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Christchurch City Council
Hagley Park South Toilets
Damage and Strengthening Report
Version FINAL

PRK_1507_BLDG_010

Hagley Park South Toilets
(Near Hospital)
Damage and Strengthening Report
Version FINAL

PRK_1507_BLDG_010

Christchurch City Council

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Date
11 March 2013

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1. Introduction

GHD has been engaged by Christchurch City Council to carry out a structural inspection of Hagley Park South Toilet Block (near the Christchurch Hospital) to check for structural damage following the 4th September 2010 earthquake and subsequent aftershocks, particularly the M6.3 aftershock on 22nd February 2011 and the M6.0 aftershocks on 13th June and 23rd December 2011, up until the time of the inspection on the 12th of January 2013.

The purpose of this report is to identify structural damage, recommend repairs where necessary to bring the structure, as far as possible, back to its pre-earthquake condition and to provide conceptual strengthening solutions to achieve 34% NBS (New Building Standard) and 67% NBS.

The repair recommendations made should not be construed as to being that required for the building to comply with current New Zealand Building Code and New Zealand earthquake standards. However, conceptual strengthening solutions are included and it is considered that these strengthening and repair works could be carried out together.

GHD has previously been engaged by Christchurch City Council to carry out structural and geotechnical assessments for other Council owned buildings.

2. Background

Hagley Park South Toilet Block is located in South Hagley Park to the west of the cricket training area, on the south side of the Christchurch Hospital, as shown in Figure 1 below. There is another similar building nearby, which is outside the scope of this report.

The site is predominantly flat with little variation in ground levels throughout.



Figure 1: Location of Toilet Block in South Hagley Park

The Toilet Block is divided into two areas, for male and female toilets. No original drawings or other information are available for the building and the date of construction is unknown.

The building is a single-storey reinforced concrete masonry wall structure with lightweight roof cladding on timber purlins supported on timber trusses, and with a reinforced concrete floor slab, which is assumed to be tied into concrete strip footings below the masonry walls.

The building stands alone and is connected to water and wastewater services.

3. Scope

This report is based on visual inspections and a limited electromagnetic survey of the concrete masonry block walls, which was undertaken to confirm the presence of reinforcement.

This report is intended to:

- ▶ Describe the damage
- ▶ Quantify the damage
- ▶ Discuss repair possibilities and options
- ▶ Discuss costs
- ▶ Discuss building seismic capacity
- ▶ Discuss strengthening options
- ▶ Make recommendations

4. Site Inspections

This building has been inspected several times after the earthquake on 4 September 2010. The following table provides a brief record of observations.

Date	Observations/Actions
4 September 2010	M7.1 earthquake at Greendale causing liquefaction and considerable land damage across Christchurch.
22 February 2011	M6.3 earthquake centred near Lyttelton causing extreme damage to Christchurch, particularly in the CBD, Cashmere and Port Hills areas.
13 June 2011	M6.3 and other large aftershocks.
23 December 2011	M6.0 and other large aftershocks.
5 May 2012	City Care/LAT assessment.
8 May 2012	<p>Structural inspection (external only) and Qualitative Detailed Engineering Evaluation Report by Sinclair Knight Merz Limited, issued 17th September 2012.</p> <p>Initial Evaluation Procedure (IEP) scores the seismic capacity of the building as 21% NBS, which classifies it as potentially Earthquake Prone according to the New Zealand Society for Earthquake Engineering (NZSEE) Guidelines.</p> <p>Short column effect noted as a potential Critical Structural Weakness (CSW) for the out-of-plane action of the walls framing the full width window on the rear (north) elevation.</p> <p>Cracking and spalling damage noted to the plaster render on the concrete nibs at the base of the masonry walls. Also cracking to the external concrete slab, deemed to be consistent with long term shrinkage movement.</p> <p>Further investigation to confirm the seismic capacity and development of strengthening concepts recommended. Also geotechnical investigations to support building assessments.</p>
12 January 2013	GHD structural inspection and electromagnetic survey of the concrete masonry block walls.

Table 1 Record of Observations from Structural Inspections of Toilet Block

The inspections typically consisted of visually observing the building to determine the structural systems and likely behaviour of the building during an earthquake. The site was assessed for damage, including observing the ground conditions, checking for damage in areas where damage would be expected for the structure type observed and noting general damage observed throughout the building in both structural and non-structural elements.

5. Building Description

The Toilet Block is divided into two areas, for male and female toilets. No original drawings or other construction information are available for the building and the date of construction is unknown.

The building is a single-storey reinforced concrete masonry wall structure with lightweight roof cladding on timber purlins supported on two timber trusses and the concrete masonry walls, which are up to 4m high. The concrete floor slab is assumed to be tied into concrete strip footings below the walls.

A brief description of the different elements of the building structure is outlined below:

- Roof: Typically lightweight metal cladding with plywood lining, however two strips consist of translucent cladding, on 95x45mm timber purlins on timber trusses. The purlin along the ridgeline is 140x45mm. The trusses consist of 95x45mm timber sections and are supported on the top of the concrete masonry walls.
- Ceilings: Plywood lining of unknown thickness below the lightweight metal roof cladding.
- Walls: 190mm thick concrete masonry walls, fully grout filled and typically reinforced with D12 vertical and horizontal bars at 600mm centres. However, at the mid-height of the 4m high end walls the horizontal reinforcement is a D16 bar. Typical masonry wall height is 2m above reinforced concrete nibs, typically 240mm high, above the floor slab. These nibs have a 10mm plaster render on all faces. On the rear elevation 200x200mm reinforced concrete beams span over two windows along the top of the masonry wall. Both end walls to the building consist of masonry walls up to 4m high. There are no internal linings to the walls.
- Cladding: No external cladding on the concrete masonry walls.
- Windows: Timber framing to the single-glazed windows along the rear elevation of the building.
- Floor slab: On grade concrete floor slab, unknown thickness.
- Foundations: Unknown details, likely to be reinforced concrete strip footings below the masonry walls.

6. Building Damage Assessment

The damage observed consists of minor cracking to the internal and external concrete floor slabs. Also, cracking and spalling of the plaster render on the concrete nibs at the base of the concrete masonry walls. However, no significant settlement or evidence of significant liquefaction were observed.

Evidence of movement of the building elements was noted by a gap opening up between the flashing of the roof cladding and the top of the concrete masonry wall on the western elevation. Also, by the residual gap between the concrete cover to the external drain and the drain pipe on the eastern elevation.

Photographs of the damage observed are included in Appendix A. Also refer to the Damage Plan in Appendix D and the following table for an overview of damage.

