

Proposed Bridge Improvement Project

Wardsboro BF 013-1(21)

Bridge #70

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:

- Design is in accordance w/ ASTM C1577, PCI MNL135, VAOT540 & AASHTO 2010 LRFD Bridge Design Specs Fifth Edition
- Any conflict between tolerances listed above shall result in the usage of the stricter tolerance
- Design Live Load = HL-93
- Materials and manufacturing shall conform to ASTM C1433
- Earth Fill Design: 0'-0" to 2'-0"
- Soil Weight: 130 pcf

Installation Sequence:

- Sub base for box culvert / cut off walls to be compacted and set to appropriate grades/slopes
- Precast cut off walls to be installed
- All elevations are to be checked and verified they match those of plan set
- Begin sequence of installing all box culvert sections
- Clean granular backfill for structures used for backfill of footers & of box culvert so water can reach weep holes if applicable
- Fill all lifting holes, bolt pockets and box culvert grooves and seams w/ non-shrink grout or repair mortar
- ASTM C1675-11 box culvert installation guidelines shall be followed.

SEE GENERAL NOTE #20. FILLING THE JOINTS BETWEEN BOX SEGMENTS WITH GROUT IS NOT REQUIRED.

Reinforcing:

General Notes:

- Reinforcing Steel -
 - Precast box sections, headwalls, & cut off walls shall be level I epoxy coated bar ASTM A615
- Materials and manufacturing shall conform to ASTM C1433
- Bar tied at every intersection.

Tolerances:

- Spacing ±1"
- Clearance ±1/4"

Lap Lengths:

- Per AASHTO 5.11.2.1.1 & 5.11.5.3.1

Lap Length:	
#4 Bar=21"	
#5 Bar=26"	VERIFY LAP LENGTHS
#6 Bar=31"	

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:

- By others if applicable

SHOP APPLIED PER GENERAL NOTE #22

Miscellaneous:

- All exposed wingwall hardware to be zinc plate galvanized.
- All box culvert bolt pocket hardware to be plain steel
- All Exposed Edges of Concrete Shall be Chamfered

Legend:

- (A) 2"Ø PVC Sleeve
- (B) 4"Ø PVC Sleeve
- (C) Mechanical Bolt Pocket (A.L. Patterson w/ 1"Ø Galv. Coil Rod)
- (D) Oxford A750-7 Lifting Device
- (E) 1"Ø x 12" CX-9 Coil Loop Insert
- (F) 5/8" F1-42 Flared Loop Ferrule Insert
- (G) Continuous Keyway (See Detail on Page 5 of 6)
- (H) Solid Lines Indicate 3/4" Chamfered Edge (Isometrics)

1" x 1"

Vermont Agency of Transportation
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June 30, 2014

RESUBMIT YES Rejected
BY KH DATE 7-14-2014



Gary K. Munkelt & Associates
Structural Consulting Engineers
1180 Welsh Rd, Suite 190
North Wales, PA 19454
Ph: 215-855-0713 F: 215-855-0714

STRUCTURAL DESIGN ONLY

CONTRACTORS VISPE:	PRECAST CONCRETE BOX CULVERT SHOP DRAWINGS (#14442)		FABRICATOR: 193 INDUSTRIAL AVE. WILLISTON, VT 05495 Ph: (802) 658-0201	SD PRECAST
	SUPERVISOR: M. WHEELER DETAILER: I. ADAMS CHECKER: E. Barendse ENGINEER: Gary K. Munkelt & Assoc.	PROJECT NAME: Wardsboro PROJECT #: BF 013-1(21) LOCATION: Wardsboro, VT		

