

NORTHSTAR TECHNOLOGIES FLORIDA BUILDING CODE TEST REPORT

SCOPE OF WORK

AAMA 501, TAS 201, TAS 202 AND TAS 203 TESTING ON EXTERIOR WALL PANEL SYSTEM

REPORT NUMBER

L4423.01-450-44 R0

TEST DATES

10/16/20 - 10/28/20

ISSUE DATE

12/16/20

RECORD RETENTION END DATE

10/28/24

PAGES

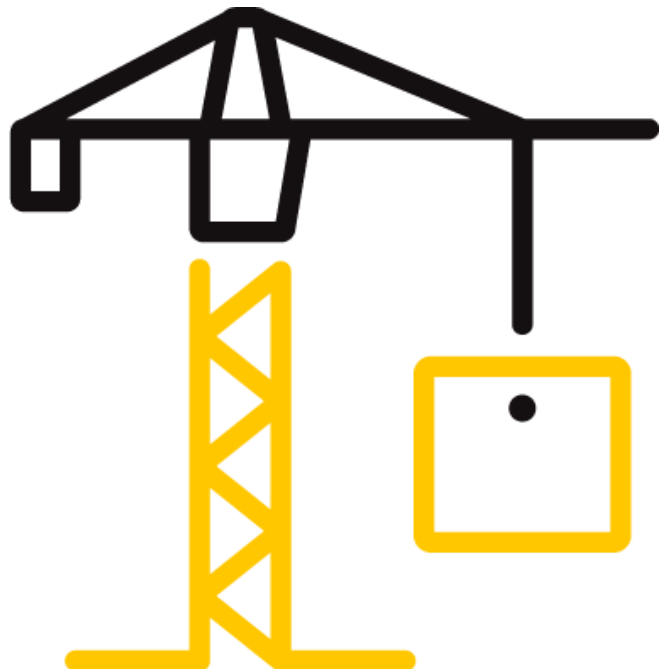
33

DOCUMENT CONTROL NUMBER

ATI 00831 (01/30/18)

RT-R-AMER-Test-2745

© 2017 INTERTEK



TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

REPORT ISSUED TO

NORTHSTAR TECHNOLOGIES

365 Fifth Ave. S

Naples, Florida 34102

PROJECT

NORTHSTAR EXTERIOR WALL PANEL SYSTEM



For INTERTEK B&C:

COMPLETED BY:	Melissa Nuttall	REVIEWED BY:	Vinu J. Abraham, P.E.
TITLE:	Technician Team Leader - Products	TITLE:	Vice President - Products
SIGNATURE:		SIGNATURE:	
DATE:	12/16/20	DATE:	

AWR/MMN

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample(s) tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

SECTION 1**SCOPE**

Intertek Building & Construction (B&C) was contracted by Northstar Technologies to perform TAS 201, TAS 202, and TAS 203 testing in accordance with Florida Building Code requirements on their Exterior Wall Panel System. Testing was conducted at the Intertek B&C test facility in West Palm Beach, Florida. Results obtained are tested values and were secured using the designated test methods. This report includes complete written and photographic documentation of all testing performed and a copy of "As-Built" mock-up drawings.

This report does not constitute certification of this product nor an opinion or endorsement by this laboratory. This report and related test records that are retained such as "As-Built" mock-up drawings, datasheets, representative samples of test specimens, or other pertinent project documentation will be serviced by Intertek B&C for the entire test record retention period. At the end of this retention period, such materials shall be discarded without notice and the service life of this report by Intertek B&C will expire.

SECTION 2**TEST METHODS**

Mock-up testing was performed in accordance with referenced test methods.

AAMA 501-15, *Methods of Test for Exterior Walls*

TAS 201-94, *Impact Test Procedures*

TAS 202-94, *Criteria for Testing Impact & Non Impact Resistant Building Envelope Components Using Uniform Static Air Pressure*

TAS 203-94, *Criteria for Testing Products Subject to Cyclic Wind Pressure Loading*

ASTM E283-04, *Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Mock Up*

ASTM E330-14, *Standard Test Method for Structural Performance of Exterior Windows, Doors, Skylights and Curtain Walls by Uniform Static Air Pressure Difference*

ASTM E331-00(2009), *Standard Test Method for Water Penetration of Exterior Windows, Skylights, Doors, and Curtain Walls by Uniform Static Air Pressure Difference*

ASTM E1886-13a, *Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials*

ASTM E1996-14a, *Standard Specification for Performance of Exterior Windows, Curtain Walls, Doors, and Impact Protective Systems Impacted by Windborne Debris in Hurricanes*

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

SECTION 3**LIST OF OFFICIAL OBSERVERS**

NAME	COMPANY
Terry Roberts	Intertek B&C
Veron Wickham	Intertek B&C
Melissa Nuttall	Intertek B&C
Vinu Abraham, P.E.	Intertek B&C

SECTION 4**GENERAL MOCK-UP DESCRIPTION****Project Type**

Exterior Wall Panel System

Mock-Up Size**Mock Ups 1, 2, 3:** 8' wide by 12' high**Mock Ups 4, 5, 6:** 14' 1-1/4" wide by 12' high**Material Source/Installation**

The mock-up materials/components were supplied by Northstar Technologies. The installation of the mock-ups was completed by Intertek B&C.

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

SECTION 5

FINAL TEST RESULTS

Protocols TAS 202-94 and AAMA 501-15, *Static Air Pressure*

Test Date(s): 9/4/19 through 10/26/20

The temperature during testing was 81°F to 85°F. The results are tabulated as follows:

Mock Up #1: Preload per ASTM E330

TITLE OF TEST	RESULTS	ALLOWED	NOTE
Preload @ +45psf	--	--	

Mock Up #1: Air Leakage per TAS 202/ASTM E283

TITLE OF TEST	RESULTS	ALLOWED	NOTE
Air Leakage, Infiltration at 1.57 psf (25 mph)	<0.01 cfm/ft ²	Report	1
Air Leakage, Infiltration at 6.27 psf (50 mph)	<0.01 cfm/ft ²	0.06 cfm/ft ² max.	1

Note 1: Test Date 10/16/20 / Time: 10:38 AM (Air Note Only)

Mock Up #1: Water Penetration per TAS 202/ASTM E331

TITLE OF TEST	RESULTS	ALLOWED	NOTE
Water Penetration, 15% of Positive Design Pressure at 13.5 psf	Pass	No leakage	

Mock Up #1: Preload and Design Load per TAS 202/ASTM E330

LOAD (psf)	INDICATOR LOCATION	DEFLECTION (in.)		PERMANENT SET (in.)	
		MEASURED	ALLOWED	MEASURED	ALLOWED
+67.5	2	0.74	N/A	0.08	N/A
50% of Test Pressure	5	0.02	N/A	0.01	N/A
+90.0	2	0.94	1.20	0.10	N/A
Design Pressure	5	0.03	0.19	<0.01	N/A
-63.75	2	0.56	N/A	0.02	N/A
50% of Test Pressure	5	0.02	N/A	0.01	N/A
-85.0	2	0.78	1.20	0.04	N/A
Design Pressure	5	0.01	0.19	0.01	N/A

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

Mock Up #1: Repeat Air Leakage per TAS 202/ASTM E283

TITLE OF TEST	RESULTS	ALLOWED	NOTE
Air Leakage, Infiltration at 1.57 psf (25 mph)	<0.01 cfm/ft ²	Report	2
Air Leakage, Infiltration at 6.27 psf (50 mph)	<0.01 cfm/ft ²	0.06 cfm/ft ² max.	2

Note 2: Test Date 11/16/20 / Time: 2:12 PM (Air Note Only)

Mock Up #1: Repeat Water Penetration per TAS 202/ASTM E331

TITLE OF TEST	RESULTS	ALLOWED	NOTE
Water Penetration, 15% of Positive Design Pressure at 13.5 psf	Pass	No leakage	

Mock Up #1: Structural Overload Load per TAS 202/ASTM E330

LOAD (psf)	INDICATOR LOCATION	DEFLECTION (in.)		PERMANENT SET (in.)	
		MEASURED	ALLOWED	MEASURED	ALLOWED
+135.0 Test Pressure	2	1.27	N/A	0.08	0.29
	5	0.04	N/A	<0.01	0.04
-127.5 Test Pressure	2	1.19	N/A	0.09	0.29
	5	<0.01	N/A	<0.01	0.04

Note 3: See Sketch #1 for indicator locations.

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

Mock Up #4: Preload per ASTM E330

TITLE OF TEST	RESULTS	ALLOWED	NOTE
Preload @ +45psf	--	--	

Mock Up #4: Air Leakage per TAS 202/ASTM E283

TITLE OF TEST	RESULTS	ALLOWED	NOTE
Air Leakage, Infiltration at 1.57 psf (25 mph)	0.01 cfm/ft ²	Report	4
Air Leakage, Infiltration at 6.27 psf (50 mph)	0.01 cfm/ft ²	0.06 cfm/ft ² max.	4

Note 4: Test Date 10/22/20 (Air Note Only)

Mock Up #4: Water Penetration per TAS 202/ASTM E331

TITLE OF TEST	RESULTS	ALLOWED	NOTE
Water Penetration, 15% of Positive Design Pressure at 13.5 psf	Pass	No leakage	

Mock Up #4: Preload and Design Load per TAS 202/ASTM E330

LOAD (psf)	INDICATOR LOCATION	DEFLECTION (in.)		PERMANENT SET (in.)	
		MEASURED	ALLOWED	MEASURED	ALLOWED
+67.5	2	0.69	N/A	0.06	N/A
50% of Test Pressure	5	0.81	N/A	<0.01	N/A
+90.0	2	0.69	1.20	<0.01	N/A
Design Pressure	5	0.89	1.20	<0.01	N/A
-63.75	2	0.78	N/A	0.05	N/A
50% of Test Pressure	5	0.82	N/A	0.15	N/A
-85.0	2	1.09	1.20	<0.01	N/A
Design Pressure	5	0.91	1.20	0.03	N/A

Mock Up #4: Repeat Air Leakage per TAS 202/ASTM E283

TITLE OF TEST	RESULTS	ALLOWED	NOTE
Air Leakage, Infiltration at 1.57 psf (25 mph)	<0.01 cfm/ft ²	Report	5
Air Leakage, Infiltration at 6.27 psf (50 mph)	<0.01 cfm/ft ²	0.06 cfm/ft ² max.	5

Note 5: Test Date 10/23/20 (Air Note Only)

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

Mock Up #4: Repeat Water Penetration per TAS 202/ASTM E331

TITLE OF TEST	RESULTS	ALLOWED	NOTE
Water Penetration, 15% of Positive Design Pressure at 13.5 psf	Pass	No leakage	

Mock Up #4: Structural Overload Load per TAS 202/ASTM E330

LOAD (psf)	INDICATOR LOCATION	DEFLECTION (in.)		PERMANENT SET (in.)	
		MEASURED	ALLOWED	MEASURED	ALLOWED
+135.0	2	1.36	N/A	0.25	0.29
Test Pressure	5	1.63	N/A	0.12	0.29
-127.5	2	1.65	N/A	0.12	0.29
Test Pressure	5	1.28	N/A	0.14	0.29

Note 6: See Sketch #2 for indicator locations.

