



QUEENSLAND BUILDING AND
CONSTRUCTION COMMISSION



A CONTRACTOR'S GUIDE TO REBUILDING AFTER A FLOOD

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Key steps to restoring a house after flood damage

Key steps to restoring a house after flood damage are as follows:

- all services must be made safe before any remedial work begins and particularly where occupancy is required before finishing work commences
- flood debris should be cleared away as soon as possible so drying can start
- plinths (kickers) should be removed from beneath kitchen and bathroom cabinets to allow for proper drying
- if necessary plasterboard linings should be partially removed to allow walls to dry out
- check for moisture content - no finishing work should be done until the moisture content of wall framing has dropped below 16 percent.

Please refer to the 'Quick Guide' in the back of this booklet. This information is intended as general advice only for contractors working on homes that have been affected by floods.

Introduction

This guideline is intended to help with the aftermath of a flood. It deals with immediate issues, mid-term and long-term reinstatements and restoration.

A house is usually a person's largest investment. There is often an emotional attachment to the house which needs to be taken into consideration during the restoration and repair process.

Immediate concerns of the home owner are often whether the damage is covered by insurance and whether or not to live in the property in the interim. This guideline relates to the restoration and repair work only.

Immediate issues

Before starting the clean-up, check that the property presents no immediate danger to occupants or others cleaning up. This will mean that the power supplier has either cut the power supply or checked that the supply and installation is safe. Gas and electrical appliances, devices and services will need to be individually checked and tagged as safe or disconnected. It will also mean that the sewage system is safe and presents no health risk to workers during the cleaning operation.

It is a good idea to take photos of the damage and any items being disposed of, especially if this has to be carried out before the owner's insurance company has a chance to inspect.

Health and safety

Some houses can be lived in while the restoration and repair work is being carried out. Other houses will be vacant, which will allow for stripping out, drying out and restoration without having to consider the owner's short-term living requirements. Some houses will need to be partially stripped out and made safe for occupancy before full restoration.

A house can be lived in when:

- living there will not constitute a health or safety risk
- the initial clean-up of water, mud and debris is completed
- the power supply has been safely restored
- all sources of potable water supply and sewage systems have been checked, repaired if necessary, tested and declared safe for use
- partial removal of wall sheeting may be required to allow the framing to dry out. Exposed wall framing needs to be safe, nails and splinters need to be removed, power outlets made safe, and any exposed electrical wiring firmly clipped in position and certified by an electrical contractor before occupancy.

Cleaning up

All wet items (furniture, bedding, carpets, clothing, appliances, books, papers, etc) should be taken outside for cleaning and drying out when weather permits, or they should be disposed of.

Absorbent items that have been saturated by contaminated water and cannot be cleaned must be disposed of. This will include wet areas of plasterboard or other wall linings, glass fiber insulation and may also include mattresses, lounge furniture, carpets, etc.

Leave nothing inside the house that can trap moisture and prevent or slow the drying out process. Remove plinths (kickers) from beneath kitchen and bathroom cabinets and front panels from baths to enable these dark and damp spaces the opportunity to dry out.

Gaining access to pockets of trapped water and debris will require:

- removing all skirting, cupboard kick panels and front panels to baths
- removing internal wall linings sufficiently to allow the cleaning out of the external wall cavity and the removal (and replacement) of wet insulation materials. If plasterboard is delaminated and/or waterlogged, it will need to be removed to the nearest joint above the flood level (i.e. 1200mm, 1350mm or full height)
- drilling holes in or removing ceilings when water is trapped above them, and removing any wet insulation
- removing or safely re-fixing electrical switches plates and fittings (ensuring power supply is disconnected)

Remove the mud and silt trapped:

- underneath the bath
- in and below cupboards
- under stairs
- under floorboards
- in basements
- in wall cavities between internal linings and claddings
- in electrical switchboards and wall sockets
- in sanitary fittings such as toilets, and cisterns
- in masonry veneer cavities
- in parts of the steel frame in buildings (particularly the bottom plate).

Remove mud and debris with shovels and squeegees. Then, if sufficient clean water is available, use a hose with a reasonable nozzle pressure to clean out the mud and dirt, starting from the top or upper limit of the flooding, working downward to the floor or basement. As work proceeds, insert the hose into concealed spaces to flush out dirt.

After hosing down, surfaces should be wiped or if considered necessary, washed down with a biocide disinfectant or diluted bleach to reduce the risk of flood-carried infections.

