BROWN

Music Bowl Structural Assessment

24 November 2014

R14265

Prepared for Rockhampton Regional Council

Rockhampton - Structures

Smart Consulting

COMMERCIAL IN CONFIDENCE

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Music Bowl Structural Assessment

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1 Introduction

We understand that consideration is being given by Rockhampton Regional Council for potential future use of the Music Bowl facility, Bruce Highway, North Rockhampton. As part of this process Rockhampton Regional Council (RRC) commissioned Brown Consulting (Qld) Pty Ltd to carry out a Structural Condition Assessment of the Music Bowl Sound Shell Structure.

The aim of this report is to provide RRC with our professional opinion of the current structural condition of the music bowl sound shell and, to a lesser degree, other structural elements to allow RRC to decide on the structure's future use, maintenance, refurbishment or demolition.

The investigation involved a review of available existing drawings, site inspection, analysis and design check of the main structural elements. Upon completion of these tasks, a condition assessment was carried out on the structural and cladding elements with appropriate recommendations provided.

2 Scope and Limitations

The scope of the assessment includes the following elements:

- Accessible and visible sound shell elements above the stage level
- External cladding elements of the sound shell
- Handrails and balustrades around the stage area
- Steel framed covered walkways adjacent the sound shell
- General inspection of concrete and blockwork elements which form part of the sound shell building.
- General inspection of other structural elements directly adjacent the sound shell building such as retaining walls.

In order to form our opinion on the elements we could view, the following level of review was undertaken:

- Visual inspection of the abovementioned elements. Access to elevated areas was provided via an elevated work platform. Minor cleaning of structural elements with non-powered hand tools was undertaken as necessary to expose the structural elements.
- Existing structural documentation provided by RRC was reviewed. Partial architectural details were provided however they did not appear to be a complete set of documents.
- Measurements of some structural items were taken.
- Analysis and design check of the primary structural elements.
- Design check of secondary structural elements was not carried out.

3 Description of Structure

The original structural design of the sound shell structure was by Rankine & Hill Pty Ltd. The design documents are dated March 1984. A photo of the sound shell structure is provided in Figure 1 below.

Figure 1 – Sound shell

3.1 Sound shell

The sound shell structure can be described as follows:

- Reinforced concreted slab and footings.
- Reinforced concrete blockwork loadbearing walls to the lower ground floor which is occupied by the dressing rooms and amenities.
- The stage is a reinforced concrete suspended slab supported on the lower ground floor blockwork walls.
- The sound shell superstructure whose form is a quarter sphere comprises a single steel arch in the vertical plane at the front of the sound shell. This arch is supported at the stage level on each side of the sound shell by reinforced concrete abutments. The arch supports a series of rolled trusses and beams diminishing in size which creates the quarter sphere form to the rear of the sound shell.
- The roof buildup, which is supported by the rafters and trusses, general comprises (from outside to inside):
  - Ceramic tiles on adhesive
  - Concrete supported on metal deck formwork
  - The metal deck formwork is supported by the trusses and roof beams

Refer Figure 2 below for a reference diagram of a typical cross section of the sound shell superstructure and roof build up.

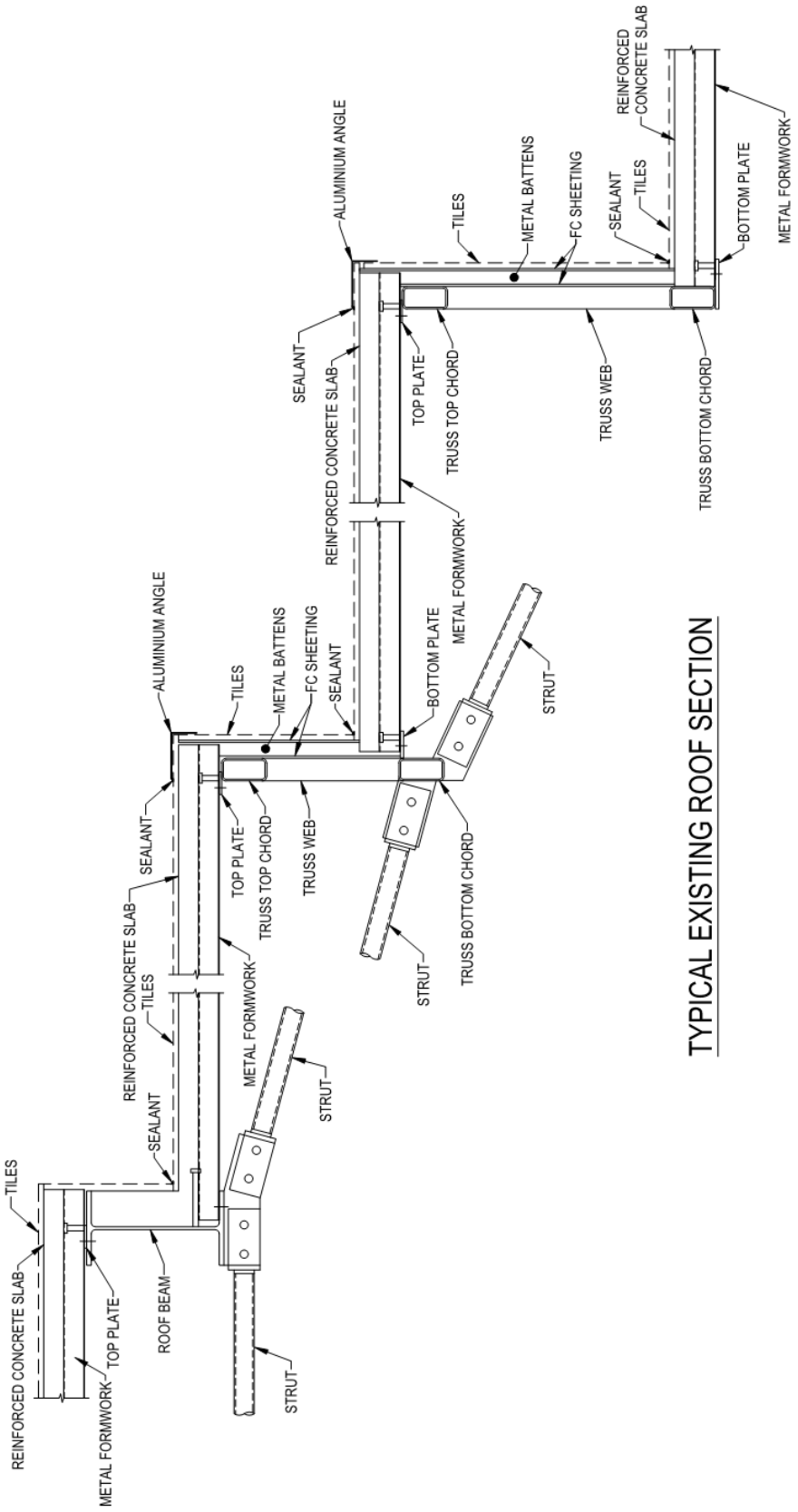

Figure 2 - Typical Existing Roof Section

3.2 Covered walkways and handrail

Directly adjacent the west of the sound shell is a covered loading area, walkway and stairs leading to the lower ground floor. The substructure is reinforced concrete slabs on loadbearing blockwork. The roof structure is steel framed SHS members supporting SHS purlins and metal roof sheeting.

To the east and west of the sound shell are steel framed handrails at the edge of the suspended slab.

3.3 External structures and landscaping

Along the east and to the rear of the sound shell is a heavily landscaped area with timber and boulder retaining walls forming the level difference as the ground slopes away to the north.

4 Site Observations

This section of the report provides a summary of the common reoccurring observed issues across the structure. A comprehensive photographic record with description of each issue observed is provided in Appendix A.

It is noted that the bottom section of trusses and beams could not be observed because they are concealed behind blockwork. This is demonstrated by Figure 3 and Figure 4 below, showing the design detail and a photograph. As a result the condition of these structural steel elements could not be assessed.

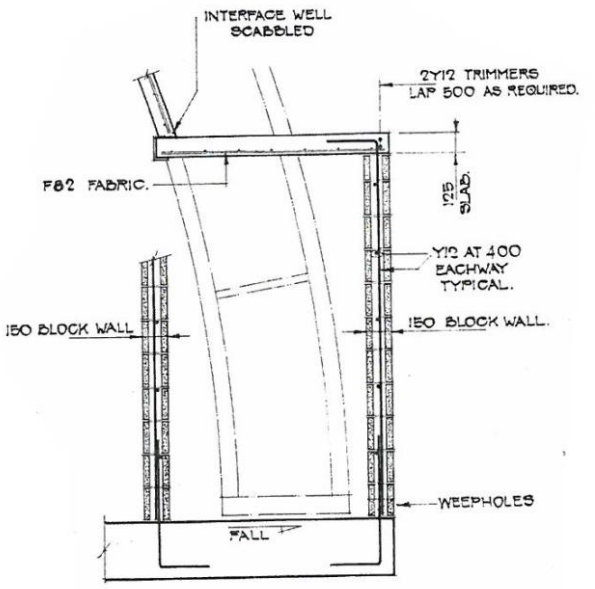

Figure 3 - Roof truss enclosed in masonry wall

Figure 4 - Roof trusses enclosed in masonry wall

4.1 Sound shell superstructure

4.1.1 Sound Shell Roof Cladding and Roof Build-up

Tiles missing from vertical surfaces. Horizontal tiled surface. Evidence of water ponding adjacent aluminium edge capping.

Figure 5 - Horizontal and vertical tiled surfaces

Horizontal tiled surface with evidence of water ponding adjacent the aluminium edge capping.

Figure 6 - Tiled Roof (horizontal section)

Detailed view of edge horizontal tiled surface with aluminium edge capping and sealant. Evidence of water ponding.

Figure 7 - Edge of horizontal tiled surface (detailed view)

Detailed view of aluminium edge capping coming loose on curved section of roof.

Figure 8 - Loose aluminium capping

Junction of vertical tiled and horizontal tiled surface showing sealant. Metal cover capping in vertical surface which appears to cover cut tile junction.

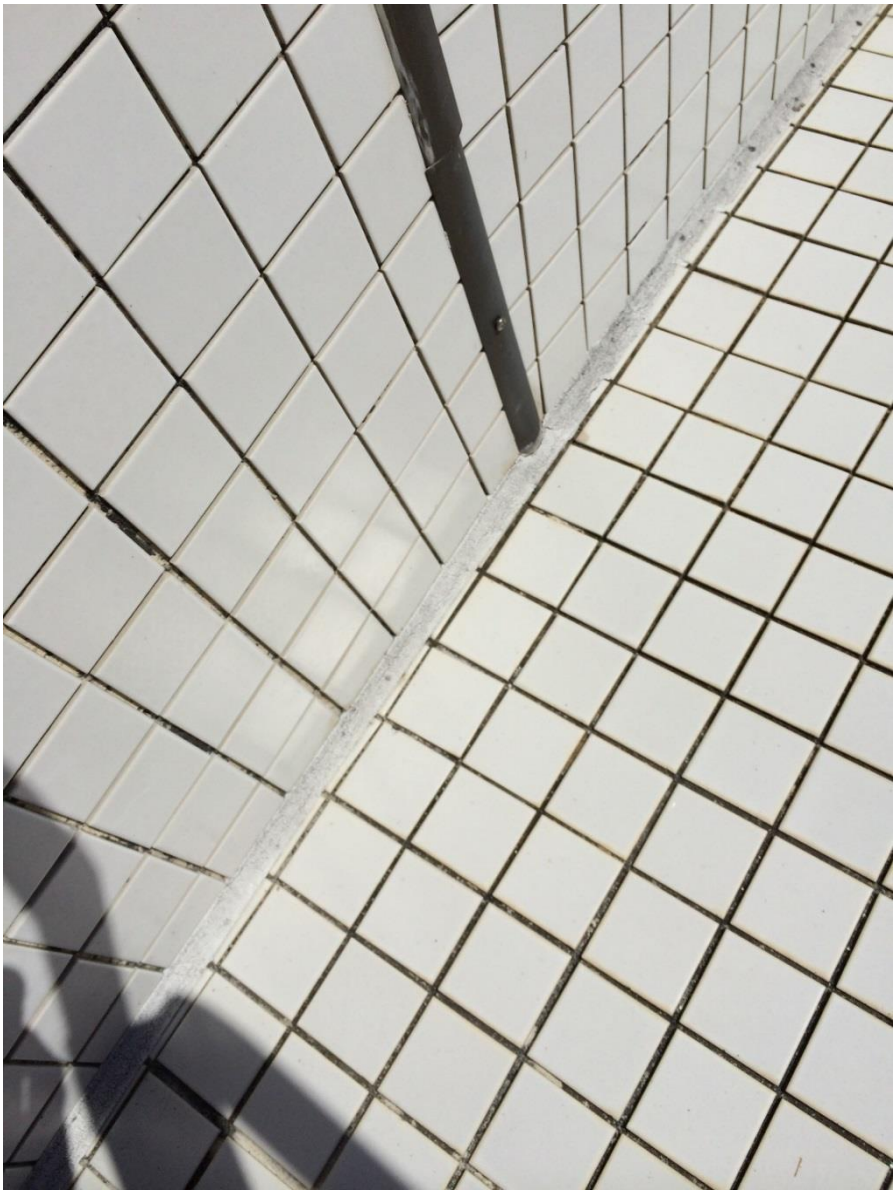

Figure 9 - Vertical and horizontal tiled junction

4.1.2 Sound Shell Roof Framing Elements

The top plate was used to fix metal formwork in place during construction, and provides support to the concrete slab.

The top plates are generally heavily corroded, with between 20% and 50% section loss in some areas.

Figure 10 - Corrosion of top plate

The metal formwork is supported by the bottom plate and is screwed in place.

The bottom plates generally have a minor degree of corrosion with up to 10% section loss.

Figure 11 - Corrosion of bottom plate

The bottom chords at the front face of the sound shell have generally corroded to approximately 10% on the bottom face of the members.

Figure 12 - Corrosion of bottom chord at the exterior face of the sound shell

The fascia at the top front of the sound shell is made of thin cold formed steel section, and is heavily corroded. Corrosion has caused holes in the section.

Figure 13 - Corrosion of the steel fascia section at top front of the sound shell

There is a minor degree of corrosion to the bottom of web members across some areas of the trusses, generally on the lower end where water can potentially pond.

Figure 14 - Corrosion to the truss web members at the bottom chord

4.1 Substructure

External view of substructure, some staining, minor shrinkage cracking, structure generally in sound condition.

Figure 15 - Rear view of substructure

Lower ground floor dressing rooms, structure generally in sound condition

Figure 16 – Substructure

Lower ground floor corridor, structure generally in sound condition

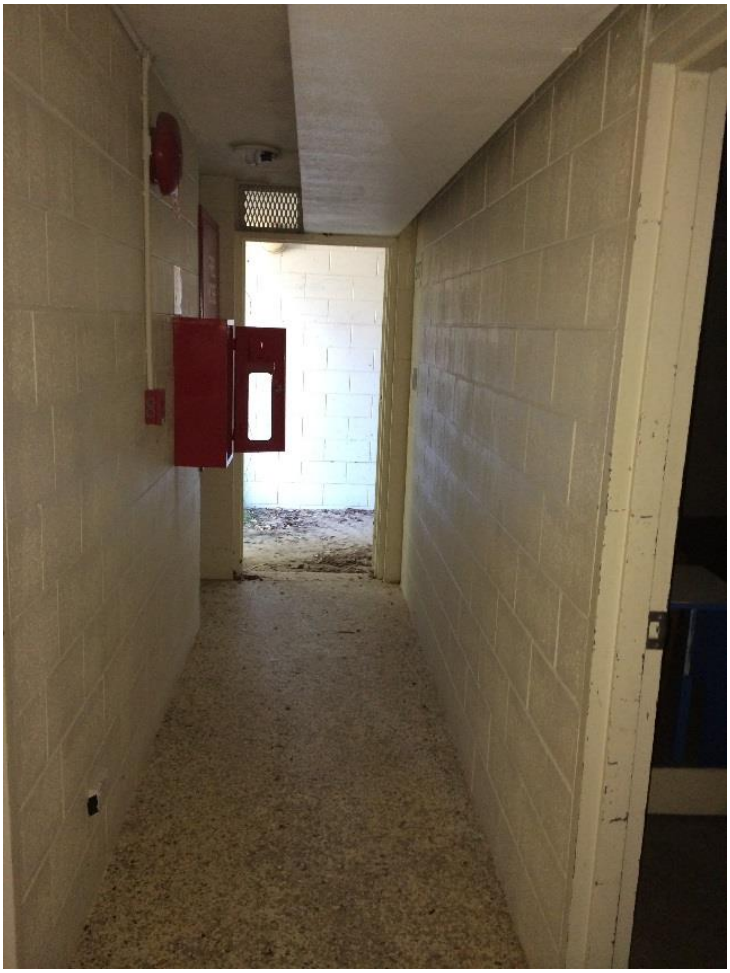

Figure 17- Substructure

4.2 External covered walkways and handrails

There is a minor degree of corrosion across the entire covered walkway structure.

Figure 18 - Minor corrosion across covered walkway structure

The roof sheeting over the covered area is dented.

Figure 19 - Dent in roof sheeting

There is some minor corrosion to each of the wall connections of the covered area.

Figure 20 - Minor corrosion to connections

The handrails have disconnected from the stanchions in some locations. Paint coating is generally deteriorated.

Figure 21 - Handrails disconnected from stanchions and coating deteriorated

Bolts missing from the base connection of stanchions in many cases.

Figure 22 - Bolts missing from stanchions

4.3 External structures and landscaping

Landscaping and retaining wall to north east of sound shell

Figure 23 – Landscaping

Collapsed and rotting timber retaining wall. Heavy vegetation on high side of retaining wall

Figure 24- Timber retaining wall

Overgrown vegetation adjacent sound shell. Access to lower ground floor is hindered.

Figure 25 - Overgrown vegetation

Figure 26 - Overgrown vegetation

5 Structural Design Check

A structural design check was carried out for the sound shell superstructure primary elements, which includes:

- Main Arch
- Rolled Roof Trusses
- Rolled Roof Beams

The structural design check involved generating a computer model and analysing for wind loads and permanent actions in accordance with the AS1170 – Structural Design Actions series. In turn, the structural elements were checked for structural capacity against AS4100 – Steel Structures.

