CLAREMONT HOUSE

12-16 KINSMEAD STREET, VAURN PONDS VIC 3216
STRUCTURAL CONDITION ASSESSEMENT REPORT

Abstract

BLOCK1 PTY LTD HAVE CONDUCTED A VISUAL INSPECTION OF CLAREMONT HOUSE AND HEREIN DOCUMENT ITS CURRENT CONDITION AND PROVIDE ADVICE AS TO VARIOUS PARTS OF THE HOUSE THAT ARE SALVGABLE AND WHICH PARTS ARE BEYOND REPAIR AND ARE UNSAFE.

Block1 Pty Ltd

[redacted]

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PROJECT: Claremont Homestead, 8 -12 Kinsmead Street, Waurn Ponds Geelong VIC 3216 **ST_REPORT_001**

CLIENT: CITY OF GREATER GEELONG Project: 21.042

DATE: 3rd May 2021 - version 1 Pages: 50

RE Structural Assessment of Claremont Homestead, 8-12 Kinsmead Street, Waurn Ponds Geelong VIC 3216

Block 1 Pty Ltd were engaged by the City of Greater Geelong (CoGG) to assess the existing conditions and structural integrity of Claremont Homestead located at 8 -12 Kinsmead Street, Waurn Ponds Geelong VIC 3216.

This structural assessment is based on a visual inspection of the existing homestead by Block1 Pty Ltd on Thursday 22.04.2021 from 2pm to 4:15pm where building elements were exposed and cracks interrogated. We have read the heritage study and guideline pertaining to Claremont Homestead, and recommend they are reviewed against this report.

The existing Claremont Homestead shows pronounced levels of deterioration to the slate roof and external masonry walls including two chimneys (that are leaning and present a clear danger to any occupants or visitors.) Most of the masonry walls (external and internal), and the slate roofing, is unrepairable and requires full replacement, as follows:

SLATE ROOF: The slate tiles are very thin, and in lots of places, have slipped, leaving holes in the roof. The holes in the slate roof are causing ongoing water damage of the timber roof framing, which shows most pronounced deterioration and rotting around the box gutters that run above two internal walls (that divide the homestead into thirds). All of the slate needs to be removed - there are no salvable portions of slate roof, it must be removed in its entirety. All the box gutters will be non-compliant to the current AS3500.3-Stormwater Design code. As such, once all rotted and deteriorated roof timber is replaced, then the entire roof will require nominal 140mm deep roof battens to be installed in lieu of the current 40x20 flats, in order to create the necessary depth to get the box gutters to work. Depending on heritage requirements, a steel-sheet roof or tile roof will need to be installed. The roof timbers seem reasonably straight, and based on a very small sample, it may be that 80% of the roof timber is salvable, with about 20% of the roof members requiring replacement, including all the members around the box-gutters and a lot around the eaves. Given all the supporting walls are masonry, which are in effect condemned, then the roof would need to be re-supported on the new stud walls set alongside every existing masonry wall. Note: It is unlikely that anyone would want to rebuild the internal masonry walls, which serve no purpose, once they are replaced with properly constructed timber-stud walls.

MASONRY: The house has solid single-brick external walls and internal walls, made of 110mm thick single-skin bricks, that are physically deteriorating and honestly, are the worst-quality bricks this engineer has seen in his twenty years in the construction industry. It is notable that they were site-made. There are many defects in the brickwork, as follows:

- The use of single skin masonry is strictly limited by AS3700-Masonry Structures, and its use as external load-bearing walls (as Claremont House has as its standard detail) is effectively forbidden. In short, the external walls are illegal.
- The external brick walls are leaning outwards on average 30-60mm, with a 30-60mm clear gap having opened up between the external wall and the adjoining internal wall, as this intersection is a butt joint, and the masonry is not interleaved across this T-intersection, which would tie the perpendicular walls together and add considerable strength and rigidity. When this intersection was inspected by scrapping a crowbar down this 30-60mm gap in four

or five different locations around the house, brick dust literally streamed like a waterfall out of the wall. It should be noted that the dust in this house is a hazard to occupants in its own right. The friability and crumbly nature of the bricks leads this engineer to suspect the bricks are quite weak, and have very little cement content, nor lime that has activated to the extent that it would provide any reasonable shear strength to the bricks. No assessment of the mortar was made, as the bricks themselves are crumbling and falling apart. The external and internal masonry walls have cracks 10, 20 and up to 40mm wide and 1-2m long in many instances., refer photos in Appendix C below.

- We conclude that the following masonry elements require demolition
    - The original kitchen – all four of its walls. Its south wall includes a chimney that is leaning, with a 20mm crack in the wall right next to it. All four walls of this room require demolition, as there are multiple 20mm cracks in the walls (and a 30mm wide one to the bathroom), and the state of the masonry is atrocious.
    - The masonry fireplace and chimney in the rear second kitchen/living room is severely cracked. It is a stand-alone masonry element surrounded by timber stud walls. This chimney is noticeably leaning and requires instant demolition, as does the entire room, whose timber floor has dry-rot, and timber walls are forsaken and in terrible condition. The entire southern portion of the homestead requires demolition – refer SK1-3.
    - There are two internal box gutters due to the double-pitched roof, that overlie four sections of internal masonry wall (dividing the house in thirds), that are more cracked than the other internal walls, and in this engineer's opinion, most probably require demolition (in full or part). Together with the kitchen's two-internal walls, this means that upon full inspection, half of the internal walls are likely to be condemned.
    - Note: The two northern-most double-sided fire-places and chimneys remain vertical and can be kept.
    - The external walls lean out 30-60mm, with bricks displaced over the bathroom window by 50mm, and in the adjacent bedroom, the inch-diameter tie-rod has also pulled out as the wall has leant outwards, with the pulled-out bricks inferring a lean of 50mm. This means the east-facing external masonry wall needs to be demolished across three rooms – the kitchen in the south, the bathroom, and the next bedroom (Bed 3). Only the NE 5m segment of the eastern wall can feasibly remain (to the NE room – the fourth bedroom).
    - The north external wall is okay in its NE corner, meaning that the walls for the NE sitting room can remain.
    - The north external wall to the NW study/living room (the magenta-room) are dislodged and cracked through to the side of one window, and severely cracked over both these windows. The northern external wall of this room (west of the corridor) needs to be rebuilt.
    - The west wall has a horrendous crack immediately behind the sunroom, and the window-heads and sills along this wall are all severely cracked. About 50% of the west wall is irreparable and requires demolition.
    - The southern wall to the original kitchen requires full demolition, as does the wall between the kitchen and corridor, and the wall between the door head into the rear kitchen (refer Appendix C photographs).
    - So whilst there are about three sections of masonry wall that might be salvageable, in reality, it is very likely that all the masonry walls in this building need to be demolished. I don't think there would be a builder alive who would put their insurance on the line to say that any of the masonry in this building are able to be kept, and certainly if the bricks were laboratory and load tested, it is very unlikely they would pass minimum strength and composition requirements, meaning the masonry bricks are very unlikely to be code-compliant.
    - And in any case, single-skin masonry walls are commonly unstable. So even if any walls were kept, then they require stainless-steel masonry ties to be installed back to a stud walls designed to provide lateral restraint

to the brickwork, eg brick-veneer construction, applicable to all external walls. It is envisioned, that the internal walls would simply be replaced by stud walls, to re-support the roof onto strengthened footings.

TIMBER FLOOR

The timber floor was inspected in only one location, where a hole exists in the corridor. The subfloor timbers are all OBHW, obviously fully-seasoned, and seemingly in reasonable condition. The engineer suspects that a majority of the existing timber joists and bearers can be salvaged. Given the damage to the internal walls under the box gutters, it is reasonable to expect that the timbers in the floor alongside these walls will have suffered some water damage. The floorboards are hardwood. I suspect a major round of restumping and relevelling would be required, particularly around the external perimeter walls that are all condemned. The northern two rooms showed the most pronounced fall to the corners, with the NE and NW corners of the homestead having fallen 50mm, and the other perimeter corners about 20-30mm. This is to be expected, as the masonry walls weigh 20x more than the timber floor, and so exert greater pressure on the subsoil, and compress it more, and settle more over time. As said previously, it is this engineer's opinion that much of the timber floor is salvable, however, it may well be, that the entire floorboards need to be pulled up, for the subfloor to be fully inspected, with damaged/broken bearers and joists replaced, and the house fully restumped and relevelled.

TIMBER FRAMING OVERVIEW

So similar to the roof, the timber in the house is in reasonable condition given the house is 150years old and has been poorly maintained. But the slate roof and basically all the masonry needs to be removed and replaced with compliant elements. So, the question is, how much value does a stripped-down house have, when all the walls are removed and rebuilt, and the roofing is completely removed and replaced. The two most externally-obvious visual elements, the walls and roof, won't survive as they are, and have no hope of remaining as original elements. At best, they will be replica's, and in the case of the masonry, obviously only compliant-masonry will be allowed which will be nothing like the crumbly original bricks that are of the most terrible-quality, that no-one in their right-mind would want replicated.

EARTHQUAKE

The masonry of Claremont House is unstable in earthquakes, and if an earthquake did occur, then it would be expected that the two southern chimneys, the both-kitchen walls, and 80% of the external masonry walls would collapse, meaning that the roof would also collapse, and the building would be in ruins. This scenario obviously represents a real risk to anyone occupying or inhabiting this building, and in truth, only a fool would grant it an occupation certificate. As such, in its current form, it offers zero-value as a residence, as to reside in it, is a danger-to-life and should never be allowed to be occupied in its current state. It might be worth the heritage stakeholders engaging another consultant, be it a building surveyor, to given their opinion. It is also notable that all the wiring has been stripped out by vandals, and obviously all the plumbing and gutters require full replacement, so really this is already a shell of a house, which upon inspection, offers very few, if any, redeeming features, apart from high-level external appearance. As a chartered professional engineer, it is my duty to inform the authorities that this house represents a risk-to-life, and should never be allowed to be occupied again, without basically a full rebuild, that is completed with full regulatory overview from a qualified and experienced building surveyor, engineer and architect.

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HERITAGE

Block 1 Pty Ltd is cognizant of the supposed heritage overlay that applies to these buildings. We have read the *Heritage Study* by David Rowe dated 25 June 2020, and the *Design Guidelines and Significance Study* dated Jan 2021. There are many methods of repairing old buildings, however a level of structural integrity and durability is a pre-requisite to achieve resilient repair outcomes. We humbly believe the heritage quality of Claremont Homestead needs to be reassessed knowing that all the masonry walls (all external and internal walls) are effectively condemned and can't remain, and that the entire slate roofing requires full replacement. In addition to this, portions of the verandah are rotted being too close to the ground, with the external piers having dropped and been affected by the settlement in the NE and NW corners of the house, with the entire northern verandah roof framing needing to be rebuilt and probably a lot of the east and west verandahs (subfloor and bullnose roof framing) too. The entire southern elevation of the house, including the laundries, kitchen, back-of-house awning and timber kitchen/living, need to be completely demolished, and cordoned off to any passer-bys. Really there is an argument to say the house should be demolished on grounds of public-safety, given its grounds are accessible from three streets and is walked-through by the public.

