ARUP

Cleanaway Operations Pty Ltd

Bromelton Energy and Resource Centre

Stormwater Management Plan and Flood Risk Assessment

Reference: BERC-ARU-BNE-SWMP-RPT-0001

D | 28 July 2026

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

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Arup acknowledges the Traditional Owners across all lands, waters and skies our firm may reach; we acknowledge their wisdom, resilience, and rich cultural heritage. We pay our respects to the Elders, past and present, and to all Aboriginal and Torres Strait Islander peoples.

'Continuing to Shift to shape an even better world' original artwork by Tarni O'Shea of Gilimbaa and updated by David Williams of Gilimbaa.

Abbreviations and glossary

Abbreviation	Definition
AEP	Annual Exceedance Probability
AHD	Australian Height Datum
APCr	Air Pollution Control residue
ARI	Average Recurrence Interval
BoM	Bureau of Meteorology
BREF	Best Available Techniques Reference Document
CEMP	Construction Environmental Management Plan
CSIRO	Commonwealth Scientific Independent Research Organisation
DES DETSI	Department of Environment and Science (formerly) Department of the Environment, Tourism, Science and Innovation
DRDMW DLGWV	Department of Regional Development, Manufacturing and Water (formerly) Department of Local Government, Water and Volunteers
DSDILGP DSDIP	Department of State Development, Infrastructure, Local Government and Planning (formerly) Department of State Development, Infrastructure and Planning
EA	Environmental Authority
EfW	Energy from waste
EMP	Environmental Management Plan
EP Act	*Environment Protection Act 1994* (Qld)
EP Regulation	Environmental Protection Regulation 2019 (Qld)
EPBC Act	*Environment Protection and Biodiversity Conservation Act 1999* (Cwlth)
EPC	Engineering, Procurement and Construction
EPP Air	Environment Protection (Air) Policy 2019 (Qld)
EPP Noise	Environmental Protection (Noise) Policy 2019 (Qld)
EPP Water and Wetland Biodiversity	Environmental Protection (Water and Wetland Biodiversity) Policy 2019 (Qld)
ERA	Environmentally Relevant Activity
ESC	Erosion and Sediment Control
EVOS	Environmental Values and Objectives
ESCP	Erosion and Sediment Control Plan
EU	European Union
FEED	Front End Engineering Design

Abbreviation	Definition
GDE	Groundwater Dependent Ecosystems
GPT	Gross Pollutant Trap
HV	High Voltage
IBA	Incinerator Bottom Ash
IBAA	Incinerator Bottom Ash Aggregate
IED	European Industrial Emissions Directive
IFD	Intensity Frequency Duration
LGA	Local Government Area
MCU	Material Change of Use
MUSIC	Model for Urban Stormwater Improvement Conceptualisation
m	Metres
mAHD	Elevation in Metres (with respect) to Australian Height Datum
Planning Act	*Planning Act 2016* (Qld)
PMF	Probable Maximum Flood
QUDM	Queensland Urban Drainage Manual (4th Edition)
RL	Reduced Level
SDA	State Development Area
SDAP	State Development Assessment Provisions
SDPWO Act	*State Development and Public Works Organisation Act 1971* (Qld)
t	Tonnes
TMR	Queensland Department of Transport and Main Roads
tpa	Tonnes per annum
TEEP	Technically, Environmentally and Economically Practical

Executive Summary

Cleanaway Operations Pty Ltd (Cleanaway) is an Australian waste management, recycling, and industrial services company. Cleanaway is developing an energy from waste (EfW) facility in Queensland known as the Bromelton Energy and Resource Centre (BERC /the Project). The Project will be located within the Special Industry Precinct of the Bromelton State Development Area (SDA), west of Beaudesert.

This report provides information relevant to the stormwater management and flood risk across the Project area, details the flood modelling undertaken and documents the potential changes in flood risk due to the proposed development activities.

The subject site is currently steeply sloping pastural land comprising grasses with low density shrubs and trees. It is bounded to the north by Beaudesert Boonah Road and a state-owned railway corridor to the east. Three cascading farm dams are positioned along a central overland flow path which conveys water to an existing 1.8m high brick culvert below the railway corridor. This overland flow path is to be retained and is not impacted by the development of the facility although one of the proposed stormwater basins discharges to this flow path.

Stormwater designs have been designed in accordance with Queensland Urban Drainage Manual (QUDM) and Australian Rainfall and Runoff (2019), as prescribed within Bromelton State Development Area Development Scheme (December 2017). Post development discharge flows match pre-development discharges for a 10-year Average Recurrence Interval (ARI) event. Two on-site detention basins have been provided to manage stormwater flows.

Modelling using the software program MUSIC demonstrates that the water sensitive urban design and water recycling measures meet pollution reduction targets required by Seqwater and comply with Performance Outcome PO14 of Seqwater's Water Quality Management in Drinking Water Catchments development guideline. Rainwater harvesting has been integrated within the design with four rainwater harvesting tanks provided.

A lined retention basin is proposed to serve the Incinerator Bottom Ash Aggregate (IBAA) hardstand. Runoff is to be captured, stored and re-used as part of the maturation process of the stockpiled ash materials. Physical separation in the form of grading and upstands will used to separate the IBA maturing hardstand from adjacent roadways.

A two-dimensional flood model was created using TUFLOW (version 2023-03-AB) software. The TUFLOW model adopted a direct rain on grid approach to generate flows for the contributing catchment.

Flood modelling of the post-development scenario demonstrates that the Project does not result in a material worsening of the operating performance of the state controlled road or railway corridor adjacent to the site in the 1% Annual Exceedance Probability (AEP) event including climate change factors.

Modelling shows that stormwater runoff does not create or exacerbate a safety hazard within state transport infrastructure, which includes Beaudesert-Boonah Road and the railway corridor.

1. Introduction

1.1 Purpose of Assessment

This report provides the Stormwater Management Plan and Flood Risk Assessment for BERC. The purpose of this report is to demonstrate compliance with the following planning and regulatory requirements:

- Bromelton State Development Area Development Scheme (December 2017)
- State Development Assessment Provisions Version 3.3 (18 July 2025)
- Environmental Protection Regulation 2019 – Schedule 8 Environmental objective assessment
- Scenic Rim Council Planning Scheme 2020
- Relevant requirements of State Codes including codes 1, 2 and 22.

This report provides information relevant to the existing site hydrology and flood risk across the study area, details the flood modelling undertaken and documents the potential changes in flood risk due to the proposed development activities. The assessment considers best practice requirements for the construction and operation of an EfW facility.

1.2 Project Description

1.2.1 Project Overview

Cleanaway Operations Pty Ltd (Cleanaway) is an Australian waste management, recycling, and industrial services company. Cleanaway is developing an Energy from Waste (EfW) facility in Queensland known as the Bromelton Energy and Resource Centre (BERC) (the Project). The Project will be located within the Special Industry Precinct of the Bromelton State Development Area (SDA), west of Beaudesert within the Scenic Rim Regional Council local government area.

The Project has been designed to thermally treat approximately 760,000 tonnes per annum (tpa) of waste feedstock, consisting of residual Municipal Solid Waste (MSW) and residual Commercial and Industrial (C&I) waste. Residual waste is waste that is not technically, environmentally and economically practical (TEEP) to reuse or recycle, which would otherwise be sent to landfill for disposal. The facility's actual annual throughput will vary depending on the calorific value of the feedstock and plant availability. To account for variability in feedstock energy content, the facility will be designed for a maximum processing capacity of up to 10% above the nominal figure (836,000 tpa). The EfW process is summarised in Figure 1.

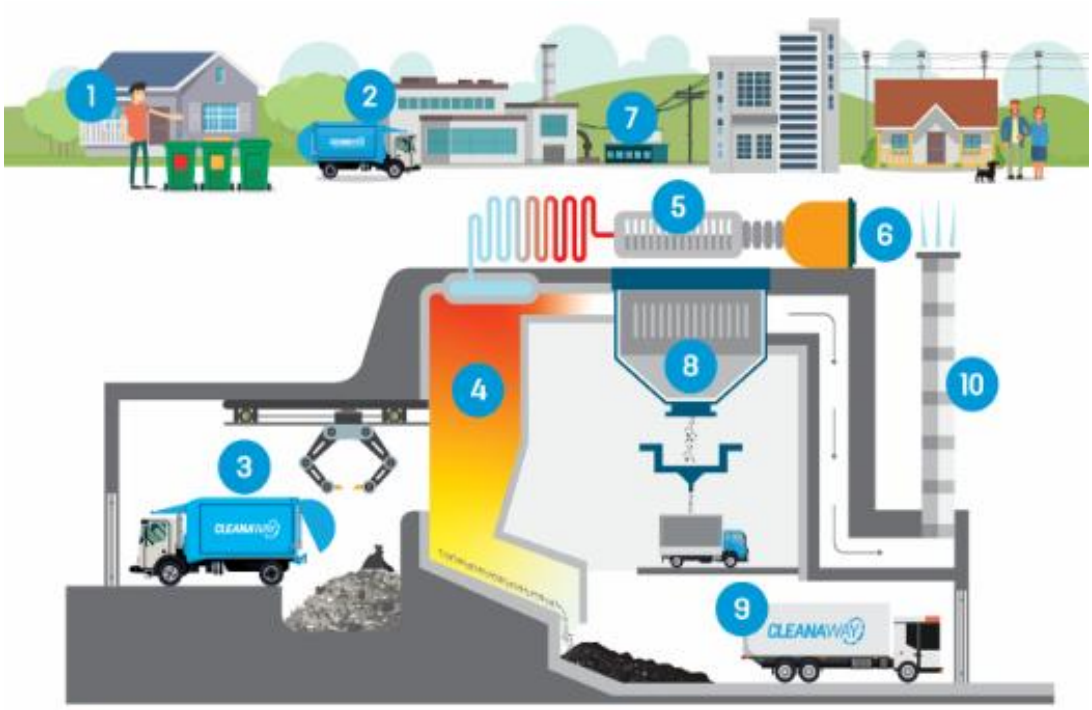

Figure 1: Energy from Waste Process

1.2.2 Proponent

Cleanaway, an Australian owned company, has operated for more than 50 years, supporting industry, government, communities and households across Australia. Its mission is to make a sustainable future possible, achieved through action across all levels of the waste hierarchy. Waste generation is minimised through extensive education programs, with Cleanaway's 50 education officers reaching over 120 businesses, 30 councils, and almost 33,000 school participants in the last financial year.

Cleanaway invests heavily in recycling, operating several Material Recovery Facilities nationwide and has partnered with Pact Group, Asahi Beverages and Coca-Cola to deliver two large-scale PET (polyethylene terephthalate) recycling facilities and a HDPE (high density polyethylene) recycling facility with Pact Group. In addition, in collaboration with Viva Energy, Cleanaway is developing a soft plastics recycling plant. EfW is recognised by Cleanaway as an important part of the future waste management framework, enabling recovery of energy and other resources from residual waste that cannot otherwise be recycled.

1.2.3 Policy Alignment

The BERC aligns with the Queensland EfW Policy and the Queensland EfW Guideline (2021) by diverting residual waste from landfill and delivering economic and social benefits through employment and local business opportunities in South East Queensland.

In accordance with Policy outcome 7 of the Queensland EfW Policy, the BERC will be designed to meet the best practice emission standards and requirements of the European Industrial Emissions Directive (IED) (2010) and the associated Best Available Techniques Reference (BREF) Document for Waste Incineration (2019), which sets the European Union environmental standards for waste incineration.

The Project also supports the Queensland Waste Strategy contributing to its 2050 targets to reduce household waste by 25%, recycle 75% of all waste, and divert 90% from landfill. In doing so, the BERC will play a key role in advancing Queensland's transition to a circular economy and reducing long-term reliance on landfill.

1.2.4 Key Components

The key components of the Project are summarised in Table 1.

Table 1: Key Project Components

Project Component	Detail
Address	Lot 1 Beaudesert Boonah Road, Bromelton, Queensland, 4285 (Lot 1 on RP45234). Refer Figure 2.
Site Area	63 hectares
Summary of proposed works	The project includes the construction of a main EfW facility for waste processing, incinerator bottom ash (IBA) maturation and processing facility and an air pollution control residue (APCr) facility. It also includes all onsite infrastructure needed for the EfW facility, such as site utilities, internal roads, weighbridges, parking and hardstand areas, stormwater infrastructure, fencing and landscaping. The Project will include a visitor centre to help educate and inform the community on circular economy principles, the waste hierarchy, including waste avoidance, recycling, resource recovery, the benefits of landfill diversion and the EfW process. The intent behind this education is to drive a shift in community awareness and attitudes toward waste management and resource recovery.
Technology Used	The proposed technology is moving grate combustion technology. This has been used globally for over 100 years and is common in many of the 500 similar operational examples across Europe.
Facility Outputs	Approximately 73.2MW (577,600 MWh/year, corrected for ambient temperature) exported to grid as baseload electricity. Potential to supply energy in the form of heat and/or process steam to local industrial users. Residual material include IBA and APCr. It is intended that the IBA will be mechanically processed on site to create incinerator bottom ash aggregate (IBAA). During the process, both ferrous and non-ferrous metals are recovered for recycling and sale. It is intended that the remaining material is re-purposed for use as an aggregate in construction. The Project includes a facility to stabilise APCr before removal and disposal at a licensed landfill.
Key Infrastructure	EfW facility including administration and visitor's centre IBA maturation and processing facility (2 x pads and 2 x sheds) APCr facility (1 x pad, 1 x shed) Transformer yard and switchyard De-coupling area for trucks Weighbridges Internal road network and carparking 2 x combined storm water treatment and detention basin 1 x lined retention basin Access from Beaudesert Boonah Road via a signalised intersection with Recycling Street

Project Component	Detail
Hours of Operation	24 hours per day, seven days per week (365 days per year)
Operational Staff	Approximately 60 staff

Figure 2: Site Location Plan

2. Regulatory Context

This section set out the legislation, policy and guidelines applicable to the stormwater and flood risk assessment.

2.1 Commonwealth Legislation, policy and guidelines

There is no Commonwealth legislation applicable to the stormwater and flood risk assessment; however, the following Commonwealth guidelines applicable to the assessment include:

- Managing the Floodplain: A Guide to Best Practice in Flood Risk Management in Australia (AIDR, 2017).
- Australian Rainfall and Runoff (ARR) (Ball, et al., 2019).

2.2 State legislation, policy and guidelines

2.2.1 Queensland Energy from Waste Policy and Guideline

The legislative context for EfW facilities in Queensland is given by the Queensland Energy from Waste Policy and Guideline. The Queensland EfW policy aims to ensure Queensland's EfW sector is developed in an environmentally and socially sound manner. The Queensland EfW Policy seeks to position EfW as an alternative to landfill, and not as an alternative to recycling, as part of a longer-term, integrated waste management system solution.

The policy and guidelines set out technical and environmental requirements, including compliance with international best practice. European Union guidelines for waste to energy technologies provide guidance where local and national guidelines are not available. These international guidelines include:

- The Industrial Emissions Directive (IED) 2010 (2010/75/EU).
- European Union Best Available Techniques Reference Document for Waste Incineration (WI BREF, 2019) and associated BAT Conclusions (BATC) for Waste Incineration (2019).

2.2.2 Bromelton State Development Area and Development Scheme

In 2008, the Coordinator-General of Queensland declared the Bromelton State Development Area (SDA) in accordance with the *State Development and Public Works Organisation Act 1971* (SDPWO Act). The Bromelton SDA comprises an area of approximately 15,610 ha of land located in the Scenic Rim Regional Council local government area, approximately 6 km west of the town of Beaudesert (refer Figure 1).

The purpose of the SDA is to promote and facilitate economic development in Queensland, and more specifically to support the growing demand for medium to large scale industries and difficult to locate industries. The Bromelton SDA Development Scheme ('Development Scheme') was prepared, outlining a development assessment framework and processes for making, assessing and deciding SDA applications. SDA applications are made to, assessed and determined by the Coordinator-General, with input from relevant referral agencies.

The site is located within the Special Industry Precinct. The proposed BERC constitutes a Material Change of Use for Special Industry and is assessable development under the Development Scheme. The SDA application is assessed against the following parts of the Development Scheme to the extent relevant:

- Strategic vision for the Bromelton SDA
- Overall objectives for development in the Bromelton SDA
- Preferred development intent for the applicable development precinct
- SDA-wide assessment criteria.

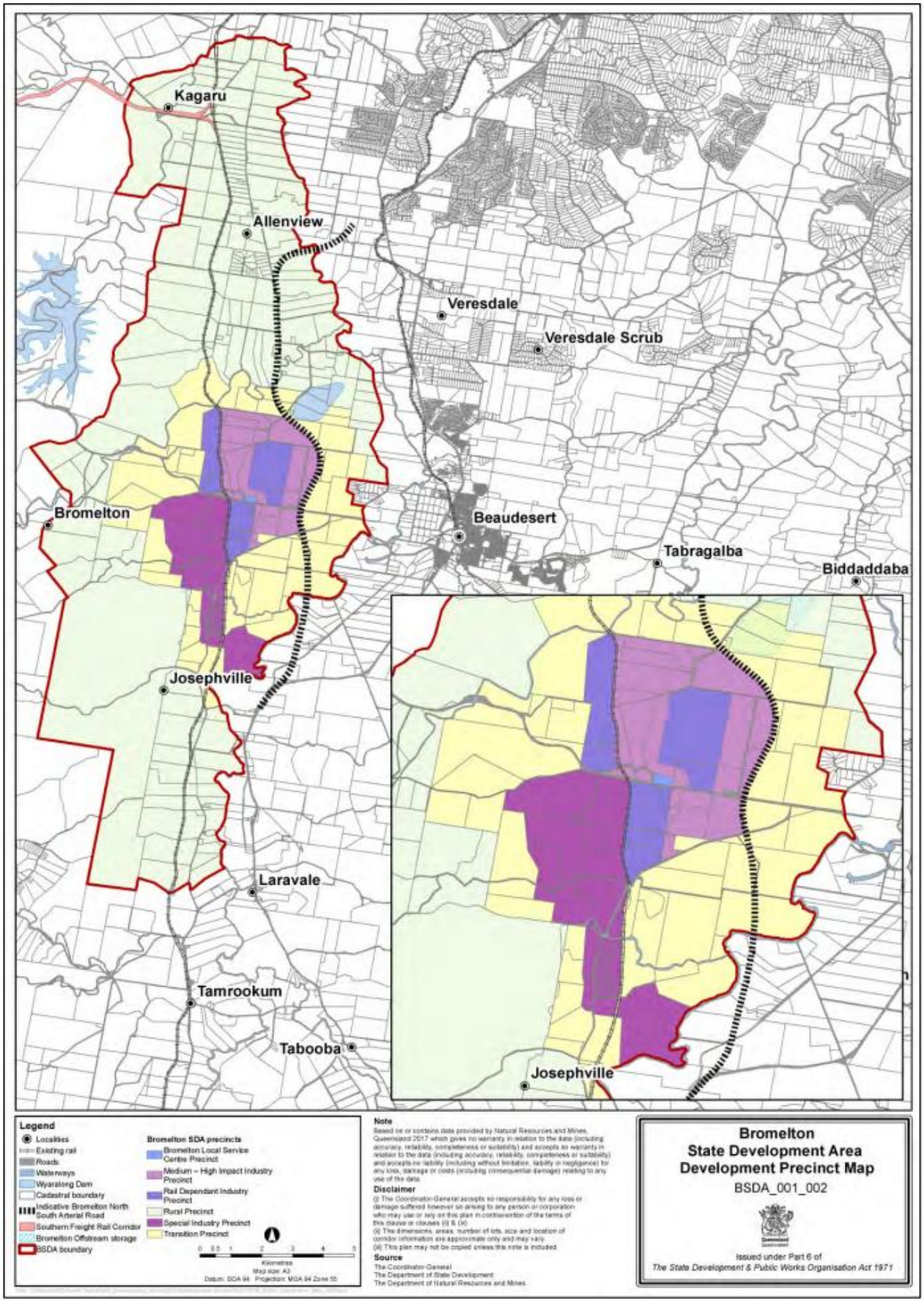

Figure 3: Bromelton SDA (Source: Bromelton SDA Development Scheme)

Overall objectives for development in the Bromelton SDA include the following (those in bold are relevant to this report):

(a) be consistent with the strategic vision for the Bromelton SDA and the development precinct

(b) ensure the integrity and long-term functionality of the Bromelton SDA is maintained and protected from land uses and activities that may be incompatible with, or adversely affect, the continued use of the Bromelton SDA for industrial development of regional, State and national significance

(c) avoid new sensitive land uses and other incompatible land uses which could restrict the ability to establish and operate industrial development within the Bromelton SDA

(d) maximise the efficient use of land, and existing and planned infrastructure

(e) minimise adverse impacts on infrastructure and infrastructure corridors

(f) support the safe and efficient function and operation of existing and planned transport infrastructure

(g) include site specific stormwater and waste water controls to avoid potential adverse impacts on the water quality of receiving waters and water assets

(h) protect, and where possible, enhance the values of water supply catchments and key water supply infrastructure to ensure a safe and secure water supply

(i) manage the risks associated with natural hazards, to protect people and property

(j) avoid adverse impacts on environmental, cultural heritage and community values, or minimise and mitigate impacts where they can't be reasonably avoided

(k) be located, designed and constructed in accordance with best practice principles and

(l) be located and designed to avoid impacts on the ongoing operation of quarries within key resource areas and their haulage routes.

The SDA-wide assessment criteria relevant to this assessment include the following:

Services

1) Development plans for and addresses the impacts of the development on existing and future planned telecommunications, transport, water, wastewater, recycled water and energy networks.
2) Development is adequately services by telecommunications, transport, water, wastewater, recycled water and energy networks as relevant.
3) Development is located, designed and constructed to avoid or mitigate potential flood damage, ensure no net worsening, avoid risks to public safety and not adversely impact on transport and service infrastructure.

Natural hazards – flooding

1) Development, in accordance with current best practice, is to:
    a. Achieve an appropriate level of flood immunity and
    b. Not adversely affect existing flow rates, flood heights or cause or contribute to other flooding impacts on upstream, downstream or adjacent properties. This includes potential impacts from changes to stormwater flows and local flooding.
2) The risk of, and the adverse impacts from, flooding are avoided, minimised or mitigated to protect people or property, and enhance the community's resilience to flooding.
3) Development maintains the safety of noxious and hazardous materials and chemicals manufactured or stored in bulk during flood events.

Water Quality

1) Development, consistent with the Environmental Protection (Water) Policy 2009, avoids potential adverse impacts on the environmental values and water quality objectives of receiving waters, arising from:

    a) Altered stormwater quality or flow

    b) Wastewater (other than contaminated stormwater and sewage) and

    c) The creation or expansion of non-tidal artificial waterways.

2) Developments protects the ecological and hydraulic function of water assets within and adjacent to the Bromelton SDA.

3) Development incorporates current best practice integrated water cycle management strategies and integrates water sensitive urban design principles.

Energy and Water Efficiency

1) The use of reticulated water supply is minimised through alternative water supply sources, including:

    a. Rain Water Harvesting and

    b. Recycled Water Sources

Development is to be designed and constructed in accordance with the relevant engineering standards (and any subsequent revisions to the relevant standards) stated below.

Table 2 provides the relevant engineering standards that are referenced in the SDA development scheme.

Table 2: Relevant Engineering Standards

Design Item	Relevant Engineering Standard	Related objective/Performance Outcome
Sewer and water	Standards of the relevant water and sewerage service provider (e.g. Queensland Urban Utilities)	Guidelines cover the design and documentation of civil components of water reticulation and sewerage assets.
	South East Queensland (SEQ) Water Supply and Sewerage Design and Construction Code	The SEQ Water Supply and Sewerage Design and Construction Code is a set of guidelines and standards that govern the planning, design, construction, and operation of water supply and sewerage infrastructure in South East Queensland, Australia. This code is typically administered by relevant water authorities or government bodies responsible for water supply and sewerage services in the region. The objective of the guideline is to establish the key criteria to be applied in the design of water supply and sewerage reticulation infrastructure to meet current and future needs of the SEQ region. Developed by the SEQ Water Service Providers (SEQ-SPs).
Water quality	Development Guidelines for Water Quality Management and Drinking Water Catchments 2012	The Seqwater Development Guidelines provide an assessment framework to manage the risk of development activities in the drinking water catchments in SEQ (South East Queensland). The below performance outcomes are used as assessment benchmarks for assessable development: **P02** – Development does not discharge wastewater unless demonstrated to not compromise the drinking water supple environmental values. **A02.1** – Development does not generate wastewater. **A02.2** – If development generates wastewater, the wastewater is collected and contained on-site, and is: a. Lawfully disposed to sewer;

Design Item	Relevant Engineering Standard	Related objective/Performance Outcome
		b. Transferred off-site for treatment/disposal to an appropriately licensed facility; c. Reused on-site in a closed-cycle irrigation scheme, industrial processes, washing/cleaning or other purposes; or d. Treated to meet the drinking water supply environmental values prior to release. Note: Where development involves the release of wastewater, a Wastewater Management Plan (WWMP) is to be prepared by a suitably qualified person. **P03** - Where treated wastewater is irrigated to land, it will: a. be confined to a dedicated area of land on-site; b. be suitably located and sized; and c. use irrigation practices that will not harm groundwater and on-site surface water quality. **P010** – Development protects and enhances riparian vegetation so that it protects against bank erosion and filters sediments, nutrients and other pollutants to ensure the environmental values for the supply of drinking water are not compromised. **A010.1** – Vegetation Clearing does not occur within the following vegetation separation distances: a) 25m to a stream order 1-3; b) 50m to a stream order 4 or greater. c) 200m to a full supply level of a dame, lake or reservoir or watercourse that serves as potable water supply. And **A010.2** – Vegetation Clearing is not undertaken at or below the 1% AEP flood event (including climate change factors) or on a slope greater than 15%. **P011** Stormwater drainage conveys runoff in a manner that: a) Minimises risk to public safety, the environment and drinking water source areas; and b) Provides a lawful point of discharge from each lot; and c) Does not worsen drainage impacts on neighbouring sites. **P013** – Manage stormwater at the construction phase to protect drinking water supply environmental values and facilitate the achievement of water quality objectives for receiving waters. **A013.1** – At the construction stage, an erosion and sediment control program (ESCP) demonstrates that stormwater achieves the design objectives listed in Table A of the SPP (Appendix 2): Construction Phase – Stormwater management design objectives. Or **A013.2** – An ESCP demonstrates how stormwater quality will be managed at the construction stage in accordance with an acceptable regional or local guideline sot that target contaminants are treated to a design objective at least equivalent to Table A of the SPP.

Design Item	Relevant Engineering Standard	Related objective/Performance Outcome
		Or **A013.3** Stormwater runoff generated during construction is captured and transferred off-site or captured and treated to any applicable re-use standards and re-used on site. **P014** – Development is located and designed to improve stormwater quality so that water source areas achieve aquatic ecosystem water quality objectives including drinking water supply environmental values **A014.3** – Stormwater runoff generated during operation (post-construction) demonstrates a minimum reduction in mean annual load from unmitigated development that achieves the following stormwater management design objectives: • 85% reduction in total suspended solids; • 65% reduction in total phosphorus; • 45% reduction in total nitrogen; and • 95% reduction in gross pollutants.
Stormwater quality	Water sensitive urban design: Design objectives for urban stormwater management	As part of the drainage strategy required by the responsible drainage authority, developers need to demonstrate either that the proposed development will not affect the downstream systems, or that the proposed stormwater treatment measures will sufficiently mitigate potential water quality and quantity impacts.
	Environmental Protection Policy (Water)	Purpose of this policy is achieved by: a) Identifying environmental values and management goals for Queensland waters b) Stating water quality guidelines and water quality objectives to enhance or protect the environmental values c) Providing a framework for making consistent, equitable and informed decisions about Queensland waters d) Monitoring and reporting on the condition of Queensland waters. Management hierarchy for surface or ground water To the extent it is reasonable to do so, release of waste water or contaminants to waters must be dealt with using the following hierarchy of preferred procedures: a) Evaluate water conservation measures to reduce the use of water and the production of waste water or contaminants b) Evaluate waste prevention options and implement appropriate waste prevention measures c) If waste prevention does not, or is not likely to, eliminate the release of waste water or contaminants to waters, evaluate treatment and recycling options and implement appropriate treatment and recycling d) If treatment and recycling does not, or is not likely to, eliminate the release of waste water or contaminants to waters, evaluate the following options for waste water or contaminants, in the order in which they are listed: a. Appropriate treatment and release to a waste facility or sewer b. Appropriate treatment and release to land

Design Item	Relevant Engineering Standard	Related objective/Performance Outcome
		c. Appropriate treatment and release to surface waters or ground waters.
	Water Sensitive Urban Design Technical Design Guidelines for South East Queensland	Design objectives are specific and measurable water management targets, selected to meet desired outcomes, such as protection of downstream environmental values. The adopted design objectives for the checking curves are to achieve the following reductions in mean annual pollutant load leaving a development site: • > = 80% reduction in total suspended solids • > = 60% reduction in total phosphorus load. • > = 45% reduction in total nitrogen load. • > = 90% reduction in gross pollutant load.
	Construction and Establishment Guidelines, Swales, Bioretention Systems and Wetlands	Water by Design and others have developed tools and guidelines to assist practitioners in applying a Water sensitive urban design (WSUD) approach in Queensland, including using bioretention systems, constructed wetlands, and other vegetated stormwater assets to achieve post-construction phase stormwater management design objectives (SMDOs). This can involve using bioretention systems and constructed wetlands to improve the quality and reduce the quantity of stormwater generated by urban development and released to receiving waters or stormwater networks. This document provides guidelines for: - Construction: all civil works involved in building or constructing an asset, including earthworks and the installation of hydraulic, functional, and other components. - Establishment: all landscape works involved in bringing an asset to an operational and resilient state, including mulching, planting, watering, and weeding.
	Healthy Waterways - Water Sensitive Urban Design Technical Design Guidelines for South East Queensland	Design objectives are specific and measurable water management targets, selected to meet desired outcomes, such as protection of downstream environmental values. The adopted design objectives for the checking curves are to achieve the following reductions in mean annual pollutant load leaving a development site: • > = 80% reduction in total suspended solids • > = 60% reduction in total phosphorus load. • > = 45% reduction in total nitrogen load. • > = 90% reduction in gross pollutant load.
	Concept Design Guidelines for Water Sensitive Urban Design	The Concept Design Guidelines were developed to assist interdisciplinary teams to conceptualise and develop design best practice water management solutions throughout the urban development to ensure compliance with legislative and planning requirements as well as result in well-designed urban form.
Stormwater quantity	Queensland Urban Drainage Manual (QUDM)	The Queensland Urban Drainage Manual (QUDM) is a comprehensive guide that provides technical guidance and standards for managing urban drainage systems in the Australian state of Queensland. The primary purpose of the QUDM is to assist engineers, planners, and developers in designing, constructing, operating, and maintaining

Design Item	Relevant Engineering Standard	Related objective/Performance Outcome
		urban drainage systems that effectively manage stormwater and mitigate flood risks in Queensland's urban areas. The QUDM covers a wide range of topics related to urban drainage, including hydrology, hydraulics, water quality management, and sustainable drainage practices. Table 7.3.1 outlines recommended design average recurrence intervals (ARI) and annual exceedance probabilities (AEP) from the minor storm.
	Australian Rainfall and Runoff – where referenced in QUDM	No Performance Outcomes nominated.

2.2.3 Queensland *Environmental Protection Act 1994*, Regulations and Policies

The Environmental Protection Act 1994 (EP Act) provides for the management of the environment in Queensland. The Environmental Protection Regulation 2019 (EP Reg) provides the environmental objectives and performance outcomes that are to be complied with for environmental decisions relating to a prescribed Environmentally Relevant Activity (ERA). BERC will require an environmental authority for conducting ERAs, including but not limited to ERA 61 Thermal Waste Processing and Treatment. ERA 63 Sewage treatment has also been considered for the site; however, is not being triggered due to the proposed management approach to sewer flows, and thus this ERA is not relevant.

Relevant environmental objectives and performance outcomes stated in the Schedule 8 of the EP Reg for this report are provided below.

Environmental Objective

The activity will be operated in a way that protections environmental values of waters.

Performance Outcomes

1. There is no actual or potential discharge to waters of contaminants that may cause an adverse effect on an environmental value from the operation of the activity.
2. All of the following –
    a. The storage and handling of contaminants will include effective means of secondary containment to prevent releases to the environmental from spillage or leaks;
    b. Contingency measures will prevent or minimise adverse effects on the environmental due to unplanned releases or discharges of contaminates to water;
    c. The activity will be managed so that stormwater contaminated by the activity that may cause an adverse effect on an environmental value will not leave the site without prior treatment;
    d. The disturbance of any acid sulfate soil, or potential acid sulfate soil will be managed to prevent or minimis adverse effects on environmental values.
    e. Acid producing rock will be managed to ensure that the production and release of acidic waste is prevented or minimised, including during operation and after the environmental authority has been surrendered.
    f. Any discharge to water or watercourse or wetland will be managed so that there will be no adverse effects due to the altering of existing flow regimes for water or watercourse of wetland.
    g. For a petroleum activity, the activity will be managed in a way that is consistent with the coal seam gas water management policy, including the prioritisation hierarchy for managing and using coal seam gas water and the prioritisation hierarchy for managing saline water.

h. The activity will be managed so that adverse effects or environmental values are prevented or minimised.

The EP Act gives the Department of Environment and Science (DES) the power to create Environmental Protection Policies that identify, and aim to protect, environmental values. Of relevance to this report is the Environmental Protection (Water and Wetland Biodiversity) Policy 2019: The purpose of this policy is to achieve the object of the EP Act in relation to water and wetlands by:

- Identifying environmental values for waters and wetlands to be enhanced or protected.
- Identifying management goals for waters
- Stating water quality guidelines and quality objectives for enhancing or protecting the environmental values of water
- Providing a framework for making consistent, equitable and informed decisions about waters
- Monitoring and reporting on the condition of waters.

The administering authority must consider the requirements of the EPP when it decides an application for an environmental authority, amendment of a licence or approval of a draft environmental management plan.

Also relevant is DES' guideline Application requirements for activities with impacts to water (Impacts to Water Guideline, ESR/2015/1837), which outlines the information to be provided as part of the application process for environmentally relevant activities and how the information is used. This outlines how the proposed activity will be assessed by comparison with the requirements stipulated in the EP Act.

Another consideration is the potential to release prescribed water contaminants to waters. Prescribed water contaminants include a wide variety of contaminants from inert substances such as earth, clay, gravel and sediment to substances such as chemicals, contaminants with a high or low pH, construction and building waste, and oil. There is a requirement for ensuring that stormwater falling on or running across a site does not leave the site contaminated. Where contamination of stormwater occurs, measures to treat the stormwater to remove contaminants must be included. Also of relevance is the storage of materials onsite such that the potential for water to become contaminated is reduced.

2.2.4 Qld *Water Act 2000*

Queensland's *Water Act 2000* (Water Act) provides a framework for the planning, allocation, and use of surface water and groundwater in Queensland, including regulating major water impoundments, such as dams and weirs, and extraction through pumping for irrigation and other uses. The Water Act 2000 provides a system of interrelated plans, licenses and permits for the regulation of in-stream (i.e. watercourses, lakes or springs) and overland water flow, and groundwater.

The Water Act requires a riverine protection permit prior to excavating and/or filling, or clearing native vegetation in a watercourse, lake or spring protected/mapped under the Water Act, unless the exemption requirements are met. There are no mapped watercourses under the Water Act occurring on the site, and watercourse determination from the Department of Regional Development, Manufacturing and Water (DRDMW) confirmed the unmapped feature is a drainage line not a watercourse.

2.2.5 Fisheries Act 1994

The drainage feature on the site is mapped as a 'green' low risk waterway for waterway barrier works under the *Fisheries Act 1994* (Fisheries Act). Considerations related to the Fisheries Act are discussed in the Biodiversity Technical Report .

2.2.6 Seqwater Development Guidelines

Seqwater is the Queensland Bulk Water Supply Authority for South East Queensland and also has a role in catchment management and flood mitigation services. Seqwater are an unofficial referral agency for applications under the SDA Scheme. The Seqwater Development Guidelines: Water Quality Management in Drinking Water Catchments (GDE-00001 V2, Seqwater October 2024), provide an assessment framework to

manage the risk of development activities in the drinking water catchments in SEQ. These guidelines, whilst not a formal benchmark for development in the SDA, have been referenced to inform this assessment.

2.2.7 State Codes

State Codes provide assessment benchmarks that include Performance Outcomes (POs), which outline the intent of the code, and Acceptable Outcomes (AOs), which represent one way to meet those outcomes. Development proposals must demonstrate compliance with either the PO or AO. Where a proposal does not strictly meet a relevant AO or PO, the State Assessment and Referral Agency (SARA) may, on balance, determine that the development complies with the overall purpose of the code.

This report addresses surface water and drainage requirements in accordance with the following State Development Assessment Provisions (SDAP) codes:

- State Code 1: Development in a State-Controlled Road Environment
- State Code 2: Development in a Railway Environment
- State Code 22: Environmentally Relevant Activities

3. Site Context

3.1 Site Description

The Project area is addressed as Lot 1 Beaudesert Boonah Road, Bromelton and formally described as Lot 1 on RP45234 (referred to as the 'site' in this report). The Lot measures approximately 63.3ha in area and is generally regular in shape. Site dimensions are approximately 510m to the northern boundary (road frontage), 965 m to the eastern boundary (adjacent rail corridor), 880 m to the southern boundary (adjacent private land) and 1,060 m to the western boundary in two parts being 535 m and 525 m (adjacent private land). Refer to Figure 4 for reference.

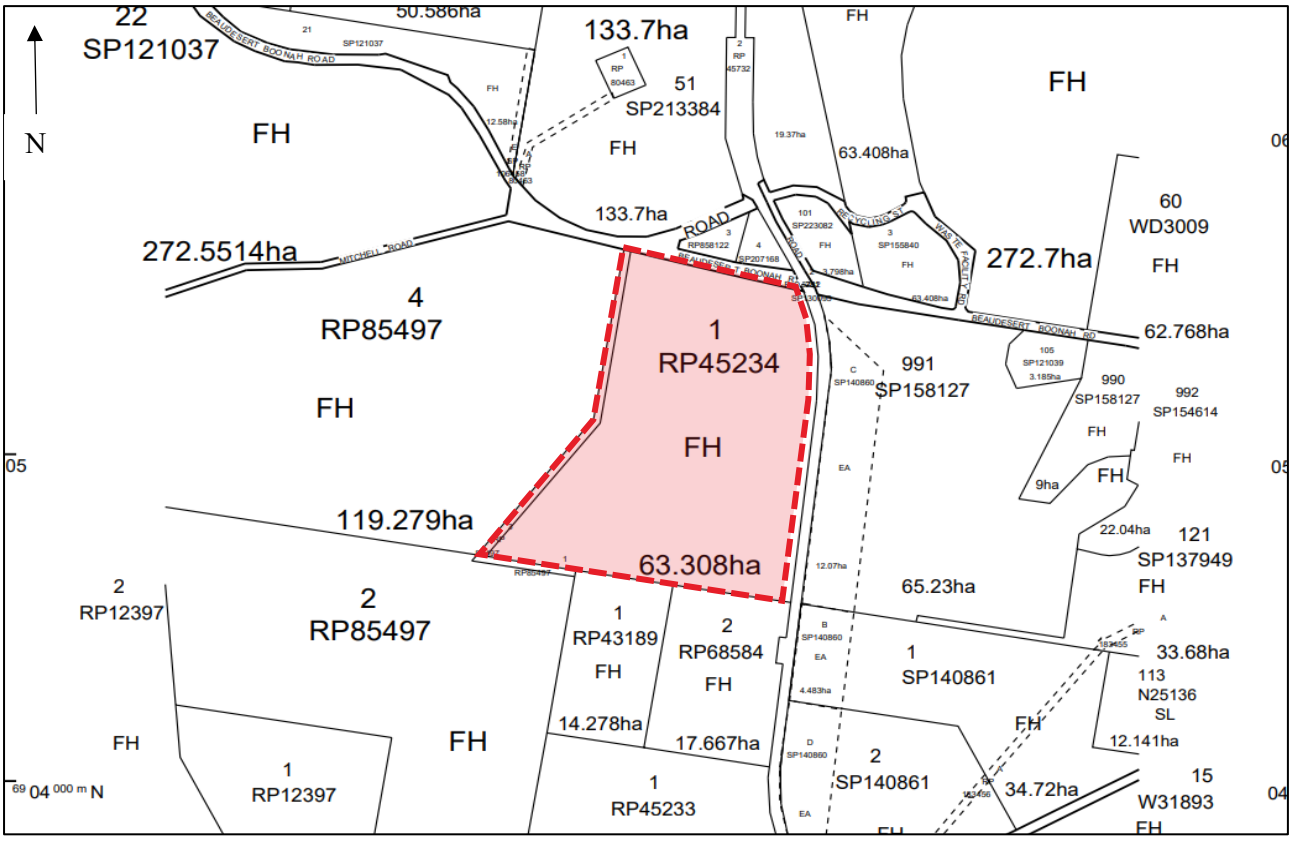

Figure 4: Smart Map (Source: Qld Globe). Red outline is the Project area boundary.

The site is subject to freehold tenure with rights and interests reserved to the Crown by Deed of Grant No. 10600025 (POR 69A). The owner of the land is Queensland Energy and Resource Centre Pty (Trustee under Instrument 722194302). The site is not encumbered by any easements and is also not the beneficiary of any easements. The site is not subject to any leases. A search of the DES database confirms the site is not listed on either the Contaminated Land Registered (CLR) or the Environmental Management Register (EMR).

3.2 Site Location and Surroundings

The Project is located in the local government area of the Scenic Rim Regional Council, and more specifically, within the Bromelton SDA. It is situated approximately 8 km by road directly west from the nearest large settlement of Beaudesert.

The locality is well serviced by transport infrastructure including Beaudesert Boonah Road, which is a State controlled road that links the settlements of Beaudesert and Boonah. This road also provides a direct link to the Mount Lindesay Highway, another State controlled road that connects to the major settlements of Logan, Brisbane and the Gold Coast. The locality is also serviced by the Sydney-Brisbane rail line, an interstate freight rail corridor.

The broader locality comprises primarily rural and agricultural land uses. Established and emerging industrial land uses are located within the Bromelton SDA. The State Government website for the Bromelton SDA identifies the following key uses:

- SCT Logistics - a $30 million intermodal rail freight facility and warehouses on land situated adjacent to the Sydney-Brisbane rail line.
- GELITA Australia Pty Ltd - the Australian plant of the GELITA Group manufactures gelatine which is sold as edible gelatine for food industry uses.
- A.J. Bush and Son's (Manufactures) Pty Ltd - established in 1993, A.J. Bush & Sons are recognised internationally as a leading rendering industry producing protein meal and tallow. The company utilises onsite clean energy practices by recycling methane content biogas captured from covered anaerobic lagoons to generate electricity for power and recycles wastewater for irrigation on their substantial landholdings.
- Beaudesert Central Waste Management Facility - a waste transfer station operated by the Scenic Rim Regional Council
- Bromelton Quarry - a hard rock quarry established in 2000 which supplies blue rock to the regional area.
- The Neilsen Group quarry - supplying general quarry and gravel products to the regional area.
- Quickcell Technology Products Pty Ltd - concrete manufacturers established in 1993 producing prestressed and precast concrete products.

The Energex Beaudesert Bulk Supply Substation is located approximately 6.5 km to the east of the site at Beaudesert, identified on Lot 183 on SP184476.

The site has a single road frontage of approximately 510 m to Beaudesert Boonah Road along its northern boundary. Established industrial premises, Quickcell Technology Products Pty Ltd and SCT Logistics are located north of the site across Beaudesert Boonah Road. The site’s eastern boundary is contiguous with the Sydney-Brisbane rail corridor. Land to the south is owned by AJ Bush although its manufacturing operations are more than 1 km south of the site. Land to the west is currently vacant. Refer to Figure 5 for reference.

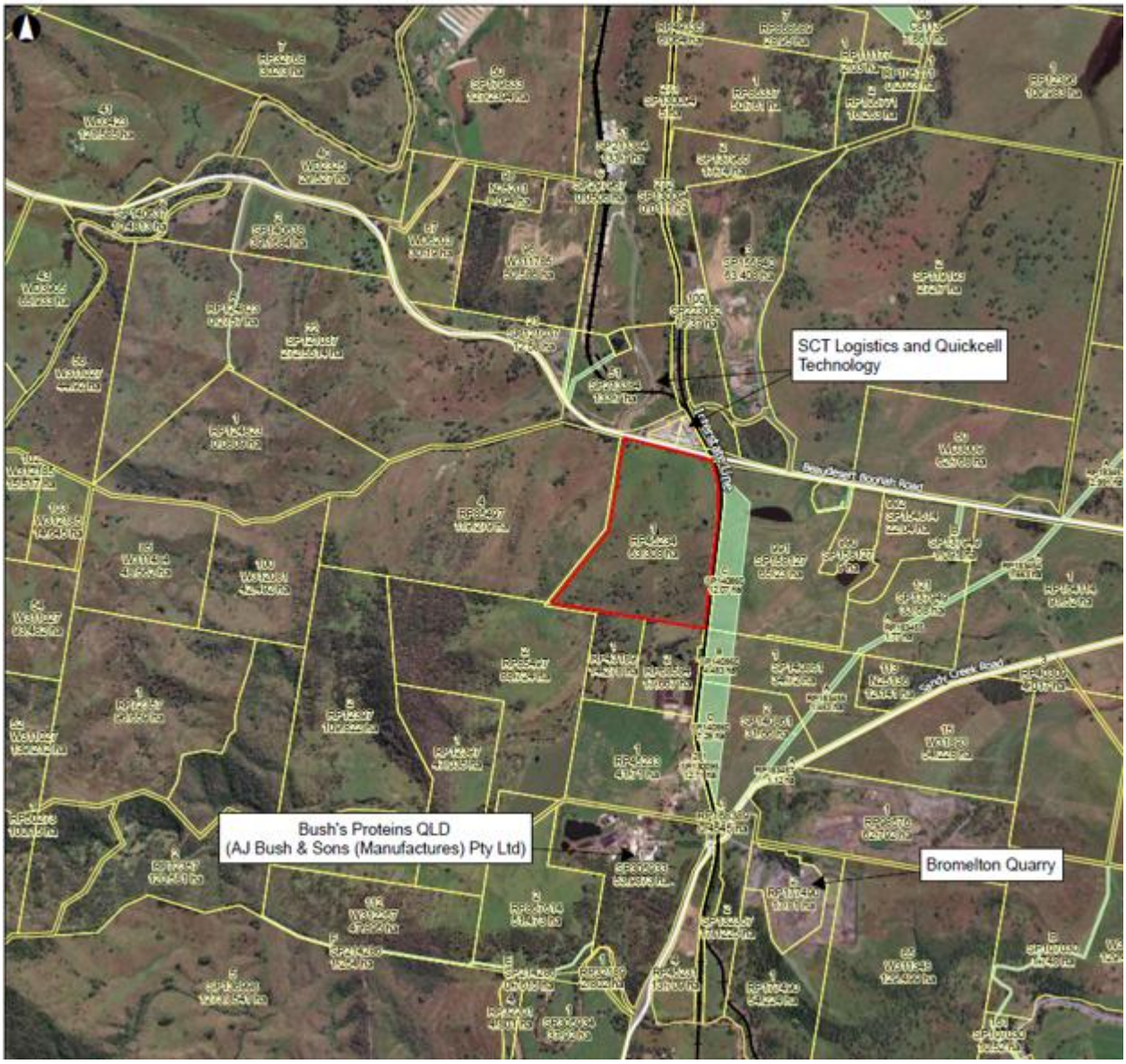

Figure 5: Site and Surrounds (Source: Qld Globe)

3.3 Recent Site History

Historical photography indicates the site has primarily been used in the past 100 years for grazing and agricultural purposes. Recent investigations identified a cattle crush infrastructure and a spray race in the northern section of the site. A review of the Scenic Rim Regional Council DAP Online system was undertaken, and advice was also sought from the Office of Co-Ordinator General regarding development application activity. These sources establish there is no development application or approval activity applicable to the subject site.

4. Assessment Methodology

To develop an understanding of the existing site conditions and inform baseline models, the following works were undertaken:

- Site walkovers in February and April 2023 and August 2025.
- Topographical survey.
- Desktop review of publicly available information such as Queensland Globe.
- Review of relevant legislation and policy as outlined in Section 2.
- Consult with relevant stakeholders such as Seqwater, TMR, Council to clarify design requirements.

A concept level civil design has been developed to enable an assessment of the post-development condition. This post-development condition has been assessed against the pre-development condition to assess design impacts and compliance with the relevant legislation, policies and guidelines outlined in Section 2.

4.1.1 Water quality methodology

MUSIC modelling software has been used to assess the water quality performance of the stormwater management strategy of the operational facility. MUSIC was developed by the Cooperative Research Centre for Catchment Hydrology (CRCCH) and is used industry wide to assess the water quality performance of urban catchments. MUSIC is appropriate for the assessment of catchment areas of up to 100 km^2 using a continuous simulation approach.

MUSIC has been used to determine if proposed changes to land use are capable of meeting mandated water quality objectives (CRC, 2002). The primary water quality parameters modelling in MUSIC are Gross Pollutants (GP), Total Suspended Solids (TSS), Total Phosphorus (TP) and Total Nitrogen (TN).

Relevant Engineering Standards outlined in Table 7 of Bromelton State Development Area Development Scheme nominate multiple design guidelines in the context of stormwater quality. Seqwater's Development Guidelines: Water Quality Management in Drinking Water Catchments (GDE-00001 V2, Seqwater October 2024), as the most onerous, have been used to assess the performance of the proposed stormwater system.

4.1.2 Surface water quantity management

Runoff from the developed portion of the site will be conveyed via the minor and major stormwater network to bioretention and on-site detention basins. The size of the detention component of the basins has been determined to cater for the 10-year Average Recurrence Interval (ARI) event as defined by Table 7.3.1 of QUDM.

4.1.3 Water Balance

A site water balance assessment has been undertaken to assess potable water demands, rainwater harvesting, sewer discharges and stormwater runoff from the site. The water balance uses 20 years of daily rainfall data from 2000 to 2019 from the closest meteorological station. This data has been used to assess average annual water flows at the site.

Water balance outputs from the MUSIC model have also been used to assess stormwater flows and interactions at the site.

4.1.4 Flood risk assessment methodology

To establish the existing flood conditions, hydraulic modelling was undertaken using TUFLOW (version 2023-03-AA), a two-dimensional (2D) hydraulic modelling software. The TUFLOW model adopted a direct rain on grid approach to generate flows for the contributing catchment in lieu of a full hydrology model. This surface water assessment has been based on available aerial photography, topographical survey (TJ Kelly Surveys Pty Ltd, 2023) and 1m LiDAR (QLD DNRM, 2011) data.

The concept design surface, surface roughness delineation and associated site drainage were tested in the hydraulic model to assess the post-development condition and inform potential flood risk at the Project area.

5. Existing Site Conditions

5.1 Existing Topography and Catchment delineation

The Project area is currently pastural land comprising grasses with low density shrubs and trees. A topographical survey of the site and adjacent road was undertaken by TJ Kelly Surveys Pty Ltd in May 2023 and is contained in Appendix A. The topographical survey was conducted using a combination of traditional surveying techniques and drone survey which was used for Beaudesert-Boonah Road and the southern portion of the site. The survey was completed to GDA 2020 projected co-ordinate system, Zone 56.

The Project area has several distinct ridgelines and low points. A high-level review of the survey notes that:

- In the northern portion of the site, the highest point is RL 98.9 m Australian Height Datum (AHD).
- Northwest corner of the site sits at RL 81.75 mAHD.
- Northeast corner of the site sits at RL 79.09 mAHD.
- Land directly adjacent to the culvert crossing under the railway line is at RL 70.54mAHD.
- Ridgeline at southwest corner of the site is at RL 119 mAHD.
- Southeast corner of the site sits at RL 66.5 mAHD.

Aside from the upper portion of the ridge, falls typically exceed 5% with the southern portion of the site containing steeply sloping terrain which exceeds 10% gradient in many places.

Pre-Development Catchments

The ridgelines split the site into three distinct catchments; a northern, central and southern. In reference to Figure 6, catchment 1 is the northern catchment, catchments 2A and 2B are defined as the central catchment and catchments 3 and 4 make up the southern catchment.

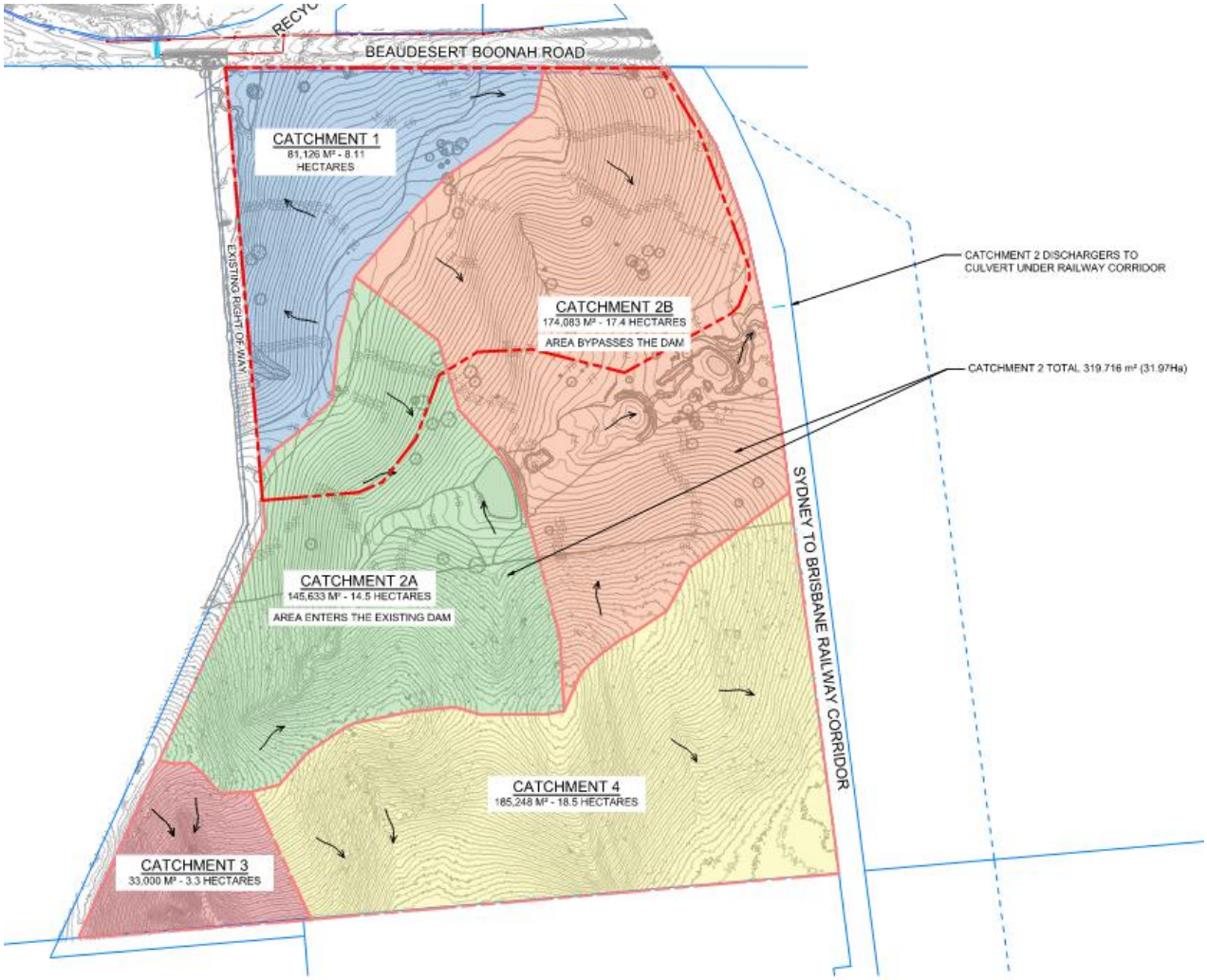

Figure 6: Pre-Development Catchment Plan

The northern catchment currently sheds overland and is collected by a swale within the Lot Boundary corridor of Beaudesert Boonah Road. These flows are conveyed to a pre-cast concrete box-culvert (see Photograph 1) which crosses under Beaudesert Boonah Road and discharges into a man made channel (see Photograph 2) flowing north, ultimately discharging into Allen Creek.

Photograph 1 – Existing box culvert

Photograph 2 – Culvert discharging into channel north of the Project area.

Three cascading farm dams are positioned centrally within the Project area (see Photograph 3) and in conjunction with a natural overland flow path, convey water to an existing 1.8 m high brick culvert (see Photograph 4). The culvert passes under the railway corridor, discharging flows to the site to the east.

Photograph 3 – View of cascading farm dams with railway corridor in the distance

Photograph 4 – View of culvert passing under railway line.

The southern catchment sheds overland flows off-site into Swan Creek, located approximately 200 m south of the Lot Boundary.

With many of the southern parts of the site exceeding 10% gradient, the decision was made to confine the initial development (the subject of the application) to the northern portion of the site. In an effort to maintain existing flow regimes, particularly in undeveloped parts of the existing site, the farms dams are to be retained in their current configuration.

In reference to the red dashed line in Figure 4, the development footprint is approximately 22.6 ha which equates to just over a third of the Project area.

5.2 Existing Stormwater Infrastructure

The Project area is pastural and currently contains no formal piped stormwater infrastructure. There are no formal stormwater quality improvement devices on site; however, it is considered that the series of farm dams provide a level of stormwater attenuation and allow sediment removal.

Beyond the Project area, a 1.85 m wide x 1.85 m high arch culvert passes under the railway corridor providing conveyance for overland flows within catchment 2.

To the northwest of the Project area, twin 2.125 m wide x 0.9 m high box culverts cross under Beaudesert Boonah Road. These culverts serve the northern catchment of the Project area, parts of the adjacent Lot to the west and the swale that drain the road.

5.3 Existing Watercourses

Swan Creek is the closest formal watercourse to the Project area and is approximately 70 m south of the southeast corner of the subject site's Lot Boundary. Swan Creek flows into Logan River about 4 km east of the site.

To the north of the Project area there are a series of culverts, overland flow channels, swales and farm dams which discharge into Allen Creek approximately 3.5km north of the subject site. Allen Creek flows into Logan River about 7km northeast of the site.

Figure 7 below shows these formal watercourses in blue with the Project area in red.

Within the site ephemeral, overland flow paths are present. It is noted that different agencies have different classifications of these flow paths. DRDMW have determined that the overland flow path, mapped as orange on Figure 7, is a 'drainage feature' and does not constitute a formal watercourse under the *Water Act 2000*.

During agency consultation, SeqWater confirmed that under the assessment of the Vegetation Management Act 1999, these overland flow paths are considered to Stream Order 1. For the purpose of this assessment and code compliance, the overland flow path within the site boundary, including the three farm dams present, are considered as Stream Order 1 features.

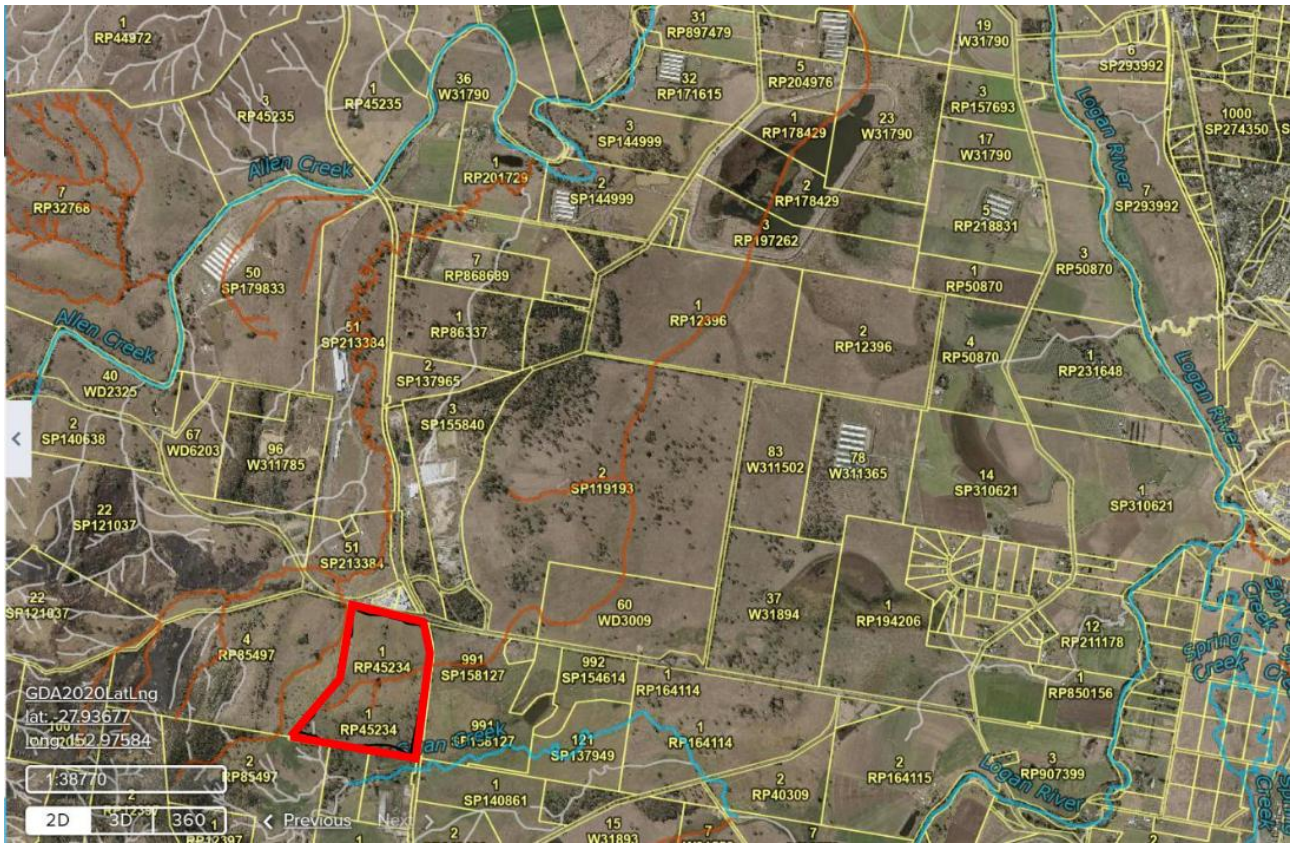

Figure 7: Existing Watercourses (source: QLD Globe)

5.4 Existing Flood Behaviour

Hydraulic modelling has been completed to assess the risk of flooding within the site and adjacent Lots. A summary of the hydraulic modelling assessment is provided in this section.

Flooding offsite associated with the Logan River is noted as potentially significant to site access and operations. The flood risk along Logan River is presented in the Queensland Flood Mapping Phase 3b, Logan River Flood Mapping Study (Department of Natural Resources and Mines, December 2014) with the 1% AEP + CC (SSP 2-4.5) Peak Flood Depth map presented in Appendix G.

5.4.1 Hydraulic Model Setup

The hydraulic modelling was undertaken using TUFLOW (version 2023-03-AA). The TUFLOW model adopted a direct rain on grid approach in order to generate flows for the contributing catchment in lieu of a full hydrology model.

The hydraulic model extent, shown in Figure 8 captures the sub-catchments upstream of the Project area and extends to the downstream control (Beaudesert Boonah Road).

The model has a grid cell size of 2 m with a southwest-northeast orientation, aligned with the major flowpath through the Project area.

The model topography utilised LiDAR (1 m resolution) flown in 2011 in addition to topographical feature survey captured in May 2023. The survey was used preferentially to create the model topography where available.

The model terrain roughness was specified according to aerial photography. The drainage culverts have been defined based on survey and site photographs.

Rainfall within the TUFLOW model extent was applied using the ARR to TUFLOW utility within QGIS. The rainfall was modelled as a 2d_rf polygon element, distributing flow across the entirety of the model boundary in a direct rainfall modelling approach. Losses were applied in TUFLOW by land use material type.

Hydrological modelling of future climate change was developed based on the updated guidelines in ARR2019 v4.2. The Shared Socio-economic Pathway (SSP) 2, known as the “middle of the road” scenario, which corresponds to RCP 4.4 used in previous climate change calculations recommended by ARR. This pathway is characterized by moderate emissions reduction with slow progress towards the Sustainable Development Goals.

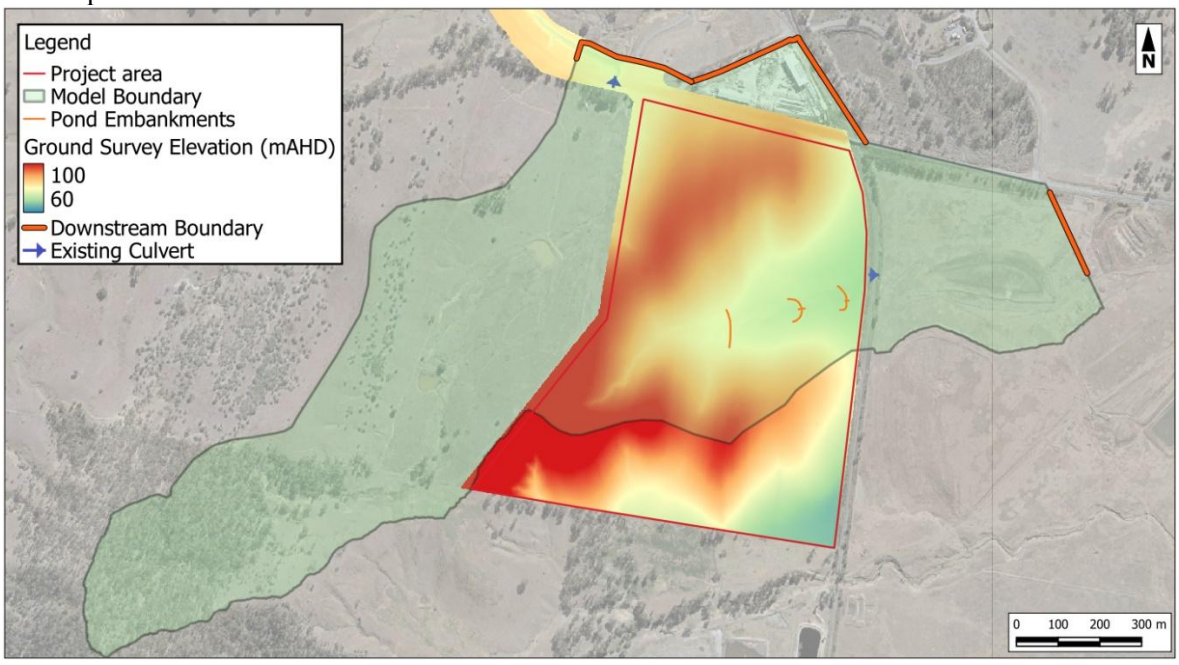

Figure 8: Existing Case TUFLOW Model Setup

5.4.2 Existing Flood Risk

The TUFLOW model was simulated for the 63.2% Annual Exceedance Probability (AEP) event through to the 1% AEP + CC (SSP2-4.5) event. For each AEP, full simulation of storm events from 10 minutes to 6 hours for the ensemble of temporal patterns were carried out.

The peak flood depth results from the existing conditions model simulation are presented in Figure 9 for the 1% AEP + CC (SSP2-4.5) event. Additional flood mapping is presented in Appendix F.

The existing condition results demonstrate that:

- Flooding is generally contained within watercourse/stream corridors, with flows following the natural topography of the site, collecting within the cascading farm dams. Some ponding is observed against the rail and road embankments.
- A shallow overland flowpath is observed passing along a depression at the southend of the Development footprint.
- Beaudesert-Boonah Road is shown to be overtopped in the 1% AEP + CC (SSP2-4.5) event at the road culvert crossing northwest of the project site.
- The railway is shown to be flood free in the 1% AEP + CC (SSP2-4.5) event.

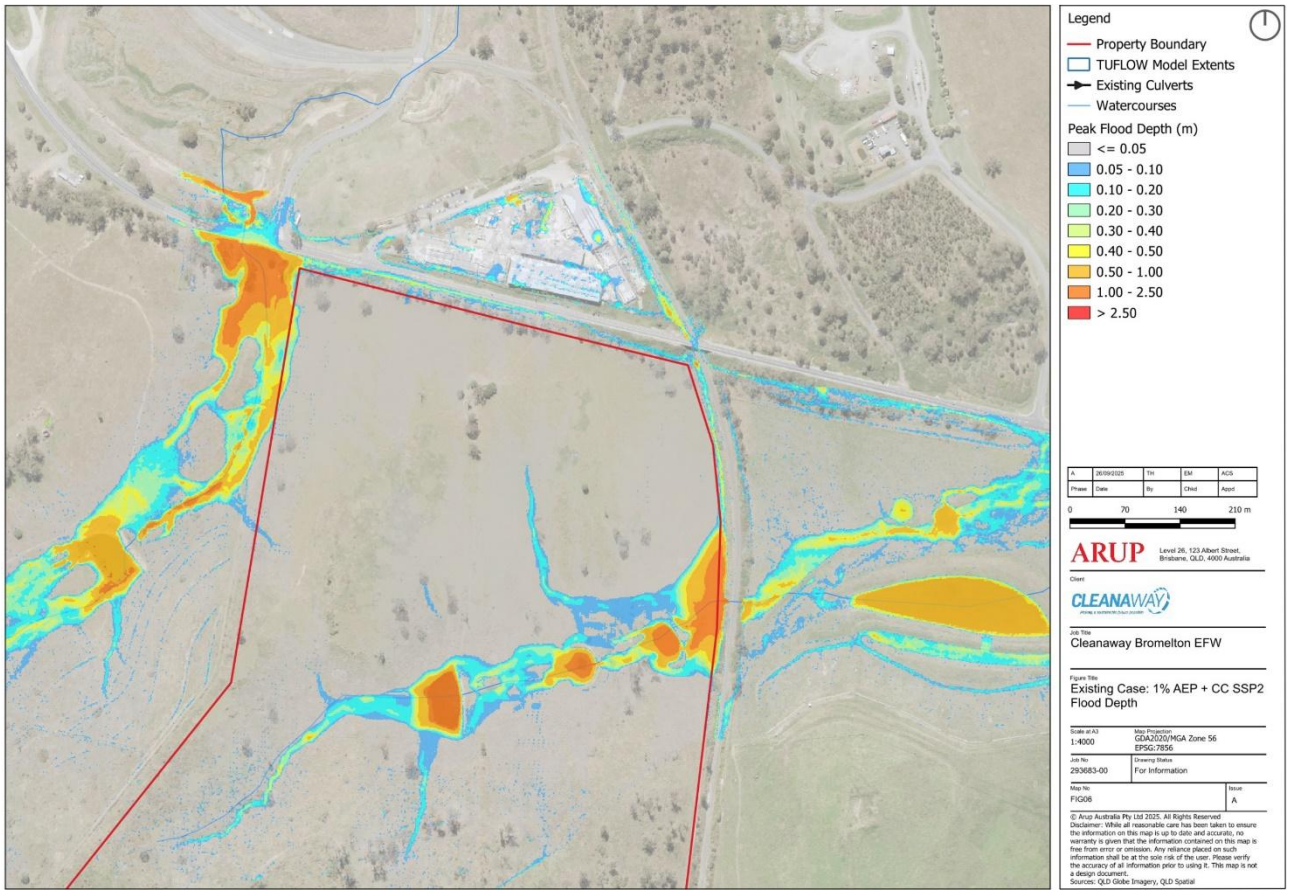

Figure 9: Existing Conditions 1% AEP + CC (SSP2-4.5) Peak Flood Depth

6. Concept Engineering Design

6.1 Levels and Grading

Site levels are to be terraced to respond to existing site topography with roads used to overcome level differences between the main building platforms. Extensive earthworks are required to re-grade the site to create large platforms with shallow gradients, suitable to accommodate the proposed buildings and operational hardstands. Site investigations completed to date (see Land and Groundwater Report by Douglas Partners for further details) indicate that excavations will primarily be in residual clay aside from the lower part of the waste bunker which may reach bedrock.

The site entrance connects to Beaudesert Boonah Road at approximately RL 85.0 mAHD. The main access road slopes up to approximately 89.5 mAHD at the weighbridge and then up to RL 93.0 mAHD as it approaches the de-coupling area, located on the existing ridge.

The de-coupling area, EfW building, Air Cooled Condenser (ACC), APCr and staff parking area adjacent to the administration building are all located within the upper plateau of the site, between RL 93.0 and 94.75 mAHD. This balances between cuts in central areas and fill in eastern and western parts as the platform is wider than the existing ridge.

The IBA facility is split into two connected platforms; the IBA maturing platform and the IBA sorting platform. The IBA sorting platform is linked to the hardstand around the EfW building and is set higher with an RL 92.0 mAHD at the west end. The platform grades to the east with the low point at RL 89.0 mAHD. . The IBA maturing platform is set lower than the IBA sorting platform and varies between RL 88.0 mAHD and 84.5 mAHD. The concept design site layout is presented in Figure 10.

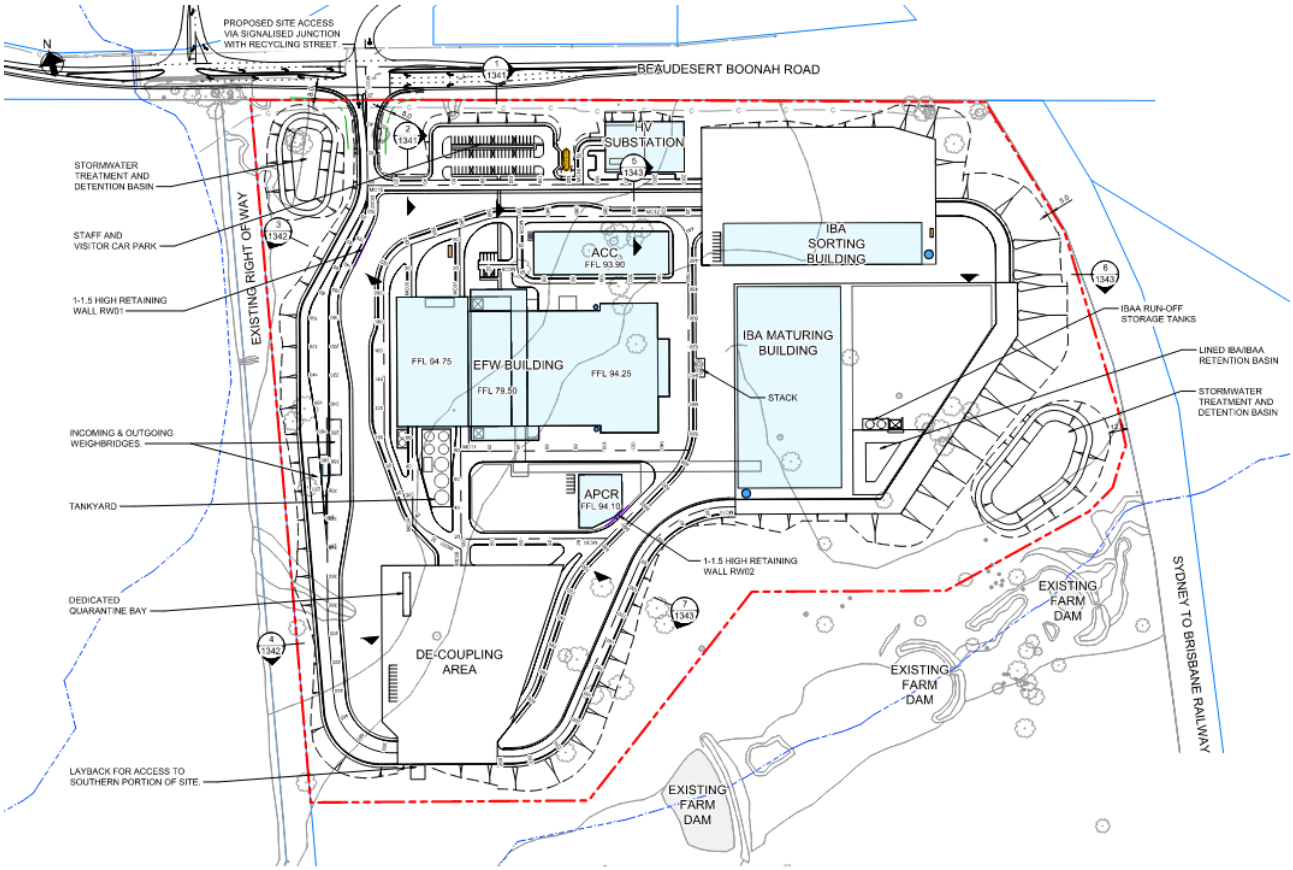

Figure 10: Concept Design Site Plan

This configuration places the EfW building, more than 100m away from Beaudesert-Boonah Road and 250m clear of the railway corridor.

