



3 Brookhollow Avenue, Norwest, NSW

Green Square DC

Long Term Environmental Management Plan

69380 | 170494 (Rev A)

22 September 2025





We acknowledge the Traditional Custodians of Country throughout Australia and their connection to land, sea and community.

We pay our respect to Elders past, present and emerging and in the spirit of reconciliation we commit to working together for our shared future where every person is respected, valued and has strong sense of belonging.

Caring for Country The Journey of JBS&G
Artist: Patrick Caruso, Eastern Arrernte

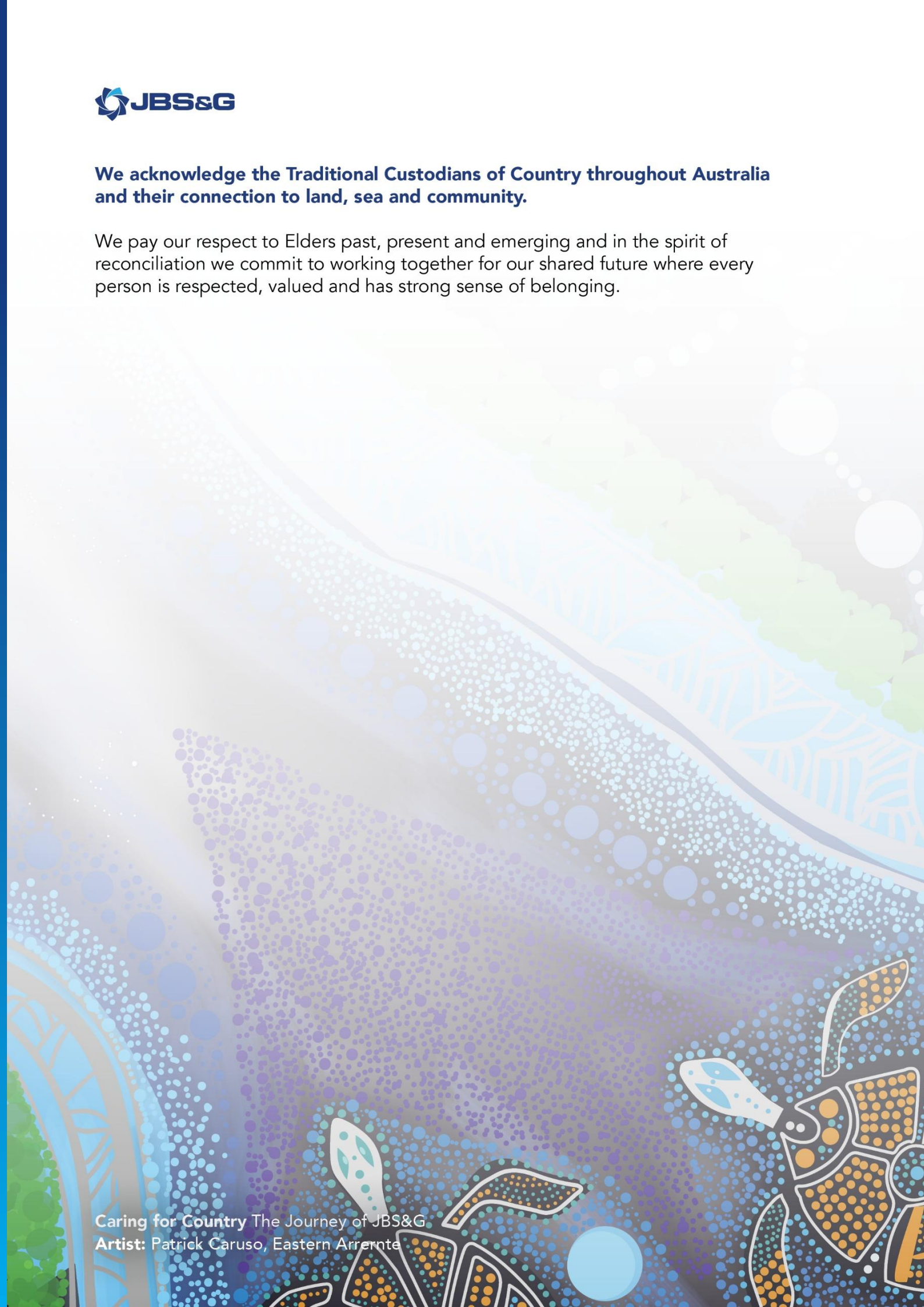


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Abbreviations

Term	Definition
AST	Above ground storage tank
ASC	Assessment of Site Contamination
bgs	Below ground surface
BTEXN	Benzene, toluene, ethylbenzene, xylene, naphthalene
COPC	Contaminants of potential concern
CSM	Conceptual site model
DC	Data Centre
DG1	Diesel Generator Room 1
DG2	Diesel Generator Room 2
DO	Dissolved oxygen
DP	Deposited Plan
DPH	Dissolved phase petroleum hydrocarbons
DQIs	Data quality indicators
EC	Electrical conductivity
EPA	Environment Protection Authority
ESLs	Ecological screening levels
ERM	Environmental Resources Management Pty Ltd
ha	hectares
HSLs	Health screening levels
JBS&G	JBS&G Australia Pty Ltd
JSRA	Job Safety Risk Assessment
LNAPL	Light non-aqueous phase liquid
LTEMP	Long Term Environmental Management Plan
MNA	Monitored natural attenuation
MVPE	Multi-phase vapour extraction
NEPC	National Environmental Protection Council
NEPM	National Environmental Protection Measure
NSW	New South Wales
ORP	Oxidation reduction potential
QA/QC	Quality assurance / quality control
RAP	Remedial Action Plan
SWMS	Safe Work Method Statement
TRH	Total recoverable hydrocarbons
UST	Underground storage tank
WHS	Work Health and Safety

1. Introduction

1.1 Background

JBS&G Australia Pty Ltd (JBS&G) was engaged by GreenSquare DC (the Client) to prepare a Long Term Environmental Management Plan (LTEMP) for the ongoing management of residual petroleum hydrocarbon impacts for the site located at 3 Brookhollow Avenue, Norwest NSW (the site). The site is legally identified as Lot 2021 in Deposited Plan (DP) 831173 and occupies an area of approximately 5.2 hectares (ha). The site location is shown in **Figure 1**.

JBS&G were previously engaged by the client to undertake a review of available investigation reports associated with a substantial diesel spill that occurred at the site as summarised in JBS&G (2024a¹). Remediation works were undertaken by Environmental Resources Management Pty Ltd (ERM) which included multiple multi-phase vapour extraction (MPVE) events from August 2019 and April 2023, regular groundwater gauging events, as well as soil remediation and replacement of the stormwater pipe on the downgradient portion of the stormwater drainage infrastructure in 2023 (ERM, 2023a²).

