

**BEFORE INDEPENDENT HEARING COMMISSIONERS  
IN CHRISTCHURCH**

**TE MAHERE Ā-ROHE I TŪTOHUA MŌ TE TĀONE O ŌTAUTAHI**

**IN THE MATTER** of the Resource Management Act 1991

**AND**

**IN THE MATTER** of the hearing of submissions on Plan Change 14 (Housing and Business Choice) to the Christchurch District Plan

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**STATEMENT OF PRIMARY EVIDENCE OF PHILIP NEVILLE GRIFFITHS ON  
BEHALF OF CHRISTCHURCH CITY COUNCIL**

**QUALIFYING MATTER: HERITAGE (HERITAGE SITES)**

Dated: 11 August 2023

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## **EXECUTIVE SUMMARY**

1. My full name is **Philip Neville Griffiths**. I am employed as a Director and Senior Quantity Surveyor at Rhodes + Associates Limited.
2. I have prepared this statement of evidence on behalf of the Christchurch City Council (the **Council**) in respect of matters arising from the submissions and further submissions on Plan Change 14 to the Christchurch District Plan (the **District Plan; PC14**).
3. My evidence relates to estimates for potential works to HIN 465 - St James Church and Setting – 65,69 Riccarton Road, Christchurch (Submission #825 – Church Property Trustees).

## **INTRODUCTION**

4. I am **Philip Neville Griffiths** and I currently work for Rhodes + Associates Limited at the head office in Christchurch. I have been in this position since August 2015
5. Christchurch City Council have asked me to produce estimates for the reinstatement and strengthening for St James Church and Setting.
6. I have not been asked to check measurements provided or to give any commentary of methodology of repair/rebuild.
7. In preparing this evidence I have:
  - (a) Read submission #825 – Church Property Trustees; and
  - (b) Undertaken a site visit to the following St James Church and Setting – 65,69 Riccarton Road, Christchurch.
8. I am authorised to provide this evidence on behalf of the Council.

## **QUALIFICATIONS AND EXPERIENCE**

9. I hold the qualification of Diploma in Quantity Surveying from Christchurch Polytechnic.
10. I have worked as a Quantity Surveyor for 29 years in both contracting and private practice.

11. I have worked on multiple heritage projects, with the more recent notable projects being The Arts Centre of Christchurch and Ivey West & Memorial Hall at Lincoln University.
12. I am a Member of the New Zealand Institute of Quantity Surveyors (NZIQS) and the Institute of Directors New Zealand (IoD).

### **CODE OF CONDUCT**

13. While this is a Council hearing, I have read the Code of Conduct for Expert Witnesses (contained in the 2023 Practice Note) and agree to comply with it. Except where I state I rely on the evidence of another person, I confirm that the issues addressed in this statement of evidence are within my area of expertise, and I have not omitted to consider material facts known to me that might alter or detract from my expressed opinions.

### **SCOPE OF EVIDENCE**

14. My statement of evidence provides estimates for the reinstatement and strengthening for St James Church and Setting.

### **#825 - HIN 465 – ST JAMES AND SETTING – 65, 69 RICcarton ROAD, CHRISTCHURCH**

15. I conducted a site inspection on my own on Wednesday 26 July 2023. I was only able to inspect the outside of the premises as no internal access was available.
16. No costings have been provided by the building owner or their representative. I was provided with a report by Aurecon from 2013, which set out a concept issue for the repair and strengthening of St James church. This is attached as **Appendix A**. However, as no pricing documentation was provided in that report, I have prepared high level estimates based on a \$/m<sup>2</sup> using the 293 m<sup>2</sup> GFA of the current building, rather than any specific detail provided in the Aurecon report.
17. The report attached as **Appendix B** sets out the full details of my estimates. In summary, my estimates are as follows:
  - (a) Repair and strengthening the original structure to 67% NBS (note general strengthening which does not consider Aurecon report):

<b>Estimate type</b>	<b>Value Excluding GST</b>	<b>\$/m2 Excluding GST</b>
Rhodes + Associates Limited estimate	\$5,274,000	\$18,000

- (b) Replacement like for like (reconstruction using materials and methods of construction as close to the original as possible):

<b>Estimate type</b>	<b>Value Excluding GST</b>	<b>\$/m2 Excluding GST</b>
Rhodes + Associates Limited estimate	\$10,367,000	\$35,800

- (c) Replacement replica (reconstruction using alternative materials and construction methods to achieve the overall look of the original):

<b>Estimate type</b>	<b>Value Excluding GST</b>	<b>\$/m2 Excluding GST</b>
Rhodes + Associates Limited estimate	\$6,013,000	\$20,520

- (d) Replacement with a modern devotional building (replacement with a modern structure with a medium standard of finish which would bear no resemblance to the existing):

<b>Estimate type</b>	<b>Value Excluding GST</b>	<b>\$/m2 Excluding GST</b>
Rhodes + Associates Limited estimate	\$1,465,000	\$5,000

11 August 2023

**Philip Neville Griffiths**

**APPENDIX A - AURECON - CONSENT DOCUMENTATION FOR REMEDIATION  
OF ST JAMES CHURCH RICcarton - CONCEPT ISSUE - APRIL 2013**



**Consent Documentation for  
Remediation of St. James  
Church, Riccarton**

**Report ref:** 213970  
23 April 2013  
Revision 1

**CONCEPT ISSUE**

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0	5 November 2012	Concept issue	MR	MR		
1	23 April 2013	Concept Issue including 34% NBS options	LH	LH	MR	

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### Appendix A

Scope of Work

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Drawings, Sketches, Specification

## 1. Introduction

Aurecon New Zealand has been commissioned by the Anglican Life Church Property Trust to provide design services and consent documentation to repair, and if necessary strengthen, earthquake damaged churches in the Christchurch region.

Aurecon's mandate is to carry out detailed assessments of the various churches, and ancillary buildings, to establish their ability to withstand seismic forces and to identify whether they are earthquake prone or earthquake risk buildings. Repair works, and strengthening to at least 67% NBS, are to be designed and documented. Options for strengthening to 34% of NBS strength are also included.

This report documents the work required for St. James Church located in Riccarton.

**Note:** *The church currently rates at about 50%NBS overall with the chancel arch and east gable rated as earthquake prone (<33% NBS).*

*Bringing the church to a minimum of 67% NBS requires significant strengthening of the side walls, the gable end walls and in particular the chancel arch.*

*This report is issued only as a concept to show the extent of strengthening work. It will allow preliminary costing to be carried out by a QS, and enable a decision to be made by the various stakeholders on an agreed way forward. Proposed strengthening options have been reviewed by the Christchurch City Council Heritage Engineer and his preferences have been indicated*

### 1.1 Description

St James church, constructed in 1923, is a Category 4 Heritage listed building (listed on the Christchurch District Plan). The nave walls, sanctuary walls and west gable are 620 mm thick unreinforced masonry constructed from basalt stone on the exterior (150 mm thick), an internal concrete core averaging 200 - 250 mm thick and two courses of brick (220 thick) with render on the interior face. The east gable wall is of similar construction but only 500 mm thick in the central window area.

Bell tower construction is similar to the nave walls except that the upper sections are solid concrete, possibly reinforced.

The walls of the church and bell tower have fairly substantial external stone buttresses.

The walls are supported by a concrete strip foundation measuring approximately 800mm wide and 600mm deep (to be confirmed).

The roof of the church is slate on timber sarking with timber purlins and rafters. The church has a wood floor supported on concrete piles.

### 1.2 Observed Damage

The church grounds have sustained no significant liquefaction or ground movement, there is no evidence of foundation damage. Observed damage to the structures is as follows:

- The east and west gable end walls are cracked and supported by steel shoring
- Render has fallen from the chancel arch and the arch is propped with timber
- Parapet capping stones above the chancel arch are dislodged

- There is minor to moderate cracking and localised damage to masonry throughout. Horizontal cracking is evident in the south wall below the roof eave connection

### 1.3 Geotechnical Information

The church precinct is located in ground zone TC-2 (yellow). No detailed investigation has been carried out, but a detailed investigation at the nearby Riccarton Mall has indicated the following:

The Westfield Riccarton site is underlain by a sequence of materials consisting of interbedded alluvial sands, silts and sandy gravels overlying the Riccarton Gravel typically encountered at depths of 17-19m. An upper layer of sand and gravels of between 2 and 6 m in thickness is commonly encountered at a depth of 7.5 to 9 m, thinning from west to east across the site. The silty sands appear to vary from loose to firm in nature. The ground water table is in the order of 1.5m below ground surface.

In the recent sequence of earthquake events in Christchurch since September 2010 little or no liquefaction has been evident at the site to date. Estimates of peak ground accelerations at nearby Riccarton sites correspond to 0.2g for the September 2010 and February 2011 events and 0.3g for the June 2011 event. For ground shaking corresponding to 100%NBS at Importance Level 3, peak ground accelerations are expected to be in order of 0.44g. This equates to 0.3g pga for 67%NBS and 0.15g pga for a 34%NBS event.

The probability of liquefaction at the SLS earthquake (corresponding to 25 year return period) and a 34% NBS earthquake (≈50 year return period) is considered low. However under ground shaking corresponding to 67%NBS earthquake (≈300 year return period), some form of liquefaction can be expected, the extent of which is unclear.

The above report implies that the church has already been subjected to a 67% NBS earthquake. No liquefaction or significant ground movements have occurred and the church has sustained only moderate damage, although the gable walls and chancel arch are propped. This suggests that the church is reasonably robust, but could perhaps be prone to more significant damage in a longer duration earthquake.

A basic geotechnical investigation was carried out on the 6<sup>th</sup> of November 2012, comprising two dynamic cone penetrometer tests. The investigation logs are included in Appendix B.

The cone penetrometer testing indicates an ultimate soil bearing capacity of 300kN/m<sup>2</sup> at 500mm depth.

These results demonstrate an acceptable soil bearing capacity, which corroborates the assumptions that were made in the structural assessment.

### 1.4 Earthquake Prone Building Assessment

We have based our remediation / strengthening designs on Aurecon report 'Strength and Repair Assessment for Godfrey & Company', report 213970, rev 0, 3 August 2011 (refer to Appendix C).

The above assessment indicates the following:

Element	% NBS
Roof diaphragm	>67
Roof diaphragm connections to side walls, gable end walls and chancel arch	To be verified on site

Side (north and south) walls	
in-plane loading	100
Out of plane loading	somewhat >33 (reassessed from 74% in Report 3 Aug 2011, refer to Strengthening Calculations Sept/Oct 2012)
Gable end walls	
in plane loading	West = 100, East = 80
Out of plane loading	West = 58, East = 25
Chancel Arch	
Out of plane	>67%
In plane loading	<33
Bell Tower	>67

Therefore based on our assessment of the current structure we estimate:

- the church lateral load capacity is less than 33% NBS and as such is classified as an Earthquake-Prone Building under the Building Act.

## 2. Repair and Strengthening Work

### 2.1 Work Required to Repair Earthquake Damage

- Repair damage to East and West Gable Walls and Chancel Arch. Note that the damaged East Gable wall and Chancel Arch are both rated as Earthquake prone, and therefore repair works would need to incorporate strengthening to 34% NBS as noted below.
- Repair random minor to moderate cracking and localised damage of masonry walls throughout.
- Reinstall and fasten loose parapet capping stones
- Re-level the wood floor

### 2.2 Work Required to Strengthen the building to 34% NBS Strength

- Strengthen the chancel arch
- Strengthen the east gable wall

### 2.3 Work Required to Strengthen the building to 67% NBS Strength

- Strengthen the chancel arch.
- Strengthen the east and west gable end walls.
- Strengthen the side walls.

### 3. Issues of Note

#### Resilience of Church

Detailed assessment of the church has shown it to have a global rating of about 50% NBS with the exception of the east gable end wall and chancel arch. This is a reasonable rating for a church of this age and construction type. The church has survived the earthquake events very well, which suggests that it may in reality rate closer to 67% NBS than the assessment shows (refer to Section 1.3).

The strengthening work required to bring the church to 67% NBS is however quite extensive and requires careful consideration of costs versus benefits.

The intent of the Building Act is 'to safeguard people from injury' and due diligence dictates an amount of strengthening to mitigate possible brittle and sudden failures rather than necessarily preservation of property for historical value.

It is very difficult to predict how an unreinforced masonry (URM) building, such as St James, will behave in a future event, especially if hidden structural damage has been caused by the recent shaking. URM buildings are not resilient structures and failures are likely to be sudden and significant when a certain load threshold is exceeded.

Specific elements requiring attention for resilience are the chancel arch, the gable walls and the side walls, but parapets and stone crosses on the roof are fall hazards and also deserve consideration.

The Scope of Work, Appendix A, therefore includes measures to improve the resilience of the church specifically targeting life safety rather than preservation of property.





