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c/ - Ethos Urban Pty Limited
173 Sussex Street
SYDNEY NSW 2000

Project 92421.01
15 March 2021
R.002.Rev0
RWG

Attention: Mr Paul Altree-Williams

Email: PAltree-Williams@ethosurban.com

Preliminary Salinity Management Plan
Proposed Industrial Subdivision
200 Aldington Road, Kemps Creek

1. Introduction

Douglas Partners Pty Ltd (DP) was engaged by Fife Kemps Creek Pty Ltd (FKC) to prepared a Preliminary Salinity Management Plan (SMP) for the proposed industrial subdivision at 200 Aldington Road, Kemps Creek (the site, as shown on Drawing 1, attached). The site has an approximate area of 72 ha and is currently used for rural residential and market gardening activities.

DP previously completed *Geotechnical and Groundwater Summary Report, 200 Aldington Road, Kemps Creek*, Project 92421.00.R.002.Rev1 dated 1 October 2020 (DP, 2020). With respect to salinity, DP (2020) recommended that additional salinity investigations were undertaken, and the preparation of an SMP was completed, to delineate saline areas and to provide appropriate recommendations during the development process.

The reporting was completed to support a State Significant Development Application (SSDA) submission. NSW Planning Industry and Environment (NSW Planning) *Response to Submissions Letter (SSD-10479)* dated 22/12/2020, requested that the additional salinity investigations and the preparation of the SMP was completed as part of the development application process.

DP understands that FKC intend to address the NSW Planning requirements however will request that NSW Planning consider that the additional salinity investigations recommended in DP (2020) be conditioned on the development consent to be completed prior to other works for the following reasons:

- FKC do not currently have access to the land to complete the investigations.
- The investigation would involve excavation of test pits which are very disruptive and would impact current users (residential and market gardening activities) if undertaken while occupied.

This Preliminary SMP utilises data from previous investigations to present a potential worst-case salinity and aggressivity characterisation, and management strategies for the site. The provided strategies should be confirmed and potentially reduced, once the above recommended site-specific salinity investigation and management plan has been completed.

2. Desktop Assessment Previous Investigations

Reference to the Map of Salinity Potential in Western Sydney (refer Figure 1) infers known salinity and high salinity potential around the primary creek line / dam in the northeast corner of the site and moderate salinity potential for the remainder of the site. It is noted that the mapping is based on soil type, surface level and general groundwater considerations and is appropriate for use only at a regional scale. The mapping of salinity on the site scale, as such is approximate only and must be confirmed by field investigations.

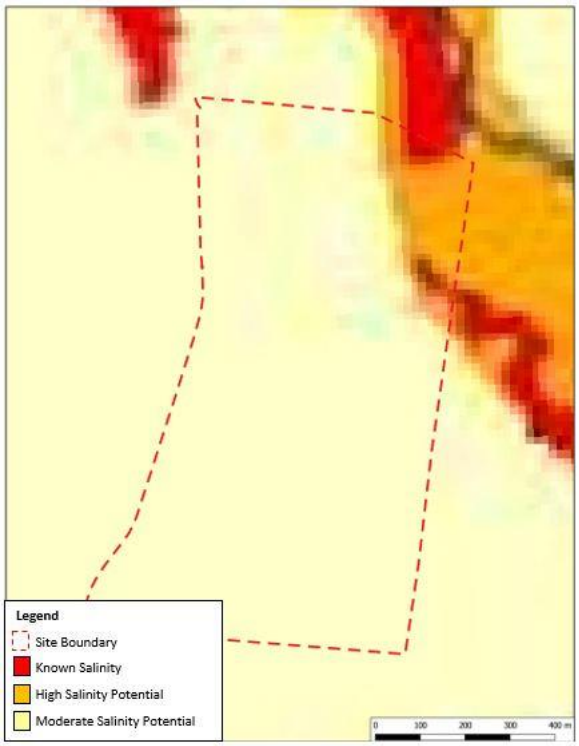


Figure 1: Salinity Mapping

The following geotechnical investigations were reviewed with a high-level summary provided below.

