AUSTRALIAN CIVIL CONSTRUCTION SERVICES

Building Inspections •
Pool Fencing Inspections •

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ABN 24 972 432 781 | QBCC Lic No 17520 | QMBA Lic No 21803
Institute of Building Consultants Lic No 21803
Australian Institute of Building Surveyors Lic No 4226

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Confidential Property Report

ABN 24 972 432 781
QBCC License 17520
Master Builders License 21803
Institute of Building Consultants Lic 21803
Member Institute of Building Surveyors 4226

A.C.C.S. PROPERTY INSPECTIONS

AGREEMENT NO:	***2325***
CLIENT	**Larsen, Mandy**
PHONE:	
EMAIL:	**Mandy.Larsen@ccrc.qld.gov.au**
POSTAL ADDRESS:	
PROPERTY:	**King Ranch Cultural Theatre**
DATE:	**24th October 2024**
WEATHER:	**Fine**

INTRODUCTION

DWELLINGS BEING SOLD

From 1 January 2022

Smoke alarms in the dwelling must:

i) be photoelectric (AS 3786-2014); and
ii) not also contain an ionisation sensor; and
iii) be less than 10 years old; and
iv) operate when tested; and
v) Be interconnected with every other smoke alarm in the dwelling so all activate together.

Smoke alarms must be installed on each storey:

i) in each bedroom; and
ii) in hallways which connect bedrooms and the rest of the dwelling; or
iii) if there is no hallway, between the bedrooms and other parts of the storey; and
iv) If there are no bedrooms on a storey at least one smoke alarm must be installed in the most likely path of travel to exit the dwelling.

Smoke alarms must be hardwired or powered by a non-removable 10-year battery, or a combination of both may be allowed

TERMINOLOGY

Please refer to Limitations and Conditions

High: ***The frequency and/or magnitude of defects are beyond the inspector's expectations When compared to similar buildings of approximately the same age that have been Reasonably well maintained.***

Typical: ***The frequency and/or magnitude of defects are consistent with the inspector's Expectations when compared to similar buildings of approximately the same age which Have been reasonably well maintained.***

Low: ***The frequency and/or magnitude of defects are lower than the inspector's expectations***

When compared to similar buildings of approximately the same age that have been Reasonably well maintained.

***Minor Defect*: Any defect other than what is described as a major defect.**

***Major Defect*: Is a Defect defined by 1 or a combination of A.B.C.D.E.F**

A	***Damage***	***The fabric of the element has ruptured or is otherwise broken***
B	***Distortion***	***Distortion Warping Twisting An element or elements has been distorted or moved from the intended location***
C	***Water penetration Damp related***	***Moisture is present in unintended or unexpected locations***
D	***Material deterioration (rusting, rotting, corrosion, decay)***	***An element or component is subject to deterioration of material or materials***
E	***Operational***	***An element or component does not operate as intended***
F	***Installations (including omissions)***	***The element or component is subject to improper or ineffective installation, inappropriate use, or missing components***

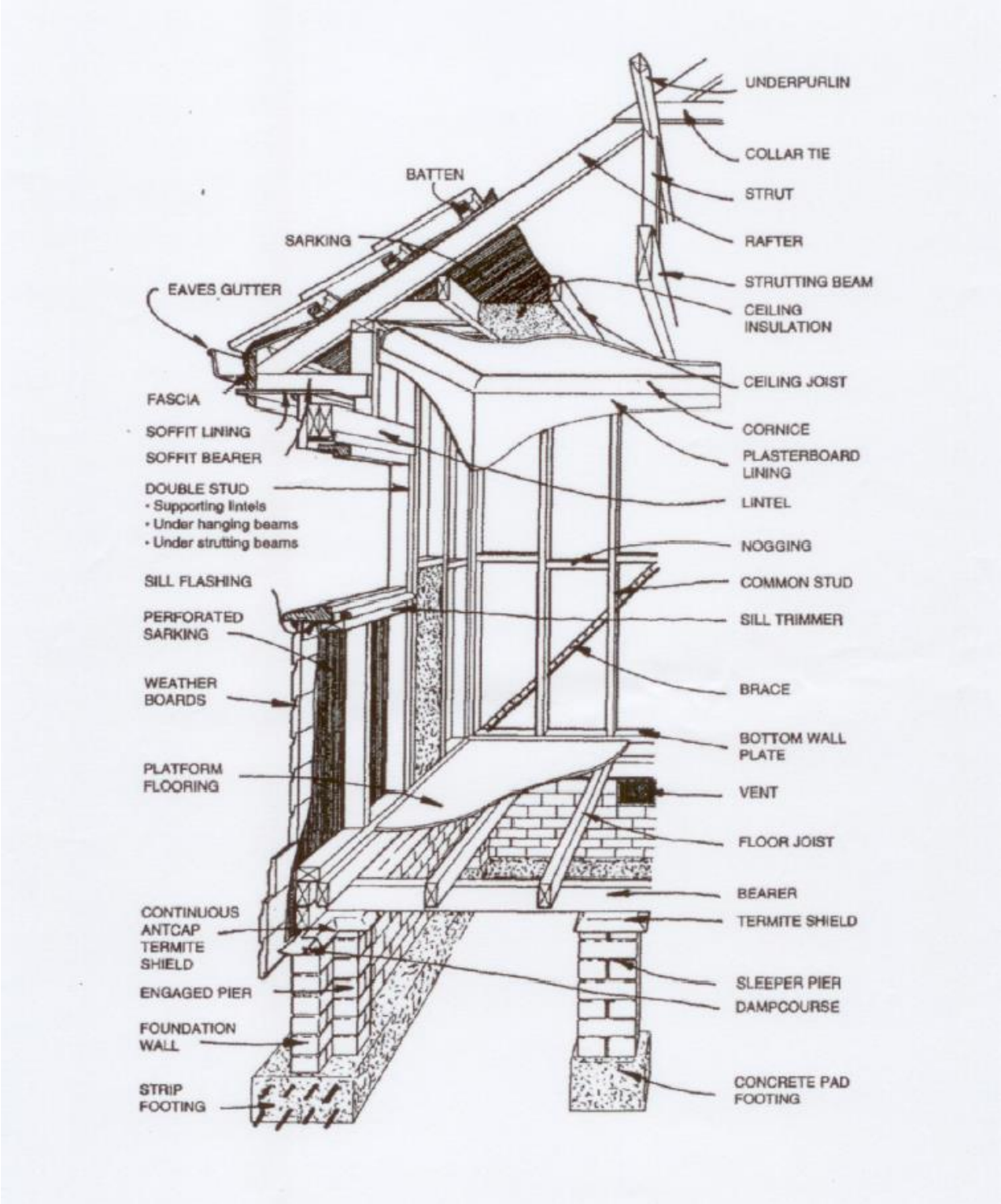
:

No defects or safety hazards found	At time of inspection there were no apparent Defects, Damage or physical Safety Hazard including weather forced lateen conditions

Acceptable	Satisfactory or reasonable condition for the age and in a serviceable general condition
Fair	Some Defects, damage or wear and tear. Further investigation and detailing of extent of any damage is recommended by licensed Trade Contractors.
Deterioration/Poor	Significant repairs or replacements required. May be in a badly neglected state due to lack of maintenance, deterioration or not completed to an acceptable standard of workmanship. Further investigation and detailing of extent of any damage is recommended by licensed Trade Contractors.
Minor Defect / Fault	Does not require immediate or substantial rectification but may show signs of general wear and tear or an imperfection
Maintenance Required	Requires immediate attention otherwise further irreversible damage may occur
Defect / Repair	Significant fault that requires rectification

ILLUSTRATED GUIDES

Timber Construction:



READILY ACCESSIBLE AREAS INSPECTED

Please refer to Limitations and Conditions

The inspection covered the Readily Accessible Areas of the property including:

X	Building Interior	**X**	Building Exterior	**X**	Roof Exterior
X	Roof Space	**X**	Sub floor Space	**X**	Outbuildings
	The grounds including any timber structures such as bridges, landscaping, retaining walls, fences, tree stumps, trees and timber embedded in the soil within the confines of the property, up to 5m from the main building.				
	Other				

AREAS NOT INSPECTED

Please refer to Limitations and Conditions

X	If checked parts or parts of the **building interior** were not readily accessible or inaccessible or obstructed at the time of inspection because of personal belongings
	If checked parts or parts of the **building exterior** were not readily accessible or inaccessible or obstructed at the time of inspection because of,
	If checked parts or parts of the **roof exterior** were not readily accessible or inaccessible or obstructed at the time of inspection because of,
	If checked parts or parts of the **roof space** were not readily accessible or inaccessible or obstructed at the time of inspection because of,
	If checked parts or parts of the **sub floor space** were not readily accessible or inaccessible or obstructed at the time of inspection because of.
	If checked parts or parts of the **retaining walls, fencing, carport** was not readily accessible or inaccessible or obstructed at the time of inspection because of,
	If checked parts or parts of the **outbuilding** were not readily accessible or inaccessible or obstructed at the time of inspection because of,
X	***The visual inspection of the parts of the premises stated in the report, to which the inspector had reasonable access, without removal of furniture, floor coverings, lining materials, electrical appliances, kitchen materials and food stocks, plants, soil, all kitchen cupboards and any cupboard with items stored, this area may have items not visible at time of inspection or may be covering a present know defect. (Rot, damage etc.) Etc.***

The inspection of all services is limited and strictly confined to our field of expertise only, as per AS 4349.1.07 we are therefore unable to guarantee that all faults relating to services have been detected. In all cases we would suggest a licensed contractor in each specialized field be engaged immediately to carry out further investigations.

SUMMARY

The incidence of Major Defects in this Residential Building as compared with similar Buildings is considered: Typical.
The incidence of Minor Defects in this Residential Building as compared with similar Buildings is considered: Typical.
The overall frequency and/or magnitude of defects in the inspector's expectations When compared to similar buildings of approximately the same age that have been Reasonably well maintained are Typical.