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

Protocol TAS 201-94, Large Missile Impact Procedures

Test Dates: 10/18/20 through 10/28/20

The temperature during testing was 75°F to 85°F. The results are tabulated as follows:

Mock Up #1

IMPACT #	MISSILE WEIGHT (lbs.)	MISSILE LENGTH (in.)	MISSILE VELOCITY (ft./sec.)
1	9.0	96	49.5
2			50.1
3			50.1

Note 7: See Sketch #3 for impact locations.

Mock Up #2

IMPACT #	MISSILE WEIGHT (lbs.)	MISSILE LENGTH (in.)	MISSILE VELOCITY (ft./sec.)
1	9.0	96	49.7
2			49.8
3			49.6

Note 8: See Sketch #4 for impact locations.

Mock Up #3

IMPACT #	MISSILE WEIGHT (lbs.)	MISSILE LENGTH (in.)	MISSILE VELOCITY (ft./sec.)
1	9.0	96	51.3
2			49.5
3			49.4

Note 9: See Sketch #5 for impact locations.

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

Mock Up #4

IMPACT #	MISSILE WEIGHT (lbs.)	MISSILE LENGTH (in.)	MISSILE VELOCITY (ft./sec.)
1	9.0	96	51.2
2			51.4
3			49.9
4			49.3
5			51.8

Note 10: See Sketch #6 for impact locations.

Mock Up #5

IMPACT #	MISSILE WEIGHT (lbs.)	MISSILE LENGTH (in.)	MISSILE VELOCITY (ft./sec.)
1	9.0	96	51.1
2			49.8
3			50.3

Note 11: See Sketch #7 for impact locations.

Mock Up #6

IMPACT #	MISSILE WEIGHT (lbs.)	MISSILE LENGTH (in.)	MISSILE VELOCITY (ft./sec.)
1	9.0	96	50.1
2			49.5
3			51.1

Note 12: See Sketch #8 for impact locations.

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

Protocol TAS 203-94, Cyclic Wind Pressure Loading
Test Dates: 10/18/20 through 10/28/20

The temperature during testing was 75°F to 85°F. The results are tabulated as follows:

Mock Up #1: Cyclic Test Spectrum and Average Cycle Time per TAS 203

DESIGN PRESSURE	STAGE		
+90.0 / -85.0 psf	1	2	3
POSITIVE PRESSURE RANGE (psf)	0 – 45.0	0 – 54.0	0 – 117.0
AVERAGE CYCLE TIME (sec.)	3.9	4.2	1.0
NUMBER OF CYCLES	600	70	1
	4	5	6
NEGATIVE PRESSURE RANGE (psf)	0 – 42.5	0 – 51.0	0 – 110.5
AVERAGE CYCLE TIME (sec.)	3.3	3.6	1.0
NUMBER OF CYCLES	600	70	1

Mock Up #1: Positive Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)	PERCENT RECOVERY	
			MEASURED %	ALLOWED %
2	0.31	<0.01	> 99	> 90

Mock Up #1: Negative Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)	PERCENT RECOVERY	
			MEASURED %	ALLOWED %
2	0.19	0.01	95	> 90

Note 13: See Sketch #9 for indicator locations.

Mock Up #2: Cyclic Test Spectrum and Average Cycle Time per TAS 203

DESIGN PRESSURE	STAGE		
+90.0 / -85.0 psf	1	2	3
POSITIVE PRESSURE RANGE (psf)	0 – 45.0	0 – 54.0	0 – 117.0
AVERAGE CYCLE TIME (sec.)	3.9	4.3	1.0
NUMBER OF CYCLES	600	70	1
	4	5	6
NEGATIVE PRESSURE RANGE (psf)	0 – 42.5	0 – 51.0	0 – 110.5
AVERAGE CYCLE TIME (sec.)	4.3	5.4	1.0
NUMBER OF CYCLES	600	70	1

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

Mock Up #2: Positive Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)	PERCENT RECOVERY	
			MEASURED %	ALLOWED %
2	0.21	0.02	> 90	> 90

Mock Up #2: Negative Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)	PERCENT RECOVERY	
			MEASURED %	ALLOWED %
2	0.14	<0.01	> 99	> 90

Note 14: See Sketch #9 for indicator locations.

Mock Up #3: Cyclic Test Spectrum and Average Cycle Time per TAS 203

DESIGN PRESSURE	STAGE		
+90.0 / -85.0 psf	1	2	3
POSITIVE PRESSURE RANGE (psf)	0 – 45.0	0 – 54.0	0 – 117.0
AVERAGE CYCLE TIME (sec.)	3.7	4.0	1.0
NUMBER OF CYCLES	600	70	1
	4	5	6
NEGATIVE PRESSURE RANGE (psf)	0 – 42.5	0 – 51.0	0 – 110.5
AVERAGE CYCLE TIME (sec.)	3.9	5.4	1.0
NUMBER OF CYCLES	600	70	1

Mock Up #3: Positive Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)	PERCENT RECOVERY	
			MEASURED %	ALLOWED %
2	0.15	<0.01	> 99	> 90

Mock Up #3: Negative Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)	PERCENT RECOVERY	
			MEASURED %	ALLOWED %
2	0.12	<0.01	> 99	> 90

Note 15: See Sketch #9 for indicator locations.

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

Mock Up #4: Cyclic Test Spectrum and Average Cycle Time per TAS 203

DESIGN PRESSURE	STAGE		
+90.0 / -85.0 psf	1	2	3
POSITIVE PRESSURE RANGE (psf)	0 – 45.0	0 – 54.0	0 – 117.0
AVERAGE CYCLE TIME (sec.)	5.7	5.1	1.0
NUMBER OF CYCLES	600	70	1
	4	5	6
NEGATIVE PRESSURE RANGE (psf)	0 – 42.5	0 – 51.0	0 – 110.5
AVERAGE CYCLE TIME (sec.)	4.5	5.0	1.0
NUMBER OF CYCLES	600	70	1

Mock Up #4: Positive Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)	PERCENT RECOVERY	
			MEASURED %	ALLOWED %
2	0.38	<0.01	> 99	> 90

Mock Up #4: Negative Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)	PERCENT RECOVERY	
			MEASURED %	ALLOWED %
2	0.27	<0.01	> 99	> 90

Note 16: See Sketch #10 for indicator locations.

Mock Up #5: Cyclic Test Spectrum and Average Cycle Time per TAS 203

DESIGN PRESSURE	STAGE		
+90.0 / -85.0 psf	1	2	3
POSITIVE PRESSURE RANGE (psf)	0 – 45.0	0 – 54.0	0 – 117.0
AVERAGE CYCLE TIME (sec.)	4.3	4.9	1.0
NUMBER OF CYCLES	600	70	1
	4	5	6
NEGATIVE PRESSURE RANGE (psf)	0 – 42.5	0 – 51.0	0 – 110.5
AVERAGE CYCLE TIME (sec.)	4.0	4.6	1.0
NUMBER OF CYCLES	600	70	1

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

Mock Up #5: Positive Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)	PERCENT RECOVERY	
			MEASURED %	ALLOWED %
2	0.33	0.01	97	> 90

Mock Up #5: Negative Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)	PERCENT RECOVERY	
			MEASURED %	ALLOWED %
2	0.17	0.01	94	> 90

Note 17: See Sketch #11 for indicator locations.

Mock Up #6: Cyclic Test Spectrum and Average Cycle Time per TAS 203

DESIGN PRESSURE	STAGE		
+90.0 / -85.0 psf	1	2	3
POSITIVE PRESSURE RANGE (psf)	0 – 45.0	0 – 54.0	0 – 117.0
AVERAGE CYCLE TIME (sec.)	4.4	5.2	1.0
NUMBER OF CYCLES	600	70	1
	4	5	6
NEGATIVE PRESSURE RANGE (psf)	0 – 42.5	0 – 51.0	0 – 110.5
AVERAGE CYCLE TIME (sec.)	4.4	4.5	1.0
NUMBER OF CYCLES	600	70	1

Mock Up #6: Positive Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)	PERCENT RECOVERY	
			MEASURED %	ALLOWED %
2	0.37	0.01	97	> 90

Mock Up #6: Negative Cyclic Load per TAS 203

INDICATOR LOCATION	MAXIMUM DEFLECTION (in.)	PERMANENT SET (in.)	PERCENT RECOVERY	
			MEASURED %	ALLOWED %
2	0.15	0.01	93	> 90

Note 18: See Sketch #11 for indicator locations.

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

SECTION 6

CONCLUSION

The mock-ups met the specified performance requirements.

No signs of failure were observed in any area of the mock ups during the TAS 202 testing; as such, the mock ups satisfy the requirements of TAS 202. Upon completion of testing, mock ups tested for TAS 202-94 met the requirements of Section 1620 of the Florida Building Code, Building.

The large missiles impacted each intended target. Each impact location was carefully inspected. No signs of penetration, rupture, or opening after the large missile impact test were observed; as such, the mock ups satisfy the large missile requirements of TAS 201. Upon completion of testing, mock ups tested for TAS 201-94 met the requirements of Section 1626 of the Florida Building Code, Building.

No signs of failure were observed in any area of the mock ups during the cyclic load test; as such, the mock ups satisfy the cyclic load requirements of TAS 203. Upon completion of testing, mock ups tested for TAS 203-94 met the requirements of Section 1625 of the Florida Building Code, Building.