JBS&G has also undertaken intrusive site investigations at the site, including soil, soil vapour and groundwater investigations, as part of a Site Contamination Assessment (JBS&G 2024b)³ and Detailed Site Investigation (DSI, JBS&G 2024c)⁴ which concluded that the site is considered suitable for ongoing use of the current facility as a DC subject to the adoption of an LTEMP to manage residual petroleum hydrocarbon impact in soils and monitor groundwater conditions.

The client has acquired the site, with the intention to complete augmentations / additions to the existing building to facilitate continued data centre (DC) operations. Development plans provided to JBS&G, and presented on **Figure 2**, indicate that an extension will be constructed on the western portion of the existing DC, in proximity / overlying the known current and historical extent of petroleum hydrocarbon impacted groundwater. An additional soil investigation was completed within the proposed development area which identified petroleum hydrocarbon impacts within shallow soils proximal to the site of the diesel spill, which were not considered to affect the ongoing suitability of the site for Commercial/Industrial use as a DC should the soils remain in-situ and or undisturbed during development.

This LTEMP is required to ensure that the impacts remaining on site on are appropriately managed during future use to ensure continued protection of human health for future site users, workers and contractors engaged to undertake work at the site, and the surrounding environment. This LTEMP focuses on requirements to complete ongoing groundwater monitoring events including monitoring of stability and natural attenuation of the diesel plume and notify the presence of residual contamination related to the historical uncontrolled diesel release. It is noted that this LTEMP is not a Construction Environmental Management Plan (CEMP) and where significant development occurs a CEMP specific to the proposed works should be developed and implemented.

¹ JBS&G (2024a) *Review of Land Contamination Information, 3 Brookhollow Avenue, Norwest NSW*, JBS&G Australia Pty Ltd Reference 65899/156514 (Rev A) dated 12 February 2024

² ERM (2023a) Status Report – Post Month 7 of MPVE Operation. ERM Services Pty Ltd dated 8 February 2023.

³ JBS&G (2024b) *Contamination Assessment, 3 Brookhollow Avenue, Norwest NSW*, JBS&G Australia Pty Ltd Reference 66798/160047 (Rev A) dated 31 May 2024

⁴ JBS&G (2024c) *Detailed Site Investigation, 3 Brookhollow Avenue, Norwest NSW*, JBS&G Australia Pty Ltd Reference 66798/163902 (Rev A) dated 21 November 2024

1.2 Objectives

The objectives of this LTEMP are to:

- Protect human health and surrounding environments from residual petroleum hydrocarbon impacts within soil and groundwater identified at the site;
- To provide a framework for the ongoing assessment and management of residual petroleum hydrocarbon impacted groundwater at the site;
- Provide guidance on the responsibilities of maintaining the requirements of this LTEMP;
- Provide guidance on the appropriate control measures to be implemented in the event that minor intrusive works require to be completed at the site; and
- Provide guidance on the appropriate procedures to manage ground disturbance works.

2. Environmental Site Setting

2.1 Site Identification

The site details are provided in Error! Reference source not found..

Table 2.1: Site Identification

Aspect	Details
Address	3 Brookhollow Avenue, Norwest NSW
Legal Property	Lot 2021 in Deposited Plan (DP) 831173
Local Government Area	The Hills Shire Council
Site Zoning	B7 Business Park
Site Area	5.2 hectares (ha)

2.2 Site Description

A site inspection was completed by JBS&G in June 2025. The site layout and key features present at the time of preparation of this LTEMP are presented on **Figure 2** and outlined below.

- The site comprised an irregularly shaped parcel of land which is used as a Data Centre. The central-western portion of the Site contained a large multi-storey commercial building, with the balance of the site being occupied by internal roads, car parking and landscaped areas;
- The site was surrounded to the north and northwest by Norwest Boulevard, east by Strangers Creek and Brookhollow Reserve, and to the south and east by Brookhollow Avenue;
- Two diesel generator rooms were observed within the main building, including Diesel Generator Room 2 (DG2) which has previously been identified to have been the site of a substantial diesel spill;
- Underground services were present external to the building at both shallow depths and deeper below ground level, comprising storm water, sewer, potable water and communications. The stormwater drainage line was noted to discharge from the Site/building to Strangers Creek;
- Previous soil and vegetation disturbance was noted in a 2024 inspection, downgradient to the west along the stormwater drainage infrastructure associated with historical remediation works. During the most recent inspection vegetation was noted to have started to regenerate within this portion of the site;

- Two 55kL above ground tanks (AST)s were present in the southeast of the site, which were fed from two fill points in the driveway to the northwest. The ASTs were present within a sunken pit, which was constructed into the existing hill slope;
- It is possible that some underground storage (UST) tanks may remain (partially) under the current driveway, based on historical plans sighted during the 2024 inspection, which included design plans for three UST's and fuel lines leading to DG1 and DG2, the configuration of which was differed from the existing AST / fuel line layout observed on site. It is also possible that the tanks were removed as part of the installation of the ASTs, as evidenced by their position within a sunken bund;
- Cut and fill was evident into the existing hillslope where asphaltic carparking areas had been constructed in the east, as well as to facilitate construction of the existing DC; and
- The remainder of the site was turfed, with peripheral wooded / heavily vegetated areas which were free from any visible signs of potential contamination.

As outlined in **Section 1.1** the site is proposed to undergo development inclusive of an extension to the existing data centre footprint.

2.3 Regional Environmental Setting

The regional environmental setting is detailed in previous reports including ERM (2022a⁵) and JBS&G (2024c). Key details and observations are provided following:

- **Geology:** The site is within the Minchinbury Sandstone geological landscape, within the Blacktown Soil Landscape. Natural soil reported and observed at the Site comprises cohesive brown clays and grey/brown shale bedrock (weathered);
- **Hydrology:** the site is primarily unsealed, with hard-setting soils. The majority of rainfall is anticipated to flow overland to stormwater drainage infrastructure with a lower proportion infiltrating into underlying soil. The receiving water body is identified as a freshwater environment (Strangers Creek) and is located adjacent to the site boundary; and
- **Hydrogeology:** groundwater is reported and observed to be present at depths of 4.5 m to 10.4 m bgl, with perched water present in some locations between 2.5 m and 3 m bgl, as associated with less weathered shale from 3 m bgl. The hydraulic conductivity of the aquifer is reported to be low (0.001 m/day to 0.005 m/day). Groundwater beneficial use has not been identified in proximity of the site.

⁵ ERM (2022a) *Remediation Action Plan – Kyndryl Data Centre, 1-9 Brookhollow Avenue Baulkham Hills*. ERM Services Pty Ltd dated 31 January 2022.

3. Summary of Site Contamination Status

A detailed review of previous contamination reports was completed by JBS&G (2024a) although not all identified contamination assessment reports were available for review by JBS&G. Information provided included substantial documentation of investigation and remedial efforts undertaken by ERM between 2020 and 2024. The findings are summarised as follows.

