

225-245 Martin Road, Bradfield SSDA-97711727

Bulk Earthworks, Rehabilitation & Quarrying Groundwater Assessment Report

24/06/2026



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Bulk Earthworks, Rehabilitation and Quarrying (SSD-97711727) – Groundwater Assessment Report

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Executive Summary

This Groundwater Assessment Report has been prepared by Arcadis to address the site-specific Secretary's Environmental Assessment Requirements (SEARs) received in respect of the proposed State Significant Development Application (SSDA) No. 97711727. The proposed development is being undertaken by Goodman Property Services (Aust) Pty Ltd (Applicant) on behalf of Goodman Western Sydney Pty Limited as trustee for the Goodman Western Sydney Trust (Owner). The development is located at 225 – 245 Martin Road, Bradfield, 2556 (the Site).

This report aims to address the site-specific Secretary's Environmental Assessment Requirements (SEARs) and associated agency requirements issued by DCCEW and the NSW EPA for State Significant Development Application (SSDA) No. 97711727. The assessment evaluates potential interactions between the proposed Bulk Earthworks (BEW) and groundwater, and identifies any associated impacts to aquifers, watercourses, water resources, and existing groundwater users.

The BEW involve site preparation and rehabilitation to achieve the design Bulk Earthwork Levels (BELs) for future industrial development under SSDA 97688711. Where feasible, BELs have been raised to minimise interaction with the shallow unconfined groundwater within the Bringelly Shale aquifer. Despite these design measures, some interaction with groundwater is unavoidable, including at the proposed sediment basins around the perimeter of the site, and temporary stormwater/sediment drainage basins within the lots, drainage swales, and two lots where the BELs intersect the existing groundwater level.

Groundwater inflow associated with BEW has been estimated using both analytical methods and an analytical element model (AEM) developed in GFLOW. Combined analytical methods indicate potential inflows of approximately 4.2 ML/year for characteristic conditions, with a sensitivity range of 2.5 to 7.5 ML/year. The AEM predicts a steady-state inflow of approximately 1.50 ML/year at completion of BEW, representing a conservative, system-scale estimate where all excavations are interacting. The site holds an existing 25 ML/year Water Access Licence (WAL 10WA109463), which provides sufficient entitlement to accommodate any licensing requirements associated with groundwater take.

The impact assessment indicates that BEW will result in negligible to low impacts to the groundwater system. Total recharge remains unchanged, and impacts are limited to a redistribution of groundwater discharge pathways, with excavation inflows largely offset by reductions in regional throughflow. Predicted changes to groundwater–surface water interaction are minimal, including a negligible reduction in baseflow to South Creek and no measurable impact to Badgerys Creek, which is ephemeral. All registered groundwater users are located outside the modelled drawdown extent and are not expected to be affected.

Impacts to groundwater dependent ecosystems (GDEs) are also limited. Negligible impacts are predicted for GDEs associated with South Creek and Badgerys Creek. Assessment against the NSW Aquifer Interference Policy indicates that minimal impact considerations are unlikely to be exceeded for groundwater levels, pressure, or quality.

A groundwater monitoring program is proposed for the duration of BEW to verify predicted groundwater conditions, confirm the extent of groundwater interaction, and support adaptive management. As existing monitoring wells will be decommissioned during BEW, four replacement wells will be installed prior to excavation to maintain monitoring continuity and support compliance reporting.

Overall, the assessment demonstrates that groundwater impacts associated with BEW are minor, localised, and manageable, and will not result in a material change to the site water balance or regional groundwater regime.

1 Introduction

This Groundwater Assessment Report has been prepared by Arcadis to address the site-specific Secretary's Environmental Assessment Requirements (SEARs) received in respect of the proposed State Significant Development Application (SSDA) No. 97711727. The proposed development includes Rehabilitation, Quarrying and Bulk Earthworks and is being undertaken by Goodman Property Services (Aust) Pty Ltd (Applicant) on behalf of Goodman Western Sydney Pty Ltd as trustee for the Goodman Western Sydney Trust (Owner). The development is located at 225 – 245 Martin Road, Bradfield, 2556 (the Site).

This SSDA seeks approval for the following;

- Site Preparation works only (i.e., no buildings, retaining walls or other infrastructure works)
- Rehabilitation of areas disturbed by historic mining and brick-making operations under major project approval MP10_0014 and MP10_0033.
- Bulk Earthworks at the site to align with the Connecting to Country and Precinct Plan principles including both the disturbed and undisturbed portions to capture the following proposed works:
 - Rehabilitation of Pits 1 & 2 using predominantly on-site fill (Engineered fill import required).
 - Preparation of the remaining site area to Bulk Earthwork Levels (BEL) (not including detailed trimming) for the proposed industrial development as considered under SSDA 97688711.
- Quarrying and Export of Bringelly Shale and Clay from select areas of Pit 1 & 2 to rectify the previous approved pit designs to ensure they are geotechnically stable to suit the proposed industrial masterplan.
- Vegetation Removal of 6.97 hectares (Ha) over land that is not certified under the Growth Centre SEPP.
 - Species being cleared involve species protected under both the BC Act and EPBC Act.
 - EPBC Act Referral completed on a precautionary measure given small amount of EPBC listed communities.
- Demolition of any remaining structures on the site.
- Rehabilitation of identified and unidentified contamination and, if required, the construction of a containment cell in the proposed northeastern corner of the site (currently identified as Lot 55 of DP3050). The containment cell is proposed to trigger Designated Development threshold due to the proposed upper limit storage volume of 100,000m³.
- Relocation of the Jemena Gas main predominantly burdening Lot 3 of DP127878.0
- If required through an Aboriginal Cultural Heritage Assessment Report (ACHAR), relocation and reburial of artefacts.

Additionally, this SSDA application seeks to rely on already existing authority approvals issued under MP10_0014 (subject to any applicable modifications). These are as follows:

- Mining Lease 1771
- Environmental Protection Licence 684
- Ground Water Access Licence WAL24346
- Ground Water Supply Works Approval No. 10WA109463

It is important to note that a number of the proposed activities being sought for approval under this SSDA have previously been assessed and approved under MP10_0014. The existing DA relates to approximately 70 Ha of Net Developable Area (NDA), with the new portion of site approx. 36 Ha NDA. Cumulatively the area is approx. 116 Ha NDA.

1.1 Related Applications/Activities

SSDA 97688711 - 14 warehouse buildings, Active Open Space & amenities precinct (including a café) and internal site infrastructure works

The SSDA seeks approval for the construction, fit-out (including office and standard warehouse racking) and operation of 14 warehouse buildings, Active Open Space & amenities precinct (including a café) and internal site infrastructure works.

This application assumes the bulk earthworks are completed under SSDA 97711727 (the focus of this report).

Part 5 Activity – External Works Lead in Roads and Services

The Applicant is proposing access to the Site via the following route which will be upgraded to be in accordance with the Precinct Plan

Part 1 - Martin Road / Elizabeth Drive intersection upgrades

- It is expected that these works will be approved by way of amendment to the existing Part 5 approval by Transport for New South Wales ('TfNSW').
- It is understood that Transport for NSW will construct the work with a target completion date of December 2029.

Part 2 - 4 - Martin Road / East West Collector Road / Lawson Road Upgrades

- Further to Part 1, access to the site is proposed to be constructed concurrently as follows:
 - Part 2 – Access from the Martin Road / Elizabeth Drive intersection will continue down Martin Road and join the future East / West Collector Road identified within the Precinct Plan through Lot 36 DP 3050.
 - The portion of road between the Intersection and future East / West Collector Road will be upgraded with a temporary access strategy that is consistent with Condition DS5 of the Precinct Plan.
 - Part 3 – The East / West Collector Road through Lot 36 DP 3050 is proposed to be delivered in ultimate form consistent with the Precinct Plan., connecting Martin Road and Lawson Road.
 - Part 4 – From the East / West Collector Road connection on Lawson Road, the portion of Lawson Road South through to the Site will be upgraded in ultimate form consistent with the Precinct Plan.
- The Applicant is currently in discussions with Liverpool City Council ('LCC') to undertake these works on behalf of Council.
- It is expected that these works are completed by December 2029, based on a commencement date of June 2028.

It is the Applicants expectation that the above-mentioned works (Part 1-4) are completed prior to the receipt of the first building Occupation Certificate (expected December 2029).

Notwithstanding the above, the Applicant notes that access to the site under SSD 97711727 will continue to be via Martin Road based on the intersection upgrades completed under MP10_0014.

2 SEARs and Other Agency Requirements

Secretary's Environmental Assessment Requirements (SEARs) for the project are outlined in Table 1. Other agency requirements from Department of Climate Change, Energy the Environment and Water (DCCEE) and NSW EPA are provided in Table 2.

Table 1 Secretary's Environmental Assessment Requirements (SEARs)

Condition/Item	Response
Water – including:	
Identification of any licencing requirements or other approvals under the Water Act 1912 and/or Water Management Act 2000.	An existing Water Access Licence (WAL) 10WA109463 for Lot 2 DP 1278780 and Lot 3 DP 1278780 was transferred to Goodman Western Sydney Pty Ltd on 19 December 2025 and allows a specified annual volume of water take from the Site. This WAL authorises a share component of up to 25 units (nominally equivalent to 25 ML/year) from the Sydney Basin Central Groundwater Source, under water sharing plan for Greater Metropolitan Region Groundwater Sources 2023. Refer to Section 6, 11 and 12 for further detail.
An assessment of the likely impacts on the quality and quantity of existing surface and ground water resources, including a detailed assessment of proposed water discharge quantities and quality against receiving water quality and flow objectives.	An assessment of potential impacts to surface water and groundwater has been undertaken, considering both water quantity and quality under pre- and post-development conditions. The analysis indicates that groundwater level declines associated with excavation will locally reduce baseflow contributions to adjacent watercourses, with impacts largely confined within the defined zone of influence. Surface water flow regimes are not expected to be materially altered beyond this localised reduction in baseflow (refer to Section 11 and 12).
An assessment of the likely impacts of the development on aquifers, watercourses, riparian land, water-related infrastructure, and other water users.	The development has been assessed for potential impacts on aquifers, watercourses, riparian land, water-related infrastructure, and surrounding water users. Predicted groundwater drawdown is localised and not expected to affect regional aquifer function or nearby users. No impacts to water-related infrastructure are anticipated, with all assets located outside the zone of influence. Overall, impacts are expected to be minimal and acceptable with standard mitigation measures in place (refer to Section 11 and 12).

Table 2 Other Agency Requirements (DCCEEW and NSW EPA)

Item	Response
DCCEEW Requirements – Water and Soils	
16. The EIS must map the following features relevant to water and soils including:	
Groundwater.	Details on the groundwater conditions are provided in Section 7, associated Figures and Appendices
Groundwater dependent ecosystems.	A review of the BoM GDE Atlas identified high potential terrestrial GDEs (Cumberland River Flat Forest) along Badgerys Creek and South Creek within the site, and a high potential aquatic GDE associated with South Creek. None of these mapped GDEs are listed in the Greater Metropolitan Region Groundwater Sources Water Sharing Plan (2023). Overall, GDEs are limited to creek alignments at the site margins (refer to Section 9 and Appendix E).
17. The EIS must describe background conditions for any water resource likely to be affected by the development, including existing surface and groundwater.	Details on the groundwater conditions are provided in Section 7, associated Figures and Appendices
NSW EPA – Groundwater	
Provide details of the project that are essential for predicting and assessing impacts to groundwater with a description of the existing environment, including:	
a. Geological, topographical, and hydrogeological resource descriptions, maps, and cross sections.	Explanations of the geological and hydrogeological conditions present at the site are provided in detail in Section 7.
b. Assessment of groundwater quality, users of groundwater, existing bores including depths and construction, assessment of local land use.	Consideration of groundwater quality, environmental conditions and existing groundwater stakeholders are provided in Section 7 to 9.
c. A hydrogeological interpretation of water-bearing geological units, depth to water table, groundwater gradient, Conceptual hydrogeological model, assessment of groundwater dependent ecosystems.	Conceptual hydrogeological model is developed through Section 7 to 9 and summarised in Section 10, with cross sections.
d. Site map and cross-sections showing and characterising any proposed excavations and spoil emplacement (relative to water table) with topography.	Site map and cross sections detailing bulk earthworks excavation interception with the water table is provided in Section 10 and 11 and Appendix F.
e. Proposed groundwater monitoring program.	A groundwater monitoring programme has been proposed for groundwater take, level and quality cross the site during bulk earthworks duration. Refer to Section 13.

Item	Response
f. Assessment should be in accordance with Groundwater assessment toolbox for major projects in NSW - Overview document (DPE, 2022)	This Groundwater Assessment Report has been prepared in accordance with the "Groundwater assessment toolbox for major projects in NSW" guidance and the relevant SEARs.

3 Objectives and Scope of Works

3.1 Objectives

The primary objectives of this assessment are to identify and describe groundwater conditions within the project site boundary, and to identify and describe any groundwater interactions or interference activities resulting from Bulk Earthworks and Rehabilitation Works associated with SSD-97711727. This includes the following, in accordance with the SEARS:

- An assessment of the likely impacts on the quality and quantity of existing groundwater resources
- An assessment of the likely impacts of the development on aquifers, watercourses, riparian land, water-related infrastructure, and other groundwater users
- Consideration of any impacts to land adjoining the site, including in relation to groundwater quality
- A detailed description of the proposed groundwater management system, groundwater monitoring program and other measures to mitigate groundwater impacts

This assessment focuses specifically on the impacts on aquifers, watercourses, water resource, and groundwater users arising from potential project derived changes to groundwater levels.

3.2 Scope of Works

The scope of works undertaken to address the project objectives have included a desktop assessment (including already available groundwater level and quality data), several groundwater monitoring events to establish site wide groundwater levels and hydraulic testing of wells to determine aquifer hydraulic properties and used to define potential impacts resulting from Bulk Earthworks, Rehabilitation and Quarrying works associated with SSD-97711727.

4 Site Description

The Site is identified as 225-245 Martin Road Bradfield. The key features of the Site are outlined in Table 3. A site map is provided in Figure 1.

Table 3 SSD-97711727 Site description

Description	Site Detail
Land Configuration	Lot 1 DP 1278780 Lot 2 DP 1278780 Lot 3 DP 1278780 Lot 55 DP 3050 Lot 56 DP 3050
Existing Land Use(s)	The Site is currently an operational Quarry and historically had a Brickmaking Facility. The structures and hardstand areas used for the quarry operations are located in the central portion of the Site, connected by an internal road network. In addition, three pits are located along the southern and southeast portion of the Site.
Surrounding Land Use	Surrounding land uses include: North: Land to the north is predominantly characterised by a mix of rural, agricultural, landscape industries and, residential properties accessed by Lawson and Martin Roads. It is noted that several sites are subject to existing SSDAs for industrial / warehouse developments. Both Martin and Lawson Roads intersect with Elizabeth Drive, a major Arterial Road that provides access to the Western Sydney International (WSI) Airport and the broader regional road network including the M7, Northern Road and the future M12. South: The land to the south is currently rural however is subject to the IPG Master Plan which was approved on 11 July 2025. The approved Master Plan covers 184 hectares and aims to support over 12,400 jobs. Inghams Property Group has allocated around 625,467 sqm. for employment space, focusing on advanced manufacturing, logistics, and community services. The plan includes a mix of industrial and commercial zones, a local centre, and accessible public green spaces near the Western Sydney International Airport. Further to the south-west of the, is Bradfield City Centre, a 114-hectare planned urban development adjacent to WSI Airport. Designed to be a hub for innovation, advanced industries, and economic growth, it has the potential to create 20,000 jobs and provide 10,000 homes, including affordable housing. The Bradfield City Master Plan prioritises sustainability, integrating green spaces, climate-resilient infrastructure, and a commitment to achieving net-zero emissions. East: Further east of the Wianamatta-South Creek which bounds the site, is the suburb of Kemps Creek. This land is characterised by a mix of open space, rural, agricultural, emerging urban development, and residential

Subject Site

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500 M

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5 Proposed Development – Earthworks

5.1 Existing Conditions and Site Operations

The Site has historically been used for quarrying, including clay and shale extraction to obtain the raw materials for both on-site and off-site brick making operations. Operations are currently ongoing.

Key features of the current Site operations include the following:

- Three main quarry pits
- Material stockpiles
- Sediment basins
- Farm dams
- Brickmaking facilities
- Supporting infrastructure such as roads and truck wash areas

Operations have been conducted under Mining Lease 1771 (valid until 2031), a groundwater access licence, and an environmental protection licence, with management of pit water and runoff in accordance with approved soil and water management plans. Rehabilitation strategies are in place to progressively stabilise stockpiles and backfill quarry pits using Virgin Excavated Natural Material (VENM), Excavated Natural Material (ENM), and tunnel spoil meeting the Environment Protection Authority (EPA) criteria, ensuring the Site will be suitable for future uses once quarrying ceases, as required by relevant approvals and lease conditions.

5.2 Pre-developed Geotechnical Conditions

Details of the pre-developed geotechnical conditions for the site are described in the Bulk Earthworks, Rehabilitation and Quarrying – Civil Engineering Report (MAR-AAP-DA-R02-RPT-CV-0002).

5.3 Site Stripping

Prior to placement of approved fill, the Site is to be cleared of all unsuitable material in accordance with 234411.00.R.003 (Earthworks Specification) prepared by Douglas Partners, including but not limited to:

- Soils with high silt content
- Vegetation or organic matter
- Existing fill (stockpiled material, existing in-situ fill or similar)
- Any foreign objects, scattered or buried waste, or dumped materials (if present)
- Contaminated soil (if present)
- Unsatisfactory or excessively wet soils

5.4 Quarry, Dams and Temporary Basin Dewatering

All existing quarry floors, dams and temporary basins are to be drained, desilted and deconstructed in accordance with 234411.00.R.003 (Earthworks Specification) prepared by Douglas Partners and the Dam Dewatering Plan, prepared by SLR. Details of these works are summarised below.

The following general procedure forms the minimum requirements:

- All existing ponded waters are to be pumped out or otherwise drained to a discharge area that is located at least 50 m away from any existing waterway, or as otherwise required by Liverpool City Council (LCC).

- All vegetation and other deleterious material (such as saturated silt and clay) is to be excavated to expose the underlying stiff clay, weathered rock or unaffected underlying previously approved fill.
- All existing dam and basin walls formed in fill are to be removed.
- The exposed surfaces are to be benched to a near-horizontal surface (<10% grade) prior to fill placement.
- Exposed surfaces are to be proof rolled with six passes of a 12-tonne dead weight roller operating in static mode, with the final pass undertaken in the presence of the Geotechnical Consultant or Geotechnical Inspection and Testing Authority (GITA) (as delegated by the Geotechnical Consultant) in order to identify areas requiring additional work.
- Saturated 'organic' soils from the dam and basin sides and base can be spread out and dried at a suitable location away from the general fill placement area. Once dried the material can be blended with other suitable granular fills (ripped rock) at a ratio of 1 in 20 (i.e. maximum 5% organic soils) and mixed into the lower fill layers. Organic soils are to be stripped of vegetation and significant roots prior to blending.
- Any saturated 'non-organic' soils can be spread out and dried. Once moisture conditioned the material can be blended with other suitable fills (clays and ripped rock) at a ratio of 1 in 5 (i.e. maximum 20% non-organic soils) and used as engineered fill below a depth of 3 m below finished bulk earthworks level (BEL).

5.5 Existing Stockpiles and Uncontrolled Fill

Management of existing stockpiles and uncontrolled fill is to be in accordance with 234411.00.R.003 (Earthworks Specification) prepared by Douglas Partners. Details of these works are summarised below.

All existing stockpiles and uncontrolled fills on site, including materials such as ripped shale, sandstone, and clay-based soils, are subject to progressive assessment to determine their suitability for reuse as engineered fill. Approved materials may be used following processes such as particle size breakdown and moisture conditioning. All unsuitable materials, including those with high silt or organic content, contamination, or excessive moisture, must be identified through geotechnical and environmental assessments and either disposed of offsite or managed in accordance with strict controls (such as encapsulation cells) if retained onsite. Suitable site-won soils may be blended with other granular materials to meet required fill standards before placement, while ongoing blending and conditioning are used to produce uniform and compliant fill materials for construction. Refer to 234411.00.R.003 (Earthworks Specification) for further details.

5.6 Over Excavation Works

Over excavation of existing quarry batters are to be conducted in accordance with 234411.00.R.003 (Earthworks Specification) prepared by Douglas Partners. Details of these works are summarised below.

Where the placement of fill is undertaken within an existing quarry, the lower layers of fill are to be placed directly against the inclined quarry batters following preparation and stripping in accordance with Section 5.3. At the lower layers of fill, horizontal benching and 'keying in' of the fill layers is restricted by the presence of higher strength in situ rock. As rock strengths reduce within the upper reaches of the quarry batters, horizontal benching is achievable, and the extent of the fill is to be extended beyond the quarry batter to step the fill / batter interface and thus provide an appropriate seal against moisture ingress from the fill surface to the quarry base.

Once the surface of the fill reaches a level equal to the top of low strength rock, the quarry batters shall be laterally over-excavated to create a level bench of a minimum 6 m width. Over-excavation will be required on all sides of all quarries, unless otherwise advised by the Geotechnical Consultant following a detailed review

of final project earthworks drawings. Over-excavation is to be completed in accordance with the following methodology:

- The Earthworks Contractor is to advise the Superintendent and Geotechnical Consultant when the fill surface is nearing the top of low strength rock.
- The Geotechnical Consultant is to inspect the site and provide a report advising the appropriate benching levels and extent along the quarry perimeter.
- The Earthworks Contractor is to provide suitable plant to site and is to excavate a level bench of at least 6 m width along the required perimeter of the quarry.
- The batter faces created in rock above the bench is to be battered to a temporary grade of 1H:1V.
- The batter faces created in soil above the bench is to be excavated to a temporary grade of 2H:1V by cutting 1.2m wide additional horizontal benches at 0.6 m height intervals (i.e. at every second fill layer) as the fill height increases.
- All excavated natural material is to be re-used as fill after approval for re-use is obtained.
- All new fill layers are to be keyed into the new batter profiles during placement and compaction.

5.7 Bulk Earthworks

All bulk earthworks shall be undertaken in accordance with 234411.00.R.003 (Earthworks Specification) prepared by Douglas Partners.

5.7.1 Developable Lot Pads

The bulk earthworks design includes the provision of developable pads for the 14 proposed lots. The developable lot pad earthworks levels are designed to minimise the volumes of earthworks required to bring the design to finished floor levels at the On-lot design stage, whilst providing a graded pad of no less than 0.5% fall to the adjacent erosion and sediment control swales. Detailed trimming of earthworks and finalisation of levels is proposed to occur under SSD 97688711. Each lot will include its own erosion and sediment control basin and diversion channels.

5.7.2 Active Open Spaces

The bulk earthworks design includes the provision of a graded pad for the proposed active open spaces area, provided as part of the Estate and On Lot works package. The earthworks levels are designed to minimise the volumes of earthworks required to bring the design to finished levels at the Estate and On-lot design stage. The open spaces area will include its own basin and diversion channels.

5.7.3 Erosion and Sediment Control Basins and Diversion Channels

Erosion and sediment control basins and diversion channels are provided throughout the Site, in accordance with the strategy outlined in the Bulk Earthworks, Rehabilitation and Quarrying Surface Water Impact Assessment provided by Engeny. The earthworks for each basin allows for sediment settling and storage zone volumes in accordance with that specified in the Bulk Earthworks, Rehabilitation and Quarrying Surface Water Impact Assessment, as well as a minimum of 750 mm freeboard. Diversion channels are provided throughout the Site to enable conveyance of the dirty water from construction works to the basins.

6 Regulatory and Approvals Frameworks – SSDs – Groundwater

6.1 Water Management Act

The Water Management Act 2000 (NSW) (WMA) provides the legislative framework for the sustainable and integrated management of the State's water resources, including groundwater.

For State Significant Development (SSD) projects, the WMA requires that groundwater extraction, including incidental take associated with aquifer interference activities (e.g. construction dewatering, mine inflow, or excavation), is appropriately authorised and accounted for. This typically involves obtaining a Water Access Licence (WAL) to cover the volume of water taken from a groundwater source, unless a specific exemption applies. A WAL is generally required regardless of whether the extracted water is used consumptively or managed on-site or discharged.

While certain approvals under the WMA (such as water supply work approvals and water use approvals) may be addressed through the SSD assessment and approval process, or may not be required separately where incorporated into development consent, groundwater take itself remains subject to licensing requirements under the WMA.

A WAL provides a legal entitlement to a share of water from a specified groundwater source (defined by the relevant Water Sharing Plan), ensuring that total extraction remains within the resource limits established for that source. The volume of groundwater take requiring licensing must be predicted, justified, and assessed in the Environmental Impact Statement (EIS), including consideration of both peak and cumulative take over the life of the project.

A WAL secures a legal entitlement to a share of water from the specific groundwater source (known as the Water Sharing Plan area), ensuring the total extraction remains within the resource limits set by the relevant Water Sharing Plan (WSP). The volume of water that needs to be licensed must be predicted and justified in the Environmental Impact Statement (EIS). A WAL exemption may be applicable where groundwater take is less than 3 ML/year.

An existing Water Access Licence (WAL) 10WA109463 for Lot 2 DP 1278780 and Lot 3 DP 1278780 was transferred to Goodman Western Sydney Pty Ltd on 19 December 2025 and allows a specified annual volume of water take from the Site. This WAL authorises a share component of up to 25 units (nominally equivalent to 25 ML/year) from the Sydney Basin Central Groundwater Source, under water sharing plan for Greater Metropolitan Region Groundwater Sources 2023.

6.2 New South Wales Aquifer Interference Policy

The New South Wales Aquifer Interference Policy (AIP) is a state-wide policy established under the Water Management Act 2000 to ensure the equitable sharing of water and the proper assessment and licensing of water taken by "aquifer interference activities."

An aquifer interference activity is broadly defined to include the penetration of an aquifer, interference with its water or flow, or the taking of water in the course of mining, extraction, or other large projects (like dewatering for construction).

For SSD projects, the AIP is crucial as it establishes "minimal impact considerations" for both groundwater quantity (availability for other users and ecosystems) and quality. Proponents must demonstrate, through their

EIS, that both the construction and operation of the project will meet these minimal impact criteria on water-dependent assets and other water users.

The policy also mandates the required licensing for any water take (incidental or consumptive) that occurs during the whole life of the project, including post-closure (e.g., perpetual void inflow).

6.3 Major Projects Groundwater Toolkit and Guidelines

This toolkit, provided by the NSW Government (often Department of Climate Change, Energy, the Environment and Water), is a set of overarching and technical guidelines specifically designed to help proponents of SSD and State Significant Infrastructure (SSI) prepare comprehensive and compliant groundwater assessments. The toolkit's purpose is to ensure that proposed activities comply with the Water Management Act 2000 and the NSW Aquifer Interference Policy. It includes:

- **Guideline for Groundwater Documentation for SSD/SSI Projects:** Outlining the necessary content and structure for the groundwater impact assessment section of the EIS. Key requirements of this guideline include:
 - Defining the geological units and groundwater sources (aquifers)
 - Identifying all Water Dependent Ecosystems (WDEs), including rivers, wetlands, and vegetation, that rely on the groundwater source
 - Mapping all existing groundwater users (bores, wells) within the area of influence, and
 - Determining the predicted maximum volume of water take and the required Water Access Licence (WAL) volume.
- **Minimum Groundwater Modelling Requirements for SSD/SSI Projects:** Setting the technical standards for groundwater modelling used to predict impacts during both construction and operation, ensuring the models are robust and scientifically defensible. Key requirements of this guideline include:
 - Model Conceptualisation: Defining the system and its boundaries accurately
 - Model Calibration and Validation: Demonstrating that the model accurately reflects real-world groundwater behaviour
 - Predictive Scenarios: Running scenarios for both construction (dewatering) and long-term operation/closure to forecast the extent and magnitude of groundwater drawdown and water quality changes
- **Cumulative Groundwater Impact Assessment Approaches:** Guiding the proponent on how to assess the combined effect of their project with other existing and future developments, a critical requirement for projects with long construction or operational phases. Key requirements of this guideline include:
 - Quantifying the total impact of all major activities on the groundwater resource, ensuring the cumulative impact does not breach the long-term limits established by the Water Sharing Plans (WSPs).

6.4 Minimum Requirements for Building Site Groundwater Investigations and Reporting

While covering all building sites, this guideline is relevant for SSD urban construction projects involving deep excavations that intersect groundwater. This document sets the minimum standards for site investigation, reporting, and monitoring bore installation to properly characterise the groundwater system. The key requirements of this guideline include:

- Establishing baseline conditions:
 - Installing monitoring bores
 - Collecting baseline data on groundwater level and quality

- Defining and quantifying impacts:
 - Developing a conceptual hydrogeological model
 - Quantifying water take
- Assessing and managing risks:
 - Completing an Impact assessment
 - Compliance with AIP criteria
 - Preparing a dewatering management plan
- Post construction:
 - Completion report

This guideline is designed to ensure all necessary hydrogeological data is collected and reported accurately for projects involving excavation below the water table.

7 Groundwater Conditions

7.1 Climate

The Site has a temperate climate with warm to hot summers and cool winters. Rainfall and evaporation data for the Site was sourced from Bureau of Meteorology (BoM) Orchard Hills Treatment Works station (067084) located 10 km northwest of the site, and the Synthetic Information for Landholders (SILO) database. The SILO database interpolates raw rainfall and evaporation data from gauges managed by the Bureau of Meteorology (BoM) to provide spatially and temporarily complete datasets for site specific locations. Rainfall and evaporation (Morton's shallow lake evaporation) data was sourced for the SILO grid point closest to the Project (-30.60 latitude and 151.90 longitude), for the period between 01/01/1889 to 31/12/2024.

Annual rainfall and evaporation statistics from the BOM weather station and the SILO database are summarised in Table 4, and the daily and monthly average rainfall and pan evaporation depth presented in Figure 2. The data indicate that pan evaporation exceeds rainfall nine-months of the year. Annually rainfall contributing to recharge is therefore likely to be focused between April/May and July/August.

Table 4 Annual rainfall and evaporation statistics

Statistic	Orchard Hills Treatment Works (067084) - Annual Rainfall depth (mm)	SILO data base - Annual Rainfall depth (mm)	Annual Mortons Lake evaporation depth (mm)
Mean	857	751	1293
10 th percentile	537	469	1235
90 th percentile	1112	1026	1351

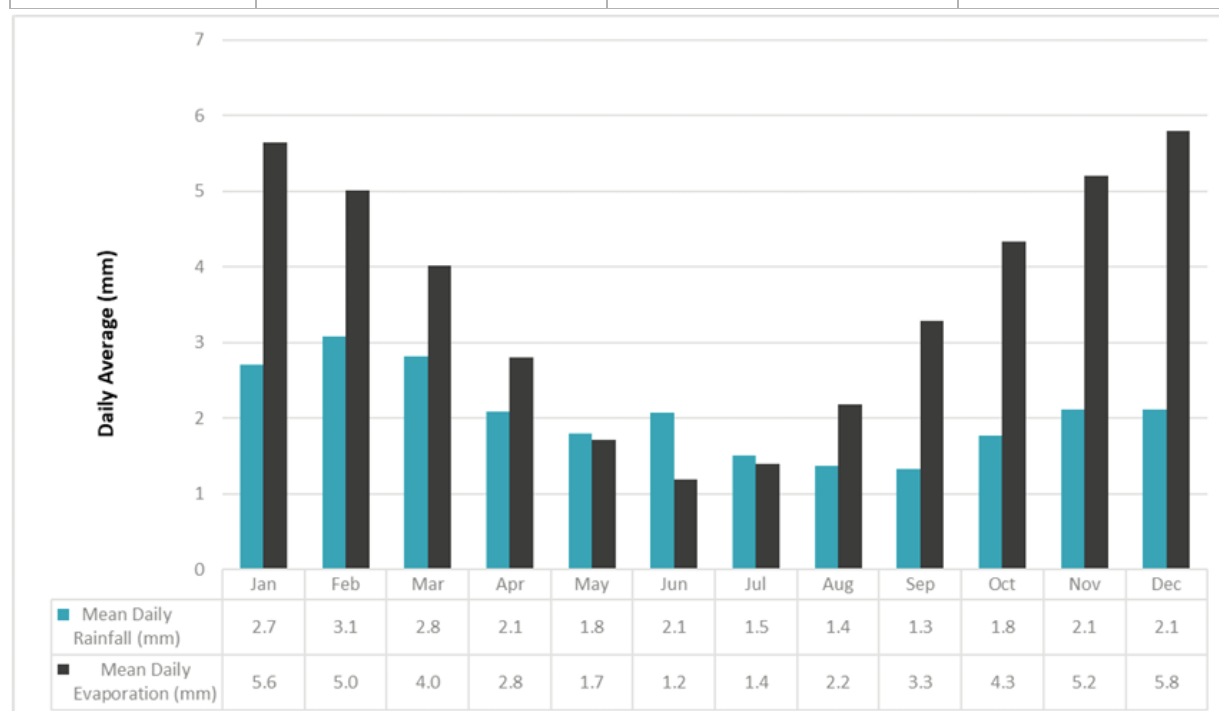


Figure 2 Monthly average rainfall and Mortons lake evaporation (SILO, 1989 – 2024)

7.2 Hydrogeology

7.2.1 Soil and Geology

The Site is located in the Upper South Creek (Sydney Basin Sediments) Hydrogeological Landscape (HGL). This HGL is characterised by low hills on Triassic shale and sandstone within the Sydney Basin at Badgerys Creek and Catherine Field. It is an area of moderate to high rainfall (~800 mm) located in the centre of the Western Sydney region.

The HGL is underlain by Triassic sedimentary rocks from the Wianamatta Group. The major unit is the Bringelly Shale, with minor Ashfield Shale and Minchinbury Sandstone. These are primarily composed of shale, carbonaceous claystone, laminite, lithic sandstone, and rare coal. A shallow weathered zone of Bringelly Shale is typically present up to 4 m below ground surface. Weathered material is described to be silty CLAY and CLAY.

Soils across the landscape are complex, forming part of the Blacktown, Second Ponds Creek, and South Creek Soil Landscapes. Common soils on the low hills and rises (Blacktown SL) are Sodic Red and Yellow Kurosols (Red/Yellow Podzolics). The footslopes and plains (Second Ponds Creek SL) have Brown and Yellow Sodosols (Soloths) and Chromosols, while the floodplains (South Creek SL) consist of deep layered alluvial sediments. A map of the site geology is presented in Figure 3.

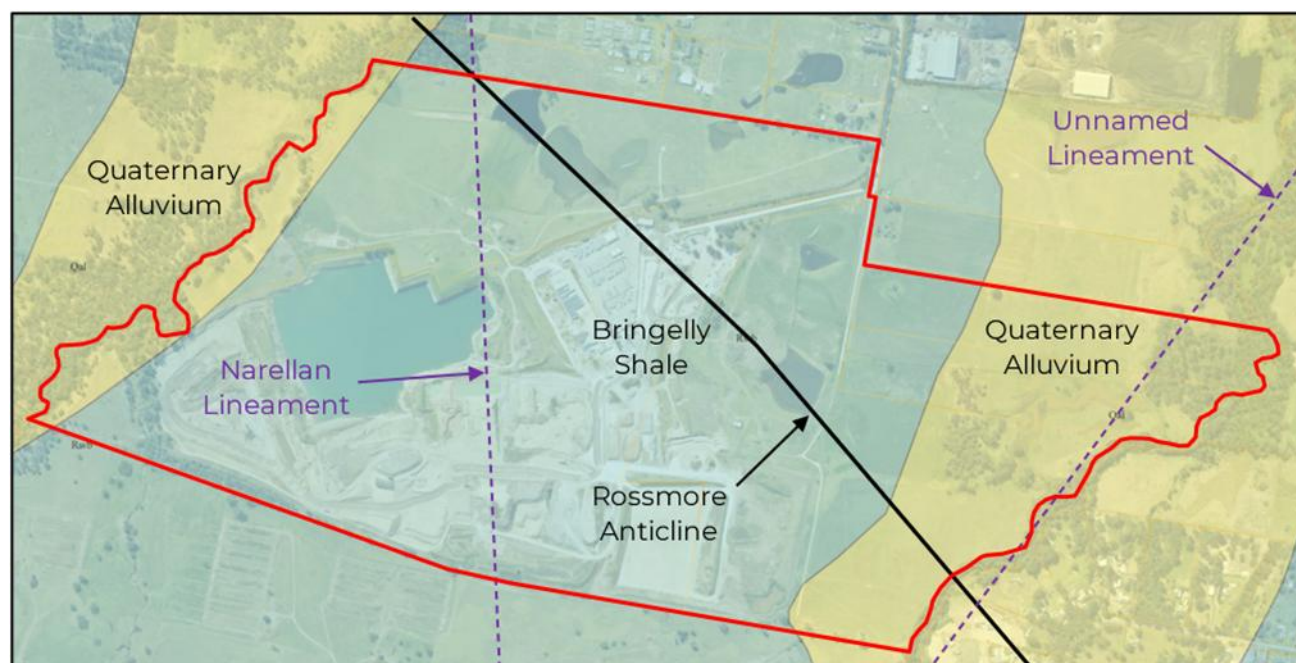


Figure 3 Geological Map

7.2.2 Aquifer Units

Groundwater occurs in two distinct systems: an unconfined fractured rock aquifer within the Wianamatta Group bedrock (Bringelly Shale) and a shallow unconfined alluvial aquifer in the sediments along creek lines. While the Wianamatta Group shales are generally considered leaky aquitards due to their fine-grained nature, they contain "scattered zones" of fracture porosity and perched aquifers within the weathered profile. The alluvial aquifer consists of unconsolidated sands, silts, and clays deposited along current streams, which can allow for lateral groundwater flow.

The Minchinbury Sandstone is present at significant depths beneath the Wianamatta Shale. Where the Bringelly Shale cap is thickest, the sandstone may be encountered at depths of 20 m to 60 m below ground level. The Minchinbury Sandstone is considered a minor aquifer with yields typically <1 L/s and is commonly used for stock watering. It's high salinity generally limits its use for irrigation and domestic water supply.

7.2.3 Groundwater Recharge

Groundwater recharge is estimated to be moderate within this HGL, driven by the interaction between vegetation water use and soil properties. Recharge is generally "diffuse" (occurring over broad areas) but is limited by the low permeability of the heavy clay soils. Studies suggest that recharge into these Permian-Triassic shale units can be as low as <1% to 5% of long-term rainfall. However, land use changes, such as the clearing of deep-rooted vegetation or the creation of urban impervious surfaces that channel water into leaking pipes or trenches, can significantly alter this balance, causing water tables to rise and mobilising stored salts.

7.2.4 Hydraulic Conductivity

The hydraulic conductivity of the aquifer units is classified as moderate, with the HGL report citing a range of 10^{-2} m/day to 10 m/day. This range accounts for the secondary porosity (fractures) and alluvial materials. In contrast, the intrinsic permeability of the fresh, unfractured Wianamatta Bringelly shale matrix is extremely low, often reported in the range of 10^{-9} m/s to 10^{-7} m/s (10^{-4} m/day), effectively acting as an aquiclude. Consequently, significant groundwater yields are rare and restricted to fractured zones.

Figure 4 is an extract of suggested guidelines for attaching ranges of hydrogeological parameters for Shales in the Sydney Region (Pells, Mostyn, Bertuzzi, & Wong, 2019). The figure provides mass hydraulic conductivity ranges for weathering grades I (fresh rock) to V (extremely weathered). Typically, Class II and III shales have closer defect/fracture spacing, such that the hydraulic conductivity is fracture dominated, and greater than Class I. Whereas at the far end of the scale, Class V material contain zones of highly and extremely weathered rock with associated increase in clay content, and clays along bedding seams and in joints. The result is a decrease in hydraulic conductivity compared with Class II and III, and in increase in compressibility and decrease in drainable storage (specific yield).

Class	Mass Young's Modulus	Mass Hydraulic Conductivity	Mass Poisson's Ratio	Total Porosity	Drainable Storage
	MPa	10^{-7} m/sec		%	%
I	2000 to 3000	0.01 to 0.1	0.15 to 0.2	4 to 8	1 to 3
II	700 to 2000	0.1 to 0.5	0.15 to 0.2	5 to 10	2 to 4
III	200 to 1200	0.5 to 1	0.2 to 0.25	10 to 15	3 to 6
IV	100 to 500	0.05 to 0.5	0.2 to 0.3	10 to 20	2 to 4
V	50 to 300	0.01 to 0.08	0.2 to 0.3	15 to 25	2 to 4

Figure 4 Representative values of hydraulic conductivity for Shales (Wianamatta Group) in the Sydney region (Pells, Mostyn, Bertuzzi, & Wong, 2019)

Historical slug testing (also known as falling or rising head test) completed in 2018 at six groundwater monitoring wells screened within the Bringelly Shale derived hydraulic conductivity values ranging from 3.6×10^{-8} m/s to 1.1×10^{-7} m/s (Groundwater Exploration Services, 2019).

As part of the recent Arcadis investigation phase, nine shallow groundwater wells were installed across the Site to target the upper Bringelly Shale aquifer and residual soils (further well installation details provided in Section 7.3.1 and borehole logs provided in Appendix A).

Slug tests were undertaken at four monitoring wells between 01/06/2026 and 02/06/2026 by an Arcadis hydrogeologist, using a 1.94 m long solid PVC "slug" to displace a volume of water in the well(s). Water level recovery data collected from the slug testing was analysed using proprietary software AQTESOLV Pro to estimate representative hydraulic conductivity (K) values at each well using a number of empirical methods for unconfined aquifers. The analysis results are summarised in Table 5 and presented in Appendix B, together with historical slug testing results.

Table 5 Hydraulic conductivity values derived from slug tests

Well ID	Screened lithology	Test	Solution	K (m/s)	Adopted K value (m/s)	Comments
BH01	Siltstone / Shale	FHT1	KGS (1994)	5.1×10^{-7}	4.4×10^{-7}	Test repeated with consistent K values. Each test duration was approximately 1 hour. Likely that the well screen encountered greater fracture density than other wells, resulting in a higher K.
		RHT1	KGS (1994)	4.2×10^{-7}		
		FHT2	KGS (1994)	4.3×10^{-7}		
		RHT2	KGS (1994)	4.1×10^{-7}		
BH03	Shale	FHT1	KGS (1994)	1.1×10^{-7}	1.1×10^{-7}	Due to time constraints on site, test could not be repeated. Test duration approx. 1.5 hours.
BH05	Siltstone	FHT1	Bouwer-Rice (1976)	1.1×10^{-8}	1.1×10^{-8}	Very slow recovery – test was terminated after 4.5 hours due to site time constraints. Test not repeated due to very low K
BW2A	CLAY / Shale	FHT1 (2026)	Bouwer-Rice (1976)	5.8×10^{-8}	5.8×10^{-8}	Very slow recovery – test was terminated after 3.5 hours due to site time constraints. Test not repeated due to very low K
		FHT (2018)	Bouwer-Rice (1976)	7.5×10^{-8}	7.5×10^{-8}	
BW2B	Shale	FHT (2018)	Hvorslev (1995)	3.4×10^{-8}	3.4×10^{-8}	Hydraulic conductivity values reported in Groundwater Assessment Report for CSR (Groundwater Exploration Services, 2019)
BW3	Shale	FHT (2018)	Hvorslev (1995)	7.5×10^{-8}	7.5×10^{-8}	
BW4A	CLAY / Shale	FHT (2018)	Bouwer-Rice (1976)	4.9×10^{-8}	4.9×10^{-8}	
BW4B	Shale	FHT (2018)	Hvorslev (1995)	1.1×10^{-7}	1.1×10^{-7}	

Well ID	Screened lithology	Test	Solution	K (m/s)	Adopted K value (m/s)	Comments
BW5A	Shale	FHT (2018)	Bouwer-Rice (1976)	5.0×10^{-8}	5.0×10^{-7}	

Slug test results indicates that hydraulic conductivity values at the tests wells vary by approximately one and half orders of magnitude, from 1.1×10^{-8} m/s to 5.0×10^{-7} m/s. The variability reflects the heterogeneous nature of the Bringelly Shale, where differing degrees of weathering and fracture development influence groundwater flow. The in situ hydraulic conductivity results are generally consistent with the literature values presented in Figure 4, with most results falling within the range expected for Class II/III shale.

Adopted hydraulic conductivity values for the Bringelly Shale at the Site have been derived from statistical analysis of the adopted K values for each well as follows:

- Lower bound (20th percentile) = 3.7×10^{-8} m/s
- Characteristic (geomean) = 6.5×10^{-8} m/s
- Upper bound (80th percentile) = 1.1×10^{-7} m/s

7.3 Groundwater Levels and Flow

7.3.1 Monitoring Network

Nine shallow groundwater wells were installed during the most recent Arcadis investigation phase to target the upper Bringelly Shale aquifer and residual soils. These wells supplement the existing monitoring wells installed in 2016. A map of the groundwater monitoring network is provided in Appendix C.

Recent groundwater level monitoring undertaken by Arcadis comprised up to five rounds of manual gauging and 12 weeks of continuous logger monitoring at one-hour intervals. The groundwater monitoring network relevant to these investigations is summarised in Table 6. This monitoring was undertaken to inform design development and assess potential risks associated with bulk earthworks intersecting groundwater at the Site.

Table 6 Groundwater Monitoring Network

ID	Easting	Northing	Surface Elevation (m AHD)	Depth (m bgl)	Response Interval (m bgl)	Screened description	Aquifer Unit
BH01	292792.7	6247309.5	60.3	5.8	1.0 - 5.8	Siltstone/Shale	Bringelly Shale
BH02	292415.6	6246578.2	64.9	6.6	1.0 - 6.5	Silty CLAY	Residual soil
BH03	292648.8	6247089.5	64.7	9.1	2.3 - 9.0	Siltstone/Shale	Bringelly Shale
BH04	292926.1	6246696.3	56.1	5.5	1.0 - 5.4	Siltstone	Bringelly Shale
BH05	292456.4	6247524.5	62.6	5.4	3.0 - 6.3	Siltstone	Bringelly Shale

ID	Easting	Northing	Surface Elevation (m AHD)	Depth (m bgl)	Response Interval (m bgl)	Screened description	Aquifer Unit
BH06	291878.4	6246672.7	67.7	6.1	1.0 - 6.0	Silty CLAY / Siltstone	Residual soil / Bringelly Shale
BH07	291674.9	6246772.0	69.4	6.5	1.0 - 6.5	FILL / CLAY	FILL / Residual soil
BH08	292121.4	6247263.3	64.5	4.6	0.5 - 5.0	CLAY / Siltstone	Residual soil / Bringelly Shale
BH09	293354.8	6247102.9	47.2	5.0	1.0 - 5.1	Alluvial CLAY	Quaternary Alluvium
BW1A	291741.0	6247174.0	56.1	6.3	4.0 - 7.0	CLAY / Shale	Bringelly Shale
BW2A	292792.7	6247309.5	60.3	8.0	5.0 - 8.0	CLAY / Shale	Bringelly Shale
BW2B	291914	6247440	56.4	33.0	27.0 – 33.0	Shale	Bringelly Shale
BW5A	293098	6246559	46.6	8.0	5.0 – 8.0	CLAY / Shale	Bringelly Shale
BW5B	291914	6247440	46.5	33.0	27.0 – 33.0	Shale	Bringelly Shale

7.3.2 Groundwater Levels

The depth to the water table is classified as intermediate, typically ranging between 2 m and 6 m below ground level. In lower-lying areas of the landscape, the water table can be close to the surface, creating a high hazard for waterlogging and dryland salinity.

A summary of the groundwater level statistics from Arcadis' monitoring is provided in Table 7, and a hydrograph presenting both logger and manual gauging data is provided in Figure 5. Manual gauging data is provided in Appendix D1.

Table 7 Groundwater Level Summary Statistics

ID	No. readings	Depth to groundwater (m bgl)			Groundwater elevation (m AHD)		
		Min	Average	Max	Min	Average	Max
BH01	1917	1.44	1.72	2.20	58.11	58.60	58.88
BH02	1917	5.66	5.75	5.87	59.04	59.14	59.24
BH03	1917	4.79	4.95	5.17	59.48	59.71	59.87
BH04	1917	0.74	3.66	4.56	51.56	52.45	55.37

ID	No. readings	Depth to groundwater (m bgl)			Groundwater elevation (m AHD)		
		Min	Average	Max	Min	Average	Max
BH05	1917	2.53	2.89	3.73	58.91	59.76	60.11
BH06	5	Dry			Unknown		
BH07	5	Dry			Unknown		
BH08	1917	0.43	3.39	3.99	60.50	61.11	64.06
BH09	1917	1.02	1.59	1.98	45.20	45.59	46.16
BW1A	2	2.64	2.67	2.70	53.36	53.39	53.42
BW2A	870	1.90	2.07	2.21	54.08	54.22	54.39
BW2B	1	8.2			48.2		
BW5A	1323	3.55	3.66	3.75	42.81	42.90	43.01
BW5B	2	3.05	3.07	3.09	41.10	41.12	41.14

The available groundwater monitoring data shows that groundwater is on average encountered at shallow depths between 1.6 m and 5.8 m from the surface across the site within the unconfined upper Wianamatta Bringelly Shale aquifer. Groundwater elevations (m AHD) approximately follow topographic levels and as such groundwater level gradients closely correspond to topographic gradients. At the BW2 well cluster, groundwater levels recorded in shallow well BW2A and deep well BW2B differ by up to 6 m, also suggesting a vertical hydraulic gradient between the upper and lower Bringelly Shale aquifers and indicating a degree of vertical disconnection.

Anomalous data in response to a significant wet weather event in Mid-January (>150 mm rainfall over 4 days) at BH04 and BH08, where water levels spiked rapidly up to near ground surface level, have been discounted because the data is thought to be caused by waterlogging on heavy clay soils leading to flooding of the borehole standpipe from poorly constructed boreholes (i.e. shallow bentonite seal leaking). During earlier wet weather events, the response to rainfall recharge is very small.

Groundwater levels from 01/01/2026 have been contoured to represent typical groundwater conditions observed across the site during the monitoring period. The contours are shown in Appendix D2.