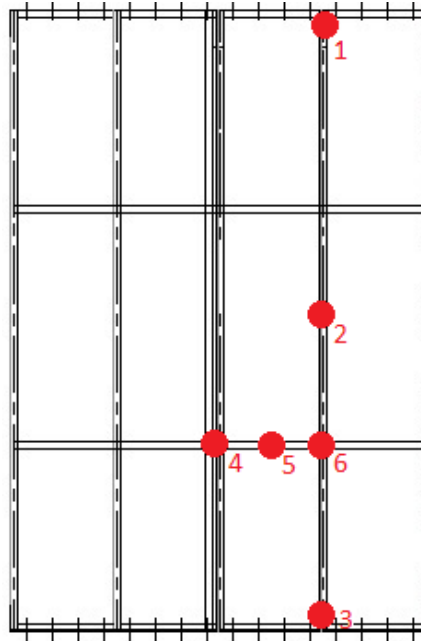
TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

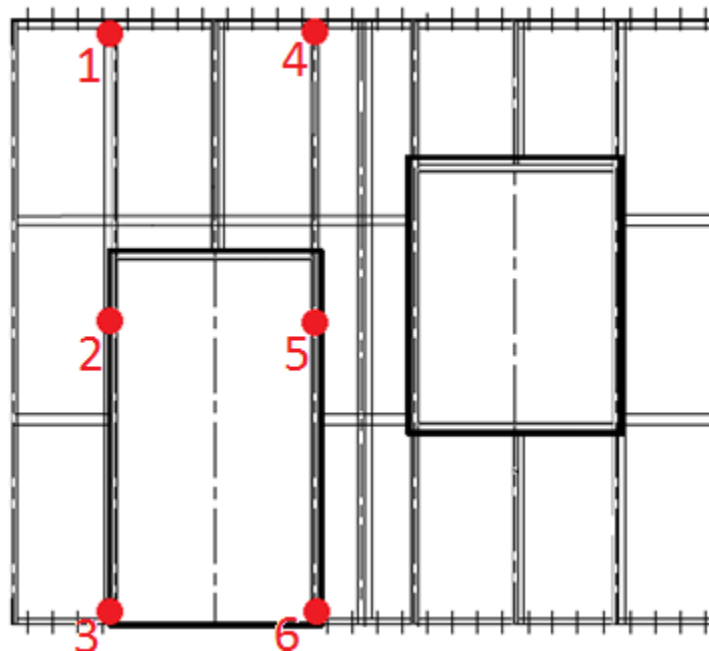
SECTION 7

SKETCHES



Sketch No. 1

Mock Up 1 – Structural Loads Indicator Locations



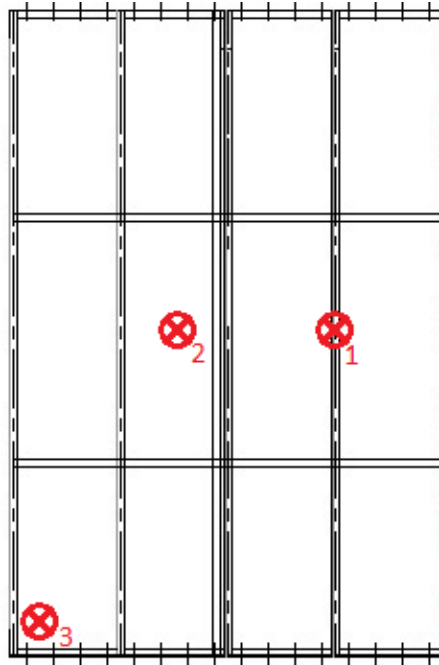
Sketch No. 2

Mock Up 4 – Structural Loads Indicator Locations

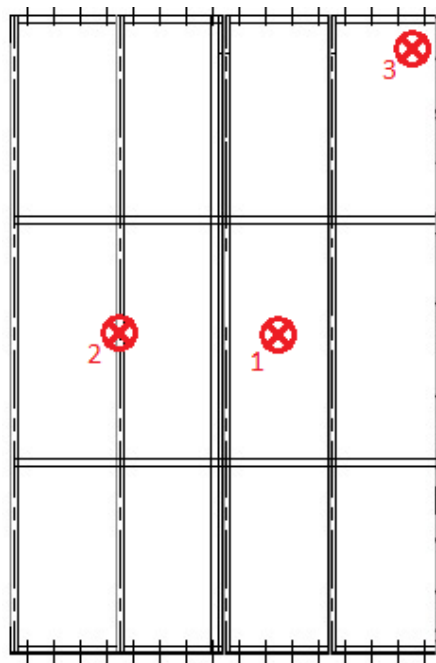
TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20



Sketch No. 3
Mock Up 1 –Impact Locations

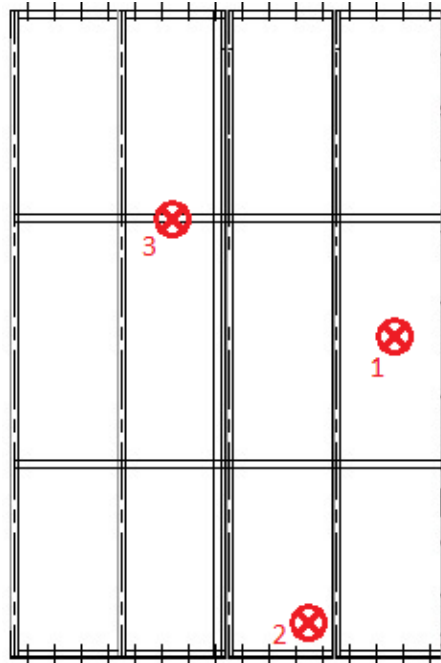


Sketch No. 4
Mock Up 2 –Impact Locations

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

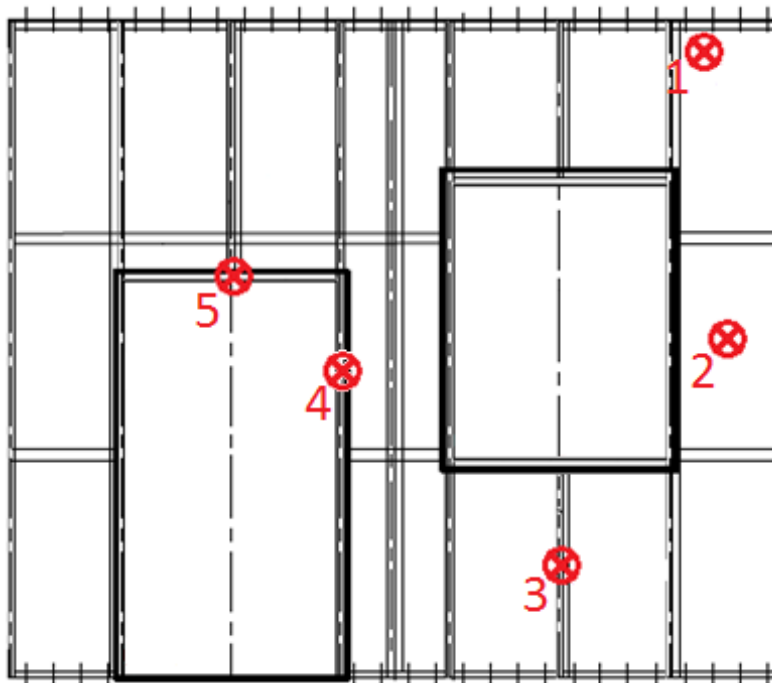
Report No.: L4423.01-450-44 R0

Date: 12/16/20



Sketch No. 5

Mock Up 3 - Impact Locations



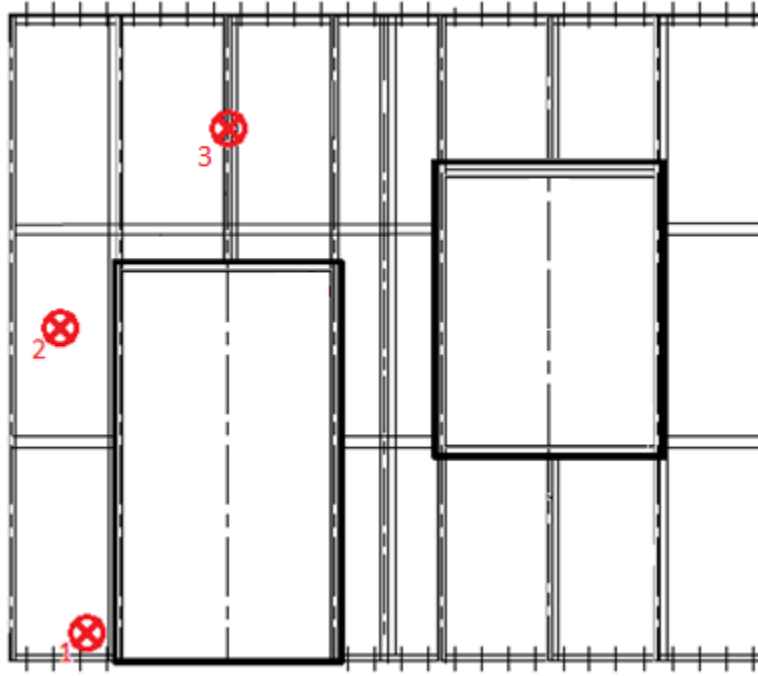
Sketch No. 6

Mock Up 4 - Impact Locations

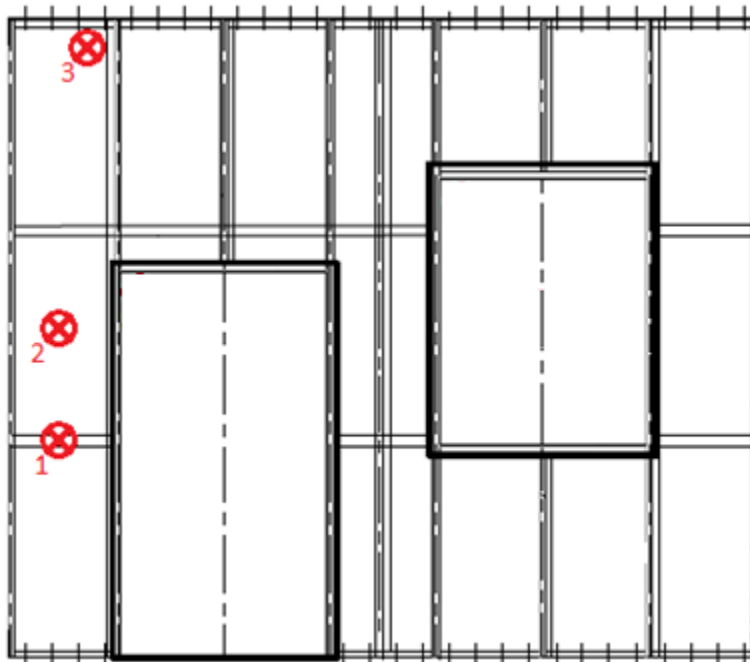
TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20



