

Proposed Bridge Improvement Project

Bridport STP CULV(29)

Bridge #2

Concrete:

- Mix Designation: P60TER
1. Specified Mix Design - 5000 PSI
 2. Proposed Mix Design - 6000 PSI
 3. Striping Strength - 3000 PSI
 4. Handling Strength - 3000 PSI
 5. Shipping Strength - 5000 PSI
 6. Install Strength - 5000 PSI
 7. Traffic Loading - 5000 PSI

Fabrication Tolerances:

1. Width ±1/4"
2. Height ±1/4"
3. Length ±1/2"
4. Rebar Cover 2" Min. (Unless Noted Otherwise)
5. Rebar Spacing ±1"
6. Rebar Clearance ±1/4"
7. Insert Placement ±1/4"

Design Notes:

1. Design is in accordance w/ ASTM C1577, PCI MNL135, VAOT540 & AASHTO 2012 LRFD bridge design specs fifth edition
2. Any conflict between tolerances listed above shall result in the usage of the stricter tolerance
3. Design live load = HL-93
4. Materials and manufacturing shall conform to ASTM C1433
5. Earth Cover: ± 15'-0"

Installation:

1. Sub Base for Box Culvert / Cut Off Walls to be Compacted and Level
2. Precast Cut Off Walls + Wing Walls to be installed
3. All Elevations are to be Checked and Verified they Match Those of Plan Set
4. Begin Sequence of Installing All Box Culvert Sections
5. Clean Granular Backfill for structures used for Backfill of Footers & of Box Culvert so water can reach weep holes if applicable
6. Fill all Lifting Holes, Bolt Pockets and Box Culvert grooves and seams w/ non-shrink grout. Applied by Site Contractor.
7. ASTM C1675-11 Box culvert installation guidelines shall be followed.

Reinforcing:

General Notes:

1. Reinforcing Steel -
 - a. Precast box sections, headwalls, wing walls, & cut off walls shall be level I uncoated bar ASTM A615
2. Materials and manufacturing shall conform to ASTM C1433

Tolerances:

1. Spacing ±1"
2. Clearance +1/4"

Lap Lengths:

1. Per AASHTO 5.11.2.1.1 & 5.11.5.3.1

Joint Treatment:

Vertical Seams:

- Per VTrans approved product list 780.02
Overhead & vertical concrete repair mortar
Applied by site contractor

Horizontal Seams / Grout:

- Per VTrans approved product list 707.03
Mortar, type IV
Applied by site contractor

Waterproofing:

1. Silane sealer applied in precast yard on all exposed surfaces (headwalls and top of wingwalls.)

Miscellaneous:

1. All bolt pocket hardware & wingwall hardware to be uncoated, black steel & shall remain in place.
2. All exposed edges of concrete shall be chamfered.
3. Concrete leveling pad for the cutoff walls is to be poured on site by the site contractor.
4. All lift anchors and embedded items will be made in America.

Legend:

- (A) 3"Ø PVC Sleeve
- (B) 4"Ø PVC Sleeve
- (C) Mechanical Bolt Pocket (w/ 1"Ø Coil Rod)
- (D) Oxford A750-7 Lifting Device
- (E) 1"Ø x 5½" F56 Coil Loop Insert
- (F) 1 1/2" x 3 1/2" Continuous Keyway
- (G) Solid Lines Indicate ¾" Chamfer
- (H) 5/8" F64 Ferrule Loop Insert

APPROVED: Approval of drawings and/or procedures indicates concurrence with the information presented and does not relieve the Contractor or Fabricator of compliance with all specifications and code requirements	X	
APPROVED AS NOTED		
REVISE AND RESUBMIT		
NOT REVIEWED		
Date: 4/02/2015		
By: Michael J. Chenette		
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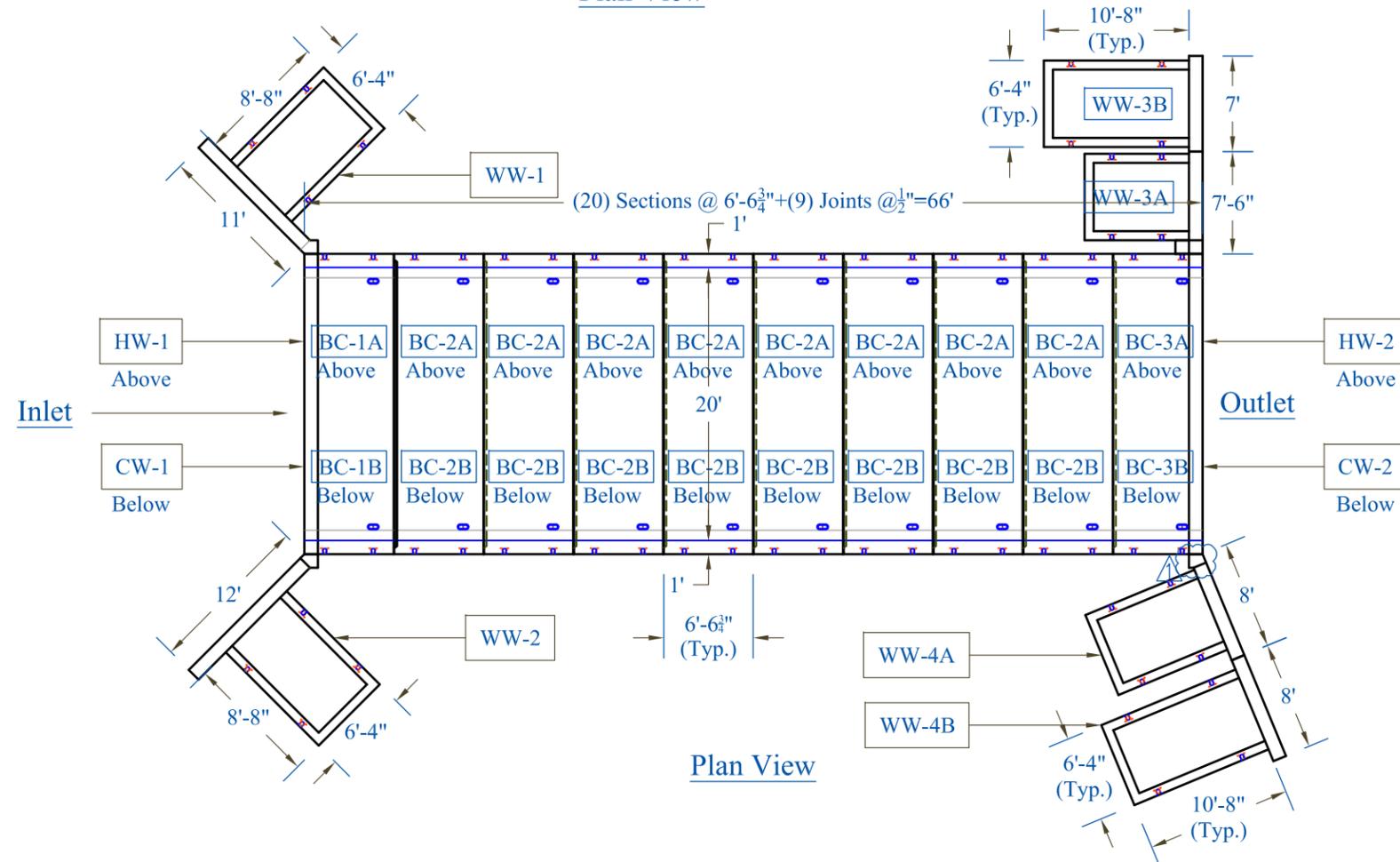
CONTRACTORS VISPE:		Rev.	Date	By	Description	PRECAST CONCRETE BOX CULVERT SHOP DRAWINGS (SDI JOB #15428)	Peckham Road Corp.	FABRICATOR:
		1	03/25/15	IBA	Changes per Stantec & State Review	SUPERVISOR: E. Barendse DETAILER: I. ADAMS CHECKER: E. Barendse ENGINEER: G. K. Munkelt	1557 St. Rt. 9, #3 Lake George, NY 12845 Ph: (518) 747-3353	193 INDUSTRIAL AVE. WILLISTON, VT 05495 Ph: (802) 658-0201
						PROJECT NAME: Bridport PROJECT #: CULV(29) Br.#2 LOCATION: Bridport, VT	02/12/15	COVER_PAGE
								1_OF_8



Plan View

Table of Units				
Name	Qty	Length	Vol.(CY)	Wt.(lbs.)*
BC-1A*	1	6'-6 $\frac{3}{4}$ "	12.17	50,000
BC-1B	1	6'-6 $\frac{3}{4}$ "	9.11	37,500
BC-2A	8	6'-6 $\frac{3}{4}$ "	9.11	37,500
BC-2B	8	6'-6 $\frac{3}{4}$ "	9.11	37,500
BC-3A*	1	6'-6 $\frac{3}{4}$ "	12.17	50,000
BC-3B	1	6'-6 $\frac{3}{4}$ "	9.11	37,500
WW-1	1	11'-0"	10.94	45,000
WW-2	1	12'-0"	11.81	48,500
WW-3A	1	7'-6"	10.35	42,500
WW-3B	1	7'-0"	9.78	40,100
WW-4A	1	8'-0"	10.80	44,250
WW-4B	1	8'-0"	10.38	42,600
CW-1	1	22'-0"	2.24	9,000
CW-2	1	22'-0"	2.24	9,000

