TRANSNET

APPENDIX 13: Geotechnical Assessment

DRAFT ENVIRONMENTAL IMPACT ASSESSMENT REPORT

SCOPING & ENVIRONMENTAL IMPACT ASSESSMENT (S&EIA) FOR THE PROPOSED 2 MEGALITRES PER DAY (MLD) SOLAR POWERED SEAWATER DESALINATION PLANT IN THE PORT OF EAST LONDON, BUFFALO CITY METROPOLITAN MUNICIPALITY, EASTERN CAPE PROVINCE, BY TRANSNET NATIONAL PORTS AUTHORITY

DFFE Pre-Application Reference Number: 2026-04-0038

July 2026

ANCHOR environmental | PART OF SLR

Technical Report
2025 / 03 / 22 / GTEC

30 years of Purpose With Passion

EAST LONDON PORT DESALINATION PLANT

Geotechnical investigation in support of feasibility study for the proposed Solar Powered Desalination plant and related infrastructure at the East London Harbour, Buffalo City Metropolitan Municipality, Eastern Cape

April 2025

Prepared for: **Sunwater East London JV (Pty) Ltd**

Document version 1.0 – Draft 1.0

Compiled by: AGES Omega (Pty) Ltd

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EAST LONDON PORT DESALINATION PLANT

Geotechnical investigation in support of the feasibility study for the proposed Solar Powered Desalination plant and related infrastructure at the East London Harbour, Buffalo City Metropolitan Municipality, Eastern Cape

April 2025

Conducted on behalf of:

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Appendix 6 of the EIA Regulations

A specialist report prepared in terms of these Regulations must contain—

Requirement	**Section where this is addressed in report or description of how requirement has been addressed.**
(a) details of— (i) the specialist who prepared the report; and (ii) the expertise of that specialist to compile a specialist report including a curriculum vitae;	Page 2 and attached at the end of the document.
(b) a declaration that the specialist is independent in a form as may be specified by the competent authority;	Specialist declaration attached at the end of the document
(c) an indication of the scope of, and the purpose for which, the report was prepared; (cA) an indication of the quality and age of base data used for the specialist report; (cB) a description of existing impacts on the site, cumulative impacts of the proposed development and levels of acceptable change;	Section 1, 2, 3, 4
(d) the duration, date and season of the site investigation and the relevance of the season to the outcome of the assessment;	Section 1
(e) a description of the methodology adopted in preparing the report or carrying out the specialised process inclusive of equipment and modelling used;	Section 2, 3, 4
(f) details of an assessment of the specific identified sensitivity of the site related to the proposed activity or activities and its associated structures and infrastructure, inclusive of a site plan identifying site alternatives;	N/A. Geotech test pit analysis was done for the desal plant, solar plant and reservoir positions to determine the most suitable position so as to avoid sensitive/ inappropriate environments.
(g) an identification of any areas to be avoided, including buffers;	N/A
(h) a map superimposing the activity including the associated structures and infrastructure on the environmental sensitivities of the site including areas to be avoided, including buffers;	N/A. This is included in EIR
(i) a description of any assumptions made and any uncertainties or gaps in knowledge;	N/A. As this process is about collecting data to accurately assess the site, no assumptions has been made.
(j) a description of the findings and potential implications of such findings on the impact of the proposed activity or activities;	Section 2, 3, 4, 5
(k) any mitigation measures for inclusion in the EMPr;	See the response in (i) below.

(l) any conditions for inclusion in the environmental authorisation;	N/A
(m) any monitoring requirements for inclusion in the EMPr or environmental authorisation;	N/A
(n) a reasoned opinion—	
(i) whether the proposed activity, activities or portions thereof should be authorised; (iA) regarding the acceptability of the proposed activity or activities; and (ii) if the opinion is that the proposed activity, activities or portions thereof should be authorised, any avoidance, management and mitigation measures that should be included in the EMPr, and where applicable, the closure plan;	It is the opinion of the geotechnical engineer that the proposed development can proceed and should be authorised. The primary purpose of the study was to investigate the underlying soil and geological conditions in order to determine the most suitable location, foundations, and construction methods for the proposed development. In this regard, the study is inherently aimed at identifying and avoiding unsuitable or structurally unsound areas and technologies at the feasibility stage, thereby reducing the likelihood of environmental or structural risks arising during or after construction. The study contributes directly to avoidance and mitigation by guiding the placement and design of infrastructure in a way that prevents failure and minimises disturbance to the receiving environment. No additional management or mitigation measures specific to environmental impacts were identified as necessary by the engineer, other than that the recommendations of the geotechnical report should be implemented in full to ensure that construction is aligned with the identified feasibility constraints.
(o) a description of any consultation process that was undertaken during the course of preparing the specialist report;	Only consultation with the EAP and Proponent.
(p) a summary and copies of any comments received during any consultation process and where applicable all responses thereto; and	N/A
(q) any other information requested by the competent authority.	N/A

