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Botany NSW 2019

Project 221327.00
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AK

Attention: Dean Johns

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Preliminary Geotechnical Assessment
Proposed Digital Sign
Grosvenor Crescent, Summer Hill

1. Introduction

This letter presents the results of a preliminary geotechnical assessment for a proposed digital sign at Grosvenor Crescent, Summer Hill, for Hanlon Industries Pty Ltd (HI). It is understood that a cantilevered, digital billboard sign supported by a monopole on a pile footing is proposed to be installed behind the crest of an underbridge abutment retaining structure adjacent to the westbound, kerbside lane of the Hume Highway within the rail corridor west of Summer Hill Railway Station.

This preliminary geotechnical assessment has included a review of published information and of DP archives for site investigations completed near to the site.

This advice is intended to provide a general overview of the subsurface geotechnical conditions likely to be encountered at the proposed structure location. Detailed site investigations will be required at a later stage of the project to provide detailed geotechnical information for design and construction purposes.

This letter should be read in conjunction with the attached notes ‘About this Report’.

2. Site Description

The site of the proposed sign is located behind the crest of a retaining structure near an underbridge abutment adjacent to the westbound, kerbside lane of Hume Highway (i.e., Liverpool Road) at the corner of Grosvenor Crescent within the upside of the rail corridor about 570 m west of the Country end of Summer Hill Railway Station. An aerial photograph showing the indicative location of the proposed sign is shown in Figure 1.

The site is located approximately 3.5 m behind the crest of an existing retaining wall. The retaining wall has a slight bend in plan, is approximately 5 m in height with a near-vertical facing slope angle and has

a brick facing. A Google Streetview image of the existing retaining wall at the site, taken from Carlton Crescent at the opposite underbridge abutment, is shown in Figure 2.

Figure 1: Aerial photograph of the site area (red mark)

Figure 2: Streetview image of the site location from Carlton Crescent

The ground surface behind the crest of the retaining wall appears to be sloping steeply down toward the crest and appears to be well vegetated with bushes and small trees.

3. Data Sources

Data sources reviewed for this preliminary geotechnical assessment included:

- The DA design drawing by Dennis Bunt Consulting Engineers Pty Ltd, specifically:
  - Drawing No. DA01 Revision F dated 17 February 2023;
- NSW 2 m elevation contour data, NSW Department of Lands (April 2009);
- The 1 metre Digital Elevation Model (DEM) derived by the Spatial Services unit of the NSW Government Department of Customer Services using a Category 1 (Classification Level 3) LiDAR (Light Detection and Ranging) device (i.e., a Leica ALS80 (SN8266)) © Department of Customer Service;
- Seamless Geology Web Map, Geological Survey of NSW;
- Sydney 1:100 000 Soils Landscape Mapping Sheet, Soil Conservation Service of NSW;
- The Australian Soil Resource Information System (ASRIS) national map of published acid sulfate soil mapping, compiled by the CSIRO;
- Report on Geotechnical Investigation, 'Proposed Development, Western Suburbs Leagues Club, 115 Liverpool Road, Ashfield', Douglas Partners Pty Ltd (Ref: 72012.00, Document 2 Revision 2 dated 26 October 2010);
- Report on Geotechnical Investigation, 'Proposed New Grosvenor Centre, 56 Liverpool Road, Summer Hill', Douglas Partners Pty Ltd (Ref: 45071, dated 24 August 2007).

4. Review of Information

A review of the available information indicates the following:

- The proposed cantilevered, digital sign structure is to be located approximately 3.5 m behind the crest of a retaining wall. The proposed sign is to be approximately 8.2 m tall with a monopole base of section 450 mm by 650 mm, supported on a 1.0 m square pile cap that is in turn supported by a pile footing of 750 mm diameter;
- The site is located near the top of a spur pointing north-east and has a south-easterly aspect;
- The site is underlain by Wianamatta Group Ashfield Shale of the Triassic Period, which typically comprises black to light grey shale and laminite.