Access roads have maximum longitudinal gradient of 5%, which is considered suitable for the proposed trucks. Hardstands have been designed at concept stage to comprise a uniform crossfall between 1% and 3%. During later design stages there is opportunity to re-visit these gradings and adjust to optimise bulk earthworks volumes.

Hardstand surfaces typically fall away from the building perimeter to the outer kerb line at 2% to 3% crossfall. To encourage overland flows and prevent ponding outside the EfW building, the longitudinal gradient on both sides of the building falls to the east. Fill batters near the eastern boundary of the site tie into existing ground levels a minimum 5.0m inside the Lot Boundary. Existing levels along the railway corridor and road corridor boundaries are maintained. There are no retaining walls proposed adjacent, or within 5m of the railway corridor along the eastern boundary of the site.

Sag points in the road network are positioned adjacent to proposed stormwater treatment and detention basins to maximise capture of stormwater runoff in the basins prior to site discharge.

The development's grading directs water away from buildings; towards the attenuation basins present within the Project area and subsequent, downstream overland flow paths. In the 1% AEP flood event, the highest water level in the overland flow path is RL 81.1 mAHD. Finished floor levels of all habitable buildings within the application sit above RL 88.0 with the EfW building more than 10 m higher than the 1% AEP flood level.

A number of internal retaining walls, less than 2.0m high are proposed to overcome level difference between roadways and adjacent hardstand. These are shown in Figure 10 and within the concept civil design drawings contained within Appendix B. Surplus spoil material maybe placed in areas of the site beyond the legislative offsets.

6.1.1 Setbacks and Clearances from Surface Flow Paths

As highlighted in Section 5.3, guidance from SeqWater considers that the hydro-lines representing the overland flow which runs through the central portion of the subject site is classified as a Stream Order 1. A similar hydro-line is present to the west of the site and is also classified as a Stream Order 1.

The design has sought to maintain sufficient clearance from these mapped hydro-lines to minimise impacts to existing overland flow paths. Drawing BERC-ARU-BNE-CICW-DRG-1030, contained within Appendix B demonstrates that the proposed development layout provides clearances in accordance with P025 of Seqwater's Development Guidelines.

Table 3: Development Setback Assessment

Seqwater Development Guideline Performance Outcome	Area	Setback Provided	Notes
PO25 / A025.1 Earthworks do not occur within 25m setback to a stream order 1 – 3.	Hydro-line south of development footprint	26.0m	Setback achieved. Setback noted is to a drainage feature.
	Hydro-line west of development site.	26.0m	Setback achieved 25m offset from hydro-line sits outside Lot Boundary
PO28 / A028.2 The storage or handling of dangerous goods, hazardous substances or environmentally hazardous materials with an aggregate quantity greater than 200L or 200kg and less than 1000L or 1000kg maintains minimum 100m separation distance to a watercourse.	Hydro-line south of development footprint	124m	Setback achieved. It is noted that the setback is measured from a drainage feature and not a formal watercourse.
	Hydro-line west of development site.	115m	Setback achieved.

6.2 Stormwater Management

The over-arching strategy of the stormwater design is to:

1. Retain existing farm dams serving the southern part of the central catchment (catchment 2) allowing un-developed areas of this catchment to maintain existing drainage regime.
2. Maintain existing drainage regime within the southern catchments (catchments 3 & 4) of the site.
3. Generally maintain pre-development catchment distribution.
4. Retain current stormwater discharge locations and flow rates via use of detention basins.
5. Provide catchment wide stormwater quality improvement measures at centralised locations.
6. Collect rainwater and re-use to offset high process demands.
7. Provide specific measures locally to serve areas of higher risk.

Outfalls from each basin will be piped and daylight to existing overland flow paths and channel. Flows would exit the Project area overland and discharge to existing drainage features:

- The northern stormwater basin, serving catchment 1, will discharge into an existing swale within the western portion of the site. This swale conveys flows into an existing channel within the road corridor passing under Beaudesert Boonah Road via the box culverts.
- The eastern basin, serving catchment 2, will discharge into the existing overland flow path downstream of the farm dam and passes under the rail corridor via the 1.85 m high culvert.

6.2.1 Stormwater Quantity

The Bromelton SDA requires that stormwater quantity is managed in accordance with QUDM and Australian Rainfall and Runoff – where referenced by QUDM. The design criteria used for BERC is as follows:

- Pipework and attenuation basins sized for the 10% AEP return event as per Table 7.3.1 of QUDM, 2016 Edition, for central business and commercial development.
- Secondary control for waterway stability to limit post development peak 1yr ARI event discharge to the pre-development peak 1yr ARI event as per Section 3.2.1 of QUDM.
- Intensity Frequency Duration (IFD) Design rainfall intensity data from the Bureau of Meteorology (BoM) website – from Bromelton.

Table 4: Rainfall Data from Bromelton

Duration (Mins)	Average Recurrence Interval (rainfall in mm/hr)						
	1 Yr	2 Yr	5 Yr	10 Yr	20 Yr	50 Yr	100 Yr
1	138	156	213	252	290	340	378
2	112	127	172	204	236	281	315
3	106	119	162	192	221	263	295
4	101	114	155	184	212	250	280
5	97	110	150	177	204	240	267
10	80.3	91	124	147	169	197	218
15	68.2	77.2	106	125	143	167	185
20	59.1	67	91.5	108	124	145	161
25	52.3	59.2	80.8	95.4	110	128	143
30	46.9	53.1	72.5	85.6	98.4	115	128
45	36	40.7	55.6	65.8	75.9	89.5	100
60	29.4	33.2	45.4	53.8	62.3	73.8	82.7
90	21.8	24.6	33.7	40.1	46.6	55.6	62.7
120	17.6	19.8	27.2	32.5	37.8	45.3	51.3
180	12.9	14.6	20.1	24.1	28.3	34.1	38.8

Duration (Mins)	Average Recurrence Interval (rainfall in mm/hr)						
	1 Yr	2 Yr	5 Yr	10 Yr	20 Yr	50 Yr	100 Yr
270	9.58	10.8	15	18.1	21.3	25.8	29.4
360	7.79	8.82	12.3	14.9	17.5	21.3	24.3
540	5.89	6.69	9.4	11.4	13.5	16.4	18.8
720	4.87	5.55	7.83	9.53	11.3	13.7	15.8
1080	3.77	4.31	6.13	7.47	8.87	10.8	12.4
1440	3.15	3.62	5.17	6.31	7.49	9.12	10.4
1800	2.74	3.16	4.53	5.53	6.56	8	9.15
2160	2.45	2.82	4.06	4.96	5.88	7.17	8.19
2880	2.04	2.36	3.4	4.15	4.92	5.99	6.84
4320	1.54	1.79	2.59	3.15	3.73	4.55	5.2
5760	1.24	1.44	2.08	2.54	3	3.66	4.18
7200	1.03	1.19	1.73	2.11	2.49	3.03	3.47
8640	0.873	1.01	1.46	1.78	2.1	2.56	2.94
10080	0.75	0.867	1.25	1.53	1.81	2.19	2.52

With respect to the existing catchment plan (see Figure 6), the development footprint is contained within catchments 1 and 2. Catchments 3 and 4 to the south are not impacted by the Project.

Pre-development discharge rates were determined using the Rational Method for rural catchments as per QUDM which is considered applicable as the catchment areas are significantly less than 25 km². Time of concentration was determined using Friends equation for overland flow as outlined in Section 4.6.6 of QUDM.

Table 5: Pre Development Stormwater Discharge & Assessment Parameters

Item	Catchment 1	Catchment 2
Area	8.77 ha	13.83 ha
Average slope	4.8%	5.2%
Time of Concentration	78.4 mins	16.1 mins
Impervious Fraction	0 (Open Space and Parks)	0 (Open Space and Parks)
Co-efficient of Discharge C_{10}	0.46	0.46
Pre-Development Flow Rate (10 Yr ARI)	0.510 m³/s	0.76 m³/s

The re-grading of land with the development footprint has resulted in a catchment re-distribution summarised in Table 6 and Figure 11. Each catchment is served by a combined bio-retention and detention basin.

Table 6: Comparison of Pre and Post Development Catchment Areas within developed footprint

Catchment	Pre-Development	Post Development
Catchment 1	8.77 ha	6.238 ha
Catchment 2 (within development footprint)	13.83 ha	15.252 ha
Development Footprint Total	22.60 ha	21.49 ha
IBAA Hardstand*	0	1.11 ha
Total (Check)	22.60 ha	22.60 ha

* Note this catchment drains to separate IBAA retention basin and is excluded from stormwater system and detention calculations.

Figure 11: Post-Development Catchment Plan (Note – Red Line denotes split between catchments 1 & 2)

A piped stormwater system will convey flows via an inlet Gross Pollutant Trap (GPT) into the bio-retention basin. In smaller rainfall events, stormwater will have an extended detention time within the bio-retention basin for treatment. In larger events, those over and above the 1Yr ARI event, stormwater flows will overtop the bio-retention basin and be contained in the detention portion of the basin. This part of the basin shall be between 1.2 m and 1.8 m deep and incorporate a gradient towards the basin's outfall. Refer to Section 6.2.3 for further details on the stormwater basin configuration.

Bromelton SDA references Queensland Urban Drainage Manual as the design basis for stormwater quantity. Table 7.3.1 of QUDM, see Table 6 below, notes a minimum 2yr ARI design event for Industrial development and 10yr ARI for central business and commercial development. Considering the scale and importance of this development the 10yr ARI was used as the minor storm event and to size the on-site detention provisions. The design basis is that the storage volume determined by matching post development flows to the pre-development condition for the 10Yr ARI event.

Table 7: Extract of Table 7.3.1 from QUDM

Table 7.3.1 – Recommended design average recurrence intervals (ARI) and annual exceedence probabilities (AEP) for the minor system

Development category [1]		ARI (yrs)	AEP
Central business and commercial		10	10%
Industrial		2	39%
Urban residential high density – greater than 20 dwelling units/ha		10	10%
Urban residential low density – 6 to 20 dwelling units/ha		2	39%
Rural residential – 2 to 5 dwelling units/ha		2	39%
Open space – parks, etc.		1	63%
Major road	Kerb and channel flow	10 [2]	10%
	Cross drainage (culverts)	50 [3]	2%
Minor road	Kerb and channel flow	[4]	[4]
	Cross drainage (culverts)	10 [3]	10%

Notes:

[1] The terms used in this table are described in the Glossary (Chapter 13) and Table 7.3.3.

[2] The design AEP for the minor drainage system in a major road must be that indicated for the major road, not that for the development category of the adjacent area.

[3] Refer to discussion in Section 7.3.7.

[4] Refer to relevant development category (above).

Detention basins have been sized in accordance with AustRoads Part 5A (AustRoads 2023) as required by TMR's Road Drainage Manual (TMR, 2019). Basins were sized following the calculations outlined in Section 7.2.7 of this guide with the Rational method used to determine the inflow volume.

In reference to the post development catchment plan, hardstands and roofs were assumed to be 100% impervious with landscaped areas allocated 5% imperviousness to consider footpaths, plinths and other ancillary items that arise from design development.

A complex control comprising orifice shall be used to limit flows in the 10Yr ARI event. The basin volumes presented below exclude the volume associated with the 300 mm freeboard above the design storage level. A 150-200mm deep overflow spillway will be provided at each basin to safely convey flows exceeding the design storm 10Yr ARI event. Flows discharging from each detention basin, via a controlled outlet structure with scour protection, will shed overland beyond the site boundary into existing drainage features in adjacent lots.

Table 8 summarises the key basin components.

Table 8: Detention basin design

Item	Catchment 1 Basin	Catchment 2 Basin
Basin Storage Volume	596m³	2,411m³
Base Level	82.40 mAHD	72.80 mAHD
Discharge Rate (10Yr ARI)	0.51m³/s	0.76m³/s

The exact details of the complex control and spillway will be developed as part of detailed design. Detention basin volumes and configurations may be refined during later design stages to reflect design development. Calculations for initial detention basin sizing are included within Appendix C.

6.2.2 Overland Flow

An existing overland flow path is positioned centrally within catchment 2 (refer Figure 6) which flows west to east through the site. The flow path starts at a natural gully near the western boundary and flows to a low point near the cross-drain culvert which passes under the railway embankment.

The drainage feature feeds three farm dams that can be seen on the topographical survey and from aerial imagery (excerpt in Figure 12).

Figure 12: Aerial Image of site showing location of Existing Farm Dams (Source: Google Maps)

The farm dams sit outside of the development footprint and along with the primary overland flow path, will be retained in their present condition. One of the stormwater detention basins will discharge flows to this overland flow path, downstream of all three farm dams.

Minor gullies and flow paths within the developed portion of the site will be filled by the works and will be drained via the proposed stormwater systems.

Natural overland flow paths within the southern catchment of the site will also be retained in their present condition.

6.2.3 Proposed Water Quality

Stormwater quality design criteria outlined within Table 7 of Bromelton SDA references several engineering standards which are not consistent. Seqwater (a referral agency) has the most stringent pollution reduction targets which are noted as being higher than Water Sensitive Urban Design guidelines for South East Queensland and Scenic Rim Regional Council's requirements.

Consultation with Seqwater during the design process (see Appendix E) was undertaken to understand their position on these differences. A comparison of these targets is outlined in Table 9 with the Seqwater targets used as per performance outcome A14.3.

Table 9: Stormwater Pollutant Reduction Targets

Pollutant Type	WSUD Technical Guidelines for South East Queensland Reduction Targets	Seqwater Reduction Targets
Total Suspended Solids (TSS)	80%	**85%**
Total Phosphorus (TP)	60%	**65%**
Total Nitrogen (TN)	45%	**45%**
Gross Pollutants	90%	**95%**

The development footprint of the Project area is approximately 22.6 ha in size and occupies all of existing catchment 1 and part of existing catchment 2 (refer Figure 6). For the purposes of the post-development water quality analysis these have been termed the northern and southern catchment. Both the northern and southern catchments have a similar water quality treatment train comprising:

- Rainwater harvesting on key buildings including EfW building, IBA maturing and sorting buildings (all part of the southern catchment).
- Collection of roads and hardstands via inlet pits with piped conveyance.
- Proprietary Gross Pollutant Trap (GTP) upstream of stormwater basins.
- Integrated bio-retention basin and detention basin.

In total, four roof rainwater harvesting tanks are proposed:

- Two 100 kL tanks at EfW building, each serving half of the roof catchment.
- One 100 kL tank at IBA maturating building.
- One 100 kL tank at IBA sorting building.

Each rainwater harvesting tank will have an overflow pipe which discharges to the trunk stormwater network.

The catchment areas associated with the IBA maturing hardstand, drained to a separate retention basin, has been excluded from the water quality assessment.

Bio-retention basins have been modelled to feature an impermeable liner and 500 mm thick filter media layer which promotes the removal of particulates and soluble contaminants that may be present in the stormwater runoff. A typical section through the combined bio-retention and on-site detention basin is shown Figure 13 and within the concept engineering drawings (Appendix B).

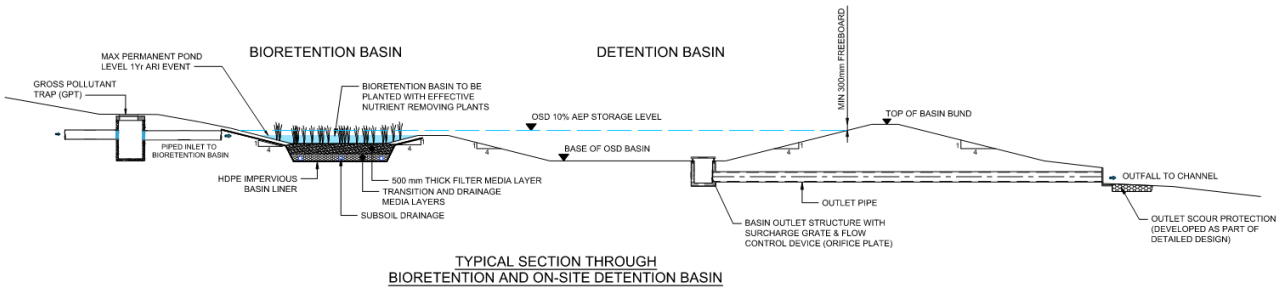

Figure 13: Bio-retention and On-Site Detention Basin Configuration

Table 10 confirms key characteristics of the northern and southern catchments, and the pollutant reduction targets achieved respectively. MUSIC modelling was completed in accordance with Queensland - MUSIC Guidelines November 2018 for industrial land use. Schematisations for the MUSIC water quality models are shown in Figures 14 and 15 with further details contained in Appendix D.

Table 10: Water Quality Parameters Modelled

Design Parameter	Northern Catchment	Southern Catchment
WQ Basin Bypass	0.65 ha (10.4%) All landscaped areas.	2.4 ha (15.7%) All landscaped areas south of roads and hardstands
GPT Unit	CDS 1512	CDS 2028
Footprint of Bio-Retention Basin	450 m²	900 m²
Rainwater Harvesting Tanks	N/A	4 x 100kL

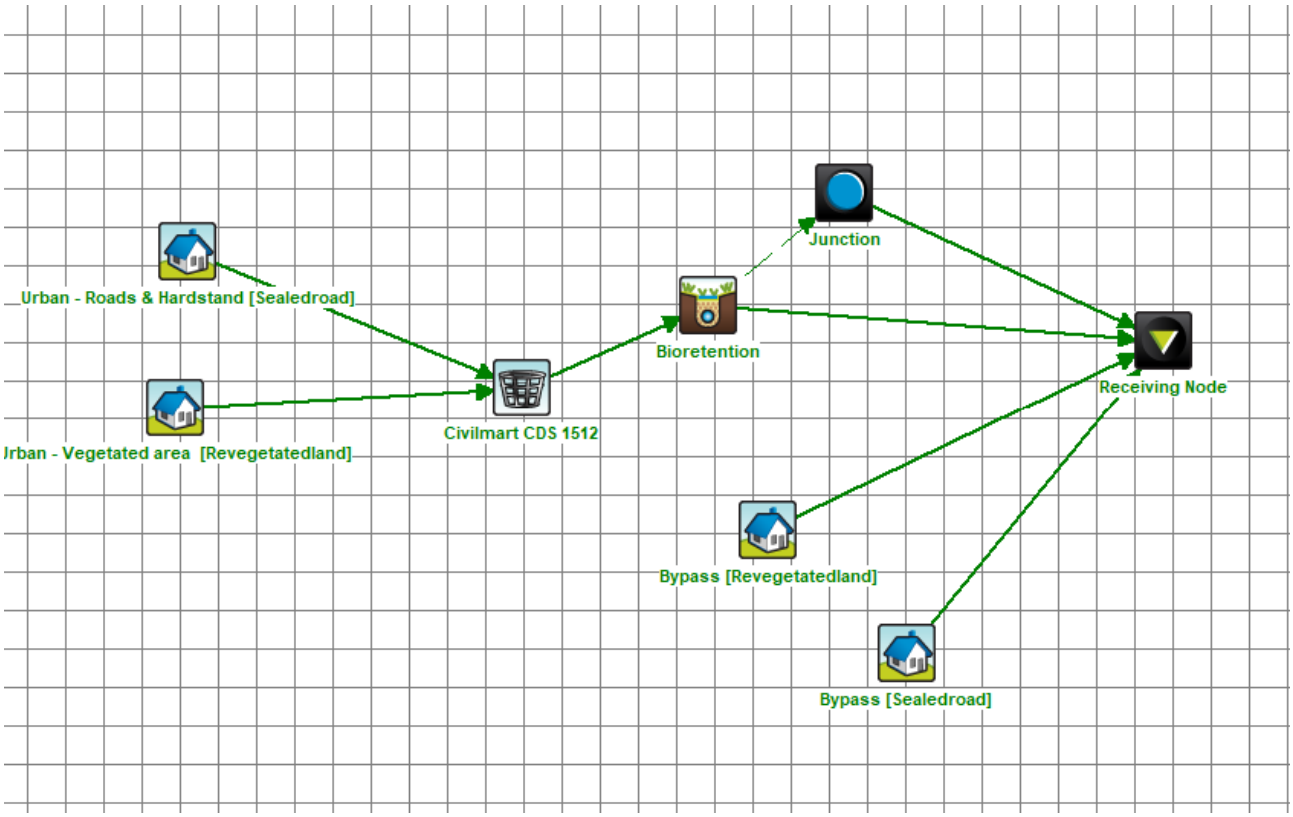

Figure 14: MUSIC Model Schematisation for Northern Catchment

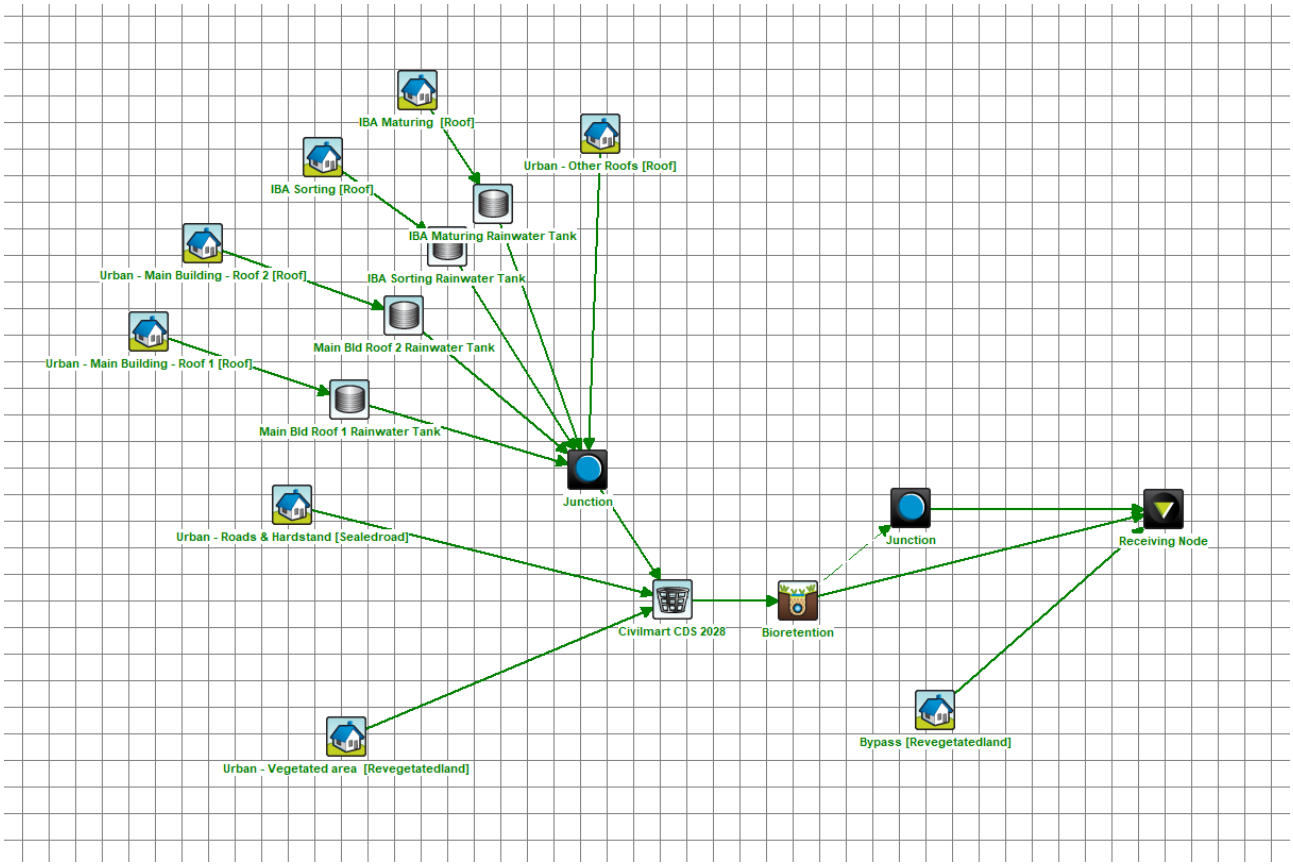

Figure 15: MUSIC Model Schematisation for Southern Catchment

The pollution reduction results from the MUSIC model are summarised in Table 11. These results demonstrate compliance with the more onerous targets set by Seqwater in Acceptable Outcome AO14.3.

Table 11: Summary of MUSIC Model Results

Pollutant	Target Reduction (Seqwater)	Northern Catchment	Compliant	Southern Catchment	Compliant
Flow Reduction (ML/yr)	N/A	3%	N/A	18.4%	N/A
Total Suspended Solids (kg/yr)	85%	87.6%	Y	85.0%	Y
Total Phosphorus (kg/yr)	65%	76.8%	Y	69.5%	Y
Total Nitrogen (kg/yr)	45%	46.2%	Y	48.7%	Y
Gross Pollutants (kg/yr)	95%	99.2%	Y	99.4%	Y

MUSIC modelling also highlights that the re-use of runoff, via rainwater harvesting, reduces the quantity of water flowing from the Project area in regular rainfall events. In particular, the rainwater harvesting tanks serving the main EfW building and IBA buildings provides a secondary source of process water which yields a flow reduction greater than 15% per annum in the context of the southern catchment.

Bio-retention footprint, configurations and the size of rainwater harvesting tanks may be refined during later design stages to reflect design development.

6.2.4 Runoff From Sensitive Areas

The stormwater system is serving building roofs, roads, general vehicle hardstands and landscaped areas. As such, stormwater runoff is considered to be typical to other industrial development.

Potentially contaminated materials within the waste mix delivered to site will be covered on delivery and will not be unloaded, transferred or stored externally, minimising the possibility for these materials to leach into the stormwater system which is serving roofs and hardstands. The receival hall itself is a fully enclosed building which has specific management measures to deal with any spills that may occur within the building.

Specific components of the facility require supplementary measures, and these are outlined below.

IBA / IBAA Stockpiles

The maturing incinerator bottom ash stockpiles can contain heavy metals and high salt content which are to be kept separate from the trunk stormwater system. Concentrations of contaminants within stockpiles and associated runoff are highly variable, dependant on factors such as waste feedstock composition, age of stockpile, duration of storage within IBA sorting and maturing buildings, size of stockpile, climatic conditions in prior days/weeks and rainfall intensity.

IBA stockpiles are initially matured inside the three-sided IBA maturation building. The IBA once matured is transferred by conveyor to the fully enclosed IBA sorting process building where the IBA is processed by removing metals and grading to create IBAA. The IBAA is transferred by conveyor back to the IBAA hardstand where it is then stockpiled. Runoff from the IBAA hardstand is to be drained to a separate lined retention basin via an inlet GPT. This basin is to be lined with either impermeable membrane or geosynthetic clay liner (GCL) with minimum permeability (K) of $1x10^{-9}$ m/s and will be bunded to prevent collection of non-contaminated flows from general hardstand areas.

The concept design of the lined retention basin assumes:

- Hardstand catchments of 1.11 ha with durable, impermeable surface (excludes IBA maturing building roof and circulation road which will be separated by kerbed upstand).
- Sizing guidance has been taken from Victorina EPA Guideline “Siting, design operations and rehabilitation of landfills”.
- This guideline recommends design for 90th percentile wet year (2 consecutive years) or a 1-in-20 year storm.
- Water balance uses 90th Percentile wet year (calcs for worst year only), using monthly data from BOM for Bromelton. The 90th %ile year is 1165 mm however the design takes into consideration intensities and rainfalls associated with peak 24hr period for a 1 in 20 year storm event.
- Peak 24 hr rainfall intensity of 7.49 mm/hr.
- Minimum storage volume of 1,995 m^3.

During operation the management of stormwater runoff in the IBAA stockpile area includes:

- Runoff from the IBA maturing building roof will drain into a min 100 kL rainwater harvesting tank for re-use within the process. Overflow from rainwater tank discharges to trunk stormwater network.
- Inlet sump to collect and remove larger sediments and pollutants that may be present on hardstand prior to discharge into lined retention basin. Materials captured in the sump will be periodically removed and disposed of at a suitable facility.
- Recovered water from the lined retention basin is to be pumped into storage tanks with minimum capacity 150 kL., treated and reused to maintain moisture levels in IBAA stockpiles (moisture aids the carbonation/maturation process) and for stockpile dust suppression and hardstand wetting.
- In the event of the lined retention basin approaching its capacity the operator will make provision to tanker off-site collected runoff to a licensed facility.

The exact configuration of the drainage system in the IBAA maturing hardstand, the lined retention basin and an IBA/IBAA management plan will be developed as part of detailed design.

Diesel and Oil

2No diesel storage tanks are proposed adjacent to the main EfW building. These tanks will be double skinned and designed in accordance with AS 1940:2017. Spill response kits shall be provided on site.

An oil and water separator has been included at the point of discharge from the HV substation area. Noting that there is potential for accidental releases of oil or fuel from vehicles and machinery, as is the case for any industrial development. Spill management plans will form part of the wider operational management plan to deal with rare, major incidents such as a damaged/faulty vehicle.

Although not included within the MUSIC model, both the GPT units and bio-retention basins are known to remove particulate and soluble contaminants including hydro-carbons and heavy metals. Independent testing of the CDS unit indicates an 80% removal efficiency of both heavy metals and hydro-carbons/oils which could treat runoff in the event of localised spills within the site roadway.

Sewer Infrastructure

There is currently no formal sewerage infrastructure within the broader Bromelton SDA precinct. Preliminary discussions with Queensland Urban Utilities indicate that there are no formal proposals to construct a sewer along Beaudesert Boonah Road.

On-site sewer holding tanks are proposed to cater for sewage wastewater (kitchen, toilets) for each of the buildings which will house staff (EfW building and IBA admin). These retention systems will be fully contained, sized for 7 days capacity, with no overflow to landscaped areas. Effluent will be transported off-site as required when these holding tanks approach capacity.

The concept design provisions for a 25,000 L sewer holding tank capacity serving the EfW building and a 50,000 L sewer retention capacity serving the IBA sorting building. These sewer holding tanks, as shown in concept engineering drawing BERC-ARU-BNE-CICW-DRG-1801, have been positioned a minimum 100 m clear of the mapped Stream Order 1 hydro-lines and are compliant with performance outcomes P02 and P07 of Seqwater's Development Guideline.

The exact position and size of the sewer holding tanks will be finalised as part of detailed design.

At future design stages landscape irrigation utilising treated wastewater may be explored, subject to the necessary site assessments and approvals. The Proponent shall investigate the opportunity to connect to a future precinct gravity sewer should this be provided by Queensland Urban Utilities.

6.2.5 Erosion and Sediment Control Plan (ESCP)

A preliminary site geotechnical investigation (Douglas Partners, 2023) found that the site has a 100-300 mm layer of topsoil which overlays a thick layer of residual clay. Geological mapping from the CSIRO indicates that the site sits in a zone defined as having an extremely low probability of Acid Sulphate Soils occurrence.

Careful planning with regard to the phasing of clearing, excavation, stockpiling, and filling stages across the development footprint will be required to effectively manage runoff from the site during construction. This will need to be considered in relation to the implementation of mitigation and control measures and stormwater runoff quality monitoring. Given the steeply sloping nature of the site, additional velocity control measures such as check dams and rip rap within channels are recommended to reduce scouring.

A detailed Soil and Water Management Plan is to be developed for the construction stage, with reference to relevant guidelines.

Potential strategies to control sediment and erosion during the construction phase include:

- Shaker pads at construction access points
- Sediment fences
- Cut-off drains.

- Check dams.
- Sediment basins.

Concept sediment and erosion control measures are shown in the engineering plans contained in Appendix B. The final design, sizing and location of these measures will be determined by the Contractor based on the proposed phasing of site works.

The Contractor will be responsible for monitoring the quality of stormwater discharged from the construction area via sedimentation basins during construction. To comply with requirements of the Department of Environment, Tourism, Science and Innovation (DETSI) authorised under the *EP Act*, the Contractor is recommended to follow the guidelines contained within Best Practice Erosion and Sediment Control (BPESC) document and the Healthy Land and Water ESC Toolkit.

6.3 Flood Impact Assessment

The concept design surface, surface roughness delineation and associated site drainage were tested in the hydraulic model to inform potential flood risk at the Project area under a range of flood conditions. The design case model setup is presented in Figure 18.

Flood mapping showing flood depth, hazard, flood level impacts and flood velocity impacts for the 63.2% AEP through to the 1% AEP + CC (SSP2-4.5) event are presented in flood maps under Appendix F.

The design conditions 1% AEP + CC (SSP2-4.5) peak flood depth results presented in Figure 19 showed that the critical site elements are located outside the peak 1% AEP + CC (SSP2-4.5) peak flood extents.

The design conditions modelling 1% AEP + CC (SSP2-4.5) peak flood depth difference presented in Figure 20 showed that no adverse off-site flood impacts are observed due to the proposed works. The proposed stormwater detention basins are shown to retain a portion of the local runoff flows within the site, resulting in a decrease in off-site flood flows.

Notably it is observed that there is no worsening in flood depth or hazard to:

1. Beaudesert Boonah Road in 1% AEP + CC (SSP2-4.5) event.
2. Railway corridor or to railway infrastructure in 1% AEP + CC (SSP2-4.5) event.

Table 12 shows the peak flows arriving at existing off-site hydraulic structures in events up to and including the 1% AEP + CC (SSP2-4.5) event at the two key locations presented in Figure 18 (i.e. (A) Railway Culvert and (B) Road Culvert). As shown, there is no increase in peak flow off-site as a result of the project.

Table 12: Comparison of Peak Flows at Existing Off-Site Culvert Crossings

Flood Event (AEP)	Location A – Railway Culvert		Location B – Beaudesert Road Culvert	
	Existing Case Peak Flow (m^3/s)	Design Case Peak Flow (m^3/s)	Existing Case Peak Flow (m^3/s)	Design Case Peak Flow (m^3/s)
1% AEP	8.2	7.0	15.1	14.7
2% AEP	6.7	5.7	14.7	14.0
5% AEP	4.8	4.0	10.0	9.7
10% AEP	3.3	2.5	8.1	7.9
20% AEP	3.1	2.4	6.5	5.5
1% AEP + CC (SSP2-4.5)	10.6	10.0	10.9	10.8

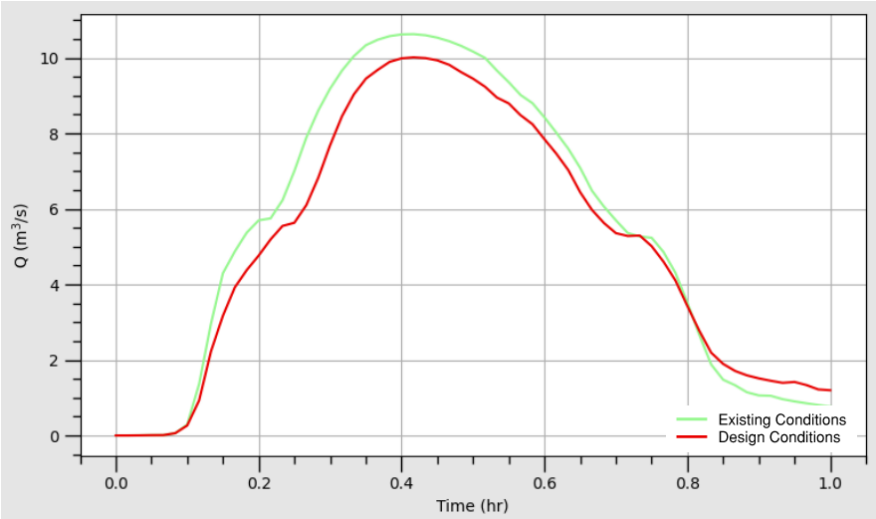

Figure 16: 1% AEP + CC (SSP2-4.5) Flow Comparison at Location (A) Railway Culvert

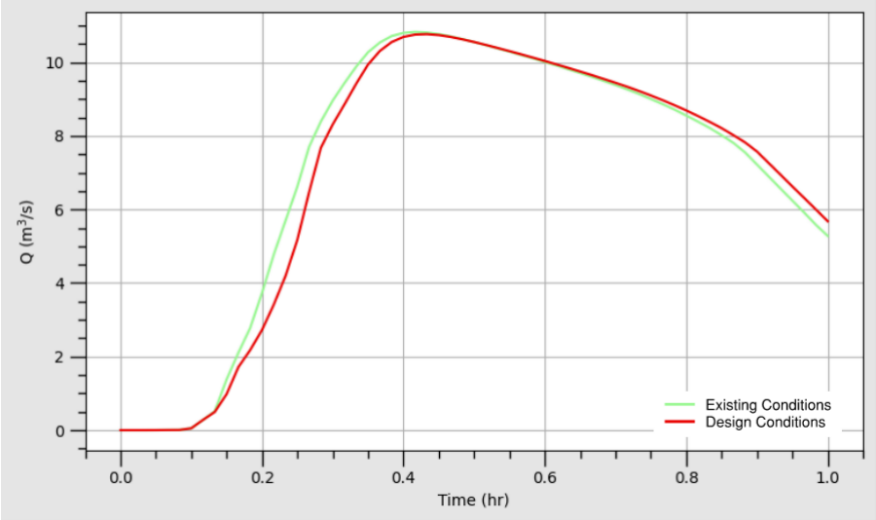

Figure 17: 1% AEP + CC (SSP2-4.5) Flow Comparison at Location (B) Beaudesert Road Culvert

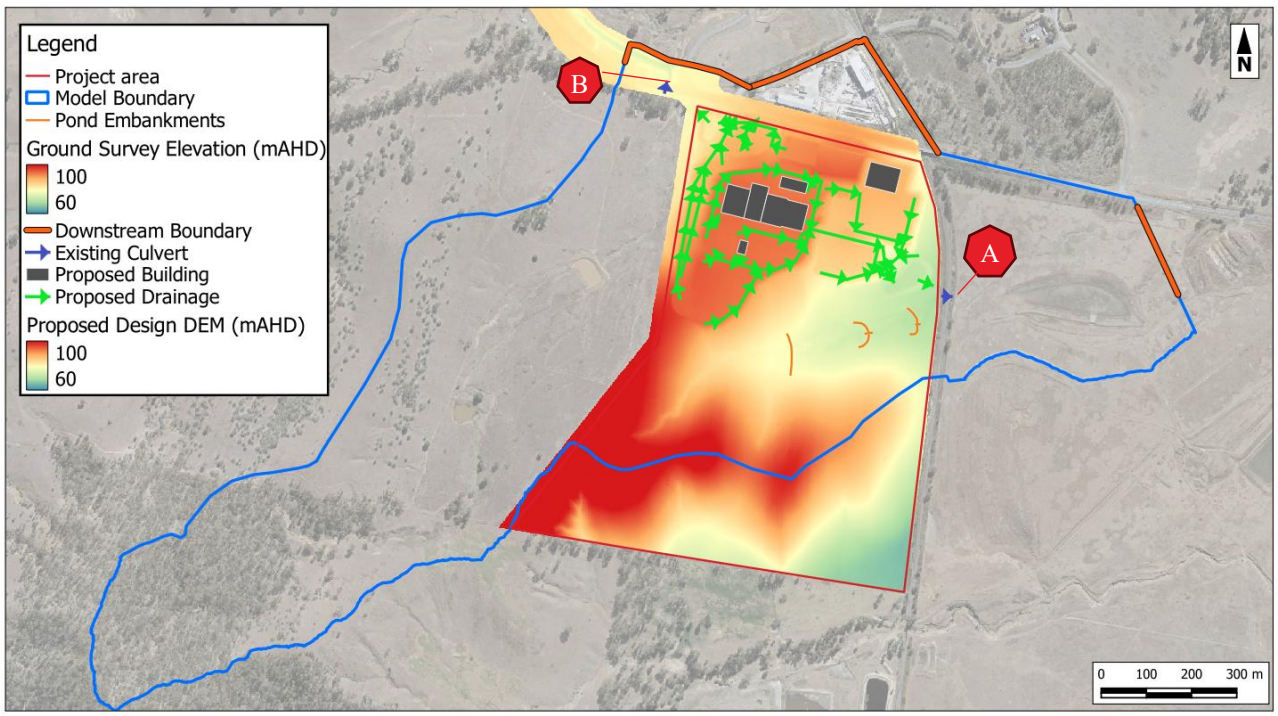

Figure 18: Design Case TUFLOW Model Setup and Reporting Location

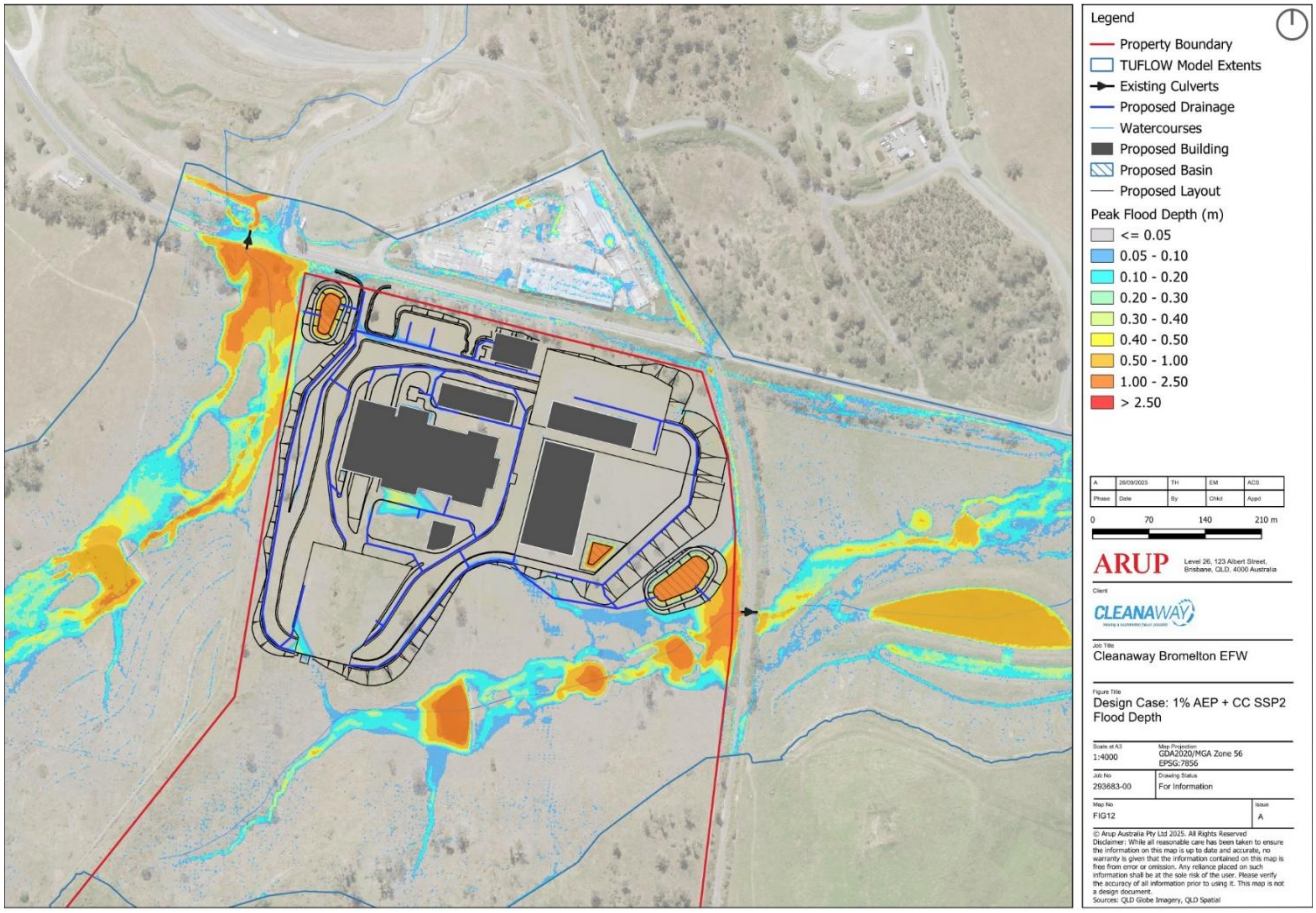

Figure 19: Design Conditions 1% AEP + CC (SSP2-4.5) Peak Flood Depth

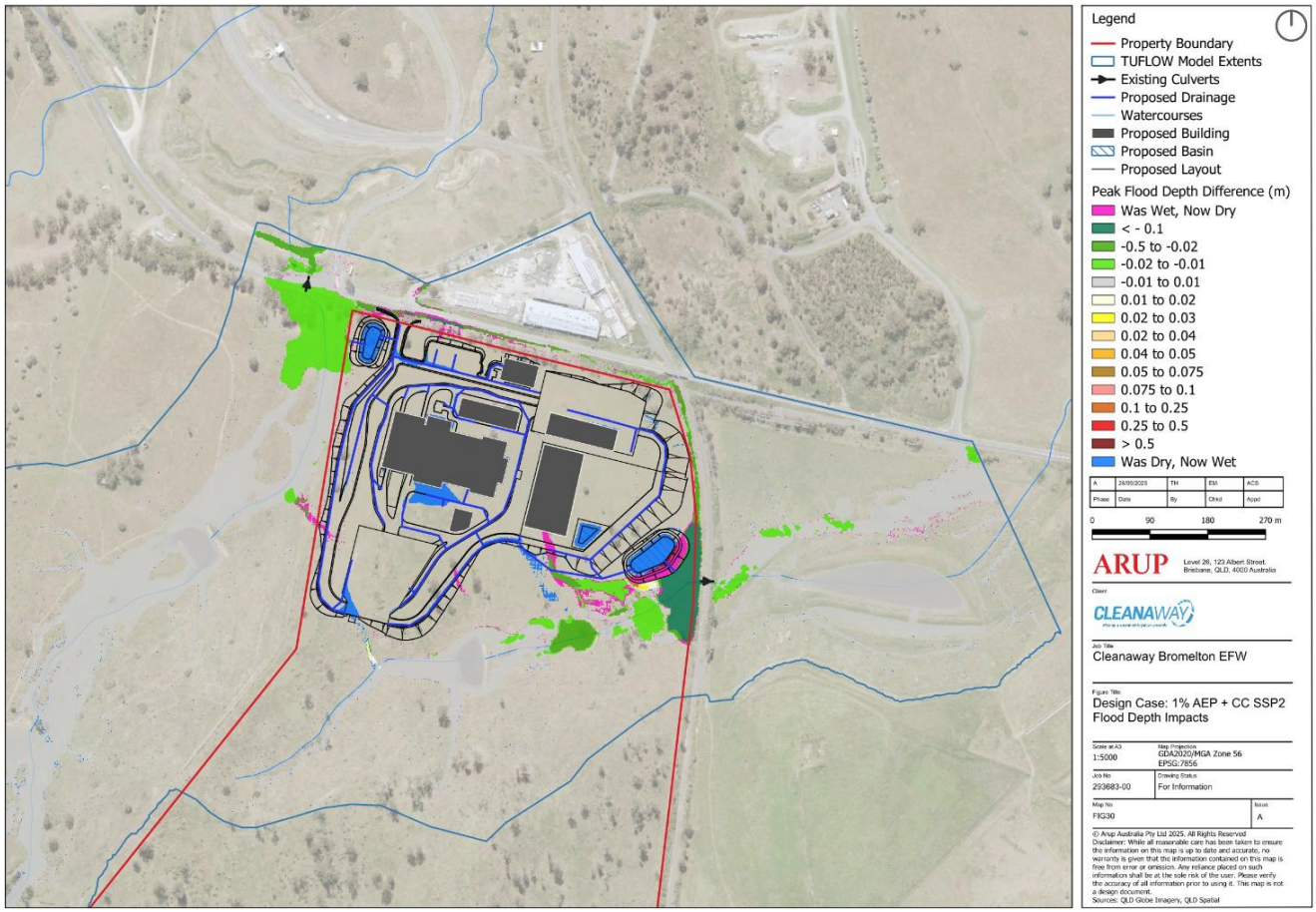

Figure 20: Design Conditions 1% AEP + CC (SSP2-4.5) Peak Flood Impact (Change in peak flood depth)

7. Assessment of Surface Water Risks

7.1 Construction

7.1.1 Water Quality

Construction activities have the potential to impact off-site watercourses should contaminated waters or high volumes of sediment discharge from the site.

Site won earthworks materials will be suitably stockpiled, clear of temporary overland flow paths and surrounded with silt fences, to prevent sediments being washed out.

A construction sediment and erosion control plan will be developed by the Contractor that considers the construction phasing and site topography. This shall develop the proposed configuration outlined in Section 6.2.5. Ongoing monitoring of water quality discharging from the site will be undertaken to demonstrate compliance with regulatory requirements.

Fuels and chemicals stored on site to support construction works will be securely stored to avoid accidental spillages discharging from the site compound.

7.1.2 Flood Risk Management

The development footprint, and in particular the main EfW building, sits at the top of the local catchment. There are no flows from upstream sites that would naturally drain towards the project site.

All construction compounds and main construction access tracks are to be located outside of the existing 1% AEP flood extent. The establishment of temporary drainage on site as outlined in Section 6.2.5 will be important to safely manage site stormwater runoff, diverting flows around key areas of excavation and minimise the risk of flooding within the development footprint during construction.

The use of sediment basins will control the discharge rate of stormwater runoff during construction works.

7.2 Operation

7.2.1 Stormwater Management

The Project results in a significant portion of farming land being transformed into industrial usage with increased areas of hardstand. Such increases in imperviousness can simultaneously reduce the time of concentration and increase stormwater flow rates discharging from the site if not managed.

The concept civil design includes a considered stormwater management strategy comprising water collection and re-use, pit and pit network and downstream bio-retention and on-site detention basins. The pit and pipe network and on-site detention basins have been sized for the 10-year ARI event. Peak stormwater flows, up to and including the 10-year ARI (10% AEP) event will be equal to or lower than pre-development conditions as per requirements within Bromelton SDA and QUDM.

7.2.2 Stormwater Quality

If not adequately managed, the industrialisation within the development footprint and subsequent vehicle trafficking has the potential to increase the level of contamination within stormwater discharging from the site.

MUSIC modelling, as detailed in Section 6.2, has been completed which demonstrates that the proposed water sensitive urban design and water recycling measures achieve pollution reduction targets stipulated by Seqwater. These targets, described in Performance Outcome P014, are to protect drinking water supply environmental values and facilitate the achievement of water quality objectives for receiving waters.

A separate, lined retention pond, serving the IBA maturing hardstand area, is proposed to collect potentially contaminated runoff. This runoff will be captured and collected water re-used within the maturation process.

Oil and water separator is proposed to serve stormwater drainage connection from the HV substation area in the unlikely event of a spillage or equipment failure.

7.2.3 Flood Risk

The development footprint sits on the ridgeline of the existing catchment. Key buildings, such as the EfW and APCr storage building are set above RL 88 mAHD, some 8 m higher than the detention basins located near the northern and eastern boundaries of the site. Design levels shed water away from the buildings towards the stormwater system and subsequently to the detention basins. It is therefore considered that the buildings within BERC have minimal risk of flooding.

The proposed stormwater management system, including on-site detention basins, controls stormwater flows discharging from the site. Flood modelling of the post-development scenario has demonstrated that the project does not result in a material worsening of the operating performance of the state controlled road or the rail transport infrastructure adjacent to the site. Indeed, the stormwater management measures are shown to reduce peak flows exiting the site in the 1% AEP + CC (SSP2-4.5) event. There is no worsening in flood hazard along Beaudesert Boonah Road in a 1% AEP + CC (SSP2-4.5) event.

Furthermore, it is noted that flood modelling of the post-development scenario has demonstrated that there is no concentration of flows at the rail corridor.

8. Proposed mitigation of impacts

This section outlines proposed mitigation and management measures that have been developed to mitigate the potential surface water and flooding impacts of the project during construction and operation.

8.1 Construction

Table 13 shows the mitigation measures for managing surface water related environmental impacts during construction.

Table 13: Construction mitigation measures for Surface Water & Flooding

ID	Mitigation measure	Timing
HYD01	Implement a Soil and Water Management Plan comprising suitable erosion and sediment control measures such as cut-off drains, shaker pads, check dams and sediment basins. This will improve the quality of stormwater runoff from the site and minimise downstream environmental impacts.	Construction
HYD02	Reuse stormwater collected in sediment basins for dust suppression.	Construction
HYD03	The water quality of stormwater discharged from the site will be monitored by the contractor to ensure water quality objectives are met.	Construction
HYD04	Locate site facilities and construction access tracks away from existing overland flow paths and identified 1% AEP flood extent.	Construction
HYD05	Locate earthworks stockpiles clear from overland flow paths created as part of the Soil and Water Management Plan.	Construction

8.2 Operation

The design for the Project includes numerous features that will act to mitigate hydrology, surface water and flooding impacts. Table 14 shows the management and mitigation measures incorporated within design that will act to reduce surface water and flood impacts.

Table 14: Operational mitigation measures for Surface Water & Flooding

ID	Mitigation measure	Timing
HYD101	The design includes two on-site detention basins which have been sized such that post development stormwater discharge rates match the pre-development condition in accordance with the requirements of QUDM.	Operation
HYD102	The design incorporates water sensitive urban design elements which enable the proposal to meet pollutant reduction targets nominated by Seqwater, including Rainwater harvesting tanks to collect runoff from the main building and reuse it for the EfW process.	Operation
HYD103	Oil and Water separator included at point of discharge from HV substation to cater for potential oil spills.	Operation
HYD104	The design elements involving the storage or processing of potentially hazardous waste have been located outside the 1% AEP flood extents and above the PMF flood level	Operation

ID	Mitigation measure	Timing
HYD105	Potential downstream flood impacts are mitigated by the inclusion of two on-site detention basins.	Operation
HYD106	All buildings within the development footprint are positioned well above the 1% AEP flood level.	Operation
HYD107	IBAA Retention Basin Management An IBA specific management plan will be prepared by the Operator to maintain the function and capacity of the IBA retention basin. This includes: • Regular cleaning and removal of inlet GPT. • Monitoring or weather forecasts and on-site rainfall to anticipate inflow. • Data logger and telemetry device to measure water level in the retention basin and record data. • Arranging for license waste contractor to transport collected runoff from the retention basin to a licensed facility, if it is approaching capacity. • Periodic inspection and maintenance of key equipment of the closed cycle arrangement (pumps, storage tank(s), retention basin etc)	Operation

9. Conclusions

A stormwater management and flood risk assessment has been completed for the Project area. Existing site conditions have been investigated and potential risks identified through the methodology presented.

The relevant environmental and planning regulations have been considered and addressed throughout the design development.

Risks have been assessed throughout the construction and operation stages with appropriate mitigation measures identified.

Key outcomes from this assessment are:

- An existing overland flow path, including three farm dams sit outside of the development footprint and will be retained in their present condition.
- Existing overland flow paths in the southern half of the Project area are not affected by the construction or operation of BERC.
- All buildings have been set above 1% AEP flood level plus freeboard.
- A stormwater strategy has been provided which minimises off-site impacts. This design features a series of pits and pipes, rainwater harvesting tanks, water quality treatment devices, bio-retention and detention basins. Pits, pipes and detention basins have been designed accordance with the QUDM and ARR such that post development discharge flows match pre-development discharges for a 10-year ARI event.
- MUSIC modelling demonstrates that the proposed water sensitive urban design and water recycling measures achieve necessary pollution reduction targets required by Seqwater and comply with performance outcome PO14.
- Rainwater harvesting has been integrated within the design with 4No rainwater harvesting tanks provided. Captured water will be re-used as process water.
- A separate, lined retention basin is proposed to serve the IBA maturing hardstand. Detained water is to be captured and re-used as part of the maturation process of the stockpiled ash materials.
- Flood modelling of the post-development scenario has demonstrated that the Project does not result in a material worsening of the operating performance of the state-controlled road, rail or transport infrastructure adjacent to the site in the 1% AEP event.
- Stormwater runoff does not create or exacerbate a safety hazard in the state transport infrastructure.

9.1 Compliance with State Codes

The following section summarises how relevant performance outcomes within the State Codes have been met and highlights relevant sections of this report.

It is noted that although the project does involve development in a state controlled road or road environment that the site boundary abuts with state owned or managed road and rail corridors.

Table 15: Assessment of State Code 1 (road)

Performance Outcome	How Outcome is Met	Section
PO2 – The design and construction of the development does not adversely impact the structural integrity or physical condition of the state-controlled road or road transport infrastructure.	The private development does not adversely impact the structural integrity or physical condition of the state controlled road (Beaudesert-Boonah Road) or road transport infrastructure.	Section 6.1
PO8 – Stormwater runoff or overland flow from the development site does not create or exacerbate a safety hazard for users of the state-controlled or road transport infrastructure.	The design maintains existing points of discharge from the site. Stormwater management measures have been integrated into the design detain flows such that post-development flows are not greater than pre-development flows. The flood impact assessment demonstrates that there are no adverse impacts on state controlled roads and no increase in flood hazard rating.	Sections 6.2, 6.3 and Appendix F.
PO9 - Stormwater runoff or overland flow from the development site does not result in a material worsening of the operating performance of the state-controlled road or road transport infrastructure	Stormwater management measures have been integrated into the design detain flows such that post-development flows are not greater than pre-development flows. The flood impact assessment demonstrates that there are no adverse impacts on state controlled roads.	Section 6.3 and Appendix F
PO10 - Stormwater runoff or overland flow from the development site does not adversely impact the structural integrity or physical condition of the state-controlled road or road transport infrastructure.	Stormwater runoff is managed via detention basins to limit post-development flows to pre-development rates resulting in no adverse impacts to the structural integrity or physical condition of the state controlled road (Beaudesert-Boonah Road) or road transport infrastructure.	Section 6.2.1 and 6.3
PO11 – Development ensures that stormwater is lawfully discharged.	The proposed development maintains existing points of discharge and does not create any new points of discharge to a state controlled road. Development does not concentrate flows to a state-controlled road. Development does not worsen the condition of an existing lawful point of discharge. Stormwater management measures have been integrated into the design detain flows such that post-development flows are not greater than pre-development flows.	Section 6.2.1 and 6.3
PO12 - Development does not result in a material worsening of flooding impacts within a state controlled road.	Potential downstream flood impacts are mitigated by the inclusion of two on-site detention basins.	Section 6.3 and Appendix F

Performance Outcome	How Outcome is Met	Section
	The flood impact assessment demonstrates that there are no adverse impacts on state controlled roads.	
PO13 - Drainage infrastructure does not create a safety hazard for users in the state-controlled road.	Drainage infrastructure associated with the development is wholly contained within the development site, except at the lawful point of discharge. Privately owned stormwater infrastructure can be access and maintained from within the development site.	Section 6.2
PO14 - Drainage infrastructure associated with, or within, a state-controlled road is constructed, and designed to ensure the structural integrity and physical condition of existing drainage infrastructure and the surrounding drainage	The application does not propose new drainage infrastructure within a state controlled road. Planned upgrades to a state controlled road will be developed in conjunction with TMR.	Section 6.2
PO35 - Excavation, boring piling, blasting and fill compaction do not adversely impact the physical condition or structural integrity of a state controlled road or road transport infrastructure.	The proposed buildings are wholly contained within the Subject site boundary. Piling works, associated with the EfW Building are positioned >100m away from the state controlled road. Earthworks associated with the development are wholly contained within the Subject site boundary.	Section 6.1 and Appendix B.

Table 16: Assessment of State Code 2 (rail)

Performance Outcome	How Outcome is Met	Section
PO1 - Development does not create a safety hazard within the railway corridor.	The private development does not adversely impact the structural integrity or physical condition of the railway corridor.	Section 6.1
PO2 - Development does not cause damage to the railway corridor, rail transport infrastructure or other rail infrastructure.	The proposed development does not encroach into the railway corridor, nor does it change ground levels at the eastern boundary.	Section 6.1
PO3 - Development does not interfere with, or obstruct, the rail transport infrastructure or other rail infrastructure.	The proposed development does not encroach into the railway corridor, nor does it change ground levels at the eastern boundary. No obstruction to the rail infrastructure is caused as a result of the development.	Section 6.1
P04 - Development does not adversely impact the structural integrity or physical condition of the railway, other rail infrastructure or the railway corridor by adding or removing loading	The proposed development does not encroach into the railway corridor, nor does it change ground levels at the eastern boundary. Fill batters near the eastern boundary of the site tie into existing ground levels a minimum 5.0m inside the Lot Boundary.	Section 6.1
PO11 – Buildings, and structures with publicly accessible or communal areas within 20 metres from the centreline of the nearest railway track are designed	No buildings are proposed within 20.0m of the railway corridor.	Section 6.1 & architectural site plans.

Performance Outcome	How Outcome is Met	Section
and constructed to prevent projectiles from being thrown onto a railway.	The site is secured with perimeter fencing preventing general public access.	
PO12 - Stormwater runoff or overland flow from the development site does not create or exacerbate a safety hazard in a railway corridor.	The design maintains existing points of discharge from the site. Stormwater management measures have been integrated into the design detain flows such that post-development flows are not greater than pre-development flows. The flood impact assessment demonstrates that there are no adverse impacts on state controlled railway and no increase in flood hazard rating.	Sections 6.2, 6.3 and Appendix F.
PO13 - Stormwater runoff or overland flow from the development site does not result in a material worsening of operating performance of the railway corridor, rail transport infrastructure or other rail infrastructure.	Stormwater runoff is managed via detention basins to limit post-development flows to pre-development rates resulting in no adverse impacts to the operating performance of the railway corridor, rail transport infrastructure or other rail infrastructure.	Section 6.2.1 and 6.3
PO14 - Stormwater runoff or overland flow from the development site does not interfere with the structural integrity or physical condition of the railway corridor, rail transport infrastructure or other rail infrastructure.	The proposed development maintains existing points of discharge and does not create any new points of discharge to the railway corridor. Development does not concentrate flows to existing flow paths/points of discharge. Development does not worsen the condition of an existing lawful point of discharge. Stormwater management measures have been integrated into the design detain flows such that post-development flows are not greater than pre-development flows.	Section 6.2 & 6.3 & Appendix F.
PO15 - Development does not result in a material worsening of flooding impacts within a railway corridor.	Stormwater runoff is managed via detention basins to limit post-development flows to pre-development rates resulting in no adverse impacts to the operating performance of the railway corridor, rail transport infrastructure or other rail infrastructure. The flood impact assessment demonstrates there is no material worsening of flood impacts within the railway corridor.	Section 6.3 and Appendix F.
PO16 - Drainage infrastructure does not create a safety hazard in a railway corridor.	Stormwater infrastructure associated with the development is wholly contained within the Subject Site and does not require access to the railway corridor to maintain.	Section 6.2
PO33 - Excavation, boring piling, blasting and fill compaction do not adversely impact the physical condition or structural integrity of a state controlled road or road transport infrastructure.	The proposed development does not encroach into the railway corridor, nor does it change ground levels at the eastern boundary. Fill batters near the eastern boundary of the site tie into existing ground levels a minimum 5.0m inside the Lot Boundary. Piles are required to support the main EfW building however this building is located >250m from the railway corridor.	Section 6.1 and Appendix B.

Performance Outcome	How Outcome is Met	Section
PO34 - Filling and excavation material does not cause an obstruction or nuisance in the railway corridor.	The proposed development does not encroach into the railway corridor, nor does it change ground levels at the eastern boundary. Fill batters near the eastern boundary of the site tie into existing ground levels a minimum 5.0m inside the Lot Boundary.	Section 6.1 and Appendix B

Table 17: Assessment of State Code 22

Performance Outcome	How Outcome is Met	Section
PO4 - Development is suitably located and designed to avoid or mitigate environmental harm to the receiving waters environment.	The site masterplan layout has been developed with key buildings located within the central portion of the site allowing space for stormwater quality improvement devices to treat runoff prior to discharge from site. The design demonstrates compliance with the Acceptable Outcomes listed in AO14.3 within Seqwater's development guidelines GDE-00001 V2.	Section 6.2.3

9.2 Compliance with SeqWater Guidelines

The following section summarises how relevant performance outcomes within the State Codes have been met and highlights relevant sections of this report.

Table 18: Assessment of Seqwater Development Guideline 2024 Final

Performance Outcome	How Outcome is Met	Section
PO1 – Development maintains adequate separation distances to watercourses and water bodies and avoids areas of flood inundation to protect drinking water.	The site masterplan layout has been developed such that all buildings and operational hardstands, used to stockpile materials, are located more than 100m from Stream Order 1 watercourse in accordance with Table 5 of Development Guidelines.	Section 6.1 and Appendix B.
PO2 – Development does not discharge wastewater unless demonstrated to not compromise the drinking water supply environmental values.	Runoff associated with the IBA maturing hardstand is stored within a lined retention basin and re-used on site in a closed cycle irrigation scheme to wet maturing stockpiles of bottom ash material (aggregate). In rare occasions, runoff will be transferred off-site when the lined retention basin in nearing capacity.	Section 6.2.4
PO7 – Development provides and on-site sewerage management system that is designed, constructed and managed in a way that does not compromises the environmental values for the supply of drinking water.	Two sewer holding tanks, with minimum 7 day capacity will be provided as part of the development. These tanks are located above the 0.5% AEP flood event (including climate change factors). No discharge from these holding tanks to the water supply source is proposed. The Proponent will enter into a contract with a licensed waste removal contractor for scheduled pump out of sewage.	Section 6.2.4 and Appendix B.

Performance Outcome	How Outcome is Met	Section
PO10 Development protects and enhances riparian vegetation so that it protects against bank erosion and filters sediments, nutrients and other pollutants to ensure the environmental values for the supply of drinking water are not compromised.	The development footprint is shown to be >25m from a Stream Order 1 hydroline. The proposal includes landscaping treatment on fill batters to stabilise slopes and protect against bank erosion.	Section 6.1 and architectural reports.
PO11 Stormwater drainage conveys runoff in a manner that: a) minimises risk to public safety, the environment and drinking water source areas; and b) provides a lawful point of discharge from each lot; and c) does not worsen drainage impacts on neighbouring sites.	The stormwater design complies with the Acceptable Outcomes listed in AO14.3 within Seqwater's development guidelines GDE-00001 V2. The stormwater designs maintains existing points of discharge from site with the stormwater basins provided restricting post-development flows to pre-development rates. The flood impact assessment completed demonstrates no adverse impacts on neighbouring sites.	Section 6.2.1, 6.2.3 and 6.3
PO12 Development is sited, designed, constructed and managed to avoid or where it is not possible to avoid, minimise adverse impacts on the environmental values and water quality of surface and ground water from: a) altered quality and hydrology; and b) the release and mobilisation of nutrients and sediments.	The development's masterplan has been developed such that all buildings and operational hardstands, used to stockpile materials, are located more than 100m from Stream Order 1. The stormwater design complies with the Acceptable Outcomes listed in AO14.3 within Seqwater's development guidelines GDE-00001 V2, minimising the release of nutrients and sediments. A preliminary erosion and sediment control plan has been prepared. This will be developed and modified by the General Contractor at the construction stage.	Section 6.2
PO13- Manage stormwater at the construction phase to protect drinking water supply environmental values and facilitate the achievement of water quality objectives for receiving waters.	A preliminary erosion and sediment control plan has been prepared. This will be developed and modified by the General Contractor at the construction stage to demonstrate compliance with the objectives listed in Table A of the SPP.	Section 6.2.5
PO14 – Development is located and designed to improve stormwater quality so that water source areas achieve aquatic ecosystem water quality objectives including drinking water supply environmental values.	The development's stormwater design incorporates stormwater quality improvement devices including rainwater harvesting, GPT's and bio-retention basins. MUSIC modelling completed demonstrates that the design achieves the stormwater management design objectives outlined in Acceptable Outcome AO14.3	Section 6.1 and 6.2.3
PO16 – Development avoids and minimises changes to the existing surface water natural hydrological regime to ensure: a) there is no change to the reference high-flow and low flow duration frequency curves, low-flow spells frequency curve and mean annual flow to	The site layout is focused on the northern portion of the site avoiding any changes to the southern catchments on the site. The existing overland flow path and farm dams are retaining in their present condition. The design maintains existing points of stormwater discharge to the site with stormwater basins detaining flows such post-	Section 6.2.1, 6.2.2 and 6.2.3

Performance Outcome	How Outcome is Met	Section
and from waterway as a result of the development; b) any relevant flows into waterways comply with the relevant flow objectives of the applicable water plan for the area; and c) the collection and re-use of stormwater occurs so there is no increase to the velocity or volume of stormwater flows entering a waterway.	developments flows do not exceed pre-development flows. The stormwater design complies with the Acceptable Outcomes listed in AO14.3 within Seqwater's development guidelines GDE-00001 V2, minimising the release of nutrients and sediments.	
PO25 The siting and design of earthworks minimises impacts on the natural landform that may cause contamination or interfere with the flow of any overland flow path, watercourse, waterbody or water supply source.	The site layout is focused on the northern portion of the site avoiding any changes to the southern catchments on the site. The existing overland flow path and farm dams are retaining in their present condition. Earthworks are not located within 25m of a Stream Order 1. Earthworks are not located below the 1% AEP event of primary overland flow paths.	Section 6.1 and Appendix B.
PO28: Development either: a) does not involve the manufacturing or storage of hazardous materials and chemicals within drinking water source areas; or b) is designed so dangerous good, hazardous substances or environmentally hazardous materials are stored and handles in a manner that minimises the potential for the release of hazardous materials and chemicals to drinking water source areas during a potential contamination event.	The design has been developed such that the primary EfW building, which is where hazardous materials and chemicals are located, has been positioned within the central, high point of the developed area. This means that dangerous goods, hazardous materials are located a minimum 100m from a watercourse and located above the 1% AEP flood event (including climate change factors). For further details on the storage of these materials, refer to the Hazards and Risks Technical Report.	Section 6.1 and Hazards and Risks Technical Report

10. References

Australian Rainfall and Runoff (Ball, et al. 2019), AR&R guidelines

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Bromelton State Development Area Development Scheme, December 2017.

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Environmental Protection Policy (Water) 2009.

Queensland – MUSIC Guidelines, 2018.

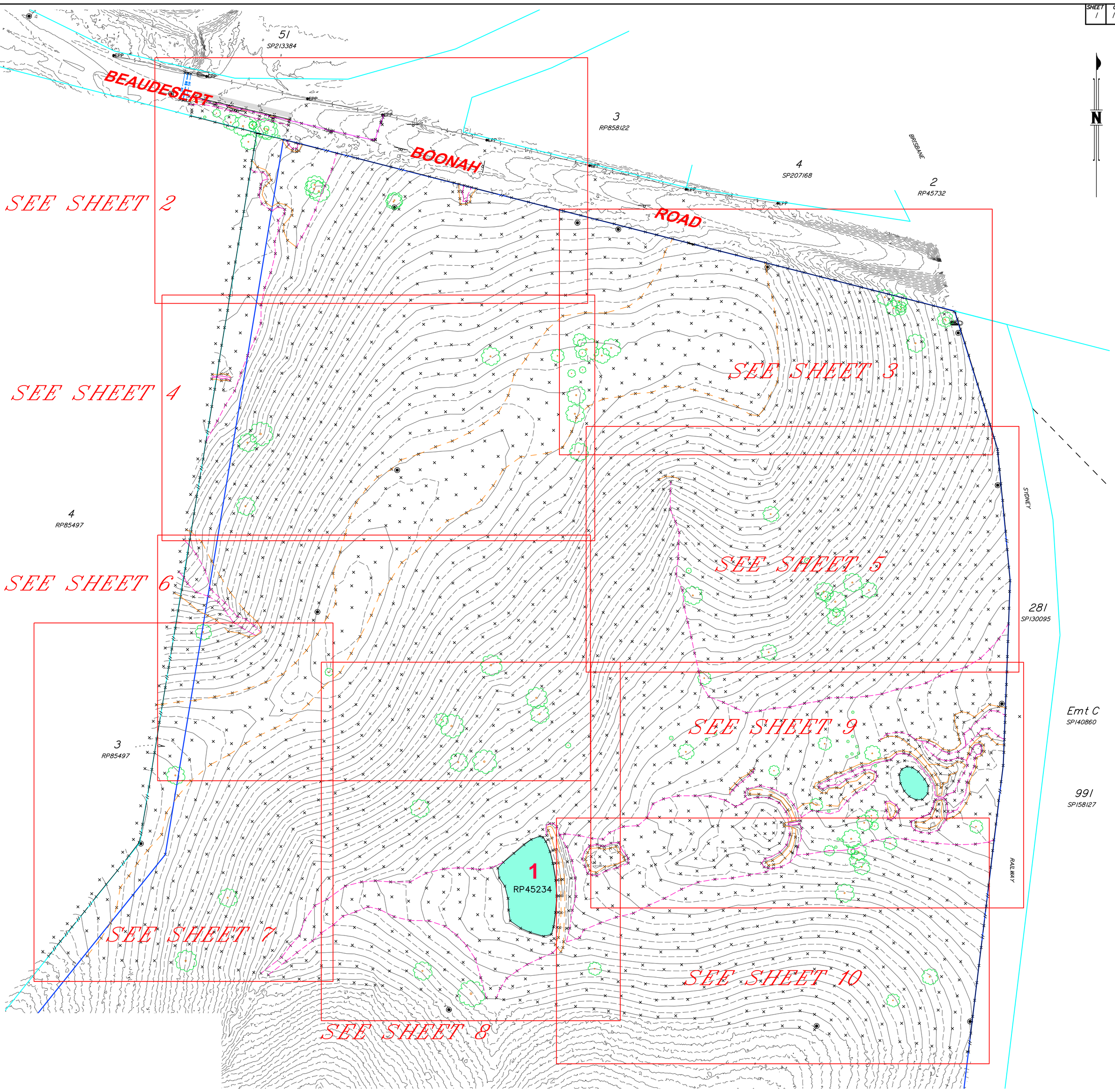
Queensland Urban Drainage Manual, 4th Edition, 2016.

Seqwater 2024. Seqwater Development Guidelines: Water Quality Management in Drinking Water Catchments (GDE-00001 V2)

TMR 2019. Manual Road Drainage September 2019.

Water Sensitive Urban Design – Technical Design Guidelines for South East Queensland, Version 1 June 2006.

Appendix A - Topographical Survey



PROPERTY DESCRIPTION

Lot 1 on RP45234

LOCALITY : Bromelton

MGA Coordinate System Datum Information	
Coordinate System	MGA2020 Zone 56
Geodetic Datum	GDA2020
Geoid	Ausgeoid2020
Origin Mark	TBM A (PSM 163769)
Origin Mark Coordinates	E: 492,094.496
	N: 6,905,859.412
	RL: 83.457
Geoid–Spheroid Seperation (N)	N = 40.367
Scale factor (To Grid)	0.999581341

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LINETYPE LEGEND

- STORM WATER
- UNDERGROUND ELECTRICITY
- OVERHEAD ELECTRICITY
- FENCE
- TOE OF BANK
- TOP OF BANK
- BOTTOM OF RETAINING WALL
- TOP OF RETAINING WALL
- KERB PROFILE (Back of Kerb / Invert of Kerb / Edge of Bitumen)

HATCH LEGEND

- Denotes Bitumen Surface
- Denotes Dam

GENERAL NOTES

1. Date of field survey: 28/04/23 RA
2. Lot dimensions compiled from IS119852
3. Contour interval 0.5m

SYMBOL LEGEND

- EPP — Denotes Electricity Power Pole
- Denotes Light Pole
- Denotes Telstra Pit
- Denotes Sign
- Denotes Electricity Pit

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GRAPHIC SCALE (IN METRES)

30 0 30 60 90 120 150

1:1500@A1 1:3000@A3

EXTENT OF GROUND SURVEY

SCALE 1: 5000

LINETYPE LEGEND

– Denotes Area of Ground Survey
All areas outside of this line have been surveyed by Aerial LiDAR

—	ORIGINAL ISSUE	5/05/2023	AD
A'MENT	REVISION DETAILS	DATE	INIT

IMPORTANT NOTE:
This plan is presented at a scale of 1: 1. To convert to MGA Coordinates scale all data around TBM A (Not Shown)(492094.496, 6905859.412) by a scale factor of 0.999581341

Beaudesert Boonah Road Bromelton

Cleanaway Operations Pty Ltd

Detail & Level Survey

DATE	5/05/2023
JOB NO	4577
DWG FILE	4577-02
DRAWN	AD
CHECKED	AD
Scale	1:1500
Drawing Number	4577-02 -

LEVEL DATUM AHD
FROM PSM 163769
R.L. 43.457m

MERIDIAN: MGA2020 Zone 56 Vide SmartNetAus

LOCAL AUTHORITY : Scenic Rim R.C.