In conclusion, the only existing elements of Claremont Homestead that can remain (in part) are the roof framing, and subfloor timber framing, along with the two northern chimneys. Its possible parts of the verandahs might be salvageable, but only if heritage desired, which nonetheless would require full reworking with probably most of the timbers replaced. But any sensible builder would much rather demolish the verandahs, and rebuild them new.

The presiding authority will have to take into account the heritage value of retaining the timber framing of the homestead. To reiterate, many of the masonry walls are cracked and leaning beyond repair, but even those that remain vertical and intact, are made from weak and crumbly bricks that are presumably non-compliant, and would all require new stud walls with brick-ties to make them stable. No assessment of the footings has occurred within this report, however it is presumed that heritage would want the bluestone footings to remain and the design engineer would need to make an assessment of suitable strengthening works to limit the amount of future and ongoing settlement.

Please note that the historical significance and 1850's character of the subject site is appreciated. However, this report needs to give a frank assessment of the structural condition of Claremont House, in order for heritage to make a considered opinion as to the heritage value of the building, knowing that major portions of it cannot remain and must be demolished and entirely rebuilt, namely the external masonry walls, most internal walls, and the slate roof/gutters.

Kind Regards,

Ashley Willis, Director Block1 Pty Ltd

MIEAust, CPEng NER RBP(Vict) EC-40413

ADDITIONAL NOTES

The following are notes that extend beyond structure and provide commentary on the built-quality of the existing house.

CEILINGS

The ceilings throughout have been replaced with 3-4mm masonite sheet. There are no period-features in the ceilings like rosettes, nor are the cornices of any aesthetic value. Given all the external walls have rotated out 30-50mm, it is easy to imagine that the ceilings would have all parted from the external walls, with gaping holes and cracks throughout, which were rectified by installing masonite ceilings with cover-strips over the join lines. This really sums up the grandeur of the house and shows that it more hovel than mansion. The dust above the ceilings is about an inch thick, and is a health-hazard. Ten days after inspecting this building and pulling down some masonite in order to create a hole to inspect the roof framing, this engineer can still feel the dust clogging his lungs and has vowed to never again make the mistake of tearing out ceilings or other linings without wearing a proper mask. The dust in the ceiling is a health-hazard in its own right, which along with the dust in the walls, makes for potentially very poor internal air quality. And so, all the ceilings in the house need to be stripped, and all the dust vacuumed out by professionals.

WINDOWS

Obviously, all the glass is very thin, probably 2-3mm thick, and all non-compliant. It goes without saying that every window would require replacing, particularly as all the external walls are masonry, and most of them are cracked and leaning and unfixable, requiring full rebuild with presumably brick-veneer construction with builders-wrap, insulation and other mod-cons like brick ties and wall bracing, and plasterboard!

DOORS

Doors weren't inspected, but no door-hardware of any value was noticed.

WALLPAPER

Every room is wallpapered, with curved wall paper around the corners of almost every room, which is probably due to the external walls learning out and pulling the wallpaper out from forming a sharp corner to a curved delaminated position. The wallpaper itself has tears reflecting the cracks in the masonry behind. Once the wallpaper is removed, the full splendour of the masonry is revealed. In the kitchen, the engineer pulled all the stuck-on-wallpaper off, and revealed massive cracks. It is expected the joinery is this room hides more massive cracks. The crack above the bath is horrific, and hence all four walls in the kitchen are condemned. The engineer suspects that if the wallpaper was stripped off every wall, then cracks would be revealed in probably every wall, and as has been stated, every masonry wall would be condemned outright as unfixable.

INTERNAL INSPECTION

No valid heritage assessment of this house can be made without visiting and inspecting its internal condition. There is very little of value, at least from the position of an occupiable building. The only purpose of keeping this building would be to act as education-tool, to show engineers, architects, builders, building surveyors, and others what terrible-masonry looks like, and how poor construction practices lead to long-term unfixable defects. It is actually quite an eye-opener,

and reminder as to how far construction practices improved during the gold-rush and 1890-era buildings, and onto today and the current minimum code requirements. No disrespect to the Baum family intended.

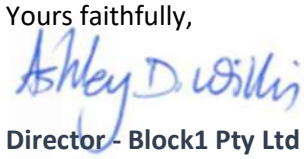
APPENDIX A – SITE NOTES

APPENDIX B – SITE PLANS SHOWING AREAS OF DILAPIDATED FLOOR, WALLS AND ROOF

APPENDIX C – PHOTOGRAPHS

APPENDIX D – COMMON DILAPIDATION ITEMS AFFECTING HOUSES (GENERIC COMMENTARY)

Yours faithfully,



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DISTRIBUTION

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File: Block1 Pty Ltd – Project 20.002 – ST_REPORT_001 Structural Assessment of Existing Heritage Structures

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APPENDIX A : SITE NOTES

Claremont Homestead, 8 -12 Kinsmead Street, Waurn Ponds Geelong VIC 3216

Structural Site Inspection 22.04.2021 – 2pm to 4:15pm. Site notes for Condition Report.

Present – [redacted]

Initial findings

Room / Feature	Item	Condition	Status	Rectification Works	Recommendation
Original Kitchen	Chimney	Chimney leaning	Moderate Safety Risk of collapse	Not possible	Demolition
	South Wall abutting chimney	Large Cracks	In state of disrepair	Not possible	Demolition
Non-original addition – Second Kitchen	Chimney	Very large cracks, chimney leaning	High Safety Risk – Risk of Collapse	Not possible	Immediate Demolition
	Timber Floor	Dry Rot	Unserviceable. Occupants feet literally crack and break floor boards	Not possible	Demolition
	External Walls	Timber	In very poor condition	Not possible	Demolition
First Bedroom (SW)	External Wall (West)	Single brick - cracks	In very poor condition	Not possible	Demolition
Little Bedroom (W)	External Wall (West)	Single brick - cracks	In very poor condition	Not possible	Demolition
Third Bedroom	External Wall (West)	Single brick - cracks	In very poor condition	Not possible	Demolition
Bathroom (East)	Internal Wall (North)	Timbers within wall, possibly an old doorway	Creates vertical cracks in masonry wall	Possible	
	Internal Wall (south) – adjoining SE kitchen	Massive crack above bath	Horrible crack	Not possible	Wall to be demolished

Room / Feature	Item	Condition	Status	Rectification Works	Recommendation
East Middle Bed	Roof	Holes in slate	Slate roof is very thin. Slate has moved and in a very poor state. Entire slate roof needs to be removed and replaced, most likely with a steel sheet roof	Not possible	Entire slate roof to be removed and replaced with entire new roof, new guttering and new downpipes
East Middle Bed	Inch steel rod	Has pulled on surrounding bricks and dislodged them 70mm wrt to adjoining wall	In state of structural failure	Would require new steel beams to be installed vertically down inside of wall with through bolts and strapping.	The design intent of the horizontal inch steel rod is to stop the walls from rotating. The external wall has partially rotated outwards, and the bricks have been pulled inwards. The connection has almost totally failed. Along with the fact the internal walls are not keyed into the external walls, it shows the masonry components of this house is actually quite poorly constructed.
East Middle Bed	Wall junction	30mm gap between internal wall and external wall	External wall literally peeling off the internal skin.	The walls would require full steel plates to have any chance of stopping them parting, and given poor quality of the bricks/mortar, this is unlikely to be totally effective. External walls need to be demolished.	
NE Lounge	Floor/External Walls	Corners of floors dropped 50mm	The floors could be torn up and replaced with all new timber floors, but the existing timbers would need to be completely lifted out of position, the subfloor restumped, and the bearers and joists and floorboards completely relaid. The external walls are cactus, and need to be demolished.		
Drawing Room/Study NW Corner	Floors	Dropped 50mm in external corners			

Room / Feature	**Item**	**Condition**	**Status**	**Rectification Works**	**Recommendation**
Rear Shed	Floors	Dropped 200mm			Demolish
Rear Shed	Walls	Rotted			Demolish
Rear Shed	Rafters	Rotted, disrepair			Demolish
Front Sunroom Addition	In okay condition	Of no historical significance	Serviceable	Not assessed	Of little historical value

Primary structural issues

External Walls – cracked, and rotating outwards, presumably due to the weight of the roof pushing laterally on top of external walls, causing them to rotate outwards.

The external walls are not keyed into the internal masonry walls and have separated on average 30mm from the intersecting internal brick walls. This was an amazingly consistent defect at all junctions between internal walls and external walls, visibly identified in almost all corners of all rooms.

The external walls are in part founded on bluestone foundations. Depth of foundations not ascertained.

The external walls have an internal sandy render, that is awful and a health risk to occupants. It crumbles upon being pryed. The bricks behind are crumbly and dirt literally falls out of the walls like a mini-waterfall. The bricks are poor quality, and the render is terrible. The dust in this house is a health-hazard in its own right and offers exceptionally poor internal air quality.

80% of the extents of the external walls have severe cracking and rotation, that is deemed irreparable, and hence require demolition.

Ceilings

The ceilings are lined with 4mm Masonite. The roof has many holes in it from where slate tiles have slipped. The dust in the roof space on top of the ceiling is about 1cm thick and once again, disastrous for internal air quality. The entire ceilings would need to be stripped, the dust cleaned out, and new ceilings/cornices installed.

Roof structure

The roof structure is in reasonable condition. It is constructed from 100x65 rafters at 545ctrs, ridge beams, and kingposts over corridor intersecting walls junctions. The ceiling joists at 110x75 OBHW at 460ctrs, with hanging beams running centrally across the rooms. Most of the roof timbers seemed relatively dry and in reasonable condition. The rafters have sagged about 20mm downwards. Timbers near the box gutters were alternately okay, and rotted and requiring replacement. In all, maybe 20% of the roof timbers would require replacement.

The slate roof is mounted on 40x20mm battens. All these would require removal and replacement with new battens.

Floor

The Timber floor throughout the house is sturdy and generally remains strong. The floors fall to the external walls in most rooms, most pronounced in the northern two rooms where the corners fall 50mm. The sub-floor timbers could possibly be salvaged. The floor boards would need to be ripped up completely, and all the entire house would require restumping, with much of the original bearers and joists likely to be able to be reused, noting that this is a subjective opinion based on a very small inspection hole created by the collapse of a floorboard in the corridor. In all likelihood, a builder would rather throw the entire subfloor in the bin and replace with new.

External Verandahs

The verandah's are dilapidated. Roughly a third of the decking and unknown amount of subfloor timbers require replacement. The verandah external columns need to be lifted and their connections to the roof beams rectified. If a good finish was sought, then the verandah's would require complete demolition back to the external wall line of the house.

