GOVERNMENT OF WESTERN AUSTRALIA

Department of **Local Government, Industry Regulation and Safety**

Building and Energy Western Australia

General inspection report ten

Residential Class 1 and Class 2 shower areas

2023–24

Contents

Executive summary

Under the *Building Services (Complaint Resolution and Administration) Act 2011* the Building Commissioner is empowered to audit the work and conduct of registered building service providers. The Department of Local Government, Industry Regulation and Safety – Building and Energy Division (Building and Energy) administers an audit program that monitors construction activities carried out by registered providers, including builders. These audits assess compliance with registration requirements and review the compliance of technical elements against applicable building standards.

As part of the 2022–23 audit priorities, Building and Energy conducted a general inspection focused on waterproofing systems. This initiative was extended into 2023–24, with the Audit Priorities Statement identifying the need for continued investigation and monitoring of waterproofing practices.

This General inspection report (GIR) presents findings from Building and Energy's oversight activities, offering a detailed analysis of how waterproofing standards are being applied in the design and installation phases of residential buildings across Western Australia (WA). The findings highlight current trends and practices observed in inspected samples, specifically relating to waterproofing systems in residential shower areas.

A key objective of this inspection was to evaluate the effectiveness of actions taken following the GIR 6 snapshot inspection, particularly in improving compliance with waterproofing design and construction standards.

In total, 86 shower areas across 38 buildings were inspected, involving the work of 24 building contractors. The inspections focused on buildings classified under NCC classes 1a and 2, with the majority conducted in apartment buildings (Class 2). Data was collected and analysed from 1,360 inspection points.

Where non-compliant work was identified, Building and Energy communicated their findings to the relevant builder. In cases deemed 'high-risk', builders were required to provide evidence of corrective or remedial action to ensure compliance with minimum building standards.

Summary of findings

The general inspection found an overall compliance rate of 60 per cent, with one out of five unsatisfactory inspection points being a result of the substandard or non-installation of waterstops.

The remaining unsatisfactory inspection points covered all aspects of shower area waterproofing installation. Common themes were the failure to adhere to manufacturer's installation instructions and the National Construction Code (NCC).

The inspection showed high levels of compliance across three key areas. In 97 per cent of the areas checked, the required two coats of waterproof membrane were correctly applied. The correct primer was used and applied properly in 93 per cent of cases. Most waterproofing teams also had a good understanding of where waterproofing was needed, with 90 per cent of areas meeting the minimum coverage.

Although the general inspection did not include a full assessment of the design documentation, these documents were reviewed prior to and during the inspection. Generally, the documentation of the sample buildings was found to contain insufficient information and detail for construction purposes. Approved plans and specifications were typically found to contain limited details in relation to waterproofing.

Discussions with site managers identified concerns that waterproofing was not being adequately considered during the design process. Where this was the case, progressed construction limited the ability to achieve required falls and install adequate waterproofing systems.

The nature of waterproofing is that it only takes one defect in the product or application of the waterproof system for a leak to occur. So, while some aspects may appear to be done well, if the whole system is not performing, a leak is likely to occur at some point.

Summary of action items

- **Industry Bulletin**

  Building and Energy will publish a bulletin to provide guidance and inform industry professionals (e.g. builders, surveyors, designers) about construction concerns related to bathroom waterproofing that were identified during inspections.

- **Stakeholder engagement and education**

  Collaboration with key industry bodies (e.g. AIBS, HIA, MBA, Engineers Australia) and permit authorities and the delivery of education based on inspection findings.

- **Mandatory inspections proposal**

  As part of the Better Building Reforms, mandatory inspections are proposed for commercial buildings. Waterproofing of wet areas is a key focus of these mandatory inspections.

- **Targeted follow-up inspections**

  Building and Energy will consider further inspections of high-risk waterproofing work and contractors with unsatisfactory performance, aligned with future audit priorities.

1. Background

In July 2021, Building and Energy published its Building Compliance Audit Strategy 2021–24 with the strategy taking a risk-based approach to achieving Building Code objectives. The associated Audit Priorities Statement 2022–23 detailed the compliance activities that Building and Energy intended to undertake within a defined period in response to areas of construction identified as posing the greatest risk to public interest and safety.

The waterproofing of internal wet areas, with a particular focus on shower waterproofing, was identified as an area where greater insight into current practices was required, due to a high volume of complaints received relating to water leaks in those locations.

Waterproofing is an expensive and invasive issue to rectify if not completed correctly the first time.

Previous research and inspections

Building and Energy published General Inspection (Snapshot) Report 6: Waterproofing systems for wet areas, in 2021 (GIR 6).

GIR 6 identified the following areas where improved compliance levels were required:

- lacking detail of wet areas on plans and specifications;
- shower recess floors with inadequate falls;
- substrates under waterproof membranes not being correctly prepared;
- drainage flanges were not being installed correctly in showers;
- installers not following manufacturer's instructions for the application of waterproof membranes;
- incompatible or incorrect primers being used;
- waterproof membranes not being the correct thickness;
- inadequate wall to floor junctions (except in showers);
- waterproof membranes were not being adequately protected after they were installed; and
- tiling in wet areas not installed adequately.

GIR 6 resulted in the publication of Industry Bulletin 134: Improving the performance of wet areas.

2. Objective and scope

2.1 Objective

The objective of Building and Energy's general inspections is to monitor the work and conduct of registered building service providers. This general inspection examines how building standards as defined by the *Building Act 2011* have been or are being applied within the scope of the affected works.

This audit inspection activity was intended to identify:

- How builders are applying applicable building standards, supervising the installation of waterproofing systems, their knowledge of products and application methods, as well as how building surveyors have confirmed compliance with the applicable building standards within referenced documentation when issuing compliance certificates.

This general inspection report aims to inform industry and foster improvements in the demonstration of applicable building standards as they relate to the waterproofing of wet areas in residential buildings.

2.2 Scope

Building and Energy's published audit priorities for 2023–24 included the inspection of waterproofing of wet areas as a follow up to the inspection work reported in GIR 6.

Wet areas within Class 1a and Class 2 new buildings under construction, of varying storeys, were selected for inspection with a particular focus on shower areas.

3. Methodology

General inspections are conducted pursuant to powers under section 65(1) of the *Building Services (Complaint Resolution and Administration) Act 2011*.

In June 2023, Building and Energy commenced general inspections of shower areas within residential buildings, with multiple sites being visited to confirm building scope suitability. Contact was made directly with building site management prior to notifying building contractors of the intention to carry out inspections where required.

The selection of buildings was not targeted to a particular locality or particular building contractors; however research was carried out to identify suitable under-construction buildings in the Perth metropolitan area, at an appropriate stage to conduct an inspection. From the selected buildings, between one and six shower areas were inspected, dependent on the size of the building and stage of construction.

Once a site was identified for inspection, Building and Energy gathered and reviewed all relevant building approval documentation prior to attending site and conducting inspections.

Building and Energy developed an inspection checklist that contained a possible 38 inspection points in each shower area. Each shower area was inspected and compared against the approved documents referenced in the relevant Certificate of Design Compliance (CDC) – All CDCs relating to the buildings inspected referenced NCC 2019, Amendment 1, Volume 1 or Volume 2.

Where the plans and specifications were considered to provide insufficient details, the Deemed-to-Satisfy (DtS) compliance pathway was used by inspectors to determine compliance (NCC 2019 Volume One Part F1.7 for Class 2 buildings, and Volume Two Part 3.8.1 for Class 1 buildings). AS 3740:2010 is the referenced waterproofing standard for both volumes.

In addition to NCC building code compliance, where a product could be identified on site, the installation and application of the product was compared against the manufacturer's specifications and installation instructions.

