Douglas Partners
Geotechnics / Environment / Groundwater

Integrated Practical Solutions

Report on
Geotechnical Desktop Assessment

42 North Steyne, Manly

Prepared for
Steyne Hotel Operations Pty Ltd

Project 225615.00
October 2023

Douglas Partners
Geotechnics / Environment / Groundwater

Document History

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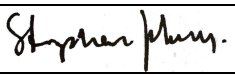
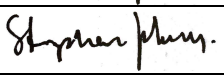
Draft A			Warwick Bowyer, Iris Capital
Rev0			Warwick Bowyer, Iris Capital

The undersigned, on behalf of Douglas Partners Pty Ltd, confirm that this document and all attached drawings, logs and test results have been checked and reviewed for errors, omissions and inaccuracies.

	Signature	Date
Author		26/10/2023
Reviewer	p.p 	26/10/2023

Douglas Partners acknowledges Australia's First Peoples as the Traditional Owners of the Land and Sea on which we operate. We pay our respects to Elders past and present and to all Aboriginal and Torres Strait Islander peoples across the many communities in which we live, visit and work. We recognise and respect their ongoing cultural and spiritual connection to Country.

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Douglas Partners
Geotechnics / Environment / Groundwater

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Report on Geotechnical Desktop Assessment
Proposed Residential Development
42 North Steyne, Manly

1. Introduction

This report presents the results of a geotechnical desktop assessment undertaken by Douglas Partners Pty Ltd (DP) for the proposed residential development at 42 North Steyne, Manly. The report was commissioned in an email dated 25 September 2023 by Warwick Bowyer of Iris Capital, on behalf of Steyne Hotel Operations Pty Ltd. The assessment was undertaken in accordance with DP's proposal dated 25 September 2023.

It is understood that the proposed development of the site includes the demolition of an existing building at 41 North Steyne, and the reuse and redevelopment of the existing building 42 North Steyne. The development will be a five-storey block of apartments, and will be adjacent to the heritage listed Hotel Steyne. The development will reuse the existing basement of 42 North Steyne, and extend it within the footprint of 41 North Steyne. The deepest bulk excavation level of the new works is anticipated to be approximately RL 1.5 m AHD (about 3.5 m below ground level).

DP has previously conducted geotechnical investigations at the adjacent properties either side of the proposed development. This data was used to inform the anticipated ground conditions at the proposed development. The previous investigations consisted of:

- Thirteen test pits at the Hotel Steyne between the period of 18/12/2001 and 1/1/2002. The test pits were undertaken as a part of building upgrades and were completed near existing footings.
- Four Cone Penetration Tests (CPT) at 43-45 North Steyne, in between the period of 26/7/2000 to 10/11/2000. The CPT tests extended to approximately RL -15 m (AHD).

This report contains a preliminary inferred geotechnical model for the site as well as advice on earthworks, foundations, retaining walls, shoring, and seismicity.

The report will be used by the structural engineers James Taylor and Associates to inform the design of the building. Noting that DP have not undertaken any investigations at the proposed development, site verification of the proposed geotechnical model will still need to occur at the construction stage. Given the relatively narrow width of the site to the adjacent historic DP investigations, a reasonable approximation of the ground conditions is expected and this level of detail would be considered sufficient for the construction certificate stage from a geotechnical perspective.

Commentary on considerations for Acid Sulphate Soils at the proposed site during construction is covered within a separate memorandum (Ref: 225615.00.R.002.Rev0).

2. Available Information

The following information was used for the assessment:

- "Documentation for Structural Works – Manly Apartments (REV E)", James Taylor and Associates, drawing set dated 16/10/2023. Attached to Appendix D.
- "Manly Apartments", Squillace Architects, preliminary drawing set dated 07/09/2023. Attached to Appendix D.
- Survey drawings of the proposed development and surrounding features from LTS Lockley dated 19/08/19.

3. Proposed Development

The proposed development will occupy the land on 41 and 42 North Steyne. The apartment building is proposed to be 5 storeys. The building will have one predominate basement level, at a similar level to the existing basement level of 42 North Steyne which will be reused, and extended into 41 North Steyne. The basement slab level is approximately RL 1.8 (m AHD) at the lowest level. Therefore the lowest bulk excavation level may be in the order of RL 1.5 m AHD (subject to slab/footing design). A smaller lower basement level in the existing 42 North Steyne building, presumably a hydrostatic slab, is proposed to be reused but with no slab penetration or excavation works at this depth; the slab level of the lower basement level is approximately RL 0.15 m (m AHD).

A review of the structural drawings indicates:

- A raft slab foundation is proposed for the building.
- The extension of the basement level at 41 North Steyne is proposed to be shored by an anchored contiguous pile wall or jet grouting.
- Existing footings and elements of the heritage listed Hotel Steyne are proposed to be shored by an anchored contiguous piled wall or jet grouting.

4. Site Description

The site is bounded by North Steyne to the east, Henrietta Street to the West, Hotel Steyne to the South, and 43-45 North Steyne to the north. The surrounding topography is relatively flat with an approximate surface level of RL 4.8 m (AHD). The building is surrounded by urban development which is assumed to be well drained from a runoff perspective, due to the presence of the council stormwater system. Table 1 below presents the site identification details.

Table 1: Site Identification

Item	Details
Allotment Identification	Lot 1 DP 1034722
Street Address	42 North Steyne
Locality	Manly, NSW 2095
Site Area	407.7 m^2
Local Government Area	Northern Beaches Council
Current Owner	Steyne Hotel Operations Pty Ltd

5. Published Data

5.1 Regional Geology

A review of the 1:100,000 geology sheet of Sydney indicates the site is underlain by Quaternary sediments from the Cainozoic era. The deposits predominantly consist of quartz sands with shell fragments (Qhb). The sheet nominates foredune deposits to the west of the site (Qhf). The Manly area is underlain by Triassic Hawkesbury Sandstone (Rh), at depths in the order of 20 m or more. Figure 1 illustrates the site with a blue marker relative to the regional geology.