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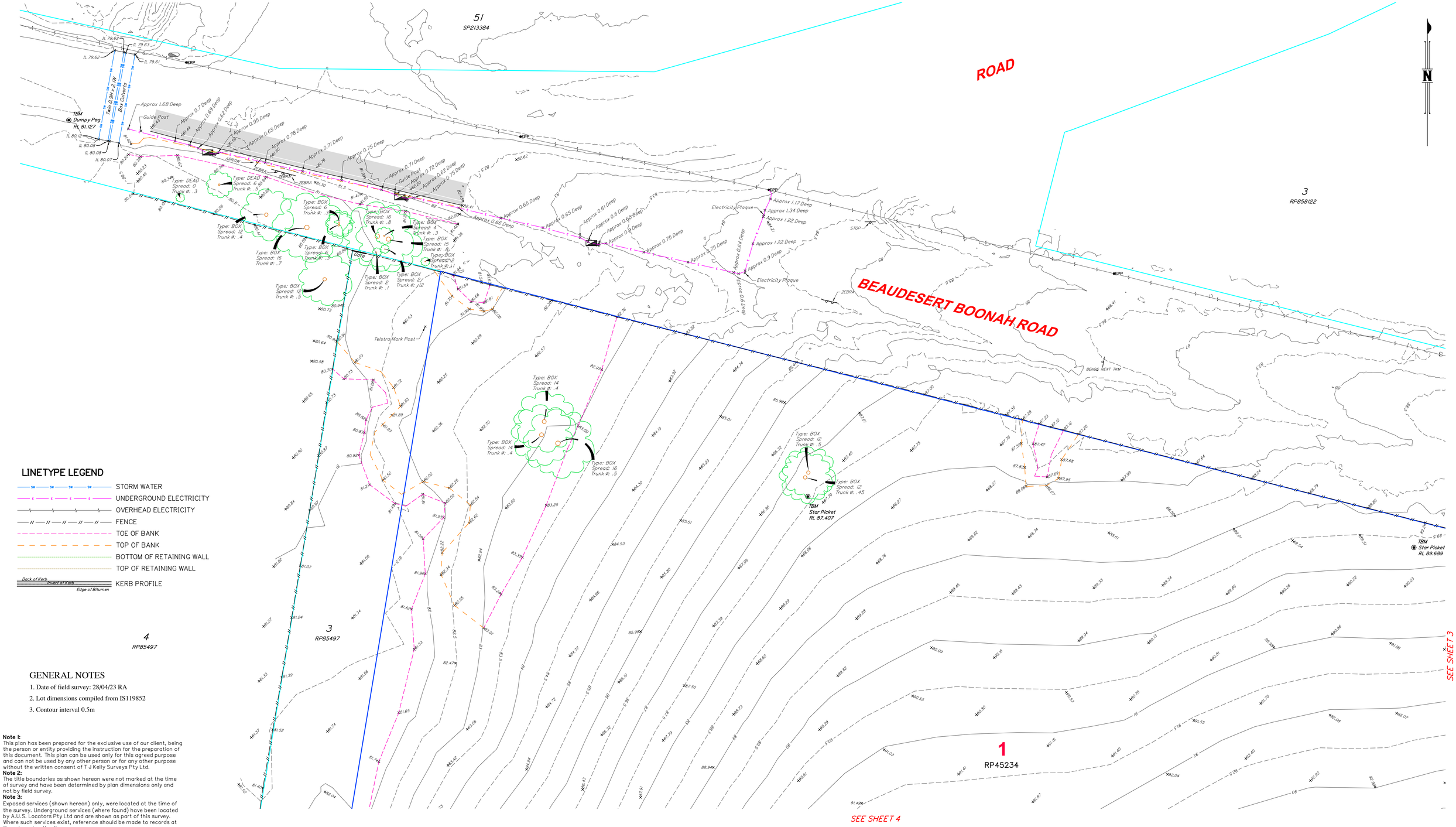

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- OVERHEAD ELECTRICITY
- FENCE
- TOE OF BANK
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A'MENT	REVISION DETAILS	DATE	INIT
–	ORIGINAL ISSUE	5/05/2023	AD

PROPERTY DESCRIPTION

Lot 1 on RP45234

LOCALITY : Bromelton

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GRAPHIC SCALE (IN METRES)
8 0 8 16 24 32 40
1:400@A1 1:800@A3

Beaudesert Boonah Road
Bromelton

Cleanaway Operations Pty Ltd

Detail & Level Survey

DATE	5/05/2023
JOB NO	4577
DWG FILE	4577-02
DRAWN	AD
CHECKED	AD
Scale	1:400
Drawing Number	4577-02 -

LEVEL DATUM AHD
FROM PSM 163769
R.L. 43.457m

MERIDIAN: MGA2020 Zone 56 Vide SmartNetAus

LOCAL AUTHORITY : Scenic Rim R.C.

TJ KELLY SURVEYS PTY LTD
CONSULTING SURVEYORS & TOWN PLANNERS
A.C.N. 058 752 417

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111 Brisbane Street, BEAUDESERT
POSTAL ADDRESS:
PO Box 221 BEAUDESERT 4285

Phone: (07) 5541 4722
Facsimilie: (07) 5541 4723
Email: admin@kellynet.com.au
Web : www.kellynet.com.au

PROPERTY DESCRIPTION

Lot 1 on RP45234

LOCALITY : Bromelton

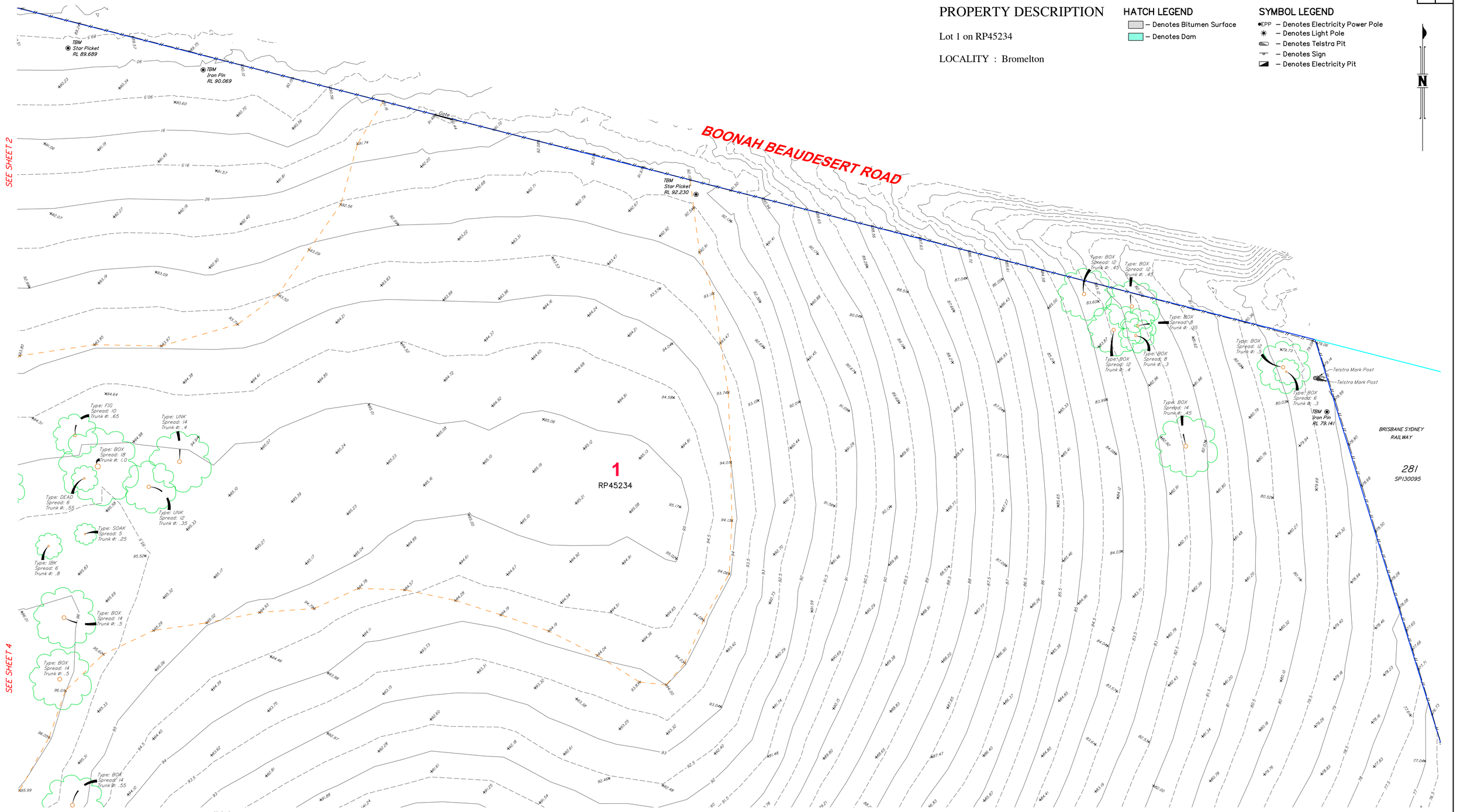
HATCH LEGEND

- Denotes Bitumen Surface
- Denotes Dam

SYMBOL LEGEND

- EPP – Denotes Electricity Power Pole
- Denotes Light Pole
- Denotes Telstra Pit
- Denotes Sign
- Denotes Electricity Pit

N



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A'MENT	REVISION DETAILS	DATE	INIT
—	ORIGINAL ISSUE	5/05/2023	AD

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LINETYPE LEGEND

- STORM WATER
- UNDERGROUND ELECTRICITY
- OVERHEAD ELECTRICITY
- FENCE
- TOE OF BANK
- TOP OF BANK
- BOTTOM OF RETAINING WALL
- TOP OF RETAINING WALL
- KERB PROFILE (Back of Kerb, Invert of Kerb, Edge of Bitumen)

MGA Coordinate System Datum Information	
Coordinate System	MGA2020 Zone 56
Geodetic Datum	GDA2020
Geoid	Ausgeoid2020
Origin Mark	TBM A (PSM 163769)
Origin Mark Coordinates	E: 492,094.496
	N: 6,905,859.412
	RL: 83.457
Geoid–Spheroid Seperation (N)	N = 40.367
Scale factor (To Grid)	0.999581341

IMPORTANT NOTE:
This plan is presented at a scale of 1: 1. To convert to MGA Coordinates scale all data around TBM A (Not Shown)(492094.496, 6905859.412) by a scale factor of 0.999581341

GENERAL NOTES

1. Date of field survey: 28/04/23 RA
2. Lot dimensions compiled from IS119852
3. Contour interval 0.5m

GRAPHIC SCALE (IN METRES)

8 0 8 16 24 32 40

1:400@A1 1:800@A3

Beaudesert Boonah Road Bromelton

Cleanaway Operations Pty Ltd

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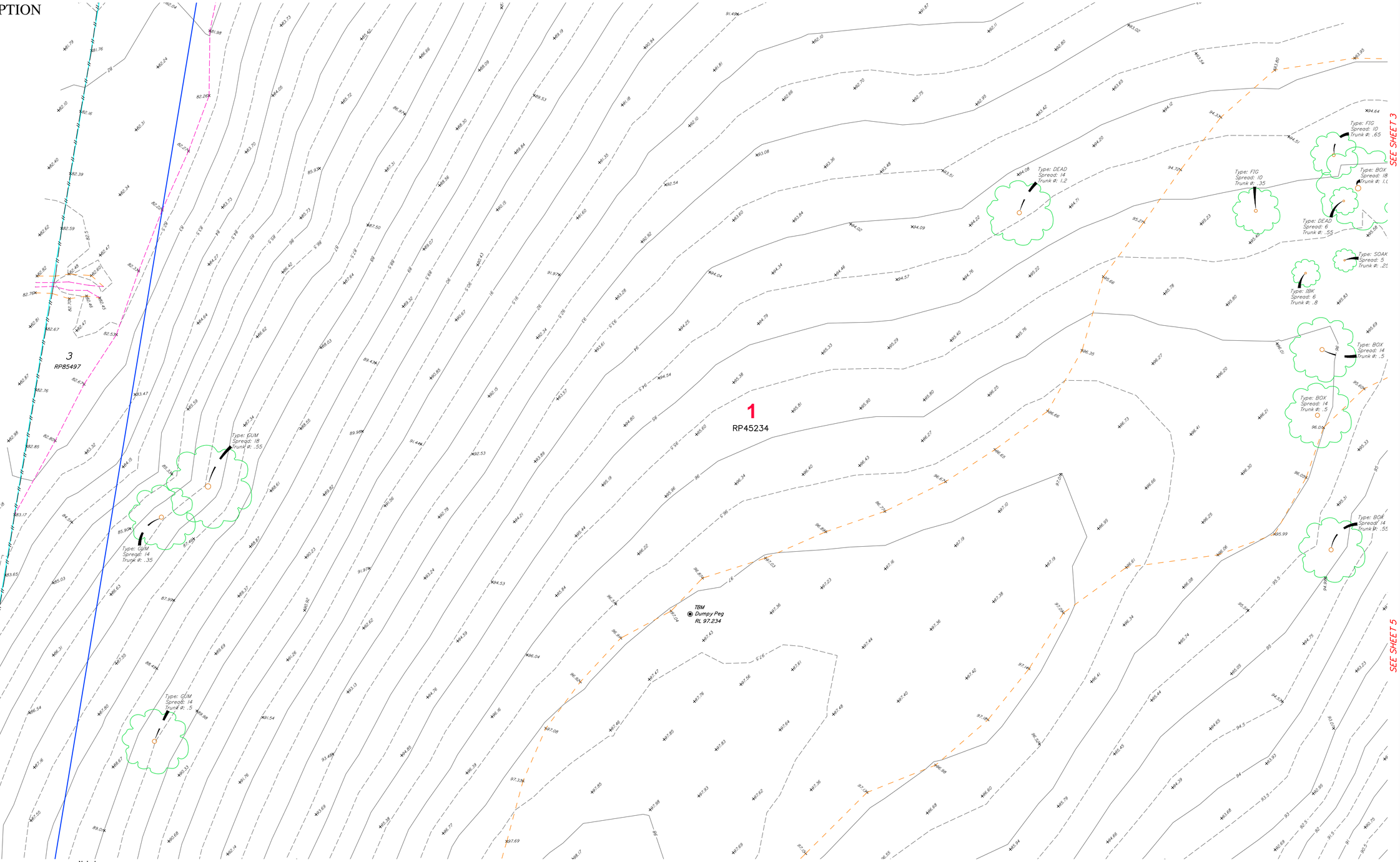
SEE SHEET 2

PROPERTY DESCRIPTION

Lot 1 on RP45234

LOCALITY : Bromelton



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HATCH LEGEND

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GRAPHIC SCALE (IN METRES)

8 0 8 16 24 32 40

1:400@A1 1:800@A3

Beaudesert Boonah Road Bromelton	
Cleanaway Operations Pty Ltd	
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SEE SHEET 3

SEE SHEET 4

SEE SHEET 6

SEE SHEET 9

N

1
RP45234

TBM
Dumpy Peg
RL 75.464

Type: MBA
Spread: 12
Trunk ø: .35

Type: GUM
Spread: 4
Trunk ø: .3

Type: GUM
Spread: 4
Trunk ø: .35

Type: GUM
Spread: 14
Trunk ø: .45

Type: IBK
Spread: 12
Trunk ø: .5

Type: DEAD
Spread: 14
Trunk ø: .5

Type: GUM
Spread: 14
Trunk ø: .5

Type: GUM
Spread: 12
Trunk ø: .6

Type: GUM
Spread: 8
Trunk ø: .3

Type: GUM
Spread: 16
Trunk ø: .6

Type: GUM
Spread: 6
Trunk ø: .3

Type: GUM
Spread: 14
Trunk ø: .45

BRISBANE SYDNEY RAILWAY

281
SP130095

HATCH LEGEND

– Denotes Bitumen Surface

– Denotes Dam

GENERAL NOTES

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3. Contour interval 0.5m

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Scale factor (To Grid)	0.999581341

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PROPERTY DESCRIPTION

Lot 1 on RP45234

LOCALITY : Bromelton

GRAPHIC SCALE (IN METRES)

8 0 8 16 24 32 40

1:400@A1 1:800@A3

A'MENT	REVISION DETAILS	DATE	INIT
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Bromelton

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R.L. 43.457m

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LOCAL AUTHORITY : Scenic Rim R.C.

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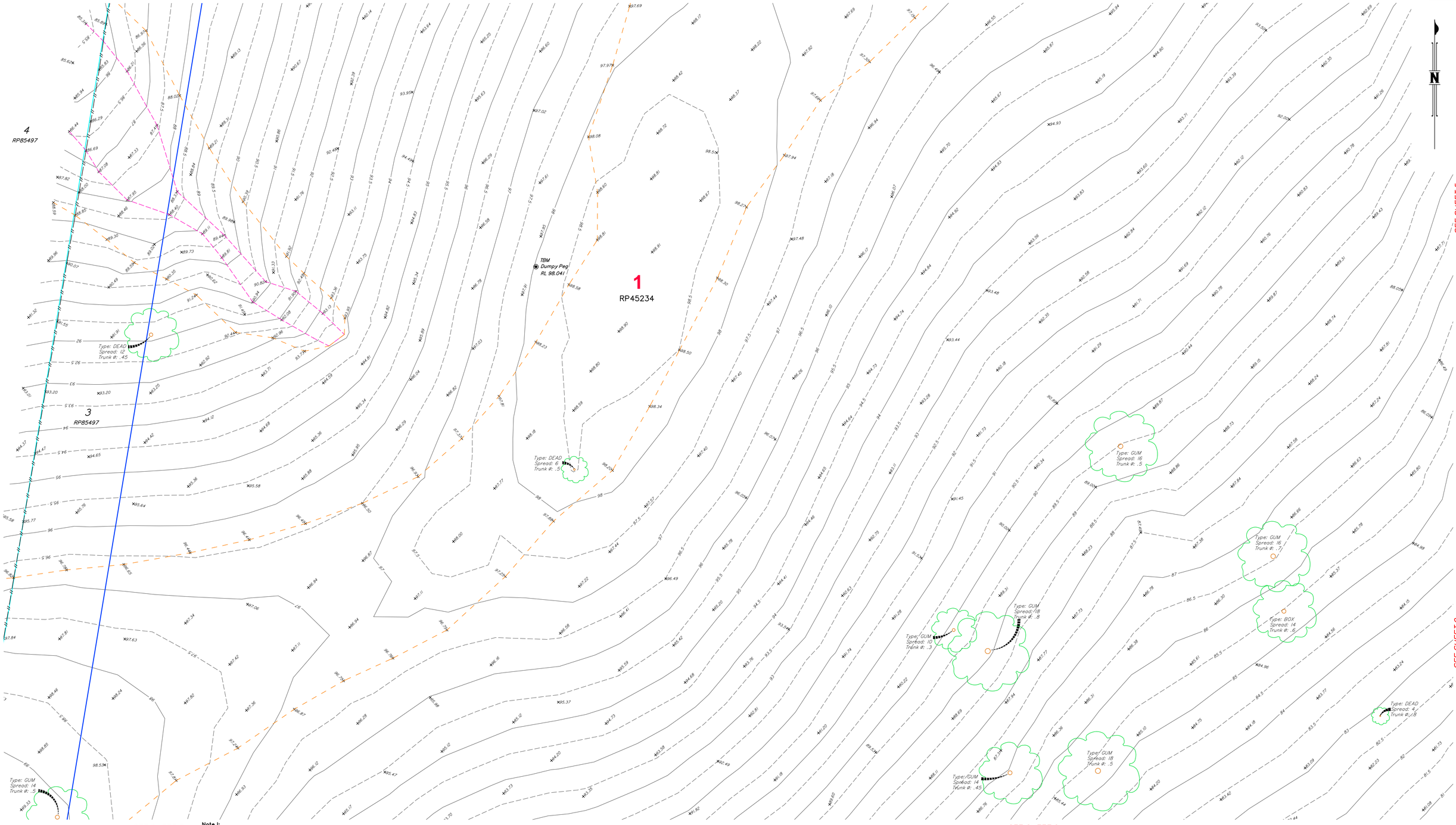
SEE SHEET 4



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SEE SHEET 7

SEE SHEET 8

SEE SHEET 9

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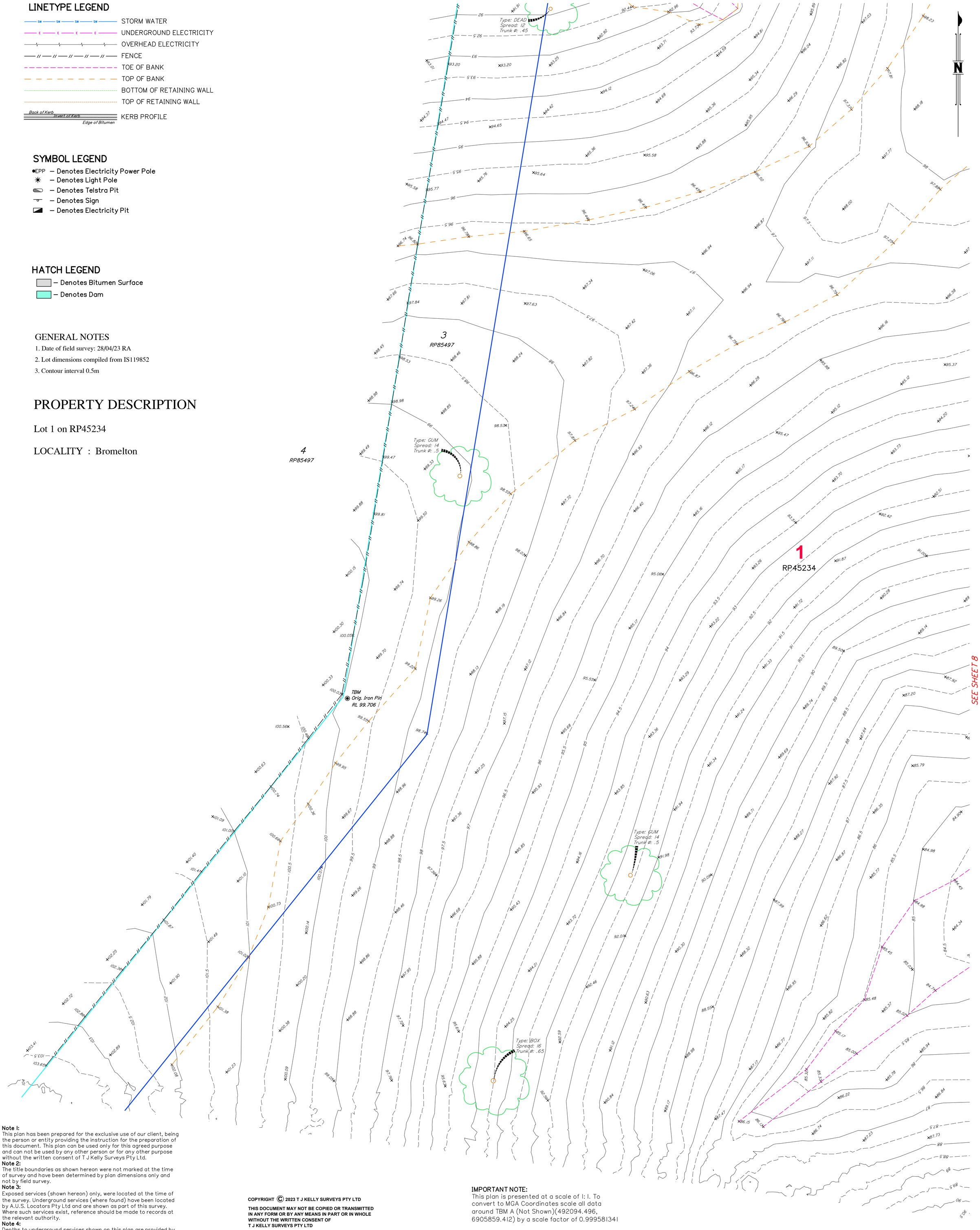

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SEE SHEET 6

SEE SHEET 5

SEE SHEET 9

SEE SHEET 7

SEE SHEET 10

N

Type: GUM
Spread: 16
Trunk ø: .5

Type: GUM
Spread: 16
Trunk ø: .7

Type: BOX
Spread: 14
Trunk ø: .6

Type: GUM
Spread: 18
Trunk ø: .8

Type: GUM
Spread: 10
Trunk ø: .3

Type: DEAD
Spread: 4
Trunk ø: .8

Type: GUM
Spread: 18
Trunk ø: .5

Type: GUM
Spread: 14
Trunk ø: .45

Type: DEAD
Spread: 14
Trunk ø: .8

1
RP45234

Dam

Type: GUM
Spread: 14
Trunk ø: .4

Type: BOX
Spread: 20
Trunk ø: .8

Type: MBA
Spread: 10
Trunk ø: .35

TBM
Star Picket
RL 85.338

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LINETYPE LEGEND

- SW — STORM WATER
- E — UNDERGROUND ELECTRICITY
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DWG FILE	4577-02
DRAWN	AD
CHECKED	AD
Scale	1:400
Drawing Number	4577-02 -

LEVEL DATUM AHD
FROM PSM 163769
R.L. 43.457m

MERIDIAN: MGA2020 Zone 56 Vide SmartNetAus

LOCAL AUTHORITY : Scenic Rim R.C.

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Email: admin@kellynet.com.au
Web : www.kellynet.com.au

SEE SHEET 6

SEE SHEET 5

SEE SHEET 8

SEE SHEET 10

1
RP45234

TBM
Iron Pin
RL 71.044

IL 69.84
1800 high
Dome Culvert

Dam

BRISBANE S SYDNEY RAILWAY

281
SP130095

N

Type: GUM Spread: 10 Trunk ø: .4
Type: GUM Spread: .3 Trunk ø: .4
Type: DEAD Spread: 0 Trunk ø: .3
Type: DEAD Spread: 0 Trunk ø: .4
Type: GUM Spread: 12 Trunk ø: .55
Type: GUM Spread: 8 Trunk ø: .3
Type: DEAD Spread: 0 Trunk ø: 1.0
Type: DEAD Spread: 0 Trunk ø: .45
Type: DEAD Spread: 10 Trunk ø: .8
Type: DEAD Spread: 0 Trunk ø: .4
Type: DEAD Spread: 0 Trunk ø: .3
Type: DEAD Spread: 0 Trunk ø: .35
Type: DEAD Spread: 12 Trunk ø: .6
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Type: BOX Spread: 10 Trunk ø: .7
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Type: GUM Spread: 14 Trunk ø: .6
Type: DEAD Spread: 0 Trunk ø: .7
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Type: BOX Spread: 12 Trunk ø: .6
Type: DEAD Spread: 12 Trunk ø: .9
Type: GUM Spread: 14 Trunk ø: .4
Type: GUM Spread: 10 Trunk ø: .35

IMPORTANT NOTE:
This plan is presented at a scale of 1: 1. To convert to MGA Coordinates scale all data around TBM A (Not Shown)(492094.496, 6905859.412) by a scale factor of 0.999581341

GENERAL NOTES

1. Date of field survey: 28/04/23 RA
2. Lot dimensions compiled from IS119852
3. Contour interval 0.5m

—	ORIGINAL ISSUE	5/05/2023	AD
A'MENT	REVISION DETAILS	DATE	INIT

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LINETYPE LEGEND

- SW SW SW SW SW — STORM WATER
- E E E E E — UNDERGROUND ELECTRICITY
- OVERHEAD ELECTRICITY
- // // // // // — FENCE
- TOE OF BANK
- TOP OF BANK
- BOTTOM OF RETAINING WALL
- TOP OF RETAINING WALL
- Back of Kerb / Invert of Kerb / Edge of Bitumen — KERB PROFILE

SYMBOL LEGEND

- EPP — Denotes Electricity Power Pole
- — Denotes Light Pole
- — Denotes Telstra Pit
- — Denotes Sign
- — Denotes Electricity Pit

MGA Coordinate System Datum Information	
Coordinate System	MGA2020 Zone 56
Geodetic Datum	GDA2020
Geoid	Ausgeoid2020
Origin Mark	TBM A (PSM 163769)
Origin Mark Coordinates	E: 492,094.496
	N: 6,905,859.412
	RL: 83.457
Geoid–Spheroid Seperation (N)	N = 40.367
Scale factor (To Grid)	0.999581341

PROPERTY DESCRIPTION

Lot 1 on RP45234

LOCALITY : Bromelton

HATCH LEGEND

- — Denotes Bitumen Surface
- — Denotes Dam

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GRAPHIC SCALE (IN METRES)
8 0 8 16 24 32 40
1:400@A1 1:800@A3

Beaudesert Boonah Road Bromelton

Cleanaway Operations Pty Ltd

Detail & Level Survey

DATE	5/05/2023
JOB NO	4577
DWG FILE	4577-02
DRAWN	AD
CHECKED	AD
Scale	1:400
Drawing Number	4577-02 -

LEVEL DATUM AHD
FROM PSM 163769
R.L. 43.457m

MERIDIAN: MGA2020 Zone 56 Vide SmartNetAus

LOCAL AUTHORITY : Scenic Rim R.C.

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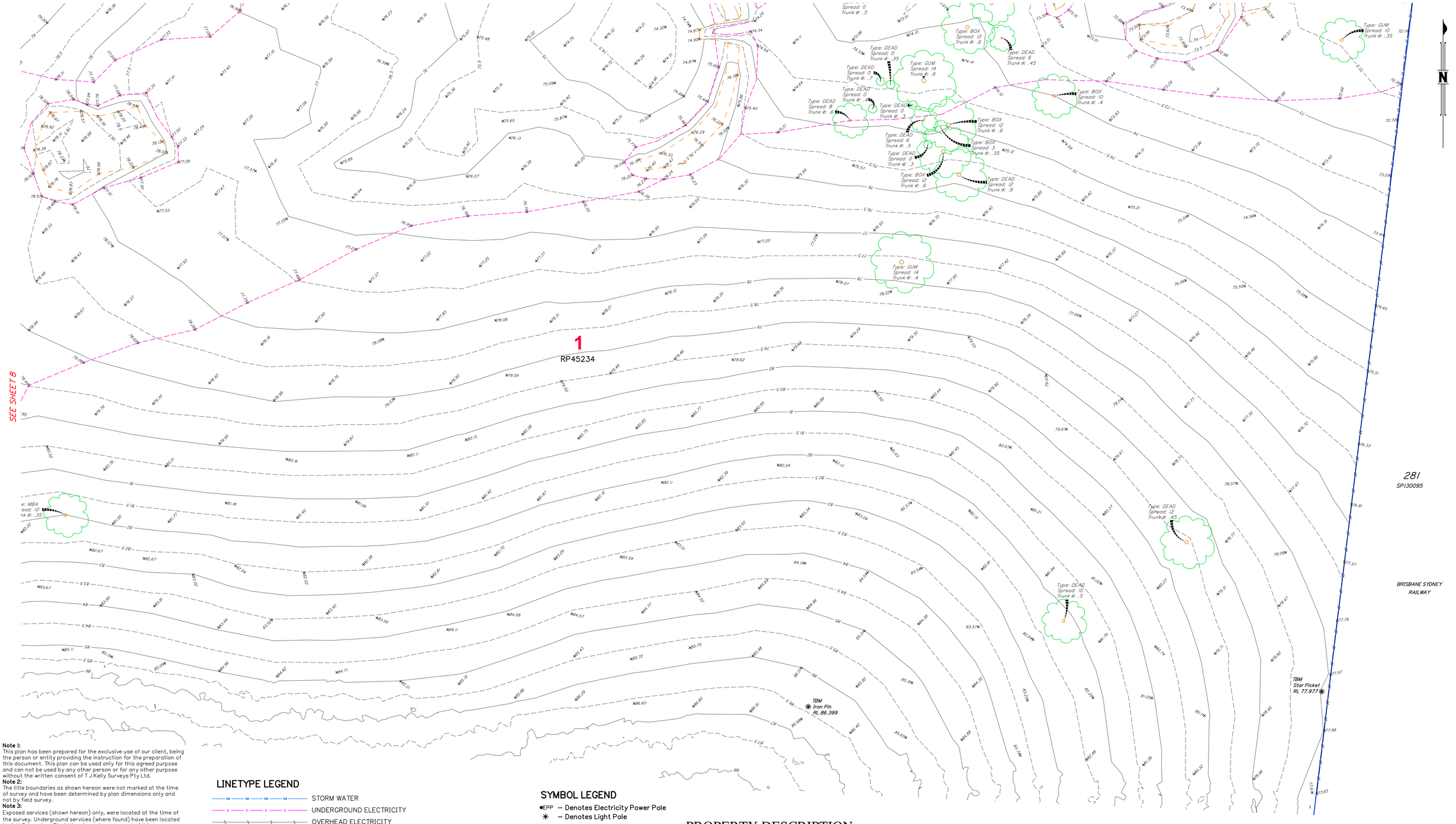
SEE SHEET 9

SEE SHEET 8



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LINETYPE LEGEND

- STORM WATER
- UNDERGROUND ELECTRICITY
- OVERHEAD ELECTRICITY
- FENCE
- TOE OF BANK
- TOP OF BANK
- BOTTOM OF RETAINING WALL
- TOP OF RETAINING WALL
- KERB PROFILE (Back of Kerb, Invert of Kerb, Edge of Bitumen)

SYMBOL LEGEND

- EPP – Denotes Electricity Power Pole
- – Denotes Light Pole
- – Denotes Telstra Pit
- – Denotes Sign
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- – Denotes Bitumen Surface
- – Denotes Dam

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PROPERTY DESCRIPTION

Lot 1 on RP45234

LOCALITY : Bromelton

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Geoid	Ausgeoid2020
Origin Mark	TBM A (PSM 163769)
Origin Mark Coordinates	E: 492,094.496
	N: 6,905,859.412
	RL: 83.457
Geoid–Spheroid Seperation (N)	N = 40.367
Scale factor (To Grid)	0.999581341

GENERAL NOTES

1. Date of field survey: 28/04/23 RA
2. Lot dimensions compiled from IS119852
3. Contour interval 0.5m

GRAPHIC SCALE
(IN METRES)
8 0 8 16 24 32 40
1:400@A1 1:800@A3

–	ORIGINAL ISSUE	5/05/2023	AD
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Beaudesert Boonah Road
Bromelton

Cleanaway Operations Pty Ltd

Detail & Level Survey

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Appendix B – Concept Civil Design Drawings

Appendix C – Stormwater Drainage Calculations

BERC Stormwater Detention Basin Calculations - Basin 1 (NW)

Date	23/07/2025
Author	Emann-Ray Arago
Reviewed:	Karen Seeto

Step 1: Coefficient of discharge

$C_y = F_y \cdot C_{10}$

F_y

ARI (years)	F_y
1	0.80
2	0.85
5	0.95
10	1.00
20	1.05
50	1.15
100	1.20

From Table 4.05.2 (QUDM)

f_i

Category	Fraction Impervious, f_i
Central Business	1
Commercial, Local Business, Neighbouring Facilities, Service Industry, General Industry, Home Industry	0.9
Sinificant Paved Areas (Roads etc)	0.9
Urban Residential. (high density)	0.7 - 0.9
Urban Residential. (low density incl. roads)	0.45 - 0.85
Urban Residential. (low density excl. roads)	0.40 - 0.75
Rural Residential	0.1 - 0.2
Open Space and parks etc.	0

From Table 4.05.1 (QUDM)

C_{10}

	Fraction impervious, f_i										
$^1I_{10}$ (mm/hr)	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
39 - 44	0.32	0.38	0.44	0.50	0.55	0.61	0.67	0.73	0.78	0.84	0.90
45 - 49	0.39	0.44	0.49	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90
50 - 54	0.46	0.51	0.55	0.60	0.64	0.68	0.72	0.77	0.81	0.86	0.90
55 - 59	0.53	0.57	0.60	0.64	0.68	0.72	0.75	0.79	0.83	0.86	0.90
60 - 64	0.59	0.62	0.65	0.69	0.72	0.75	0.78	0.81	0.84	0.87	0.90
65 - 69	0.66	0.69	0.71	0.74	0.76	0.78	0.80	0.83	0.85	0.88	0.90
70 - 90	0.70	0.72	0.74	0.76	0.78	0.80	0.82	0.84	0.86	0.88	0.90

From Table 4.05.3(a) (QUDM)

	Fraction Impervious	F_{10}	F_{100}	$^1I_{10}$ (60 min, 10% AEP)	C_{10}	C_{100}
Pre-development	0	1	1.2	53.8	0.46	0.552
Post-development	0.495	1	1.2	53.8	0.66	0.792

Step 2: Time of concentration

$t = (107 \cdot n \cdot L^{0.333}) / S^{0.2}$ Friends Equation for pre-development

	A (ha)	L (m)	S (%)	n	t (mins)
Pre-development	8.7704	300	4.8	0.15	78.4

n

Surface condition	n
Concrete or Asphalt	0.010-0.013
Bare Sand	0.010-0.016
Gravelled Surface	0.012-0.030
Bare Clay-Loam Soil (er	0.012-0.033
Sparse Vegetation	0.053-0.130
Short Grass Paddock	0.100-0.200
Lawns	0.170-0.480

Table 4.06.4 - Surface roughness or retardance factors (QUDM pg 4-

Post Development Flow and Time of Concentration: In Accordance with Section 4.6 of QUDM
There are two primary stromwater trunk drains flowing to the basin. The time of concentration calculated is the average of each trunk.

Sub-Catchment 1a - De-Coupling Hardstand to Ba	**Length**	**t (mins)**	Ref
Overland Sheet Flow on Hardstand to First Inlet Pit		5	Table 4.6.2 of QUDM
Pipe Flow from Inlet Pit to Basin (L= 486m)	486	4.05	Section 4.6.9 of QUDM (based on 2 m/s)
	Total	9.05	

Sub-Catchment 1b - HV Substation to Basin.	**Length**	**t (mins)**	Ref
Overland Sheet Flow on Hardstand to First Inlet Pit		5	Table 4.6.2 of QUDM
Pipe Flow from Inlet Pit to Basin (L= 182m)	182	1.52	Section 4.6.9 of QUDM (based on 2 m/s)
	Total	6.52	

Average of Sub-Catchments 1a & 1b	Tc	7.78	

Post Development Catchment Area	6.24	ha
Impervious Area	3.09	ha

Step 3: Flow

$Q_y = 1/360 \cdot C_y \cdot {}^{t}I_y \cdot A$

	$^{78.4}I_{10}$	$^{78.4}I_{100}$	Q_{10}	Q_{100}
Pre-development	45.4	70.4	0.51	0.95

	$^{7.78}I_{10}$	$^{7.78}I_{100}$	Q_{10}	Q_{100}
Post-development	160.3	239.8	1.83	3.29

Step 4: Storage Volume Required

Section 7.2.7 of Guide to Road design Part 5A: Drainage - Road Surface, Networks, Basins and Subsurface

All items presented below are for the 10% AEP Event

Reduction Ratio	r	0.723	
Inflow Volume	Vi	825.065	Eqn 47
	Vs/Vi	0.589	Eqn 43
	Vs	485.892	
	Vs	596.158	Eqn 44
	Vs/Vi	0.597	Eqn 45
	Vs	492.784	
	Average	524.945	
	Highest	**596.158**	Min Basin Volume

If the Rational Method is used for the determination of Q_i then the initial estimate of the inflow volume (V_i) may be determined as:

$$V_i = \frac{4\, t_c\, r\, Q_i}{3} \qquad 47$$

where

t_c = Time of concentration (sec)

The above equations are most appropriate when it is necessary to limit the peak discharge for only the nominated design storm, such as the ARI 100 year event. In those circumstances, where it is necessary to ensure the post-development peak discharge for each tested storm duration is not increased, then these equations are likely to underestimate the required detention volume.

$$\frac{V_s}{V_i} = \frac{r\,(1+2r)}{3}\ (Culp\ 1948) \qquad 43$$

$$\frac{V_s}{V_i} = r\ (Boyd\ 1989) \qquad 44$$

$$\frac{V_s}{V_i} = \frac{r\,(3+5r)}{8}\ (Carroll\ 1990) \qquad 45$$

$$\frac{V_s}{V_i} = \frac{r\,(2+r)}{3}\ (Basha\ 1994) \qquad 46$$

where

r = Reduction ratio, calculated as $r = \frac{(Q_i - Q_o)}{Q_i}$ (for Q_i and Q_o see below)

V_s = Required storage volume (max) (m³)

V_i = Inflow volume (m³) (see Equation 47 below, or from hydrograph, see Figure 7.3)

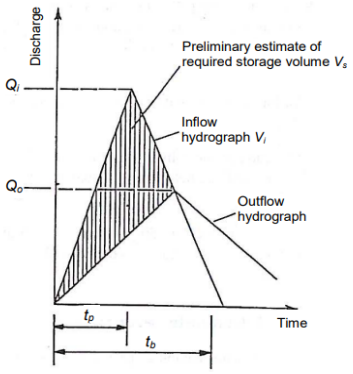
Q_i = Peak inflow discharge (m³/s) (from hydrologic calculations)

Q_o = Peak outflow discharge (m³/s) (outflow adopted for the basin)

7.2.7 Initial Design and Feasibility

Preliminary design may be conducted using a simple set of calculations however in many cases it is just as easy to undertake preliminary sizing using the same techniques as used for the detailed design. Preliminary sizing will determine if a detention basin is feasible, or if there is any significant flood mitigation effect to be obtained from such a basin. If a simplified technique is used, it will need to be checked using detailed design techniques.

Figure 7.3: Triangular shaped hydrographs



Notes:
t_p – time to peak discharge.
t_b – can be taken as 2.67 t_p when no better information is available.
Source: DTMR (2010).

BERC Stormwater Detention Basin Calculations - Basin 2 (SE)

Date 23/07/2025
Author Emann-Ray Arago
Reviewed: Karen Seeto

Step 1: Coefficient of discharge

$C_y = F_y \cdot C_{10}$

F_y

ARI (years)	F_y
1	0.80
2	0.85
5	0.95
10	1.00
20	1.05
50	1.15
100	1.20

From Table 4.05.2 (QUDM)

f_i

Category	Fraction Impervious, f_i
Central Business	1
Commercial, Local Business, Neighbouring Facilities, Service Industry, General Industry, Home Industry	0.9
Sinificant Paved Areas (Roads etc)	0.9
Urban Residential. (high density)	0.7 - 0.9
Urban Residential. (low density incl. roads)	0.45 - 0.85
Urban Residential. (low density excl. roads)	0.40 - 0.75
Rural Residential	0.1 - 0.2
Open Space and parks etc.	0

From Table 4.05.1 (QUDM)

C_{10}

$^1I_{10}$ (mm/hr)	Fraction impervious, f_i 0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1.0
39 - 44	0.32	0.38	0.44	0.50	0.55	0.61	0.67	0.73	0.78	0.84	0.90
45 - 49	0.39	0.44	0.49	0.55	0.60	0.65	0.70	0.75	0.80	0.85	0.90
50 - 54	0.46	0.51	0.55	0.60	0.64	0.68	0.72	0.77	0.81	0.86	0.90
55 - 59	0.53	0.57	0.60	0.64	0.68	0.72	0.75	0.79	0.83	0.86	0.90
60 - 64	0.59	0.62	0.65	0.69	0.72	0.75	0.78	0.81	0.84	0.87	0.90
65 - 69	0.66	0.69	0.71	0.74	0.76	0.78	0.80	0.83	0.85	0.88	0.90
70 - 90	0.70	0.72	0.74	0.76	0.78	0.80	0.82	0.84	0.86	0.88	0.90

From Table 4.05.3(a) (QUDM)

	Fraction Impervious	F_{10}	F_{100}	$^1I_{10}$ (60 min, 10% AEP)	C_{10}	C_{100}
Pre-development	0	1	1.2	53.8	0.46	0.552
Post-development	0.61	1	1.2	53.8	0.725	0.87

Step 2: Time of concentration

$t = (107 \cdot n \cdot L^{0.333}) / S^{0.2}$ Friends Equation for pre-development

	A (ha)	L (m)	S (%)	n	t (mins)
Pre-development	0.875	250	5.80	0.15	71.0

n

Surface condition	n
Concrete or Asphalt	0.010-0.013
Bare Sand	0.010-0.016
Gravelled Surface	0.012-0.030
Bare Clay-Loam Soil (er	0.012-0.033
Sparse Vegetation	0.053-0.130
Short Grass Paddock	0.100-0.200
Lawns	0.170-0.480

Table 4.06.4 - Surface roughness or retardance factors (QUDM pg 4-

Post Development Flow and Time of Concentration: In Accordance with Section 4.6 of QUDM
There are two primary stromwater trunk drains flowing to the basin. The time of concentration calculated is the average of each trunk.

Catchment 1 - De-Coupling Hardstand to Basin.	**Length**	**t (mins)**	Ref
Overland Sheet Flow on Hardstand to First Inlet Pit		5	Table 4.6.2 of QUDM
Pipe Flow from Inlet Pit to Basin (L= 423m)	423	3.525	Section 4.6.9 of QUDM (2 m/s)
	Total	8.525	

Catchment 2 - EfW Building Roof to Basin.	**Length**	**t (mins)**	Ref
Overland Sheet Flow on Hardstand to First Inlet Pit		5	Table 4.6.2 of QUDM
Pipe Flow from Inlet Pit to Basin (L= 600m)	600	5.00	Section 4.6.9 of QUDM (2 m/s)
	Total	10.00	

Average of Catchment 1 & 2	Tc	9.26	

Post Development Catchment Area	15.25	ha
Impervious Area	9.30	ha

Step 3: Flow

$Q_y = 1/360 \,.\, C_y \,.\, {}^{t}I_y \,.\, A$

	$^{83.6}I_{10}$	$^{83.6}I_{100}$	Q_{10}	Q_{100}
Pre-development	43.02	67	0.05	0.09

	$^{9.26}I_{10}$	$^{9.26}I_{100}$	Q_{10}	Q_{100}
Post-development	151.4	225.3	4.65	8.30

Step 4: Storage Volume Required

Section 7.2.7 of Guide to Road design Part 5A: Drainage - Road Surface, Networks, Basins and Subsurface

All items presented below are for the 10% AEP Event

Reduction Ratio	r	0.990	
Inflow Volume	Vi	3409.836	Eqn 47
	Vs/Vi	0.983	Eqn 43
	Vs	3351.292	
	Vs	3374.564	Eqn 44
	Vs/Vi	0.983	Eqn 45
	Vs	3352.747	
	Average	3359.534	
	Highest	**3374.564**	Min Basin Volume

If the Rational Method is used for the determination of Q_i then the initial estimate of the inflow volume may be determined as:

$$V_i = \frac{4\, t_c\, r\, Q_i}{3}$$

where

t_c = Time of concentration (sec)

The above equations are most appropriate when it is necessary to limit the peak discharge for only th nominated design storm, such as the ARI 100 year event. In those circumstances, where it is necessa to ensure the post-development peak discharge for each tested storm duration is not increased, then these equations are likely to underestimate the required detention volume.

Guide to Road Design Part 5A: Drainage – Road Surface, Networks, Basins and Subsurface

$$\frac{V_s}{V_i} = \frac{r\,(1+2r)}{3}\ (Culp\ 1948) \qquad 43$$

$$\frac{V_s}{V_i} = r\ (Boyd\ 1989) \qquad 44$$

$$\frac{V_s}{V_i} = \frac{r\,(3+5r)}{8}\ (Carroll\ 1990) \qquad 45$$

$$\frac{V_s}{V_i} = \frac{r\,(2+r)}{3}\ (Basha\ 1994) \qquad 46$$

where

r = Reduction ratio, calculated as $r = \frac{(Q_i - Q_o)}{Q_i}$ (for Q_i and Q_o see below)

V_s = Required storage volume (max) (m^3)

V_i = Inflow volume (m^3) (see Equation 47 below, or from hydrograph, see Figure 7.3)

Q_i = Peak inflow discharge (m^3/s) (from hydrologic calculations)

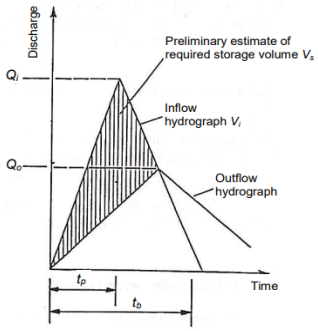
Q_o = Peak outflow discharge (m^3/s) (outflow adopted for the basin)

Reference Guidelines

7.2.7 Initial Design and Feasibility

Preliminary design may be conducted using a simple set of calculations however in many cases it is just as easy to undertake preliminary sizing using the same techniques as used for the detailed design. Preliminary sizing will determine if a detention basin is feasible, or if there is any significant flood mitigation effect to be obtained from such a basin. If a simplified technique is used, it will need to be checked using detailed design techniques.

Figure 7.3: Triangular shaped hydrographs



Notes:
t_p – time to peak discharge.
t_b – can be taken as 2.67 t_p when no better information is available.
Source: DTMR (2010).

4.6.5 Travel times from roof to main system connection

In cases where the use of a standard inlet time is not considered appropriate, the following roof to drainage system flow travel times are recommended:

Table 4.6.3 – Recommended roof drainage system travel times

Development category	Time to point A (minutes)
Rural residential, residential low-density	
For the roof, downpipes and pipe connection system from the building to the kerb and channel or a rear-of-allotment drainage system (Figure 4.2).	5
Residential medium and high-density, commercial, industrial and central business district	
For the roof and downpipe collection pipe to the connection point to the internal allotment drainage system abutting the building (Figure 4.3).	5

Note: The flow time from point A (figures 4.2 & 4.3) through the internal allotment pipe system to the kerb and channel, street underground system or rear of allotment system for the more intense developments noted should be calculated separately.

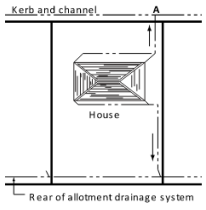


Figure 4.2 – Typical roof drainage systems (residential)

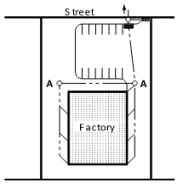


Figure 4.3 – Typical roof drainage systems (industrial)

Note (figures 4.2 & 4.3): Point A is referred to in Table 4.6.3

Copyright Commonwealth of Australia 2016 Bureau of Meteorology (ABN 92 637 533 532)

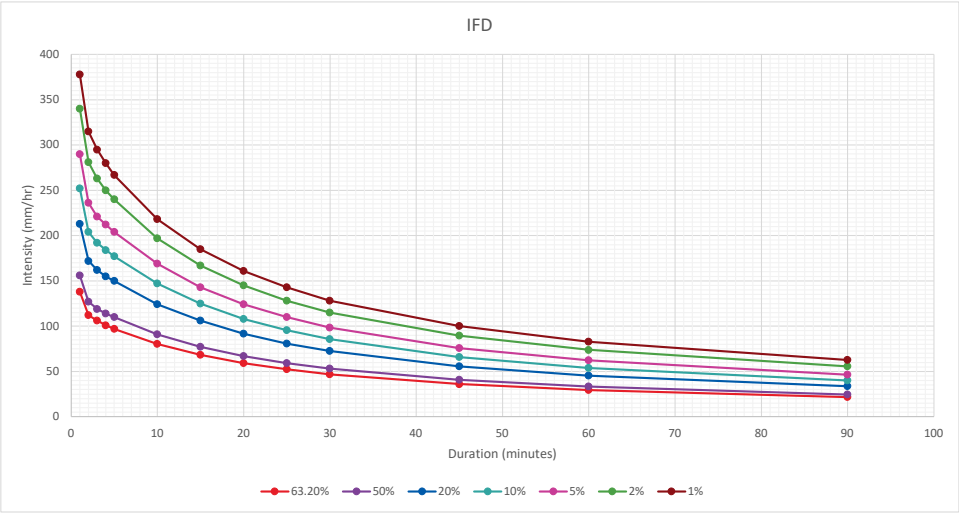
IFD Design Rainfall Intensity (mm/h)
Issued: 2-May-23
Location Label:
Requested co Latitude -27.977 Longitude 152.925
Nearest grid (Latitude 27.9875 (Longitude 152.9375 (E)

		Annual Exceedance Probability (AEP)						
Duration	Duration in n	63.20%	50%	20%	10%	5%	2%	1%
1 min	1	138	156	213	252	290	340	378
2 min	2	112	127	172	204	236	281	315
3 min	3	106	119	162	192	221	263	295
4 min	4	101	114	155	184	212	250	280
5 min	5	97	110	150	177	204	240	267
10 min	10	80.3	91	124	147	169	197	218
15 min	15	68.2	77.2	106	125	143	167	185
20 min	20	59.1	67	91.5	108	124	145	161
25 min	25	52.3	59.2	80.8	95.4	110	128	143
30 min	30	46.9	53.1	72.5	85.6	98.4	115	128
45 min	45	36	40.7	55.6	65.8	75.9	89.5	100
1 hour	60	29.4	33.2	45.4	**53.8**	62.3	73.8	82.7
1.5 hour	90	21.8	24.6	33.7	40.1	46.6	55.6	62.7
2 hour	120	17.6	19.8	27.2	32.5	37.8	45.3	51.3
3 hour	180	12.9	14.6	20.1	24.1	28.3	34.1	38.8
4.5 hour	270	9.58	10.8	15	18.1	21.3	25.8	29.4
6 hour	360	7.79	8.82	12.3	14.9	17.5	21.3	24.3
9 hour	540	5.89	6.69	9.4	11.4	13.5	16.4	18.8
12 hour	720	4.87	5.55	7.83	9.53	11.3	13.7	15.8
18 hour	1080	3.77	4.31	6.13	7.47	8.87	10.8	12.4
24 hour	1440	3.15	3.62	5.17	6.31	7.49	9.12	10.4
30 hour	1800	2.74	3.16	4.53	5.53	6.56	8	9.15
36 hour	2160	2.45	2.82	4.06	4.96	5.88	7.17	8.19
48 hour	2880	2.04	2.36	3.4	4.15	4.92	5.99	6.84
72 hour	4320	1.54	1.79	2.59	3.15	3.73	4.55	5.2
96 hour	5760	1.24	1.44	2.08	2.54	3	3.66	4.18
120 hour	7200	1.03	1.19	1.73	2.11	2.49	3.03	3.47
144 hour	8640	0.873	1.01	1.46	1.78	2.1	2.56	2.94
168 hour	10080	0.75	0.867	1.25	1.53	1.81	2.19	2.52

INPUTS TO STEP 3

	Basin 1		Basin 2	
	10%	1%	10%	1%
Pre-Dev	45.3973	70.4333	43.0227	66.9667
Post Dev	160.32	239.756	151.44	225.252

	Basin 1		**Basin 2**	
Pre	78.4	0.61333	83.6	0.78667
Post	7.78	0.556	9.29	0.852



Appendix D - MUSIC Model Outputs

Refer to separate folder for
MUSIC Model outputs.

Appendix E – Correspondence with Seqwater

Minutes

Project Discussions: Cleanaway BERC and Seqwater

Date:	18/09/2025	*Chair:*	Rachael Leeson
Time:	1.00 pm – 2.00 pm BNE		
Venue:	Teams		
Objectives:	Discuss potential impacts of the proposed Cleanaway BERC facility on Seqwater interests, and any requirements that may apply in relation to this.		
Attendees:	OCG: Rachael Leeson (RL), Felicity McCann (FM), Amanda Koenig (AK) SeqWater: Philip Chan (PC), Jessica Fraser (JF), Chris Thompson (CT), Medina Handley (MH), David Fox (DF), Will Hardy (WH) CWY: Ricky McNally (RM), Michael Hartley (MH) Arup: Anna Stewart (AS), Euan Mitchell (EM) Therefor: Andrew Crawford (AC), Gabriella Tomarchio (GT)		

Meeting Notes

Refer to copy of the slide deck presentation.

1.0 Introductions

2.0 Overview

- AK opened the meeting noting that the intention was to discuss the Cleanaway BERC proposal, any impacts on SeqWater Interests and any SeqWater requirements that the BERC project team should consider.
- AS share and explained the masterplan for the BERC and provided a high level overview of the Energy from Waste Process.
- AS noted, previous engagement with SeqWater in 2023 and the 2025 all agency briefing.

3.0 Matters of Interest for SEQwater

- **Stormwater/Overland Flow**
  - EM discussed stormwater and overland flow paths including the flood modelling of pre and post development conditions.
  - Noted that 22.5 ha is the proposed development area of the 63 ha site area.
  - SEQ Water queried the setback distance of the stormwater basin to the waterway. EM noted that a drawing showing the offsets has been prepared. The basin is at least 25m from the waterway.
  - EM noted that this is some ambiguity in how the drainage feature onsite is mapped based on different legislation – Fisheries Act, Water Act, Vegetation Management Act.
  - DRDMW confirmed in 2023 that they classified the flow path in centre of site as “drainage feature.”
  - Seqwater noted that the Development Guideline is based on the stream order under Vegetation Management Act.
  - SeqWater confirmed the waterway is identified as Stream Order 1.
  - SeqWater noted that the southern basin is disconnected to the Logan River and queried if it was known what rainfall event is required to provide connection (specific AEP).

        - *Post Meeting Note: We have reached out to our flood modeller who noted that: The model only extents to the Beaudesert Boonah Rd crossing just east of the site. Logan River is ~7 km downstream. The model extents do not allow us to identify at what event the site and Logan River would be connected.*
    - EM noted that MUSIC modelling has been completed for the concept design that demonstrates the stormwater design achieves the pollution reduction targets set by Seqwater, which are noted as being more stringent than the requirements set within Bromelton SDA.
    - EM described the filling and excavation approach for the site.

- **Hazard & Risk**
    - AS presented the outcomes of the hazard and risk assessment noting that Air Pollution Control Residue and diesel would be stored on the site. It was noted that these goods were stored more than 100 m from the watercourse.

- **Layout and Set Backs**
    - EM presented the setbacks from the watercourse noting that the layout has been developed to ensure that the SeqWater offset requirements have been met.

- **Water Demand**
    - AS presented the potable water requirements for the BERC noting that a Service Advice Notice was sought from Queensland Urban Utilities. QUU have confirmed that there is sufficient capacity in the existing DN375 main to support the full BERC operational demand.
    - SeqWater advised that there is a current project to connect Beaudesert to the grid. There are delays in finalising the connection and SeqWater require water volumes and demands of the development proposal to ensure it can be catered for.
    - SeqWater require timeline for connection into the network (construction and operation).
    - AS noted, if approved construction would start in 2028. The facility would be operation in 2032. No phasing is planned i.e full water demand from Day 1.
    - *PMN: An additional timeline slide has been added to the slide pack with program information.*
    - AS noted that in community engagement members of the public are concerned about water allocation and if queried if SeqWater could provide some additional details on this.
    - SeqWater advised that as the facility will be connected to the QUU water network, water allocation is not applicable to the project.
    - Recycled water was disused. It was noted that potential for recycled water had been explored with QUU but no mains were nearby. If a network was extended into SDA, Cleanaway could investigate options for servicing process water demand.
    - *PMN: Water demands*

Type	*Volume*	*Approach*	*Additional Commentary*
Waste- Domestic	*1.995 m3/day* *0.08 m3/h*	*Connection to QUU main in Beaudesert Boonah Rd*	
Waste – Process	*545 m3/day* *22.7 m3/h*		
Water – Total	*Applied for with QUU* *550 m3/day* *32 m3/hr (8.9l/s)*		*Note: Higher flow rate applied for with QUU to allow for peak demand during operation*

- **Sewer**
    - EM provided a summary of the approach to sewer connection noting that no process water wastewater would be discharged.
    - EM noted that two separate, on site sewer systems proposed to serve main EfW Building and IBA Sorting Building.
    - EM noted that an opportunity has been identified for irrigation using treated wastewater.

- SeqWater noted that as the proposal has 55 staff, it may trigger an ERA 63 of EP Regulation based on the 'equivalent people'.
- SEQ Water noted that any irrigation with treated wastewater would need to be robust and thoroughly reviewed by SeqWater as the site is in a drinking catchment.
- SeqWater noted that catchment was sensitive and was experiencing "death by 100 cuts" primarily due to industry and a lack of wastewater infrastructure.
- SeqWater noted that design would need to be informed by specific boreholes.
- SeqWater queried if discussion has been had with DETSI on ERA 63.
- AC noted that ERAs have been discussed with DETSI but ERA 63 would need to be discussed if irrigation of wastewater was to be pursued.
- AS queried how developed the design would need to be for SeqWater to provide comment and if irrigation for waterwate was not included in the application would the opportunity be available to explore in later design stages.
- FM noted that a viable solution need to be proposed in the planning application. Opportunities including connection to an extended QUU wastewater network or irrigation of waste water could be explore later (via appropriate approvals).
- SEQ Water queried the makeup of the IBA and how the IBA retention basin has been designed to prevent overtopping etc.
- AS noted that the IBA composition is provided in the Waste Management Technical Report.

4.0 Questions/AOB

- We will need to run to ground if ERA 63 is triggered with consideration to the preferred sewage treatment options.

Bromleton Energy and Resource Centre

18th September 2025

CLEANAWAY

Agenda

1.0 Introductions

2.0 Overview

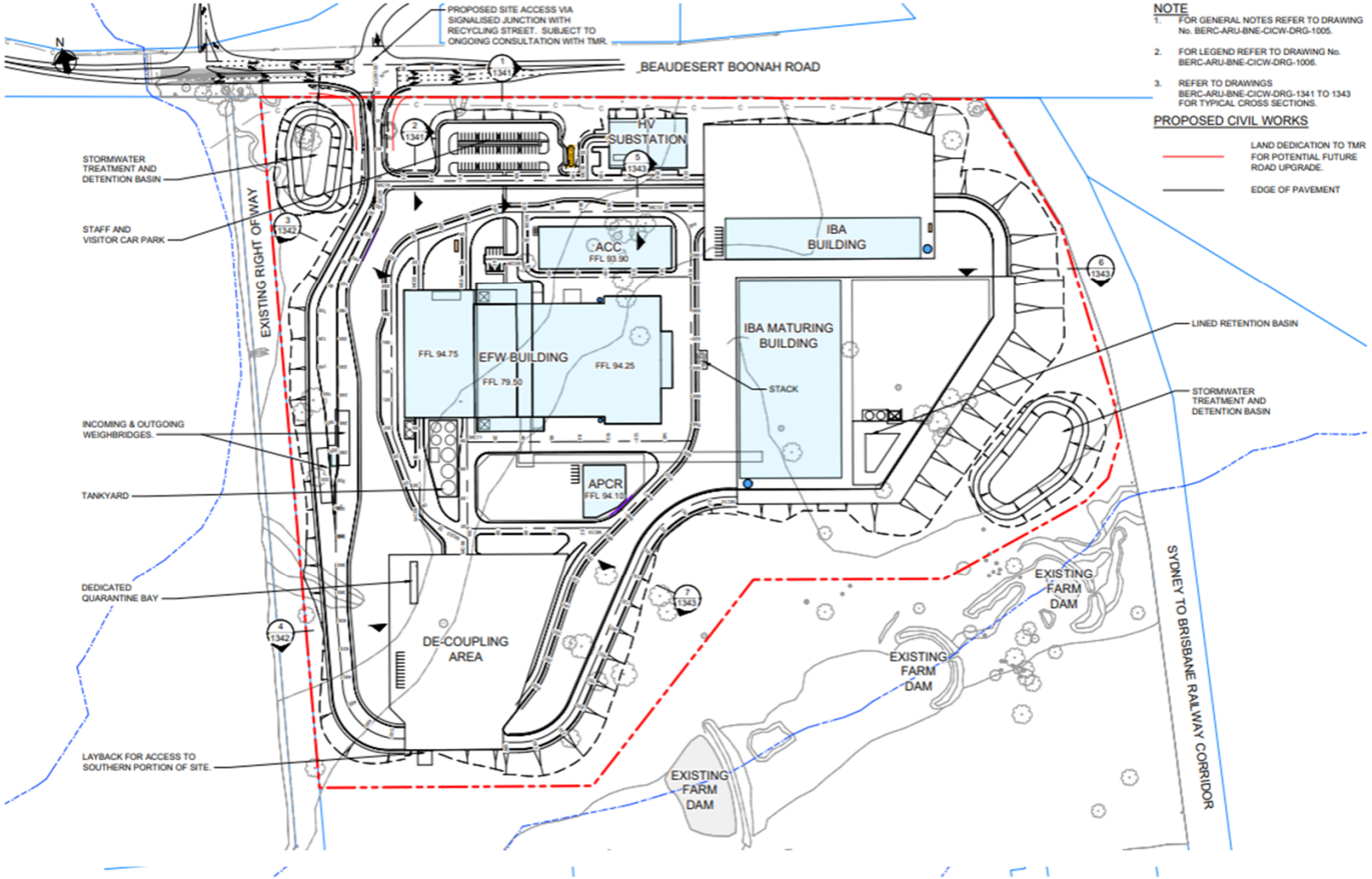
- Masterplan
- Previous engagement

2.0 Matters of Interest for Seq Water

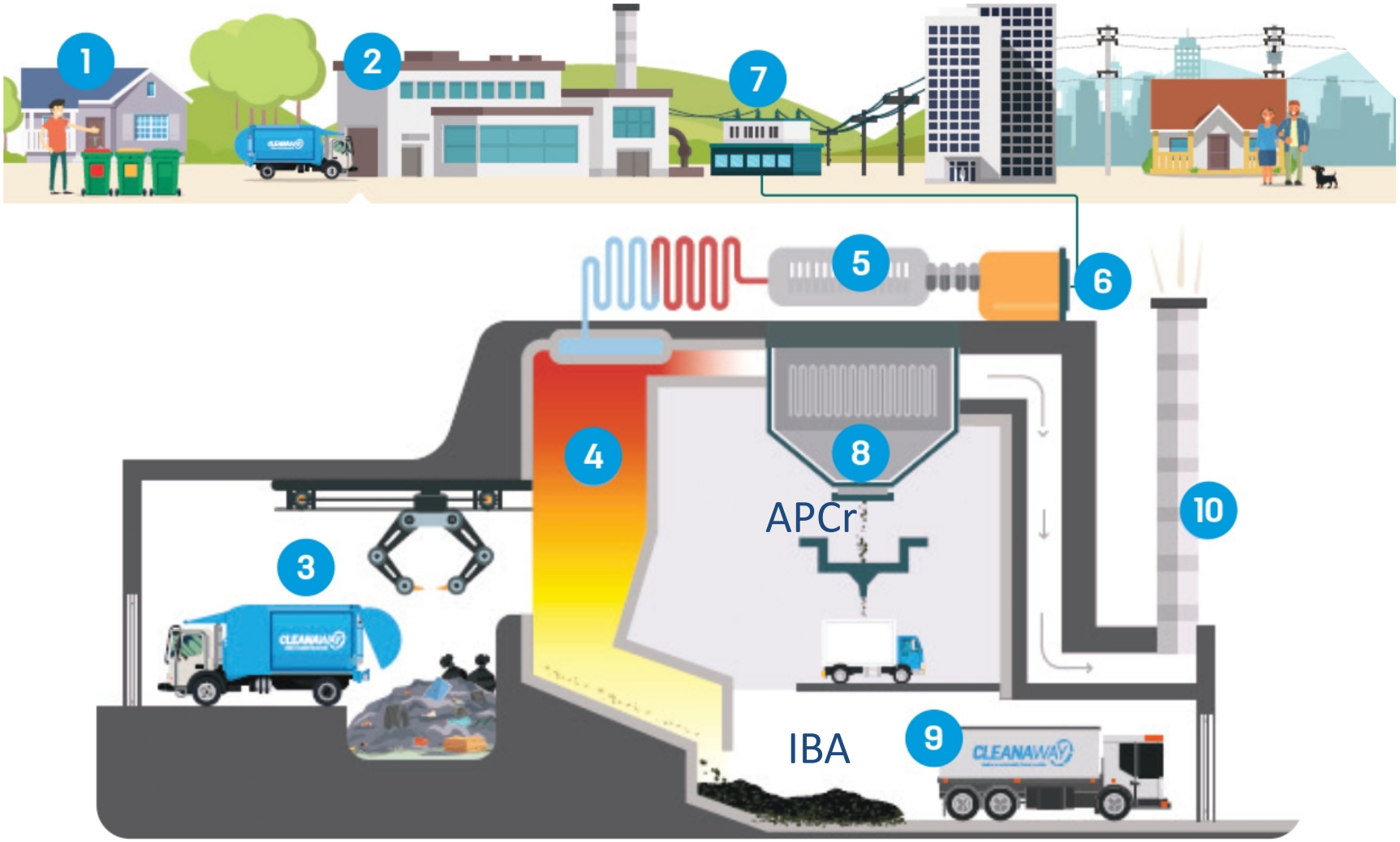
- Stormwater / Overland Flow
- Layout and Set Backs
- Water Demand
- Sewer

4.0 Questions / AOB

Project Update – Masterplan



Overview



Previous Engagement

11 May 2023 Meeting with QUU & SeqWater

27 July 2023 Meeting SeqWater to discuss an earlier version of the proposed development.

14 August 2025 All agency briefing (attended by Leah Snerling)

Matter of Interest – Stormwater / Overland Flow

Existing Condition

Site features 2 primary ridgelines separating site into 3 distinct catchments.

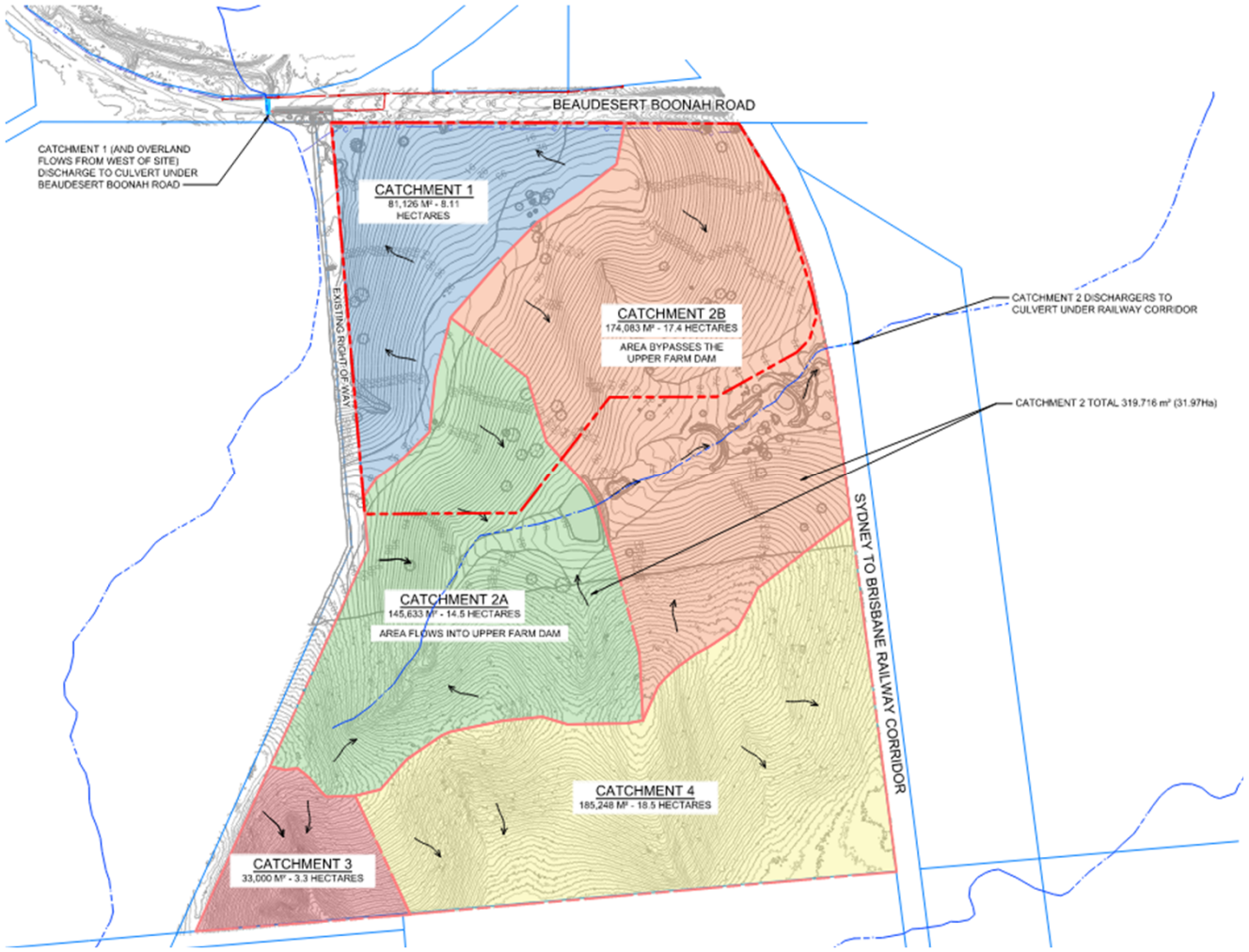
Majority of site (Catchment 2A & 2B) currently drains overland, via 3No farm dams.

Flows pass through existing culvert below railway embankment to Lot to East.

1.85m culvert under railway

No formal piped stormwater system on site.

DRDMW completed watercourse determination that the unmapped water feature through the centre of the site is a "drainage feature".