1 INTRODUCTION

1.1 GENERAL

AGES Omega (Pty) Ltd was appointed by the Sunwater East London Joint Venture (Pty) Ltd to conduct detailed engineering geological investigations in support of the feasibility study for the proposed 0.5 MLD solar-powered seawater desalination plant and related infrastructure i.e. solar farm, desalination plant and 1 ML reservoir, at the port of East London.

1.2 TERMS OF REFERENCE

The investigation was requested by Mr. Patrice Boyer of the firm Impact Water Solutions (Pty) Ltd and Mr. Jarl Heurlin of the firm Norland Construction, on behalf of the Sunwater East London Joint Venture (Pty) Ltd. AGES was appointed for the relevant geotechnical investigation following the submission of various detailed proposals for the geotechnical investigation, and was appointed on the 17th of May 2024. The scope of the investigation was changed since appointment with the final sites selected and draft layouts received in December 2024.

1.3 SCOPE OF THE INVESTIGATION

The investigation had the following aims:

- Geotechnical investigation of proposed infrastructure for determination of the following:
  - competent horizon / estimated safe bearing capacity.
  - adverse material occurrence and properties.
  - potential use of the in-situ materials in construction.
  - perched groundwater conditions.
  - Excavatability conditions.

- Geotechnical investigations required at the following positions:
  - Desalination Plant.
  - Reservoir 1ML.
  - Solar Farm.

1.4 LOCATION OF THE PROJECT AREA

The project area is located within the East London Harbour on the west bank of the river port of East London. The site is generally accessed via the Dr Zahn Road from the Buffalo Bridge to the West Bank Town. The site is located in the Buffalo City Metropolitan Municipality, Eastern Cape.

The locality of the proposed desalination plant and related infrastructure can be defined by the following coordinate, as also indicated in the regional locality figure below:

- Latitude: 33.029019° S
- Longitude: 27.906822° E

Figure 1: Regional locality of the desalination plant.

Figure 2: Site layout of the proposed desalination plant

1.5 REGIONAL GEOLOGICAL SETTING

According to the 1: 250 000 geological map 3326 GRAHAMSTOWN and the 1:50 000 geological map 3327 BB EAST LONDON; the project area is underlain by the rocks of the Middleton and Balfour Formation (Pa) that forms part of the Adelaide Subgroup of the Karoo Supergroup sequence of rocks. The lithology of the formations comprise of mudstone, sandstone, locally overlain by soil >1m thick. The Formation dips to the northwest at approximately 5 degrees.

The geology map indicates material from the Nanaga Formation in close proximity to the site, and therefore it is possible that this formation might be encountered within the project area. The Nanaga formation comprise of Aeolianite (calcareous sandstone), paleosol and subordinate calcrete.

Dolerite intruded into the sedimentary formations of the Karoo Supergroup in the form of dykes and sills. The west bank area is located on a very large and prominent dolerite sill. Although not present on the surface geology, dolerite can be expected at depth. No dolerite intrusions were encountered on the project area during the site investigation.

The geology maps do not indicate any prominent geological structures such as fault zones and/or lineaments derived from LANDSAT imagery that intersect the project area. The area does not reflect any risk for the formation of sinkholes or subsidence caused by the presence of water-soluble rocks (for example: dolomite or limestone).

Figure 3: Regional geological setting of project area

1.6 REGIONAL SEISMIC INTENSITY

According to Fernandez *et al* (1979) the regional seismic hazard in the project area can be defined as follows:

- The area exhibits a 90 % probability of the occurrence of a seismic event not exceeding Class VI-intensity[1] (i.e.: equivalent to a seismic event registering 4.9 to 5.4 on the Richter Scale) within a period of 100 years.
- The area exhibits a 90 % probability of the occurrence of a seismic event not exceeding Class VII-intensity (i.e.: equivalent to a seismic event registering 6.1 on the Richter Scale) within a period of 500 years.