* Headwall Included in BC-1A and BC-3A



Culvert Specifications	
Inside Dimensions	10'-0" x 20'-0"
Waterway Area	160 Sq. Ft.
Top Slab Thickness	15"
Side Wall Thickness	12"
Bottom Slab Thickness	15"

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NOT REVIEWED

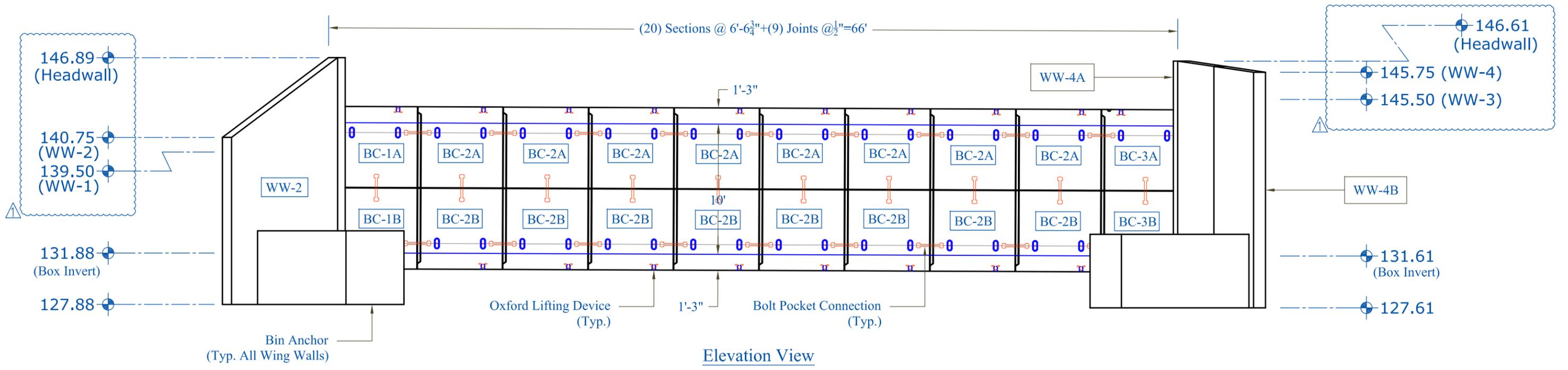
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Stantec

Elevation View



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SUPERVISOR: E. Barendse
 DETAILER: I. ADAMS
 CHECKER: E. Barendse
 ENGINEER: G. K. Munkelt

PROJECT NAME: Bridport
 PROJECT #: CULV(29) Br.#2
 LOCATION: Bridport, VT

Peckham Road Corp.
 1557 St. Rt. 9, #3
 Lake George, NY 12845
 Ph: (518) 747-3353

FABRICATOR:
 193 INDUSTRIAL AVE.
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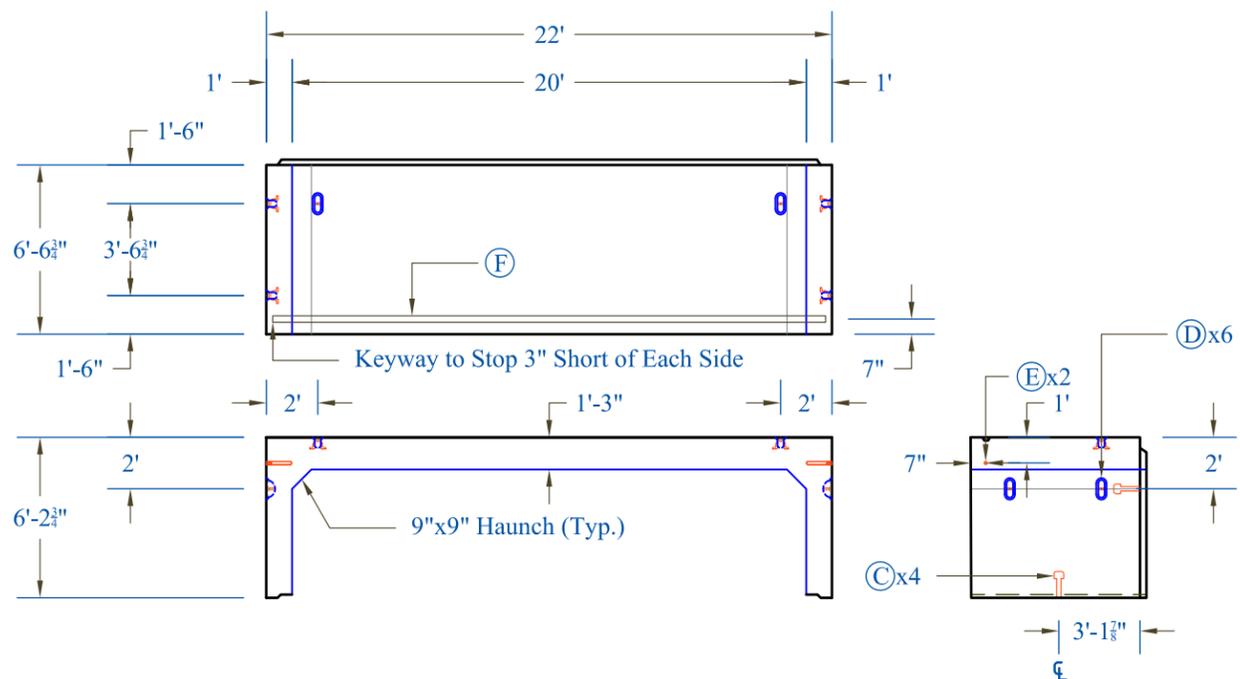
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PLAN_ELEVATION

