TECHNOLOGY CENTRE

Technical Report

Title: Product wind resistance, dynamic watertightness and impact resistance testing of a NaturAL-X Façade for Ash & Lacy

Report No: N950-19-17790

Technical Report

Title:	Product wind resistance, dynamic water tightness and impact resistance testing a NaturAL-X Façade for Ash & Lacy
Customer:	Ash & Lacy, Bromford Lane, West Bromwich West Midlands, B70 7JJ
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Distribution: (confidential)	1 copy to Ash & Lacy 1 copy to project file

UKAS TESTING
0057

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CONTENTS

1 INTRODUCTION

This report describes tests carried out at VINCI Technology Centre UK Limited at the request of Ash & Lacy.

The test sample consisted of a sample of a NaturAL-X Façade manufactured by Ash & Lacy.

The tests were carried out on 15 October 2019 and were to determine the wind, water and impact resistance of the test sample. The test methods were in accordance with the CWCT Standard Test Methods for building envelopes, 2005, for:

Wind resistance – serviceability & safety.

Watertightness – dynamic pressure.

Impact resistance.

The testing was carried out in accordance with Technology Centre Method Statement C7587MS rev 0.

This test report relates only to the actual sample as tested and described herein.

The results are valid only for sample(s) tested and the conditions under which the tests were conducted.

The long-term durability of the façade system is not assessed by these test methods.

VINCI Technology Centre UK Limited is accredited to ISO/IEC 17025:2017 by the United Kingdom Accreditation Service as UKAS Testing Laboratory No. 0057.

VINCI Technology Centre UK Limited is Notified Body No. 1766.

VINCI Technology Centre UK Limited is certified by BSI for:

- ISO 9001:2008 Quality Management System,
- ISO 14001:2004 Environmental Management System,
- BS OHSAS 18001:2007 Occupational Health and Safety Management System.

The tests were witnessed by Y. Tian of Ash & Lacy.

2 SUMMARY AND CLASSIFICATION OF TEST RESULTS

The following summarises the results of the tests carried out. For full details refer to Sections 6, 7 and 8.

2.1 SUMMARY OF TEST RESULTS

TABLE 1

Date	Test number	Test description	Result
15 October 2019	1	Wind resistance – serviceability	Pass
15 October 2019	2	Wind resistance – safety	Pass
15 October 2019	3	Watertightness - dynamic	Pass
15 October 2019	4	Impact resistance	Pass

2.2 CLASSIFICATION

TABLE 2

Test	Standard	Classification / Declared value
Wind resistance	CWCT	±2400 pascals serviceability ±3600 pascals safety
Watertightness - dynamic	CWCT	600 pascals
Impact resistance	CWCT TN76	Class 1 serviceability Negligible risk safety

3 DESCRIPTION OF TEST SAMPLE

3.1 GENERAL ARRANGEMENT

The sample was as shown in the photo below and the Ash & Lacy technical report included as an appendix to this report.

The test sample measured 5.0 m high by 5.0 m wide.

The sample was mounted on a backing wall supplied by Technology Centre, comprising of 100 x 100 m angle and RCM boards.

PHOTO 0569

TEST SAMPLE ELEVATION

3.2 CONTROLLED DISMANTLING

During the dismantling of the sample no discrepancies from the drawings were found.

PHOTO 0901

TEST SAMPLE DURING DISMANTLE

PHOTO 0905

VIEW IN CAVITY

PHOTO 0906

SUPPORT BRACKET

PHOTO 0907

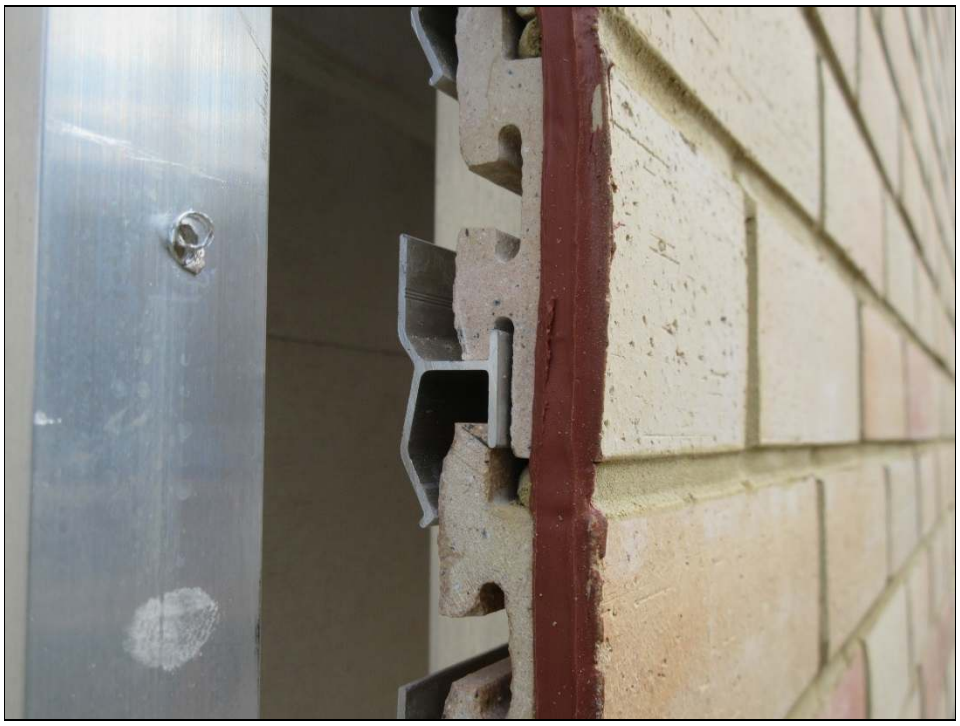
SUPPORT BRACKET

PHOTO 0909

TEST SAMPLE DURING DISMANTLE

PHOTO 00911

TEST SAMPLE DURING DISMANTLE

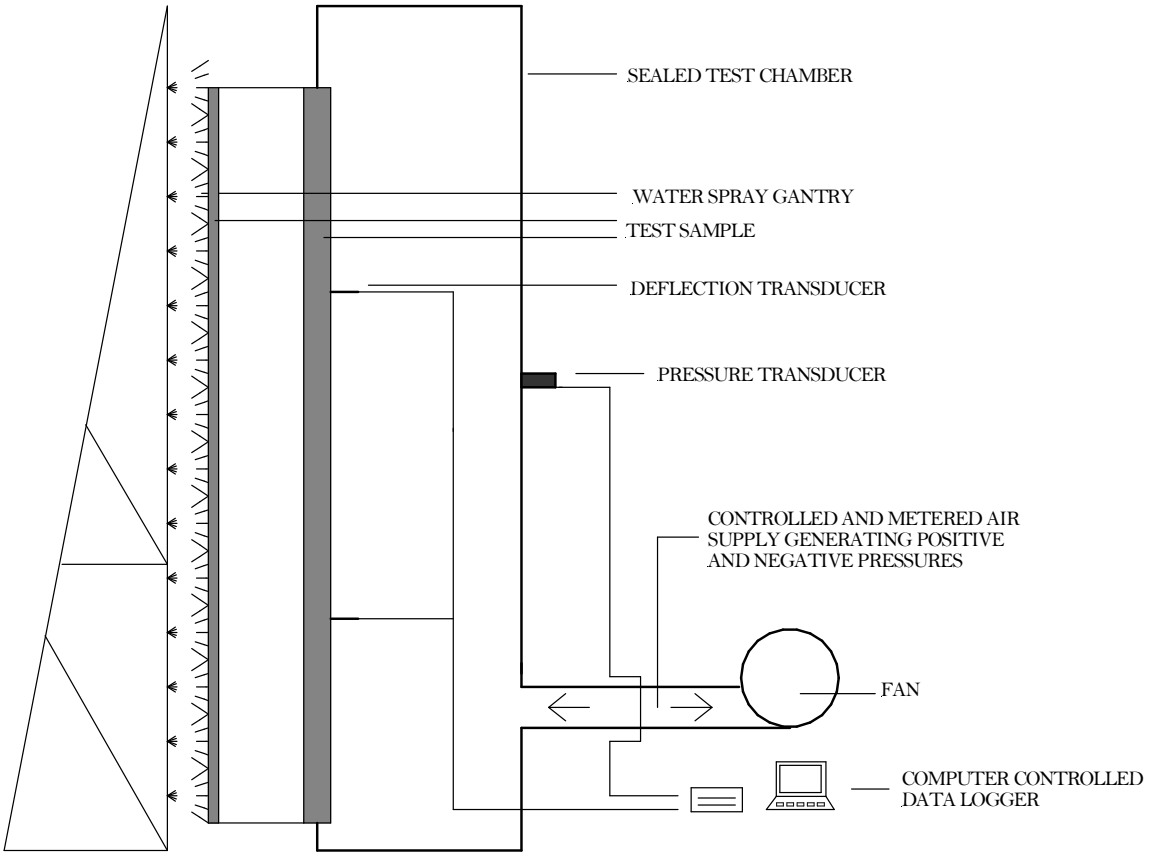


4 TEST RIG GENERAL ARRANGEMENT

The test sample was mounted on a rigid test rig with support steelwork designed to simulate the on-site/project conditions. The test rig comprised a well sealed chamber, fabricated from steel and plywood. A door was provided to allow access to the chamber. Representatives of Ash & Lacy installed the sample on the test rig. See Figure 1.

FIGURE 1

TEST RIG SCHEMATIC ARRANGEMENT



SECTION THROUGH TEST RIG

5 TEST SEQUENCE

The test sequence was as follows:

(1) Wind resistance – serviceability

(2) Wind resistance - safety

(3) Watertightness – dynamic

(4) Impact resistance

6 WIND RESISTANCE TESTING

6.1 INSTRUMENTATION

6.1.1 Pressure

One static pressure tapping was provided to measure the chamber pressure and was located so that the readings were unaffected by the velocity of the air supply into or out of the chamber.

A pressure transducer, capable of measuring rapid changes in pressure to within 2% was used to measure the differential pressure across the sample.

6.1.2 Deflection

Displacement transducers were used to measure the deflection of principle framing members to an accuracy of 0.1 mm. The gauges were set normal to the sample framework at mid-span and as near to the supports of the members as possible and installed in such a way that the measurements were not influenced by the application of pressure or other loading to the sample. The gauges were located at the positions shown in Figure 2.

6.1.3 Temperature

Platinum resistance thermometers (PRT) were used to measure air temperatures to within 1°C.

6.1.4 General

Electronic instrument measurements were scanned by a computer controlled data logger, which also processed and stored the results.

All measuring instruments and relevant test equipment were calibrated and traceable to national standards.

6.2 FAN

The air supply system comprised a variable speed centrifugal fan and associated ducting and control valves to create positive and negative static pressure differentials. The fan provided essentially constant air flow at the fixed pressure for the period required by the tests and was capable of pressurising at a rate of approximately 600 pascals in one second.

6.3 PROCEDURE

6.3.1 Wind Resistance – serviceability

Three positive pressure differential pulses of 1200 pascals were applied to prepare the sample. The displacement transducers were then zeroed.

The sample was subjected to one positive pressure differential pulse from 0 to 2400 pascals to 0. The pressure was increased in four equal increments each maintained for 15 ±5 seconds. Displacement readings were taken at each increment. Residual deformations were measured on the pressure returning to zero.

Any damage or functional defects were recorded.

The test was then repeated using a negative pressure of -2400 pascals.

6.3.2 Wind Resistance – safety

Three positive pressure differential pulses of 1200 pascals were applied to prepare the sample. The displacement transducers were then zeroed.

The sample was subjected to one positive pressure differential pulse from 0 to 3600 pascals to 0. The pressure was increased as rapidly as possible but not in less than 1 second and maintained for 15 ±5 seconds. Displacement readings were taken at peak pressure. Residual deformations were measured on the pressure returning to zero.

