

ECO BUILDING SYSTEMS CORP. TEST REPORT

SCOPE OF WORK

TORNADO IMPACT AND STRUCTURAL WIND LOAD TESTING ON EBS 10 INCH ASYMMETRIC INSULATED COMPOSITE CONCRETE FORM (ICCF) BLOCK WALL SYSTEM

REPORT NUMBER

H6867.01-801-44-R0

TEST DATE(S)

02/27/18 - 03/16/18

ISSUE DATE

03/19/18

RECORD RETENTION END DATE

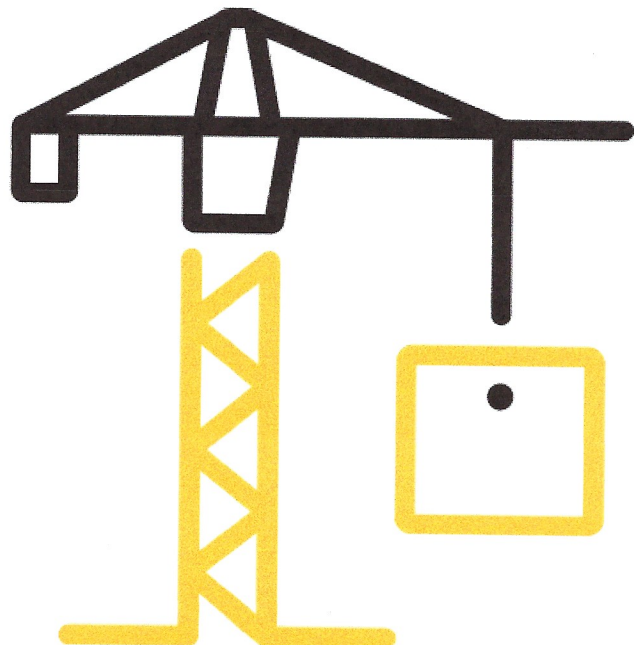
03/16/22

PAGES

17

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TEST REPORT FOR ECO BUILDING SYSTEMS CORP.

Report No.: H6867.01-801-44-r0

Date: 03/19/18

REPORT ISSUED TO

ECO BUILDING SYSTEMS CORP.

8960 W Larkspur Drive, STE 105

Peoria, Arizona 85381

SECTION 1

SCOPE

Intertek Building & Construction (B&C) was contracted by Eco Building Systems Corp. to perform testing in accordance with ICC 500-2014 Section 804 Tornado Impact and Section 806.2 Tornado Wind Pressure according to FEMA 361 *Guidance for Community and Residential Safe Rooms* on their EBS 10 Inch Asymmetric insulated composite concrete form (ICCF) block wall system. Results obtained are tested values and were secured by using the designated test method(s). Testing was conducted at Intertek B&C test facility in Plano, Texas.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory.

SECTION 2

SUMMARY OF TEST RESULTS

TITLE	RESULTS
Design Pressure	+11,970 Pa (+250.00 psf)
1.2 x Positive Pressure	+14, 364 Pa (+300.00 psf)
Negative Design Pressure	-11,970 Pa (-250.00 psf)
1.2 x Negative Design Pressure	-14, 364 Pa (-300.00 psf)
Impact Test	See Results

For INTERTEK B&C:

COMPLETED BY: Clint Barnett

REVIEWED BY: Andy Cost

TITLE: Technician

TITLE: Manager

SIGNATURE: 

SIGNATURE: 

DATE: 03/19/18

DATE: 03/19/18

CAB:jc

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SECTION 3

TEST METHOD(S)

The specimens were evaluated in accordance (general accordance if deviated from method; all deviations must be described within test report) with the following:

ASTM E 330-14, *Standard Test Method for Performance of Exterior Windows, Curtain Walls and Doors by Uniform Static Air Pressure Difference.*

ASTM E 1886-13, *Test Method for Structural Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials. (Impact Only)*

ICC 500-2014, *Standard for the Design and Construction of Storm Shelters. Chapters 804 and 806.2*

SECTION 4

MATERIAL SOURCE/INSTALLATION

Test specimens were provided by the client. Representative samples of the test specimen(s) will be retained by Intertek B&C for a minimum of four years from the test completion date.

The specimen was installed into a C12x20 x 1/4" thick steel C-Channel buck with #5 rebar spaced 12" apart horizontally and 12" apart vertically. The rough opening allowed for a 1/8" shim space. The exterior perimeter of the wall panel was sealed with sealant. Installation of the tested product was performed by the client. Three brick ties were secured to the stucco with 1/4" x 2" tapcon screws at every 5th course of bricks.

LOCATION	ANCHOR DESCRIPTION	ANCHOR LOCATION
Head, Sill, Jambs	Polyurethane Spray Foam	Bottom of blocks
Head, Sill, Jambs	#5 rebar	Vertical and horizontal full width and height 12" on center welded to the steel perimeter frame.

