Douglas Partners

Geotechnics • Environment • Groundwater

Integrated Practical Solutions

REPORT

ON

SALINITY ASSESSMENT

PROPOSED MEDICAL CENTRE

26 BIGGE STREET, LIVERPOOL

Prepared for

HEALTHSCOPE

Project 45575.01

August 2010

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REPORT ON SALINITY ASSESSMENT
PROPOSED MEDICAL CENTRE
26 BIGGE STREET, LIVERPOOL

1. INTRODUCTION

This salinity assessment report has been prepared by Douglas Partners (DP) for the proposed new medical centre at 26 Bigge Street, Liverpool. The salinity assessment was commissioned by Mr Wes Gault of BurnsBridge Sweett, on behalf of Healthscope. It is understood that Healthscope are in the process of purchasing the property.

DP have previously undertaken a geotechnical investigation and a waste classification on the site (Project 45575, geotechnical report dated 22 May 2008 and waste classification report dated 23 June 2008). It is understood that the development of the site proposed by the new owners is similar to that proposed at the time of preparation of the previous reports.

Saline soils affect much of the Western Sydney Region. Buildings and infrastructure located in areas underlain by rocks of the Wianamatta Group are particularly at risk. Salinity can affect urban structures in a number of ways including: corrosion of concrete, breakdown of bricks and mortar, corrosion of steel (including reinforcement in concrete), deterioration of roads, attack on buried infrastructure, reduced ability to grow vegetation, and increased erosion potential.

This report provides the results of a site specific salinity assessment and presents salinity management measures designed to:

- reduce the impacts of salinity, aggressivity and sodicity on the proposed development and associated structures; and

- minimise the impact of the proposed development on the existing salinity characteristics of the site.

2. SCOPE OF WORK

The scope of work for the salinity assessment comprised the following:

- Review of regional mapping of soils and geology;
- Review of the following documents:
  - Map of Salinity Potential in Western Sydney, DIPNR (2002);
  - Guidelines to Accompany Map of Salinity Potential in Western Sydney, DIPNR (2002);
  - Western Sydney Salinity Code of Practice (amended January 2004), Rebecca Nicholson for WSROC, DIPNR and Natural Heritage Trust;
  - Introduction to Urban Salinity, DIPNR (2003);
  - Building in a Saline Environment, DIPNR (2003);
  - Roads and Salinity, DIPNR (2003);
  - Urban Salinity Processes, DIPNR (2004); and
  - Waterwise Parks and Gardens, DIPNR (2004);
- Inspection of the site for indicators of potential salinity;
- Review of the results of drilling and logging of five test bores across the site, to depths in the order of 10 m;
- Review of groundwater levels measured in standpipes installed in two of the bores; and
- Assessment of the impacts of the proposed development on salinity.

3. SITE DESCRIPTION AND PROPOSED DEVELOPMENT

The site is a rectangular area with a frontage of about 30 m on Bigge Street and a depth of about 48 m, giving an approximate site area of 1440 m^2. It is understood that the site was previously two standard residential lots occupied by two single houses, but at the time of the geotechnical investigation in 2008 these houses had been demolished and the site was vacant.

The proposed development of the site comprises construction of an eight storey building with two levels of basement car parking. It is understood that the building and basements will extend almost up to the site boundaries and will cover most of the site. Excavation to depths of about 7 m will be required for the basements.

4. REGIONAL SOILS, GEOLOGY AND HYDROGEOLOGY

4.1 Soil Landscapes

Reference to the 1:100 000 Soil Landscape Map for Penrith indicates that the site is included within the Blacktown Soil Landscape, which has the following typical features:

- Gently undulating rises on Wianamatta Group shale;
- Local relief to 30 m and slopes generally less than 5%;
- Broad rounded crests and ridges with gently inclined slopes;
- Deep podzolic soils and soloths in lower slopes and in areas of poor drainage;
- Shallow to moderately deep podzolic soils in upper slopes, crests and in well drained areas; and
- Moderately reactive, highly plastic subsoils or low fertility and poor drainage.