A plume of light non-aqueous phase liquid (LNAPL) and dissolved phase contamination associated with the diesel spill is present in perched and deeper groundwater downgradient and proximal to DG2 (**Figure 2**). Shallow (depth <2 m bgl) LNAPL was also identified underlying DG2. Groundwater wells installed to the southeast of the spill have historically been observed to have contained LNAPL. The lateral extent of impacts to the southeast of DG2 within the building footprint have not been able to be appropriately assessed. Since clean-up efforts have been made, LNAPL remains present, in lower quantities, beneath DG2 within the main building and it is understood that LNAPL may be present underlying current building slabs (**Figure 3**).

The LNAPL plume was reported to have migrated along a preferential pathway (stormwater infrastructure) at depth. A substantial extent of LNAPL removal has occurred via multi-phase vapour extraction (MPVE) since remediation works began, however LNAPL is noted to persist on the site with the plume having reduced / fragmented. The LNAPL plume was not reported to have migrated beyond the site boundary to the southwest.

Groundwater impacted by dissolved phase petroleum hydrocarbons (DPH) has been identified at the site. Levels were not reported to have exceeded health screening levels (HSLs) nominated in NEPC (2013⁶) on the basis of a commercial / industrial land use where the HSLs are non-limiting. DPH were present at levels above water quality criteria adopted by ERM in historical reports, however no exceedances of these criteria were reported at the downgradient site boundary.

Soil was assessed at the site by ERM at approximately 40 locations. The presence of petroleum hydrocarbons varied considerably across the assessed areas. The following key aspects are identified by review of ERM (2022a):

- Petroleum hydrocarbons were present at levels which are considerably higher than the management limits for commercial/industrial as well as residential land uses;
- Petroleum hydrocarbons were present at levels which are considerably higher than the ecological screening levels for commercial/industrial as well as residential land uses; and
- ERM (2022a) reported that the levels of semi- and non-volatile petroleum hydrocarbons did not generally exceed the HSLs for residential land use, with exceptions nominated on a figure provided in the RAP (ERM 2022a). Exceedances were generally observed underlying the existing building proximal to DG2 and outside the building to the immediate south and west of DG2. The provided figure did not distinguish which samples exceeded the identified HSLs, and no primary soil analytical data were provided for an assessment to be made by JBS&G.

⁶ NEPC (2013) *National Environmental Protection (Assessment of site contamination) Measure 1999 (as amended 2013)*. National Environmental Protection Council dated April 2013.

3.1 Extent of LNAPL Contamination

ERM completed a number of groundwater gauging and sampling events (ERM 2022b⁷, 2022c⁸, 2022d⁹, 2022e¹⁰, 2022f¹¹, 2023b¹², 2023c¹³, 2023d¹⁴, 2024a¹⁵, and 2024b¹⁶) with the most recent report available to JBS&G from October 2024 (ERM 2024b).

LNAPL thickness has been observed to vary over time in several wells, however the extent of reported LNAPL remains relatively consistent. Some wells have also reported distinct decreases in LNAPL thickness over time. The inferred extent of LNAPL impacts is presented in **Figure 3**, and a summary table of historical LNAPL is provided in **Appendix A**. The extent of the current known LNAPL and DPH plume based on ERM (2024b) are shown on **Figure 3**.

3.2 Detailed Site Investigation (JBS&G 2024c)

Groundwater, soil, and soil vapour assessed across the broader site by JBS&G as part of the DSI (JBS&G 2024c). The following conclusions were made:

- Soil observations and analytical data from 10 representative locations across the broader site confirm that general site soils do not pose a potential risk to the future commercial / industrial use of the site. There were no significant soil contamination constraints (beyond the existing known diesel impact) that would affect the ongoing use of the site for commercial/industrial purposes. Localised area(s) of soil impacted with petroleum hydrocarbons are expected in proximity to the known extent of historical LNAPL. The presence of these soils are not considered to pose a risk to future site users;
- 18 sub slab soil vapour locations were sampled within the existing building footprint proximal to DG2. The soil vapour data collected confirmed that the underlying soil and groundwater impact, including shallow LNAPL impacts underlying DG2 do not pose a risk to users of the current facility for ongoing commercial / industrial land use under the current site configuration;
- Gauging of existing on-site wells identified the extent of LNAPL was observed to be generally consistent with the observations made by ERM (2023a). Whilst the extent of free phase product in groundwater was observed to have reduced significantly in some wells as a result of the remedial works, variability in the historic gauging data indicates some redistribution of LNAPL and dissolved phase impact may be occurring on site. While there is no evidence of significant migration of LNAPL/dissolved phase impact towards the site boundary ongoing monitoring is required to ensure that the impact continues to attenuate and there are no unacceptable risks to offsite receptors; and
- Nine wells were sampled and analysed for a range of contaminants of potential concern (COPC), which identified DPH impacts within wells proximal to DG2. However based on the overall results, the absence of potential future source / receptor pathway linkages and lack of beneficial re-use opportunities, groundwater was considered to pose an unacceptable risk to future site receptors.

⁷ ERM (2022b) *Groundwater Monitoring Event – #3 June 2022*. ERM Services Pty Ltd dated 12 July 2022.

⁸ ERM (2022c) *Groundwater Gauging Event – May-July 2022*. ERM Services Pty Ltd dated 14 July 2022.

⁹ ERM (2022d) *Groundwater Gauging Event – August 2022*. ERM Services Pty Ltd dated 25 August 2022.

¹⁰ ERM (2022e) *Groundwater Gauging Event – October 2022*. ERM Services Pty Ltd dated 26 October 2022.

¹¹ ERM (2022f) *Groundwater Gauging Event – November 2022*. ERM Services Pty Ltd dated 17 November 2022.

¹² ERM (2023b) *Groundwater Monitoring Event – #4 December 2022*. ERM Services Pty Ltd dated 9 February 2023.

¹³ ERM (2023c) *Q1 Groundwater Monitoring Event – July 2023*. ERM Services Pty Ltd dated 4 August 2023.

¹⁴ ERM (2023d) *Q2 Groundwater Monitoring Event – October 2023*. ERM Services Pty Ltd dated 31 October 2023.

¹⁵ ERM (2024a) *Q1 Year 2 Groundwater Gauging – August 2024* ERM Services Pty Ltd dated 23 August 2024

¹⁶ ERM (2024b) *Q2 Year 2 Groundwater Gauging – October 2024* ERM Services Pty Ltd dated 1 November 2024.