SECTION 5

LIST OF OFFICIAL OBSERVERS

NAME	COMPANY
Clint Barnett	Intertek B&C
Andy Cost	Intertek B&C

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SECTION 6

TEST SPECIMEN DESCRIPTION

Product Type: Insulated composite concrete form (ICCF) block wall system

Series/Model: EBS 10 Inch Asymmetric ICCF

Product Size(s):

Test Specimen

OVERALL AREA:	WIDTH		HEIGHT	
	millimeters	inches	millimeters	inches
3.04 m ² (32.67 ft ²)				
Overall Size	2438	96	1245	49
ICCF Block Size	1219	48	305	12

Panel Construction:

PANEL MEMBER	MATERIAL	DESCRIPTION
Exterior Facade	Solid Clay Brick	2" x 3-1/2" red clay brick with 3/4" thick mortar joints
ICCF Block	Recycled Expanded Polystyrene (EPS) and Cement	45"x12"x10" ICCF blocks, grout filled, and reinforced with #5 rebar
1/2" Gypsum Board	Gypsum	Secured to interior part of the ICCF blocks with joint compound
Hard Coat Stucco	Concrete	3/4" thick stucco was applied directly to the exterior of the ICCF blocks.

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SECTION 7

TEST RESULTS

Tornado Impact Testing Per ICC-500 / ASTM E1886 – 15 pound 2x4 missile impact at 100 mph. The temperature during testing was 21°C (70°F). The results are tabulated as follows:

Test Specimen

TITLE OF TEST	RESULTS	ALLOWED	NOTE
Uniform Load Deflection, per ASTM E330 +11,970 Pa (+250.00 psf) -11,970 Pa (-250.00 psf)	No Damage	No Damage	1, 2
Uniform Load Structural, per ASTM E330 Permanent set taken at +14, 364 Pa (+300.00 psf) -14, 364 Pa (-300.00 psf)	No Damage	No Damage	1, 3

Test Specimen: Orientation within ±5° of horizontal

IMPACT	#1	#2
MISSILE VELOCITY	44.81 m/s (147.00 fps) (100 MPH)	44.81 m/s (147.00 fps) (100 MPH)
IMPACT AREA	Center Panel	Left Quarter
OBSERVATIONS	Missile hit target area, No damage beyond the allowable	Missile hit target area, No damage beyond the allowable
RESULTS	Pass, See Note 4	Pass, See Note 4

IMPACT	#3
MISSILE VELOCITY	44.81 m/s (147.00 fps)
IMPACT AREA	Left top corner
OBSERVATIONS	Missile hit target area, No damage beyond the allowable
RESULTS	Pass, See Note 4

General Note: All testing was performed in accordance with the referenced standard(s).

Note 1: Loads were held for 60 seconds.

Note 2: Pressure meets the specification in ICC-500-2014 Section 304.2 and Figure 304.2(1) for a design wind speed of 250 MPH.

Note 3: Pressure meets the specification in ICC-500-2014 Section 806.2 for a design wind speed of 250 MPH.

Note 4: Impacts meet the specification in ICC-500-2014 Table 305.1.1 for a design wind speed of 250 MPH.

TEST REPORT FOR ECO BUILDING SYSTEMS CORP.

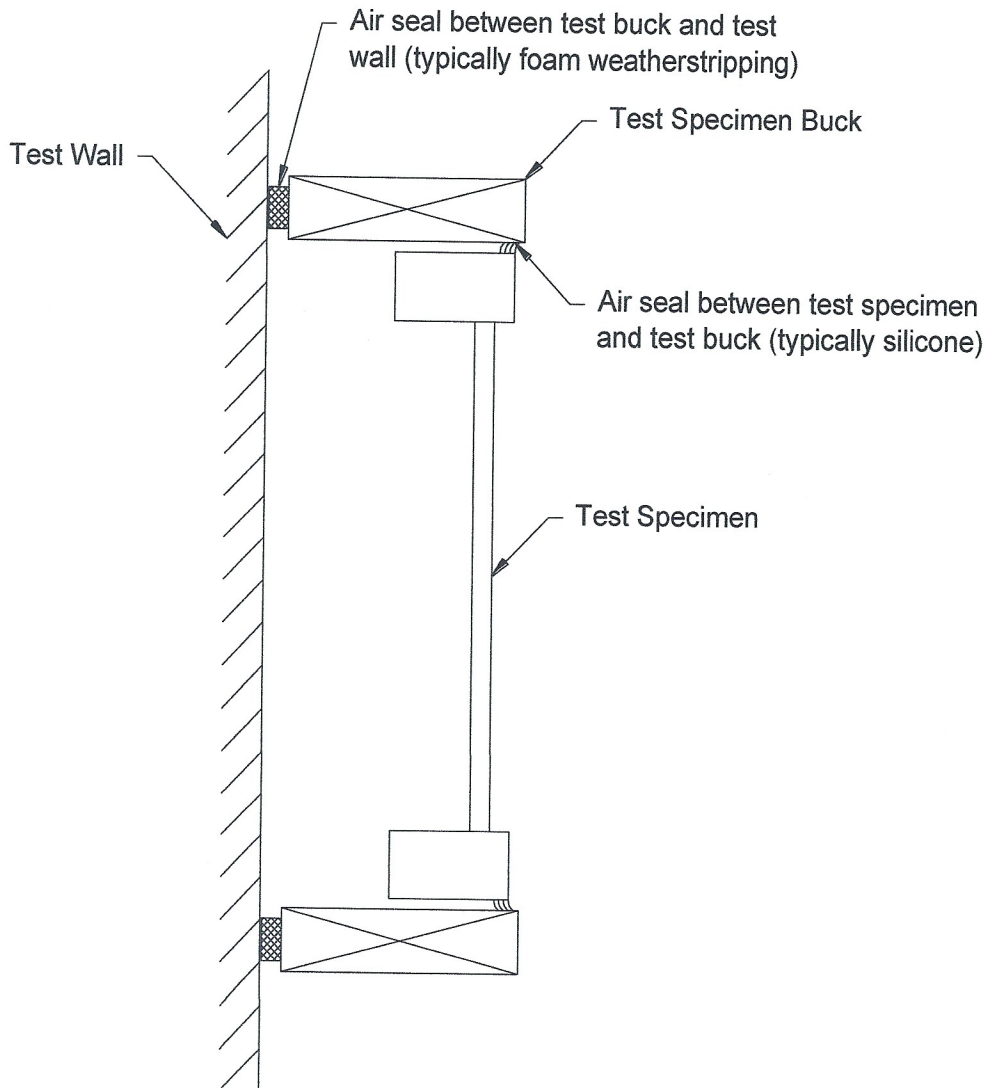
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SECTION 8