The DIPNR "*Salinity Potential in Western Sydney 2002*" map suggests that the site is located within an area of "moderate salinity potential".

4.2 Geology

The Geological Map of Penrith (Geological Series Sheet 9030, Scale 1:100,000, Edition 1, 1991), indicates that the site is underlain by Bringelly Shale, which is the uppermost member of the Wianamatta Group. The Bringelly Shale formation includes shale, carbonaceous claystone, claystone, laminite, fine to medium grained lithic sandstone, rare coal and tuff.

4.3 Hydrogeology

The results of the investigations indicate that the site is underlain by a weathered shale profile. Weathered shale profiles typically act as an ephemeral or perched water table aquifer of relatively low permeability and low storage capacity. Most of the water temporarily stored in the weathered shale profile following extended periods of heavy rain is later lost as base flow or by evapo-transpiration. During periods of normal rainfall, little or no surface water penetrates below the root zone.

The deeper, less weathered shales have a very low intrinsic permeability and groundwater flow in these rocks is likely to be dominated by flow along fractures in the rock which may yield very small quantities of generally saline groundwater.

The groundwater in the Wianamatta Group is typically brackish to saline with total dissolved solids (TDS) in the range 500 – 5000 mg/L (but with cases up to 32,000 mg/L reported). The dominant ions are typically sodium and chloride and the water is generally unsuitable for livestock or irrigation.

Due to the general poor quality and low yields, very few water bores have been installed in the weathered shale areas of western Sydney and consequently little is known of the regional water table.

Measurements of water levels were undertaken in two of the test bores drilled on site. No water was recorded in one of the bores, which had been drilled to a depth of 8.5 m. In the other bore there was a small volume of water in the bottom of the bore (below a depth of 8.2 m) which is considered to have resulted from some slight seepage along the clay/rock interface.

5. SITE ASSESSMENT

Guidelines for assessing the salinity of sites are provided in Section 7 of the Western Sydney Salinity Code of Practice (published 2003 & amended 2004). The code indicates that for small sites full salinity investigations may not be appropriate. The detailed investigations outlined in the Code and accompanying notes are directed at development of sites which occupy large areas, typically with areas of several hectares.

For this site which will cover two standard residential lots and has a total area of about 1440 m^2 it is considered that the process outlined in Section 7.2 of the Code for single lot development applications is appropriate. Section 7.2 provides a flow chart for assessing such sites and the results of the processes followed are presented in Table 1 below.

Table 1: Assessment Process

Step	Assessment	Conclusion
1. Identify site on DIPNR Salinity Potential Map	Site is located totally in a yellow area.	Site is in an area identified as having moderate salinity potential. Proceed to Step 2
2. Does the development involve salinity risk activities?	The proposed development will comprise excavation of most of the existing site to depths of 7m. The excavation will be above the groundwater table. After construction the site will be essentially covered by buildings and any stormwater will be directed into drains. • Water flow into the ground will not be increased • The basements will not cause a rise in groundwater levels in the surrounding ground • Any saline subsoils excavated from the site will be removed and disposed to licensed landfills • There is no native vegetation on the site	The development will not involve salinity risk activities. Level 1 response is considered appropriate - applies to small developments involving low risk activities in areas with a moderate salinity potential Proceed to Step 3
3. Complete LEVEL 1 Salinity Management Response Checklist	See Table 2 below, based on Appendix 11.1 of Western Sydney Salinity Code of Practice	

