ARUP

EIS

Project Echidna

Geotechnical Desktop Study

Reference: Appendix K

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Executive summary

The Proponent is proposing to construct and operate a Data Centre on the site at 10 Eastern Creek Drive, legally described as Lot 4001 DP 1243178 (the Site). An Environmental Impact Statement is required to be submitted as part of the requirement for the State Significant Development application. This Statement is supported by a series of specialist technical studies.

This report forms one of those technical studies and presents the findings of a geotechnical desktop study that has been carried out for the proposed Development development. Publicly available information has been reviewed to understand the geotechnical, hydrogeological and contamination characteristics of the site. Potential risks have been highlighted and recommendations have been made regarding the anticipated geotechnical works and proposed foundation system of the buildings and their impacts on the environment and surrounding infrastructure.

Contents

Tables

Figures

1. Introduction

1.1 Purpose of this report

To support the submission of the Environmental Impact Statement (EIS) in fulfilment of the SEARs, this report aims to provide a summary of the findings from the review of the following items:

- Identification and review of existing geotechnical investigation reports
- Review of published site geology, soil landscape and topographic maps
- Review of the information on Australian Soil Resource Information System (ASRIS) to identify the risk of potential sulfate soil in the ground.
- Review of historical aerial photographs
- High-level review of the proposed earthworks including the levels proposed versus final floor level of the development and any potential trench excavation for installation of utilities.

Following the review of the above documents and information, an assessment of potential impacts to the environment due to ground works such as removal or introduction of materials during the construction phase is undertaken.

1.2 Proposal overview

Arup on behalf of the Proponent is seeking development consent to construct a data centre (the Proposal) at 10 Eastern Creek Drive, Eastern Creek NSW, legally described as Lot 4001 DP 1243178 (the Site). The Proposal involves the construction of a two-storey data centre comprising of data halls, mechanical and electrical equipment rooms, offices, other ancillary support spaces, and external/rooftop mechanical and electrical equipment.

The Site is situated within the Blacktown Local Government Area (LGA) on the corner of Eastern Creek Drive and Old Wallgrove Road. Building 1 is a two-storey data centre in the vicinity of the Proposal and broadly similar in nature, which has already been approved under the DA SPP-19-00013 and is currently under construction. Building 1A is a smaller data centre building nearby, also approved under an amendment to the DA SPP-19-00013, and is expected to be constructed prior to the Proposal.

The Proposal's site coverage is approximately 9,225 square metres. The design of the Data Centre is based on the end-client's reference design as well as applicable Australian Standards and will deliver capacity for approximately 35.2MW of IT equipment. The two (2) level facility will reach a building height of approximately 25m including all significant plant and rooftop equipment. The facility will include two (2) levels of data hall space and supporting plantrooms, and supporting administrative spaces incorporating secure entry facilities, loading dock, storage, staff offices, common areas and amenities.

Utility power will be delivered via a dedicated on-site electricity substation to the west of the Proposal (subject to a separate development application), with emergency backup power provided by a combination of lithium-ion battery systems and standby generators. The back-up generators will occupy an external equipment yard to the west of the main building, and some mechanical equipment will be located at roof level. Cooling will be delivered by highly efficient fresh air free-cooling systems in the Winter and evaporative cooling in the Summer to ensure energy consumption is minimised as far as practical.

Landscaped areas are also proposed, where mature local trees will be used to improve aesthetics and amenity for local businesses.

On-site car parking spaces will be provided for staff and visitors, including disabled and electric vehicle parking.

Figure 1 Site location

1.3 SEARs requirements relevant to this report

Table 1 identifies the SEARs requirements which are relevant to this technical assessment.

Table 1 SEARs requirements Geotechnical

SEARs relevant to this technical report	Where addressed in this technical report
Provide an assessment of the potential impacts on soil resources, including related infrastructure and riparian lands on and near the site.	Section 5
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.	Section 5
Provide an assessment of salinity and acid sulfate soil impacts.	Section 4

2. Policy and planning context

The policies and guidelines adhered to in this report are summarised in Table 2.

Table 2 Policies related to this report

Policy
Soil and Landscape Issues in Environmental Impact Assessment, 2000
Contaminated Land Management Act 1997 (CLM Act)
State Environmental Planning Policy (Resilience and Hazards) 2021
NSW EPA (2020). Consultants reporting on contaminated land – Contaminated land guidelines
National Environment Protection (Assessment of Site Contamination) Measure 1999 as amended in 2013 (ASC NEPM)
PFAS National Environmental Management Plan 2020
NSW State Groundwater Policy Framework Document 1997
NSW State Groundwater Quality Protection Policy 1998
NSW Aquifer Interference Policy 2012
Water Sharing Plan for the Greater Metropolitan Region Groundwater Sources 2011
Water Management Act 2000
Water Act 1912
Storing and Handling Liquids: Environmental Protection (DECC), 2007
National Water Quality Management Strategy Guidelines for Groundwater Protection in Australia 2000
Risk Assessment Guidelines for Groundwater Dependent Ecosystems 2012
NSW State Groundwater Dependent Ecosystems Policy 2002

3. Methodology

3.1 General

Publicly available data and information supplied to Arup has been reviewed to understand the geotechnical, hydrogeological and contamination characteristics of the site. Potential risks have been highlighted and recommendations have been made regarding the anticipated geotechnical works and proposed foundation system of the buildings and their impacts on the environment and surrounding infrastructure.