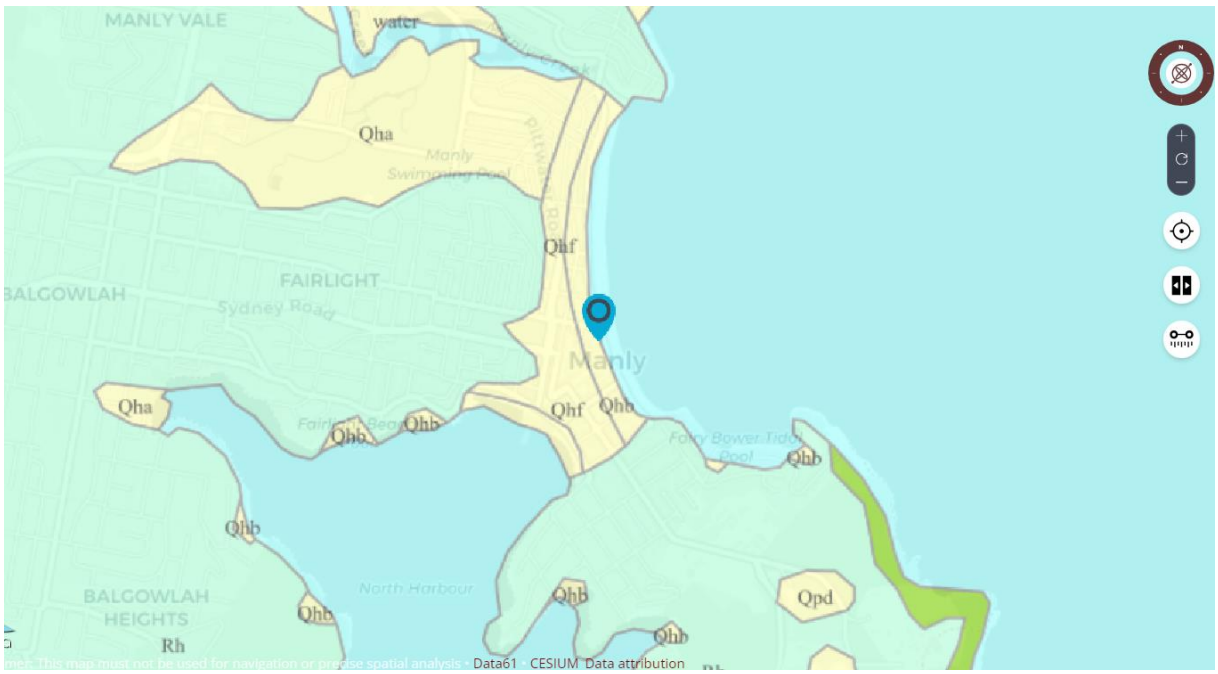


Figure 1: Regional geology surrounding the proposed development

The regional hydrology is dominated by the Pacific Ocean to the east approximately 50 m from the site and North Harbour further to the south-west. Previous DP investigations in the area have measured the groundwater typically at RL 0.5 to RL 1.0m. The groundwater levels will fluctuate with climatic conditions and to a lesser extent due to tidal influences, and are likely to increase following periods of extended wet weather.

6. Previous Investigations

DP have previously conducted investigations in the properties adjacent to the proposed development. These investigations are summarised in Table 2.

Table 2: Summary of previous DP investigations

Investigation Location	Year	Description
43-45 North Steyne	2000	4 CPT tests that extended to approximately RL -15 m (AHD) (approx. 19 m below ground level).
75 The Corso	2001-2002	13 test pits at Hotel Steyne on existing footings as a part of building upgrades. Some test pits also included Dynamic Cone Penetrometer (DCP) testing.

The locations of the relevant previous investigations are shown on Drawing 1, in Appendix B. The logs for these investigations are provided in Appendix C.

7. Geotechnical Model

The results of the previous investigations were consistent with the inferred regional geology, with the addition of uncontrolled fill material in some areas. The preliminary geotechnical model is summarised in Table 3. The geotechnical model was inferred from the available investigation data, in particular CPT testing at 43-45 North Steyne.

Table 3: Inferred preliminary geotechnical model

Unit	Top of Unit (m AHD)	Description
Fill or Disturbed Sand (Loose)	4.5	Poorly compacted filling or disturbed loose sands.
Sand (Medium Dense)	2.5	Sands, medium dense, marine origin.
Sand (Loose)	0.0	Sands, loose, marine origin.
Sand (Medium Dense)	-4.5	Sands, medium dense, marine origin.
Sand (Loose)	-7.5	Silty sands, loose, marine origin
Sands (Dense)	-9.5	Sands, dense or better, marine origin.

Noting that no investigations have occurred directly at the proposed development the inferred geotechnical model should be confirmed by site investigations prior to detailed design.

The groundwater table is expected to be intercepted between RL 0.5 m to RL 1.0 m. It should be noted that groundwater levels will fluctuate with climatic conditions and to lesser extent due to tidal influences, and are likely to increase following periods of extended wet weather. Periods of intense rainfall or climatic factors may see water levels rise by at least 1.5 m above the typical range of RL 0.5 to RL 1.0 m AHD. These levels should be considered in the structural design.

Table 4 summarises the recommended geotechnical parameters from the available information.

Table 4: Recommended geotechnical parameters.

Unit ID	Unit Weight (kN/m3)	Poisson's Ratio	Friction Angle (deg)	Young's Modulus (MPa)
Fill or Sands (Loose)	16	0.3	27	10
Sand (Medium Dense)	19	0.3	33	30
Sand (Dense)	20	0.3	36	50

8. Comments

8.1 Excavations

It is expected that the excavation will be carried out through minor filling and natural sands which should be readily removed using conventional earthmoving equipment such as tracked hydraulic excavators.

Based on the groundwater level measured on the adjacent sites (RL 0.5 m to RL 1.0 m AHD) it is anticipated that the deepest proposed bulk excavation (RL 1.5 m AHD), should be marginally above the water table. As such on available information active dewatering of the site will generally not be required. Experience with sites underlain by sand indicate that short term fluctuations in groundwater levels of at least 1.5 m can occur during periods of heavy rainfall which could result in the groundwater level being at or above the excavation depth in the short term, this should be considered by the designer and contractor.

8.2 Dilapitation Surveys

Dilapidation surveys should be undertaken on surrounding structures and pavements (on neighbouring sites and the subject site) prior to commencing work on the site to document any existing defects so that any claims for damage due to construction related activities can be accurately assessed. The

appropriate extent of dilapidation surveys may be better assessed once details of the proposed development and construction methods have been confirmed.

8.3 Subgrade Preparation

It is expected that at bulk excavation level, the subgrade will consist of loose to medium dense sands.

For subgrade preparation, it is suggested that following excavation to achieve design levels, the exposed soil surface should be thoroughly rolled with a minimum of eight passes using an appropriately sized smooth drum roller (say 8 tonne static weight). The final pass (proof roll) should be inspected by a geotechnical engineer to help identify any soft or heaving areas.

It is recommended that a working platform be constructed atop the prepared subgrade to ensure trafficability of large plant. The platform should be constructed from good quality granular material with low fines, such as recycled concrete or high strength crushed rock. The thickness of the platform should be assessed once specific details of the heavy plant that will operate within the basement are known.

8.4 Foundations

8.4.1 Pad Footings

Referencing the nominated bulk excavation level of between RL 2.5 m and to RL 1.5 m it is anticipated that any pad footings will be within the zone of influence of saturated loose sands, which would not have adequate bearing capacity and stiffness when considering the size of the proposed development (and loads). Pad footings are not recommended for the building loads.

8.4.2 Raft Slabs

A raft slab foundation should be suitable for the development, however, this will be subject to detailed review and analysis of bearing pressures and settlements once more specific details of the founding level, column layout and slab loadings have been confirmed. The presence of loose sands below the raft slab should be considered in the design particularly for the concentrated column loadings.

Preliminary modulus of subgrade reaction (k_s) values for a raft slab spanning the proposed development site (approx. 20 wide by 40 m long), would be in the range of 2.0 to 3.0 kPa/mm. Indicative preliminary maximum total settlements could be derived using this k_s value provided that any load is distributed evenly at the underside of the raft. It is noted that the modulus of subgrade reaction is not an intrinsic property of the soil, and depends on the loading size and flexural rigidity of the structural element applying the loading. Differential settlement would be dependent on load transfer of the building loads and generally would be subject to detailed analysis.

