

Heritage Facades Specification

Sandstones Precinct Bridge Street, Sydney

Pontiac Land (Australia) Pty Ltd / 31 August 2018

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Sandstones Precinct

Bridge Street, Sydney

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0171 GENERAL REQUIREMENTS

1 HERITAGE FACADES SPECIFICATION

1.1 GENERAL

This is a prescriptive specification for conservation works to the external heritage façades of the former Education Building forming the proposed Sandstones Precinct Project.

Definitions Defined:

The following role definitions have been used throughout this document:

Role:	Company:
Architect	Make / Ridley
Contractor	Built
Heritage Façade Sub-contractor	TBC - the Sub-contractor undertaking the heritage façade works
Heritage Consultant	Urbis
Façade Engineer	Taylor Thomson Whitting
Principal / Principal of the Works	Pontiac Land (Australia) Pty Ltd
Structural Engineer	Taylor Thomson Whitting

1.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

1.1.1 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- 0171 General Requirements
- 0192 Structural Components
- 0332 Sandstone Masonry.
- 0333 Stone Repair.
- 0335 Brick Construction
- 0411 Waterproofing – External and Tanking
- 0423 Roofing – Profiled Sheet Metal
- 0424 Roofing – Seamed Sheet Metal
- 0451 Windows and Glazed Doors
- 0453 Doors and Access Panels
- 0671 Painting
- 0821 Stormwater – Buildings

1.1.2 STANDARDS

- Refer to relevant section for applicable set of standards.

1.1.3 SCOPE OF WORKS

1.1.4 DEPARTMENT OF EDUCATION BUILDING

The Department of Education Building (35-39 Bridge Street) was built in two stages between 1914-1915 and 1929-1930. The building covers an entire city block and is constructed over four main storeys. It has a dressed sandstone façade which is rock-faced at street level. There are entrances from each of the four street frontages. The sandstone masonry is loadbearing in Stage 1 (northern portion) but self-supporting over a concrete-encased steel structural frame in Stage 2 (southern portion). The key external elements of the street façades and roofs requiring conservation works as outlined in the Conservation Management Plan by City Plan Heritage, dated March 2015 are:

- Copper roofing (to roof lanterns)
- Timber fascia's (to roof lanterns)
- Copper cladding (to roof lanterns)
- Timber windows (to roof lanterns)
- Sandstone masonry
- Steel windows
- External doors and entrances

- Wrought iron grilles and entrance gates
- Trachyte masonry (at entrances)
- Bronze plaques
- Aluminium vents

HERITAGE WORK REQUIREMENTS

The heritage significance of the building requires that all works shall be carried out in accordance with the conservation policies of the Australia ICOMOS Burra Charter. In addition to this, all works should be carried out in accordance with the following Conservation Management Plans; prepared for the former Department of Education Conservation Management Plan Department of Education Building 35-39 Bridge Street, Sydney, March 2015, by City Plan Heritage.

- The Lands Building Bridge Street Sydney Conservation Management Plan, March 2015, by the Government Architects Office.

1.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.
- Roofing and Metalwork Series:
 - Refer to TEE700 Drawing Series.
 - Refer to TPE700 Drawing Series.
- Seismic Strengthening Series:
 - Refer to TDE600 Drawing Series.
 - Refer to TEE600 Drawing Series.
 - Refer to TPE600 Drawing Series.
- Windows Series:
 - Refer to TEE800 Drawing Series.
 - Refer to TPE800 Drawing Series.

1.3 SKILLED PERSONNEL

- All works to be performed only by skilled and qualified persons as detailed in the following sections of this specification.

1.4 SUBMISSIONS

The buildings are listed on the NSW State Heritage Register and in Schedule 5 of the City of Sydney Local Environmental Plan 2012 (LEP).

- Education Building SHR No. 00726 and Sydney LEP 2012 Inventory No. I684

Conservation Management Plans

Individual Conservation Management Plans have been prepared for both buildings. This document has been prepared in consideration of the relevant Conservation Policies contained within these Conservation Management Plans. Copies of the Conservation Management Plans will be available to the Contractor on request.

Inspection to Establish Quantity of Works

- This specification has been prepared based upon a visual inspection from a distance. Quantities have been allowed based on a combination of observation and experience. These are estimated quantities for the purpose of obtaining comparable tender prices. For this reason, the rates per item will be used to vary the contract sum.
- Upon provision of access to each section of the façade, you will be required to undertake a joint inspection with the Facade Engineer to identify the location and type of conservation works required to each element. Use the work types as outlined in this specification and the schedule of rates.
- Based on a joint submission, submit a revised schedule of agreed conservation works for each section of the façade, along with a revised contract sum. Determine the revised contract sum by varying the amount for each work type using the variation rate provided in the tender bid.

1.4.1 SAFE WORK METHOD STATEMENT

- Draft safe work method statements (SWMS) are to be provided for each element of the works at least four weeks prior to commencement on site. SWMS should be in point or step format, with sketches and detail drawings incorporated where appropriate.
- SWMS should be developed in conjunction with the personnel carrying out each element of the works. All personnel are to be familiar with the content of the SWMS for each element prior to commencing work on that element.
- The SWMS will be reviewed by the Superintendent and his representatives. Where required by the Superintendent, prototype works shall be carried out for the approval of the Superintendent or his representatives.
- Final SWMS are to be submitted immediately following approval of any samples or prototype works.

- All works are to be carried out in accordance with the approved SWMS unless circumstances change requiring amendments to agreed procedures. The Superintendent is to be advised in writing of all changes to agreed work methods.
- Copies of the SWMS are to be available on site at all times during execution of the relevant works.

1.4.2 SAMPLES

- Samples of all new materials to be used in the conservation works shall be provided at least four weeks prior to ordering. Samples are to show exposed finishes and construction where relevant. Samples are to be clearly labelled identifying the product, manufacturer and supplier for this project. Technical data sheets and material safety data sheets are to be supplied with each sample. Refer to following sections for specific samples required.

Schedule of Samples and Prototypes:

Item	Reference Section	Size
Asbestos sampling test	0192 - 1.4.3	As Required
Install Loxin	0332 - 1.4.2	NO.1 Unit
Seismic Bracing	0332 - 2.4.2	3NO. (1 of Each Item)
Sandstone Cleaning	0333 - 1.4.2	2000x2000mm Each Item
Sandstone Desalination	0333 - 2.4.2	1000x1000mm
Sandstone Repairs	0333 - 3.4.2	Refer to Section
Sandstone Colouring	0333 - 4.4.2	300x300mm
Indent Trachyte	0333 - 5.4.2	150x150x100mm
Repointing	0333 - 6.4.2	3ln.m
Porous Mortar Repairs	0333 - 7.4.2	50x50x50mm
Sealant Joints	0333 - 9.4.2	3ln.m
Render Repairs	0335 - 1.4.2	2000x2000mm
Mineral Felt Membrane	0411 - 1.4.2	Refer to Section
Copper Batten Seam Roofing	0423 - 1.4.2	300x300mm
Lead Weatherings	0424 - 1.4.2	3ln.m
Steel Windows	0451 - 1.5	NO.1 Unit
Timber Windows	0451 - 2.5	NO.1 Unit
Clean Bronze Doors	0453 - 1.4.2	1000x1000mm
Glass Block Pavement Lights	0463 - 1.5	NO.1 Unit
Painting	0671 - 1.4.2	Refer to Section

Copper Guttering	0821 - 1.4.2	5ln.m
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Schedule of Witness and Hold Points:

Item	Reference Section	Hold / Witness	Approval
Asbestos sampling test	0192 – 1.4.3	Witness – During sampling	Superintendent
Install Loxin	0332 – 1.4.2	Hold – After first installation	Superintendent
Seismic Bracing	0332 – 2.4.2	Hold – After each first unique installation	Superintendent
Sandstone Cleaning	0333 – 1.4.2	Hold – After first sample	Superintendent
Sandstone Desalination	0333 – 2.4.2	Hold – After each first unique sample	Superintendent
Sandstone Repairs	0333 – 3.4.2	Hold – After each first unique sample	Superintendent
Sandstone Colouring	0333 – 4.4.2	Hold – After each first unique sample	Superintendent
Indent Trachyte	0333 - 5.4.2	Hold – After first sample	Superintendent
Repointing	0333 – 6.4.2	Hold – After each first unique sample	Superintendent
Porous Mortar Repairs	0333 – 7.4.2	Hold – After each first unique sample	Superintendent
Sealant Joints	0333 – 9.4.2	Hold – After each first unique sample	Superintendent
Render Repairs	0335 – 1.4.2	Hold – After each first unique sample	Superintendent
Mineral Felt Membrane	0411 - 1.4.2	Hold – After each first unique sample	Superintendent
Copper Batten Seam Roofing	0423 - 1.4.2	Hold – After each first unique sample	Superintendent
Lead Weatherings	0424 – 1.4.2	Hold – After each first unique sample	Superintendent
Steel Windows	0451 – 1.5	Hold – After each first unique prototype	Superintendent
Timber Windows	0451 - 2.5	Hold – After each first unique prototype	Superintendent
Clean Bronze Doors	0453 - 1.4.2	Hold – After each first unique sample	Superintendent
Glass Block Pavement Lights	0463 - 1.5	Hold – After each first unique prototype and installation	Superintendent

Painting	0671 - 1.4.2	Hold – After each first unique sample	Superintendent
Copper Guttering	0821 - 1.4.2	Hold – After each first unique sample	Superintendent

1.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0171 - Clause 1.5.

1.4.4 INSPECTION AND TEST PLAN

- An inspection and test plan (ITP) is to be prepared and used to ensure satisfactory completion of all agreed works.
- The ITP can take the form of a checklist to confirm execution of all agreed items of work.
- Submit the ITP in draft form at least four weeks prior to commencing works on the site.
- Progressively complete the ITP throughout the works, ensuring it is available on site for review by the Superintendent and their representatives at all times. Submit relevant sections of the completed ITP with each progress claim.

1.5 PROTOTYPES

- Prototype works are to be carried out for each element of the facade conservation works. The Superintendent and his representatives are to be notified in advance of the date on which prototype works will be executed and completed. Completed prototype works shall be inspected by the Superintendent and his representatives prior to continuing with the works.
- Prototype works are to be repeated until the Superintendent and his representatives are satisfied that the manner of execution meets the required standards.
- All further work is to be carried out to the same standard as approved prototypes.

1.6 METHODS

1.6.1 ROOFTOP STRUCTURES:

- The proposed scope of works is based on the Conservation Management Plan for the Department of Education Building, prepared by City Plan Heritage, and a visual inspection of the building façades from street level and inside specific areas of the building.

- It is proposed that the detailed extent of works will be determined following erection of external access, enabling detailed hands-on inspection and scheduling.

Roof Lanterns

- The following rooftop structures are to be retained and conserved where practical. Care is required to protect these elements during demolition of other rooftop structures and construction of the new infill roof elements.
- Detailing of interfaces is to be undertaken with the utmost care, and all connections to the existing heritage structures and finishes must be fully designed, detailed and approved before works on site commence.

Copper Roofing

- Inspect copper roofing and roof plumbing; repair any damage (missing or loose screws, tears, holes or open seams) using traditional and compatible materials and repair methods.
- **Extent:**
 - Refer to 700 Drawing Series
- **Specification:**
 - Refer to Section 0423 Roofing – Profiled Sheet Metal (including all internally referenced Specifications).

Timber Fascia

- Conserve timber fascia's where practical, otherwise patch repair decayed timber using matching pieced-in timber and protect to match original.
- **Extent:**
 - Refer to 700 Drawing Series
- **Specification:**
 - Refer to Section 0451 Windows and Glazed Doors (including all internally referenced Specifications).

Copper Cladding

- Conserve copper cladding where practical, otherwise replace cladding to match original.
- **Extent:**
 - Refer to 700 Drawing Series
- **Specification:**

- Refer to Section 0423 Roofing – Profiled Sheet Metal (including all internally referenced Specifications).

Timber Windows

- Investigate and document existing / original finishes (different inside and outside) and determine new external finish colour to match existing; in conjunction with Heritage Consultant.
- Remove glazing beads and existing glass from all window sashes (fixed and operable).
- Strip existing paint finishes (typically external surfaces only) back to bare timber; conserve existing clear finishes where in sound condition.
- Patch repair decayed timber using matching pieced-in timber (where visible) or epoxy patch (where small and/or not visible); do not repair small impact damage or evidence of wear and tear on internal surfaces.
- Modify frame members (to both operable and fixed sashes) to receive new laminated glass of varying thickness in lieu of original glass.
- Prepare painted surfaces (sand, prime).
- Finish painted surfaces to match existing.
- Prepare timber where clear finishes to be replaced.
- Apply new clear finish in lieu of original as required to match existing.
- Clean and buff existing clear finish where retained to match existing.
- Install new laminated glass according to detail, including fixing of aluminium angle, structural silicone glazing of glass lights, and installation of external glazing bead.
- Repair and service original hardware; replace missing or damaged hardware with appropriate matching; install stops to limit size of openings to hinged or pivot sashes to match existing.
- Clean frames and glass upon completion to match existing.
- **Extent:**
 - Refer to 700 & 800 Drawing Series
- **Specification:**
 - Refer to Section 0451 Windows and Glazed Doors (including all internally referenced Specifications).

Main Facades

- The proposed scope of works is based on the Conservation Management Plan for the Department of Education Building, prepared by City Plan Heritage, and a visual inspection of the building façades from street level and inside the building.

- It is proposed that the detailed extent of works will be determined following erection of external access, enabling a detailed hands-on inspection and scheduling.

Sandstone Masonry

- Erect scaffold access and hoardings.
- Undertake a detailed hands-on inspection and schedule extent of works required (jointly between Heritage Façade Consultant and Specialist Subcontractor).
- Treat soiled areas of sandstone masonry with biocide; clean all areas of sandstone masonry.
- Redress and desalinate undersides of cornices, string courses and pediments where evidence of efflorescence exists.
- Replace or indent badly weathered stone units with new replacement sandstone to match existing.
- Patch small areas of decay using mortar patch repair to match existing surrounding stone.
- Repair all stone cracks in an aesthetically sympathetic manner (confirm with Heritage Consultant).
- Allow to re-render brickwork sections of parapets.
- Allow to remove all existing bird proofing.
- Conserve all Plaques.
- Conserve all Gratings.
- Allow to replace damaged base flashing to parapet interior.
- Remove all existing ferrous metal fixings and patch repair to match existing.
- Install seismic restraints to individual elements considered to be at risk from seismic loading.
- Replace failed or missing pointing.
- Replace elastomeric pointing with sand: lime: mortar: cement pointing.
- Apply artificial colouring to areas of previously replaced off-coloured sandstone to better match oxidised colour of original stone.
- It is proposed that replacement stone will be from Gosford Quarries' 200 George Street stockpile, if available.
- Remove existing lead weatherings and install new weatherings to improved detail.
- Construction clean.
- **Extent:**
 - Refer to 900 Drawing Series

- **Specification:**
 - Refer to Section 0333 Stone Repair (including all internally referenced Specifications).

Steel Windows

- Document existing / original finishes (different inside and outside) and determine new finish colour in conjunction with Heritage Consultant.
- Remove all existing secondary glazing.
- Conserve existing steel windows including glass where practical; repair and repaint. Alternatively replaced windows to match existing if repair is impractical.
- **Extent:**
 - Refer to 800 Drawing Series
- **Specification:**
 - Refer to Section 0451 Windows and Glazed Doors (including all internally referenced Specifications).

External Doors and Entrances

- Patch repair damage to external doors and entranceways using traditional methods and compatible materials
- Clean, buff or refinish existing finishes; do not damage or strip or re-patinate copper or bronzework
- Service and repair as necessary existing hardware; replace missing hardware with matching replacements
- **Extent:**
 - Refer to 800 Drawing Series
 - Refer to 900 Drawing Series
- **Specification:**
 - Refer to Section 0453 Doors and Access Panels (including all internally referenced Specifications).

Wrought Iron Grilles and Entrance Gates

- Undertake paint investigations to establish likely original finish colour.
- Label and remove from building
- Abrasive blast clean to remove all paint (assume lead-containing)
- Repair missing, corroded or damaged details
- Blast and prime (zinc-rich epoxy)

- Topcoat x 2 to required finish colour to match original (to be advised by Heritage Consultant)
- Repair fixing locations in sandstone (indents, patches)
- Reinstall grilles with stainless steel bolts into stainless steel threaded insert fixings in masonry
- **Extent:**
 - Refer to 800 Drawing Series
- **Specification:**
 - Refer to Section 0671 Painting (including all internally referenced Specifications).

Trachyte

- Patch small areas of damage, including old patch repairs, using trachyte indents to match existing.
- Remove all existing metal fixings and patch repair.
- Allow to replace damaged or missing jointing.
- Construction clean.
- **Extent:**
 - Refer to 900 Drawing Series
- **Specification:**
 - Refer to Section 0333 Stone Repair (including all internally referenced Specifications).

Aluminium Vents

- Remove past paint.
- Brush back visible corrosion with aluminium wire brushes.
- Prime with primer specified by manufacturer for aluminium.
- Repaint colour (to be advised by Heritage Consultant)
- **Extent:**
 - Refer to 900 Drawing Series
- **Specification:**

Refer to Section 0671 Painting (including all internally referenced Specifications).

0192 STRUCTURAL COMPONENTS

1 HAZARDOUS MATERIALS

1.1 GENERAL

1.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

1.1.2 CROSS-REFERENCES

Read with the following associated work sections:

- Refer Section 0171 General Requirements.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0411 Waterproofing – External and Tanking.
- Refer Section 0423 Roofing – Profiled Sheet Metal.
- Refer Section 0424 Roofing – Seamed Sheet Metal.
- Refer Section 0451 Windows and Glazed Doors.
- Refer Section 0453 Doors and Access Panels.
- Refer Section 0671 Painting.
- Refer Section 0821 Stormwater - Buildings.

1.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS 2601	The Demolition of Structures
AS 4361.2	Guide to Lead Paint Management – Residential and Commercial Buildings
NOHSC 2018 (2005)	Safe Work Australia – Code of Practice for The Management and Control of Asbestos in Workplaces.

*Use standards which are the editions, with amendments, current at the time of the works.

1.1.4 SCOPE OF WORKS

General

- A hazardous substances audit of the building facades for this project has not been undertaken. Sampling and analysis of pointing is reported in previous documentation on the building, and has not shown the presence of asbestos.
- The Contractor is required to undertake a hazardous substances audit of areas affected by the Works Under Contract as soon as scaffold access has been erected and prepare a Hazardous Substances Management Plan. Provide a copy to the Superintendent.
- Should hazardous substances be found they are to be either left undisturbed or, if required for the carrying out of the Works under Contract (WUC), removed strictly in accordance with current Work Health and Safety (WHS) and other relevant legislation.
- Prepare a works plan for removal of any hazardous substances. Provide a copy to the Superintendent.
- Keep all site personnel informed and aware of any hazards.

Potential presence of asbestos-containing material

- The competent person undertaking the audit shall be responsible for identifying all hazardous substances which may be affected by the WUC.
- The Education Building was constructed between 1912-1930, and therefore it is possible that original materials, particularly in the second stage (southern half) may contain asbestos. It is also possible that previous repair or maintenance works have used materials which contained asbestos. Consequently, bedding and pointing mortars to these areas may contain asbestos.

Potential presence of lead paint

- The competent person undertaking the audit shall be responsible for identifying all hazardous substances which may be affected by the WUC.
- Painted masonry on both buildings may be painted with paint containing lead.

1.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.
- Roofing and Metalwork Series:
 - Refer to TEE700 Drawing Series.
 - Refer to TPE700 Drawing Series.
- Seismic Series:
 - Refer to TDE600 Drawing Series.
 - Refer to TEE600 Drawing Series.
 - Refer to TPE600 Drawing Series.
- Windows Series:
 - Refer to TEE800-03 inclusive.
 - Refer to TPE800.

1.7 SKILLED PERSONNEL

- All works to be carried out by an appropriately qualified contractor. All waste to be disposed of appropriately.

1.3 SUBMISSIONS

1.3.1 INSPECTION

In accordance with Section 1.6 of AS 2601, a competent person shall determine the presence of hazardous substances or conditions in the structure and all parts of the site which may be hazardous to the health of the site personnel or the public if disturbed by stripping or demolition.

1.3.2 HAZARDOUS SUBSTANCES MANAGEMENT PLAN

- The nature and location of each hazard shall be recorded and both the record and proposed method of controlling the hazards shall be recorded in a Hazardous Substances Management Plan.

- The Hazardous Substances Management Plan shall include, but not be limited to, location and quantity of each substance, the method in which that substance is to be controlled or removed, the methods of monitoring exposure limits, and the handling, storage and disposal procedures to an approved landfill or approved storage area.

1.3.3 SAMPLES

- The audit shall be supported by a laboratory analysis of samples taken of the suspected hazardous substances by a competent person in accordance with NOHSC 2018.
- Test samples should be carried in accordance with NOHSC 2018 which advises samples should be representative of the building and taken at every floor and wherever any variations in appearance, texture or colour are present.
- Notify the Superintendent in advance of the date on which prototype works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Prototype works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved prototypes.

1.4 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0192 – Clause 1.4.3 above.

1.5 MATERIALS

Hazardous Substances

- All materials to be disposed of in an appropriate manner by the contractor.

1.6 METHODS

1.6.1 REMOVAL OF HAZARDOUS SUBSTANCES

General

- Removal of hazardous substances shall be carried out only by competent persons, or competent and registered persons if so required prior to the start of any demolition or stripping works.

Removal of Asbestos

- Removal of asbestos or asbestos-containing material (ACM) shall be in accordance with the NOHSC (Safe Work Australia) code of practice for the safe removal of asbestos.

Removal of Lead Paint

Removal or abrading of lead paint shall be in accordance with AS 4361, Guide to lead paint management – Residential and commercial buildings.

Removal of Other Hazardous Materials

- Precautions to be observed, and procedures to be adopted during the removal of hazardous substances other than asbestos, shall be in accordance with the relevant State or Territory regulations pertaining to those materials.

1.7 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

0332 STONEMASONRY

1 SCAFFOLD RESTRAINTS

1.1 GENERAL

1.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- Scaffolding shall be designed in accordance with AS1576 series of standards by a NPER registered Structural Engineer with a minimum of 5 years recent experience in the design of scaffolds.
- The scaffold Structural Engineer shall procure and maintain a minimum of \$5M Professional Indemnity Insurance and \$20M Public Liability Insurance.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

1.1.2 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0671 Painting.

1.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS 1657	Fixed Platforms, Walkways, Stairways and Ladders – Design, Construction and Installation
AS 1576.1:2010	Scaffolding - General Requirements
NOHSC 2002	Safe Work Australia – Code of Practice for The Safe Removal of Asbestos

*Use Standards which are the editions, with amendments, current at the time of the works.

1.1.4 SCOPE OF WORKS

- Install scaffold restraints into sandstone masonry on a progressive basis as scaffold is erected.

1.2 LOCATION OF WORKS

- Refer Scaffolders Engineer drawings.

1.2.1 DESIGN DRAWINGS

- Provide scaffold design proposals for each building.
- Design of restraint system to be based on the following principles:
 - Minimise requirement for fixings into the external face of sandstone masonry.
 - Use fixing locations on upward facing projecting surfaces, or return surfaces, or behind balustrades
 - Liaise with Structural Engineer to ensure that locations have adequate structural capacity for scaffold design loads.
 - Ensure sufficient edge distance for installation of all scaffold restraints within sandstone.
 - Wherever possible, utilise embedded Loxins that can be covered upon completion and retained for future access.

1.3 SKILLED PERSONNEL

Work to be performed only by skilled and qualified persons, employed by a firm with at least 5 years' experience in conservation and restoration works on heritage sandstone buildings, specifically including those constructed of Sydney sandstone.

1.4 SUBMISSIONS

1.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

1.4.2 SAMPLES

- Submit for approval one stainless steel Loxin sample.
- Submit at least four weeks prior to ordering material.
- Install a single Loxin into one sandstone unit in a discrete location.
- Notify the Superintendent in advance of the date on which sample works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved samples.

1.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0332 - Clause 1.5.

1.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4
- Submit at least four weeks prior to commencing work on site.

1.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0332 – Clause 1.4.2 above.

1.6 MATERIALS

- Scaffolding shall be designed in accordance with AS1576 series of standards by a NPER registered Structural Engineer with a minimum of 5 years recent experience in the design of scaffolds. The scaffold Structural Engineer shall procure and maintain a minimum of \$5M Professional Indemnity Insurance and \$20M Public Liability Insurance.

- Ties through stonework are to be kept to a minimum while also ensuring the stability of the scaffold. All anchors are to be removed from stonework on completion of the works (leaving only the stainless-steel sleeves to the inner leaf of brickwork) and the hole in the stonework made good in accordance with Note 6.
- Where chemical anchors are used, all anchors shall be proof load tested to 1.25 times their design working load. Documented verification of testing is to be kept on site for inspection by the Superintendent, stating the date of installation, location of installation and name of competent person installing and testing the anchors.
- Chemical anchors shall have a failure load safety factor of at least 3 times their design load. If any anchor should fail in use the remaining anchors on the same scaffold level shall be retested as per note 3.
- Scaffold ties should not obstruct access along the working and access platforms. Ties should interconnect with both the inner and outer scaffold standards (unless otherwise specified by the scaffold Structural Engineer) to increase the rigidity of the scaffold.
- Removal: On removal, leave treaded sleeve anchors in brickwork for reuse. Plug surface holes in stone with porous mortar, flush with stone surface and colour-matched to surrounding stone.

1.6.1 EMBEDDED FIXINGS

- Use stainless steel Loxin of minimum grade 316 stainless steel. Diameter to be determined by scaffold certifying engineer.

1.6.2 CHEMICAL ANCHOR

Use of products equal in performance to the following:

- Manufacturer: Refer to Scaffolding Certifying Engineer
- Product: Refer to Scaffolding Certifying Engineer

1.7 METHODS

1.7.1 GENERAL

- Provide scaffold design proposals for each building.
- Design of restraint system to be based on the following principles:
 - Minimise requirement for fixings into the external face of sandstone masonry.
 - Use fixing locations on upward facing projecting surfaces, or return surfaces, or behind balustrades.
 - Liaise with Structural Engineer to ensure that locations have adequate structural capacity for scaffold design loads.

- Ensure sufficient edge distance for installation of all scaffold restraints within sandstone.
- Wherever possible, utilise embedded Loxins that can be covered upon completion and retained for future access.

1.7.2 CORING SANDSTONE

- Locate position of hole in accordance with drawings and detail. Coordinate with scaffolder.
- Use diamond core bits of diameter to suit the requirements of the Loxin manufacturer.

1.7.3 INSTALL FIXINGS

- Install fixings in accordance with manufacturer's specifications.

1.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

2 SEISMIC RESTRAINTS

2.1 GENERAL

2.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

2.1.2 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.

2.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS 1170.4-2007	Structural Design Actions - Part 4 Earthquake Actions in Australia
AS 1170.1-2002	Structural Design Actions - Part 1 Permanent, Imposed and Other Actions
AS 4100-1998	Steel Structures

*Use Standards which are the editions, with amendments, current at the time of the works.

2.1.4 SCOPE OF WORKS

- Install seismic restraints to sandstone masonry as required by Structural Engineer.

2.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.
- Seismic Series:
 - Refer to TDE600 Drawing Series.
 - Refer to TEE600 Drawing Series.
 - Refer to TPE600 Drawing Series.

2.3 SKILLED PERSONNEL

Work to be performed only by skilled and qualified stonemasons, employed by a firm with at least 5 years' experience in conservation and restoration works on heritage sandstone buildings, specifically including those constructed of Sydney sandstone.

2.4 SUBMISSIONS

2.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

2.4.2 SAMPLES

As a sample, install seismic restraints to each of the following elements.

- Balustrade pier
- Balustrade capping stone
- Pediment
- Notify the Superintendent in advance of the date on which sample works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved samples.

2.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0332 - Clause 2.5

2.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4
- Submit at least four weeks prior to commencing work on site.

2.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0332 – Clause 2.4.2 above.

2.6 MATERIALS

2.6.1 STAINLESS STEEL

- Cold formed stainless steel shall comply with AS 4673. Hot formed stainless steel shall comply with Eurocode 3 (EN1993-1). Stainless steel shall be Austenitic to AISI Grade 316 unless otherwise stated on drawings.
- All stainless steel shall have a surface roughness Ra of less than 0.5 micrometres (equivalent to No. 4 finish). This may be achieved by using a minimum 320 abrasive grit.
- Equipment and workspaces used to fabricate stainless steels shall not have been previously used to fabricate other carbon steels. Workspaces shall be clean.

2.6.2 STAINLESS STEEL BOLTS, NUTS AND TREADED ROD

- All stainless-steel bolts, nuts and threaded rods shall be austenitic stainless steels grade A4-70 to DIN ES ISO 3506-1: 1997.

2.6.3 CHEMICAL ANCHORS

- Refer Structural Engineers Seismic Strengthening Details

2.7 METHODS

2.7.1 PICKLING AND PASSIVATION

- The Contractor shall provide all labour, tools, plant and materials for the passivation of stainless steel and welded areas on stainless steel fabrications. Cleaning and passivation shall be carried out before installation, to ensure that the protective chromium oxide film is fully effective.

- Welded areas on fabricated stainless steel shall be pickled by treating with "SANDVIK" Pickling Paste, or approved equivalent, used in strict accordance with the manufacturer's printed directions. Pickling should take place outdoors or in a well-ventilated room because of the risk of gas emissions. Persons working with nitric acid or pickling paste should be equipped with appropriate PPE, in compliance with current WHS regulations.
- Bolts, nuts and washers and other small items shall be cleaned and passivated by an overnight soak in 15% dilute nitric acid followed by thoroughly washing in fresh water. Items too large to be treated using this method shall be treated using "SANDVIK" Pickling Paste, or approved equivalent, used in strict accordance with the manufacturer's printed directions.

2.7.2 HANDLING AND STORAGE OF STAINLESS STEEL

- Support shall be provided so that the stainless-steel members and fabrications maintain their shape and form. Stainless steel shall not be stored in contact with other carbon steels. Stainless steel shall be handled and stored in a manner that does not allow damage to its surface. If damage to surfaces does occur the surface shall be passivated in accordance with this Specification.
- The surface of stainless steelwork shall be kept clean and free from grease, dirt and other contaminants at all times. Cleaning can be carried out by using mild detergents or soap and warm water, followed by thoroughly rinsing with cold water.

2.7.3 INSTALLATION

- Equipment used during the installation of stainless steel shall not have been previously used with other carbon steels. Immediately following construction, and again prior to Practical Completion, all stainless steelwork shall be thoroughly cleaned by using mild detergents or soap and warm water followed by thorough rinsing with cold water. Cleaning products may include stainless steel wool, stainless steel wire or Scotch-Brite that have not had prior contact with other carbon steels.
- Stainless steel fasteners shall be electrically isolated from metals dissimilar on galvanic scale by use of insulating gaskets, washers and bushes, as appropriate (refer Figure C5 of AS/NZS 4673-2001).
- The length of each bolt and threaded rod shall be such that a threaded portion projects at least one and one half complete threads past the nut. Bolts shall be tightened using a standard wrench to a 'snug-tight' condition unless noted otherwise on the drawings.

At the end of construction, and prior to Practical Completion, the Contractor shall reinspect that all nuts are correctly tightened.

2.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

0333 STONE REPAIR

1 SANDSTONE CLEANING

1.1 GENERAL

1.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

1.1.2 CROSS-REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0423 Roofing – Profiled Sheet Metal.
- Refer Section 0424 Roofing – Seamed Sheet Metal.
- Refer Section 0451 Windows and Glazed Doors.
- Refer Section 0671 Painting.

1.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1

No.	Title
AS 1141.11	Methods for Sampling and Testing Aggregates
AS 1672.1	Limes and Limestones - Limes for Building
AS 2701	Methods of Sampling and Testing Mortar for Masonry Constructions
AS 3700	Masonry Structures
AS 3972	General Purpose and Blended Cements
AS 4456.10	Masonry Units and Segmental Pavers and Flags - Methods of Test - Determining Resistance to Salt Attack
AS 4489	Test Methods for Limes and Limestones
ASTM C97	Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone
ASTM C99	Standard Test Methods for Modulus of Rupture of Dimension Stone
ASTM C170	Standard Test Methods for Compressive Strength of Dimension Stone
ASTM C1489	Standard Specification for Lime Putty for Structural Purposes
ASTM C1496	Standard Guide for Assessment and Maintenance of Exterior Dimension Stone Masonry Walls and Facades
ASTM C1713	Standard Specification for Mortars for The Repair of Historic Masonry
BS 8221.1	Code of Practice for Cleaning and Surface Repair of Buildings - Cleaning of Natural Stone, Brick, Terracotta and Concrete
BS 8221.2	Code of Practice for Cleaning and Surface Repair of Buildings - Surface Repair of Natural Stones, Brick and Terracotta
BS 8298.1	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – General
BS 8298.2	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – Traditional Handset External Cladding

No.	Title
I.S. EN 1008	Mixing Water for Concrete - Specification for Sampling, Test and Assessing the Suitability of Water as Mixing Water for Concrete

Use standards which are the editions, with amendments, current at the time of the works.

1.1.4 SCOPE OF WORKS

General requirements

- Treat all visibly soiled areas of sandstone masonry with biocide. Allow to act (up to 4-6 weeks) before cleaning sandstone.
- Clean all the existing stonework to the entire faces of elevations. Remove harmful deposits of foreign material, bird droppings, mould, fungal and lichen growths and salts from the building fabric without damage to the stonework. Leave the stonework surface in a neutral state. Leave an even final appearance without overlaps between bays, streaks or stains.
- Determine with Superintendent the nature and extent of dirt and deposits to be removed from each area of stone.
- Do not over clean.
- Do not damage stone or building during cleaning.
- Do not attempt to produce a 'new stone' appearance.
- Do not use acids or cleaning detergents (use only clean water).

Program

Requirement: Submit a program that allows work to be carried out in a sequence as specified and scheduled. Do not commence pointing or repainting work, stonework replacement and repair, porous mortar repairs or window works until cleaning in the vicinity has been completed.

1.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.

1.3 SKILLED PERSONNEL

Work to be performed only by skilled and qualified stonemasons, employed by a firm with at least 5 years' experience in conservation and restoration works on heritage sandstone buildings, specifically including those constructed of Sydney sandstone.

1.4 SUBMISSIONS

1.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

1.4.2 SAMPLES

Give Notice

- Give notice to the Superintendent in advance of when selection of a sample panel for test cleaning is needed.

Sample Size

Carry out sample works applying cleaning to the following off-white or grey sandstone elements.

- | | |
|--|---------------------------|
| • Rear of parapet (Education Building) | Quantity: 4m ² |
| • Cornice beneath lead weathering | Quantity: 4m ² |
| • Dentil beneath cornice | Quantity: 2m ² |
| • Capping to balcony | Quantity: 4m ² |
| • Baluster to balcony | Quantity: 1NO. |
| • Base of balcony balustrade | Quantity: 4m ² |

Notify the Superintendent in advance of the date on which prototype works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved samples.

Hold Point

- Before commencing cleaning, operations test clean a minimum 2m x 2m sample area nominated by the Superintendent. Use the methods specified herein, or as advised

by the Superintendent, including final washing and testing of the surface for neutrality. Allow time for the Superintendent to reinspect.

Record

- Record the sequence of test cleaning operations including duration of pre-wetting, water pressure, flow rate and temperature, period of cleaning and scrubbing, number of passes, results of neutrality testing and any other relevant details. Provide a copy of the record to the Superintendent.

Assessment

- The Superintendent will assess the result in terms of final appearance, condition of the surface and neutrality, and if necessary will issue instructions to vary the cleaning methods before cleaning operations commence.

Sample Panel

- Contractor to inform the Superintendent which cleaning solution will be used prior to sampling.
- If approved by the Superintendent, the cleaned test area shall become the sample panel for assessing and approving the appearance stonework.

1.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0333 - Clause 1.5.

1.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4.
- Submit at least 2 weeks prior to commencing work on site.

1.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0333 – Clause 1.4.2 above.

1.6 MATERIALS

BIOCIDE

- Use “Wet and Forget” - This product is supplied as a blue liquid concentrate in which the active ingredient is benzalkonium chloride. The concentrate was diluted on-site to produce a 2% solution (i.e. 20 grams per litre).

- Or “Boracol 100RH” - This product is supplied as an already diluted clear liquid. The active ingredients are benzalkonium chloride present at a rate of 22g/L, and boron present at a rate of 23g/L.

1.7 METHODS

1.7.1 PRECAUTIONS DURING CLEANING

GENERAL

Take precautions to prevent damage to the building, surrounding footpaths and roads and nuisance to occupants and to the public. Prevent water and cleaning waste from entering the building or escaping from scaffold and hoarding enclosures. Suspend work during inclement weather conditions or high winds which prevent compliance with the above.

RUNOFF

- Prevent cleaning runoff from marking or tracking across stone facings or glazed areas.
- Collect and dispose of residual water and cleaning waste to the sewer system (subject to Sydney Water approval), or collect and dispose of via a licensed liquid waste contractor in accordance with appropriate authority requirements. Waste water must not be allowed to flow into the street gutters and stormwater drainage system.

CAULKING

- Provide temporary caulking of an approved type where necessary to prevent the entry of water and cleaning waste into the building, open or defective joints, penetrations, building-footpath junctions and the like.
- Remove all traces of caulking on completion of cleaning.

WARNING NOTICES

Provide notices in conspicuous positions to warn occupants and the public of any dangers or risks associated with the work.

1.7.2 CLEANING OPERATIONS

FOREIGN MATTER

- Without damaging the stonework, before wet cleaning commences remove foreign matter including, but not limited to, old finishes, bird droppings, bird repellent devices, soot, moss, vegetation and the like.
- Remove thick encrustations of bird droppings, bird repellent compounds, lichen, soot and the like by carefully scraping and lifting away with plastic, non-marking spatulas,

taking care not to mark or damage the stonework. Seek prior approval from Superintendent if other implements are proposed.

- Bag up bird droppings, bird repellent compounds and other encrusted compounds considered deleterious to human health and remove from site on a daily basis. Workers to wear appropriate PPE at all times.

BIOCIDES

- Use “Wet and Forget” - This product is supplied as a blue liquid concentrate in which the active ingredient is benzalkonium chloride. The concentrate was diluted on-site to produce a 2% solution (i.e. 20 grams per litre).
- Or “Boracol 100RH” - This product is supplied as an already diluted clear liquid. The active ingredients are benzalkonium chloride present at a rate of 22g/L, and boron present at a rate of 23g/L.

CLEANING WATER

Water Supply

- Use clean potable water, non-staining to stonework, for stonework cleaning operations including pre-wetting, soaking, washing down and final washing.

PRESSURE BOOSTING

- Provide additional storage capacity and pressure boosting if the required pressure and flow rate are not available on site from mains supply.
- Maximum water pressure: Nominally 3100 kPa (450 psi), but to be such that the surfaces of sandstone and jointing material are not abraded.

TEMPERATURE

- Maximum water temperature: 90°C
- Provide approved safety devices to ensure that the required maximum water temperature at the nozzle is not exceeded.

ADDITIVES

- Cleaning water shall contain no solvents, chemicals or other additives.

FILTRATION

- If necessary, filter the cleaning water to remove existing minerals or other substances deleterious to stonework.

SEQUENCE

- Clean stonework in a progressive sequence of elements in vertical bays. Start cleaning each bay from the top and work downward to the bottom, avoiding run-off streaks or staining.
- Cleaning shall be carried out under strict surveillance during daylight hours to ensure that no damage is caused to the surfaces of stone or other building elements by cleaning.

PRE-WETTING

Prior to cleaning pre-wet the wall areas to be cleaned and any masonry areas underneath the areas to be cleaned by means of spray mist nozzles using clean water.

- Mist spray nozzles: 450mm centres on rigid pipe or frame.
- Distance of nozzles from stone surface: 300mm minimum.
- Minimum initial pre-wetting and soaking period: 30 minutes.
- Water pressure at machine gauge: 3100 kPa (450 psi) maximum.

PRELIMINARY RINSE

Immediately prior to scrubbing, rinse surfaces to remove loose dirt, mould, soot, bird dropping residues and the like.

- Water temperature: 90°C (maximum)
- Water pressure at machine gauge: 3100 kPa (450 psi) maximum.
- Apply water with 50° fan jet held no closer than 150mm from the surface of the stone.

SCRUBBING

- Immediately after the preliminary rinse, commence cleaning the stonework by hand scrubbing, assisted by fine water jets to remove the soiled water and cleaning waste continuously from the stonework surface.
- Scrubbing brushes: Use approved new stiff nylon or natural fibre bristle brushes. Replace brushes worn down with new brushes.
- Seek prior approval: Use new fine bronze wire brushes on areas of complex geometry and/or particularly obstinate areas of heavy soiling only if prior approval has been given by the Superintendent. Replace brushes worn down with new brushes.
- Due care: At all times take care not to damage arrises, joints and the like by excessive abrasion. Do not use severely worn brushes.

WASHING DOWN

At the completion of the scrubbing, wash down the stonework as specified for Preliminary Rinse and vacuum all water from the surface of the stonework. Allow those surfaces not specified to be desalinated to dry.

NEUTRALITY TESTING

At the completion of washing down, but before drying the surface, test the cleaned surface for neutrality with litmus pH test strips. Repeat the washing down process if the surface is not pH neutral and re-test. Repeat until surface is pH neutral.

FINAL WASHING

On completion

- Immediately before the removal of the scaffold, wash down again with water to remove any debris or staining arising from the works.
- On completion of all the works all stone and adjacent building areas shall be left free of all debris, cleaning material and waste. Leave the site area clean and tidy.

Final Appearance

- After completion of final washing, the cleaned surfaces shall match as closely as possible the quality, condition and appearance of the Test Cleaning Area.

INSPECTION ON COMPLETION OF WASHING DOWN

Hold Point

On completion of Final Washing Down inspection of stonework is to be undertaken by the Superintendent to review the condition of the cleaned stonework and to confirm the scope of the following repair works:

- Sandstone repairs
- Raking out and repointing
- Extent of desalination required
- Any other repairs not evident prior to cleaning.
-

1.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

2 SANDSTONE DESALINATION

2.1 GENERAL

2.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

2.1.2 CROSS-REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0424 Roofing – Seamed Sheet Metal.

2.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS 1141.11	Methods for Sampling and Testing Aggregates
AS 1672.1	Limes and Limestones - Limes for Building

No.	Title
AS 2701	Methods of Sampling and Testing Mortar for Masonry Constructions
AS 3700	Masonry Structures
AS 3972	General Purpose and Blended Cements
AS 4456.10	Masonry Units and Segmental Pavers and Flags - Methods of Test - Determining Resistance to Salt Attack
AS 4489	Test Methods for Limes and Limestones
ASTM C97	Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone
ASTM C99	Standard Test Methods for Modulus of Rupture of Dimension Stone
ASTM C170	Standard Test Methods for Compressive Strength of Dimension Stone
ASTM C1489	Standard Specification for Lime Putty for Structural Purposes
ASTM C1496	Standard Guide for Assessment and Maintenance of Exterior Dimension Stone Masonry Walls and Facades
ASTM C1713	Standard Specification for Mortars for The Repair of Historic Masonry
BS 8221.1	Code of Practice for Cleaning and Surface Repair of Buildings - Cleaning of Natural Stone, Brick, Terracotta and Concrete
BS 8221.2	Code of Practice for Cleaning and Surface Repair of Buildings - Surface Repair of Natural Stones, Brick and Terracotta
BS 8298.1	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – General
BS 8298.2	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – Traditional Handset External Cladding
I.S. EN 1008	Mixing Water for Concrete - Specification for Sampling, Test and Assessing the Suitability of Water as Mixing Water for Concrete

Use standards which are the editions, with amendments, current at the time of the works.

2.1.4 SCOPE

- Desalinate and redress surface sandstone along the extent indicated in Section 0333 Clause 2.2.1 and Clause 2.2.2

2.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.

2.3 SKILLED PERSONNEL

Work to be performed only by skilled and qualified stonemasons, employed by a firm with at least 5 years' experience in conservation and restoration works on heritage sandstone buildings, specifically including those constructed of Sydney sandstone.

2.4 SUBMISSIONS

2.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

2.4.2 SAMPLES

- As a sample, desalinate a 1000x1000mm discrete section of prescribed stone.
- Notify the Superintendent in advance of the date on which sample works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved samples.

2.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0333 - Clause 2.5

2.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4

- Submit at least four weeks prior to commencing work on site.

2.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0333 – Clause 2.4.2 above.

2.6 MATERIALS

Desalination Poultice

- Westox 'Cocoon', supplied by Westlegate Pty Ltd (T. 02 4628 5010)

2.7 METHODS

General

- On completion of Stonework Cleaning and before raking out pointing, desalinate the existing stonework in the locations shown on the drawings. Leave the stonework surface in a neutral state.

Program

- Requirement: Submit a program that allows work to be carried out in a sequence as specified and scheduled. Do not commence pointing or repainting works, stonework replacement and repair or porous mortar repairs until desalination in the vicinity has been completed.

2.7.1 PRECAUTIONS DURING DESALINATION

General

- Take precautions to prevent damage to the building and its surroundings and nuisance to occupants and to the public. Prevent desalination poultice and cleaning water from entering the building or escaping from scaffold and hoarding enclosures. Suspend work during inclement weather conditions, including high winds, which prevent compliance with the above.

Removal of poultice

- Remove poultice and immediately bag for removal from site.

Rinsing water runoff

- Prevent cleaning water runoff from marking or tracking across stone facings or glazed areas. Collect and dispose of rinsing water and cleaning waste at source by wet vacuum or similar means.

Caulking

- Provide temporary caulking of an approved type where necessary to prevent rinsing water from entering the building, open or defective joints, penetrations or the like.
- Remove all traces of caulking on completion of rinsing.

2.7.2 DESALINATION PROCEDURE

Sequence

- Apply the desalination poultice immediately after completion of the washing down phase of Cleaning and before the stonework has dried.

Application

Westox 'Cocoon' can be applied by a trowel, but the preferred application is by spray using a positive displacement mono pump with an air assisted spray head. It is preferable if the surface is left with a spray textured finish to provide a greater surface area.

Apply the desalination poultice in accordance with the manufacturer's instructions and as follows:

- Mask and cover areas to protect from over-spray.
- Apply one coat of poultice by spray at the rate of 6 - 7kg of mixed material per square metre, to provide a wet film thickness of a minimum of 10mm. Leave the surface with its textured finish.
- Do not apply the poultice on surfaces that have free or running water present.
- Do not apply the poultice to external walls if inclement weather is forecast before the material dries (this normally takes approximately 4 days @ 25°C and 2 days @ 30°C).
- Protect the poultice from premature drying caused by wind.
- Protect the poultice from unpredicted rain. If the material is wetted after initial drying some shrinkage can occur. In this case loose material should be removed and new poultice applied.
- Leave each application in place for minimum 14 days before removal. Obtain the Superintendent's approval before removing each coat.
- Apply poultice a minimum of two times.

Removal

- Remove the poultice by peeling from the substrate. Place the removed material in bags and dispose of off-site to an appropriate land fill area.

Rinse Down

- Immediately after removal of the poultice, rinse down the stonework to remove any residual material.

Neutrality Testing

At the completion of rinsing down, but before drying the surface, test the cleaned surface for neutrality with litmus pH test strips. Repeat the rinsing down process if the surface is not pH neutral and re-test. Repeat until surface is pH neutral.

Final Washing

On completion

- Immediately before the removal of the scaffold, wash down again with water to remove any debris or staining arising from the works.
- On completion of all the works all stone and adjacent building areas shall be left free of all debris, cleaning material and waste. Leave the site area clean and tidy.

2.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.
- After completion of desalination and final washing, the cleaned surfaces shall match as closely as possible the quality, condition and appearance of the Test Cleaning Area.

3 SANDSTONE REPAIRS

3.1 GENERAL

3.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

3.1.2 CROSS-REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0424 Roofing – Seamed Sheet Metal.

3.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS 1141.11	Methods for Sampling and Testing Aggregates
AS 1672.1	Limes and Limestones - Limes for Building

No.	Title
AS 2701	Methods of Sampling and Testing Mortar for Masonry Constructions
AS 3700	Masonry Structures
AS 3972	General Purpose and Blended Cements
AS 4456.10	Masonry Units and Segmental Pavers and Flags - Methods of Test - Determining Resistance to Salt Attack
AS 4489	Test Methods for Limes and Limestones
ASTM C97	Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone
ASTM C99	Standard Test Methods for Modulus of Rupture of Dimension Stone
ASTM C170	Standard Test Methods for Compressive Strength of Dimension Stone
ASTM C1489	Standard Specification for Lime Putty for Structural Purposes
ASTM C1496	Standard Guide for Assessment and Maintenance of Exterior Dimension Stone Masonry Walls and Facades
ASTM C1713	Standard Specification for Mortars for The Repair of Historic Masonry
BS 8221.1	Code of Practice for Cleaning and Surface Repair of Buildings - Cleaning of Natural Stone, Brick, Terracotta and Concrete
BS 8221.2	Code of Practice for Cleaning and Surface Repair of Buildings - Surface Repair of Natural Stones, Brick and Terracotta
BS 8298.1	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – General
BS 8298.2	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – Traditional Handset External Cladding
I.S. EN 1008	Mixing Water for Concrete - Specification for Sampling, Test and Assessing the Suitability of Water as Mixing Water for Concrete

Use standards which are the editions, with amendments, current at the time of the works.