3.2 Study area

The study area of this assessment falls within the site boundary as shown on Figure 2.

Figure 2 Study area

3.3 Geotechnical Desktop Study

The following documents were reviewed to inform this assessment:

- Published site geology, soil landscape and topographic maps:
    a. Colquhoun G.P., Hughes K.S., Deyssing L., Ballard J.C., Folkes C.B, Phillips G., Troedson A.L. & Fitzherbert J.A. of Geological Survey of New South Wales, Department of Regional NSW, Maitland, (2020). New South Wales Seamless Geology dataset, version 2.0 [Digital Dataset]
    b. Bannerman S.M. and Hazelton P.A., 2011, Soil Landscapes of the Penrith 1:100,000 Sheet report, digital reprint, Office of Environment and Heritage, Sydney. Department of Planning and Environment (2016).
    c. Fitzpatrick, Rob; Powell, Bernie; Marvanek, Steve, 2011. Atlas of Australian Acid Sulfate Soils, v2 (CSIRO) Data Collection
    d. Historical aerial photographs (google)
    e. Historic aerial photographs (lotsearch)

f. Salinity Potential in Western Sydney 2002. Department of Infrastructure, Planning and Natural Resources, ISBN 0-73475-3039.

- Existing investigations:

a. Building 1 Eastern Creek, NSW, Preliminary Geotechnical Investigation Report. 268039-ARP-REP-GIR-001, August 2019.

b. 10 Eastern Creek Drive, Geotechnical Assessment Report (For Stage 1). Reference: 507182, October 2020.

c. 10 Eastern Creek Drive, Eastern Creek, NSW 2766. Development Application Preliminary Site Investigation for Contamination Risks. Reference: 507182 Revision: A 2019-10-23.

4. Existing environment

To provide information on the geological feature underlying the site, a review of the New South Wales Seamless Geology and the Soil Landscapes were undertaken.

4.1 Site History

Historical aerial photographs were reviewed to identify historic changes in land use and development using both publicly available photographs using Google Imagery and through Lotsearch Pty Ltd (Lotsearch).

The earliest available aerial imagery for the site is from 1947 and showed the site was vegetated and undeveloped, surrounded by bushland and farmland as shown in Figure 3. Imagery from 1947 to 2005 show vegetation has been cleared and the site and surrounding area appears to have been used for agricultural purposes (Figure 3 to Figure 6). Imagery from 1975 (Figure 4) indicates a drainage path running north-south intersects the centre of the site and flows toward a creek to the north of site.

By 2009, Eastern Creek Drive had been constructed to the west of the site and industrial development had occurred to the south (Figure 6 and Figure 7). Further development occurred between 2009 and 2018 to the east and west of the site. Current aerial imagery dated to March 2022 shows construction works including Building 1 and earthwork activities within the immediate vicinity of the site (Figure 10).

Figure 3 Aerial Imagery 1947 marked with Site boundary (Source: Lotsearch)

Figure 4 Aerial Imagery 1975 marked with Site boundary (Source: Lotsearch)

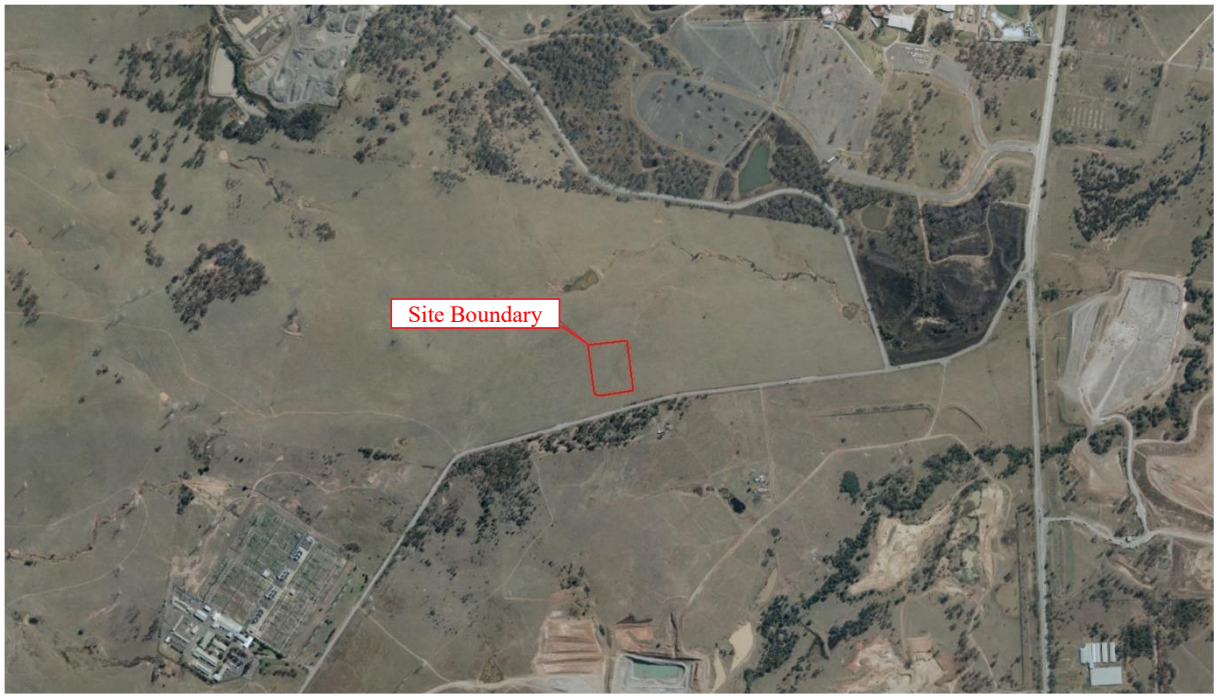

Figure 5 Aerial Imagery 1991 with Site boundary (Source: Lotsearch)