  The logs of nearby boreholes suggest fill and residual clayey soils over weathered bedrock at depths ranging from 2 m to 3 m below the ground surface, and that the bedrock may comprise siltstone and claystone.

- The site is located within the 'Blacktown' residual soil landscape unit, and the map notes indicate that the bedrock is typically overlain by shallow to moderately deep (i.e., less than 1 m deep) red and brown podzolic soils on crests, upper slopes and well drained areas, and by deep (i.e., 1.5 – 3.0 m deep) yellow podzolic soils and soloths on lower slopes and in areas of poor drainage.

  The proposed site of the digital sign, behind a retaining wall near an existing underbridge, strongly suggests that deep fill overlies residual clays above the bedrock surface.
- There is an extremely low probability of occurrence of acid sulphate soil (ASS) at the site.
- Given the site elevation, at about RL 31.5 m relative to the Australian height datum (AHD), and the location behind a retaining wall, temporary 'perched' groundwater could be expected to occur above the clay and bedrock surface following periods of wet weather but could vary in depth depending on seasonal and climatic factors.

5. Likely Subsurface Profile

Based on the available geotechnical information, the subsurface profile at the proposed location of the structure is likely to be:

- Fill up to about 2 m thick; overlying
- Residual clay, ranging from very stiff to hard in consistency with depth, to depths of between 2 m and 3 m; overlying
- Siltstone and claystone bedrock.

6. Geotechnical Constraints

Access for machinery and personnel to the proposed location may be possible from Grosvenor Crescent, however, it is likely that Transport for NSW's Traffic Management Centre will require that works be undertaken at night under a Road Occupancy Licence (ROL) with active traffic management, owing to the close proximity of a signalled intersection.

The geotechnical constraints requiring consideration for footing design and construction are:

- The need to confirm the construction details of the existing retaining wall and capacity to withstand any surcharge loads.
- Footing stability and bearing capacity behind the existing retaining wall. It is not presently known whether the existing retaining wall can support the surcharge loading, both lateral and vertical, due to the proposed digital sign footing however this would be highly unlikely. This would be of particular importance should the design founding level for the proposed footing be located within the 'zone of influence' of the retaining wall. The zone of influence of the retaining wall could be taken as the envelope of ground above an imaginary plane rising at 1H:1V from behind the toe of the retaining wall to the ground surface behind the crest of the retaining wall.

- Whether the backfill behind the existing retaining wall is a controlled fill with reliably uniform engineering strength and stiffness properties. If the retaining wall backfill is uncontrolled, then no reliance could be placed on the foundation support the fill can provide and the sign footing would need to be founded in natural soils and/or bedrock below the fill, with the footing design ignoring any contribution from the fill in resisting foundation loadings. At this stage it is expected that all lateral loads will need to be supported by soil and rock below the zone of influence of the retaining wall.

7. Possible Footing System Options

The current footing system being considered, as understood from the drawings provided, is a pile footing. At this stage, it is suggested that the pile socket should be formed in natural clay and rock below the zone of influence of the retaining wall with no reliance on soil within the zone of influence. It is further suggested that the pile footing be also designed to not apply any lateral loads to the retaining wall.

The lateral and vertical bearing capacity requirements for a footing are dependent on the structural engineer's requirements of the foundation to resist design loadings (both vertical and lateral) and to limit deflections (both vertical and lateral), as well as the geological conditions to be confirmed by intrusive investigations prior to the detailed design stage. Further, it will be necessary for a structural engineer to determine what additional surcharge loading the existing retaining wall is capable of safely supporting.

Conventional bored piles may be considered. If the fill behind the retaining wall is granular, then temporary casing through the fill would be required to prevent sidewall collapse prior to concrete placement. It is noted that socketing a bored pile in bedrock would significantly improve the foundation lateral and vertical bearing capacities to resist design structural loads in comparison to a pile socketed in the overlying fill and natural clay soils above the bedrock.