3.3 Targeted Soil Investigation (JBS&G 2025)

JBS&G completed a targeted investigation of shallow soils, which comprised the advancement of 15 test pits to the west of the existing DC targeting the current/historic diesel spill area (JBS&G 2025). The following key aspects were identified:

- Elevated total recoverable hydrocarbon (TRH) concentrations were identified in shallow soil at TP09 and TP10 to the immediate west of DG2. The concentrations exceeded ecological screening levels (ESLs) and Management Limits. Visual and olfactory impact (odorous / stained and visibly impacted materials) were observed at these locations which are likely a result contamination release at/near the ground surface (potential overflow atop concrete slabs/shallow infrastructure at the time of uncontrolled release);
- It is expected that significantly contaminated soils are present within the current DG2 footprint and within the smear zone at the depth of groundwater where NAPL is / has historically been present;
- There is potential for localised contaminant migration to the existing stormwater easement located further west of TP09 and TP10. This is consistent with assumptions made during previous investigations (ERM 2022a). Should the stormwater alignment require to be relocated or replaced, backfill materials surrounding the easement may need to be segregated and assessed; and
- The presence of some shallow diesel impacted soil at the site (should it remain *in-situ* and or undisturbed during development) is not considered to affect the ongoing suitability of the site for Commercial/Industrial use as a DC.

4. Application and Enforcement of LTEMP and Responsibilities

4.1 Application of LTEMP

This LTEMP will apply indefinitely for future site operations and/or until such time as sufficient evidence may be available to either rescind or revise the requirements for ongoing environmental management.

This LTEMP are intended to notify the presence of residual diesel impacted soil and groundwater related to the historical uncontrolled diesel release, including the requirements for:

- Ongoing periodic monitoring of diesel impacted groundwater including assessment of plume stability and monitored natural attenuation; and
- Managing the potential that some activities which may involve ground disturbance (shallow excavations) could expose impacted soils which may pose a potential human health (direct contact), environmental or aesthetic issue.

It is not intended that the LTEMP apply to major excavations, earthworks or significant construction activities (such as deep/extensive excavations). A specific management plan should be prepared if major works are proposed within the area of the contaminated soils.

4.2 Site Owner

It is the responsibility of the site owner to ensure that:

- A copy of this LTEMP is provided to all persons with management or control of a workplace at the site.
- A person/s with management or control of the workplace is made responsible for the implementation and maintenance of the provisions of this LTEMP.
- A person in a senior management position in the organisation is appointed as Site Environmental Manager and given the responsibility for ensuring the maintenance of the provisions of this LTEMP.

The Site Environmental Manager may appoint appropriate personnel to implement the LTEMP day to day but will remain the responsible manager to whom the appointed personnel must report.

- Site personnel or contractors that must conduct intrusive works at the site are inducted into the LTEMP and are aware of their responsibilities with regard to health and safety and protection of the environment.
- A copy of this LTEMP is supplied to anyone conducting intrusive works on the site.
- The health and safety and environmental requirements specific to the contamination issues on the site, as outlined in this LTEMP, are complied with.
- Environmental incidents are reported in a timely manner to the appropriate statutory authorities, as necessary in accordance with legislation.

4.3 Persons with Management or Control of the Workplace

The person/s with management or control of the workplace shall be responsible for the implementation and maintenance of the provisions of this LTEMP for the area of contaminated soil and groundwater.

Specifically, the persons/s with management or control of the workplace shall be responsible for:

- Ensuring the required routine biannual groundwater monitoring rounds are completed and accurate records maintained;
- Inducting relevant personnel, contractors and visitors into the requirements of this LTEMP. Detailed records of personnel inducted into the conditions of this LTEMP shall be kept (**Appendix C**);
- Ensuring any personnel or engaged contractors undertaking intrusive works of any kind are aware of their responsibilities in relation to the identified residual petroleum hydrocarbon impacts;
- Ensuring any ground disturbance works are appropriately reinstated in accordance with the requirements of this LTEMP; and
- Revising this LTEMP to reflect any works completed within the site area that may have altered the current and documented site conditions.

4.4 Summary of Provisions of this LTEMP

The provisions of this LTEMP are summarised as follows:

- Routine biannual groundwater monitoring rounds (as outlined in **Section 5**) are to be completed and accurate records maintained;
- Site personnel or contractors required to conduct intrusive works at the site must be inducted into the LTEMP and must be aware of their responsibilities with regard to health and safety and protection of the environment; and
- A copy of this LTEMP is to be supplied to all persons conducting intrusive works on the site.

5. Groundwater Monitoring Program

The existing well network is presented on **Figure 3**. The residual LNAPL plume is delineated except to the east and south east of the current plume, beneath the building footprint. Notwithstanding, the current well network is considered sufficient to assess the long-term groundwater conditions on site.

5.1 Groundwater Sampling Schedule

All available wells will be gauged as part of the initial groundwater monitoring event as a baseline assessment. For following events, 10 key monitoring wells will be gauged as part of the monitoring program. Sampling will be undertaken for key wells which do not include LNAPL impacts.

Wells selected for biannual groundwater monitoring have been summarised in **Table 5.1**.

Table 5.1: Summary of Groundwater Monitoring Requirements

Monitoring Well ID	Frequency	Analysis
MW01	Bi-annual	Gauge & inspect all wells.
MW02	Bi-annual	If no LNAPL is observed, collect a sample and record field parameters.
MW04	Bi-annual	Analyse for:
MW09A	Bi-annual	• TRH
MW11	Bi-annual	• BTEX
RW13	Bi-annual	• Natural attenuation parameters
RW15	Bi-annual	
RW16	Bi-annual	
RW24	Bi-annual	
SRW04	Bi-annual	

Notes: Field parameters – pH, dissolved oxygen, electrical conductivity, redox potential and temperature

TRH – total recoverable hydrocarbon

BTEXN – benzene, toluene, ethylbenzene, xylenes and naphthalene

Natural attenuation parameters –nitrate, sulfate, ferrous ion, and methane

The above wells have been selected as most appropriate for ongoing groundwater monitoring based on their close proximity to and direction from the current diesel plume. The identified wells and their position with respect to the LNAPL plume (as defined in ERM 2024a) has been shown on **Figure 3**.

Should any monitoring wells be impacted by future development works, they will need to be appropriately decommissioned, and any key monitoring wells as outlined in **Table 5.1** will require replacement following construction works.

5.2 Groundwater Sampling Method

Bi-annual groundwater monitoring will be undertaken with the following method:

- Initial calibration and decontamination of equipment, as required;
- Gauging of monitoring wells nominated in **Table 5.1** using an interface probe (IP). Recording of the depth to groundwater (in metres below top of casing) and the depth to the LNAPL (if identified);
- Removal of a small volume of groundwater using a new disposable bailer and string, and visual inspection for any oil globules, LNAPL films or petroleum sheens and odours;
- Purging with a peristaltic pump, to remove the standing water. During purging, physiochemical parameters (pH, electrical conductivity (EC), dissolved oxygen (DO), reduction-oxidation potential (ORP) and temperature) will be monitored until stabilisation, followed by collection groundwater samples;
- The collected samples shall be immediately filtered (as necessary) and transferred directly to laboratory supplied bottles as appropriate to the range of analytes;

- Decontamination of any reusable equipment (i.e. IP) in 10% DECON-90 solution and tap water between each sample location; and
- Securing of the well cap and gatic lid with screws flush to ground level and secure.