Within the limitations and conditions of this inspection, now, it is our opinion; the house is in a generally Acceptable condition with repairs and replacements required as per the report.
No electrical items were checked. Please read the **TERMINOLOGY** *section. photos in report file are only a snap shop, please refer to total photo's file.*

Only if all items mentioned within the report are attended to ASAP, in our opinion, the house will give many years of ongoing service.

This Summary is intended as a quick and superficial overview of the inspection results. This Summary is NOT the Report and is not to be relied upon on its own. This Summary must be read in conjunction with the full Report and not in isolation from the Report. If there is a discrepancy between the Summary and the Report, the Report shall override.

ADDITIONAL COMMENTS

- It is recommended that repairs be undertaken or inspected by a qualified professional to ensure repairs meet the requirements of the Queensland Building Construction Commission (QBCC).

PROPERTY DESCRIPTION	
Building Type	Single story dwelling
Status	occupied
Number of ooms	3
Upper Floor	N/A
Lower floor	ground
External Wall Construction	Concrete masonry block and timber walls with metal wall cladding
Internal Wall Construction	Concrete masonry block and Timber frame
Ceiling Cladding	Timber frame with metal sheeting
Roof Cladding	Custom orb

Allotment	Comments
Paths & Drive	• Gravel and grass. No real access to property
Surface Drainage	• No defects or safety hazards found. • Divert all away from foundations.
Trees & garden beds	• No defects or safety hazards found. • With trimming to all trees recommended.
Exterior tiles and paving	• Where installed Deterioration to paving repairs is recommended.
Fencing	• **Defect**: where installed fair condition • **Location**: all • **Recommendation: Carpenter** – engage a suitably qualified carpenter for rectification advice in accordance with A1684.2
Shed 	• In an acceptable condition. With cleaning of walls recommend and cleaning of gutter from vegetation growing. Building is not vermin proof. Roller door were not operated due to gear laying on doors .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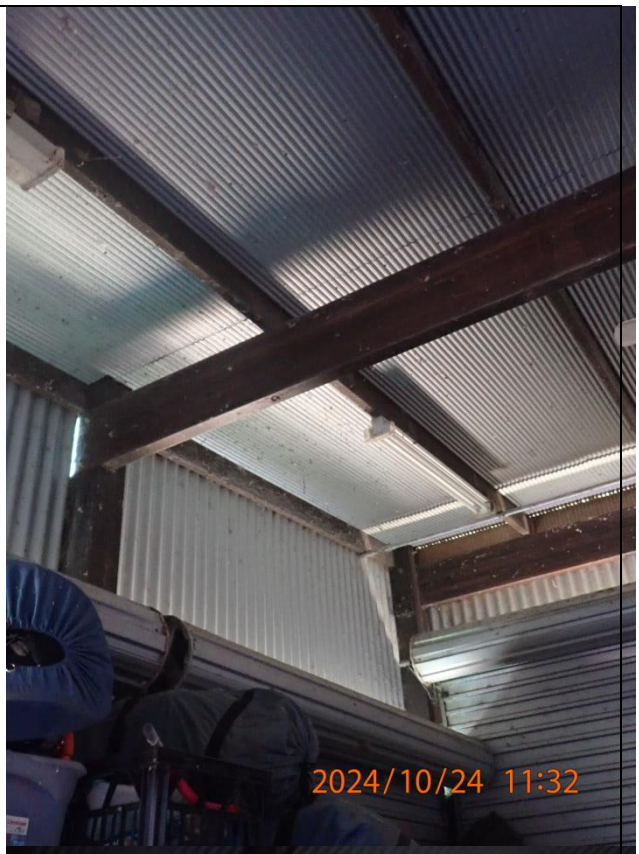
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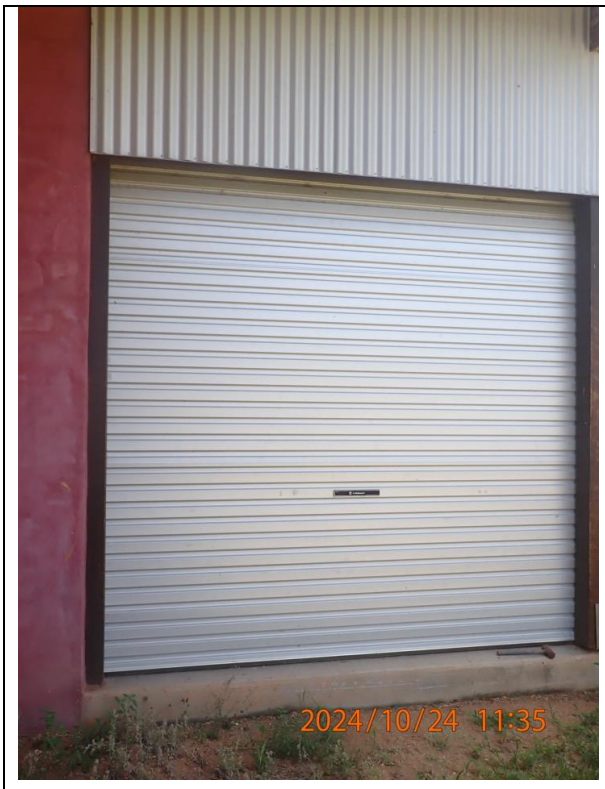
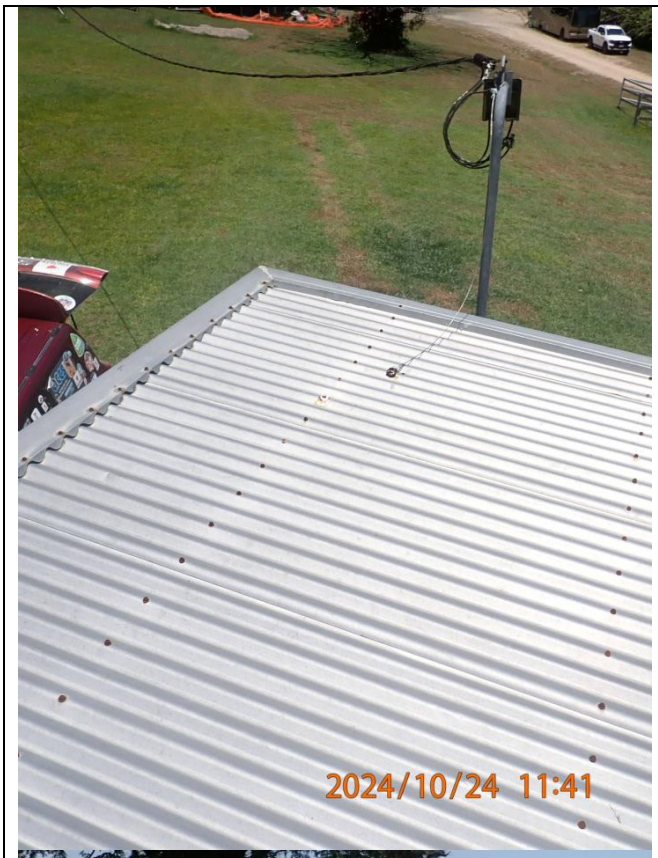
	

Building/House Exterior	**Comments**
External Walls and claddings 	Timber deterioration to gable ends and repairs are recommended. **Recommendation: Carpenter** – engage a suitably qualified carpenter for rectification advice in accordance with A1684.2