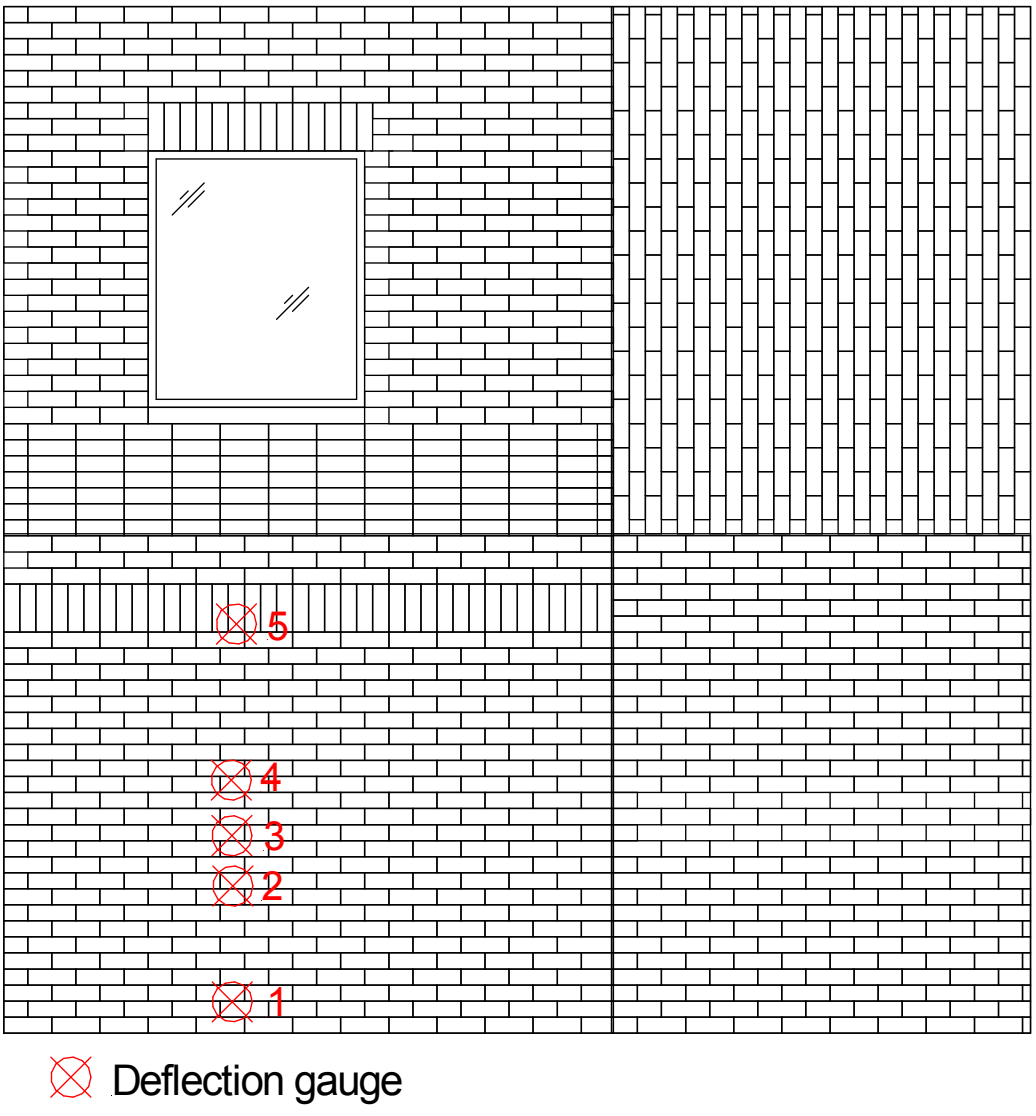
Any damage or functional defects were recorded.

The test was then repeated using a negative pressure of –3600 pascals.

FIGURE 2

DEFLECTION GAUGE LOCATIONS

External View



6.4 PASS/FAIL CRITERIA

6.4.1 Calculation of permissible deflection

Serviceability Test TABLE 3

Gauge number	Member	Span (L) (mm)	Permissible deflection (mm)	Permissible residual deformation
3	Vertical rail	600	L/200 = 3.0	1 mm

Safety Test TABLE 4

Gauge number	Member	Span (L) (mm)	Permissible deflection (mm)	Permissible residual deformation
3	Vertical rail	600	n/a	L/500 = 1.2 mm

6.5 RESULTS

Test 1 (serviceability) Date: 15 October 2019

The deflections measured during the wind resistance test, at the positions shown in Figure 2, are shown in Tables 7 and 8.

Summary:

Serviceability Test TABLE 5

Gauge number	Member	Pressure differential (Pa)	Measured deflection (mm)	Residual deformation (mm)
3	Vertical rail	2399 -2403	0.1 -0.1	0.0 0.0

No damage to the test sample was observed.

Ambient temperature = 10°C
Chamber temperature = 12°C

Test 2 (safety) Date: 15 October 2019

The deflections measured during the structural safety test, at the positions shown in Figure 2, are shown in Table 9.

Summary

Safety Test TABLE 6

Gauge number	Member	Pressure differential (Pa)	Measured deflection (mm)	Residual deformation (mm)
3	Vertical rail	3598 -3607	0.1 -0.2	0.0 0.0

No damage to the sample was observed.

Ambient temperature = 10°C
Chamber temperature = 12°C

TABLE 7

WIND RESISTANCE – POSITIVE **SERVICEABILITY** TEST RESULTS

Position	**Pressure (pascals) / Deflection (mm)**				
	601	**1196**	**1802**	**2399**	**Residual**
1	0.3	0.6	0.9	1.2	0.0
2	0.3	0.6	0.9	1.3	0.1
3	0.3	0.6	0.8	1.1	0.1
4	0.2	0.4	0.6	0.9	0.1
5	0.2	0.5	0.7	1.1	0.2
3 *	0.0	0.0	0.1	0.1	0.0

* Mid-span reading adjusted between end support readings

TABLE 8

WIND RESISTANCE – NEGATIVE **SERVICEABILITY** TEST RESULTS

Position	Pressure (pascals) / Deflection (mm)				
	-603	**-1208**	**-1807**	**-2403**	**Residual**
1	-0.3	-0.7	-1.2	-1.7	-0.1
2	-0.3	-0.6	-1.1	-1.6	-0.2
3	-0.3	-0.6	-1.1	-1.7	-0.2
4	-0.2	-0.5	-1.0	-1.5	-0.2
5	-0.2	-0.4	-0.9	-1.4	-0.2
3 *	0.0	0.0	-0.1	-0.1	0.0

* Mid-span reading adjusted between end support readings

TABLE 9

WIND RESISTANCE - **SAFETY** TEST RESULTS

Position	Pressure (pascals) / Deflection (mm)			
	3598	**Residual**	**-3607**	**Residual**
1	1.9	0.1	-2.5	-0.1
2	1.8	0.1	-2.4	-0.1
3	1.7	0.2	-2.5	-0.1
4	1.3	0.2	-2.3	-0.1
5	1.6	0.3	-2.2	-0.1
3 *	0.1	0.0	-0.2	0.0

* Mid-span reading adjusted between end support readings

7 WATERTIGHTNESS TESTING

7.1 INSTRUMENTATION

7.1.1 Pressure

One static pressure tapping was provided to measure the chamber pressure and was located so that the readings were unaffected by the velocity of the air supply into or out of the chamber.

A pressure transducer, capable of measuring rapid changes in pressure to within 2% was used to measure the differential pressure across the sample.

7.1.2 Water Flow

An in-line water flow meter was used to measure water supplied to the spray gantry to within 5%.

7.1.3 Temperature

Platinum resistance thermometers (PRT) were used to measure air and water temperatures to within 1°C.

7.1.4 General

Electronic instrument measurements were scanned by a computer controlled data logger, which also processed and stored the results.

All measuring instruments and relevant test equipment were calibrated and traceable to national standards.

7.2 FAN

A wind generator was mounted adjacent to the external face of the sample and used to create positive pressure differentials during dynamic testing. The wind generator comprised a piston type aero-engine fitted with 4 m diameter contra-rotating propellers.

7.3 WATER SPRAY

The water spray system comprised nozzles spaced on a uniform grid not more than 700 mm apart and mounted approximately 400 mm from the face of the sample. The nozzles provided a full-cone pattern with a spray angle between 90° and 120°. The spray system delivered water uniformly against the exterior surface of the sample.

7.4 PROCEDURE

Water was sprayed onto the sample using the method described above at a flow rate of at least 3.4 litres/m^2/minute.

The aero-engine was used to subject the sample to wind of sufficient velocity to produce average deflections in the principle framing members equal to those produced by a static pressure differential of 600 pascals. These conditions were maintained for 15 minutes. Throughout the test the inside of the sample was examined for water penetration.

7.5 PASS/FAIL CRITERIA

There shall be no water penetration to the internal face of the backing wall throughout testing. At the completion of the test there shall be no standing water in locations intended to remain dry.

PHOTO 0220

DYNAMIC WIND GENERATOR

7.6 RESULTS

Test 3 Date: 15 October 2019

Water was observed down the back of the bricks on some areas of the wall.

The water drained into the horizontal rails and drained out of the end of the rails.

No water penetration was observed around the window perimeter or through the backing wall.

Chamber temperature= 13°C
Ambient temperature = 12°C
Water temperature = 14°C

8 IMPACT TESTING

8.1 IMPACTOR

8.1.1 Soft body

The soft body impactor comprised a canvas spherical/conical bag 400 mm in diameter filled with 3 mm diameter glass spheres with a total mass of 50 kg suspended from a cord at least 3 m long.

8.1.2 Hard body

The hard body impactor was a solid steel ball of 50 mm or 62.5 mm diameter and approximate mass of 0.5 kg or 1.0 kg.

8.2 PROCEDURE (CWCT TN76)

8.2.1 Soft body

The impactor almost touched the face of the sample when at rest. It was swung in a pendular movement to hit the sample normal to its face. The test was performed at the locations shown in Figure 3. The impact energies were 120 Nm for serviceability and 350 Nm and 500 Nm for safety.

8.2.2 Hard body

The impactor almost touched the face of the sample when at rest. It was swung in a pendular movement to hit the sample normal to its face. The test was performed at the locations shown in Figure 3. The impact energies were 3 Nm, 6 Nm and 10 Nm.

8.3 PASS/FAIL CRITERIA

Note: Tables 1 to 2 are taken from CWCT TN76.

Table 1 - Classes for serviceability performance

Class	Definition	Explanation/Examples
1	No damage.	No damage visible from 1m, and Any damage visible from closer then 1m unlikely to lead to significant deterioration.
2	Surface damage of an aesthetic nature which is unlikely to require remedial action.	Dents or distortion of panels not visible from more than 5m (note visibility of damage will depend on surface finish and lighting conditions – damage will generally be more visible on reflective surfaces), and Any damage visible from closer than 5m unlikely to lead to significant deterioration.
3	Damage that may require remedial action or replacement of components to maintain appearance or long term performance but does not require immediate action.	Dents or distortion of panels visible from more than 5m, or Spalling of edges of panels of brittle materials, or Damage to finishes that may lead to deterioration of the substrate.
4	Damage requiring immediate action to maintain appearance or performance. Remedial action may include replacement of a panel but does not require dismantling or replacement of supporting structure.	Significant cracks in brittle materials e.g. cracks that may lead to parts of tile falling away subsequent to test, or Fracture of panels causing significant amounts of material to fall away during test.
5	Damage requiring more extensive replacement than 4.	Buckling of support rails.

Table 2 - Classes for safety performance

Class	Explanation/examples
Negligible risk	No material dislodged during test, and No damage likely to lead to materials falling subsequent to test, and No sharp edges produced that would be likely to cause severe injury to a person during impact, and Cladding not penetrated by impactor.
Low risk	Maximum mass of falling particle 50g, and Maximum mass of particle that may fall subsequent to impact 50g, and No sharp edges produced that would be likely to cause severe injury during impact.
Moderate risk	Maximum mass of falling particle less than 500g, and Maximum mass of particle that may fall subsequent to impact less than 500g, and Cladding not penetrated by impact, and No sharp edges produced that would be likely to cause severe injury during impact.
High risk	Maximum mass of falling particle greater than 500g, or Cladding penetrated by impact, or Sharp edges produced that would be likely to cause severe injury during impact.

8.4 RESULTS

Test 4 Date: 15 October 2019

The impact test results are shown in Table 10.

Ambient temperature = 14°C

FIGURE 3

IMPACT TEST LOCATIONS

External View

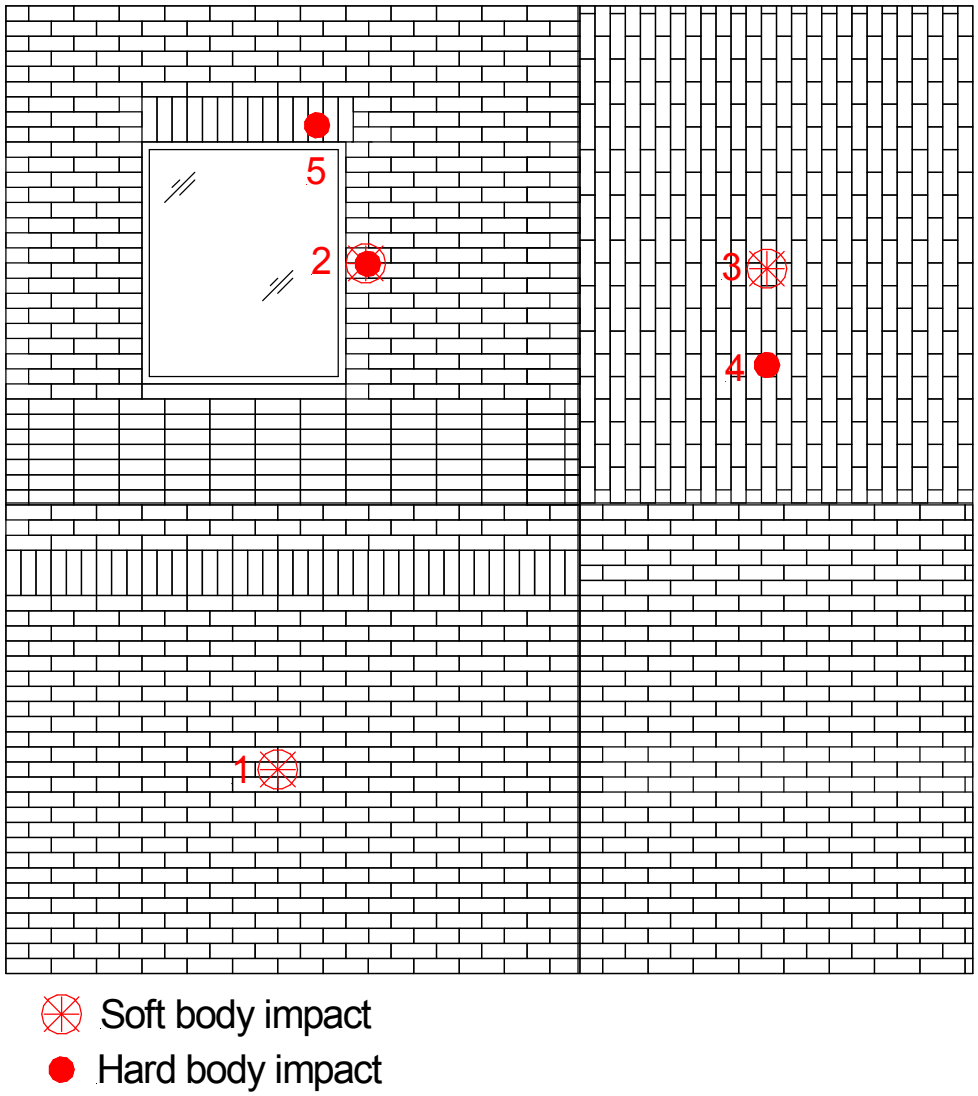


TABLE 10

IMPACT RESISTANCE TEST RESULTS

Impact location	Impact energy (Nm)	Observations	Classification
1	120 x 3 350 500 3 6 10	No damage observed No damage observed Minor mortar cracks Mark on surface Mark on surface Minor mortar cracks	Class 1 Negligible risk Negligible risk Class 1 / Negligible risk Class 1 Class 1 / Negligible risk
2	120 x 3 350 500 10	No damage observed No damage observed Minor mortar cracks Mark on surface	Class 1 Negligible risk Negligible risk Class 1 / Negligible risk
3	120 x 3 350 500	No damage observed No damage observed Minor mortar cracks	Class 1 Negligible risk Negligible risk
4	3 6 10	Mark on surface Mark on surface Minor mortar cracks	Class 1 / Negligible risk Class 1 Class 1 / Negligible risk
5	10	Mark on surface	Class 1 / Negligible risk

