

Practice and Guidance note

Groundwater Diversion and

Dewatering for planners

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1 Background and introduction

The [Auckland Unitary Plan \(Operative in part\)](#) (AUP (OP)) contains rules to manage the diversion and dewatering of groundwater.

Dewatering or diversion of groundwater can occur:

- when undertaking excavation to a depth that will reach groundwater, including perched groundwater
- when constructing new structures that are below the existing surface level of the ground, for example a basement, large retaining walls, large pipes etc.

In the majority of cases it is the perched groundwater table that is dewatered or diverted.

The purpose of this Practice and Guidance note (“PGN”) is to introduce to our planners the definitions, key terms, rules, relevant assessment matters, and policy. The PGN then explains the planner’s role in the assessment process, including identifying the necessary information to be provided with an application, and how to check whether standards are complied with.

The information in this PGN is being published to assist applicants and their consultants in understanding the approach that will be taken in terms of determining whether an application is complete, and how we interpret the relevant standards that apply.

2 Definitions and key terms

The AUP (OP) defines, in [Chapter J1](#):

- **Water take** as: The activity of removing water from a water body (including rivers, streams, lakes, wetlands, water impounded by dams and aquifers), by pumping and/or gravity, typically for consumptive use, but also including groundwater de-watering and groundwater removal as part of land drainage. Take does not include the removal of water from a water body where that removal is by a discharge (for example, where water is discharged over a dam spillway) (*underline is added emphasis*)
- **Groundwater diversion** as: Significantly changing the permeability of the aquifer and/or rerouting the ambient groundwater flow regime by draining, piping, or physically impeding the flow of groundwater.

Key terms that may be used in an effects assessment, and their meaning, include:

- **Consolidation settlement** is the ground settlement that results from groundwater dewatering or diversion. Consolidation settlement can occur naturally as a result of seasonal changes in groundwater level. However, it will

more often occur as a direct result of artificial activities that have the effect of lowering groundwater level, such as excavation and construction of below-ground structures.

- **Mechanical settlement** is the settlement of the ground that occurs behind a retaining wall as a result of retaining wall deflection.
- **Total settlement** is the combination of both consolidation settlement and mechanical settlement.
- **Burland assessment** is a type of assessment that considers the extent of adverse effects of total settlement on human-made elements, such as buildings, structures and services. This type of assessment provides a predicted category of damage.¹
- **Perched groundwater** is natural, unconfined groundwater separated from an underlying body of groundwater (usually the aquifer).

3 The relevant rules, standards, matters and assessment criteria

The take or diversion of groundwater are activities that are restricted by [s14\(3\)](#) of the Resource Management Act 1991 (“the RMA”).

No person may take or divert any groundwater unless it is for reasonable domestic needs or animal drinking water ([s14\(3\)\(b\)](#) of the RMA), or is expressly allowed by a:

- national environmental standard;
- a rule in a regional plan as well as a rule in a proposed regional plan for the same region (if there is one); or
- a resource consent.

A take of groundwater associated with a diversion is often described in the AUP(OP) and elsewhere as dewatering, however not exclusively so.

The definition of ‘water take’ in [Chapter J1](#) makes clear that any plan reference to ‘water take’ will also include groundwater de-watering and groundwater removal as part of land drainage.

The regional plan rules for the take or diversion of groundwater are located in [Chapter E7](#) in Table E7.4.1. These rules are summarised on the following pages.

To visualise the rules and standards applying to a take or diversion, follow the flow chart located in [Section 7](#).

¹ The groundwater specialist or geotechnical engineer will usually provide you with a table defining each of the different damage terms used, such as Negligible damage, Very Slight Damage etc.

3.1 Dewatering of groundwater:

- Rule E7.4.1(A17): Dewatering or groundwater level control associated with a permitted activity groundwater diversion **is a permitted activity in all zones and in the High-Use Stream Management Areas Overlay**.
 - The dewatering must comply with Standard E7.6.1.6
 - If the ground around a basement or retaining structure is dewatered beyond its initial construction period (see Standard E7.6.1.6(3)), it will require consent under rule E7.4.1(A20).

Note: This rule prescribes a restricted discretionary activity status to dewatering within the Wetland Management Areas Overlay where associated with a permitted activity diversion. However, this rule is redundant because you cannot undertake a permitted activity diversion within this Overlay. The default rule that will apply instead is Rule E7.4.1(A20).

- Rule E7.4.1(A20): Dewatering or groundwater level control associated with a restricted discretionary activity groundwater diversion, a diversion not meeting Standard E7.6.1.6, or not otherwise listed, **is a restricted discretionary activity in all zones and overlays**.

- Matters of discretion are found at E7.8.1(1) & (4)
- Assessment criteria are found at E7.8.2(1), (2), (4), (5), (6), (7) & (9)

Note: This is the default rule for any groundwater dewatering within the Wetland Management Areas Overlay.

3.2 Diversion of groundwater:

- Rule E7.4.1(A27): Diversion of groundwater caused by any excavation (including trench) or tunnel **is a permitted activity in all zones and in the High-Use Stream Management Areas Overlay**.

- The diversion must comply with Standard E7.6.1.10

- Rule E7.4.1(A27): Diversion of groundwater caused by any excavation (including trench) or tunnel **is a restricted discretionary activity in the Wetland Management Areas Overlay**.

- Matters of discretion are found at E7.8.1(1) & (6)
- Assessment criteria are found at E7.8.2(1) & (10)

- Rule E7.4.1(A28): The diversion of groundwater caused by any excavation, (including trench) or tunnel that does not meet Standard E7.6.1.10, or not otherwise specified, **is a restricted discretionary activity in all zones and overlays**.

