

**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

**STATEMENT OF PRIMARY EVIDENCE OF GARETH WRIGHT ON BEHALF OF
CHRISTCHURCH CITY COUNCIL**

HERITAGE

QUALIFYING MATTER: HERITAGE (LISTED HERITAGE ITEMS)

Dated: 11 August 2023

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EXECUTIVE SUMMARY

1. My full name is **Gareth Robert Wright**. I am employed as Heritage Advisor at Christchurch City Council.
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 those District Plan provisions applicable to the removal of the former Dwelling and Setting, 471 Ferry Road (the **Building**) from the Schedule of Significant Historic Heritage Items in Appendix 9.3.7.2 (the **Schedule**) in the District Plan.
4. In summary, I consider:
 - (a) In its current condition the Building meets the necessary thresholds to remain on the Schedule;
 - (b) If repaired according to the recommended engineering scope and methodology, the Building would meet the necessary thresholds to remain on the Schedule;
 - (c) Financial factors may however preclude the Building remaining on the Schedule.

INTRODUCTION

5. My name is **Gareth Robert Wright**. I have been employed as a Heritage Advisor in the Heritage Team at Christchurch City Council since 2011.
6. My evidence relates to District Plan provisions applicable to the submission (S1043.1) of Cameron Parsonson requesting that the Building at 471 Ferry Road be removed from the Schedule of Significant Historic Heritage Items in the District Plan.
7. In preparing this evidence I have reviewed:
 - (a) All relevant engineering reports, including:
 - (i) *L2 Structural Report*, Don Thomson Consulting Engineers, July 2011 (attached as **Appendix A**);
 - (ii) *Heritage Engineering Advice*, Andrew Marriott, Christchurch City

Council Heritage Response Team, June 2012 (attached as **Appendix B**); and

- (iii) *Formalised Preliminary Design*, Dunning Thornton Consultants, November 2013 (attached as **Appendix C**);
- (b) All relevant costing reports (which are appended to the evidence of Gavin Stanley), including:
 - (i) *Budget Repair Estimate*, Rhodes and Associates, January 2014; and
 - (ii) *Budget Repair Estimate*, Rhodes and Associates, July 2023;
- (c) Reviewed the statements of primary evidence of:
 - (i) Clara Caponi, engineer (Egis);
 - (ii) Timothy Holmes, conservation architect (Warren and Mahoney); and
 - (iii) Gavin Stanley, quantity surveyor (Rhodes and Associates); and
- (d) Made a site visit on 24 July 2023.

8. I am authorised to provide this evidence on behalf of the Council.

QUALIFICATIONS AND EXPERIENCE

- 9. I hold the qualifications of Master of Arts in History from the University of Canterbury and a Graduate Diploma in Resource Management from Lincoln University.
- 10. The greater part of my work is providing consent advice on behalf of Council's Heritage Team. This has included advice on the demolition of a number of scheduled heritage items.
- 11. In the period 2012-2014 I coordinated the Council Heritage Team's earthquake response on the Building. This included commissioning the 2013 Dunning Thornton report and the 2014 Rhodes and Associates report.
- 12. I am a board member of ICOMOS New Zealand (the New Zealand committee of the International Council on Monuments and Sites).

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.
14. I confirm that, while I am employed by the Council, the Council has agreed to me providing this evidence in accordance with the Code of Conduct.

SCOPE OF EVIDENCE

15. My statement of evidence addresses the following matters:
 - (a) The heritage significance of the Building;
 - (b) The damage sustained by the Building;
 - (c) The District Plan scheduling process;
 - (d) The capacity of the Building to remain scheduled in current condition;
 - (e) The capacity of the Building to remain scheduled if repaired;
 - (f) Financial factors which may make retaining the Building on the schedule unreasonable; and
 - (g) Conclusion.
16. I address each of these points in my evidence below.

HERITAGE SIGNIFICANCE

17. The Building at 471 Ferry Road was built by stonemason James Courtenay during the 1860s whilst he was working on the construction of the Lyttelton Rail Tunnel. The Courtenay family retained ownership of the Building until 1916. In 1971 it was renamed Portstone and subsequently utilized as part of the Portstone nursery business. In 1980 it was converted for use as a restaurant. Between 1988 and 2010 it was the premises of Dizzy Lizzy's Catering.
18. The Building has historical and social significance as the former home of James Courtenay, an early Christchurch stonemason. It has cultural

significance because it demonstrates the lives of former residents. It has architectural and aesthetic significance as one of the earliest surviving stone residential buildings in the city. It has technological and craftsmanship significance as an example of the work of an Irish-born stone mason in colonial Christchurch. It has contextual significance as a landmark on Ferry Road, and archaeological significance as a consequence of the date at which development first occurred on site.

19. The Building is a scheduled as a Significant heritage item in the Christchurch District Plan because it has been assessed as meeting the threshold for significance to the District.
20. The Building is a Category 2 listed Historic Place on the New Zealand Heritage List administered by Heritage New Zealand Pouhere Taonga (**HNZPT**). Category 2 Historic Places are those considered to be of historical or cultural heritage significance or value.

DAMAGE

21. The Building sustained moderate damage in the 2010-2011 Canterbury Earthquake Sequence. This damage manifested as extensive cracking to the external walls, particularly at the corners and openings. Discrete areas of both internal and external wythes have fallen, including the lintel above the west door and an internal section of the east wall. The external wythe of the road-facing south elevation has tilted outwards. There has been further deterioration since the initial engineering reports were prepared a decade ago (as detailed in the evidence of Clara Caponi).
22. A submission (S1043.1) has been made seeking the deletion of the Building from the Schedule of Significant Historic Heritage Items in Appendix 9.3.7.2 of the District Plan. The submitter - who owns an adjacent property - contends that the condition of the Building should preclude it from being scheduled.
23. The owner of the Building did not make a submission. However through conversation with the owner I am aware that it is her preference to see the Building repaired, but that she does not have the financial resources to do so herself. She acknowledges that the removal of the Building from the Schedule would allow her to dispose of the property more readily, although the future of the Building would be less certain.

SCHEDULING POLICY

24. To be scheduled as a Significant heritage item on the District Plan, according to Policy 9.3.2.2.1 (a) and (b), appropriate heritage values are ascribed to the item and assessed. If at least one of the ascribed values is assessed as meeting the criteria for significance, (and) the item is assessed as being of importance to the Christchurch District for its capacity to convey cultural and historical themes and activities that contribute to a sense of place and identity; (and) the item is assessed as having a moderate degree of authenticity and integrity, then the item may be considered to qualify for inclusion on the Schedule as a Significant item.
25. Policy 9.3.2.2.1 does however contain caveats in (c), which states that historic heritage that would otherwise meet the thresholds for scheduling should not be considered for scheduling (or retention on the schedule if already scheduled) if its current physical condition or its condition following (necessary) works would compromise its values and integrity such that it would no longer be of sufficient significance to be (or remain) scheduled and/or there are engineering or financial factors that would make scheduling 'unreasonable or inappropriate'.

CAPACITY TO REMAIN SCHEDULED IN CURRENT CONDITION

26. At the time it was scheduled in the operative District Plan (in 2016), historical, social, cultural, architectural, aesthetic, technological, craftsmanship, contextual and archaeological values were ascribed to the Building and assessed as meeting the significance threshold. Despite the damage the building has sustained, it still meets at least one of these values at a Significant level. Arguably it would still meet all of them at a Significant level. As it stands, the building retains the capacity to convey aspects of Christchurch District's cultural and historic themes and activities, and thereby contribute to the District's sense of place and identity. It also retains a moderate degree of authenticity and integrity. In current condition therefore, the Building still meets all the necessary thresholds to remain on the Schedule as a Significant item.

CAPACITY TO REMAIN SCHEDULED IF REPAIRED

If the Building were to undergo a programme of repair, would its integrity and values be compromised to such a degree that it could not remain a scheduled heritage item? Or would there be engineering or

financial factors that would preclude it from remaining on the schedule?

27. A scope of repair and seismic upgrade for the Building was proposed by Dunning Thornton in 2013. This involved repairing delaminated areas of stonework, inserting corner ties, applying a continuous mesh system (tied through the walls with rods) to the mortar joints, pinning the lintels in place, underpinning the walls with piles, and inserting a diaphragm at ceiling level. This methodology has been assessed by engineer Clara Caponi, who agrees with it, but also recommends the internal grouting of the walls to stabilize the infill rubble. She considers that the methodology will strengthen the building to a standard greater than the minimum requirement of the New Zealand Building Code whilst minimizing the work's invasiveness and retaining its heritage features. Architect Timothy Holmes also considers that the scheme is pragmatic and minimally invasive.