Table 2: Level 1 Salinity Management Response Checklist

Area	Concern	Response
Salinity Potential Areas	Are you satisfied that there is only a moderate salinity potential on this site and that site specific investigations are not required?	Yes. The site is located on a slight rise and the investigations show that it is underlain by a residual weathered shale profile.
Water Inputs	Will infiltration of stormwater be avoided?	Infiltration of stormwater on the site will be substantially reduced by construction of the building over most of the site.
	Will there be permanent water storage on site which requires lining and regular maintenance?	No ponds or dams are proposed for the site.
	Will underground water pipes and sewer pipes be properly installed to eliminate leaks?	Building contractor will be required to comply with this good engineering practice
	Consideration given to salinity when designing and installing swimming pools	No swimming pools are proposed
Drainage	Disturbance of natural drainage patterns minimised	There are no natural drainage paths across the site
	Slab, foundations and retaining walls designed to allow good drainage and minimise water logging	To be undertaken in accordance with good design and construction practice
	Existing areas of water logging and poor drainage remediated	No water logged areas or poor drainage observed on site
	Design and layout of retaining walls, driveways and service connections reduces cut, minimises impediment of natural groundwater flows and provides for good drainage	Proposed excavation will not penetrate the groundwater table or impede groundwater flows.
	Guttering and down pipes properly connected and maintained	Building design will comply with this and owner will ensure ongoing maintenance occurs
Vegetation	Areas of established vegetation maintained	There is no existing established vegetation on the site.
	Landscaping plans apply Waterwise gardening principles	Minimal landscaping is proposed for the site
	Gardens designed so that they are not adjacent to the property (building)	Minimal landscaping is proposed for the site
	Irrigation properly installed to avoid leakage and 'smart' sprinkler systems considered	Minimal landscaping is proposed for the site
Building	Damp-proof courses properly installed and maintained throughout construction, landscaping and finishing	Building design will comply ensure this.
	Susceptible construction materials avoided	Building design will take this into account
	Consideration given to the need for salt resistant bricks and construction materials	Building to be designed for moderately aggressive soil conditions

6. DISCUSSION

The site has been identified as being located in an area of moderate salinity potential, due primarily to the fact that it is underlain by weathered shale from the Wianamatta Group of rocks.

The site is a small suburban property which is surrounded by existing urban development. It was formerly occupied by two small houses and the site has been cleared of any existing structures and vegetation. The proposed development comprises excavation over most of the property to maximum depths of about 7 m and construction of an eight storey reinforced concrete building which will occupy most of the site.

Investigations on the site have shown that the proposed excavation and basement will not penetrate into the permanent groundwater table and rainwater infiltration into the site will be greatly reduced by the proposed building. The designer has previously been advised to allow for moderately aggressive soil conditions in his design of the structures on the site. Provided that appropriate good design and construction measures are adopted to allow for concrete to be in contact with moderately saline soils and to minimise water infiltration into the soils, then it is assessed that no further action is required.

The following strategies are provided to give recommendations on good management practices which should be adopted in order to:

- minimise the impact of the development on the site salinity; and
- minimise the impact of salinity on the development.

7. RECOMMENDED MANAGEMENT STRATEGIES

7.1 General

In general, the recommended management strategies are directed at:

- Maintaining the natural water balance;
- Maintaining good drainage;
- Avoiding disturbance or exposure of sensitive soils;

- Retaining or increasing appropriate native vegetation in strategic areas; and
- Implementing building controls and engineering responses where appropriate.

7.2 Civil Works

- An Erosion and Sediment Control Plan must be developed by the appointed contractor and implemented in accordance with the NSW Department of Housing document "*Managing Urban Stormwater: Soils and Construction"* (1998).
- All sediment and erosion controls proposed by the Erosion and Sediment Control Plan are to be installed prior to commencement of any excavation or construction works.

7.3 Building Construction Works

- For slab-on-ground construction, a layer of bedding sand of at least 50 mm thickness under the slab must be provided. This will permit free drainage of water beneath the slab, minimising the possibility of pooling or trapping water that might potentially be carrying salts.
- A high impact damp-proof membrane, not just a vapour-proof membrane, must be laid under any ground-bearing slab. The damp-proof membrane must be extended to the outside face of the external edge beam up to the finished ground level.
- Ground bearing slabs, retaining walls, footings, piers or beams must be designed for moderately aggressive soil conditions
- For masonry building construction, the damp-proof course must consist of polyethylene or polyethylene coated metal that is correctly placed in accordance with the Building Code of Australia. Once installed, any later construction works must not breach the damp-proof course and/or waterproof membrane.
- Exposure class masonry units must be used below the damp proof course.
- Appropriate mortar and mixing ratios must be used with exposure class masonry units.
- Ground levels immediately adjacent to masonry walls must be kept below the damp-proof course.
- Water should not be permitted to pond against the walls of any new structures. Surrounding pathways, hardstand parking areas or the like should be sloped so as to drain water away from any external walls.

