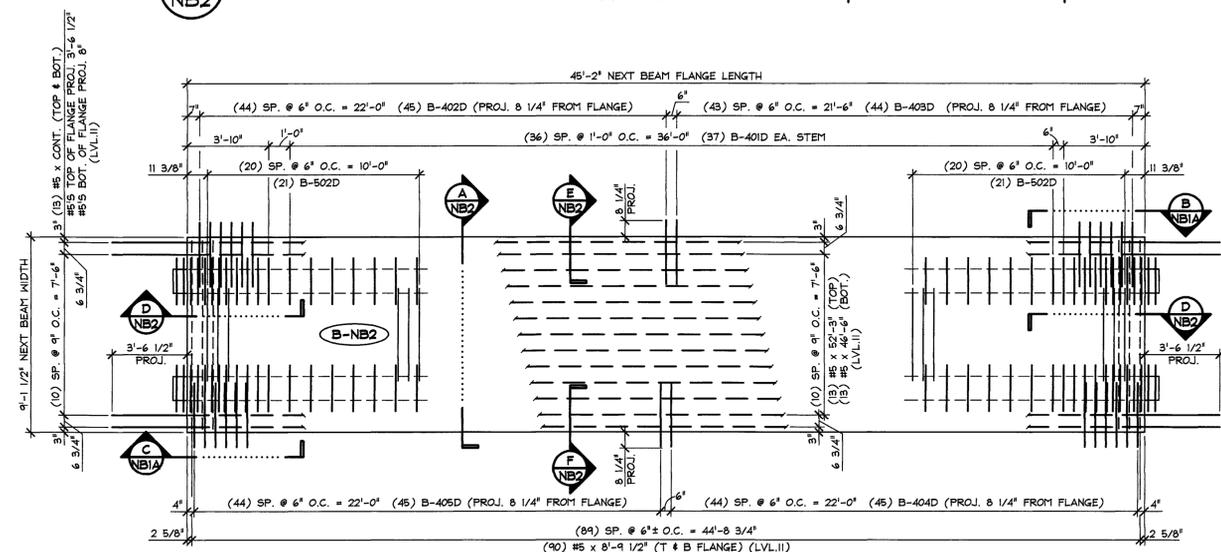


STEM SECTION



STEM ELEVATION ALONG C OF STEM

D END BLOCK STEM REINFORCING DETAILS NB2
3/4" = 1'-0"



2 REINFORCING PLAN VIEW IN FORM
NB2
1/4" = 1'-0"

SHOP DRAWING REVIEW

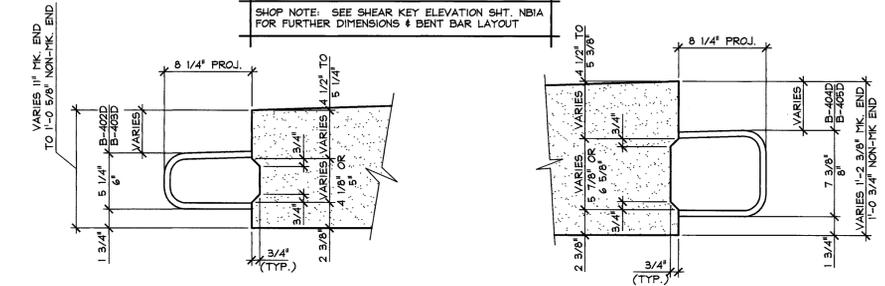
REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

REJECTED REVISE AND RESUBMIT APPROVED AS NOTED

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CLD Consulting Engineers
340 Commercial Street
Montpelier, VT 05601
802.888.8522

Job Number: 1201174
Reviewed by: SRB
Date: 05/26/2015

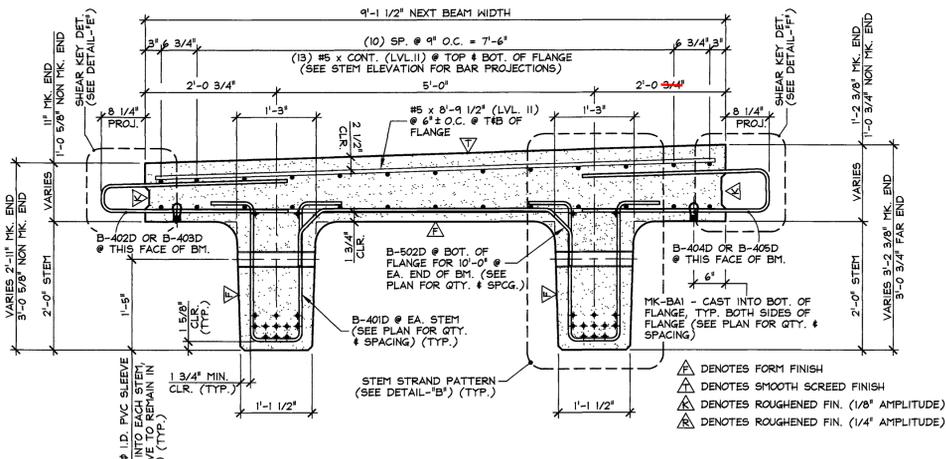


E SHEAR KEY DETAIL NB2
1 1/2" = 1'-0"

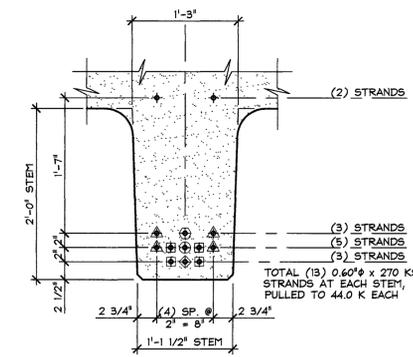
F SHEAR KEY DETAIL NB2
1 1/2" = 1'-0"

DENENSIONING SCHEDULE
N.T.S.

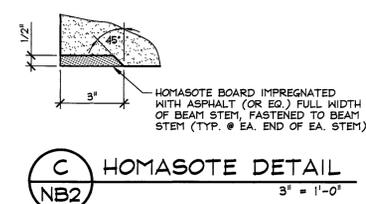
1	3	4	2
7	5	8	
17	16	15	14
24	23	25	
	9	6	10
	19	18	12
	22	20	21



A DIMENSIONAL & REINFORCING SECTION
NB2
3/4" = 1'-0"



B STEM STRAND PATTERN
NB2
1" = 1'-0"



C HOMASOTE DETAIL NB2
3" = 1'-0"

- PRESTRESSING NOTATIONS**
- ▲ DENOTES STRAIGHT STRANDS TO BE DEBONDED 6" FROM EA. END OF EA. STEM
 - DENOTES FULLY BONDED STRAIGHT STRANDS EXTENDED 2'-0" FROM EA. END OF EA. STEM
 - ◆ DENOTES STRAIGHT STRANDS TO BE DEBONDED 8'-0" FROM EA. END OF EA. STEM
 - DENOTES STRAIGHT STRANDS TO BE DEBONDED 4'-0" FROM EA. END OF EA. STEM
 - ⊕ DENOTES STRAIGHT STRANDS TO BE DEBONDED 2'-0" FROM EA. END OF EA. STEM
 - ⊕ DENOTES FULLY BONDED STRAIGHT STRANDS TO BE CUT FLUSH 1/4" EA. END OF EA. STEM

Vermont Agency of Transportation

RECEIVED

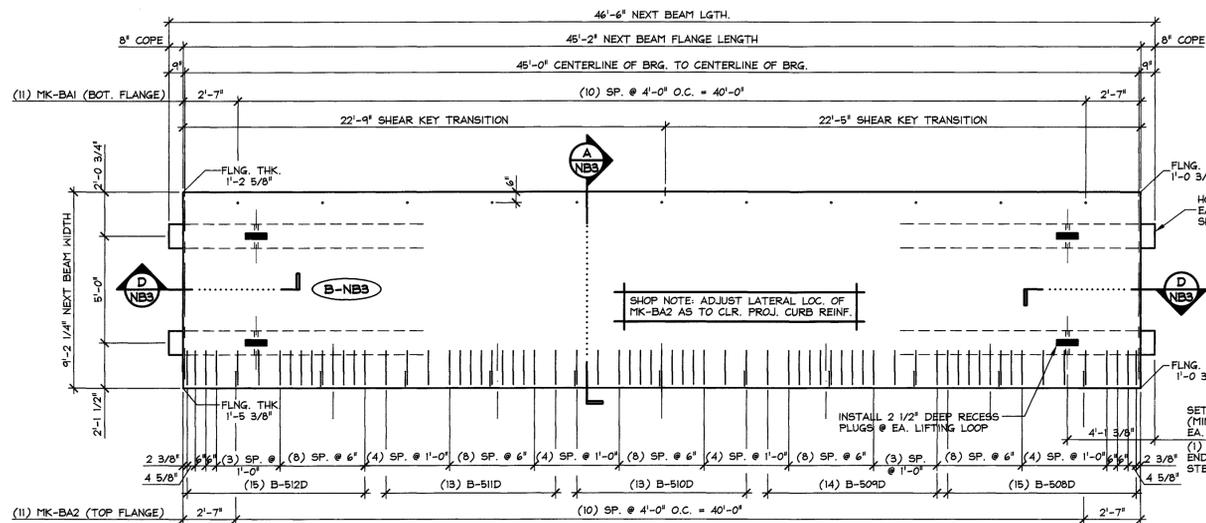
ON: **May 8, 2015**
and Checked for
CONFORMANCE

BY: **Todd A. Sumner** DATE: **05/27/2015**

MARK: B-NB2 QTY.: 1 WT.: 49.36 T VOL.: 24.38 cy

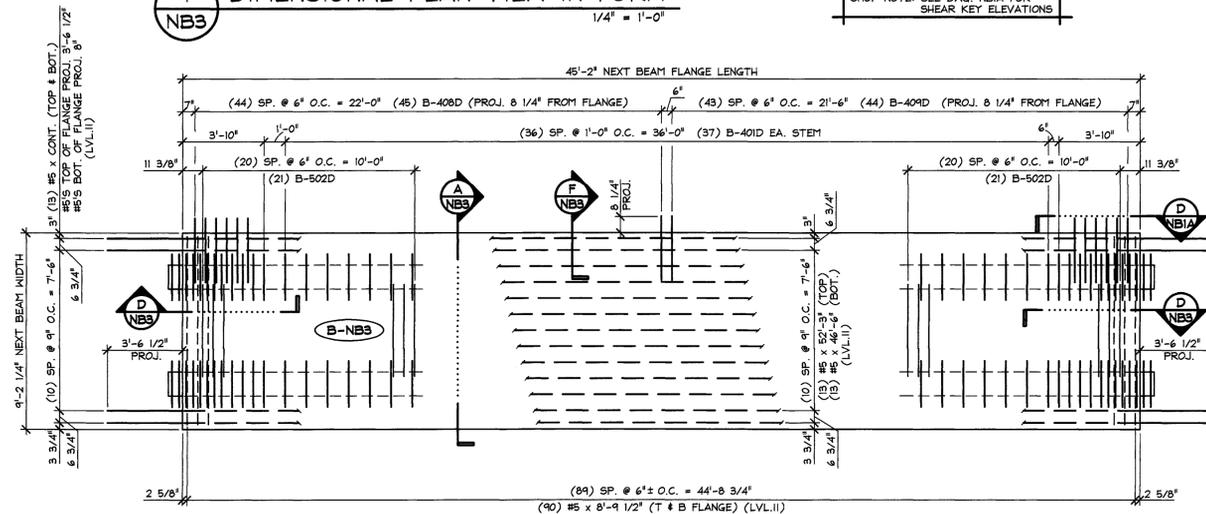
MATERIAL LIST / NEXT BEAM			
ITEM	MARK	DESCRIPTION	QTY.
1	MK-BAI	3/4" F42 FERRULE INSERT (GALV.)	22
2	B-401D	#4 BENT BAR (LEVEL II, DUAL COATED)	122
3	B-402D	#4 BENT BAR (LEVEL II, DUAL COATED)	45
4	B-403D	#4 BENT BAR (LEVEL II, DUAL COATED)	44
5	B-404D	#4 BENT BAR (LEVEL II, DUAL COATED)	45
6	B-405D	#4 BENT BAR (LEVEL II, DUAL COATED)	45
7	B-501D	#5 BENT BAR (LEVEL II, DUAL COATED)	16
8	B-502D	#5 BENT BAR (LEVEL II, DUAL COATED)	42
9			
10		#4 x 8'-9 1/2" (LEVEL II, DUAL COATED)	20
11		#5 x 8'-9 1/2" (LEVEL II, DUAL COATED)	180
12		#5 x 46'-6" (LEVEL II, DUAL COATED)	13
13		#5 x 52'-3" (LEVEL II, DUAL COATED)	13
14			
15		SET OF (4) 0.60" STRAND LIFTING LOOPS	4

J.P. CARRARA & SONS INC. Precast & Prestress Manufacturer 244 OASE STR., MIDDLEBURY, VERMONT 05753 Phone: (802)388-6361 Fax: (802)388-9010		J.P. Sicard CONTRACTOR BARTON, VERMONT	
STATE OF VERMONT AGENCY OF TRANSPORTATION COUNTY OF ORLEANS		DATE: FEB. 25, 2015 SCALE: NOTED	
TOWN OF BARTON ROARING BROOK ROAD TH #2, RURAL MINOR COLLECTOR BRIDGE NO.: 8 PROJECT NO.: BRO 1449(31)		CHKD: - DFTM: T.D. JOB NO: 23462-015	
PRESTRESSED NEXT BEAM DETAILS		DWG. NO: NB2	