5.3 Data Quality Objectives

Groundwater monitoring Data Quality Objectives (DQOs) are summarised below:

5.3.1 State the Problem

Groundwater below the site is contaminated with petroleum hydrocarbons from a historical uncontrolled diesel release. Previous assessments and reports prepared by JBS&G and ERM have identified that the remaining plume appears to be generally stable, and initial indicators suggest natural attenuation processes are occurring as to control its extent.

Based on the current data-set, there are no unacceptable risks to onsite or offsite receptors from the remaining residual impact. Ongoing monitoring if the existing plume has been recommended in order to monitor groundwater conditions, monitor natural attenuation of the plume, and notify the presence of residual contamination related to the historical uncontrolled diesel release.

5.3.2 Identify the Decision

Data generated as part of ongoing groundwater monitoring is required to satisfy the below decisions:

1. Is there an increasing trend in DPH impact (confirmed by statistical analysis i.e. Mann-Kendall) and/or a geometrically expanding plume over two successive groundwater monitoring events (GMEs)?
2. Is there any evidence of, or potential for, migration of contaminants from the site?
3. Is there a low and acceptable level of risk to receptors?
4. Is ongoing monitoring required?

5.3.3 Identify the Inputs to the Decision

The following inputs are required to satisfy the above decisions:

- Groundwater monitoring data generated in accordance with **Table 5.2**;
- Assessment of groundwater data against criteria and previous results; and
- Data quality indicators as determined by a quality assurance / quality control (QA/QC) assessment.

5.3.4 Define the Study Boundary

The study boundary includes the western portion of the site proximal to DG2 and specifically wells nominated in **Table 5.2** and shown on **Figure 3**.

5.3.5 Develop a Decision Rule

Table 5.2: Decision Rules

Decision Required to be Made	Decision Rule
1. Is there an increasing trend in DPH impact (confirmed by statistical analysis i.e. Mann-Kendall) and/or a geometrically expanding plume over two successive GMEs?	Potential trends in levels of petroleum hydrocarbons in groundwater shall be assessed by comparison to historically reported levels, Mann-Kendall statistical analysis and against assessment criteria adopted for the site. If reported LNAPL and concentrations of COPC remain consistent or improved compared to monitoring rounds, the answer to the decision was No . If this is not the case, then the answer to the decision is Yes and additional investigation / increased frequency of monitoring may be required.

2. Is there any evidence of, or potential for, migration of contaminants from the site?	Based on assessment results, was there any evidence of, or the potential for, migration of unacceptable contaminant concentrations to migrate from the site? If yes, the answer to the decisions was Yes and implementation of appropriate contingencies (Section 8) will be required. Otherwise, the answer to the decision was No .
3. Is there a low and acceptable level of risk to receptors?	Groundwater analytical data was compared against Environment Protection Authority (EPA) endorsed criteria. If the reported concentrations were all below the site criteria, the answer to the decision was No . If analytical concentrations were in excess of the site criteria, further consideration of potential risks would be required to establish whether the results are indicative of background conditions. If this is not the case, then the answer to the decision is Yes .
4. Is ongoing monitoring required?	If a minimum of 4 samples round has been completed and the answers to Decisions 1, 2 and 3 are No, No and Yes respectively then the Decision is Yes and ongoing monitoring is not required. Otherwise the decision is No and monitoring should continue.

5.3.6 Specify Limits on Decision Error

Specific limits for this project have been adopted in accordance with appropriate guidance from the NSW Environment Protection Authority (EPA), National Environmental Protection Council (NEPC 2013), appropriate Data Quality Indicators (DQIs) (DQIs used to assess QA/QC) and standard JBS&G procedures for field sampling and handling.

The pre-determined DQIs established for groundwater sampling and analysis are discussed below in relation to precision, accuracy, representativeness, comparability, completeness and sensitivity (PARCCS parameters), and are shown in **Table 5.3** following.

- **Precision** - measures the reproducibility of measurements under a given set of conditions. The precision of the laboratory data and sampling techniques is assessed by calculating the Relative Percent Difference (RPD) of duplicate samples.
- **Accuracy** - measures the bias in a measurement system. The accuracy of the laboratory data that are generated during this study is a measure of the closeness of the analytical results obtained by a method to the 'true' value. Accuracy is assessed by reference to the analytical results of laboratory control samples, laboratory spikes and analyses against reference standards.
- **Representativeness** - expresses the degree which sample data accurately and precisely represent a characteristic of a population or an environmental condition. Representativeness is achieved by collecting samples on a representative basis across the site, and by using an adequate number of sample locations to characterise the site to the required accuracy.
- **Comparability** - expresses the confidence with which one data set can be compared with another. This is achieved through maintaining a level of consistency in techniques used to collect samples; ensuring analysing laboratories use consistent analysis techniques and reporting methods.
- **Completeness** – is defined as the percentage of measurements made which are judged to be valid measurements. The completeness goal is set at there being sufficient valid data generated during the study.
- **Sensitivity** – expresses the appropriateness of the chosen laboratory methods, including the limits of reporting, in producing reliable data in relation to the adopted site assessment criteria.

Table 5.3: Summary of Quality Assurance / Quality Control Program

Data Quality Indicators	Frequency	Data Quality Criteria
Precision		
Blind duplicates (intra laboratory)	1 / 20 samples	<50% RPD ¹

Blind duplicates (inter laboratory)	1 / 20 samples	<50% RPD ¹
Laboratory Duplicates	1 / 20 samples	<50% RPD ¹
Accuracy		
Surrogate spikes	All organic samples	70-130% ²
Laboratory control samples	1 per lab batch	70-130% ²
Matrix spikes	1 per lab batch	70-130% ²
Representativeness		
Sampling appropriate for media and analytes		-
Samples extracted and analysed within holding times.	-	14 days for principal COPCs
Trip spike	1 per sampling event	70-130% recovery
Trip blank	1 per sampling event	<LOR
Laboratory blanks	1 per sampling event	<LOR
Rinsate blank	1 per sampling event	<LOR
Comparability		
Standard operating procedures for sample collection & handling	All Samples	All samples
Standard analytical methods used for all analyses	All Samples	All samples
Consistent field conditions, sampling staff and laboratory analysis	All Samples	All samples
Limits of reporting appropriate and consistent	All Samples	All samples
Completeness		
Sample description and COCs completed and appropriate	All Samples	All samples
Appropriate documentation	All Samples	All samples
Satisfactory frequency and result for QC samples	All QA/QC samples	-
Data from critical samples is considered valid	-	Critical samples valid
Sensitivity		
Analytical methods and limits of recovery appropriate for media and adopted Site assessment criteria	All samples	LOR ≤ Site assessment criteria

1. If the RPD between duplicates is greater than the pre-determined data quality indicator, a judgement will be made as to whether the excess is critical in relation to the validation of the data set or unacceptable sampling error is occurring in the field.