PHOTO 0225

SOFT BODY IMPACT

PHOTO 0228

SOFT BODY IMPACT

PHOTO 0229

SOFT BODY IMPACT

PHOTO 0231

SOFT BODY IMPACT

PHOTO 0232

HARD BODY IMPACT

PHOTO 0235

HARD BODY IMPACT

PHOTO 0237

HARD BODY IMPACT

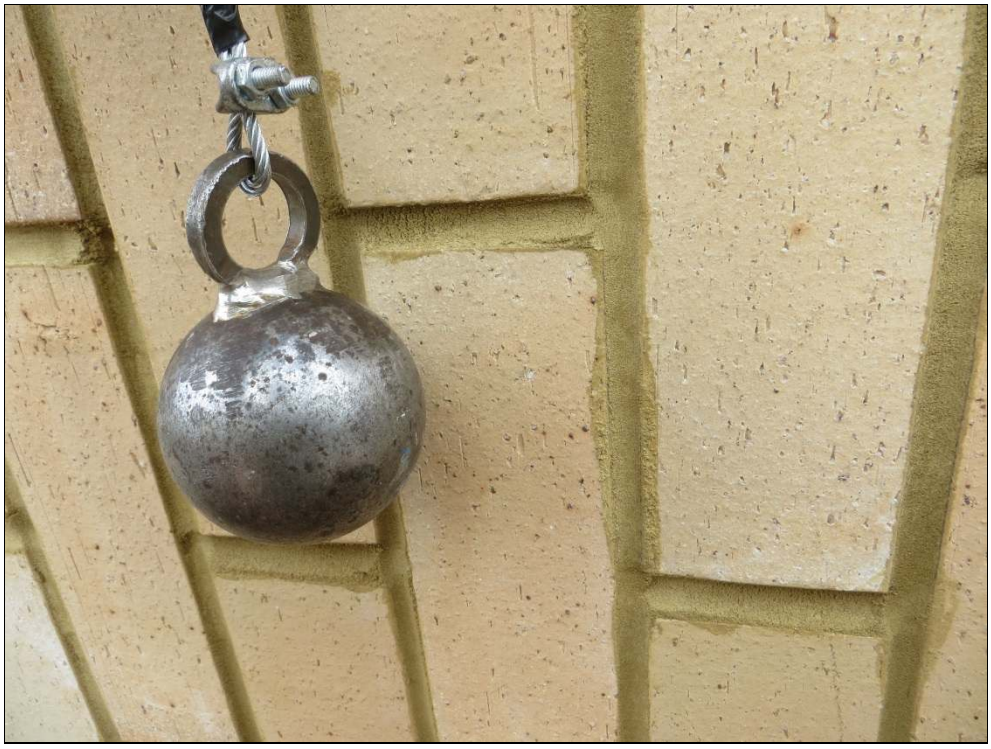
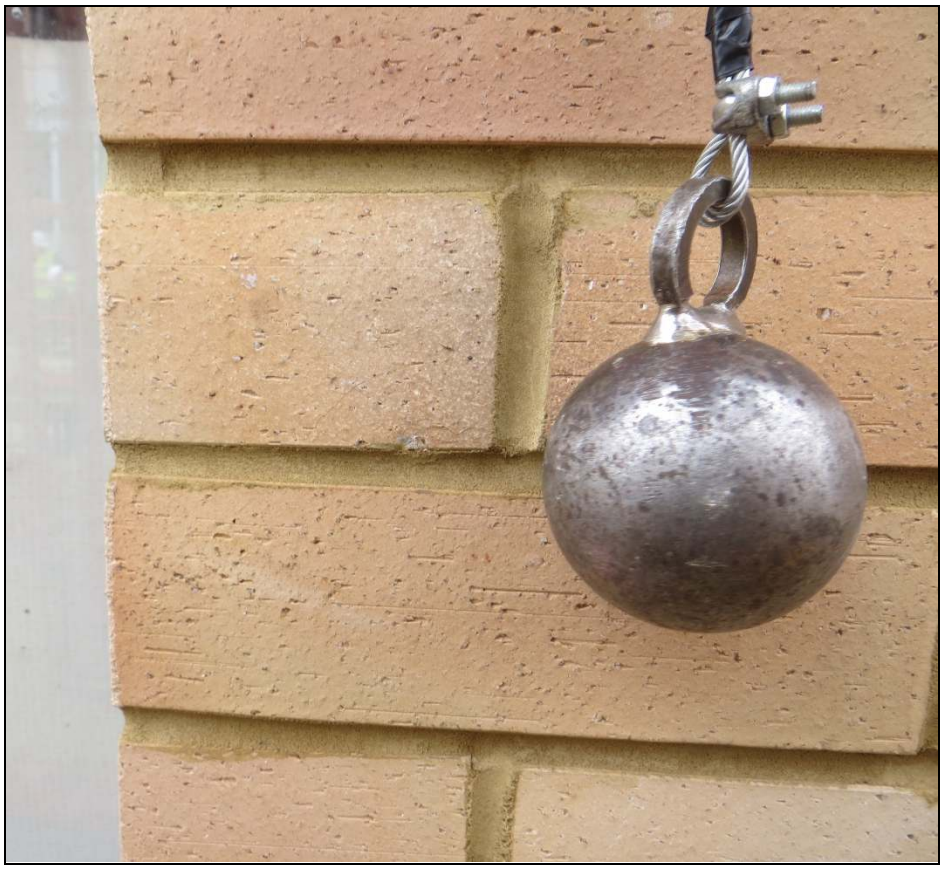


PHOTO 0241

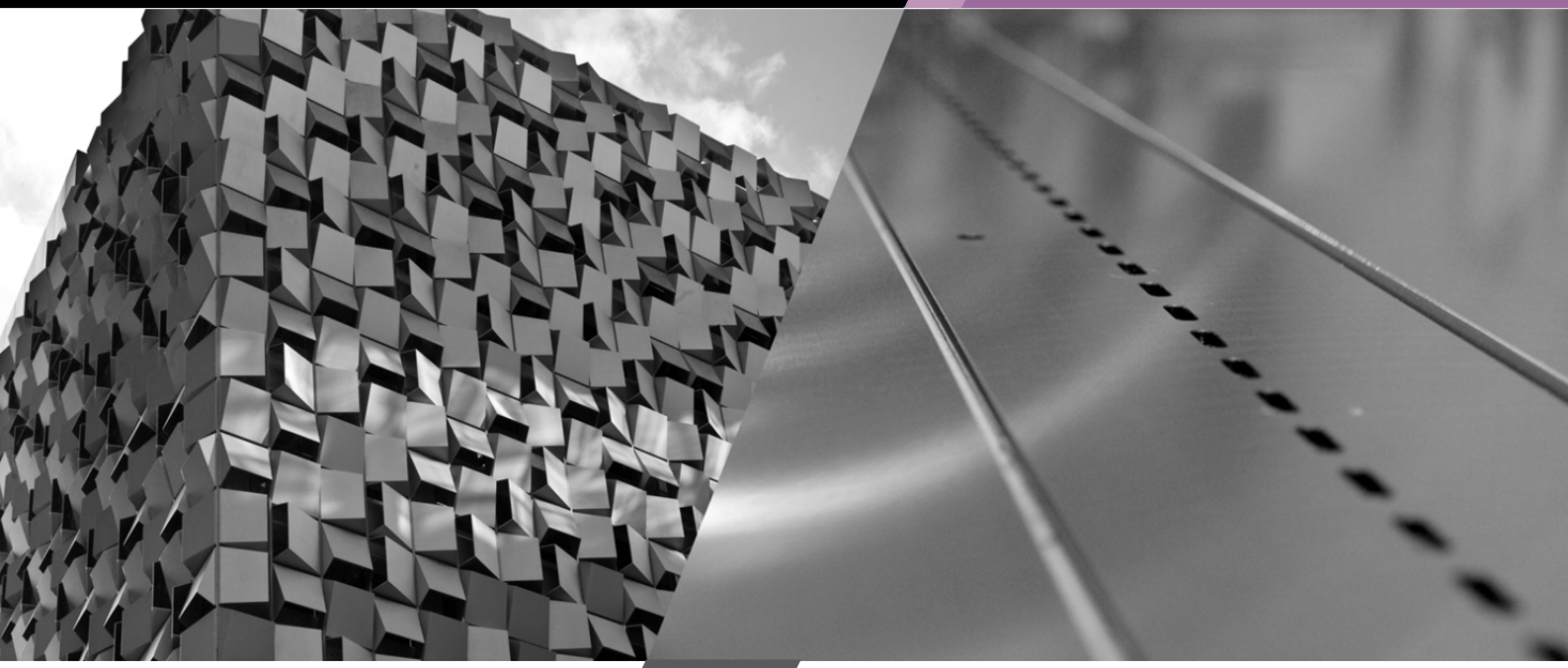
HARD BODY IMPACT



9 APPENDIX – ASH & LACY TECHNICAL REPORT

The following 23 unnumbered pages are copies of Ash & Lacy Façade product development technical report V3.0 dated 03/09/2019.

END OF REPORT



Ash & Lacy Façade

PRODUCT DEVELOPMENT TECHNICAL REPORT

ED REF: ED-Facade-1823

NaturAL-X CWCT Test Set Up And Procedure

V3.0 – 3/09/2019

ASH & LACY

VERSION HISTORY

Below is recorded the revision history of this document;

Version	By	Date	Description
1.0	YT	4/6/2019	First Issue
2.0	YT	18/6/2019	Amend the bracket centre around wind and bracket reference mistakes
3.0	YT	3/9/2019	Amend bracket and brick rail fixing reference on the material list

EXECUTIVE SUMMARY

This report summarised test sequence and sample drawings for NaturAL-X CWCT test, which will be used as CWCT assessment and panel installation.

Report Prepared by	Report Checked by
Name:	**Name:**
Position:	**Position:**
Signature:	**Signature:**
Date:	**Date:**

Managers Approval to Issue

Signature:

Date:

1. Background

This document summarised NaturAL-X brick layout, features in the systems, supporting system for CWCT test based on discussion with BBA, NHBC and testing house Vinci. The test result is the part of the technical assessment for BBA certificate.

2. Test Method

The testing will be in accordance with CWCT Standard for systemised building envelopes. The detailed test sequence is given below.

3. Test sequence:

For rainscreen system, the test sequence is referred to Section 8.12.2 Standard Sequence B. Based on the technical note in the standard, technical help conversation with CWCT on 31/5/2019, and test house recommendation (Vinci Quote Q20226), the air permeability and water penetration resistance-static tests are mainly for the backing wall system, which are not applicable for the ventilated rainscreen system. After consideration of the actual application of the system, the test sequence is listed as:

1) Wind resistance – serviceability

2) Watertightness – dynamic

3) Wind resistance – safety

4) Impact resistance

5) Controlled dismantle, inspect and record

4. Test Sample

NaturAL-X brick slip system will be tested on the test rig in Vinci Technology Centre. The overall sample area is about approximately 5 m high by 5 m wide. The test sample includes features as:

- Test area: approximately 5 m X 5 m
- Brick layout: vertical & horizontal
- Brick thickness: 28 mm
- About 1.0 m (W) X 1.1 m (H) window installed in the test with
- Window return: brick return
- Window head: brick return
- Window cill: flashing cill

- 10 mm horizontal joint included
- 10 mm vertical joint included
- One row of soldier course brick
- The bracket centre: 600 mm max
- Rail centre: 600 mm rail max
- Typical rail: AXL-L40X60X2.2
- Bracket for horizontal brick: AXL-HB300S and AXL-HB300D
- Bracket for vertical brick: AXL-HB270S+AXL-HB80D adaptor and AXL-HB270D+AXL-HB80D

More details can be found in the sample drawing attached.