8. Risks and Opportunities

Risks that should be considered during design and construction at this site include:

- the potential presence of buried services;
- working close to existing road and rail infrastructure;
- traffic management measures, if construction work is to proceed from the Hume Highway and/or Grosvenor Crescent;
- pedestrian and traffic management along the footpath on the westbound sides of Grosvenor Crescent and the Hume Highway above the underbridge abutment;
- depending on footing excavation depth and type of retaining wall backfill, the need for temporary excavation support (e.g., casing for a bored pile);

- possible damage to, and/or failure of, the existing retaining wall due to sign foundation loadings in excess of the structural capacity of the retaining wall to support;
- The size of the equipment used may need to be limited to reduce applied surcharge loads to the retaining wall;
- If rock socketed piles are required suitably powerful piling rigs may be required;
- Deep piles if used may encounter groundwater seepage and may require dewatering and/or tremie pouring methods.

9. Recommendations for Further Investigation

The following intrusive site investigation is recommended at this site:

- Investigation of the existing retaining wall to determine its type, wall thickness and variations thereof over its height, backfill, wall drainage, footing type, founding level and foundations;
- Drilling of a cored borehole at the proposed structure location to log the ground profile and obtain samples of soil and rock for laboratory testing. The borehole should extend at least 4 m into the bedrock below the toe level of the existing retaining wall;
- In situ strength testing of the soil profile below any existing fill, using a rig-operated Standard Penetration Test (SPT);
- Laboratory testing of the recovered soil and rock samples, specifically:
  - Sieve analysis of the existing retaining wall backfill material to assess the particle size distribution;
  - Atterberg limits and linear shrinkage tests of the natural clay to for soil classification and assessment of soil reactivity;
  - Aggressivity testing of soil (i.e., electrical conductivity (EC), pH, chloride- and sulfate-ions);
  - Point load strength index testing of rock core samples at 1 m depth intervals; and
- Preparation of a summary report on the results of the field work and laboratory testing, together with comments on the relevant issues, including but not limited to the existing retaining wall features, footing excavations, excavation support, footing types and foundations, and soil aggressivity to buried structural elements.

Further to the intrusive geotechnical investigations, investigation of the structural elements and capacity of the existing retaining wall by a structural engineer will be required to determine if the retaining wall can support the additional surcharge loading due to the construction equipment and the sign footing. The geotechnical engineer could assist the structural engineer in their structural assessment by providing additional advice on the lateral surcharge pressure behind the retaining wall and its distribution due to the design loadings from the proposed sign footing.

10. Limitations

Douglas Partners (DP) has prepared this report for this project at Grosvenor Crescent, Summer Hill, in accordance with DP's proposal dated 8 March 2023 and acceptance received from Hanlon Industries Pty Ltd dated 8 March 2023. The work was carried out under DP's Conditions of Engagement. This report is provided for the exclusive use of Hanlon Industries Pty Ltd for this project only and for the purposes as described in the report. It should not be used by or be relied upon for other projects or purposes on the same or another 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.

DP's advice is based upon published information sources. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site. The advice may also be limited by budget constraints imposed by others or by site accessibility.

The assessment of atypical safety hazards arising from this advice is restricted to the geotechnical components set out in this report and based on known project conditions and stated design advice and assumptions. While some recommendations for safe controls may be provided, detailed 'safety in design' assessment is outside the current scope of this report and requires additional project data and assessment.

This report must be read in conjunction with all the attached notes and should be kept in its entirety without separation of individual pages or sections. DP cannot be held responsible for interpretations or conclusions made by others unless they are supported by an expressed statement, interpretation, outcome or conclusion stated in this report.

This report, or sections from this report, should not be used as part of a specification for a project, without review and agreement by DP. This is because this report has been written as advice and opinion rather than instructions for construction.

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

Yours faithfully
Douglas Partners Pty Ltd

Atha Kapitanof
Associate

Reviewed by

Scott Easton
Principal

Attachments: About this Report
Architectural DA Drawing

About this Report

Douglas Partners

Introduction

These notes have been provided to amplify DP's report in regard to classification methods, field procedures and the comments section. Not all are necessarily relevant to all reports.

