Department of Building and Housing

Te Tari Kaupapa Whare

ASSESSOR'S REPORT AS 012

For Multiple Unit Complex

WHRS Act (2006) CLAIM NUMBER 05533

This is an independent report prepared for the Weathertight Services Group (WSG) of the Department of Building and Housing by an Assessor contracted by the Chief Executive of the Department of Building and Housing (DBH) to provide specific information on dwellinghouses that are the subject of claims under the Weathertight Homes Resolution Services Act 2006 (WHRS Act).

This report is provided to the WSG Assessment Services Manager who requested the report on behalf of the DBH Chief Executive. Drafts or copies of the report are not to be provided to any other person except as directed by the Assessment Services Manager.

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CLAIM SUMMARY SHEET

Claim number	05533	
Property address	7 Tyburnia Avenue, Mt. Roskill; Auckland	
Claimant name	7 Tyburnia Avenue Body Corporate	
Claimant status	Michelle Young	Owner's representative
Site legal description	All units on DP 204595	

Assessor	Allen Miller	
Report type	Full Report	☐ Eligibility Report
Assessment provided by this report	Unit property and Common Property ☐ The Common property only ☐ Unit property and Common property	

Date application Received by DBH	3 September 2007	*Date report completed by assessor*	23/01/2008

The claim to which this report relates *meets* the criteria set out in section 14 of the Weathertight Homes Resolution Services Act 2006

ASSISTANCE ENGAGED BY ASSESSOR

Name	*Role*
Don Baker	Assessor
PLANTwise Services Limited	Laboratory Report
Mike Lake	Structural Engineer
Hughes Hill Maddren Limited	Quantity Surveyor

BACKGROUND

1. Description of Property/Development

1.1 The property is located at 7 Tyburnia Avenue Mt. Roskill; Auckland

1.2 The dwellings have been constructed in a low wind zone and approximately 4.5 kilometers from the nearest salt water environment.

1.3 The building site has been excavated and retained to a near level site; the driveway and parking area, which is designated as Common Property, has a gentle slope from south to north and from east to west. The 4 dwellings occupy approximately 290 m^2 site ground coverage

1.4 The dwellings were constructed during the period of July 2000 and July 2001. The development consists of four semi-detached, double storey, three bedroom apartments (constructed in two stand-alone blocks) and an existing weather-board stand-alone dwelling which is not the subject of this report.

1.5 The building consent (No. AC/00/03482) was issued by the Auckland City Council and was dated 11/07/2000; a final code compliance certificate (No. AC/00/03482) was issued and dated 10/07/2001, there were no special conditions noted; both documents are attached under **Attachment D.** Page 53

1.6 From Council held documents it appears that Block 2 (Units D and E) were constructed first, followed by Block 1(Units B and C). Both blocks are of the same design with only minor changes to the window configuration. Unit B and C are handed as are Units D and E.

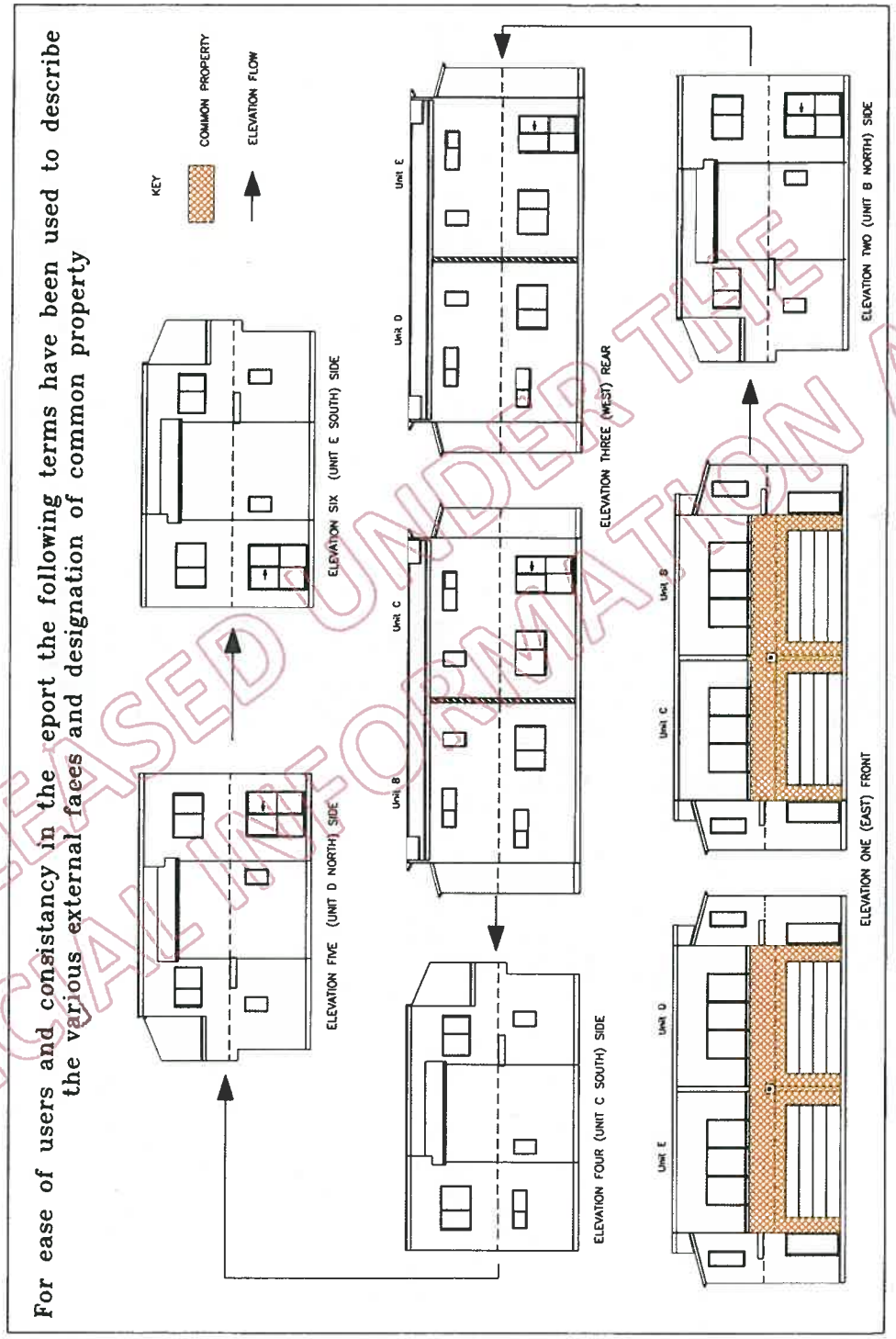
1.7 The brief construction details are as follows;

- Reinforced concrete foundation with concrete block foundation wall and concrete slab floor.
- Light untreated timber frame, clad externally with 7.5mm fibre-cement flush finished and texture coated; the intermediate floor is timber frame and particle board, the interior linings are plaster board.
- Powder coated double glazed aluminium joinery, with timber front door in aluminium frame and Colorsteel sectional overhead automatic garage door.
- Timber framed mono-pitch roof with Trapezoidal Zincalume roofing at approximately 3.5° pitch.

1.8 The two blocks are positioned along the site from north to south in a boomerang configuration with the front and garage doors being orientated to the East. Each building consists of two attached dwellings encompassing a front entrance and hallway with stairs to the first floor area, the ground floor consists of two larger single bedrooms, a bathroom and double garage which accommodates the laundry. The first floor consists of an open plan, living, dining and kitchen area; master bedroom with En'suite and walk-in wardrobe

1.9 A balcony extending the full width of the living area is approximately 1600mm deep and has been constructed and partly cantilevered over the front wall of the garage. The balcony floor is scheduled as 18mm construction plywood over 150x50 joists at 450mm ¢s water protected with a trafficable membrane fixed according to manufacturers specs; the membrane is Butynol overlaid with ceramic tiles. The balustrade wall is as specified; 100x50mm framed wall with studs at 600 ¢s, clad externally with spray textured cladding (7.5mm Fibre-cement) the internal linings of the balustrade wall is jointed fibre-cement and painted

1.10 For the purpose of this report the sketch drawing below and the following table will identify the individual Units and the designation of elevations used throughout this report



The opinion with regards to legal entitlement provided by Connell Wagner, (Surveyor) is located in **Appendix K.**

1.12

Report Identification	Units as per physical address	Elevations	Description
Elevation 1	Unit B and C, E and D	Block 1 and 2 Front	Elevation facing driveway
Elevation 2	Unit B	Block 1 North	Side facing North
Elevation 3	Unit B and C, E and D	Block 1 and 2 West	Rear elevation
Elevation 4	Unit C	Block 1 South	Side facing South
Elevation 5	Unit D	Block 2 North	Side facing North
Elevation 6	Unit E	Block 2 South	Side facing South

2. Building Documentation and Construction History

Construction History	
Period of construction/alteration	07/2000 – 07/2001
Date Building Consent applied for	15/05/2000
Date Building Consent issued	11/07/2000
Date of final inspection by certifier	29/06/2001
Date Code Compliance Certificate applied for	Not Known
Date Code Compliance Certificate issued	10/07/2001
Date Dwellinghouse first inhabited	Not Known

Other relevant documentation/information held by the owner/TA

- Building Consent application and Building Consent
- Site Inspection Reports
- Final Code Compliance Certificate, Dated: 10/07/2001

3. People and Organisations Associated with the Construction

Construction phase/ component	*Name of Service Provider or Product*	*Details of role / association*	*Source*	
			TA / Certifier	*Other***
Project Initiator/s				
Land purchaser	St. Lukes Properties Ltd	Owner/Developer	X	

Construction phase/ component	*Name of Service Provider or Product*	*Details of role / association*	*Source*	
			TA / Certifier	*Other***
Project Team: Pre-construction				
Developer	Francis Collins	Agent /Director	X	
Designer / architect	Archiplan Design / Mike Hill	Designed Dwelling	X	
Engineer	Powell Fenwick	Consulting Engineer	X	
other				
Building Consent Processors				
Building certifier	Auckland City Council	Building Certifier	X	
Project Team: Construction phase				
Head contractor	Francis Collins	Agent /Director	X	
Specialist contractors / Product suppliers				
Builder	Peninsula Construction Ltd.	Developer /Builder	X	
Component / materials manufacturer eg. Windows, cladding	James Hardie Ltd	Harditex Cladding	X	
Aluminium Joinery	Not Known			
Roofing Contractor	Not Known			
Texture Coating	Contractor Not Known	Supplier and Applicator		
Other				

4. Weathertightness Risk Factors

Risk factor	*Description*	*Observations*
A	Wind Zone	Low Wind Zone (NZS 3604) E2/AS risk factor score = 0
B	Number of storeys	Double Storey Dwelling E2/AS risk factor score = 2
C	Roof/Wall intersection design	High risk design (no protection for top of wall) E2/AS risk factor score = 3

D	Eaves Width	Effective eaves width for all elevations = 0 E2/AS risk factor score = 5
E	Envelope Complexity	High risk with roof parapets complex shapes E2/AS risk factor score = 3
F	Balcony design	Second storey part cantilevered over garage E2/AS risk factor score = 6
	Total Risk Score	All Elevations = 19

5. Comments from the Claimants

An interview with the owners' representative, also a Claimant, was undertaken on site by me on October the 2nd 2007; at this time we discussed the investigation procedure and access to the remaining properties for which she was acting as agent. The following questions and answers were recorded at the initial interview between the Claimant and me.

5.1 ***Question:*** **Where have you noticed any damage?**
Answer: Mainly to the internal frame of her own garage and where previous destructive investigation has been undertaken, and to balconies.

5.2 ***Question:*** **What causes or problems do you know about? (Eg flashings incorrectly installed etc**
Answer: Incorrectly constructed balconies and damage reveled by the recent Hampton-Jones report.

5.3 Question: **What action have you taken to remedy the leaks?**
Answer: The Body Corporate 204595 have instigated a comprehensive report on units B and C which was carried out by Hampton-Jones: dated June 2007, viewed but not attached to this report.

5.4 ***Question:*** **Have you taken any action against any of the parties?**
Answer: No.

5.5 ***Question:*** **What are your expectations of the assessment and resolution process?**
Answer: Establish cause of leaks and identify repairs that are required; achieve resolution.

5.6 ***Question***: **Who do you think should be involved in the resolution process?**
Answer: Auckland City Council, Developer, Builder, Architect, project manager and anyone else who may have been responsible.

5.7 ***Question:*** **Do you have any guarantees from builders, suppliers and manufacturers?**
Answer: No, not that I am aware of.

5.8 During the investigation of unit D the owner of that unit advised me that the previous owner had arranged a property inspection on his behalf which was carried out by the "Home Check Company Limited" prior to the confirmation; the report stated that the property was in good condition and did not identify any significant faults, the owner said he purchased the property on that basis. The Home Check Report is attached under Appendix E, (Page 98)

6 Investigation Process

6.1 A visual inspection of the interior and exterior of all four units was carried out, initially to identify high risk areas where moisture may have penetrated, and to enable any visual damage to be logged.