Material List for NaturAL-X CWCT Test (Updated on 3/9/2019)

Part 1: Frame

Ref	Length (mm)	Qty
AXL-L60X40X2.2	6000	2
AXL-L60X40X2.2	2475	15
AXL-L60X40X2.2	2042	5
AXL-L60X40X2.2	1170	2
AXL-L60X40X2.2	748	2
AXL-L60X40X2.2	555	10
AXL-L60X40X2.2	534	2
AXL-L60X40X2.2	355	2
AXL-L60X40X2.2	40	40
AXL-HB300S-TP		52
AXL-HB300D-TP		40
AXL-HB270S-TP		12
AXL-HB270D-TP		12
AXL-HB80D		20

Part 2: Brick Rail for NaturAL-X

Name	Drawing No	Length (mm)	Qty
Brick Rail	A42	2925	41
Brick Rail	A42	2445	26
Brick Rail	A42	2015	32
Brick Rail	A42	1065	20
Brick Rail	A42	742	20
Brick Rail	A42	215	38
Brick Rail	A42	192	13
Brick Rail	A42	72	32
Brick Start Rail	A43	2925	3
Brick Start Rail	A43	2445	1
Brick Start Rail	A43	2015	1
Brick Start Rail	A43	1117	1
Brick Start Rail	A43	215	1
Brick Start Rail	A43	192	1
Brick Start Rail	A43	72	46
Brick Top Rail	A44	2925	3
Brick Top Rail	A44	2445	1
Brick Top Rail	A44	1117	1
Brick Top Rail	A44	215	1
Brick Top Rail	A44	192	1

Part 3: Window Steel Frame

Ref	Length (mm)	Qty
AU154070200	1400	2
AC150070200	1000	2
AC150070200	1320	2
AHC88L		6

Part 4: Accessories

Name	Drawing No	Length (mm)	Qty
Z120X345X120X2	ED-Façade-1823M.3-1	2500	8
Angle L30X20X2.0	ED-Façade-1823M.3-2	2015	1
Double Angle L17.8X20X2.0	ED-Façade-1823N.3-1	2015	1
Window cill	ED-Façade-1823M.3-4	1060	1
Window cill support	ED-Façade-1823M.3-5	1060	1

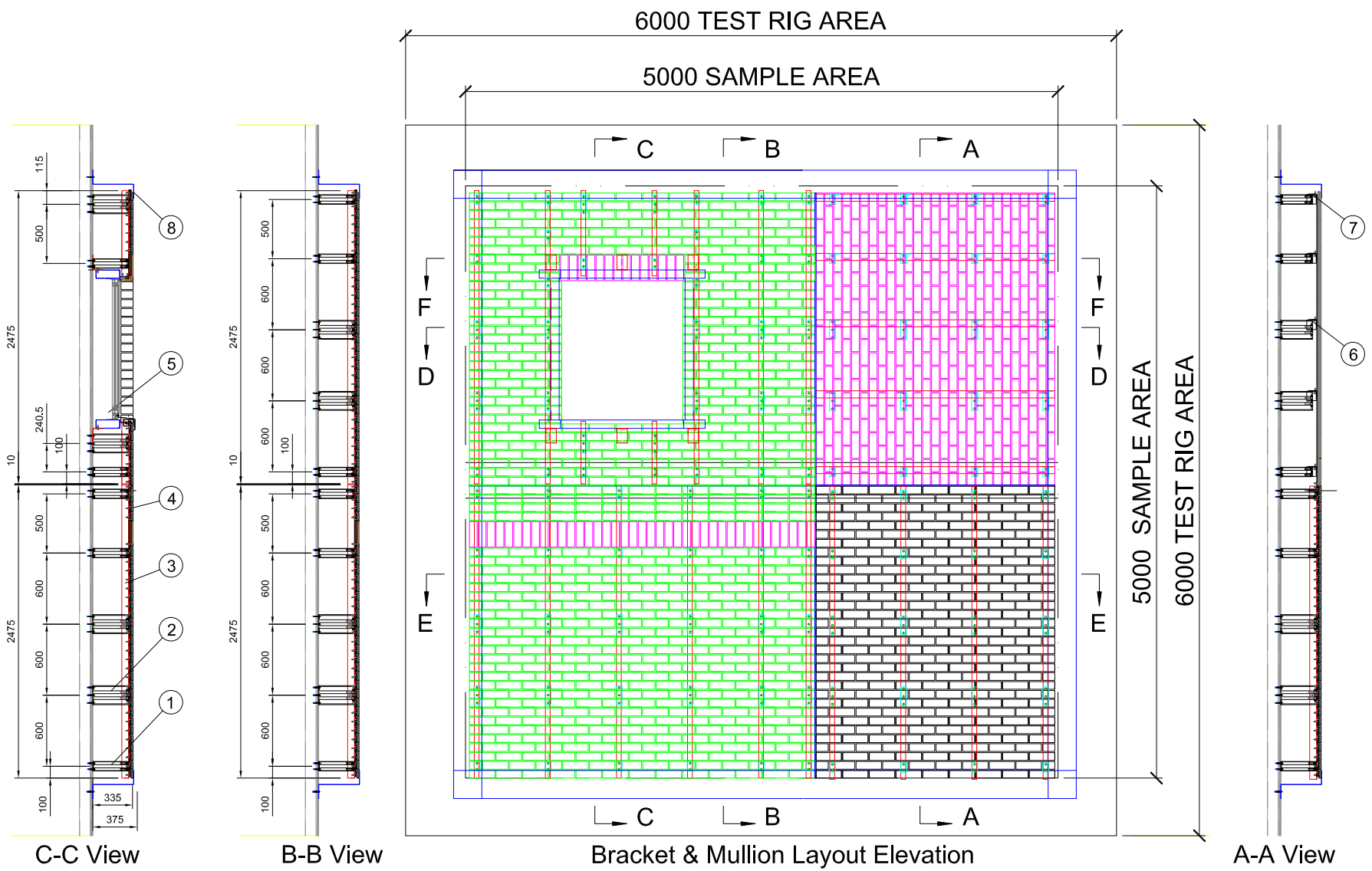
Part 5: Fixings

Ref	Qty
SS-LS22	1000
BM-LS25	500
BM-LS55	500
LP-BM-LS28	200

Part 6: One UPVC Window to Suit for Window Frame Openning with 1062 mm W X 1197 mm H

Part 7: NaturAL-X Brick

Name	Qty
Full Brick 28X65X215 mm	1500
Corner Brick A1 (SD.NX.02)	20
Corner Brick A2 (SD.NX.03)	40
Soldier Course Start Brick	40
Half Brick A1 (SD.NX.11)	100
Half Brick A1 (SD.NX.12)	100



Material List

1. AXL-HB300S-TP bracket
2. AXL-HB300D-TP Bracket
3. AXL-L60X40X2.2 Rail
4. NaturAL-X Brick
5. SFS Windlow Frame
6. AXL-HB270S-TP + HDB80 Bracket
7. AXL-HB270D-TP + HDB80 Bracket
8. Flashing

FACADE

General Notes:

All drawings to be read in conjunction with architects and engineers drawings.

Do not scale this drawing - If in doubt contact the Technical Office.

All dimensions to be confirmed prior to commencement of manufacture.

It is the customers responsibility to ensure that Ash & Lacy products are correctly installed and that they are suitable for the customers particular requirement and application.

Drawing errors or omissions are to be reported and checked with the Technical Office.

Drawings will be issued for construction once Approved, Do not proceed with construction until this drawing clearly states "CONSTRUCTION ISSUE"

Rev	Description	Drawn	Checked	Date
C				
B				
A	Amend the bracket center around window and bracket reference	YT		18/06/2019

Drawing Status: Proposal

ASH & LACY
BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTIONS FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client : Ash & Lacy Ltd.

Project : ED-Facade-1823

Drawing Title : NaturAL- CWCT Test Brick Layout -1

Drawn By:	Checked By:	Date :
YT		20/5/2019

Scale : NTS @ N/A

Drawing No : ED-Facade-1823N.1-1

Rev: A

General Notes:

All drawings to be read in conjunction with architects and engineers drawings.

Do not scale this drawing - If in doubt contact the Technical Office.

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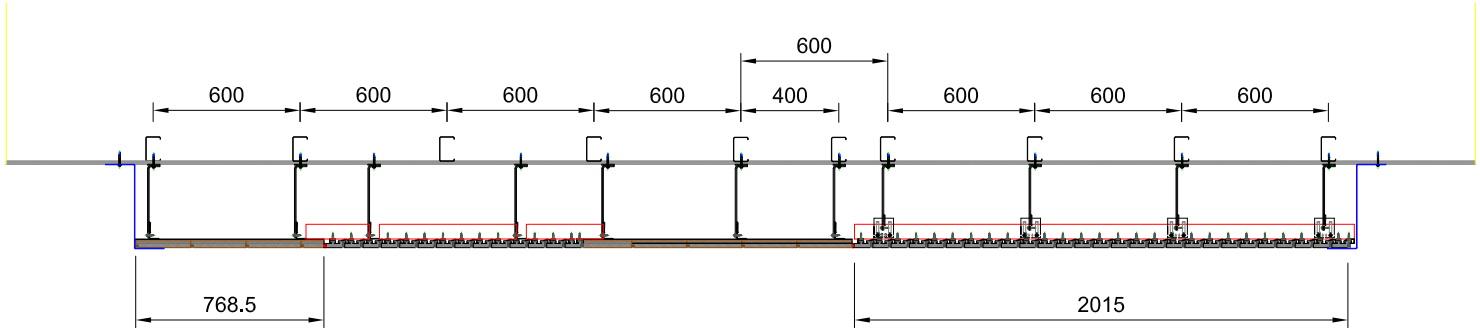
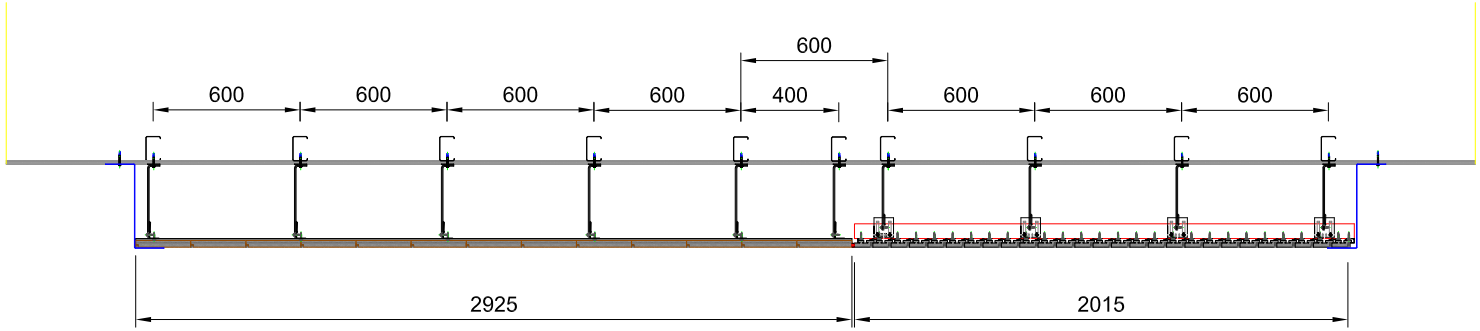
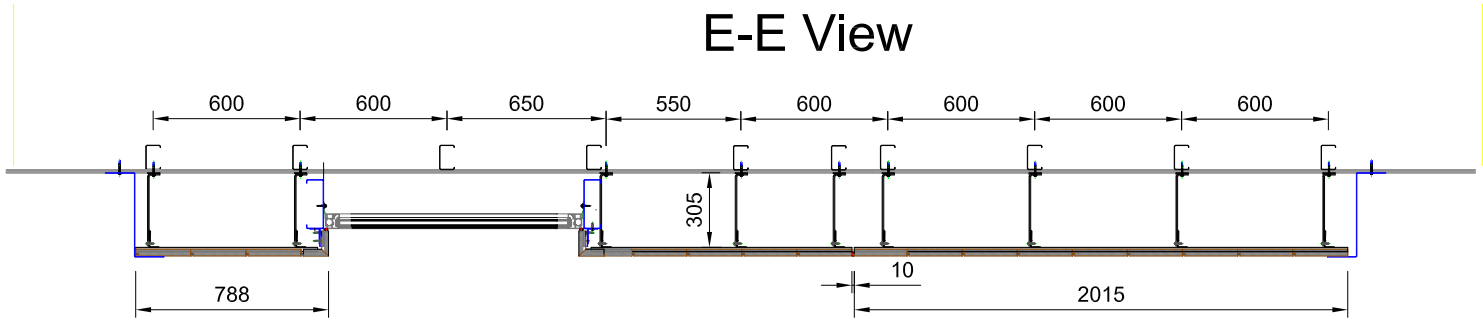


F-F View



E-E View



D-D View

Rev	Description	Drawn	Checked	Date
C				
B				
A				

Drawing Status: Approval

ASH & LACY
BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTION6 FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client : Ash & Lacy Ltd.