Does this strategy compromise the Building's values?

28. Arguably the technological value of the Building would no longer meet the significance threshold. But if the recommended repair is undertaken on like-for-like basis and with due regard for accepted heritage conservation precepts, then the Building will still appear as it did and will still firmly represent the majority of values for which it was scheduled at a significant level. And as noted earlier, an item need only meet one of its ascribed values at a significant level to be considered for scheduling.

Does this this strategy compromise the Building's integrity?

29. Integrity is defined in the ICOMOS New Zealand Charter (2010) as the wholeness or intactness of a place, including its meaning and sense of place, and all the tangible and intangible attributes and elements necessary to express its cultural heritage value. If integrity is understood as just a tangible, physical quality, then the reconstruction of large parts of a building might be understood to compromise its wholeness or intactness. The definition of integrity however also refers to intangible attributes, and these qualities are less tied to the simple age of a building's fabric. Additionally, it should be recognized that all buildings suffer decay and therefore inevitably and necessarily undergo repair and reconstruction over time. This situation has just been exacerbated by earthquake damage. There is no reason to think therefore that the proposed strategy would not leave the Building

sufficiently whole or intact that it retains the moderate degree of integrity necessary for it to be scheduled as Significant.

Are there engineering factors which preclude the Building remaining on the schedule?

30. Clara Caponi concludes that there are not. And if engineering does not compromise a building's values nor compromise its integrity, then the only factor which might preclude an item remaining on the heritage schedule is in fact the cost of that engineering – a financial factor.

Are there financial factors which preclude it remaining on the schedule?

31. The Dunning Thornton proposal was costed by Gavin Stanley in 2014 at \$577,000 excluding GST. The owner's insurance settlement is understood to have been in the region of \$100,000 so the grant assistance then available (an offer of \$60,000 from the Earthquake Heritage Building Fund, and a similar sum from Council's Heritage Incentive Grant Fund) left a funding shortfall of approximately \$357,000. As detailed in his evidence, the same proposal has been re-costed by Gavin Stanley in 2023 at \$705,000 excluding GST. Grant assistance now available is limited to Council's Heritage Incentive Grant Fund alone, and although sums cannot be confirmed at this time, it has been indicated that this is highly unlikely to be able to make a meaningful difference. The funding gap (at not less than a probable \$550,000) is therefore considerably greater than in 2013. I note that the capital value of the property is \$280,000, so a sale is unlikely to recoup the cost of repair. Thus if a significant repair cost shortfall of at least \$550,000 is considered a relevant financial factor in this context, then it would preclude the building remaining on the schedule.

CONCLUSION

32. The former Dwelling and Setting, 471 Ferry Road, is a Significant scheduled heritage item in the Christchurch District Plan. It sustained substantial damage in the Canterbury Earthquake Sequence of 2010-2011. In its current condition, the Building meets the necessary threshold to remain on the schedule. If repaired according to the recommended engineering scope, it would retain sufficient value and integrity to remain scheduled as a Significant item– and as a consequence, engineering factors are not determinative. Given the apparent costs however, financial factors may be

considered an 'unreasonable' hurdle to repair – and therefore a justifiable reason to remove it from the schedule.

Dated: 11 August 2023

Gareth Wright

**APPENDIX A: L2 STRUCTURAL REPORT, DON THOMSON CONSULTING
ENGINEERS, JULY 2011**

(Overleaf)

MWH Mainzeal Joint Venture Ltd Christchurch Earthquake Commercial Claims

Address: 471 Ferry Road, Woolston, Christchurch
Building Name: Dizzy Lizzy's Restaurant
Claim Number: 3878268
Contact: Elizabeth Thompson
Assessment date: 04-07-2011
Assessed by: Alasdair Sinclair
Assessment level: 1
DTCE Project No. 211409

Introduction / Scope

Don Thomson Consulting Engineers Ltd (DTCE) were requested by MWH Mainzeal Joint Venture Ltd (MWHM) to undertake a visual inspection of the property located at 471 Ferry Road, Christchurch. The building suffered damage from the first earthquake in September 2010, and further damage resulted from aftershocks on 22 February 2011 and 13 June 2011.

The scope of works includes:

- external inspection of exposed structure
- check wall verticality with spirit level/similar
- record structural and non-structural defects
- review any available engineering reports
- determine potential outcome of building
- scope basic 'make safe' requirements, if needed

Deliverables:

- complete level 1 rapid assessment form (if not already done)
- Level 1 report including recommended building outcome
- any recommendations for further investigation (any further structural assessment, geotechnical, survey, services etc.)
- sketch any make safe requirements, if needed

Description of Property

The building is a one storey house originally constructed c. 1863 and is listed as a heritage site. Prior to the September earthquake it was used as a restaurant. The external walls are stone masonry and the internal walls are made from timber. The slate tile roof is supported by internal timber columns and beams which appear to be independent of the masonry walls. There is a concrete floor in the kitchen area but the rest of the floor is suspected to be timber.

It is unlikely that the stone walls have any foundation at all.

The building has gone through several iterations of expansion and alteration which can be seen by the different quality and style of stonework and pointing in the external walls. At the street frontage it appears that the original monolithic stonework has been covered by a thinner stone façade.

A small reinforced masonry structure was built c. 1977 against the stone wall on the eastern side of the house and was used to store gas cylinders. At present it is not being used for any purpose. Two free standing timber structures have been built out the front of the property of which one is used as toilet facilities and the other as a cool store.

No placard has been placed on the building but the owner has vacated the premises under recommendation from a friend, Jon Donovan, who is a structural engineer.

Condition of Property

Access to the interior of the building was not possible due to the doors being jammed shut by movement in the stone walls from seismic activity. We therefore conducted an assessment of the buildings exterior only. Please refer to the attached marked-up drawing of the structure indicating the areas of damage. For reference, we were supplied site notes and descriptions of the interior condition by Andrew Russell of MWH Mainzeal from his inspection on 1/02/11, before the second earthquake of 22/02/11.

The stone walls around the perimeter of the building show a large amount of cracking due to in-plane shear stresses, and in places stones have fallen away. In particular, the most severe damage appears to be concentrated in the corners. At the North-West corner of the house there is diagonal cracks about 20mm wide through the mortar. The inherent stability of these walls is likely to be marginal at best.

The stone lintel over the door on the western side of the house shows signs of incipient collapse as it has moved away from the adjacent wall. It appears that this lintel is a facing stone approximately 100mm to 150mm thick, as this is the thickness of the stone veneer. There is a greater chance of the lintel toppling in this case as there is less bearing area providing support. There are a number of 1 - 2mm cracks around the other stone lintels on the southern external wall but these are not at risk of collapsing.

The external wall on the southern side of the building has tilted and the veneer is showing some signs of separating from the original wall. There is a 25mm gap between the stone veneer and timber doorway. This doorway was measured using a digital level and found to be 1.3° out of plumb. According to Jon Donovan there is a 50mm gap between the main stone wall and the ceiling, which he saw when inspecting the interior before the June seismic event. Windows and doorways around the rest of the house are still plumb.

Pounding has occurred between the reinforced masonry wall and the external stone wall on the eastern side of the house. Stones have fallen out of the wall into the interior of the house causing damage to the plasterboard lining. Mortar between the stones has broken away within a 45 degree failure plane to the top of the stone wall from the corner of the masonry wall.

The timber framing supporting the roof shows no sign of damage as viewed from outside the building.

Conclusions

Damage to the corners of the building need to be repaired. The surface cracking could be re-pointed, however, it is likely that the mortar binding the corners has been compromised for the full depth of the wall. It may be possible to inject a high-strength grout resin in the least damaged area. Where blocks have been lost from the wall this could leave uncertainty that all the voids were filled adequately and it may not be possible to simply push the lost or moved blocks back into place. It is likely that the corners of the building will need to be demolished and rebuilt around a reinforced concrete core.

The stone lintels should be propped, and will likely all require replacement.

To realign the southern external wall, it will need to be demolished and then rebuilt on engineered foundations and a reinforced concrete core.

The masonry adjunct building remains a hazard to the stone building due to an insufficient construction gap. Rebuilding which does not address the seismic gap invites future damage from pounding. Given the relative importance of the two structures, the masonry adjunct building could be demolished and rebuilt with an appropriate gap. Alternatively, the repaired external stone wall could be connected to the adjunct to prevent relative movement.