- Matters of discretion are found at E7.8.1(1) & (6)
- Assessment criteria are found at E7.8.2(1) & (10)

3.3 Failure to comply with a permitted activity standard relating to diversion or dewatering of groundwater

If any of the standards referred to in Sections 3.1 and 3.2 of this PGN are not complied with, they do not become a separate reason for consent under [rule C1.9\(2\)](#).

This is because Table E7.4.1 specifies the activity status of a diversion or dewatering not complying with standards.

However, per rule C1.13(3), when deciding whether an application should be publicly or limited notified, council must still have regard to the standards for permitted activities as part of the context of the assessment of effects. Note that this is different from permitted baseline and is better known as 'plan context'.

Note however that it will still be helpful to describe the reasons why the standards are not complied with, and that consent is then required.

4 The relevant objectives and policies

The objectives and policies that relate to the take or diversion of groundwater are found in [Chapter E2](#).

- Objectives E2.2(1)-(5)
- Policies:
 - Priority of water use
 - Policies E2.3(1)-(2)
 - Efficient allocation and use
 - Policy E2.3(4)
 - Water allocation and availability guidelines
 - Policy E2.3(5)
 - Take and use of water
 - Policy E2.3(7)-(11)
 - National Policy Statement for Freshwater Management 2014
 - Policies E2.3(13)-(16)
 - Comprehensive review of consents
 - Policy E2.3(17)
 - Diversion of groundwater
 - Policy E2.3(23)²

² This policy states 'in addition to the matters addressed in Policy E2.3(6) and (7)' however only Policy E2.3(7) will be relevant to take and use of groundwater. Policy E2.3(6) relates only to proposals to take and use water from lakes, rivers, streams, springs or wetlands.

Take of Groundwater

Below is a summary of what the AUP (OP) is aiming to manage with regard to the **take** of groundwater:

- Sustainable management of aquifers with respect to aquifer availability and levels
- Avoidance of aquifer consolidation and surface subsidence
- Avoiding, remedying or mitigating adverse effects on surface water flows, and on terrestrial and freshwater ecosystem habitat
- Avoidance of any saltwater intrusion or any other aquifer contamination
- That the take will not cause adverse interference effects on neighbouring bores to the extent their owners are prevented from exercising their lawfully established water takes (e.g. water dropping below the level of their bore)
- That the take avoids, remedies or mitigates any ground settlement that may cause distress/damage, including reducing the ability of an existing building or structure to meet the relevant requirements of the Building Act 2004 or the New Zealand Building Code, to any existing:
 - buildings;
 - structures; or
 - services including roads, pavements, power, gas, electricity, water and wastewater networks and fibre-optic cables
- That alternative designs for dewatering proposals are considered where there are significant adverse effects on the above matters
- Requiring monitoring of the effects of the take on the quality and quantity of the groundwater resource, and the measurement and recording of ground, buildings and other structures.
- Consents for a take of water shall be for a specified duration and shall include a condition setting the review date(s) of the consent.

Note: The volume of groundwater taken from most excavations is minimal compared to a take of groundwater from a bore for domestic, rural or industrial purposes. The take will generally amount to drainage only. The level and detail of assessment required for the 'take and use' (as described in the plan policies, but also relevant to groundwater dewatering and diversion) can therefore be proportionate not only to the scale and risk of effects, but also to the level of water that is taken, and the permanency of the dewatering (i.e. whether it is a temporary take during excavation, or a long-term take/drainage of water around a constructed building/basement below natural ground level).

Diversion of groundwater

Below is a summary of what the AUP (OP) is aiming to manage with regard to the **diversion** of groundwater:

- That the diversion avoids, remedies or mitigates any adverse effects on:

- scheduled historic heritage places and scheduled sites and places of significance to Mana Whenua; and
- people and communities.
- That the diversion does not cause or exacerbate any flooding
- That monitoring has been incorporated where appropriate, including to measure and record water levels and pressures, and of the movement of ground, buildings and other structures.
- That mitigation has been incorporated where appropriate, including:
 - minimising the period where the excavation is open/unsealed;
 - use of low permeability perimeter walls and floors;
 - use of temporary and permanent systems to retain the excavation; or
 - re-injection of water to maintain groundwater pressures.

5 The council planner's role

The assessment of effects for a groundwater diversion or dewatering is complex and requires specialist input. Confirming whether a consent is required can also be complex, due to the level of information that must be available to assess a proposal against the permitted activity standards.

The council planner will look out for specific application information that will assist to determine whether a consent is required or not, before referring the application to a specialist. The subsections below indicate what sort of information is typically required.

Applicants are encouraged, where possible, to provide as much supporting information with their application as they can, which avoids the need to request further information, or potentially return applications that are incomplete.

The council planner's role and the type of information to request is scenario dependent. The sections below should be read in conjunction with the flow chart in [Section 9](#).

5.1 Applicant has applied for a permit to divert and/or dewater groundwater

If the applicant has applied for a permit to divert and/or dewater groundwater, the application should include the following information at a minimum:

- A description of the proposed groundwater dewatering and/or diversion, e.g. what will be dewatered, when, how much, and how.
- An assessment of the effects of the proposal against the relevant AUP(OP) Chapter E2 and E7 provisions.

- A geotechnical report identifying groundwater levels, including any summer low, and winter high (note that same day bore drilling is unlikely to be accurate).
- Architectural drawings showing cross-sections of the depth of the proposed excavation, groundwater level, the location of in-ground assets like stormwater and wastewater, and the proximity of the excavation to the site boundaries and the proximity of neighbouring assets i.e. building / structures and services to the site boundary.
- A draft ground settlement monitoring and contingency plan (GSCMP). This plan should address the matters for discretion found at E7.8.1(6)(a)(vi), (c) and (f).

If this information has not been provided, the application is likely to be returned under [section 88\(3A\)](#) of the RMA as it is incomplete.

If this information has been provided, the application can be referred for specialist input.