2_OF_8

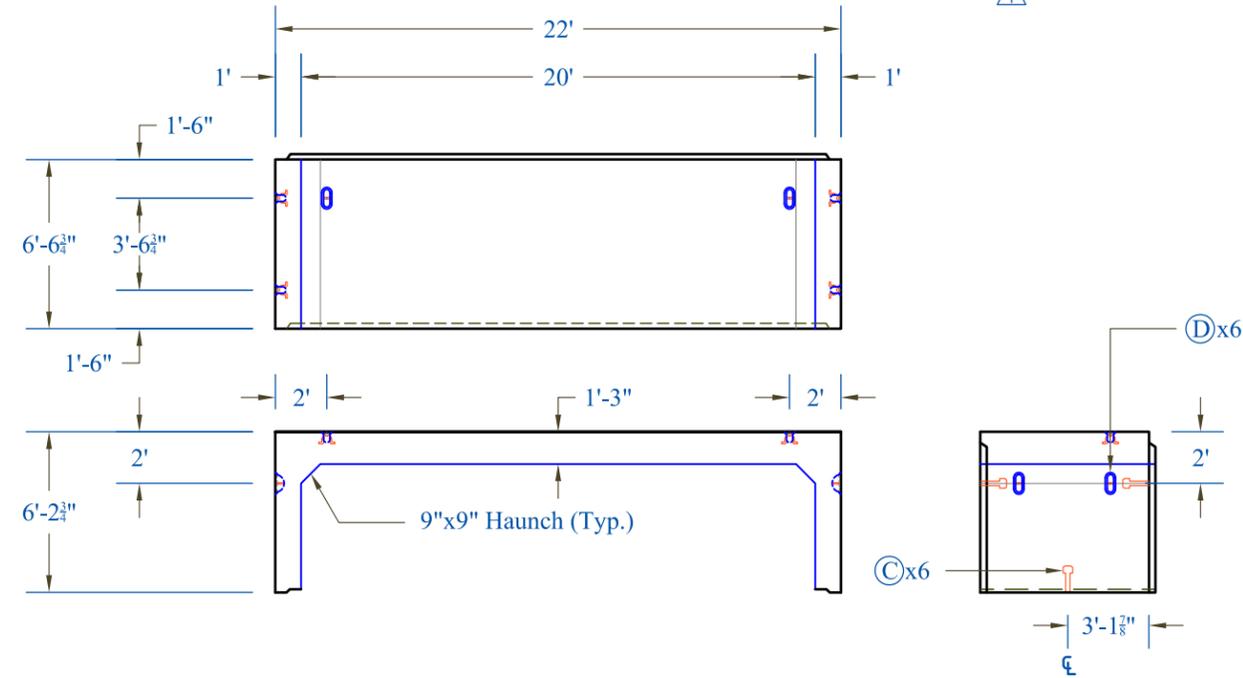
BC-1A Detail

Note: See Sh. 8 for Additional Details



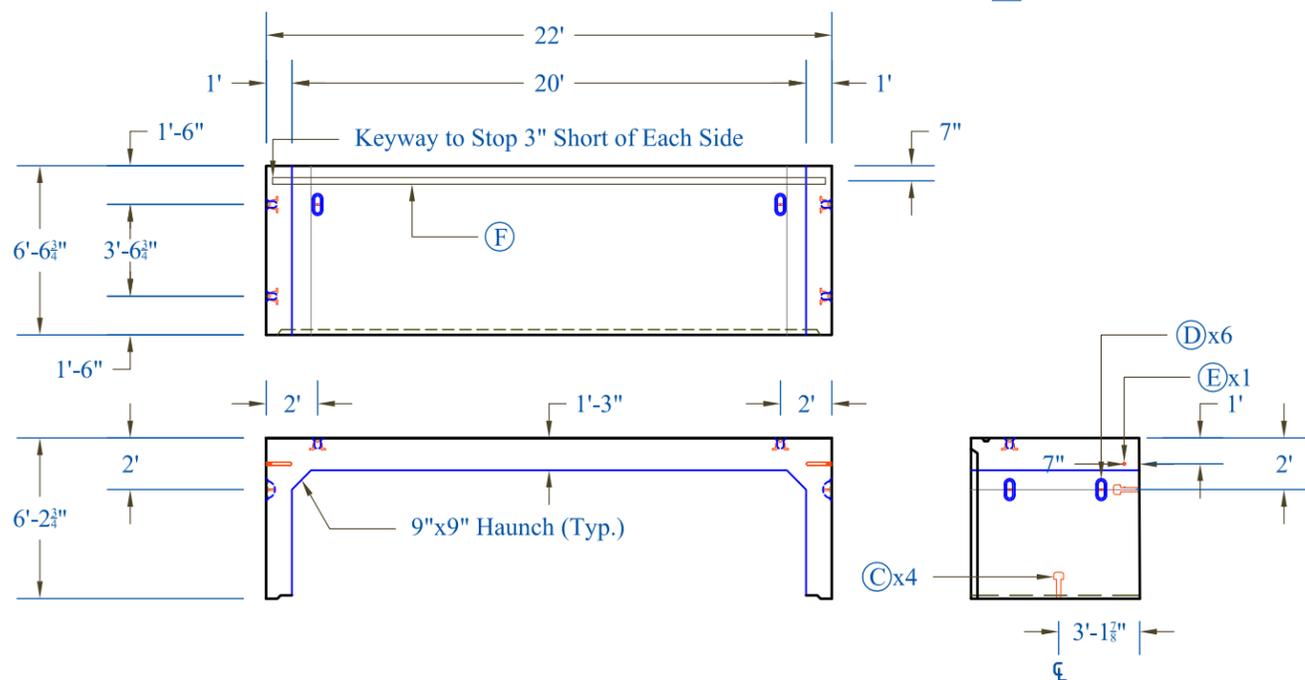
BC-2A Detail

Note: See Sh. 8 for Additional Details

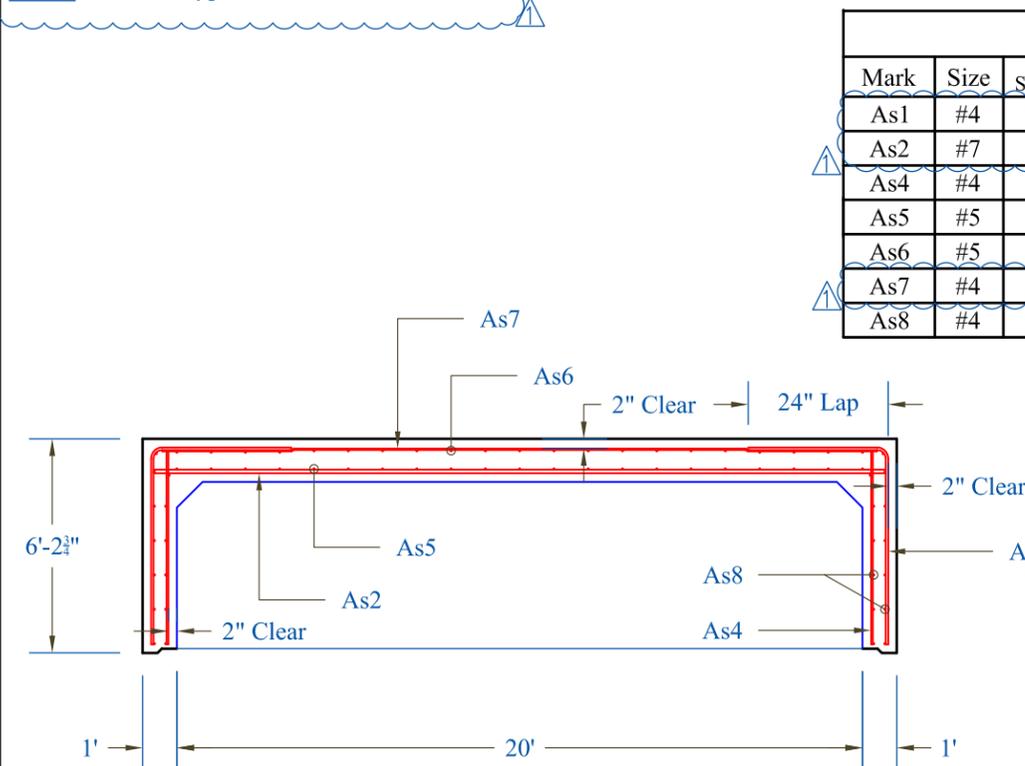


BC-3A Detail

Note: See Sh. 8 for Additional Details



Notes: -2" Clear Typical Unless Noted Otherwise Box Section Reinforcement Detail



Rebar Schedule						
Mark	Size	Max Spacing	Length	Type	A	B
As1	#4	6"	94 3/4"	Bent	24"	70 3/4"
As2	#7	4"	260"	Str	260"	
As4	#4	8"	70 3/4"	Str	70 3/4"	
As5	#5	8"	74 3/4"	Str	74 3/4"	
As6	#5	8"	74 3/4"	Str	74 3/4"	
As7	#4	6"	260"	Str	260"	
As8	#4	12"	74 3/4"	Str	74 3/4"	

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(G) Solid Lines Indicate 3/4" Chamfer	(H) 5/8" F64 Ferrule Loop Insert	

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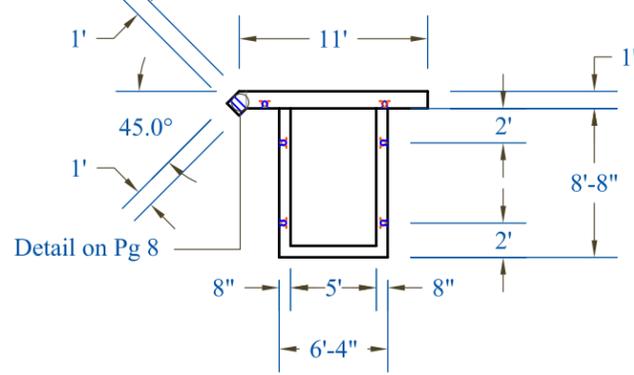
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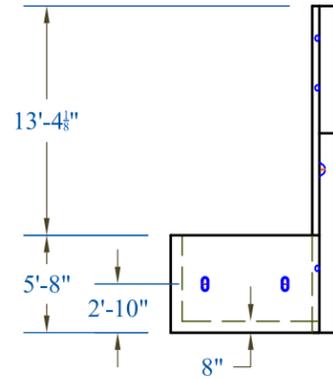
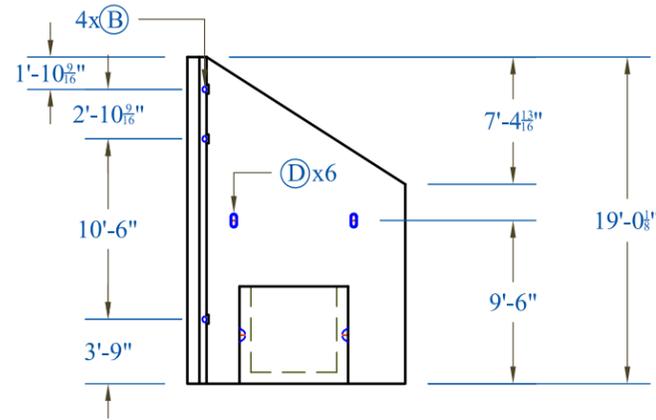
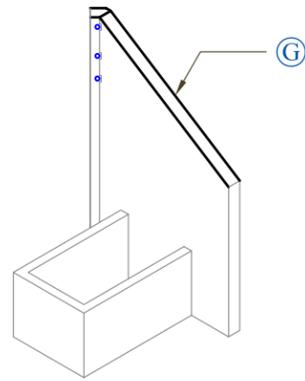
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3_OF_8