Figure 6 Aerial Imagery 2005 marked with Site boundary (Source: Lotsearch)

Figure 7 Aerial Imagery 2009 marked with Site boundary (Source: Google)

Figure 8 Aerial Imagery 2013 marked with Site boundary (Source: Google)

Figure 9 Aerial Imagery 2018 marked with Site boundary (Source: Google)

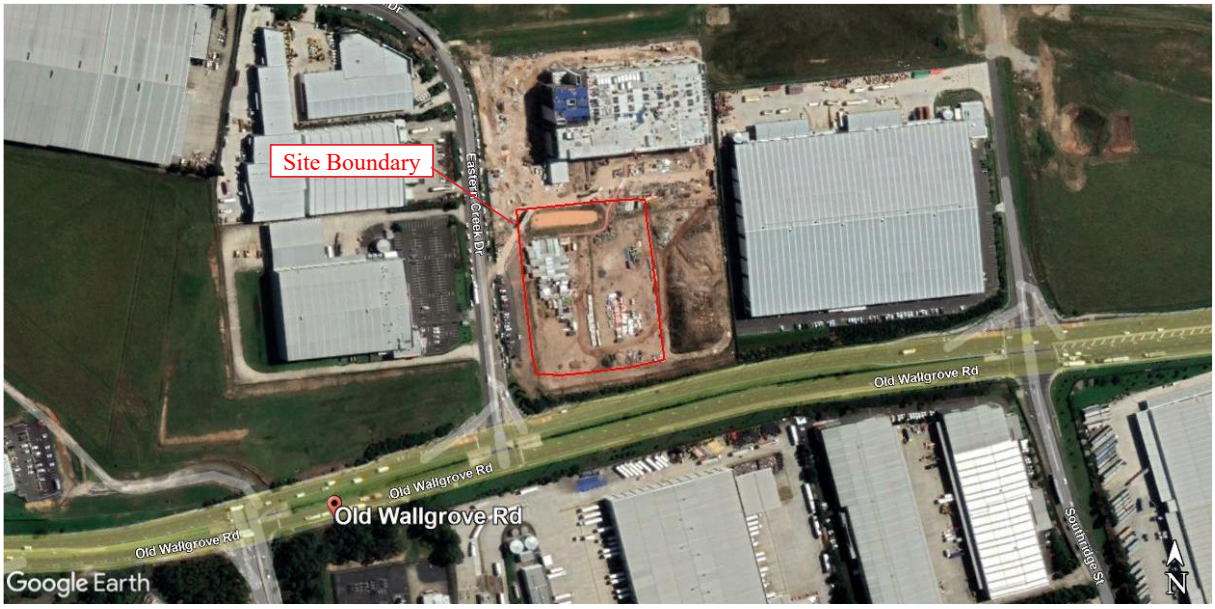

Figure 10 Aerial Imagery 2022 marked with Site boundary (Source: Google)

4.2 Topography of the site

Prior to the bulk earthworks, the site generally sloped from north to south with levels ranging approximately from 66mAHD at the north of the site to 70mAHD to the south (towards Old Wallgrove Road), as can be seen in Figure 11.

Figure 11 Pre-construction site topography (Crux Surveying Australia, 2019) superposed on satellite image [2]

4.3 Site Geology and Soil Landscape

4.3.1 Geological Mapping

Reference to the New South Wales Seamless Geology dataset indicates that the site is underlain by the Bringelly Shale of the Wianamatta Group. Bringelly shale bedrock is expected to consist of claystone/shale, laminite and sandstone. Alluvial deposits are mapped in the region but do not encroach on the site however reference to the historic imagery indicates there is a probably natural drainage line that intersects the site. It is possible that alluvial deposits associated with this drainage line may be present on the site. The geological mapping is presented in Figure 12.

No faults or dykes are mapped in the vicinity of the site.

Figure 12 Regional Geology of the site [3]

4.3.2 Soil Landscape Mapping

Soil landscapes have been interpreted with reference to the Soil Landscapes of the Central and Eastern NSW. The site is indicated to be underlain by the Blacktown Residual Soils, which are characterised as moderately reactive and plasticity with potential for seasonal waterlogging and water erosion. A more detailed description of this soil landscape is presented in Table 3.

It should be noted that the Soil Landscape Map is a regional scale map which may not be representative of conditions at a site level. The soil units suggested by the Soil Landscape may or may not match the regional geological units due to the scale and the different purpose of the map in nature.

Figure 13 Soil landscape mapping of the site [4]

Table 3: Soil Landscapes

Soil Landscape Unit	Landscape	Soils	Qualities and Limitations
Blacktown (bt) – residual	Gently undulating rises on Wianamatta Group shales. Local relief to 30m, slopes usually >5%. Broad rounded crests and ridges with gently inclined slopes. Cleared Eucalypt woodland and tall open-forest (dry sclerophyll forest).	Shallow to moderately deep (generally <100 cm) hard setting mottled texture contrast soils, red and brown podzolic soils on crests grading to yellow podzolic soils on lower slopes and in drainage lines.	Localised seasonal waterlogging, localised water erosion hazard, moderately reactive highly plastic subsoil, localised surface movement potential.