External Walls of House

Almost all the external walls of the house need to be demolished. The original bluestone footings may still be okay, but they are non-compliant with current codes, and the engineering preference would be to dig them all out and replace with reinforced concrete footings, embedded nominally 500mm into the ground with 100mm minimum embedment into stiff clay of 100kPa SWL bearing capacity (pending a geotechnical investigation).

Roof and Ceilings - Internal

In order to demolish the external walls, the roof structure would require full propping around its external edge. Most likely the timbers around the external walls in the roof would be rotted (due to the walls pulling away) and require full replacement. It is likely that the perimeter 1m of roof timbers would require a full rebuild, by lapping in new timbers and cutting out dilapidated/rotted/split original timbers.

The ceiling linings require complete stripping, so all the dust in the ceiling can be removed, which is currently a massive health risk to occupants.

Parts of House that are possibly salvageable

The parts of the house that may be salvageable include the roof rafters and ceiling joists, internal walls (in part), two chimneys (northern two). Given that single masonry walls are not code-compliant as they are deemed unstable in earthquakes, then all the internal walls would require additional timber stud walls to be installed to provide them with sufficient lateral restraint. Given the terrible render on all the internal faces of the brick walls, which is itself crumbly and poor, and given the bricks are crumbly and poor and the amount of dust and fragmented brick dust in the walls is astounding, then the better answer would be to demolish all the internal walls in all the rooms, and just leave the corridor walls, noting that the southern 5m of corridor walls are themselves cracked and require demolition.

And so all that is possibly serviceable in the house is

- The rafters and ceiling battens, excepting their perimeters where the external walls have pulled away and water damage is expected.
- The corridor walls (for the northern 20m, given the southern 5m of wall on the eastern side (shared with the original kitchen) require demolition).

Conclusions

The parts of the house that are unsalvageable, and are a health and safety risk to occupants, are

- The original kitchen, including its chimney, and laundry behind, including all four walls, including its north wall to the bathroom, and west wall to the corridor of the actual house.
- The southern addition – called the second kitchen, its chimney which is badly leaning, and awning roof to the laundry
- The rear laundry (behind the main kitchen), and awning roof.
- Portions of the verandahs – west, north and east.
- All the slate roofing, guttering and any remaining downpipes
- A portion of the four internal walls under the box gutters

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- 80% of the original western external wall
- 50% of the northern external wall
- 80% of the eastern external wall
- 100% of the southern wall (along the original kitchen).
- The rear large workshop shed to the south
- The small sheds to the east
- The well to the west

Refer to SK1 – SK3 overleaf (appendix B)

Yours faithfully,

Director - Block1 Pty Ltd

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CAVEAT ON REPORTS BY BLOCK1 PTY LTD:

This report presents the professional opinion of Block1 Pty Ltd, in accordance with the Charter of Ethics of Engineers Australia. We believe we hold sufficient experience and knowledge to make the comments, and provide the assessments contained within this report. We are happy to receive feedback and respond to various alternate viewpoints and perspectives, and reassess our conclusions upon receipt of additional information. As with all reports, it is based on partial information and therefore its conclusions are based on the extents and limitations of its inputs.

VERANDAH SECTION HAS DROPPED AND IS TOO CLOSE TO THE GROUND, MUST BE DEMOLISHED)

NORTH WALL HAS DROPPED, WORST IN CORNERS, MEANING LIVING AND BED4 FLOORS NEED TO BE RELEVELLED BY LIFTING BEARERS ETC

VIEW LOOKING NORTH (NNW)

EAST VERANDAH 13.0 x 2.0m

SIDE L'DRY

WATER TANK

-50

4th BED 4.5 x 4.8m NE ROOM

3rd BED 3.3 x 4.8m

1 INCH TIE ROD

BATH

ORIGINAL KITCHEN 4.1 x 4.8m

REAR L'DRY

-20

NORTH VERANDAH 2.0 x 13.4m

ENTRY

COVERED AREA 6.8 x 1.8m

FAMILY KITCHEN FLOOR SUFFERING DRY-ROT. AND IS UNSAFE. NEEDS TO BE TOTALLY DEMOLISHED & REBUILT (ALONG WITH ENTIRE ROOM)

-30

STUDY / LIVING 4.5 x 4.8m NW MAGENTA ROOM

BED 2 2.7 x 4.8m

BED 1 2.7 x 4.8m

LOUNGE 4.0 x 4.8m

SECOND REAR KITCHEN

FAMILY / KITCHEN FLOOR DRY-ROT UNSALVAGABLE

OVEN

STORE

-50

WATER FEATURE

WEST VERANDAH 11.6 x 2.0m

SUNROOM 5.3 x 3.6m

COVERED AREA

SHED 4.5 x 2.5m

(NOT IN POSITION)

SHED UNSALVAGABLE

4.8 x 4.8m

STORE 2.6 x 7.3m

WORKSHOP UNSALVAGABLE

WORKSHOP/ GARAGE 10.6 x 9.4m

WC

(NOT IN POSITION)

FLOORBOARDS IN CORRIDOR ARE BROEKN WIHT A HOLE IN THE FLOOR THAT REQUIRES REPAIR.

OLD WELL WALLS ARE CRACKED AND NEED TO BE DEMOLISHED. WELL ITSELF NEEDS TO BE PROPERLY BACKFILLED AND SURVEYED AS IT IS A HAZARD FOR FUTURE BUILDINGS/FOUNDATIONS

ORIGINAL WELL

SK1 - SUB/FLOOR - DILAPIDATION PLAN

Approx House Area 236m²

Whilst **bwrm.com.au** has made every attempt to ensure the accuracy of the floor plan contained here, measurements are approximate and no responsibility is taken for any error, omiss

12-16 Kinsmead Street, Waurn Ponds

REVIEWED

PROJECT: CLAREMONT HOUSE AT 12-16 K NSMEAD ST, WAURN PONDS
SKETCH : DILAPIDATION PLANS
AUTHOR : ASHLEY WILLIS 23 04 2021
BLOCK1 PTY LTD, ABN 19 639 931 490

1

TIE ROD DISLODGED BRICKS 70mm

MASSIVE CRACK IN INTERNAL WALL. ABOVE BATH

KITCHEN WALLS SEVERELY CRACKED

BRICKS AROUND WINDOW DISLODGED 50mm

LEANING KITCHEN CHIMNEY & EAST LDRY

WORKSHOP - SOUTH

CHIMNEY CRACKED LEANING & UNSAFE

CHIMNEY CRACKED LEANING & UNSAFE

BRICKWORK OVER LINTELS TO BE REPLACED AND NEW EA125x8 LINTEL INSTALLED

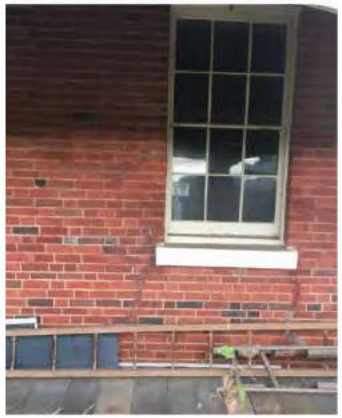
WORKSHOP - INTERNAL

SIGNIFICANT CRACKING IN WALL BETWEEN KITCHEN AND CORRIDOR WALL TO BE RE

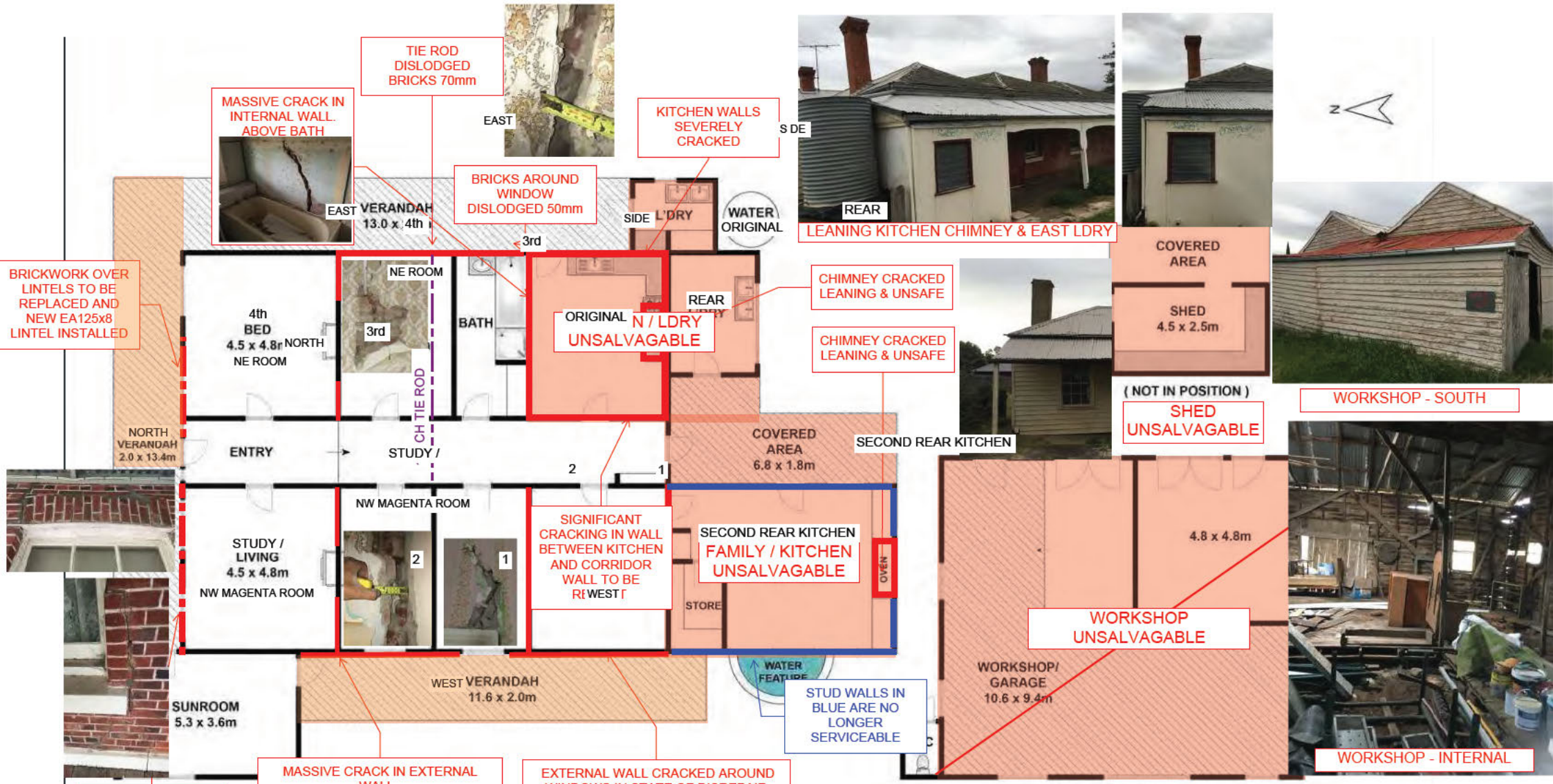
BRICK SIDES TO WINDOW CRACKED BEYOND REPAIR DUE TO WATER DAMAGE

MASSIVE CRACK IN EXTERNAL WALL.