A new raft is proposed at 41 North Steyne and the existing raft at 42 North Steyne is to be reused. A review of the structural drawings indicates that these two elements will be structurally connected. Potential differential settlements of the two connected rafts will ultimately depend on the stress history

of the soil, load magnitudes and load timing on each raft component. Assuming the existing raft is unloaded, and equal loads are then applied on each raft component, at the same time, the response of the existing raft is expected to be approximately 3 times stiffer (Aplan, 1970) than the new raft area (41 North Steyne). This is due to the fact that the loose sand deposit under the new raft area is normally consolidated as currently pad footings support the building (at the current ground level) and therefore have not exerted stress from building loads onto lower layers of loose sands. It is likely if the new loads on the existing raft are similar to the previous loads, that the response of the soil will be stiffer than the area occupying 41 North Steyne.

Construction of the raft slabs should incorporate subgrade preparation as outlined in Section 7.6. It is also suggested that a 150 mm thick layer of good quality granular material such as recycled concrete or crushed rock should be placed and compacted over the prepared surface, particularly at the more heavily loaded areas. The granular layer will help to confine the sandy soils and improve the compaction and density of the surface soils.

A piled raft foundation may also be considered to reduce differential settlements, if required.

Further geotechnical analysis and advice will be required in relation to the design and construction of both raft slabs and piled raft slabs, if these are to be considered.

8.4.3 Piles

Continuous Flight Auger (CFA) piles are a potential option for the main building foundations. If CFA piles are adopted then particular care will be required by the piling contractor to avoid "decompression". This phenomenon involves the drilling auger drawing in the surrounding soils, due to a sudden decrease in the rate of penetration when drilling through dense layers. Decompression can lead to settlement of the ground surface and damage to existing structures.

It is recommended that the foundation piles for building loads extend into dense (or better) sands. The pile design should be based on AS2159 and adopt a preliminary geotechnical reduction factor ($\emptyset_g$) equal to 0.45. The following parameters may be suitable for the design of piles:

- An ultimate end bearing equal to 8000 kPa for dense sands (or better)
- An ultimate average shaft adhesion of 40 kPa for medium dense sand, and 100 kPa for dense sands. The contribution of shaft adhesion should be ignored for loose sands and fill.

8.4.4 Existing Foundations

The heritage listed Hotel Steyne foundations are adjacent to the proposed excavation. This building will be sensitive to excavation induced movement of the existing footings due to the proposed construction works. It is therefore recommended to:

- Underpin the footings where it is feasible. Grout stabilisation of particularly sensitive footings could be considered.

- Undertake geotechnical retaining wall analysis to predict and limit existing foundation movements from the proposed excavation and construction works, as the retention system will likely be within the zone of influence of the building foundations.
- Prepare a vibration and movement monitoring plan.
- Monitor the existing building / foundation movement against predefined trigger levels from the vibration and monitoring plan.

8.5 Retaining Walls

8.5.1 Retaining Wall Design

Vertical excavations within the sands will require retaining structures both during construction and as part of the final structure. Given the proposed excavation is generally expected to be above the water table a contiguous pile CFA wall could be used. If this was to occur, then it may be necessary to use jet-grouting or other similar methods to seal the gaps in the wall to stop sand flow and groundwater ingress during extreme rainfall. This may also be required for connection to the existing shoring wall.

It is recommended that the design of cantilevered shoring walls or shoring with a single row of anchors be designed with a triangular earth pressure distribution. Cantilevered walls are not recommended adjacent to existing structures or where wall movement needs to be limited. Recommended parameters for preliminary design are summarised in Table 6.

Table 6: Recommended parameters for shoring wall design

Unit ID	K_A	K_P	K_0
Fill or Sands (Loose)	0.35	2.60	0.55
Sand (Medium Dense)	0.30	3.00	0.45
Sand (Dense)	0.25	3.50	0.40

The horizontal thrust force should be designed to K_0 conditions should the wall movements want to be minimised, along with a factor of safety on passive resistance in order to limit the movement which is required to mobilise passive resistance.

8.5.2 Ground Anchors

It is presumed that temporary anchors or stiff propping will be used to restrict wall movements during the construction phase, with permanent support of walls provided by the final structure.

Design of temporary anchors within loose to medium dense sand may be based on a friction angle (ϕ) of 30 degrees. Trial anchors may be used to determine if higher friction angles or shaft adhesion values are achievable. The anchors should be bonded behind a line drawn up at 45 degrees from the base of the excavation, and lift-off tests should be carried out to confirm the anchor capacities. Post-grouting techniques may be used to achieve higher capacities.

The anchors will need to be carefully positioned and possibly inclined at steeper angles to avoid adjacent services and basements and footings for adjacent buildings. It is noted that permission from adjacent property owners will be required prior to installing soil anchors beneath their land.

It is recommended that only reputable, specialist anchor contractors be engaged to design and/or install temporary anchors on this site.

8.6 Seismicity

In accordance with AS1170-2007 “Structural Design Actions, Part 4: Earthquake Actions in Australia”, a hazard factor (Z) of 0.08 and a site subsoil Class C_e is considered to be appropriate for the site.

It is noted that there is a potential for the saturated loose sands (approximately RL 0.0 m to RL-4.5 m) to liquefy during major earthquakes. This would be considered an extermely rare event given the siesmicity of Austrailia. Generally, for developments of this nature in Australia the structure from a high -level perspective should be designed to be robust under potential settlements (liquefaction induced).

8.7 Acid Sulfate Soils

Commentary on considerations for Acid Sulphate Soils at the proposed site during construction is covered within a separate memorandum (Ref: 225615.00.R.002.Rev0).

8.8 Further Geotechnical Testing

It is recommended that post demolition when a CPT rig is able to access the site that testing occur to confirm the proposed geotechnical model.

9. References

Alpan, I. (1970). The geotechnical properties of soils. *Earth-Science Reviews*, *6*(1), 5-49.

10. Limitations

Douglas Partners (DP) has prepared this report (or services) for this project at 42 North Steyne, Manly in accordance with DP’s proposal dated 25/09/2023 and acceptance received from Warwick Bowyer dated 25/09/2023. The work was carried out under DP’s Conditions of Engagement. This report is provided for the exclusive use of Steyne Hotel Operations Pty Ltd 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.

The results provided in the report are indicative of the sub-surface conditions on the site only at the specific sampling and/or testing locations, and then only to the depths investigated and at the time the work was carried out. Sub-surface conditions can change abruptly due to variable geological processes and also as a result of human influences. Such changes may occur after DP's field testing has been completed.

DP's advice is based upon the conditions encountered during previous investigations. The accuracy of the advice provided by DP in this report may be affected by undetected variations in ground conditions across the site between and beyond the sampling and/or testing locations. 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 / environmental / groundwater) 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 of the attached 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.