4.4 Groundwater

Reference to the Hydrogeological Landscapes of NSW mapping indicates the site falls within the Shale Plains Hydrogeological Landscape (HGL). Groundwater flow in this HGL is unconfined along structures (bedding, joints, faults) in the fractured bedrock. Lateral flow occurs through alluvial sediments on slopes and plains. Hydraulic conductivity is moderate, and transmissivity is low to moderate and typically have brackish to saline groundwater due to naturally occurring salts related to original depositional environment. The groundwater in this Hydrogeological Landscapes (HGL) is expected within intermediate depth ranging from 2.0 to 6.0m below ground level.

4.5 Potential for Acid Sulfate Soil

Acid sulfate soil (ASS), when disturbed or exposed to air can release acid, which can cause damage to the environment and to structural elements. The CSIRO ASS map indicates that there is extremely low probability of ASS within the site, as shown in Figure 14. In addition, the obtained results from laboratory

testing as per “268039-ARP-REP-GIR-001” classified the Fill, Residual, and Alluvium soils on site as non-aggressive according to AS 2159.

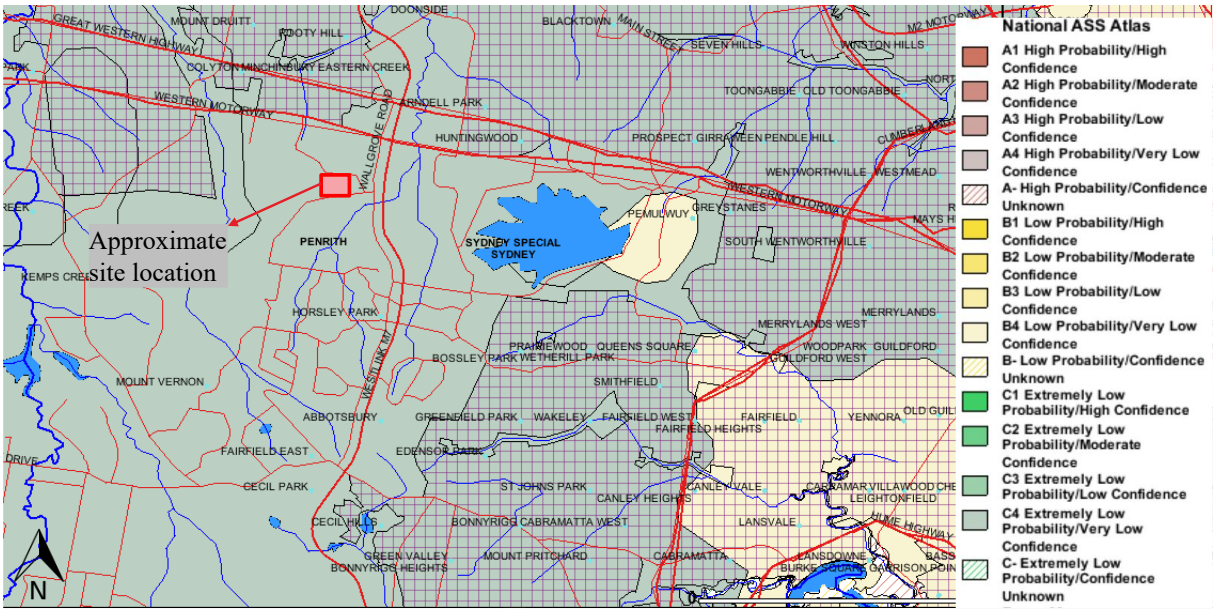

Figure 14 Acid Sulfate Soil Plan according to CSIRO ASS map [5]

4.6 Soil salinity

According to eSPADE soil landscape mapping the site has a very high potential for salinity as shown in Figure 15.

In contrast, Department of Infrastructure, Planning and Natural Resources (DIPNR), conducted a study of the salinity potential in Western Sydney in 2002. The map produced as a result of the study depicts localised salinity categories for all the areas of Western Sydney and makes reference to associated landscapes and landform – geology (DIPNR, 2003). The map shows the site is located within moderate potential of soil salinity (Figure 14).