DP's reports are based on information gained from limited subsurface excavations and sampling, supplemented by knowledge of local geology and experience. For this reason, they must be regarded as interpretive rather than factual documents, limited to some extent by the scope of information on which they rely.

Copyright

Borehole and Test Pit Logs

The borehole and test pit logs presented in this report are an engineering and/or geological interpretation of the subsurface conditions, and their reliability will depend to some extent on frequency of sampling and the method of drilling or excavation. Ideally, continuous undisturbed sampling or core drilling will provide the most reliable assessment, but this is not always practicable or possible to justify on economic grounds. In any case the boreholes and test pits represent only a very small sample of the total subsurface profile.

Interpretation of the information and its application to design and construction should therefore take into account the spacing of boreholes or pits, the frequency of sampling, and the possibility of other than 'straight line' variations between the test locations.

Groundwater

Where groundwater levels are measured in boreholes there are several potential problems, namely:

- In low permeability soils groundwater may enter the hole very slowly or perhaps not at all during the time the hole is left open;
- A localised, perched water table may lead to an erroneous indication of the true water table;
- Water table levels will vary from time to time with seasons or recent weather changes. They may not be the same at the time of construction as are indicated in the report; and
- The use of water or mud as a drilling fluid will mask any groundwater inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water measurements are to be made.

More reliable measurements can be made by installing standpipes which are read at intervals over several days, or perhaps weeks for low permeability soils. Piezometers, sealed in a particular stratum, may be advisable in low permeability soils or where there may be interference from a perched water table.

Reports

The report has been prepared by qualified personnel, is based on the information obtained from field and laboratory testing, and has been undertaken to current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal, the information and interpretation may not be relevant if the design proposal is changed. If this happens, DP will be pleased to review the report and the sufficiency of the investigation work.

Every care is taken with the report as it relates to interpretation of subsurface conditions, discussion of geotechnical and environmental aspects, and recommendations or suggestions for design and construction. However, DP cannot always anticipate or assume responsibility for:

- Unexpected variations in ground conditions. The potential for this will depend partly on borehole or pit spacing and sampling frequency;
- Changes in policy or interpretations of policy by statutory authorities; or
- The actions of contractors responding to commercial pressures.

If these occur, DP will be pleased to assist with investigations or advice to resolve the matter.

About this Report

Site Anomalies

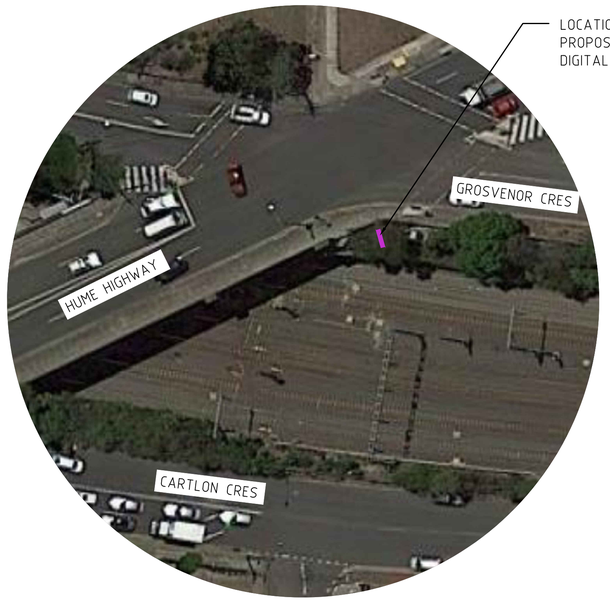
In the event that conditions encountered on site during construction appear to vary from those which were expected from the information contained in the report, DP requests that it be immediately notified. Most problems are much more readily resolved when conditions are exposed rather than at some later stage, well after the event.