EXTERNAL WALL CRACKED AROUND WINDOWS IN STATE OF DISREPAIR



STUD WALLS IN BLUE ARE NO LONGER SERVICEABLE



KEY

ENTIRE WALL BEYOND REPAIR AND UNSAFE

WALL IN PARTIAL STATE OF COLLAPSE

SK2 - WALL - DILAPIDATION PLAN

Approx House Area

Whilst bwrm.com.au has m

te and no responsibility is taken for any error, omission, or mis-statement. This plan is for illustrative purposes only.

12-16 Kir

PARTIAL REBUILD REQUIRED

TOTAL DEMOLITION REQUIRED

REVIEWED

PROJECT: CLAREMONT HOUSE AT 12-16 KINSMEAD ST, WAURN PONDS

SKETCH : DILAPIDATION PLANS

AUTHOR : ASHLEY WILLIS 23.04.2021

BLOCK1 PTY LTD, ABN 19 639 931 480

1

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BLOCK1 PTY LTD, ABN 19 639 931 490
1

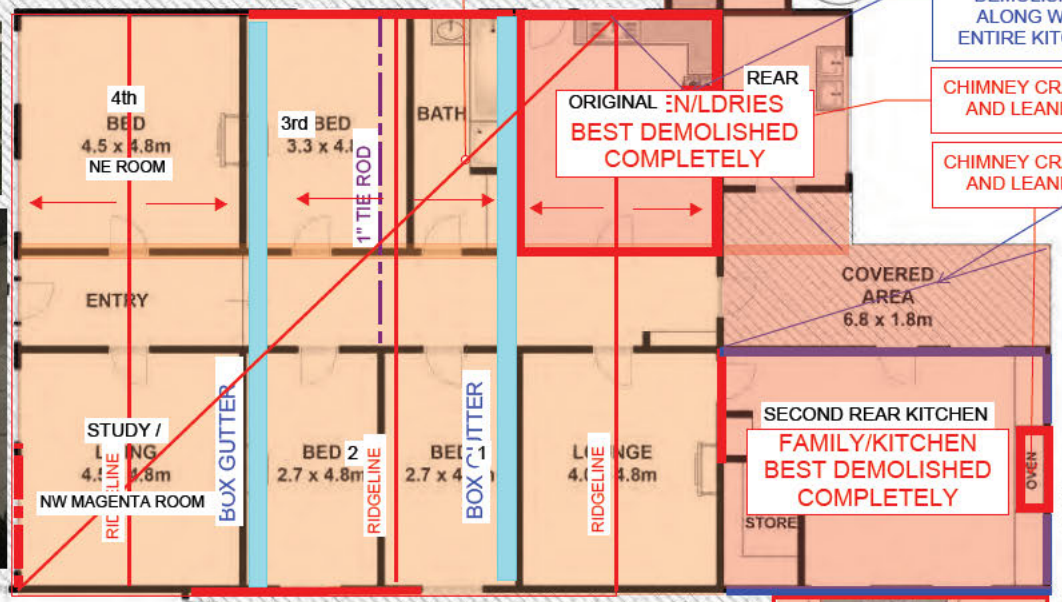
TILED ROOF & GUTTERS

ENTIRE SLATE ROOFING IN STATE OF FAILURE AND NEEDS TO BE ENTIRELY REMOVED & REPLACED.

ALL GUTTERS TO BE REPLACED.

NEW ROOF BATTENS REQUIRED, NOM 140x45 LV5 H2S TO CREATE DEPTH FOR NEW COMPLIANT BOX GUTTERS WITH NEW SHEET ROOFING

TILED ROOF & GUTTERS



REPLACEMENT TIN ROOF TO BE DEMOLISHED ALONG WITH ENTIRE KITCHEN

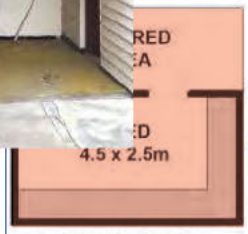
CHIMNEY CRACKED AND LEANING.

CHIMNEY CRACKED AND LEANING.

EXTERNAL COVERED ROOF TO BE DEMOLISHED ALONG WITH FAMILY ROOM AND LAUNDRY

SHED TO BE TOTALLY DEMOLISHED

SHED UNSALVAGABLE



(NOT IN POSITION)

TOTAL REPLACEMENT OF SLATE ROOF / BATTENS / GUTTERS REQ'D

TOTAL DEMOLITION REQUIRED

VERANDAH POSTS AND BEAMS HAVE DROPPED AND TIMBERS NEED 50% REPLACEMENT

SW AWNING ROOF HAS COLLAPSED

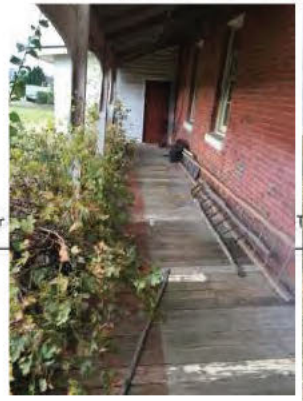
SOUTHERN ELEVATION OF HOUSE

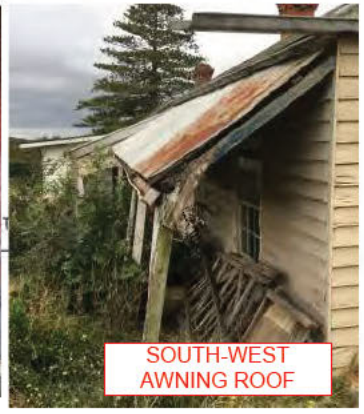
SK3 ROOF - DILAPIDATION PLAN

SW AWNING ROOF HAS COLLAPSED

SOUTH-WEST AWNING ROOF

WEST VERANDAH





SOUTH-WEST AWNING ROOF

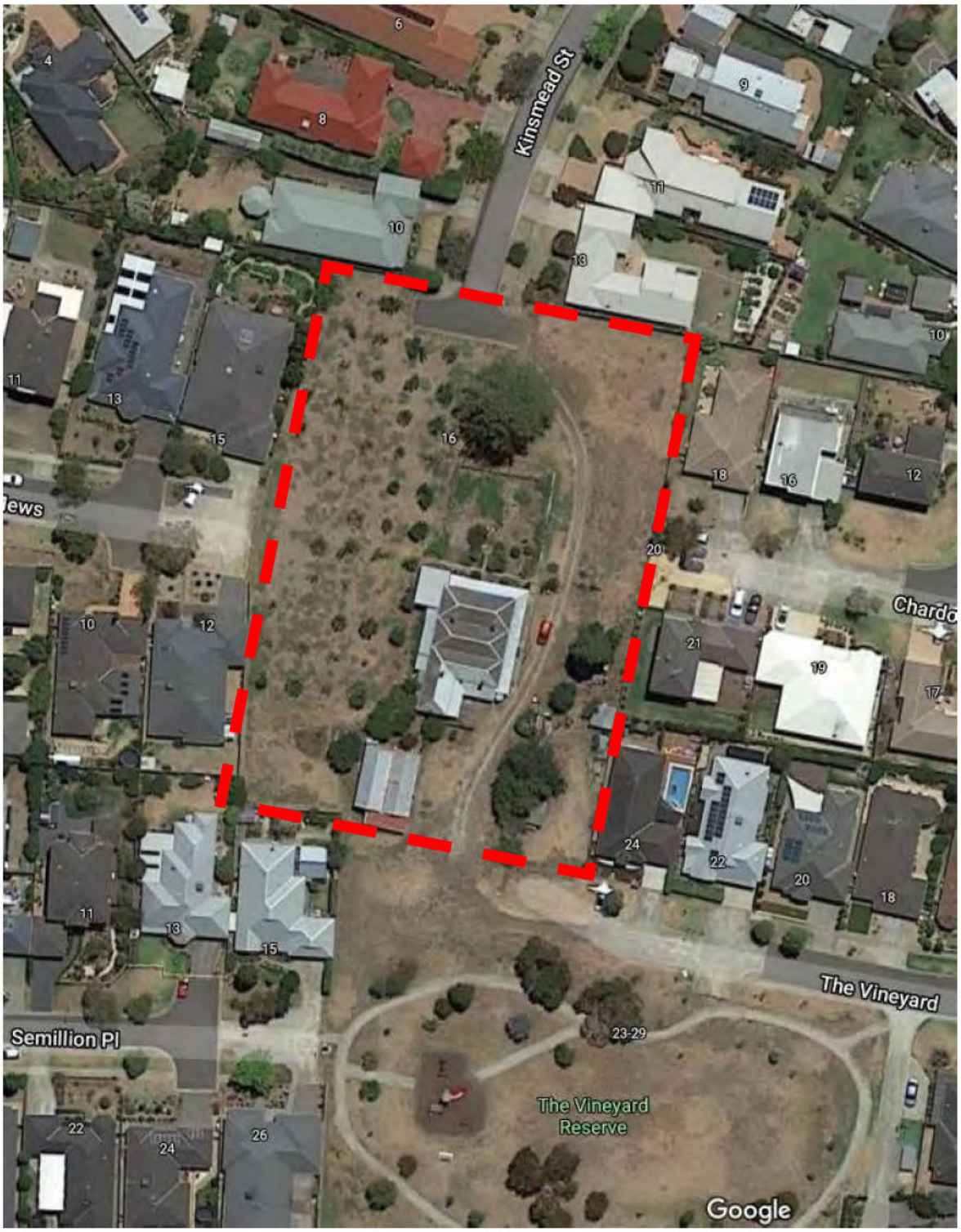
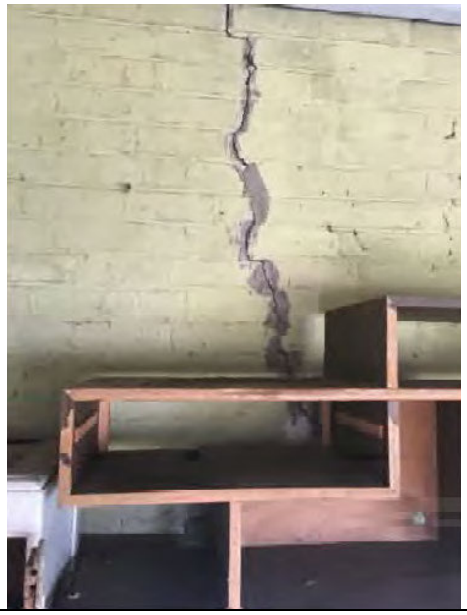