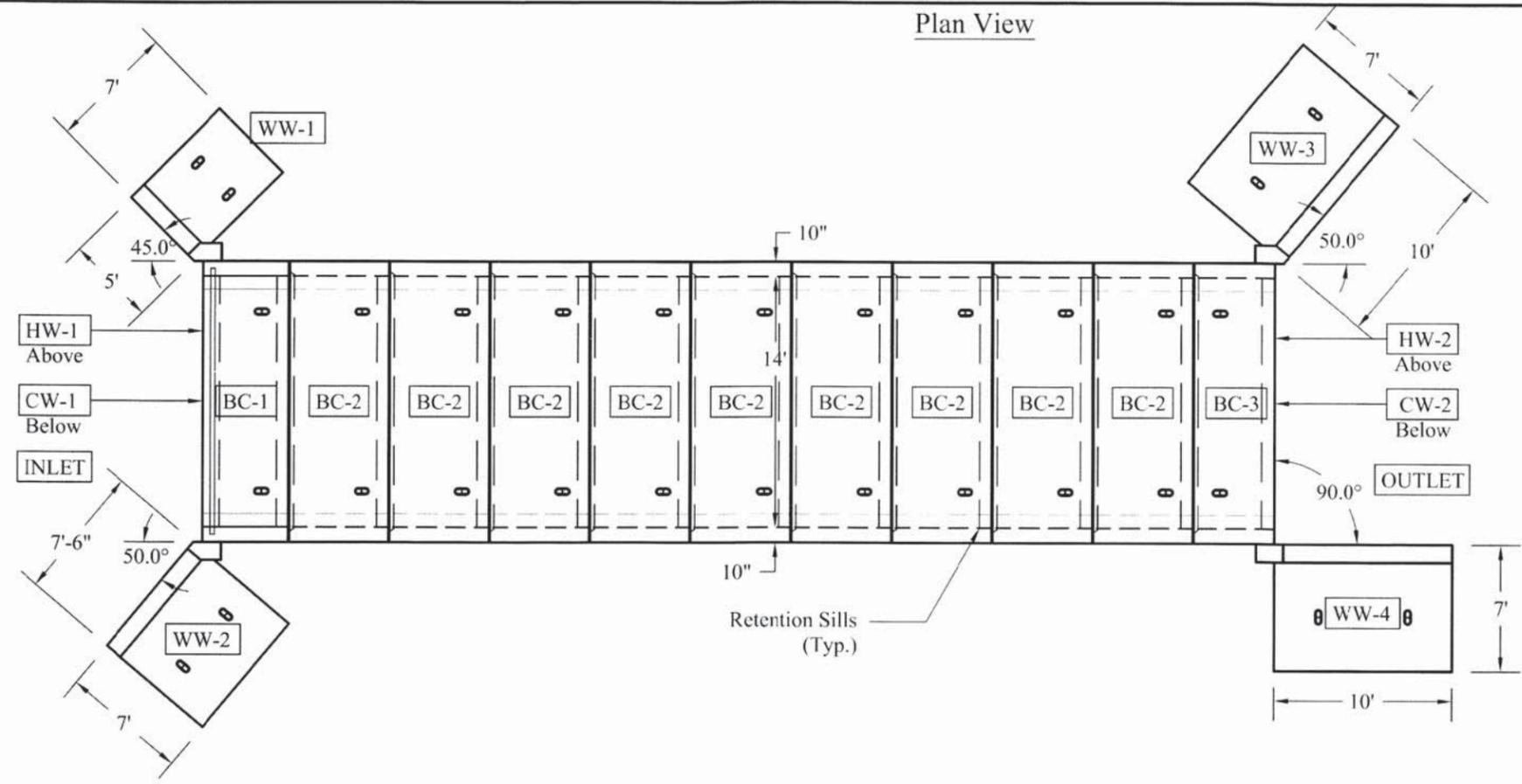
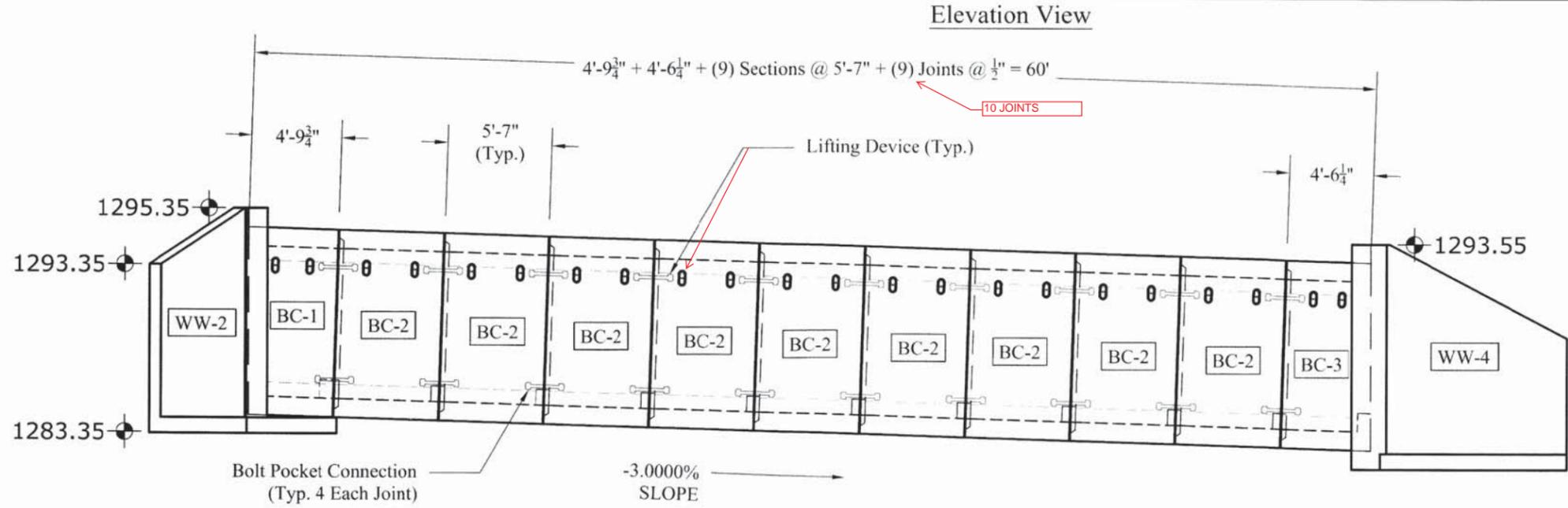


Table of Units				
Name	Qty	Length	Vol.(CY)	Wt.(lbs.)*
BC-1**	1	4'-9 ³ / ₄ "	9.72	38,900
BC-2*	9	5'-7"	9.24	36,950
BC-3**	1	4'-6 ¹ / ₄ "	9.37	37,500
WW-1	1	5'-0"	3.47	13,880
WW-2	1	7'-6"	5.23	20,920
WW-3	1	10'-0"	6.64	26,560
WW-4	1	10'-0"	6.23	24,920
CW-1	1	15'-8"	.57	2,280
CW-2	1	15'-8"	.59	2,360

* Baffle Weight Included in BC-2
 ** Baffle and Headwall Included in BC-1 and BC-3

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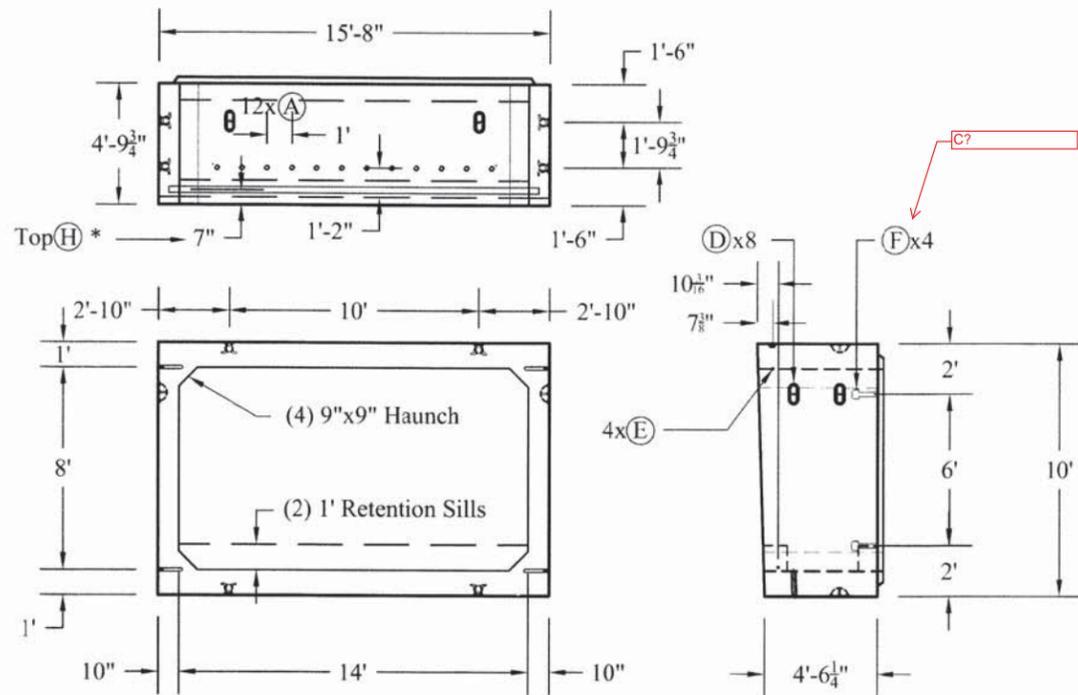
Culvert Specifications	
Inside Dimensions	8'-0"x14'-0"
Waterway Area	84 Sq. Ft.
Top Slab Thickness	12"
Side Wall Thickness	10"
Bottom Slab Thickness	12"