Table 2 Damage description

Element	Description of Damage
Roof	<p>There has been no reported or observed damage to roofing materials or fixings and no evidence of water leaks was observed.</p> <p>There is a gap opened up between the roof flashing cladding and the top of the concrete masonry wall on the western elevation, which is likely to be due to movement of the walls.</p>
Ceilings	No earthquake related damage was noted to the ceiling linings.
Walls	<p>The plaster render on the concrete nib at the base of the walls has cracked and spalled off in a few places, which is considered likely to have been caused by earthquake related movement. However, no damage was observed to the concrete behind the render, where it is exposed.</p> <p>No damage was noted to the concrete masonry walls above the reinforced concrete nibs.</p>
Doors & Windows	No damage noted.
Other Fittings	No damage noted.

Floor Slab	<p>Some minor cracking has occurred to the internal concrete floor slab, up to approximately 0.2mm in width, across the entrance ways to both areas.</p> <p>Cracking, up to approximately 5mm in width, observed in the external concrete slab is considered to be pre-existing and not earthquake related.</p> <p>No information is known on the presence of any damp proof membrane (DPM) below the slab, however given the very minor level of cracking that has occurred, it is not considered likely that any significant damage has occurred to the DPM, if any, below the slab.</p> <p>No evidence of settlement was observed.</p>
Foundations	<p>No inspection could be carried out due to the lack of access, however, no reported damage or settlement was observed, therefore no significant damage appears to have occurred to the foundations.</p>
Site Works	<p>Minor unevenness of the external concrete slab, adjacent to the pre-existing cracking, is not considered to be earthquake related.</p> <p>Ground movement has opened up a gap between the external concrete cover over the drain and the drainpipe on the eastern elevation.</p>
Services	<p>The water and wastewater services appear to be working and there has been no reported damage.</p>

6.1 Can the Damage be Repaired?

The damage noted is typically minor and non-structural in nature, therefore it can be easily repaired to reinstate the building to its original condition prior to the earthquakes.

Cost estimates for comparison of the repair options have been provided by WT Partnership Limited, Quantity Surveyors, and are included in Appendix F of this report.

7. Building Repair Options

7.1 Ground Condition Assessment

Canterbury Earthquake Recovery Authority (CERA) has classified the site as Green Zone, indicating the land is generally suitable for repair and rebuilding to take place. Adjacent residential areas are classified as TC2.

A soil class of **D** (in accordance with NZS 1170.5:2004) has been adopted for this assessment.

7.2 Services

It should be noted that buried services below the building have not been checked and may have suffered some damage. It is recommended that all services should be inspected for damage prior to repairs being carried out on the floor slab.

7.3 Concrete Floor Slab Crack Repair

Cracking has occurred to the interior on grade concrete floor slab, however the damage observed is not considered to be structurally significant and will require crack injection repairs only to reinstate it to its pre-earthquake condition.

The presence of a damp proof membrane (DPM) under the slab is unknown, and from the minor nature of the damage observed, it is not considered likely to have been damaged.

Where the crack widths are less than 2mm, we recommend that an epoxy crack injection system (e.g. Sika Sikadur or similar approved) be used for their repair, it should be noted that epoxy injection cannot be carried out where crack widths are less than 0.2mm in width, however these cracks are not considered to be significant or requiring repair. Repairs should be carried out in accordance with manufacturer's instructions.

It should be noted that this solution does not offer any improvement to the structural capacity of the existing floor slab or any increased resistance to potential damage that may occur due to liquefaction in future earthquake events.

7.4 Concrete Nib Render Repairs

The observed damage to the plaster render on the face of the concrete nibs at the base of the masonry walls is non-structural, however this contributes to the integrity of the waterproofing system and protects the structure beneath it. Therefore it is recommended that in all places where damage has occurred, repairs are carried out by a competent tradesman.

Cracks are to be filled using a suitable plaster system to match the existing. Where the render has spalled off, any adjacent loose render should be removed and the edges squared off. A new plaster render should be installed according to manufacturer's instructions.

7.5 Roof

No structural damage has been observed to the roof, and there has been no reported damage or evidence of leaking. However, there is a gap opened up between the flashing and the top of the concrete masonry wall on the western elevation, due to earthquake induced movement. It is recommended that a further close-up inspection of the roof cladding and waterproof flashings is carried out by a competent tradesman to determine if this movement has caused any further damage to the cladding requiring repair. The flashing that has opened up should be fixed back to the top of the wall to ensure the waterproofing detail remains intact. Any further repairs required should be carried out in accordance with manufacturer's instructions.

7.6 External works

Since the damage to the uneven and cracked concrete slabs in front of the building is not considered to be earthquake related, and since it is minor in nature and not causing a trip hazard to users, no repairs are recommended.

The damaged concrete drainage cover should be replaced with new concrete to suit the existing detail.

8. Building Repair Methodology Recommendations

No structural damage has been observed to the building, however for the minor non-structural damage observed, it is recommended that repairs are carried out as outlined below.

8.1 Building Repair Methodology

The following is an overview of the expected repair scope of works. All quantities will need to be confirmed by site observation by a Quantity Surveyor.

These notes should be read in conjunction with the damage plan in Appendix D.

1. Preparation/Demolition/Removal

- a. Inspect services below the building for damage and scope any repairs required.
- b. Remove any further loose plaster render on the concrete nibs and square off damaged edges.
- c. Remove damaged concrete drainage cover.

2. Floor Slab and Render on Concrete Nibs

- a. Epoxy repair cracks in the interior floor slab as detailed in Section 7.3.
- b. Reinststate plaster render finish to concrete nibs at the base of the masonry walls, as detailed in Section 7.4.

3. Exterior

- a. Inspect roof, check all flashings and waterproof joint details and repair where necessary.
- b. Reinststate the flashing fixings where the gap has opened up along the top of the western wall – refer to separate specification and advice from specialist Contractor.
- c. Pour new concrete drainage cover.

4. Site Works

- a. Allow to remove all debris and leave the site tidy. Allow for one commercial clean before handing the building back over to the Council.

8.2 Repair Costs

The extent of the damage and the repair options outlined have been reviewed by WT Partnership Limited, Quantity Surveyors and estimates for comparison of costs are provided (refer Appendix F).

9. Existing Building Strength

9.1 Qualitative Detailed Engineering Evaluation

A Qualitative Detailed Engineering Evaluation (DEE) was undertaken by SKM Limited in September 2012, which assessed the seismic capacity of the building as a percentage of New Building Standards (NBS), based on the Initial Evaluation Procedure (IEP) outlined in the New Zealand Society for Earthquake Engineering (NZSEE) guidelines. This assessed the building as achieving 21% NBS and as this score is less than 33% NBS, it was deemed to be potentially Earthquake Prone.

