# 1-3 Burrows Road, St Peters - Soil Salinity Investigation

## SSD-35962232: Burrows Road Multi-level Warehouse, St Peters

PSM2808-012R REV4 8 October 2024

Goodman Property Services (Aust) Pty Ltd

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# 1. Preamble

The proposed development seeks consent for:

- Demolition of all existing structures and buildings on site.
- Tree removal both on site and for a limited number of trees in the public domain and adjoining lot.
- Site remediation, and establishment works, including minor excavation / bulk earthworks.
- Design, construction and operation of a two-storey warehouse and distribution centre building with an ancillary office building, including:
  - Approximately 34,032 sqm of total GFA, comprising:
    - 30,389 sqm of warehouse and distribution centre GFA;.
    - 3,334 sqm of GFA for ancillary office space; and
    - End of Trip Facilities on the ground floor of 309 sqm GFA
  - Maximum building height of RL 29.70 (maximum 25 m from existing ground level)
  - Operation 24 hours per day seven days a week.
- Provision of on grade car parking accessed off Burrows Road which provides 145 tenant and visitor car parking spaces (including 8 accessible bays), 14 motorcycle spaces, and bicycle parking and end-of-trip facilities (including 66 bicycle parking spaces, showers, lockers and change rooms for occupants).
- New crossings to Burrows Road for truck and car access.
- Single fire and utilities services ingress crossing off Canal Road.
- Site landscaping works totalling approximately 6,856sqm (or 19.8% of the site), including
  - Two x 6-metre landscaped setback areas to both the Burrows Road and Canal Road site frontages
  - 3,829 sqm or 11.0% deep soil landscaping
  - 3,027 sqm or 8.7% of permeable paving; and
  - 5,450 sqm or 15.7% tree canopy coverage.
- Provision of building / business identification and wayfinding signage.

# 2. Introduction

This salinity and aggressivity assessment report has been prepared by PSM to accompany a State Significant development application **(SSDA)** for a proposed warehouse and distribution centre development located at 1-3 Burrows Road, St Peters **(the site)**.

This report has been prepared to assess the salinity and aggressivity of the soil units at the site. The work has been undertaken in accordance with PSM proposal dated 13 April 2022 (Ref. PSM2808-010L).

As summarised in the Table 1 below, this report has also been prepared to address the relevant the Secretary's Environmental Assessment Requirements (SEARs) issued by the Department of Planning and Environment (DPE) for SSD-35962232 on 7 February 2022.

The current revision has been undertaken to reflect the updated development plans as of July 2024 for SSDA submission.

**Table 1 – Relevant items of SEARS for SSD-35962232**

| Item | Description of Requirement | Report of Reference |
|---|---|---|
| 12 | 12. Ground and Water Conditions<br>• Provide an assessment of the potential impacts on soil resources, including related infrastructure and riparian lands on and near the site.<br>• Provide an assessment of the potential impacts on surface and groundwater resources (quality and quantity), including related infrastructure, hydrology, aquatic and groundwater dependent ecosystems, drainage lines, downstream assets and watercourses.<br>• Identify predicted water discharge points to surface/groundwater and consider discharge quality against relevant water quality criteria.<br>• Provide a detailed site water balance including identification of water requirements for the life of the development, and measures to ensure an adequate and secure water supply.<br>• Provide an assessment of salinity and acid sulfate soil impacts. | See Section 6 |

PSM has previously completed a geotechnical investigation and prepared a report of the geotechnical conditions at the site (ref. PSM2808-005R REV2 dated 25 September 2024).

# 3. Site Context

## 3.1 Site Description

The land to which this SSDA relates is located at 1-3 Burrows Road, St Peters **(the site)**. The site comprises two parcels of land (allotments) and is legally described as follows:

- Lot 1 DP 1227450
- Lot 11 DP 606737.

The site is an irregular shaped allotment with a total area of approximately 35,895 sqm. The site adjoins Burrows Road to the east with a primary curved frontage of approximately 528 metres and adjoins Canal Road to the west with a secondary frontage of approximately 289 metres.

The site is located in the City of Sydney Local Government Area (LGA), at the junction with the Inner West and Bayside LGA's.

The site is currently occupied by older low-rise industrial units that are largely consistent with development in the surrounding area which is predominantly of an industrial nature. The industrial units comprise four large format steel framed warehouse / distribution facilities.

The site is situated within an established largely industrial area to the immediate south of the St Peters WestConnex Interchange and well-connected to the Sydney Airport. The locality surrounding the site is characterised by existing industrial and commercial developments, as well as new road and other major transport infrastructure. The Alexandria Canal is located approximately 100 metres to the south-east and east.

Inset 1 presents an aerial image of the site.


**Inset 1: Aerial image of the site**

# 4. Methodology

## 4.1 Site Investigation

### 4.1.1 Fieldwork (11 July 2022)

The fieldwork was undertaken on 11 July 2022 under the full-time supervision of a PSM geotechnical engineer who undertook the following tasks:

- Undertake hand augering
- Provide description on the material samples in the boreholes
- Collect disturbed samples for laboratory testing.

A total of four (4) boreholes were drilled using a hand auger/tools to a maximum depth of 1.9 m below the existing ground or prior refusal.

These boreholes consist of:

- Four (4) boreholes (BH A to BH D).

At completion of the fieldwork, the boreholes were backfilled with excavated spoil / cuttings.

A total of four (4) soil samples in BH A, BH B and BH C are collected for salinity testing and aggressivity testing.

Geotechnical engineering logs of the boreholes are presented in Appendix A.

Figure 1 presents a site locality plan of the geotechnical investigation for the proposed development. Figure 2 and 3 present selected site photos.

### 4.1.2 Analytical Laboratory Testing

Four (4) disturbed soil samples were recovered for testing by a NATA accredited analytical laboratory. The following tests were undertaken on the disturbed soil samples:

- Cation Exchange Capacity (CEC) of calcium, magnesium, potassium and sodium
- Exchangeable sodium percentage
- Salinity (EC 1:5, one part soil to five parts water)
- Soil pH
- Chlorides
- Sulphates
- Resistivity.