2. Lower recoveries may be recorded for some semi-volatile organic analyses particularly including phenols, generally results within the laboratory nominated limits may also be acceptable.

5.4 Groundwater Assessment Criteria

Screening criteria have been adopted from the following guidelines to assess the current condition of groundwater and its suitability for future uses:

- Australian Drinking Water Guidelines Volume 6 2011. National Health and Medical Research Council dated April 2023 (NHMRC 2023), for recreational use (10x health criteria);
- Australian & New Zealand Guidelines for Fresh and Marine Water Quality (ANZG 2018¹⁷). Default guideline values (95 %) (DGV) for protection of freshwater aquatic ecosystems; and
- Groundwater HSLs from the Assessment of Site Contamination (ASC) National Environmental Protection Measure (NEPM).

5.5 Reporting and Communication

Following completion of each GME, a letter is to be prepared by an appropriately qualified environmental consultant and issued within six weeks of receipt of laboratory results. The letter requires to detail:

- Data quality objectives as applicable to the design of the GME;
- Summary of sampling and analysis works completed;
- Summary of assessment criteria to be applied;
- Assessment of data reliability;
- Summary of field observations;
- Summary of results;
- Comparison of results to assessment criteria and past results;
- Mann-Kendall statistical analysis to monitor for monitored natural attenuation (MNA);
- Verification of any potential health and ecological risk; and
- Suitability for ongoing operation as a data centre or any recommendations (if required).

6. Contaminated Soil Management Controls

6.1 Soil Management

6.1.1 Overview

Petroleum hydrocarbon impacts have been identified in shallow soils (< 2 m below ground surface (bgs)) to the west of the building, proximal to DG2, and are also expected to be present beneath the DG2 building footprint. Diesel impacted soils are also present at depths aligning with the level of groundwater within the extent of the diesel plume (ranging from 5 to 10 m bgs).

Minimum depth to groundwater will vary across seasons and monitoring periods. While no specific controls on use of the site are required based on the residual soil impacts, it is recommended that wherever possible the existing ground levels are maintained and any new surfaces are maintained in good condition.

Future workers undertaking shallow excavations should be aware of the potential of occurrence of impacted soils underlying and in proximity to DG2 (see **Figure 2**). While unlikely to occur, future workers undertaking

¹⁷ Australian & New Zealand Guidelines for Fresh and Marine Water Quality, 29 August 2018 (ANZG 2018).

deeper excavations which reach levels of groundwater (5-10 m bgs) should also be aware of the potential occurrence for impacted soils and LNAPL at depth. Any excavations within the site should consider the requirement to environmentally characterise soils prior to commencement of the excavation works and/or an appropriate management plan should be prepared to ensure any impacted soils are appropriately handled on-site.

6.1.2 On-site Management Procedures

In the event that minor intrusive works (i.e. service installation or minor excavations of soils) disturb shallow soils within areas of known impact, then these shall be conducted in a manner that minimises potential direct exposure of workers to impacted materials. Impacted materials which are subject to excavation should be placed atop builders plastic / or atop hardstand within a designated / controlled stockpiling area. Temporary storage should include covering of material(s) with builders plastic to reduce the potential for contamination to migrate from the stockpile during rainfall events and to ensure they do not pose a visual / olfactory impact to site or surrounding site users.

Any excess soil generated from the excavation activity should be classified and managed in accordance with NSW EPA (2014) Waste Classification Guidelines. Should on-site retention / potential remediation of soils be proposed in lieu of off-site disposal, further advice must be sought from a qualified environmental consultant as to appropriate procedures / monitoring / safeguards to be put in place for such works.

Should dewatering works be required, further provision will be required to be made for the handling of dewater / effluent. Dewater generated by the works will need to be disposed of appropriately as consistent with the potential presence of petroleum hydrocarbons or otherwise treated to remove petroleum hydrocarbon constituents. It is recommended should such works be undertaken, the management procedures be outlined in a site specific management plan such as a construction environmental management plan (CEMP) or dewatering management plan (DMP).

In the event that major excavation earthworks are proposed at the site which may intersect the historical LNAPL plume extent a separate remedial works plan (or similar) should be prepared by a suitably experienced contaminated land consultant to appropriately manage the potential for petroleum hydrocarbon impacts that may be encountered.

7. Health and Safety Management

Generally, the identified diesel impact is not considered to pose an unacceptable human health risk to every-day users of the site under the ongoing use as a DC. It is considered that potentially unacceptable risks are limited to intrusive maintenance workers who may encounter highly impacted soils (generally expected to be limited to soils at depth and/or underlying DG2) which may exceed relevant Direct Contact HSLs (CRC Care Technical Report No.10).

It is the responsibility of persons with management or control of workplaces at the site to ensure that comprehensive health and safety programmes that comply with the requirements of the WHS Regulation and are appropriate for the activities undertaken at the site are implemented.

The supervising personnel shall prepare or review existing Job Safety Risk Assessments (JSRA) and Safe Work Method Statements (SWMS) relating to the potential for petroleum hydrocarbon impacts in soil and groundwater to be present at depth and shall ensure that any minor intrusive works are carried out in accordance with the JSRAs and SWMS and requirements identified in **Sections 4 and 6** of this LTEMP.

8. Contingency Plans and Triggers

The results of the groundwater monitoring shall be reviewed after each GME. Initially, if any trigger is identified, the quality and reliability of the data will be reviewed, which may consist of a review of sampling and laboratory procedures and QA/ QC procedures and DQOs (as outlined in **Section 5.3**) to ascertain whether the trigger is not an artefact of uncertainties in measurements/ analysis. As an initial verification, re-analysis of the original sample (including silica gel clean-up analysis, as required) by the laboratory (if holding times are not exceeded) to assess the reliability of the data.

If the trigger exceedance is confirmed, contingency measures will be implemented as detailed in **Table 8.1** below.