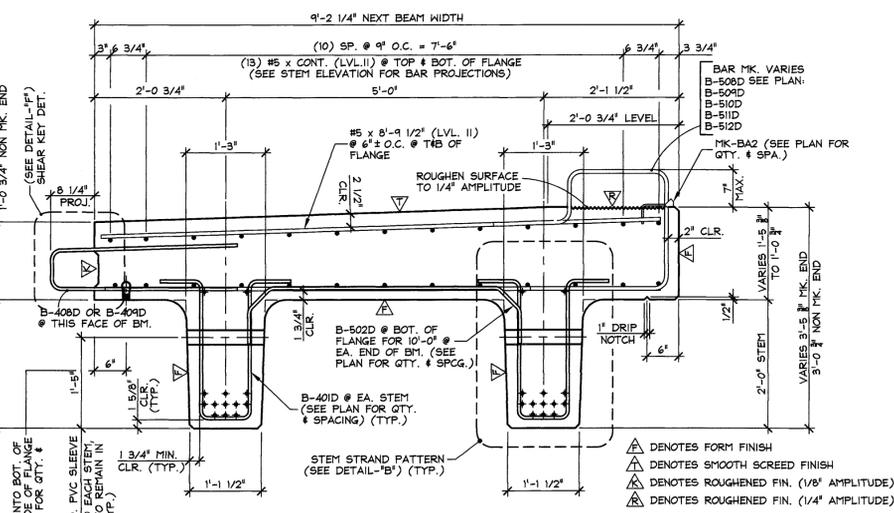


1 DIMENSIONAL PLAN VIEW IN FORM
NB3
1/4" = 1'-0"

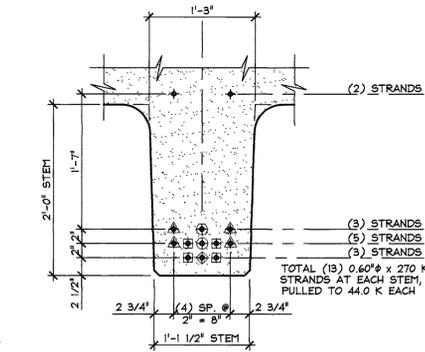
SHOP NOTE: SEE DWG. NB3A FOR SHEAR KEY ELEVATIONS



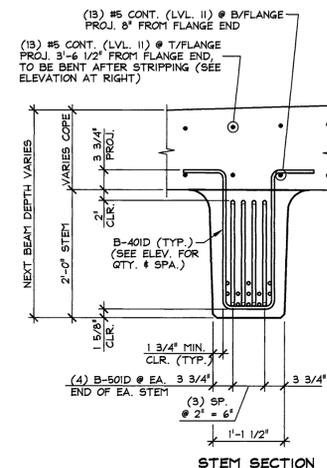
2 REINFORCING PLAN VIEW IN FORM
NB3
1/4" = 1'-0"



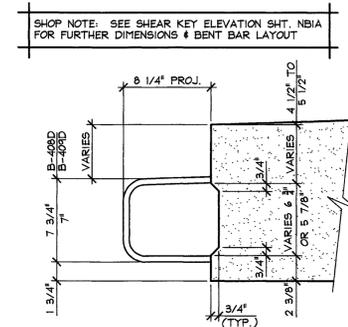
A DIMENSIONAL & REINFORCING SECTION
NB3
3/4" = 1'-0"



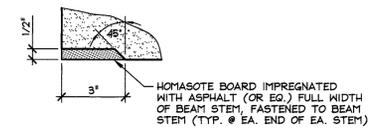
B STEM STRAND PATTERN
NB3
1" = 1'-0"



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



F SHEAR KEY DETAIL
NB3
1 1/2" = 1'-0"



C HOMASOTE DETAIL
NB3
3" = 1'-0"

Vermont Agency of Transportation
RECEIVED
ON: **May 8, 2015**
and Checked for
CONFORMANCE
BY: **Todd A. Sumner** DATE: **05/27/2015**

1 3 4 2

7 5 8 6
17 16 15 14 13
24 25 23

DETENSIONING SCHEDULE
N.T.S.

PRESTRESSING NOTATIONS

- ▲ DENOTES STRAIGHT STRANDS TO BE DEBONDED 6" FROM EA. END OF EA. STEM
- ⊕ DENOTES FULLY BONDED STRAIGHT STRANDS EXTENDED 2'-0" FROM EA. END OF EA. STEM
- ⊖ DENOTES STRAIGHT STRANDS TO BE DEBONDED 8'-0" FROM EA. END OF EA. STEM
- ⊙ DENOTES STRAIGHT STRANDS TO BE DEBONDED 4'-0" FROM EA. END OF EA. STEM
- ⊕ DENOTES FULLY BONDED STRAIGHT STRANDS TO BE CUT FLUSH W/ EA. END OF EA. STEM

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
Precast & Prestress Manufacturer
244 GSE STR., MIDDLEBURY, VERMONT 05753 Phone: (802)388-4361 Fax: (802)388-9010

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORLEANS

TOWN OF BARTON
ROARING BROOK ROAD TH #2, RURAL MINOR COLLECTOR
BRIDGE NO.: 8 PROJECT NO.: BRO 1449(31)

PRESTRESSED NEXT BEAM DETAILS

J.P. Sicard
CONTRACTOR
BARTON, VERMONT

DATE: FEB. 25, 2015
SCALE: NOTED

CHKD: - DFTM: T.D.
JOB NO: 23462-015

DWG. NO: NB3

SHOP DRAWING REVIEW

REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

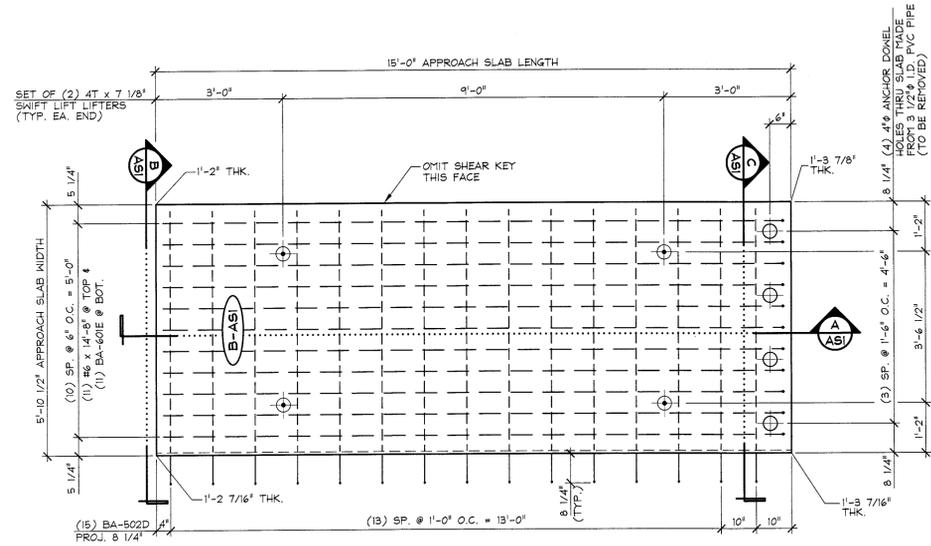
REJECTED REVISE AND RESUBMIT APPROVED AS NOTED

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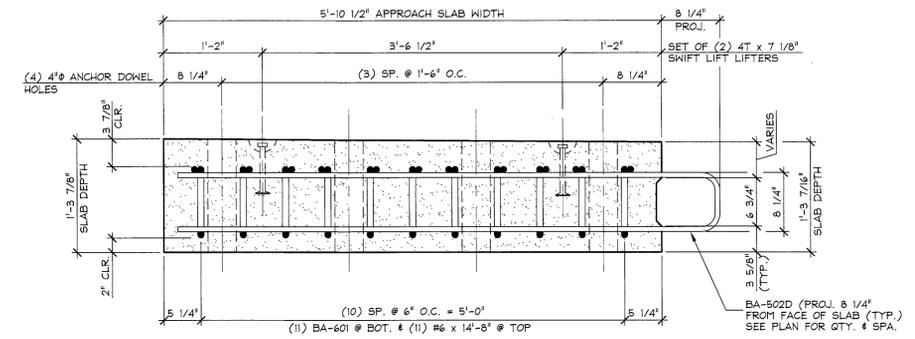
CLD Consulting Engineers
140 Commercial Street
Manchester, NH 03101
603-689-8223

Job Number: 120174
Reviewed by: SRB
Date: 05/26/2015

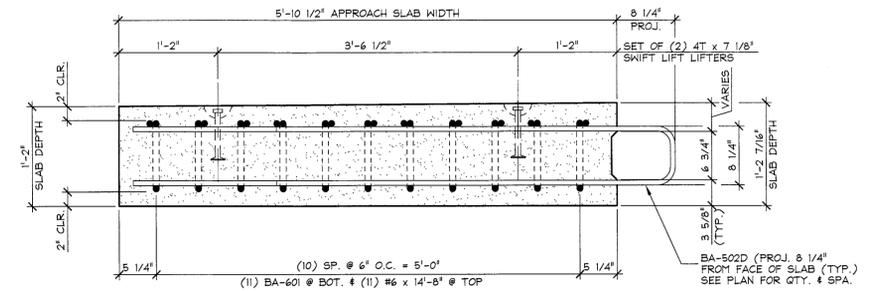
MARK:	B-NB3	QTY.:	1	WT.:	54.39 T	VOL.:	26.86 cy
MATERIAL LIST / NEXT BEAM							
ITEM	MARK	DESCRIPTION	QTY.				
1	MK-BA1	3/4" F42 FERRULE INSERT (GALV.)	11				
2	MK-BA2	DAYTON C-24 TYPE 4-APR DECK FORM HANGER (GALV.)	11				
3							
4	B-401D	#4 BENT BAR (LEVEL II, DUAL COATED)	122				
5	B-408D	#4 BENT BAR (LEVEL II, DUAL COATED)	45				
6	B-409D	#4 BENT BAR (LEVEL II, DUAL COATED)	44				
7	B-501D	#5 BENT BAR (LEVEL II, DUAL COATED)	16				
8	B-502D	#5 BENT BAR (LEVEL II, DUAL COATED)	42				
9	B-508D	#5 BENT BAR (LEVEL II, DUAL COATED)	15				
10	B-509D	#5 BENT BAR (LEVEL II, DUAL COATED)	14				
11	B-510D	#5 BENT BAR (LEVEL II, DUAL COATED)	13				
12	B-511D	#5 BENT BAR (LEVEL II, DUAL COATED)	13				
13	B-512D	#5 BENT BAR (LEVEL II, DUAL COATED)	15				
14		#4 x 8'-9 1/2" (LEVEL II, DUAL COATED)	20				
15		#5 x 8'-9 1/2" (LEVEL II, DUAL COATED)	180				
16		#5 x 46'-6" (LEVEL II, DUAL COATED)	13				
17		#5 x 52'-3" (LEVEL II, DUAL COATED)	13				
18		SET OF (4) 0.60" Ø STRAND LIFTING LOOPS	4				



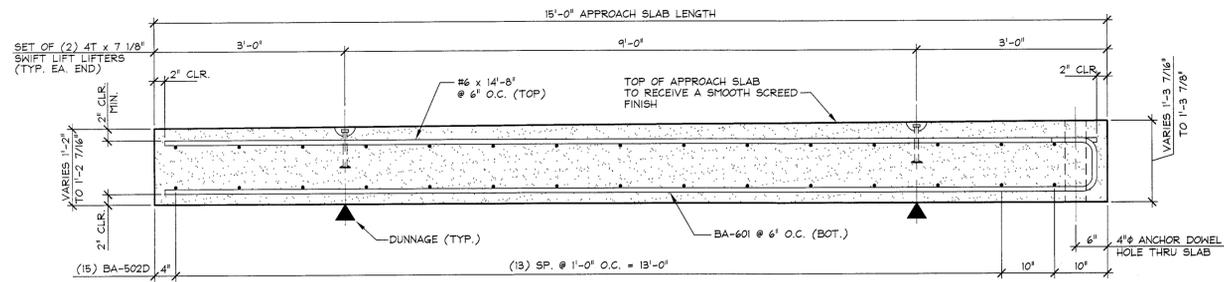
1 PLAN VIEW IN FORM
ASI
1/2" = 1'-0"



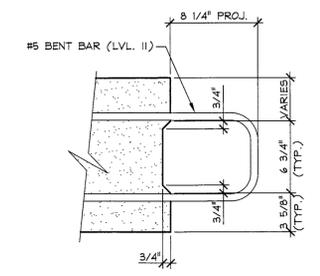
C SECTION
ASI
1" = 1'-0"



B SECTION
ASI
1" = 1'-0"



A LONGITUDINAL SECTION
ASI
3/4" = 1'-0"



SHEAR KEY DETAIL
1 1/2" = 1'-0"

MARK: B-ASI	QTY.: 2	WT.: 8.26 T	VOL.: 4.08 cy
MATERIAL LIST / APPROACH SLAB			
ITEM	MARK	DESCRIPTION	QTY.
1			
2	BA-502D	#5 BENT BAR (LEVEL II, DUAL COATED)	15
3	BA-601	#6 BENT BAR (LEVEL I)	11
4			
5			
6		#6 x 14'-8" (LEVEL I)	11
7			
8			
9			
10			
11			
12			
13			
14		DAYTON 4T x 7 1/8" SWIFT LIFT	4
15			

Vermont Agency of Transportation
RECEIVED
 ON: **May 8, 2015**
 and Checked for
CONFORMANCE
 BY: Todd A. Sumner DATE: 05/27/2015