6/27/14
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 STATE OF VERMONT
 GARY K. MUNKELT
 NO. 8291
 REGISTERED
 PROFESSIONAL ENGINEER

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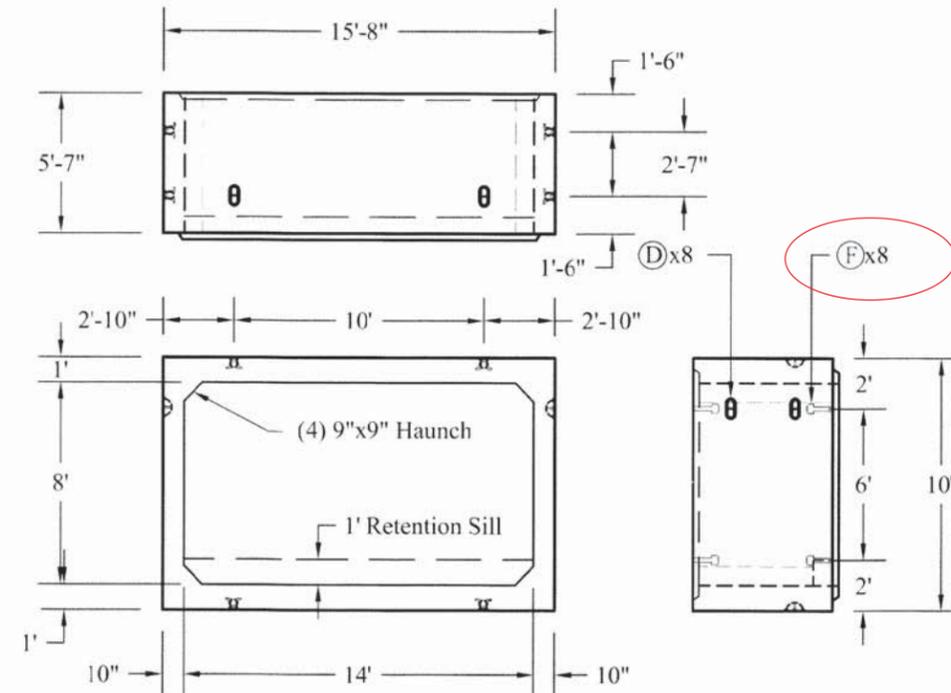
CONTRACTORS VISPE: (A) 2"Ø PVC Sleeve (B) 4"Ø PVC Sleeve (C) Mechanical Bolt Pocket (A.L. Patterson w/ 1"Ø Coil Rod) (D) Oxford A750-7 Lifting Device (E) 1"Øx12" CX-9 Coil Loop Insert (F) 1/2" F1-42 Flared Loop Ferrule Insert (G) 1 1/2" x 3 1/2" Continuous Keyway (H) Solid Lines Indicate 1/4" Chamfer	PRECAST CONCRETE BOX CULVERT SHOP DRAWINGS (#14442) SUPERVISOR: M. WHEELER DETAILER: I. ADAMS CHECKER: E. Barendse ENGINEER: Gary K. Munkelt & Assoc.		PROJECT NAME: Wardsboro PROJECT #: BF 013-1(21) LOCATION: Wardsboro, VT	FABRICATOR: 193 INDUSTRIAL AVE. WILLISTON, VT 05495 Ph: (802) 658-0201
	06/27/2014	PLAN_ELEVATION	2_OF_6	

BC-1 Detail



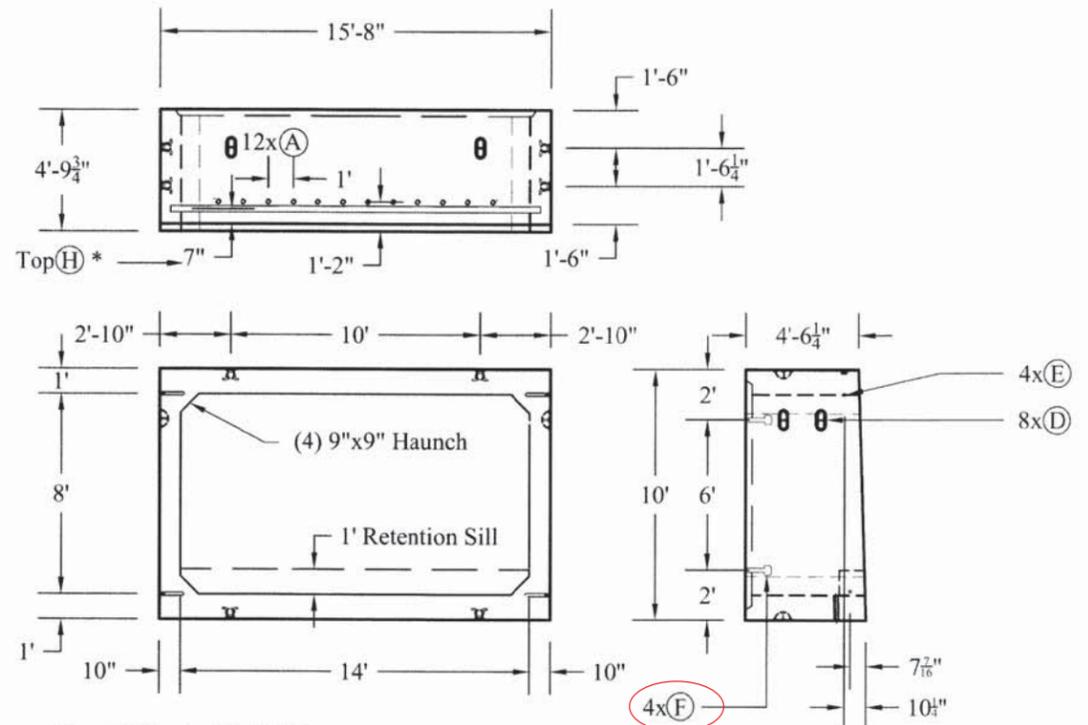
*Keyway to Stop 3" Short of Each Side

BC-2 Detail



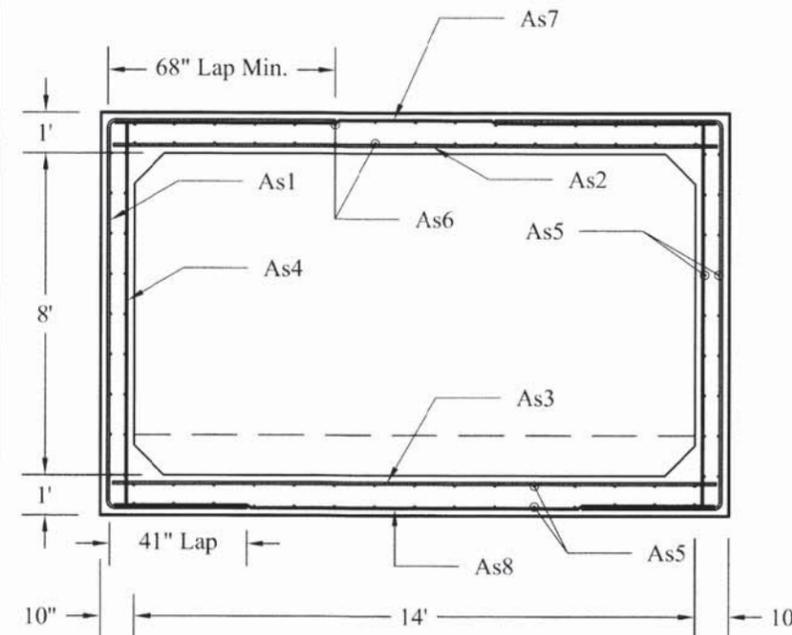
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BC-3 Detail