A thorough inspection of all waterproofing elements able to be observed at the time of inspection was conducted at each selected shower area.

Where elements of non-compliance were identified during site inspections, Building and Energy inspectors brought this to the installer's attention, if they were on site at the time. All instances of non-compliance were communicated to the registered building contractor for the site, which resulted in either rectification of the issue or the provision of valid reasoning for the variation from the expected outcome. This reasoning could include incomplete work or the application of a Performance Solution that had not been included in the approvals documentation.

Limitations

This general inspection of waterproofing systems applied to shower areas and the general floor area affected by the shower and did not include balconies, laundries, baths or vanity units.

While the findings include the assessment of the physical building against the certified design documentation, the inspection did not include a general assessment of the certified design documentation itself. The design documentation was assessed exclusively for the inclusion of waterproofing details and specifications.

Note: A more recent version of the applicable Australian Standard (AS 3740:2021) contains some changes to current requirements, along with the Housing Provisions provides the DtS requirements when using NCC BCA 2022 and NCC BCA 2022 Amendment 1 AS 3740:2010 was the relevant standard for this body of work due to the building approval dates and the nomination of NCC 2019 in all CDCs.

4. Findings

4.1 Summary of technical inspection findings

A total of 86 shower areas were inspected against a possible 38 inspection points, resulting in a total of 1360 inspection points being checked and an overall satisfactory finding of 821 (60 per cent).

The inspection showed high levels of compliance across three key areas. In 97 per cent of the areas checked, the required two coats of waterproof membrane were correctly applied. The correct primer was used and applied properly in 93 per cent of cases. Most waterproofing teams also had a good understanding of where waterproofing was needed, with 90 per cent of areas meeting the minimum coverage.

Figure 1 below shows overall building characteristics from the 86 inspections.

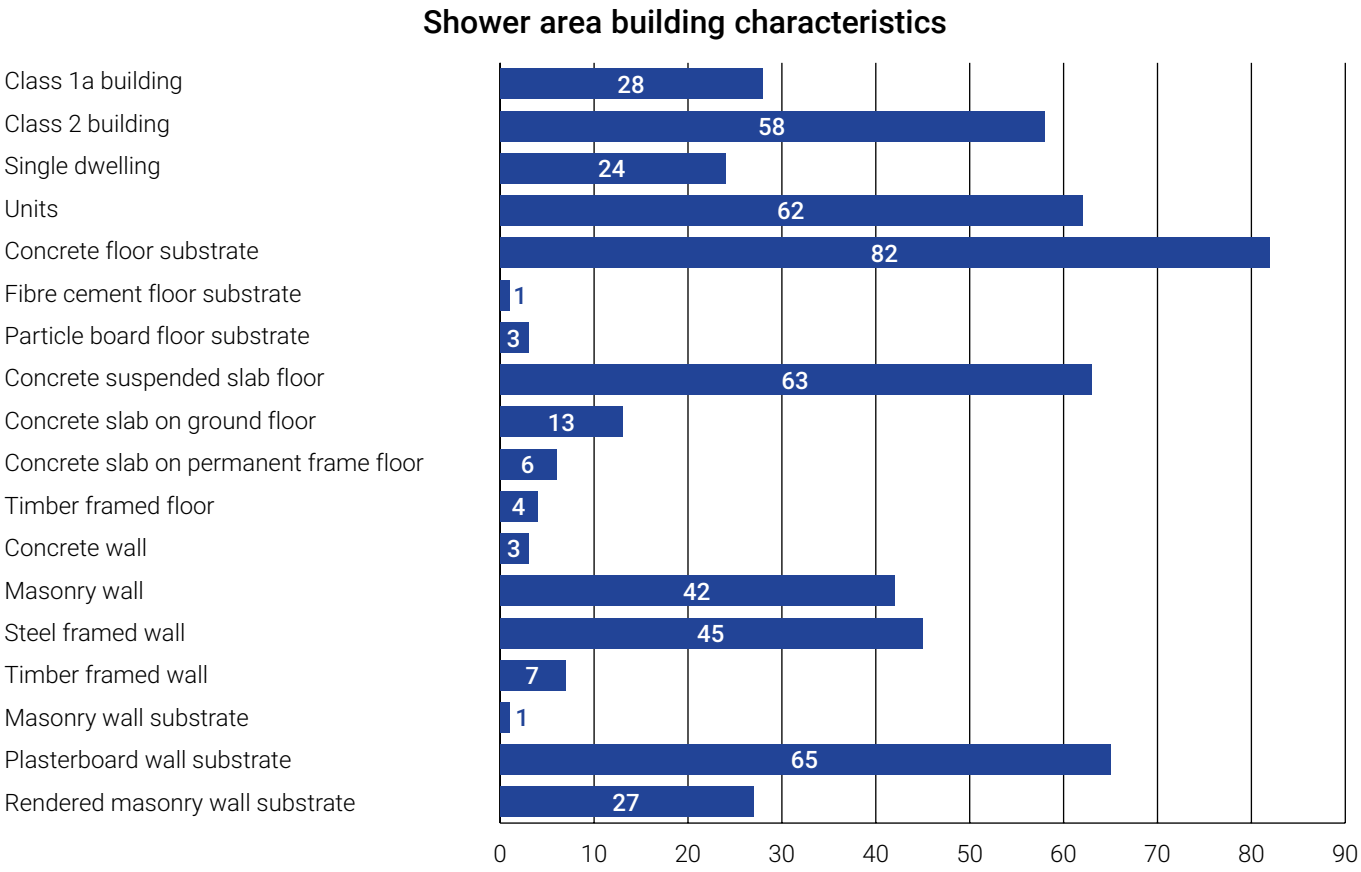

Figure 1: Building characteristics from inspections conducted.

4.2 General floor area inspections

The general floor area is identified as the part of the wet area that is not within the shower area; but may be affected by water from the shower area. Of the 581 related inspection points, 235 (40 per cent) were assessed as unsatisfactory. Of the 13 related inspection points, six were assessed to have an unsatisfactory rate of more than 40 per cent.