SHOP DRAWING REVIEW

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CLD Consulting Engineers
 440 Commercial Street
 Manchester, NH 03101
 603-468-8223

Job Number: 120174
 Reviewed by: SRB
 Date: 05/26/2015

APPROVAL STAMP:

J.P. CARRARA & SONS INC.
 Precast & Prestress Manufacturer
 2464 CASE STR., MIDDLEBURY, VERMONT 05753 Phone: (802)388-6361 Fax: (802)388-9810

J.P. Sicard
 CONTRACTOR
 BARTON, VERMONT

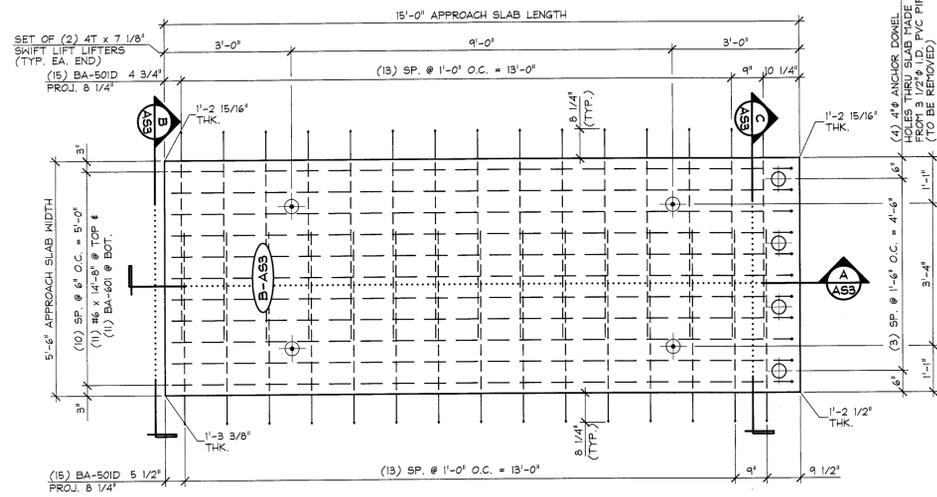
STATE OF VERMONT AGENCY OF TRANSPORTATION
 COUNTY OF ORLEANS

DATE: FEB. 25, 2015
 SCALE: NOTED

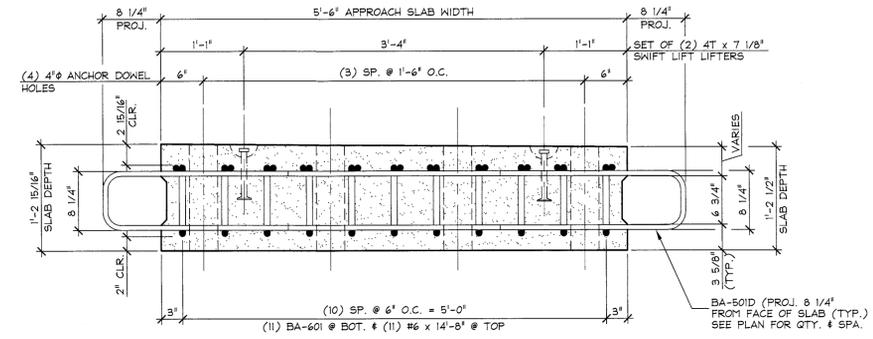
TOWN OF BARTON
 ROARING BROOK ROAD TH #2, RURAL MINOR COLLECTOR
 BRIDGE NO.: 8 PROJECT NO.: BRO 1449(31)

CHKD: DFTM: T.D.
 JOB NO: 23462-015

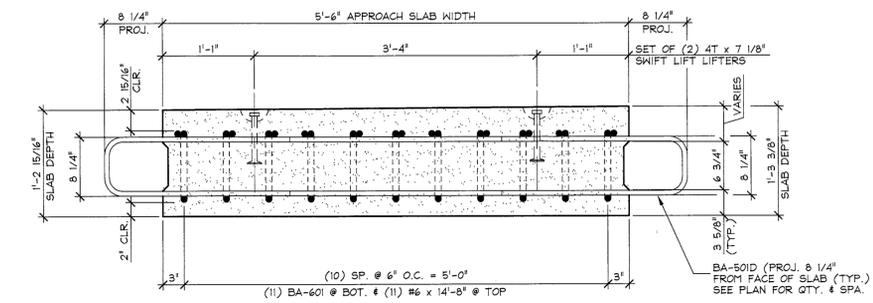
APPROACH SLAB DETAILS
 DWG. NO: ASI



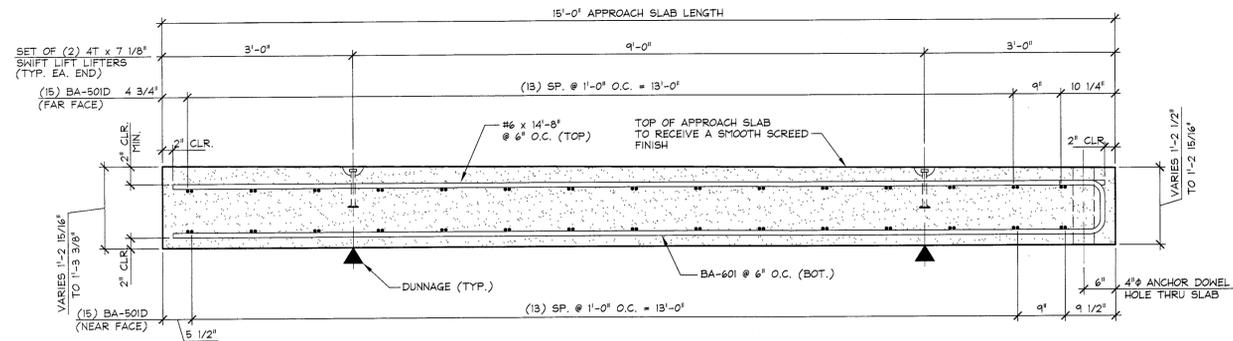
1 PLAN VIEW IN FORM
AS3 1/2" = 1'-0"



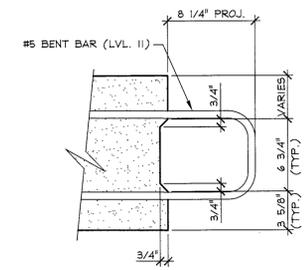
C SECTION
AS2 1" = 1'-0"



B SECTION
AS2 1" = 1'-0"



A LONGITUDINAL SECTION
AS3 3/4" = 1'-0"



SHEAR KEY DETAIL
1 1/2" = 1'-0"

MARK: B-AS3 QTY.: 2 WT.: 7.73 T VOL.: 3.82 cy

MATERIAL LIST / APPROACH SLAB			
ITEM	MARK	DESCRIPTION	QTY.
1			
2	BA-501D	#5 BENT BAR (LEVEL 11, DUAL COATED)	30
3	BA-601	#6 BENT BAR (LEVEL 1)	11
4			
5			
6		#6 x 14'-8" (LEVEL 1)	11
7			
8			
9			
10			
11			
12			
13			
14		DAYTON 4T x 7 1/8" SKIFF LIFT	4
15			

Vermont Agency of Transportation

RECEIVED
ON: **May 8, 2015**
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CONFORMANCE
BY: **Todd A. Sumner** DATE: **05/27/2015**

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CLD Consulting Engineers
240 Central Street
Manchester, NH 03101
603-888-9223

Job Number: **120174**
Reviewed by: **SRB**
Date: **05/26/2015**

APPROVAL STAMP:

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

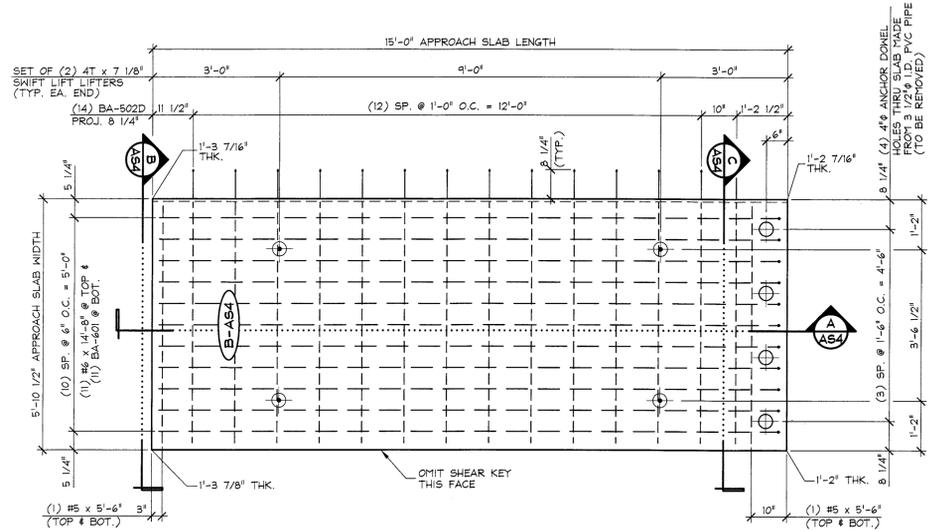
J.P. Sicard
CONTRACTOR
BARTON, VERMONT

STATE OF VERMONT AGENCY OF TRANSPORTATION
COUNTY OF ORLEANS

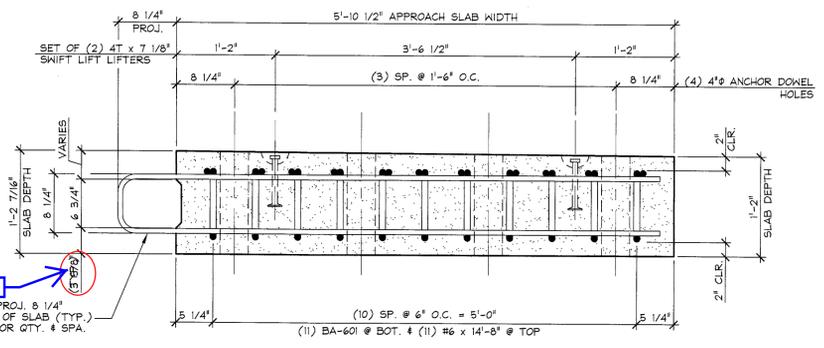
TOWN OF BARTON
ROARING BROOK ROAD TH #2, RURAL MINOR COLLECTOR
BRIDGE NO.: 8 PROJECT NO.: BR0 1449(31)

DATE: FEB. 25, 2015
SCALE: NOTED
CHKD: DFTM: T.D.
JOB NO.: 23462-015
DWG. NO: **AS3**

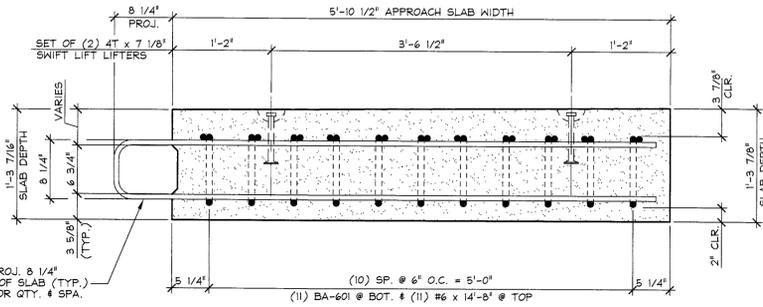
APPROACH SLAB DETAILS



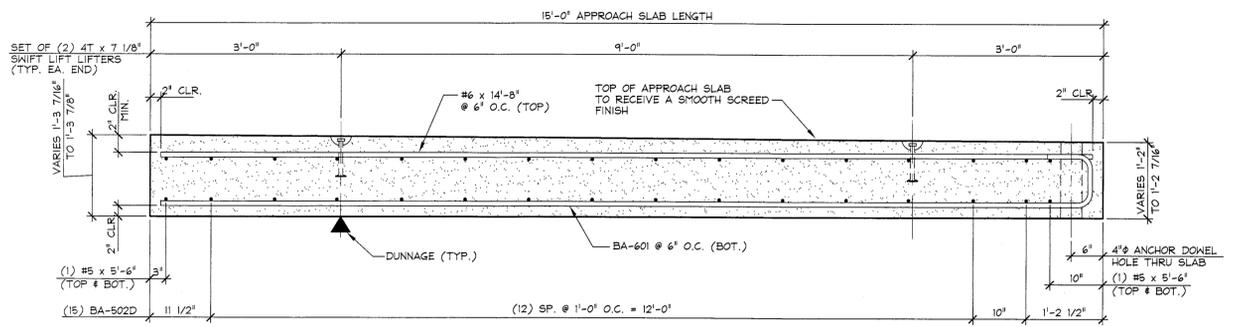
1 PLAN VIEW IN FORM
AS4 1/2" = 1'-0"



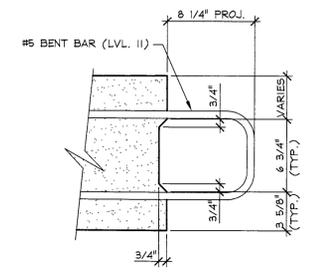
C SECTION
AS4 1" = 1'-0"



B SECTION
AS4 1" = 1'-0"



A LONGITUDINAL SECTION
AS4 3/4" = 1'-0"



SHEAR KEY DETAIL
1 1/2" = 1'-0"