Further Investigations

The following works are required in assessing this structure:

1. The outside of the house must be well shored in order to access the interior of the house.
2. Once propped inside and out, the internal plaster lining on the external walls should be removed.
3. Carry out careful demolition on the stone walls at the corners of the house from top down to assess the depth of cracking through the stone work.

Disclaimer

In preparing this report, Don Thomson Consulting Engineers Ltd (DTCE) has undertaken a limited visual inspection only of the property at 471 Ferry Road, Christchurch. The recommendations of this report are intended to address damaged structural elements and are not intended to improve the building's structural performance. DTCE's views are based on the presence of visible physical damage only as at the time of inspection. DTCE makes no representation or warranty, express or implied that the structures are intrinsically safe or without latent or hidden defects, damage or deficiency other than those which are visibly apparent at the time of inspection.

This report has been prepared at the specific instructions of MWHM for the purpose stated in the report scope.

Only MWH Mainzeal Joint Venture Ltd and Vero Insurance New Zealand Ltd are entitled to rely upon this report, and then only for the purpose stated above. Don Thomson Consulting Engineers Ltd accept no liability to anyone other than MWH Mainzeal Joint Venture Ltd and Vero Insurance New Zealand Ltd in any way in relation to this report and the content of it and

any direct or indirect effect this report may have. Don Thomson Consulting Engineers Ltd does not contemplate anyone else relying on this report or that it will be used for any other purpose. Should anyone wish to discuss the content of this report with Don Thomson Consulting Engineers, they are welcome to contact us at the address stated above.

Prepared by:



Robyn Murray
Structural Engineer

Reviewed by:



Alasdair Sinclair
Senior Engineer

Approved by:



Don Thomson
Director

Don Thomson Consulting Engineers

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safety in numbers

sketch sheet

sketch:

1

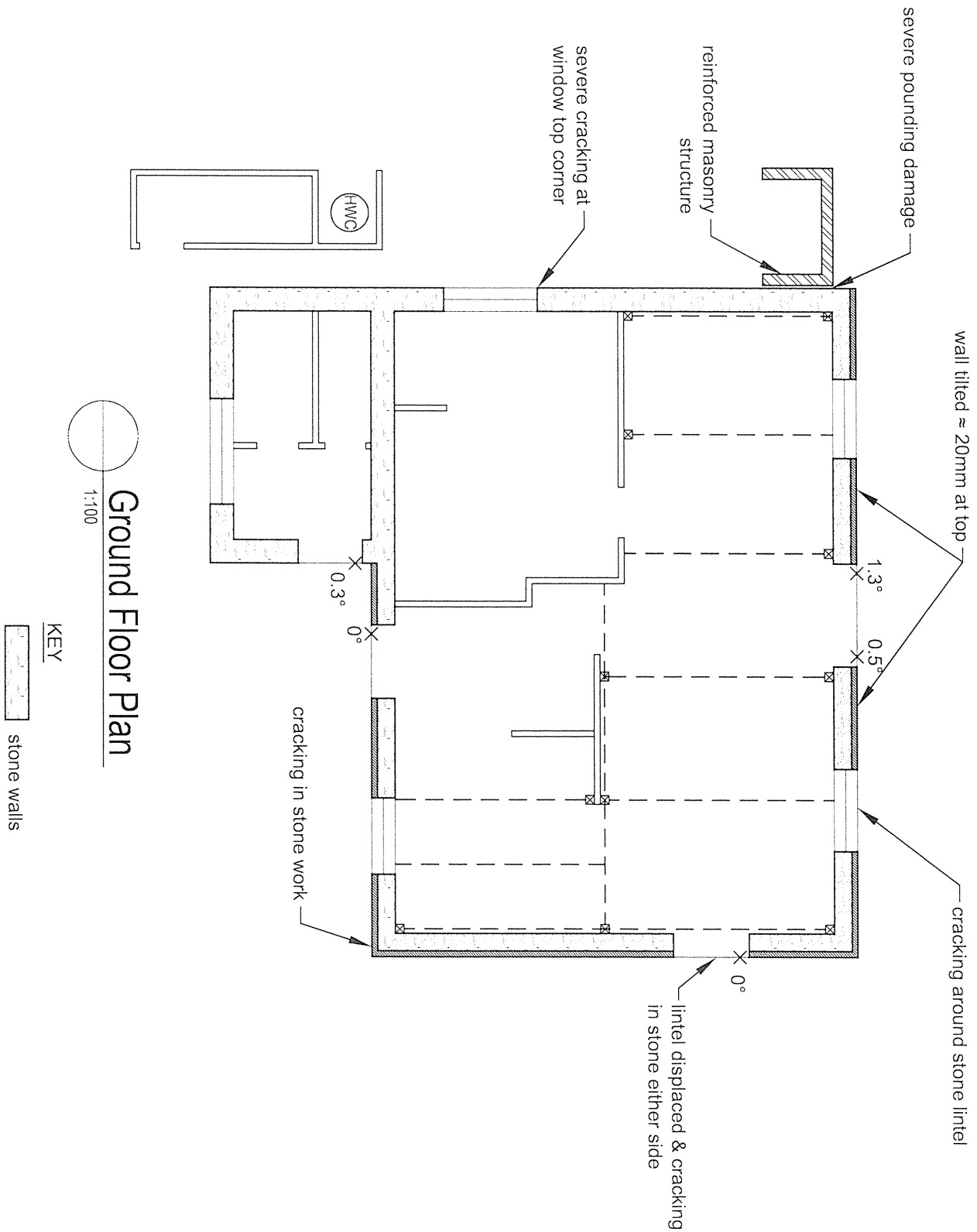
job name: 471 Ferry Road

drawn: ERY

job no: 211409

checked: RLM

date: 25-07-11



Structural Hazards/ Damage	Minor/None	Moderate	Severe	Comments
Foundations	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Roofs, floors (vertical load)	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Columns, pilasters, corbels	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Diaphragms, horizontal bracing	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Pre-cast connections	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Beam	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Non-structural Hazards / Damage				
Parapets, ornamentation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Cladding, glazing	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	Veneer tiff
Ceilings, light fixtures	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Interior walls, partitions	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Elevators	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Stairs/Exits	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Utilities (eg. gas, electricity, water)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Other	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Geotechnical Hazards / Damage				
Slope failure, debris	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Ground movement, fissures	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	
Soil bulging, liquefaction	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	

General Comment severe cracking in external stone walls

Usability Category

Damage Intensity	Posting	Usability Category	Remarks
Light damage	Inspected (Green)	G1. Occupiable, no immediate further investigation required	
Low risk		G2. Occupiable, repairs required	
Medium damage	Restricted Use (Yellow)	Y1. Short term entry	
Medium risk		Y2. No entry to parts until repaired or demolished	
Heavy damage	Unsafe (Red)	R1. Significant damage: repairs, strengthening possible	
High risk		R2. Severe damage: demolition likely	
		R3. At risk from adjacent premises or from ground failure	

2 Inspection ID: _____ (Office Use Only)

**APPENDIX B: HERITAGE ENGINEERING ADVICE, ANDREW MARRIOTT,
CHRISTCHURCH CITY COUNCIL HERITAGE RESPONSE TEAM, JUNE 2012**

**HERITAGE RESPONSE TEAM -
HERITAGE ENGINEERING ADVICE
Post Site Visit (Non Resource Consent)**

Date	15 June 2012
Address:	471 Ferry Road, Linwood
Attendance on Site	Mrs E Thompson(Owner), Gareth Wright (CCC) and Andrew Marriott (CCC CPEng)
City/Banks Plan Listing	Group 3

1. Damaged Suffered in earthquakes

The building at 471 Ferry Road, known as "Portstone" suffered moderate damage in the 4th September 2010 and 26th December 2010 earthquakes and aftershocks. This assessment is written following the 22nd February 2011 M6.3 and 13th June 2011 M6.3 earthquakes when additional major to moderate damage occurred. The building is a group 3 listed building under the Christchurch City Council District Plan and is registered as category II with the New Zealand Historic Places Trust.

2. Building Description

The building is single storey with a slate roof, rubble stone external walls and timber internal walls. The floor of the building appeared to be a concrete slab on grade. The roof is supported on timber trusses and a modern tiled ceiling has been installed. The building is believed to date from 1863 and is one of the last stone workers cottages remaining in Christchurch.