*Keyway to Stop 3" Short of Each Side

Box Section Reinforcement Detail



Rebar Schedule

Mark	Size	Max Spacing	Length	Type	A	B	C
As1	#6	6"	225"	Bent	68"	116"	41"
As2	#6	6"	184"	Str.	184"		
As3	#5	5"	184"	Str.	184"		
As4	#4	9"	116"	Str.	116"		
As5	#4	12"	Varies	Str.	Varies		
As6	#5	12"	Varies	Str.	Varies		
As7	#4	9"	184"	Str.	184"		
As8	#4	9"	184"	Str.	184"		

Notes: 2" Clear Typical Unless Noted Otherwise

PROVIDE THE TOTAL LENGTH OR WEIGHT FOR EACH SIZE OF REBAR FOR THE ENTIRE JOB FOR DETERMINING TESTING REQUIREMENTS.

Gary K. Munkelt
6/27/14
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REGISTERED PROFESSIONAL ENGINEER

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STRUCTURAL DESIGN ONLY

- CONTRACTORS VISPE:
- (A) 2"Ø PVC Sleeve
 - (B) 4"Ø PVC Sleeve
 - (C) Mechanical Bolt Pocket (A.L. Patterson w/ 1"Ø Coil Rod)
 - (D) Oxford A750-7 Lifting Device
 - (E) 1"Øx12" CX-9 Coil Loop Insert
 - (F) F1-42 Flared Loop Ferrule Insert
 - (G) 1 1/2" x 3 1/2" Continuous Keyway
 - (H) Solid Lines Indicate 1/2" Chamfer

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CHECKER: E. Barendse
ENGINEER: Gary K. Munkelt & Assoc.

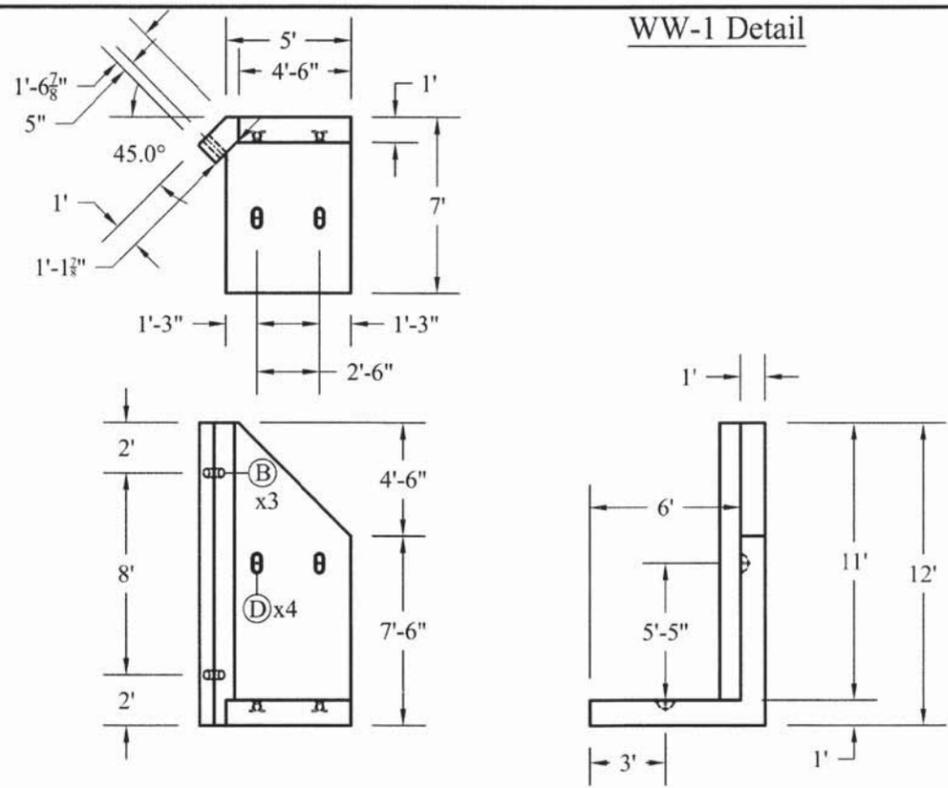
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PROJECT #: BF 013-1(21)
LOCATION: Wardsboro, VT
06/27/2014

FABRICATOR:
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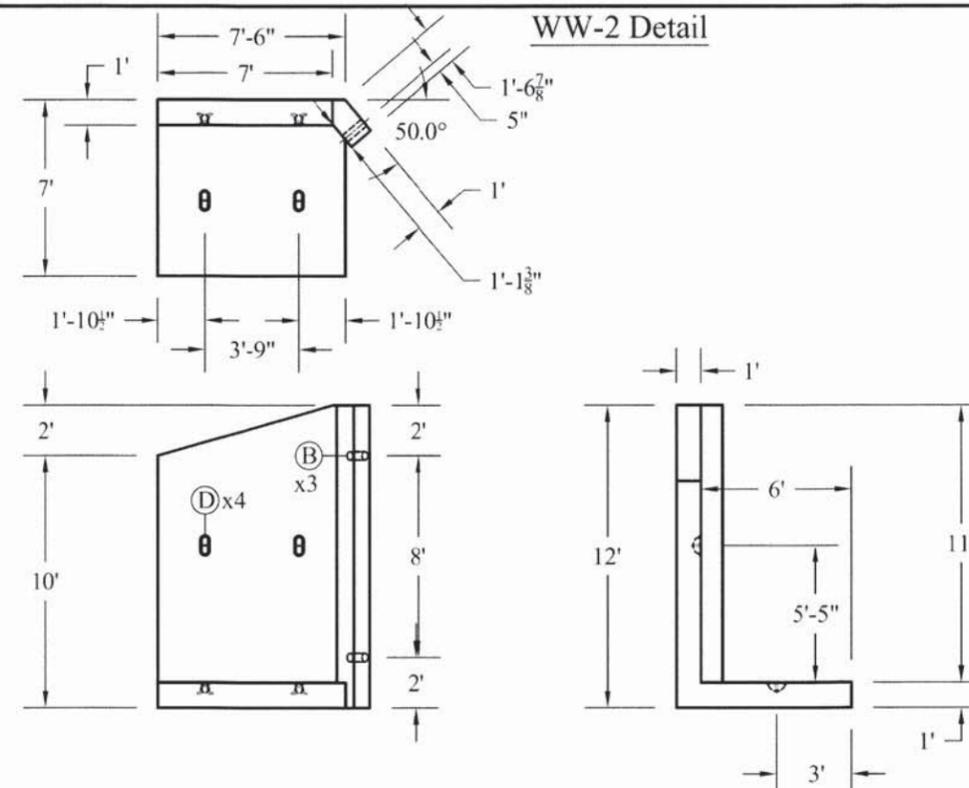
SD Ireland PRECAST