Table 2 presents a summary of the results. The laboratory test results are included in Appendix B.

**Table 2 - Analytical Laboratory Test Results**

| Sample ID | pH | Electrical Conductivity [µS/cm] | Saturated Resistivity [ohm.cm] | Moisture Content [%] | Chloride by discrete analyser [mg/kg] | Soluble Sulfate by icpaes [mg/kg] | Exchangeable Cations [meq/100g] | | | | | ESP [%] |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Ca | Mg | K | Na | CEC | |
| BH A (0.65 m) | 8.6 | 429 | 2330 | 10.1 | 20 | 500 | 4.3 | <0.2 | 0.4 | <0.2 | 4.7 | <0.2 |
| BH B (1.1 m) | 7.9 | 322 | 3100 | 23.2 | 10 | 260 | 6.7 | 0.4 | 0.8 | <0.2 | 7.9 | <0.2 |
| BH B (1.9 m) | 7.8 | 383 | 2610 | 30.4 | 20 | 360 | 14.3 | 1.4 | 2.0 | 0.5 | 18.4 | 3.0 |
| BH C (1.5 m) | 8.0 | 153 | 6540 | 37.1 | 30 | 20 | 6.3 | <0.2 | 0.3 | <0.2 | 6.6 | <0.2 |

# 5. Site Conditions

## 5.1 Groundwater

Groundwater was encountered during the fieldwork at BH03 at a depth of 0.8 m below the surface. There was no groundwater observed during excavation of the other boreholes. PSM also measured the groundwater level at the three piezometers installed in April 2019. Table 3 presents the depth of groundwater encountered below the ground surface level on 11 July 2022.

**Table 3 – RL (m) of Groundwater Encountered in Piezometers (11/07/2022)**

| BH ID | Groundwater encountered RL (m) |
|---|---|
| BH01 | 0.65 |
| BH02 | -0.80 |
| BH03 | -0.60 |

This is consistent with previous findings that is groundwater level recorded was between RL -1.8 m and RL 0.8 m, i.e., between 1.6 m and 4.0 m below the existing surface.

## 5.2 Assessment of Analytical Laboratory Testing

### 5.2.1 Soil Chemistry

The laboratory test results summarised in Section 4.1.2 indicate the following:

- pH of the soil samples analysed was in the range of 7.8 to 8.6
- The 1:5 soil to water extraction and subsequent electrical conductivity ($EC_{1:5}$) of the soil samples analysed to be in the range of 153 µS/cm to 429 µS/cm
- Concentrations of chlorides in samples analysed was in the range of 10 mg/kg to 30 mg/kg
- Concentrations of soluble sulphate in samples analysed was in the range of 20 mg/kg to 500 mg/kg
- Cation Exchange Capacity (CEC) in samples analysed was in the range of 4.7 meq/100g to 18.4 meq/100g
- Exchange Sodium Percentage (ESP) in samples analysed was in the range of <0.2 % to 3.0 %.

### 5.2.2 Salinity Assessment

Site Investigations for Urban Salinity (DLWC 2002) classify soil salinity based on electrical conductivity ($EC_e$). The method of conversion from $EC_{1:5}$ to $EC_e$ (electrical conductivity of saturated extract) is based on DLWC (2002) and given by $EC_e = EC_{1:5} \times M$, where M is the multiplication factor based on "Soil Texture Group".

The "Soil Texture Group" of the samples tested were assessed during our investigation. The salinity classification for the soil samples that were tested are presented in Table 4.

**Table 4 - Salinity Classification**

| SAMPLE ID | $EC_{1:5}$ (dS/m) | SOIL TYPE | M | $EC_e$ (dS/m) | SALINITY CLASS |
|---|---|---|---|---|---|
| BH A (0.65 m) | 0.429 | Sands | 17 | 7.3 | Moderately Saline |
| BH B (1.1 m) | 0.322 | Sands | 17 | 5.5 | Moderately Saline |
| BH B (1.9 m) | 0.383 | Sands | 17 | 6.5 | Moderately Saline |
| BH C (1.5 m) | 0.153 | Sands | 17 | 2.6 | Slightly Saline |

It is assessed that the soils on site are classified as "Slightly saline" to "Moderately Saline".

We have referred to Clause 4.8.2 of Australian Standard AS3600-2018 “Concrete Structures” and note that the assessed soil electrical conductivity ($EC_e$) is within the “A2” exposure classification.

### 5.2.3 Corrosivity / Aggressivity

Table 4.8.1 of AS3600-2018 “Concrete Structures” provides criteria for exposure classification for concrete in sulphate soils based on sulphates in soil and groundwater, and pH of soil. On the basis of the sulphate and pH testing completed we assess the exposure classification for concrete in sulphate soils to be “A1” to “A2”.

Table 6.4.2(C) of Australian Standard AS2159:2009, Piling – Design and Installation provides criteria for exposure classification for concrete piles based on sulfates in the soil and groundwater, soil and groundwater pH, and chlorides in groundwater. On the basis of the soil sulfates and pH testing completed we assess the exposure classification for concrete piles in the soil to be non-aggressive to mild.

Table 6.5.2(C) of Australian Standard AS2159:2009, Piling – Design and Installation provides criteria for exposure classification for steel piles based on resistivity, soil and groundwater pH, and chlorides in soil and groundwater. On the basis of the soil chlorides and pH testing completed we assess the exposure classification for steel piles in the soil to be non-aggressive.

### 5.2.4 Sodicity

Sodicity provides a measure of the likely dispersion on wetting and to shrink/swell properties of a soil. Soil sodicity is classified based on the Exchangeable Sodium Percentage (ESP) which is the amount of exchangeable sodium as a percentage of the Cation Exchange Capacity (DLWC, 2002).