An inspection was undertaken of the interior and exterior by Andrew Marriott CPEng on 19th January 2012. The inspection of the building was limited to a visual inspection of those areas accessible at the time and did not include removal of linings and testing of structural elements or building services. No detailed calculation or design work has been undertaken.

3. Level of Damage Observed

The building has suffered from shaking damage from the earthquake swarm beginning on 4th September 2010. This is evidenced by movement cracking to the external walls principally at the corners and adjacent to openings. Inside the building the plaster and some of the stone rubble has loosened and in some places fallen as shown in the photo below.



Externally the most severe damage has occurred above the entry door on the western side of the building, where the stone lintel has dislodged and fallen. The photo below shows the area where the stone lintel was and the variable nature of the stone used in the wall with the inner and outer faces being large and worked and the rubble infill being small and un-worked with some mortar bonding the rubble.



The external stone face on the South wall has tilted towards the exterior resulting in a 50mm gap between the stone and the door frame on this elevation. It would appear that the stone face has separated from the rubble infill and the whole wall is leaning as well as shown in the photo below.



We have not checked the house for level, but believe that it has not been subjected to settlement.

The chimney and fireplace in the restaurant area appeared to be a modern addition and undamaged. This should be checked by a chimney specialist prior to being used.

4. Review of Engineering reports

An Engineering report by Robyn Murray of Don Thomson Consulting Engineers, dated 4th July 2011 was provided to us on 20th January 2012. The report is based on an external inspection only and its recommendations and my comments are as below:-

“Access to the interior of the building was not possible due to the doors being jammed shut by movement in the stone walls from seismic activity. We therefore conducted an assessment of the buildings exterior only. Please refer to the attached marked-up drawing of the structure indicating the areas of damage. For reference, we were supplied site notes and descriptions of the interior condition by Andrew Russell of MWH Mainzeal from his inspection on 1/02/11, before the second earthquake of 22/02/11.

The stone walls around the perimeter of the building show a large amount of cracking due to in-plane shear stresses, and in places stones have fallen away. In particular, the most severe damage appears to be concentrated in the corners. At the North-West corner of the house there is diagonal cracks about 20mm wide through the mortar. The inherent stability of these walls is likely to be marginal at best.” I agree that the damage is as per the report, the stability of the walls is better than marginal as they have remained standing throughout the forty 5Mw or greater earthquakes in the 4th September 2010 to present earthquake swarm.

“The stone lintel over the door on the western side of the house shows signs of incipient collapse as it has moved away from the adjacent wall. It appears that this lintel is a facing stone approximately 100mm to 150mm thick, as this is the thickness of the stone veneer. There is a greater chance of the lintel toppling in this case as there is less bearing area providing support. There are a number of 1 – 2mm cracks around the other stone lintels on the southern external wall but these are not at risk of collapsing.” At the time of our inspection the stone lintel had collapsed along with some of the rubble infill, as the photo on page 2 above shows. The lintel appeared to be intact

and it can be refitted with ties installed across the width of the wall from the inside to 50mm from the outer face. The tying should be undertaken to the remaining windows and doors to secure the lintels.

“The external wall on the southern side of the building has tilted and the veneer is showing some signs of separating from the original wall. There is a 25mm gap between the stone veneer and timber doorway. This doorway was measured using a digital level and found to be 1.3° out of plumb. According to Jon Donovan there is a 50mm gap between the main stone wall and the ceiling, which he saw when inspecting the interior before the June seismic event. Windows and doorways around the rest of the house are still plumb.” It is likely that the wall can be plumbed, if necessary, using horizontal walers connected to turfs tied through the width of the building and carefully tensioned to move the wall back into position. The wall should then be permanently tied to the roof structure to prevent it moving out again. The inner and outer stone whytes should then be tied together with Helifix Dryfix ties at 400mm horizontally and vertically. The ties should be installed from the inside once the plaster has been removed from the face of the wall.

“Pounding has occurred between the reinforced masonry wall and the external stone wall on the eastern side of the house. Stones have fallen out of the wall into the interior of the house causing damage to the plasterboard lining. Mortar between the stones has broken away within a 45 degree failure plane to the top of the stone wall from the corner of the masonry wall.” The masonry wall should be removed in order to protect the older stone building. If it necessary to rebuild the masonry, it should be positioned at least 200mm away from the stonework. The stonework should then be reinstated incorporating ties between the inner and outer whytes.

In general, the inner and outer stone whytes throughout the building should then be tied together with Helifix Dryfix ties at 400mm horizontally and vertically. The ties should be installed from the inside once the plaster has been removed from the face of the wall. The walls should then be repointed where necessary to protect the walls from water ingress and frost damage. A low pressure cementitious grout should then be used to fill any remaining voids in the core of the walls. The internal face of the wall should then be plastered to match the existing.

“The timber framing supporting the roof shows no sign of damage as viewed from outside the building.” Agreed.

“Conclusions

Damage to the corners of the building need to be repaired. The surface cracking could be repointed, however, it is likely that the mortar binding the corners has been compromised for the full depth of the wall. It may be possible to inject a high-strength grout resin in the least damaged area. Where blocks have been lost from the wall this could leave uncertainty that all the voids were filled adequately and it may not be possible to simply push the lost or moved blocks back into place. It is likely that the corners of the building will need to be demolished and rebuilt around a reinforced concrete core.” Refer above for my recommended approach to repair of the walls. If the repair approach is followed it is unlikely that any reinforced concrete cores will be necessary. This will however need further clarification by detailed calculations that should be undertaken by a Chartered Structural Engineer familiar with design of unreinforced masonry structures.

“The stone lintels should be propped, and will likely all require replacement.” Refer above for treatment of the existing lintels, which I believe can be saved and reincorporated into the walls.

“To realign the southern external wall, it will need to be demolished and then rebuilt on engineered foundations and a reinforced concrete core.” My recommendations above detail the Releveling and strengthening of the wall, which I believe can be undertaken insitu.

“The masonry adjunct building remains a hazard to the stone building due to an insufficient construction gap. Rebuilding which does not address the seismic gap invites future damage from pounding. Given the relative importance of the two structures, the masonry adjunct building could be demolished and rebuilt with an appropriate gap. Alternatively, the repaired external stone wall could be connected to the adjunct to prevent relative movement.” I agree that the modern masonry structure be demolished and rebuilt with a 200mm seismic gap.

5. Engineering recommendations

The building is of significant heritage value as it is one of the last remaining stone cottages in Christchurch dating back to 1863. I recommend that the building be repaired using the techniques noted above.

The above advice is of a preliminary nature and should be confirmed with a more detailed assessment of the building by the owners Engineers.