3.1.4 SCOPE OF WORKS

General

Provide cleaning, repair and replacement works as documented and as follows:

- Cleaning of stonework;
- Desalination of salt-contaminated sandstone, retooling and remedying any damage;
- Replacement of deteriorating sandstone with new sandstone;
- Repair of deteriorating sandstone with repair mortar;
- Rectification of any structural inadequacies; and
- Restoration of sandstone surfaces to a consistent visual appearance.

Performance

- Appearance standard: Cleaned and/or repaired surfaces to have a uniform appearance when viewed from a distance of 6 m.

3.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.

3.3 SKILLED PERSONNEL

Work to be performed only by skilled and qualified stonemasons, employed by a firm with at least 5 years' experience in conservation and restoration works on heritage sandstone buildings, specifically including those constructed of Sydney sandstone.

3.4 SUBMISSIONS

3.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

3.4.2 SAMPLES

- Submit samples of the following:
 - Replacement sandstone, after at least 6-8 weeks of exposure to permit oxidation
 - Sands for bedding mortars
 - Blended sands for repointing mortars, selected to give the required colour of repointing

- Colour sample of repointing mortar (refer to 6.7333 – Section 4)
- Selected coloured sharp sands blended to give as much of the required colour of artificial stone repair mortar as possible
- Colour samples of artificial stone mortar (refer to 0333– Section 4).

Allow for the cost of any tests of the following materials that may be required prior to commencing stonework. Materials are to be submitted to the approved NATA accredited testing laboratory and tested as specified in General Preliminaries:

- Sands for bedding mortars
- Blended sands for repointing mortars
- Blended sands for artificial stone repair mortar refer Clause 3.4.3 Prototypes
- Carry out and arrange inspection of prototypes in accordance with Section 0333 - Clause 3.5

3.4.3 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4
- Submit at least four weeks prior to commencing work on site.

3.5 PROTOTYPES

- As a prototype, produce a small in a discrete location for review.
- Notify the Superintendent in advance of the date on which prototype works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Prototype works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved prototypes.

3.6 METHODS

3.6.1 INSPECTION

Witness Points

Give not less than two working days' notice to the Facade Engineer so that inspection may be made of the following:

- Proposed replacement stone quarry blocks at stone fabricator's yard;

- Proposed replacement stone after initial oxidation (about 6 weeks);
- Samples and sample panels;
- Replacement stone in worked condition at the mason's yard;
- Areas prepared and/or opened up for confirmation of works to be undertaken;
- Replacement stones laid out before fixing;
- Items to be built in located in their correct positions, including but not limited to damp-proof course, flashings, bolts, cramps, brackets, structural metalwork, rainwater goods and the like;
- Joints prepared and ready for repointing;
- Stones prepared for indenting;
- Stone and reinforcement anchorage prepared and ready for application of artificial stone mortar; and
- Completion of stone repairs before the installation of lead weatherings and/or covering over.

3.6.2 SAMPLE PANELS

Hold Points

Submit sample panels for approval of the following materials:

- Cleaned area (minimum 3m x 3m)
- Raked out joints, ready for repointing (2 linear metres)
- Repointed joints (2 linear metres)
- Retooled stones (at least 3 separate stones)
- The first of each type of repair: replacement stone; stone indent; porous mortar repair.

Incorporation into The Work

If it is intended to incorporate samples into the works submit proposals. Incorporate only those samples into the works which have been endorsed in writing for incorporation.

3.6.3 QUALITY CONTROL

Stone Testing

- Quarry blocks proposed for used in the works shall be sampled and laboratory tested as specified in 0333 – Clause 3.7. All costs associated with this testing shall be borne by the Contractor.

Sandstone Selection Requirements

General

Yellow Block Sandstone shall be of uniform quality, texture and strength, sound and free from defects including fractures, banding, inclusions or similar, liable to affect the durability, strength or appearance of the stone. The sandstone shall comply with the following selection standards:

- The natural bedding of each block shall be marked in the stockpile
- The stone is to be fine- to medium-grained, with consistent buff colour. It is intended that in the long term the weathered replacement stone will closely match sandstone currently on the building
- The stone shall be 'freestone' suitable for fine carving where required, and capable of holding sharp arrises
- Select stone for the properties appropriate to its final purpose in the building, such as carved or moulded elements, steps, sills, lintels, cornices or copings etc.
- Stone should be self-oxidising, of the 'yellow block' type. The stone surfaces should oxidise evenly, i.e. not change colour unevenly. The stone colour must be proven to be stable over time and not fade or darken unduly. Any stone which changes colour unpredictably will be rejected and replaced
- The stone colour will ideally be achieved without the use of colouring agents. The use of colouring agents, stains, bleaches or treatments with colouring or chemical oxidising agents is permitted only after provision of samples and a detailed method statement, and receipt of written approval of the proposed method of colouring from the Facade Engineer
- The use of acid on the sandstone, in any concentration, is permitted only after provision of samples and a detailed method statement, and receipt of written approval of the proposed use of acid from the Facade Engineer
- Stone with any evidence of structural defect will be rejected. Structural defects include fractures, cracks, fissures, open or healed joints, horizontal rifts and the like
- Stone with any sharp lines or colour changes will be rejected. Such defects include bedding laminations, cross-bedding, abrupt mineral changes and 'black line'
- Stones with turbulent 'tea leaf', multiple shale inclusions or blotchy or linear iron stains will be rejected
- Stones with iron stains known as 'kidney' may be rejected if the size or frequency of stains is considered to be detrimental to the appearance of the finished stone

- Stone with soft or hard sandballs will be rejected
- Stone with surface concentrations of quartz pebbles or pebble bands will be rejected. Pebble within finished work shall be restricted to the occasional pebble. Acceptance shall be subject to the final location and appearance of the pebble.

Control Samples

Samples of Yellow Block sandstone acceptable to the Superintendent will be held by the Façade Engineer. These samples shall be used as control samples against which colour and blemishes of proposed sandstone for the works shall be assessed.

Acceptable Blemishes

- Shale inclusions shall be restricted to a single occurrence in an occasional stone. Acceptance will be subject to the final location of the stone and the inclusion and the size of the inclusion
- Stone with sharp lines or with thick distinctly marked lines (5mm or more in width) will not be accepted. Stone with faint indistinct markings, which are indefinable as lines, may be acceptable
- Concentrations of carbonaceous material inclusions ('tea leaf') per stone face shall not exceed 20 occurrences per square metre of face (i.e. on a stone measuring 0.5m x 1m, shall not exceed 10 occurrences). Individual tea leaf inclusions shall not exceed 20mm in length.

Rejection of Stone

Sandstone proposed for the works may be liable to be rejected if:

- It cannot be identified as coming from the appropriate section of the quarry source identified herein, with level and quarry block numbering
- The natural bedding of the block is not marked
- After quality control testing it fails to meet the acceptance criteria specified in the sandstone test schedule in Section 0333 - Clause 3.7.1; or
- On final carving the colour, markings, banding, texture, lustre, inclusions and general appearance vary markedly from the Control Samples or the acceptance criteria set out herein.

Stone so rejected may still be accepted if:

- The Contractor provides evidence that it is suitable for its intended use in the building; and/or

- After additional testing it meets the specified acceptance criteria.

All costs associated with the additional evidence and/or testing shall be borne by the Contractor. If then these requirements are not satisfied the sandstone shall be rejected.

Contractor Sign-off

- The Contractor is required to sign off on the selected six-sided sawn stonework at the stone supplier's yard. The Contractor is to make his own investigations as to the compliance of the stone supply with this specification and agreement with the stone supplier.

Final Inspection

- All worked stone shall be inspected on site, or as otherwise agreed, immediately before installation on the building. Stones found unacceptable for their specific purpose and position on the building will be rejected. Final approval will not be given until the stone is fixed in position.

3.7 MATERIALS

3.7.1 STONE

Sandstone Source

Sandstone used in the works shall be:

- 200 *George Street* Yellow Block Sandstone, available from Gosford Quarries, from their sandstone stockpile,
 - Charlie Sarkis, Senior National Sales Executive Gosford Quarries:
 - 50 Whiting Street, Artarmon NSW 2064
 - Tel.: (02) 8585 8282
 - Email: Charlie@gosfordquarries.com.au
- *Pymont 'Harris Street'* Yellow Block Sandstone available from Bundanoon Sandstone, from their sandstone stockpile;
 - Troy Stratti
 - Bundanoon Sandstone
 - Quarry Road, Bundanoon NSW 2578
 - Tel: (02) 4883 6179
 - Email: info@bundanoonsandstone.com.au
- or equivalent, subject to approval by the Superintendent.

Stockpiled Stone Supply

- Before commencing stoneworks, assess stockpile, inspect, test and set aside selected stone sufficient to supply the whole of the works.
- Ensure that stone is stored so that it is protected from the weather, damage, staining or soiling. Stone is to be stored clear of the ground on its natural bed and on evenly spaced supports which do not locally or generally overstress it. It should be stored in conditions that allow seasoning without damage, staining, contamination or marking.

Stone Testing

- Quarry blocks proposed for supply to the works shall be sampled, tested and certified by an approved NATA accredited testing laboratory in accordance with the following test schedule:
- The properties of all sandstone supplied shall equal or exceed these test requirements. The Contractor shall provide all test certificates to the Superintendent for approval.

Test	Acceptance Criterion	Test Method
Water absorption	Max 5% by weight	ASTM C97
Apparent porosity	Max 8% by volume	ASTM C97
Bulk density	(min. mean value) 2300 kg/m ³	ASTM C97
Modulus of rupture - Dry - Saturated - Saturated/dry ratio	(min. mean value) 6.5 MPa 3.0 MPa Min. 0.4	ASTM C99
Compressive strength - Dry - Saturated - Saturated/dry ratio	(min. mean value) 40 MPa 20 MPa Min. 0.5	ASTM C170
Sodium sulphate soundness	Max. 1% weight loss	AS4456.10, Method A

Test	Acceptance Criterion	Test Method
Petrography	Equivalent to Petrographic Analysis of 200 George Street sandstone samples for Geotechnical Centre, NSW Dept. of Finance and Services, by Dr Brenda J Franklin BSc(Hons)(Syd), MSc, PhD(NSW), FAIG, FGSAust.	

Frequency

- Tests are to be carried out at a frequency of one **sample** per 10m³ gross volume of stone proposed to be supplied to the project or one **sample** per four quarry blocks proposed to be supplied to the project whichever is the lesser. Perform 5 tests per sample for each test (5 tests each where both dry and saturated tests are required).
- Petrography to be carried out at a frequency of one assessment per **sample** as defined above.

Stone Processing

General

- The Contractor's nominated Project Manager shall have at least 15 years' relevant experience in managing heritage stonemasonry works. The Contractor's Project Manager is to oversee all works and provide expertise and direction as required. In addition, all works are to be overseen by a Principal Stonemason with not less than 15 years' experience in heritage stonemasonry conservation.
- Works are to be performed only by skilled and qualified stonemasons, employed by a firm with at least 15 years' experience in conservation and restoration works on heritage sandstone buildings, specifically including those constructed of Sydney Yellowblock sandstone.

Banker Mason

- All stone processing works shall be supervised by a qualified Banker Mason with a minimum of 10 years' experience in stone profile cutting and carving. All processing works shall be carried out by Banker Masons, or equivalent personnel, experienced in stone profile cutting and carving.

- Before commencing stonework submit the name, qualifications and experience of the proposed stone processing supervising Banker Mason to the Superintendent for approval.

Banker Mason Visit to Site

- Before undertaking works, allow all Banker Masons employed on the project to visit site to become acquainted with the building. Particular note should be made of the age and architectural design of the building, the techniques used by the original masons in working and setting stones, joint sizes and how tools were used to achieve the variety of finishes on the building, the aim being to achieve harmonious and corresponding finishes to match those existing.

Shop Drawings

- Prepare shop drawings for all stonework scheduled as 'Replacement' or 'Indented'. Submit shop drawings to the Superintendent for review prior to proceeding with stone processing.
- Shop drawings are to be based on the Contractor's own site surveys and measurements and are to note the following for each stone:
 - Location, position and identification number of stone
 - Stone setting out
 - Bedding orientation of stone (naturally or vertically bedded)
 - Type of face finish or finishes and direction of finish according to the form and location of the stone where applicable (for example, gang-sawn, sparrow-pecked, boasted or fluted finishes and margins)
 - Dimensions of stone (shop drawings to be typically to 1:5 scale)
 - Where multiple stones are to be replaced and at edges and corners etc., detailed existing setting out prior to dismantling to ensure accurate reconstruction
 - Method of lifting (so as not to damage finishes or arrises); and
 - Method of installation and fixings, fittings and accessories required to install and support the stone.
- Submit each shop drawing to the Superintendent for review. Do not proceed with stone processing or removal until authorisation has been received.
- The Contractor shall check all replacement stones and indents for the works and shall be responsible for the accuracy of each stone or indent. Any inaccuracies shall be made good at the Contractor's cost and to the satisfaction of the Superintendent.

New Stone

- Work all new stone accurately to the forms and dimensions shown on the shop drawings and measured by the Contractor on site.
- Install new stone carried up plumb with existing lines and finishes. Match the finishes of the new stone to be indented or replaced with those of the original stone. The line of all faces, arrises, carvings, mouldings etc. shall exactly match the original profile of the stone being replaced. Dress replacement stones and indents to fit tightly into the existing stone.

Tolerances

- Maximum deviation from required dimensions is to be ± 2 mm.

Natural Bedding

- Set new stones on their natural bed unless otherwise shown or specified (refer below).

Note:

- Stone investigations to date have found no vertically bedded stone courses, however the Contractor is required to investigate the current bedding of each stone course where stone is being replaced or indented.

Carved and Moulded Work

- All carving and moulded work is to exactly match the original, including the correct matching profiles, finishes, chisel and punch marks etc.

Moulding Profiles

- Where the stone remains in situ and to the original profile, take templates for moulding profiles from existing joint positions. Where moulding profiles have eroded or weathered, or have been removed, templates should be taken from the most intact stone profile, as approved by the Superintendent.
- For hand-worked mouldings reverse templates shall be used to maintain the accuracy and consistency of the moulded profile. All moulding profiles shall have clean sharp arrises. In machine-worked mouldings, flattened planes and planing machine marks shall be removed by wet carborundum rub to give true continuous moulding profiles.
- In finished work do not feather ends of profiles to meet the existing eroded or weathered profiles of adjacent mouldings.

Bed, Joggle and Key Preparation

- Work the bed, perpend and back faces of stones square and true, unless noted otherwise.
- Cut all keys and joggles at shop, prior to delivery to site.
- The bottom bed of each replacement stone is to be punch scabbled to provide an adequate mortar key. At outside margins, punch 2 rows of punch marks, a minimum of 25mm from exposed outside faces and not more than 50mm apart.
- Unless noted otherwise, all hidden perpend joints are to be worked with corresponding concealed centrally located 'Y' joggles. Fill with mortar prior to fixing stone.

Holes and Inserts

- Mark the exact positions for any drilling and cutting of holes and chases for bolts, dowels, cramps etc. on concealed faces of stones before delivery on site.

Stone Indents

- All stone indents shall use new stone. Exposed faces shall be profiled and finished to match the surrounding stone. All joints with parent stone are to be hairline joints finished flush with parent stone.
- All stone indents greater than 150mm in length shall have a minimum horizontal embedment of 100mm into the parent stone. Where shelves and projections exist, stone indents shall be embedded at least to the depth of the stone projection plus 30mm, or to a depth of 100mm, whichever is the greater. Stone indents less than 150mm in length shall have a minimum horizontal embedment of 75mm.
- Stone indents to the underside of projecting courses shall be dovetailed in shape so as to provide mechanical interlock and restraint regardless of the installation of pins or dowels.
- Indent replacement stones with internal return angles shall have all internal angles chamfered at 45° to avoid potential weakness in the stone at these corners.

Stone Jointing

Unless noted otherwise in the contract documents, all existing stone joint patterns, joint widths, stone arrises and pointing details are to be maintained.

- Whole stone replacements shall be to the exact face profile of the original stone
- Indented stones at the edges and corners of stones shall have the same stone arrises as the original stone.

For stone indents, or where otherwise noted in the contract documents, any introduced joints shall be hairline joints or unfilled/unpointed joints, if noted thus. Indented stone must not cross existing joints.

Under no circumstances are introduced joints to be used without the prior written approval of the Superintendent.

Sweetening

Minimise abrupt changes in stone surface profiles, especially in matching new indented stone work to existing. Where instructed by Superintendent sweetening may be permitted by rubbing back using wet carborundum block to a maximum depth of 3mm. Generally, rubbing back is to be to the full face of the new indented stone and not just to its edges, to avoid abrupt changes in surface profile. This work must only be undertaken by Banker Masons.

New Stone Patching

- New stone with broken or chipped arrises or chipped exposed surfaces will be rejected.
- Small patching of new stone using hairline or tight jointed stone insert patches may only be permitted to repair small natural face defects, sandballs or the like in new stone found on processing and only if approved by the Superintendent after inspection. Typically, patching will only be permitted to planar surfaces of new stone, with borders a minimum of 100mm in from the edges of a stone. If permitted, similarly coloured matching new stone must be used to match the parent stone. This work must only be undertaken by Banker Masons.

Stone Finishes

General

- All finishes shall match the corresponding existing original finishes.
- At the commencement of stone ordering and before shop drawings have been undertaken the Contractor's supervising Banker Mason shall inspect site with the Superintendent and agree stone finishes.
- Allow to prepare up to three samples of each finish for inspection and approval by the Superintendent.

Dressed and rubbed finish

- Rub back stone face by hand using a wet carborundum block and water to a depth not exceeding 3mm. Rubbed finish stonework shall be finished free from saw and other tool marks.

Rockface finish

- Fabricate stone or indent to a depth sufficient to allow creation of the rockface finish. Pitch off rockface by hand. Machine splitting is not permitted. Finish margin to match existing rockface finished stones on the building.

Storage of Processed Stone

Store processed stone so that it is protected from the weather, damage, staining or soiling. Stones are to be stored clear of the ground on their natural bed, on evenly spaced supports which do not locally or generally overstress the stone, and which allow room for lifting with slings or lewis pins. Processed stones are to be stored in conditions that allow seasoning without damage, staining, contamination or marking.

Delivery of Processed Stone

- Deliver processed stone to site in accordance with the approved works program.
- Take all care not to damage processed stone during handling and transport. Damaged stone may be rejected. If permitted, any stone damaged due to transportation or handling shall be made good at the Contractor's cost and to the satisfaction of the Superintendent.
- Arrange each stone for handling and transportation to take its own weight without support from adjoining stones, and without damage to the stones. Keep all straps and slings etc. free of all arrises, mouldings and other features which may be susceptible to damage.
- Mark for identification and store where appropriate on site for fixing/refixing.

Retooling

- Remove all loose, decayed, delaminated, exfoliating or cracked stone from the surface of deteriorated stones in those locations identified on the reference drawings, and all other areas agreed with the Facade Engineer.
- Retool back to sound stone, producing a flat even surface across the face of each individual stone. Use hand tools in preference to mechanical.

- Finish retooled surfaces to match the surface of surrounding stone units as closely as possible. If significant colour contrast is apparent, review potential for artificial colouring with Facade Engineer.
- Remove no more stone than is necessary to minimise the risk of stone falling within the next 25-40 years, consistent with requirements for nominated repairs.
- If a significant amount must be removed consult with Façade Engineer for advice.

3.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

4 SANDSTONE COLOURING

4.1 GENERAL

4.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

4.1.2 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0424 Roofing – Seamed Sheet Metal.

4.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS 1141.11	Methods for Sampling and Testing Aggregates
AS 1672.1	Limes and Limestones - Limes for Building

No.	Title
AS 2701	Methods of Sampling and Testing Mortar for Masonry Constructions
AS 3700	Masonry Structures
AS 3972	General Purpose and Blended Cements
AS 4456.10	Masonry Units and Segmental Pavers and Flags - Methods of Test - Determining Resistance to Salt Attack
AS 4489	Test Methods for Limes and Limestones
ASTM C97	Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone
ASTM C99	Standard Test Methods for Modulus of Rupture of Dimension Stone
ASTM C170	Standard Test Methods for Compressive Strength of Dimension Stone
ASTM C1489	Standard Specification for Lime Putty for Structural Purposes
ASTM C1496	Standard Guide for Assessment and Maintenance of Exterior Dimension Stone Masonry Walls and Facades
ASTM C1713	Standard Specification for Mortars for The Repair of Historic Masonry
BS 8221.1	Code of Practice for Cleaning and Surface Repair of Buildings - Cleaning of Natural Stone, Brick, Terracotta and Concrete
BS 8221.2	Code of Practice for Cleaning and Surface Repair of Buildings - Surface Repair of Natural Stones, Brick and Terracotta
BS 8298.1	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – General
BS 8298.2	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – Traditional Handset External Cladding
I.S. EN 1008	Mixing Water for Concrete - Specification for Sampling, Test and Assessing the Suitability of Water as Mixing Water for Concrete

No.	Title
BS EN 12878	Pigments for The Colouring of Building Materials Based on Cement And/or Lime. Specifications and Methods of Test

*Use Standards which are the editions, with amendments, current at the time of the works.

4.1.4 SCOPE OF WORKS

- Artificially colour all existing off-white or grey sandstone installed into the sandstone masonry during previous repair campaigns.
- Colour to achieve a uniform appearance as close to the background colour of surrounding original stonework.
- Do not use artificial colouring to any original sandstone masonry.

4.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.

4.3 SKILLED PERSONNEL

Work to be performed only by skilled and qualified stonemasons, employed by a firm with at least 5 years' experience in conservation and restoration works on heritage sandstone buildings, specifically including those constructed of Sydney sandstone.

4.4 SUBMISSIONS

4.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

4.4.2 SAMPLES

- Provide samples of artificial colouring on 200 George Street sandstone, showing range of achievable colouring.
- Samples to measure at least 300 x 300 mm in surface area.
- Notify the Superintendent in advance of the date on which sample works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is

satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved samples.

4.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0333 - Clause 4.5

4.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4
- Submit at least 2 weeks prior to commencing work on site.

4.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0333 – Clause 4.4.2 above.

4.6 MATERIALS

- Use an artificial colouring technique with at least five years of demonstrated success on 200 George Street Sandstone located on buildings in Sydney.
- Investigations of alternative systems will be carried out by the Facade Engineer during 2018, and the outcome of these investigations will be incorporated into a future revision of this section.
- Gosford Quarries proprietary system, as developed by Amdel Limited, will be acceptable.

4.7 METHODS

- In accordance with specifications of the supplier of the artificial colouring technique.
- Apply artificial colouring BEFORE repointing of joints adjacent to stone to be artificially coloured.
- Where existing pointing is to remain, protect pointing during application of artificial colouring solutions.

4.8 PROTECTION

- Carry out all works so as not to cause damage to surrounding sandstone, brickwork, , window frames or glass, down pipes or any other finishes.
- Particularly avoid:
- Rundown, spilling or splashing of any artificial colouring solutions

- Provide all necessary protection to existing finishes, including sandstone masonry.

5 TRACHYTE REPAIRS

5.1 GENERAL

5.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

5.1.2 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0424 Roofing – Seamed Sheet Metal.

5.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS 1141.11	Methods for Sampling and Testing Aggregates
AS 1672.1	Limes and Limestones - Limes for Building

No.	Title
AS 2701	Methods of Sampling and Testing Mortar for Masonry Constructions
AS 3700	Masonry Structures
AS 3972	General Purpose and Blended Cements
AS 4456.10	Masonry Units and Segmental Pavers and Flags - Methods of Test - Determining Resistance to Salt Attack
AS 4489	Test Methods for Limes and Limestones
ASTM C97	Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone
ASTM C99	Standard Test Methods for Modulus of Rupture of Dimension Stone
ASTM C170	Standard Test Methods for Compressive Strength of Dimension Stone
ASTM C1489	Standard Specification for Lime Putty for Structural Purposes
ASTM C1496	Standard Guide for Assessment and Maintenance of Exterior Dimension Stone Masonry Walls and Facades
ASTM C1713	Standard Specification for Mortars for The Repair of Historic Masonry
BS 8221.1	Code of Practice for Cleaning and Surface Repair of Buildings - Cleaning of Natural Stone, Brick, Terracotta and Concrete
BS 8221.2	Code of Practice for Cleaning and Surface Repair of Buildings - Surface Repair of Natural Stones, Brick and Terracotta
BS 8298.1	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – General
BS 8298.2	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – Traditional Handset External Cladding
I.S. EN 1008	Mixing Water for Concrete - Specification for Sampling, Test and Assessing the Suitability of Water as Mixing Water for Concrete

*Use Standards which are the editions, with amendments, current at the time of the works.

5.1.4 SCOPE OF WORKS

- Indenting of old fixing holes, patches and other damaged areas with trachyte indents to match surrounding stone.

5.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.

5.3 SKILLED PERSONNEL

Work to be performed only by skilled and qualified stonemasons, employed by a firm with at least 5 years' experience in conservation and restoration works on heritage sandstone buildings, specifically including those constructed of Sydney sandstone.

5.4 SUBMISSIONS

5.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

5.4.2 SAMPLES

- Install a 150x150x100mm trachyte indent as a sample.
- Submit for approval a sample of trachyte to be used for indents.
- Submit at least four weeks prior to ordering material.

5.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0333 - Clause 5.5

5.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4
- Submit at least four weeks prior to commencing work on site.

5.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0333 – Clause 5.4.2 above.

5.6 MATERIALS

5.6.1 TRACHYTE

- Use polished Bowral Trachyte.
Most likely supplier is:
 - Refer Qualified Project Stone Mason (Heritage Consultant to Confirm)

5.6.2 ADHESIVE

- Use epoxy or polyester resin based glue.
- Glue to be suitable for use on trachyte as specified by manufacturer. Glue shall not stain the trachyte, nor be discoloured by exposure to ultraviolet radiation.

5.7 METHODS

- Cut out old patches or spalls using diamond tools.
- Drill out old fixings using slightly larger diameter diamond core bits.
- Source a piece of matching trachyte.
- Cut indents to fit snugly into the prepared location on site.
- Core out plugs of a diameter to fit snugly into the core holes drilled on site.
- Insert indent or plug and glue in place using an epoxy or polyester resin based glue which does not stain the trachyte. Glue line to be a maximum of 0.5mm in width.

5.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

6 REPOINTING

6.1 GENERAL

6.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

6.1.2 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0424 Roofing – Seamed Sheet Metal.

6.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS 1672.1	Limes and Limestones - Limes for Building
AS 2701	Methods of Sampling and Testing Mortar for Masonry Constructions

No.	Title
AS 3700	Masonry Structures
AS 3972	General Purpose and Blended Cements
AS 4456.10	Masonry Units and Segmental Pavers and Flags - Methods of Test - Determining Resistance to Salt Attack
AS 4489	Test Methods for Limes and Limestones
ASTM C97	Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone
ASTM C99	Standard Test Methods for Modulus of Rupture of Dimension Stone
ASTM C170	Standard Test Methods for Compressive Strength of Dimension Stone
ASTM C1713	Standard Specification for Mortars for The Repair of Historic Masonry
BS 8221.1	Code of Practice for Cleaning and Surface Repair of Buildings - Cleaning of Natural Stone, Brick, Terracotta and Concrete
BS 8221.2	Code of Practice for Cleaning and Surface Repair of Buildings - Surface Repair of Natural Stones, Brick and Terracotta
I.S. EN 1008	Mixing Water for Concrete - Specification for Sampling, Test and Assessing the Suitability of Water as Mixing Water for Concrete

*Use Standards which are the editions, with amendments, current at the time of the works.

6.1.4 SCOPE OF WORKS

- Mix mortar in accordance with relevant Australian Standards

6.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.

6.3 SKILLED PERSONNEL

Work to be performed only by skilled and qualified stonemasons, employed by a firm with at least 5 years' experience in conservation and restoration works on heritage sandstone buildings, specifically including those constructed of Sydney sandstone.

6.4 SUBMISSIONS

6.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

6.4.2 SAMPLES

- As a sample, a 3m long section of stone is to be repointed using the specified mix.
- Notify the Superintendent in advance of the date on which sample works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved samples.

6.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0333 - Clause 6.5

6.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4

- Submit at least four weeks prior to commencing work on site.

6.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0333 – Clause 6.4.2 above.

6.6 MATERIALS

6.6.1 GENERAL

Water

- To I.S.EN 1008 - Mixing Water for Concrete

Off-white Cement

- To AS 3972, Type A - with iron salts content not exceeding 1%.

Lime

- Hydrated lime (slaked lime) to AS 4489, from a source approved by the Superintendent.
- Lime tests: Provide a test certificate showing that the lime has passed the relevant tests for physical properties to AS 1672.
- Lime putty: Incorporate lime into the mortar in the form of lime putty which has been allowed to stand for a minimum of 24 hours before incorporation into the mortar.

Sand

Sands shall be sharp, sub-angular, with grading when tested to AS 1141.11.1 as follows:

Sieve Size	%Retained Bedding Mortar & Joggles	%Retained Repointing Mortar
2.30mm	5	0
1.18mm	10	5
0.60mm	20	20
0.30mm	35	35
0.15mm	20	30
0.075mm	10	10

- Sand used for pointing and repointing shall be subject to approval after the preparation of sample panels.
- Sand colour: To match the approved sample.
- Blend sands for repointing mortars, selected to give the required colour of repointing. The proportion of each sand type shall be recorded. Coloured sand is to be used to provide colour match to existing pointing colour, rather than oxides. Seek prior approval for the use of oxides only if the solution to colour matching existing pointing colour warrants use.
- The Contractor shall provide a method statement on how the blending of the sand will remain consistent throughout the works.
- Sand stockpile: Before commencing stonework, stockpile sand of the approved types sufficient to supply the whole of the works.

Storage of Materials

- Store sands separately, clear of the ground, on timber pallets or the like, in a weatherproof enclosure.
- Store off-white cement and dry hydrated lime clear of the ground or concrete on timber pallets or the like in a weatherproof structure. Bags should be stacked so as to permit inspection and used in order of delivery and prior to expiry date marked by the manufacturer.
- Cement affected by moisture must not be used.

6.6.2 MORTAR MIXES

Type	Mix Ratio	Constituents
Bedding Mortar & Joggles:	1:1:6	Cement: Lime: Sand
Repointing Mortar	1:2:9	Cement: Lime: Sand

Batching

- All mortars shall be batched by gauging boxes approved by the Superintendent. Shovel batching is not permitted.

Mixing

- All mortars shall be mixed in an approved machine mixer. Hand mixing is not permitted.
- Revolving drum mixer: Blend dry constituents with two thirds water. Use remaining water to adjust consistency. Mix for 3 minutes minimum.
- Pan Mixer: To be used to mix lime putty and sands. Cement to be added as powder towards the end of mixing. Cement gauged mixes must be used within 60 minutes of mixing.

6.7 METHODS

6.7.1 POINTING AND REPOINTING GENERALLY

Extent

- Carry out the repointing of existing stonework to the extent and in the locations shown in the Contract documents.

Sequence

- Unless accepted otherwise by the Superintendent, do not commence repointing until all repair work and stone cleaning in the vicinity has been completed.

6.7.2 JOINT PREPARATION FOR REPOINTING

Raking Out

- Rake out joints to the depths specified below, whichever is the greater depth, using non- powered hand tools or approved power tools.
 - Bed joints: 25mm
 - Perpend joints: 25mm
 - The minimum raked out depth shall be 3 times the width of the joint, unless scheduled otherwise.

Protect all adjoining surfaces and arrises from accidental damage during raking out operations.

Cleaning

- Clean the internal stone surfaces of raked out joints with abrasive sheet, metal rasp or metal comb. Remove residual pointing, foreign material and loose stone using oil-free compressed air or fine pressure water sprays. Do not undercut or feather the stone arrises.

Joints Previously Containing Elastomeric Sealant

- There are substantial areas of joints currently containing elastomeric sealant which is to be removed prior to repointing with mortar.
- Before commencing removal of sealant joints, the Contractor shall prepare a written work method statement describing the preferred work method for removal of the sealants including preparation of the joint faces to receive the new mortar. The Contractor shall prepare sample lengths of sealant removal, including preparation of joint faces for new mortar, for approval, using the nominated work method.

Sample Panels

- Before commencing raking out work the Contractor shall prepare a written work method statement describing the preferred work method for removal of the pointing and shall prepare sample lengths of raking out for approval, prepared using the nominated work method.
- The sample lengths shall be agreed with the Superintendent and shall include, as appropriate: bed joints; perpend joints; window reveals; joints at decorative elements; window perimeter joints.
- The Superintendent will assess the results of sample panels in terms of damage to stonework and acceptability of raked out joint, and if necessary will issue instructions to the Contractor to vary the work method before final raking out work commences.
- If approved, the sample panels shall become the standard for assessing acceptability of the final raked out work.

Protection

- Raked out joints shall not be left unfilled and shall be protected at all times to prevent the ingress of moisture into the bedding mortar between stones.

Accidental damage

- Make good all accidental damage to the approval of the Superintendent.

6.7.3 POINTING/REPOINTING METHOD

Dampening

- Immediately before repointing use a fine water spray to dampen the joint surfaces and the residual pointing and bedding at the back of the joint. Do not over-wet.

Joint Masking

- After washing down and immediately prior to repointing, mask both sides of all joints to be pointed with 50mm wide Scotch Blue Painters Tape 2090. The tape shall be fixed as close as possible to the arrises so that the finished repointed joint matches the original as closely as possible.

Pointing/Repointing

- Pointing/repointing depth to be to the full raked out depth of all joints.
- Fill the joint in several operations by inserting the mortar and compacting it with a jointing key, applying pressure normal to the joint, i.e. not drawn along the joint. Half fill the joint in the first operation then complete the filling and cut the joint off flush.
- Joint finish
- Strike the joint to a dense smooth slightly concave surface unless otherwise specified.
- Worn joints: If the stone arrises have become rounded or otherwise worn away, iron the joint to a slightly concave surface.
- Do not overfill or feather-edge worn and eroded joints.

Curing

- Cure all pointing for a minimum of 7 days by means of 50mm wide Scotch Blue Painters Tape 2090 applied over joint masking tape. Progressively apply tape every 15 minutes over freshly finished joints to prevent premature drying of repointing mortar. In addition, prevent exposure to direct sunlight throughout the 7-day curing period.

Do Not Retemper Mortar

- Discard mortar which has become too stiff for use. Do not retemper with water.
-

6.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.
- Raked out joints shall not be left unfilled and shall be protected at all times to prevent the ingress of moisture into the bedding mortar between stones.

7 POROUS MORTAR REPAIRS

7.1 GENERAL

The use of porous mortar to repair stone shall only be undertaken where indicated in the contract documents or for repairing minor defects such as drill holes. Obtain prior written approval from the Superintendent for any additional uses.

7.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

7.1.2 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0424 Roofing – Seamed Sheet Metal.

7.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1

No.	Title
AS 1141.11	Methods for Sampling and Testing Aggregates
AS 1672.1	Limes and Limestones - Limes for Building
AS 2701	Methods of Sampling and Testing Mortar for Masonry Constructions
AS 3700	Masonry Structures
AS 3972	General Purpose and Blended Cements
AS 4456.10	Masonry Units and Segmental Pavers and Flags - Methods of Test - Determining Resistance to Salt Attack
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ASTM C97	Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone
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ASTM C170	Standard Test Methods for Compressive Strength of Dimension Stone
ASTM C1489	Standard Specification for Lime Putty for Structural Purposes
ASTM C1496	Standard Guide for Assessment and Maintenance of Exterior Dimension Stone Masonry Walls and Facades
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BS 8221.2	Code of Practice for Cleaning and Surface Repair of Buildings - Surface Repair of Natural Stones, Brick and Terracotta
BS 8298.1	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – General
BS 8298.2	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – Traditional Handset External Cladding

No.	Title
I.S. EN 1008	Mixing Water for Concrete - Specification for Sampling, Test and Assessing the Suitability of Water as Mixing Water for Concrete

*Use Standards which are the editions, with amendments, current at the time of the works.

7.1.4 SCOPE OF WORKS

- Mix mortar in accordance with relevant Australian Standards

7.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.

7.3 SKILLED PERSONNEL

Work to be performed only by skilled and qualified stonemasons, employed by a firm with at least 5 years' experience in conservation and restoration works on heritage sandstone buildings, specifically including those constructed of Sydney sandstone.

7.4 SUBMISSIONS

7.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

7.4.2 SAMPLES

- As a sample, a 50x50x50mm section in a discrete location requiring mortar repair should be repaired with specified mortar.
- Notify the Superintendent in advance of the date on which sample works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved samples.

7.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0333 - Clause 7.5

7.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4
- Submit at least four weeks prior to commencing work on site.

7.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0333 – Clause 7.4.2 above.

7.6 MATERIALS

Material for the repair mortar mixes is to be:

- Lithomex or St. Astier NHL 3.5 Natural Hydraulic Lime
- Colour range(s) to be selected to cover the range of colour of existing sandstone on the buildings following cleaning
- Water to I.S.EN 1008 – Mixing Water for Concrete
- Stainless steel rod and wire armatures: grade 316

7.6.1 REPAIR MORTAR MIX

- The repair mortar is supplied pre-mixed.
- The mortar constituents are to be well mixed with the minimum of water required for a moist but firm mix which will hang on an upturned trowel. The prepared mortar is to be protected from rain and drying out. Only the mortar required for one day is to be prepared each day.
- For best results, use hand-held drill or whisk type mixer and mix for 3-4 minutes. Mix dry powder into water gradually, start wet, work to drier consistency. Do not short mix; short mixing requires greater water content and will lead to bleed or shrinkage. Over mixing will weaken the material. If hand mixing, mix only small amounts and ensure the materials are properly mixed, usually around 4-5 minutes of vigorous mixing.
- The addition of other materials is not permitted.

7.6.2 SAMPLES

- The Contractor is to prepare a palette of repair mortar colours suitable for the works. These are to be kept on site for comparison to cleaned stonework.

- Prepare samples of stainless steel armature for first repairs for Facade Engineer to approve. Approved samples may be used in the works.

7.7 METHOD

Filling of Drill Holes

- Protect the stone surface surrounding the hole.
- Repair mortar of agreed colour is to be firmly packed to fill the full depth of the hole and immediately finished to match the surface texture and profile of the stone.
- The repair is to be immediately taped over with 50mm wide Scotch Blue Painters Tape 2090 and left to cure for a minimum of 7 days. Protect from rain, dampness and cold.

Repair of Stone Faces

- Porous mortar repair of stone faces is only to be undertaken where repair of the stone cannot be achieved by replacement, indenting or retooling. Each individual location is to be discussed and agreed with the Superintendent before proceeding.

Stone Preparation

- All mortar repairs are to be rectangular, with edges at right angles to the edges of the stone being repaired.
- Cut back decayed stone to sound stone, to a minimum depth of 25mm. Vertical edges of repairs are to be undercut slightly. Prepare the stone to have a good key. Clean cut surfaces by brushing with a stiff bristle brush and rinsing clean with fresh water.
- Install armature of stainless steel 6mm Ø dowels and/or 3mm Ø wires, bent into staples. Dowels or wires are to be at maximum 100mm centres and embedded and grouted into stone with epoxy resin. Finish surface of the armature to have minimum 10mm cover below the finished surface of the repair.
- For repairs at edges of stones, install planar and rigid boards of thickness to securely fit within the joints surrounding the repair area. Boards are to be to the full lengths of the free edges of the repair, to act as formwork against which the mortar can be compacted. Boards are to have a smooth surface to enable them to be carefully removed without disturbing the mortar.

Dampening

- Immediately before application of the repair mortar use a fine water spray to dampen the surface of the stone to be repaired. Do not over-wet.

Mortar Placement

- Place repair mortar as follows:
 - Apply an initial layer 3mm or so thick with some pressure to the background, then lay the rest of the Lithomex up against this to the desired thickness; this can be laid on or thrown on but should always be on to the fresh closed-in base coat.
 - Ensure repair mortar is thoroughly compacted, including around reinforcement.
 - Generally, up to 40mm can be applied in a single pass, including the 3mm base layer, however it is always best to divide up thick layers 20mm or more into 2-3 or even 4 layers.
 - Allow at least 2 hours between each application. Work out to gradually thinner layers towards the face. The final coat must be capable of being tooled to an adequate depth to match the existing masonry and should be at least 5mm thick at the shallowest point.
 - Form edges to the perimeter to match arrises of the parent stone.
 - Ensure the final application is at least 2mm proud of the finished surfaces to allow for tooling - scraping, shaping back.
- Finish the repair mortar patches with a texture to match the surrounding parent stone as follows:
 - Finish with appropriate tools as the mortar takes its initial set, 4-8 hours depending on ambient conditions.
 - Shaping with trowel edges, sculpting tools, sanding blocks, tungsten carbide abrasive sheet, scratch floats and the like can be done from 4 to 24 hours. For uniform perfect colour across all the repairs the method of finishing and timing should remain consistent to avoid differential hydration.
 - All repairs should be overfilled and cut back, where a tighter finish, closed down is required, scrape back and close down with a stainless-steel float or a dry sponge while still sufficiently green to achieve the desired results.

Do not place porous repair mortars when temperatures are forecast to fall below 10°C or to rise above 30°C.

Curing

Immediately cover with polythene sheet taped all round with 50mm wide Scotch Blue Painters Tape 2090. In addition, cover the repairs to prevent exposure to direct sunlight throughout the curing period. Leave to cure for a minimum of 7 days.

Workmanship

For the execution of all stages of the porous mortar repair process, all personnel shall have experience in the preparation and execution of porous mortar repairs to sandstone and shall have a minimum of five years' experience in conservation and restoration works on sandstone of a similar nature.

7.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

8 MORTARS

8.1 GENERAL

8.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

8.1.2 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0424 Roofing – Seamed Sheet Metal.

8.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
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No.	Title
AS 2701	Methods of Sampling and Testing Mortar for Masonry Constructions
AS 3700	Masonry Structures
AS 3972	General Purpose and Blended Cements
AS 4456.10	Masonry Units and Segmental Pavers and Flags - Methods of Test - Determining Resistance to Salt Attack
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ASTM C97	Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone
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ASTM C170	Standard Test Methods for Compressive Strength of Dimension Stone
ASTM C1489	Standard Specification for Lime Putty for Structural Purposes
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BS 8221.2	Code of Practice for Cleaning and Surface Repair of Buildings - Surface Repair of Natural Stones, Brick and Terracotta
BS 8298.1	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – General
BS 8298.2	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – Traditional Handset External Cladding
I.S. EN 1008	Mixing Water for Concrete - Specification for Sampling, Test and Assessing the Suitability of Water as Mixing Water for Concrete

*Use Standards which are the editions, with amendments, current at the time of the works.

8.1.4 SCOPE OF WORKS

- Mix mortar in accordance with relevant Australian Standards

8.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.

8.3 SKILLED PERSONNEL

Work to be performed only by skilled and qualified stonemasons, employed by a firm with at least 5 years' experience in conservation and restoration works on heritage sandstone buildings, specifically including those constructed of Sydney sandstone.

8.4 SUBMISSIONS

8.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

8.4.2 SAMPLES

- Refer to Section 0333 – 6 Repointing & Section 0333 – 7 Porous Mortar Repairs for applicable mortar samples.

8.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0333 - Clause 8.5

8.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4
- Submit at least four weeks prior to commencing work on site.

8.5 PROTOTYPES

- Refer to Section 0333 – 6 Repointing & Section 0333 – 7 Porous Mortar Repairs for applicable mortar prototypes.

8.6 MORTAR MATERIALS

Water

- To I.S.EN 1008 - Mixing Water for Concrete

Off-White Cement

- To AS 3972, Type A - with iron salts content not exceeding 1%.

Lime

- Hydrated lime (slaked lime) to AS 4489, from a source approved by the Superintendents Representative and Heritage Consultant.
- Lime tests: Provide a test certificate showing that the lime has passed the relevant tests for physical properties to AS 1672.
- Lime putty: Incorporate lime into the mortar in the form of lime putty which has been allowed to stand for a minimum of 24 hours before incorporation into the mortar.

Sand

Sands shall be sharp, sub-angular, with grading when tested to AS 1141.11.1 as follows:

Sieve size	% Retained Bedding Mortar & Joggles	% Retained Repointing Mortar
2.30mm	5	0
1.18mm	10	5
0.60mm	20	20
0.30mm	35	35
0.15mm	20	30
0.075mm	10	10

- Sand used for pointing and repointing shall be subject to approval after the preparation of sample panels.
- Sand colour: To match the approved sample.
- Blend sands for repointing mortars, selected to give the required colour of repointing. The proportion of each sand type shall be recorded. Coloured sand is to be used to provide colour match to existing pointing colour, rather than oxides. Seek prior approval for the use of oxides only if the solution to colour matching existing pointing colour warrants use.

- The Contractor shall provide a method statement on how the blending of the sand will remain consistent throughout the works.
- Sand stockpile: Before commencing stonework, stockpile sand of the approved types sufficient to supply the whole of the works.

Storage of Materials

- Store sands separately, clear of the ground, on timber pallets or the like, in a weatherproof enclosure.
- Store off-white cement and dry hydrated lime clear of the ground or concrete on timber pallets or the like in a weatherproof structure. Bags should be stacked so as to permit inspection and used in order of delivery and prior to expiry date marked by the manufacturer.
- Cement affected by moisture must not be used.

8.6.1 MORTAR MIXES

Type	Mix Ratio	Constituents
Bedding Mortar & Joggles:	1:1:6	Cement: Lime: Sand
Repointing Mortar	1:2:9	Cement: Lime: Sand

Batching

- All mortars shall be batched by gauging boxes approved by the Superintendents Representative and Heritage Consultant. Shovel batching is not permitted.

Mixing

- All mortars shall be mixed in an approved machine mixer. Hand mixing is not permitted.
- Revolving drum mixer: Blend dry constituents with two thirds water. Use remaining water to adjust consistency. Mix for 3 minutes minimum.
- Pan Mixer: To be used to mix lime putty and sands. Cement to be added as powder towards the end of mixing. Cement gauged mixes must be used within 60 minutes of mixing.

8.7 METHODS

8.7.1 POINTING AND REPOINTING GENERALLY

Extent

- Carry out the repointing of existing stonework to the extent and in the locations shown in the Contract documents.

Sequence

- Unless accepted otherwise by the Superintendents Representative and Heritage Consultant, do not commence repointing until all repair work and stone cleaning in the vicinity has been completed.

8.7.2 JOINT PREPARATION FOR REPOINTING

Raking out

Rake out joints to the depths specified below, whichever is the greater depth, using non-powered hand tools or approved power tools.

- Bed joints: 25mm
- Perpend joints: 25mm
- The minimum raked out depth shall be 3 times the width of the joint, unless scheduled otherwise. Protect all adjoining surfaces and arrises from accidental damage during raking out operations.

Cleaning

- Clean the internal stone surfaces of raked out joints with abrasive sheet, metal rasp or metal comb. Remove residual pointing, foreign material and loose stone using oil-free compressed air or fine pressure water sprays. Do not undercut or feather the stone arrises.

Sample panels

- Before commencing raking out work the Contractor shall prepare a written work method statement describing the preferred work method for removal of the pointing and shall prepare sample lengths of raking out for approval, prepared using the nominated work method.
- The sample lengths shall be agreed with the Principal's Heritage Consultant and shall include, as appropriate: bed joints; perpend joints; window reveals; joints at decorative elements; window perimeter joints.
- The Principal's Heritage Consultant will assess the results of sample panels in terms of damage to stonework and acceptability of raked out joint, and if necessary will issue instructions to the Contractor to vary the work method before final raking out work commences.

- If approved, the sample panels shall become the standard for assessing acceptability of the final raked out work.

Protection

- Raked out joints shall not be left unfilled and shall be protected at all times to prevent the ingress of moisture into the bedding mortar between stones.

Accidental Damage

- Make good all accidental damage to the approval of the Principal's Heritage Consultant.

8.7.3 POINTING/REPOINTING METHOD

Dampening

- Immediately before repointing use a fine water spray to dampen the joint surfaces and the residual pointing and bedding at the back of the joint. Do not over-wet.

Joint Masking

- After washing down and immediately prior to repointing, mask both sides of all joints to be pointed with 50mm wide Scotch Blue Painters Tape 2090. The tape shall be fixed as close as possible to the arrises so that the finished repointed joint matches the original as closely as possible.

Pointing / Repointing

- Pointing/repointing depth to be to the full raked out depth of all joints.
- Fill the joint in several operations by inserting the mortar and compacting it with a jointing key, applying pressure normal to the joint, i.e. not drawn along the joint. Half fill the joint in the first operation then complete the filling and cut the joint off flush.

Joint Finish

- Strike the joint to a dense smooth slightly concave surface unless otherwise specified.
- Worn joints: If the stone arrises have become rounded or otherwise worn away, iron the joint to a slightly concave surface.
- Do not overfill or feather-edge worn and eroded joints.

Curing

- Cure all pointing for a minimum of 7 days by means of 50mm wide Scotch Blue Painters Tape 2090 applied over joint masking tape. Progressively apply tape every 15 minutes

over freshly finished joints to prevent premature drying of repointing mortar. In addition, prevent exposure to direct sunlight throughout the 7-day curing period.

Do Not Retemper Mortar

- Discard mortar which has become too stiff for use. Do not retemper with water.

8.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

9 SEALANT JOINTS

9.1 GENERAL

9.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

9.1.2 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0424 Roofing – Seamed Sheet Metal.
- Refer Section 0451 Windows and Glazed Doors.
- Refer Section 0453 Doors and Access Panels.
- Refer Section 0671 Painting.
- Refer Section 0821 Stormwater - Buildings.