	
Roof Cladding (visual only) *Due to possible deterioration, we are not able to advise the condition of metal or timber roof battens under roof insulation or roof sheeting.* Plumbing (Roof) *Note: ACCS inspectors are not qualified plumbers or Roofers, for a comprehensive report, a plumbing inspection on all Roofing and associated. Flashings etc. is recommended. We are not able to advise the condition of metal fascia behind gutters and roof sheeting laps or metal roof battens under roof insulation, nor able to advise if insulation has been installed as per manufacturer specifications.* *as per **AS 4349.1.07***	• Defect: minor rusting fixings and around vent pipe. clean roof sheeting of leaves • Location: total roof area • Recommendation: **Plumber** – Engage a suitably qualified plumber to provide rectification advice in accordance with AS/NZ 3500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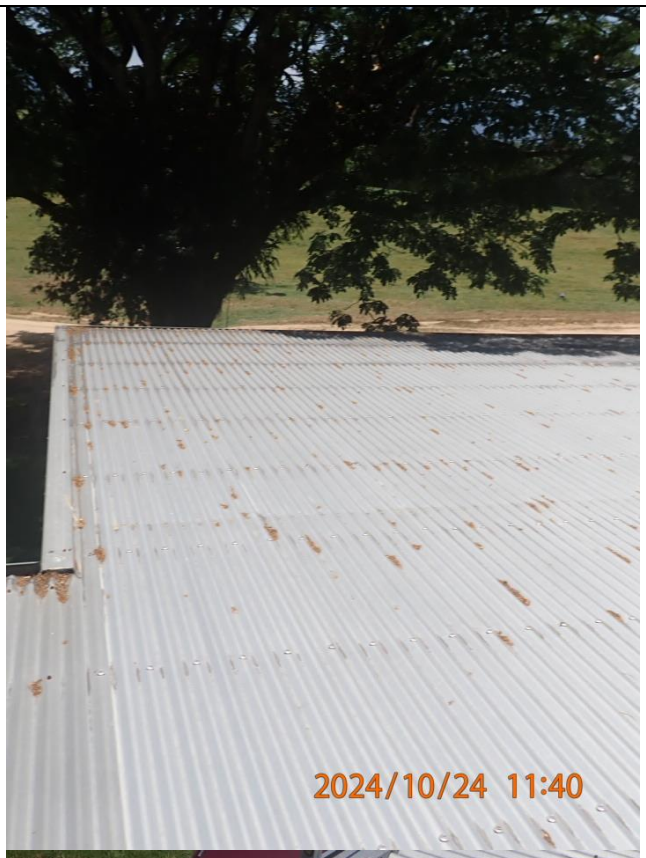
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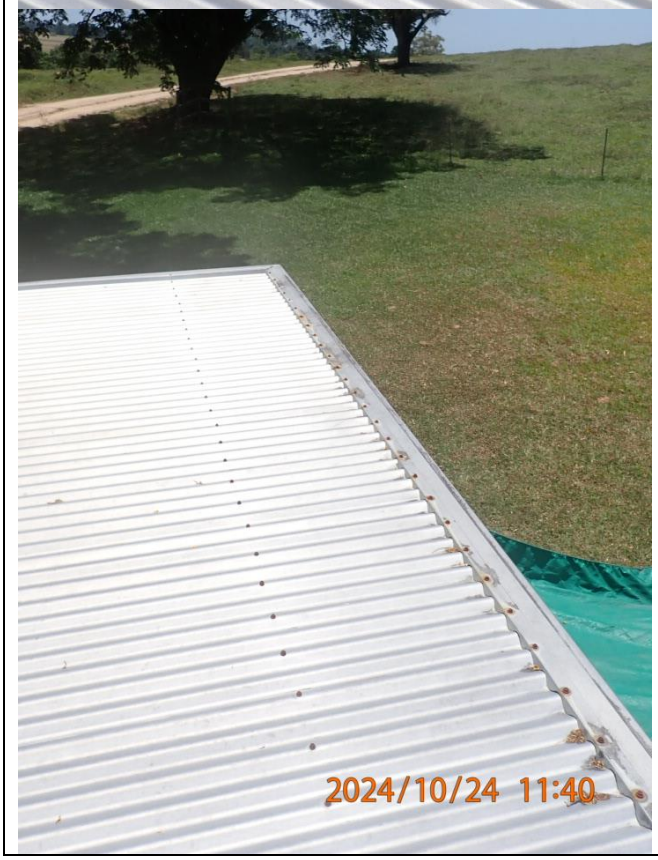
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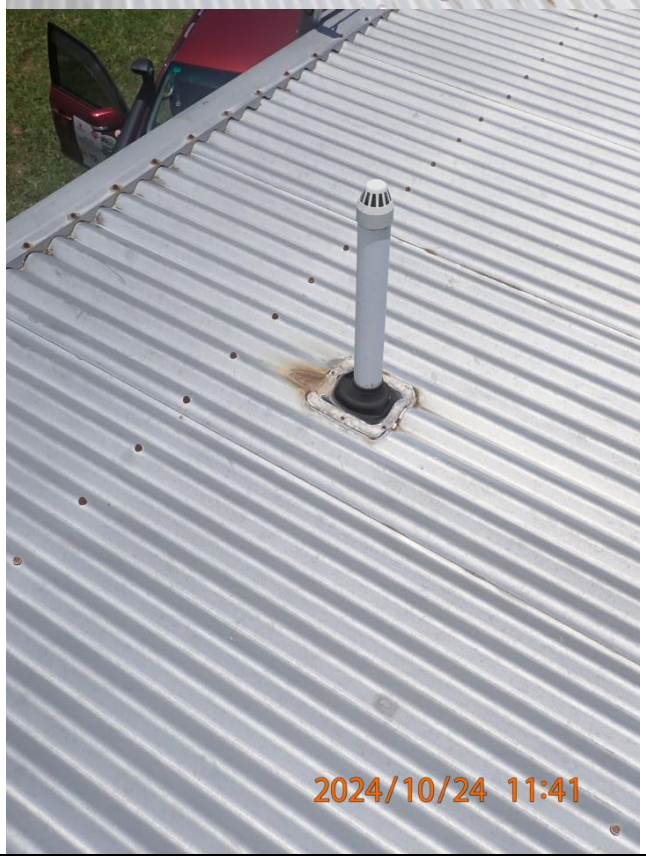
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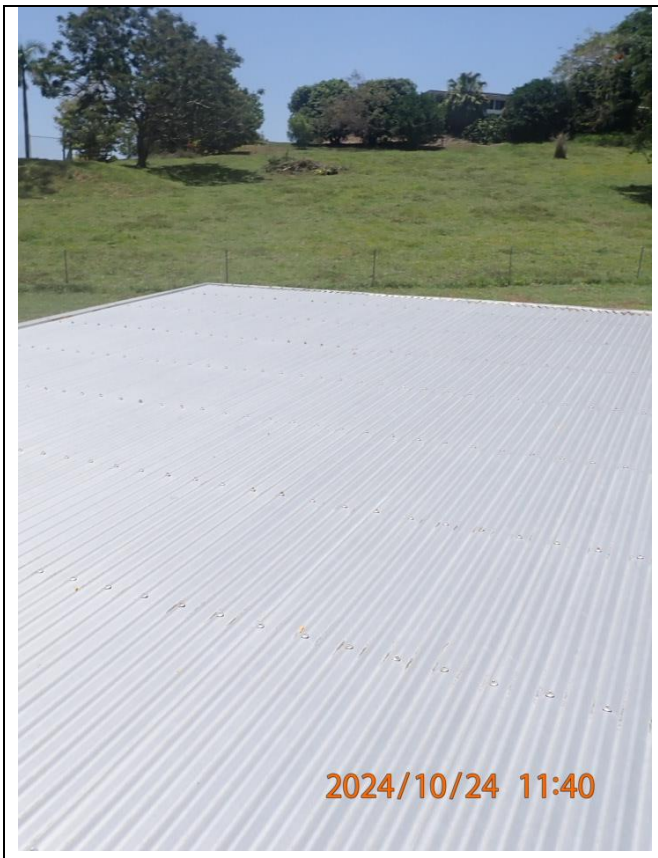	
Flashings (visual oly) Plumbing (Roof) *Note: ACCS inspectors are not qualified plumbers or Roofers, for a comprehensive report, a plumbing inspection on all Roofing and associated flashings etc. is recommend.* *as per AS 4349.1.07*	• Defect: rust to fixings • Location: all • Recommendation: **Plumber** – Engage a suitably qualified plumber to provide rectification advice in accordance with AS/NZ 3500
Gutters (visual only) Plumbing (Roof) *Note: ACCS inspectors are not qualified plumbers or Roofers, for a comprehensive report, a plumbing inspection on all Roofing and associated flashings etc. is recommended. We are not able to advise the condition of metal fascia behind gutters and roof sheeting laps or metal roof battens under roof insulation.* *as per AS 4349.1.07*	• Defect: where fitted rust and minor deterioration • Location: all • Recommendation: **Plumber** – Engage a suitably qualified plumber to provide rectification advice in accordance with AS/NZ 3500
Painted Surfaces	• Exterior Paint is in a fair condition.

Fascia's, Soffits, Eaves

We are not able to advise the condition of metal fascia behind gutters and roof sheeting laps or metal roof battens under roof insulation

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- Defect: minor deterioration
- Location: all
- Recommendation: **Plumber** – Engage a suitably qualified plumber to provide rectification advice in accordance with AS/NZ 3500

- **Recommendation: Carpenter** – engage a suitably qualified carpenter for rectification advice in accordance with A1684.2


