Design & Approval of Developments that Impact the Water Table or Aquifer

A Technical Guide for Architects

DINCEL
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Introduction

As density increases, urban development across Australian cities is increasingly extending below ground level. Deeper basements for parking, services, storage and increasingly habitable spaces are now common in many metropolitan projects. In areas where the groundwater table is present at shallow depth, excavation works frequently intersect aquifers. Groundwater in New South Wales is regulated as a state-managed resource. As a result, developments that intercept or alter groundwater flows may fall within a distinct regulatory framework that extends beyond the typical planning approval process.

Excavations that penetrate or intercept an aquifer, or require groundwater extraction, may be classified as aquifer interference activities. These works require assessment under a dedicated approval pathway administered separately from the standard development application process. The approval structure is generally a two-stage process and may involve additional technical documentation, hydrogeological analysis and agency consultation. Despite these requirements, the implications for design teams are often underestimated during early project planning.

For architects, early design decisions can significantly influence the regulatory pathway and project risk profile. Basement construction approaches, particularly the choice between tanked and drained systems, can determine how groundwater is managed during both construction and long-term operation. This paper outlines the regulatory framework governing aquifer interference in New South Wales and highlights the key design considerations architects must address when projects interact with the groundwater table.

Legislative framework governing water table and aquifer interference

Groundwater interaction in New South Wales is regulated under the Water Management Act 2000 (NSW). The Act defines aquifer interference activities, which include both groundwater extraction and structural works that alter aquifer behaviour. Basement excavations that intersect the water table may therefore trigger additional regulatory approvals beyond the standard development application process.

The legislative framework is supported by Water Sharing Plans (WSPs) and the NSW Aquifer Interference Policy (AIP). WSPs establish management rules for defined groundwater sources. They set long-term extraction limits and determine how groundwater may be accessed within each management area. The AIP requires that aquifer interference approvals are not granted unless the Minister is satisfied that adequate arrangements are in place to ensure that no more than minimal harm will occur to any water source or its dependent ecosystems. Technical investigations are guided by the document NSW Minimum Requirements for Building Site Groundwater Investigations,[1] which outlines expectations for hydrogeological assessment.

Several authorities administer this framework. WaterNSW assesses aquifer interference proposals and issues Water Supply Works Approvals (WSWAs) under the Water Management Act 2000. WSWAs are granted to construct and operate infrastructure that takes, stores, diverts or controls water.

The NSW Department of Climate Change, Energy, the Environment and Water (DCCEEW) establishes the policy framework that governs groundwater management. Local councils continue to manage the development application process under the planning system, but their consent conditions must incorporate the General Terms of Approval (GTAs) issued by WaterNSW. Misalignment between development consent conditions and groundwater approval requirements can delay or compromise the approval pathway.

What is an aquifer?

"The term 'aquifer' is commonly understood to mean a groundwater system that can yield useful volumes of groundwater. This also implies that the water is of good enough quality to be used for purposes such as irrigating crops or for town or stock drinking water. Aquifers are not underground rivers or streams."

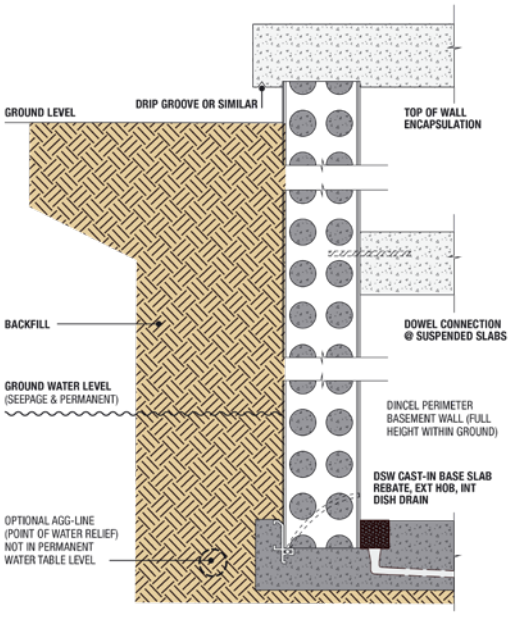
Source: NSW Government

What constitutes water table or aquifer interference?