This assessment also highlighted a potential Critical Structural Weakness (CSW) consisting of short column action due to the full width windows along the rear elevation.

9.2 Quantitative Detailed Engineering Evaluation

GHD have undertaken further investigation and calculations, which have confirmed the seismic capacity of the building as 43% NBS based on the minimum capacity of each element of the structure. As this score is greater than 33% NBS but less than 67% NBS, it is therefore classified as an Earthquake Risk building in accordance with NZSEE Guidelines.

The structural elements of the building consist of fully filled reinforced concrete masonry walls, timber roof trusses, a concrete floor slab, and reinforced concrete footings, which are assumed to exist below the masonry walls. Based on fully grout filled reinforced concrete masonry walls, an overall ductility factor for the structure of 1.25 has been assumed. The existing plywood lining to the roof is assumed to provide some bracing to the roof structure and some lateral load transfer to the top of the front and rear elevation walls.

The potential critical structural weakness of short column action of the concrete masonry walls on the rear elevation is deemed not to be significant due to the reinforcement confirmed to be present. No other critical structural weaknesses have been identified for the building, and since the damage observed was minor and non-structural in nature, no reductions have been applied to the seismic capacity. Therefore the 43% NBS value given above represents both the original and post damage capacity.

Since the building achieves less than 67% NBS it is recommended that strengthening is implemented, in accordance with NZSEE Guidelines. Conceptual strengthening options are discussed in Section 10.

10. Conceptual Strengthening

10.1 Conceptual Strengthening to 34% NBS

The building is assessed as achieving greater than 33% NBS and therefore is not classified as an Earthquake Prone building in accordance with NZSEE Guidelines, therefore conceptual strengthening works to achieve 34% NBS are not required.

10.2 Conceptual Strengthening to 67% NBS

Since the building is assessed as achieving greater than 33% NBS but less than 67% NBS, it is classified as an Earthquake Risk building in accordance with NZSEE Guidelines, and therefore strengthening is recommended to achieve 67% NBS.

The lowest scoring structural elements to the building are the 4m high concrete masonry walls on both ends of the building. There are various options available to provide strengthening to the structure, however, it is considered that the installation of bracing to these walls within the existing roof structure would cause only minimal disruption during construction and therefore be the most economical solution.

An alternative solution would involve removing the top cantilevering section of these walls, to be replaced with lightweight cladding on timber framing tied back to the existing timber roof trusses, however, this would involve more extensive works and therefore it is not anticipated to be the preferred option.

10.3 Recommended Strengthening Concept

Strengthening is recommended to achieve 67% NBS in accordance with NZSEE Guidelines, and the recommended solution, which would cause minimal disruption during construction, involves the installation of steel bracing within the existing roof structure to the 4m high walls.

11. Repair Costs

The extent of the damage repair options and the strengthening concepts outlined have been reviewed by WT Partnership Limited Quantity Surveyors and estimates for comparison of costs have been provided (refer Appendix F).

The repair works are non-structural and therefore are not considered likely to require building consent; however the recommended strengthening works will require building consent.

It should be noted that no allowance has been made for any repairs required to the underground building services, as no damage has been reported, however, it is recommended that an investigation is carried out to confirm the condition of the services below the building prior to any repair works being carried out.

11.1 Rough Order of Cost Exclusions

The rough order of cost estimates have been compiled based on the assumptions outlined in this report and a number of exclusions, outlined below. No allowance for betterment is included.

The exclusions are as follows:

- Goods and Services Tax
- Any costs associated with re-levelling of the existing structure
- A fire report & works required arising from this
- Any requirements for disabled access works / facilities
- Repairs to cracks in external slab
- Below ground service inspection and any work required arising from this
- Damage inspection of existing roof and any work required arising from this
- Site remediation works
- Works to site amenities
- Tender negotiation, consent application, negotiation with insurer
- External works unless specifically noted within this estimate
- Internal fit-out unless specifically stated within this estimate
- Fitting, fixtures and equipment
- Loss on income, relocation, temporary storage and disruption costs for the period of repair or reconstruction
- Construction finance costs
- Statutory authority charges including but not limited to, Vector, Telecom, Metro Water and gas
- Finance Costs

- Holding costs including rates, taxes and related outbuildings
- Land and legal costs

12. Summary & Conclusions

The Toilet Block has been assessed to be an Earthquake Risk building, in accordance with the NZSEE Guidelines, however as there are no immediate collapse hazards associated with the structure it is recommended that general occupancy of the building is permitted.

Overall, the building has mostly suffered only minor non-structural damage, which will be relatively simple to repair. It will also be possible to carry out the strengthening of the building and the repair works together.

Cost estimates for the strengthening works and repair options are included in Appendix F.

The recommended repairs include the epoxy injection of cracks to the interior ground floor slab and reinstatement of the plaster render to the concrete nibs at the base of the masonry walls. In addition, further inspection is recommended of the flashing details of the roof cladding and repair is required to the flashing where a gap has opened up at the top of the concrete masonry wall on the western elevation.

It should also be noted that no allowance has been made for any repairs required to the underground services, as no damage has been reported, however, it is recommended that an investigation is carried out to confirm the condition of the services below the building prior to any repair works being carried out.

13. Limitations

This report has been prepared subject to the following limitations:

- ▶ Intrusive structural investigations have not been undertaken.
- ▶ Floor level and verticality surveys have not been undertaken.
- ▶ Material testing has not been undertaken.

It is noted that this report has been prepared at the request of and on behalf of Christchurch City Council and is intended to be used for their purposes only. GHD accepts no responsibility for any other party or person who relies on the information contained in this report.