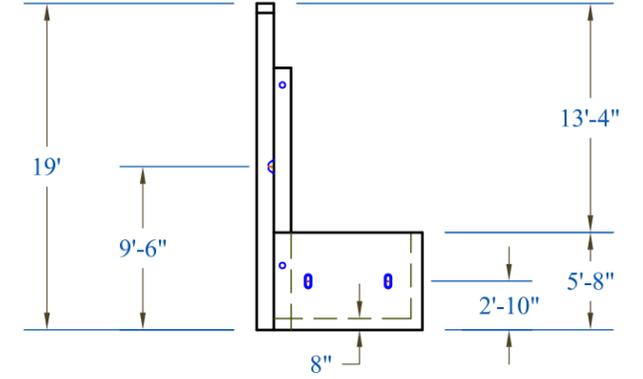
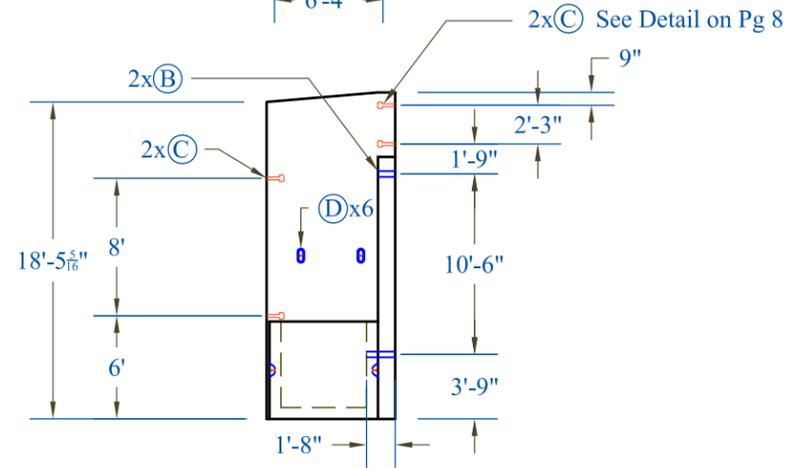
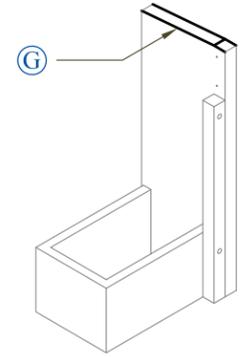
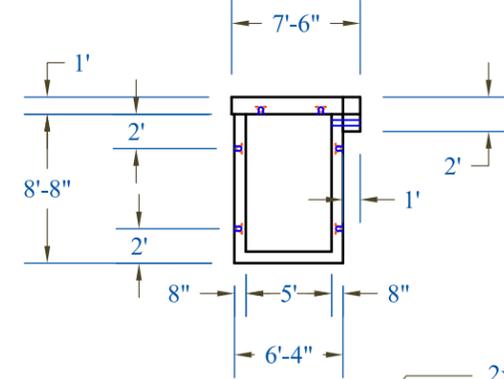
WW-1 Detail



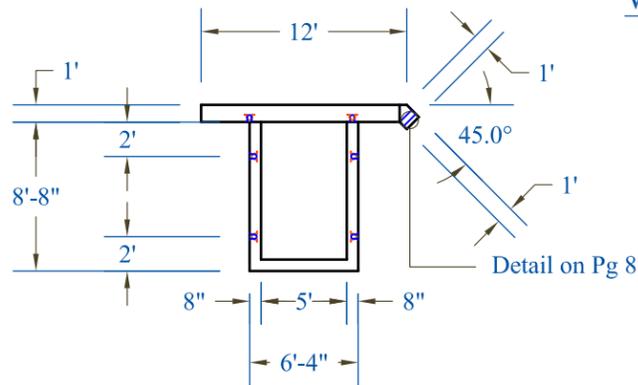
Detail on Pg 8



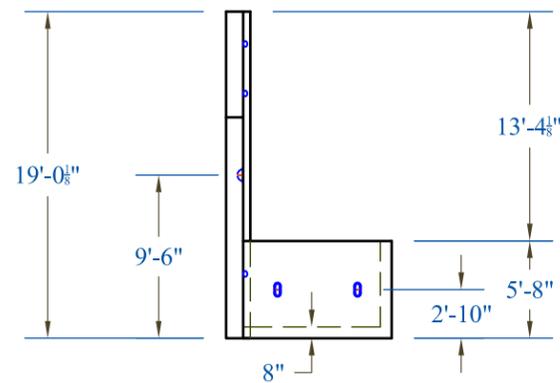
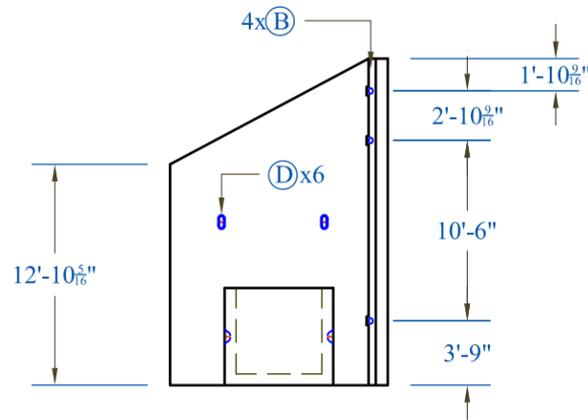
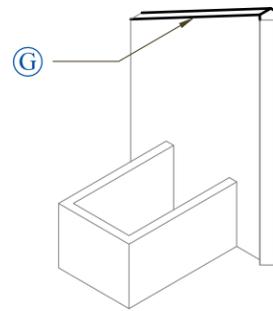
WW-3A Detail



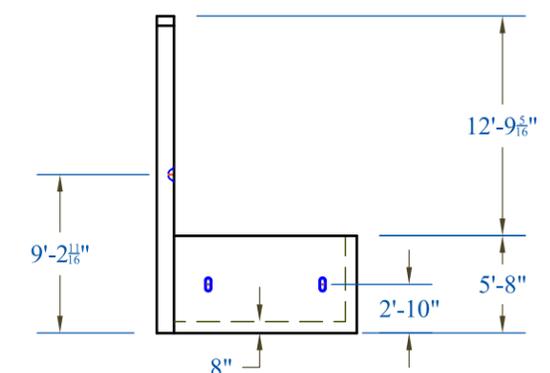
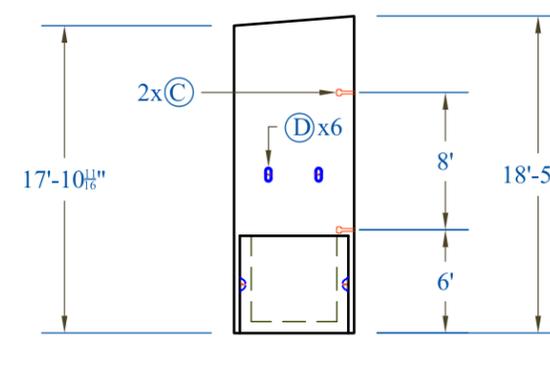
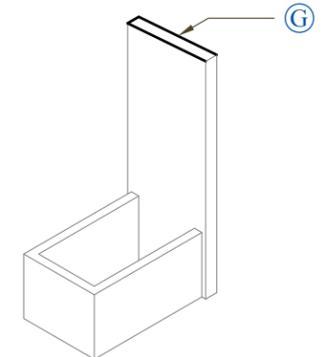
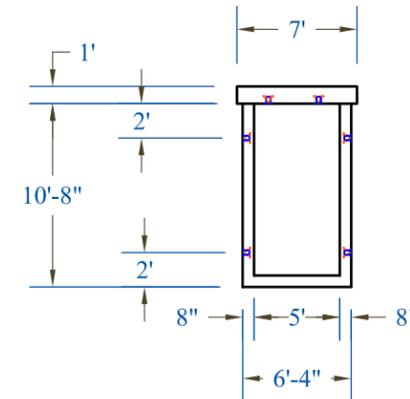
WW-2 Detail