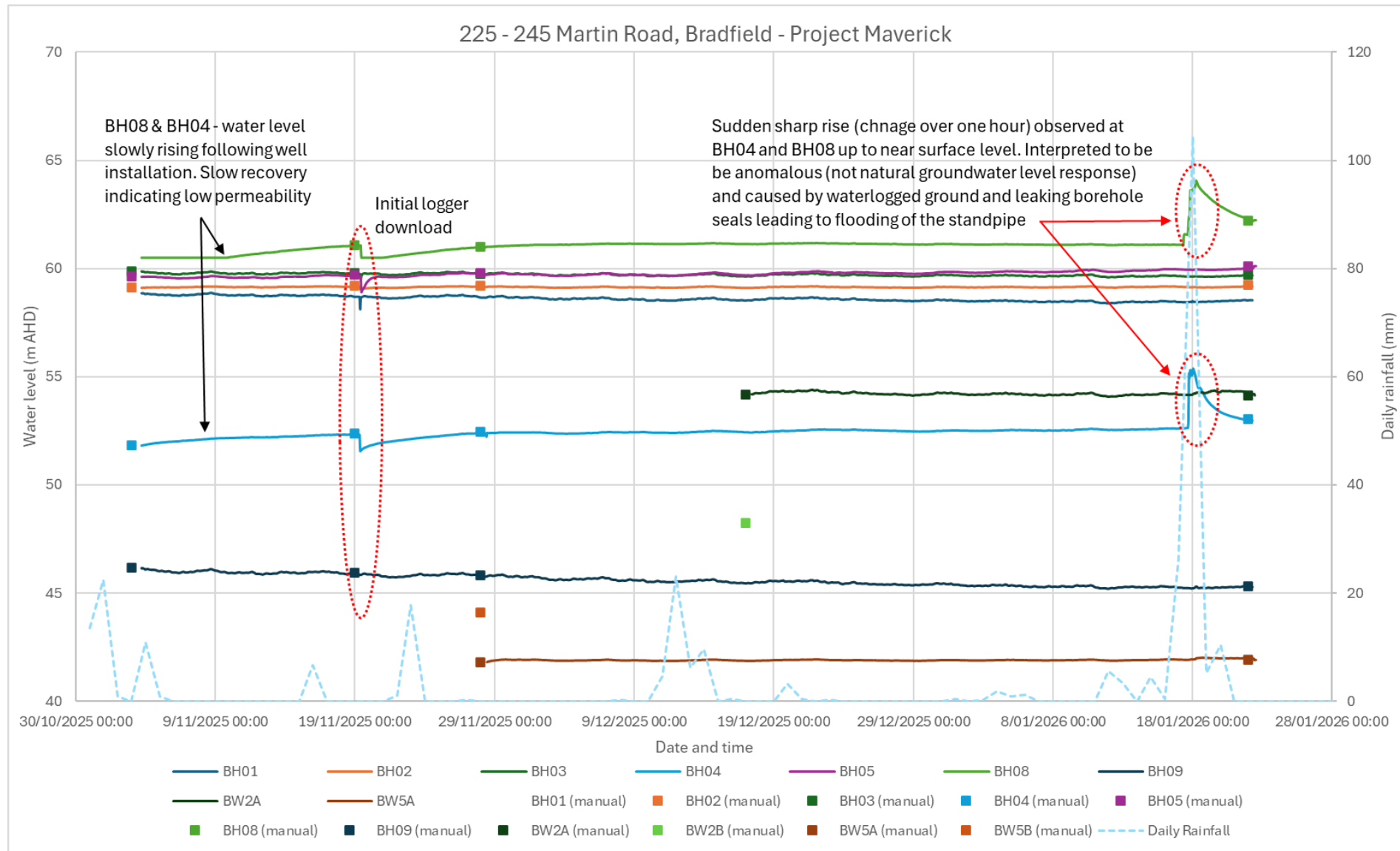


Figure 5 Hydrograph of groundwater monitoring data

During the Arcadis monitoring period the average variation in groundwater elevation was around (0.46 m when removing anomalous data spikes) for most wells. Previous monitoring of shallow wells BW2A and BW4A between 2018 to 2021 recorded declining stable water levels, with a limited seasonal response to rainfall. Groundwater levels across the site respond to longer-term climate cycles rather than shorter term (e.g., <6 month) climate conditions in response to the low permeability of soils and bedrock affecting both recharge and discharge rates causing a lag effect.

In the context of long term climatic cycles, groundwater monitoring data for shallow wells has been plotted alongside the cumulative deviation from mean rainfall (CDMR) to contextualise the observed climate conditions during monitoring (Figure 5). The CDMR trend was declining between 2017 to 2020, which was coincidental with declining water levels at BW2A and BW5A. Since 2024 CDMR has remained stable, indicating that rainfall conditions have been broadly average during this timeframe. As evidenced by previous monitoring at BW2A and BW5A, under sustained negative or positive CDMR conditions, groundwater levels would typically be expected to fall or rise, respectively, in response to changes in rainfall-driven recharge.

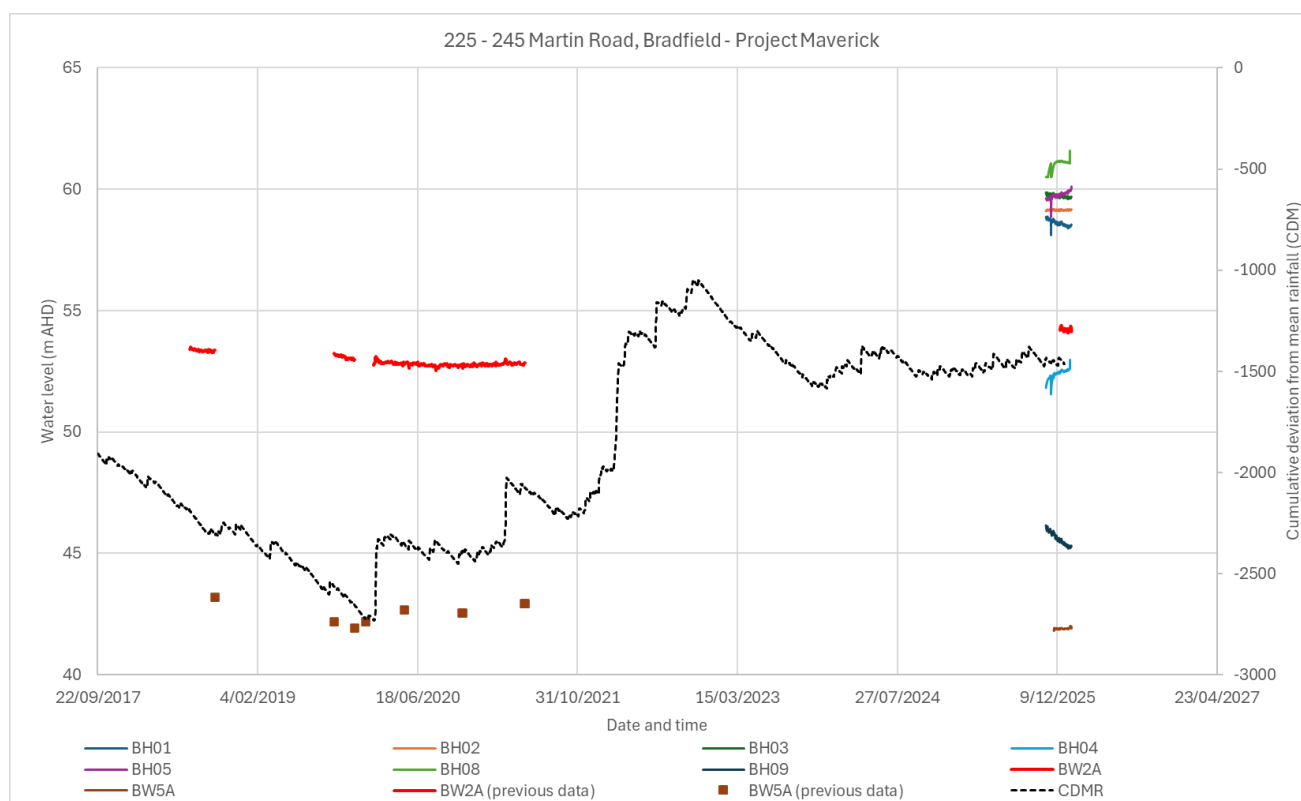


Figure 6 CDMR vs recent observed groundwater levels

7.3.3 Groundwater Flow

Groundwater contours provided in Appendix D2 indicate that groundwater flow in the western portion of the site is towards the west and north (towards Badgerys Creek), while groundwater flow in the eastern portion of the site is to the east and north (towards South Creek). This groundwater catchment divide corresponds with the topographic divide for the site.

The Bringelly Shale groundwater flow systems encountered at the site can be described as local, with relatively short flow lengths of generally less than 5 km. The flow is unconfined and driven by gravity, moving from hill crests towards drainage lines. Water moves laterally through the shale bedding planes and alluvial sediments, and vertically through fractures in the sandstone units. Considerable lateral flow is noted to occur at the interface between shale layers and sandstone units (such as the sandstone-shale interface), which can act as preferential flow paths in an otherwise tight formation.

7.4 Groundwater Quality

7.4.1 Salinity

Groundwater quality is a defining and critical feature of this landscape, characterised as brackish to saline. Electrical Conductivity (EC) typically exceeds 4.8 dS/m (approx. 3,000 mg/L TDS), and in some Wianamatta shale areas, salinity can reach 50,000 mg/L (NSW Department of Climate Change, Energy, the Environment and Water, 2020). The salts are predominantly sodium chloride (NaCl) and are derived from a combination of connate salts (trapped in the marine sediments during deposition) and the accumulation of cyclic salts (aerosols) over millennia.

Groundwater quality monitoring undertaken by JBS&G in 2025 recorded electrical conductivity ranging from 4,213 μ S/cm to 16,258 μ S/cm, which correlate with brackish to moderately saline waters as expected within the shale bedrock and the hydrogeological setting of the site.

7.4.2 Baseline Water Quality and Pollutants

A due diligence site contamination assessment was completed by JBS&G in 2025, which included investigations for groundwater pollutants across the site (JBS&G, 2025):

- Groundwater has a relatively neutral pH (6.77 to 7.56) and ranged from relatively low in oxygen levels to having moderate oxygen levels.
- Groundwater investigation identified free product oil in monitoring well MW101, with laboratory fingerprinting indicating it is likely engine oil.
- PCB concentrations were not detected above laboratory reporting limits. The product is considered likely to be present within more permeable fill and/or fractures in the underlying shale, although further investigation is required to define its extent and recharge behaviour.
- Groundwater sampling from surrounding wells did not identify TRH, VOCs or BTEXN above laboratory reporting limits or adopted assessment criteria.
- Heavy metal concentrations were generally consistent with previous data and below criteria protective of freshwater ecosystems.
- Trace PFAS were detected above the 99% ecological protection guideline values but remained several orders of magnitude below the 95% species protection values and adopted human health recreational criteria. In the context of the limited well network and absence of PFAS in soil, the PFAS detections may reflect a broader regional groundwater condition rather than a site-specific source.

8 Environmental Conditions

8.1 Drainage and Watercourses

8.1.1 Catchment Context and Hydrology

The Site is located within the Wianamatta - South Creek Catchment, which covers an area of approximately 682 km². It is one of the hottest and driest catchments in the Greater Sydney Region.

South Creek is the primary arterial watercourse for the catchment. Historical natural conditions in South Creek comprised a chain of interconnected ponds with an ephemeral flow regime. Today, the flow is effectively perennial (continuous) in many sections, but this is artificial. It is driven by urban stormwater runoff, agricultural return flows, and significant upstream discharges from Sewage Treatment Plants (STPs). Due to the extremely low gradient of the Cumberland Plain, water moves very slowly. This low energy environment promotes the deposition of fine sediments (silts and clays). Despite the slow base velocity, the creek is "flashy" during storms.

The impermeable clay catchment sheds water rapidly, causing sharp peaks in discharge following rain. South Creek is susceptible to "backwater flooding." During major regional floods, the Hawkesbury-Nepean River can back up into the South Creek channel, stalling outflow and causing water levels to rise significantly even without local heavy rain. The creek receives baseflow from the adjacent shale aquifers. This groundwater discharge is naturally saline (often >4.8 dS/m). During dry periods, when surface runoff is low, the proportion of saline groundwater increases, raising the salinity of the creek pools.

Badgerys Creek is ephemeral and therefore flows infrequently during periods of rainfall with pools of water present along the creek during times of no rain (Engeny, 2026). It is fed by numerous small, ephemeral overland flow paths. The headwaters and mid-reaches of Badgerys Creek are currently undergoing massive transformation due to the Western Sydney International Airport construction. The levelling of the site and creation of artificial drainage channels is altering the time of concentration, potentially increasing the speed of runoff reaching the lower creek sections around the site. As it drains the "low hills" of the Bringelly Shale, Badgerys Creek naturally transports high loads of fine clay sediment. This makes the water naturally turbid (cloudy).

The banks of both creeks are composed of dispersive (sodic) clays. They are highly unstable when wet and prone to slumping or erosion if vegetation is removed or if rapid water level changes occur (drawdown). Both creeks act as "salt drains" for the landscape. The HGL report assesses the Salt Export hazard as High. This means both creeks actively transport large volumes of salt washed off the clay soils and discharged from the groundwater.

8.1.2 Local Drainage and Hydrology

The Site sits between Badgerys Creek (located to the west of the Site) and South Creek (located to the east of the Site). The Site topography and drainage in the western portion of the falls towards Badgerys Creek, while Site topography and drainage in the eastern portion of the Site falls towards South Creek. The drainage lines, depressions, waterbodies, and watercourses are shown in Appendix C.

Within the Site boundary drainage occurs as both sheet flows and concentrated flows through ephemeral depressions and first order (Strahler) watercourses. Some local storages are present in the form of farm dams. Badgerys Creek and South Creek are both perennial watercourses along the reaches that run adjacent to the Site.

Hydrology across the Site (Badgerys Creek to South Creek) is heavily influenced by the Triassic Wianamatta Group geology and the Blacktown Soil Landscape. Clay soils in this area are highly reactive and may swell significantly in response to rainfall events leading to impermeable surface conditions. Subsequently, the Site produces a rapid runoff response to rainfall resulting in high volumes of overland flow including sheet flows and concentrated flows in drainage depressions. Overland flow from hills and slopes will have prevalence to pond in depressions and foot slopes leading to swampy conditions.

The heavy clay subsoil creates a barrier that prevents water from draining vertically. This leads to "local perching" of water above clay layers, creating ephemeral waterlogged zones that persist long after the rain stops.

8.2 Groundwater-Surface Water Interactions

The regional landscape contributes groundwater baseflow to local waterways, including South Creek. This groundwater–surface water interaction is a key driver of catchment salinity, as discharging groundwater typically carries elevated salt loads. As a result, many streams in the region function as gaining systems, particularly along footslopes of hills and drainage depressions, where saline groundwater discharge can lead to elevated salinity in surface waters. This process presents a high likelihood of salinity occurrence and a potentially severe impact on surface water quality and receiving infrastructure.

At the site scale, however, the contribution of groundwater baseflow to receiving waterways (including South Creek and Badgerys Creek) is expected to be limited due to the relatively low permeability of the underlying hydrogeological units, which constrain groundwater flux. This interpretation is supported by the ephemeral nature of Badgerys Creek, which flows primarily in response to rainfall events rather than sustained groundwater discharge.

9 Groundwater Stakeholders

9.1 Groundwater Dependent Ecosystems

Review of the Australian Government Bureau of Meteorology (BoM) Groundwater Dependent Ecosystem Atlas has been carried out to identify any potential or actual groundwater dependent ecosystems (GDEs) within the site boundary. GDE Mapping (Appendix E) shows the presence of high potential terrestrial GDEs in the eastern and western portions of the site along the alignments of Badgerys Creek and South Creek, which are described as “Cumberland River Flat Forest”. South Creek is listed as a high potential aquatic GDE.

None of the potential GDEs are listed in the Sydney Basin Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2023.

9.2 Groundwater Users

A review of the Australian Government BoM Groundwater Atlas has been carried out to identify registered groundwater bores within a 1 km radius of the site. The registered boreholes and their use identified through this search are summarised in Table 8, and shown in Appendix E.

Table 8 Summary of Registered Groundwater Bores within 1km Radius of the Site

Bore ID	Direction	Distance (m)	Aquifer	Registered Use
GW103739 – GW103744	On Site	On Site	Bringelly Shale	Monitoring Bores (6 bores of varying depth)
GW106636	On Site	On Site	No Details	Monitoring Bore
GW106735	On Site	On Site	No Details	Industrial Bore
GW112650	SW	500	Minchinbury Sandstone	Monitoring Bore
GW112649	SW	700	Minchinbury Sandstone	Monitoring Bore
GW10516	NE	1,000	Minchinbury Sandstone	Domestic Stock

10 Conceptual Hydrogeological Model

Based on the information presented above for baseline groundwater and environmental considerations, and groundwater stakeholders, the hydrogeological conceptual model is summarised below:

- The Site geology is located in the Upper South Creek Hydrogeological Landscape, where the underlying geology is characterised by Triassic sedimentary rocks from the Wiannamatta Group, with the major unit being the Bringelly Shale. Quaternary alluvial soils are present along creek floodplains located to the east and west of the site.
- Bringelly Shale (Wianamatta Group) is the main groundwater bearing unit at the Site, and groundwater is predominantly unconfined. However, the shale is generally considered to act as a leaky aquitard due to its fine-grained nature, however "scattered zones" of fracture porosity and perched aquifers within the weathered profile can be found.
- Groundwater recharge is generally diffuse but is limited by low permeability of the heavy clay soils. Studies suggest that recharge into these Permian-Triassic shale units can be as low as <1% to 5% of long-term rainfall.
- Recent groundwater monitoring shows groundwater is typically encountered at shallow depths between 1.0 m and 5.0 m from the surface across the site within the unconfined upper Bringelly Shale aquifer. Groundwater elevations typically follow topographic elevations, creating a subdued replica of the land surface.
- The Site is located on a groundwater divide with highest groundwater elevations in the centre of the Site. As such, groundwater flow in the western portion of the site is towards the west and north (towards Badgerys Creek), while groundwater flow in the eastern portion of the site is to the east (towards South Creek).
- High potential groundwater dependent ecosystems (GDEs) are present in the eastern and western portions of the site along the alignments of Badgerys Creek and South Creek, which are described as "Cumberland River Flat Forest".
- Multiple farm dams located at the site appear to be connected to groundwater when comparing topography data and interpolated groundwater contours. The underlying Bringelly Shale aquifer likely supports wet conditions within the dams.

A hydrogeological cross section is provided in Figure 7. Section line A-A' runs through the centre of the Site, parallel to groundwater flow (see Appendix D).

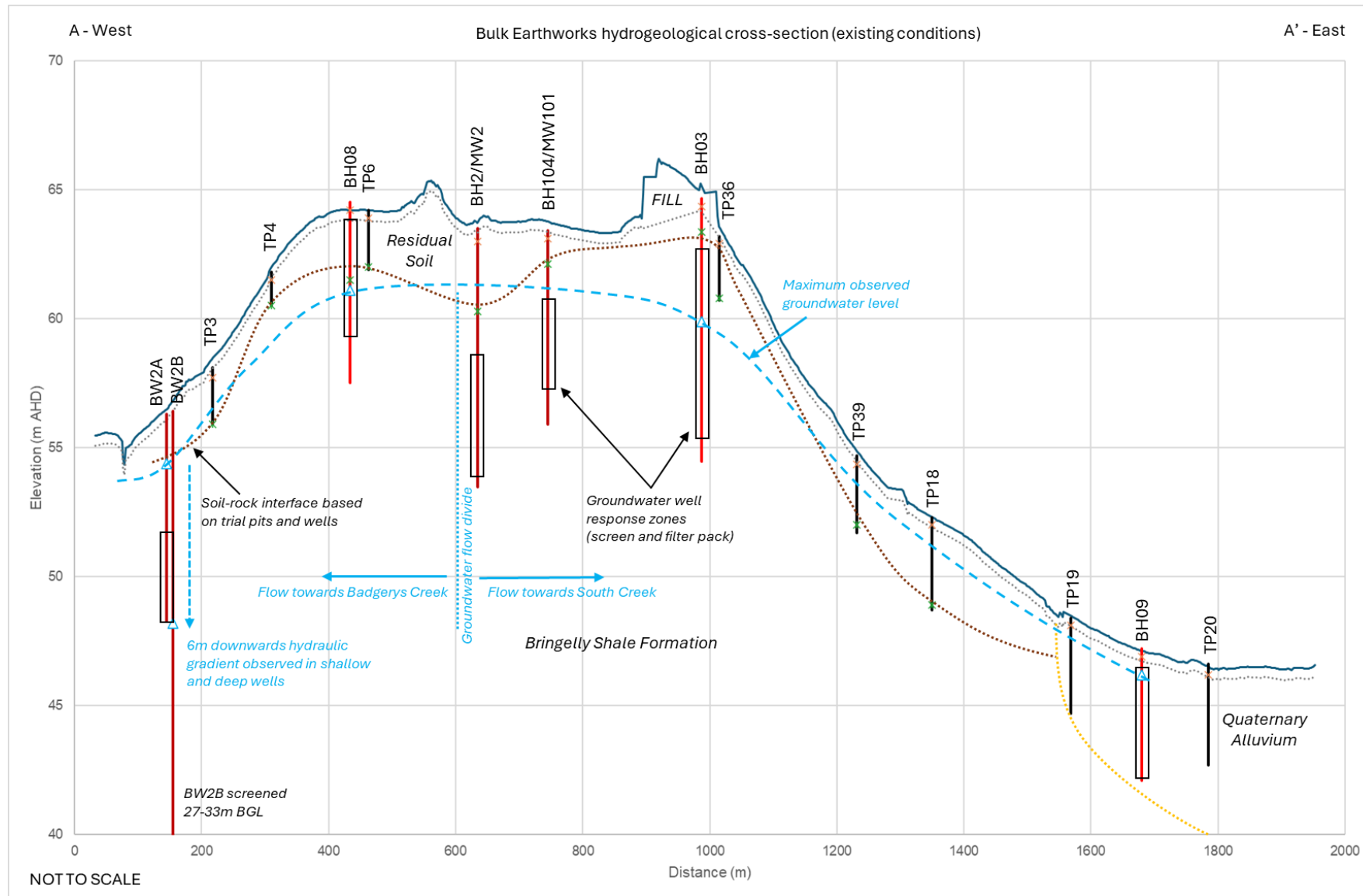


Figure 7 Hydrogeological cross section

11 Groundwater Interference Activities

The Bulk Earthworks, Rehabilitation and Quarrying works (BEW) for the site consists of site preparation and rehabilitation works required in developing the Bulk Earthworks Levels (BEL) for the proposed industrial development as considered under SSDA 97688711. Where practical BEL have been raised to avoid or limit any interaction with groundwater present in the unconfined portions of the Bringelly Shale Aquifer present on site. However, where groundwater interactions cannot be avoided, appropriate management and mitigation measures will be implemented to address the minimal impact considerations under the NSW Aquifer Interference Policy. Specific considerations for the site are identified in Section 12.

Appendix F identifies the locations where unavoidable interaction with shallow groundwater in the unconfined Bringelly Shale Aquifer is expected to occur during the BEW SSD 97711727 package. Groundwater is encountered across the site, with more frequent occurrences in the north-eastern and north-western areas (including around Lots 7 and 10), and more localised occurrences at temporary drainage basins and swales. Owing to the generally low permeability of the hydrogeological setting, groundwater seepage into the bulk earthworks is expected to be limited and passive in nature, and can be managed via the on-site swales and drainage basins without the need for active pumping or groundwater control.

Passive groundwater seepage (dewatering) is expected to occur at the following locations:

- **Four large sediment basins** located around the perimeter of the Site, where seepage to the basin base and sides may occur during periods when the water level within the basin is below the surrounding groundwater level.
- **Seven temporary stormwater drainage/sediment basins** located across the earthworks lots, which are similarly expected to act as groundwater sinks during periods when basin levels are below the water table.
- **Up to five temporary drainage swales**, which may also act as groundwater sinks in the same manner as the drainage basins.
- **Lots 7 and 10**, where the proposed Bulk Earthworks Level is below the typical groundwater level and passive seepage to perimeter drains and through the excavation base is expected.

A hydrogeological cross section showing the existing groundwater conditions and the proposed bulk earthworks level is shown in Figure 8.

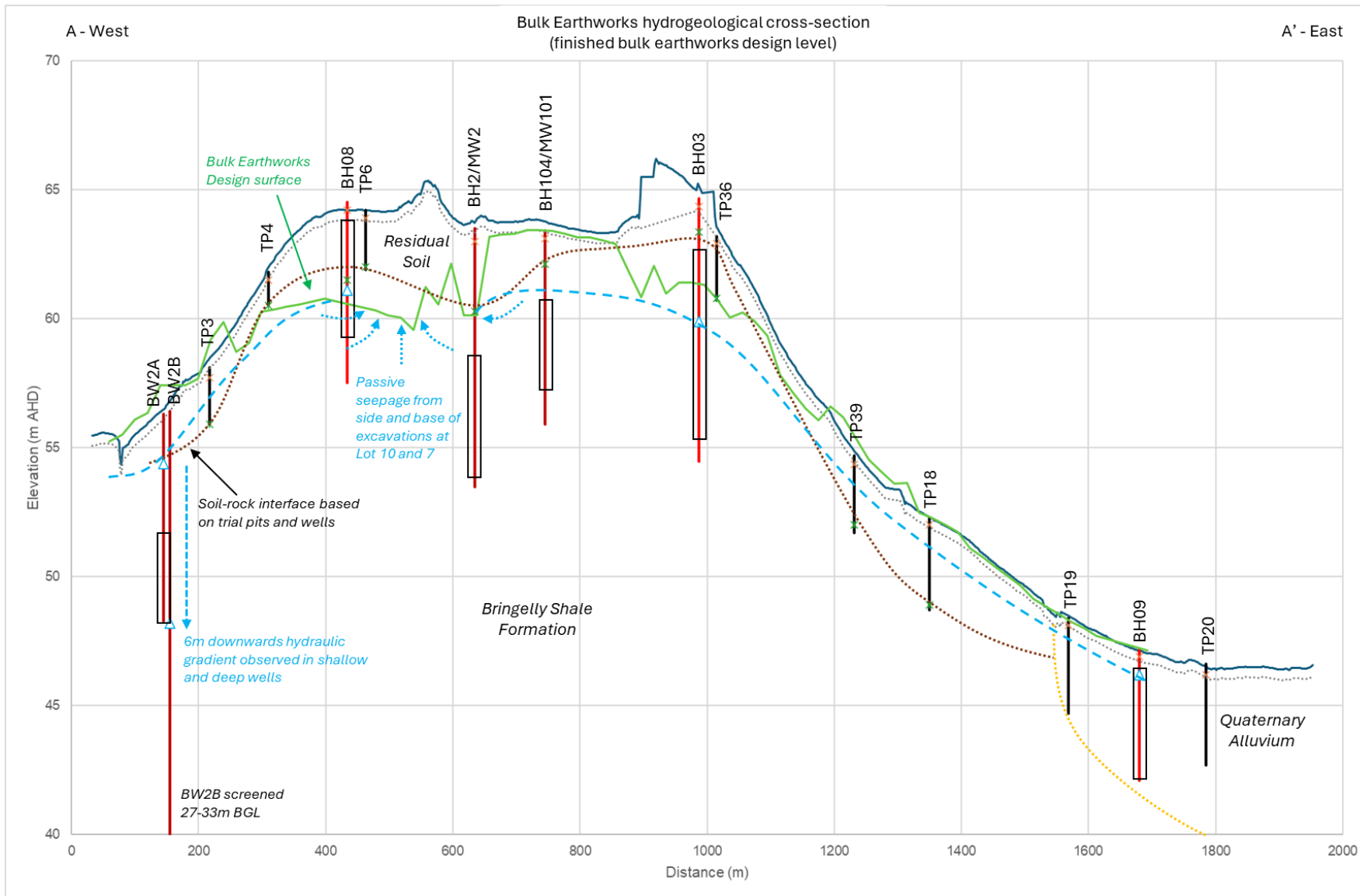


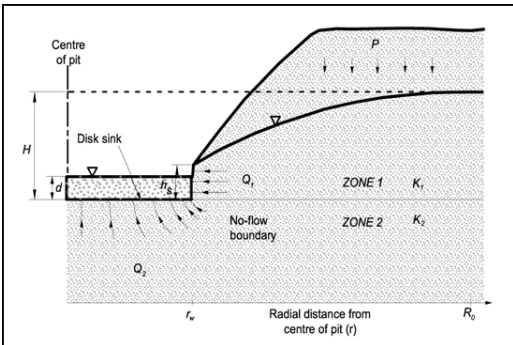
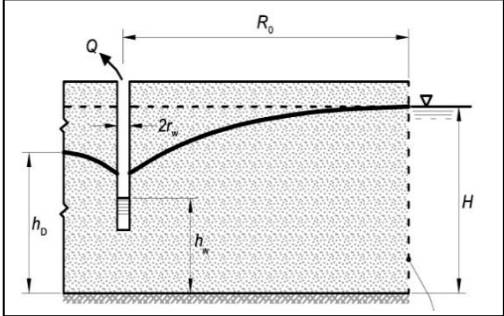
Figure 8 Bulk earthworks hydrogeological cross-section A-A'

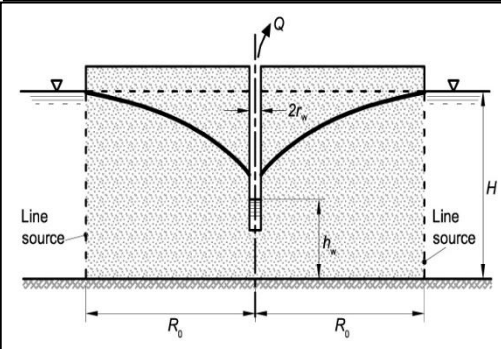
11.1 Groundwater Take

A Water Access Licence (WAL) for groundwater take is required where it exceeds 3 ML/year. However, an existing Water Access Licence (WAL) 10WA109463 for Lot 2 DP 1278780 and Lot 3 DP 1278780 was transferred to Goodman Western Sydney Pty Ltd on 19 December 2025. This WAL authorises a share component of up to 25 units (25 ML/year) from the Sydney Basin Central Groundwater Source. An assessment of groundwater take is therefore presented to establish compliance with either an exemption or the WAL.

Groundwater take has been estimated using analytical models for inflows to excavations, as summarised in Table 9. To account for variations in excavation depths and hydrogeological conditions (including geology, groundwater levels, and flow directions), the site was divided into 20 drainage areas.

Table 9 Analytical models adopted for estimating groundwater take

Analytical model	Assumptions
$Q_1 = P\pi(R_0^2 - r_w^2)$ $Q = 4\left(\frac{K_{h2}}{m_2}\right)r_w(H-d)$  $H = \sqrt{h_s^2 + \frac{P}{K_{h1}} \left[R_0^2 \ln\left(\frac{R_0}{r_w}\right) - \frac{R_0^2 - r_w^2}{2} \right]}$	Flow to a radial pit (Marinelli and Niccoli, 1998): - There is no groundwater flow between zones 1 and 2 - Zone 1 - Steady stage, unconfined, horizontal radial flow - Pit walls are approximated as a right circular cylinder - Initial water table and groundwater flow are both horizontal - Groundwater flow to the pit is axially symmetric - Zone 2 - Steady stage flow to one side of a circular disk sink of constant and uniform drawdown - Hydraulic head is initially uniform throughout Zone 2 - Initial head is equal to the elevation of the initial water table in Zone 1 - Disk sink has a constant hydraulic head equal to the elevation - Flow to the disk sink is three-dimensional and axially symmetric - Materials are anisotropic, principal directions for K are horizontal and vertical
$Q = \left[\left(0.73 + 0.27 \frac{(H - h_w)}{H} \right) \frac{Kx}{2R_0} (H^2 - h_w^2) \right]$ 	Mansur & Kaufman (1962) flow to a trench/slot from one side: - The slot is infinite in length R_0/H greater than or equal to 3 - Aquifer is unconfined - Aquifer is homogenous, isotropic and of uniform thickness - The Dupuit-Forcheimer assumption is valid - The aquifer has reached steady state conditions - The initial water table is horizontal

Analytical model	Assumptions
$Q = \left[\left(0.73 + 0.27 \frac{(H - h_w)}{H} \right) \frac{Kx}{R_0} (H^2 - h_w^2) \right]$ 	Mansur & Kaufman (1962) flow to a trench/slot from two sides: • The slot is infinite in length • R_0/H greater than or equal to 3 • Aquifer is unconfined • Aquifer is homogenous, isotropic and of uniform thickness • The Dupuit-Forcheimer assumption is valid • The aquifer has reached steady state conditions • The initial water table is horizontal
$R_0 = \sqrt{\frac{K (H^2 - h_w^2)}{P}}$	Bear (1979) steady-state radius of influence for a gallery, trench, or line of wells operating under uniform recharge in an unconfined aquifer. • Flow is assumed to be horizontal and moving perpendicularly toward a long, straight drainage gallery. • The aquifer hydraulic conductivity is uniform throughout the zone of influence. • The total discharge pumped out by the gallery is perfectly balanced by the vertical recharge rate over the surface area defined by R_0.

Parameter definitions:

- H, height of water table at radius of influence (m)
- h_w , height of water table at slot / h_s = saturated thickness at seepage face (m)
- K_{h1} and K_{h2} , horizontal hydraulic conductivity in Zones 1 & 2 (m/s)
- K_{v2} , vertical hydraulic conductivity beneath the pit (m/s) (assumed isotropic = 1.0)
- P, effective recharge to the water table in Zone 1 (m/s)
- A, wet area of excavation (m^2)
- r_p , circular equivalent radius of excavation ($r_p = \sqrt{A/\pi}$)
- R_0 , radius of influence (m) (calculated using Niccoli et al, 1998)
- h_s , pre-mining (excavation) saturated thickness above the Zone 1 base at the far radius (m).
- D, depth of ponded area (m)
- x, length of slot/trench (m)

11.1.1 Input parameters and assumptions

The following input parameter assumption were used in the analytical modelling of groundwater take during the BEW:

- Adopted hydraulic conductivity values are stated in Table 10 and derived from in-situ hydraulic testing summarised in Section 7.2.4 where appropriate. Literature values commensurate with the encountered geological descriptions have been used for FILL and residual soils due to no in-situ testing being completed within these units.
- Aquifer is conservatively assumed to be isotropic, therefore $K_h = K_v$.

- Uniform groundwater recharge (P) is estimated to be between 1% to 5% of average annual rainfall (As documented in the Upper South Creek Hydrogeological Landscape).
 - Recharge was conservatively assumed to be 1% of annual rainfall (8.6 mm/year)
- Initial saturated aquifer thickness (h_w) for the Bringelly Shale aquifer is assumed to be 10 m, and a maximum of 3 m for the overlying extremely weathered material (silty CLAY and CLAY).
- To satisfy the assumptions of the Mansur & Kaufman (1962) flow to a trench/slot model, the radius of influence was calculated using the Bear (1979) equation for steady state flow to a trench.
- Maximum height of water table above the BEW surface has been adopted across each drainage area, to provide conservative estimates of groundwater seepage. In reality the height of groundwater above the BEL varies across each drainage area.
- Groundwater seepage is assumed to be continuous during BEW to estimate groundwater take on an annual basis (i.e. no construction staging has been considered)

Table 10 Adopted hydraulic conductivity values for groundwater inflow assessment

Hydrogeological Layer	Adopted hydraulic conductivity (K)	Source
FILL material (predominantly cohesive)	Lower bound: 5×10^{-9} m/s Characteristic: 1×10^{-8} m/s Upper bound: 5×10^{-8} m/s	Assumed values based on material descriptions for bulk fill.
Quaternary Alluvium / Residual Soil (silty CLAY and CLAY)	Lower bound: 5×10^{-9} m/s Characteristic: 1×10^{-8} m/s Upper bound: 5×10^{-8} m/s	No in-situ testing for CLAY soils. K values adopted based on literature resources (Hiscock, 2005) (Pells, Mostyn, Bertuzzi, & Wong, 2019)
Wianamatta Bringelly Shale (Class II to III)	Lower bound: 3.7×10^{-8} m/s Characteristic: 6.5×10^{-8} m/s Lower bound: 1.1×10^{-7} m/s	Slug testing results in Section 7.2.4

11.1.2 Groundwater take results

Following the approach outlined above, groundwater take during the BEW has been estimated to be 4.2 ML/year under characteristic hydraulic conductivity conditions as presented in Table 11. Sensitivity analysis was undertaken for lower and upper bound estimates of hydraulic conductivity, with the estimated groundwater take ranging from 2.5 ML to 7.5 ML/year. Estimates of groundwater take are above the 3 ML/year limit for an exemption but below the 25 ML/year allowance for water under the existing WAL (10WA109463). Analytical modelling calculation sheets are presented in Appendix H for completeness.

Table 11 Estimated groundwater take

Groundwater seepage areas	Analytical model	Inflow volume (ML/year)		
		Lower bound	Characteristic	Upper bound
Four large sediment Basins located around perimeter of the Site	Flow to a radial pit	1.0	1.8	3.5
Bulk Earthworks Lots 7 & 10	Flow to a radial pit	0.5	1.0	1.9

Groundwater seepage areas	Analytical model	Inflow volume (ML/year)		
		Lower bound	Characteristic	Upper bound
Temporary stormwater/sediment basins	Flow to a trench/slot from one or two sides	0.4	0.7	1.2
Swales	Flow to a trench/slot from two side	0.6	0.7	0.9
Total estimated groundwater take		2.5	4.2	7.5

11.2 Radius of influence

11.2.1 Analytical Element Modelling

An Analytical Element Model (AEM) was developed using GFLOW to estimate the radial extent of groundwater drawdown resulting from groundwater interception during the proposed BEW. GFLOW is a steady-state modelling platform that represents hydrogeological features as analytical elements (e.g. line-sinks, area-sinks, wells) superimposed on a regional flow field, avoiding the need for grid discretisation.

11.2.1.1 Conceptual model and assumptions

The model conceptualisation was based on the following key assumptions:

- The Bringelly Shale aquifer at the site was represented as a homogeneous, isotropic, unconfined system of uniform thickness.
- Quaternary Alluvium along South Creek and Badgery's Creek was modelled as inhomogeneities in the model, with increased hydraulic conductivity and porosity.
- Groundwater flow was assumed to be horizontal and steady-state, with recharge applied as a spatially uniform flux.
- Regional hydraulic gradients were incorporated based on observed groundwater levels and interpreted groundwater contours.
- The bulk earthworks excavation was simulated as a groundwater sink (e.g. circular area sink or equivalent well representation), representing interception of groundwater within the excavation footprint.
- Boundary conditions were implemented using constant head lines or far-field uniform flow to reproduce regional conditions.
- No transient effects (e.g. seasonal variability, construction staging) were explicitly simulated; results represent long-term equilibrium conditions.

These assumptions are considered conservative for estimating the maximum spatial extent of drawdown from bulk earthworks activities.

11.2.1.2 Model domain

The AEM domain has been defined to adequately capture the regional hydrogeological setting and ensure that model boundaries do not unduly influence simulated drawdown within the area of interest. The domain extent exceeds the predicted radius of influence (defined by the 0.2 m drawdown contour and within the bounds of typical seasonal variability) in all directions. No flow boundaries were defined along topographic highs and interpreted groundwater divides.

Boundary conditions have been assigned to reflect regional groundwater flow processes. Surface water features, including South Creek and Badgerys Creek, are represented by either a head specified line-sink boundary conditions or as drain elements to simulate groundwater–surface water interaction. A diffuse recharge boundary condition is applied to the whole model domain.

The model domain is shown in Figure 9.

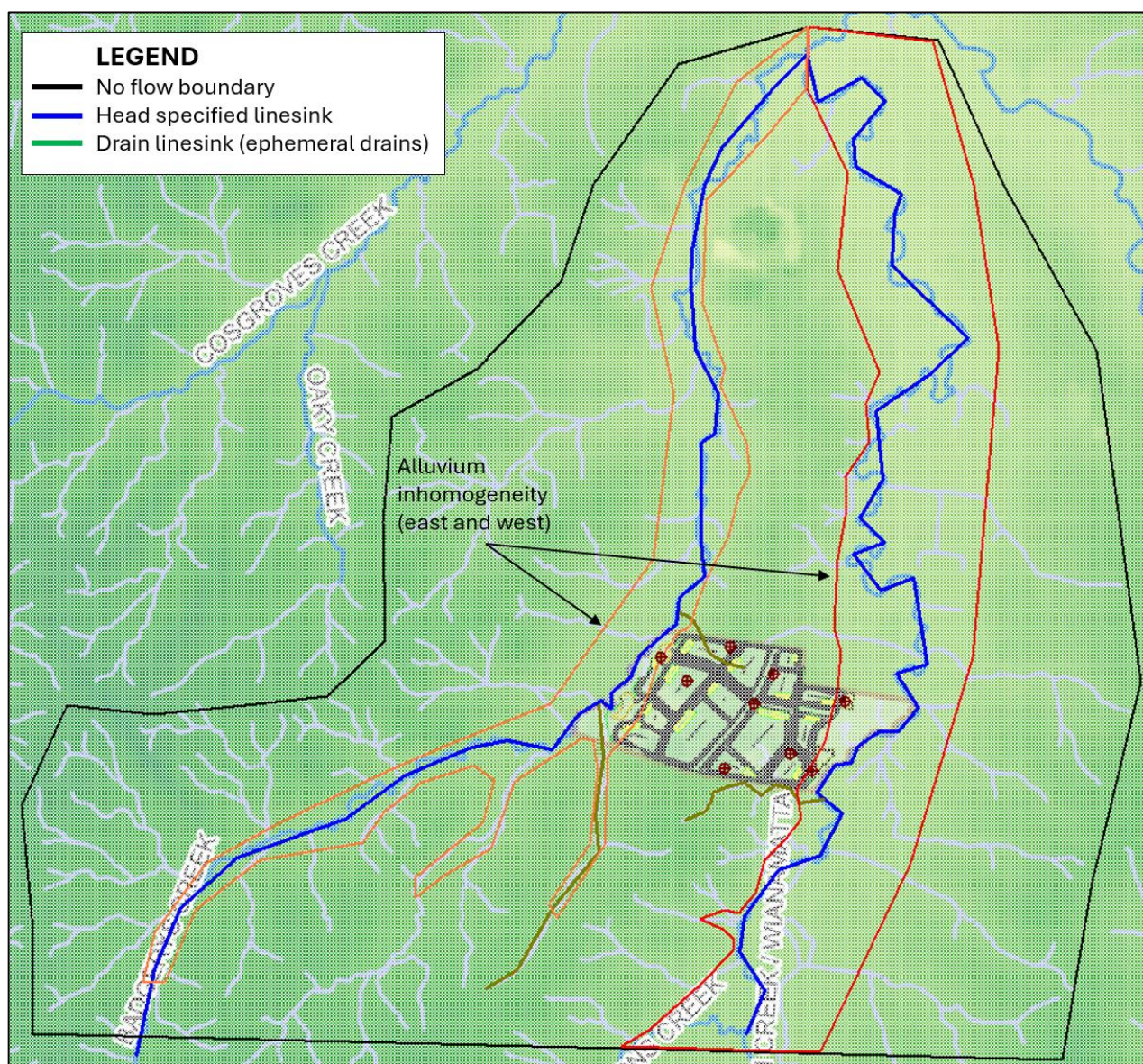


Figure 9 AEM model domain

11.2.1.3 Model inputs and calibration

The GFLOW model was calibrated using the Parameter ESTimation (PEST) tool to improve the reliability of simulated groundwater levels. Calibration was undertaken by adjusting key hydraulic parameters, including hydraulic conductivity and recharge, to minimise the difference between modelled heads and observed groundwater levels recorded at site monitoring wells. The calibration achieved a Normalised Root Mean Square Error (NRMSE) of approximately 6%, with anything better than a 10% NRMSE deemed to be satisfactory. Initial parameters and calibrated parameters are summarised in Table 12, and calibration statistics provided in Figure 10. Calibration required an increase in the hydraulic conductivity of the

Quaternary alluvium (ALV) along both creeks, including by approximately an order of magnitude along South Creek, to reproduce the lower hydraulic gradient observed in groundwater monitoring wells along the eastern part of the site. Global recharge applied across the model was reduced from 1% to 0.2% of annual rainfall while maintaining reasonable aquifer parameter values associated with the sub-surface conditions. Given that evaporation exceeds rainfall for most of the year (August to April), this is considered a reasonable and conservative estimate of recharge.

Table 12 Analytical element model inputs

Input		Initial	Calibrated
Aquifer parameters	Quaternary ALV	K = 6.0×10^{-3} m/d Porosity = 0.5	Quaternary ALV (east along South Creek) = 4.6×10^{-2} m/d Quaternary ALV (west along Badgery's Creek) = 9.0×10^{-3} m/d Porosity = 0.5
	Bringelly Shale	K = 6.0×10^{-3} m/d Porosity = 0.1	Bringelly Shale = 6.4×10^{-3} m/d Porosity = 0.1
Recharge		2.1×10^{-5} m/d (1% of rainfall)	5×10^{-6} m/s (0.2% of rainfall)
Model base		35 m AHD	40 m AHD
Surface water features		South Creek and Badgery's Creek = modelled as constant head boundary – levels set based on elevations extracted from DEM data Other unnamed small water features draining into Badgery's Creek and South Creek modelled as drain features	

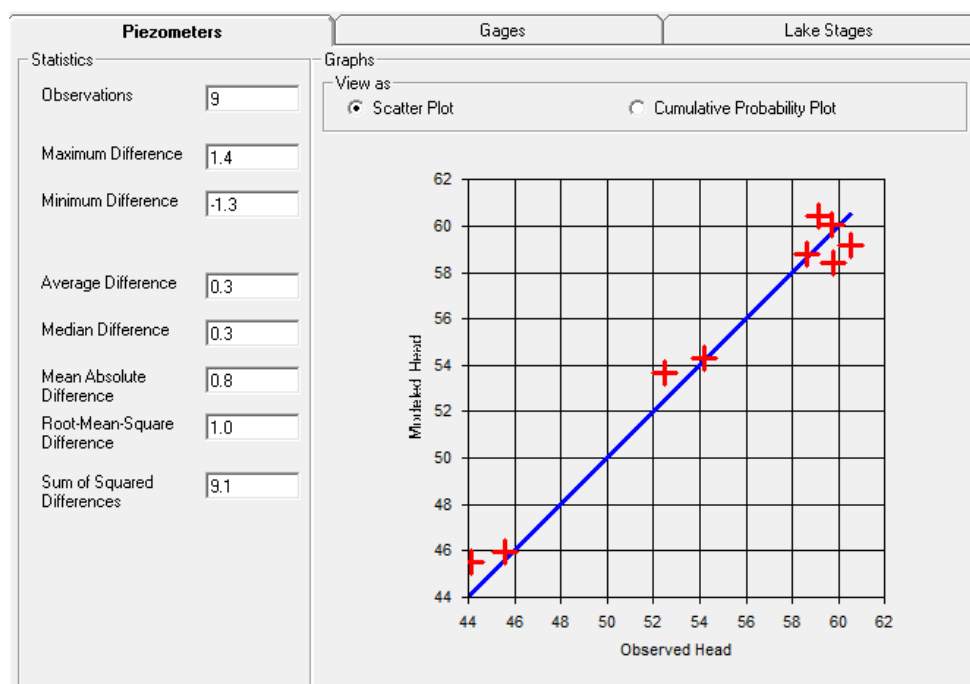


Figure 10 Calibration statistics

11.2.1.4 Model predictions

To represent the BEL, areas where the excavations intercept groundwater were modelled as drain features in the model. The combined radial effect of all excavations interacting with groundwater heads were then simulated in steady state conditions. Steady state drawdown contours representing the end of BEW (i.e. finished bulk earthworks level) are presented in Figure 11. Predicted drawdown contours are considered conservative, as the modelling assumes simultaneous excavation. In practice, excavation will be staged over the construction period (transient), meaning drawdown and the associated radius of influence will vary spatially and temporally. Additionally, the time required to reach steady-state conditions may exceed the duration of the works, further reducing the extent of realised impacts.

The radius of influence for groundwater impact assessment has been defined by the 0.2 m drawdown contour and being within the bounds of typical seasonal variability. This contour is generally contained within the eastern and western site boundaries, with a notable extension of approximately 500 m to the northeast along the boundary between the shale and Quaternary ALV.

The extension to the northeast is interpreted to be an artefact of the model, associated with drawdown propagated along the boundary between shale and Quaternary ALV in the model. This behaviour likely reflects numerical model limitations associated with the analytical model adopted (e.g. preferential propagation along linear boundary conditions) rather than a realistic hydrogeological response.

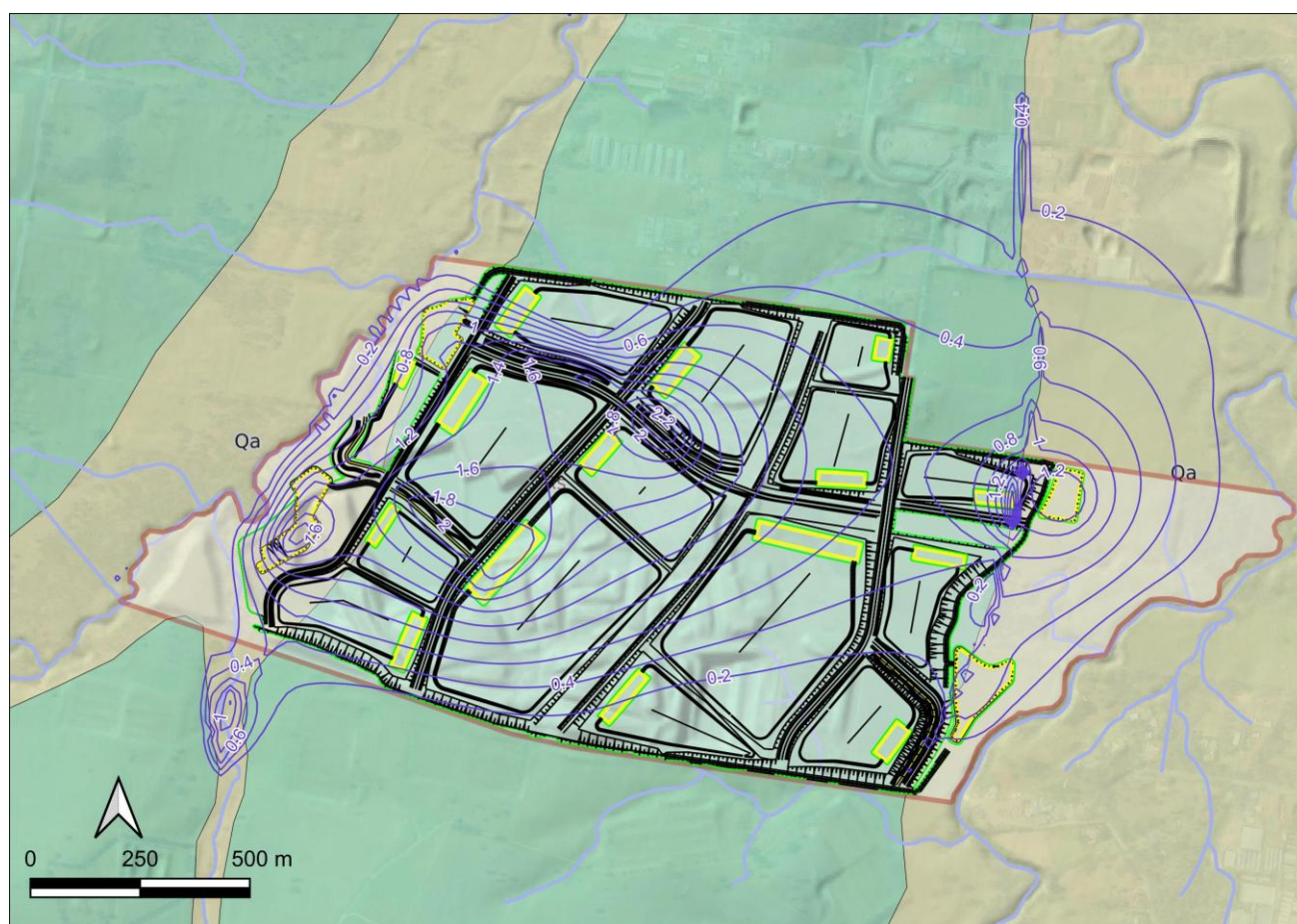


Figure 11 Steady state groundwater drawdown contours simulated at bulk earthworks finished surface level

The AEM predicts a steady-state groundwater inflow of approximately 1.50 ML/year to BEW finished surface. This estimate represents conditions at the completion of BEW, when all excavations are simultaneously open

and interacting, and therefore reflects a combined, system-scale seepage response under steady-state conditions.

In comparison, analytical calculations undertaken in Section 11.1 estimates groundwater inflow during BEW to be approximately 4.2 ML/year under characteristic hydraulic conductivity conditions (refer Table 11). Sensitivity analysis indicates a potential range of 2.5 ML/year to 7.5 ML/year, reflecting uncertainty in hydraulic conductivity.

