Salinity Management Plan

Mamre Road, Abbotts Road and Aldington Road Upgrade, Kemps Creek NSW

Prepared for: Land Owners Group – East c/o AT&L

A101024.0241.00 | SMP.v2f | Date: 14/08/2024

Document Information

Report Title: Salinity Management Plan
Prepared for: Land Owners Group – East c/o AT&L
Project Address: Mamre Road, Abbotts Road and Aldington Road Upgrade, Kemps Creek NSW
File Reference: A101024.0241.00
Report Reference: A101024.0241.00.SMP.v2f
Date: 14/08/2024

Document Control

Version	Date	Author	Revision description	Reviewer
v1d	31/05/2024	Zahra Derakhshan	Draft for client review	Andrew Hunt
v1f	06/08/2024	Zahra Derakhshan	Final for Issue	Andrew Hunt
v2f	14/08/2024	Nicholas Maricic	Update per client request	Andrew Hunt

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1 Introduction and Background

1.1 Introduction

ADE Consulting Group Pty Ltd (ADE) has been requested by Land Owners Group – East (LOG-E) (the Client) to provide a salinity management plan (SMP) for the Mamre Road, Abbotts Road and Aldington Road Upgrade (AARU and MAIU) project located within Kemps Creek, New South Wales (NSW) ('the site'). The location of the site and the physical boundaries which apply to this SMP are defined in Figure 1, **Appendix A – Figures**.

A previous salinity assessment was completed as a part of a geotechnical investigation by ADE in 2022 (ADE, 2022a), the results of which will form the SMP. This SMP will outline the existing site conditions, assess potential impacts to construction and the environment and outline the key strategies for managing potential risks associated with urban salinity.

This plan is considered to involve 'passive' management protocols and is considered to be supplemental document which must be read in conjunction with the construction environmental management plan (CEMP).

1.2 Developmental Consent

A development application (DA) is a formal application for development that requires consent under the NSW Environmental Planning and Assessment Act 1979 (EP&A Act). The conditions of Development Consent (SSD 10479 200A and SSD-9138102) include:

- (D38) – The Applicant must prepare a Salinity Management Plan, which must form part of the CEMP, that addresses all aspects of the development plan. The Applicant must implement the most recent revision of the Salinity Management Plan for the duration of construction.

This SMP has been prepared to accompany a CEMP for the MOD to State Significant Development (SSD-10479 and SSD-9138102) occurring at the site. The proposed development is considered to be an ancillary requirement to facilitate the client's DA.

1.3 Proposed Development

It is understood that the proposed road upgrade will involve upgrading a 4 kilometre (km) stretch of road from the intersection of Mamre Road and Abbotts Road, extending up Aldington Road, Kemps Creek. The road upgrade is expected to involve bulk earthwork activities including cut and fill activities and road widening along which may result in the excavation of soils impacted by urban salinity.

As per information provided geotechnical aspects (ADE, 2022a), earthworks and subgrade preparation should be carried out in accordance with the Road Controlling Authority's (TfNSW) specification and Australian Standard 3798-2007. However, a general procedure is provided below for the proposed upgrade and widening areas.

Fill materials, topsoil and unsuitable materials should be removed from the site.

- Excavated materials for reuse as engineering fill should be carefully stockpiled separately.
- After excavation, the exposed surface should be treated to not vary more than 2% from the Optimum Moisture Content (OMC) and then compacted using a vibrating compactor of at least 12 tonnes to the design density.
- The exposed surface should be tested with appropriate density testing and proof rolling should be carried out under the supervision of a geotechnical engineer with a smooth drum roller.
- Any soft or loose areas should be identified and excavated i.e., ripped and recompacted or otherwise replaced with appropriate imported fill material.

Every layer of fill area and the final surface in cut areas should be suitably compacted to the required design parameters. Recommendations for fill layer compaction are listed below:

- Fill material moisture content should be treated to ±2% OMC of the material.
- All placed material should have a minimum density ratio of 98% of the maximum dry density.
- Placement of loose thickness of fill layers should not exceed 200 mm during compaction.