BOX_SECTIONS 3_OF_6

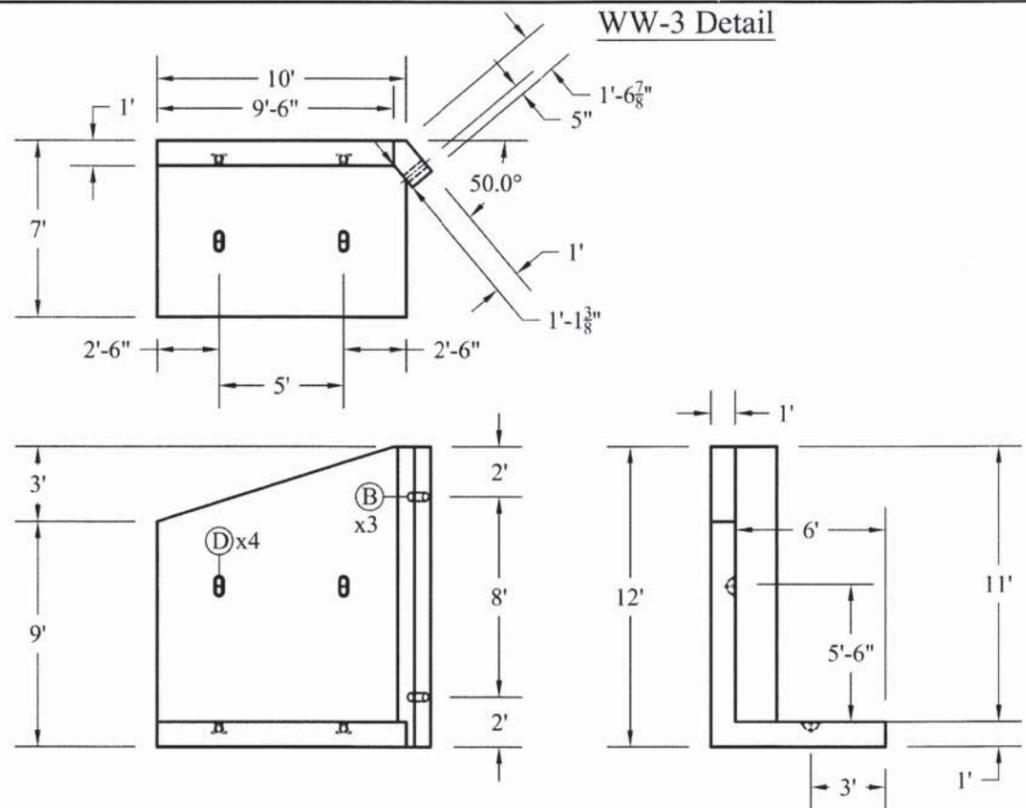
WW-1 Detail



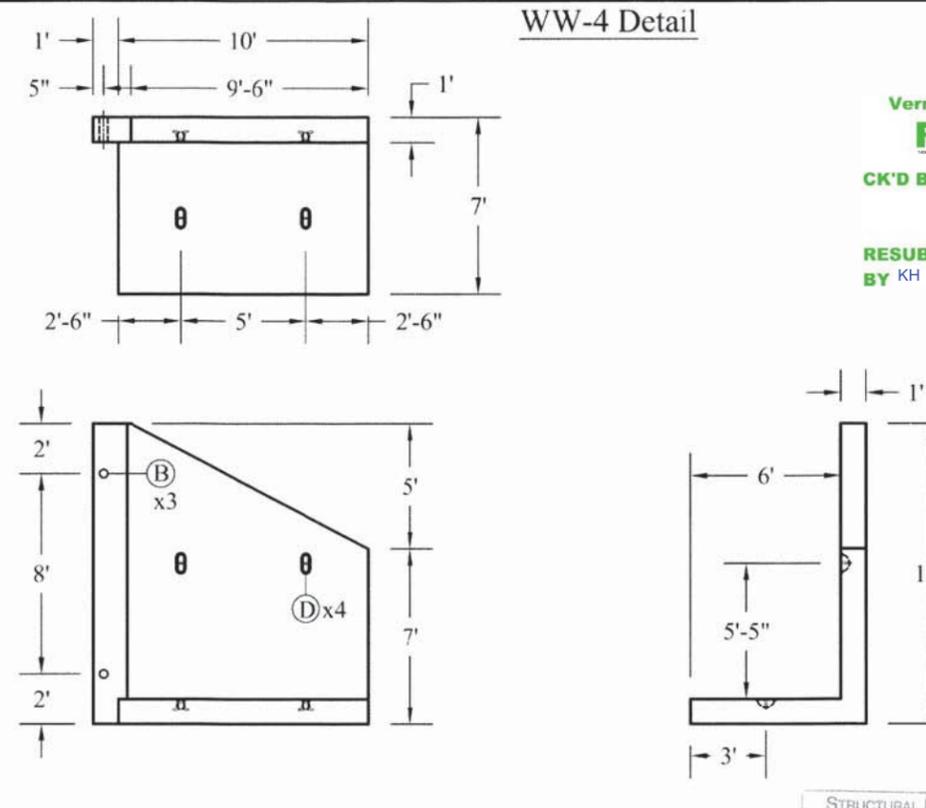
WW-2 Detail



WW-3 Detail



WW-4 Detail



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- (B) 4"Ø PVC Sleeve
- (C) Mechanical Bolt Pocket (A.L. Patterson w/ 1"Ø Coil Rod)
- (D) Oxford A750-7 Lifting Device
- (E) 1"Øx12" CX-9 Coil Loop Insert
- (F) 3/4" F1-42 Flared Loop Ferrule Insert
- (G) 1 1/2" x 3 1/2" Continuous Keyway
- (H) Solid Lines Indicate 1/4" Chamfer

