



# Review of Environmental Factors

Gunyama Park Stage 2 and George Julius Avenue North

September 2023

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PLANNING



## Document control


Project name	Gunyama Park Stage 2 and George Julius Avenue North – Review of Environmental Factors
Project number	J2304
Status	Final
Version number	1
Date	14 September 2023

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# Approval and certification

Approval	
Title	Gunyama Park Stage 2 and George Julius Avenue North – Review of Environmental Factors
Prepared by	Nick Hall Principal Environmental Planner
Reviewed / approved by	John Arnold Director, Arnold Planning Pty Ltd
Signed	
Date	14 September 2023

Certification	
Review by determining authority	I certify that I have reviewed and endorsed the contents of this REF document, and to the best of my knowledge, it is in accordance with the <i>Environmental Planning and Assessment Act 1979</i> , the <i>Environmental Planning and Assessment Regulation 2021</i> (the EP&A Regulation) and the Guidelines approved under Clause 170 of the EP&A Regulation, and the information it contains is neither false nor misleading.
Determining authority	City of Sydney Council
Signed	
Date	
Accepted on behalf of determining authority	I have examined this REF and accept it on behalf of City of Sydney Council
Signed	
Dated	

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# 1 Introduction

City of Sydney Council (Council) proposes to deliver the final part (Stage 2) of the Gunyama Park Aquatic and Recreation Centre (GPARC - Stage 2) at 17 Zetland Avenue, Zetland, NSW, as well as a section of the new George Julius Avenue North road, east of Gunyama Park (the project). The project site is located within the Epsom Park Precinct in Zetland, which forms part of the broader Green Square Precinct.

This review of environmental factors (REF) has been prepared to describe the project, identify potential impacts on the environment and establish management and mitigation measures that shall be implemented to ensure that potential impacts are adequately addressed.

Council is the proponent and determining authority for the project under Part 5 of the NSW *Environmental Planning and Assessment Act 1979* (EP&A Act).

## 1.1 Background

In February 2021, GPARC - Stage 1 opened to the public. It comprises a multi-pool aquatic and gym building, a synthetic playing field, a small natural turf area, barbeque area, circulation path and landscaped perimeter.

GPARC - Stage 2 is the remaining undeveloped portion of the project site to the east of the synthetic playing field. It includes a children's playground, natural lawn, seating areas, skate park, shade structures, new tree and understorey planting and connecting pathways. An amenities building is also proposed, which will house public toilets, playing field changing rooms and field storage.

The design has been informed by a cultural design strategy developed by Indigenous cultural consultant, Djinjama.

The original staging design anticipated that the field would be widened into the GPARC Stage 2 area. However, to reduce disruption to the new playing surface and the community, the design was revised by the original GPARC Stage 1 design team (Andrew Burges Architects with Grimshaw and Taylor Cullity Lethlean) to retain the completed field and path in their current configurations. This approach was also endorsed by Council's Design Advisory Panel (DAP) in 2018.

George Julius Avenue North is a new road that will connect Epsom Road to Zetland. Adjacent portions of George Julius Avenue will be constructed by neighbouring private developers, Meriton and Lincoln Developments, and are expected to be completed or substantially completed, when the project commences construction. The stretch of road delivered through this project is to the east of Gunyama Park.

The new road will comprise a 23 m wide dual carriageway with planted centre median and street trees, parking lanes on both sides of the carriageway, kerbside trees with planting, footpaths and a bidirectional cycleway on the eastern side of the road.

Construction documentation for GPARC Stage 2 was also completed to approximately 70% by the Stage 1 design team. As detailed further in Chapter 2 of this REF, the Stage 2 project consultants have amended the existing construction documentation to deliver the revised detailed design.

The project site shown in the context of GPARC Stage 2 is provided in Figure 1.1.





Figure 1.1 The project (red dashed line) in the context of GPARC - Stage 1 (Source: City of Sydney Council)

## 1.2 Community engagement

Council consulted extensively with the following community and user groups during the design and development of Gunyama Park Aquatic and Recreation Centre:

- Consultation for the Cultural Design Strategy;
- Green Square Community through Update Newsletters;
- Green Square Community through Have Your Say Days and Infohubs;
- Focus Groups (Swimmers with Disabilities, Green Square Primary School, Weave Youth & Community Services, Cafe Operators, Guide Dogs Australia & Vision Australia, NSW Fire Brigade);
- Aquatic Leisure Centre Operators;
- Royal Life Saving Society NSW;
- Local Health District (Operational and Consumers);
- Key Park User Groups (Rugby League, Australian Football League, Australian Rugby Union, Football NSW, Hockey NSW, Sydney Oztag, NSW Touch);
- Council's Design Advisory Panel; and
- Council's Public Art Advisory Panel.

Issues raised were addressed in the design of the GPARC Stage 1 and, where relevant, have been addressed in the design of GPARC Stage 2.

## 1.3 Overview of the project

The project is for GPARC Stage 2, comprising a new recreation park and amenities building, and a new section of road. The road and park portions of the project are both at the detailed design and documentation stage.

Council has engaged Place Design Group (PDG) to finalise all design work, revise documentation and coordinate documentation to provide for a single construction documentation package.

PDG and its subconsultants have verified and modified the existing construction documentation and existing as-built drawings to produce a coordinated and complete design and documentation package. In doing so, PDG has amended the existing construction documentation to deliver the revised detailed design.

Further details of the project are provided in Chapter 2 and detailed design drawings are provided in Appendix A.

## 1.4 Project vision

Council's vision for the GPARC project is to deliver a sustainable, all-inclusive physical activity hub to provide active and passive recreational opportunities. The project combines a district recreation park with a state-of-the-art aquatic and recreation facility with the overriding aim of enhancing the fitness and recreational needs of the large and diverse local community, and residents and workers, in and around Green Square. The construction of the Stage 2 works will complete this vision.

## 1.5 The project site and surrounding area

As shown in Figure 1.2, the project site is located in the suburb of Zetland, NSW, approximately 5 km south of Sydney central business district. It is close to the neighbouring suburbs of Waterloo, Kensington and Beaconsfield. The site is located within the Green Square Urban Renewal Precinct, which includes these suburbs as well as Zetland, and parts of Rosebury and Alexandria. This primarily industrial area has been earmarked as a transitional precinct with many residential and commercial development projects having recently been completed or currently taking place.

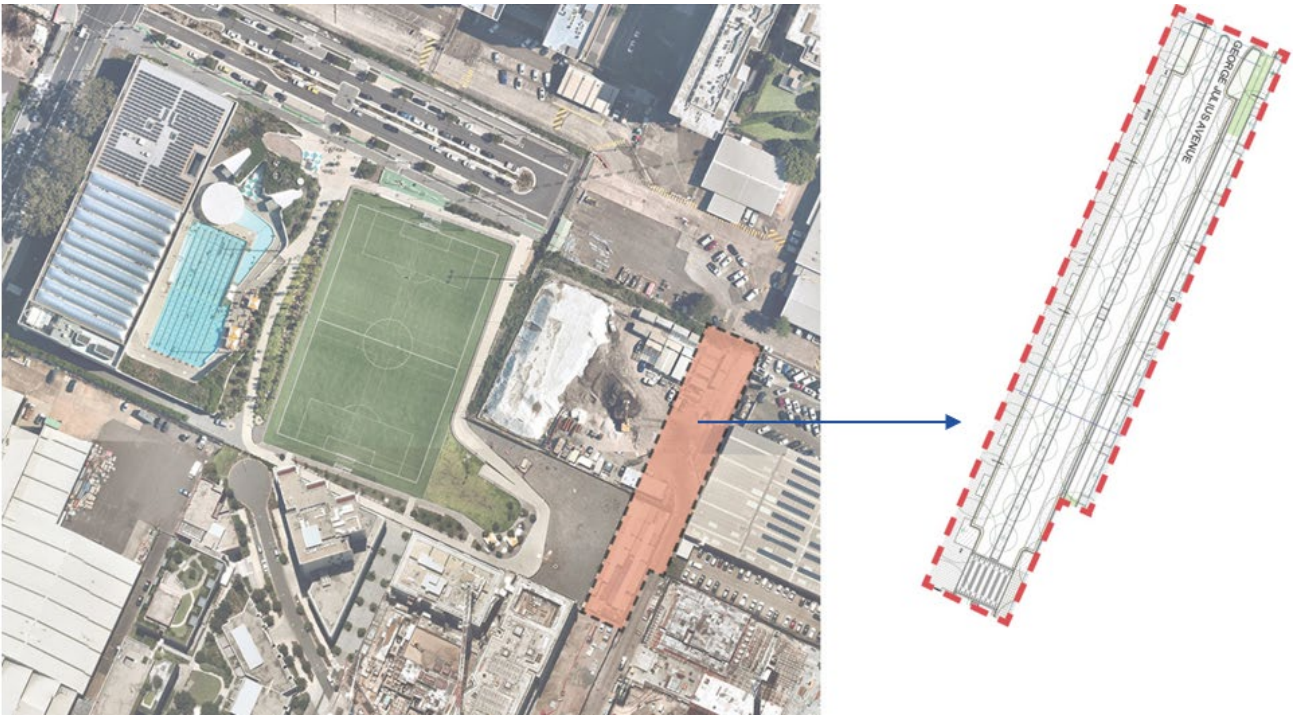
The area is well serviced by road and rail. Zetland Avenue joins Joynton Avenue. From there, the site is easily accessible to Green Square, which provides a train station and vehicular access by road to Botany Road, O'Riordan Street and Bourke Road. In the opposite direction, the project site is easily accessible to South Dowling Street (M1) via O'Dea Avenue. The project site is located approximately 4 k m north of Sydney Airport.

The overall project site is approximately 8,700 m<sup>2</sup> and is bounded by the Gunyama Park Stage 1 site to the west, by an industrial property and public road to the north, and by commercial and residential developments to the east and south, respectively.



**Figure 1.2** The project site and surrounding area (Source: Six Maps)

As shown in Figure 1.3, George Julius Avenue North is approximately 2,500 m<sup>2</sup>. The road lot is 23 m wide and approximately 112 m long. Adjoining the roadway to the south-east is residential development, including an adjoining portion of George Julius Avenue, currently in construction by Meriton. Adjoining the roadway to the south-west is residential development, including an adjoining portion of George Julius Avenue, currently in construction by Lincoln Developments and Deicorp.

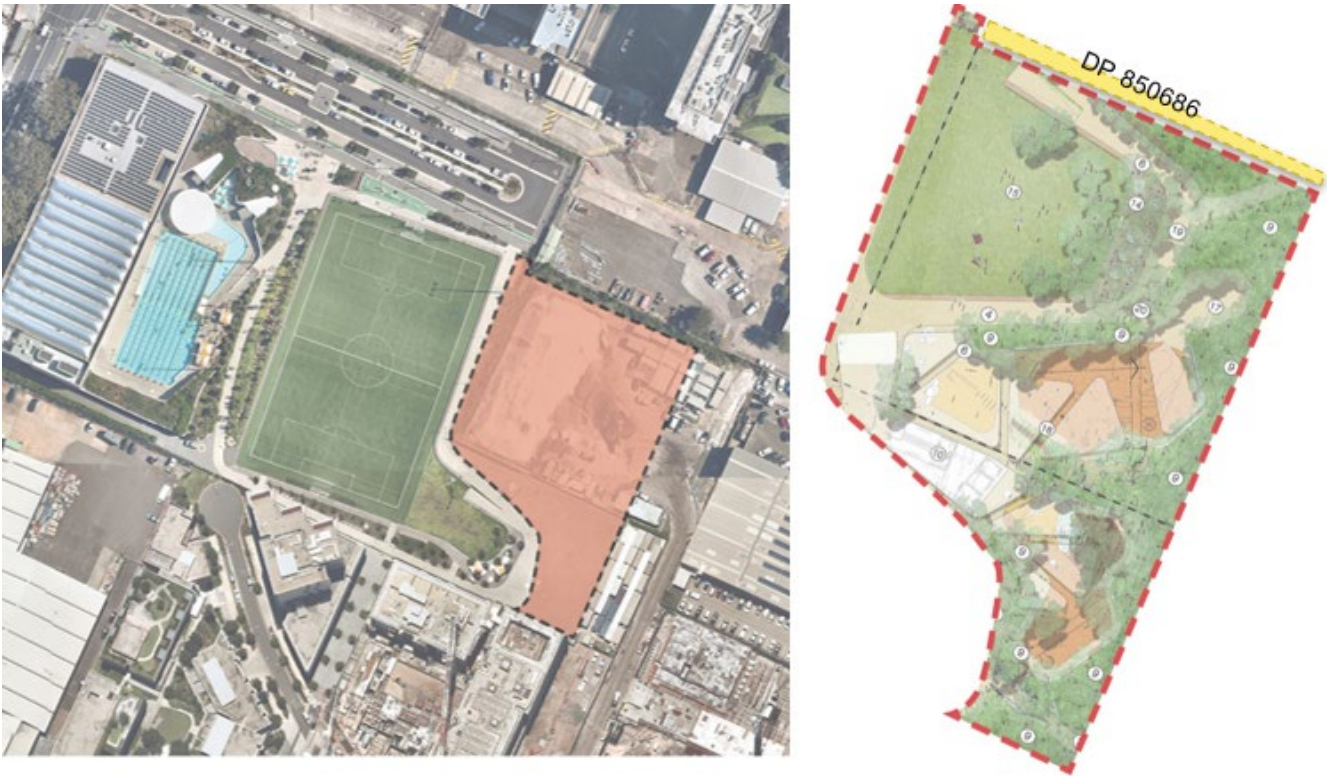


**Figure 1.3** Location of George Julius Avenue North (Source: City of Sydney Council)

The GPARC Stage 2 area is approximately 6,200 m<sup>2</sup>. This is the remaining undeveloped land of the GPARC site. The site is bounded to the west by Gunyama Park synthetic sports field, to the north by Zetland Avenue (partially constructed), to the east by George Julius Avenue North (also part of the subject works), to the south by private (Meriton owned) residential development.

At construction of GPARC Stage 2 and George Julius Avenue North, a narrow strip (1.6 m to 2.2 m wide) of the GPARC Stage 2 site adjoining Zetland Avenue will not be developed, due to ownership issues. This strip will be constructed with the final segment of Zetland Avenue in the future. Design will consider options to reduce the impact of the future stage of construction.