The analytical estimates are consistently higher than the AEM-derived inflow. This difference is considered reasonable and reflects the inherent conservatism and simplifying assumptions of analytical methods, which typically:

- assume more idealised flow geometry,
- analytical method uses conservative radius of influence values (<100m) and a fixed recharge which is five times greater than the AEM model,
- do not fully account for hydraulic interaction between excavations, and
- may overestimate inflow where boundary effects or partial hydraulic capture occur.

Conversely, the AEM provides a more integrated representation of site-wide groundwater flow processes, including interaction between excavations and drainage features, and therefore is considered to provide a more realistic estimate of cumulative inflow under steady-state conditions.

Notwithstanding these differences, both approaches indicate that groundwater take is well below the 25 ML/year entitlement available under the existing Water Access Licence (WAL 10WA109463).

On this basis, while the analytical method provides a conservative upper-bound estimate, the AEM results are considered more representative of likely long-term groundwater take during full excavation conditions, with overall take remaining within the licensed allocation.

11.3 Site water balance

A site-scale groundwater water balance has been developed to quantify the relative magnitude of recharge, discharge, and project-related groundwater fluxes under pre-development and post-development conditions (BEL), as presented in Table 13. The water balance is intended to provide a first-order assessment of groundwater sustainability and potential impacts to surrounding receptors.

The groundwater system is conceptualised as an unconfined aquifer receiving diffuse recharge from rainfall infiltration, with groundwater flow occurring in response to regional hydraulic gradients toward local discharge points (e.g. streams and/or low-lying areas). The key components of the groundwater balance are:

- Diffuse recharge from rainfall infiltration (assumed to be 0.2% rainfall based on the calibrated AEM model above)
- Baseflow discharge to surface water features (estimated using Darcy's law)
- Groundwater extraction (steady state groundwater extraction estimates in the AEM model)
- Residual outflows (aquifer through flow)

Overall, the water balance shows that groundwater inflow to excavation during BEW is primarily sourced from a reduction in natural throughflow, with only a very minor reduction in baseflow to South Creek. The total post-development outflow remains balanced with recharge at 3.48 ML/year, indicating that the project results in a redistribution of groundwater discharge pathways rather than a change in the overall site water balance.

Table 13 Site water balance (groundwater)

Component	Pre-Development (ML/year)	End of BEW (ML/year)	Change (ML/year)	Commentary
Recharge	3.48	3.48	0.0	Assumes 0.2% of rainfall as per calibrated AEM model
Baseflow to streams	0.057	0.048	-0.009	Base flow to Badgery's Creek assumed to be negligible due to the stream being ephemeral. Negligible change to baseflow to South Creek due to change in hydraulic gradient
Extraction	0.0	1.50	+1.50	Steady state groundwater inflow to bulk earthwork surfaces (extracted from AEM model)
Residual outflows	3.42	1.93	-1.49	Reduction in lateral through flow as a result of extraction and drawdown
Net balance (ΔS)	~0	~0	~0	Steady-state assumption

12 Impact Assessment

An impact assessment has been undertaken to evaluate changes to groundwater conditions between pre-development and the completion of BEW (SSDA 97711727).

Following BEW completion, the project transitions to a separate Internal Works SSD (SSDA 97688711), under which industrial development will occur from the BEW finished levels. Potential groundwater impacts associated with the Internal Works stage are addressed separately in the Groundwater Assessment prepared for SSDA 97688711 (in response to the SEARs) and are not considered in this report.

12.1 Groundwater Stakeholders

All identified existing bores listed in Table 8 are located outside the modelled radial extent of groundwater drawdown presented in Figure 11 above. Accordingly, no impact to existing groundwater bores is anticipated as a result of BEW activities.

Nearby water courses and sensitive receptors (Figure 12) are discussed below:

South Creek:

- South Creek is identified as the primary receiving watercourse in hydraulic connection with the local groundwater system and is regarded as a high potential aquatic GDE.
- The site water balance indicates that any reduction in groundwater discharge (baseflow) to South Creek at the completion of BEW would be small over the length of the site (<0.01 ML/y) as a result of drawdown and reduced hydraulic gradient. When compared to the typical flow regime for South Creek, where 50% of the time flow in the Creek exceeds 0.5 ML/d (Engeny, 2026), the predicted reduction in base flow by 0.01 ML/y is inconsequential.
- Predicted drawdown does not materially alter the hydraulic gradients controlling groundwater–surface water interaction at the creek, and therefore no significant impact to baseflow contribution is expected.
- Minor drawdown is predicted at high-potential terrestrial GDEs adjacent to South Creek, with the 0.2 m drawdown contour generally skirting the mapped GDE boundary.
- Potential impacts to these GDEs are considered negligible, as the magnitude of drawdown is within the range of seasonal groundwater level variability.
- Groundwater level and quality monitoring is proposed (refer Section 13) to verify model predictions and manage potential impacts.

Badgerys Creek:

- Badgerys Creek is characterised as an ephemeral system with negligible groundwater baseflow contribution under pre-development conditions.
- Interception of groundwater during BEW is therefore not expected to result in measurable changes to surface water flow conditions within Badgerys Creek.
- High potential GDEs along Badgerys Creek include Cumberland River-flat Forests.
- Model results indicate drawdown extending along the western site boundary beneath these GDEs in the north-west of the site, with predicted drawdown in the order of 0.2 to 0.4 m.
- Given the ephemeral nature of the creek and the relatively small magnitude of drawdown, impacts to these GDEs are expected to be low and within the range of natural variability.
- Groundwater level and quality monitoring (refer Section 13) is proposed to validate model predictions and manage any potential impacts.

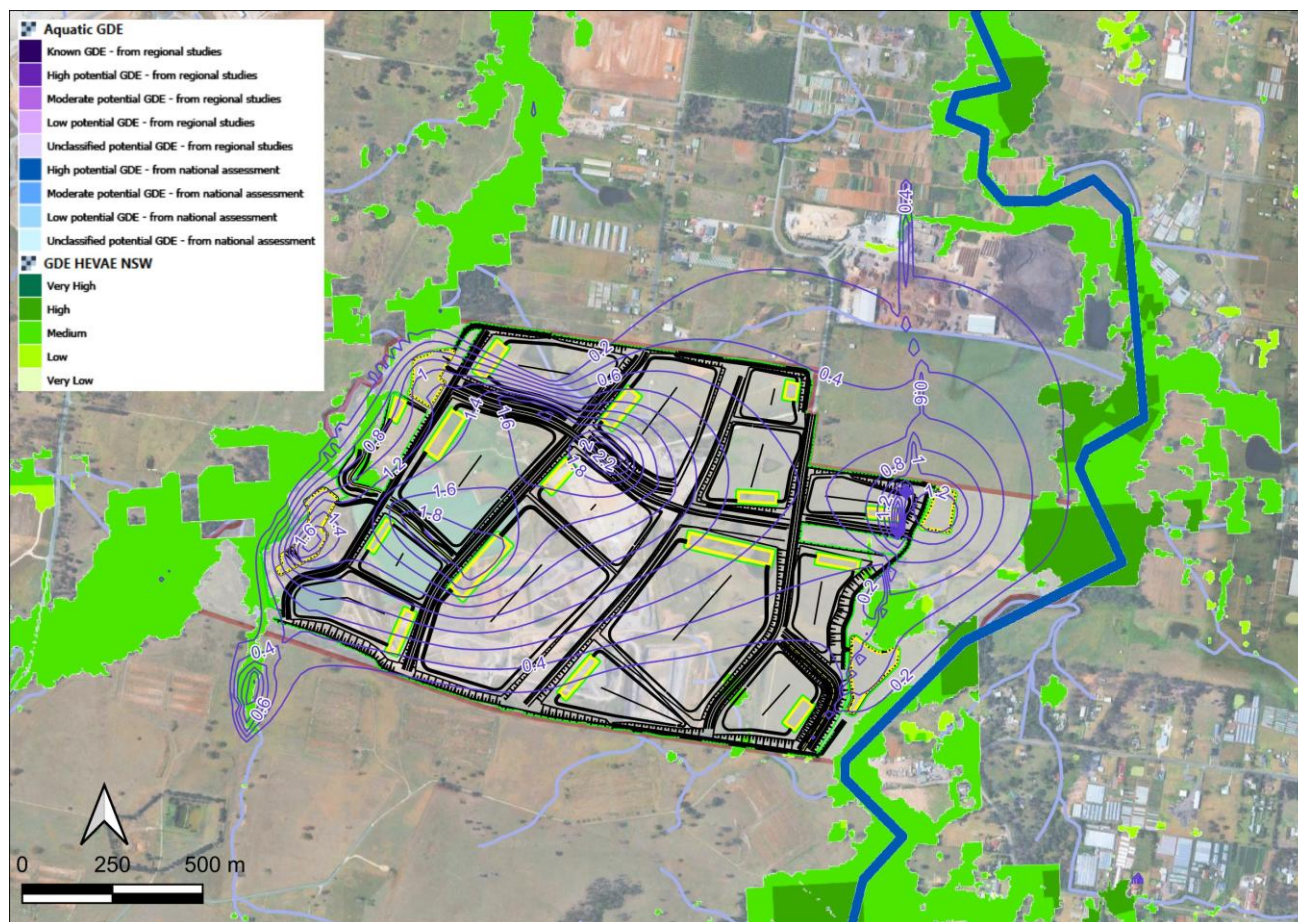


Figure 12 Predicted groundwater drawdown at water courses and associated GDEs

12.2 Aquifer Interference Policy

12.2.1 Aquifer Classification

The Wianamatta Bringelly Shale is considered a 'less productive' aquifer under the NSW Aquifer Interference Policy. This classification accounts for both the high salinity of groundwater within the shale aquifer (typically $>1,500 \mu\text{S/cm}$) and the low yields (typically $<1 \text{ L/s}$).

For a "Less Productive Porous Rock Water Source," the AIP sets out specific thresholds to determine if a project's impact is acceptable (Level 1). If a project exceeds these, it is considered a Level 2 impact and requires further detailed assessment and potential "make good" provisions.

12.2.2 Minimal Impact Considerations

The minimal impact considerations for aquifer interference activities are listed in Table 14 with an assessment of the potential impact. In accordance with the DPI Aquifer Interference Policy (2012), the assessment presented indicates that the development is assessed to induce less than "minimal" impact upon groundwater resources.

Table 14 NSW Aquifer Interference Policy minimum impact considerations

Impact	Impact consideration for less productive porous and fractured rock water sources	Impact assessment
Water table	1. Less than or equal to 10% cumulative variation in the water table, allowing for typical climatic “post-water sharing plan” variations, 40 m from any: (a) high priority groundwater dependent ecosystem; or (b) high priority culturally significant site; listed in the schedule of the relevant water sharing plan. A maximum of a 2 m decline cumulatively at any water supply work. 2. If more than 10% cumulative variation in the water table, allowing for typical climatic “post water sharing plan” variations, 40 m from any: (a) high priority groundwater dependent ecosystem; or (b) high priority culturally significant site; listed in the schedule of the relevant water sharing plan if appropriate studies demonstrate to the Minister’s satisfaction that the variation will not prevent the long-term viability of the dependent ecosystem or significant site. If more than a 2m decline cumulatively at any water supply work then make good provisions should apply.	As stated above, no impact on nearby water supply works. There are no high priority groundwater dependent ecosystems or culturally significant sites to consider. Ongoing groundwater level monitoring is proposed adjacent to the NW basin to monitor changes in groundwater level and determine if the basin is having a greater than minimal impact on the neighbouring high priority GDE (see Section 13). It is noted for the Upper South Creek HGL that base flow to Creeks typically carries a high salt load, and as such reduction in baseflow from groundwater from the site may provide beneficial outcomes for GDEs located adjacent within the riparian corridors of South Creek and Badgerys Creek.
Water pressure	1. A cumulative pressure head decline of not more than a 2 m decline, at any water supply work. 2. If the predicted pressure head decline is greater than requirement 1. above, then appropriate studies are required to demonstrate to the Minister’s satisfaction that the decline will not prevent the long-term viability of the affected water supply works unless make good provisions apply.	It is considered unlikely that this minimal impact consideration threshold will be exceeded as the planned development is not proposing to intersect or interfere with any confined aquifers. Subsequently, it is considered that no further work is required. Also, the closest privately owned water supply bore is over 1,000 m from the Site, outside of the predicted radius of influence from any groundwater interference activity.
Water quality	1. Any change in the groundwater quality should not lower the beneficial use category of the groundwater source beyond 40 m from the activity.	The planned development is not expected to impact the beneficial use category of the groundwater source or trigger an increase in salinity of the groundwater source as minimal interaction is expected.

Impact	Impact consideration for less productive porous and fractured rock water sources	Impact assessment
	2. If condition 1 is not met then appropriate studies will need to demonstrate to the Minister's satisfaction that the change in groundwater quality will not prevent the long-term viability of the dependent ecosystem, significant site or affected water supply works.	The bulk earthworks activities will act as a groundwater sink. ReInjection of groundwater is not proposed. The development is therefore not expected to modify groundwater quality.

13 Groundwater Monitoring

Groundwater monitoring is required to verify groundwater conditions during the BEW, confirm the extent of groundwater interaction, and demonstrate compliance with project approvals and management measures. As all existing groundwater monitoring wells are expected to be destroyed during the BEW and associated construction activities, a replacement monitoring well protocol is required to maintain continuity of groundwater monitoring before, during and following the works.

13.1 Objectives and Monitoring Principles

- Confirm groundwater levels and seepage conditions encountered during BEW relative to pre-construction expectations.
- Provide an evidence base for adaptive management where groundwater conditions differ from those assumed in the assessment.
- Maintain an appropriate groundwater monitoring network throughout construction despite destruction of the existing wells.
- Monitor for potential impacts to groundwater levels, groundwater take estimates and nearby sensitive receptors.
- Provide records suitable to inform compliance reporting, construction management and any post-construction groundwater assessment.

13.2 Monitoring Locations

All existing groundwater wells (listed in Section 7.3.1) at the site are located within the BEW footprint and are expected to be destroyed during construction works. Therefore, to maintain groundwater monitoring coverage during construction, a minimum of four groundwater wells are proposed to be installed prior to commencement of bulk excavation works.

The proposed replacement well locations are shown in Appendix I and summarised in Table 15, together with the justification for each location.

Table 15 Groundwater monitoring well proposals for Bulk Earthworks

Replacement well ID	Location	Target screened interval (m bgl)	Justification
BEW-MW01	Western perimeter	3 m to 6 m bgl	Monitoring groundwater levels adjacent to Badgerys Creek and GDEs (sensitive receptors) to confirm any changes in groundwater levels and quality
BEW-MW02	Lot 7, adjacent to groundwater interception at swales and Lots 7 and 10	5 m to 8 m bgl	Replacement for BH08 to monitoring changes to groundwater levels and quality adjacent to Lot 7 and 10 where groundwater take is expected. Confirm if there are any changes to the hydraulic gradient down to Badgerys Creek.
BEW-MW03	Haul road interchange	5 m to 8 m bgl	Replacement for BH03 to monitoring groundwater levels to confirm any

Replacement well ID	Location	Target screened interval (m bgl)	Justification
	adjacent to Lot 9A and 6A		changes to the hydraulic gradient down to South Creek.
BEW-MW04	Eastern perimeter	3 m to 6 m bgl	Monitoring groundwater levels adjacent to South Creek and GDEs (sensitive receptors) to confirm any changes in groundwater levels and quality

13.2.1 Well construction requirements

Replacement groundwater monitoring wells should be designed and constructed in accordance with the minimum construction requirements for water bores in Australia (National Uniform Drillers Licensing Committee, 2020) and the NSW minimum requirements for building site groundwater investigations and reporting (NSW Department of Planning and Environment, 2022).

- Replacement wells should be installed by a suitably licensed driller, with all drilling and construction works undertaken in accordance with the applicable bore construction permit, approval conditions and relevant safety requirements.
- Boreholes should be drilled with a sufficient diameter to allow installation of 50 mm diameter PVC casing and screen, with construction materials selected to be durable, chemically suitable for groundwater monitoring and compatible with the expected ground conditions.
- A filter pack should be placed across the screened interval, with an appropriate annular seal installed above the screen to prevent vertical leakage and ingress of shallow water along the bore annulus.
- The upper annulus should be sealed to ground surface using bentonite or cement grout, to protect the bore from contamination and preserve hydraulic separation between strata.
- Each completed well should include a secure surface completion, such as a flush-mount or stick-up protective casing, that protects the installation from damage by construction traffic.
- Wells should be surveyed to an appropriate horizontal and vertical datum, clearly labelled with a unique identifier, and incorporated into the site monitoring register and site plans prior to commencement of routine monitoring.
- Following installation, each well should be developed to remove drilling fines and establish hydraulic connection with the monitored interval before baseline water level monitoring is undertaken.
- A bore construction record should be prepared for each well, including drilling method, lithology, construction details, screened interval, seal materials, development outcomes and surveyed coordinates and elevations.

13.2.2 Well decommissioning

Existing groundwater wells that are destroyed, rendered inaccessible or no longer required for the construction monitoring program should be decommissioned in accordance with the minimum requirements for water bores in Australia (National Uniform Drillers Licensing Committee, 2020). The objective of decommissioning is to permanently seal the well so that it cannot act as a preferential pathway for vertical groundwater movement, contamination ingress or uncontrolled flow between water-bearing zones.

- Decommissioning works should be undertaken by a suitably licensed driller or other appropriately qualified contractor, with the method selected having regard to the well construction, condition, diameter, depth and the hydrogeological units intersected.

Prior to decommissioning, the well should be inspected and its construction details reviewed to confirm casing depth, screened interval and any evidence of collapse, obstruction or uncontrolled inflow.

- The borehole should be sealed from the base upward using an appropriate low-permeability sealing material, such as cement grout, bentonite, or a combination of approved materials, to restore hydraulic separation between strata as far as practicable.
- Where the well intersects more than one water-bearing unit, particular care should be taken to seal screened and annular intervals so that inter-aquifer leakage cannot occur following decommissioning.
- The upper part of the well should be cut off below ground level and backfilled or capped as appropriate so that no trip hazard remains and the location cannot be reused as an open conduit.
- A decommissioning record should be prepared for each well, including the date, contractor, method, materials used, estimated seal intervals and any departures from the planned method, and the monitoring network register should be updated accordingly.

13.2.3 Replacement well protocol

Where a monitoring well listed in Table 15 is damaged, destroyed, or becomes inaccessible due to construction activities, it will be assessed by a suitably qualified hydrogeologist and replaced where necessary. Replacement wells will, where practicable, be located close to the original well and constructed to a similar depth and screen interval within the same monitored unit, while also considering site access, safety, services and construction constraints. Replacement wells will be installed by a qualified driller, surveyed, developed as required, and incorporated into the ongoing groundwater monitoring program. Any damaged or redundant wells will be decommissioned in accordance with relevant guidelines as reported above.

13.3 Monitoring Plan

During BEW, the following monitoring is recommended:

- Monitoring of groundwater inflow into open excavations during the entire BEW period as a minimum on a weekly basis, or in accordance with WaterNSW approvals. Where surface runoff or direct rainfall contribute to discharge volumes, a note should be made on the estimated quantity of that contribution.
- Monitor groundwater levels in replacement wells (BEW-MW01 to BEW-MW04) at a frequency commensurate with construction staging, expected to be weekly at a minimum.
- Undertake targeted monitoring before, during and after excavation in areas where groundwater interception is anticipated, including sediment basins, swales and low-lying lot areas.
- Record qualitative observations during bulk excavation works, including seepage locations, wet ground, perched water and any unexpected groundwater conditions.

Monitoring data should be reviewed monthly throughout the construction period and a construction report presenting the groundwater data collated. A summary of monitoring requirements is provided in Table 16.

A Groundwater Monitoring Report is required and will need to be provided to the relevant agency on an annual basis and or at the end of construction period to confirm whether the observed groundwater response remains consistent with the conceptual model and impact assessment.

Table 16 Groundwater monitoring requirement – Bulk Earthworks

Element	Purpose	Methodology	Frequency of monitoring	Frequency of data review	Duration
Water Quantity (Take)	Confirm groundwater take (dewatering) proceeding in accordance with expectations. Comply with WaterNSW requirements.	Measurement using a flow meter of volume of water intercepted and discharged to sediment basins. Qualitative inspection of groundwater seepage locations and seepage volumes, including photos and descriptions of water ingress.	Weekly	Weekly	Duration of bulk earthworks activities
Water Level	Confirm groundwater drawdown in accordance with expectations. Reduce risk of drawdown impacts on nearby sensitive receptors. Comply with WaterNSW requirements.	Measurement of groundwater levels in replacement wells, and any existing wells prior to decommissioning.	Monitored manually on a weekly basis, or using data logger at frequency no greater than daily	Monthly	Duration of bulk earthworks activities
Water Quality	Monitor any change to groundwater quality during construction. Comply with WaterNSW requirements.	Field measurements of pH, turbidity, electrical conductivity (EC) and observation of odours, changes to water colour.	Weekly, concurrently with manual measurement of groundwater levels	Weekly	Duration of bulk earthworks activities
		Sampling and analysis at a NATA registered laboratory for: • Turbidity • Total suspended solids and total dissolved solids • Metals	Monthly	Monthly	Duration of bulk earthworks activities

13.4 Trigger and Response Framework

Trigger levels are required for unexpected groundwater level changes, greater-than-anticipated seepage volumes and changes in water quality.

Trigger levels for groundwater levels are set out in Table 17 and have been derived based on existing baseline data recorded during groundwater investigations and modelled predictions for drawdown. Groundwater level trigger values for individual bores should be reviewed once the proposed replacement wells are constructed and groundwater levels have stabilised in the wells.

Table 17 Groundwater level trigger levels

Monitoring well	Nominated Pre-development Groundwater level (m AHD)*	Modelled drawdown (m)	Trigger Groundwater Level (m AHD)
BEW-MW01	54.0	0.8	53.2
BEW-MW02	59.2	0.7	58.5
BEW-MW03	60.0	1.0	59.0
BEW-MW04	45.5	1.0	44.5

*estimated based on existing groundwater monitoring data and contouring.

Groundwater quality trigger levels will be set accordingly following collection of baseline data following installation of the proposed monitoring wells.

Table 18 outlines the required actions up trigger levels being exceeded. Where triggers are exceeded, the response should include verification of the data, inspection of site conditions, review by the project hydrogeologist and implementation of additional mitigation or monitoring where required.

Potential responses may include increased monitoring frequency, installation of additional monitoring points, revision of seepage management measures, adjustment to excavation staging, or reassessment of groundwater take.

Table 18 Required actions upon trigger

Item	Trigger level	Action
Groundwater quantity	If groundwater take is greater than 25 ML/year allowance for water under the existing WAL (10WA109463)	Notify WaterNSW
Groundwater level	Monitored groundwater level does not go lower than trigger level	Continue Bulk Earthworks and dewatering
	Monitored groundwater level is lower than trigger level	Undertake review of monitoring results within three days and cease excavation and dewatering if review not then carried out.
Groundwater quality – daily observation	Observations are consistent with previous observations	Continue Bulk Earthworks and dewatering
	Significant visual change in groundwater as compared to the previous observation	Sample and analyse groundwater quality (outside of usual groundwater monitoring rounds) to determine the cause of changed visual condition. Re-commence discharge once the cause is established and understood to no longer be a risk to groundwater quality.
Groundwater quality – sampling and analysis	Analyte records are below/within trigger level	Continue Bulk Earthworks and dewatering
	Analyte records a concentration above the guideline values for three consecutive readings	Notify hydrogeologist of change in conditions. Treat groundwater discharge, where necessary, in line with discharge permits.

14 Conclusions

This Groundwater Assessment Report has been prepared by Arcadis to address the site-specific Secretary's Environmental Assessment Requirements (SEARs) and associated agency requirements (DCCEE and NSW EPA) for the proposed State Significant Development Application (SSDA) No. 97711727. The assessment focuses on groundwater interactions and potential impacts to aquifers, watercourses, water resources, and groundwater users arising from changes to groundwater levels during the project.

The Bulk Earthworks, Rehabilitation and Quarrying works (BEW) involve site preparation and rehabilitation to achieve the proposed Bulk Earthwork Levels (BELs) for industrial development under SSDA 97688711. Where practical, the BELs have been raised to avoid or minimise interaction with groundwater within the unconfined Bringelly Shale aquifer. Unavoidable groundwater interaction is expected at the proposed sediment basins around the perimeter of the site and temporary stormwater/sediment basins within the lots, drainage swales, and two lots where the BEL is below the groundwater level.

Groundwater inflow associated with seepage during BEW has been estimated using analytical methods and an analytical element model (AEM) developed in GFLOW. Analytical calculations estimated groundwater inflow to be 4.2 ML/year in the characteristic permeability case, with sensitivity analysis for lower and upper bound permeability values estimating a groundwater take range between 2.5 ML to 7.5 ML/year. The AEM predicts a steady-state groundwater inflow of approximately 1.76 ML/year to BEW finished surface. This estimate represents conditions at the completion of bulk earthworks, when all excavations are simultaneously open and interacting, and therefore reflects a combined, system-scale seepage response under steady-state conditions. The Site holds an existing Water Access Licence (WAL) 10WA109463 for Lot 2 DP 1278780 and Lot 3 DP 1278780, which authorises a share component of 25 units (25 ML/year). This allocation is sufficient to cover dewatering licensing requirements should groundwater take exceed the 3 ML/year threshold requiring a WAL under NSW regulatory provisions.

The groundwater impact assessment indicates that Bulk Earthworks (BEW) will result in negligible to low impacts to the local groundwater system. Total recharge remains unchanged, with the primary effect being a redistribution of groundwater discharge pathways, whereby groundwater inflow to excavations (approximately 1.50 ML/year) is largely offset by a corresponding reduction in regional throughflow. Predicted changes to groundwater–surface water interaction are minimal, with a negligible reduction in baseflow to South Creek and no measurable impact to Badgerys Creek, which is ephemeral under pre-development conditions. All registered groundwater users are located outside the modelled drawdown extent and are therefore not expected to be impacted. Potential effects on groundwater dependent ecosystems (GDEs) are also limited, with negligible impacts predicted for South Creek and Badgery's Creek GDEs. Overall, the assessment demonstrates that BEW-related groundwater impacts are minor, localised, and manageable, and do not result in a material change to the site water balance or regional groundwater regime.

Assessment against the NSW Aquifer Interference Policy Minimal Impact Considerations indicates that minimal impact thresholds for groundwater level, pressure, and quality are unlikely to be exceeded as a result of the proposed works.

Groundwater monitoring during BEW has been proposed to confirm actual groundwater conditions encountered, verify the extent of groundwater interaction, and support compliance with project approvals and management measures. Because the existing groundwater wells will be decommissioned and removed as part of the bulk earthworks, four replacement monitoring wells will be installed prior to excavation to maintain continuity of monitoring coverage. This approach will provide data to support adaptive management during construction and inform compliance reporting and any post-construction groundwater assessment.

15 Limitations

The findings of this report are based on the Scope of Work described in this report. Arcadis performed the services in a manner consistent with the level of care and expertise exercised by members of the environmental profession.

No warranties, express or implied, are made. Subject to the Scope of Work, Arcadis' assessment is limited strictly to identifying typical environmental conditions associated with the subject property.

While normal assessments of data reliability have been made, Arcadis assumes no responsibility or liability for errors in any data obtained from regulatory agencies, statements from sources outside of Arcadis, or developments resulting from situations outside the scope of this project

Arcadis prepared this report for the sole and exclusive benefit and use of the client. Notwithstanding delivery of this report by Arcadis or the client to any third party, any copy of this report provided to a third party is provided for informational purposes only, without the right to rely.

Information from samples collected by Arcadis personnel relating to soil, groundwater, waste, air or other matrix conditions in this document is considered to be accurate at the date of issue. Surface, subsurface and atmospheric conditions can vary across a particular site or region, which cannot be wholly defined by investigation. As a result, it is unlikely that the results and estimations presented in this report will represent the extremes of conditions within the site that may exist. Subsurface conditions including contaminant concentrations can change in a limited period of time and typically have a high level of spatial heterogeneity.

From a technical perspective, there is a high degree of uncertainty associated with the assessment of subsurface, aquatic and atmospheric environments. They are prone to be heterogeneous, complex environments, in which small subsurface features or changes in geologic conditions or other environmental anomalies can have substantial impact on water, air and chemical movement.

Arcadis' professional opinions are based upon its professional judgment, experience, and training. These opinions are also based upon data derived from the limited testing and analysis described in this report. It is possible that additional testing and analysis might produce different results and/or different opinions. Arcadis has limited its investigation(s) to the scope agreed upon with its client.

That standard of care may change and new methods and practices of exploration, testing and analysis may develop in the future, which might produce different results.

16 References

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Appendices

Appendix A – Borehole Logs

PROJECT NUMBER 30297987	DRILLING DATE 28/10/2025	COORDINATES 292792.669, 6247309.54
PROJECT NAME Project Maverick	TOTAL DEPTH 6 m	COORD SYS GDA 2020 Z56
CLIENT Goodman Property Services Australia	DIAMETER 50 mm	COMPLETION Monument
ADDRESS 265 Martin Road, NSW 2556	CASING 0 - 2.8 m (uPVC)	SURFACE ELEVATION 60.32 m AHD
LICENCE NO. -	SCREEN 2.8 - 5.8 m (uPVC Factory Slotted)	WELL TOC 61.206m AHD

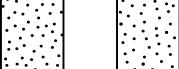
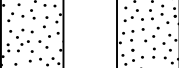
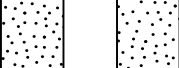
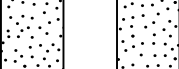
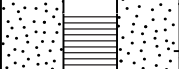
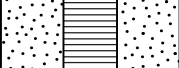
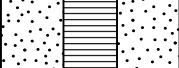
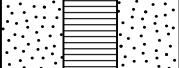
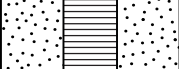
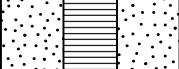
COMMENTS

LOGGED BY EB
CHECKED BY DH

PID	Samples	Analysed	% Recovery	Depth (m)	Graphic Log	Moisture	Material Description	Well Diagram	Elevation (m AHD)
				0.5		SM	TOPSOIL		60
				1		D	CLAY; white-yellow-orange mottled, stiff, with rate ironstone inclusions 1-2mm	concrete cement grout Bentonite	59.5
				1.5					59
				2			SILTSTONE; pale brown, ironstone inclusions		58.5
				2.5					58
				3			SHALE; pale brown		57.5
				3.5			SILTSTONE; pale brown to grey, with gravel inclusions	filter pack	57
				4					56.5
				4.5					56
				5		SM	SILTSTONE; brown to grey, with gravel inclusions		55.5
				5.5		M			55
				6			Termination Depth at: 6 m	backfill	54.5
				6.5					54
				7					53.5
				7.5					53
				8					52.5
				8.5					52
				9					51.5
				9.5					51
									50.5

PROJECT NUMBER 30297987	DRILLING DATE 28/10/2025	COORDINATES 292792,669, 6247309,54
PROJECT NAME Project Maverick	TOTAL DEPTH 7 m	COORD SYS GDA 2020 Z56
CLIENT Goodman Property Services Australia	DIAMETER 50 mm	COMPLETION Monument
ADDRESS 265 Martin Road, NSW 2556	CASING 0 - 3.5 m (uPVC)	SURFACE ELEVATION 64.89 m AHD
LICENCE NO. -	SCREEN 3.5 - 6.5 m (uPVC Factory Slotted)	WELL TOC 65.72 m AHD

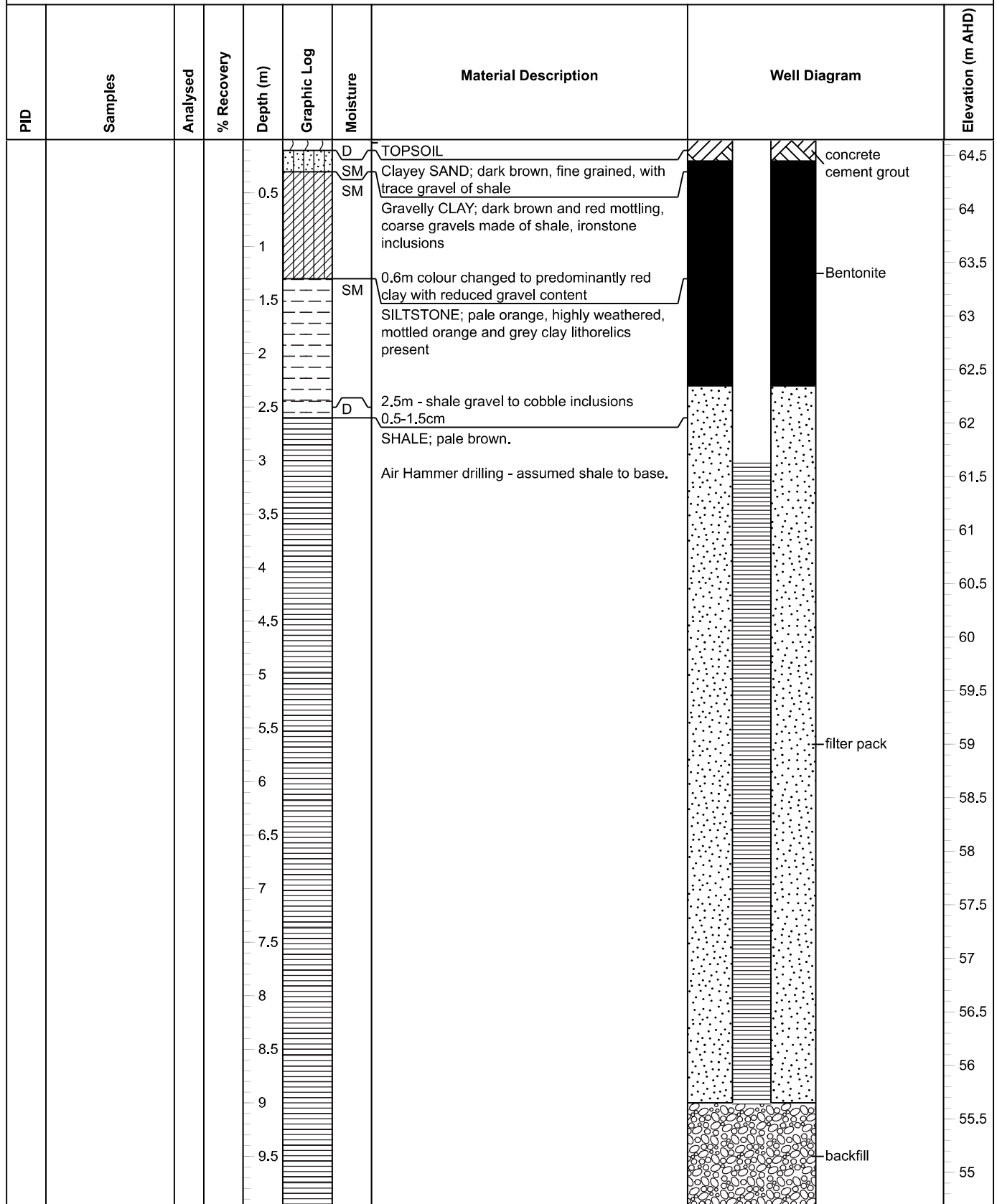
COMMENTS	LOGGED BY EB CHECKED BY DH
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PID	Samples	Analysed	% Recovery	Depth (m)	Graphic Log	Moisture	Material Description	Well Diagram	Elevation (m AHD)
				0.5		D	TOPSOIL		64.5
				1		SM	Silty CLAY; pale brown CLAY; dark grey mottled orange, ironstone inclusions 1-2mm		64
				1.5		SM	Silty CLAY; dark brown to mottled orange Reduced silt content with depth (1.5 - 3.6)		63.5
				2					63
				2.5					62.5
				3					62
				3.5					61.5
				4		SM	Clayey SILT; mottled orange to yellow, slightly moist		61
				4.5			Increased clay content and siltstone inclusions		60.5
				5			colour change to pale brown (5.0 to 5.3)		60
				5.5					59.5
				6		SM	SILT; dark brown, mottled orange, with siltstone inclusions		59
				6.5					58.5
				7			Termination Depth at: 7 m Collapsed 6.5 - 7.0 m		58
				7.5					57.5
				8					57
				8.5					56.5
				9					56
				9.5					55.5
									55

PROJECT NUMBER 30297987	DRILLING DATE 30/10/2025	COORDINATES 292648,841, 6247089,520
PROJECT NAME Project Maverick	TOTAL DEPTH 10.2	COORD SYS GDA 2020 Z56
CLIENT Goodman Property Services Australia	DIAMETER 50 mm	COMPLETION Monument
ADDRESS 265 Martin Road, NSW 2556	CASING 0 - 3 m (uPVC)	SURFACE ELEVATION 64.65 m AHD
LICENCE NO. -	SCREEN 3 - 9 m (uPVC Factory Slotted)	WELL TOC 65.57 m AHD

COMMENTS

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PID	Samples	Analysed	% Recovery	Depth (m)	Graphic Log	Moisture	Material Description	Well Diagram	Elevation (m AHD)
				9.5					54.5
				10.0			Termination Depth at: 10.2 m	backfill	54
				10.5					53.5
				11.0					53
				11.5					52.5
				12.0					52
				12.5					51.5
				13.0					51
				13.5					50.5
				14.0					50
				14.5					49.5
				15.0					49
				15.5					48.5
				16.0					48
				16.5					47.5
				17.0					47
				17.5					46.5
				18.0					46
				18.5					45.5
				19.0					45
				19.5					44.5
				20.0					44
				20.5					43.5
				21.0					43
				21.5					

PROJECT NUMBER 30297987	DRILLING DATE 28/10/2025	COORDINATES 292926.132, 6246696.303
PROJECT NAME Project Maverick	TOTAL DEPTH 6 m	COORD SYS GDA 2020 Z56
CLIENT Goodman Property Services Australia	DIAMETER 50 mm	COMPLETION Monument
ADDRESS 265 Martin Road, NSW 2556	CASING 0 - 1 m (uPVC)	SURFACE ELEVATION 56.11 m AHD
LICENCE NO. -	SCREEN 1 - 5.4 m (uPVC Factory Slotted)	WELL TOC 56.99 m AHD

COMMENTS	LOGGED BY EB CHECKED BY DH
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PID	Samples	Analysed	% Recovery	Depth (m)	Graphic Log	Moisture	Material Description	Well Diagram	Elevation (m AHD)
				0.5		D	TOPSOIL		56
				1		D	Silty CLAY; pale brown, fine grained silt, soft		55.5
				1.5		D	CLAY; mottled red and grey, trace ironstone inclusions		55
				2		D	SILTSTONE; pale brown, highly weathered, coarse gravel siltstone lithorelics		54.5
				2.5			2.5m - pale brown colour		54
				3					53.5
				3.5					53
				4			4.0m - dark grey to brown, trace gravels		52.5
				4.5			4.5m - increase in sand content		52
				5					51.5
				5.5					51
				6					50.5
				6			Termination Depth at: 6 m		50
				6.5					49.5
				7					49
				7.5					48.5
				8					48
				8.5					47.5
				9					47
				9.5					46.5

PROJECT NUMBER 30297987	DRILLING DATE 29/10/2025	COORDINATES 292456.445, 6247524.516
PROJECT NAME Project Maverick	TOTAL DEPTH 7 m	COORD SYS GDA 2020 Z56
CLIENT Goodman Property Services Australia	DIAMETER 50 mm	COMPLETION Monument
ADDRESS 265 Martin Road, NSW 2556	CASING 0 - 3.3 m (uPVC)	SURFACE ELEVATION 62.64 m AHD
LICENCE NO. -	SCREEN 3 - 6.3 m (uPVC Factory Slotted)	WELL TOC 63.43 m AHD

COMMENTS

LOGGED BY EB
CHECKED BY DH

PID	Samples	Analysed	% Recovery	Depth (m)	Graphic Log	Moisture	Material Description	Well Diagram	Elevation (m AHD)
				0.5		D	TOPSOIL		62.5
				0.5		D	CLAY; mottled pale red dark orange and pale grey, ironstone inclusions	concrete cement grout	62
				1		SM			61.5
				1.5				Bentonite	61
				2					60.5
				2.5		D	SILTSTONE; pale reddish brown, highly weathered, trace red and grey clay nodules		60
				3			3.0m - colour darkens to brown		59.5
				3.5					59
				4			4.0m - increased clay nodules		58.5
				4.5				filter pack	58
				5					57.5
				5.5					57
				6					56.5
				6.5				collapse	56
				7			Termination Depth at: 7 m Collapsed to 6.3 m		55.5
				7.5					55
				8					54.5
				8.5					54
				9					53.5
				9.5					53

PROJECT NUMBER 30297987	DRILLING DATE 29/10/2025	COORDINATES 291878,362, 6246672,710
PROJECT NAME Project Maverick	TOTAL DEPTH 6.4 m	COORD SYS GDA 2020 Z56
CLIENT Goodman Property Services Australia	DIAMETER 50 mm	COMPLETION Monument
ADDRESS 265 Martin Road, NSW 2556	CASING 0 - 3 m (uPVC)	SURFACE ELEVATION 67.74 m AHD
LICENCE NO. -	SCREEN 3 - 6 m (uPVC Factory Slotted)	WELL TOC 68.57 m AHD

COMMENTS

LOGGED BY EB
CHECKED BY DH

PID	Samples	Analysed	% Recovery	Depth (m)	Graphic Log	Moisture	Material Description	Well Diagram	Elevation (m AHD)
				0.5		D	TOPSOIL		67.5
				1		SM	FILL CLAY; mottled grey and pale red, ironstone inclusions 1-2mm		67
				1.5					66.5
				2					66
				2.5					65.5
				3		D	Silty CLAY; mottled red-grey, fine silt		65
				3.5					64.5
				4					64
				4.5		D	SILTSTONE; pale orange brown, highly weathered, coarse gravel siltstone lithorelics		63.5
				5			4.5m - colour pales to orangish yellow		63
				5.5			5.5m - colour pales to yellowish brown		62.5
				6			6.0m - pale brown		62
				6.5					61.5
				6.5			Termination Depth at: 6.4 m (refusal)		61
				7					60.5
				7.5					60
				8					59.5
				8.5					59
				9					58.5
				9.5					58

PROJECT NUMBER 30297987	DRILLING DATE 29/10/2025	COORDINATES 291674.927, 6246772.005
PROJECT NAME Project Maverick	TOTAL DEPTH 7 m	COORD SYS GDA 2020 Z56
CLIENT Goodman Property Services Australia	DIAMETER 50 mm	COMPLETION Monument
ADDRESS 265 Martin Road, NSW 2556	CASING 0 - 3.5 m (uPVC)	SURFACE ELEVATION 69.42 m AHD
LICENCE NO. -	SCREEN 3.5 - 6.5 m (uPVC Factory Slotted)	WELL TOC 70.29 m AHD

COMMENTS Located on fill stockpile	LOGGED BY EB CHECKED BY DH
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PID	Samples	Analysed	% Recovery	Depth (m)	Graphic Log	Moisture	Material Description	Well Diagram	Elevation (m AHD)
				0.5		SM	TOPSOIL		69
				1			FILL CLAY; mottled dark orange and pale grey, ironstone inclusions 1-2mm	concrete cement grout	68.5
				1.5				Bentonite	68
				2					67.5
				2.5		D	2.5m - colour change to dark brown and grey		67
				3					66.5
				3.5		SM	3.5m - increased moisture content, minor coarse gravels of siltstone		66
				4				filter pack	65.5
				4.5			4.5m - colour change to mottled dark orange pale red and pale grey		65
				5					64.5
				5.5		SM	CLAY; mottled red and grey		64
				6					63.5
				6.5					63
				7			Termination Depth at: 7 m	bentonite	62.5
				7.5					62
				8					61.5
				8.5					61
				9					60.5
				9.5					60
									59.5

PROJECT NUMBER 30297987	DRILLING DATE 29/10/2025	COORDINATES 292121.36, 6247263.304
PROJECT NAME Project Maverick	TOTAL DEPTH 7 m	COORD SYS GDA 2020 Z56
CLIENT Goodman Property Services Australia	DIAMETER 50 mm	COMPLETION Monument
ADDRESS 265 Martin Road, NSW 2556	CASING 0 - 1.5 m (uPVC)	SURFACE ELEVATION 64.49 m AHD
LICENCE NO. -	SCREEN 1.5 - 4.5 m (uPVC Factory Slotted)	WELL TOC 65.39 m AHD

COMMENTS	LOGGED BY EB CHECKED BY DH
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PID	Samples	Analysed	% Recovery	Depth (m)	Graphic Log	Moisture	Material Description	Well Diagram	Elevation (m AHD)
				0.5			TOPSOIL		64
				1		SM	CLAY; mottled pale orange and grey, trace ironstone inclusions 1-2mm		63.5
				1.5					63
				2					62.5
				2.5					62
				3		D	SILTSTONE; pale grey, highly weathered		61.5
				3.5					61
				4			4.0m - colour change to pale brown		60.5
				4.5					60
				5					59.5
				5.5					59
				6			6.0m - colour change to pale grey		58.5
				6.5					58
				7			Termination Depth at: 7 m Collapsed at 6.3 - 7 m		57.5
				7.5					57
				8					56.5
				8.5					56
				9					55.5
				9.5					55

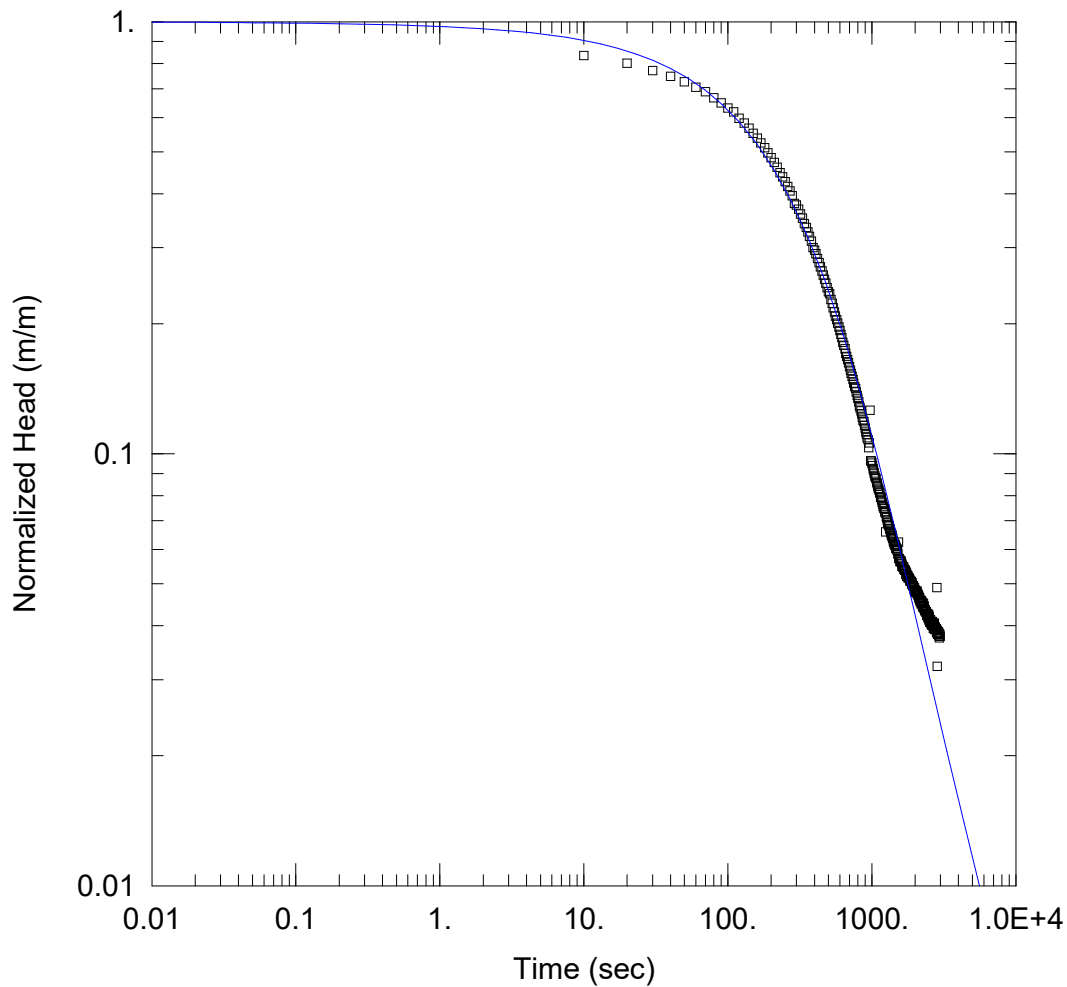
PROJECT NUMBER 30297987	DRILLING DATE 28/10/2025	COORDINATES 293354.754, 6247102.896
PROJECT NAME Project Maverick	TOTAL DEPTH 5.1 m	COORD SYS GDA 2020 Z56
CLIENT Goodman Property Services Australia	DIAMETER 50 mm	COMPLETION Monument
ADDRESS 265 Martin Road, NSW 2556	CASING 0 - 2 m (uPVC)	SURFACE ELEVATION 47.18 m AHD
LICENCE NO. -	SCREEN 2.0 - 5.0 m (uPVC Factory Slotted)	WELL TOC 48.03 m AHD

COMMENTS

LOGGED BY EB
CHECKED BY DH

PID	Samples	Analysed	% Recovery	Depth (m)	Graphic Log	Moisture	Material Description	Well Diagram	Elevation (m AHD)
				0.5		SM	TOPSOIL		47
				1			CLAY; mottled pale orange and grey, trace silt	concrete cement grout	46.5
				1.5				bentonite	46
				2					45.5
				2.5					45
				3			3.0m - increasing silt content, colour change to brown		44.5
				3.5		M		filter pack	44
				4		W	Silty gravelly CLAY; pale brown, coarse gravel		43.5
				4.5		W			43
				5		W	Gravelly CLAY; mottled orange and grey, coarse gravel		42.5
				5.5			Termination Depth at: 5.1 m		42
				6					41.5
				6.5					41
				7					40.5
				7.5					40
				8					39.5
				8.5					39
				9					38.5
				9.5					38
									37.5

Appendix B – Slug testing results



WELL TEST ANALYSIS

Data Set: C:\...\BH01 FHT1.aqt

Date: 06/03/26

Time: 11:47:58

PROJECT INFORMATION

Company: Arcadis

Client: Goodman

Project: Maverick

AQUIFER DATA

Saturated Thickness: 10. m

WELL DATA (BH01 FHT1)

Initial Displacement: 0.8854 m

Total Well Penetration Depth: 4.8 m

Casing Radius: 0.025 m

Static Water Column Height: 4.23 m

Screen Length: 4.8 m

Well Radius: 0.025 m

SOLUTION

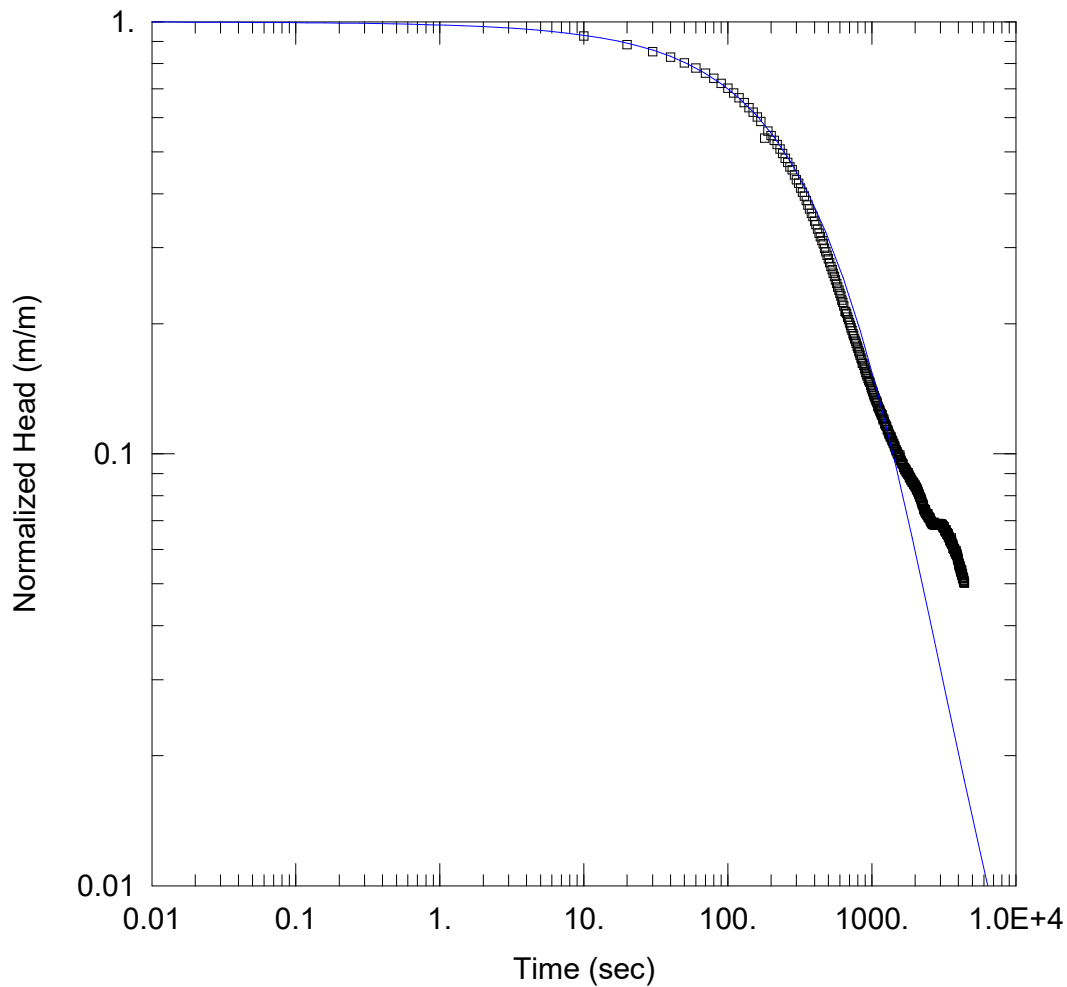
Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 0.04396 m/day

Kz/Kr = 1.