Detail on Pg 8



WW-3B Detail



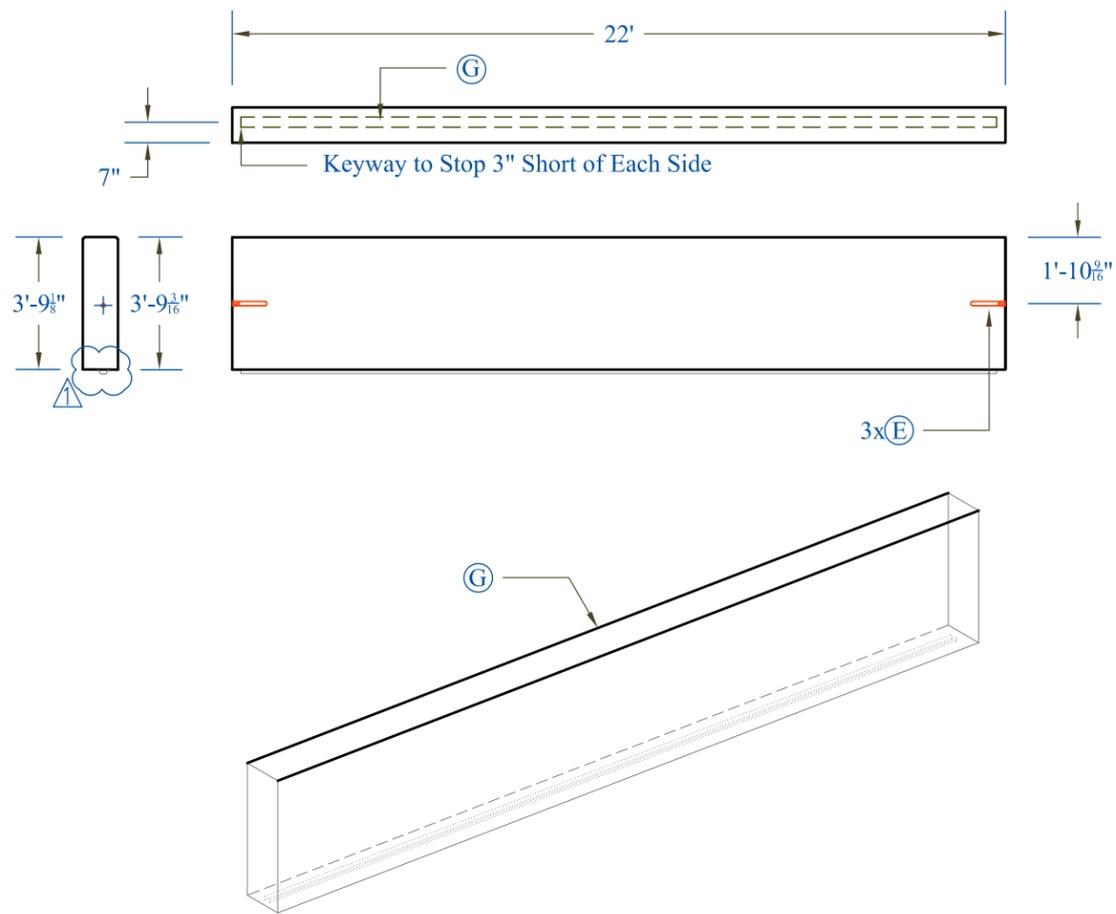
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SUPERVISOR: E. Barendse DETAILER: I. ADAMS CHECKER: E. Barendse ENGINEER: G. K. Munkelt	PROJECT NAME: Bridport PROJECT #: CULV(29) Br.#2 LOCATION: Bridport, VT	SD Ireland PRECAST
	02/12/15	WING_WALLS_1

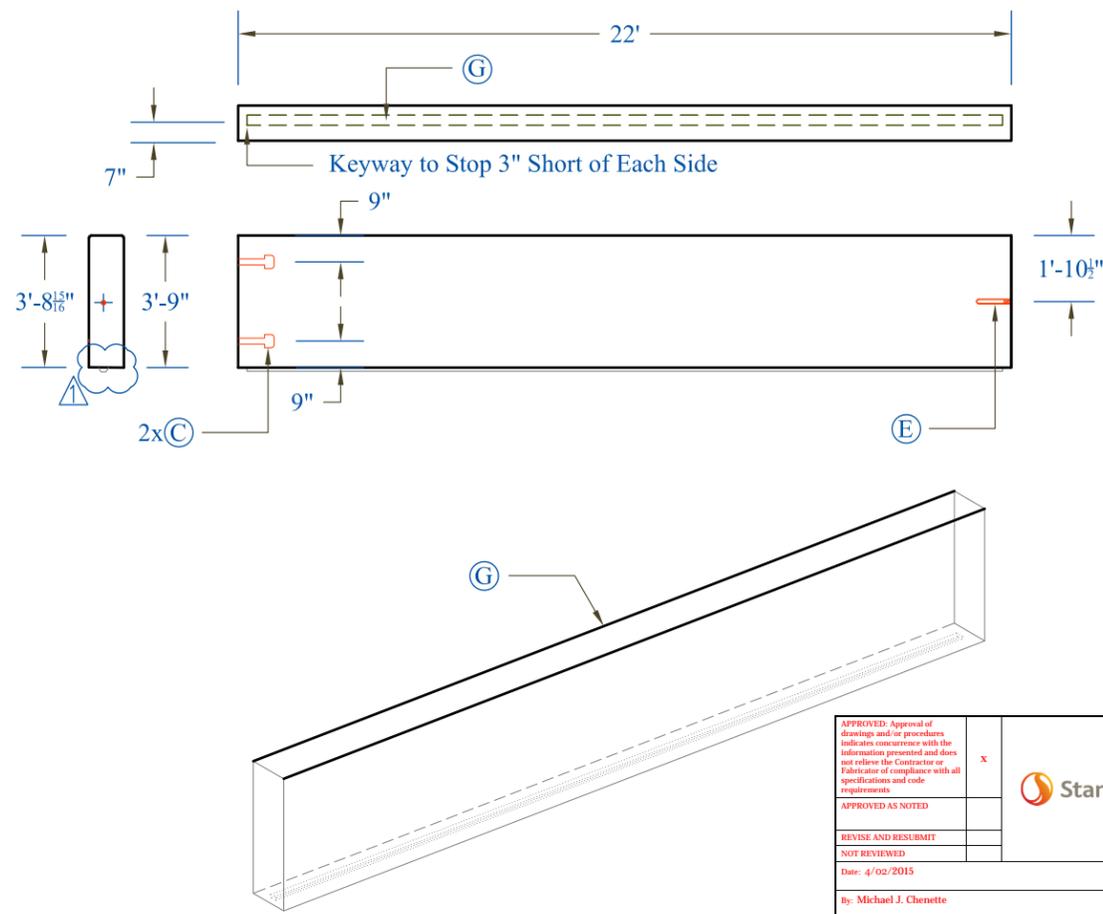
02/12/15	WING_WALLS_1	5_OF_8
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Headwall 1 Detail



