



**March 2005**

**Partial Building Defects Survey Report**

**Of**

**Basement & units 1,2,3,5,6 & 7** (bathrooms & balconies)

**Rose Bay**

**For**

**The Owners Corporation**  
Strata Plan No 67XXX

**Prepared By**  
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**LEGEND**

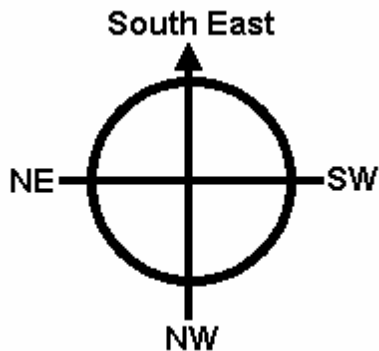
- Poor** = Inferior and in most cases requires significant repair / replacement.  
**Fair** = Moderately good and in most cases either minor or smaller repairs will suffice  
**Good** = Most advantageous, dose not require further work.

The **weather** just prior to and/ or during our inspections was;

- Dry Sunny                       Light Showers                       Raining

**PROPERTY DIRECTION**

The Carlisle St frontage of the property faces:

**ABBREVIATIONS/ EXPLANATIONS LEGEND**

<b>A.C.</b>	= Asbestos Cement	<b>H/wd</b>	= Hardwood
<b>A/C</b>	= Air Conditioner	<b>H.W.S.</b>	= Hot Water Service
<b>AL</b>	= Aluminium	<b>L.H.S.</b>	= Left Hand Side
<b>Br/Wk</b>	= Brickwork	<b>L.m.</b>	= Linear Metre
<b>Co-ax</b>	= Coaxial Cable	<b>M.D.F.</b>	= Medium Density Fibreboard
<b>BCA</b>	= Building Code Of Australia	<b>M.C.</b>	= moisture content (expressed as %)
<b>C.I.</b>	= Cast Iron	<b>M</b>	= Metre
<b>C/W</b>	= Cold Water	<b>m<sup>2</sup></b>	= Square Metre
<b>D/P</b>	= Down Pipe	<b>mm</b>	= Millimetre
<b>D.P.C.</b>	= Damp Proof Course	<b>P/Brd</b>	= Plaster Board
<b>D/W</b>	= Dishwasher	<b>Perps</b>	= Perpend
<b>E.L.C.B.</b>	= Earth Leakage Circuit Breaker	<b>R.C.D.</b>	= Residual Current Device
<b>F.C.</b>	= Fibre Cement	<b>R.H.S.</b>	= Right Hand Side <u>or</u> Rolled Hollow Section.
<b>FIB</b>	= Fire Indicator Board	<b>S.C.</b>	= Solid Core
<b>F.R.L</b>	= Fire Resistance Level	<b>S.H.S.</b>	= Square Hollow Section
<b>F.F.L.</b>	= Finished Floor Level /Line	<b>S.t.</b>	= steel trowel
<b>F.R.</b>	= Fire Rated/ Resistance	<b>S/W</b>	= Stormwater
<b>F.W.</b>	= Floor Waste	<b>W/M</b>	= Washing Machine
<b>G.I.</b>	= Galvanised Iron	<b>W/P</b>	= Waterproof
<b>G.P.O.</b>	= General Purpose Outlet	<b>P.V.C.</b>	= Poly Vinyl Chloride
<b>G.F.</b>	= Ground Floor. ( <b>L.G.F</b> ) = Lower Ground	<b>F.I.B.</b>	= Fire Indicator Board
<b>H.C.</b>	= Hollow Core		
<b>H/W</b>	= Hot Water		



## INTRODUCTION

Further to our 7.1.05 fee proposal I undertook a detailed building survey (on the 15.3.05 and follow up visit 31.3.05) of essentially the leaking basement carpark ceiling/ walls, Units 1,2, 3,5, 6 , & 7 bathrooms, most balcony balustrades and planters and Unit 7 flooding laundry and Unit 1 Bed1 leaking ceiling, for the client *Owners Corporation of SP No 67XXX*

Unit 4 was not inspected as the resident was not home during the course of my inspection.

Whilst not in my original brief I also inspected and have reported on various lower internal and external walls and windows for damp and the front and rear external façade.

Prior to completion of this report I reviewed the client supplied Stubbs & Cruickshank building inspection report, which highlighted a number of similar defects.

I do not agree with Stubbs & Cruickshank defect findings that Unit 1 external stairs (to pool) are not compliant with BCA requirements and that Unit 2 rear terrace hose cock requires a gully trap.

*Refer Annexure No 1* Building Repairs and Maintenance 11.4.05 indicative estimates for the various noted investigation works and defect repair recommendations as made by me within this report and which has been divided into basement, units 1, 2, 3, 5, 6 and 7 separately costed works.

I have reviewed these costings and based my experience within the industry I consider them reasonable for the comprehensive scope of works which have been included.

I have used these budget estimates within my report.

This building inspection report complies with *AS 4349.1* (Inspection of buildings - residential) and is based on the inspection of accessible and visible structures only and does not include the condition of inaccessible or concealed areas of buildings, nor the existence of pests or asbestos.

The report does not include specific reviews of the fire safety, mechanical, hydraulic, lift, electrical services and most structural and acoustic elements however; I have made some basic overviews and recommendations on some of these services.

No responsibility can be accepted for defects, which are latent or otherwise not reasonably detected on a visual inspection without interference with or removal of the structures, coverings or fittings of the building. I have not inspected woodwork or other parts of the structure which are covered, unexposed or inaccessible and I'm therefore unable to report that any such part of the structure is free from defect.

I have viewed and made reference to some Council held approved for construction architectural drawings and final certification documents within this report.

I note that *Westbury Developments P/L* were responsible for submission of the Development & Building Applications based of architectural drawings and a project specification as prepared by architects *Humphrey & Edwards* (Ph 9264 9705).

There was no Construction Certificate and very few warranties available within Council records.

Council officer Luke Oldfield advised me that Woollahra Council had been the project PCA (Principal Certifying Authority) and that Council issued the Occupation Certificate, which is a certificate which establishes that the building has reached a stage at which it complies with councils or authority standards for its particular classification and is suitable for occupation - *Refer Annexure No2*.

At the time of completing this report I had not received a response from Luke Oldfield (PCA) with respect to my 15.3.05 email query (*Refer Annexure No2a*) regarding the non-BCA compliant balcony balustrades. I recommend that a copy of this report be forwarded to Woollahra Council for review/ action.

I have not been made aware of the terms of the parties' contract pertaining to the property however; my overview relies on industry accepted good building practice, the BCA and A.S. minimum requirements.

The summary of 'primary and secondary repairs' at the front of this report is not a definitive listing of all major and non major repairs as the [whole of this report must be read](#) to fully determine same.



**SUMMARY OF DEFECT / ADVICE ISSUES****PRIMARY REPAIRS/ ISSUES (not in priority order listing)**

1. **Fire Safety Services;** recommend appointment of an independent fire engineer, to comprehensively inspect the fire safety services. Reinstate hard wired *smoke detector* to *Garage No7*.
- 1A **Floor & Separating Wall Penetrations;** remedial works maybe required so that requisite *F.R.L. ratings* are achieved, by correct sealing of noted penetrations and/ or gaps at separating walls or floors.
2. **Leakage's & Damp;**
  - (a) Potentially very *significant damp remedial works required* to *basement* ceiling slab, some perimeter *retaining and some lower staircase walls*.
  - (b) Arrest *falling and penetrating damp* with *Unit 1* as noted.
  - (c) Further investigate and rectify source of *moisture entry* and damp damage around noted *external window/doors* within noted units (e.g Units 1, 5 & 7) and rectify noted damaged surfaces. Likely additional cavity wall weep holes required.
  - (d) Further investigate and rectify source of moisture *gain/ seepage* within noted *planter boxes*.
  - (e) vendor to complete *incomplete Unit 3 & 5* window repair works as noted
3. **Bathroom Shower Areas;** potentially *very significant remedial works required* to all inspected and noted defective *shower areas* (predominantly for defective 'water stops' and shower recess floor falls) and rectify noted damaged surfaces.
4. **Balustrades;** rectify non compliant *balcony balustrades* (for height and climbing facilitation) in noted units. Install fall arrest balustrade to accessible and unprotected *Unit 2 NE* retaining wall planter.
5. **Doors;** paint seal top and bottom edges of noted doors in accordance with manufacturers warranty requirements and replace noted *warped or moisture damaged doors*.
6. **Ventilation;** Recommend owners engage mechanical engineer to determine BCA compliance of *non ventilated bedroom 3 of Units 1 & 2* and also to check lack of ventilation in *Garbage room*.
7. **External Facade;** Potentially *significant remedial works required* to rectify cracked, drummy and moisture effected external wall render and paint finishes, as noted.
8. **Unit 7** rectify all *A/C condensate line leaks*, make good all damaged surfaces including carpet and paint finishes. Reimburse owner for associated A/C leak investigation expenses.