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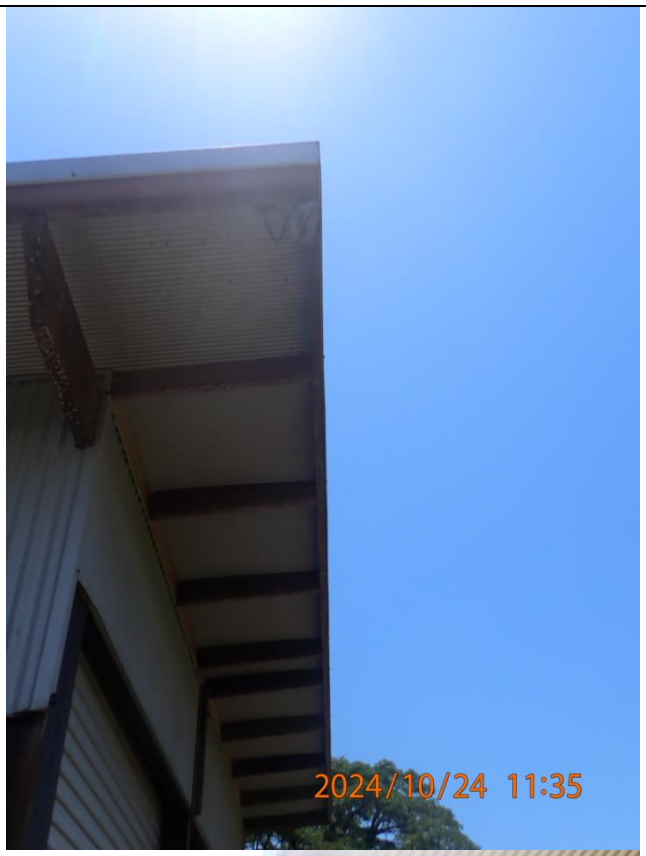
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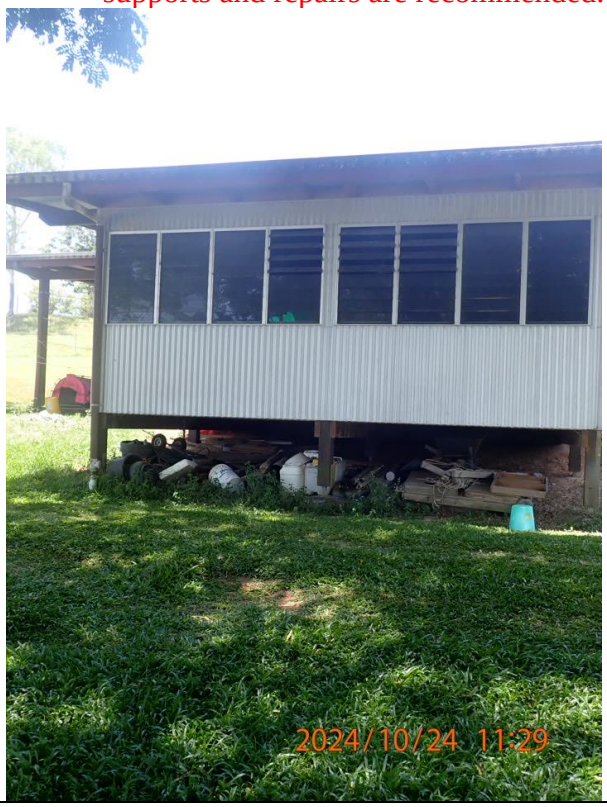
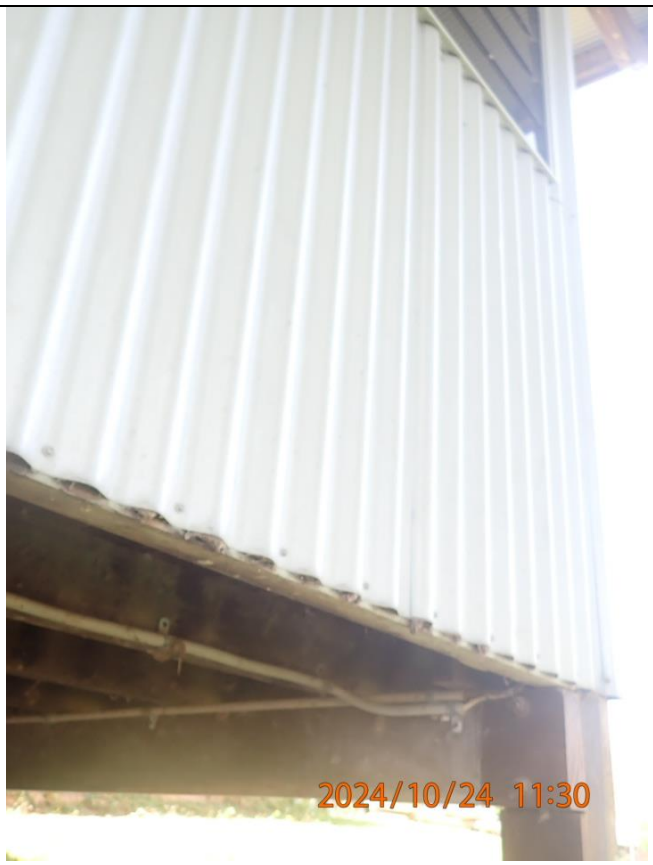
Down Pipes 	• Defect: minor repairs required • Location: all • Recommendation: **Plumber** – Engage a suitably qualified plumber to provide rectification advice in accordance with AS/NZ 3500 

Under floor Areas	**Comments**
Tie Downs and metal items. *Recommend all bare metal items are treated and coated with a rust preventative*	• Visible rust to hold down bolts.
Termite Barriers (Any Caps etc.)	**Timber And Pest** – Seek advice from qualified and experienced professional in accordance with AS 3660.

Foundations (Visual above ground only  	• As per stumps and supports
Stumps and support  	• Minor Deteriorating to several timber supports and repairs are recommended. 

Bearers and Joists 	• Appear in an acceptable condition. 

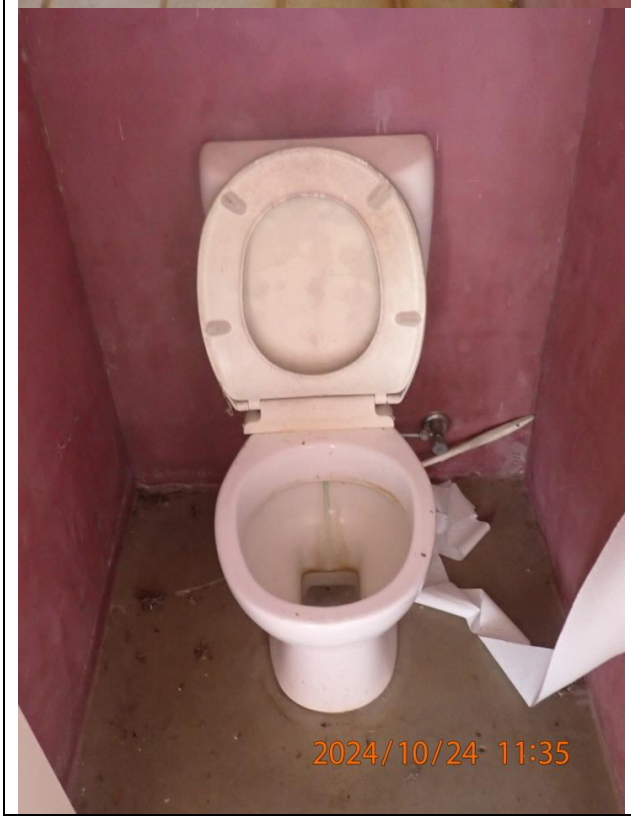
	
Stairs and verandah	• Where visible appears in an acceptable condition.
Building House Interior	**Comment**
Roof structure ***(visual only)*** *Due to possible deterioration, we are not able to advise the condition of metal or timber roof battens under roof insulation or roof sheeting and, not able to advise if insulation has been installed as per manufacturer specifications.* *as per* ***AS 4349.1.07***	• Where visible appears in an acceptable condition.
Ceiling lining	• Where visible appears in an acceptable condition.
Internal walls	• Defect: minor repairs recommended.

Paint Finish	• Defect: fair • Location: all • Recommendation: repaint
Floor and Coverings 	• Visible cracking to concrete
Doors Recommend rekeying or replacing all external door locks upon purchase reason being as all keys may not have worked correctly.	• **Defect**: minor repairs recommended. • **Recommendation: Carpenter** – engage a suitably qualified carpenter for rectification advice in accordance with A1684.2

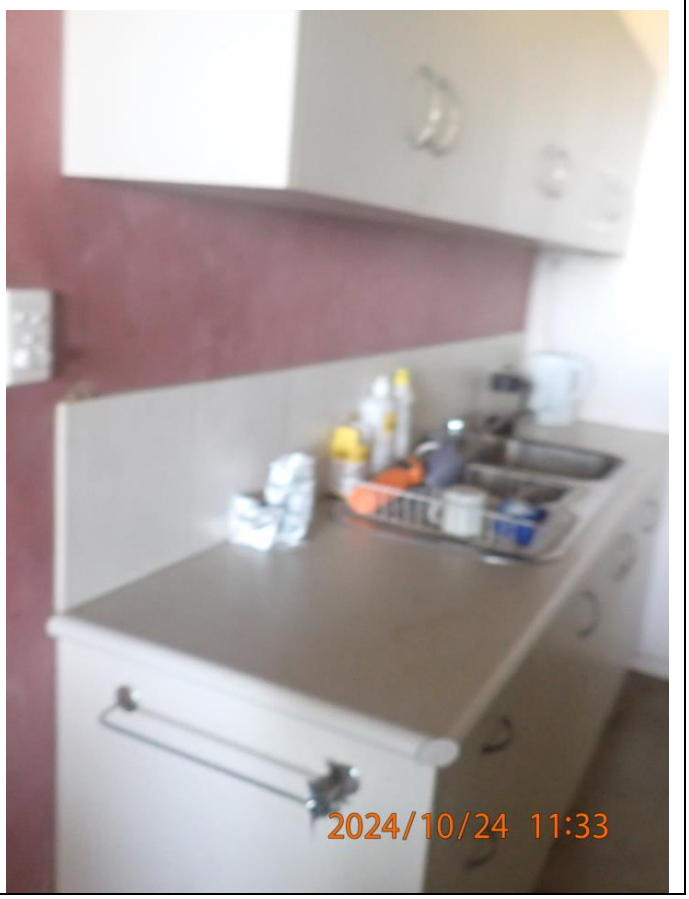
Window Recommend regular maintenance of sliding window tracks and rollers to prevent seizing.  	• **Defect**: minor repairs recommended. Visible rust to louvers • **Recommendation: Carpenter** – engage a suitably qualified carpenter for rectification advice in accordance with A1684.2

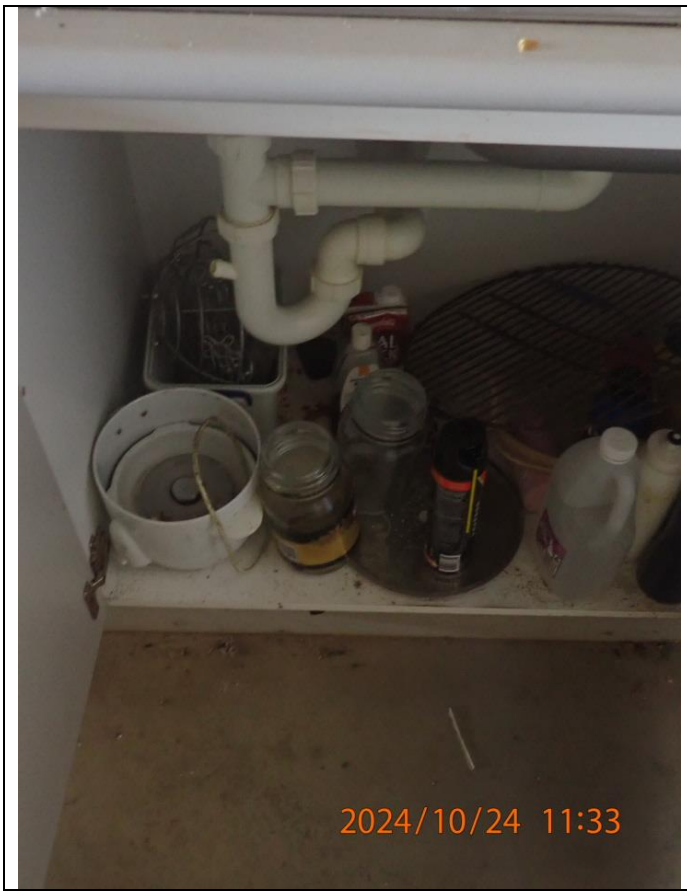
House Interior Wet Areas	**Comments**
Bathroom 1 –  	• In a fair condition with repairs recommended. • Recommend replacement of all sealants as preventative maintenance when required. 