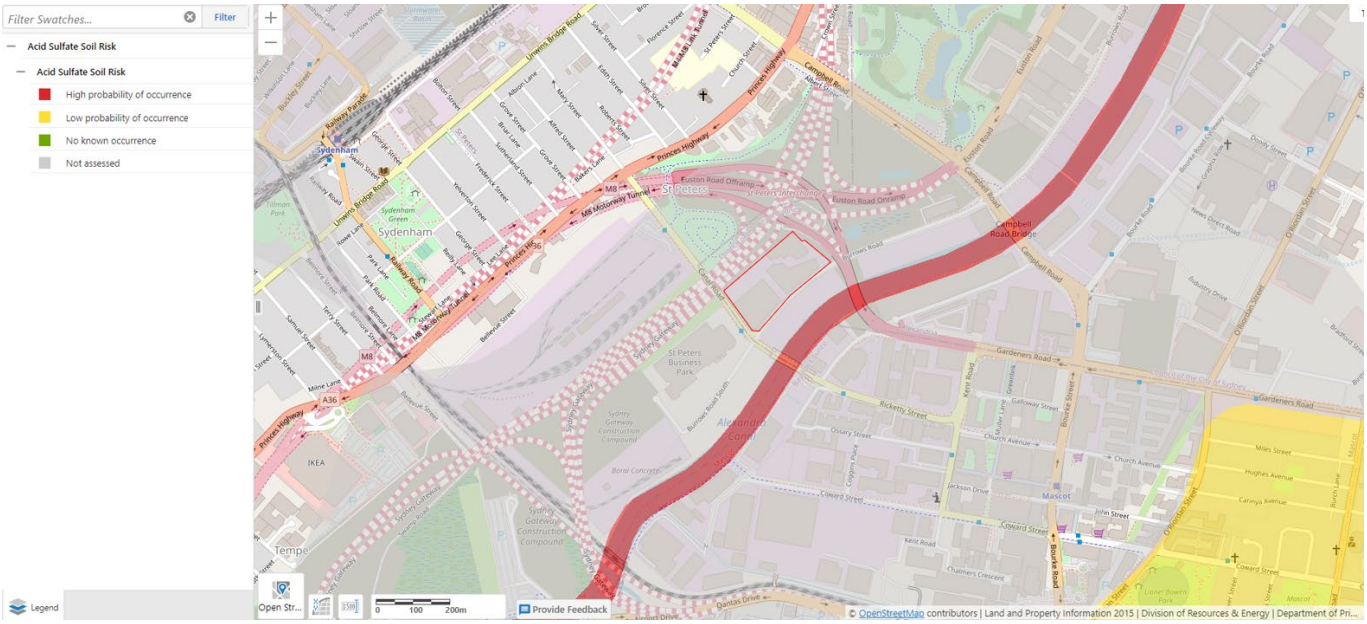
The Exchangeable Sodium Percentages calculated from these laboratory results, ranging from <0.2% to 3.0%, indicates that the soils on site are non-sodic when compared to criteria listed in “Site Investigations for Urban Salinity”, DLWC (2002).

### 5.2.5 Salinity Management Plan

With regards to salinity, PSM has prepared a salinity management plan (SMP) for the site, refer to PSM2808-013L REV2, dated 25 September 2024.

## 5.3 Acid Sulphate Soils – Desktop Assessment

Based on the NSW Government SEED (Sharing and Enabling Environmental Data), the risk of acid sulfate soil is not assessed for the site.




**Inset 2: Acid Sulphate Soils Map – Red outline defines approximate site boundary**

# 6. Assessment of SEARs – Geotechnical Items

This section presents PSM response on some of Item 12 of the SEARs from geotechnical point of view.

## 6.1 Point 1 – *Provide an assessment of the potential impacts on soil resources, including related infrastructure and riparian lands on and near the site.*

We have been provided with the following documents:

- Architectural Drawings by SBA – 24132 DA000 to SK805 dated 2 July 2024
- Survey plan undertaken by LTS Surveyors (ref. 50937 002DT Sheet 1 to 5 dated 14 June 2022.

From the drawings, PSM understands the following:

- Current existing levels of the site range between approximately RL 2.0 m AHD and RL 4.5 m AHD
- The proposed pad bulk earthworks levels (BEL) will be at RL 4.7 m AHD
- Based on the previously mentioned levels, it is expected that up to 3.0 m of ENGINEERED FILL will be required for the Site.

With regards to this clause and the potential impacts of the proposed developments on soil resources, we consider that the proposed development has close to no impact on the soil resource on and near the Site. The opinion is based on the following considerations:

- The site and surrounds have been industrial/ commercial use for decades
- The proposed development:
  - Does not alter the site use given that the proposed development is of industrial nature
  - Includes importation of VENM/ENM fill to raise the existing levels.

With regards to the impact on existing infrastructures, we note the following:

- All existing structures and buildings on site will be demolished.

We understand that the civil designer will design the stormwater system, surface gradients and landscaping requirements to control surface flows and minimise soil erosion and the effects of soil erosion on adjacent waterways.

We assume that most of the Site will be sealed by the proposed development and appropriate surface runoff collection and disposal system will be included in the design. We understand that riparian lands / areas are not present at the site.

Further comments / inputs from other disciplines (e.g., civil designer, ecologist, etc.) should be requested if required.

## 6.2 Point 2 – *Provide an assessment of the potential impacts on surface and groundwater resources (quality and quantity), including related infrastructure, hydrology, aquatic and groundwater dependent ecosystems, drainage lines, downstream assets and watercourses*

We have reviewed the architectural and survey drawings of the site and the measured piezometric data. We note the following:

- Groundwater level ranges from 1.6 to 4.0 m below existing ground (i.e. RL -1.8 m to 0.8 m)
- The majority of the Site in the proposed development is in fill, which does not intercept the groundwater.

We consider the potential impact on groundwater resource is minimal as the pad levels is above the groundwater level.

We note that impacts on surface water are not considered by PSM and should be addressed by the civil / drainage designer. We understand that the civil designer has designed or will design the stormwater system, surface gradients and landscaping requirements to control surface flows and minimise soil erosion and the effects of soil erosion on adjacent waterways. We note that the vast majority of the site will be sealed by the proposed development.

We understand that appropriate erosion control will also be included during construction.