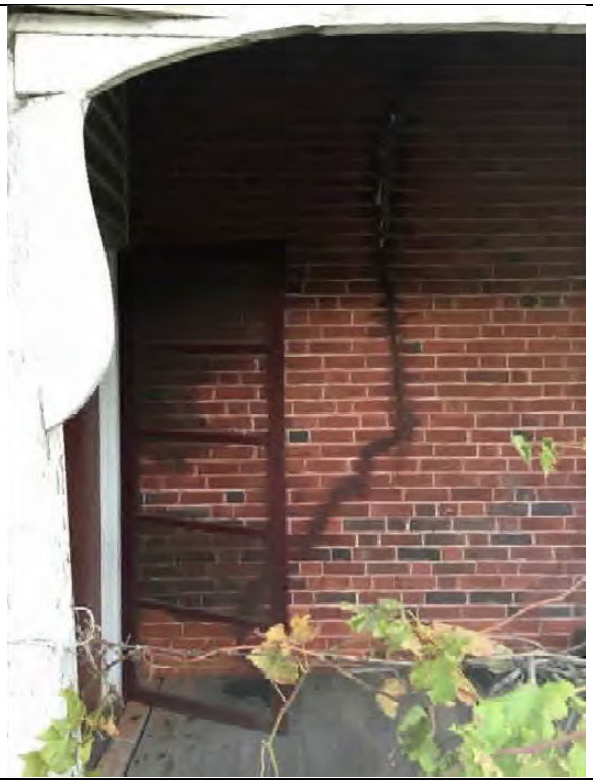
Fig 0 – Aerial satellite image showing property of Claremont Homestead at 8-12 Kinsmead St

APPENDIX C – SITE PHOTOGRAPHS AND COMMENTARY

EXTERNAL WALLS:

Site Inspection conducted by Block1's Ashley Willis on 22.04.2021		
	ITEM	**COMMENTS**
1	 	SOUTHERN CHIMNEY IS LEANING AND SEVERELY CRACKED
2		PHOTO SHOWING THIS BACK CHIMNEY LEANING NORTH

3	  	KITCHEN FIREPLACE IS LEANING AND IS DEEMED UNSTABLE DUE TO MASSIVE CRACKS IN MASONRY WALL TO ITS SIDE. CRACK IN REAR LAUNDRY TO THE SIDE OF THE KITCHEN CHIMNEY. THIS ENTIRE WALL NEEDS TO BE DEMOLISHED. GRAFFITI IS ON 'SIDE LAUNDRY' THAT IS DILAPIDATED AND REQUIRES DEMOLITION. BOTTOM RIGHT – CRACK IN EXTERNAL WALL IN BATHROOM WINDOW ALONG EAST FAÇADE, (WHICH IS THE RIGHT WINDOW IN THE PHOTO ABOVE)

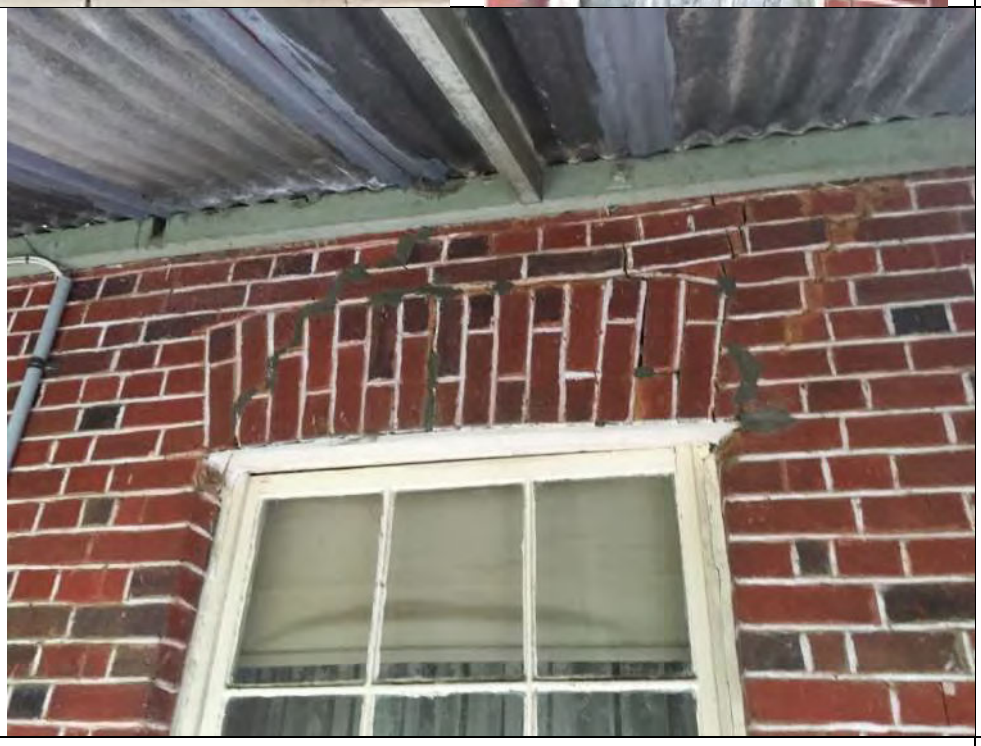
4		VIEW OF SOUTHERN END OF HOUSE, PHOTO LOOKING WEST. SHOWS LEANING CHIMNEY TO KITCHEN IN FOREGROUND BEHIND THE WATER TANK, AND WONKY REAR LAUNDRY WALLS AND DILAPIDATED SOUTHERN AWNING ROOF. THE ENTIRE SOUTHERN END OF THE HOUSE IS UNFIXABLE AND NEEDS TO BE DEMOLISHED.
5		WEST EXTERNAL WALL - MASSIVE CRACK

6		WEST VERANDAH END POST AND BEAM GIVING WAY AND NEEDING REPLACEMENT, WITH BIG CRACK IN THE EXTERNAL MASONRY WALL OPPOSITE.
7		WEST VERANDAH MIDDLE POST WITH CRACKED HEADER MEMBER, MOST PROBABLY REQUIRING FULL REPLACEMENT

8		WELL TO WEST, CRACKED. FILLED IN IN THE 1960's. PROBABLY BEST RIPPED OUT. 
9		WEST VERANDAH – REQUIRES REPAIR

10		AWNING ROOF ALONGSIDE 'REAR KITCHEN' ON SW CORNER OF BUILDING. THIS AWNING, AND THE ENTIRE ROOM NEEDS TO BE DEMOLISHED, ALONG WITH SOUTH CHIMNEY.
11		VIEW OF 'REAR KITCHEN' SHOWING SOUTH CHIMNEY, AWNING ROOF AND WATERBOARDS – ALL REQUIRE DEMOLITION.

12		EAST FAÇADE OF 'REAR KITCHEN' WITH AWNING ROOF AND 'REAR LAUNDRY' TO RHS OF PHOTO. ALL ARE AT 'END-OF'LIFE' AND REQUIRE DEMOLITION, ALONG WITH ALL THE REAR CONCRETE PAVEMENT.
13	 	

14	 	WATER INGRESS AND ROTATING WALLS HAS CRACKED THE MASONRY THROUGH TO THE SIDE OF THIS WINDOW TO THE FRONT 'MAGENTA' ROOM (NW ROOM). THE CRACKING CONTINUES BELOW, AND THE WINDOW HEAD IS CRACKED. THIS ENTIRE SECTION OF WALLS REQUIRES REPLACEMENT.
15		WINDOW TO MAGENTA ROOM, NEXT TO CORRIDOR. MASONRY CRACKED THROUGH ABOVE WINDOW IN STATE OF COMPLETE DISREPAIR, CRACKED, BULGING AND UNFIXABLE. THE ENTIRE SECTION OF NORTH WALL, WEST OF THE CORRIDOR ENTRY DOOR NEEDS TO BE DEMOLISHED AND REPLACED.

16		NORTHERN VERANDAH SHOWING CRACKED TIMBER BEAM AND DROPPED POST. IN REALITY, THE NORTHERN VERANDAH REQUIRES FULL REPLACEMENT.
17		NE CORNER OF VERANDAH. IT IS BUILT CLOSE TO THE GROUND ON THE EAST, WITH ROTTED TIMBERS. ITS IS VERY LIKLELY THAT THIS ENTIRE VERANDAH NEEDS TO BE REPLACED.

18		NE CORNER OF VERANDAH SHOWING ROTTED FLOORBOARDS AND EXTERNAL JOIST AND BEARER. THE VERANDAH REQUIRES FULL REPLACEMENT.
19		ANOTHER IMAGE OF THE ROTTED VERANDAH, ALSO IN THE NE CORNER OF THE HOUSE. THE BEARER IS SEATED ONA TREATED PINE STUMP EMBEDDED DIRECTLY INTO THE GROUND, PRESUMABLE WITHOUT A FOOTING, EXPLAINING WHY THE VERANDAH HAS DROPPED. IT IS BUILT TOO CLOSE TO THE GROUND EXPLAINING WHY ITS ALL ROTTED, ALSO DUE TO ITS AGE AND EXPOSURE TO WEATHER OVER 50+YRS.

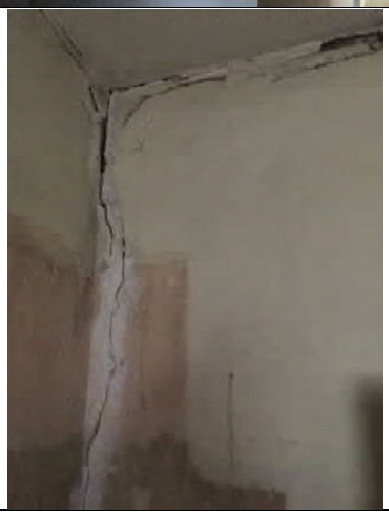
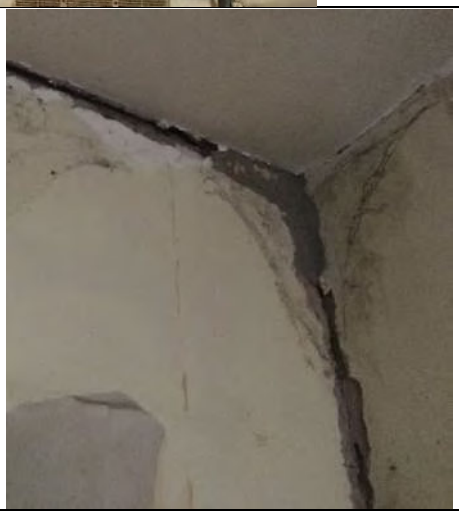
20		NORTH VERANDAH, SHOWING PATCHWORK OF COLORS AND STRIPS OF TIMBER THAT HAVE PREVIOUSLY BEEN REPLACED. THE ENTIRE BALCONY IS FALLING TO THE NORTH, CAUSED BY BOTH THE VERANDAH POST LEANING OUT, AND ALSO DUE TO THE NORTHERN WALL ROTATING.
21		NW CORNER OF VERANDAH, SHOWING HOW CLOSE IT IS BUILT TO THE GROUND.