## Appendix A

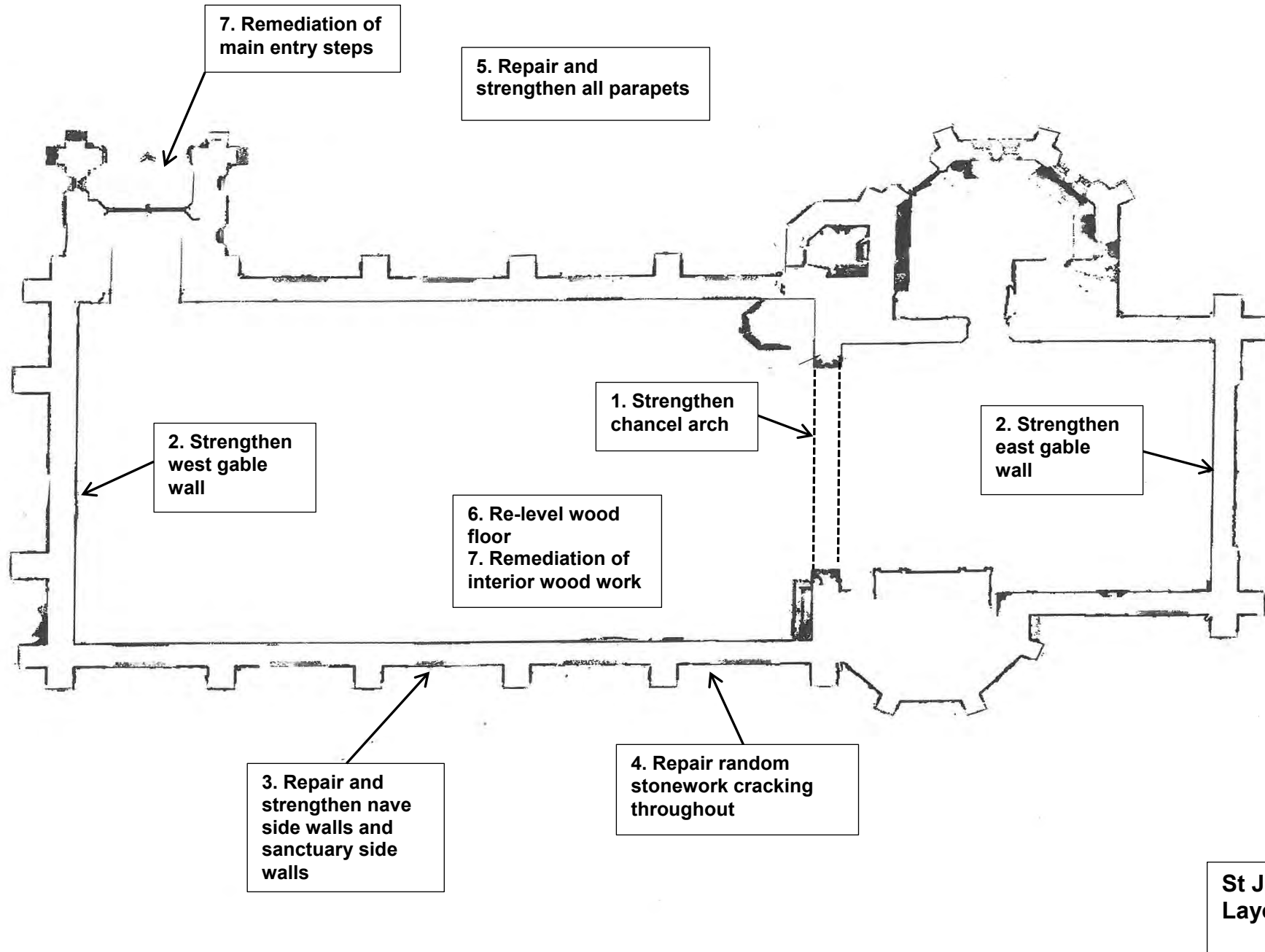
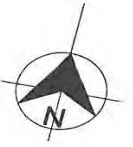
### Scope of Work



## Scope of Work – Summary

Item		Description	Reference
<b>Earthquake Strengthening and Repair of Damage</b>			
1.	<b>Chancel Arch</b>	Repair and strengthen the chancel arch	Photos 1 to 1a and SK- 01 to 03 and SK 09-10 Appendix B
2.	<b>Gable Walls</b>	Repair and strengthen the east and west gable walls	Photos 2 to 2b and SK – 04 and 05 Appendix B
3.	<b>Side Walls</b>	Repair and strengthen the nave side walls	Photos 3 and 3a and SK – 06 to 08 Appendix B
4.	<b>Stonework</b>	Local repair of cracked and damaged interior and exterior stonework	Photo 4
5.	<b>Parapets</b>	Local repair and strengthening of parapets	Photos 5 to 5b
6.	<b>Floor re-levelling</b>	Re-level existing wood floor	Photo 6 and SK - 09 Appendix B
7.	<b>Other Issues</b>	<ul style="list-style-type: none"> <li>- Possible remediation of Interior wood work</li> <li>- Repair main entry step damage</li> <li>- Reference should be made to the Architect drawings for extent of repairs and remediation methods for non-structural issues, watertightness issues and ground works (if any)</li> </ul>	Photo 7 and 7a
<b>Contingency items</b>		<ul style="list-style-type: none"> <li>- Possible remediation of connections between the roof and the side walls, gable end walls and chancel arch. During remediation work the Engineer is to be provided access to inspect the existing connections for adequacy</li> </ul>	
<b>General</b>		<ul style="list-style-type: none"> <li>- Contractor to note: St. James Church is a heritage listed building. Any proposed deviations from approved Drawings must have the approval of the Architect and Engineer prior to commencement of work</li> </ul>	





## Scope of Work cont'd



General view of St James Church (information only)

## 1. Repair and Strengthen the Chancel Arch



**The chancel arch is vulnerable to seismic damage and represents a fall hazard**

**Photo 1 – General view of chancel arch (timber propped)**





Photo 1a – Chancel arch, render damage and cracking at nave wall eave level

### **CHANCEL ARCH DAMAGE REPAIR INCLUDING STRENGTHENING TO 34% NBS:**

Repair and strengthen the chancel arch to 34%NBS Strength using one of the following methods.

Option 1: FRP Strengthening and helifix anchors

Refer to Sketch SK-09.

- Prop roof beams and remove timber truss from sanctuary face of arch wall.
- Strip paint and plaster from arch surfaces to receive fabric.
- Repair cracks to masonry using low pressure epoxy injection.
- Install Sika glass fibre string anchors to predrilled holes in side faces of chancel arch.
- Install sika wrap 930G glass fibre fabric to faces of masonry
- Install helifix ties.
- Make good plasterwork to architect's requirements.
- Reinstate timber beam to Sanctuary face of arch.

Option 2: Apply recessed steel plate to both faces of arch, and tie masonry with helifix anchors.

Refer to Sketch SK-10

- Remove plaster from faces of wall
- Repair masonry cracks using low pressure epoxy injection.

- Cut recess into brick masonry
- Install continuous steel plate to face of arch with welded splices. Through bolt to masonry with M16 bolts.
- Install helifix ties.
- Make good plasterwork to architect's requirements.

**CHANCEL ARCH STRENGTHENING TO 67% NBS:**

Repair cracking and strengthen arch to 67% NBS using one of the following methods.

- Option 1: (Sketch SK01) Install post tensioned rods to keep the arch in compression and prevent blocks dislodging during a seismic event. Stainless steel rods are installed on both faces of the arch and would be exposed to view. The use of concealed steel strands drilled through the centre of the wall, in lieu of exposed strands, is not considered a viable alternative because the strands have to cross each other in a confined space. The potential down side to the use of post tensioned rods is the reduction of prestress over time due to creep. Periodic re-tensioning will likely be required. Option 1 is preferred by the CCC Heritage Engineer
- Option 2 and 3: (Sketches SK02 and SK03). Install steel support beams, shaped to the profile of the arch, to provide support to the arch and prevent blocks dislodging during a seismic event. These may not be attractive options, even if they could be concealed, because of the heritage designation of the church, but they do offer more positive support against fall hazards

## 2. Repair and Strengthen the East and West Gable Wall



Photo 2 – Exterior view of east gable showing propping (west gable is similar)



Photo 2a – Interior view of east gable – note cracking at nave wall eave level





**Photo 2b – Interior view of west gable showing render damage (masonry cracking exists but is not visible on this photo)**

### **WEST GABLE WALL DAMAGE REPAIR**

The out of plan strength of the existing gable wall panel is above 34% NBS strength, however some work is required to repair the crack and damaged plaster.

Damaged or loose render is to be removed, especially where it is a potential fall hazard, and replaced with an approved proprietary product such as SIKA Monotop 412N, refer to note on SK - 01. This applies to all areas of the church.

If no strengthening work is to be undertaken, the eaves level cracking should be stabilised using the detail shown on sketch SK-11.

### **WEST GABLE WALL STRENGTHENING TO 34% NBS**

Not Applicable

### **WEST GABLE WALL STRENGTHENING TO 67% NBS**

Items above, plus strengthen to 67% NBS using one of the following methods.

- Option 1: See SK-05. Installation of post tensioned stainless vertical steel rods on the interior and exterior of the gable wall.
- Option 2: See SK-04. Installation of 310UC or 250UC columns on the inside faces of the gable walls. This is an intrusive solution, the columns will be visible even if they were to be encased, however, it is a more positive support than Option 1. CCC's Heritage Architect prefers this option because the exterior fabric of the church remains unchanged
- Option 3: . Installation of post tensioned stainless vertical steel rods through the centre of the wall is possible and would require 5 M25 stainless steel threaded rods on either side of the window. For this option a concrete capping beam would be required to the top of the wall to fix the core drilling rig. Wet drilling would be required to minimize vibration. The effect of wet drilling on surrounding timber and plaster work should be considered.

### **EAST GABLE WALL DAMAGE REPAIR INCLUDING STRENGTHENING TO 34% NBS**

Damaged or loose render is to be removed, especially where it is a potential fall hazard, and replaced with an approved proprietary product such as SIKA Monotop 412N, refer to note on SK - 01. This applies to all areas of the church.

Strengthen to 34% NBS strength using one of the following methods.

- Option 1: See SK-05. Installation of post tensioned stainless vertical steel rods on the interior and exterior of the gable wall. M25 bars can be reduced to M20 bars.
- Option 2: See SK-04. Installation of 250UC columns on the inside faces of the gable walls.
- Option 3: Installation of post tensioned stainless vertical steel rods through the centre of the wall is possible. It would require 2 M20 stainless steel threaded rods on either side of the window, within the thicker section of wall. For this option a concrete capping beam would be required to the top of the wall to fix the core drilling rig. Wet drilling would be required to minimize vibration. The effect of wet drilling on surrounding timber and plaster work should be considered.

### **EAST GABLE WALL STRENGTHENING TO 67% NBS**

Items above, plus,

Gable end walls are to be tied through to the chancel arch using 20mm diameter Macalloy bars running under the roof.

Strengthen to 67% NBS strength using one of the following methods. ( It is noted that both of the available options result in visible new structure).

- Option 1: See SK-05. Installation of post tensioned stainless vertical steel rods on the interior and exterior of the gable wall.



- Option 2: See SK-04. Installation of 310UC or 250UC columns on the inside faces of the gable walls.

67% NBS strength cannot be achieved through core drilled post tensioned rods in this case as tensioning to this level would over compress the more slender section of wall to the centre of the gable.

### 3. Repair and Strengthen the Nave Side Walls



Photo 3 – general view of nave side walls



Photo 3a – brick work along top of side walls (opened for investigation purposes)

### **SIDE WALLS DAMAGE REPAIR**

Remediation of brickwork along the tops of the nave walls is required, as shown on SK – 08 (scope of work includes the Sanctuary side walls also)

### **SIDE WALLS STRENGTHENING TO 34% NBS**

Not Applicable.

### **SIDE WALLS STRENGTHENING 67% NBS:**

Work required to strengthen the nave walls is shown on SK-06 and SK-07 in Appendix B. Two options have been considered, namely,

- Option 1: the installation of vertical post tensioned strands drilled through the centre of the wall.
- Option 2: the installation of an SHS steel post, recessed into the wall at each rafter location and tie rods similar to Option 1 (refer to SK – 07)

For both options, prevention of outward overturning of the walls should be achieved either by the installation of tie rods across the nave at eave level to tie the north and south walls together, or by increasing the size of the foundation. Both of these solutions are shown on SK-06.

#### 4. Repair Cracked and Damaged Stonework



**Photo 4 – Loose masonry and cracking on east gable wall, but random repair is required throughout the church walls and chancel arch**

This is an earthquake damage repair item of work.

**Work Required:**

- The extent of work and method of repair is to be agreed on site with the Engineer and Architect
- Repair of stonework will depend on extent of damage, but could include the replacement of stone, stitching with Helifix anchors, raking and re-pointing mortar joints, low pressure cement grouting to fill cracks, or possibly epoxy grouting (using Sikadur Injectokit-TH or similar)



## 5. Repair and Strengthening of Parapets



Photo 5 – Dislodged capping stones over chancel arch



Photo 5a – Capping stone damage over chance arch



**Photo 5b – view at roof level looking from chance arch (cross support will need stitching)**

This Item of work comes under the categories of damage repair and of strengthening. A comprehensive approach is required to mitigate against fall hazards, therefore the scope of works cannot be divided into the two categories.

**Work Required:**

- All parapets, gable end wall and chancel arch, are to be anchored with Helifix anchors similar to that shown on SK - 01
- Crosses are to be replaced with light weight replicas if acceptable to the church and Heritage Engineer. If not, the existing crosses will need to be anchored in place and strengthened to mitigate a fall hazard (Engineer to provide details if required)



## 6. Floor Re-Levelling



**Photo 6 – General view under floor**

This is an earthquake damage repair item of work.

### **Work Required:**

- The existing wood floor is out of level and does not meet Department of Building and Housing guidelines for acceptability (refer to SK- 09, Appendix B)
- Re-level floor by adjusting floor supports to achieve a maximum floor gradient of 1:200 between any two points greater than 2m apart and no abrupt irregularities
- Ideally floor re-levelling should be carried out from under the floor to preserve the integrity of the 'heritage' floor boards.
- Generally work on the floor will involve checking the vertical alignment of the internal supports. If existing supports are leaning at an angle of more than 50mm per 1m height then new supports will be required. Leans of less than this value are considered to be acceptable.
- For lifts up to 50mm at any support, fit H5 treated timber packing (preferably as a single thickness piece) and connect to the existing support top and the underside of the bearer.
- For lifts greater than 50mm at any support, new supports will be required to be fitted that may be connected directly to the existing bearers.
- Supports that have been lifted can be cut to the required height or the pile replaced.
- Inspect all supports to ensure their condition is acceptable (no rot, properly bearing) and supports and fixings are in accordance with NZS 3604 – Timber Framed Buildings
- The church may wish to install under floor insulation during the course of this work – refer to the architectural drawings for details (requirement to be confirmed)

## 7. Other Issues



**Photo 7 – Interior wood work**

This is an earthquake damage repair item of work.