The GPARC Stage 2 area and the narrow strip adjoining Zetland Avenue are shown in Figure 1.4.



**Figure 1.4 GPARC - Stage 2 (Source: City of Sydney Council)**

GPARC Stage 1 is accessed at 17 Zetland Avenue, Zetland, which runs in a roughly east to west direction and includes a synthetic playing field which is located adjacent to the Stage 2 site.

The project site consists of a vacant lot and is temporarily being used as a stockpile area for a neighbouring construction site. It was historically occupied as a racetrack, stables and paddocks with a tyre and rubber factory located on the same property but to the south. The ground surface over the northern part of the overall site is generally relatively flat bare ground exposing granular fill material, and is currently occupied by temporary sheds, spoil and building material stockpiles. The southern part of the project site is mostly covered by bark mulch and a small area of lawn. A small temporary shed on a concrete slab also currently occupies the site with the tops of several steel screw piles exposed at the ground surface around it.

A concrete-lined stormwater detention basin and adjacent access road are located on the eastern side of the project site. The base of the concrete-lined detention basin and adjacent access road surface on the eastern side of the southern portion are approximately 2–3.5 m below the level of the adjacent site.

Access to both GPARC Stage 1 and Stage 2 will continue to be provided through the existing site access at 17 Zetland Avenue. The project will likely rely on that access arrangement until such time as other future road sections in the area have been constructed, including George Julius Avenue. This arrangement will continue in this manner for certain park users, particularly those park users that want to use both the aquatic and park elements.

## 1.6 Current approvals

On 24 May 2017, development application D/2016/824 was approved for the demolition of existing structures and staged construction of GPARC – Stage 1. Since then D/2016/824 has been modified as follows:

- D/2016/824/A – Consent dated 7 December 2017 modified Condition 68, relating to the timing and submission of a Site Audit Statement;
- D/2016/824/B – Consent dated 21 February 2018 permitted the deletion of Conditions 27, 29, 55, 94, 97 and 98 relating to the public domain beyond the subject site;

- D/2016/824/C – Consent dated 3 April 2018 modified the timing of preparatory, demolition and public domain works;
- D/2016/824/D – Consent dated 1 February 2019 allowed for minor changes to the design of the main building and a modification to Condition 26, concerning bicycle parking and end of trip facilities;
- D/2016/824/E – Consent dated 3 March 2019 allowed for minor modifications to the design of amenities building, playground and landscaping to the east of the sports field;
- D/2016/824/F – Consent dated 30 May 2019 permitted a revised toddler pool shade structure, removal of a deceased tree and landscaping amendments to satisfy Sydney Water requirements;
- D/2016/824/G – Consent dated 10 September 2019 approved changes to the southern plant room, building height and services on the gym roof;
- D/2016/824/H – Consent dated 16 December 2019 approved changes to the landscape strategy; and
- D/2016/824/I – Consent dated 19 August 2020 approved the staging of delivery of the amenities block, and deletion of the requirement for a bicycle facilities wayfinding plan.

It is understood that once this REF is approved, Council will complete a further modification to D/2016/824 to strike out various elements that relate to GPARC Stage 2, which are no longer part of the scope of works. This will close out D/2016/824 and this REF will become the updated planning approval for the project.

## 1.7 The existing environment

The following description of the site's existing environment includes information provided in the Report on Geotechnical Investigation for the site prepared by Douglas Partners for the project (refer Section 4.2, Appendix C of this REF).

### 1.7.1 Geology

The site is underlain by marine-deposited and aeolian-reworked coastal sand dunes of the Holocene Epoch which comprises Ashfield Shale comprises black to light grey shale and laminite. Hawkesbury Sandstone underlies ashfield shale and typically comprises medium, to coarse-grained quartz sandstone with minor shale and laminite lenses.

### 1.7.2 Subsoil

The ground profile interpreted from previous boreholes and cone penetration tests (CPT) undertaken within the site comprised:

- fill – concrete and asphalt pavement, underlain by gravelly sand, crushed sandstone, sandy clay, silty sand and building rubble (including bonded asbestos fragments) to depths of between 1.9 m and 4.0 m;
- natural soils – loose to dense sands to depths of between 11.8 m and 16.0 m, and firm to hard clays to depths of between 20.3 m to 24.9 m depth. Some layers of peat/organic clay were also encountered; and
- sandstone – extremely low to very low strength grading to low, medium or high strength from depths of between 20 m and 24.4 m, to the base of the cored bores at 26.5 m to 29.1 m depth.

Fill generally comprises a sandy topsoil layer overlying clayey fill containing varying amounts of sand, igneous and sandstone gravels. Below this is some natural fine to medium grained sand with trace root fibres. Some bedrock is visible at the surface in certain areas of the site. Soils are moderately deep at between 50-150 cm.

### 1.7.3 Hydrogeology

The site is located within the 'Botany Sands' groundwater source, according to the NSW Government Water Sharing Plan for the *Greater Metropolitan Region Groundwater Sources 2011* under Section 50 of the *Water Management Act 2000*. In particular, the site is located within Botany Management Zone 1 of the Botany Sands groundwater source.

As considered further in Section 4.2.2, groundwater was encountered at depths of between 3.0 m and 3.8 m below ground level (bgl) during auger drilling of the boreholes and at depths of between 4.8 m and 5.7 m bgl at some of the cone penetration tests (CPTs). Subsequent measurement of the groundwater depths in the installed monitoring standpipes on 6 April 2016 indicated that the groundwater table ranged from depths of between 2.2 m bgl and 4.3 m bgl i.e. from RL 15.6m to RL 16.0m relative to Australian Height Datum (AHD)

It should be noted that there was no evidence of the monitoring standpipes observed at the site during the field work for the present investigation, and it is therefore assumed that the standpipes were destroyed during construction works following the previous investigations.

### 1.7.4 Topography

The site is in an area of generally flat topography and forms an elevated fill platform in the northern part of up to approximately 1.5 m above the surrounding ground surface levels.

## 1.8 Purpose and structure of this report

The purpose of this review of environmental factors (REF) is to provide Council, as the proponent and the determining authority, with sufficient information to examine and take into account to the fullest extent possible, all matters affecting or likely to affect the environment by reason of the project, in accordance with Division 5.1, Section 5.5 of the EP&A Act.

A description of the project and an assessment of potential environmental impacts have been prepared to address Clause 171 of the NSW *Environmental Planning and Assessment Regulation 2021* (EP&A Regulation) (factors to be taken into account concerning the impact of an activity on the environment), the NSW *Biodiversity Conservation Act 2016* (BC Act) and the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

To achieve this purpose, this REF report includes the format and content outlined in Table 1.1.

**Table 1.1 Format and content of this REF**

Chapter	Content
Chapter 1 - Introduction	Includes an introduction to the project, a description of the site and the surrounding area and a brief overview of the project
Chapter 2 – The project	Includes a detailed description of the project
Chapter 3 – Planning framework	Outlines the planning assessment/approval requirements for the project and the relevant national, state and local statutes and planning instruments
Chapter 4 – Environmental assessment	Identifies and provides an assessment of potential environmental impacts of the project
Chapter 5 – Environmental management	Identifies environmental management and mitigation measures
Chapter 6 – Conclusion	Summarises the outcomes of the REF

The findings of the REF will be considered when assessing:

- whether the project is likely to have a significant impact on the environment and therefore if an environmental impact statement (EIS) is required to be prepared and approval sought from the Minister for Planning and Parks under Division 5.1, Section 5.7 of the EP&A Act;
- whether the project is likely to have a significant impact on any threatened species or ecological communities as defined by the BC Act; and therefore, whether a Species Impact Statement (SIS) is required; and
- whether the project is likely to significantly impact on Matters of National Environmental Significance (MNES) and the need to make a referral to the Commonwealth Government Department of Climate Change, Energy, the Environment and Water (DCCEEW) under the EPBC Act.

## 2 The project

The project is for the detailed design and construction of Stage 2 of the Gunyama Park Aquatic and Recreation Centre (GPARC Stage 2) and a new section of the George Julius Avenue North Road to the east of Gunyama Park.

This chapter provides further details of the project. Detailed design drawings are provided in Appendix A and an excerpt of the project is provided in Figure 2.1.



Figure 2.1 Excerpt of the detailed design – GPARC - Stage 2 (Source: PGD)

### 2.1 GPARC – Stage 2

The main components of GPARC – Stage 2, comprise:

- amenities building, comprising:
  - public toilets;
  - playing field changerooms; and
  - field storage.
- skate park;
- new tree plantings & understorey species (native and native indigenous);
- playground and play equipment;
- shade canopies;



- secondary access paths;
- recreational lawn (natural turf);
- recycled water irrigation; and
- BBQs and seating.

## 2.2 George Julius Avenue North

Detailed design has been prepared for George Julius Avenue North, which will be a 23 m wide road lot comprising dual carriageway with planted centre median and street trees, parking lanes on both sides of the carriageway, kerbside trees and planting, footpaths and a bidirectional cycleway on the eastern side of the road. The new road will be approximately 112 m in length.

## 2.3 Staging

The project includes staging to accommodate the timing of the Zetland Avenue intersection, noting that at the time George Julius Avenue North is constructed, the intersection with Zetland Avenue will not be constructed due to land ownership issues (a turn head will be provided at the northern end of George Julius Avenue). The Zetland Avenue intersection and extension are works by others and do not form part of this REF.

## 2.4 Construction activities

This section provides a summary of likely construction staging, methodology, work hours, and plant and equipment associated with construction of the project. The construction methodology will be further developed by the nominated contractor in consultation with Council.

A construction environmental management plan (CEMP) will be required to be prepared by the contractor and approved by Council ahead of works. Where relevant, Council specifications will be referred to, including those relevant to environmental performance and management of works such as stockpile management and sediment and erosion control.

Subject to approval, construction is expected to take 15-18 months.

The proposed construction activities are identified in Table 2.1. This staging is indicative and will be dependent on the contractor's preferred methodology, program and sequencing of work.

**Table 2.1 Indicative staging and construction activities**

Stage	Activities
1. Site establishment and environmental protection	<ul style="list-style-type: none"> <li>• secure site perimeter boundary</li> <li>• establish site office, amenities and plant/material storage areas</li> <li>• establish traffic and other environmental controls in accordance with the CEMP</li> <li>• install water and sediment management controls in accordance with an erosion and sediment control plan</li> <li>• protect, secure and relocate any affected services</li> </ul>
3. Feature entry point, pathway, earthworks, drainage, natural playground and landscaping	<ul style="list-style-type: none"> <li>• undertake minor earthworks to establish design levels</li> <li>• prepare footings and retaining walls (as required)</li> <li>• undertake planting and tree planting throughout the site</li> </ul>
4. Construction of skate park and play equipment	<ul style="list-style-type: none"> <li>• undertake traditional construction for site structures</li> <li>• construct playground in accordance with <i>Australian Standard 4685:2021 (Playground equipment and surfacing general safety)</i></li> </ul>
5. Finishing work	<ul style="list-style-type: none"> <li>• restore disturbed areas</li> </ul>

**Table 2.1 Indicative staging and construction activities**

Stage	Activities
	<ul style="list-style-type: none"> <li>• remove controls once plantings established</li> <li>• remove compounds and materials from site, ensuring the work site is rehabilitated to pre-construction levels</li> <li>• remove all waste and tidy the construction site</li> <li>• dispose of any unused/contaminated spoil to an appropriate licensed waste facility</li> </ul>

### 2.4.1 Plant and equipment

The plant and equipment likely to be used during construction of the project includes:

- backhoes;
- cherry pickers;
- chainsaws;
- compressors;
- concrete pumps;
- concrete vibrators;
- concrete trucks;
- drilling rigs;
- dump trucks;
- excavators;
- front end loaders;
- generators;
- graders;
- light vehicles;
- mulchers;
- pavers;
- trucks;
- vibratory rollers; and
- watercarts.

### 2.4.2 Demolition and earthworks

Based on information provided by Council, it is understood that the area of GPARC Stage 2 will require depth of cut (ie earthworks excavation and removal) of up to approximately 1.0 m in portions of the site. The area of the existing detention basin on the site will be filled with excavated site soil.

As detailed in the accompanying Report on Geotechnical Investigation (refer Section 4.2, Appendix C of this REF), it is understood that the proposed design subgrade level (DSL) for George Julius Avenue North will be similar to the present site levels over the

northern part of the site, and that additional fill of up to 1.5 m is to be placed over the existing ground surface in the southern part of the road alignment up to the required DSL, which is understood to range from approximately RL 19.2 m to RL 20.8 m AHD from north to south along the road alignment.

All excavated materials will be managed under the following hierarchy:

- reuse as engineered fill on-site;
- store on-site to allow for its future reuse;
- transfer to another construction site for use as engineering fill; and
- test and take to a licenced waste recovery site.

Any materials reused on-site, or imported to site from another live development, will be subject to testing and waste classification in accordance with the requirements of the accompanying Remedial Action Plan (RAP) (refer Section 4.1, Appendix B of this REF). No fill material will be imported to the site until such time as a validation certificate (with a copy of any report forming the basis for the validation) for the fill material has been provided and approved by Council.

Materials which do not meet the soil validation criteria and/or are deemed not suitable for reuse at the site will be assessed for off-site disposal in accordance with the NSW EPA (2014) Waste Classification Guidelines.

### 2.4.3 Source and quantity of materials

The source and quantity of materials will be determined by the contractor selected by Council to undertake the proposed works. Materials will be sourced from local suppliers where practicable, and reuse of existing and recycled materials will be undertaken where practicable.

### 2.4.4 Construction workforce

It is estimated that a construction workforce of approximately 20 personnel will be required.

### 2.4.5 Construction traffic and access

The CEMP will include construction traffic management measures such as the detailed scheduling and staging of the construction activities.

Table 2.2 summarises expected levels of construction traffic.

**Table 2.2 Construction traffic**

Type of vehicle	Maximum vehicle numbers per day	Likely travel patterns
Heavy vehicles	5	Equivalent to an average of 1-2 movements per hour
Light vehicles	8	Most light vehicle movements will occur prior to 7:00 and after 18:00 based on standard construction hours and to avoid peak periods

### 2.4.6 Construction hours

Construction works will occur during the following standard working hours:

- Monday to Friday: 7:00 to 18:00;
- Saturday: 8:00 to 13:00; and
- no work on Sundays or public holidays.