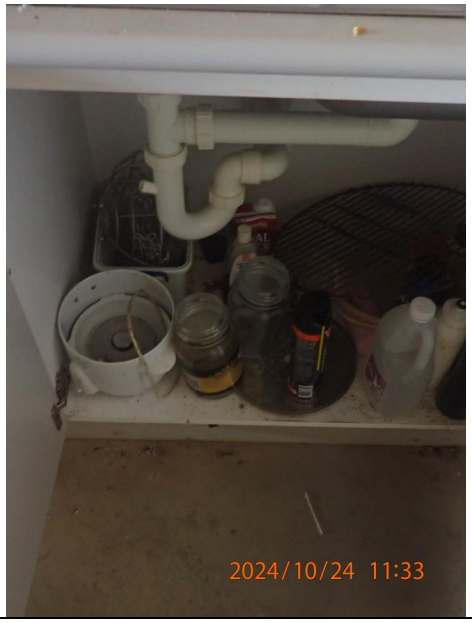
Toilets –



- Generally, appears to be in a fair condition.1 is not working
- Recommend replacement of all sealants as preventative maintenance when required.

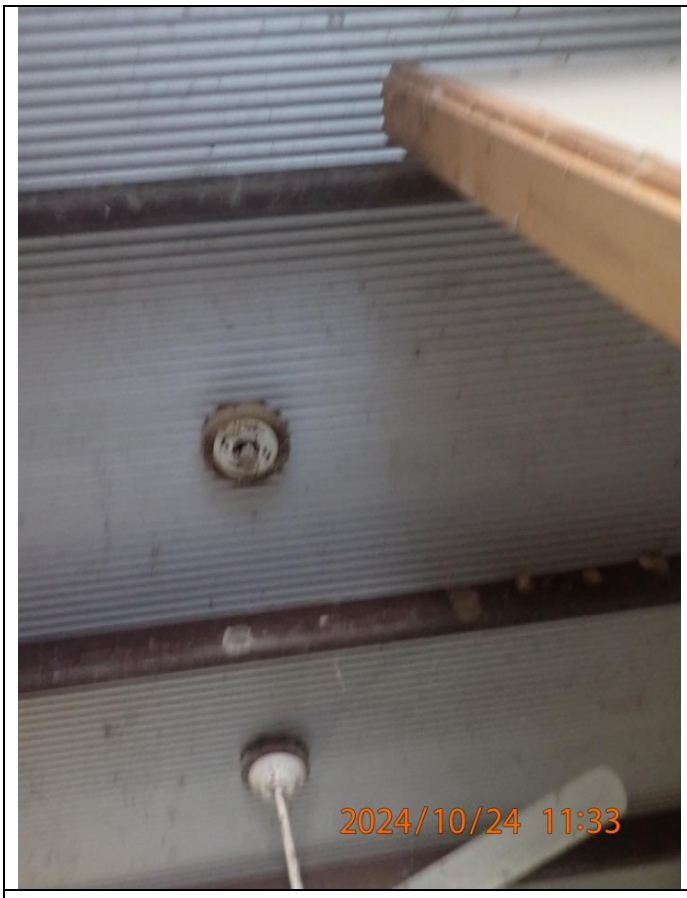
Laundry	• N/A
Kitchen 1 – NOTE WE DO NOT CHECK ANY ELECTRICAL ITEMS OR APPLIANCES 	• BASIC. • Generally, appears to be in a Fair condition. • Recommend replacement of all sealants as preventative maintenance when required. 

Misc. Items	Comments
Plumbing (Interior) *Note: ACCS inspectors are not qualified plumbers. For a comprehensive report, a plumbing inspection on all underground septic and sewerage systems is recommended. Recommend council be consulted to confirm all existing serviced are as per present by laws is recommended.*	• No defects or safety hazards found. 

Plumbing (Exterior) *Note: ACCS inspectors are not qualified plumbers. For a comprehensive report, a plumbing inspection on all underground septic and sewerage systems is recommended. Recommend the council be consulted to confirm all existing services are as per present by laws is recommended.*	• No defects or safety hazards found.
Water Pressure *Note: ACCS inspectors are not qualified plumbers. For a comprehensive report, a plumbing inspection on all underground septic and sewerage systems is recommended. Recommend the council be consulted to confirm all existing serviced are as per present by laws is recommended.*	• No defects or safety hazards found.
Hot Water Service (visual only) 	• No defects or safety hazards found.

Power Board and Wiring (Restricted by ERGON) NOTE WE DO NOT CHECK ANY ELECTRICAL ITEMS OR APPLIANCES *Note: ACCS inspectors are not qualified electricians. For a comprehensive report, an electrical inspection is recommended.*  	• No defects or safety hazards found.
Lights (Limited inspection) NOTE WE DO NOT CHECK ANY ELECTRICAL ITEMS OR APPLIANCES *Note: ACCS inspectors are not qualified electricians. For a comprehensive report, an electrical inspection is recommended.*	• Recommend inspection of smoke alarms

	
Appliances NOTE WE DO NOT CHECK ANY ELECTRICAL ITEMS OR APPLIANCES *Note: ACCS inspectors are not qualified electricians. For a comprehensive report, an electrical inspection is recommended.*	• We're not tested during inspection.
Meter Box	• No defects or safety hazards found. • We're not tested during inspection.

MAINTENANCE ADVICE UPON OWNERSHIP

After taking possession of a new home, there are some maintenance and safety issues that should be addressed immediately. The following checklist should help you to undertake these improvements:

- Change the locks on all exterior entrances for improved security.
- Check that all windows and doors are secure. Improve window hardware as necessary. Security rods can be added to sliding windows and doors. Consideration could also be given to a security system.
- Install smoke detectors on each level of the home. Ensure that there is a smoke detector outside all sleeping areas. Replace batteries on any existing smoke detectors, test and date them. Make a note to replace batteries in one year.
- Create a plan of action in the event of a fire in your home. Ensure that there is an operable window in every room of the house. Consult with your local fire department regarding fire safety issues and what to do in the event of fire.
- Examine driveways and walkways for trip hazards. Undertake repairs where necessary.
- Examine the interior of the home for trip hazards. Loose of torn carpeting and flooring should be repaired.
- Undertake improvements to all stairways, decks, porches and landings where there is a risk of falling or stumbling.
- Review your home inspection report for any items that require immediate improvement or further investigation. Address these areas as required.
- Investigate the location of the main shut-off for the plumbing and electrical systems. If you attended the home inspection, these items would have been pointed out to you.

REGULAR MAINTENANCE

Every Month

- Check that the fire extinguisher(s) are fully charged. Re-charge if necessary.
- Examine heating/cooling air filters and replace or clean as necessary.
- Bleed the valves of the hot water heaters.
- Clean gutters and down pipes. Ensure that down pipes are secure and that the discharge of down pipes is appropriate.
- Carefully inspect the condition of shower enclosures. Repair or replace deteriorated grout and sealant. Ensure that water is not escaping the enclosure during showering. Check below all plumbing fixtures for evidence of leaks.
- Repair or replace leaking taps or showerheads.
- Secure loose toilets or repair flush mechanisms that become troublesome.

Before and After Wet Season

- Examine the roof for evidence of damage to roof coverings and flashings.
- Inspect the roof space (if accessible) for evidence of leakage, condensation or vermin activity. Level out insulation if needed.
- Trim back tree branches and shrubs to ensure that they are not in contact with the house.
- Inspect the exterior walls and foundations for evidence of damage, cracking or movement. Watch for bird nests or other vermin or insect activity.
- Survey any sub-floor walls or walls of rooms built below ground level for evidence of moisture seepage.
- Look at overhead wires coming into the house. They should be secure and clear of trees or other obstructions.
- Ensure that the grade of the land around the house encourages water to flow away from the foundation.
- Inspect all driveways, walkways, decks, porches and landscape components for evidence of deterioration, movement or safety hazards.
- Clean windows and test their operation. Improve caulking and weather-stripping as necessary. Watch for evidence of wood rot in window frames. Paint and repair windowsills and frames as necessary.
- Test the electrical safety switch (if installed) as identified in the inspection report, by pressing the test button.
- Inspect for evidence of wood-boring insect activity. Eliminate any wood/soil contact around the perimeter of the home.
- Replace or clean exhaust hood filters
- Clean, inspect and/or service all appliances as per the manufacturer's recommendations.

Annually

- Replace smoke detector batteries.
- Have the heating, cooling and water-heating systems cleaned and serviced.

- Examine the electrical panels, wiring and electrical components for evidence of overheating. Ensure that all components are secure. Flip the breakers on and off to ensure that they are not sticky.
- If the property has a septic system, have the tank inspected (and pumped as needed).
- If your home is in an area prone to wood destroying insects (termites, borers, etc.), have the home inspected by a licensed specialist. Preventative treatment may be recommended in some cases.

PREVENTION IS THE BEST APPROACH

Although we've heard it many times, nothing could be truer than the old cliché "an ounce of prevention is worth a pound of cure". Preventative maintenance is the best way to keep your house in great shape. It also reduces the risk of unexpected repairs and improves the odds of selling your house at a fair market value, when the time comes. Please feel free to contact our office should you have any questions regarding the operation or maintenance of your home.

FOUNDATION MAINTENANCE AND FOOTING PERFORMANCE

Buildings can and often do move. This movement can be up, down, lateral or rotational. The fundamental cause of movement in buildings can usually be related to one or more problems in the foundation soil. It is important for the homeowner to identify the soil type to ascertain the measures that should be put in place to ensure that problems in the foundation soil can be prevented, thus protecting against building movement.