The structural analysis was performed based on the existing structural documentation and the following assumptions.

- Structure is as new i.e. no corrosion or deterioration
- The structure has been built in accordance with the design documentation

The overall arrangement of the sound shell and the structural elements analysed were found to be of adequate structural capacity for the loads imparted to them in accordance with the current versions of AS1170 and AS4100.

6 Assessment of Condition

The assessment provided below results from consideration of the current condition on site, and also considers the structural design check of primary elements. The assessment has been presented in the form of a risk assessment. The risk assessment allows assignment of a qualitative level of risk, which can be used by the client to decide on suitable actions.

6.1 Risk Assessment Methodology

The risk matrix adopted for the risk assessment has been adapted from Brown Consulting's standard risk assessment template. The risk assessment procedure is outlined below.

Table 1: Consequence Table – Identify the consequence of an event

Consequence	Description
Minor (1)	First aid treatment, no lost time Insignificant environmental damage Slight damage to property, No disruption to operation
Moderate (2)	Medical treatment or hospital required Notable environmental damage Minor damage to property, Brief disruption to operation
Serious (3)	Single serious injury/illness requiring hospitalisation Substantial environmental damage Local damage to property
Major (4)	Single fatality or major permanent disability Significant environmental damage Major damage to property, Partial loss of operation
Extreme (5)	Multiple fatalities Disastrous environmental loss Extensive financial loss

Table 2: Likelihood Table – Identify the likelihood of an event

Almost Certain (A)	Expected to occur in most circumstance
Likely (B)	Will probably occur, >50 percent chance
Possible (C)	Evidence exists that it might occur
Unlikely (D)	Unlikely, but history of such event
Rare (E)	May occur only in exceptional circumstances

Table 3: Risk Level Table – Identify the level of risk

		Consequence				
		Minor (1)	**Moderate (2)**	**Serious (3)**	**Major (4)**	**Extreme (5)**
Likelihood	Almost certain (A)	High	High	Very High	Extreme	Extreme
	Likely (B)	Medium	High	High	Very High	Extreme
	Possible (C)	Low	Medium	High	High	Very High
	Unlikely (D)	Low	Low	Medium	High	High
	Rare (E)	Low	Low	Low	Low	Medium

6.2 Risk Assessment

6.2.1 Water ponding at top of roof and cladding composed of multiple materials

The top section of the roof is very flat with very little fall potentially resulting in excess ponding of water. The aluminium edge capping creates a ridge which contains any water on the top of the roof.

The weather tightness of tiled cladding is questionable especially at grout joints, interface with aluminium capping, deteriorated sealants. There would be heightened risk of water penetration at these locations.

The concrete slab below the tiled cladding does not appear to be designed as waterproof. It will would not be effective as a waterproof cladding. Once there is moisture below the tiles and within the slab zone it would track down towards the structural steel elements of the sound shell roof structure. Given the potential for the roof build up to be subject to prolonged periods of moisture, it is highly likely the structural steel elements directly supporting the concrete slab will suffer corrosion to varying degrees.

Allowing the steelwork to corrode over time will mean high repair costs and disruption to use of the music bowl. If allowed to continue to corrode with no action, the sound shell may corrode to a point of disrepair.

Consequence	2
Likelihood	B
Risk Level	HIGH

6.2.2 Corrosion of top plate

The top plate was used during construction to support the metal formwork, and to allow it to be screwed in place. Existing structural documentation shows that shear studs are welded to the top plate, and the concrete slab bears directly onto the top plate and the top chord of the truss.

The top plates are generally heavily corroded, with between 20% and 50% section loss in some areas.

The top plate serves very little structural purpose, however; allowing the top plate to corrode completely could allow corrosion to other elements such as the metal formwork and the top chord of the trusses.

Corrosion is likely to continue unless action is taken to protect against corrosion.

Consequence	2
Likelihood	C
Risk Level	MEDIUM

6.2.3 Corrosion of bottom plate

The bottom plate was used during construction to support the metal formwork, and to allow it to be screwed in place. Existing structural documentation shows that shear studs are welded to bottom plate, and the concrete slab bears directly onto the bottom plate.

The bottom plates generally have a minor degree of corrosion with up to 10% section loss.

The structural purpose of the bottom plate is to provide direct support to the concrete slabs, so the consequence of the element corroding out completely is high.

The likelihood of the corrosion causing failure of the bottom plate is low due to the currently minor level of corrosion, however corrosion is likely to worsen without treatment.

Consequence	3
Likelihood	D
Risk Level	MEDIUM

6.2.4 Corrosion of the truss bottom chord at the front face of the sound shell

The structural analysis shows that the bottom chord of the truss at the front face of the sound shell is subject to small action effects in comparison with other bottom chord elements within the truss.

The bottom chords have generally corroded to approximately 10% on the bottom face of the members.

Due to the small structural action effects in this member, we believe the current degree of corrosion is within an acceptable range for strength.

Corrosion of this member is likely to worsen unless action is taken to protect against corrosion.

Consequence	2
Likelihood	C
Risk Level	MEDIUM

6.2.5 Corrosion of steel fascia section at top front of sound shell

The steel fascia is used to support tiling. The fascia serves no structural purpose.

Corrosion has caused holes in the section.

Corrosion of this member is likely to allow further corrosion to the metal formwork.

Consequence	1
Likelihood	C
Risk Level	LOW

6.2.6 Corrosion to truss web members at bottom chord

The structural analysis shows that the bottom chord of the truss at these locations are under low stresses.

Corrosion has caused approximately 5-10% loss of section in some areas.

Due to the small structural action effects in this member, we believe that the current degree of corrosion is within an acceptable range for strength.

Corrosion of the member is likely to continue unless action is taken to protect against corrosion. Further corrosion could spread to other elements within the structure, which could present a structural issue in the future.

Consequence	2
Likelihood	C
Risk Level	MEDIUM

6.2.7 Corrosion to truss tab plates

The truss tab plates provide hold down to the end trusses under wind loads. The structural analysis found that these hold down bolts and cleats are subject to low stresses.

Corrosion has caused approximately 10-20% section loss in some areas.

Due to the low stresses on the tab plates, we believe that the current degree of corrosion is within an acceptable range for strength. The corrosion may have caused some reduction in the effectiveness of the connection.

Corrosion of this tab plate is likely to worsen unless action is taken to protect against corrosion.

Consequence	2
Likelihood	C
Risk Level	MEDIUM

6.2.8 Corrosion to truss at interface with concrete

The trusses are heavily corroded at the interface with the concrete slab. Structural analysis found that top chord, bottom chord and web are subjected to low stresses at this location.

Corrosion has caused approximately 10% section loss in some areas.

Due to the low stresses on the truss elements at this location, we believe that the current degree of corrosion is within an acceptable range for strength.

Corrosion of the member is likely to worsen unless action is taken to protect against corrosion.

Consequence	2
Likelihood	C
Risk Level	MEDIUM

6.2.9 Corrosion to side of truss bottom chord

The bottom chord of the end truss (RT7 in the existing structural documentation) is heavily corroded on the side along the length of the masonry wall. Structural analysis found that the bottom chord is subjected to low stresses at this location.

Corrosion has caused approximately 5% section loss locally.

Due to the low stresses on the bottom chord at this location, we believe that the current degree of corrosion is within an acceptable range for strength.

Corrosion of the member is likely to worsen unless action is taken to protect against corrosion.

Consequence	2
Likelihood	C
Risk Level	MEDIUM

6.2.10 Corrosion across the sound shell structure

Across the steel structure there are many areas with minor corrosion in addition to the areas specifically detailed elsewhere. We believe that this current degree of corrosion is structurally acceptable.

Corrosion across the structure is likely to worsen over time unless action is taken to protect against corrosion.

Consequence	1
Likelihood	B
Risk Level	MEDIUM

6.2.11 Corrosion across covered walkway structure

Across the steel walkway structure there is a minor degree of corrosion. We believe that the current degree of corrosion is structurally acceptable.

Corrosion across the structure is likely to worsen over time unless action is taken to protect against corrosion.

Consequence	1
Likelihood	B
Risk Level	MEDIUM

6.2.12 Handrails disconnected from stanchions and stanchions not bolted to slab

The handrails around the side of stage is currently in a poor condition, with handrails disconnected from stanchions in some places, and bolts missing from the base connection of stanchions.

The handrails in their current state do not comply with the requirements of AS1657 – Fixed platforms, walkways, stairways and ladders. Use of the handrails in their current state could potentially cause a serious injury.

Consequence	3
Likelihood	C
Risk Level	HIGH

7 Conclusion

The Rockhampton Music Bowl Facility is almost 30 years old and for its age the concrete and masonry substructure elements are generally in sound condition with very few signs of deterioration. These elements are generally performing to a satisfactory level.

The sound shell superstructure is framed in structural steel supporting sprayed concrete roof panels. The concrete is clad with tiles. The steel framed elements are suffering from corrosion throughout the roof structure to varying degrees with the more severe instances towards to the top of the sound shell which is directly below the horizontal roof surface. The tiled and concrete roof cladding is not an impervious waterproof membrane and coupled with the roofs inability to shed water at the top of the sound shell results in there being a frequent and probably constant source of moisture for the structural steel elements. This appears to be the major cause of the corrosion to the structural steel framing elements.

Given the current level of corrosion on the structural steel framing elements we do not believe there is an immediate risk of structural failure of these elements. However, should the corrosion be left untreated and the cause of the corrosion is not rectified then, in time, there is the potential for failure of the structural elements.

The covered walkway structure is generally suffering from a minor degree of corrosion, and has some damage to roof sheeting. The handrails around the side of stage are generally in poor condition with bolts missing and deteriorated coatings.

The landscaping to the north east of the building contains mature trees and dense bushes. There is also a timber retaining wall which is in a state of disrepair. Having this landscaping so close to the building hinders access to the lower ground level, causes maintenance issues for the building and requires ongoing maintenance itself.

8 Recommendations

For the concrete and masonry substructure elements to continue to perform and to minimise potential deterioration it is recommended that the building would need to be subject to a facilities maintenance regime similar to other buildings of significance.

In regards to the corrosion on the structural steel framing of the sound shell we recommend the primary cause of the corrosion be rectified. Installing a continuous, impervious cladding which can adequately drain would prevent moisture from entering the tiled and concrete surface. This could be achieved with traditional metal roof sheeting and flashings etc. Refer Appendix B for some basic details on how this could be achieved.

Further to treating the cause of corrosion, it is recommended that the currently corroded elements are cleaned and coated with a suitable corrosion protection system. This would involve removing the existing tiles and fibre cement sheeting on the vertical faces to properly access the existing steelwork. Primary structural elements with heavy corrosion (i.e. roof beam, trusses and main arch) should be machine tool cleaned and reinspected prior to applying corrosion protection in case extra strengthening is required.

To reduce ongoing maintenance issues we would recommend the landscaped area to the north east of the building be removed. To give clearer access to the lower ground floor and minimise the impact of the trees on the building it is possible to carry out some earthworks in this area which would produce a gentle battered slope away from the building

It is recommended that the covered walkway structural steel is cleaned to remove corrosion, and painted with a suitable corrosion protective paint. Consideration should be made for the replacement of roof sheeting in some locations.

With the handrails in their current condition, and for the relative cost of repair, it is recommended that these are replaced.

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Appendices

Appendix A – Photographic Record

Photo 001 - Corrosion to truss web at end

Photo 002 - Corrosion to top plate

Photo 003 - Corrosion to top plate

Photo 004 - Corrosion to top plate

Photo 005 - Corrosion to truss tab plate

Photo 006 - Corrosion to truss tab plate

Photo 007 - Corrosion to truss web at end

Photo 008 - Corrosion to truss bottom chord and web at end

Photo 009 - Corrosion to truss bottom chord and web at end

Photo 010 - Corrosion to truss bottom chord and web at end

Photo 011 - Corrosion to truss bottom chord and web at end

Photo 012 - Minor corrosion to main arch baseplate

Photo 013 - Minor corrosion to main arch bottom flange at baseplate

Photo 014 - Minor corrosion to main arch top flange at baseplate

Photo 015 - Minor corrosion to bottom chord along concrete

Photo 016 - Minor corrosion in corner of stub

Photo 017 - Minor corrosion in corner of stub

Photo 018 - Heavy corrosion to bottom chord

Photo 019 - Heavy corrosion to bottom chord

Photo 020 - Heavy corrosion to bottom chord

Photo 021 - Heavy corrosion to top plate all along

Photo 022 - Heavy corrosion to top plate all along

Photo 023 - Heavy corrosion to top plate all along

Photo 024 - Heavy corrosion to top plate all along

Photo 025 - Struts generally in good condition

Photo 026 - Heavy corrosion to side of bottom chord

Photo 027 - Heavy corrosion to side of bottom chord

Photo 028 - Heavy corrosion to side of bottom chord

Photo 029 - Heavy corrosion to side of bottom chord

Photo 030 - Heavy corrosion to top plate

Photo 031 - Heavy corrosion to top plate

Photo 032 - Heavy corrosion to top plate

Photo 033 - Minor corrosion to struts

Photo 034 - Minor corrosion to struts

Photo 035 - Minor corrosion to struts

Photo 036 - Minor corrosion to struts

Photo 037 - Minor corrosion to struts

Photo 038 - Heavy corrosion to top plate

Photo 039 - Heavy corrosion to top plate

Photo 040 - Heavy corrosion to top plate

Photo 041 - Heavy corrosion to top plate

Photo 042 - Heavy corrosion to top plate

Photo 043 - Heavy corrosion to top plate

Photo 044 - Heavy corrosion to top plate

Photo 045 - Minor corrosion to struts

Photo 046 - Heavy corrosion to top plate

Photo 047 - Heavy corrosion to top plate

Photo 048 - Heavy corrosion to top plate

Photo 049 - Heavy corrosion to top plate

Photo 050 - Heavy corrosion to top plate

Photo 051 - Heavy corrosion to top plate

Photo 052 - Minor corrosion to bottom plate

Photo 053 - Minor corrosion to bottom plate

Photo 054 - Minor corrosion to bottom plate

Photo 055 - Heavy corrosion to top plate

Photo 056 - Heavy corrosion to top plate

Photo 057 - Heavy corrosion to top plate

Photo 058 - Heavy corrosion to top plate

Photo 059 - Heavy corrosion to top plate

Photo 060 - Minor corrosion to bottom plate

Photo 061 - minor corrosion to bottom plate

Photo 062 - Minor corrosion to bottom chord at stub

Photo 063 - Minor corrosion to bottom chord at stub

Photo 064 - Heavy corrosion to top plate

Photo 065 - Minor corrosion to bottom plate and stub

Photo 066 - Heavy corrosion to bottom plate

Photo 067 - Heavy corrosion to bottom plate

Photo 068 - Heavy corrosion to bottom plate

Photo 069 - Minor corrosion to stub

Photo 070 - Heavy corrosion to bottom plate

Photo 071 - Minor corrosion to stub

Photo 072 - Splice in good condition

Photo 073 - Heavy corrosion to truss bottom chord at the exterior face of the soundshell

Photo 074 - Heavy corrosion to bottom plate

Photo 075 - Heavy corrosion to steel fascia

Photo 076 - Heavy corrosion to top plate and top chord

Photo 077 - Heavy corrosion to top plate all along

Photo 078 - Heavy corrosion to truss bottom chord at the exterior face of the soundshell

Photo 079 - Minor corrosion to bottom plate

Photo 080 - Minor corrosion to bottom plate

Photo 081 - Minor corrosion to truss bottom chord at the exterior face of the soundshell

Photo 082 - Minor corrosion to truss bottom chord at the exterior face of the soundshell

Photo 083 - Heavy corrosion to truss bottom chord and web at the exterior face of the soundshell

Photo 084 - Heavy corrosion to truss bottom chord at the exterior face of the soundshell

Photo 085 - Heavy corrosion to truss bottom chord

Photo 086 - Heavy corrosion to truss bottom chord

Photo 087 - Heavy corrosion to top plate

Photo 088 - Heavy corrosion to top plate

Photo 089 - Heavy corrosion to truss web at exterior face of the soundshell

Photo 090 - Heavy corrosion to truss web at exterior face of the soundshell

Photo 091 - Heavy corrosion to fascia

Photo 092 - Heavy corrosion to fascia

Photo 093 - Heavy corrosion to fascia

Photo 094 - Heavy corrosion to fascia

Photo 095 - Heavy corrosion to fascia

Photo 096 - Heavy corrosion to fascia

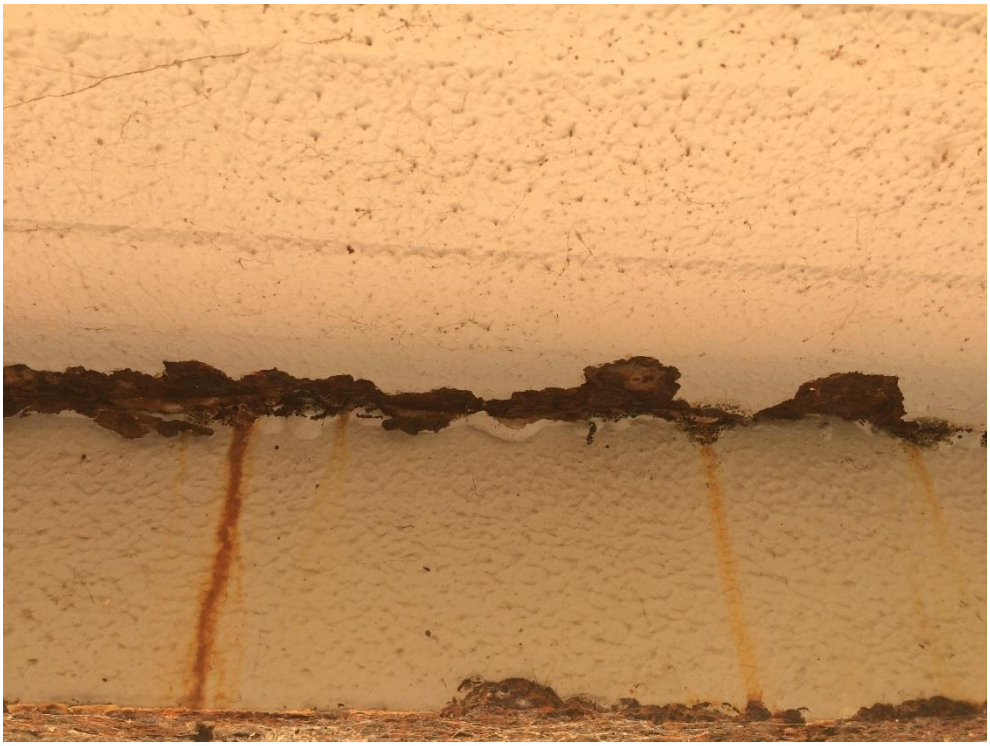


Photo 097 - Minor corrosion to metal formwork

Photo 098 - Minor corrosion to roof beam

Photo 099 - Minor corrosion to roof beam

Photo 100 - Minor corrosion to roof beam

Photo 101 - Minor corrosion to roof beam

Photo 102 - Minor corrosion to roof beam

Photo 103 - Heavy corrosion to fascia

Photo 104 - Heavy corrosion to fascia

Photo 105 - Heavy corrosion to fascia

Photo 106 - Minor corrosion to main arch

Photo 107 - Minor corrosion to bottom chord

Photo 108 - Minor corrosion to bottom chord

Photo 109 - Minor corrosion to web member

Photo 110 - Minor corrosion to web member

Photo 111 - Minor corrosion to roof beam to concrete interface

Photo 112 - Heavy corrosion to truss at concrete interface

Photo 113 - Heavy corrosion to truss at concrete interface

Photo 114 - Heavy corrosion to truss at concrete interface, heavy corrosion to inside corner of tie