Ss = 0.004733 m⁻¹



WELL TEST ANALYSIS

Data Set: C:\...\BH01 RHT1.aqt

Date: 06/03/26

Time: 11:50:51

PROJECT INFORMATION

Company: Arcadis

Client: Goodman

Project: Maverick

AQUIFER DATA

Saturated Thickness: 10. m

WELL DATA (BH01 RHT1)

Initial Displacement: 0.8414 m

Total Well Penetration Depth: 4.8 m

Casing Radius: 0.025 m

Static Water Column Height: 4.23 m

Screen Length: 4.8 m

Well Radius: 0.025 m

SOLUTION

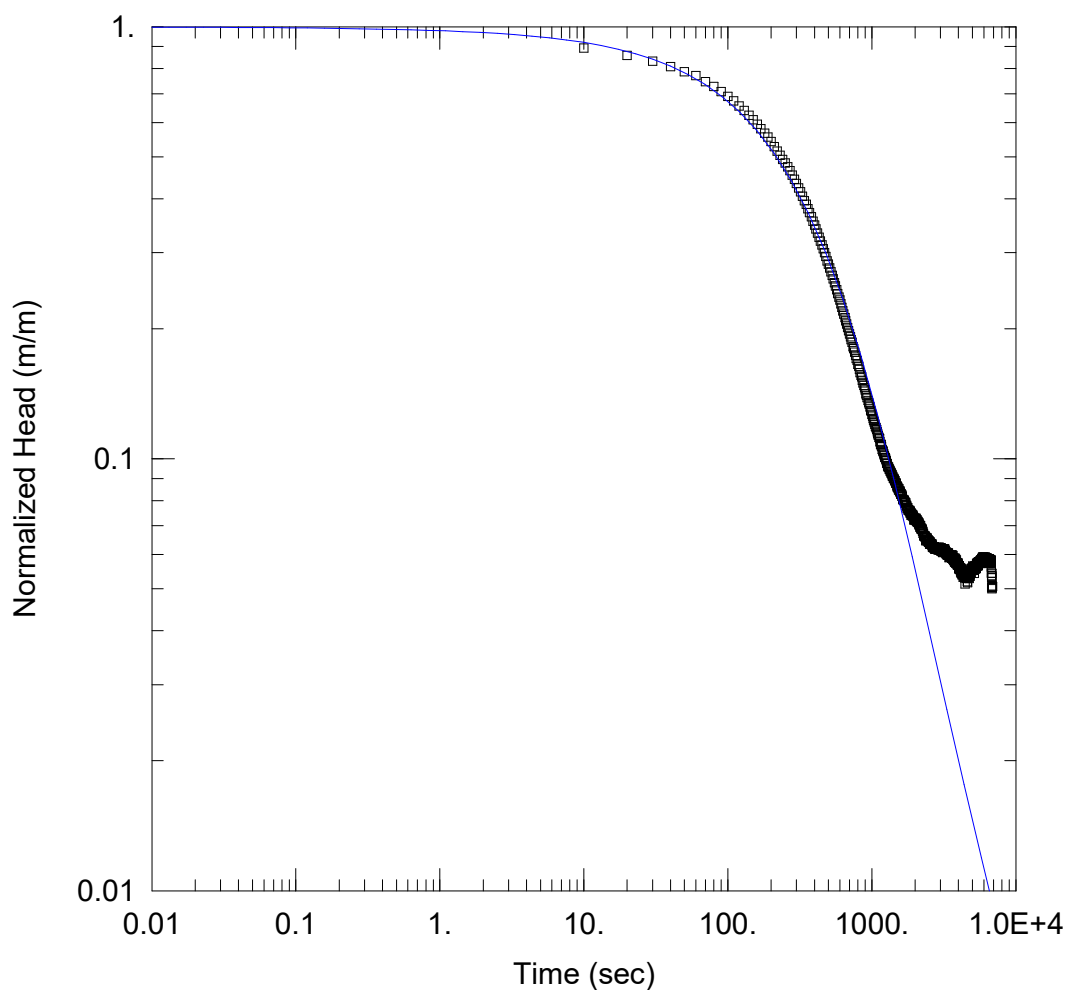
Aquifer Model: Unconfined

Kr = 0.03594 m/day

Kz/Kr = 1.

Solution Method: KGS Model

Ss = 0.0026 m⁻¹



WELL TEST ANALYSIS

Data Set: C:\...\BH01 FHT2.aqt

Date: 06/03/26

Time: 11:53:15

PROJECT INFORMATION

Company: Arcadis

Client: Goodman

Project: Maverick

AQUIFER DATA

Saturated Thickness: 10. m

WELL DATA (BH01 FHT2)

Initial Displacement: 0.8419 m

Total Well Penetration Depth: 4.8 m

Casing Radius: 0.025 m

Static Water Column Height: 4.23 m

Screen Length: 4.8 m

Well Radius: 0.025 m

SOLUTION

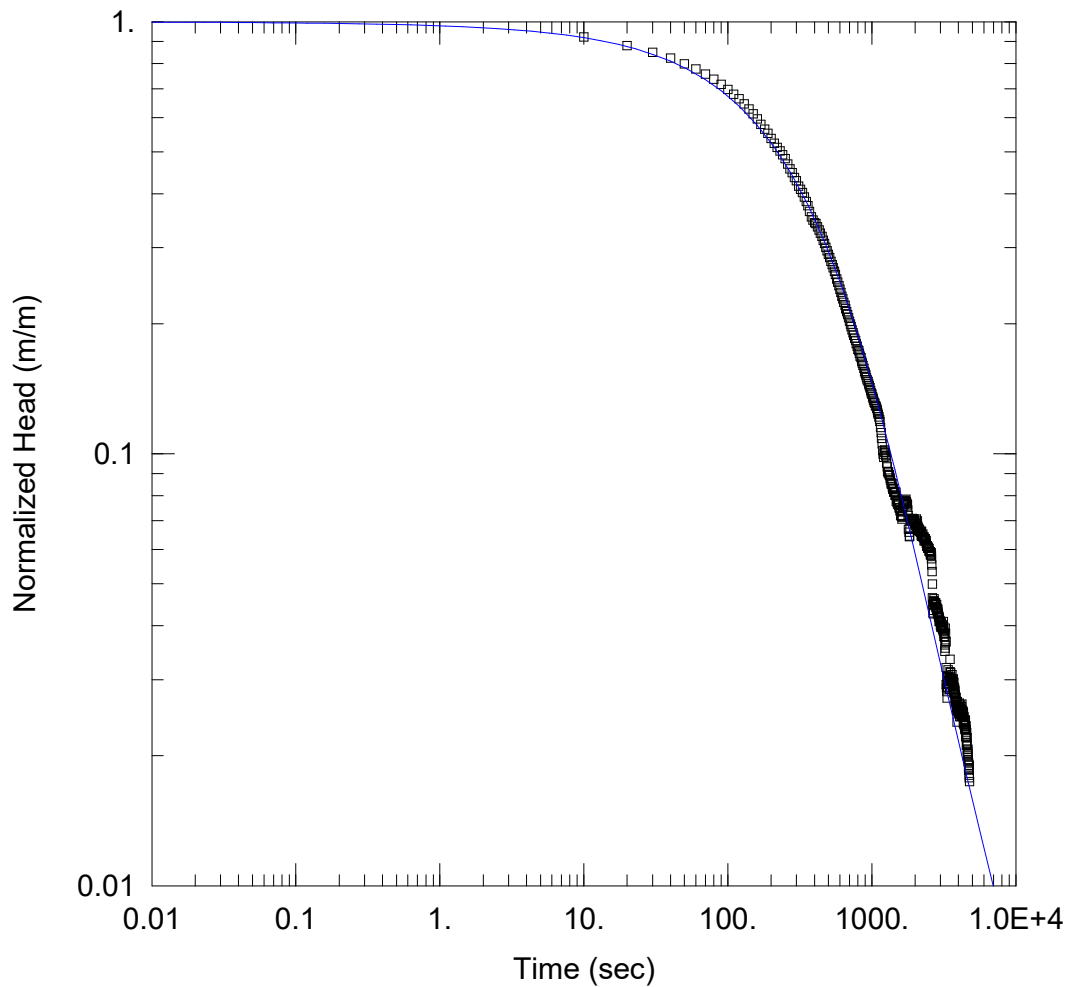
Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 0.03684 m/day

Kz/Kr = 1.

Ss = 0.003936 m⁻¹



WELL TEST ANALYSIS

Data Set: C:\...\BH01 RHT2.aqt

Date: 06/03/26

Time: 11:42:35

PROJECT INFORMATION

Company: Arcadis

Client: Goodman

Project: Maverick

AQUIFER DATA

Saturated Thickness: 10. m

WELL DATA (BH01 RHT2)

Initial Displacement: 0.8314 m

Total Well Penetration Depth: 4.8 m

Casing Radius: 0.025 m

Static Water Column Height: 4.23 m

Screen Length: 4.8 m

Well Radius: 0.025 m

SOLUTION

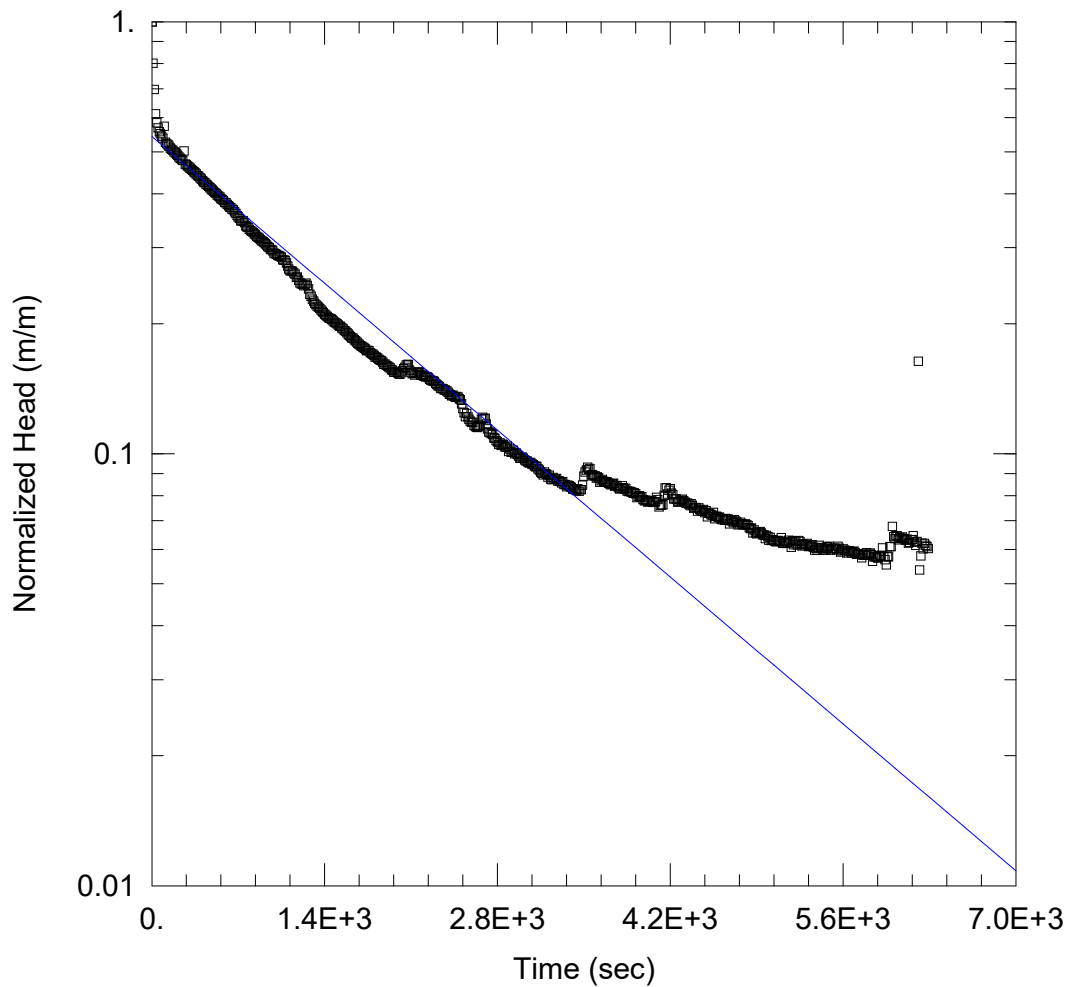
Aquifer Model: Unconfined

Solution Method: KGS Model

Kr = 0.03513 m/day

Kz/Kr = 1.

Ss = 0.004472 m⁻¹



WELL TEST ANALYSIS

Data Set: C:\Users\batesc2027\OneDrive - ARCADIS\Projects\Project Maverick\Slug testing\BH03.aqt
 Date: 06/03/26 Time: 11:55:00

PROJECT INFORMATION

Company: Arcadis
 Client: Goodman
 Project: Maverick

AQUIFER DATA

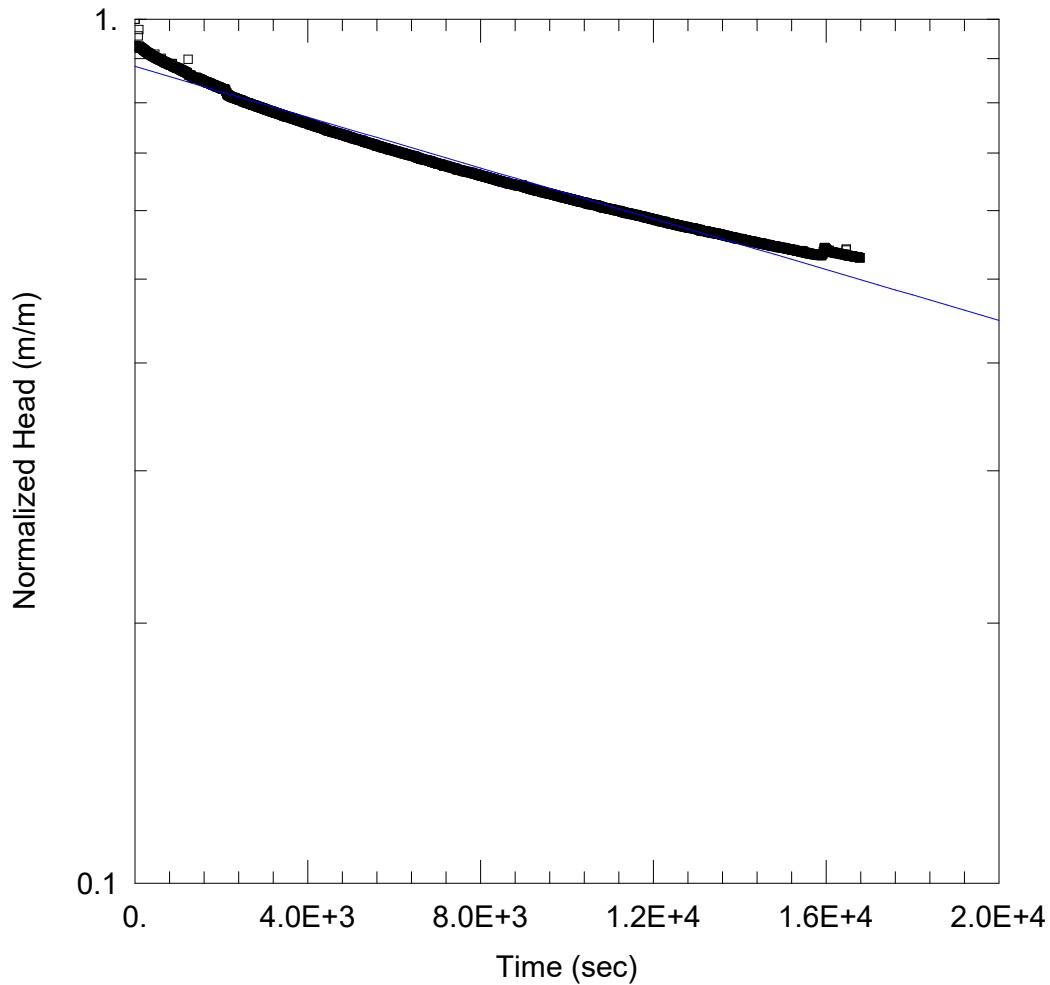
Saturated Thickness: 10. m Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (BH03)

Initial Displacement: 0.8404 m Static Water Column Height: 2.52 m
 Total Well Penetration Depth: 6.7 m Screen Length: 6.7 m
 Casing Radius: 0.025 m Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 $K = 0.009085$ m/day $y_0 = 0.4561$ m



WELL TEST ANALYSIS

Data Set: C:\Users\batesc2027\OneDrive - ARCADIS\Projects\Project Maverick\Slug testing\BH05.aqt
 Date: 06/05/26 Time: 16:05:55

PROJECT INFORMATION

Company: Arcadis
 Client: Goodman
 Project: Maverick

AQUIFER DATA

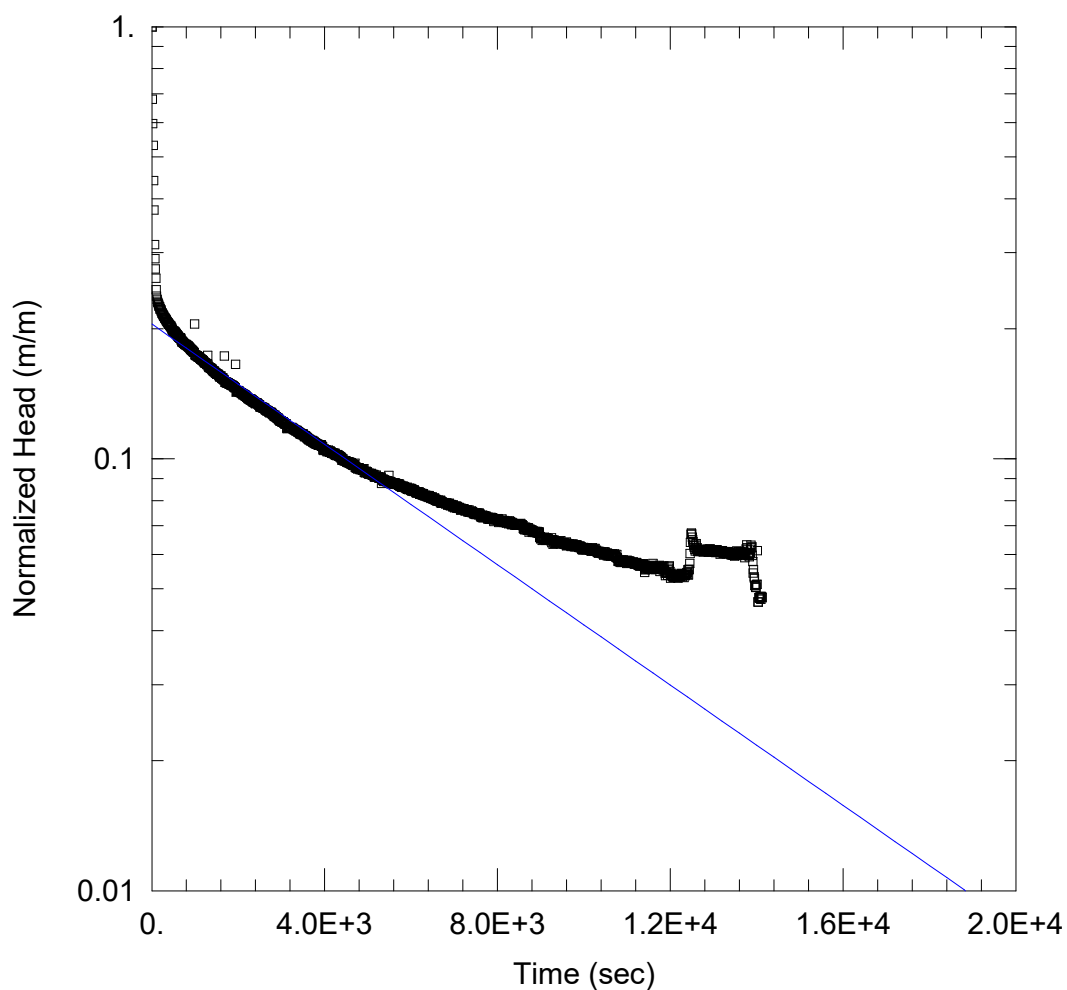
Saturated Thickness: 10. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH05)

Initial Displacement: 0.9556 m Static Water Column Height: 2.52 m
 Total Well Penetration Depth: 3.3 m Screen Length: 3.3 m
 Casing Radius: 0.025 m Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.0009221 m/day y0 = 0.8425 m



WELL TEST ANALYSIS

Data Set: C:\Users\batesc2027\OneDrive - ARCADIS\Projects\Project Maverick\Slug testing\BW2A.aqt
 Date: 06/03/26 Time: 11:46:33

PROJECT INFORMATION

Company: Arcadis
 Client: Goodman
 Project: Maverick

AQUIFER DATA

Saturated Thickness: 10. m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BW2A)

Initial Displacement: 0.8876 m Static Water Column Height: 4.385 m
 Total Well Penetration Depth: 4.385 m Screen Length: 3. m
 Casing Radius: 0.025 m Well Radius: 0.025 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice
 K = 0.004981 m/day $y_0 = \underline{0.1821}$ m

Appendix C – Groundwater Monitoring Network and Hydrology Lines



Legend Site Boundary Arcadis Groundwater Bores JBSG Borehole Locations		Existing Groundwater Monitoring Bores Included in GME Excluded from GME		Named Watercourse Unnamed Drainage Lines				Rev: A Author: CB Checked: PG Approved: PG Date: 04/03/2026		Goodman 225-245 Martin Road, Bradfield Groundwater Assessment Appendix C - Groundwater Monitoring Network and Hydrology Lines	
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Appendix D – Groundwater Level Data

D1. Manual Groundwater Gauging Data

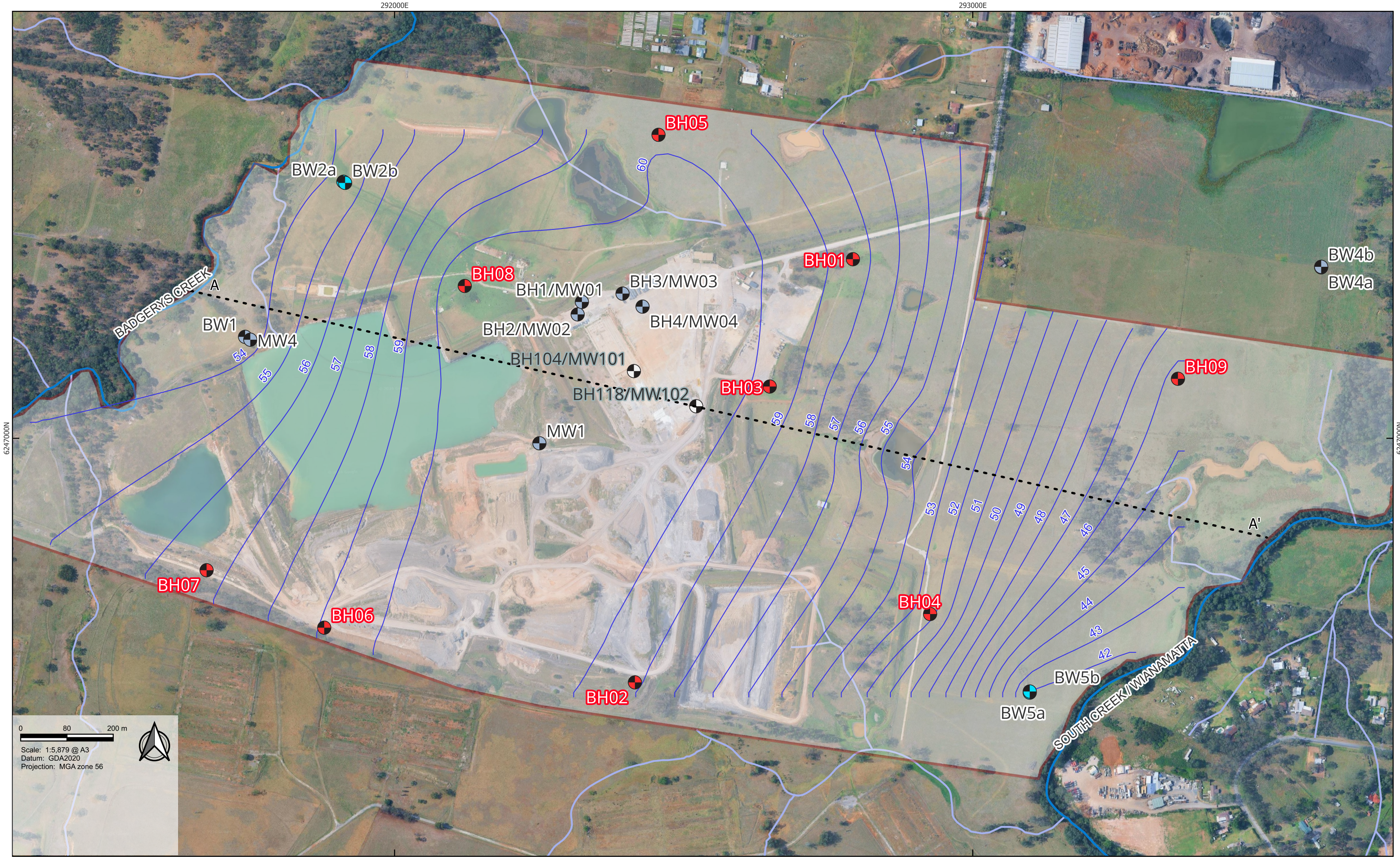
ID	Easting	Northing	Surface Elevation (m AHD)	Depth (m)	Response Interval (m)	Gauging Date	GW Depth (m bgl)	GW Level (m AHD)
BH01	292792.669	6247309.540	60.316	5.8	1.0 - 5.8	03.11.25	1.5	58.9
						19.11.25	1.5	58.8
						28.11.25	1.6	58.7
						22.01.26	1.7	58.6
						01.06.26	1.6	58.7
BH02	292415.627	6246578.150	64.891	6.6	1.0 - 6.5	03.11.25	5.8	59.1
						19.11.25	5.7	59.2
						28.11.25	5.7	59.2
						22.01.26	5.7	59.2
						01.06.26	5.7	59.2
BH03	292648.841	6247089.520	64.654	9.1	2.3 - 9.0	03.11.25	4.8	59.9
						19.11.25	4.9	59.8
						28.11.25	4.9	59.8
						22.01.26	5.0	59.7
						02.06.26	4.9	59.7
BH04	292926.132	6246696.303	56.114	5.5	1.0 - 5.4	03.11.25	4.3	51.8
						19.11.25	3.7	52.4
						28.11.25	3.7	52.4
						22.01.26	3.1	53.0
						02.06.26	3.1	53.0
BH05	292456.445	6247524.516	62.644	5.5	3.0 - 6.3	03.11.25	3.0	59.6
						19.11.25	2.9	59.7
						28.11.25	2.9	59.8
						22.01.26	2.6	60.1
						01.06.26	2.8	59.8
BH06	291878.362	6246672.710	67.743	6.1	1.0 - 6.0	03.11.25	Dry	-
						19.11.25	Dry	-
						28.11.25	Dry	-
						01.06.26	Dry	-
BH07	291674.927	6246772.005	69.422	6.5	1.0 - 6.5	03.11.25	Dry	-

ID	Easting	Northing	Surface Elevation (m AHD)	Depth (m)	Response Interval (m)	Gauging Date	GW Depth (m bgl)	GW Level (m AHD)
						19.11.25	Dry	-
						28.11.25	Dry	-
						01.06.26	Dry	-
BH08	292121.36	6247263.304	64.492	4.5	0.5 - 5.0	03.11.25	Dry	-
						19.11.25	3.4	61.1
						28.11.25	3.5	61.0
						22.01.26	2.3	62.2
						01.06.26	3.8	60.7
BH09	293354.754	6247102.896	47.179	5.0	1.0 - 5.1	03.11.25	1.0	46.2
						19.11.25	1.3	45.9
						28.11.25	1.4	45.8
						22.01.26	1.8	45.3
						02.06.26	1.6	45.5
BW1A	291741	6247174	56.06	6.3	4.0 - 7.0	19.11.25	2.6	53.4
						28.11.25	2.7	53.4
BW5A	293098	6246559	45.56	8.0	5.0 - 8.0	28.11.25	3.8	42.8
						22.01.26	3.7	42.9
						02.06.26	3.7	42.9
BW5B	293098	6246561	46.51	33.0	27.0 – 33.0	28.11.25	2.4	44.1
						02.06.26	2.4	44.1
BW2A	291911	6247442	56.29	8.0	5.0 - 8.0	17.12.25	2.1	54.2
						22.01.26	2.2	54.1
						01.06.26	2.6	53.7
BW2B	291914	6247440	56.40	33.0	27.0 – 33.0	17.12.25	8.2	48.2

225-245 Martin Road, Bradfield
Bulk Earthworks, Rehabilitation and Quarrying (SSD-97711727)
Groundwater Assessment Report



D2. Groundwater Contour Map



Site Boundary

Arcadis Groundwater Bores

JBSG Borehole Locations

Existing Groundwater Monitoring Bores

Included in GME

Excluded from GME

Unnamed Drainage Lines

Named Watercourse

Groundwater contours (m AHD)

A-A' Section Line

ARCADIS

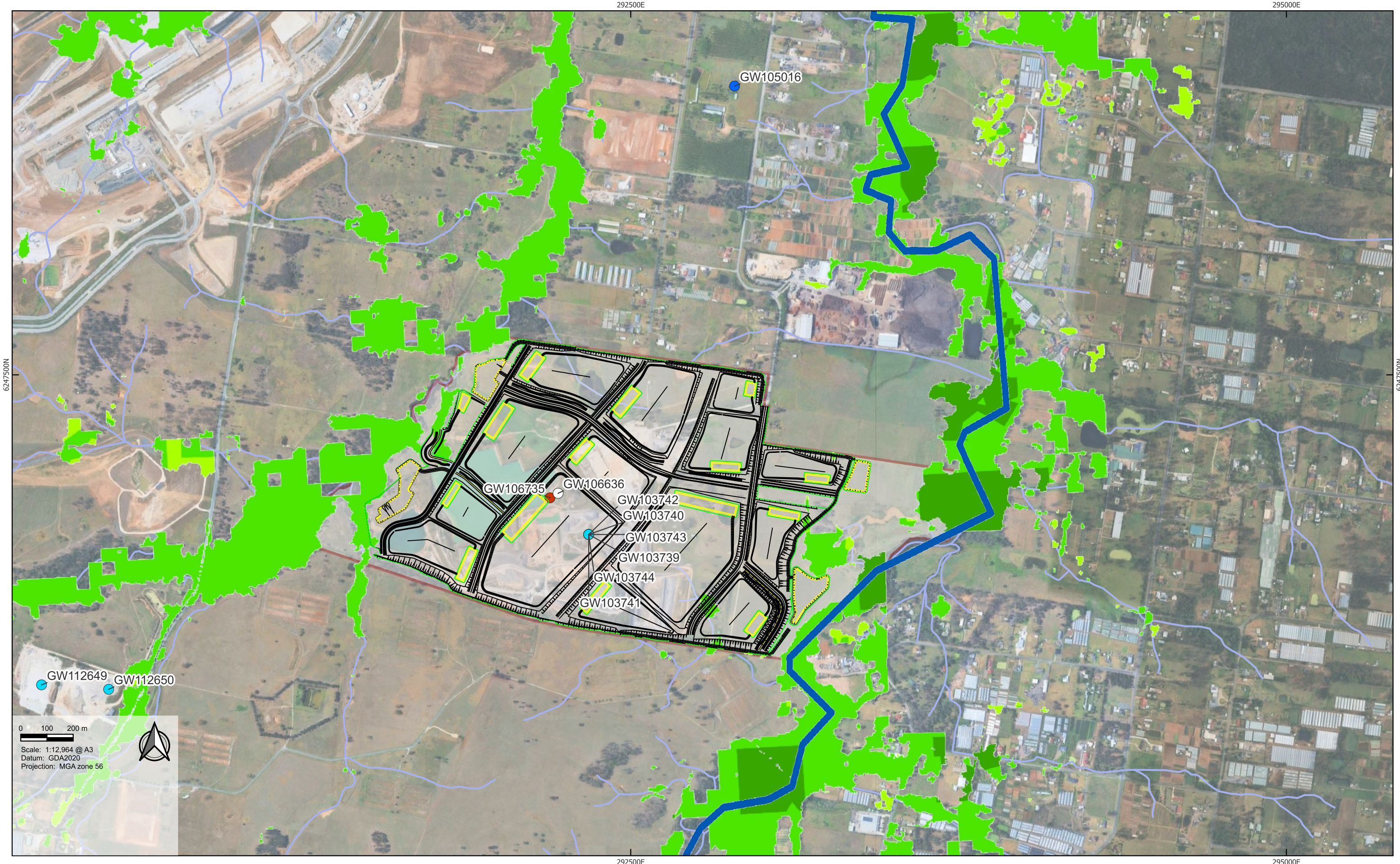
Rev: B
Author: CB
Checked: PG
Approved: PG
Date: 05/06/2026

Goodman
225 -245 Martin Road, Bradfield
Groundwater Assessment

Appendix D -
Groundwater Level
Contours

Badgerys Rev A 05/06/2026

Appendix E – Potential Groundwater Dependant Ecosystems and Groundwater Users



Site Boundary	BOM Groundwater Bore Types ● Water Supply ● Monitoring ● Commercial and Industrial ○ Unknown	GDE HEVAE NSW ■ Very High ■ High ■ Medium ■ Low ■ Very Low	Aquatic GDE ■ Known GDE - from regional studies ■ High potential GDE - from regional studies ■ Moderate potential GDE - from regional studies ■ Low potential GDE - from regional studies ■ Unclassified potential GDE - from regional studies ■ High potential GDE - from national assessment ■ Moderate potential GDE - from national assessment		Rev: A Author: CB Checked: PG Approved: PG Date: 06/03/2026	Goodman 225 - 245 Martin Road, Bradfield Groundwater Assessment Appendix E - Potential Groundwater Dependant Ecosystems and Groundwater Users
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Appendix F – Groundwater Interception with Bulk Earthworks



Legend

Site Boundary

Depth to GW (m)

0

-4.5

Named Watercourse

Unnamed Drainage Lines

Rev: B
Author: CB
Checked: PG
Approved: PG
Date: 05/06/2026

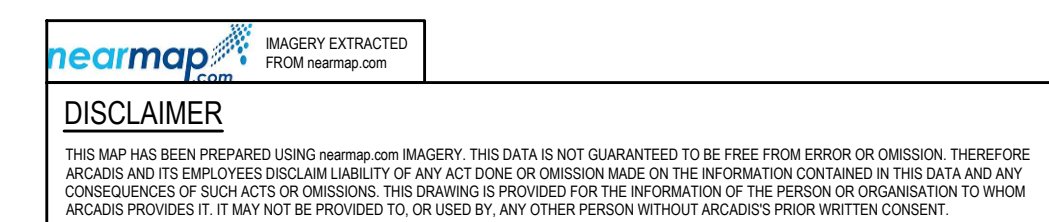
Goodman
225 - 245 Martin Road, Bradfield
Groundwater Assessment

Appendix F - Map showing where
groundwater is intercepted by
Bulk Earthworks Level

Badgerys Rev A 05/06/2026

Appendix G – Bulk Earthworks, Rehabilitation and Quarrying Civil Drawings

DRAWING NUMBER	DESCRIPTION
GENERAL	
MAR-AAP-DA-R02-DRG-CI-0001	COVER SHEET, LOCALITY PLAN AND DRAWING SCHEDULE
MAR-AAP-DA-R02-DRG-CI-0021	GENERAL NOTES
MAR-AAP-DA-R02-DRG-CI-0061	GENERAL ARRANGEMENT PLAN
MAR-AAP-DA-R02-DRG-CI-0091	PIT 1 EXCAVATION PLAN
MAR-AAP-DA-R02-DRG-CI-0092	PIT 1 EXCAVATION SECTIONS SHEET 1
MAR-AAP-DA-R02-DRG-CI-0093	PIT 1 EXCAVATION SECTIONS SHEET 2
MAR-AAP-DA-R02-DRG-CI-0095	PIT 2 EXCAVATION PLAN
MAR-AAP-DA-R02-DRG-CI-0096	PIT 2 EXCAVATION SECTIONS
EARTHWORKS	
MAR-AAP-DA-R02-DRG-CI-0101	CUT AND FILL PLAN
MAR-AAP-DA-R02-DRG-CI-0121	EARTHWORKS SITE SECTIONS SHEET 1
MAR-AAP-DA-R02-DRG-CI-0122	EARTHWORKS SITE SECTIONS SHEET 2
MAR-AAP-DA-R02-DRG-CI-0123	EARTHWORKS SITE SECTIONS SHEET 3
MAR-AAP-DA-R02-DRG-CI-0124	EARTHWORKS SITE SECTIONS SHEET 4
MAR-AAP-DA-R02-DRG-CI-0125	EARTHWORKS SITE SECTIONS SHEET 5
MAR-AAP-DA-R02-DRG-CI-0126	EARTHWORKS SITE SECTIONS SHEET 6
MAR-AAP-DA-R02-DRG-CI-0127	EARTHWORKS SITE SECTIONS SHEET 7
MAR-AAP-DA-R02-DRG-CI-0128	EARTHWORKS SITE SECTIONS SHEET 8
MAR-AAP-DA-R02-DRG-CI-0129	EARTHWORKS SITE SECTIONS SHEET 9
MAR-AAP-DA-R02-DRG-CI-0141	CONTAINMENT CELL PLAN
MAR-AAP-DA-R02-DRG-CI-0142	CONTAINMENT CELL SECTIONS
MAR-AAP-DA-R02-DRG-CI-0171	EROSION AND SEDIMENT CONTROL PLAN
MAR-AAP-DA-R02-DRG-CI-0191	EROSION AND SEDIMENT CONTROL DETAILS SHEET 1
MAR-AAP-DA-R02-DRG-CI-0192	EROSION AND SEDIMENT CONTROL DETAILS SHEET 2
MAR-AAP-DA-R02-DRG-CI-0241	CIVIL WORKS DETAILS



Date Plotted: 24 Jun 2026 - 10:16am File Name: C:\Users\santosa4174\DC\ACCDocs\Arcadis ACC AU\AAU-30281481-265 Martin Road Project Maverick\Project Files\10_WIP\10_AAP_Civil\R02\DRG\IMAR-AAP-DA-R02-DRG-CI-0001-CoverSheetLocalityPlanAndDrawingSchedule.dwg

1. ALL WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH LIVERPOOL CITY COUNCIL'S STANDARDS AND SPECIFICATIONS AND/OR AS DIRECTED BY THE ENGINEER. CONTRACTOR IS TO PROVIDE EVIDENCE THAT VEHICULAR CROSSING HAS BEEN CONSTRUCTED IN ACCORDANCE WITH LIVERPOOL CITY COUNCIL STANDARDS.
2. THE CONTRACTOR SHALL LOCATE AND LEVEL ALL EXISTING SERVICES PRIOR TO COMMENCING CONSTRUCTION AND SHALL MAKE ALL NECESSARY ARRANGEMENTS WITH THE RELEVANT AUTHORITY TO RELOCATE OR ADJUST AS REQUIRED. ALL COSTS TO BE BORNE BY THE APPLICANT. (NOT AT COUNCIL'S EXPENSE)
3. THE CONTRACTOR SHALL NOT ENTER UPON OR DO ANY WORK WITHIN ADJACENT LANDS WITHOUT PRIOR WRITTEN PERMISSION OF THE LAND OWNER.
4. SURVEY MARKS SHALL BE MAINTAINED AT ALL TIMES. WHERE RETENTION IS NOT POSSIBLE THE CONTRACTOR SHALL BE NOTIFIED AND CONSENT RECEIVED PRIOR TO THEIR REMOVAL.
5. ALL NEW WORKS SHALL MAKE SMOOTH JUNCTION WITH EXISTING CONDITIONS.
6. SEDIMENT CONTROL MEASURES SHALL BE IMPLEMENTED PRIOR TO SOIL DISTURBANCE IN KEEPING WITH THE "MANAGING STORMWATER MANUAL", 2004 BY LANDCOM AND TO COUNCIL'S SOIL EROSION AND SEDIMENT CONTROL POLICY.
7. ALL LAND DISTURBED BY EARTHWORKS SHALL BE HYDROMULCHED, OR SIMILARLY TREATED TO ESTABLISH GRASS COVER. SEED MIXTURES ARE TO BE APPROVED BY COUNCIL PRIOR TO SPRAYING. ALL GRASSED AREAS SHALL BE REGULARLY WATERED AND MAINTAINED UNTIL EXPIRATION OF THE MAINTENANCE PERIOD.
8. THE CONTRACTOR SHALL MAINTAIN DUST CONTROL THROUGHOUT THE DURATION OF THE PROJECT.
9. ALL PITS DEEPER THAN 12m SHALL HAVE STEP IRONS PROVIDED IN ACCORDANCE WITH COUNCIL'S STANDARDS.
10. ALL DRAINAGE LINES THROUGH LOTS SHALL BE CONTAINED WITHIN THEIR EASEMENTS AND CONFORM WITH COUNCIL'S STANDARDS.
11. SUBSOIL DRAINS SHALL BE CONSTRUCTED TO THE SATISFACTION OF THE COUNCIL.
12. MINIMUM 100mm THICK TOPSOIL SHALL BE SPREAD ON ALL VERGES, BERMS, BATTERS AND SITE REGRADING AREAS. EXCESS TOPSOIL SHALL BE DISPOSED OF AS DIRECTED BY THE ENGINEER.
13. THE CONTRACTOR SHALL PROVIDE MINIMUM 24 HOURS NOTICE TO THE ENGINEER FOR ALL INSPECTIONS.
14. THE CONTRACTOR SHALL PROVIDE SERVICES AND ALL WEATHER ACCESS AT ALL TIMES TO THE ADJOINING PROPERTIES.
15. THE CONTRACTOR SHALL UNDERTAKE TRAFFIC CONTROL MEASURES TO ENGINEERS SATISFACTION AND SHALL DISPLAY APPROPRIATE WARNING SIGNS THROUGHOUT THE DURATION OF CONSTRUCTION.
16. ALL NATURAL SURFACE DATA HAS BEEN DETERMINED BY TERRAIN MODELLING. ALL CONSTRUCTION SITE WORKS MUST BE CARRIED OUT USING THE BENCH MARKS NOTED ON THIS DRAWING.
17. 100 YEAR FLOW PATHS TO BE FORMED AT TIME OF CONSTRUCTION.
18. CONSERVATION OF NATURAL FEATURES AND REQUIREMENTS RELATING TO NATIVE VEGETATION, EXISTING WATERCOURSES AND TREES WITH RESPECT TO THE AEROTROPOLIS DEVELOPMENT CONTROL PLAN (DCL) AND THE CUMBERLAND PLAIN CONSERVATION PLAN (CPCP) IS TO BE UNDERTAKEN PRIOR TO COMMENCEMENT OF EARTHWORKS.

1. THE TOPOGRAPHICAL SURVEY WITHIN THE SITE AND BOUNDARIES WAS SUPPLIED BY LTS SURVEYORS. THE FOLLOWING INFORMATION IS TAKEN DIRECTLY FROM THE SURVEY DOCUMENTS.

DATUM	A.H.D.	JOB REF.	52486 001 DT (REV A) DATED 13/06/25
ORIGIN	PM 33801	GRID	MGA 2020
2. THE INFORMATION IS SHOWN TO PROVIDE A BASIS FOR DESIGN. ARCADIS DOES NOT GUARANTEE THE ACCURACY OR COMPLETENESS OF THE SURVEY BASE OR ITS SUITABILITY AS A BASIS FOR CONSTRUCTION DRAWINGS.
3. SHOULD DISCREPANCIES BE ENCOUNTERED DURING CONSTRUCTION BETWEEN THE SURVEY DATA AND ACTUAL FIELD DATA, CONTACT THE SUPERINTENDENT.
4. DUE TO THE NATURE OF THE SITE AS AN ACTIVE QUARRY, THE EXISTING SURFACE IS SUBJECT TO ONGOING CHANGES. AS SUCH ADDITIONAL EXISTING SURFACE INFORMATION HAS BEEN PROVIDED FROM DRONE SURVEY DATA SUPPLIED BY FREEBURN SURVEYING. THIS INFORMATION WILL BE USED TO CREATE EXISTING SURFACE DATA ONLY AND WILL NOT REPLACE THE TOPOGRAPHICAL (FEATURES) SURVEY PROVIDED BY LTS SURVEYORS.
5. REFERENCE TO TABLE EXISTING AND PROPOSED SURFACE INFORMATION FOR DETAILS OF INFORMATION USED TO CREATE THE EXISTING SURFACES.
6. GEOTECHNICAL INFORMATION IS BASED ON DOUGLAS PARTNERS DUE DILIGENCE REPORT: 234411.00.R.001 REV. DATED 19th JUNE 2025. ARCADIS CANNOT TAKE RESPONSIBILITY FOR THE ACCURACY OF THIS INFORMATION IN THE EARTHWORKS MODEL.

1. ORIGIN OF LEVELS: REFER SURVEY NOTES.
2. ALL WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH DOUGLAS PARTNERS EARTHWORKS SPECIFICATION PROJECT 234411.00 FILE NAME 234411.00.R.003, REVISION 0, DATED 18 AUGUST 2025 AND MEMORANDUM R.005 FILE NAME 234411.01.R.005.Rev0 DATED 30 JANUARY 2026.

1. THE LOCATIONS OF UNDERGROUND SERVICES SHOWN IN THIS SET OF DRAWINGS HAVE BEEN PLOTTED FROM SURVEY INFORMATION AND SERVICE AUTHORITY INFORMATION.
2. THE SERVICE INFORMATION HAS BEEN PREPARED ONLY TO SHOW THE APPROXIMATE POSITIONS OF ANY KNOWN SERVICES AND MAY NOT BE AS COMPLETED OR ACCURATE.
3. ARCADIS CAN NOT GUARANTEE THAT THE SERVICES INFORMATION SHOWN ON THESE DRAWINGS ACCURATELY INDICATES THE PRESENCE OR ABSENCE OF SERVICES OR THEIR LOCATION AND WILL ACCEPT NO LIABILITY FOR INACCURACIES IN THE SERVICES INFORMATION SHOWN FROM ANY CAUSE WHATSOEVER.
4. CONTRACTORS SHALL TAKE DUE CARE WHEN EXCAVATING ONSITE INCLUDING HAND EXCAVATION WHERE NECESSARY.
5. CONTRACTORS ARE TO CONTACT THE RELEVANT SERVICE AUTHORITY PRIOR TO COMMENCEMENT OF EXCAVATION WORKS.
6. CONTRACTORS ARE TO UNDERTAKE A SERVICES SEARCH, PRIOR TO COMMENCEMENT OF WORKS ON SITE. SEARCH RESULTS ARE TO BE KEPT ON SITE AT ALL TIMES.
7. CONTRACTOR TO ENSURE WORKS AROUND THE EXISTING HIGH PRESSURE GAS MAIN ARE UNDERTAKEN IN ACCORDANCE WITH JEMENA'S GUIDELINE TO DESIGNING, CONSTRUCTING AND OPERATING AROUND THE EXISTING AS4645 NATURAL GAS NETWORK

2. ORIGIN OF LEVELS: REFER SURVEY NOTES.
3. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK. ANY DISCREPANCIES TO BE REPORTED TO THE SUPERINTENDENT IMMEDIATELY.
4. MAKE SMOOTH CONNECTION WITH EXISTING WORKS.
5. ALL TRENCH BACKFILL MATERIAL SHALL BE COMPACTED TO THE SAME DENSITY AS THE ADJACENT MATERIAL.
6. ALL SERVICE TRENCHES UNDER VEHICULAR PAVEMENTS SHALL BE BACKFILLED WITH SAND TO 300mm ABOVE PIPE. WHERE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH TO UNDERSIDE OF PAVEMENT WITH SAND OR APPROVED GRANULAR MATERIAL. ALL COMPACTED IN 150mm LAYERS TO MINIMUM 98% MODIFIED MAXIMUM DRY DENSITY IN ACCORDANCE WITH AS 1289 5.2.1. (OR A DENSITY INDEX OF NOT LESS THAN 75)
6. PROVIDE 10mm WIDE EXPANSION JOINTS BETWEEN BUILDINGS AND ALL CONCRETE OR UNIT PAVEMENTS.
7. ASPHALTIC CONCRETE SHALL CONFORM TO RMS SPECIFICATION R16.
8. ALL BASECOURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH RMS SPECIFICATION 3051 COMPACTED TO MINIMUM 98% MODIFIED DENSITY IN ACCORDANCE WITH AS 1289 5.2.1.
9. FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m² OF BASECOURSE MATERIAL PLACED.
10. ALL SUB-BASE COURSE MATERIAL SHALL BE IGNEOUS ROCK QUARRIED MATERIAL TO COMPLY WITH RMS SPECIFICATION 3051 COMPACTED TO MINIMUM 98% MODIFIED DENSITY IN ACCORDANCE WITH AS 1289 5.2.1.
11. FREQUENCY OF COMPACTION TESTING SHALL NOT BE LESS THAN 1 TEST PER 50m² OF SUB-BASE COURSE MATERIAL PLACED.
12. AS AN ALTERNATIVE TO THE USE OF IGNEOUS ROCK AS A SUB-BASE MATERIAL IN (9) A CERTIFIED RECYCLED CONCRETE MATERIAL COMPLYING WITH RMS SPECIFICATION 3051 WILL BE CONSIDERED. SUBJECT TO MATERIAL SAMPLES AND APPROPRIATE CERTIFICATIONS BEING PROVIDED TO THE SATISFACTION OF THE SUPERINTENDENT.
13. SHOULD THE CONTRACTOR WISH TO USE A RECYCLED PRODUCT THIS SHALL BE CLEARLY IDENTIFIED IN THEIR TENDER AND THE PRICE DIFFERENCE BETWEEN AN INDICATED PRODUCT AND A RECYCLED PRODUCT SHALL BE CLEARLY INDICATED.
14. WHERE NOTED ON THE DRAWINGS THAT WORKS ARE TO BE CARRIED BY OTHERS, (eg ADJUSTMENT OF SERVICES), THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE CO-ORDINATION OF THESE WORKS.
15. UNSUITABLE AND/OR SURPLUS AND/OR CONTAMINATED MATERIAL REQUIRING OFF-SITE DISPOSAL, WILL BE TESTED AND CLASSIFIED IN ACCORDANCE WITH THE RELEVANT ACT (LANDFILL) AND RELEVANT NSW EPA MADE AND APPROVED GUIDELINES, AND DISPOSED OF TO A SUITABLE LICENCED FACILITY WHERE REQUIRED. UNSUITABLE MATERIAL INCLUDES BUT IS NOT LIMITED TO TOPSOIL, CLAY AND SILT.