5.2 Applicant has not applied for a permit to divert and/or dewater groundwater, but have identified that they will require a consent to do so

[Schedule 4](#), clause 2(1)(e) of the RMA requires an application to include a description of any other resource consents required for a proposal to which the application relates. This enables an applicant to legitimately 'flag' that they want to unbundle or stage their proposal in terms of the consents that they apply for.

However, based on the principles of bundling, a diversion or dewatering of groundwater will more often than not be related in some way to another activity that requires resource consent, e.g. earthworks, or the construction of a new building. This means that we should generally be considering these consents together, and not separate.

If an applicant has identified that they require a permit to divert or dewater groundwater, but they have not applied for it, our practice is to require that they apply for this additional consent using [section 91](#) of the RMA.

The applicant will be required to prepare a new AEE, application form, and pay an additional application deposit. The new application should include the information listed under [Section 5.1](#).

Once the new application is received, it will be lodged. If the application is complete, it can formally be referred for specialist input.

5.3 It is unclear whether a diversion or dewatering of groundwater is required

This is often the most common scenario, where excavation is proposed, but it is unclear on where the natural groundwater level is, and whether a diversion or dewatering of groundwater will take place (as a permitted activity or otherwise).

Excavation does not automatically mean that consent will be required.

If excavation is proposed, the council planner should turn their focus to what information has been provided with the application. For example, a geotechnical report with bore logs can sometimes provide an indication of where natural groundwater level is located. The time of the year and duration that the bore measurements have been recorded can influence their accuracy. For example, the more often the measurements are taken, the greater likelihood of their accuracy. If groundwater measurements are taken during winter, they are also more likely to be representative of where the highest level will be.

If there is no geotechnical report, the council planner may call the applicant to ask whether they have one. Often one has been prepared for an associated building consent, but not included with the resource consent application. Once shared, this may shed some light on whether there is any likelihood of there being a diversion or dewatering of groundwater.

If still unsure, and excavation greater than 1.5m below natural ground level is proposed or the council planner has any other reason to consider that there could be impacts on groundwater, they may request further information from the applicant to demonstrate whether the dewatering and diversion rules and standards are relevant to their proposal, prior to referring the application for specialist input. The steps following specialist review are set out on the flow chart in [Section 9](#).

5.4 A diversion or dewatering of groundwater is required, but this has not been identified or assessed by the applicant

If a review of the application has concluded with certainty that a diversion or dewatering of groundwater is required as part of the proposal, and the applicant has not provided enough information to confirm whether the diversion or dewatering can be undertaken as a permitted activity, the application can be returned under [section 88\(3A\)](#) of the RMA.

This is because the application will fail to meet the requirements of [Schedule 4](#), clause 3(a) for not providing information to confirm the permitted activity status of the activity.

Note that sometimes it might be quite obvious from the application documents that the diversion or dewatering could be undertaken as a permitted activity. In this case,

the applicant could be provided the opportunity to suspend processing of the application using [section 91D](#) (assuming that notification has not yet been determined) while they formally confirm the permitted activity status. Use the diagrams in [Section 7](#) to do an initial check the application for this purpose.

Often it may also be obvious that a resource consent is required for the diversion or dewatering, such as where multiple levels of basement are proposed. These applications should also be returned under [section 88\(3A\)](#) of the RMA as they fail to meet the requirements of [Schedule 4](#), clause 2(1)(e) of the RMA.

5.5 The applicant has assessed that the diversion/dewatering is a permitted activity

An application may include a statement that the diversion or dewatering of groundwater is permitted, and goes on to include a description of the works that demonstrates compliance with the relevant rules and standards (so that a resource consent is not required under [section 87A\(1\)](#) of the RMA) (see Schedule 4, [clause 3\(a\)](#) of the RMA).

Do an initial check of this information to determine whether it is adequate.

For example, an applicant may be excavating to install a new detention tank and assess that any dewatering will occur for less than 30 days (in non-peat soils), with no permanent dewatering, and otherwise full compliance with the standards relating to a diversion. This is likely to be a relatively low-risk scenario where further specialist review is not required.

Use the diagrams in [Section 7](#) to assist with these checks.

If unsure, or it is considered that the information is inadequate, refer the applicant's assessment to the groundwater specialist team for further checking. The steps following their review are set out on the flow chart in [Section 9](#).

6 Discharge or use of groundwater

If a take (dewatering) is proposed, details on whether the discharge or use of the water has been appropriately addressed should be provided with the application, i.e. the application should demonstrate what will happen to the water – either its use or discharge will be a permitted activity, or will require resource consent. The approach to integrated consenting applies here also.

The rules for a temporary or permanent discharge of uncontaminated groundwater onto or into land and/or into water can be found in [Chapter E4](#) (see rule E4.4.1(A2(d))).

A discharge of contaminated groundwater is managed by the rules in [Chapter E30](#).