MARK: B-AS4	QTY.: 2	WT.: 8.26 T	VOL.: 4.08 cy
MATERIAL LIST / APPROACH SLAB			
ITEM	MARK	DESCRIPTION	QTY.
1			
2	BA-502D	#5 BENT BAR (LEVEL II, DUAL COATED)	14
3	BA-601	#6 BENT BAR (LEVEL I)	11
4			
5			
6		#6 x 14'-8" (LEVEL I)	11
7		#5 x 5'-6" (LEVEL I)	4
8			
9			
10			
11			
12			
13			
14		DAYTON 4T x 7 1/8" SWIFT LIFT	4
15			

Vermont Agency of Transportation
RECEIVED
 ON: **May 8, 2015**
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CONFORMANCE
 BY: **Todd A. Sumner** DATE: **05/27/2015**

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CLD Consulting Engineers
 240 Commercial Street
 Manchester, NH 03101
 603-499-6229

Job Number: **120174**
 Reviewed by: **SRB**
 Date: **05/26/2015**

APPROVAL STAMP:

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

J.P. Sicard
 CONTRACTOR
 BARTON, VERMONT

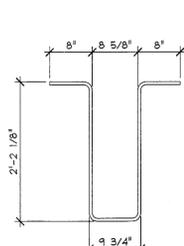
STATE OF VERMONT AGENCY OF TRANSPORTATION
 COUNTY OF ORLEANS

DATE: FEB. 25, 2015
 SCALE: NOTED

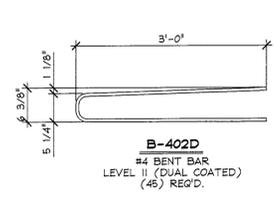
TOWN OF BARTON
 ROARING BROOK ROAD TH #2, RURAL MINOR COLLECTOR
 BRIDGE NO.: 8 PROJECT NO.: BRO 1449(31)

CHKD: DFTM: T.D.
 JOB NO: 23462-015

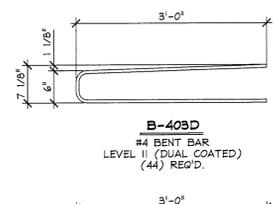
APPROACH SLAB DETAILS
 DWG. NO: **AS4**



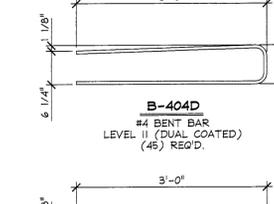
B-401D
#4 BENT BAR
LEVEL II (DUAL COATED)
(366) REQ'D.



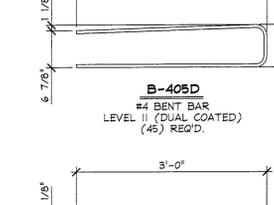
B-402D
#4 BENT BAR
LEVEL II (DUAL COATED)
(45) REQ'D.



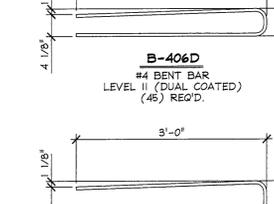
B-403D
#4 BENT BAR
LEVEL II (DUAL COATED)
(44) REQ'D.



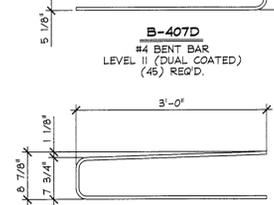
B-404D
#4 BENT BAR
LEVEL II (DUAL COATED)
(45) REQ'D.



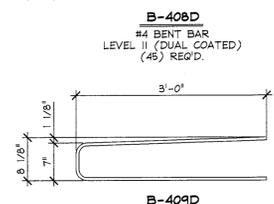
B-405D
#4 BENT BAR
LEVEL II (DUAL COATED)
(45) REQ'D.



B-406D
#4 BENT BAR
LEVEL II (DUAL COATED)
(45) REQ'D.



B-407D
#4 BENT BAR
LEVEL II (DUAL COATED)
(45) REQ'D.

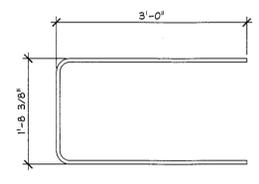


B-408D
#4 BENT BAR
LEVEL II (DUAL COATED)
(45) REQ'D.

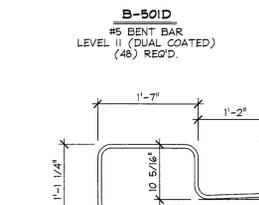


B-409D
#4 BENT BAR
LEVEL II (DUAL COATED)
(45) REQ'D.

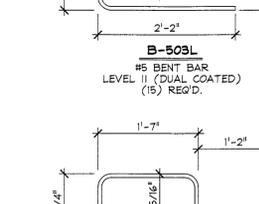
44



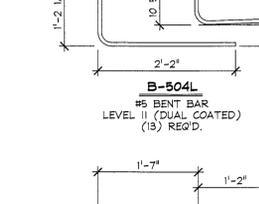
B-501D
#5 BENT BAR
LEVEL II (DUAL COATED)
(48) REQ'D.



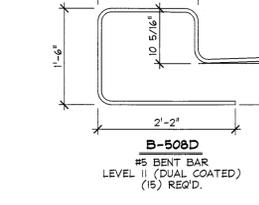
B-503L
#5 BENT BAR
LEVEL II (DUAL COATED)
(15) REQ'D.



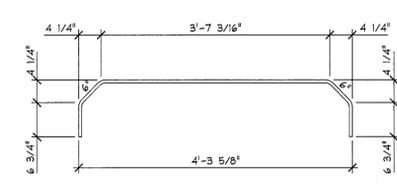
B-504L
#5 BENT BAR
LEVEL II (DUAL COATED)
(15) REQ'D.



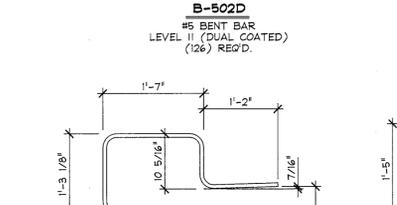
B-508D
#5 BENT BAR
LEVEL II (DUAL COATED)
(15) REQ'D.



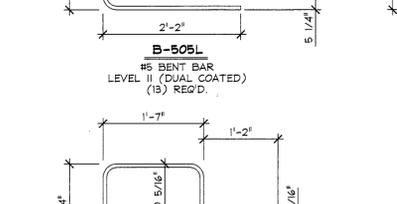
B-509D
#5 BENT BAR
LEVEL II (DUAL COATED)
(14) REQ'D.



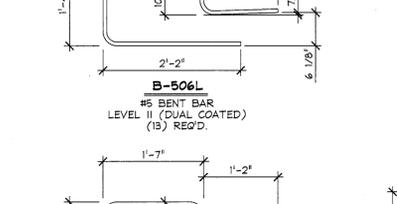
B-502D
#5 BENT BAR
LEVEL II (DUAL COATED)
(126) REQ'D.



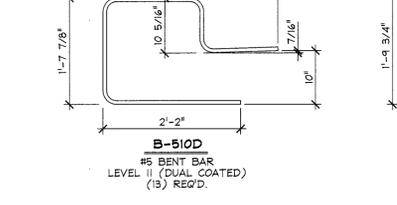
B-505L
#5 BENT BAR
LEVEL II (DUAL COATED)
(15) REQ'D.



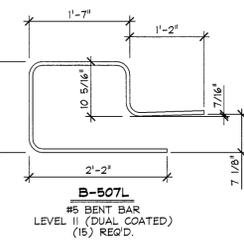
B-506L
#5 BENT BAR
LEVEL II (DUAL COATED)
(15) REQ'D.



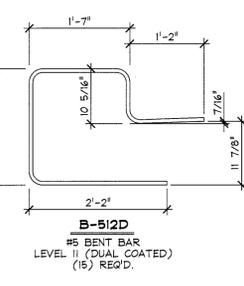
B-510D
#5 BENT BAR
LEVEL II (DUAL COATED)
(15) REQ'D.



B-511D
#5 BENT BAR
LEVEL II (DUAL COATED)
(15) REQ'D.



B-507L
#5 BENT BAR
LEVEL II (DUAL COATED)
(15) REQ'D.

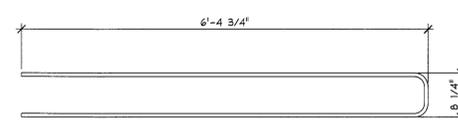


B-512D
#5 BENT BAR
LEVEL II (DUAL COATED)
(15) REQ'D.

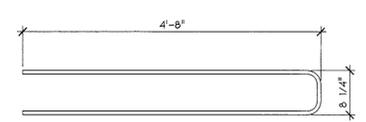
MISCELLANEOUS MATERIALS				P/S NEXT BEAMS	
ITEM	MARK	QTY.	DESCRIPTION	REMARKS	
1	B-401D	366	#4 BENT BAR (LEVEL II, DUAL COATED)		
2	B-402D	45	#4 BENT BAR (LEVEL II, DUAL COATED)		
3	B-403D	44	#4 BENT BAR (LEVEL II, DUAL COATED)		
4	B-404D	45	#4 BENT BAR (LEVEL II, DUAL COATED)		
5	B-405D	45	#4 BENT BAR (LEVEL II, DUAL COATED)		
6	B-406D	45	#4 BENT BAR (LEVEL II, DUAL COATED)		
7	B-407D	45	#4 BENT BAR (LEVEL II, DUAL COATED)		
8	B-408D	45	#4 BENT BAR (LEVEL II, DUAL COATED)		
9	B-409D	45	#4 BENT BAR (LEVEL II, DUAL COATED)		
10	B-501D	48	#5 BENT BAR (LEVEL II, DUAL COATED)		
11	B-502D	126	#5 BENT BAR (LEVEL II, DUAL COATED)		
12	B-503D	15	#5 BENT BAR (LEVEL II, DUAL COATED)		
13	B-504D	13	#5 BENT BAR (LEVEL II, DUAL COATED)		
14	B-505D	13	#5 BENT BAR (LEVEL II, DUAL COATED)		
15	B-506D	13	#5 BENT BAR (LEVEL II, DUAL COATED)		
16	B-507D	15	#5 BENT BAR (LEVEL II, DUAL COATED)		
17	B-508D	15	#5 BENT BAR (LEVEL II, DUAL COATED)		
18	B-509D	14	#5 BENT BAR (LEVEL II, DUAL COATED)		
19	B-510D	13	#5 BENT BAR (LEVEL II, DUAL COATED)		
20	B-511D	13	#5 BENT BAR (LEVEL II, DUAL COATED)		
21	B-512D	15	#5 BENT BAR (LEVEL II, DUAL COATED)		
22					
23		60	#4 x 8'-9 1/2" (LEVEL II, DUAL COATED)		
24		540	#5 x 8'-9 1/2" (LEVEL II, DUAL COATED)		
25		39	#5 x 46'-6" (LEVEL II, DUAL COATED)		
26		39	#5 x 52'-3" (LEVEL II, DUAL COATED)		
27		12	SET OF (4) 0.60"φ STRAND LIFTING LOOPS		
28	MK-BA1	44	3/4"φ F42 FERRULE INSERT (GALV.)		
29	MK-BA2	22	DAYTON C-24 TYPE 4-APR DECK FORM HANGER (GALV.)		

MISCELLANEOUS MATERIALS				P/C APPROACH SLABS	
ITEM	MARK	QTY.	DESCRIPTION	REMARKS	
1	BA-501D	116	#5 BENT BAR (LEVEL II, DUAL COATED)		
2	BA-502D	58	#5 BENT BAR (LEVEL II, DUAL COATED)		
3	BA-601	88	#6 BENT BAR (LEVEL I)		
4					
5					
6		88	#6 x 14'-8" (LEVEL I)		
7		8	#5 x 5'-2" (LEVEL I)		
8		8	#5 x 5'-6" (LEVEL I)		
9					
10		32	DAYTON 4T x 7 1/8" SWIFT LIFT		

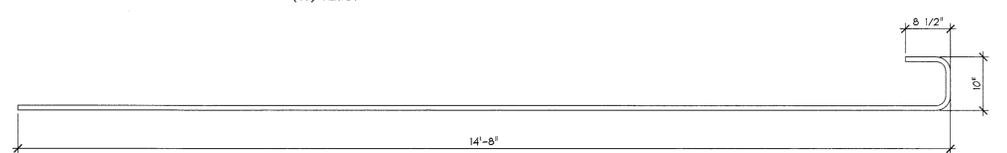
ADD BARS FOR TESTING!



BA-502D
#5 BENT BAR
LEVEL II (DUAL COATED)
(58) REQ'D.



BA-501D
#5 BENT BAR
LEVEL II (DUAL COATED)
(116) REQ'D.



BA-601
#6 BENT BAR
LEVEL I
(88) REQ'D.

Vermont Agency of Transportation
RECEIVED
 ON: **May 8, 2015**
 and Checked for
CONFORMANCE
 BY: **Todd A. Sumner** DATE: **05/27/2015**

SHOP DRAWING REVIEW

REVIEWED AS REQUIRED BY THE CONSTRUCTION CONTRACT DOCUMENTS AND APPROVED, BUT ONLY FOR CONFORMANCE TO THE DESIGN CONCEPT OF THE WORK, AND SUBJECT TO FURTHER LIMITATIONS AND REQUIREMENTS CONTAINED IN THE CONSTRUCTION CONTRACT DOCUMENTS.