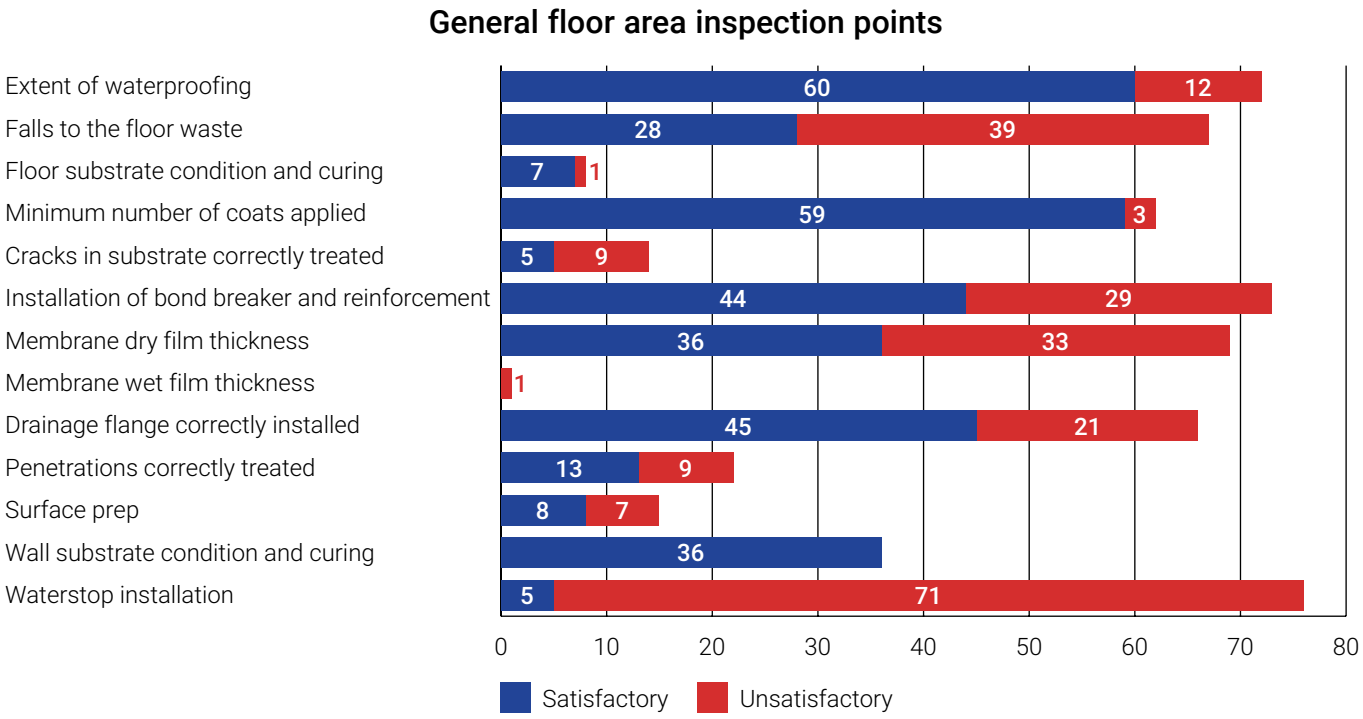

Figure 2: General floor area inspection points.

4.3 Shower area inspection points

A shower area is identified as the part of the wet area that is contained by a shower screen or within a 1500mm radius from the shower rose. Of the 661 points inspected, 249 (38 per cent) were assessed as unsatisfactory. Of the 15 related inspection points seven were assessed to have an unsatisfactory rate of greater than 40 per cent.

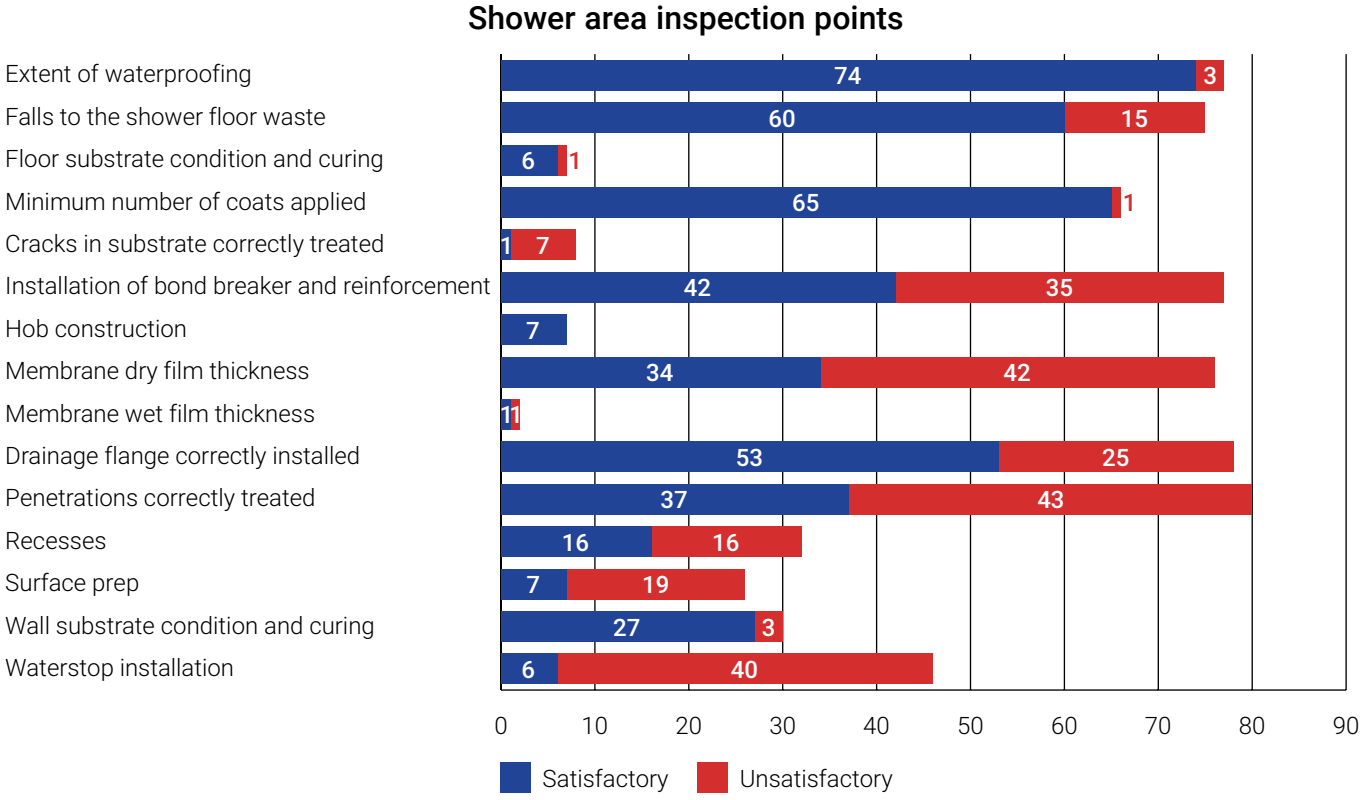

Figure 3: Shower area inspection points

4.4 Tiling inspection points

Tiling inspection points were limited to tiling elements that may affect the waterproofing being tiled on. Of the 78 points inspected, 47 (60 per cent) were assessed as unsatisfactory. Of the eight related inspection points, two were assessed to have an unsatisfactory rate of greater than 40 per cent.

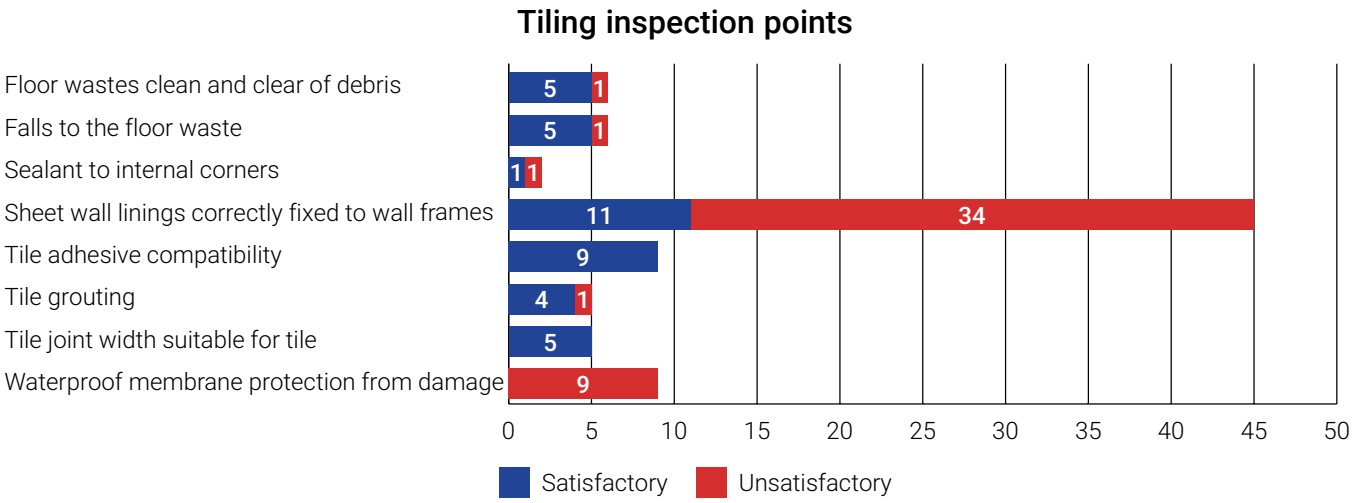

Figure 4: Tiling inspection points.