LOCATION OF AIR SEAL

The air seal between the test specimen and the test wall is detailed below. The seal is made of foam weatherstripping and is attached to the edge of the test specimen buck. The test specimen buck is placed against the test wall and clamped in place, compressing the weatherstripping and creating a seal.



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SECTION 9 PHOTOGRAPHS

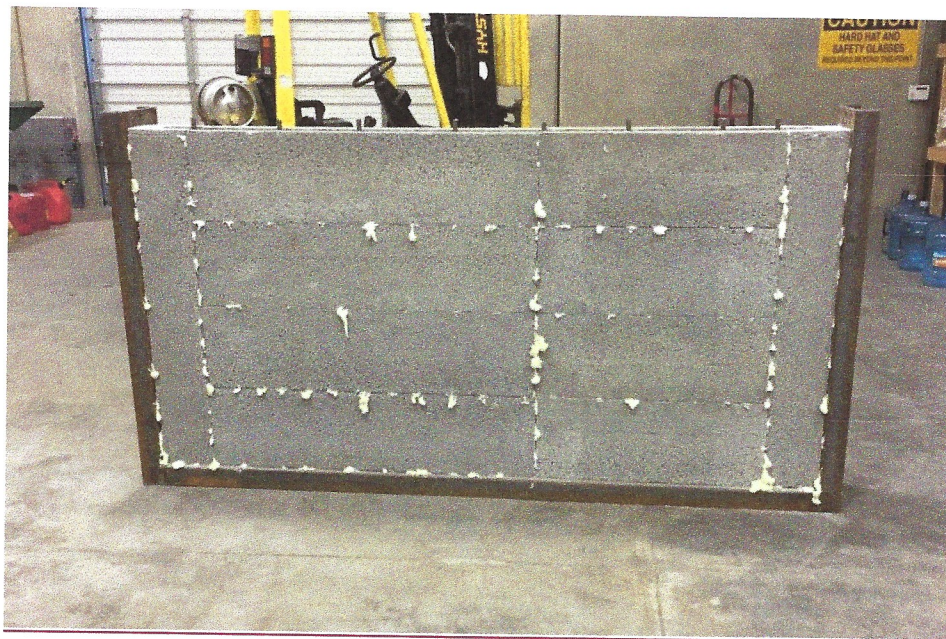


Photo #1
Block Wall configuration

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Photo #2

Exterior Stucco base coat configuration

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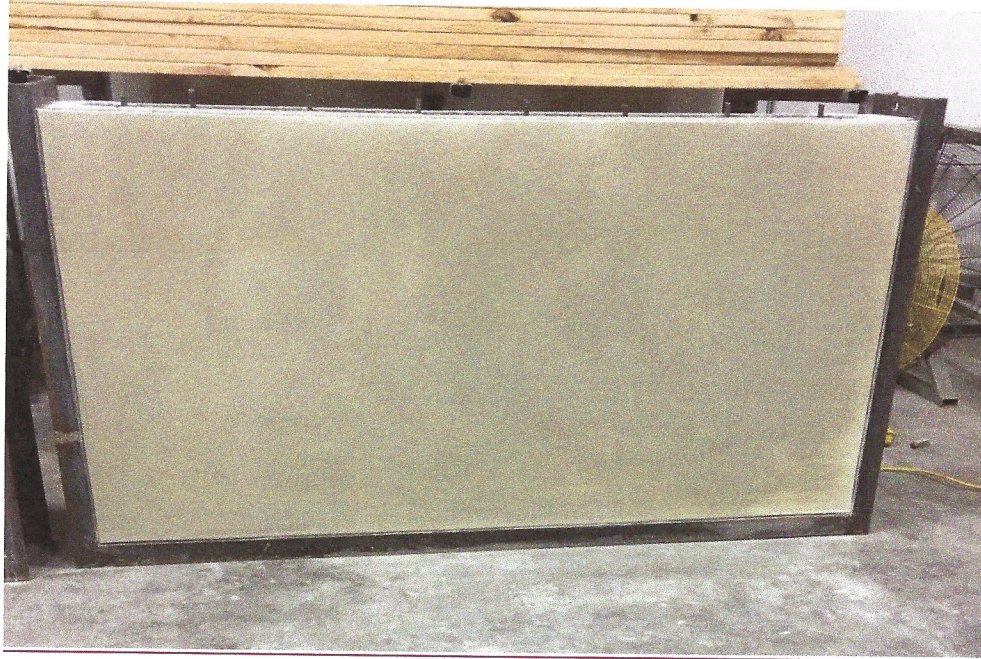