6.2 Non-invasive moisture meter readings were taken internally with the Protimeter MMS set in capacitance mode. During the course of this investigation visual damage was observed to the front right corner of Unit C garage and to the living/dining room ceiling of Unit D, these areas were noted for further investigation. Further investigation of the interior of Unit C garage revealed that a previous investigation by others had been carried out; a section of wall and ceiling linings had been removed which showed extensive advanced decay to the western end of the 450x100mm garage beam and supporting framing. After contacting WSG with my concerns, a structural Engineer was engaged to assess the damage, his report is located within the attachments of this report under appendix D; I understand temporary remediation has been carried out.

6.3 Non-invasive moisture meter readings were taken externally with the Protimeter MMS set in capacitance mode. During the course of this part of the investigation areas that showed high moisture readings were marked in readiness for invasive testing. At this time it became evident that considerable destructive investigations to units C and D had been previously undertaken by others, these areas were also noted for further investigation

Areas of concern were:

- Elevated scan moisture readings on all elevations
- Distortion and failure at the horizontal junctions
- Vertical joint failure to all elevations
- The obvious omission of vertical control joints
- Failure at a number of window and door sill and jamb seals
- Considerable cracking to the surface of the texture coated cladding
- The poor quality and failure of the texture coating system
- The absence of visible window or door jamb and sill flashings or protected seals
- The absence of appropriate sealing at the eaves and fascia to wall junctions
- The absence of correct saddle flashings at the wall to balcony cap junction
- The use of timber balustrade cappings and open mitres and splice joins to those cappings
- The incorrect installation of the balustrade hand rails and stanchions
- The incorrect sheet configuration of the fibre-cement cladding sheets
- Open and unsealed joins and terminations of the inter-storey H moulds
- The termination of inter-storey joins at mid wall
- The unnecessary use of horizontal control joints
- The absence of flashings and or sealant at the top of the meter box and extractor fans
- The absence of sealant and or protection around plumbing and other penetrations
- The poor installation of the parapet cap and roof flashings
- The incorrect ground clearance, especially on the front and some side elevations
- The absence of kick-out flashings to the roof apron flashings
- The excessive usage of sealant in lieu of adequate and correct flashing detailing
- Leaking spouting joints and stop ends

6.4 All areas where elevated scan readings were encountered, and where obvious high risk junctions were found, were marked and logged for further invasive investigation.

6.5 A full inspection of all four units was carried out checking roof, flashings, gutters and storm water outlets, a number of photographs were taken of these areas and are located within the attachments of this report. **Refer Appendix G** (Page 119 to 200)

6.6 Determining the extent of moisture ingress internally was by way of invasive investigation using the MMS Protimeter in resistance mode; this was achieved by inserting two 12mm pin probes into the interior wall linings, and at positions below and beside windows and at skirting level around all internal perimeter walls and areas that displayed signs of damage.

6.7 Determining the extent of moisture ingress externally was by way of invasive investigation using the MMS Protimeter in resistance mode; this was achieved by drilling two 5mm holes through the fibre cement cladding and into the timber wall framing and inserting the electrode probes of the moisture meter. All probe readings externally were logged; the results can be identified in the moisture readings summary and in the CAD sketch drawings located in sections 9 to 14. The areas affected by invasive testing were sealed on completion to minimise further moisture ingress.

6.8 Determining the extent of fungal damage and timber treatment levels was by way of destructive investigation. Destructive testing was carried out by cutting out previous investigation sites and further sites as required and removing sections of the internal wall linings and external cladding to establish the presence of mould, fungi and decay. The twelve samples taken were forwarded to PLANTwise Laboratory for analysis; the results of laboratory testing are located in **Appendix H. (**Page 202 to 228)

6.9 All sites that were the subject of destructive testing and most elevated probe readings were logged and photographed; these can be identified in **Appendix (G)** (Page 119 to 200)

7. Equipment Used

The following specialist equipment was used:

Protimeter MMS Moisture Meter; in both Capacitance and Resistance modes
Sonny Cyber-shot DSC-P8 Digital Camera

The Protimeter Moisture Meter was calibration tested prior and after the investigation, the results of which indicated that the meter was within the calibration limits.

The following general equipment was also used:
Hand held power tools
Small hand tools
Ladders
Laptop Computer

8. Site visits

Date	*Weather conditions*	*Purpose of visit*	*Persons present*
2/10/2007	Mostly Rain	Interview/investigation	Claimant during interview Mike Lake- Engineer
3/10/2007	Mostly Rain	Investigation	Claimant during interview
4/10/2007	Showers	Investigation	Don Baker - Assessor
10/10/2007	Showers	Investigation	N/a
11/10/2007	Mostly Rain	Investigation	N/a
12/10/2007	Fine	Investigation	N/a

9. Investigative Observations - (Elevation 1) Front

9.1 Visual Assessment (Elevation 1: Front – Units B, C, D and E)

9.1.1 A preliminary visual investigation was carried out and capacitance moisture readings were carried out at critical locations.

- At corners and wall surfaces
- At the inter-storey joints
- Around all openings
- At ground level

9.1.2 The following locations were found to be at high risk and potential leak areas during the New Zealand Building Code specified life of the building component.

- The wall to eaves junction was open and had not been sealed
- There are no vertical control joints installed
- Harditex™ sheet configuration is incorrect
- Window opening jamb and sill flashings were incorrect and have failed
- The apron flashings to the main roof have been incorrectly installed and do not have the required kick-out flashing to prevent water entering in behind the wall cladding
- The horizontal inter-storey joints have been incorrectly installed and are allowing water ingress
- The balcony wall junctions do not have adequate saddle flashings and are allowing water ingress

9.1.3 The New Zealand Building Code specified life of the building components is:

1. Not less than 50 years if those building elements provide structural stability to the building.
2. Not less than 15 years if those building elements form part of the building envelope.
3. Not less than 5 years for linings, renewable coatings fittings and other building elements to which there is ready access.

9.2 Moisture Readings – Elevation 1) Front

Note: All moisture readings can be identified as to locality on the table and CAD sketch drawing inserted below.

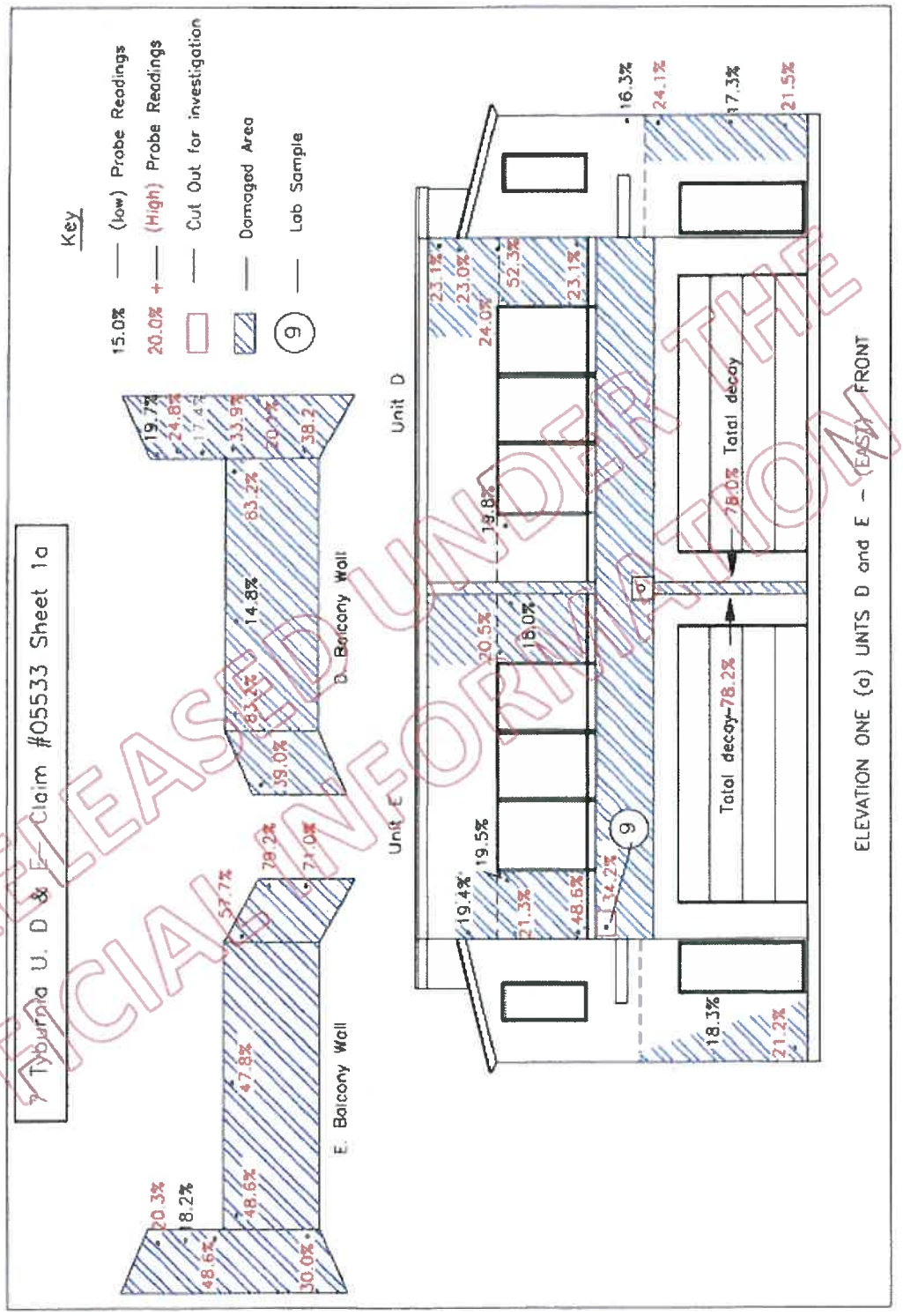
9.2.1 The maximum "in service" moisture content for untreated timber, as documented in NZS 3602: 1995, to achieve a 50-year durability is 18%. Readings for untreated timber below 18% indicate dry or slightly damp timber. Readings 19% - 29% indicate moisture accumulation above the "in service" maximum but below decay initiation levels; active decay will still grow. Readings above 30% moisture content indicate wet timber at a level where timber decay onset may initiate.

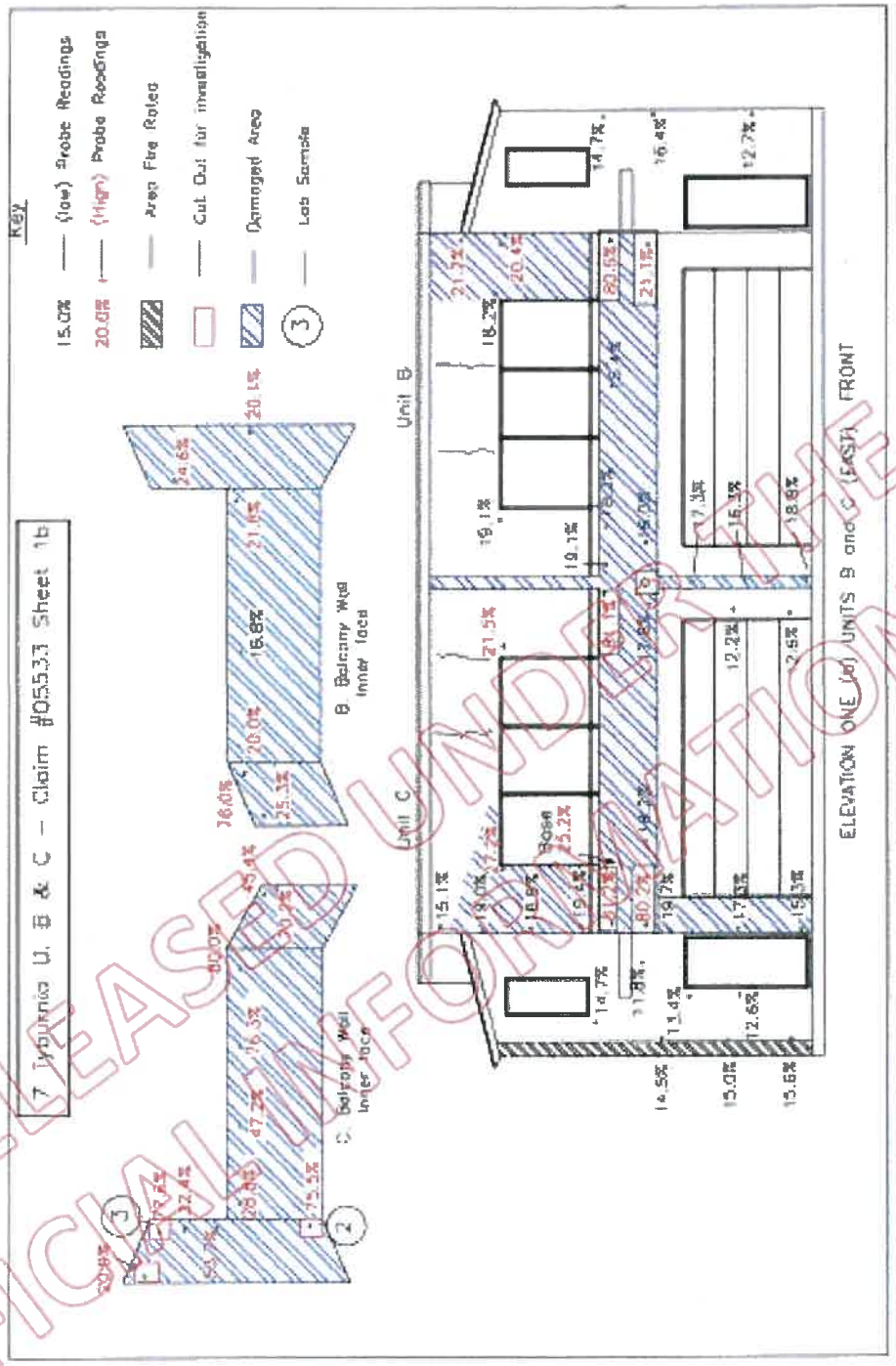
9.2.2 Moisture readings exceeding the "in service" percentage documented in NZS 3602 to achieve a 50 year durability i.e. readings between 18.0% and 83.2% have been recorded and highlighted in red in the tables below, a number of readings were below 18%.