9.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1

No.	Title
AS 1141.11	Methods for Sampling and Testing Aggregates
AS 1672.1	Limes and Limestones - Limes for Building
AS 2701	Methods of Sampling and Testing Mortar for Masonry Constructions
AS 3700	Masonry Structures
AS 3972	General Purpose and Blended Cements
AS 4456.10	Masonry Units and Segmental Pavers and Flags - Methods of Test - Determining Resistance to Salt Attack
AS 4489	Test Methods for Limes and Limestones
ASTM C97	Standard Test Methods for Absorption and Bulk Specific Gravity of Dimension Stone
ASTM C99	Standard Test Methods for Modulus of Rupture of Dimension Stone
ASTM C170	Standard Test Methods for Compressive Strength of Dimension Stone
ASTM C1489	Standard Specification for Lime Putty for Structural Purposes
ASTM C1496	Standard Guide for Assessment and Maintenance of Exterior Dimension Stone Masonry Walls and Facades
ASTM C1713	Standard Specification for Mortars for The Repair of Historic Masonry
BS 8221.1	Code of Practice for Cleaning and Surface Repair of Buildings - Cleaning of Natural Stone, Brick, Terracotta and Concrete
BS 8221.2	Code of Practice for Cleaning and Surface Repair of Buildings - Surface Repair of Natural Stones, Brick and Terracotta
BS 8298.1	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – General
BS 8298.2	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – Traditional Handset External Cladding

No.	Title
I.S. EN 1008	Mixing Water for Concrete - Specification for Sampling, Test and Assessing the Suitability of Water as Mixing Water for Concrete

*Use Standards which are the editions, with amendments, current at the time of the works.

9.1.4 SCOPE OF WORKS

- Repoint with elastomeric sealant all upwards facing joints to parapet and balustrade copings that are not otherwise covered by lead weatherings.
- Terminate the sealant joint on the vertical face inboard of the drip moulding or edge of the coping unit. Do not continue the sealant joint down vertical joints in parapet or balustrade piers.

9.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.

9.3 SKILLED PERSONNEL

- Work to be performed only by skilled and qualified stonemasons, employed by a firm with at least 5 years' experience in conservation and restoration works on heritage sandstone buildings, specifically including those constructed of Sydney sandstone.

9.4 SUBMISSIONS

9.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

9.4.2 SAMPLES

- As a sample a 3ln.m section of sealant is to be produced in a discrete location to be approved by the Superintendent prior to the commencement of further works.
- Notify the Superintendent in advance of the date on which sample works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is

satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved samples.

9.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0333 - Clause 9.5

9.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4
- Submit at least four weeks prior to commencing work on site.

9.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0333 – Clause 9.4.2 above.

9.6 MATERIALS

Sealant

- The sealant shall be a neutral-cure single-component non-sag polyurethane of a colour to match surrounding stone; colour to be approved by Superintendent. It shall be able to accommodate the likely range of joint movements without damage to either the sealant or to the joint substrates. It shall be suitable for contact with the existing materials without interfusion or staining. This is to be confirmed by compatibility testing.
- The sealants shall be of sufficiently low modulus that the tensile stress on the adjoining materials in service is significantly lower than the anticipated tensile strengths of those materials.
- Prepare samples and technical data sheets for sealant(s) proposed, including colour options. Provide to Superintendent for approval in good time prior to lead works commencing.

Primer

- Apply primer to surfaces in contact with jointing materials as specified by sealant manufacturer. The primer shall not interfuse, stain, discolour or otherwise damage the sandstone. This is to be confirmed by compatibility testing.

Backer rod

- Use round, open-cell polyethylene rod. The rod size should be such that the rod diameter is approximately 25% greater than the width of the joint.
- Bond breaker: The backer rod shall not adhere to the sealant.

9.7 METHODS

9.7.1 PREPARATION FOR SEALANT

Cleaning Sandstone Joints

Surfaces shall be free of oils, dust and other contaminants. Clean sandstone joints as follows:

- Bristle brush
- Apply cleaning agent specified by sealant manufacturer. The cleaning agents shall not discolour or otherwise damage the sandstone.
- Bristle brush again.

Jet cleaning

- Immediately prior to sealing joints remove loose particles from the joint using oil-free compressed air. Do not use water.

Taping

- Protect the stonework surfaces adjoining joints using 50mm wide Scotch Blue Painters Tape 2090. On completion of jointing and before the jointing material cures, remove the tape and remove any stains or marks from stonework surfaces.

Priming

- Apply primer in accordance with sealant manufacturer's written specification. The primer shall not interfuse, stain, discolour or otherwise damage the sandstone. Prevent staining of adjacent surfaces.

9.7.2 SEALANT APPLICATION

Joint condition

- The joint surface shall be dry when jointing commences.

Sealant proportions

- The joint width and the sealant depth to width ratio shall be in accordance with the sealant manufacturer's written specification. Position the backer rod in the joint to maintain those proportions.

Sealant application

- Apply sealant by means of proprietary applicator gun specified by sealant manufacturer. Do not apply sealant in unsuitable weather conditions or outside sealant manufacturer's specified working time for the material or the primer.
- The whole of the work is to be carried out in accordance with the sealant manufacturer's specifications.

Sealant finish

- Produce a smooth, slightly concave surface using an approved tool designed for the purpose.
-

9.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

0335 BRICK CONSTRUCTION

1 RENDER REPAIRS

1.1 GENERAL

1.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- It is the Contractors' responsibility to carry out all works in accordance with all relevant standards as listed by not limited to what is included in this document.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

1.1.2 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0424 Roofing – Seamed Sheet Metal.
- Refer Section 0451 Windows and Glazed Doors.
- Refer Section 0453 Doors and Access Panels.
- Refer Section 0671 Painting.
- Refer Section 0821 Stormwater - Buildings.

1.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1

No.	Title
AS 1141.11	Methods for Sampling and Testing Aggregates
AS 1672.1	Limes and Limestones - Limes for Building
AS 2701	Methods of Sampling and Testing Mortar for Masonry Constructions
AS 3700	Masonry Structures
AS 3972	General Purpose and Blended Cements
AS 4456.10	Masonry Units and Segmental Pavers and Flags - Methods of Test - Determining Resistance to Salt Attack
AS 4489	Test Methods for Limes and Limestones
AS/NZS 4455.1	Masonry Units and Segmental Pavers
BS EN 12878	Pigments for The Colouring of Building Materials Based on Cement And / Or Lime - Specifications and Methods of Test
ASTM C170	Standard Test Methods for Compressive Strength of Dimension Stone
ASTM C1489	Standard Specification for Lime Putty for Structural Purposes
ASTM C1496	Standard Guide for Assessment and Maintenance of Exterior Dimension Stone Masonry Walls and Facades
ASTM C1713	Standard Specification for Mortars for The Repair of Historic Masonry
BS 8221.1	Code of Practice for Cleaning and Surface Repair of Buildings - Cleaning of Natural Stone, Brick, Terracotta and Concrete
BS 8221.2	Code of Practice for Cleaning and Surface Repair of Buildings - Surface Repair of Natural Stones, Brick and Terracotta
BS 8298.1	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – General
BS 8298.2	Code of Practice for The Design and Installation of Natural Stone Cladding and Lining – Traditional Handset External Cladding

No.	Title
I.S. EN 1008	Mixing Water for Concrete - Specification for Sampling, Test and Assessing the Suitability of Water as Mixing Water for Concrete

*Use Standards which are the editions, with amendments, current at the time of the works.

1.1.4 SCOPE OF WORKS

- Surface of parapets along Education Building to be re-rendered to match existing.

1.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.

1.3 SKILLED PERSONNEL

Work to be performed only by skilled and qualified stonemasons, employed by a firm with at least 5 years' experience in conservation and restoration works on heritage sandstone buildings, specifically including those constructed of Sydney sandstone.

1.4 SUBMISSIONS

1.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

1.4.2 SAMPLES

- As a sample, produce a 2000x2000mm section with sample content noted.
- Notify the Superintendent in advance of the date on which sample works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved samples.

1.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0335 - Clause 1.5

1.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4
- Submit at least four weeks prior to commencing work on site.

1.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0335 – Clause 1.4.2 above.

1.6 MATERIALS

Water

- To I.S.EN 1008 - Mixing Water for Concrete

Cement

- Off-white: to AS 3972, Type A - with iron salts content not exceeding 1%.
- Portland: to AS3972, Type GP
- Select type of cement with regard to required colour of render to be matched by repair mortar or new render.

Lime

- Hydrated lime (slaked lime) to AS 4489, from a source approved by the Superintendent.
- Lime tests: Provide a test certificate showing that the lime has passed the relevant tests for physical properties to AS 1672.
- Lime putty: Incorporate lime into the mortar in the form of lime putty which has been allowed to stand for a minimum of 24 hours before incorporation into the mortar.

Sand

Sands shall be sharp, sub-angular, with grading when tested to AS 1141.11.1 as follows:

Sieve Size	% Retained Bedding Mortar & Joggles	% Retained Repointing Mortar
2.30mm	5	0
1.18mm	10	5
0.60mm	20	20
0.30mm	35	35
0.15mm	20	30
0.075mm	10	10

Sand used for render repair shall be subject to approval after the preparation of sample panels.

- Sand colour: To match the approved sample.
- Blend sands for render repair mortars, selected to give the required colour of render. The proportion of each sand type shall be recorded. Coloured sand is to be used to provide colour match to existing render colour, rather than oxides. Seek prior approval for the use of oxides only if the solution to colour matching existing render colour warrants use.
- The Contractor shall provide a method statement on how the blending of the sand will remain consistent throughout the works.
- Sand stockpile: Before commencing work to rendered areas, stockpile sand of the approved types sufficient to supply the whole of the works.

Storage of Materials

- Store sands separately, clear of the ground, on timber pallets or the like, in a weatherproof enclosure.
- Store cement and dry hydrated lime clear of the ground or concrete on timber pallets or the like in a weatherproof structure. Bags should be stacked so as to permit inspection and used in order of delivery and prior to expiry date marked by the manufacturer.
- Cement affected by moisture must not be used.

1.6.1 MORTAR MIXES

Type	Mix Ratio	Constituents
New Render	1:1:6	Cement: Lime: Sand
Repair Mortar	1:1:6	Cement: Lime: Sand

Batching

- All mortars shall be batched by gauging boxes approved by the Superintendent. Shovel batching is not permitted.

Mixing

- All mortars shall be mixed in an approved machine mixer. Hand mixing is not permitted.
- Revolving drum mixer: Blend dry constituents with two thirds water. Use remaining water to adjust consistency. Mix for 3 minutes minimum.
- Pan Mixer: To be used to mix lime putty and sands. Cement to be added as powder towards the end of mixing. Cement gauged mixes must be used within 60 minutes of mixing.
- Do not retemper mortar
- Discard mortar which has become too stiff for use. Do not retemper with water.

1.6.2 RENDER REPAIRS GENERALLY

Extent

- Carry out the repairs of existing rendered surfaces in the Courtyards to the extent and in the locations shown in the Contract documents.

Sequence

- Unless accepted otherwise by the Superintendent, complete all render repairs prior to commencement of any cleaning or refinishing or repainting works in the vicinity.

1.6.3 PREPARATION FOR RENDER REPAIR

Breaking Out

- Break out deteriorated render to the limit of loose or de-bonded portions to a minimum depth of 5mm or the full depth of the deteriorated render, whichever is the minimum. Use non-powered hand tools or approved power tools.

- Protect all adjoining surfaces and arrises from accidental damage during breaking out operations.

Cleaning

- Clean the exposed render surfaces with a stiff brush. Remove loose render or dust using oil-free compressed air or fine pressure water sprays. Do not undercut or feather the edges of the original render.

Sample Panels

- Before commencing breaking out work the Contractor shall prepare a written work method statement describing the preferred work method for repair of the render, and shall prepare sample areas of breaking out for approval, prepared using the nominated work method.
- The sample areas shall be agreed with the Superintendent and shall include, as appropriate: blank wall area; window reveals; window heads; window sills; external corners.
- The Superintendent will assess the results of sample areas in terms of damage to existing render and acceptability of prepared surfaces, and if necessary will issue instructions to the Contractor to vary the work method before final breaking out work commences.
- If approved, the sample areas shall become the standard for assessing acceptability of the final broken out work.

Accidental Damage

- Make good all accidental damage to the approval of the Superintendent.

1.7 METHOD

Dampening

- Immediately before repairing render use a fine water spray to dampen the surfaces upon which the repair mortar is to be placed. Do not over-wet.

Masking

- After washing down and immediately prior to placement of repair mortar, mask perimeter of area to be repaired with 50mm wide Scotch Blue Painters Tape 2090. The tape shall be fixed as close as possible to the edge of the repaired area so that the overlap of repair mortar onto the original render finish is minimised.

Placement of Render Repair

Place repair mortar as follows:

- Apply an initial layer 3mm or so thick with some pressure to the background, then lay the rest of the repair mortar up against this to the desired thickness; this can be laid on or thrown on but should always be on to the fresh closed-in base coat.
- Ensure repair mortar is thoroughly compacted.
- Generally, up to 20mm can be applied in a single pass, including the 3mm base layer, however it is always best to divide up thick layers 20mm or more into 2-3 or even 4 layers.
- Allow at least 2 hours between each application. Work out to gradually thinner layers towards the face. The final coat must be capable of being tooled to an adequate depth to match the existing masonry and should be at least 5mm thick at the shallowest point.
- Form edges to the perimeter to match the edge of the original render.
- Ensure the final application is at least 2mm proud of the finished surfaces to allow for tooling - scraping, shaping back.

Finish the repair mortar patches with a texture to match the surrounding render as follows:

- Finish with appropriate tools as the mortar takes its initial set, 4-8 hours depending on ambient conditions.
- Shaping with trowel edges, sculpting tools, sanding blocks, tungsten carbide abrasive sheet, scratch floats and the like can be done from 4 to 24 hours. For uniform perfect colour across all the repairs the method of finishing and timing should remain consistent to avoid differential hydration.
- All repairs should be overfilled and cut back, where a tighter finish, closed down is required, scrape back and close down with a stainless-steel float or a dry sponge while still sufficiently green to achieve the desired results.
- Do not place repair mortars when temperatures are forecast to fall below 10°C or to rise above 30°C.

Curing

- Immediately cover with polythene sheet taped all round with 50mm wide Scotch Blue Painters Tape 2090. In addition, cover the repairs to prevent exposure to direct sunlight throughout the curing period. Leave to cure for a minimum of 7 days.

Workmanship

For the execution of all stages of the render repair process, all personnel shall have experience in the preparation and execution of render repairs and shall have a

minimum of five years' experience in conservation and restoration works on historic rendered buildings of a similar nature.

1.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

0411 WATERPROOFING – EXTERNAL AND TANKING

1 MINERAL FELT MEMBRANE

1.1 GENERAL

1.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- Contractor to match existing material, colour and design as much as reasonably possible unless otherwise noted and confirm with Heritage Consultant prior to carrying out any work.
- It is the Contractors' responsibility to carry out all works in accordance with all relevant standards as listed by but not limited to what is included in this document.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

1.1.2 CROSS REFERENCE

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0423 Roofing – Profiled Sheet Metal.
- Refer Section 0424 Roofing – Seamed Sheet Metal.
- Refer Section 0451 Windows and Glazed Doors.
- Refer Section 0453 Doors and Access Panels.
- Refer Section 0671 Painting.
- Refer Section 0821 Stormwater - Buildings.

1.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS 4654.2	Waterproofing Membranes for External Above-Ground Use Design and Installation
AS/NZS 2904	Damp-Proof Courses and Flashings
AS 1397	Continuous Hot-Dip Metallic Coated Steel Sheet and Strip - Coatings of Zinc and Zinc Alloyed With Aluminium and Magnesium

*Use Standards which are the editions, with amendments, current at the time of the works.

1.1.4 SCOPE OF WORKS

The scope includes:

- Temporary protection of vulnerable areas below the roof to be installed.
- Temporary weatherproofing to ensure watertightness of building at all times.
- Test samples of existing mineral felt from each of the three roof areas for possible asbestos content. Test results are to be reported to Superintendent and appropriate removal methods agreed before proceeding with removal.
- Removal of existing mineral felt roofing and fibre cement roof tiles and disposal of appropriately.
- Note: Samples of fibre cement tiles on Precinct roof have been tested and found not to contain asbestos.
- Where floorboards are rotten, replace with marine grade 20mm plywood.
- Supply and installation of new mineral felt roof membrane, dressing up under existing wall flashings, into sumps and through rainwater outlets through parapet walls, to match existing.
- Replacement of bottom two weatherboards of stair wall to area 3a and other weatherboards where weatherboards are rotten. Replace with pre-primed cypress weatherboarding, profile to match existing.
- Sand back, prime and repaint all weatherboards, barge boards, fascia boards etc. to all walls where rotten or damaged timbers are replaced or where removed to permit installation of roof membranes or sheeting. Paint to full area of wall. Paint colour and sheen to match existing.

1.2 LOCATION OF WORKS

- Roofing and Metalwork Series:
 - Refer to TEE700 Drawing Series.
 - Refer to TPE700 Drawing Series.

1.3 SKILLED PERSONNEL

Work to be performed only by skilled and qualified persons, employed by a firm with at least 5 years' experience in waterproofing and roof membrane works.

1.4 SUBMISSIONS

1.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

1.4.2 SAMPLES

Provide the following samples of materials to the Superintendent prior to commencing.

- Produce a 500x500mm colour sample for new Testudo Mineral.
- Produce a 500x500mm sample for new Rollbase.
- Produce a 500x500mm colour sample of timber top coat paint, colour matched to existing.
- Lay a 2mx2m area of specified mineral felt in a discrete area.
- Notify the Superintendent in advance of the date on which sample works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved samples.

1.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0411 - Clause 1.5

1.4.4 INSPECTION AND TEST PLAN

- Because of the continuous method of working trials are not appropriate for mineral felt roof membranes.
- Undertake trials (trial works) in accordance with proposed work procedure and agreed materials for the following, to be carried out in typical locations agreed between the Contractor and Superintendent.
- Removal of existing mineral felt roofing and preparation for Rollbase
- A fully prepared rainwater outlet through parapet wall
- Timber weatherboards prepared ready for priming and painting
- Repeat trial works until approval is obtained.
- Ensure adequate waterproofing to the area below the trial is maintained throughout the trial works.
- Obtain approval of the trial before commencing the remainder of the works. Incorporate the approved trial into the works upon approval.
- The approved trial is to be referred to as the required standard for the execution of the remainder of the works.

1.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0411 – Clause 1.4.2 above.

1.6 MATERIALS

1.6.1 FLAT ROOF PRODUCTS AND MATERIALS

- The flat roof membranes of the building are to be removed and replaced with a multi-layer torch-applied bitumen membrane system of Parchem Rollbase and Testudo Mineral Felt. All other system components and rainwater goods are to be compatible with these products and the requirements of this system. All materials used in conjunction with the new membrane system shall be approved by the membrane manufacturer.
- All works shall be carried out by a pre-qualified contractor who is well trained in the application of the specific membrane system.

- The zinc wall flashing and soakers and bottom weatherboards etc. on each flat roof area are to be carefully lifted, to allow roof membrane to be turned up, and reused where appropriate. Minimum upturn on new roofing membrane to be 100mm. Minimum overlap of flashing to be 75mm.

1.6.2 PARCHEM ROLLBASE

Product:

- Rollbase (Parchem Product code 742010)

Colour:

- N/A

Material Requirements:

- Rollbase: Polyester backed base sheet for heat sensitive substrates in multi-layer torch-on membrane system.
- Reinforcement: Polyester / fibreglass composite
- Thickness = 2mm
- Roll width = 1m
- Roll length = 10m

Adhesive:

- Adhesive A901
- Refer to Adhesive A901 MSDS specifically regarding the flash point and flammability.

Surface preparation:

- All surfaces to which Rollbase is to be applied must be smooth and free from contaminants and loose material.
- Timber substrates may require a primer coat of Adhesive A901 cut back with Solvent 10 by 50% and allowed to dry prior to applying the Rollbase sheet product.
- Sand / cement fillets, polymer modified, shall be installed at all changes in direction of substrate locations (e.g. from horizontal to vertical).
- All substrate cracks and surface imperfections are to be filled, sealed and dried prior to membrane application.

Application:

- Plan the installation of the membrane to ensure that joints occur in suitable locations.

- Generally, lay Rollbase to allow 50mm side laps but with end abutted and not overlapped*.
- The Rollbase should be unrolled and set in the exact position in which it is going to be attached. It should be folded back sideways to expose half the underside and a coat of Adhesive A901 applied. The Rollbase should then be worked back into position avoiding wrinkles and entrapped air bubbles. Repeat the process for the other half of the sheet. On completion, broom out any air to maximise adhesion.
- A minimum drying period of 2 hours with good air flow is to be allowed to dry the adhesive before using any heat source in the area. Ensure all Adhesive A901 containers are removed from the area before applying any heat source.
- After a minimum of 2 hours drying has been allowed and the adhesive is dry, heat fuse together the side laps to provide a homogeneous joint.
- When the membrane has been installed, bond over the transverse joints with a strip of smooth membrane (Fidia/Modo/P) at least 150mm wide.
- Complete all detail and up-stands with a layer of plane Index membrane (Fidia/Modo/P).

1.6.3 PARCHEM TESTUDO MINERAL

Product

- Testudo Mineral (Parchem Product code 742070)

Colour

- Mineral Green

Material requirements:

- Testudo Mineral: Elastomeric polymer bitumen torch-applied membrane
- Reinforcement: 160gsm rot-proof non-woven single strand spunbond polyester fabric
- Thickness = 4.5mm
- Roll width = 1m
- Roll length = 10m

Adhesive

- Torch applied

Surface preparation

- All surfaces to which Testudo Mineral is to be applied must be smooth, free from contaminants and loose material.

Priming

- Prime surface to which Testudo Mineral will be applied with Index Bitumen Primer at a rate of approximately 8m² per litre (primer coverage rate will vary depending on the porosity of the surface being treated). Allow the primer to dry for at least 1 hour at 25°C and above, until the primed surface is tack free. At lower temperatures allow additional drying time to ensure a tack free surface. Priming should only be carried out on surface that will be covered with Testudo Mineral on the same day.

Application

- Plan the installation of the membrane to ensure that joints occur in suitable locations.
- The Testudo Mineral membrane should be laid to form end laps of 150mm. Side laps are set at 70mm, as pre-prepared margins.
- Application of the membrane is to be by torch bonding, using a suitable gas torch. Bond by slowly unrolling the membrane whilst directing the flame at the underside of the roll and melting the bitumen by moving the gas torch from left to right.
- Side laps are to be welded with care; correct welding will show a bead of bitumen along the lap. Attention should also be given to end laps to ensure complete adhesion of the 150mm lap.
- Minimum upturn along all edge of new roofing membrane to be 100mm. Minimum overlap of wall flashing to be 75mm.
- On completion of the membrane all exposed perimeter edges should be sealed by installing a pressure seal.

Miscellaneous

- As with all mineral felt roofing systems, Testudo Mineral is only suitable for non-trafficable areas (roofs intended for maintenance access only).

Maintenance

- No special requirements. Any damage identified during normal inspections should be repaired or replaced as appropriate.

1.6.4 REPLACEMENT OF ROOF BOARDS WHERE ROTTEN

- Existing roof boards are 20mm thick pine. Replace where rotten with marine grade 20mm plywood spanning a minimum of 4 joists (approximately 1.4m o/a). Butt joint to next board on centreline of joist so that both boards are supported.

1.6.5 SUMPS AND RAINWATER OUTLETS THROUGH PARAPET WALLS

- Dress mineral felt membrane into sumps to provide a homogeneous waterproof membrane.
- Waterproof rainwater outlets through parapet walls. Line bottom of outlet with galvanised steel sheet conforming to AS 1397 – G300 – Z600 and base metal thickness (BMT) $\geq 0.5\text{mm}$, project a minimum of 60mm beyond external wall face and angled down to form an effective drip, to protect wall (refer to trials).

1.6.6 REPLACEMENT OF ROTTEN OR DAMAGED WEATHERBOARDS

- Replace bottom two weatherboards of stair wall to area 3a and other weatherboards where weatherboards are rotten. Replace with pre-primed cypress weatherboarding, profiled to match existing.
- Sand back, prime and repaint all weatherboards, barge boards, fascia boards etc. to all walls where rotten or damaged timbers are replaced or where removed to permit installation of roof membranes or sheeting. Paint to full area of wall. Paint colour and sheen to match existing. Paint as follows.

1.6.7 MISCELLANEOUS FLASHINGS, CAPPINGS AND ACCESSORIES

- Before re-roofing, remove all redundant pipes etc. penetrating roof, as directed by Superintendent.
- Flashing material shall conform to AS/NZS 2904.
- Flashings are to be coloured to match the surrounding material.
- Cappings and flashings shall be purpose-made and profiled for the fasciae, verges, chimneys, pipes or other penetrations that they flash
- All pipe and other penetrations through mineral felt roof membranes shall be flashed using proprietary collars and over-flashings complying with AS 4654.2 Section 2.6.4 and shall be tested for watertightness.

1.7 METHODS

1.7.1 GENERAL METHOD

The following general methods shall apply to these works:

- Remove existing mineral felt roof membrane and fibre cement tiles and dispose of appropriately.
- Inspect support structure and repair/treat, if required, as directed by Superintendent.
- Allow for reinspection and approval of roof structures by Superintendent.
- Remove any redundant fixings, pipes, plant and machinery as instructed by Superintendent.
- Install new waterproof Testudo system (Sections 1.7.2 and 1.7.3).
- Install flashings, soaker trays, pressure seals etc.
- In addition to this specification, all roof membrane works are to be undertaken in accordance with AS 4654.2, Waterproofing membrane systems for exterior use – above ground level, Part 2, design and installation.

1.7.2 SITE PREPARATION

The Contractor is required to carry out a full clean-up of the existing roof surfaces before installing the new roofing system. This includes sweeping down the entire roof surface to ensure there is no waste materials, (leaf litter, rubbish, sand, stones, discarded equipment, metal filings, drill swarf or any debris of any nature) left on the roof. Ensure that no part of this clean-up process causes any foreign matter to enter the downpipe systems.

1.7.3 INSTALLATION OF MINERAL FELT ROOF

The selected proprietary roofing product is to be installed as per manufacturer's instructions. The following shall also apply:

- Plan the installation of the membrane to ensure that joints occur in suitable locations and that the roof will drain to rainwater outlets.
- The membrane is to be fully bonded, as defined in AS 4654.2, similar to the existing membranes.
- All works shall be carried out by a pre-qualified contractor who is well trained in the application of the specific membrane system.
- Install membranes in accordance with Sections 6.2.1 to 6.2.3, including substrate fillet and perimeter pressure seals, conforming to AS 4654.2, or existing over-flashings.
- Flash all pipe and other vertical penetrations using proprietary collars and over-flashings complying with AS 4654.2 Section 2.6.4. Test on completion for watertightness.
- Dress mineral felt membrane into sumps to provide a homogeneous waterproof membrane.

- Waterproof rainwater outlets through parapet walls and construct an effective drip to protect wall, as Section 6.2.5. Refer also to Trials. All outlets through parapet walls are to drain directly to a rainhead and downpipe.
- Completed roof is to be suitable as a trafficable surface for maintenance, as defined in AS 4654.2.

1.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

0423 ROOFING - PROFILED SHEET METAL

1 COPPER BATTEN SEAM ROOFING

1.1 GENERAL

1.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

1.1.2 CROSS REFERENCE

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0411 Waterproofing – External and Tanking.
- Refer Section 0423 Roofing – Profiled Sheet Metal.
- Refer Section 0424 Roofing – Seamed Sheet Metal.
- Refer Section 0451 Windows and Glazed Doors.
- Refer Section 0453 Doors and Access Panels.
- Refer Section 0671 Painting.
- Refer Section 0821 Stormwater - Buildings.

1.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS 1566-1997	Copper and Copper Alloys - Rolled Flat Products
AS 2738	Copper and Copper Alloys - Compositions and Designations of Refinery Products, Wrought Products, Ingots and Castings
AS 1562.1:2018	Design and Installation of Sheet Roof and Wall Cladding Metal
AS 1720	Timber Structures
DIN EN 10002-1	Metallic Materials. Tensile Testing
BS EN 1172	Strips and Sheets for The Building Industry
BS EN 1652	Plates, Sheets, Strips and Discs for General Purposes
ASTM-B-152 ASME-SB-152	Copper Sheet, Strip, Plate and Rolled Bar
ASTM-B-370	Copper Sheet and Strip for Building Construction
IIS H 3100	Copper and Copper Alloys Sheets, Plates and Strips

*Use Standards which are the editions, with amendments, current at the time of the works.

1.1.4 SCOPE OF WORKS

The scope includes:

- Rooves to roof lanterns
- cladding to roof lanterns

1.2 LOCATION OF WORKS

- Roofing and Metalwork Series:
 - Refer to TEE700 Drawing Series.
 - Refer to TPE700 Drawing Series.

1.3 SKILLED PERSONNEL

Fabricator's Qualifications:

- Company specializing in copper sheet metal roofing work with three years' experience in similar size and type of installations.

Installer:

- A firm with 3 years of successful experience with installation of copper roofing of type and scope equivalent to Work of this Section.

1.4 SUBMISSIONS

1.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

1.4.2 SAMPLES

The following is to be submitted:

- Product data including metal manufacturer's specifications, installation instructions, and general specifications for roofing applications. Include certification or other data substantiating that materials comply with requirements.
- Shop drawings showing manner of forming, joining, and securing copper roofing, and pattern of seams. Show expansion joint details and waterproof connections to adjoining work and at obstructions and penetrations.
- Samples consisting of (150 mm) or (300 mm) square specimens of specified copper roofing material.
- As a sample one section of vertical cladding is to be installed on a roof lantern in accordance with specifications and to match existing.
- Before proceeding with final purchase of materials and fabrication of copper roofing components, prepare a mock-up of work. Incorporate materials and methods of fabrication and installation identical with project requirements. Install mock-up at discrete roof area location as directed by Heritage Consultant. Retain accepted mock-up as quality standard for acceptance of completed copper roofing. If accepted, mock-up may be incorporated as part of copper roofing work.
- Provide mock-up of sufficient size and scope to show typical pattern of seams, fastening details, edge construction, and finish texture and colour.
- Certificates: Fabricator's certification that products furnished for Project meets or exceeds specified requirements.

- Notify the Superintendent in advance of the date on which sample works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved samples.

1.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0423 - Clause 1.5.

1.4.4 INSPECTION AND TEST PLAN

Industry Standard:

- Except as otherwise shown or specified, comply with applicable specifications and details of the "Copper in Architecture" handbook published by the Copper Development Association (CDA). Conform to dimensions and profiles shown.

Wind Uplift:

- Provide roof assemblies meeting wind uplift ratings as required by code.

1.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0333 – Clause 1.4.2 above.

1.6 MATERIALS

1.6.1 MATERIAL REQUIREMENTS

Copper Roofing Sheets:

Cold-rolled copper sheet complying with ASTM B370 temper H00, unless otherwise indicated, and as follows:

- Weight: 6.1Kg per sq. m. (0.69 mm) unless otherwise indicated.
- Batten Caps: 4.9Kg per sq. m. (0.55 mm) unless otherwise indicated.

Miscellaneous Materials:

Provide materials and types of fasteners, solder, protective coatings, separators, sealants and accessory items as specified by copper sheet manufacturer for copper roofing work, except as otherwise indicated.

Accessories:

Except as indicated as work of another specification Section, provide components required for a complete roof system, including trim, copings, fascia's, ridge closures, cleats, seam covers, battens, flashings, gutters, louvers, sealants, gaskets, and closure strips. Match materials and finishes of roof.

Cleats

- Concealed type as indicated in the "Copper in Architecture" handbook published by the Copper Development Association (CDA) for flat-seam and batten seam spaced on (300 mm) centres.
- Fabricate cleats to allow thermal movement of copper roof panels while preventing copper panel distortion due to wind uplift forces.

Trim, Closure Pieces, and Accessories

- Same material, thickness [heavier weight], and finish as adjacent copper roof panels, brake formed to required profiles.
- Comply with standards conforming to recognized industry standard sheet metal practice.

Bituminous Coating

- SSPC - Paint 12, Cold-Applied Asphalt Mastic (Extra Thick Film), nominally free of sulfur, compounded for 0.38mm dry film thickness per coat.

High Temperature Grade Water Barrier Underlayment

Cold applied, self-adhering membrane composed of a high density, cross laminated polyethylene film coated on one side with a layer of butyl rubber or high temperature asphalt adhesive. Provide primer when specified by water barrier manufacturer.

- Minimum Thickness: 0.76mm.
- Tensile Strength: ASTM D412 (Die C Modified); 1.73MPa.
- Membrane Elongation: ASTM D412 (Die C Modified); 250%
- Permeance (Max): ASTM E96; 0.05 Perms.
- Acceptable Products:
 - Blueskin PE 200 HT, Henry.
 - Ultra, W.R. Grace Company.
 - CCW MiraDRI WIP 300 High Temperature, Carlisle Coatings and Waterproofing.

Batten Bars and Strips

If size is not indicated, provide battens of nominal (50 mm) by (50 mm) size [(38 mm) by (38 mm) minimum].

- Copper Batten Caps: 0.56Kg cold-rolled copper.
- Wood Batten Strips: Fabricated to size indicated from lumber complying with requirements of Division 06 Section "Rough Carpentry" and preservative treated by pressure process using a chemical solution that is nonhygroscopic and noncorrosive to type of copper roofing.

Nails for Wood Substrate

- Copper or hardware bronze, 0.109 inch minimum not less than 7/8 inch (22 mm) long barbed with large head.

Screws & Bolts

- Copper, bronze, brass, or passivated stainless steel (300 Series) of sufficient size and length to sustain imposed stresses.
- Silica bronze

Solder

- ASTM B32; Provide 50-50 tin/lead or lead-free alternative of similar or greater strength solder. Killed acid flux.

Flux

- Muriatic acid neutralized with zinc or approved brand of soldering flux.

Rivets

- Pop Rivets: (3 mm) to (4.5 mm) diameter, with solid brass mandrels.
- Provide solid copper rivet (tinner's rivets) where structural integrity of seam is required.

1.6.2 FABRICATION

General Metal Fabrication

Shop-fabricate work to greatest extent possible. Comply with details shown and with applicable requirements of the "Copper in Architecture" handbook published by the Copper Development Association (CDA) and other recognized industry practices. Fabricate for waterproof and weather-resistant performance with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrate. Comply with material manufacturer's instructions and specifications for forming

material. Form exposed copper work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.

- Fabricate to allow for adjustments in field for proper anchoring and joining.
- Form sections true to shape, accurate in size, square, free from distortion and defects.
- Cleats: Fabricate cleats and starter strips of same material as sheet, to interlock with sheet in accordance with CDA specifications.
- Tin edges of copper sheets and cleats at soldered joints for flat lock and soldered system.
- Flat Panel Seams:
 - Fabricate flat seams for solid soldered [sealant in] [dry] joints.
 - Fabricate seams for panels to be installed in overlapped, interlocking shingle manner.
 - Fold two adjacent edges over 180 degrees for width of (19mm) and other two adjacent edges under (19 mm). Refer to CDA "Copper in Architecture" handbook.
 - Fabricate flat seam roofing from pans (450 mm) by (600 mm) in size.
- Flat Locked Panel Seams:

Batten Seam Panels

- All panels to match existing panels and Architects' details.
- Fabricate pans to create centre to centre standing and batten seam spacing as indicated on Drawings.
- Fabricate battens to sizes indicated.
- Form overlapping and interlocking transverse joints.
- Provide (13 mm) single lock seam at batten caps.

Seams

- Fabricate non-moving seams in copper sheet with flat-lock seams. Tin edges and cleats to be soldered, form seams, and solder.

Expansion Provisions

- Where lapped or bayonet-type expansion provisions in work cannot be used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than (25 mm) deep, filled with mastic sealant (concealed within joints).

Sealant Joints

- Where movable, non-expansion-type joints are indicated or required for proper performance of work, form copper to provide for proper installation of elastomeric

sealant, in compliance with the "Copper in Architecture" handbook published by the Copper Development Association (CDA).

Separations

- Provide for separation of copper from noncompatible metal or corrosive substrate by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as specified by manufacturer/fabricator.

Solder

- Solder and seal non-moving copper joints on slopes up to 3:12, except those indicated or required to be expansive type joints.
- After soldering, remove flux. Wipe and wash solder joints clean. Refer to CLEANING Article in Section 0423 Clause 1.7.4.

1.7 METHODS

1.7.1 EXAMINATION

- General: Examine conditions and proceed with work when substrates are ready.
- Confirm that substrate system is even, smooth, sound, clean, dry, and free from defects.
- Verify roof openings, pipes, sleeves, ducts, and vents through roof are solidly set, cant strips and reglets in place, and nailing strips located.

1.7.2 PREPARATION

Clean surfaces to receive copper roofing. Substrate to be smooth and free of defects. Drive all projecting nails or other fasteners flush with substrate.

Water Barrier Underlayment:

- Install high temperature grade water barrier on clean, dry roof substrate.
- Remove dust, dirt, and loose fasteners.
- Remove protrusions from the deck area.
- Verify substrate has no voids, damaged, or unsupported areas.
- Repair voids or unacceptable areas before installing membrane.
- Prime substrates with manufacturer's approved primer if required for proper installation of membrane over substrate.
- Install membrane in strict accordance with manufacturer's printed application procedures, precautions, and limitations.

- Start application at low points and lap membrane shingle fashion to prevent water penetration.
- Membrane Underlayment: Apply horizontally, lapping preceding layer not less than 4 inches (100 mm). End lap membrane not less than 6 inches (150 mm).
 - Maximize adhesion to substrate by brooming or rolling membrane in place after placement.
 - Centre membrane at valleys, hips, and ridges.

Roofing Felt Underlayment:

- Install underlayment over solid substrates with horizontal overlaps and end-laps staggered.
- Lay parallel to ridge line with (63 mm) side-laps and (150 mm) end-laps.
- Start application at low point, working up deck laying plies in shingle fashion.
- Fasten underlayment with copper roofing nails spaced on (300 mm) centres maximum.
- Install underlayment and paper slip sheet on substrate under copper roofing to greatest extent possible unless otherwise specified by manufacturer of sheet metal. Paper slip sheets must be installed over the underlayment. Use adhesive for temporary anchorage, where possible, to minimize use of mechanical fasteners under copper roofing. Lap joints (50 mm) minimum.

1.7.3 INSTALLATION

Manufacturer's Recommendations: Except as otherwise shown or specified, comply with specifications and instructions of manufacturer of copper being fabricated and installed.

General:

- Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating, by applying rubberized asphalt or butyl underlayment to each metal surface, or by other permanent separation as specified by manufacturers of dissimilar metals.
- Form and fabricate sheets, seams, strips, cleats, valleys, ridges, edge treatments, integral flashings, and other components of copper roofing to profiles, patterns, and drainage arrangements shown and as required for permanently leakproof construction. Provide for thermal expansion and contraction of the work, as indicated. Seal joints as shown and as required for leakproof construction. Shop-fabricate materials to greatest extent possible.
- Sealant-Type Joints: Where sealant-filled joints are used, embed hooked flanges of joint members not less than (25 mm) into sealant. Form joints to conceal sealant

completely. When ambient temperature is moderate at time of installation, (4 degrees to 21 degrees C), set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher or lower ambient temperatures. Do not install sealant-type joints at temperatures below (4 degrees C). Comply with requirements of Division 07 "Joint Sealant" Sections for handling and installing sealants.

- Fabricate and install work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves, and avoidable tool marks considering temper and reflectivity of metal. Provide uniform, neat seams with minimum exposure of solder, and sealant. Except as otherwise shown, fold back sheet metal to form a hem on concealed side of exposed edges.
- Conceal fasteners and expansion provisions where possible in exposed work, and locate so as to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- Tin uncoated copper surfaces and cleats at edges of sheets to be soldered, for a width of (38 mm), using solder specified for copper work.

Batten Seam Roofing:

- Turn up sides of sheets to extend above top of battens (13 mm). Turn this (13 mm) at right angles to battens.
- Form cross seams with (19 mm) fold under on lower end and (50 mm) fold over on upper end. Slit folds in cross seams at each corner (25 mm) in from batten to form tab. Hook fold on lower end of pan into fold on upper end of underlaying pan.
- Apply pans beginning at eaves.
- Place cover strips over battens, locking edges with flanges of pan malletted down against sides of battens. Cover batten ends with cap folded and locked into extensions of batten covers and vertical legs of pans.
- At intersections of roof slope with ridge and hip battens, turn up edges of roof pans against sides of battens and terminate in (13 mm) flange at top of battens. Install cover strips over top of hip and ridge battens.
- Form valleys of sheets not exceeding (3000 mm) in length. Lap joints (200 mm) in direction of drainage. Extend valley sheet minimum (150 mm) under roofing sheets. At valley, double fold valley and roofing sheets and secure with cleats spaced (300 mm) centres.
- At eaves without gutters, hook pan over edge strip. Extend edge strip up under metal roofing (100 mm) and secure with nails at (75 mm) centres, at (25 mm) from upper end.

- Install batten flush with gable. Extend batten cover down exterior face and lock into edge strip.
- Coordinate installation of panels with adjacent construction to ensure watertight enclosure.

1.7.4 CLEANING

- Remove protective film (if any) from exposed surfaces of copper roofing promptly upon installation. Strip with care to avoid damage to finishes.
- Upon completion of each area of soldering, carefully remove flux and other residue from surfaces. Neutralize acid flux by washing with baking soda solution, and then flushing clear water rinse. Use special care to neutralize and clean crevices.
- Clean exposed metal surfaces of substances that would interfere with uniform oxidation and weathering.

1.8 PROTECTION

- Provide final protection in a manner acceptable to installer that ensures that copper roofing is without damage or deterioration at time of Substantial Completion
- Natural weathering mill finished copper. No applied finish.
- Patina to be included at request and direction of Heritage Consultant.

0424 ROOFING - SEAMED SHEET METAL

1 LEAD WEATHERINGS

1.1 GENERAL

1.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

1.1.2 CROSS-REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0424 Roofing – Seamed Sheet Metal.
- Refer Section 0451 Windows and Glazed Doors.
- Refer Section 0453 Doors and Access Panels.
- Refer Section 0671 Painting.
- Refer Section 0821 Stormwater - Buildings.

1.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS 1562	Design and Installation of Sheet Roofing and Wall Cladding
AS 1804	Soft Lead Sheet and Strip
BS EN 12588	Rolled Lead Sheet for Building Purposes.
Lead Sheet Manual	The Lead Sheet Association (LSA) Lead Sheet Manual

Use standards which are the editions, with amendments, current at the time of the works.

1.1.4 SCOPE OF WORKS

The scope of the work comprises:

- Modification and repair of existing lead weatherings on the Education Building
- Installation of new lead weatherings on the Education Building in locations where none presently exists

1.2 LOCATION OF WORKS

- Roofing and Metalwork Series:
 - Refer to TEE700 Drawing Series.
 - Refer to TPE700 Drawing Series.

1.3 SKILLED PERSONNEL

Work to be performed only by skilled and qualified stonemasons, employed by a firm with at least 5 years' experience in conservation and restoration works with experience with lead on heritage sandstone buildings, specifically including those constructed of Sydney sandstone.

1.4 SUBMISSIONS

1.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

1.4.2 SAMPLES

- As a sample, a minimum 3 lineal meter section of lead weathering is to be installed in a discrete location to all specification. It is critical that within the 3m of weathering at least 1 lap is produced for inspection.
- Notify the Superintendent in advance of the date on which sample works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved samples.

1.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0424 - Clause 1.5

1.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4
- Submit at least four weeks prior to commencing work on site.

1.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0424 – Clause 1.4.2 above.

1.6 MATERIALS

1.6.1 LEAD SHEET, FIXINGS AND ACCESSORIES

- Lead sheet: Rolled lead sheet complying with the requirements of BS EN 12588
 - 30 kg/m² level 7 and level 3 cornices
 - 20 kg/m² cappings to column capitals
- Underlay: Non-woven needle-punched polyester geotextile fabric, minimum weight 210g/m²
 - Clips: Use copper clips cut from copper sheet not less than 0.6mm thickness and of temper grade ¼H
 - Fixing screws: Use brass or stainless-steel screws not less than 35mm long. Use nylon wall plugs to suit screw length and gauge
 - Nosings: Continuous copper nosings

- Patination oil: Water based

1.6.2 SEALANT AT REGLETS

Sealant

- The sealant shall be a neutral-cure single-component non-sag polyurethane of a colour to match surrounding stone; colour to be approved by Superintendent. It shall be able to accommodate the likely range of joint movements without damage to either the sealant or to the joint substrates. It shall be suitable for contact with the existing materials without interfusion or staining. This is to be confirmed by compatibility testing.
- The sealants shall be of sufficiently low modulus that the tensile stress on the adjoining materials in service is significantly lower than the anticipated tensile strengths of those materials.
- Prepare samples and technical data sheets for sealant(s) proposed, including colour options. Provide to Superintendent for approval in good time prior to lead works commencing.

Primer

- Apply primer to surfaces in contact with jointing materials as specified by sealant manufacturer. The primer shall not interfuse, stain, discolour or otherwise damage the sandstone. This is to be confirmed by compatibility testing.

Backer Rod

- Use round, open-cell polyethylene rod. The rod size should be such that the rod diameter is approximately 25% greater than the width of the joint.
- Bond breaker: The backer rod shall not adhere to the sealant.

1.7 METHOD

1.7.1 NEW LEAD WEATHERINGS

- Fabricate and install new lead weatherings in the locations shown on the drawings.
- Install lead weatherings after completion of stone repairs.
- Lead sheeting shall be laid over the underlay on clean stone surfaces, free of any sharp objects and debris.
- Install lead weatherings in strict accordance with the fixing and jointing details given in the LSA Lead Sheet Manual.

- All joints shall be welted and clipped. Welt details and spacings shall to be in accordance with the LSA Lead Sheet Manual, for the weight of lead sheet being used. LSA specified welt centres shall not be exceeded. Unless specified otherwise, all welted joints shall be finished before turning sheets up under nose clips.
- Sheets shall be laid flat and worked to the reglet joint at the back of the weathering (existing stone bed joint). Insert sheets a minimum 25 mm into reglets, secured with lead wedges in accordance with LSA Lead Sheet Manual, and sealant jointed as specified.
- Unless specified otherwise, all nosings shall have continuous copper clips extending to underside of stone nosing, with finger gap (approximately 15mm) between nosing and stone.

1.7.2 PATINATION

- To mitigate potential run-down of lead carbonate and staining of sandstone beneath, as soon as practical after fixing and no later than the end of the day's work apply a coat of patination oil to exposed leadwork. Apply the coating under the lower edge of leadwork and between laps. Turn clips over after application of the oil.
- Apply a final coat of patination oil on completion of each weathering.

1.7.3 PREPARATION FOR SEALANT

Cleaning Lead

- Thoroughly clean lead, including patination oil, with cleaning solvent specified by sealant manufacturer. Take care not to get cleaning solvent on sandstone.

Cleaning Sandstone Reglet

- Surfaces shall be free of oils, dust and other contaminants. Clean sandstone reglets as follows:
 - Bristle brush
 - Apply cleaning agent specified by sealant manufacturer. The cleaning agents shall not discolour or otherwise damage the sandstone.
 - Bristle brush again.

Jet Cleaning

- Immediately prior to sealing reglets remove loose particles from the reglet using oil-free compressed air. Do not use water.

Taping

- Protect the stonework surfaces adjoining reglets using 50mm wide Scotch Blue Painters Tape 2090. On completion of jointing and before the jointing material cures, remove the tape and remove any stains or marks from stonework surfaces.

Priming

- Apply primer in accordance with sealant manufacturer's written specification. The primer shall not interfuse, stain, discolour or otherwise damage the sandstone. Prevent staining of adjacent surfaces.

1.7.4 SEALANT APPLICATION

Joint Condition

- The joint surface shall be dry when jointing commences.

Sealant Proportions

- The joint width and the sealant depth to width ratio shall be in accordance with the sealant manufacturer's written specification. Position the backer rod in the reglet to maintain those proportions.

Sealant Application

- Apply sealant by means of proprietary applicator gun specified by sealant manufacturer. Do not apply sealant in unsuitable weather conditions or outside sealant manufacturer's specified working time for the material or the primer.
- The whole of the work is to be carried out in accordance with the sealant manufacturer's specifications.

Sealant Finish

- Produce a smooth, slightly concave surface using an approved tool designed for the purpose.

1.7.5 PROTECTION OF LEADWORK

- On completion of leadwork, temporarily protect from damage with rigid sheets suitably weighted and secured until completion of all Works under Contract.

1.7.6 COMPLETION

- Upon completion of all Works under Contract all lead weatherings shall be cleaned down and left free of debris. All weatherings shall be completely water- and weathertight.
Apply a final coat of patination oil on completion.

1.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

0451 WINDOWS AND GLAZED DOORS

1 STEEL WINDOWS

1.1 GENERAL

1.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

1.1.2 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0411 Waterproofing – External and Tanking.
- Refer Section 0451 Windows and Glazed Doors.
- Refer Section 0453 Doors and Access Panels.
- Refer Section 0671 Painting.

1.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1

No.	Title
AS 2047	Windows and External Glazed Doors in Buildings
AS 1288	Glass in Buildings - Selection and Installation
AS 4361.2	Guide to Lead Paint Management – Residential and Commercial Buildings

*Use Standards which are the editions, with amendments, current at the time of the works.

1.1.4 SCOPE OF WORKS

The heritage building façade steel-framed windows are to be repaired and refinished as part of the works under contract. Generally, this will include the following:

- Remove all existing secondary glazing and associated framing.
- Conserve existing steel windows including glass and brass hardware; repair, prepare and repaint.
- Fix shut all operable sashes
- Silicone seal the full perimeter of openable windows
- Clean windows.

1.2 LOCATION OF WORKS

- Windows Series:
 - Refer to TEE800 Drawing Series.
 - Refer to TPE800 Drawing Series.