**SECONDARY REPAIRS/ ADVICE ISSUES****1. Warranty Provision;**

Vendor to provide the following combined manufacturer/applicator warranties;

*External Paint film*

*Manufacturer warranties for all doors.*

*Powder coating applicators written certification that the as applied powdercoat finish to balustrading/ handrails and steel work, are in compliance with the relevant Australian Standards and confirm the thickness of the coatings.*

*Garden Lighting transformers*

**2. Certification Provision;**

Vendor to provide the following certification;

*Windows*; as per the BCA requirements provide certification stating the *design wind pressure or water resistance* of as installed windows in accordance with A.S. 2047.1 (1999)

*Hydraulic services; as installed plumbing Certificate of Compliance*

*Electrics; certification in accordance with A.S. 3000*

**3. External Painting;** rectify all *moisture related efflorescence staining* of external paint finishes as caused by leaking or defective planters/ balconies Units 1,2,3 & 5.**4.** Rectify loose skirting tiles on various noted balconies.**5.** Remaining repairs and advice as noted.

## 1.0 BASEMENT Carpark LEVEL

### 1.1 General Comments & Requirements

**1.2 Note: Doors; door manufacturers** (of both fire and standard doors), state in their *conditional warranty* requirements that all their doors “*must receive two coats of paint*” or *sealer*, including “*the top and bottom edges*”, “*prior to hanging*”.

This requirement is to prevent excessive moisture gain, which can cause warpage and cupping.

I refer you to the enclosed sample 'Corinthian' door guarantee *Refer Annexure No 3*.

*The majority of inspected basement doors were not adequately paint sealed on the top and bottom edges.*

**1.2A Note: Fire Door Installation Requirements;** The fire door sets have been tag certified by the installation contractor Titan Fire Doors, to comply with the minimum requirements of **A.S 1905.1 1997**.

In order that compliance with this minimum Standard is achieved, the following (but not limited to) are required;

- \* Fire door & frame are to be separately tagged noting the specific Fire Resistance Level (F.R.L)
- \* Fire door frames are to be solid grouted (full perimeter).
- \* Rubber door buffers are to be installed on the door frames, top and bottom.
- \* Automatic door closers are required and must fully close the door.
- \* Gaps at base of doors cannot be >10mm and perimeter gaps cannot exceed maximum 3mm.

**1.2B Note: Floor Slabs & Penetrations;** I'm not a fire engineer and **recommend** that a fire engineer be appointed by the O.C to inspect this important service however I understand the various floors that separate one area from another (horizontal separation) are essentially required to achieve a specified Fire Resistant Level (F.R.L).

In order to do so all penetrations are typically required to be thoroughly sealed using approved fire resistant grout or fire pillows unless they are located within a fire isolated compartment.

It is good practice to provide some fire stopping at floor levels in addition to the fire enclosure.

**1.2C Note: Separating Walls & Penetrations;** I'm not a fire engineer and understand the various walls that separate one area from another (vertical separation) are essentially required to achieve a specified F.R.L.

In order to do so the walls are required to be continuous from slab to underside of slab and all penetrations should be adequately sealed using approved fire resistant grout, sealant or fire pillows.



### 1.3 Basement Carpark Level

#### Comments:

The basement is the lowest floor (below ground level) in the building and essentially incorporates various private lot Garage car parking spaces, basement perimeter retaining walls, lift lobby, some service cupboard rooms, Garbage room and a small store area.

The forward basement carpark is located beneath numerous external G.F planter boxes (flower boxes) and a public footpath and is bounded by two external stairs at the forward NE and SW external walls.

As such part of the ground floor slab acts as a roof over the basement area.

I was unable to gain access into the Garage car parking spaces of units 1, 2, 3, 4, 5 & 6 as they were locked at the time of my inspection.

I used a Protimeter pin resistance type moisture meter to test the moisture content of the various perimeter retaining walls and some ceilings.

The **architectural Specification for 16 – 18 Carlisle Street Rosebay** (dated 5.2.99 *Refer Annexure No 3A*) states under **Clause 4.14 - Waterproofing**; “provide waterproofing membranes and sealant in the locations indicated and as necessary to protect the concrete and other materials from damage, and to *prevent ingress of water and moisture into the building*”.

**Clause 10.03 - Warranty**; states the contractor shall provide the proprietor with a 20 year unconditional warranty against defects in materials and workmanship in the whole of the roofing installation. The warranty shall provide the proprietor with rectification of any and all defects and reinstatement of wall consequential damages to as new condition, at no cost to the proprietor. The warranty shall be underwritten by each roofing manufacturer.

*Refer Annexure No 4* for the project waterproofing contractors (White House & Kind) **Certificate of Compliance for the entire project waterproofing** noting that no warranty document was included.

### 1.4 Basement Slab Soffit Leaks & Penetrations;

#### Noted Defects;

*Leaks/ Damps; Refer Photo No1* showing a *continuous leak* through an approx 50mm diameter slab penetration located adjacent to basement Garage entry door.

*Refer Photo No2* showing evidence of *extensive prior leakages* and heavy efflorescence down the face of a drop beam at eastern corner of visitor car parking space No 1 and which recorded very high moisture content when moisture meter tested. This area appears to have had some prior remedial works undertaken to same however, in my professional opinion it continues to leak.

*Refer Photo No3* showing evidence of *extensive prior leakages* and heavy efflorescence down the face of a drop beam at northern corner of visitor car parking space No 1 and which recorded moderate-high moisture content when moisture meter tested. This area appears to have had some prior remedial works undertaken to same however, in my professional opinion it continues to leak.

*Refer Photo No4* showing evidence of *extensive prior leakages* (falling damp) and heavy calcification \ efflorescence staining down the **internal face of southwestern external wall**, beneath *junction with SW external staircase soffit*, at visitor car parking space No 1.

This damp has resulted in extensive moisture penetration to the painted blockwork wall, which is suffering from extensive moisture related paint blistering – *Refer Photo No5*

In my professional opinion this leak is current.



*Refer Photo No6* showing evidence of *moisture related* efflorescence staining at the *northern slab soffit (i.e. rear NW wall)* between wall mounted air-conditioning units and emergency exit sign. Moisture meter testing of the slab soffit revealed moderate to high moisture content.

In my professional opinion this falling damp is current.

*Refer Photo No7* showing evidence of *moisture related* efflorescence \ calcification staining at a *water pipe penetration*, located at the SE end of basement car park (near visitor car space No2). Moisture meter testing of the slab soffit revealed moderate to high moisture content.

In my professional opinion damp is current.

A *current and quite significant leak* was apparent in and around a 100mm diameter copper pipe penetration located at the NW end of *Garbage Rm* slab soffit – *Refer Photo No 8*. This leak has caused rusting of some metal components beneath and high efflorescence in the painted wall face.

There is evidence of moderate to high moisture content within the slab soffit, together with evidence of prior moisture related calcification staining in and around a 100mm PVC pipe penetration adjacent to basement lift lobby – *Refer Photo No9*. There is evidence of prior remedial work to this location however, in my professional opinion the leak appears to be continuing.

There is evidence of minor - moderate moisture content within the slab soffit, together with evidence of prior moisture related calcification staining in and around a 100mm PVC pipe penetration adjacent to basement entry garage door – *Refer Photo No10*. There is evidence of prior remedial work to this location however, in my professional opinion the leak appears to be continuing.

*Refer Photo No11* showing evidence of *prior moisture related staining* (falling damp) down the **internal face of NE external wall (within SE fire stair well)** beneath *junction with NE external staircase soffit*. Moisture meter testing of the upper section of wall revealed moderate to high moisture content and in my professional opinion the leak is current.

*Refer Photo No12* showing evidence of *prior moisture related staining* (falling \ penetrating damp) at the base of **internal face of NE external wall (at mid flight SE fire stair landing)**.

Moisture meter testing of the wall revealed moderate to high moisture content and in my professional opinion the leak is current.

*Refer Photo No13* showing evidence of *prior moisture related efflorescence staining* (falling \ penetrating damp) at the uppermost stair tread and **internal face of NE external wall (at upper SE fire stair landing adjacent to external fire door)**.

Moisture meter testing of the wall revealed moderate to high moisture content and in my professional opinion the leak is probably associated with falling damp from higher in the wall and the base of fire door frame has commenced rusting.

**1.5 Penetrations; Refer report item 1.2B. Refer Photo N14** showing a series of electrical conduit penetrations and a 100mm diameter PVC pipe penetration at the eastern basement slab soffit, which does not appear to be adequately sealed for F.R.L. The 100 mm diameter PVC pipe serves as a drain to an unknown water source.

*Refer Photo No15* showing a single approx *50mm diameter slab/ conduit penetration* (at central basement drop beam soffit), which has been inappropriately sealed with paper and in my professional opinion has not been adequately sealed for F.R.L.

*Refer Photo N16* showing two slab/ *PVC pipe penetration* (at central basement drop beam soffit), which appear to have been inappropriately sealed with expanding polyurethane foam and in my professional opinion have not been adequately sealed for F. R. L.

The *smoke detector* of Garage space No 7 has been disconnected.



### 1.6 Recommendations;

Vendor to rectify cause of all noted leaks\damp and make good all effected surfaces.

Recommend that the owners Corporation engage the services of a fire engineer to more accurately determine need to adequately seal noted penetrations for FRL.

Reinstate smoke detector to garage space No 7.