	SLATE ROOF SLATE ROOF. REQUIRES FULL REPLACMENT. ALL GUTTERS AND BOX GUTTERS ARE FAILING. THE ENTIRE ROOF NEEDS TO BE STRIPPED AND RECLAD. IT IS EXPECTED THAT THE EXSTING RAFTERS CAN LARGELY BE REUSED, BUT WILL REQUIRE OVERBATTENING WITH 140dp BATTENS TO CREATE DEPTH FOR BOX GUTTERS
22	
	

INTERNAL MASONRY WALLS

ORIGINAL KITCHEN

23		MAIN KITCHEN CHIMNEY – CRACKS ARE TERRIBLE, CHIMNEY IS LEANING, ENTIRE WALL IS UNFIXABLE, AND CONSEQUENTLY NEEDS TO BE DEMOLISHED. ALL FOUR WALLS IN THE ORIGINAL KITCHEN ARE CONDEMNED.
24		THIS IS THE CRACK NEXT TO THE ORIGINAL KITCHEN FIREPLACE, WHICH ABUTS ONTO THE REAR LAUNDRY. THE ENTIRE ORIGINAL BRICK SOUTHERN WALL IS LEANING AND FAILING AND IN A STATE OF TOTAL DISREPAIR. IT IS CONDEMNED AND MUST BE DEMOLISHED FOR SAFETY'S SAKES. ALL THE WALLS ARE MOULDY AND DISGUSTING.

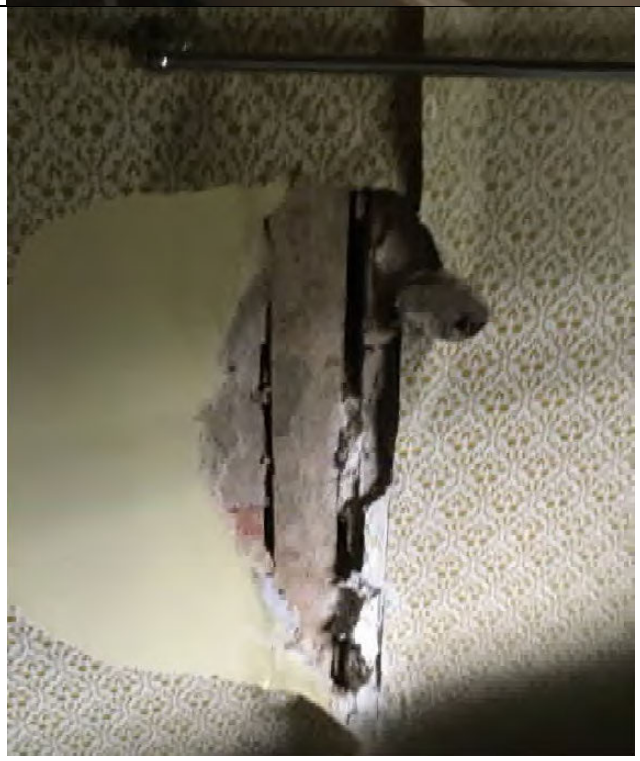
25	 	TOP – SE CORNER OF KITCHEN IN ALL ITS GLORY. CLEARLY THE ENTIRE ROOM NEEDS TO BE STRIPPED OF ITS RENDER, AND DUE TO THE CRACKING IN THE WALL, THE WALLS THEMSELVES NEED TO BE PULLED DOWN. FOR EXAMPLE, SEE THE CRACK EAST OF KITCHEN CHIMNEY (BELOW). THIS ENTIRE WALL IS LEANING AND IN A HORRIBLE STATE. THE ENTIRE WALL AND CHIMNEY IS CONDEMNED.
26	 	LEFT - THIS IS THE SW CORNER OF THE KITCHEN. WALL IN TERRIBLE CONDITION. ALONG WITH ENTIRE ROOM, CONDEMNED RIGHT - THIS IS EQUALLY HORRIBLE CONDITION OF NW CORNER WALL OF THE KITHCEN. ALL FOUR WALLS IN THE KITCHEN ARE CONDEMNED. (SEE CRACK ABOVE BATH, WHICH IS THE KITCHEN NORTH WALL!)

REAR KITCHEN EXTENSION (SECOND KITCHEN)

27		THIS IS THE 'NEW KITCHEN' ENTRY, WHICH IS THE ORIGINAL SOUTHERN WALL OF THE HOUES. THE CRACKS ARE RIGHT THROUGH AND UNREPAIRABLE. THIS SOUTHERN WALL (WHICH JOINS ACROSS THE CORRIDOR TO THE SOUTHERN WALL IN THE ORIGINAL KITCHEN, IS UNFIXABLE AND MUST BE DEMOLISHED. IT IS CLEARLY UNSAFE AND IN AWFUL CONDITION.

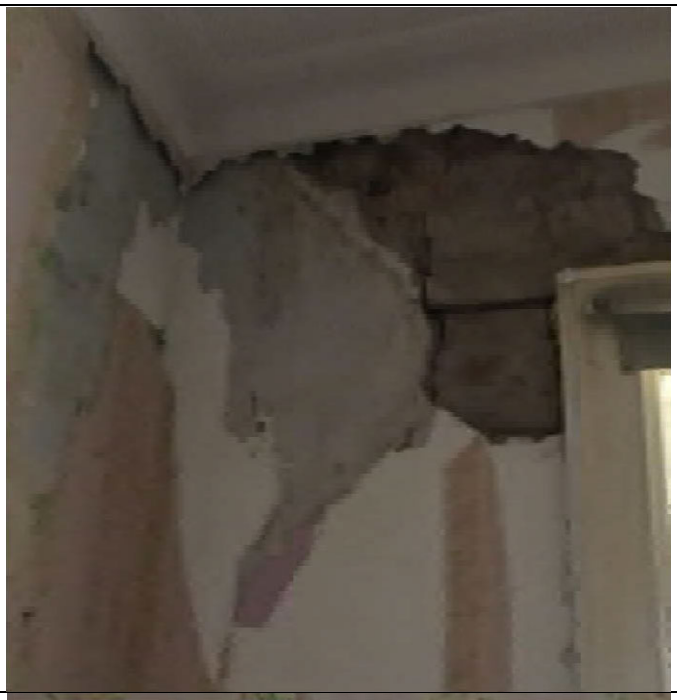
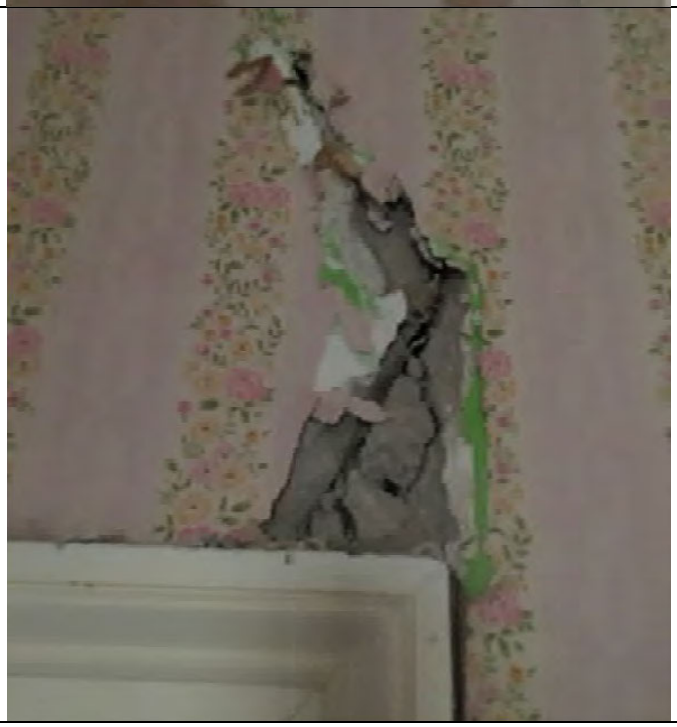
28		THIS IS THE 'EXTENSION' SECOND KITCHEN MADE BECAUSE BACK IN THE DAY, MUM COULDN'T SHARE WITH GRANDMA AND NEEDED HER OWN. THE SOUTHERN CHIMNEY IS CRACKED THROUGH & LEANING. THIS CHIMNEY IS CONDEMNED. THE FLOOR HAS DRY-ROT AND NEEDS TO BE TOTALLY RIPPED UP. ALL THE STUD WALLS ARE LEANING AND IN A BACK STATE & ALSO NEED TO BE DEMOLISHED. SO THE 'SECOND KITCHEN' IS TOTALLY DILAPIDATED AND REQUIRES FULL DEMOLITION, ALONG WITH THE ADJOINING AWNING TO THE WEST WHICH HAS COLLAPSED, AND THE AWNING TO THE BACK DOOR/LANDRY WHICH IS PAST ITS END-OF-LIFE.
29		THIS PHOTO SHOWS THE DRY-ROT IN THE FLOOR, THAT HAS BEARERS IN CONTACT WITH THE GROUND WITH GRAVEL BETWEEN THE BEARERS. THE FLOORBOARDS ARE TOTALLY GONE AND YOU CAN STOMP THROUGH THEM. THE ENTIRE ROOM IS A SAFETY RISK, ESPECIALLY THE CHIMNEY THAT IS FALLING OVER.

INTERNAL MASONRY WALLS - BATHROOM

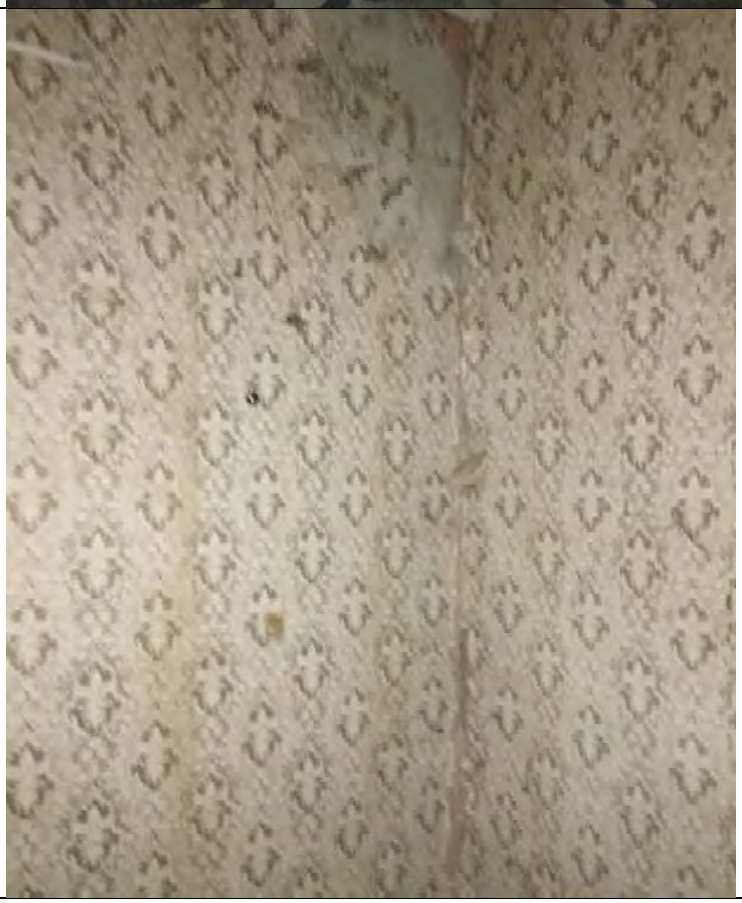
30		THIS IS THE MOST HORRIFIC CRACK IN THE HOUSE – DIRECTLY ABOVE THE BATH!! BACKING ONTO THE KITCHEN (EG THE KITCHEN NORTH WALL). THIS IS DISASTEROUS. THIS ENTIRE WALL IS CONDEMNED AND MUST BE DEMOLISHED. IT IS UNBELIEVABLE!
31		THIS IS VERTICAL CRACKING IN THE WALL OPPOSITE THE BATH, CAUSED BY A TIMBER POST EMBEDDED IN THE MASONRY WALL. THIS IS AN EXAMPLE OF AN INTERNAL MASONRY WALL THAT REALLY SHOULD BE REMOVED AND REPLACED WITH A NEW INTERNAL STUD WALL, WITH THE ROOF TIMBERS COMPLETELY PROPPED DURING THE WORKS.