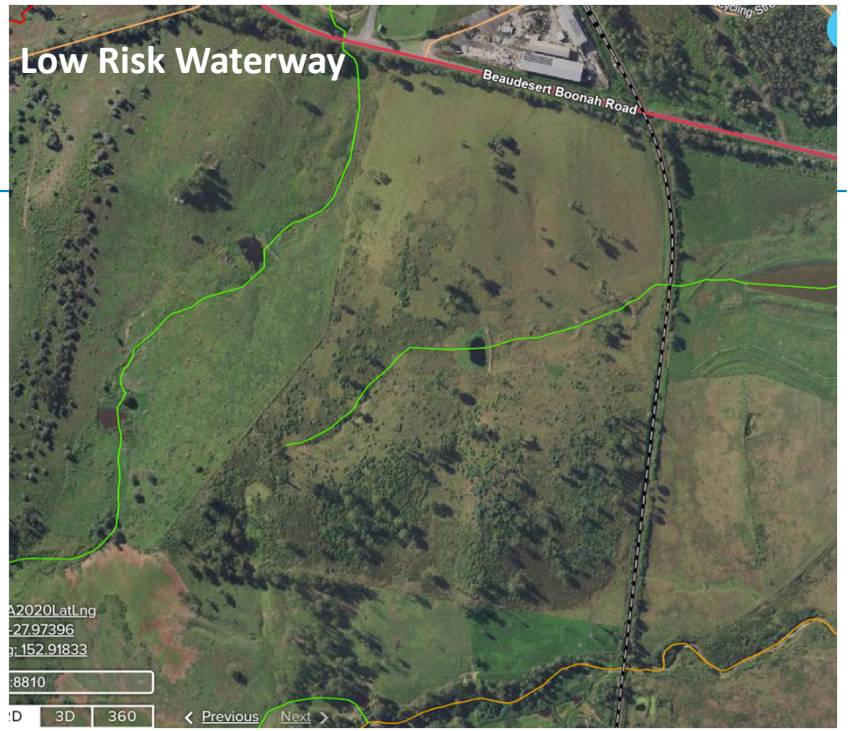


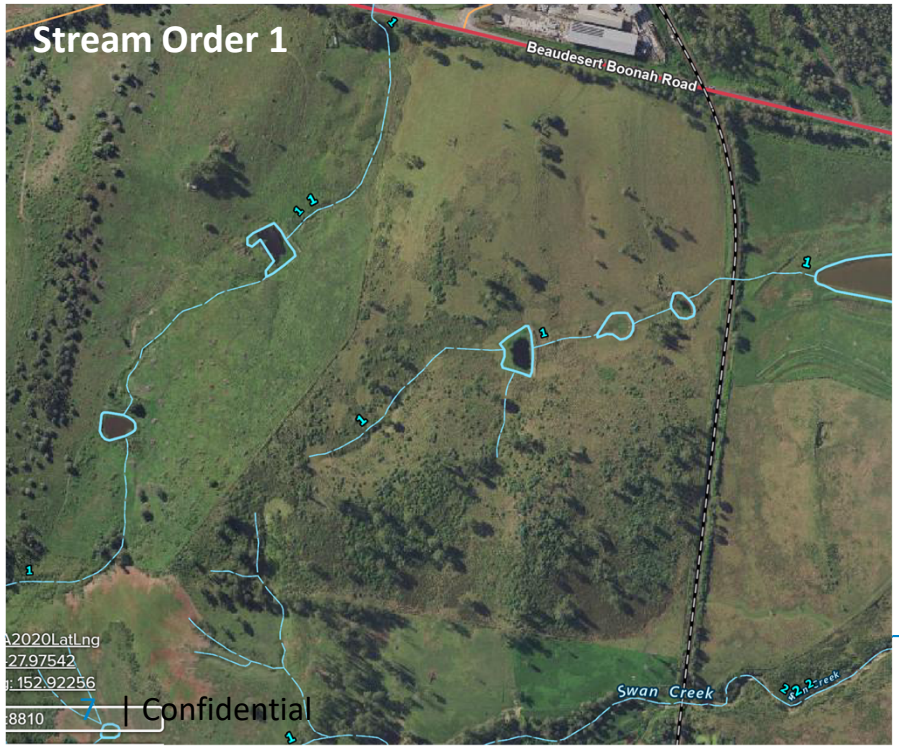
Drainage Line

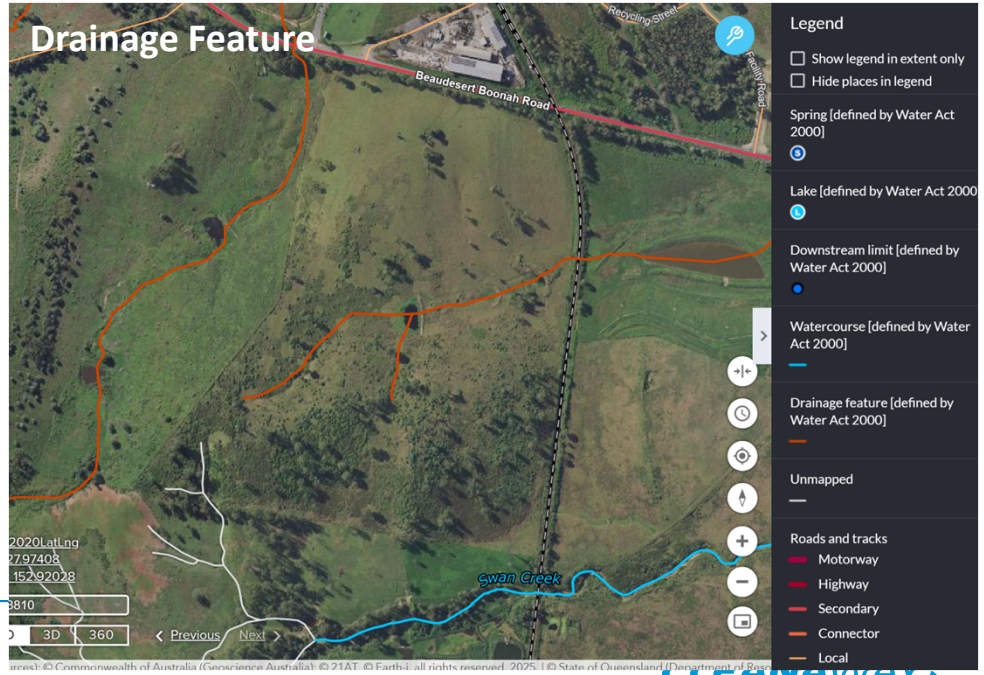
Fisheries Act – low risk waterway (unmapped → low risk)

Water Act – Drainage Line (unmapped → drainage feature)

Vegetation Management Act –Stream Order 1



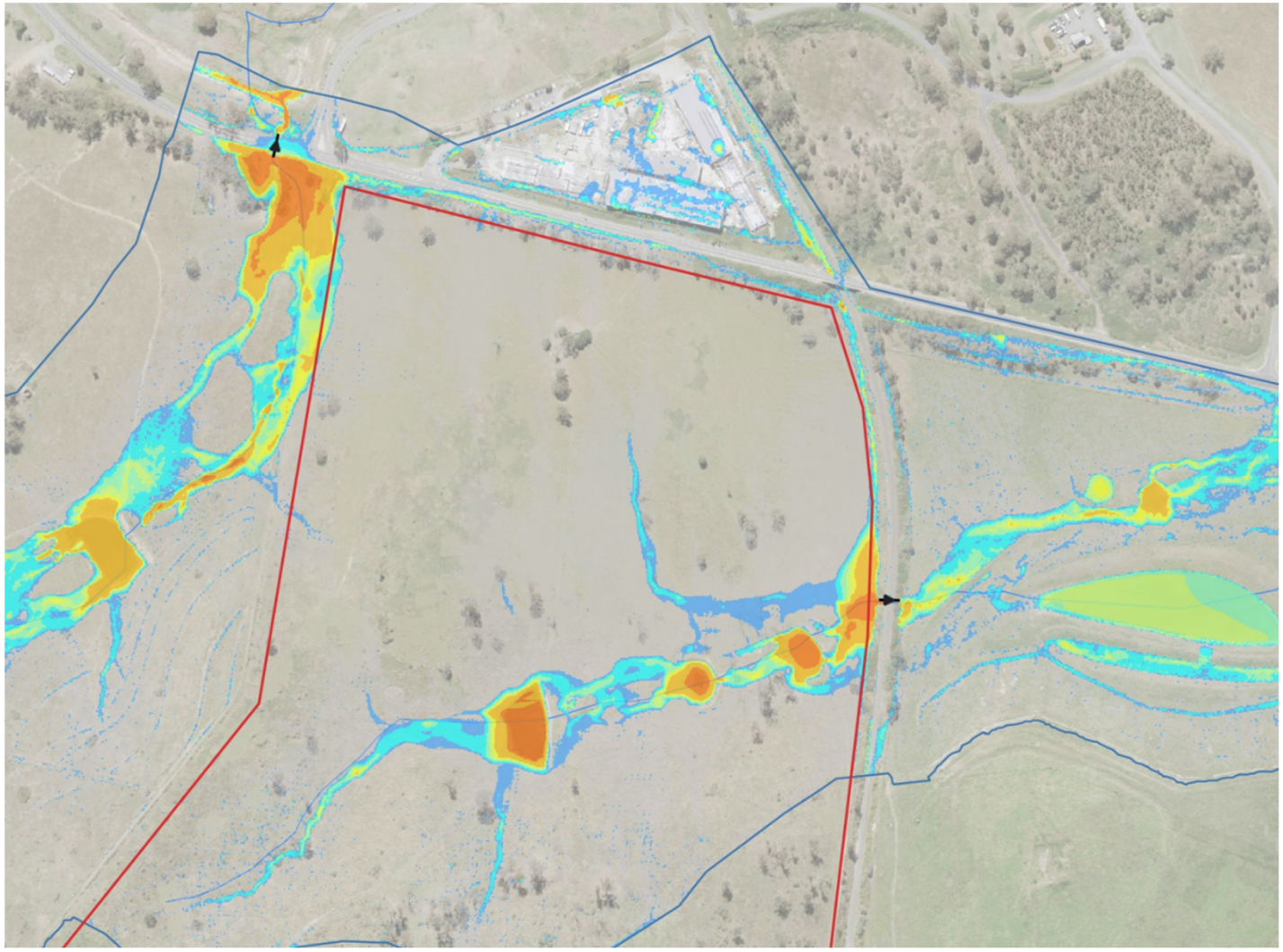




Matter of Interest – Stormwater / Overland Flow

Existing Flood Assessment - 1% AEP Event

Flooding evident at existing farm dams and general build up adjacent to railway corridor indicative of throttling effect of the culvert below the railway embankment.



Matter of Interest – Stormwater / Overland Flow

Proposed

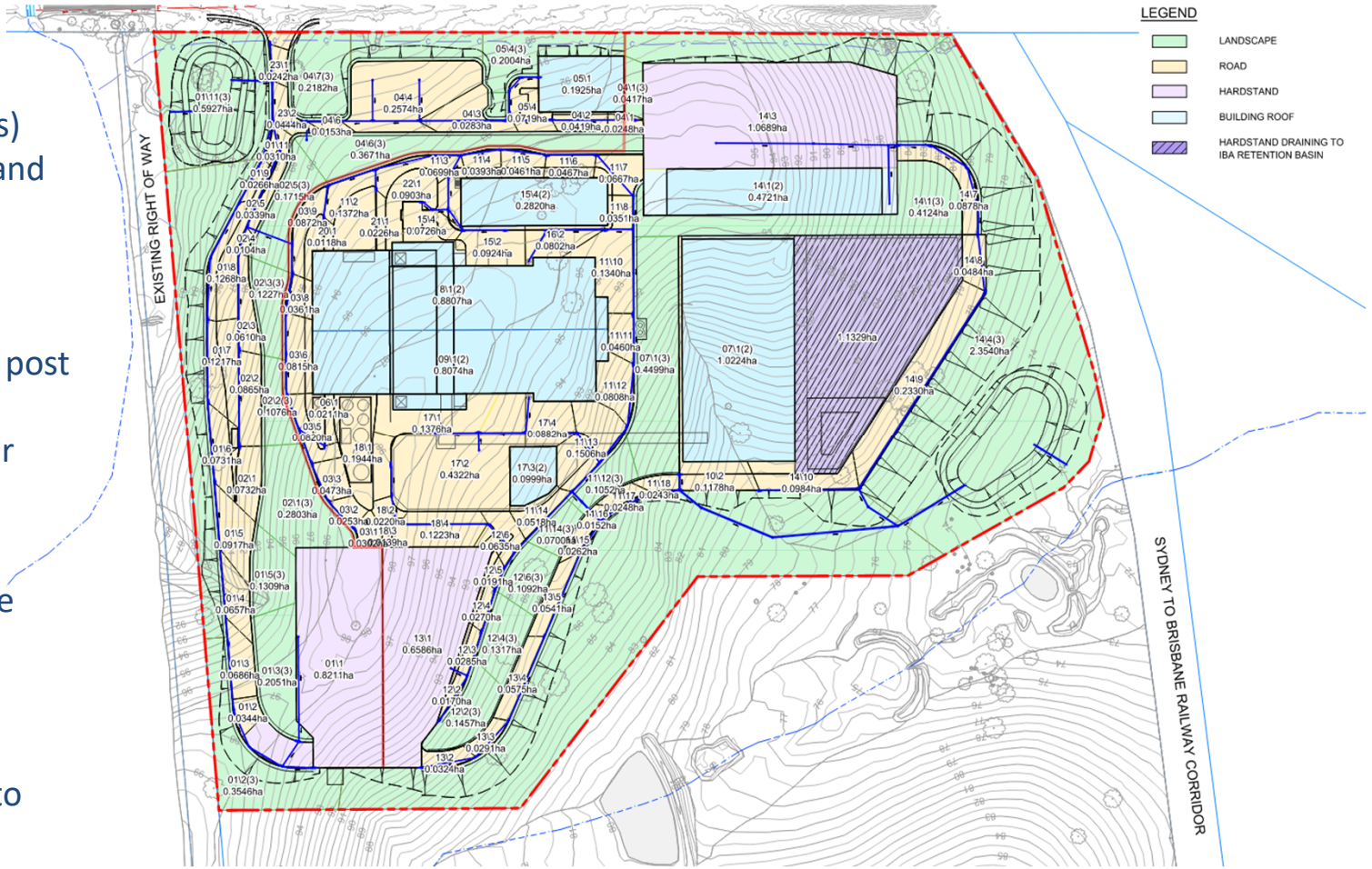
Formal Pit and Pipe system with appropriate treatment measures (GPT's) conveying to two, separate treatment and detention basins.

Basins discharge, at controlled rate, to existing overland flow paths, to ensure post development flows are no greater than pre-development flows for 10% AEP per QUDM guidelines.

Rainwater harvesting proposed to serve primary buildings with water re-used within cooling and maturation process.

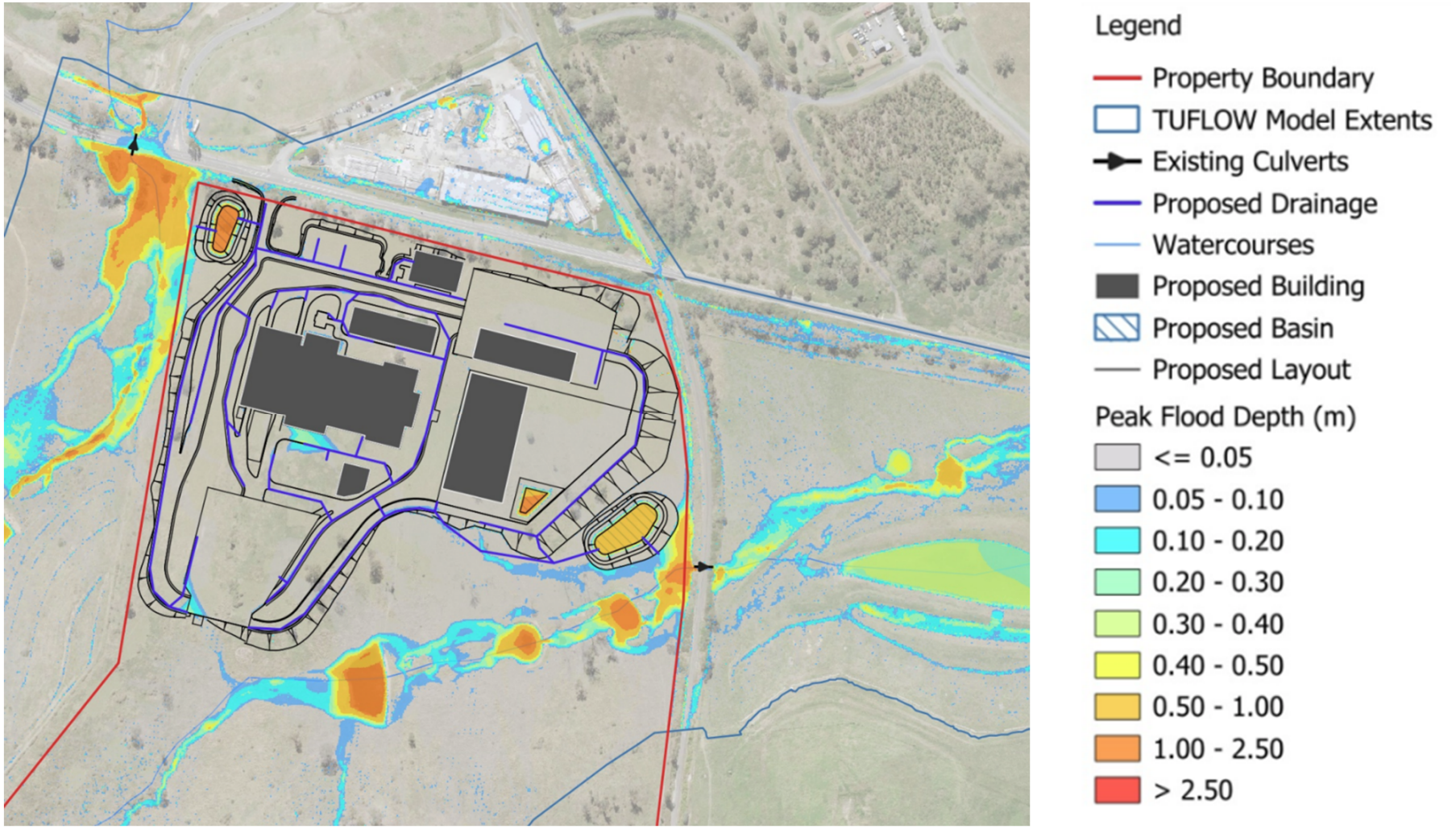
Existing farm dams are being retained to un-developed sections of catchment 2.

MUSIC modelling completed and results will be provided within submission.



Matter of Interest – Stormwater / Overland Flow

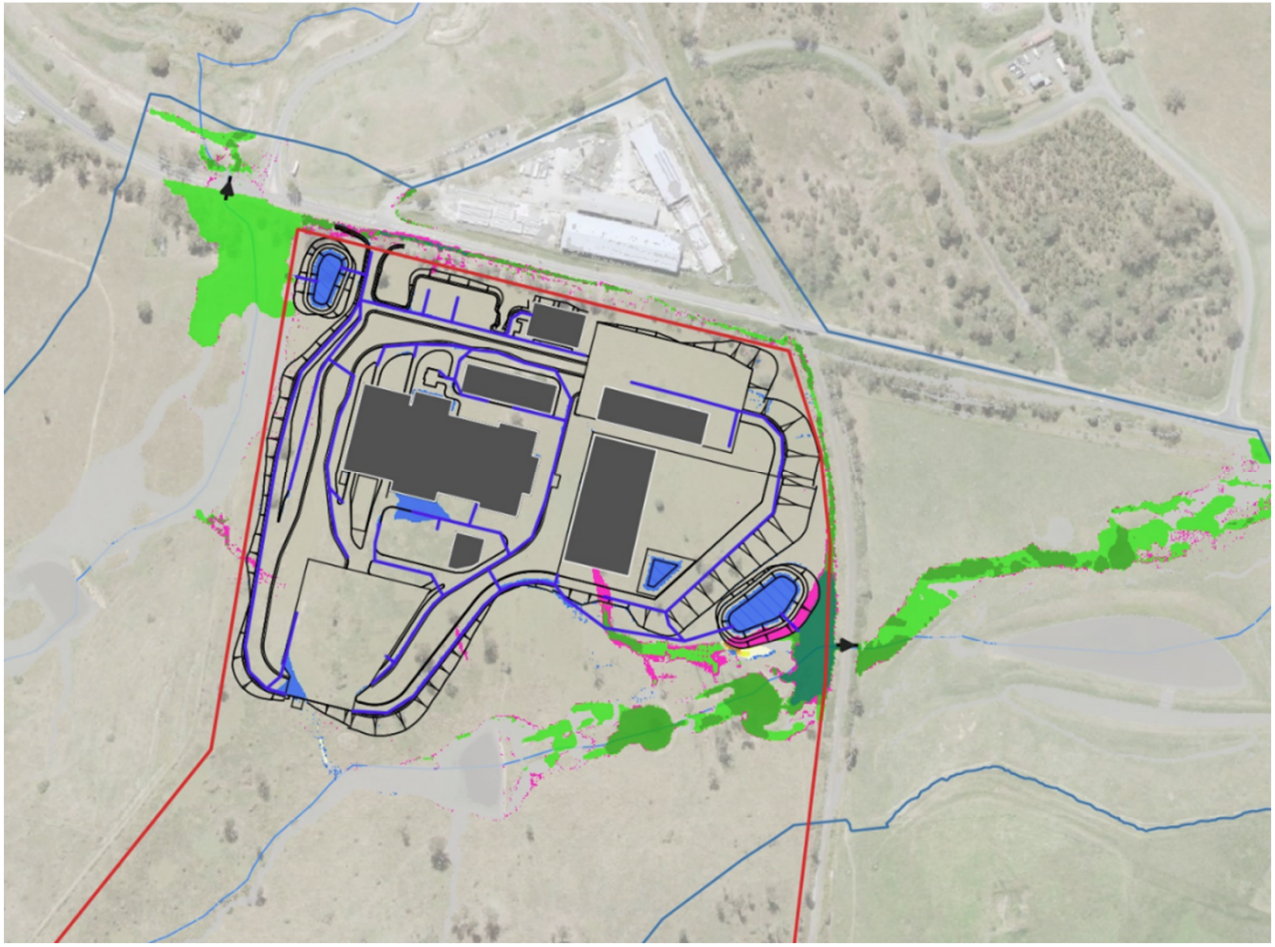
Post Development Flood Levels



Matter of Interest – Stormwater / Overland Flow

Post Development Flood Impact Assessment

Indicates slight reduction in flood levels immediately adjacent to railway corridor and downstream. This is due to retarding effect of the stormwater basin.



Legend

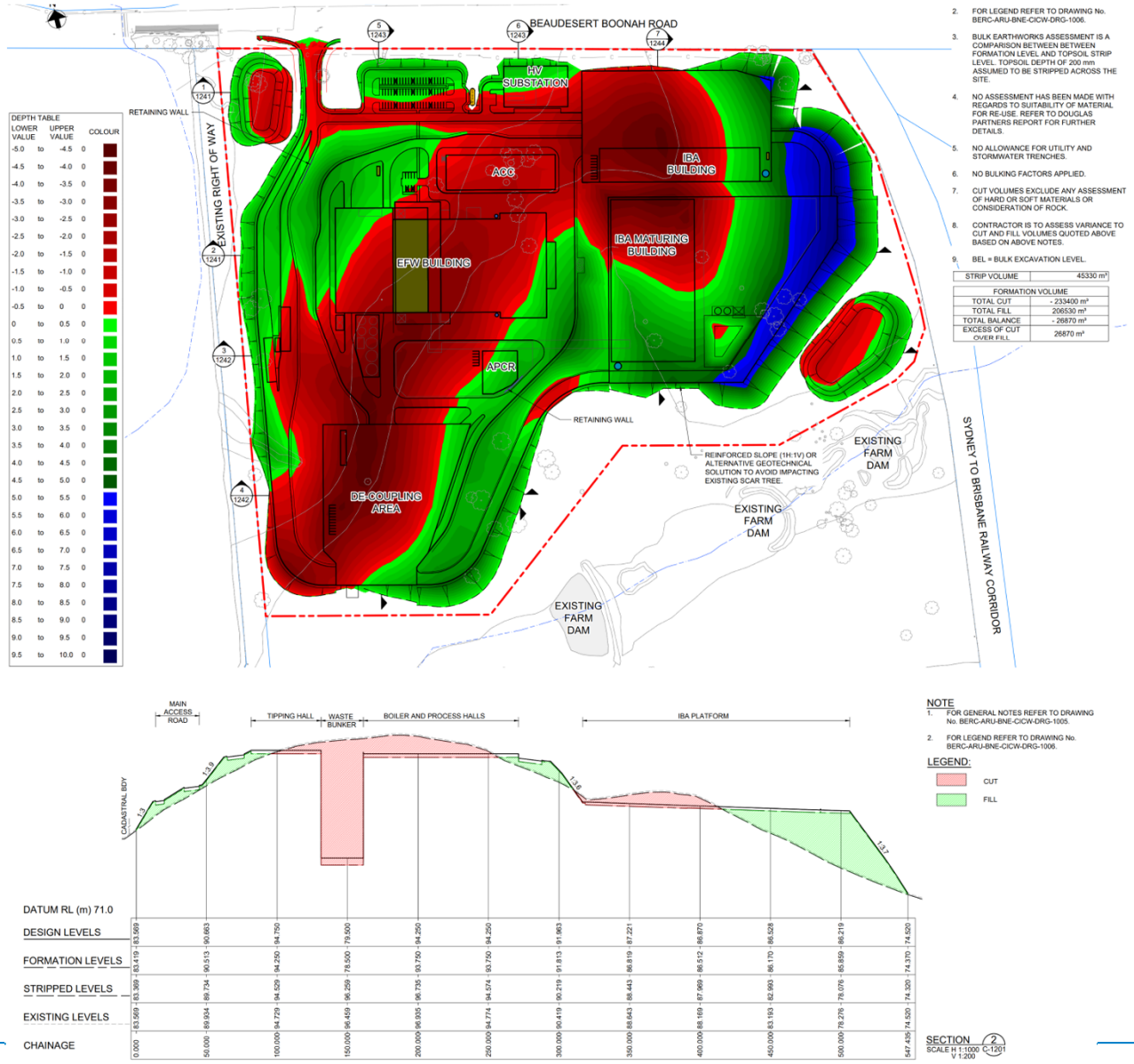
- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth Difference (m)

- Was Wet, Now Dry
- < - 0.1
- -0.5 to -0.02
- -0.02 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.03
- 0.02 to 0.04
- 0.04 to 0.05
- 0.05 to 0.075
- 0.075 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- Was Dry, Now Wet

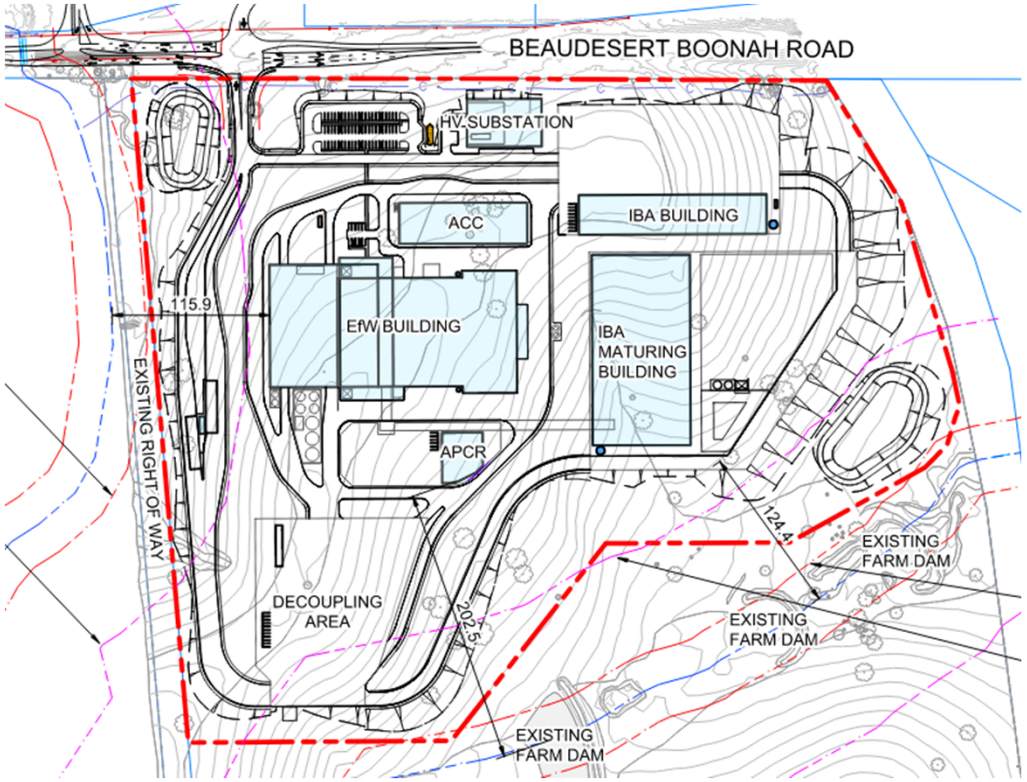
Matter of Interest – Filling and Excavation

- Significant fill at eastern end of development site to maximise workable platforms.
- Typically max 1 in 3 batters
- Footprint of earthworks setback from existing overland flow paths.
- Piling proposed for EfW building & stack.



Matter of Interest – Dangerous Goods

- Hazard and Risk assessment has been undertaken which reviews hazardous chemicals and industrial hazards for both the construction and operational phases of the Project.
  - The stored quantity for air pollution control residue (APCr) in the facility exceeds the HCF threshold quantity under the criteria of State Code 21 therefore the facility needs to be assessed against the requirements of the Code.
  - Diesel storage (360kL) exceeds the threshold of 25,000L under notifiable activity of 'petroleum product or oil storage'.
    - The design of the facility shall comply with AS1940-2017 The storage *and handling of flammable and combustible liquids* including bunds, outside storage.

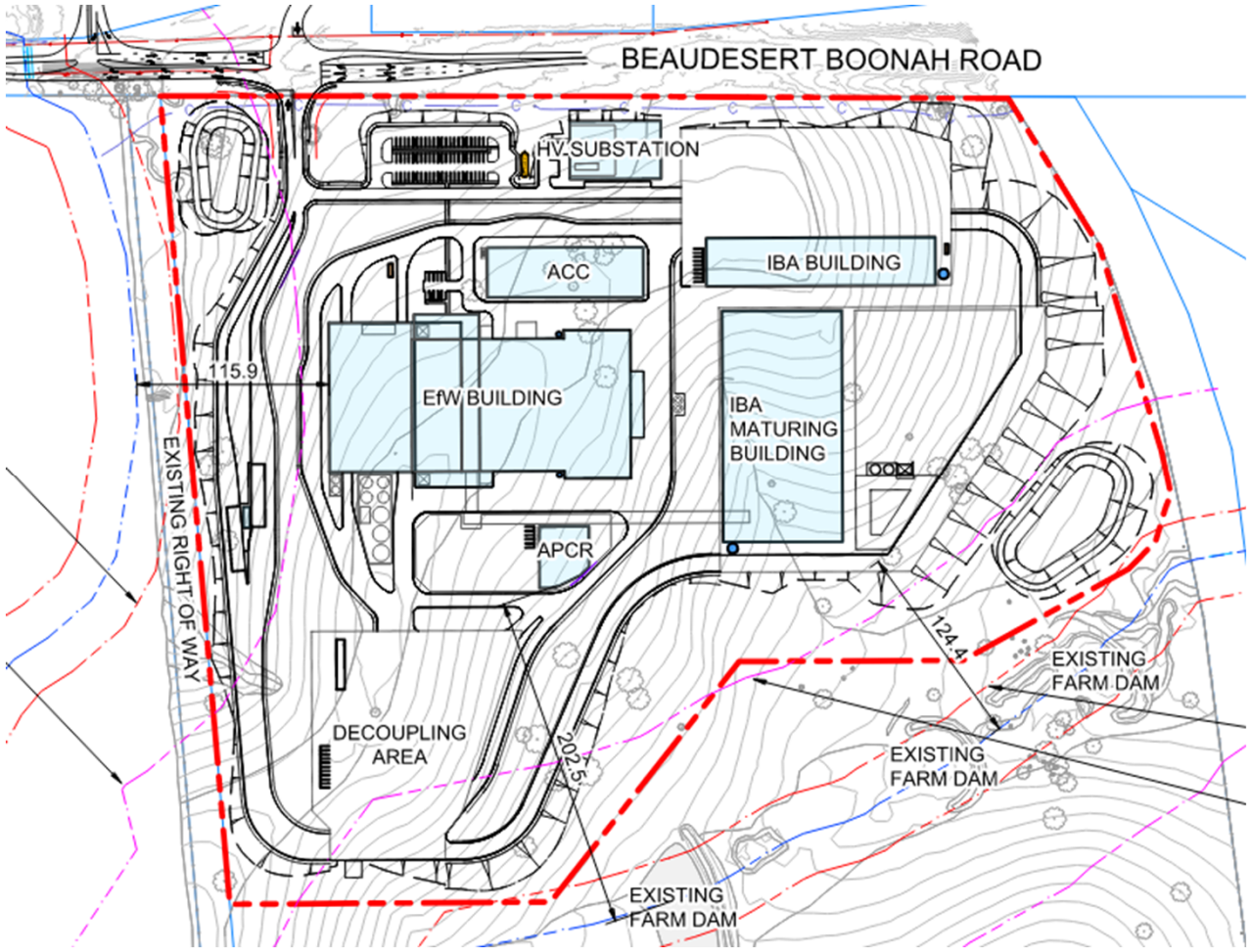


Matter of Interest – Clearances to Flow Paths

- Primary buildings positioned in central area of developed footprint to maximise separation from key constraints such as railway corridor, overland flow paths.

- Building platforms set well above flood level.

- Proposal to include perimeter landscaping and tree planting.



Water Demand & Connection Point

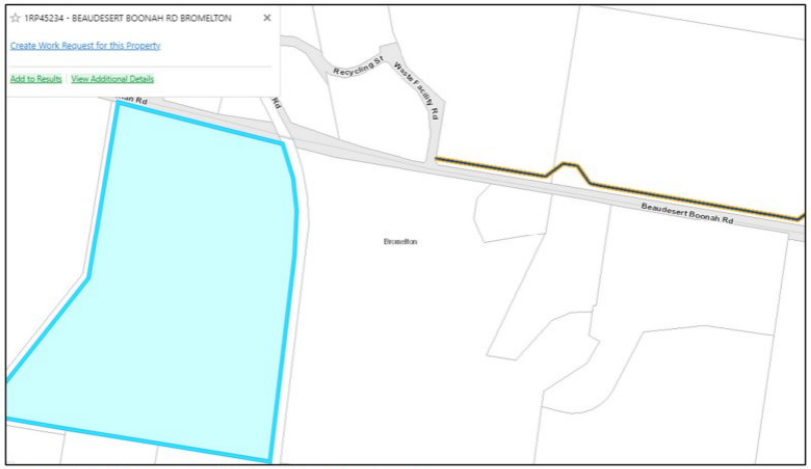


Figure 1: Existing infrastructure within the vicinity of the subject site

- BERC will prioritise water reuse to minimise demand on the local water network. The design includes four 100kL rainwater tanks to capture and store rainwater for reuse across the site. Additionally, process water will be recycled internally wherever possible to further reduce reliance on external water supplies and support sustainable operations.

- Water use is estimated to be 500m3/day (average of 6.4l/s).
- Peak flow rate: 32 m^3/hour (equivalent to 8.9 L/s

- An exiting DN375 DI main which generally follows the Beaudesert Boonah Rd alignment terminates to the east of the BERC site.

- The main was built in 2018 in anticipation for the Bromelton SDA however there have been no customer connections to date.

- A Service Advice Notice was sought from Queensland Urban Utilities (extract below).

- QUU have confirmed that there is sufficient capacity in the DN375 main to support the full BERC operational demand.

2. Urban Utilities has conducted additional modelling and can confirm that capacity is available within the existing DN375 main to accommodate for the increase water demand, assuming reconnection is established per 23-SAN-64867 advice. Prior advice indicated concern regarding water quality and adequate turnover of the existing DN375. The current proposed demand reduces water age within the existing main to within a more desirable range providing confidence water quality may be provided in accordance with drinking water standards. On this basis, Urban Utilities support the increased demand as it is necessary to effectively commission the existing main.

Sewer and Process Water

Existing Condition

QUU has advised that there is no existing or proposed sewer infrastructure within the vicinity of the site.

Proposed Development

Within the main Energy from Waste Building facility there is no process wastewater discharge.

Run-Off from IBA Maturing Hardstand is collected in a separate, lined retention basin with water treated and re-used for wetting maturing stockpiles. This basin does not discharge to the trunk stormwater system.

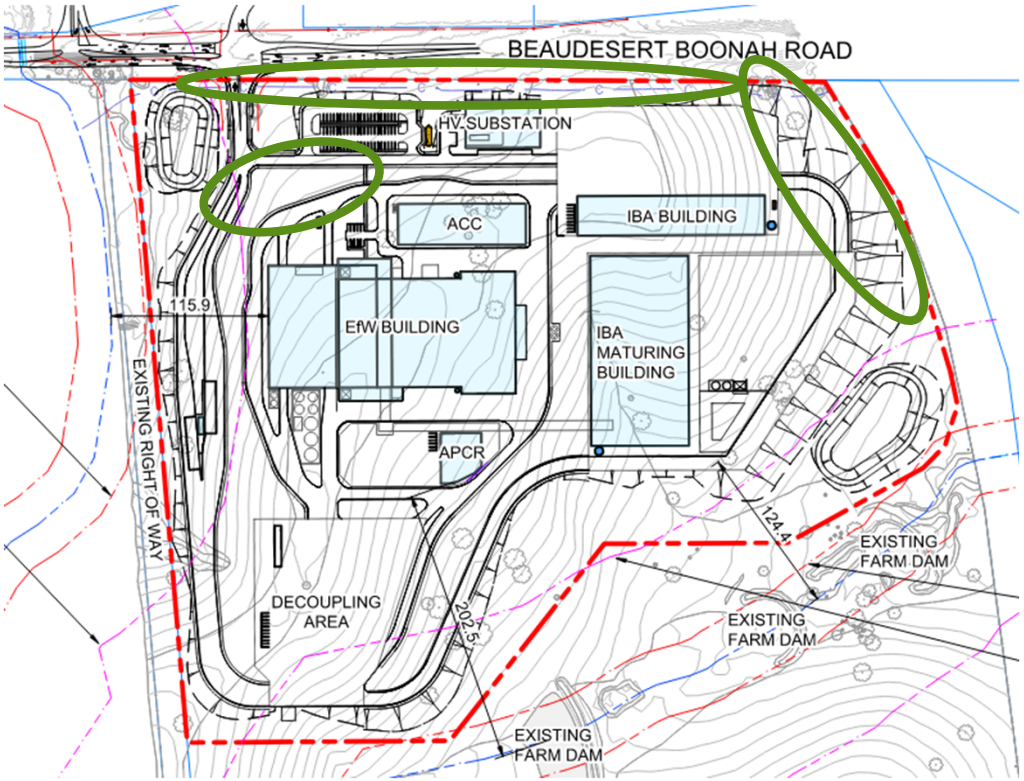
Non-Process / Sewer flows are generated from staff / visitor facilities including showers, toilets, kitchen etc.

During operation there will be approximately 55No staff working in shifts to facilitate 24/7 operation.

Facility includes provision for scheduled visitor parties, likely school and community groups.

Two separate, on site sewer systems proposed to serve main EfW Building and IBA Sorting Building.

Opportunities for Irrigation of Sewage



We are keen to explore opportunities for irrigation of sewerage.

Green circles show the potential locations

Program (Added post meeting)

2022
Property purchased in Bromelton State Development Area for Special Industry

2023
Project design, technical investigations, agency and initial community engagement

2024
Planning and technical assessments

2025
Establish Stakeholder Reference Group, community engagement, planning application lodged

2026-2028
Public consultation, planning refinements and approvals, financial close, detailed design, procurement (subject to approvals)

2028-2032
Construction (subject to approvals)

2032 onwards
Operation (subject to approvals)

Questions / AOB

RECORD OF SEQWATER CONSULTATION FROM 2023 BELOW.

Euan Mitchell

From: Kay Casson
Sent: Monday, 31 July 2023 4:24 PM
To: Leah Snerling
Cc: Ian Hustwick; Euan Mitchell; Karsten Forsterling; Jenna Beckett; Andrew Crawford; Keana Munro; 293683-00@qeep.arup.com
Subject: BERC project - Seqwater meeting notes

Hi Leah
Thanks for your time last week. My notes below.
As the stormwater assessment and wastewater design progresses we will reach out for a further meeting as needed.
Cheers,
Kay

Location:	Teams Meeting	**Date:** 27/07/2023 2.30pm
Minutes by:	Kay Casson	**Issue Date:** 31/07/2023

Attendees:		
Leah Snerling (Seqwater)	Andrew Crawford (Wolter)	Kay Casson (Arup)
	Euan Mitchell (Arup)	Jenna Beckett (Arup)
Apologies:		
None		

Summary of Actions:

No.	Item	Notes
1	ERA 63	KC to circulate info from DES in relation to ERA 63 *[sent 31/07]*
2	Wastewater	LS to circulate Seqwater guidelines/info in relation to wastewater options

Minutes:

Item	Notes	Action

General	• Intros
	• Leah - Seqwater is an unofficial referral agency - will provide recommendations that the OCG can take or not.
	• Kay - noting that the unmapped water feature through the site has been confirmed as a drainage line by DRDMW (not a watercourse). Vegetation management drainage layer shows the drainage line as stream order 1.
	<u>Euan</u>
	• Overview of site and catchments
	• Overview of legislative and design requirements
	• Stormwater quantity - will reference QUDM and most recent AR&R
	  ○ Proposed design will include detention basins and stormwater system for 10 %AEP
	  ○ Bioretention basin for 1 yr ARI
	• Water quality - MUSIC modelling assessment being undertaken. Pollution reduction targets of 80, 60, 45 and 90	

	• Focus is on the northern half of the site where the development is occurring • Southern catchments remain untouched for this scope of work • There will be rainwater harvesting and reuse from EfW and IBA buildings • 2 x bio-retention/attenuation basins • Flood assessment will include a post-development flood assessment of the 10% and 1% AEP events • Assessment is still in progress and will be included with the DA application • QUU have advised there is no sewer infrastructure within vicinity of the site • The strategy for the site is proposed to pursue tankering of sewage. Irrigation to land will also be investigated. <u>Leah</u> • Leah advised Seqwater has recommendations and preferences if treated water is used for irrigation • As this industry doesn't involve waste or water emissions - the setbacks can be more flexible. But the reporting should identify the setbacks that are achieved, mainly for the industrial buildings • EfW is not a use that has Seqwater has assessed before • Seqwater pollution reduction guidelines - 85, 65, 45, 95 which are slightly more stringent • Euan: MUSIC modelling has been set up - indicates 91/92 for gross pollutant reduction • Leah: may be simpler to demonstrate compliance with the Performance outcomes (PO) in the Seqwater development guideline rather than the acceptable outcomes (AO). <u>Wastewater</u> • Euan queried whether the setbacks for sewer would apply to holding tanks. • Leah confirmed setbacks to drainage feature/waterway apply if holding tank or treatment plant with treated discharge • Seqwater reiterated that if the on-site wastewater facilities are under 21 Equivalent Persons (i.e. not ERA63), we would require submission of a site and soil evaluation (on-site wastewater design) prepared by a qualified wastewater designer and a 'medium' or lower risk rating under the Land Use Risk Tool. • Leah - Acceptable outcomes 5.3 of the Seqwater guideline goes into more detail for treatment and disposal • Euan: Equivalent persons (EP) for the site would be approx 20-30 and subject to confirmation. • Project team will confirm applicability of ERA 63 as design progresses. • Seqwater noted consideration of removal of irrigation component as one option to reduce EP. • Seqwater preferences: Sub surface disposal + 50m setback + advanced secondary treatment with disinfection method • Kay: DES have provided guidelines - to forward to Seqwater for comparison. • Leah will provide some information related to the scenarios discussed - including 1) Tankering 2) Irrigation 3) <21 EP 4) >21EP	KC LS
	Next Meeting: Possible further meeting as design and modelling progresses	TBC

Kay Casson
Associate | Environment and Biodiversity | Qld team lead
BSc, MEnvMgt, CEnvP

My work days are Monday, Tuesday, Thursday and Friday

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Appendix F - Flood Mapping

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Brisbane, QLD, 4000 Australia

Client

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Job Title

Cleanaway Bromelton EFW

Figure Title

Existing Case: 1% AEP Flood Depth

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG01	Issue A

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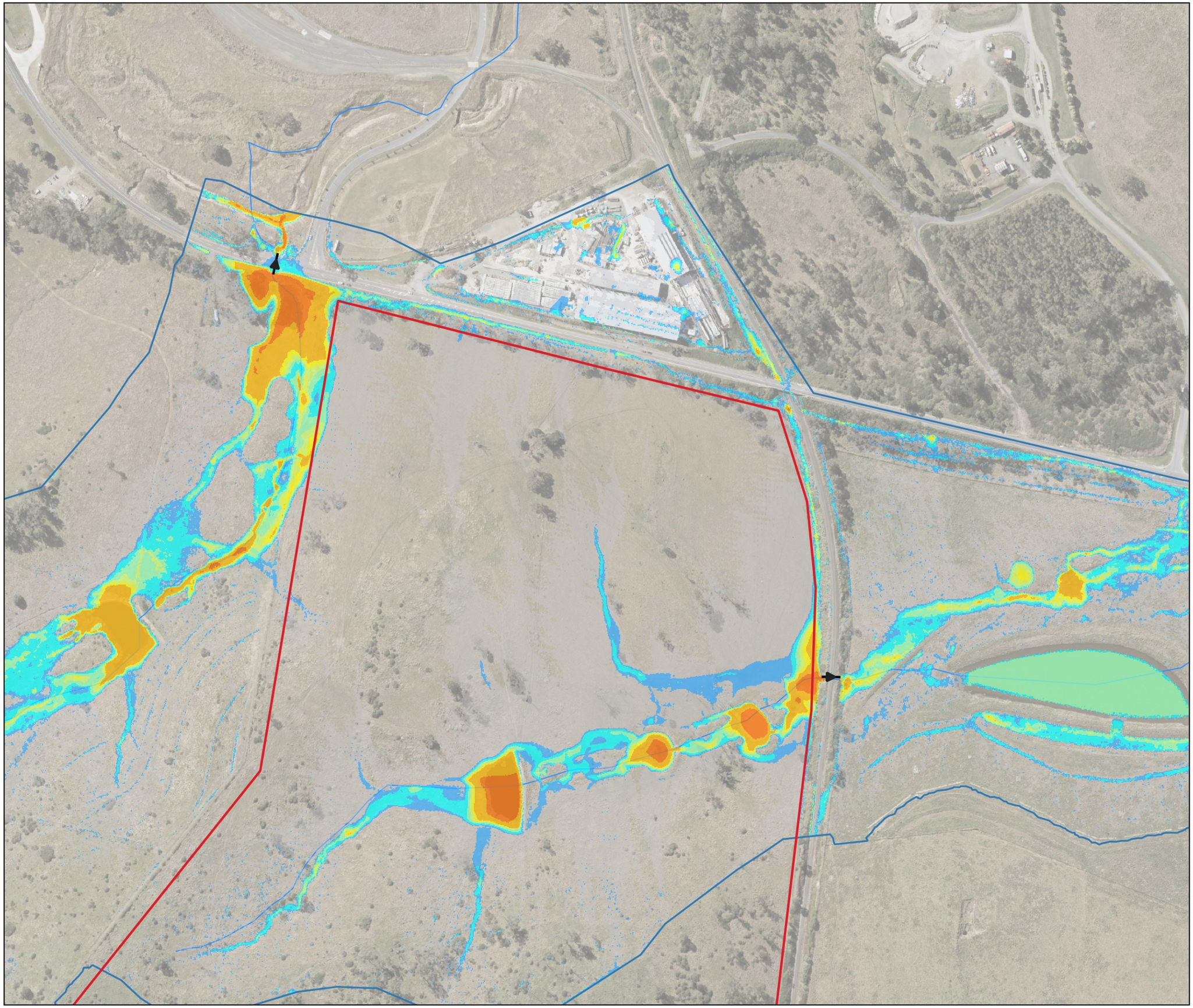
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Job Title

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Figure Title

Existing Case: 2% AEP Flood Depth

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG02	Issue A

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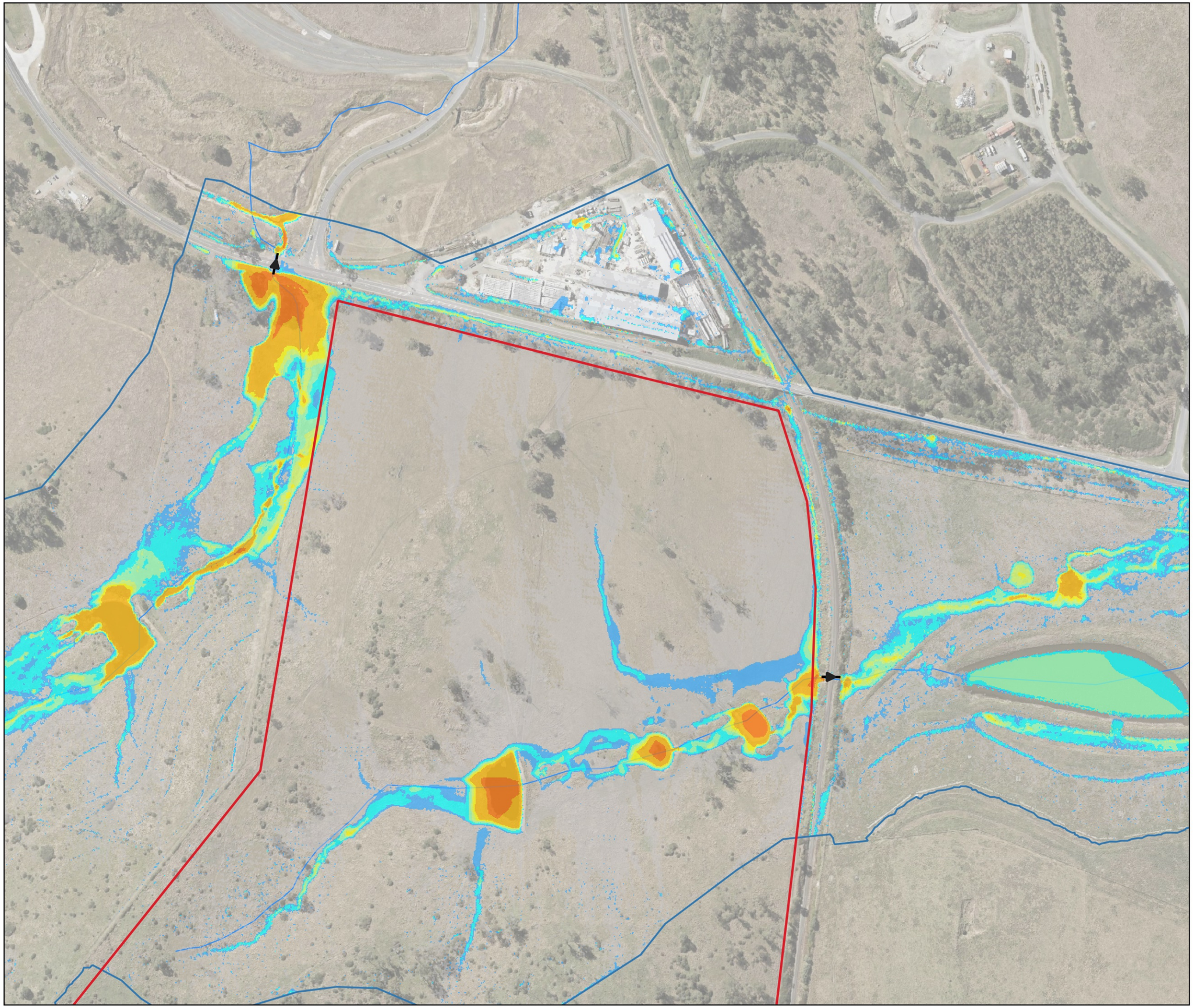

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Figure Title

Existing Case: 5% AEP Flood Depth

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG03	Issue A

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Sources: QLD Globe Imagery, QLD Spatial

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Job Title

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Figure Title

Existing Case: 10% AEP Flood Depth

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG04	Issue A

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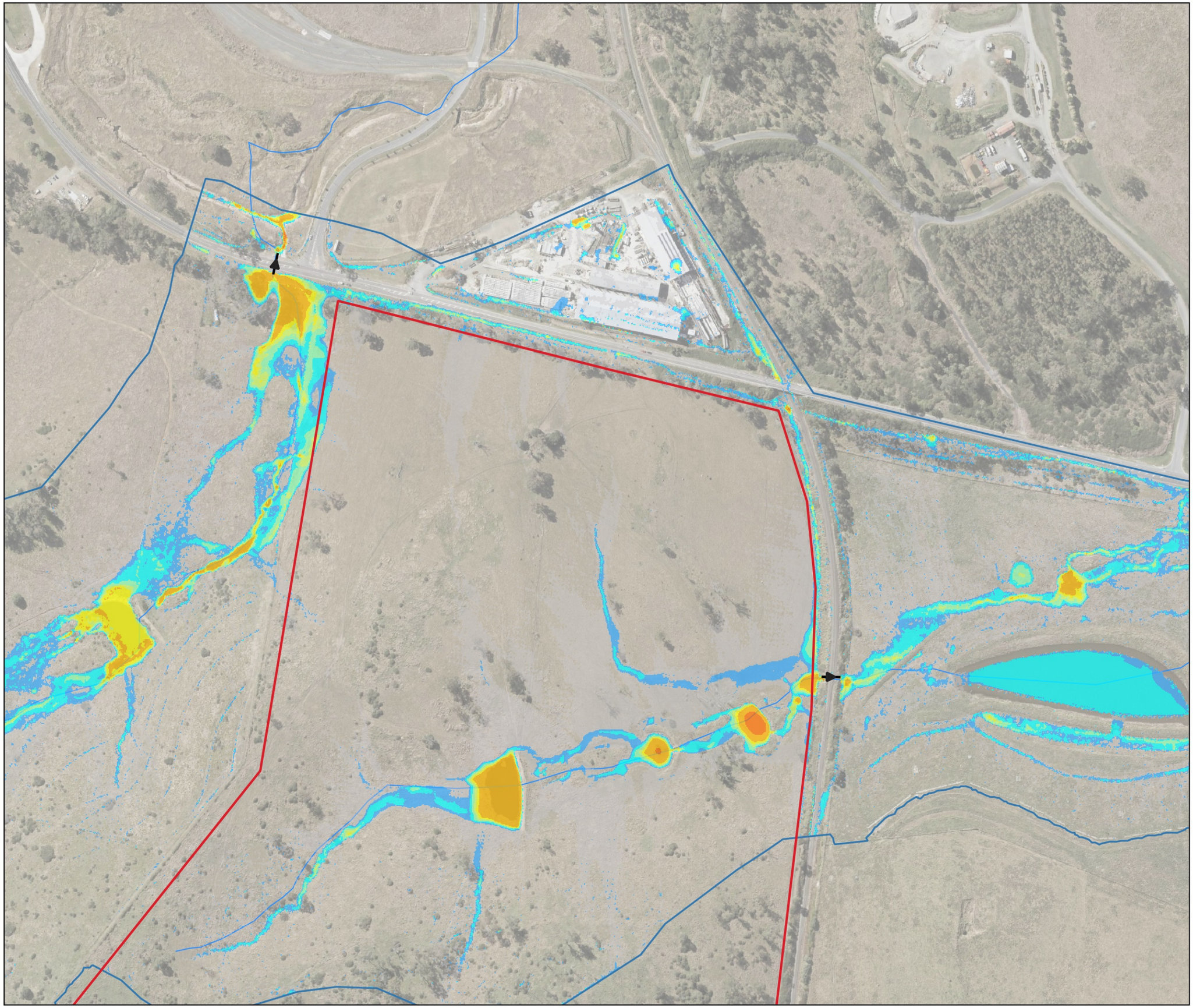

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Job Title

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Figure Title

Existing Case: 20% AEP Flood Depth

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG05	Issue A

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Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Job Title

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Figure Title

Existing Case: 50% AEP Flood Depth

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG06	Issue A

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Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Job Title

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Figure Title

Existing Case: 63.2% AEP Flood Depth

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG07	Issue A

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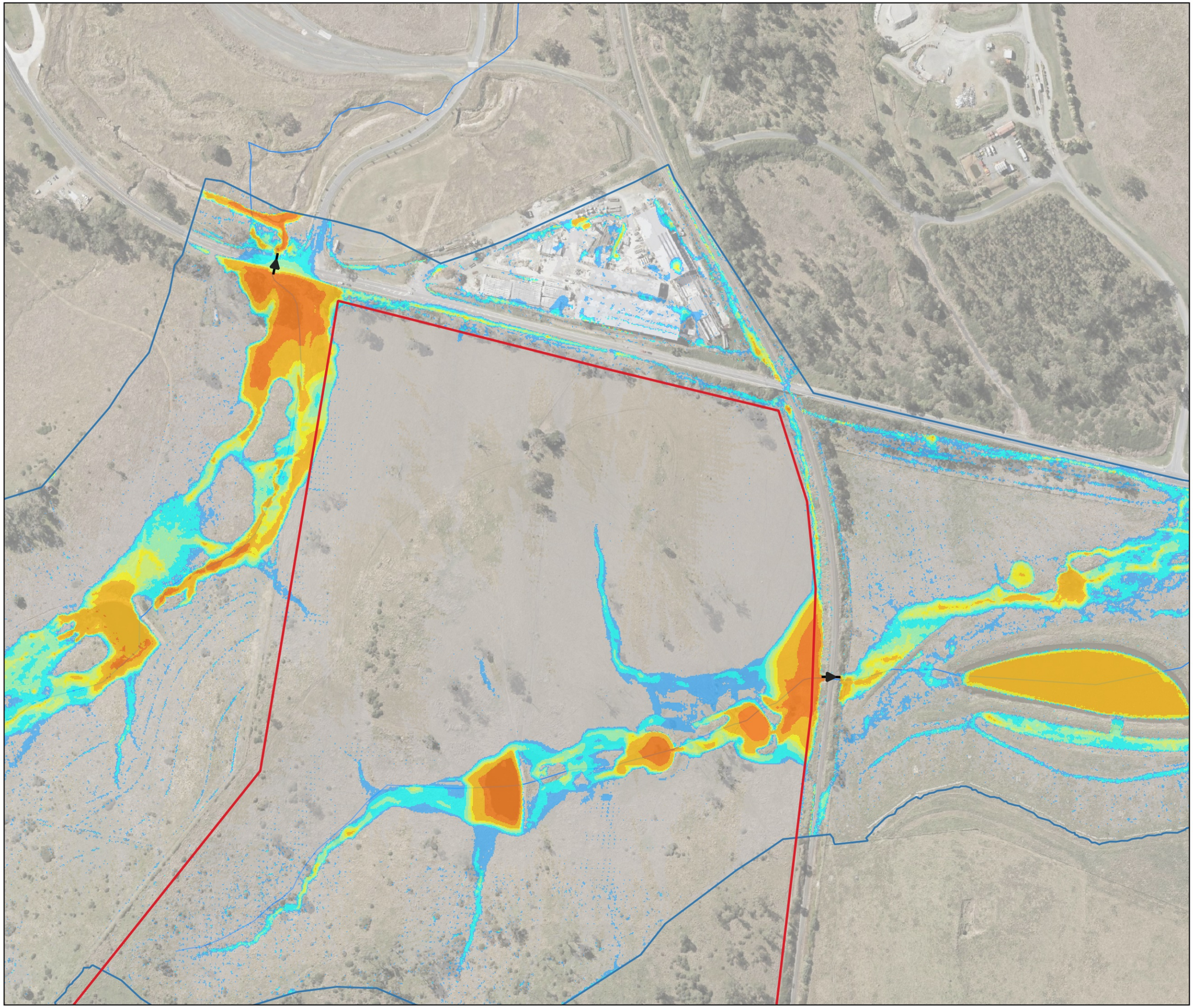

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Figure Title

Existing Case: 1% AEP + CC SSP2 Flood Depth

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Job No 293683-00	Drawing Status For Information
Map No FIG08	Issue A

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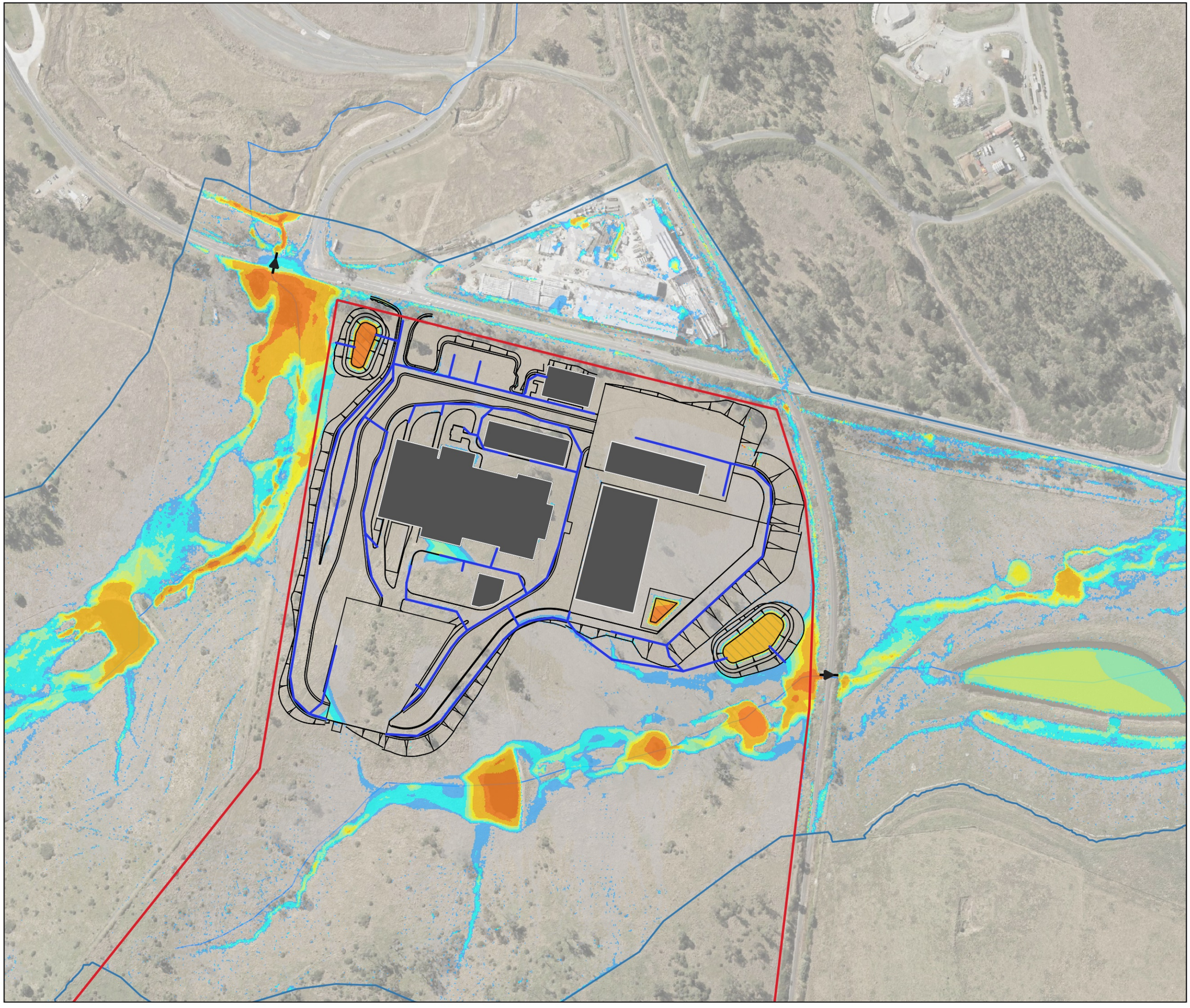

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Job Title

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Figure Title

Design Case: 1% AEP Flood Depth

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG09	Issue A

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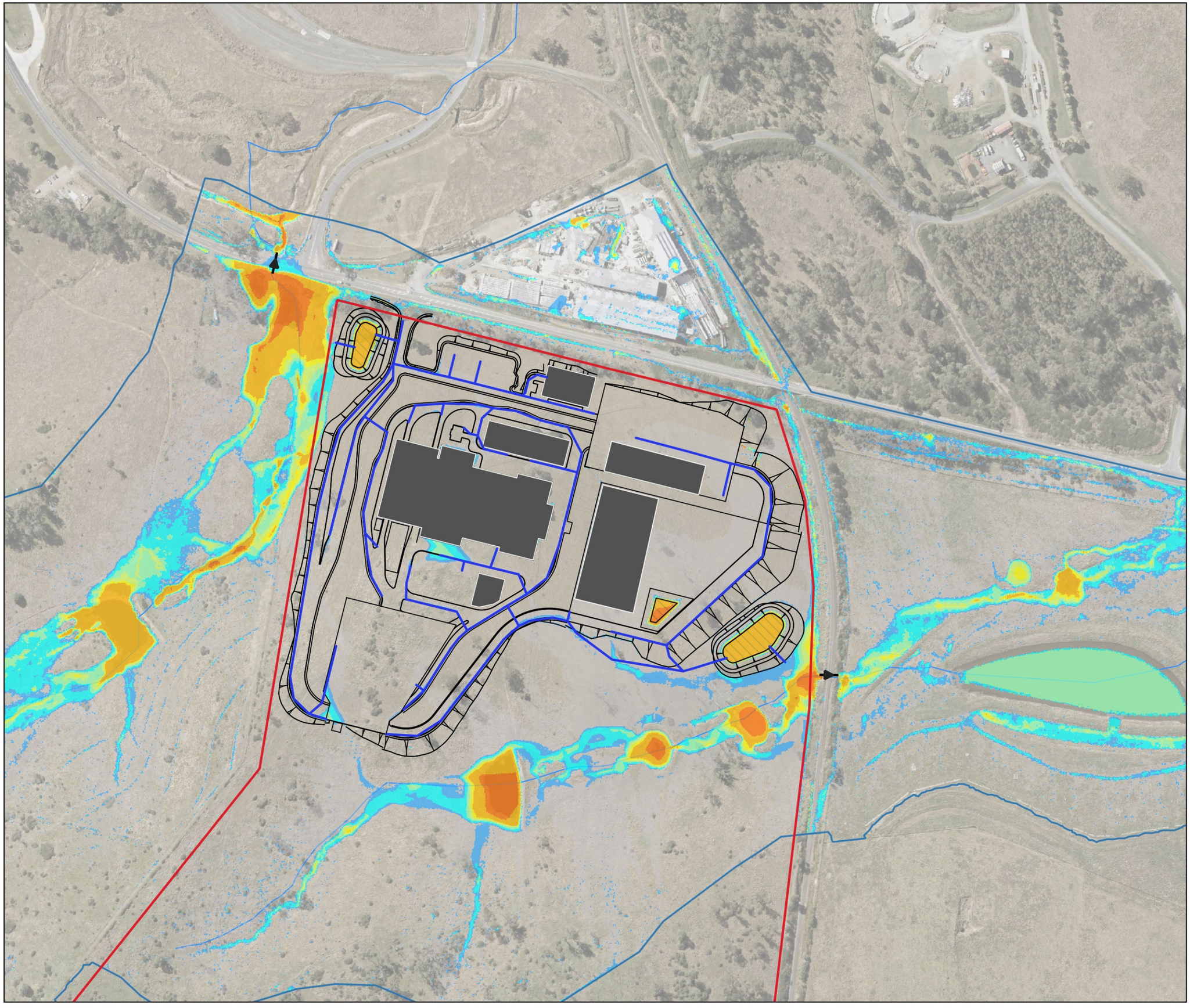

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Job Title

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Figure Title

Design Case: 2% AEP Flood Depth

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Map No FIG10	Issue A

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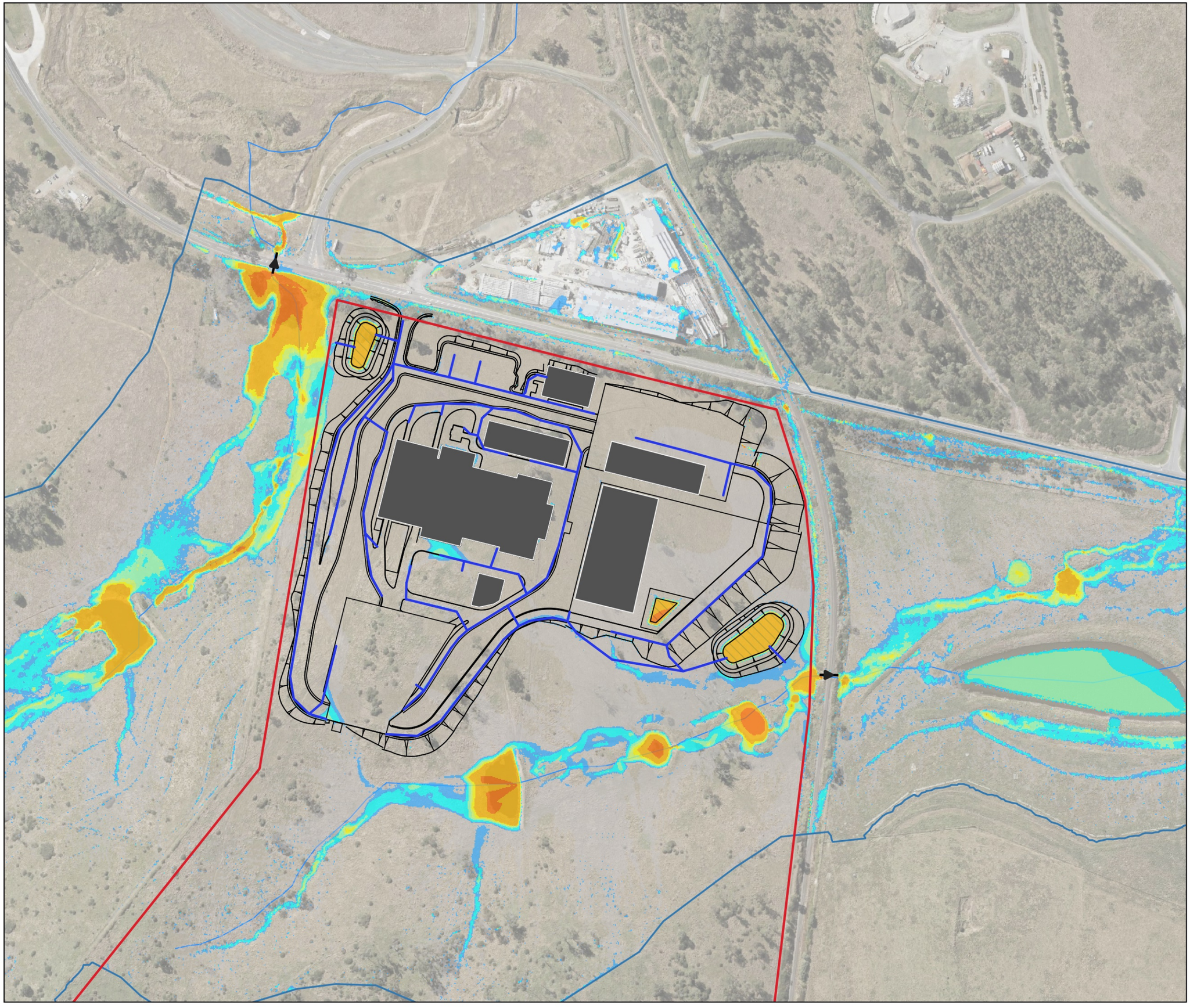

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Job Title

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Figure Title

Design Case: 5% AEP Flood Depth

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Job No 293683-00	Drawing Status For Information
Map No FIG11	Issue A

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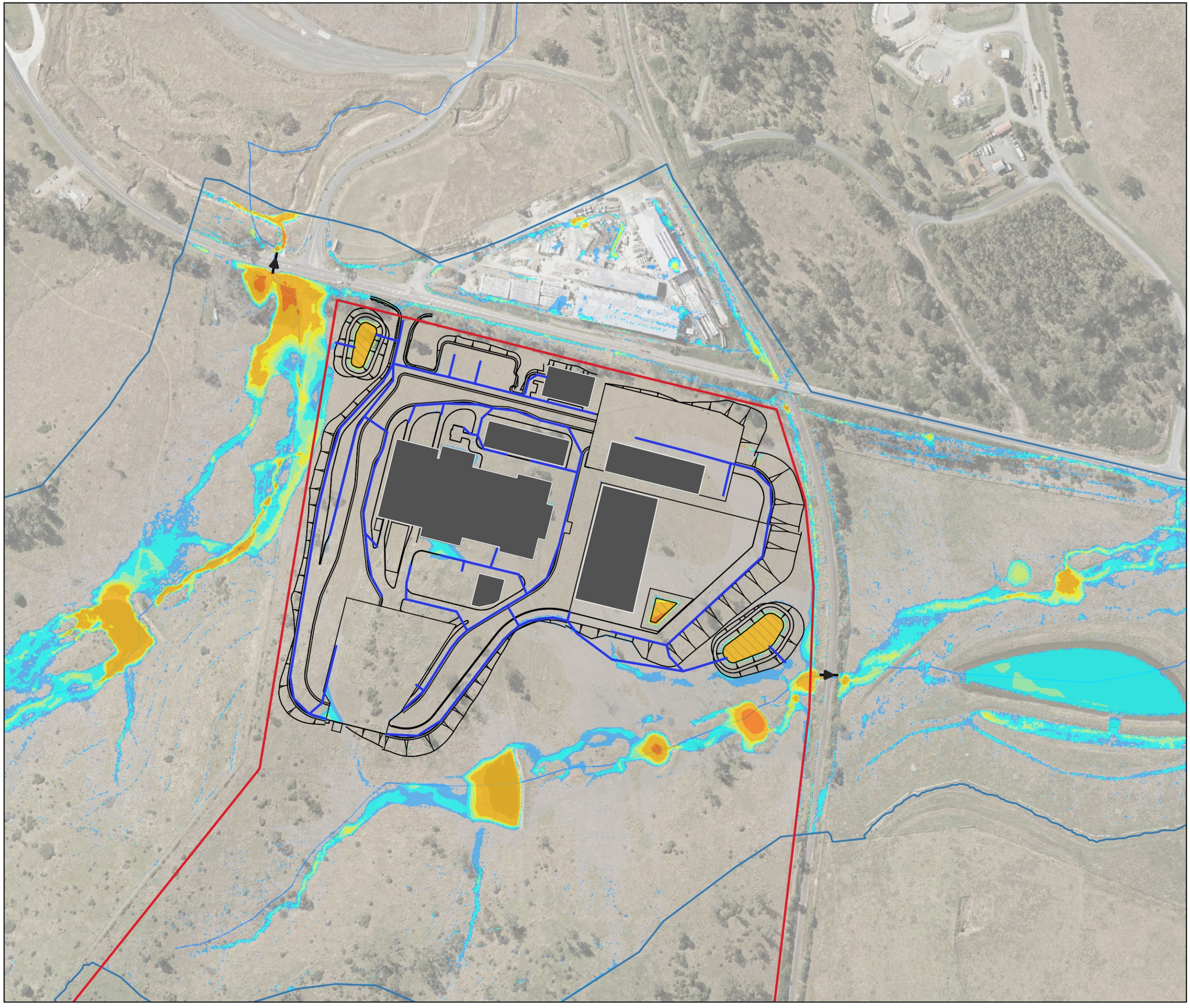

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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CLEANAWAY
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Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 10% AEP Flood Depth

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG12	Issue A

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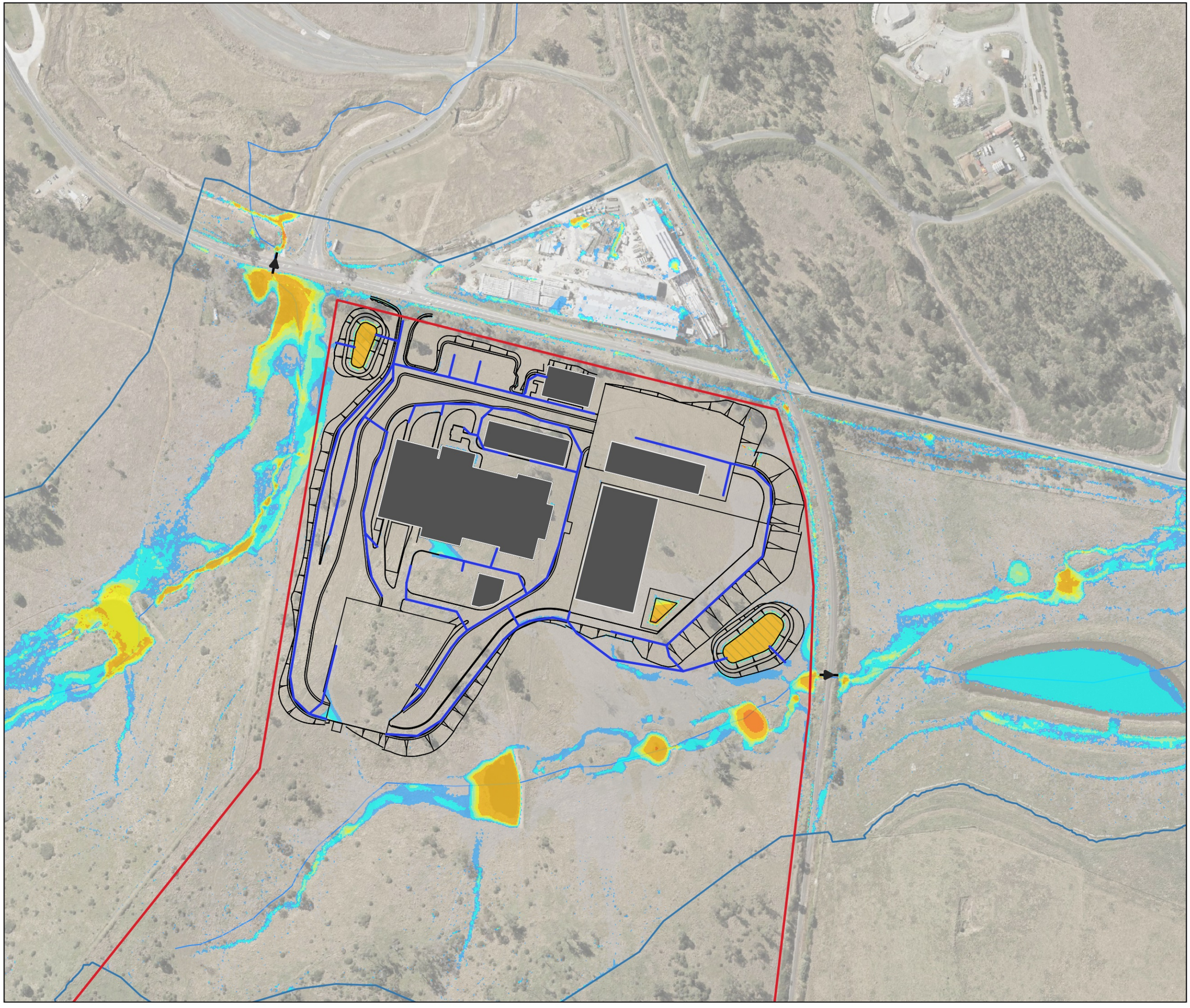

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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CLEANAWAY
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Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 20% AEP Flood Depth