## **2.5 Utilities**

Any affected services and utilities will be protected and secured or, if necessary, relocated.

## 3 Planning framework

This chapter provides an overview of the relevant planning framework that relates to the project and identifies the relevant assessment and approval requirements.

### 3.1 Commonwealth legislation

#### 3.1.1 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) provides a national framework for environmental protection and management of nationally and internationally important flora, fauna, ecological communities and heritage places. Part 3 of the Act lists nine Matters of National Environmental Significance (MNES).

An action taken by any person on Commonwealth land that is likely to have a significant impact on the environment or an action taken by any person outside of Commonwealth land that is likely to have a significant impact on MNES may require approval from the Commonwealth Minister for the Environment.

A consideration of the project against the relevant MNES is provided in Table 3.1 below. Overall, it is concluded that the project is not likely to have a significant impact on any MNES and approval under the EPBC Act is not required.

**Table 3.1** Consideration of MNES

Factor	Impact
Any impact on a World Heritage property? There are no World Heritage properties that will be impacted by the project	Nil
Any impact on a National Heritage place? There are no National Heritage places that will be impacted by the project	Nil
Any impact on a wetland of international importance? The project will not impact wetlands of international importance	Nil
Any impact on a listed threatened species or communities? Given the highly disturbed nature of the project site, which is devoid of vegetation, it is not anticipated that there will be any impact to listed threatened species or communities	Minor
Any impacts on listed migratory species? Given the highly disturbed nature of the project site, which is devoid of vegetation, it is not anticipated that there will be any impact to listed migratory species	Minor
Does the project involve a nuclear action (including uranium mining)? The project does not involve a nuclear action	Nil
Any impact on a Commonwealth marine area? There are no Commonwealth marine areas that will be impacted by the project	Nil
Does the project involve development of coal seam gas and/or large coal mine that has the potential to impact on water resources? The project is for a recreation park and a new road	Nil
Additionally, any impact (direct or indirect) on Commonwealth land? The project will not be undertaken on or near any Commonwealth land	Nil

## 3.2 NSW legislation and regulations

### 3.2.1 Environmental Planning and Assessment Act 1979

The NSW *Environmental Planning and Assessment Act 1979* (EP&A Act) establishes the system of environmental planning and assessment in NSW. The project is subject to the environmental impact assessment and planning approval requirements of Division 5.1 of the EP&A Act. Division 5.1 of the EP&A Act specifies the environmental assessment requirements for activities undertaken by public authorities, which do not require development consent under Part 4 of the EP&A Act.

Under Division 5.1 of the EP&A Act, Council must assess the environmental impact of certain activities they are carrying out themselves, referred to as a review of environmental factors (REF). If the REF identifies that the proposed activity is likely to have a significant impact on the environment more broadly, then an environmental impact statement (EIS) must be prepared.

### 3.2.2 Environmental Planning and Assessment Regulation 2021

Clause 170 of the EP&A Regulation states that the Planning Secretary may issue guidelines in relation to the factors to be taken into account by a determining authority when considering the likely impact of an activity (the environmental factors) and the form of the document required to be prepared by a determining authority under Clause 171 of the EP&A Regulation.

This REF has been prepared in accordance with the *Guidelines for Division 5.1 assessments* prepared by the Department of Planning and Environment in June 2022 (the Division 5.1 Guideline), which have been approved under Clause 170 of the EP&A Regulation.

Clause 171 of the EP&A Regulation defines the factors which must be considered when determining if an activity assessed under Division 5.1 of the EP&A Act (as set out in the Division 5.1 guideline) has or is likely to have a significant impact on the environment. Chapter 4 of this REF provides an environmental assessment of the project and Table 3.2 below considers the specific factors of Clause 171 in relation to the project.

With the implementation of the proposed management and mitigation measures, the project has been assessed as having nil to minor potential impacts when considered against the factors of Clause 171.

**Table 3.2 Consideration of the factors of Clause 171 of the EP&A Regulation**

Factor	Impact
(a) Any environmental impact on a community? There will be some temporary impacts to the community during construction in the form of traffic, noise and air quality; however, a suite of environmental management and mitigation measures will be implemented to minimise these potential impacts	Minor
(b) Any transformation of a locality? The project will improve the appearance of the site by providing a new recreation area for use by the general public	Minor
(c) Any environmental impact on the ecosystem of the locality? An environmental assessment has been provided in Chapter 4 in relation to contamination and remediation, flooding, traffic and parking. Other potential impacts in relation to stormwater, erosion and sediment control, heritage, air, noise, biodiversity and waste management, have also been considered during both the construction and operational phases of the project. A range of environmental management and mitigation measures set out in Chapter 5 will be implemented to ensure that potential environmental impacts are minimised. With these measures in place, there are not expected to be any significant adverse impacts on the ecosystem of the locality	Minor
(d) Any reduction of the aesthetic, recreational, scientific or other environmental quality or value of a locality? With the implementation of the proposed management and mitigation measures there is not expected to be any reduction of the aesthetic, recreational, scientific or other environmental quality or value of the locality The project will improve the locality through the provision of public open space in the form of a new recreation area	Nil
(e) Any effect on a locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations?	Nil

**Table 3.2 Consideration of the factors of Clause 171 of the EP&A Regulation**

Factor	Impact
As detailed further in Section 4.5, there will be no impacts to items of European heritage and with the implementation of the proposed management and mitigation measures there are not anticipated to be any adverse impacts to any Aboriginal heritage items	
(f) Any impact on the habitat of protected fauna (within the meaning of the <i>National Parks and Wildlife Act 1974</i> )? Given the highly disturbed nature of the project site, it is not anticipated that there will be any impact on the habitat of protected fauna	Nil
(g) Any endangering of any species of animal, plant or other form of life, whether living on land, in water or in the air? Given the highly disturbed nature of the site, the REF did not identify any endangering impacts to any species of animal, plant or other form of life, whether living on land, in water or in the air. As detailed in Section 4.5, with the implementation of the proposed management and mitigation measures and through the proposed landscaping and planting, it is considered that the project will result in a net improvement to the site's biodiversity value	Nil
(h) Any long-term effects on the environment? With the implementation of the proposed management and mitigation measures there are not expected to be any long-term effects on the environment	Nil
(i) Any degradation of the quality of the environment? With the implementation of the proposed management and mitigation measures any potential for degradation to the environment will be adequately addressed	Nil
(j) Any risk to the safety of the environment? With the implementation of the proposed management and mitigation measures there is unlikely to be a risk to the safety of the environment	Nil
(k) Any reduction in the range of beneficial uses of the environment? The project is unlikely to have any reduction in the range of beneficial uses of the environment and will likely improve them	Nil
(l) Any pollution of the environment? With the implementation of the proposed management and mitigation measures, the project is unlikely to result in any significant pollution of the environment	Minor
(m) Any environmental problems associated with the disposal of waste? The project will not cause any environmental problems associated with the disposal of waste. All waste will be managed and disposed of in accordance with the NSW Environment Protection Authority's (EPA) <i>Waste Classification Guidelines</i> . Management and mitigation measures will be implemented to ensure waste is reduced, reused or recycled where practicable	Nil
(n) Any increased demands on resources (natural or otherwise) that are, or are likely to become, in short supply? The project will not increase demands on resources that are or are likely to become in short supply	Nil
(o) Any cumulative environmental effect with other existing or likely future activities? The project is for a new recreation area and road so there will be no cumulative effects with other existing or likely future activities	Nil
(p) Any impact on coastal processes and coastal hazards, including those under projected climate change conditions? The project is not located in the coastal zone and will not be directly affected by any coastal processes or hazards Measures shall be included in the CEMP to manage any acid sulfate soils if encountered during construction	Nil
(q) applicable local strategic planning statements, regional strategic plans or district strategic plans? The provision of a new recreation area and road is consistent with relevant local, regional and district strategic plans	N/A
(r) other relevant environmental factors? All relevant environmental factors have been considered in the assessment of this REF	N/A

### 3.2.3 State Environmental Planning Policies

#### i State Environmental Planning Policy (Transport and Infrastructure) 2021

The NSW *State Environmental Planning Policy (Transport and Infrastructure) 2021* (Transport and Infrastructure SEPP) permits certain activities undertaken by a public authority (ie Council) to be undertaken without consent, including relevantly Section 2.73 (3), which states (underlined for emphasis):

*Any of the following development may be carried out by or on behalf of a public authority without consent on land owned or controlled by the public authority—*

*(a) development for any of the following purposes—*

*(i) roads, pedestrian pathways, cycleways, single storey car parks, ticketing facilities, viewing platforms and pedestrian bridges,*

*(ii) recreation areas and recreation facilities (outdoor), but not including grandstands,*

A recreation area is defined under the *Standard Instrument – Principal Local Environmental Plan* (Standard Instrument) as:

**recreation area** means a place used for outdoor recreation that is normally open to the public, and includes—

*(a) a children's playground, or*

*(b) an area used for community sporting activities, or*

*(c) a public park, reserve or garden or the like,*

*and any ancillary buildings, but does not include a recreation facility (indoor), recreation facility (major) or recreation facility (outdoor).*

The project will complete Gunyama Park (a public park), which meets the definition of a recreation area and George Julius Avenue North (a road), and which are permissible without consent pursuant to Section 2.73 of the Transport and Infrastructure SEPP.

#### ii State Environmental Planning Policy (Hazards and Resilience) 2021

Chapter 4 of the NSW *State Environmental Planning Policy (Resilience and Hazards) 2021* (Resilience and Hazards SEPP) provides a State-wide approach to the remediation of contaminated land, which is relevant because the project will take place on a contaminated site that has been remediated.

Section 4.9 (1) of the Resilience and Hazards SEPP requires contamination and remediation to be considered by a consent authority in the determination of a development application. It states that a consent authority must not consent to the carrying out of any development on land unless:

*(a) it has considered whether the land is contaminated, and*

*(b) if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and*

*(c) if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.*

As considered further in Section 4.1, a Remedial Action Plan (RAP) has been prepared for the project and is provided in Appendix B. With the implementation of the proposed remediation strategy, it is considered that the project site is suitable for the proposed uses, including for recreation and open space.

To ensure that the integrity of the capping layer and all other site remediation work that has taken place is not in any way undermined when earthworks and other intrusive construction activities are carried out, a series of specific management and mitigation measures shall be implemented through the (CEMP) (refer Section 5.2).



The ongoing future management of the site from a remedial standpoint will be through the implementation of a site-wide long term environmental management plan (LTEMP). As considered further in Section 5.3, the LTEMP is currently in place for GPARC - Stage 1 and will be updated to incorporate the project.

### **3.3 Sydney Local Environmental Plan 2021**

The project site is zoned MU1 – Mixed Use pursuant to the *Sydney Local Environmental Plan 2012* (SLEP 2012). Recreation areas and roads are permissible in the MU1 zone. The objectives of the MU1 zone are:

- *To encourage a diversity of business, retail, office and light industrial land uses that generate employment opportunities.*
- *To ensure that new development provides diverse and active street frontages to attract pedestrian traffic and to contribute to vibrant, diverse and functional streets and public spaces.*
- *To minimise conflict between land uses within this zone and land uses within adjoining zones.*
- *To encourage business, retail, community and other non-residential land uses on the ground floor of buildings.*
- *To ensure land uses support the viability of nearby centres.*
- *To integrate suitable business, office, residential, retail and other land uses in accessible locations that maximise public transport patronage and encourage walking and cycling.*

The project is consistent with the objectives of the zones as it will assist in providing diverse and attractive street frontages that will attract pedestrian traffic and contribute to vibrant, diverse and functional streets and public spaces. It will assist in minimising the conflict between land uses and encourage walking and cycling.

### **3.4 Other relevant NSW legislation**

Other NSW legislative approval requirements relevant to the project are detailed in Table 3.3.

**Table 3.3 NSW legislative approval requirements**

Legislation	Purpose	Comment
<i>Biodiversity Conservation Act 2016 (BC Act)</i>	The BC Act aims to maintain a healthy, productive and resilient environment for the well-being of the community Section 7.8 of the BC Act states that a proposal that is regarded as an activity that significantly affects threatened species and ecological communities, or their habitats, is taken to also significantly affect the environment Significance is assessed via the test of significance in Section 7.3 of the BC Act, which may then lead to a species impact statement (SIS), or a biodiversity development assessment report (BDAR) being required	As detailed in Section 4.5, the project site has been previously disturbed and does not contain vegetation. It will not significantly affect threatened species or ecological communities, or their habitats and therefore a SIS or (BDAR) is not required under the BC Act
<i>Contaminated Land Management Act 1997 (CLM Act)</i>	The CLM Act is the primary Act under which contaminated land is regulated by the NSW Environment Protection Authority (EPA) and sets out requirements for site audits	A Site Audit Statement is required to be prepared by a NSW EPA Accredited Site Auditor for the project site. The SAS will confirm whether the project site has been remediated to a standard suitable for the proposed development land uses
<i>Heritage Act 1977</i>	The <i>Heritage Act 1977</i> protects and conserves environmental heritage in NSW	The project site has been previously disturbed and there are no known heritage items that will be impacted by the project
<i>National Parks and Wildlife Act 1974</i>	The <i>National Parks and Wildlife Act 1974</i> aims to conserve nature and objects, places or features of cultural value. An Aboriginal Heritage Impact Permit (AHIP) is required for any activities likely to have an impact on Aboriginal objects or Places or cause land to be disturbed for the purposes of discovering an Aboriginal object	The project site has been previously disturbed and is unlikely to have an impact on Aboriginal objects or places. Therefore, an AHIP is unlikely to be required
<i>Protection of the Environment Operations Act 1997 (POEO Act)</i>	The POEO Act provides for issuing licences regarding environmentally hazardous activities, issuing offence notices, establishing environmental protection policies, instituting proceedings, investigating breaches and auditing activities. It primarily regulates pollution control and waste disposal in NSW	The project does not constitute a scheduled activity and will not require a licence under the POEO Act
<i>Roads Act 1993 (Roads Act)</i>	Section 138 of the Roads Act requires approval for work to occur over a public road	Approval under Section 138 of the Roads Act will be required for the construction of George Julius Avenue North
<i>Water Management Act 2000 (WM Act)</i>	The WM Act aims to provide for the sustainable and integrated management of water sources of the State for the benefit of both present and future generations. Works within 40 m of a waterway generally require a Controlled Activity Approval (Section 91)	Works within 40 m of a waterway generally require a Controlled Activity Approval (Section 91). There are no works proposed within 40 m of any waterway and public authorities are exempt from the requirement to obtain a Controlled Activity Approval under Clause 41 of the <i>Water Management (General) Regulation 2011</i>

## 4 Environmental assessment

This chapter provides an environmental assessment in accordance with Part 5 of the EP&A Act, to enable Council, as the determining authority, to examine and consider to the fullest extent possible all matters affecting or likely to affect the environment by reason of the project.