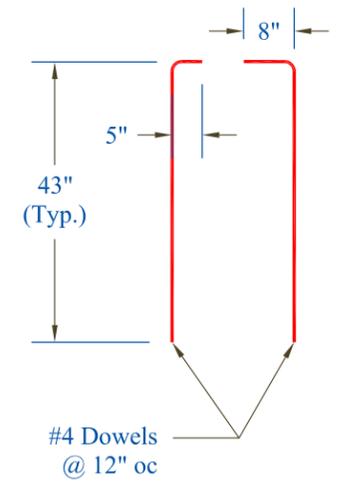
Note: Secondary Pour

Headwall 2 Detail

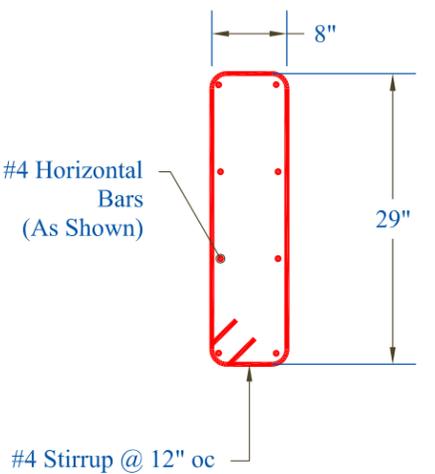


Note: Secondary Pour

Headwall Reinforcing

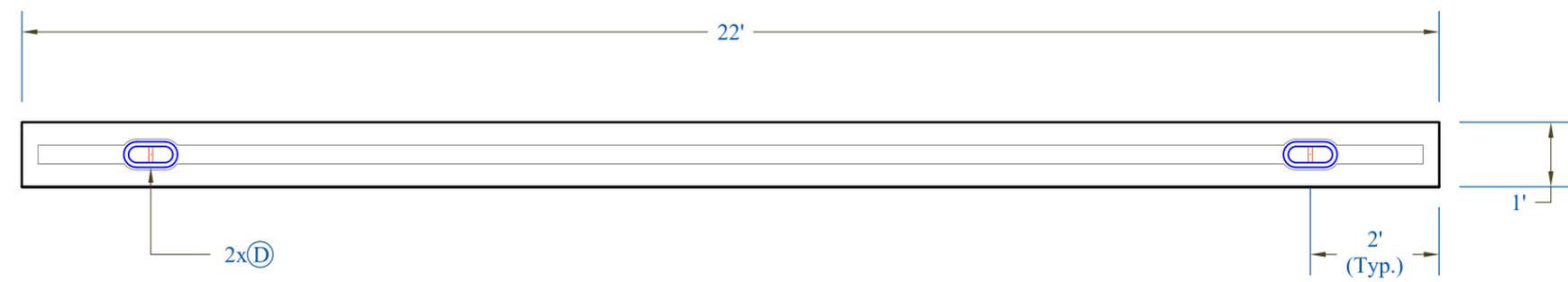


Cutoff Wall Reinforcing

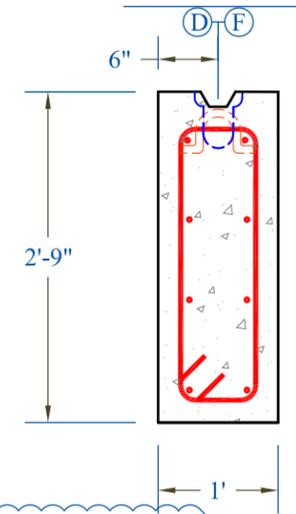


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CW-1/2 Detail

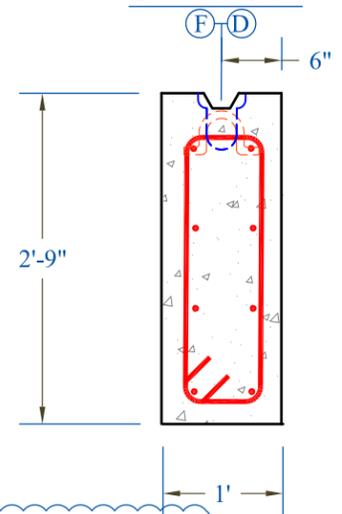


CW-1 Detail



Note: 2" Clear Cover

CW-2 Detail



Note: 2" Clear Cover

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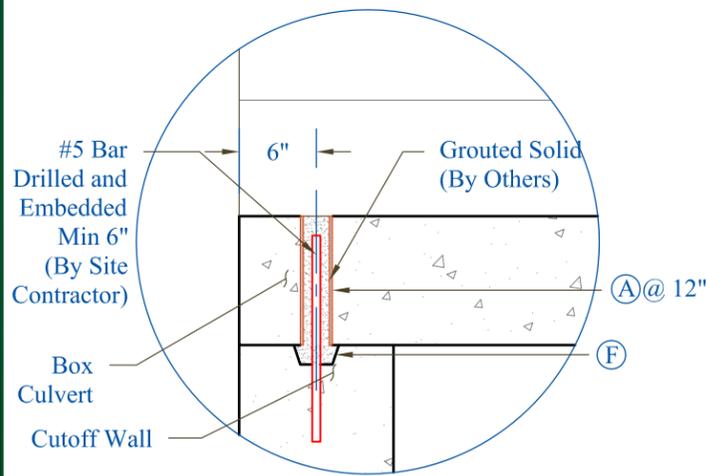
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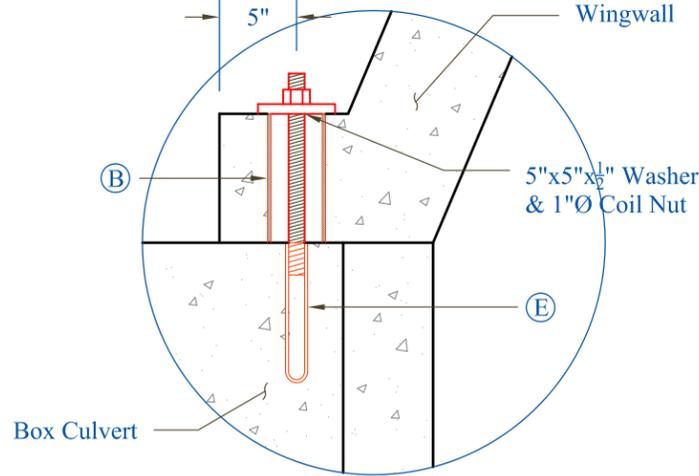
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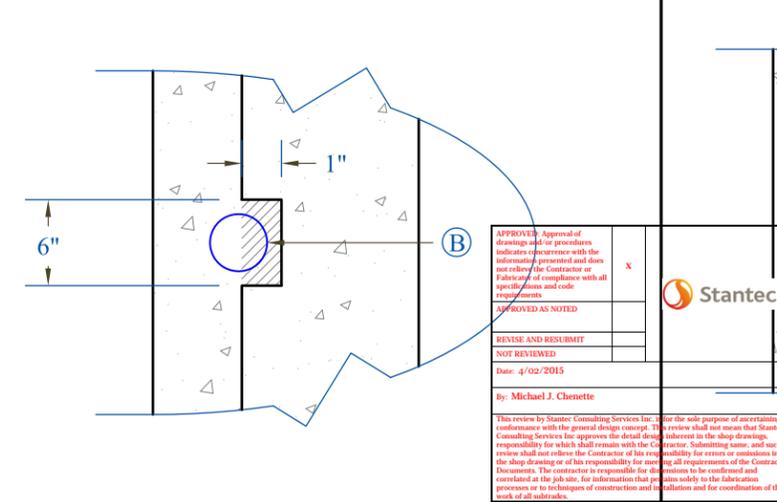
CW to BC Connection Detail



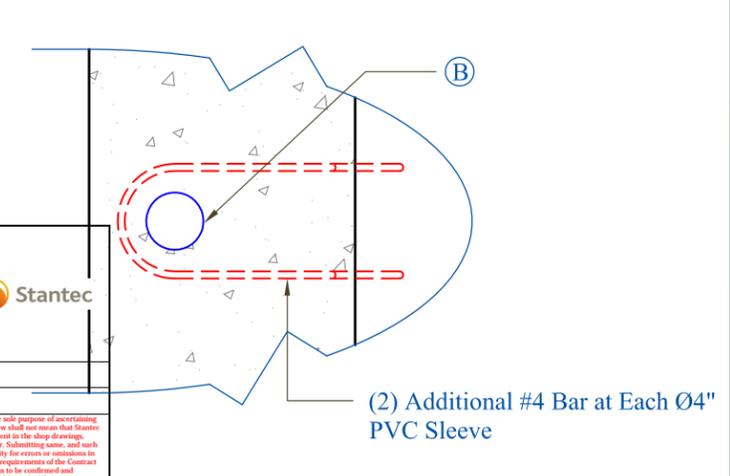
WW to BC Connection Detail



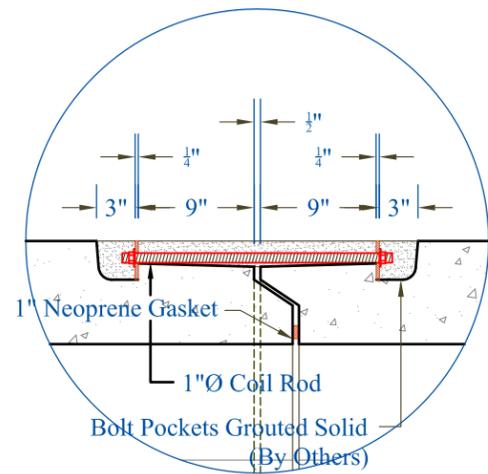
WW Sleeve Blockout Elevation Detail



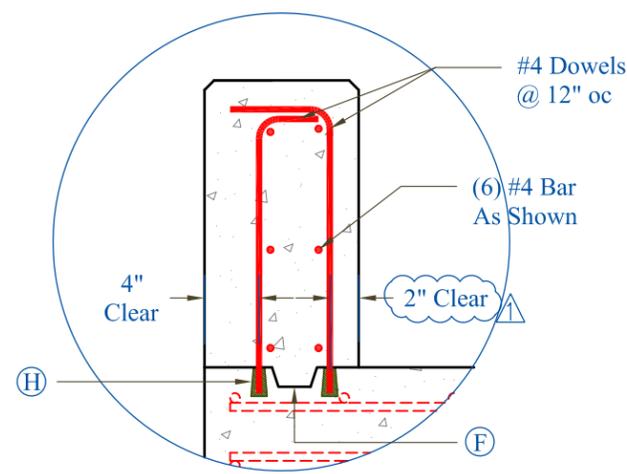
WW Sleeve Reinforcement Detail



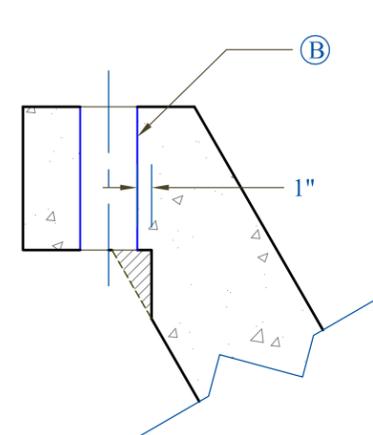
Bolt Pocket Connection Detail - (C)