1. THESE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH THE DOUGLAS PARTNERS EARTHWORKS SPECIFICATION PROJECT 234411.00 FILE NAME 234411.00.R.003, REVISION 0, DATED 18 AUGUST 2025 AND MEMORANDUM R.005 FILE NAME 234411.01.R.005.Rev0 DATED 30 JANUARY 2026.
2. A WORKSHOP IS REQUIRED WITH THE CONTRACTOR, GEOTECHNICAL ENGINEER AND CIVIL ENGINEER TO REVIEW AND AGREE ANY AMENDMENTS TO THIS EARTHWORKS SPECIFICATION PRIOR TO CONSTRUCTION COMMENCING ON SITE.

THE EROSION AND SEDIMENTATION CONTROLS SHOWN IN THE DRAWINGS IS INDICATIVE ONLY AND SHOULD BE CONSIDERED A MINIMUM TREATMENT. THE CONTRACTOR HAS SOLE RESPONSIBILITY TO ENSURE THESE MEASURES ARE ADJUSTED TO THE SUBSTRATE AND APPLIED APPROPRIATELY TO SUIT SITE CONDITIONS AT THE TIME OF STAGING OF THE WORKS AND CONSTRUCTION METHODOLOGY.

2. ALL WORK SHALL BE GENERALLY CARRIED OUT IN ACCORDANCE WITH

- a. LOCAL AUTHORITY REQUIREMENTS
- b. EPA REQUIREMENTS
- c. LANDCOM MANUAL "MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION", 4TH EDITION, MARCH 2004.

3. MAINTAIN THE EROSION CONTROL DEVICES TO THE SATISFACTION OF THE SUPERINTENDENT AND THE LOCAL AUTHORITY.

4. THE WATER IN THE SEDIMENT BASIN(S) SHALL BE LOWERED PERIODICALLY TO MAINTAIN THE MINIMUM STORAGE VOLUME REQUIRED FOR FINE SILTS.

5. AT ALL TIMES A WAIVER (ART)S SHALL BE MAINTAINED ON SITE TO:

- a. WATER THE AREAS OF HYDROMULCH
- b. CONTROL DUST

WATERING OF MULCH, DUST OR VEGETATION MUST BE KEPT TO THE MINIMUM REQUIRED TO ACHIEVE SPECIFIED OUTCOMES. IN NO CASE SHALL AREAS BE OVER WATERED TO SATURATION OR TO THE POINT WHERE WATER PONDS ON THE SURFACE.

6. STORMWATER IN THE SETTLING ZONE SHALL BE DRAINED OR PUMPED OUT WITHIN 7 DAYS (NO LATER THAN 14 DAYS AS SITE CONDITIONS ALLOW) FOLLOWING RAINFALL EVENT IF THE NOMINATED WATER QUALITY TARGETS CAN BE MET. THE LOWER LEVEL OF THE SETTLING ZONE SHALL BE IDENTIFIED WITH A FLAG THAT SHOWS CLEARLY THE LEVEL WHICH DESIGN CAPACITY IS AVAILABLE.

STORED SEDIMENT SHALL NOT ENCRATCH INTO SETTLING ZONE. SEDIMENT REMOVED FROM SEDIMENT BASIN SHALL BE DISPOSED OF IN PLACES THAT WILL NOT RESULT IN A FUTURE EROSION OR POLLUTION HAZARD.

TEMPORARY SEDIMENT BASIN OUTLET PIPE SHALL BE CAPPED DURING CONSTRUCTION. AFTER CONSTRUCTION BASIN SHOULD BE CLEARED OF SEDIMENTS BEFORE OUTLET PIPE CAP IS REMOVED.

7. WHEN STORMWATER PITS ARE CONSTRUCTED, PREVENT SITE RUNOFF ENTERING UNLESS DESIGNED FENCES ARE ERECTED AROUND PITS.

8. THE CONTROLS AND SWALES, AND EROSION AND SEDIMENT CONTROL DEVICES ARE MAINTAINED IN GOOD WORKING ORDER AND OPERATE EFFECTIVELY. REPAIRS AND/OR MAINTENANCE SHALL BE UNDERTAKEN AS REQUIRED, PARTICULARLY FOLLOWING STORM EVENTS.

9. ALL EARTHWORKS BATTERS ASSOCIATED WITH ALL SEDIMENT & EROSION CONTROL CHANNELS AND BASINS TO HAVE A MINIMUM BATTER OF 1:2 TO HELP MITIGATE AGAINST POTENTIAL BIRD NESTING.

10. THE TRUNK DRAINAGE CHANNELS WILL BE FORMED DURING THE BULK EARTHWORKS UNDERTAKEN AS PART OF THE REHAB PACKAGE. THESE CHANNELS WILL BE GRADED BETWEEN 0.5% AND 3% AND WILL NOT BE FREE DRAIN TO THE DOWNSTREAM BASIN. A SEDIMENT CATCHMENT CHANNEL SHALL BE PROVIDED BASIN FOR THE CATCHMENT THAT IS CAPTURED BY THE CHANNEL. IN MOST CASES THE CATCHMENT WILL BE THE PLAN AREA OF THE RESPECTIVE TRUNK DRAINAGE CHANNEL ITSELF. THESE DOWNSTREAM AREAS OF THE TRUNK DRAINAGE CHANNELS WILL NEED TO BE MONITORED BY THE CONTRACTOR AND CLEANED OUT DURING CONSTRUCTION IN ACCORDANCE WITH THE MAINTENANCE AND OPERATION GUIDELINES APPLICABLE ALL SEDIMENT BASINS ACROSS THE DEVELOPMENT.

11. REFER TO ENGNEY SURFACE WATER IMPACT ASSESSMENT FOR BASIN MAINTENANCE AND OPERATION REQUIREMENTS.

12. ALL EROSION AND SEDIMENT CONTROL MEASURES SHOWN IN THIS PACKAGE, THE CONTROLS AND SWALES, AND EROSION AND SEDIMENT CONTROL DEVICES IS REQUIRED DUE TO THE STAGED NATURE OF CONSTRUCTION, WHERE FINAL SEQUENCING, ACCESS CONSTRAINTS, AND TEMPORARY DRAINAGE CONDITIONS WILL EVOLVE THROUGHOUT THE WORKS. BASIN AND SWALE LOCATIONS ARE TO BE ADJUSTED DURING CONSTRUCTION TO SUIT STAGING, ACCESS, AND THE PROGRESSION OF EARTHWORKS. SIMILARLY, BASIN DIMENSIONS, DEPTHS, AND STORAGE CAPACITIES MAY BE REFINED BY THE CONTRACTOR TO RESPOND TO ACTUAL SITE CONDITIONS, CATCHMENT EXTENTS AT EACH STAGE, AND CONTRACTOR METHODOLOGY. ANY ADJUSTMENTS SHALL MAINTAIN THE REQUIRED EROSION AND SEDIMENT CONTROL PERFORMANCE AND BE COMPLY WITH THE DESIGN AND CONSTRUCTION RELEVANT GUIDELINES AND THE SURFACE WATER IMPACT ASSESSMENT, PREPARED BY ENGNEY. ANY ADJUSTMENTS TO THE PROPOSED EROSION AND SEDIMENT CONTROL MEASURES REQUIRED DURING CONSTRUCTION ARE SUBJECT TO APPROVAL BY A CERTIFIED PROFESSIONAL IN EROSION AND SEDIMENT CONTROL (CPESC).

3. WHERE PRACTICAL, THE SOIL EROSION HAZARD ON THE SITE WILL BE KEPT AS LOW AS POSSIBLE. TO THIS END, WORKS SHOULD BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:

- A. INSTALL A WIND AND SITE SECURITY FENCE ALONG THE BOUNDARIES AS SHOWN ON PLAN.
- B. INSTALL A SEDIMENT FENCE ALONG THE BOUNDARIES AS SHOWN ON PLAN.
- C. CONSTRUCT STABILISED CONSTRUCTION ENTRANCE TO LOCATION AS DETERMINED BY SUPERINTENDENT / ENGINEER.
- D. INSTALL SEDIMENT BASIN
- E. INSTALL SEDIMENT TRAPS
- F. UNDERTAKE SITE DEVELOPMENT WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS. WHERE POSSIBLE, PHASE DEVELOPMENT SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE.
- G. REFER TO LANDCOM MANUAL "MANAGING URBAN STORMWATER, SOILS AND CONSTRUCTION" FOR DETAILS OF EROSION AND SEDIMENT CONTROL MEASURES, WHERE AND WHEN TO USE THESE AND HOW TO CORRECTLY INSTALL.

14. DURING WINDY WEATHER, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.

15. FINAL SITE LANDSCAPING WILL BE UNDERTAKEN AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM COMPLETION OF CONSTRUCTION ACTIVITIES.

20. ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER.
21. ANY EXISTING TREES WHICH FORM PART OF THE FINAL LANDSCAPING PLAN WILL BE PROTECTED FROM CONSTRUCTION ACTIVITIES IN ACCORDANCE WITH LANDSCAPE ARCHITECTS DETAILS.

SURFACE NAME	INCOMING DATA	DESCRIPTION	COMMENTS
EXISTING	31126 251218 Stockpiles.dwg	TOPOGRAPHICAL SURVEY	
EXISTING LESS STOCKPILE	31126 251218 Stockpiles.dwg	TOPOGRAPHICAL WITH STOCKPILES REMOVED	1. LESS STOCKPILE SURFACE HAS BEEN EXTRAPOLATED USING BASE OF STOCKPILE INFORMATION INCLUDED IN THE INCOMING DATA
EXISTING PIT 1 STRIPPED BASE	31126 Pit 1 Stripped- 260108.dwg	DRONE SURVEY	
FILL SETTLEMENT	BOREHOLE DATA: 1. BECA Geotechnical Investigation Report Dec 2018 2. Douglas Partners Pit Fill investigation June 2023 3. Douglas Partners Detailed Geotech Investigation May 2023 4. MQ test pit investigation July 2024 5. Douglas Partners investigation Sept 2024	BOTTOM OF UNCONTROLLED FILL SURFACE	1. FILL SETTLEMENT SURFACE HAS BEEN EXTRAPOLATED UTILISING BOREHOLE DATA 2. BOREHOLE DATA PROVIDED BY BECA, DOUGLAS PARTNERS AND MULGOA
EXISTING PIT 2 STRIPPED BASE	31126 Pit 2 Final Strip 250818.dwg	DRONE SURVEY	
DESIGN TOPSOIL	31126 260120 Stockpiles.dwg	EXTRAPOLATED TOPSOIL SURFACE (300mm DEPTH)	1. DESIGN TOPSOIL SURFACE EXTRAPOLATED FROM EXISTING FREEBURN SURFACE 2. TOPSOIL DEPTH ASSUMED TO BE 300mm FROM EXISTING SURFACE 3. TOPSOIL EXTENTS ARE CALCULATED FROM GRASSED AREAS SHOWN ON AERIAL IMAGERY WITHIN THE FINISHED ESTATE WORKS DISTURBED AREA FOOTPRINT
DESIGN PIT 1 BASE	N/A	EXTRAPOLATED STRIPPED BASE OF PIT 1	1. EXTRAPOLATED SURFACE IS BASED ON ASSUMED DEPTH BELOW EXISTING WATER LEVEL IN PIT 1. 2. ASSUMED DEPTHS PROVIDED BY MULGOA VIA EMAIL RE: Project Maverick Pit 1 Base Levels 11/02/26 7:54AM
DESIGN PIT 1 WALL EXCAVATION	N/A	PIT 1 WALL EXCAVATION	
DESIGN PIT 1 UNCONTROLLED FILL	N/A	UNKNOWN AREA OF UNCONTROLLED FILL AT SOUTHERN END OF PIT 1	1. PIT 1 UNCONTROLLED FILL SURFACE IS BASED ON ASSUMED DEPTHS PROVIDED BY MULGOA
DESIGN PIT 2 WALL EXCAVATION	N/A	PIT 2 WALL EXCAVATION	
DESIGN PIT 2 TEMPORARY PILING BENCH	N/A	BENCH FOR PILING RIG	1.5m WIDE BENCH FOR PILING RIG FOR CONSTRUCTION OF WAREHOUSE 12 RETAINING WALL
DESIGN REHABILITATION	N/A	BULK EARTHWORKS, REHABILITATION AND QUARRYING DESIGN SURFACE	

THESE DRAWINGS SHOULD BE READ IN CONJUNCTION WITH THE FOLLOWING DOCUMENTS	
DOCUMENT TITLE	PREPARED BY
MAR-AAP-DA-R02-RPT-CV-0002 - BULK EARTHWORKS, REHABILITATION AND QUARRYING CIVIL ENGINEERING REPORT	ARCADIS
MAR-AAP-DA-R02-RPT-GW-0001 - GROUNDWATER ASSESSMENT REPORT	ARCADIS
234411.00.R.001 - DUE DILIGENCE GEOTECHNICAL INVESTIGATION	DOUGLAS PARTNERS
234411.00.R.003 - EARTHWORKS SPECIFICATION	DOUGLAS PARTNERS
234411.01.R.005 - EARTHWORKS MEMO	DOUGLAS PARTNERS
COMBINED PRELIMINARY AND DETAILED SITE INVESTIGATION	JBS&G
SITE WIDE REMEDIAL ACTION PLAN	JBS&G
BNTL02053_0001-01-SWIA - SURFACE WATER IMPACT ASSESSMENT	ENGENY
DAM DEWATERING PLAN	SLR
FLOOD IMPACT & RISK ASSESSMENT	COLLIERS

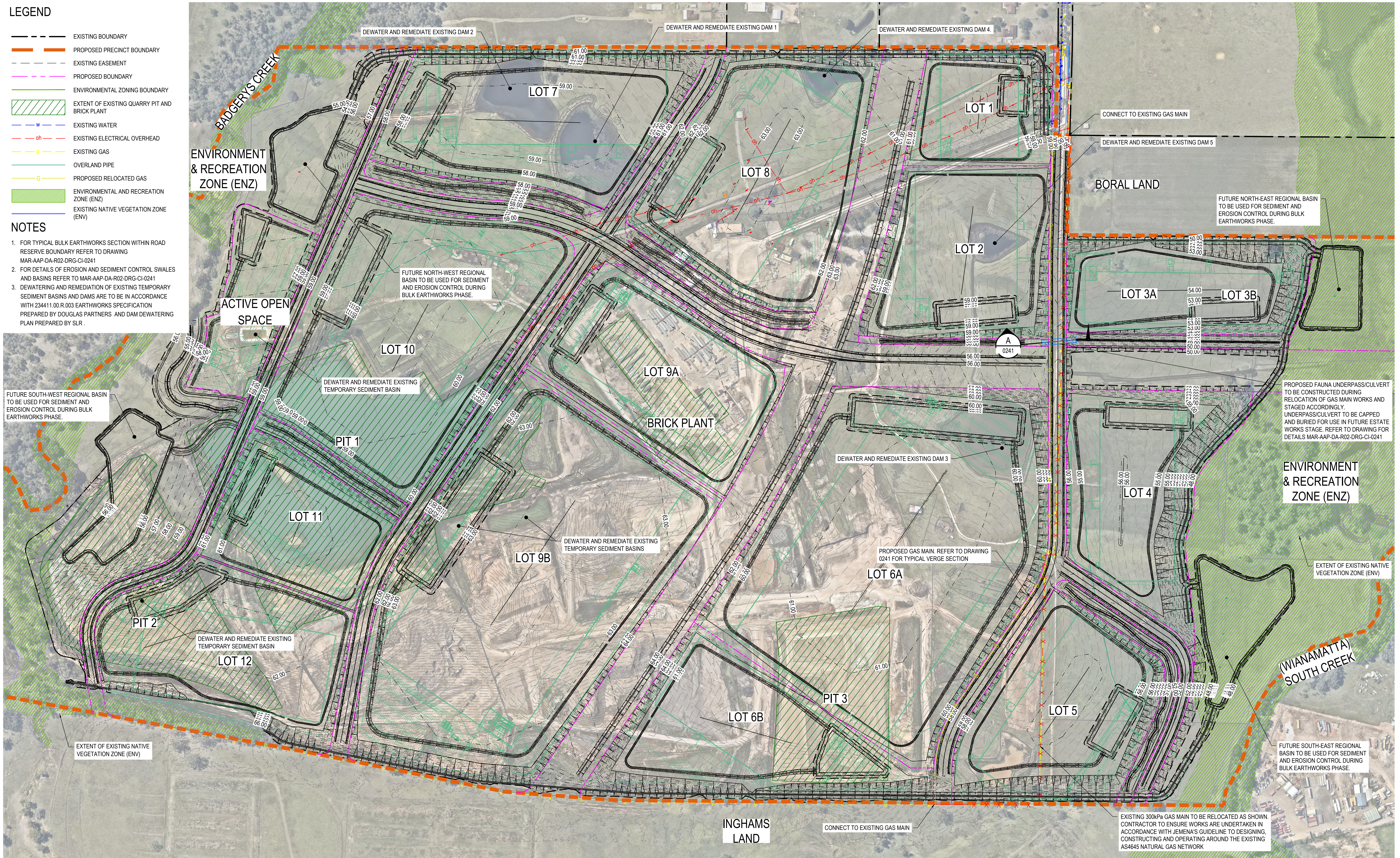
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LEGEND

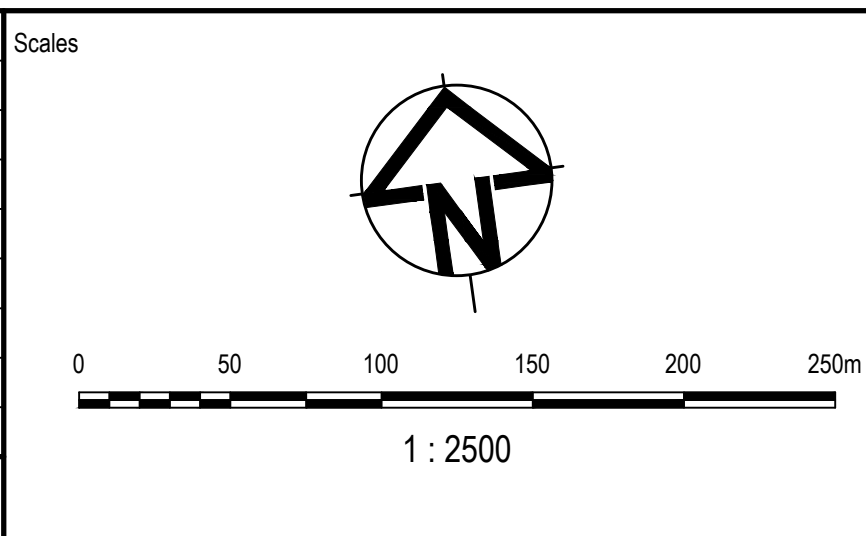
- EXISTING BOUNDARY
- PROPOSED PRECINCT BOUNDARY
- EXISTING EASEMENT
- PROPOSED BOUNDARY
- ENVIRONMENTAL ZONING BOUNDARY
- EXTENT OF EXISTING QUARRY PIT AND BRICK PLANT
- EXISTING WATER
- EXISTING ELECTRICAL OVERHEAD
- EXISTING GAS
- OVERLAND PIPE
- PROPOSED RELOCATED GAS
- ENVIRONMENTAL AND RECREATION ZONE (ENZ)
- EXISTING NATIVE VEGETATION ZONE (ENV)

NOTES

- FOR TYPICAL BULK EARTHWORKS SECTION WITHIN ROAD RESERVE BOUNDARY REFER TO DRAWING MAR-AAP-DA-R02-DRG-CI-0241
- FOR DETAILS OF EROSION AND SEDIMENT CONTROL SWALES AND BASINS REFER TO MAR-AAP-DA-R02-DRG-CI-0241
- DEWATERING AND REMEDIATION OF EXISTING TEMPORARY SEDIMENT BASINS AND DAMS ARE TO BE IN ACCORDANCE WITH 234411.00.R.003 EARTHWORKS SPECIFICATION PREPARED BY DOUGLAS PARTNERS AND DAM DEWATERING PLAN PREPARED BY SLR.



Issue	Description	DR	CH	VE	Date
D	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.06.26
C	ISSUED FOR CLIENT REVIEW	RS	IS	JH	04.03.26
B	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.02.26
A	ISSUED FOR CLIENT REVIEW	RS	IS	-	18.12.25



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Drawn	R. SANTOS	Original Size	A1
Designed	I. SUMMERS	Height Datum	AHD
Project Manager	K. MCAREAVEY	Grid	MGA/20-56
Verified	J. HEYDON		

Project	225-245 MARTIN ROAD, BRADFIELD BULK EARTHWORKS, REHABILITATION AND QUARRYING
Title	GENERAL ARRANGEMENT PLAN

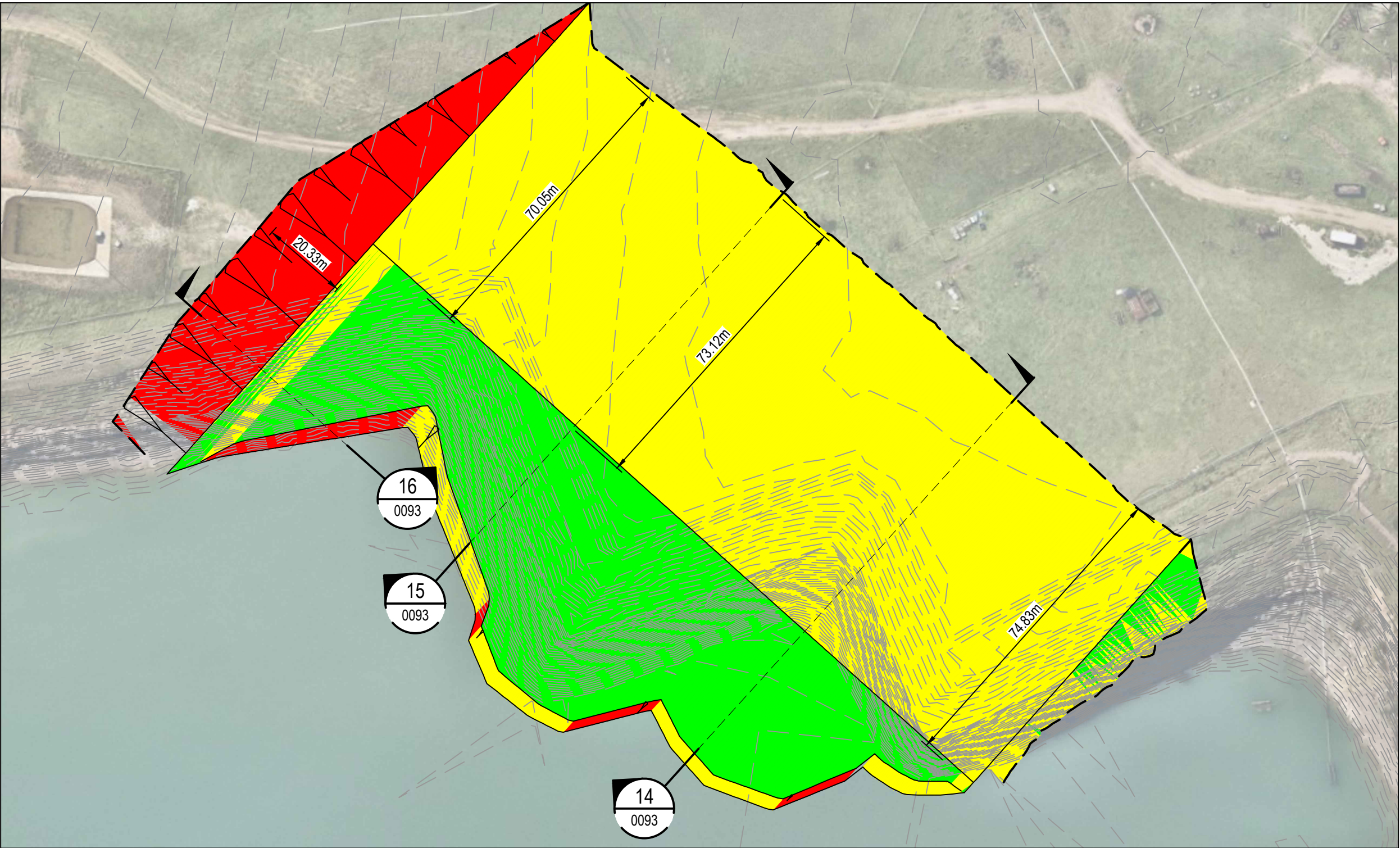
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Project Number	30281481
Issue	D

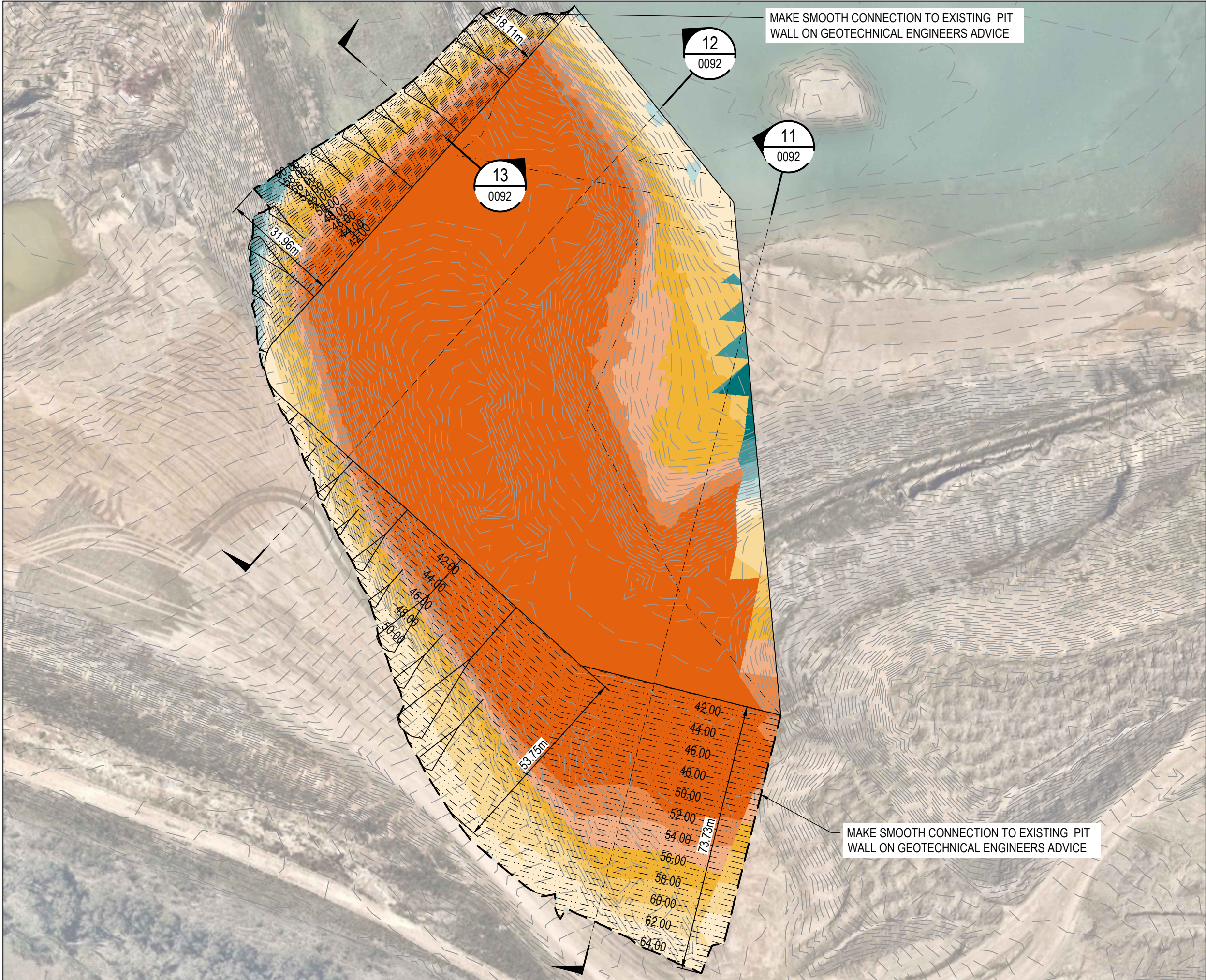
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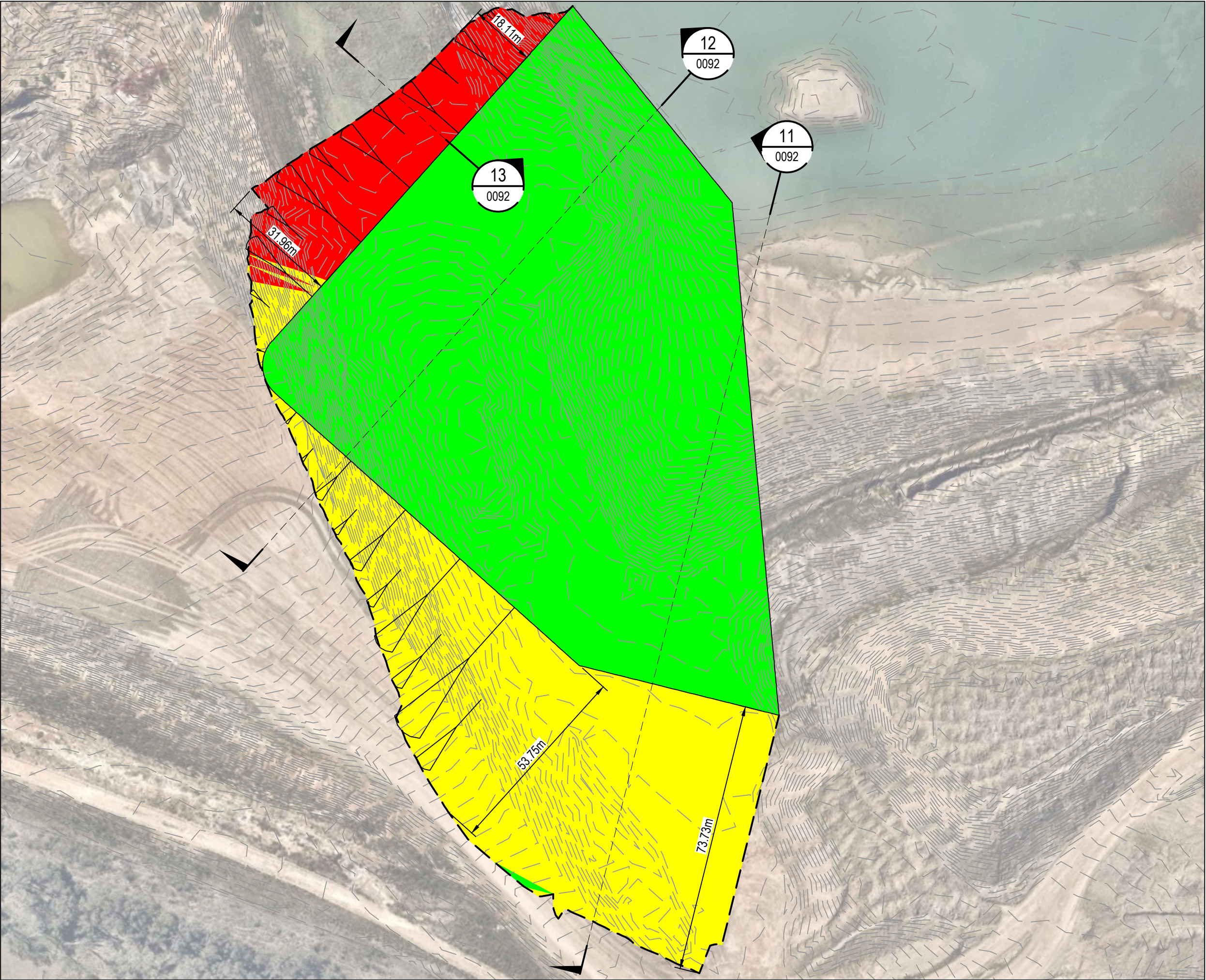
PIT 1 - NORTHERN EXCAVATION DEPTH RANGE



PIT 1 - NORTHERN EXCAVATION SLOPE RANGE



PIT 1 - SOUTHERN EXCAVATION DEPTH RANGE



PIT 1 - SOUTHERN EXCAVATION SLOPE RANGE

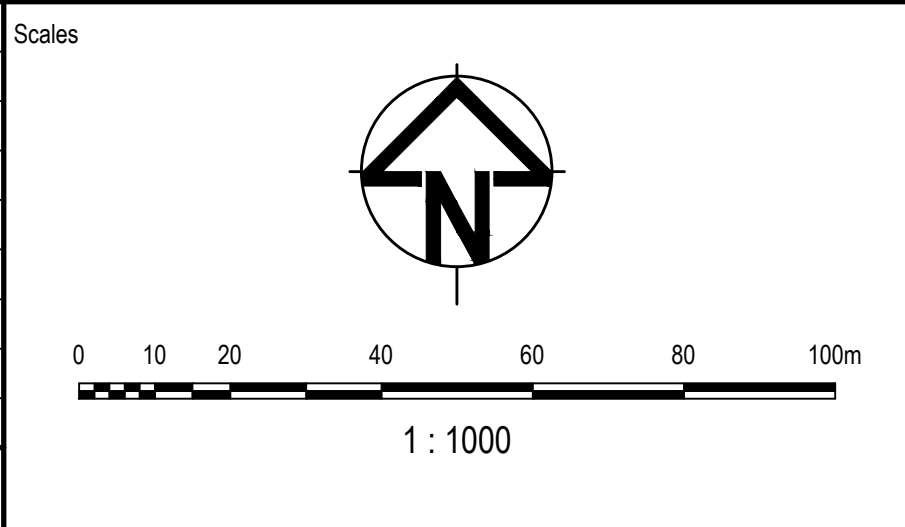
CUT FILL DEPTH RANGE		
LOWER VALUE	UPPER VALUE	COLOUR
-9999m	to -15m	
-15m	to -12m	
-12m	to -10m	
-10m	to -8m	
-8m	to -5m	
-5m	to -2m	
-2m	to 0m	
0m	to 2m	
2m	to 5m	
5m	to 8m	
8m	to 10m	
10m	to 12m	
12m	to 15m	
15m	to 9999m	

SLOPE RANGE		
LOWER VALUE	UPPER VALUE	COLOUR
0%	to 33%	
33%	to 50%	
50%	to 100%	

- NOTES**
- THE VOLUMES BELOW HAVE BEEN CALCULATED BETWEEN 'LOWEST POINT SURFACE' AND 'DESIGN PIT 1 WALL EXCAVATION'
 - THE 'LOWEST POINT SURFACE' IS MADE UP OF A COMBINATION OF 'EXISTING LESS STOCKPILE', 'FILL SETTLEMENT', 'EXISTING PIT 1 STRIPPED BASE', 'DESIGN PIT 1 BASE', 'DESIGN PIT 1 UNCONTROLLED FILL' AND 'EXISTING PIT 2 STRIPPED BASE' SURFACES.
 - REFER TO 'EXISTING AND PROPOSED SURFACE INFORMATION' SHEET FOR SURFACE INFORMATION AND ASSUMPTIONS

CUT/FILL VOLUMES
TOTAL PIT 1 EXCAVATION VOLUME = 655334.43m³

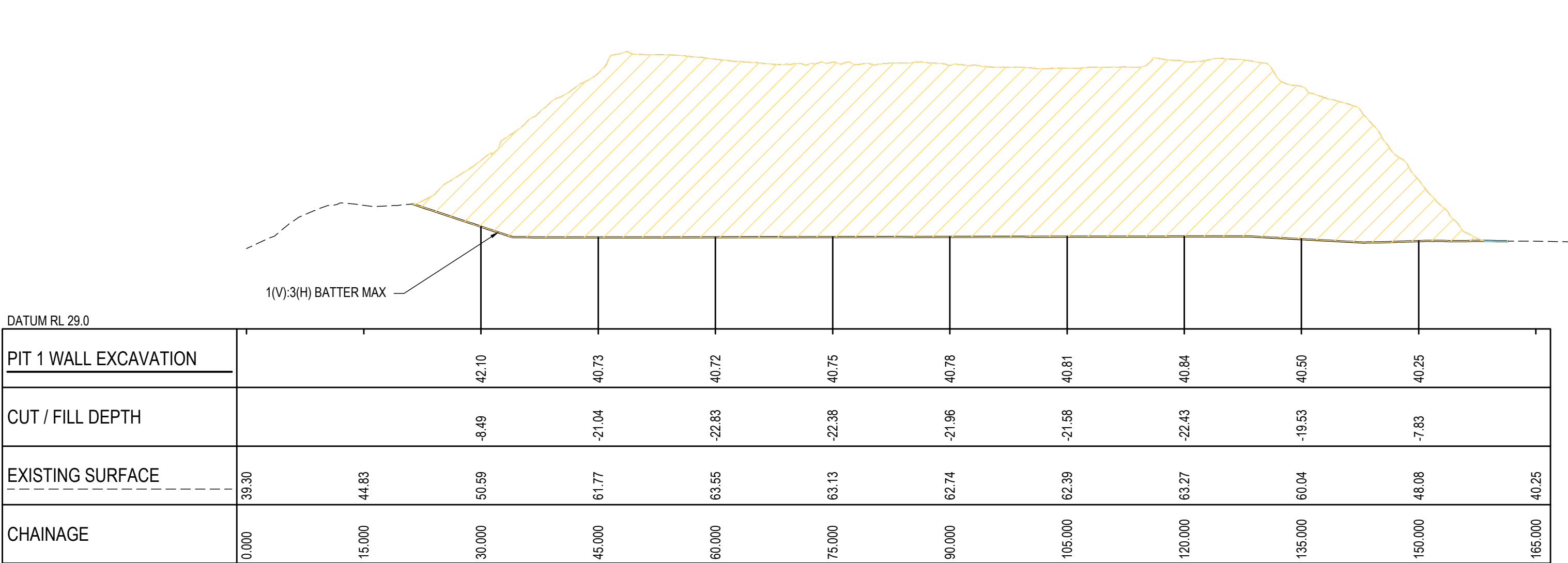
Issue	Description	DR	CH	VE	Date
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Drawn	R. SANTOS	Original Size	A1
Designed	I. SUMMERS	Height Datum	AHD
Project Manager	K. MCAREAVEY	Grid	MGA/20-56
Verified	J. HEYDON		

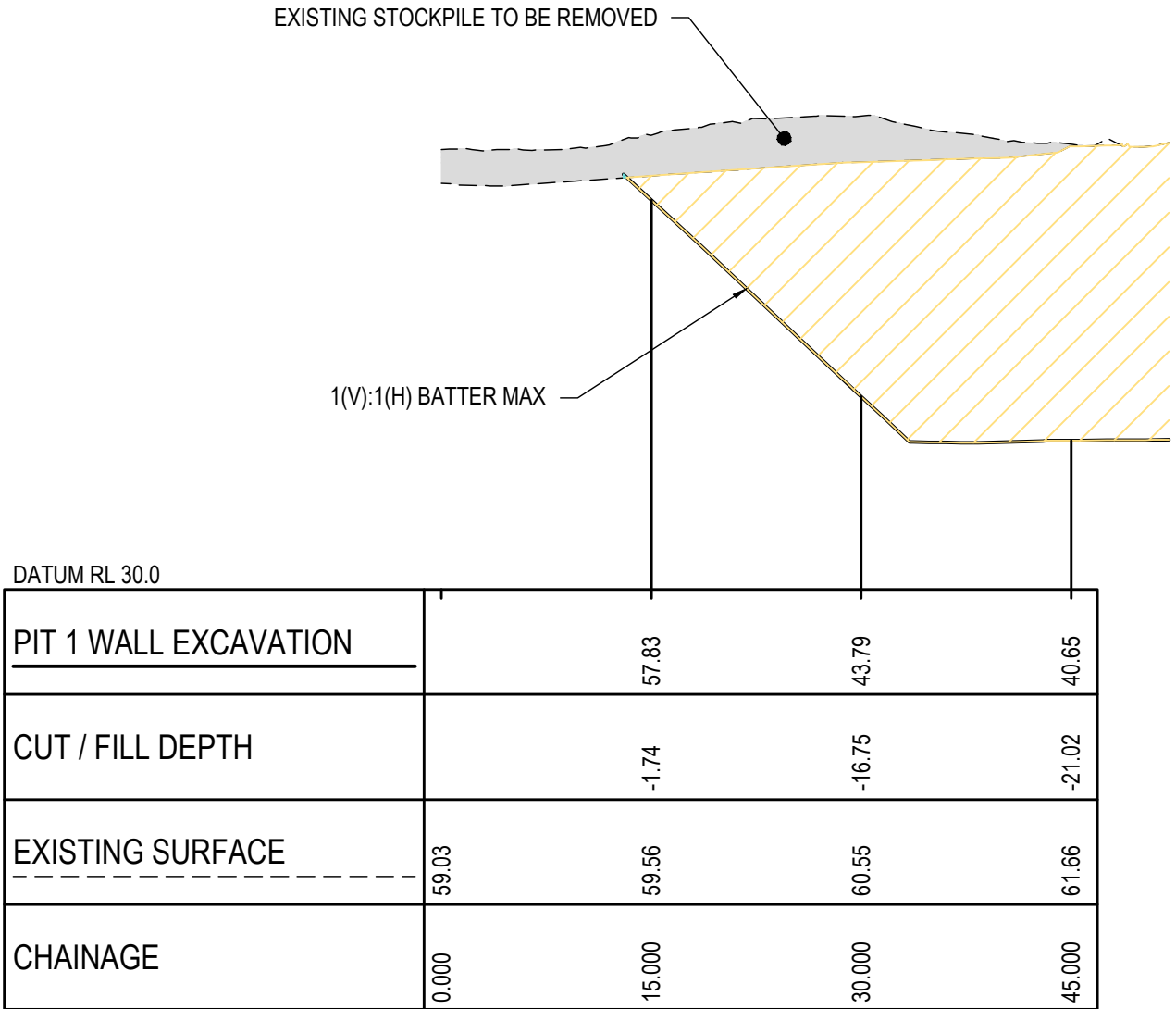
Project	225-245 MARTIN ROAD, BRADFIELD BULK EARTHWORKS, REHABILITATION AND QUARRYING
Title	PIT 1 EXCAVATION PLAN

Arcadis Australia Pacific Pty Limited Level 15, 580 George Street SYDNEY NSW 2000 ABN 76 104 485 289 Tel No: +61 2 8907 9000 www.arcadis.com/au	
Project Number	30281481
Issue	D
MAR-AAP-DA-R02-DRG-CI-0091	



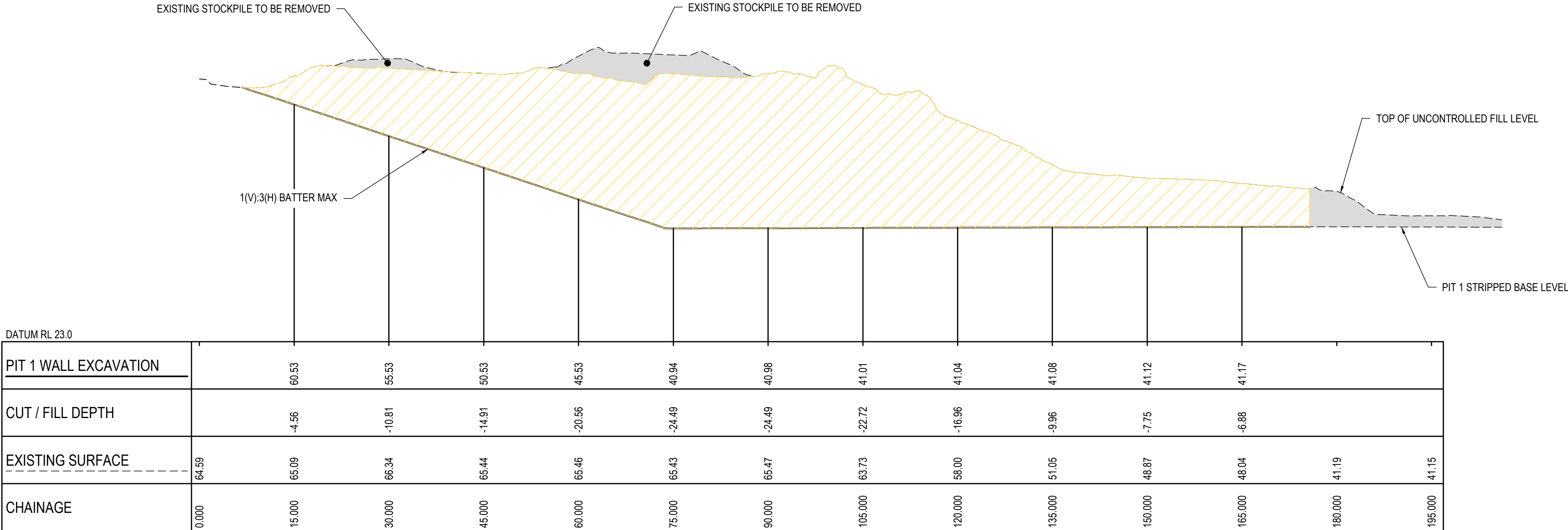
DATUM RL 29.0											
PIT 1 WALL EXCAVATION		42.10	40.73	40.72	40.75	40.78	40.81	40.84	40.50	40.25	
CUT / FILL DEPTH		-8.49	-21.04	-22.83	-22.38	-21.96	-21.98	-22.43	-19.53	-7.83	
EXISTING SURFACE	39.30	44.83	50.59	61.77	63.55	63.13	62.74	62.39	63.27	60.04	48.08
CHAINAGE	0.000	15.000	30.000	45.000	60.000	75.000	90.000	105.000	120.000	135.000	150.000

SECTION 12 LONGITUDINAL SECTION
SCALE 1:500 HORI.
1:500 VERT.



DATUM RL 30.0			
PIT 1 WALL EXCAVATION	57.83	43.79	40.65
CUT / FILL DEPTH	-1.74	-16.75	-21.02
EXISTING SURFACE	59.03	59.56	60.55
CHAINAGE	0.000	15.000	30.000

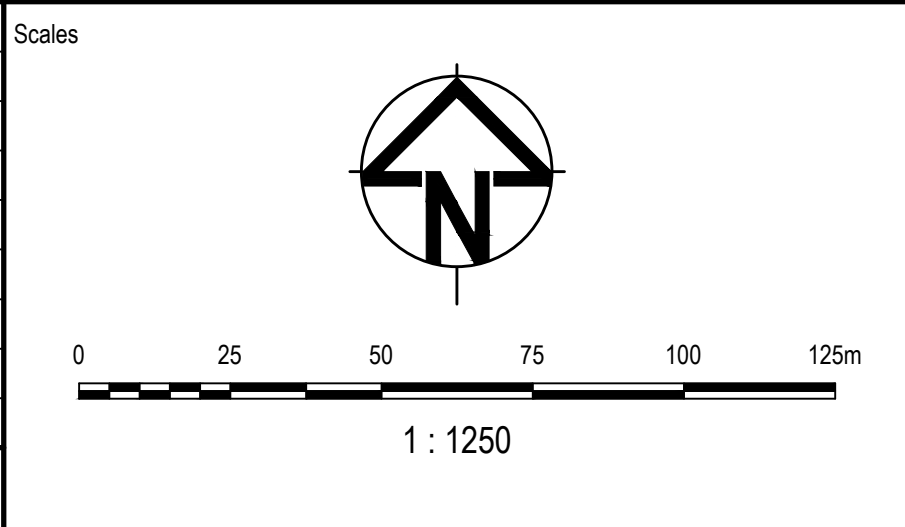
SECTION 13 LONGITUDINAL SECTION
SCALE 1:500 HORI.
1:500 VERT.



DATUM RL 23.0													
PIT 1 WALL EXCAVATION	60.53	55.53	50.53	45.53	40.94	40.98	41.01	41.04	41.08	41.12	41.17		
CUT / FILL DEPTH	-4.56	-10.81	-14.91	-20.56	-24.49	-24.49	-22.72	-16.96	-9.96	-7.75	-6.88		
EXISTING SURFACE	64.59	65.09	66.34	65.44	65.46	65.43	65.47	63.73	58.00	51.05	48.87	48.04	41.19
CHAINAGE	0.000	15.000	30.000	45.000	60.000	75.000	90.000	105.000	120.000	135.000	150.000	165.000	180.000

SECTION 11 LONGITUDINAL SECTION
SCALE 1:500 HORI.
1:500 VERT.