Under the Water Management Act 2000, certain works must enter a dedicated approval pathway where they constitute an aquifer interference activity. For architects, the most common trigger arises from basement excavation below the groundwater level. Excavations that intersect the water table may allow groundwater to enter the site or require systems that permanently control groundwater movement around the structure.

Even where groundwater inflow occurs only during construction, the activity will still require regulatory approval. Preferably, this involves referral during the development application stage, followed by a WSWA before excavation or groundwater management works can commence.

Dincel Waterproof System



As groundwater is not intended to be extracted on an ongoing basis, tanked basements are generally considered lower risk from a groundwater management perspective.

The two-stage approval process explained

Where a development is likely to interact with groundwater, approval typically occurs through a two-stage process that operates alongside the development application (DA).

Stage 1: Integrated development referral at DA stage

The first stage occurs during the DA process. Where excavation is likely to intersect the groundwater table or interfere with an aquifer, the proposal should be referred to WaterNSW through the integrated development pathway. WaterNSW reviews the proposal and issues GTAs that must be incorporated into the development consent issued by the consent authority.

Early referral allows groundwater risks to be identified before the design is finalised. At this stage, design decisions such as whether a basement will operate as a tanked system or a drained system can influence the depth of technical assessment required. In some cases, proposals may also involve consultation with the DCCEEW where groundwater systems or policy considerations are relevant.

Stage 2: Water Supply Works Approval (WSWA)

A WSWA must be granted before works that interfere with groundwater can commence. This approval is issued by WaterNSW under the Water Management Act 2000 and is separate from the development consent. It applies to infrastructure or activities that intercept, control or extract groundwater, including construction dewatering systems.

The project applicant is responsible for ensuring that the appropriate approvals and licences are in place before undertaking any groundwater extraction or dewatering. Where groundwater is proposed to be discharged into council-owned stormwater infrastructure, councils typically require a separate consent to discharge.

Applications for a WSWA must also align with the development consent. If conditions imposed by council or through the Land and Environment Court conflict with the groundwater approval requirements, WaterNSW may be unable to accept the application.

Consequences of not referring groundwater impacts at DA stage

Where groundwater interaction is not identified during the DA stage, projects may face additional approval risks. Common consequences include:

- Revised GTAs.
- More restrictive groundwater management conditions.
- Approval delays while groundwater approvals are obtained.
- Potential refusal of the groundwater approval.

Early identification of groundwater impacts helps reduce regulatory risk for projects involving basement excavation or subsurface works.

Basement design considerations

Basement design can significantly influence how a project is assessed under groundwater regulation. In practice, regulators distinguish between **tanked basements**, which aim to exclude groundwater, and **drained basements**, which allow groundwater to enter and be actively managed. The selected strategy affects the approval pathway, compliance obligations and long-term operational requirements.

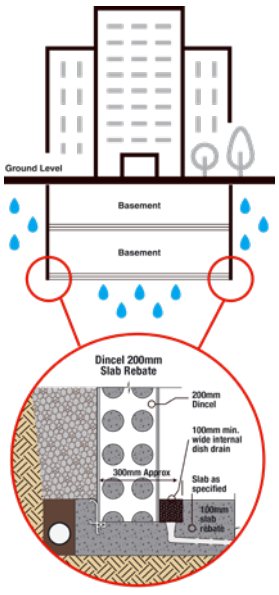
Tanked basements

Overview

A tanked basement is designed to prevent groundwater from entering the structure. Waterproofing systems and structural detailing are used to resist groundwater pressure and isolate the basement from the surrounding aquifer.

As groundwater is not intended to be extracted on an ongoing basis, tanked basements are generally considered lower risk from a groundwater management perspective. Post-construction water take is typically minimal or avoided entirely. As a result, long-term operational obligations are often reduced.

Note that the WaterNSW and DCCEEW advice is as follows: “Best practice is considered to include engineered drainage around and beneath a tanked basement” (author’s highlight).[2]



Implications for the approvals process

- Groundwater impacts are typically addressed during the DA stage through the integrated development process.
- WaterNSW reviews the proposal and issues GTAs that must be incorporated into the development consent.
- Temporary construction dewatering may still require a WSWA and possibly a Water Access Licence (WAL) depending on the volume of groundwater taken.
- Once construction is complete, no ongoing groundwater take is expected, so regulatory obligations generally end.