Photo 115 - Heavy corrosion to truss bottom chord, paint peeling off

Photo 116 - Heavy corrosion to truss bottom chord, paint peeling off

Photo 117 - Heavy corrosion to truss bottom chord, paint peeling off

Photo 118 - Minor corrosion to truss to concrete interface

Photo 119 - Minor corrosion to truss top and bottom plate

Photo 120 - Minor corrosion to truss top and bottom plate

Photo 121 - Minor corrosion to truss top and bottom plate

Photo 122 - Minor corrosion to truss top and bottom plate

Photo 123 - Minor corrosion to truss top and bottom plate

Photo 124 - Minor corrosion to truss top and bottom plate

Photo 125 - Minor corrosion to truss top and bottom plate

Photo 126 - Minor corrosion to truss top and bottom plate

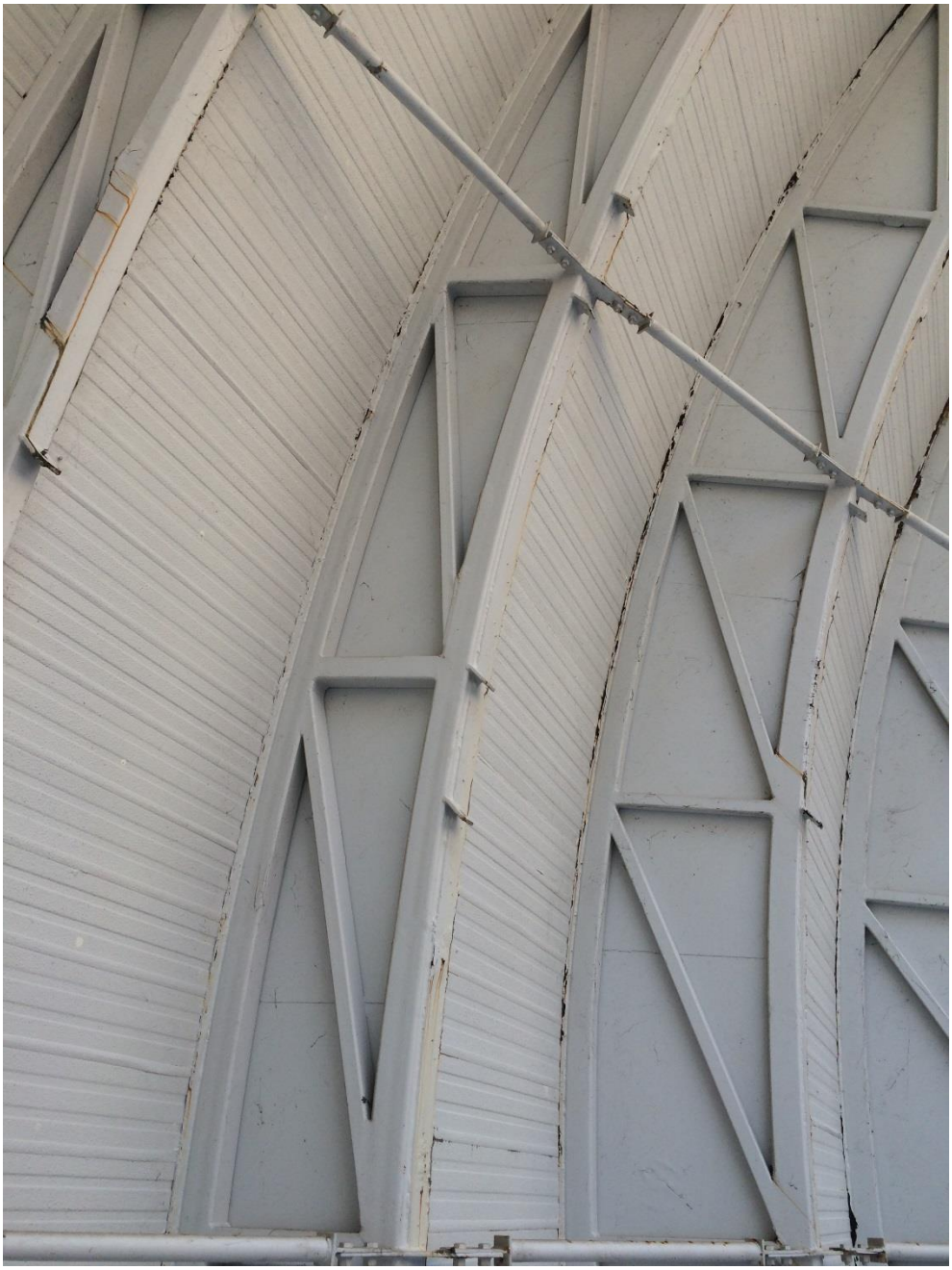


Photo 127 - Minor corrosion to truss top and bottom plate

Photo 128 - Minor corrosion to truss top and bottom plate

Photo 129 - Heavy corrosion to web of roof beam

Photo 130 - Heavy corrosion to web of roof beam

Photo 131 - Heavy corrosion to bottom chord of truss at concrete interface

Photo 132 - Minor corrosion to bottom chord and web of truss

Photo 133 - Minor corrosion to bottom chord

Photo 134 - Minor corrosion to web of truss

Photo 135 - Minor corrosion to bottom chord

Photo 136 - Heavy corrosion to top plate

Photo 137 - Heavy corrosion to top plate

Photo 138 - Heavy corrosion to top plate

Photo 139 - Minor corrosion to bottom chord of truss

Photo 140 - Minor corrosion to bottom chord of truss

Photo 141 - Minor corrosion to bottom chord of truss and top plate

Photo 142 - Minor corrosion to top plate

Photo 143 - Minor corrosion to top plate

Photo 144 - Minor corrosion to top plate

Photo 145 - Minor corrosion to top plate

Photo 146 - Heavy corrosion to top plate

Photo 147 - Heavy corrosion to top plate

Photo 148 - Heavy corrosion to top plate

Photo 149 - Heavy corrosion to top plate

Photo 150 - Heavy corrosion to bottom chord

Photo 151 - Heavy corrosion to bottom chord

Photo 152 - Minor corrosion to bottom chord

Photo 153 - Minor corrosion to top plate

Photo 154 - Minor corrosion to top plate

Photo 155 - Minor corrosion to bottom chord

Photo 156 - Minor corrosion to top plate

Photo 157 - Minor corrosion to top plate

Photo 158 - Minor corrosion to top plate

Photo 159 - Minor corrosion to top plate

Photo 160 - Minor corrosion to bottom chord

Photo 161 - Minor corrosion to bottom chord

Photo 162 - Minor corrosion to top plate

Photo 163 - Minor corrosion to bottom plate

Photo 164 - Minor corrosion to top plate

Photo 165 - Minor corrosion to bottom plate

Photo 166 - Minor corrosion to bottom chord

Photo 167 - Minor corrosion to bottom chord

Photo 168 - Minor corrosion to bottom plate and top plate

Photo 169 - Minor corrosion to bottom plate and top plate

Photo 170 - Minor corrosion to top plate

Photo 171 - Minor corrosion to top plate

Photo 172 - Heavy corrosion to tab plate and nut

Photo 173 - Heavy corrosion to tab plate and nut

Photo 174 - Heavy corrosion to the side of bottom chord

Photo 175 - Minor corrosion to main arch base plate

Photo 176 - Heavy corrosion to bottom chord at front face of soundshell

Photo 177 - Heavy corrosion to end web of truss

Photo 178 - Heavy corrosion to bottom chord at front face of soundshell

Photo 179 - Minor corrosion to bottom chord of truss

Photo 180 - Heavy corrosion to top plate and top chord of truss

Photo 181 - Heavy corrosion to top plate and top chord of truss

Photo 182 - Heavy corrosion to top plate and top chord of truss

Photo 183 - Heavy corrosion to top plate and top chord of truss

Photo 184 - Heavy corrosion to top plate, minor corrosion to end web of truss

Photo 185 - Heavy corrosion to end web of truss

Photo 186 - Heavy corrosion to bottom chord at front face of soundshell

Photo 187 - Minor corrosion to bottom chord

Photo 188 - Minor corrosion to bottom chord

Photo 189 - Minor corrosion to bottom chord

Photo 190 - Minor corrosion to bottom chord

Photo 191 - Minor corrosion to bottom chord at front face of soundshell

Photo 192 - Heavy corrosion to top plate, minor corrosion to metal formwork, heavy corrosion to fascia

Photo 193 - Heavy corrosion to top plate and bottom chord

Photo 194 - Heavy corrosion to top plate and bottom chord

Photo 195 - Heavy corrosion to top plate and bottom chord

Photo 196 - Heavy corrosion to top plate and bottom chord

Photo 197 - Minor corrosion to roof beam

Photo 198 - Minor corrosion to roof beam

Photo 199 - Minor corrosion to roof beam

Photo 200 - Minor corrosion to roof beam

Photo 201 - Minor corrosion to roof beam

Photo 202 - Minor corrosion to roof beam

Photo 203 - Minor corrosion to roof beam

Photo 204 - Tiles missing from vertical surface, aluminium edge capping, evidence of water staining adjacent edge capping

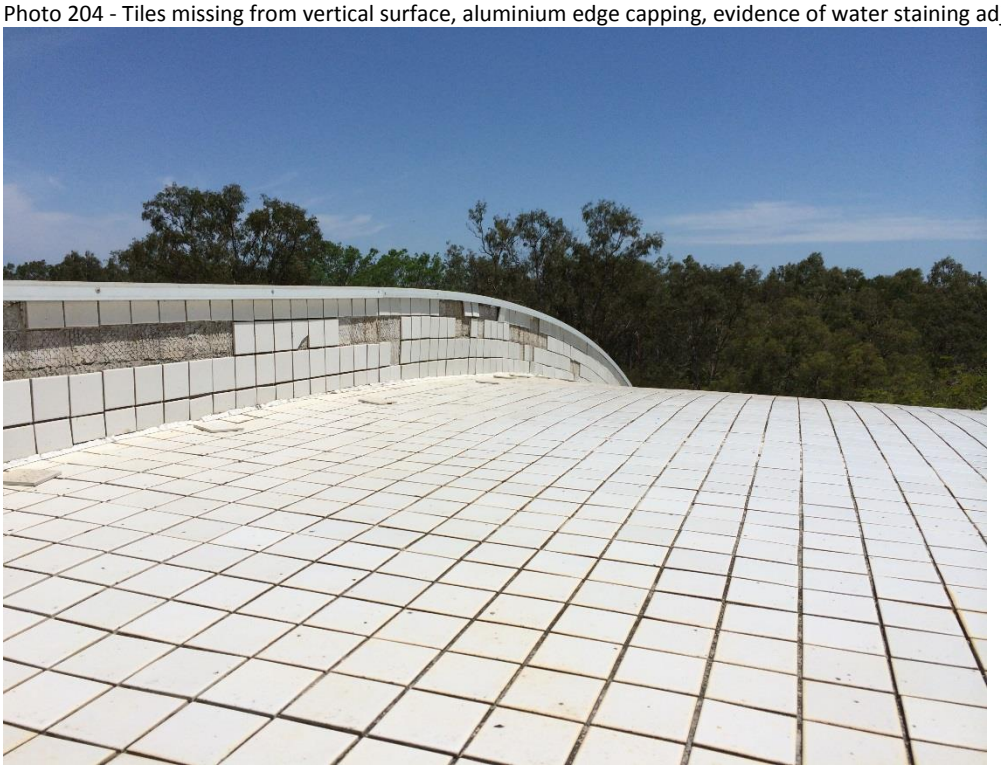


Photo 205 - Tiles missing from vertical surface, Horizontal tiled surface at top of sound shell

Photo 206 - Tiles missing from vertical surfaces, Horizontal tiled surface at top of sound shell. Evidence of water ponding on horizontal surface

Photo 207 - Horizontal tiled surface with aluminium edge capping. Evidence of water ponding

Photo 208 - Weathered and brittle sealant between horizontal tiled surface and aluminium edge capping

Photo 209 - Front fascia, tiles missing, aluminium edge capping slightly higher than horizontal tiles with evidence of water ponding

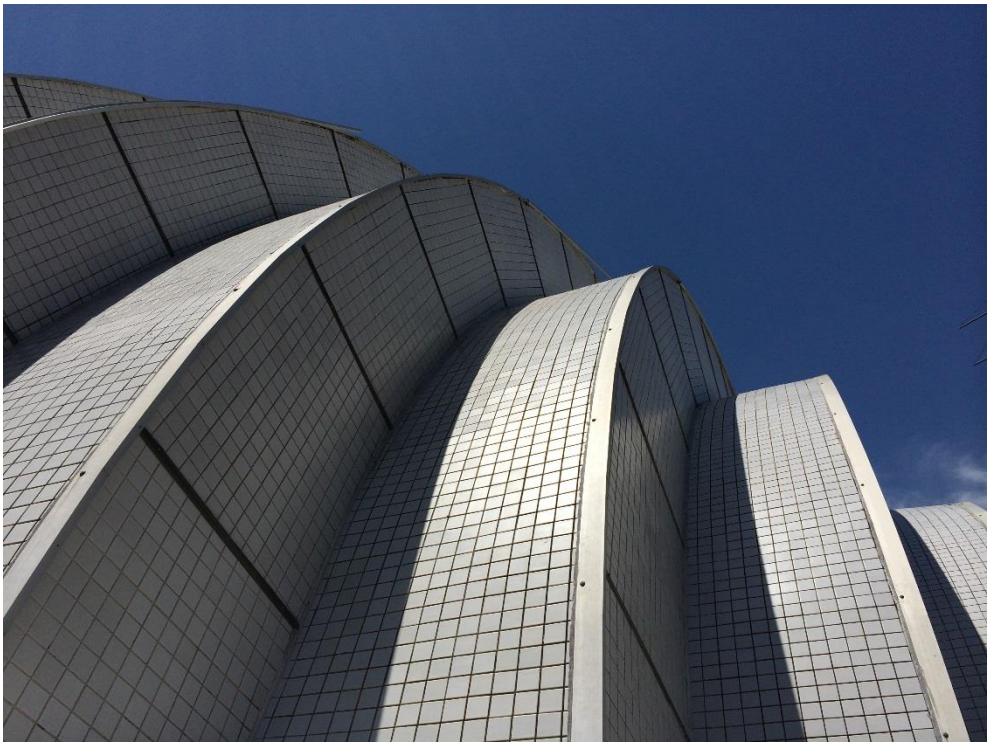


Photo 210 - Rear surface of sound shell, some aluminium edge capping coming loose on curved surfaces

Photo 211 - Rear surface of sound shell and main arch support abutment

Photo 212 - Rear lower surface of sound shell meeting blockwork plinth. Aluminium capping coming loose

Photo 213 - Rear of sound shell, general photo

Photo 214 - Rear of sound shell, general photo

Photo 215 - Rear of sound shell, general photo

Photo 216 - Rear of sound shell, junction of tiled cladding, aluminium capping coming loose