REJECTED REVISE AND RESUBMIT APPROVED AS NOTED

CORRECTIONS OR COMMENTS MADE ON THE SHOP DRAWINGS DURING THIS REVIEW DO NOT RELIEVE CONTRACTOR FROM COMPLIANCE WITH REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS. THIS CHECK IS ONLY FOR REVIEW OF GENERAL CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND GENERAL COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR CONFIRMING AND CORRELATING ALL QUANTITIES AND DIMENSIONS; SELECTING FABRICATION PROCESSES AND TECHNIQUES OF CONSTRUCTION; COORDINATING THEIR WORK WITH THAT OF ALL OTHER TRADES; AND PERFORMING THEIR WORK IN A SAFE AND SATISFACTORY MANNER.

CLD Consulting Engineers
 540 Commercial Street
 Montpelier, VT 05101
 802-888-9223

Job Number: **120174**
 Reviewed by: **SRB**
 Date: **05/26/2015**

APPROVAL STAMP:	J.P. CARRARA & SONS INC. Precast & Prestress Manufacturer 2464 OASE STR., WOODLERY, VERMONT 05753 Phone: (802)388-6361 Fax: (802)388-9010	J.P. Sicard CONTRACTOR BARTON, VERMONT
STATE OF VERMONT AGENCY OF TRANSPORTATION COUNTY OF ORLEANS		DATE: FEB. 25, 2015
TOWN OF BARTON ROARING BROOK ROAD TH #2, RURAL MINOR COLLECTOR BRIDGE NO.: 8 PROJECT NO.: BRO 1449(31)		SCALE: NOTED
NEXT BEAM MATERIAL LIST		CHKD: - DFTM: T.D. JOB NO: 23462-015 DWG. NO: M1



LIFTING LOOP/LIFTING INJECT DESIGN CALCULATIONS
(WORK W/ CARRARA SHOP DWGS)

APPROACH SLABS

$f'_c = 5000 \text{ PSI}$ $f'_{cr} = 3500 \text{ PSI}$

WT OF HEAVIEST APPROACH SLAB = $8.26^T \approx 16.52^K$

THERE ARE (4) LIFT POINTS

ASSUME 60° SLING ANGLE W/ THE HORIZONTAL

DESIGN LOAD/LIFT POINT = $\frac{16.52}{4 \times 0.866} = 4.77^K$

FROM ATTACHED PRODUCT LITERATURE, P 24

USE $4^T \times 7\frac{1}{8}^S$ S.L. SWL (9:1 S.F.) = 8000 LB > 4.77^K, OK

NOTE 1 LOCATE LIFTERS APPROX $e/5$ POINTS E.W. CENTER LIFTER PATTERN ON C.C. OF SLAB

NOTE 2 MIN EDGE DISTANCE OF 20" IS APPLICABLE WHEN LIFTERS ARE USED IN SHEAR. IN THIS APPLICATION THE LIFTERS ARE PRIMARILY IN TENSION AND THE MIN EDGE DISTANCE IS APPROX = $7\frac{1}{8} + 9/16 + 1\frac{3}{8} = 8.625"$, SAY 10". SEE ATTACHED PRODUCT LITERATURE, P 24 FOR LIFTER DIM. & INSTALLATION DIM. SHEAR CODE IS SIM TO HEADER STUB, SEE FIG 4.5.3 OF PCI DESIGN HANDBOOK, ATTACHED.

Vermont Agency of Transportation

RECEIVED

ON: **May 8, 2015**

and Checked for

CONFORMANCE

BY: Todd A. Sumner DATE: 05/27/2015

CLD Consulting Engineers, Inc.

Checked for

CONFORMANCE

BY: SRB

DATE: 05/26/2015

NEXT BEAMS

$f'_c = 6000 \text{ psi}$

$f'_{LL} = 4000 \text{ psi}$

WEIGHT OF HEAVIEST NEXT BEAM = 108780 LB (NB-3)

AND HEAVIEST VERTICAL LIFTED LOAD IS

$0.27 \times 108780 = 29371 \text{ LB}$, SEE NEXT BEAM

SUMMARY OF LOAD DISTRIBUTION / BEAM WEIGHT / ATTACH

ASSUME 60° MIN SLING ANGLE W/ THE HORIZONTAL

DESIGN LOAD / LIFTED = $\frac{29371}{0.866} = 33915 \text{ LB}$
 $= 33.9 \text{ K}$

FROM ATTACHED PCI LITERATURE TABLE 5.2.3
BY INTERPOLATION BETWEEN VERTICAL / 45° LIFT

USE (+) 2.600" ϕ X 270 KIL STRAIN LIFT LOOP, MIN

LEAD 2'-6", SWL (4.1 S.F)

$$= \left[23 + \frac{30-28}{34-28} (29-23) + 33 + \frac{30-28}{34-28} (41-33) \right] \frac{1.1}{2}$$

$$= (25 + 35.67) / 1.1 = 33.4 \text{ K} \leq 33.9 \text{ K}$$
, BUT O.K

(W/ ACCEPT)

ALSO CHECK USING PCI REC 4.15.7A, CASE 3, ATTACH

$$\phi P_n = 0.85 \times 2.67 \sqrt{4000} \left(\frac{14}{4} \right) \left(\frac{~6'' + 2 \times 36''}{1000} \right)$$

$$= 135 \text{ K}$$

LIFT LOOP SIZE

FOR 4.1 S.F

$$SWL = \frac{135}{4.1} = 33.7 \text{ K} \leq 33.9 \text{ K}$$
, BUT O.K
(W/ ACCEPT)

ABUTMENTS

$f'_c = 5000 \text{ PSI}$

~~$f'_w = 3500 \text{ PSI}$~~

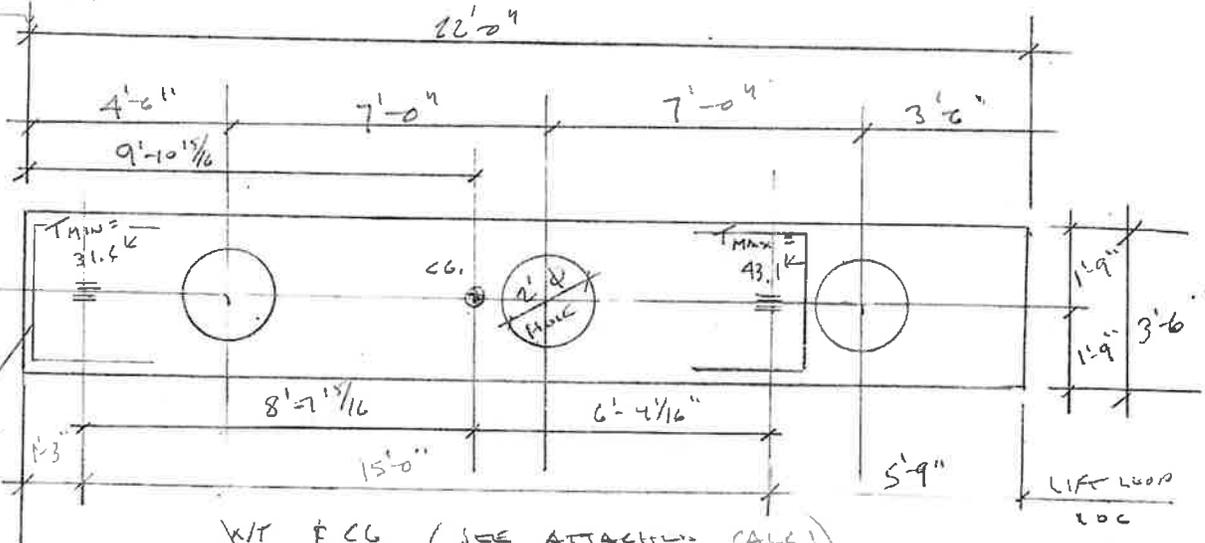
REUSE $f'_c = 5000 \text{ PSI}$

B-AB1

WT 37.33T

PLAN VIEW

CHEEK WALL
END



WT F CG (SEE ATTACHMENT CALLS)

$WT = 37.33T = 74.66 \text{ K}$

$T_{MAX} = \frac{8'-7\frac{1}{16}}{15'} \times 74.66 = 43.1 \text{ K}$

$T_{MIN} = 74.66 - 43.1 = 31.6 \text{ K}$

USE (4) 0.600" ϕ X 270 KSI STRAND LIFT LOOP

MIN. EMBED 6'-0" @ 43.1 K LOC ϕ

MIN EMBED TO WITHIN 2" OF B/ABUT ϕ 31.6 K LOC, SEE SKETCH ABOVE

FROM ATTACHMENT TABLE 5.2.3 OF PCI DESIGN HANDBOOK

$SWL(4:1 \text{ S.F.}) = 1.1 \times 41.0 = 45.1 \text{ K} > 43.1 \text{ K} > 31.6 \text{ K}, \text{ O.K.}$

ALSO CHECK SWL USING PCI FIG 6.15.7A (CASE C, ATTACHMENT)

$\phi P_{ci} = 0.85 \times 2.6 \sqrt{3500} (42)(42) / 1000 = 237 \text{ K} \phi$

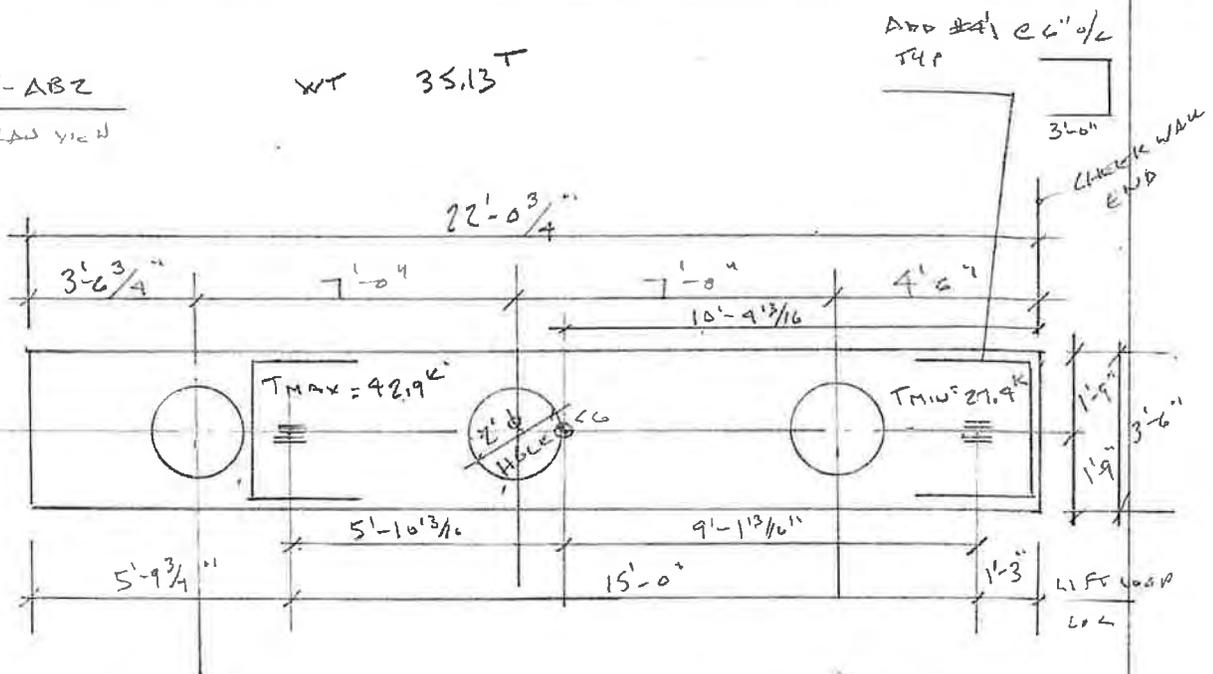
FOR S.F. = 4:1

$SWL = 237 / 4 = 59 \text{ K} > 43.1 \text{ K} > 31.6 \text{ K}, \text{ O.K.}$

B-ABZ

WT 35.13^T

PLAN VIEW



WT @ CC (SEE ATTACHED CALLS)

$$WT = 35.13^T = 70.26^k$$

$$T_{MAX} = \frac{9'-1 \frac{13}{16}}{15.0} \times 70.26 = 42.9^k$$

$$T_{MIN} = 70.26 - 42.9 = 27.9^k$$

USE (4) 0.600" ϕ X 270 KSI STRAND LIFT LOOP

MIN EMBEDMENT 1'-0" @ 42.9^k LOC &

MIN EMBEDMENT TO WITHIN 2" OF B/ABUT \mp @ 27.9^k LOC.