### 1.7 Basement Perimeter & Separating Walls;

#### Noted Defects;

*Refer Photo No17* showing evidence of *moisture related* damp efflorescence within the painted SW external wall of Garage space No 7 and which is located beneath a ventilation louvre. The lower section of this wall revealed moderate to high moisture content in both the forward and rear sections, when moisture meter tested. In my professional opinion the damp is current.

A *current and quite significant leak* was apparent in and around a 100mm diameter PVC pipe penetration located in the upper SW and external wall of the *Fire Hydrant Booster Rm*, which is causing extensive pooling of water on floor – *Refer Photo No 18*.

*Refer report item 1.2 C*. A penetration in the wall over the internal head of *Fire Hydrant Booster Rm doors* has an electrical cable tray and various pipe penetrations and in my professional opinion has not been adequately sealed for F. R. L. – *Refer Photo No 19*.

A penetration in the wall over the head of *southern basement storeroom door* has an electrical cable tray together with timber packing and in my professional opinion both the penetration and the junction of separating wall and slab over have not been adequately sealed for F. R. L. – *Refer Photo No 20*.

### 1.8 Recommendations;

Vendor to rectify cause of all noted leaks\damp and moisture penetration and make good all effected surfaces.

Recommend that the owners Corporation engage the services of a fire engineer to more accurately determine need to adequately seal noted penetrations for FRL.

### 1.85 Basement Miscellaneous;

#### Noted Defects;

*Refer report item 1.2*. Many of the basement *doors* had not been adequately paint sealed on both the top and bottom edges, which contravenes standard manufacturer conditional warranty requirements (against warpage. Both sets of *garbage room doors* have not been paint sealed and have a *warp >4mm* in the external lower face.

I'm not a mechanical engineer however the fully enclosed *Garbage Rm* does not appear to incorporate adequate ventilation as the Ventilation code A.S1668.2-1991 states that Garbage Rooms should have exhaust ventilation at a minimum rate of 5 L/s per sq. metre of floor area.

### 1.90 Recommendations;

Vendor to adequately paint seal timber doors on top and bottom edges.

Vendor should remove and replace warped Garbage room doors.

Recommend the owners Corporation engage the services of a mechanical engineer to determine compliance of enclosed Garbage Rm with A.S1668.2-1991.

**1.95 Indicative Budget Estimate (for noted repair basement recommendations) = \$14,500 (excl GST)**  
Excludes painting and replacing warped doors & other consultants costs (*Refer Annexure No 1*)



## 2.0 Unit1

### Unit 1 Observations

#### 2.1 Comments:

Unit 1 is located on ground floor and incorporates two bathrooms, three bedrooms, various external planters (flower boxes), a pool, rear stairs and rear terrace, which is located over pool pumping equipment.

#### 2.2 General Comments;

Both bathroom shower recesses incorporate frameless glass shower screens having an approx 10mm micro sill under door. *Refer Typical Frameless Shower Recess Photo on pg22.*

These shower recesses are deemed to be **unenclosed shower** area types, as defined by A. S. 3740 (1994). This same standard requires that an unenclosed shower area have minimum floor falls of **1.66 %** (or 1 in 60).

As part of my inspection I both water tested (by turning on shower rose and not blocking shower waste) and electronic level tested the floor falls within the shower recesses, by taking an average of four readings. I also used a 'Protimeter' pin resistance type moisture meter to test the relative moisture content (M.C) of both the tile bed outside of the shower area and at bathroom entries. I also pulled back the carpet across entrance in an attempt to visually determine any evidence of moisture seepage.

#### 1.3 Note: Building Code of Australia (deemed to satisfy provisions)

At the time of construction the **BCA referenced A.S. 3740 (1994) which required that an 'unenclosed shower' area has minimum floor falls of 1.66 % (or 1:60) for a distance of 1.5 m** measured from the shower rose, back towards the shower waste. As such the requirements of A.S 3740 (1994) are mandatory.

**1.3A 'Water stop'; "a vertical extension of the waterproofing system forming a barrier to prevent the passage of moisture in the floor"(A.S. 3740 1994)**

#### 2.3 Main Bathroom;

##### General Comments;

The owner advised me that this bathroom and shower recess is rarely used.

**Noted Defects; Water testing;** significant quantities of water remained pooled on the shower recess floor some 10 minutes after my water testing.

**Shower recess floor falls;** average shower recess falls were **0.38%**, which is significantly less than the minimum as required by A.S. 3740 (1994).

**Damp;** There was visual evidence of moisture related staining to the tile grout outside of the shower area and moisture meter testing of the tile bed (outside of the shower area) recorded moderate --high moisture readings for a distance of up to 1.6 m from shower screen.

In my professional opinion the moderate -- high moisture content within the tile bed (outside of the shower area) would be due to moisture migration outside of the shower area either due to the lack of and/or a defective 'water stop'. More frequent use of the shower area would probably exacerbate the problem. There was no evidence of a 'water stop' projecting the above the tile line as is required by A.S. 3740 (2004).

#### 2.4 Recommendations;

Rectify inadequate shower recess floor falls (to prevent unacceptable pooling) and install 'water stop' that projects above the floor tile surface.



## 2.5 Ensuite Bathroom;

**Noted Defects; Water testing;** excess shower water pooled at the external shower screen corner some 10 minutes after water testing. In addition water pooled on the central area around floor waste.

**Shower recess floor falls;** average shower recess falls were **0.50%**, which is significantly less than the minimum as required by A.S. 3740 (1994) and additionally there are negative falls at the external shower screen corner, where excess shower water permanently pooled.

**Damp;** there was visual evidence of moisture related staining to the tile grout outside of the shower area and moisture meter testing of the tile bed (outside of the shower area) and at the bathroom entry, recorded high moisture readings. It was further apparent that some moisture had seeped down onto the carpet and smooth edge (@ bathroom entry) causing moisture related staining to the rear face of carpet and mild rusting of the nail fixings and lower metal door jamb *Refer example Photo No20A at pg 22.*

In my professional opinion the unacceptably high moisture content within the tile bed (outside of the shower area) and the apparent seepage that is occurring at bathroom entry would be due to moisture migration out side of the shower area, due to either the lack of and/or a defective 'water stop'.

There was no evidence of a 'water stop' projecting the above the tile line as is required by A.S. 3740 (2004).

## 2.6 Recommendations;

Rectify inadequate falls (to prevent unacceptable pooling) and install 'water stop' that projects above the floor tile surface. Rectify damaged carpet and rust paint treat lower door jamb.

## 2.7 Bed 1 Damp & Windows;

**Comments:** the owner advised me that the Bed 1 SE window partially leaked during periods of prolonged driving rain. I was unable to determine any evidence of prior leaks around this window sill.

**Noted Defects;** moisture meter testing of the lower *Bed1 southeastern wall*, which is abounding a raised SE external planter, revealed moderate to high moisture readings (particularly at the SW end at built in cupboard) together with efflorescence and paint blister *Refer Photo Nos21 & 22*. The highly damp MDF skirting on wall has moisture related swelling and buckling.

In my professional opinion the damp is current and is most likely been caused by either a failure at the window frame/ sill due to defective flashings and/ or weep holes or a defective external planter waterproof membrane and moisture migration through the external wall.

Moisture meter testing of the lower *Bed1 NW wall*, which is abounding a raised planter, revealed moderate to high moisture readings (particularly at either NE side of external door) together with efflorescence.

The owner advised me that the vendor's representative had previously undertaken remedial works to the planter box and external cavity wall, opposite this area, the scope of which is unknown.

In my professional opinion it is possible that the noted damp may be related to the builder's failure to remove all salt effected plaster and reinstate with a salt retardant treated type however, the leak may be continuing.

There was a visual evidence of very significant *moisture related paint\plaster blistering on Bed 1 SW ceiling bulkhead soffit* (directly beneath planter box of unit 3 above). Moisture meter testing of same recorded *very high moisture readings*.

The ceiling void above was not accessible and in my professional opinion I consider the damp to be current.



**2.75 Recommendations;**

Recommend that noted B1 window be water tested to determine if and how they may leak. Determine cause of and rectify cause of moisture entry into B1 external wall/s reinstate defective skirting, paint & surface finishes. This may require some destructive investigative work prior to actual repair. Form ceiling access trap in Bed1 bulkhead and inspect the void behind to determine cause of leak and then determine requisite repairs.

**2.80 Bed 3 Ventilation;**

*Refer example Photo No38 (of unit 2) of the external door window frame of unit No2 Bed 3 (identical to subject unit) and I note that the highlight windows are fixed. As such this Bedroom does not incorporate any openable windows and in my professional opinion is unlikely to be compliant with the ventilation requirements of the BCA.*

**2.85 Recommendations;**

Recommend that the owners engage a mechanical engineer to inspect and report on the seeming lack of adequate ventilation to Bed 3 noting that one possible solution might be to install hopper style windows to replace existing fixed highlight type.

**2.90 Terrace/ Balcony, Balustrading & Pool Stairs;**

Unit 1 staircase is not accessible by other unit owners and therefore is deemed to be a private stairway

**Note: Stair Riser & Going Dimensions;** BCA Table 2.13 details the maximum and the minimum riser and going dimensions for a private stairway tread as;

- (i) Riser Max =190mm Min = 115
- (ii) Going Max =355mm Min = 240 (*Refer Annexure No5*)

**Council approved architectural drawing No 1534/BA10 Issue A** details the “outline of new stairs to existing swimming pool”.