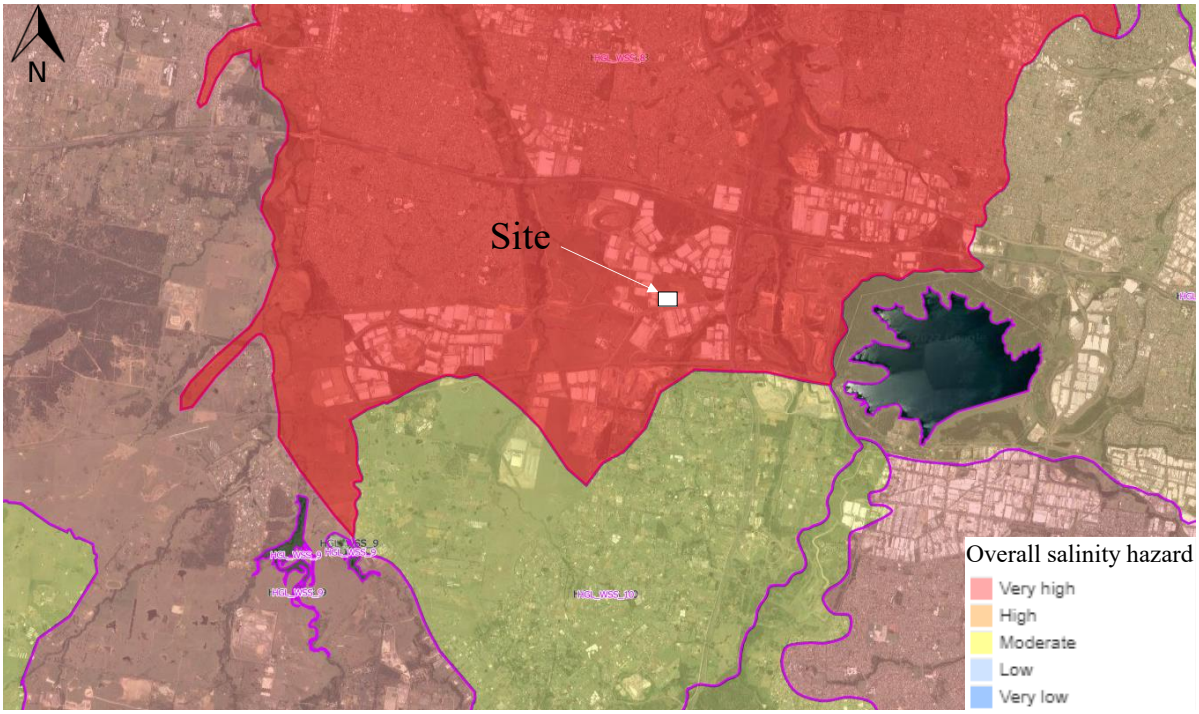

Figure 15 Overall soil Salinity Hazard [4]

Figure 16 Soil salinity classification of Western Sydney [7]

4.7 Geotechnical Investigation Information

4.7.1 Existing investigation

Two geotechnical reports were provided for the site:

a) BUILDING 1 Eastern Creek, NSW, Preliminary Geotechnical Investigation Report. 268039-ARP-REP-GIR-001, Arup August 2019.

b) 10 Eastern Creek Drive, Geotechnical Assessment Report (For Stage 1). Reference: 507182, Aurecon October 2020.

The reports provided site-specific geotechnical information including geotechnical sections and detailed borehole logs. The location of the previous site investigation is shown in Figure 17. The provided information has been used to review the following:

- Verification of the desktop study
- The anticipated sub-surface ground conditions
- The geotechnical properties of the material that may potentially be removed during construction

The inferred preliminary ground model as informed by the existing geotechnical reports based on the geotechnical site investigation within site boundary for the proposed development is shown in Table 4.

Figure 17 Location of previous site investigation [2]

Table 4 Preliminary ground model for the proposed development

Material type		Material description	Top of layer (m AHD)	Typical Layer thickness (m)
Fill	Clayey SILT / Silty CLAY	Brown/dark brown, low to high plasticity, with fine to medium, sub-rounded to rounded siltstone and ironstone gravel, with roots, trace sand.	71.2 – 68.2	0.5 – 3.9
Alluvium	Silty CLAY	Brown/Red-brown and grey/pale brown, medium to high plasticity, with fine to medium sub-rounded to rounded siltstone and trace fine to medium, sub-angular to rounded gravel, Stiff to Very Stiff. Thin layer of clayey GRAVEL, Red-brown mottled yellow and maroon, fine to coarse sub-angular to rounded siltstone and ironstone gravel, low plasticity fines, medium dense.	68.5 – 64.3	1.0 – 2.8
Residual Soil	Silty CLAY	Pale brown/ Grey mottled brown, medium to high plasticity, with sub-angular to sub-rounded, fine to medium gravel, hard.	63.3 – 66.8	0.75 – 1.1
Rock	CLAYSTONE LAMINITE SANDSTONE SHALE	CLAYSTONE: Pale grey-stained pale orange, high iron staining, bedding obscured by weathering very low to low strength. LAMINITE: Grey, thinly laminated, low to medium strength. SANDSTONE: Grey, fine to coarse grained, moderately weathered to fresh, medium to high strength, moderately iron stained. SHALE: Pale to dark grey, moderately weathered to fresh, low to high strength.	62.3 – 65.9	10.0 – unconfirmed

4.8 Groundwater level

Six groundwater monitoring wells have been installed on the site:

- Three Standpipe piezometers were in December 2019 by Aurecon.
- Three standpipes along the path of the existing creek in June 2019 by ARUP.

The groundwater readings were taken on site in December 2019 by Aurecon and on 20 June 2019 by Arup. The results showed the groundwater levels at middle of the site for the proposed development were between approximately RL 65.3 m AHD and RL 63.5 m AHD (5.4 m to 6.4 m BGL).

It should be noted that groundwater levels were recorded at a time when New South Wales was experiencing wide-spread drought and as such may not be truly reflective of long-term groundwater levels.

5. Geotechnical Constraints and Risks

A summary of potential risks to the proposed development is shown in Table 5.