7 What do the standards for groundwater diversion “look” like?

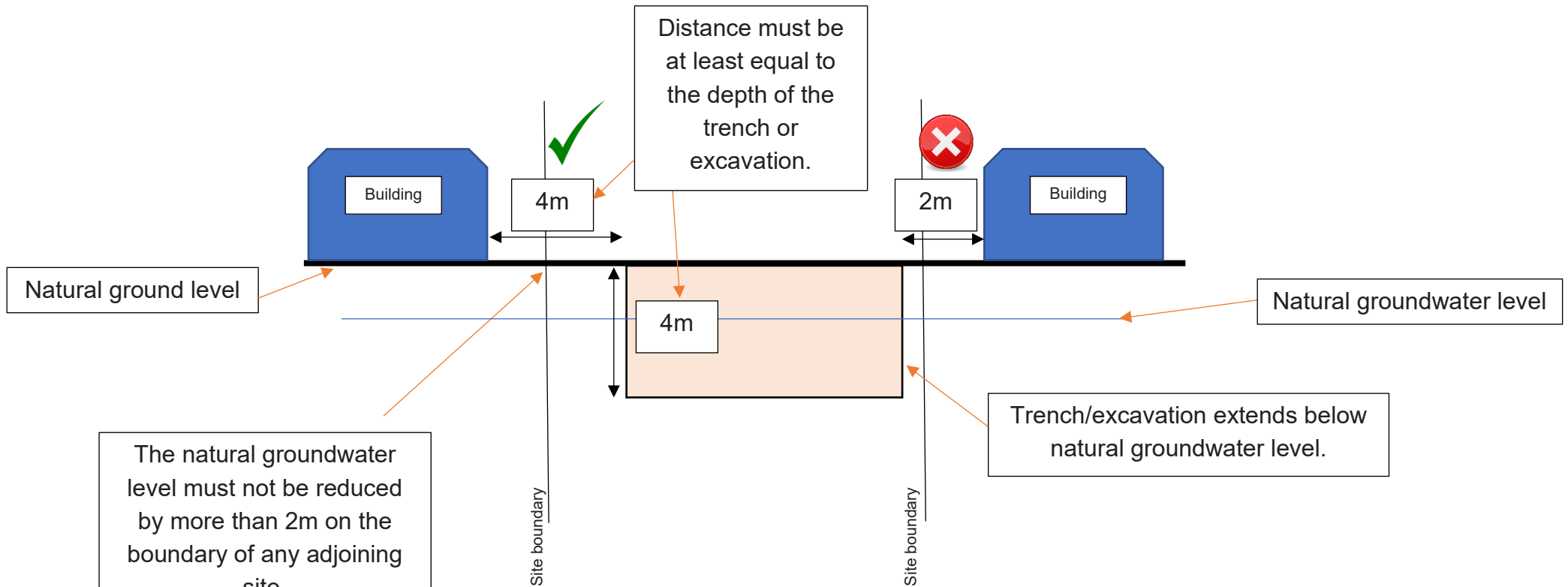
It can be difficult to interpret what the groundwater diversion standards at E7.6.1.10 ‘look like’ when reviewing application drawings.

The following pages pictorialise each part of the standard.

Note that the groundwater dewatering standards at E7.6.1.6 are more straightforward to check, as they relate only to identifying soil type, duration of water take, and purpose of the take. For this reason, no diagrams have been created. However, be aware that often a consent is required solely for dewatering (take), so these standards are equally as important to check, particularly in terms of querying the applicant as to whether any permanent drainage is being installed for any below-ground structures.

Figure 7.1

Standard E7.6.1.10(3) & (5)(a) for a diversion arising from a **trench or excavation**:



The natural groundwater level must not be reduced by more than 2m on the boundary of any adjoining site.

As a rule of thumb to meeting this:

- Max trench/excavation of 2m on boundary with no further groundwater investigation, and then setback a minimum of 1m for every additional 1m depth of cut.

Per Standard E7.6.1.10(1), these standards do not apply to:

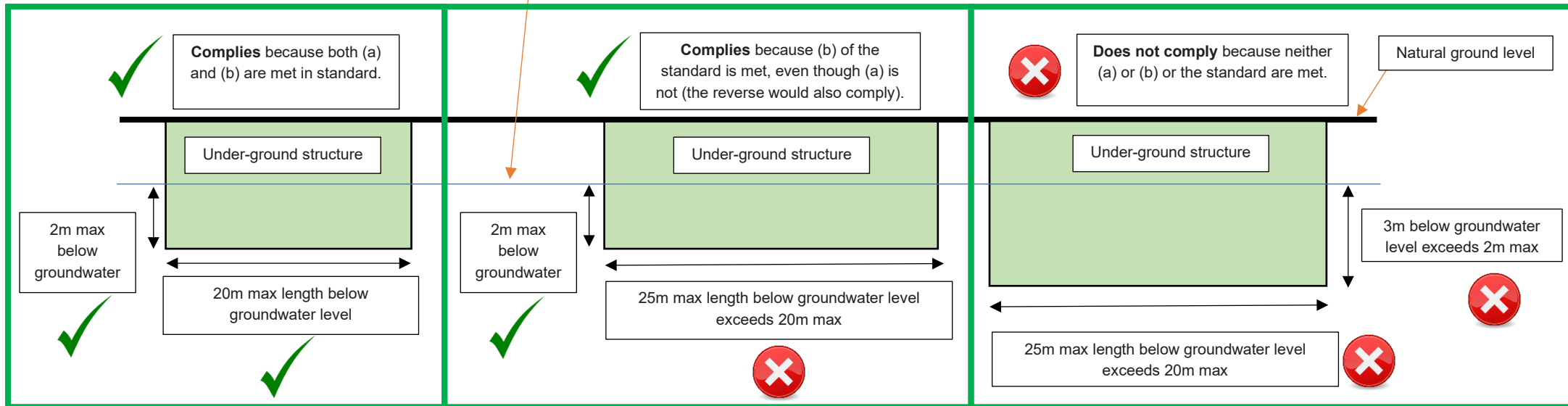
- diversions from any trench/excavation for no longer than 10 days (e.g. a very short-term trench/excavation); or
- diversions for network utilities and road network linear trenching activities that are progressively opened, closed and stabilised where the part of the trench that is open at any given time is no longer than 10 days

Figure 7.2

Standard E7.6.1.10(4) for **structures**:

(if installation of the structure requires excavation, read in conjunction with previous page)

Note: The structure must meet either (a) or (b) of the standard to comply. Exceedance of both will be a non-compliance.



Per Standard E7.6.1.10(1), this standard does not apply to:

- piles up to 1.5m in external diameter
- sheet piling that remains in place for no more than 30 days
- pipes cables or tunnels including associated structures which are **drilled or thrust** and are **up to 1.2m** in external diameter
- pipes including associated structures **up to 1.5m** in external diameter where a **closed faced or earth pressure balanced machine is used**
- diversions for any structure for no longer than 10 days

Note that most pipes etc. (even those not listed above) will not physically 'impede' the flow of groundwater through a site (per definition of groundwater diversion in [Chapter J1](#)). It will generally be solid structures of some dimension and length, e.g. a basement.