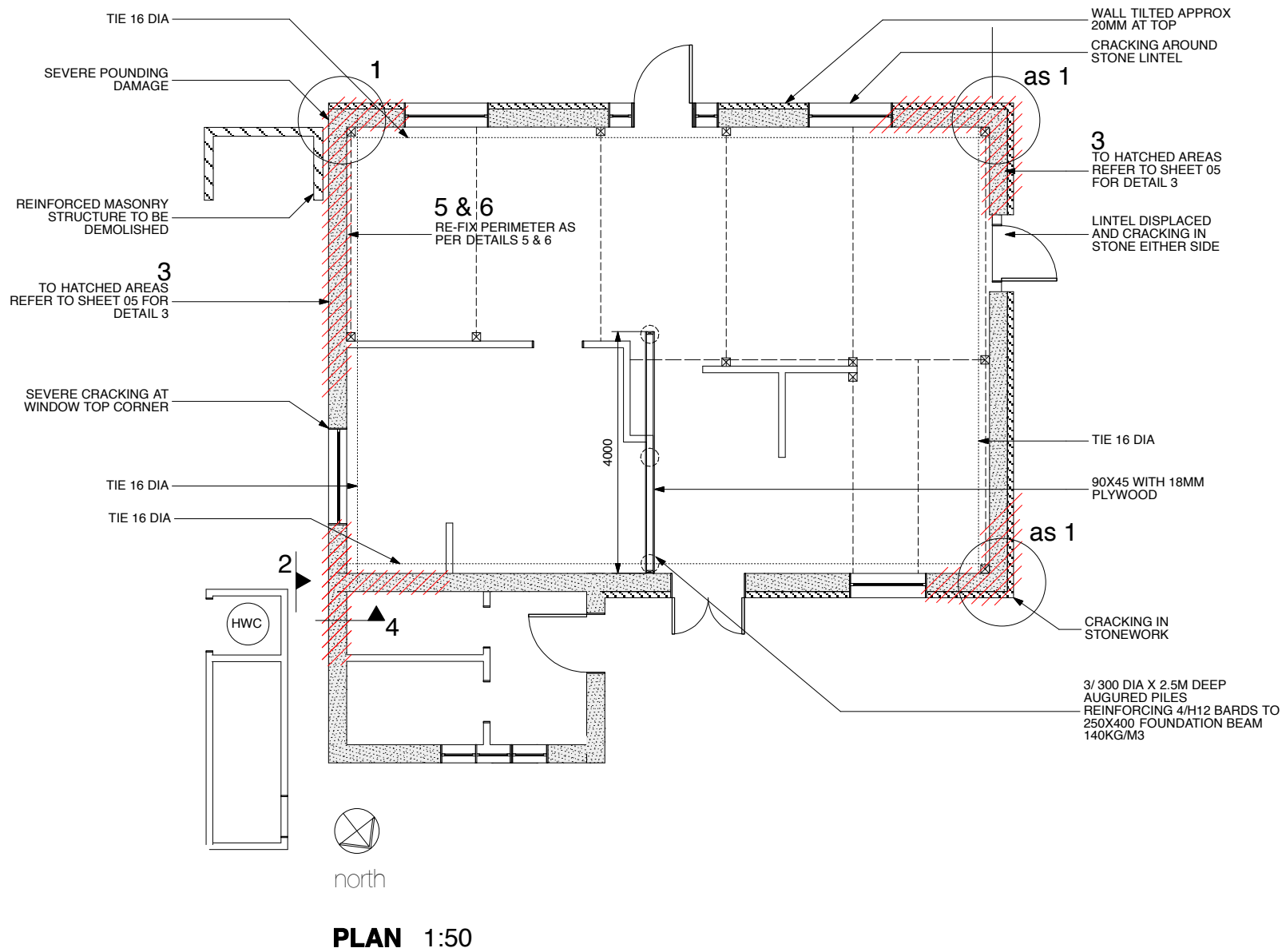
**APPENDIX C: FORMALISED PRELIMINARY DESIGN, DUNNING THORNTON
CONSULTANTS, NOVEMBER 2013**

(Overleaf)

Original Size A1

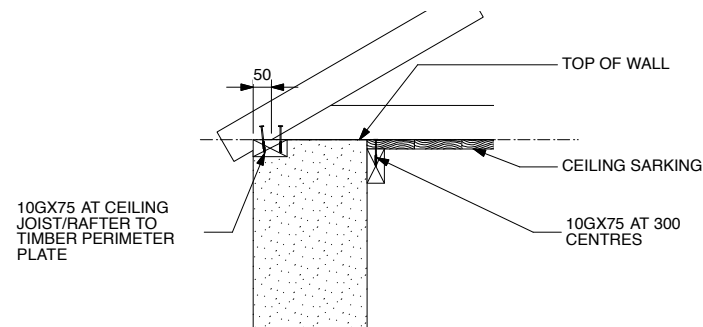
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Original Scale
Original Size A1

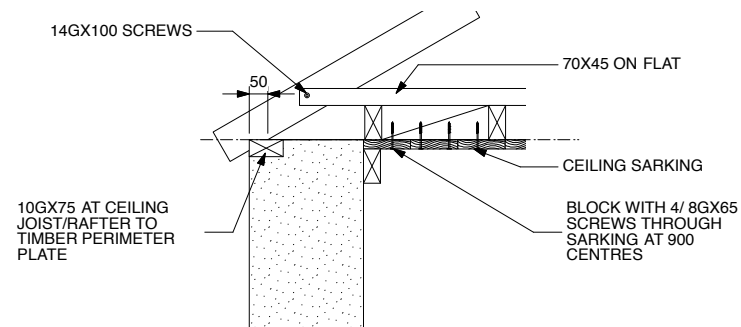


PLAN 1:50

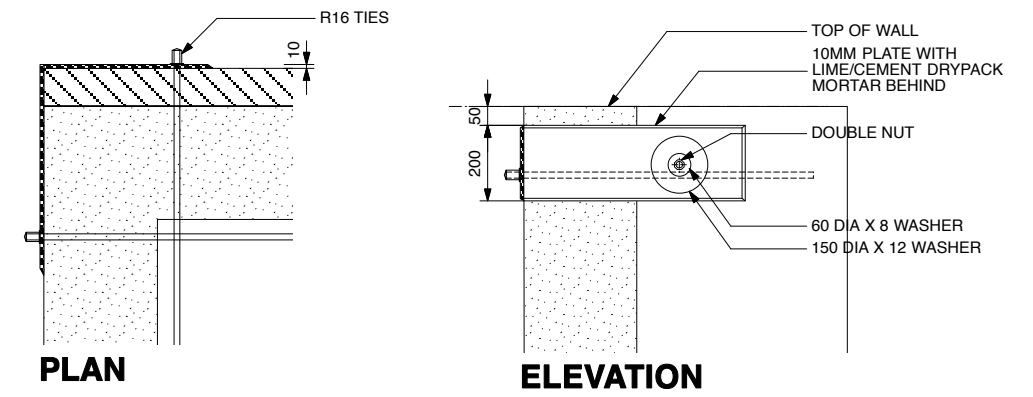
5. PERIMETER FIXING DETAIL (FRONT & BACK)



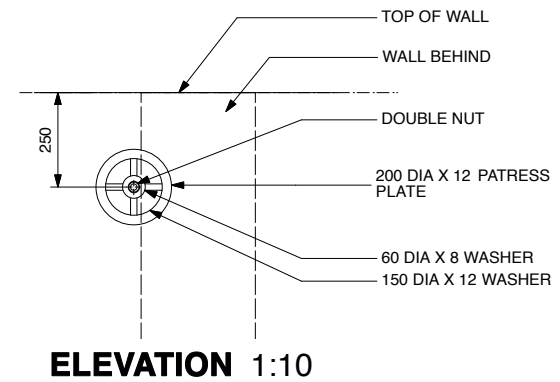
6. PERIMETER FIXING DETAIL (SIDES)



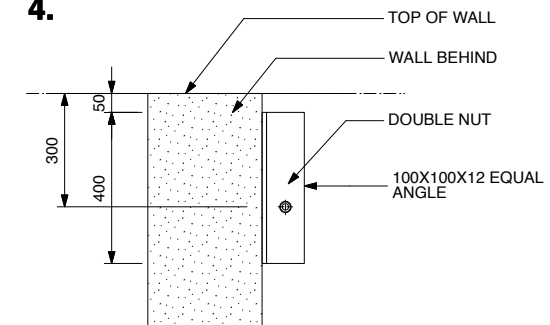
1. TYPICAL CORNER TIE DETAIL 1:10



2. ISOLATED PATRESS PLATE



4.