D	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.06.26
C	ISSUED FOR CLIENT REVIEW	RS	IS	JH	04.03.26
B	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.02.26
A	ISSUED FOR CLIENT REVIEW	RS	IS	-	18.12.25
Issue	Description	DR	CH	VE	Date



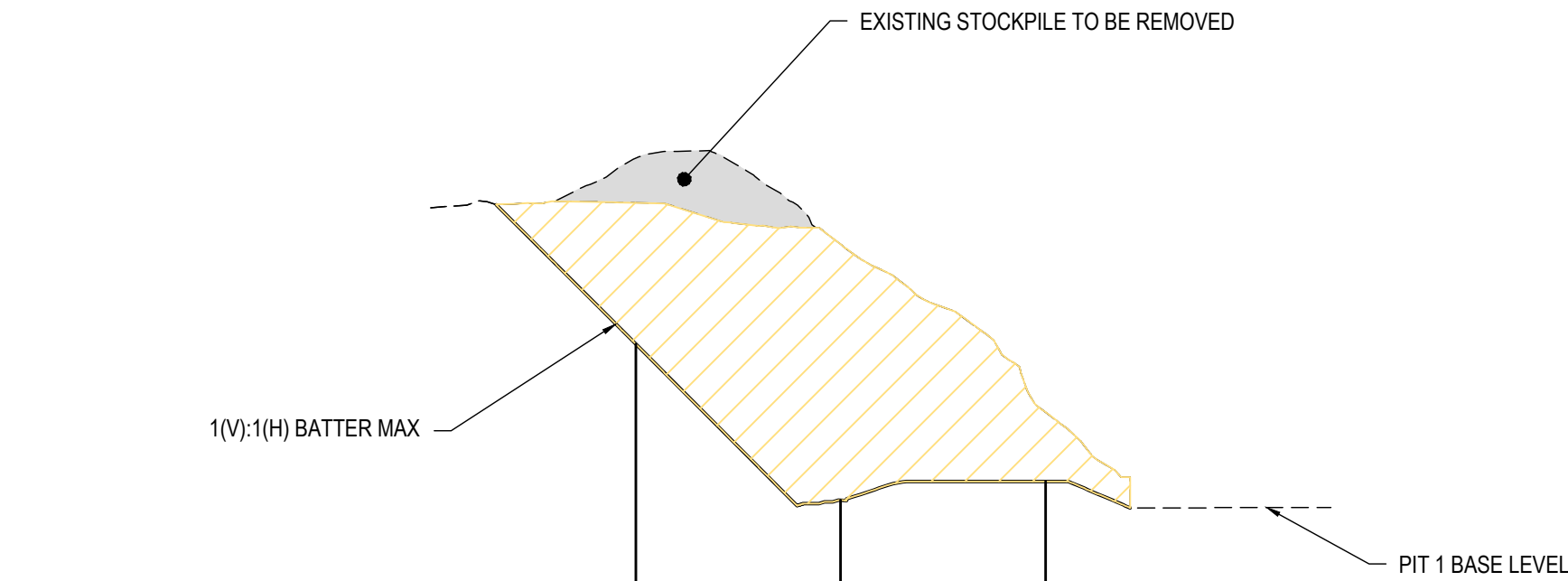
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© Copyright reserved			
Original Issue Signatures			
Drawn	R. SANTOS	Original Size	A1
Designed	I. SUMMERS	Height Datum	AHD
Project Manager	K. MCAREAVEY	Grid	MGA/20-56
Verified	J. HEYDON		

Project	225-245 MARTIN ROAD, BRADFIELD BULK EARTHWORKS, REHABILITATION AND QUARRYING		
Title	PIT 1 EXCAVATION SECTIONS SHEET 1		

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www.arcadis.com/au

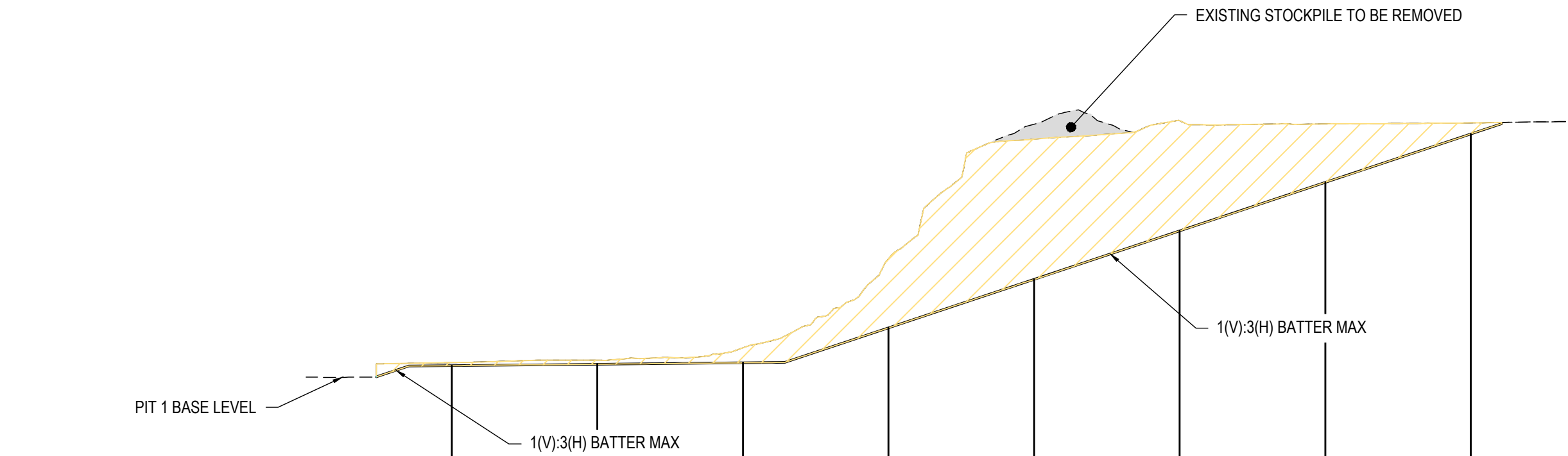
Project Number	30281481
Issue	D

MAR-AAP-DA-R02-DRG-CI-0092



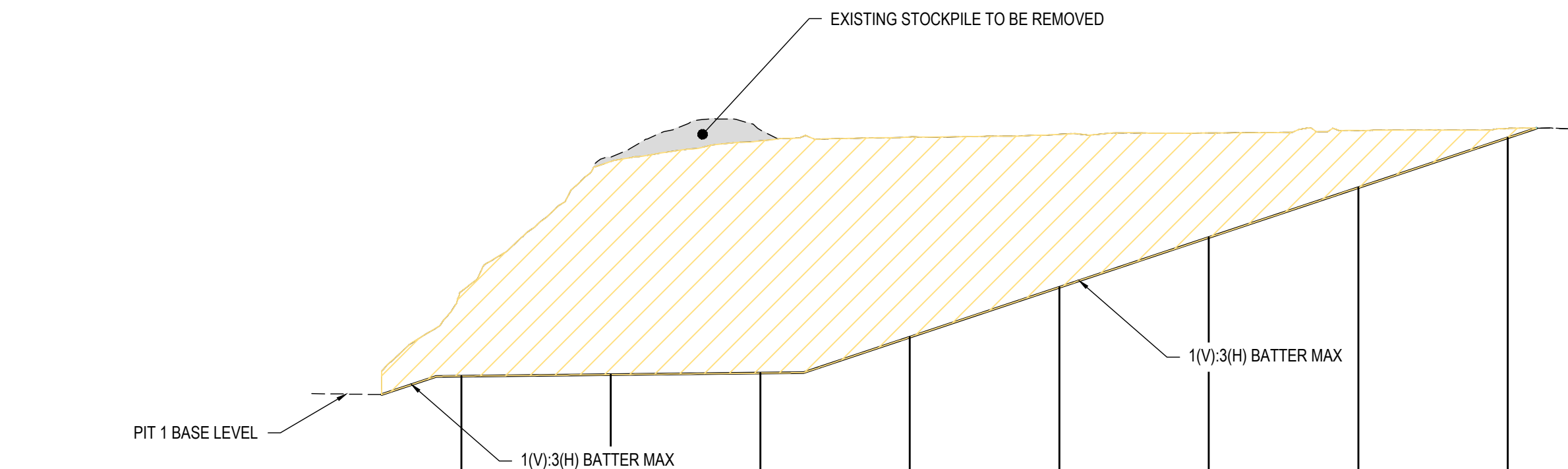
PIT 1 WALL EXCAVATION	49.16	37.73	39.11
CUT / FILL DEPTH	-10.35	-18.74	-5.07
EXISTING SURFACE	59.16	59.51	56.47
CHAINAGE	0.000	15.000	30.000

SECTION 16 LONGITUDINAL SECTION
SCALE 1:500 HORI.
1:500 VERT.



PIT 1 WALL EXCAVATION	39.16	39.31	39.46	43.06	48.06	53.06	58.06	63.06
CUT / FILL DEPTH	-0.32	-0.43	-1.55	-7.12	-14.46	-11.36	-6.03	-1.04
EXISTING SURFACE	37.97	39.47	39.73	41.00	50.18	62.52	64.42	64.09
CHAINAGE	0.000	15.000	30.000	45.000	60.000	75.000	90.000	105.000

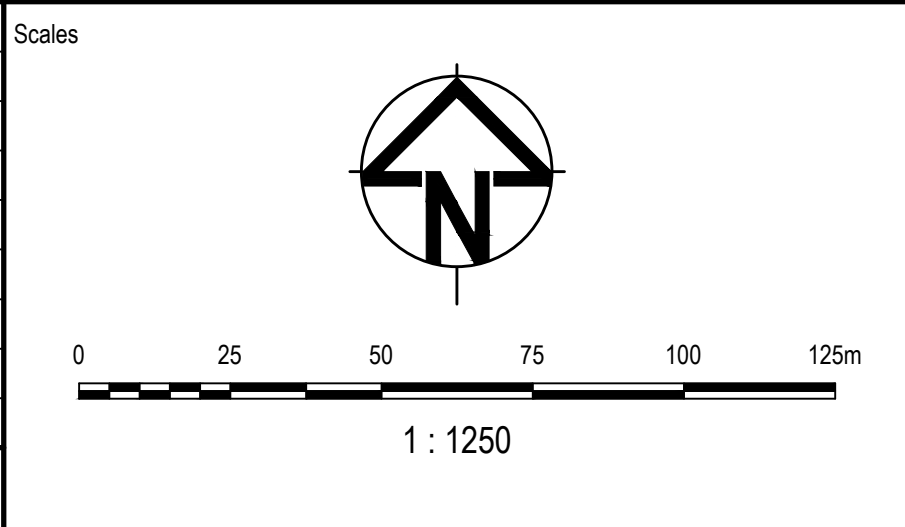
SECTION 14 LONGITUDINAL SECTION
SCALE 1:500 HORI.
1:500 VERT.



PIT 1 WALL EXCAVATION	39.16	39.31	39.46	43.06	48.06	53.06	58.06	63.06
CUT / FILL DEPTH	-8.49	-21.38	-23.29	-20.07	-15.34	-10.48	-5.72	-0.92
EXISTING SURFACE	37.40	47.65	60.69	62.75	63.13	63.40	63.54	63.78
CHAINAGE	0.000	15.000	30.000	45.000	60.000	75.000	90.000	105.000

SECTION 15 LONGITUDINAL SECTION
SCALE 1:500 HORI.
1:500 VERT.

Issue	Description	DR	CH	VE	Date
D	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.06.26
C	ISSUED FOR CLIENT REVIEW	RS	IS	JH	04.03.26
B	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.02.26
A	ISSUED FOR CLIENT REVIEW	RS	IS	-	18.12.25



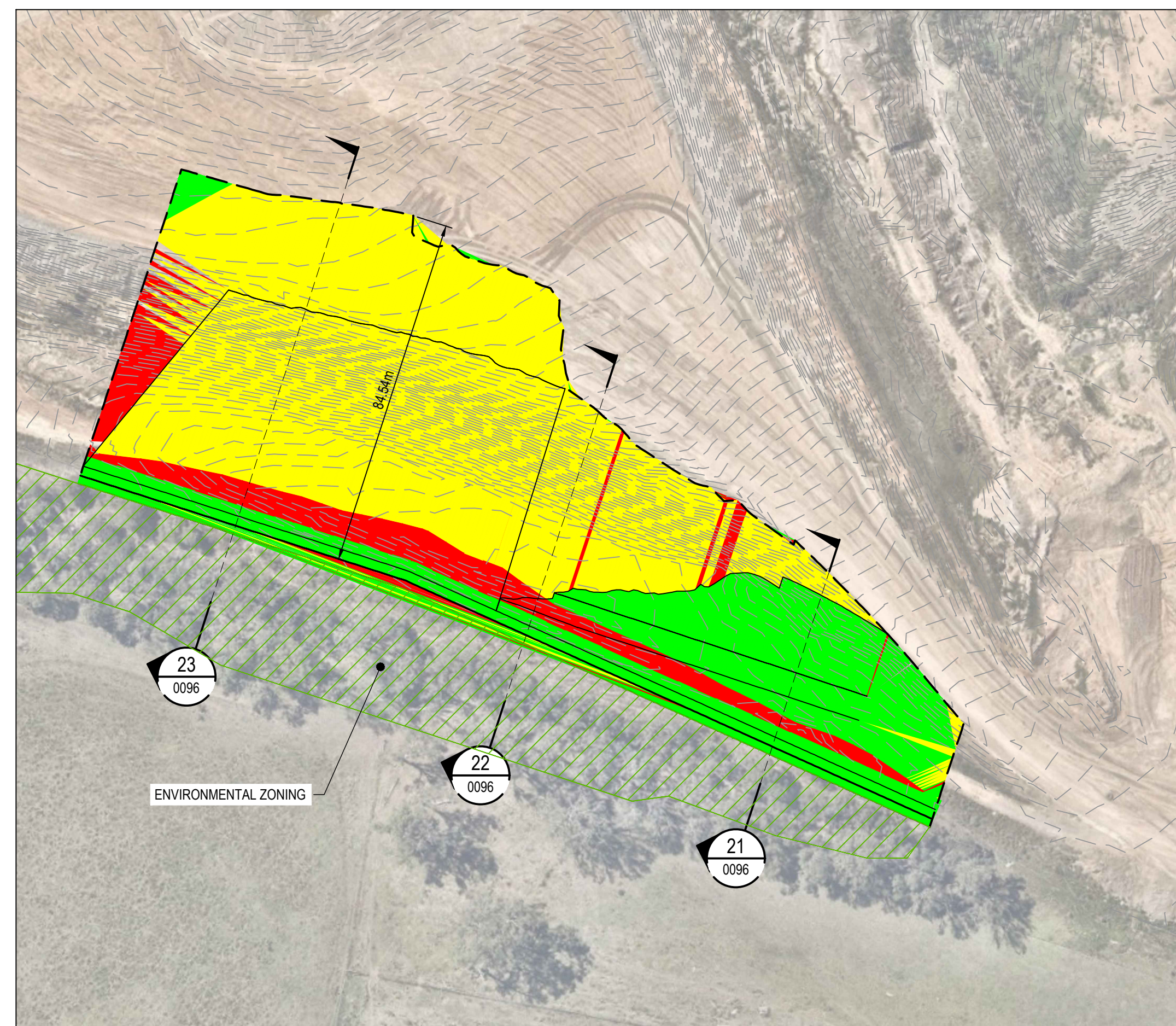
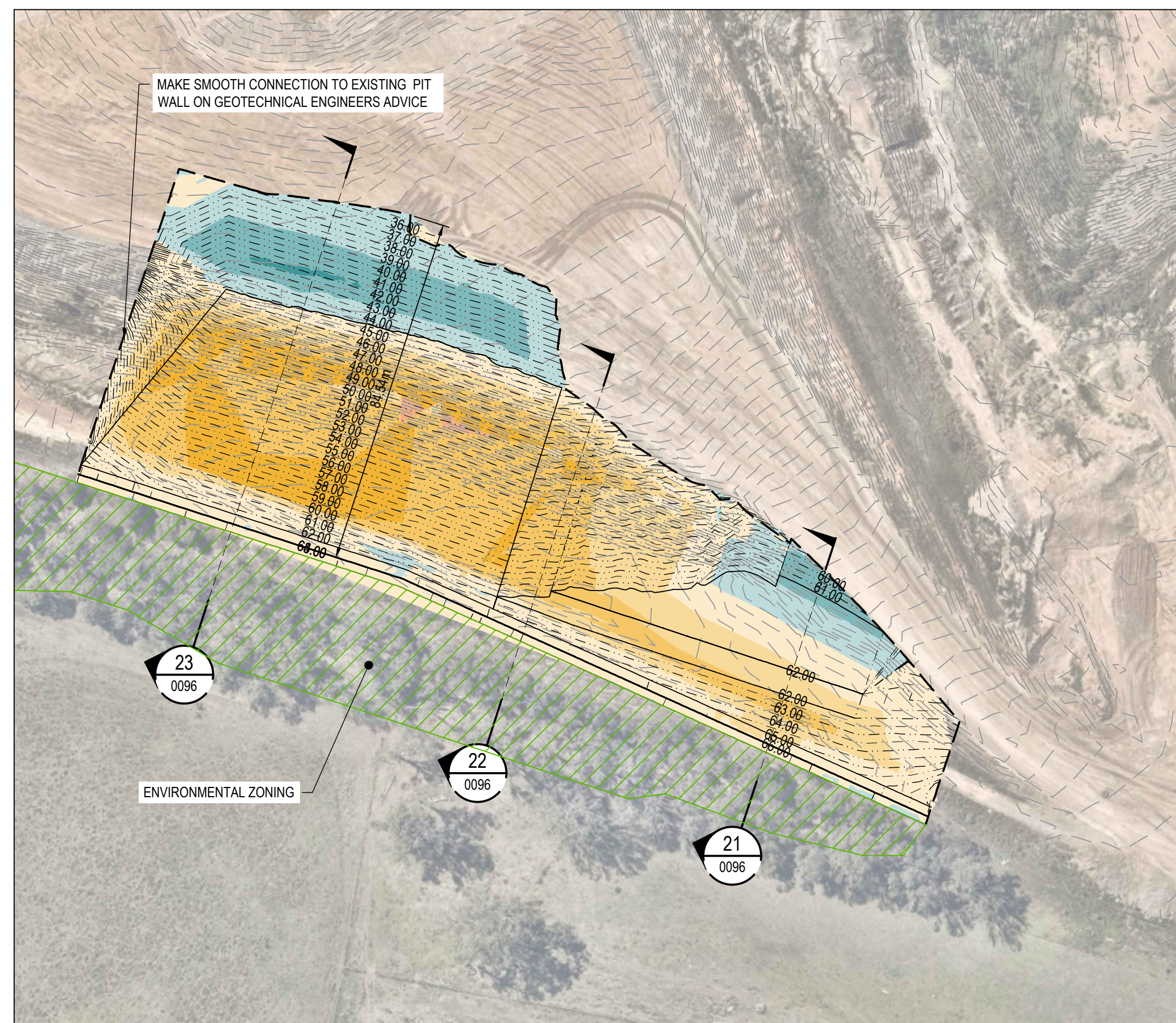
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Original Issue Signatures	© Copyright reserved			
Drawn	R. SANTOS	Original Size	A1	
Designed	I. SUMMERS	Height Datum	AHD	
Project Manager	K. MCAREAVEY	Grid	MGA/20-56	
Verified	J. HEYDON			

Project	225-245 MARTIN ROAD, BRADFIELD BULK EARTHWORKS, REHABILITATION AND QUARRYING	
Title	PIT 1 EXCAVATION SECTIONS SHEET 2	

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Project Number	30281481
Issue	D

MAR-AAP-DA-R02-DRG-CI-0093



CUT FILL DEPTH RANGE			
LOWER VALUE		UPPER VALUE	COLOUR
-9999m	to	-15m	
-15m	to	-12m	
-12m	to	-10m	
-10m	to	-8m	
-8m	to	-5m	
-5m	to	-2m	
-2m	to	0m	
0m	to	2m	
2m	to	5m	
5m	to	8m	
8m	to	10m	
10m	to	12m	
12m	to	15m	
15m	to	9999m	

SLOPE RANGE

LOWER VALUE		UPPER VALUE	COLOUR
0%	to	33%	
33%	to	50%	
50%	to	100%	

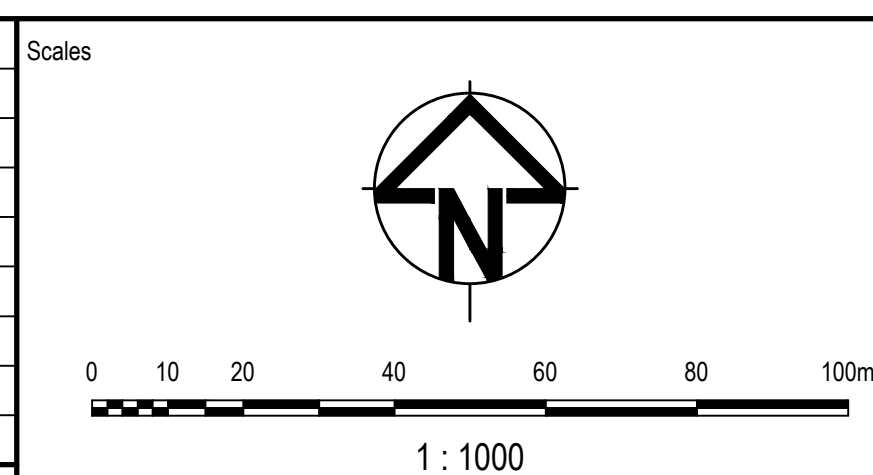
NOTES

1. THE VOLUMES BELOW HAVE BEEN CALCULATED BETWEEN 'LOWEST POINT SURFACE' AND 'SUPER DESIGN PIT 2 WALL EXCAVATION'
2. THE 'LOWEST POINT SURFACE' IS MADE UP OF A COMBINATION OF 'EXISTING LESS STOCKPILE', 'FILL SETTLEMENT', 'EXISTING PIT 1 STRIPPED BASE', 'DESIGN PIT 1 BASE', 'DESIGN PIT 1 UNCONTROLLED FILL' AND 'EXISTING PIT 2 STRIPPED BASE' SURFACES.
3. THE 'SUPER DESIGN PIT 2 WALL EXCAVATION' IS MADE UP OF A COMBINATION OF 'DESIGN PIT 2 WALL EXCAVATION' AND 'DESIGN PIT 2 TEMPORARY PILING BENCH' SURFACES
4. REFER TO 'EXISTING AND PROPOSED SURFACE INFORMATION' SHEET FOR SURFACE INFORMATION AND ASSUMPTIONS

CUT/FILL VOLUMES

PIT 2 EXCAVATION VOLUME (WITH TEMPORARY BENCH) = 44961.04m³
PIT 2 EXCAVATION VOLUME (NO TEMPORARY BENCH) = 49855.74m³

C	ISSUED FOR CLIENT REVIEW	RS	IS	JH 24.06.26
B	ISSUED FOR CLIENT REVIEW	RS	IS	JH 04.03.26
A	ISSUED FOR CLIENT REVIEW	RS	IS	JH 20.02.26
Issue	Description	DR	CH	VE Date



Surveyor



Client	
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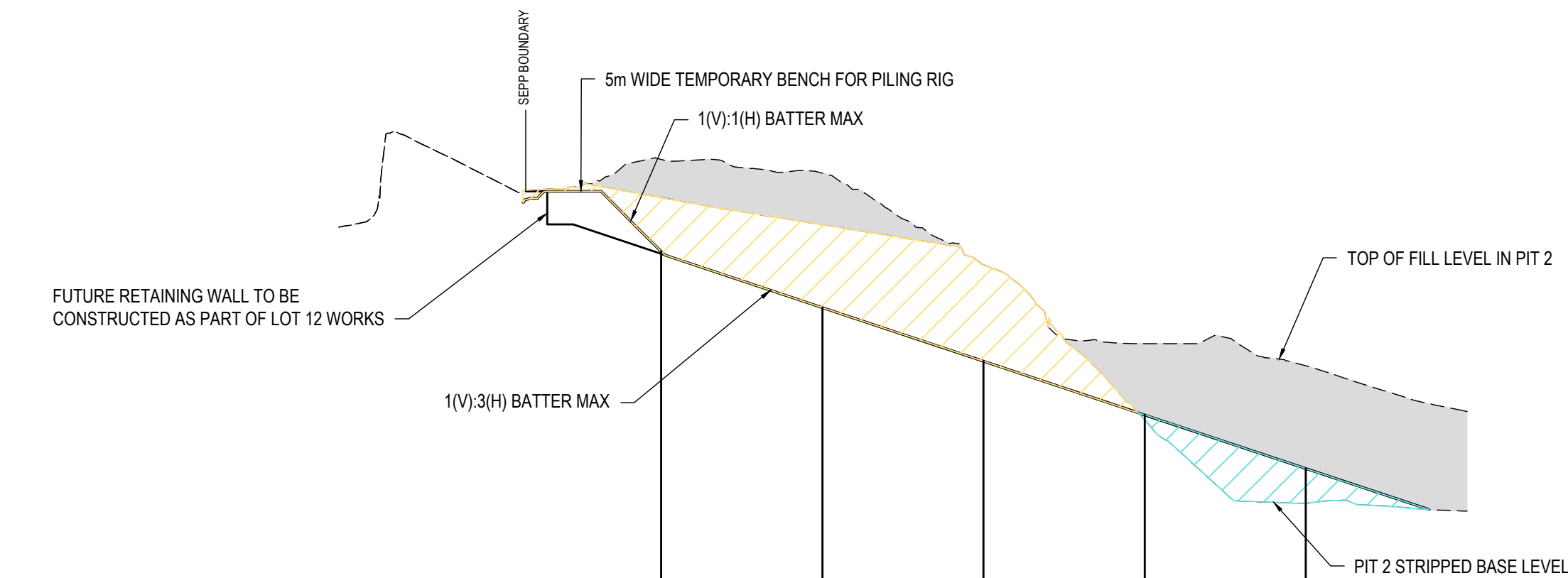
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Original Issue Signatures			
Drawn	R. SANTOS	Original Size	A1
Designed	I. SUMMERS	Height Datum	AHD
Project Manager	K. MCAREAVEY	Grid	MGA/20-56
Verified	J. HEYDON		

Project	225-245 MARTIN ROAD, BRADFIELD BULK EARTHWORKS, REHABILITATION AND QUARRYING
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Title	PIT 2 EXCAVATION PLAN
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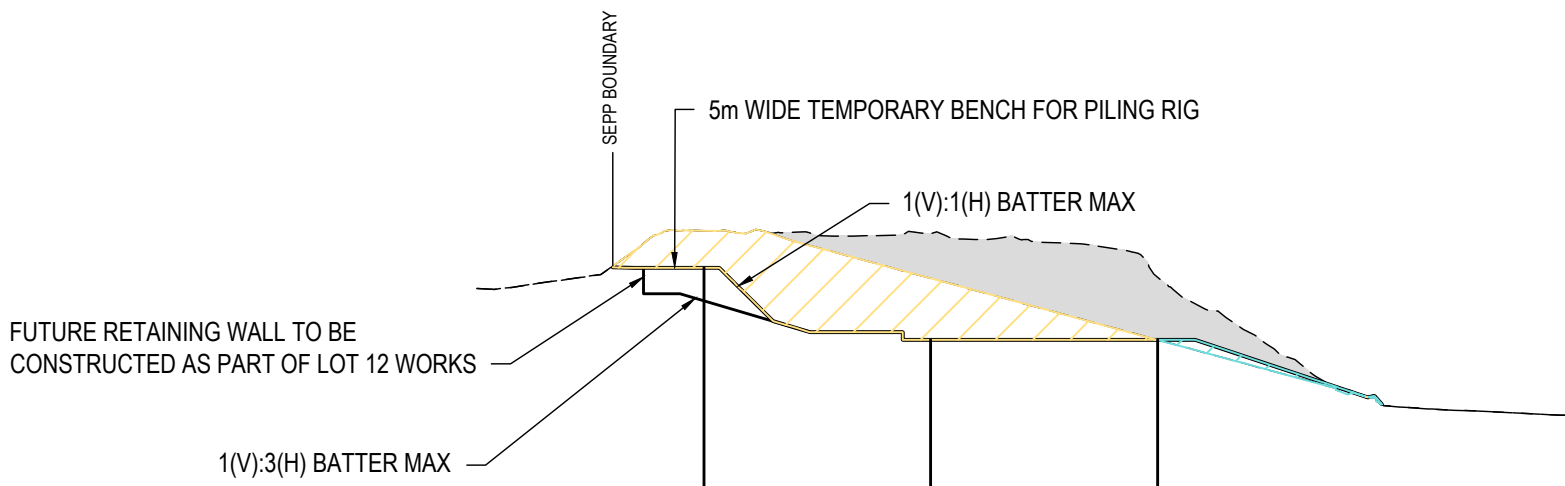


	Number
Drawing No.	
MAR-AAP-DA-R02-DRG-CI-0095	



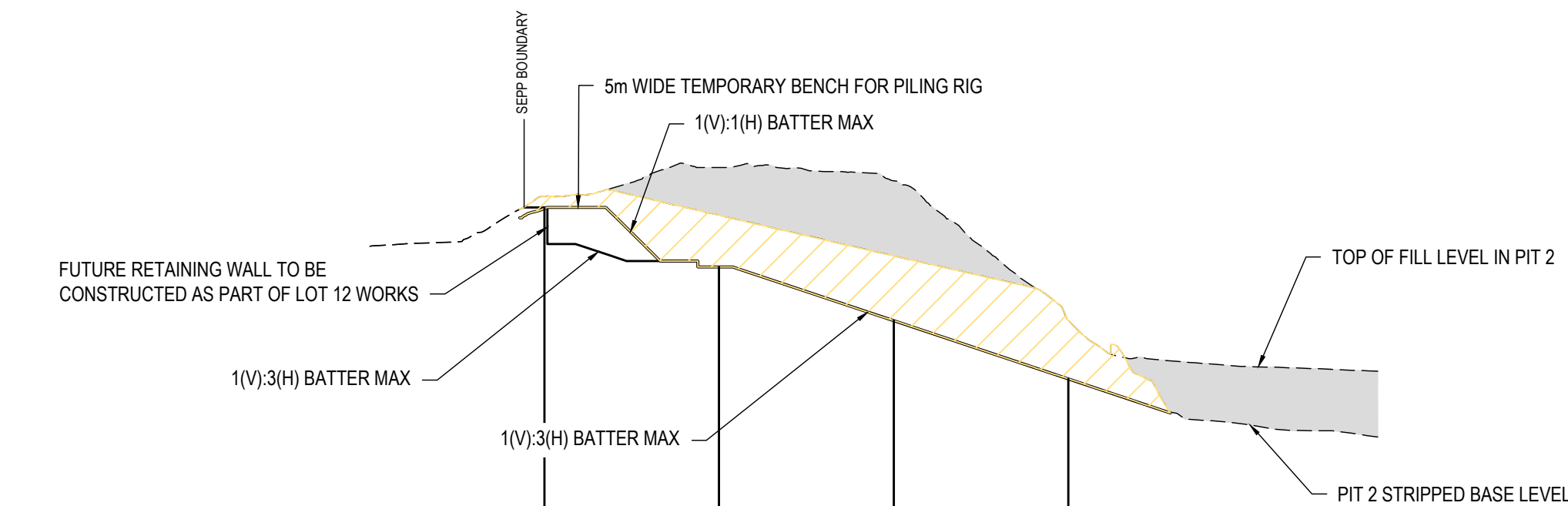
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PIT 2 WALL EXCAVATION			59.92	54.70	49.69	44.69	39.69
CUT / FILL DEPTH			-6.19	-6.99	-8.98	0.43	3.24
EXISTING SURFACE	62.19	66.28	64.93	62.40	58.67	44.26	36.46
CHAINAGE	0.000	15.000	30.000	45.000	60.000	75.000	90.000

SECTION 23 LONGITUDINAL SECTION
SCALE 1:500 HORI.
1:500 VERT.



DATUM RL 46.0				
PIT 2 WALL EXCAVATION	66.26	61.50	61.50	
CUT / FILL DEPTH	-2.46	-3.28	1.45	
EXISTING SURFACE	64.87	68.71	65.55	61.49
CHAINAGE	0.000	15.000	30.000	45.000

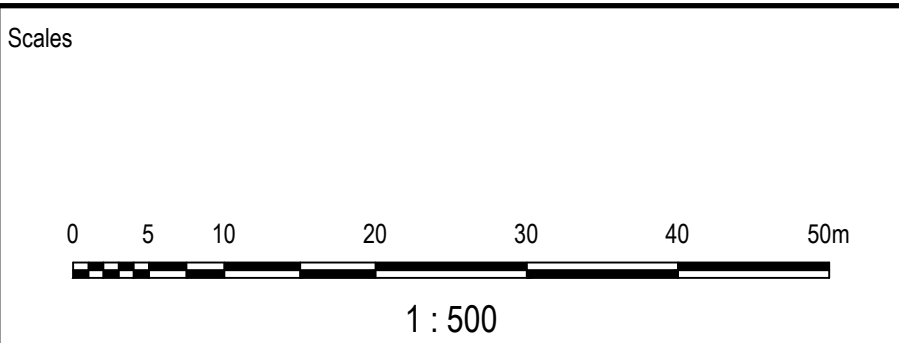
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SCALE 1:500 HORI.
1:500 VERT.



DATUM RL 36.0					
PIT 2 WALL EXCAVATION	66.51	61.50	56.88	51.87	
CUT / FILL DEPTH	-1.04	-5.61	-4.79	-5	
EXISTING SURFACE	63.27	67.55	65.93	62.44	56.87
CHAINAGE	0.000	15.000	30.000	45.000	60.000

SECTION 22 LONGITUDINAL SECTION
SCALE 1:500 HORI.
1:500 VERT.

C	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.06.26
B	ISSUED FOR CLIENT REVIEW	RS	IS	JH	04.03.26
A	ISSUED FOR CLIENT REVIEW	RS	IS	JH	20.02.26
Issue	Description	DR	CH	VE	Date



Status

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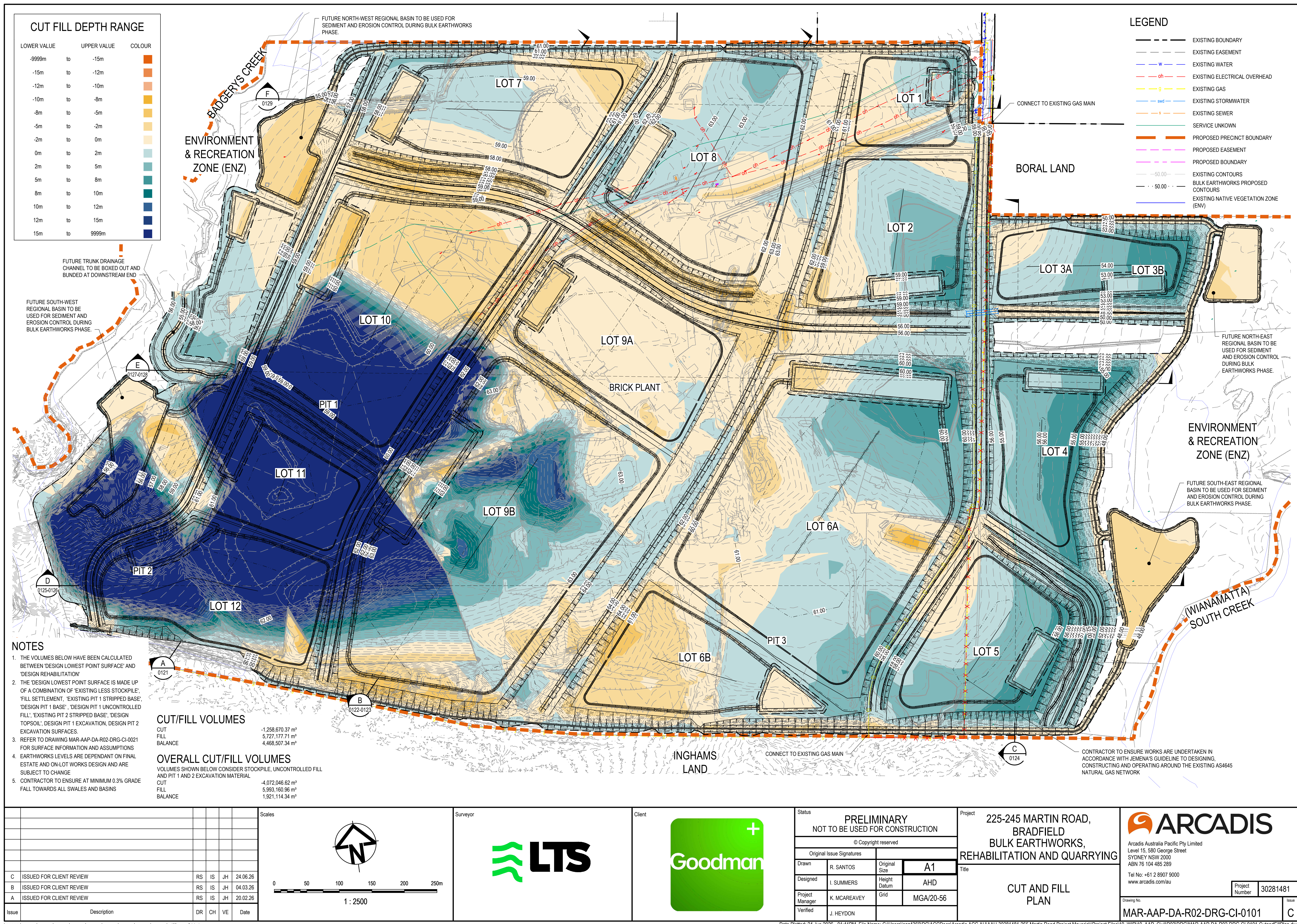
Original Issue Signatures			
Drawn	R. SANTOS	Original Size	A1
Designed	I. SUMMERS	Height Datum	AHD
Project Manager	K. MCAREAVEY	Grid	MGA/20-56
Verified	J. HEYDON		

Project	225-245 MARTIN ROAD, BRADFIELD BULK EARTHWORKS, REHABILITATION AND QUARRYING
PIT 2 EXCAVATION SECTIONS	

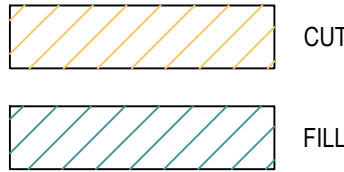
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Project Number	30281481
Issue	C

MAR-AAP-DA-R02-DRG-CI-0096

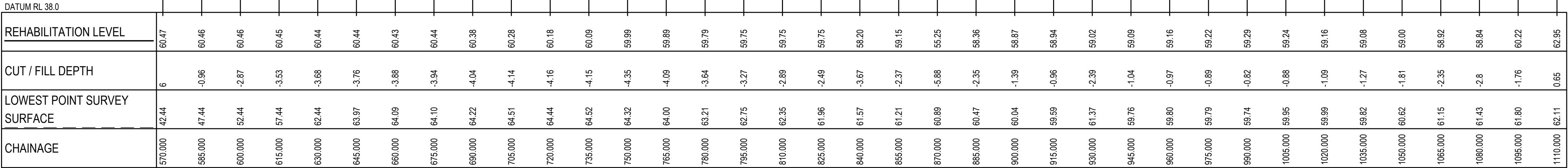


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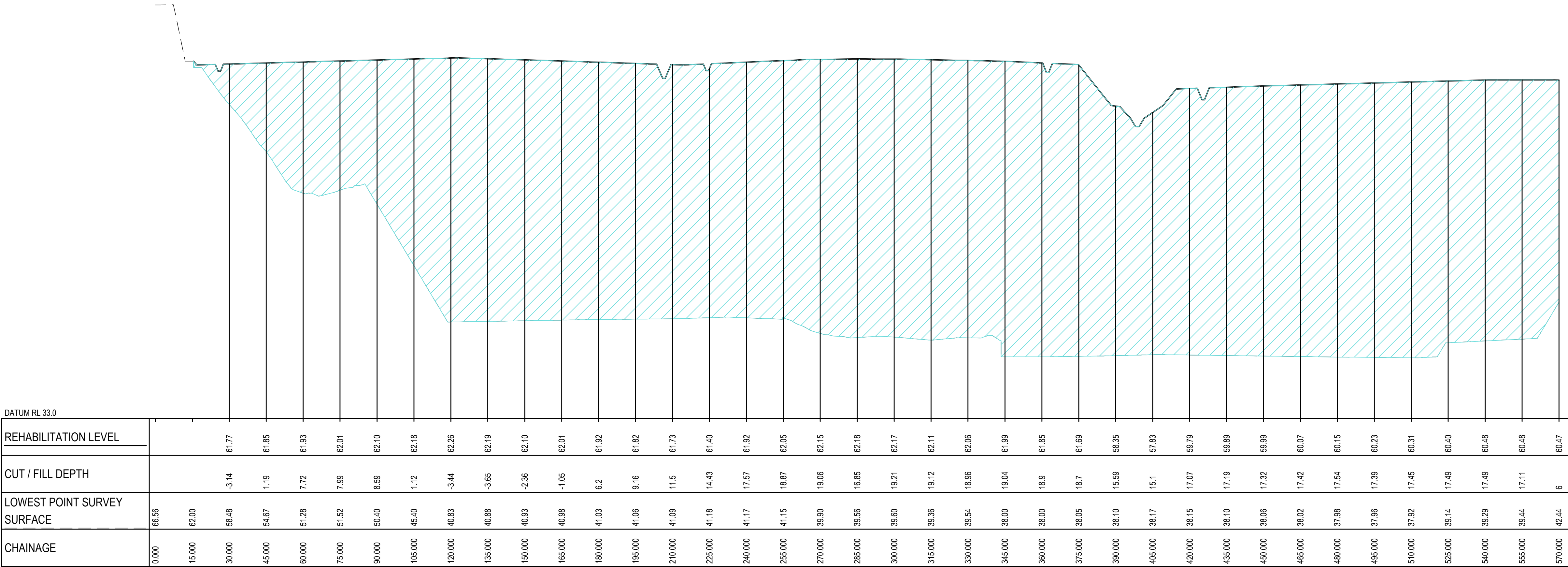
NOTES

1. THE VOLUMES BELOW HAVE BEEN CALCULATED BETWEEN 'DESIGN LOWEST POINT SURFACE' AND 'DESIGN REHAB'
2. THE 'DESIGN LOWEST POINT SURFACE' IS MADE UP OF A COMBINATION OF 'EXISTING LESS STOCKPILE', 'FILL SETTLEMENT', 'EXISTING PIT 1 STRIPPED BASE', 'DESIGN PIT 1 BASE', 'DESIGN PIT 1 UNCONTROLLED FILL', 'EXISTING PIT 2 STRIPPED BASE', 'DESIGN PIT 1 EXCAVATION, SUPER DESIGN PIT 2 EXCAVATION SURFACES.
3. REFER TO DRAWING MAR-AAP-DA-R02-DRG-CI-0021 FOR SURFACE INFORMATION AND ASSUMPTIONS
4. EARTHWORKS LEVELS ARE DEPENDANT ON FINAL ESTATE AND ON-LOT WORKS DESIGN AND ARE SUBJECT TO CHANGE
5. CONTRACTOR TO ENSURE AT MINIMUM 0.3% GRADE FALL TOWARDS ALL SWALES AND BASINS



SECTION A LONGITUDINAL SECTION

SCALE 1:1000 HORI.
1:200 VERT.



SECTION A LONGITUDINAL SECTION

SCALE 1:1000 HORI.
1:200 VERT.

D	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.06.26
C	ISSUED FOR CLIENT REVIEW	RS	IS	JH	04.03.26
B	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.02.26
A	ISSUED FOR CLIENT REVIEW	RS	IS	-	18.12.25
Issue	Description	DR	CH	VE	Date

Scales

0 10 20 40 60 80 100m

1 : 1000

0 5 10 15 20m

1 : 200

Surveyor

Client

Status

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Original Issue Signatures	
Drawn	R. SANTOS
Designed	I. SUMMERS
Project Manager	K. MCAREAVEY
Verified	J. HEYDON
Original Size	A1
Height Datum	AHD
Grid	MGA/20-56

Project

225-245 MARTIN ROAD,
BRADFIELD
BULK EARTHWORKS,
REHABILITATION AND QUARRYING

Title

EARTHWORKS SITE SECTIONS
SHEET 1

Arcadis Australia Pacific Pty Limited
Level 15, 580 George Street
SYDNEY NSW 2000
ABN 76 104 485 289
Tel No: +61 2 8907 9000
www.arcadis.com/au

Project Number	30281481	Issue	D
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Date Plotted: 24 Jun 2026 - 10:16am

File Name: C:\Users\santosa4174\Documents\Arcadis ACC AU\AAU-30281481-265 Martin Road Project Mavenick\Project Files\10_WIP\10_AAP_Civil\R02\DRG\MAR-AAP-DA-R02-DRG-CI-0121-EarthworksSiteSections.dwg

1. THE VOLUMES BELOW HAVE BEEN CALCULATED BETWEEN 'DESIGN LOWEST POINT SURFACE' AND 'DESIGN REHAB'
2. THE 'DESIGN LOWEST POINT SURFACE' IS MADE UP OF A COMBINATION OF 'EXISTING LEAST STOCKPILE', 'FILL SETTLEMENT', 'EXISTING PIT 1 STRIPPED BASE', 'DESIGN PIT 1 BASE', 'DESIGN PIT 1 UNCONTROLLED FILL', 'EXISTING PIT 2 STRIPPED BASE', 'DESIGN PIT 1 EXCAVATION, SUPER DESIGN PIT 2 EXCAVATION SURFACES.
3. REFER TO DRAWING MAR-AAP-DA-R02-DRG-CL0021 FOR SURFACE INFORMATION AND ASSUMPTIONS
4. EARTHWORKS LEVELS ARE DEPENDANT ON FINAL ESTATE AND ON-LOT WORKS DESIGN AND ARE SUBJECT TO CHANGE
5. CONTRACTOR TO ENSURE AT MINIMUM 0.3% GRADE FALL TOWARDS ALL SWALES AND BASINS



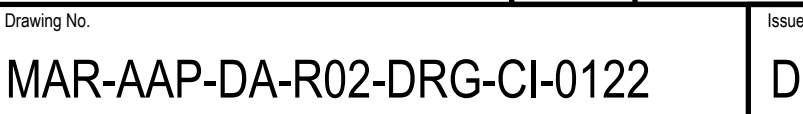
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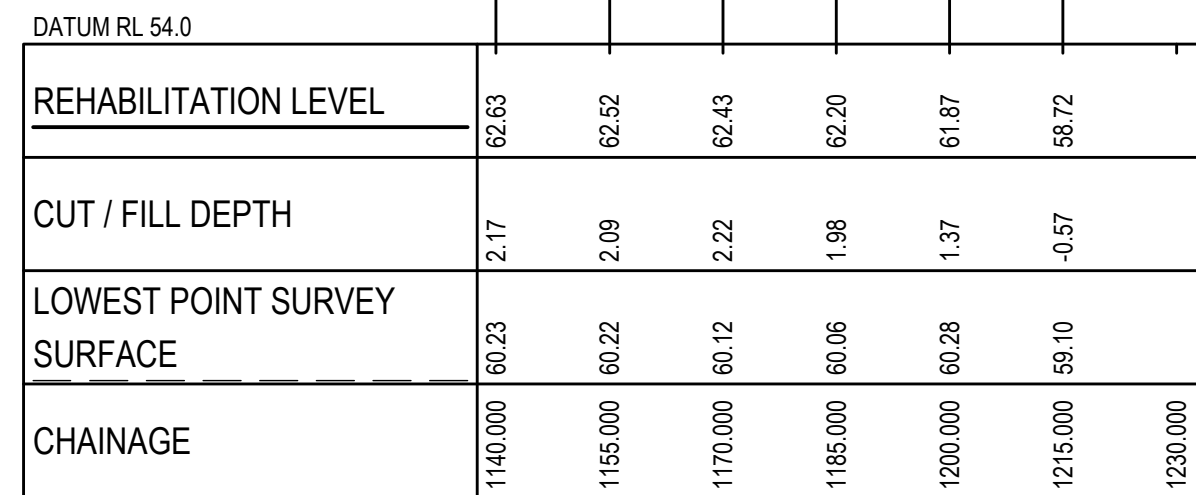
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Project	225-245 MARTIN ROAD, BRADFIELD BULK EARTHWORKS, REHABILITATION AND QUARRYING
Title	EARTHWORKS SITE SECTIONS SHEET 2



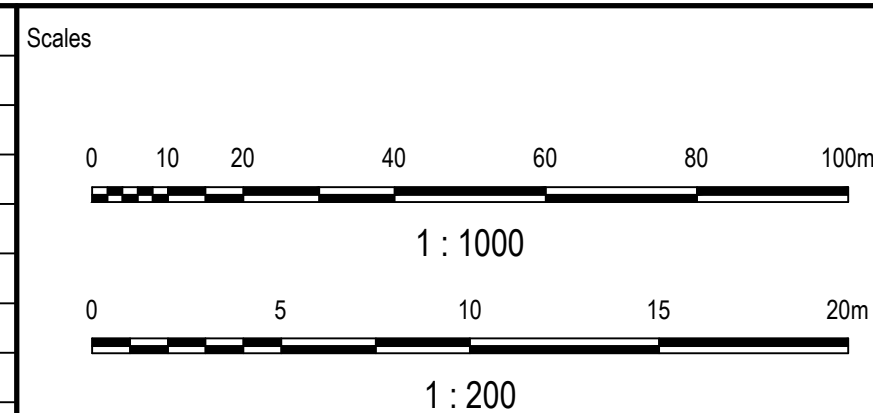
1. THE VOLUMES BELOW HAVE BEEN CALCULATED BETWEEN 'DESIGN LOWEST POINT SURFACE' AND 'DESIGN REHAB'
2. THE 'DESIGN LOWEST POINT SURFACE' IS MADE UP OF A COMBINATION OF 'EXISTING LESS STOCKPILE', 'FILL SETTLEMENT', 'EXISTING PIT 1 STRIPPED BASE', 'DESIGN PIT 1 BASE', 'DESIGN PIT 1 UNCONTROLLED FILL', 'EXISTING PIT 2 STRIPPED BASE', 'DESIGN PIT 1 EXCAVATION, SUPER DESIGN PIT 2 EXCAVATION SURFACES.
3. REFER TO DRAWING MAR-AAP-DA-R02-DRG-Cl-0021 FOR SURFACE INFORMATION AND ASSUMPTIONS
4. EARTHWORKS LEVELS ARE DEPENDANT ON FINAL ESTATE AND ON-LOT WORKS DESIGN AND ARE SUBJECT TO CHANGE
5. CONTRACTOR TO ENSURE AT MINIMUM 0.3% GRADE FALL TOWARDS ALL SWALES AND BASINS



SECTION B LONGITUDINAL SECTION

SCALE 1:1000 HORI.
1:200 VERT.