- DP *Preliminary Site Geotechnical Investigation, 106 - 142 Aldington Road, Kemps Creek, NSW* Project 92345.00.R.001.Rev0 dated 16 May 2019 (DP, 2019a).
- DP *Preliminary Geotechnical Investigation and Preliminary Salinity Assessment, 144 - 228 Aldington Road, Kemps Creek, NSW,* Project 92364.02.R.001.Rev0 dated 25 September 2019 (DP, 2019b).

The investigations were completed at the site for Lots 31 and 32 DP258949, as detailed in DP (2019a) and Lots 20 to 23 DP255560, and Lot 30 DP258949, as detailed in DP (2019b). The investigations were undertaken for pre-purchase due diligence purposes.

The investigations comprised a site walkover inspection, test pit excavation, borehole drilling and in-situ testing, followed by laboratory testing of selected samples. Selected samples from 15 locations were analysed for salinity parameters: texture, electrical conductivity, pH, chloride and sulphate, sodicity and Emerson crumb dispersibility. Test pit and borehole locations where salinity sampling occurred are shown on Drawing 1.

Based on the finding of DP (2019a and DP2019b) material within the site was characterised as follows:

- Non to mildly aggressive to concrete.
- Non to moderately aggressive to steel.
- Non to very saline.
- Non to very sodic (erosive).

The salinity classification at each test pit and borehole location is shown on Drawing 1. Very saline soil was observed in the north eastern area of the site which generally conforms to the salinity potential mapping (Figure 1).

3. Salinity Management Plan

The previous reports indicate that there is non to very saline material at the site and as such, the site will have salinity constraints. The following general management strategies are confined to the management of those factors with a potential to impact on the development. These management strategies are based on the worst-case salinity conditions reported in DP (2009a) and DP (2019b). Undertaking further investigations will make it possible to target the specific areas where salinity exists and may reduce the salinity classifications.

A. Avoid water collecting in low lying areas, in depressions, or behind filling embankments. This can lead to water logging of the soils, evaporative concentration of salts, and eventual breakdown in soil structure resulting in accelerated erosion.

B. Any pavements should be designed to be well drained of surface water. There should not be excessive concentrations of runoff or ponding that would lead to waterlogging of the pavement or additional recharge to the groundwater through any more permeable zones in the underlying filling material.

C. Surface drains should generally be provided along the top of batter slopes to reduce the potential for concentrated flows of water down slopes possibly causing scour.

D. Salt tolerant grasses and trees should be considered for landscaping, to reduce soil erosion and to maintain the existing evapo-transpiration and groundwater levels. Reference should be made to an experienced landscape planner or agronomist.

In addition to the above, DP have also provided the following management strategies for the installation of services or construction of pavements and structures/buildings. These strategies should be complementary to standard good building practices, including cover to reinforcement within concrete and correct installation of a brick damp course (where used), so that it cannot be bridged to allow moisture to move into brick work and up the wall. These strategies are based on a potential worst-case

classification. Based on the desktop review, DP considers that an appropriate worst-case classification for the site would be a classification of very saline and moderately aggressive to both concrete and steel.

E. Concrete piles should have a minimum strength of 40 MPa and a minimum cover to reinforcement of 65 mm (as per AS 2159) to limit the corrosive effects of the surrounding soils (in accordance with AS 2159).

F. With regard to concrete structures, for very saline soils with salinities of 8 – 16 dS/m which are moderately aggressive to concrete (AS 3600 – B1), slabs and foundations should have a minimum strength of 32 MPa, a minimum cover to reinforcement of 50 mm from unprotected ground and should be allowed to cure for a minimum of seven days (as per AS 3600) to limit the corrosive effects of the surrounding soils.

G. For steel, a uniform corrosion allowance of 0.02 – 0.04 mm/year (as per AS 2159 – 2009) should be taken into account by the designer. In instances where a coating is applied to the pile, if the design life of the pile is greater than the design life for the coating, consideration must be given to corrosion of the pile in accordance with the above.