Sketch No. 7
Mock Up 5 –Impact Locations

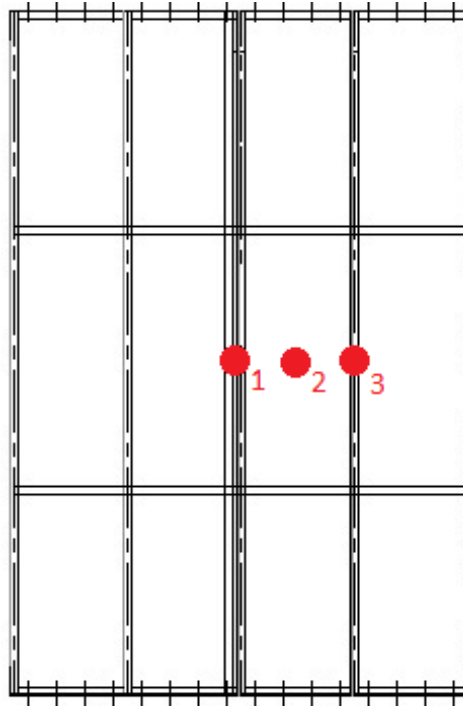


Sketch No. 8
Mock Up 6 –Impact Locations

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

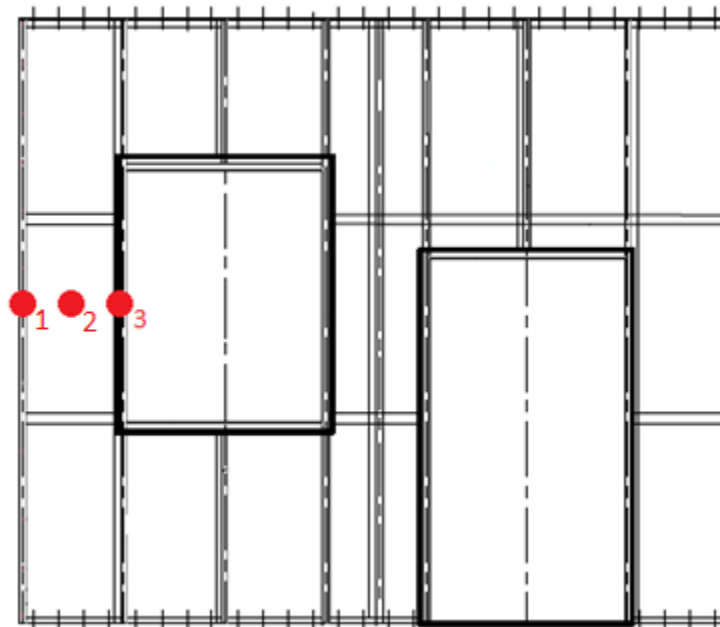
Report No.: L4423.01-450-44 R0

Date: 12/16/20



Sketch No. 9

Mock Ups 1, 2 & 3 – Cycling Indicator Location



Sketch No. 10

Mock Up 4, 5 & 6 – Cycling Indicator Location

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

SECTION 8

PHOTOGRAPHS

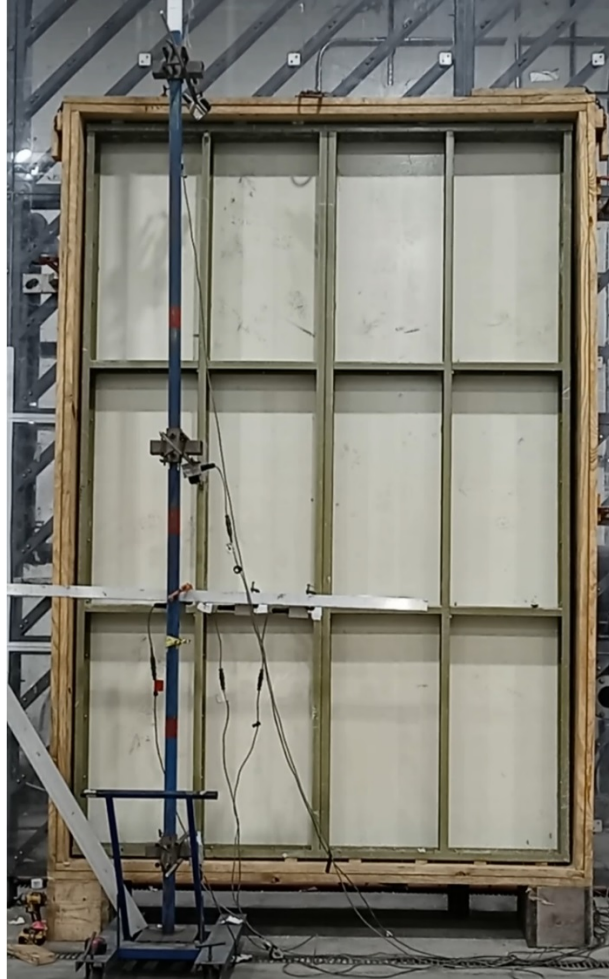


Photo No. 1
Specimen #1 Negative Structural Loads

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20



Photo No. 2
Specimen #4 Large Missile Impacts



Total Quality. Assured.

2658 Electronics Way
West Palm Beach, Florida 33407

Telephone: 561-881-0020
www.intertek.com/building

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

SECTION 9

DRAWINGS

The "As-Built" drawings have been reviewed by Intertek B&C and are representative of the project reported herein. Project construction was verified by Intertek B&C per the drawings included in this report. Any deviations are documented herein or on the drawings.



NORTHSTAR EXTERIOR WALL PANEL SYSTEM

A FIBER REINFORCED POLYMER EXTERIOR WALL PANEL WITH A 1/4" THICK
FIBER REINFORCED POLYMER BALLISTIC ARMOR PLATE SHEATHING BONDED
TO A 6" FIBER REINFORCED POLYMER FRAME ASSEMBLY

DESIGN PRESSURE: +90 / -85 PSF
MISSILE IMPACT: LEVEL D
DEFLECTION LIMIT: L/120



NORTHSTAR TECHNOLOGIES GROUP INC
365 FIFTH AVE S.
NAPLES, FLORIDA 34102
239.850.6253

PINGLESE@NORTHSTARTGI.COM

NORTHSTARTGI.COM

The information contained in this document is proprietary, confidential, privileged and only for the use of the intended recipients. No part of this document may be used, published, or redistributed in any manner without the prior written consent of Northstar Technologies Group Inc. All trademarks, service marks, trade names, product names, and logos appearing in this document are the property of Northstar Technologies Group Inc. (Patent Pending)

ENGINEER

Scott Wolters
FL PE# 62354

Wolters Engineering
(COA# 27194)
15211 97th Road N.
West Palm Beach, FL 33412
561.225.1982

JOB NUMBER: 20201214

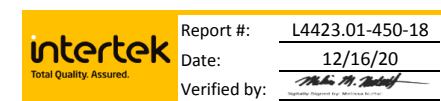
DATE: 12.14.2020

DRAWN BY: P Inglesse

REVISIONS

NO.	DATE	DRWN	CHKD
1	12.14.20	PI	PI

**COVER
PAGE**



Report #: L4423.01-450-18

Date: 12/16/20

Verified by:

LARGE MISSILE

2"X4" 9.0 LB +0.25 / -0 +0 /-4
VELOCITY 50 FT/S
LEVEL "D"

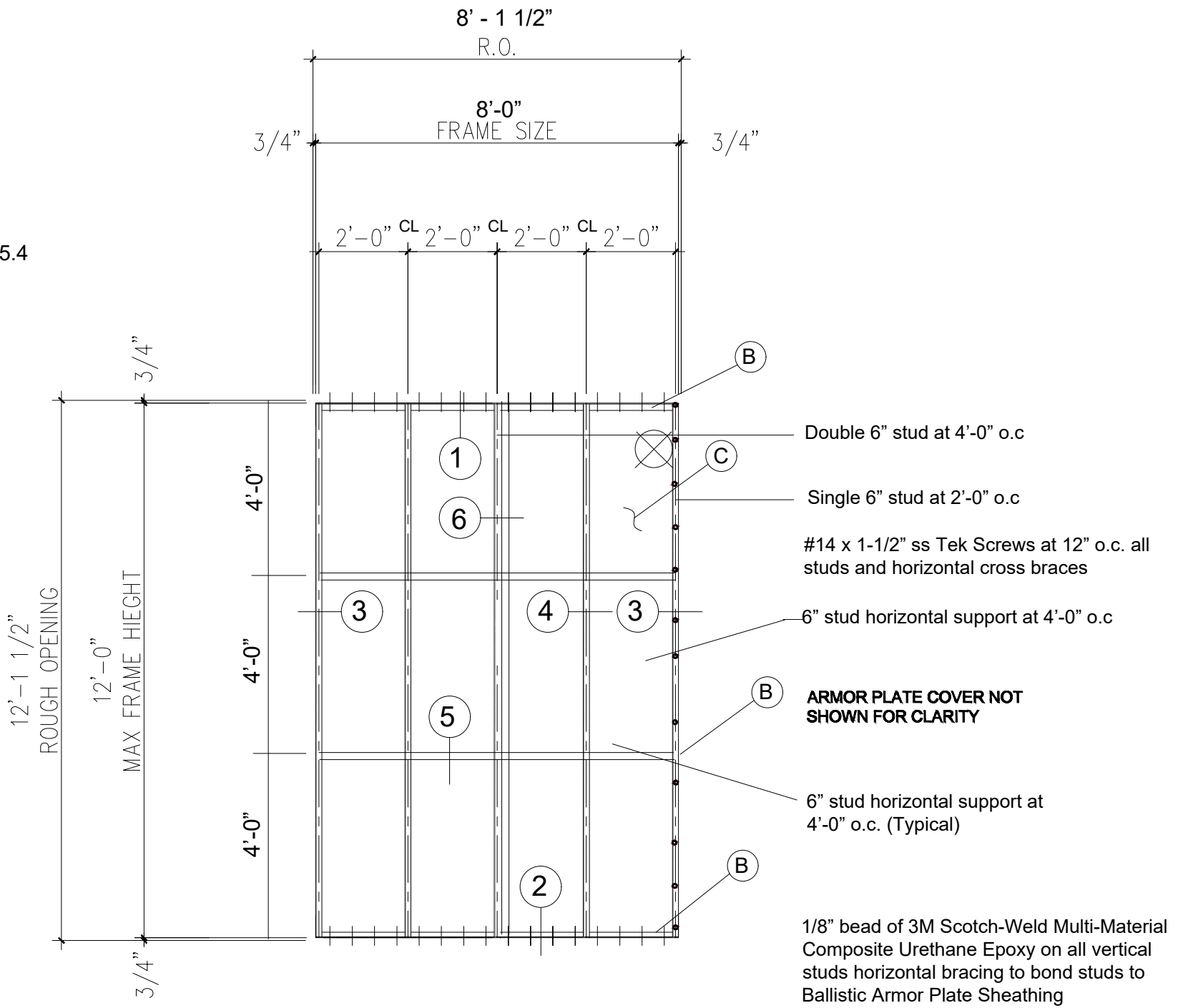
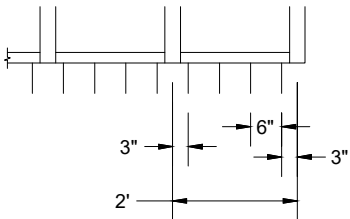
DESIGN PRESURE