1.3 SKILLED PERSONNEL

Work to be performed only by skilled and qualified steel window repairers, glaziers and painters, employed by a firm with at least 5 years' experience in conservation and restoration works on steel windows in heritage buildings.

1.4 SUBMISSIONS

1.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

1.4.2 SAMPLES

- Prototypes are carried out in place of samples, refer to Section 0451 – Clause 1.4.3 below.

1.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0451 - Clause 1.5

1.4.4 INSPECTION AND TEST PLAN

1.5 PROTOTYPES

One representative window is to undergo the following works as specified as a prototype:

- Repair of corroded framing members
- Replacement of glazing putty
- Removal of existing paint and corrosion products
- Priming and painting
- Repair of hinges
- Repair of window hardware
- Reglazing
- Notify the Superintendent in advance of the date on which prototypes works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved prototypes.

1.6 MATERIALS

Replacement Framing Members

- Use rolled mild steel sections to match existing wherever possible. If matching sections are unavailable, submit alternative sections for approval by Facade Engineer prior to use. If alternative sections are unacceptable, fabricate matching elements by welding and machining appropriate plate, bar and angle stock sections.

Glass

- Use clear float glass to match existing glass in windows in thickness and appearance as closely as possible. Provide samples for approval by Facade Engineer prior to ordering.

- Use patterned glass to match original patterned glass in thickness and appearance as closely as possible. Provide sample for approval by Facade Engineer prior to ordering.

Glazing Putty and Sealant

- Linseed oil putty shall be used on all reglazing of steel windows

Glazing Pins

- Where reglazing occurs, replace existing glazing pins with non-ferrous pins (e.g. lead).

Paint System

- All internal and external shall be in accordance with Section 0671 Painting of this Specification.

Operating Hardware

- Replacement operating hardware is to match original as closely as possible in appearance and materials.
- If catches or stays matching in all respects cannot be obtained, allow to relocate remaining original hardware to ensure hardware on given floors or rooms is matching, and use new replacements matching as closely as possible elsewhere. Liaise with Facade Engineer to agree locations.

Lubricant

- Use a dry silicone-based lubricant e.g. 3M Spray Silicone Lubricant (Dry Type) compatible with paint system and suitable for steel window systems. Obtain manufacturer's specification prior to use.

Steel External Perimeter Sealant

- Acoustically rated sealant shall be installed where external sealant is required. Refer to Acoustic Consultant's Report (Lands and Education) for mastic performance specification.

1.7 METHODS

1.7.1 REGLAZE BROKEN OR DEFECTIVE WINDOW PANES

Scope

- Where existing glass is cracked, broken, chipped or otherwise indicated not adequate for the proposed use.

Method

- Remove defective glass, remove frame and make any required frame repairs off-site, repaint, refinish and reinstall frame, set new glass on replacement glazing pins and reglaze with triangular putty bead

1.7.2 IN-SITU CORROSION REPAIR

Scope

- This method is to be applied where no reglazing is required, existing fixed frame or operable sash are easily accessible and exhibiting mild enough signs of steel corrosion damage such that repairs are able to be carried out in situ with low risk of hidden corrosion worsening over time. This includes surface rust on all visible faces. This excludes framing or sashes exhibiting significant flaking corrosion and surface corrosion on hidden steel faces.

Method

- Scale off existing loose or flaking paint and all corrosion back to clean steel with wire brush in order to close window to flush seal, prime bare metal, prepare and paint in accordance with Section 0671 Painting, then close window to be flush.

1.7.3 REMOVAL AND REPAIR/REPLACEMENT OFF SITE OF CORRODED STEEL

Scope

- Where existing fixed frame or operable sash are not easily accessible (e.g. sash/frame meeting faces, fixed frames against sandstone, sash frames against glass). This includes surface rust to all hidden steel faces and significant corrosion to all steel faces.

Method

- Deglaze operable sash or entire window frame as required prior to removal, then remove affected frame & transport to factory, cut out defective steel and weld in new clean steel (e.g. bottom rail of sash, external weather bar or glazing bar) in matching profiles and method of construction using salvaged materials from the building. Reglazing will require replacement of glazing pins and putty bead.

1.7.4 REPAIR OR REPLACE HARDWARE IN SITU

Scope

- This scope items includes handles, vertical handle coupling bars, top sash locks, hinges and stays.

- Regularly operable hardware is not required. The windows however, are required to be permanently closed and locked. The hardware only needs to be visually restored and they need to not provide a hindrance to keeping the windows shut and locked. During the survey it was found that various pieces of existing hardware require either repair replacement.

Method

- Where hardware is indicated as broken, incomplete, defective or missing, allow for the cost of the more expensive option between repair and replacement of required parts.

1.7.5 VISUAL REPAIRS

Scope

- For extent and nature of visual repairs, Refer to Heritage consultant's report entitled "Appendix 4 - SCW Issue E Lands Department Building" for Architectural scope of joinery repair works.
- Paint and coatings specification is detailed in Section 0671 Painting.

Internal and External Paint

- All internal and external shall be in accordance with Section 0671 Painting of this Specification.

Fixing Operable Sashes Shut with Locking Disc

- All operable sashes are to be fixed shut in the proposed condition.
- To be installed after painting:
- Brass circular locking disc, 8mm high x nominal 15mm diameter – screwed to stile directly beneath handle with hex single central head socket to suit 5mm Allen key to prevent handle from rotating to open sash.

1.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

2 TIMBER WINDOWS

2.1 GENERAL

2.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

2.1.2 CROSS-REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0451 Windows and Glazed Doors.
- Refer Section 0453 Doors and Access Panels.
- Refer Section 0671 Painting.

2.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS 2047	Windows and External Glazed Doors in Buildings

No.	Title
AS 4361.2	Guide to Lead Paint Management – Residential and Commercial Buildings

*Use Standards which are the editions, with amendments, current at the time of the works.

2.1.4 SCOPE OF WORKS

The heritage building façade timber-framed windows are to be repaired and refinished as part of the works under contract. Generally, this will include the following:

- Indent repairs to external joinery
- Replacing timber members
- Repairing and strengthening timber joints
- Repairing masonry cracks
- Repairing hardware components
- Acoustic recaulking
- Visual repairs

2.2 LOCATION OF WORKS

- Windows Series:
 - Refer to TEE800 Drawing Series.
 - Refer to TPE800 Drawing Series.

2.3 SKILLED PERSONNEL

- The Contractor's attention is drawn to safety regulations concerning working with paint containing lead.

2.4 SUBMISSIONS

- On first erection of the scaffold, the Contractor's Joiner and Heritage Façade Consultant are to inspect all windows to be re-painted and agree the extent of repairs needed. The Contractor's Joiner is to make a schedule of these repairs. The areas to be repaired are also to be marked on the frames with indelible marker.
- A copy of the schedule is to be kept on site and copies provided to the Heritage Façade Consultant and to the Superintendent.

2.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

2.4.2 SAMPLES

- Prototypes are carried out in place of samples, refer to Section 0451 – Clause 1.5 below.

2.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0451 - Clause 2.5.

2.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4.
- Submit at least four weeks prior to commencing work on site.

2.5 PROTOTYPE

- As a prototype, install a single window in accordance with specifications.
- Notify the Superintendent in advance of the date on which prototypes works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved prototypes.

2.6 MATERIALS

- Repairs are to be made by piecing in timber of the same species as the existing timber. Proprietary epoxy fillers are not to be used.
- For pricing purposes assume that all members are Australian Cedar (*Cedrela toona* var. *australis*).
- Putty:
 - Use linseed oil glazing putty.
 - Confirm with paint manufacturer compatibility of proposed putty with paint system.

- Glass and timber are to be dust free. Prime the glass and timber joinery to take the bead of putty. The top of putty is to be weathered to match existing angle.

2.7 METHODS

2.7.1 INDENT REPAIRS TO EXTERNAL JOINERY

Scope

- “External Joinery” refers to externally exposed timber associated with the Education building windows and doors on the building envelope (e.g. external sill, window sash frames, guide rails, beads, counterweight boxes and door leaves), as well as the internal faces of external timber joinery. This excludes any internal windows/doors between enclosed spaces.

Secondhand Timber

- Where partial renewal or repair calls for the use of new timber in association with old, the ideal is to use reasonable second-hand timber that has had an opportunity to age under similar circumstances to that which is being repaired.
- The timber selected is to be sound and perfectly free from decay and is to be of approximately the right scantling.

New Timber

- If matching second hand timber is not available, then new timber may be introduced but it must be selected with great care.
 - The replacement timber species must match the existing;
 - The quality and grain must match the existing; and
 - The moisture content must match the existing.
- It is imperative that these selection criteria are adhered to as the new will be bonded to the old with an adhesive; otherwise seasonal movements may produce twisting and distortion disproportionate to that which might normally be expected. Twisting and distortion defects will not be accepted.

Replace Section of Stile or Rail

- Remove decayed timber to form a splice repair. Remove the minimum amount of existing timber to form an effective repair. Ensure an effective bond between the new and existing sections of timber.

- Work new material to line of existing and avoid unnecessary trimming of the original timber. Repair is to follow any existing deformations in the line of the window.
- Pieced-in repairs are to be formed using timber to match existing. The quality and grain must match the original. The moisture content must match the original.
- Where access is possible, screw or pin fixings through from the inner face of the window to secure splice repairs and glue joint.

Indent Small Section to Stile or Rail

- Remove decayed timber to form an indent repair, including pelleting. Remove the minimum amount of existing timber to form an effective repair. Ensure an effective bond between the new and existing sections of timber.
- Work new material to line of existing and avoid unnecessary trimming of the original timber. Repair is to follow any existing deformations in the line of the window.
- Pieced-in repairs are to be formed using timber to match existing. The quality and grain must match the original. The moisture content must match the original.
- Where access is possible, screw or pin fixings through from the inner face of the window to secure splice repairs and glue joint.

Indent Sill in situ

- Remove minimum amount of timber to form an effective repair. Ensure an effective bond between the new and existing sections of timber.
- Cut back to behind the line of drip groove in bottom rail of sash. Where access is possible, glue and screw fix from inner face using brass screws. Work new material to line of existing and avoid unnecessary trimming of the original timber. Repair is to follow any existing deformations in the line of the window.
- The quality and grain must match the original. The moisture content must match the original. Prime and undercoat before regluing.
- Introduce a stainless-steel water bar if slot in stone exists.
- Form rebate along outer bottom edge and point in approved lime mortar or polyurethane sealant to repair existing sealant beneath window sill.

Fill Small Areas

- To localised pockets of decay where structural integrity of window remains sound.

- Scrape out defective areas. Treat sound timber with timber preservative. Ensure that timber preservative is compatible with paint as specified in Section 0671 Painting. Allow preservative to dry out. Prime the decayed area and build up with a filler of epoxy resin mixed with sawdust of that timber species. Follow line of timber and any deformations.

2.7.2 REPLACE MEMBER

Method

- Remove decayed timber to form a splice repair. Remove the minimum amount of existing timber to form an effective repair. Ensure an effective bond between the new and existing sections of timber.
- Work new material to line of existing and avoid unnecessary trimming of the original timber. Repair is to follow any existing deformations in the line of the window.
- Pieced-in repairs are to be formed using timber to match existing. The quality and grain must match the original. The moisture content must match the original.
- Where access is possible, screw or pin fixings through from the inner face of the window to secure splice repairs and glue joint.

2.7.3 REPAIR JOINT

Scope

- Loose timber joints

Reglue Loose Joints

- Carefully remove the loose wedges and pull the joints together.
- Apply glue to the shoulders of the tenon. Work glue down to base of tenon with a hacksaw blade or piece of plastic card. Apply glue to the voids left by removal of wedges from mortice. Pull joint together and re-wedge.

Strengthening of Joints

- Form recess in edge of stile and rail to fit 20mm wide, 125mm x 125mm, 2mm thick grade 316 stainless steel angle bracket. Cut bracket to shape at corner to match shape of rail. Prime before fitting bracket. Use brass or grade 316 stainless steel screws to fix bracket to stile and rail, hidden from view.

2.7.4 REPAIR HARDWARE COMPONENT

Method

- Ensure style and finish is consistent with Heritage Consultant's advice in CMP documentation.
- Repair hardware in situ where practical, remove and repair if not. Where hardware is missing, inconsistent style or irreparably damaged, replace unit.

2.7.5 ACOUSTIC RECAULKING

Method

- Install new mastic bead between sandstone and timber externally (refer Acoustic specification). Test for asbestos prior to removal.

2.7.6 ACOUSTIC REGLAZING

Scope

- Reglazing works are to be undertaken to Education building external windows and doors using glass makeups as indicated in the Acoustic Report (Education) and Acoustic Report by Wood & Grieve. Where windows/doors do not require acoustic reglazing allow for reglazing with a minimum makeup of 10.38 laminated heat strengthened glass. This applied only to the lower ground floor circulation hallway.

Removal of Putty

- Replace glazing putty which is loose, missing or has become hard and friable.
- Remove glazing putty carefully by hand. Putty that cannot be removed by hand is to be softened by:
 - Organic solvent paint stripper; or
 - Mix of 1-part potassium carbonate to 3 parts quick lime ratio by weight.
- Take extreme care not to damage glazing or frame. Numerous applications may be required to soften putty adequately.

Removal of glass

- Remove glass panes without breakage wherever possible and stack for removal from site and recycling.

Preparation of sash frames and external joinery

- Lightly sand and apply primer all visible external surfaces on sashes, all exposed timber within glazing reveal and external sill.
- DO NOT prime any internal timber surfaces.

Reglazing Roof Lanterns (Education)

- Below is the glass-only performance for 6mm lowE#2 + 12mm Argon with stainless steel spacer + 8.76mm clear as stated below in Table 2.6.7.1

Glass Types	Visible Light (%)			U-value, (W/m².K)		Solar Heat Gain Coefficient,SHGC
	Trans. (min)	Reflectance (max)		Winter	Summer	
		External	Internal			
DGU	60	10	10	1.41	1.34	0.35

Table 2.6.7.1 – Window Performance Specification

2.7.7 VISUAL REPAIRS

Scope

- For description of visual repairs, Refer to Heritage consultant's report entitled "Appendix 4 - SCW Issue E Lands Department Building" for Architectural scope of joinery repair works.
- All internal and external shall be in accordance with Section 0671- Painting of this Specification.

2.8 PROTECTION

- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

0453 DOORS AND ACCESS PANELS

1 BRONZE DOORS

1.1 GENERAL

1.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

1.1.2 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0424 Roofing – Seamed Sheet Metal.
- Refer Section 0671 Painting.

1.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
ASTM B62 - 17	Standard Specification for Composition Bronze or Ounce Metal Castings

No.	Title
JIS H 3110	Phosphor Bronze and Nickel Silver Sheets, Plates and Strips

*Use Standards which are the editions, with amendments, current at the time of the works.

1.1.4 SCOPE OF WORKS

Carry out works to the bronze doors and associated grillwork in the following order:

- Cleaning of dirt/grime and graffiti removal
- Treatment of active corrosion
- Re-patination
- Wax application

1.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.

1.3 SKILLED PERSONNEL

- Work to be carried out by specialist metal or objects conservator with at least 3 years demonstrable experience in cleaning of bronze features with the method(s) proposed.

1.4 SUBMISSIONS

1.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

1.4.2 SAMPLES

- Carry out sample cleaning works on one section of one door leaf. 1000x1000mm section to be cleaned around door handles.
- Notify the Superintendent in advance of the date on which sample works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All

subsequent work shall be carried out to a standard equal to or better than the approved samples.

1.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0453 - Clause 1.5.

1.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4.
- Submit at least 2 weeks prior to commencing work on site.

1.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0453 – Clause 1.4.2 above.

1.6 MATERIALS

- Submit technical data and materials safety data sheets for all materials proposed to be used for approval by the Superintendent prior to commencement of any trials on the building.

1.6.1 DIRT REMOVAL

- Use Triton X100 or equivalent conservation grade surfactant.
- Do not use acids or other chemical dirt removal products.

1.6.2 GRAFFITI REMOVAL

- Use appropriate solvent as determined by conservator or metals specialist for removal of graffiti.

1.6.3 CORROSION TREATMENT

- Use appropriate reagents as determined by conservator or metals specialist for treatment of corrosion identified.

1.6.4 REPATINATION

- Use appropriate materials as determined by patination specialist or conservator for treatment of bronze doors.

1.6.5 WAX APPLICATION

- Use high temperature microcrystalline wax 'Dusack Campbell 2095' or equivalent.

1.7 METHODS

1.7.1 DIRT REMOVAL

- Wash both sides of doors and adjacent bronze features with water and non-metallic soft bristle brush to remove all dirt and grime (including in crevices and deep-set features).
- If all dirt is not removed, wash with a dilute solution (1%-2%) of a non-ionic pH neutral surfactant (i.e. detergent) in water. Rinse repeatedly with clean water to remove all detergent residues.
- Allow to completely air dry.

1.7.2 GRAFFITI REMOVAL

- Carry out solubility test on graffiti to determine appropriate solvent for removal that does not stain or damage bronze material or finish.
- Carry out graffiti removal in conjunction with dirt removal (section **Error! Reference source not found.**)

1.7.3 CORROSION TREATMENT

- If active corrosion is noted, treat locally.

1.7.4 REPATINATION

- Re-patination techniques are to be guided by the Heritage requirements for the overall appearance of the doors (i.e. colour, tone, pattern, finish).
- Once end desired end appearance is known, consult patination specialist and/or materials conservator to ascertain specific requirements for treatment.

1.7.5 WAX APPLICATION

- Heat surface of metal using blowtorch to a temperature greater than 100 degrees Celsius to drive off all water.
- Brush wax evenly onto heated metal surface ensuring wax gets into all crevices and deep-set features. Allow wax to cool.
- Buff using soft cloths and brushes to desired appearance. Final appearance to be determined by Heritage Consultant.
- Inspect to ensure wax has even coverage and has been applied and buffed in all crevices and deep-set features.

1.8 PROTECTION

- Monitor doors during heating of bronze for waxing. Stop work if any evidence of damage detected.
- Provide protection to building materials directly adjacent to the doors.
- Provide protection to surrounding trachyte and sandstone.
- Provide protection to other surrounding existing finishes from damage.
- Pay costs of repairs to areas damaged during the works as directed by the Client's Superintendent.

1.8.1 EXTERNAL

- Ensure overhead protection is in place during all external works.
- Make good external finishes prior to completion of works to each location.

1.8.2 INTERNAL

- Provide protection against water penetration or dust causing damage to internal fit out.

0463 GLASS BLOCKWORK

1 GLASS BLOCK PAVEMENT LIGHTS

1.1 GENERAL

1.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

1.1.2 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0671 Painting.
- Refer Section 0821 Stormwater – Buildings.

1.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS/NZ 4586-2004	Slip Resistance Classification of New Pedestrian Surface Materials
AS 3740-1994	Waterproofing of Wet Areas Within Residential Buildings

*Use Standards which are the editions, with amendments, current at the time of the works.

1.1.4 SCOPE OF WORKS

Carry out works to the glass block pavement lights in the following order:

- Subcontractor to review quantity of glass blocks to be replaced, taking care to retain as much original fabric as reasonably possible in consultation with the Heritage Consultant
- Broken glass blocks as approved by the Heritage Consultant to be removed.
- New approved glass blocks to be installed.
- Joints to be adequately waterproofed after installation complete.

1.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.

1.3 SKILLED PERSONNEL

- Work to be carried out by specialist glass block contractor with at least 5 years demonstrable experience in repairing glass block pavement lights with the method(s) proposed.
- We have been informed that Obeco typically services Sydney's heritage pavement lights.

1.4 SUBMISSIONS

1.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

1.4.2 SAMPLES

- Prototypes are carried out in place of samples, refer to Section 0463 – Clause 1.5 below.

1.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0463 - Clause 1.5.

1.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4.
- Submit at least 2 weeks prior to commencing work on site.

1.5 PROTOTYPES

- As a prototype, a single glass block is to be provided to the superintendent for review.
- Notify the Superintendent in advance of the date on which prototypes works will be executed and completed. Arrange for inspection by the Superintendent prior to continuing with the works. Sample works to be repeated until the Superintendent is satisfied that the manner of execution is in accordance with required standards. All subsequent work shall be carried out to a standard equal to or better than the approved prototypes.

1.6 MATERIALS

- Submit technical data and materials safety data sheets for all materials proposed to be used for approval by the Superintendent prior to commencement of any trials on the building.

1.7 METHODS

1.7.1 REMOVAL

- Damaged glass blocks are to be removed by a specialist contractor in consultation with the Heritage Consultant.
- Care to be taken not to damage cast iron grill or other adjacent intact glass blocks.
- Sealant / mortar to be removed and substrate cleaned.

1.7.2 INSTALLATION

- Glass blocks to be installed by experienced contractor.
- Hammering of glass blocks into place must not damage cast iron grilles or adjacent glass blocks.
- Sealant to be proposed by manufacturer of proprietary glass blocks and approved by the Heritage Consultant prior to works being carried out.

1.7.3 MAINTENANCE

- Glass block panels need little maintenance. They should be washed occasionally with soapy water and then rinsed off.
- Solvents or abrasive solutions should not be used.

- Do not use harsh cleaners, acids or abrasives.

1.8 PROTECTION

- Take care when removing glass blocks not to damage the cast iron grids.
- Provide protection to building materials directly adjacent to the pavement lights.
- Provide protection to surrounding sandstone and pavement.
- Provide protection to other surrounding existing finishes from damage.
- Pay costs of repairs to areas damaged during the works as directed by the Client's Superintendent.

1.8.1 EXTERNAL

- Ensure overhead protection is in place during all external works.
- Make good external finishes prior to completion of works to each location.

1.8.2 INTERNAL

- Provide protection against water penetration or dust causing damage to internal fit out.

0671 PAINTING

1 PAINTING

1.1 GENERAL

1.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- It is the Contractors' responsibility to carry out all works in accordance with all relevant standards as listed by not limited to what is included in this document.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

1.1.2 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- 0171 General Requirements
- 0192 Structural Components
- 0332 Sandstone Masonry.
- 0333 Stone Repair.
- 0335 Brick Construction
- 0411 Waterproofing – External and Tanking
- 0423 Roofing – Profiled Sheet Metal
- 0424 Roofing – Seamed Sheet Metal
- 0451 Windows and Glazed Doors
- 0453 Doors and Access Panels
- 0821 Stormwater – Buildings

1.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS 1580	Paints and Related Materials - Methods of Test
AS 1627	Metal Finishing - Preparation And Pre-Treatment of Surfaces - Method Selection Guide
AS/NZS 2311	Guide to The Painting of Buildings
AS/NZS 2312	Guide to The Protection of Structural Steel Against Atmospheric Corrosion by The Use of Protective Coatings
AS/NZS 3750	Paints for Steel Structures
AS 4361.2	Guide to Lead Paint Management - Residential and Commercial Buildings

*Use Standards which are the editions, with amendments, current at the time of the works.

1.1.4 SCOPE OF WORKS

- Coating trials
- Substrate repairs
- Surface preparation
- Paint all concrete, render and masonry surfaces with a high-build protective coating.

1.2 LOCATION OF WORKS

- Masonry Series:
 - Refer to TEE900 Drawing Series.
 - Refer to TPE900 Drawing Series.
- Roofing and Metalwork Series:
 - Refer to TEE700 Drawing Series.
 - Refer to TPE700 Drawing Series.
- Windows Series:
 - Refer to TEE800 Drawing Series.
 - Refer to TPE800 Drawing Series.

1.3 SKILLED PERSONNEL

- The Contractor's Project Manager is to oversee all works and provide expertise and direction as required. The nominated Project Manager shall have at least 10 years relevant experience in managing such works.
- All works are to be undertaken by skilled tradespersons who have relevant training, demonstrable skills and proven experience in the application of protective coating systems and the work methods required.
- The nominated site foreman or supervisor shall have at least 10 years demonstrable experience in the supervision of such works.

Provide evidence of this experience, including relevant project examples. Work to be performed only by skilled and qualified painters, employed by a firm with at least 5 years' experience in conservation and restoration works on heritage buildings.

1.4 SUBMISSIONS

1.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

1.4.2 SAMPLES

- As a sample, a 2mx2m section is to be painted as specified for each variation in colour / texture / substrate as required by the architect. This is to include but not limited to:
 - Submitting product data and certifications for all coating systems prior to on site sampling. Submit A4 sized samples of all colours for approval by the Architect and Heritage Consultant.
 - Surface preparation
 - Preparation of cracks to ensure the crack bridging capability of the coating
 - Application of protective/paint coating.

1.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0671 - Clause 1.5

1.4.4 INSPECTION AND TEST PLAN

- The Contractor shall prepare an Inspection and Test Plan (ITP) for all works to be carried out in accordance with this Specification.
- The stages for inspection will be agreed with the Engineer prior to commencing works and may be modified at any time at the Engineer's discretion.
- The ITP shall include hold points and identify frequency of inspections required for approval and sign-off on completion.
- Critical inspection points shall include but not be limited to:
 - Prototypes
 - Preparation of substrates
 - Application.
- The Contractor shall perform sufficient inspection of materials, processes and completed items to assure compliance with the Specification.
- The Contractor shall carry out sufficient testing to ensure that all the materials and workmanship comply with the performance criteria and minimum requirements of the Specification.
- At the discretion of the Engineer, the Engineer may witness any or all testing whether carried out on site, at the place of manufacture, or at an approved laboratory.
- Only after inspection and approval by the Engineer shall the Contractor proceed with the next stage. The Engineer's inspection in no way limits or alters the Contractor's obligations under the Contract.

1.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0671 – Clause 1.4.2 above.

1.6 MATERIALS

- The following paint specifications are for tender purposes only, subject to paint manufacturers inspection of substrates.
- The material properties stipulated below relate to Dulux specifications however a certified equivalent would also be deemed suitable for the works if required.
- A written certification from equivalent paint manufacturer will be required prior works being carried out.
- Items and dry film thickness' have been taken directly from applicable Dulux specifications, found in the appendices of this specification.

1.6.1 STEEL WINDOWS (WORKSHOP APPLIED 15 YEAR WARRANTY):

Layer	Item	Dry Film Thickness (DFT) (µm)
Surface Preparation:	Refer –Appendix Specification Document No. NSW-180078 /A	N/A
1ST Coat:	ZINCANODE 402	MINIMUM: 75µm MAXIMUM: 90µm
2nd Coat:	DUREMAX GPE	200µm
3rd Coat:	WEATHERMAX HBR	MINIMUM: 75µm MAXIMUM: 125µm
4th Coat:	NONE	N/A

- Refer to Appendix Specification Document No. NSW-180078 /A

1.6.2 STEEL WINDOWS (IN-SITU APPLIED 7 YEAR WARRANTY):

Layer	Item	Dry Film Thickness (DFT) (µm)
Surface Preparation:	Refer –Appendix Specification Document No. NSW-180078 /B	N/A
1ST Coat:	DUREBILD STE	MINIMUM: 125µm MAXIMUM: 200µm
2nd Coat:	DUREBILD STE	MINIMUM: 125µm MAXIMUM: 200µm
3rd Coat:	WEATHERMAX HBR	MINIMUM: 75µm MAXIMUM: 125µm
4th Coat:	NONE	N/A

- Refer to Appendix Specification Document No. NSW-180078 /B

1.6.3 GRILL AND OTHER METAL SURFACES (WORKSHOP APPLIED 15 YEAR WARRANTY AT BELFRY):

Layer	Item	Dry Film Thickness (DFT) (µm)
Surface Preparation:	Refer –Appendix Specification Document No. NSW-180078 /C	N/A
1ST Coat:	ZINCANODE 402	MINIMUM: 75µm MAXIMUM: 90µm
2nd Coat:	DUREMAX GPE	200µm
3rd Coat:	WEATHERMAX HBR	MINIMUM: 75µm MAXIMUM: 125µm
4th Coat:	NONE	N/A

- Refer to Appendix Specification Document No. NSW-180078 /C

1.6.4 GRILL AND OTHER METAL SURFACES (IN-SITU APPLIED 7 YEAR WARRANTY):

Layer	Item	Dry Film Thickness (DFT) (µm)
Surface Preparation:	Refer –Appendix Specification Document No. NSW-180078 /D	N/A
1ST Coat:	DUREBILD STE	MINIMUM: 125µm MAXIMUM: 200µm
2nd Coat:	DUREBILD STE	MINIMUM: 125µm MAXIMUM: 200µm
3rd Coat:	WEATHERMAX HBR	MINIMUM: 75µm MAXIMUM: 125µm
4th Coat:	NONE	N/A

- Refer to Appendix Specification Document No. NSW-180078 /D

1.6.5 CAST IRON GUTTERS, CRESTING AND OTHER CAST IRON SURFACES (IN-SITU APPLIED 7 YEAR WARRANTY):

Layer	Item	Dry Film Thickness (DFT) (µm)
Surface Preparation:	Refer –Appendix Specification Document No. NSW-180078 /E	N/A
1ST Coat:	DUREBILD STE	MINIMUM: 125µm MAXIMUM: 200µm
2nd Coat:	DUREBILD STE	MINIMUM: 125µm MAXIMUM: 200µm
3rd Coat:	WEATHERMAX HBR	MINIMUM: 75µm MAXIMUM: 125µm
4th Coat:	NONE	N/A

- Refer to Appendix Specification Document No. NSW-180078 /E

1.6.6 PAINTED RENDERED WALLS IN AVERAGE TO EXCELLENT CONDITION:

Layer	Item	Dry Film Thickness (DFT) (µm)
Surface Preparation:	Refer –Appendix Specification Document No. AU_SA10324	N/A
1ST Coat:	Dulux AcraTex Acraprime Solvent Based Clear	MINIMUM: 10µm MAXIMUM: 20µm
2nd Coat:	Dulux AcraTex 968 AcraSkin Low Gloss	MINIMUM: 165µm MAXIMUM: 250µm
3rd Coat:	Dulux AcraTex 968 AcraSkin Low Gloss	MINIMUM: 165µm MAXIMUM: 250µm
4th Coat:	Dulux AcraTex 968 AcraSkin Low Gloss	MINIMUM: 125µm MAXIMUM: 250µm

- Refer to Appendix Specification Document No. AU_SA10324

1.6.7 RENDERED WALLS REQUIRING HIGH LEVEL OF REPAIR AND PATCHING:

Layer	Item	Dry Film Thickness (DFT) (µm)
Surface Preparation:	Refer –Appendix Specification Document No. AU_SA10449	N/A
1ST Coat:	Dulux AcraTex Green Render Sealer	MINIMUM: 43.75µm MAXIMUM: 43.75µm
2nd Coat:	Dulux AcraTex 968 AcraSkin Low Gloss	MINIMUM: 165µm MAXIMUM: 250µm
3rd Coat:	Dulux AcraTex 968 AcraSkin Low Gloss	MINIMUM: 165µm MAXIMUM: 250µm
4th Coat:	Dulux AcraTex 968 AcraSkin Low Gloss	MINIMUM: 125µm MAXIMUM: 250µm

- Refer to Appendix Specification Document No. AU_SA10449

1.6.8 RENDERED WALLS REQUIRING SOME REPAIR AND PATCHING:

Layer	Item	Dry Film Thickness (DFT) (µm)
Surface Preparation:	Refer –Appendix Specification Document No. AU_SA09531	N/A
1ST Coat:	Dulux AcraTex Acraprime Solvent Based Clear	MINIMUM: 10µm MAXIMUM: 20µm
Intermediate:	Dulux AcraTex Acrapatch High Build High Build Course	MINIMUM: 2000µm MAXIMUM: 4075µm
2nd Coat:	Dulux AcraTex 968 AcraSkin Low Gloss	MINIMUM: 125µm MAXIMUM: 250µm
3rd Coat:	Dulux AcraTex 968 AcraSkin Low Gloss	MINIMUM: 165µm MAXIMUM: 250µm

- Refer to Appendix Specification Document No. AU_SA09531

1.6.9 RENDERED WALLS REQUIRING SOME REPAIR AND PATCHING:

Layer	Item	Dry Film Thickness (DFT) (µm)
Surface Preparation:	Refer –Appendix Specification Document No. AU_SC11804	N/A
1ST Coat:	Dulux Acrathane IF Clear Low Sheen	MINIMUM: 50µm MAXIMUM: 70µm
2nd Coat:	Dulux Acrathane IF Clear Low Sheen	MINIMUM: 50µm MAXIMUM: 70µm

- Refer to Appendix Specification Document No. AU_SC11804

1.6.10 PAINTED WINDOWS REQUIRING FULL STRIPPING AND PREPARED AS BARE TIMBER ON SITE:

Layer	Item	Dry Film Thickness (DFT) (µm)
Surface Preparation:	Refer –Appendix Specification Document No. AU_SD13620	N/A
Prep Coat:	Dumond Smart Strip 1 HD Red	N/A
1ST Coat:	Dulux Precision Advanced Stain and Odour Blocker	MINIMUM: 34µm MAXIMUM: 54µm
2nd Coat:	Dulux Precision Advanced Stain and Odour Blocker	MINIMUM: 34µm MAXIMUM: 54µm
3rd Coat:	Dulux Aquanamel Gloss	MINIMUM: 19µm MAXIMUM: 19µm
4th Coat:	Dulux Aquanamel Gloss	MINIMUM: 19µm MAXIMUM: 19µm

- Refer to Appendix Specification Document No. AU_SD13620

1.6.11 PAINTED WINDOWS WHERE ADHESION OF EXISTING COATINGS ARE SOUND:

Layer	Item	Dry Film Thickness (DFT) (µm)
Surface Preparation:	Refer –Appendix Specification Document No. AU_SD12068	N/A
Spot Primer:	Dulux Prepcoat 1 Step Oil Primer Sealer Undercoat	MINIMUM: 40µm MAXIMUM: 40µm
1ST Coat:	Dulux Precision High Opacity Stain Blocker	MINIMUM: 60.5µm MAXIMUM: 40µm
2nd Coat:	Dulux Aquanamel Gloss	MINIMUM: 19µm MAXIMUM: 19µm
3rd Coat:	Dulux Aquanamel Gloss	MINIMUM: 19µm MAXIMUM: 19µm

- Refer to Appendix Specification Document No. AU_SD12068

1.6.12 NEW TIMBER WINDOWS (IF PRE-PRIMED, ADHESION TEST REQUIRED):

Layer	Item	Dry Film Thickness (DFT) (µm)
Surface Preparation:	Refer –Appendix Specification Document No. AU_SD13167	N/A
1ST Coat:	Dulux Prepcoat 1 Step Oil Primer Sealer Undercoat	MINIMUM: 40µm MAXIMUM: 40µm
2nd Coat:	Dulux Prepcoat 1 Step Oil Primer Sealer Undercoat	MINIMUM: 40µm MAXIMUM: 40µm
3rd Coat:	Dulux Aquanamel Gloss	MINIMUM: 19µm MAXIMUM: 19µm
4th Coat:	Dulux Aquanamel Gloss	MINIMUM: 19µm MAXIMUM: 19µm

- Refer to Appendix Specification Document AU_SD13167

1.7 METHOD

1.7.1 PREPARATION

Order of work

- Before painting, complete the work of other trades as far as practicable within the area to be painted, except for installation of fittings.

Protection

- Fixtures: Remove door furniture, switch plates, light fittings and other fixtures before starting to paint, and refix in position undamaged on completion of the installation.
- Adjacent surfaces: Protect adjacent finished surfaces liable to damage from painting operations.

'Wet paint' warning

- Place notices conspicuously and do not remove them until paint is dry.

Restoration

- Clean off marks, paint spots and stains progressively and restore damaged surfaces to their original condition. Touch up damaged decorative paintwork or misses only with the paint batch used in the original application.

Substrate preparation

- General: Prepare substrates to receive the painting systems.
- Cleaning: Clean down the substrate surface. Do not cause undue damage to the substrate or damage to, or contamination of, the surroundings.
- Filling: Fill cracks and holes with fillers, sealants, putties or grouting cements as appropriate for the finishing system and substrate, and sand smooth.

Existing lead paint

- The Asbestos and Hazardous Materials Survey Report by Noel Arnold and Associates dated August 2011 identified potential lead-containing paints throughout the interior of the Lands Clocktower.
- Subject to assessment of the condition of adhesion to the substrate [after installation of an access system], existing lead paint shall be stabilised in accordance with the requirements of Cl3.3 of AS4361.2

1.7.2 PAINTING

Generally

- Assessment of the condition of the existing coatings and their adhesion to the substrates, surface preparation [including cleaning/degreasing, removal of existing corrosion products and abrasion of existing coatings], spot priming, coating application methods, and dry film thickness are to be in accordance with the manufacturer's specifications for the particular conditions.

Light levels

- During preparation of surfaces, painting, and inspection, maintain light levels such that the luminance (photometric brightness) of the surface is equal to the specified permanent artificial illumination conditions or 400 lux, whichever is the greater.

Substrate moisture

- Use a moisture meter to demonstrate that the moisture content of the substrate is at or below the specified maximum level for the type of paint and the substrate material.

Paint application

- Apply the first coat immediately after substrate preparation and before contamination of the substrate can occur. Apply subsequent coats after the manufacturer's specified drying period has elapsed.

Priming before fixing

- Apply one coat of wood primer (2 coats to end grain) to the hidden surfaces of new and existing external timber components before fixing in position.

Sanding

- Sand the sealer using the finest possible abrasive and avoid cutting through the colour. Take special care with round surfaces and edges.

Tinting

- Tint each coat of an opaque coating system so that each has a noticeably different tint from the preceding coat, except for top coats in systems with more than one top coat.

PAINT COLOURS

- To be nominated by the Architect and Heritage Consultant and confirmed by the Superintendent.

COMPLETION

- Leave all adjacent surfaces clean on completion of work.

1.8 PROTECTION

- All finishes and protection in fulfilment of paint manufacturers specifications.
- Refer to Dulux Appendix Specification inclusive for respective warranties.
- All appropriate protection is to be provided by the contractor as required by law and reasonable consideration.

0821 STORMWATER – BUILDINGS

1 COPPER GUTTERING AND ELEMENTS

1.1 GENERAL

1.1.1 RESPONSIBILITIES

- It is the responsibility of the contractor to ensure all work is carried out in accordance with all relevant standards as listed by but not limited to what is included in this document.
- The contractor to ensure all work is carried out in a safe manner, as documented in this specification, in all referenced documents and proprietary product Manufacturers Specification.
- It is the Contractors' responsibility to carry out all works in accordance with all relevant standards as listed by not limited to what is included in this document.
- All works affecting architectural features require approval from the Heritage Consultant Prior to works being carried out. It is the responsibility of the contractor to seek approval for these items.
- In accordance with the Conservation Management Plans for the Lands and Education Buildings; all proposed alterations to the building require drawn details of work to be carried out, which is to be provided to and approved by the Heritage Consultant.

1.1.2 CROSS REFERENCES

This section is to be read in conjunction with the following sections:

- Refer Section 0171 General Requirements.
- Refer Section 0192 Structural Components.
- Refer Section 0332 Sandstone Masonry.
- Refer Section 0333 Stone Repair.
- Refer Section 0335 Brick Construction.
- Refer Section 0423 Roofing – Profiled Sheet Metal.
- Refer Section 0453 Doors and Access Panels.
- Refer Section 0671 Painting.
- Refer Section 0821 Stormwater - Buildings.

1.1.3 STANDARDS

This Specification refers but is not limited to the following National and International Standards:

No.	Title
NCC 2016	National Construction Code Volume 1
AS3500	National Plumbing and Drainage Code
AS 1566-1997	Copper and Copper Alloys - Rolled Flat Products
AS 2738	Copper and Copper Alloys - Compositions and Designations of Refinery Products, Wrought Products, Ingots and Castings
AS 1562.1:2018	Design and Installation of Sheet Roof and Wall Cladding Metal
DIN EN 10002-1	Metallic Materials. Tensile Testing
BS EN 1172	Strips and Sheets for The Building Industry
BS EN 1652	Plates, Sheets, Strips and Discs for General Purposes
ASTM-B-152 ASME-SB-152	Copper Sheet, Strip, Plate and Rolled Bar
ASTM-B-370	Copper Sheet and Strip for Building Construction
IIS H 3100	Copper and Copper Alloys Sheets, Plates and Strips

*Use Standards which are the editions, with amendments, current at the time of the works.

1.1.4 SCOPE OF WORKS

Carry out works to the copper guttering and associated elements (including brackets and downpipes) in the following order:

- Inspect for damage, leaks and consistent fall
- Repairs including replacement of sections
- Realignment to fall

1.2 LOCATION OF WORKS

- Roofing and Metalwork Series:
 - Refer to TEE700 Drawing Series.
 - Refer to TPE700 Drawing Series.

1.3 SKILLED PERSONNEL

- Work to be carried out by specialist conservation roof plumbers with at least 5 years demonstrable experience in repair of copper roof plumbing.

1.4 SUBMISSIONS

1.4.1 SAFE WORK METHOD STATEMENT

- Submit for approval a work procedure in step or point format. Use written style incorporating diagrams or sketches suitable for use on site. This work procedure should form the basis of the safe work method statement.
- Submit at least four weeks prior to commencing work on site.

1.4.2 SAMPLES

- Provide samples of 600x600mm patinated copper sheet to demonstrate achievable patination of new copper used where replacement material is required.
- Carry out a minimum of 5ln.m sample repair works on representative discrete sections of copper guttering which demonstrate all proposed repair methods and materials.

1.4.3 PROTOTYPES

- Carry out and arrange inspection of prototypes in accordance with Section 0821 - Clause 1.5.

1.4.4 INSPECTION AND TEST PLAN

- Submit for approval inspection and test plan in accordance with Section 0171 - Clause 1.4.4.
- Submit at least 2 weeks prior to commencing work on site.

1.5 PROTOTYPES

- Samples are carried out in place of prototypes, refer to Section 0821 – Clause 1.4.2 above.

1.6 MATERIALS

- Submit technical data and materials safety data sheets for all materials proposed to be used for approval by the Superintendent prior to commencement of prototypes.

1.6.1 COPPER SHEET

- Use new copper sheet to match existing material in thickness and temper.

- Patinate sections of new copper sheet to generally match patina of surrounding existing copper elements.

1.6.2 FIXINGS

- Use brass screws rated for external use by supplier.

1.7 METHODS

1.7.1 INSPECTION OF GUTTERING

- Inspect all guttering for evidence of damage requiring repair, and mark up with chalk or other removable marking system.
- Temporarily block all downpipes, and fill guttering with clean water. Inspect surrounding surfaces after one hour and four hours. If no leaks are evident, leave water in place overnight and inspect after twenty-four hours. Mark up and record locations and sources of leaks for repair. Establish scope of repair.
- Remove temporary block to downpipes and allow water to drain. Immediately inspect run of gutters to identify areas where water ponds and does not drain. Establish extent of adjustment required, and confirm that this is feasible without removal and replacement of guttering.
- Hold point: completion of inspection and scheduling of repairs

1.7.2 REPAIR

Identify locations of:

- Damage
- Corrosion
- Failure of joints or connections
- Missing elements or fixings
- Bent or distorted profiles

Propose appropriate repairs in each instance, taking into account that the copper guttering is a heritage item and should retain evidence of normal wear and tear.

1.7.3 REPLACEMENT

- Replacement of sections of copper guttering should only be undertaken where the extent of damage or corrosion is such that repairs are extensive, and unlikely to perform adequately for a period of 15-25 years.
- All replacement work to be carried out to match the section of copper guttering being replaced in profile and technique. All work should be in accordance with traditional

trade methods and quality, as well as meeting relevant Australian Standards and NCC requirements.

1.7.4 REALIGNMENT TO FALL

- Provide temporary marking line for required realignment to fall.
- Temporarily support gutter sections to be realigned.
- Carefully remove brackets and reinstall in required alignment.
- Lower gutter into new alignment, easing any joints or other sections that need to move or deform. Where heat is used, ensure no damage to surrounding finishes occurs.

1.8 PROTECTION

- Provide protection to surrounding existing finishes from damage during works.
- Pay costs of repairs to areas damaged in the course of the works as directed by the Client's Superintendent.

1.8.1 EXTERNAL

- Ensure overhead protection is in place during all external works.
- Make good external finishes prior to completion of works to each location.

1.8.2 INTERNAL

- Provide protection against water penetration or dust causing damage to internal fit out.

2000 APENDICES – DULUX PAINT SPECIFICATIONS

Dulux Acrathane IF Clear Low Sheen on Painted Cement Render [Exterior]

AU_SC11804

Substrate And Substrate Preparation	
Substrate Notes:	CEMENT RENDER / PRE MIXED RENDER CEMENT RENDER Cement Render is a substrate produced by mixing sand and cement that is applied to a surface, usually block-work and brick. Subsequently finished by screeding, floating or sponging to give an even finish. PREMIXED RENDERS Premixed renders are stringently formulated based wall renders that are polymer modified. They are supplied in a dry powder form usually 20kg bags which only require the addition of water to produce a mortar paste that exhibits minimal drying shrinkage and good adhesion to clean masonry substrates. NOTE: Both cement render and premixed renders will produce fine cracks during the drying period. These cracks will open and close as weather conditions change. Renders require a minimum 28 days curing at 25°C & 50% relative humidity before coating.
Substrate Preparation Notes:	PCE007 - NEW CEMENT RENDER / PRE MIXED RENDER ASSESS SUITABILITY Inspect to determine the degree of deterioration of existing coatings. Check coating adhesion using the cross-hatch test.as per AS 1580.408.4-1993 : Paints and related materials - Methods of test - Adhesion (cross-cut) CLEAN SURFACE Clean to remove all dirt, dust, efflorescence, laitance, powdery surfaces and all other surface contaminants by using a suitable cleaning agent and rinsing / water blasting clean with water. 1500 2500 PSI water blast Treat mould with an appropriate mould treatment after the substrate has been pressure washed, leave for 24hours prior to coating. Efflorescence should be wire brushed clean. REPAIR SURFACE IMPERFECTIONS Prepare all areas that have poor adhesion, cracking, peeling and flaking by sanding, power sanding, scraping, wire brushing or grit blast to leave a clean surface. as appropriate. Feather edges of the surrounding sound paint to completely remove visual ridges and wash / dust off to remove debris. Any major design faults leading to structural failure of the plaster coating must be corrected prior to repainting. For cracked plaster which is sound but has cracks > 1mm rake out and fill with Sikadur 31 a two pot epoxy filler which is applied into the crack with a spatula and finish flush with the sound surface, once cured a coat of suitable cement based render can be applied over the repaired area and feather edged on to the existing coating. SANDING Sand the entire cleaned substrate to an even flat gloss level to provide a smooth, even surface and to provide a good key for the new coating system to adhere to. PRIME Prime any bare areas with a suitable deep penetrating primer

Coating System			
Coat Type:	1st Coat	Datasheet:	AU_DC02082 Dulux Acrathane IF Clear Low Sheen
Application Methods:	   Air Spray Airless Spray Brush		
Product Code	PC218	Thinner	Brush - Duthin 040 (965-42166), Spray - Urethane Thinner (965-63023)
Colour	Clear colourless	Coverage	7.2
Volume Solids	43		
		Min	Max
Theoretical Spread Rate *		8.7	6.1
Wet Film Per Coat (microns)		115	165
Dry Film Per Coat (microns)		50	70
Recoat Time **		8 Hours	INDEFINITE
Coating Application Details:	Conventional, Airless or Air Assisted Spray		

Coat Type:	2nd Coat	Datasheet:	AU_DC02082 Dulux Acrathane IF Clear Low Sheen
Application Methods:	   Air Spray Airless Spray Brush		
Product Code	PC218	Thinner	Brush - Duthin 040 (965-42166), Spray - Urethane Thinner (965-63023)
Colour	Clear colourless	Coverage	7.2
Volume Solids	43		
		Min	Max
Theoretical Spread Rate *		8.7	6.1
Wet Film Per Coat (microns)		115	165
Dry Film Per Coat (microns)		50	70
Recoat Time **		8 Hours	INDEFINITE
Coating Application Details:	Conventional, Airless or Air Assisted Spray		
Coating System Notes:	* Theoretical Coverage is the area is the area covered by 1 Litre of material at the specifiacion 'Dry Film Thickness' without a loss to a smooth and non porous surface.		

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DuluxGroup (Australia) Pty Ltd 1956 Dandenong Road, Clayton, Victoria 3168 AU ABN 67 000 049 427

Dulux Aquanamel Gloss on Painted Timber [Exterior/Coastal]

AU_SD12068

Description

DULUX Aquanamel Gloss is a waterbased interior/exterior acrylic enamel that dries to a glossy smooth and tough finish. DULUX Aquanamel Gloss can be used in many of the areas that traditional solvent based enamels are used, with all the time saving benefits of an acrylic paint. DULUX Aquanamel Gloss is non-yellowing and resists chipping. DULUX Aquanamel Gloss is highly recommended for doors, architraves, skirting boards, windows, timber trim and walls and is ideal for bathrooms, kitchens and laundries.

DULUX PRECISION High Opacity Stain Blocker is an interior & exterior oil based, fast drying, superior stain blocker for a wide range of water & oil based stains. One coat effectively blocks stains so they will not migrate through subsequent coats of paint. It delivers excellent hiding power over stubborn stains & dark colours and is ideal for blocking tannin. With excellent adhesion properties, it is suitable as a primer, sealer and undercoat.

DULUX Oil Based Primer Sealer Undercoat (new formula) is quick drying an interior/exterior prep coat with excellent hiding and filling properties and good hold-out for enamel topcoats.