Note: Do not use the definition of building in Chapter J1. The standard refers to 'structure', so the default is the definition in [s2](#) of the RMA:

"...any building, equipment, device, or other facility made by people and which is fixed to land; and includes any raft"

Figure 7.3

Standard E7.6.1.10(3) & (5)(b) for **tunnel or pipe with an external diameter of 0.2 - 1.5m:**

Per Standard E7.6.1.10(1), these standards do not apply to:

- pipes cables or tunnels including associated structures which are **drilled or thrust** and are **up to 1.2m** in external diameter
- pipes including associated structures **up to 1.5m** in external diameter where a **closed faced or earth pressure balanced machine is used**
- diversions for any structure for no longer than 10 days
- where network utilities are installed in a way where trenches are progressively opened, closed and stabilised where the part of the trench that is open at any given time is no longer than 10 days

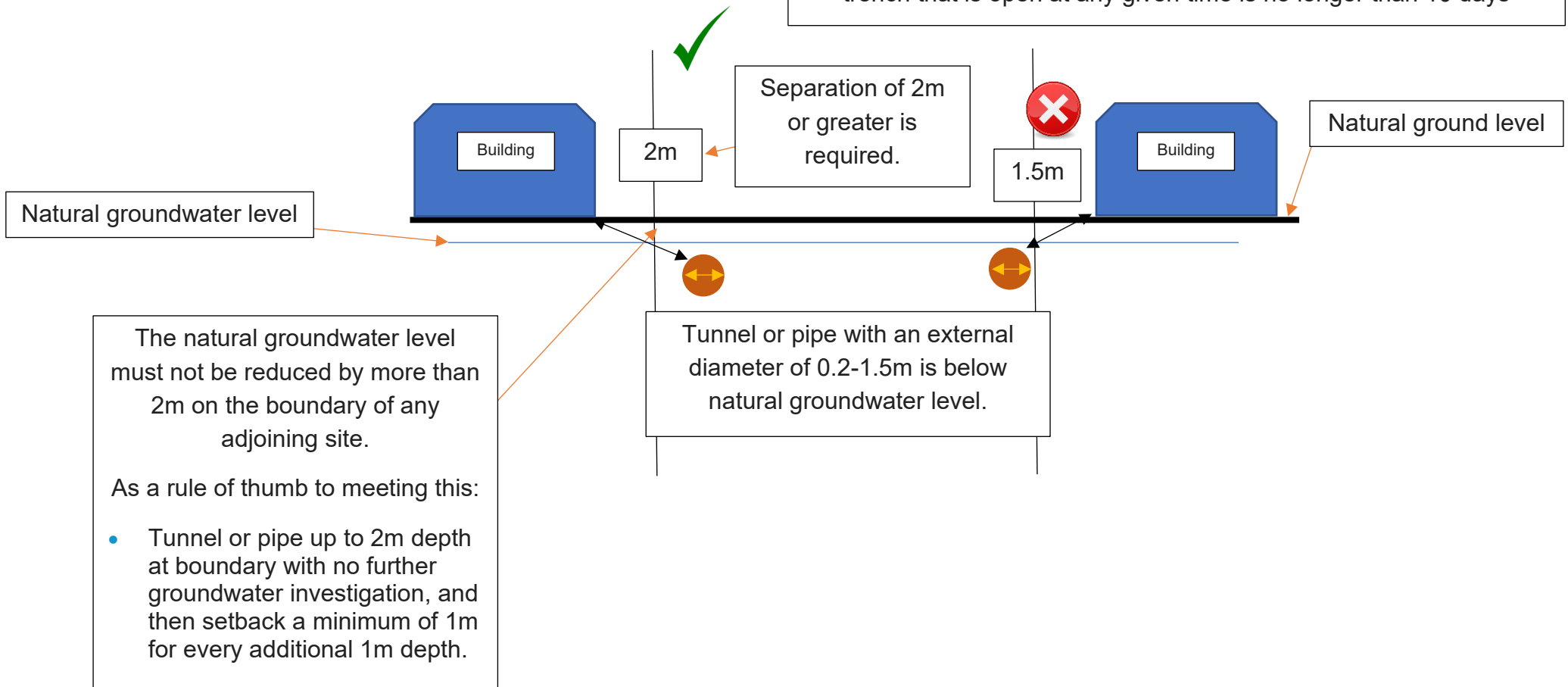


Figure 7.4

Standard E7.6.1.10(3) & (5)(c) for **tunnel or pipe with an external diameter of up to 0.2m**:

Per Standard E7.6.1.10(1), these standards do not apply to:

- pipes cables or tunnels including associated structures which are **drilled or thrust** and are **up to 1.2m** in external diameter
- pipes including associated structures **up to 1.5m** in external diameter where a **closed faced or earth pressure balanced machine is used**
- diversions for any structure for no longer than 10 days
- where network utilities are installed in a way where trenches are progressively opened, closed and stabilised where the part of the trench that is open at any given time is no longer than 10 days