Douglas Partners Pty Ltd

Appendix A

About This Report

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

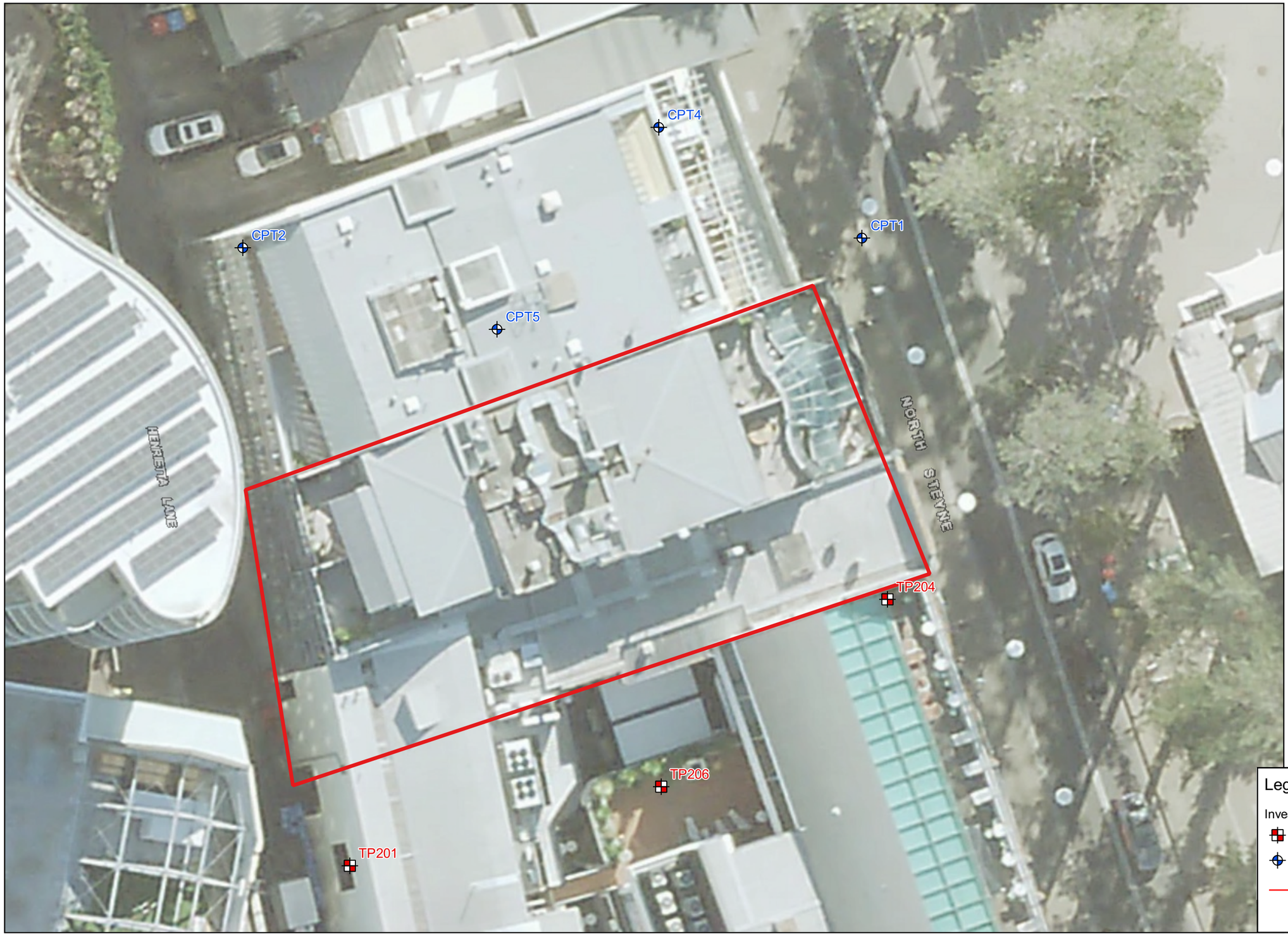
Where information obtained from this report is provided for tendering purposes, it is recommended that all information, including the written report and discussion, be made available. In circumstances where the discussion or comments section is not relevant to the contractual situation, it may be appropriate 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.

Appendix B

Previous Investigation Locations



Site Location

Legend

Investigation Locations

- Historic Test Pit / DCP
- Historic CPT
- Approximate Location of Proposed Development

NOTE:
1. Drawing adapted from aerial imagery from "Metromap" dated 13/06/2022.
2. Test locations are approximate only and should only be used as a reference

0 10 20 30 40 50 m

Douglas Partners
Geotechnics / Environment / Groundwater

CLIENT:	Styene Hotel Operations Pty Ltd	
OFFICE:	Sydney	DRAWN BY: SK
SCALE: 1:250 @A3		DATE: 10.October.2023

TITLE: **Historic Investigation Locations**
Proposed Development at 42 North Steyne
Manly, NSW 2095

N

Project:	225615.00
DRAWING No:	1
REVISION:	0

DP.QGIS.A3LandscapeDrawingLayout.3.26.3 - \\dpsydnas02\Projects\225615.00 - MANLY, 42 North Steyne\7.0 Drawings\QGIS\Location Plan.qgz