5. Inspection items with low rates of compliance

Of the possible 38 inspection points, nine were highlighted and brought to the attention of industry due to low recorded rates of compliance during the general inspection:

- installation of bond breaker fillets and tapes;
- installation of drainage flanges;
- waterproofing of penetrations;
- installation of waterstops;
- membrane applied to wall recesses;
- substrate preparation of shower floors and walls;
- the correct fixing of wall linings to be tiled;
- fall in the substrate to floor wastes;
- membrane dry film thickness.

Further information about these areas are listed in this section (parts 5.1 to 5.9).

5.1 Installation of bond breaker fillets and tapes

The inspections identified a high level of unsatisfactory outcomes in the application of membrane bond breaker fillets and tape to junctions. From the total 539 items of unsatisfactory waterproofing work, 64 were attributed to bond breaker fillets, bond breaker tape and membrane not being correctly applied to corner junctions. Analysis of these unsatisfactory items identified six common areas of concern:

- Poorly applied membrane to junctions resulting in pinholes, cracking, and thin or no membrane.
- Poorly applied bond breaker to junctions resulting in air pockets, lumps and/or hollows.
- No bond breaker having been applied to junctions.
- Bond breaker sealant fillet not reaching the minimum size of 12mm (Class 3 membrane).
- The installation of bond breaker being incomplete resulting in gaps.
- Junctions having no waterproof membrane or bond breaker installed where it was required.

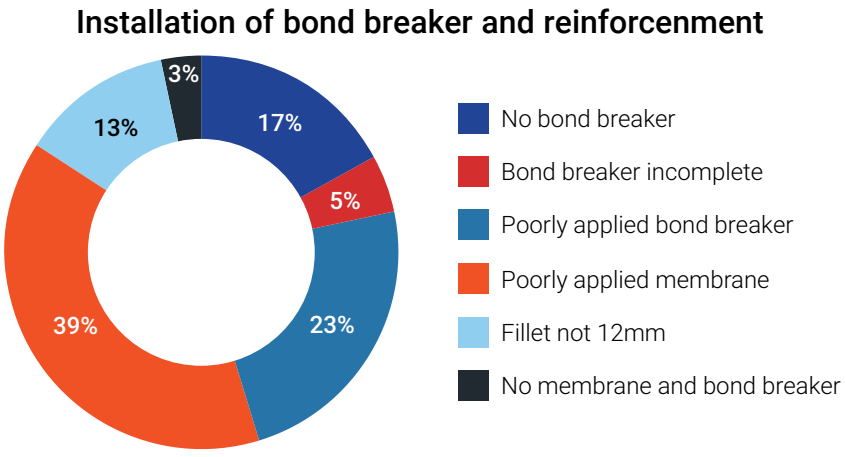

Figure 5: Bond breaker non-compliances

AS 3740:2010, Waterproofing of domestic wet areas, Part 3.13.7 requires the use of bond breakers at all wall/floor and hob/wall junctions, and at any joint where the membrane is bonded to the substrate where there may be movement. Table 3.2 of AS 3740:2010 is then used to identify appropriate bond breakers for the class of membrane used. Figure 3.7 can then be used for examples of typical bond breaker details.

The general inspection identified 78 shower areas to have Class 3 membrane, seven to have Class 2 membrane, and one membrane class was not identified.

AS 3740:2010 Table 3.2 specifies a 12mm bond breaker for Class 3 membranes and Figure 3.7 of the standard identifies the bond breaker as a flexible sealant or fillet. Table 3.2 specifies a 35mm bond breaker for Class 2 membranes and Figure 3.7 identifies the bond breaker as a 35mm tape.

Typically, waterproof membrane was observed to be installed with both a sealant fillet and tape at junctions.

To properly identify the bond breaker required, installers should refer to the manufacturer's product data and installation requirements. Most manufacturers of membrane, develop systems for different situations and applications of their membrane. Manufacturer data will identify the membrane class and manufacturer installation requirements will specify the bond breaker fillets and tapes required for the intended application. This information can generally be found on the membrane container. More detailed information may also be found on the manufacturer's website and/or the manufacturer's published literature.

5.2 Installation of drainage flanges

The inspections identified instances of unsatisfactory installation of drainage flanges to floor drains. From the 539 items of unsatisfactory waterproofing work, 46 of those were attributed to unsatisfactory installation of drainage flanges. Analysis of the 46 unsatisfactory items identified six common areas of concern:

- depression observed around the drainage flange resulting in an area where water can collect;
- no drainage flange installed;
- no required floor waste installed and therefore no drainage flange;
- gaps pinholes and cracking observed in the membrane around the drainage flange;
- the drainage flange not installed level resulting in a depression where water can collect; and
- the membrane not bonded to the drainage flange resulting in a pathway for water to bypass the membrane.

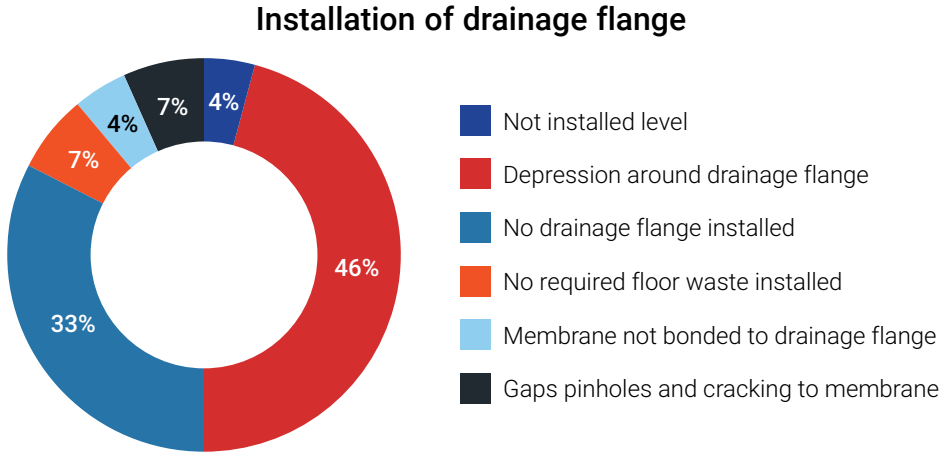

Figure 6: Drainage flange non-compliances

AS 3740:2010, Waterproofing of domestic wet areas, Part 3.14.1 requires a drainage flange to be installed with the waterproof membrane terminated at/in the drainage flange to provide a waterproof connection. As such, any drain that is installed in a floor that is waterproofed is required to be fitted with a drainage flange. Figure 3.8 details the typical drainage flange installation and termination of the membrane.

While most buildings were observed to have drainage flanges fitted, observed issues were generally a matter of substandard workmanship regarding the floor substrate and membrane application. Drainage flanges were observed to sit higher than the substrate, have depressions in the substrate around them or be installed in a way that created an area lower than the drainage flange. This results in water pooling around the drain that is unable to drain away.

On lesser occasions, drainage flanges were observed buried under screed with the membrane not bonded to the drainage flange or the drainage flange not being correctly primed, resulting in delamination of the membrane. To correctly identify the priming requirements of the membrane in use, installers should refer to the manufacturer's product data and installation requirements. It is also important to note that the manufacturer may require the use of a different primer on a porous substrate than the one required on a non-porous drainage flange. This information can generally be found on the membrane container. More detailed information may also be found on the manufacturer's website and/or published literature.