**2.91 Comments:**

I measured the external *stair treads* leading down from Unit 1 terrace to pool (incorporating a total of No14 treads and a mid landing) and determined the following measurements.

Risers = Max 180mm – Min 130mm

Going = Max 255mm – Min 240 mm

*Refer example Photos Nos 23 & 24*

**Summary Comments;** the subject stairway is quite steep and the narrow depth treads (which incorporate non-slip edges) make for a difficult and potentially dangerous transition however, in my professional opinion and based on my site measurements the stair treads are compliant with the minimum requirements of the BCA for a private stairway – no defect.

**2.92 Defects;** *Refer Photo No25 of the moderate cracking that has occurred between the terrace tiling and upper stair tread. Refer Photo No26 (taken beneath this area) and showing the very significant moisture penetration that is occurring through the junction of terrace slab and staircase, together with severe calcification staining and falling into the void where pool pumping equipment is located.*

In my professional opinion the movement related cracking has resulted in a failure in the waterproof membrane.



*Refer Photo No27* of the moisture related *calcification staining* and efflorescence, occurring at the junction of terrace tile bed and waterproof membrane, at the SW edge beam face causing significant deterioration of the paint finish. Similar calcification staining is evident at the northwestern terrace slab edge.

In my professional opinion, whilst this is aesthetically unacceptable, it is not a building defect.

Moisture meter readings were moderate to high in the lower NW rendered column directly behind copper down pipe (*Refer Photo No28*) and I observed free flowing water traveling down the outside face of this D/P (serves as a balcony drain for unit over).

In my professional opinion I consider this to be a defect as the D/P penetration is unlikely to be adequately waterproofed in the balcony slab over.

### **2.93 Recommendations;**

Vendor to rectify cause of moisture entry at junction of terrace slab and upper stair landing and reinstate finishes.

Vendor to rectify cause of moisture seepage down external face of copper D/P, which is probably associated with a W/P membrane failure at waste penetration.

Suggest CRC chemical cleaner be used to remove calcification staining at terrace slab edges.

**2.95 Indicative Budget Estimate (for unit 1 noted repair recommendations) = \$28,900 (excl GST)**

Excludes other consultants costs & CRC chemical treatment (*Refer Annexure No 1*)



**Typical Frameless Shower Recess**



**Photo No20A**



## 3.0 Unit 2

### Unit 2 Observations

#### 3.1 Comments:

Unit 2 is located on ground floor and incorporates two bathrooms, three bedrooms, various external planters (flower boxes) and a front and rear terrace.

#### 3.2 General Comments;

Both bathroom shower recesses incorporate frameless glass shower screens having an approx 10mm micro sill under door. These shower recesses are deemed to be *unenclosed shower* area types, as defined by A. S. 3740 (1994). This same standard requires that an unenclosed shower area have minimum floor falls of 1.66 % (or 1 in 60).

As part of my inspection I both water tested (by turning on shower rose and not blocking shower waste) and electronic level tested the floor falls within the shower recesses, by taking an average of four readings. I also used a Protimeter pin resistance type moisture meter to test the relative moisture content (M.C) of both the tile bed outside of the shower area and at bathroom entries. I also pulled back the carpet across entrance in an attempt to visually determine any evidence of moisture seepage.

#### 3.3A Note: Building Code of Australia (deemed to satisfy provisions)

At the time of construction the **BCA referenced A.S. 3740 (1994) which required that an unenclosed shower area has minimum floor falls of 1.66 % (or 1:60) for a distance of 1.5 m measured from the shower rose, back towards the shower waste. As such the requirements of A.S 3740 is mandatory.**

3.3B 'Water stop'; "a vertical extension of the waterproofing system forming a barrier to prevent the passage of moisture in the floor"(A.S. 3740 1994)

#### 3.4 Main Bathroom;

**Noted Defects; Water testing;** Some 10 minutes after my water testing significant quality of water remained pool on the floor directly around the floor waste (*Refer Photo No29*).

**Shower recess floor falls;** average shower recess falls were 1.60%, which is only marginally less than the minimum as required by A.S. 3740 (1994), however there was a distinct low spot in an around the floor waste.

**Damp;** There was visual evidence of moisture related staining to the tile grout outside of the shower area (*Refer Photo No30*) and moisture meter testing of the tile bed (outside of the shower area) and at the bathroom entry recorded high moisture readings.

In my professional opinion the unacceptably high moisture content within the tile bed (outside of the shower area) would be due to moisture migration out side of the shower area due to either the lack of and/or a defective 'water stop'.

There was no evidence of a water stop projecting the above the tile line as is required by A.S. 3740 (2004).

There was evidence of prior moisture related staining to the rear section of ceiling (adjacent to shower recess) and moisture meter testing of same recorded normal dry readings inspection of the ceiling void above revealed no current leak- no defect.

#### 3.45 Recommendations;

Rectify inadequate falls (to prevent unacceptable pooling) directly around the floor waste by installing diagonally cut tiles. Install 'water stop' that projects above the floor tile surface.



### 3.50 Ensuite Bathroom;

**Noted Defects; Water testing;** at the time of my inspection *water was still pooling* on the shower recess floor (near waste) some hours after use by the tenant.

**Shower recess floor falls;** average shower recess falls were **1.63%**, which is only marginally less than the minimum as required by A.S. 3740 (1994) however, there was a distinct low spot in an around the floor waste.

**Damp;** moisture meter testing of the tile bed at the bathroom entry recorded moderate to high moisture readings and it was further apparent that some moisture has seeped down onto the carpet smooth edge (@ bathroom entry) causing mild rusting of the nail fixings and lower metal door jamb *Refer example Photo No31.*

In my professional opinion the unacceptably high moisture content within the tile bed (outside of the shower area) and the apparent seepage that is occurring at bathroom entry would be due to moisture migration out side of the shower area due to either the lack of and/or a defective 'water stop'. There was no evidence of a water stop projecting the above the tile line as is required by A.S. 3740 (2004).

### 3.55 Recommendations;

Rectify inadequate falls (to prevent unacceptable pooling) directly around the floor waste by installing diagonally cut tiles. Install 'water stop' that projects above the floor tile surface.

Rectify damaged carpet and rust paint treat lower door jamb.

#### Front External Façade Photos



Example Photo A



Example Photo B



**3.60 Terrace/ Balcony, Balustrading & Planters;****Comments:**

**3.65A Note: Balustrades or other barriers;** BCA Cl 2.16 states that a *continuous balustrade all other barrier* must be provided along the side of any roof, any stairway, or ramp, any floor, corridor, hallway balcony, veranda, mezzanine, access bridge or the like and along the side of any path of access to a building if;

- (iii) is not bounded by a wall; and
- (iv) its level above the surface beneath, is more than-
  - (A) 4m where it is possible for a person fall through an openable window; or
  - (B) 1 m in any other case

The council approved **project specification (dated 5.2.99)** states under clause 9.05 balustrades and handrail that external handrails (Type A) are required to be a minimum of 1000mm high (*Refer Annexure No6*)

**Council approved architectural drawing No1534/BA09 Issue A** details the external balcony handrails as being 1 m high stainless steel.

The project **handrail contractors certification** (from A.M. Balustrades and dated 13.12.01 states that all Balustrades comply in general with BCA Cl 2.16 and A.S 1288 (*Refer Annexure No6A*)

**3.70 Terrace/ Balcony, Balustrading & Planters;**

**Comments:** I used a Protimeter moisture meter to test the external walls of the various planters (flower boxes) and some lower external walls.

**3.75 NW Terrace Noted Defects;** There are a number of *loose skirting tiles* that require refitting. *Refer Photo No32* showing significantly cracked and very *drummy render* located on a SW planter wall. *Moderate to high moisture content* was recorded within the upper *NE planter walls* and the forward SE face, the paint finish of which is suffering from moisture related staining *Refer example Photos No33 & 33A*.

There is evidence of moisture staining \ *seepage around a recessed wall light*, which is indicative of an inadequate waterproof seal.

In my professional opinion the most likely source of the high moisture content would be due to a failed waterproof membrane within the planter box.

I determined saturated and *quite boggy soil conditions* in the northern corner of turfed terrace. Similar conditions are apparent within the turfed G.F area at the front southern corner of the property and which are indicative of inadequate sub soil drainage.

**3.80 Recommendations;**

Replace all noted drummy render, provide adequate expansion provision in same and reinstate paint finish to match.

Rectify cause of moisture gain within the external face of planter boxes.

Consider installation of sub soil drainage within saturated northern terrace turfed area.

**3.85 NE Terrace Garden Bed Noted Defects;** *Refer Photo No34* showing the NE terrace garden/ retaining wall, which is accessible from the NW terrace by a vendor supplied access gate (*Refer Photo No35*) and *has an unprotected edge that is some 3- 4 metres above the surface beneath*.

In my professional opinion this garden terrace area is not in accordance with the requirements of BCA Clause 2.16 or in accordance with OH& S requirements and presents *a very significant fall hazard*.