Project : ED-Facade-1823

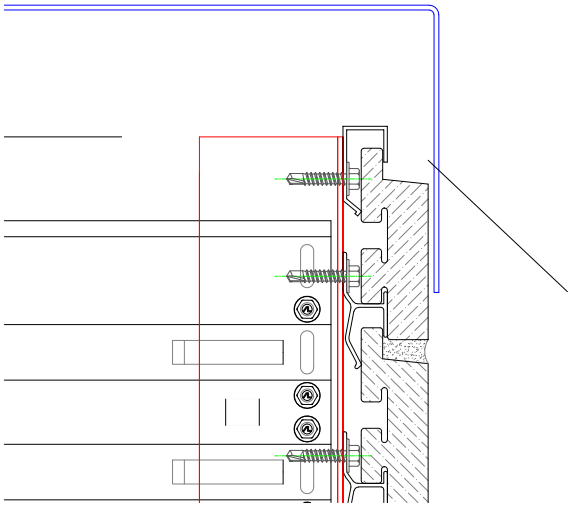
Drawing Title : NaturAL-X CWCT Test Brick Layout -2

Drawn By:	Checked By:	Date :
YT		20/5/2019

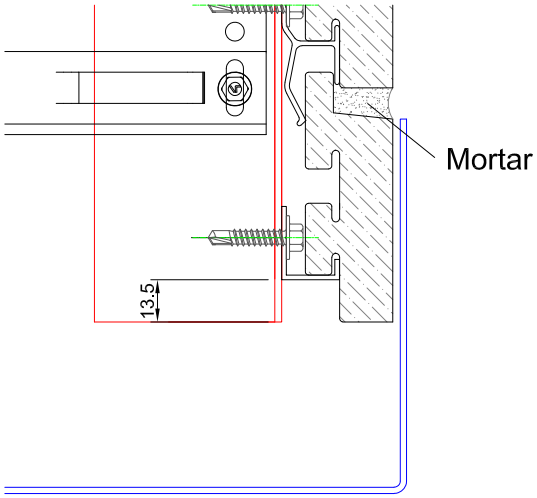
Scale : NTS @ N/A

Drawing No : ED-Facade-1823N.1-2

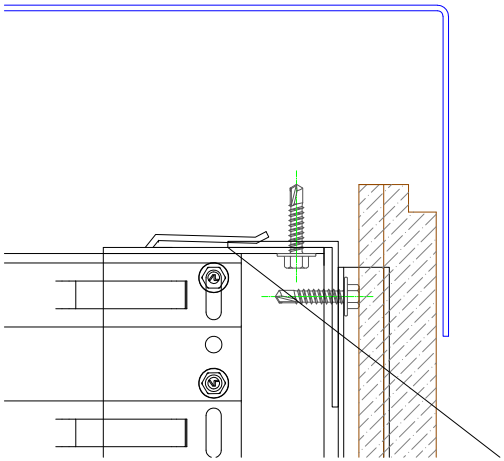
Rev: [-]



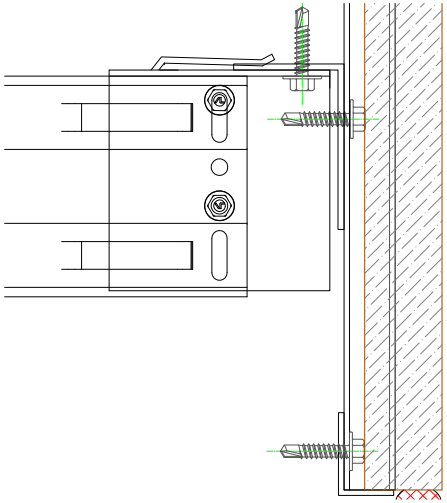
Top of Horizontal Brick



Bottom of Horizontal Brick



Top of Vertical Brick



Bottom of Vertical Brick

General Notes:

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Rev	Description	Drawn	Checked	Date
C				
B				
A				

Drawing Status:
Proposal

ASH & LACY
BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTIONS FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client :
Ash & Lacy Ltd.

Project :
ED-Facade-1823

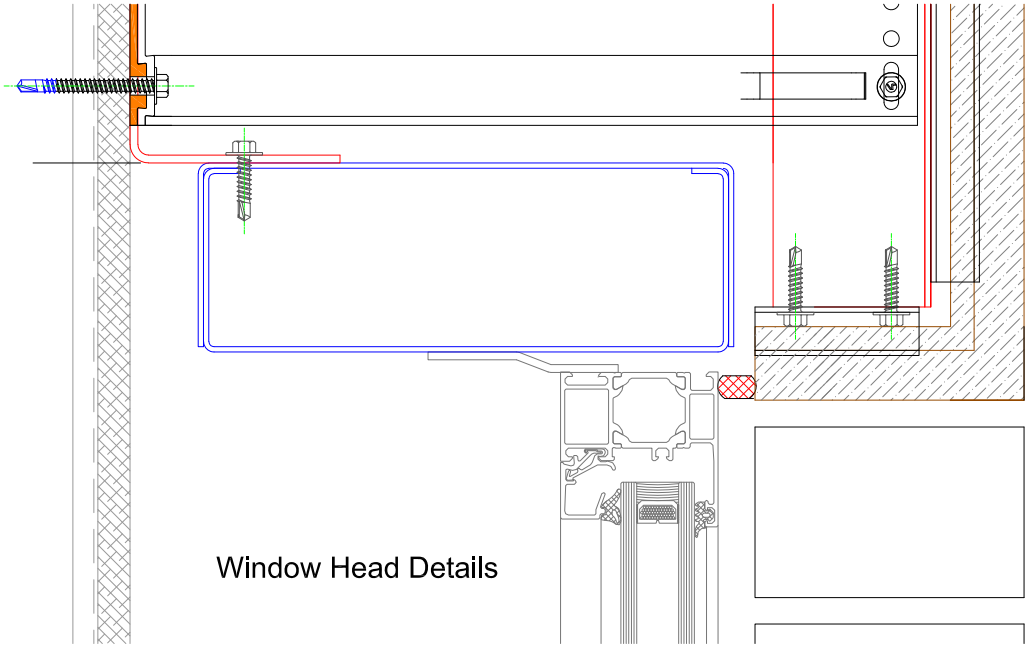
Drawing Title :
NaturAL-X CWCT Test
Brick Layout - 3

Drawn By:	Checked By:	Date :
YT		20/5/2019

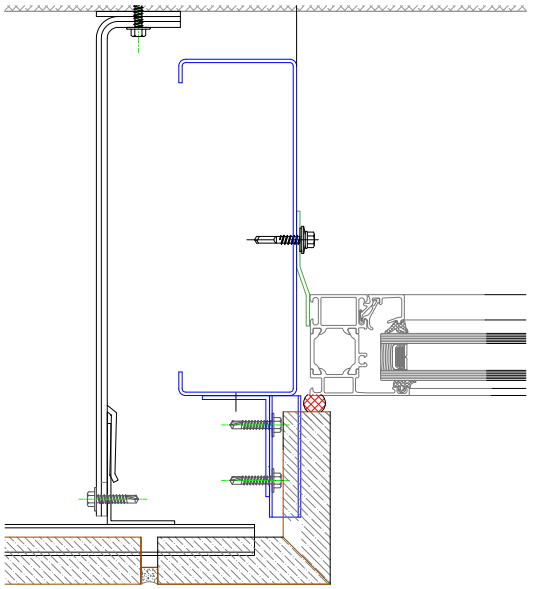
Scale : NTS @ A1

Drawing No : ED-Facade-1823N.1-3

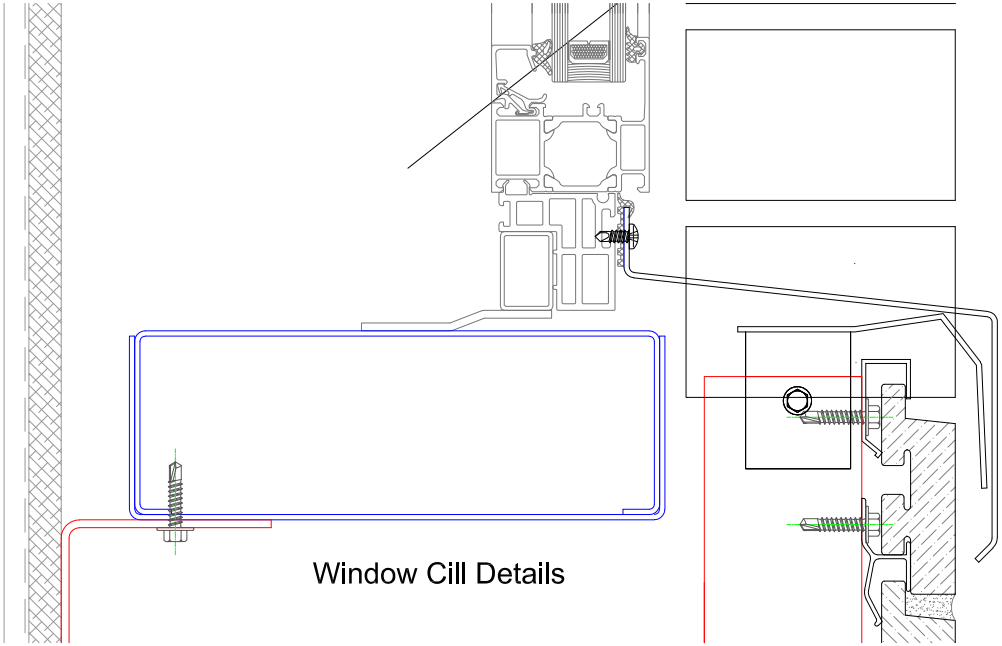
Rev: [-]



Window Head Details



Window Return Details



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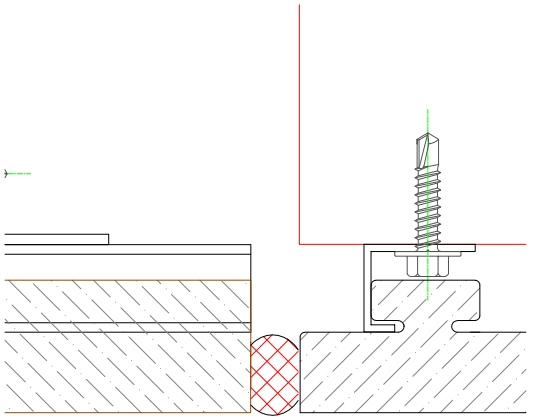


Standard brick and solider brick joint

Rev	Description	Drawn	Checked	Date
C				
B				
A				

Drawing Status: Proposal

ASH & LACY

BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTIONS FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client : Ash & Lacy Ltd.

Project : ED-Facade-1823

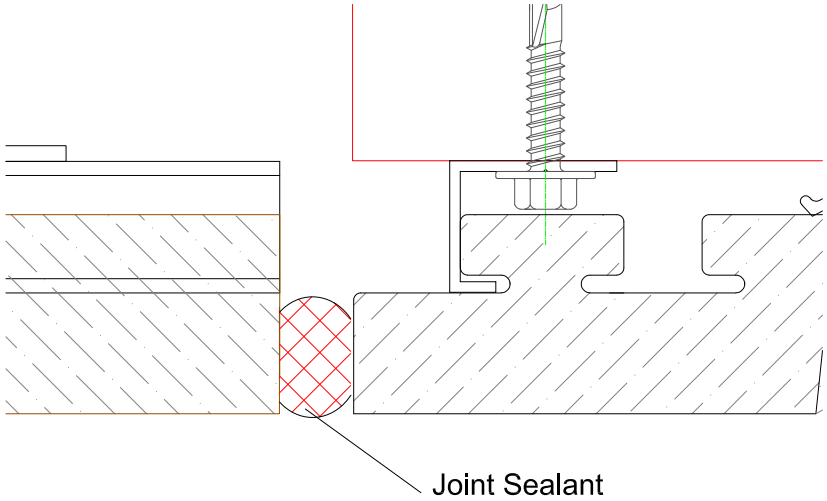
Drawing Title : NaturAL-X CWCT Test Brick Layout - 4

Drawn By:	Checked By:	Date :
YT		20/5/2019

Scale : NTS @ A1

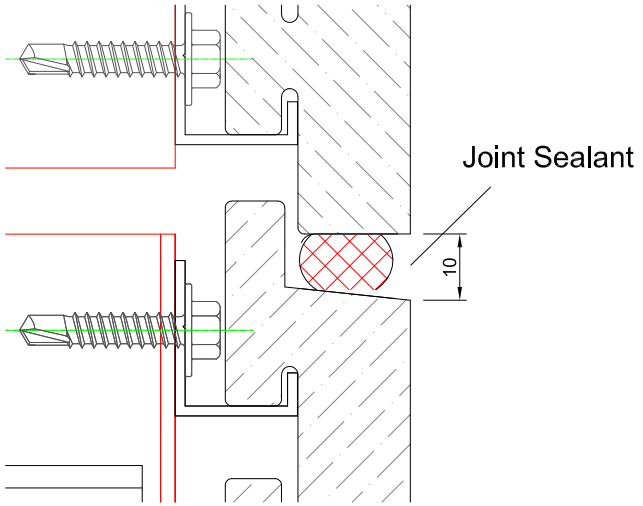
Drawing No : ED-Facade-1823N.1-4

Rev: [-]



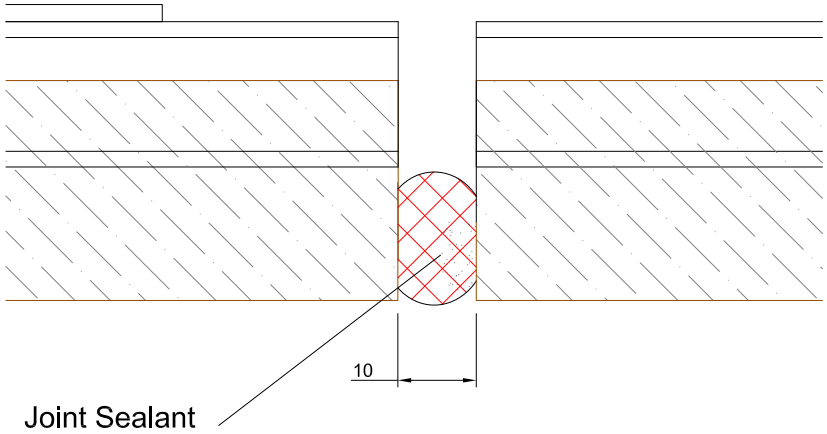
Vertical Movement Joint (E-E View)

(Between Horizontal brick and vertical brick)



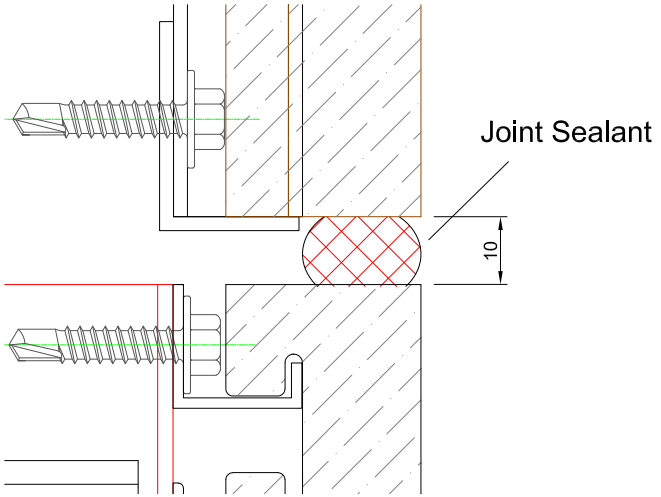
Horizontal Movement Joint (B-B View)

(Between Horizontal brick and horizontal brick)



Vertical Movement Joint (D-D View)

(Between horizontal brick and horizontal brick)



Horizontal Movement Joint (A-A View)

(Between vertical brick and horizontal brick)

General Notes:

All drawings to be read in conjunction with architects and engineers drawings.