Information for Contractual Purposes

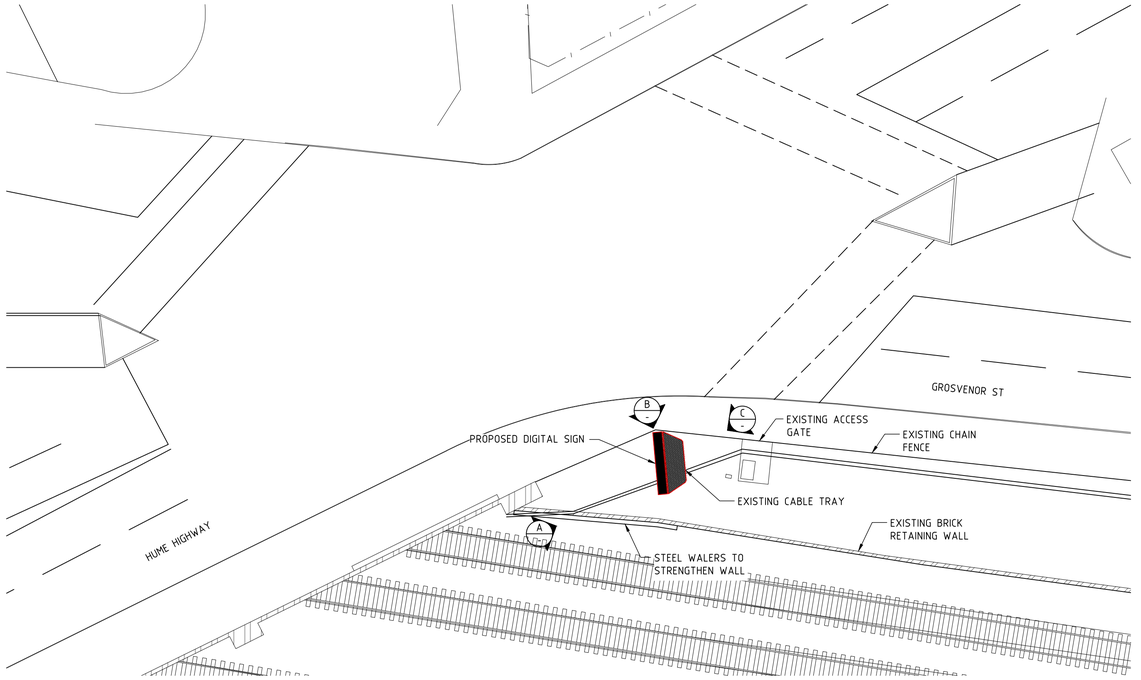
Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate to prepare a specially edited document. DP would be pleased to assist in this regard and/or to make additional report copies available for contract purposes at a nominal charge.

Site Inspection

The company will always be pleased to provide engineering inspection services for geotechnical and environmental aspects of work to which this report is related. This could range from a site visit to confirm that conditions exposed are as expected, to full time engineering presence on site.