Substrate And Substrate Preparation

Substrate Notes:	SUBSTRATE DESCRIPTION NEW TIMBER New timber items should be delivered in a clean dry condition, just prior to installation. The timber should be inspected for physical defects, such as splinters, cracks, woolly grain, machine marks, and knot holes and also for other defects such as sap and tannin stains, and resin exudation from knots. Examine surfaces for wax or preservatives. Moisture content should be close to equilibrium, usually 10-17% for satisfactory staining or coating. Timber should be stored out of the weather before painting. Timber left exposed to the weather for as little as one month prior to painting will suffer from reduced paint adhesion and durability. AGED TIMBER Old timber surfaces should be inspected for dry rot, mould or fungus, excessive water content, grey and weathered timber, grain cracking, resins, stains, old unsound paint, dirt and any surface contamination. These defects should be rectified prior to painting. TANNIN RICH TIMBER Tannins are water-soluble compounds present in some timbers such as meranti, merbau, kwila, western red cedar and tallowwood. These tannins are leached out by water or moisture and can cause staining of surrounding areas. They are seen as dark coloured stains either under or within a coating. Tannin staining is most obvious in light coloured coatings, such as whites. Darker and wood-toned colours hide the tannin stains best. When using light colours on tannin rich timbers, an appropriate primer should be used to seal the tannins in the wood. MANUFACTURED HARDBOARD These products are manufactured as smooth sheets consisting of wood fibres bound with either natural lignin or a small percentage of phenolic resin. Hardboard is widely used as interior panelling but is vulnerable to moisture and therefore not suitable for exterior exposure or in high condensation conditions. Repairing damaged hardboard is not generally practical and it is advisable to completely replace any damaged sections. These products are manufactured from timber fibre bound with thermosetting phenol formaldehyde resin. They contain wax which may inhibit the drying of solvent based alkyd enamels and tannins which may bleed through water based coatings. As manufactured the smooth surfaces provide an ideal surface for finishing but machined edges are more porous and may show fibre raising when primed.
Substrate Preparation Notes:	ASSESS SUITABILITY Ensure the wood is thoroughly clean and dry before commencing. If there is any doubt, measure moisture content which must be between 10-17% before staining or finishing can commence. REMOVE SURFACE CONTAMINANTS Examine the surface for the presence of sap, grease, oil, wax, tannin, building marks, or other contaminants. Scrape off and remove residual contaminants by solvent cleaning. Use scraper to remove dirt and mortar splashes. Any greyed wood fibres on aged timbers need to be removed by sanding and / or suitable chemical wood cleaner. CLEAN Clean to remove all dirt, dust and all other surface contaminants by using a suitable cleaning agent and rinse off with clean water. Treat mould with a suitable mould treatment. REPAIR SURFACE IMPERFECTIONS Fill nail holes, cracks and other defects with a suitable wood filler and allow to dry thoroughly. SANDING Sand dressed timber with fine sandpaper in direction of the grain and along the full length of the board. Round off all sharp edges to a minimum of 2 mm radius in order to achieve an even film build and uniform paint coverage.

Coating System Summary

Spot Primer:	AUDD1698: Dulux Prepcat 1 Step Oil Primer Sealer Undercoat
1st Coat:	AU_DD02065: Dulux Precision High Opacity Stain Blocker
2nd Coat:	AUDD1282: Dulux Aquanamel Gloss
3rd Coat:	AUDD1282: Dulux Aquanamel Gloss
Please refer to the coating system details below	

Coating System			
Coat Type:	Spot Primer	Datasheet:	AUDD1698 Dulux Prepcoat 1 Step Oil Primer Sealer Undercoat
Application Methods:	    Air Spray Airless Spray Brush Roller		
	Theoretical Spread Rate * Wet Film Per Coat (microns) Dry Film Per Coat (microns) Recoat Time **	Min 10 100 40 1 Hour	Max 10 100 40 Indefinite
	Recommended 12 100 40		
Coating Application Details:	Brush, roller, conventional or airless spray. Stir thoroughly before and during use. Brush/Roller: Apply by brush or roller, full even coats direct from the container. If necessary up to 50ml per litre of mineral turpentine may be added to ease application. Airless/Conventional Spray: Suitable for application by all standard spray equipment. If necessary thin up to 100ml per litre of DULUX Spraying Thinner to aid atomisation. Clean brushes and rollers with mineral turpentine prior to and after use.		
Coat Type:	1st Coat	Datasheet:	AU_DD02065 Dulux Precision High Opacity Stain Blocker
Application Methods:	    Air Spray Airless Spray Brush Roller		
	Theoretical Spread Rate * Wet Film Per Coat (microns) Dry Film Per Coat (microns) Recoat Time **	Min 8 125 60.5 90 minutes	Max 12 83 40 indefinite
	Recommended 12 83 40 90 minutes		
Coating Application Details:	Brush Roller, conventional spray or airless spray application. Stir thoroughly before and during use. For Stainblocking applications do not tint or thin. Apply one even coat of PRECISION High Opacity Stain Blocker. For heavily stained surfaces and for paperfaced plasterboard where there is a different texture between the paper and jointing compound or where extra filling and smoothness is required, apply a second coat of PRECISION High Opacity Stain Blocker. For optimal coverage and smoothness, apply with: • Brush: High quality synthetic filament brush (Nylon or Polyester) Apply in full even coating direct from the container. • Roller: Medium nap synthetic roller (10-13mm on smooth surfaces or 13-18mm on semi-rough or porous surfaces) Apply in full even coating direct from the container. • Spray: Do not thin for stain blocking applications. Suitable for application by all standard spray equipment. Clean Brushes and Rollers with Mineral Turpentine prior to and after use. Brush/Roller:		

Coat Type:	2nd Coat	Datasheet:	AUDD1282 Dulux Aquanamel Gloss	
Application Methods:	    Air Spray Airless Spray Brush Roller			
		Min	Max	Recommended
Theoretical Spread Rate *		18.7	18.7	16
Wet Film Per Coat (microns)		53	53	53
Dry Film Per Coat (microns)		19	19	19
Recoat Time **		2 Hours	Indefinite	
Coating Application Details:	Brush, roller or HVLP spray * Some colours may require more than the recommended number of coats to achieve full opacity. Stir contents thoroughly before and during use with a broad flat stirrer using an upward lifting action. Brush/Roller: Brush- Dulux Professional range of brushes are recommended Roller- Very short nap roller e.g. 5mm Apply evenly, dividing area into patches about 50-60 square centimetres. Paint one patch at a time working back into previously applied paint. Finally lay off each patch with light vertical strokes again lapping lightly into previously painted patches. On wall areas use a 5mm nap roller to achieve the smoothest finish. Do not lay off with a brush. Generally thinning is not recommended, however, under hot conditions DULUX Hot Weather Thinner should be added to improve application performance to maximum of 50 ml per litre. Airless/Conventional Spray: Airless/Conventional Spray: Suitable for application by conventional or airless spray equipment. Up to 100mL/L of water may be added for application by conventional spray, up to 30mL/L of water for airless spray, and up to 5mL/L for HVLP spray, to aid atomisation. Wagner recommendation: F230 Aircoat recommended. Tip: 211 for archs and trim, 411 for doors Pressure: 1100 PSI 1-1.5 at the bar at the gun Graco recommendation: Air Assisted Airless. Tip: 210 or 310 Pressure: 1100 PSI			
Coat Type:	3rd Coat	Datasheet:	AUDD1282 Dulux Aquanamel Gloss	
Application Methods:	    Air Spray Airless Spray Brush Roller			
		Min	Max	Recommended
Theoretical Spread Rate *		18.7	18.7	16
Wet Film Per Coat (microns)		53	53	53
Dry Film Per Coat (microns)		19	19	19
Recoat Time **		2 Hours	Indefinite	
Coating Application Details:	Brush, roller or HVLP spray * Some colours may require more than the recommended number of coats to achieve full opacity. Stir contents thoroughly before and during use with a broad flat stirrer using an upward lifting action. Brush/Roller: Brush- Dulux Professional range of brushes are recommended Roller- Very short nap roller e.g. 5mm Apply evenly, dividing area into patches about 50-60 square centimetres. Paint one patch at a time working back into previously applied paint. Finally lay off each patch with light vertical strokes again lapping lightly into previously painted patches. On wall areas use a 5mm nap roller to achieve the smoothest finish. Do not lay off with a brush. Generally thinning is not recommended, however, under hot conditions DULUX Hot Weather Thinner should be added to improve application performance to maximum of 50 ml per litre. Airless/Conventional Spray: Airless/Conventional Spray: Suitable for application by conventional or airless spray equipment. Up to 100mL/L of water may be added for application by conventional spray, up to 30mL/L of water for airless spray, and up to 5mL/L for HVLP spray, to aid atomisation. Wagner recommendation: F230 Aircoat recommended. Tip: 211 for archs and trim, 411 for doors Pressure: 1100 PSI 1-1.5 at the bar at the gun Graco recommendation: Air Assisted Airless. Tip: 210 or 310 Pressure: 1100 PSI			
Coating System Notes:	* Practical Spreading Rate will vary from the quoted Theoretical Spreading Rate due to factors such as method and condition of application and surface roughness. ** Recoat times are quotes for 25°C and 50% relative humidity, these may vary under different conditions.			

Comments

- Do not apply paint if Relative Humidity is above 85% or temperature is within 3°C of Dew Point.
Do not apply if the surface temperature is greater than 40°C or below 10°C, or likely to fall below 10°C during the application or drying period.
- Do not apply paint if the temperature is below 10°C or likely to fall below 10°C during the drying period.
- This is an abridged specification and must be read in conjunction with the FULL Dulux specification and product data sheet(s).

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Dulux Aquanamel Gloss on New Timber [Exterior/Coastal]

AU_SD13167

Substrate And Substrate Preparation	
Substrate Notes:	SUBSTRATE DESCRIPTION NEW TIMBER New timber items should be delivered in a clean dry condition, just prior to installation. The timber should be inspected for physical defects, such as splinters, cracks, woolly grain, machine marks, and knot holes and also for other defects such as sap and tannin stains, and resin exudation from knots. Examine surfaces for wax or preservatives. Moisture content should be close to equilibrium, usually 10-17% for satisfactory staining or coating. Timber should be stored out of the weather before painting. Timber left exposed to the weather for as little as one month prior to painting will suffer from reduced paint adhesion and durability. AGED TIMBER Old timber surfaces should be inspected for dry rot, mould or fungus, excessive water content, grey and weathered timber, grain cracking, resins, stains, old unsound paint, dirt and any surface contamination. These defects should be rectified prior to painting. TANNIN RICH TIMBER Tannins are water-soluble compounds present in some timbers such as meranti, merbau, kwila, western red cedar and tallowwood. These tannins are leached out by water or moisture and can cause staining of surrounding areas. They are seen as dark coloured stains either under or within a coating. Tannin staining is most obvious in light coloured coatings, such as whites. Darker and wood-toned colours hide the tannin stains best. When using light colours on tannin rich timbers, an appropriate primer should be used to seal the tannins in the wood. MANUFACTURED HARDBOARD These products are manufactured as smooth sheets consisting of wood fibres bound with either natural lignin or a small percentage of phenolic resin. Hardboard is widely used as interior panelling but is vulnerable to moisture and therefore not suitable for exterior exposure or in high condensation conditions. Repairing damaged hardboard is not generally practical and it is advisable to completely replace any damaged sections. These products are manufactured from timber fibre bound with thermosetting phenol formaldehyde resin. They contain wax which may inhibit the drying of solvent based alkyd enamels and tannins which may bleed through water based coatings. As manufactured the smooth surfaces provide an ideal surface for finishing but machined edges are more porous and may show fibre raising when primed.
Substrate Preparation Notes:	ASSESS SUITABILITY Ensure the wood is thoroughly clean and dry before commencing. If there is any doubt, measure moisture content which must be between 10-17% before staining or finishing can commence. REMOVE SURFACE CONTAMINANTS Examine the surface for the presence of sap, grease, oil, wax, tannin, building marks, or other contaminants. Scrape off and remove residual contaminants by solvent cleaning. Use scraper to remove dirt and mortar splashes. Any greyed wood fibres on aged timbers need to be removed by sanding and / or suitable chemical wood cleaner. CLEAN Clean to remove all dirt, dust and all other surface contaminants by using a suitable cleaning agent and rinse off with clean water. Treat mould with a suitable mould treatment. REPAIR SURFACE IMPERFECTIONS Fill nail holes, cracks and other defects with a suitable wood filler and allow to dry thoroughly. SANDING Sand dressed timber with fine sandpaper in direction of the grain and along the full length of the board. Round off all sharp edges to a minimum of 2 mm radius in order to achieve an even film build and uniform paint coverage.

Coating System Summary	
1st Coat:	AUDD1698: Dulux Prepcoat 1 Step Oil Primer Sealer Undercoat
2nd Coat:	AUDD1698: Dulux Prepcoat 1 Step Oil Primer Sealer Undercoat
3rd Coat:	AUDD1282: Dulux Aquanamel Gloss
4th Coat:	AUDD1282: Dulux Aquanamel Gloss
Please refer to the coating system details below	

Coating System				
Coat Type:	1st Coat	Datasheet:	AUDD1698 Dulux Prepcoat 1 Step Oil Primer Sealer Undercoat	
Application Methods:	    Air Spray Airless Spray Brush Roller			
Theoretical Spread Rate * Wet Film Per Coat (microns) Dry Film Per Coat (microns) Recoat Time **		Min 10 100 40 1 Hour	Max 10 100 40 Indefinite	Recommended 12 100 40
Coating Application Details:	Brush, roller, conventional or airless spray. Stir thoroughly before and during use. Brush/Roller: Apply by brush or roller, full even coats direct from the container. If necessary up to 50ml per litre of mineral turpentine may be added to ease application. Airless/Conventional Spray: Suitable for application by all standard spray equipment. If necessary thin up to 100ml per litre of DULUX Spraying Thinner to aid atomisation. Clean brushes and rollers with mineral turpentine prior to and after use.			
Coat Type:	2nd Coat	Datasheet:	AUDD1698 Dulux Prepcoat 1 Step Oil Primer Sealer Undercoat	
Application Methods:	    Air Spray Airless Spray Brush Roller			
Theoretical Spread Rate * Wet Film Per Coat (microns) Dry Film Per Coat (microns) Recoat Time **		Min 10 100 40 1 Hour	Max 10 100 40 Indefinite	Recommended 12 100 40
Coating Application Details:	Brush, roller, conventional or airless spray. Stir thoroughly before and during use. Brush/Roller: Apply by brush or roller, full even coats direct from the container. If necessary up to 50ml per litre of mineral turpentine may be added to ease application. Airless/Conventional Spray: Suitable for application by all standard spray equipment. If necessary thin up to 100ml per litre of DULUX Spraying Thinner to aid atomisation. Clean brushes and rollers with mineral turpentine prior to and after use.			
Coat Type:	3rd Coat	Datasheet:	AUDD1282 Dulux Aquanamel Gloss	
Application Methods:	    Air Spray Airless Spray Brush Roller			
Theoretical Spread Rate * Wet Film Per Coat (microns) Dry Film Per Coat (microns) Recoat Time **		Min 18.7 53 19 2 Hours	Max 18.7 53 19 Indefinite	Recommended 16 53 19
Coating Application Details:	Brush, roller or HVLP spray * Some colours may require more than the recommended number of coats to achieve full opacity. Stir contents thoroughly before and during use with a broad flat stirrer using an upward lifting action. Brush/Roller: Brush- Dulux Professional range of brushes are recommended Roller- Very short nap roller e.g. 5mm Apply evenly, dividing area into patches about 50-60 square centimetres. Paint one patch at a time working back into previously applied paint. Finally lay off each patch with light vertical strokes again lapping lightly into previously painted patches. On wall areas use a 5mm nap roller to achieve the smoothest finish. Do not lay off with a brush. Generally thinning is not recommended, however, under hot conditions DULUX Hot Weather Thinner should be added to improve application performance to maximum of 50 ml per litre. Airless/Conventional Spray: Airless/Conventional Spray: Suitable for application by conventional or airless spray equipment. Up to 100mL/L of water may be added for application by conventional spray, up to 30mL/L of water for airless spray, and up to 5mL/L for HVLP spray, to aid atomisation. Wagner recommendation: F230 Aircoat recommended. Tip: 211 for archs and trim, 411 for doors Pressure: 1100 PSI 1-1.5 at the bar at the gun Graco recommendation: Air Assisted Airless. Tip: 210 or 310 Pressure: 1100 PSI			

Coat Type:	4th Coat	Datasheet:	AUDD1282 Dulux Aquanamel Gloss
Application Methods:	    Air Spray Airless Spray Brush Roller		
		Min	Max
Theoretical Spread Rate *		18.7	18.7
Wet Film Per Coat (microns)		53	53
Dry Film Per Coat (microns)		19	19
Recoat Time **		2 Hours	Indefinite
Coating Application Details:	Brush, roller or HVLP spray * Some colours may require more than the recommended number of coats to achieve full opacity. Stir contents thoroughly before and during use with a broad flat stirrer using an upward lifting action. Brush/Roller: Brush- Dulux Professional range of brushes are recommended Roller- Very short nap roller e.g. 5mm Apply evenly, dividing area into patches about 50-60 square centimetres. Paint one patch at a time working back into previously applied paint. Finally lay off each patch with light vertical strokes again lapping lightly into previously painted patches. On wall areas use a 5mm nap roller to achieve the smoothest finish. Do not lay off with a brush. Generally thinning is not recommended, however, under hot conditions DULUX Hot Weather Thinner should be added to improve application performance to maximum of 50 ml per litre. Airless/Conventional Spray: Airless/Conventional Spray: Suitable for application by conventional or airless spray equipment. Up to 100mL/L of water may be added for application by conventional spray, up to 30mL/L of water for airless spray, and up to 5mL/L for HVLP spray, to aid atomisation. Wagner recommendation: F230 Aircoat recommended. Tip: 211 for archs and trim, 411 for doors Pressure: 1100 PSI 1-1.5 at the bar at the gun Graco recommendation: Air Assisted Airless. Tip: 210 or 310 Pressure: 1100 PSI		
Coating System Notes:	* Practical Spreading Rate will vary from the quoted Theoretical Spreading Rate due to factors such as method and condition of application and surface roughness. ** Recoat times are quotes for 25°C and 50% relative humidity, these may vary under different conditions.		

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Dulux Aquanamel Gloss / over Precision Advanced Stain and Odour Blocker on Painted Timber [Exterior]

AU_SD13620

Description

DULUX Aquanamel Gloss is a waterbased interior/exterior acrylic enamel that dries to a glossy smooth and tough finish. DULUX Aquanamel Gloss can be used in many of the areas that traditional solvent based enamels are used, with all the time saving benefits of an acrylic paint. DULUX Aquanamel Gloss is non-yellowing and resists chipping. DULUX Aquanamel Gloss is highly recommended for doors, architraves, skirting boards, windows, timber trim and walls and is ideal for bathrooms, kitchens and laundries.

DULUX PRECISION Advanced Stain and Odour Blocker is developed with innovative water based technology that offers the superior stain blocking performance of an Oil and Shellac based undercoat with the convenience of low odour, fast drying & water wash up. It delivers advanced stain blocking for a wide range of water & oil based stains and locks in the stain ensuring it does not migrate through subsequent coats of paint. With excellent adhesion properties, it is suitable in most situations as a primer, sealer and undercoat. Suitable for use in interior & exterior applications

Dumond® Smart Strip®1 Heavy Duty Removal Kit is an environmentally responsible method for removing organic and lead based paint from most substrates. The Dumond® Smart Strip®1 Heavy Duty Removal Kit includes paste remover, application tool, pH test kit, DUMOND® Laminated Paper, and Citri-Lize™ neutraliser.

Dumond® Smart Strip®1 Heavy Duty is suitable for interior and exterior application. The N-Methylpyrrolidone (NMP) and Methylene Chloride Free formula has been specifically developed for safer, fume free use. With excellent softening power and deep penetration that allows multiple layers to be stripped in a single application, Dumond® Smart Strip®1 Heavy Duty effectively removes most water and oil based coatings including acrylics, alkyds and varnishes.

Substrate And Substrate Preparation

Substrate Notes:	SUBSTRATE DESCRIPTION NEW TIMBER New timber items should be delivered in a clean dry condition, just prior to installation. The timber should be inspected for physical defects, such as splinters, cracks, woolly grain, machine marks, and knot holes and also for other defects such as sap and tannin stains, and resin exudation from knots. Examine surfaces for wax or preservatives. Moisture content should be close to equilibrium, usually 10-17% for satisfactory staining or coating. Timber should be stored out of the weather before painting. Timber left exposed to the weather for as little as one month prior to painting will suffer from reduced paint adhesion and durability. AGED TIMBER Old timber surfaces should be inspected for dry rot, mould or fungus, excessive water content, grey and weathered timber, grain cracking, resins, stains, old unsound paint, dirt and any surface contamination. These defects should be rectified prior to painting. TANNIN RICH TIMBER Tannins are water-soluble compounds present in some timbers such as meranti, merbau, kwila, western red cedar and tallowwood. These tannins are leached out by water or moisture and can cause staining of surrounding areas. They are seen as dark coloured stains either under or within a coating. Tannin staining is most obvious in light coloured coatings, such as whites. Darker and wood-toned colours hide the tannin stains best. When using light colours on tannin rich timbers, an appropriate primer should be used to seal the tannins in the wood. MANUFACTURED HARDBOARD These products are manufactured as smooth sheets consisting of wood fibres bound with either natural lignin or a small percentage of phenolic resin. Hardboard is widely used as interior panelling but is vulnerable to moisture and therefore not suitable for exterior exposure or in high condensation conditions. Repairing damaged hardboard is not generally practical and it is advisable to completely replace any damaged sections. These products are manufactured from timber fibre bound with thermosetting phenol formaldehyde resin. They contain wax which may inhibit the drying of solvent based alkyd enamels and tannins which may bleed through water based coatings. As manufactured the smooth surfaces provide an ideal surface for finishing but machined edges are more porous and may show fibre raising when primed.
Substrate Preparation Notes:	ASSESS SUITABILITY Inspect to determine the degree of deterioration of existing coatings and presence of decayed timber. Check coating adhesion using the cross-hatch test. CLEAN SURFACE Clean to remove all dirt, dust and all other surface contaminants by using a suitable cleaning agent and rinse off with clean water. Treat mould with a suitable mould treatment. REPAIR SURFACE IMPERFECTIONS Prepare all areas that have poor adhesion, are cracking, peeling and flaking by sanding, power sanding, scraping, wire brushing or burning off as appropriate. Feather edges of the surrounding sound paint to completely remove visual ridges and wash or dust off to remove debris. Any major design faults or decayed timber leading to structural weakness must be corrected prior to repainting. SANDING Sand the entire cleaned surface to an even flat gloss level to provide a smooth, even surface and to provide a good key for the new coating system to adhere to. PRIME Prime any bare areas with a suitable primer. NOTE: If Staining: Timber must be sanded back to clean bare timber All coatings must be removed.

Coating System Summary

Prep Coat:	AU_DD02344: Dumond Smart Strip 1 HD Red
1st Coat:	AU_DD02063: Dulux Precision Advanced Stain and Odour Blocker
2nd Coat:	AU_DD02063: Dulux Precision Advanced Stain and Odour Blocker
3rd Coat:	AUDD1282: Dulux Aquanamel Gloss
4th Coat:	AUDD1282: Dulux Aquanamel Gloss
Please refer to the coating system details below	

Coating System

Coat Type:	Prep Coat	Datasheet:	AU_DD02344 Dumond Smart Strip 1 HD Red	
Application Methods:	     Airless Spray Brush Roller Trowel Other Hawk and Trowel Splade Hand Glove Airless Spray - please refer to DULUX representative if considering airless spray application			
		Min	Max	Recommended
Theoretical Spread Rate *		0.5	0.17	0.3
Wet Film Per Coat (microns)		2000	6000	3000
Coating Application Details:	IMPORTANT: DANGER! CORROSIVE! AVOID SKIN AND EYE CONTACT. WEAR PROTECTIVE GLOVES AND GOGGLES AND OR FULL FACE MASK. BASIC PROCESS STEPS 1. BEFORE STARTING ANY TEST PATCH OR PAINT REMOVAL PROGRAM ENSURE THAT ALL OPERATORS ARE WEARING PROPER PERSONAL PROTECTION EQUIPMENT. 2. Always perform a test patch check on the paint system to determine required paste thickness and dwell time for best results. 3. TEST PATCH a) Let the DUMOND® Smart Strip®1 HD dwell generally for at least 12 hours before checking performance. (for softwood start the checking process at 4 hours) b) Never apply DUMOND® Smart Strip®1 HD and leave for 24-48 hours without checking its behaviour. Some substrates are porous and will dehydrate the paint remover causing it to dry. c) If DUMOND® Smart Strip®1 HD dries or hardens on the surface remove the laminated paper and apply a new thin coat of DUMOND® Smart Strip®1 HD , reapply the DUMOND® Laminated Paper then wait 30 – 60 minutes and remove. 4. Prepare the surface by removal of all loose and flaking paint. 5. Check that the air and substrate temperatures will be above 2C and below 32C for the period of the job. 6. Apply paste at between 2mm and 7mm spread rate, refer test patch dwell time and cover with laminated paper, removing all air bubbles 7. Work to a maximum 1.0m X 1.0m application area at a time. ensuring paper is applied to product quickly to prevent premature drying. 8. Allow the product to dwell on the surface for the required time (set from the test patch evaluation.) 9. Remove the paint, product and laminated paper as a single layer with the assistance of a Tungsten Carbide (TC) edged paint scrapper. 10. Dispose of the removed materials according to legislated requirements. 11. Wash and scrub the substrate clean using water, being mindful of water volume. , 12. Allow the cleaned area to sit for 24-48 hours to properly dry. 13. Neutralise the dry surface using Citri-Lize™ Neutraliser 14. Check the neutralised surface for pH using pH test strips. 15. Check the surface for moisture content using a suitable moisture meter. 16. Repainting can occur when the pH is between 5 and 8 and the substrate moisture content is below 13% 17. Additional comments a. Use undiluted white vinegar as a substitute for the Citri-Lize™ neutraliser. b. Some timbers will tend to bleed resin or tannins after the removal procedure. c. Special high performance tannin resistant stain blocking primers (such as Dulux PRECISION Advanced Stain and Odour Blocker) may be required to cope with this behaviour to stop staining of the top coat. d. Other timbers will darken after treatment with DUMOND® Smart Strip®1 e. Wood Bleach - Integrain Reviva - can be used on these wooden surfaces (after application of Citri-Lize™ neutraliser) to lighten the substrate. Checklist for a complete, successful job: 1) Only use DUMOND® Laminated Paper sheets 2) Citri-Lize™ Neutraliser (Refer to Guide Sheet) 3) Available running water supply, a nylon brush, trowel or spatula 4) Litmus Paper to conduct a pH test (Refer to Neutraliser Guide Sheet) 5) Gloves Gauntlet Type - Nitrile or PVC Chemically Resistant to Alkaline materials 6) Chemically resistant cover-alls 7) Eye protection goggles and/or full face mask, 8) Masking tape, scissors and/or knife			

- 9) Hawk and Trowel or other means of applying paste.
- 10) DUMOND® Catch-N-Cover Micro Filtration Membrane
- 11) Plastic drop sheets for protection of surrounding surfaces
- 12) Plastic Bucket for mixing Citri-Lize™
- 13) Nylon brush and or scouring pad
- 14) Extra DUMOND® Laminated Paper sheets may be required, because paste coverage may go further.

TEST PATCH

Every Paint removal project is different as substrate types, surface profiles, application techniques, types of coating to be removed and the number of layers to be removed can vary significantly. Hence, the amount of product and corresponding spread rate required to achieve the desired outcome need to be established. TEST Patch Kits with directions for use are available from Dulux Trade Stores. The kit contains everything that a contractor needs to accomplish the task with minimal effort and maximum results.

APPLICATION AND SPREAD RATE:

Before application ensure that air and substrate temperatures will remain above 20°C at all times and preferably between 10°C and 32°C for the entire application, dwell and removal period.

Always work in small manageable areas when applying DUMOND® Smart Strip®1.
Typically a work area of 1.0m X 1.0m area is a suitable size for most applications.

Using a trowel (or other chosen application method) apply paste at a thickness determined by the test patch evaluation results. When applying onto irregular surfaces use a nylon brush to force the paste into intricate areas. Cover all product immediately with DUMOND® Laminated Paper being very careful to smooth out all air pockets.

DUMOND® Smart Strip®1 HD will need to dwell on the surface for variable time frames depending on the substrate, paint system being removed etc. Dwell times are typically 12 to 48 hours. In some cases the job can need a dwell time of up to 96 hours. For a 48 hour dwell time a 6mm (6000 micron) thick layer is recommended. For longer dwell times – 72 hours and up to 96 hours - a correspondingly thicker layer of product will be required. (Note that the dwell time and product thickness will be determined during the TEST PATCH evaluation.)

DUMOND® Smart Strip®1 HD yields an average spread rate of 0.5m²/l. Yields may vary depending on substrate texture and porosity, and paint thickness.

SPRAY APPLICATION – SPECIAL CASE

If Airless Spray application is required please refer to your DULUX representative for advice.

REMOVAL AND CLEAN-UP

BEFORE STARTING ANY PAINT REMOVAL PROGRAM ENSURE THAT ALL OPERATORS ARE WEARING PROPER PERSONAL PROTECTION EQUIPMENT. EVEN USED PASTE IS HIGHLY CORROSIVE

Remember: Only strip from the substrate an area that you can rinse/wash before the remover has a chance to dry. Typically this will be an area of 1.0m X 1.0m.

After the appropriate dwell time remove the DUMOND® Smart Strip®1 HD and the DUMOND® Laminated Paper as a single layer by inserting a steel or stainless steel trowel, spatula or other paint scrapping tool underneath the softened paint and lift all of the materials away from the surface together.

Continue to use the paint scrapping tool to separate the paint from the substrate.

After the paint, paste and laminated paper have been removed from the surface use a nylon brush or scouring pad and clean water to scrub residue off the substrate, paying particular attention to crevices, grooves and cracks.

Rinse thoroughly with water to remove all remaining residue. For optimum results, low pressure washing is recommended for the final rinse when working outside.

Dispose of paper, paste remover and softened and dissolved coatings according to National, State and Local regulations.

For best results wait 24 – 48 hours for the substrate to dry before neutralising.

WASTE DISPOSAL

When lead-based paint coatings are being removed from the substrate, disposal of the waste is regulated by the various National and State Environmental Protection Agencies and possibly some local regulatory authorities.

NEUTRALISATION

Use Citri-Lize™ Neutraliser (included in the kit) for the neutralisation process. Wait for at least 24 – 48 hours after final washing of the treated substrate before neutralising porous surfaces.

Neutralising is required when re-painting or re-staining after paint removal. Failure to properly clean and neutralise the substrate as directed can result in alkaline residue on the surface that may cause hazing and or subsequent coating failure.

Citri-Lize™ Neutraliser can be applied at any point after final rinsing but is most effective when applied to a dry substrate. Follow the directions for water ratio (dilution) on the back of the Citri-Lize™ bag and use a plastic bottled wand type sprayer to thoroughly coat the entire substrate. On vertical walls, start at the top of the wall.

Allow the substrate to dry and test for pH using pH test strips. Re-painting can occur when the pH range is between 5 and 8 and the moisture content is below 13%

NB: Neutralising timber substrates thoroughly is the key to fastest moisture level reduction to a point where we can safely repaint. There is sufficient Citri-Lize™ neutraliser in the kit to neutralise up to 3 times.

RE-PAINTING OF WOODEN SURFACES.

NB: When we speak of timber darkening after treatment with the remover, and the need for stain blocking primers, it is because of the following. DUMOND® Smart Strip® 1 HD has the ability to react with lignin within the timber creating a highly migratory calcium and sodium lignates. These are chemically different materials to the acidic tannins we normally encounter in coating timber, and are created by reaction with the active components of DUMOND® Smart Strip® 1 HD.

These lignin reaction products, and the presence of unreacted Sodium and Calcium Hydroxide that has migrated into the timber surface, make the timber more water loving (Hygroscopic) and therefore slower to dry. It may take more than one application of Citri-Lize™ neutraliser to properly neutralise the timber surface, and convert the residue alkali materials. A properly neutralised timber surface is necessary to reduce tendency of staining compounds to migrate, and to speed up the drying process.

It is important to note that Lignin is the material that holds the cellulosic structure of timber together. Its removal through reaction with the alkali's in DUMOND® Smart Strip® 1 HD leaves the contact area of the timber without its natural binder. These areas will often become "furry" due to the loss of lignin in the surface layers of the timber.

A separate Bulletin on repainting timber after paint removal using DUMOND® Smart Strip® 1 HD is available from DULUX.

For best results on wooden surfaces use a moisture meter before re-painting. Re-painting can occur when the moisture content is below 13%.

Even when the moisture content is within acceptable limits for painting it is recommended that a high performance stain blocking primer system is used as part of the repainting process.

Products from the DULUX PRECISION Range will meet even the most difficult requirements.

For Heavy Duty stain challenges a combination of a first prime with DULUX PRECISION Advanced Stain and Odour Blocker, followed by a coat of DULUX PRECISION High Opacity Stain Blocker may be required.

Otherwise use of DULUX PRECISION Advanced Stain and Odour Blocker (WB), or DULUX PRECISION High Opacity Stain Blocker (SB) can be used on treated timber substrates.

For applications where staining is not an issue DULUX PRECISION Stain and Mould Blocker or DULUX PRECISION Maximum Strength Adhesion Primer may be suitable products.

Coat Type:	1st Coat	Datasheet:	AU_DD02063 Dulux Precision Advanced Stain and Odour Blocker		
Application Methods:					
Air Spray		Airless Spray	Brush	Roller	
			Min	Max	Recommended
Theoretical Spread Rate *			10.12	6.37	10.12
Wet Film Per Coat (microns)			100	125	100
Dry Film Per Coat (microns)			34	54	34
Recoat Time **			1 hour	Indefinite	1 hour
Coating Application Details:	Brush Roller, conventional spray or airless spray application. Stir thoroughly before and during use. For Stain blocking applications do not thin. This product is not suitable to tint. Tinting will result in coagulation of the primer. Apply one even coat of PRECISION Advanced Stain and Odour Blocker. For heavily stained surfaces or timbers treated with alkaline paint removers or for paper-faced plasterboard where there is a different texture between the paper and jointing compound or where extra filling and smoothness is required, apply a second coat of PRECISION Advanced Stain and Odour Blocker. For optimal coverage and smoothness, apply with: Brush: High quality synthetic filament brush (Nylon or Polyester) Apply in full even coating direct from the container. Roller: Medium nap synthetic roller (9-12mm) on smooth surfaces, or 13 -18mm on semi-rough or porous surfaces. Apply in full even coating direct from the container. Spray: Do not thin for stain blocking applications. Suitable for application by all standard spray equipment. Clean Brushes and Rollers with water prior to and after use.				

Coat Type:	2nd Coat	Datasheet:	AU_DD02063 Dulux Precision Advanced Stain and Odour Blocker	
Application Methods:	    Air Spray Airless Spray Brush Roller			
		Min	Max	Recommended
Theoretical Spread Rate *		10.12	6.37	10.12
Wet Film Per Coat (microns)		100	125	100
Dry Film Per Coat (microns)		34	54	34
Recoat Time **		1 hour	Indefinite	1 hour
Coating Application Details:	Brush Roller, conventional spray or airless spray application. Stir thoroughly before and during use. For Stain blocking applications do not thin. This product is not suitable to tint. Tinting will result in coagulation of the primer. Apply one even coat of PRECISION Advanced Stain and Odour Blocker. For heavily stained surfaces or timbers treated with alkaline paint removers or for paper-faced plasterboard where there is a different texture between the paper and jointing compound or where extra filling and smoothness is required, apply a second coat of PRECISION Advanced Stain and Odour Blocker. For optimal coverage and smoothness, apply with: Brush: High quality synthetic filament brush (Nylon or Polyester) Apply in full even coating direct from the container. Roller: Medium nap synthetic roller (9-12mm) on smooth surfaces, or 13 -18mm on semi-rough or porous surfaces. Apply in full even coating direct from the container. Spray: Do not thin for stain blocking applications. Suitable for application by all standard spray equipment. Clean Brushes and Rollers with water prior to and after use.			
Coat Type:	3rd Coat	Datasheet:	AUDD1282 Dulux Aquanamel Gloss	
Application Methods:	    Air Spray Airless Spray Brush Roller			
		Min	Max	Recommended
Theoretical Spread Rate *		18.7	18.7	16
Wet Film Per Coat (microns)		53	53	53
Dry Film Per Coat (microns)		19	19	19
Recoat Time **		2 Hours	Indefinite	
Coating Application Details:	Brush, roller or HVLP spray * Some colours may require more than the recommended number of coats to achieve full opacity. Stir contents thoroughly before and during use with a broad flat stirrer using an upward lifting action. Brush/Roller: Brush- Dulux Professional range of brushes are recommended Roller- Very short nap roller e.g. 5mm Apply evenly, dividing area into patches about 50-60 square centimetres. Paint one patch at a time working back into previously applied paint. Finally lay off each patch with light vertical strokes again lapping lightly into previously painted patches. On wall areas use a 5mm nap roller to achieve the smoothest finish. Do not lay off with a brush. Generally thinning is not recommended, however, under hot conditions DULUX Hot Weather Thinner should be added to improve application performance to maximum of 50 ml per litre. Airless/Conventional Spray: Airless/Conventional Spray: Suitable for application by conventional or airless spray equipment. Up to 100mL/L of water may be added for application by conventional spray, up to 30mL/L of water for airless spray, and up to 5mL/L for HVLP spray, to aid atomisation. Wagner recommendation: F230 Aircoat recommended. Tip: 211 for archs and trim, 411 for doors Pressure: 1100 PSI 1-1.5 at the bar at the gun Graco recommendation: Air Assisted Airless. Tip: 210 or 310 Pressure: 1100 PSI			

Coat Type:	4th Coat	Datasheet:	AUDD1282 Dulux Aquanamel Gloss
Application Methods:	    Air Spray Airless Spray Brush Roller		
		Min	Max
Theoretical Spread Rate *		18.7	18.7
Wet Film Per Coat (microns)		53	53
Dry Film Per Coat (microns)		19	19
Recoat Time **		2 Hours	Indefinite
Coating Application Details:	Brush, roller or HVLP spray * Some colours may require more than the recommended number of coats to achieve full opacity. Stir contents thoroughly before and during use with a broad flat stirrer using an upward lifting action. Brush/Roller: Brush- Dulux Professional range of brushes are recommended Roller- Very short nap roller e.g. 5mm Apply evenly, dividing area into patches about 50-60 square centimetres. Paint one patch at a time working back into previously applied paint. Finally lay off each patch with light vertical strokes again lapping lightly into previously painted patches. On wall areas use a 5mm nap roller to achieve the smoothest finish. Do not lay off with a brush. Generally thinning is not recommended, however, under hot conditions DULUX Hot Weather Thinner should be added to improve application performance to maximum of 50 ml per litre. Airless/Conventional Spray: Airless/Conventional Spray: Suitable for application by conventional or airless spray equipment. Up to 100mL/L of water may be added for application by conventional spray, up to 30mL/L of water for airless spray, and up to 5mL/L for HVLP spray, to aid atomisation. Wagner recommendation: F230 Aircoat recommended. Tip: 211 for archs and trim, 411 for doors Pressure: 1100 PSI 1-1.5 at the bar at the gun Graco recommendation: Air Assisted Airless. Tip: 210 or 310 Pressure: 1100 PSI		
Coating System Notes:	* Practical Spreading Rate will vary from the quoted Theoretical Spreading Rate due to factors such as method and condition of application and surface roughness. ** Recoat times are quotes for 25°C and 50% relative humidity, these may vary under different conditions.		

Comments
- Do not apply paint if Relative Humidity is above 85% or temperature is within 3°C of Dew Point. Do not apply if the surface temperature is greater than 40°C or below 10°C, or likely to fall below 10°C during the application or drying period. - Do not apply paint if the temperature is below 10°C or likely to fall below 10°C during the drying period. - This is an abridged specification and must be read in conjunction with the FULL Dulux specification and product data sheet(s).

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Dulux AcraTex 968 AcraSkin Low Gloss / Dulux AcraTex AcraPatch AU_SA09531 High Build on Painted Cement Render [Exterior]

Description	
Flexible High Build Repair System with Alkali Reinforcement Mesh , finished with a Weatherproof Membrane System for previously painted cracked render. Incorporating the following: AcraTex AcraPrime Solvent Based Sealer designed to consolidate the surface and promote adhesion.. AcraTex AcraPatch High Build is an acrylic Pre Mixed Render designed to level surface irregularities and produce a high quality even surface for absorbent masonry substrates. This high build flexible repair system incorporates Exsulte Alkali Resistant Mesh for reinforcement purposes. Once completed the finish will resemble that of a coarse granular render finish. Top coat with AcraTex AcraSkin, weather-proofing membrane topcoat, applied by either conventional NAP roller or texture roller to provide a paint like or low profile texture appearance. This system has excellent water impermeability, resistance to mould and mildew, crack bridging & anti-carbonation performance for long term protection of masonry substrates.	
Summary	
AcraTex High Build Flexible Remedial System for aged & weathered previously painted cracked render reinforced with Exsulte alkali resistant mesh. Refer to coating details for system application.	
Substrate And Substrate Preparation	
Substrate Notes:	CEMENT RENDER / PRE MIXED RENDER CEMENT RENDER Cement Render is a substrate produced by mixing sand and cement that is applied to a surface, usually block-work and brick. Subsequently finished by screeding, floating or sponging to give an even finish. PREMIXED RENDERS Premixed renders are stringently formulated based wall renders that are polymer modified. They are supplied in a dry powder form usually 20kg bags which only require the addition of water to produce a mortar paste that exhibits minimal drying shrinkage and good adhesion to clean masonry substrates. NOTE: Both cement render and premixed renders will produce fine cracks during the drying period. These cracks will open and close as weather conditions change. Renders require a minimum 28 days curing at 25°C & 50% relative humidity before coating.
Substrate Preparation Notes:	PCE007 - NEW CEMENT RENDER / PRE MIXED RENDER ASSESS SUITABILITY Inspect to determine the degree of deterioration of existing coatings. Check coating adhesion using the cross-hatch test as per AS 1580.408.4-1993 : Paints and related materials - Methods of test - Adhesion (cross-cut) CLEAN SURFACE Clean to remove all dirt, dust, efflorescence, laitance, powdery surfaces and all other surface contaminants by using a suitable cleaning agent and rinsing / water blasting clean with water. 1500 2500 PSI water blast Treat mould with an appropriate mould treatment after the substrate has been pressure washed, leave for 24 hours prior to coating. Efflorescence should be wire brushed clean. REPAIR SURFACE IMPERFECTIONS Prepare all areas that have poor adhesion, cracking, peeling and flaking by sanding, power sanding, scraping, wire brushing or grit blast to leave a clean surface. as appropriate. Feather edges of the surrounding sound paint to completely remove visual ridges and wash / dust off to remove debris. Any major design faults leading to structural failure of the plaster coating must be corrected prior to repainting. For cracked plaster which is sound but has cracks > 1mm rake out and fill with AcraPatch Fine which is applied into the crack with a spatula and finish flush with the sound surface, once cured a coat of suitable cement based render can be applied over the repaired area and feather edged on to the existing coating. SANDING Sand the entire cleaned substrate to an even flat gloss level to provide a smooth, even surface and to provide a good key for the new coating system to adhere to. PRIME Prime any bare areas with a suitable deep penetrating primer
Additional Notes:	Remove all under bound & delaminated aged coating in accordance with the project consultant's specification & criteria. Expansion /Movement Joints to be installed in locations where the structure's facade appears under stress ie - at external corner, 6 meters maximum or above or below window or other weak points of the facade. Once all additional Movement Joint have been installed, together with any additional fixings an approved by the project consultant's only then can application commence of the specified remedial specification. Wash down and remove all surface contaminates including mould and algae to ensure a clean dry surface is achieved to receive the specified coating. Once all areas have been reinstated apply one coat of Solvent Based Sealer

Coating System Summary

1st Coat:	AUDA0442: Dulux AcraTex Acraprime Solvent Based Clear
Intermediate:	AUDA0440: Dulux AcraTex Acrapatch High Build High Build Course
2nd Coat:	AUDA1392: Dulux AcraTex 968 AcraSkin Low Gloss
3rd Coat:	AUDA1392: Dulux AcraTex 968 AcraSkin Low Gloss
Please refer to the coating system details below	

Coating System

Coat Type:	1st Coat	Datasheet:	AUDA0442 Dulux AcraTex Acraprime Solvent Based Clear
Application Methods:	 Other Brush, roller, conventional or airless spray.		
		Theoretical Spread Rate * Wet Film Per Coat (microns) Dry Film Per Coat (microns) Recoat Time ** Min 14 71 10 16 Hours Max 7 143 20 Indefinite Recommended 10 107 15	
Coating Application Details:	Brush, roller, conventional or airless spray. Do not leave primer for longer than 7 days before coating. A time lag between applications of the primer may lead to the build up of surface contaminants that may require the need to wash again. Product should be thoroughly mixed before use. Refer to the DULUX AcraTex Application Manual for detailed application instructions. DULUX AcraTex AcraPrime Solvent Based may be applied by brush, roller and conventional or airless spray. A brush is required to cut in around edges and obstacles. Typical airless set-up: Graco Ultra 500,695,795 using 0.011-0.013 spray tip at approx 1000 psi. When applying Acraprime SB ensure that flooding is not achieved. This will result in a high gloss appearance.		
Additional Coating Details:	When applying 501/2 Acraprime ensure that flooding is not achieved. This will result in a high gloss appearance. AcraPrime SB can be tinted with Protective Coatings tinter - PB (Blue) to a maximum of 4Y per 15 litre pail. Tinted product may require regular stirring during application. Recommend a test area is used after cleaning between any remaining previous paint coating and exposed substrate to ensure the solvent primer doesn't fry and lift any edges.		
Coat Type:	Intermediate	Datasheet:	AUDA0440 Dulux AcraTex Acrapatch High Build High Build Course
Application Methods:	  Trowel Other Trowel		
		Theoretical Spread Rate * Wet Film Per Coat (microns) Dry Film Per Coat (microns) Recoat Time ** Min 0.4 2469 2000 24 Hours Max 0.2 5030 4075 Indefinite Recommended 0.4 2469 2000	
Coating Application Details:	Trowel or spatula DULUX AcraTex AcraPatch High Build is not designed for use as a joint flush compound over external fibre cement sheeting. A spread rate of 0.5 sqm/l corresponds to 2000 microns dry film thickness assuming no loss. Product should be thoroughly mixed before use. Refer to the DULUX AcraTex Application Manual for detailed application instructions. Before application us a power mixing device to incorporate 5% cement. Add a little water to achieve the required workability. DULUX AcraTex AcraPatch High Build is generally applied with trowel and hawk. A spatula knife can be used for isolated patching and often a sponge float is used to spread the material over extensive blow holes. Use several coats to fill larger irregularities.		
Additional Coating Details:	Using a power mixing tool, mix the Acra-Patch High Build with the addition of 5% cement and add a little water to help achieve the required workability. Apply a skimcoat of the mixed material to nominated wall areas to a level even surface to a minimum 4mm cover or to the required level. Whilst wet imbed the Exsulite reinforcing mesh into the Acra-Patch High Build base coat and overlap all mesh edges by a minimum of 100mm. Note: The mesh is not to be pushed through the wet material onto the face of the substrate, nor is it to be applied directly to the substsrate as this will make the mesh in-effective. Apply finishing coat of AcraPatch High Build mixed with 5% cement to completely cover and encapsulate the mesh with a minimum of 2mm-4mm cover depending on surface level. Finish the Acra-Patch High Build with a Red Plastic Flaot to provide a surface "key" for subsequent coatings.		

Coat Type:	2nd Coat	Datasheet:	AUDA1392 Dulux AcraTex 968 AcraSkin Low Gloss	
Application Methods:	 Airless Spray  Brush  Roller			
		Min	Max	Recommended
Theoretical Spread Rate *		4.1	2.1	3.1
Wet Film Per Coat (microns)		244	488	322
Dry Film Per Coat (microns)		125	250	165
Recoat Time **		4 Hours	Indefinite	
Coating Application Details:	Brush, Roller, Medium Textured Roller, Airless Spray. When cutting in edges , brush and roll-in a continuous process to avoid differences in gloss level. Application on single areas should be completed uninterrupted. All independent tests are available on request. Product should be thoroughly mixed before use. Refer to the DULUX AcraTex Application Manual for detailed application instructions. NAP ROLLER finish: Apply 2 coats (minimum) using a 10 - 20mm Nap roller at 4 sq.m / litre LOW PROFILE TEXTURE (requires higher material consumption): Apply 1 coat with a low profile black Texture Roller at 2-3 sq.m / litre Apply a 2nd (finishing coat) with a nap roller at 4 sq.m / litre			
Coat Type:	3rd Coat	Datasheet:	AUDA1392 Dulux AcraTex 968 AcraSkin Low Gloss	
Application Methods:	 Airless Spray  Brush  Roller			
		Min	Max	Recommended
Theoretical Spread Rate *		4.1	2.1	3.1
Wet Film Per Coat (microns)		244	488	322
Dry Film Per Coat (microns)		125	250	165
Recoat Time **		4 Hours	Indefinite	
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Additional Coating Details:	Apply in full accordance with Product and Application data sheets - by nap roller working well into the substrate profile. Ensure adequate batch tint lots to achieve coverage over single elevations to ensure colour consistency. It is recommended to hold a volume of finish material for future maintenance touch-ups.			

Comments

- Practical spreading rates will vary from quoted theoretical figures depending on substrate porosity, surface roughness, overspray losses, application methods and environmental conditions (e.g. wind).

All preparation and painting must conform to AS2311: The Painting of Buildings

Do not apply paint if Relative Humidity is above 85% or temperature is within 3°C of Dew Point.