### **Work Required:**

- All timber work, especially the rafters are to be inspected by the Contractor for damage, especially to the bolted joints
- Work may involve resolving alignment issues, retightening bolts or replacing damaged bolts or timbers
- There could be remediation work required to connections between the roof and the side walls, gable end walls and chancel arch. During remediation work the Engineer is to be provided access to inspect the existing connections for adequacy





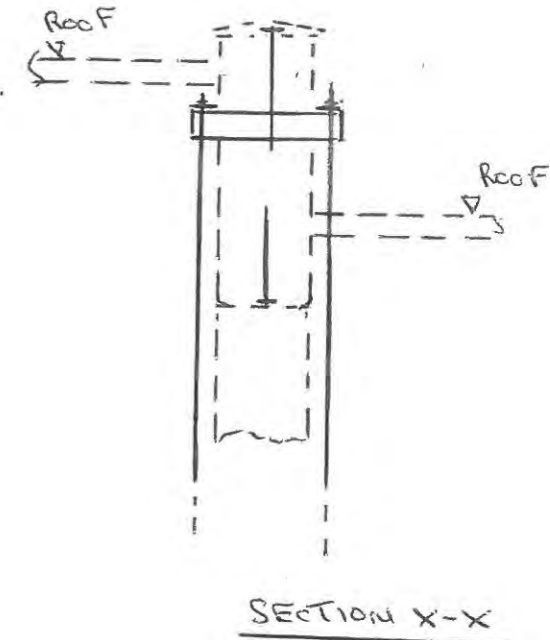
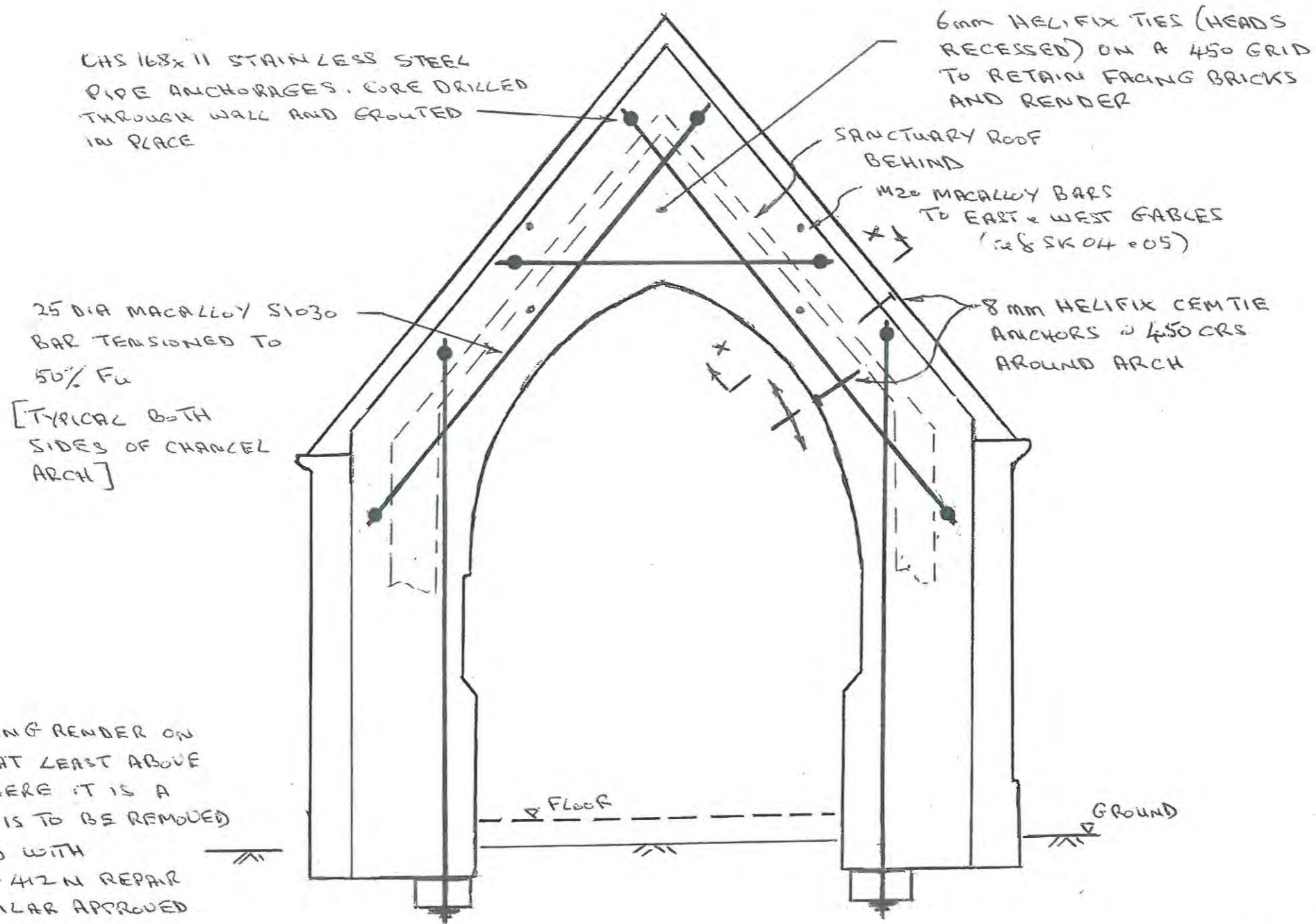
**Photo 7a – Cracks in main entry steps**

**Work Required:**

- The practicality of repairing the steps or rebuilding is to be reviewed on site with the Architect and Engineer

Appendix B  
Drawings, Sketches, (Specification)  
LATER





NOTE: ALL EXISTING RENDER ON CHANCEL ARCH, AT LEAST ABOVE EAVE LEVEL WHERE IT IS A FALL HAZARD, IS TO BE REMOVED AND REINSTATED WITH SIKR MONOTOP-412N REPAIR MORTAR OR SIMILAR APPROVED (TYPICAL ALL OPTIONS)

CRACK REMEDIATION IS REQUIRED PRIOR TO OTHER WORK ON THE CHANCEL (REFER TO SCOPE OF WORK ITEM 4)

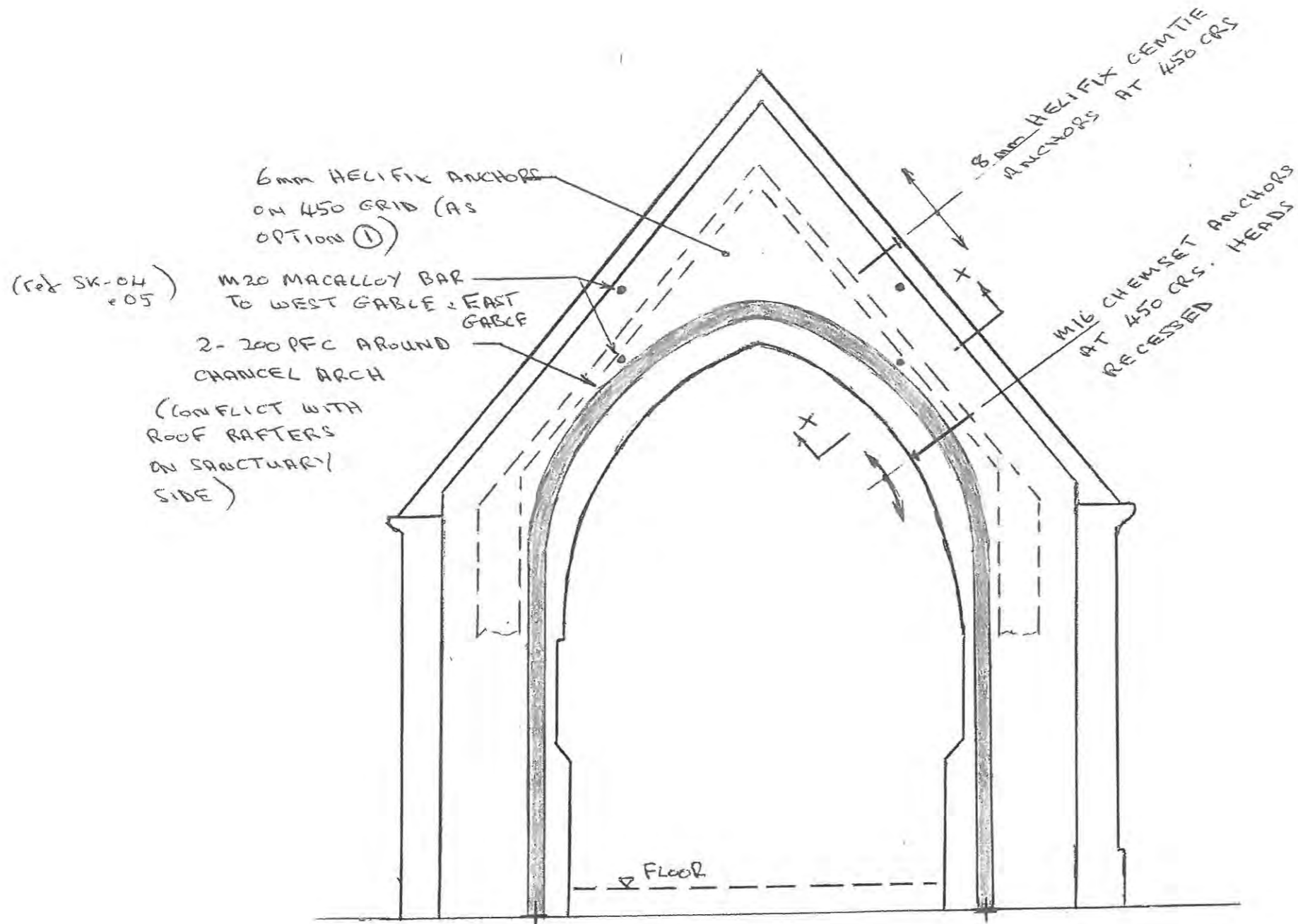
ELEVATION LOOKING EAST ON CHANCEL ARCH  
(1:75)