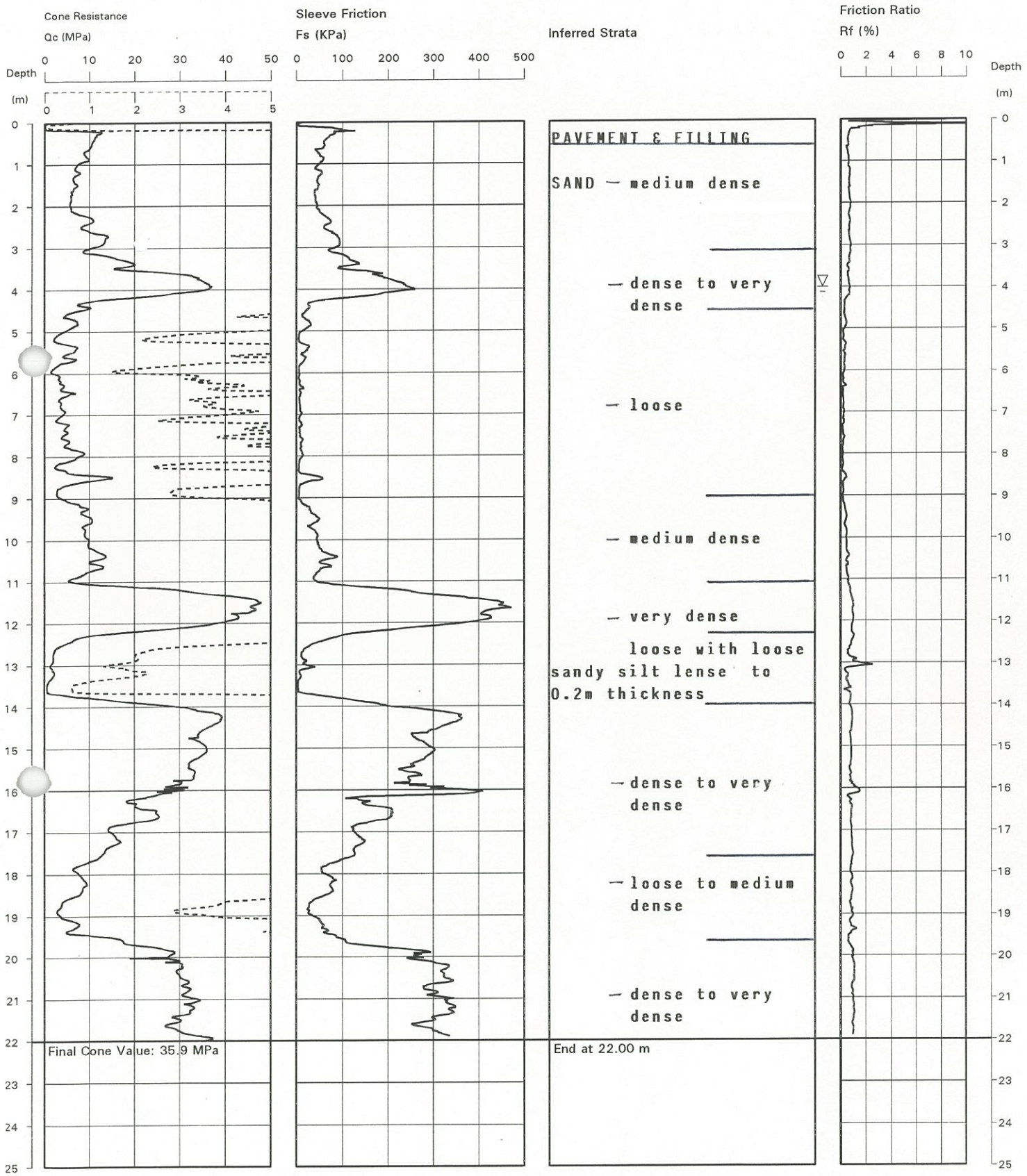
Appendix C

Previous Investigation Logs

CONE PENETRATION TEST

CLIENT	PROPERTY DEVELOPMENT ENTERPRISES PTY LTD
PROJECT	PROPOSED RESIDENTIAL DEVELOPMENT
LOCATION	43-45 NORTH STEYNE, MANLY
PROJECT No	29148

CPT 1
Page 1 of 1
DATE 26 JUL 2000
SURFACE RL 4.57 AHD



REMARKS: DUMMY CONE TO 0.2 METRES DEPTH.

Date	31/7
Plotted	
Checked	DEM

File: A:\29148-01.CPT
Cone ID: CONE-901 **Type:** Standard

▽ Water Level after test: 4.0m depth

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CONE PENETRATION TEST

CLIENT PROPERTY DEVELOPMENT ENTERPRISES PTY LTD

PROJECT PROPOSED RESIDENTIAL DEVELOPMENT

LOCATION 43-45 NORTH STEYNE, MANLY

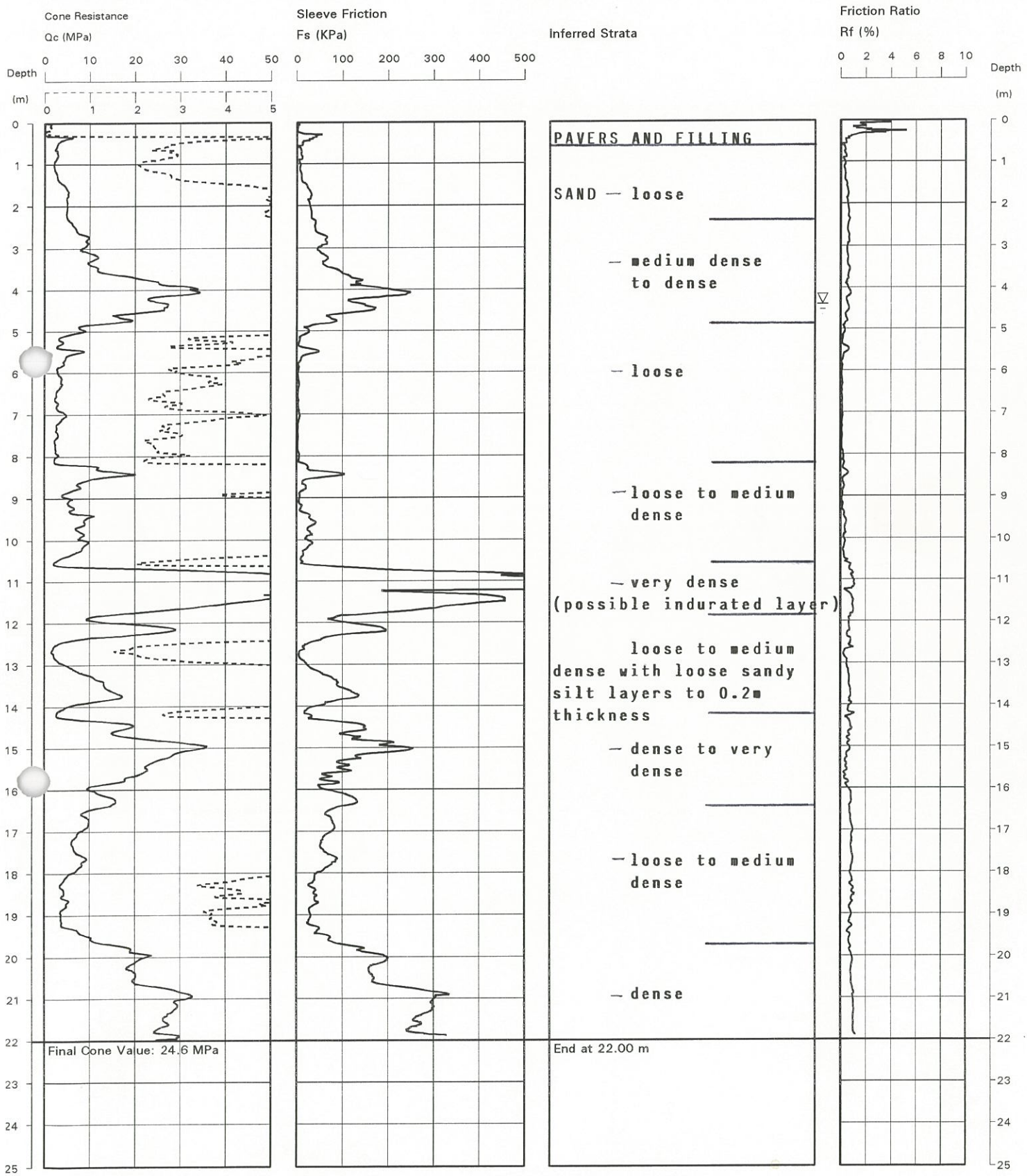
PROJECT No 29148

CPT 2

Page 1 of 1

DATE 26 JUL 2000

SURFACE RL 4.95 AHD



REMARKS: DUMMEY CONE TO 0.3 METRES DEPTH.
PIEZOMETER STANDPIPE INSTALLED AT THIS LOCATION.