**3.86 Recommendations;**

Vendor to supply and install minimum 1m high balustrading for the full-length on north eastern terrace garden bed and in keeping with the style and type of the remaining building (i.e. stainless steel) and also compliant with BCA Cl D2.16 (g) (ii) so as not to facilitate climbing

**3.90 SE Terrace Balcony Noted Defects;** Refer Photo No36 showing the *significant rusting* which is occurring to the metal external set edge at the *Bed2* window sill, together with external protective paint film discoloration.

Moisture meter testing of Unit 2 *lower external SE walls* revealed *moderate to high moisture* readings and moisture related efflorescence staining of the external paint film at external corner, between *Bed2* and *Bed3* Refer example Photo No37. This area of wall appears to have inadequate cavity weep hole provision Refer Annexure A3a - Architectural Project Specification Cl 6.13.

Moisture meter testing of the lower external *planter walls* revealed *moderate to high moisture* readings and moisture related efflorescence staining of the external paint film of external planter walls opposite *Bed3* and *Bed 2*.

Refer Photo No38 of the *external door window frame of Bed 3* and I note that the highlight windows are fixed. As such this Bedroom does not incorporate any openable windows and in my professional opinion is unlikely to be compliant with the ventilation requirements of the BCA.

**3.92 SE Building Elevation Noted Defects;** Refer example Photo A (pg 28) showing significantly cracked and *delaminated render* on front building outside *Unit 5 Bed 3*, where moisture has begun to enter. Refer example Photo B (pg 28) showing evidence of significant calcification (moisture seepage) and minor hairline cracking on the balcony edge beam of *Unit 7 Bed 2*.

In my professional opinion this cracked and delaminated render as shown in *Photo A* will eventually fully delaminate and dislodge and is a defect.

The efflorescence stained render shown in *example Photo B* is most likely associated with minor moisture penetration through the paint film resulting in calcification and is not considered a defect.

**3.95 Recommendations;**

Remove and replace rusting external set edge of *Bed2* window with a plastic alternative and reinstate all surface and paint finishes to match.

Further investigation (possibly destructive) required to determine the exact cause of high moisture gain within the lower external SE walls and which do not appear to incorporate adequate cavity weep holes. Possible causes might be defective window frame/sill or cavity wall flashings.

Rectify cause of moisture gain within noted planter walls.

Recommend that the owners engage a mechanical engineer to inspect and report on the seeming lack of adequate ventilation to *Bed 3* noting that one possible solution might be to install hopper style windows to replace existing fixed highlight type.

Rectify all delaminated external render and make good paint finishes.

**3.96 Indicative Budget Estimate (for unit 2 noted repair recommendations) = \$61, 300 (excl GST)**

Excludes other consultants costs and sub soil drainage to northern terrace (*Refer Annexure No 1*)



## 4.0 Unit 3

### Unit 3 Observations

#### 4.1 Comments:

Unit 3 is located on the first floor and incorporates two bathrooms, three bedrooms, various external planters (flower boxes) and three terraces. The owner advised me that the vendor's representative had previously undertaken remedial works to a number of external window doors (for leakages) and that some of these *works were still incomplete* (e.g. fitment of internal window trims).

#### 4.2 General Comments;

Both bathroom shower recesses incorporate frameless glass shower screens having an approx 10mm micro sill under door. These shower recesses are deemed to be *unenclosed shower* area types, as defined by A. S. 3740 (1994). This same standard requires that an unenclosed shower area have minimum floor falls of **1.66 %** (or 1 in 60).

As part of my inspection I both water tested (by turning on shower rose and not blocking shower waste) and electronic level tested the floor falls within the shower recesses, by taking an average of four readings. I also used a Protimeter pin resistance type moisture meter to test the relative moisture content (M.C) of both the tile bed outside of the shower area and at bathroom entries. I also pulled back the carpet across entrance in an attempt to visually determine any evidence of moisture seepage.

#### 4.3A Note: Building Code of Australia (deemed to satisfy provisions)

At the time of construction the **BCA referenced A.S. 3740 (1994) which required that an unenclosed shower area has minimum floor falls of 1.66 % (or 1:60)** for a distance of 1.5 m measured from the shower rose, back towards the shower waste. As such the requirements of A.S 3740 are mandatory.

4.3B 'Water stop'; "a vertical extension of the waterproofing system forming a barrier to prevent the passage of moisture in the floor"(A.S. 3740 1994)

#### 4.5 Main Bathroom;

**Comments:** the owner advised me that this bathroom shower recess is rarely used and that a small leak was apparent at the base of W.C., which I witnessed.

**4.6 Noted Defects; Water testing;** Some 10 minutes after water testing a significant quantity of water remained pooled on the floor particularly on the near flat section.

*Shower recess floor falls;* average shower recess falls were **0.48%**, which is significantly less than the minimum as required by A.S. 3740 (1994), with an almost flat floor on one side.

*Damp;* There was visual evidence of moisture related staining to the tile grout outside of the shower area and moisture meter testing of the tile bed (outside of the shower area) and at the bathroom entry recorded high moisture readings.

In my professional opinion whilst the noted minor W.C. leak maybe contributing to the moisture gain within the floor, I consider that the majority of moisture gain (outside of the shower area) would be due to moisture migration out side of the shower area would be due to lack of adequate falls and lack of and/or a defective 'water stop'.

There was no evidence of a 'water stop' projecting the above the tile line as is required by A.S. 3740 (2004).



**4.65 Recommendations;**

Rectify minor W.C. cistern leak. Rectify inadequate falls to prevent ponding and install 'water stop' that projects above the floor tile surface.

**4.70 Ensuite Bathroom;**

**Noted Defects;** *Water testing;* at the time of my inspection *water was still pooling* on the shower recess around floor waste, some hours after use by the resident.

*Shower recess floor falls;* average shower recess falls were **1.00%**, which is significantly less than the minimum as required by A.S. 3740 (1994), however there was a distinct low spot in an around the floor waste.

*Damp;* moisture meter testing of the tile bed at the bathroom entry recorded minor- moderate moisture readings.

In my professional opinion the unacceptable ponding of water on the shower recess floor is due to inadequate floor falls within the shower area.

There was no evidence of a water stop projecting the above the tile line as is required by A.S. 3740 (2004).

**4.75 Recommendations;**

Rectify inadequate falls (to prevent unacceptable pooling) and install 'water stop' that projects above the floor tile surface.

**4.80 Terrace/ Balcony, Balustrading;**

**Comments:** I measured the various balcony balustrade heights and a Protimeter moisture meter to test the external walls of the various planters (flower boxes) and some lower external walls.

**SW balcony;** I measured the height of the balcony balustrading above tiling on all elevations and recorded the following heights;

On *NW side 950 -990mm.*

Remaining handrails are >1m high.

In my professional opinion the noted <1m high section of balustrade is not compliant with the minimum requirements of the BCA and is therefore defective.

Significant evidence of prior *moisture related rust staining on the painted external SW face of Unit 5 balcony \planter over edge over* (above unit3 B1 SW window).

In my professional opinion the noted damp related staining is possibly due to hairline cracking of the planter box render together with falling damp however, it might be associated with a defective planter waterproof membrane. Further moisture meter testing of the external wall face to be undertaken to ascertain whether there is a high moisture gain within the planter substrate.

**SE balcony (Bed 3);** I measured the height of the balcony balustrading above tiling on all elevations and recorded the following heights;

On *SE side 950 -995mm.*

Remaining handrails are >1m high.

In my professional opinion the noted <1m high section of balustrade is **not compliant with BCA Cl D2.16 (f) ii (A) and is defective.**

Evidence of minor differential movement cracking within the balcony tiling (at internal corner), which has resulted in *significant delamination* (drumminess) of a number of balcony *skirting tiles* which are near loose.

In my professional opinion these tiles are defective.



**NW balcony;** evidence of prior *moisture related staining and efflorescence build up on the external NW face of Unit 5 balcony edge over.*

**4.90 Recommendations;**

Vendor to remove and reinstate all noted below high balustrade handrails and associated structures to achieve a minimum 1000mm height above balcony tiling.

Recommend further testing of noted damp affected external wall faces to determine cause of moisture entry and staining.

Reinstate all noted loose skirting tiles to SE balcony.

**4.95 Indicative Budget Estimate (for unit 3 noted repair recommendations) = \$16,000** (excl GST)

Excludes other consultants costs (*Refer Annexure No 1*)



## 5.0 Unit 5

### Unit 5 Observations

#### 5.1 Comments:

Unit 5 is located on second floor and incorporates two bathrooms, three bedrooms, various external planters (flower boxes) and terraces.

The owner advised me that the vendors representative had previously undertaken remedial works to a number of external window/ doors (for leakages and damp) most particularly around external doors facing onto the N.W. & SW balconies, (i.e. Lounge B1, & B2) by way of work to the external wall cavities and waterproofing at sill level, including installation of new tiled sill thresholds on the internal face.

The owner further advised that the builder had not undertaken any remedial works to Bed3 external door leading onto it's balcony and that much of the builders work remained incomplete (for example internal window trims and skirtings have not been re fixed).

My inspection confirmed that there are *incomplete* builder's works.