AURECON  
ST JAMES CHURCH - RICcarton  
CHANCEL ARCH REMEDIATION  
\* OPTION ① - PT BARS

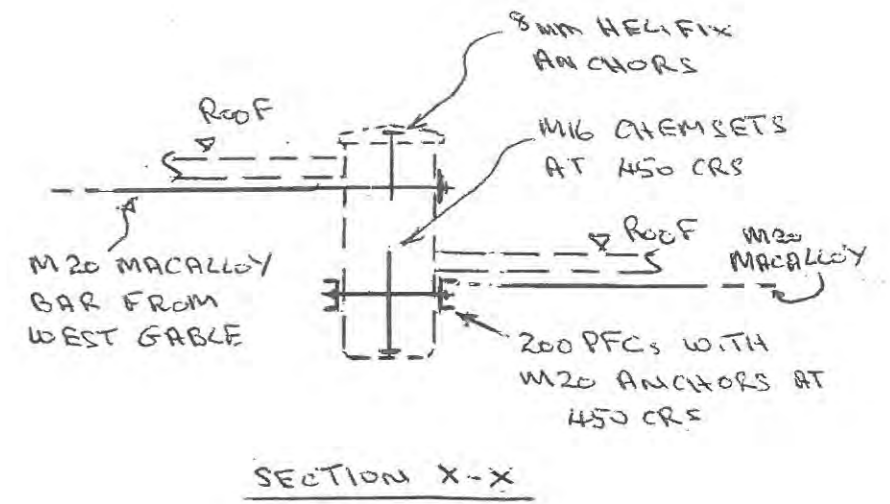
SK-01

5 NOV/2012

\* PREFERRED OPTION OF CCC HERITAGE ENGINEER



ELEVATION LOOKING EAST  
ON CHANCEL ARCH



SECTION X-X

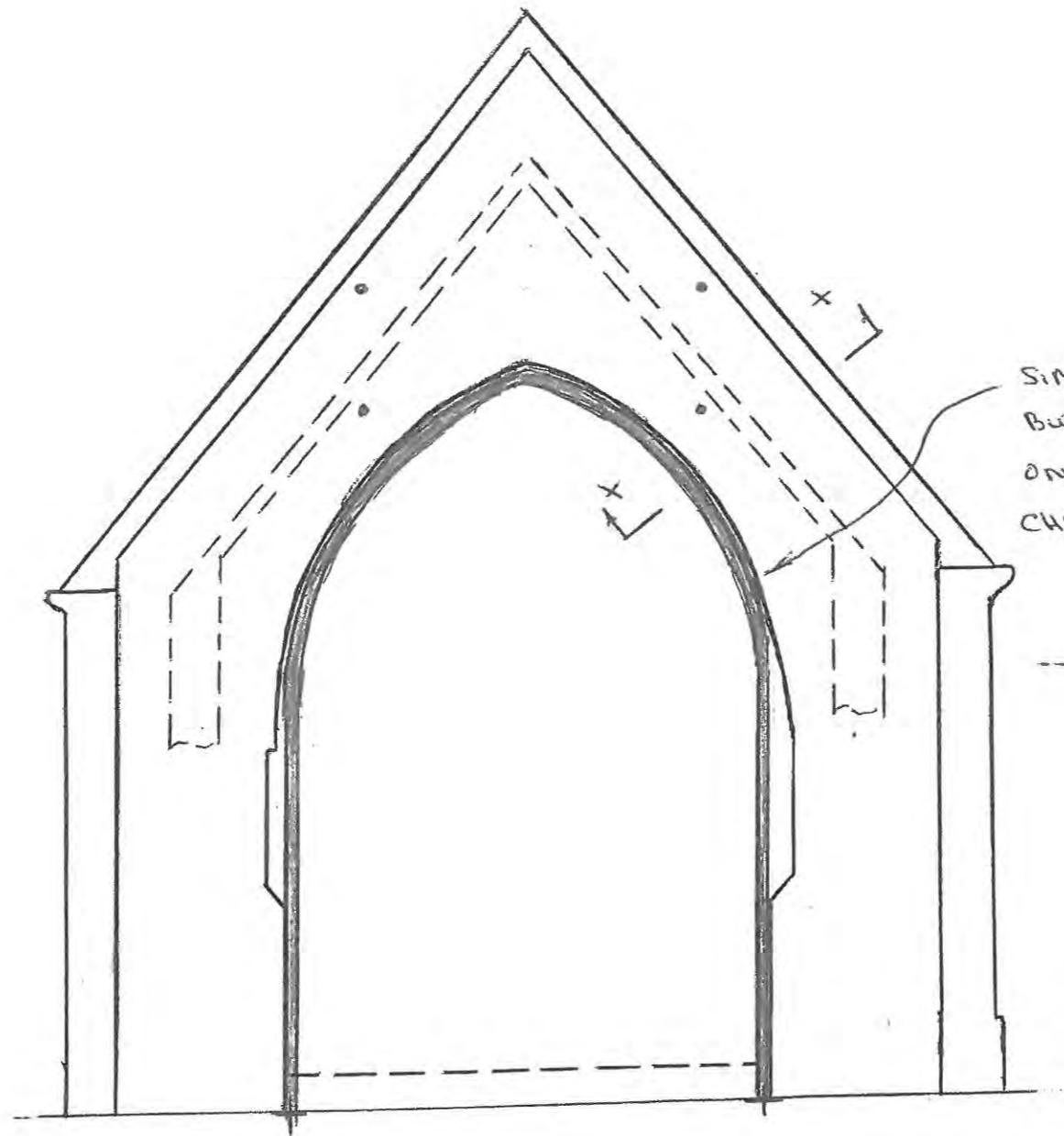
AURECON

ST JAMES CHURCH - RICCARTON  
CHANCEL ARCH REMEDIATION

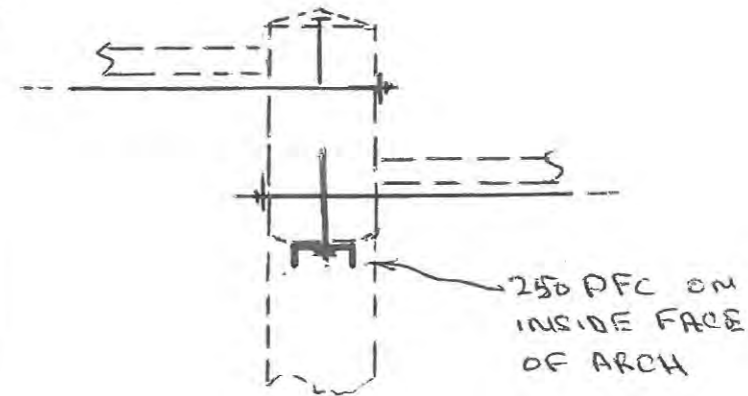
OPTION (2) - STEEL SUPPORT

SK-02

5 NOV 2012



SIMILAR TO OPTION (2)  
 BUT USING 1-250PFC  
 ON INSIDE FACE OF  
 CHANCEL ARCH



250 PFC ON  
 INSIDE FACE  
 OF ARCH

AURECON

ST JAMES CHURCH - RICcarton

CHANCEL ARCH REMEDIATION

OPTION (3) - STEEL SUPPORT

SK-03

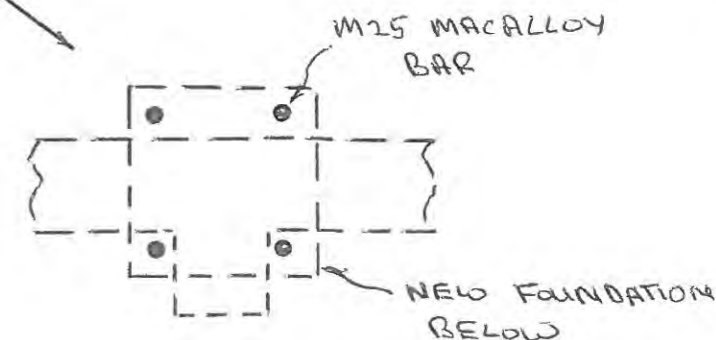
5 NOV 2012



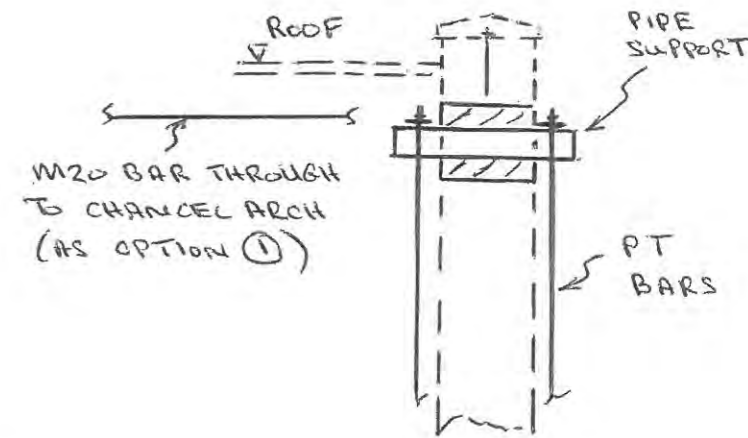
APPLIES TO 67%  
STRENGTHENING FOR  
EAST GABLE  
AND WEST GABLE

FOR EAST  
GABLE  
STRENGTHENING  
TO 34% NBS  
REDUCE BARS  
TO M20

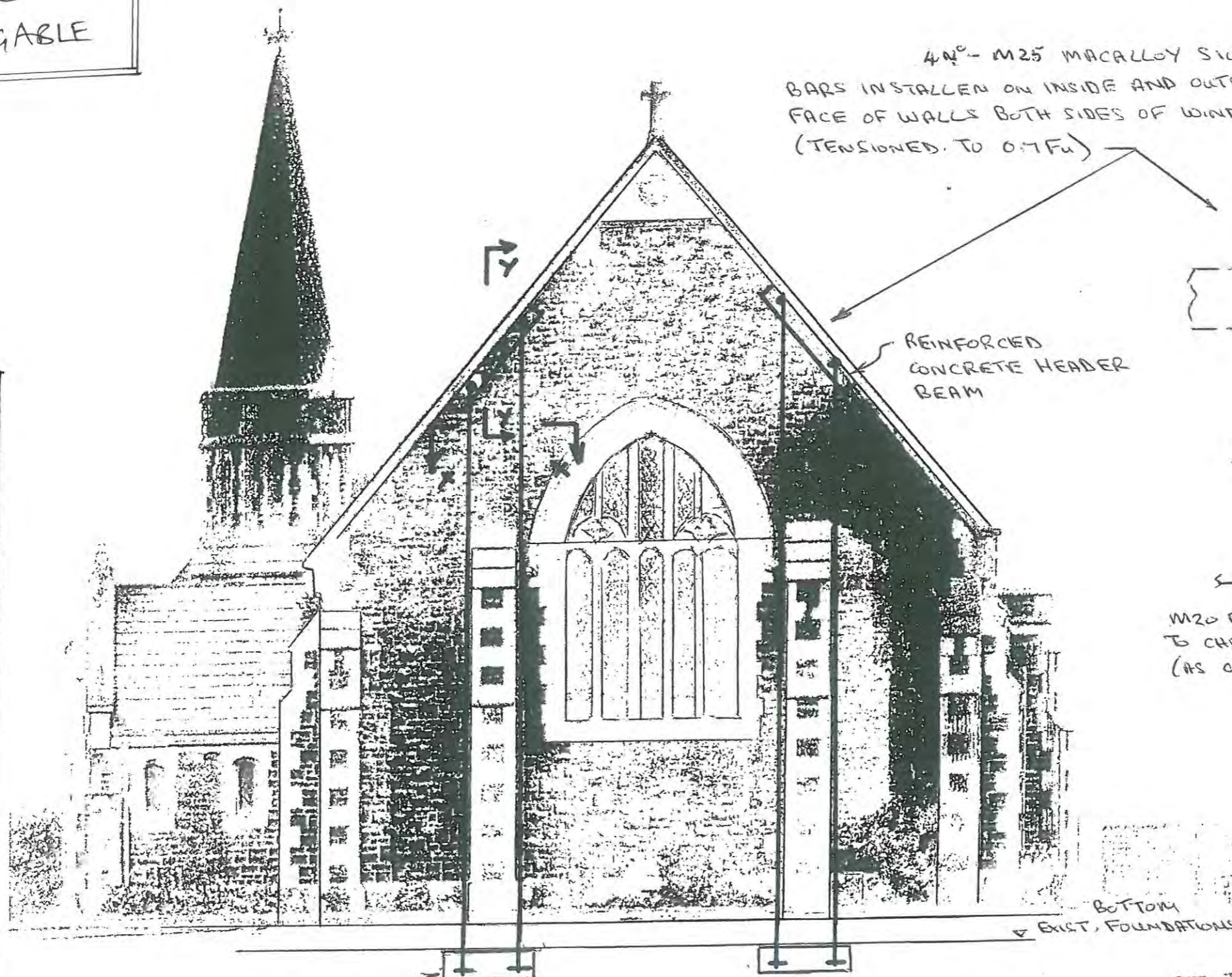
4 No. - M25 MACALLOY S1030  
BARS INSTALLED ON INSIDE AND OUTSIDE  
FACE OF WALLS BOTH SIDES OF WINDOW  
(TENSIONED TO 0.7Fu)



SECTION X-X



SECTION Y-Y



NEW FOUNDATION  
(PT BAR DEAD END)

ELEVATION ON WEST GABLE WALL  
(1:75)

[EAST GABLE SIMILAR]

OPTION 3

ALTERNATIVE  
INTERNAL  
POST TENSIONING

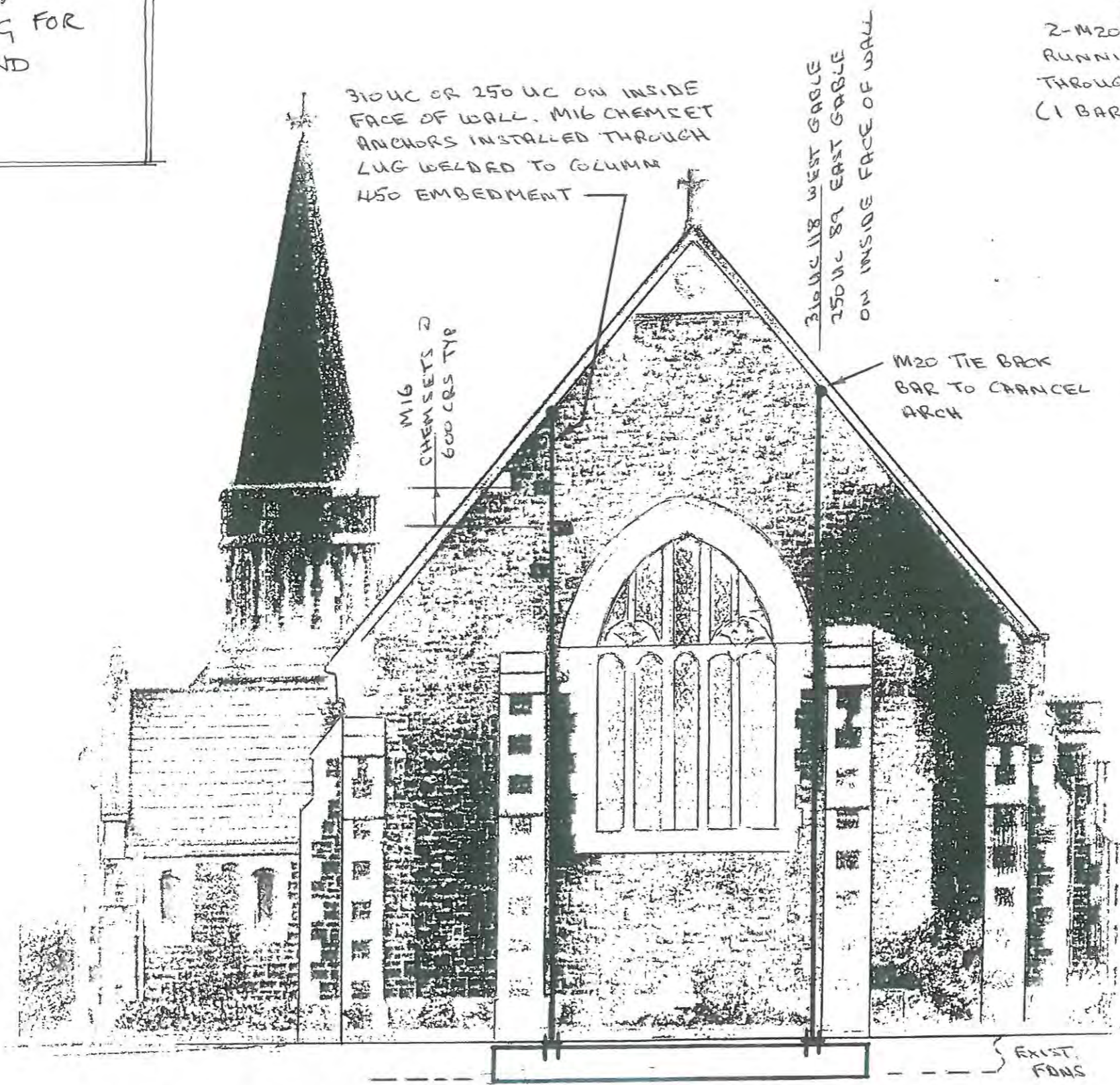
- FOR WEST GABLE 67% NBS STRENGTH COULD BE ACHIEVED USING 5 No. M25 BARS EACH SIDE OF WINDOW, BY CORE DRILLING TO CENTRE OF WALL
- FOR EAST GABLE 34% NBS STRENGTH COULD BE ACHIEVED USING 2 No. M20 BARS EACH SIDE OF WINDOW BY CORE DRILLING TO CENTRE OF WALL