In this light, the seismic risk of the project area can be classified as SLIGHT to LOW, and as such requires that Masonry Class B design and construction measures be implemented, incorporating good workmanship and reinforced mortar work, but specific design and construction measures to resist the effect of lateral forces on the proposed structures are not deemed necessary.

1 The effects of a Class VII-intensity event (categorized as strong to very strong) can be summarized as follows:
- Difficult to stand
- Noticed by drivers of motorcars
- Hanging objects quiver
- Furniture broken
- Damage to weak materials (such as adobe: poor mortar; low standards of workmanship; weak horizontally) including cracks (Masonry Class D)
- Weak chimneys broken at roof line
- Fall of plaster, loose bricks, stones, tiles, cornices, unbraced parapets and architectural ornaments
- Some cracks in ordinary workmanship and mortar (Masonry Class C)
- Small slides and caving-in along sand or gravel banks and concrete irrigation ditches will be damaged

2 DESALINATION PLANT INVESTIGATION

2.1 Trial pit profiling

A total of four (4) trial pits, numbered DS 1 to DS 4 were excavated utilising a CAT 426 4x4 TLB-type excavator on the 4th of February 2025 with pit positions indicated in the figure below. Test pits were generally excavated to a depth of 3.00 mbgl or refusal. Profiling of the trial pits were conducted according to the Guidelines for Soil and Rock Profiling in South Africa (Sept 2008).

Detailed trial pit profiles are included as Appendix A-1.

Figure 4: Test pit layout – Desalination Plant

2.2 Generalised soil profile

The following generalised soil conditions can be expected based on limited point source test pit information obtained from test pits.

The proposed desalination plant site is generally covered by fill material that is likely related to previous construction activities (road construction). The imported soil material is generally composed of abundant angular gravel to cobbles loosely packed in a matrix of silty sand to sandy clay. This imported soil horizon was found to be highly variable in composition and highly collapsible with sidewall collapse / overbreak

observed in most test pits. The material has a thickness of between 0.70 m and in excess of 3.00 m in portions of the site.

The imported soils are underlain by transported aeolian soil material in the form of dune sand. The dune sand exhibits an intact soil structure with a loose to very loose consistency and a thickness of up to 1.60 mbgl.

The dune sand is underlain by colluvium / hillwash soil material generally composed of clayey sand with scattered cobbles and boulders. The material exhibits a firm consistency and intact to micro-shattered soil structure. The material has a thickness of up to 0.70 m.

The transported soil material is underlain by residual siltstone material composed of sandy clay with scattered to abundant angular gravel and cobbles. The material exhibits a shattered to intact(relic) soil structure with a firm consistency in ported matrix rich horizons, to a dense overall consistency in clast rich horizons of the material. The material has a thickness in excess of 1.00 m.

No bedrock material was encountered in any of the test pits.

The generalised soil profile the desalination plant site is indicated in the figure below with detailed test pit logs and photographs attached in Appendix A-1 for reference.