Do not apply if the surface temperature is greater than 40°C or below 10°C, or likely to fall below 10°C during the application or drying period.

Dry times apply to a single coat at recommended spread rate and at 25°C and 50% Relative Humidity

Allow longer times under cool, moist, or still conditions and or when applied at high film builds.

Protect from dew, rain and frost for 48 hours when apply at the recommended spread rate.

Avoid application in hot, windy conditions or on hot surfaces cool the surface by hosing with water and paint the cool damp surface.

When using Bright Reds, Oranges, Blues and Yellows or where very light (or dark) colours are applied over highly contrasting colours an extra coat maybe required.

Dulux recommend full coating systems including a top coat. For ALL systems the Texture &/or Base Coat should be tinted in accordance with AcraTex Tint Guide to the specified membrane top coat colour (or a colour as close as possible to the specified colour as product and tint rules allow).

Application techniques should be adjusted to achieve the recommended DFT and finishing standard.

To avoid "Picture Framing" of texture topcoats "wet on wet" cutting in & coating technique is recommended or apply multiple coats thinning the first coat.

At Commencement of coating system application to the substrate it shall be deemed that the Applicator has certified that the surface which it is to be applied to is fit to receive the specified coating(s) system.

When the Applicator is preparing the site sample for approval he should advise the Project Superintendent if the substrate condition is not of sufficient standard to produce the specified finish.

Where possible avoid dark colours - these will give rise to much higher surface temperature that may cause addition thermal stress and cooling demand to the building envelope and/ or require extra engineering considerations (greater building costs). Consult Dulux on the potential to use InfraCOOL Heat Reflective Coatings that will keep the surface cooler "like for like" colour.

Glancing light

Joints and panel deformation may be clearly evident under glancing light, casting visible shadows of the minute and uneven projections of the joints. Glancing light is light that is nearly parallel to the surface of the wall and casts visible shadows and uneven projections of the joints. Just like rendered masonry/ Jointed system any uneven projections will be highlighted and as such are outside the control / scope of this specification. Refer http://www.dulux.com.au/pdf/tech-advice/DLX_TECH_Glancing-Light.pdf

The coastal area is considered a marine environment and as such salt potentially can shorten the life of the coating systems. Care needs to be taken to wash down all areas twice. Once to remove surface contaminants, and raise salts to the surface and then secondly to remove these salts. Due to the locality, Weather conditions and lag time between applications of the coating system it may require the need to wash again, between coats.

This specification is to be read in conjunction with DULUX product data sheets

A DULUX warranty can be provided on request, when the FULL AcraTex system including a membrane topcoat/s is applied by a DULUX AcraTex trained applicator, according to specification, & at the specified spreading rates, & to the surface preparation details described in the DULUX AcraTex Specification Manual.

The dynamics of the substrate is outside the control of Dulux Australia and as such joint deformation or cracking is excluded from warranty terms. Colour change is a natural part of a coating weathering and is excluded from warranty terms. Refer warranty document for full terms and conditions.

Fungi and Algae can exist on virtually any surface (even glass) provided the right conditions for growth are met.

Visible growth on painted surfaces is typically caused by contaminants present together with the presence of high enough levels of moisture to support growth.

Agents in paints become ineffective where they cannot "touch" the growth source (eg where growth emanates from deposits on the film). Additionally the active agents are "consumed" in the process such that protection is time limited where conditions support ongoing growth performance is greatly improved with the inclusion of a membrane Top coat like AcraShield, Elastomeric 201 or AcraSkin.

Refer: <http://www.dulux.com.au/specifier/our-brands/dulux-acratex/more-than-just-render>

The exterior texture coatings should be cleaned on a regular basis. This will help maintain your overall aesthetic appearance and preserve your AcraTex Texture coating system. Cleaning once every year will remove light soil as well as grime and airborne pollutants refer Dulux AcraTex Care & Maintenance Guide

<http://www.dulux.com.au/specifier/our-brands/dulux-acratex/acratex-care-and-maintenance>

When using this specification, the Applicator shall maintain records in accordance with AS 3894 Parts 10, 11 and 12 and others as required by the Project Manager. These records shall be made available for inspection at any time by the Project Manager or authorised representative and submitted to the Principal Contractor upon completion of work.

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SURFACTANT LEACHING FROM EXTERIOR WATER-BASED COATINGS

Occasionally amber, clear or white spots/streaks are seen on a newly painted surface within the first few weeks after application. They usually appear after light rain or overnight dew and generally located in sheltered areas or areas with limited sun exposure. Under normal conditions surfactant contained in the tinted paint colour is slowly leached to the surface and washed away by rain leaving no trace and is a normal part of drying of any exterior water-based paint. Under certain atmospheric conditions and these surfactants leach or migrate to the paint surface, is concentrated forms and leaves clear or white deposits upon drying. These conditions include cool or humid weather or painting cold substrate and in most cases these marks on the wall surfaces are more noticeable on dark colours, such as browns or dark greens, etc..

The clear/white surfactants that have migrated to the wall surface areas will cause no down grading nor performance changes or long term durability concerns of the paint films integrity and unfortunately have become an appearance issue instead.

They easily removed from the paint film within a week or so of their appearance by washing with warm water & commercial grade detergent or via Nifti or Spray'n'Wipe followed by rinsing with fresh clean water.

Under severe conditions they may reappear once or twice until all the surfactant has been removed. It will be less noticeable each time, and can be removed in the same manner as before. Refer http://www.dulux.com.au/pdf/tech-advice/DLX_TECH_Leaching.pdf

Images



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The data provided within the Duspec system is correct at the time of publication, however it is the responsibility of those using this information to check that it is current prior to specifying or using any of these coating/product systems.

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Please note that this document is only valid for 60 days from the date of issue.

DuluxGroup (Australia) Pty Ltd 1956 Dandenong Road, Clayton, Victoria 3168 AU ABN 67 000 049 427

**Dulux AcraTex 968 AcraSkin Low Gloss / AcraPrime SB / on
Painted Cement Render [Exterior]**

AU_SA10324

Description

High Build Elastomeric Finishing System for Previously Rendered & Painted Masonry

Incorporating:

AcraTex AcraPrime Solvent Base Sealer - penetrating & surface consolidating sealer for aged & weathered surfaces.

AcraTex AcraSkin, weather-proofing elastomeric texture coat, applied by conventional NAP/ textured roller to provide a light stippled appearance with excellent water impermeability, resistance to mould and mildew, high build crack bridging performance to accommodate cement render thermal movement for long term protection of masonry substrates.

Substrate And Substrate Preparation	
Substrate Notes:	CEMENT RENDER / PRE MIXED RENDER CEMENT RENDER Cement Render is a substrate produced by mixing sand and cement that is applied to a surface, usually block-work and brick. Subsequently finished by screeding, floating or sponging to give an even finish. PREMIXED RENDERS Premixed renders are stringently formulated based wall renders that are polymer modified. They are supplied in a dry powder form usually 20kg bags which only require the addition of water to produce a mortar paste that exhibits minimal drying shrinkage and good adhesion to clean masonry substrates. NOTE: Both cement render and premixed renders will produce fine cracks during the drying period. These cracks will open and close as weather conditions change. Renders require a minimum 28 days curing at 25°C & 50% relative humidity before coating.
Substrate Preparation Notes:	PCE007 - NEW CEMENT RENDER / PRE MIXED RENDER ASSESS SUITABILITY Inspect to determine the degree of deterioration of existing coatings. Check coating adhesion using the cross-hatch test as per AS 1580.408.4-1993 : Paints and related materials - Methods of test - Adhesion (cross-cut) CLEAN SURFACE Clean to remove all dirt, dust, efflorescence, laitance, powdery surfaces and all other surface contaminants by using a suitable cleaning agent and rinsing / water blasting clean with water. 1500 2500 PSI water blast Treat mould with an appropriate mould treatment after the substrate has been pressure washed, leave for 24 hours prior to coating. Efflorescence should be wire brushed clean. REPAIR SURFACE IMPERFECTIONS Prepare all areas that have poor adhesion, cracking, peeling and flaking by sanding, power sanding, scraping, wire brushing or grit blast to leave a clean surface. as appropriate. Feather edges of the surrounding sound paint to completely remove visual ridges and wash / dust off to remove debris. Any major design faults leading to structural failure of the plaster coating must be corrected prior to repainting. For cracked plaster which is sound but has cracks > 1mm rake out and fill with Sikadur 31 a two pot epoxy filler which is applied into the crack with a spatula and finish flush with the sound surface, once cured a coat of suitable cement based render can be applied over the repaired area and feather edged on to the existing coating. SANDING Sand the entire cleaned substrate to an even flat gloss level to provide a smooth, even surface and to provide a good key for the new coating system to adhere to. PRIME Prime any bare areas with a suitable deep penetrating primer
Additional Notes:	ASSESS SUITABILITY 1. At Commencement of coating system application to the substrate it shall be deemed that the Applicator has certified that the surface which it is to be applied to is fit receive the specified coating(s) system. When the Applicator is preparing the site sample for approval he should advise the Project Superintendent if the substrate condition is not of sufficient standard to produce the specified finish. 2. The substrate's surface condition must be of consistent density/integrity and not subject to continual wetting, hydrostatic pressure, spalling or other conditions that will cause premature coating failure SUBSTRATE INSPECTION & PREPARATION 1. The surface must be inspected to ensure integrity and uniform consistency. Some cement renders may contain impurities or be contaminated; these contaminants may cause a surface staining resembling 'Rust'. It is therefore important to pick out and remove any contaminants such as rust stains, etc. 2. Drummy sections need to be identified as a hollow ring when tapped this will indicate poor adhesion of the render to substrate it was applied to. Considerations should be to given removing and reinstating using the same original render type/mix to ensure compatibility or as approved by the project consultant. COATING CONSIDERATIONS FOR NEW RENDERS All renders produce surface cracking whilst drying & curing which continue to expand & contract during daily temperature fluctuations allowing water ingress and causing potential discolouration and coating failure. The specified coating needs to accommodate the render's thermal dynamics, protect from atmospheric pollutants, salt air, water ingress, alkali attack, dirt accumulation and carbon dioxide and for maximum crack bridging resistance . A "High Build Acra-Tex Elastomeric Coating System is Recommended. .STAGE 1 – SURFACE PREP ALL SURFACES Rub down textured walls to remove texture peaks by stone or steel trowel to an acceptable and approved level. (Note: I have specified requirements for a test panel – only then will we know what is "acceptable") High pressure wash to remove all surface contamination to leave a clean surface STAGE 2 – SURFACE PREP CRACKS Hairline Cracks: Remove texture by grinding to expose full length of crack. Apply AcraSkin as a filler coat with a nap roller or brush Cracks > Hairline Cracks. Rout out crack and seal with paintable flexible PU sealant. Reinstate textured with 3mm roll -on or s approved and is to be applied by texture roller to the affected areas so as to match texture to surrounding areas STAGE 3 – SURFACE PREP PIN HOLES Apply AcraSkin by nap roller as a filler coat to pin hole areas (this may require multiple coats until pinholes are filled)

Coating System Summary	
1st Coat:	AUDA0442: Dulux AcraTex Acraprime Solvent Based Clear
2nd Coat:	AUDA1392: Dulux AcraTex 968 AcraSkin Low Gloss
3rd Coat:	AUDA1392: Dulux AcraTex 968 AcraSkin Low Gloss
Optional:	AUDA1392: Dulux AcraTex 968 AcraSkin Low Gloss
Please refer to the coating system details below	

Coating System			
Coat Type:	1st Coat	Datasheet:	AUDA0442 Dulux AcraTex Acraprime Solvent Based Clear
Application Methods:	    Air Spray Airless Spray Brush Roller		
	Theoretical Spread Rate * Wet Film Per Coat (microns) Dry Film Per Coat (microns) Recoat Time **	Min 14.1 71 10 16 Hours	Max 7 143 20 Indefinite
Coating Application Details:	Brush, roller, conventional or airless spray. Do not leave primer for longer than 7 days before coating. A time lag between applications of the primer may lead to the build up of surface contaminants that may require the need to wash again. Product should be thoroughly mixed before use. Refer to the DULUX AcraTex Application Manual for detailed application instructions. DULUX AcraTex AcraPrime Solvent Based may be applied by brush, roller and conventional or airless spray. A brush is required to cut in around edges and obstacles. Typical airless set-up: Graco Ultra 500,695,795 using 0.011-0.013 spray tip at approx 1000 psi. When applying Acraprime SB ensure that flooding is not achieved. This will result in a high gloss appearance.		
Additional Coating Details:	Apply in full accordance with Product and Application data sheets -for best results apply by nap roller working well into the substrate profile		
Coat Type:	2nd Coat	Datasheet:	AUDA1392 Dulux AcraTex 968 AcraSkin Low Gloss
Application Methods:	    Airless Spray Brush Roller Other		
	Theoretical Spread Rate * Wet Film Per Coat (microns) Dry Film Per Coat (microns) Recoat Time **	Min 3.1 322 165 4 Hours	Max 2.1 488 250 Indefinite
Coating Application Details:	Brush, Roller, Medium Textured Roller, Airless Spray. When cutting in edges , brush and roll-in a continuous process to avoid differences in gloss level. Application on single areas should be completed uninterrupted. All independent tests are available on request. Product should be thoroughly mixed before use. Refer to the DULUX AcraTex Application Manual for detailed application instructions. NAP ROLLER finish: Apply 2 coats (minimum) using a 10 - 20mm Nap roller at 4 sq.m / litre LOW PROFILE TEXTURE (requires higher material consumption): Apply 1 coat with a low profile black Texture Roller at 2-3 sq.m / litre Apply a 2nd (finishing coat) with a nap roller at 4 sq.m / litre		
Additional Coating Details:	DULUX AcraTex 968 AcraSkin may be applied using a Medium textured Roller sleeve to achieve a soft stipple finish at a spread rate of 2 m²/L.		

Coat Type:	3rd Coat	Datasheet:	AUDA1392 Dulux AcraTex 968 AcraSkin Low Gloss	
Application Methods:	    Airless Spray Brush Roller Other DULUX AcraTex 968 AcraSkin TO BE applied using a Medium textured Roller sleeve to achieve a soft stipple finish at a spread rate of 2 m²/L per coat			
		Min	Max	Recommended
Theoretical Spread Rate *		3.1	2.1	2.1
Wet Film Per Coat (microns)		322	488	488
Dry Film Per Coat (microns)		165	250	250
Recoat Time **		4 Hours	Indefinite	
Coating Application Details:	Brush, Roller, Medium Textured Roller, Airless Spray. When cutting in edges , brush and roll-in a continuous process to avoid differences in gloss level. Application on single areas should be completed uninterrupted. All independent tests are available on request. Product should be thoroughly mixed before use. Refer to the DULUX AcraTex Application Manual for detailed application instructions. NAP ROLLER finish: Apply 2 coats (minimum) using a 10 - 20mm Nap roller at 4 sq.m / litre LOW PROFILE TEXTURE (requires higher material consumption): Apply 1 coat with a low profile black Texture Roller at 2-3 sq.m / litre Apply a 2nd (finishing coat) with a nap roller at 4 sq.m / litre			
Additional Coating Details:	Apply in full accordance with Product and Application data sheets - If applied by nap roller working well into the substrate profile, an extra coat maybe required to achieve the full system DFT of 500 microns Ensure adequate batch tint lots to achieve coverage over single elevations to ensure colour consistency. It is recommended to hold a volume of finish material for future maintenance touch-ups.			
Coat Type:	Optional	Datasheet:	AUDA1392 Dulux AcraTex 968 AcraSkin Low Gloss	
Application Methods:	    Airless Spray Brush Roller Other To all parapet & horizontal areas for additional crack bridging performance			
		Min	Max	Recommended
Theoretical Spread Rate *		4.1	2.1	3.1
Wet Film Per Coat (microns)		244	488	322
Dry Film Per Coat (microns)		125	250	165
Recoat Time **		4 Hours	Indefinite	
Coating Application Details:	Brush, Roller, Medium Textured Roller, Airless Spray. When cutting in edges , brush and roll-in a continuous process to avoid differences in gloss level. Application on single areas should be completed uninterrupted. All independent tests are available on request. Product should be thoroughly mixed before use. Refer to the DULUX AcraTex Application Manual for detailed application instructions. NAP ROLLER finish: Apply 2 coats (minimum) using a 10 - 20mm Nap roller at 4 sq.m / litre LOW PROFILE TEXTURE (requires higher material consumption): Apply 1 coat with a low profile black Texture Roller at 2-3 sq.m / litre Apply a 2nd (finishing coat) with a nap roller at 4 sq.m / litre			
Additional Coating Details:	Additional AcraSkin coating to all horizontal areas only .			

Comments

- Practical spreading rates will vary from quoted theoretical figures depending on substrate porosity, surface roughness, overspray losses, application methods and environmental conditions (e.g. wind).

All preparation and painting must conform to AS2311: The Painting of Buildings

Do not apply paint if Relative Humidity is above 85% or temperature is within 3°C of Dew Point.

Do not apply if the surface temperature is greater than 40°C or below 10°C, or likely to fall below 10°C during the application or drying period.

Dry times apply to a single coat at recommended spread rate and at 25°C and 50% Relative Humidity

Allow longer times under cool, moist, or still conditions and or when applied at high film builds.

Protect from dew, rain and frost for 48 hours when apply at the recommended spread rate.

Avoid application in hot, windy conditions or on hot surfaces cool the surface by hosing with water and paint the cool damp surface.

When using Bright Reds, Oranges, Blues and Yellows or where very light (or dark) colours are applied over highly contrasting colours an extra coat maybe required.

Dulux recommend full coating systems including a top coat. For ALL systems the Texture &/or Base Coat should be tinted in accordance with AcraTex Tint Guide to the specified membrane top coat colour (or a colour as close as possible to the specified colour as product and tint rules allow).

Application techniques should be adjusted to achieve the recommended DFT and finishing standard.

To avoid "Picture Framing" of texture topcoats "wet on wet" cutting in & coating technique is recommended or apply multiple coats thinning the first coat.

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When the Applicator is preparing the site sample for approval he should advise the Project Superintendent if the substrate condition is not of sufficient standard to produce the specified finish.

Where possible avoid dark colours - these will give raise to much higher surface temperature that may cause addition thermal stress and cooling demand to the building envelope and/ or require extra engineering considerations (greater building costs).

Consult Dulux on the potential to use InfraCOOL Heat Reflective Coatings that will keep the surface cooler "like for like" colour.

Glancing light

Joints and panel deformation may be clearly evident under glancing light, casting visible shadows of the minute and uneven projections of the joints.

Glancing light is light that is nearly parallel to the surface of the wall and casts visible shadows and uneven projections of the joints. Just like rendered masonry/ Jointed system any uneven projections will be highlighted and as such are outside the control / scope of this specification. Refer

http://www.dulux.com.au/pdf/tech-advice/DLX_TECH_Glancing-Light.pdf

The coastal area is considered a marine environment and as such salt potentially can shorten the life of the coating systems. Care needs to be taken to wash down all areas twice. Once to remove surface contaminants, and raise salts to the surface and then secondly to remove these salts. Due to the locality, Weather conditions and lag time between applications of the coating system it may require the need to wash again, between coats.

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A DULUX warranty can be provided on request, when the FULL AcraTex system including a membrane topcoat/s is applied by a DULUX AcraTex trained applicator, according to specification, & at the specified spreading rates, & to the surface preparation details described in the DULUX AcraTex Specification Manual.

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Fungi and Algae can exist on virtually any surface (even glass) provided the right conditions for growth are met.

Visible growth on painted surfaces is typically caused by contaminants present together with the presence of high enough levels of moisture to support growth.

Agents in paints become ineffective where they cannot "touch" the growth source (eg where growth emanates from deposits on the film). Additionally the active agents are "consumed" in the process such that protection is time limited where conditions support ongoing growth performance is greatly improved with the inclusion of a membrane Top coat like AcraShield, Elastomeric 201 or AcraSkin.

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Occasionally amber, clear or white spots/streaks are seen on a newly painted surface within the first few weeks after application. They usually appear after light rain or overnight dew and generally located in sheltered areas or areas with limited sun exposure. Under normal conditions surfactant contained in the tinted paint colour is slowly leached to the surface and washed away by rain leaving no trace and is a normal part of drying of any exterior water-based paint. Under certain atmospheric conditions and these surfactants leach or migrate to the paint surface, is concentrated forms and leaves clear or white deposits upon drying. These conditions include cool or humid weather or painting cold substrate and in most cases these marks on the wall surfaces are more noticeable on dark colours, such as browns or dark greens, etc..

The clear/white surfactants that have migrated to the wall surface areas will cause no down grading nor performance changes or long term durability concerns of the paint films integrity and unfortunately have become an appearance issue instead.

They easily removed from the paint film within a week or so of their appearance by washing with warm water & commercial grade detergent or via Nifti or Spray'n'Wipe followed by rinsing with fresh clean water.

Under severe conditions they may reappear once or twice until all the surfactant has been removed. It will be less noticeable each time, and can be removed in the same manner as before. Refer http://www.dulux.com.au/pdf/tech-advice/DLX_TECH_Leaching.pdf

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DuluxGroup (Australia) Pty Ltd 1956 Dandenong Road, Clayton, Victoria 3168 AU ABN 67 000 049 427

**Dulux AcraTex 968 AcraSkin Low Gloss / Green Render Sealer on
Painted Cement Render [Exterior]**

AU_SA10449

Description

High Build Elastomeric Finishing System for Previously Rendered & Painted Masonry

Incorporating:

AcraTex Green Render Sealer Primer Coatt & AcraTex AcraSkin, weather-proofing elastomeric top coat applied by conventional NAP/ textured roller to provide a light stippled appearance with excellent water impermeability, resistance to mould and mildew, high build crack bridging performance to accommodate cement render thermal movement for long term protection of masonry substrates.

Substrate And Substrate Preparation	
Substrate Notes:	CEMENT RENDER / PRE MIXED RENDER CEMENT RENDER Cement Render is a substrate produced by mixing sand and cement that is applied to a surface, usually block-work and brick. Subsequently finished by screeding, floating or sponging to give an even finish. PREMIXED RENDERS Premixed renders are stringently formulated based wall renders that are polymer modified. They are supplied in a dry powder form usually 20kg bags which only require the addition of water to produce a mortar paste that exhibits minimal drying shrinkage and good adhesion to clean masonry substrates. NOTE: Both cement render and premixed renders will produce fine cracks during the drying period. These cracks will open and close as weather conditions change. Renders require a minimum 28 days curing at 25°C & 50% relative humidity before coating.
Substrate Preparation Notes:	PCE007 - NEW CEMENT RENDER / PRE MIXED RENDER ASSESS SUITABILITY Inspect to determine the degree of deterioration of existing coatings. Check coating adhesion using the cross-hatch test.as per AS 1580.408.4-1993 : Paints and related materials - Methods of test - Adhesion (cross-cut) CLEAN SURFACE Clean to remove all dirt, dust, efflorescence, laitance, powdery surfaces and all other surface contaminants by using a suitable cleaning agent and rinsing / water blasting clean with water. 1500 2500 PSI water blast Treat mould with an appropriate mould treatment after the substrate has been pressure washed, leave for 24hours prior to coating. Efflorescence should be wire brushed clean. REPAIR SURFACE IMPERFECTIONS Prepare all areas that have poor adhesion, cracking, peeling and flaking by sanding, power sanding, scraping, wire brushing or grit blast to leave a clean surface. as appropriate. Feather edges of the surrounding sound paint to completely remove visual ridges and wash / dust off to remove debris. Any major design faults leading to structural failure of the plaster coating must be corrected prior to repainting. For cracked plaster which is sound but has cracks > 1mm rake out and fill with Sikadur 31 a two pot epoxy filler which is applied into the crack with a spatula and finish flush with the sound surface, once cured a coat of suitable cement based render can be applied over the repaired area and feather edged on to the existing coating. SANDING Sand the entire cleaned substrate to an even flat gloss level to provide a smooth, even surface and to provide a good key for the new coating system to adhere to. PRIME Prime any bare areas with a suitable deep penetrating primer
Additional Notes:	ASSESS SUITABILITY 1.At Commencement of coating system application to the substrate it shall be deemed that the Applicator has certified that the surface which it is to be applied to is fit receive the specified coating(s)system. When the Applicator is preparing the site sample for approval he should advise the Project Superintendent if the substrate condition is not of sufficient standard to produce the specified finish. 2.The substrates surface condition must be of consistent density/integrity and not subject to continual wetting, hydrostatic pressure, spalling or other conditions that will cause premature coating failure SUBSTRATE INSPECTION & PREPARATION 1.The surface must be inspected to ensure integrity and uniform consistency. Some cement renders may contain impurities or be contaminated; these contaminants may cause a surface staining resembling 'Rust'. It is therefore important to pick out and remove any contaminants such as rust stains, etc. 2.Drummy sections need to be identified as a hollow ring when tapped this will indicate poor adhesion of the render to substrate it was applied to. Considerations should be to given removing and reinstating using the same original render type/mix to ensure compatibility or as approved by the project consultant. COATING CONSIDERATIONS FOR NEW RENDERS All renders produce surface cracking whilst drying & curing which continue to expand & contract during daily temperature fluctuations allowing water ingress and causing potential discolouration and coating failure. The specified coating needs to accommodate the render's thermal dynamics, protect from atmospheric pollutants, salt air, water ingress, alkali attack, dirt accumulation and carbon dioxide and for maximum crack bridging resistance . A "High Build Acra-Tex Elastomeric Coating System is Recommended. .STAGE 1 – SURFACE PREP ALL SURFACES Rub down textured walls to remove texture peaks by stone or steel trowel to an acceptable and approved level. (Note: I have specified requirements for a test panel – only then will we know what is "acceptable") High pressure wash to remove all surface contamination to leave a clean surface STAGE 2 – SURFACE PREP CRACKS Hairline Cracks: Remove texture by grinding to expose full length of crack. Apply AcraSkin as a filler coat with a nap roller or brush Cracks > Hairline Cracks. Rout out crack and seal with paintable flexible PU sealant. Reinstate textured with 3mm roll -on or s approved and is to be applied by texture roller to the affected areas so as to match texture to surrounding areas STAGE 3 – SURFACE PREP PIN HOLES Apply AcraSkin by nap roller as a filler coat to pin hole areas (this may require multiple coats until pinholes are filled)

Coating System Summary

1st Coat:	AUDA1582: Dulux AcraTex Green Render Sealer
2nd Coat:	AUDA1392: Dulux AcraTex 968 AcraSkin Low Gloss
3rd Coat:	AUDA1392: Dulux AcraTex 968 AcraSkin Low Gloss
Optional:	AUDA1392: Dulux AcraTex 968 AcraSkin Low Gloss

Please refer to the coating system details below

Coating System

Coat Type:	1st Coat	Datasheet:	AUDA1582 Dulux AcraTex Green Render Sealer	
Application Methods:	    Air Spray Airless Spray Brush Roller			
		Min	Max	Recommended
Theoretical Spread Rate *		8	8	8
Wet Film Per Coat (microns)		125	125	125
Dry Film Per Coat (microns)		43.75	43.75	43.75
Recoat Time **		120		
Coating Application Details:	Brush, roller and airless spray Brush and roll at the same time to avoid picture framing. Product should be thoroughly mixed before use. Refer to the DULUX AcraTex Application Manual for detailed instructions. A 10-20mm nap roller is used depending on the type of surface profile being overcoated. Typical Airless Spray set up is: Graco Ultra 500 using 0.017-0.019 spray tip at approx. 1000 psi.			
Additional Coating Details:	Apply in full accordance with Product and Application data sheets -for best results apply by nap roller working well into the substrate profile			
Coat Type:	2nd Coat	Datasheet:	AUDA1392 Dulux AcraTex 968 AcraSkin Low Gloss	
Application Methods:	    Airless Spray Brush Roller Other DULUX AcraTex 968 AcraSkin TO BE applied using a Medium textured Roller sleeve to achieve a soft stipple finish at a spread rate of 2 m²/L per coat			
		Min	Max	Recommended
Theoretical Spread Rate *		3.1	2.1	2.1
Wet Film Per Coat (microns)		322	488	488
Dry Film Per Coat (microns)		165	250	250
Recoat Time **		4 Hours	Indefinite	
Coating Application Details:	Brush, Roller, Medium Textured Roller, Airless Spray. When cutting in edges , brush and roll-in a continuous process to avoid differences in gloss level. Application on single areas should be completed uninterrupted. All independent tests are available on request. Product should be thoroughly mixed before use. Refer to the DULUX AcraTex Application Manual for detailed application instructions. NAP ROLLER finish: Apply 2 coats (minimum) using a 10 - 20mm Nap roller at 4 sq.m / litre LOW PROFILE TEXTURE (requires higher material consumption): Apply 1 coat with a low profile black Texture Roller at 2-3 sq.m / litre Apply a 2nd (finishing coat) with a nap roller at 4 sq.m / litre			
Additional Coating Details:	DULUX AcraTex 968 AcraSkin may be applied using a Medium textured Roller sleeve to achieve a soft stipple finish at a spread rate of 2 m²/L.			

Coat Type:	3rd Coat	Datasheet:	AUDA1392 Dulux AcraTex 968 AcraSkin Low Gloss																			
Application Methods:	    Airless Spray Brush Roller Other DULUX AcraTex 968 AcraSkin TO BE applied using a Medium textured Roller sleeve to achieve a soft stipple finish at a spread rate of 2 m²/L per coat																					
		<table><tr><td></td><td>Min</td><td>Max</td><td>Recommended</td></tr><tr><td>Theoretical Spread Rate *</td><td>3.1</td><td>2.1</td><td>2.1</td></tr><tr><td>Wet Film Per Coat (microns)</td><td>322</td><td>488</td><td>488</td></tr><tr><td>Dry Film Per Coat (microns)</td><td>165</td><td>250</td><td>250</td></tr><tr><td>Recoat Time **</td><td>4 Hours</td><td>Indefinite</td><td></td></tr></table>		Min	Max	Recommended	Theoretical Spread Rate *	3.1	2.1	2.1	Wet Film Per Coat (microns)	322	488	488	Dry Film Per Coat (microns)	165	250	250	Recoat Time **	4 Hours	Indefinite	
	Min	Max	Recommended																			
Theoretical Spread Rate *	3.1	2.1	2.1																			
Wet Film Per Coat (microns)	322	488	488																			
Dry Film Per Coat (microns)	165	250	250																			
Recoat Time **	4 Hours	Indefinite																				
Coating Application Details:	Brush, Roller, Medium Textured Roller, Airless Spray. When cutting in edges , brush and roll-in a continuous process to avoid differences in gloss level. Application on single areas should be completed uninterrupted. All independent tests are available on request. Product should be thoroughly mixed before use. Refer to the DULUX AcraTex Application Manual for detailed application instructions. NAP ROLLER finish: Apply 2 coats (minimum) using a 10 - 20mm Nap roller at 4 sq.m / litre LOW PROFILE TEXTURE (requires higher material consumption): Apply 1 coat with a low profile black Texture Roller at 2-3 sq.m / litre Apply a 2nd (finishing coat) with a nap roller at 4 sq.m / litre																					
Additional Coating Details:	Apply in full accordance with Product and Application data sheets - If applied by nap roller working well into the substrate profile, an extra coat maybe required to achieve the full system DFT of 500 microns Ensure adequate batch tint lots to achieve coverage over single elevations to ensure colour consistency. It is recommended to hold a volume of finish material for future maintenance touch-ups.																					
Coat Type:	Optional	Datasheet:	AUDA1392 Dulux AcraTex 968 AcraSkin Low Gloss																			
Application Methods:	    Airless Spray Brush Roller Other For all parapet & horizontal areas for additional crack bridging performance																					
		<table><tr><td></td><td>Min</td><td>Max</td><td>Recommended</td></tr><tr><td>Theoretical Spread Rate *</td><td>4.1</td><td>2.1</td><td>3.1</td></tr><tr><td>Wet Film Per Coat (microns)</td><td>244</td><td>488</td><td>322</td></tr><tr><td>Dry Film Per Coat (microns)</td><td>125</td><td>250</td><td>165</td></tr><tr><td>Recoat Time **</td><td>4 Hours</td><td>Indefinite</td><td></td></tr></table>		Min	Max	Recommended	Theoretical Spread Rate *	4.1	2.1	3.1	Wet Film Per Coat (microns)	244	488	322	Dry Film Per Coat (microns)	125	250	165	Recoat Time **	4 Hours	Indefinite	
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Additional Coating Details:	Additional AcraSkin coating to all horizontal areas only .																					

Comments

- Practical spreading rates will vary from quoted theoretical figures depending on substrate porosity, surface roughness, overspray losses, application methods and environmental conditions (e.g. wind).

All preparation and painting must conform to AS2311: The Painting of Buildings

Do not apply paint if Relative Humidity is above 85% or temperature is within 3°C of Dew Point.

Do not apply if the surface temperature is greater than 40°C or below 10°C, or likely to fall below 10°C during the application or drying period.

Dry times apply to a single coat at recommended spread rate and at 25°C and 50% Relative Humidity

Allow longer times under cool, moist, or still conditions and or when applied at high film builds.

Protect from dew, rain and frost for 48 hours when apply at the recommended spread rate.

Avoid application in hot, windy conditions or on hot surfaces cool the surface by hosing with water and paint the cool damp surface.

When using Bright Reds, Oranges, Blues and Yellows or where very light (or dark) colours are applied over highly contrasting colours an extra coat maybe required.

Dulux recommend full coating systems including a top coat. For ALL systems the Texture &/or Base Coat should be tinted in accordance with AcraTex Tint Guide to the specified membrane top coat colour (or a colour as close as possible to the specified colour as product and tint rules allow).

Application techniques should be adjusted to achieve the recommended DFT and finishing standard.

To avoid "Picture Framing" of texture topcoats "wet on wet" cutting in & coating technique is recommended or apply multiple coats thinning the first coat.

At Commencement of coating system application to the substrate it shall be deemed that the Applicator has certified that the surface which it is to be applied to is fit to receive the specified coating(s) system.

When the Applicator is preparing the site sample for approval he should advise the Project Superintendent if the substrate condition is not of sufficient standard to produce the specified finish.

Where possible avoid dark colours - these will give raise to much higher surface temperature that may cause addition thermal stress and cooling demand to the building envelope and/ or require extra engineering considerations (greater building costs).

Consult Dulux on the potential to use InfraCOOL Heat Reflective Coatings that will keep the surface cooler "like for like" colour.

Glancing light

Joints and panel deformation may be clearly evident under glancing light, casting visible shadows of the minute and uneven projections of the joints.

Glancing light is light that is nearly parallel to the surface of the wall and casts visible shadows and uneven projections of the joints. Just like rendered masonry/ Jointed system any uneven projections will be highlighted and as such are outside the control / scope of this specification. Refer http://www.dulux.com.au/pdf/tech-advice/DLX_TECH_Glancing-Light.pdf

The coastal area is considered a marine environment and as such salt potentially can shorten the life of the coating systems. Care needs to be taken to wash down all areas twice. Once to remove surface contaminants, and raise salts to the surface and then secondly to remove these salts. Due to the locality, Weather conditions and lag time between applications of the coating system it may require the need to wash again, between coats.

This specification is to be read in conjunction with DULUX product data sheets

A DULUX warranty can be provided on request, when the FULL AcraTex system including a membrane topcoat/s is applied by a DULUX AcraTex trained applicator, according to specification, & at the specified spreading rates, & to the surface preparation details described in the DULUX AcraTex Specification Manual.

The dynamics of the substrate is outside the control of Dulux Australia and as such joint deformation or cracking is excluded from warranty terms. Colour change is a natural part of a coating weathering and is excluded from warranty terms

Refer warranty document for full terms and conditions.

Fungi and Algae can exist on virtually any surface (even glass) provided the right conditions for growth are met.

Visible growth on painted surfaces is typically caused by contaminants present together with the presence of high enough levels of moisture to support growth.

Agents in paints become ineffective where they cannot "touch" the growth source (eg where growth emanates from deposits on the film). Additionally the active agents are "consumed" in the process such that protection is time limited where conditions support ongoing growth performance is greatly improved with the inclusion of a membrane Top coat like AcraShield, Elastomeric 201 or AcraSkin.

Refer: <http://www.dulux.com.au/specifier/our-brands/dulux-acratex/more-than-just-render>

The exterior texture coatings should be cleaned on a regular basis. This will help maintain your overall aesthetic appearance and preserve your AcraTex Texture coating system. Cleaning once every year will remove light soil as well as grime and airborne pollutants refer Dulux AcraTex Care & Maintenance Guide

<http://www.dulux.com.au/specifier/our-brands/dulux-acratex/acratex-care-and-maintenance>

When using this specification, the Applicator shall maintain records in accordance with AS 3894 Parts 10, 11 and 12 and others as required by the Project Manager. These records shall be made available for inspection at any time by the Project Manager or authorised representative and submitted to the Principal Contractor upon completion of work.

When using this specification, the Applicator shall maintain records in accordance with AS 3894 Parts 10, 11 and 12 and others as required by the Project Manager. These records shall be made available for inspection at any time by the Project Manager or authorised representative and submitted to the Principal Contractor upon completion of work.

SURFACTANT LEACHING FROM EXTERIOR WATER-BASED COATINGS

Occasionally amber, clear or white spots/streaks are seen on a newly painted surface within the first few weeks after application. They usually appear after light rain or overnight dew and generally located in sheltered areas or areas with limited sun exposure. Under normal conditions surfactant contained in the tinted paint colour is slowly leached to the surface and washed away by rain leaving no trace and is a normal part of drying of any exterior water-based paint. Under certain atmospheric conditions and these surfactants leach or migrate to the paint surface, is concentrated forms and leaves clear or white deposits upon drying. These conditions include cool or humid weather or painting cold substrate and in most cases these marks on the wall surfaces are more noticeable on dark colours, such as browns or dark greens, etc..

The clear/white surfactants that have migrated to the wall surface areas will cause no down grading nor performance changes or long term durability concerns of the paint films integrity and unfortunately have become an appearance issue instead.

They easily removed from the paint film within a week or so of their appearance by washing with warm water & commercial grade detergent or via Nifti or Spray'n'Wipe followed by rinsing with fresh clean water.

Under severe conditions they may reappear once or twice until all the surfactant has been removed. It will be less noticeable each time, and can be removed in the same manner as before. Refer http://www.dulux.com.au/pdf/tech-advice/DLX_TECH_Leaching.pdf

Images



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EDUCATION BUILDING ROOF REPAIR SCHEDULE



Date: 31/08/2018 SP-FA-E-S-700 (E)

NOTES:
1. THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH THE HERITAGE FAÇADE SPECIFICATION AND SCHEDULES, WITH ALL ARCHITECT’S DRAWINGS AND SPECIFICATIONS, AND DRAWINGS AND SPECIFICATIONS PREPARED BY OTHER ENGINEERING DISCIPLINES.
2. THE INFORMATION ON THESE DRAWINGS/SCHEDULES HAS BEEN OBTAINED BY VISUAL OBSERVATIONS ONLY FROM STREET, ROOF LEVEL AND THROUGH INTERNAL BUILDING ACCESS USING BINOCULARS, TELESCOPE AND HIGH-RESOLUTION PHOTOGRAPHY. IT IS LIMITED BY THE PRESENCE OF TREES ON SOME STREET FRONTAGES, AND AT HIGHER LEVEL BY THE ANGLE OF VIEW. ROPE ACCESS DROPS WERE UNDERTAKEN AT LIMITED LOCATIONS AS MARKED.
3. THE LOCATION AND EXTENT OF REPAIRS IS INDICATIVE AND APPROXIMATE ONLY AND SHOULD NOT BE RELIED UPON. EXTENT AND QUANTITIES SHALL BE VERIFIED BY VISUAL INSPECTION BY TENDERERS PRIOR TO QUOTING, AND HANDS-ON INSPECTION PRIOR TO THE COMMENCEMENT OF ANY WORK.
4. THE TECHNICAL EXECUTION OF WORKS REQUIRED IS DOCUMENTED IN THE HERITAGE FAÇADE SPECIFICATION.
5. QUANTITIES PRESENTED IN SCHEDULES ARE REPRESENTATIVE OF THE LIMITED ACCESS AVAILABLE FOR INSPECTION, HAVE NOT BEEN PHYSICALLY MEASURED AND ARE TO BE TAKEN AS INDICATIVE ONLY. TENDERERS SHALL MAKE THEIR OWN ASSESSMENT OF QUANTITIES.
6. ANY WORKS NOT DETAILED ON DRAWINGS OR IN THE ASSOCIATED SCHEDULES BUT REASONABLY ABLE TO BE INFERRED AS NECESSARY FOR THE PROPER EXECUTION OF THE WORKS SHALL BE CARRIED OUT AS PART OF THE WORKS AT NO EXTRA COST TO THE PRINCIPAL.
7. NO CONTINGENCY AMOUNTS HAVE BEEN ALLOWED ON THESE DRAWINGS AND SCHEDULES. THE MAIN CONTRACTOR SHOULD MAKE THEIR OWN % ALLOWANCE FOR CONTINGENCIES.

WORK ITEM KEY	
R	ROOF

PREFIX KEY	
01	ROOF LANTERN 1
02	ROOF LANTERN 2
03	ROOF LANTERN 3
04	ROOF LANTERN 4
05	ROOF LANTERN 5
06	ROOF LANTERN 6
07	ROOF LANTERN 7
08	ROOF LANTERN 8
09	ROOF LANTERN 9
10	ROOF LANTERN 10

Work Item	Description	Total	Units
R1	WINDOW SASH TO BE REPLACED	280	m
R2	WINDOW MULLION TO BE REPLACED	120	m
R3	REPLACED TIMBER FASCIA	11	m
R4	REPLACE COPPER CLADDING	18	m²
DGU	NEW INSULATED GLASS UNIT	220	UNITS

TO BE READ IN CONJUNCTION WITH DRAWINGS
TPE700-701, TDE700-701 & TEE700-703

NOTES:- 1) ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE. 2) DO NOT SCALE THE DRAWING. FOLLOW THE WRITTEN DIMENSIONS. 3) ALL ELEVATIONS ARE VIEWED FROM EXTERIOR UNLESS NOTED OTHERWISE.				Facade Consultant 612 9439 7288 48 Chandos Street St Leonards NSW 2065 PO Box 738 Crows Nest NSW 1585 E:ttwsyd@ttw.com.au	Project SANDSTONE PRECINCT 23-39 BRIDGE STREET SYDNEY 2000	Sheet Subject EDUCATION BUILDING HERITAGE ROOF & METALWORKS SCHEDULE - SHEET 1 OF 7	Scale : NTS Job No 151903	Drawn By: AB Drawing No S-700	Eng RK Revision E	Director NMCC
F FOR TENDER	RK	AB	31.08.18							
Rev	Description	Eng	Drawn	Date						

ROOF LANTERN 1									
Nom.	Building	Prefix	Label	Work Item	Length / Nom	Width	Depth	Amount	Measurement
1	E	(01)	E(01)1	R1	4200			4.2	ln.m
2	E	(01)	E(01)2	R1	650			0.65	ln.m
3	E	(01)	E(01)3	R1	650			0.65	ln.m
4	E	(01)	E(01)4	R1	650			0.65	ln.m
5	E	(01)	E(01)5	R1	650			0.65	ln.m
6	E	(01)	E(01)6	R2	1800			1.8	ln.m
7	E	(01)	E(01)7	R4	1700	650		1.105	m²
8	E	(01)	E(01)8	R2	1800			1.8	ln.m
9	E	(01)	E(01)9	R2	1800			1.8	ln.m
10	E	(01)	E(01)10	R2	900			0.9	ln.m
11	E	(01)	E(01)11	R2	1800			1.8	ln.m
12	E	(01)	E(01)12	R4	1700	650		1.105	m²
13	E	(01)	E(01)13	R2	1800			1.8	ln.m
14	E	(01)	E(01)14	R1	4200			4.2	ln.m
15	E	(01)	E(01)15	R1	650			0.65	ln.m
16	E	(01)	E(01)16	R1	650			0.65	ln.m
17	E	(01)	E(01)17	R1	650			0.65	ln.m
18	E	(01)	E(01)18	R1	4200			4.2	ln.m
19	E	(01)	E(01)19	R2	1800			1.8	ln.m
20	E	(01)	E(01)20	R4	1700	650		1.105	m²
21	E	(01)	E(01)21	R2	1800			1.8	ln.m
22	E	(01)	E(01)22	R2	600			0.6	ln.m
23	E	(01)	E(01)23	R2	600			0.6	ln.m
24	E	(01)	E(01)24	R2	1800			1.8	ln.m
25	E	(01)	E(01)25	R4	1700	650		1.105	m²
26	E	(01)	E(01)26	R2	1800			1.8	ln.m
27	E	(01)	E(01)27	R1	4200			4.2	ln.m
28	E	(01)	E(01)28	R1	650			0.65	ln.m
29	E	(01)	E(01)29	R1	650			0.65	ln.m
30	E	(01)	E(01)30	R1	650			0.65	ln.m
31	E	(01)	E(01)31	R1	4200			4.2	ln.m
32	E	(01)	E(01)32	R2	1800			1.8	ln.m
33	E	(01)	E(01)33	R4	1700	650		1.105	m²
34	E	(01)	E(01)34	R2	1800			1.8	ln.m
35	E	(01)	E(01)35	R2	900			0.9	ln.m
36	E	(01)	E(01)36	R2	900			0.9	ln.m
37	E	(01)	E(01)37	R2	1800			1.8	ln.m
38	E	(01)	E(01)38	R2	1800			1.8	ln.m
39	E	(01)	E(01)39	R4	1700	650		1.105	m²
40	E	(01)	E(01)40	R1	4200			4.2	ln.m
41	E	(01)	E(01)41	R1	650			0.65	ln.m
42	E	(01)	E(01)42	R1	650			0.65	ln.m
43	E	(01)	E(01)43	R1	650			0.65	ln.m
44	E	(01)	E(01)44	R1	650			0.65	ln.m
45	E	(01)	E(01)45	R2	1800			1.8	ln.m
46	E	(01)	E(01)46	R4	1700	650		1.105	m²
47	E	(01)	E(01)47	R2	1800			1.8	ln.m
48	E	(01)	E(01)48	R2	900			0.9	ln.m
49	E	(01)	E(01)49	R2	900			0.9	ln.m
50	E	(01)	E(01)50	R3	1300			1.3	ln.m
51	E	(01)	E(01)51	R4	1700	650		1.105	m²
52	E	(01)	E(01)52	R2	1800			1.8	ln.m
53	E	(01)	E(01)53	R3	3800			3.8	ln.m
54	E	(01)	E(01)54	R3	1300			1.3	ln.m

		NOTES:- 1) ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE. 2) DO NOT SCALE THE DRAWING. FOLLOW THE WRITTEN DIMENSIONS. 3) ALL ELEVATIONS ARE VIEWED FROM EXTERIOR UNLESS NOTED OTHERWISE.  612 9439 7288 48 Chandos Street St Leonards NSW 2065 PO Box 738 Crows Nest NSW 1585 E:ttwsyd@ttw.com.au	Project	Sheet Subject	Scale :	Drawn By:	Eng	Director
			SANDSTONE PRECINCT	EDUCATION BUILDING	NTS	AB	RK	NMcC
			23-39 BRIDGE STREET SYDNEY 2000	HERITAGE ROOF & METALWORKS				
				SCHEDULE - SHEET 2 OF 7				
F FOR TENDER	RK AB 31.08.18				Job No	Drawing No	Revision	
Rev Description Eng Drawn Date					151903	S-700	E	

ROOF LANTERN 2									
Nom.	BUIDLING	Prefix	Label	WORK ITEM	Length / Nom	Width	Depth	Amount	Measurement
1	E	(02)	E(02)1	R1	650			0.65	ln.m
2	E	(02)	E(02)2	R1	650			0.65	ln.m
3	E	(02)	E(02)3	R1	650			0.65	ln.m
4	E	(02)	E(02)4	R2	900			0.9	ln.m
5	E	(02)	E(02)5	R2	900			0.9	ln.m
6	E	(02)	E(02)6	R1	650			0.65	ln.m
7	E	(02)	E(02)7	R1	4200			4.2	ln.m
8	E	(02)	E(02)8	R2	600			0.6	ln.m
9	E	(02)	E(02)9	R2	600			0.6	ln.m
10	E	(02)	E(02)10	R2	1800			1.8	ln.m
11	E	(02)	E(02)11	R2	1800			1.8	ln.m
12	E	(02)	E(02)12	R4	1700	650		1.105	m^2
13	E	(02)	E(02)13	R1	4200			4.2	ln.m
14	E	(02)	E(02)14	R1	4200			4.2	ln.m
15	E	(02)	E(02)15	R4	1700	650		1.105	m^2
16	E	(02)	E(02)16	R2	1800			1.8	ln.m
17	E	(02)	E(02)17	R2	1800			1.8	ln.m
18	E	(02)	E(02)18	R2	1800			1.8	ln.m
19	E	(02)	E(02)19	R2	1800			1.8	ln.m
20	E	(02)	E(02)20	R2	900			0.9	ln.m
21	E	(02)	E(02)21	R2	900			0.9	ln.m

ROOF LANTERN 3									
Nom.	BUIDLING	Prefix	Label	WORK ITEM	Length / Nom	Width	Depth	Amount	Measurement
1	E	(03)	E(03)1	R1	650			0.65	ln.m
2	E	(03)	E(03)2	R2	1800			1.8	ln.m
3	E	(03)	E(03)3	R1	650			0.65	ln.m
4	E	(03)	E(03)4	R1	650			0.65	ln.m
5	E	(03)	E(03)5	R2	600			0.6	ln.m
6	E	(03)	E(03)6	R2	600			0.6	ln.m
7	E	(03)	E(03)7	R1	4200			4.2	ln.m
8	E	(03)	E(03)8	R2	1800			1.8	ln.m
9	E	(03)	E(03)9	R2	1800			1.8	ln.m
10	E	(03)	E(03)10	R1	4850			4.85	ln.m
11	E	(03)	E(03)11	R2	1800			1.8	ln.m
12	E	(03)	E(03)12	R2	1800			1.8	ln.m
13	E	(03)	E(03)13	R3	1500			1.5	ln.m
14	E	(03)	E(03)14	R3	1500			1.5	ln.m
15	E	(03)	E(03)15	R3	1500			1.5	ln.m