With regards to the quality of water, impacts on groundwater dependent ecosystems, drainage lines, downstream assets and watercourses, these items could be addressed by a suitably qualitied person(s), (e.g., ecologist, drainage/civil designer and environmental consultant or other suitably qualified persons).

### 6.3 Point 3 – *Identify predicted water discharge points to surface/groundwater and consider discharge quality against relevant water quality.*

These items regarding water discharge points to surface and discharge quality should be addressed by a suitably qualitied person(s), (e.g., drainage/civil designer and environmental consultant / hydrologist).

### 6.4 Point 4 – *Provide a detailed site water balance including identification of water requirements for the life of the development, and measures to ensure an adequate and secure water supply.*

These is not a geotechnical item and should be addressed by a suitably qualified person(s), (e.g. drainage/civil designer or hydrologist).

### 6.5 Point 5 – *Provide an assessment of salinity and acid sulfate soil impacts*

With regards to salinity, PSM have prepared an assessment of the salinity in this report Section 5.2 and prepared the salinity management plan (SMP) for the site, refer to PSM2808-013L REV2, dated 25 September 2024.

With regards to acid sulfate soil, PSM has undertaken a desktop study for the site, refer to Section 5.3.

Should further assessment / testing and acid sulfate soil management plan be required, we suggest an environmental consultant be engaged to undertake the work.

## 7. General

If at any time, the conditions are found to vary from those described in this report, further advice should be sought.

Should you have further queries, please do not hesitate to contact the undersigned.

**Yours Sincerely**

**KEN TONG LEE**
**GEOTECHNICAL ENGINEER**

**AGUSTRIA SALIM**
**PRINCIPAL**

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**Legends:**

- Site Boundary
- Boreholes undertaken at 2019
- Boreholes undertaken at 2022

**Notes:**
Aerial image sourced from Nearmap.com dated 17 May 2022

0 25 50 m

| | | | |
|---|---|---|---|
| P S M | Created By: PSM | Revision: A | |
| | Date: 02 Aug 2022 | Paper Size: A3 | |

Goodman Property Services (Aust) Pty Ltd
1-3 Burrows Road
St Peters

Site Locality Plan
Borehole Locations

PSM2808-012R | Figure 1

P:\PSM2808\Docs Out\PSM2808-012R\Tool\Locality plan.qgz Layout: A3_LandscapeTemplate_V1_QGIS

Photo 1: General site photo of the site near BH A looking towards the West (11/07/2022)

Photo 1: General site photo of the site near BH C looking towards the South East (11/07/2022)

**Goodman Property Services (Aust) Pty Ltd**

**1-3 Burrow Road, St Peters**

**Results of geotechnical investigation**

**11/07/2022**

**SELECTED SITE PHOTOS (1 of 2)**

| | |
|---|---|
| **PSM2808-012R** | **Figure 2** |

Photo 1: General site photo of the site near BH D looking towards the North west (11/07/2022)

Photo 4: Typical FILL retrieved from the boreholes (11/07/2022)

**Goodman Property Services (Aust) Pty Ltd**

**1-3 Burrow Road, St Peters**

**Results of geotechnical investigation**

**11/07/2022**

**SELECTED SITE PHOTOS (2 of 2)**

| | |
|---|---|
| **PSM2808-012R** | **Figure 3** |

# Appendix A
# Geotechnical Engineering Logs

Borehole ID

**BH A**



# Engineering Log - Non Cored Borehole

Project No.: PSM2808

| | | | |
|---|---|---|---|
| Client: | Goodman Limited | Commenced: | 11/07/2022 |
| Project Name: | 1-3 Burrows Road | Completed: | 11/07/2022 |
| Hole Location: | | Logged By: | BT |
| Hole Position: | 331742.0 m E 6245485.0 m N GDA2020 | Checked By: | AS |

| | | | | | |
|---|---|---|---|---|---|
| Drill Model and Mounting: | | Inclination: | -90° | RL Surface: | No survey |
| Hole Diameter: | 125 mm | Bearing: | | Datum: | AHD Operator: |

| ***Drilling Information*** | | | | | | | | ***Soil Description*** | | | | | ***Observations*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Method | Penetration | Support | Water | Samples Tests Remarks | Recovery | RL (m) | Depth (m) | Graphic Log | Classification Symbol | Material Description<br>SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations | Moisture Condition | Consistency / Relative Density | Hand Penetrometer UCS (kPa) 100 200 300 400 500 | Structure, Zoning, Origin, Additional Observations |
| HA | | N | Not Encountered | | | | | | | CONCRETE | | | | 0.00: CONCRETE |
| | | | | | | | | | | Gravelly SAND: fine to medium grained, dark grey; gravel sub-angular to angular, up to 30 mm | M | | | 0.22: INFERRED FILL<br>Tiles, bricks and concrete fragments observed, brick up to 140 mm |
| | | | | | | | 1 | | | Hole Terminated at 0.65 m<br>Target depth | | | | |
| | | | | | | | 2 | | | | | | | |
| | | | | | | | 3 | | | | | | | |
| | | | | | | | 4 | | | | | | | |

***Method***
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
SPT - Standard penetration test
PT - Push tube
AS - Auger screwing
CT - Continuous push tube 1.5m long 76mm diameter

***Penetration***
No resistance
Refusal

***Water***
Inflow
Partial Loss
Complete Loss

***Samples and Tests***
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

***Moisture Condition***
D - Dry
M - Moist
W - Wet

***Consistency/Relative Density***
VS - Very soft
S - Soft
F - Firm
St - Stiff
VSt - Very stiff
H - Hard
VL - Very loose
L - Loose
MD - Medium dense
D - Dense
VD - Very dense
Ce - Cemented
C - Compact

Logged in accordance with AS 1726:2017 Geotechnical site investigations

PSM 3.02.2 .LIB.GLB Log PSM AU NONCORE BH NZ AU PSM2808.GPJ <<DrawingFile>> 15/07/2022 12:15 10.02.00.04 Datgel Fence and Map Tool | Lib: PSM 3.02.1 2019-03-06 Prj: PSM 3.02.0 2019-02-24