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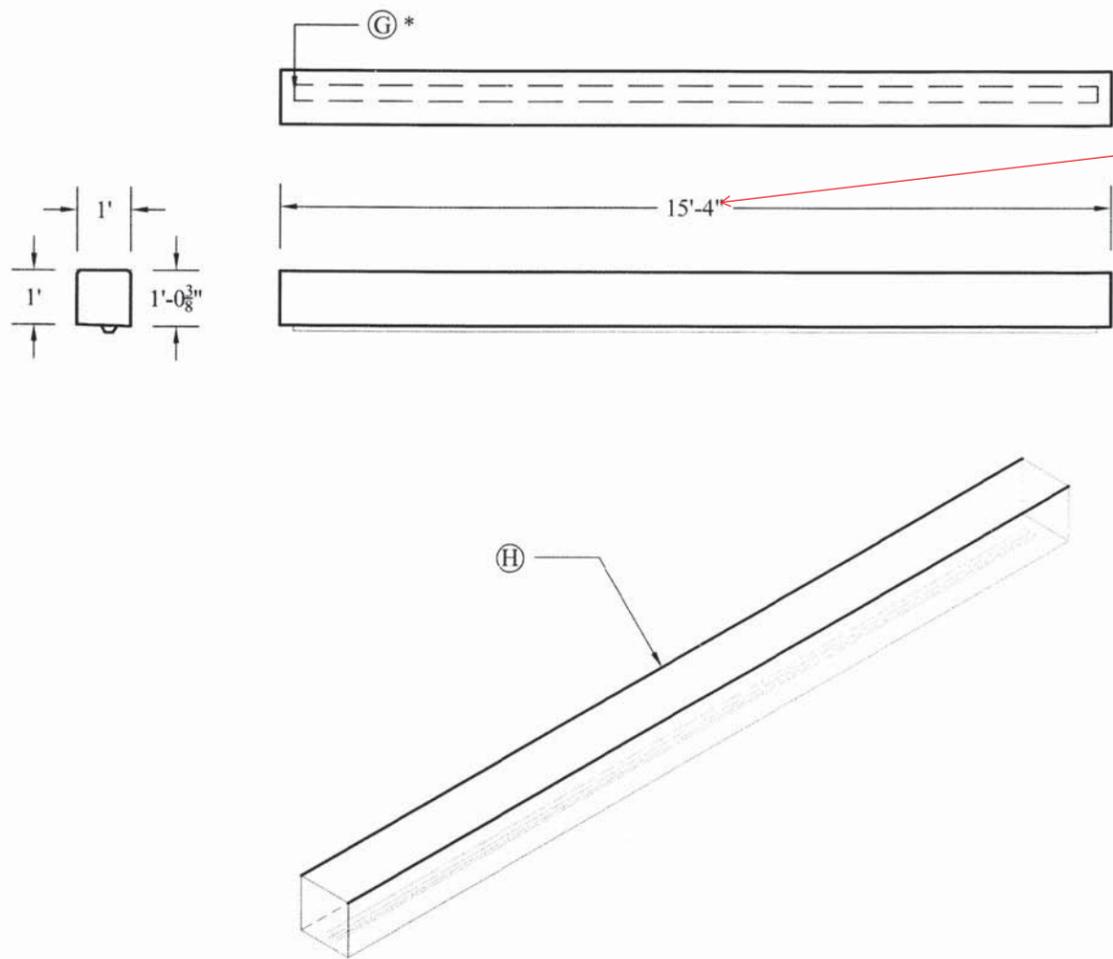