Probe elevation	Description of Probe location	Moisture reading	Photo no.
1a Unit – E	Front elevation, above right side of sliding door head flashing	20.5%	
1a Unit – E	Front elevation, 1500mm below fascia at inter-tenancy	18.0%	
1a Unit – E	Front elevation, 500mm below fascia at south corner of living	19.4%	
1a Unit – E	Front elevation, above left side of sliding door head flashing	19.5%	
1a Unit – E	Front elevation, 1500mm below fascia at south corner of living	21.3%	
1a Unit – E	Front elevation, above balcony junction at south corner	48.6%	
1a Unit – E	Front elevation, top of balcony wall, Cut out No. 9 a south corner	34.2%	1e 2
1a Unit – E	Front elevation, midway at inter-tenancy, adjacent to garage door	78.2%	
1a Unit – E	Front elevation, South east corner at entry, 1500mm from base	18.3%	
1a Unit – E	Front elevation, South east corner at entry, 200mm from base	21.2%	
1a Unit – E	Top of inter-tenancy wall above balcony wall	20.3%	
1a Unit – E	Top of inter-tenancy wall 400mm above balcony wall	18.2%	
1a Unit – E	Top of inter-tenancy wall above balcony wall junction	48.6%	
1a Unit – E	Bottom of inter-tenancy wall at balcony wall junction	30.0%	1e 7
1a Unit – E	Top inside of balcony wall at inter-tenancy	48.6%	1e 6
1a Unit – E	Top inside of balcony wall 3m from inter-tenancy	47.8%	1e 5
1a Unit – E	Top inside of balcony wall at south east corner	57.7%	1e 4
1a Unit – E	Top inside of balcony wall at front wall junction	79.2%	1e 3
1a Unit – E	Bottom inside of balcony wall at front wall junction	71.0%	
1a Unit – D	Front elevation, northern corner above inter-storey	16.3%	
1a Unit – D	Front elevation, northern corner below inter-storey	24.1%	
1a Unit – D	Front elevation, northern corner 900mm above base	17.3%	
1a Unit – D	Front elevation, northern corner 200mm above base	21.5%	
1a Unit – D	Front elevation, 200mm below fascia at north corner of living	23.1%	1d 33
1a Unit – D	Front elevation, 500 below fascia at north corner of living	23.0%	
1a Unit – D	Front elevation, above right side of sliding door head flashing	24.0%	1d 32
1a Unit – D	Front elevation, above left side of sliding door head flashing	19.8%	
1a Unit – D	Front elevation, 1m below fascia at north corner of living	52.3%	1d 34
1a Unit – D	Front elevation, above balcony wall at north corner of living	23.1%	1d 35
1a Unit – D	Front elevation, midway at inter-tenancy, adjacent to garage door	78.0%	
1a Unit – D	Front elevation, at top of inter-tenancy	19.7%	
1a Unit – D	Front elevation, 350mm from top of inter-tenancy	24.8%	1d 27
1a Unit – D	Front elevation, 700mm from top of inter-tenancy	17.4%	
1a Unit – D	Front elevation, 1500mm from top of inter-tenancy	33.9%	1d 26
1a Unit – D	Front elevation, at inter-tenancy – front wall junction	20.1%	
1a Unit – D	Front elevation, at base of inter-tenancy	38.2%	1d 28
1a Unit – D	Front elevation, top of balcony wall at inter-tenancy junction	82.3%	1d 25
1a Unit – D	Top inside of balcony wall 3m from inter-tenancy	14.8%	
1a Unit – D	Inside top of balcony wall, north end	83.2%	1d 24
1a Unit – D	Inside top of balcony end wall at east wall junction	39.0%	1d 23

Probe elevation	Description of Probe location	Moisture reading	Photo no.
1b Unit – C	Front elevation, above right side of sliding door head flashing	21.5%	
1b Unit – C	Front elevation, 150mm below fascia at south corner of living	15.1%	
1b Unit – C	Front elevation, 500mm below fascia at south corner of living	19.0%	
1b Unit – C	Front elevation, above left side of sliding door head flashing	27.2%	
1b Unit – C	Front elevation, 1500mm below fascia at south corner of living	16.9%	
1b Unit – C	Front elevation, above balcony junction at south corner	19.4%	
1b Unit – C	Front elevation, at base of sliding door, left side	25.2%	
1b Unit – C	Front elevation, at top of balcony wall, south corner	81.2%	
1b Unit – C	Front elevation, at top of balcony wall, adjacent to inter-tenancy	81.1%	1c 55
1b Unit – C	Front elevation, base of balcony wall, south corner	80.2%	1c 56
1b Unit – C	Front elevation, base of balcony wall, 1500mm from south corner	18.2%	
1b Unit – C	Front elevation, base of balcony wall, adjacent to inter-tenancy	17.8%	
1b Unit – C	Front elevation, right side of garage door	12.2%	
1b Unit – C	Front elevation, right side of garage door at base	12.6%	
1b Unit – C	Front elevation, left side of garage door below balcony	19.7%	
1b Unit – C	Front elevation, left side of garage door, 1200mm from base	17.3%	
1b Unit – C	Front elevation, left side of garage door at base	15.3%	
1b Unit – C	Front elevation, bottom left of stair window	14.7%	
1b Unit – C	Front elevation, below front door canopy	11.8%	
1b Unit – C	Front elevation, at top left side of front door	13.4%	
1b Unit – C	Front elevation, at top centre left of front door	12.6%	
1b Unit – C	Front elevation, south east corner below inter-storey	14.5%	
1b Unit – C	Front elevation, south east corner 1200mm from base	15.0%	
1b Unit – C	Front elevation, south east corner at base	15.6%	
1b Unit – C	Top of inter-tenancy wall adjacent to east wall	20.9%	
1b Unit – C	Top of inter-tenancy wall at cut No. 3	77.6%	1c 40
1b Unit – C	Top of inter-tenancy wall 300mm below cut No. 3	32.4%	
1b Unit – C	Top of inter-tenancy wall at balcony wall junction	53.7%	
1b Unit – C	Base of inter-tenancy wall at balcony wall junction, cut out No. 2	75.5%	1c 41
1b Unit – C	Top inside of balcony wall at inter-tenancy	28.8%	1c 50
1b Unit – C	Top inside of balcony wall 1200mm from inter-tenancy	47.2%	1c 49
1b Unit – C	Top inside of balcony wall 1200mm from south east corner	76.3%	1c 48
1b Unit – C	Top inside of balcony wall 200mm from south east corner	81.0%	1c 46
1b Unit – C	Top inside of balcony wall at front wall junction	45.4%	1c 44
1b Unit – C	Inside of front wall at balcony wall junction	70.2%	1c 45
1a Unit - B	Front elevation, northern corner above inter-storey	14.7%	
1a Unit - B	Front elevation, northern corner below inter-storey	16.4%	
1a Unit - B	Front elevation, northern corner 800mm above base	12.7%	
1a Unit - B	Front elevation, 300mm below fascia at north corner of living	21.2%	
1a Unit - B	Front elevation, 1m below fascia at north corner of living	20.4%	
1a Unit - B	Front elevation, above left side of sliding door head flashing	18.2%	
1a Unit - B	Front elevation, above right side of sliding door head flashing	19.1%	
1a Unit - B	Front elevation, at top of balcony wall, adjacent to inter-tenancy	19.1%	
1a Unit - B	Front elevation, at base of balcony wall, adjacent to inter-tenancy	16.0%	
1a Unit - B	Front elevation, at top of balcony wall, 900mm from inter-tenancy	18.3%	
1a Unit - B	Front elevation, at top of balcony wall, 4m from inter-tenancy	15.4%	
1a Unit - B	Front elevation, at top of balcony wall, north corner	80.5%	
1a Unit - B	Front elevation, at base of balcony wall, north corner	21.1%	
1a Unit - B	Front elevation, at inter-tenancy below balcony	17.3%	
1a Unit - B	Front elevation, at inter-tenancy 1200mm below balcony	16.8%	
1a Unit - B	Front elevation, at base	18.8%	
1a Unit - B	Top of inter-tenancy wall	24.6%	1b 60
1a Unit - B	Centre of inter-tenancy wall, adjacent to east wall	20.1%	
1a Unit - B	Inside top of balcony wall, south end	21.8%	1b 61
1a Unit - B	Inside top of balcony wall, at centre	16.8%	
1a Unit - B	Inside top of balcony wall, north end	20.0%	
1a Unit - B	Inside top of balcony wall north east corner	76.0%	1b 62
1a Unit - B	Inside top of balcony end wall at east wall junction	25.3%	

The CAD sketch drawings below show all invasive moisture readings taken externally on the eastern elevation; note all readings over 18% are shown marked in red, some probe readings were below the 18% threshold





Note: Hatched areas on the above sketch drawings are the areas which, in my view, have sustained damage to the framing and other building elements, due to water/moisture ingress.
During invasive testing it became evident that moisture is ingressing into the wall cavities, as moisture readings into the timber framing were registering in excess of 18% in resistance mode

9.3 Further Investigation: Current Damage – (Elevation 1) Front

Cut-out Location	*Photo ref (if any)*	*Observations*
Lab Samples Cut outs Nos. 2, 3, & 9	1e 1 to 1e 12/1 1d 13 to 1d 35 1c 36 to 1c 58 1b 59 to 1b 67	The roof parapets have not been constructed in accordance the Building Consent documents and have failed. The cap flashing is flat and water is ponding around joins, there is no up-stand to the front parapet causing water ingress into the wall cavities. The parapet cap flashing junctions and joints have been badly constructed and merely surface sealed with unprotected sealant. The junctions where the balcony wall timber capping intersects with the eastern wall and wing walls, do not have saddle flashings installed, consequently gravitational water is able to ingress into the wall cavities below which is causing extensive damage to the wall framing below, the 450x100mm garage support beams and the balcony floor joists and substrate. The Harditex™ cladding as fixed appears not to be in compliance with the James Hardie Technical Information 1998 for the following reasons ➢ The Sheet configuration is not in accordance with Section 3: Fig. 12, 13, and 14 page 10 ➢ The installation of the proprietary H mould, vertical and horizontal control joints have not been installed in accordance with Section 4 Fig. 23, to 26 and Fig. 31 to 34, pages 15 to 18; none of the corner mitre or horizontal butt joints has been adequately sealed or is watertight. ➢ The installation of the aluminium joinery is not in accordance with Section 3: Fig. 15 to 18, pages 11 and 12; or Section 6 Fig. 58 to 62 page 38; there was no evidence of jamb or sill flashings or proprietary seals correctly installed, some of the windows have failed. ➢ The ground clearance on this elevation is not in accordance with Section 5: Fig. 46, to 48 pages 26and 27, consequently damage has occurred to the lower framing. ➢ The Harditex™ clad balcony walls and wing walls on this elevation are not in accordance with Section 6: Fig. 68 page 39; the timber capping has failed. The method of fixing the metal handrails is also poor building practise and has failed. The result of the above listed variations from the Harditex™ Technical Information and recommendations in my view is causing the premature breakdown of the cladding system and is allowing water ingress into the wall cavities causing damage.

9.4 Further Investigation: Future Likely Damage – (Elevation 1) Front

Cu-tout location	*Photo ref (if any)*	*Observations*
N/A	N/A	Recommend full Reclad: No Future Likely Damage

10. Investigative Observations – (Elevation 2) Side

10.1 Visual Assessment (Elevation 2) Side

10.1.1 A preliminary visual investigation was carried out and capacitance moisture readings were carried out at critical locations.

- At the inter-storey joint
- Around all openings
- At wall to parapet wall junctions
- At ground. level

10.1.2 The following locations were found to be at high risk and potential leak areas during the New Zealand Building Code specified life of the building component.