PORTSTONE
471 FERRY ROAD

GROUND FLOOR
PLAN

REVISIONS

NO.	DESCRIPTION	DATE
1	FOR PRICING	27.11.13
2	PRELIMINARY DESIGN	04.03.13

Scales
A3 Scales 1: 50, 1:10, 1:5
Designed
Drawn SO
CAD Reference

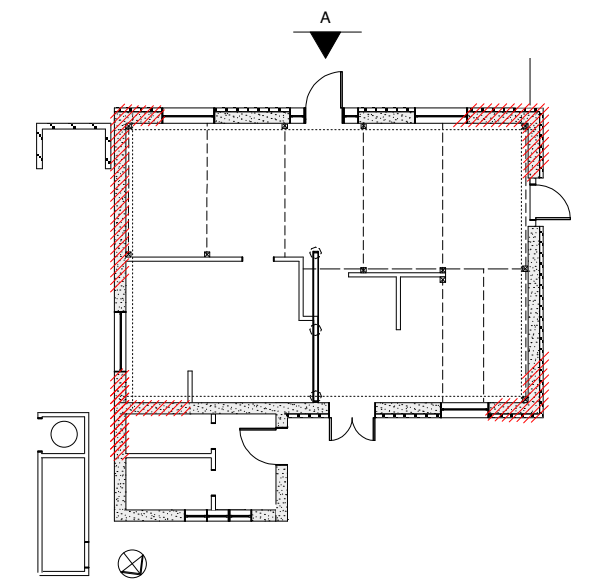
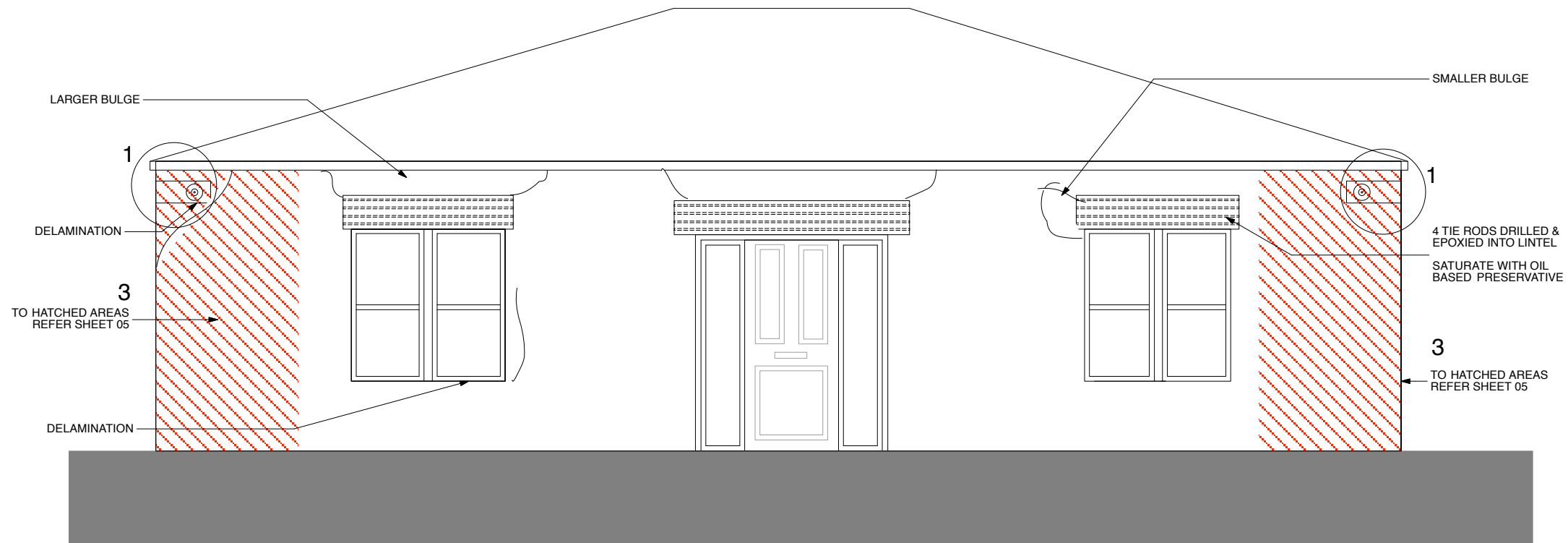
Job Number
7296
Drawing Number
00
Rev A



IF IN DOUBT ASK

DO NOT SCALE

Original Size A1



PLAN 1:200

ELEVATION A 1:50

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50
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10



Original Scale

Original Size A1

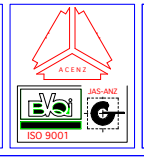
PORTSTONE
471 FERRY ROAD

ELEVATION A

REVISIONS	
FOR PRICING	27.11.13
PRELIMINARY DESIGN	04.03.13

Scales
A3 Scales 1:50, 1:200
Designed
Drawn SO
CAD Reference

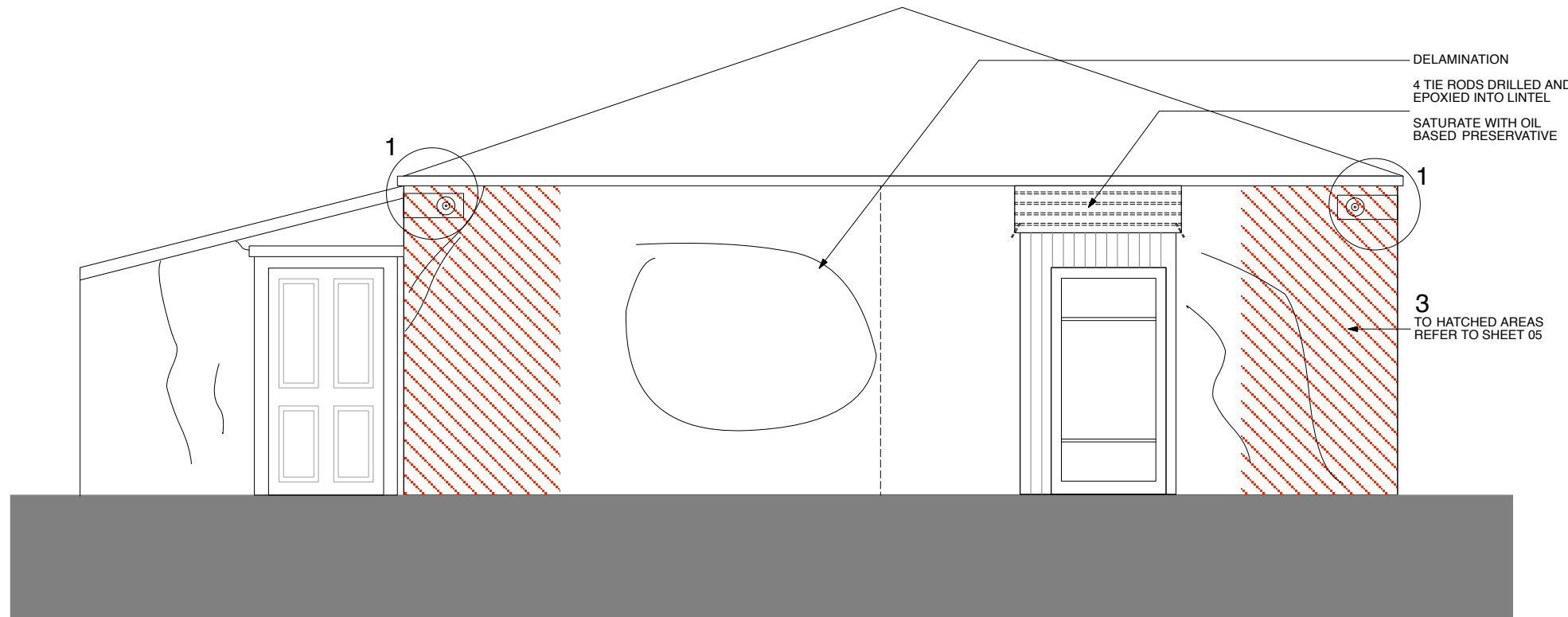
Job Number
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Drawing Number
01
Rev A



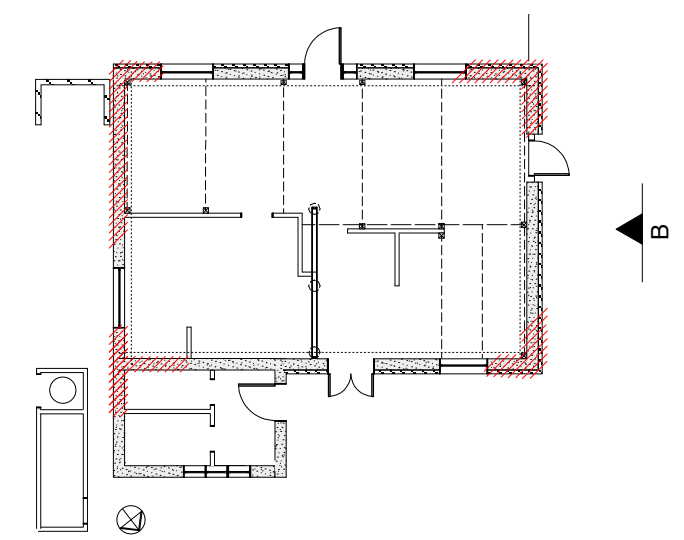
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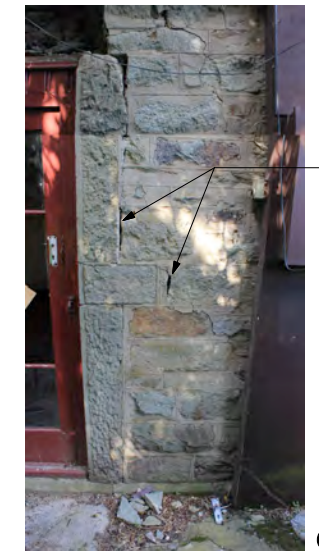