It is usually easier to clean the external wall cavities from the inside of the house, because of the presence of building paper on the outer face of the framing and the need to replace insulating materials. If the flood water was heavily silt laden, there is a probability there will be silt trapped between the outside wall cladding and the building paper. If this is the case, then the cladding should also be removed sufficiently to allow the silt to be removed as it will affect the performance of the building paper.

With timber clad exteriors, wedging out or removing the bottom two or three weatherboards will allow for draining and flushing out of the bottom of the wall cavity where it continues past the inside floor level. This will also give much better ventilation to the wall and assist in the drying process.

For sheet clad houses, the sheets may span from top to bottom and may have to be removed completely.

Sub-floor spaces

It is also very important to clean out the space under the floor of the house to prevent excess moisture remaining. Flood waters may have altered the ground profile below a house allowing water to pond.

Drain away the water under the floor by:

- digging drainage channels to drain the water out
- pumping water out
- digging a pit for the water to drain into, then pumping the collected water out.

It is essential that sub floor ground surfaces are higher than the ground surrounding a house to prevent water ponding below the house.

Once the sub floor water has been drained, the debris which has been deposited under the house should be removed. Sub-floor spaces must allow free drainage to the outside so as to prevent water ponding.

Under floor services such as drains, pipes, wiring and conduits should be checked for damage and repaired.

Silt can be taken by the floodwater into the sewage and storm water drains through the gully traps. This may require flushing with clean water.

The best way to dry the under floor space is to maximize the airflow beneath the floor by:

- clearing debris on the outside of the building that is blocking ventilation openings
- knocking out the grilles to under floor vents to increase the airflow
- cutting back plants which are obstructing vents
- removing items stored under the house
- leaving access doors wide open
- removing part of the foundation enclosure such as base boards or sheet linings.

NOTE: if asbestos sheeting of more than 10m² requires removal, a 'B' class license is required. This licence is available from Workplace Health and Safety. Visit www.deir.qld.gov.au or contact 1300 362 128 or 13 QGOV (13 7468).

Drying out the house

Once all the wet materials have been removed and the house has been thoroughly cleaned and disinfected if necessary, drying out can begin.

Quick drying is preferable. The removal of linings can speed the drying of concealed places. Internal linings can be readily replaced when the house is dry. Re-lining should not be carried out until the moisture content in the timber wall framing has dropped below 16% and the framing presents as sound.

On dry days, keep all windows and doors open to maximise ventilation and therefore drying. Windows and doors may have swelled as a result of the water and can be difficult to open. On wet days, leave the windows ajar so there is still some ventilation. Leaving cupboard doors and drawers open will also speed the drying of these items.

Heaters and fans can be used to dry out moisture, but care must be taken to not use too much heat because it can cause wood to warp and split. It is essential to use some ventilation as well as heating to remove the warm moist air from the house.

Drying of a suspended timber floor can be helped by:

- light sanding or using a heat gun to remove any varnish or sealer
- making sure there is good ventilation both inside the house and under the floor
- lifting water-resistant floor covering like vinyl sheet, vinyl tiles and ceramic tiles.

Do not attempt to straighten warped or buckled timber floors until all of the house has dried completely and the moisture content of the timber is below 16%.

Interior walls

Hard linings like wood paneling or villaboard can be scrubbed with a stiff bristle brush, using plenty of water and a detergent so that dirt is removed from cracks, corners and crevices. The surfaces should be well-rinsed with clean cold water.

Plasterboard generally has a low tolerance to water and will have to be removed and replaced if it is delaminated and/or waterlogged and the integrity of the stud adhesives has been compromised. Plasterboard that has to be removed should be taken to the nearest joint above the inundation level. This will be either 1200mm, 1350mm or full height.

Items made from composite wood materials like MDF (Medium Density Fibre board) or particleboard have a low tolerance to being immersed in water and will need replacing. This may include such things as doors, skirtings, architraves, scotias, window reveals, jamb linings and joinery units such as kitchen cabinets, vanity units and wardrobes.

Doors and cabinets

Doors and cabinets are generally constructed of timber-based products, which will swell and become unusable after being inundated. Also, many cabinets are made of plywood or particleboard which will delaminate or come apart over time. Cabinets and doors that have been even partially submerged will need to be replaced. Veneered doors will delaminate and/or be damaged by water "wicking" through end grain. Solid wood or wood panel doors may also swell and subsequently shrink, which might cause them to crack and for joints to open up. In all such cases, all doors and cabinets partly or wholly submerged will need replacement.