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG13	Issue A

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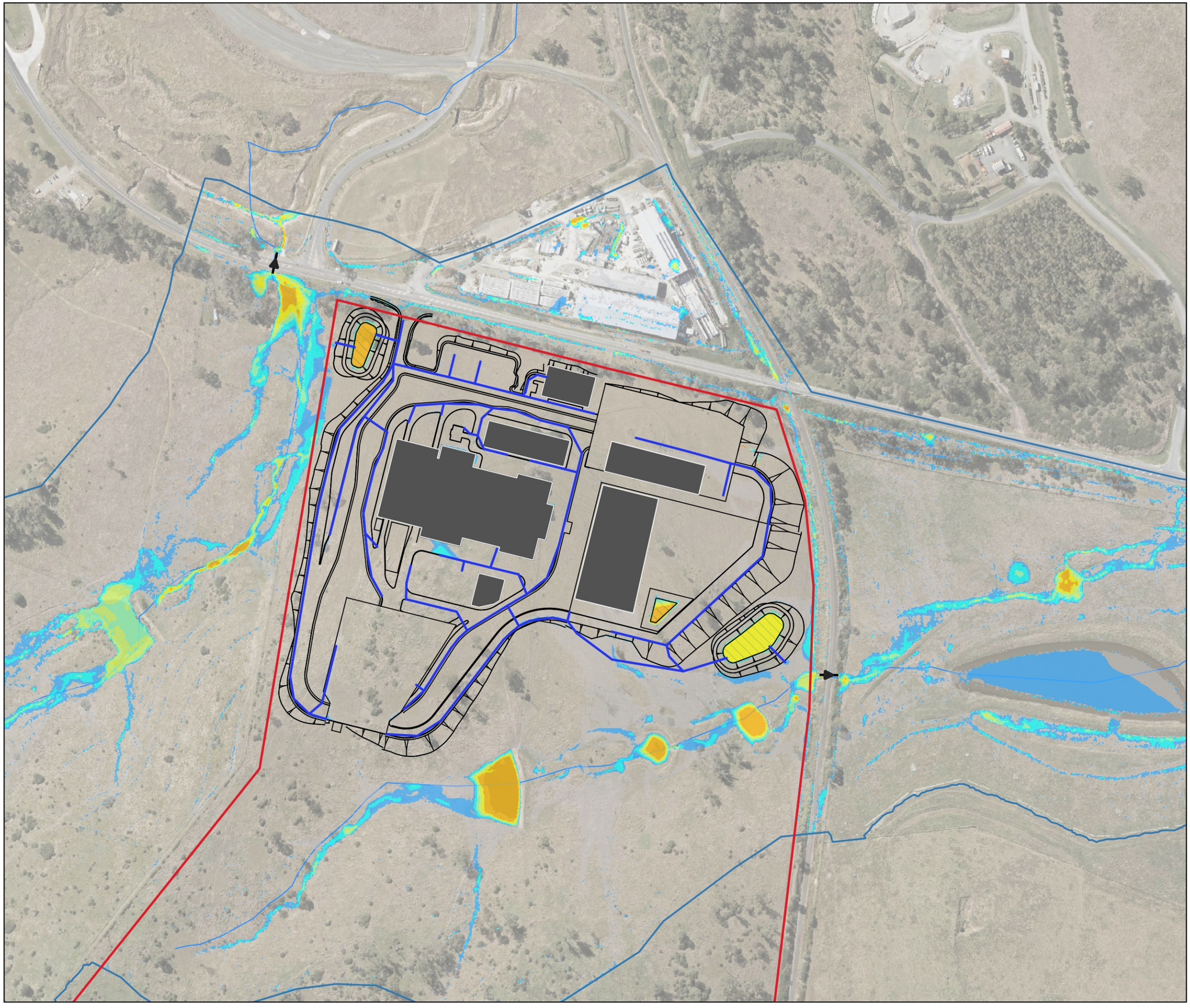

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
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- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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CLEANAWAY
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Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 50% AEP Flood Depth

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Job No 293683-00	Drawing Status For Information
Map No FIG14	Issue A

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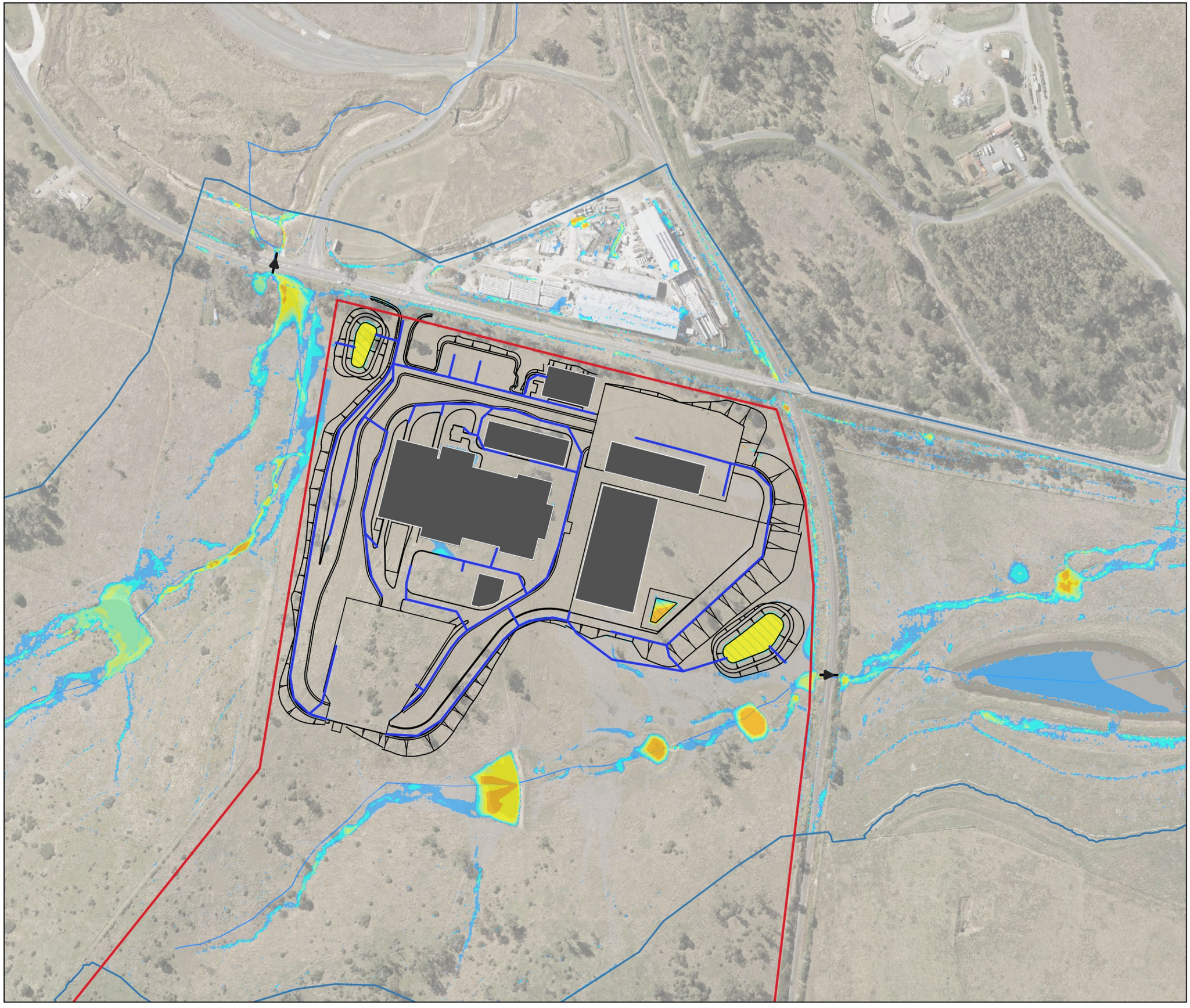

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

ARUP
Level 26, 123 Albert Street,
Brisbane, QLD, 4000 Australia

Client

CLEANAWAY
Making a sustainable future possible

Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 63.2% AEP Flood Depth

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG15	Issue A

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Sources: QLD Globe Imagery, QLD Spatial

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth (m)

- <= 0.05
- 0.05 - 0.10
- 0.10 - 0.20
- 0.20 - 0.30
- 0.30 - 0.40
- 0.40 - 0.50
- 0.50 - 1.00
- 1.00 - 2.50
- > 2.50

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

ARUP
Level 26, 123 Albert Street,
Brisbane, QLD, 4000 Australia

Client

CLEANAWAY
Making a sustainable future possible

Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 1% AEP + CC SSP2 Flood Depth

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG16	Issue A

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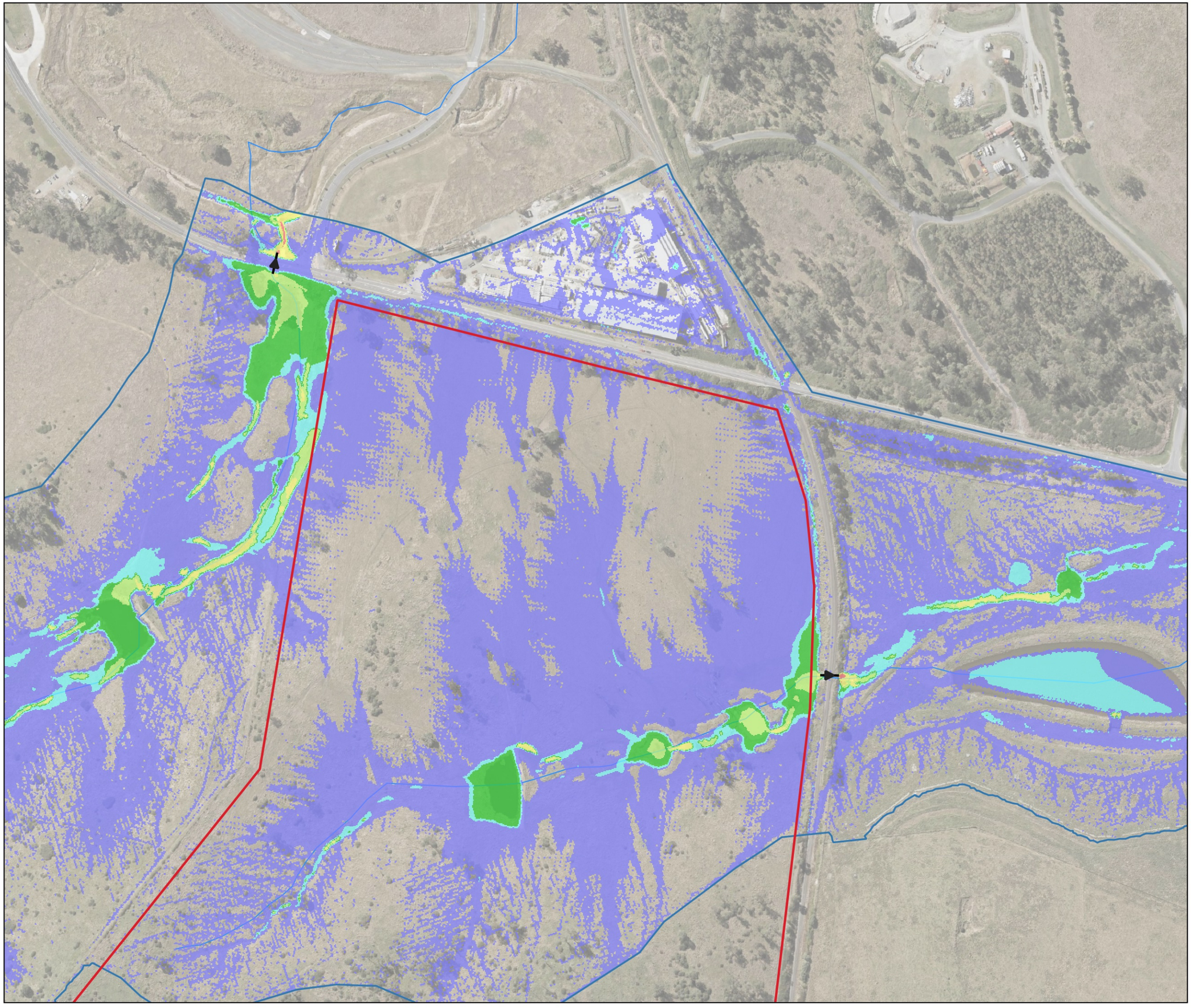
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

ARUP
Level 26, 123 Albert Street,
Brisbane, QLD, 4000 Australia

Client

CLEANAWAY
Making a sustainable future possible

Job Title

Cleanaway Bromelton EFW

Figure Title

Existing Case: 1% AEP Flood Hazard

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG17	Issue A

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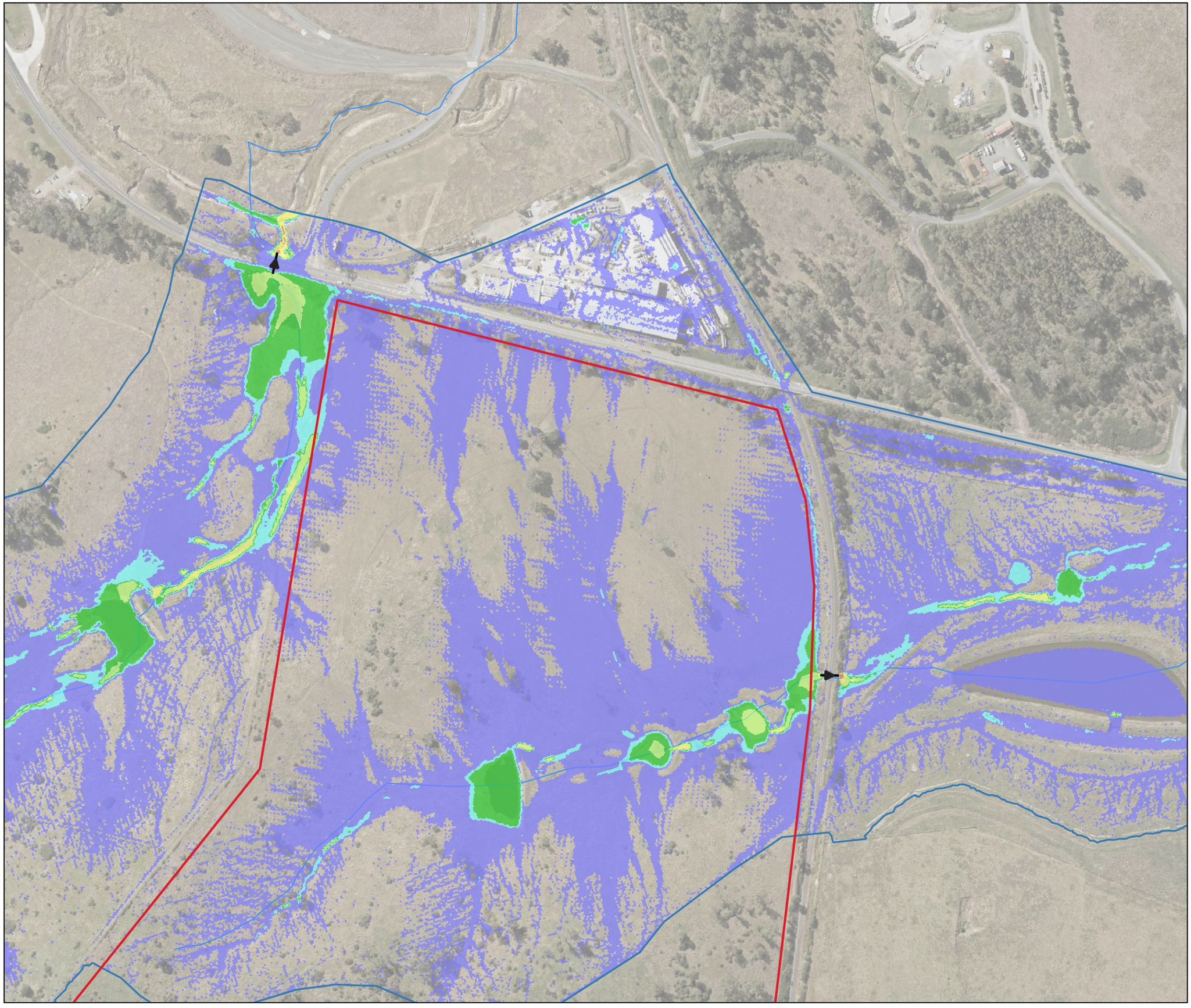
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Client

CLEANAWAY
Making a sustainable future possible

Job Title

Cleanaway Bromelton EFW

Figure Title

Existing Case: 2% AEP Flood Hazard

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG18	Issue A

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Sources: QLD Globe Imagery, QLD Spatial

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

ARUP
Level 26, 123 Albert Street,
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Client

CLEANAWAY
Making a sustainable future possible

Job Title

Cleanaway Bromelton EFW

Figure Title

Existing Case: 5% AEP Flood Hazard

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG19	Issue A

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Sources: QLD Globe Imagery, QLD Spatial

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

ARUP
Level 26, 123 Albert Street,
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Client

CLEANAWAY
Making a sustainable future possible

Job Title

Cleanaway Bromelton EFW

Figure Title

Existing Case: 10% AEP Flood Hazard

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG20	Issue A

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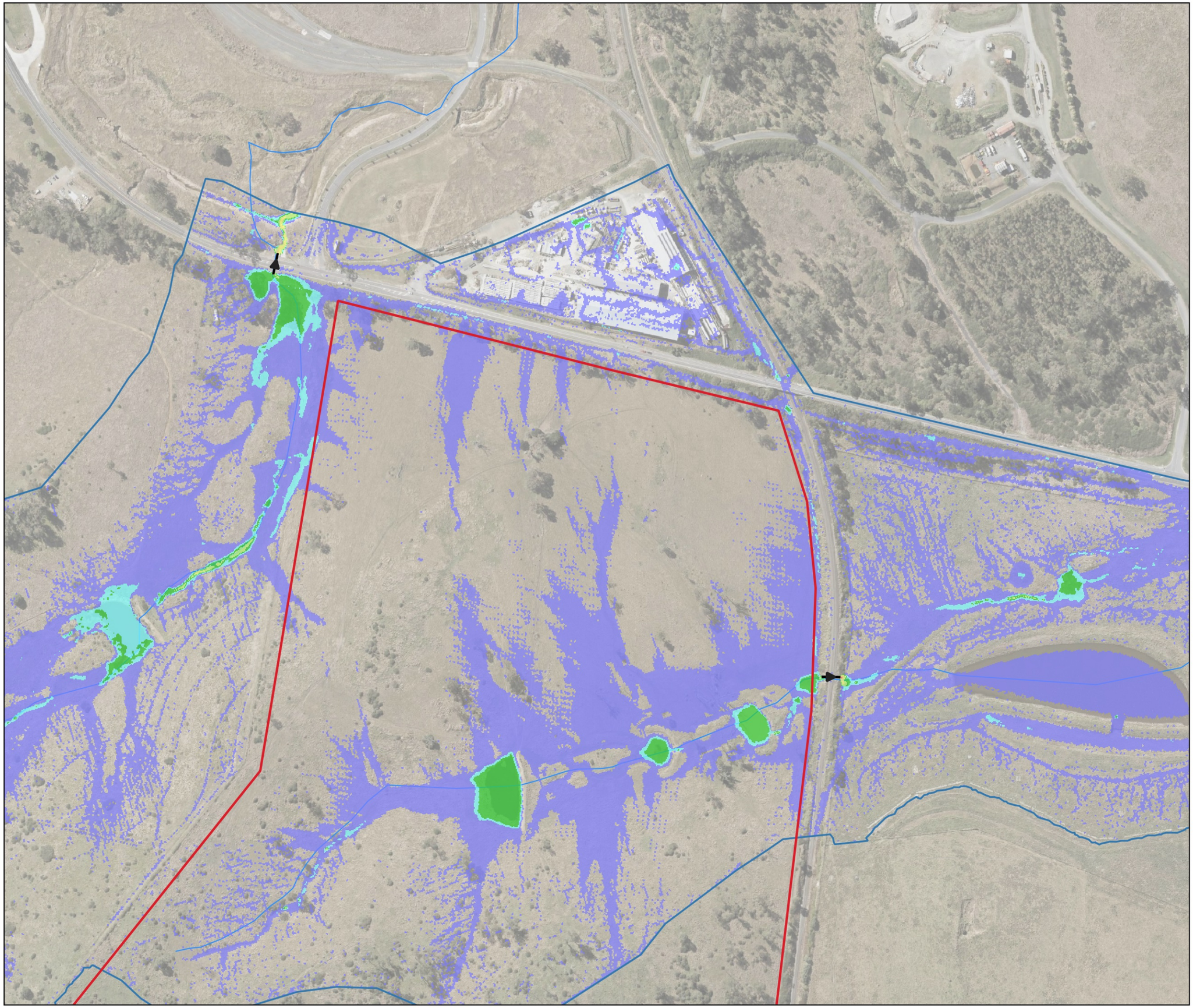
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

ARUP
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Client

CLEANAWAY
Making a sustainable future possible

Job Title

Cleanaway Bromelton EFW

Figure Title

Existing Case: 20% AEP Flood Hazard

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG21	Issue A

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Sources: QLD Globe Imagery, QLD Spatial

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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CLEANAWAY
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Job Title

Cleanaway Bromelton EFW

Figure Title

Existing Case: 50% AEP Flood Hazard

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG22	Issue A

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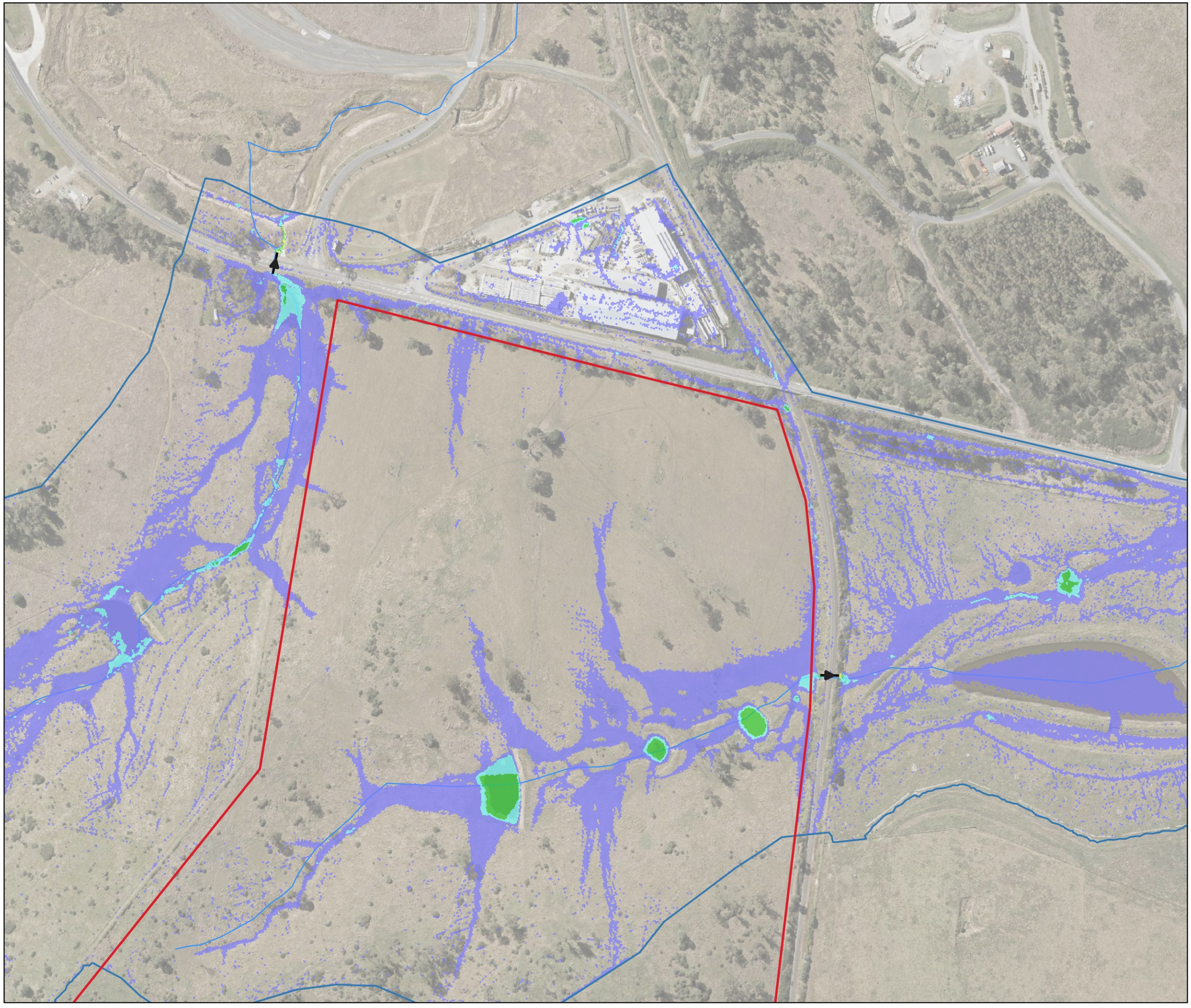
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

ARUP
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Client

CLEANAWAY
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Job Title

Cleanaway Bromelton EFW

Figure Title

Existing Case: 63.2% AEP Flood Hazard

Scale at A3	Map Projection
1:4000	GDA2020/MGA Zone 56 EPSG:7856
Job No	**Drawing Status**
293683-00	For Information
Map No	**Issue**
FIG23	A

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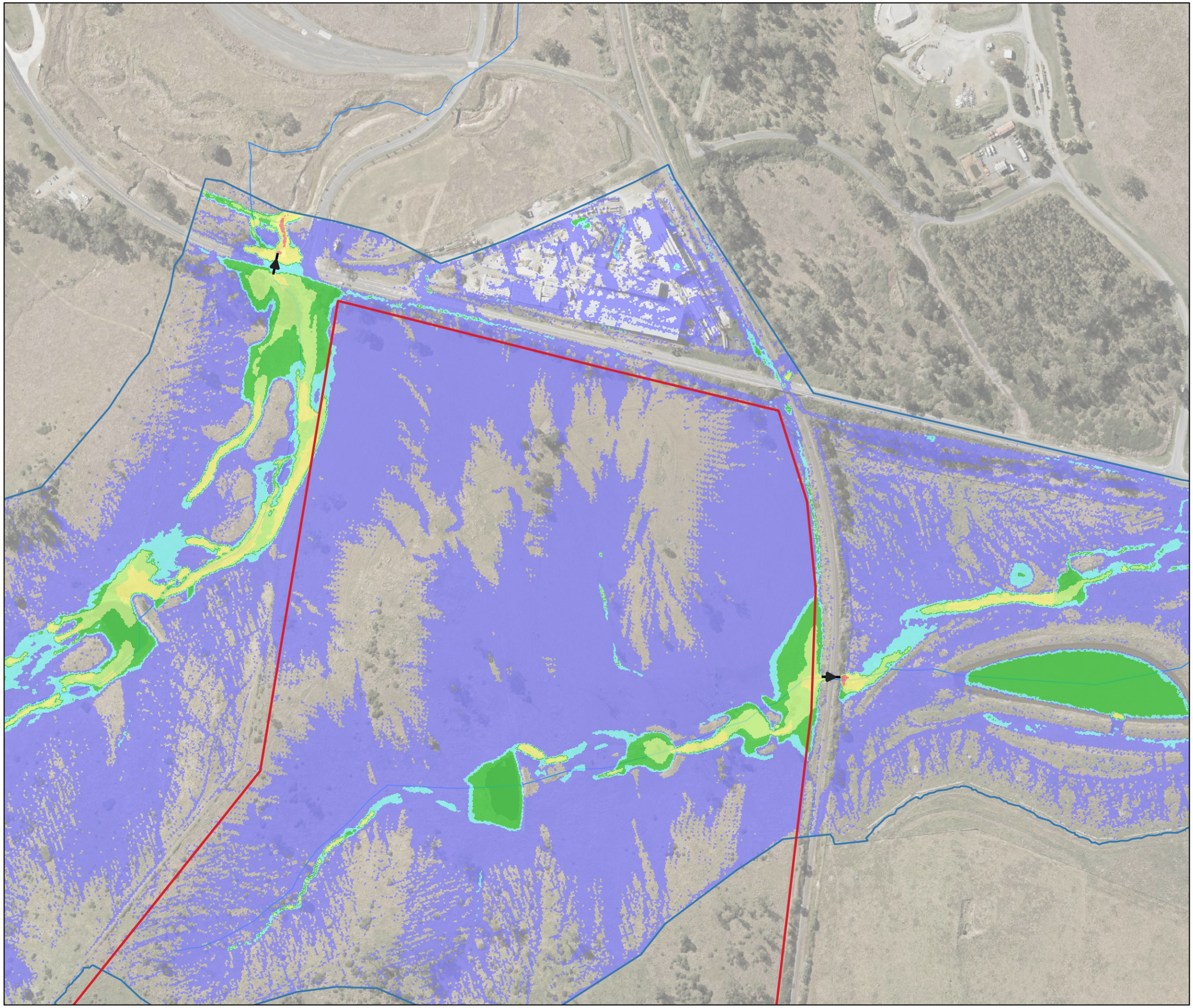
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Watercourses

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

ARUP
Level 26, 123 Albert Street,
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Client

CLEANAWAY
Making a sustainable future possible

Job Title

Cleanaway Bromelton EFW

Figure Title

Existing Case: 1% AEP + CC SSP2 Flood Hazard

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG24	Issue A

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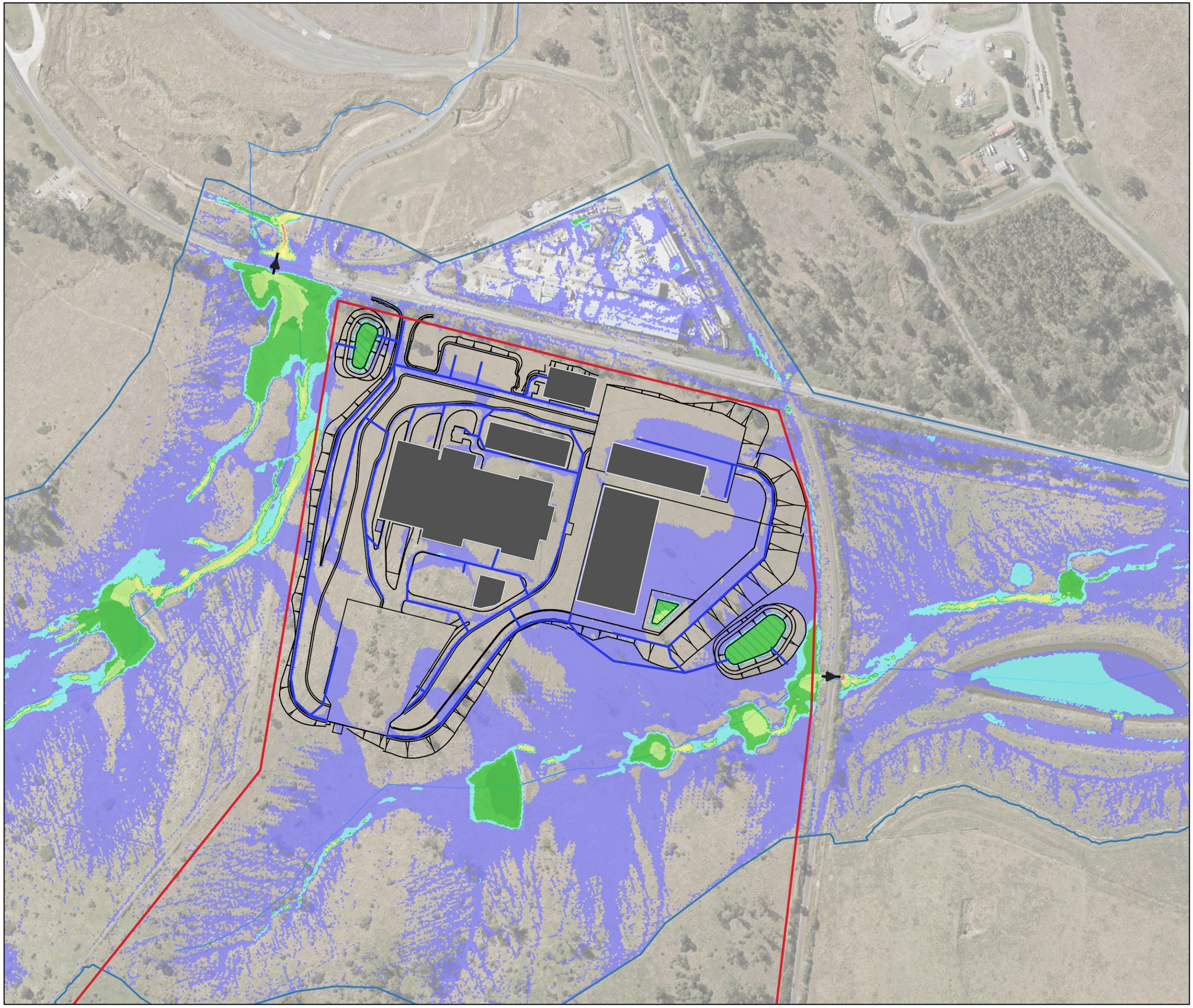
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Proposed Building
- Proposed Basin
- Proposed Layout

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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CLEANAWAY
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Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 1% AEP Flood Hazard

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG25	Issue A

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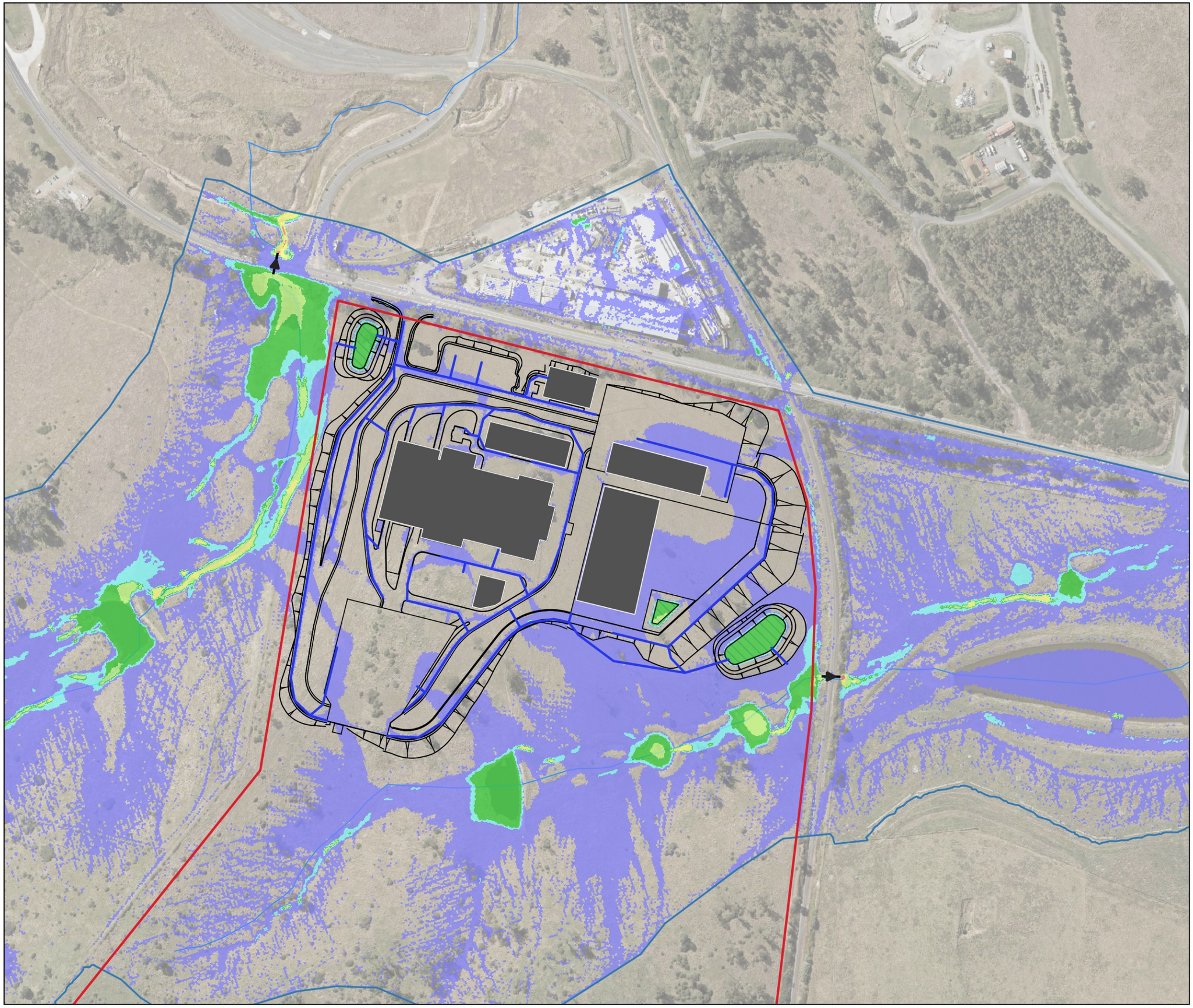
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Proposed Building
- Proposed Basin
- Proposed Layout

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Client

CLEANAWAY
Making a sustainable future possible

Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 2% AEP Flood Hazard

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG26	Issue A

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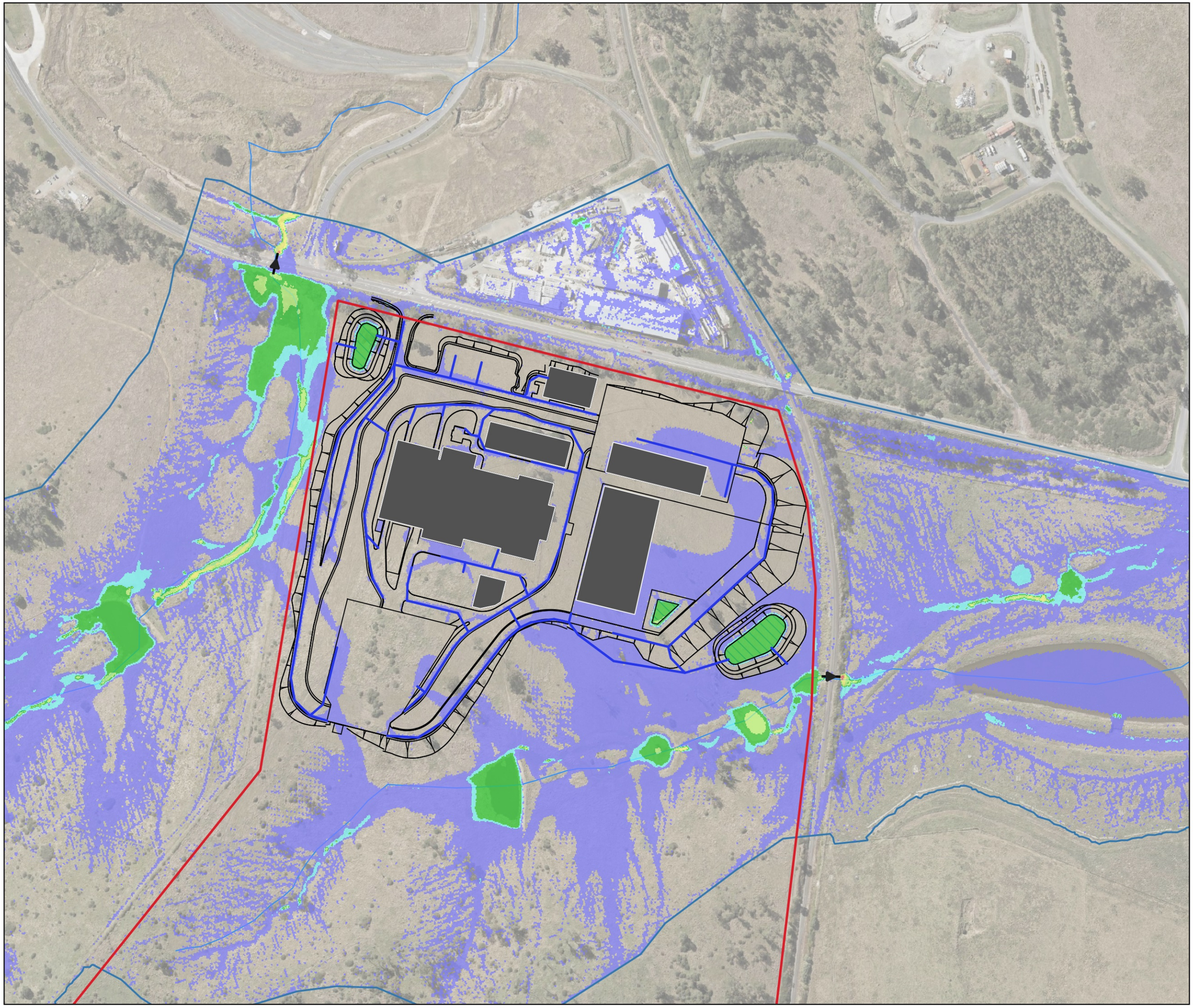

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Proposed Building
- Proposed Basin
- Proposed Layout

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

ARUP
Level 26, 123 Albert Street,
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Client

CLEANAWAY
Making a sustainable future possible

Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 5% AEP Flood Hazard

Scale at A3	Map Projection
1:4000	GDA2020/MGA Zone 56 EPSG:7856
Job No	Drawing Status
293683-00	For Information
Map No	Issue
FIG27	A

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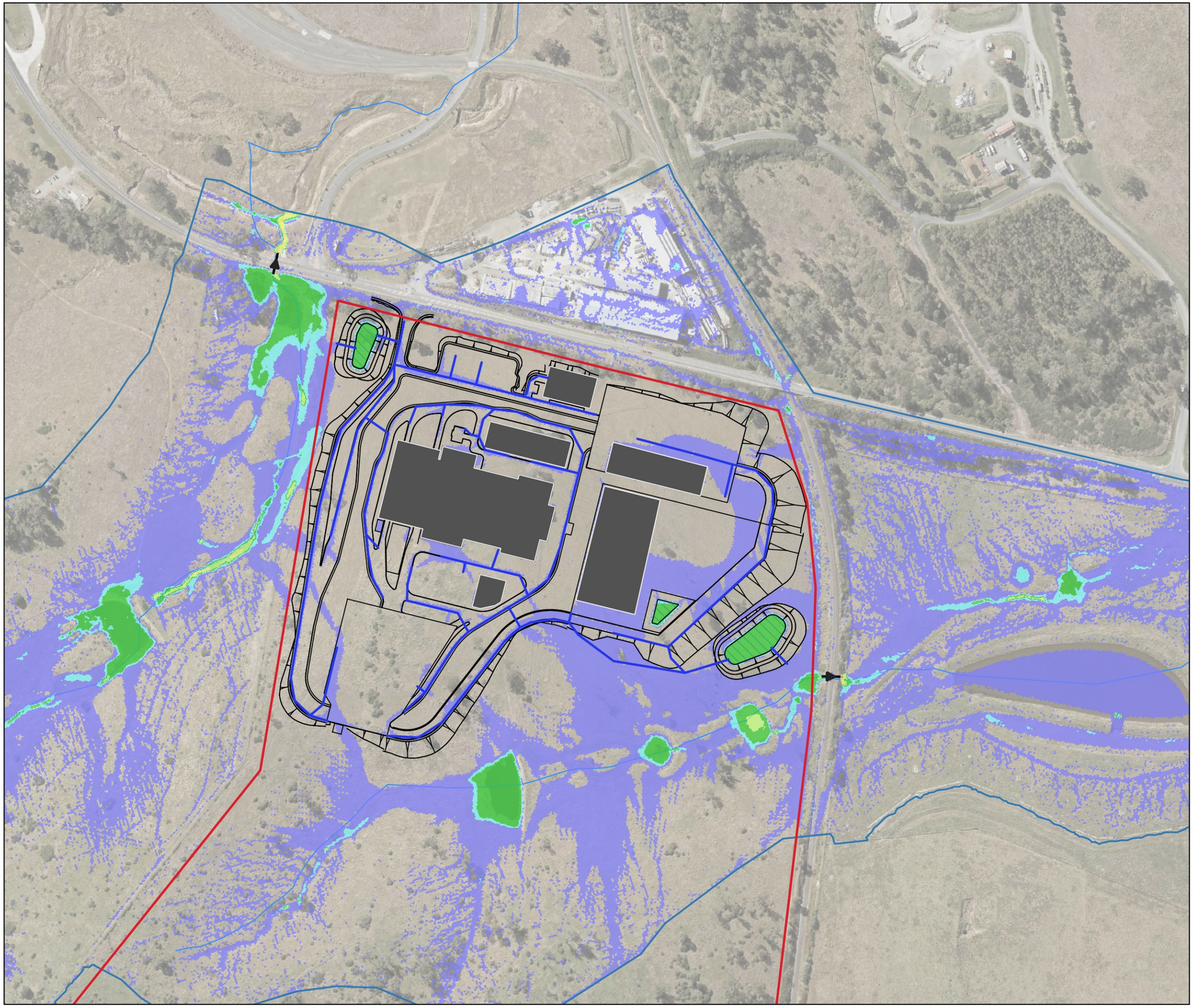
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Proposed Building
- Proposed Basin
- Proposed Layout

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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CLEANAWAY
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Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 10% AEP Flood Hazard

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG28	Issue A

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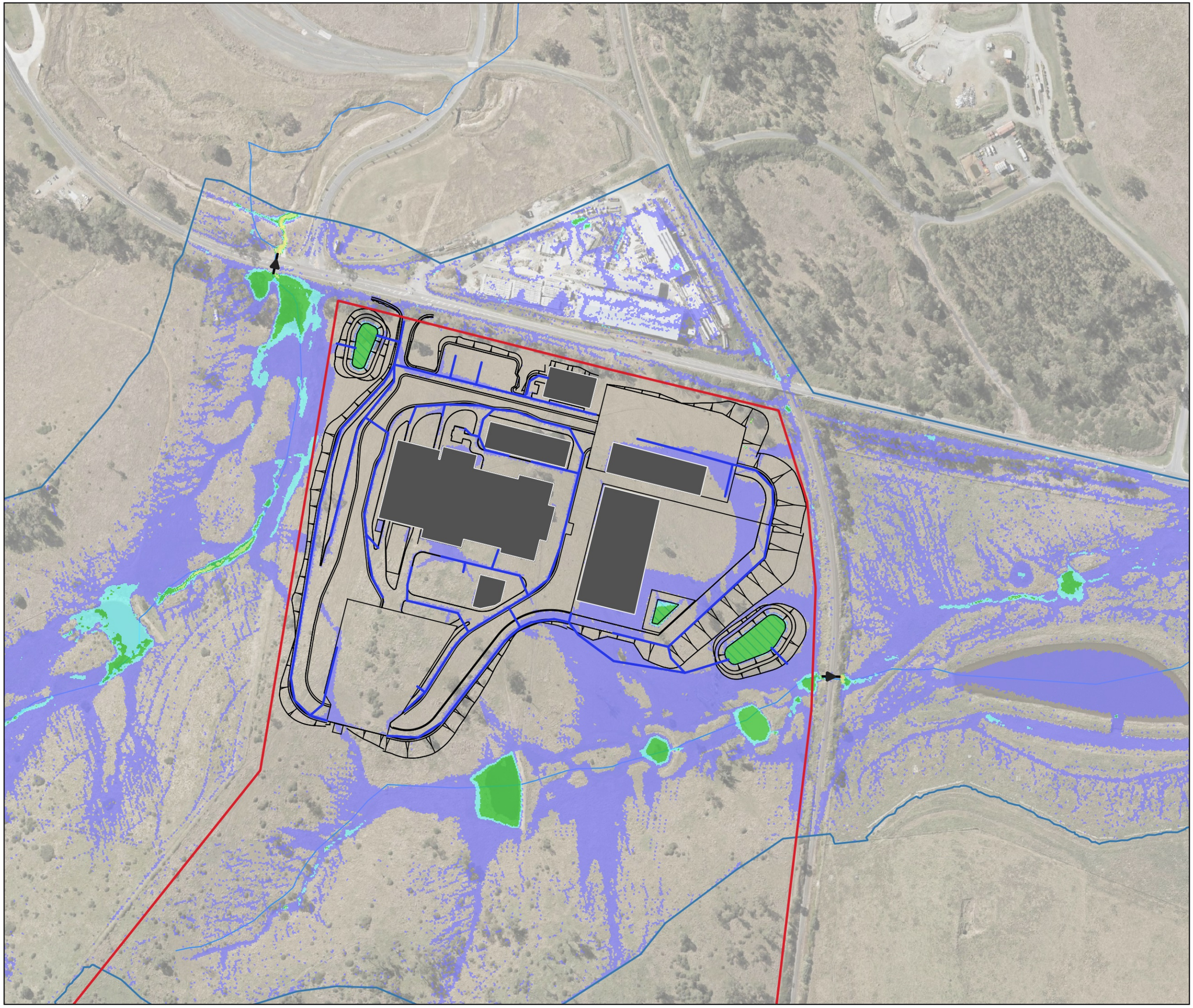

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Proposed Building
- Proposed Basin
- Proposed Layout

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

ARUP
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CLEANAWAY
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Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 20% AEP Flood Hazard

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG29	Issue A

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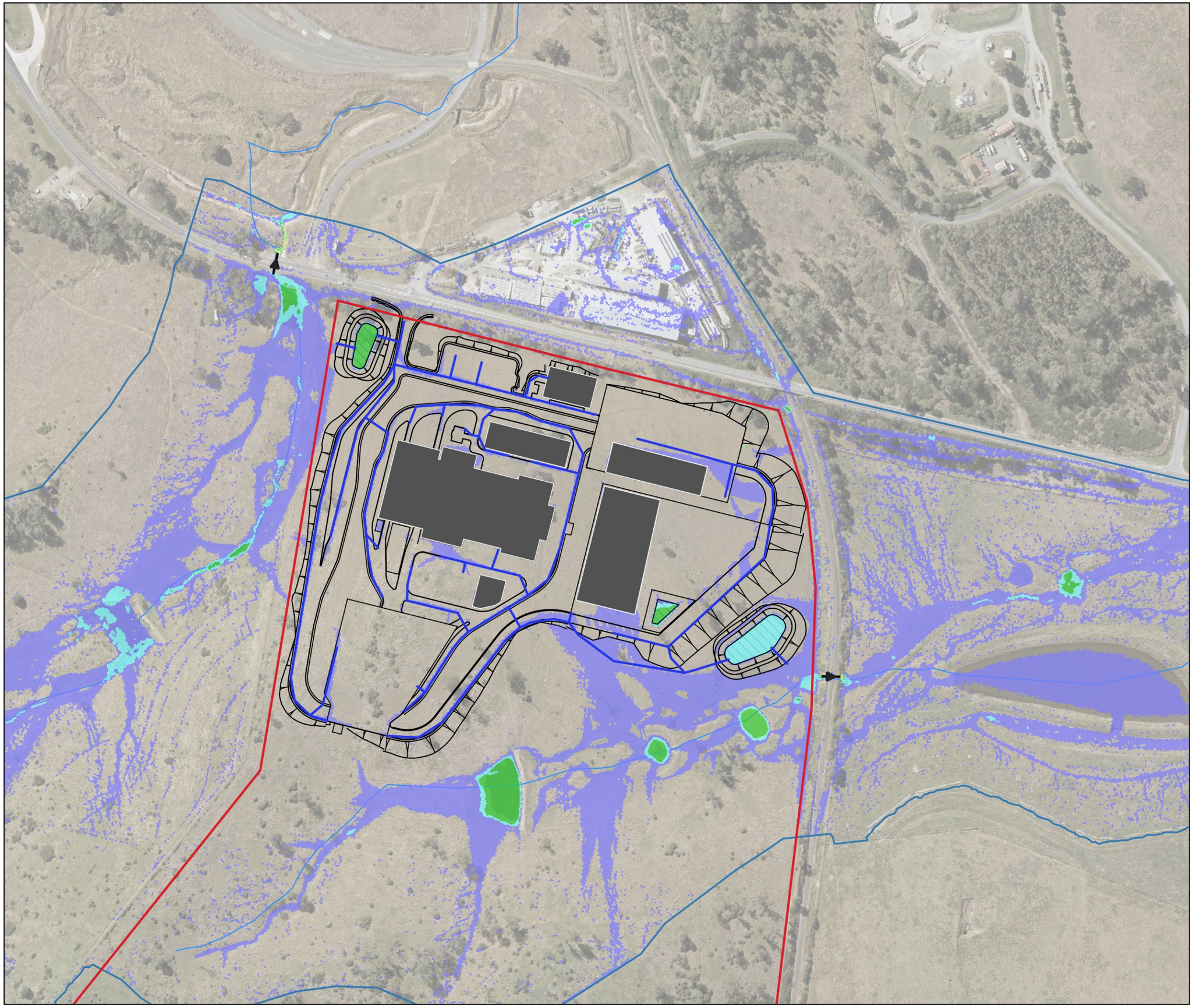
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Proposed Building
- Proposed Basin
- Proposed Layout

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Client

CLEANAWAY
Making a sustainable future possible

Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 50% AEP Flood Hazard

Scale at A3 1:4000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG30	Issue A

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Sources: QLD Globe Imagery, QLD Spatial

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Proposed Building
- Proposed Basin
- Proposed Layout

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Level 26, 123 Albert Street,
Brisbane, QLD, 4000 Australia

Client

CLEANAWAY
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Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 63.2% AEP Flood Hazard

Scale at A3	Map Projection
1:4000	GDA2020/MGA Zone 56 EPSG:7856
Job No	**Drawing Status**
293683-00	For Information
Map No	**Issue**
FIG31	A

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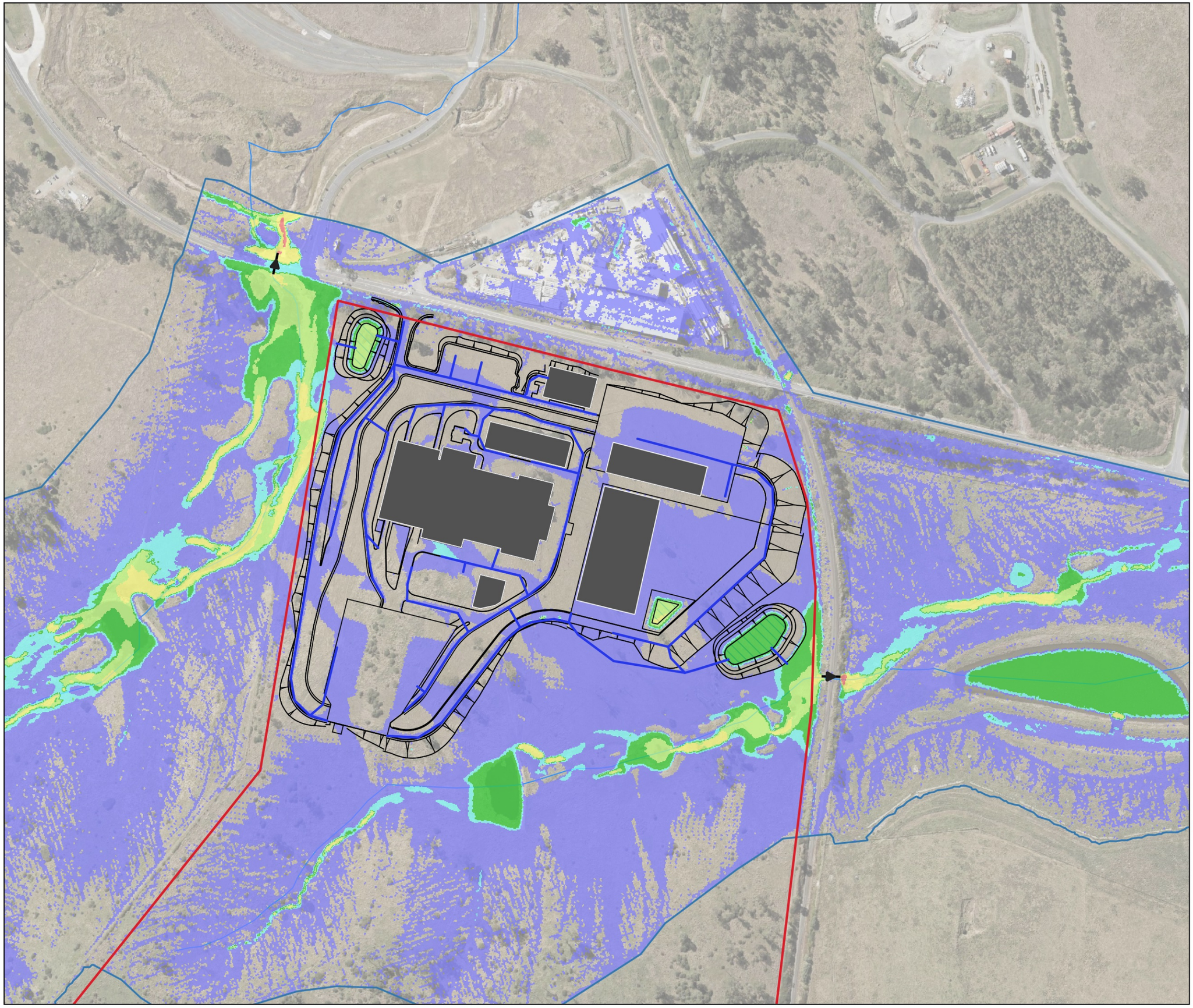
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Proposed Building
- Proposed Basin
- Proposed Layout

Hazard Category

- H1 Generally safe for vehicles, people and buildings.
- H2 Unsafe for small vehicles.
- H3 Unsafe for vehicles, children and the elderly.
- H4 Unsafe for vehicles and people.
- H5 Unsafe for vehicles and people. All building types vulnerable to structural damage.
- H6 Unsafe for vehicles and people. All building types considered vulnerable to failure.

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 70 140 210 m

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Client

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Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 1% AEP + CC SSP2 Flood Hazard

Scale at A3	Map Projection
1:4000	GDA2020/MGA Zone 56 EPSG:7856
Job No	Drawing Status
293683-00	For Information
Map No	Issue
FIG32	A

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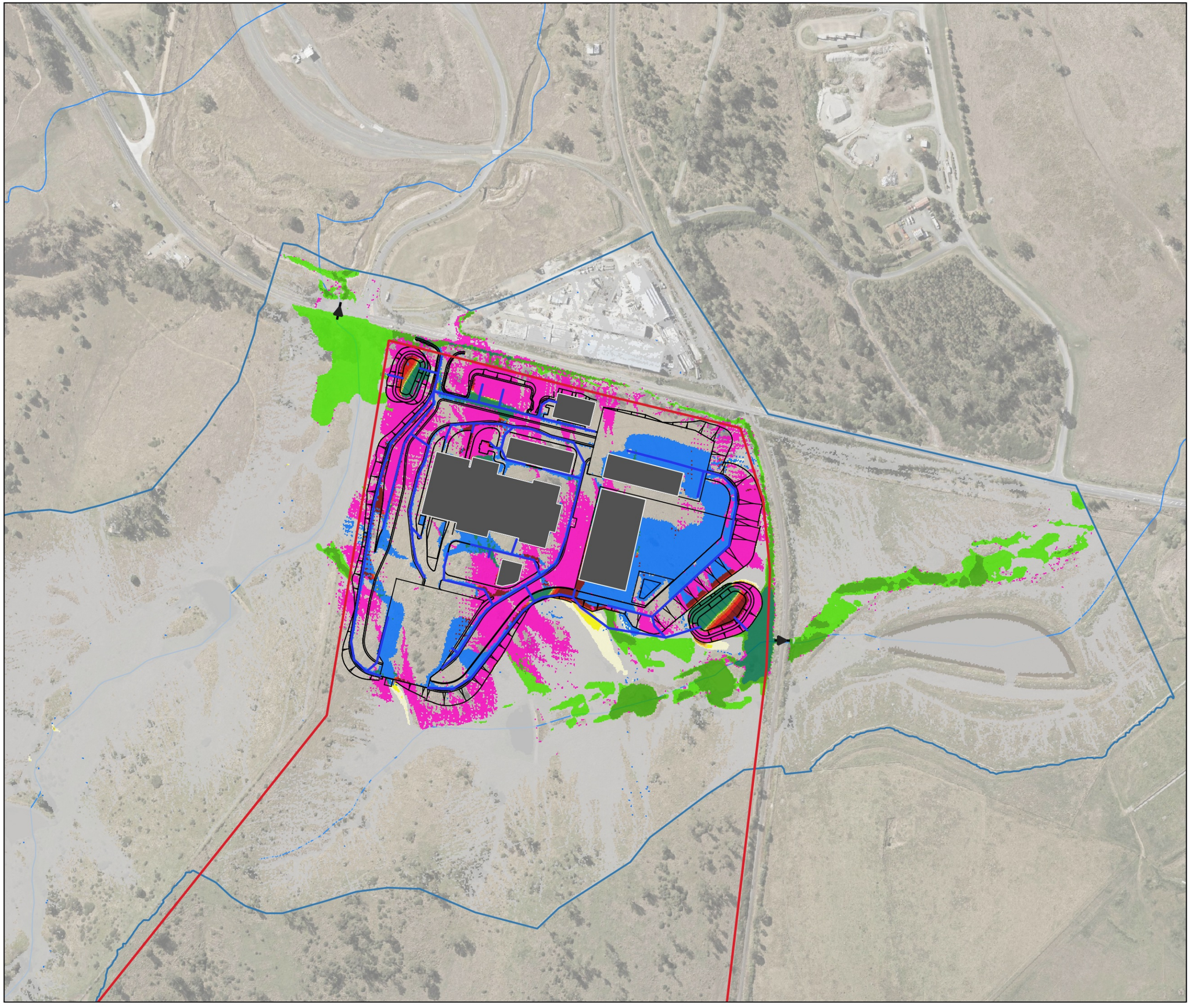
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth Difference (m)

- Was Wet, Now Dry
- < - 0.1
- -0.5 to -0.02
- -0.02 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.03
- 0.02 to 0.04
- 0.04 to 0.05
- 0.05 to 0.075
- 0.075 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- Was Dry, Now Wet

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 90 180 270 m

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Job Title

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Figure Title

Design Case: 1% AEP Flood Depth Impacts

Scale at A3 1:5000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG33	Issue A

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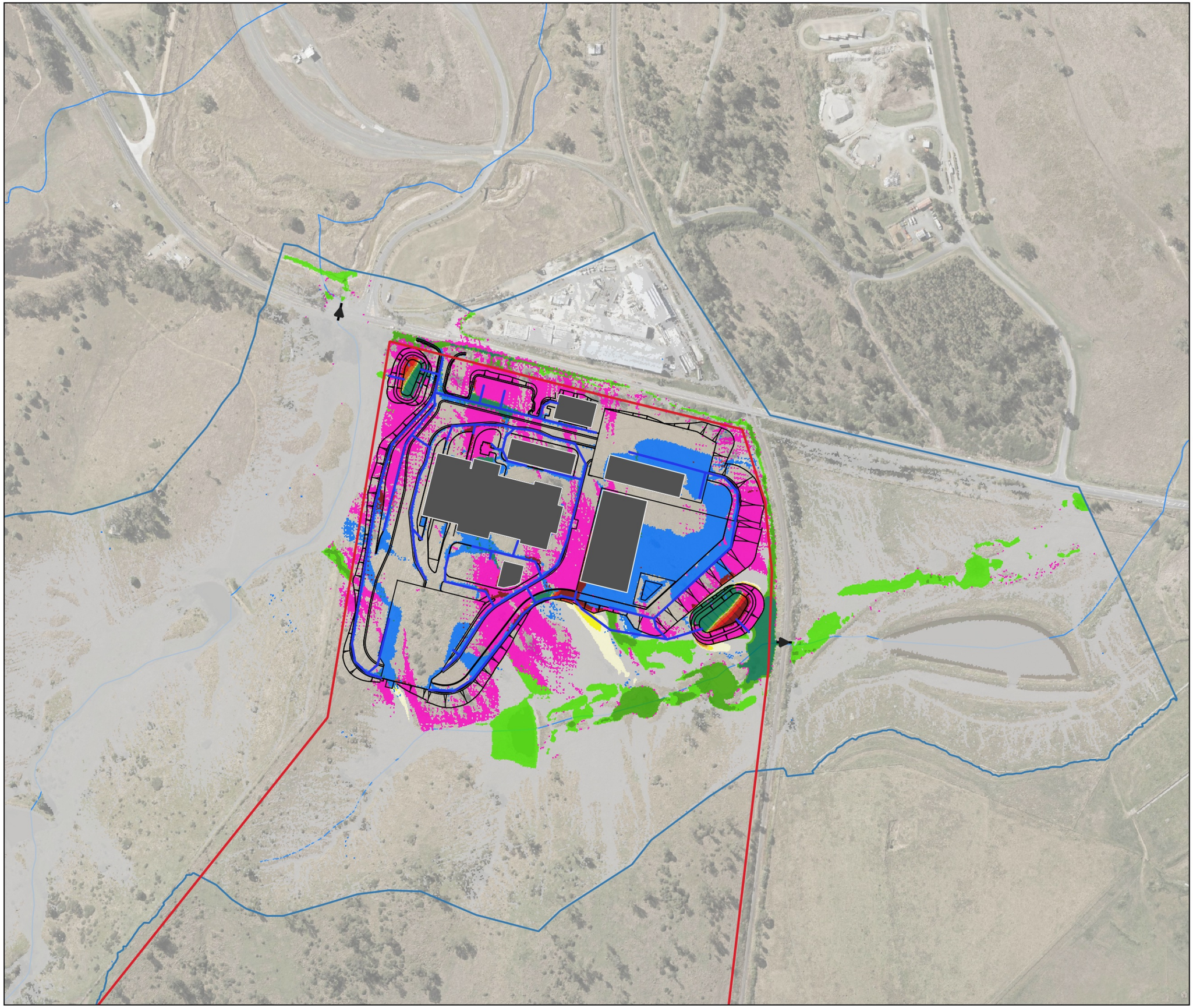
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth Difference (m)

- Was Wet, Now Dry
- < - 0.1
- -0.5 to -0.02
- -0.02 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.03
- 0.02 to 0.04
- 0.04 to 0.05
- 0.05 to 0.075
- 0.075 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- Was Dry, Now Wet

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 90 180 270 m

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Job Title

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Figure Title

Design Case: 2% AEP Flood Depth Impacts

Scale at A3 1:5000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG34	Issue A

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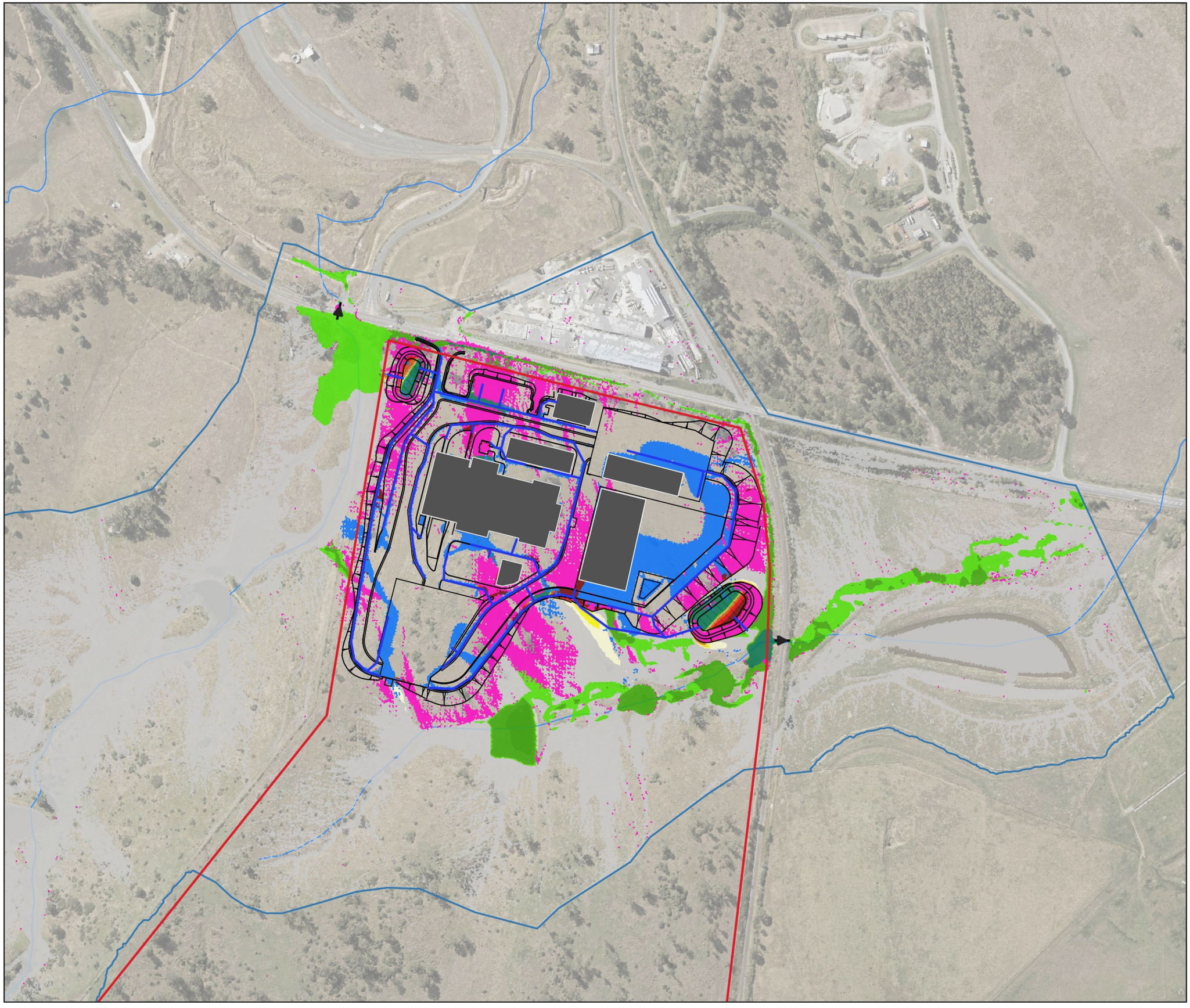
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth Difference (m)

- Was Wet, Now Dry
- < - 0.1
- -0.5 to -0.02
- -0.02 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.03
- 0.02 to 0.04
- 0.04 to 0.05
- 0.05 to 0.075
- 0.075 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- Was Dry, Now Wet

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 90 180 270 m

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Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 5% AEP Flood Depth Impacts

Scale at A3 1:5000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG35	Issue A

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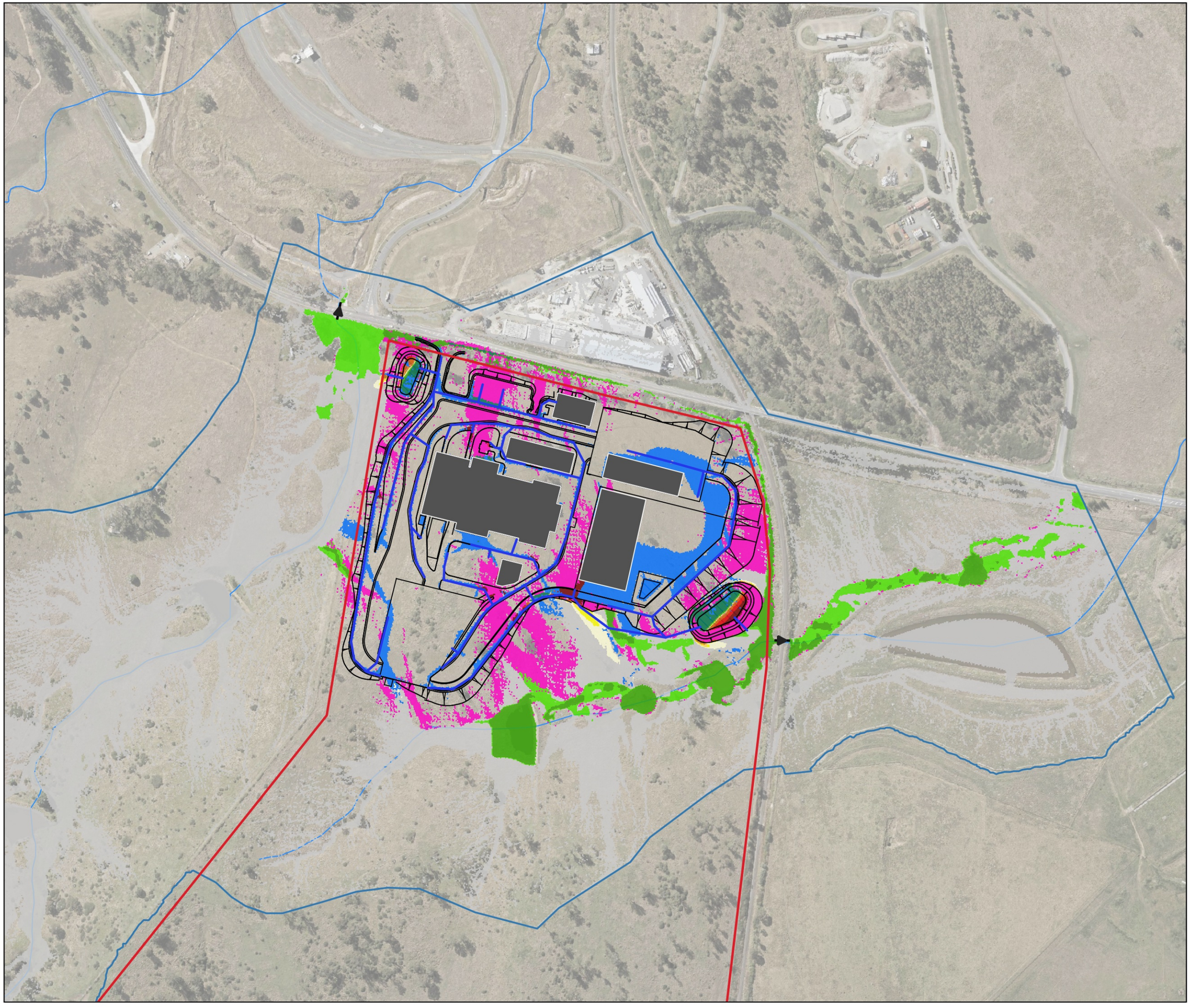
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth Difference (m)

- Was Wet, Now Dry
- < - 0.1
- -0.5 to -0.02
- -0.02 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.03
- 0.02 to 0.04
- 0.04 to 0.05
- 0.05 to 0.075
- 0.075 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- Was Dry, Now Wet

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 90 180 270 m

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Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 10% AEP Flood Depth Impacts

Scale at A3 1:5000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG36	Issue A

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Sources: QLD Globe Imagery, QLD Spatial

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth Difference (m)

- Was Wet, Now Dry
- < - 0.1
- -0.5 to -0.02
- -0.02 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.03
- 0.02 to 0.04
- 0.04 to 0.05
- 0.05 to 0.075
- 0.075 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- Was Dry, Now Wet

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 90 180 270 m

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Job Title

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Figure Title

Design Case: 20% AEP Flood Depth Impacts

Scale at A3 1:5000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG37	Issue A

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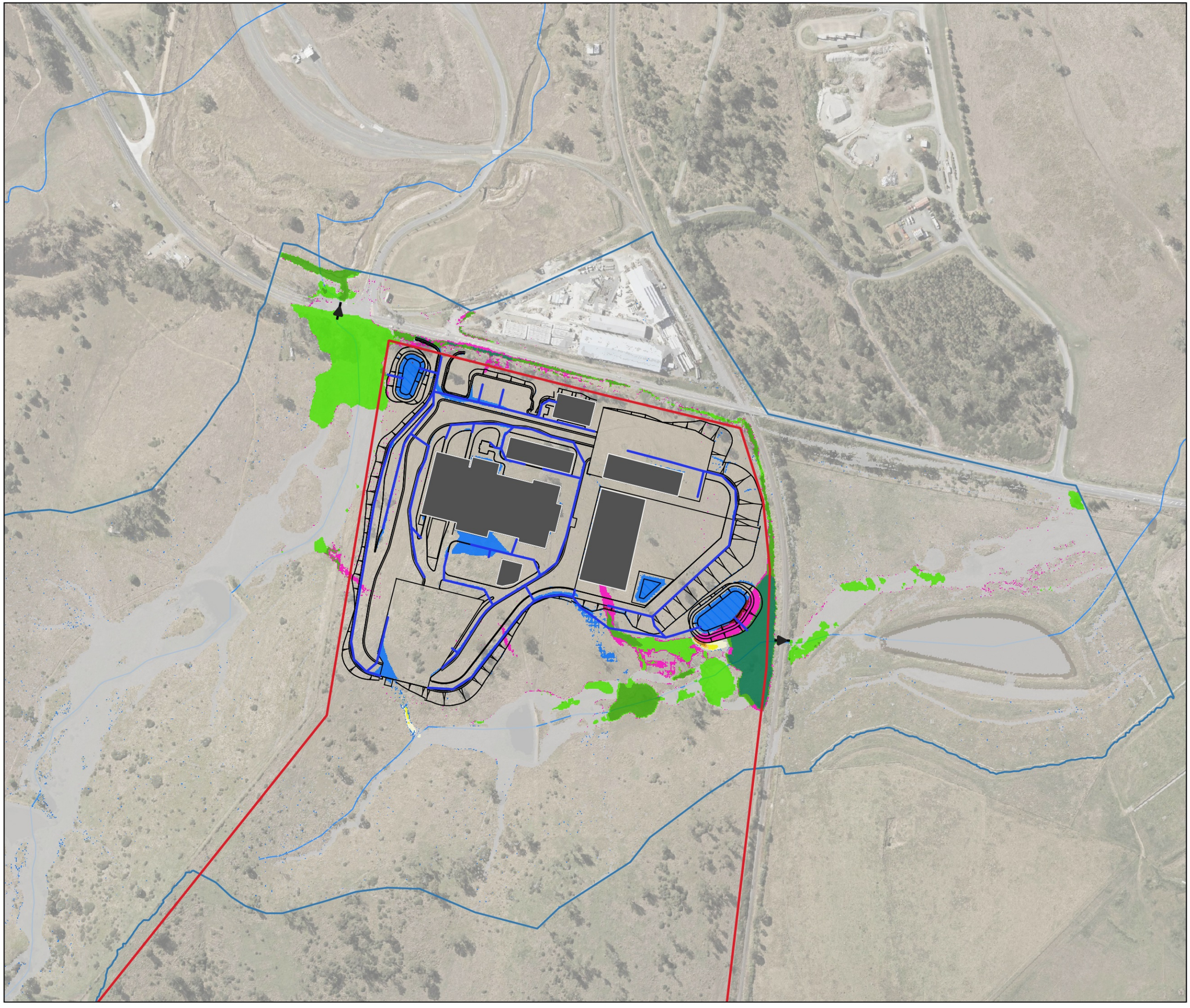

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Depth Difference (m)