DESIGN PRESSURE: +90 / - 85 PSF
CYCLIC PRESSURE: FATIGUE SEQUENCE LOADING TABLE 1625.4

ANCHORING TYPE

5/16" DIA x 3-1/4" ULTRACON BY ELCO
INTO SOUTHERN YELLOW PINE # 2 MIN. EDGE DISTANCE
FROM ANY WOOD EDGE.

ANCHORING
@ HEAD & SILL



ELEVATION 1 - LARGE MISSILE



365 FIFTH AVE S.
NAPLES, FLORIDA 34102

NORTHSTARTGI.COM

The information contained in this document is proprietary, confidential, privileged and only for the use of the intended recipients. No part of this document may be used, published, or redistributed in any manner without the prior written consent of Northstar Technologies Group Inc. All trademarks, service marks, trade names, product names, and logos appearing in this document are the property of Northstar Technologies Group Inc. (Patent Pending)

CLIENT

Northstar
Technologies Group

365 Fifth Avenue S. Naples, Florida 34102

Phone # 239.850.6253
EMAIL plingese@northstartgi.com

PROJECT

Northstar Exterior
Wall Panel

JOB NUMBER:

DATE: 09.23.2020

DRAWN BY: P Inglese

REVISIONS

NO.	DATE	DRWN	CHKD
1	09.23.20	PI	PI

intertek
Total Quality Assured.

Report #:

L4423.01-450-18

Date:

12/16/20

Verified by:

LARGE MISSILE

2"X4" 9.0 LB +0.25 / -0 +0 /-4
VELOCITY 50 FT/S
LEVEL "D"

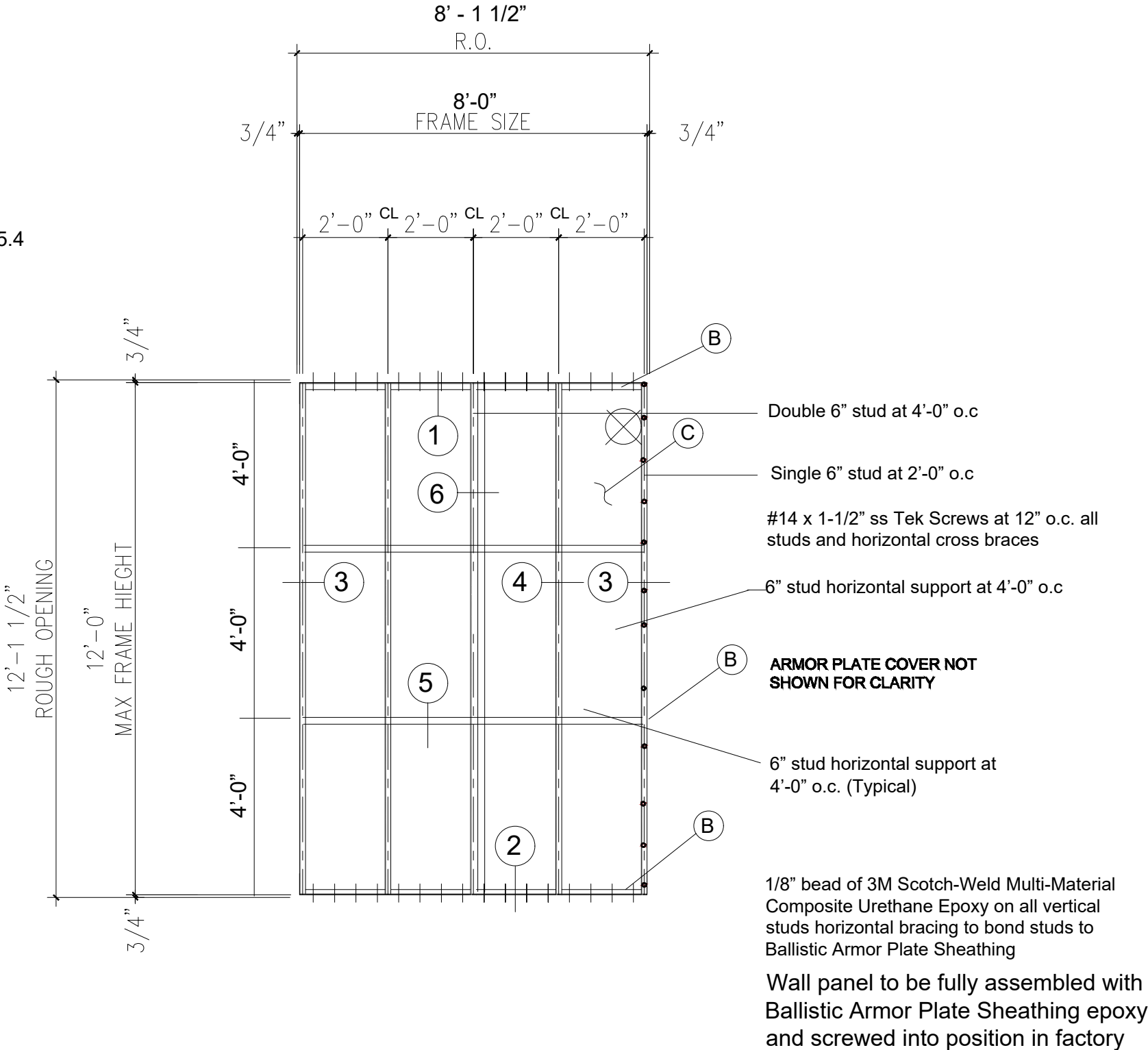
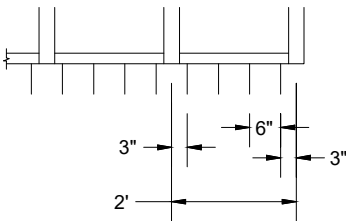
DESIGN PRESURE

DESIGN PRESSURE: +90 / - 85 PSF
CYCLIC PRESSURE: FATIGUE SEQUENCE LOADING TABLE 1625.4

ANCHORING TYPE

5/16" DIA x 3-1/4" ULRACON BY ELCO
INTO SOUTHERN YELLOW PINE # 2 MIN. EDGE DISTANCE
FROM ANY WOOD EDGE.

ANCHORING
@ HEAD & SILL



ELEVATION 2 - LARGE MISSILE



365 FIFTH AVE S.
NAPLES, FLORIDA 34102

NORTHSTARTGI.COM

The information contained in this document is proprietary, confidential, privileged and only for the use of the intended recipients. No part of this document may be used, published, or redistributed in any manner without the prior written consent of Northstar Technologies Group Inc. All trademarks, service marks, trade names, product names, and logos appearing in this document are the property of Northstar Technologies Group Inc. (Patent Pending)

CLIENT

Northstar
Technologies Group

365 Fifth Avenue S. Naples, Florida 34102

Phone # 239.850.6253
EMAIL plingese@northstartgi.com

PROJECT

Northstar Exterior
Wall Panel

JOB NUMBER:

DATE: 09.23.2020

DRAWN BY: P Inglese

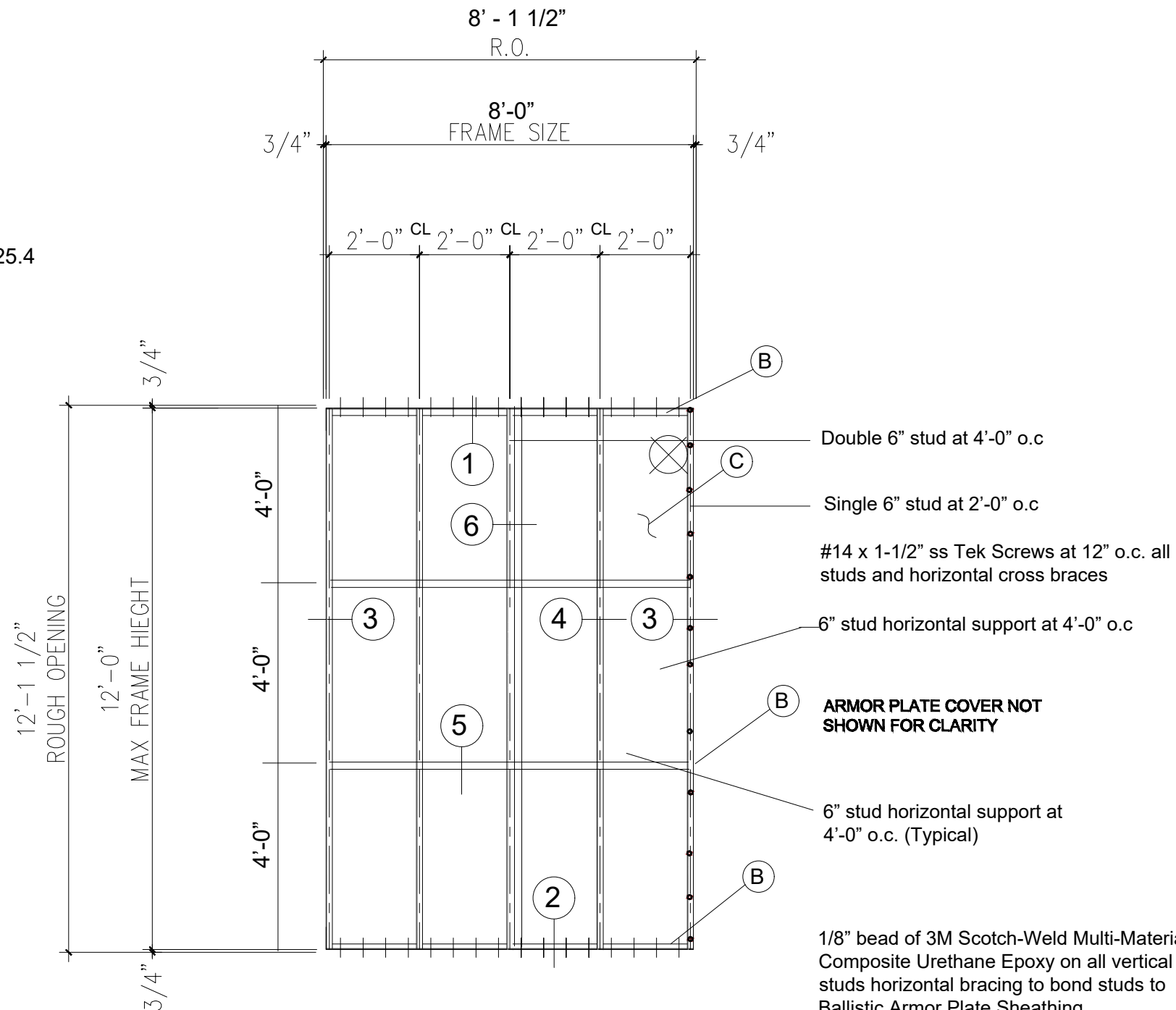
REVISIONS

NO.	DATE	DRWN	CHKD
1	09.23.20	PI	PI

2"X4" 9.0 LB +0.25 / -0 +0 /-4
VELOCITY 50 FT/S
LEVEL "D"

DESIGN PRESSURE: +90 / - 85 PSF
CYCLIC PRESSURE: FATIGUE SEQUENCE LOADING TABLE 1625.4

5/16" DIA x 3-1/4" ULRACON BY ELCO
INTO SOUTHERN YELLOW PINE # 2 MIN. EDGE DISTANCE
FROM ANY WOOD EDGE.



ELEVATION 3 - LARGE MISSILE

Wall panel to be fully assembled with Ballistic Armor Plate Sheathing epoxy and screwed into position in factory

LARGE MISSILE

2"X4" 9.0 LB +0.25 / -0 +0 /-4
VELOCITY 50 FT/S
LEVEL "D"

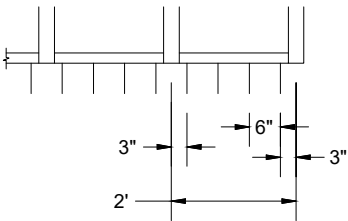
DESIGN PRESURE

DESIGN PRESSURE: +90 / - 85 PSF
CYCLIC PRESSURE: FATIGUE SEQUENCE LOADING TABLE 1625.4

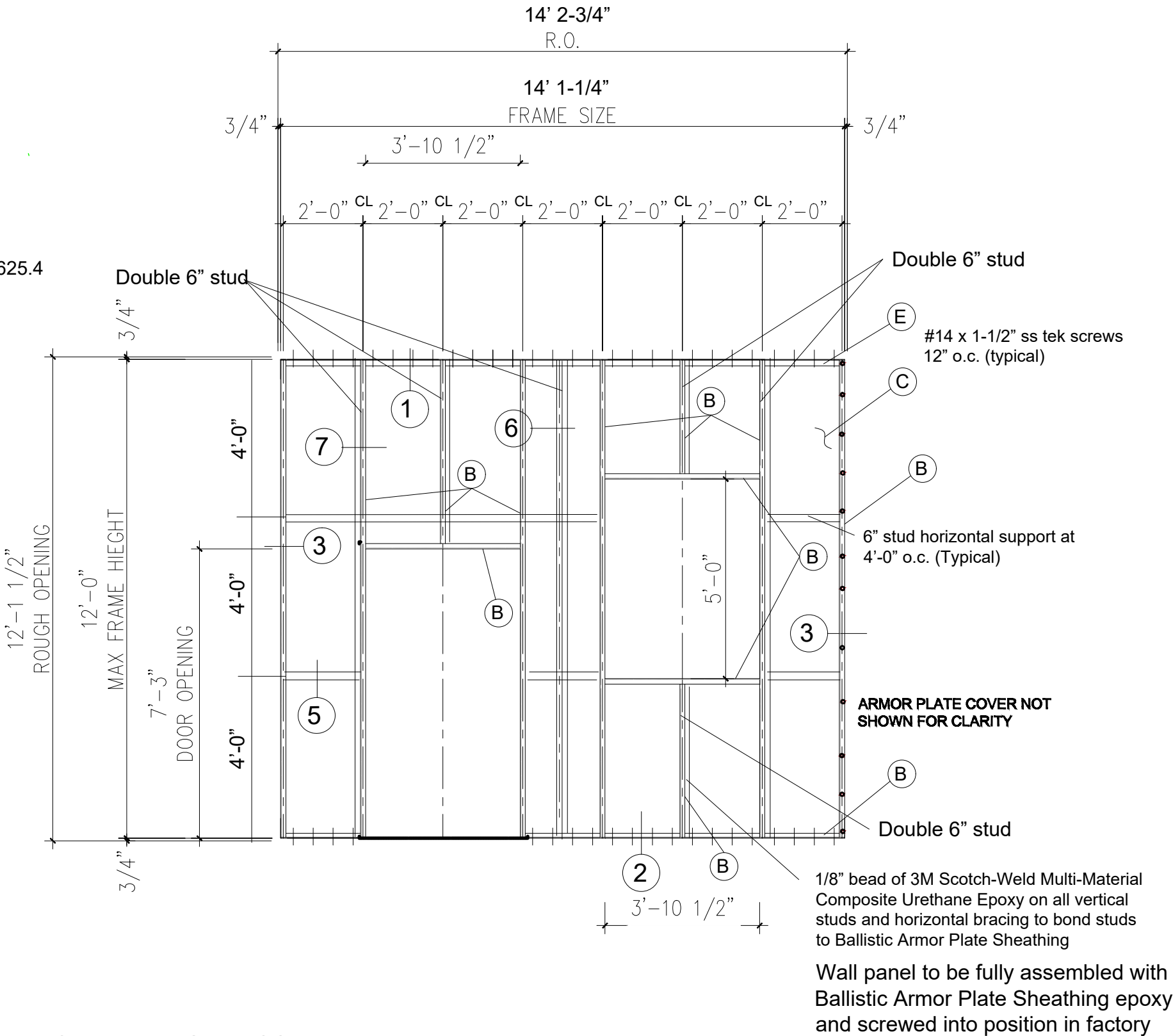
ANCHORING TYPE

5/16" DIA x 3-1/4" ULTRACON BY ELCO
INTO SOUTHERN YELLOW PINE # 2 MIN. EDGE DISTANCE
FROM ANY WOOD EDGE.

ANCHORING SPACING
@ HEAD & SILL



ELEVATION 4 - LARGE MISSILE



365 FIFTH AVE S.
NAPLES, FLORIDA 34102

NORTHSTARTGI.COM

The information contained in this document is proprietary, confidential, privileged and only for the use of the intended recipients. No part of this document may be used, published, or redistributed in any manner without the prior written consent of Northstar Technologies Group Inc. All trademarks, service marks, trade names, product names, and logos appearing in this document are the property of Northstar Technologies Group Inc. (Patent Pending)

CLIENT

Northstar
Technologies Group

365 Fifth Avenue S. Naples, Florida 34102

Phone # 239.850.6253
EMAIL plingese@northstartgi.com

PROJECT

Northstar Exterior
Wall Panel

JOB NUMBER:

DATE: 09.23.2020

DRAWN BY: P Inglese

REVISIONS

NO.	DATE	DRWN	CHKD
1	00.23.20	PI	PI



Report #: L4423.01-450-18
Date: 12/16/20
Verified by: 

LARGE MISSILE

2"X4" 9.0 LB +0.25 / -0 +0 /-4
VELOCITY 50 FT/S
LEVEL "D"