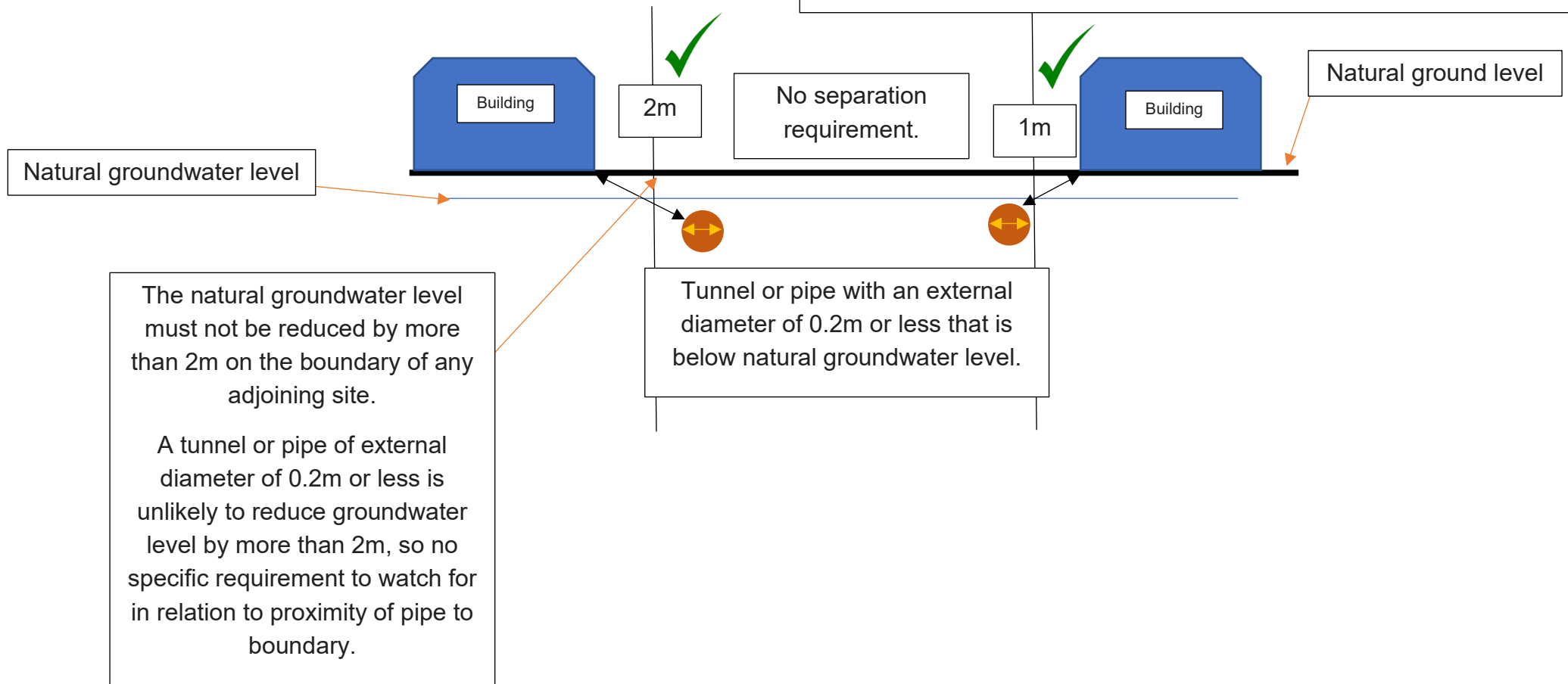


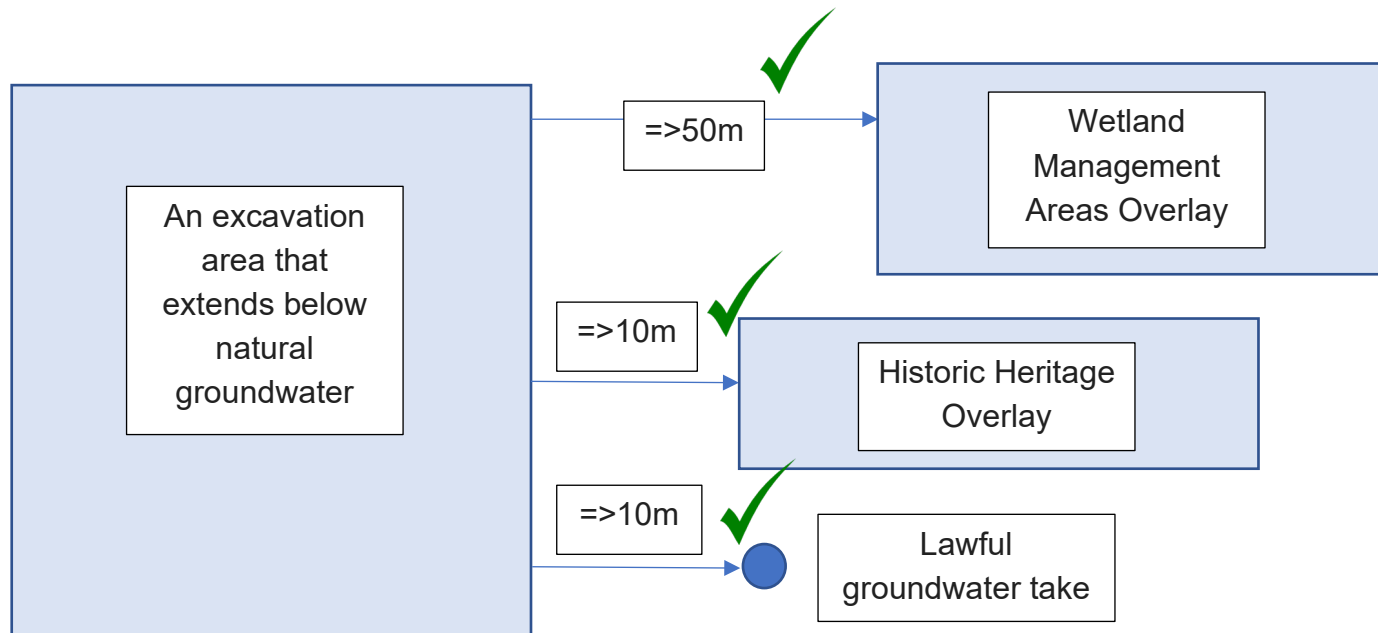
Figure 7.5

E7.6.1.10(6) – This scenario complies for **excavation**:

Note: This is shown in plan view, not elevational.