5.3 Waterproofing of penetrations

The inspection identified instances of unsatisfactory waterproofing of plumbing fixture penetrations. From the 539 items of unsatisfactory waterproofing work, 52 of those were attributed to unsatisfactory waterproofing of penetrations. Analysis of the 52 unsatisfactory items identified three common areas for concern:

- no bond breaker used at the junction of plumbing fixtures and wall substrate;
- gaps observed between the membrane and the plumbing fixture; and
- membrane applied over plumbing fixtures protective covering, resulting in damage to the membrane and gaps between the membrane and plumbing fixture when the protection is removed.

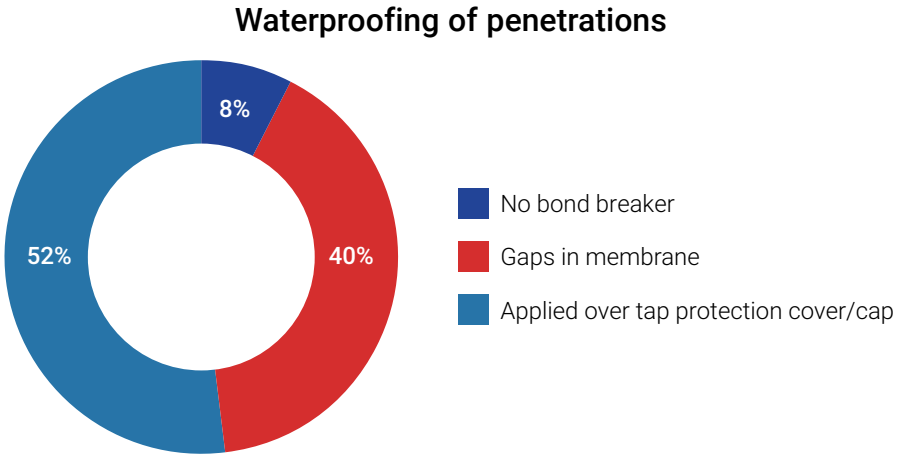

Figure 7: Waterproofing of penetrations non-compliances

AS 3740:2010, Waterproofing of domestic wet areas, Part 3.10.1 requires penetrations for taps, shower roses, recesses and similar fixtures to be waterproof.

On all occasions, the wall containing the penetration was observed to be waterproofed, with the membrane in use for the penetration. The applicator should refer to the manufacturer's instructions for the appropriate system of waterproofing penetrations with the membrane in use.

In all cases, some attempt had been made to waterproof the penetration, with the observed non-compliance deemed to be the result of substandard workmanship. The workmanship defects observed generally indicated a lack of clear understanding by the applicator of how the waterproofing system works to prevent water ingress, as well as a lack of quality control.

5.4 Installation of waterstops

The inspection identified waterstops as an area of concern in the waterproofing of shower areas. From the 539 items of unsatisfactory waterproofing work, 111 of those were attributed to the unsatisfactory or non-installation of waterstops. Analysis of the 111 unsatisfactory items identified four problems:

- no waterstops installed at room openings forming part of the perimeter flashing;
- waterstops installed with gaps at the ends;
- no waterstop installed to unenclosed shower areas; and
- no waterstop installed to enclosed shower areas.

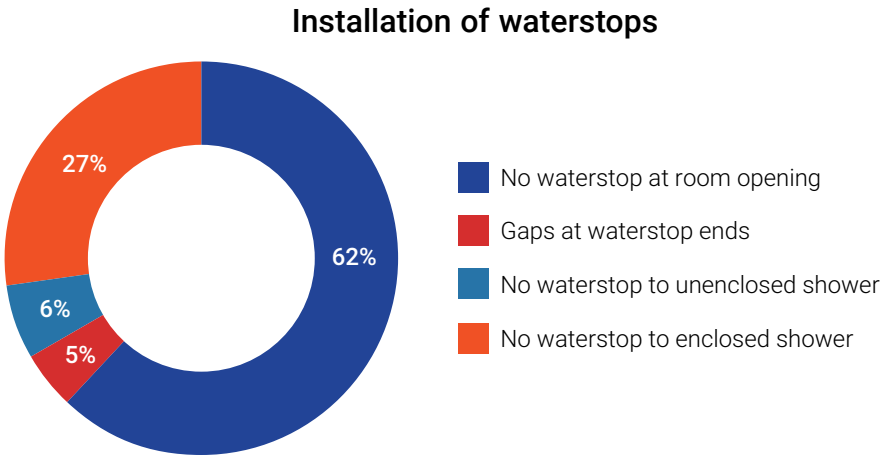

Figure 8: Installation of Waterstops

AS 3740:2010, Waterproofing of domestic wet areas, Part 3.9.1.2 specifies the requirement for waterstops in perimeter flashing at floor level openings (door openings), while parts 3.13.4 and 3.13.5 specify the requirement for waterstops to enclosed and unenclosed showers.

While the installation of waterstops was not always completed in a satisfactory manner; the largest issue was the absence of waterstops where they were required to be installed. Building and Energy was regularly advised by membrane installers that they weren't aware that waterstops are required to be installed in Western Australia.

It is important to note that AS 3740:2010 requires the installation of waterstops to both the shower area and openings in the room perimeter flashing. Therefore, if a required waterstop is not installed at the shower area, whether it is enclosed or unenclosed, the entire room must then be treated as a shower area and waterproofed accordingly. This includes the installation of a waterstop at any room perimeter flashing opening. If a waterstop is installed at the shower area, Part 3.9.1.2 still requires the installation of a perimeter flashing, for other than whole wet area floor waterproofing. This also includes the requirement of a waterstop to the perimeter flashing at floor level openings.

5.5 Membrane applied to wall recesses

The inspection identified the installation of wall recesses within shower areas as an area of concern. From the 539 items of unsatisfactory waterproofing work, 16 of those were attributed to the unsatisfactory installation and waterproofing of shower wall recesses. These represent 50 per cent of all wall recesses inspected as being unsatisfactory. Analysis of the 16 unsatisfactory items identified three problem areas:

- the base of the wall recesses having no fall;
- poorly applied membrane to wall recess junctions resulting in lumps, pinholes, cracking, and thin or no membrane; and
- no bond breaker of any type having been applied to junctions.

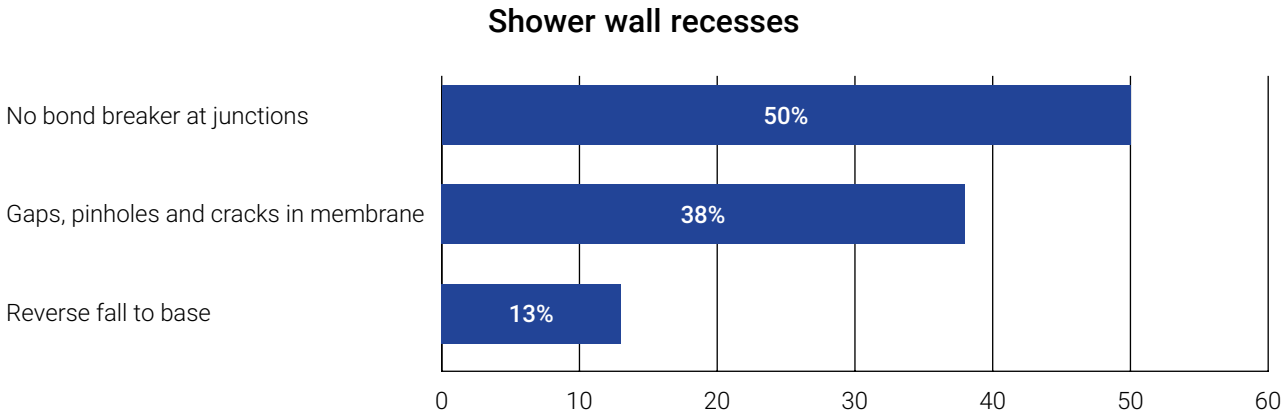

Figure 9: Shower wall recesses

Shower wall recesses were typically observed with poorly applied bond breaker and poorly applied membrane resulting in defects such as holes and cracking. Incorrect fall to the recess shelf was usually a result of poorly applied bond breaker creating a high point at the front edge, trapping water.