AURECOM  
ST JAMES CHURCH - RICCARTON  
WEST GABLE WALL REMEDIATION  
OPTION 2 - PT BARS

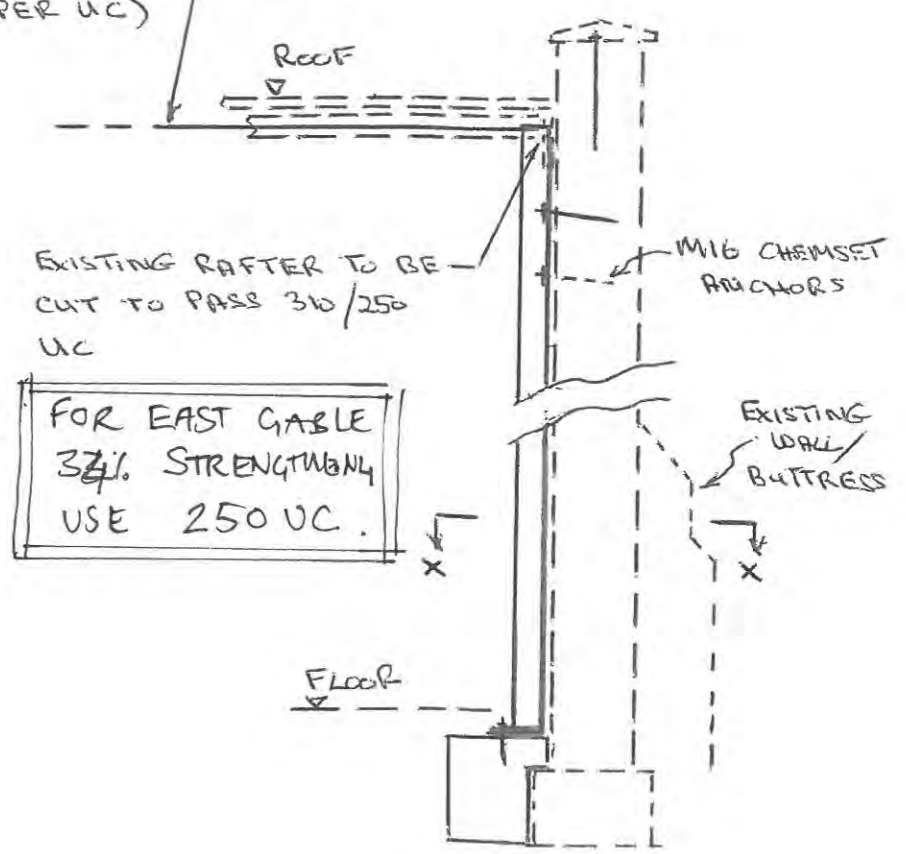
SK-05 5 NOV 2012  
REV A



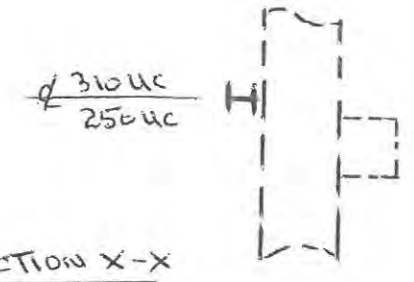
APPLIES TO 671,  
STRENGTHENING FOR  
EAST GABLE AND  
WEST GABLE



TIE BACK  
2-M20 MACALLOY S1030 BARS  
RUNNING FROM STEEL UC'S  
THROUGH TO CHANCEL ARCH  
(1 BAR PER UC)



FOR EAST GABLE  
37% STRENGTHENING  
USE 250 UC.



⊛ PREFERRED OPTION OF  
CCC HERITAGE ENGINEER

AURECON  
ST JAMES CHURCH - RICcarton  
WEST GABLE WALL REMEDIATION

⊛ OPTION ① - 310 UC SUPPORT  
SK-04 REV A 5 NOV 2012

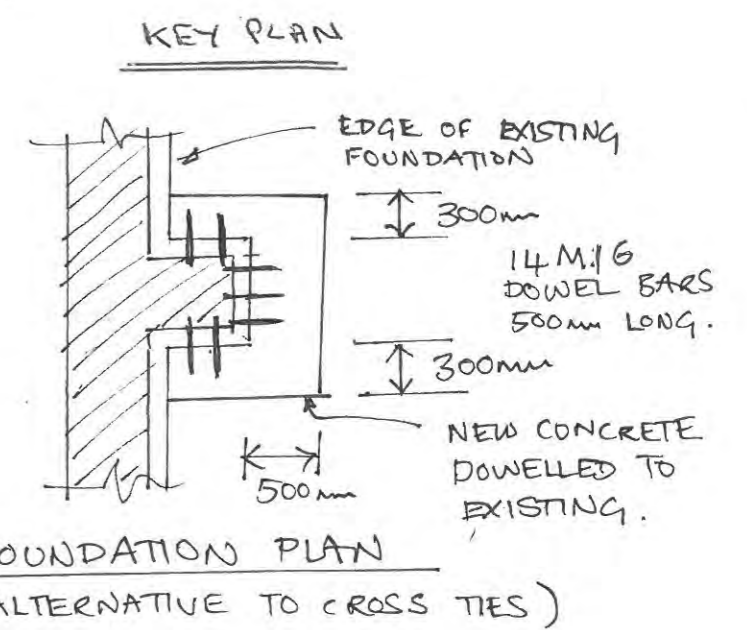
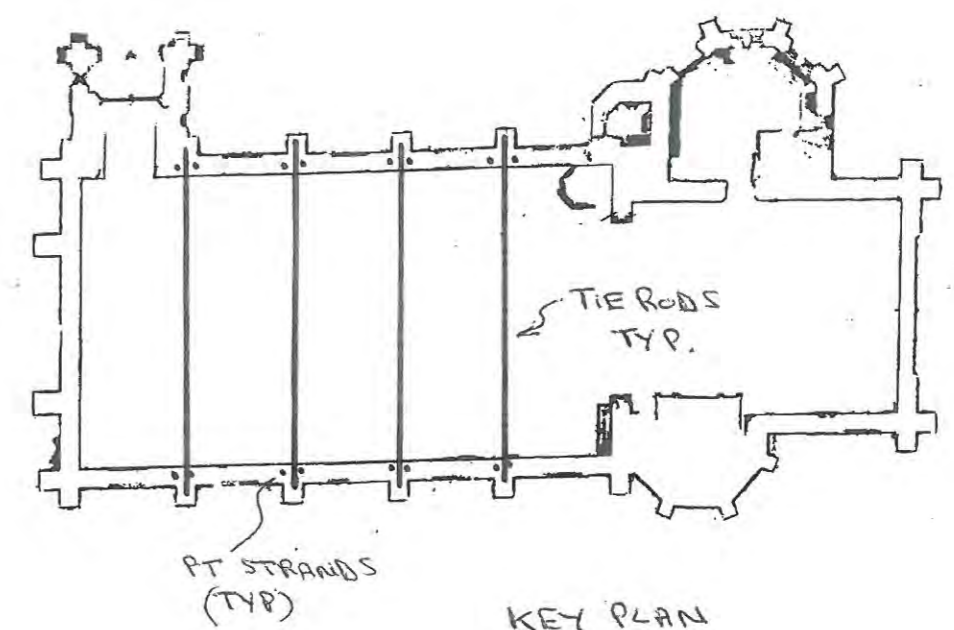
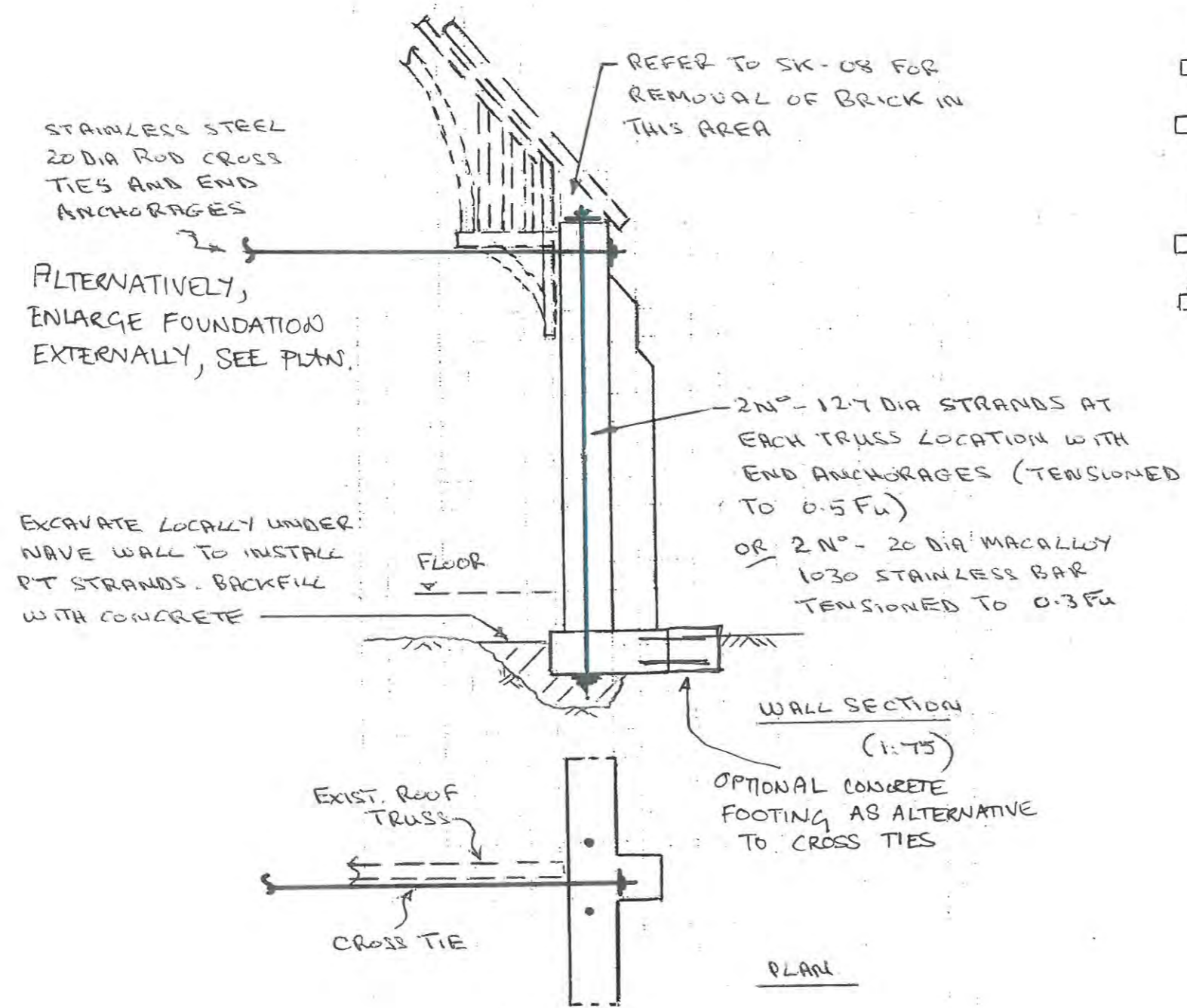
APPROX 600x600x6000 LG  
REINFORCED FOUNDATION

NOTE:  
RENDER TREATMENT  
SIMILAR TO SK-01

ELEVATION ON WEST GABLE  
(1:75 APPROX)

[EAST GABLE SIMILAR]





(\*) ACCEPTABLE TO CCC HERITAGE ENGINEER

AURECON

ST JAMES CHURCH - RICCARTON

NAVE WALL REMEDIATION

(\*) OPTION ①

SK-06

5 NOV 2012

REV A.