H. Wet cast concrete pipes and currently manufactured spun concrete pipes are understood to have estimated compressive strengths of 50 MPa and 60 - 70 MPa, respectively, in excess of the requirements for mass concrete in F above. It is recommended that any concrete pipes installed within the site should employ AS 4058 - compliant steel reinforced pipes or general purpose Portland cement, with minimum cover to reinforcement of 20 mm, or should be fibre reinforced.

The above strategies should be confirmed and potentially reduced, once the above recommended site-specific salinity investigation and management plan has been completed within the proposed development area.

Department and Land and Water Conservation (2002) *Site Investigations for Urban Salinity* (DLWC, 2002) requires one salinity test pit investigation location per two hectares for a commercial and industrial development as is proposed at the site. Given 15 locations were previously investigated as part of the previous investigations, an additional 21 locations are required to meet the requirements of DLWC (2002). Locations should be spaced on a systemic grid and extended to a minimum depth of 3 m or to the of depth of proposed cut.

We trust that the above is suitable for your present requirements. Please do not hesitate to contact the undersigned with any further queries.

Please contact the undersigned if you have any questions on this matter.

Yours faithfully
Douglas Partners Pty Ltd

Reviewed by

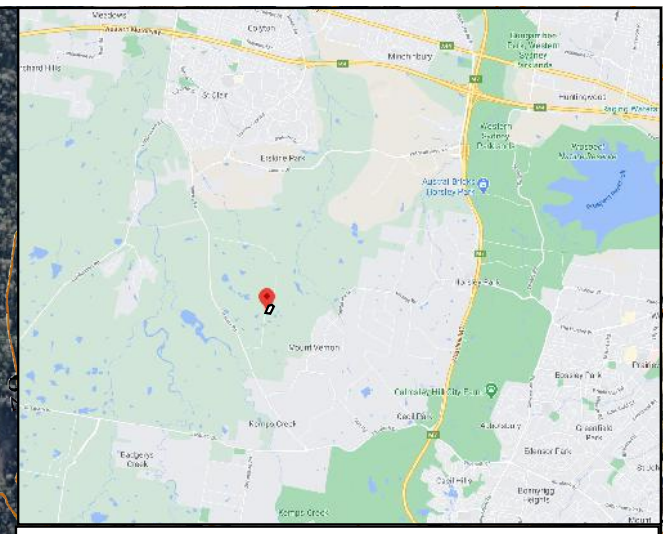
Rod Gray
Senior Associate

For **Christopher C Kline**
Principal

Attachments: Limitations
Drawing 1

Limitations

Douglas Partners Pty Ltd (DP) has prepared this report for this project at 200 Aldington Road, Kemps Creek in accordance with DP's proposal 92421.01.P.001.Rev0 dated 15 February 2020. The work was carried out under Fife Kemps Creek Pty Limited Contract Standard Consulting Terms (Design). This report is provided for the exclusive use of Fife Kemps Creek Pty Limited for this project only and for the purposes as described in the report. It should not be used by or relied upon for other projects or purposes on the same or other site or by a third party. Any party so relying upon this report beyond its exclusive use and purpose as stated above, and without the express written consent of DP, does so entirely at its own risk and without recourse to DP for any loss or damage. In preparing this report DP has necessarily relied upon information provided by the client and/or their agents.



Site Locality

2019b Non Saline
2019a Non Saline
2019a Sightly Saline
2019b Slightly Saline
2019a Moderately Saline
2019b Moderately Saline
2019a Very Saline
2019b Very Saline
Boundary
NSW 2m Elevation Contours
Elevation Contours: 2m Interval (AHD)

0 50 100 150 200 250 300 m

Douglas Partners
Geotechnics | Environment | Groundwater

TITLE: **Salinty Test Locations**
Preliminary SMP
200 Aldington Road, Kemps Creek

MGA

OFFICE: Macarthur
DRAWN BY: SJC
DATE: 25/02/2021

CLIENT: Kife Kemps Creek Pty Limited
PROJ. #: 92421.01.R.002
DRAWING No: 1
REVISION: 0
SCALE: As Shown