Imported materials for fill layers should be clean (i.e., free of contaminants, deleterious or organic material), free of oversize material, of suitable moisture content, and otherwise satisfy Australian Standard AS 3798-2007 and the Road Controlling Authorities specification.

1.4 Objectives

The objective of the SMP is to outline the outline the management protocols required to manage urban salinity and minimise its impact on the proposed development. All works are to conform with the Western Sydney Regional Organisation of Councils Ltd (2023). *Western Sydney Salinity Code of Practice March 2003 (amended January 2004)*.

2 Site Identification

The site is located within nominated areas on Mamre Road, Abbotts Road and Aldington Road, Kemps Creek NSW. The proposed development is expected to encompass a length of 4 km and is situated within the Penrith City Council Local Government Area (LGA).

Table 1. Summary of site identification details and information.

Site Project Details	
Site Owner:	Multiple owners
Site Address:	Mamre Road, Abbotts Road and Aldington Road, Kemps Creek NSW
Site Area:	~8.9 ha
Local Government Authority:	Penrith City Council
Title Identification:	Part of Lots 1-2 in DP 250002, Lot 10 in DP 1296455, Lots 141-142 in DP 1033686, Lots 8-10 and 13-18 in DP 253503, Lots 20-28 in DP 255560, lots 30-37 in DP 258949m Lots 38 and 41-42 in DP 708347 and DP 1033686.
Current Land Zoning:	'IN1 – General Industrial'
Local Environmental Plan:	Penrith City Council Local Environmental Plan 2010
Current Land Use:	Road reserves: • From the western end of Abbotts Road to the Abbotts / Aldington intersection. • From the Abbotts/Aldington intersection continuing north along Aldington Road.

3 Site Condition and Surrounding Environment

3.1 Geology

3.1.1 Proposed Development

The site comprises public road reserves and private land across multiple residential properties located at Abbotts and Aldington Road, Kemps Creek, NSW (refer to **Appendix A**).

The site comprises Abbotts Road reserve from the western end to Abbotts / Aldington intersection, Aldington Road reserve from the junction to the north, and 5-10 m extension to private land of both roadsides. The total route length of estimated at 4 km.

3.1.2 MAIU Staging

The site lies on the western side of the Sydney Basin before the Blue Mountains. The Penrith 1:100 000 Geological series sheet 9030 map reported in Geotechnical investigation Report (ADE, 2022a) indicated that the site overlies Triassic period Bringelly Shale (Rwb). The Bringelly Shale is described as shale and carbonaceous claystone, claystone, laminate, fine to medium-grained lithic sandstone, rare coal, and tuff.

The border of an area of Quaternary period Alluvial sediments (Qal) lies approximately 100 m west of Mamre Road and 350 m east of Aldington Road. These sediments typically comprise fine-grained sand, silt, clay, alluvial & estuarine sediments. To the west the Kemps Creek tributary of South Creek flows into the Hawkesbury River while Ropes Creek flows north to South Creek.

3.1.3 AARU Phase I

Reference to the 1:100,000 scale Penrith Soil Landscape Series Sheet 9030 map, indicates that Abbotts Road lies in the Blacktown (bt) soil landscape group comprising gently undulating rises on Wianamatta Group Shales, broad rounded crests, and ridges with gently inclined slopes.

3.1.4 AARU Phase II

Aldington Road mostly lies in the Luddenham (lu) soil landscape group (which generally comprises undulating to rolling low hills on Wianamatta Group Shales and extensively cleared tall open forest) and occasionally lies on the border between the Blacktown and Luddenham soil landscape groups. Approx. 50-100 m to the east of Mamre Road lies Kemps Creek and the south creek (sc) soil landscape group comprising floodplains, valley flats and drainage depressions of channels on the Cumberland Plain. Ropes Creek lies approx. 1.5 km east of the south end of Aldington Road and 500m east at the northern end.