Where required, management and mitigation measures are proposed to be implemented to ensure that potential impacts from the project are adequately addressed.

### 4.1 Contamination and remediation

A Remedial Action Plan (RAP) has been prepared by AECOM for the project and is provided in Appendix B. The outcomes of the RAP are summarised below.

#### 4.1.1 Site history

The project site was formerly part of a natural wetland that was drained and filled for development of a racecourse in the 1930s and was briefly used as part of an ordnance unit and military camp during WWII. It was then purchased by Nuffield (Australia) Pty Limited (car manufacturers) in the 1950s. The northern part of the project site was further filled in the 1960s and used as open space and a car park. It was most recently used as stockpiling area for a neighbouring construction site in 2022.

The southern part of the project site was part of a property operating as a printing business during the 1970s to 1990s until it became part of Council in 1998 and used for a works depot until demolished in around 2018. A stormwater detention basin was then excavated and constructed within the southern part of the project site and two underground storage tanks (UST) were removed during these works.

The areas and contaminants of concern based on the historical information and former and current surrounding land uses are summarised in Table 4.1.

**Table 4.1 Areas and contaminants of concern**

Area	Activity	Contaminants
All of the project site	Uncontrolled spoil disposal (potentially liquid and solid) in the 1900s and between 1950s and 1970	Asbestos, metals, polycyclic aromatic hydrocarbon (PAH), total recoverable hydrocarbons (TRH), benzene toluene ethylbenzene xylene (BTEX), organochlorine pesticides (OCPs), organophosphate pesticides (OPPs), polychlorinated biphenyls (PCBs) and industrial solvents (semi volatile organic compounds [SVOCs] and volatile organic compounds VOCs)
	Racecourse construction and operation, the use of ash on the racecourse surface	Metals, PAHs, OCPs and OPPs
	Ordnance storage or use during WWII	There is no Unexploded Ordnance (UXO) reported on the Department of Defence website
Southern portion of the project site	Unknown fuel storage and dispensing (known fuel storage and dispensing on southern boundary of the project site UST was removed and validated, although impacts not fully delineated)	Lead, TRH, BTEX and PAHs
	Industrial manufacturing (rubber), printing and depot use	Metals, TRH, BTEX, PAHs, industrial solvents (SVOCs and VOCs)
Upgradient offsite sources	Industrial manufacturing, electrical substations, car servicing centres/mechanics and filled land from up-gradient off-site sources	Metals, TRH, BTEX, PAHs, cyanide, industrial solvents (SVOCs and VOCs), PCBs and per- and poly-fluoroalkyl substances (PFAS)

Remediation and validation works were completed within all of the GPARC Stage 1 area and some parts of GPARC Stage 2 area, including a small portion of the project site where the USTs were removed. This area and the site borehole and monitoring locations that informed the preparation of the RAP are shown in Figure 4.1.

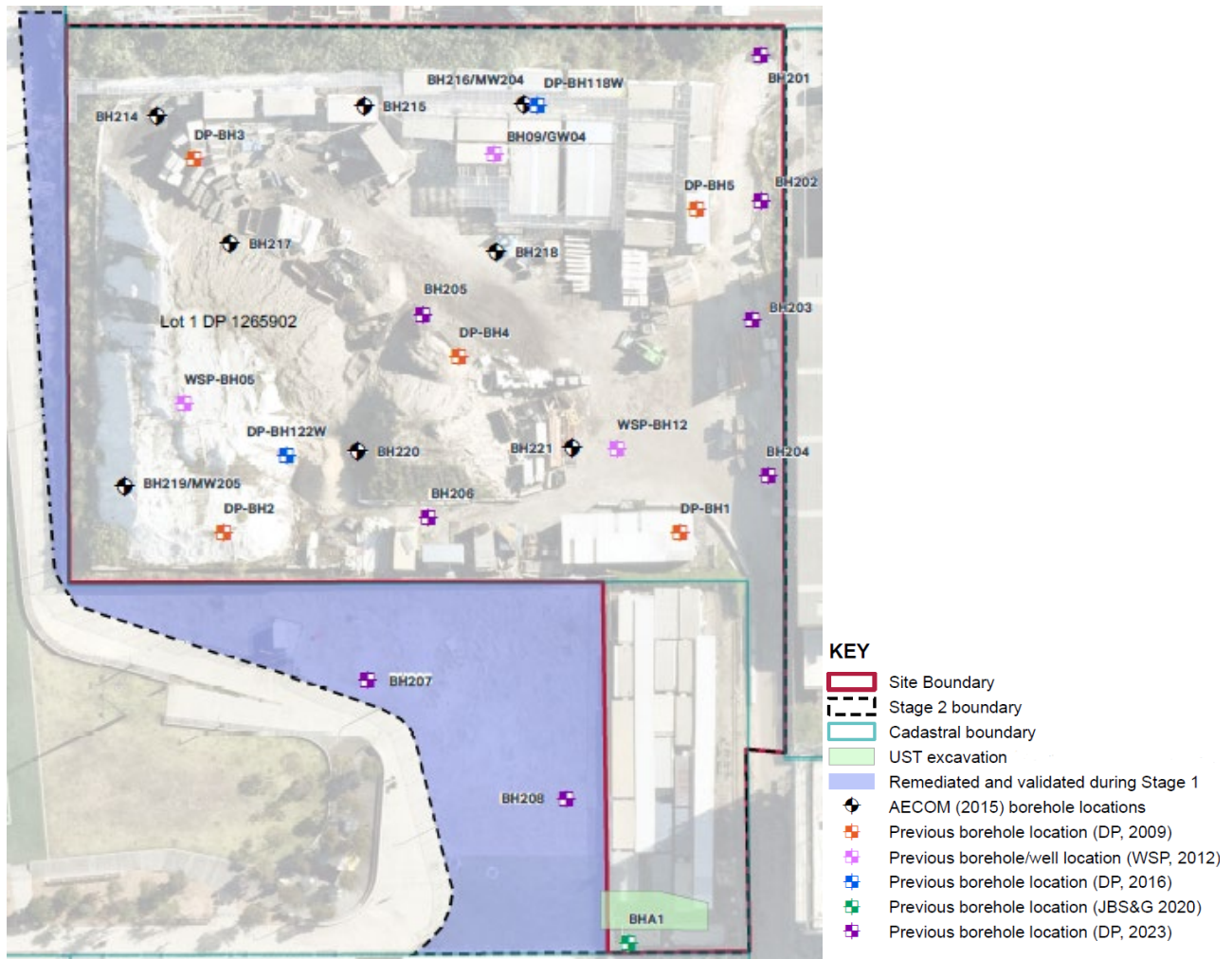


Figure 4.1 Site borehole and monitoring locations (Source: AECOM)

#### 4.1.2 Nature and extent of contamination

##### i Fill/soil

Based on the findings of previous site investigations, as well as field observations and the analytical data considered as part of the RAP, the following two generations of filling were identified at the site:

- **Fill Generation 1** - prior to 1910 and contains waste with slag, ash and metal. The material filled the former Waterloo swamp and dam that was located within and surrounding the project site. The fill was deepest in the west near Joynton Avenue and shallowest in the south east. The highest concentrations of carcinogenic PAHs and lead were in the western part of the project site and highest towards Joynton Avenue. The depth of fill adjacent to Joynton Avenue is generally 3-3.5 m.
- **Fill Generation 2** – From the mid-1950s, the project site was filled with a mound of material that sits above the Generation 1 fill. The Generation 2 Fill consists of soil mixed with demolition and tyre waste.

The RAP identified that the fill is impacted mainly with lead, copper, nickel, zinc, PAHs, asbestos and more isolated areas of TRH. Exceedances of the adopted HILs for carcinogenic PAHs and lead occurred in some areas of the project site. Lead and PAH

concentrations were significantly lower in the Generation 2 fill, which validates the concept that different generations of filling have occurred at the project site. This distribution has implications of how material can be excavated and separated for potential reuse.

## ii Groundwater

Based on the reported soil contaminant and groundwater concentrations of previous investigations, adverse impacts to groundwater in the project site were not considered likely and further investigation or management of groundwater were not considered warranted. However, the RAP identified that there are potential semi-volatile hydrocarbon groundwater impacts that have since been identified in the southern portion of the project site where the former USTs were removed. This hydrocarbon contamination is localised within the project site to an approximately 1.5 m wide strip. Remediation and validation works were undertaken up to and immediately adjacent to the southern boundary of the project site. As the validation works did not identify hydrocarbon impacts, they are not considered to extend off-site to the south.

### 4.1.3 Conceptual site model

A conceptual site model (CSM) was developed to assess risks potentially present at the project site by identifying and describing contaminant sources, transport mechanisms, exposure pathways and sensitive receptors. The outcomes of the CSM developed are summarised in Table 4.2.

**Table 4.2 Conceptual site model**

Consideration	Details
Site setting	The project site is located in a former commercial/industrial area The future land-use is to change to recreational and open space with a playground and parkland areas and a roadway
Contaminants and areas of concern	The main contaminants of concern in soil are metals (mainly lead, nickel and zinc), PAHs, TRH and asbestos The source of contamination is related predominantly to historical uncontrolled placement of impacted fill across the project site, rather than historical operations
Sources of contamination	The following contamination activities are known or suspected to have occurred: <ul style="list-style-type: none"> <li>• Deposition of uncontrolled contaminated fill, including ash, slag and demolition waste from unconfirmed sources.</li> <li>• Leaks from two former USTs</li> <li>• Off-site sources of groundwater contamination from surrounding industrial and filled sites</li> </ul>
Groundwater depth and flow direction	Groundwater conditions on the project site are summarised below: <ul style="list-style-type: none"> <li>• Shallow groundwater was encountered at a depth of 4.3 m AHD</li> <li>• The flow direction was inferred to be towards the west</li> </ul>
Extent of groundwater impacts	<ul style="list-style-type: none"> <li>• No sheens LNAPL or DNAPL were encountered in the well monitored</li> <li>• All concentrations of TRH and BTEXN were less than the human health based groundwater assessment criteria (GAC)</li> <li>• All concentrations of CoPC were less than the ecological based GAC</li> <li>• There may be localised semi-volatile TRH contamination in groundwater at the southernmost extent of the project site</li> </ul>
Extent of soil impacts	<ul style="list-style-type: none"> <li>• Some concentrations of lead and benzo(a)pyrene TEQ (LOR) in fill exceeded the HIL for open space</li> <li>• Asbestos was detected in one sample and is concluded to be present randomly in fill on the project site</li> <li>• Concentrations of BTEXN and TRH were below the adopted HSLs</li> <li>• Concentrations of zinc, nickel, copper, benzo(a)pyrene and TRH C16-C34 exceeded the ecological based criteria</li> </ul>

**Table 4.2 Conceptual site model**

Consideration	Details
	<ul style="list-style-type: none"> <li>Localised semi-volatile TRH contamination exceeding the ecological based criteria and management limits remains in the southernmost portion (~1.5 m wide strip) of the project site and could extend off-site to the south</li> </ul>
Potential transport mechanisms and exposure pathways for contaminants	<ul style="list-style-type: none"> <li>Dermal contact or ingestion of contaminants in soil during construction or post development</li> <li>Dispersion of dust in the wind from unsealed surfaces during construction</li> <li>Uptake of contaminants by plants and ecological receptors in soil post development.</li> <li>Off-site groundwater migration</li> </ul>
Potential receptors of contamination	<p>The potential human receptors of contamination include:</p> <ul style="list-style-type: none"> <li>Construction workers, contractors and visitors on the Site during redevelopment works</li> <li>Future receptors are recreational users of Gunyama Park and intrusive maintenance workers</li> </ul> <p>Potential environmental receptor of impacts are off-site groundwater which flows towards the Alexandra Canal</p>
Site setting	<p>The project site is located in a former commercial/industrial area</p> <p>The future land-use is to change to recreational and open space with a playground and parkland areas and a roadway</p>

#### 4.1.4 Assessment of remediation requirements

Based on the current soil and groundwater data set (2008-2020) and in conjunction with the elements of the project, the RAP identified that the PAH, lead and asbestos impacted fill materials in the project site do not warrant further remediation (other than capping) – the future risk of contaminated soil coming into contact with human or ecological receptors is considered low and does not warrant remediation for the following reasons:

- the impacts will not present an unacceptable risk to future site occupants or intrusive maintenance workers (following completion of the proposed development works);
- the lithology encountered at boreholes within this area generally consisted of fill from 1–2 m below ground level (bgl);
- the project site will be capped with a minimum of 500 mm of validated suitable clean fill below finished site levels in areas of shallow planting and other open spaces; and a minimum of 1.5 m below finished site levels in areas of tree planting, with environmentally suitable materials placed in construction garden beds/planter boxes to the final finished site levels; and the capping material will be underlain by a marker material;
- analytical results from groundwater wells for metals, PAH, BTEX, TRH and VHCs all reported concentrations below the laboratory limit of reporting; and
- the area of TRH contamination in the southernmost portion of the project site is limited in extent on-site and will be below the depth of services as 3 m of fill and capping will be placed for the construction of George Julius Avenue North.

The ‘cap and contain’ strategy outlined below will prevent PAH, lead and asbestos impacted material from coming into contact with receptors.

#### 4.1.5 Remediation strategy

The overarching remedial strategy for the project site will be the implementation of a capping layer of clean material over the contaminated fill present in the area.