Date	3/17
Plotted	
Checked	DEM

File: A:\29148-02.CPT
Cone ID: CONE-901 **Type:** Standard

▽ Water Level after test: 4.4m depth

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CONE PENETRATION TEST

CLIENT PROPERTY DEVELOPMENT ENTERPRISES PTY L

PROJECT PROPOSED RESIDENTIAL DEVELOPMENT

LOCATION 43-45 NORTH STEYNE, MANLY

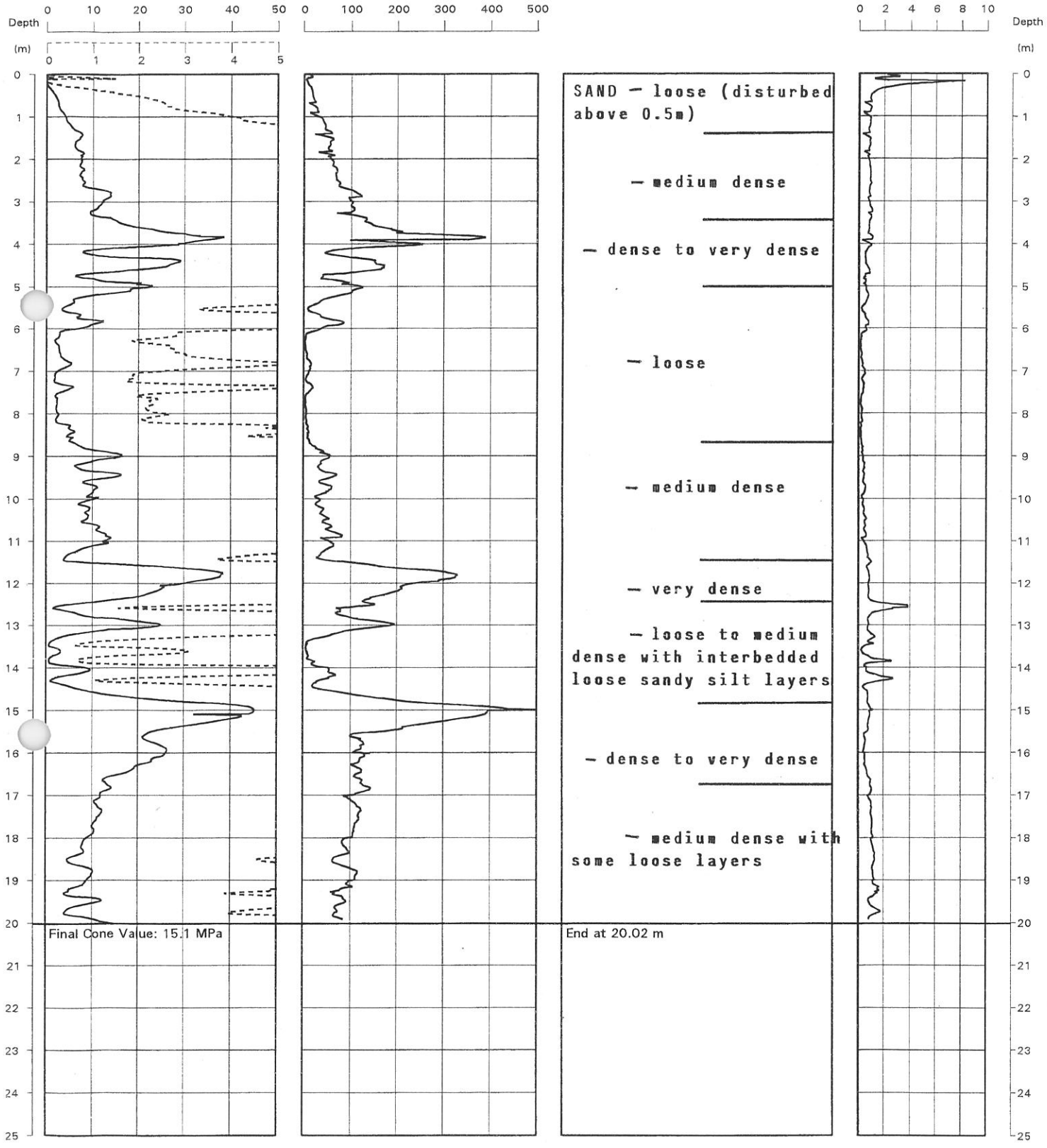
PROJECT No 29148A

CPT 4

Page 1 of 1

DATE 10 NOV 2000

SURFACE RL 4.9 AHD



REMARKS: HOLE COLLAPSED AT 3.8 METRES AT COMPLETION OF TEST.

Date	10/11/00
Plotted	HW
Checked	DEM

File: A:\29148-04.CPT
Cone ID: CONE-154 Type: Standard

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CONE PENETRATION TEST

CLIENT PROPERTY DEVELOPMENT ENTERPRISES PTY L

PROJECT PROPOSED RESIDENTIAL DEVELOPMENT

LOCATION 43-45 NORTH STEYNE, MANLY

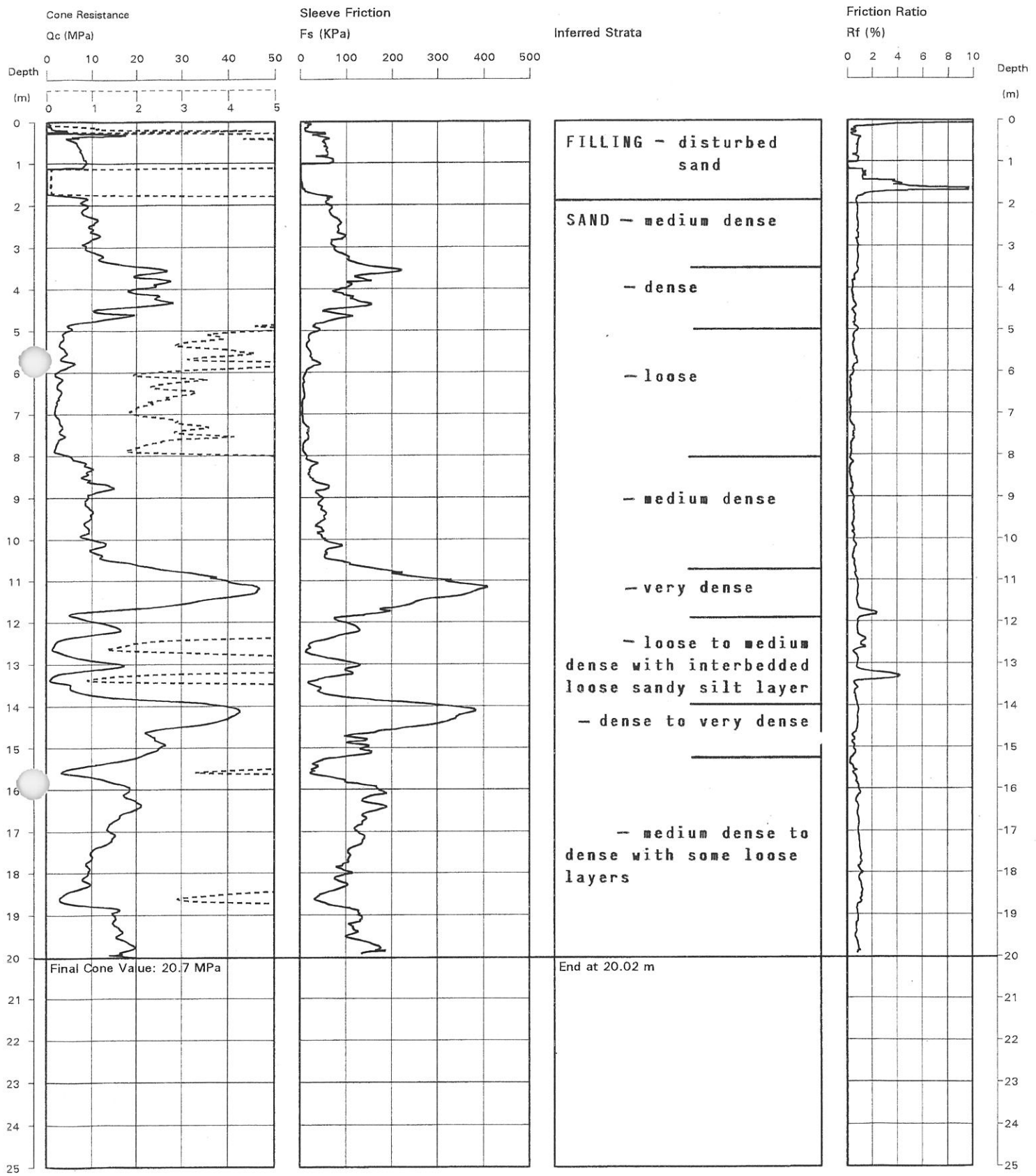
PROJECT No 29148A

CPT 5

Page 1 of 1

DATE 10 NOV 2000

SURFACE RL 4.6 AHD



REMARKS: HOLE COLLAPSED AT 4.0 METRES AT COMPLETION OF TEST.
DUMMY CONE USED FROM 1.1 TO 1.9 METRES.