SEE SKETCH ABOVE

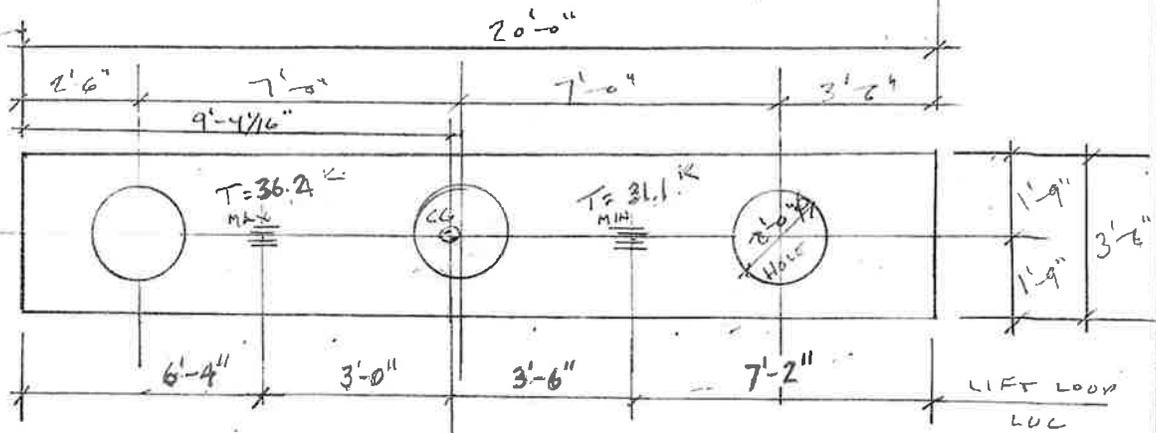
ALSO CHECK SWL USING PCI FIG 6.15.7A CASE 6, ATTACHED

O.K. BY B-AB1 SIM CALC

B-AB3
PLAN VIEW

WT 33.64^T

CHEEK WALL
END



WT & CG (SEE ATTACHED CALC)

WT & CC, (SEE ATTACHED CALC)

$$WT = 33.64^T = 47.28^k$$

$$T_{MAX} = \frac{3'-6''}{6'-6''} \times 47.28 = 36.2^k$$

$$T_{HI} = 47.28 - 36.2 = 31.1^k$$

USE (A) 0.600" 4 X 271 ksi STRAND LIFT LOOP

MIN 4 MBOLTS 6'-5" SEE SKETCH ABOVE

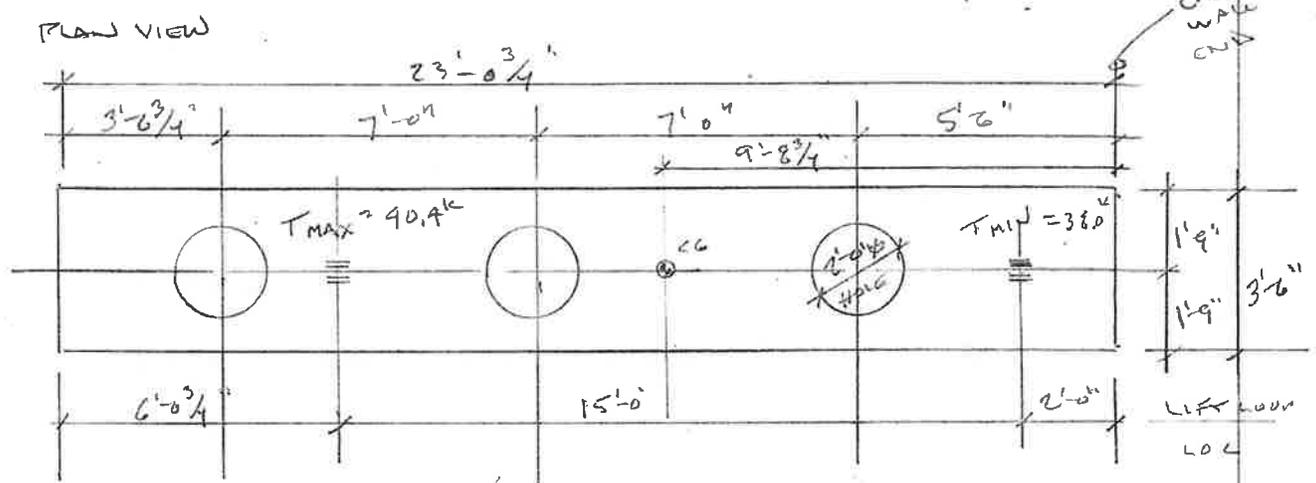
FROM ATTACHED TABLE 5.2.3 OF PCI DESIGN HANDBOOK

$$SWL(4:1 S.F.) = 1.1 \times 41.0 = 45.1^k > 36.2^k > 31.1^k, \text{ O.K.}$$

ALSO CHECK SWL USING PCI FIG 6.15.7A CASE C, 4 STRANDS

O.K. BY B-AB1 SIM CALC.

B-AB4 WT 39.22^T



WT & CC. (SEE ATTACHED CALC.)

$$WT = 39.22^T = 78.44^K$$

$$T_{MAX} = \frac{7'-8 \frac{3}{4}''}{15'} \times 78.44 = 40.4^K$$

$$T_{MIN} = 78.44 - 40.42 = 38.0$$

USE (4) 0.600" ϕ x 270 KW STRAIN LIFT LOOP

MIN EMBED 6'-5" @ 40.4^K LOC &

MIN EMBED TO WITHIN 2" OF B/ABOUT @ 38.0^K LOC

SEE SKETCH ABOVE

ALSO CHECK SWL USING PCI FIG 6.15.7A CASE 6,
ATTACHED

OK. BY B-AB1 SIM CALC

P-52 Swift Lift® Anchor Tensile and Shear Capacity

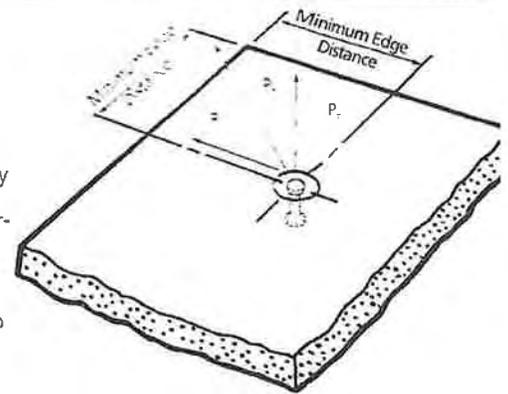
When anchors are used in the face of thin concrete elements

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 to 1 in normal weight concrete. Safe Working Load is based on anchor setback from face of concrete "X" dimension, as shown on page 26.

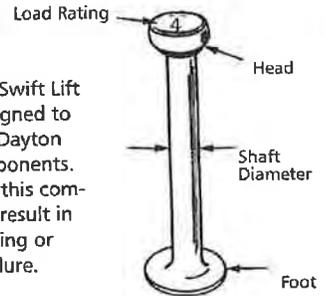
P-52 Swift Lift® Anchor

The P-52 Swift Lift Anchor is hot forged from carbon steel. The formed head provides spherical seating that the Lifting Eye engages, while a disc-shaped foot is embedded in the concrete.

Due to its being a forged part, the Swift Lift Anchor does not depend on welds or thread engagement to develop its safe working load. Forging provides maximum safety with its advantageous material structure. This allows the anchor to easily meet the OSHA requirement of a 4 to 1 factor of safety.

In addition to the carbon steel anchors, Type 304 or 316 Stainless Steel Swift Lift Anchors are available on special order. Use stainless steel anchors when maximum protection against corrosion is required.

For safety, refer to the P-52 Swift Lift Anchor Selection Chart on page 31 to determine the actual safe working load of an individual anchor. The MAXIMUM safe working load is clearly visible on the head of the anchor for easy recognition of the appropriate hardware and accessories for use with each Swift Lift Anchor.®



Caution: The Swift Lift Anchor is designed to be used with Dayton Superior components. Failure to use this combination may result in concrete spalling or premature failure.

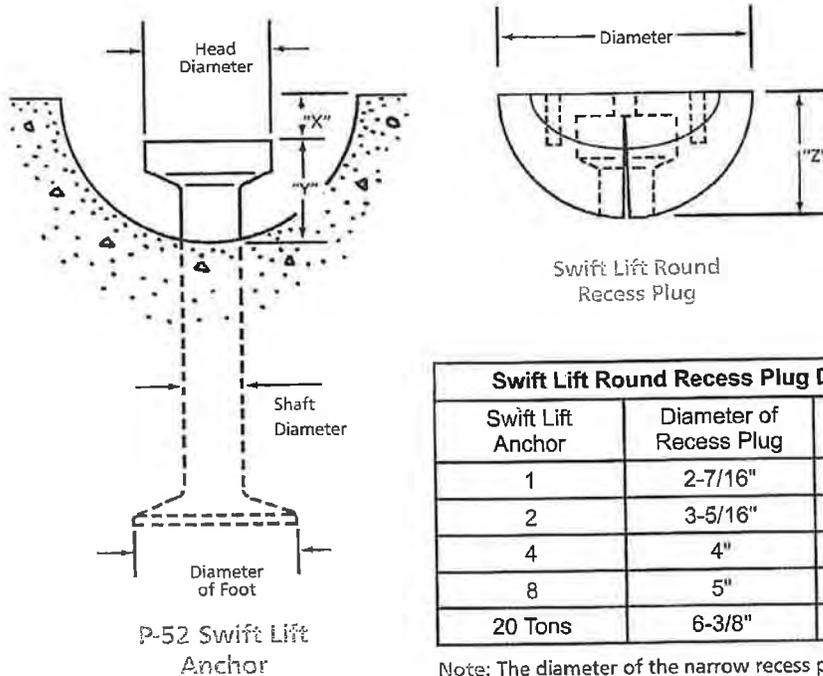
To Order:

Specify: (1) quantity, (2) name, (3) system size, (4) length

Example:

200, P-52 Swift Lift Anchors, 4 ton, 9-1/2" long

P-52 Swift Lift Anchor and Recess Plug Dimensions



Swift Lift Round Recess Plug Dimensions		
Swift Lift Anchor	Diameter of Recess Plug	Dimension "Z"
1	2-7/16"	1-3/16"
2	3-5/16"	1-7/16"
4	4"	1-13/16"
8	5"	2-5/16"
20 Tons	6-3/8"	3-1/8"

Note: The diameter of the narrow recess plug is the same as the diameter of the round recess plug.

P-52 Swift Lift Anchor Dimensions					
Swift Lift Anchor	Dimension "X"	Dimension "Y"	Shaft Diameter	Foot Diameter	Head Diameter
1	5/16"	7/8"	3/8"	1"	11/16"
2	7/16"	1-1/16"	9/16"	1-3/8"	1-1/32"
4	9/16"	1-5/16"	3/4"	1-7/8"	1-11/32"
8	9/16"	1-5/8"	1-3/32"	2-5/8"	1-7/8"
20 Tons	9/16"	2-5/8"	1-1/2"	3-3/4"	2-3/4"

ability of headed stud design. The design methods used here should be considered an interim step toward a final headed stud design procedure. It is recommended that this procedure be limited to headed studs with an embedment not greater than 8 in.

An important factor in the performance of headed studs when controlled by concrete capacity is the confinement of the failure area with reinforcement. In shear, design capacity is increased with such reinforcement. In tension, ductility can be provided. It is recommended that reinforcement be placed to cross failure planes around headed stud anchorages.

Welded headed studs are designed to resist direct tension, shear or a combination of the two. The design equations given below are applicable to studs which are welded to steel plates or other structural members, and embedded in unconfined concrete.

Where feasible, headed stud connections should be designed and detailed such that the connection failure is precipitated by failure (typically defined as yielding) of the stud material rather than failure of the surrounding concrete. The in-place strength should be taken as the smaller of the values based on concrete and steel.

6.5.2.1 Tension

The design tensile strength governed by concrete failure is [9]:

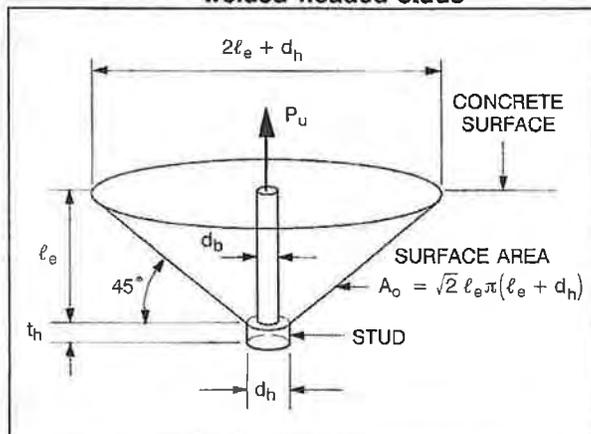
$$\phi P_c = \phi A_o (2.8\lambda \sqrt{f'_c}) \quad (\text{Eq. 6.5.2})$$

where:

$$\phi = 0.85$$

A_o = area of the assumed failure surface which, for a single stud not located near a free edge, is taken to be that of a 45° truncated cone as shown in Figure 6.5.3.

Figure 6.5.3 Shear cone development for welded headed studs



Using the 45° cone area and $\phi = 0.85$, Eq. 6.5.2 may be written as:

$$\phi P_c = 10.7 \ell_e (\ell_e + d_h) \lambda \sqrt{f'_c} \quad (\text{Eq. 6.5.3})$$

Note: The stud length is often used in place of the actual embedment length, ℓ_e , which is equal to the stud length minus the thickness of the head. This simplification is generally acceptable except in short stud. In short studs (length ≤ 4 in.), the use of actual embedment length is recommended. It should also be noted that short stud capacities are also sensitive to fabrication tolerances. Thus, use of a larger over factor of safety may be appropriate for short stud. See Sect. 6.3.

For a stud located closer to a free edge than the embedment length, ℓ_e , the design tensile strength given by Eq. 6.5.3, should be reduced by multiplying it by C_{es} :

$$C_{es} = \frac{d_e}{\ell_e} \leq 1.0 \quad (\text{Eq. 6.5.4})$$

where d_e is the distance measured from the stud axis to the free edge. If a stud is located in the corner of a concrete member, Eq. 6.5.4 should be applied twice, once for each edge distance. Figure 6.15.6 lists values based on Eqs. 6.5.3 and 6.5.4.

For a group of studs, the concrete failure surface may be along a truncated pyramid rather than separate shear cones, as shown in Figure 6.5.4.