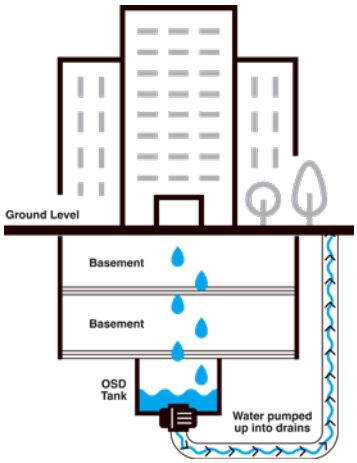
Drained basements

Overview

A drained basement allows groundwater to enter the basement perimeter or drainage system and then removes it through pumping. This approach is sometimes used where full waterproofing is difficult or where groundwater pressure must be relieved around the structure.

Because groundwater is intentionally intercepted and removed, drained basements can create ongoing groundwater extraction. This can introduce long-term regulatory obligations and monitoring requirements.

It should be noted that a drained basement will potentially create a humid environment. Such an environment can promote the growth of mould, which may be in contravention of the National Construction Code.



Implications for the approvals process

- The project may require ongoing groundwater extraction approvals, not just construction dewatering approvals.
- A WSWA is required for the drainage and pumping infrastructure used to intercept groundwater.
- A WAL is typically required if groundwater is taken above exempt thresholds.
- Monitoring, reporting and metering conditions may apply for the life of the building.
- The project may require additional hydrogeological assessment to demonstrate compliance with the NSW Aquifer Interference Policy and “minimal harm” criteria.

Water take thresholds and licensing

Groundwater extraction can occur during construction where excavation intersects the water table. In basement projects, this most commonly arises through construction dewatering, where groundwater entering the excavation must be removed to allow safe and stable construction. While this activity is often temporary, it is still regulated under the Water Management Act 2000 because it involves taking water from an aquifer.

During construction

Where groundwater is intercepted and removed during excavation, the activity requires a WSWA. This approval authorises the installation and operation of infrastructure used to intercept or pump groundwater, such as wells, pumps or drainage systems.

Under current NSW regulatory settings, a WAL is not required where groundwater taken through an aquifer interference activity is 3 megalitres (ML) or less per water year, provided the water is not taken for supply or consumption and appropriate records are maintained. However, a WSWA is still required for the infrastructure used to intercept or pump groundwater.

Post-construction

Where groundwater interception continues after construction, licensing requirements depend on the volume of groundwater extracted over time.

- **Less than 3 ML per year.** Groundwater extraction below this threshold is generally considered low risk. A WAL is not required, although approval, monitoring and record-keeping obligations may still apply.
- **More than 3 ML per year.** A WAL is required in addition to the WSWA. The licence establishes a legal entitlement to extract groundwater and introduces ongoing compliance, monitoring and reporting obligations.
- **Drained basements.** Post construction and prior to granting of Occupation Certificate (OC), the proponent must resubmit for approval the whole-of-life (100 years) water management plan. OC will not be granted until the management plan has been approved by both WaterNSW and DCCEEW.

These post-construction requirements are only relevant for drained basements, where groundwater will be intercepted and pumped continuously to keep the basement inflows under control. In these cases, early estimates of groundwater inflow can help determine whether the project will require ongoing groundwater licensing and regulatory oversight.