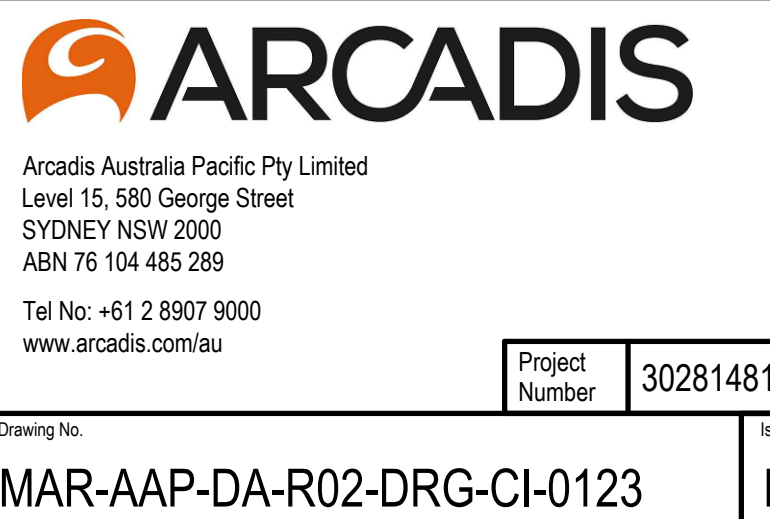
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C	ISSUED FOR CLIENT REVIEW	RS	IS	JH	04.03.26
B	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.02.26
A	ISSUED FOR CLIENT REVIEW	RS	IS	-	18.12.25
Issue	Description	DR	CH	VE	Date



Status			
PRELIMINARY NOT TO BE USED FOR CONSTRUCTION			
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Original Issue Signatures			
Drawn	R. SANTOS	Original Size	A1
Designed	I. SUMMERS	Height Datum	AHD
Project Manager	K. MCAREAVEY	Grid	MTA/20-56
Verified	J. HEYDON		

Project	225-245 MARTIN ROAD, BRADFIELD BULK EARTHWORKS, REHABILITATION AND QUARRYING
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EARTHWORKS SITE SECTIONS
SHEET 3

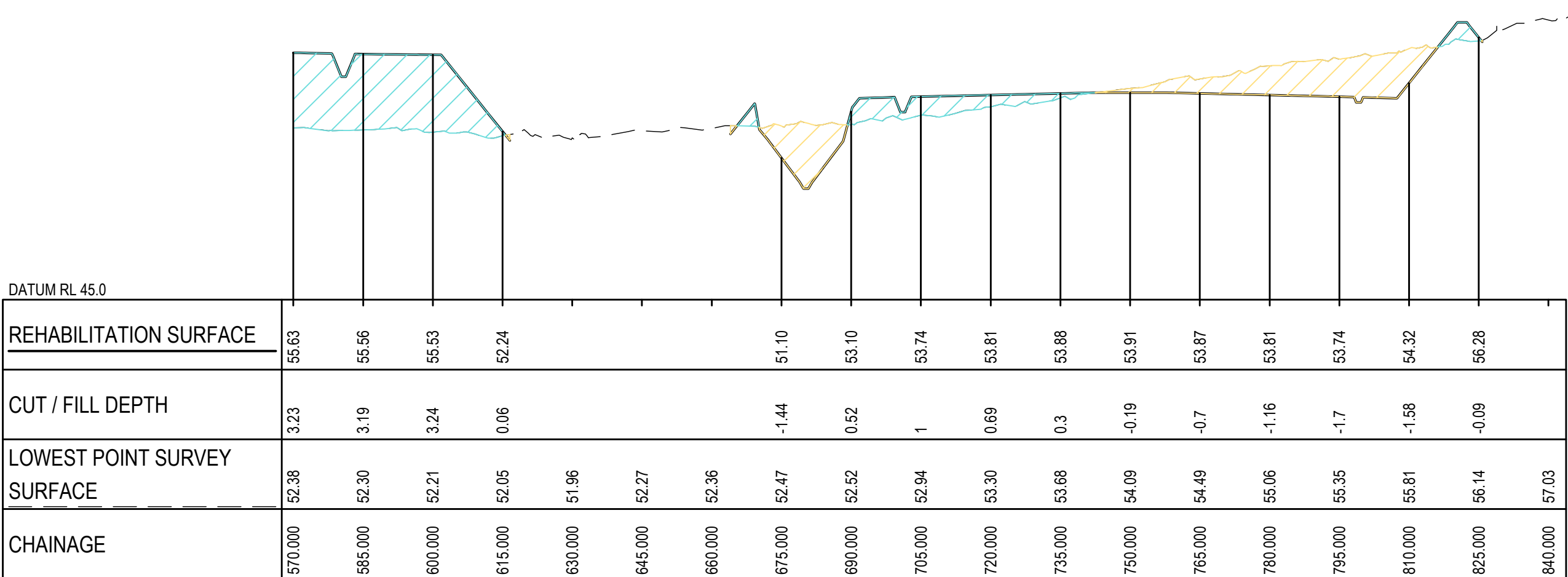


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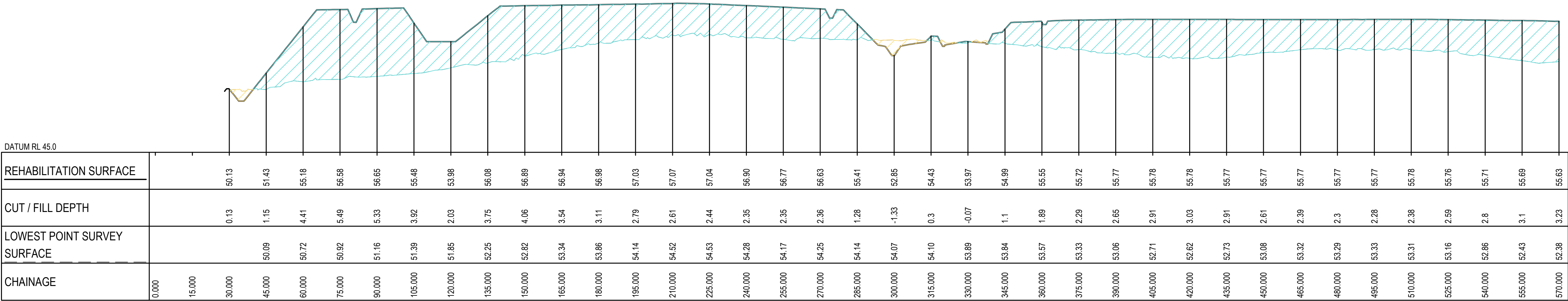
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- NOTES
- THE VOLUMES BELOW HAVE BEEN CALCULATED BETWEEN 'DESIGN LOWEST POINT SURFACE' AND 'DESIGN REHAB'
 - THE 'DESIGN LOWEST POINT SURFACE' IS MADE UP OF A COMBINATION OF 'EXISTING LESS STOCKPILE', 'FILL SETTLEMENT', 'EXISTING PIT 1 STRIPPED BASE', 'DESIGN PIT 1 BASE', 'DESIGN PIT 1 UNCONTROLLED FILL', 'EXISTING PIT 2 STRIPPED BASE', 'DESIGN PIT 1 EXCAVATION, SUPER DESIGN PIT 2 EXCAVATION SURFACES.
 - REFER TO DRAWING MAR-AAP-DA-R02-DRG-CI-0021 FOR SURFACE INFORMATION AND ASSUMPTIONS
 - EARTHWORKS LEVELS ARE DEPENDANT ON FINAL ESTATE AND ON-LOT WORKS DESIGN AND ARE SUBJECT TO CHANGE
 - CONTRACTOR TO ENSURE AT MINIMUM 0.3% GRADE FALL TOWARDS ALL SWALES AND BASINS



SECTION C LONGITUDINAL SECTION

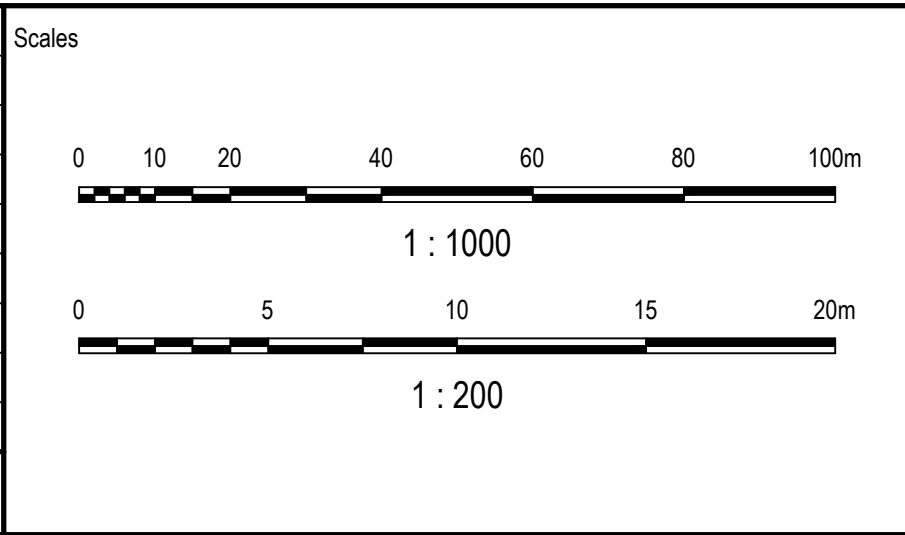
SCALE 1:1000 HORI.
1:200 VERT.



SECTION C LONGITUDINAL SECTION

SCALE 1:1000 HORI.
1:200 VERT.

D	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.06.26
C	ISSUED FOR CLIENT REVIEW	RS	IS	JH	04.03.26
B	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.02.26
A	ISSUED FOR CLIENT REVIEW	RS	IS	-	18.12.25
Issue	Description	DR	CH	VE	Date



Status	PRELIMINARY NOT TO BE USED FOR CONSTRUCTION		
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Original Issue Signatures			
Drawn	R. SANTOS	Original Size	A1
Designed	I. SUMMERS	Height Datum	AHD
Project Manager	K. MCAREAVEY	Grid	MGA/20-56
Verified	J. HEYDON		

Project	225-245 MARTIN ROAD, BRADFIELD BULK EARTHWORKS, REHABILITATION AND QUARRYING		
Title	EARTHWORKS SITE SECTIONS SHEET 4		

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Project Number	30281481
Issue	D

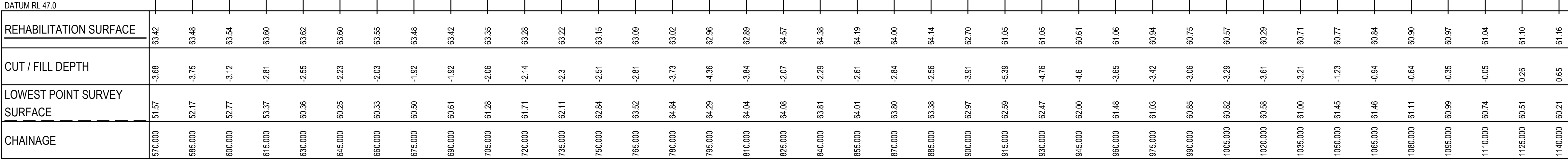
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LEGEND

CUT

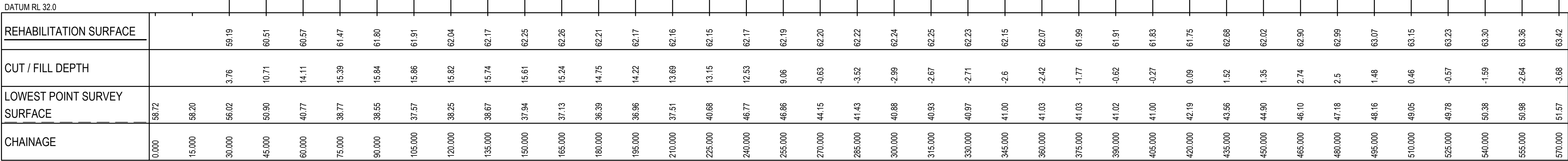
FILL

- NOTES
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 - THE 'DESIGN LOWEST POINT SURFACE' IS MADE UP OF A COMBINATION OF 'EXISTING LESS STOCKPILE', 'FILL SETTLEMENT', 'EXISTING PIT 1 STRIPPED BASE', 'DESIGN PIT 1 BASE', 'DESIGN PIT 1 UNCONTROLLED FILL', 'EXISTING PIT 2 STRIPPED BASE', 'DESIGN PIT 1 EXCAVATION, SUPER DESIGN PIT 2 EXCAVATION SURFACES.
 - REFER TO DRAWING MAR-AAP-DA-R02-DRG-CI-0021 FOR SURFACE INFORMATION AND ASSUMPTIONS
 - EARTHWORKS LEVELS ARE DEPENDANT ON FINAL ESTATE AND ON-LOT WORKS DESIGN AND ARE SUBJECT TO CHANGE
 - CONTRACTOR TO ENSURE AT MINIMUM 0.3% GRADE FALL TOWARDS ALL SWALES AND BASINS



SECTION D LONGITUDINAL SECTION

SCALE 1:1000 HORI.
1:200 VERT.



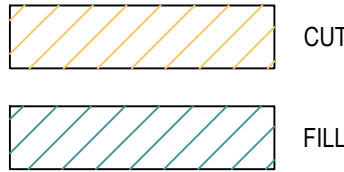
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SCALE 1:1000 HORI.
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											Original Issue Signatures				Title				Project Number							
D ISSUED FOR CLIENT REVIEW					RS IS JH 24.06.26						Drawn R. SANTOS				Original Size A1				EARTHWORKS SITE SECTIONS SHEET 5				30281481			
C ISSUED FOR CLIENT REVIEW					RS IS JH 04.03.26						Designed I. SUMMERS				Height Datum AHD											
B ISSUED FOR CLIENT REVIEW					RS IS JH 24.02.26						Project Manager K. MCAREAVEY				Grid MGA/20-56											
A ISSUED FOR CLIENT REVIEW					RS IS - 18.12.25						Verified J. HEYDON															
Issue Description					DR CH VE Date																		MAR-AAP-DA-R02-DRG-CI-0125			
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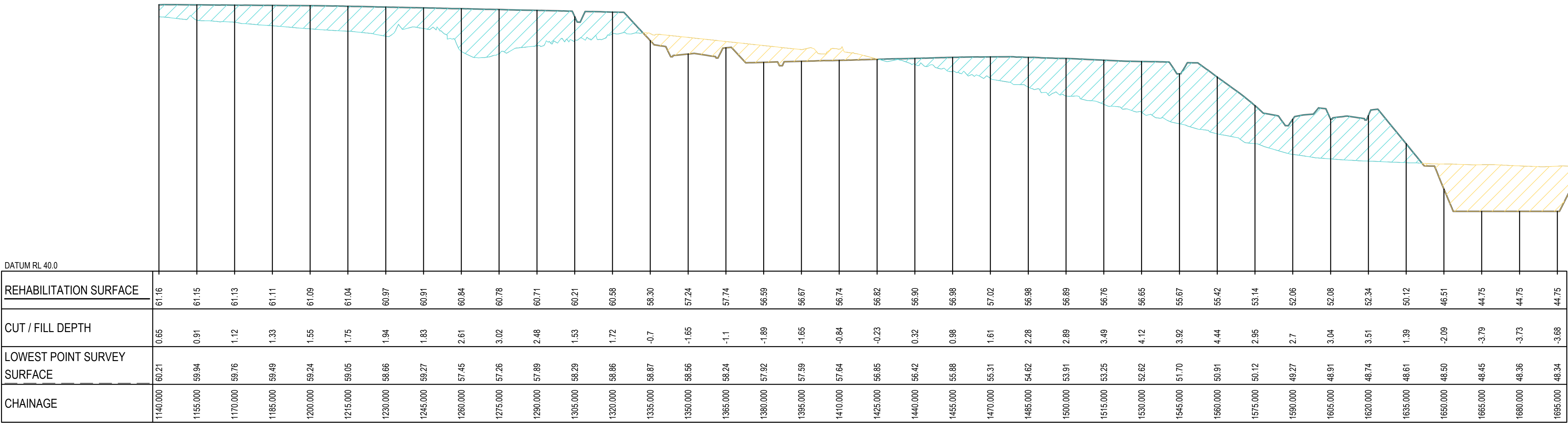
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LEGEND



NOTES

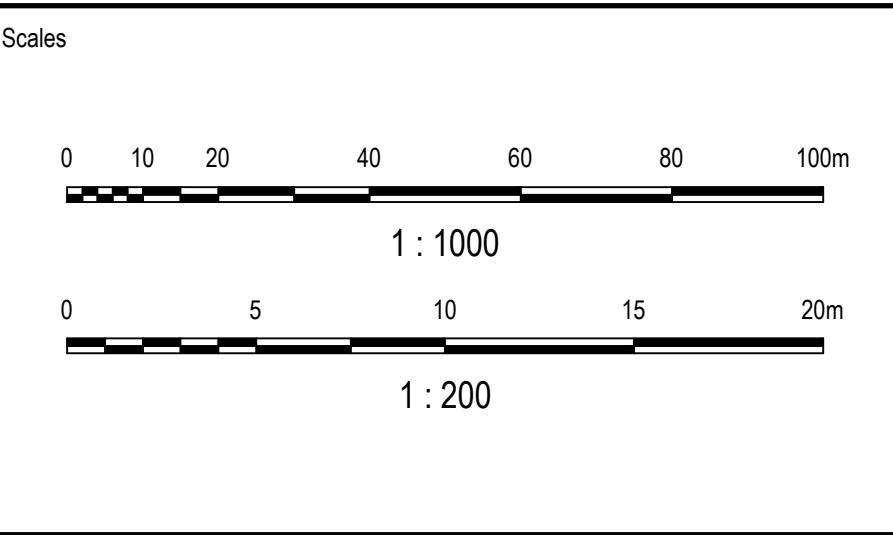
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SECTION D LONGITUDINAL SECTION

SCALE 1:1000 HORI.
1:200 VERT.

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C	ISSUED FOR CLIENT REVIEW	RS	IS	JH	04.03.26
B	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.02.26
A	ISSUED FOR CLIENT REVIEW	RS	IS	-	18.12.25
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Project Manager	K. MCAREAVEY	Grid	MGA/20-56
Verified	J. HEYDON		

Project	225-245 MARTIN ROAD, BRADFIELD BULK EARTHWORKS, REHABILITATION AND QUARRYING
Title	EARTHWORKS SITE SECTIONS SHEET 6

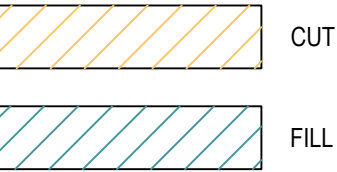
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Project Number	30281481
Issue	D

Drawing No.

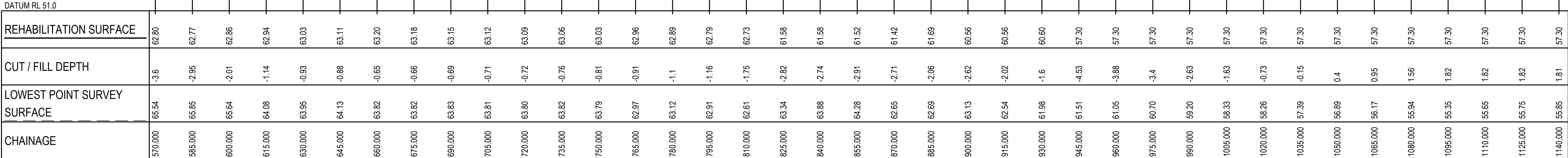
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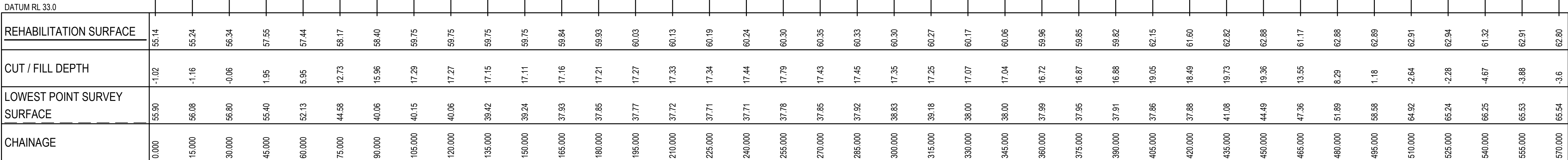
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SECTION E LONGITUDINAL SECTION

SCALE 1:1000 HORI.
1:200 VERT.



SECTION E LONGITUDINAL SECTION

SCALE 1:1000 HORI.
1:200 VERT.

Issue	Description	DR	CH	VE	Date
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B	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.02.26
A	ISSUED FOR CLIENT REVIEW	RS	IS	-	18.12.25

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Surveyor

Client

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Designed	I. SUMMERS	Height Datum	AHD
Project Manager	K. MCAREAVEY	Grid	MGA/20-56
Verified	J. HEYDON		

Project

225-245 MARTIN ROAD,
BRADFIELD
BULK EARTHWORKS,
REHABILITATION AND QUARRYING

Title

EARTHWORKS SITE SECTIONS
SHEET 7

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Drawing No.

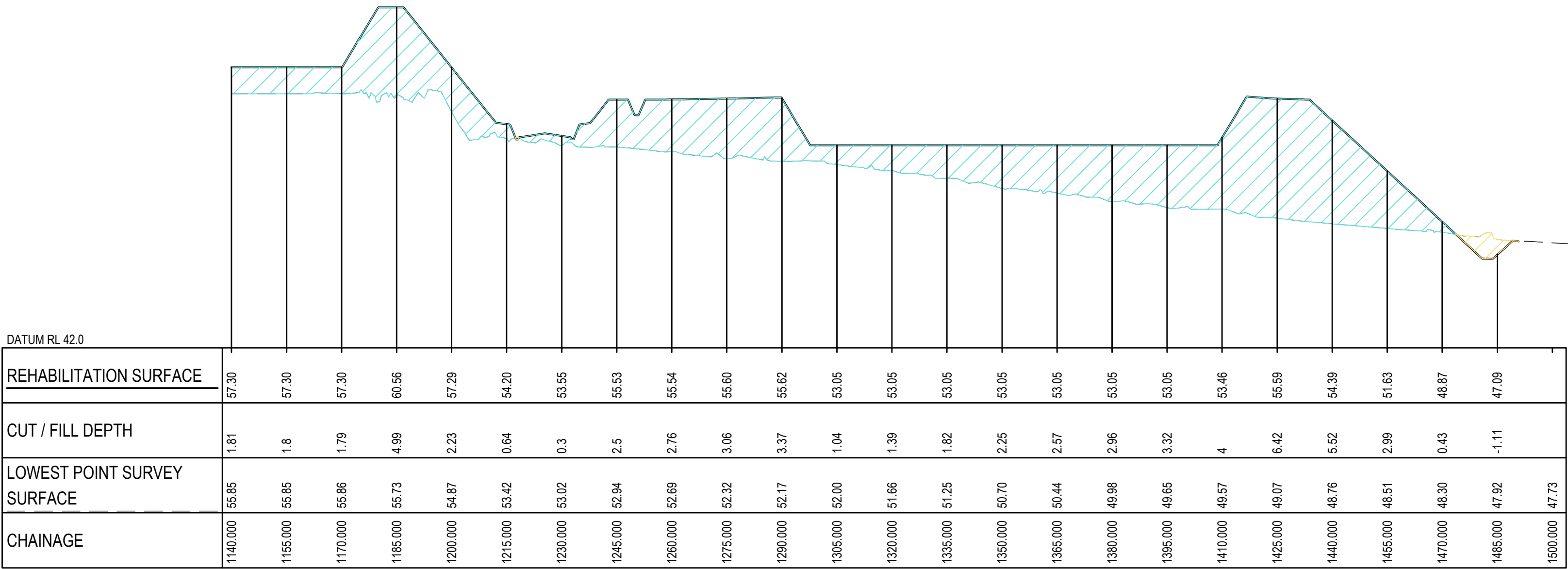
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LEGEND

CUT

FILL

- NOTES
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SECTION E LONGITUDINAL SECTION

SCALE 1:1000 HORI.
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Issue	Description	DR	CH	VE	Date

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Surveyor

Client

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Designed	I. SUMMERS	Height Datum	AHD
Project Manager	K. MCAREAVEY	Grid	MGA/20-56
Verified	J. HEYDON		

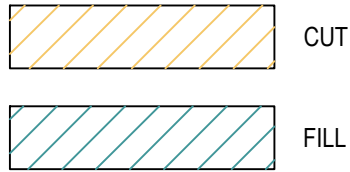
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Project Number	30281481	Issue	D

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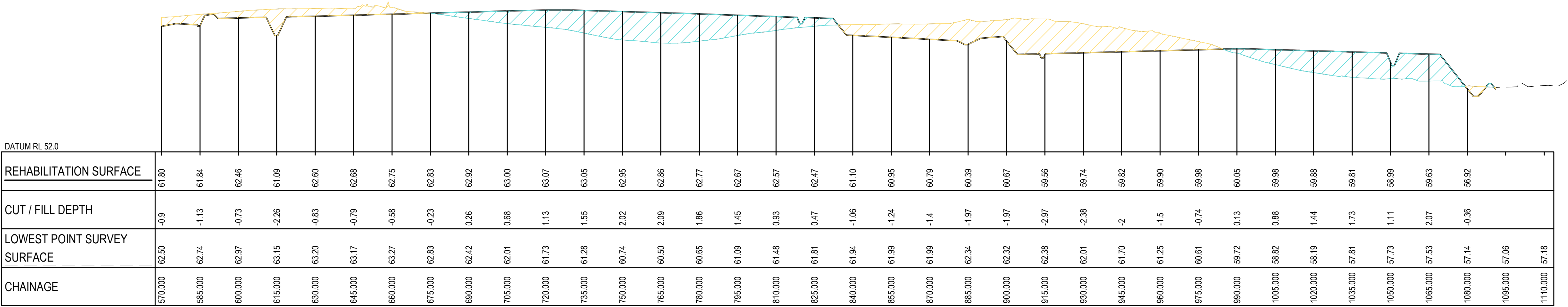
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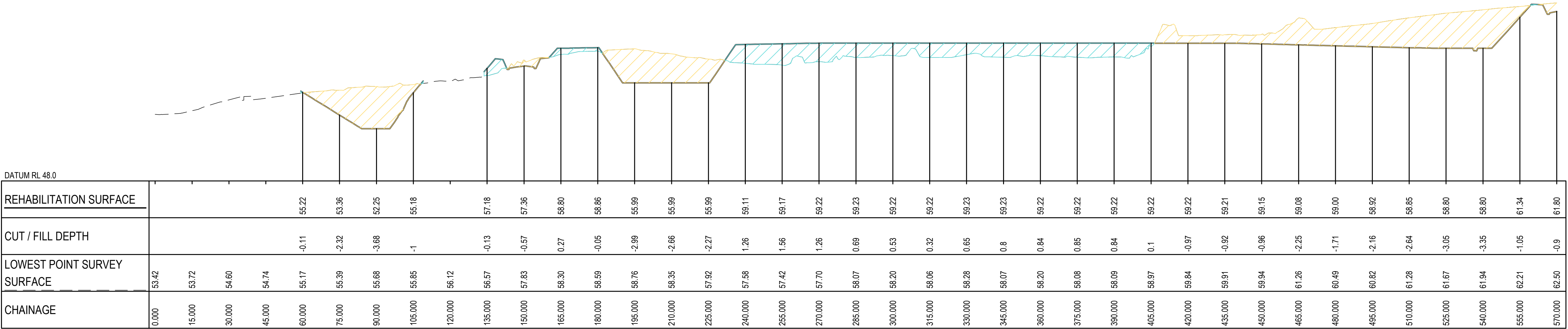
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SECTION F LONGITUDINAL SECTION

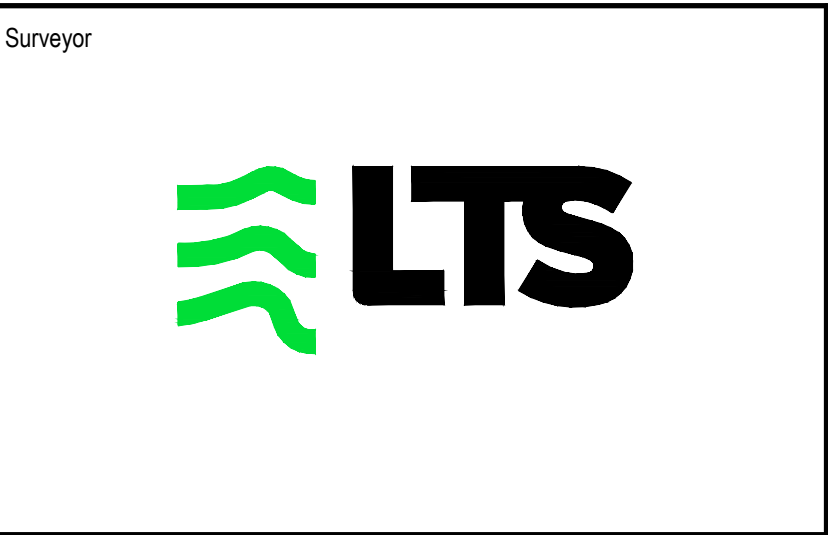
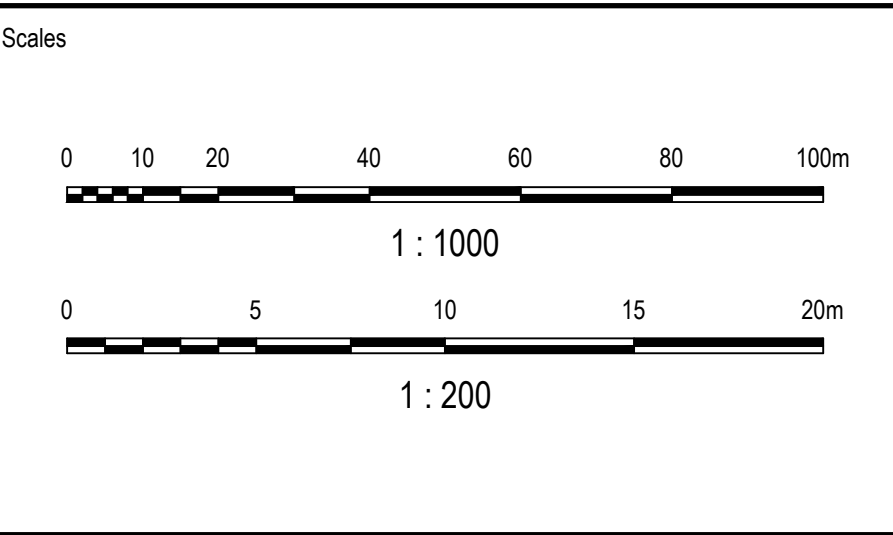
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SECTION F LONGITUDINAL SECTION

SCALE 1:1000 HORI.
1:200 VERT.

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Issue	Description	DR	CH	VE	Date



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Project Manager	K. MCAREAVEY	Grid	MGA/20-56
Verified	J. HEYDON		

Project	225-245 MARTIN ROAD, BRADFIELD BULK EARTHWORKS, REHABILITATION AND QUARRYING		
Title	EARTHWORKS SITE SECTIONS SHEET 9		

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Project Number	30281481
Issue	D

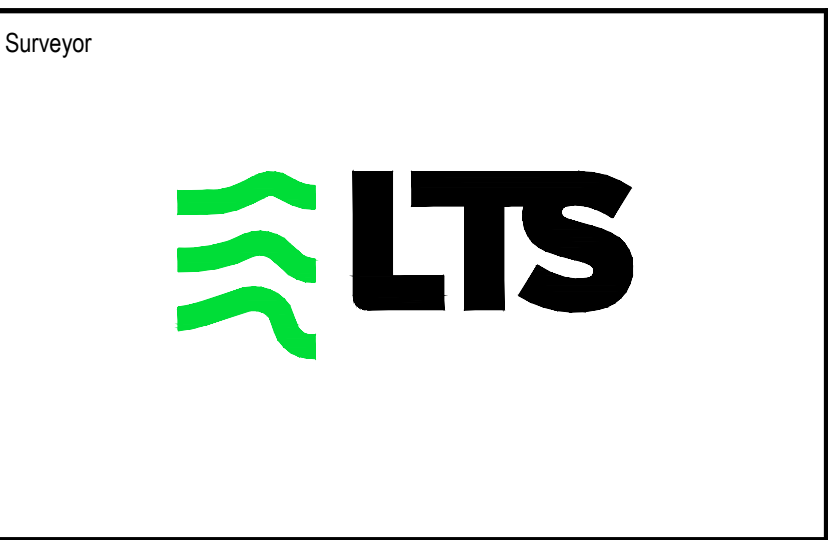
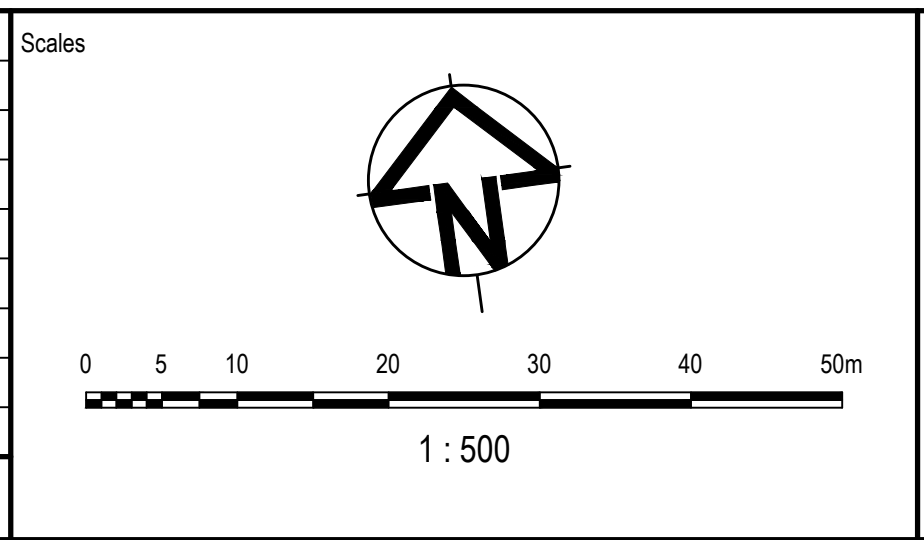
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MAR-AAP-DA-R02-DRG-CI-0129



- LEGEND**
- EXISTING BOUNDARY
 - PROPOSED PRECINCT BOUNDARY
- NOTES**
1. THE CONTAINMENT CELL IS DESIGNED TO ACCOMMODATE A MAXIMUM OF 100,000m³ OF CONTAMINATED MATERIAL.
 2. THE CONTRACTOR SHALL VERIFY ACTUAL ON SITE CONTAMINATED MATERIAL VOLUMES PRIOR TO COMMENCEMENT OF CELL CONSTRUCTION. IF THE VERIFIED VOLUME IS LESS THAN 100,000m³, THE CONTRACTOR SHALL REVISE THE CELL DESIGN ACCORDINGLY AND OBTAIN ACCEPTANCE OF THE REVISED DESIGN FROM THE GEOTECHNICAL ENGINEER AND SITE SUPERINTENDENT PRIOR TO COMMENCEMENT OF WORKS.
 3. THE CONTAINMENT CELL DESIGN, INCLUDING CAPPING LAYER AND ANY LINING SHALL BE IN ACCORDANCE WITH THE STRATEGY AND DESIGN PRESENTED IN THE SITE WIDE REMEDIAL ACTION PLAN, PREPARED BY JBS&G.

C	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.06.26
B	ISSUED FOR CLIENT REVIEW	RS	IS	JH	04.03.26
A	ISSUED FOR CLIENT REVIEW	RS	IS	JH	20.02.26
Issue	Description	DR	CH	VE	Date

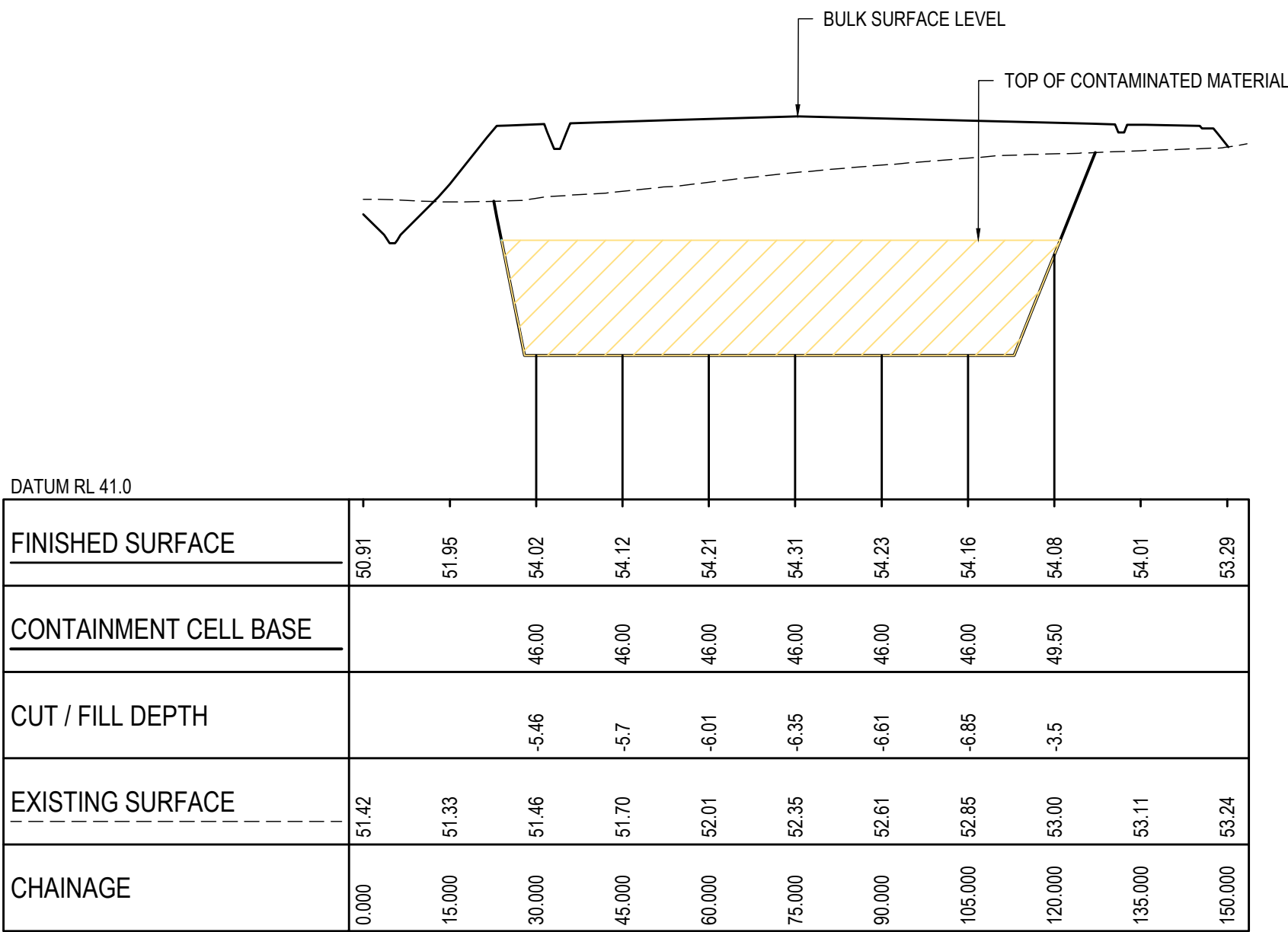


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Verified	J. HEYDON		

Project	225-245 MARTIN ROAD, BRADFELD BULK EARTHWORKS, REHABILITATION AND QUARRYING
Title	CONTAINMENT CELL PLAN

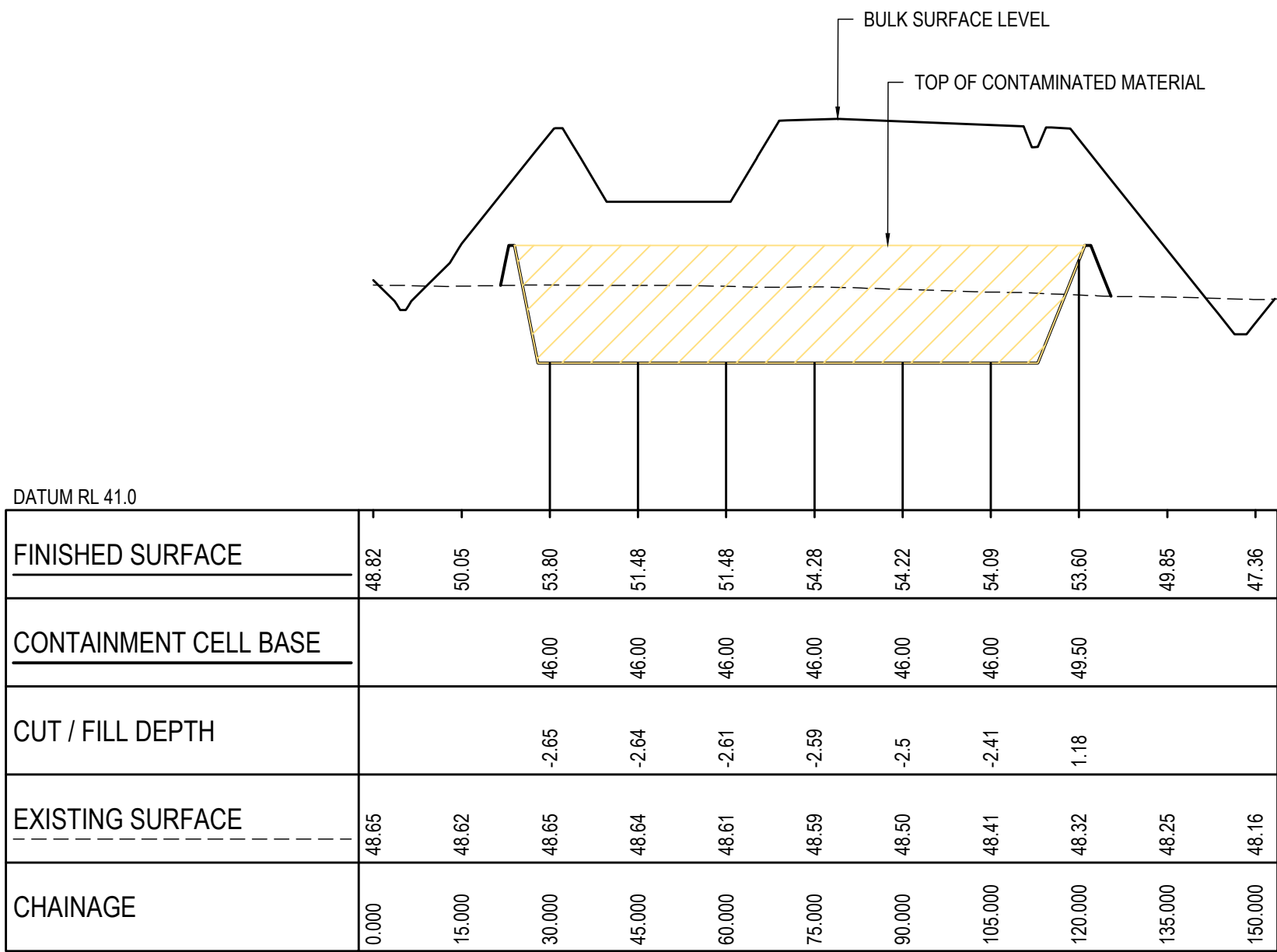
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Project Number	30281481	Issue	
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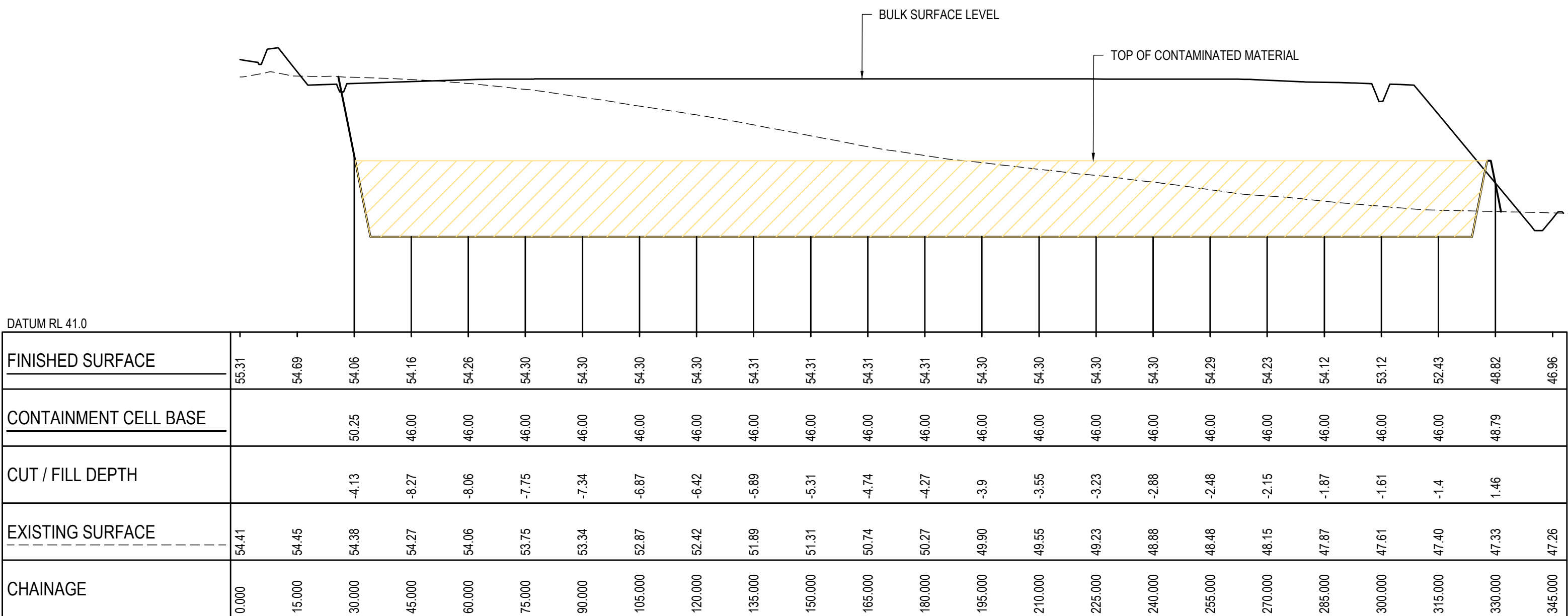
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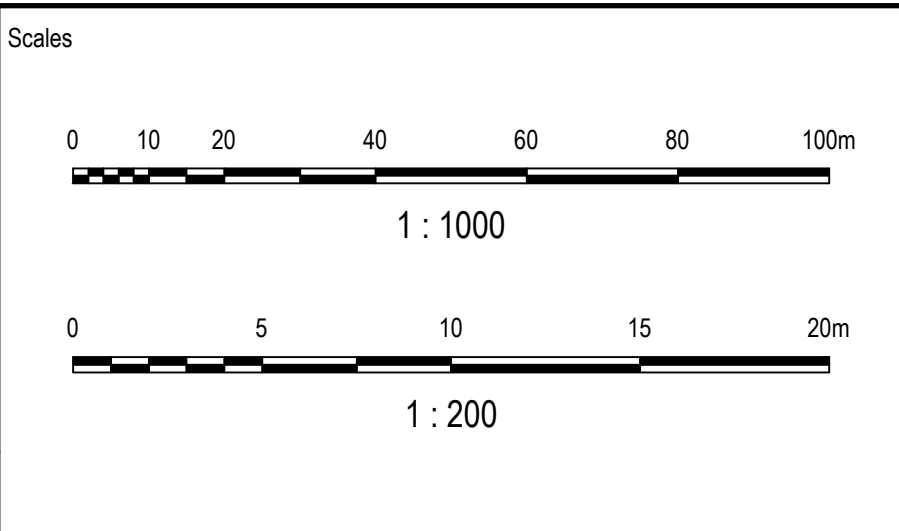
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SECTION A LONGITUDINAL SECTION

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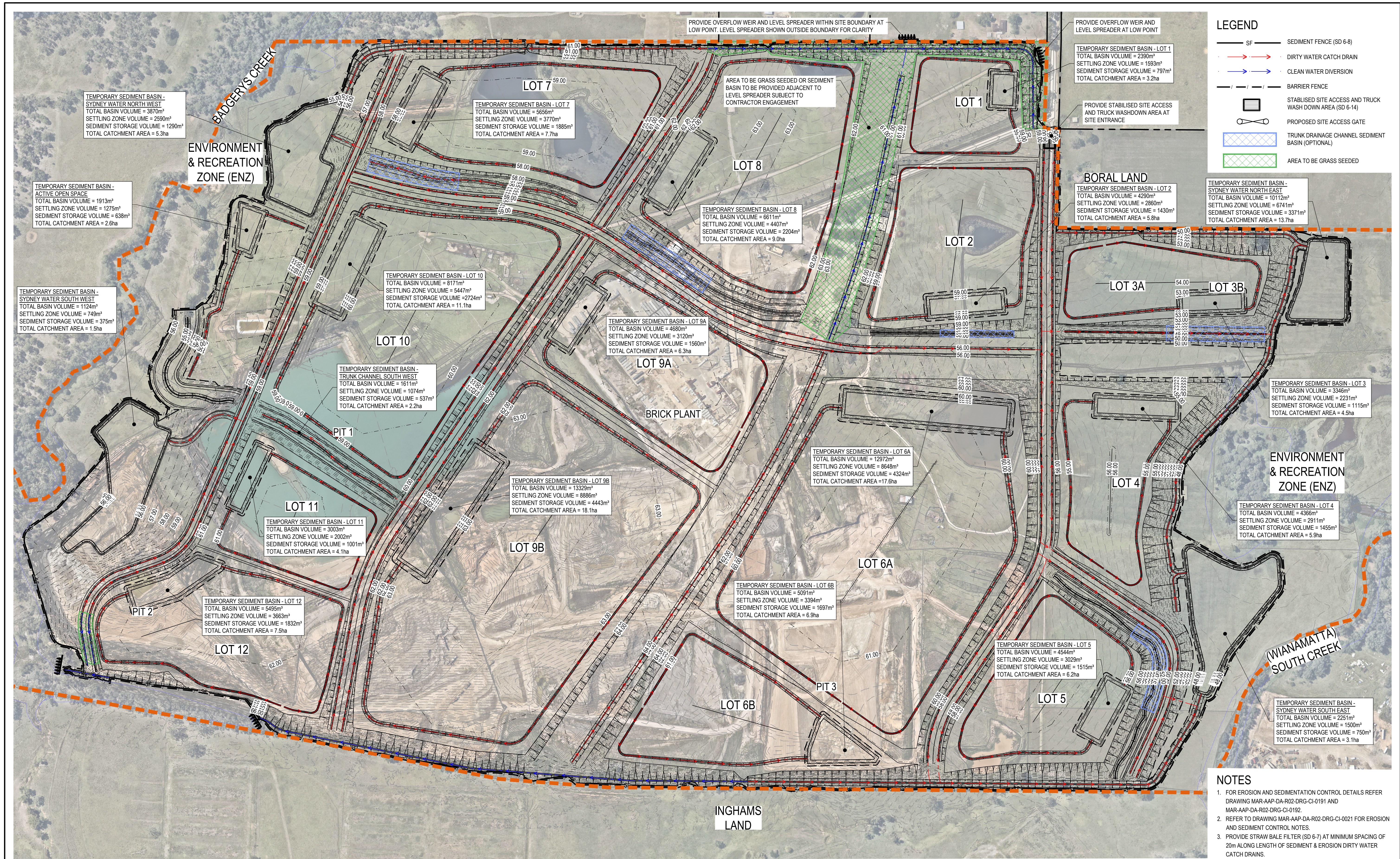
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Verified	J. HEYDON		

Project	225-245 MARTIN ROAD, BRADFIELD BULK EARTHWORKS, REHABILITATION AND QUARRYING
Title	CONTAINMENT CELL SECTIONS

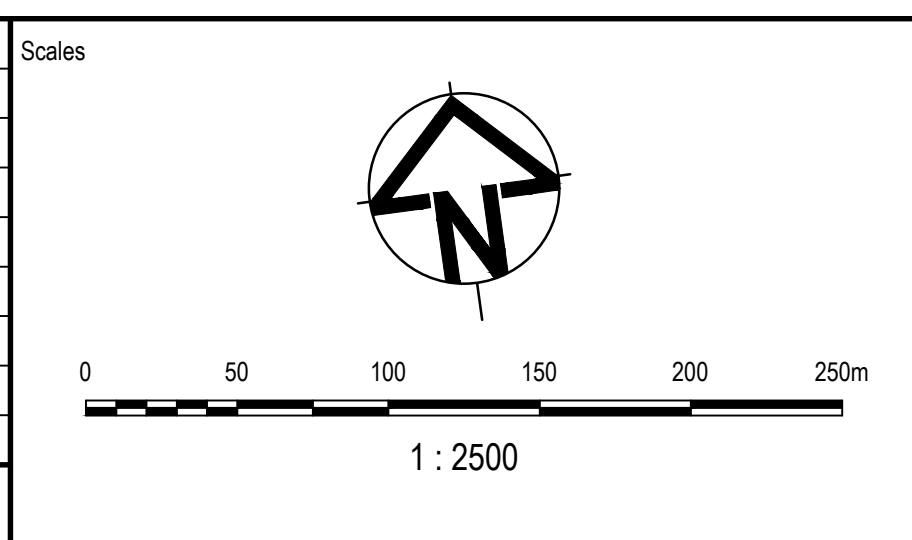
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Project Number	30281481
Issue	C

MAR-AAP-DA-R02-DRG-CI-0142



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Issue	Description	DR	CH	VE	Date



Project

225-245 MARTIN ROAD,
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BULK EARTHWORKS,
REHABILITATION AND QUARRYING

Title

EROSION AND SEDIMENT
CONTROL PLAN

ARCADIS

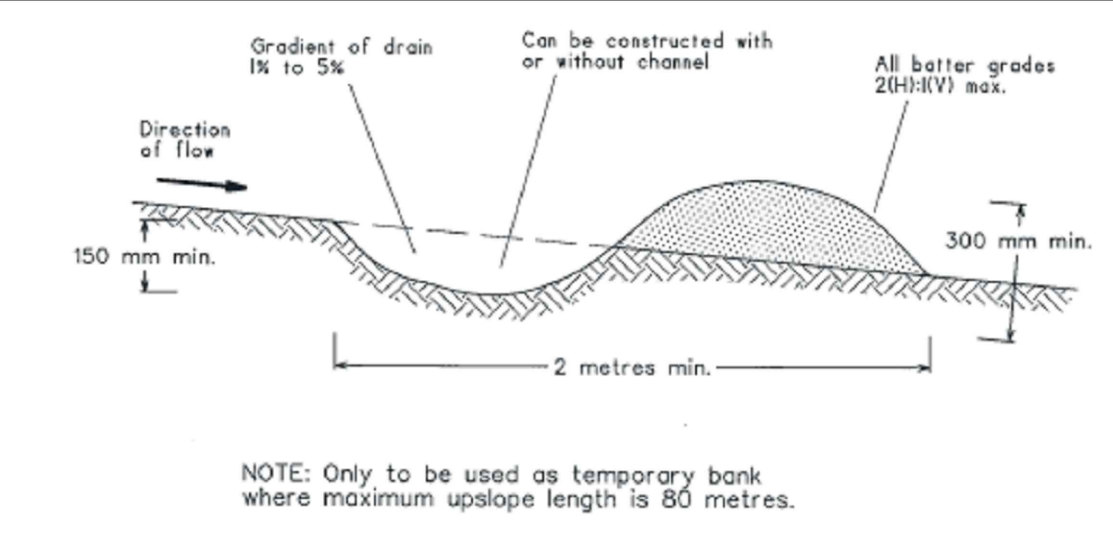
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Project Number 30281481

Issue

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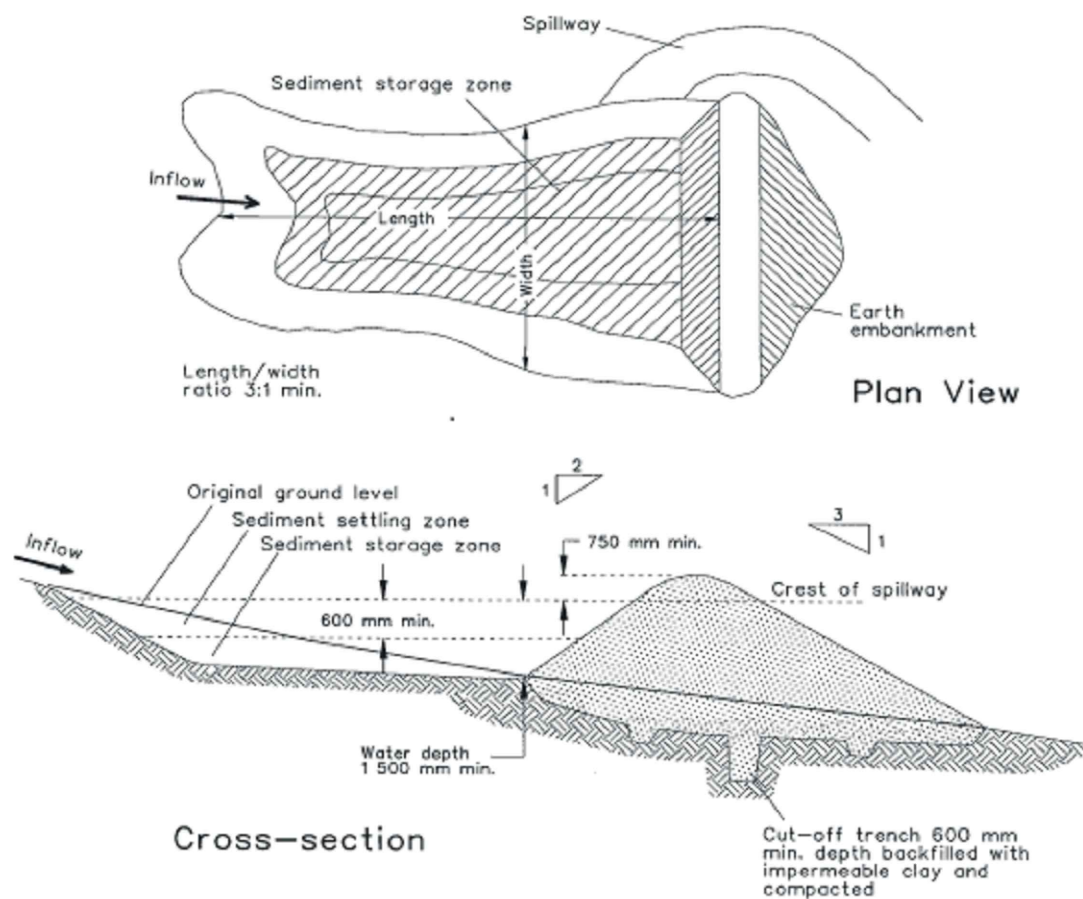
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Construction Notes

- Build with gradients between 1 percent and 5 percent.
- Avoid removing trees and shrubs if possible - work around them.
- Ensure the structures are free of projections or other irregularities that could impede water flow.
- Build the drains with circular, parabolic or trapezoidal cross sections, not V shaped.
- Ensure the banks are properly compacted to prevent failure.
- Complete permanent or temporary stabilisation within 10 days of construction.