This Building Technology File is designed to identify causes of soil-related building movement, and to suggest methods of prevention of resultant cracking in buildings.

Soil Types

The types of soils usually present under the topsoil in land zoned for residential buildings can be split into two approximate groups – granular and clay. Quite often, foundation soil is a mixture of both types. The general problems associated with soils having granular content are usually caused by erosion. Clay soils are subject to saturation and swell/shrink problems.

Classifications for a given area can generally be obtained by application to the local authority, but these are sometimes unreliable and if there is doubt, a geotechnical report should be commissioned. As most buildings suffering movement problems are founded on clay soils, there is an emphasis on classification of soils according to the amount of swell and shrinkage they experience with variations of water content. The table below is Table 2.1 from AS 2870, the Residential Slab and Footing code.

GENERAL DEFINITIONS OF SITE CLASSES	
Class	**Foundation**
A	Most sand and rock sites with little or no ground movement from moisture changes
S	Slightly reactive clay sites with only slight ground movement from moisture changes
M	Moderately reactive clay or silt sites, which can experience moderate ground movement from moisture changes
H	Highly reactive clay sites, which can experience high ground movement from moisture changes
E	Extremely reactive sites, which can experience extreme ground movement from moisture changes
A to P	Filled sites
P	Sites which include soft soils such as soft clay or silt or loose sands; landslip; mine subsidence; collapsing soils; soils subject to erosion; reactive sites subject to abnormal moisture conditions or sites which cannot be classified otherwise.

Causes of Movement

Settlement due to Construction

There are two types of settlement that occur because of construction:

- Immediate settlement occurs when a building is first placed on its foundation soil, because of compaction of the soil under the weight of the structure. The cohesive quality of clay soil militates against this, but granular (particularly sandy) soil is susceptible.
- Consolidation settlement is a feature of clay soil and may take place because of the expulsion of moisture from the soil or because of the soil's lack of resistance to local compression or shear stresses. This will usually take place during the first few months after construction but has been known to take many years in exceptional cases.

These problems are the province of the builder and should be taken into consideration as part of the preparation of the site for construction. Building Technology File 19 (BTF 19) deals with these problems.

Erosion

All soils are prone to erosion, but sandy soil is particularly susceptible to being washed away. Even clay with a sand component of say 10% or more can suffer from erosion.

Saturation
This is particularly a problem in clay soils. Saturation creates a bog-like suspension of the soil that causes it to lose virtually all its bearing capacity. To a lesser degree, sand is affected by saturation because saturated sand may undergo a reduction in volume – particularly imported sand fills for bedding and blinding layers. However, this usually occurs as immediate settlement and should normally be the province of the builder.

Seasonal swelling and shrinkage of soil
All clays react to the presence of water by slowly absorbing it, making the soil increase in volume (see table below). The degree of increase varies considerably between different clays, as does the degree of decrease during the subsequent drying out caused by fair weather periods. Because of the low absorption and expulsion rate, this phenomenon will not usually be noticeable unless there are prolonged rainy or dry periods, usually of weeks or months, depending on the land and soil characteristics.

The swelling of soil creates an upward force on the footings of the building, and shrinkage creates subsidence tat takes away the support needed by the footing to retain equilibrium.

Shear failure
This phenomenon occurs when the foundation soil does not have enough strength to support the weight of the footing. There are two major pos-construction causes:

- Significant load increase.
- Reduction of lateral support of the soil under the footing due to erosion and excavation.
- In clay soil, shear failure can be caused by saturation of the soil adjacent to or under the footing.
-

Tree root growth
Trees and shrubs that can grow near footings can cause foundation soil movement in two ways:

- Roots that grow under footings may increase in cross-sectional size, exerting upward pressure on footings.
- Roots near footings will absorb much of the moisture in the foundation soil, causing shrinkage or subsidence.

Unevenness of Movement
The types of ground movement described above usually occur unevenly throughout the building's foundation soil. Settlement due to construction tends to be uneven because of:

- Differing compaction of foundation soil prior to construction.
- Differing moisture content of foundation soil prior to construction.

Movement due to non-construction causes is usually more uneven still. Erosion can undermine a footing that traverses the flow or can create the conditions for shear failure by eroding soil adjacent to a footing that runs in the same direction as the flow.

Saturation of clay foundation soil may occur where sub floor walls create a dam that makes water pond. It can also occur wherever there is a source of water near footings in clay soil. This leads to a severe reduction in the strength of the soil which may create local shear failure.

Seasonal swelling and shrinkage of clay soil affects the perimeter of the building first, and then gradually spreads to the interior. The swelling process will usually begin at the uphill extreme of the building, or on the weather side where the land is flat. Swelling gradually reaches the interior soil as absorption continues. Shrinkage usually begins where the sun's heat is greatest.

Effects of Uneven Soil Movement on Structures
Erosion and Saturation
Erosion removes the support from under footings, rending to create subsidence of the part of the structure under which it occurs.
Brickwork walls will resist the stress created by this removal of support by bridging the gap or cantilevering until the bricks or the mortar bedding fail. Older masonry has little resistance. Evidence of failure varies according to circumstances and symptoms may include:

- Step cracking in the mortar beds in the body of the walls or above/below openings such as doors or windows.
- Vertical cracking in the bricks (usually but not necessarily in line with the vertical beds or perpends).

Isolated piers affected by erosion or saturation of foundations will eventually lose contact with the bearers they support and may tilt or fall over. The floors that have lost this support will become bouncy, sometimes rattling ornaments etc.

Seasonal swelling/shrinkage in clay
Swelling foundation soil due to rainy periods first lifts the most exposed extremities of the footing system, then the remainder of the perimeter footings while gradually permeating inside the building footprint to lift internal footings. This swelling first tends to create a dish effect, because the external footings are pushed higher that the internal ones.

The first noticeable symptom may be that the floor appears slightly dished. This is often accompanied by some doors binding on the floor or the door head, together with some cracking of cornice mitres. In buildings with timber flooring supported by bearers and joists, the floor can be bouncy. Externally there may be visible dishing of the hip or ridge lines.

As the moisture absorption process completes its journey to the innermost areas of the building, the internal footings will rise. If the spread of moisture is roughly even, it may be that the symptoms will temporarily disappear, but it is most likely that the swelling will be uneven, creating a difference rather than a disappearance in symptoms. In buildings with timber flooring supported by bearers and joists, the isolated piers will rise more easily than the strip footings or piers under walls, creating noticeable doming of flooring. As the weather pattern changes and the soil begin to dry out, the external footings will be first affected, begging with the locations where the sun's effect is strongest. This has the effects of lowering the external footings. The doming is accentuated, and cracking reduces or disappears where it occurred because of dishing, but other cracks open. The roof line may become convex.

Doming and dishing are also affected by weather in other ways. In areas where warm wet summers and cooler dry winters prevail, water migration tends to be toward the interior and doming will be accentuated, whereas where summers are dry, and winters are wet and cold, migration tends to be toward the exterior and the underlying propensity is toward dishing.

Movement caused by tree roots
In general, growing roots will exert an upward pressure on footings, whereas soil subject to drying because of tree or shrub roots will tend to remove support from under footings by inducing shrinkage.

Complications caused by the structure itself
Most forces that the soil causes to be exerted on structures are vertical – i.e, either up or down. However, because these forces seldom spread evenly around the footings, and because the building resists uneven movement because of its rigidity, forces are exerted from one part of the building to another. The net result of all these forces is usually rotational. This resultant force often complicates the diagnosis because the visible symptoms do not simply reflect the original cause. A common symptom is binding of doors on the vertical member of the frame.

Effects on full masonry structures
Brickwork will resist cracking where it can. It will attempt to span areas that lose support because of subsided foundations or raised points. It is therefore unusual to see cracking at weak pints, such as openings for windows or doors.

In the event of construction settlement, cracking will usually remain unchanged after the process of settlement has ceased.

With local shear or erosion, cracking will usually continue to develop until the original cause has been remedied, or until the subsidence has completely neutralized the affected portion of footing and the structure has stabilized on other footings that remain effective.

In the case of swell/shrink effects, the brickwork will in some cases return to its original position after completion of a cycle, however it is more likely that the rotational effect will not be exactly reversed, and it is usual that the brickwork will settle in its new position and will resist the forces trying to return it to its original position. This means that in a case where swelling takes place after construction and cracking occurs, the cracking is likely to at least partly remain after the shrink segment of the cycle is complete. Thus, each time the cycle is repeated, the likelihood is that the cracking will become wider until the sections of brickwork become virtually independent.

With repeated cycles, once the cracking is established, if there is no other complication, it is normal for the incidence of cracking to stabilize, as the building has the articulation it needs to cope with the problem. This is by no means always the case, however, and monitoring of cracks in walls and floors should be treated seriously.

Upheaval caused by growth of tree roots under footings is not a simple vertical shear stress. There is a tendency for the root to also exert lateral forces that attempt to separate sections of brickwork after initial cracking has occurred.

The normal structural arrangement is that the inner leaf of brickwork in the external walls and at least some of the internal walls (depending on the roof type) comprise the load-bearing structure on which any upper floors, ceilings and the roof are supported. In these cases, it is internally visible cracking that should be the focus of attention; however, there are a few examples of dwellings whose external leaf of masonry plays some supportive role, so this should be checked if there is any doubt. In any case, externally visible cracking is important as a guide to stresses on the structure generally, and it should also be remembered that the external walls must can support themselves.