Photo #3

Exterior Stucco Top coat configuration

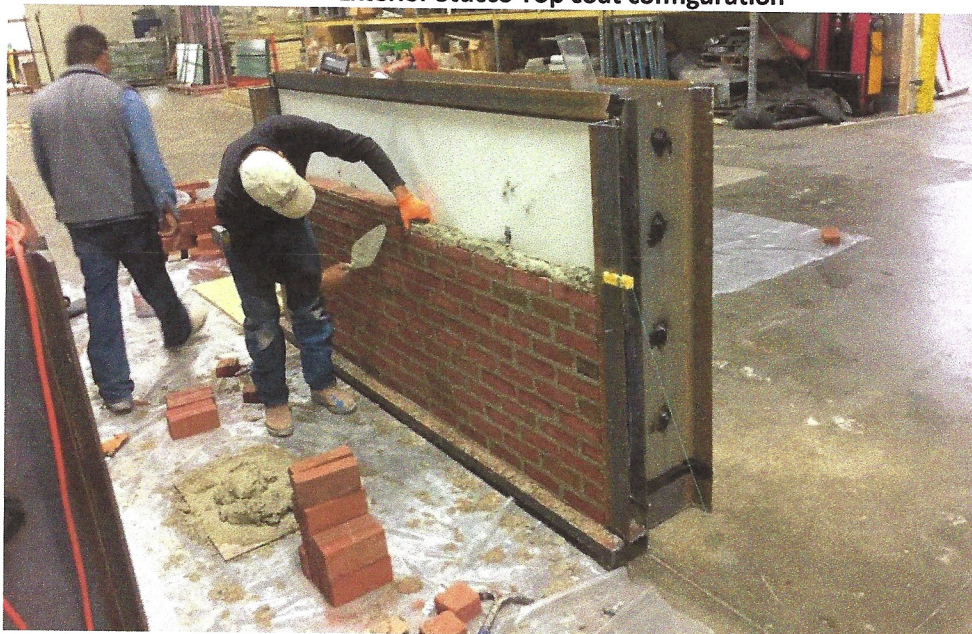


Photo No. 4

Wall system Construction Features

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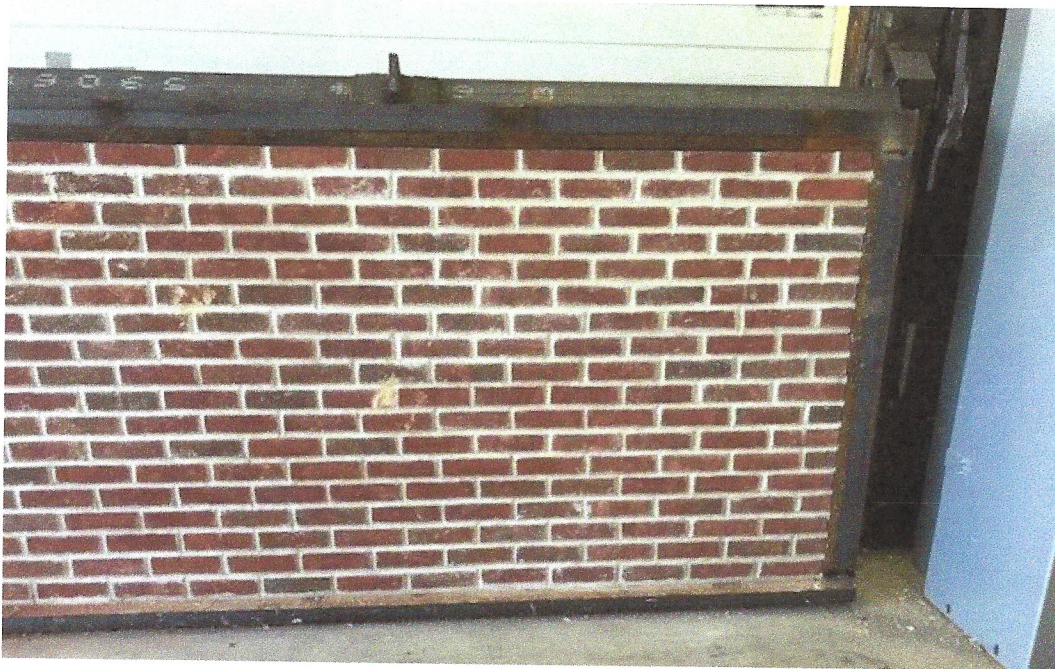