The preferred strategy to achieve the remediation objectives is as follows:

- site establishment and preparatory works;
- the existing concrete slabs will be retained where possible. Where sections of the slab are removed, a suitably qualified Validation Consultant will inspect the removed slabs for asbestos and the underlying soils to assess for potentially contaminated soils (based on visual and olfactory observations and field screening of soil samples using a photoionisation detector [PID]);
- excavation and separation of any other potentially contaminated fill materials (based on visual and olfactory observations) considered to be Unexpected Find Material for separate stockpiling and validation testing to confirm if it is suitable for reuse within Gunyama Park Stage 2 and George Julius Avenue North works or will require offsite disposal;
- importation of suitable/validated imported fill to the Site to achieve the Gunyama Park, related open space final levels and George Julius Avenue North (if required) and as required for the capping material;
- once the required levels (minus the capping layer) have been achieved in the Gunyama Park, related open space areas and George Julius Avenue North, a survey of the top of fill levels will be undertaken during a detailed survey and site inspection will be conducted to confirm that the marker material meets the relevant requirements; and
- a final survey of the final finished level will be conducted to confirm that the marker and capping requirements are achieved.

The above approach is considered to be appropriate as there will be no complete exposure pathway to the underlying fill materials for future occupants of the Gunyama Park open space area and George Julius Avenue North due to the proposed capping works.

#### **4.1.6 Management and mitigation measures**

The following management and mitigation measures shall be incorporated in the environmental management plans and documents for the project:

- A material tracking plan (MTP) to allow verification of the correct movement and handling of all material during construction shall be prepared in accordance with the requirements specified in the RAP.
- An asbestos management plan shall be prepared in accordance with the requirements specified in the RAP.
- Stockpiled unexpected finds material from the excavation works shall be assessed for its suitability for reuse on-site.
- Materials deemed not suitable for reuse or which require excavation to accommodate the redevelopment works shall be assessed for off-site disposal in accordance with the NSW EPA's *Waste Classification Guidelines - Part 1: Classifying Waste*.
- Classified waste shall be taken to an appropriately licensed waste disposal facility.
- The following material handling requirements shall be implemented for trucks transporting materials off-site:
  - a licensed transporter shall be used to transport material to an appropriately licensed NSW EPA waste facility;
  - all truck loads shall be filled to the correct level, no over-filling;
  - trucks carrying waste materials shall be covered prior to exiting the project site and shall remain covered until authorised to unload at the destination (NSW EPA licensed waste facility);
  - trucks shall be fitted with seals to ensure that the movement of potentially saturated materials is undertaken appropriately;
  - the integrity of the seals shall be inspected and tested prior to commencement of each day's haulage works;
  - excess dust or load material shall be removed from vehicles prior to departure from the project site, and as such may require the use of an onsite wheel wash or spray wash or similar - in the event that materials are tracked

offsite, it shall be immediately cleaned up in a way that prevents contamination of land, the stormwater or waterways;

- trucks shall not wait in the streets surrounding or within the project site; and
  - trucks shall exit the project site through predetermined exit points and will follow a predetermined transport route to the destination (landfill) via an approved route.
- Asbestos fibre air monitoring must be carried out during times when excavation of fill materials is conducted in accordance with the *Guidance Note on The Membrane Filter Method For Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)]* and to meet the specific requirements of the RAP.
  - The validation of Unexpected Finds Material shall be conducted to assess whether it can be reused onsite in accordance with the specific requirements of the RAP.
  - If any USTs and related infrastructure are encountered during the excavation works, soil characterisation / validation sampling of the resulting excavation shall be completed in accordance with NSW EPA (2014) *Technical Note: Investigation of Service Station Sites*.
  - A validation consultant shall adopt the Data Quality Objectives (DQO) process, which have been developed based on the iterative DQO process developed by the USEPA (2000) *Guidance for the Data Quality Objectives Process - EPA QA/G-4*.
  - A validation report shall be prepared by the validation consultant on completion of remediation works in accordance with the specific requirements of the RAP.

It is concluded that upon successful implementation of the selected remediation strategy described in the RAP and in conjunction, the project site will have been made suitable for the proposed Gunyama Park – Stage 2 and George Julius Avenue North roadway.

## **4.2 Geotechnical**

A Report on Geotechnical Investigation was prepared by Douglas Partners (DP) for the project and is provided in Appendix C. The outcomes of the report are summarised below.

### **4.2.1 Assessment**

The aim of the geotechnical investigation was to assess the subsurface soil and groundwater conditions across the project site and provide comments on the relevant issues, including:

- site classification in accordance with *AS 2870:2011 Residential Slabs and Footings*;
- site preparation and earthworks;
- excavations and retaining walls;
- suggested footings systems, design parameters and estimated settlements;
- vibrations and seismic site classification;
- acid sulfate soil potential;
- soil aggressivity; and
- ground slab and pavement design parameters.

The geotechnical investigation was carried out to supplement the existing geotechnical information for the site previously obtained by DP for Council as part of GPARC Stage 1 and included the drilling of eight additional boreholes and laboratory testing of selected samples from within the project site.



## i Existing geotechnical investigations

Field work undertaken by DP in 2013/2014 included the drilling of four cored boreholes (BH1 to BH4), one augered borehole (BH5) and the completion of 12 cone penetration tests (CPT1 to CPT12). One of the CPTs (CPT10) was located within the southern part of the project site at the approximate location shown in Figure 4.2. Field work undertaken in 2015/2016 included the drilling of 21 cored boreholes (BH115, BH118, BH119, BH122, BH128 and BH130 to BH145) and the completion of 30 cone penetration tests (CPT101 to CPT130). Three of the boreholes (BH118, BH122 and BH130) and six of the CPTs (CPT117, CPT118, CPT121, CPT122, CPT123 and CPT124) were located within the project site at the locations also shown in Figure 4.2.

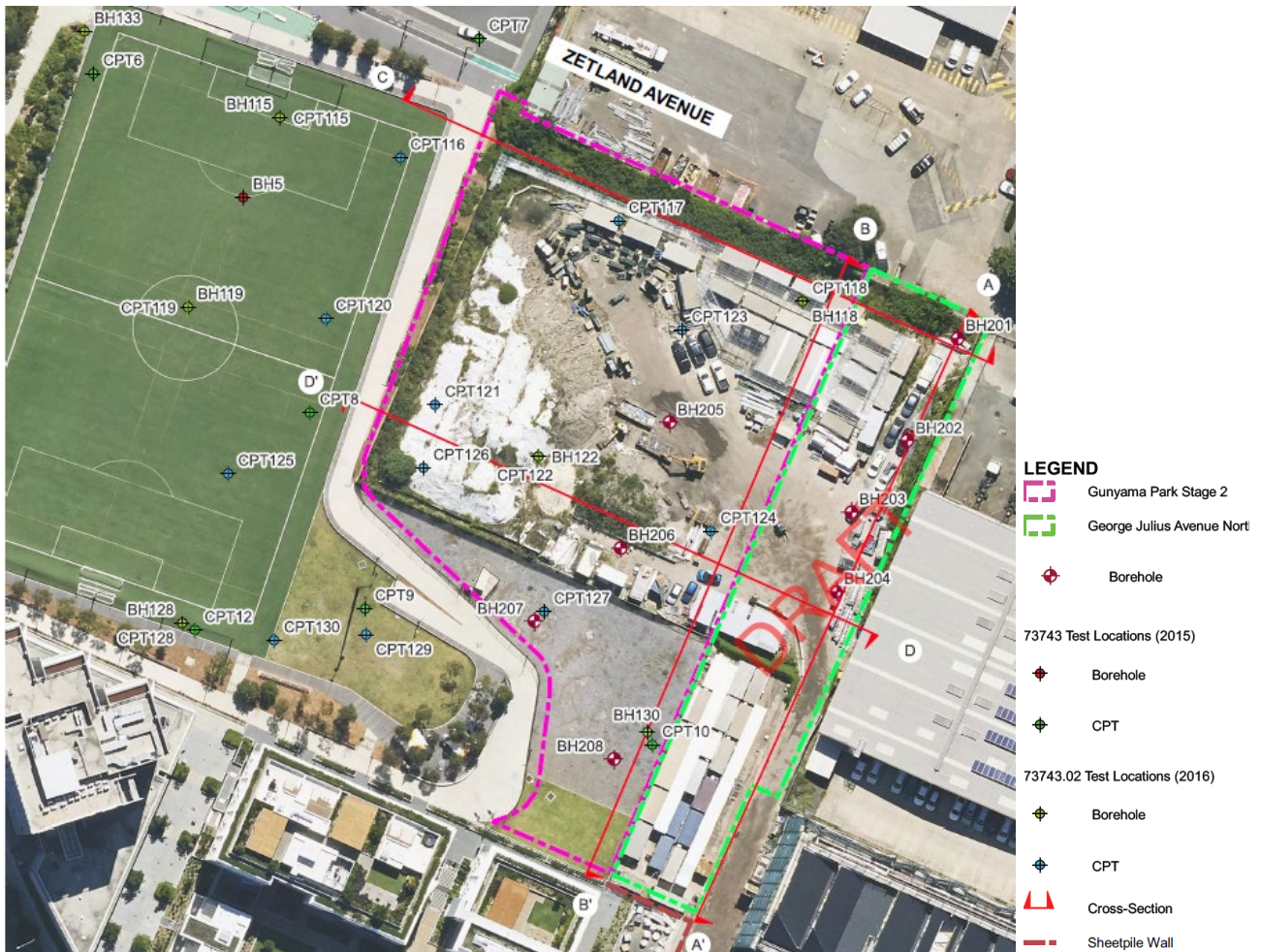


Figure 4.2 Test location plan (Source: Douglas Partners)

## ii Laboratory testing

Laboratory testing of selected disturbed and bulk samples recovered from the boreholes was carried out by NATA-accredited laboratories and consisted of:

- 10 soil aggressivity suite tests (pH, electrical conductivity, sulphate and chloride-ions);
- 20 acid sulfate soil (ASS) screening tests; and
- four, 4-day soaked, California bearing ratio (CBR) tests of subgrade bulk soil samples for pavement design parameters.

The details and results of the laboratory testing are provided on the test reports in Appendix D of the Report on Geotechnical Investigation (Appendix C of this REF).

### iii Geotechnical model

The general ground profile interpreted from the previous and current boreholes and the previous CPTs undertaken within the project site is detailed in Section 1.7.2.

## 4.2.2 Results and recommendations

### i Site classification

Due to the presence of uncontrolled, variably compacted and variable (though predominantly granular) fill to depths more than 800 mm, the site is 'Class P' as defined in AS 2870 – 2011 *Residential Slab and Footings Classification*. Slabs and footings for the development should therefore be designed in accordance with engineering principles as recommended in AS 2870.

### ii Site preparation and earthworks

As detailed in Section 2.4.2, depth of cut of up to approximately 1.0 m will be undertaken in portions of the GPARC Stage 2 site, with an additional fill of up to approximately 1.0 m proposed at the southern end of the George Julius Avenue North site.

Prior to the commencement of bulk earthworks, all debris such as old footings, buried pipes and the like, should be removed to sufficient depth to reduce the risk of inconvenience during the subsequent excavations and foundation works. The resulting excavations in areas to receive fill should be themselves backfilled to the same standard as that required for subsequent filling operations.

The area to receive fill in the southern part of the George Julius Avenue North site (i.e., which is to form the 'foundation' of the fill), should be prepared by first scarifying the surface to a minimum depth of 150 mm then moisture conditioning to within 2% of the optimum moisture content (at Standard compaction) of the existing subgrade material, before compacting the foundation to a minimum dry density ratio of 98% relative to Standard compaction. The ground surface should then be proof rolled using a minimum 12-tonne smooth drum roller in the presence of a geotechnical engineer, to check for areas of excessive deflection or heaving under rolling, which should be delineated by the engineer and treated in accordance with the advice of the geotechnical engineer. This would usually involve stripping of material to a nominal depth of approximately 600 mm and subsequently backfilling with clean granular fill compacted in maximum 300 mm (loose thickness) layers to a minimum dry density ratio of 98% relative to standard compaction.

After the foundation preparation is completed in the area to receive fill, additional fill should be placed up to the DSL in horizontal layers not exceeding 300 mm loose thickness, with each layer compacted to a minimum dry density ratio of 98% Standard. It is recommended that the upper 0.5 m of fill subgrade to support the pavement (particularly where truck or other heavy vehicle movements are anticipated) be compacted to a minimum dry density ratio of 100% Standard. Where the fill material used is clayey, moisture content within the fill should be maintained within 2% of OMC (where OMC is the optimum moisture content at standard compaction) during and after compaction.

Where sloping ground greater than 8H:1V forms the foundation for the engineered fill, the foundation of the fill should be further prepared but cutting in level benches with a minimum vertical height of 0.3 m to ensure compaction and interlocking, and to reduce the potential for instability between the existing soils and any newly placed controlled fill.

From an engineering perspective, it is possible that the existing fill material to be stripped from the northern half of the GPARC Stage 2 site may be made suitable for re-use in an engineered fill, provided it is screened to remove all unsuitable and oversize (ie greater than 100 mm) material.

For the section of existing subgrade for the proposed road pavement that is close to the DSL in the northern part of the George Julius Avenue North site, there will be an elevated risk of future pavement distress and reduced life due to the uncontrolled and variably compacted nature of the existing subgrade fill. Accordingly, the following options are suggested to manage the risks associated with the existing uncontrolled fill:

- **Low Level of Potential Risk** – The option with maximum additional work but generally the lowest risk (of poor pavement performance) is to remove all the existing fill and test roll the underlying natural ground for soft or loose conditions. The fill material should then be screened to remove all coarse, oversize or deleterious material prior to replacement in layers of maximum 300 mm 'loose' thickness up to the required DSL. Each fill layer should be compacted under a 'Level 1'

inspection and testing regime in accordance with AS 3798. Complexities with this approach include the possible need to undertake temporary dewatering to lower the groundwater table, so as to allow excavation and removal of material to typical depths of 3-3.5 m, which depending on the preceding weather conditions may be below the groundwater table.

- **Intermediate Level of Risk** – It follows from the above that varying thicknesses of the existing fill may be removed, screened and recompacted (as for 'Low Level Risk' above), leaving an existing thickness of 'uncontrolled' fill in place (after proof rolling with a 12-tonne roller), with an inherent mid-level of risk of future subgrade movement. For example, excavation to 1.0 m below the design subgrade level followed by proof rolling (and geotechnical inspection) and replacement using granular (sand and/or gravel) material compacted in layers, as described above, should significantly reduce the risk of long-term pavement problems.