#### 5.2 General Comments;

Both bathroom shower recesses incorporate frameless glass shower screens having an approx 10mm micro sill under door. These shower recesses are deemed to be *unenclosed shower* area types, as defined by A. S. 3740 (1994). This same standard requires that an unenclosed shower area have minimum floor falls of **1.66 %** (or 1 in 60).

As part of my inspection I both water tested (by turning on shower rose and not blocking shower waste) and electronic level tested the floor falls within the shower recesses, by taking an average of four readings. I also used a Protimeter pin resistance type moisture meter to test the relative moisture content (M.C) of both the tile bed outside of the shower area and at bathroom entries. I also pulled back the carpet across entrance in an attempt to visually determine any evidence of moisture seepage.

##### 5.2A Note: Building Code of Australia (deemed to satisfy provisions)

At the time of construction the **BCA referenced A.S. 3740 (1994) which required that an unenclosed shower area has minimum floor falls of 1.66 % (or 1:60) for a distance of 1.5 m measured from the shower rose, back towards the shower waste. As such the requirements of A.S 3740 are mandatory.**

**5.2B 'Water stop'; "a vertical extension of the waterproofing system forming a barrier to prevent the passage of moisture in the floor" (A.S. 3740 1994)**



### 5.3 Main Bathroom;

**Noted Defects; Water testing;** Some 10 minutes after my water testing significant quantity of water remained pooled on the floor particularly at the NE near flat side.

**Shower recess floor falls;** average shower recess falls were **0.83%**, which is significantly less than the minimum as required by A.S. 3740 (1994), and noting that the floor is new flat at the NE corner.

**Damp;** There was visual evidence of moisture related staining to the tile grout outside of the shower area (*Refer example Photo No39*) and moisture meter testing of the tile bed (outside of the shower area) including near W.C recorded high moisture readings.

In my professional opinion the unacceptably high moisture content within the tile bed (outside of the shower area) would be due to moisture migration out side of the shower area due to either both inadequate floor falls and/or a defective 'water stop'.

There was no evidence of a 'water stop' projecting the above the tile line as is required by A.S. 3740 (2004).

The owner advised me that the internally located hot water service **overflow collection tray** (*Refer Photo No40*) has, on occasion, overflowed due to a blockage of the approx 10mm diameter drainage outlet at base of same. When I tested the condensate overflow pipe, water built up in the bottom of the tray and remained pooled (i.e. partially blocked). In addition it would appear that the A/C condensate overflow pipe also discharges into this tray (*Refer Photo No41*).

I'm not a mechanical engineer however, in my professional opinion I consider that a dedicated waste tundish drain should be provided for the A/C condensate overflow.

There was evidence of prior moisture related staining to the central section of ceiling and moisture meter testing of same recorded normal dry readings. There was no current evidence of leaks noted within the ceiling void over, when inspected – no defect.

### 5.4 Recommendations;

Rectify inadequate floor falls and install 'water stop' that projects above the floor tile surface.

Attempt to clear blocked hot water service overflow tray and recommend owners engage a mechanical engineer to determine whether a dedicated waste tundish drain should be provided for the A/C condensate overflow pipe.

### 5.5 Ensuite Bathroom;

**Noted Defects; Water testing;** Some 10 minutes after my water testing significant quantity of water remained pooled on the floor.

**Shower recess floor falls;** average shower recess falls were **0.60%**, which is significantly less than the minimum as required by A.S. 3740 (1994).

**Damp;** There was visual evidence of moisture related staining to the tile grout outside of the shower area and moisture meter testing of the tile bed (outside of the shower area) including near vanity recorded high moisture readings - *Refer Photo No39..*

In my professional opinion the unacceptably high moisture content within the tile bed (outside of the shower area) would be due to moisture migration out side of the shower area due to either both inadequate floor falls and the lack of and/or a defective 'water stop'.

There was no evidence of a water stop projecting the above the tile line as is required by A.S. 3740 (2004).

### 5.6 Recommendations;

Rectify inadequate floor falls and install 'water stop' that projects above the floor tile surface.



### 5.7 Terrace/ Balcony, Balustrading & Planters;

**Comments:** I used a Protimeter moisture meter to test the external walls of the various planter boxes.

**5.7A A Balustrades or other barriers; BCA Cl D2.16 (g) (ii)** balustrade all other barrier (B) for floors more than 4m above the surface beneath, in the horizontal or near horizontal elements between 150 mm and 760 mm above the floor must not facilitate climbing

The project **handrail contractors certification** ( from A.M. Balustrades and dated 13.12.01 states that all Balustrades comply in general with BCA Cl 2.16 and A.S 1288 (*Refer Annexure No6 & 6A*)

**5.75 NW Terrace Noted Defects;** *Refer prior noted defect comments relating visual evidence of moisture related efflorescence staining to the external face of this units planter box and balcony, under Unit 1 section of this report.*

The stainless steel *balustrading* incorporates *horizontal rails with some 110mm gaps between* each from bottom to underside of balustrade handrail (*Refer example Photo No 42 below*). The SW end balustrade (>4m above the surface beneath) incorporates a glass cover panel in front of these rails, which prevents climbing however, in my professional opinion the *western corner* section of this balustrade is contrary to the requirements of *BCA Clause 2.16 (g) (ii) (B)* as the existence of the horizontal rails *facilitates easy climbing to a potential fall of more than 4m to surface beneath*.

In my professional opinion the western corner of the balustrade (as constructed) facilitates easy climbing to a potential fall >4m and is therefore not compliant with the BCA. I also consider the remaining section of this balustrade (situated <4m above the surface beneath), whilst compliant with BCA, to be potentially hazardous.

There was visual evidence of moisture related falling damp over the head of *Bed1 external balcony door*, which is located beneath a planter box of unit above.

### 5.76 Recommendations;

Recommend that a copy of this report be provided to the project PCA (Woollahra Council) and that they be requested to formally request (by issuing a letter of intent) the vendor rectify all non-compliant handrails and associated structures to achieve a minimum compliance with the BCA requirement to prevent balustrade climbing, which will likely involve installation of safety cover glass panels.



Example Photo No 42



Example Photo No 43



**5.80 Internal Walls/ Windows;**

**Comments:** Unit 5 owner advised me that some minor leakages occur in and around Bed 1 & Bed 3 windows during periods of prolonged wind driven rain. I observed some evidence of minor prior moisture penetration / damage only around both B1 SW & B3 SE window sill areas.

**5.81A** BCA Clause P 2.2.2 *Weatherproofing states "a roof and external wall (including openings around the windows and doors) must prevent the penetration of water that could cause --*  
*(a) unhealthy or dangerous conditions or loss of amenity for occupants; and*  
*(b) undue dampness or deterioration of building elements*

**5.81B N.B\*** The external aluminium sliding doors and windows in this building would need to comply with 'AS 2047.1 (1999)' Windows In Building Part 1 Specification for materials and performance (Residential Buildings Other than Housing) and the frames should be clearly labelled with the following information;

- (1) the manufacturers name,
- (2) the window rating
- (3) water penetration resistance

None of this information has been marked on the external doors or windows and the BCA states that in such an event the installation contractor **MUST supply written certification that these elements comply with the minimum requirements of the standard.**

**5.85 Noted Defects;** *moisture meter testing* revealed moderate to high moisture content together with considerable efflorescence staining to the following lower internal walls;

*Lounge Rm;* both internal lower wall reveals either side of external doors leading to NW balcony.

*Bed 3;* Extensive moisture related staining noted to the carpet and lower wall at the western corner together with *very high moisture content in the lower walls* adjacent to external door (*Refer example Photo No 43*).

Evidence of prior moisture related minor damage to the lower set plaster of SW window sill reveal.

*Bed 1;* minor moisture related staining damage to internal sill

I consider that *B1, B3 & Lounge Rm window openings are leaking* and that this may be associated with defective window frames (inadequate sill drainage), defective external cavity weep holes and/ or head/ sill or lower wall flashings.

Such moisture entry is in contravention of the BCA CL P2.2.2.

**5.90 Recommendations;**

I recommend that water testing be undertaken of all noted external windows to determine if the leaks are continuing. Destructive investigation work may also be required to the concealed lower cavity walls, some of which have inadequate and/ or defective (for position) external cavity weep holes.

Upon determination of Bed3 SW external door moisture entry cause reinstate internal salt effected wall plaster and replace carpet.

**5.95 Indicative Budget Estimate (for unit 5 noted repair recommendations) = \$16,600** (excl GST)

Excludes repairs to external walls & flashings of windows (*Refer Annexure No 1*)



## 6.0 Unit 6

### Unit 6 Observations

#### 6.1 Comments:

Unit 6 is located on the second floor and incorporates two bathrooms, three bedrooms, various external planters (flower boxes) and rear terrace. The owner advised me that the vendor's representative had previously undertaken remedial works to a number of external window doors (for leakages and damp) most particularly around external doors facing onto N.W. balcony and which I was advised involved works associated with defective sill and/or cavity wall flashings.

I moisture meter tested the lower internal walls around these doors and recorded normal dry readings.

#### 6.2 General Comments;

Both bathroom shower recesses incorporate frameless glass shower screens having an approx 10mm micro sill under door. These shower recesses are deemed to be **unenclosed shower** area types, as defined by A. S. 3740 (1994). This same standard requires that an unenclosed shower area have minimum floor falls of **1.66 %** (or 1 in 60).