- The wall to fascia junction was open and had not been sealed
- There are no vertical control joints installed
- Harditex™ sheet configuration is incorrect
- Window opening jamb and sill flashings were incorrect and have failed
- The apron flashings to the main roof have been incorrectly installed and do not have the required kick-out flashing to prevent water entering in behind the wall cladding

The horizontal inter-storey joints have been incorrectly installed and are allowing water ingress

- The balcony wall junctions do not have adequate saddle flashings and are allowing water ingress

10.1.3 The New Zealand Building Code specified life of the building components is:

1. Not less than 50 years if those building elements provide structural stability to the building.
2. Not less than 15 years if those building elements form part of the building envelope.
3. Not less than 5 years for linings, renewable coatings fittings and other building elements to which there is ready access.

10.2 Moisture Readings – (Elevation 2) Side

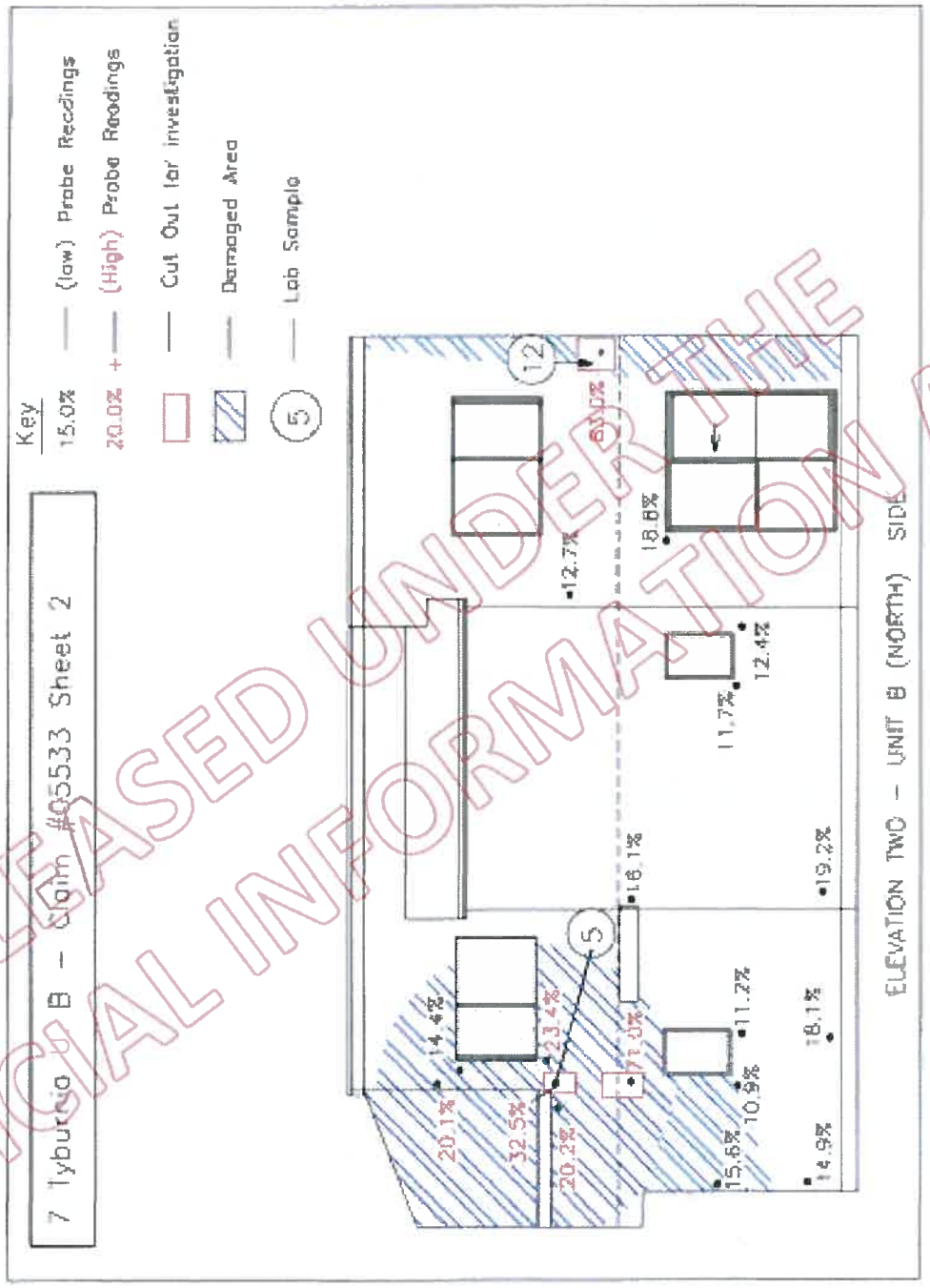
Note: All moisture readings can be identified as to locality in the moisture readings table and on the CAD sketch drawing inserted below

10.2.1 The maximum "in service" moisture content for untreated timber, as documented in NZS 3602: 1995, to achieve a 50-year durability is 18%. Readings for untreated timber below 18% indicate dry or slightly damp timber. Readings 19% - 29% indicate moisture accumulation above the "in service" maximum but below decay initiation levels; active decay will still grow. Readings above 30% moisture content indicate wet timber at a level where timber decay onset may initiate.

10.2.2 Moisture readings exceeding the "in service" percentage documented in NZS 3602 to achieve a 50 year durability i.e. readings between 18% and 83.0% have been recorded and highlighted in red in the table below, a number of readings were below 18%.

Probe Elevation	Description of Probe location	Moisture reading	Photo no.
2 – Unit B	North east corner 1m below parapet	20.1%	
2 – Unit B	Right side of living room window head	14.4%	
2 – Unit B	Below right side of living room window sill	23.4%	2b 68
2 – Unit B	Cut out No 5 at balcony saddle junction	32.5%	2b 69
2 – Unit B	300mm from balcony saddle junction	20.2%	
2 – Unit B	900mm below balcony saddle junction at inter-storey	71.0%	2b 70
2 – Unit B	North wall, east corner 900mm below inter-storey joint	15.6%	
2 – Unit B	North wall, east corner 200mm from base	14.9%	
2 – Unit B	Below left side of garage window	10.9%	
2 – Unit B	Below right side of garage window	11.2%	
2 – Unit B	150mm from base below garage window	18.1%	
2 – Unit B	North wall, east corner of stair well below inter-storey	16.1%	
2 – Unit B	150mm from base at north east corner of stair well	19.2%	
2 – Unit B	Below left side of stair well window	11.7%	
2 – Unit B	Below right side of stair well window	12.4%	
2 – Unit B	Left side of garage door 800 mm below head	11.6%	
2 – Unit B	North wall of bedroom 1 400mm above inter-storey	12.7%	
2 – Unit B	Cut out No.12 at north west corner above inter-storey	83.0%	2b 74
2 – Unit B	North wall of bedroom 2 at left side of sliding door head	18.8%	

The CAD sketch drawing below shows all invasive moisture readings taken externally on the northern elevation; note all readings over 20% are shown marked in red, some probe readings were below the 20% threshold



Note: Hatched areas on the above sketch drawings are the areas which, in my view, have sustained damage to the framing and other building elements, due to water/moisture ingress.
During invasive testing it became evident that moisture is ingressing into the wall cavities, as moisture readings into the timber framing were registering in excess of 18% in resistance mode

10.3 Further Investigation: Current Damage – (Elevation 2) Side

Cut-out Location	*Photo ref (if any)*	*Observations*
Lab Samples	2b 68 to 2b 74	The roof parapets have not been constructed in accordance the Building Consent documents and have failed. The cap flashing is flat and water is ponding around joins, there is no up-stand to the front parapet causing water ingress into the wall cavities. The parapet cap flashing junctions and joints have been badly constructed and merely surface sealed with unprotected sealant. The junctions where the balcony wall timber capping intersects with the eastern wall do not have saddle flashings installed, consequently gravitational water is able to ingress into the wall cavities below which is causing extensive damage to the wall framing below, the 450x100mm garage support beams and the balcony floor joists and substrate. The Harditex™ cladding as fixed appears not to be in compliance with the James Hardie Technical Information 1998 for the following reasons ➢ The Sheet configuration is not in accordance with Section 3: Fig. 12, 13, and 14 page 10 ➢ The installation of the proprietary H mould, vertical and horizontal control joints have not been installed in accordance with Section 4 Fig. 23, to 26 and Fig. 31 to 34, pages 15 to 18; none of the corner mitre or horizontal butt joints has been adequately sealed or is watertight. ➢ The installation of the aluminium joinery is not in accordance with Section 3: Fig. 15 to 18, pages 11 and 12; or Section 6 Fig. 58 to 62 page 38; there was no evidence of jamb or sill flashings or proprietary seals correctly installed, some of the windows have failed. ➢ The ground clearance on this elevation is not in accordance with Section 5: Fig. 46, to 48 pages 26and 27, consequently damage has occurred to the lower framing. ➢ The Harditex™ clad balcony walls and wing walls on this elevation are not in accordance with Section 6: Fig. 68 page 39; the timber capping has failed. The method of fixing the metal handrails is also poor building practice and has failed. The result of the above listed variations from the Harditex™ Technical Information and recommendations in my view is causing the premature breakdown of the cladding system and is allowing water ingress into the wall cavities causing damage.
Cut out No. 5		
Cut out No. 12		

10.4 Further Investigation: Future Likely Damage – (Elevation 1) Side

Cu-tout location	*Photo ref (if any)*	*Observations*
N/A	N/A	Recommend full Reclad: No Future Likely Damage

a) Investigative Observations – (Elevation 3) Rear

11.1 Visual Assessment (Elevation 3) Rear – Units B, C, D and E

11.1.1 A preliminary visual investigation was carried out and capacitance moisture readings were carried out at critical locations.

- Below eaves
- At the inter-storey joint
- Around all openings
- At ground level
- At wall to parapet wall junctions

11.1.2 The following locations were found to be at high risk and potential leak areas during the New Zealand Building Code specified life of the building component.

- The wall to Fascia junction had not been sealed
- There no vertical control joints installed
- The horizontal control joints were incorrectly formed and not in accordance with the manufactures technical information
- The sheet configuration is incorrect
- Window and door opening facings have failed
- The apron flashing to the main roof does not have the required kick-out flashing to prevent water entering in behind the wall cladding
- The spouting is leaking

11.1.3 The New Zealand Building Code specified life of the building components is:

1. Not less than 50 years if those building elements provide structural stability to the building.
2. Not less than 15 years if those building elements form part of the building envelope.
3. Not less than 5 years for linings, renewable coatings fittings and other building elements to which there is ready access.

11.2 Moisture Readings – (Elevation 3) Rear

Note: All moisture readings can be identified as to locality on the CAD sketch drawing inserted below

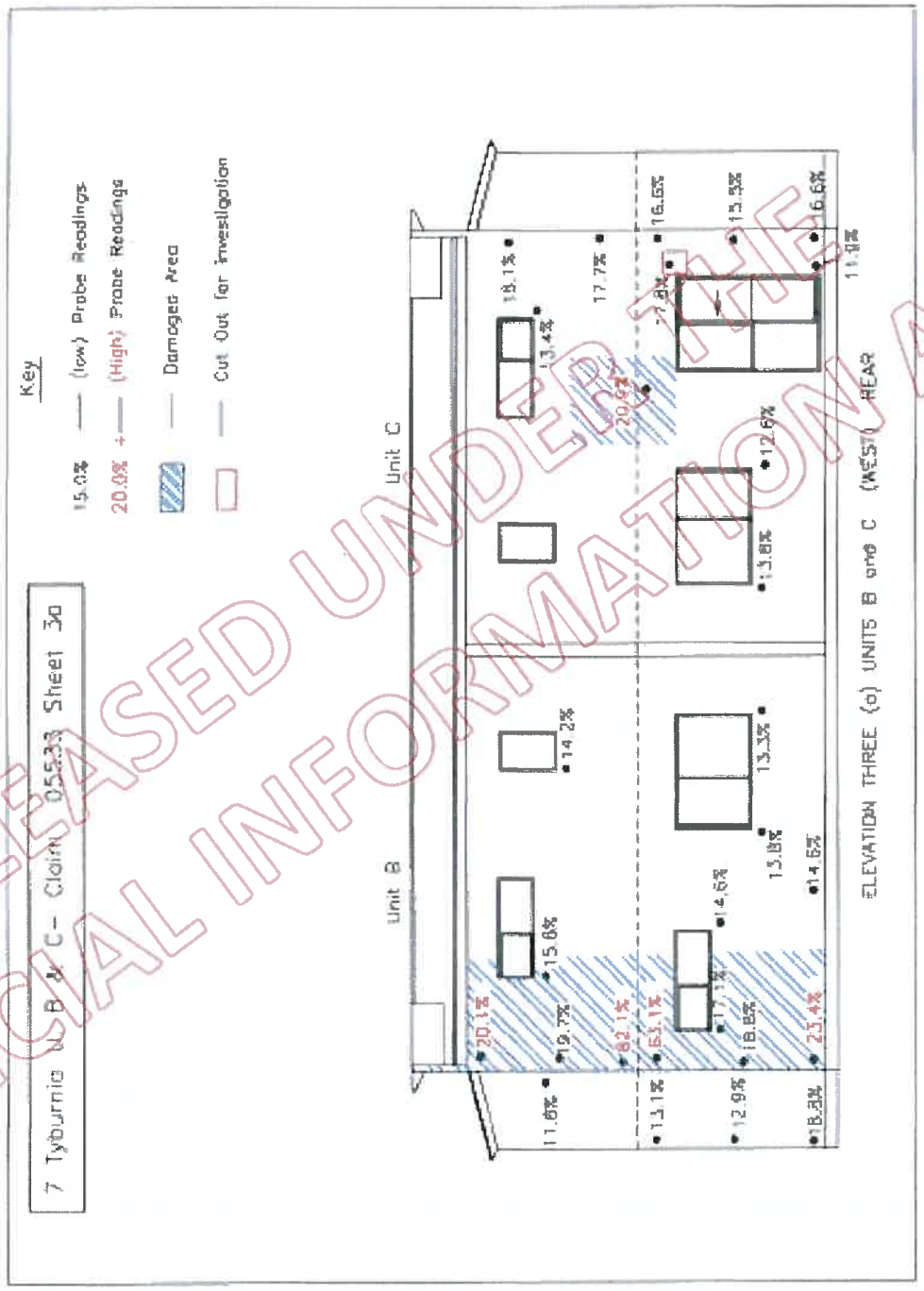
11.2.1 The maximum "in service" moisture content for untreated timber, as documented in NZS 3602: 1995, to achieve a 50-year durability is 18%. Readings for untreated timber below 18% indicate dry or slightly damp timber. Readings 19% - 29% indicate moisture accumulation above the "in service" maximum but below decay initiation levels; active decay will still grow. Readings above 30% moisture content indicate wet timber at a level where timber decay onset may initiate.