Appendix A
Photographs



Photograph 1: Front (South) elevation of Hagley Park South Toilet Block



Photograph 2: Rear (North) elevation



Photograph 3: Rear (North) elevation



Photograph 4: Rear (North) elevation



Photograph 5: East elevation with cantilevered concrete masonry wall



Photograph 6: West elevation with cantilevered concrete masonry wall



Photograph 7: View of timber truss supporting roof on West elevation at cantilevered wall



Photograph 8: Internal view with timber roof framing and plywood ceiling



Photograph 9: Internal view showing timber roof framing fixed along top of fully filled concrete masonry walls



Photograph 10: Internal view showing nailplate connection detail of timber roof trusses



Photograph 11: Internal view showing fixing of timber roof framing to rear elevation concrete beam above window



Photograph 12: Internal view showing fixing of timber roof framing to concrete masonry wall on western elevation



Photograph 13: Cracking in external slab and spalling of render on concrete footing to wall



Photograph 14: Close-up view of spalling of render on concrete footing to wall



Photograph 15: View of crack in internal concrete floor slab



Photograph 16: Close-up view of crack in internal concrete floor slab



Photograph 17: Close-up view of crack in concrete floor slab and in render on footing to wall



Photograph 18: View of crack in internal concrete floor slab



Photograph 19: Cracking and spalling of render on concrete footing to internal wall



Photograph 20: Spalling of render on concrete footing to internal wall



Photograph 21: Minor cracking in render on concrete footing to internal wall



Photograph 22: Close-up view of minor cracking in render on concrete footing to internal wall



Photograph 23: Spalling of render on concrete footing to internal wall



Photograph 24: Render spalled off concrete footing to internal wall



Photograph 25: Render spalled off concrete footing to internal wall



Photograph 26: Spalling of render on external concrete footing and movement of building shown by gap between concrete and drainpipe



Photograph 27: Close-up view of gap between roof flashing and top of concrete masonry wall on West elevation



Photograph 28: Close-up view of gap between roof flashing and top of concrete masonry wall on West elevation



Photograph 29: Close-up view of gap between roof flashing and top of concrete masonry wall on West elevation