Photo 217 - Detail photo at loose aluminium cladding

Photo 218 - Detail photo at loose aluminium cladding

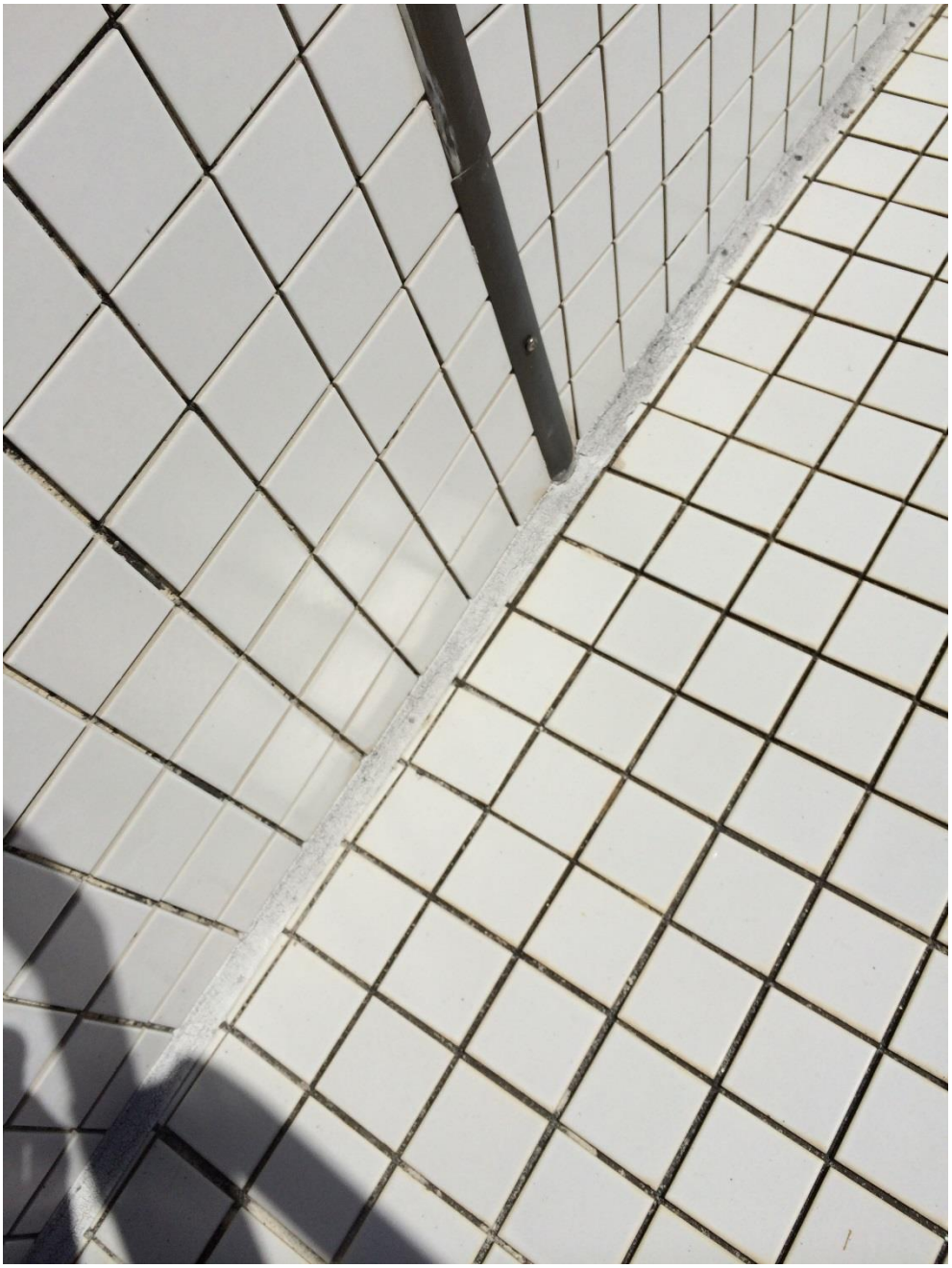


Photo 219 - Junction of vertical tiled surface and horizontal tiled surface, sealant at junction

Photo 220 - Loose aluminium capping on rear of sound shell

Photo 220 - Overgrown vegetation, boulder wall adjacent covered stairs

Photo 221 - Overgrown vegetation adjacent covered walkway

Photo 222 - Loading area at rear, vegetated

Photo 223 - Landscaping and retaining wall to north east of sound shell

Photo 224 - Timber retaining wall, rotted and collapsed

Photo 225 - Timber retaining wall, rotted and collapsed

Photo 226 - Timber retaining wall, rotted and collapsed

Photo 227 - Substation to rear of soundshell

Photo 228 - Overgrown vegetation in landscaped area adjacent sound shell

Photo 229 - Stormwater outlet from front of sound shell discharging at north west of sound shell