3.2 Topography

The site has a moderate to steep sloping surface ranging from 44-74 m Australian Height Datum (AHD). The lowest point (44 m) on-site is in the southwestern portion of the site, with the highest point found at the northern part of the site. As such, the site is considered to have a moderate to steep gradient towards the southwest. Based on the data collected during the Geological Investigation (ADE, 2022), two samples exhibited high sodicity levels. This highlights the importance of recognising that high sodicity can lead to surface pooling if adequate drainage measures are not implemented.

3.3 Hydrology and hydrogeology

No surface water body was identified on-site. The closest surface water body to the site is Kemps Creek. The closest portion of Kemps Creek is found approximately 350 m west of the Site. Multiple surface water drains were noted to be scattered throughout the various properties on-site, predominantly within artificial drainage lines, or along the road and curbing.

Due to the topography of the site and proximity to Kemps Creek, it is inferred that the local groundwater flow is in a south westerly direction towards Kemps Creek, a freshwater ecological system. As the future use of the site will primarily feature a local road upgrade, a moderate to high level of surface water run-off is expected to be captured within local stormwater systems which commonly discharge into local ecological communities.

Geotechnical investigations (ADE, 2022a) indicated groundwater was encountered at depths of 1.5 to 2.1 meters below ground level (BGL). This suggests that groundwater interactions may occur if bulk earthworks extend to these depths.

High sodicity levels in some soil samples further emphasise the need for proper drainage to prevent surface pooling. Considering these factors, there is a potential for groundwater interactions, especially in areas with perched or raised water tables. These interactions should be carefully managed to avoid negative impacts on both the construction process and the surrounding ecological systems.

3.4 Naturally occurring contaminants

A review of the Atlas of Australian Acid Sulfate Soils outlined within the Land Insight Report (ADE, 2022b) identified the site situated within a 'extremely low' (1-5%) probability of encountering acid sulfate soils. The site is however, situated within an area which is classified as having a 'moderate hazard or risk' for dryland salinity to occur for years up to and including 2050 as per the National Assessment for Dryland Salinity. This is discussed within the Section 4.

4 Current Salinity Conditions

4.1 Salinity Mapping

From the map of salinity potential in Western Sydney (Department of Infrastructure, Planning and Natural Resources, 2002), the site has an inferred 'moderate' salinity potential. It is noted that the mapping is based on soil type, surface level and general groundwater considerations and, as such is approximate only.

Based on the salinity map reported in ADE's Abbotts Aldington Geotech investigation report (ADE, 2022a) it is noted that the proximity to Kemps Creek and Ropes Creek is not determined to be a high-risk area.

4.2 Historical Environmental Investigations

4.2.1 ADE Consulting Group NSW (2022a), Geotechnical Investigation Report, Proposed Mamre Road Upgrade, Kemps Creek NSW 2178.

In September 2022, ADE undertook a Geotechnical Investigation for proposed road upgrade and widening works for the Mamre Road and Abbotts Road intersection, along Mamre Road extending to approximately 350m north and 650m south of the intersection and approximately 80 m along Abbotts Road. The investigation was commissioned by Land Owners Group-EAST.

The fieldwork comprised drilling of 10 boreholes identified as BH01 to BH10 inclusive. The drilling was generally carried out by a 5 tonne (t) excavator with 200mm diameter auger attachment with extensions. Based on the data and evidence collected during the investigation, the following conclusions were drawn regarding the salinity, aggressivity and sodicity of the site:

- Of the 10 samples collected, 7 were classified as non-saline and 3 as slightly saline.
- Soils were identified to be non-aggressive to concrete and non-aggressive to steel.
- One sample was analysed for sodicity (BH03/1.0-1.1m), which was characterized as sodic.

- The salinity, aggressivity, and sodicity levels are considered naturally occurring features of the local landscape. Provided that appropriate management techniques are utilised, they are not considered to be significant impediments to the proposed development.
- Topsoils observed on site ranged from 0.15-0.3 m BGL, which consisted mostly of silty clays and medium clays with an estimated saturated hydraulic conductivity of 0.36 to 36 mm/hr.
- The underlying natural strata consisted of medium to heavy clays with an estimated saturated hydraulic conductivity of 0.0036 to 3.6 mm/hr.
- Based on a review of the available information, ADE did not consider that the proposed development will adversely impact soil salinity and sodicity.