- Adequate drainage of down pipes must be provided to divert water away from structures and prevent cyclic wetting and drying.
- Service connections and stormwater runoffs should be checked to avoid leaking pipes which may affect off site areas further down slope and increase groundwater recharge resulting in increases in groundwater levels.
- Landscaping and garden designs should preferably not be placed against building walls and should be designed to minimise the use of water on site.

7.4 Infrastructure

- Underground cast-in-situ concrete structures should be designed for moderately aggressive soil conditions,
- Utilise copper or non-metallic pipes as opposed to galvanised iron;
- Utilise fibre-reinforced concrete (FRC) stormwater pipes or pipes with aggressivity resistance equivalent to that of 32 MPa concrete;
- Ensure all underground services are provided with adequate corrosion protection, including sheaths to power and telecommunication cables;
- Monitor water pipes for leaks on a regular basis and repair any damaged pipes as soon as possible after detection.

DOUGLAS PARTNERS PTY LTD

Reviewed by

Fiona MacGregor
Principal

Michael J Thom
Principal

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6. Hazelton, P. A. and Murphy B. W. 1992. A Guide to the Interpretation of Soil Test Results. Department of Conservation and Land Management.

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NOTES RELATING TO THIS REPORT

Introduction

These notes have been provided to amplify the geotechnical report in regard to classification methods, specialist field procedures and certain matters relating to the Discussion and Comments section. Not all, of course, are necessarily relevant to all reports.

Geotechnical reports are based on information gained from limited subsurface test boring 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.

Description and Classification Methods

The methods of description and classification of soils and rocks used in this report are based on Australian Standard 1726, Geotechnical Site Investigations Code. In general, descriptions cover the following properties - strength or density, colour, structure, soil or rock type and inclusions.

Soil types are described according to the predominating particle size, qualified by the grading of other particles present (eg. sandy clay) on the following bases:

Soil Classification	Particle Size
Clay	less than 0.002 mm
Silt	0.002 to 0.06 mm
Sand	0.06 to 2.00 mm
Gravel	2.00 to 60.00 mm

Cohesive soils are classified on the basis of strength either by laboratory testing or engineering examination. The strength terms are defined as follows.

Classification	Undrained Shear Strength kPa
Very soft	less than 12
Soft	12—25
Firm	25—50
Stiff	50—100
Very stiff	100—200
Hard	Greater than 200

Non-cohesive soils are classified on the basis of relative density, generally from the results of standard penetration tests (SPT) or Dutch cone penetrometer tests (CPT) as below:

Relative Density	SPT "N" Value (blows/300 mm)	CPT Cone Value (q_c — MPa)
Very loose	less than 5	less than 2
Loose	5—10	2—5
Medium dense	10—30	5—15
Dense	30—50	15—25
Very dense	greater than 50	greater than 25

Rock types are classified by their geological names. Where relevant, further information regarding rock classification is given on the following sheet.

Sampling

Sampling is carried out during drilling to allow engineering examination (and laboratory testing where required) of the soil or rock.

Disturbed samples taken during drilling provide information on colour, type, inclusions and, depending upon the degree of disturbance, some information on strength and structure.

Undisturbed samples are taken by pushing a thin-walled sample tube into the soil and withdrawing with a sample of the soil in a relatively undisturbed state. Such samples yield information on structure and strength, and are necessary for laboratory determination of shear strength and compressibility. Undisturbed sampling is generally effective only in cohesive soils.

Details of the type and method of sampling are given in the report.

Drilling Methods.

The following is a brief summary of drilling methods currently adopted by the Company and some comments on their use and application.

Test Pits — these are excavated with a backhoe or a tracked excavator, allowing close examination of the in-situ soils if it is safe to descent into the pit. The depth of penetration is limited to about 3 m for a backhoe and up to 6 m for an excavator. A potential disadvantage is the disturbance caused by the excavation.