				NOTES:- 1) ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE. 2) DO NOT SCALE THE DRAWING. FOLLOW THE WRITTEN DIMENSIONS. 3) ALL ELEVATIONS ARE VIEWED FROM EXTERIOR UNLESS NOTED OTHERWISE.	Facade Consultant TTW Taylor Thomson Whitting 612 9439 7288 48 Chandos Street St Leonards NSW 2065 PO Box 738 Crows Nest NSW 1585 E:ttwsyd@ttw.com.au	Project SANDSTONE PRECINCT 23-39 BRIDGE STREET SYDNEY 2000	Sheet Subject EDUCATION BUILDING HERITAGE ROOF & METALWORKS SCHEDULE - SHEET 3 OF 7	Scale : NTS	Drawn By: AB	Eng RK	Director NMcC			
								Job No 151903	Drawing No S-700	Revision E				
F FOR TENDER	RK	AB	31.08.18											
Rev	Description	Eng	Drawn	Date										

ROOF LANTERN 4									
Nom.	BUIDLING	Prefix	Label	WORK ITEM	Length / Nom	Width	Depth	Amount	Measurement
1	E	(04)	E(04)1	R1	4200			4.2	ln.m
2	E	(04)	E(04)2	R2	650			0.65	ln.m
3	E	(04)	E(04)3	R1	650			0.65	ln.m
4	E	(04)	E(04)4	R1	2200			2.2	ln.m
5	E	(04)	E(04)5	R2	600			0.6	ln.m
6	E	(04)	E(04)6	R2	900			0.9	ln.m
7	E	(04)	E(04)7	R1	900			0.9	ln.m
8	E	(04)	E(04)8	R2	600			0.6	ln.m
9	E	(04)	E(04)9	R2	600			0.6	ln.m
10	E	(04)	E(04)10	R1	900			0.9	ln.m

ROOF LANTERN 5									
Nom.	BUIDLING	Prefix	Label	WORK ITEM	Length / Nom	Width	Depth	Amount	Measurement
1	E	(05)	E(05)1	R1	2200			2.2	ln.m
2	E	(05)	E(05)2	R1	2200			2.2	ln.m
3	E	(05)	E(05)3	R1	2200			2.2	ln.m
4	E	(05)	E(05)4	R1	2200			2.2	ln.m
5	E	(05)	E(05)5	R2	900			0.9	ln.m
6	E	(05)	E(05)6	R2	900			0.9	ln.m
7	E	(05)	E(05)7	R2	900			0.9	ln.m
8	E	(05)	E(05)8	R2	900			0.9	ln.m
9	E	(05)	E(05)9	R2	900			0.9	ln.m
10	E	(05)	E(05)10	R2	900			0.9	ln.m
11	E	(05)	E(05)11	R1	2200			2.2	ln.m
12	E	(05)	E(05)12	R1	2200			2.2	ln.m
13	E	(05)	E(05)13	R2	900			0.9	ln.m
14	E	(05)	E(05)14	R2	900			0.9	ln.m
15	E	(05)	E(05)15	R1	2200			2.2	ln.m
16	E	(05)	E(05)16	R1	2200			2.2	ln.m
17	E	(05)	E(05)17	R2	900			0.9	ln.m
18	E	(05)	E(05)18	R2	900			0.9	ln.m
19	E	(05)	E(05)19	R2	900			0.9	ln.m

					NOTES:- 1) ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE. 2) DO NOT SCALE THE DRAWING. FOLLOW THE WRITTEN DIMENSIONS. 3) ALL ELEVATIONS ARE VIEWED FROM EXTERIOR UNLESS NOTED OTHERWISE.	Facade Consultant TTW Taylor Thomson Whitting 612 9439 7288 48 Chandos Street St Leonards NSW 2065 PO Box 738 Crows Nest NSW 1585 E:ttwsyd@ttw.com.au	Project SANDSTONE PRECINCT 23-39 BRIDGE STREET SYDNEY 2000	Sheet Subject EDUCATION BUILDING HERITAGE ROOF & METALWORKS SCHEDULE - SHEET 4 OF 7	Scale : NTS Drawn By: AB Eng RK Director NMcC				
F FOR TENDER	RK	AB	31.08.18										
Rev	Description	Eng	Drawn	Date									
									Job No 151903 Drawing No S-700 Revision E				

ROOF LANTERN 6									
Nom.	BUIDLING	Prefix	Label	WORK ITEM	Length / Nom	Width	Depth	Amount	Measurement
1	E	(06)	E(06)1	R1	2200			2.2	ln.m
2	E	(06)	E(06)2	R1	2200			2.2	ln.m
3	E	(06)	E(06)3	R1	2200			2.2	ln.m
4	E	(06)	E(06)4	R1	2200			2.2	ln.m
5	E	(06)	E(06)5	R2	900			0.9	ln.m
6	E	(06)	E(06)6	R2	900			0.9	ln.m
7	E	(06)	E(06)7	R2	900			0.9	ln.m
8	E	(06)	E(06)8	R2	900			0.9	ln.m
9	E	(06)	E(06)9	R2	1800			1.8	ln.m
10	E	(06)	E(06)10	R2	900			0.9	ln.m
11	E	(06)	E(06)11	R2	900			0.9	ln.m
12	E	(06)	E(06)12	R1	4200			4.2	ln.m
13	E	(06)	E(06)13	R1	4200			4.2	ln.m
14	E	(06)	E(06)14	R2	900			0.9	ln.m
15	E	(06)	E(06)15	R2	900			0.9	ln.m
16	E	(06)	E(06)16	R2	1800			1.8	ln.m
17	E	(06)	E(06)17	R1	2200			2.2	ln.m
18	E	(06)	E(06)18	R1	2200			2.2	ln.m
19	E	(06)	E(06)19	R2	900			0.9	ln.m
20	E	(06)	E(06)20	R2	900			0.9	ln.m
21	E	(06)	E(06)21	R2	900			0.9	ln.m

ROOF LANTERN 7									
Nom.	BUIDLING	Prefix	Label	WORK ITEM	Length / Nom	Width	Depth	Amount	Measurement
1	E	(07)	E(07)1	R1	2200			2.2	ln.m
2	E	(07)	E(07)2	R1	2200			2.2	ln.m
3	E	(07)	E(07)3	R1	2200			2.2	ln.m
4	E	(07)	E(07)4	R1	2200			2.2	ln.m
5	E	(07)	E(07)5	R2	900			0.9	ln.m
6	E	(07)	E(07)6	R2	900			0.9	ln.m
7	E	(07)	E(07)7	R2	900			0.9	ln.m
8	E	(07)	E(07)8	R2	900			0.9	ln.m
9	E	(07)	E(07)9	R1	2200			2.2	ln.m
10	E	(07)	E(07)10	R1	2200			2.2	ln.m
11	E	(07)	E(07)11	R2	900			0.9	ln.m
12	E	(07)	E(07)12	R2	900			0.9	ln.m
13	E	(07)	E(07)13	R2	900			0.9	ln.m
14	E	(07)	E(07)14	R1	2200			2.2	ln.m
15	E	(07)	E(07)15	R1	2200			2.2	ln.m
16	E	(07)	E(07)16	R2	900			0.9	ln.m
17	E	(07)	E(07)17	R2	900			0.9	ln.m
18	E	(07)	E(07)18	R1	2200			2.2	ln.m
19	E	(07)	E(07)19	R1	2200			2.2	ln.m
20	E	(07)	E(07)20	R2	900			0.9	ln.m
21	E	(07)	E(07)21	R2	900			0.9	ln.m
22	E	(07)	E(07)22	R2	900			0.9	ln.m

					NOTES:- 1) ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE. 2) DO NOT SCALE THE DRAWING. FOLLOW THE WRITTEN DIMENSIONS. 3) ALL ELEVATIONS ARE VIEWED FROM EXTERIOR UNLESS NOTED OTHERWISE.	Facade Consultant TTW Taylor Thomson Whitting 612 9439 7288 48 Chandos Street St Leonards NSW 2065 PO Box 738 Crows Nest NSW 1585 E:ttwsyd@ttw.com.au	Project SANDSTONE PRECINCT 23-39 BRIDGE STREET SYDNEY 2000	Sheet Subject EDUCATION BUILDING HERITAGE ROOF & METALWORKS SCHEDULE - SHEET 5 OF 7	Scale : NTS	Drawn By: AB	Eng RK	Director NMcC		
									Job No 151903	Drawing No S-700	Revision E			
F	FOR TENDER	RK	AB	31.08.18										
Rev	Description	Eng	Drawn	Date										

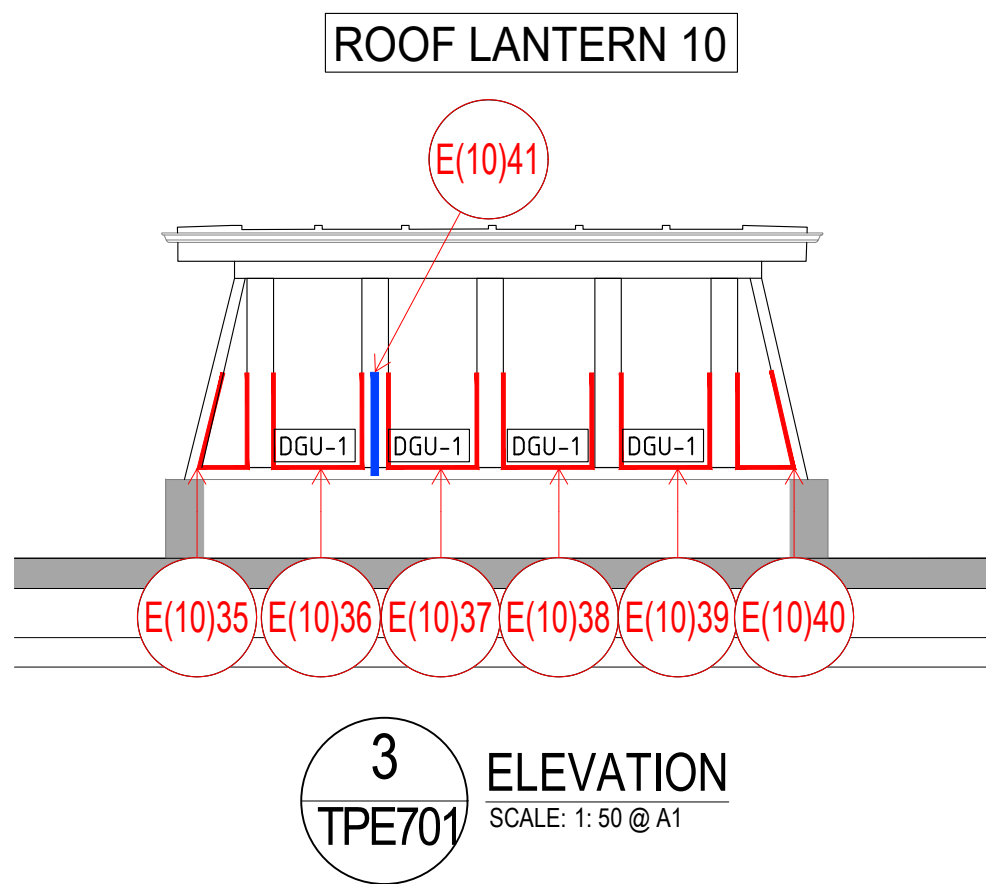
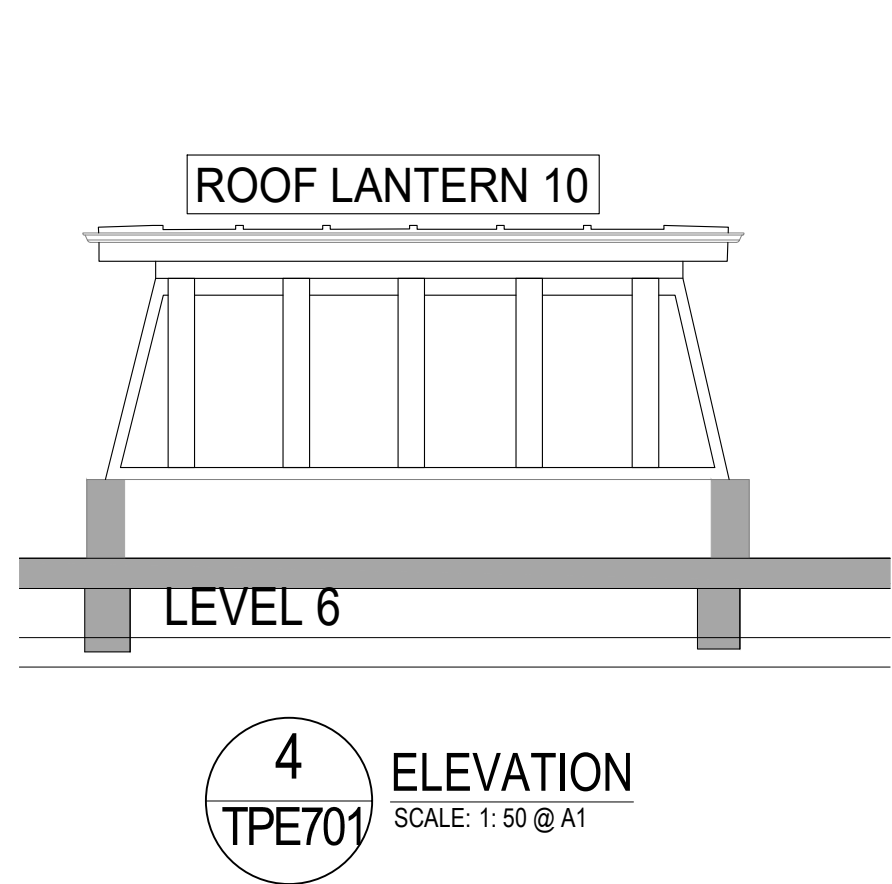
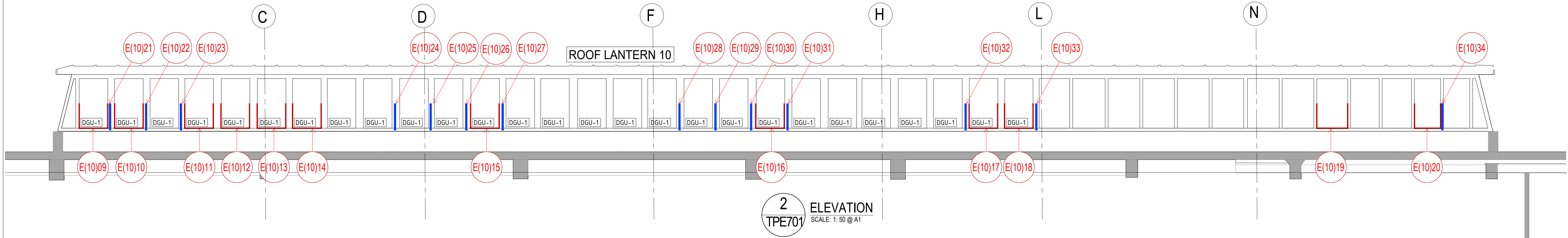
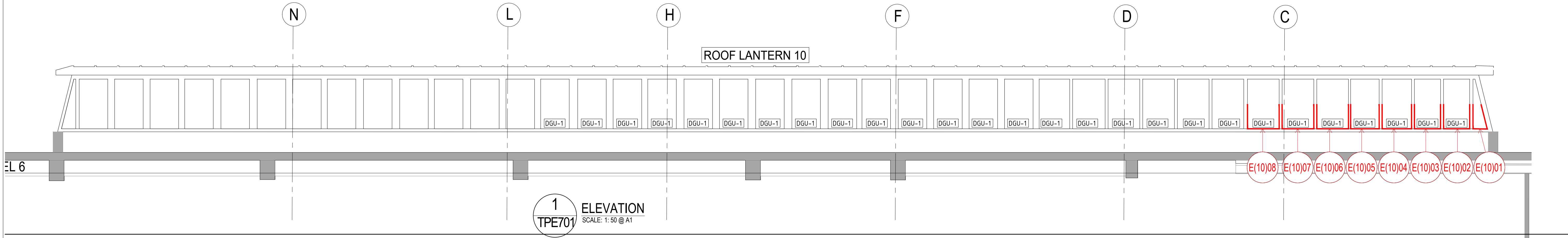
ROOF LANTERN 8									
Nom.	BUIDLING	Prefix	Label	WORK ITEM	Length / Nom	Width	Depth	Amount	Measurement
1	E	(08)	E(08)1	R1	2200			2.2	ln.m
2	E	(08)	E(08)2	R1	2200			2.2	ln.m
3	E	(08)	E(08)3	R1	2200			2.2	ln.m
4	E	(08)	E(08)4	R2	900			0.9	ln.m
5	E	(08)	E(08)5	R2	900			0.9	ln.m
6	E	(08)	E(08)6	R2	900			0.9	ln.m
7	E	(08)	E(08)7	R1	2200			2.2	ln.m
8	E	(08)	E(08)8	R1	2200			2.2	ln.m
9	E	(08)	E(08)9	R1	2200			2.2	ln.m
10	E	(08)	E(08)10	R2	900			0.9	ln.m
11	E	(08)	E(08)11	R1	2200			2.2	ln.m
12	E	(08)	E(08)12	R1	2200			2.2	ln.m
13	E	(08)	E(08)13	R2	900			0.9	ln.m
14	E	(08)	E(08)14	R2	900			0.9	ln.m
15	E	(08)	E(08)15	R2	900			0.9	ln.m
16	E	(08)	E(08)16	R1	2200			2.2	ln.m
17	E	(08)	E(08)17	R2	900			0.9	ln.m

ROOF LANTERN 9									
Nom.	BUIDLING	Prefix	Label	WORK ITEM	Length / Nom	Width	Depth	Amount	Measurement
1	E	(09)	E(09)1	R4	1700	650		1.105	m ²
2	E	(09)	E(09)2	R4	1700	650		1.105	m ²
3	E	(09)	E(09)3	R4	1700	650		1.105	m ²
4	E	(09)	E(09)4	R4	1700	650		1.105	m ²
5	E	(09)	E(09)5	R4	1700	650		1.105	m ²
6	E	(09)	E(09)6	R1	1700			1.7	ln.m
7	E	(09)	E(09)7	R1	1700			1.7	ln.m
8	E	(09)	E(09)8	R1	1700			1.7	ln.m
9	E	(09)	E(09)9	R1	1700			1.7	ln.m
10	E	(09)	E(09)10	R1	1700			1.7	ln.m
11	E	(09)	E(09)11	R1	1700			1.7	ln.m
12	E	(09)	E(09)12	R1	1700			1.7	ln.m
13	E	(09)	E(09)13	R1	1700			1.7	ln.m
14	E	(09)	E(09)14	R1	1700			1.7	ln.m
15	E	(09)	E(09)15	R1	1700			1.7	ln.m
16	E	(09)	E(09)16	R1	1700			1.7	ln.m
17	E	(09)	E(09)17	R4	1700	650		1.105	m ²
18	E	(09)	E(09)18	R2	600			0.6	ln.m
19	E	(09)	E(09)19	R2	600			0.6	ln.m

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F FOR TENDER	RK	AB	31.08.18										
Rev	Description	Eng	Drawn	Date									

ROOF LANTERN 10									
Nom.	BUIDLING	Prefix	Label	WORK ITEM	Length / Nom	Width	Depth	Amount	Measurement
1	E	(10)	E(10)1	R1	4200			4.2	ln.m
2	E	(10)	E(10)2	R1	4200			4.2	ln.m
3	E	(10)	E(10)3	R1	4200			4.2	ln.m
4	E	(10)	E(10)4	R1	4200			4.2	ln.m
5	E	(10)	E(10)5	R1	4200			4.2	ln.m
6	E	(10)	E(10)6	R1	4200			4.2	ln.m
7	E	(10)	E(10)7	R1	4200			4.2	ln.m
8	E	(10)	E(10)8	R1	4200			4.2	ln.m
9	E	(10)	E(10)9	R1	4200			4.2	ln.m
10	E	(10)	E(10)10	R1	4200			4.2	ln.m
11	E	(10)	E(10)11	R1	4200			4.2	ln.m
12	E	(10)	E(10)12	R1	4200			4.2	ln.m
13	E	(10)	E(10)13	R1	4200			4.2	ln.m
14	E	(10)	E(10)14	R1	4200			4.2	ln.m
15	E	(10)	E(10)15	R1	4200			4.2	ln.m
16	E	(10)	E(10)16	R1	4200			4.2	ln.m
17	E	(10)	E(10)17	R1	4200			4.2	ln.m
18	E	(10)	E(10)18	R1	4200			4.2	ln.m
19	E	(10)	E(10)19	R1	4200			4.2	ln.m
20	E	(10)	E(10)20	R1	4200			4.2	ln.m
21	E	(10)	E(10)21	R2	900			0.9	ln.m
22	E	(10)	E(10)22	R2	900			0.9	ln.m
23	E	(10)	E(10)23	R2	900			0.9	ln.m
24	E	(10)	E(10)24	R2	900			0.9	ln.m
25	E	(10)	E(10)25	R2	900			0.9	ln.m
26	E	(10)	E(10)26	R2	900			0.9	ln.m
27	E	(10)	E(10)27	R2	900			0.9	ln.m
28	E	(10)	E(10)28	R2	900			0.9	ln.m
29	E	(10)	E(10)29	R2	900			0.9	ln.m
30	E	(10)	E(10)30	R2	900			0.9	ln.m
31	E	(10)	E(10)31	R2	900			0.9	ln.m
32	E	(10)	E(10)32	R2	900			0.9	ln.m
33	E	(10)	E(10)33	R2	900			0.9	ln.m
34	E	(10)	E(10)34	R2	900			0.9	ln.m
35	E	(10)	E(10)35	R1	4200			4.2	ln.m
36	E	(10)	E(10)36	R1	4200			4.2	ln.m
37	E	(10)	E(10)37	R1	4200			4.2	ln.m
38	E	(10)	E(10)38	R1	4200			4.2	ln.m
39	E	(10)	E(10)39	R1	4200			4.2	ln.m
40	E	(10)	E(10)40	R1	4200			4.2	ln.m
41	E	(10)	E(10)41	R2	900			0.9	ln.m

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F FOR TENDER	RK AB 31.08.18				
Rev Description	Eng Drawn Date				



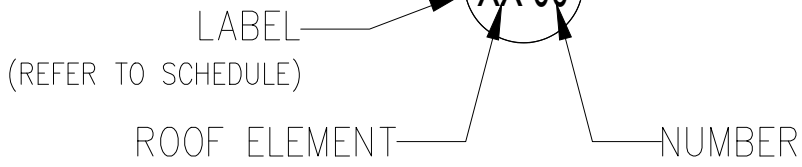
NOTES:

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	R3	REPLACE TIMBER FASCIA AS PER THE EXTENT MARKED
	R4	REPLACE COPPER CLADDING
	DGU	NEW INSULATED (DOUBLE GLAZED) GLASS UNIT

CALL OUT DETAILS :



NOTE - REFER THE ABOVE TABLE WITH THE THE EDUCATION ROOF HERITAGE REPAIR SCHEDULE

Rev	Description	Eng	Drawn	Date
T	FOR TENDER	A.B	A.A	29.10.18
E	FOR TENDER	R.K	S.K	31.08.18
D	FOR OMP	R.K	S.K	27.07.18
C	FOR INFORMATION	R.K	S.K	07.05.18

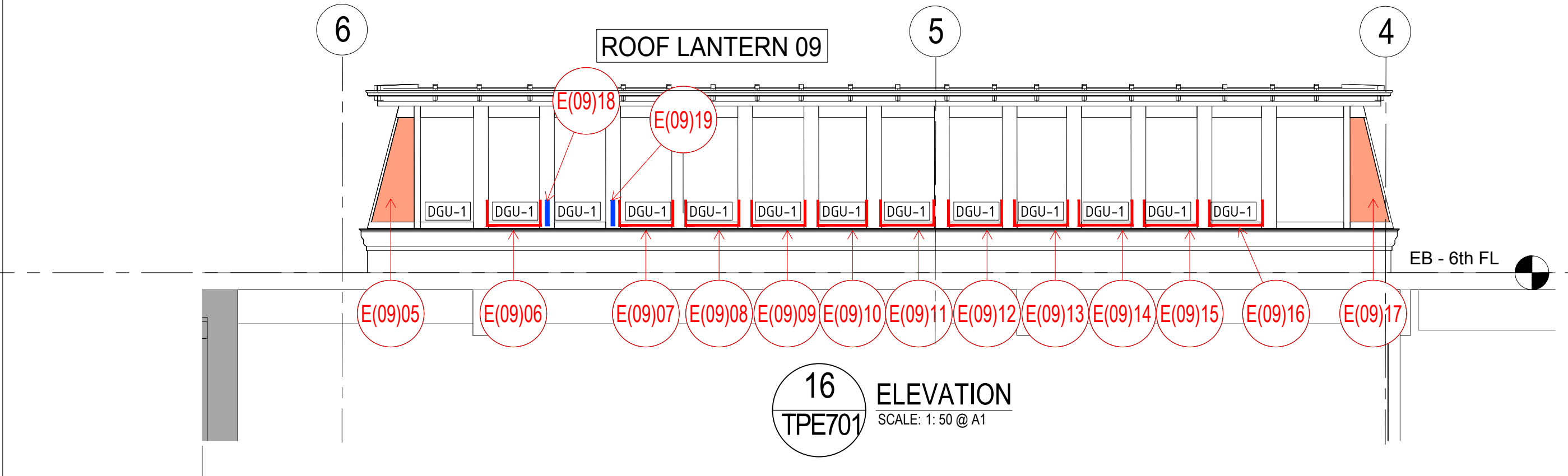
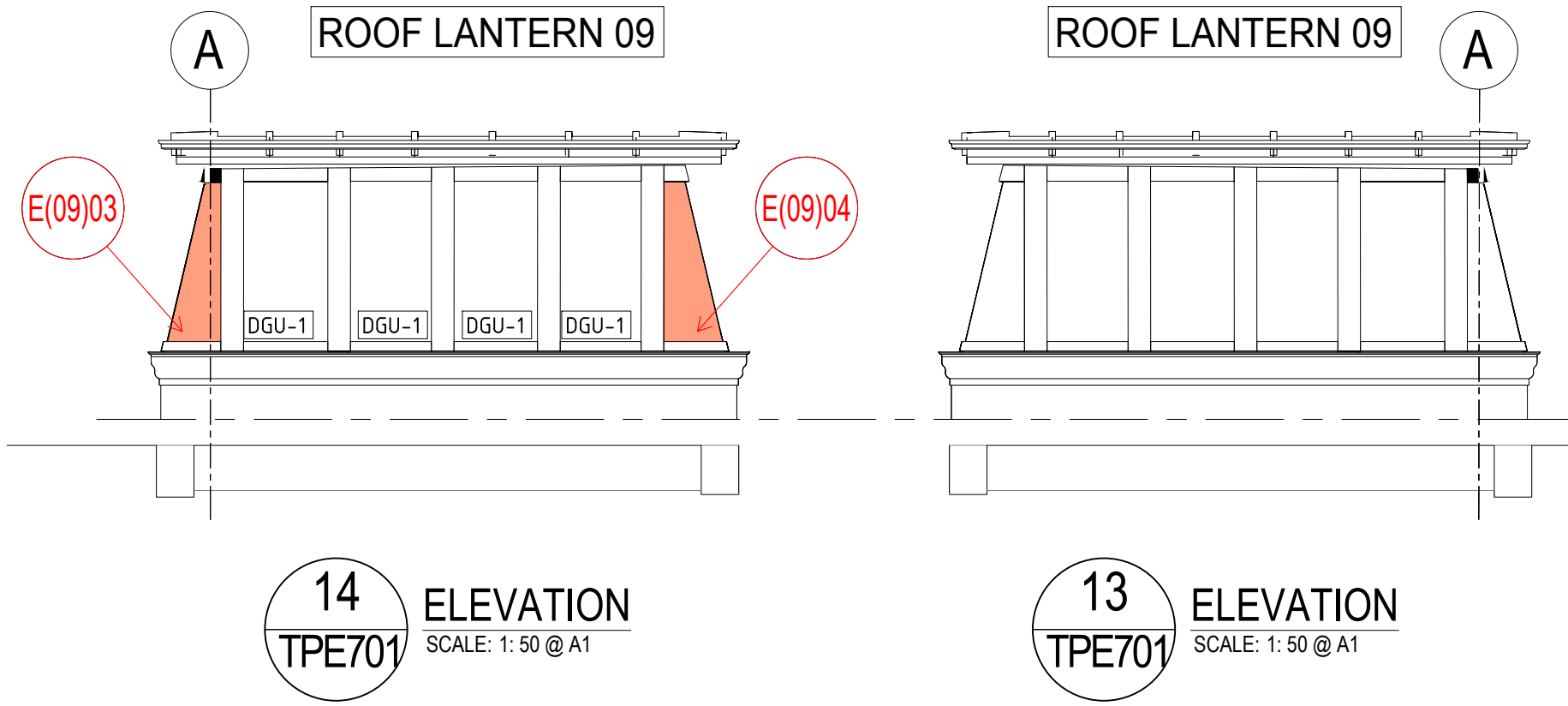
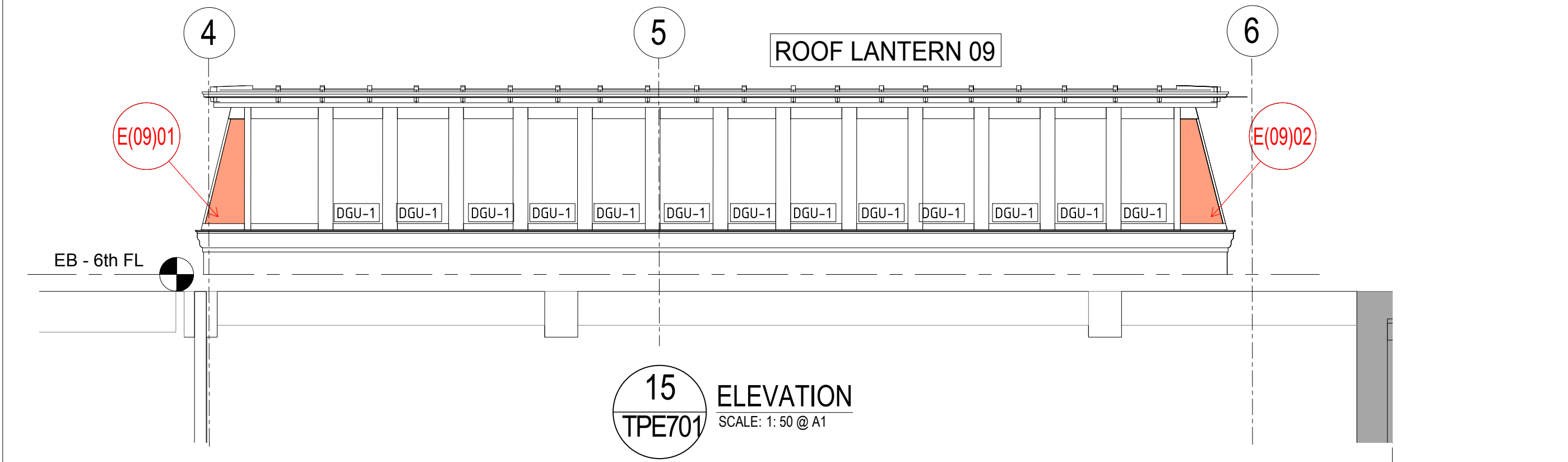
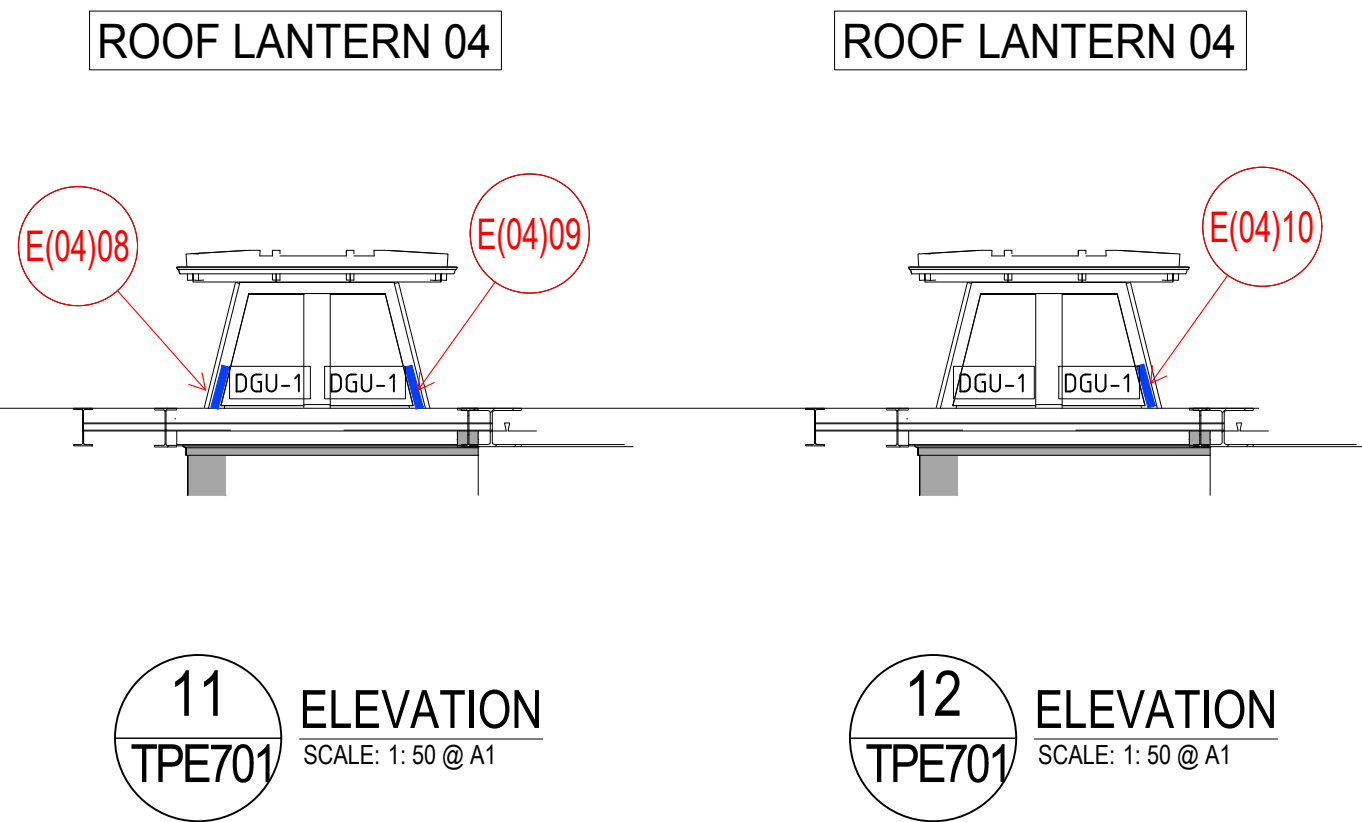
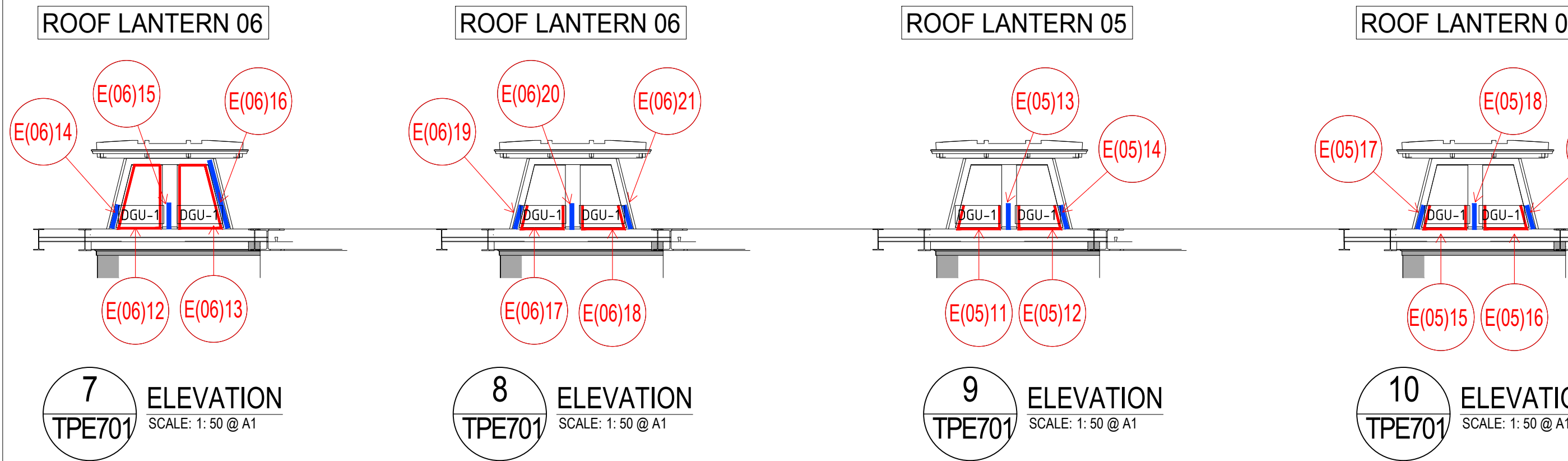
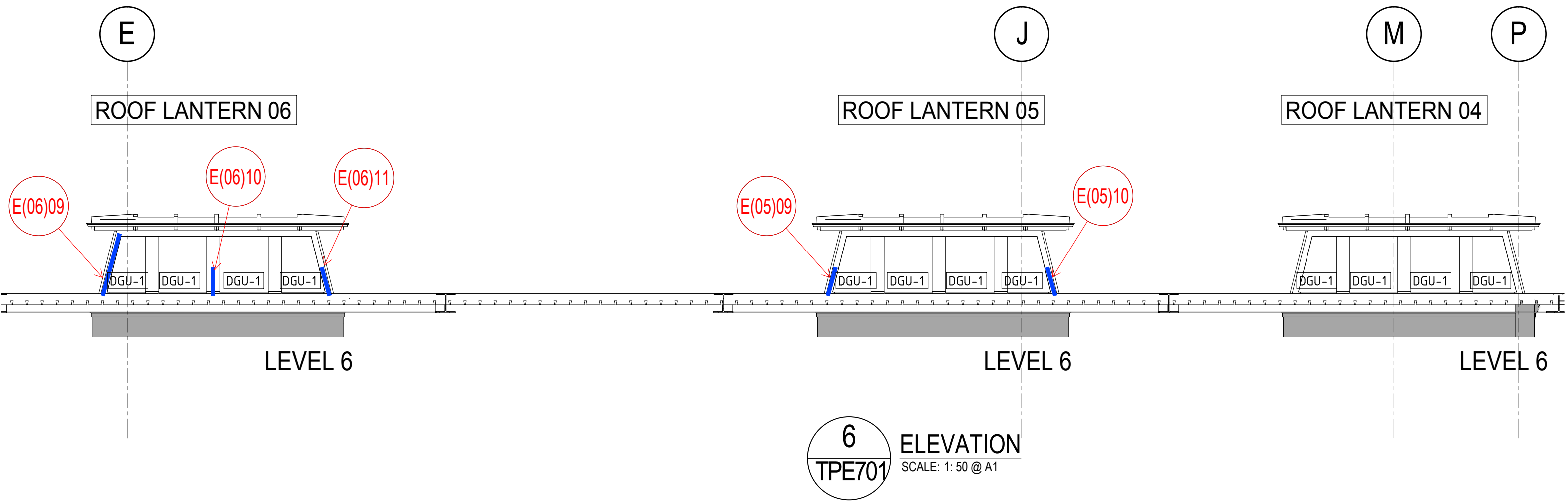
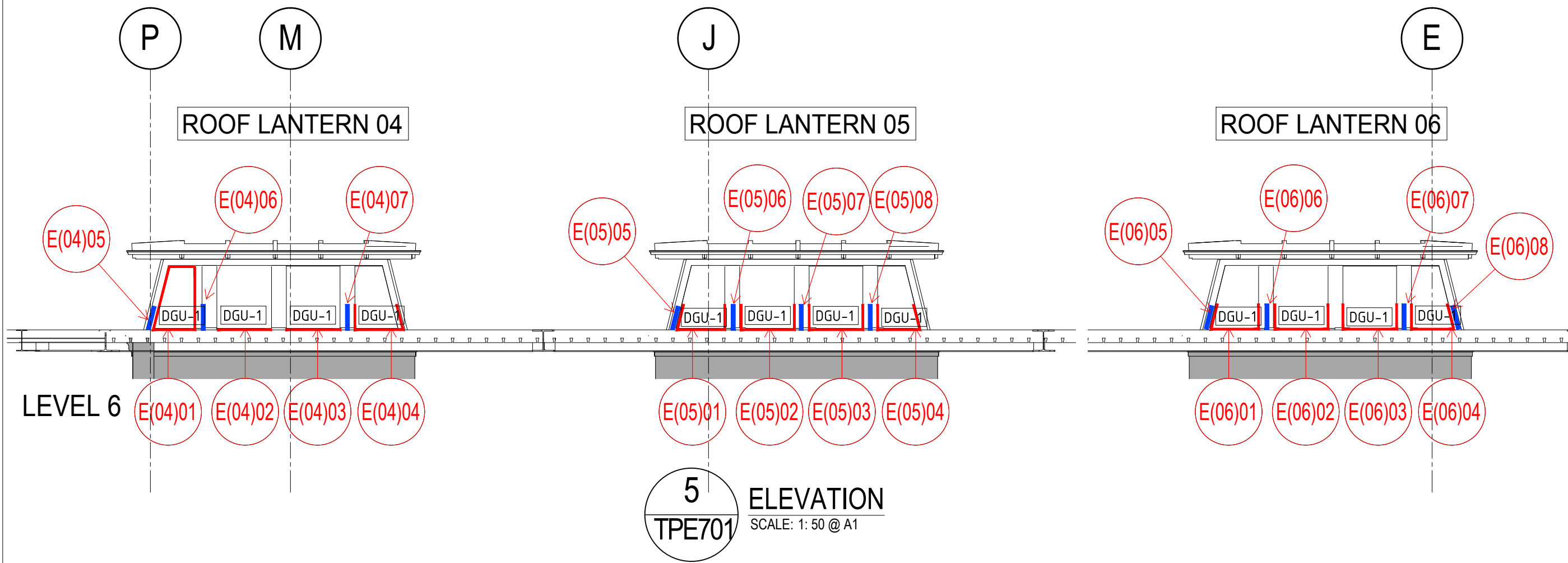
NOTES:
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3) ALL ELEVATIONS ARE VIEWED FROM EXTERIOR UNLESS NOTED OTHERWISE.