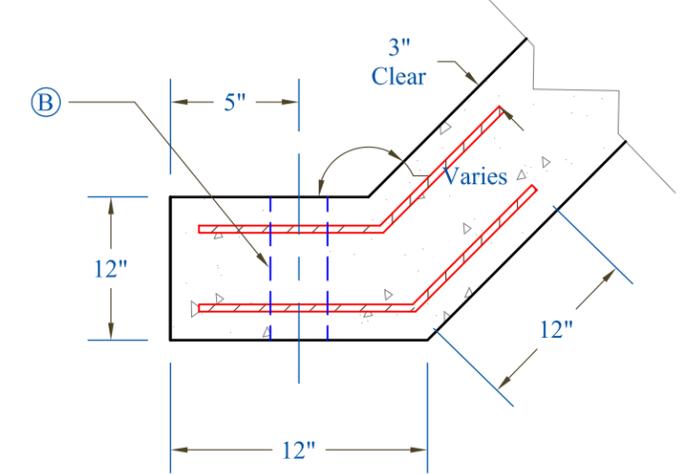
HW to BC Connection Detail



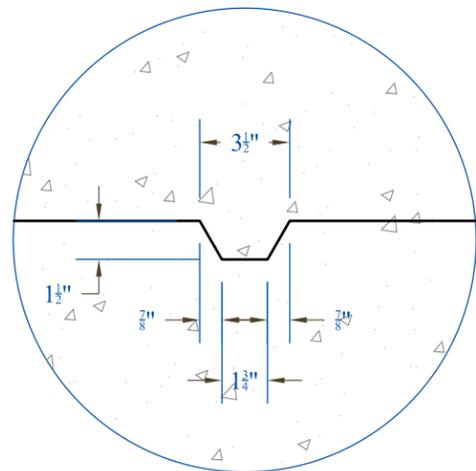
WW Sleeve Blockout Plan Detail



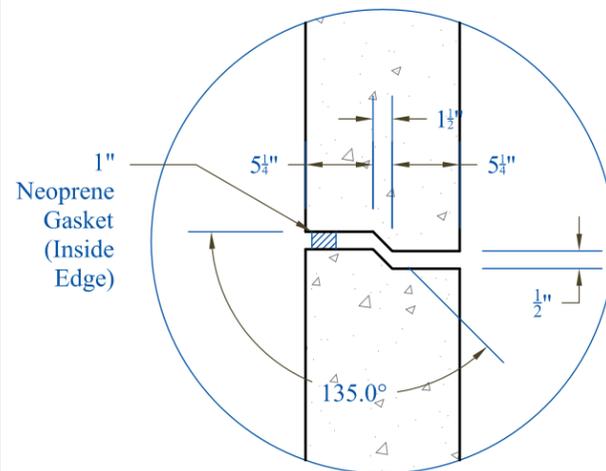
WW Angle Reinforcing Detail



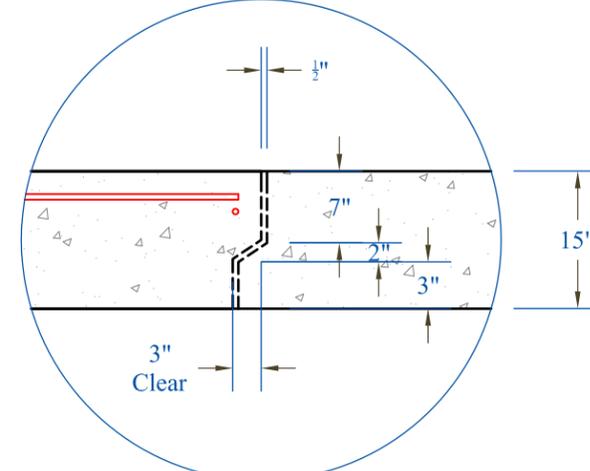
Keyway Connection Detail - (F)



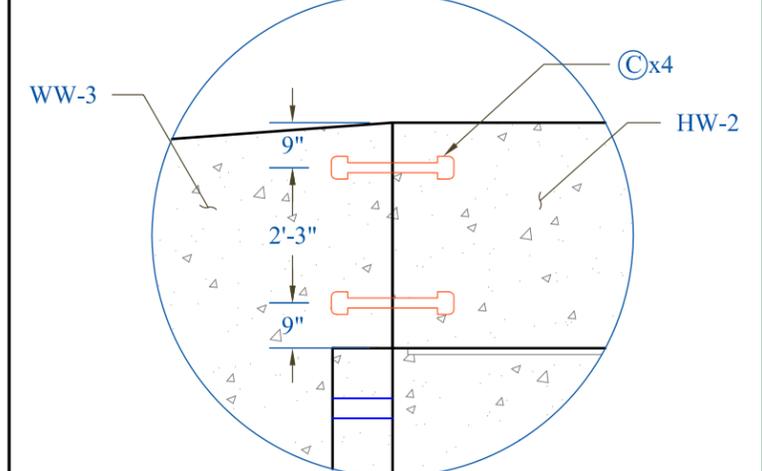
BC Horizontal Shear Key Detail



BC Vertical Shear Key Detail



WW-3A to HW-2 Connection Detail



CONTRACTORS VISPE:	A 3"Ø PVC Sleeve	D Oxford A750-7 Lifting Device	G Solid Lines Indicate 3/4" Chamfer
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Rev.	Date	By	Description
1	03/25/15	IBA	Changes per Stantec & State Review

PRECAST CONCRETE BOX CULVERT SHOP DRAWINGS (SDI JOB #15428)
 SUPERVISOR: E. Barendse
 DETAILER: I. ADAMS
 CHECKER: E. Barendse
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 1557 St. Rt. 9, #3
 Lake George, NY 12845
 Ph: (518) 747-3353

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 193 INDUSTRIAL AVE.
 WILLISTON, VT 05495
 Ph: (802) 658-0201

02/12/15 CONNECTION_DETAILS 8_OF_8

CONCRETE MIX DESIGN

6000 psi

SCC

SDI MIX CODE: P60TER

DATE: March 28, 2014 **PLANT:** Burlington/Williston, VT

PROJECT: General DOT Precast - 2014

FINE AGGREGATE:
ASTM C 33

Source: Hinesburg Sand & Gravel
Specific Gravity: 2.67 (Abs.: 1.3%)
Fineness Modulus: ≥ 2.6

COARSE AGGREGATE:
ASTM C 33

Source: S.D. Ireland, Brownell Quarry
Specific Gravity: 2.80 (Abs.: 0.30%)
Description: 3/4" 100% Crushed Stone (Size #67)

CEMENT:

Ternary Blend Cement; Lefarge North America Lakes and Seaway Re
St. Constant, Quebec (Sp. Gvty. 3.02)

ADMIXTURES:

Water Reducer (HRWR): Glenium 7500; BASF
Air Entraining Agent: Darex II AEA; Grace Concrete Chemicals

CONSTITUENTS (LBS. /YD³)

		Abs. Vol.
Coarse Aggregate (SSD)	1750	10.02
Fine Aggregate (SSD)	1017	6.10
Cement	800	4.25
Water	304.6	4.88
Air Content (Entrained)	6.5%	1.75
Total	3872	27.00ft ³

MIX PROPERTIES

Water Cement Ratios: 0.38
Entrained Air Content: 5.0 % – 9.0%
Dry Unit Weight: 144.2 ± pcf
Spread: 20" to 28"
VSI ≤ 1

ADMIXTURE(S) DOSEAGE (OZ. /YD³)

Glenium 7500 (HRWR)	56 - 64
Darex II AEA	2.8

BREAK HISTORY±

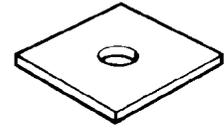
24-HR.	3400 PSI
7-DAYS	6000 PSI
28-DAYS	6700 PSI

*Approved by James Walsh, VAOT Composite
Materials Engineer 7/17/14*

*Admixture dosage rates are subject to change.

B11 Flat Washer

Made from carbon steel.



B11 Flat Washer

Type	Bolt Diameter	Safe Working Load	Sizes
B11 Standard	1/2"	1,800 lbs.	3" x 4" x 1/4"
B11 Heavy	1/2"	2,700 lbs.	4" x 5" x 1/4"
B11 Standard	3/4"	2,700 lbs.	4" x 5" x 3/8"
B11 Heavy	3/4"	3,600 lbs.	5" x 5" x 3/8"
B11 Standard	1"	7,200 lbs.	5" x 5" 1/2"
B11 Heavy	1"	15,000 lbs.	7" x 7" x 3/4"
B11 Standard	1-1/4"	10,800 lbs.	5" x 5" x 5/8"
B11 Heavy	1-1/4"	15,000 lbs.	7" x 7" x 3/4"
B11 Standard	1-1/2"	15,000 lbs.	5" x 5" x 3/4"
B11 Heavy	1-1/2"	15,000 lbs.	7" x 7" x 3/4"

To Order:

Specify: (1) quantity, (2) type, (3) diameter of bolt to be used, (4) finish.

Example:

200, B11 Heavy Flat Washers, 1" bolt dia., plain finish.

Safe Working Load provides a factor of safety of approximately 5 to 1.

B12 Coil Rod

- Available high tensile B12 strengths.
- May be cut with carborundum blades without damaging the threads.
- Do not use cutting torch to cut coil rod to length.
- Used with B13 or B25 Coil Nuts for making special coil bolts.
- B12 requires two B13 or one B25 Coil Nut to develop safe working loads.
- B12 standard length is 12'-0" and P49 standard length is 10'-0".
- Available in any length up to 20'-0" on special order.