AS 3740:2010, Waterproofing of domestic wet areas, Part 3.10.1 specifies the requirement for recessed soap holders to be waterproofed by sealing with a "proprietary flange system or a sealant". Figure 3.4 shows a typical recess built into a wall and specifies "fall in the base of soap holder to drain to the shower recess". Part 3.13.7 requires the use of bond breakers at "all wall/floor, hob/wall junctions and at movement joints". Table 3.2 of AS 3740:2010 is then to be used to identify appropriate bond breakers for the class of membrane used. Figure 3.7 can then be used for examples of typical bond breaker details.

5.6 Substrate preparation of shower floors and walls

The inspection identified the preparation of substrates as a point of concern. From the 539 items of unsatisfactory waterproofing work, 26 of those were attributed to the unsatisfactory preparation of surfaces prior to the application of waterproof membrane. Analysis of the 26 unsatisfactory items identified four problem areas:

- absence of primer used as per the membrane manufacturer's application instructions;
- the primer used being incorrect and not suitable for the membrane used;
- holes, voids and damage to the substrate not repaired prior to the application of the membrane; and
- delamination of the membrane from the substrate indicating the substrate was not clean and/or the substrate was not correctly primed.

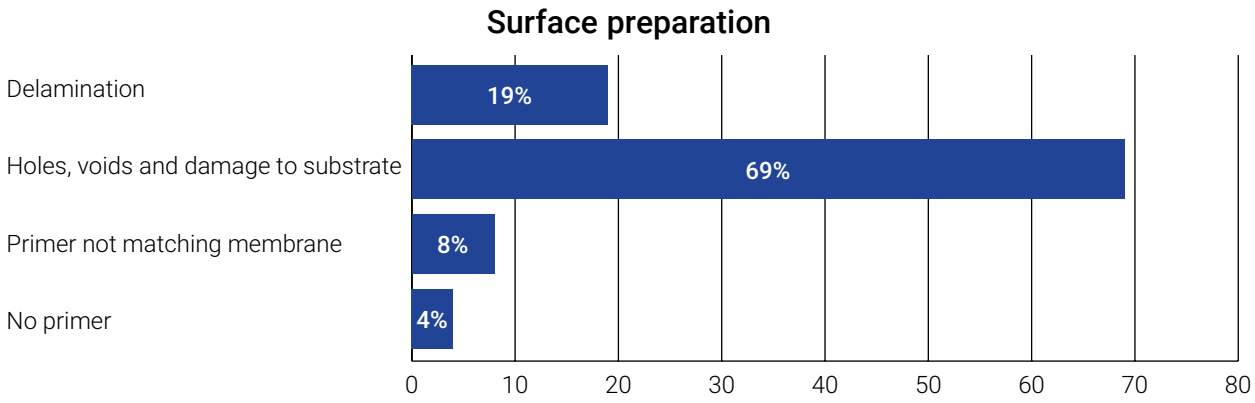

Figure 10: Surface preparation

A significant number of shower areas were observed to not have been prepared to a satisfactory standard. The wall and floor substrate were often observed to be poorly finished, generally with large depressions at the base of wall render. This leaves a gap between the wall render and floor screed that would prevent any bond breaker from being correctly applied. It would also often result in areas where water could pool and not be able to make its way to the drain. Additionally, bubbles where often observed in floor membrane, indicating that the membrane had lost its bond with the substrate. This generally indicates that the substrate was not correctly cleaned of all sand and/or dust before application of the membrane, or the membrane primer had not been correctly applied.

AS 3740:2010, Waterproofing of domestic wet areas, Part 3.13.1 specifies that "the area shall be cleaned and dust free. Indentations and imperfections shall be kept to a minimum and repaired where necessary". Additionally, the membrane manufacturer's application instructions should be referred to for specific preparation and priming requirements necessary for the membrane being applied. Membranes are generally not suitable gap-fillers, so it is important that substrates are adequately prepared.

5.7 The correct fixing of wall linings to be tiled

While not directly related to the application of waterproofing, the inspection identified the unsatisfactory and incorrect fixing of internal wall lining to walls that are to be tiled. From the 539 items of unsatisfactory waterproofing work, 45 of those were attributed to the unsatisfactory and incorrect fixing of wall linings.

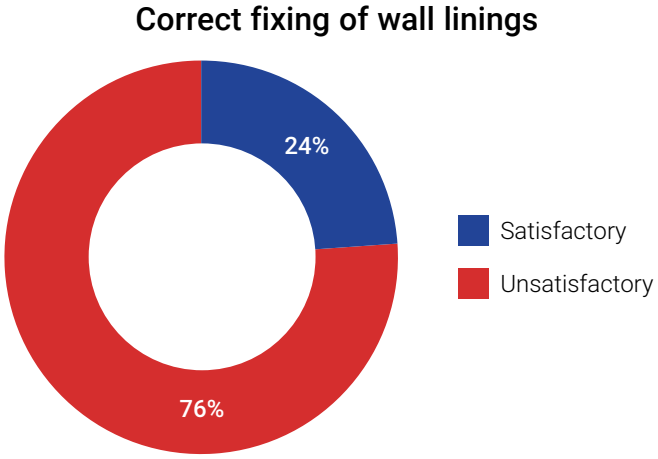

Figure 11: Correct fixing of wall linings

Generally, gypsum wall linings to walls that were to be tiled were observed to have an insufficient number of mechanical fixings. Failure of the wall lining due to incorrect fixing may result in breaches of the waterproof membrane and therefore directly affect the waterproofing of the wet area.

The National Construction Code, AS 3740:2010, Waterproofing of domestic wet areas and AS/NZS 2589:2017, Gypsum linings - application and finishing, do not specify any additional fixing requirements for wall lining that are to be tiled. However, the installation requirements for all manufacturers of gypsum linings do have specific instructions for this application. Generally, manufacturers require mechanical fixings to be installed at closer spacings and no glue to be used. The spacing of fixings may vary dependant on the weight of the tiles to be installed.

5.8 Fall in the substrate to floor wastes

The inspection identified the fall of the floor substrate to often be unsatisfactory. From the 539 items of unsatisfactory waterproofing work, 54 of those were attributed to the floor substrate having insufficient fall.

Analysis of the 54 unsatisfactory items identified that, while 20 per cent of shower floors were observed to be unsatisfactory, 58 per cent of floors outside of the shower were observed to have insufficient fall.

AS 3740:2010, Waterproofing of domestic wet areas, Part 3.3 specifies a minimum fall to the waste of 1:100. Part 3.3 also refers to Appendix B for further information. Appendix B, while informative, notes the primary consideration for fall in floors is "to ensure water does not remain on the finished floor in a manner that can adversely affect the health or amenity of the occupants or deteriorate building elements". And "to ensure water exits the area at the floor waste or doorway that is the designed exit point". And "water should not pond on the floor, with the exception of residual water remaining due to surface tension".