Do not scale this drawing - If in doubt contact the Technical Office.

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Drawings will be issued for construction once Approved. Do not proceed with construction until this drawing clearly states "CONSTRUCTION ISSUE"

Rev	Description	Drawn	Checked	Date
C				
B				
A				

Drawing Status: Proposal

ASH & LACY

BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTION6 FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client : Ash & Lacy Ltd.

Project : ED-Facade-1823

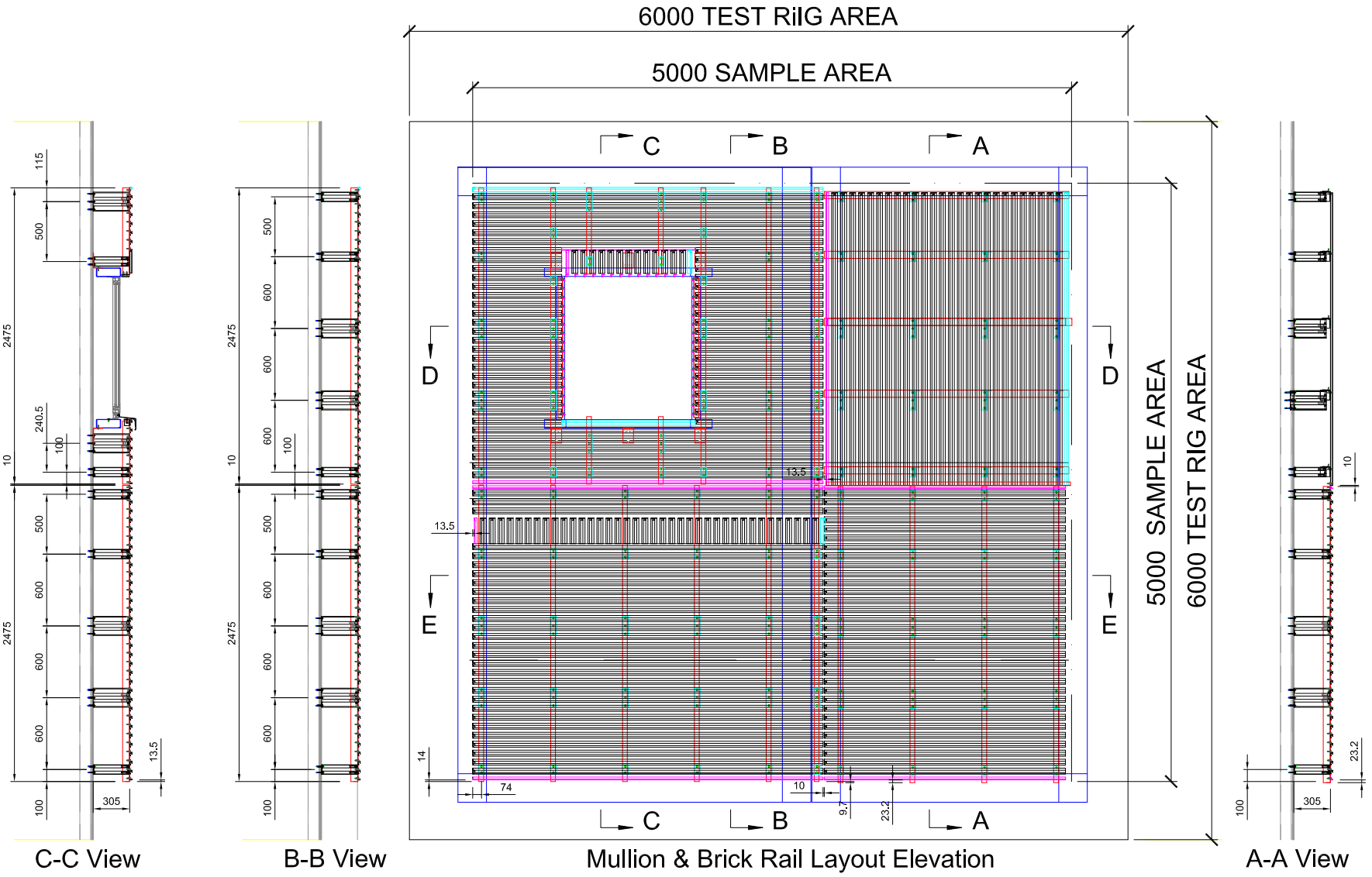
Drawing Title : NaturAL CWCT Test Brick Layout - 5

Drawn By:	Checked By:	Date :
YT		03/6/2019

Scale : NTS @ A1

Drawing No : ED-Facade-1823N.1-5

Rev: [-]



General Notes:

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Rev	Description	Drawn	Checked	Date
C				
B				
A				

Drawing Status: Proposal

ASH & LACY
BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTIONS FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client : Ash & Lacy Ltd.

Project : ED-Facade-1823

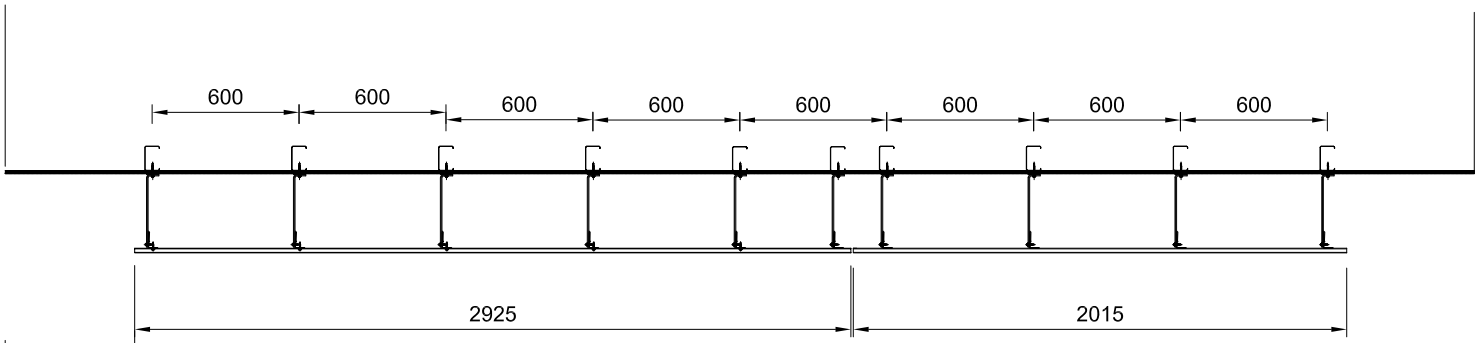
Drawing Title : NaturAL- CWCT Test Frame Layout -1

Drawn By:	Checked By:	Date :
YT		20/5/2019

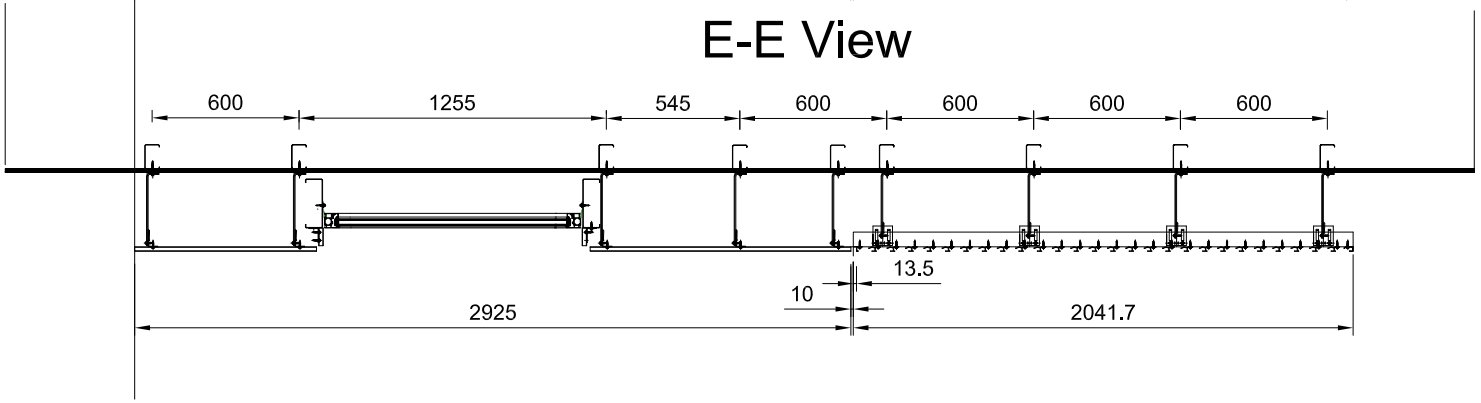
Scale : NTS @ N/A

Drawing No : ED-Facade-1823N.2-1

Rev: [-]



E-E View



D-D View

General Notes:

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Rev	Description	Drawn	Checked	Date
C				
B				
A				

Drawing Status:
Approval

ASH & LACY
BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTIONS FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client :
Ash & Lacy Ltd.

Project :
ED-Facade-1823

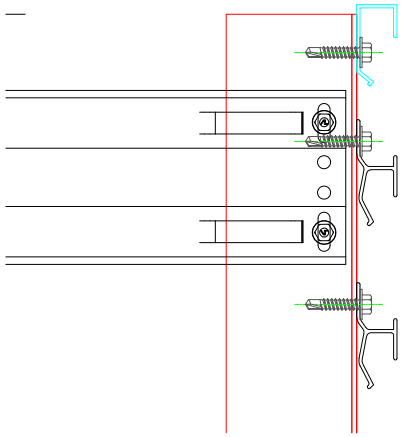
Drawing Title :
NaturAL-X CWCT Test Frame Layout -2

Drawn By:	Checked By:	Date :
YT		20/5/2019

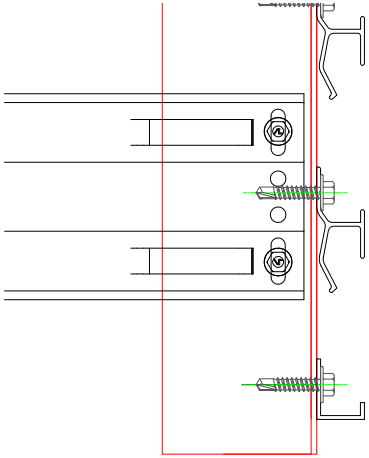
Scale : NTS @ N/A

Drawing No : ED-Facade-1823N.2-2

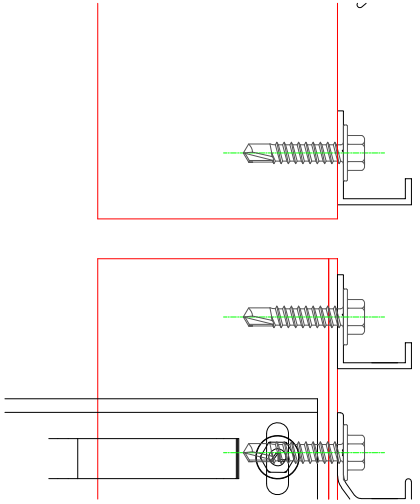
Rev: [-]



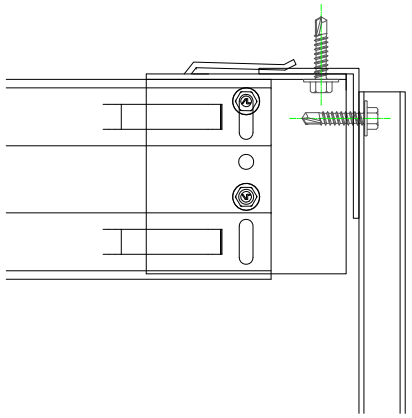
Top of Horizontal Brick



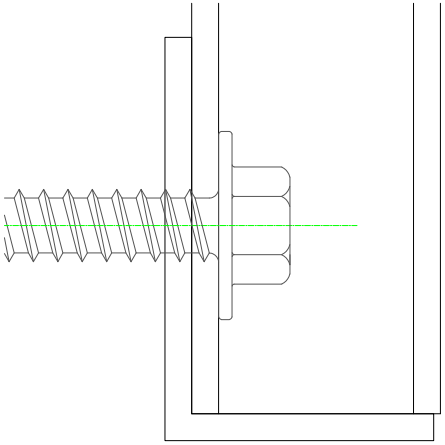
Bottom of Horizontal Brick



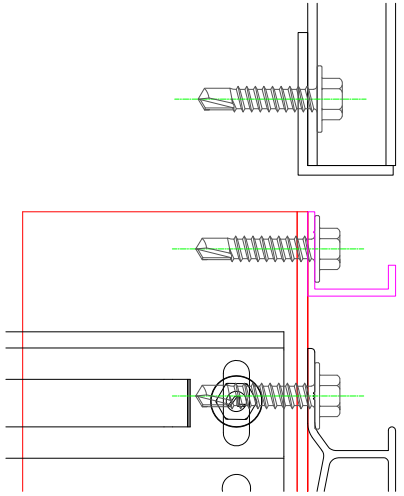
Joint for Horizontal Brick & Horizontal Brick



Top of Vertical Brick



Bottom of Vertical Brick



Joint for Horizontal & Vertical Brick

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Rev	Description	Drawn	Checked	Date
C				
B				
A				

Drawing Status: Proposal

ASH & LACY

BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTION8 FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client : Ash & Lacy Ltd.