### iii Excavations

Excavations for the proposed structures and any remediation works required on the GPARC Stage 2 site are likely to be limited to less than 2 m depth. Excavation will therefore primarily be required within fill and soils above the groundwater table which should be readily achievable using conventional earthmoving equipment such as a hydraulic excavator with bucket attachment, or bulldozers. The use of a hydraulic rock hammer or impact breaker will generally be required to break up surface concrete slabs and any buried obstructions like remnant footings, tanks or concrete slabs.

### iv Excavation and support

Vertical excavations in the existing fill and soil are not expected to be self-supporting. Temporary batters are expected to be feasible for supporting excavations on the site and should be not steeper than 1.5H:1V for cuts up to 3 m depth. Where temporary batters are not suitable, temporary and permanent retaining structures should be subjected to earth pressures from the ground surface down to the base of the excavation.

### v Footings and foundations

In general, footings for any structure should be found on a bearing stratum with uniform engineering properties to reduce the risk of excessive differential settlements. For this reason, it is considered that the existing uncontrolled fill is generally not suitable for the (foundation) support of permanent structures.

Piles founded within the medium dense (or denser) sands, below the existing fill, could be used to support lightly loaded structures, such as the amenities building.

### vi Acid sulfate soils

Acid sulfate soils (ASS) are commonly used to label soils and sediments that contain iron sulfides, which, when oxidised by draining or exposure to air, form sulfuric acid. The main form of iron sulfide present is pyrite or iron di-sulfide ( $\text{FeS}_2$ ). Monosulfides are also found in certain circumstances.

It is noted that ASS, although commonly associated with estuarine muds and clays, may have any texture and are also found in sands and gravel beds. They may also be found in inland locations.

Acid sulfate soils are further subdivided into 'actual' and 'potential' ASS as follows:

- **Actual acids sulfate soils (AASS)** - are soils that are rich in sulfides already exposed to oxidation. These soils have pH values of 4 or less and are often identifiable by the presence of yellow (straw coloured) mottlings and irregular coatings, typical of the mineral jarosite.
- **Potential acid sulfate soils (PASS)** - are soils rich in sulfides that have not been exposed to air or oxidation. Their field pH values are generally greater than 4 and are commonly neutral (pH 7) or slightly alkaline. Any lowering of the water table, or exposure to air through excavation, will result in PASS generating acid and becoming ASS.

The results for ASS field screening tests were compared to the following criteria given in the relevant guidelines (see references given in Section 10 of the Report on Geotechnical Investigation (Appendix C of this REF)):

- For pH<sub>F</sub> (pH in water):
  - $\text{pH}_F \leq 4$  indicates AASS are present.
  - $4 < \text{pH}_F < 5.5$  indicates the soil is acidic. This may be because of limited oxidation of sulfides but may also be because of the presence of organic acids.
- For pH<sub>FOX</sub> (pH in hydrogen peroxide):
  - $\text{pH}_{\text{FOX}} < 3$ , plus a strong reaction with peroxide, plus a  $\text{pH}_{\text{FOX}}$  value of at least one pH unit below  $\text{pH}_F$ , strongly indicates a PASS. The higher the reaction, the lower the drop between  $\text{pH}_F$  and  $\text{pH}_{\text{FOX}}$ , and the lower the  $\text{pH}_{\text{FOX}}$  value, the higher the potential for PASS.
  - $3 < \text{pH}_{\text{FOX}} < 4$  is less positive.
  - $4 < \text{pH}_{\text{FOX}} < 5$  is neither positive nor negative, as some sulfides may be present in small quantities.
  - $\text{pH}_{\text{FOX}} > 5$  and little or no drop from  $\text{pH}_F$  to  $\text{pH}_{\text{FOX}}$  indicate little net acid generating ability. Acid generation can be buffered, however, by carbonate material in the samples (such as shell fragments).

Based on the screening test results and the soil descriptions given in the borehole logs, it is considered that PASS is likely to be present within the project site soils.

While dewatering may not be required for the proposed development, given that PASS have been identified at the site and significant bulk earthworks are proposed, it is considered that an Acid Sulfate Soils Management Plan (in accordance with Acid Sulfate Soils Management Advisory Committee, Acid Sulfate Soils Manual, 1998) is required for the project.

The preparation of an Acid Sulfate Soils Management Plan is included in the requirements of the Remedial Action Plan.

#### **vii Soil aggressivity**

Results of chemical laboratory testing indicate that the fill present at the site is generally 'non-aggressive' to both buried concrete and buried steel.

Appropriate allowances for concrete cover, concrete strength, steel-section loss and steel protection requirements should be made in the design of buried structural elements, such as piles.

#### **viii Pavements**

The uncontrolled fill on the site should require site preparation to be made suitable for supporting pavements.

### **4.2.3 Management and mitigation measures**

The following geotechnical management and mitigation measures shall be implemented during construction and incorporated in the relevant environmental management plans as required:

- Slabs and footings shall be designed in accordance with engineering principles as recommended in AS 2870 – 2011.
- Site preparation and earthworks shall be undertaken in accordance with the methodology outlined in Section 9.2 of the Report on Geotechnical Investigation prepared by Douglas and Partners, dated September 2023.
- Site excavations shall be undertaken in accordance with the methodology outlined in Section 9.3 of the Report on Geotechnical Investigation prepared by Douglas and Partners, dated September 2023.
- Any off-site disposal of spoil will generally require assessment for re-use or classification in accordance with the NSW EPA's *Waste Classification Guidelines*.
- Temporary batters and permanent structures shall be provided as required in accordance with the methodology outlined in Section 9.5 of the Report on Geotechnical Investigation prepared by Douglas and Partners, dated September 2023.

- Footings and foundations shall be designed and constructed in accordance with the methodology and design parameters provided in Section 9.6 (and Table 5) of the Report on Geotechnical Investigation prepared by Douglas and Partners, dated September 2023.
- Structural design shall accord with Australian Standard AS 1170.4 – 2007 *Structural design actions – Part 4: Earthquake actions in Australia*.
- An Acid Sulfate Soils Management Plan shall be prepared in accordance with the *Acid Sulfate Soils Management Advisory Committee, Acid Sulfate Soils Manual, 1998*.
- Appropriate allowances for concrete cover, concrete strength, steel-section loss and steel protection requirements should be made in the design of buried structural elements, such as piles.
- The uncontrolled fill on the site shall include site preparation to be made suitable for supporting pavements, as detailed in Section 9.2 of the Report on Geotechnical Investigation prepared by Douglas and Partners, dated September 2023

## 4.3 Flooding

A temporary flood detention basin was provided under the GPARC Stage 1 works within the road reserve of the future George Julius Avenue. The drainage basin was constructed to manage the flood impacts of GPARC under the interim development scenario for the Epsom Park Precinct as outlined the Hydrostorm Consulting letter dated 11 April 2017 (refer Appendix D). The temporary detention basin will be filled with excavated site soil as part of the project.

### 4.3.1 Assessment

Hydraulic modelling was undertaken to assess the impact of providing a detention basin in the future George Julius Avenue North road reserve, to service the following interim development (now mostly completed):

- Gunyama Park Aquatic Centre and Gunyama Park (including GPARC Stage 2);
- Meriton Development;
- Rose Valley Way (developed beside Merton site);
- Part Zetland Avenue;
- Raised Joynton Avenue
- Council Depot site (re-developed);
- Rose Valley Way (developed beside Council Depot site);
- Sydney Water Trunck Drain (completed).

The location of the detention basin and the interim development is shown in Figure 4.4 below.

The flow which arrives at the basin is drained via pit and pipe arrangement to the Green Square Trunk Drain (GSTD). The basin is located within an easement along the eastern boundary of GPARC Stage 2, within the road reserve of the future George Julius. The basin width is half the width of the road reserve (approximately 11 m). The length of the basin along the George Julius Avenue is approximately 40 m. Hydraulic modelling was undertaken to verify the above size of the basin.

### 4.3.2 Modelling results

Hydraulic modelling was undertaken using Council’s existing model for the Alexandra Canal catchment. The model is based on a 4 m grid and utilises the rainfall-on-grid or direct rainfall approach for modelling of design flood events.

The proposed flood management measure of a basin with pipe drainage along the eastern boundary of Gunyama Park provides a concept to manage the impact of GPARC (Stage 1 and 2) under the interim development scenario. The modelling was undertaken for the 100 yr 2-hour flood event. The results show that the proposed GPARC (Stage 1 and 2), when considered within the interim development scenario of Epsom Park, does not have an adverse impact on the surrounding properties. The flood levels in fact reduce by approximately 0.2 m for the properties to the east of the proposed basin.

Figure 4.3 shows the modelled interim development scenario without the basin and Figure 4.4 shows the same scenario with the basis for the 100 year 2-hour flood event.

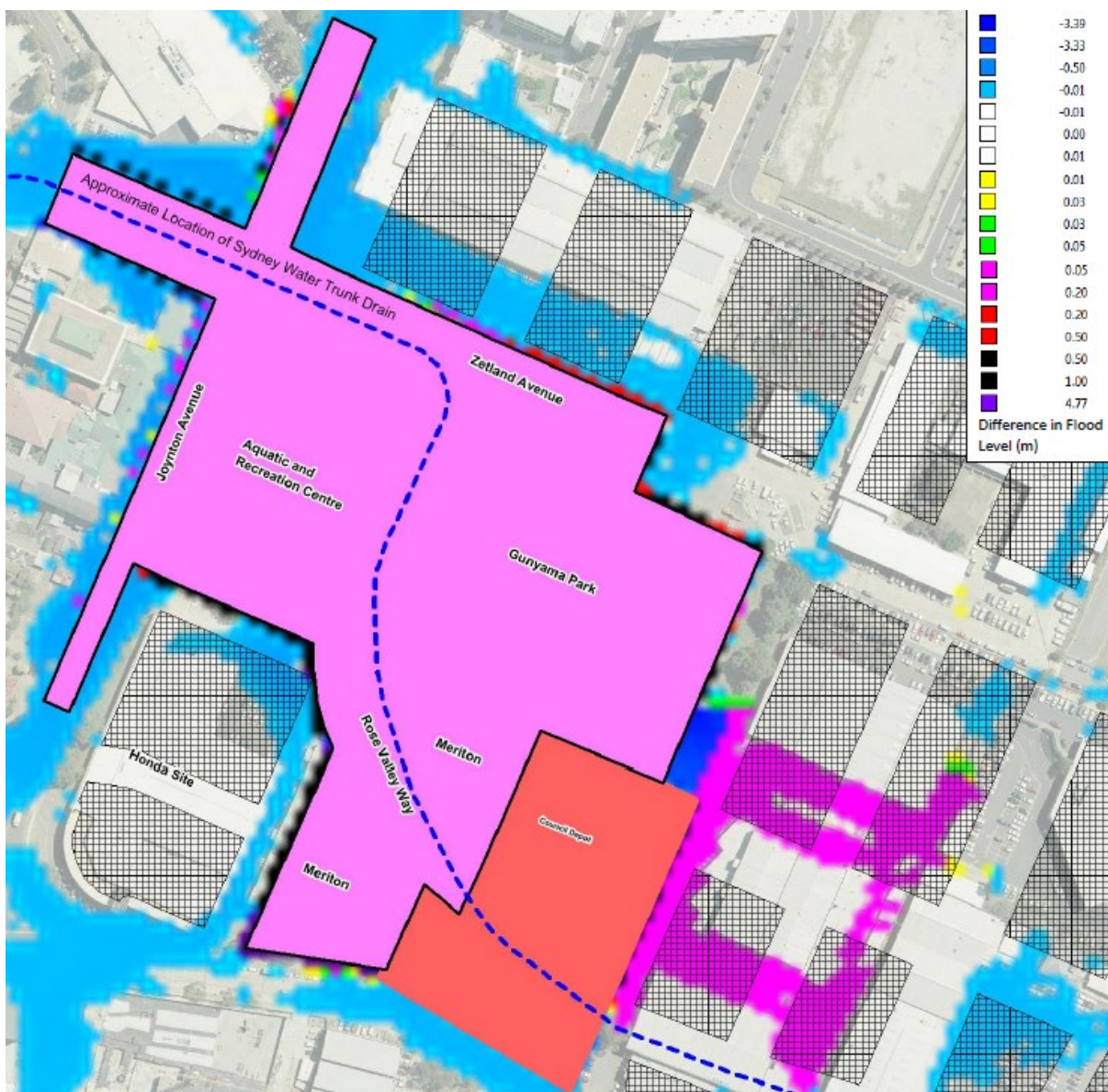


Figure 4.3 Modelled interim development scenario without the basin – 100 yr flood event (Source: Hydro Storm)