AERIAL PHOTO
NTS



SITE PLAN
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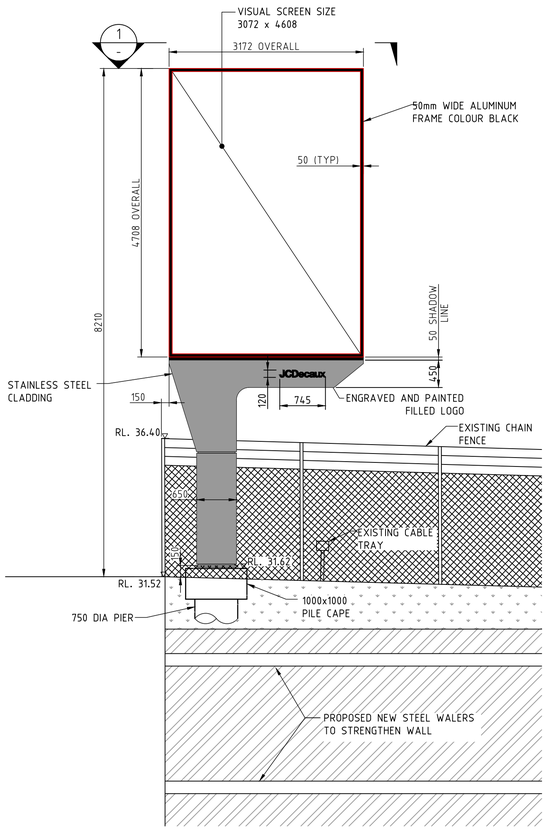
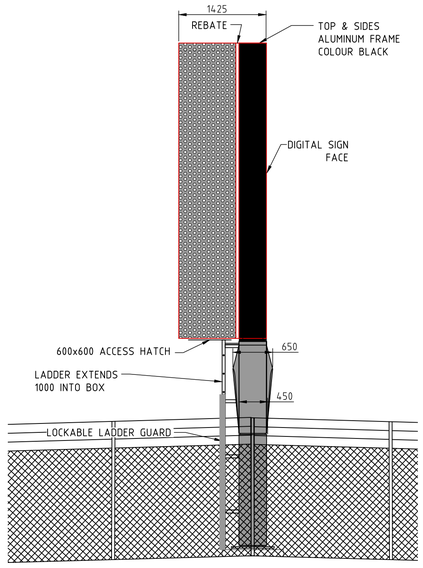


ELEVATION A
SCALE 1:50



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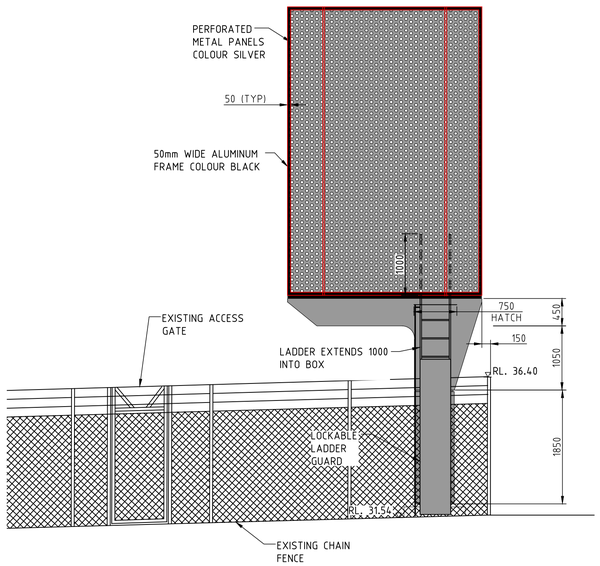
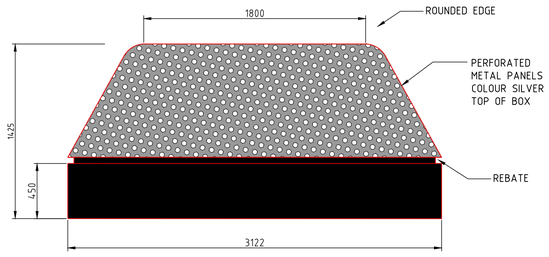


ELEVATION C
SCALE 1:50



SECTION 1
SCALE 1:25

NOT FOR CONSTRUCTION

ISS	DATE	COMMENT
A	22/12/21	ISSUED FOR APPROVAL
B	25/02/22	ISSUED FOR APPROVAL
C	18/03/22	ISSUED FOR APPROVAL
D	25/03/22	ISSUED FOR APPROVAL
E	17/01/23	ISSUED FOR APPROVAL
F	17/02/23	ISSUED FOR APPROVAL

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CLIENT: JCDecaux

PROJECT: HUME HWY, ASHFIELD
PORTRAIT 50

TITLE: PROPOSED DIGITAL SIGN
GENERAL ARRANGEMENT &
SITE PLAN

DRAWN A.T	DESIGN J.L	DATE: DEC' 21
JOB NO: 21325		DWG NO: DA01
SCALE @ A1: AS SHOWN		REV: F