For this case, the design tensile strength is:

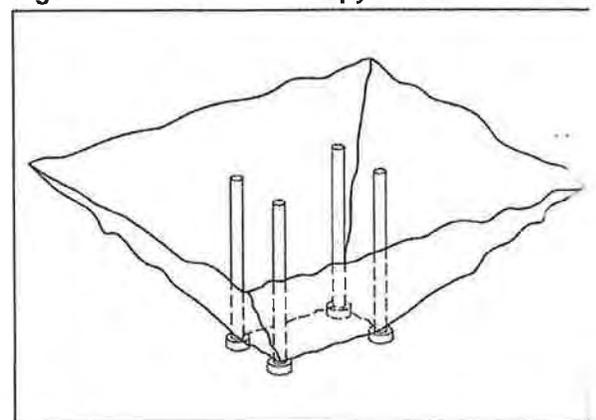
$$\phi P_c = \phi \lambda \left(\frac{2}{3} \right) \sqrt{f'_c} (2.8A_{\text{slope}} + 4A_{\text{flat}}) \quad (\text{Eq. 6.5.5})$$

where:

A_{slope} = sum of the areas of the sloping sides

A_{flat} = area of the flat bottom of the truncated pyramid

Figure 6.5.4 Truncated pyramid failure



4/17/15

BARTON

10
1/13

NEXT BEAM SUMMARY OF LOAD DISTRIBUTION/BEAM WEIGHTS

MARKED
END

• 0.23L	NB1 WT = 89,728 LB	0.26L •
• 0.24L		0.27L •

NON-MARKED
END

MARKED
END

• 0.24L	NB2 WT. = 98,719 LB	0.25L •
• 0.26L		0.25L •

NON-MARKED
END

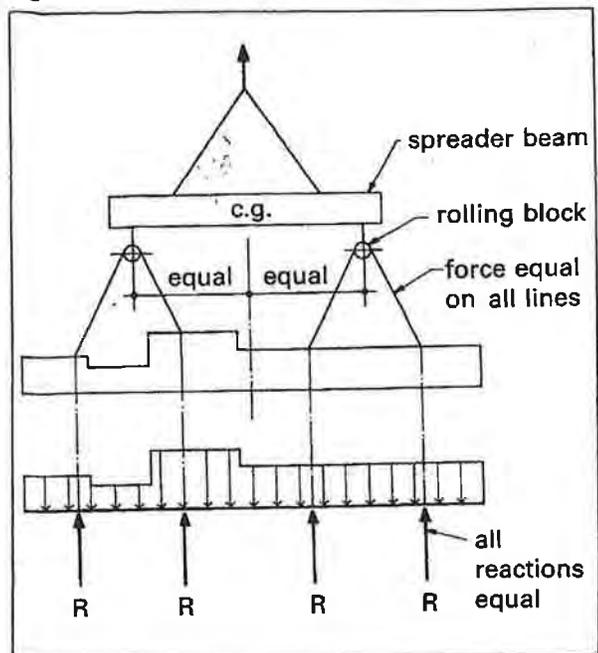
MARKED
END

• 0.25L	NB-3 WT. = 108,780 LB	0.24L •
• 0.27L		0.24L •

NON-MARKED
END

CONTRLS
DESIGN

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.

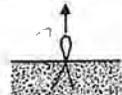
Reduced capacities for shorter embedment lengths may be suitable. In shallow products, providing a 90° bend can reduce the required embedment length significantly. Lightly rusted strand has better bond than bright strand.

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 %

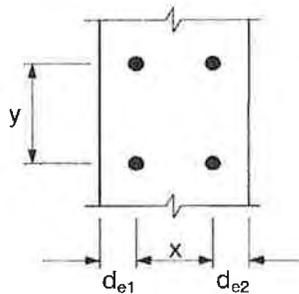
The angle of incline of lifting has little effect on the strand lifting loop capacity if the angle from the horizontal is more than about 20°. Typical handling methods are usually such that this angle is no less than 60°.

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.

Figure 6.15.7A (continued) Design tensile strength for $h \geq h_{min}$, ϕP_{c1} —Case 3



x and y are the overall dimensions (width and length) of the stud group.

Case 3: Free edges on two opposite sides

$$\phi P_{c1} = \phi 2.67 \lambda \sqrt{f'_c} (x_1)(y_1 + 2\ell_e)$$

$$\phi = 0.85$$

where: x_1 and y_1 are the dimensions of the flat bottom of the part of the truncated pyramid.

For Case 3: $x_1 = x + d_{e1} + d_{e2}$ $y_1 = y$

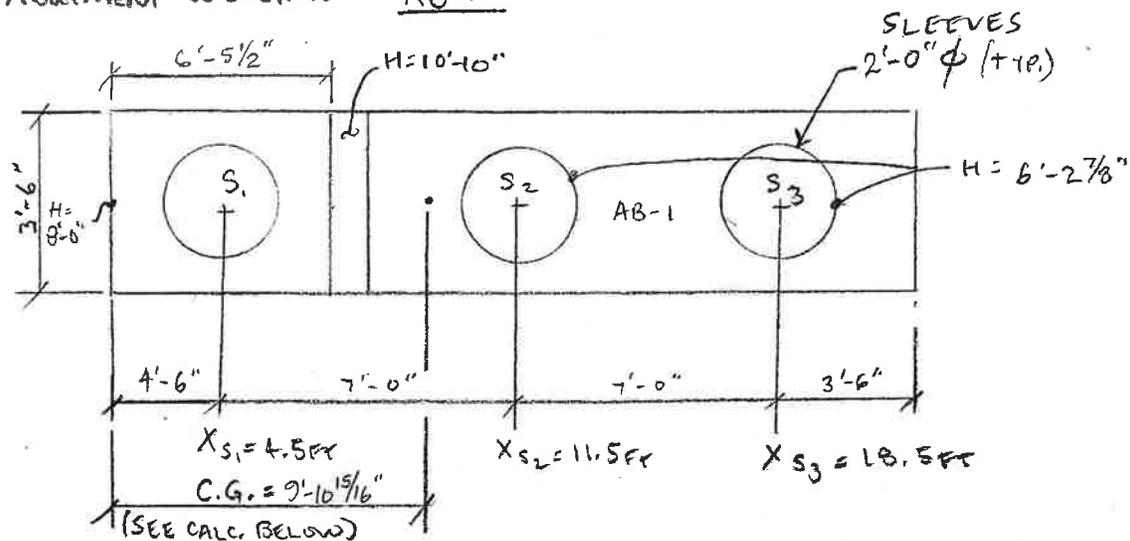
Note: Table values are based on

$$\lambda = 1.0 \text{ and } f'_c = 5000 \text{ psi;}$$

for different material properties, multiply table

values by $\lambda \sqrt{f'_c} / 5000$

ℓ_e in.	x_1, y_1 in.	Design tensile strength, ϕP_{c1} (kips)														
		2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
3	0	2	4	6	8	9	11	13	15	17	19	21	23	25	27	29
	2	3	5	8	10	13	15	18	21	23	25	28	31	33	36	39
	4	3	7	9	13	16	19	23	25	29	32	35	39	42	45	48
	6	4	8	11	15	19	23	27	31	35	39	42	46	50	54	58
	8	5	9	13	18	23	27	31	36	41	45	49	54	59	63	67
	10	5	10	15	21	25	31	36	41	46	51	57	61	67	72	77
	12	6	11	17	23	29	35	41	46	52	58	63	69	75	81	87
	14	7	13	19	25	32	39	45	51	58	64	71	77	83	90	96
	16	7	14	21	28	35	42	49	57	63	71	77	85	92	99	106
4	0	3	5	8	10	13	15	18	21	23	25	28	31	33	36	39
	2	3	7	9	13	16	19	23	25	29	32	35	39	42	45	48
	4	4	8	11	15	19	23	27	31	35	39	42	46	50	54	58
	6	5	9	13	18	23	27	31	36	41	45	49	54	59	63	67
	8	5	10	15	21	25	31	36	41	46	51	57	61	67	72	77
	10	6	11	17	23	29	35	41	46	52	58	63	69	75	81	87
	12	7	13	19	25	32	39	45	51	58	64	71	77	83	90	96
	14	7	14	21	28	35	42	49	57	63	71	77	85	92	99	106
	16	8	15	23	31	39	46	54	61	69	77	85	92	100	108	115
6	0	4	8	11	15	19	23	27	31	35	39	42	46	50	54	58
	2	5	9	13	18	23	27	31	36	41	45	49	54	59	63	67
	4	5	10	15	21	25	31	36	41	46	51	57	61	67	72	77
	6	6	11	17	23	29	35	41	46	52	58	63	69	75	81	87
	8	7	13	19	25	32	39	45	51	58	64	71	77	83	90	96
	10	7	14	21	28	35	42	49	57	63	71	77	85	92	99	106
	12	8	15	23	31	39	46	54	61	69	77	85	92	100	108	115
	14	9	17	25	33	42	50	59	67	75	83	92	100	109	117	125
	16	9	18	27	36	45	54	63	72	81	90	99	108	117	125	135
8	0	5	10	15	21	25	31	36	41	46	51	57	61	67	72	77
	2	6	11	17	23	29	35	41	46	52	58	63	69	75	81	87
	4	7	13	19	25	32	39	45	51	58	64	71	77	83	90	96
	6	7	14	21	28	35	42	49	57	63	71	77	85	92	99	106
	8	8	15	23	31	39	46	54	61	69	77	85	92	100	108	115
	10	9	17	25	33	42	50	59	67	75	83	92	100	109	117	125
	12	9	18	27	36	45	54	63	72	81	90	99	108	117	125	135
	14	9	19	29	39	48	58	67	77	87	96	106	115	125	135	144
	16	10	21	31	41	51	61	72	82	92	103	113	123	133	143	154

ABUTMENT WEIGHTS AB-1

SOLID ABUT. PROPERTIES, NOT CONSIDERING SLEEVES:

$$X_A = \text{CENTER OF GRAVITY W/O SLEEVES} = 9'-11 \frac{9}{16}'' \quad \left. \begin{array}{l} \\ \\ \end{array} \right\} \text{DERIVED FROM AUTOCAD}$$

$$A_A = \text{ABUT AREA IN ELEV. VIEW} = 162.383 \text{ SF}$$

$$V_A = \text{ABUT. VOL. W/O SLEEVES CONSIDERED} = 162.383 \text{ SF} (3.5 \text{ FT}) = 568.34 \text{ CF}$$

$$W_A = 568.34 \text{ CF} \times 150 \text{ PCF} = 85,251 \text{ LB}$$

SLEEVES:

$$W_{S_1} = \text{WT OF } S_1 = (8'-0" \times 4'-6" (10'-10" - 8'-0" / 16'-5 \frac{1}{2}")) (\pi (1'-0")^2) (150 \text{ PCF}) = 4700.2 \text{ LB}$$

$$W_{S_2} = \text{WT OF } S_2 = (6'-2 \frac{7}{8}" (7 (1'-0")^2) (150 \text{ PCF}) = 2940.3 \text{ LB} = W_{S_3}$$

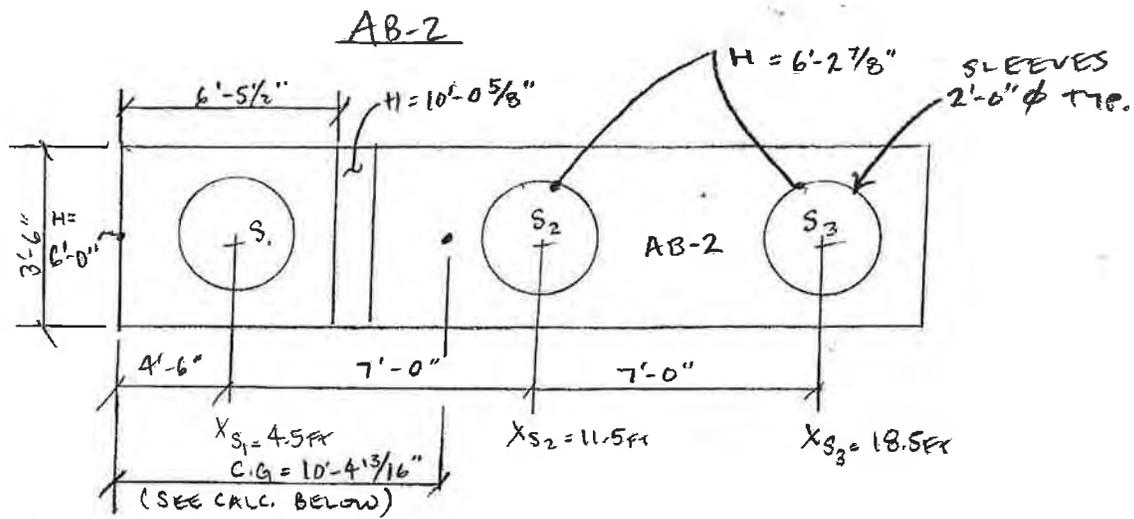
FINAL ABUT. WT / C.G.:

$$W_{A-FINAL} = 85,251 \text{ LB} - 4700.2 \text{ LB} - 2(2940.3 \text{ LB}) = \boxed{74,670.3 \text{ LB}}$$

$$\bar{X}_{A-FINAL} = \frac{(85,251 \text{ LB})(9'-11 \frac{9}{16}'' - (4700.2 \text{ LB})(4.5 \text{ FT}) - 2(2940.3 \text{ LB})(11.5 \text{ FT} + 18.5 \text{ FT}))}{74,670.3 \text{ LB}}$$

$$\bar{X}_{A-FINAL} = \text{ABUT. FINAL C.G.} = \boxed{9'-10 \frac{15}{16}''}$$

ABUTMENT WEIGHTS (CONTINUED):