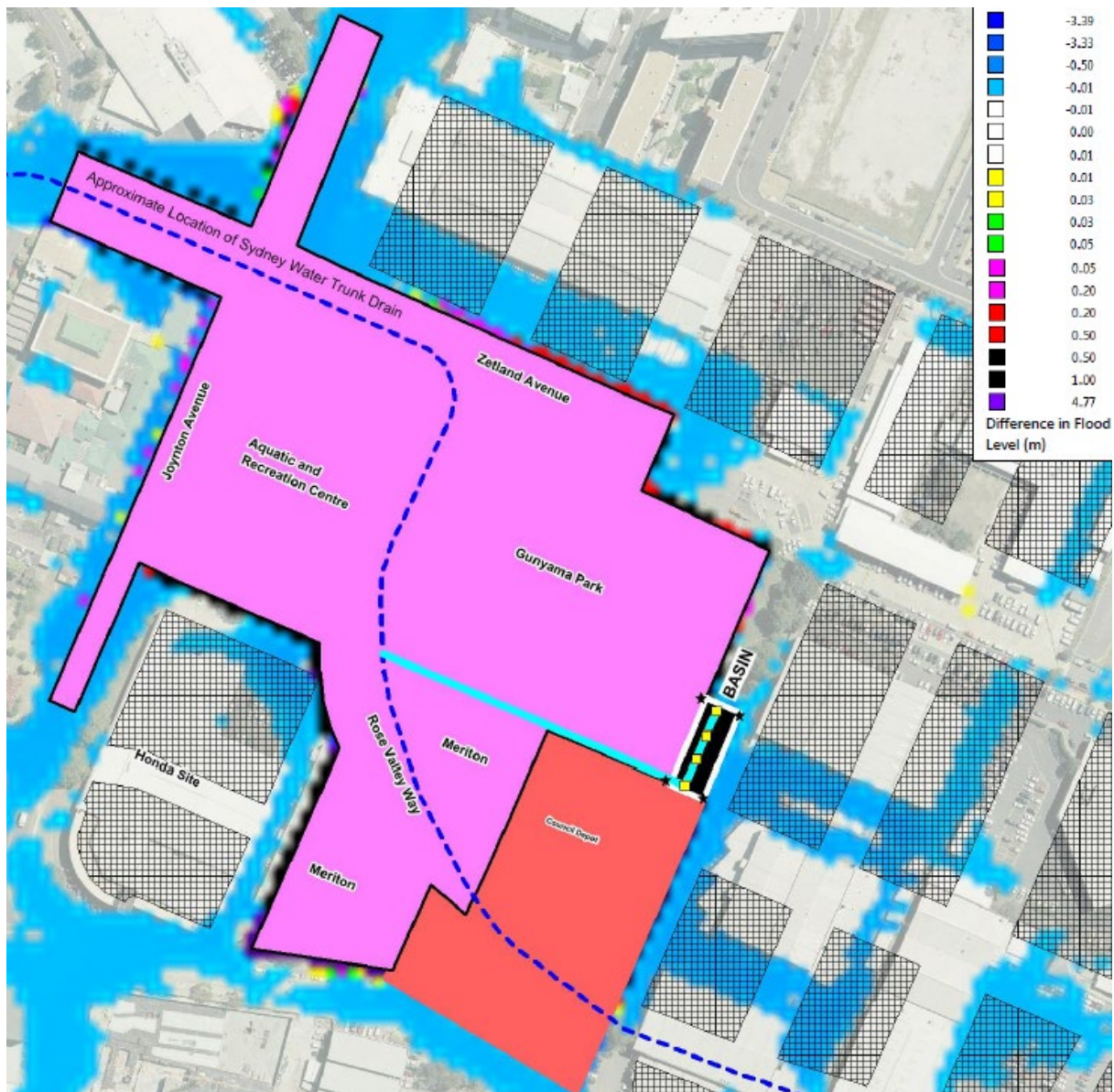


Figure 4.4 Modelled interim development scenario with the basin – 100 yr flood event (Source: Hydro Storm)

### 4.3.3 Management and mitigation measures

The following management and mitigation measures were implemented:

- A temporary drainage arrangement was provided to the east of GPARC Stage 2 and constructed in accordance with the drainage details provided in the *Guryama Park Aquatic and Recreation Centre Flood Investigations - Interim Development Scenario - Modified Flood Management Option – Drainage Reserve at George Julius Avenue*, prepared by Hydro Storm Consulting, dated 11 April 2017.
- The flood management measure of a basin with pipe drainage along the eastern boundary of Guryama Park provides a concept to manage the impact of GPARC under the interim development scenario.

## 4.4 Traffic, parking and road safety

The potential construction and operational traffic and parking impacts of the project are considered below.

#### **4.4.1 Construction traffic**

Construction traffic associated with the project will occur during the approximate 15-18 month construction phase, with the delivery of materials and the daily workforce. Peak hour construction traffic has been calculated with a predicted peak of up to 13 vehicle trips per day consisting of 8 light vehicles and 5 heavy vehicles.

The site is well serviced by road infrastructure with direct links to local, state and regional roads. Overall, given the relatively short duration of construction works and the relatively low level of construction traffic generated by the project, it is considered that there will be a negligible impact to the surrounding road network and there is adequate space on site to temporarily accommodate a construction compound with an associated parking area for the workforce.

Notwithstanding, construction traffic management measures will be incorporated in the CEMP, including site access and parking arrangements, detailed scheduling and staging of the construction activities, as well as the measures set out in Section 4.5 to mitigate and manage construction noise impacts.

#### **4.4.2 Operational traffic**

A Transport Assessment was prepared by GTA consultants to accompany the development application (D/2016/824) for the GPARC – Stage 1. The assessment included the project site as part of the assessment and considered modelling undertaken to 2031. It is therefore relevant to the project. A copy of the Transport Assessment is provided in Appendix E and the outcomes are summarised below.

##### **i Transport context**

GPARC is located within the Epsom Park Precinct in Zetland, which forms part of the broader Green Square development area. The site is planned to be highly accessible by walking, cycling and public transport services with limited car parking, which is generally in accordance with the City of Sydney's Green Square development objectives. Future surrounding land uses will predominantly consist of high density residential with ground floor retail/commercial uses, with Green Square Town Centre (GSTC) located to the west, which will further support reduced reliance on private vehicle transport.

##### **ii Traffic volumes**

Based on reports available at the time, the Transport Assessment identified that that the Epsom Park Precinct generated a total of 585 vehicle movements during the weekday AM peak hour, 452 during the weekday PM and 276 on a Saturday.

##### **iii Future road network relevant to the project**

The Transport Assessment identified that George Julius Avenue will provide a key north-south link along the eastern boundary of Gunyama Park. It will be a key future traffic route through Epsom Park Precinct linking Epsom Road with Zetland Avenue and Defries Avenue further to the north. The key intersections along the length of George Julius Avenue will be signalised on account of the anticipated future traffic volumes.

##### **iv Traffic assessment**

The Transport Assessment refers a report prepared by Council in 2014, which estimated the traffic generation of the GPARC site based on a series of mode split assumptions and traffic generated by the Ian Thorpe Aquatic Centre and the Cook + Phillip Park Aquatic and Leisure Centre, summarised as follows:

- 50% of visitors would be locals residing in the immediate surrounding precincts and 50% from the outer Green Square area;
- all local visitors to travel by non-car modes;
- 60% of visitors from the outer area to be by non-car modes;
- average of 2 people per car; and



- less than 20% of daily visits occurring in any peak hour.

The 2014 Council report concluded that GPARC will generate low traffic volumes; 15 vehicle trips in the AM peak and 30 vehicle trips in the PM peak.

Given the site will not provide off-street parking, all site-specific traffic will be associated with the on-street car parking spaces. The Transport Assessment detailed the impact of some 65 trips during the PM peak hour and will be more aligned with future travel modes, where increased use of active/sustainable travel will lessen traffic associated with the site.

The Transport Assessment identified that in 2031 the future Joynton Avenue/Zetland Avenue intersection will operate close to capacity in peak periods, noting that this is a realisation of other traffic generating uses within the Epsom Park Precinct and will not be solely due to the contribution of the GPARC site, which will in fact lessen in traffic impact by 2031 due to anticipated travel mode shift.

#### v Parking assessment

The Transport Assessment included a precinct wide parking assessment, which identified the following potential future parking provision:

- there will be approximately 60 parking spaces available within 100 m walking distance from the Aquatic Centre entrance;
- there will be approximately 105 parking spaces available between 100-200 m walking distance from the Aquatic Centre entrance;
- there is potential for approximately 315 spaces outside a 200 m walk from the Aquatic Centre entrance for visitors to park; and
- a set-down/ pick-up area and four accessible parking spaces will be provided along Zetland Avenue close to the Aquatic Centre entrance.

Based on the above, it was considered that, in the short term, there will be some impact on nearby on street parking, but as the area develops into a higher density region, the reliance on vehicular transport will shift to adopt more sustainable transport methods and the impact on the surrounding streets car parking due to the GPARC will reduce.

#### 4.4.3 Road safety

A Road Safety Audit (RSA) was prepared by TTPP for the project and is provided in Appendix F.

The RSA presents road safety audit findings for the extension of George Julius Avenue between Zetland Avenue and Peters Street, Zetland and identifies several 'low risk' road safety deficiencies that could be modified in order to improve safety.

The RSA will form part of the following environmental management plans and work procedures identified in Section 5.1 this REF.

### 4.5 Other environmental aspects

An assessment of the environmental aspects as a consequence of the project (other than those addressed in the preceding sections) is provided in Table 4.3. This method of assessment is commensurate with the low levels of projected impacts arising from the project on each of these aspects.

**Table 4.3 Other environmental aspects**

Environmental aspect	Details
Noise	The project will require construction activities which have the potential to generate noise. Construction hours will be restricted to the following as recommended in the NSW EPA's Draft Construction Noise Guideline 2020 (DCNG 2020): <ul style="list-style-type: none"> <li>• Monday to Friday - 07:00 to 18:00</li> </ul>

**Table 4.3 Other environmental aspects**

Environmental aspect	Details
	<ul style="list-style-type: none"> <li>• Saturday - 08:00 to 13:00</li> <li>• Sundays and public holidays - Nil</li> </ul> <p>The characteristics of the noise associated with construction are low level in terms of potential annoyance and related to general construction activities such as the use of power tools and the reversing alarms of trucks. Potential construction noise impacts will be limited, given the restriction on construction hours, and background road traffic noise.</p> <p>Notwithstanding, the following standard construction noise management and mitigation measures will be incorporated in the CEMP and will be implemented to reduce potential impacts on all surrounding receivers:</p> <ul style="list-style-type: none"> <li>• plant shall be operated in a conservative manner (no over-revving) and shutdown when not in use;</li> <li>• the quietest suitable machinery shall be available for each activity;</li> <li>• noisy plant/machinery shall not be operated simultaneously, and noise impacts will be minimised where practicable;</li> <li>• broadband reverse alarms shall be utilised in lieu of the traditional high frequency type reverse alarm;</li> <li>• toolbox meetings, training and education shall be provided to drivers and contractors visiting the site during construction, so they are aware of the location of noise sensitive receivers and to be cognisant of any noise generating activities;</li> <li>• signage shall be placed at the front entrance advising truck drivers of their requirement to minimise noise both on and off-site; and</li> <li>• project related community consultation forums shall be utilised where necessary to notify residences within proximity of the site with project progress, proposed/upcoming potentially noise generating works, its duration and nature and complaint procedure.</li> </ul> <p>With the management and mitigation measures proposed, there are not expected to be any significant adverse noise impacts from construction of the project.</p> <p>Once construction works have been carried out and the recreation area becomes operational, the new recreation area will be used by residents and visitors for public open space and recreational purposes (eg children using the new playground) during day-time hours only. The project is not expected to generate any discernible noise above existing background noise levels.</p>
Air quality	<p>Potential air quality impacts will comprise dust generation and vehicle/machinery emissions during construction. These impacts will be limited to the following construction hours:</p> <ul style="list-style-type: none"> <li>• Monday to Friday - 07:00 to 18:00</li> <li>• Saturday - 08:00 to 13:00</li> <li>• Sundays and public holidays - Nil</li> </ul> <p>Specific air quality management and mitigation measures (eg progressive excavation of topsoils, dust suppression with water during construction etc) will be incorporated in the CEMP.</p>
Heritage	<p><u>Historic heritage</u></p> <p>The site is highly disturbed and will not impact any known items of historic heritage.</p> <p><u>Aboriginal heritage</u></p> <p>The site is highly disturbed and there are no records of any known Aboriginal objects. Notwithstanding, the following management and mitigation measures shall be implemented as required during construction:</p> <ul style="list-style-type: none"> <li>• If suspected Aboriginal objects, such as stone artefacts are located during future works, works shall cease in the affected area and an archaeologist called in to assess the finds. If the finds are found to be Aboriginal objects, Heritage NSW must be notified under Section 89A of the NSW <i>National Parks and Wildlife Act 1974</i> (NPW Act). Appropriate management and avoidance or approval under a Section 90 AHIP shall then be sought if Aboriginal objects are to be moved or harmed; and</li> <li>• In the unlikely event that human remains are found, works shall immediately cease, and the NSW Police shall be contacted. If the remains are suspected to be Aboriginal, Heritage NSW may also be contacted at this time to assist in determining appropriate management.</li> </ul> <p>With the implementation of the proposed management and mitigation measures, it is considered that any potential adverse impacts to Aboriginal heritage that may arise as a result of the project will be avoided.</p>
Stormwater, soil and erosion control	<p>Standard erosion and sediment controls, including the requirement for a Soil and Erosion Sediment Control Plan and an Acid Sulfate Soils Management Plan will be incorporated in the CEMP.</p>

**Table 4.3 Other environmental aspects**

Environmental aspect	Details
Waste management	<p>The project will generate waste during the construction and operational phases.</p> <p>Construction activities will require the use of several resources, including:</p> <ul style="list-style-type: none"> <li>• material required for paving, edges and walls, seating, surfacing, such as asphalt, concrete, rubber softfall and play mulch;</li> <li>• material required for the construction of the road;</li> <li>• material required for the construction of the play equipment;</li> <li>• landscaping including the species listed in the planting schedule; and</li> <li>• construction water and other operational construction resources.</li> </ul> <p>Whilst construction of the project will result in some increased demand on local and regional resources, the development alone will not result in any resource becoming scarce or in short supply within the local or greater regional area. Resource requirements, particularly for water and general construction materials, will be determined by the contractor as detailed design progresses.</p> <p>The management of waste during the construction phase will be undertaken in accordance with the objectives of the <i>NSW Waste Avoidance and Resource Recovery Act 2001</i>.</p> <p>Construction wastes will include concrete paving, redundant play structures, building materials, scrap metal and cabling material, trees, shrubs and topsoils. Waste produced during construction will be disposed of at an appropriately licensed waste facility.</p> <p>In accordance with the <i>NSW Protection of the Environment Operations Act 1997</i> (POEO Act) and associated waste classification guidelines, most waste will be classified as building and demolition waste within the class general solid waste (non-putrescibles).</p> <p>Most of the waste generated by the project will either be recycled or disposed off-site as general solid waste, depending on its type.</p> <p>Construction waste management measures will be incorporated in the CEMP, to address all waste materials likely to result from the project with details of the estimated waste volumes, onsite storage and management, proposed re-use of materials, designated waste contractors, and identification of landfill sites and suitably licenced waste facilities.</p> <p>In relation to operational waste, a series of bins will be located throughout the project site for both general waste and recycling. Waste collection will be undertaken by Council as part of their ongoing maintenance of the area.</p>
Biodiversity	<p>The project site is highly disturbed and does not contain any vegetation. The project will result in significant landscaping and tree planting providing a net improvement to the biodiversity values of the project site.</p>

## 5 Environmental management

Management and mitigation measures have been identified in this REF to minimise adverse environmental impacts from the project. These management and mitigation measures will be implemented during the construction and operation of the project.