4.2.2 ADE Consulting Group NSW (2022b), Geotechnical Investigation Report, Proposed Abbotts and Aldington Road Upgrade, Kemps Creek NSW 2178.

In October 2022, ADE undertook a Geotechnical Investigation for proposed road upgrade and widening works for Abbotts Road (CH 0.0 – CH 447.527) and Aldington Road from its south connection to Abbotts Road to 74 Aldington Road, Kemps Creek (approx. CH 0.0 - CH 2250). The existing culverts were also proposed to be upgraded at locations on Aldington Road. The investigation was commissioned by Land Owners Group-EAST.

The fieldwork comprised drilling of 15 boreholes identified as BH11 to BH25 inclusive. The drilling was generally carried out by a 5-tonne excavator with 300mm diameter auger attachment with extensions and a tracked drill rig with 100m diameter auger was used for the boreholes adjacent to proposed culverts (BH15-16, BH21-24 inclusive).

Standard Penetration Tests (SPT) were undertaken during drilling of BH15, BH21-24 inclusive, in accordance with Australian Standard AS 1289.6.3.1-2004 at regular intervals of 1.5m to provide an assessment of soil strength. The tests were completed to help correlate the soil consistency and obtain soil samples for laboratory testing.

Piezometric wells were installed within boreholes BH23 and BH24 to a maximum depth of 5.3m below ground level (m BGL) to monitor groundwater levels. Installation was carried out using a PVC standpipe at the completion of the borehole drilling.

Based on the data and evidence collected during the investigation, the following conclusions were drawn regarding the salinity, aggressivity and sodicity of the site:

- Of the 17 samples collected, 5 were classified as non-saline, 9 as slightly saline and 3 as moderately saline.
- Soils were identified to be non-aggressive to concrete and non-aggressive to steel.
- Two samples were analysed for sodicity (BH17/0.4-0.5m and BH24/0.4-0.5m), with both characterized as highly sodic.
- The salinity, aggressivity, and sodicity levels are considered naturally occurring features of the local landscape. Provided that appropriate management techniques are utilised, they are not considered to be significant impediments to the proposed development.
- Topsoils observed on site ranged from 0.1-0.3 m BGL, which consisted mostly of silty clays and medium clays with an estimated saturated hydraulic conductivity of 0.36 to 36 mm/hr.
- The underlying natural strata consisted of medium to heavy clays with an estimated saturated hydraulic conductivity of 0.0036 to 3.6 mm/hr.
- Based on a review of the available information, ADE did not consider that the proposed development will adversely impact soil salinity and sodicity.

4.3 Sodic Soils

Sodicity is expressed as the amount of exchangeable sodium as a percentage of the Cation Exchange Capacity (CEC), or Exchangeable Sodium Percentage (ESP %). Sodic soils may be affected by very severe surface crusting, very low infiltration and hydraulic conductivity, very hard and dense subsoils as well as high susceptibility to gully and tunnel erosion. Sodicity also affects the shrink – swell properties of a soil.

Based on the Geotechnical Investigation by ADE (ADE, 2022a), 2 samples were analysed for sodicity (BH17/0.4-0.5m and BH24/0.4-0.5m), with both characterized as highly sodic. Given the high sodic conditions detected in above mentioned locations, it is important to recognise the potential for excessive swelling of clays when wet, reduced water infiltration, and subsequent waterlogging issues. These conditions can result in the deposition of surface salts, which further degrade soil quality.

To mitigate these issues, additional soil conditioning may be required. For example, applying gypsum can help displace sodium ions and improve soil structure, thereby enhancing water infiltration and reducing waterlogging (see **Table 2**). Proper soil management practices, including the use of soil conditioners, are essential to maintain soil health and support the intended land use.

Table 2. Gypsum Application Rate with respect to soil ESP.

Enchantable Sodium percentage (ESP%) of cut area	Gypsum application rate (t/ha)
Greater than 5, less than 10	2-5
Greater than 10	5

5 Management Activities and Procedures

This SMP addresses the components of the proposed development at construction stage for the permanent works.