Photo 230 - Stormwater swale to the south loading area south of sound shell

Photo 231 - Rear of sound shell and loading area

Photo 232 - Boulder wall to south east of sound shell

Photo 233 - Boulder wall to north west of sound shell

Photo 234 - Boulder wall to north west of sound shell

Photo 235 - Rear plinth of sound shell

Photo 236 - Rear plinth of sound shell

Photo 237 - Entrance to lower ground floor

Photo 238 - Lower ground floor dressing rooms

Photo 239 - Lower ground floor dressing rooms

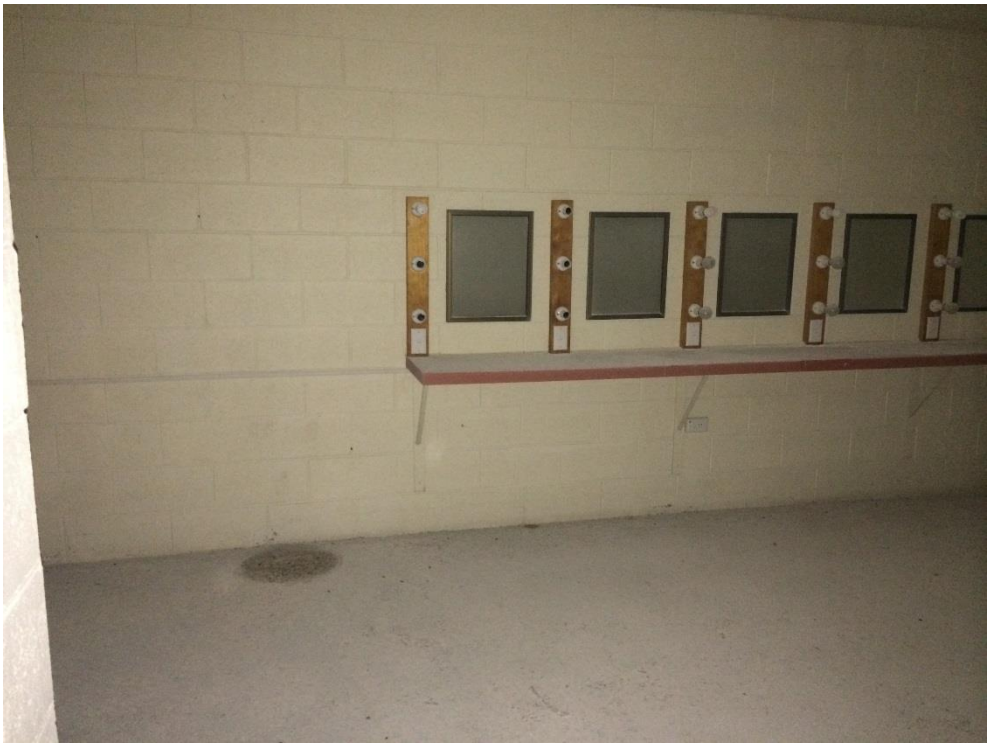


Photo 240 - Lower ground floor dressing rooms

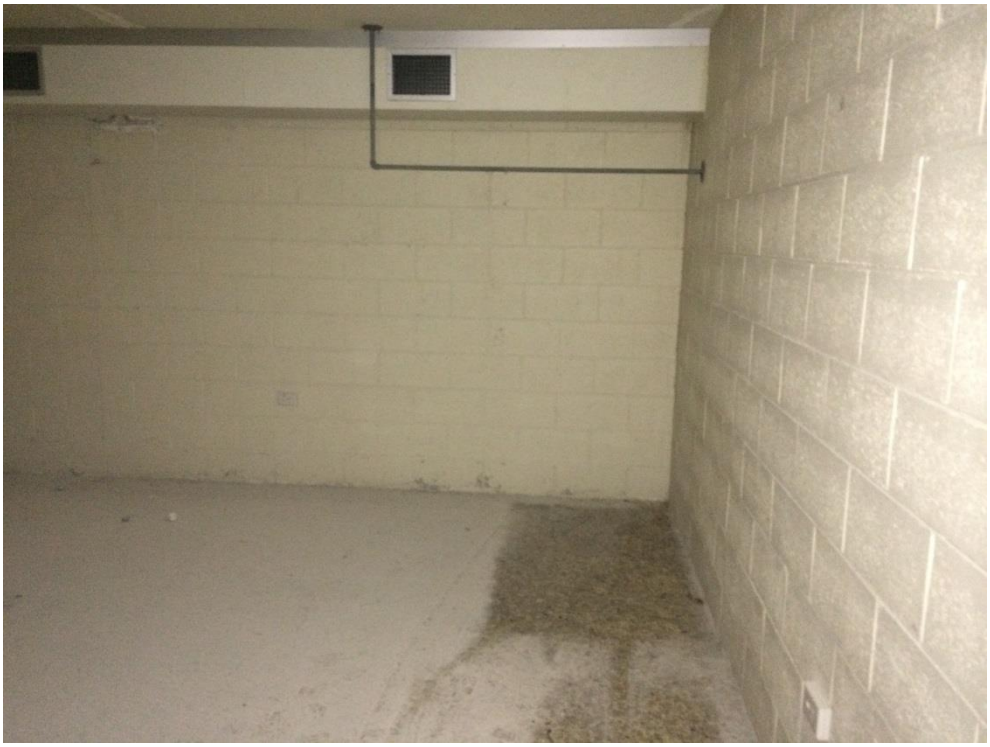


Photo 241 - Lower ground floor dressing rooms

Photo 242 - Lower ground floor dressing rooms

Photo 243 - Lower ground floor dressing rooms

Photo 244 - Lower ground floor corridor

Photo 245 - Lower ground floor corridor

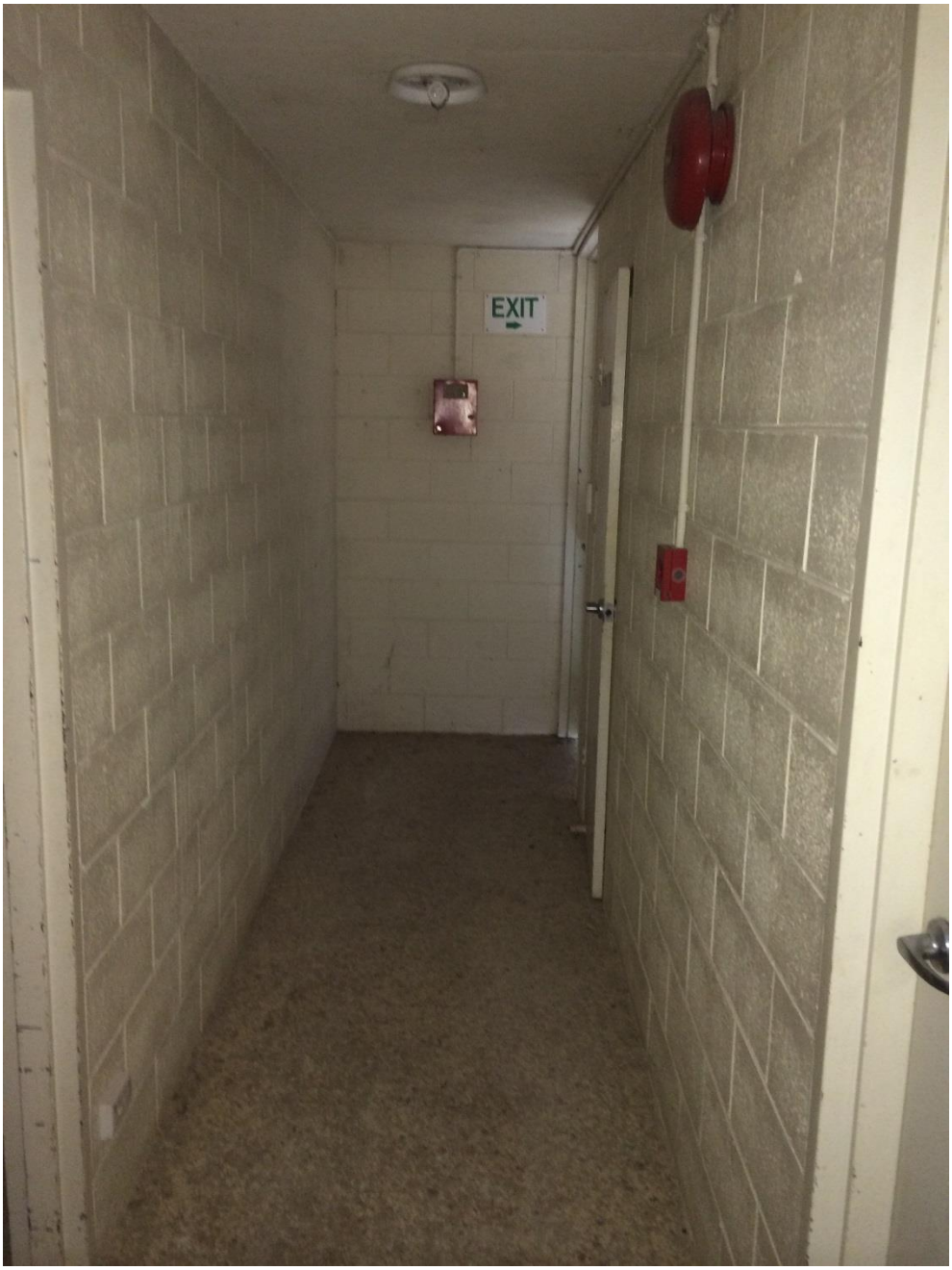


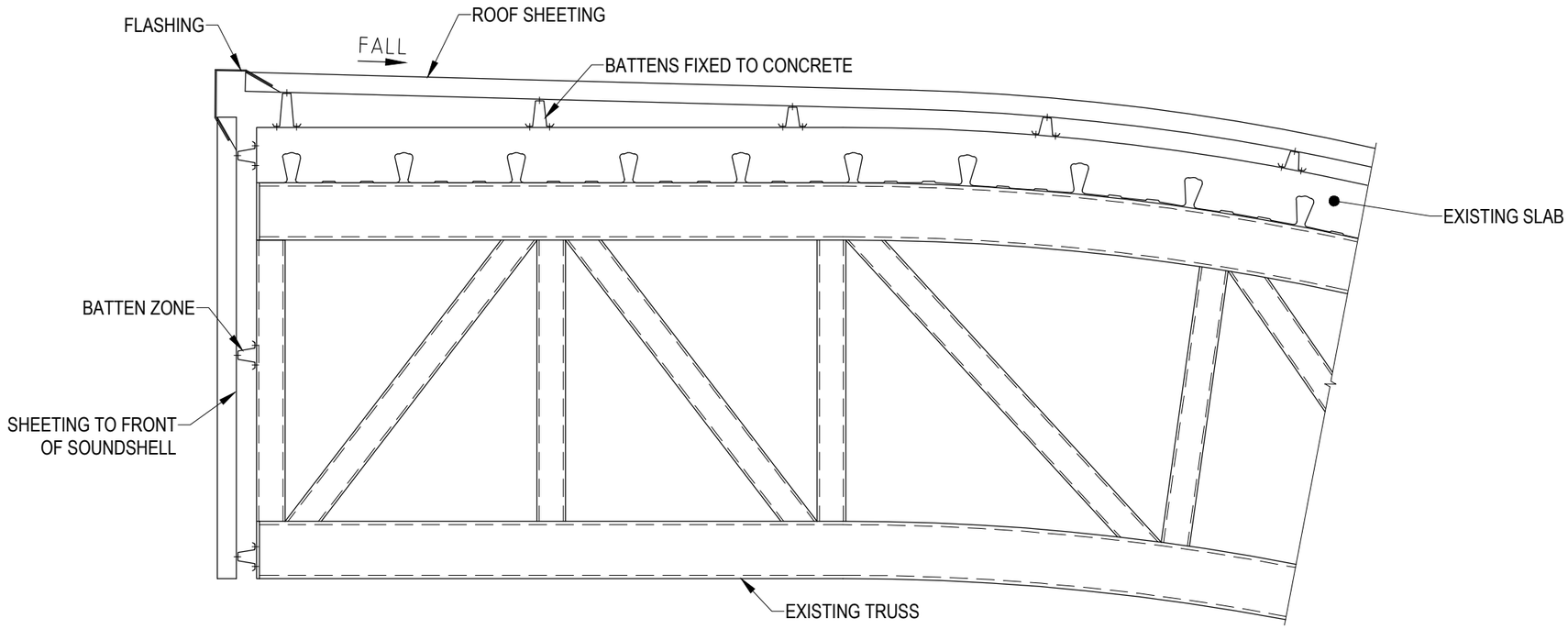
Photo 246 - Lower ground floor corridor

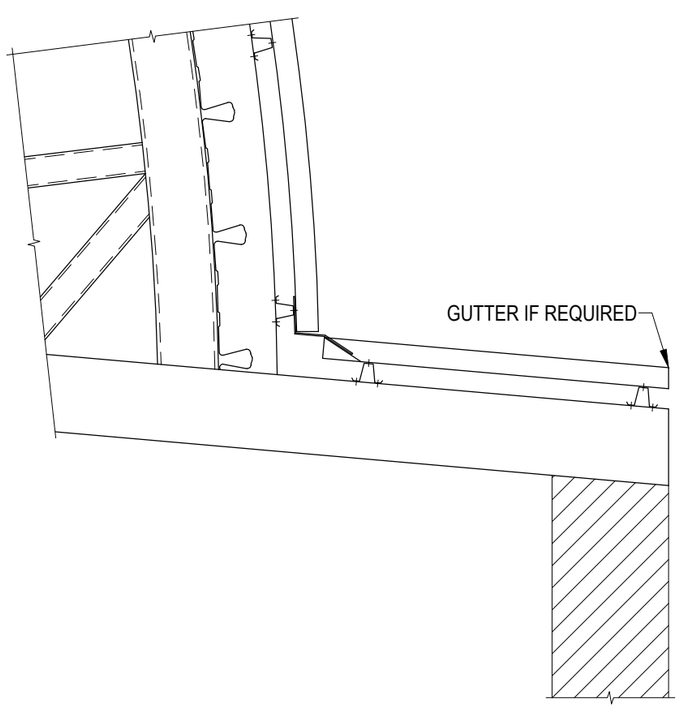
Photo 247 - Lower ground floor corridor

Photo 248 - Lower ground floor corridor, entrance

Photo 249 - Rear view of external substructure

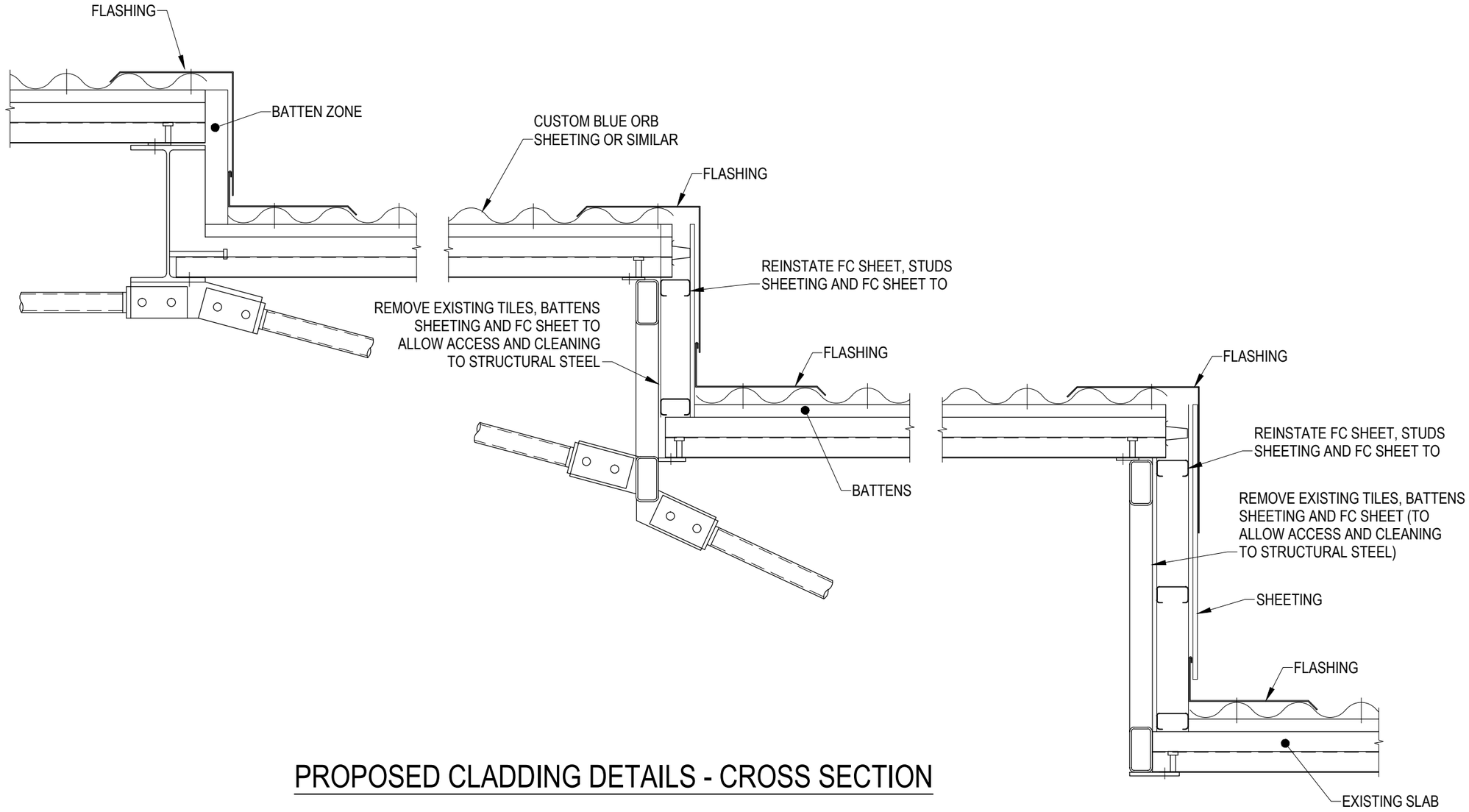
Appendix B Sketches





PROPOSED CLADDING DETAILS - LONG SECTION

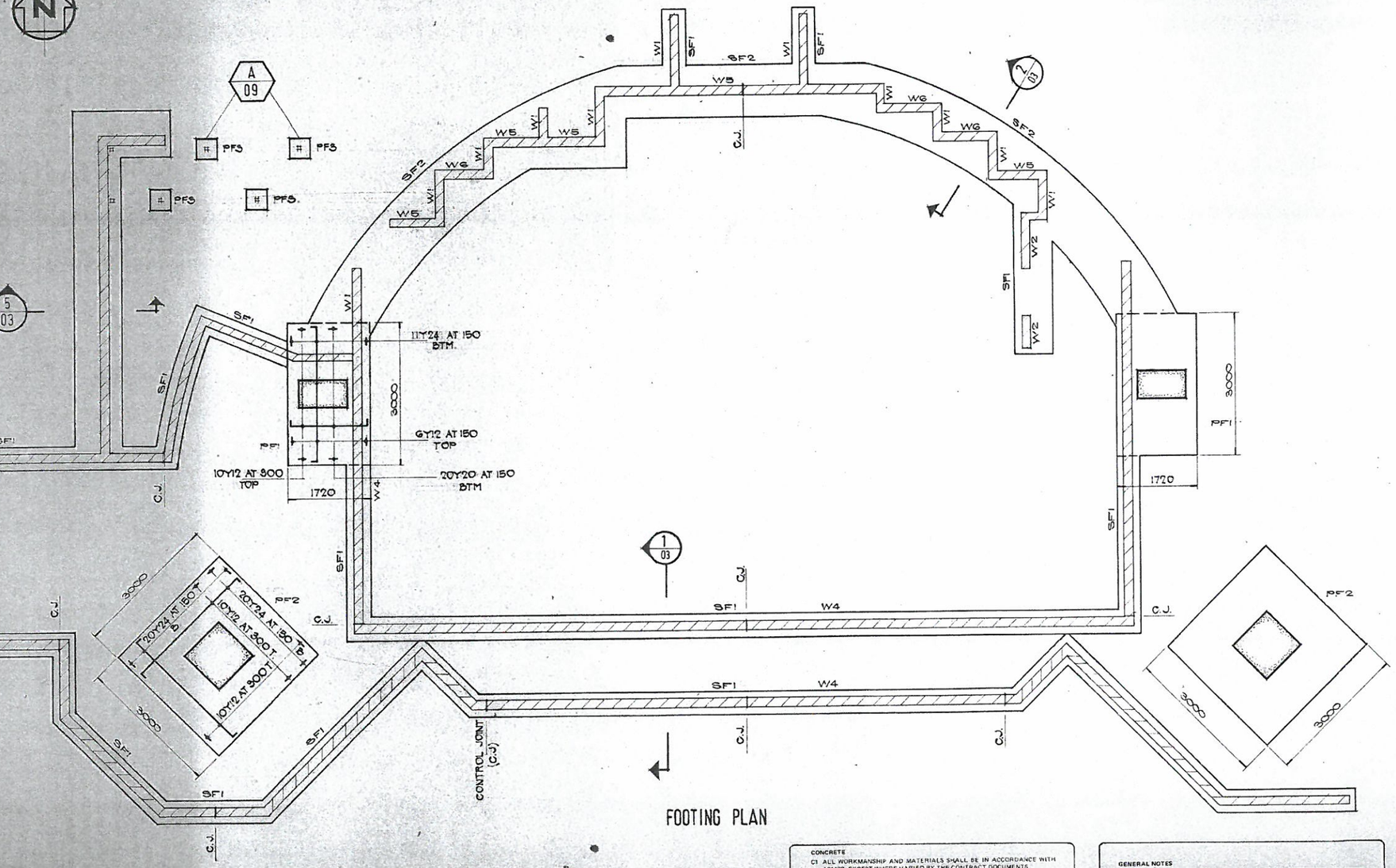
Appendix B - SK1



PROPOSED CLADDING DETAILS - CROSS SECTION

Appendix B - SK2

Appendix C Existing Drawings



FOOTING PLAN

FOOTING SIZES

SF1	300 × 400 DP STRIP FOOTING.
SF2	1300 × 400 DP " "
PF1	3000 × 1720 × 500 DP PAD FOOTING.
PF2	3000 × 3000 × 500 DP " "
PF3	450 × 450 × 600 DP MASS CONC.

BRICKWORK AND BLOCKWORK

B1 ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS1640 AND AS1475

B2 STRENGTHS OF BRICKS, CLASS OF BLOCKS AND TYPE OF MORTAR SHALL BE AS FOLLOWS.

ELEMENT	MATERIAL	STRENGTH (C) OR CLASS	MORTAR TYPE
ALL	CONC BLOCKS	12 MPa	CEM:LIME:SAND 1 : 0 to ¼ : 3

B3 MASONRY SUPPORTING SLABS AND BEAMS SHALL HAVE A HORIZONTAL FLAT BED ON MORTAR ON TOP WITH 2 LAYERS OF SUPER ALCOR (OR OTHER TREATMENT IF SO DETAILED)

CONCRETE

C1 ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS1480, EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS

C2 CONCRETE QUALITY

ELEMENT	SLUMP	MAX. SIZE AGGREGATE	CEMENT TYPE	ADMIXTURE	CONCRETE GRADE
BLOCK INFILL	230	10	A	-	12
ALL OTHER	80	20	A	-	25

C3 CLEAR CONCRETE COVER SHALL BE AS NOTED ON THE DRAWINGS WHERE COVER IS NOT NOTED IT SHALL COMPLY WITH TABLE 6.1.0 OF AS1480

C4 SIZES OF CONCRETE ELEMENTS DO NOT INCLUDE THICKNESS OF APPLIED FINISHES

C5 CONSTRUCTION JOINTS WHERE NOT SHOWN SHALL BE LOCATED TO THE APPROVAL OF THE ENGINEER

C6 BEAM DEPTHS ARE WRITTEN FIRST AND INCLUDE SLAB THICKNESS IF ANY.

C7 NO HOLES OF CHASES OTHER THAN THOSE SHOWN ON THE STRUCTURAL DRAWINGS SHALL BE MADE IN CONCRETE MEMBERS WITHOUT THE PRIOR APPROVAL OF THE ENGINEER.

C8 REINFORCEMENT IS REPRESENTED DIAGRAMATICALLY. IT IS NOT NECESSARILY SHOWN IN TRUE PROJECTION

C9 SPLICES IN REINFORCEMENT SHALL BE MADE ONLY IN THE POSITIONS SHOWN. THE WRITTEN APPROVAL OF THE ENGINEER SHALL BE OBTAINED FOR ANY OTHER SPLICES. WHERE THE LAP LENGTH IS NOT SHOWN IT SHALL BE SUFFICIENT TO DEVELOP THE FULL STRENGTH OF THE REINFORCEMENT.

C10 WELDING OF REINFORCEMENT WILL NOT BE PERMITTED UNLESS SHOWN ON THE STRUCTURAL DRAWINGS OR APPROVED IN WRITING BY THE CONSULTING ENGINEER

C11 REINFORCEMENT SYMBOLS

S – DENOTES GRADE 230S HOT ROLLED DEFORMED BARS TO AS1302
Y – DENOTES GRADE 410Y HOT ROLLED DEFORMED BAR TO AS1302
R – DENOTES GRADE 230R HOT ROLLED PLAIN BARS TO AS1302
F – DENOTES HARD-DRAWN WIRE REINFORCING FABRIC TO AS1304
W – DENOTES HARD-DRAWN PLAIN WIRE TO AS1303

C12 ALL REINFORCEMENT FABRIC SHALL COMPLY WITH AS1303 AND AS1304.

C13 FABRIC REINFORCEMENT TO SLABS ON GROUND SHALL BE SUPPORTED ON CHAIRS OR FORCED INTO THE CONCRETE AFTER PLACING AND BEFORE FINISHING. FABRIC SHALL NOT BE LAID ON THE GROUND AND PULLED INTO POSITION THROUGH THE CONCRETE.

GENERAL NOTES

G1 THESE DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL ARCHITECTURAL AND OTHER CONSULTANTS' DRAWINGS AND SPECIFICATIONS AND WITH SUCH OTHER WRITTEN INSTRUCTIONS AS MAY BE ISSUED DURING THE COURSE OF THE CONTRACT. ALL DISCREPANCIES SHALL BE REFERRED TO THE ARCHITECT FOR DECISION BEFORE PROCEEDING WITH THE WORK.

G2 DIMENSIONS SHALL NOT BE OBTAINED BY SCALING THE STRUCTURAL DRAWINGS.

G3 SETTING OUT DIMENSIONS SHOWN ON THE DRAWINGS SHALL BE VERIFIED BY THE BUILDER.

G4 DURING CONSTRUCTION THE STRUCTURE SHALL BE MAINTAINED IN A STABLE CONDITION AND NO PART SHALL BE OVERSTRESSED.

G5 ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH THE REQUIREMENTS OF THE SAA CODES AND THE BY-LAWS AND ORDINANCES OF THE RELEVANT BUILDING AUTHORITY.

G6 THE STRUCTURAL COMPONENTS DETAILED ON THESE DRAWINGS HAVE BEEN DESIGNED IN ACCORDANCE WITH THE RELEVANT SAA CODES AND LOCAL GOVERNMENT ORDINANCES.

FOUNDATIONS

F1 FOOTINGS HAVE BEEN DESIGNED FOR THE FOLLOWING BEARING PRESSURES. 300 kPa

FOUNDATION MATERIAL SHALL BE APPROVED BY THE CONSULTING ENGINEER BEFORE PLACING CONCRETE.

LOADING

L1 SUPERIMPOSED FLOOR LOADS ARE GENERALLY IN ACCORDANCE WITH AS1170 AND ARE NOTED ON THE FLOOR PLAN DRAWINGS.

L2 WIND LOADS ARE IN ACCORDANCE WITH AS1170 AS FOLLOWS

BASIC WIND VELOCITY 55 M/S.
TERRAIN CATEGORY 2.5

NO	DATE	BY	CHKD	AMENDMENTS

Rankine & Hill Pty Limited
Consulting Engineers Incorporated in N.S.W.

OFFICE 31 GOONDOON STREET GLADSTONE 4680 TELEPHONE (079) 723077

Members of the ACEA

DRAWN	J PIPER
DATE	MARCH '84
SCALE	1:50
DESIGNED	C.WILLIAMS
CHECKED	M.B.K
APPROVED	

CLIENT: ROCKHAMPTON CITY COUNCIL

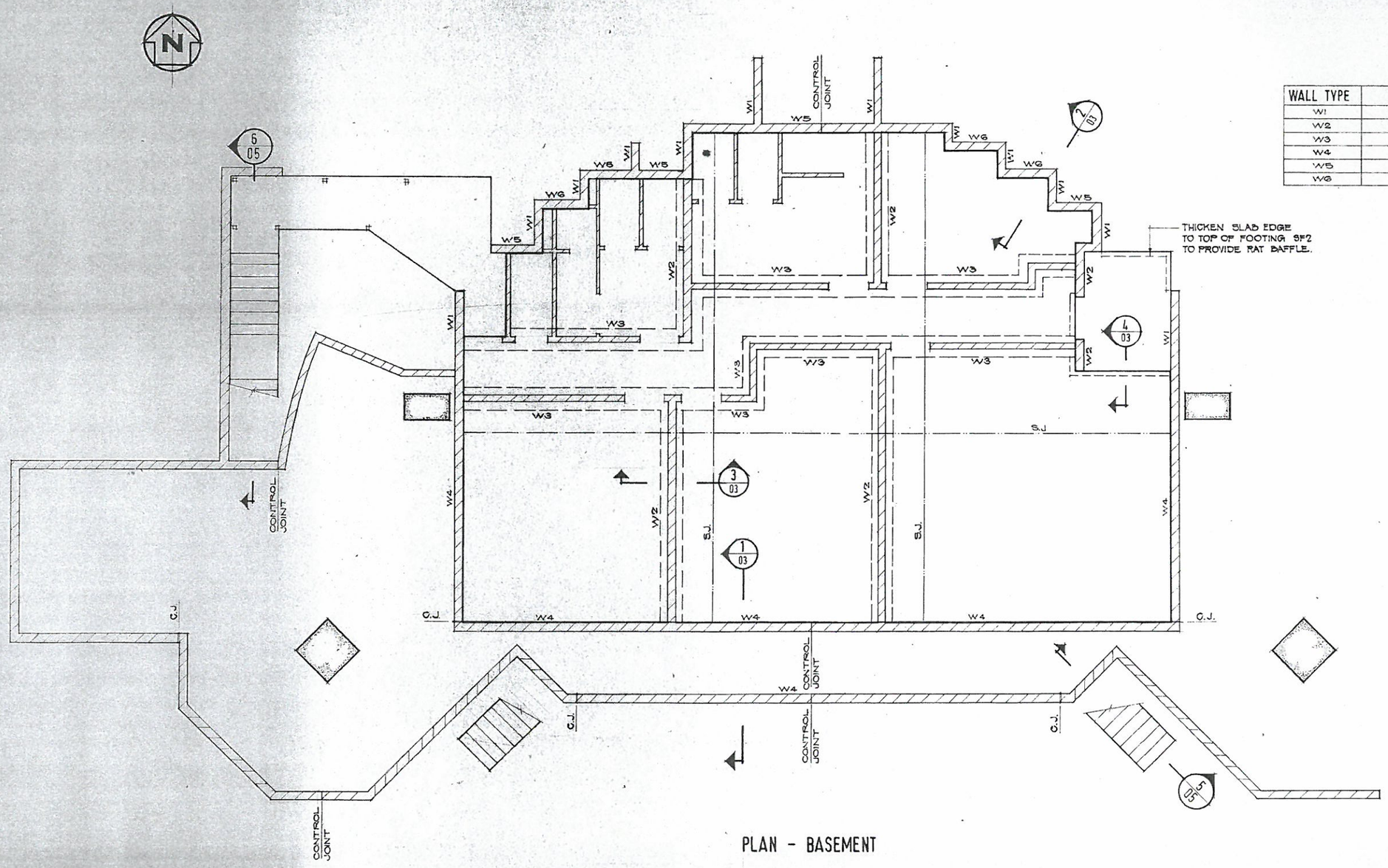
JOB NAME: PROPOSED SOUND SHELL KIOSK AND AMENITIES NUTTALL STREET, SLADE STREET AND YAAMBA ROAD

DWG TITLE: FOOTING PLAN

JOB NO 0784S006

DRAWING NO. 01

REV.



WALL TYPE	SIZE	VERT. BARS	HORIZ. BARS
W1	200	Y16 AT 200	Y12 AT 400
W2	200	Y12 AT 400	Y12 AT 400
W3	150	Y12 AT 200	Y12 AT 400
W4	200	Y12 AT 200	Y12 AT 400
W5	200	Y12 AT 200	Y12 AT 400
W6	200	Y12 AT 400	Y12 AT 400

NO	DATE	BY	CHKD	AMENDMENTS

PLAN - BASEMENT

NOTES

1. SLABS TO BE 100 THICK REINFORCED WITH FQ2 FABRIC LAYED WITH 30 TOP COVER
2. SLABS TO BE CAST ON WATERPROOF MEMBRANE (REFER SPECIFICATION) OVER 50mm MIN SAND BLINDING
3. ALL STEPS AND FALLS TO ARCHITECTS DETAILS
4. LAP FABRIC THUS 25
5. S.J. DENOTES SAWN JOINTS REFER DETAIL DRG. Nº 03.