Exterior walls

Many houses are constructed of brick, brick veneer or solid blockwork. Weep holes should be cleared to aid the "drying out" process for the wall cavity. Renders or other applied finishes need to be checked carefully following "drying out" to see if any delamination has occurred. If so, it will need to be removed and replaced.

Houses that have elevated floors should have all the perimeter vents opened to allow for as much crossventilation and movement of air in the crawl space as possible. This is necessary to adequately dry out the floor joists and floor sheeting or floor boards from the underside to minimise moisture damage.

Electrical and appliances

Most appliances have the electric motor mounted very low to the floor, so even a small amount of water in the structure can cause damage to motors and bearings. These need to be checked and replaced as required following inspection and testing by an electrical or mechanical contractor. Replacement or repair should be based on the advice from one of these experts.

Repairs

While owners want to get their house back to how it was before the flood as soon as possible, it is essential that the house is sufficiently dry before repair work is carried out.

Undertaking repairs to the structure and finishes before the house is properly dry can result in:

- poor adhesion (blistering) of finishes
- materials continuing to move as they finish drying resulting in cosmetic cracking to plaster and paintwork
- lifting and bubbling of vinyl floor coverings
- health problems for occupants.

Timber in houses normally has an in-service moisture content of between 9% and 13%. After standing in water, the timber will absorb moisture and will take time for the moisture content to return to what it was. It must drop below 16% before wall linings can be replaced.

Damaged building paper may also need to be replaced. This will require the cladding to be removed from the outside of the house in the damaged areas. It is not sufficient to staple a new piece between the studs on the inside.

All reinstatement work must be carried out in accordance with the Building Code of Australia.

Where appropriate, the opportunity should be taken to add tie-down straps between the studs and bottom plates, and the number of foundation holding-down bolts checked and added to if necessary.

Check particleboard floors for swelling at the joints by using a long straight edge. If swelling is more than 4mm the floor should be sanded flat. If it exceeds 6-8mm, replace the floor.

Replace doors (including cupboard doors) which have been damaged as a result of swelling and/or blistering or peeling surfaces. In some instances existing frames may be retained.

Once the house is cleaned out and the building fabric dried the following items can be reinstated after cleaning and/or repair or replacement:

- appliances
- hot water cylinders
- air conditioning condensers
- central vacuum and heating systems
- toilet cisterns
- shower mixers
- electrical fittings
- carpet which does not have rubber backing or rubber underlay (rubber underlay will restrict the final drying).

No painting should be carried out until the moisture levels have dropped to the acceptable levels for linings, which will typically be less than 16%.

Ventilation holes in foundation walls should be made vermin proof if they have been damaged or removed to assist drying.

Testing for moisture

Before any wall linings are replaced a moisture meter should be used to ascertain if the framing moisture level has dropped to a suitable level. Plasterboard fixers should ensure moisture levels are to the standard for the manufacturer's product.

For concrete floors, the most reliable test for dryness is a flooring hygrometer. If one is not available, the following method will give a general indication of the moisture level.

Tape all four edges of a 1m x 1m piece of clear polyethylene sheet to the floor in an area away from direct sunlight. Cover with a blanket and leave for 24 hours. If condensation forms on the underside of the polyethylene, the floor is too damp for laying vinyl or carpet with rubber underlay or backing. Lift the polyethylene and if the floor is too wet place another piece in a few days (do not leave the piece attached to the floor). Wait until polyethylene taped in place stays dry for two to three days before laying the floor covering.