Per Standard E7.6.1.10(1), this standard does not apply to:

- diversions from any trench/excavation for no longer than 10 days (e.g. a very short-term trench/excavation); or
- diversions for network utilities and road network linear trenching activities that are progressively opened, closed and stabilised where the part of the trench that is open at any given time is no longer than 10 days



For the avoidance of doubt – if the excavation is within the Historic Heritage Overlay, then the standard will not be met.

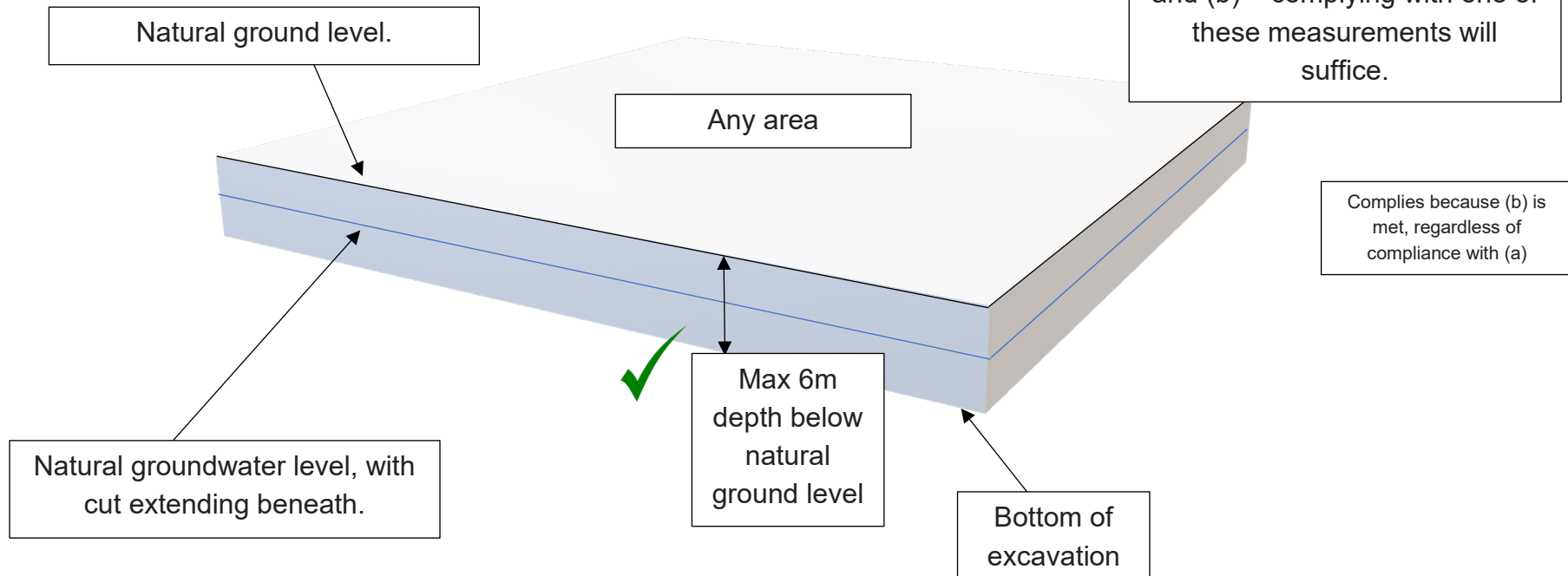
This standard does not apply to a diversion within the Wetland Management Areas Overlay – as this activity will always require consent as an RD activity, and the standards do not apply to RD activities in Chapter E7.

Figure 7.6

E7.6.1.10(2) – This scenario complies **for excavation**:

Area of excavation that is below natural groundwater level must not exceed 1ha (10,000m²). Would only ever be exceeded for very large projects, e.g. greenfield cut/development.

Note: The excavation does not have to comply with both (a) and (b) – complying with one of these measurements will suffice.



Per Standard E7.6.1.10(1), this standard does not apply to:

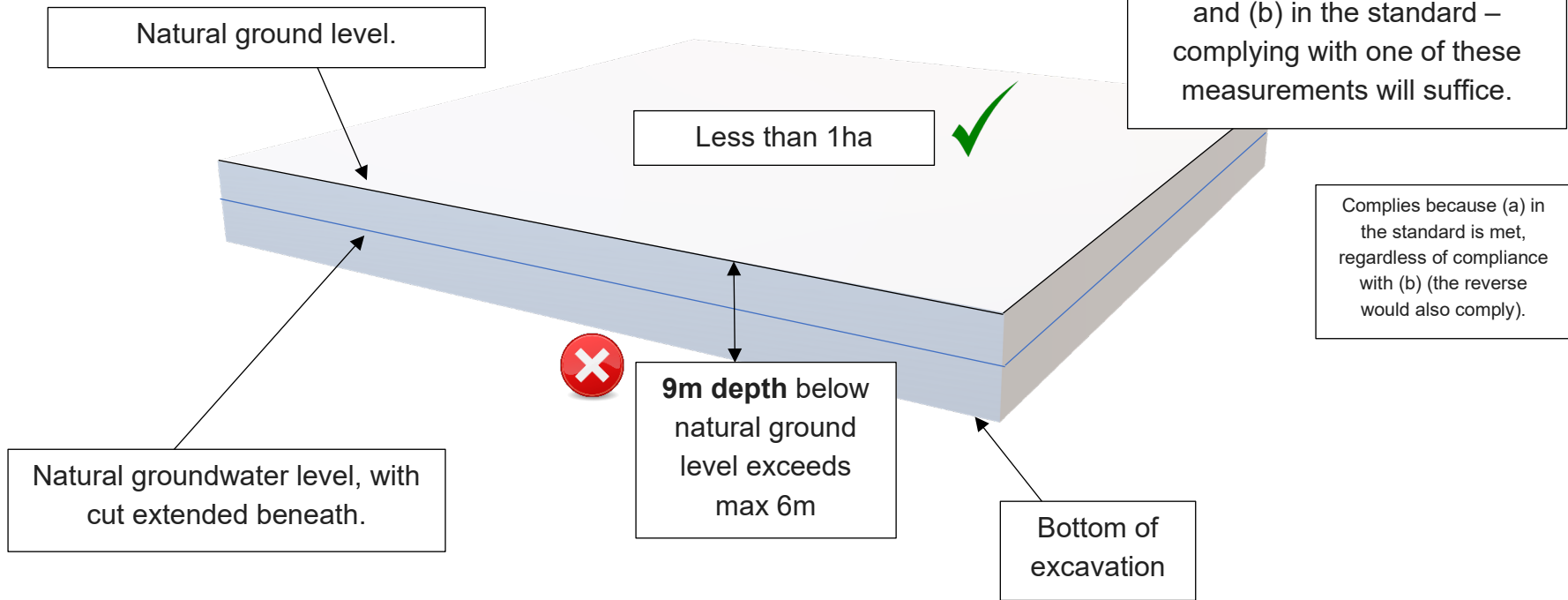
- diversions from any trench/excavation for no longer than 10 days (e.g. a very short-term trench/excavation); or
- diversions for network utilities and road network linear trenching activities that are progressively opened, closed and stabilised where the part of the trench that is open at any given time is no longer than 10 days