Facade Consultant
TTW Taylor Thomson Whitting
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Project
SANDSTONE PRECINCT 23-39 BRIDGE STREET SYDNEY 2000

Sheet Subject
EDUCATION BUILDING HERITAGE ROOF & METAL WORKS ROOF LANTERN ELEVATIONS

Scale : NTS	Drawn By: A.A	Eng A.B	Director P.C
Job No 151903	Drawing No TEE701	Revision F	



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	DGU	NEW INSULATED (DOUBLE GLAZED) GLASS UNIT

CALL OUT DETAILS :

LABEL
(REFER TO SCHEDULE)

ROOF ELEMENT

XX 00

NUMBER

NOTE - REFER THE ABOVE TABLE WITH THE THE EDUCATION ROOF HERITAGE REPAIR SCHEDULE

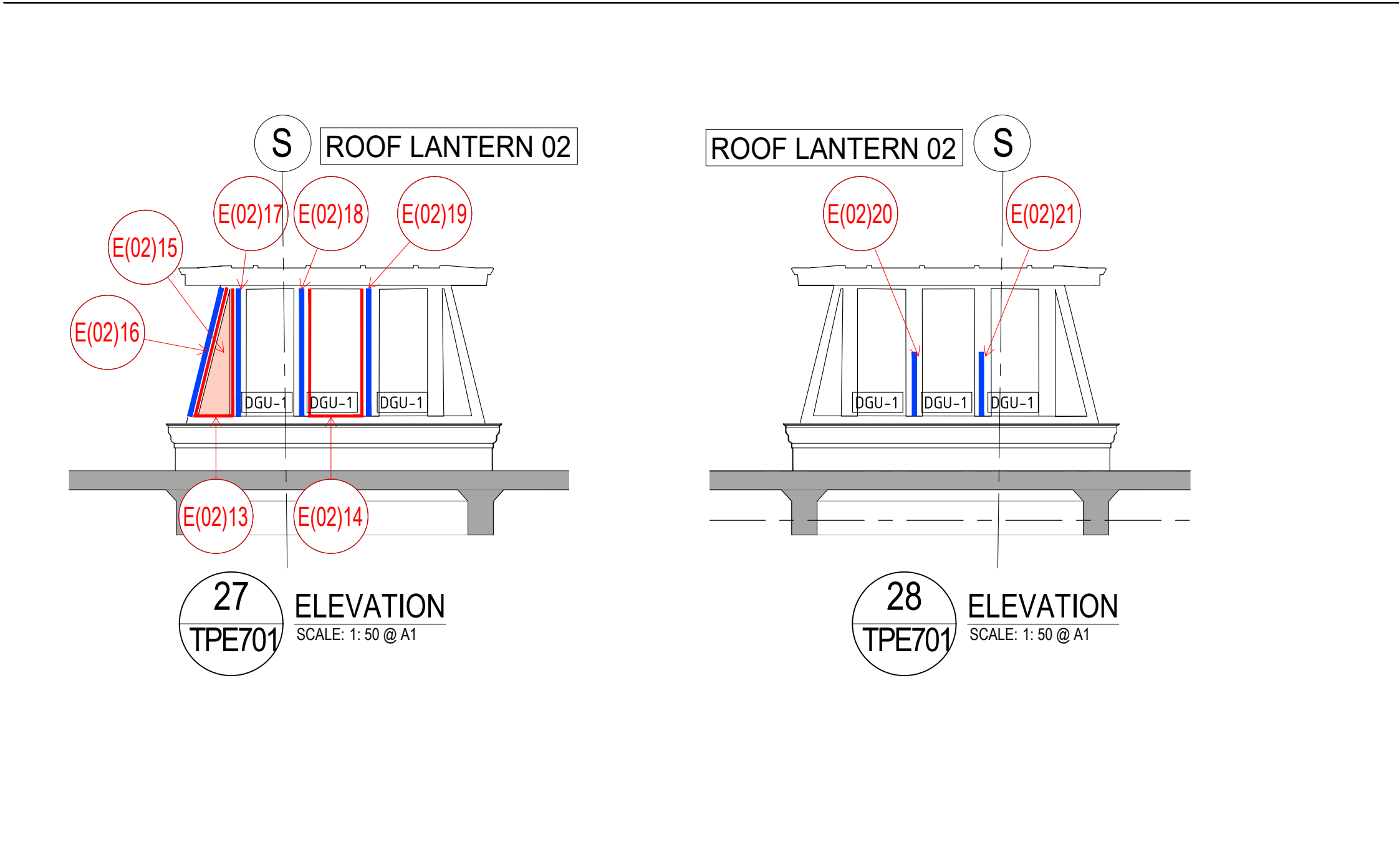
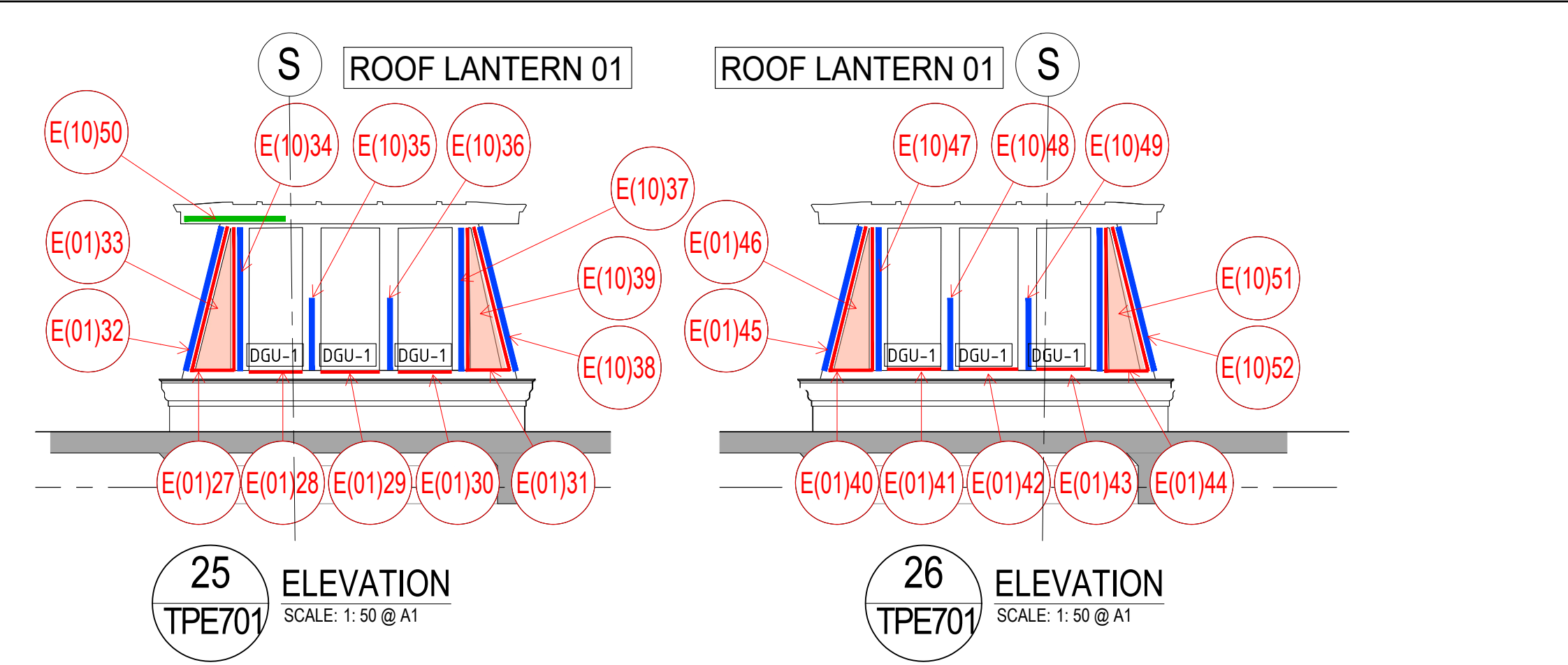
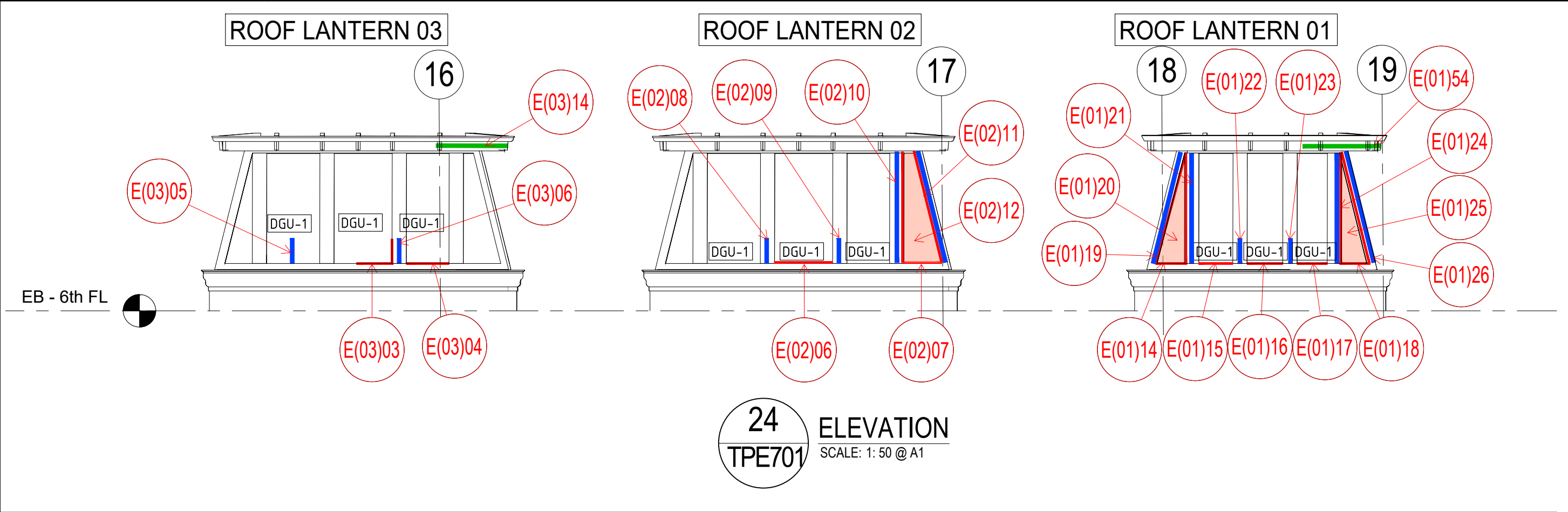
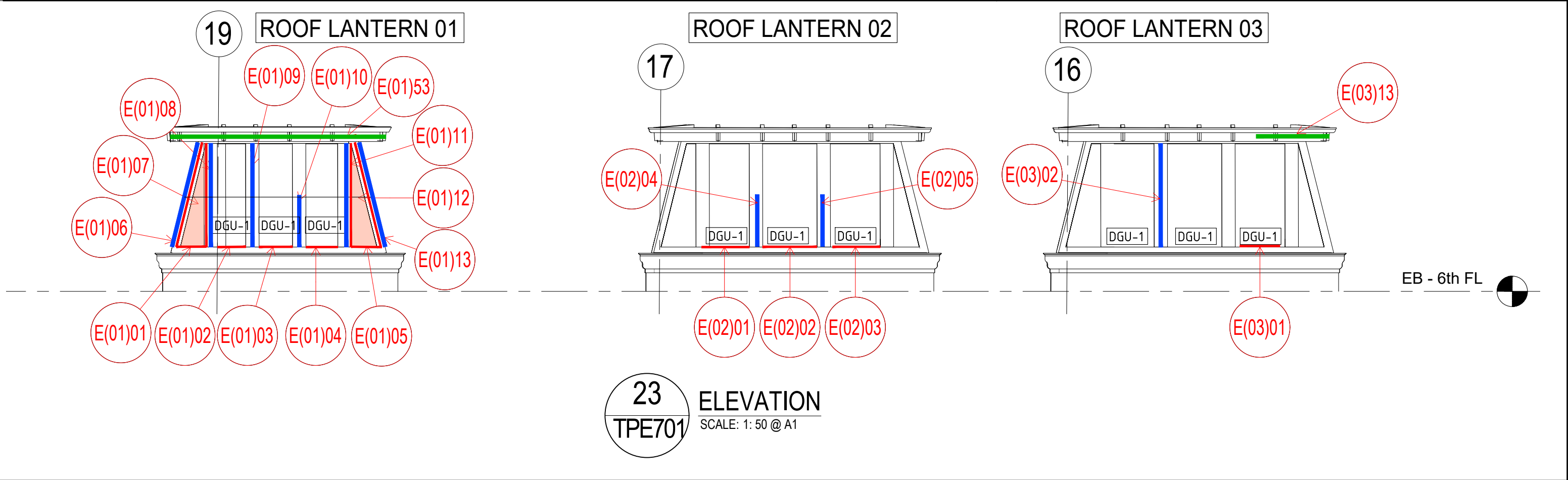
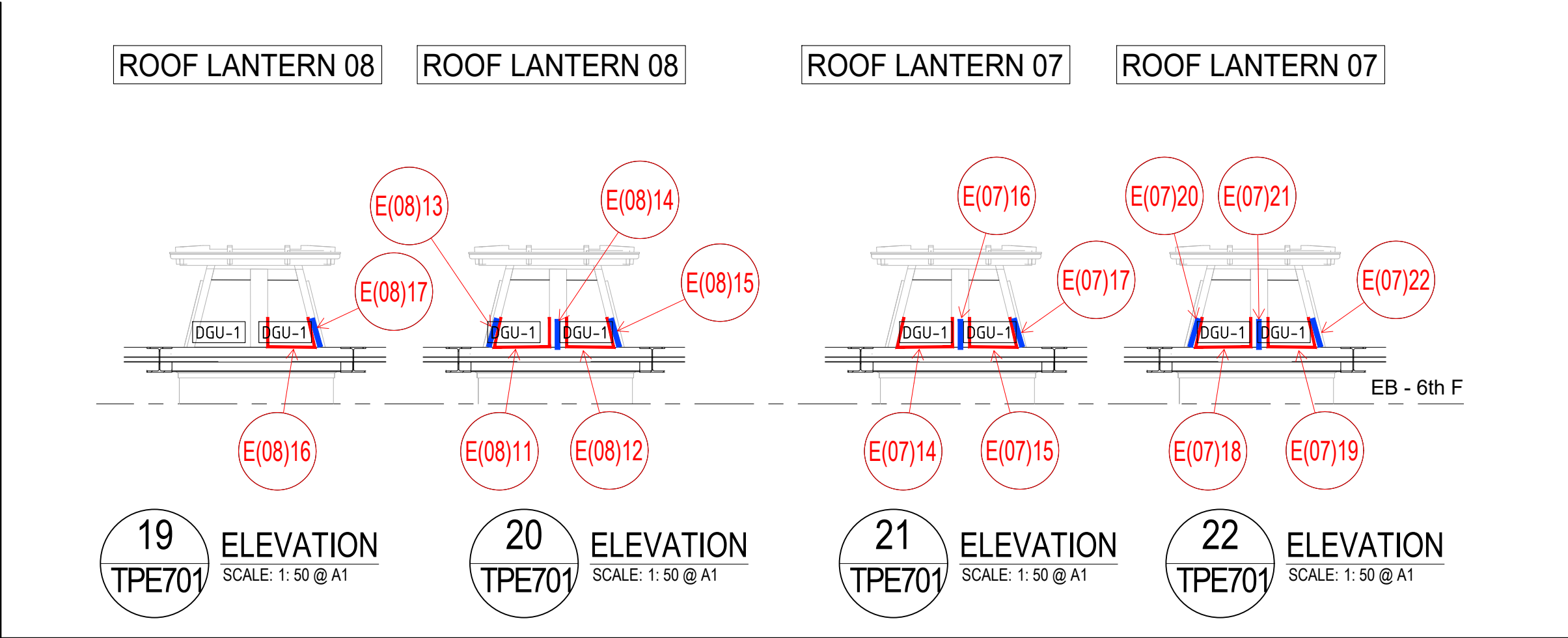
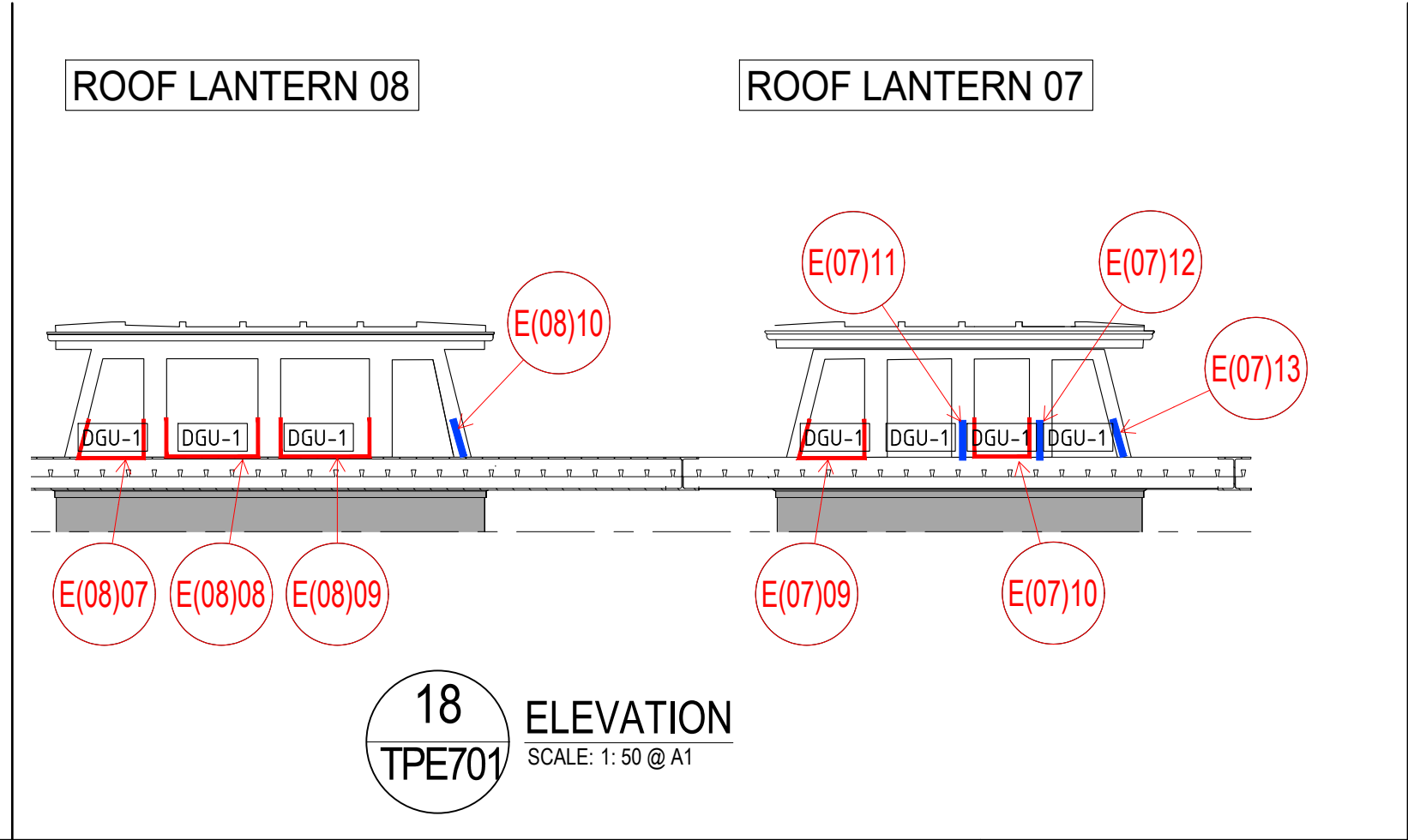
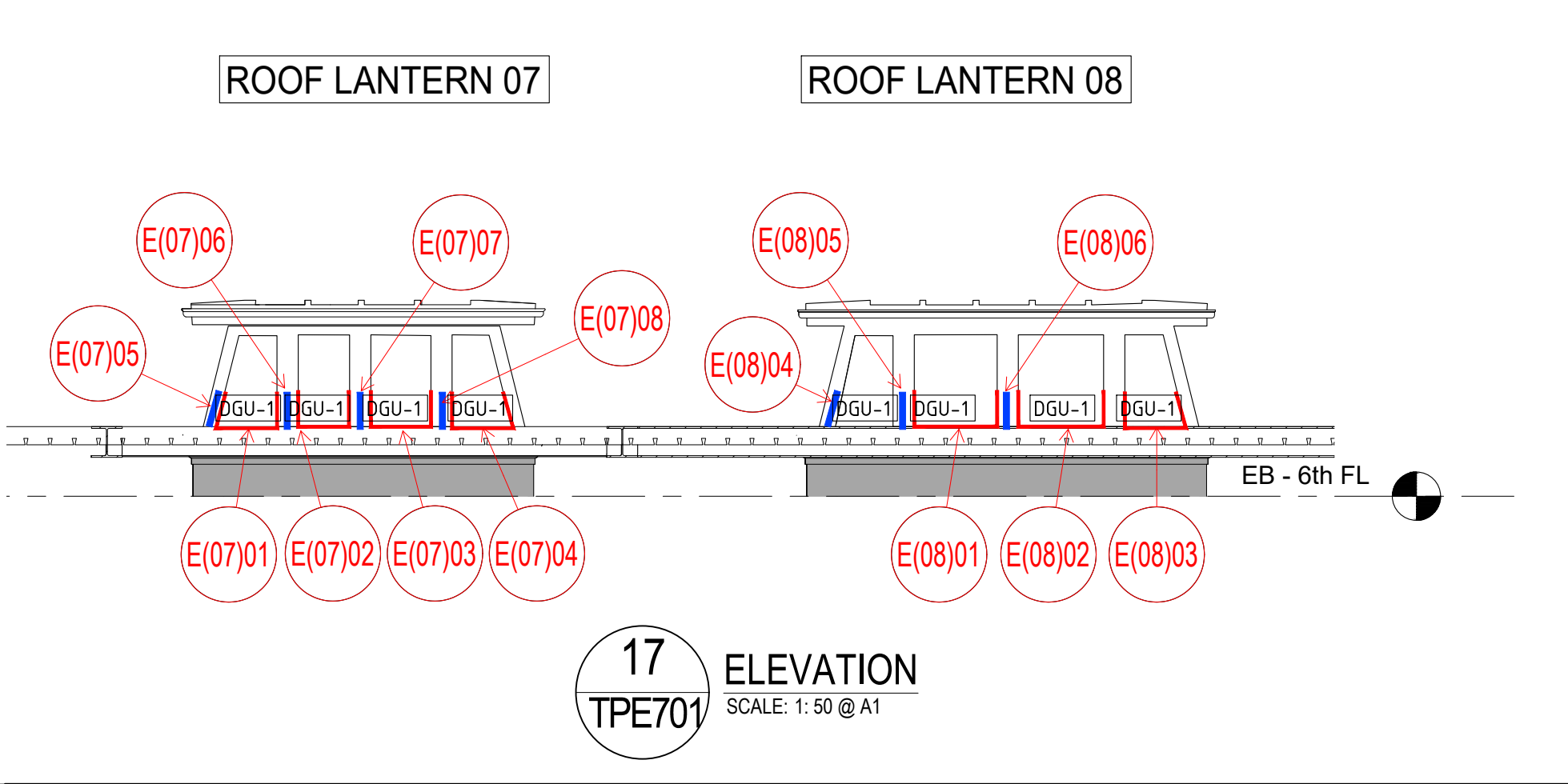
Rev	Description	Eng	Drawn	Date
E	FOR TENDER	RK	SK	31.08.18
D	FOR INFORMATION	RK	SK	27.07.18
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Facade Consultant
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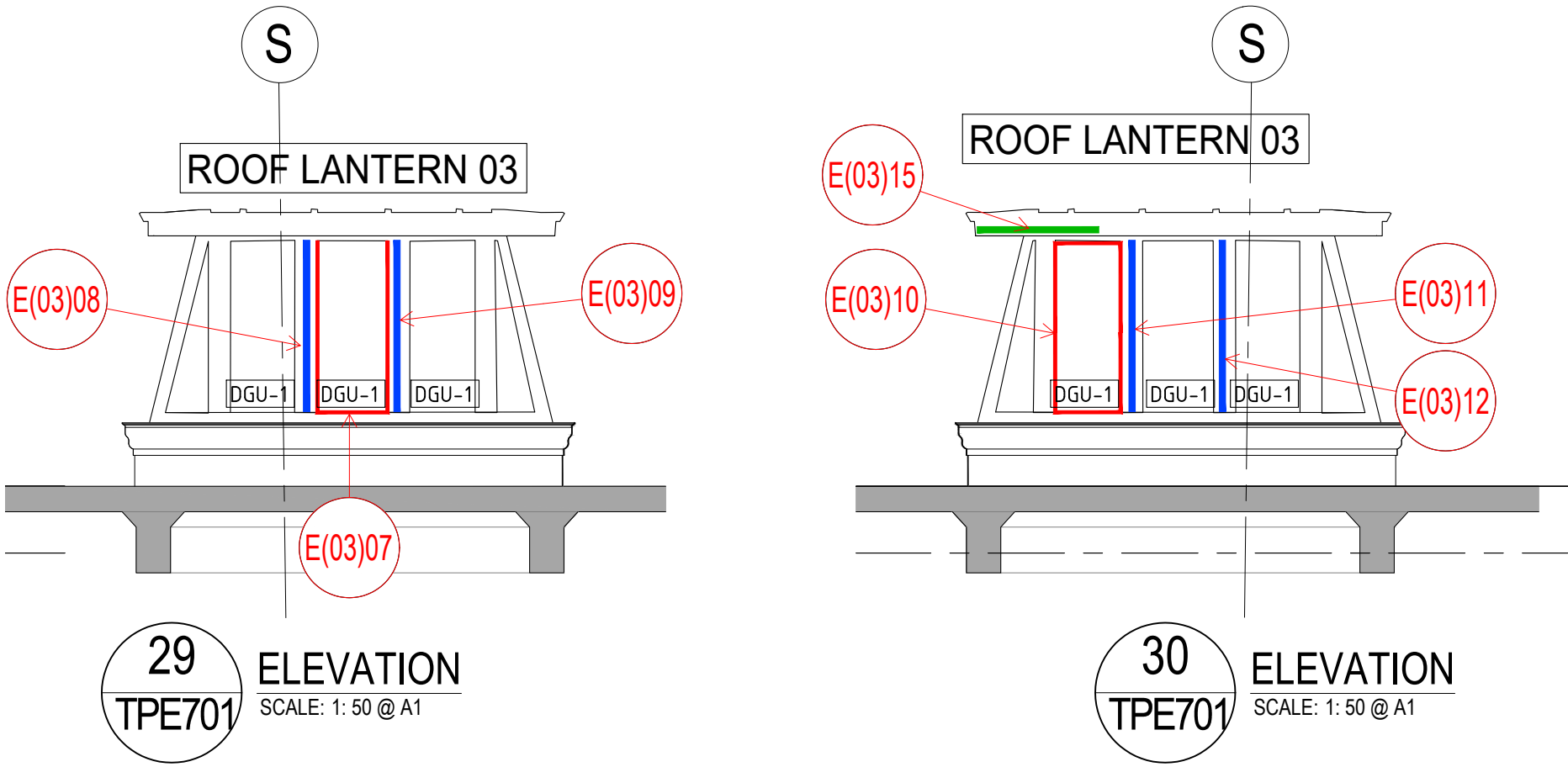
Project
SANDSTONE PRECINCT
23-39 BRIDGE STREET SYDNEY 2000

Sheet Subject
**EDUCATION BUILDING
HERITAGE ROOF & METALWORKS
ROOF LANTERN ELEVATIONS**

Scale: NTS
Drawn By: SK
Eng: AB
Director: PC
Job No: 151903
Drawing No: TEE702
Revision: E



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CALL OUT DETAILS :

LABEL
(REFER TO SCHEDULE)

ROOF ELEMENT

XX 00

NUMBER

NOTE - REFER THE ABOVE TABLE WITH THE THE EDUCATION ROOF HERITAGE REPAIR SCHEDULE

Rev	Description	Eng	Drawn	Date
1	FOR TENDER	A.B	A.A	29.10.18
2	FOR TENDER	RK	SK	31.08.18
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Project
SANDSTONE PRECINCT
23-39 BRIDGE STREET SYDNEY 2000

Sheet Subject
**EDUCATION BUILDING
HERITAGE ROOF & METAL WORKS
ROOF LANTERN ELEVATIONS**

Scale: NTS
Drawn By: A.A
Eng: A.B
Director: PC
Job No: 151903
Drawing No: TEE703
Revision: F

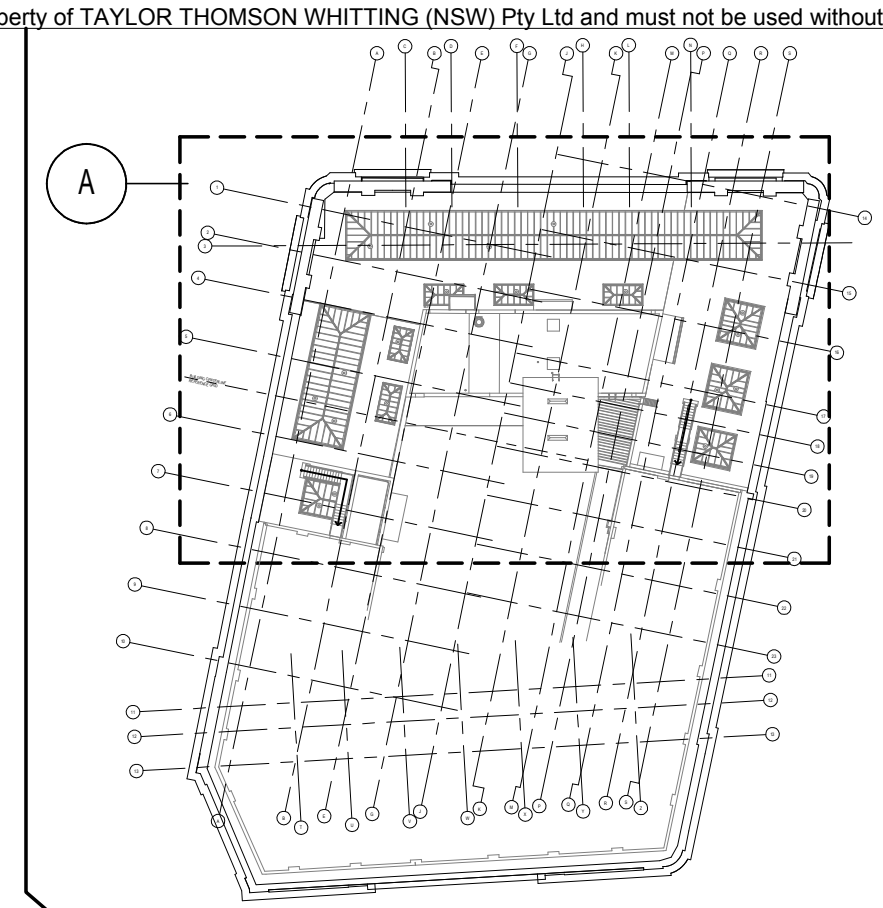
EDUCATION BUILDING ROOF AND METAL WORKS COVER SHEET

DRAWING LIST FOR ROOF AND METAL WORKS EDUCATION			
DRAWING NUMBER	DESCRIPTION	REVISION	ISSUE
TPE700	COVER SHEET	E	FOR TENDER
TPE701	MARKING PLAN OF EDUCATION ROOF- ROOF LANTERNS	E	FOR TENDER
TEE701	EDUCATION ROOF ELEVATIONS- ROOF LANTERNS	E	FOR TENDER
TEE702	EDUCATION ROOF ELEVATIONS- ROOF LANTERNS	E	FOR TENDER
TEE703	EDUCATION ROOF ELEVATIONS- ROOF LANTERNS	E	FOR TENDER
TDE700	ENLARGED DETAILS OF ROOF LANTERN WINDOW	C	FOR TENDER
TDE701	ENLARGED DETAILS OF ROOF LANTERN WINDOW	C	FOR TENDER

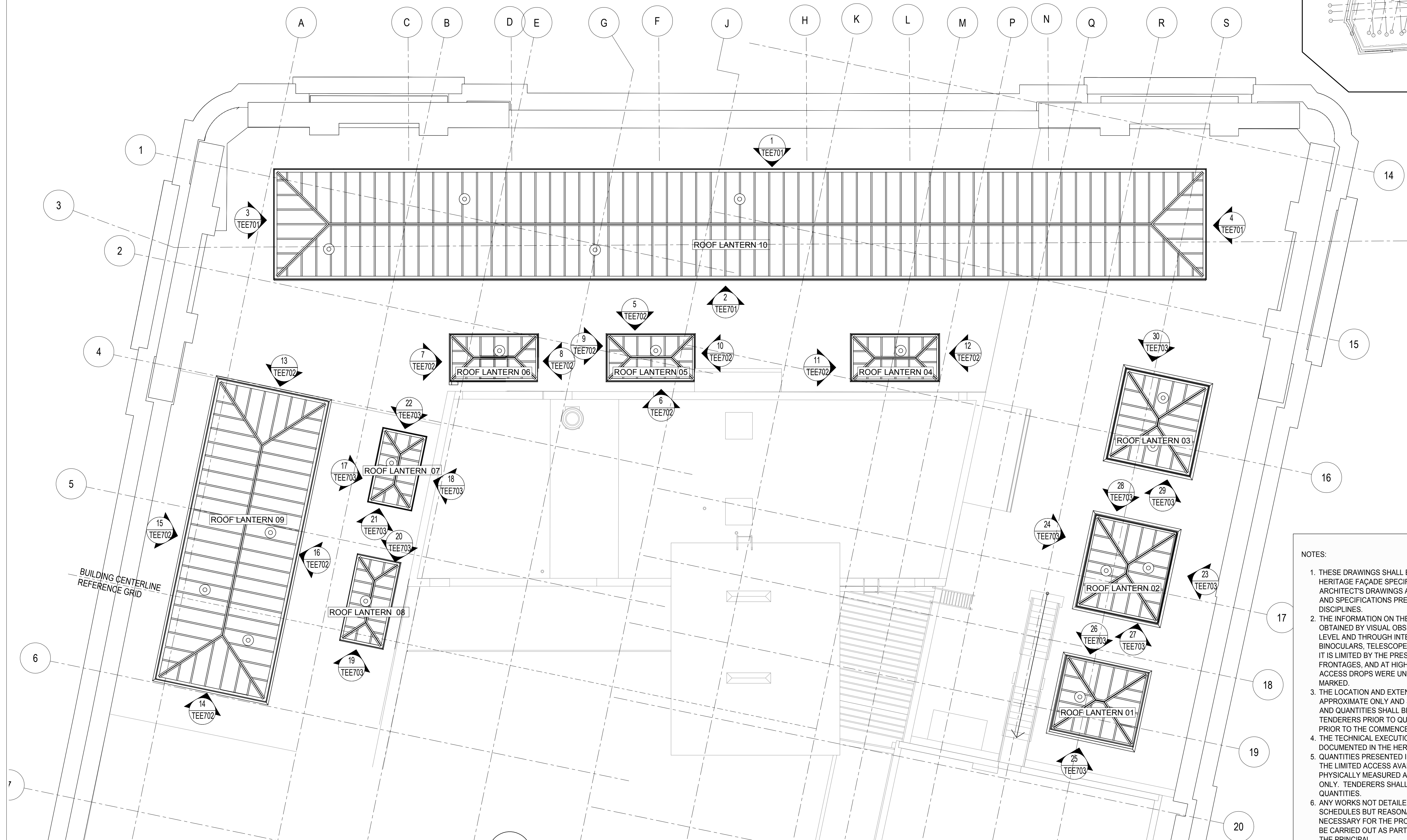
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NOTE: ALL FRAMES DESIGNED AND REFITTED WITH DGU
REFER TO WINDOW ELEVATIONS



KEY PLAN



A ENLARGED MARKING PLAN OF ROOF AND METAL WORK - EDUCATION BUILDING - LEVEL 6 (EXISTING LEVEL 8)
SCALE: 1:1 @ A3

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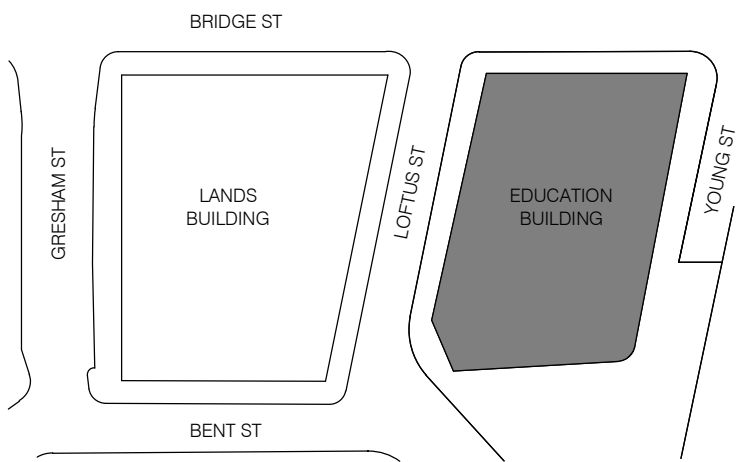
Facade Consultant
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612 9439 7288 | 48 Chandos Street St Leonards NSW 2065
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Project
SANDSTONE PRECINCT
23-39 BRIDGE STREET SYDNEY 2000

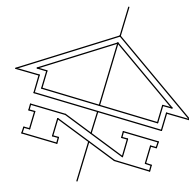
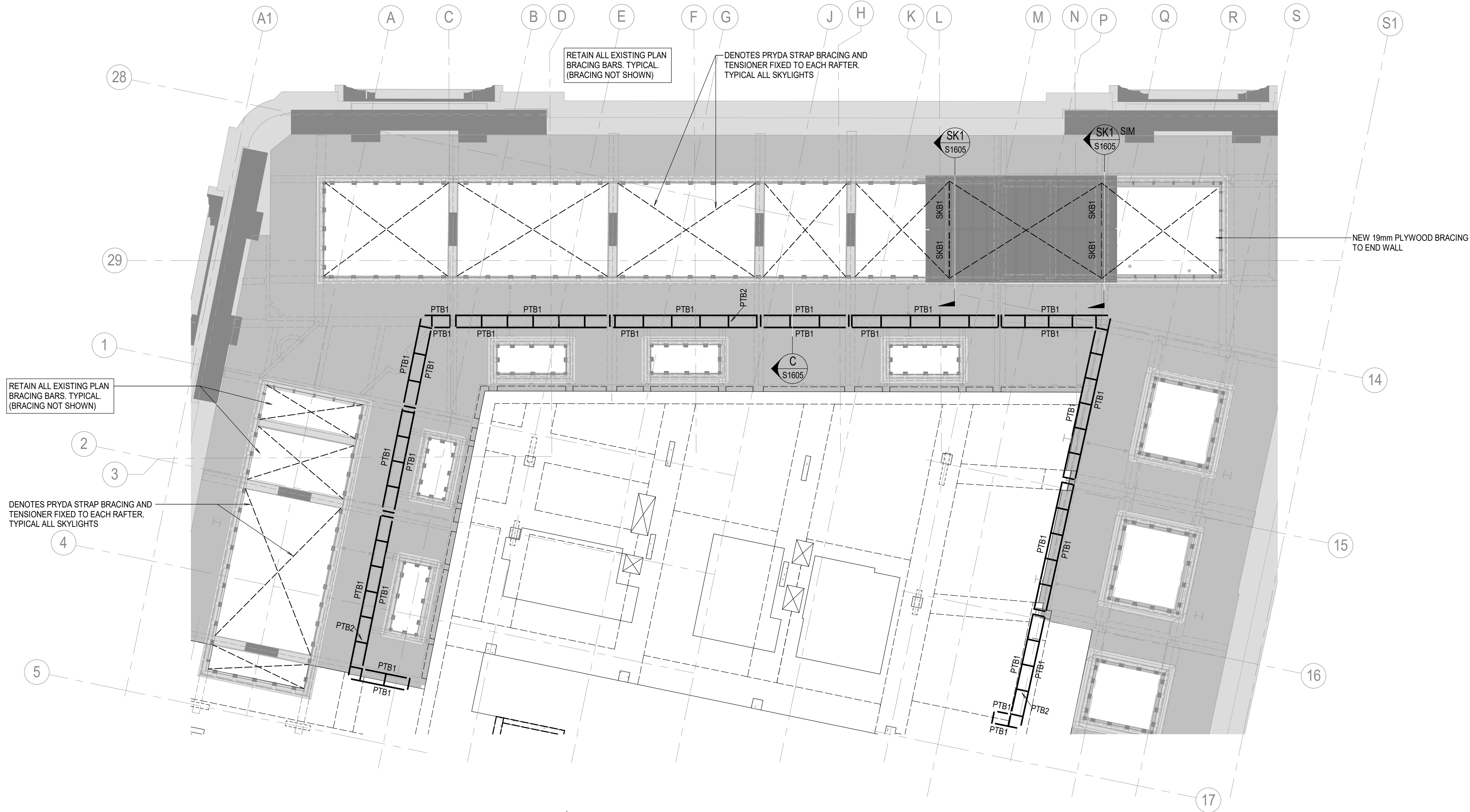
Sheet Subject
**EDUCATION BUILDING HERITAGE
ROOF AND METAL WORKS
MARKING PLAN**

Scale	Drawn By	Eng	Director
NTS	SK	AB	PC
Job No	Drawing No	Revision	
151903	TPE701	E	

KEY PLAN



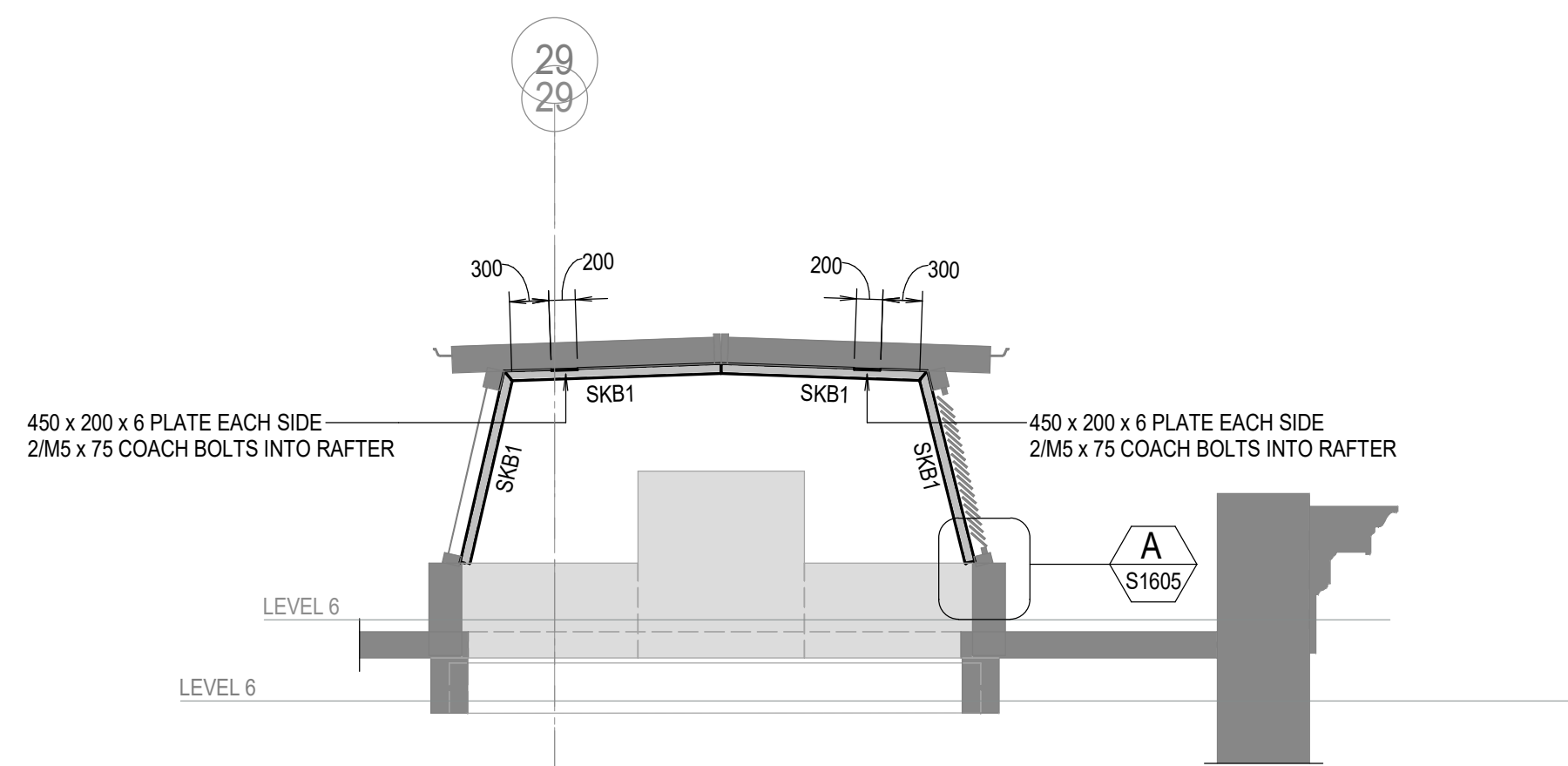
DRAWING TO BE PRINTED IN COLOUR



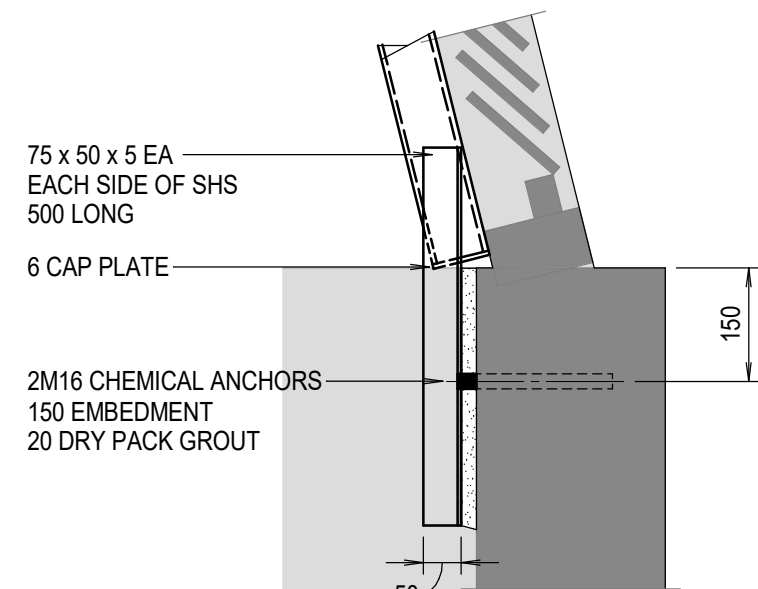
LEVEL 6 FRAMING PLAN

SCALE 1:100

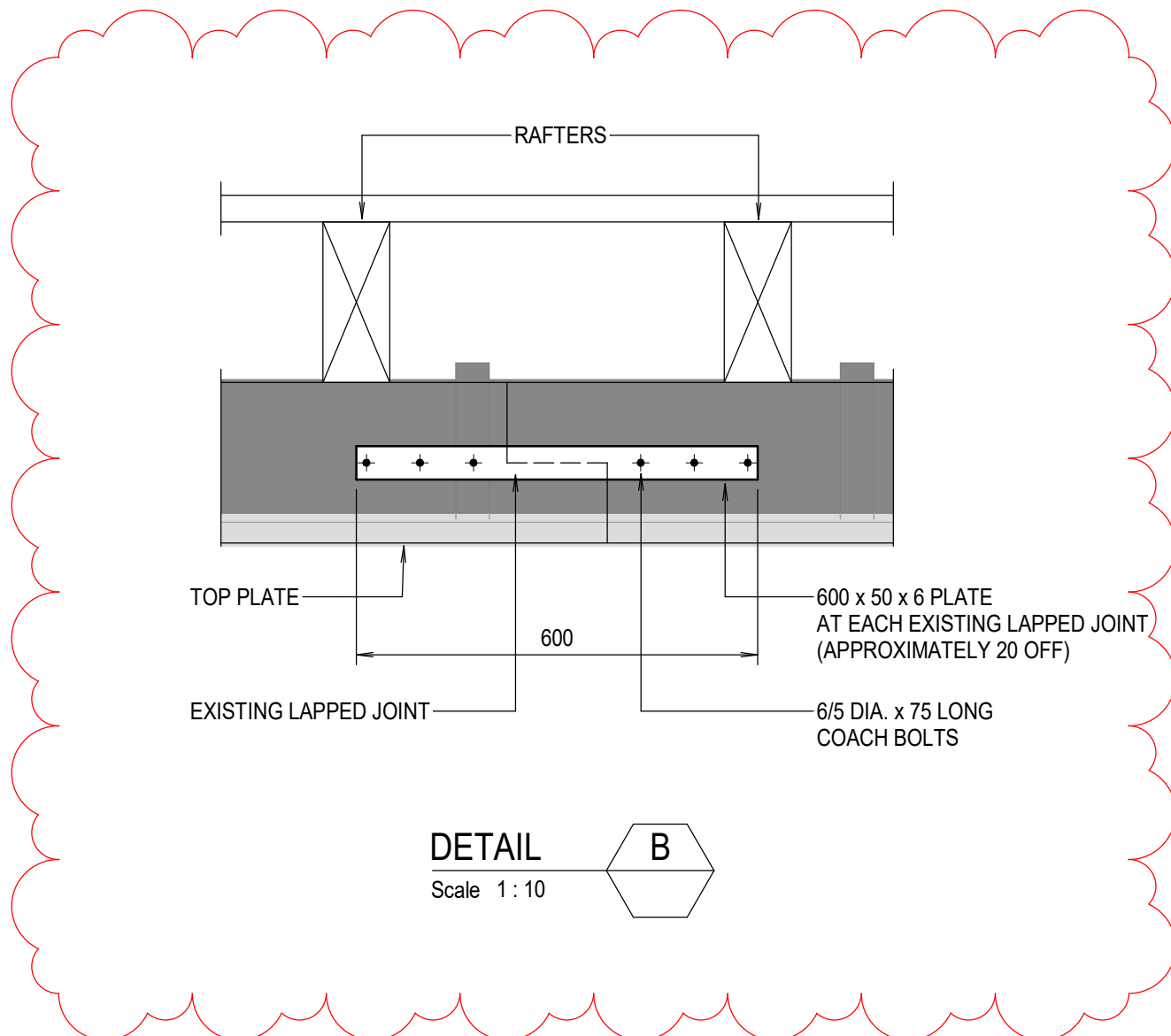
SKYLIGHT STEEL MEMBER SCHEDULE		
MARK	TYPE	SIZE
PTB1	PLANTER BEAMS	200x100x5.0 RHS
PTB2	PLANTER BEAMS	65x65x5.0 SHS
SKB1	SKYLIGHT BEAM	75x75x6.0 SHS



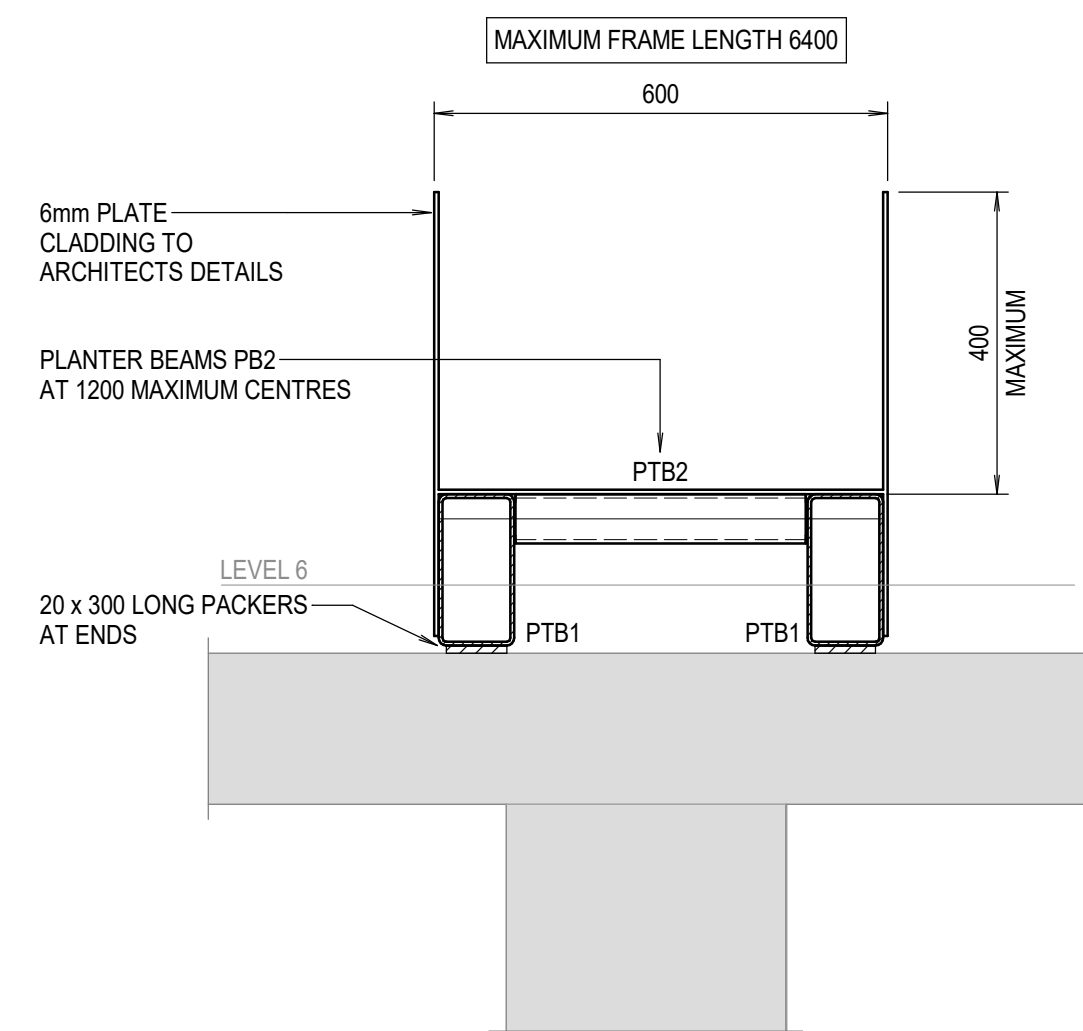
ELEVATION SK1
Scale 1:50



DETAIL A
Scale 1:10



DETAIL B
Scale 1:10



SECTION C
Scale 1:10

TENDER NOTES

- These drawings are preliminary drawings issued for tender as an indication of the extent of works only. They are not a complete set of construction drawings.
- To determine the full extent of work, these drawings shall be read in conjunction with the architectural drawings and other contract documents. Allow for all items shown on architectural and other drawings as not all items are shown on the structural drawings.
- Should any ambiguity, error, omission, discrepancy, inconsistency or other fault exist or seem to exist in the documents, immediately notify, in writing, to the superintendent.
- Rates shown on these drawings are for the final structure in place and do not allow for any wastage, rolling margins, over supply or fabrication requirements etc.

C	102 KEYS REDESIGN PACKAGE	M.R.	M.A.E.	01/11/19
B	ISSUED FOR REVIEW	M.R.	M.A.E.	25/10/19
A	ISSUED FOR COORDINATION	M.R.	M.A.E.	19/09/19

Rev	Description	Eng	Draft	Date
-----	-------------	-----	-------	------

Project

**SANDSTONE PRECINCT
EDUCATION BUILDING**

23-39 Bridge Street, Sydney 2000, Australia

Sheet Subject

**LEVEL 6 FRAMING PLAN
AND DETAILS**

Architect



www.webberaustralia.com.au
Tower One Level 47, 100 Barangaroo Avenue Barangaroo, NSW, 2000, 02 8067 0688
Structural Engineer

TTW Taylor
Thomson
Whitting

612 9439 7288 | 48 Chandos Street St Leonards NSW 2065

Scale: B1 Drawn Authorised

As indicated M.A.E. B.Y.

Job No Drawing No Revision

151903 SP-ST-E-S1605 C

1/11/2019 6:27:11 PM

FOR TENDER