Photo 1: Test pit excavation on DS 3

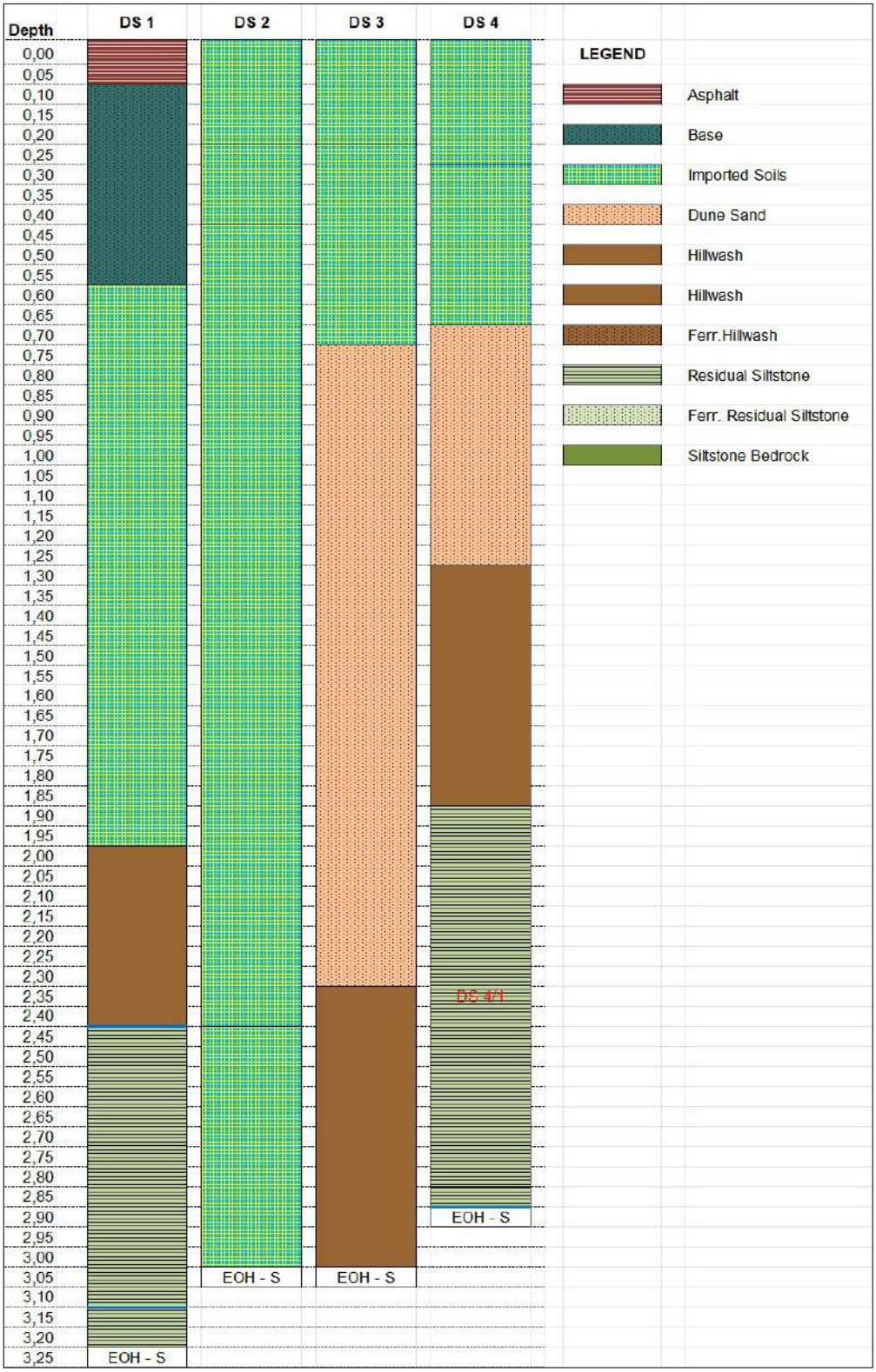


Figure 5: Conceptual soil profile - Desalination Plant

2.3 Excavatability

It was possible to excavate trial pits by TLB to a depth between 2.85 and 3.20 mbgl (mean 3.01 mbgl) after which excavation was stopped as the machine's excavation capacity was reached. No bedrock material was encountered. Excavation conditions are summarised in the table below.

Table 1: Test Pit Excavation Summary – Desalination Plant

Test Pit No:	Coordinates		Excavation Depth	Depth to Bedrock	E.O.H Comment(Refused/Stopped)	G/W Seepage	Materials Encountered			
	Latitude	Longitude					Imported Soils	Dune Sand	Hillwash	Residual Siltstone
DS 1	-33.028840	27.906560	3,20	–	Stopped	3,1	0,00 - 1,95	–	1.95 - 2.40	2,40 - 3,20
DS 2	-33.028710	27.906710	3,00	–	Stopped	–	0,00 - 3,00	–	–	–
DS 3	-33.028800	27.906910	3,00	–	Stopped	–	0,00 - 0,70	0,70 - 2,30	2,30 - 3,00	–
DS 4	-33.028890	27.907150	2,85	–	Stopped	2,85	0,00 - 0,65	0,65 -1,25	1,25 - 1,85	1,85 - 2,85

2.4 Sidewall Stability

The sidewalls of the trial pits remained moderately stable during profiling with little collapse or overbreak occurring. The imported fill materials are considered highly unstable with overbreak encountered in this material. It is recommended that all excavations with a depth in excess of 1.0 m must be shored and/or battered back to safe angles to prevent any slope stability problems.

2.5 Groundwater Occurrences

Slight to moderate groundwater seepage was encountered in 2 of the 4 test pits, DS1 and DS4 at depths of 3.10 and 2.85 mbgl respectively. The soils in this portion of the project area are generally moist to wet. The presence of pedogenic soil material and groundwater seepage indicates that the occurrence of seasonal groundwater seepage conditions are likely to occur.

2.6 Dynamic Cone Penetrometer Testing

A total of 3 DCP tests was conducted during the site investigation. The tests were conducted from surface to a depth of approximately 1.0 mbgl or refusal adjacent to each of the trial pits and at the bottom of test pits where possible.