- Was Wet, Now Dry
- < - 0.1
- -0.5 to -0.02
- -0.02 to -0.01
- -0.01 to 0.01
- 0.01 to 0.02
- 0.02 to 0.03
- 0.02 to 0.04
- 0.04 to 0.05
- 0.05 to 0.075
- 0.075 to 0.1
- 0.1 to 0.25
- 0.25 to 0.5
- > 0.5
- Was Dry, Now Wet

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 90 180 270 m

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CLEANAWAY
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Job Title

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Figure Title

Design Case: 1% AEP + CC SSP2
Flood Depth Impacts

Scale at A3 1:5000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG38	Issue A

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Sources: QLD Globe Imagery, QLD Spatial

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Velocity Difference (m/s)

- Was Wet, Now Dry
- < - 0.5
- -0.1 to -0.05
- -0.05 to 0.05
- 0.05 to 0.075
- 0.075 to 0.1
- 0.1 to 0.15
- 0.15 to 0.2
- 0.2 to 0.25
- 0.25 to 0.5
- 0.5 to 1
- 1 to 1.5
- 1.5 to 2
- > 2
- Was Dry, Now Wet

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 90 180 270 m

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Job Title

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Figure Title

Design Case: 1% AEP Flood Velocity Afflux

Scale at A3 1:5000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG39	Issue A

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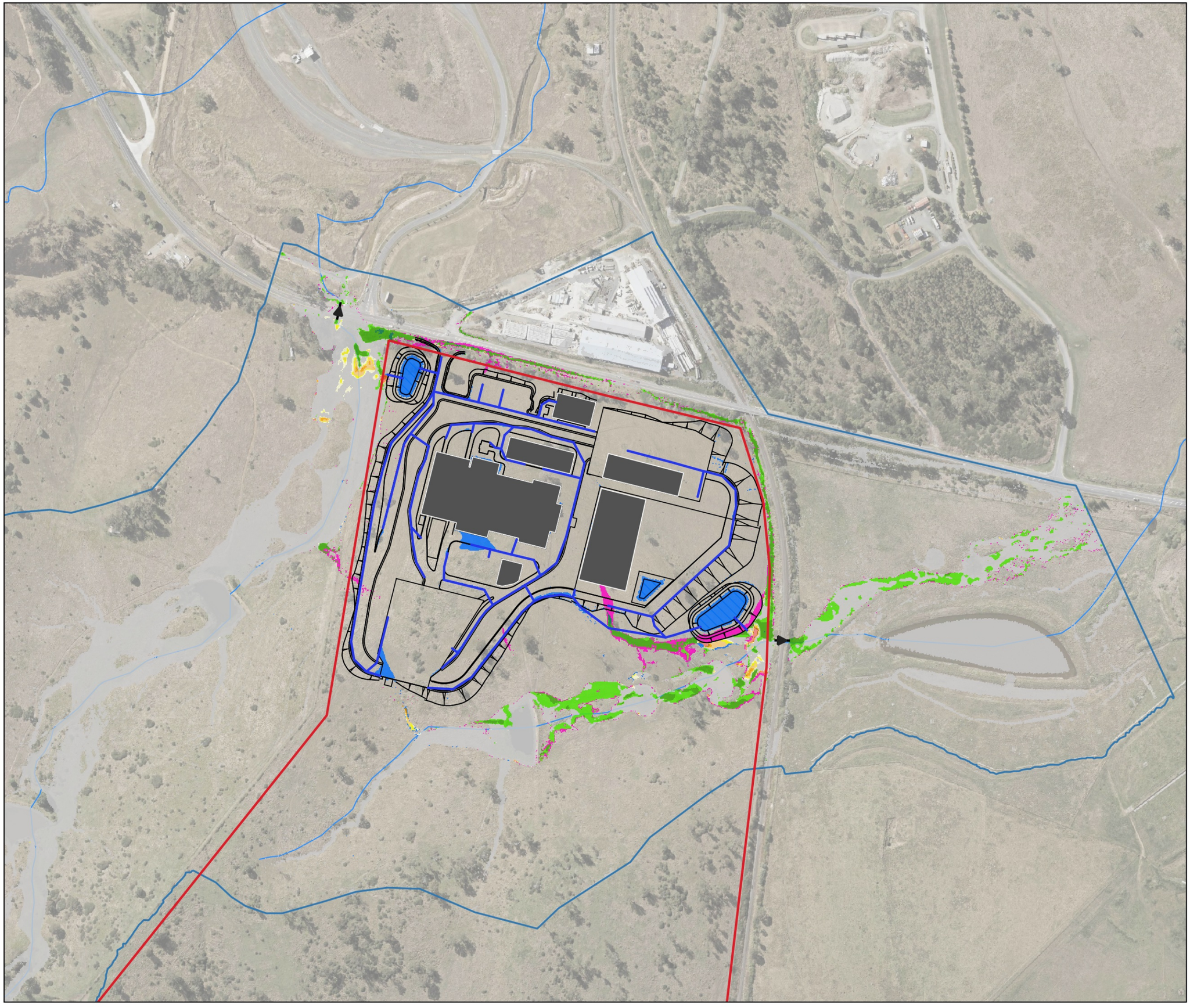

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Velocity Difference (m/s)

- Was Wet, Now Dry
- < - 0.5
- -0.1 to -0.05
- -0.05 to 0.05
- 0.05 to 0.075
- 0.075 to 0.1
- 0.1 to 0.15
- 0.15 to 0.2
- 0.2 to 0.25
- 0.25 to 0.5
- 0.5 to 1
- 1 to 1.5
- 1.5 to 2
- > 2
- Was Dry, Now Wet

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 90 180 270 m

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Job Title

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Figure Title

Design Case: 2% AEP Flood Velocity Afflux

Scale at A3 1:5000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG40	Issue A

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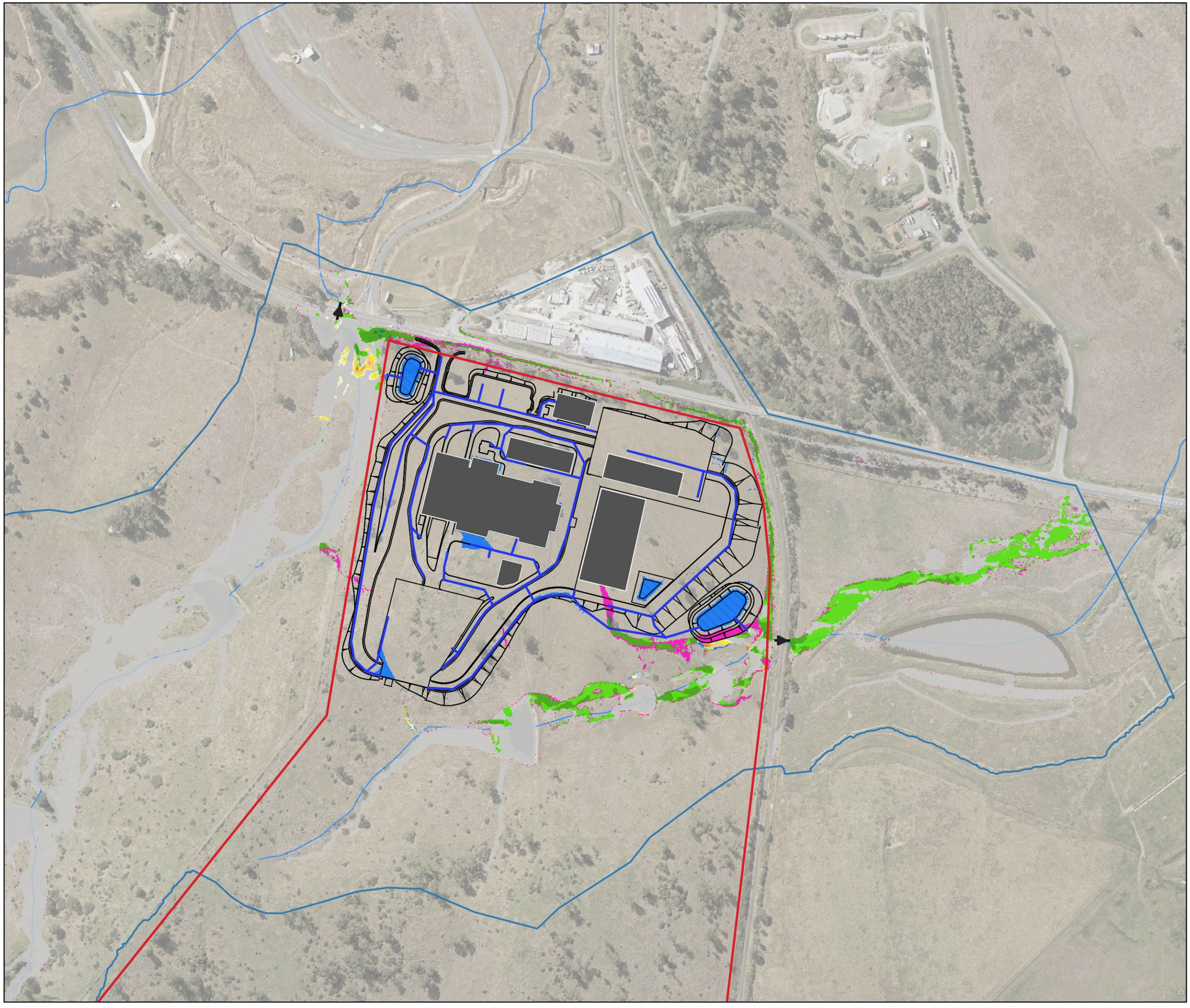

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Velocity Difference (m/s)

- Was Wet, Now Dry
- < - 0.5
- -0.1 to -0.05
- -0.05 to 0.05
- 0.05 to 0.075
- 0.075 to 0.1
- 0.1 to 0.15
- 0.15 to 0.2
- 0.2 to 0.25
- 0.25 to 0.5
- 0.5 to 1
- 1 to 1.5
- 1.5 to 2
- > 2
- Was Dry, Now Wet

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 90 180 270 m

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Job Title

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Figure Title

Design Case: 5% AEP Flood Velocity Afflux

Scale at A3 1:5000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG41	Issue A

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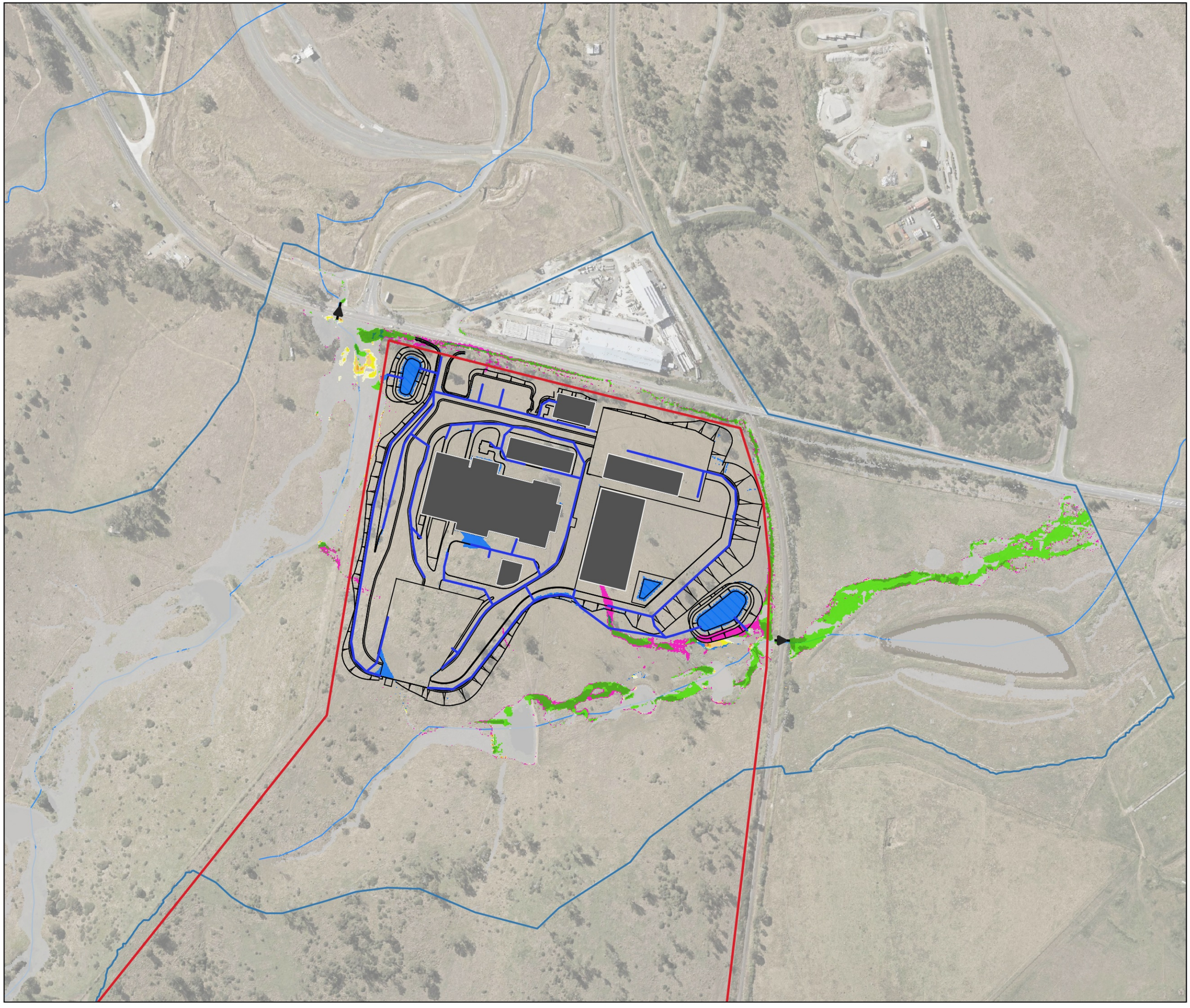

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Velocity Difference (m/s)

- Was Wet, Now Dry
- < - 0.5
- -0.1 to -0.05
- -0.05 to 0.05
- 0.05 to 0.075
- 0.075 to 0.1
- 0.1 to 0.15
- 0.15 to 0.2
- 0.2 to 0.25
- 0.25 to 0.5
- 0.5 to 1
- 1 to 1.5
- 1.5 to 2
- > 2
- Was Dry, Now Wet

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 90 180 270 m

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Job Title

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Figure Title

Design Case: 10% AEP Flood Velocity Afflux

Scale at A3 1:5000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG42	Issue A

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Sources: QLD Globe Imagery, QLD Spatial

Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Velocity Difference (m/s)

- Was Wet, Now Dry
- < - 0.5
- -0.1 to -0.05
- -0.05 to 0.05
- 0.05 to 0.075
- 0.075 to 0.1
- 0.1 to 0.15
- 0.15 to 0.2
- 0.2 to 0.25
- 0.25 to 0.5
- 0.5 to 1
- 1 to 1.5
- 1.5 to 2
- > 2
- Was Dry, Now Wet

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 90 180 270 m

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CLEANAWAY
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Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 20% AEP Flood Velocity Afflux

Scale at A3 1:5000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG43	Issue A

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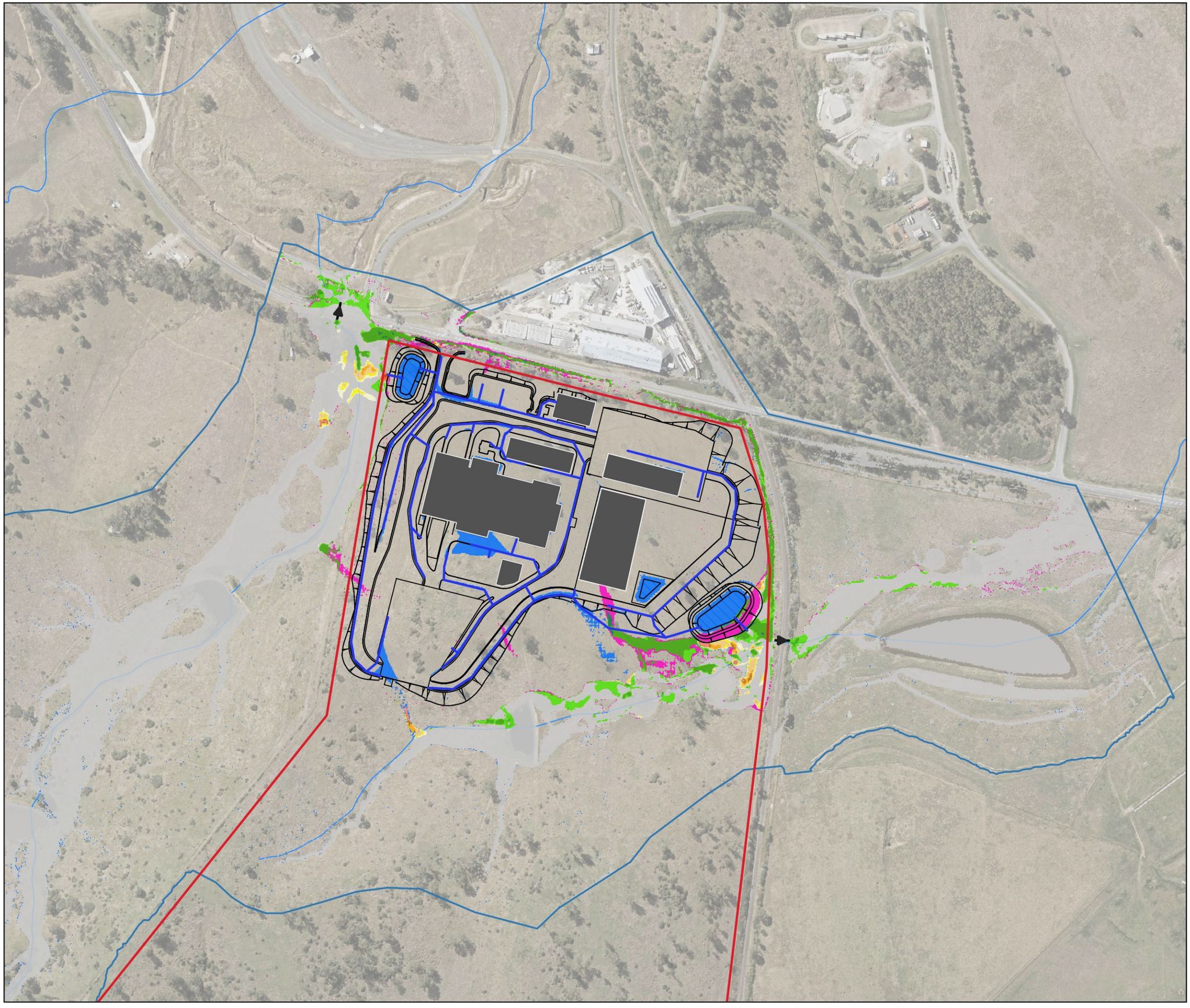
Sources: QLD Globe Imagery, QLD Spatial



Legend

- Property Boundary
- TUFLOW Model Extents
- Existing Culverts
- Proposed Drainage
- Watercourses
- Proposed Building
- Proposed Basin
- Proposed Layout

Peak Flood Velocity Difference (m/s)

- Was Wet, Now Dry
- < - 0.5
- -0.1 to -0.05
- -0.05 to 0.05
- 0.05 to 0.075
- 0.075 to 0.1
- 0.1 to 0.15
- 0.15 to 0.2
- 0.2 to 0.25
- 0.25 to 0.5
- 0.5 to 1
- 1 to 1.5
- 1.5 to 2
- > 2
- Was Dry, Now Wet

A	30/01/2026	NS	TH	ACS
Phase	Date	By	Chkd	Appd

0 90 180 270 m

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Client

CLEANAWAY
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Job Title

Cleanaway Bromelton EFW

Figure Title

Design Case: 1% AEP + CC SSP2
Flood Velocity Afflux

Scale at A3 1:5000	Map Projection GDA2020/MGA Zone 56 EPSG:7856
Job No 293683-00	Drawing Status For Information
Map No FIG44	Issue A

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Sources: QLD Globe Imagery, QLD Spatial

Appendix G – Logan River Regional Flood Map

153°0'0"E

This map is for general land use and disaster management planning purposes only

The extent of flooding shown on this map is applicable for the specified gauge height at the referenced gauge only. The extent of flooding has been estimated based on hydraulic models prepared for Scenic Rim Regional Council and documented in the report "Logan River Flood Study Update".

Refer to the "uncertainty comments" in the accompanying report entitled "Queensland Flood Mapping Phase 3b - Logan River Flood Mapping" by Aurecon, November 2014.

The flooding shown on this map represents the influence of the Logan River system only. The effects of local overland flows are not presented.

Disclaimer

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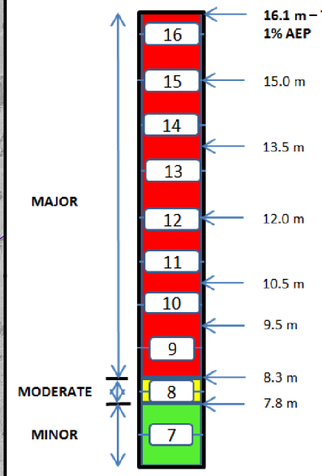
Queensland Government

Australian Government
Attorney-General's Department

Department of Natural Resources and Mines

Funded by the Natural Disaster Resilience Program

Beaudesert Gauge Information



Beaudesert
Gauge: Beaudesert Alert (BoM 040939)
Location: Beaudesert
GPS Coordinates: 27°58'05" S, 152°59'10" E
Gauge Zero: 29.457m AHD

Gauge Height = 16.1 m

Beaudesert Alert BoM 040939
Beaudesert Community Arts and Information Centre
Beaudesert
Beaudesert Railway Station
Beaudesert Post Office
Beaudesert Ambulance Station
Beaudesert Police Station
Uniting Church Beaudesert
Beaudesert Historical Museum & Information Centre
River
Spring Ck
Logan
Direction of Flow

28°0'0"S

153°0'0"E

aurecon

- Points of interest
- Roads
- Rail
- BoM gauging station
- NRM gauging station
- Cadastre

Flood Depth (m)
- 0.0 - 0.5
- 0.5 - 1.0
- 1.0 - 1.5
- 1.5 - 2.0
- > 2.0

Local Authority: Scenic Rim Regional Council
Locality: Beaudesert
Datum: Australian Height Datum (AHD)
Projection: Geocentric Datum of Australia 1994 (GDA94)

Department of Natural Resources and Mines
13 QGOV (13 74 68)
www.dnrm.qld.gov.au

Queensland Government

0 250 500 750 1000 1250
Metres

Scale at A3 - 1:25,000

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Beaudesert
Gauge Height Mapping
Flood Depth Map
16.1m at BoM Gauge
Beaudesert Alert 040939
(i.e. 45.552 m AHD)

BEA-15

13/01/2015

1

Appendix B – Concept Civil Design Drawings

BERC - INFRASTRUCTURE

CIVIL ENGINEERING

AERIAL GPS open street maps @ 2023

LOCALITY PLAN
NTS

DRAWING No.	DESCRIPTION
BERC-ARU-BNE-CICW-DRG-1001	GENERAL - COVER SHEET, LOCALITY PLAN AND DRAWING INDEX
BERC-ARU-BNE-CICW-DRG-1005	GENERAL - NOTES
BERC-ARU-BNE-CICW-DRG-1006	GENERAL - LEGEND
BERC-ARU-BNE-CICW-DRG-1010	EXISTING SITE - PLAN
BERC-ARU-BNE-CICW-DRG-1020	PROPOSED SITE - PLAN
BERC-ARU-BNE-CICW-DRG-1021	PROPOSED SITE PLAN - DEVELOPMENT FOOTPRINT
BERC-ARU-BNE-CICW-DRG-1030	PROPOSED SITE PLAN -CLEARANCES FROM DEVELOPMENT FOOTPRINT
BERC-ARU-BNE-CICW-DRG-1080	DEMOLITION AND SITE CLEARANCE - PLAN
BERC-ARU-BNE-CICW-DRG-1101	SOIL AND WATER MANAGEMENT - PLAN
BERC-ARU-BNE-CICW-DRG-1191	SOIL AND WATER MANAGEMENT - DETAILS
BERC-ARU-BNE-CICW-DRG-1201	BULK EARTHWORKS - PLAN
BERC-ARU-BNE-CICW-DRG-1241	BULK EARTHWORKS - SITE SECTIONS - SHEET 1
BERC-ARU-BNE-CICW-DRG-1242	BULK EARTHWORKS - SITE SECTIONS - SHEET 2
BERC-ARU-BNE-CICW-DRG-1243	BULK EARTHWORKS - SITE SECTIONS - SHEET 3
BERC-ARU-BNE-CICW-DRG-1244	BULK EARTHWORKS - SITE SECTIONS - SHEET 4
BERC-ARU-BNE-CICW-DRG-1245	BULK EARTHWORKS - SITE SECTIONS - SHEET 5
BERC-ARU-BNE-CICW-DRG-1341	CIVIL WORKS - TYPICAL CROSS SECTIONS - SHEET 1
BERC-ARU-BNE-CICW-DRG-1342	CIVIL WORKS - TYPICAL CROSS SECTIONS - SHEET 2
BERC-ARU-BNE-CICW-DRG-1343	CIVIL WORKS - TYPICAL CROSS SECTIONS - SHEET 3
BERC-ARU-BNE-CICW-DRG-1351	CIVIL WORKS - MC01 LONGITUDINAL SECTIONS - SHEET 1
BERC-ARU-BNE-CICW-DRG-1352	CIVIL WORKS - MC01 LONGITUDINAL SECTIONS - SHEET 2
BERC-ARU-BNE-CICW-DRG-1353	CIVIL WORKS - MC02 LONGITUDINAL SECTIONS
BERC-ARU-BNE-CICW-DRG-1354	CIVIL WORKS - MC13 LONGITUDINAL SECTIONS
BERC-ARU-BNE-CICW-DRG-1355	CIVIL WORKS - MC14 LONGITUDINAL SECTIONS
BERC-ARU-BNE-CICW-DRG-1356	CIVIL WORKS - MC15 LONGITUDINAL SECTIONS
BERC-ARU-BNE-CICW-DRG-1466	CIVIL WORKS - VEHICLE SWEPT PATH - PLAN - SHEET 1
BERC-ARU-BNE-CICW-DRG-1467	CIVIL WORKS - VEHICLE SWEPT PATH - PLAN - SHEET 2
BERC-ARU-BNE-CICW-DRG-1468	CIVIL WORKS - VEHICLE SWEPT PATH - PLAN - SHEET 3
BERC-ARU-BNE-CICW-DRG-1469	CIVIL WORKS - VEHICLE SWEPT PATH - PLAN - SHEET 4
BERC-ARU-BNE-CICW-DRG-1470	CIVIL WORKS - VEHICLE SWEPT PATH - PLAN - SHEET 5
BERC-ARU-BNE-CICW-DRG-1601	STORMWATER - PRE-DEVELOPMENT CATCHMENT - PLAN
BERC-ARU-BNE-CICW-DRG-1605	STORMWATER - PROPOSED CATCHMENT - PLAN
BERC-ARU-BNE-CICW-DRG-1611	STORMWATER - PLAN - SHEET 1
BERC-ARU-BNE-CICW-DRG-1612	STORMWATER - PLAN - SHEET 2
BERC-ARU-BNE-CICW-DRG-1613	STORMWATER - PLAN - SHEET 3
BERC-ARU-BNE-CICW-DRG-1614	STORMWATER - PLAN - SHEET 4
BERC-ARU-BNE-CICW-DRG-1615	STORMWATER - PLAN - SHEET 5
BERC-ARU-BNE-CICW-DRG-1641	STORMWATER - LONGITUDINAL SECTIONS - SHEET 1
BERC-ARU-BNE-CICW-DRG-1642	STORMWATER - LONGITUDINAL SECTIONS - SHEET 2
BERC-ARU-BNE-CICW-DRG-1643	STORMWATER - LONGITUDINAL SECTIONS - SHEET 3
BERC-ARU-BNE-CICW-DRG-1644	STORMWATER - LONGITUDINAL SECTIONS - SHEET 4
BERC-ARU-BNE-CICW-DRG-1645	STORMWATER - LONGITUDINAL SECTIONS - SHEET 5
BERC-ARU-BNE-CICW-DRG-1646	STORMWATER - LONGITUDINAL SECTIONS - SHEET 6
BERC-ARU-BNE-CICW-DRG-1647	STORMWATER - LONGITUDINAL SECTIONS - SHEET 7
BERC-ARU-BNE-CICW-DRG-1648	STORMWATER - LONGITUDINAL SECTIONS - SHEET 8
BERC-ARU-BNE-CICW-DRG-1649	STORMWATER - LONGITUDINAL SECTIONS - SHEET 9
BERC-ARU-BNE-CICW-DRG-1650	STORMWATER - LONGITUDINAL SECTIONS - SHEET 10
BERC-ARU-BNE-CICW-DRG-1651	STORMWATER - LONGITUDINAL SECTIONS - SHEET 11
BERC-ARU-BNE-CICW-DRG-1652	STORMWATER - LONGITUDINAL SECTIONS - SHEET 12
BERC-ARU-BNE-CICW-DRG-1653	STORMWATER - LONGITUDINAL SECTIONS - SHEET 13
BERC-ARU-BNE-CICW-DRG-1691	STORMWATER - MISCELLANEOUS DETAILS
BERC-ARU-BNE-CICW-DRG-1700	PAVEMENT - PLAN
BERC-ARU-BNE-CICW-DRG-1791	PAVEMENT - PROFILES
BERC-ARU-BNE-CICW-DRG-1801	UTILITIES - PLAN
BERC-ARU-BNE-CICW-DRG-1802	OFF-SITE WATER AND SEWER PLAN

NOT FOR CONSTRUCTION

Scales

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 NOT TO SCALE

Discipline CIVIL

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Member Firm
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ABN 18 000 966 165

Drawing Title
GENERAL
COVER SHEET, LOCALITY PLAN AND DRAWING INDEX

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1001**	**C**

Do not scale

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GENERAL

1. DRAWINGS TO BE READ IN CONJUNCTION WITH FEED REPORT BERC-ARU-BNE-GLDM-RPT-0002.
2. DRAWINGS PRODUCED SHOW PRELIMINARY DESIGN AND ARE PROVIDED IN SUPPORT OF A DEVELOPMENT LICENSE APPLICATION.THEY DO NOT REPRESENT DETAILED DESIGN OR CONSTRUCTION LEVEL INFORMATION.
3. FEED DESIGNS PRESENTED ARE BASED UPON "MASTERPLAN LAYOUT REV P, JULY 2025", BY RAMBOLL.
4. DIMENSIONS SHALL NOT BE OBTAINED BY SCALING THE DRAWINGS.
5. ALL DIMENSIONS ON DETAILS ARE IN MILLIMETRES UNLESS STATED OTHERWISE. ALL PLANS AND LEVELS ARE EXPRESSED IN METRES.
6. THE APPROVAL OF A SUBSTITUTION SHALL BE SOUGHT FROM THE ENGINEER BUT IS NOT AN AUTHORISATION FOR A VARIATION. ANY VARIATIONS INVOLVED MUST BE TAKEN UP WITH THE ENGINEER / PRINCIPAL'S REPRESENTATIVE BEFORE THE WORK COMMENCES.
7. ANY DISCREPANCIES OR OMISSIONS SHALL BE REFERRED TO THE ENGINEER FOR A DECISION BEFORE PROCEEDING WITH THE WORK.
8. THE CONTRACTOR SHALL GIVE 48 HOURS NOTICE FOR ALL ENGINEERING INSPECTIONS. ALL INSPECTIONS AND CERTIFICATIONS TO BE INCLUDED IN CONTRACTORS COST.
9. BUILDING FROM THESE DRAWINGS IS NOT TO COMMENCE UNTIL APPROVED BY THE PRINCIPAL CERTIFYING AUTHORITY.
10. THE WORD 'ENGINEER' USED IN THESE NOTES REFER TO AN EMPLOYEE OR NOMINATED REPRESENTATIVE OF ARUP AUSTRALIA PTY LTD.
11. ALL CONSTRUCTION ACTIVITIES SHALL COMPLY WITH THE RELEVANT CURRENT WORKPLACE HEALTH AND SAFETY LEGISLATION.

SITEWORKS

1. ORIGIN OF LEVELS:- AUSTRALIAN HEIGHT DATUM (A.H.D)
2. CONTRACTOR MUST VERIFY ALL DIMENSIONS AND EXISTING LEVELS ON SITE PRIOR TO COMMENCEMENT OF WORK.
3. ALL WORK IS TO BE UNDERTAKEN IN ACCORDANCE WITH THE DETAILS SHOWN ON THE DRAWINGS, THE SPECIFICATIONS AND THE DIRECTIONS OF THE PRINCIPAL'S REPRESENTATIVE.
4. EXISTING SERVICES HAVE BEEN PLOTTED FROM SUPPLIED DATA AND AS SUCH THEIR ACCURACY CANNOT BE GUARANTEED. IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ESTABLISH THE LOCATION AND LEVEL OF ALL EXISTING SERVICES PRIOR TO THE COMMENCEMENT OF ANY WORK. ANY DISCREPANCIES SHALL BE REPORTED TO THE PRINCIPAL'S REPRESENTATIVE. CLEARANCES SHALL BE OBTAINED FROM THE RELEVANT SERVICE AUTHORITY.
5. WHERE NEW WORKS ABUT EXISTING THE CONTRACTOR SHALL ENSURE THAT A SMOOTH EVEN PROFILE, FREE FROM ABRUPT CHANGES IS OBTAINED.
6. THE CONTRACTOR SHALL ARRANGE ALL SURVEY SETOUT TO BE CARRIED OUT BY A REGISTERED SURVEYOR.
7. CARE IS TO BE TAKEN WHEN EXCAVATING NEAR EXISTING SERVICES. NO MECHANICAL EXCAVATIONS ARE TO BE UNDERTAKEN OVER COMMUNICATIONS OR ELECTRICAL SERVICES. HAND EXCAVATE IN THESE AREAS.
8. ON COMPLETION OF PIPE INSTALLATION ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL. INCLUDING KERBS, FOOTPATHS, CONCRETE AREAS, GRAVEL AND GRASSED AREAS AND ROAD PAVEMENTS IN ACCORDANCE WITH ALL LOCAL COUNCIL REQUIREMENTS.
9. PROVIDE 10mm WIDE EXPANDING CORK JOINTS BETWEEN CONCRETE PAVEMENTS AND ALL BUILDINGS, WALLS, FOOTINGS, COLUMNS, KERBS, DISH DRAINS, GRATED DRAINS, BOLLARD FOOTINGS ETC.
10. CONTRACTOR TO OBTAIN ALL AUTHORITY APPROVALS.
11. ALL BATTERS TO BE GRASS LINED WITH MINIMUM 100 TOPSOIL AND APPROVED COUCH LAID AS TURF U.N.O.
12. MAKE SMOOTH TRANSITION TO EXISTING SERVICES AND MAKE GOOD.
13. THE CONTRACTOR SHALL PROVIDE ALL TEMPORARY DIVERSION DRAINS AND MOUNDS TO ENSURE THAT AT ALL TIMES EXPOSED SURFACES ARE FREE DRAINING AND WHERE NECESSARY EXCAVATE SUMPS AND PROVIDE PUMPING EQUIPMENT TO DRAIN EXPOSED AREAS.
14. ON COMPLETION OF WORKS ALL DISTURBED AREAS MUST BE RESTORED TO ORIGINAL INCLUDING, BUT NOT LIMITED TO, KERBS, FOOTPATHS, CONCRETE AREAS, GRASS AND LANDSCAPED AREAS.

SURVEY

1. SURVEYS FOR THIS DESIGN ARE SUPPLIED BY: TJ KELLY SURVEYS PTY LTD DATED 26/05/2023 - REF 4577-02 REV B. SURVEYS ARE MGA2020 ZONE 56
2. ALL BEARINGS AND DISTANCES BY SURVEY.

EROSION AND SEDIMENT CONTROL MEASURES

1. ALL EROSION AND SEDIMENT CONTROL MEASURES TO BE IN ACCORDANCE WITH LANDCOM "SOILS AND CONSTRUCTION MANUAL VOLUME 1, MARCH 2004".
2. THIS PLAN IS TO BE READ IN CONJUNCTION WITH THE ENGINEERING PLANS, AND ANY OTHER PLANS OR WRITTEN INSTRUCTIONS THAT MAY BE ISSUED AND RELATING TO DEVELOPMENT AT THE SUBJECT SITE.
3. THE PRINCIPAL'S REPRESENTATIVE WILL ENSURE THAT ALL SOIL AND WATER MANAGEMENT WORKS ARE LOCATED AS INSTRUCTED IN THIS SPECIFICATION.
4. ALL BUILDERS AND SUB-CONTRACTORS WILL BE INFORMED OF THEIR RESPONSIBILITIES IN MINIMISING THE POTENTIAL FOR SOIL EROSION AND POLLUTION TO DOWNSLOPE LANDS AND WATERWAYS.
5. THE SOIL EROSION POTENTIAL ON THIS SITE SHALL BE MINIMISED. HENCE WORKS SHALL BE UNDERTAKEN IN THE FOLLOWING SEQUENCE:
   A) INSTALL SEDIMENT FENCES, TEMPORARY CONSTRUCTION EXIT AND SANDBAG KERB INLET SEDIMENT TRAP.
   B) UNDERTAKE SITE DEVELOPMENT WORKS IN ACCORDANCE WITH THE ENGINEERING PLANS. PHASE DEVELOPMENTS SO THAT LAND DISTURBANCE IS CONFINED TO AREAS OF WORKABLE SIZE.
6. DURING WINDY CONDITIONS, LARGE, UNPROTECTED AREAS WILL BE KEPT MOIST (NOT WET) BY SPRINKLING WITH WATER TO KEEP DUST UNDER CONTROL.
7. FINAL SITE LANDSCAPING WILL BE UNDERTAKEN AS SOON AS POSSIBLE AND WITHIN 20 WORKING DAYS FROM COMPLETION OF CONSTRUCTION ACTIVITIES.
8. STOCKPILES WILL NOT BE LOCATED WITHIN 2 METRES OF HAZARD AREAS. INCLUDING LIKELY AREAS OF CONCENTRATED OR HIGH VELOCITY FLOWS SUCH AS WATERWAYS. WHERE THEY ARE BETWEEN 2 AND 5 METRES FROM SUCH AREAS, SPECIAL SEDIMENT CONTROL MEASURES SHOULD BE TAKEN TO MINIMISE POSSIBLE POLLUTION TO DOWNSLOPE WATERS, E.G. THROUGH INSTALLATION OF SEDIMENT FENCING.
9. ANY SAND USED IN THE CONCRETE CURING PROCESS (SPREAD OVER THE SURFACE) WILL BE REMOVED AS SOON AS POSSIBLE AND WITHIN 10 WORKING DAYS FROM PLACEMENT.
10. WATER WILL BE PREVENTED FROM ENTERING THE PERMANENT DRAINAGE SYSTEM UNLESS IT IS RELATIVELY SEDIMENT FREE, I.E. THE CATCHMENT AREA HAS BEEN PERMANENTLY LANDSCAPED AND/OR ANY LIKELY SEDIMENT HAS BEEN FILTERED THROUGH AN APPROVED STRUCTURE.
11. TEMPORARY SOIL AND WATER MANAGEMENT STRUCTURES WILL BE REMOVED ONLY AFTER THE LANDS THEY ARE PROTECTING ARE REHABILITATED.
12. ACCEPTABLE RECEPTORS WILL BE PROVIDED FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER.
13. RECEPTORS FOR CONCRETE AND MORTAR SLURRIES, PAINTS, ACID WASHINGS, LIGHT-WEIGHT WASTE MATERIALS AND LITTER ARE TO BE EMPTIED AS NECESSARY. DISPOSAL OF WASTE SHALL BE IN A MANNER APPROVED BY THE PRINCIPAL'S REPRESENTATIVE.
14. EROSION AND SEDIMENT CONTROL MEASURES SHALL BE INSPECTED AFTER RAINFALL EVENTS TO ENSURE THAT THEY OPERATE EFFECTIVELY. REPAIR AND OR MAINTENANCE SHALL BE UNDERTAKEN AS REQUIRED.

ROADWORKS GENERAL

1. THE CONTRACTOR SHALL OBTAIN ALL LEVELS FROM ESTABLISHED BENCH MARKS ONLY AS SUPPLIED BY THE APPOINTED SURVEYORS.
2. SERVICES SHOWN ON THESE PLANS ARE LOCATED FROM INFORMATION SUPPLIED BY THE RELEVANT AUTHORITIES AND FIELD INVESTIGATIONS AND ARE NOT GUARANTEED COMPLETE OR CORRECT. ALL SERVICE LOCATIONS ARE TO BE VERIFIED BY THE CONTRACTOR PRIOR TO CONSTRUCTION.
3. NO WORK TO BE CARRIED OUT ON ADJOINING PROPERTIES WITHOUT THE WRITTEN PERMISSION FROM THE OWNER.
4. VEHICULAR ACCESS AND ALL SERVICES ARE TO BE MAINTAINED AT ALL TIMES TO AREAS AFFECTED BY CONSTRUCTION.
5. ALL RUBBISH, BUILDINGS, SHEDS, FENCES, AND POWER POLES ARE TO BE REMOVED IN ACCORDANCE WITH THE SPECIFICATION.
6. NO TREES TO BE REMOVED OTHER THAN THOSE AFFECTED BY THE WORKS.
7. CONTRACTOR TO INSTALL ROOT CONTROL BARRIERS ALONG LENGTH OF KERBS AND RETAINING WALLS ADJACENT TO LANDSCAPED AREAS.

STORMWATER DRAINAGE

1. ALL KERB INLET PITS (ON GRADE) TO BE BENCHED AND STREAMLINED, PITS OVER 1.2 m IN DEPTH TO BE PROVIDED WITH STEP IRONS AND REINFORCED IN ACCORDANCE WITH AS 4198.
2. CONCRETE TO HAVE A MINIMUM COMPRESSIVE STRENGTH OF 32 MPa AT 28 DAYS U.N.O.
3. TAIL OUT DRAINS TO BE PROVIDED WITH COUCH LINED INVERT, JUTE STABILISED BATTERS, STRAWBALE AND GEOTEXTILE SEDIMENT FILTERS EVERY 10 m.
4. PRIOR TO THE FINAL INSPECTION A CCTV INSPECTION AND REPORT IS TO BE UNDERTAKEN FOR ALL STORMWATER PIPES AND CULVERTS THAT ARE PART OF THE DRAINAGE SYSTEM.
5. STRUCTURAL CERTIFICATION IS REQUIRED FOR CONSTRUCTION OF MAJOR AND NON STANDARD STORMWATER DRAINAGE STRUCTURES. THE CONTRACTOR TO ARRANGE FOR A HOLD POINT FOR CONSTRUCTION INSPECTIONS WITH A SUITABLY QUALIFIED ENGINEER AS APPOINTED BY THE CONTRACTOR TO PROVIDE IN WRITING A STRUCTURAL CERTIFICATE AT COMPLETION OF WORKS.
6. CONNECT DOWNPIPES TO THE STORMWATER SYSTEM AS EARLY AS POSSIBLE.
7. CONTRACTOR TO PROVIDE ROOT CONTROL BARRIERS FOR DRAINAGE PIPES WITHIN LANDSCAPED AREAS.
8. ALL 225 DIA. DRAINAGE PIPES AND LARGER SHALL BE CLASS "4" APPROVED SPIGOT AND SOCKET FRC OR RCP PIPES WITH RUBBER RING JOINTS. (U.N.O.)
9. ALL PIPE JUNCTIONS UP TO AND INCLUDING 450 DIA. AND TAPERS SHALL BE VIA PURPOSE MADE FITTINGS.
10. CONTRACTOR TO SUPPLY AND INSTALL ALL FITTINGS AND SPECIALS INCLUDING VARIOUS PIPE ADAPTORS TO ENSURE PROPER CONNECTION BETWEEN DISSIMILAR PIPEWORK.
11. ALL CONNECTIONS TO EXISTING DRAINAGE PITS SHALL BE MADE IN A TRADESMAN-LIKE MANNER AND THE INTERNAL WALL OF THE PIT AT THE POINT OF ENTRY SHALL BE CEMENT RENDERED TO ENSURE A SMOOTH FINISH.
12. WHERE TRENCHES ARE IN ROCK, THE PIPE SHALL BE BEDDED ON A MIN. 50 mm CONCRETE BED (OR 75 mm THICK BED OF 12 mm BLUE METAL) UNDER THE BARREL OF THE PIPE. THE PIPE COLLAR AT NO POINT SHALL BEAR ON THE ROCK. IN OTHER THAN ROCK, PIPES SHALL BE LAID ON A 75 mm THICK SAND BED. IN ALL CASES BACKFILL THE TRENCH WITH SAND TO 200 mm ABOVE THE PIPE. WHERE THE PIPE IS UNDER PAVEMENTS BACKFILL REMAINDER OF TRENCH WITH SAND OR APPROVED GRANULAR BACKFILL COMPACTED IN 150 mm LAYERS TO 98% STANDARD MAX. DRY DENSITY.
13. BEDDING SHALL BE (U.N.O.) TYPE HS2, IN ACCORDANCE WITH CURRENT RELEVANT AUSTRALIAN STANDARDS.
14. WHERE STORMWATER LINES PASS UNDER FLOOR SLABS, SEWER GRADE RUBBER RING JOINTS ARE TO BE USED.
15. WHERE SUBSOIL DRAINAGE LINES PASS UNDER FLOOR SLABS AND VEHICULAR PAVEMENTS UNSLOTTED UPVC SEWER GRADE PIPE SHALL BE USED.
16. PROVIDE 3.0 m LENGTH OF 100 DIA. SUBSOIL DRAINAGE PIPE WRAPPED IN FABRIC SOCK, AT UPSTREAM END OF EACH PIT.

NOT FOR CONSTRUCTION

Scales

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				

Client: CLEANAWAY — Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title: BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1: NOT TO SCALE

Discipline: CIVIL

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Arup Pty Ltd
ABN 18 000 966 165

Drawing Title: GENERAL NOTES

Drawing Status: **FOR APPROVAL**

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1005**	**C**

Do not scale

© Arup

A1

EXISTING FEATURES

- LOT BOUNDARY
- DRIVEWAY, PATHWAY OR CYCLE WAY
- TOP OF BATTER
- BOTTOM OF BATTER
- KERB AND GUTTER — KERB AND GUTTER
- KERB ONLY — KERB ONLY
- KERB INLET PIT
- DISH DRAIN — DISHED CROSSING
- FENCE
- EDGE OF GARDEN
- x15.83 — SPOT LEVEL
- BOLLARDS
- 17.0 — EXISTING CONTOURS
- EXISTING TREE
- STORMWATER EASEMENT

EXISTING UTILITIES

- ELECTRICAL (OVERHEAD)
- E — ELECTRICAL (UNDERGROUND)
- C — COMMS (UNDERGROUND)
- SW — STORMWATER
- CROSS DRAINAGE
- W(D) — WATER (CLASS D)

PROPOSED UTILITIES

- EO — ELECTRICAL (OVERHEAD)
- W — WATER
- S — SEWER

PROPOSED CIVIL WORKS

- EXTENT OF WORKS BOUNDARY
- EDGE OF PAVEMENT
- MINOR CONTOUR
- 17.0 — MAJOR CONTOUR
- SA — SA KERB
- SM — SM KERB
- VC — VEHICULAR CROSSING
- GIVEWAY LINE
- PROPOSED EXTERNAL RETAINING WALL
- LAND DEDICATION TO TMR FOR POTENTIAL FUTURE ROAD UPGRADE.
- BUILDING EXTEND

PROPOSED DRAINAGE

- STORMWATER PIPE AND FLOW DIRECTION
- Ø375 — PIPE SIZE
- STORMWATER GRATED INLET PIT
- INSPECTION PIT
- HEADWALL
- 14\1 — PIT LABEL LINE NUMBER 01 / PIT NUMBER 1
- PERIMETER SWALE
- TRENCH DRAIN
- RETAINING WALL SUBSOIL DRAINAGE (PERFORATED PIPE)
- CUT-OFF CHANNEL DRAIN
- FP — FLUSHING POINT
- SCOUR PROTECTION
- CATCHMENT BOUNDARY LANDSCAPE
- CATCHMENT BOUNDARY ROAD PATHWAY
- CATHCMENT BOUNDARY BYPASS

QUEENSLAND GLOBE DATA

- HYDROLINES

PAVEMENT

- RP1 JOINTED REINFORCED CONCRETE PAVEMENT (JRCP)
- FP1 GRANULAR PAVEMENT WITH THIN ASPHALT SURFACING (CARPARK)
- FP2 FULL DEPTH ASPHALT PAVEMENT (WORKING AREAS)
- RP2 CONCRETE FOOTPATH

PROPOSED BULK EARTHWORKS

- × BEL: 23.021m — BULK EARTHWORKS LEVEL

PROPOSED EROSION AND SEDIMENT CONTROL MEASURES

- TEMPORARY CONSTRUCTION EXIT
- CONSTRUCTION COMPOUND
- SEDIMENT FENCE
- STOCKPILE
- FILTER SOCK
- RISING MAIN
- CHANNEL
- TEMPORARY PIPE & HEADWALL
- EARTH BANK
- ROCK CHECK DAM
- SEDIMENT BASIN
- SUMP

NOT FOR CONSTRUCTION

Scales

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client: CLEANAWAY — Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title: BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1: NOT TO SCALE

Discipline: CIVIL

ARUP
Arup, Level 5, 151 Clarence St
Sydney, NSW, 2000
Tel +61 (02) 9320 9320 Fax +61 (02) 9320 9321
www.arup.com

CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title: GENERAL LEGEND

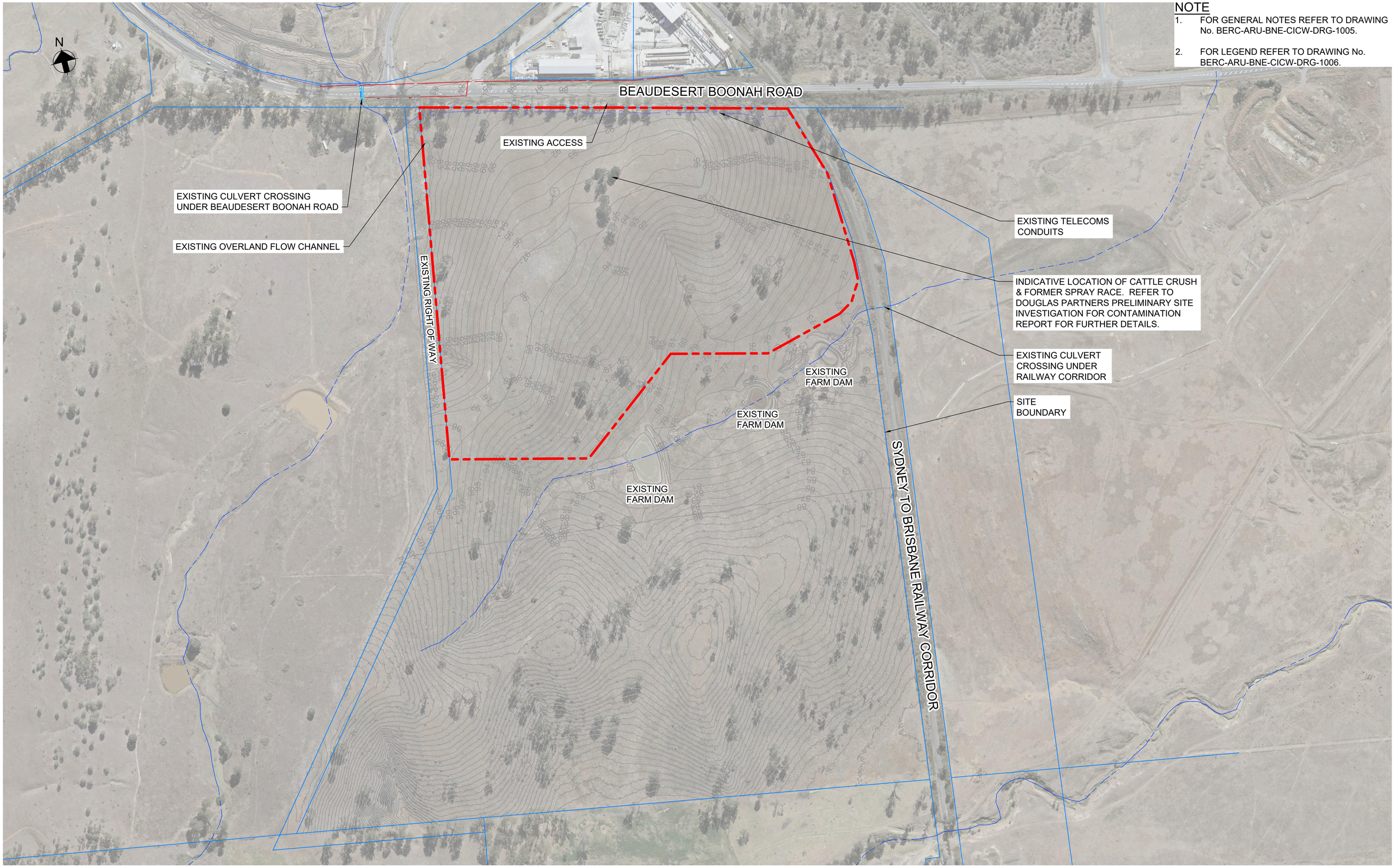
Drawing Status: **FOR APPROVAL**

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1006**	**C**

Do not scale

© Arup

A1



NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.

NOT FOR CONSTRUCTION

Scales

25 0 50 100m

1:2500(A1)/1:5000(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client

CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)

Name: .....

Signature: ..... Date: .....

Job Title

BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 1:2500m

Discipline CIVIL

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CONSULT AUSTRALIA
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ABN 18 000 966 165

Drawing Title

EXISTING SITE PLAN

Drawing Status

FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1010**	**C**

Do not scale

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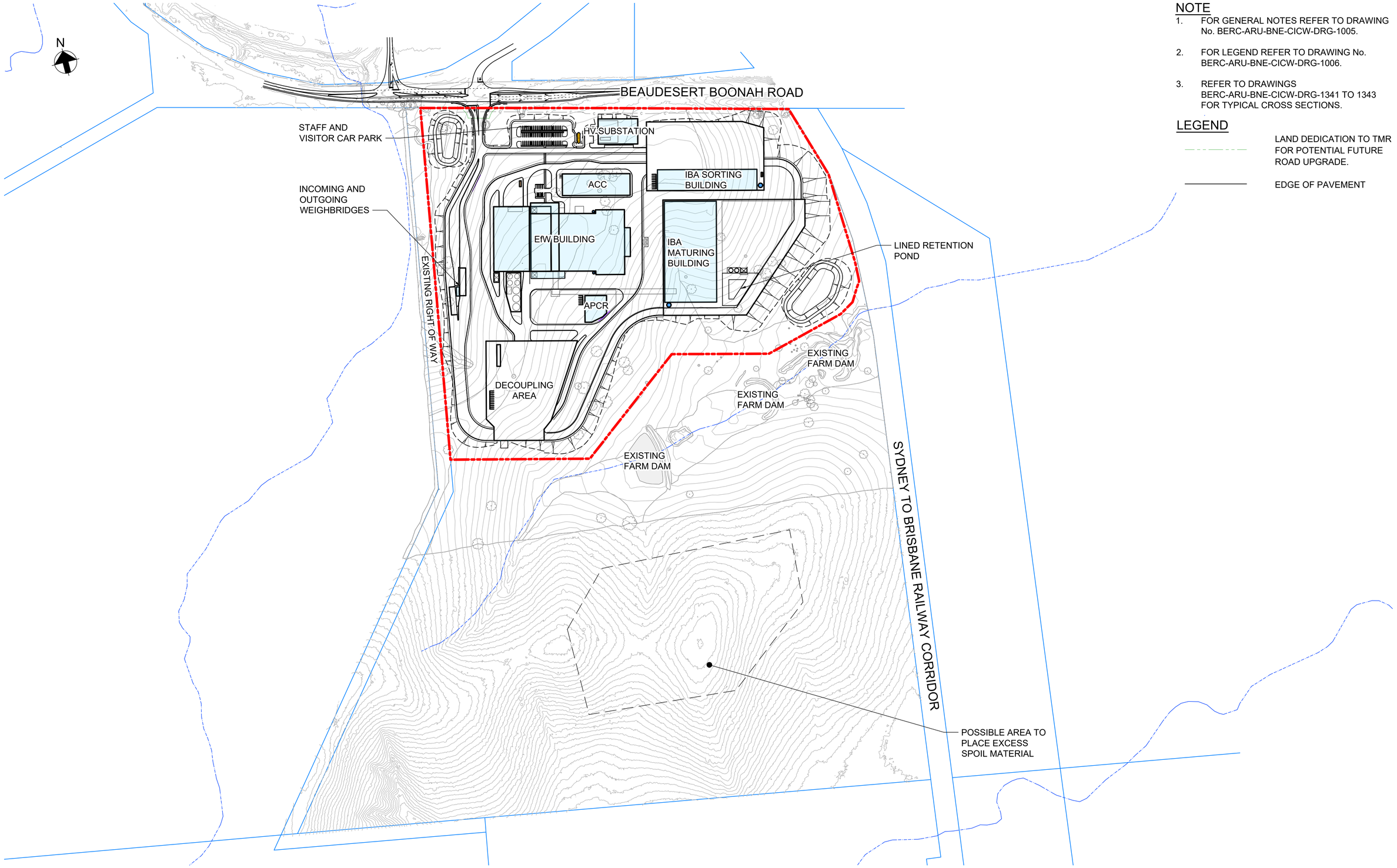

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.
3. REFER TO DRAWINGS BERC-ARU-BNE-CICW-DRG-1341 TO 1343 FOR TYPICAL CROSS SECTIONS.

LEGEND

LAND DEDICATION TO TMR FOR POTENTIAL FUTURE ROAD UPGRADE.

EDGE OF PAVEMENT

NOT FOR CONSTRUCTION

Scales

25 0 50 100m

1:2500(A1)/1:5000(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
E	27.07.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
D	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				

Issue	Date	By	Chkd	Appd
C	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
B	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				
A	22.07.25	PDA	ERA	EGM
ISSUED FOR INFORMATION				

Client

CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)

Name: .....

Signature: ..... Date: .....

Job Title

BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 1:2500m

Discipline CIVIL

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www.arup.com

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Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title

PROPOSED SITE PLAN

Drawing Status

FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1020**	**E**

Do not scale

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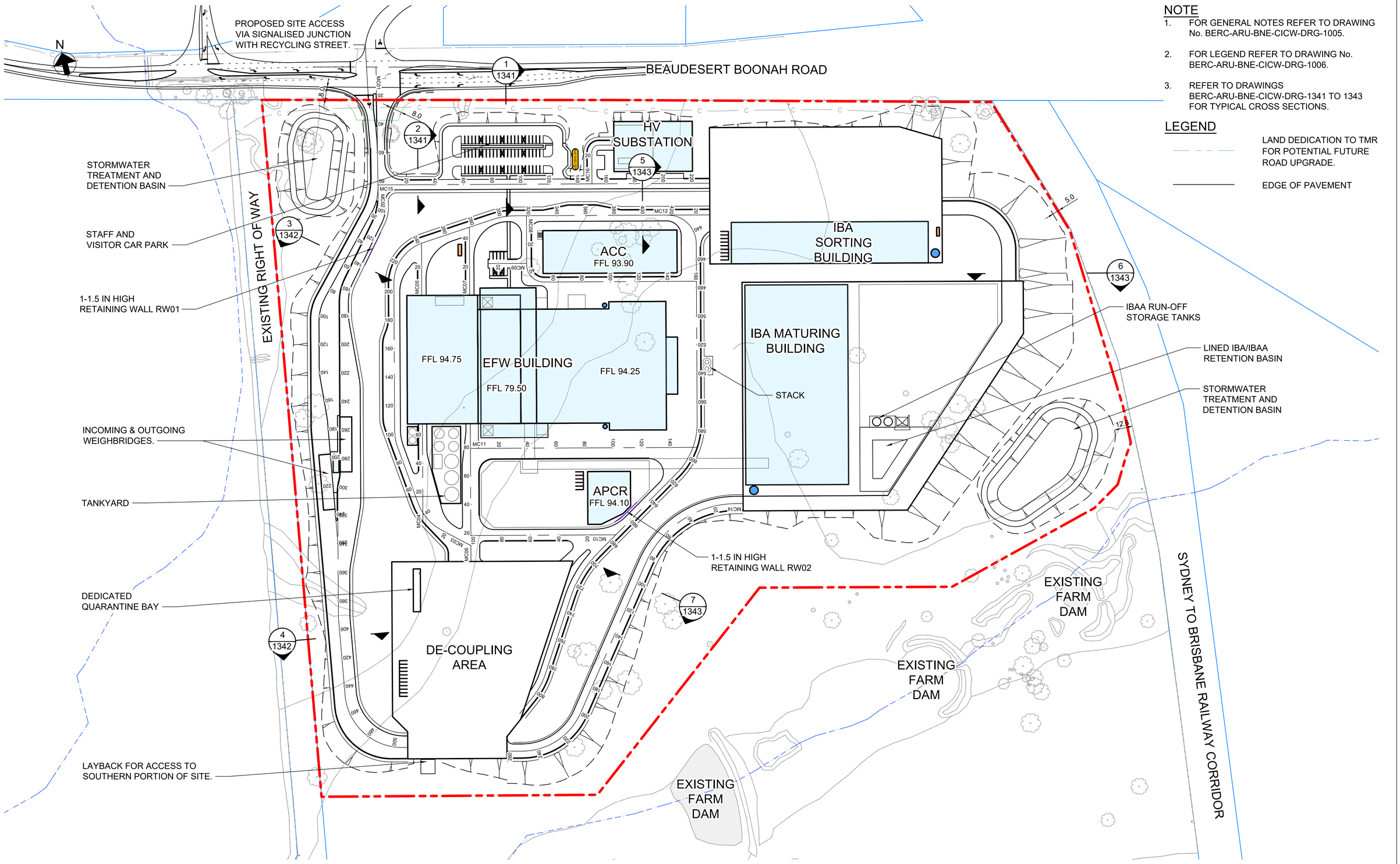

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.
3. REFER TO DRAWINGS BERC-ARU-BNE-CICW-DRG-1341 TO 1343 FOR TYPICAL CROSS SECTIONS.

LEGEND

LAND DEDICATION TO TMR FOR POTENTIAL FUTURE ROAD UPGRADE.

EDGE OF PAVEMENT

NOT FOR CONSTRUCTION

Scales

10 0 10 20 30 40 50m

1:1250(A1)/1:2500(A3)

Issue	Date	By	Chkd	Appd
E	27.07.26	PDA	PDA	EGM
ISSUE FOR APPROVAL				
D	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
C	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
B	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				
A	22.07.25	PDA	ERA	EGM
ISSUED FOR INFORMATION				

Client: CLEANAWAY — Making a sustainable future possible

Engineering Certification (CEng)

Name: .....

Signature: ..... Date: .....

Job Title: BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1: 1:1250m

Discipline: CIVIL

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ABN 18 000 966 165

Drawing Title: PROPOSED SITE PLAN - DEVELOPMENT FOOTPRINT

Drawing Status: FOR APPROVAL

Job No	Drawing No	Issue
293683-00	BERC- ARU-BNE-CICW-DRG-1021	E

Do not scale

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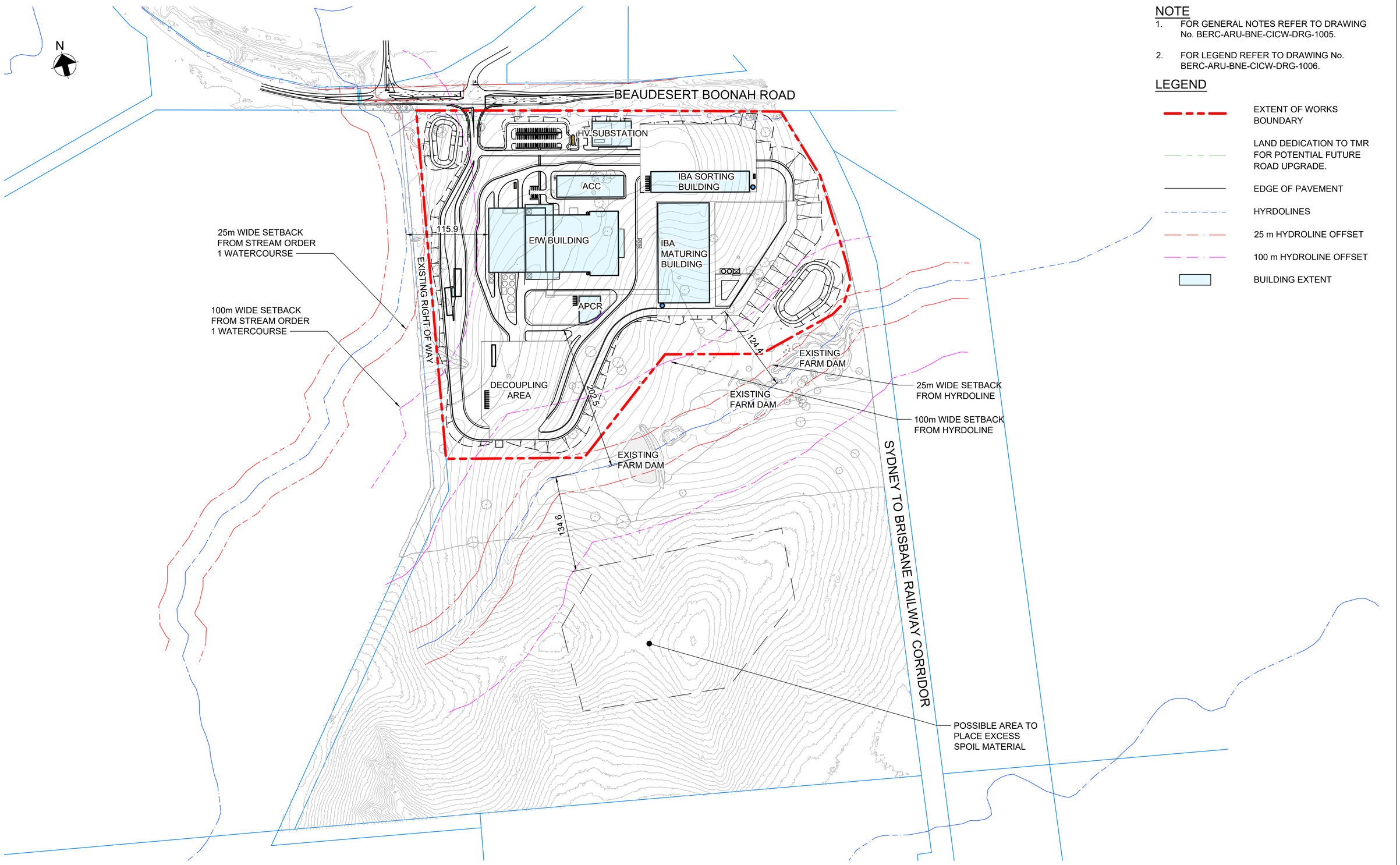

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.

LEGEND

- EXTENT OF WORKS BOUNDARY
- LAND DEDICATION TO TMR FOR POTENTIAL FUTURE ROAD UPGRADE.
- EDGE OF PAVEMENT
- HYRDOLINES
- 25 m HYDROLINE OFFSET
- 100 m HYDROLINE OFFSET
- BUILDING EXTENT

NOT FOR CONSTRUCTION

Scales

25 0 50 100m

1:2500(A1)/1:5000(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
D	27.07.26	PDA	ERA	
ISSUE FOR APPROVAL				

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				

Client: CLEANAWAY — Making a sustainable future possible

Engineering Certification (CEng)

Name: .....

Signature: ..... Date: .....

Job Title: BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1: 1:2500m

Discipline: CIVIL

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Arup Pty Ltd
ABN 18 000 966 165

Drawing Title: PROPOSED SITE PLAN - CLEARANCES FROM DEVELOPMENT FOOTPRINT

Drawing Status: **FOR APPROVAL**

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1030**	**D**

Do not scale

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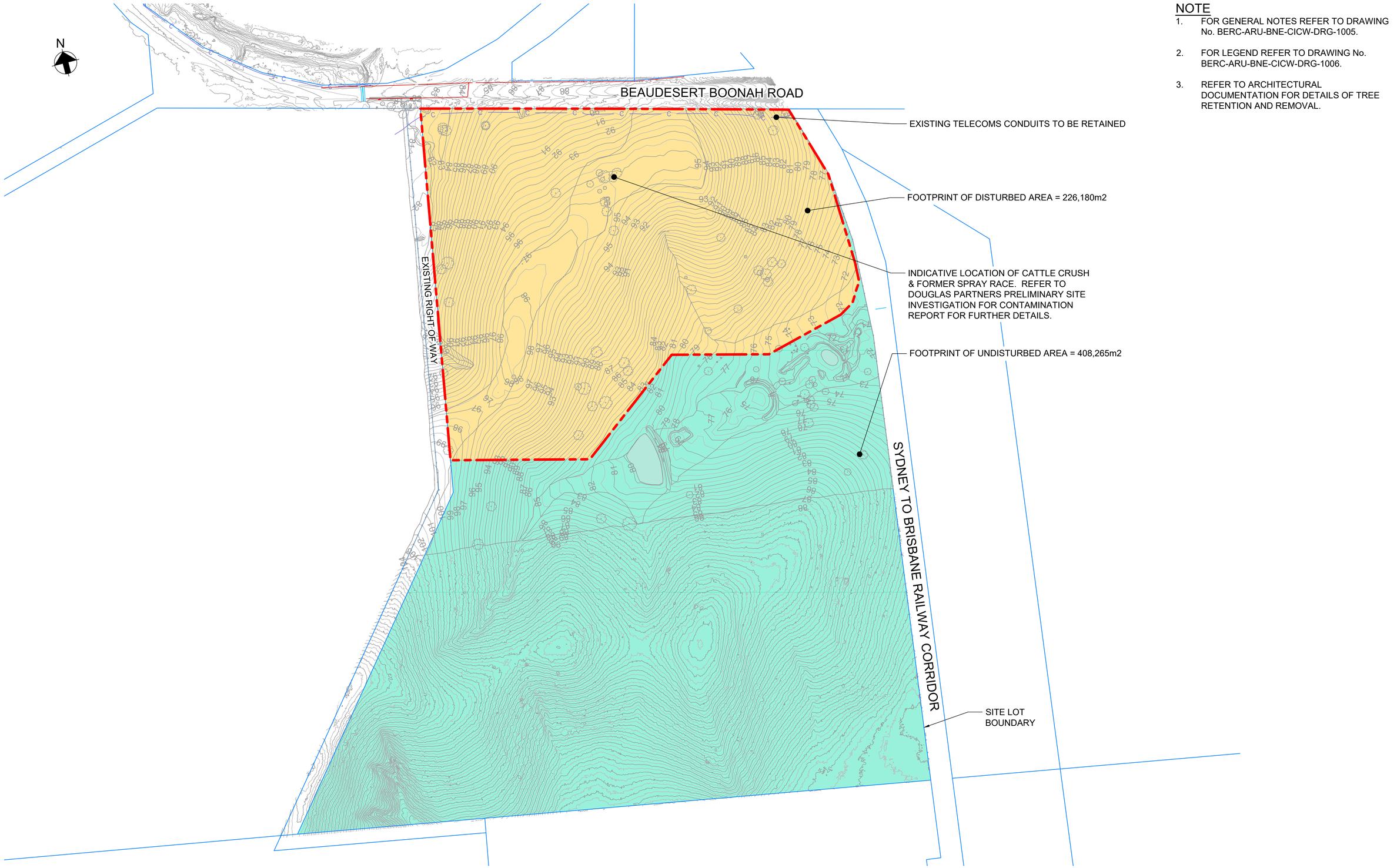

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.
3. REFER TO ARCHITECTURAL DOCUMENTATION FOR DETAILS OF TREE RETENTION AND REMOVAL.

NOT FOR CONSTRUCTION

Scales

25 0 50 100m

1:2500(A1)/1:5000(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				

Client

CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)

Name: .....

Signature: ..... Date: .....

Job Title

BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 1:2500m

Discipline CIVIL

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Arup Pty Ltd
ABN 18 000 966 165

Drawing Title

DEMOLITION AND SITE CLEARANCE PLAN

Drawing Status

FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1080**	**C**

Do not scale

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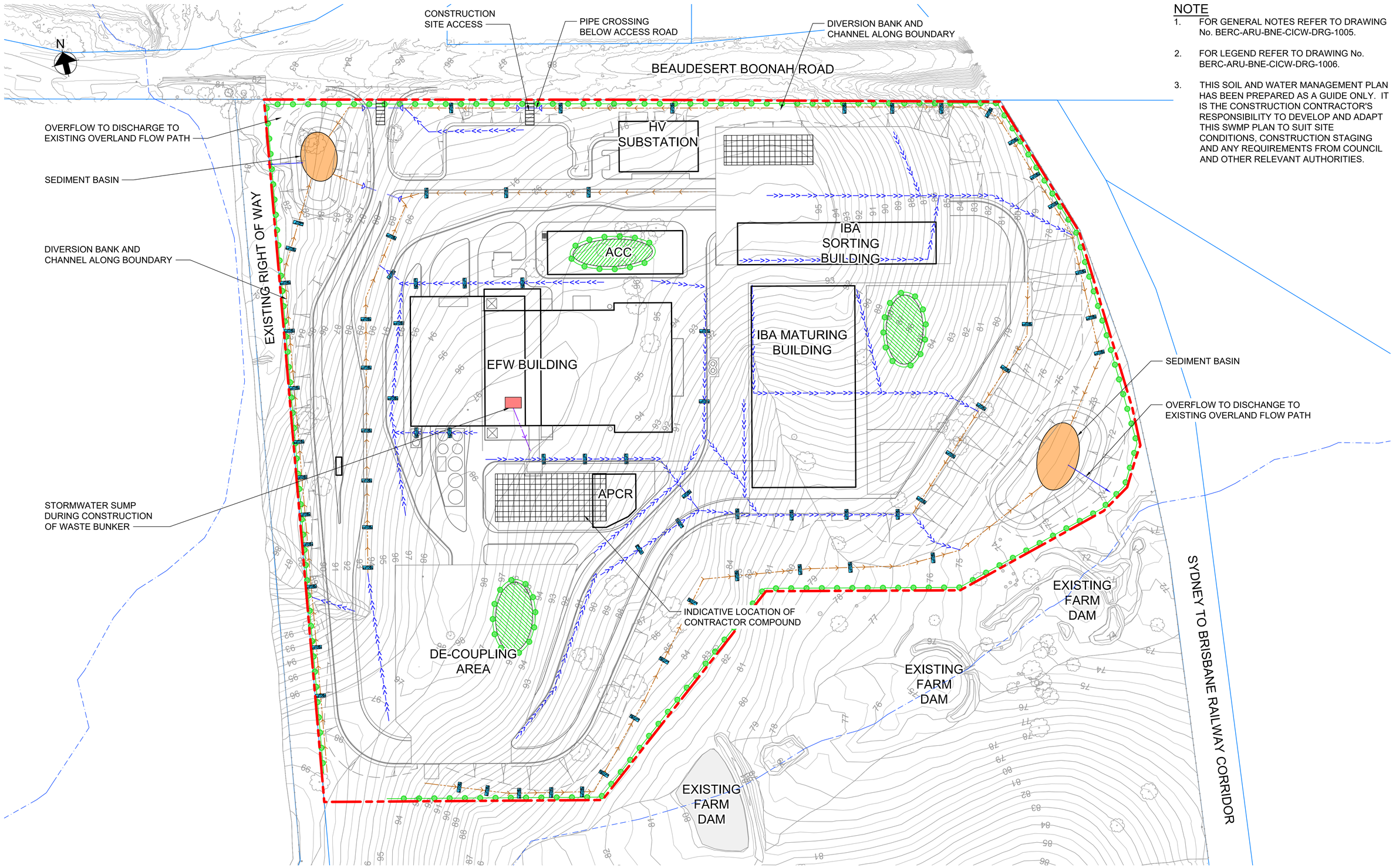

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.
3. THIS SOIL AND WATER MANAGEMENT PLAN HAS BEEN PREPARED AS A GUIDE ONLY. IT IS THE CONSTRUCTION CONTRACTOR'S RESPONSIBILITY TO DEVELOP AND ADAPT THIS SWMP PLAN TO SUIT SITE CONDITIONS, CONSTRUCTION STAGING AND ANY REQUIREMENTS FROM COUNCIL AND OTHER RELEVANT AUTHORITIES.

NOT FOR CONSTRUCTION

Scales

10 0 10 20 30 40 50m

1:1250(A1)/1:2500(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				

Client

CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)

Name: .....

Signature: ..... Date: .....