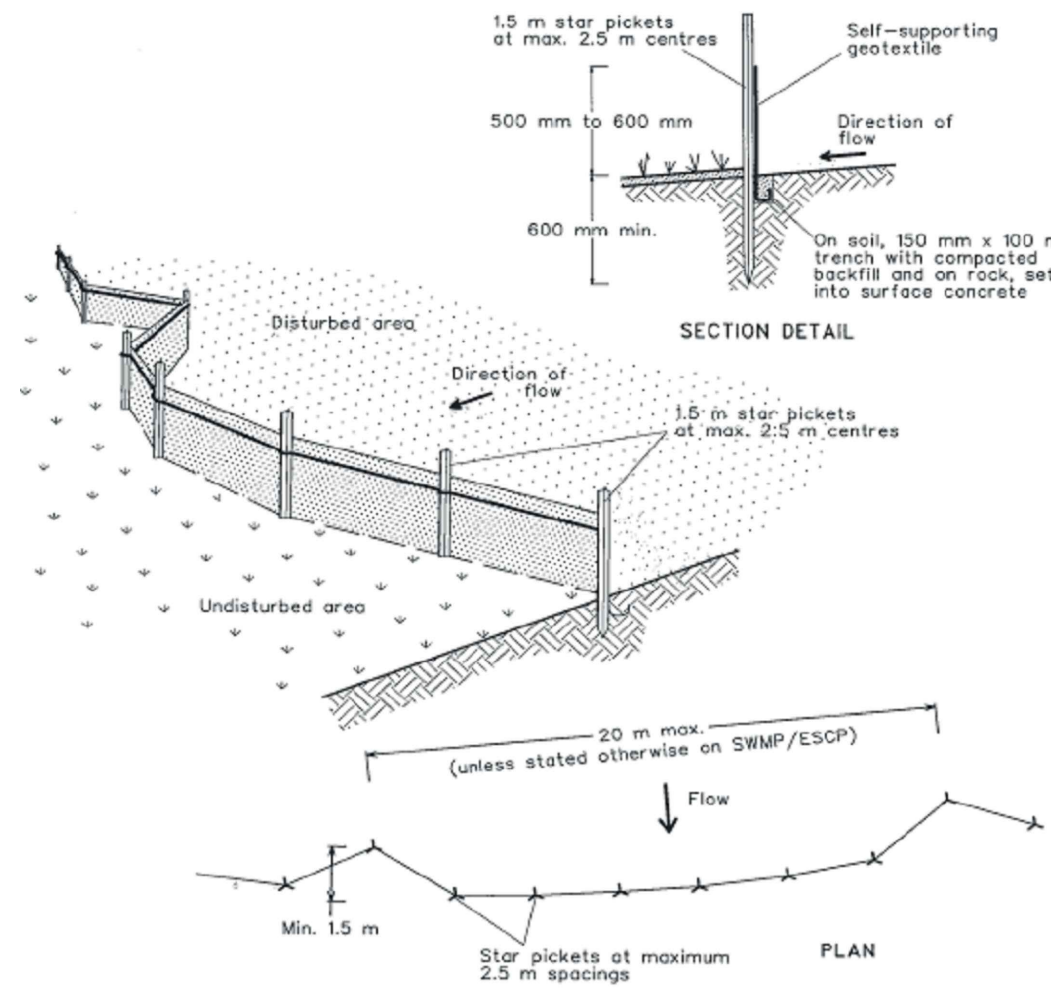
EARTH BANK LOW FLOW (SD 5-5)



Construction Notes

- Remove all vegetation and topsoil from under the dam wall and from within the storage area.
- Construct a cut-off trench 500 mm deep and 1,200 mm wide along the centreline of the embankment extending to a point on the gully wall level with the riser crest.
- Maintain the trench free of water and recompact the materials with equipment as specified in the SWMP to 95 per cent Standard Proctor Density.
- Select fill following the SWMP that is free of roots, wood, rock, large stone or foreign material.
- Prepare the site under the embankment by ripping to at least 100 mm to help bond compacted fill to the existing substrate.
- Spread the fill in 100 mm to 150 mm layers and compact it at optimum moisture content following the SWMP.
- Construct the emergency spillway.
- Rehabilitate the structure following the SWMP.

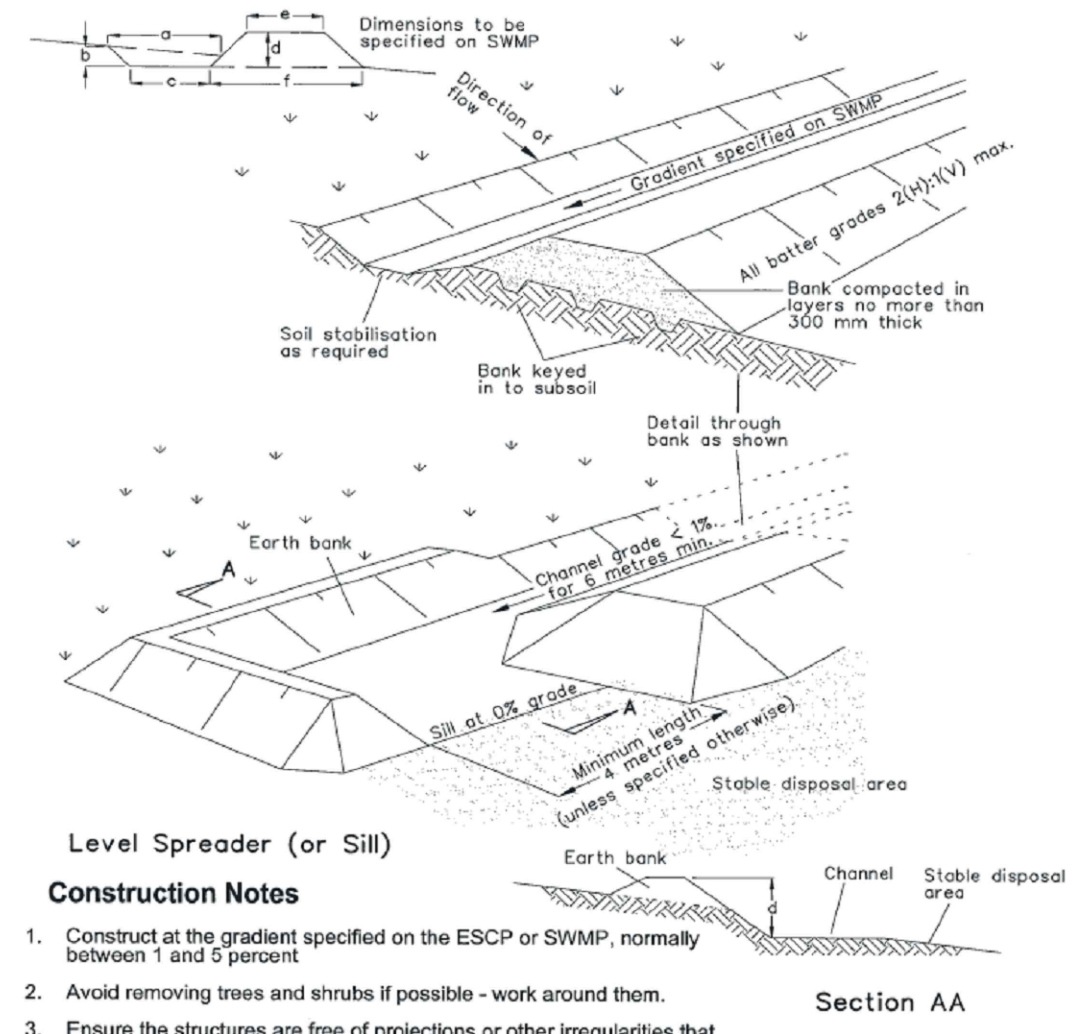
SEDIMENT BASIN (SD 6-4)



Construction Notes

- Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
- Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
- Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
- Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
- Join sections of fabric at a support post with a 150-mm overlap.
- Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

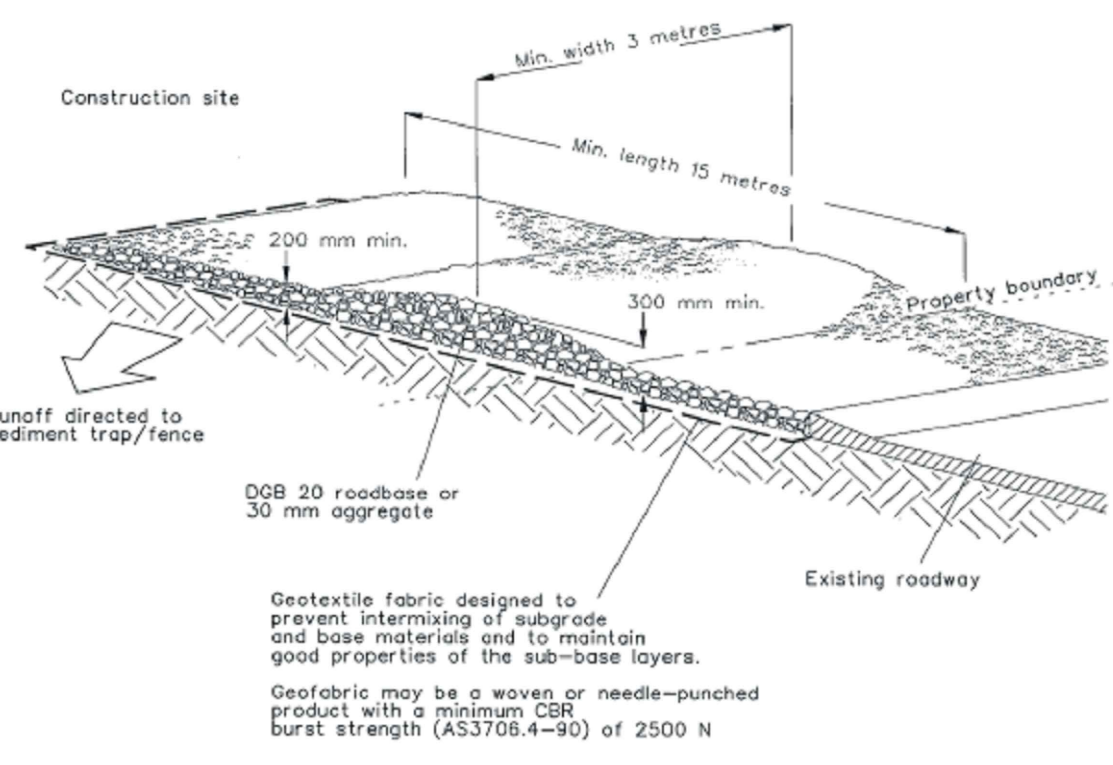
SEDIMENT FENCE (SD 6-8)



Construction Notes

- Construct at the gradient specified on the ESCP or SWMP, normally between 1 and 5 percent.
- Avoid removing trees and shrubs if possible - work around them.
- Ensure the structures are free of projections or other irregularities that could impede water flow.
- Build the drains with circular, parabolic or trapezoidal cross sections, not V-shaped, at the dimensions shown on the SWMP.
- Ensure the banks are properly compacted to prevent failure.
- Complete permanent or temporary stabilisation within 10 days of construction following Table 5.2 in Landcom (2004).
- Where discharging to erodible lands, ensure they outlet through a properly constructed level spreader.
- Construct the level spreader at the gradient specified on the ESCP or SWMP, normally less than 1 percent or level.
- Where possible, ensure they discharge waters onto either stabilised or undisturbed disposal sites within the same subcatchment area from which the water originated. Approval might be required to discharge into other subcatchments.

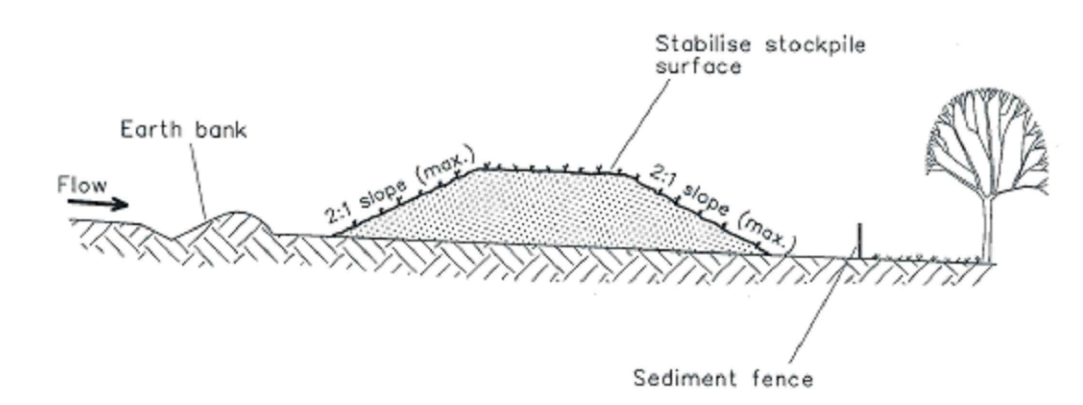
EARTH BANK HIGH FLOW (SD 5-6)



Construction Notes

- Strip the topsoil, level the site and compact the subgrade.
- Cover the area with needle-punched geotextile.
- Construct a 200-mm thick pad over the geotextile using road base or 30-mm aggregate.
- Ensure the structure is at least 15 metres long or to building alignment and at least 3 metres wide.
- Where a sediment fence joins onto the stabilised access, construct a hump in the stabilised access to divert water to the sediment fence

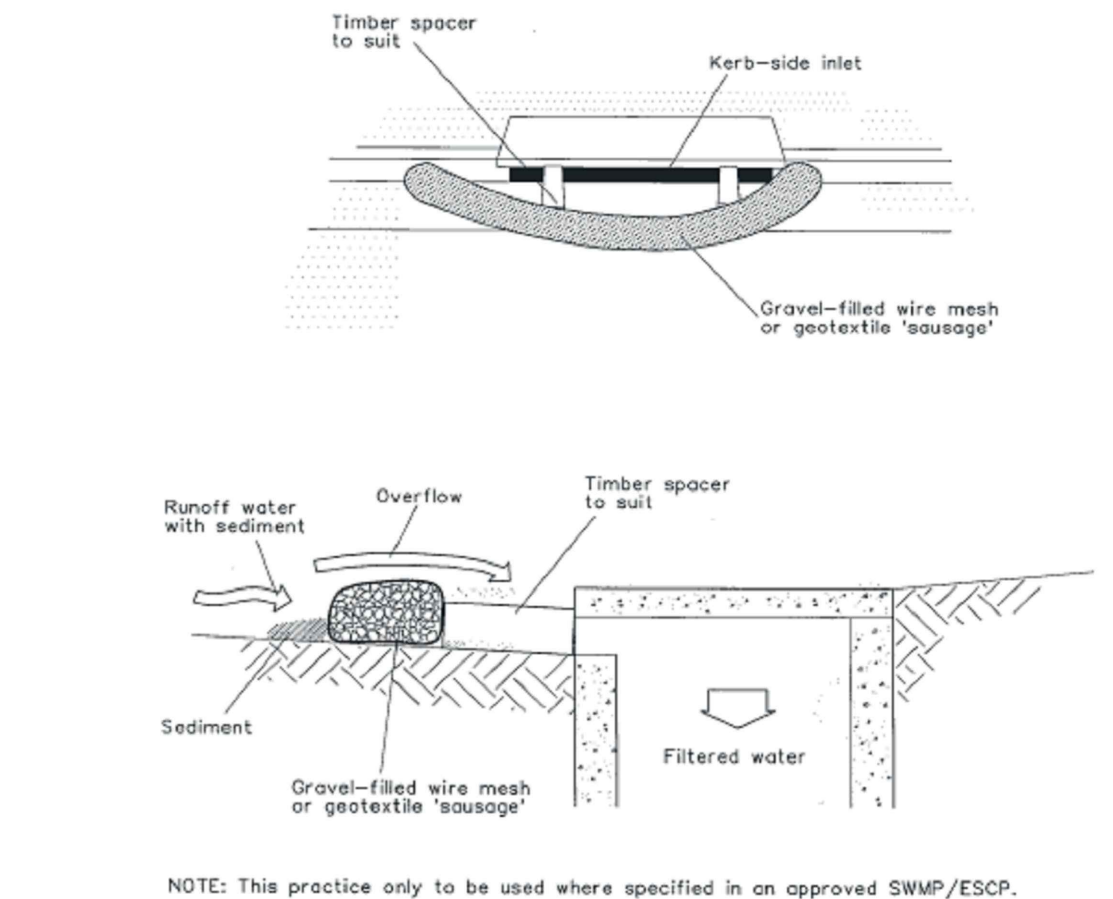
STABILISED SITE ACCESS (SD 6-14)



Construction Notes

- Place stockpiles more than 2 (preferably 5) metres from existing vegetation, concentrated water flow, roads and hazard areas.
- Construct on the contour as low, flat, elongated mounds.
- Where there is sufficient area, topsoil stockpiles shall be less than 2 metres in height.
- Where they are to be in place for more than 10 days, stabilise following the approved ESCP or SWMP to reduce the C-factor to less than 0.10.
- Construct earth banks (Standard Drawing 5-5) on the upslope side to divert water around stockpiles and sediment fences (Standard Drawing 6-8) 1 to 2 metres downslope.

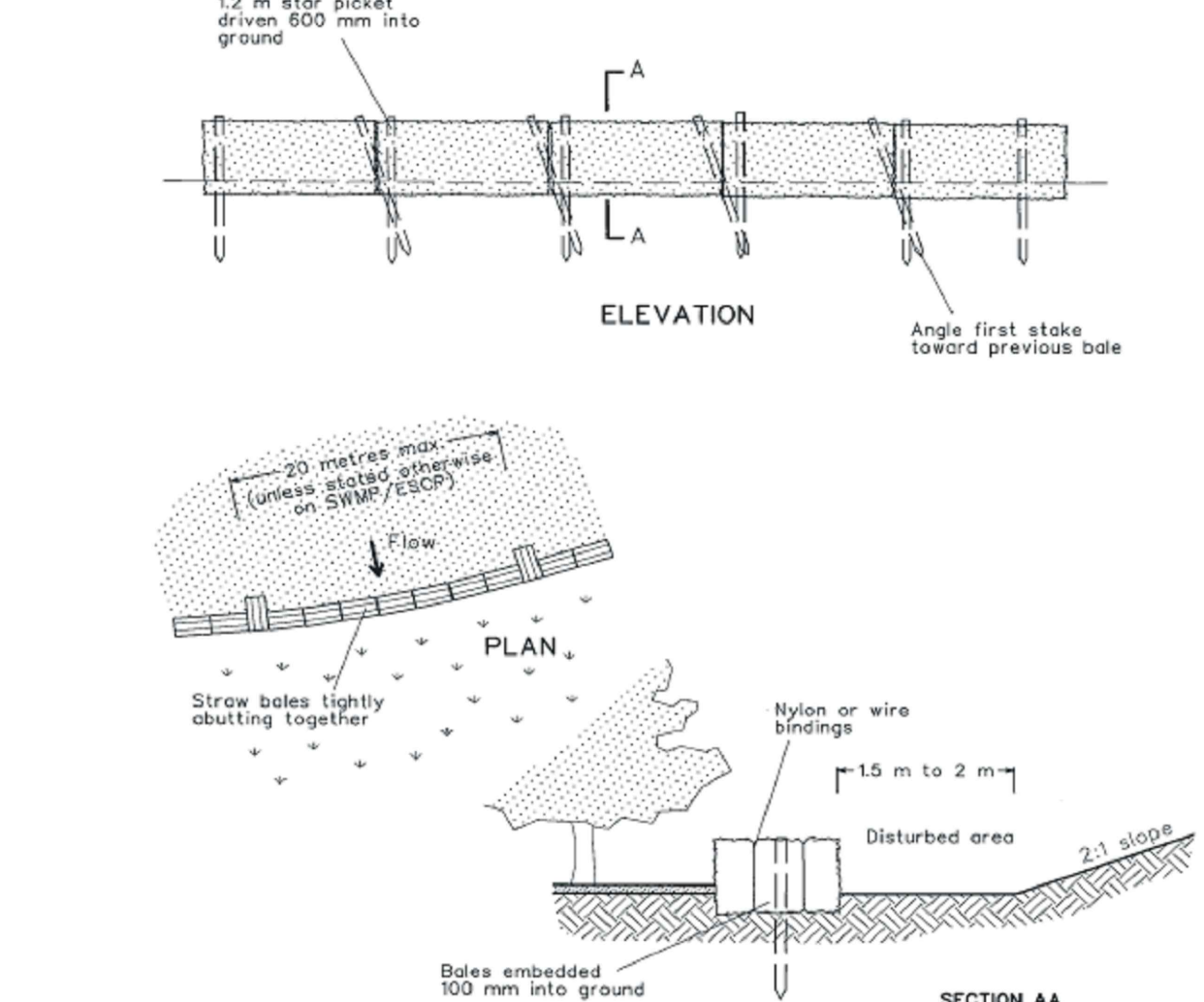
STOCKPILES (SD 4-1)



Construction Notes

- Install filters to kerb inlets only at sag points.
- Fabricate a sleeve made from geotextile or wire mesh longer than the length of the inlet pit and fill it with 25 mm to 50 mm gravel.
- Form an elliptical cross-section about 150 mm high x 400 mm wide.
- Place the filter at the opening leaving at least a 100-mm space between it and the kerb inlet. Maintain the opening with spacer blocks.
- Form a seal with the kerb to prevent sediment bypassing the filter.
- Sandbags filled with gravel can substitute for the mesh or geotextile providing they are placed so that they firmly abut each other and sediment-laden waters cannot pass between.

MESH AND GRAVEL INLET FILTER (SD 6-11)

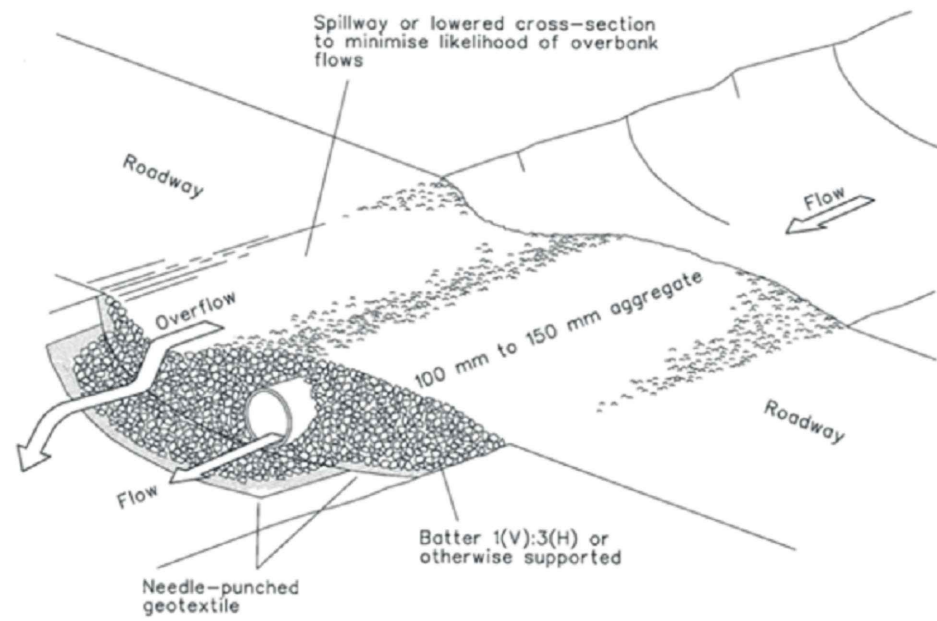


Construction Notes

- Construct the straw bale filter as close as possible to being parallel to the contours of the site.
- Place bales lengthwise in a row with ends tightly abutting. Use straw to fill any gaps between bales. Straws are to be placed parallel to ground.
- Ensure that the maximum height of the filter is one bale.
- Embed each bale in the ground 75 mm to 100 mm and anchor with two 1.2 metre star pickets or stakes. Angle the first star picket or stake in each bale towards the previously laid bale. Drive them 600 mm into the ground and, if possible, flush with the top of the bales. Where star pickets are used and they protrude above the bales, ensure they are fitted with safety caps.
- Where a straw bale filter is constructed downslope from a disturbed batter, ensure the bales are placed 1 to 2 metres downslope from the top.
- Establish a maintenance program that ensures the integrity of the bales is retained - they could require replacement each two to four months.

STRAW BALE FILTER (SD 6-7)

					Scales					Surveyor					Client					Status PRELIMINARY NOT TO BE USED FOR CONSTRUCTION © Copyright reserved Original Issue Signatures Drawn R. SANTOS Original Size A1 Designed I. SUMMERS Height Datum AHD Project Manager K. MCAREAVEY Grid MGA/20-56 Verified J. HEYDON Project 225-245 MARTIN ROAD, BRADFIELD BULK EARTHWORKS, REHABILITATION AND QUARRYING Title EROSION AND SEDIMENT CONTROL DETAILS SHEET 1 ARCADIS Arcadis Australia Pacific Pty Limited Level 15, 580 George Street SYDNEY NSW 2000 ABN 76 104 485 289 Tel No: +61 2 8907 9000 www.arcadis.com/au Project Number 30281481 Issue D Drawing No. MAR-AAP-DA-R02-DRG-CI-0191 Date Plotted: 24 Jun 2026 - 10:16am File Name: C:\Users\lsantos4174\Documents\Arcadis ACC AU\AAP-30281481-265 Martin Road Project\Project Files\10_WIP\10_AAP_Civil\R02\DRG\MAR-AAP-DA-R02-DRG-CI-0191-ErosionAndSedimentControlDetails.dwg									
D					ISSUED FOR CLIENT REVIEW					RS					IS					JH					24.06.26				
C					ISSUED FOR CLIENT REVIEW					RS					IS					JH					04.03.26				
B					ISSUED FOR CLIENT REVIEW					RS					IS					JH					24.02.26				
A					ISSUED FOR CLIENT REVIEW					RS					IS					-					18.12.25				
Issue					Description					DR					CH					VE					Date				
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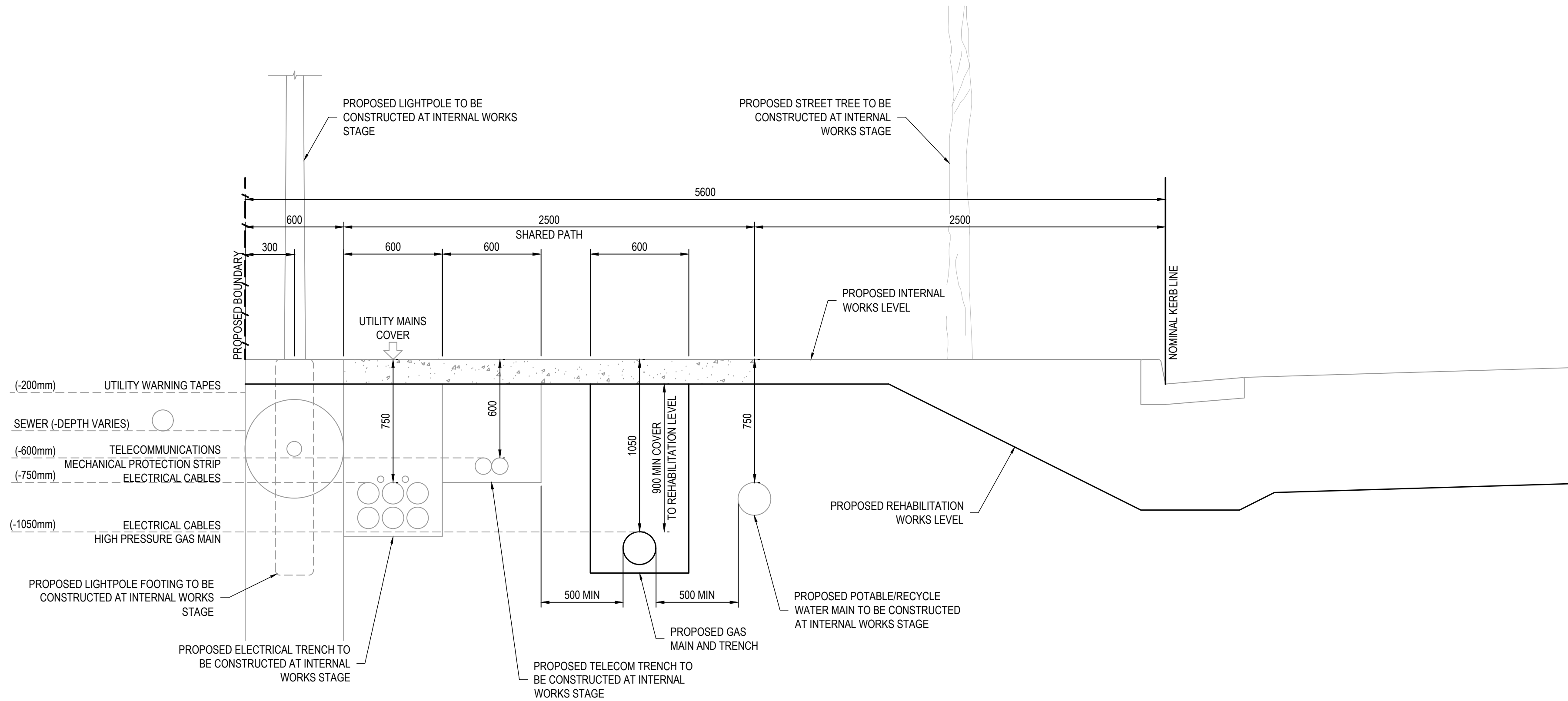


Construction Notes

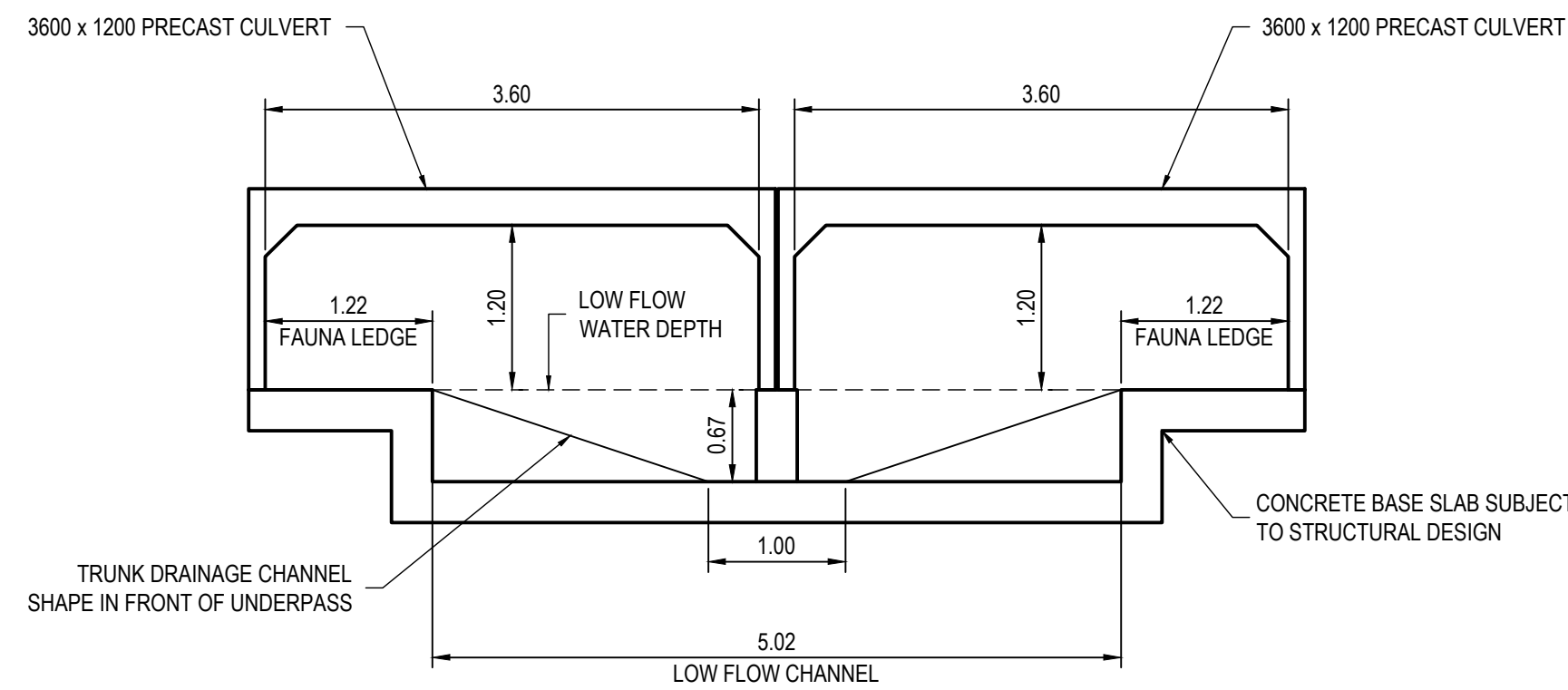
- 1. Prohibit all traffic until the access way is constructed.
- 2. Strip any topsoil and place a needle-punched textile over the base of the crossing.
- 3. Place clean, rigid, non polluting aggregate or gravel in the 100 mm to 150 mm size class over the fabric to a minimum depth of 200 mm.
- 4. Provide a 3-metre wide carriageway with sufficient length of culvert pipe to allow less than a 3(h): 1 (V) slope on side batters.
- 5. Install a lower section to act as an emergency spillway in greater than design storm events.
- 6. Ensure that culvert outlets extend beyond the toe of fill embankments.

TEMPORARY WATERWAY CROSSING (SD 5-1)

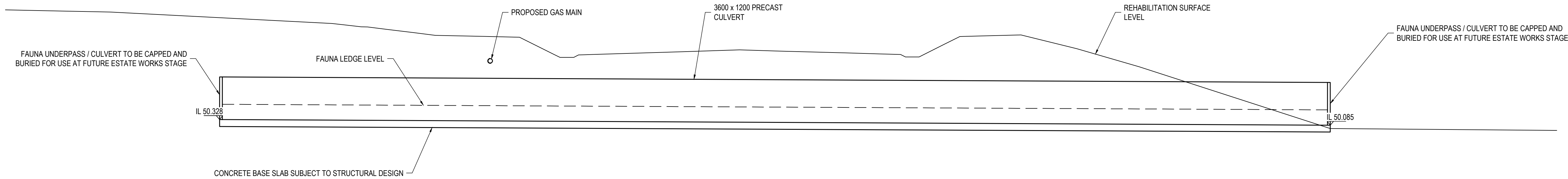
						Scales		Surveyor		Client		Status		Project		ARCADIS Arcadis Australia Pacific Pty Limited Level 15, 580 George Street SYDNEY NSW 2000 ABN 76 104 485 289 Tel No: +61 2 8907 9000 www.arcadis.com/au			
								LTS		Goodman		PRELIMINARY NOT TO BE USED FOR CONSTRUCTION		225-245 MARTIN ROAD, BRADFELD BULK EARTHWORKS, REHABILITATION AND QUARRYING					
												© Copyright reserved		Title					
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												Drawn	R. SANTOS	Original Size	A1				
												Designed	I. SUMMERS	Height Datum	AHD				
												Project Manager	K. MCAREAVEY	Grid	MGA/20-56				
														Verified	J. HEYDON			MAR-AAP-DA-R02-DRG-CI-0192	
								</											



TYPICAL GAS MAIN TRENCH DETAIL
1 : 20

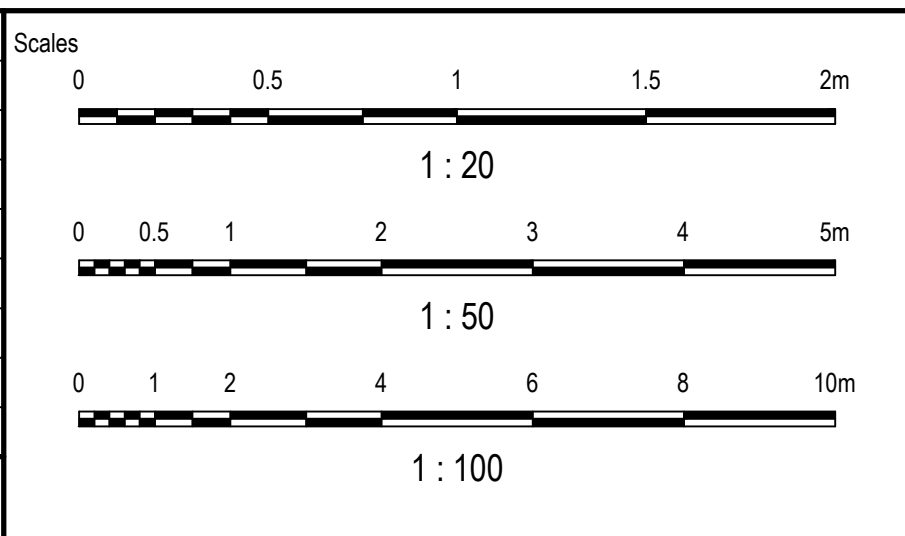


FAUNA UNDERPASS - TYPICAL CROSS SECTION
1 : 50



SECTION A
SCALE 1:100

C	ISSUED FOR CLIENT REVIEW	RS	IS	JH	24.06.26
B	ISSUED FOR CLIENT REVIEW	RS	IS	JH	04.03.26
A	ISSUED FOR CLIENT REVIEW	RS	IS	JH	20.02.26
Issue	Description	DR	CH	VE	Date



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Designed	I. SUMMERS	Height Datum	AHD
Project Manager	K. MCAREAVEY	Grid	MGA/20-56
Verified	J. HEYDON		

Project	225-245 MARTIN ROAD, BRADFIELD BULK EARTHWORKS, REHABILITATION AND QUARRYING
CIVIL WORKS DETAILS	

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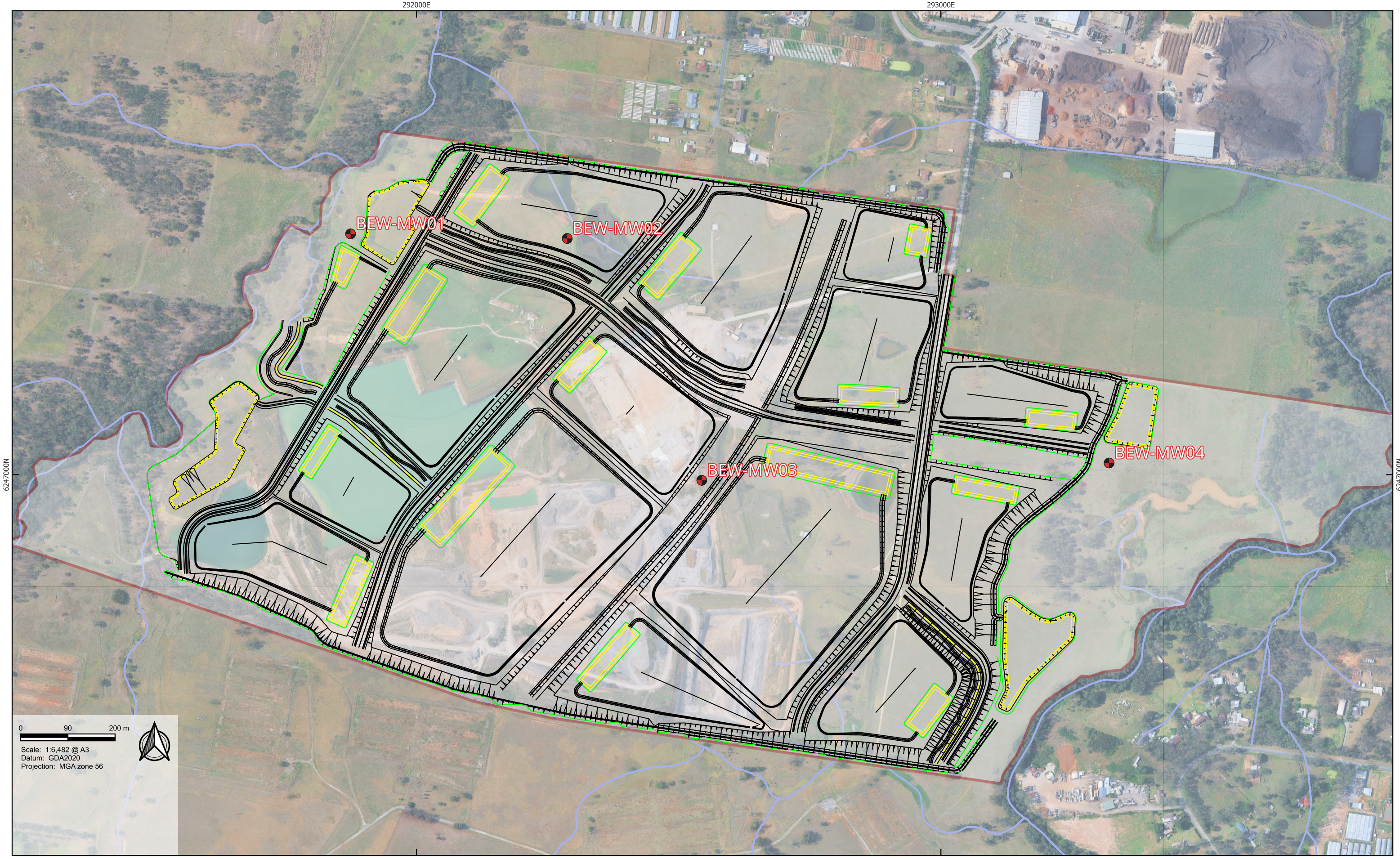
Project Number	30281481
Issue	C

Drawing No. MAR-AAP-DA-R02-DRG-CI-0241

Appendix H – Analytical Modelling

Lower bound case																				
Parameter	NW Basin	SW Basin	NE Basin	SE Basin	Lot 7 - drainage basin	Lot 10 - drainage basin	Rec area - drainage basin	Lot 8 - drainage basin	Lot 9A - drainage basin	Lot 9B - drainage basin	Lot 2 - drainage basin	Lot 6a - drainage basin	Lot 7 - sited at exit	Lot 10	Swale 1	Swale 2	Swale 3	Swale 4	Swale 5	
Head above basin (max)(m)	3.4	1.1	1.4	1.2	0.8	1.2	1.2	0.4	1.25	1.2	0.4	1.7	0.8	1.2	3.4	3.2	0.6	2.3	1.4	
Width (m)	91	52	73	70	31	35	29	33	28	41	22	39								
Length (m)	163	200	106	60	100	130	55	85	91	191	33	100			300	280	190	195	125	
Wet area (m2)	10076	9563.3	6300	2620	3140	4645	1221	3100	2420	7800	740	3600	24210	27680						
Analytical solution	Flow to Pit (M&N)	Flow to Pit (M&N)	Flow to Pit (M&N)	Flow to Pit (M&N)	Flow to one side of trench (M&K)	Flow to one side of trench (M&K)	Flow to one side of trench (M&K)	Flow to trench two sides (M&K)	Flow to trench two sides (M&K)	Flow to one side of trench (M&K)	Flow to one side of trench (M&K)	Flow to Pit (M&N)	Flow to Pit (M&N)	Flow to Pit (M&N)	Flow to trench two sides (M&K)	Flow to trench two sides (M&K)	Flow to trench two sides (M&K)	Flow to trench two sides (M&K)	Flow to trench two sides (M&K)	Flow to trench two sides (M&K)
Topo elevation m AHD	58	56	47.1	48.2	59	62	55.8	60.5	63.7	58.9	61.8	60.1	63							
Cut elevation (approx) m AHD	52.5	53.75	44.5	44.75	56.23	56.64	53.1	60.14	60.1	56.98	57.3	59	59.86							
Cut depth (m)	5.5	2.25	2.6	3.45	2.77	5.36	2.7	0.36	3.6	1.92	4.5	1.1	3.14							
Formation geology	SHALE/SILTSTONE	CLAY (alluvium)	CLAY (alluvium)	CLAY (alluvium)	SHALE/SILTSTONE	SHALE/SILTSTONE	CLAY (alluvium)	CLAY (residual soil)	SHALE/SILTSTONE	BACKFILL	SHALE/SILTSTONE	SHALE/SILTSTONE	CLAY (residual soil)	SHALE/SILTSTONE	SHALE/SILTSTONE	SHALE/SILTSTONE	SHALE/SILTSTONE	SHALE/SILTSTONE	SHALE/SILTSTONE	SHALE/SILTSTONE
Assumed aquifer thickness (m)	10		3	3	10	10	3	1.5	10	10	10	3	10	10	10	10	10	10	10	10
Hydraulic conductivity (m/s)	3.7E-08	5.00E-10	5.00E-10	5.00E-10	3.7E-08	3.7E-08	5.00E-10	5.00E-10	3.7E-08	5.00E-09	3.7E-08	3.7E-08	5.00E-10	3.7E-08	3.7E-08	3.7E-08	3.7E-08	3.7E-08	3.7E-08	3.7E-08
Anisotropy	1.00																			
Hydraulic conductivity (m/d)	0.003	0.000	0.0000	0.0000	0.00	0.003	0.000	0.000	0.003	0.000	0.003	0.0032	0.0000	0.003	0.003	0.003	0.003	0.003	0.003	0.003
depth of ponded area	1.00																			
Equivalent Radius of Quarry	56.63	55.17	44.78	28.88	31.61	38.45	19.71	28.88	31.41	27.75	38.45	49.83	15.35	33.85	87.79	93.87				
ROI (m) 1% recharge	92.87	0	0	0								52.17	0	0						
ROI (schart)					0.27	0.40	0.05	0.02	0.42	0.15	0.13				1.14	1.07	0.20	0.77	0.47	
ROI (bear) line flow only					45.49	55.13	3.26	1.38	56.20	20.39	32.50				87.21	85.11	39.60	74.06	59.23	
H	3.4	1.1	1.4	1.2	10	10	1.5	0.7	10	10	10	1.7	0.8	1.2	10	10	10	10	10	10
hw	0.000	0	0	0	9.2	8.8	0.3	0.3	8.75	8.8	9.6	0	0	0	6.6	6.8	9.4	7.7	8.6	
Q1 (m3/s)	4.62E-06	0.00E+00	0.00E+00	0.00E+00								1.34E-06	0.00E+00	0.00E+00						
Q2 (m3/s)	2.82E-05	1.21E-07	1.25E-07	6.93E-08								8.42E-06	1.40E-07	1.65E-05						
Flow, Q (m3/d) 1% recharge	2.833	0.010	0.011	0.006	0.040	0.064	0.001	0.001	0.092	0.035	0.006	0.844	0.012	1.424	0.504	0.456	0.132	0.268	0.133	
MLy	1.034	0.00	0.00	0.002	0.015	0.023	0.000	0.000	0.033	0.013	0.002	0.308	0.004	0.520	0.184	0.167	0.048	0.098	0.049	

Appendix I – Proposed Replacement Well Locations



Legend Site Boundary Named Watercourse	Unnamed Drainage Lines Replacement Wells Bulk Earthworks		Goodman 225-245 Martin Road, Bradfield Groundwater Assessment Rev: A Author: CB Checked: PG Approved: PG Date: 12/06/2026 Appendix I - Replacement Wells
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