### 5.1 Environmental management plans and work procedures

The following environmental management plans and work procedures will be prepared for the proposed development works at the project site:

- Remedial Action Plan;
- Road Safety Audit;
- Construction Environmental Management Plan (refer Section 5.2 below);
- Long Term Environmental Management Plan (refer Section 5.3 below);
- Occupational Health and Safety Plan;
- Asbestos Management Plan;
- Acid Sulfate Soils Management Plan;
- Material Tracking Plan;
- Quality Management Plan; and
- Validation Report.

### 5.2 Construction environmental management plan

A construction environmental management plan (CEMP) shall be prepared by the contractor to describe management and mitigation measures identified in this REF during construction of the project, including in relation to the following:

- construction traffic management;
- road safety;
- erosion and sediment control;
- acid sulfate soils management;
- an unexpected finds protocol;
- construction noise management;
- construction air quality management; and
- construction waste management.

The CEMP will provide a framework for establishing how these measures will be implemented and approved by Council prior to any site works commencing. The CEMP will be a working document, subject to ongoing change and updated as necessary to respond to specific requirements. The CEMP will be developed in accordance with Council specifications, requirements of this REF, and the requirements of any other relevant environmental assessments.

### **5.3 Long term environmental management plan**

JBS&G Australia Pty Ltd (JBS&G) prepared a long term environmental management plan (LTEMP) for the Gunyama Park Aquatic and Recreation Centre (GPARC - Stage 1).

The objective/purpose of the LTEMP is to ensure the ongoing suitability of the site for recreational use as aquatic centre, public park and sports playing field facilities via identification and maintenance of cap/cover measures that form a physical barrier to the underlying contaminated soil present at depth beneath the site. It is anticipated that this LTEMP will operate for the life of the constructed facilities to protect the health and safety of personnel who visit and/or work on the site, and to protect the environment – both on-site and off-site.

The LEMP will be updated to incorporate the project.

### **5.4 Management and mitigation measures**

Management and mitigation measures identified in the environmental assessment will minimise potential adverse impacts on the surrounding environment and the community and will be undertaken during the construction and operational stages of the project. These measures are detailed in Table 5.1.

**Table 5.1 Management and mitigation measures**

Aspect	Measure
General	The project must be carried out generally in accordance with this REF and the detailed design drawings provided in Appendix A.
Construction management	<p>A CEMP shall be prepared by the contractor to describe management and mitigation measures identified in this REF during construction of the project, which will incorporate management measures in relation to the following:</p> <ul style="list-style-type: none"> <li>• construction traffic management;</li> <li>• road safety;</li> <li>• erosion and sediment control;</li> <li>• an acid sulfate soils management;</li> <li>• an unexpected finds protocol;</li> <li>• construction noise management;</li> <li>• construction air quality management; and</li> <li>• construction waste management.</li> </ul>
Environmental management	The current Long Term Environmental Management Plan for GPARC - Stage 1 shall be updated to incorporate the project.
Demolition and earthworks	<p>All excavated materials shall be managed under the following hierarchy:</p> <ul style="list-style-type: none"> <li>• reuse as engineered fill on-site;</li> <li>• store on-site to allow for its future reuse;</li> <li>• transfer to another construction site for use as engineering fill; and</li> <li>• test and take to a licenced waste recovery site.</li> </ul> <p>Any materials reused on-site, or imported to site from another live development, shall be subject to testing and waste classification. No fill material shall be imported to the site until such time as a validation certificate (with a copy of any report forming the basis for the validation) for the fill material has been provided and approved by Council.</p> <p>Materials which do not meet the soil validation criteria and/or are deemed not suitable for reuse at the Site will be assessed for off-site disposal in accordance with the NSW EPA (2014) Waste Classification Guidelines.</p> <p>Topsoil and subsoil shall be stored appropriately to ensure management of any leaching, erosion, sediment dispersion, dust dispersion and acid sulfate soil risks and impact on the surrounding environment.</p> <p>Earthworks shall be carried out in accordance with Australian Standard 3798-2007 <i>Guidelines on earthworks for commercial and residential developments</i>.</p>
Remediation	<ul style="list-style-type: none"> <li>• A material tracking plan (MTP) to allow verification of the correct movement and handling of all material during construction shall be prepared in accordance with the requirements specified in the Remedial Action Plan, prepared by AECOM, dated 28 August 2023.</li> <li>• An asbestos management plan shall be prepared in accordance with the requirements specified in the Remedial Action Plan, prepared by AECOM, dated 28 August 2023.</li> <li>• Stockpiled unexpected finds material from the excavation works shall be assessed for its suitability for reuse on-site.</li> </ul>

**Table 5.1 Management and mitigation measures**

Aspect	Measure
	<ul style="list-style-type: none"> <li>• Materials deemed not suitable for reuse or which require excavation to accommodate the redevelopment works shall be assessed for off-site disposal in accordance with the NSW EPA's <i>Waste Classification Guidelines - Part 1: Classifying Waste</i>.</li> <li>• Classified waste shall be taken to an appropriately licensed waste disposal facility.</li> </ul> <p>The following material handling requirements will be implemented for trucks transporting materials off-site:</p> <ul style="list-style-type: none"> <li>• a licensed transporter shall be used to transport material to an appropriately licensed NSW EPA waste facility;</li> <li>• all truck loads shall be filled to the correct level, no over-filling;</li> <li>• trucks carrying waste materials shall be covered prior to exiting the project site and shall remain covered until authorised to unload at the destination (NSW EPA licensed waste facility);</li> <li>• trucks shall be fitted with seals to ensure that the movement of potentially saturated materials is undertaken appropriately;</li> <li>• the integrity of the seals will be inspected and tested prior to commencement of each day's haulage works;</li> <li>• excess dust or load material shall be removed from vehicles prior to departure from the project site, and as such may require the use of an onsite wheel wash or spray wash or similar - in the event that materials are tracked offsite, it shall be immediately cleaned up in a way that prevents contamination of land, the stormwater or waterways;</li> <li>• trucks will not wait in the streets surrounding or within the project site; and</li> <li>• trucks shall exit the project site through predetermined exit points and will follow a predetermined transport route to the destination (landfill) via an approved route</li> <li>• Asbestos fibre air monitoring must be carried out during times when excavation of fill materials is conducted in accordance with the Guidance Note on <i>The Membrane Filter Method For Estimating Airborne Asbestos Fibres 2nd Edition [NOHSC:3003(2005)]</i> and to meet the specific requirements of the Remedial Action Plan, prepared by AECOM, dated 28 August 2023.</li> <li>• The validation of Unexpected Finds Material shall be conducted to assess whether it can be reused onsite in accordance with the specific requirements of the Remedial Action Plan, prepared by AECOM, dated 28 August 2023.</li> <li>• If any USTs and related infrastructure are encountered during the excavation works, soil characterisation / validation sampling of the resulting excavation shall be completed in accordance with the NSW EPA's <i>Technical Note: Investigation of Service Station Sites</i>.</li> <li>• A validation consultant shall adopt the Data Quality Objectives (DQO) process, which have been developed based on the iterative DQO process developed by the USEPA (2000) <i>Guidance for the Data Quality Objectives Process - EPA QA/G-4</i>.</li> <li>• A validation report shall be prepared by the validation consultant on completion of remediation works in accordance with the specific requirements of the Remedial Action Plan, prepared by AECOM, dated 28 August 2023.</li> <li>• The ongoing future management of the site from a remedial standpoint shall be through the implementation of the site-wide LTEMP that has been put in place through the development consent for remediation works</li> </ul>
Geotechnical	<ul style="list-style-type: none"> <li>• Slabs and footings shall be designed in accordance with engineering principles as recommended in AS 2870 – 2011.</li> <li>• Site preparation and earthworks shall be undertaken in accordance with the methodology outlined in Section 9.2 of the Report on Geotechnical Investigation prepared by Douglas and Partners, dated September 2023.</li> <li>• Site excavations shall be undertaken in accordance with the methodology outlined in Section 9.3 of the Report on Geotechnical Investigation prepared by Douglas and Partners, dated September 2023.</li> </ul>

**Table 5.1 Management and mitigation measures**

Aspect	Measure
	<ul style="list-style-type: none"> <li>• Any off-site disposal of spoil will generally require assessment for re-use or classification in accordance with the NSW EPA's Waste Classification Guidelines.</li> <li>• Temporary batters and permanent structures shall be provided as required in accordance with the methodology outlined in Section 9.5 of the Report on Geotechnical Investigation prepared by Douglas and Partners, dated September 2023.</li> <li>• Footings and foundations shall be designed and constructed in accordance with the methodology and design parameters provided in Section 9.6 (and Table 5) of the Report on Geotechnical Investigation prepared by Douglas and Partners, dated September 2023.</li> <li>• Structural design shall accord with Australian Standard AS 1170.4 – 2007 <i>Structural design actions – Part 4: Earthquake actions in Australia</i>.</li> <li>• An Acid Sulfate Soils Management Plan shall be prepared in accordance with the Acid Sulfate Soils Management Advisory Committee, <i>Acid Sulfate Soils Manual</i>, 1998.</li> <li>• Appropriate allowances for concrete cover, concrete strength, steel-section loss and steel protection requirements should be made in the design of buried structural elements, such as piles.</li> <li>• The uncontrolled fill on the site shall include site preparation to be made suitable for supporting pavements, as detailed in Section 9.2 of the Report on Geotechnical Investigation prepared by Douglas and Partners, dated September 2023.</li> </ul>
Work health and safety	<p>Work Health and Safety (WHS) signage shall be installed at the project site entrance detailing the location of the site offices, construction/excavation works, first aid facilities and parking. Traffic restrictions shall be installed to limit access further into the project site and ensure the safety of visitors.</p> <p>Signage at the main gate will include after-hours contact details. Additional signage will be erected along exclusion zone boundaries to restrict access to these areas to authorised personnel only.</p>
Construction traffic	<p>Construction traffic management measures shall be incorporated in the CEMP, which will contain details of site access and parking arrangement, detailed scheduling and staging of the construction activities.</p>
Aboriginal heritage	<p>If suspected Aboriginal objects, such as stone artefacts are located during future works, works must cease in the affected area and an archaeologist called in to assess the finds. If the finds are found to be Aboriginal objects, Heritage NSW must be notified under Section 89A of the NPW Act. Appropriate management and avoidance or approval under a Section 90 AHIP shall then be sought if Aboriginal objects are to be moved or harmed.</p> <p>In the unlikely event that human remains are found, works shall immediately cease, and the NSW Police shall be contacted. If the remains are suspected to be Aboriginal, Heritage NSW may also be contacted at this time to assist in determining appropriate management.</p>
Noise	<p>The CEMP will describe in detail the construction phases, programme, processes and equipment used, noise impact assessment and proposed mitigation measures, including that:</p> <ul style="list-style-type: none"> <li>• plant shall be operated in a conservative manner (no over-revving) and shutdown when not in use;</li> <li>• the quietest suitable machinery shall be available for each activity;</li> <li>• noisy plant/machinery shall not be operated simultaneously, and noise impacts will be minimised where practicable;</li> <li>• broadband reverse alarms shall be utilised in lieu of the traditional high frequency type reverse alarm;</li> <li>• toolbox meetings, training and education shall be provided to drivers and contractors visiting the site during construction, so they are aware of the location of noise sensitive receivers and to be cognisant of any noise generating activities;</li> <li>• signage shall be placed at the front entrance advising truck drivers of their requirement to minimise noise both on and off-site; and</li> </ul>



**Table 5.1 Management and mitigation measures**

Aspect	Measure
	<ul style="list-style-type: none"><li>project related community consultation forums shall be utilised where necessary to notify residences within proximity of the site with project progress, proposed/upcoming potentially noise generating works, its duration and nature and complaint procedure.</li></ul>
Stormwater, soil and erosion control	Standard erosion and sediment controls, including the requirement for a Soil and Erosion Sediment Control Plan and an Acid Sulfate Soils Management Plan will be incorporated in the CEMP.

## 6 Conclusion

The project has been assessed under Division 5.1 of the EP&A Act and the REF has examined and taken into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed activity.

The project will provide a new, high-quality recreation area and new road that meets the needs of the local community and the relevant strategic directions of Council. Potential adverse impacts to the community and the environment will be adequately addressed through the implementation of a comprehensive suite of management and mitigation measures.

It has been demonstrated in this REF that, with the implementation of the proposed management and mitigation measures, the project is unlikely to cause significant adverse impacts on the community or the environment and, therefore, an environmental impact statement (EIS) is not required.

The project will not significantly affect threatened species or ecological communities, or their habitats and therefore a species impact statement (SIS) or biodiversity development assessment report (BDAR) is not required under the NSW *Biodiversity Conservation Act 2016*.

For these reasons, it is recommended that the project may proceed subject to the implementation of the proposed management and mitigation measures set out in this REF and an EIS, SIS and/or BDAR is not required.

## References

AECOM, 2023, *Remedial Action Plan – Gunyama Park Stage 2 and George Julius Avenue North – Zetland, NSW*, dated 28 August 2023. Prepared for Place Design Group on behalf of City of Sydney

DP 2023, *Report on Geotechnical Investigation Gunyama Park Stage 2 and George Julius Avenue North 13 George Julius Avenue, Zetland*, dated September 2023. Prepared for City of Sydney

GTA Consultants, 2016, *Gunyama Park Aquatic and Recreation Centre Transport Assessment*, dated 9 June 2016. Prepared for City of Sydney.

HydroStorm Consulting, 2016, *Gunyama Park Aquatic and Recreation Centre – Hydrological Assessment and Flood Analysis*, Report-RJ1037-V5-0616, Version 5, dated 3 June 2016. Prepared for City of Sydney.

HydroStorm consulting, 2017, *Gunyama Park Aquatic and Recreation Centre Flood Investigations - Interim Development Scenario - Modified Flood Management Option – Drainage Reserve at George Julius Avenue*, dated 11 April 2017. Prepared for City of Sydney.

JBS&G, 2023, *Gunyama Park Aquatic and Recreation Centre Long Term Environmental Management Plan*, dated 11 November 2023. Prepared for CBP Contractors Pty Ltd.

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