Rankine & Hill Pty Limited
Consulting Engineers
Incorporated in N.S.W.

OFFICE 31 GOONOON STREET GLADSTONE 4680 TELEPHONE (079) 72 3077
Members of the ACEA

DRAWN	J. PIPER
DATE	MARCH '84
SCALE	1:50
DESIGNED	G. WILLIAMS
CHECKED	M.B.K
APPROVED	23.3.84

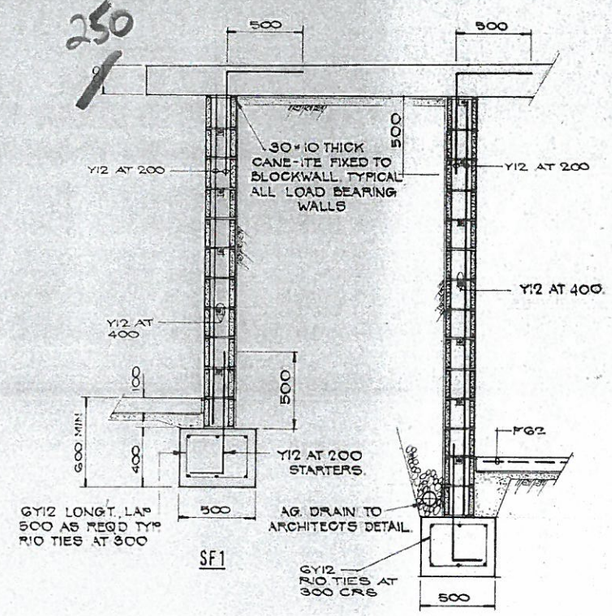
CLIENT: ROCKHAMPTON CITY COUNCIL

JOB NAME: PROPOSED SOUND SHELL, KIOSK AND AMENITIES NUTTALL STREET, SLADE STREET AND YAAMBA ROAD

DWG TITLE: PLAN - BASEMENT

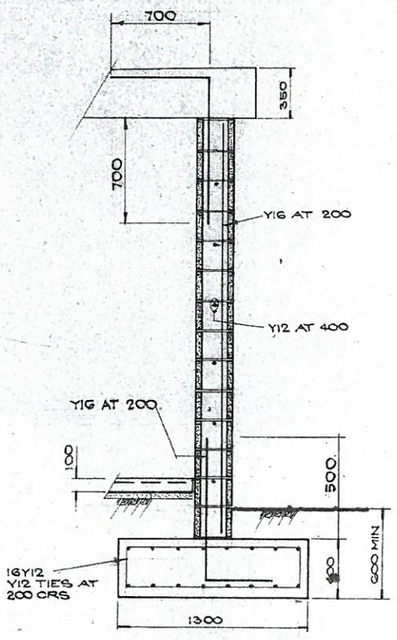
JOB NO	DRAWING NO.	REV
0784S006	02	

250



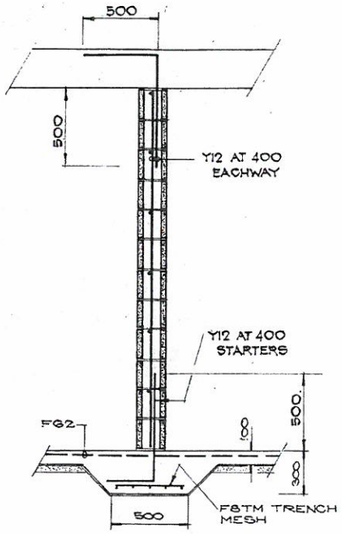
SF1

SECTION 1/01 1/02



SF2

SECTION 2/01 2/02



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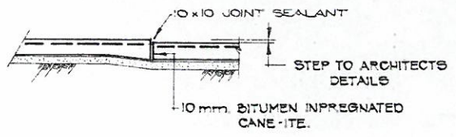

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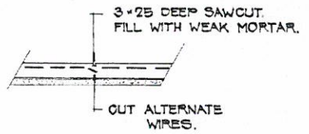
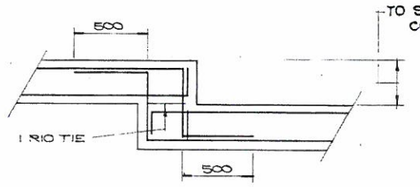
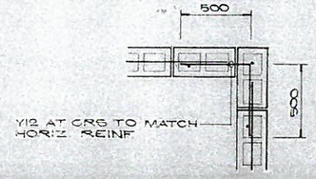


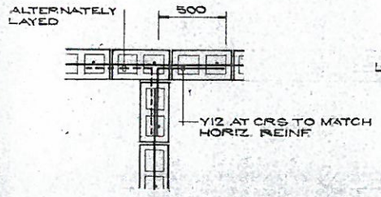
SAWN JOINT



FOOTING STEP



90° CORNER



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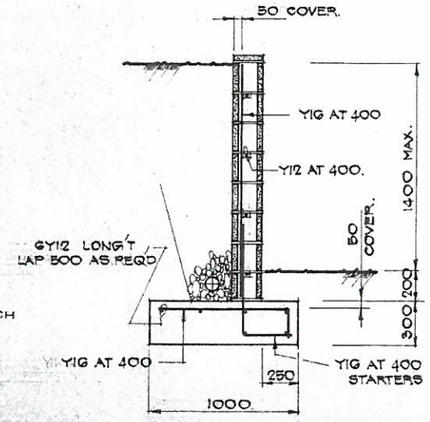

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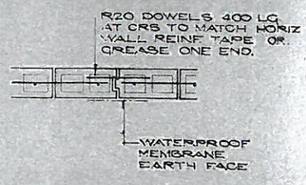

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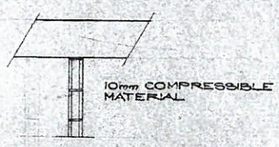
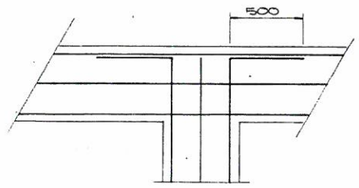


90 WIDE NON LOAD BEARING WALL

BLOCKWORK DETAILS



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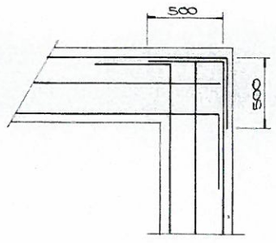


90° CORNER

FOOTING DETAILS

NO	DATE	BY	CHKD	AMENDMENTS

Rankine & Hill Pty Limited
Consulting Engineers (incorporated in N.S.W.)

DRAWN	J. PIPER
DATE	MARCH '84
SCALE	1:20
DESIGNED	G. WILLIAMS
CHECKED	M.B.K
APPROVED	29-3-84

OFFICE 31 GOONDOON STREET, GLADSTONE 4680, TELEPHONE (079) 723077. Members of the ACEA

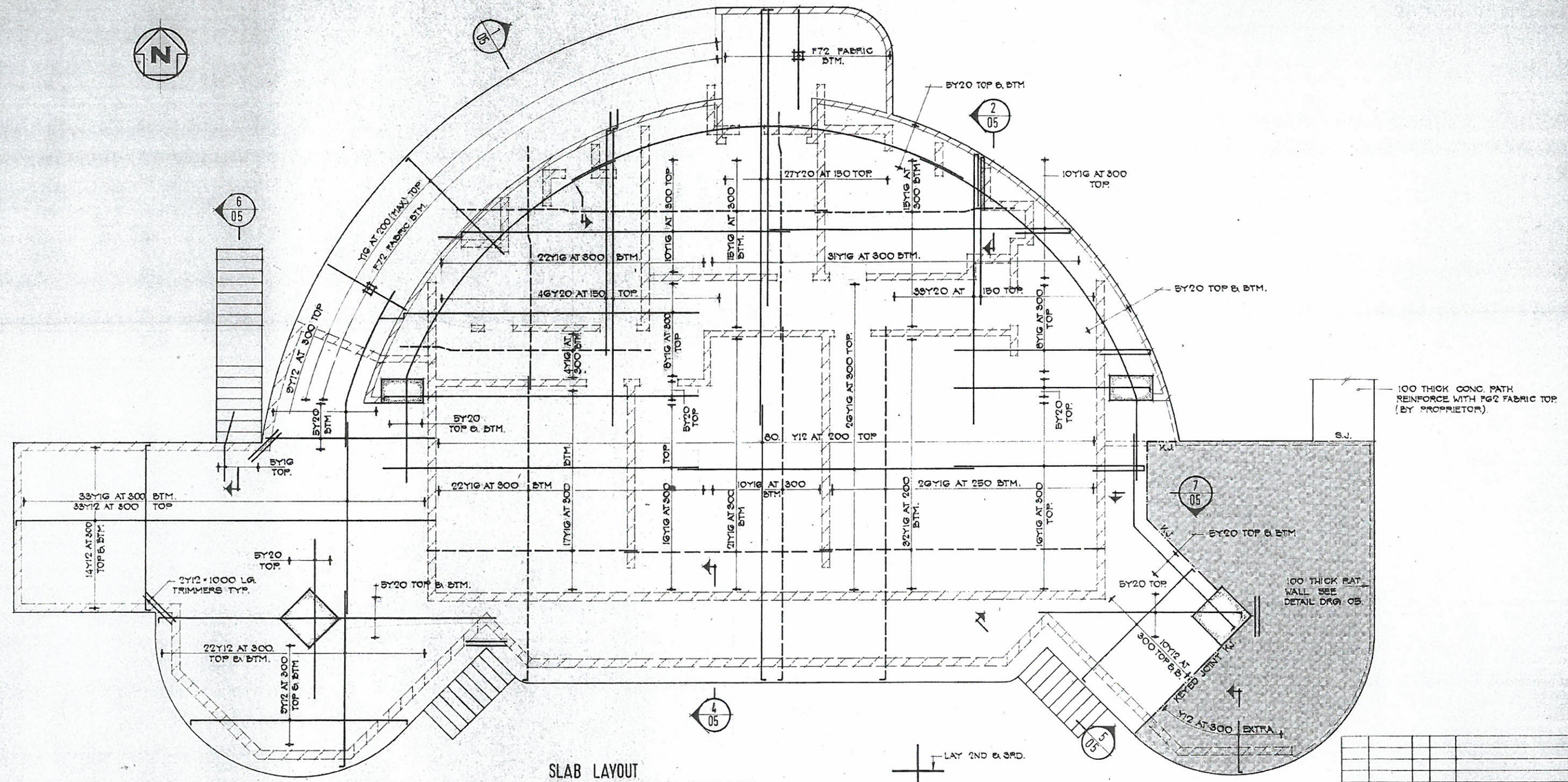
CLIENT: ROCKHAMPTON CITY COUNCIL

JOB NAME: PROPOSED SOUND SHELL, KIOSK AND AMENITIES NUTTALL STREET, SLADE STREET AND YAAMBA ROAD

DWG TITLE: FOOTING SLAB AND BLOCKWORK DETAILS

JOB NO. 0784S006

DRAWING NO. 03 REV



SLAB LAYOUT

MAIN SLAB VARIES 200 TO 350 THICK

DESIGN LOADING..... 7·5 kPa (750 kg/m²) U.D.L.
OR 4·5 kN (450 kg) POINT LOADS.

NOTES - SLAB ON GROUND

1. SLABS (SHADED) TO BE 125 THICK REINFORCED WITH 1 LAYER F72 FABRIC 50 TOP COVER.
2. FILL UNDER SLABS TO BE COMPACTED TO 95% OF MAX. DRY DENSITY TO AS1289 E1.1.
3. SLABS TO BE CAST ON A WATERPROOF MEMBRANE (REFER SPECIFICATION) OVER 50 MIN. SAND BLINDING.
4. LAP FABRIC THUS: 25

NOTE - RE SUSPENDED SLAB

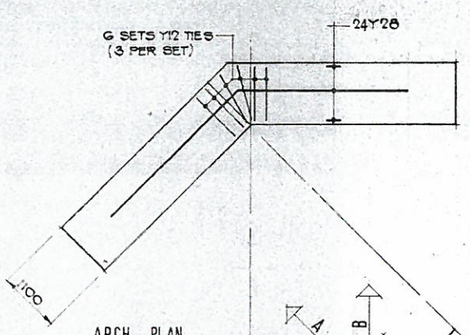
1. PROVIDE Y12 AT 300 DISTRIBUTION BARS WHERE REQUIRED.
2. REFER STEELWORK DRAWINGS FOR HOLDING DOWN BOLT LOCATIONS AND DETAILS.

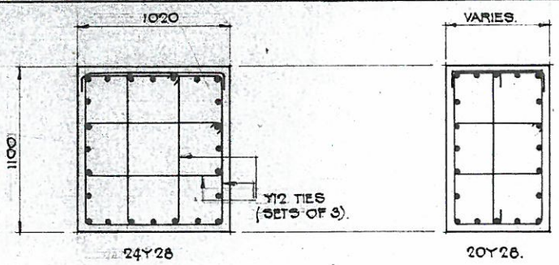
BAR LAYING SEQUENCE
UNLESS SHOWN OTHERWISE IN SECTIONS

N°	DATE	BY	CHKD	AMENDMENTS

Rankine & Hill Pty Limited
Consulting Engineers Incorporated in N.S.W.

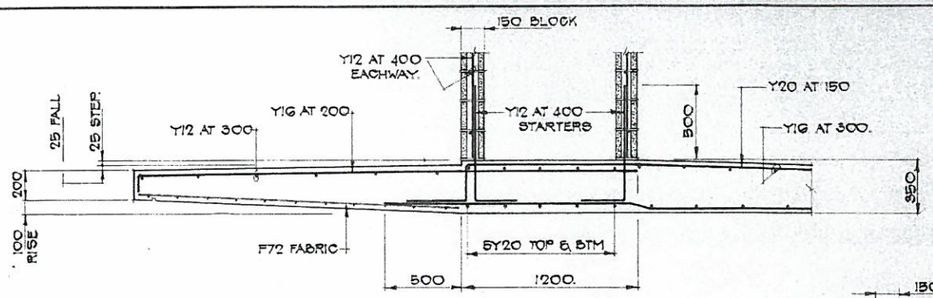
DRAWN: D.McCLURG	OFFICE: 31 GOONDOON STREET, GLADSTONE 4680, TELEPHONE (079) 72 3077 — Members of the ACEA
DATE: MARCH '84	CLIENT: ROCKHAMPTON CITY COUNCIL
SCALE: 1:50	JOB NAME: PROPOSED SOUND SHELL KIOSK AND AMENITIES, NUTTAL STREET, SLADE STREET AND YAAMBA ROAD
DESIGNED: G. WILLIAMS	
CHECKED: M.B.K.	DWG TITLE: STAGE LEVEL SLAB LAYOUT
APPROVED: 29.3.84	
JOB NO: 0784S006	DRAWING NO.: 04 — REV:





SECTION 1/-

SECTION 2/-



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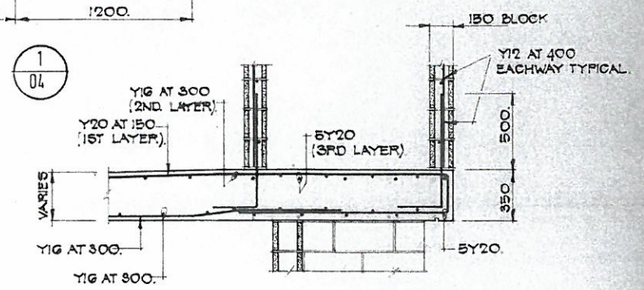

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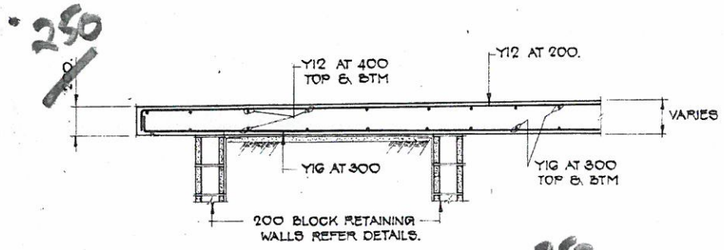
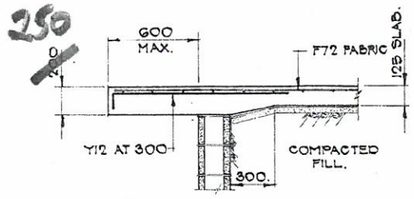
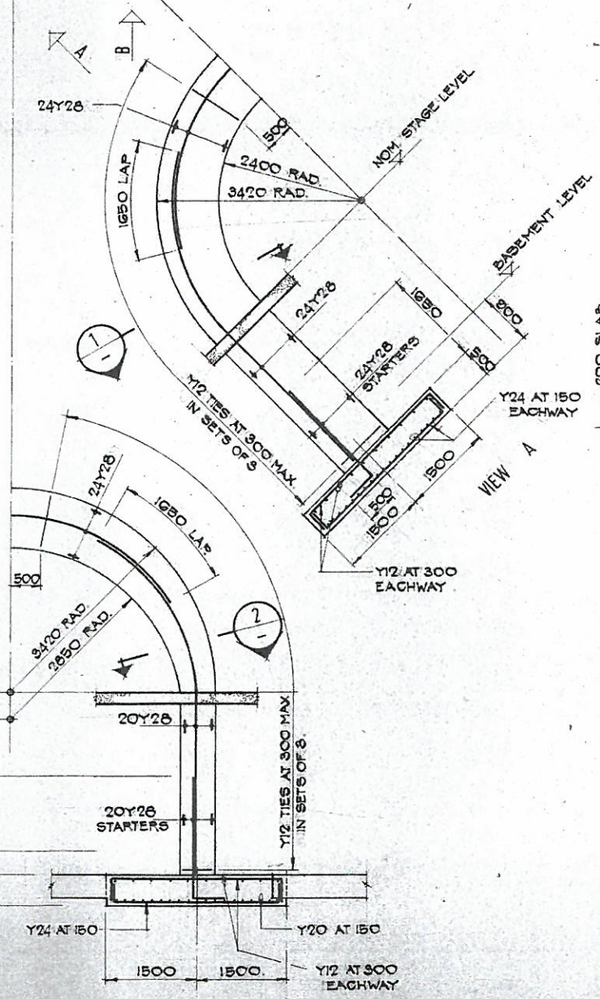


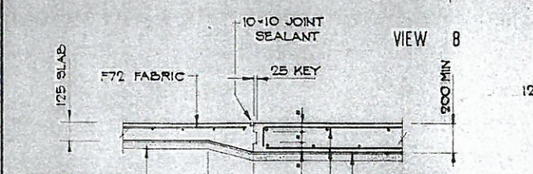
SECTION 4/04



SECTION 3/04



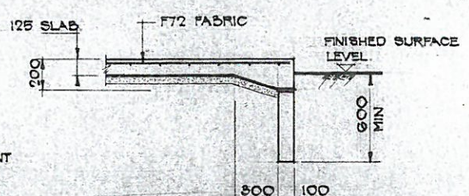
SECTION 6/04



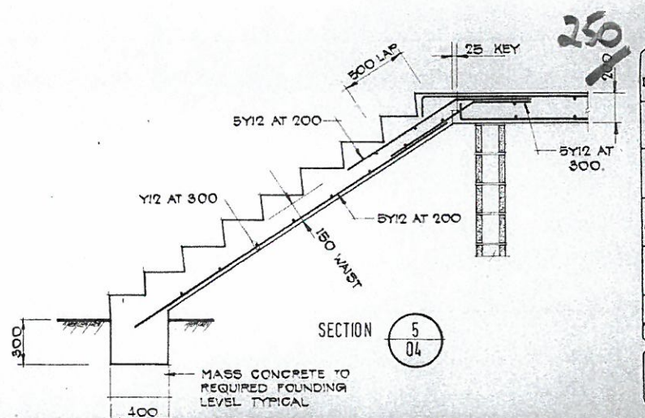
KEYED JOINT DETAIL

SECTION 7/04

VIEW B



RAT WALL DETAIL



SECTION 5/04

NO	DATE	BY	CHKD	AMENDMENTS

Rankine & Hill Pty Limited
Consulting Engineers
Incorporated in N.S.W.