Effects on framed structures
Timber or steel framed buildings are less likely to exhibit cracking due to swell/shrink than masonry buildings because of their flexibility. Also, the doming/dishing effects tend to be lower because of the lighter weight of walls. The main risks to framed buildings are encountered because of the isolated pier footings used under walls. Where erosion or saturation cause a footing to fall away, this can double the span which a wall must bridge. This additional stress can create cracking in wall linings, particularly where there is a weak point in the structure caused by a door or window opening. It is, however, unlikely that framed structures will be so stressed as to suffer serious damage without first exhibiting some or all or all the above symptoms for s considerable period. The same warning period should apply in the case

of upheaval. It should be noted, however, that where framed buildings are supported by strip footings there is only one leaf of brickwork and therefore the externally visible walls are the supporting structure for the building. In this case, the sub floor masonry will behave as full brickwork walls.

Effects on brick veneer structures
Because of the load-bearing structure of a brick veneer building is the frame that makes up the interior leaf of the external walls plus perhaps the internal walls, depending on the type of roof, the building can be expected to behave as a framed structure, except that the external masonry walls can be expected to behave in a similar way to the external leaf of a full masonry structure.

Water Service and Drainage
Where a water service pipe, a sewer or storm water drainage pipe is near a building, a water leak can cause erosion, swelling or saturation of susceptible soil. Even a minuscule leak can be enough to saturate a clay foundation. A leaking tap near a building can has the same effect. In addition, trenches containing pipes can become watercourses even though backfilled, particularly where broken rubble is used as fill. Water that runs along these trenches can be responsible for serious erosion, interstrata seepage into sub floor areas and saturation.

Pipe leakage and trench water flows also encourage tree and shrub roots to the source of water, complicating and exacerbating the problem. Poor roof plumbing can result in large volumes of rainwater being concentrated in a small area of soil:

- Incorrect falls in roof guttering may result in overflows, as may gutters blocked with leaves etc.
- Corroded guttering or down pipes can spill water to ground.
- Down pipes not positively connected to a proper storm water collection system will direct a concentration of water to soil that is directly adjacent to footings, sometimes causing large-scale problems such as erosion, saturation and migration of water under the building.

Seriousness of Cracking
In general, most cracking found in masonry walls is a cosmetic nuisance only and can be kept in repair or even ignored. The table below is a reproduction of Table C1 of AS 2870.

AS 2870 also publishes figures relating to cracking in concrete floors, however because wall cracking will usually reach the critical point significantly earlier than cracking in slabs, this table is not reproduced here.

CLASSIFICATION OF DAMAGE WITH REFERENCE TO WALLS		
Description of typical damage and required repair	**Approximate crack width limit**	**Damage category**
Hairline cracks	<0.1 mm	0
Fine cracks which do not need repair	<1 mm	1
Cracks noticeable but easily filled. Doors and windows slightly stick.	<5 mm	2
Cracks can be repaired and possible a small amount of wall will need to be replaced. Doors and windows stick. Service pipes can fracture. Weather tightness often impaired	5-15 mm (or several cracks 3mm or more in one group)	3
Extensive repair work involving break-out and replacing sections of walls, especially over doors and windows. Window and door frames distort. Walls lean or bulge noticeable, some loss of bearing in beams. Service pipes disrupted.	15-25 mm but also depend on number of cracks	4

Prevention/Cure
Plumbing
Where building movement is caused by water service, roof plumbing, sewer or storm water failure, the remedy is to repair the problem. It is prudent, however, to consider also rerouting pipes away from the building where possible and relocating taps to positions where any leakage will not direct water to the building vicinity. Even where gully traps are present, there is sometimes enough spill to create erosion or saturation, particularly in modern installations using smaller diameter PVC fixtures. Indeed, some gully traps are not situated directly under the taps that are installed to charge them, with the result that water from the tap may enter the backfilled trench that houses the sewer piping. If the trench has been poorly backfilled, the water will either pond or flow along the bottom of the trench. As these trenches usually run alongside the footings and can be at a similar depth, it is not hard to see how see how any water that is thus directed into a trench can easily affect the foundation's ability to support footings or even gain entry to the sub floor area.

Ground drainage
In all soils there is a capacity for water to travel on the surface and below it. Surface water flows can be established by inspection during and after heavy or prolonged rain. If necessary, a grated drain system connected to the storm water collection system is usually an easy solution.

It is, however, sometimes necessary when attempting to prevent water migration that testing be carried out to establish water-table height and subsoil water flows. This subject is referred to a BTF 19 and may properly be regarded as an area for an expert consultant.

Protection of the building perimeter
It is essential to remember that the soil that affects footings extends well beyond the actual building line. Watering of garden plants, shrubs and trees causes some of the most serious water problems.

For this reason, particularly where problems exist are likely to occur, it is recommended that an apron of paving be installed around as much of the building perimeter as necessary. This paving should extend outwards a minimum of 900mm (more in highly reactive soil) and should have a minimum of 900 mm (more in highly reactive soil) and should have a minimum fall away from the building of 1:60. The finished paving should be no less than 100 mm below brick vent bases.

It is prudent to relocate drainage pipes away from this paving, if possible, to avoid complications from future leakage. If this is not practical, earth ware pipes should be replaced by PVC and backfilling should be of the same soil type as the surrounding soil and compacted to the same density.

Except in areas where freezing of water is an issue, it is wise to remove taps in the building area and relocate them well away from the building – preferably not uphill from it (see BTF 19)

It may be desirable to install a grated drain at the outside edge of the paving on the uphill side of the building. If subsoil drainage is needed this can be installed under the surface drain.

Condensation
In buildings with a sub floor void such as where bearers and joists support flooring, insufficient ventilation creates ideal conditions for condensation, particularly where there is little clearance between the floor and the ground. Condensation adds to the moisture already present in the sub floor and significantly slows the process of drying out. Installation of an adequate ventilation system, either natural or mechanical, is desirable.
Warning: Although this Building Technology File deals with cracking in buildings, it should be said that sub floor moisture can result in the development of other problems, notable:

- Water that is transmitted into masonry, metal or timber building elements causes damage and/or decay to those elements.
- High sub floor humidity and moisture content create an ideal environment for various pests, including termites and spiders.
- Where high moisture levels are transmitted to the flooring and walls, an increase in the dust mite count can ensue within the living areas. Dust mites, as well as dampness in general, can be a health hazard to inhabitants, particularly those who are abnormally susceptible to respiratory ailments.

The garden
The ideal vegetation layout is to have lawn or plants that require only light watering immediately adjacent to the drainage or paving edge, then more demanding plants, shrubs and trees spread out in that order.

Over watering due to misuse of automatic watering systems is a common cause of saturation and water migration under footings. If it is necessary to use these systems, it is important to remove garden beds to a completely safe distance from buildings.

Existing Trees
Where a tree is causing a problem of soil drying or there is the existence or threat of upheaval of footings, if the offending roots are subsidiary and their removal will not significantly damage the tree, they should be severed, and a concrete or metal barrier placed vertically in the soil to prevent future root growth in the direction of the building. If it is not possible to move the relevant roots without damage to the tree, an application to remove the trees should be made to the local authority. A prudent plan is to transplant likely offenders before they become a problem.

Information on trees, plants and shrubs
State departments overseeing agriculture can give information regarding root patterns, volume of water needed and safe distance from buildings of most species. Botanic gardens re also sources of information. For information on plant roots and drains, see Building Technology File 17.

Excavation
Excavation around footings must be properly engineered. Soil supporting footings can only be safely excavated at tna angle that allows the soil under the footings] to remain stable. This angle is called the angle of repose (or friction) and varies significantly between soil types and conditions. Removal of soil within the angle of repose will cause subsidence.

Remediation
Where erosion has occurred that has washed away soil adjacent to footings, soil of the same classification should be introduced and compacted to the same classification should be introduced and compacted to the same density. Where footings have been undermined,

augmentation or another specialist work may be required. Remediation of footings and foundations is generally the realm of a specialist consultant.
Where isolated footings rise and fall because of swell /shrink effect, the homeowner may be tempted to alleviate floor bounce by filling the gap that has appeared between the bearer and the pier with blocking. The danger here is that when the next swell segment of the cycle occurs, the extra blocking will push the floor up into an accentuated dome and may also cause local shear failure in the soil. If it is necessary to use blocking, it should be by a pair of fine wedges and monitoring should be carried out fortnightly.

This BTF was prepared by John Lewer FAIB, MIAMA, Partner, and Construction Diagnosis.

The information in this and other issues in the series were derived from various sources and were believed to be correct when published.
The information is advisory. It is provided in good faith and not claimed to be an exhaustive treatment of the relevant subject.
Further professional advice needs to be obtained before taking any action on the information provided.

LIMITATIONS AND CONDITIONS

THE LIMITATIONS AND CONDITIONS OUTLINED BLOW FORM AN INTEGRAL PART OF THIS REPORT AND MUST BE READ THOROUGHLY.

SCOPE

Standard property inspection deals with the detection or non-detection of structural damage, conditions conducive to structural damage and any significant defect in the general condition of Secondary Elements and finishing elements of construction discernible at the time of inspection, with or without ancillary testing. All other reports are special-purpose inspection reports.

As requested by the client, a building inspector carried out a visual examination of surface work and an inspection of the readily accessible areas.

LIMITATIONS

The client acknowledges:

1. This inspection report does not include the assessment or inspection of items outside of the scope. Other items or matters may be subject of a special-purpose inspection report.
2. The inspection report does not cover items or matters that do not fall within the consultant's direct expertise.
3. Whilst all fair and reasonable care has been taken with the inspection and preparation of this report, it should be noted that all the statements contained in this report are based on our professional opinion only.
4. The inspection only covered the readily accessible areas of the property. The inspection did not include areas, which were inaccessible, not readily accessible or obstructed at the time of inspection. Obstructions may include but are not limited to – fixed ceilings, wall linings, floor coverings, fixtures, fittings, furniture, clothes, stored articles/materials, thermal insulation, pipe duct work, builder's debris, vegetation, pavements or earth.
   Reasonable access according to AS4349.1 is defined as "areas where safe, unobstructed access is provided, and the minimum clearances specified in the table below are available or, where the clearances are not available, areas within the consultant's unobstructed line of sight. Reasonable access does not include removing screws or bolts to access covers."