Salinity management regarding the following development components are provided in the following sections:

- Earthworks.
- Imported soil.
- Gardens and landscaped areas.
- Roads and footpaths.
- 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 Management Strategies

5.1.1 Bulk Earthworks

As per earthworks plans provided by the client (ADE, 2022a and 2022b) the construction of the earthworks should in general consider the following strategies:

- Importation of soil as per **Section 5.2** of this report.
- Vegetation cover should be estimated and maintained on permanent batters upon completion to control erosion.
- The final surface of all areas of the development should be graded to prevent the ponding of surface water.
- Erosion control of temporary batters, stockpiles and disturbed areas should be planned prior to undertaking the earthworks and implemented during the earthworks. Consideration should be given to:
    - Grading and sealing partially completed surfaces.
    - Installation of clearly visible fencing and traffic control measures to prevent unnecessary trafficking of areas and ensuring site disturbance.
    - Establishing set vehicular access points and roads.
    - Protecting stockpiles (temporary vegetation or mulching) where these are to be left in place for long durations.

  - Managing disturbance of the soil – focus on capping of the soil surface, both exposed when excavated and filling, with more permeable material which will prevent ponding and reduce capillary rise. This will also act as a drainage layer and reduce potential erosion.
  - Minimising cut and fill – where possible use excavation soils in fill areas with similar salinity characteristics and place back in the original order.
- Minimising water infiltration – ensuring cut and fill areas are compacted well.
- Maintain vegetation where possible and plant salt tolerant species – plants will also reduce soil erosion and should be considered in areas of disturbance soil.
- Ensure the site is well drained.
- Sediment control shall be implemented by means of sediment traps and silt fencing where considered necessary.
- Dust suppression using water carts will avoid over-watering and only use sufficient water to manage dust rise (i.e., avoid surface ponding).
- Water used for construction purposes (e.g. to achieve adequate compaction rates) will be applied sparingly.

5.1.2 Gardens and Landscaped Areas

The proposed development will result in the majority of the site comprising hardstand roads and footpaths. Garden and landscaped areas are likely to be limited to nominated areas only, such as the road verge. The construction of the gardens and landscaped areas should consider the following:

- Irrigation of rehabilitated or landscaped areas will utilize low-water-use fixtures such as drippers, sub-surface irrigation or similar. Water will be applied sparingly and only in quantities sufficient to promote plant growth.
  - **Note:** given the high sodic conditions detected in site, it is important to recognise the potential for excessive swelling of clays when wet, reduced water infiltration, and subsequent waterlogging issues. These conditions can result in reduced water infiltration thus results in waterlogging and poor drainage, which further degrade soil quality.
- Subsoil moisture will be physically checked (through visual observation) regularly during irrigation to ensure watering rates are not excessive.
- Selection of plant species should consider the soil conditions, including moderate salinity, relatively poor fertility, and clayey low permeability soil profiles. An indicative species list is provided in Section 11.3 of the Western Sydney Salinity Code of Practice (2004). Promotion of successful revegetation is likely to require use of nutrient rich topsoil. Saline topsoils should not be imported to site.
  - For saline soils, the pH range can vary, but typically, saline soils are alkaline due to the presence of soluble salts:
    - Moderately saline Soils: pH ranges from 7.5 to 8.5
    - Strongly Saline Soils: pH ranges from 8.5 to 10.
- 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.

5.1.3 Roads and Footpaths

The construction of roads and footpaths should consider the following measures:

- Roads and footpaths 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 and footpath 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 and footpath surfaces should be installed, where practical, at the time of construction.