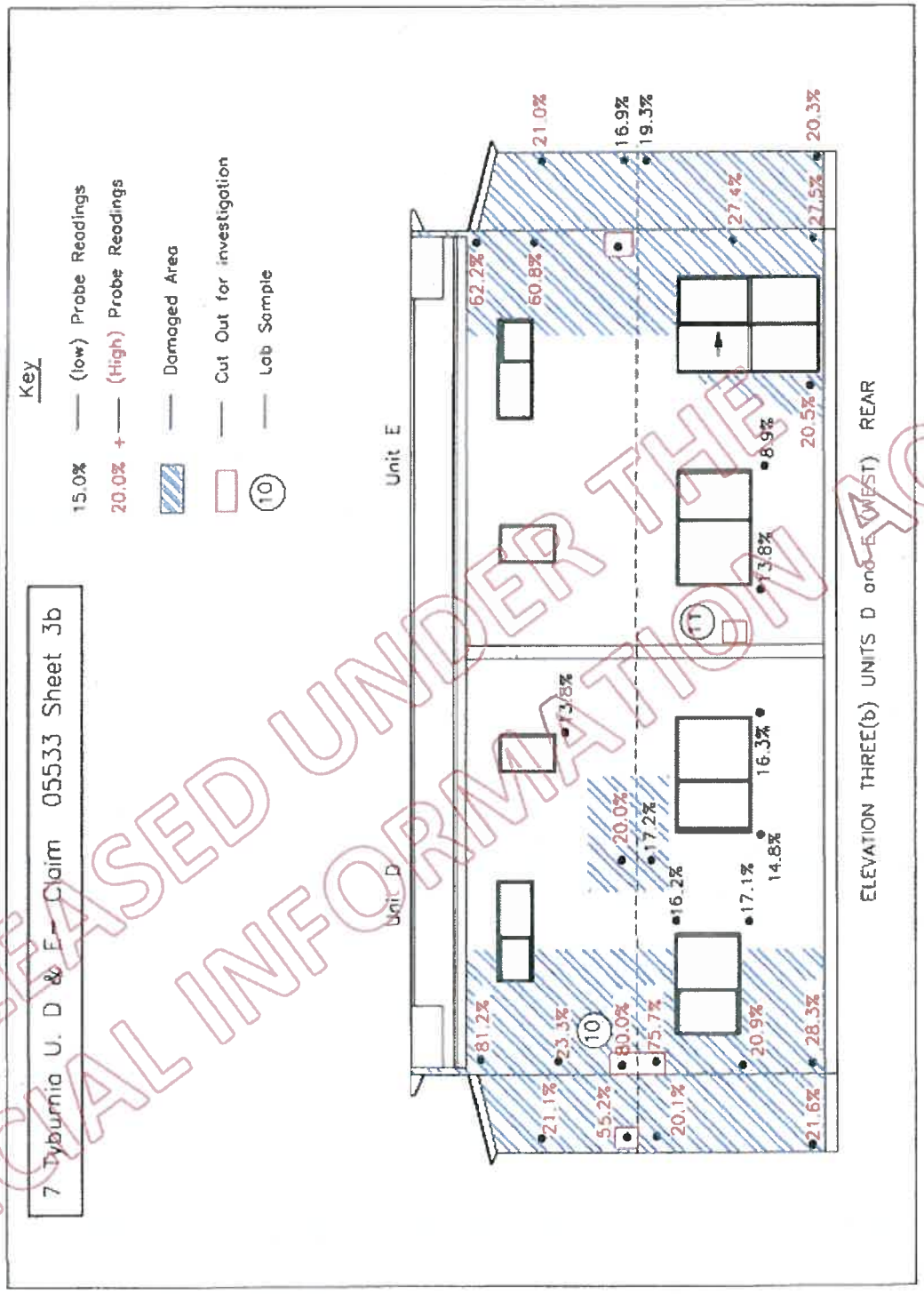
11.2.2 Moisture readings exceeding the "in service" percentage documented in NZS 3602 to achieve a 50 year durability i.e. readings between 18% and 82.1% have been recorded and highlighted in red in the tables below, a number of readings were below 18%.

Probe location	Description of Probe location	Moisture reading	Photo no.
3a Unit - B	Rear elevation, northern corner 200 below fascia	20.1%	
3a Unit - B	Rear elevation, bottom left corner of bedroom 1 window	15.6%	
3a Unit - B	Rear elevation, northern corner of stair well above inter-storey	11.6%	
3a Unit - B	Rear elevation, northern corner of stair well below inter-storey	13.1%	
3a Unit - B	Rear elevation, northern corner 1200 below fascia	19.7%	
3a Unit - B	Rear elevation, northern corner above inter-storey	82.1%	3b 78
3a Unit - B	Rear elevation, northern corner below inter-storey	63.1%	3b 79
3a Unit - B	Rear elevation, bottom left corner of bedroom 2 window	17.1%	
3a Unit - B	Rear elevation, bottom right corner of bedroom 2 window	14.6%	
3a Unit - B	Rear elevation, northern corner 1500 below inter-storey	18.8%	
3a Unit - B	Rear elevation, north corner of stair well 1500 below inter-storey	12.9%	
3a Unit - B	Rear elevation, northern corner of stair well at base	18.8%	
3a Unit - B	Rear elevation, northern corner at base	23.4%	3b 80
3a Unit - B	Rear elevation, at bottom left corner of bathroom window	14.2%	
3a Unit - B	Rear elevation, at bottom left corner of bedroom 3 window	13.8%	
3a Unit - B	Rear elevation, at bottom right corner of bedroom 3 window	13.3%	
3a Unit - B	Rear elevation, at base below bedroom 3 window	14.6%	
3a Unit - C	Rear elevation, at bottom left corner of bedroom 3 window	13.8%	
3a Unit - C	Rear elevation, at bottom right corner of bedroom 3 window	12.6%	
3a Unit - C	Rear elevation, Centre of west wall above inter-storey	20.9%	3c 83
3a Unit - C	Rear elevation, bottom right corner of bedroom 1 window	13.4%	
3a Unit - C	Rear elevation, southern corner 400 below fascia	18.1%	
3a Unit - C	Rear elevation, southern corner 400 above inter-storey	17.7%	
3a Unit - C	Cut out above right side of sliding door head flashing	17.8%	
3a Unit - C	Rear elevation, southern corner below inter-storey	16.6%	
3a Unit - C	Rear elevation, southern corner 1200mm below inter-storey	15.5%	
3a Unit - C	Rear elevation, southern corner at base	16.6%	
3a Unit - C	Rear elevation, southern corner at base of sliding door	11.9%	

Probe location	Description of Probe location	Moisture reading	Photo no.
3b Unit - D	Rear elevation, northern corner 200 below fascia	81.2%	3d 89
3b Unit - D	Rear elevation, north corner of stair well 900mmabove inter-storey	21.1%	
3b Unit - D	Rear elevation, northern corner of stair well above inter-storey	55.2%	3d 88
3b Unit - D	Rear elevation, northern corner 1200 below fascia	23.3%	
3b Unit - D	Rear elevation, northern corner above inter-storey	82.1%	
3b Unit - D	Rear elevation, Cut out No. 10 at inter-storey	80.0%	3d 90
3b Unit - D	Rear elevation, Cut out No. 10 below inter-storey	75.7%	3d 93
3b Unit - D	Rear elevation, northern corner of stair well below inter-storey	20.1%	
3b Unit - D	Rear elevation, northern corner of stair well at base	21.6%	
3b Unit - D	Rear elevation, northern corner 1400mm below inter-storey	20.9%	
3b Unit - D	Rear elevation, northern corner at base	28.3%	3d 94
3b Unit - D	Rear elevation, at top right corner of bedroom 2 window	16.2%	
3b Unit - D	Rear elevation, at bottom right corner of bedroom 2 window	17.1%	
3b Unit - D	Rear elevation, at top right corner of bathroom window	13.8%	
3b Unit - D	Rear elevation, mid wall above inter-storey	20.0%	
3b Unit - D	Rear elevation, mid wall below inter-storey	17.2%	
3b Unit - D	Rear elevation, at bottom left corner of bedroom 3 window	14.8%	
3b Unit - D	Rear elevation, at bottom right corner of bedroom 3 window	16.3%	
3a Unit – E	Rear elevation, at bottom left corner of bedroom 3 window	13.8%	
3a Unit – E	Rear elevation, at bottom right corner of bedroom 3 window	8.9%	
3a Unit – E	Rear elevation, bottom right corner of bedroom 2 sliding door	20.5%	
3a Unit – E	Rear elevation, bottom right corner of bedroom 1 window	13.4%	
3a Unit – E	Rear elevation, southern corner 100 below fascia	62.2%	3e 99
3a Unit – E	Rear elevation, southern corner 1400mm above inter-storey	60.8%	
3a Unit – E	Rear elevation, southern corner 1400mm below inter-storey	27.4%	
3a Unit – E	Rear elevation, southern corner at base	27.5%	
3a Unit – E	Rear elevation, south corner of stair well 600mm below fascia	21.0%	
3a Unit – E	Rear elevation, south corner of stair well above inter-storey	16.9%	
3a Unit – E	Rear elevation, south corner of stair well below inter-storey	19.3%	
3a Unit – E	Rear elevation, south corner of stair well at base	20.3%	

The CAD sketch drawing below shows all invasive moisture readings taken externally on the Rear elevation; note all readings over 20% are shown marked in red, some probe readings were below the 20% threshold





Note: Hatched areas on the above sketch drawings are the areas which, in my view, have sustained damage to the framing and other building elements, due to water/moisture ingress.
During invasive testing it became evident that moisture is ingressing into the wall cavities, as moisture readings into the timber framing were registering in excess of 18% in resistance mode

11.3 Further Investigation: Current Damage – (Elevation 3) Rear

Cut-out Location	*Photo ref (if any)*	*Observations*
Cut out Nos. 10 and 11	3b 75 to 3b 82 3c 83 to 3c 84 3d 85 to 3d 96 3e 97 to 3e 101	The roof parapets have not been constructed in accordance the Building Consent documents and have failed. The parapet cap flashing junctions and joints have been badly constructed and merely surface sealed with unprotected sealant. The apron flashings at the western end of the parapets have been incorrectly installed, and kick-out or diverter flashings have not been fitted, consequently roof water is entering the wall cavities at the north west and south west corners at the roof-parapet junction causing fungal deca to the wall framing. The Harditex™ cladding as fixed appears not to be in compliance with the James Hardie Technical Information 1998 for the following reasons ➢ The Sheet configuration is not in accordance with Section 3: Fig. 12, 13, and 14 page 10 ➢ The installation of the proprietary H mould, vertical and horizontal control joints have not been installed in accordance with Section 4 Fig. 23, to 26 and Fig. 31 to 34, pages 15 to 18; none of the corner mitre or horizontal butt joints has been adequately sealed or is watertight. ➢ The installation of the aluminium joinery is not in accordance with Section 3: Fig. 15 to 18, pages 11 and 12; or Section 6 Fig. 58 to 62 page 38; there was no evidence of jamb or sill flashings or proprietary seals correctly installed, some of the windows have failed. ➢ The ground clearance on this elevation is not in accordance with Section 5: Fig. 46, to 48 pages 26and 27, consequently damage has occurred to the lower framing.. The result of the above listed variations from the Harditex™ Technical Information and recommendations in my view is causing the premature breakdown of the cladding system and is allowing water ingress into the wall cavities causing damage.

11.4 Further Investigation: Future Likely Damage – (Elevation 3) Rear

Cu-tout location	*Photo ref (if any)*	*Observations*
N/A	N/A	Recommend full Reclad: No Future Likely Damage

12. Investigative Observations – (Elevation 4) Unit C - Side

12.1 Visual Assessment – (Elevation 4) Side

12.1.1 A preliminary visual investigation was carried out and capacitance moisture readings were carried out at critical locations.