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WINGWALLS

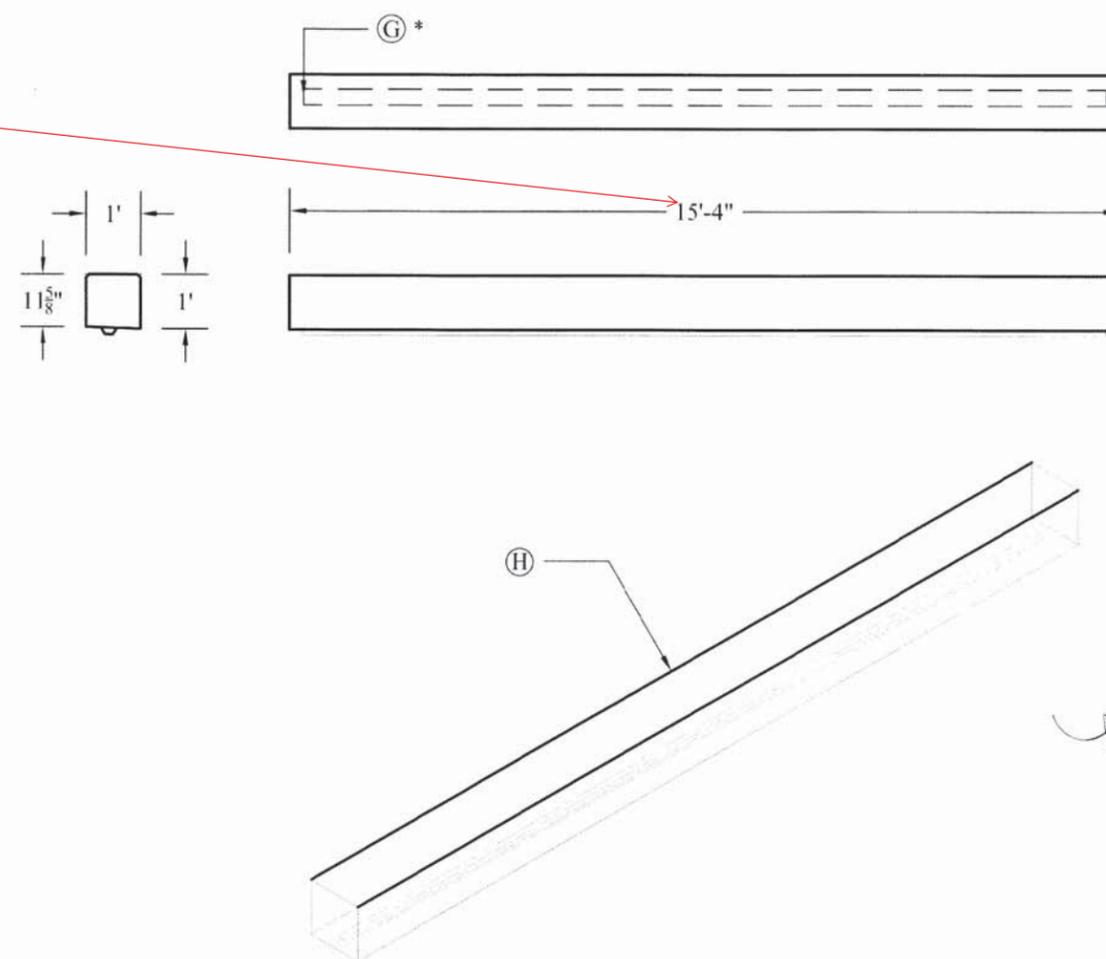
4_OF_6

HW-1 Detail



*Keyway to Stop 3" Short of Each Side

HW-2 Detail



*Keyway to Stop 3" Short of Each Side

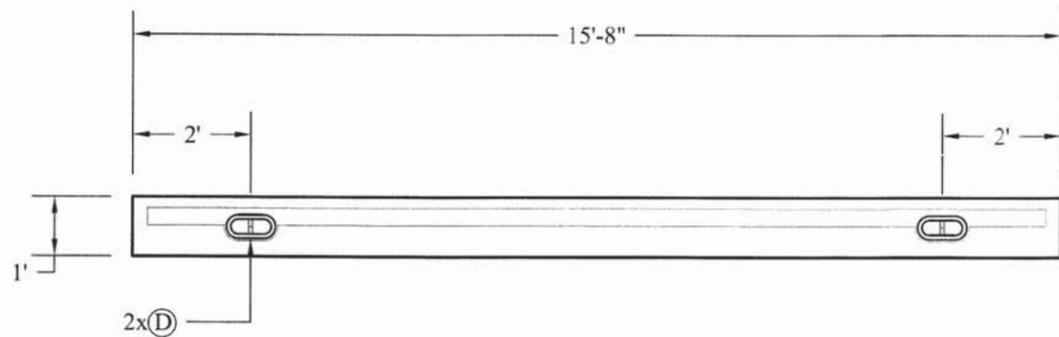
SHOULDN'T THE HEADWALLS BE 15'-8"



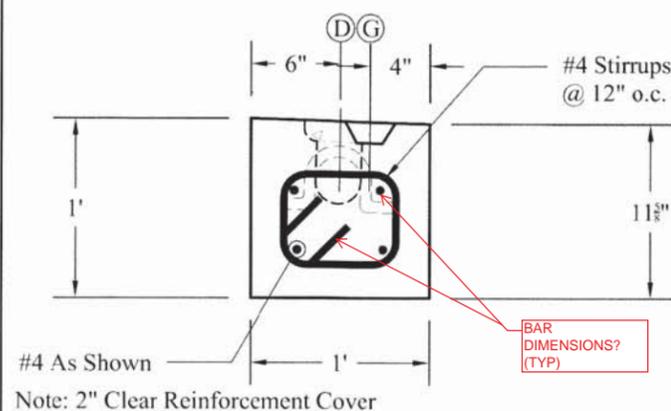
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CW-1/2 Detail



CW-1 Detail

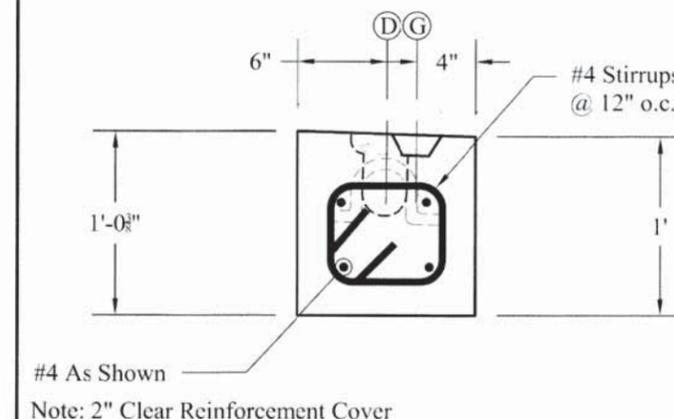


#4 As Shown

Note: 2" Clear Reinforcement Cover

BAR DIMENSIONS? (TYP)

CW-2 Detail



#4 As Shown

Note: 2" Clear Reinforcement Cover

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- (G) 1 1/2" x 3 1/2" Continuous Keyway
- (H) Solid Lines Indicate 1/4" Chamfer

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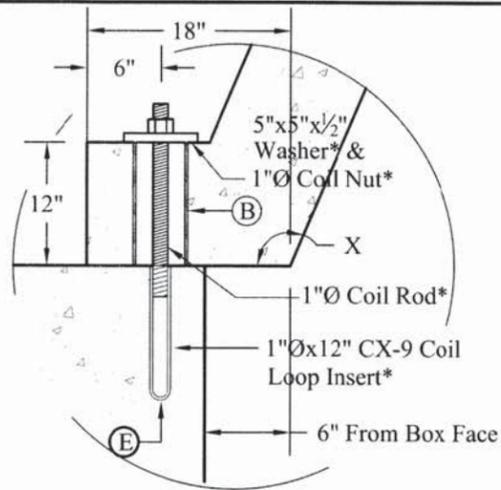
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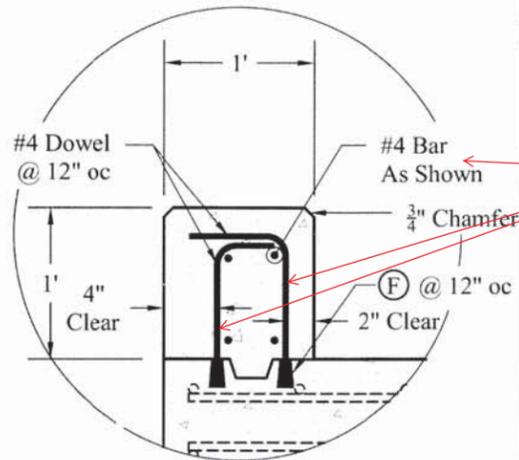
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HEADWALLS_CUTOFFWALLS