Date	10/11/00
Plotted	HW
Checked	OEM

File: A:\29148-05.CPT
Cone ID: CONE-154 **Type:** Standard

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RESULTS OF DYNAMIC PENETROMETER TESTS

CLIENT: THE STEYNE HOTEL
DATE: 1/11/02
PROJECT: PROPOSED ALTERATIONS AND ADDITIONS
PROJECT NO: 27412B
LOCATION: CNR THE CORSO AND HENRIETTA LANE, MANLY
PAGE NO: 1 of 1

TEST LOCATIONS	201A	201B	201C	201D	202	203	204	205	206	
RL of Test										
DEPTH m	PENETRATION RESISTANCE BLOWS/150mm									
0.00 - 0.15	Test	Test	Test	Test	Test	Test	Test	Test	Hand	
0.15 - 0.30	Pit to	Pit to	Pit to	Pit to	Pit to	Pit to	Pit to	Pit to	Dig to	
0.30 - 0.45	0.75m	0.75m	0.75m	0.75m	1.2m	1.05m	1.05m	1.05m	0.6m	
0.45 - 0.60	↓	↓	↓	↓	↓	↓	↓	↓	↓	
0.60 - 0.75	↓	↓	↓	↓	↓	↓	↓	↓	2	
0.75 - 0.90	Push	Push	Push	Push	↓	↓	↓	↓	2	
0.90 - 1.05	By	By	By	By	↓	↓	↓	↓	3	
1.05 - 1.20	Hand	Hand	Hand	Hand	↓	1	1	1	2	
1.20 - 1.35	To	To	To	To	3		3	1	2	
1.35 - 1.50	1.95m	1.95m	1.95m	1.95m	3		3	3	3	
1.50 - 1.65	↓	↓	↓	↓	4	1	3	3	3	
1.65 - 1.80	↓	↓	↓	↓	5	1	4	4	3	
1.80 - 1.95	↓	↓	↓	↓	6	2	3	4	3	
1.95 - 2.10	R	R	1	R	END	2	3	4	2	
2.10 - 2.25			3			2	5	END	3	
2.25 - 2.40			5			END	END		8	
2.40 - 2.55			4						END	
2.55 - 2.70			END							
2.70 - 2.85										
2.85 - 3.00										

TEST METHOD AS 1289.6.3.2, CONE PENETROMETER
TESTED: STE
Note: R = Refusal (bouncing) of DPT hammer
CHECKED: STE

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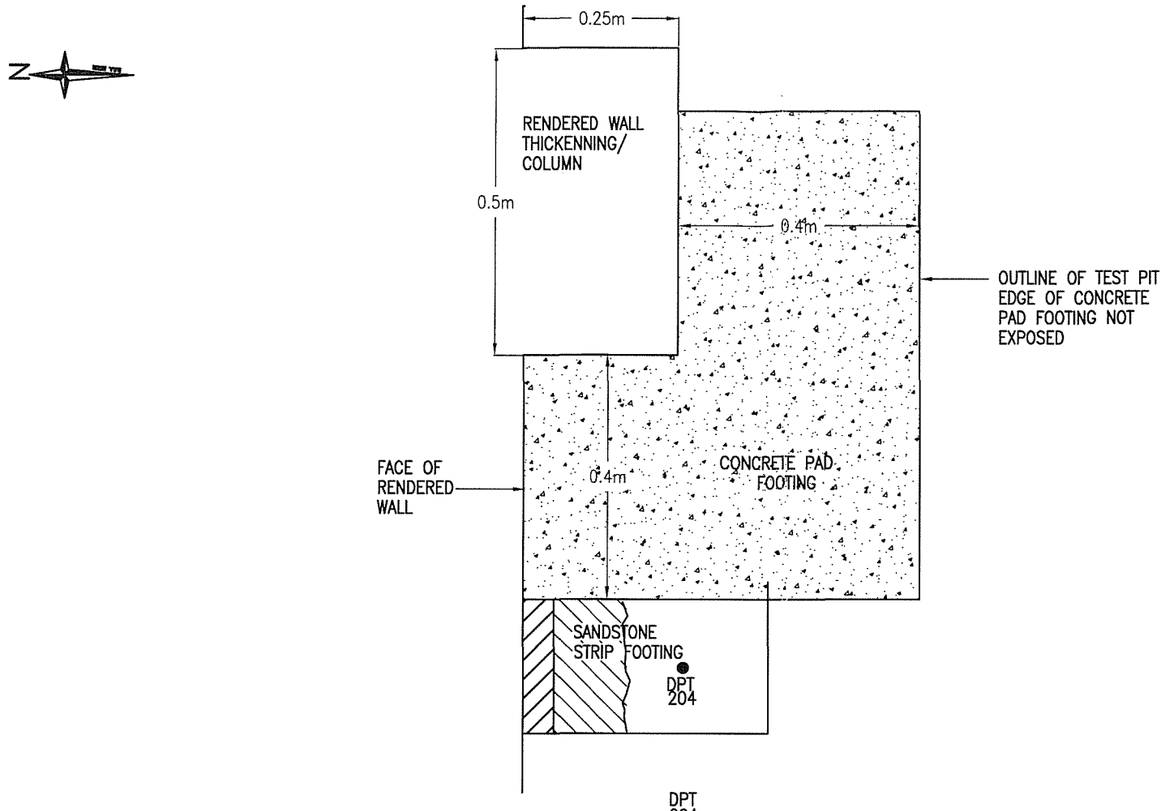
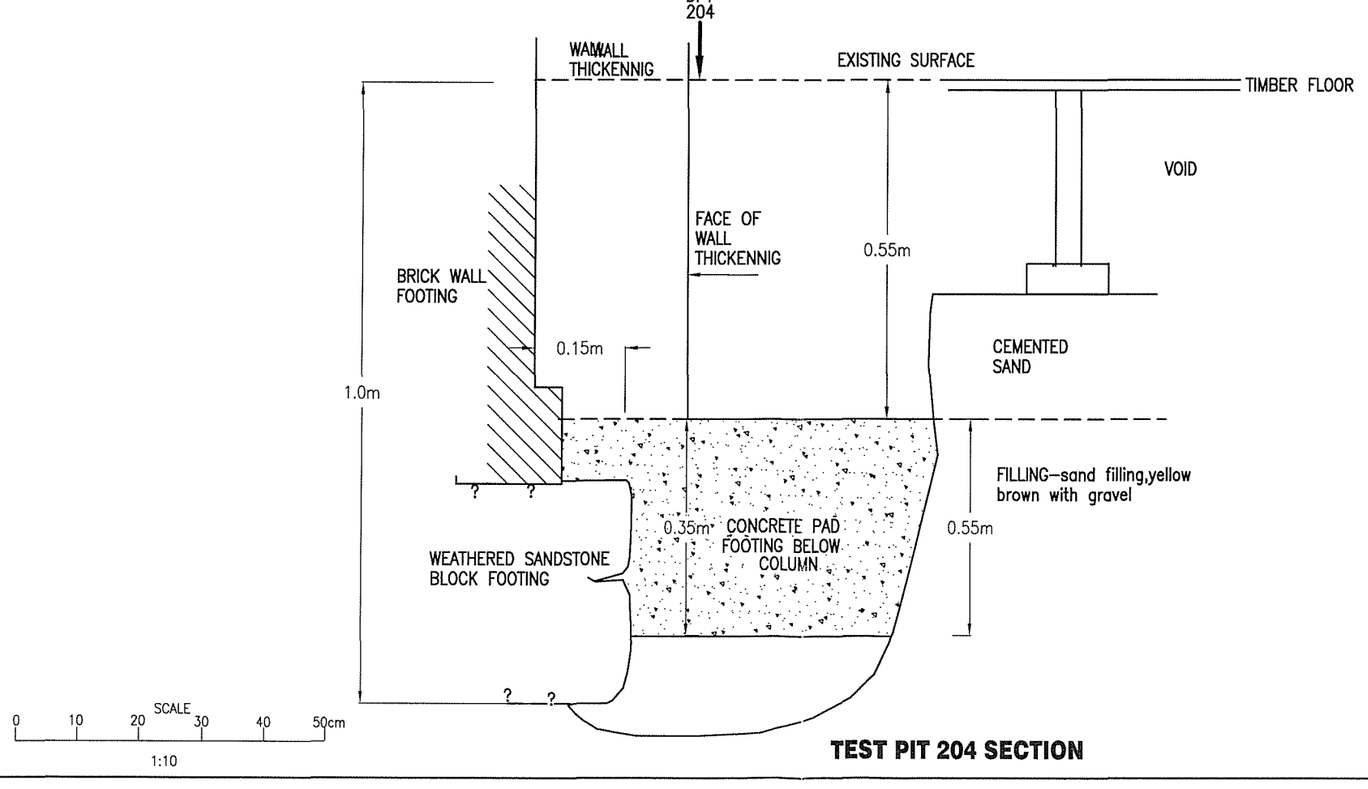
TEST PIT 204 PLAN