- At eaves to wall junctions
- At the inter-storey joint
- Around all openings
- At ground level
- At wall to parapet wall junctions

12.1.2 The following locations were found to be at high risk and potential leak areas during the New Zealand Building Code specified life of the building component.

- The wall to fascia junction was open and had not been sealed
- There are no vertical control joints installed
- Harditex™ sheet configuration is incorrec
- Window opening jamb and sill flashings were incorrect and have failed
- The apron flashings to the main roof have been incorrectly installed and do not have the required kick-out flashing to prevent water entering in behind the wall cladding
- The horizontal inter-storey joints have been incorrectly installed and are allowing water ingress
- The balcony wall junctions do not have adequate saddle flashings and are allowing water ingress

12.1.3 The New Zealand Building Code specified life of the building components is:

1. Not less than 50 years if those building elements provide structural stability to the building.
2. Not less than 15 years if those building elements form part of the building envelope.
3. Not less than 5 years for linings, renewable coatings fittings and other building elements to which there is ready access.

12.2 Moisture Readings – (Elevation 4) Side

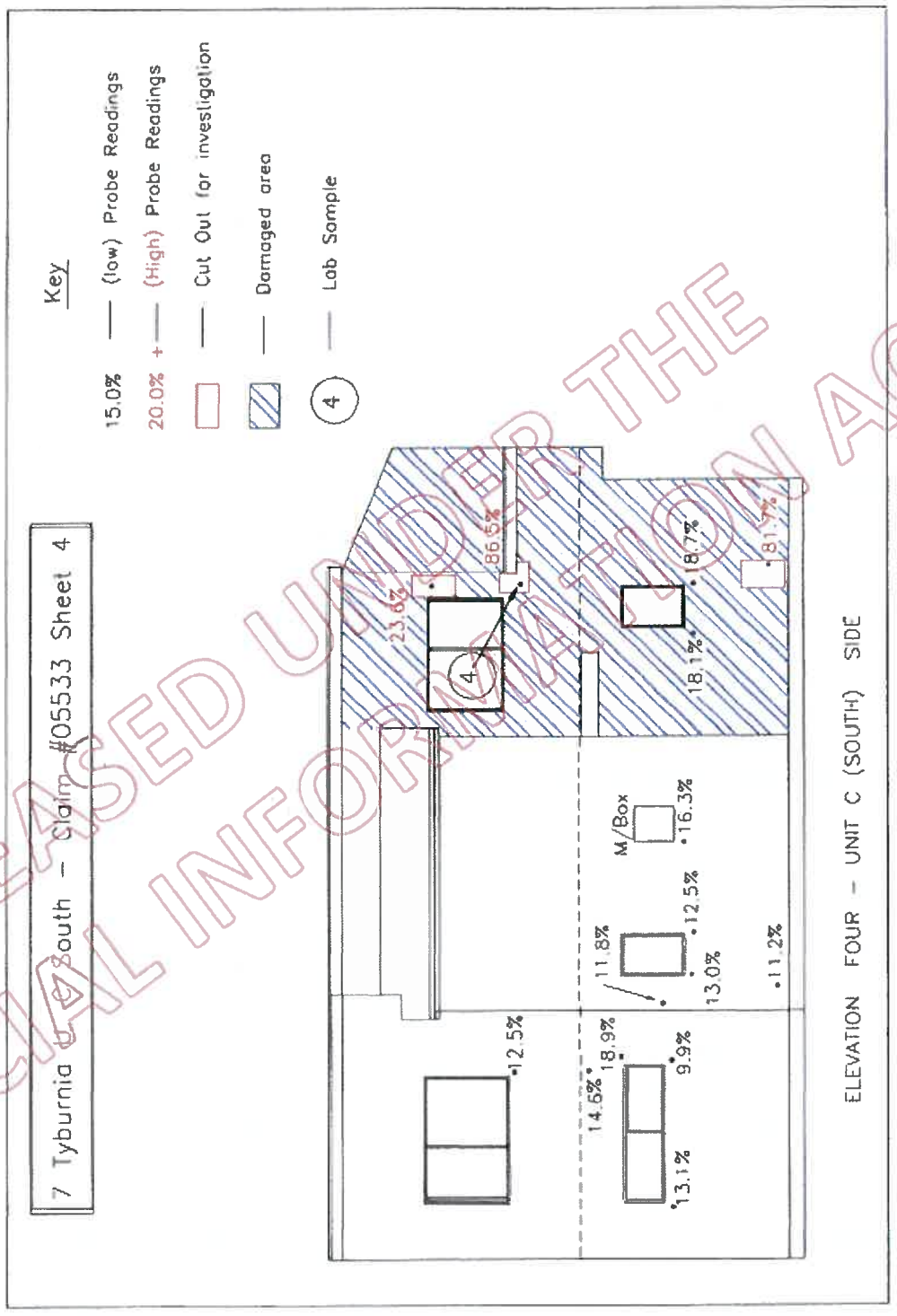
Note: All moisture readings can be identified as to locality on the CAD sketch drawing inserted below

12.2.1 The maximum "in service" moisture content for untreated timber, as documented in NZS 3602: 1995, to achieve a 50-year durability is 18%. Readings for untreated timber below 18% indicate dry or slightly damp timber. Readings 19% - 29% indicate moisture accumulation above the "in service" maximum but below decay initiation levels; active decay will still grow. Readings above 30% moisture content indicate wet timber at a level where timber decay onset may initiate.

12.2.2 Moisture readings exceeding the "in service" percentage documented in NZS 3602 to achieve a 50 year durability i.e. readings between 18% and 86.5% have been recorded and highlighted in red in the tables below, a number of readings were below 18%.

Probe Elevation	Description of Probe location	Moisture reading	Photo no.
4 – Unit C	South east corner, Cut out at head of living room window	23.6%	4c 102
4 – Unit C	South wall, Cut out No. 4 below balcony wall saddle	86.5%	4c 104
4 – Unit C	Below right side of garage window sill	18.7%	
4 – Unit C	Below left side of garage window sill	18.1%	
4 – Unit C	South wall, Cut out below garage window at base	81.7%	4c 105
4 – Unit C	South wall, below left side of meter box	16.3%	
4 – Unit C	South wall, below left side of stair well window	12.5%	
4 – Unit C	South wall, below right side of stair well window	13.0%	
4 – Unit C	South wall, at external corner of stair well, 1600mm from base	11.8%	
4 – Unit C	South wall, 300mm from external corner of stair well at base	11.2%	
4 – Unit C	South wall, right side of Bedroom 1 window sill	12.5%	
4 – Unit C	South wall, near west corner of stair well below inter-storey	14.6%	
4 – Unit C	South wall, right side of Bedroom 2 window head	18.9%	
4 – Unit C	South wall, right side of Bedroom 2 window sill	9.9%	
4 – Unit C	South wall, left side of Bedroom 2 window sill	13.1%	

The CAD sketch drawing below shows all invasive moisture readings taken externally on the eastern elevation; note all readings over 20% are shown marked in red, some probe readings were below the 20% threshold



Note: Hatched areas on the above sketch drawings are the areas which, in my view, have sustained damage to the framing and other building elements, due to water/moisture ingress.
During invasive testing it became evident that moisture is ingressing into the wall cavities, as moisture readings into the timber framing were registering in excess of 18% in resistance mode.

12.3 Further Investigation: Current Damage – (Elevation 4) Side

Cut-out Location	*Photo ref (if any)*	*Observations*
		The roof parapets have not been constructed in accordance the Building Consent documents and have failed. The cap flashing is flat and water is ponding around joins, there is no up-stand to the front parapet causing water ingress into the wall cavities. The parapet cap flashing junctions and joints have been badly constructed and merely surface sealed with unprotected sealant. The junctions where the balcony wall timber capping intersects with the eastern wall do not have saddle flashings installed, consequently gravitational water is able to ingress into the wall cavities below which is causing extensive damage to the wall framing below, the 450x100mm garage support beams and the balcony floor joists and substrate. The Harditex™ cladding as fixed appears not to be in compliance with the James Hardie Technical Information 1998 for the following reasons ➢ The Sheet configuration is not in accordance with Section 3: Fig. 12, 13, and 14 page 10 ➢ The installation of the proprietary H mould, vertical and horizontal control joints have not been installed in accordance with Section 4 Fig. 23, to 26 and Fig. 31 to 34, pages 15 to 18; none of the corner mitre or horizontal butt joints has been adequately sealed or is watertight. ➢ The installation of the aluminium joinery is not in accordance with Section 3: Fig. 15 to 18, pages 11 and 12; or Section 6 Fig. 58 to 62 page 38; there was no evidence of jamb or sill flashings or proprietary seals correctly installed, some of the windows have failed. ➢ The ground clearance on this elevation is not in accordance with Section 5: Fig. 46, to 48 pages 26and 27, consequently damage has occurred to the lower framing. ➢ The Harditex™ clad balcony walls and wing walls on this elevation are not in accordance with Section 6: Fig. 68 page 39; the timber capping has failed. The method of fixing the metal handrails is also poor building practise and has failed. The result of the above listed variations from the Harditex™ Technical Information and recommendations in my view is causing the premature breakdown of the cladding system and is allowing water ingress into the wall cavities causing damage.

12.4 Further Investigation: Future Likely Damage – (Elevation 4) Side

Cu-tout location	*Photo ref (if any)*	*Observations*
N/A	N/A	Recommend full Reclad: No Future Likely Damage

13. Investigative Observations – (Elevation 5) Unit D - Side

13.1 Visual Assessment – (Elevation 5) Side

13.1.1 A preliminary visual investigation was carried out and capacitance moisture readings were carried out at critical locations.

- At fascia to wall junctions
- At the inter-storey joint
- Around all openings
- At ground level

12.1.2 The following locations were found to be at high risk and potential leak areas during the New Zealand Building Code specified life of the building component.

- The wall to fascia junction was open and had not been sealed
- There are no vertical control joints installed
- Harditex™ sheet configuration is incorrect
- Window opening-jamb and sil flashings were incorrect and have failed
- The apron flashings to the main roof have been incorrectly installed and do not have the required kick-out flashing to prevent water entering in behind the wall cladding
- The horizontal inter-storey joints have been incorrectly installed and are allowing water ingress
- The balcony wall junctions do not have adequate saddle flashings and are allowing water ingress

13.1.3 The New Zealand Building Code specified life of the building components is:

1. Not less than 50 years if those building elements provide structural stability to the building.
2. Not less than 15 years if those building elements form part of the building envelope.
3. Not less than 5 years for linings, renewable coatings fittings and other building elements to which there is ready access.

13.2 Moisture Readings – (Elevation 5) Side

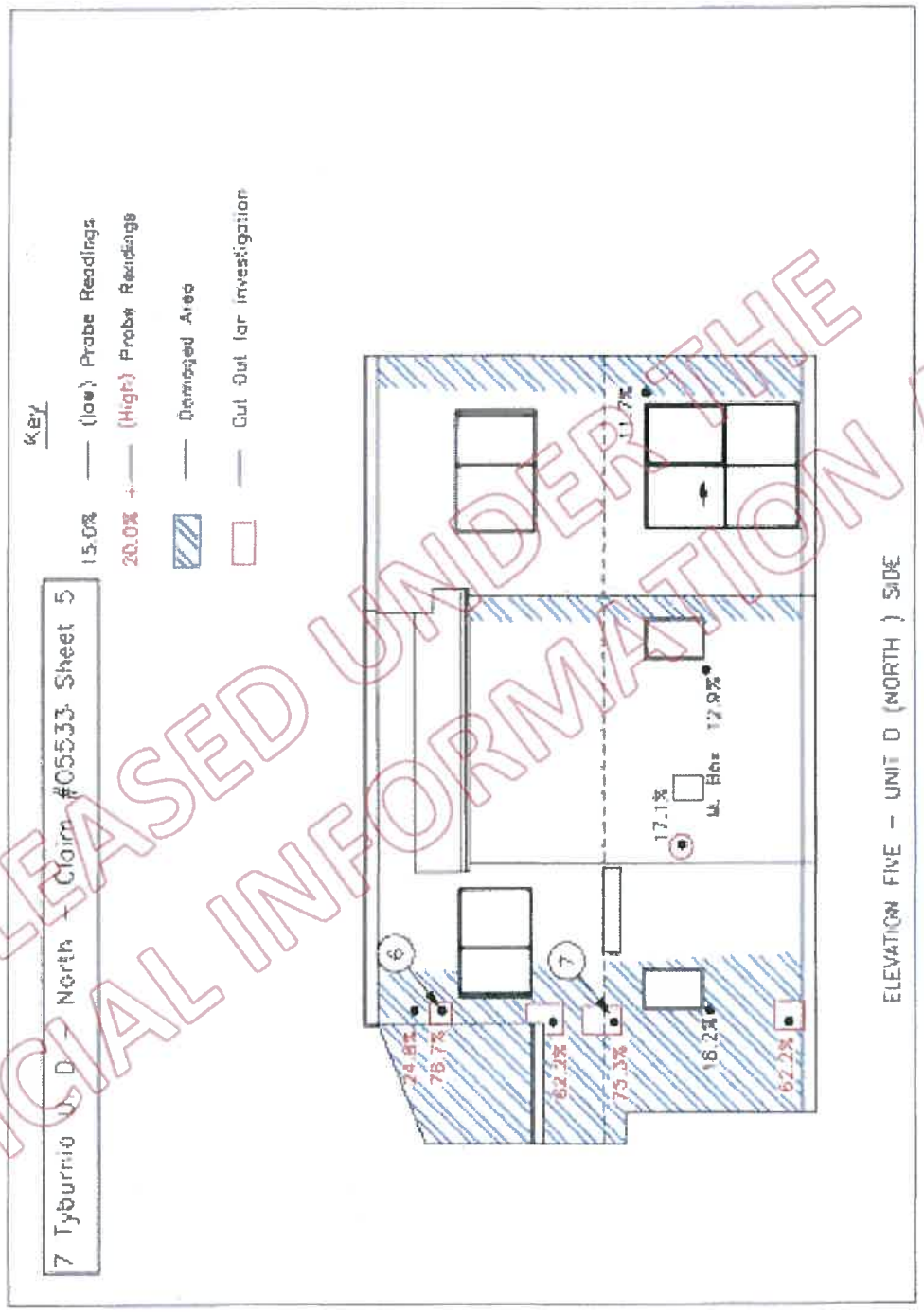
Note: All moisture readings can be identified as to locality on the CAD sketch drawing inserted below

13.2.1 The maximum "in service" moisture content for untreated timber, as documented in NZS 3602: 1995, to achieve a 50-year durability is 18%. Readings for untreated timber below 18% indicate dry or slightly damp timber. Readings 19% - 29% indicate moisture accumulation above the "in service" maximum but below decay initiation levels; active decay will still grow. Readings above 30% moisture content indicate wet timber at a level where timber decay onset may initiate.