Quick guide to home restoration after a flood

Issue	Concerns	Temporary solutions	Possible long-term solutions
Doors and windows	Doors can't be closed because they are swollen. Aluminium doors and windows may have been bent. Adhesives may have been compromised.	For security and privacy, temporary rectification of doors. Temporary fix to aluminium doors and windows.	New internal doors will be required in most cases where they have been immersed in water. Replace damaged aluminium doors and windows where necessary. In some cases hardware may be able to be re-used.
Wall linings	Moisture needs to be released to minimise mould risk and assist in drying out. Adhesives may be compromised due to water inundation.	If necessary, remove one side of wall linings to allow for effective airing. Clean and disinfect remaining side. If both sides have been removed then temporary privacy may be required. This privacy should be considered on a case by case basis.	Replacement of linings where removed.
Ceiling linings	Insulation in ceiling and walls may be wet, causing mould and damage to ceiling.	Remove wet insulation from ceiling and walls.	Replace insulation.
Floor tiles	Adhesive may be compromised and may become drummy and retain contaminants.	Clean thoroughly	May need replacement or re-gluing to ensure long-term integrity. This should be assessed on a case by case basis.
Electrical and gas services	Water inundation causes debris to collect in General Purpose Outlets (GPO) and switches. Corrosion within switches. Water penetration and corrosion to gas systems and appliances.	Electrical test and certification. Replacement of affected GPOs and switches. Gas inspection and test.	
Kitchen and built in joinery	Carcass will swell and retain moisture. Voids behind kickboards may need drying and disinfecting.	Provision of short term facility to ensure safe food preparation. Clean and disinfect.	Installation of new kitchen and joinery. If water has not risen above kickboards, kitchen cupboard carcasses may not require replacement, however kickboards need to be removed for drying purposes and replaced along with gables which extend to the floor. Re-use stone and other durable benchtops and hardware where possible. If carcasses and benchtops are re-used ensure proper hygienic cleaning.
Oven	Electrical safety if water has entered unit.	Electrical safety test / hygienist check. Disconnect if not safe.	Replacement if the unit fails the safety test.
Toilets	Consumer needs to have toilet facilities. Cisterns must be secured if wall lining is mouldy and needs removal.	Retain toilet and floor covering, ensure temporary wall linings installed for privacy. Clean thoroughly.	Possible replacement of floor tiles and any water proofing membrane. Pay particular attention to the wall/floor junction. Needs to be considered on a case by case basis.
Showers and bathrooms	Consumers need to be able to use facilities to maintain personal hygiene and have privacy. Floor and wall tiles may become drummy and retain contaminants. Some installations of Fibre Cement and Plasterboard may be without mechanical fixings, and adhesive will have been compromised	Clean thoroughly	Possible replacement of tiles, depending on drumminess. Waterproof membrane to be reinstated or installed according to the Building Code.
Vanity	Carcass will swell and fall apart. Customer needs to be able to maintain personal hygiene.	Disinfect, clean and make serviceable.	Repair or replace, subject to water level, reusing sinks, taps and hardware.

Quick guide to home restoration after a flood cont.

Issue	Concerns	Temporary solutions	Possible long-term solutions
Built-in robes	Consumer needs hanging space that is not enclosed to reduce risk of further loss of contents.	Supply temporary facility such as cardboard storage wardrobes.	Replacement of cupboard storage units including doors and cupboard lining materials which have been submerged.
Timber floors	Timber on concrete will not dry out. Seek expert advice on suspended timber floors.	Remove timber flooring if installed over concrete. Dry and ventilate suspended timber floors.	Replace as necessary. Timber on concrete to be replaced. Suspended floors to be reviewed on a case by case basis. Retain where possible. Some floors may be able to be dried, treated, sanded and sealed.
Paint	Paint damage and mould.	Treat mould as soon as practicable	Most houses will require internal re-painting where damaged. Some ceilings may need a clean and mould treatment only. External painting may be needed or may require cleaning, this will need to be considered on a case by case basis.
Render	Render may have become drummy and delaminated from blueboard or masonry surfaces.		Remove affected areas and replace. This should be assessed on a case by case basis.
Termite management systems	Termite Management Systems may be compromised as a result of water levels.		Chemical barriers need to be re-instated. Physical barriers will require checking by suppliers and/or manufacturers in line with warranty requirements.
Mould / hygiene	Risk to health of workers and occupants.	Provide every opportunity to dry out. Disinfect and / or bleach mould-affected areas as necessary.	Ensure any mould-affected areas are properly treated.
Storm water and sewer	Partial blockages and silting up.		Test and clean as required.
Asbestos in products	Wall sheeting, roof sheeting and some vinyl floor covering may contain asbestos. Do not sand asbestos surfaces.	Identify asbestos products and dispose of to Local Council requirements. Note: B class licence required for removal of 10m ² or more. For further information: www.deir.qld.gov.au/asbestos/	Ensure proper treatment, removal and disposal.
Asbestos sheeting in older homes	It may not be necessary to remove asbestos sheeting in older homes. Such sheeting is generally mechanically fixed to a hardwood frame.	Remove skirtings and architraves to maximise opportunity for drying. Treat edges with disinfectant below inundation level.	After drying, replace skirting and architraves and paint. NOTE: do not sand asbestos sheeting prior to painting.
Airconditioning	Water inundation causes motor and bearing failure	Electrical test and certification to allow use.	May need later replacement or repair because of bearings failure.

Need more information?

Visit qbcc.qld.gov.au or call us on 139 333.



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