TEST PIT 204 SECTION

Douglas Partners
Geotechnics, Environment, Groundwater

Sydney, Newcastle, Brisbane, Melbourne, Perth, Wyong, Campbelltown, Townsville Cairns, Wollongong

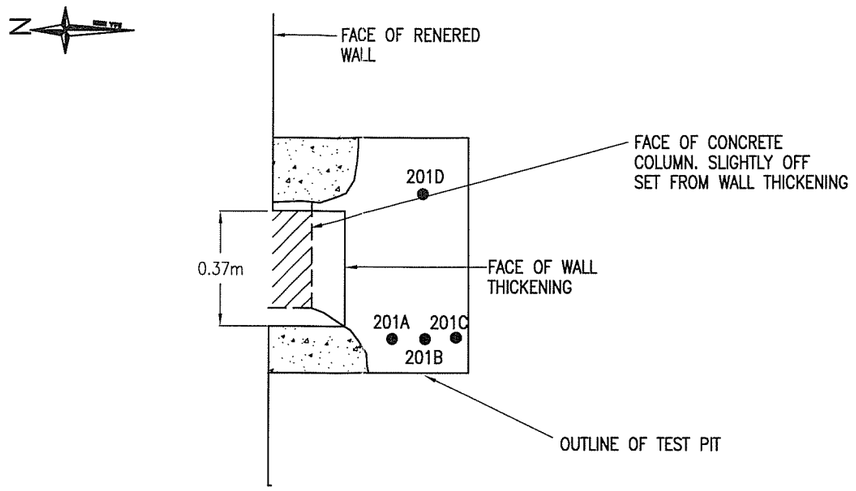
TITLE:
Test Pit 204 Plan & Section
Proposed Alterations & Additions
The Steyne Hotel
MANLY

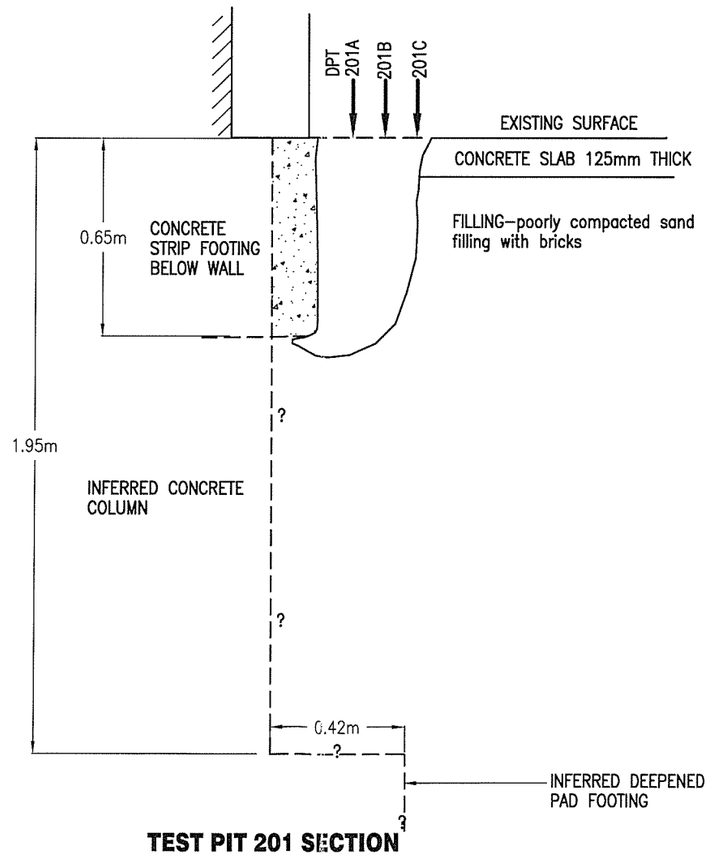
CLIENT: The Steyne Hotel			
DRAWN BY: PSCH	SCALE: As shown	PROJECT No: 27412B	OFFICE: SYDNEY
APPROVED BY: STE		DATE: 11.11.2002	DRAWING No: 5

Test Pit 204

Test Pit 205

TEST PIT 201 PLAN





TEST PIT 201 SECTION

SCALE 1:20

0 50 100 150 200cm

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Sydney, Newcastle, Brisbane, Melbourne, Perth, Wyong, Campbelltown, Townsville Cairns, Wollongong

TITLE:
Test Pit 201 Plan & Section
Proposed Alterations & Additions
The Steyne Hotel
MANLY

CLIENT: The Steyne Hotel			
DRAWN BY: PSCH	SCALE: As shown	PROJECT No: 27412B	OFFICE: SYDNEY
APPROVED BY: STE		DATE: 11.11.2002	DRAWING No: 2

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Test Pit 201

Test Pit 202