32		THIS CRACK IS ALSO IN THE BATHROOM NORTH WALL. DITTO ABOVE. THE HORRIBLE FLAKEY RENDER OVER THE BRICKS IS APPARENT.

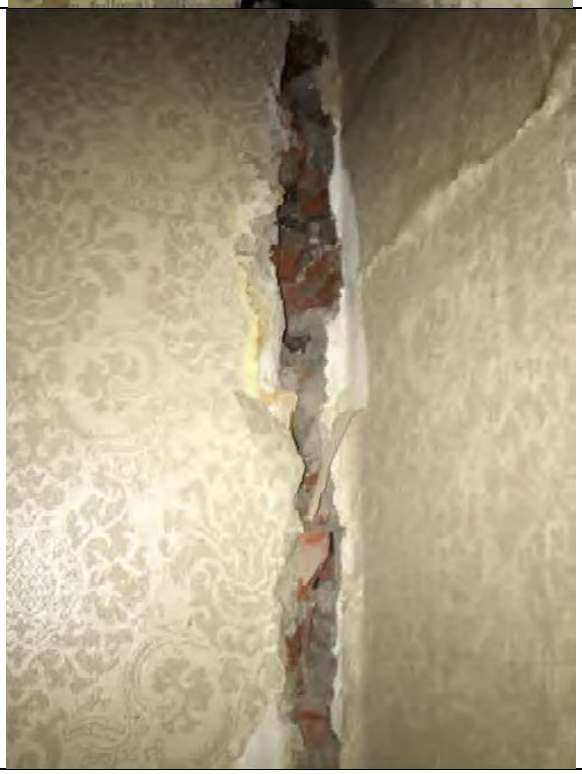
INTERNAL MASONRY WALLS – LOUNGE

33		THIS IS TYPICAL CRACK IN THE MASONRY EXTENRAL WALLS TO THE CORNERS OF WINDOWS. MOST WINDOWS SUFFER FROM SIMILAR CRACKS, WHICH SHOWCASES WHY THE EXTERNAL MASONRY WALLS REQUIRE DEMOLITION.
34		THIS IS THE CRACK IN THE OTHER SIDE OF THE SAME EXTERNAL WINDOW AS ABOVE. THE DUSTY FLAKEY RENDER IS EXPOSED.

INTERNAL MASONRY WALLS – BEDROOM 1

35		THIS PHOTO IS A TYPICAL SILL UNDER A WINDOW, WITH CRACKS THROUGH THE BRICKS THAT HAS DIRECT SANDY RENDER OVER. THERE IS NO CAVITY TO THE EXTERNAL MASONRY, NO AIR-GAP, AND HENCE THE ENTIRE HOUSE HAS MOISTURE COMING THROUGH THE WALLS (AND ROOF) AND IS MUSTY.
36		WE ARE NOW LOOKING AT THE T-INTERSECTION OF INTERNAL 110mm BRICK WALLS, THAT ARE MADE UP AGAINST THE EXTERNAL WALLS, WITHOUT KEYING IN, SO THAT NEITHER WALL GAINS STRENGTH BY BEING INTEGRATED, ALLOWING THE EXTERNAL WALLS TO DELAMINATE AND LEAN OUTWARDS TYPICALLY 30-50mm>

INTERNAL MASONRY WALLS – BEDROOM 1

37		EXTERNAL WALL THAT HAS MOVED 50 - 60mm OUT FROM THE INTERNAL WALL AT THEIR 'JOIN' LINE.
38		THIS SAME WALL, LOOKING AT THE AMOUNT OF MOVEMENT. THE DUST THAT FALLS OUT OF THESE WALLS UPON RIPPING THROUGH THE WALLPAPER AND RENDER AND EXPOSING THESE GAPS IS ASTONISHING.

INTERNAL MASONRY WALLS – BEDROOM 2

39		ANOTHER CRACK, THIS TIME IN AN INTERNAL INTERSECTION WITH THE CORRIDOR WALL. NOTE THAT ONLY A SMALL PART OF THE WALL PAPER WAS REMOVED DURING THE INSPECTOIN, HOWEVER CRACKS LIKE THIS WERE SEEN IN ALMOST EVERY INSTANCE, AND IF THE WALLS WERE FULLY EXPOSED, IT IS EXPECTED THAT THEIR WOULD BE CRACKS EVERYWHERE.

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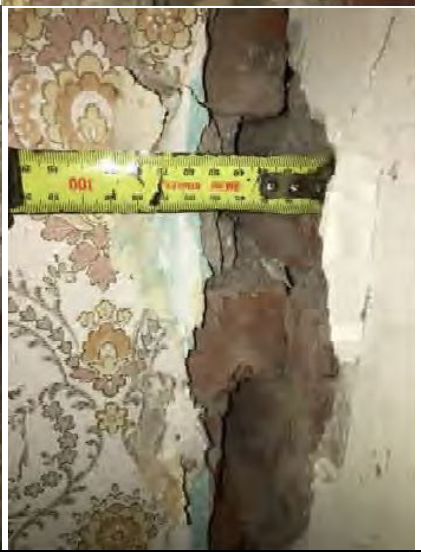
INTERNAL MASONRY WALLS – BEDROOM 3

40-43



THIS IS A PARTICULARLY NOTICEABLE DEFECT. THERE IS AN INCH-DIAMETER STEEL ROD ACTING AS A LATERAL TIE ACROSS THIS BEDROOM (SECOND IN FROM NE) AS OPPOSED TO THE ROD HAVING PULLED ON THE WALL, I BELIEVE WHAT HAS ACTUALLY HAPPENED IS THAT THE ENTIRE EAST WALL HAS FALLEN OUTWARDS BY 50mm AND ONLY THE BRICKS CONNECTED TO THE ROD (AND ITS END PLATE) REMAIN IN THEIR ORIGINAL POSITION.

BOTTOM LEFT – 50mm DISLODGEMENT. THIS IS WAS THE INCH-DIAMTER ROD CONNECTION TO THE EAST EXTERNAL WALL LOOKS LIKE BEHIND THE WALLPAPER.

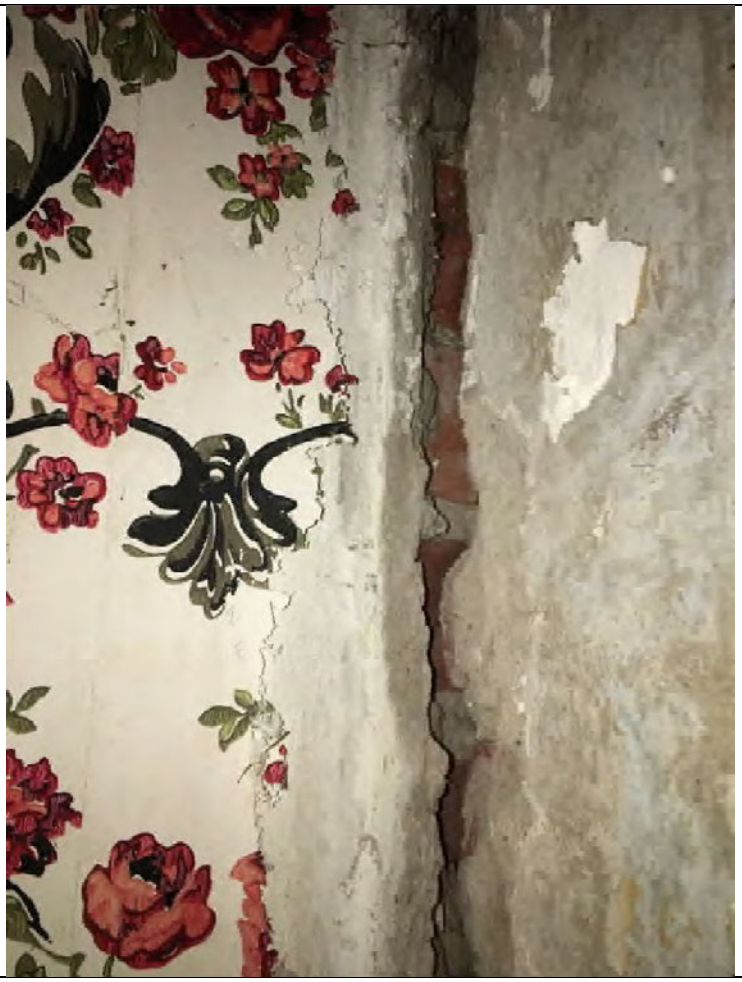
BOTTOM RIGHT - IN THE SAME ROOM, AT ITS NE CORNER, THE EAST PERIMETER WALL HAS MOVED OUTWARDS LEAVING A 40-50mm GAP TO THE NORTH INTERNAL WALL OF THIS ROOM. JUST A TYPICAL EXAMPLE.