Appendix B
Plan Drawing

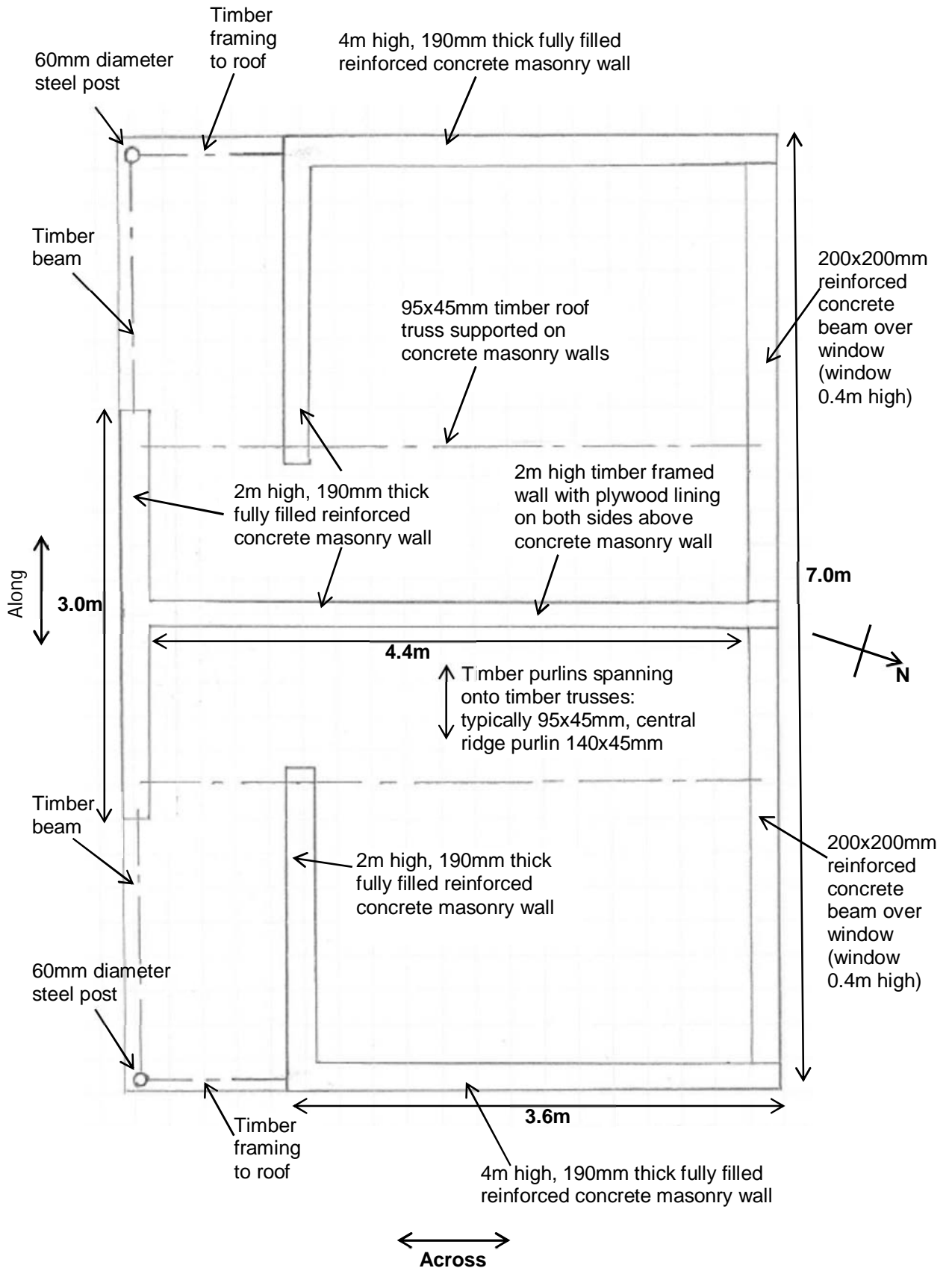


Figure 2: Sketch plan of structural elements to Hagley Park South Toilet Block

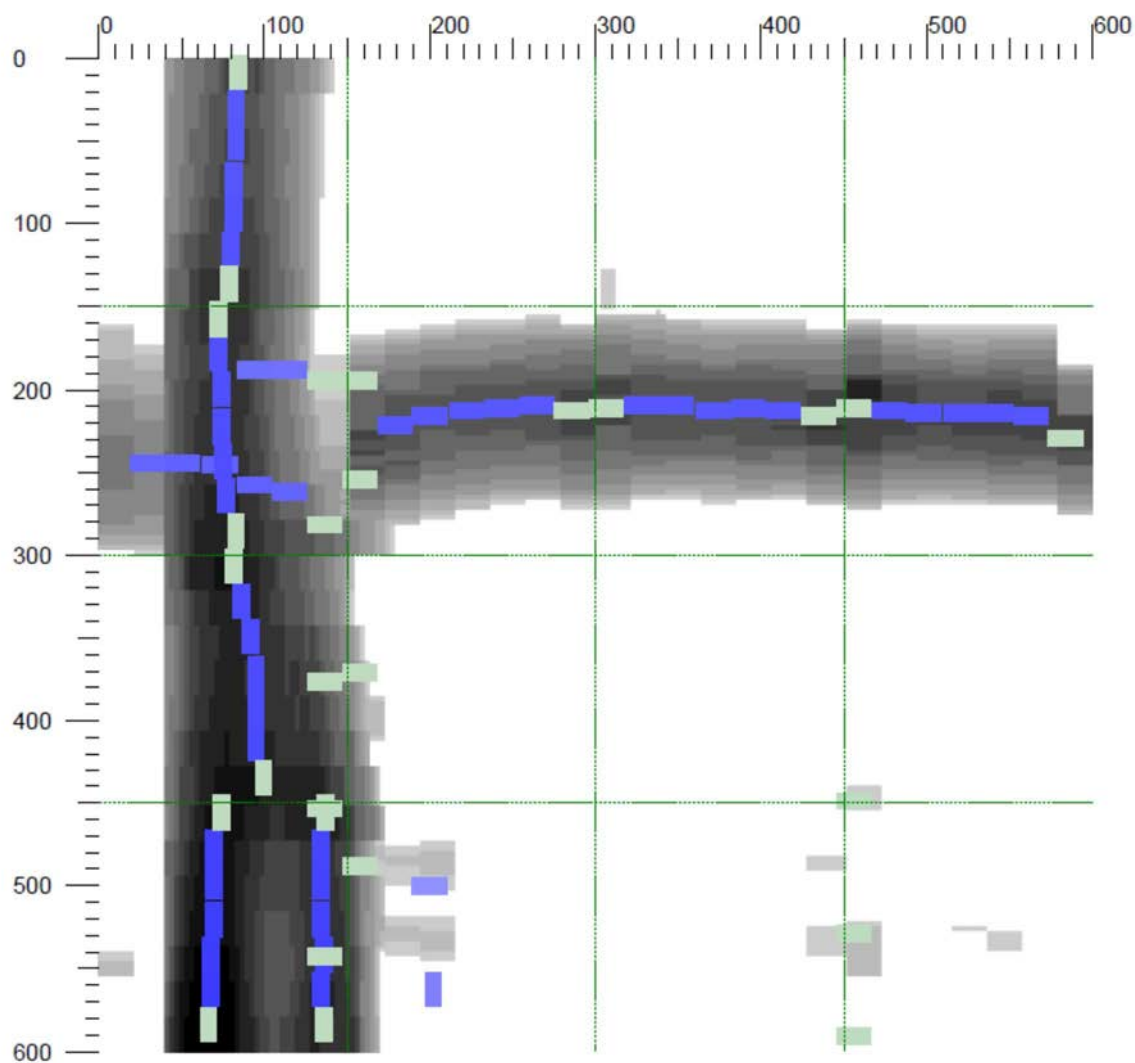
Appendix C

Electromagnetic Surveys of Concrete Masonry Walls

Imagescan: Wall 4 - front elevation.xff

Date / Time: 2013-02-12 09:22:11

SSN: 31311003 [mm]



Customer: Christchurch City Council

Location: Front elevation - Wall 4

Operator: RV/JS

Comment:

190mm fully filled concrete masonry wall.

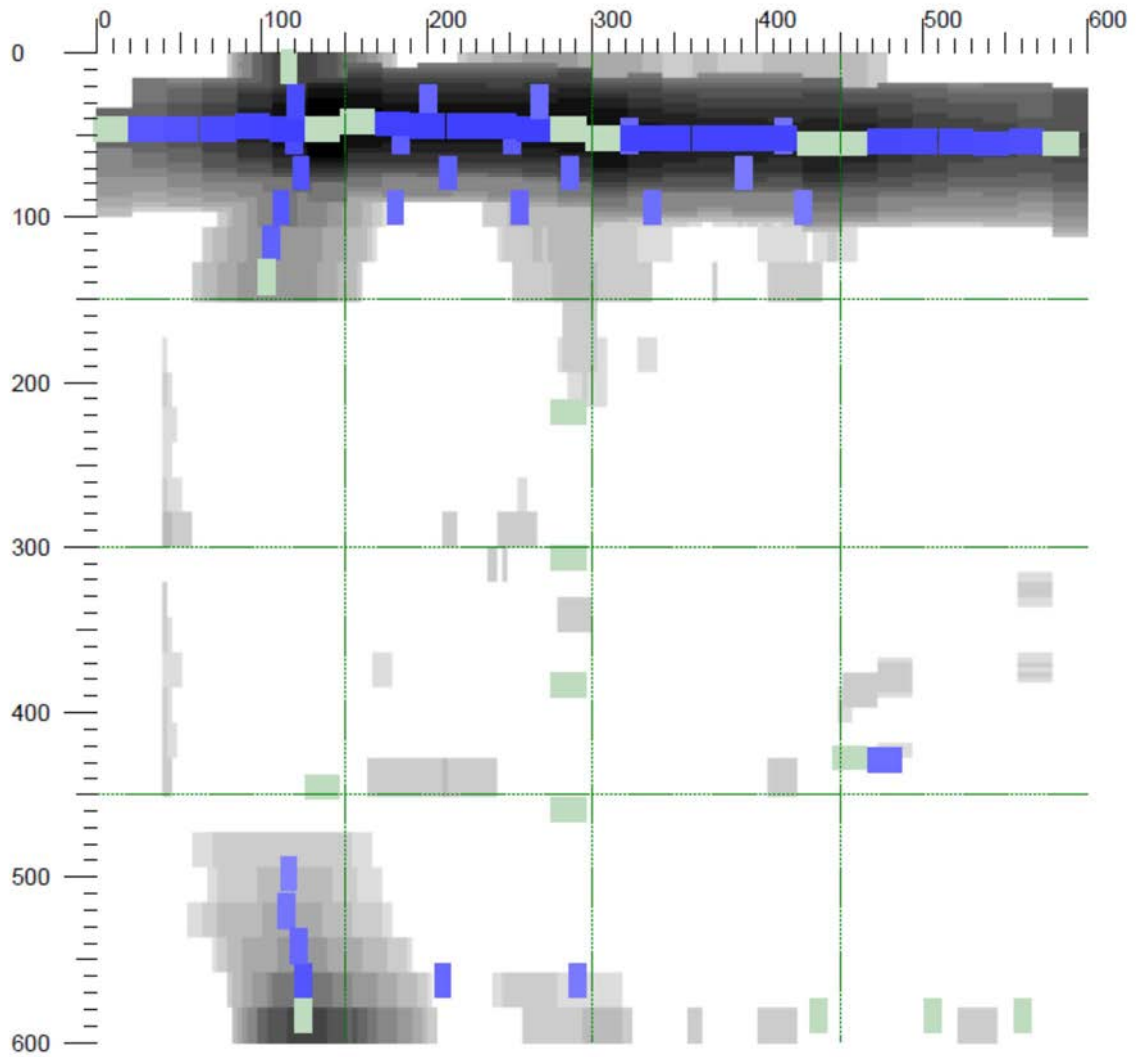
Typical reinforcement: D12 at 600mm centres, horizontally & vertically