The DCP testing does not give an accurate estimation on the expected excavation conditions and in-situ bearing capacity of the soil materials, as only the UCS of the material is determined. The testing is however useful to get a basic estimation of existing in-situ conditions.

Please note the calculated DCP values does not incorporate any factor of safety and is only applicable to soil moisture contents at the time of the investigation. Processed DCP results are attached in Appendix A-2.

2.7 Laboratory Testing

Selected samples were taken of the prominent soil horizons identified during the site investigation for detailed laboratory analysis. The samples were submitted to Messrs. Labco (Pty) Ltd, Civil engineering materials and geotechnical laboratory in East London on the 6th of February 2025. Results were received on the 24th of March 2025. Materials were generally tested for the following:

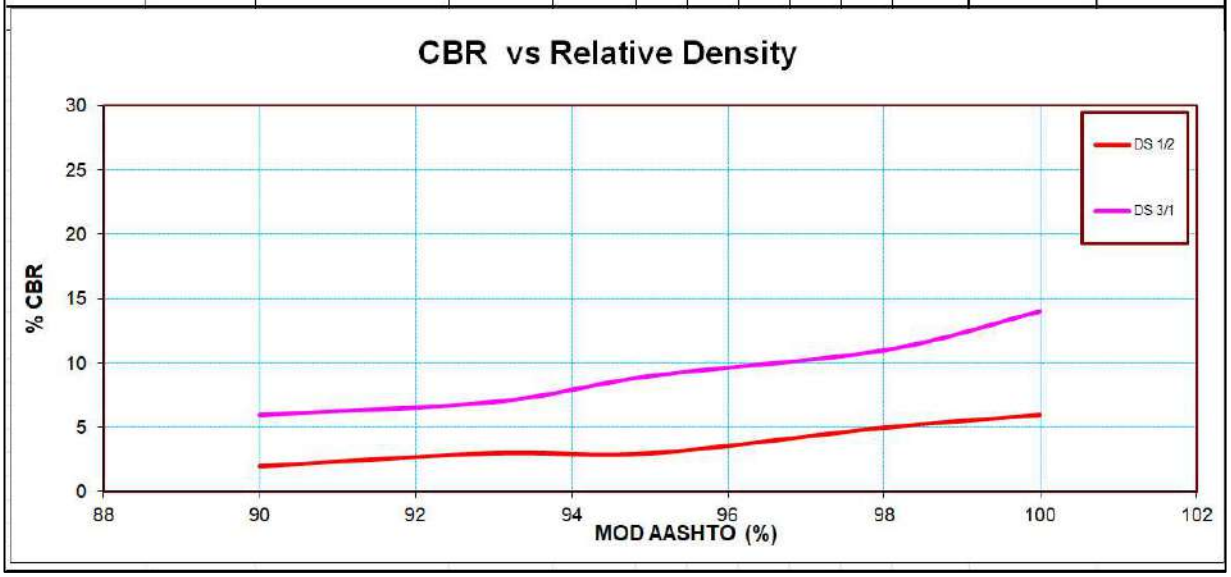
- Sieve Analysis including Hydrometer to determine % clay.
- Atterberg Limits
- Foundation Indicators
- Maximum Dry Density
- Optimum Moisture Content
- CBR vs MOD AASHTO density
- % Swell
- TRH14 / COLTO Classification

Processed laboratory results are summarised in the Tables below. Analysis certificates are attached in Appendix D for reference.

Table 2 : Summarised lab testing results - Desalination Plant

SAMPLE INFORMATION			GRADING ANALYSES				ATTERBERG LIMITS			LS	Moisture	UNIFIED (ASTM D2487)
Number	Depth (m – m)	Material Origin	Gravel %	Sand %	Silt %	Clay %	LL %	PI	PI'	%	%	Soil Classification
DS 1/1	1,95 - 2,40	Hillwash	0	68	22	10	15	3	3,0	1,5	17,10	SM: Silty sand
DS 3/1	0,70 - 2,30	Dune Sand	4	87	5	4	19	NP	NP	0,0	15,90	SP-SM: Poorly graded sand with silt
DS 4/1	1,85 - 2,85	Residual Siltstone	0	42	50	8	26	5	4,9	2,5	16,00	CL-ML: Sandy silty clay

Sample Number	Depth	Origin	MOD. AASHTO		CBR at % MOD.AASHTO					Swell	TRH14 Class	Colto
			MDD Kg/m^3	OMC %	100	98	95	93	90			
DS 1/2	2,40 - 3,20	Residual Siltstone	1997	11,2	8	5	3	3	2	0,6	<G10	<G10
DS 3/1	0,70 - 2,30	Dune Sand	1863	12,6	14	11	9	7	6	0	G10	G9



2.8 Geotechnical Properties of Materials

Based on the site investigation results and laboratory data the following geotechnical conditions can be expected and should be allowed for in the foundation design.