DRAWN	D.McCLURG
DATE	MARCH 84
SCALE	1:50, 1:20
DESIGNED	G. WILLIAMS
CHECKED	M.B.K
APPROVED	

OFFICE: 31 GOONDOON STREET, GLADSTONE 4680, TELEPHONE (079) 72 3077
Members of the ACEA

CLIENT: ROCKHAMPTON CITY COUNCIL

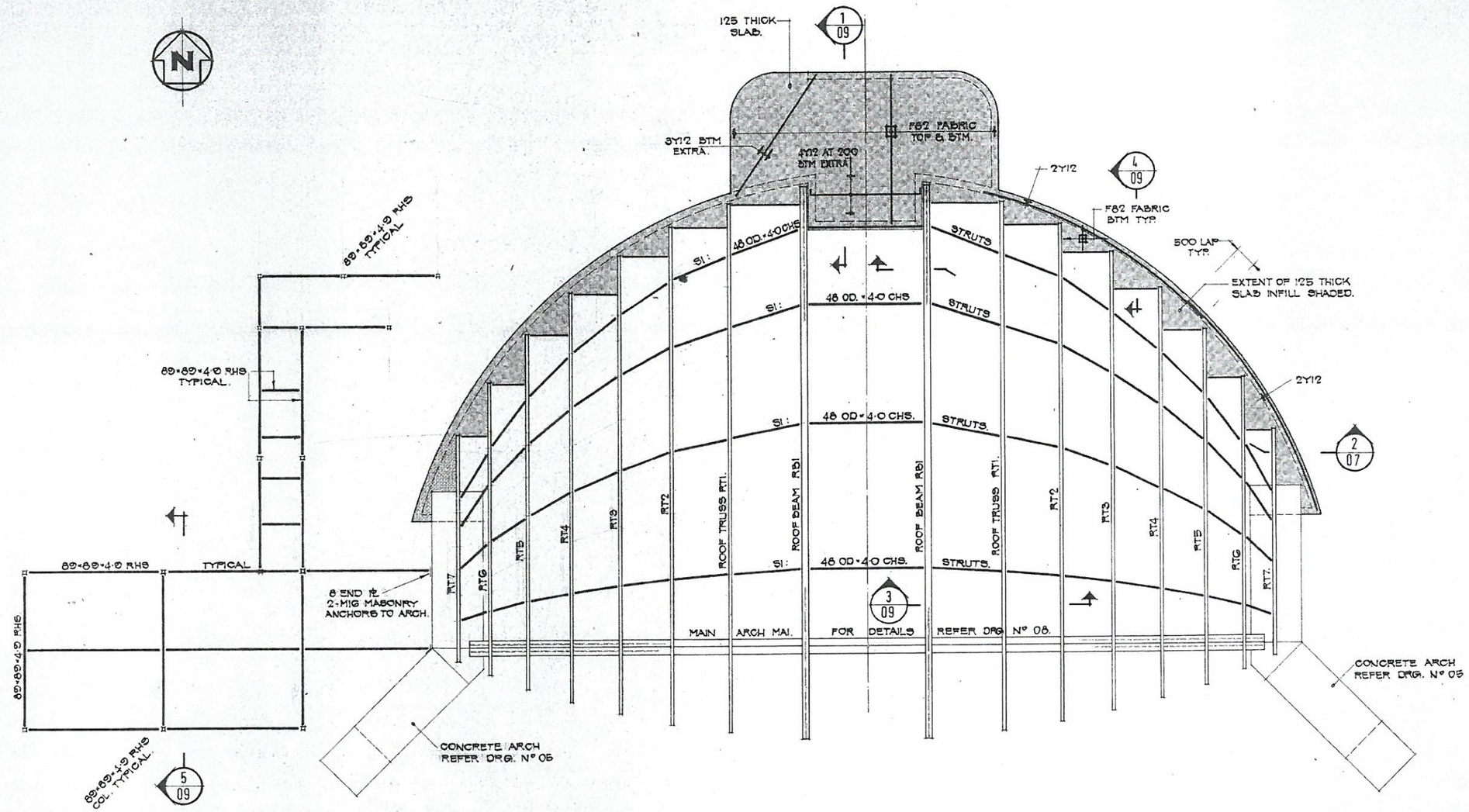
JOB NAME: PROPOSED SOUND SHELL KIOSK AND AMENITIES
NUTTALL STREET, SLADE STREET AND YAAMBA ROAD

DWG TITLE: CONCRETE DETAILS

JOB NO: 0784S006

DRAWING NO: 05

REV:



ROOF PLAN

NOTE DURING HANDLING AND ERECTION CARE SHALL BE TAKEN TO ENSURE TRUSSES ARE NOT OVERSTRESSED BY BENDING IN THEIR WEAK DIRECTION.

STRUCTURAL STEEL

S1 ALL WORKMANSHIP AND MATERIALS SHALL BE IN ACCORDANCE WITH AS1250 AND AS1554 EXCEPT WHERE VARIED BY THE CONTRACT DOCUMENTS.

S2 UNLESS OTHERWISE NOTED, ALL STEEL SHALL BE IN ACCORDANCE WITH
AS 1204 GRADE 250 FOR ROLLED SECTIONS
AS 1163 GRADE 250 FOR RHS SECTIONS
AS 1163 GRADE 200 FOR CHS SECTIONS
AS 1204 GRADE 350 FOR ALL HIGH STRENGTH STEEL

S4 UNLESS NOTED OTHERWISE, ALL WELDS SHALL BE 6MM CONTINUOUS FILLET FROM E41 XX ELECTRODES, ALL BOLTS M20 COMMERCIAL GRADE AND ALL CLEATS AND GUSSETS 8MM PLATE

S5 FOR WELDS AND BOLTS OTHER THAN AS NOTED ABOVE, THE FOLLOWING NOTATION IS USED.
WELDS – SYMBOLS IN ACCORDANCE WITH AS1101 PART 3
BOLTS – DESIGNATED BY THE NUMBER, DIAMETER, GRADE AND TIGHTENING PROCEDURE
E.G 4–M16–4.6S MEANS 4 16 DIA. COMMERCIAL GRADE BOLTS SNUG TIGHT
6–M20–8.8TF MEANS 6 M20 HIGH STRENGTH STRUCTURAL BOLTS FULLY TENSIONED IN A NO SLIP JOINT
6–M24–8.8TB MEANS 6 M24 HIGH STRENGTH STRUCTURAL BOLTS FULLY TENSIONED IN A BEARING JOINT (SOME SLIP ALLOWED)

S6 COMMERCIAL GRADE BOLTS SHALL CONFORM TO AS1111 AND AS1200 HIGH STRENGTH STRUCTURAL BOLTS SHALL CONFORM TO AS1252 AND AS1511. WELDS SHALL CONFORM TO AS1554 AND WELDING ELECTRODES TO AS1553

S7 FAYING SURFACES OF TF CONNECTIONS SHALL BE LEFT UNPAINTED AND FREE OF SCALE UNLESS OTHERWISE SPECIFIED.

S8 BOLTS IN TF AND TB CONNECTIONS SHALL BE TIGHTENED USING THE PART TURN METHOD OR LOAD INDICATING WASHERS. CALIBRATED TORQUE WRENCHES SHALL NOT BE USED. A HARDENED WASHER SHALL BE USED UNDER THE BOLT HEAD OR NUT, WHICHEVER IS ROTATED. THE REUSE OF FULLY TENSIONED BOLTS IS PROHIBITED.

S9 CONCRETE ENCASED STEELWORK SHALL HAVE A MINIMUM OF 50MM OF CONCRETE ENCASEMENT REINFORCED WITH W5 WIRE WRAPPING AT 150 CENTRES OR F62WT FABRIC UNLESS NOTED OTHERWISE.

S10 STRUCTURAL STEELWORK SHALL HAVE THE FOLLOWING SURFACE TREATMENT IN ACCORDANCE WITH AS2312 AND THE SPECIFICATION.

ELEMENT	SURFACE CLEANING	PRIME COAT	TOP COATS
H.D. BOLTS	Hot dip galvanise in accordance with A.S.1214		
ALL OTHER	CLASS 2	75 Microns dry thickness British Paints Zincanode 200 or equiv	

S11 THE BUILDER SHALL PROVIDE ALL CLEATS AND DRILL ALL HOLES NECESSARY FOR FIXING STEEL AND TIMBER TO STEEL WHETHER OR NOT DETAILED IN THE DRAWINGS

NO	DATE	BY	CHKD	AMENDMENTS

Rankine & Hill Pty Limited
Consulting Engineers (Incorporated in N.S.W.)
OFFICE 31 GOONOON STREET GLADSTONE 4680 TELEPHONE (079) 723077
Members of the ACEA

DRAWN	D.McCLURG
DATE	MARCH '84
SCALE	1:50
DESIGNED	G.WILLIAMS
CHECKED	M.B.K
APPROVED	29.3.84
JOB NO.	0784S006

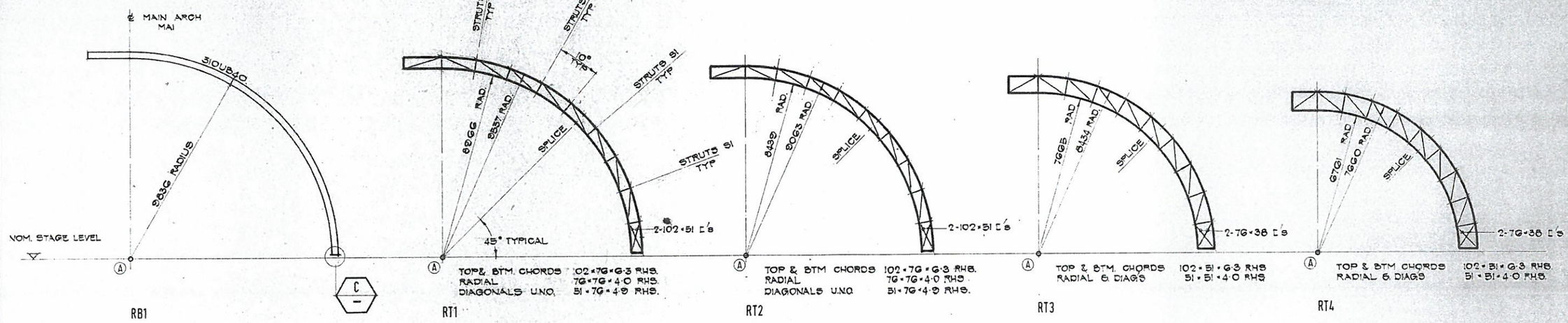
CLIENT: ROCKHAMPTON CITY COUNCIL

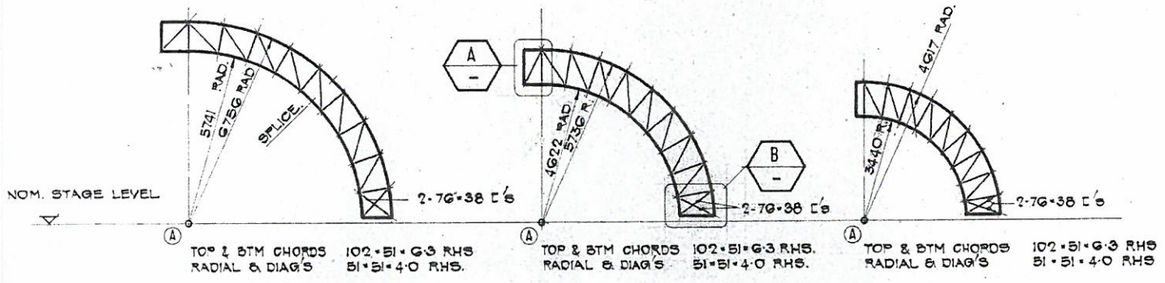
JOB NAME: PROPOSED SOUND SHELL, KIOSK AND AMENITIES NUTTALL STREET, SLADE STREET AND YAAMBA ROAD

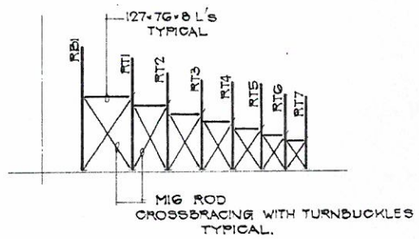
DWG TITLE: ROOF FRAMING PLAN

DRAWING NO. 06

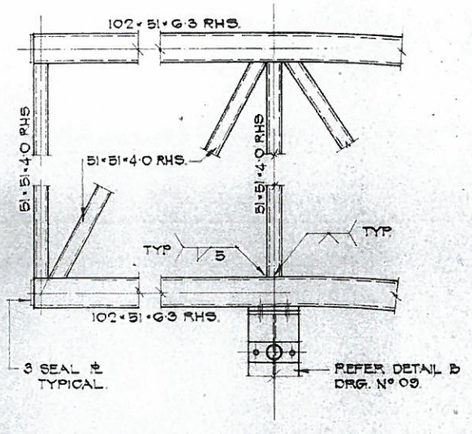
REV



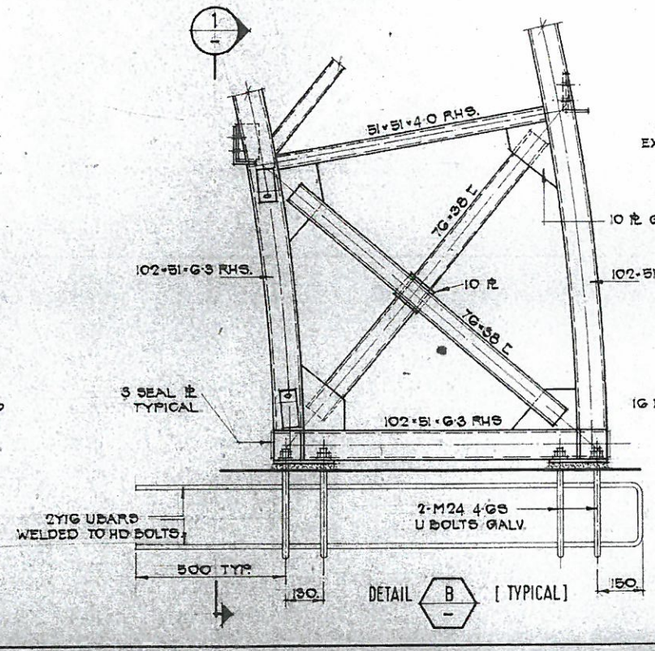




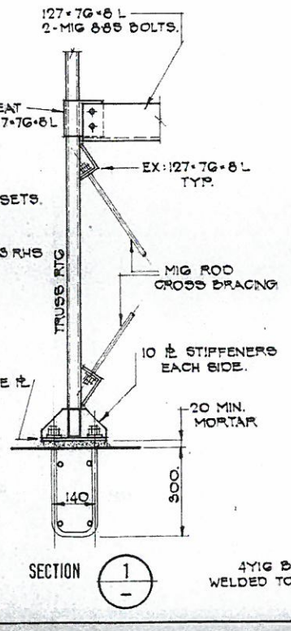
SECTION 2/06



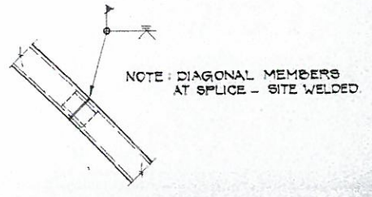
DETAIL A [TYPICAL]



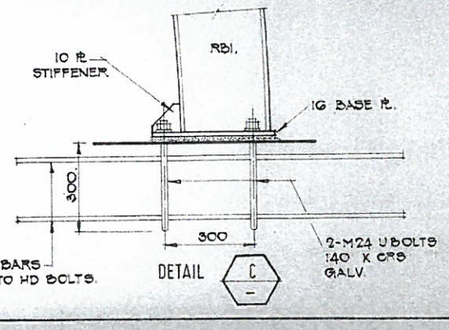
DETAIL B [TYPICAL]