ELEVATION B 1:50

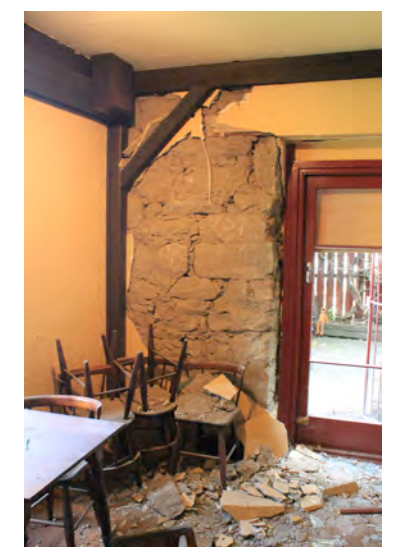


PLAN 1:200

100
50
0
10



RAKE OUT, REPLUMB AND REPOINT STONEMWORK



FIX NEW FACING LINTEL TO UPRIGHTS WITH 2/M10 S/S PINS IN 12MM DIA DRYFIT HOLES

Original Scale

Original Size A1

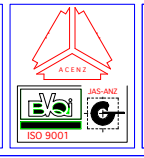
PORTSTONE 471 FERRY ROAD

ELEVATION B

REVISIONS	
FOR PRICING	27.11.13
PRELIMINARY DESIGN	04.03.13

Scales
A3 Scales 1: 50, 1:200
Designed
Drawn SO
CAD Reference

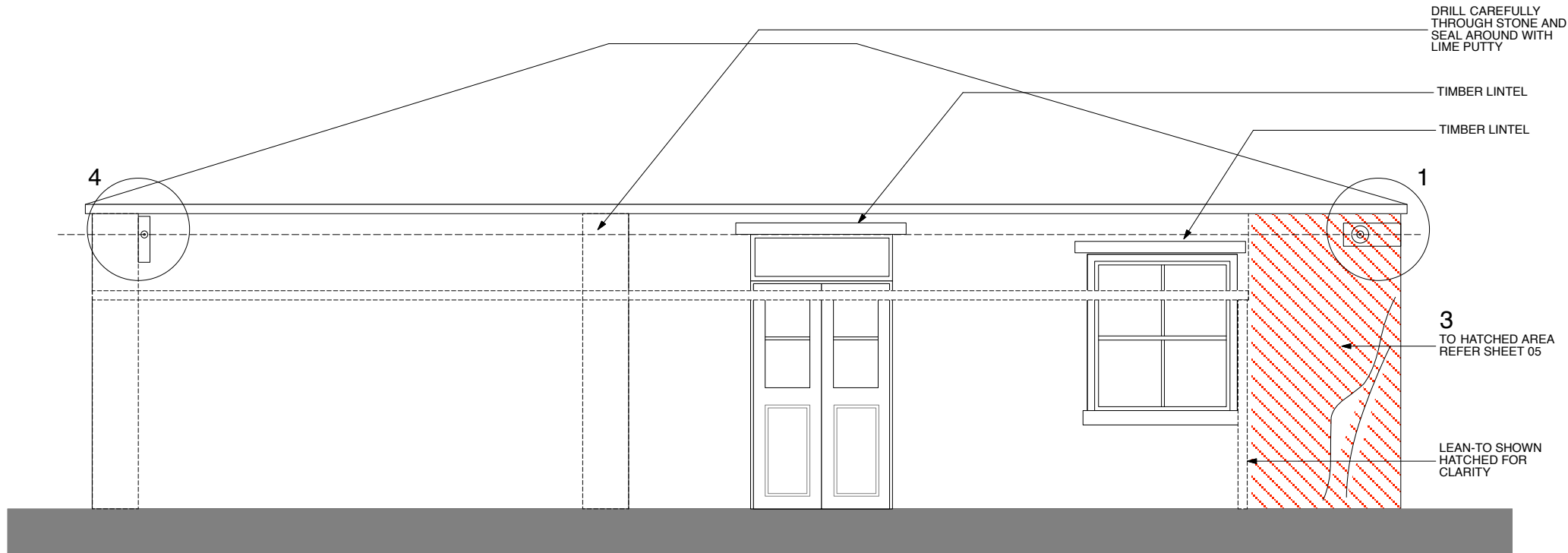
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Drawing Number
02
Rev A



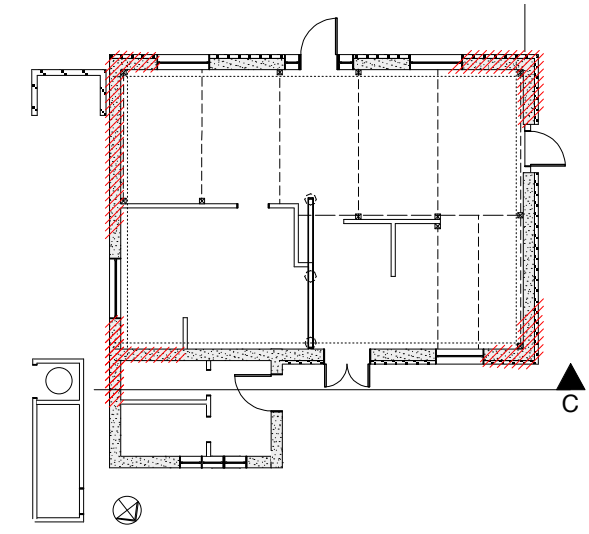
IF IN DOUBT ASK

DO NOT SCALE

Original Size A1



ELEVATION C 1:50



PLAN 1:200

100
50
0
10
Original Scale

ELEVATION C2 1:50



Original Size A1

PORTSTONE
471 FERRY ROAD

ELEVATION C

REVISIONS	
FOR PRICING	27.11.13
PRELIMINARY DESIGN	04.03.13

Scales
A3 Scales 1: 50, 1:200
Designed
Drawn SO
CAD Reference

Job Number
7296
Drawing Number
03
Rev A

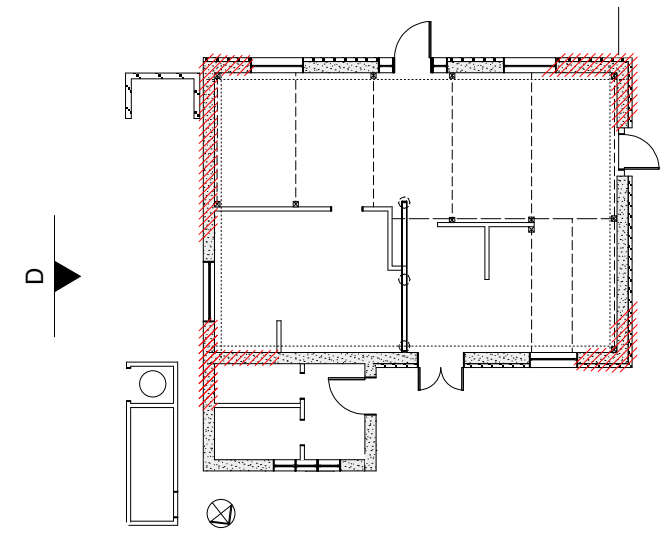
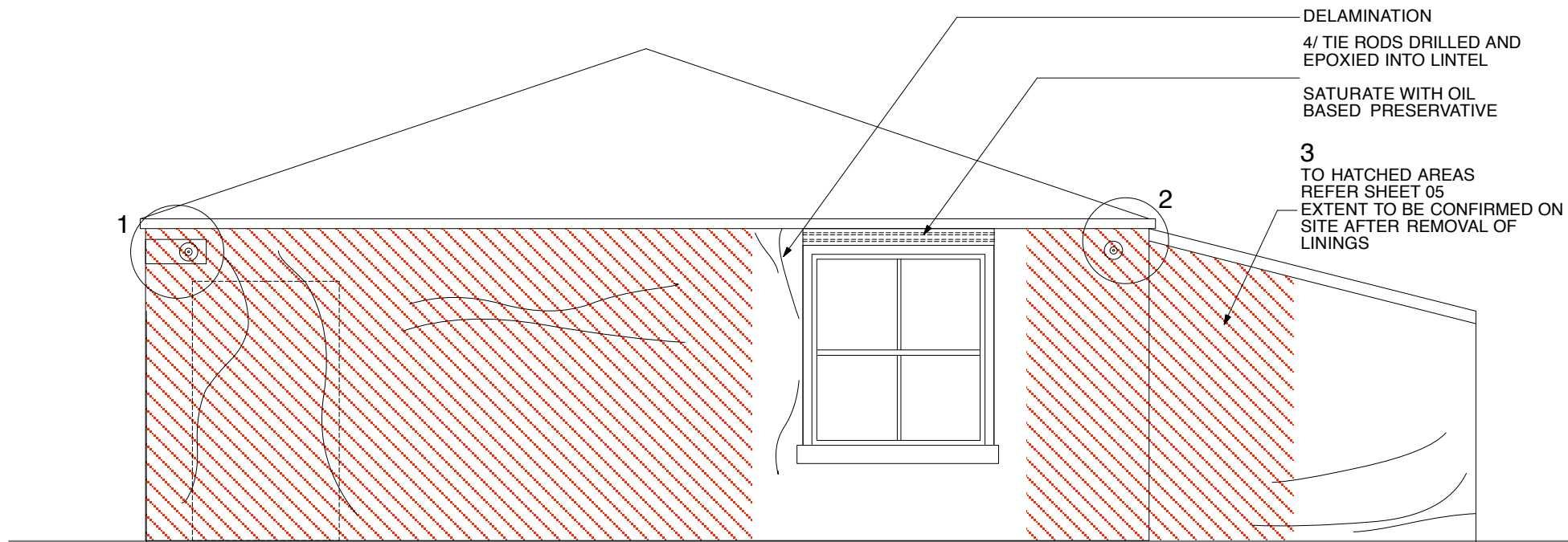