Large Diameter Auger (eg. Pengo) — the hole is advanced by a rotating plate or short spiral auger, generally 300 mm or larger in diameter. The cuttings are returned to the surface at intervals (generally of not more than 0.5 m) and are disturbed but usually unchanged in moisture content. Identification of soil strata is generally much more reliable than with continuous spiral flight augers, and is usually supplemented by occasional undisturbed tube sampling.

Continuous Sample Drilling — the hole is advanced by pushing a 100 mm diameter socket into the ground and withdrawing it at intervals to extrude the sample. This is the most reliable method of drilling in soils, since moisture content is unchanged and soil structure, strength, etc. is only marginally affected.

Continuous Spiral Flight Augers — the hole is advanced using 90—115 mm diameter continuous spiral flight augers which are withdrawn at intervals to allow sampling or in-situ testing. This is a relatively economical means of drilling in clays and in sands above the water table. Samples are returned to the surface, or may be collected after withdrawal of the auger flights, but they are very disturbed and may be contaminated. Information from the drilling (as distinct from specific sampling by SPTs or undisturbed samples) is of relatively lower reliability, due to remoulding, contamination or softening of samples by ground water.

Non-core Rotary Drilling — the hole is advanced by a rotary bit, with water being pumped down the drill rods and returned up the annulus, carrying the drill cuttings. Only major changes in stratification can be determined from the cuttings, together with some information from ‘feel’ and rate of penetration.

Rotary Mud Drilling — similar to rotary drilling, but using drilling mud as a circulating fluid. The mud tends to mask the cuttings and reliable identification is again only possible from separate intact sampling (eg. from SPT).

Continuous Core Drilling — a continuous core sample is obtained using a diamond-tipped core barrel, usually 50 mm internal diameter. Provided full core recovery is achieved (which is not always possible in very weak rocks and granular soils), this technique provides a very reliable (but relatively expensive) method of investigation.

Standard Penetration Tests

Standard penetration tests (abbreviated as SPT) are used mainly in non-cohesive soils, but occasionally also in cohesive soils as a means of determining density or strength and also of obtaining a relatively undisturbed sample. The test procedure is described in Australian Standard 1289, “Methods of Testing Soils for Engineering Purposes” — Test 6.3.1.

The test is carried out in a borehole by driving a 50 mm diameter split sample tube under the impact of a 63 kg hammer with a free fall of 760 mm. It is normal for the tube to be driven in three successive 150 mm increments and the ‘N’ value is taken as the number of blows for the last 300 mm. In dense sands, very hard clays or weak rock, the full 450 mm penetration may not be practicable and the test is discontinued.

The test results are reported in the following form.

- In the case where full penetration is obtained with successive blow counts for each 150 mm of say 4, 6 and 7

  as 4, 6, 7
  N = 13

- In the case where the test is discontinued short of full penetration, say after 15 blows for the first 150 mm and 30 blows for the next 40 mm

  as 15, 30/40 mm.

The results of the tests can be related empirically to the engineering properties of the soil.

Occasionally, the test method is used to obtain samples in 50 mm diameter thin walled sample tubes in clays. In such circumstances, the test results are shown on the borelogs in brackets.

Cone Penetrometer Testing and Interpretation

Cone penetrometer testing (sometimes referred to as Dutch cone — abbreviated as CPT) described in this report has been carried out using an electrical friction cone penetrometer. The test is described in Australian Standard 1289, Test 6.4.1.

In the tests, a 35 mm diameter rod with a cone-tipped end is pushed continuously into the soil, the reaction being provided by a specially designed truck or rig which is fitted with an hydraulic ram system. Measurements are made of the end bearing resistance on the cone and the friction resistance on a separate 130 mm long sleeve, immediately behind the cone. Transducers in the tip of the assembly are connected by electrical wires passing through the centre of the push rods to an amplifier and recorder unit mounted on the control truck.

As penetration occurs (at a rate of approximately 20 mm per second) the information is plotted on a computer screen and at the end of the test is stored on the computer for later plotting of the results.