Project : ED-Facade-1823

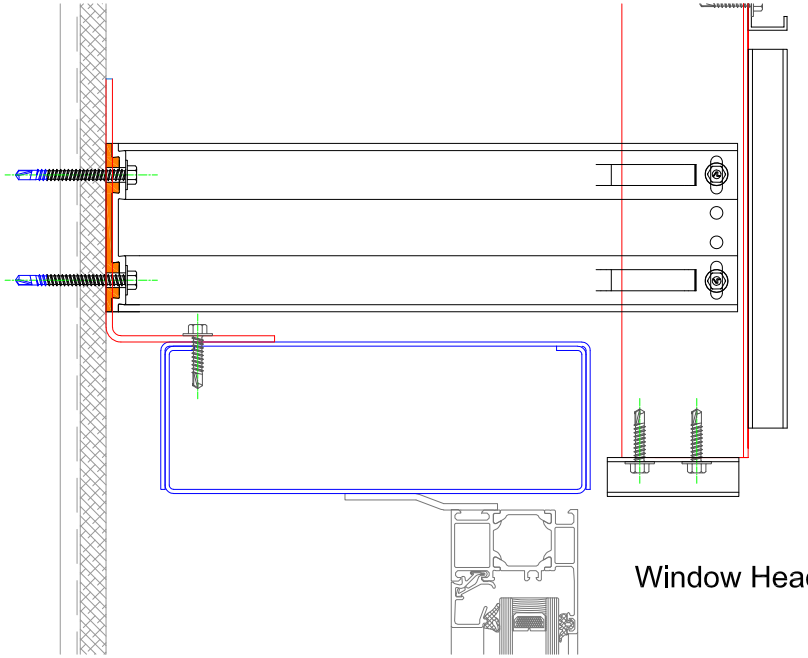
Drawing Title : NaturAL-X CWCT Test Frame Layout - 3

Drawn By:	Checked By:	Date :
YT		20/5/2019

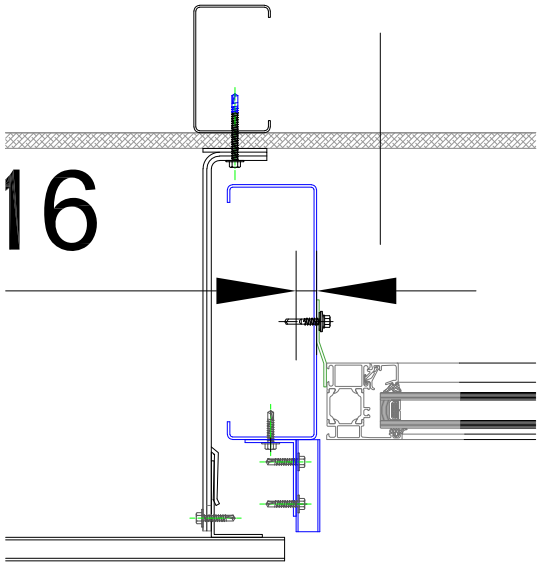
Scale : NTS @ A1

Drawing No : ED-Facade-1823N.2-3

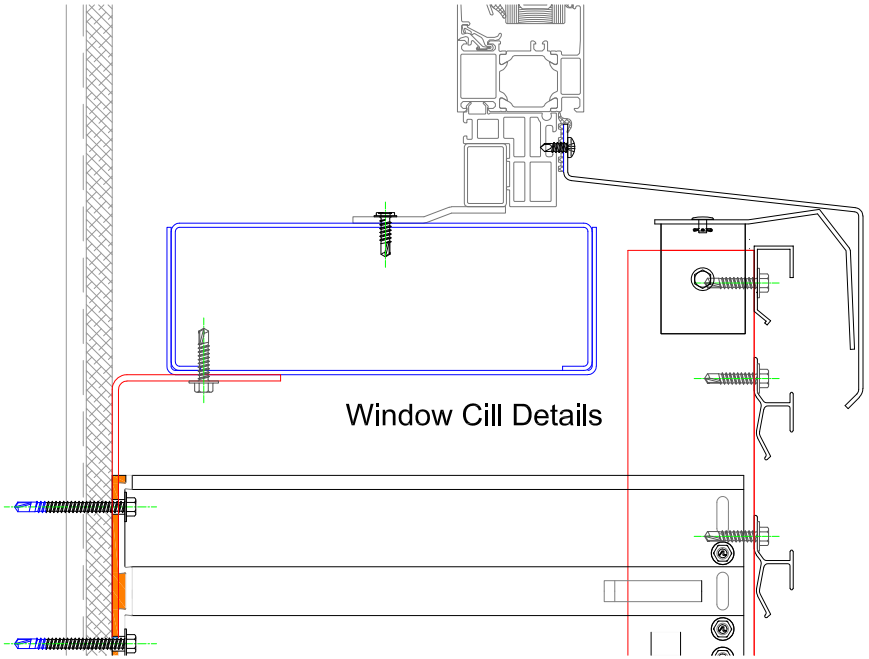
Rev: [-]



Window Head Details



Window Return Details



Window Cill Details

General Notes:

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Rev	Description	Drawn	Checked	Date
C				
B				
A				

Drawing Status:
Proposal

ASH & LACY
BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTION6 FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client :
Ash & Lacy Ltd.

Project :
ED-Facade-1823

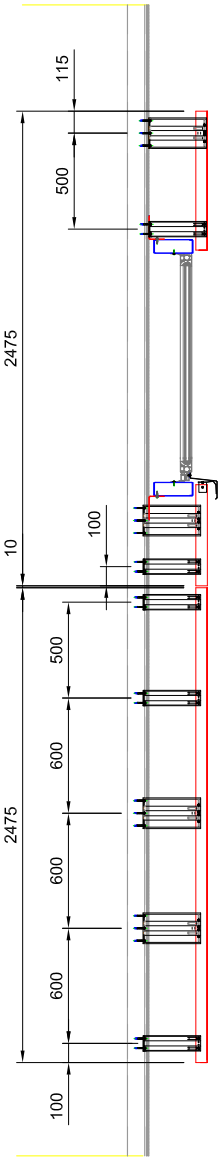
Drawing Title :
NaturAL-X CWCT Test
Frame Layout - 4

Drawn By:	Checked By:	Date :
YT		20/5/2019

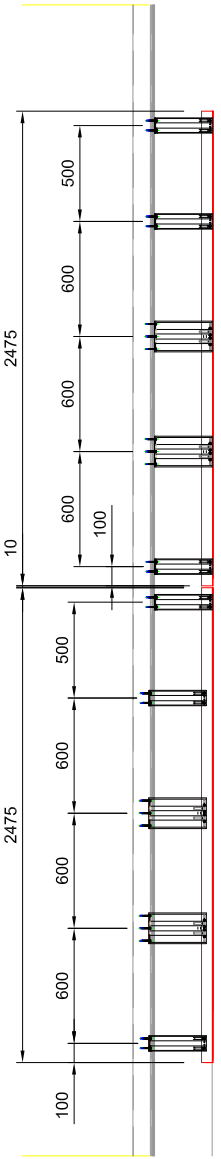
Scale : NTS @ A1

Drawing No : ED-Facade-1823N.2-4

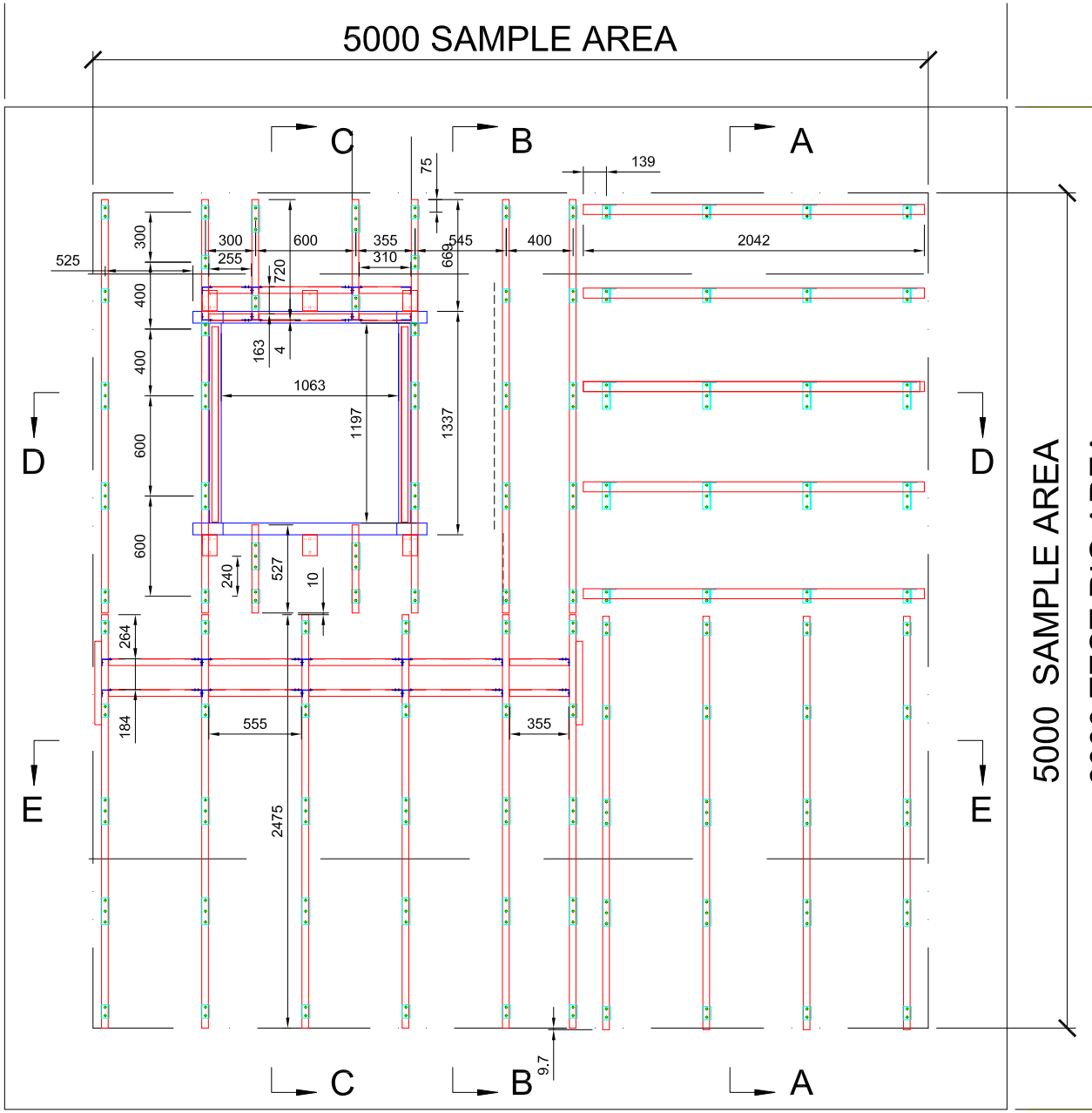
Rev: [-]



C-C View



B-B View



Mullion & Brick Rail Layout Elevation

FACADE

General Notes:

All drawings to be read in conjunction with architects and engineers drawings.

Do not scale this drawing - If in doubt contact the Technical Office.

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Rev	Description	Drawn	Checked	Date
C				
B				
A	Amend the bracket center around window	YT		18/06/2019

Drawing Status: Proposal

ASH & LACY
BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTION6 FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client : Ash & Lacy Ltd.

Project : ED-Facade-1823

Drawing Title : NaturAL-X CWCT Test Frame Layout - 5

Drawn By:	Checked By:	Date :
YT		20/5/2019

Scale : NTS @ A1

Drawing No : ED-Facade-1823N.2-5

Rev: A

General Notes:

All drawings to be read in conjunction with architects and engineers drawings.