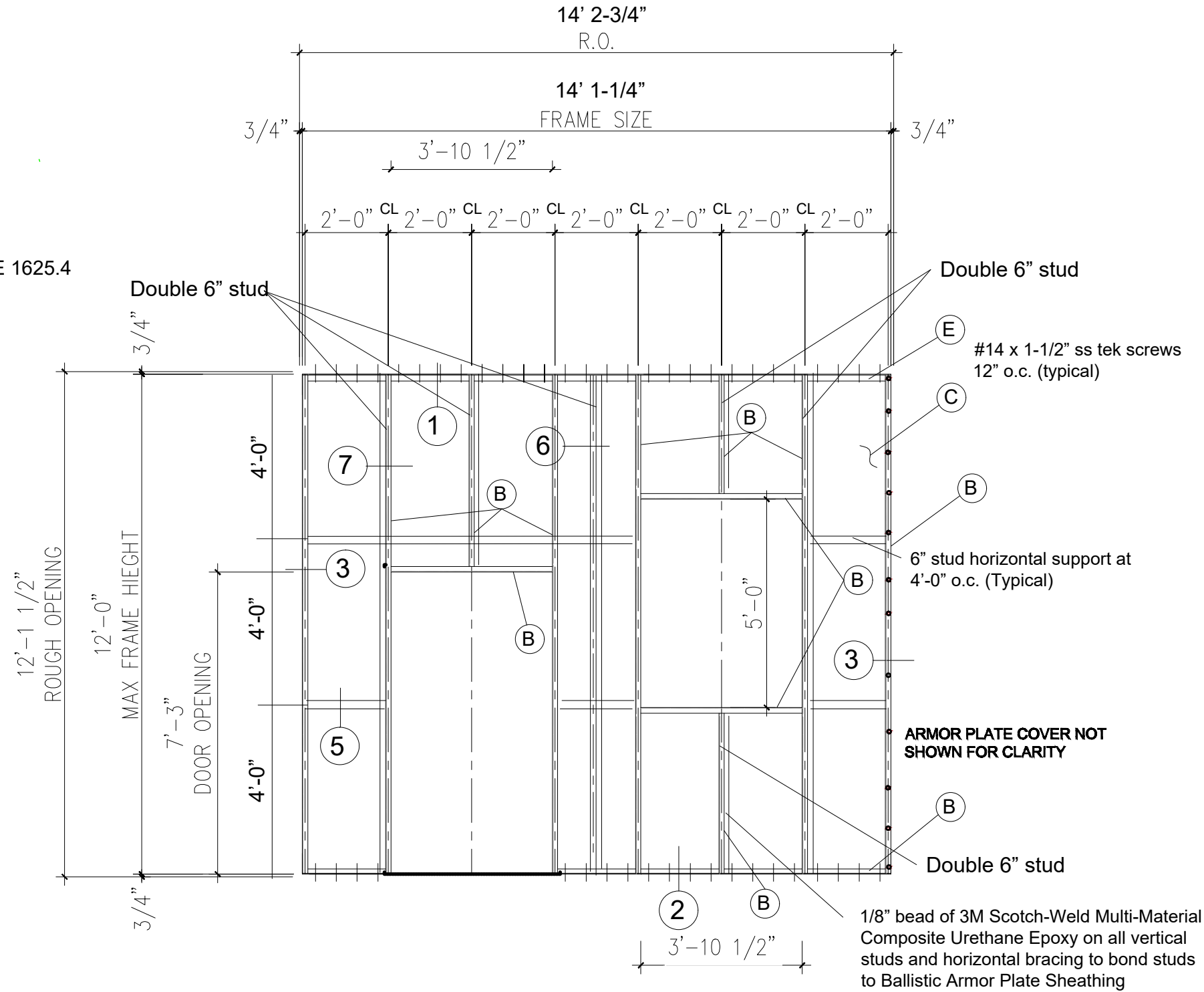
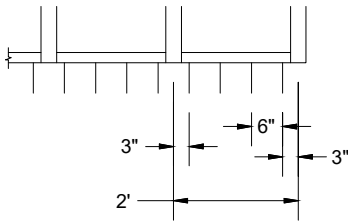
DESIGN PRESURE

DESIGN PRESSURE: +90 / - 85 PSF
CYCLIC PRESSURE: FATIGUE SEQUENCE LOADING TABLE 1625.4

ANCHORING TYPE

5/16" DIA x 3-1/4" ULTRACON BY ELCO
INTO SOUTHERN YELLOW PINE # 2 MIN. EDGE DISTANCE
FROM ANY WOOD EDGE.

ANCHORING SPACING
@ HEAD & SILL



ELEVATION 5 - LARGE MISSILE

The information contained in this document is proprietary, confidential, privileged and only for the use of the intended recipients. No part of this document may be used, published, or redistributed in any manner without the prior written consent of Northstar Technologies Group Inc. All trademarks, service marks, trade names, product names, and logos appearing in this document are the property of Northstar Technologies Group Inc. (Patent Pending)

CLIENT

**Northstar
Technologies Group**

365 Fifth Avenue S. Naples, Florida 34102

Phone # 239.850.6253
EMAIL plingese@northstartgi.com

PROJECT

**Northstar Exterior
Wall Panel**

JOB NUMBER:

DATE: 09.23.2020

DRAWN BY: P Inglese

REVISIONS

NO.	DATE	DRWN	CHKD
1	09.23.20	PI	PI

LARGE MISSILE

2"X4" 9.0 LB +0.25 / -0 +0 /-4
VELOCITY 50 FT/S
LEVEL "D"

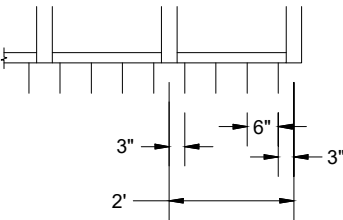
DESIGN PRESURE

DESIGN PRESSURE: +90 / - 85 PSF
CYCLIC PRESSURE: FATIGUE SEQUENCE LOADING TABLE 1625.4

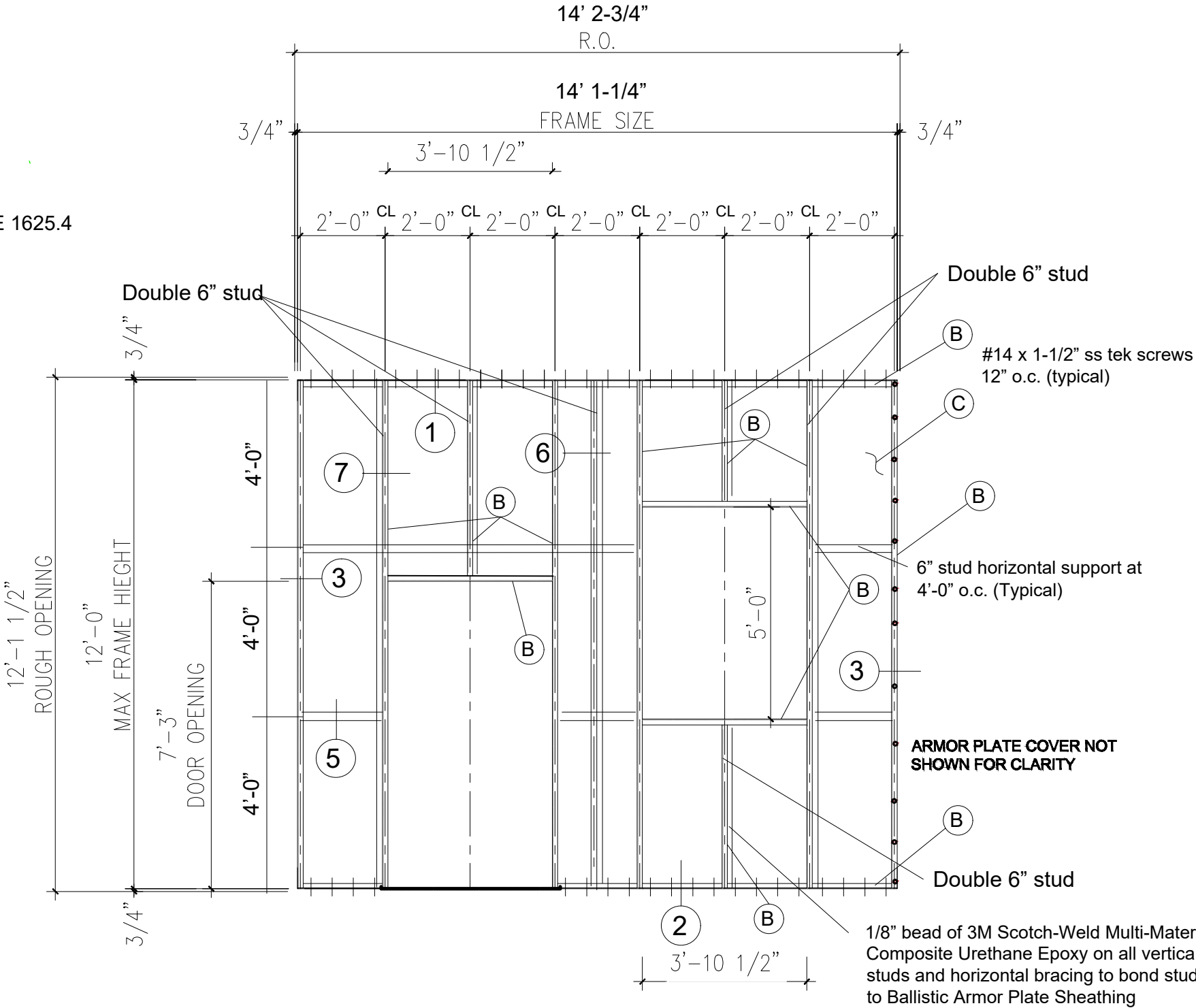
ANCHORING TYPE

5/16" DIA x 3-1/4" ULRACON BY ELCO
INTO SOUTHERN YELLOW PINE # 2 MIN. EDGE DISTANCE
FROM ANY WOOD EDGE.

ANCHORING SPACING
@ HEAD & SILL



ELEVATION 6 - LARGE MISSILE



Wall panel to be fully assembled with
Ballistic Armor Plate Sheathing epoxy
and screwed into position in factory



Total Quality. Assured.