The information provided on the plotted results comprises: —

- Cone resistance — the actual end bearing force divided by the cross sectional area of the cone — expressed in MPa.
- Sleeve friction — the frictional force on the sleeve divided by the surface area — expressed in kPa.
- Friction ratio — the ratio of sleeve friction to cone resistance, expressed in percent.

There are two scales available for measurement of cone resistance. The lower scale (0—5 MPa) is used in very soft soils where increased sensitivity is required and is shown in the graphs as a dotted line. The main scale (0—50 MPa) is less sensitive and is shown as a full line.

The ratios of the sleeve friction to cone resistance will vary with the type of soil encountered, with higher relative friction in clays than in sands. Friction ratios of 1%—2% are commonly encountered in sands and very soft clays rising to 4%—10% in stiff clays.

In sands, the relationship between cone resistance and SPT value is commonly in the range:—

$$q_c \text{ (MPa)} = (0.4 \text{ to } 0.6) \text{ N (blows per 300 mm)}$$

In clays, the relationship between undrained shear strength and cone resistance is commonly in the range:—

$$q_c = (12 \text{ to } 18)\, c_u$$

Interpretation of CPT values can also be made to allow estimation of modulus or compressibility values to allow calculation of foundation settlements.

Inferred stratification as shown on the attached reports is assessed from the cone and friction traces and from experience and information from nearby boreholes, etc. This information is presented for general guidance, but must be regarded as being to some extent interpretive. The test method provides a continuous profile of engineering properties, and where precise information on soil classification is required, direct drilling and sampling may be preferable.

Hand Penetrometers

Hand penetrometer tests are carried out by driving a rod into the ground with a falling weight hammer and measuring the blows for successive 150 mm increments of penetration. Normally, there is a depth limitation of 1.2 m but this may be extended in certain conditions by the use of extension rods.

Two relatively similar tests are used.

- Perth sand penetrometer — a 16 mm diameter flat-ended rod is driven with a 9 kg hammer, dropping 600 mm (AS 1289, Test 6.3.3). This test was developed for testing the density of sands (originating in Perth) and is mainly used in granular soils and filling.
- Cone penetrometer (sometimes known as the Scala Penetrometer) — a 16 mm rod with a 20 mm diameter cone end is driven with a 9 kg hammer dropping 510 mm (AS 1289, Test 6.3.2). The test was developed initially for pavement subgrade investigations, and published correlations of the test results with California bearing ratio have been published by various Road Authorities.

Laboratory Testing

Laboratory testing is carried out in accordance with Australian Standard 1289 “Methods of Testing Soil for Engineering Purposes”. Details of the test procedure used are given on the individual report forms.

Bore Logs

The bore logs presented herein 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. 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 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, the frequency of sampling and the possibility of other than ‘straight line’ variations between the boreholes.

Ground Water

Where ground water levels are measured in boreholes, there are several potential problems;

- In low permeability soils, ground water although present, may enter the hole slowly or perhaps not at all during the time it 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.
- The use of water or mud as a drilling fluid will mask any ground water inflow. Water has to be blown out of the hole and drilling mud must first be washed out of the hole if water observations 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.

Engineering Reports

Engineering reports are prepared by qualified personnel and are based on the information obtained and on current engineering standards of interpretation and analysis. Where the report has been prepared for a specific design proposal (eg. a three storey building), the information and interpretation may not be relevant if the design proposal is changed (eg. to a twenty storey building). If this happens, the Company 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 condition, discussion of geotechnical aspects and recommendations or suggestions for design and construction. However, the Company cannot always anticipate or assume responsibility for:

- unexpected variations in ground conditions — the potential for this will depend partly on bore spacing and sampling frequency
- changes in policy or interpretation of policy by statutory authorities
- the actions of contractors responding to commercial pressures.

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

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, the Company requests that it immediately be notified. Most problems are much more readily resolved when conditions are exposed than at some later stage, well after the event.

Reproduction of Information for Contractual Purposes

Attention is drawn to the document “Guidelines for the Provision of Geotechnical Information in Tender Documents”, published by the Institution of Engineers, Australia. Where information obtained from this investigation 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. The Company 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 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.