5.1.4 Surface Water, Stormwater and Drainage

The design and construction of surface water, stormwater and drainage measures should consider the following:

- Disturbance of natural drainage patterns should be reduced. Where these are disturbed or altered appropriate artificial drainage should be installed. Swales and basins will be incorporated as temporary measures to minimise disturbance to natural drainage patterns.
- Stormwater and surface water should be managed to restrict infiltration. Two lined on-site detention basins will collect stormwater.
- Temporary water retaining structures used during construction should be managed to restrict infiltration. Basins will collect runoff to manage sediment discharge.
- Stormwater and surface water infrastructure should be designed and constructed to minimise the likelihood of leakage. Two on-site detention basins will collect stormwater to control runoff.
- Surface water runoff should be directed around all exposed surfaces, temporary stockpiles and landscaped areas.
- Swales and basins will be incorporated as temporary erosion and sediment control (ESC) measures to direct surface water around all exposed and temporary stockpiles.
- Disturbance to the natural hydrological system shall be minimised by maintaining good surface drainage and reducing water logging on the site.
- Groundwater recharge is to be minimised to the extent it does not adversely impact groundwater dependent ecosystems downstream.
- Trunk drainage channels shall be lined were subject to frequent inundation in accordance with Sydney Water requirements.

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 (ADE, 2022c), it is recommended:

- The design of structural concrete members in contact with the ground (excluding piles) adopt a “A2” exposure classification as defined in AS3600:2009.
- The design of concrete cast in situ piles adopt a “mild” classification as defined in AS2159:2009.

5.2 Importation and Sampling Requirements

5.2.1 Importation Requirements

It may be required to import soil onto site. All soil/landscaping materials which are imported to site for application within the site boundaries must be either classified as Virgin Excavated Material (VENM) or meet an NSW approved resource recovery order. Materials to be imported to site should be assessed for suitability for the intended use. Very high (>1.6 dS/m) to high saline (0.8-1.6 dS/m) soils shall not be imported to site.

5.2.2 Minimum Sampling Requirements

Salinity testing shall be undertaken on imported soil and in accordance with Department of Land and Water Conservation (DLWC) (2002), *Site Investigations for Urban Salinity*. These guidelines are essential for ensuring the suitability of imported soil and preventing the introduction of soil with excessively high salinity levels onto the site. Material with electrical conductivity (ECe) > 8 decisiemens per cm (dS/cm); i.e. very high to high saline shall not be imported.

When conducting salinity testing, it is crucial to employ comprehensive sampling techniques that capture the full range of salinity variations within the soil profile. This includes sampling at multiple depths and locations across the proposed importation area to obtain representative samples that accurately reflect the overall salinity characteristics of the soil.

The DLWC guidelines, although valuable, may lack specificity regarding the exact sampling requirements for salinity testing. Therefore, it is recommended to supplement these guidelines with best practices in soil sampling and analysis. This may involve:

1. **Depth-Specific Sampling:** Collecting soil samples at various depths, especially in areas where the soil profile exhibits significant changes in salinity levels. This depth-specific sampling provides a more comprehensive understanding of salinity variations within the soil profile.
2. **Spatial Sampling:** Ensuring that soil samples are collected from multiple locations across the importation area, considering factors such as topography, soil type variability, and historical land use practices. Spatially distributed sampling helps capture spatial heterogeneity in salinity distribution.
3. **Laboratory Analysis:** Utilizing accredited laboratories with expertise in soil salinity analysis. The laboratory analysis should include measurements of electrical conductivity (ECe) to accurately quantify the salinity levels in the soil samples.
4. **Quality Assurance/Quality Control (QA/QC):** Implementing rigorous QA/QC measures during sample collection, handling, transportation, and analysis to minimize potential errors and ensure data reliability.

By combining the DLWC guidelines with industry best practices in soil sampling and analysis, stakeholders can effectively assess and manage soil salinity risks associated with imported soil, thereby promoting sustainable land use practices and environmental stewardship.

5.3 Contingency/Incident Response Protocol

As a contingency if unexpected finds, such as visible crystal salts on surface or future signs of concrete degradation, the following steps can be followed as an incident response protocol:

- Notify site owner.
- Site owner to contact environmental consultant.
- Consultant to inspect site and advise on further controls of protocols required.

6 Implementation, Monitoring and Review

6.1 Management Structure and Responsibilities

Table 3 outlines the main parties involved and responsible for the application and implementation of this SMP.

Table 3. Key Roles and Responsibilities.