Figure 3 Electromagnetic Survey of concrete masonry wall on front elevation of Toilet Block building

Imagescan: Wall 7 - East elevation.xff

Date / Time: 2013-02-12 09:43:31

SSN: 31311003 [mm]



Customer: Christchurch City Council

Location: Wall 7 - East elevation

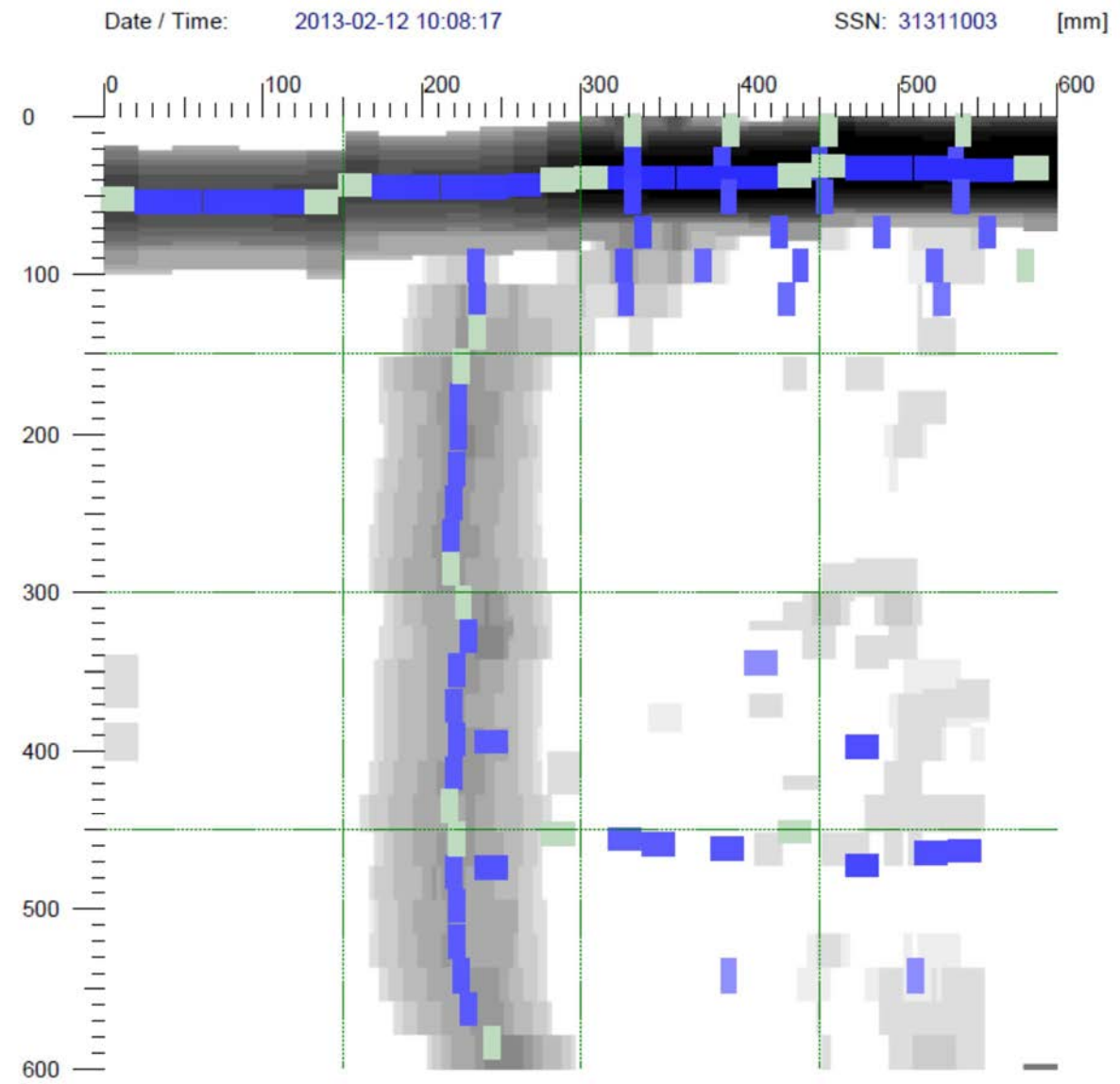
Operator: RV/JS

Comment:

190mm thick fully filled concrete masonry wall.
Typical reinforcement:
Vertical and Horizontal: D12 at 600mm centres.
Except D16 Horizontal bar at 2m above ground level.

Figure 4 Electromagnetic Survey of concrete masonry wall on East elevation of Toilet Block building

Imagescan: Wall 1 - Rear elevation below window.xff



Customer: Christchurch City Council

Location: Rear elevation - Wall 1 - below window)operator: RV/JS

Comment:

190mm thick concrete masonry wall.
Horizontal reinforcement: D16mm below window.
Vertical reinforcement: D12 at 600mm centres.

Figure 5 Electromagnetic Survey of concrete masonry wall on rear elevation of Toilet Block building – at centre of wall below window