Report #: L4423.01-450-18

Date: 12/16/20

Verified by: *Mark M. [Signature]*



365 FIFTH AVE S.
NAPLES, FLORIDA 34102

NORTHSTARTGI.COM

The information contained in this document is proprietary, confidential, privileged and only for the use of the intended recipients. No part of this document may be used, published, or redistributed in any manner without the prior written consent of Northstar Technologies Group Inc. All trademarks, service marks, trade names, product names, and logos appearing in this document are the property of Northstar Technologies Group Inc. (Patent Pending)

CLIENT

Northstar
Technologies Group

365 Fifth Avenue S. Naples, Florida 34102

Phone # 239.850.6253
EMAIL plingese@northstartgi.com

PROJECT

Northstar Exterior
Wall Panel

365 Fifth Avenue S. Naples, Florida 34102

JOB NUMBER:

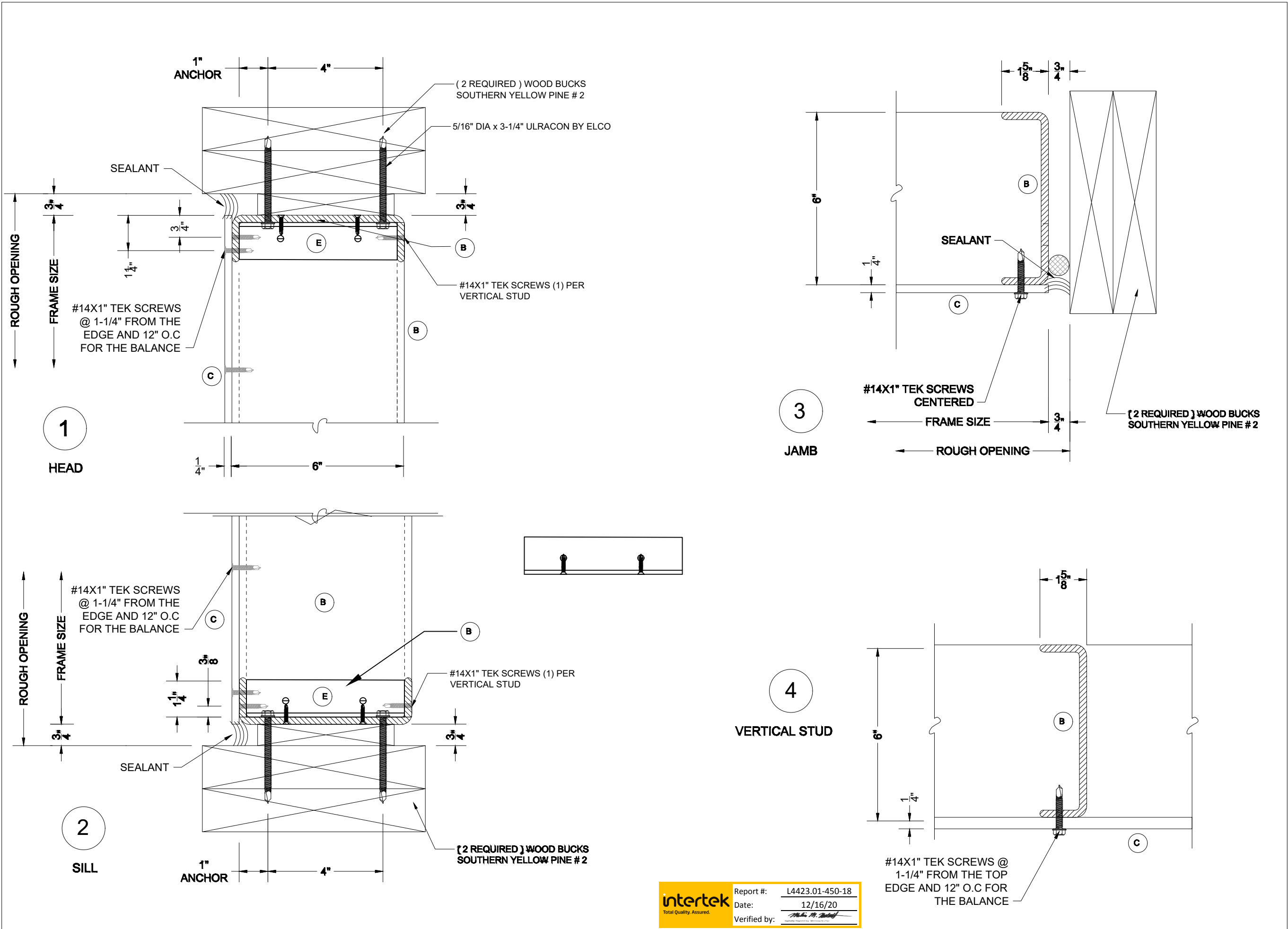
DATE: 09.23.2020

DRAWN BY: P Inglese

REVISIONS

NO.	DATE	DRWN	CHKD
1	09.23.20	PI	PI

6

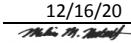




Total Quality. Assured.

Report #: L4423.01-450-18

Date: 12/16/20

Verified by: 

The information contained in this document is proprietary, confidential, privileged and only for the use of the intended recipients. No part of this document may be used, published, or redistributed in any manner without the prior written consent of Northstar Technologies Group Inc. All trademarks, service marks, trade names, product names, and logos appearing in this document are the property of Northstar Technologies Group Inc. (Patent Pending)

CLIENT

Northstar Technologies Group

365 Fifth Avenue S. Naples, Florida 34102

Phone # 239.850.6253
EMAIL pinglese@northstartgi.com

PROJECT

Northstar Exterior Wall Panel

365 Fifth Avenue S. Naples, Florida 34102

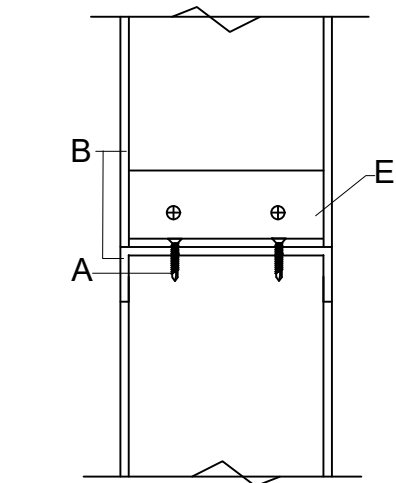
JOB NUMBER:

DATE: 09.23.2020

DRAWN BY: P Inglesse

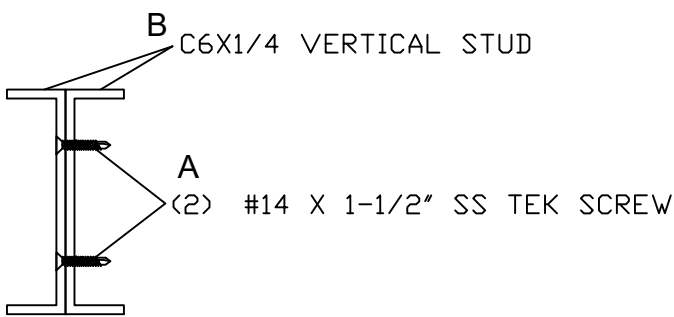
REVISIONS

NO.	DATE	DRWN	CHKD
1	09.23.20	PI	PI



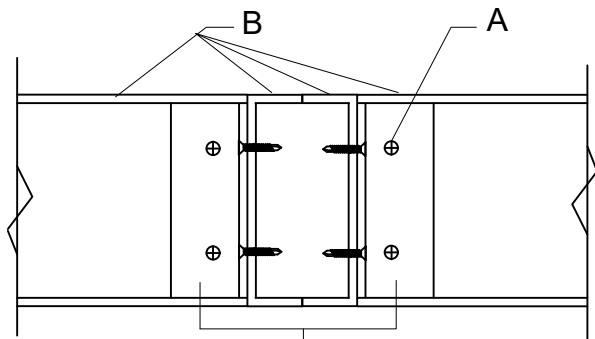
5

VERTICAL STUD TO HORIZONTAL STUD CONNECTION
AT END OF PANELS



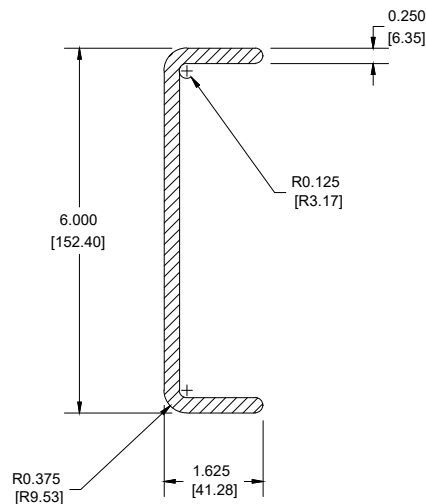
6

DOUBLE STUD CONNECTION DETAIL



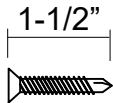
7

VERTICAL STUD TO HORIZONTAL ST
AT MID-POINT STUDS



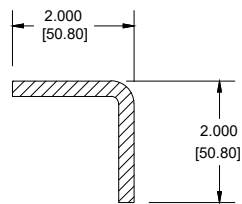
B

C6 X 1-5/8 STUDS
(FIBERGLASS)



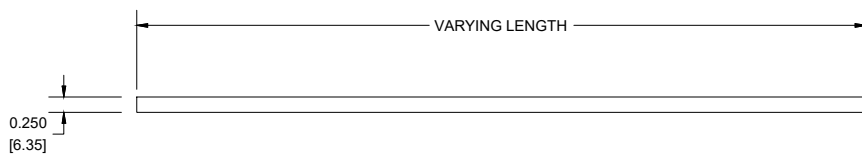
A #14 x 1-1/2" Self-Drilling Tek Screw
(stainless steel)

F 3M Scotch - Weld Mult-Material
Composite Urethane Epoxy



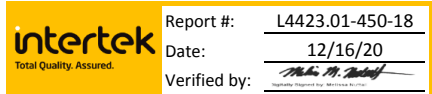
E

L2 x 1/4" CLIP ANGLE BRACKET
FIBERGLASS



C

FIBERGLASS BALLISTIC ARMOR PLATE
(COMPOSITE MATERIAL)



The information contained in this document is proprietary, confidential, privileged and only for the use of the intended recipients. No part of this document may be used, published, or redistributed in any manner without the prior written consent of Northstar Technologies Group Inc. All trademarks, service marks, trade names, product names, and logos appearing in this document are the property of Northstar Technologies Group Inc. (Patent Pending)

CLIENT

**Northstar
Technologies Group**

365 Fifth Avenue S. Naples, Florida 34102

Phone # 239.850.6253
EMAIL pinglese@northstartgi.com

PROJECT

**Northstar Exterior
Wall Panel**

365 Fifth Avenue S. Naples, Florida 34102

JOB NUMBER:

DATE: 09.23.2020

DRAWN BY: P Inglesse

REVISIONS

NO.	DATE	DRWN	CHKD
1	09.23.20	PI	PI



Total Quality. Assured.

2658 Electronics Way
West Palm Beach, Florida 33407

Telephone: 561-881-0020
www.intertek.com/building

TEST REPORT FOR NORTHSTAR TECHNOLOGIES

Report No.: L4423.01-450-44 R0

Date: 12/16/20

SECTION 10

REVISION LOG

REVISION #	DATE	PAGES	REVISION
0	12/16/20	N/A	Original Report Issue