Borehole ID

**BH B**



# Engineering Log - Non Cored Borehole

Project No.: PSM2808

| | | | |
|---|---|---|---|
| Client: | Goodman Limited | Commenced: | 11/07/2022 |
| Project Name: | 1-3 Burrows Road | Completed: | 11/07/2022 |
| Hole Location: | | Logged By: | BT |
| Hole Position: | 331622.0 m E 6245481.0 m N GDA2020 | Checked By: | AS |

| | | | | | |
|---|---|---|---|---|---|
| Drill Model and Mounting: | | Inclination: | -90° | RL Surface: | No survey |
| Hole Diameter: | 125 mm | Bearing: | | Datum: | AHD Operator: |

| ***Drilling Information*** | | | | | | | | ***Soil Description*** | | | | ***Observations*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Method | Penetration | Support | Water | Samples Tests Remarks | Recovery | RL (m) | Depth (m) | Graphic Log | Classification Symbol | Material Description<br>SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations | Moisture Condition | Consistency / Relative Density | Hand Penetrometer UCS (kPa) 100 200 300 400 500 | Structure, Zoning, Origin, Additional Observations |
| HA | | N | Not Encountered | | | | 1 | | | ASPHALT<br>CONCRETE<br>Gravelly SAND: medium to coarse grained, brown and dark grey; gravel sub-angular to angular, up to 30 mm | M | | | 0.00: ASPHALT<br>0.08: CONCRETE<br><br>0.23: INFERRED FILL<br>Tiles, grass and brick fragments observed throughout borehole |
| | | | | | | | | | | Sandy Clayey GRAVEL: up to 40 mm; sand coarse-grained; clay, high plasticity, dark grey | | | | |
| | | | | | | | 2 | | | Hole Terminated at 1.90 m<br>Refusal | | | | |
| | | | | | | | 3 | | | | | | | |
| | | | | | | | 4 | | | | | | | |

***Method***
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
SPT - Standard penetration test
PT - Push tube
AS - Auger screwing
CT - Continuous push tube 1.5m long 76mm diameter

***Penetration***
No resistance
Refusal

***Water***
Inflow
Partial Loss
Complete Loss

***Samples and Tests***
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

***Moisture Condition***
D - Dry
M - Moist
W - Wet

***Consistency/Relative Density***
VS - Very soft
S - Soft
F - Firm
St - Stiff
VSt - Very stiff
H - Hard
VL - Very loose
L - Loose
MD - Medium dense
D - Dense
VD - Very dense
Ce - Cemented
C - Compact

Logged in accordance with AS 1726:2017 Geotechnical site investigations

PSM 3.02.2 .LIB.GLB Log PSM AU NONCORE BH NZ AU PSM2808.GPJ <<DrawingFile>> 15/07/2022 12:15 10.02.00.04 Datgel Fence and Map Tool | Lib: PSM 3.02.1 2019-03-06 Prj: PSM 3.02.0 2019-02-24

Borehole ID

**BH C**



# Engineering Log - Non Cored Borehole

Project No.: PSM2808

| | | | |
|---|---|---|---|
| Client: | Goodman Limited | Commenced: | 11/07/2022 |
| Project Name: | 1-3 Burrows Road | Completed: | 11/07/2022 |
| Hole Location: | | Logged By: | BT |
| Hole Position: | 331676.0 m E 6245389.0 m N GDA2020 | Checked By: | AS |

| | | | | | |
|---|---|---|---|---|---|
| Drill Model and Mounting: | | Inclination: | -90° | RL Surface: | No survey |
| Hole Diameter: | 125 mm | Bearing: | | Datum: | AHD Operator: |

| ***Drilling Information*** | | | | | | | | ***Soil Description*** | | | | ***Observations*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Method | Penetration | Support | Water | Samples Tests Remarks | Recovery | RL (m) | Depth (m) | Graphic Log | Classification Symbol | Material Description<br>SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations | Moisture Condition | Consistency / Relative Density | Hand Penetrometer UCS (kPa) 100 200 300 400 500 | Structure, Zoning, Origin, Additional Observations |
| HA | | N | ▽ | | | | 1 | | | ASPHALT<br>Sandy Clayey GRAVEL: dark grey, sub-angular to angular, up to 30 mm; clay, low plasticity; sand, medium to coarse grained | M<br>W | | | 0.00: ASPHALT<br>0.10: INFERRED FILL<br>Tiles, grass, metal debris and brick fragments observed throughout borehole |
| | | | | | | | 2 | | | Hole Terminated at 1.60 m<br>Target depth | | | | |
| | | | | | | | 3 | | | | | | | |
| | | | | | | | 4 | | | | | | | |

***Method***
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
SPT - Standard penetration test
PT - Push tube
AS - Auger screwing
CT - Continuous push tube 1.5m long 76mm diameter

***Penetration***
No resistance
Refusal

***Water***
Inflow
Partial Loss
Complete Loss

***Samples and Tests***
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

***Moisture Condition***
D - Dry
M - Moist
W - Wet

***Consistency/Relative Density***
VS - Very soft
S - Soft
F - Firm
St - Stiff
VSt - Very stiff
H - Hard
VL - Very loose
L - Loose
MD - Medium dense
D - Dense
VD - Very dense
Ce - Cemented
C - Compact

Logged in accordance with AS 1726:2017 Geotechnical site investigations

PSM 3.02.2_LIB.GLB Log PSM AU NONCORE BH NZ AU PSM2808.GPJ <<DrawingFile>> 15/07/2022 12:15 10.02.00.04 Datgel Fence and Map Tool | Lib: PSM 3.02.1 2019-03-06 Prj: PSM 3.02.0 2019-02-24