SOLID ABUT. PROPERTIES, NOT CONSIDERING SLEEVES:

$$X_A = \text{CENTER OF GRAVITY w/o SLEEVES} = 10'-5\frac{3}{16}'' \quad \left. \begin{array}{l} \\ \end{array} \right\} \text{DERIVED FROM AUTOCAD}$$

$$A_A = \text{ABUT. AREA IN ELEV. VIEW} = 153.011 \text{ SF}$$

$$W_A = \text{ABUT. WT. w/o SLEEVES CONSIDERED} = 153.011 \text{ SF} (3.5 \text{ FT}) (150 \text{ PCF}) = 80,330.8 \text{ LB}$$

SLEEVES:

$$W_{S_1} = \text{WT. OF } S_1 = (6'-0'' + 4'-6'' (10'-0\frac{5}{8}'' - 6'-0'') / (6'-5\frac{1}{2}'')) (\pi (1'-0'')^2) (150 \text{ PCF}) = 4157.9 \text{ LB}$$

$$W_{S_2} = \text{WT. OF } S_2 = \text{WT. OF } S_3 = 2940.3 \text{ LB (SEE AB-1 CALC)}$$

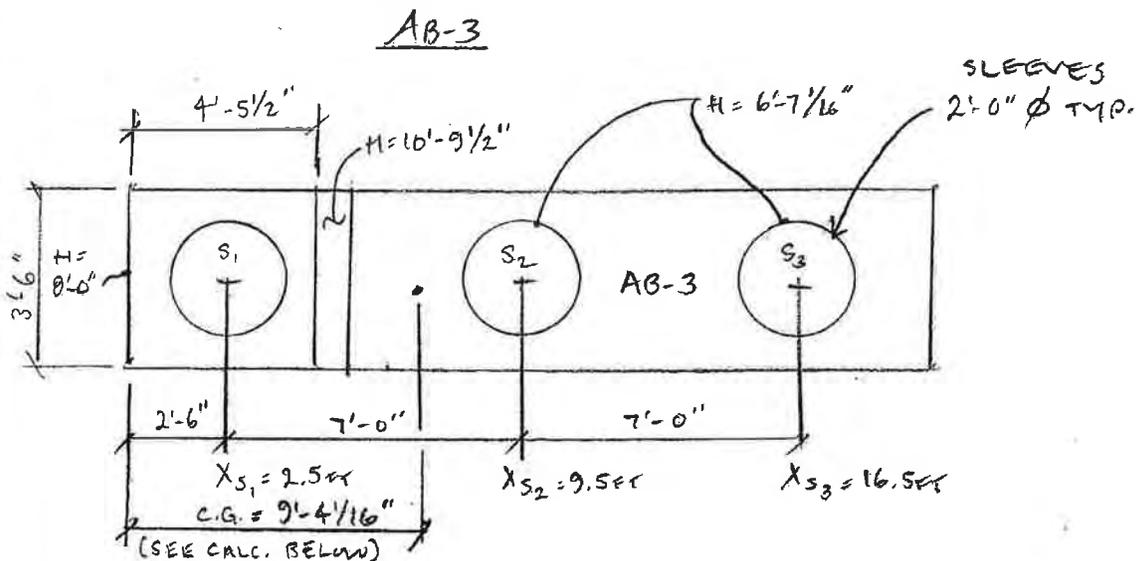
FINAL ABUT. WT / C.G.:

$$W_{A-FINAL} = 80,330.8 \text{ LB} - 4157.9 \text{ LB} - 2(2940.3 \text{ LB}) = \boxed{70,292.3 \text{ LB}}$$

$$\bar{X}_{A-FINAL} = \frac{(80,330.8 \text{ LB})(10'-5\frac{3}{16}'') - (4157.9 \text{ LB})(4.5 \text{ FT}) - 2940.3 \text{ LB}(11.5 \text{ FT} + 18.5 \text{ FT})}{70,292.3 \text{ LB}}$$

$$\bar{X}_{A-FINAL} = \text{ABUT. FINAL C.G.} = \boxed{10'-4\frac{13}{16}''}$$

ABUTMENT WEIGHTS (CONTINUED):



SOLID ABUT. PROPERTIES, NOT CONSIDERING SLEEVES:

$$X_A = \text{CENTER OF GRAVITY W/O SLEEVES} = 9'-2 \frac{13}{16}'' \quad \left. \begin{array}{l} \text{DERIVED FROM} \\ \text{AUTOCAD} \end{array} \right\}$$

$$A_A = \text{AREA ABUT. IN ELEV VIEW} = 148.566 \text{ SF}$$

$$W_A = \text{ABUT. WT. W/O SLEEVES CONSIDERED} = 148.566 \text{ SF} (3.5 \text{ FT}) (150 \text{ PCF}) = 77,997.2 \text{ LB}$$

SLEEVES:

$$W_{S_1} = \text{WT. OF } S_1 = (8'-0'' + 2.5 \text{ FT} (10'-9 \frac{1}{2}'' - 8'-0'') / (4'-5 \frac{1}{2}'') (\pi (1'-0'')^2) (150 \text{ PCF}) = 4507.6 \text{ LB}$$

$$W_{S_2} = \text{WT. OF } S_2 = \text{WT. OF } S_3 = (6'-7 \frac{1}{16}'') (\pi (1'-0'')^2) (150 \text{ PCF}) = 3104.8 \text{ LB}$$

FINAL ABUT. WT (C.G.):

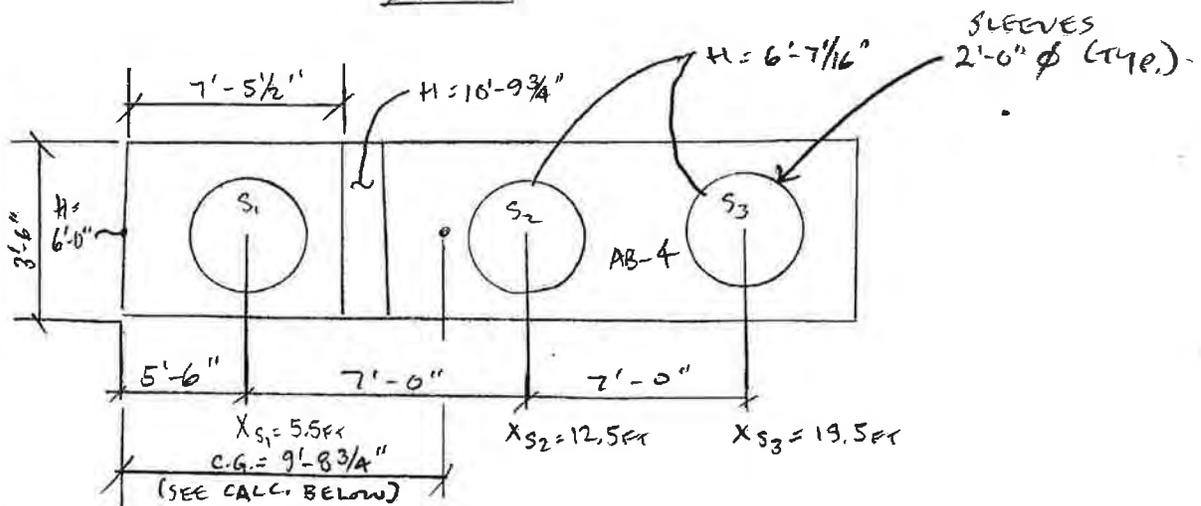
$$W_{A_FINAL} = 77,997.2 \text{ LB} - 4507.6 \text{ LB} - 2(3104.8 \text{ LB}) = \boxed{67,280 \text{ LB}}$$

$$\bar{X}_{A_FINAL} = \frac{(77,997.2 \text{ LB})(9'-2 \frac{13}{16}'') - (4507.6 \text{ LB})(2.5 \text{ FT}) - (3104.8 \text{ LB})(9.5 \text{ FT} + 16.5 \text{ FT})}{67,280 \text{ LB}}$$

$$\bar{X}_{A_FINAL} = \text{ABUT. FINAL C.G.} = \boxed{9'-4 \frac{1}{16}''}$$

ABUTMENT WEIGHTS (CONTINUED)

AB-4



SOLID ABUT. PROPERTIES, NOT CONSIDERING SLEEVES!

$$X_A = \text{CENTER OF GRAVITY W/O SLEEVES} = 9'-11\frac{7}{16}'' \quad \left. \begin{array}{l} \text{DERIVED FROM} \\ \text{AUTOCAD} \end{array} \right\}$$

$$A_A = \text{AREA ABUT. IN ELEV. VIEW} = 169.805 \text{ SF}$$

$$W_A = \text{ABUT. WT. W/O SLEEVES CONSIDERED} = 169.805 \text{ SF} (3.5 \text{ FT}) (150 \text{ PCF}) = 89,147.6 \text{ LB}$$

SLEEVES:

$$W_{S1} = \text{WT. OF } S_1 = (6'-0'' + 5'-6'' (10'-9\frac{3}{4}'' - 6'-0'') / (7'-5\frac{1}{2}')) \left(\frac{1'-0''}{2} \right)^2 (150 \text{ PCF}) = 4499.8 \text{ LB}$$

$$W_{S2} = \text{WT OF } S_2 = \text{WT OF } S_3 = 3104.8 \text{ LB (SEE AB-3 CALC.)}$$

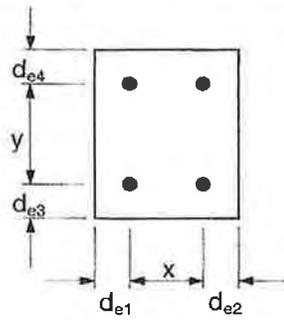
FINAL ABUT. WT/C.G.:

$$W_{A-FINAL} = 89,147.6 \text{ LB} - 4499.8 \text{ LB} - 2(3104.8 \text{ LB}) = \boxed{78,438.2 \text{ LB}}$$

$$\bar{X}_{A-FINAL} = \frac{(89,147.6 \text{ LB})(9'-11\frac{7}{16}'') - (4499.8 \text{ LB})(5.5 \text{ FT}) - 3104.8 \text{ LB}(12.5 \text{ FT} + 19.5 \text{ FT})}{78,438.2 \text{ LB}}$$

$$\bar{X}_{A-FINAL} = \text{ABUT. FINAL C.G.} = \boxed{9'-8\frac{3}{4}''}$$

Figure 6.15.7A (continued) Design tensile strength for $h \geq h_{\min}$, ϕP_{c1} —Case 6



x and y are the overall dimensions (width and length) of the stud group.

Case 6: Free edges on four adjacent sides

$$\phi P_{c1} = \phi 2.67 \lambda \sqrt{f'_c} (x_1)(y_1)$$

$$\phi = 0.85$$

where: x_1 and y_1 are the dimensions of the flat of the part of the truncated pyramid.

For Case 6: $x_1 = x + d_{e1} + d_{e2}$ $y_1 = y + d_{e3} + d_{e4}$

Note: Table values are based on $\lambda = 1.0$ and $f'_c = 5000$ psi;

for different material properties, multiply table values by $\lambda \sqrt{f'_c} / 5000$

ℓ_o in.	x_1, y_1 in.	Design tensile strength, ϕP_{c1} (kips)													
		2	4	6	8	10	12	14	16	18	20	22	24	26	28
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	1	1	2	3	3	4	5	5	6	7	7	8	9	9
	4	1	3	4	5	7	8	9	10	11	13	14	15	17	17
	6	2	4	6	8	9	11	13	15	17	19	21	23	25	25
	8	3	5	8	10	13	15	18	21	23	25	29	31	33	33
	10	3	7	9	13	16	19	23	25	29	32	35	39	42	42
	12	4	8	11	15	19	23	27	31	35	39	42	46	50	50
	14	5	9	13	18	23	27	31	36	41	45	49	54	59	59
16	5	10	15	21	25	31	36	41	46	51	55	61	67	67	
4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	1	1	2	3	3	4	5	5	6	7	7	8	9	9
	4	1	3	4	5	7	8	9	10	11	13	14	15	17	17
	6	2	4	6	8	9	11	13	15	17	19	21	23	25	25
	8	3	5	8	10	13	15	18	21	23	25	29	31	33	33
	10	3	7	9	13	16	19	23	25	29	32	35	39	42	42
	12	4	8	11	15	19	23	27	31	35	39	42	46	50	50
	14	5	9	13	18	23	27	31	36	41	45	49	54	59	59
16	5	10	15	21	25	31	36	41	46	51	55	61	67	67	
6	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	1	1	2	3	3	4	5	5	6	7	7	8	9	9
	4	1	3	4	5	7	8	9	10	11	13	14	15	17	17
	6	2	4	6	8	9	11	13	15	17	19	21	23	25	25
	8	3	5	8	10	13	15	18	21	23	25	29	31	33	33
	10	3	7	9	13	16	19	23	25	29	32	35	39	42	42
	12	4	8	11	15	19	23	27	31	35	39	42	46	50	50
	14	5	9	13	18	23	27	31	36	41	45	49	54	59	59
16	5	10	15	21	25	31	36	41	46	51	55	61	67	67	
8	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	2	1	1	2	3	3	4	5	5	6	7	7	8	9	9
	4	1	3	4	5	7	8	9	10	11	13	14	15	17	17
	6	2	4	6	8	9	11	13	15	17	19	21	23	25	25
	8	3	5	8	10	13	15	18	21	23	25	29	31	33	33
	10	3	7	9	13	16	19	23	25	29	32	35	39	42	42
	12	4	8	11	15	19	23	27	31	35	39	42	46	50	50
	14	5	9	13	18	23	27	31	36	41	45	49	54	59	59
16	5	10	15	21	25	31	36	41	46	51	55	61	67	67	