Appendix D
Damage Plan

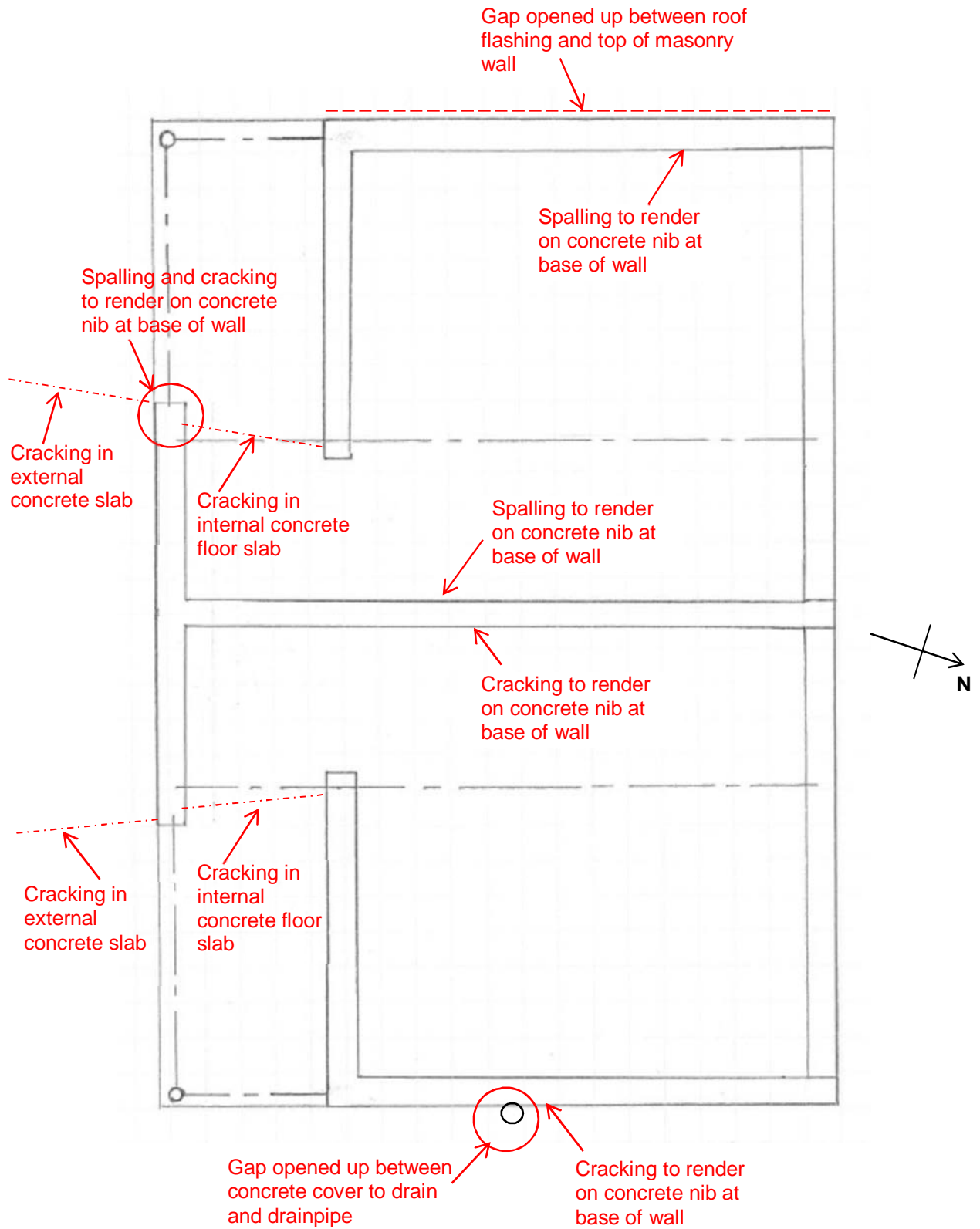


Figure 7 Damage Plan – Hagley Park South Toilet Block – 12 January 2013

Appendix E
Conceptual Strengthening Plan

Addition of bracing within roof structure

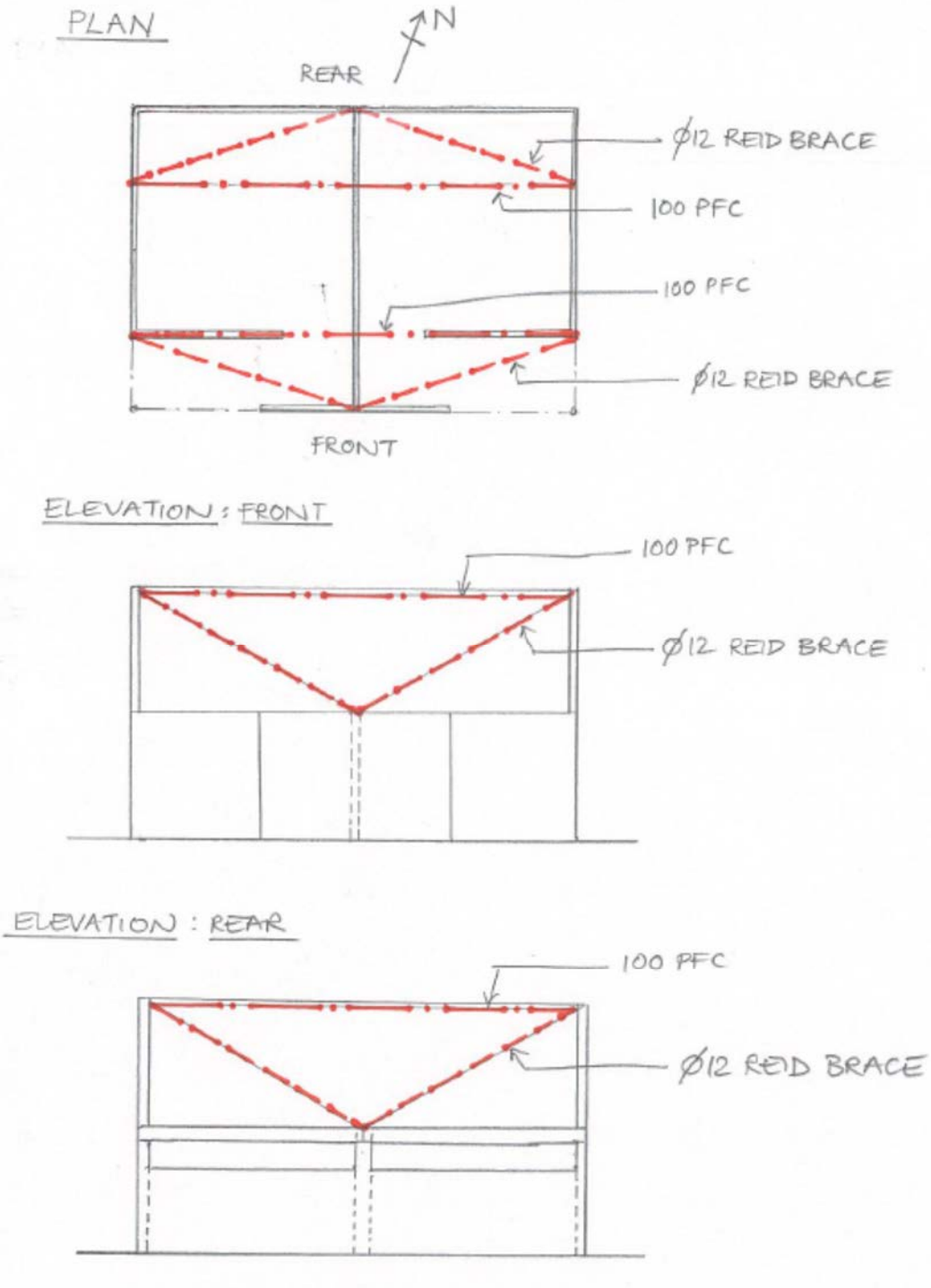


Figure 8 Conceptual Strengthening Plan to 67% NBS – Hagley Park South Toilet Block