Job Title

BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 1:1250m

Discipline CIVIL

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Drawing Title

SOIL AND WATER MANAGEMENT PLAN

Drawing Status

FOR APPROVAL

Job No	Drawing No	Issue
293683-00	BERC- ARU-BNE-CICW-DRG-1101	C

Do not scale

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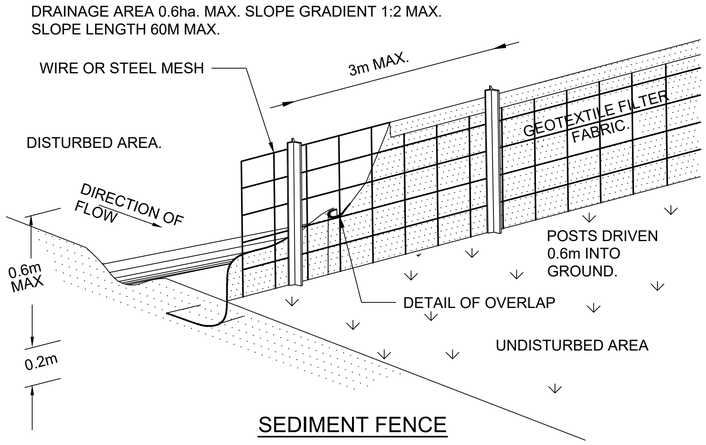
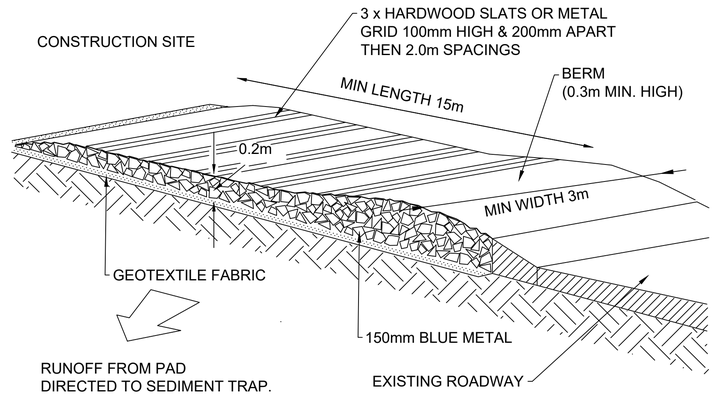
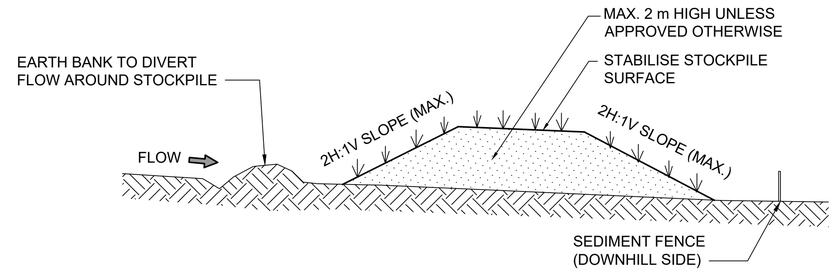


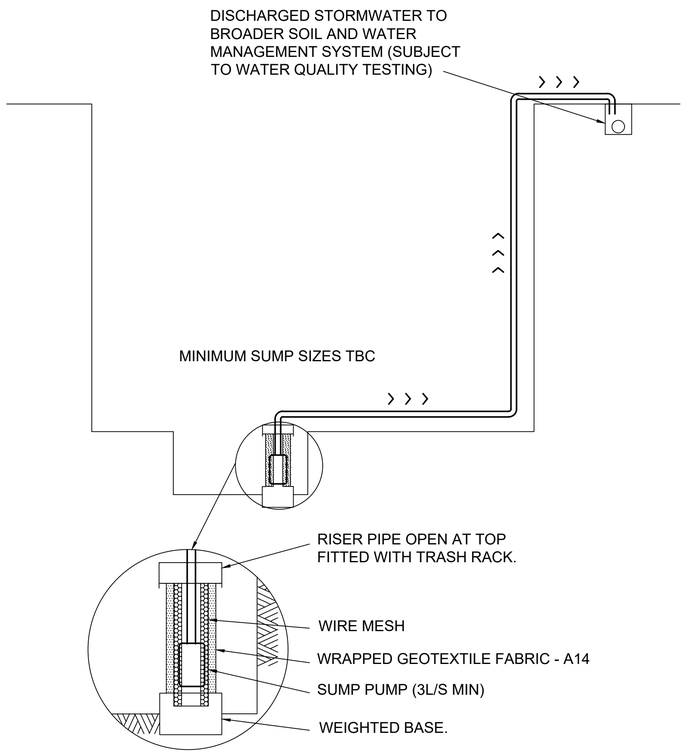
SEDIMENT FENCE



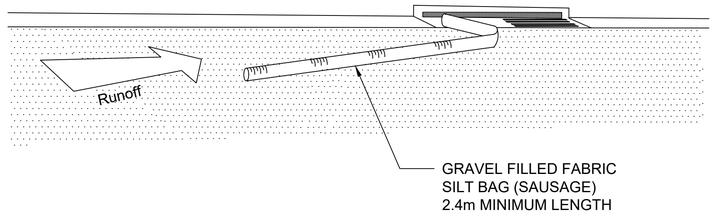
TEMPORARY CONSTRUCTION EXIT



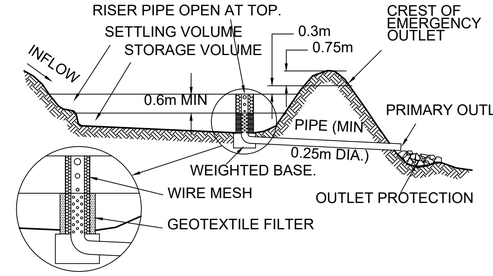
STOCKPILE



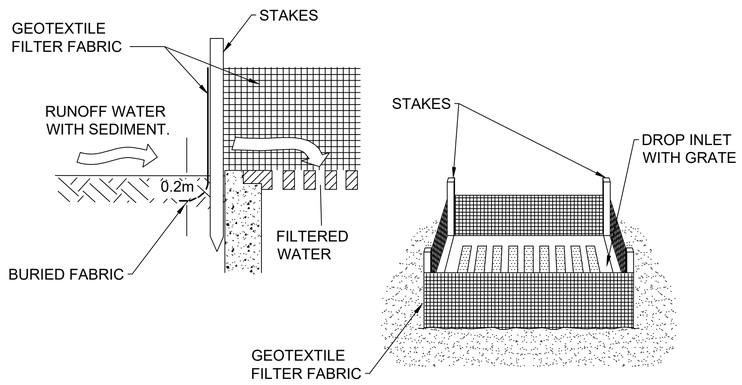
STORMWATER SUMP AND OUTLET



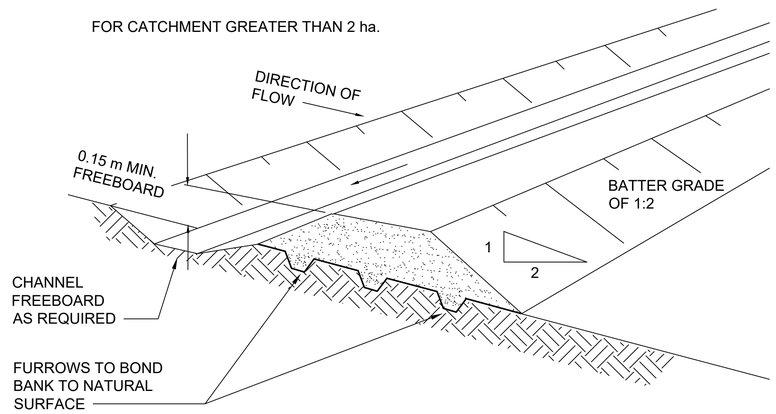
FABRIC STOCKING
KERB INLET SEDIMENT TRAP



CROSS SECTION OF TYPICAL SEDIMENT BASIN



GEOTEXTILE FILTER FABRIC DROP INLET SEDIMENT TRAP



DIVERSION BANK AND CHANNEL

NOT FOR CONSTRUCTION

Scales

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name:
Signature: Date:

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 NOT TO SCALE

Discipline CIVIL

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ABN 18 000 966 165

Drawing Title
EROSION AND SEDIMENT CONTROL DETAILS

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	BERC- ARU-BNE-CICW-DRG-1191	C

Do not scale

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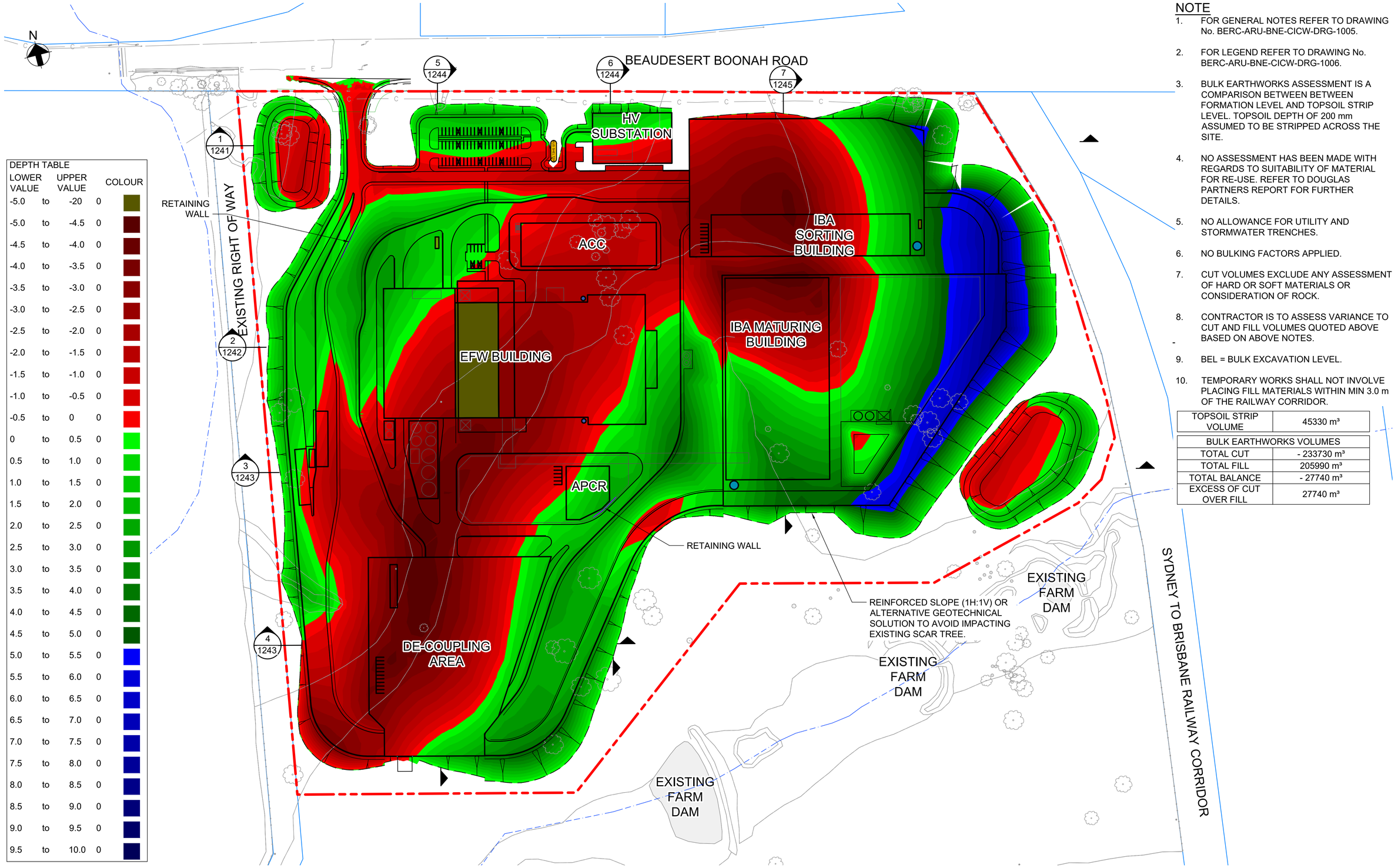

DEPTH TABLE

LOWER VALUE		UPPER VALUE		COLOUR
-5.0	to	-20	0	
-5.0	to	-4.5	0	
-4.5	to	-4.0	0	
-4.0	to	-3.5	0	
-3.5	to	-3.0	0	
-3.0	to	-2.5	0	
-2.5	to	-2.0	0	
-2.0	to	-1.5	0	
-1.5	to	-1.0	0	
-1.0	to	-0.5	0	
-0.5	to	0	0	
0	to	0.5	0	
0.5	to	1.0	0	
1.0	to	1.5	0	
1.5	to	2.0	0	
2.0	to	2.5	0	
2.5	to	3.0	0	
3.0	to	3.5	0	
3.5	to	4.0	0	
4.0	to	4.5	0	
4.5	to	5.0	0	
5.0	to	5.5	0	
5.5	to	6.0	0	
6.0	to	6.5	0	
6.5	to	7.0	0	
7.0	to	7.5	0	
7.5	to	8.0	0	
8.0	to	8.5	0	
8.5	to	9.0	0	
9.0	to	9.5	0	
9.5	to	10.0	0	

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.
3. BULK EARTHWORKS ASSESSMENT IS A COMPARISON BETWEEN BETWEEN FORMATION LEVEL AND TOPSOIL STRIP LEVEL. TOPSOIL DEPTH OF 200 mm ASSUMED TO BE STRIPPED ACROSS THE SITE.
4. NO ASSESSMENT HAS BEEN MADE WITH REGARDS TO SUITABILITY OF MATERIAL FOR RE-USE. REFER TO DOUGLAS PARTNERS REPORT FOR FURTHER DETAILS.
5. NO ALLOWANCE FOR UTILITY AND STORMWATER TRENCHES.
6. NO BULKING FACTORS APPLIED.
7. CUT VOLUMES EXCLUDE ANY ASSESSMENT OF HARD OR SOFT MATERIALS OR CONSIDERATION OF ROCK.
8. CONTRACTOR IS TO ASSESS VARIANCE TO CUT AND FILL VOLUMES QUOTED ABOVE BASED ON ABOVE NOTES.
9. BEL = BULK EXCAVATION LEVEL.
10. TEMPORARY WORKS SHALL NOT INVOLVE PLACING FILL MATERIALS WITHIN MIN 3.0 m OF THE RAILWAY CORRIDOR.

TOPSOIL STRIP VOLUME	45330 m³

BULK EARTHWORKS VOLUMES	
TOTAL CUT	- 233730 m³
TOTAL FILL	205990 m³
TOTAL BALANCE	- 27740 m³
EXCESS OF CUT OVER FILL	27740 m³

NOT FOR CONSTRUCTION

Scales

25 0 50 100m

1:2500(A1)/1:5000(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
D	27.07.26	PDA	PDA	EGM
ISSUE FOR APPROVAL				

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				

Client

CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)

Name: .....

Signature: ..... Date: .....

Job Title

BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 1:2500m

Discipline CIVIL

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www.arup.com

CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title

BULK EARTHWORKS PLAN

Drawing Status

FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1201**	**D**

Do not scale

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A1

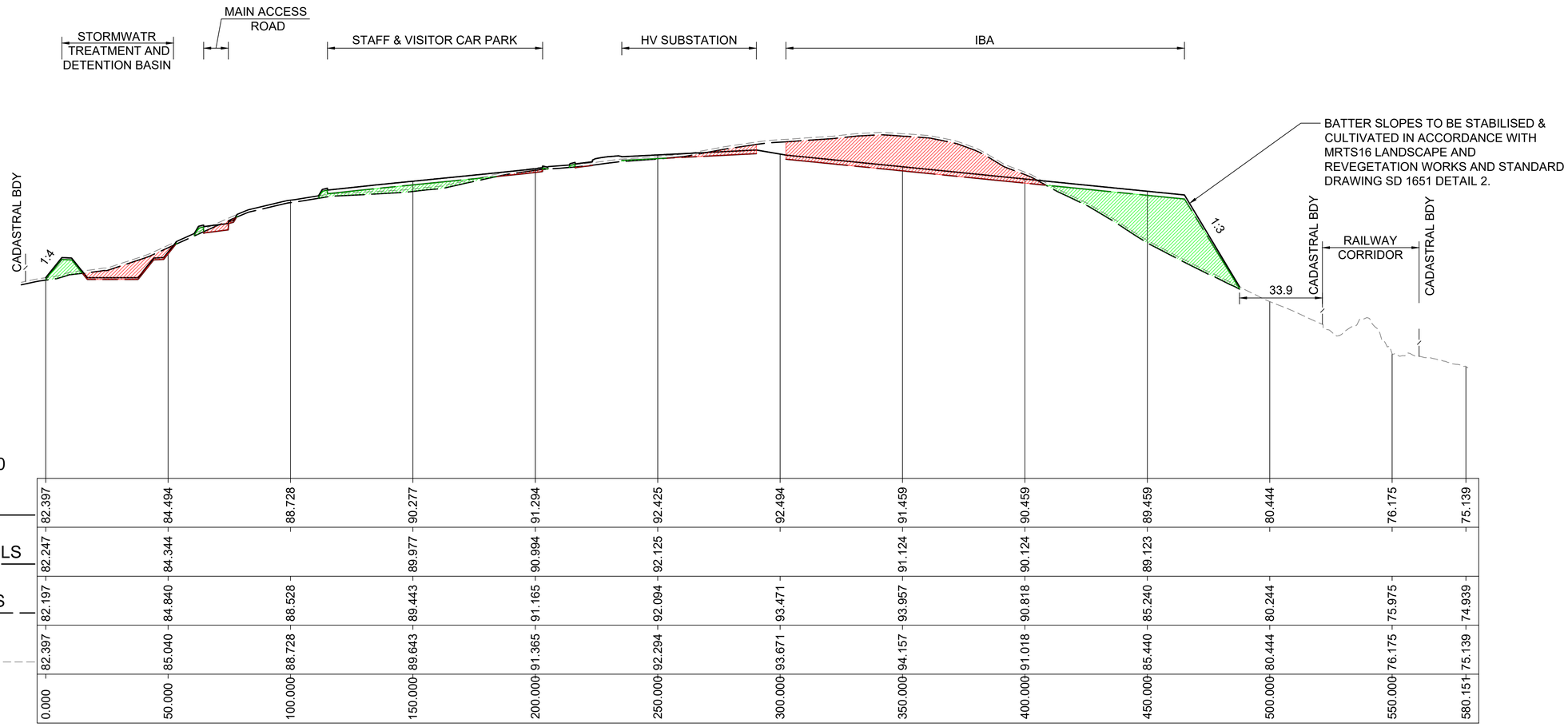
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.

LEGEND:

CUT

FILL



DATUM RL (m) 66.0													
DESIGN LEVELS	82.397	84.494	88.728	90.277	91.294	92.425	92.494	91.459	90.459	89.459	80.444	76.175	75.139
FORMATION LEVELS	82.247	84.344		89.977	90.994	92.125		91.124	90.124	89.123			
STRIPPED LEVELS	82.197	84.840	88.528	89.443	91.165	92.094	93.471	93.957	90.818	85.240	80.244	75.975	74.939
EXISTING LEVELS	82.397	85.040	88.728	89.643	91.365	92.294	93.671	94.157	91.018	85.440	80.444	76.175	75.139
CHAINAGE	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	500.000	550.000	580.151

SECTION 1 C-1201
SCALE H 1:1000
V 1:200

NOT FOR CONSTRUCTION

Scales

10 0 10 20 30 40 50m
1:1000(A1)/1:2000(A3)
2 0 2 4 6 8 10m
1:200(A1)/1:400(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 AS SHOWN

Discipline CIVIL

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Sydney, NSW, 2000
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www.arup.com
CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
BULK EARTHWORKS
SITE SECTIONS
SHEET 1

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1241**	**C**

Do not scale

© Arup

A1

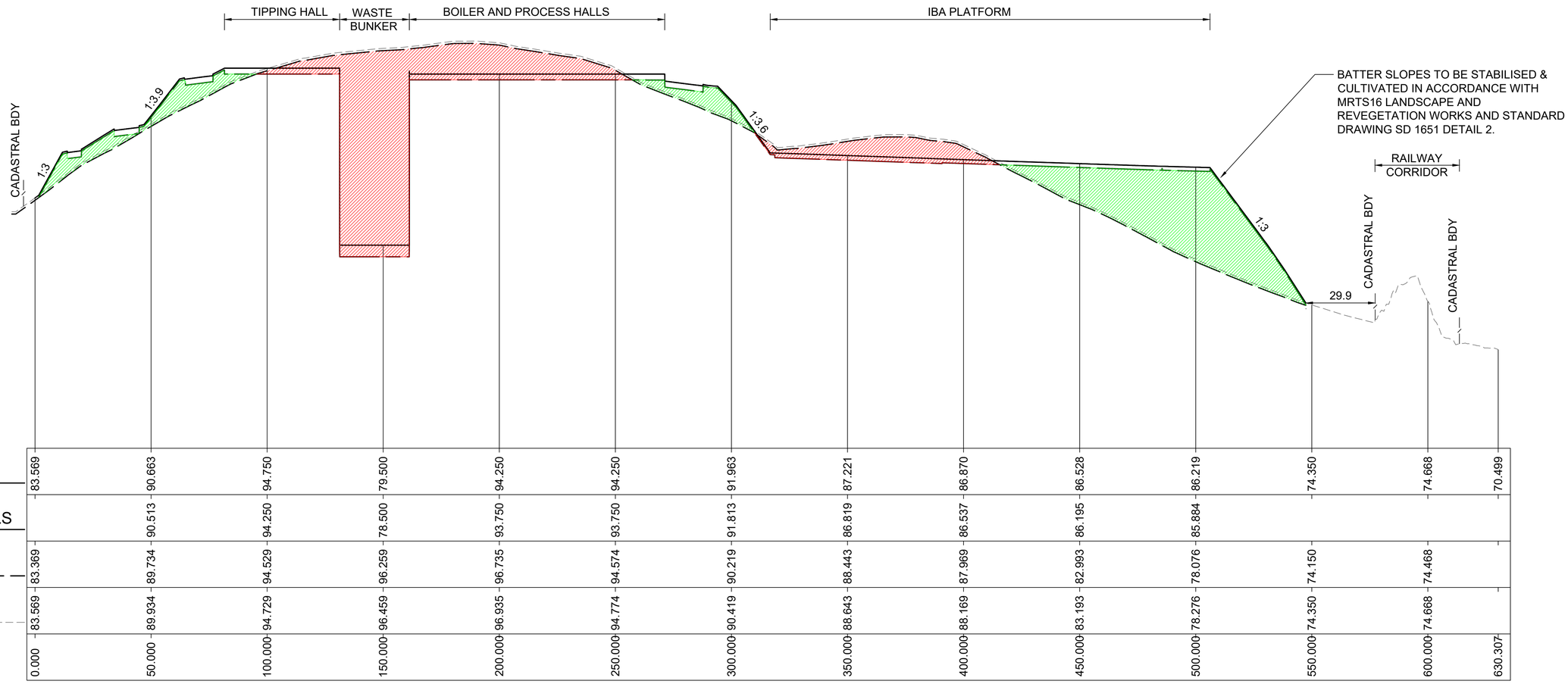
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.

LEGEND:

CUT

FILL



DATUM RL (m) 62.0													
DESIGN LEVELS	83.569	90.663	94.750	79.500	94.250	94.250	91.963	87.221	86.870	86.528	86.219	74.350	74.668	70.499
FORMATION LEVELS		90.513	94.250	78.500	93.750	93.750	91.813	86.819	86.537	86.195	85.884			
STRIPPED LEVELS	83.369	89.734	94.529	96.259	96.735	94.574	90.219	88.443	87.969	82.993	78.076	74.150	74.468	
EXISTING LEVELS	83.569	89.934	94.729	96.459	96.935	94.774	90.419	88.643	88.169	83.193	78.276	74.350	74.668	
CHAINAGE	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	500.000	550.000	600.000	630.307

SECTION 2
SCALE H 1:1000 C-1201
V 1:200

NOT FOR CONSTRUCTION

Scales

10 0 10 20 30 40 50m
1:1000(A1)/1:2000(A3)

2 0 2 4 6 8 10m
1:200(A1)/1:400(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 AS SHOWN

Discipline CIVIL

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ABN 18 000 966 165

Drawing Title
BULK EARTHWORKS
SITE SECTIONS
SHEET 2

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1242**	**C**

Do not scale

© Arup

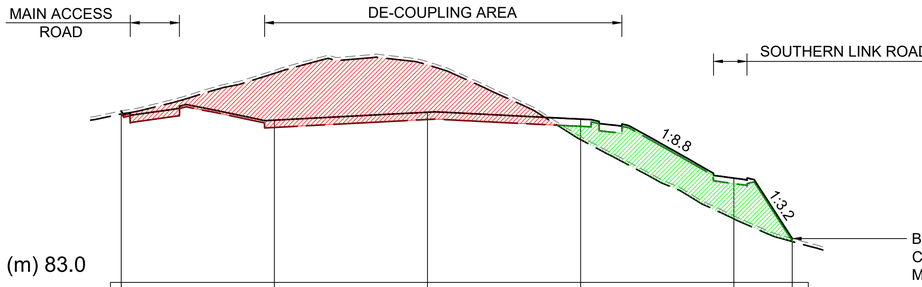
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.

LEGEND:

CUT

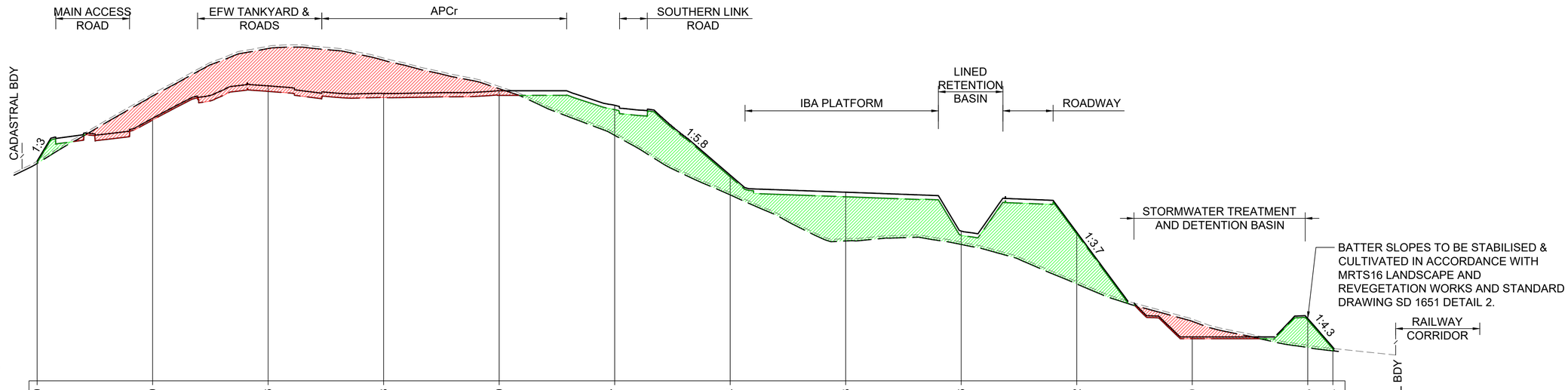
FILL



BATTER SLOPES TO BE STABILISED & CULTIVATED IN ACCORDANCE WITH MRTS16 LANDSCAPE AND REVEGETATION WORKS AND STANDARD DRAWING SD 1651 DETAIL 2.

DATUM RL (m) 83.0						
DESIGN LEVELS	94.195	93.593	94.113	93.659	89.811	85.865
FORMATION LEVELS	94.045	93.118	93.638	93.184	89.451	
STRIPPED LEVELS	93.997	96.643	97.205	92.325	87.152	85.670
EXISTING LEVELS	94.197	96.843	97.405	92.525	87.352	85.870
CHAINAGE	0.000	50.000	100.000	150.000	200.000	219.074

SECTION 4
SCALE H 1:1000 C-1201
V 1:200



BATTER SLOPES TO BE STABILISED & CULTIVATED IN ACCORDANCE WITH MRTS16 LANDSCAPE AND REVEGETATION WORKS AND STANDARD DRAWING SD 1651 DETAIL 2.

DATUM RL (m) 69.0												
DESIGN LEVELS	88.010	91.720	94.526	93.868	94.100	92.847	86.804	85.323	81.956	81.862	72.800	74.393	71.904
FORMATION LEVELS	87.860	91.570	94.051	93.508	93.700	92.470	86.654	84.923	81.596	81.712	72.650	74.243	71.754
STRIPPED LEVELS	87.810	93.650	97.755	96.735	94.277	90.246	85.095	81.105	80.804	77.388	74.148	71.883	71.594
EXISTING LEVELS	88.010	93.850	97.955	96.935	94.477	90.446	85.295	81.305	81.004	77.588	74.348	72.083	71.794
CHAINAGE	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	500.000	550.000	560.861

SECTION 3
SCALE H 1:1000 C-1201
V 1:200

NOT FOR CONSTRUCTION

Scales

10 0 10 20 30 40 50m
1:1000(A1)/1:2000(A3)

2 0 2 4 6 8 10m
1:200(A1)/1:400(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client: CLEANAWAY — Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title: BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1: AS SHOWN

Discipline: CIVIL

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Arup Pty Ltd
ABN 18 000 966 165

Drawing Title: BULK EARTHWORKS SITE SECTIONS SHEET 3

Drawing Status: **FOR APPROVAL**

Job No	Drawing No	Issue
293683-00	BERC- ARU-BNE-CICW-DRG-1243	C

Do not scale

© Arup

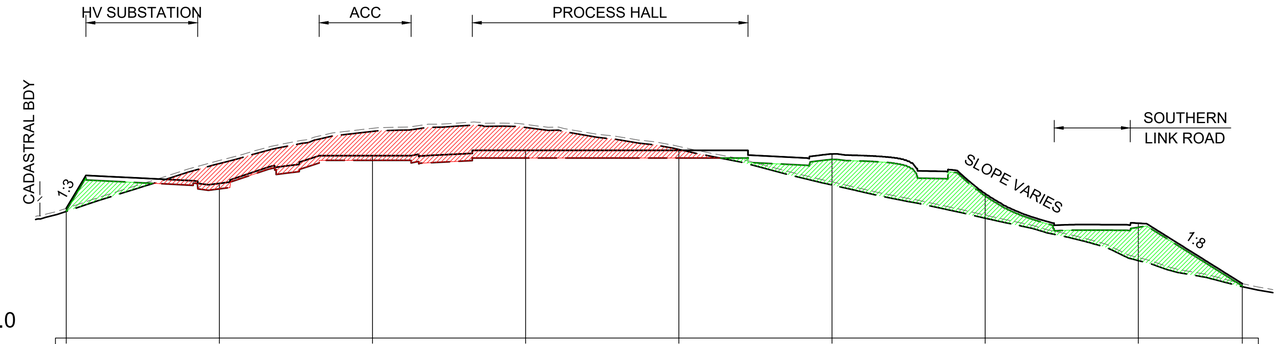
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.

LEGEND:

CUT

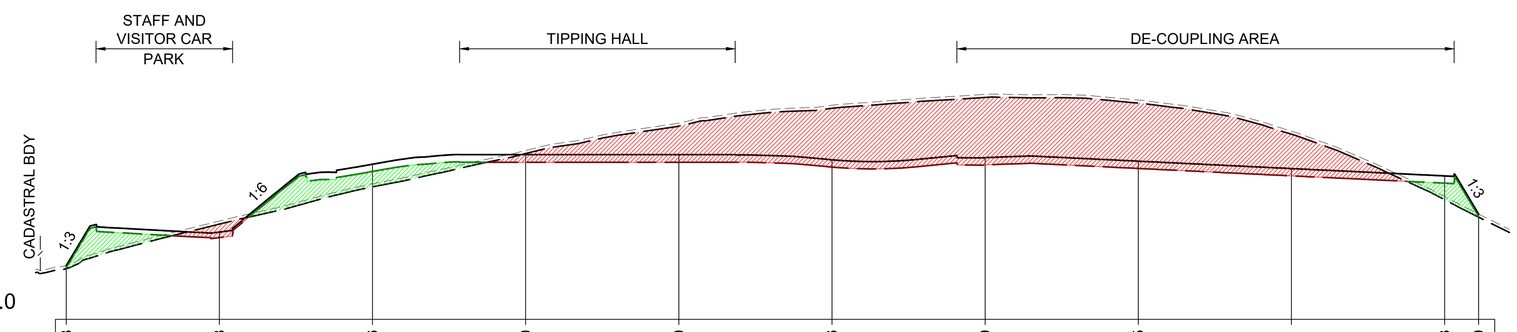
FILL



DATUM RL (m) 82.0

DESIGN LEVELS	90.467	92.094	93.900	94.250	94.250	94.014	91.433	89.495	85.555
FORMATION LEVELS	90.317	91.734	93.600	93.750	93.750	93.654	91.283	89.230	85.405
STRIPPED LEVELS	90.267	93.391	95.490	95.747	94.311	91.996	89.825	87.055	85.354
EXISTING LEVELS	90.467	93.591	95.690	95.947	94.511	92.196	90.025	87.255	85.554
CHAINAGE	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	383.950

SECTION 6 C-1201
SCALE H 1:1000
V 1:200



DATUM RL (m) 84.0

DESIGN LEVELS	87.508	89.698	94.126	94.750	94.750	94.416	94.549	94.325	93.841	93.363	90.869
FORMATION LEVELS	87.358	89.338	93.651	94.250	94.250	93.941	94.074	93.850	93.366	92.888	90.719
STRIPPED LEVELS	87.308	90.216	92.646	94.823	96.615	97.775	98.485	98.117	96.084	91.811	90.669
EXISTING LEVELS	87.508	90.416	92.846	95.023	96.815	97.975	98.685	98.317	96.284	92.011	90.869
CHAINAGE	0.000	50.000	100.000	150.000	200.000	250.000	300.000	350.000	400.000	450.000	461.120

SECTION 5 C-1201
SCALE H 1:1000
V 1:200

NOT FOR CONSTRUCTION

Scales
10 0 10 20 30 40 50m
1:1000(A1)/1:2000(A3)
2 0 2 4 6 8 10m
1:200(A1)/1:400(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 AS SHOWN

Discipline CIVIL

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Drawing Title
BULK EARTHWORKS
SITE SECTIONS
SHEET 4

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	BERC- ARU-BNE-CICW-DRG-1244	C

Do not scale

© Arup

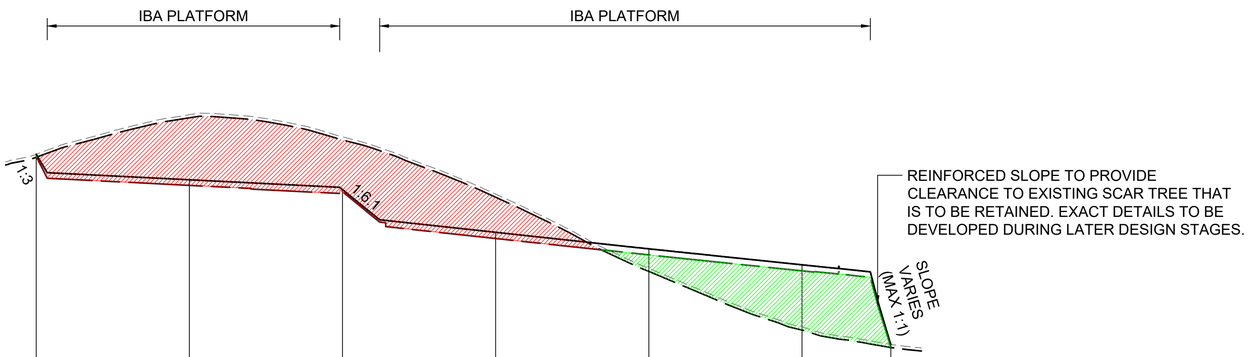
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.

LEGEND:

CUT

FILL



DATUM RL (m) 77.0							
DESIGN LEVELS	92.478	90.808	90.173	87.380	86.303	85.263	80.060
FORMATION LEVELS	92.328	90.448	90.023	86.976	85.905	84.863	79.910
STRIPPED LEVELS	92.278	94.855	93.411	89.673	84.831	80.999	79.860
EXISTING LEVELS	92.478	95.055	93.611	89.873	85.031	81.199	80.060
CHAINAGE	0.000	50.000	100.000	150.000	200.000	250.000	278.998

SECTION 7 C-1201
SCALE H 1:1000 V 1:200

NOT FOR CONSTRUCTION

Scales

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
B	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
A	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				

Client: CLEANAWAY — Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title: BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1: AS SHOWN

Discipline: CIVIL

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Drawing Title: BULK EARTHWORKS SITE SECTIONS SHEET 5

Drawing Status: **FOR APPROVAL**

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1245**	**B**

Do not scale

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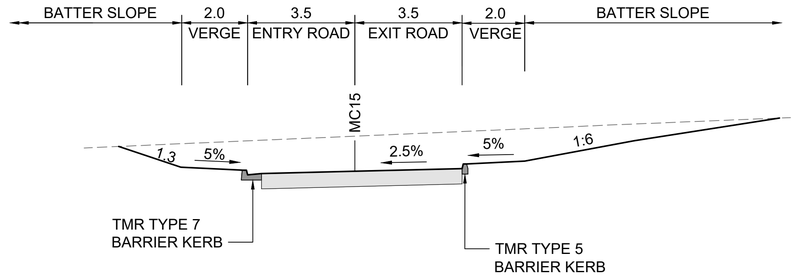
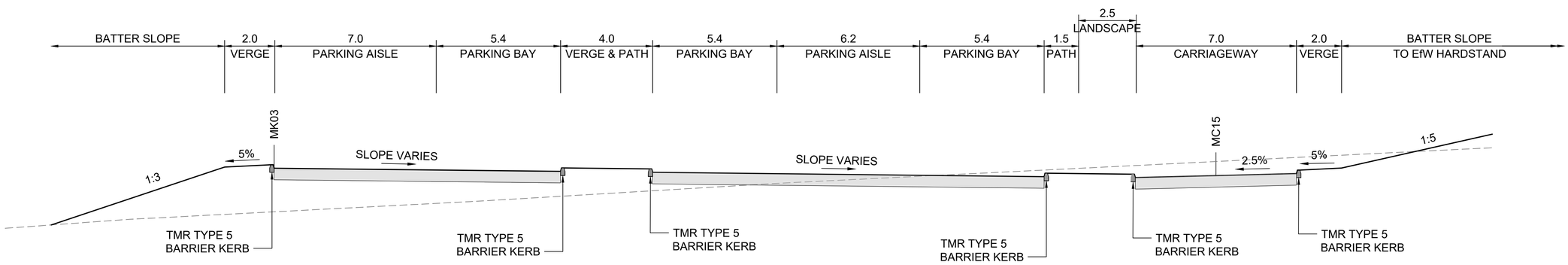
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.



SECTION 2 (1021)
SCALE 1:100

CAR PARK AND IBA ACCESS ROAD



SECTION 1 (1021)
SCALE 1:100

STAFF AND VISITOR CAR PARK

NOT FOR CONSTRUCTION

Scales
1 0 1 2 3 4 5m
1:100(A1)/1:200(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			
Issue	Date	By	Chkd	Appd

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 1:100m

Discipline CIVIL

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Drawing Title
CIVIL WORKS
TYPICAL CROSS SECTIONS
SHEET 1

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1341**	**C**

Do not scale

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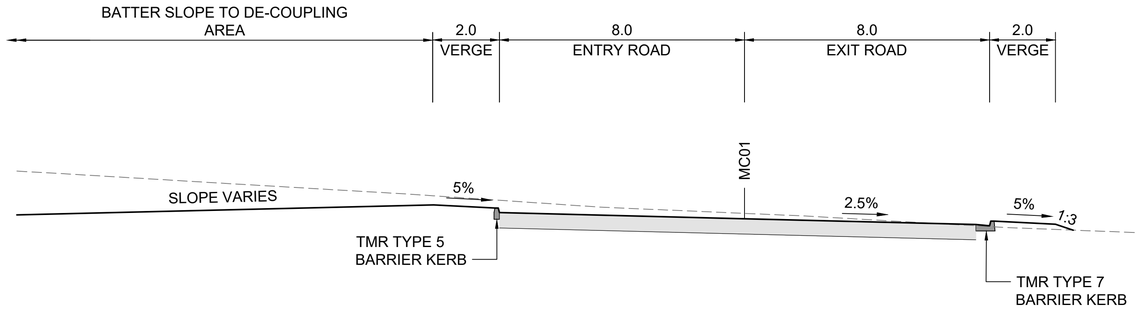
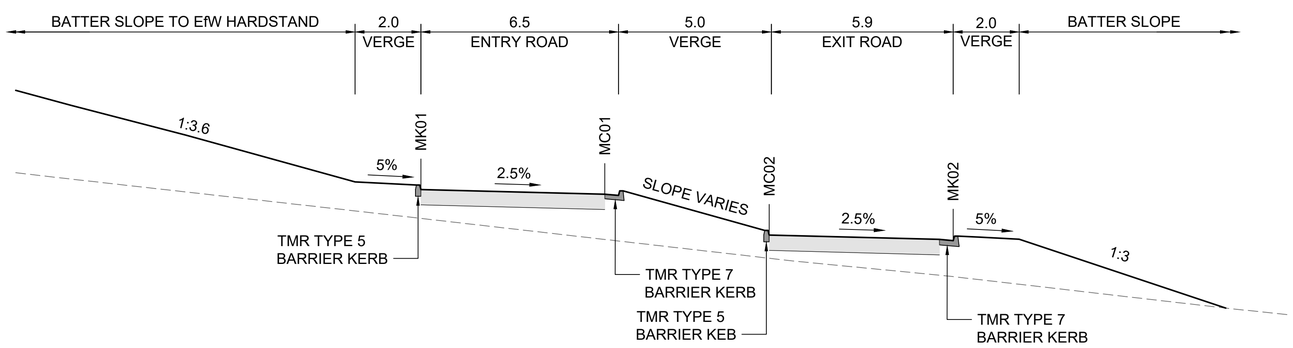
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.



SECTION 4 / 1021
SCALE 1:100

MAIN ENTRANCE ROAD



SECTION 3 / 1021
SCALE 1:100

MAIN ENTRANCE ROAD

NOT FOR CONSTRUCTION

Scales
1 0 1 2 3 4 5m
1:100(A1)/1:200(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 1:100m

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Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
CIVIL WORKS
TYPICAL CROSS SECTIONS
SHEET 2

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1342**	**C**

Do not scale

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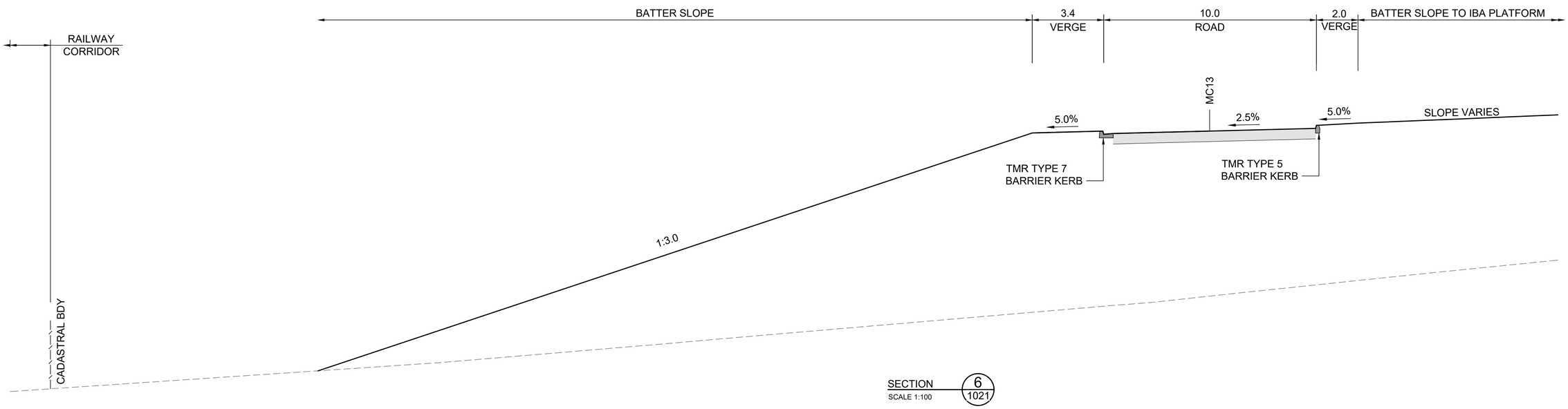
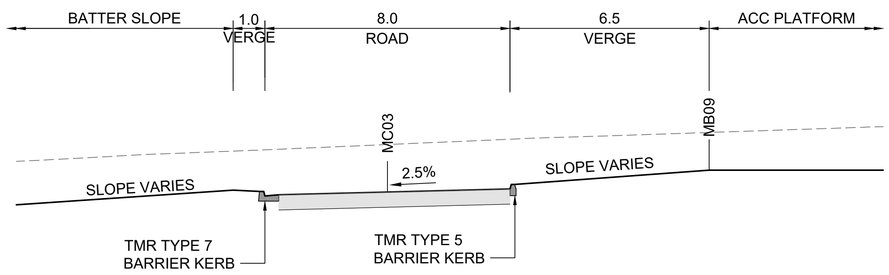
NOTE

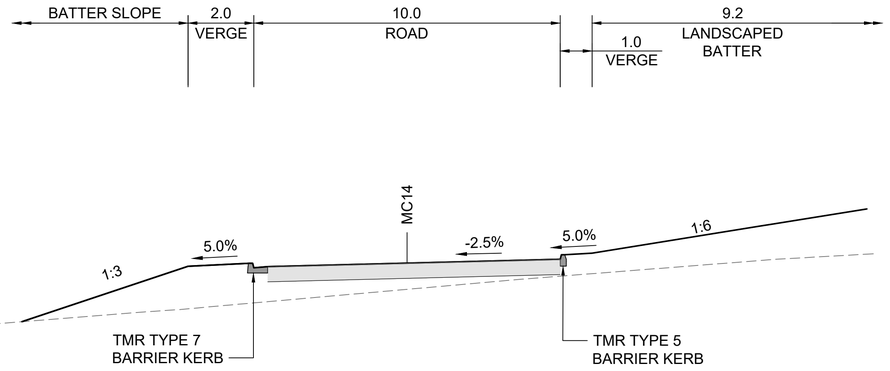
1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.



SECTION 6 (1021)
SCALE 1:100



SECTION 5 (1021)
SCALE 1:100



SECTION 7 (1021)
SCALE 1:100

NOT FOR CONSTRUCTION

Scales
1 0 1 2 3 4 5m
1:100(A1)/1:200(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 1:100m

Discipline CIVIL

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Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
CIVIL WORKS
TYPICAL CROSS SECTIONS
SHEET 3

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1343**	**C**

Do not scale

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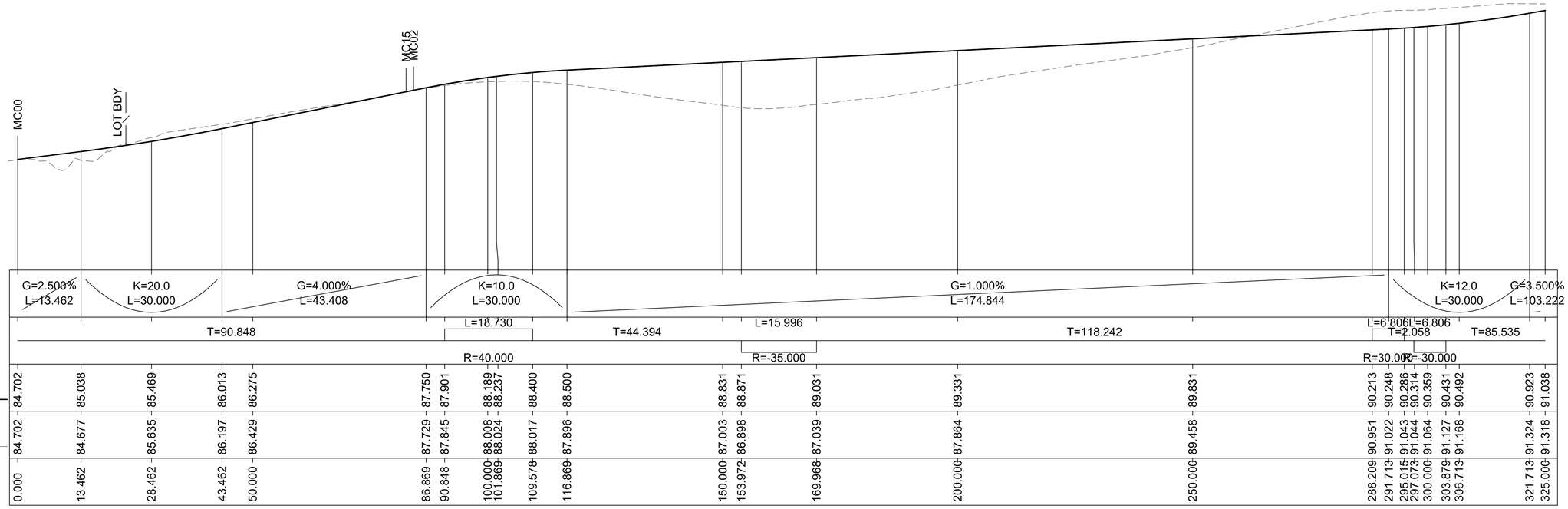
A1

NOTE

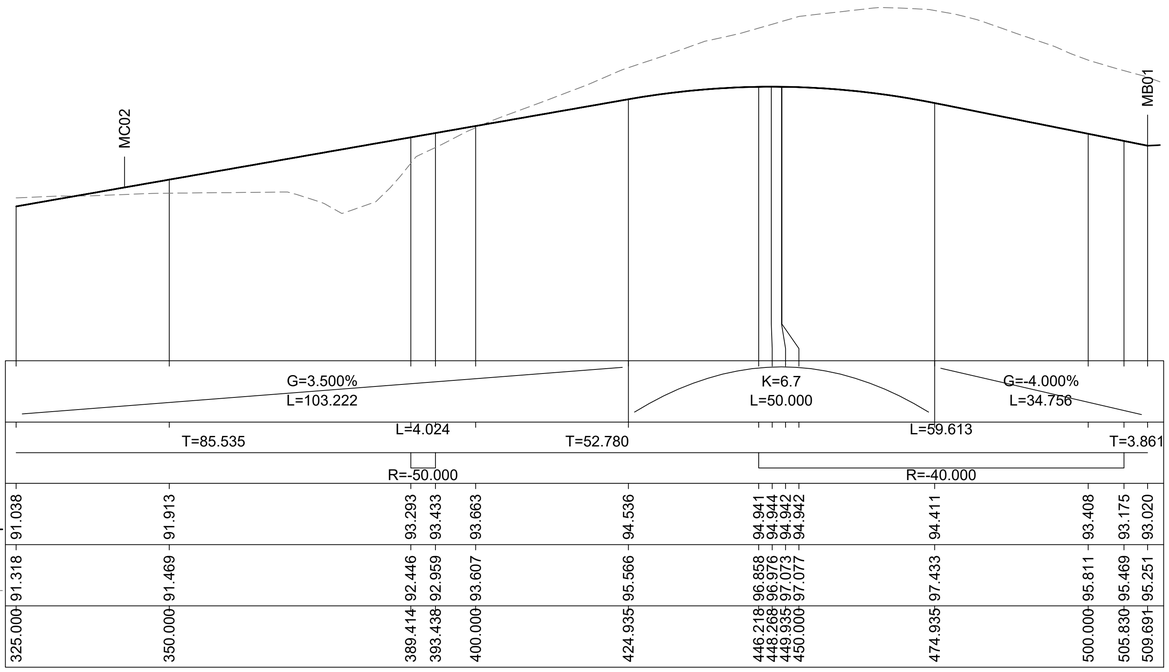
1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.



| | | |

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.



LONGITUDINAL SECTION OF MC01 CONTROL LINE

H 1:500

V 1:100

NOT FOR CONSTRUCTION

Scales

5 0 10 20m

1:500(A1)/1:1000(A3)

1 0 1 2 3 4 5m

1:100(A1)/1:200(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client: CLEANAWAY — Making a sustainable future possible

Engineering Certification (CEng)

Name: .....

Signature: ..... Date: .....

Job Title: BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1: AS SHOWN

Discipline: CIVIL

ARUP

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Tel +61 (02) 9320 9320 Fax +61 (02) 9321 9321
www.arup.com

CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title: CIVIL WORKS
MC01 LONGITUDINAL SECTIONS
SHEET 2

Drawing Status: **FOR APPROVAL**

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1352**	**C**

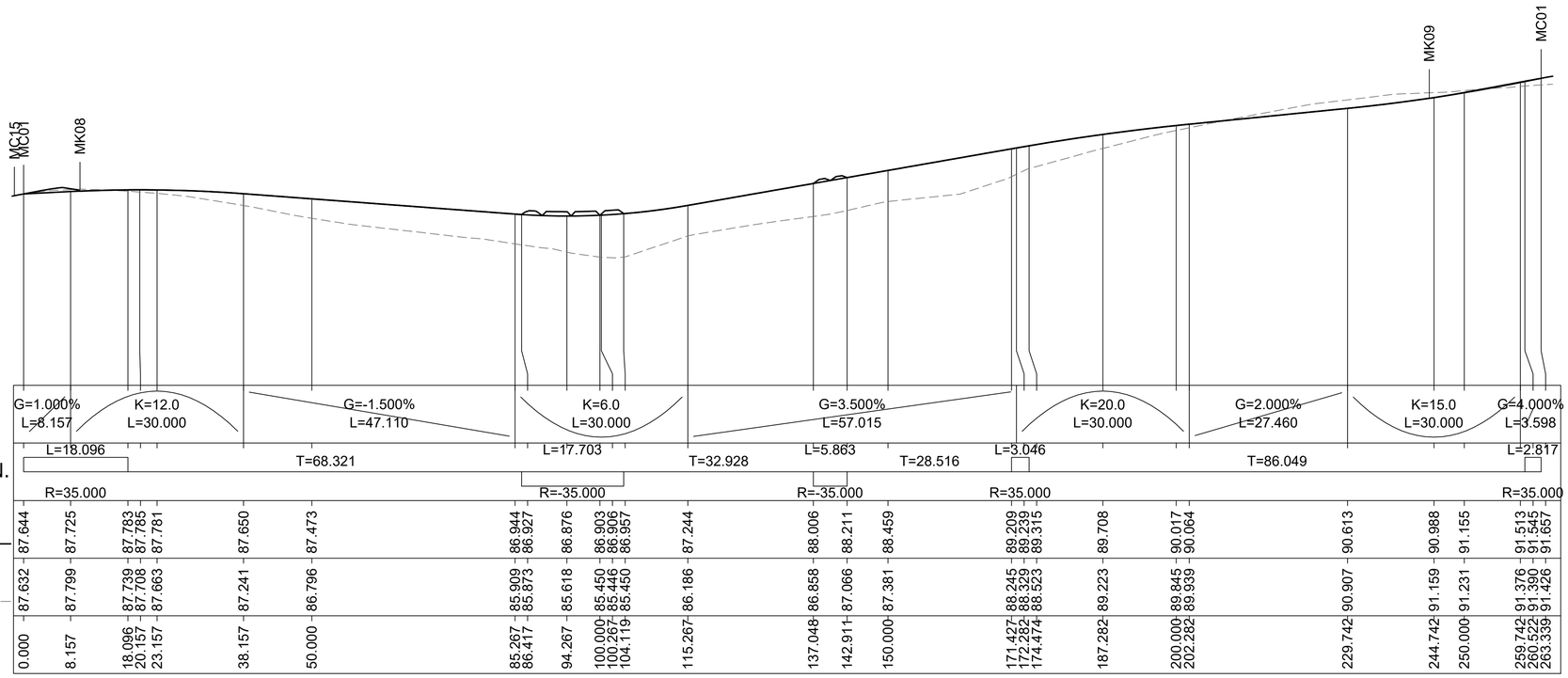
Do not scale

© Arup

A1

NOTE

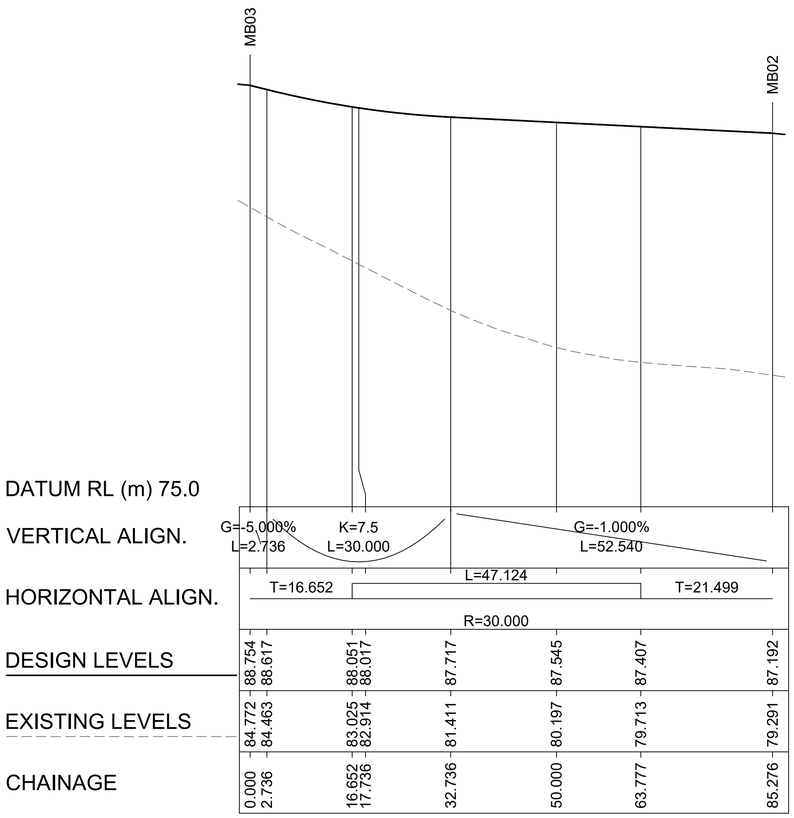
1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.



| | | |

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.



LONGITUDINAL SECTION OF MC13 CONTROL LINE

H 1:500

V 1:100

NOT FOR CONSTRUCTION

Scales

5 0 10 20m

1:500(A1)/1:1000(A3)

1 0 1 2 3 4 5m

1:100(A1)/1:200(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client

CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)

Name: .....

Signature: ..... Date: .....

Job Title

BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 AS SHOWN

Discipline CIVIL

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Member Firm
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ABN 18 000 966 165

Drawing Title

CIVIL WORKS
MC13 LONGITUDINAL SECTIONS

Drawing Status

FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1354**	**C**

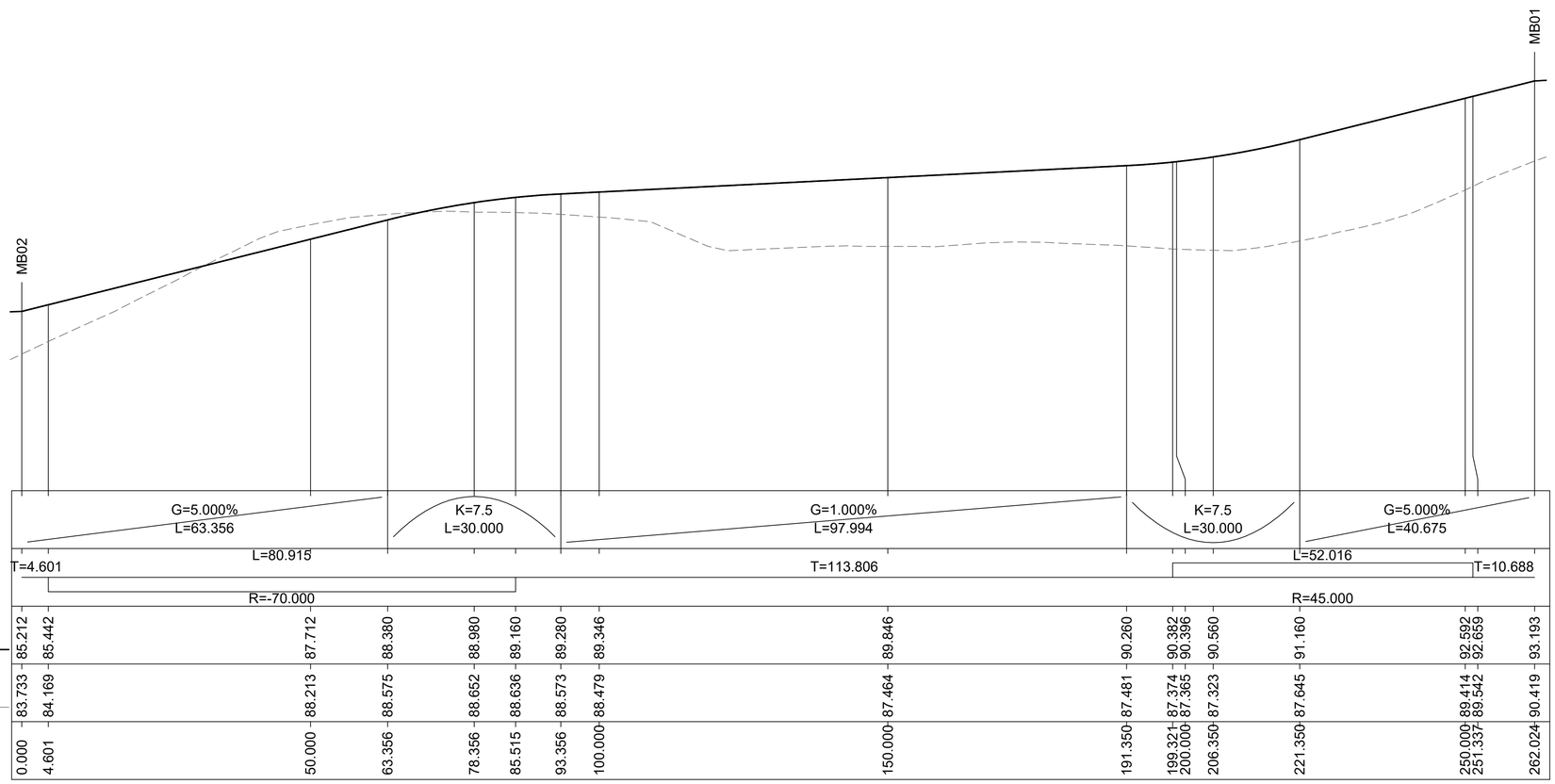
Do not scale

© Arup

A1

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.



LONGITUDINAL SECTION OF MC14 CONTROL LINE

H 1:500

V 1:100

NOT FOR CONSTRUCTION

Scales

5 0 10 20m

1:500(A1)/1:1000(A3)

1 0 1 2 3 4 5m

1:100(A1)/1:200(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client

CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)

Name: .....

Signature: ..... Date: .....

Job Title

BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 AS SHOWN

Discipline CIVIL

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ABN 18 000 966 165

Drawing Title

CIVIL WORKS
MC14 LONGITUDINAL SECTIONS

Drawing Status

FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1355**	**C**

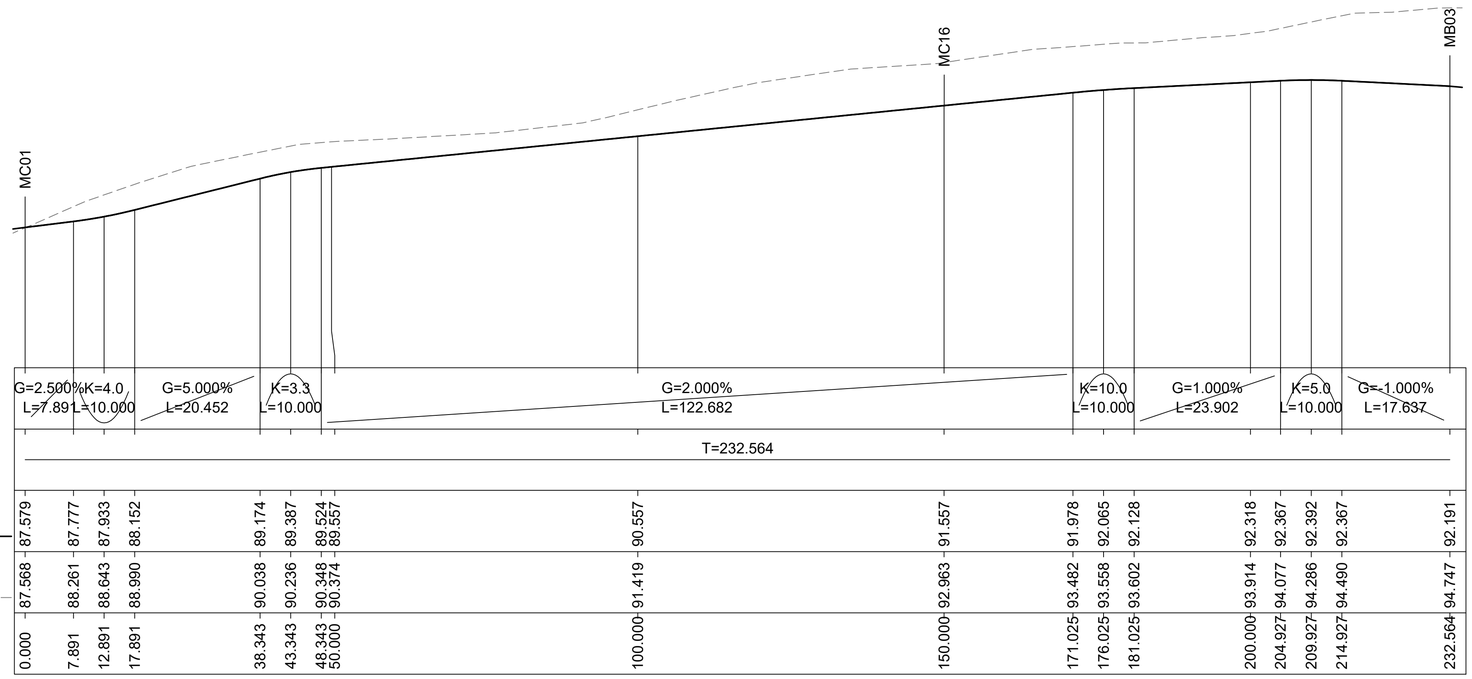
Do not scale

© Arup

A1

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.



LONGITUDINAL SECTION OF MC15 CONTROL LINE

H 1:500

V 1:100

NOT FOR CONSTRUCTION

Scales

5 0 10 20m

1:500(A1)/1:1000(A3)

1 0 1 2 3 4 5m

1:100(A1)/1:200(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				
Issue	Date	By	Chkd	Appd

Client

CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)

Name: .....

Signature: ..... Date: .....

Job Title

BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 AS SHOWN

Discipline CIVIL

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Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title

CIVIL WORKS
MC15 LONGITUDINAL SECTIONS

Drawing Status

FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1356**	**C**

Do not scale

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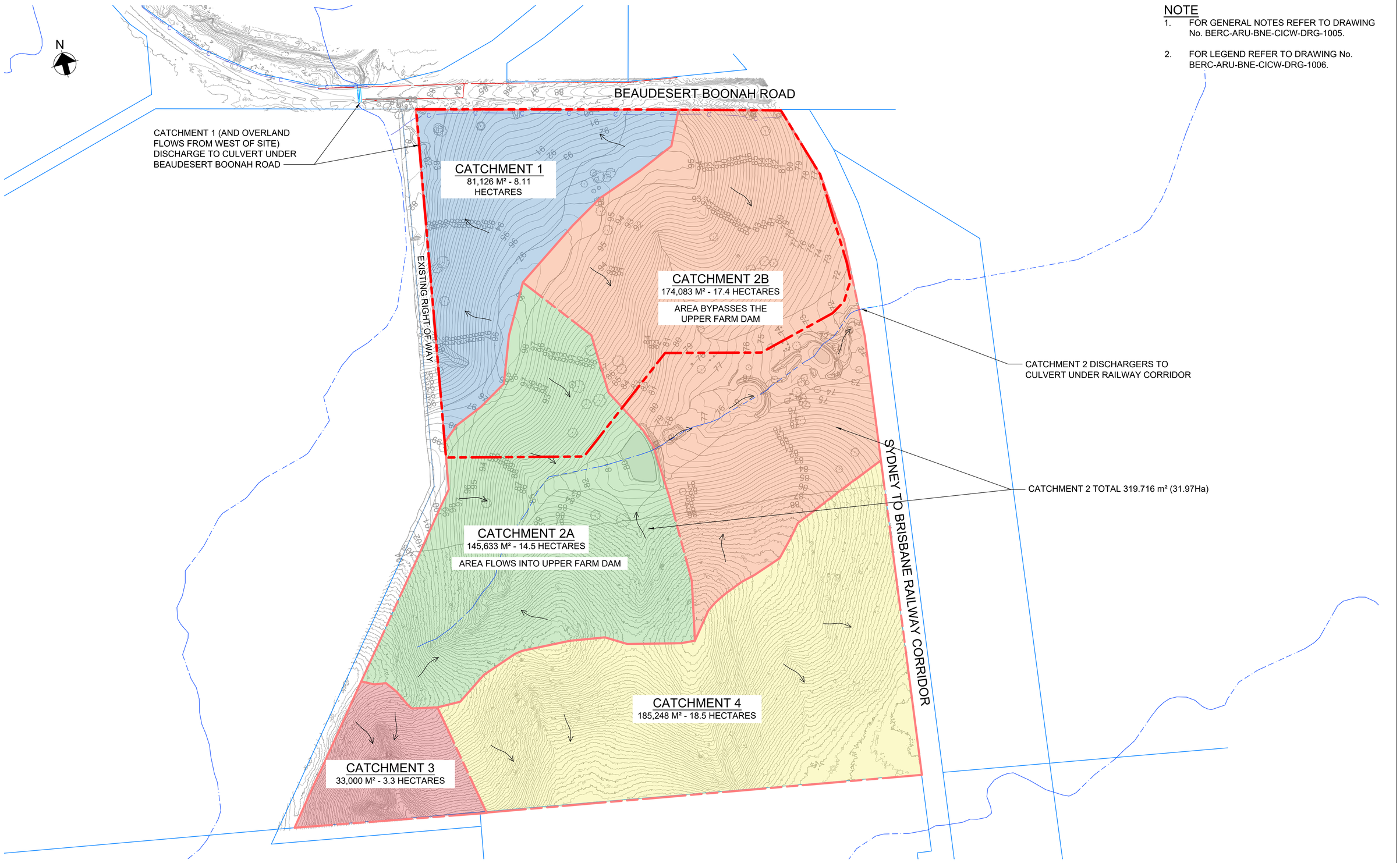

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.

NOT FOR CONSTRUCTION

Scales

25 0 50 100m

1:2500(A1)/1:5000(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client

CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)

Name: .....

Signature: ..... Date: .....

Job Title

BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 1:2500m

Discipline CIVIL

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ABN 18 000 966 165

Drawing Title

STORMWATER
PRE - DEVELOPMENT CATCHMENT - PLAN

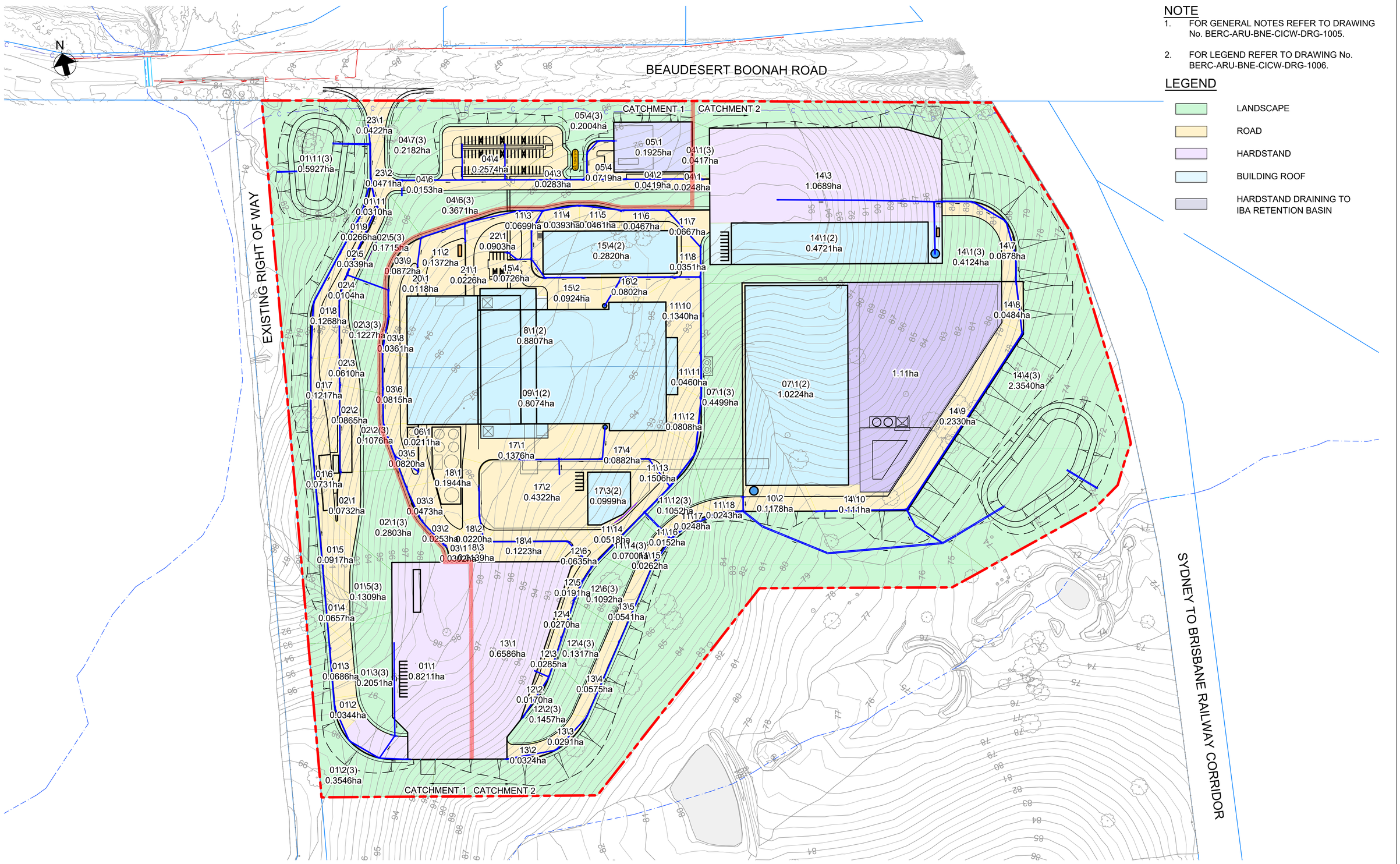
Drawing Status

FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1601**	**C**

Do not scale

© Arup



NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.

LEGEND

- LANDSCAPE
- ROAD
- HARDSTAND
- BUILDING ROOF
- HARDSTAND DRAINING TO IBA RETENTION BASIN

NOT FOR CONSTRUCTION

Scales

10 0 10 20 30 40 50m

1:1250(A1)/1:2500(A3)

Issue	Date	By	Chkd	Appd
D	27.07.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client: CLEANAWAY — Making a sustainable future possible

Engineering Certification (CEng)

Name: .....

Signature: ..... Date: .....

Job Title: BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1: 1:1250mm

Discipline: CIVIL

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www.arup.com

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Arup Pty Ltd
ABN 18 000 966 165

Drawing Title: STORMWATER PROPOSED CATCHMENT - PLAN

Drawing Status: **FOR APPROVAL**

Job No	Drawing No	Issue
293683-00	BERC- ARU-BNE-CICW-DRG-1605	D

Do not scale

© Arup

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.
3. THE STORMWATER DESIGNS PRESENTED ARE AT CONCEPT LEVEL AND WILL BE DEVELOPED AS PART OF FUTURE DESIGN STAGES.