13.2.2 Moisture readings exceeding the "in service" percentage documented in NZS 3602 to achieve a 50 year durability i.e. readings between 18% and 78.7% have been recorded and highlighted in red in the table below, a number of readings were below 18%.

Probe Elevation	Description of Probe location	Moisture reading	Photo no.
5 – Unit D	Probe reading below interstorey at north east corner	24.8%	5d 109
5 – Unit D	North wall, Cut out No. 6 above head of living room window	78.7%	5d 111
5 – Unit D	North wall, Cut out below balcony wall saddle	62.2%	5d 112
5 – Unit D	North wall, Cut out No. 7 below inter-storey	75.3%	5d 114
5 – Unit D	Below left side of garage window sill	18.2%	
5 – Unit D	North wall, Cut out below garage window at base	62.2%	5d 116
5 – Unit D	North wall, Cut out north east corner adjacent to meter box	17.1%	
5 – Unit D	North wall, below left side of stair well window	12.9%	
5 – Unit D	North wall, at top right side of bedroom 2 sliding door	11.7%	

The CAD sketch drawing below shows all invasive moisture readings taken externally on the eastern elevation; note all readings over 20% are shown marked in red, some probe readings were below the 20% threshold



Note: Hatched areas on the above sketch drawings are the areas which, in my view, have sustained damage to the framing and other building elements, due to water/moisture ingress.
During invasive testing it became evident that moisture is ingressing into the wall cavities, as moisture readings into the timber framing were registering in excess of 18% in resistance mode.

13.3 Further Investigation: Current Damage – (Elevation 5) Side

Cut-out Location	*Photo ref (if any)*	*Observations*
		The roof parapets have not been constructed in accordance the Building Consent documents and have failed. The cap flashing is flat and water is ponding around joins, there is no up-stand to the front parapet causing water ingress into the wall cavities. The parapet cap flashing junctions and joints have been badly constructed and merely surface sealed with unprotected sealant. The junctions where the balcony wall timber capping intersects with the eastern wall do not have saddle flashings installed, consequently gravitational water is able to ingress into the wall cavities below which is causing extensive damage to the wall framing below, the 450x100mm garage support beams and the balcony floor joists and substrate. The Harditex™ cladding as fixed appears not to be in compliance with the James Hardie Technical Information 1998 for the following reasons ➢ The Sheet configuration is not in accordance with Section 3: Fig. 12, 13, and 14 page 10 ➢ The installation of the proprietary H mould, vertical and horizontal control joints have not been installed in accordance with Section 4 Fig. 23, to 26 and Fig. 31 to 34, pages 15 to 18; none of the corner mitre or horizontal butt joints has been adequately sealed or is watertight. ➢ The installation of the aluminium joinery is not in accordance with Section 3: Fig. 15 to 18, pages 11 and 12; or Section 6 Fig. 58 to 62 page 38; there was no evidence of jamb or sill flashings or proprietary seals correctly installed, some of the windows have failed. ➢ The ground clearance on this elevation is not in accordance with Section 5: Fig. 46, to 48 pages 26and 27, consequently damage has occurred to the lower framing. ➢ The Harditex™ clad balcony walls and wing walls on this elevation are not in accordance with Section 6: Fig. 68 page 39; the timber capping has failed. The method of fixing the metal handrails is also poor building practise and has failed. The result of the above listed variations from the Harditex™ Technical Information and recommendations in my view is causing the premature breakdown of the cladding system and is allowing water ingress into the wall cavities causing damage.

13.4 Further Investigation: Future Likely Damage – (Elevation 5) Side

Cu-tout location	*Photo ref (if any)*	*Observations*
N/A	N/A	Recommend full Reclad: No Future Likely Damage

14. Investigative Observations – (Elevation 6) Unit E Side

14.1 Visual Assessment – (Elevation 6) Side

14.1.1 A preliminary visual investigation was carried out and capacitance moisture readings were carried out at critical locations.

- At fascia to wall junctions
- At the inter-storey joint
- Around all openings
- At ground level
- At wall to parapet wall junctions

14.1.2 The following locations were found to be at high risk and potential leak areas during the New Zealand Building Code specified life of the building component.

- The wall to fascia junction was open and had not been sealed
- There are no vertical control joints installed
- Harditex™ sheet configuration is incorrect
- Window opening jamb and sill flashings were incorrect and have failed
- The apron flashings to the main roof have been incorrectly installed and do not have the required kick-out flashing to prevent water entering in behind the wall cladding
- The horizontal inter-storey joints have been incorrectly installed and are allowing water ingress
- The balcony wall junctions do not have adequate saddle flashings and are allowing water ingress

14.1.3 The New Zealand Building Code specified life of the building components is:

1. Not less than 50 years if those building elements provide structural stability to the building.
2. Not less than 15 years if those building elements form part of the building envelope.
3. Not less than 5 years for linings, renewable coatings fittings and other building elements to which there is ready access.

14.2 Moisture Readings – West Elevation

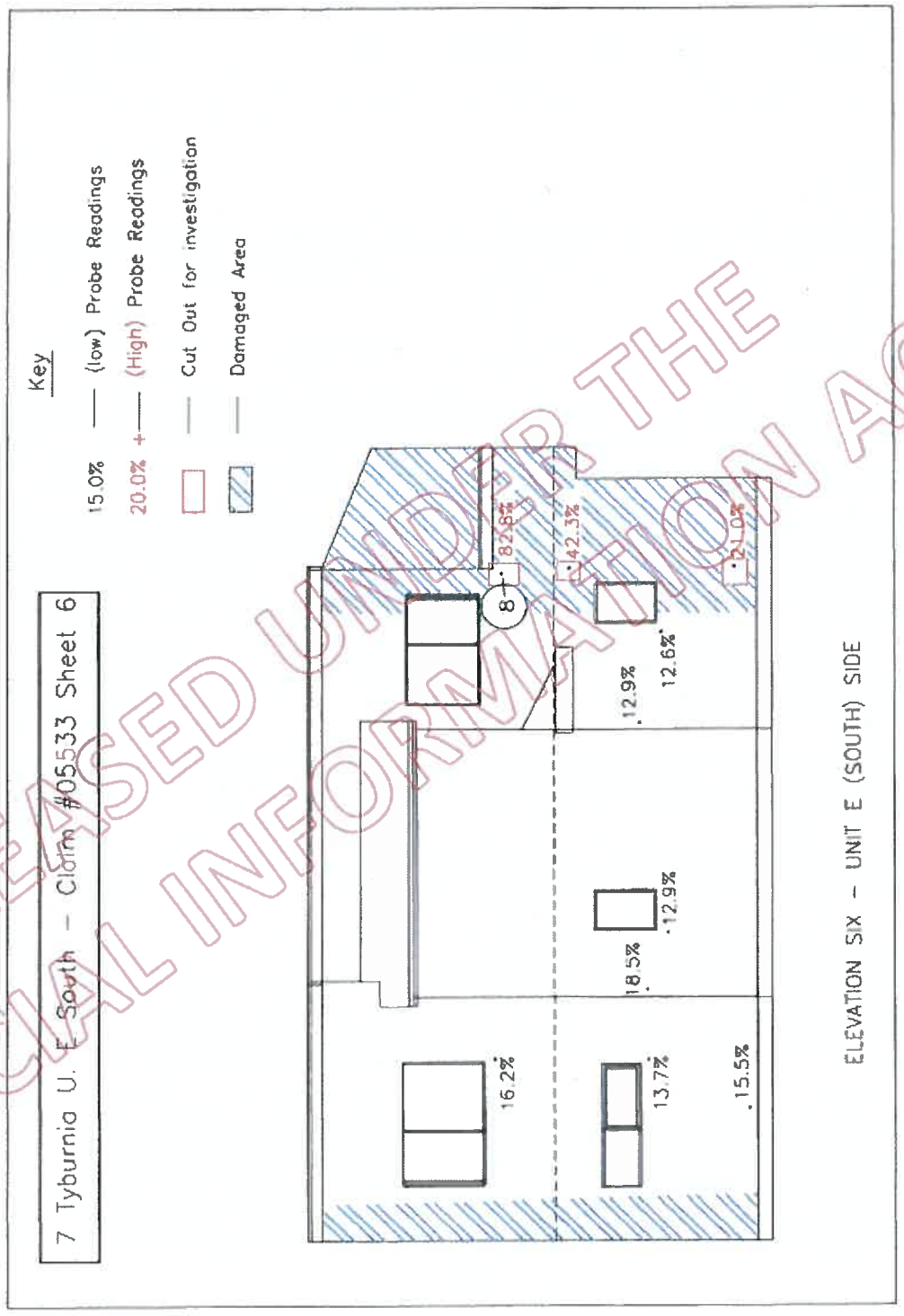
Note: All moisture readings can be identified as to locality on the CAD sketch drawing inserted below

14.2.1 The maximum "in service" moisture content for untreated timber, as documented in NZS 3602: 1995, to achieve a 50-year durability is 18%. Readings for untreated timber below 18% indicate dry or slightly damp timber. Readings 19% - 29% indicate moisture accumulation above the "in service" maximum but below decay initiation levels; active decay will still grow. Readings above 30% moisture content indicate wet timber at a level where timber decay onset may initiate.

14.2.2 Moisture readings exceeding the "in service" percentage documented in NZS 3602 to achieve a 50 year durability i.e. readings between 18% and 82.8% have been recorded and highlighted in red in the table below, a number of readings were below 18%.

Probe Elevation	Description of Probe location	Moisture reading	Photo no.
6 – Unit E	South wall, Cut out No. 8 below balcony wall saddle	82.8%	6e 119
6 – Unit E	South wall, Cut out below inter-storey	42.3%	6e 120
6 – Unit E	Below left side of garage window sill	12.6%	
6 – Unit E	South wall, adjacent to front entry 1400mm from base	12.9%	
6 – Unit E	South wall, Cut out below garage window at base	21.0%	
6 – Unit E	South wall, below left side of stair well window	12.9%	
6 – Unit E	South wall, western corner of stair well 1500mm from base	18.5%	
6 – Unit E	South wall, at bottom right side of bedroom 1 window	16.2%	
6 – Unit E	South wall, at bottom right side of bedroom 2 window	13.7%	
6 – Unit E	South wall, at bottom below bedroom 2 window at base	15.5%	

The CAD sketch drawing below shows all invasive moisture readings taken externally on the eastern elevation; note all readings over 20% are shown marked in red, some probe readings were below the 20% threshold



Note: Hatched areas on the above sketch drawings are the areas which, in my view, have sustained damage to the framing and other building elements, due to water/moisture ingress.
During invasive testing it became evident that moisture is ingressing into the wall cavities, as moisture readings into the timber framing were registering in excess of 18% in resistance mode.