Appendix F
WT Partnership Rough Order of Cost

SIC702 PRK_1507_BLDG_010 HAGLEY PARK STH TOILET

E S T I M A T E S U M M A R Y

REVISION

1	DAMAGE ASSESSMENT AND STRENGTHENING	4,800.00
		4,800.00

WORKS

D	KEY DAMAGE	4,800.00
		4,800.00

ELEMENT

DE	DEMOLITIONS	100.00
02	SUBSTRUCTURE	2,500.00
07	EXTERNAL WALLS AND EXTERNAL FINISH	1,700.00
22	DRAINAGE	500.00
		4,800.00

PRELIMINARY & GENERAL CHARGES	[10.00% of Total]	480.00
	Subtotal 1:	5,280.00

CONTRACTORS MARGIN	[8.00% of 1]	422.40
	Subtotal 2:	5,702.40

DESIGN/ESTIMATING CONTINGENCY	[15.00% of 2]	855.36
	Subtotal 3:	6,557.76

		=====
	GRAND TOTAL	6,557.76

SIC702 PRK_1507_BLDG_010 HAGLEY PARK STH TOILET

REVISION 1 DAMAGE ASSESSMENT AND STRENGTHENING
 WORKS D KEY DAMAGE
 ELEMENT DE DEMOLITIONS

Demolitions

1	Allow to hack off spalled render on concrete nib at base of wall; make good edges to receive new	m2	4	25.00	100.00
				Demolitions	100.00
				Total for DEMOLITIONS	100.00

REVISION 1 DAMAGE ASSESSMENT AND STRENGTHENING
 WORKS D KEY DAMAGE
 ELEMENT 02 SUBSTRUCTURE

SUBSTRUCTURE

Cracking in Floor Slab

2	Allow to repair cracking in internal floor slab with epoxy injection; cracks not exceeding 0.2mm in width	m	10	250.00	2,500.00
3	Cracking to external slab excluded as noted as non-earthquake damage		Note		Excluded
				SUBSTRUCTURE	2,500.00
				Total for SUBSTRUCTURE	2,500.00

REVISION 1 DAMAGE ASSESSMENT AND STRENGTHENING
 WORKS D KEY DAMAGE
 ELEMENT 07 EXTERNAL WALLS AND EXTERNAL FINISH

Cracks in Render

4	Allow to repair cracks in plaster render on the face of the concrete nibs at the base of the masonry walls; fill using plaster system to match existing [Provisional Allowance]		Item		500.00
				Cracks in Render	500.00

SIC702 PRK_1507_BLDG_010 HAGLEY PARK STH TOILET

New Plaster Render System

5	Allow for new plaster render system	m2	4	300.00	1,200.00
				New Plaster Render System	1,200.00
				Total for EXTERNAL WALLS AND EXTERNAL FINISH	1,700.00

REVISION 1 DAMAGE ASSESSMENT AND STRENGTHENING
 WORKS D KEY DAMAGE
 ELEMENT 22 DRAINAGE

Existing Drainage Cover

6	Allow to remove existing damaged concrete drainage cover and replace with new	Item			500.00
				Existing Drainage Cover	500.00
				Total for DRAINAGE	500.00
				Total for KEY DAMAGE	4,800.00
				Total for DAMAGE ASSESSMENT AND STRENGTHENING	4,800.00
				TOTAL	4,800.00

PRELIMINARY & GENERAL CHARGES [10.00% of Total] 480.00
 Subtotal 1: 5,280.00

CONTRACTORS MARGIN [8.00% of 1] 422.40
 Subtotal 2: 5,702.40

DESIGN/ESTIMATING CONTINGENCY [15.00% of 2] 855.36
 Subtotal 3: 6,557.76

GRAND TOTAL 6,557.76

SIC702 PRK_1507_BLDG_010 HAGLEY PARK STH TOILET

ESTIMATE SUMMARY

REVISION

1	DAMAGE ASSESSMENT AND STRENGTHENING	3,810.00
		3,810.00

WORKS

S	STRUCTURAL STRENGTHENING	3,810.00
		3,810.00

ELEMENT

06	ROOF	3,810.00
		3,810.00

PRELIMINARY & GENERAL CHARGES	[10.00% of Total]	381.00
	Subtotal 1:	4,191.00

CONTRACTORS MARGIN	[8.00% of 1]	335.28
	Subtotal 2:	4,526.28

DESIGN/ESTIMATING CONTINGENCY	[15.00% of 2]	678.94
	Subtotal 3:	5,205.22

		=====
GRAND TOTAL		5,205.22

SIC702 PRK_1507_BLDG_010 HAGLEY PARK STH TOILET

REVISION 1 DAMAGE ASSESSMENT AND STRENGTHENING
 WORKS S STRUCTURAL STRENGTHENING
 ELEMENT 06 ROOF

ROOF

Steel Roof Bracing

7	Allow for 12mm diameter Reidbar bracing in existing roof structure	m	16	60.00	960.00
8	Allow for 100 PFC in existing roof structure	m	14	150.00	2,100.00
9	Allow for connections to the above	Item			750.00

ROOF 3,810.00

Total for ROOF 3,810.00

Total for STRUCTURAL STRENGTHENING 3,810.00

Total for DAMAGE ASSESSMENT AND STRENGTHENING 3,810.00

TOTAL 3,810.00

PRELIMINARY & GENERAL CHARGES [10.00% of Total] 381.00
 Subtotal 1: 4,191.00

CONTRACTORS MARGIN [8.00% of 1] 335.28
 Subtotal 2: 4,526.28

DESIGN/ESTIMATING CONTINGENCY [15.00% of 2] 678.94
 Subtotal 3: 5,205.22

GRAND TOTAL 5,205.22

GHD





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Document Status

Rev No.	Author	Reviewer		Approved for Issue		
		Name	Signature	Name	Signature	Date
DRAFT	Jenny Stevenson	David Lee		Nick Waddington		25/2/2013
FINAL	Jenny Stevenson	David Lee		Nick Waddington		11/3/2013