- The overlying fill / imported soil material is highly variable in composition and highly collapsible.
- The transported soil materials are potentially highly to very highly compressible / collapsible with a calculated collapse / consolidation settlement greatly in excess of 10 mm (calculated 112 mm).
- The transported soil material are not potentially expansive.
- The residual siltstone soil material is potentially highly to very highly compressible / collapsible with a calculated collapse / consolidation settlement in excess of 10 mm (calculated 40 mm).
- The residual soil material materials are not potentially.
- The transported soil and residual siltstone materials are potentially highly erodible and dispersive.

2.9 Material Utilisation

None of the sampled materials have good TRH14 classifications with low maximum CBR's. The materials are therefore not suitable for use in any engineered fills and not suitable for use during construction. Potential application of the materials can be discussed.

2.10 Founding Conditions & Recommendations

In the light of the results of this investigation the site is deemed to be MARGINALLY SUITABLE for the placement of the proposed Desalination Plant with the implementation of special precautionary measures, giving due cognisance to the following aspects.

- No site development plan or design drawings with foundation requirements were available at the time of reporting.

- No competent horizon was encountered over the entire project area during the investigation that included the excavation of 4 test pits up to a depth of 3.20 mbgl.

- The imported, transported and residual materials encountered on site are deemed to be highly compressible / collapsible with a calculated collapse / consolidation settlement greatly excess of 10 mm.

- The materials on site are not suitable for use during construction due to very low CBR values. Possible application of the materials can be discussed.

- Follow up geotechnical investigation in the form of deep pit excavation and/or rotary-core drilling is recommended to determine the thickness of the materials and depth to competent bedrock material if required.

- The following foundation options can be considered for the proposed desalination plant:
    - The fill-, transported- and possibly residual materials have to be stripped to spoil.
    - Foundation options that can be considered and discussed include but is not limited to the following:
        - Engineered Fill / Rockfill mattress.
        - Raft foundations.
        - Piled or pier foundations on competent bedrock material.

- It is recommended that an efficient surface water drainage system be installed around the structure to ensure that moisture contents in the soils near foundations are kept stable. Water seepage and ponding will result in differential movement of the structure.

- Please note that the recommendations and findings are based on limited site investigation information and data in the form of point source trial pits. It is essential that the site be inspected during bulk earthworks by a qualified engineering geologist or geotechnical engineer prior to the construction of the foundations, to confirm soil conditions encountered in this investigation and / or identify any differences.

3 RESERVOIR SITE INVESTIGATION

3.1 Trial Pit Profiling

A total of three (3) trial pits, numbered RS 1 to RS 3 were excavated utilising a CAT 426 4x4 TLB-type excavator on the 5th of February 2025 with pit positions indicated in the figure below. Test pits were generally excavated to a depth of 3.00 mbgl or refusal. Profiling of the trial pits were conducted according to the Guidelines for Soil and Rock Profiling in South Africa (Sept 2008).

Detailed trial pit profiles are included as Appendix B-1.

Figure 6: Reservoir– Trial Pit Layout

3.2 Generalised soil profile

The following generalised soil conditions can be expected based on limited point source test pit information obtained from test pits.

The site is generally covered by Fill material that is likely related to previous construction. The imported soil material is generally composed of silty sand to sandy clay with frequent to abundant gravel, bricks and cobbles and rubble. This imported soil horizon was found to highly variable in composition and highly collapsible with sidewall collapse/ overbreak observed in most test pits. The material has a thickness up

to 1.10 m.

The imported soils are underlain by hillwash soil material generally composed of clayey sand to sandy clay. The material exhibits a firm consistency and intact soil structure. The material has a maximum thickness of 0.50 m.

The transported soil material is underlain by residual siltstone material generally composed of silty clay to sandy clay with scattered to abundant angular gravel and cobbles. The material exhibits a shattered to an intact(relic) soil structure with a firm consistency in ported matrix rich horizons to dense overall consistency in clast-rich horizons of the material. The residual siltstone material has a thickness of approximately 0.60 m and in excess thereof in portions of the site.