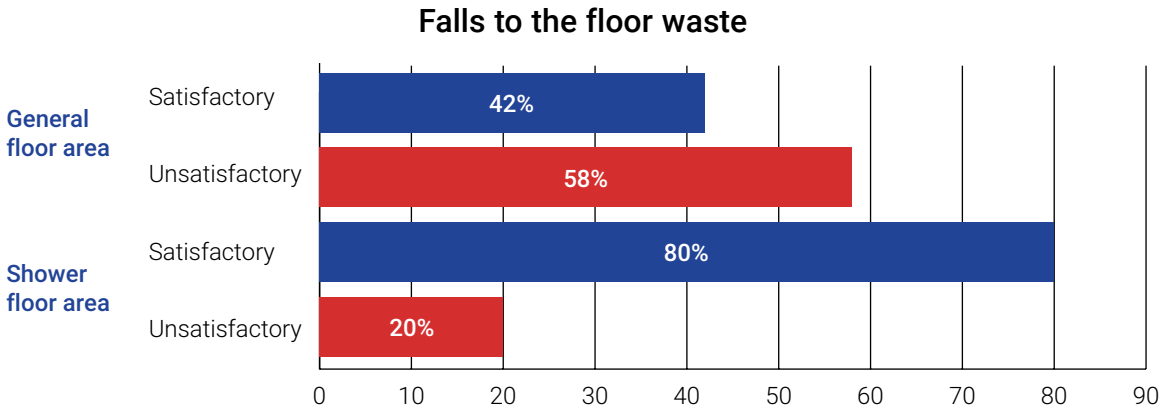

Figure 12: Falls to the floor waste

5.9 Membrane dry film thickness

The inspection identified liquid membrane dry film thickness to be a point of concern. Membrane thickness was examined, non-destructively, with a PosiTector 200 ultrasonic coating thickness gauge. While the PosiTector 200 is recognised as a high-quality instrument for non-destructive testing of membrane, Building and Energy recognises that reliance on these types of instruments may not always provide an 100 per cent accurate reading.

Analysis of the 539 items found 75 items to be attributed to unsatisfactory membrane dry film thickness. Of 145 membrane tests, over half (52 per cent) were measured to be less than the manufacturer's specified thickness.

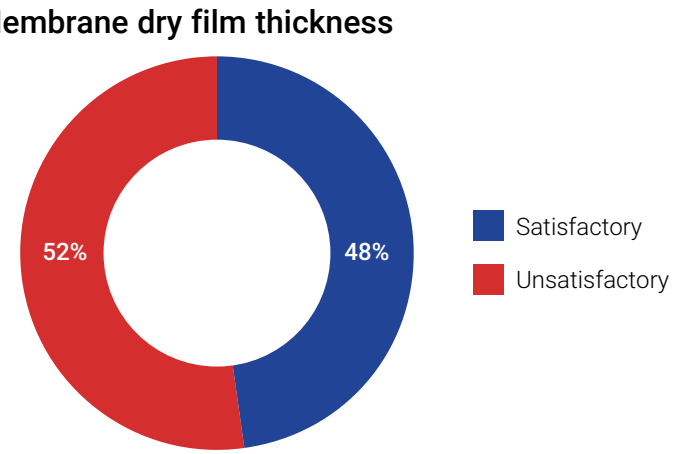

Figure 13: Membrane dry film thickness.

For information on the correct membrane dry film and wet film thickness, applicators should refer to the manufacturer's requirements for the membrane in use.

Most manufacturers of membrane develop systems for varying situations and applications of their membrane. Manufacturer data will identify the membrane class and manufacturer installation requirements will specify the required dry film and/or wet film thickness. This information can generally be found on the membrane container. More detailed information may also be found on the manufacturer's website and/or the manufacturer's published literature.

It is important for membrane applicators to understand the characteristics of waterproof membrane and how a failure to achieve the correct thickness may affect the performance of the membrane. AS 3740:2010, Waterproofing of domestic wet areas, Table 3.2 specifies Class 3 membrane to have an elongation at break of more than 300 per cent. Manufacturers test and warrant their products to perform as per their installation instructions. If the membrane is applied at less than the specified thickness, this may result in the membrane breaking at less than 300 per cent elongation.

Building and Energy inspector discussions with membrane applicators during inspections found that very few applicators were checking membrane thickness as part of the application process. Many were not aware of the minimum membrane thickness required. Most applicators advised that they applied one primer coat and two coats of membrane as thick as they could manage. It is also important for applicators to be aware of the requirements of the membrane in use, as manufacturer requirements for dry film thickness of common shower area membranes can range from 0.5mm to 1.5mm.

6. Actions

Action 1: Building and Energy will produce an Industry Bulletin for those involved in the design, certification and installation of bathroom waterproofing systems, including builders, building surveyors, designers, architects, suppliers and applicators. The bulletin will highlight construction concerns identified during this general inspection.

Action 2: Building and Energy will work with key stakeholders in the building and construction industry, including the Australian Institute of Building Surveyors, the Housing Industry Association, Master Builders Association and the Institution of Engineers Australia, along with permit authorities, to provide further information, education and training based on the findings of this inspection.

Action 3: Building and Energy has proposed the introduction of mandatory inspections to Western Australia's building regulation framework, as part of the Better Building Reforms. Initially, these inspections will apply to commercial buildings. One of the key elements identified for mandatory inspection under the proposed reforms is the waterproofing of wet areas, reflecting a targeted approach to improving construction quality and reducing defects.

Action 4: In line with internal processes and future audit priorities, Building and Energy will consider conducting further targeted inspections of waterproofing. Contractors who were found to have carried out unsatisfactory work previously would be considered high-risk.

7. Appendices

7.1 Appendix A: Building classification description table

Class	Description
1a	A detached house or a group of attached dwellings separated by fire resistant walls (for example, town houses or villa units) which is not located above or below another building other than a private garage.
2	An apartment building or group of single-storey units located above a communal basement or garage.

7.2 Appendix B: Role and powers of Building and Energy

Western Australia (WA) has a suite of laws governing building control, including the *Building Act 2011* (the Building Act), the *Building Services (Complaint Resolution and Administration) Act 2011* (the BSCRA Act), and the *Building Services (Registration) Act 2011* (the Registration Act).

The BSCRA Act empowers the Building Commissioner to monitor any building or building service in Western Australia to verify how building services have been or are being carried out, and how building standards have been or are being applied.

The Building Commissioner can designate Building and Energy officers to review approval documentation and to inspect buildings during construction and after the completion of building works.

The Registration Act provides a framework for registering building surveyors and builders and includes disciplinary provisions to manage substandard work and conduct by a registered building service provider.

For a new building of any classification that requires a building permit, the Building Act requires a registered building surveyor to sign a Certificate of Design Compliance (CDC) for the building design. The CDC contains a statement to the effect that if the building is completed in accordance with the plans and specifications that are referenced in the certificate, the building will comply with each applicable building standard.

Additionally, for new Class 2 to 9 buildings that require a building permit, the Building Act requires a registered building surveyor to sign a Certificate of Construction Compliance (CCC) for the completed building. The CCC contains a statement to the effect that the building has been completed in accordance with the plans and specifications that were referenced in the CDC, and as such, the building complies with each applicable building standard.

Further information regarding the role of Building and Energy is available on the WA Government website.

7.3 Appendix C: Building approvals

Western Australia's building approval process is legislated under the Building Act and associated building regulations. This legislation controls the application of building standards for the design and construction of buildings and incidental structures and the requirements for building permits for building work.

The Building Act generally requires a building permit to construct or renovate buildings, and an occupancy permit to allow Class 2 to 9 buildings to be occupied. As part of the building permit process, a building surveyor is engaged to assess the design documentation and state that if the building is completed in accordance with the plans and specifications, the building will comply with each applicable building standard that applies to it. For an occupancy permit, a building surveyor needs to sign a Certificate of Construction Compliance (CCC) stating the building has been completed in accordance with the plans and specification specified in the CDC.

The permit authority (usually the local government in whose district the dwelling will be built) can grant building permits and occupancy permits if satisfied that the application for a permit addresses the requirements of the Building Act and building regulations. The permit authority can request further information to assist it in considering an application (if there is an error) and impose conditions on the grant of a building permit if necessary.