Table 5: Geotechnical Hazards / Constraints

Hazards / Constraints	Potential risks	Description	Mitigations
Material (Soil, Rock)			
Aggressive soils and groundwater (salinity, acidic)	Impact on infrastructure/structure durability/durability design Earthworks management required during construction	The Salinity Potential is moderate which increases to high near watercourses. Aggressive environments may compromise the durability of foundations and other concrete and steel infrastructure.	Further testing is required to verify the site specific aggressivity of soil. An earthworks management strategy is also necessary to avoid mixing of saline soils in areas of less or non-saline soils.
Erodible and dispersive (sodic) soils	Highly dispersible and erodible soils Poor water drainage	Erodible and dispersive soils are present within localised areas of the Blacktown soil landscape. These soils disperse when wet and are susceptible to erosion and strength loss. When dry, the soils set hard and have poor water infiltration and drainage. Reusing these soils in fills can be problematic and if feasible at all would likely require careful management, handling and treatment to stabilise the fill material.	Further testing is required to verify the site specific aggressivity of soil. Drainage and erosion control measures are necessary during construction to prevent ponding and scouring.
Shrink-swell and poor durability	Material deterioration Unsuitable for reuse as backfill Consideration of seasonal moisture variation Differential settlement	Bringelly Shale and its residual clay soil, and potentially highly plastic alluvial clays, are highly susceptible to shrink-swell behaviour and can rapidly weaken and deteriorate from moisture variation when exposed. The removal of residual soils in order to found structures on underlying the Bringelly Shale rock will not entirely circumvent this behaviour as interaction with water and reduction of confining stresses will result in reactive behaviour. Construction techniques	Treatment of the soils for possible use as general fill material. Material disposal management needs to meet regulatory requirement – appropriate testing must be undertaken to classify spoil. Seasonal moisture variation (suction change) should also be considered which, in accordance AS2870-2011, could influence to a depth of 1.8m. This

Hazards / Constraints	Potential risks	Description	Mitigations
		should implement strict moisture control as well as management of groundwater and rock exposure. Support measures for excavation needs to be considered during design. Excavation should have minimum exposure to avoid the rock weathering and water ingress.	can also impact the bearing capacity and settlement behaviour of foundations in Bringelly Shale which is known to derive strength and stiffness from its high suction.
Uncontrolled fill (poorly compacted, heterogenous)	Unsuitable founding material Excessive or differential settlement Potentially unsuitable for reuse as backfill Trench instability	Uncontrolled fill is not a suitable founding material as it can be highly variable in engineering characteristics and extent on site. Excessive or differential settlement due to poorly consolidated material can lead to movement along the pipeline which may affect joints and lead to leakage. Uncontrolled fill may also be deemed as unsuitable material and when excavated may not be suitable for backfill.	A site-specific assessment of the material is required to classify and assess its competency. Imported fill may be required, especially where the ground will be load bearing. Trenching in unconsolidated material may require more shallow batters or other trench stabilisation/retention methods (see 'Trench instability' below).
Trench / excavation / slope instability	Collapse of trench	Bringelly Shale and its derived residual soil are susceptible to creep and slope instability, including on relatively shallow slopes. This may be exacerbated by altering the natural terrain and inducing high loads.	Excavation support in form of a temporary/permanent retention system may need to be considered. Where space permits, temporary batters may be feasible.
Poor soil drainage / impermeable sub soils	Excavatability/construction considerations Ponding and scouring Strength reduction of materials	Poor soil drainage can result in waterlogging and prolonged saturated conditions which requires design and construction process considerations such as stormwater management to prevent ponding and	Considered strength reduction of materials in design. Prepared stormwater management plan.

Hazards / Constraints	Potential risks	Description	Mitigations
		scouring. Saturated conditions may lead to strength reduction of soil and rock.	
Variable bedrock conditions	Excavatability considerations Differing founding strata Differing site conditions	Bringelly Shale is highly variable in nature with varying lithologies from siltstone/claystone to thick sandstone lenses. Varying materials may require different construction methods and site-specific design. Furthermore, the presence of drainage lines could also contribute to variable bedrock profiles and conditions.	Further investigations at subsequent design stage to inform design of piles founded on rock.
Other			
High water tables (localised), seepage flows and surface runoff	Variability across site Saturated conditions Poor excavatability Trench instability and upheave Treatment of saline water	Groundwater levels may vary across the site, and perched groundwater may also be encountered. Risks are likely to increase during or for a period after prolonged or heavy rainfall. Seepage flows tend to follow preferential pathways through bedding planes and can be encountered within excavations in soil and the fractured Bringelly Shale. This can lead to instability and upheave of trenches and will require dewatering during construction (see point above) or an appropriate retention system. Significant groundwater management is not expected as limited earthworks required for foundations and utilities (i.e. bulk earthworks for the site are completed) and soils are expected to be fine-grained and of low permeability and hydraulic conductivity. It is expected that	Adequate drainage, dewatering or an appropriate sealed retention system may be necessary to avoid seepage and saturated conditions and to accommodate groundwater pressures. Saturated conditions may lead to strength reduction of soil and rock, poor excavatability in saturated clays, and instability that needs to be considered during design. .

Hazards / Constraints	Potential risks	Description	Mitigations
		Bringelly Shale will be encountered during piling activities only.	
Changing groundwater levels due to climate change	More extreme groundwater level variations	With increasing impacts from climate change, the variation in the groundwater table will become more extreme, leading to issues with durability, drainage and uplift.	Consideration must be given to design for the worst-case scenario for future groundwater levels, not just the current regime.