Role	Responsibility
Site Owner	The site owner must ensure that the SMP is attached to and implemented as a sub-management plan to the CEMP and is transferred to the site manager for implementation and review.
Site Manager	The site manager must implement all administrative and physical controls to ensure that any work being carried out in the site are as per the SMP. The site manager must provide a copy of this SMP to any worker or contractor who may have reason to disturb or exacerbate the current salinity conditions. The site manager must ensure that all workers/contractors operating within the site are aware of this SMP and are inducted to an appropriate level of environmental and emergency procedures. The site manager must demonstrate that any workers/contractors working within the site are fully trained in the management of the risks and hazards associated with urban salinity. The site manager is responsible for ensuring all works are undertaken as per the CEMP, SMP and other relevant sub-management plans.
Site Workers/Contractors	Site workers/contractors who undertake intrusive works at the site must review this SMP and implement the procedures provided within **Section 5** of this report. It is the responsibility of all workers/contractors to raise any safety concerns or report any unexpected finds to the site manager upon identification.
Environmental Consultant	The environmental consultant must ensure that all supervision, sampling and/or investigative methodologies are completed in accordance with relevant legislation and codes of practice. The environmental consultant is responsible for reviewing and updating the SMP under certain circumstances as deemed necessary by the site manager. Reviewing and updating the SMP will be required during changes in land use or in response to unexpected finds. All amendments and/or any environmental reports shall be issued to the site manager in a timely manner.

6.2 Worker and Contractor Training

All personnel and contractors engaged in intrusive activities at the site must undergo comprehensive training to understand their roles and responsibilities as outlined within the SMP. This training should cover environmental responsibilities and associated risks, particularly when dealing with potentially contaminated soils which may represent a salinity risk. Training requirements include:

- Site induction.
- Understanding the SMP, including how to identify indicators of potential urban salinity (e.g., surface salt deposits).
- Environmental emergency response training.
- Specific environmental training tailored to job roles.

Records of all training sessions must be maintained properly. The site manager is responsible for identifying the need for additional or updated training and ensuring its implementation. Workers should be briefed on the minimum PPE requirements for the project.

6.3 Audit and Review Process

The SMP is a dynamic document that requires periodic review and amendments to align with site changes and evolving legislative requirements, enhancing its effectiveness. It remains applicable as long as potential salinity risks exist on-site.

The site manager, along with a suitably qualified individual (e.g., environmental consultant), must conduct an SMP review at least once every five years or in response to specific triggers, including:

- Changes in land use.
- Identification of significant environmental or health and safety issues.
- Discovery of unexpected incidents or finds.
- Completion of an environmental audit.

7 Conclusion and Closure

On the basis that the area has been classified low risk, the nature of the development and following the incorporating of the management strategies outlined within this document, further monitoring or remediation of identified issues associated with urban salinity are not considered warranted.

It is considered that the implementation of this SMP within the overall site CEMP will ensure impacts of this development on urban salinity will be minimised to a safe level.

8 Bibliography

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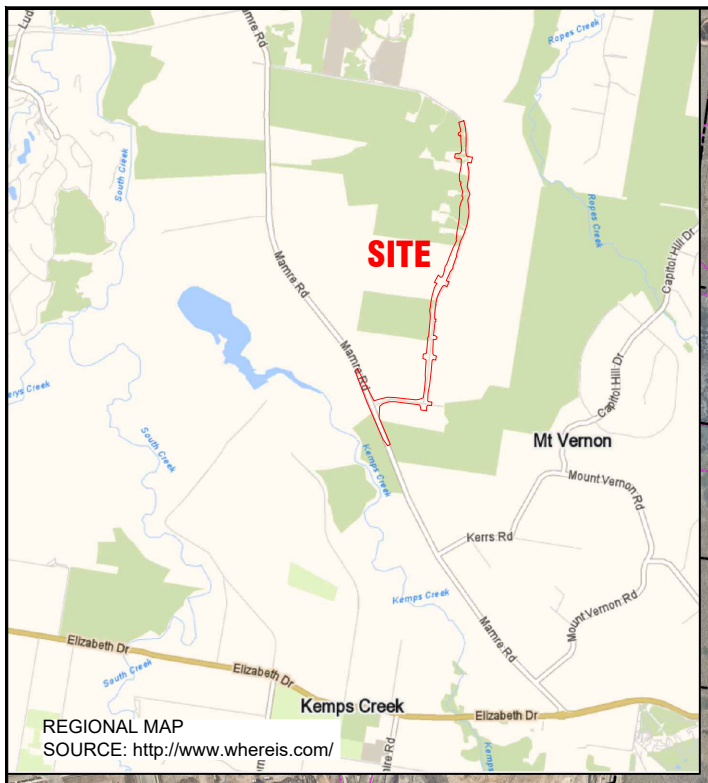
Appendix A – Site Figure