Table 8.1: Trigger and Contingency Actions

No.	Trigger	Contingency Measures
1	Significantly increasing COPC concentrations	Perform confirmatory groundwater monitoring of select wells to confirm elevated readings within two months of obtaining initial results. Review the conceptual site model (CSM) to assess whether the exceedance is significant with regards to risk to receptors and plume delineation and to ensure sufficient well coverage. Subject to the outcome of CSM review and assessment of risk to receptors, consideration of further assessment may be considered. Undertake appropriate remediation if there's an unacceptable risk or adverse effects to human health or environment.
2	Dissolved phase plume (above the adopted HSL criteria for vapour intrusion) expanding in key sentinel wells (RW24 and MW09a)	Perform confirmatory groundwater monitoring of select wells to confirm elevated readings within two months of obtaining initial results. Review CSM to assess whether the exceedance is significant with regards to risk to receptors and plume delineation and to ensure sufficient well coverage. Subject to the outcome of CSM review and assessment of risk to receptors, consideration of further assessment may be considered. Undertake appropriate remediation if there's an unacceptable risk or adverse effects to human health or environment, including the potential to install a cut off wall/barrier along the southern site boundary.
3	Measurable LNAPL identified in any wells that have not historically contained LNAPL within the previous 12 months	Visually confirm the presence of LNAPL with a bailer. Implement a short-term containment and recovery measures, where practical such as passive recovery via manual bailing or installation of skimming socks or passive skimmers. Investigate potential source of impacts within three months including the review of CSM to assess whether the occurrence of LNAPL is significant with regards to risk to receptors. Reassess well network to ensure sufficient coverage for plume delineation where practicable (may be unable to advance further wells within existing buildings). Subject to the outcome of CSM review, assessment of risk to receptors and LNAPL, consideration of further assessment may be considered. Undertake appropriate remediation if there's an unacceptable risk or adverse effects to human health or environment.
4	Monitoring wells are damaged, lost or no longer sufficiently delineate the contaminant plume	Investigate the cause/s of damage. Repair damage or install/ re-instate wells, if required, prior to the next monitoring event. Decommission damage well/s if no longer useful in assessing the groundwater contamination status on-site and off-site. Construct additional wells as necessary to delineate the plume. Review and update the LTEMP, as required.

No.	Trigger	Contingency Measures
6	Land use changes such as construction of new structure(s) including major excavations and/or land development on-site.	Assess whether the change is significant with regards to risk to receptors and plume delineation. Develop a site-specific Construction Environmental Management Plan (CEMP) for intrusive project works for protection of site workers during construction. Reinstate any lost or damaged wells or evaluate the need to install additional well, if necessary, to maintain the integrity of the well network. Coordinate and inform relevant stakeholders to assist in developing a suitable management plan, if necessary. Undertake remediation as required.

9. Revision of LTEMP

It may, from time to time, be necessary to revise this LTEMP to reflect changes to legislation, changes on site and/or improvements in technologies or knowledge. Revision of the LTEMP should be undertaken by an appropriately qualified and experienced environmental consultant. Copies of the revised LTEMP should be distributed to the current site owners, person/s with management or control of the workplace and regular site workers for on-going implementation.

A register of updated with each revision of the LTEMP shall be completed as follows in **Table 9.1**.

Table 9.1: Register of EMP Revisions and Updates

Rev 0	22/09/2025, Initial LTEMP Issued
Rev 1	
Rev 2	
Rev 3	
Rev 4	

10. Limitations

This report has been prepared for use by the client who has commissioned the works in accordance with the project brief only, and has been based in part on information obtained from the client and other parties. The report has been prepared specifically for the client for the purposes of the commission, and no warranties, express or implied, are offered to any third parties and no liability will be accepted for use or interpretation of this report by any third party.

The advice herein relates only to this project and all results conclusions and recommendations made should be reviewed by a competent person with experience in environmental investigations, before being used for any other purpose. This report should not be amended in any way without prior approval by JBS&G, or reproduced other than in full including all attachments as originally provided to the client by JBS&G.

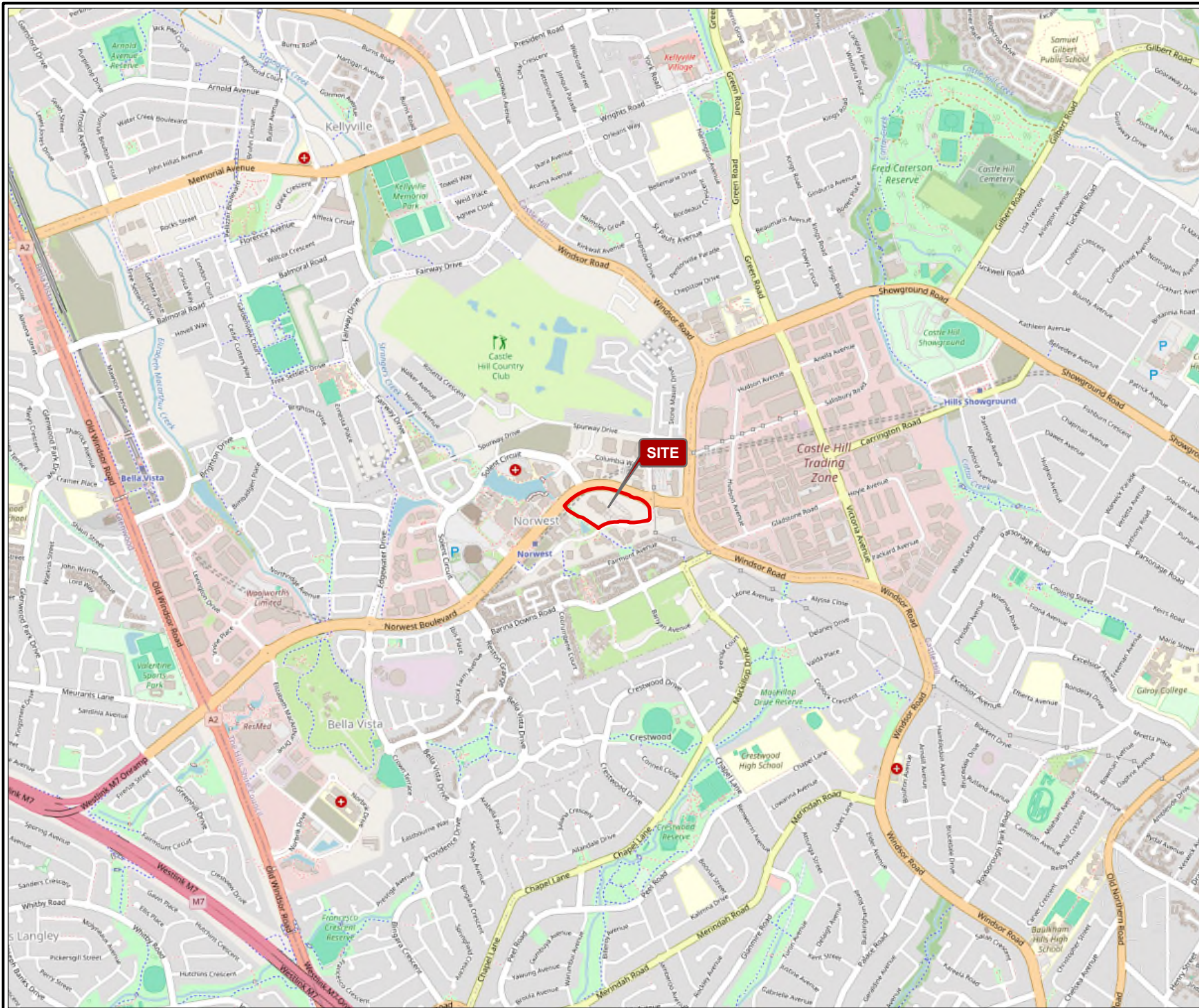
Sampling and chemical analysis of environmental media is based on appropriate guidance documents made and approved by the relevant regulatory authorities. Conclusions arising from the review and assessment of environmental data are based on the sampling and analysis considered appropriate based on the regulatory requirements or agreed scope of work.