Borehole ID

**BH D**



# Engineering Log - Non Cored Borehole

Project No.: PSM2808

| | | | |
|---|---|---|---|
| Client: | Goodman Limited | Commenced: | 11/07/2022 |
| Project Name: | 1-3 Burrows Road | Completed: | 11/07/2022 |
| Hole Location: | | Logged By: | BT |
| Hole Position: | 331538.0 m E 6245403.0 m N GDA2020 | Checked By: | AS |

| | | | | | |
|---|---|---|---|---|---|
| Drill Model and Mounting: | | Inclination: | -90° | RL Surface: | No survey |
| Hole Diameter: | 125 mm | Bearing: | | Datum: | AHD Operator: |

| ***Drilling Information*** | | | | | | | | ***Soil Description*** | | | | | ***Observations*** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Method | Penetration | Support | Water | Samples Tests Remarks | Recovery | RL (m) | Depth (m) | Graphic Log | Classification Symbol | Material Description<br>SOIL NAME: Plasticity, behaviour or particle characteristics of primary component, colour, secondary components, additional observations | Moisture Condition | Consistency / Relative Density | Hand Penetrometer UCS (kPa) 100 200 300 400 500 | Structure, Zoning, Origin, Additional Observations |
| HA | | N | Not Encountered | | | | | | | CONCRETE | | | | 0.00: CONCRETE |
| | | | | | | | | | | GRAVEL: grey, angular, up to 40 mm | M | | | 0.23: Roadbase material |
| | | | | | | | 1 | | | Hole Terminated at 0.65 m<br>Refusal | | | | |
| | | | | | | | 2 | | | | | | | |
| | | | | | | | 3 | | | | | | | |
| | | | | | | | 4 | | | | | | | |

***Method***
AD/T - Auger drilling TC bit
AD/V - Auger drilling V bit
WB - Washbore
SPT - Standard penetration test
PT - Push tube
AS - Auger screwing
CT - Continuous push tube 1.5m long 76mm diameter

***Penetration***
No resistance
Refusal

***Water***
Inflow
Partial Loss
Complete Loss

***Samples and Tests***
U - Undisturbed Sample
D - Disturbed Sample
SPT - Standard Penetration Test
ES - Environmental Sample
TW - Thin Walled
LB - Large Disturbed Sample

***Moisture Condition***
D - Dry
M - Moist
W - Wet

***Consistency/Relative Density***
VS - Very soft
S - Soft
F - Firm
St - Stiff
VSt - Very stiff
H - Hard
VL - Very loose
L - Loose
MD - Medium dense
D - Dense
VD - Very dense
Ce - Cemented
C - Compact

Logged in accordance with AS 1726:2017 Geotechnical site investigations

PSM 3.02.2_LIB.GLB Log PSM AU NONCORE BH NZ AU PSM2808.GPJ <<DrawingFile>> 15/07/2022 12:15 10.02.00.04 Datgel Fence and Map Tool | Lib: PSM 3.02.1 2019-03-06 Prj: PSM 3.02.0 2019-02-24

# Appendix B
# Analytical Laboratory Testing Results

ALS Environmental

# CERTIFICATE OF ANALYSIS

| | | | |
|---|---|---|---|
| **Work Order** | : **ES2224360** | Page | : 1 of 3 |
| Client | : **PELLS SULLIVAN MEYNINK T/A PSM Admin PTY LTD** | Laboratory | : Environmental Division Sydney |
| Contact | : BRYAN TAM | Contact | : Customer Services ES |
| Address | : G3, 56 DELHI ROAD<br>NORTH RYDE NSW, AUSTRALIA 2113 | Address | : 277-289 Woodpark Road Smithfield NSW Australia 2164 |
| Telephone | : ---- | Telephone | : +61-2-8784 8555 |
| Project | : PSM2808 | Date Samples Received | : 11-Jul-2022 15:15 |
| Order number | : ---- | Date Analysis Commenced | : 12-Jul-2022 |
| C-O-C number | : ---- | Issue Date | : 19-Jul-2022 13:06 |
| Sampler | : ---- | | |
| Site | : ---- | | |
| Quote number | : EN/333 | | |
| No. of samples received | : 4 | | |
| No. of samples analysed | : 4 | | |

Accreditation No. 825
Accredited for compliance with
ISO/IEC 17025 - Testing

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted, unless the sampling was conducted by ALS. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

**Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.**

## *Signatories*

This document has been electronically signed by the authorized signatories below. Electronic signing is carried out in compliance with procedures specified in 21 CFR Part 11.

| *Signatories* | *Position* | *Accreditation Category* |
|---|---|---|
| Ankit Joshi | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |
| Dian Dao | Senior Chemist - Inorganics | Sydney Inorganics, Smithfield, NSW |
| Ivan Taylor | Analyst | Sydney Inorganics, Smithfield, NSW |
| Wisam Marassa | Inorganics Coordinator | Sydney Inorganics, Smithfield, NSW |

## General Comments

The analytical procedures used by ALS have been developed from established internationally recognised procedures such as those published by the USEPA, APHA, AS and NEPM. In house developed procedures are fully validated and are often at the client request.

Where moisture determination has been performed, results are reported on a dry weight basis.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Where a result is required to meet compliance limits the associated uncertainty must be considered. Refer to the ALS Contract for details.

Key : CAS Number = CAS registry number from database maintained by Chemical Abstracts Services. The Chemical Abstracts Service is a division of the American Chemical Society.
LOR = Limit of reporting
^ = This result is computed from individual analyte detections at or above the level of reporting
ø = ALS is not NATA accredited for these tests.
~ = Indicates an estimated value.

- ALS is not NATA accredited for the analysis of Exchangeable Cations on Alkaline Soils when performed under ALS Method ED006.
- ED007 and ED008: When Exchangeable Al is reported from these methods, it should be noted that Rayment & Lyons (2011) suggests Exchange Acidity by 1M KCl - Method 15G1 (ED005) is a more suitable method for the determination of exchange acidity ($H^+ + Al^{3+}$).