5_OF_6



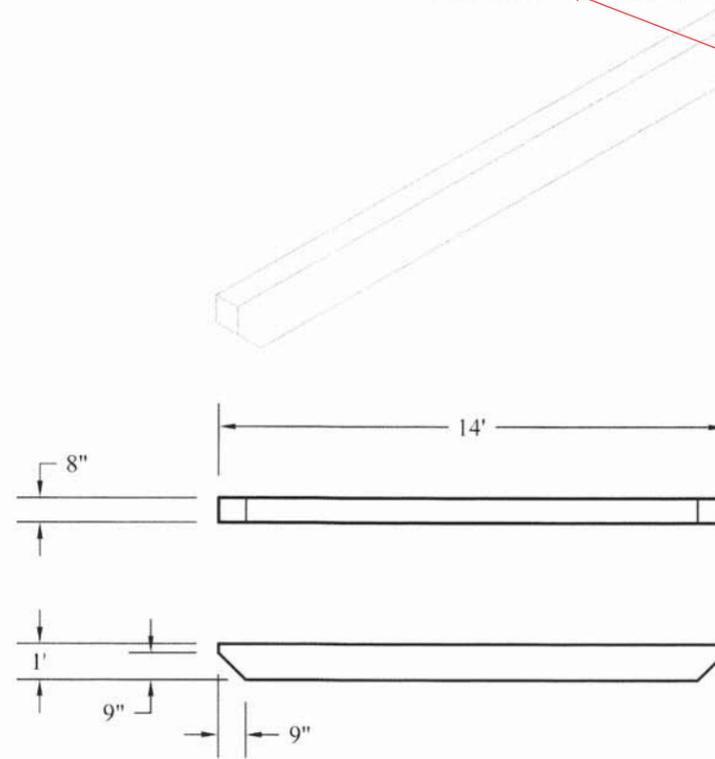
Wing Wall to Box Culvert Connection



Head Wall to Box Culvert Connection

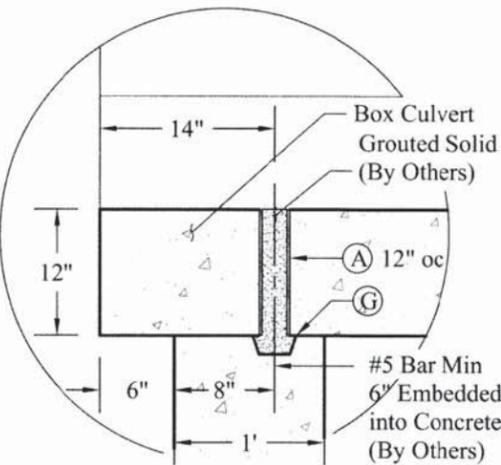
BAR DIMENSIONS?

Baffle Wall Detail

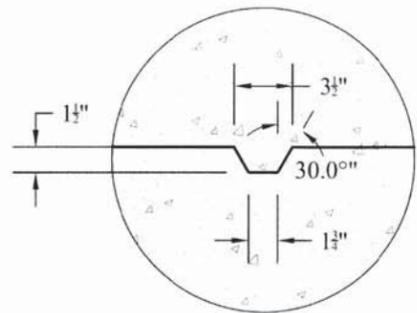


RETENTION SILL

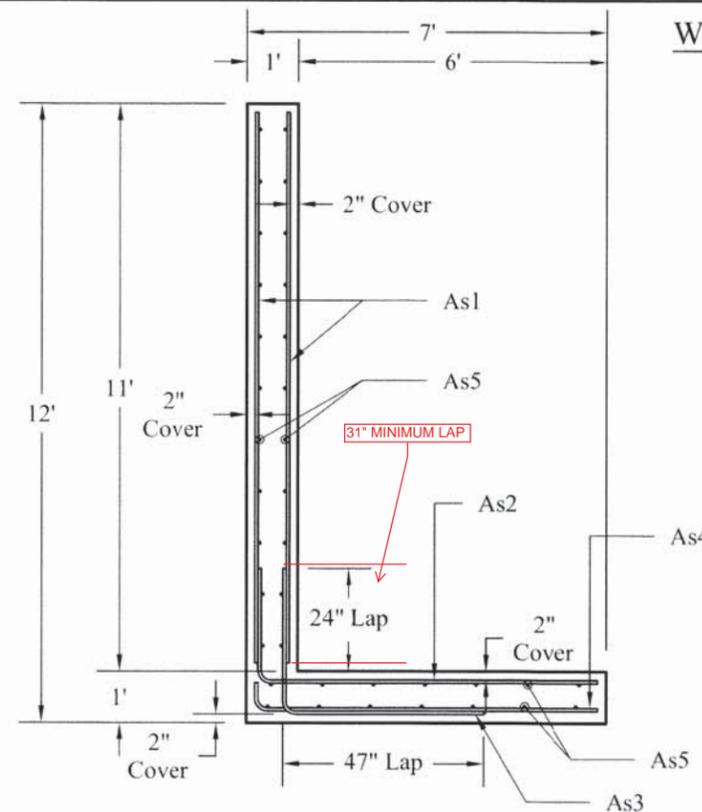
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Culvert to Cut Off Wall Connection



Keyway Detail

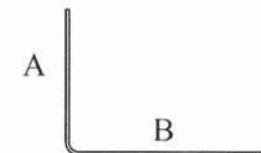


Wing Wall Reinforcement

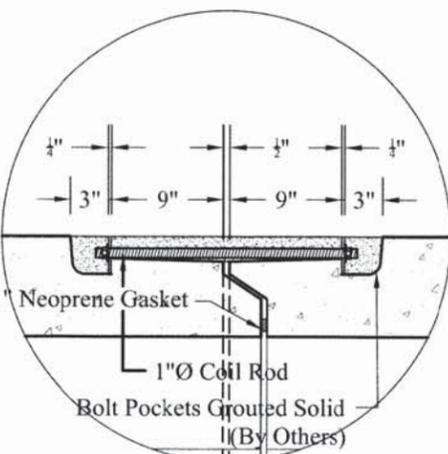
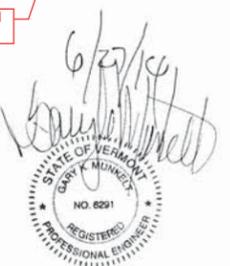
Rebar Schedule						
Mark	Size	Max Spacing	Length	Type	A	B
As1	#6	8"	Varies	Str		
As2	#6	8"	108"	Bent	26"	82"
As3	#6	8"	81"	Bent	34"	47"
As4	#6	8"	88"	Bent	8"	80"
As5	#5	12"	Varies	Str		

Notes: 2" Clear Typical Unless Noted Otherwise

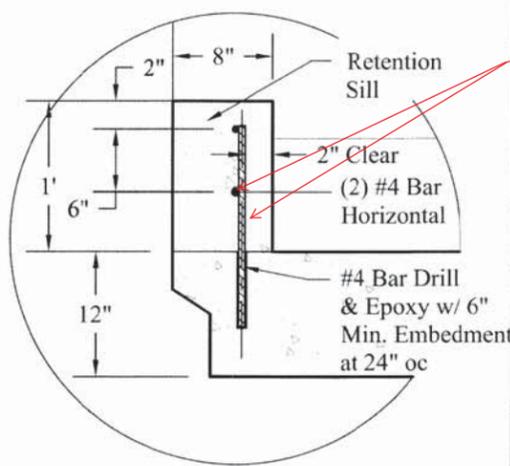
Bent Bar Guide



VERIFY LENGTH FOR 90 HOOK



Bolt Pocket Connection Detail



Retention Sill Reinforcing Detail

BAR DIMENSIONS?

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- (E) 1"Øx12" CX-9 Coil Loop Insert
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CONNECTIONS

6_OF_6

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