6. Assessment of potential construction impacts

The proposed development is described in Section 0. This section discusses the proposed ground works that will be undertaken as part of the permanent Project works.

6.1 Proposed geotechnical works

The assessment of potential construction impacts takes into consideration the site topography, the anticipated sub-surface ground profile, anticipated earthworks, and foundations required for the permanent project works.

The proposed geotechnical works that may induce disturbance and/or movement of earth materials include, but are not limited to, localised excavation of lift pits, construction of foundations and preparation of formation level.

6.1.1 Building Foundations

At this stage of design, it is anticipated that the proposed foundation system will be as follows:

- Pile cap foundation for support the columns of the proposed development
    - Two Piles with 900mm diameter and 12m long
    - Pile cap with 1500mm thickness
- Pile raft foundation for core walls and Tank

The piles are expected to be founded within competent bedrock. Further geotechnical investigations should be considered at the next design phase to provide additional information on the depth and quality of founding materials. If suitable founding material is different to the conditions currently assumed, adjustments to the pile lengths may be required.

6.1.2 Generator Foundations

At this stage of design, the proposed foundation system for the generator platform consists of a 500mm thick raft slab at grade with subgrade preparation. Foundations for the generator should be confirmed during the next design stage when loadings, settlement criteria and additional geotechnical investigation information is available.

6.1.3 Excavation Condition

The shallow soils comprising fills and alluvial materials are expected to be excavatable using conventional mechanical equipment such as a backhoe, or excavator. Deeper excavations are likely to encounter highly weathered claystone. As such, the excavation may require the use of an excavator equipped with a hydraulic breaker attachment. Over break could occur in excavations in weathered rock and the contractor should make an allowance for this.

Excavations may intersect the groundwater table. Seepage flows tend to follow preferential pathways through bedding plans and can be encountered within excavations in soil and the fractured Bringelly Shale. This can lead to instability and upheave of trenches and will require dewatering during construction or an appropriate retention system. Groundwater flows in the alluvial gravels may be significantly higher than other materials on site.

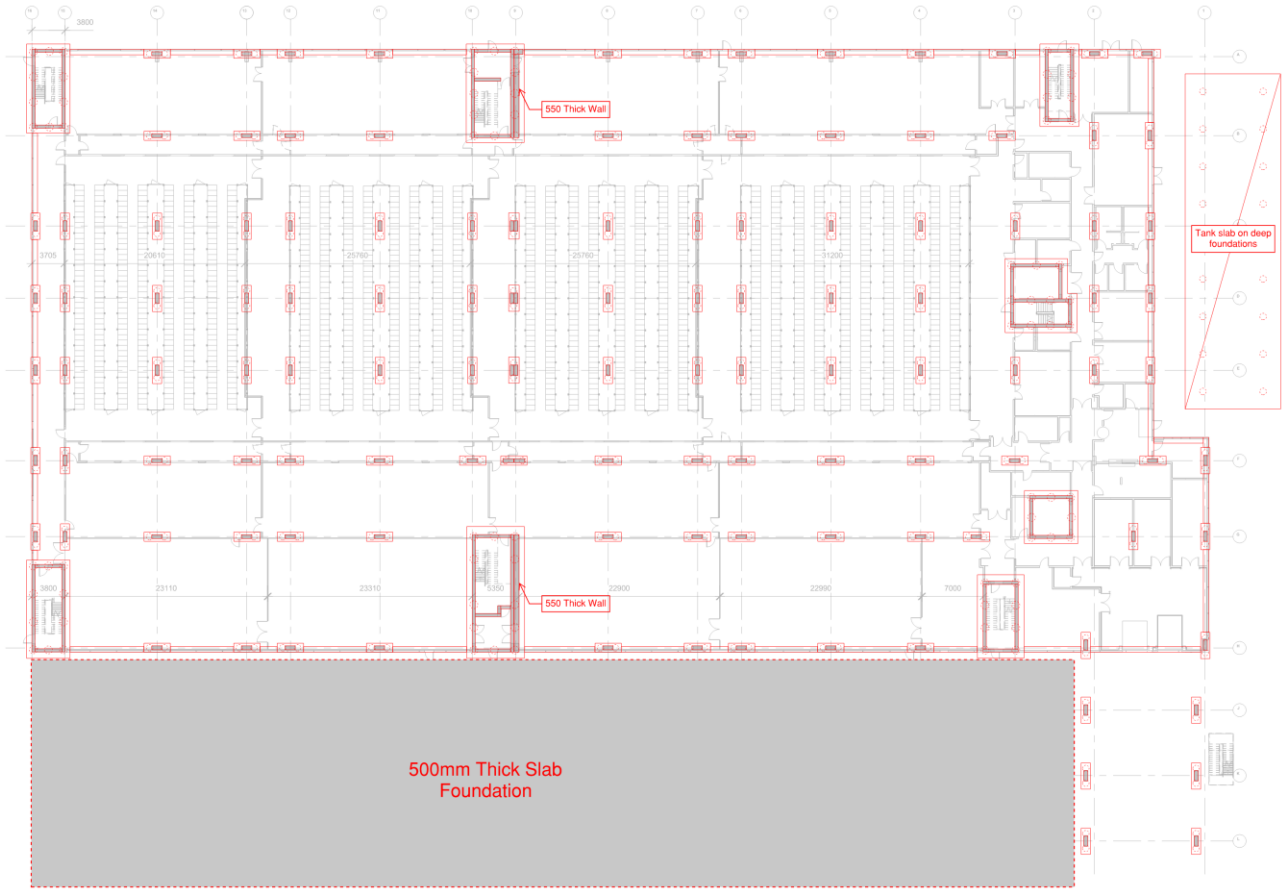

Figure 18 Proposed foundation system for the Project Echidna

6.1.4 Earthworks

At this stage of design, the proposed development requires the construction of a piled foundation to competent rock and a raft slab at grade, minimising the volume of excavation below the proposed building footprint. In addition, trench excavations will be required for installation of utilities and drainage.