As part of my inspection I both water tested (by turning on shower rose and not blocking shower waste) and electronic level tested the floor falls within the shower recesses, by taking an average of four readings. I also used a Protimeter pin resistance type moisture meter to test the relative moisture content (M.C) of both the tile bed outside of the shower area and at bathroom entries. I also pulled back the carpet across entrance in an attempt to visually determine any evidence of moisture seepage.

**6.25A Note: Building Code of Australia (deemed to satisfy provisions)**

At the time of construction the **BCA referenced A.S. 3740 (1994) which required that an unenclosed shower area has minimum floor falls of 1.66 % (or 1:60)** for a distance of 1.5 m measured from the shower rose, back towards the shower waste. As such the requirements of A.S 3740 are mandatory.

**6.25B 'Water stop'; "a vertical extension of the waterproofing system forming a barrier to prevent the passage of moisture in the floor"(A.S. 3740 1994)**

#### 6.5 Main Bathroom;

##### Comments:

The owner advised me that due to prior noted (in pre purchase property inspection report) lack of adequate floor falls, within the main bathroom shower recess, the vendors representative had undertaken some remedial works to same, which included the installation of a raised approximately 25mm high marble sill under the shower screen door. The owner advises me that this bathroom is rarely used.

**Noted Defects; Water testing;** Some 10 minutes after my water testing significant quantity of water remained pooled on the floor near flat floor corner.

**Shower recess floor falls;** average shower recess falls were **0.40%**, which is significantly less than the minimum as required by A.S. 3740 (1994) and in one corner the falls are almost flat.

**Damp;** There was visual evidence of moisture related staining to the tile grout outside of the shower area and moisture meter testing of the tile bed (outside of the shower area) extending for an a distance of some 1m from shower screen.



In my professional opinion the unacceptably high moisture content within the tile bed (outside of the shower area) would be due to moisture migration out side of the shower area due to either the lack of and/or a defective 'water stop'.

There was no evidence of a water stop projecting the above the tile line as is required by A.S. 3740 (2004).

#### 7.0 Recommendations;

Rectify inadequate floor falls (to prevent unacceptable pooling) and install 'water stop' that projects above the floor tile surface.

#### 7.5 Ensuite Bathroom;

**Noted Defects; Water testing;** significant *water remained pooled* on the shower recess floor around the floor waste some 15minutes after testing.

**Shower recess floor falls;** average shower recess falls were **1.15%** and which is less than the minimum as required by A.S. 3740 (1994).

**Damp;** there was visual evidence of moisture related staining to the tile grout outside of the shower area and moisture meter testing of the tile bed (outside of the shower area) and at the bathroom entry, recorded high moisture readings. Additionally the internal door *architraves* have a moisture content of 20%, which is excessive and there was evidence of moisture related surface rusting of the lower steel door jamb and nail fixings of carpet smooth edge across entry.

In my professional opinion the unacceptably high moisture content within the tile bed (outside of the shower area) and the apparent seepage that is occurring at bathroom entry would be due to moisture migration out side of the shower area due to either the lack of and/or a defective 'water stop'.

There was no evidence of a water stop projecting the above the tile iron as is required by A.S. 3740 (2004).

#### 8.0 Recommendations;

Rectify inadequate floor falls (to prevent unacceptable pooling) directly around the floor waste by installing diagonally cut tiles and install 'water stop' that projects above the floor tile surface. Make good or moisture damaged finishes such as lower door architraves and rusted metal door jamb.



**8.5 Terrace/ Balcony, Balustrading & Planters;**

**Comments:** I used a Protimeter moisture meter to test the external walls of the various planter boxes.

**8.55 NW Terrace Noted Defects;** Refer prior noted defect comments relating visual evidence of minor hairline cracking and moisture related efflorescence staining to the external face of this units planter box and balcony, under Unit 1 section of this report and *Photo No43A*. This is not considered a defect. Refer also to prior defect comments relating to the cracked and significantly drummy external wall render on the NW external wall above and below subject unit *Lounge room* window and *Photo No44*.

*Bedroom 2;* incorporates a fully openable casement window, which opens onto an external planter box, which incorporates a balustrade much less than 1 m high and is located > 4m above the surface beneath. The window has a sill height of 610mm (step up zone) above the internal finished floor level and a further 480mm high fixed window low light.

**8.60 Recommendations;**

Rectify cause of moisture entry and moisture related damage to external balcony\planter walls

Remove and reinstate noted drummy external wall render together with all paint finishes.

Bedroom 2 window is not considered a defect however, notwithstanding same I recommend that the window operation have a limiter installed to prevent sash being opened more than 150mm.

**8.65 Indicative Budget Estimate (for unit 6 noted repair recommendations) = \$27,300** (excl GST)

Excludes other consultants costs (*Refer Annexure No 1*)



## 7.0 Unit 7

### Unit 7 Observations

#### 7.1 Comments:

Unit 7 is located on the upper most floor and incorporates two bathrooms, three bedrooms, external planters (flower boxes) and various terraces.

#### 7.2 General Comments;

Both bathroom shower recesses incorporate frameless glass shower screens having an approx 10mm micro sill under door. These shower recesses are deemed to be *unenclosed shower* area types, as defined by A. S. 3740 (1994). This same standard requires that an unenclosed shower area have minimum floor falls of **1.66 %** (or 1 in 60).

As part of my inspection I both water tested (by turning on shower rose and not blocking shower waste) and electronic level tested the floor falls within the shower recesses, by taking an average of four readings. I also used a Protimeter pin resistance type moisture meter to test the relative moisture content (M.C) of both the tile bed outside of the shower area and at bathroom entries. I also pulled back the carpet across entrance in an attempt to visually determine any evidence of moisture seepage.

#### 7.3A Note: Building Code of Australia (deemed to satisfy provisions)

At the time of construction the **BCA referenced A.S. 3740 (1994) which required that an unenclosed shower area has minimum floor falls of 1.66 % (or 1:60)** for a distance of 1.5 m measured from the shower rose, back towards the shower waste. As such the requirements of A.S 3740 are mandatory.

7.3B 'Water stop'; "a vertical extension of the waterproofing system forming a barrier to prevent the passage of moisture in the floor"(A.S. 3740 1994)

#### 7.4 Main Bathroom;

**Noted Defects; Water testing:** Some 10 minutes after my water testing a significant quantity of water remained pooled on the floor particularly in the NW corner.

**Shower recess floor falls;** average shower recess falls were **0.73%**, which is significantly less than the minimum as required by A.S. 3740 (1994)

**Damp;** There was visual evidence of moisture related staining to the tile grout outside of the shower area and moisture meter testing of the tile bed (outside of the shower area) and at the bathroom entry recorded high moisture readings including within the lower door architraves (17% M.C). *Refer example Photo No45.* Some moisture had seeped out causing surface rusting of lower metal door jamb.

In my professional opinion the unacceptably high moisture content within the tile bed (outside of the shower area) would be due to moisture migration out side of the shower area due to either the lack of and/or a defective 'water stop'.

There was no evidence of a water stop projecting the above the tile line as is required by A.S. 3740 (2004).

#### 7.45 Recommendations;

Rectify inadequate floor falls (to prevent unacceptable pooling) within shower recess and install 'water stop' that projects above the floor tile surface.



### 7.5 Ensuite Bathroom;

**Noted Defects; Water testing;** Some 10 minutes after my water testing significant quantity of water remained pooled on the general shower floor area.

**Shower recess floor falls;** average shower recess falls were **0.35%**, which is substantially less than the minimum as required by A.S. 3740 (1994) and are near flat - *Refer example Photo No46.*

**Damp;** There was visual evidence of moisture related staining to the tile grout outside of the shower area, moisture meter testing of the tile bed (outside of the shower area) and at the bathroom entry recorded moderate-high moisture readings including within the lower door architraves (19% M.C) *Refer example Photo No45.*

Some moisture had seeped down onto the carpet smooth edge (at bathroom entry) causing mild rusting of the nail fixings and lower metal door jamb.

In my professional opinion the unacceptably high moisture content within the tile bed (outside of the shower area) and the apparent seepage that is occurring at bathroom entry would be due to moisture migration out side of the shower area due to either the lack of and/or a defective 'water stop'.

There was no evidence of a water stop projecting the above the tile line as is required by A.S. 3740 (2004).

### 7.55 Recommendations;

Rectify inadequate floor falls (to prevent unacceptable pooling) within shower recess and install 'water stop' that projects above the floor tile surface.



## 7.6 Internal Walls/ Windows;

**Comments:** Unit 7 owner advised me that prior to her purchase of the subject unit and as a result of prior leakages in an around the base of various Lounge \ Dining Rm external doors the vendor had undertaken some remedial works, the scope of which is unknown.

7.6A BCA Clause P 2.2.2 Weatherproofing states "a roof and external wall (including openings around the windows and doors) must prevent the penetration of water that could cause --  
(a) unhealthy or dangerous conditions or loss of amenity for occupants; and  
(b) undue dampness or deterioration of building elements

7.6B N.B\* The external aluminium sliding doors and windows in this building would need to comply with 'AS 2047.1 (1999)' Windows In Building Part 1 Specification for materials and performance (Residential Buildings Other than Housing) and the frames should be clearly labelled with the following information;

- (1) the manufacturers name,
- (2) the window rating
- (3) water penetration resistance

None of this information has been marked on the external doors or windows and the BCA states that in such an event the installation contractor MUST supply written certification that these elements comply with the minimum requirements of the standard.