IF IN DOUBT ASK

DO NOT SCALE

p: 385 0019 f: 385 0312 e: dtw@dtg@dunningthornton.co.nz P.O. Box 27-153 Wellington

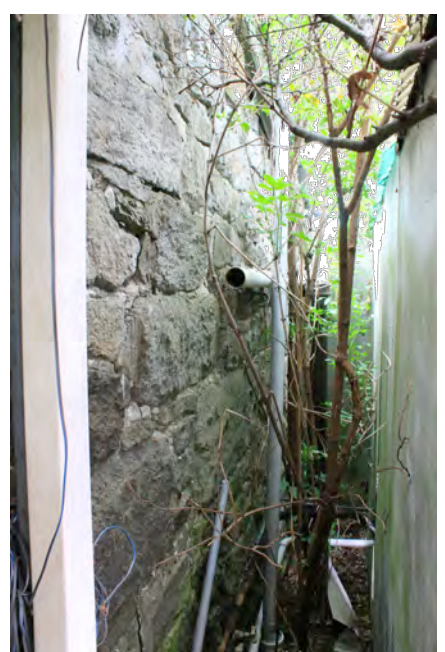
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PLAN 1:200

ELEVATION D 1:50

100
50
0
10



Original Scale

Original Size A1

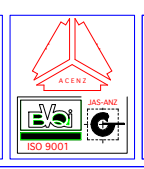
PORTSTONE
471 FERRY ROAD

ELEVATION D

REVISIONS	
FOR PRICING	27.11.13
PRELIMINARY DESIGN	04.03.13

Scales
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Designed
Drawn SO
CAD Reference

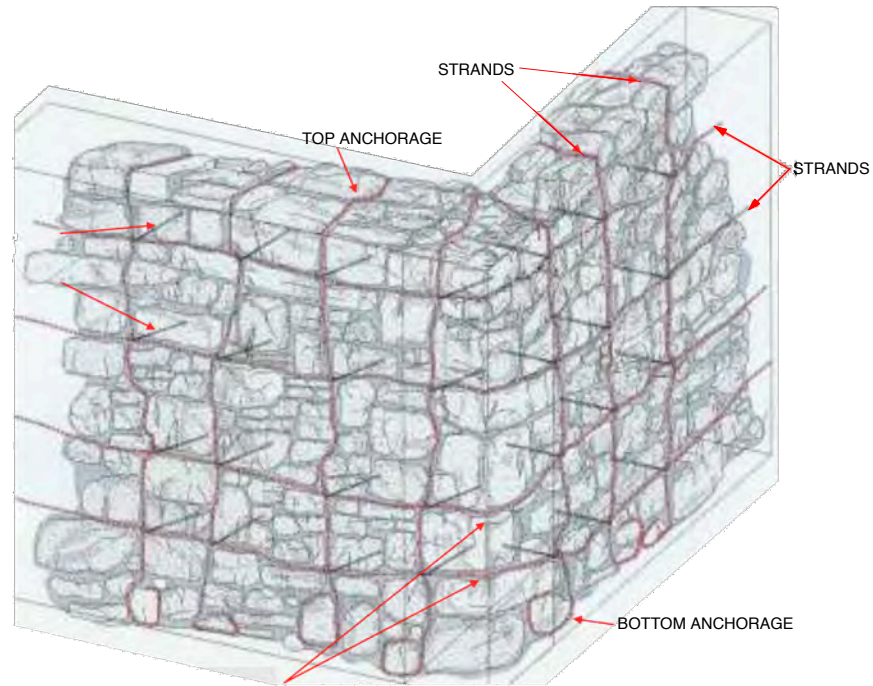
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Rev A



IF IN DOUBT ASK

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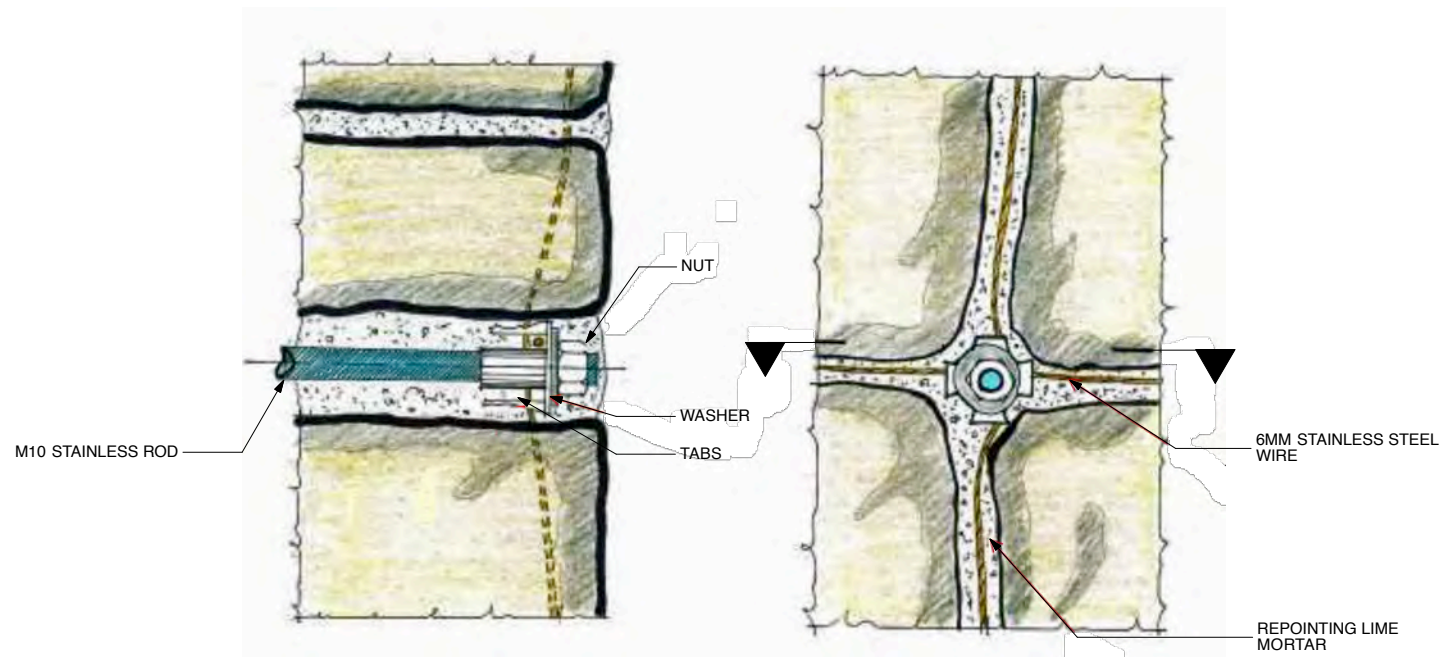
Original Size A1



DETAIL 3 NTS
CONTINUOUS MESH SYSTEM



100
50
0
10
Original Scale



DETAIL 3 NTS
MINI INVASIVE AND REVERSIBLE SYSTEM

Original Size A1

**PORTSTONE
471 FERRY ROAD**

DETAIL 3

REVISIONS	
FOR PRICING	27.11.13
PRELIMINARY DESIGN	04.03.13

Scales
A3 Scales 1:50
Designed SO
Drawn SO
CAD Reference

Job Number
7296
Drawing Number
05
Rev A



IF IN DOUBT ASK

DO NOT SCALE