14.3 Further Investigation: Current Damage – (Elevation 6) Side

Cut-out Location	*Photo ref (if any)*	*Observations*
		The roof parapets have not been constructed in accordance the Building Consent documents and have failed. The cap flashing is flat and water is ponding around joins, there is no up-stand to the front parapet causing water ingress into the wall cavities. The parapet cap flashing junctions and joints have been badly constructed and merely surface sealed with unprotected sealant. The junctions where the balcony wall timber capping intersects with the eastern wall do not have saddle flashings installed, consequently gravitational water is able to ingress into the wall cavities below which is causing extensive damage to the wall framing below, the 450x100mm garage support beams and the balcony floor joists and substrate. The Harditex™ cladding as fixed appears not to be in compliance with the James Hardie Technical Information 1998 for the following reasons ➢ The Sheet configuration is not in accordance with Section 3: Fig. 12, 13, and 14 page 10 ➢ The installation of the proprietary H mould, vertical and horizontal control joints have not been installed in accordance with Section 4 Fig. 23, to 26 and Fig. 31 to 34, pages 15 to 18; none of the corner mitre or horizontal butt joints has been adequately sealed or is watertight. ➢ The installation of the aluminium joinery is not in accordance with Section 3: Fig. 15 to 18, pages 11 and 12; or Section 6 Fig. 58 to 62 page 38; there was no evidence of jamb or sill flashings or proprietary seals correctly installed, some of the windows have failed. ➢ The ground clearance on this elevation is not in accordance with Section 5: Fig. 46, to 48 pages 26and 27, consequently damage has occurred to the lower framing. ➢ The Harditex™ clad balcony walls and wing walls on this elevation are not in accordance with Section 6: Fig. 68 page 39; the timber capping has failed. The method of fixing the metal handrails is also poor building practise and has failed. The result of the above listed variations from the Harditex™ Technical Information and recommendations in my view is causing the premature breakdown of the cladding system and is allowing water ingress into the wall cavities causing damage.

14.4 Further Investigation: Future Likely Damage – (Elevation 6) Side

Cu-tout location	*Photo ref (if any)*	*Observations*
N/A	N/A	Recommend full Reclad: No Future Likely Damage

15 Compliance Relating to Weathertightness

15.1 Due to the incorrect installation of the Harditex™ exterior cladding system, the absence of saddle flashings at the east wall to balcony wall junctions and balcony wall to wing wall junctions, and the absence of apron kick-out flashings, the performance requirements of the New Zealand Building Code 1992 clause E2 External Moisture has not been achieved; therefore the requirements of clauses B2 – Durability and B1 – Structure of the New Zealand Building Code 1992, have not met.

16. Health and Safety Issues

Toxic mould:

A number of different moulds and fungi were identified during the assessment; these have been identified in the Laboratory Reports attached in **Appendix H.** (Pages 202 to 228): extreme care and precautions should be taken during the removal of interior linings or exterior cladding, refer OSH Regulations.

17. Conclusions

17.1 Does the Multi Unit Complex leak?

17.1.1 Yes: Water has penetrated the dwellinghouses due to aspects of the design, construction methods; variance from aspects of material manufactures specifications, Building Consent details and poor building practice: **Refer Photographs, Appendix G** (Page 119 to 200)

17.2 Where and why does it leak?

17.2.1 The dwellinghouse has leaked at the following locations:

Elevation: 1 – Front

- Water has ingressed into the wall cavities due to the incorrect roof design
- The incorrect installation of the cladding system,
- The poorly installed inter-storey joints
- The omission of appropriate saddle flashings at balcony wall junctions
- At the unsealed wall to fascia junctions
- At the heads of the living room sliding doors
- At the bottom plate

Elevation: 2 – Side

- Water has ingressed into the wall cavities due to the incorrect roof design
- The incorrect installation of the cladding system
- The poorly installed inter-storey joints,
- The omission of appropriate saddle flashings at balcony wall junctions
- At the base of the living room window

Elevation: 3 – Rear

- Water has ingressed into the wall cavities due to the incorrect installation of the cladding system
- The poorly installed inter-storey joins
- The badly installed roof apron flashings
- The omission of diverter flashing at the base of the roof aprons
- At the bottom corner of Unit E bedroom sliding door
- At the bottom plate

Elevation: 4 – Side

- Water has ingressed into the wall cavities due to the incorrect roof design
- The incorrect installation of the cladding system
- The poorly installed inter-storey joints,
- The omission of appropriate saddle flashings at balcony wall junctions
- At the head of the living room window
- At the bottom plate

Elevation: 5 – Side

- Water has ingressed into the wall cavities due to the incorrect roof design
- The incorrect installation of the cladding system
- The poorly installed inter-storey joints,
- The omission of appropriate saddle flashings at balcony wall junctions
- At the head of the living room window
- At the bottom of the garage window
- At the bottom plate

Elevation: 6 – Side

- Water has ingressed into the wall cavities due to the incorrect roof design
- The incorrect installation of the cladding system
- The poorly installed inter-storey joints,
- The omission of appropriate saddle flashings at balcony wall junctions
- At the bottom plate

17.2.2 Inter-storey Joints

A proprietary uPVC horizontal jointer has been used at the interstorey junction on all elevations. The jointers typically have not been installed correctly and the installation would seem to be in variance with the James Hardie Horizontal Flashing Control Joint as detailed at Detail 25, 26 and 27 of the James Hardie Technical Information: July 1998, consequently moisture ingress is occurring at butt joins and corner junctions.

17.2.3 Flashings

- Gravitational and capillary driven water has penetrated the wall cavities at the wall to balcony wall junctions causing advanced fungal and timber decay
- Due to the variance from the consent drawings the roof parapet flashings on the front elevation are allowing water ingress into the wall and roof cavities causing fungal and timber decay.
- Due to the incorrect installation of the wing wall cap flashings gravitational water has entered the wall cavities causing fungal and timber decay

17.3 What damage has been caused to the Multi Unit Complex?

17.3.1 The nature and extent of any damage caused by water entering the dwellinghouse is as follows:

- Damage by way of water entry into the wall cavities has occurred at all elevations causing fungal and timber decay to the framing and building wrap, interior wall linings and trim on all elevations , toxic mold growth was encountered
- Damage by way of water entry and fungal decay has occurred to the 450x100mm garage beams, garage floor/ceiling joists, balcony floor substrate and interior wall and ceiling linings.

.

17.4 Where and why might it leak in the future?

Providing the dwellinghouse is totally reclad in accordance with the provisions of the NZBC 2004 and related legislation, there should be no future leaks.

17.5 What damage might be caused by a leak in the future?

Providing the dwellinghouse is totally reclad in accordance with the provisions of the NZBC 2004 and related legislation, there should be no future damage from leaks.

17.6 What remedial work is required to: stop current leaks?

17.6.1 Temporarily seal all flashings.

17.6.2 Temporarily seal all cracks to the exterior cladding and seal all openings in the inter-storey join.

17.6.3 Temporarily seal all cracks and gap to the aluminium window openings.

17.7 What remedial work is required to: repair current damage and prevent future leaks?

- Erect suitable scaffold and provide site protection where necessary.
- Temporarily disconnect electrical and plumbing fittings for re-use.
- Temporarily remove and set aside for re-use spouting and down pipes.
- Remove exterior Harditex cladding and remove from site.
- Remove existing building wrap.
- Remove balcony tiles, membrane and substrate.
- Assess and remove all decayed balcony floor joists, 450x100mm beam, associated framing affected wall and ceiling linings.
- Temporarily remove and set aside for re-use sectional garage doors
- Temporarily remove and set aside for re-use where practical, all fascia and eaves material.
- Temporarily remove aluminium joinery and set aside for future re-use.
- Remove all fibre glass insulation and remove from site
- Cut away and remove from site any decayed framing: allow for removing at least 1m from visually affected timber; replace decayed frame with timber to a treatment level not less than H1.2 and in accordance with NZS 3602:2003.
- Replace garage beam and reconstruct balconies and inter-tenancy wing walls maintaining approved fire rating; all balcony framing to comply with NZS 3602:2003.

- Treat all remaining timber frame with Frame-saver or similar approved treatment.
- Reconstruct balcony balustrade walls to comply with NZBC 2004: F4
- Fit new parapet and roof flashings and repair roof to comply with NZMRM Code of practice section 5.
- Strip any internal Gibraltar board lining damaged by framing replacement and remove from site; include replacement and re-plastering to a level 5 finish or to match existing.
- Re-install aluminium joinery allowing for the replacement of reveals to accommodate a cavity cladding system. Ensure all head, jamb and sill flashing comply with NZBC E2/ AS1
- Replace or renew wall cavity and ceiling insulation as required.
- Fit new building wrap to the exterior and re-clad with Monotek™ cavity system or similar; allow for all flashings associated with the cavity system and ensure all minimum ground clearances are achieved in accordance with NZBC E2/AS1
- Reinstate or replace fascias eaves and replace associated roof flashings.
- Supply Fix and Stop Gibraltar Board to all affected areas
- Replace skirting, architraves and interior trim and redecorate.
- Clear site of all debris and make good any damaged landscaping.

17.8 How much will the remedial work cost?

The estimated cost of that work is as follows:

The total estimated cost to repair the damage is $620,513.65 (Inclusive of GST): **Refer Appendix (J)** pages 268 to 273

Note 1: This is a costing based on inspection and information forwarded to the Quantity Surveyor at this time. All costings were provided by Hughes Hill Maddren Limited, Quantity Surveyors; however it is advisable to obtain more that one quote before carrying out any remediation.

Note 2: As in my view a total re-clad will be required, it is not envisaged that Future Likely Damage will be necessary.)

17.9 Summary Tables

Summary Table 1 - Current Damage

Building component	*Damage*	*Scope of repair*	*Cost*
Cladding, Flashings, Roof, Balconies, Framing and Linings Structural repairs	Decayed framing, Re-clad, Balconies, Structural failure, Roof and flashings	Total Reclad, Repair roof, Replace flashings, Carryout Structural repairs, re-construct balconies, re-decorate	$620,513.65

Summary Table 2 - Future Likely Damage / Not applicable

Building component at risk	*Why the location is likely to allow water ingress*	*Scope of repair*	*Cost*
		Na	Na

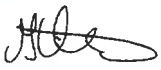
18. Parties to the Claim

The parties to the claim are as follows:

Party	*Involvement*
St Lukes Properties Limited/ Francis Collins	Developer / Owner/ Head Contractor
Peninsular Construction Limited	Developer/ Building Contractor
Archiplan Design/ Mike Hill	Designed and produced working plans
Auckland City Council	Territorial Authority and Building Certifier
Michelle Young	Claimant/Owners agent

19. Eligibility Statement

In my opinion the claim in respect of the Multi Unit Complex that is the subject of this report *meets* the criteria set out in section 16 of the Weathertight Homes Resolution Services Act 2006.

WHRS Assessor's name	Allen Miller
Signature	
Date	30th January 2008

20. APPENDICES

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APPENDIX A

Claim information summary **1 Page**

Appendix A – Claim information summary (from Claims Advisor)

Department of Building and Housing
Te Tari Kaupapa Whare

Claim Information Summary

DBH case number	05533		
Property address	7 Tyburnia Ave, Mt Roskill, Auckland		
Claimant name	7 Tyburnia Ave Body Corporate		
Claimant status	☐ Owner	☒ Owner's representative	
Site legal description	All units on DP204595		
Unit title - Site			
Unit title - Subject property			
Body Corporate	204595		
Assessor's Report type	☒ Full	☐ Eligibility *	
Documents provided	☒ Application form	☒ Statutory declaration	
*Evidence of "within time"**	☐ Code Compliance Certificate Date:	☐ Habitation evidence Type:	
Assessment required by this report	☒ Unit property and Common property ☐ One Unit only (no common property or other units assessed)* ☐ The Common property only* ☐ Stand-alone property ☐ Stand-alone complex property* *check for damage to unclaimed property		
Assessor name	Allen Miller		
Date Received	*3 September 2007*	*Date allocated*	27 September 2007

*The dwelling house to which the claim relates must be less than 10 years old, or the alterations which are causing the leaks are less than 10 years old, at the time of applying to use the service.

AS001

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Issued: 01/04/07

APPENDIX B

Assessor Qualifications **1 Page**

Appendix B – Assessor Qualifications

QUALIFICATIONS and MEMBERSHIPS

- Member MNZIBS – Admitted membership October 1997
- Registered IQP – South Island IQP Register
- Level One Certificate in CAD drawing, Christchurch Polytechnic.
- Intermediate Certificate in CAD drawing, Christchurch Polytechnic.
- Selected judge Master Builders House of the Year Awards 2001
- Completion of Weathertightness Course/Examination November 2002

EXPERIENCE

- Over 48 years building and related trades experience
- Building Consultant – 13 years.
- Building Consultant new homes including supervision and Branch Management – 20 years.
- Aluminium joinery and Decramastic roofing sales ands service – 4 years.
- Joiner/carpenter and self employed – 10 years

I consider I have a strong background in the building industry; my career has provided exposure to most aspects of design and construction. For many years I have carried out architectural design and draughting on a part-time basis. In the late 90s I completed two 18-week courses in computerized drawing and achieved certificates at both levels.

My ten years as a Building Consultant for Property Check Limited has enabled me to gain experience in weathertightness. For the past 10 years, I have specialized in maintenance programming and problem solving in the commercial field and exterior cladding and weathertightness in the residential field.

During the past four and a half years, I have contracted as an Independent Assessor for WHRS, The BIA and in more recent times Department of Building and Housing.

APPENDIX C

Extracts from the WHRS Act (2006 **2 Pages**