Photo No. 5
Wall system after impacts



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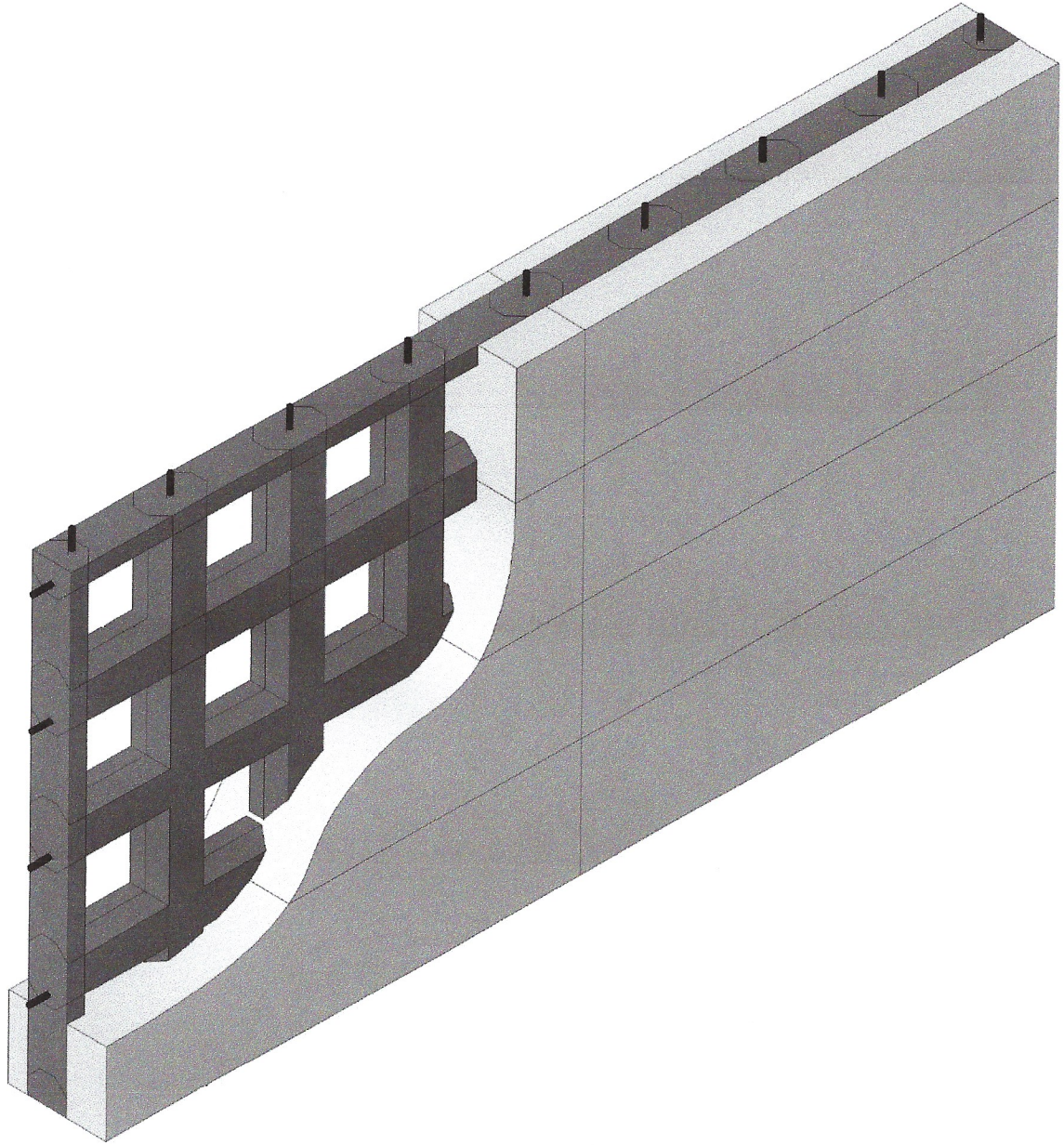
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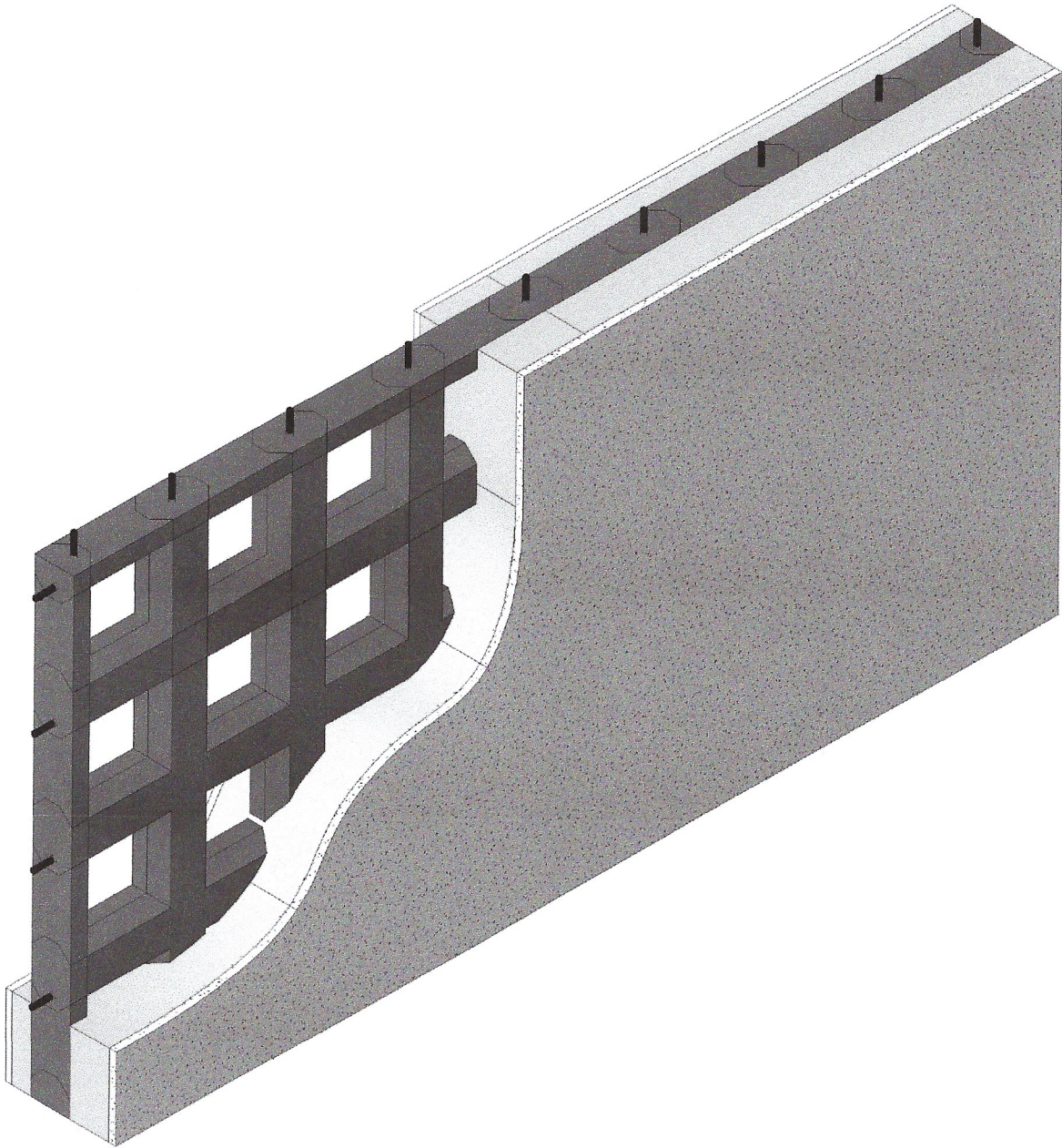
SECTION 10
DRAWINGS