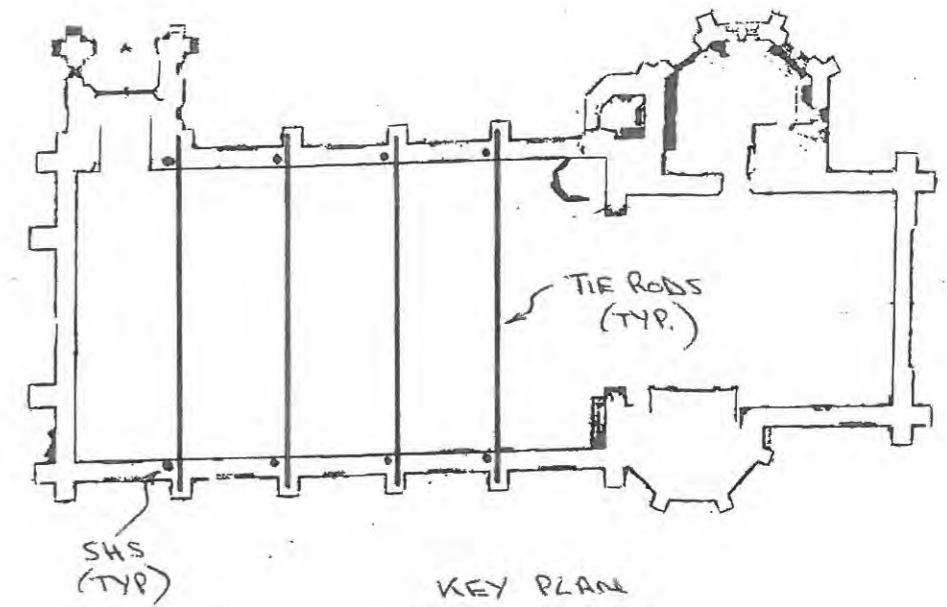
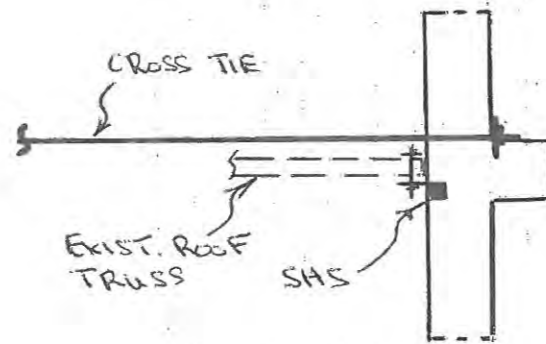
CROSS TIES - AS OPTION ①  
OR ENLARGE FOUNDATION AS  
SKETCH SK-06

SHS 100x6 'REDUNDANT' COLUMN  
EMBEDDED IN WALL BEHIND RENDER.  
SHS TO BE BOLTED TO ROOF TRUSS TO  
PREVENT A POTENTIAL ROOF COLLAPSE  
IN THE EVENT OF WALL FAILURE.  
[INSTALLING SHS CLOSE TO ROOF  
RAFTER MAY BE DIFFICULT]

FLOOR

LOCALISED FOUNDATION TO  
SUPPORT SHS

OPTIONAL DOWELLED  
CONCRETE FOOTING  
SEE SK-06.



AURECON

ST JAMES CHURCH - RICCARTON

NAVE WALL REMEDIATION

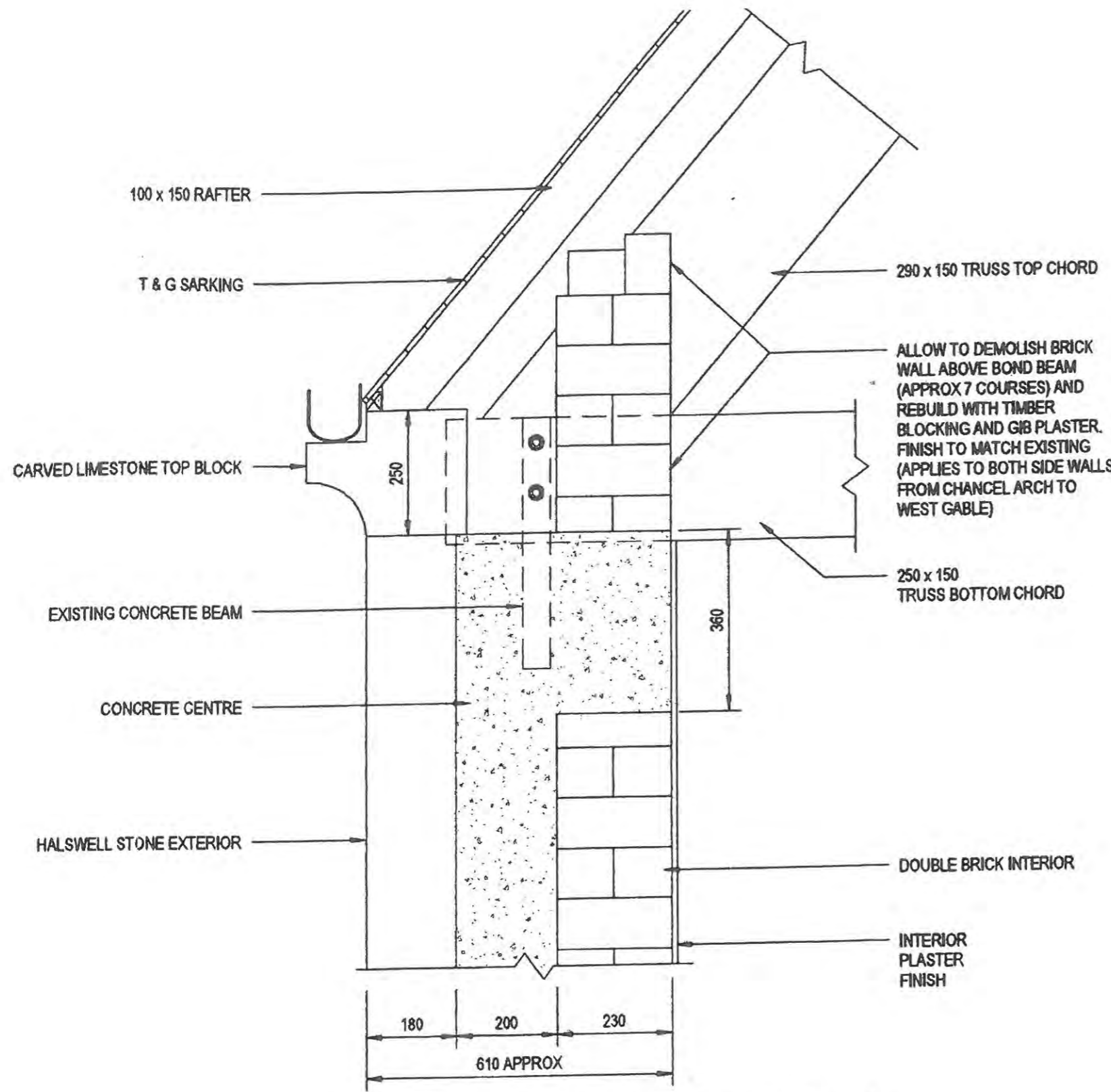
⊛ OPTION ②

SK-07

5 NOV 2012

REV A

⊛ ACCEPTABLE TO CCC  
HERITAGE ENGINEER



ALLOW TO DEMOLISH BRICK WALL ABOVE BOND BEAM (APPROX 7 COURSES) AND REBUILD WITH TIMBER BLOCKING AND GIB PLASTER. FINISH TO MATCH EXISTING (APPLIES TO BOTH SIDE WALLS FROM CHANCEL ARCH TO WEST GABLE)

THIS ITEM MAY BECOME A STRUCTURAL TIMBER SHEAR WALL TO HELP WITH LATERAL LOAD TRANSFER FROM ROOF DIAPHRAGM INTO WALL

TYPICAL SECTION THROUGH NAVE WALL (1:10)

AURECON  
 ST JAMES CHURCH - RIC CARTON  
 NAVE WALLS - REMEDIATION  
 REMOVAL OF BRICK ON TOP OF WALLS  
 SK-08 5 NOV 2012

ROOF ON SANCTUARY  
 SIDE TO BE TEMPORARILY  
 PROPPED TO ALLOW TEMPORARY  
 REMOVAL OF TRUSS TIMBER  
 TO WALL FACE

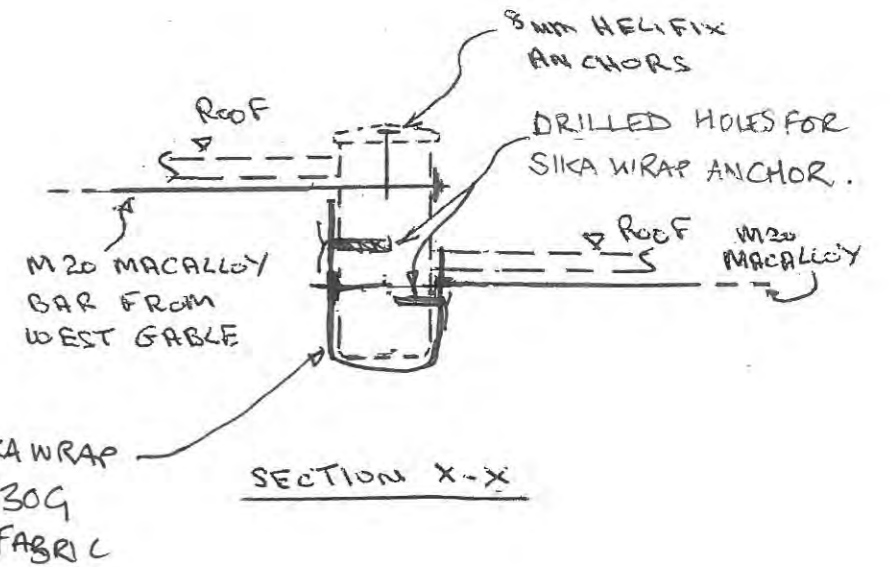
6mm HELIFIX ANCHORS  
 ON 450 GRID (AS  
 OPTION ①)

(ref SK-04  
 05)

M20 MACALLOY BAR  
 TO WEST GABLE & EAST  
 GABLE

8mm HELIFIX CENTRE  
 ANCHORS AT 450 CRS

8mm HELIFIX TIES  
 AT 450 CRS. HEADS  
 RECESSED

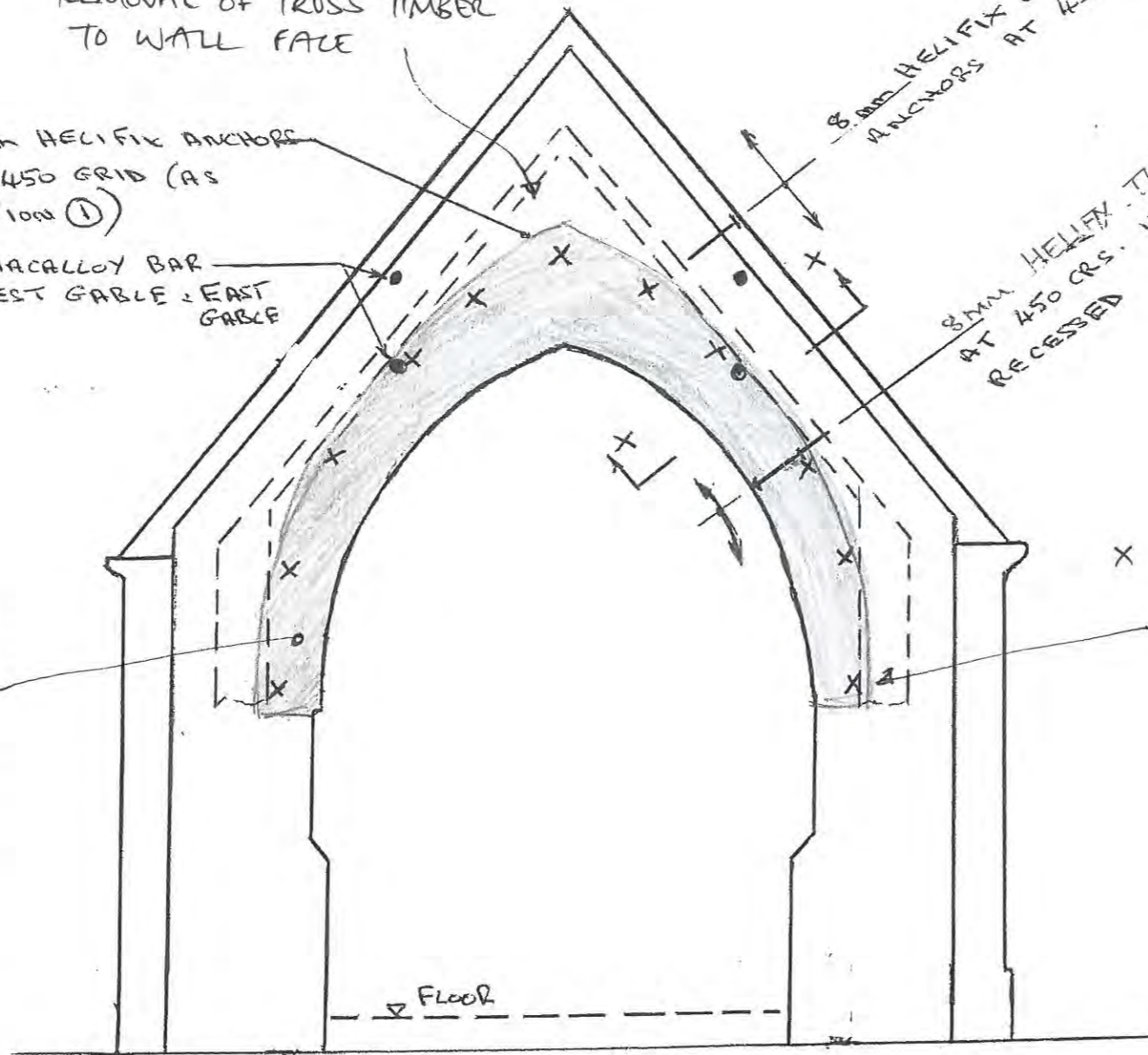


SIKAWRAP 930 G  
 GLASS FIBRE FABRIC  
 APPLIED TO CLEANED  
 BRICKWORK.

WRAP AROUND INNER  
 FACE OF ARCH AND  
 WALL FACES TO NAVE  
 AND SANCTUARY  
 SIDE.

IMPREGNATE FABRIC  
 WITH SIKADUR 300  
 RESIN.

X DENOTES SIKAWRAP  
 ANCHOR G GLASS FIBRE  
 STRING EMBEDDED INTO  
 20mm DIAMETER, 200mm DEEP  
 HOLES DRILLED INTO MASONRY  
 FIXED WITH SIKA ANCHORFIX 3 + ADHESIVE  
 INSTALL AT 800mm CENTRES TO  
 BOTH SIDES OF ARCH.



ELEVATION LOOKING EAST  
ON CHANCEL ARCH

OPTION FOR STRENGTHENING  
 CHANCEL ARCH TO 34% NBS STRENGTH  
 USING GLASS FIBRE FABRIC.