It is expected that most excavations across the site will be confined to within the fill and alluvium layers. The alluvial clay is expected to be of high plasticity and sensitive to moisture changes and only suitable for reuse as engineered fill if used with care to remove cobbles and boulders and to manage moisture condition and placement.

It should be noted, that where clay is used as engineered fill to support structural loads, consideration should be given to the potential for higher characteristic surface movements and the site classification should be re-assessed.

The high shrink swell potential of the alluvial clay means pavement subgrades formed of natural and recompacted alluvial clay may need to be covered by a capping layer of imported low permeability and low reactive clay to reduce road subgrade movements.

Select fill may comprise imported material such as crushed rock or soils of low reactivity to reduce the potential for shrink-swell movements. It is recommended that imported fill materials be required to have a maximum particle size after compaction of 50 mm and have a liquid limit not exceeding 50%.

Subgrade preparation and engineered fill construction should be carried out during dry weather conditions where possible. Provisions should be made to divert or remove of all surface water from prepared subgrades during construction.

It is recommended that subgrade preparation and engineered fill placement/compaction be continuously supervised by a geotechnical practitioner and the compaction checked by field density testing in accordance with AS 3798-2007 “Guidelines on earthworks for commercial and residential developments”.

The risk of the presence of contaminant in the soil and rock to be removed from site as part of the earthworks is to be confirmed with soil and water contaminant testing prior to construction.

6.2 Environmental Assessment of Geotechnical Works

Considerations for assessment of environmental impact include:

Presence of contaminants

The construction of a piled foundation will involve removal of material (fill, residual soil and rock) from the ground. The materials removed from the ground will need to be assessed for potential reuse and/or offsite disposal in accordance with the EPA Waste Classification Guidelines – the Construction Environmental Management Plan (CEMP) prepared for the Project should include a 'spoil management plan' and an 'unexpected finds protocol' to manage potentially contaminated materials.

Potential for migration of any such contaminants from the removed materials whilst stored on site could also be induced during rainfall events through rainwater leaching and runoff into stormwater drains and surface waters.

Reference to the Preliminary Site Investigation for Contamination Risks (PSICR) [6] indicates that the site represents a LOW risk with regards to potential environmental (contamination) liabilities associated with the proposed construction of the development. The site is considered suitable for future commercial/ industrial land use. Further discussion on relevant site contamination can be found in preliminary site investigation for contamination risks [6].

The PSICR [6] also recommended that prior to construction, a site walkover/inspection be undertaken to check for any possible contamination including asbestos in surface soil. This is in order to confirm no asbestos from previously imported materials is present at the surface.

Alteration of groundwater flows due to pile foundation

Due to the limited available groundwater information and the unknown impact of the pile foundation construction on the groundwater table, there is uncertainty about the groundwater table elevation across the site. However, minor impact is expected due to pile foundation construction.

In addition, depending on the construction method of the piles, intersecting the groundwater table with piles and localised lift pit excavations is expected to be minor as groundwater inflows are expected to be high at gravel layer and low in clayey soil layers due to the relatively low hydraulic conductivity.

Dust generated from excavation and construction

It is not uncommon for dust to be generated during the construction of piles and ground formation works. As these materials are easily transportable by water medium, they may be deposited in watercourses, and alter its natural behaviour.

6.3 Impact on Surrounding Infrastructure

The site is located adjacent to existing infrastructure including roads and utilities as follows:

- Old Wallgrove Road is located to the south and Eastern Creek Drive to the west of the site.
- Underground utilities are present within southern and western boundaries of the site.
- Building 1 is located at the north of the site and is currently under construction.
- East of the site is currently vacant and will be used to construct the future substation.

As discussed previously, the bulk earthworks for the site will be completed prior to the proposed development works commencing. The impact of ground movements on infrastructure surrounding the site due to minor localised excavations associated with the proposed development is expected to be minor.

References

[1] Building 1 Eastern Creek, NSW, Preliminary Geotechnical Investigation Report. 268039-ARP-REP-GIR-001, August 2019.

[2] 10 Eastern Creek Drive, Geotechnical Assessment Report (For Stage 1). Reference: 507182, October 2020.

[3] Colquhoun G.P., Hughes K.S., Deyssing L., Ballard J.C., Folkes C.B, Phillips G., Troedson A.L. & Fitzherbert J.A. of Geological Survey of New South Wales, Department of Regional NSW, Maitland, (2020). New South Wales Seamless Geology dataset, version 2.0 [Digital Dataset]

[4] Department of Planning, Industry and Environment, NSW, 2020. eSPADE version 2.1. https://www.environment.nsw.gov.au/eSpade2Webapp, accessed 14 May 2021

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