N

EXISTING RIGHT OF WAY

EXISTING RIGHT OF WAY

DRIVEWAY FOR CONNECTION TO SOUTHERN PORTION OF SITE

TRUCK SHED

DE-COUPLING AREA

BERC-ARU-BRI-CICW- DRG-1612

BERC-ARU-BRI-CICW- DRG-1613

KEY PLAN
N.T.S

NOT FOR CONSTRUCTION

Scales
5 0 10 20m
1:500(A1)/1:1000(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name:
Signature: Date:

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 1:500m

Discipline
CIVIL

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CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
STORMWATER PLAN SHEET 1

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1611**	**C**

Do not scale

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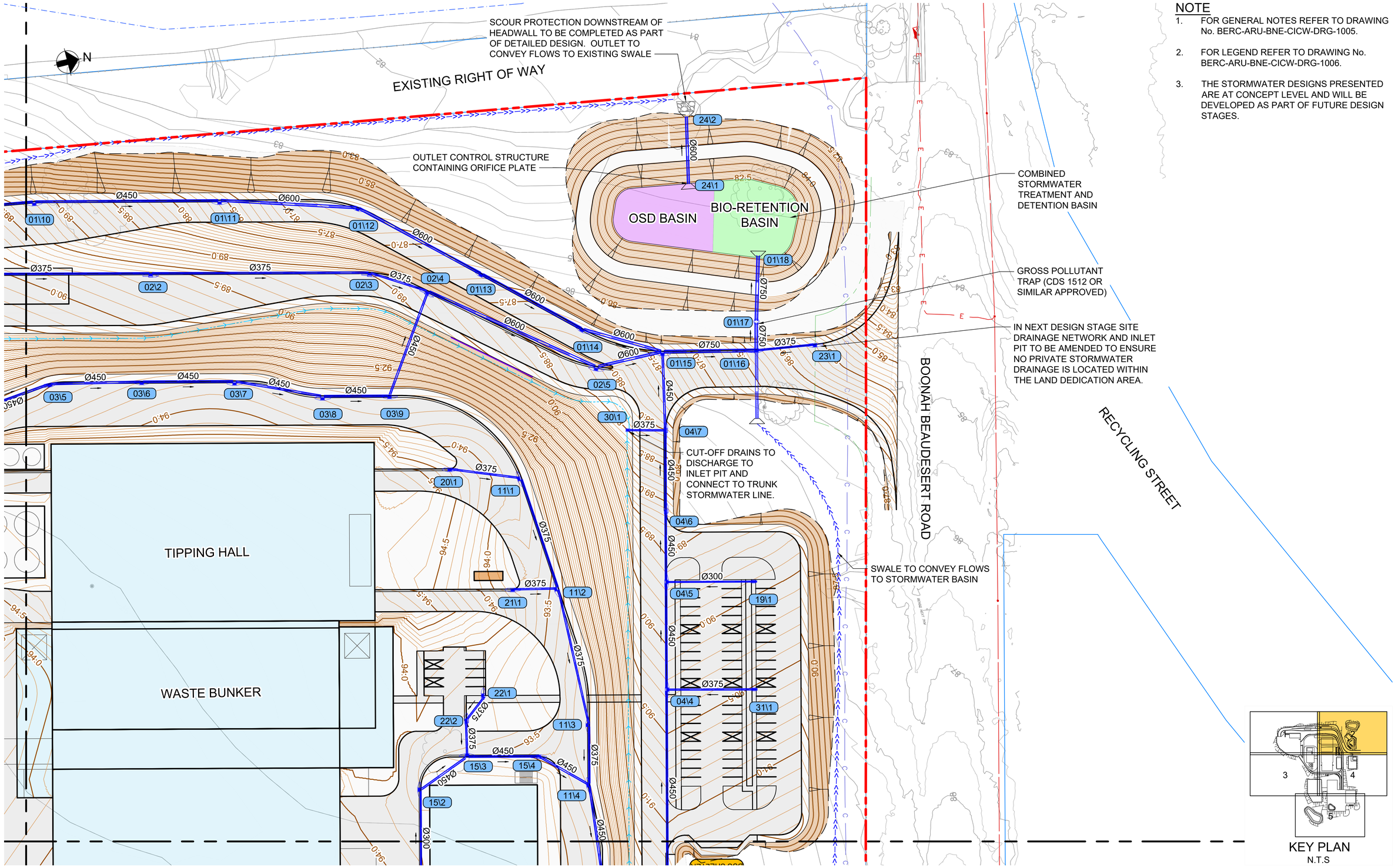

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.
3. THE STORMWATER DESIGNS PRESENTED ARE AT CONCEPT LEVEL AND WILL BE DEVELOPED AS PART OF FUTURE DESIGN STAGES.

NOT FOR CONSTRUCTION

Scales
5 0 10 20m
1:500(A1)/1:1000(A3)

Issue	Date	By	Chkd	Appd
E	27.07.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
D	14.05.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name:
Signature: Date:

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 1:500m
Discipline CIVIL

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www.arup.com

CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
STORMWATER PLAN SHEET 2

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	BERC- ARU-BNE-CICW-DRG-1612	E

Do not scale

© Arup

A1

ADJOIN DRG No. BERC-ARU-BRI-CICW-DRG-1611

N

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.
3. THE STORMWATER DESIGNS PRESENTED ARE AT CONCEPT LEVEL AND WILL BE DEVELOPED AS PART OF FUTURE DESIGN STAGES.

EXISTING FARM DAM

APCR ROOF DRAINAGE TO CONNECT TO PIT 17/3.
APCR

CUT-OFF DRAINS TO DISCHARGE INTO PIT 07/1

MIN 100kL RAINWATER HARVESTING TANK WITH OVERFLOW DISCHARGING TO PIT 07/1

LINED IBA RETENTION BASIN

ADJOIN DRG No. BERC-ARU-BRI-CICW-DRG-1614

ADJOIN DRG No. BERC-ARU-BRI-CICW-DRG-1615

KEY PLAN
N.T.S

NOT FOR CONSTRUCTION

Scales
5 0 10 20m
1:500(A1)/1:1000(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 1:500m

Discipline CIVIL

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CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
STORMWATER PLAN SHEET 3

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1613**	**C**

Do not scale

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ADJOIN DRG No. BERC-ARU-BRI-CICW-DRG-1612

ADJOIN DRG No. BERC-ARU-BRI-CICW-DRG-1613

ADJOIN DRG No. BERC-ARU-BRI-CICW-DRG-1615

BOILER HALL

PROCESS HALL

ACC

HV SUBSTATION

STACK

IBA SORTING BUILDING

IBA SORTING BUILDING

BUS SHELTER

MIN 100 kL RAINWATER HARVESTING TANK WITH OVERFLOW DISCHARGING TO STORMWATER NETWORK

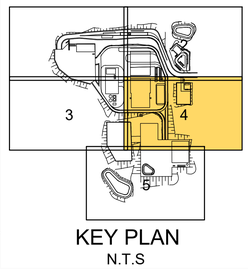
CUT-OFF DRAIN

OIL & WATER SEPARATOR TO BE PROVIDED UPSTREAM OF PIT 05/1.

DETAILED DESIGN OF HV SUBSTATION FORMS PART OF LATER DESIGN STAGES.

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.
3. THE STORMWATER DESIGNS PRESENTED ARE AT CONCEPT LEVEL AND WILL BE DEVELOPED AS PART OF FUTURE DESIGN STAGES.



KEY PLAN
N.T.S

NOT FOR CONSTRUCTION

Scales
5 0 10 20m
1:500(A1)/1:1000(A3)

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 1:500m

Discipline
CIVIL

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Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
STORMWATER PLAN SHEET 4

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1614**	**C**

Do not scale

© Arup

A1

ADJOIN DRG No. BERC-ARU-BRI-CICW-DRG-1613

ADJOIN DRG No. BERC-ARU-BRI-CICW-DRG-1614

N

INLET SUMP AND OVERFLOW AT IBA RETENTION BASIN.

KERB UPSTAND AND CHANNEL TO DIVERT FLOWS TO IBAA RETENTION BASIN.

MIN 100kL RAINWATER HARVESTING TANK.

GROSS POLLUTANT TRAP (CDS 2028 OR SIMILAR APPROVED)

BIO-RETENTION BASIN

STORMWATER BASIN

EXISTING FARM DAM

OUTLET CONTROL STRUCTURE CONTAINING ORIFICE PLATE

SCOUR PROTECTION DOWNSTREAM OF HEADWALL TO BE COMPLETED AS PART OF DETAILED DESIGN.

DETENTION BASIN

SWALE TO CONVEY FLOWS TO EXISTING OVERLAND FLOW PATH

SWALE TO CONVEY FLOWS TO EXISTING OVERLAND FLOW PATH

SYDNEY TO BRISBANE RAILWAY CORRIDOR

EXISTING CULVERT BELOW RAILWAY EMBANKMENT

BEAUDESERT BOONAH ROAD

KEY PLAN
N.T.S

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.
3. THE STORMWATER DESIGNS PRESENTED ARE AT CONCEPT LEVEL AND WILL BE DEVELOPED AS PART OF FUTURE DESIGN STAGES.

NOT FOR CONSTRUCTION

Scales
5 0 10 20m
1:500(A1)/1:1000(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 1:500m

Discipline CIVIL

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Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
STORMWATER PLAN SHEET 5

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1615**	**C**

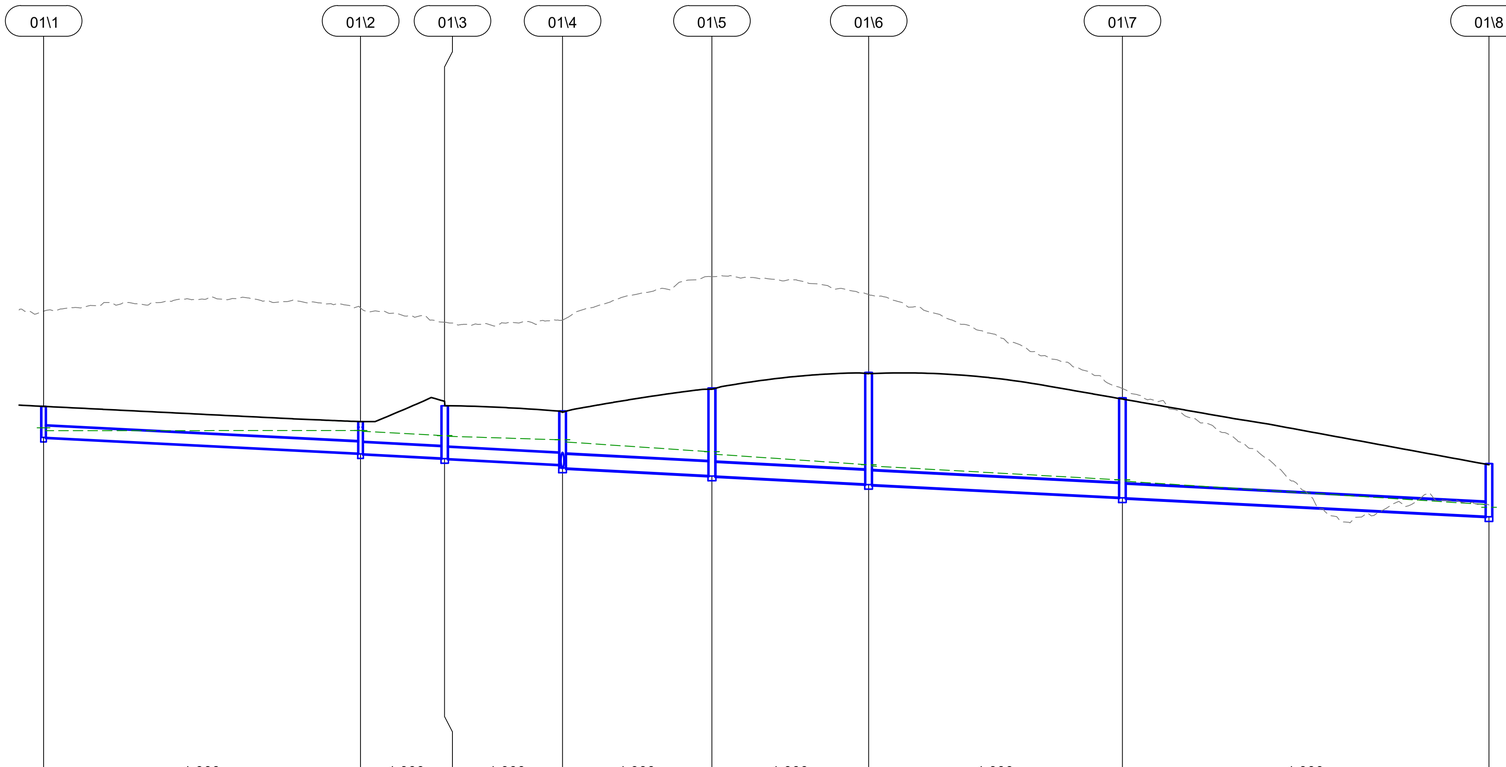
Do not scale

© Arup

A1

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.
2. FOR PAVEMENT LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.



PIPE GRADE (%)		1.000	1.000	1.000	1.000	1.000	1.000	1.000
PIPE DIAMETER (mm)		Ø375	Ø375	Ø375	Ø450	Ø450	Ø450	Ø450
10% AEP PIPE VELOCITY (m/s)		0.780	1.330	1.250	1.640	1.730	1.650	1.970
5% AEP PIPE FLOW (m³/s)		0.066	0.141	0.115	0.261	0.268	0.259	0.301
DATUM R.L.		74.000						
HYDRAULIC GRADE LINE (m) (10% AEP)	92.921	92.831	92.832	92.810	92.670	92.647	92.531	92.461	92.144	92.061	91.722	91.676	91.225	91.178	90.419 / 90.326	
PIPE INVERT LEVELS (m)		92.609	92.092	92.072	91.935	91.915	91.722	91.610	91.366	91.346	91.090	91.070	90.656	90.636	90.037	
DESIGN LEVELS (m)		93.622		93.124		93.642		93.472		94.223		94.728		93.901		91.754
EXISTING LEVELS (m)		96.728		96.834		96.368		96.436		97.853		97.274		94.205		90.403
CHAINAGE (m)	-51.742	51.742		0.000	13.716	13.716	19.247	32.964	24.384	57.348	25.593	82.941	41.412	124.353	59.844	184.197

LINE 01
H 1:500
V 1:100

NOT FOR CONSTRUCTION

Scales

1 0 1 2 3 4 5m
1:100(A1)/1:200(A3)
5 0 10 20m
1:500(A1)/1:1000(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				
Issue	Date	By	Chkd	Appd

Client: CLEANAWAY — Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title: BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1: AS SHOWN

Discipline: CIVIL

ARUP
Arup, Level 5, 151 Clarence St
Sydney, NSW, 2000
Tel +61 (02) 9320 9320 Fax +61 (02) 9320 9321
www.arup.com
CONSULT AUSTRALIA Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title: STORMWATER LONGITUDINAL SECTIONS SHEET 1

Drawing Status: **FOR APPROVAL**

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1641**	**C**

Do not scale

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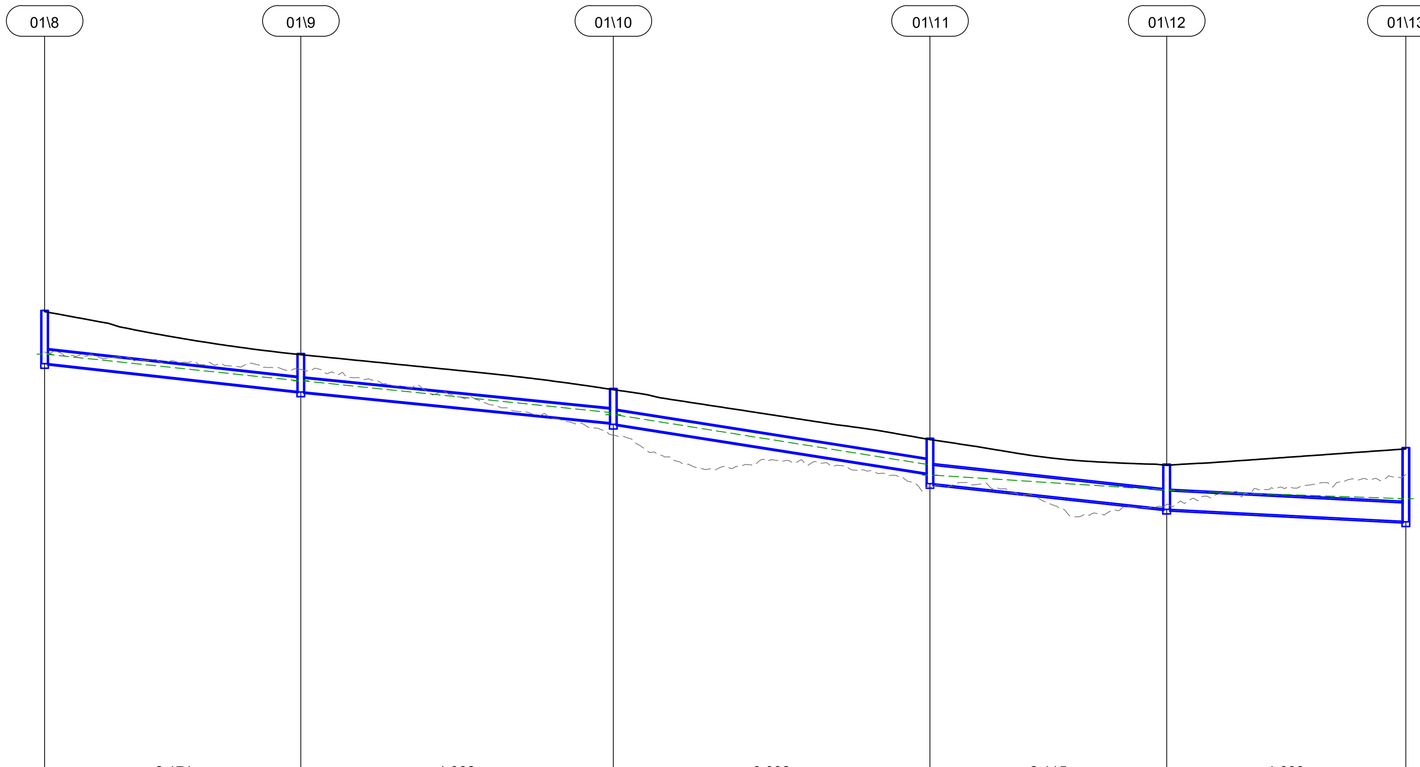
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.
2. FOR PAVEMENT LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.



PIPE GRADE (%)		2.171	1.962	3.092	2.115	1.000
PIPE DIAMETER (mm)		Ø450	Ø450	Ø450	Ø600	Ø600
10% AEP PIPE VELOCITY (m/s)		2.670	2.710	3.330	2.250	1.970
5% AEP PIPE FLOW (m³/s)		0.320	0.359	0.374	0.398	0.407
DATUM R.L.		69.000				
HYDRAULIC GRADE LINE (m) (10% AEP)	90.419 90.326	90.320	89.461	89.453 88.421 88.349	88.344 86.728	86.379 85.896	85.876 85.609
PIPE INVERT LEVELS (m)	90.037	90.017	89.109	89.089 88.088	88.036 86.438	86.099 85.282	85.262 84.872
DESIGN LEVELS (m)		91.754	90.350	89.206	87.579	86.737	87.274
EXISTING LEVELS (m)		90.403	89.828	87.682	85.995	85.414	86.400
CHAINAGE (m)		184.197	41.831	226.028	51.000	277.028	51.695	328.723	38.638	367.361	39.042	406.404

LINE 01
H 1:500
V 1:100

NOT FOR CONSTRUCTION

Scales

1 0 1 2 3 4 5m
1:100(A1)/1:200(A3)
5 0 10 20m
1:500(A1)/1:1000(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				
Issue	Date	By	Chkd	Appd

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 AS SHOWN

Discipline CIVIL

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www.arup.com

CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
STORMWATER
LONGITUDINAL SECTIONS
SHEET 2

Drawing Status
FOR APPROVAL

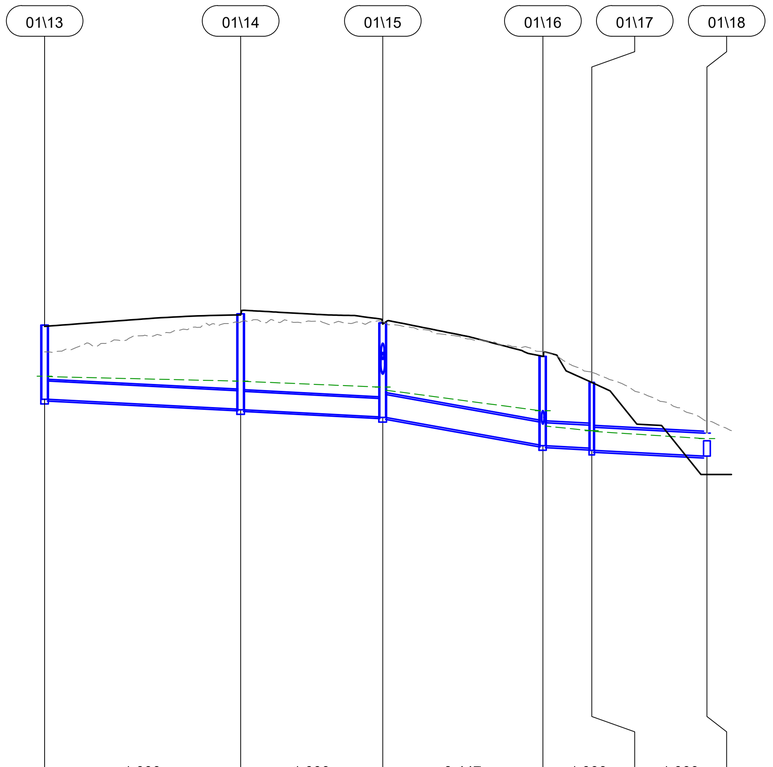
Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1642**	**C**

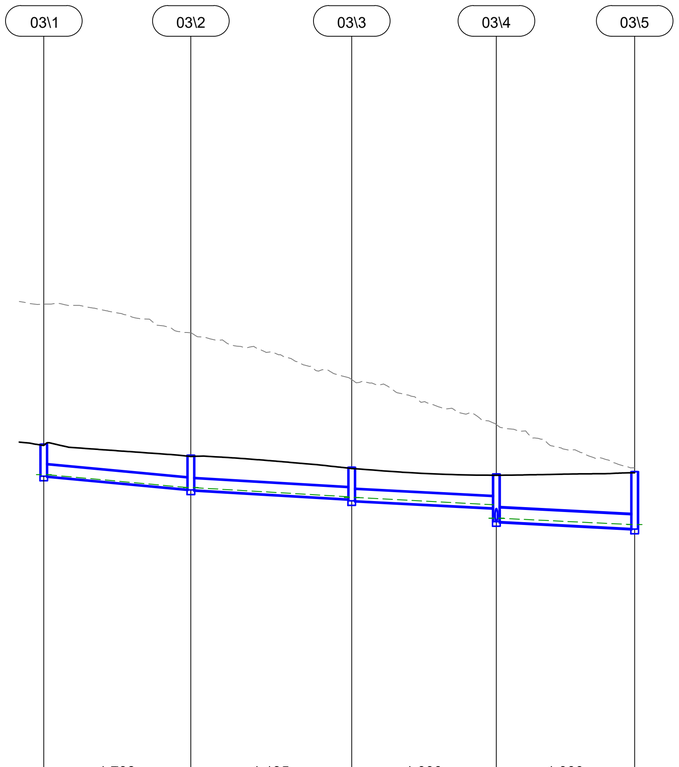
Do not scale

© Arup

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.
2. FOR PAVEMENT LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.





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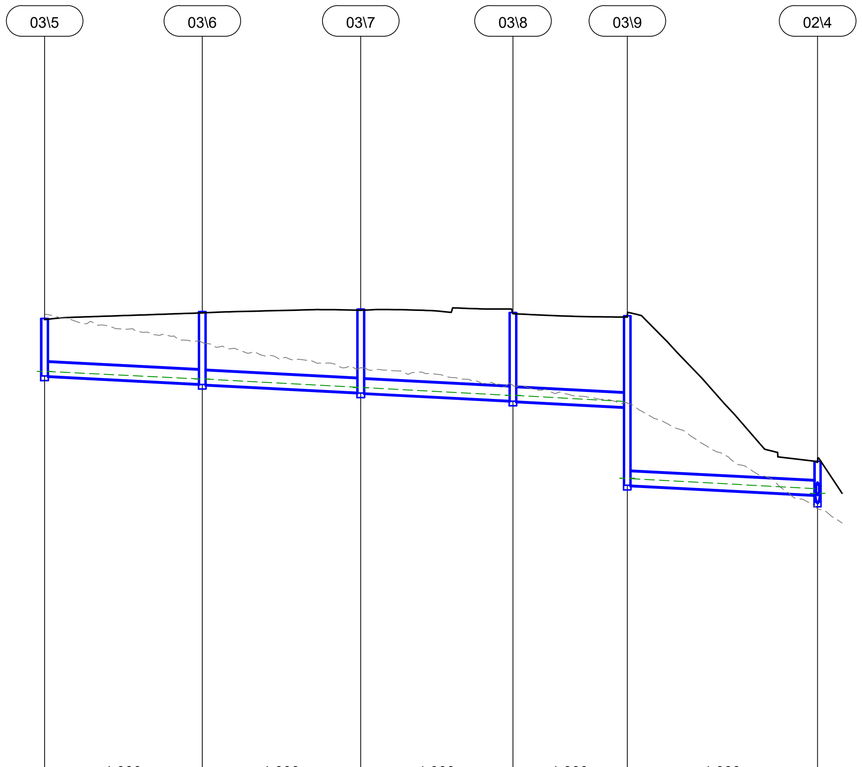
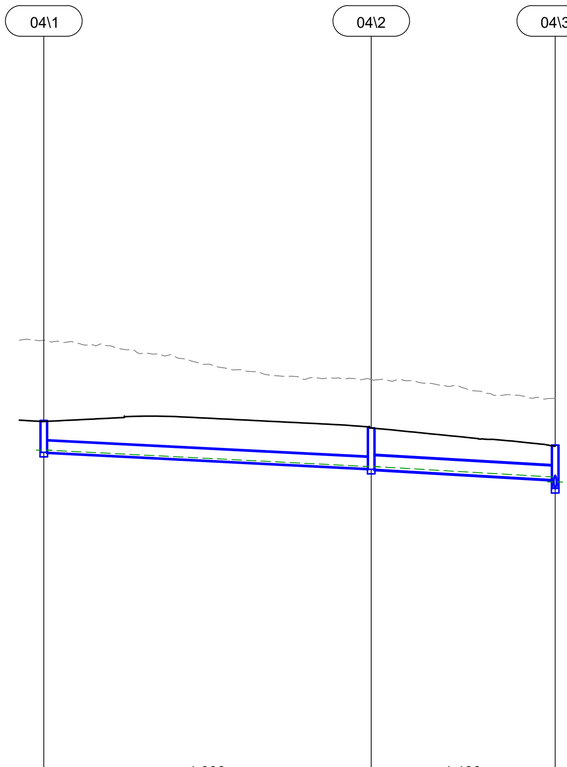
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.
2. FOR PAVEMENT LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.





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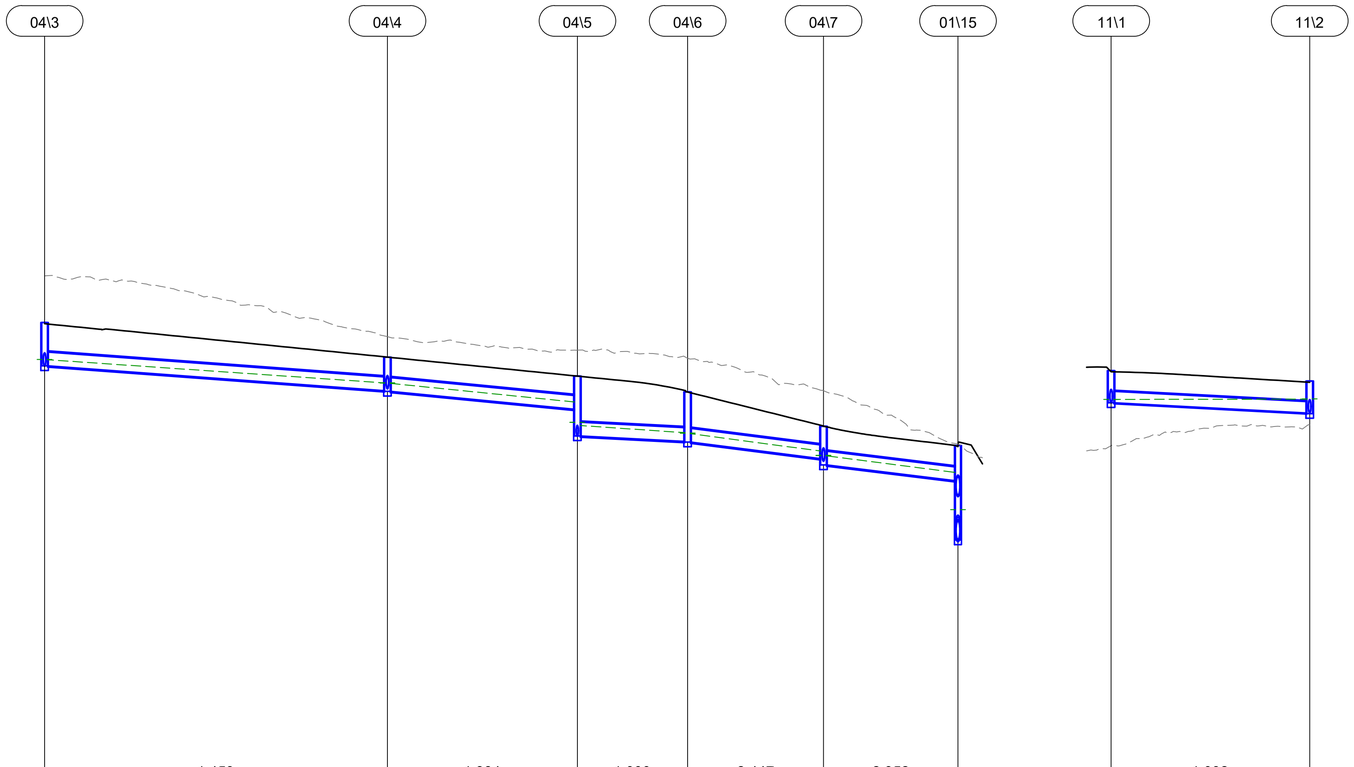
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.
2. FOR PAVEMENT LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.



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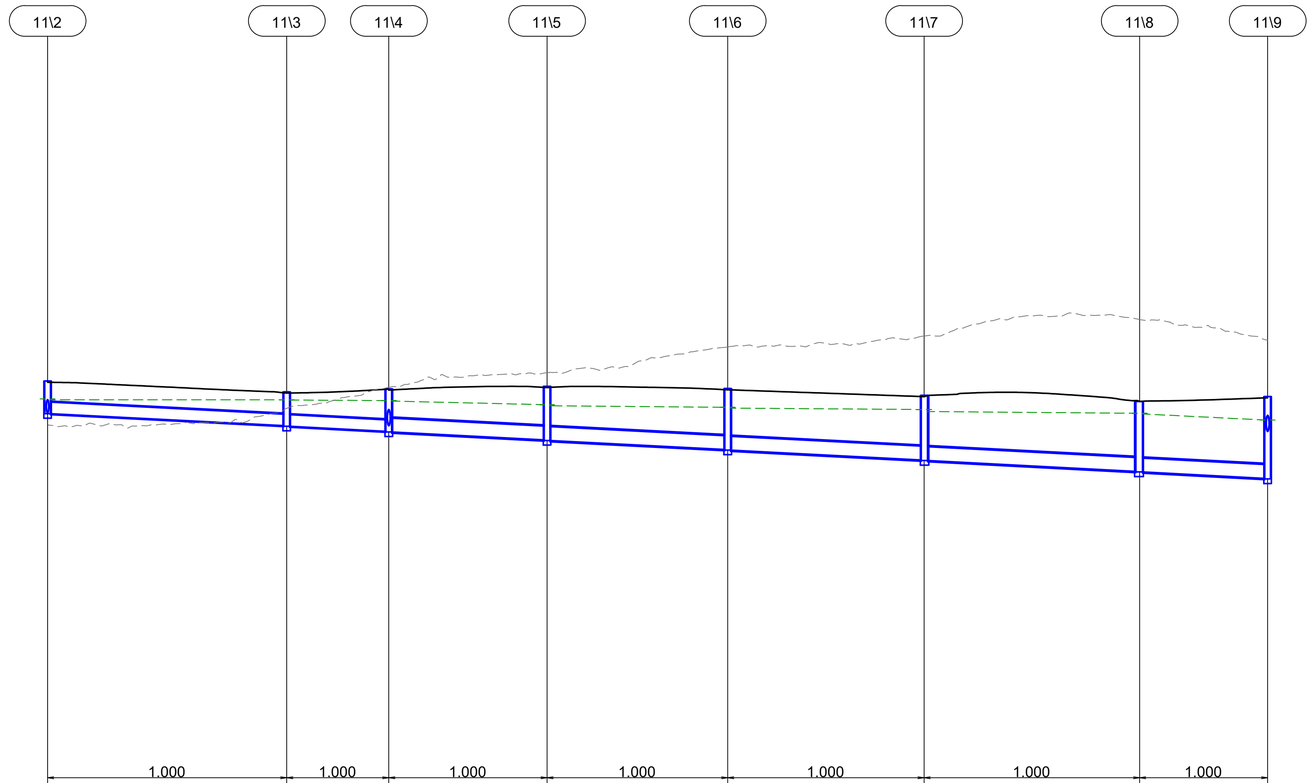
A1

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.
2. FOR PAVEMENT LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.



PIPE GRADE (%)		1.000		1.000		1.000		1.000		1.000		1.000		1.000	
PIPE DIAMETER (mm)		Ø375		Ø375		Ø450		Ø450		Ø450		Ø450		Ø450	
10% AEP PIPE VELOCITY (m/s)		1.130		1.250		1.550		1.650		1.610		1.420		1.850	
5% AEP PIPE FLOW (m³/s)		0.072		0.094		0.218		0.213		0.215		0.226		0.294	
DATUM R.L.		73.000													
HYDRAULIC GRADE LINE (m) (10% AEP)	92.858 92.867	92.838	92.838	92.830	92.810	92.795	92.678	92.642	92.592	92.565	92.520	92.453	92.397	92.375	92.177
PIPE INVERT LEVELS (m)	92.405	92.385	91.994	91.974	91.808	91.788	91.529	91.509	91.214	91.194	90.874	90.854	90.502	90.482	90.273
DESIGN LEVELS (m)		93.449		93.096		93.194		93.277		93.205		92.980		92.783	92.942
EXISTING LEVELS (m)		92.017		92.559		93.244		93.722		94.559		94.916		95.452	94.775
CHAINAGE (m)		32.409	39.042	71.451	16.659	88.109	25.830	113.940	29.485	143.425	32.058	175.482	35.188	210.671	20.894	231.565

LINE 11
H 1:500
V 1:100

NOT FOR CONSTRUCTION

Scales

1 0 1 2 3 4 5m
1:100(A1)/1:200(A3)
5 0 10 20m
1:500(A1)/1:1000(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				

Client
CLEANAWAY
Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 AS SHOWN

Discipline CIVIL

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Sydney, NSW, 2000
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www.arup.com

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Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
STORMWATER
LONGITUDINAL SECTIONS
SHEET 6

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1646**	**C**

Do not scale

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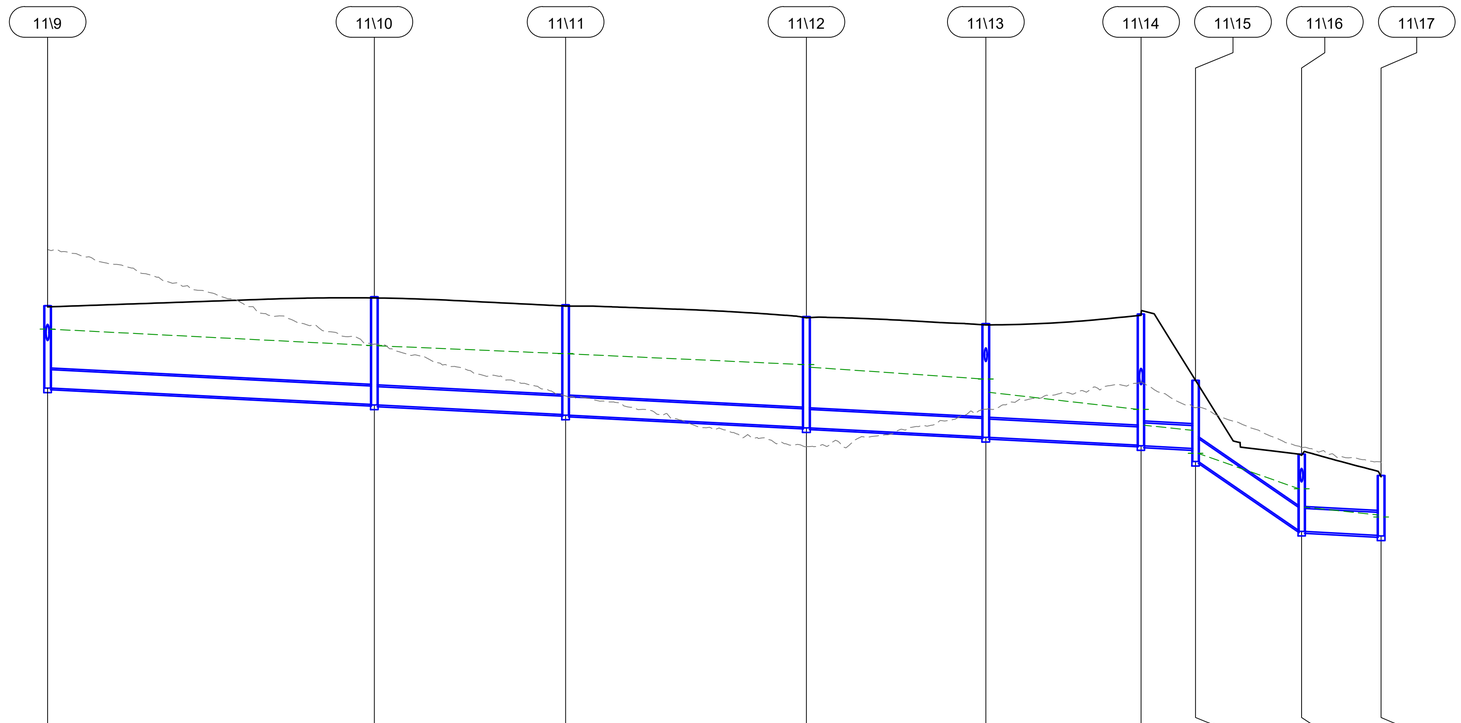
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.
2. FOR PAVEMENT LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.



PIPE GRADE (%)		1.000	1.000	1.000	1.000	1.000	1.000	13.063	1.000
PIPE DIAMETER (mm)		Ø600	Ø600	Ø600	Ø600	Ø600	Ø750	Ø750	Ø750
10% AEP PIPE VELOCITY (m/s)		2.070	2.070	1.840	1.930	2.770	2.580	3.390	2.830
5% AEP PIPE FLOW (m³/s)		0.500	0.499	0.512	0.544	0.781	1.076	1.077	1.223
DATUM R.L.	70.000								
HYDRAULIC GRADE LINE (m) (10% AEP)	92.177	92.174	91.642	91.633	91.377	91.369	91.018	90.934	90.549	90.115	89.556	89.039	88.873	88.124	88.120	86.966	86.366	86.112	86.045
PIPE INVERT LEVELS (m)	90.273	90.253	89.720	89.700	89.387	89.367	88.974	88.954	88.661	88.641	88.388	88.368	88.279	87.856	85.594	85.574	85.445		
DESIGN LEVELS (m)		92.942		93.233		92.969		92.584		92.354		92.667		90.504		88.098		87.398	
EXISTING LEVELS (m)		94.775		91.687		89.996		88.339		89.560		90.453		89.612		88.310		87.821	
CHAINAGE (m)		231.565	53.342	284.907	31.209	316.116	39.317	355.433	29.278	384.712	25.341	410.053	8.898	418.951	17.313	436.264	12.978	449.243	

LINE 11
H 1:500
V 1:100

NOT FOR CONSTRUCTION

Scales
1:100(A1)/1:200(A3)
1:500(A1)/1:1000(A3)

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client: CLEANAWAY — Making a sustainable future possible

Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title: BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1: AS SHOWN

Discipline: CIVIL

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Tel +61 (02) 9320 9320 Fax +61 (02) 9320 9321
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ABN 18 000 966 165

Drawing Title: STORMWATER LONGITUDINAL SECTIONS SHEET 7

Drawing Status: **FOR APPROVAL**

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1647**	**C**

Do not scale

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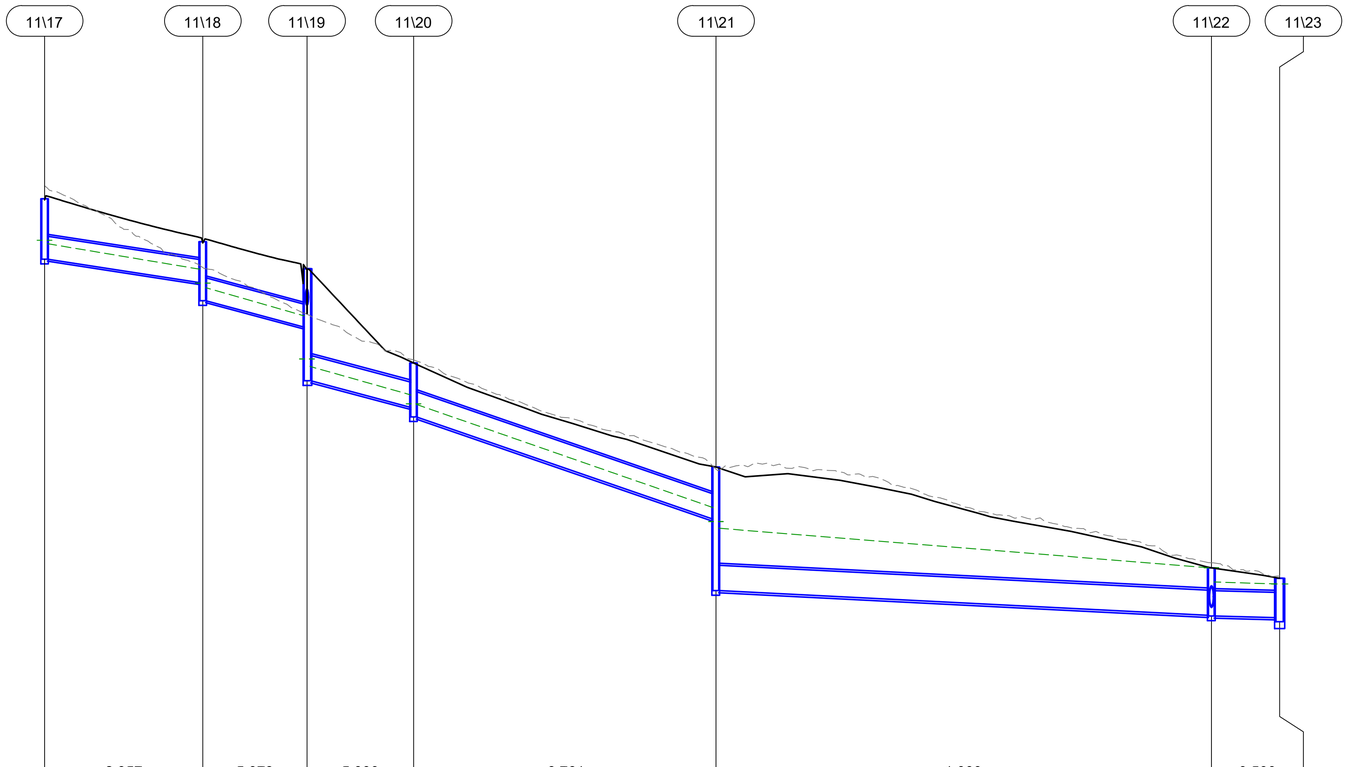
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.
2. FOR PAVEMENT LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.

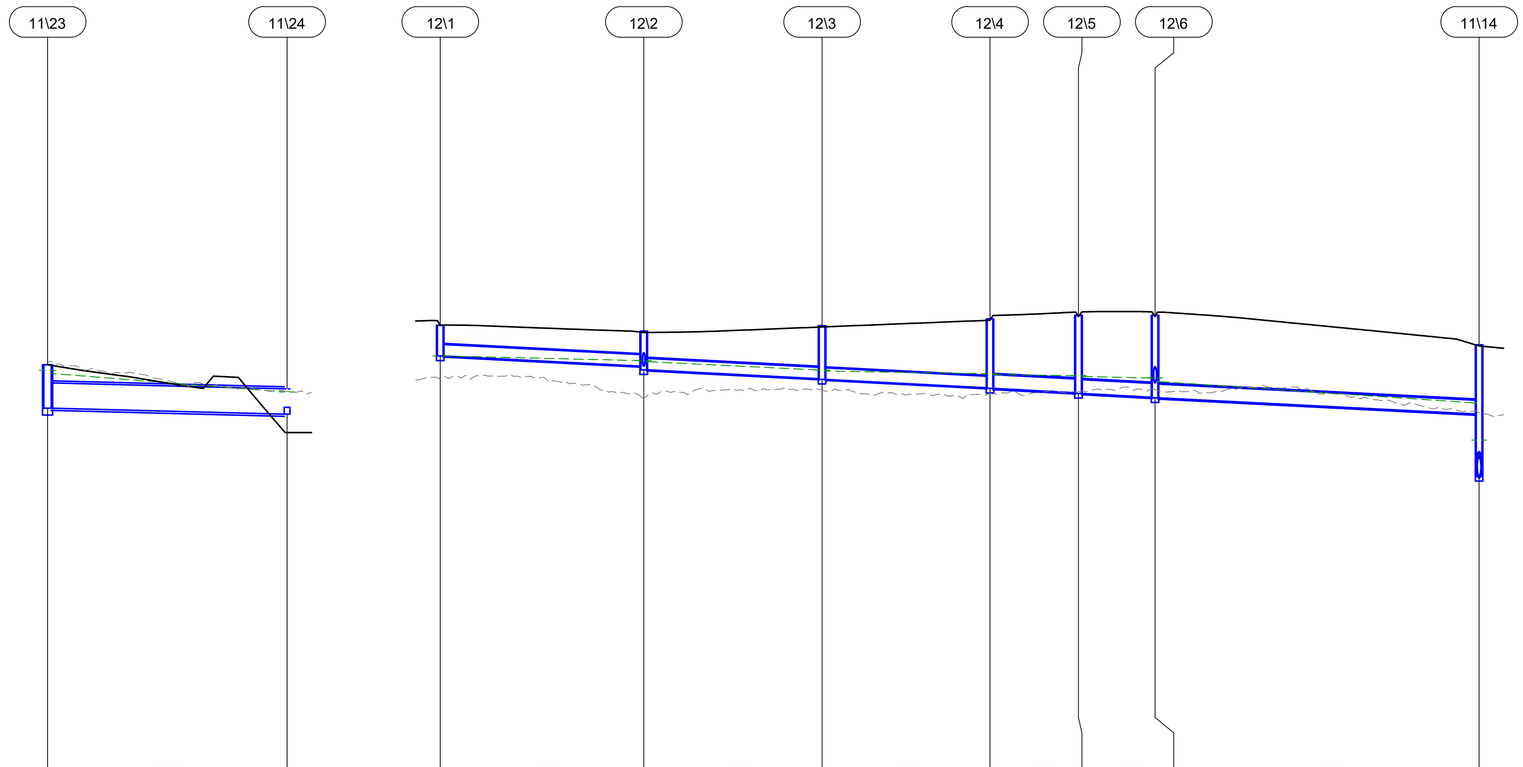


| | | |

A1

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.
2. FOR PAVEMENT LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.



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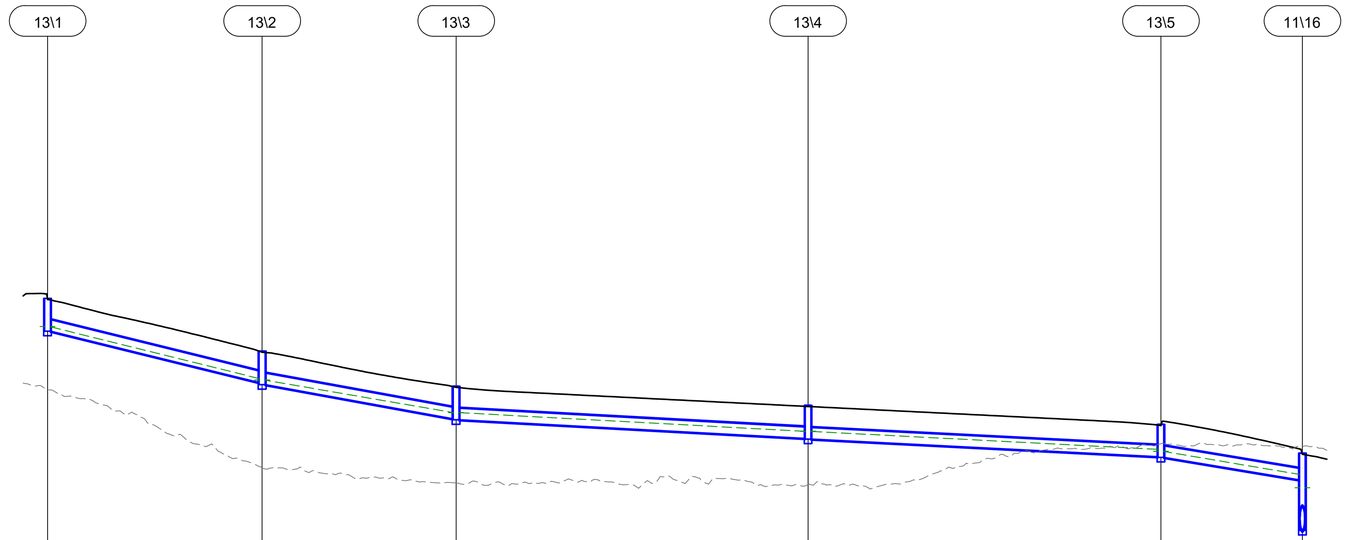
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.
2. FOR PAVEMENT LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.



PIPE GRADE (%)	4.791	3.529	1.063	1.000	3.189
PIPE DIAMETER (mm)	Ø375	Ø375	Ø375	Ø375	Ø375
10% AEP PIPE VELOCITY (m/s)	2.590	2.120	1.600	1.690	2.610
5% AEP PIPE FLOW (m³/s)	0.096	0.106	0.114	0.129	0.143
DATUM R.L.	70.000				
HYDRAULIC GRADE LINE (m) (10% AEP)	92.228 / 92.219	90.528 / 90.482 / 90.478	89.419 / 89.418	88.807 / 88.805	88.219 / 88.155 / 88.151	87.401 / 86.966 / 86.366
PIPE INVERT LEVELS (m)	92.078	90.400 / 90.332	89.214 / 89.185	88.575 / 88.555	87.979 / 87.959	87.223 / 85.574
DESIGN LEVELS (m)	93.147	91.428	90.282	89.659	89.036	88.098
EXISTING LEVELS (m)	90.165	87.612	87.119	87.068	88.404	88.310
CHAINAGE (m)	0.000	35.023	35.023 / 31.668	66.691 / 57.450	124.141 / 57.589	181.730 / 23.091	204.821

LINE 13
H 1:500
V 1:100

NOT FOR CONSTRUCTION

Scales
1 0 1 2 3 4 5m
1:100(A1)/1:200(A3)
5 0 10 20m
1:500(A1)/1:1000(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				

Client
CLEANAWAY
Making a sustainable future possible
Engineering Certification (CEng)
Name: .....
Signature: ..... Date: .....

Job Title
BROMELTON ENERGY AND RESOURCES CENTRE

Scale at A1 AS SHOWN

Discipline CIVIL

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CONSULT AUSTRALIA
Member Firm
Arup Pty Ltd
ABN 18 000 966 165

Drawing Title
STORMWATER
LONGITUDINAL SECTIONS
SHEET 10

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1650**	**C**

Do not scale

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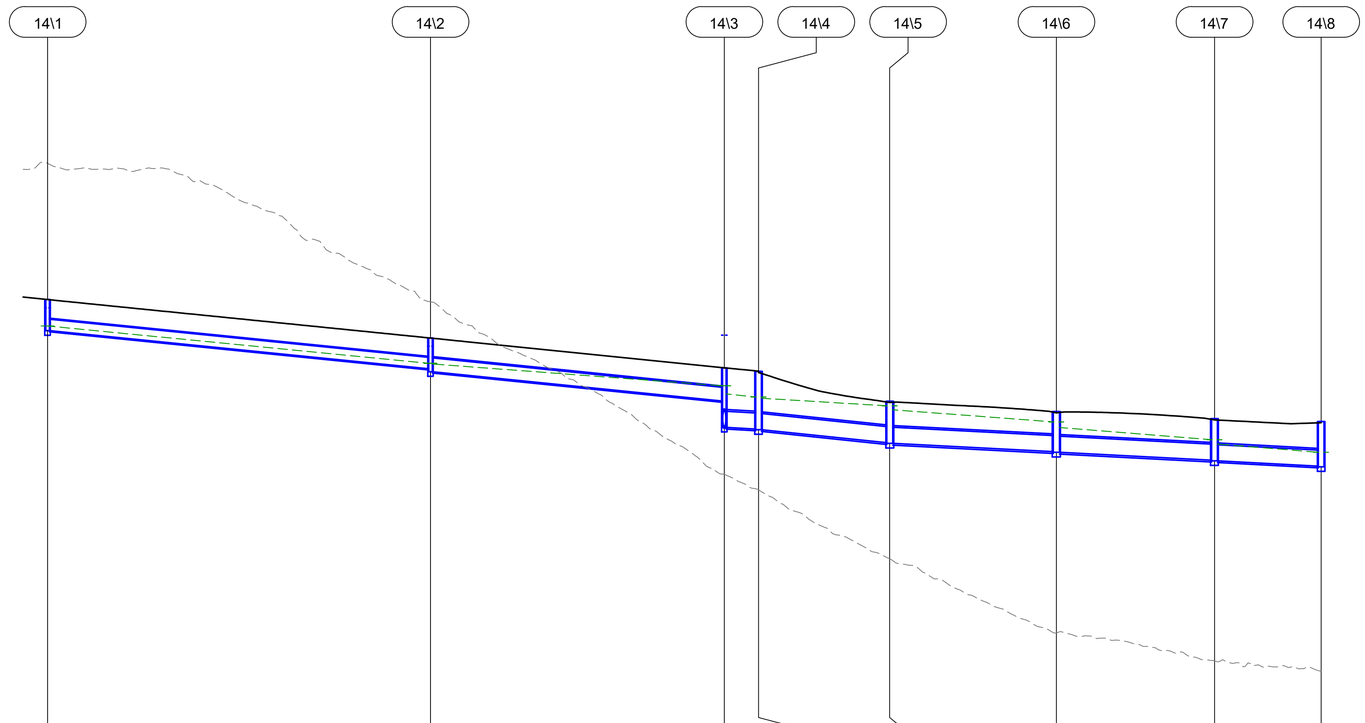
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.
2. FOR PAVEMENT LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.



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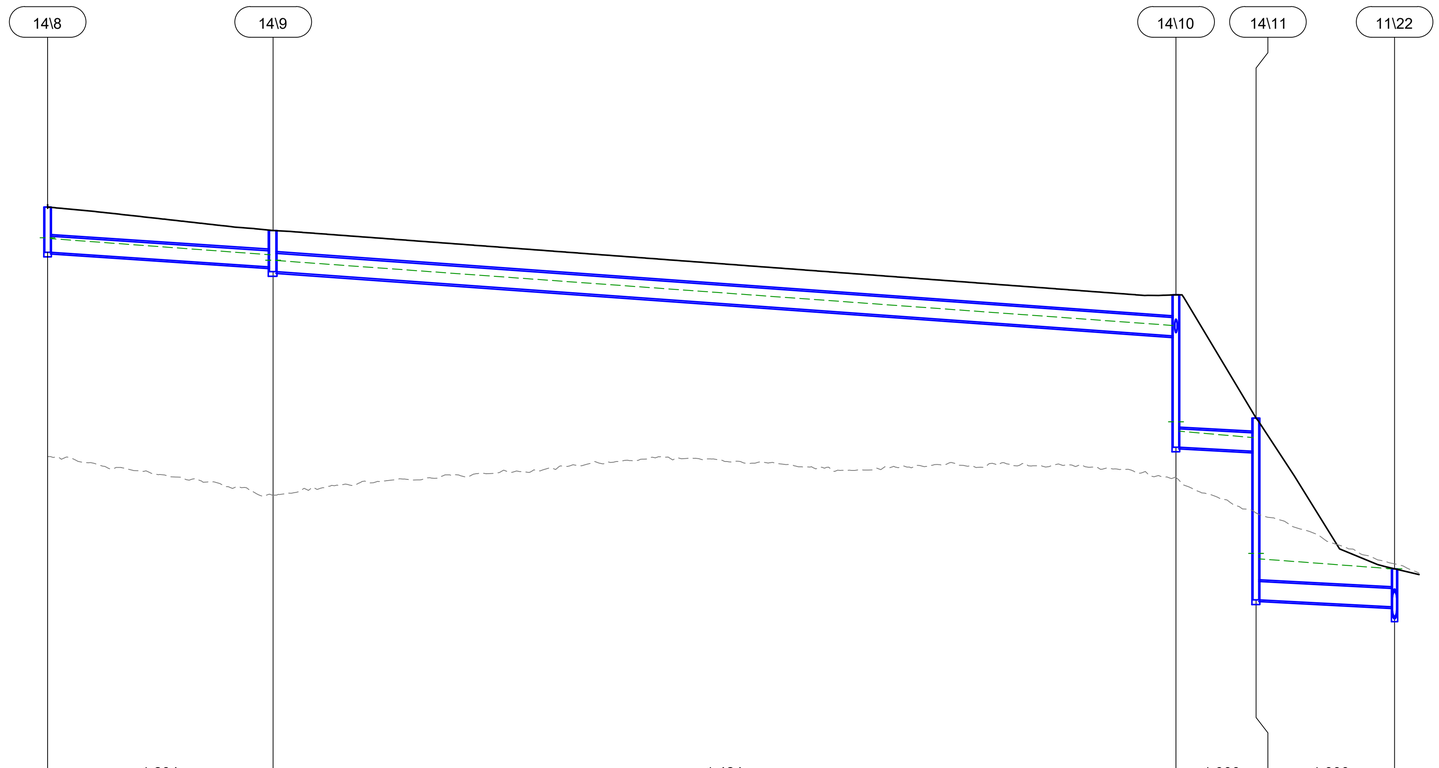

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.
2. FOR PAVEMENT LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.

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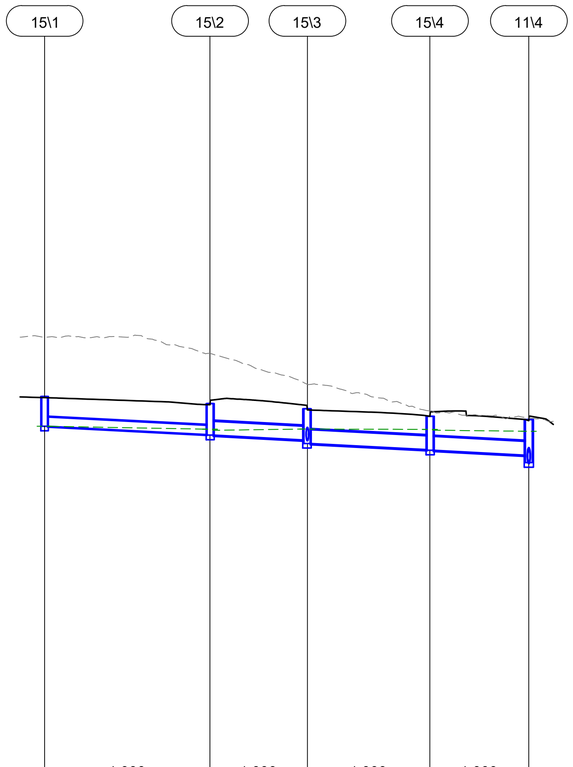
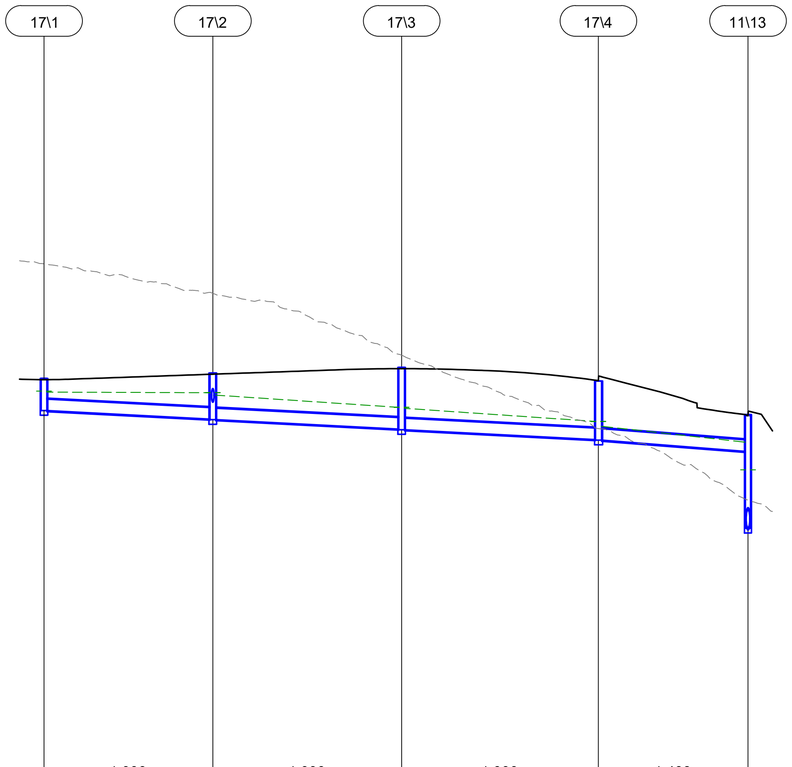
NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.
2. FOR PAVEMENT LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1791.





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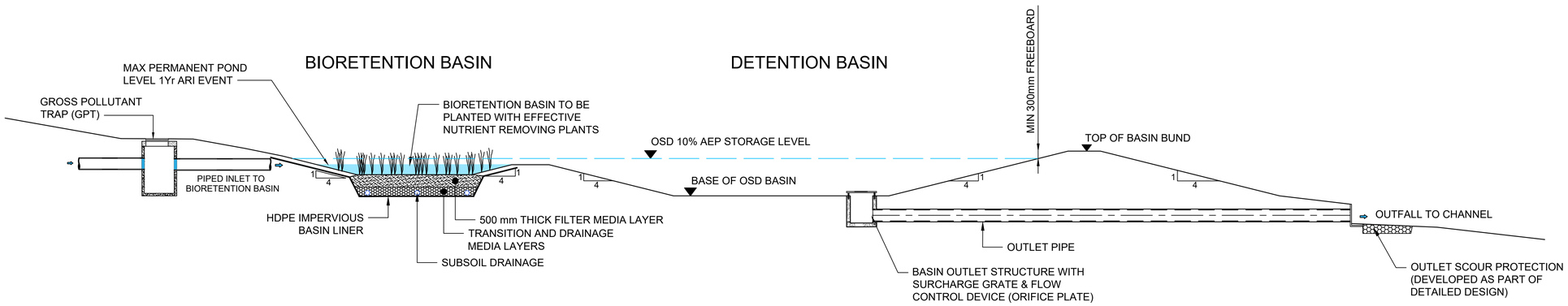

TYPICAL SECTION THROUGH STORMWATER TREATMENT AND DETENTION BASIN

NOT FOR CONSTRUCTION

Scales

10 0 10 20 30 40 50m

1:1250(A1)/1:2500(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
	ISSUE FOR APPROVAL			
B	26.09.25	PDA	ERA	EGM
	ISSUED FOR ADEQUACY REVIEW			
A	18.08.25	PDA	ERA	EGM
	DRAFT FEED ISSUE			

Client

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Engineering Certification (CEng)

Name: .....

Signature: ..... Date: .....

Job Title

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Scale at A1 1:1000mm

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CONSULT AUSTRALIA
Member Firm
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ABN 18 000 966 165

Drawing Title

STORMWATER MISCELLANEOUS DETAILS

Drawing Status

FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1691**	**C**

Do not scale

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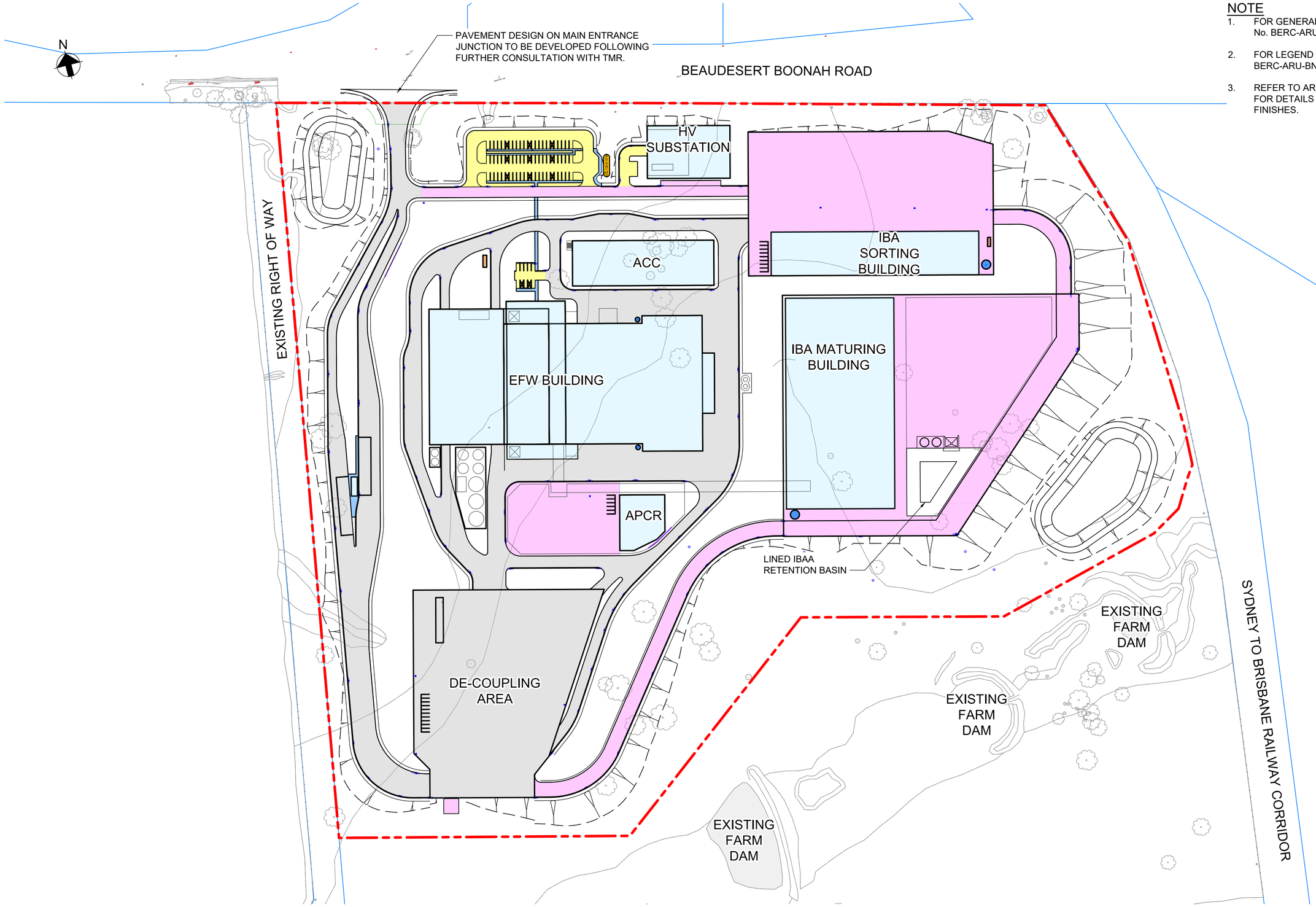

NOTE

1. FOR GENERAL NOTES REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1005.
2. FOR LEGEND REFER TO DRAWING No. BERC-ARU-BNE-CICW-DRG-1006.
3. REFER TO ARCHITECTURAL DRAWINGS FOR DETAILS OF SOFT LANDSCAPING FINISHES.

NOT FOR CONSTRUCTION

Scales
10 0 10 20 30 40 50m
1:1250(A1)/1:2500(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
E	27.07.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
ISSUE FOR APPROVAL				
B	26.09.25	PDA	ERA	EGM
ISSUED FOR ADEQUACY REVIEW				
A	18.08.25	PDA	ERA	EGM
DRAFT FEED ISSUE				

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Scale at A1 1:1250m

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Drawing Title
PAVEMENT PLAN

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	BERC- ARU-BNE-CICW-DRG-1700	D

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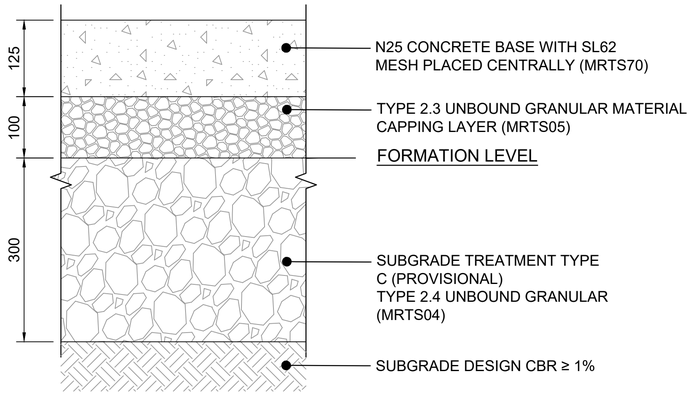
NOTES:

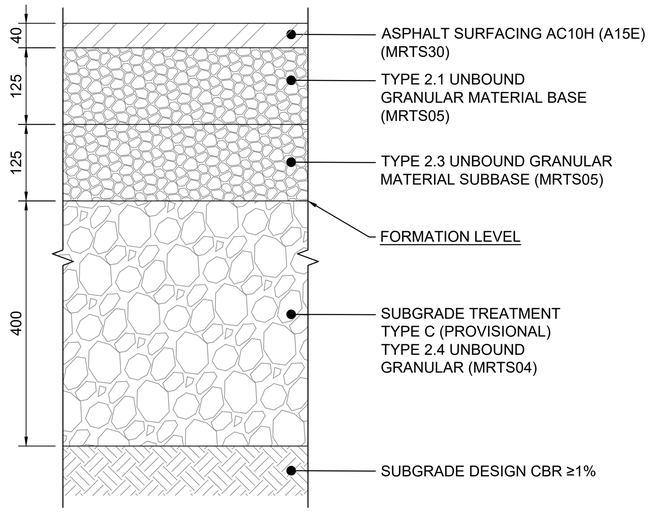
1. EARTHWORKS AND SUBGRADE PREPARATION TO BE IN ACCORDANCE WITH MRTS04.
2. THE SUBGRADE WILL BE VERIFIED IN ACCORDANCE WITH MRTS04.
3. SUB-SURFACE DRAINAGE BELOW LOW AND HIGH SIDE OF KERBS & CHANNELS TO BE PROVIDED. EXACT DETAILS TO BE INCLUDED WITHIN DETAILED DESIGN.
4. DESIGNS ARE BASED ON THE SUBGRADE ACHIEVING A CBR OF 3% AS PER SECTION 6.9 OF DOUGLAS PARTNERS REPORT ON GEOTECHNICAL INVESTIGATION, BROMELTON ENERGY & RESOURCES CENTRE (BERC), AUGUST 2023.
5. SUBGRADE TREATMENT IS RECOMMENDED FOR USE WHERE 97% COMPACTION OR THE PROOF ROLLING REQUIREMENTS STIPULATED WITHIN MRTS04 ARE NOT MET. APPROPRIATE SUBGRADE TREATMENT TYPE MAY BE VARIED AS DIRECTED BY THE ADMINISTRATOR.
   SUBGRADE TREATMENTS ALLOWED FOR IN THIS CONTRACT INCLUDE:
   - SUBGRADE TREATMENT TYPE C - 150-400 mm TYPE 2.4 UNBOUND.
   - SUBGRADE TREATMENT TYPE E - 150-250 mm LIGHTLY BOUND BASE.
   - SUBGRADE TREATMENT TYPE J - 300 mm GEOTEXTILE WRAPPED ROCK FILL LAYER.
6. SUBGRADE CBR %TO BE CONFIRMED VIA 4-DAY SOAKED CBRs AND DCPs TO 1.5 m DEPTH BELOW SUBGRADE SURFACE LEVEL PRIOR TO CONSTRUCTION (REFER TO MRTS04 APPENDIX A).
7. JOINTED REINFORCED CONCRETE PAVEMENT JOINTS SHALL BE IN ACCORDANCE WITH THE TRANSPORT FOR NEW SOUTH WALES JRCP STANDARD DRAWINGS.
8. PAVEMENT SUBSOIL DRAINAGE DESIGNS TO BE DEVELOPED AS PART OF FUTURE DESIGN STAGES IN ACCORDANCE WITH REQUIREMENTS OF PART 10: SUBSURFACE DRAINAGE OF THE AUSTROADS GUIDE TO PAVEMENT TECHNOLOGY.

FOOTPATH NOTES

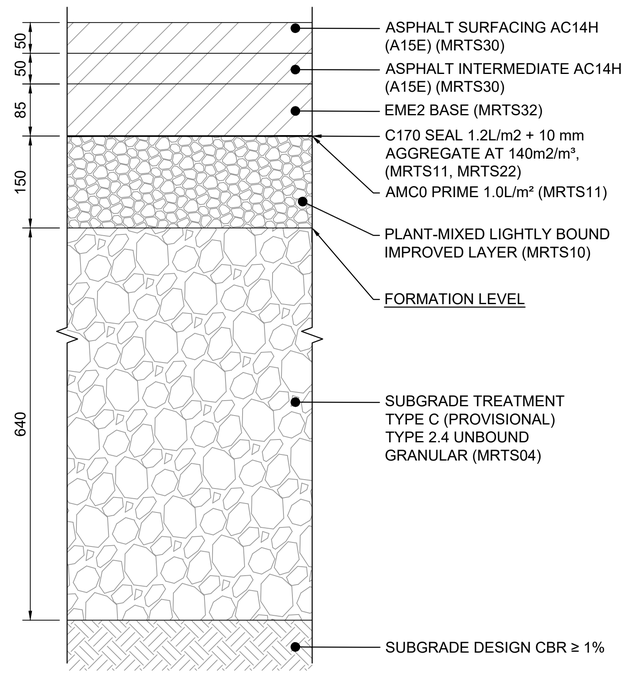
1. CONCRETE FOOTPATH SURFACE TO BE NON-SLIP TO AS 4586 (SLIP RESISTANCE CLASSIFICATION OF NEW PEDESTRIAN SURFACE MATERIALS).
2. CONCRETE PAVEMENT JOINTING SHALL BE IN ACCORDANCE WITH NOTE 5 OF SCENIC RIM COUNCIL STANDARD DRAWING R-13 WHICH HAS MAXIMUM SPACING OF 2.5 m.



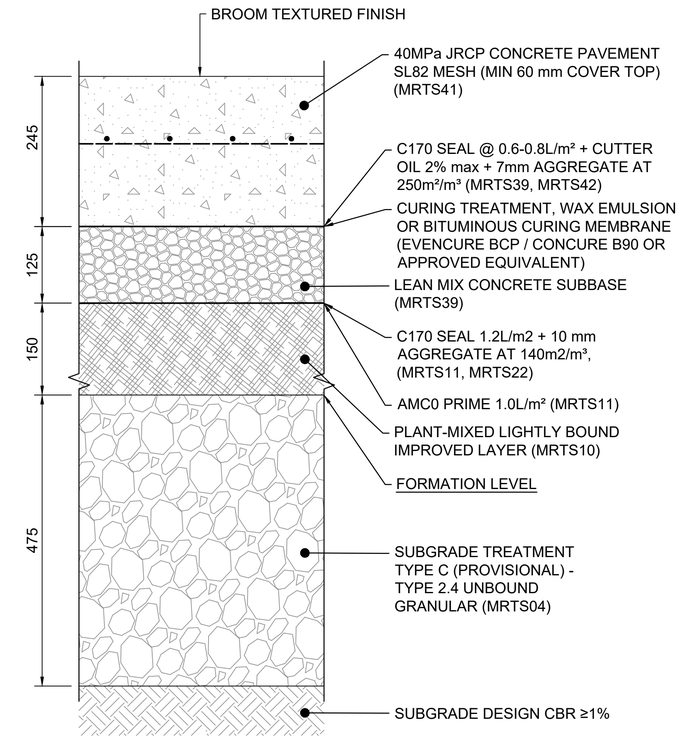
RP2 - JOINTED REINFORCED CONCRETE PAVEMENT (JRCP) FOOTPATH



FP1 - GRANULAR PAVEMENT WITH THIN ASPHALT SURFACING (CARPARK)



FP2 - FULL DEPTH ASPHALT PAVEMENT (WORKING AREAS)



RP1 - JOINTED REINFORCED CONCRETE PAVEMENT (JRCP)

NOT FOR CONSTRUCTION

Scales
0.05 0 0.1 0.2m
1:5(A1)/1:10(A3)

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd

Issue	Date	By	Chkd	Appd
C	16.01.26	PDA	ERA	EGM
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	DRAFT FEED ISSUE			

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Scale at A1 1:5m

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Drawing Title
PAVEMENT PROFILES
SHEET 1

Drawing Status
FOR APPROVAL

Job No	Drawing No	Issue
293683-00	**BERC- ARU-BNE-CICW-DRG-1791**	**C**

Do not scale

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