AURECON

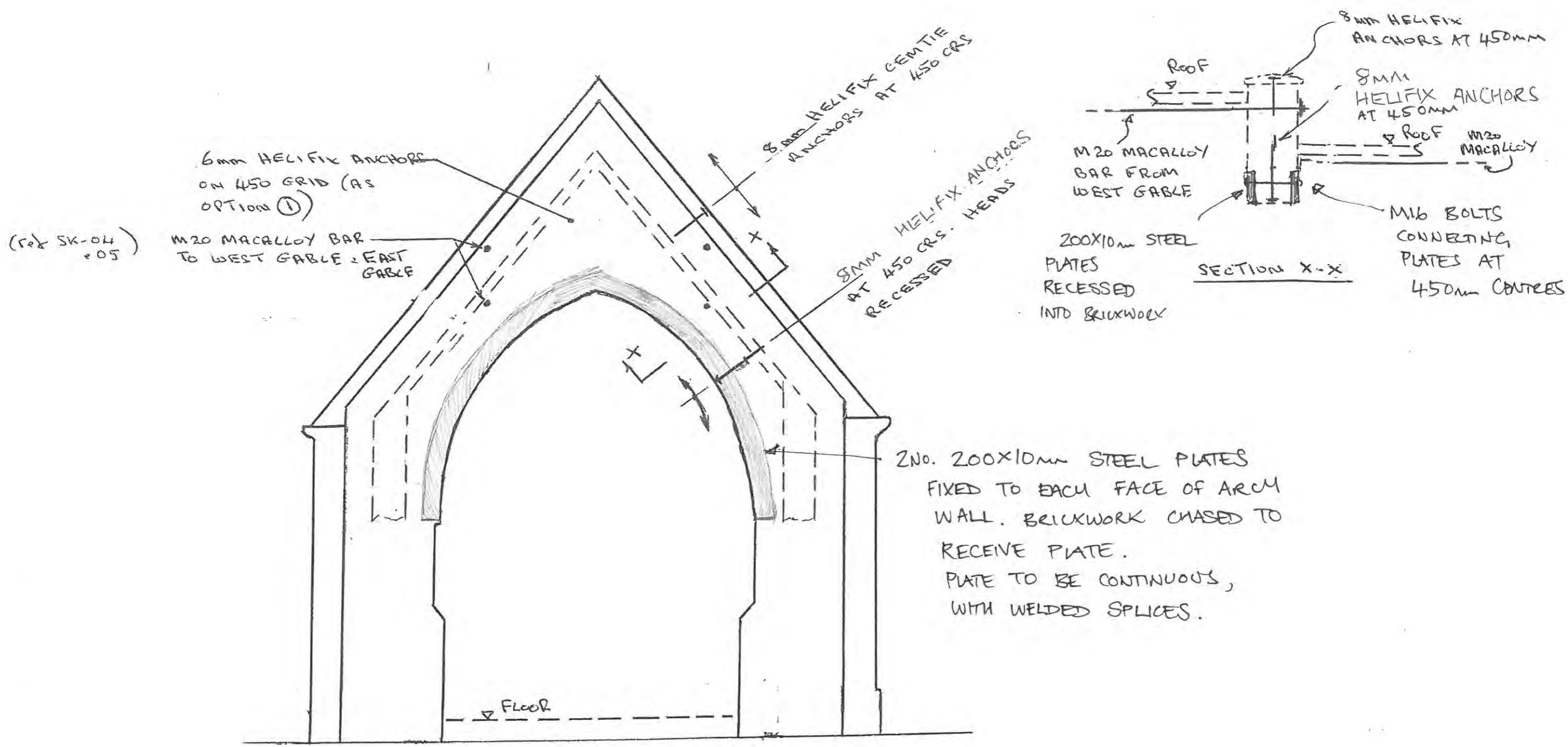
ST JAMES CHURCH - RICCARTON  
CHANCEL ARCH REMEDIATION

OPTION 1 34% - FRP STRENGTHENING

SK-09

APR 2013

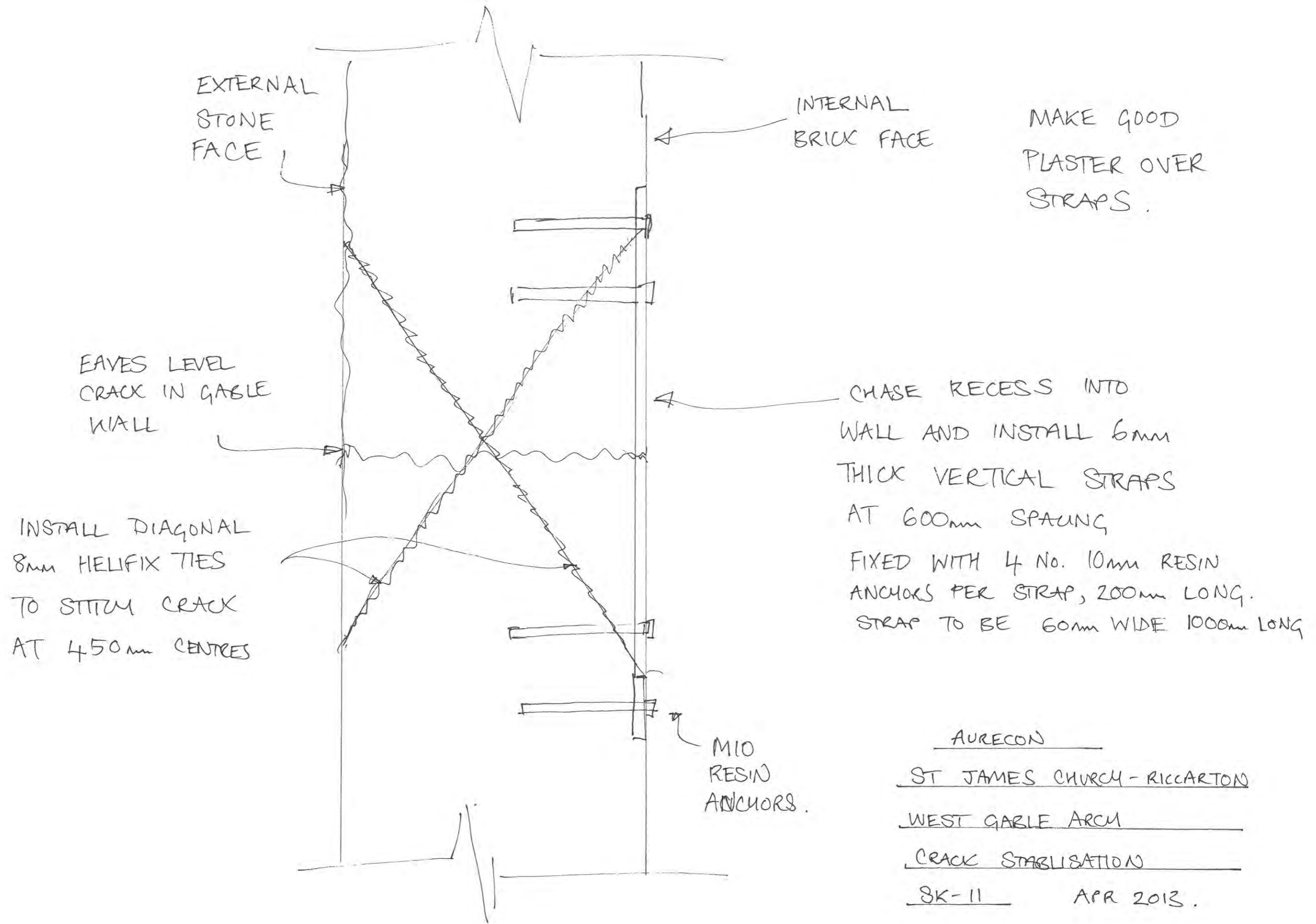




ELEVATION LOOKING EAST  
ON CHANCEL ARCH

AURECON  
ST JAMES CHURCH - RICCARTON  
CHANCEL ARCH REMEDIATION  
OPTION 2 341 - STEEL SUPPORT  
SK-10      APR 2013





EXTERNAL  
STONE  
FACE

INTERNAL  
BRICK FACE

MAKE GOOD  
PLASTER OVER  
STRAPS.

EAVES LEVEL  
CRACK IN GABLE  
WALL

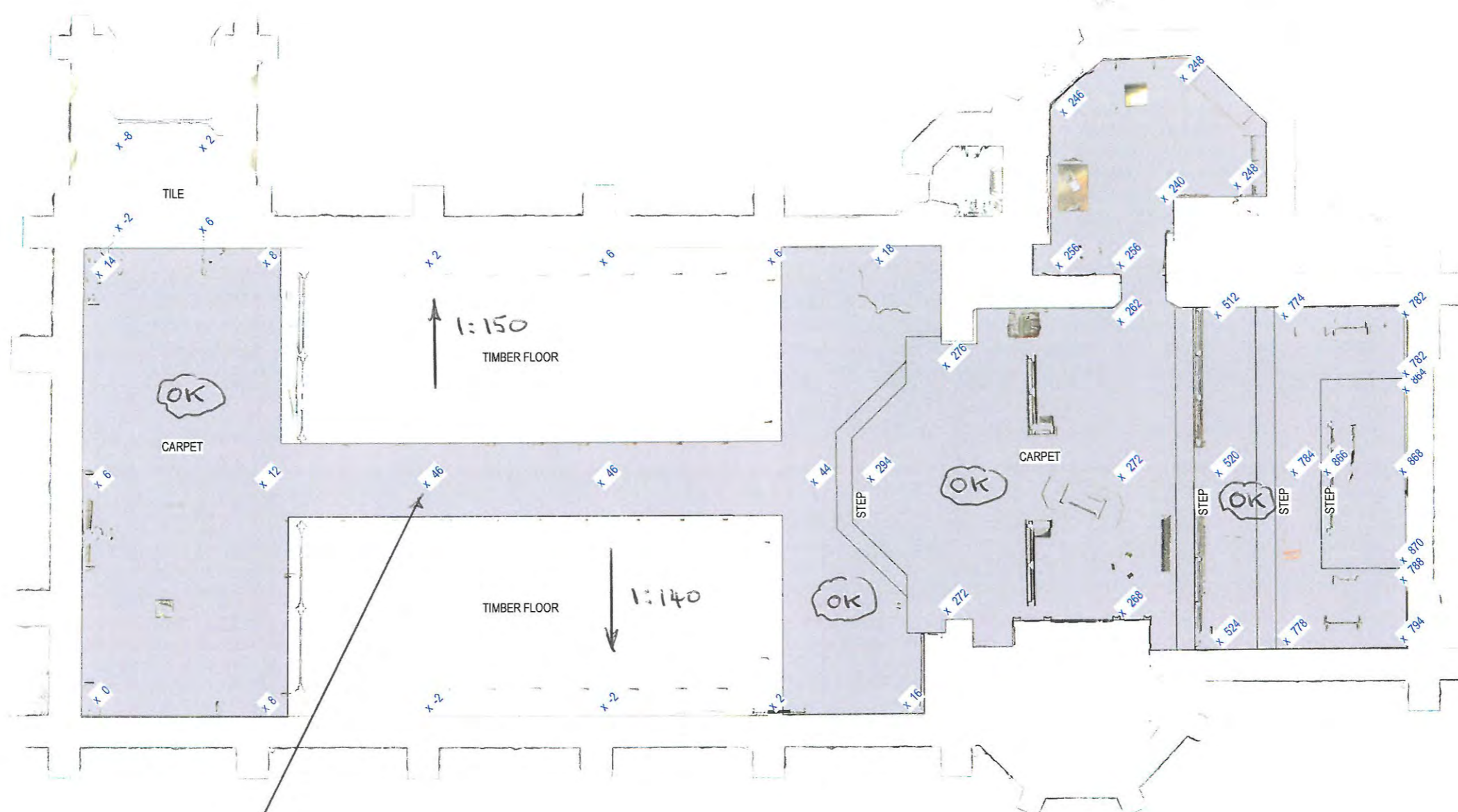
CHASE RECESSES INTO  
WALL AND INSTALL 6mm  
THICK VERTICAL STRAPS  
AT 600mm SPACING

INSTALL DIAGONAL  
8mm HELIFIX TIES  
TO STITCH CRACK  
AT 450mm CENTRES

FIXED WITH 4 No. 10mm RESIN  
ANCHORS PER STRAP, 200mm LONG.  
STRAP TO BE 60mm WIDE 1000mm LONG

10  
RESIN  
ANCHORS.

AURECON  
ST JAMES CHURCH - RICcarton  
WEST GABLE ARCH  
CRACK STABILISATION  
SK-11      APR 2013.