LEGEND

AREA OF INVESTIGATION

0 80 160 240 320 400

SCALE 1:8000 @A3 METRES

NOTE:
ALL LOCATIONS ARE APPROXIMATE DIMENSIONS IN METRES.

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM, 13 MAR 2024.

revision	no.	description	drawn	approved	date
	A	FIRST ISSUE	MC	NM	28/03/24

drawn	MC
approved	NM
date	28/03/2024
scale	AS SHOWN
original size	A3

client: LAND OWNER'S GROUP - EAST

project: SALINITY MANAGEMENT PLAN
MAMRE ROAD, ABBOTTS ROAD AND
ALINGTON ROAD UPGRADE, KEMPS CREEK NSW

title: SITE LAYOUT AND SITE LOCATION PLAN

project no: A101024.0241.00 figure no: FIGURE 1 rev: A

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PLOT DATE: 28/03/2024 3:10:47 PM DWG FILE: C:\USERS\MIRANDA.CHAU\ADE CONSULTING GROUP PTY LTD\ENV-WORKING - DOCUMENTS\NSW\PROPOSAL\24.0241.00 AARU AND MAIU\6 CAD_MCP1\101024.0241.00_SMP.DWG

BH/MW24	0.2-0.3	0.4-0.5	0.9-1.0	1.4-1.5	1.9-2.0
SALINITY	2.8	<2	2.5	3.5	5.8

BH20	0.4-0.5	0.9-1.0	1.4-1.5	1.7-1.8
SALINITY	2.5	4.0	3.1	3.1

BH17	0.2-0.3	0.4-0.5	0.9-1.0
SALINITY	<2	<2	2.6

BH14	0.3-0.4	0.4-0.5	0.9-1.0	1.4-1.5	1.9-2.0
SALINITY	<2	<2	2.6	7.2	5.6

BH/MW24
BH/MW23
BH22
BH21
BH20
BH19
BH25
BH18
BH17
BH16
BH15
BH14
BH11
BH12

LEGEND

- AREA OF INVESTIGATION
- BH — BORE HOLE LOCATION
- BH/MW — BORE HOLE / GROUNDWATER MONITORING WELL

BH	DEPTH IN METERS
SALINITY	CONCENTRATION (ECe µs/cm)

- NS — NON-SALINE
- SS — SLIGHTLY-SALINE
- MS — MODERATELY SALINE

0 80 160 240 320 400
SCALE 1:8000 @A3 METRES

NOTE:
ALL LOCATIONS ARE APPROXIMATE DIMENSIONS IN METRES.

AERIAL IMAGE SOURCE: MAPS.AU.NEARMAP.COM, 13 MAR 2024.

revision	no.	description	drawn	approved	date
	A	FIRST ISSUE	MC	NM	30/05/24

drawn	MC
approved	NM
date	30/05/2024
scale	AS SHOWN
original size	A3

client: LAND OWNER'S GROUP - EAST

project: SALINITY MANAGEMENT PLAN
MANRE ROAD, ALDINGTON AND ABBOTTS ROAD
KEMPS CREEK, NSW

title: SALINITY ANALYTICAL RESULT PLAN

project no: A101024.0241.00 | figure no: FIGURE 2 | rev: A

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ADECONSULTINGGROUP
SOLUTIONS THROUGH INNOVATION

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