## Analytical Results

| Sub-Matrix: SOIL (Matrix: SOIL) | | | Sample ID | BH01_0.65m | BH02_1.1m | BH02_1.9m | BH03_1.5m | ---- |
|---|---|---|---|---|---|---|---|---|
| | | | Sampling date / time | 11-Jul-2022 00:00 | 11-Jul-2022 00:00 | 11-Jul-2022 00:00 | 11-Jul-2022 00:00 | ---- |
| Compound | CAS Number | LOR | Unit | ES2224360-001 | ES2224360-002 | ES2224360-003 | ES2224360-004 | -------- |
| | | | | Result | Result | Result | Result | ---- |
| **EA002: pH 1:5 (Soils)** | | | | | | | | |
| pH Value | ---- | 0.1 | pH Unit | **8.6** | **7.9** | **7.8** | **8.0** | ---- |
| **EA010: Conductivity (1:5)** | | | | | | | | |
| Electrical Conductivity @ 25°C | ---- | 1 | µS/cm | **429** | **322** | **383** | **153** | ---- |
| **EA055: Moisture Content (Dried @ 105-110°C)** | | | | | | | | |
| Moisture Content | ---- | 0.1 | % | **10.1** | **23.2** | **30.4** | **37.1** | ---- |
| **EA080: Resistivity** | | | | | | | | |
| Resistivity at 25°C | ---- | 1 | ohm cm | **2330** | **3100** | **2610** | **6540** | ---- |
| **ED006: Exchangeable Cations on Alkaline Soils** | | | | | | | | |
| Exchangeable Calcium | ---- | 0.2 | meq/100g | **4.3** | **6.7** | **14.3** | **6.3** | ---- |
| Exchangeable Magnesium | ---- | 0.2 | meq/100g | <0.2 | **0.4** | **1.4** | <0.2 | ---- |
| Exchangeable Potassium | ---- | 0.2 | meq/100g | **0.4** | **0.8** | **2.0** | **0.3** | ---- |
| Exchangeable Sodium | ---- | 0.2 | meq/100g | <0.2 | <0.2 | **0.5** | <0.2 | ---- |
| Cation Exchange Capacity | ---- | 0.2 | meq/100g | **4.7** | **7.9** | **18.4** | **6.6** | ---- |
| Exchangeable Sodium Percent | ---- | 0.2 | % | <0.2 | <0.2 | **3.0** | <0.2 | ---- |
| **ED040S: Soluble Major Anions** | | | | | | | | |
| Sulfate as SO4 2- | 14808-79-8 | 10 | mg/kg | **500** | **260** | **360** | **20** | ---- |
| **ED045G: Chloride by Discrete Analyser** | | | | | | | | |
| Chloride | 16887-00-6 | 10 | mg/kg | **20** | **10** | **20** | **30** | ---- |

# Appendix C
# Salinity Management Plan (Ref. PSM2808-013L REV3)

G3 56 Delhi Road
North Ryde NSW 2113
P +61-2 9812 5000
E mailbox@psm.com.au
www.psm.com.au

Our Ref: PSM2808-013L REV3

8 October 2024

Goodman Property Services (Aust) Pty Ltd
Level 10, 60 Castlereagh Street
James.Crouch@goodman.com

Attention: James Crouch

Dear James

**RE: 1 - 3 BURROWS ROAD, ST PETERS, NSW**
**SALINITY MANAGEMENT PLAN**

## 1. Preamble

The proposed development seeks consent for:

- Demolition of all existing structures and buildings on site.
- Tree removal both on site and for a limited number of trees in the public domain and adjoining lot.
- Site remediation, and establishment works, including minor excavation / bulk earthworks.
- Design, construction and operation of a two-storey warehouse and distribution centre building with an ancillary office building, including:
  - Approximately 34,032 sqm of total GFA, comprising:
    - 30,389 sqm of warehouse and distribution centre GFA;.
    - 3,334 sqm of GFA for ancillary office space; and
    - End of Trip Facilities on the ground floor of 309 sqm GFA.
  - Maximum building height of RL 29.70 (maximum 25 m from existing ground level)
  - Operation 24 hours per day seven days a week
- Provision of on grade car parking accessed off Burrows Road which provides 145 tenant and visitor car parking spaces (including 8 accessible bays), 14 motorcycle spaces, and bicycle parking and end-of-trip facilities (including 66 bicycle parking spaces, showers, lockers and change rooms for occupants).
- New crossings to Burrows Road for truck and car access.
- Single fire and utilities services ingress crossing off Canal Road.
- Site landscaping works totalling approximately 6,856 sqm (or 19.8% of the site), including
  - Two x 6-metre landscaped setback areas to both the Burrows Road and Canal Road site frontages
  - 3,829 sqm or 11.0% deep soil landscaping
  - 3,027 sqm or 8.7% of permeable paving; and
  - 5,450 sqm or 15.7% tree canopy coverage.
- Provision of building / business identification and wayfinding signage.

## 2. Introduction

This letter presents salinity management advice for the proposed development at 1 -3 Burrow Street, St Peters (the Site). This work has been undertaken in accordance with PSM proposal PSM2808-010L dated 13 July 2022.

The current revision has been undertaken to reflect the updated development plans as of July 2024 for SSDA submission.

Inset 1 presents the site aerial photograph.


**Inset 1: Nearmap Aerial Photograph of the site conditions on 17 May 2022**

### 2.1 Background

This plan has been prepared to address the requirement of salinity analysis in "Section 12. Ground and Water Conditions" of the SEARs deliverables list for the SSDA lodgement. The requirement is reproduced below.

> *"Provide an assessment of salinity and acid sulfate soil impacts."*

With regards to acid sulfate soil, PSM has undertaken a desktop study for the site, refer to PSM2808-012R REV3, dated 25 September 2024. Should further assessment / testing and acid sulfate soil management plan be required, we suggest Goodman engage an environmental consultant to undertake the work.

## 3. Objective

The objective of this salinity management plan (SMP) is to effectively manage site salinity, to minimise the effect of the proposed development on the salinity processes and to protect the proposed development from salinity damage.

With regards to the potential impacts of salinity damage on the proposed development, we expect the impact to be minimal.

## 4. Salinity and Sodicity Assessment

PSM have undertaken a salinity and sodicity investigation at the Site as part of our geotechnical site investigation (ref: PSM2808-012R REV3, dated 25 September 2024).

The investigation included a total of 4 boreholes, from which 4 samples were taken for salinity and sodicity testing. Figure 1 presents the locality plan of the site.