REDUCE LEVELS ON  
CARPET BY 15mm

FLOOR LEVELS (OCTOBER 2012)  
SK-09

CLIENT	REV	DATE	REVISION DETAILS

APPROVAL	DRAWN T.DOWN	DESIGNED M.RICHARDS

CHECKED	APPROVED

PROJECT
ST JAMES CHURCH 69 RICCARTON ROAD, CHRISCHURCH
TITLE
GROUND LEVEL SURVEY

PRELIMINARY NOT FOR CONSTRUCTION
PROJECT No. 213970
SCALE 1:50
DRAWING No. SK-01-00
SIZE A1
REV



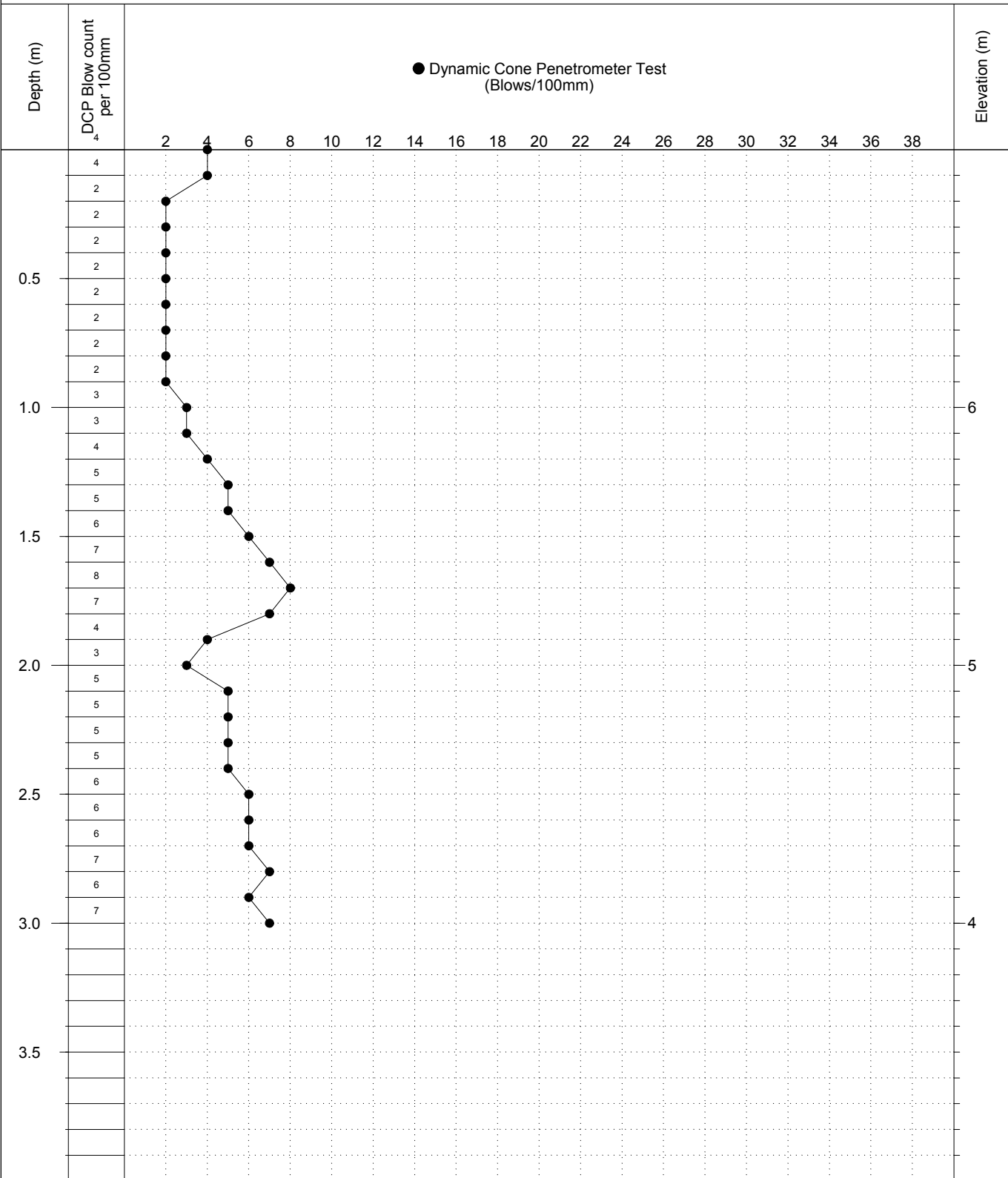


DCP01

DCP02

Mandeville St

<b>DCP INFORMATION</b>	<b>CO-ORDINATES NZTM</b> Easting: 1568132 m Northing: 5180295 m Ground Level: 7 m	Date Started: 6/11/2012 Date Completed: 6/11/2012 Weather: Dry	Tested by: RG Input by: RG Checked by: AF Verified by: BJ
Method: Dynamic Cone (Scala) Penetrometer			



Remarks:  
 END OF DCP: Target depth reached  
 Coordinates located using handheld GPS equipment accurate to +/- 5m

Logged by: RG  
 Input by: RG  
 Checked by: AF  
 Verified by: BJ



**DCP INFORMATION**

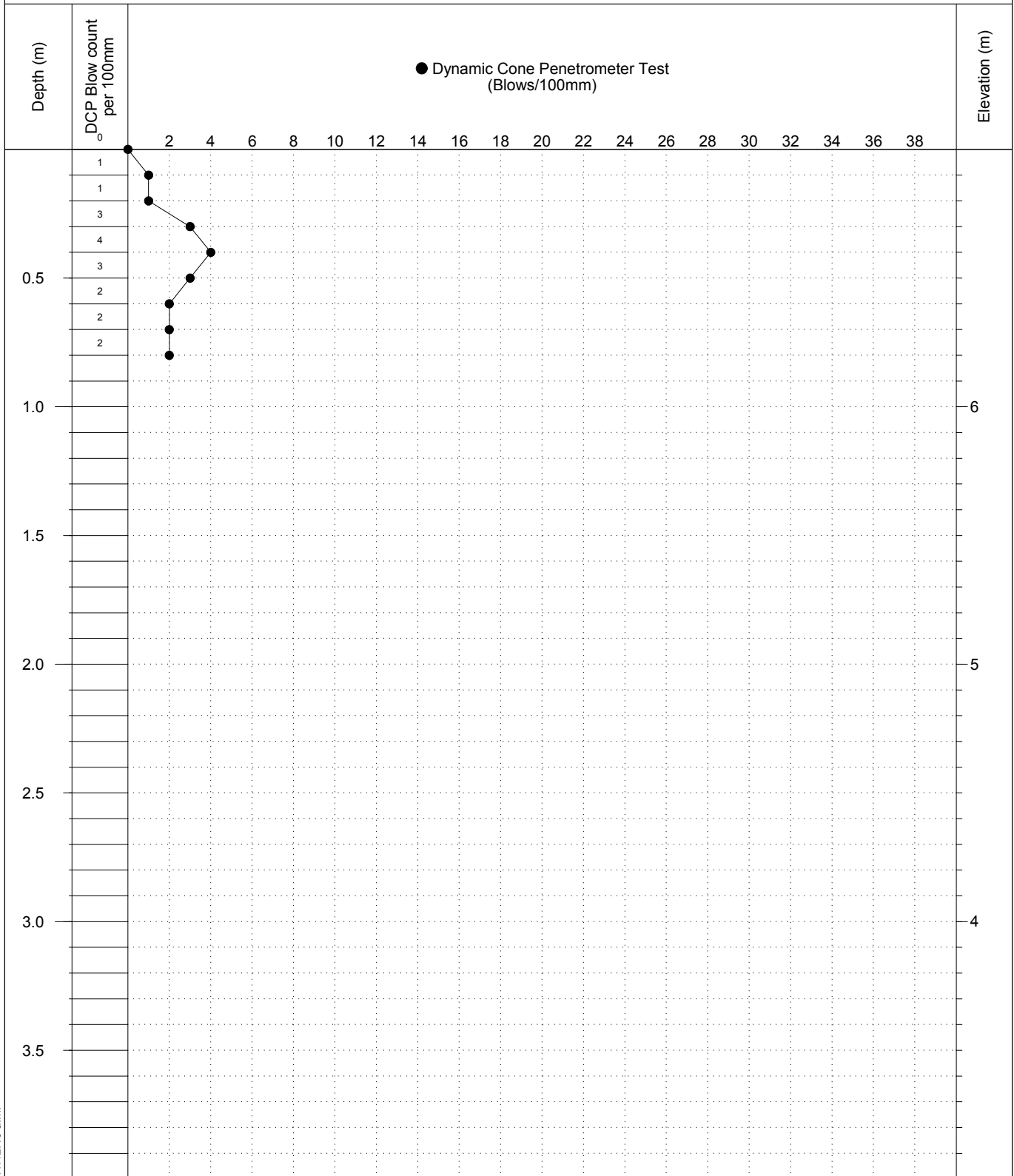
Method: Dynamic Cone (Scala) Penetrometer

**CO-ORDINATES NZTM**

Easting: 1568141 m  
 Northing: 5180300 m  
 Ground Level: 7 m

Date Started: 6/11/2012  
 Date Completed: 6/11/2012  
 Weather: Dry

Tested by: RG  
 Input by: RG  
 Checked by: AF  
 Verified by: BJ



Remarks:  
 END OF DCP: Refusal

Refusal on inferred obstruction, after three attempts at location. Coordinates located using handheld GPS equipment accurate to +/- 5m.

Logged by: RG  
 Input by: RG  
 Checked by: AF  
 Verified by: BJ

Appendix C  
Detailed Seismic Assessment  
(LATER)



Appendix D  
Structural Calculations for Building Consent  
(LATER)



Appendix E

Producer Statement PS1

Memorandum from Licensed Building Practitioner

(LATER)



**APPENDIX B - R2 REPORT - HIN 465 - ST JAMES CHURCH - REVIEW**

7 August 2023

Te Hononga Civic Offices  
53 Hereford Street  
CHRISTCHURCH 8013

Attn: Amanda Ohs (e: [Amanda.ohs@ccc.govt.nz](mailto:Amanda.ohs@ccc.govt.nz))

Dear Amanda

**3380/006 R2 –REPORT – HIN 465 – ST JAMES' CHURCH AND SETTING – 65, 69 RICCARTON ROAD  
CHRISTCHURCH**

Please find enclosed our revised review for St James Church and Setting – 65, 69 Riccarton Road, Christchurch.

Should you have any queries, please do not hesitate to contact the writer

Yours faithfully



Phil Griffiths DipQS MNZIQS  
Director  
**Rhodes + Associates Limited**

# RA

**Rhodes  
+Associates**

Quantity Surveyors  
Cost Consultants

3380/006 R2 - HIN 465 - ST JAMES CHURCH, 65, 69 RICCARTON  
ROAD

Elemental Estimate

07 August 2023

Christchurch City Council



## QUALITY ASSURANCE INFORMATION

**Report:** ELEMENTAL ESTIMATE  
**Document:** HIN 465 - ST JAMES CHURCH, 65, 69 RICCARTON ROAD  
**Ref:** 3380/006 R2  
**Date:** 07 August 2023  
**Client:** CHRISTCHURCH CITY COUNCIL  
**Lead QS:** PHIL GRIFFITHS

---

<b>Ver:</b>	<b>Date:</b>	<b>Prepared By:</b>	<b>Reviewed By:</b>
	20/07/2023	Phil Griffiths	Lindsey Rhodes
R1	25/07/2023	Phil Griffiths	Lindsey Rhodes
R2	07/08/2023	Phil Griffiths	Lindsey Rhodes

## **EXECUTIVE SUMMARY**

Rhodes + Associates Limited have been appointed by Christchurch City Council to provide a report for St James Church and Setting – 65, 69 Riccarton Road, Christchurch.

This report has been prepared specifically for Christchurch City Council. Rhodes + Associates Limited accepts no liability in the event this report is used for any other purpose or by any other party.

## CLARIFICATIONS AND EXCLUSIONS

Rhodes + Associates Limited have not been requested to produce an estimate for the reinstatement and strengthening for St James Church and Setting – 65, 69 Riccarton Road, Christchurch and as such we have been requested to carry out a high-level review of the documentation from Aurecon provided by Christchurch City Council.

We would confirm that Rhodes + Associates have visited site to look at the external envelop only.

### Building Description

St James Church was constructed between 1923 and 1924, is of cultural and spiritual significance. The building is of stone construction with a Welsh slate roof, has a gross floor area of approximately 293 m<sup>2</sup> (measure estimated from a drawing contained within Aurecon's report and in accordance with NZIQS guidelines, see Appendix A).

### Procurement

- It has been assumed the market is competitive with no adjustment included for inflationary factors associated with a major event
- The works are to be negotiated with a fixed lump sum contract

### Review

This review has been carried out by Phil Griffiths, Director with Rhodes + Associated Limited who has a Diploma in Quantity Surveying, 25+ years' experience and is a Member of the NZIQS.

### Repair and strengthening

Documentation from Aurecon has been provided which is a concept issue for the repair and strengthening of St James church although no pricing documentation has been provided.

Aurecon's report is split into the following sections:

- 2.1 - Work required to repair earthquake damage
- 2.2 - Work required to strengthen the building to 34% NBS strength
- 2.3 - Work required to strengthen the building to 67% NBS strength

In lieu of any financial information pertaining to the project and the fact that we have not been engaged to undertake any measurement or detailed estimate of the above we are only able to provide an extremely high-level guide for general repair and strengthening works to 67% NBS on a square meter rate based on our experience with heritage projects and not in line with any detail provided within the Aurecon documentation.

We would suggest a guide of \$18,000/m<sup>2</sup> at current market rates. Given that the GFA is approximately 293 m<sup>2</sup>, this would give that a repair and strengthening estimate of around \$5,274,000.

### Replacement Cost

As noted above we have not been provided with any pricing documentation for this project.

The following assessments allow for demolition of the existing structure and exclude external works such as landscaping, carparks and the like. An allowance for and organ has been allowed to both 'Replacement like for like' and 'Replacement replica'

*Replacement like for like (reconstruction using materials and methods of construction as close to the original as possible)*



Given our experience on heritage projects we would suggest a guide of around \$35,380/m<sup>2</sup> at current market rates. Given that the GFA is approximately 293 m<sup>2</sup>, this would result in a replacement estimate of around \$10,367,000.

*Replacement replica (reconstruction using alternative materials and construction methods to achieve the overall look of the original)*

Given our experience on heritage projects we would suggest a guide of around \$20,520/m<sup>2</sup> at current market rates. Given that the GFA is approximately 293 m<sup>2</sup>, this would result in a replacement estimate of around \$6,013,000.

*Replacement modern devotional building*

A replacement with a modern structure with a medium standard of finish (which would bear no resemblance to the existing) from our recent experience would be in the region of \$5,000/m<sup>2</sup> at current market rates. GFA is approximately 293 m<sup>2</sup>, this would result in a replacement estimate of around \$1,465,000.

## **DOCUMENTATION**

- Aurecon  
Consent Documentation for Remediation of St. James Church Riccarton –  
Concept Issue – April 2013