Figure 7.7

E7.6.1.10(2) – This scenario complies **for excavation**:

Area of excavation that is below natural groundwater level must not exceed 1ha (10,000m²).
Would only ever be exceeded for very large projects, e.g. greenfield cut/development.

Note: The excavation does not have to comply with both (a) and (b) in the standard – complying with one of these measurements will suffice.



Complies because (a) in the standard is met, regardless of compliance with (b) (the reverse would also comply).

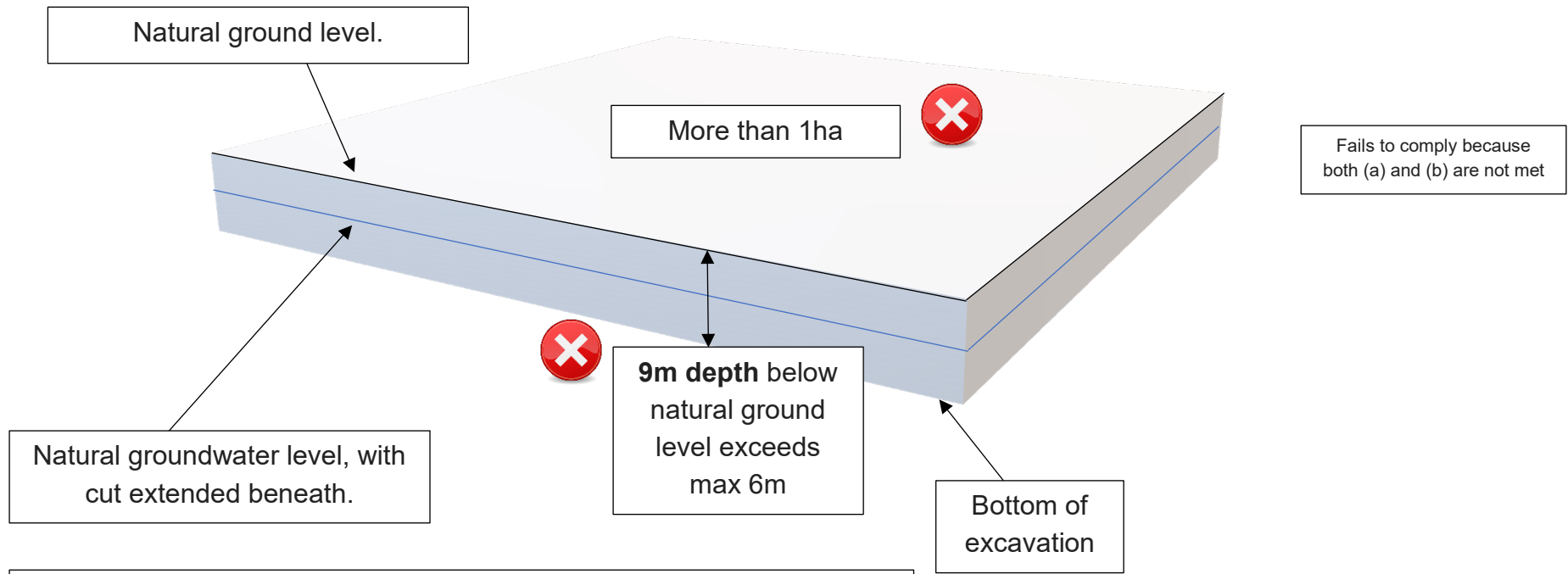
Per Standard E7.6.1.10(1), this standard does not apply to:

- diversions from any trench/excavation for no longer than 10 days (e.g. a very short-term trench/excavation); or
- diversions for network utilities and road network linear trenching activities that are progressively opened, closed and stabilised where the part of the trench that is open at any given time is no longer than 10 days

Figure 7.8

E7.6.1.10(2) – This scenario **does not** comply for excavation:

Area of excavation that is below natural groundwater level must not exceed 1ha (10,000m²).
Would only ever be exceeded for very large projects, e.g. greenfield cut/development.



Per Standard E7.6.1.10(1), this standard does not apply to:

- diversions from any trench/excavation for no longer than 10 days (e.g. a very short-term trench/excavation); or
- diversions for network utilities and road network linear trenching activities that are progressively opened, closed and stabilised where the part of the trench that is open at any given time is no longer than 10 days

8 Flow chart for determining what rules and standards apply to diversion or dewatering