ROOF FRAMING (VIEWED FROM BED 3)

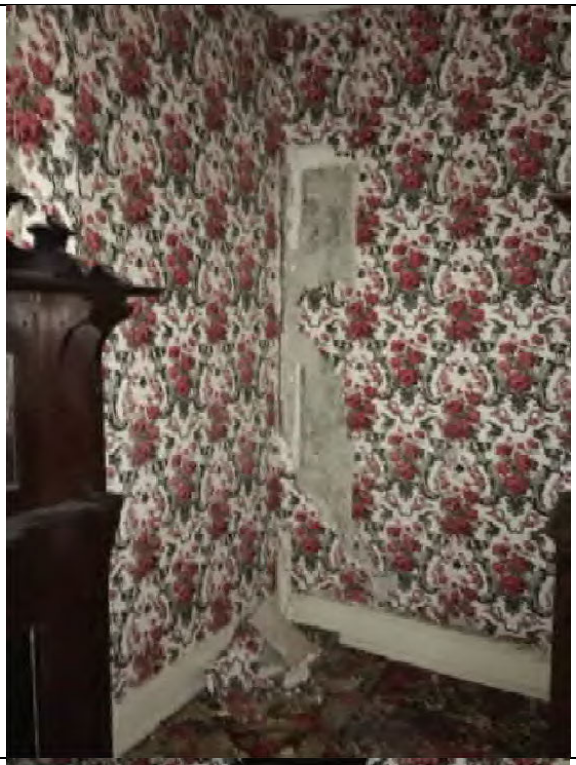
44	 	THE MASONITE CEILING WAS PULLED DOWN TO ALLOW FOR AN INSPECTION INTO THE ROOF CAVITY. THE TIMBERS ARE MOSTLY DRY AND REUSABLE. THERE IS 1cm OF DUST O ON THE CEILINGS THAT NEEDS TO BE VACUUMED OUT. THERE IS ROTTED TIMBERS ALONGSIDE THE BOX GUTTERS.

45		THIS PHOTO SHOWS 40X20 BATTENS OVER 100x## RAFTERS AT ## CENTRES, WITH A BARGEBOARD TO THE GUTTER THAT IS ROTTED.

INTERNAL MASONRY WALLS – BEDROOM ?

46		HERE IS ANOTHER EXAMPLE OF THE EXTERNAL WALL HAVING PULLED 30mm AWAY FROM THE INTERNAL WALLS.

NORTH-WEST "STUDY" (LIVING) MAGENTA ROOM

47		AND OTHER, IN THE MAGENTA FROM NW ROOM (SET UP LIKE A STUDY).
48		FIREPLACE IN THE CRIMSON ROOM, WHICH SEEMS OKAY. (BACKS UP WITH PHOTO ABOVE)

49			BED 2 - HERE IS A HAPPY PHOTO OF ONE OF THE FRONT CHIMNEYS (THAT BACKS ONTO THE CRIMSON ROOM (FRONT NW) THAT APPEARS TO BE RELATIVELY UNCRACKED AND ABLE TO BE SALVAGED.
50			BED 3 - HERE IS ANOTHER FIREPLACE (IN THE FRONT NE ROOM) THAT DOESN'T SEEM TO BE CRACKED AND IS VISIBLY STILL VERTICAL ABOVE ROOF LEVEL, AND SO CAN BE RETAINED.

51		A PHOTO LOOKING NORTH DOWN THE CORRIDOR. THE HOLE IN THE FLOOR IS MOST OF THE WAY ALONG
52		THE SUNROOM, THAT IS A LATER ADDITION & PROBABLY THE ONLY ROOM IN THE HOUSE THAT COULD REMAIN INTACT, HOWEVER APPARENTLY IT HOLDS LITTLE HERITAGE VALUE.
		END OF PHOTO RECORD

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RECOMMENDATIONS:

As has been stated already, as shown in the photos above, the following elements of Claremont House are in such a state of disrepair as to be deemed unrepairable. The following components are unsafe and require demolition and replacement:

- The original kitchen – all four walls including a leaning chimney, and the two adjoining laundries
- The second kitchen – entire room, leaning chimney, dry-rot floorboards
- Most of the external masonry walls
- Many of the internal masonry walls (particularly those under box gutters).
- Most of the verandahs
- The back storage shed and side shed.

CONCLUSION:

We understand that our structural assessment is at odds with the desire to retain Claremont Homestead in its original condition. However, we believe occupant health and safety takes precedence over attempting to maintain elements of buildings that are clearly beyond-repair and dangerous. We believe that the masonry and slate is simply defective and doesn't conform to current code requirements. It is not surprising that building elements from the 1850's should be deemed defective by today's current standards, and it is equally unsurprising that buildings 150 years old are in a serious state of dilapidation requiring a complete overhaul to make them usable.

We encourage the responsible heritage and planning advisors to make their own inspection of the internal quality of the house, and pay particular attention to the masonry, slate roof and gutters, and verandahs, in order to make their own assessment as to the utility of these building elements.

We are happy to elaborate on any comments or items contained within this report.

Yours faithfully,

Director - Block1 Pty Ltd

Ashley Willis

Chartered Professional Engineer
MIEAust CPEng NER RBP(Vict) EC 40413
[redacted]
[redacted]
Block1 Pty Ltd ABN 19 639 931 490

APPENDIX D - COMMON DEFECTS IN RESIDENTIAL STRUCTURES:

This section discusses some common defects which are observed in residential structures and their possible remedies.

INTRODUCTION:

Residential structures have a service life ranging between 50-100 years however regular maintenance and repairs are required for any structure to reach even the lower bound of this limit. Several factors may impact the service life of a residential structure among which soil subsidence and weathering effects are the most crucial. During its service life, a structure may undergo damage at a local levels and the key to ensuring continued service life of any structure is to fix local defects as they occur to avoid compounding of such defects which may cause local collapse or contribute towards global damage or failure in the future.

While most defects can be fixed using common retrofit and restrengthening techniques, integration of strengthening material/elements with the existing structure is crucial for such repairs to be effective.

WET ROT OF TIMBER:

Wet rot is caused by a variety of fungal species' attack on timber or any kind of wood. Timbers which are exposed to moisture for longer periods provide an environment where wet rot spores grow. Damp wood whether inside a structure or outside, attracts fungus which eats away the wood destroying it in the process.

For residential structures wet rot can be a major contributing factor towards immediate collapse as loss of timber section renders the remaining section to carry a reduced load-bearing capacity, as compared to its original design, however load actions remain the same making such sections even more vulnerable.

Wet rot can be treated using fungicides and wood patching compounds however repairing timber is a tricky procedure and such repairs work on localized sections of timber in structures where only a small amount of timber has been damaged. Wet rot is also likely to reoccur after repairs if the timber members continue to be exposed to water ingress.

BULGING OF BRICK LAYERS:

Bulges in outdoor brick walls are caused by water seeping through the mortar joints. This moisture swells once it is trapped behind the wall, causing the bricks to bulge outward, away from the inner wall framework. This is similar to how potholes form in the road due to water intrusion. Trapped moisture can also cause any metal anchors to rust and loosen from the brick.

Winter moisture, coupled with repeated freezing and thawing, causes this phenomenon to happen through the winter months. As warmer temperatures appear in the spring, the forced evaporation through the mortared joints causes the bulges to become more prominent and noticeable.

This condition will only grow worse over time, especially if the bulging brick is allowed to sit through another wet winter season. As more water, snow and ice accumulate behind the wall, the brick and mortar will weaken more rapidly, causing greater deterioration and a possible collapse of your wall.

If allowed to go unrepaired, moisture trapped behind the brick wall freezes and thaws with changes in the seasons, further applying pressure on weakened bricks and mortar joints, and causing more cracks and bulging.

ROATION OF BRICKS:

Rotation of bricks can occur due to a variety of reasons. While settlement of foundations can cause walls to settle and crack, disturbing the load transfer mechanism of the wall and subsequently causing bricks to rotate, local rotation of brick units can

occur due to excessive deflection of beams supporting masonry units and deflection or failure of lintels or loss of load transfer which puts additional loads on certain brick layers.

Although local treatment of brick layers is possible, it is always important to understand the reasons behind rotation of brick units so that the load transfer mechanism can be fixed. If left unattended, brick rotation can cause local or global failure of brick walls.

DIAGONAL CRACKS:

Diagonal cracks running in a zigzag pattern are mostly caused due to settlement or movement of walls. Structural foundations are prone to subsidence due to movement of moisture from the underlying soil strata. Such variation in soil water content may be triggered by changes in weather however, nearby trees and vegetation cause a greater shift in moisture levels. Soils are prone to both expansion and contraction due to this seasonal variation in moisture content and settlement of structural foundations follows such soil movement.

When one end of the wall settles relative to its other end, diagonal cracking is manifested by the wall due to breakage of mortar bond between brick units. The progression of such cracks mostly starts at the wall corners or along the corners of doors and windows and is indicative of the load path within a wall.

A diagonally running stepped crack, similar in appearance to a set of stairs when viewed from the side, can denote that structural settlement is happening, which may be because of upheaval at foundation level or some other type of slippage. These types of cracks generally start off as hairline crack which tend to follow the alignment of the horizontal beds and vertical joints in the structure. If foundational settlement continues the crack can grow in width and individual stones or bricks may even loosen and become dislodged. With these types of cracks we advise that you seek the advice of a professional as soon as possible.

Diagonal cracks can be fixed by under pinning and later on by filling mortar into gaps between brick units.

VERTICAL CRACKS:

Vertical or near vertical cracks can be indicative of serious structural damage. If the cracks appear to be wide at the top and tight at the bottom this may indicate that one or both ends of the buildings' foundation are dropping, or in fact that the middle of the foundations are rising. It should also be noted that vertical cracks also usually mean that the stresses within the buildings' structure have been sufficiently severe enough to crack individual stones or bricks in the wall to such an extent that could make the broken pieces unsafe. Alternatively, if the cracks are wider at the bottom and tighter at the top then the opposite effects may be occurring. Parallel sets of vertical or near vertical cracks can also display variations on these symptoms which indicate complex foundational movements are taking place.

HORIZONTAL CRACKS:

Horizontal cracks are more serious than vertical or diagonal cracks as they indicate foundation failure directly under the crack. While horizontal cracks indicate localized failure, for walls sitting on strip footings, this may be a sign of damaged footings and such damage may progress into the rest of the foundation in time. Horizontal cracks, if left unattended, can cause a certain portion of the wall to collapse.

Horizontal cracks at the connection of two adjacent structural elements (eg. Wall and cantilever slab) indicate loss of strength and failure of the connections.

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FRETTING MORTAR:

Fretting is caused by the action of salt migration through brickwork. Water which has salt dissolved in it migrates through brickwork to its surface. As the brick dries, the salt is left behind and forms salt crystals which grow in the voids within the brick. As more salt is left behind by evaporation of water, salt crystals grow larger and larger. The strength of growing salt crystals can be stronger than the elements that hold the brick together. If this occurs, the brick face begins to crumble and fall away. This is also true for mortar joints. For salt attack to occur the following three conditions are required:

1. There must be salts present
2. There must be water entering the wall
3. The water must evaporate from the wall

The absence of any of these conditions will prevent salt attack. The fretting of bricks can be exacerbated at specific locations around a house, which undergo increased wetting and drying cycles. The brickwork will continue to deteriorate unless moisture movement through the masonry is prevented. When treating fretting, "prevention is the best cure". The source of the salt may be airborne salt from sea spray or salts that are naturally present in the soil, or introduced by fertilizers and salt-water swimming pools. The use of bore water may also provide the source of the salt.