Coil Rod

To Order:

Specify: (1) quantity, (2) name, (3) diameter, (4) length.

Example:

200, B12 Coil Rod, 1" dia. x 12'-0" long.

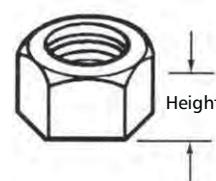
B13 Coil Nut and B25 Heavy Coil Nut

Diameter	B12 Safe Working Load		P49 Safe Working Load	
	Tension	Shear	Tension	Shear
1/2"	3,600 lbs.	2,400 lbs.	2,700 lbs.	1,800 lbs.
3/4"	7,200 lbs.	4,800 lbs.	–	–
1"	15,000 lbs.	10,000 lbs.	–	–
1-1/4"	22,500 lbs.	15,000 lbs.	–	–
1-1/2"	27,000 lbs.	18,000 lbs.	–	–

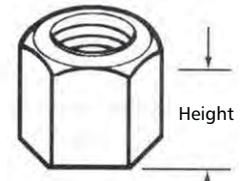
Safe Working Load provides a factor of safety of approximately 5 to 1.

Type	Diameter	Approx. Height	Safe Working Load Tension	
			Using One B13 Nut	Using Two B13 Nuts or One B-25 Heavy Nut
B13	1/2"	7/16"	2,400 lbs.	3,600 lbs.
B25	1/2"	1-3/16"	–	3,600 lbs.
B13	3/4"	5/8"	3,600 lbs.	7,200 lbs.
B25	3/4"	1-3/16"	–	7,200 lbs.
B13	1"	1"	9,600 lbs.	15,000 lbs.
B25	1"	2"	–	15,000 lbs.
B13	1-1/4"	1-1/4"	14,400 lbs.	22,500 lbs.
B13	1-1/2"	1-1/2"	19,000 lbs.	27,000 lbs.

Safe Working Load provides a factor of safety of approximately 5 to 1.



B13 Coil Nut



B25 Heavy Coil Nut

To Order:

Specify: (1) quantity, (2) name, (3) diameter.

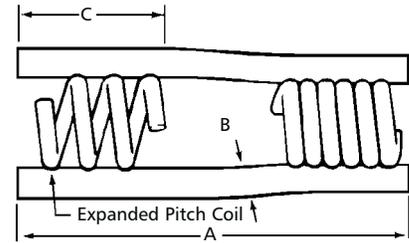
Example:

200, B13 Coil Nuts, 1" diameter.

F56, F58 and F60 Expanded Coil Inserts

Expanded Coil Inserts are fabricated in two, four or six strut versions, as required. A standard coil is welded at one end of the strut wires and on the opposite end, an expanded pitch coil is welded. The expanded pitch coil welded to the more deeply embedded end of the insert, serves to distribute the applied loads over a larger volume of concrete.

- Ethafoam Plug installed when mounting washers are ordered.
- Minimum spacing between inserts is twice the minimum corner distance.
- Longer lengths available, if required.



F56 Expanded Coil Insert for Coil Threaded Bolts

F56 Insert – 2 Struts
F58 Insert – 4 Struts
F60 Insert – 6 Struts

To Order:

Specify: (1) quantity, (2) name, (3) bolt diameter, (4) finish.

Example:

200, F60 Expanded Coil Inserts, 1-1/2" diameter, plain finish.

Expanded Coil Insert Selection Chart

Insert Type	Bolt Diameter	Insert Length	Minimum Edge Distance	Minimum Corner Distance	Safe Working Load Tension	Safe Working Load Shear	A	B	C
F56 Coil	3/4"	4-1/2"	2-1/2"	6"	1,800 lbs.	680 lbs.	4-1/2"	0.375"	1-1/2"
			4"	8"	2,220 lbs.	1,380 lbs.			
			8"	12"	4,250 lbs.	2,760 lbs.			
			14"	20"	4,250 lbs.	4,250 lbs.			
F56 Coil	1"	5-1/2"	2-1/2"	7"	2,000 lbs.	740 lbs.	5-1/2"	0.440"	2-1/2"
			4"	9"	2,560 lbs.	1,500 lbs.			
			8"	12"	5,300 lbs.	3,250 lbs.			
			16"	24"	6,250 lbs.	6,250 lbs.			
F58 Coil	1-1/4"	7-1/2"	3"	10"	2,480 lbs.	1,270 lbs.	7-1/2"	0.440"	2-3/4"
			5"	12"	3,600 lbs.	2,730 lbs.			
			8"	15"	5,700 lbs.	4,790 lbs.			
F60 Coil	1-1/2"	9-1/2"	3"	12"	2,820 lbs.	1,500 lbs.	9-1/2"	0.440"	3-5/8"
			5"	15"	3,880 lbs.	3,230 lbs.			
			8"	15"	6,680 lbs.	6,260 lbs.			
			22"	30"	14,580 lbs.	16,430 lbs.			

Safe Working Load provides a factor of safety of approximately 4 to 1 in 3,000 psi normal weight concrete.

Safe Working Load is based on a 1/2" setback from face of concrete.

F64 Ferrule Loop Insert

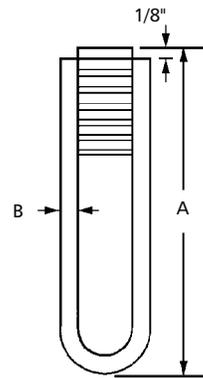
The Dayton Superior F64 Ferrule Loop Insert is manufactured by welding a wire loop to a steel ferrule which has been machined from bar stock. One end of the ferrule is closed, while the other end is drilled and tapped to accept an NC threaded bolt.

Typically, this insert is used to attach a precast wall panel to a building frame, as well as provide attachment of other structural elements that may be required.

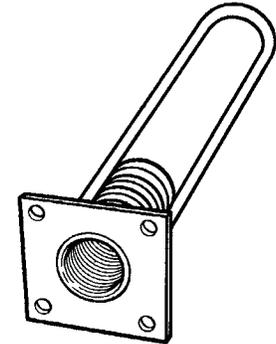
Mounting Washer Option for all Ferrule Type Inserts

All ferrule type inserts are available with a 16 gauge x 2" x 2" mounting washer as an option. The mounting washer allows you to nail a ferrule type insert to the form.

To keep concrete from entering the threaded portion of an insert with mounting washer, cover the open face of the washer with duct tape.



F64 Ferrule Loop Insert



Insert with Optional Mounting Washer.

F64 Ferrule Loop Insert Selection Chart

Bolt Diameter and Threads per Inch	Insert Height (A)	Minimum Edge Distance	Minimum Corner Distance	Safe Working Load Tension	Safe Working Load Shear	B	Maximum Bolt Engagement
1/2" — 13 NC	4-1/8"	5"	10"	3,000 lbs.	1,810 lbs.	0.223"	1"
		9"	15"	3,000 lbs.	3,000 lbs.		
1/2" — 13 NC	6-1/8"	7"	12"	5,000 lbs.	3,410 lbs.	0.306"	1"
		9"	12"	5,000 lbs.	3,410 lbs.		
5/8" — 11 NC	4-1/8"	5"	10"	3,000 lbs.	1,810 lbs.	0.223"	1-1/8"
		9"	12"	3,000 lbs.	3,000 lbs.		
5/8" — 11 NC	6-1/8"	7"	12"	5,000 lbs.	3,420 lbs.	0.306"	1-1/8"
		11"	15"	5,000 lbs.	5,000 lbs.		
3/4" — 10 NC	4-1/8"	5"	10"	3,000 lbs.	1,810 lbs.	0.223"	1-1/8"
		9"	12"	3,000 lbs.	3,000 lbs.		
3/4" — 10 NC	6-1/8"	7"	12"	5,000 lbs.	3,420 lbs.	0.306"	1-1/8"
		11"	15"	5,000 lbs.	5,000 lbs.		
7/8" — 9 NC	6-1/8"	7"	12"	5,000 lbs.	3,420 lbs.	0.306"	1-1/8"
		11"	15"	5,000 lbs.	5,000 lbs.		
1" — 8 NC	6-1/8"	7"	12"	5,000 lbs.	3,420 lbs.	0.306"	1-1/8"
		11"	12"	5,000 lbs.	4,650 lbs.		
1" — 8 NC	8-1/8"	7"	12"	5,000 lbs.	3,830 lbs.	0.306"	1-1/8"
		11"	15"	5,000 lbs.	5,000 lbs.		

Safe Working Load provides a factor of safety of approximately 3 to 1 in 3,000 psi normal weight concrete.

Safe Working Loads are based on 1/2" setback from the face of the concrete.

Minimum spacing between inserts is twice the minimum corner distance.

To Order:

Specify: (1) quantity, (2) name, (3) bolt diameter, (4) insert length, (5) finish.

Example:

200, F64 Ferrule Loop Insert, 5/8" bolt diameter, 6-1/8" insert length, plain finish.

Structural Connectors