Limited sampling and laboratory analyses were undertaken as part of the investigations undertaken, as described herein. Conditions between sampling locations and media may vary, and this should be considered when extrapolating between sampling points. Chemical analytes are based on the information detailed in the site history. Further chemicals or categories of chemicals may exist at the site, which were not identified in the site history and which may not be expected at the site.

Changes to the conditions may occur subsequent to the investigations described herein, through natural processes or through the intentional or accidental addition of contaminants. The conclusions and recommendations reached in this report are based on the information obtained at the time of the investigations.

This report does not provide a complete assessment of the environmental status of the site, and it is limited to the scope defined herein. Should information become available regarding conditions at the site including previously unknown sources of contamination, JBS&G reserves the right to review the report in the context of the additional information.

Figures



Legend
 Approximate Site Boundary



Job No: 69380

Client: GreensquareDC

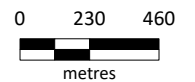
Version: R01 Rev A

Date 4/09/2025

Drawn By: MW

Checked By: AH

Scale 1:25,000



Coord. Sys. GDA2020 MGA Zone 56

**3 Brookhollow Ave,
 Norwest NSW**

SITE LOCATION

FIGURE 1



- Legend
- Approximate Site Boundary
 - NSW Cadastre
 - Site Features
 - AST
 - Historical UST
 - Diesel Generator Rooms
 - Fuel Line
 - Stormwater Layout



Job No: 69380

Client: GreensquareDC

Version: R01 Rev A

Date 4/09/2025

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Scale 1:2,000



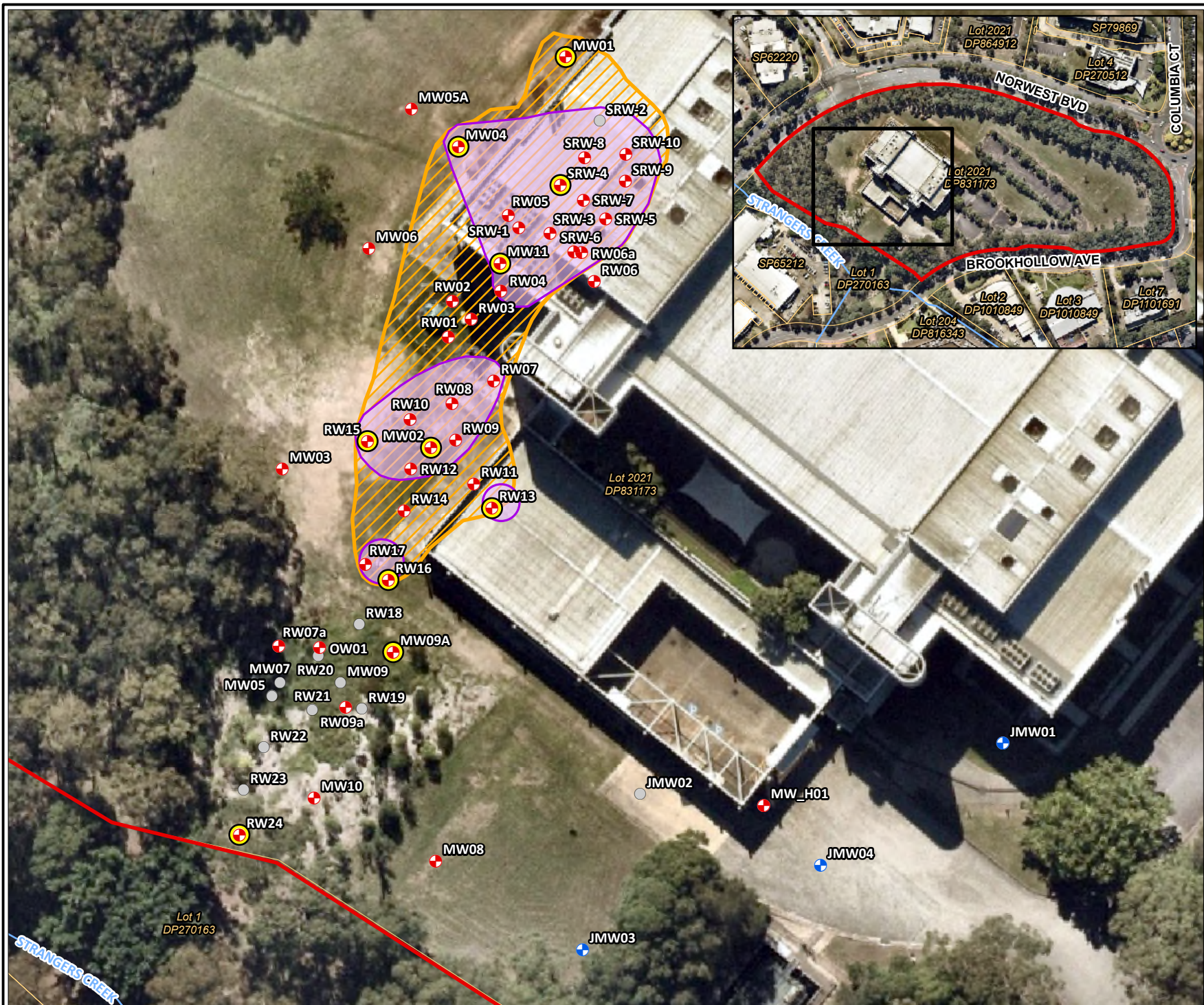
0 10 20
metres

Coord. Sys. GDA2020 MGA Zone 56

**3 Brookhollow Ave,
Norwest NSW**

SITE LAYOUT

FIGURE 2



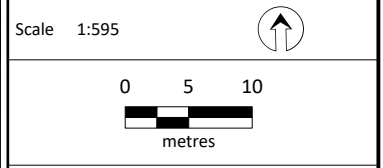
- Legend
- Approximate Site Boundary
 - NSW Cadastre
- Site Features
- Inferred Dissolved Phase Plume (ERM 2024)
 - Inferred LNAPL Plume (ERM 2024)
- Sample Locations
- Monitoring Wells (JBS&G 2024)
 - Historical Well Locations
 - Lost/Decommissioned Wells
 - Key Monitoring Wells



Job No: 66798

Client: GreensquareDC

Version: R01 Rev A	Date 4/09/2025
Drawn By: MW	Checked By: AH



Coord. Sys. GDA2020 MGA Zone 56

**3 Brookhollow Ave,
Norwest NSW**

MONITORING WELL LOCATIONS

FIGURE 3

Appendix A Historical LNAPL Summary Table

[illegible]

Appendix B EMP Record of Induction Form

[illegible]

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