The builder named on the building permit is responsible for ensuring that the building is constructed in accordance with the building permit (including any conditions) and the applicable building standards.

Building surveyors must be satisfied that the building has been constructed in accordance with the approval documentation prior to signing a CCC.

The Building Act gives the permit authority powers to monitor and inspect building work to ensure compliance with these requirements. The Building Act also provides permit authorities with the power to issue building orders to remedy or stop building work, and to prosecute builders and owners for non-compliance.

Further information about the building approvals process is available on the WA Government website.

7.4 Appendix F: Risk ranking tool

For the purposes of auditing, risk is determined to inform the seriousness of any non-compliance and what follow-up actions are required.

To determine the risk ranking of areas identified as being unsatisfactory, officers utilise a 5x5 risk matrix developed for the purposes of auditing. Each identified item is assessed individually against the matrix, which considers the possible consequences of the non-compliance and then considering the likelihood of that consequence occurring.

The matrix considers four consequences categories – people, financial, environmental and reputational. The many permutations available ensure that a risk outcome can be achieved for a particular non-compliance when related to a specific building. The methodology does not include any pre-determined risk-ranking outcomes.

			CONSEQUENCE				
		People	Minor disruption and no risk to people's health or safety.	Slight disruption of occupants and minor injury to people. Minor impact on people's health (mental &/or physical) Moderate impact on people's legal rights.	Could cause a major disruption to occupants and result in injury or illness to people resulting in one or more day(s) unable to function in a working environment. Significant impact on people's legal rights.	Occupants could suffer a permanent total disability or major health issue (mental &/or physical). Major impact on people's legal rights.	Could result in fatality
		Financial	Cost <$1000	Cost $1000 - $10 000	Cost $10 000 to $100 000	Cost > $100 000	Cost > $1, 000 000
		Environmental	No environmental consequence greater than as expected business as usual	No environmental consequence greater than as expected business as usual	Environmental damage can be mitigated and is not required to be notified under jurisdiction requirements as environment can be restored.	Risk of reversible environmental damage required to be notified under jurisdiction requirements.	Could result in irreversible severe environmental damage required to be notified under jurisdiction requirements.
		Reputational	No reputational consequence greater than as expected business as usual	Minor reputational consequence compared to business as usual	Reputational damage is possible if action is not taken on subject non-compliance (possible chance of media coverage or loss in confidence by industry and public. Contentious Issue Briefing Note likely required)	Reputational damage is likely if action is not taken on subject non-compliance (likely chance of media coverage or loss in confidence by industry and public. Minister likely required to make a statement)	Reputational damage is almost certain if action is not taken on subject non-compliance (almost certain chance of media coverage and loss in confidence by industry and public. Parliamentary inquiry or Royal Commission could result)
			1	2	3	4	5
LIKELIHOOD	Probability		Insignificant	Moderate	Significant	High	Extreme
	Is expected to occur in most circumstances (>95%)	5 Almost certain	6	7	8	9	10
	Will probably occur in most circumstances (65 - 95%)	4 Likely	5	6	7	8	9
	Might occur at some time (35 - 65%)	3 Possible	4	5	6	7	8
	Could occur at some time (5 - 35%)	2 Unlikely	3	4	5	6	7
	May occur only in exceptional circumstances (<5%)	1 Rare	2	3	4	5	6

Score outcomes:	
2-5:	Low Risk: Builder to rectify defects (no proof of rectification sought). Building service provider or building surveyor to comply in future.
6:	Medium Risk: Builder to rectify defects (no proof of rectification sought). Building service provider or building surveyor to comply in future.
7-8:	High Risk: Proof of rectification is required. Building surveyor required to demonstrate future compliance. Refer to Audit Manual Chapter 17 (Escalation Process for High Risk Inspections).
9-10:	Very High Risk: **Immediate referral to Line Manager and/or building service provider, permit authority,Worksafe and any other as required.** Refer to Audit Manual Chapter 17 (Escalation Process for High Risk Inspections).

Additional resources

- Industry Bulletin 134 Improving compliance of wet areas
- General Inspection (Snapshot) Report Six – Waterproofing of wet areas
- Building and Energy complete Industry Bulletin list
- Information and obligations for builders

Feedback

Feedback on the content of this report can be submitted via be.info@lgirs.wa.gov.au.

Glossary of terms, acronyms and abbreviations

Applicable building standards	In general, the applicable building standards for proposed building work are contained in the Building Code of Australia.
BCA	Building Code of Australia (Volumes 1 and 2 of the National Construction Code).
Bond breaker	A system that prevents the membrane bonding to the substrate, bedding or lining to dissipate the shear forces that may otherwise cause failure of the membrane.
Building and Energy	The Building and Energy division of the Department of Local Government, Industry Regulation, and Safety.
Building classification	A categorisation system for buildings of similar risk levels based on use, hazard, and occupancy.
Building services acts	A suite of laws governing building control.
Building permit	Permission granted by the permit authority for building work to be conducted.
Building Regulations	Building Regulations 2012 (WA).
Building surveyor contractor	Registered individuals, partnerships or companies that undertake to conduct building surveying work and issue approved certificates.
Building surveyor practitioner	Registered individuals that conduct building surveying work. They cannot issue a certificate but can be nominated supervisors for a building surveyor contractor.
Certificate of Construction Compliance (CCC)	A Certificate of construction compliance is an approved certificate issued by a building surveying contractor. It is required to obtain an occupancy permit from the permit authority to occupy a newly completed Class 2 to Class 9 building or a newly completed part of the building.
BSCRA Act	*Building Services (Complaint Resolution and Administration) Act 2011*.
Compliance demonstrated	The design documentation includes sufficient information to demonstrate compliance with the applicable building standards.
Compliance not demonstrated	The design documentation does not include sufficient information to demonstrate compliance with the applicable building standards, or the information provided clearly demonstrates non-compliance with the applicable building standards.
Deemed-to-Satisfy (DtS)	Provisions that are Deemed-to-satisfy the Performance Requirements of the BCA of Australia.
Design documentation	Drawings, specifications, and technical documents referenced on the Certificate of design compliance (CDC) that demonstrate compliance with the applicable building standards.

Drainage flange	A flange connection to a waste pipe, at the point at which it passes through the floor substrate, to prevent leakage and enable tile bed drainage into the waste pipe. (In WA, it is commonly referred to as a Leak Control Flange or puddle flange)
Dry film thickness	Measurement of thickness of a coating remaining on the surface after full cure of the coating.
Evidence of suitability	Evidence that supports the use of the material, product, form of construction or design meets a performance requirement or a Deemed-to-satisfy provision of the NCC BCA.
Fall	Difference in level over a given length in the direction of flow
General floor area	The bathroom floor area, located outside of the shower area.
LGIRS	Department of Local Government, Industry Regulation, and Safety.
Membrane	A barrier that is impervious to moisture – AS 3740:2010 Note: A barrier may be a single or multi-part system.
NCC	National Construction Code.
Permit authority	Unless otherwise prescribed, usually the local government in whose district the building or incidental structure is, or is proposed to be, located.
Shower area	The area directly affected by water from a shower, including a shower over a bath.
Substrate	Surface to which the membrane is applied.
Waterproof (WP)	The property of a material that does not allow moisture to penetrate through it. when tested in accordance with AS/NZS 4858.
Waterproofing system	Combination of elements that are required to achieve a waterproof barrier as required by AS 3740.
Waterstop	A vertical extension of the waterproofing system forming a barrier to prevent the passage of moisture in the floor.
Wet area	An area within a building supplied with water from a water supply system, which includes bathrooms, showers, laundries, and sanitary compartments and excludes kitchens, bar areas, kitchenettes or domestic food and beverage preparation areas.

Government of Western Australia

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