The test specimen drawings have been reviewed by Intertek B&C and are representative of the test specimen(s) reported herein. Test specimen construction was verified by Intertek B&C per the drawings included in this report. Any deviations are documented herein or on the drawings.

Note: Complete drawings packet on file with Intertek B&C.



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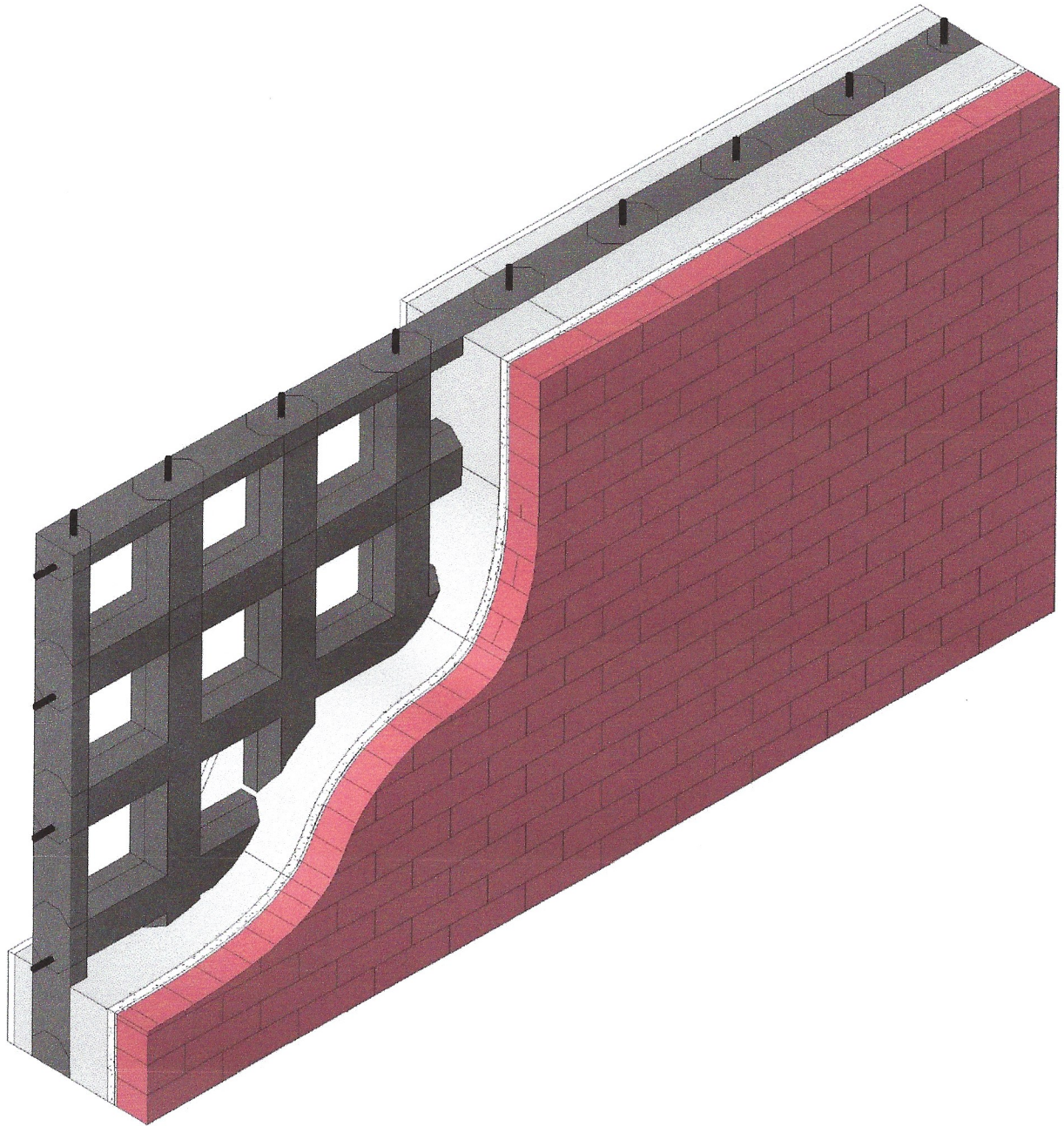


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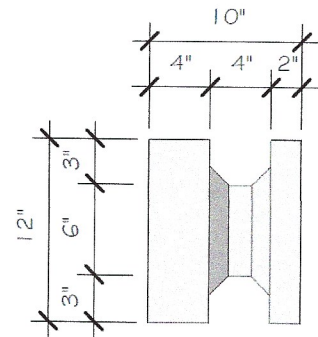
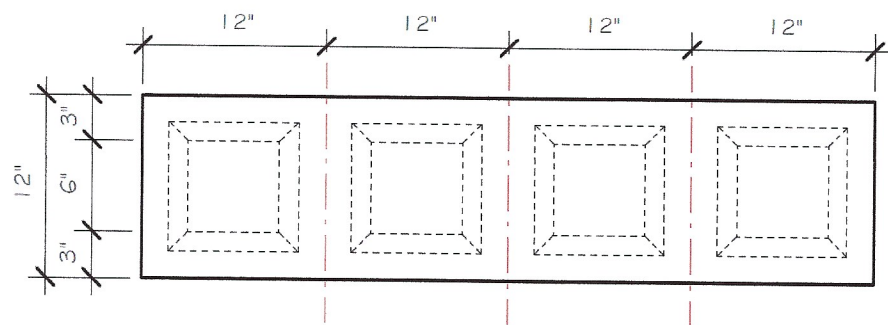
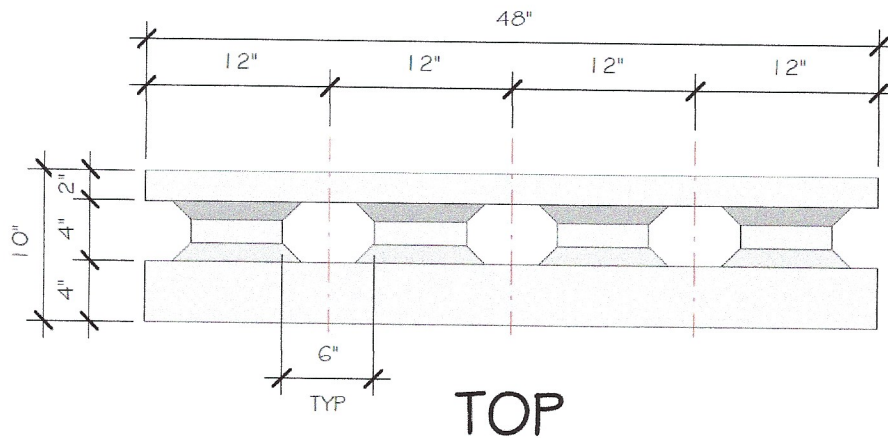
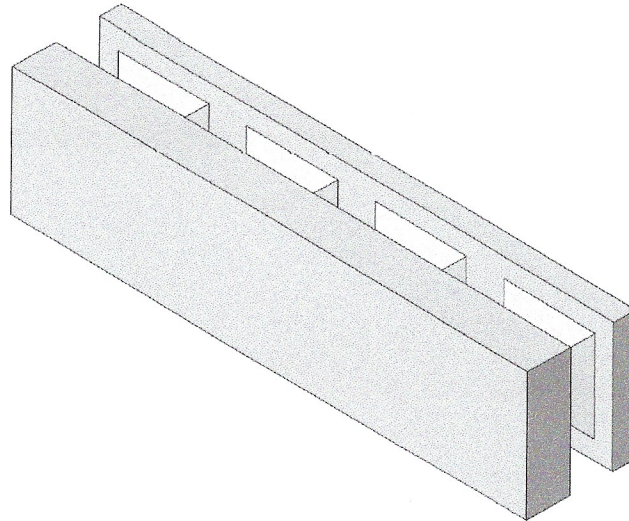
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**EBS 10 INCH ASYMMETRIC
BLOCK SPECIFICATIONS**