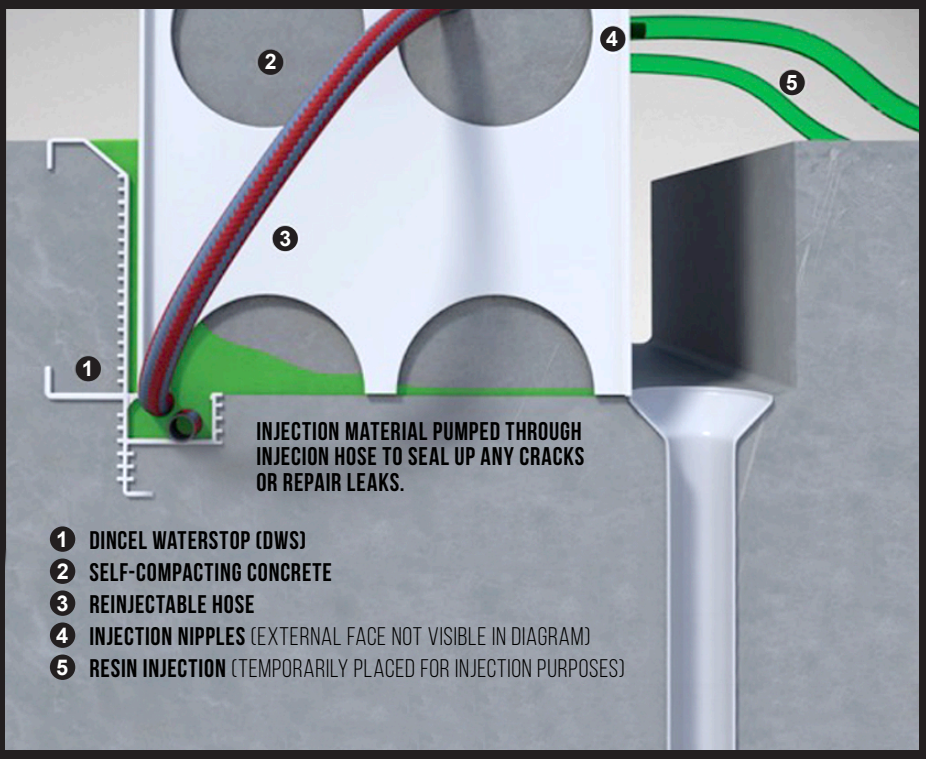
Basement construction approaches, particularly the choice between tanked and drained systems, can determine how groundwater is managed during both construction and long-term operation.

Designing for regulatory certainty and lifecycle performance

Early coordination is critical when projects are likely to interact with groundwater. Engaging a hydrogeologist during the early design stages can help identify groundwater conditions, estimate potential inflows and determine whether aquifer interference approvals are likely to be required. This allows groundwater risks to be addressed before the design is finalised and supports a smoother progression through the approval process.

Where groundwater interaction is anticipated, the proposal should be referred at the DA stage through the integrated development pathway. Early referral helps align council development consent conditions with WaterNSW requirements and reduces the risk of redesign during the later WSWA stage.

Basement design strategy can also influence regulatory complexity over the life of the building. Tanked basements, which are designed to exclude groundwater, generally involve lower environmental risk and avoid ongoing groundwater extraction once construction is complete. This will reduce long-term compliance obligations and simplify operational management.



Integrated tanked basement system by Dincel

For projects seeking a tanked basement strategy, Dincel presents an integrated wall-based waterproofing solution that is intended to reduce reliance on conventional externally applied membrane systems and drained basement approaches. In Dincel's system, the wall assembly, wall-to-slab junction treatment and associated injection detail are conceived as part of a coordinated waterproofing strategy rather than as separate, loosely connected components. From a specification perspective, this is relevant because it aligns with the broader regulatory framework: minimise groundwater ingress, reduce long-term water take and avoid basement solutions that depend on permanent pumping, monitoring and maintenance over the life of the building.

The Dincel system is a concrete-filled permanent formwork wall system made from interlocking polymer panels. For basement construction, it is used as an integrated tanked wall solution, with the panel skins providing a waterproof barrier and proprietary detailing at the wall-to-slab junction addressing a key point of potential water ingress. This differs from conventional basement construction, where structural walls and external waterproofing membranes are typically specified as separate systems.

For architects, the value of this approach lies in its potential to support regulatory certainty and lifecycle performance at the same time. A tanked system can reduce ongoing groundwater management obligations, simplify post-construction compliance and lower the operational burden placed on owners. Dincel positions its integrated tanked basement system as a means of achieving these outcomes while also addressing practical construction issues such as buildability, waterproofing continuity and reduced dependence on multiple trade interfaces.

As with any below-ground system, specification should remain project-specific and be supported by appropriate hydrogeological, structural and waterproofing advice. However, where the design objective is a dry, fully tanked basement with minimal long-term groundwater liability, Dincel offers a robust, high-performing solution.

For CPD training on this topic, access **Design & Approval of Developments That Impact the Water Table Aquifer.**

REFERENCES

1 https://publications.water.nsw.gov.au/watergroupjspui/handle/100/792

2 NSW Department of Planning and Environment. “Minimum requirements for building site groundwater investigations and reporting.” NSW Government. https://publications.water.nsw.gov.au/watergroupjspui/bitstream/100/792/1/Minimum_requirements_for_building_site_groundwater_investigations_and_reporting.pdf (accessed 24 March 2026).

All information provided correct as of May 2026

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