Area	Access Hole	Crawl Space	Height
Roof Interior	450 x 400mm	600 x 600mm	Accessible from 3.6m
Sub-floor	500 x 400mm	Vertical clearance Timber floor – 400mm to bearer underside of. Concrete floor – 500mm	
Roof Exterior			Accessible from a 3.6m ladder

5. A standard property report is not a warranty or an insurance policy against problems developing with the building in the future.
6. This inspection report was produced for the client. The building consultant is not liable for any reliance placed on this report by any third party.

EXCLUSIONS

The client acknowledges:
A Standard Property Inspection Report does not cover or deal with:

I. Solving or providing costs for any rectification or repair work;
II. The structural adequacy or design of any element of construction;
III. Detection of wood destroying insects such as termites and wood bores;
IV. The operation of fireplaces and chimneys;
V. Any services including building, engineering (electronic), fire and smoke detection or mechanical;
VI. Any swimming pools or spa baths and associated equipment or the like;
VII. Any appliances including, but not limited to air conditioners, dish washers, insinkerators, ovens, stoves and ducted vacuum systems;
VIII. Health and safety issues such as asbestos content, toxic mould, safety glass or swimming pool fencing;
IX. Whether the building complies with the provisions of any building act, code, regulation(s) or by-laws;
X. Whether the ground on which the building rests has been filled, is liable to subside or if the structure is capable of withstanding acts of God e.g. cyclones, earthquakes, floods etc.

BUILDING STANDARDS

Building standards changed significantly in the 1970's when the Building Act was passed and again in 1990 when the Building code of Australia was introduced. Unless a building has been constructed recently it may not comply with current standards. This does not necessarily mean that established dwellings are of poor construction.

CONDITIONS OF INSPECTION

The report has been based on the following:

Abuse of the premises and changes in the use may cause defects.

The visual inspection of the parts of the premises stated in the report, to which the inspector had reasonable access, without removal of furniture, floor coverings, lining materials, electrical appliances, plants, soil, etc.

The defects occurring in inaccessible areas will not be disclosed, nor will latent defects or defects which may be apparent in weather conditions, which differ from those at the time of inspection.

PRECAUTIONS FOR OLDER HOMES

No inspection for asbestos was carried out and no report on the presence or absence of asbestos is provided. If during the inspection asbestos or materials containing asbestos happen to be noticed, then this may be commented on. Buildings built prior to 1982 may have wall and/or ceiling sheeting and other materials such as roof sheeting that contain asbestos. Some asbestos may be present in buildings built even as recently as the early 1990's. If asbestos is noted then advise from an asbestos removal expert crucial as drilling, cutting or removing sheeting or products containing asbestos puts a person's health at risk.

Lead based paint can also be a health risk if swallowed or inhaled. Dwellings constructed prior to 1970 may contain lead paint but particularly if constructed before the 1940's.

Lead paint in good condition posses no threat but paint should be removed from areas, which are deteriorated or likely to be licked or chewed by children.

Dwellings build prior to the 1980's are not likely to contain safety glass, which is now a requirement. When broken, glass from windows or doors may cause serious injury.

SAFETY SWITCH

From 1 September 2002, anyone who buys a dwelling will be required to install a safety switch within 3 months of ownership.
Safety switches have been compulsory in new homes in Queensland since 1992. If a home already has a safety switch that works, a new one is not required.
Under the new requirement, sellers will have to declare on both the standard sales contract and the property transfer form whether a safety switch is present. It will then be up the buyer to ensure a switch is installed.

IMPORTANT NOTE

The presence of damp is not always consistent. The absence of any dampness at the time of inspection does not mean the dwelling will not experience damp problems in wet weather conditions.

Where possible, the records of the appropriate local authority should be checked to determine or confirm:

- Whether the ground on which the building rests has been filled, is liable to subside, is subject to landslip or tidal inundation, or if it is flood prone.
- The status of the property and services.
- Whether the council has issued a building certificate or other notice for the dwelling.

DISCLAIMER OF LIABILITY

No liability will be accepted on an amount of failure of the report to notify any problems in the area(s) or section(s) of the property physically inaccessible for inspection, or which access for inspection was denied to or by the inspector.

DISCLAIMER OF LIABILITY TO THE THIRD PARTIES

This report has been prepared for the benefit of the client named. No liability or responsibility is accepted to any third party who may rely on the report wholly or in part. Any third party acting or relying on this report does so at his or her own risk.

ACCS recommends that the named client obtain quotes from qualified trades' people to make good any repair work prior to the purchase contract becoming binding.

WARRENTY CLAUSE

Except as expressly provided to the contrary in this agreement all terms, warranties or representations whether express, implied, statutory or otherwise relating in any way to our consultancy services or to this agreement are excluded. Without limiting the generality of the preceding sentence, we will not be under any liability to the customer in respect of any loss or damage however caused, which may be suffered or incurred, or which may arise directly or indirectly in respect of the failure or omission on our part to comply with our obligations under this agreement.

Where any act of parliament applies in this agreement, any terms, conditions or warranties prohibits the exclusion, restriction or modification or certain terms, conditions and warranties them our liability for any breach of such term, condition or warranty will be limited, at our option, to any one or more of the following: -

- The supplying of the services again
- The payment of the cost of having the services supplied again;
- $200.00

It is expressly noted that we do not have any expertise in entomology or pest infestation detection, and the report should not be considered to include comments relating to the practice of a registered pest controller.

The report is based on the results of a visual inspection ad we cannot comments therefore on aspects, faults or otherwise which are below ground level, covered up in any way or which are not apparent at the time of inspection or which might otherwise be termed latent defects. It is expressly agreed that we are not responsible for any loss or damage which may arise in connection with the body corporate and Community Management Act 1979.

The report is not intended to imply compliance or otherwise with building codes, ordinances or other standards or requirements of the local authority on any other statutory body.

GLOSSARY

Ant Caps or Strip Ant Capping – Metal barriers placed on stumps, piers or along masonry walls to aid in the detection of termites.

Architraves – Moldings surrounding windows and doors.

Articulated Joint – To separate sections of masonry walls etc with joints, to reduce the effects of shrinkage and settlement.

Balustrade – Spaced members used to support a handrail or to fill the gap left between the floor and a handrail on a verandah or stairs.

Beam – a load bearing member used to support structures or to create open spans.

Bearer – A sub floor timber that supports joists.

Booker Rods – Threaded steel rods. Used for wall frames, tie downs or in stair construction.

Brick Veneer – A single skin brick external wall tied to an internal timber or steel frame.

C.C.A. Treated – Timber treated with chemicals such as copper sulphate to deter termite attack and wood decay.

Cathedral Ceiling – Ceiling linings that run at the same rake as the exposed rafters used in the roof construction.

Ceiling Joists – Timber members opening between walls and with a ceiling lining attached.

Chamfer Boards – Generally used as exterior wall cladding. Usually have a beveled edge and a rebate edge.

Cistern – Water storage unit for a toilet to enable flushing.

Conduit – A hollow casing used to protect soft cables e.g. electrical wires.

Cornice – A moulding used to hide the joint between a wall and ceiling lining where they meet.

Dampcourse – A PVC or bitumen foil etc used to prevent moisture penetration or moisture rising.

Door Jambs – The vertical members of a doorframe.

Door Furniture – Refers to handles, hinges, locks etc.

Easement – A right of way e.g. drain easements, power lines etc.

Eaves – The overhang of a roof around the exterior of a dwelling.

Efflorescence – A white powdery crystal substance deposited on masonry walls due to moisture leaching.

Fascia – Capping to the end of the rafter along the eaves.

Flashings – Impervious materials used in various parts of a house to prevent moisture penetration e.g. lead.

Floor Joists – Timber members that support and are fixed to the floorboards.

Footing – The support used (usually concrete) to transfer the weight of a structure to the foundation (ground).

Foundations – The earth in which the footings are placed to support a house or structure.

Fretting – The crumbling and breakdown of bricks due to moisture or chemical reaction damage etc.

Gable – The vertical triangular end of a roof.

Grout – A flowing mixture used to bind individual bricks in a wall or to fill the joints of floor or wall tiles.

Hip – The rafter running from the corner of an exterior wall to the roof apex. A roof roughly pyramidical in shape with roof surfaces sloping inwards.

Infill Panels – Panels used to conceal the under-floor area structure from exterior viewing e.g. timber battens fixed across stump openings.

Insulation – Could be one of many various products used to control thermal or acoustic elements within our environment.

Lagging – Insulation applied to hot water pipes.

Lintel – A horizontal load bearing member above an opening in a wall.

Masonry – Stone or brick to form a wall of some description.

Mullion – the vertical dividing member in a window frame or door.

Newell Post – The main support posts at either end of a handrail.

Nogging – Blocking placed between studs or joists to give greater stability.

Piers – Usually constructed of bricks or blocks. Used to support the bearers of a house.

Purlins – A horizontal member in a roof used to help support the rafters in a pitched roof.

Rafter – The main supporti
material.

Reinforcing – Usually steel
concrete to give additional s

Riser – The vertical board u
stair designs.

Sarking – A waterproof typ
rafters in a roof.

Sash – The movable part of
glass.

Skillion – A roof sloping in

Skirting – Interior mouldin
the walls and the floors.

Soffitts – The underside lin
ceiling.

Spalling – The blowout or
steel corrosion within the co

Stringers – The main side s
treads fit into.

Terrazzo – A moulded rein
marble and aggregate. Used

Tie Down – Various means
down to a stable base.

Tread – The horizontal me
walking on.

Truss – A structural load-b
found in the roof.

Under Pinning – A metho
damaged or undermined fo

Weep Holes – Drainage ho
the relate of water behind th