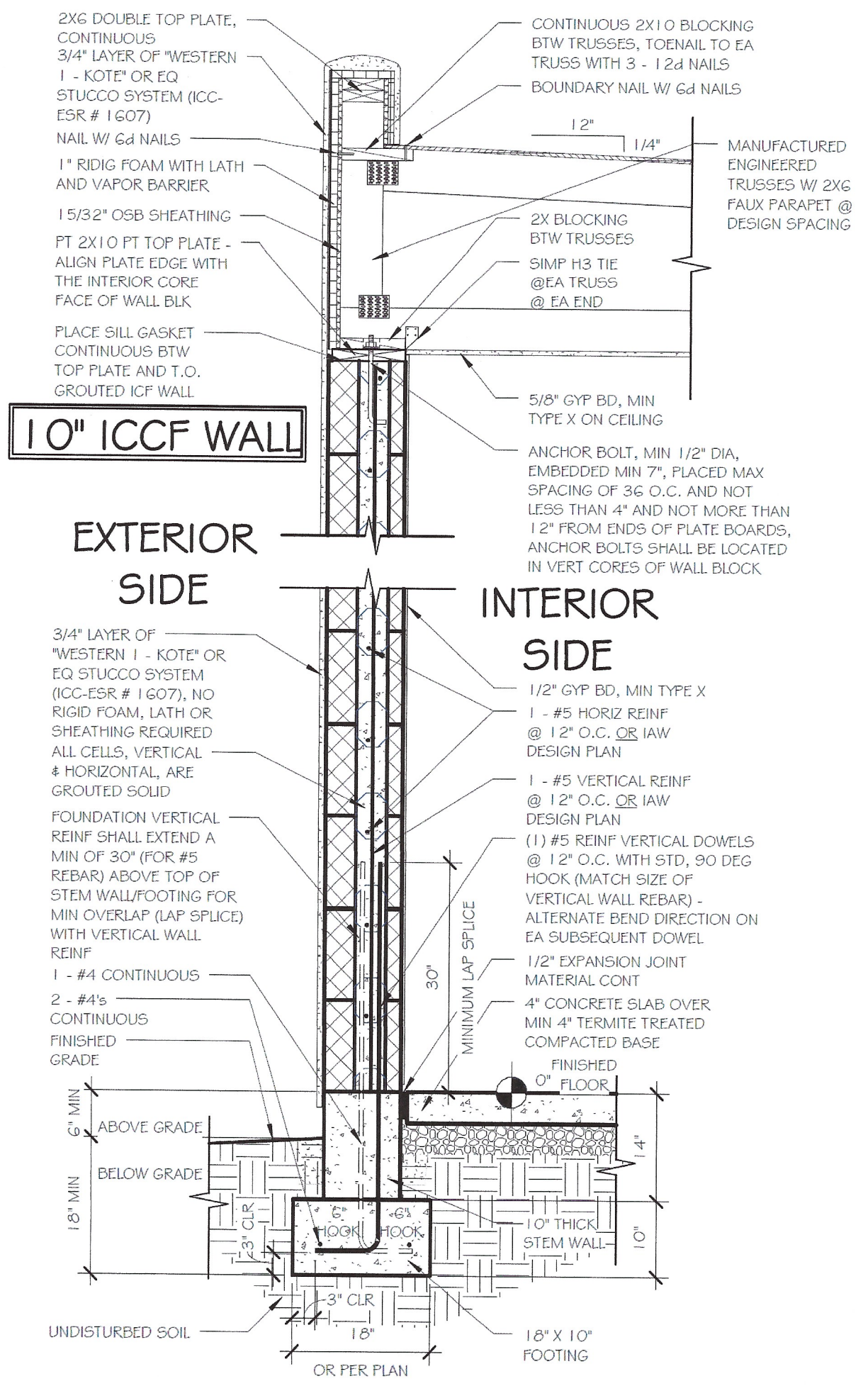
FRONT (WIREFRAME VIEW)

RIGHT

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CONCRETE & ICCF WALL





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SECTION 11
REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	03/19/18	N/A	Original Report Issue