SECTION 1



TYPICAL TOP - BTM. CHORD SPLICE

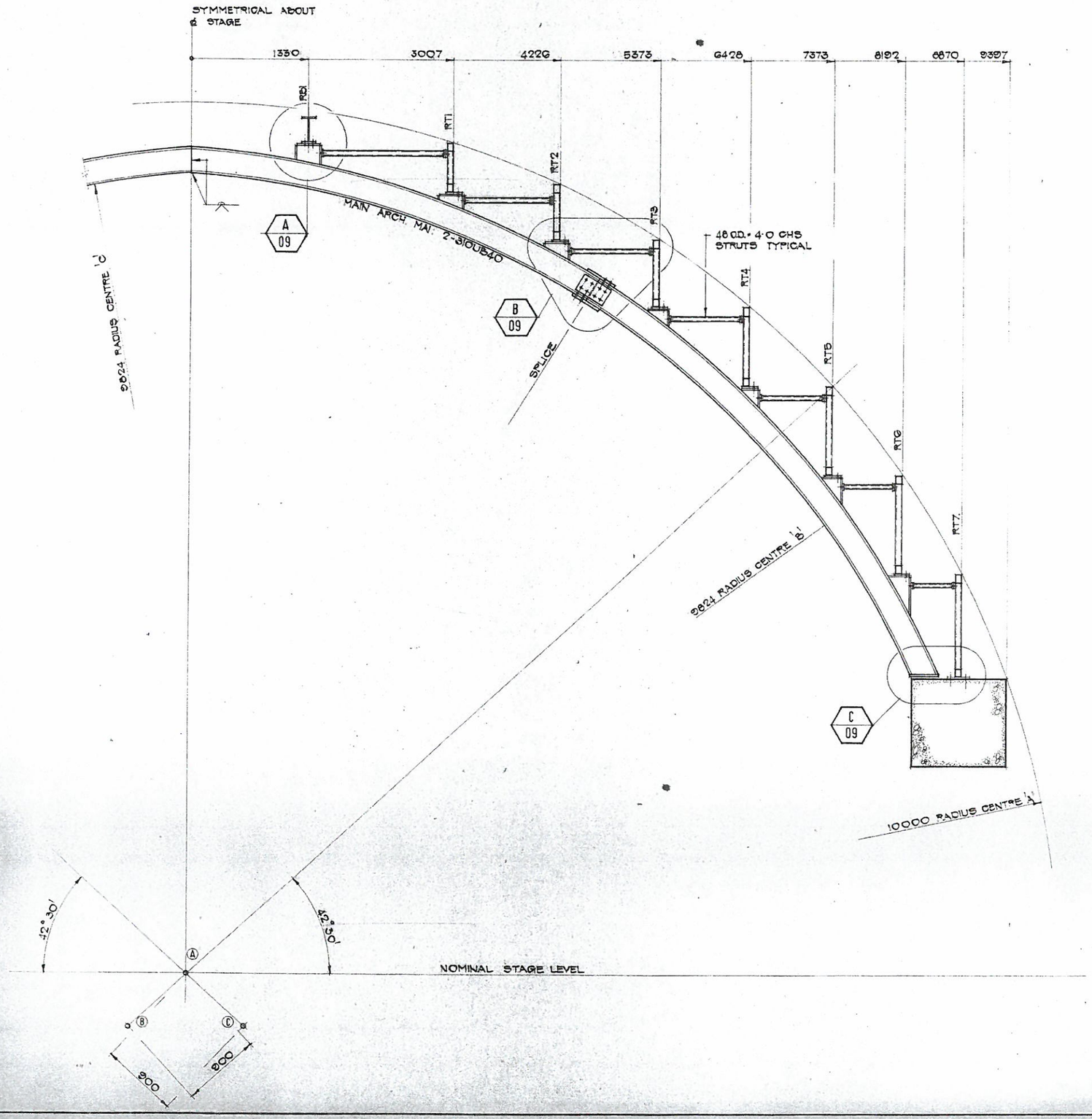


DETAIL C

NO.	DATE	BY	CHKD	AMENDMENTS

Rankine & Hill Pty Limited
Consulting Engineers Incorporated in N.S.W.

DRAWN D.McCLURG	OFFICE 31 GOONOON STREET GLADSTONE 4680 TELEPHONE (079) 72 3077 Members of the ACEA
DATE MARCH 84	CLIENT ROCKHAMPTON CITY COUNCIL
SCALE 1:100 1:10	JOB NAME PROPOSED SOUND SHELL, KIOSK AND AMENITIES NUTTALL STREET, SLADE STREET AND YAAMBA ROAD
DESIGNED G. WILLIAMS	DWG TITLE ROOF TRUSS ELEVATIONS AND DETAILS
CHECKED M.B.K.	
APPROVED M.B.K. 29.3.84	
JOB NO 0784S006	DRAWING NO. 07 REV



NO	DATE	BY	CHKD	AMENDMENTS

Rankine & Hill Pty Limited
Consulting Engineers
Incorporated in N.S.W.

Members of the ACEA

OFFICE 31 GOONOON STREET
GLADSTONE 4680
TELEPHONE (079) 723077

DRAWN	D. McCLURG
DATE	MARCH 84
SCALE	1:25
DESIGNED	G. WILLIAMS
CHECKED	M.B.K.
APPROVED	25.5.84

CLIENT: ROCKHAMPTON CITY COUNCIL

JOB NAME: PROPOSED SOUND SHELL, KIOSK AND AMENITIES
NUTTALL STREET, SLADE STREET AND YAAMBA ROAD

DWG TITLE: MAIN ARCH ELEVATION

JOB NO	DRAWING NO.	REV
0784S006	08	

RB1 - 310UB40
90 SLAB REFER DETAIL.
4-M20 8.8S BOLTS
310UB40 STUB TO END PL.
MA1 : 2-310UB40.
48 OD x 4.0 CHS STRUT.

16 PL.
2-M20 8.8S BOLTS
TRUSS RT2
310 UB40 STUB TO END PL.
90 SLAB REFER DETAIL.
48 OD x 4.0 CHS.
MA1 : 2-310UB40.
TRUSS RT3
10 PL's
2-M16 8.8S BOLTS
2
2-10 WEB PL's
16 - M20 8.8S BOLTS
TACK WELD BOLT HEADS INSIDE UB WEBS.
12 PL. TOP & BTM
4-M20 8.8S BOLTS.

MA1 - 2-310UB40.
TRUSS RT7.
12 PL. (AT STRUT LOCATIONS)
2-M20 MASONRY ANCHORS.
(HILTI HSA-M20x170).
20 NOMINAL MORTAR.
RL. 46.570
20 MIN MORTAR.
12 BASE PL.
600
WELD BOLTS INTO CAGE USING 25 x 6 PL.
4-M24 4.6 S. HD BOLTS (GALV)
100
150
60 x 6 PL.
235 EQ. EQ.
1

310UB40
310UB40 WELDS GROUND FLUSH
SECTION 2

DETAIL A 08
12 DIA x 50 SHEAR STUDS AT 200 CRS.
RB1
50 TYP
90
50
50 x 5 PL CONT. PACKER
12 DIA x 125 SHEAR STUDS AT 200 CRS.
ALUMINIUM TRIM TO BE ELECTRICALLY ISOLATED FROM STEEL
3
B1 : 48 OD x 4.0 CHS.
8 PL's M16 8.8S BOLTS
FIX BONDEK WITH 12 ggc. SERIES 500 HEX. HEAD SCREWS AT 200 CRS TYPICAL

DETAIL B 08
12 DIA x 50 SHEAR STUDS AT 200.
3
F62 FABRIC TYP 20 TOP COVER.
50 x 10 JOINT SEALANT
30.
RT1
60 x 6 PL. CONT.
8 PL's M16 8.8S BOLTS
50 x 5 PL CONT TYP
COMPRESSED FIBROUS CEMENT BOARD TO ARCHITECT'S DETAIL
12 DIA x 50 SHEAR STUDS AT 200.
3
RT2
100 x 6 PL. CONT. TYP
50 TYP
60
0.75 mm BONDEK TYP

SECTION 3 06

DETAIL C 08
INTERFACE WELL SCABBLED
2Y12 TRIMMERS LAP 500 AS REQUIRED.
F82 FABRIC.
125 SLAB.
Y12 AT 400 EACHWAY TYPICAL.
150 BLOCK WALL
150 BLOCK WALL.
WEEPHOLES
FALL

SECTION 4 06

89 x 89 x 4.5 RHS CURVED.
89 x 89 x 4.5 RHS
89 x 89 x 4.5 RHS
A
B

SECTION 5 06

90. SLAB REFER DETAILS ABOVE
INTERFACE TO BE WELL SCABBLED
F82 FABRIC
8Y12 AT 300 EXTRA
500
125 SLAB (MIN.)
FALL
1 M16
RG TIES AT 200.
1 M16
4Y12 AT 200 EXTRA
F82 FABRIC.
Y12 AT 400 EACHWAY
150 WIDE LINTEL BEAM
150 BLOCKWORK

SECTION 1 06

X
G CAP PL.
89 x 89 x 4.5 RHS CURVED.
8 END PL.
G PL.
2-M12 4.6 S BOLTS

DETAIL A —

VIEW X —

89 x 89 x 4.5 RHS COLUMN.
GO POCKET.
10 BASE PL.
20 MORTAR
1-M16 4.6 S. U BOLT

DETAIL B —

200
10 BASE PL.
PLAN
CONCRETE ENGAGE
2-M16 4.6 S U BOLTS
450 60

DETAIL A 01

NO	DATE	BY	CHKD	AMENDMENTS

Rankine & Hill Pty Limited
Consulting Engineers
Incorporated in N.S.W.

Members of the ACEA

OFFICE 31 GOONDOON STREET GLADSTONE 4680 TELEPHONE (079) 723077

DRAWN	D.McCLURG
DATE	MARCH 84
SCALE	1:10, 1:20
DESIGNED	G. WILLIAMS
CHECKED	M.B.K
APPROVED	

CLIENT: ROCKHAMPTON CITY COUNCIL

JOB NAME: PROPOSED SOUND SHELL, KIOSK AND AMENITIES NUTTALL STREET, SLADE STREET AND YAAMBA ROAD

DWG TITLE: STEELWORK DETAILS

JOB NO. 0784S006

DRAWING NO. 09

REV

Appendix D Previous Reports

Asset Services
Building Inspection

Sound Shell

Address: Nuttal Street Kawana.

Asset ID: 564588
Inspected by: Dave Barnett
Inspection Date: 28 March 2011

Purpose: To provide a general assessment of the buildings current condition.

1 Superstructure

The structural steel to the sound shell is rusted to a lot of the surfaces under the roof of the shell due to the roof leaking at the roof to wall junctions. Refer photo 1 to 4. The steel frame work for the covered walk ways is also covered in surface rust. Refer photo 11.

Rusted Structural Steel (photo 1)

Rusted Structural Steel (photo 2)

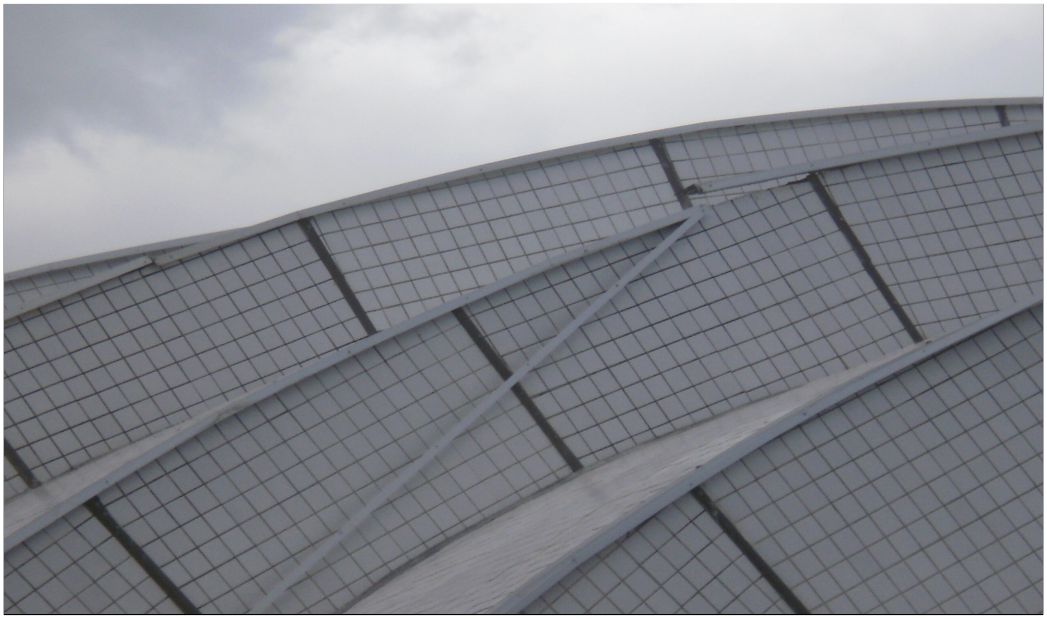
Rusted Structural Steel (photo 3)

Rusted Structural Steel (photo 4)

1.1 Roof

The tiles to the roof of the sound shell are missing at various locations refer photo 10. The colour bond roof sheeting to the covered walkways is also damaged refer photo 8 and 9. The metal roof finishing flashing is loose and falling off most of the roof refer photo 5 and 6.

Metal flashing falling off the roof (photo 5)



Metal flashing loose on the roof (photo 6)

Tree growing in the building (photo 7)

Damaged roofing iron to covered walk way (photo 8)

Damaged roofing iron to covered walk way (photo 9)

Missing tiles (photo 10)

Rusted steel work on covered walk way (photo 11)

Trees overgrown next to the building (photo 12)

2 Finishes

2.1 External

The paintwork to the exterior of the building is faded, marked and in poor condition. The Granosite texture coating is peeling at the back of the stage area refer photo 13 and 14. The interior paint work is also faded and has paint peeling off in the dressing rooms and amenities refer photo 18.

Granosite texture coating flaking (photo 13)

Paintwork in poor condition (Photo 14)

2.2 Balustrade

The balustrade has bolts missing on the foot plate on the southern side and sections of balustrade missing or removed on the western side's photo 15, 16 and 17.

Bolts missing to handrail foot plates (photo 15)

Section of balustrade missing (photo 16)

Section of balustrade missing (photo 17)

Internal paintwork in poor condition (photo 18)

2.3 Floor Finishes

The seamless flooring to the dressing rooms and toilets is marked and worn in places refer photo 19.

Seamless flooring worn in places (photo 19)

Toilets very dirty (photo 20)

3 Services

3.1 Fire

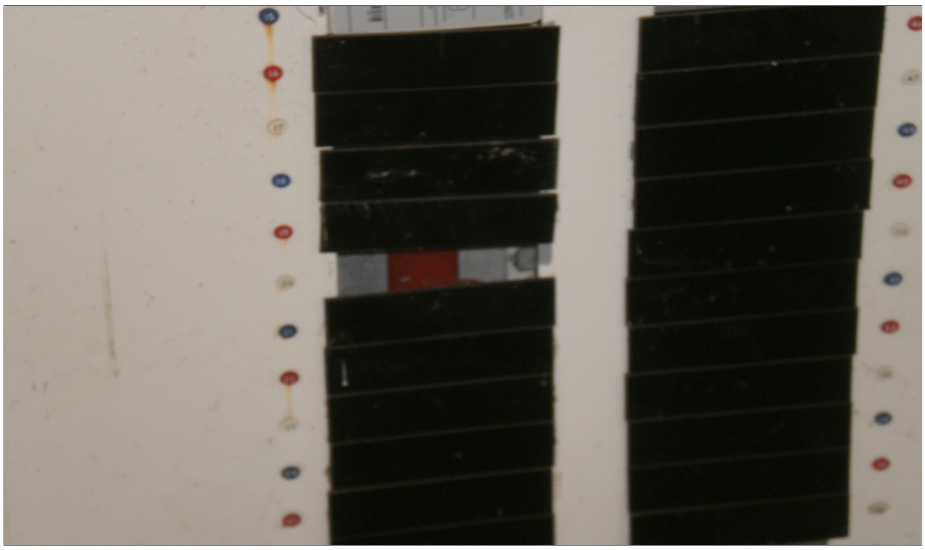
The door to the fire hose reel in the stage area is damaged refer photo 23 and the fire exit lights are not illuminated refer photo 21.

No exit lighting (photo 21)

3.2 Electrical

The power board has a cover plate missing in the main switch board refer photo 22. The light covers are missing on the lights in the hall way . refer photo 21.

Cover panel missing in power board (photo 22)



Door damaged on fire hose cabinet (photo 23)

3.3 Site Grounds

The timber retaining wall to the eastern side of the sound shell is falling down due to termite damage refer photo 24. There are trees growing against the eastern side of the building and in the sound shell refer photos 7 and 12.

Retaining wall falling down (photo 24)

4 Conclusions

The tiled roof to the building has been leaking for a long time, the water has been entering through the roof to wall junctions over the complete shell and lot of the steel frame work is rusted to various stages from surface rust to rusted. Some of the tiles have fallen off the building roof and the finishing flashing to the complete roof is falling off, loose, or missing.

To repair this building is going to be a major task as you would need to remove all of the tiles and tile substrate to the roof structure, then assess the rusted steel members, replace and treat any rusted steel members and reconstruct the shell roof. You would also need to water proof the complete roof, retile the roof and repaint all previously painted surfaces.

There are trees growing over the building on the eastern side and one tree is growing in the sound shell itself. The timber retaining wall on the eastern side of the shell is falling down due to termite damage.

5 Recommendations.

Some of the roof flashing is falling off the building or laying on the roof, this should be removed so that it will not cause injury, also some of the roof tiles have fallen off in places this also could cause injury.

The balustrade to the south east side has one rail missing and on the southern and western side there are bolts missing in the foot plates and some of the rails have been removed in the area of the loading ramp this could also be dangerous as no fall protection is provided.

Further investigation into the fire management for this building.

Repair defect in switchboard.

Remove all trees against the building and remove the tree growing in the sound shell and fence off the area where the retaining wall is falling down.

An indicative cost to repair this building is $450,000 .Cost allowances are
Scaffold hire $62,000.
Removal and repair of roof $188,000
Re tile and water proof roof $150,000
Repaint the complete building $50,000.
No allowances have been made for any latent costs.