**7.7 Noted Defects;** *moisture meter testing* revealed moderate to high moisture content together with considerable efflorescence staining in the following lower internal walls;

*Dining room;* SW wall either side of external door *Refer Photo No47A & 47B.*

*Lounge Rm;* SW wall below TV cabinet - *Refer Photo No48* showing extensive moisture related efflorescence and paint blistering. NW wall either side of external doors leading to NW balcony, with extensive moisture related efflorescence and paint blistering.

*Bed 1;* NW wall either side of external door with aggressive moisture related efflorescence *Refer Photo No49.*

In my professional opinion most of the noted damp effected walls do not incorporate adequate external cavity weep holes and/ or these and lower wall flashings are located partially beneath the external tile bed.

*Bed 2;* SE wall either side of external door together with moisture related efflorescence and staining *Refer Photo No50* and significant moisture related damage to the carpet and smooth edge beneath *Refer Photo No51.*

*Bed 3;* *Refer Photo No52* where wall plaster has been removed at internal window opening and rusting set external edge.

Moisture meter testing of the surrounding plaster including half way up window opening recorded moderate to high moisture readings *Refer Photo No53.* The lower weep holes, of this window) are incorrectly located down at near floor slab level and are likely to be contributory to moisture entry.

In my professional opinion I consider that *Bed1, 2, 3 Lounge and Dining Rm window openings are leaking* and that this may be associated with defective window frames (inadequate sill drainage) head or sill flashings and /or defective weep holes and lower wall flashing position.

Such leaks are in contravention of the BCA CL P2.2.2.



### 7.8 Recommendations;

Whilst it is possible that a few of the above noted highly damp internal walls maybe due to the failure to replace all salt affected plaster, it is very likely that leaks are continuing.

I recommend that water testing be undertaken of all these external windows to determine if the leaks are continuing and that some destructive investigation work be undertaken to expose some noted concealed building elements (e.g. position of lower wall flashings and weep holes) and upon determining cause of moisture entry that requisite remedial works be fully costed and undertaken.

It is very likely that such remedial works may involve replacing window frames with a type that incorporates adequate sill drainage, installation of new lower wall flashings and weep holes and reinstating part of the balcony membrane. Matching the balcony tiles (that are removed) maybe very difficult.

### 7.81 Laundry;

**Comments:** The owner advised me of the prior frequent floodings of the laundry and immediate surrounding floors, which she maintained had occurred after the overnight use of the ducted A/C system, the condensate line of which is connected to the laundry vanity basin waste pipe.

The flooding has caused *very significant damage to the carpet* in hallway adjacent to laundry entry and *high damp within all the enclosing lower walls* of laundry.

There were no ceiling access trap within the laundry and no access to the ceiling mounted A/C unit.

There was no W.C. cistern access trap.

Prior to my inspection I recommended that the owner have a wall mounted access trap cut into the rear wall of laundry (from kitchen side) and within the laundry ceiling, in an attempt to access /view any leaking services.

The owner had both these access panels installed prior to my inspection and also had a plumbing contractor inspect for leaks and whom determined a *leak was apparent* in the lower section of the A/C condensate pipe.

**7.82 Noted Defects;** Refer example Photo No54 of the type of *flooding* that has occurred and caused *very significant damage to the hall carpet* and resulted in very *high moisture content* within all of the *lower enclosing walls* of laundry and has commenced rusting of the lower steel laundry door jamb.

Refer Photo No55 of the *A/C condensate overflow pipe* (within laundry vanity cupboard), which I determined as *significantly leaking*. Refer Photo No56 of wall opening made at the rear face of laundry (kitchen side) exposing the A/C condensate line which was *substantially leaking*.

I also observed another *leak* within the *A/C condensate line* near junction with A/C unit within the laundry ceiling.

In my professional opinion all of the above noted leaks have contributed to the prior noted flooding and moisture related damage and it would appear that the lower section of the A/C condensate line has been pierced via redundant vanity cupboard raw plug fixings.

The marble clad *laundry W.C cistern cover* has no removable access panel to allow access to maintain and service the concealed cistern (Refer Photo No57) and which is considered essential.

### 7.83 Recommendations;

Vendor to reimburse owner for the various access panels that were installed to determine source of laundry flooding and rectify all A/C condensate pipe leaks and reinstate all water damage surfaces including carpet.

Vendor to install removable access panel within the marble W.C. cistern cover.



**7.84 Terrace/ Balcony, Balustrading & Planters;****Comments:**

**7.85A Balustrades or other barriers;** BCA CI D2.16 (a) states that a *continuous balustrade or other barrier must be provided* along the side of any roof, any stairway, or ramp, any floor, corridor, hallway balcony, veranda, mezzanine, access bridge or the like and along the side of any path of access to a building if;

- (i) is not bounded by a wall; and
- (ii) its level above the surface beneath, is more than-
  - (A) 4m where it is possible for a person to fall through an openable window; or
  - (B) 1 m in any other case

BCA CI D2.16 (f) states the height of a balustrade or other barrier must be constructed in accordance with the following **ii (A)** 1m above the floor of any access path, balcony, landing or the like with a path of travel has a gradient less than 1:20.

The council approved **project specification (dated 5.2.99)** states at *clause 9.05* balustrades and handrails that external handrails (Type A) are required to be a minimum of 1000mm high

*Refer Annexure NoA3A*

**Council approved architectural drawing No1534/BA09** Issue A details the external balcony handrails as being 1 m high stainless steel.

The project **handrail contractors certification** ( from A.M. Balustrades and dated 13.12.01 states that all Balustrades comply in general with BCA CI 2.16 and A.S 1288 (*Refer Annexure No6 & 6A*)

**7.86 Terrace/ Balcony, Balustrading & Planters;**

**Comments:** I used a Protimeter moisture meter to test the external walls of the various planter boxes and some lower external walls.

**7.87 Balustrading**

**SW Terrace Noted Defects;** I measured the height of the balcony balustrading above tiling on all elevations and recorded the following heights; 955,980, 960 and 940mm *Refer example Photo No58.*

**NW (external) Terrace Noted Defects;** I measured the height of the balcony balustrading above tiling on all elevations and recorded the following heights; 940mm, 945, 950, 975 and 980mm

**NW (internal) Terrace Noted Defects;** I measured the height of the balcony balustrading above tiling on all elevations and recorded the following heights; 920mm, 930 & 940mm

**Bed 2 SE Terrace Noted Defects;** I measured the height of the balcony balustrading above tiling on all elevations and recorded the following heights; 975mm, 955 & 975mm

The entire above noted balustrade heights are below the minimum requirements of the BCA clause 2.16 (minimum 1000mm high) and are also in contravention with the project specification and council approved architectural drawings.

As such the balustrading is **not compliant with BCA CI D2.16 (f) ii (A) and is defective.**



**7.88 Recommendations;**

Recommend that a copy of this report be provided to the project PCA (Woollahra Council) and that they be requested to formally request (by issuing a letter of intent) the vendor to remove and reinstate handrails and associated structures to achieve a minimum 1000mm height above balcony tiling and make good all associated finishes.

**7.89 Planters**

**SW Terrace Noted Defects;** There was evidence of hairline cracking within the internal face wall render of planter together with moisture related efflorescence *Refer example Photo No59*.

Moisture meter reading of external walls revealed *moderate to high damp* within the SW and *external lower Dining Rm wall* at the NW end (adjacent to planter box *Refer Photo No60*).

In my professional opinion I consider that this is a defect and is probably being caused either due to defective lower wall weep holes and/ or cavity wall flashing.

**NW Terrace Noted Defects;** *Refer Photo No61 & 62* showing evidence of moisture related efflorescence and partially cracked render on NW external face external face of this terrace planter.

Similar moisture related evidence of failure was also evident on the SW and external face of SW and terrace

In my professional opinion this type of efflorescence staining is most likely been caused by moisture entry through the external paint film and hairline cracks and is not consider a building defect and could only be considered defective if the render becomes drummy and delaminates.

**Bed 2 SE Terrace Noted Defects;** *Refer Photo No63* (below) showing evidence of moisture related efflorescence and partially cracked render on *SE external face external face of this terrace*. Refer also prior comments under *Unit 2 Paragraphs 3.92 & 3.95* of this report.

In my professional opinion this moisture stained and partially cracked is not a building defect and could only be considered defective if the render becomes drummy and delaminates.

**7.90 Recommendations;**

Determine (via destructive investigation) cause\s of moisture gain within the external walls of noted terrace/ planters and make good or paint finishes to match.

Some destructive investigate of concealed elements (such as lower wall flashings and weep holes is required to determine requisite remedial works and rectify cause of and rectify cause of moisture gain within noted lower external wall/s.

**7.95 Indicative Budget Estimate (for unit 7 noted repair recommendations) = \$46,100** (excl GST)  
Excludes A/C condensate / carpet repairs & other consultants costs (*Refer Annexure No 1*)



Photo No63