It is assessed that the soil units tested (as follows) are classified as “Slightly saline” to “Moderately saline”.

- Four (4) samples from EXISTING FILL.

Furthermore, it is assessed that the soil units on the site are classified as “Non-sodic”.

The report also presented laboratory test results for soil aggressivity assessment as follows:

- The pH of the soil samples analysed was in the range of 7.8 to 8.6, with an average of 8.1
- The concentrations of chlorides in samples analysed was in the range of 10 mg/kg to 30 mg/kg
- The concentrations of soluble sulphate in samples analysed was in the range of 20 mg/kg to 500 mg/kg
- The moisture content ranged from 10.1 to 37.1 %
- The resistivity of the soil samples ranged from 2,330 ohm.cm to 6,540 ohm.cm.

## 5. Discussion

### 5.1 Development Components

This Salinity Management Plan (SMP) addresses the components of the proposed development at construction stage for the permanent works. Recommendations regarding the following development components are provided in the following sections:

- Importation of soil
- Roads, footpaths and paved areas
- Landscaped area
- Surface water, stormwater and drainage
- Durability of concrete structures in contact with the ground
- Durability of steel structures in contact with the ground.

#### 5.1.1 Importation of Soil

We understand that all fill imported onto the site will be either virgin excavated natural material (VENM) or excavated natural material (ENM). Either material to be imported to the site should be assessed for suitability for the intended use. Highly saline or contaminated soils should not be imported to site.

#### 5.1.2 Roads, Footpaths and Paved Areas

The proposed development will result in the majority of the site comprising roads, footpaths and paved areas for warehouse buildings. The design and construction of roads, footpaths and paved areas should consider the following recommendations:

- Roads, footpath and paved surfaces should be graded, and the grades maintained at all times to prevent ponding of surface water at locations where this can result in infiltration into the underlying soils (e.g., pavement joints).
- Connections between the roads, footpath and paved surfaces and the surface water and stormwater drainage infrastructure should be designed, constructed and maintained to restrict infiltration into underlying soils.

- Services that are to be located below the roads, footpath and paved surfaces should be installed, where practical at the time of construction.
- Provision for a damp-proof course or membrane beneath slabs should be considered by the slab designer.

### 5.1.3 Landscaped Areas

The proposed development will include two landscaped setback areas to both the Burrows and Canal Roads site frontage. The design and construction of the landscaped areas should consider the following recommendations:

- Selection of plant species should consider the soil conditions, including moderate salinity, relatively poor fertility and clayey low permeability soil profiles. Promotion of successful revegetation is likely to require use of nutrient rich topsoil. Saline topsoils should not be imported to site.
- Potential for water logging should be minimised by:
  - Adopting plant species with minimal watering requirements
  - Adopting 'waterwise' gardening principles
  - Minimising use of potable water in landscaped areas
  - Properly designed and implemented irrigation systems
  - Establishment of perennial species and deep-rooted trees.

### 5.1.4 Surface Water, Stormwater and Drainage

Surface water, stormwater and drainage design should aim at restricting infiltration into the ground resulting in groundwater recharge. The design and construction of surface water, stormwater and drainage measures should thus consider the following recommendations:

- Disturbance of natural drainage patterns should be reduced. Where these are disturbed or altered appropriate artificial drainage should be installed.
- Stormwater and surface water should be managed to restrict infiltration.
- Temporary water retaining structures used during construction should be managed to restrict infiltration.
- Stormwater and surface water infrastructure should be designed and constructed to minimise the likelihood of leakage.
- Guttering and down pipes should be connected and maintained.
- Surface water runoff should be directed around all exposed surfaces, temporary stockpiles and landscaped areas.

### 5.1.5 Durability of Concrete Structures in Contact with The Ground

In designing structural concrete elements in contact with the ground the design should consider the results of the salinity assessment and the durability requirements in AS2159:2009 Piling "Design and Installation" and AS3600:2018 "Concrete Structures".

Both these standards provide guidance on minimum concrete grade/strength and minimum cover requirements.

Based on the salinity and aggressivity test results (ref. PSM2808-012R, dated 1 August 2022), it is recommended that:

1. The design of structural concrete members in contact with the ground (excluding piles) adopt an "A2" exposure classification as defined in AS3600:2018.
2. The design of concrete cast in situ piles adopt a "mild" classification as defined in AS2159:2009.

### 5.1.6 Durability of Steel Structures in Contact with The Ground

Table 6.5.2(C) of Australian Standard AS2159:2009, Piling – Design and Installation provides criteria for exposure classification for steel piles based on resistivity, soil and groundwater pH, and chlorides in soil and groundwater. On the basis of soil chlorides, resistivity and pH testing completed we assess the exposure classification for steel piles in the soil to be "non-aggressive".

## 6. Sign off

We recommend the following:

- The designer(s) and contractor(s) responsible for construction of the various development components be required to sign-off their design and the as built, certifying that:

  *"The works have been designed/constructed having given appropriate consideration to the recommendations in the SMP (Ref. PSM2808-013L REV2)".*

The designer and contractors should contact PSM during the works if they have any queries with regards to the requirements in the SMP or if conditions significantly differ from those described in this SMP.

**Yours Sincerely**

**KEN TONG LEE**
**GEOTECHNICAL ENGINEER**

**AGUSTRIA SALIM**
**PRINCIPAL**

Enc.

Figure 1 Site Locality Plan


**Legends:**

- Site Boundary
- Boreholes undertaken at 2019
- Boreholes undertaken at 2022

**Notes:**
Aerial image sourced from Nearmap.com dated 17 May 2022

0 25 50 m

| | | | |
|---|---|---|---|
| P S M | Created By: PSM | Revision: A | Goodman Property Services (Aust) Pty Ltd<br>1-3 Burrows Road<br>St Peters<br>Site Locality Plan<br>Borehole Locations |
| | Date: 02 Aug 2022 | Paper Size: A3 | PSM2808-013L \| Figure 1 |

P:\PSM2808\Docs Out\PSM2808-012R\Tool\Locality plan.qgz Layout: A3_LandscapeTemplate_V1_QGIS