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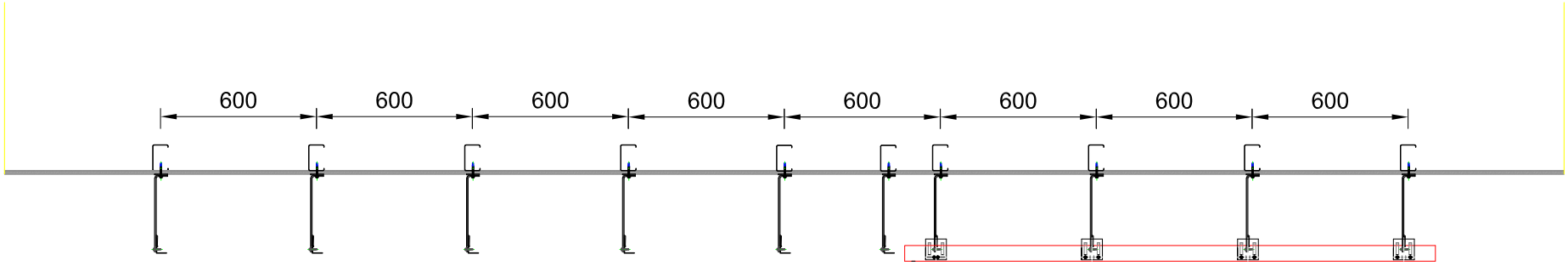
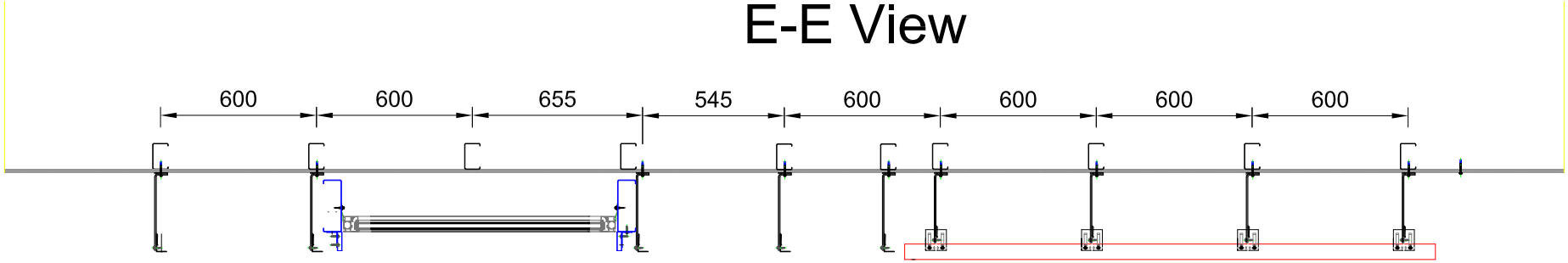


E-E View



D-D View

Rev	Description	Drawn	Checked	Date
C				
B				
A				

Drawing Status:
Proposal

ASH & LACY
BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTION6 FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client :
Ash & Lacy Ltd.

Project :
ED-Facade-1823

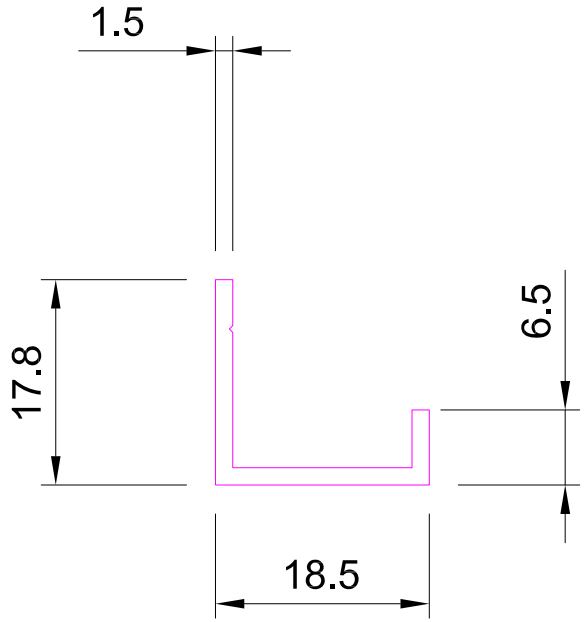
Drawing Title :
NaturAL-X CWCT Test
Frame Layout - 6

Drawn By:	Checked By:	Date :
YT		20/5/2019

Scale : NTS @ A1

Drawing No : ED-Facade-1823N.2-6

Rev: [-]



1. Material: alum 1050H14
2. Thickness 1.5 mm
3. Length: 2015 mm
4. Finish: mill finish

Note: The angle can be made by cutting long leg of existing brick start rail

Rev	Description	Drawn	Checked	Date
C				
B				
A				

Drawing Status: Proposal

ASH & LACY
BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTIONS FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client : Ash & Lacy Ltd.

Project : ED-Facade-1823

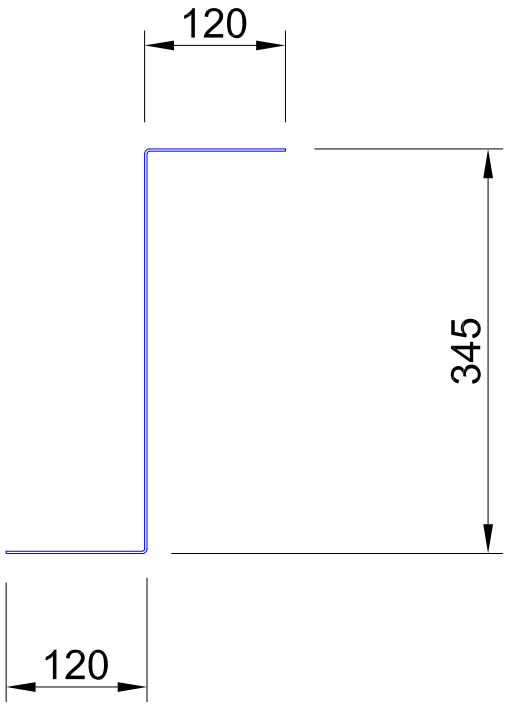
Drawing Title : NaturAL-X CWCT Test Accessory - Special brick rail

Drawn By:	Checked By:	Date :
YT		20/5/2019

Scale : NTS @ A1

Drawing No : ED-Facade-1823N.3-1

Rev: [-]



1. Material: alum 1050H14
2. Thickness 2 mm
3. Length: 2500 mm
4. Finish: PPC RAL2013

General Notes:

All drawings to be read in conjunction with architects and engineers drawings.

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Rev	Description	Drawn	Checked	Date
C				
B				
A				

Drawing Status:
Proposal

ASH & LACY
BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTIONS FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client :
Ash & Lacy Ltd.

Project :
ED-Facade-1823

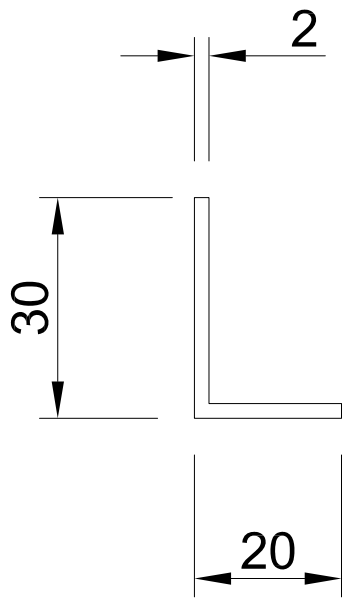
Drawing Title :
MechsIIp CWCT Test Accessory - Z120X345X120X2

Drawn By:	Checked By:	Date :
YT		20/5/2019

Scale : NTS @ A1

Drawing No : ED-Facade-1823M.3-1

Rev: [-]



1. Material: alum 1050H14
2. Thickness 2 mm
3. Length: 2015 mm
4. Finish: mill finish

Rev	Description	Drawn	Checked	Date
C				
B				
A				

Drawing Status: Proposal

ASH & LACY

BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTIONS FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client : Ash & Lacy Ltd.

Project : ED-Facade-1823

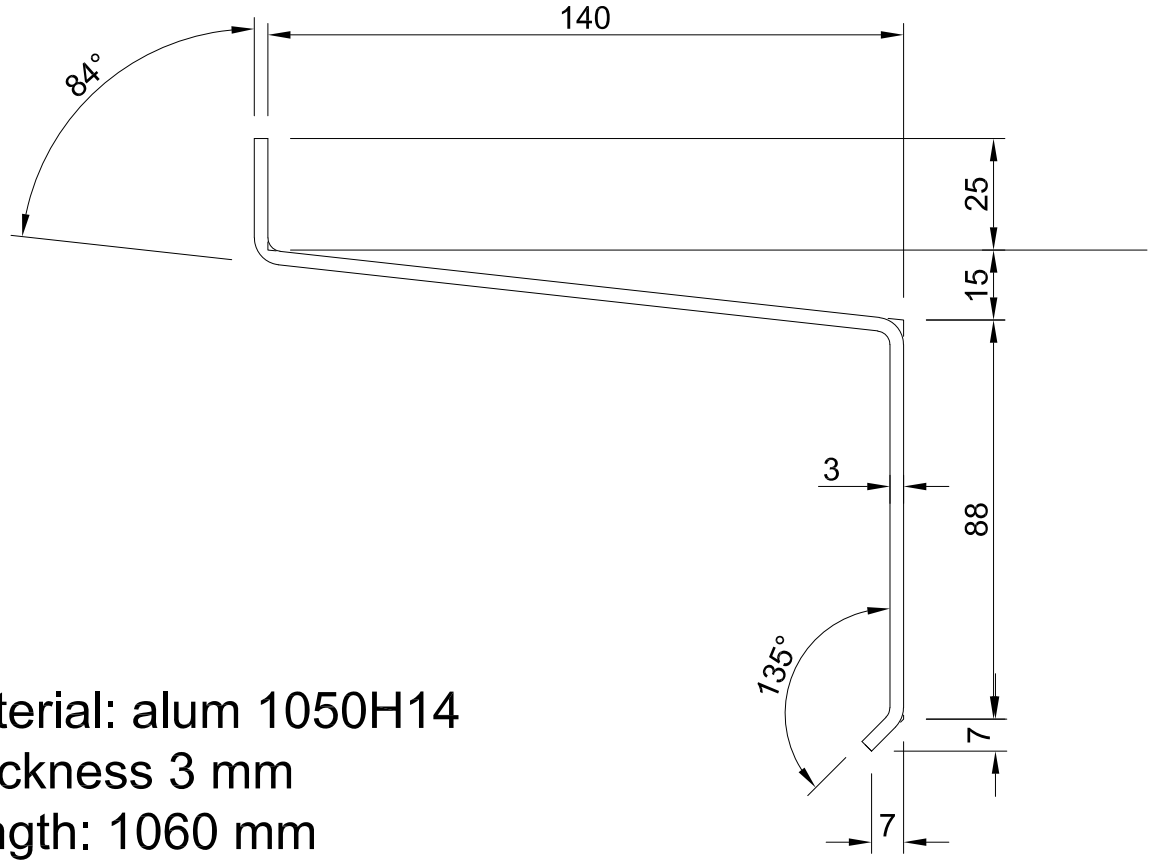
Drawing Title : MechsIIp CWCT Test Accessory - L30X20X2

Drawn By:	Checked By:	Date :
YT		20/5/2019

Scale : NTS @ A1

Drawing No : ED-Facade-1823M.3-2

Rev: [-]



1. Material: alum 1050H14
2. Thickness 3 mm
3. Length: 1060 mm
4. Finish: PPC RAL2013

Rev	Description	Drawn	Checked	Date
C				
B				
A				

Drawing Status: Proposal

ASH & LACY
BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTIONS FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client : Ash & Lacy Ltd.

Project : ED-Facade-1823

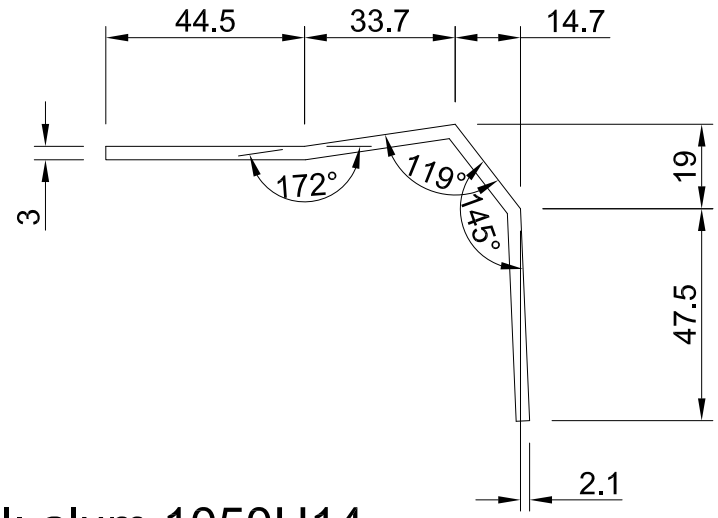
Drawing Title : Mechsllp CWCT Test Accessory - Window Cill

Drawn By:	Checked By:	Date :
YT		20/5/2019

Scale : NTS @ A1

Drawing No : ED-Facade-1823M.3-4

Rev: [-]



1. Material: alum 1050H14
2. Thickness 3 mm
3. Length: 1060 mm
4. Finish: Mill finish

Rev	Description	Drawn	Checked	Date
C				
B				
A				

Drawing Status: Proposal

ASH & LACY

BROMFORD LANE WEST BROMWICH WEST MIDLANDS B70 7JJ TEL: 0121 525 1444 OPTIONS FAX: 0121 525 3444 WWW.ASHANDLACY.COM

Client : Ash & Lacy Ltd.

Project : ED-Facade-1823

Drawing Title : Mechsllp CWCT Test Accessory - WIndow CIII Support

Drawn By:	Checked By:	Date :
YT		20/5/2019

Scale : NTS @ A1

Drawing No : ED-Facade-1823M.3-5

Rev: [-]

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