Siltstone bedrock was encountered in 2 of the 3 test pits. The bedrock material is highly to moderately weathered, very fine grained, thinly jointed and highly fractured with a soft rock to hard rock hardness. The bedrock material was encountered from a depth of 1.10 to 2.20 mbgl (mean 1.77 mbgl).

Detailed test pit logs and photographs are attached in Appendix B-1. The generalised soil profile the site is indicated in the Figure below.

Photo 2: Test pit excavation on the Reservoir position

Figure 7: Conceptual Soil Profile - Reservoir

3.3 Excavatability

It was possible to excavate trial pits by TLB to a depth between 1.50 and 2.95 mbgl (mean 2.37 mbgl) after which excavation refused on bedrock material or excavation was stopped as the machine's excavation capacity was reached. Excavation conditions are summarised in the table below.

Table 3: Excavation Summary - Reservoir

Test Pit No:	Coordinates		Excavation Depth	Depth to Bedrock	E.O.H Comment(Refused/Stopped)	G/W Seepage	Materials Encountered				
	Latitude	Longitude					Imported Soils	Dune Sand	Hillwash	Residual Siltstone	Siltstone Bedrock
RS 1	-33.029220	27.906630	2,65	2,00	Stopped	2,65	0,00 - 0,80	–	0,80 - 1,25	1,25 - 2,00	2,00 - 2,65
RS 2	-33.028990	27.906800	2,95	2,20	Stopped	–	0,00 - 1,10	–	1,10 - 1,60	1,60 - 2,95	–
RS 3	-33.029200	27.906950	1,50	1,10	Refused	1,50	–	–	0,00 - 0,30	0,30 - 1,10	1,10 - 1,50

3.4 Sidewall Stability

The sidewalls of the trial pits remained stable to moderately stable during profiling with little to no collapse or overbreak occurring. It is recommended that all excavations with a depth in excess of 1.0 m must be shored and/or battered back to safe angles to prevent any slope instability.

3.5 Groundwater Occurrences

Slight to moderate groundwater seepage was encountered in all 3 test pits from a depth of 1.50 to 2.65 mbgl in 2 of the 3 test pits. The soil of this portion of the project area are generally very moist to wet.

The occurrence of seasonal groundwater seepage conditions is likely to occur across the proposed reservoir position.

3.6 Dynamic Cone Penetrometer Testing

A total of 3 DCP tests were conducted as part of the investigation. The tests were conducted at surface adjacent to each of the trial pits and at the bottom of test pits where possible. The DCP did not refuse in any of the tests.

The DCP testing does not give an accurate estimation on the expected excavation conditions and in-situ bearing capacity of the soil materials, as only the UCS of the material is determined. The testing is however useful to get a basic estimation of existing in-situ conditions.

Please note the calculated DCP values does not incorporate any factor of safety and is only applicable to soil moisture contents at the time of the investigation. Processed DCP results are attached in Appendix B-2.

3.7 Laboratory Testing

Selected samples were taken of the prominent soil horizons identified during the site investigation for detailed laboratory analysis. The samples were submitted to Messrs. Labco (Pty) Ltd, Civil engineering materials and geotechnical laboratory in East London on the 6th of February 2025. Results were received on the 24th of March 2025. Materials were generally tested for the following:

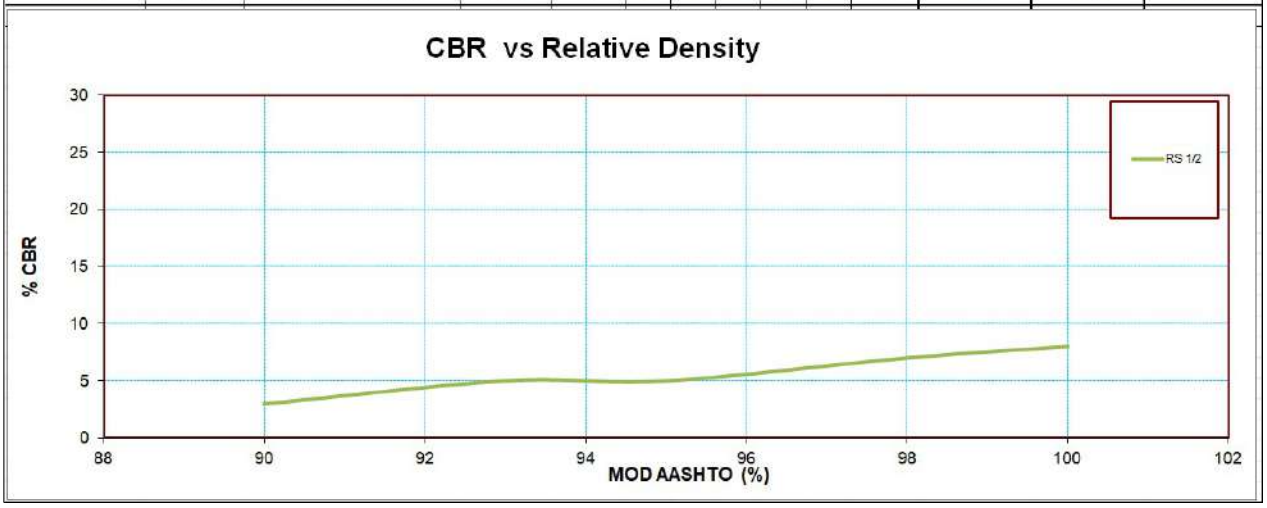
- Sieve Analysis including Hydrometer to determine % clay.
- Atterberg Limits
- Foundation Indicators
- Maximum Dry Density
- Optimum Moisture Content
- CBR vs MOD AASHTO density
- % Swell
- TRH14 / COLTO Classification

Processed laboratory results are summarised in the Tables below. Analysis certificates are attached in Appendix D for reference.

Table 4: Summarised Lab testing results - Reservoir

SAMPLE INFORMATION			GRADING ANALYSES				ATTERBERG LIMITS			LS	Moisture	UNIFIED (ASTM D2487)
Number	Depth (m – m)	Material Origin	Gravel %	Sand %	Silt %	Clay %	LL %	PI	PI'	%	%	Soil Classification
RS 1/1	0,80 - 1,25	Hillwash	0	49	33	18	27	13	12,6	7,0	11,90	CL: Sandy lean clay
RS 3/1	0,30 - 1,10	Residual Siltstone	15	27	44	14	31	4	3,1	2,0	12,40	ML: Sandy silt with gravel

Sample Number	Depth	Origin	MOD. AASHTO		CBR at % MOD.AASHTO					Swell	TRH14 Class	Colto	TRH 20 Class
			MDD Kg/m³	OMC %	100	98	95	93	90				
RS 1/2	1,25 - 2,00	Residual Siltstone	2009	10	8	7	5	5	3	0,6	G10	<G10	Class B



3.8 Geotechnical Properties of Materials

Based on the site investigation results and laboratory data the following adverse geotechnical conditions can be expected and should be allowed for in the foundation design of the reservoir.

- The overlying fill / imported soil material is highly variable in composition and highly collapsible.
- The residual siltstone material is potentially highly to very highly compressible / collapsible with a calculated collapse / consolidation settlement in excess of 10 mm (calculated 55 mm).
- The residual soil material is not potentially expansive.
- The residual siltstone materials are potentially highly erodible and dispersive.

3.9 Material Utilisation

None of the sampled materials have good TRH14 classifications with low maximum CBR's. The materials are therefore not suitable for use in any engineered fills and not suitable for use during construction. Potential application of the materials can be discussed.

The residual siltstone soil material has a TRH 14 classification of <G10 together with a maximum CBR of 8 at a 100% compaction effort. This material is not suitable for use during construction.

3.10 Foundation Conditions & Recommendations

In the light of the results of this investigation the site is deemed to be SUITABLE to MARGINALLY SUITABLE for the placement of the proposed reservoir with the implementation of special precautionary measures, giving due cognizance to the following aspects.

- No site development plan or design drawings with foundation requirements were available at the time of reporting.

- The moderately hard rock siltstone bedrock material on which excavation by TLB refused on 1 of the 3 test pits (RS 3) at a depth of 1.50 mbgl is a suitable competent horizon for the founding of the reservoir. It is recommended that excavation up to this competent horizon be conducted over the entire reservoir site if possible.

- The imported, hillwash and residual siltstone materials are deemed to highly compressible / collapsible with a calculated collapse / compress in greatly excess of 10 mm. This material is not suitable for founding and should be removed.

- The following foundation options can be considered for the proposed desalination plant:
    - The fill, hillwash and residual siltstone materials have to be stripped to spoil.
    - Foundation options that can be considered and discussed include but is not limited to the following:

- Engineered Fill / Rockfill mattress.
- Raft foundations.
- Piled or pier foundations on competent bedrock material.

- It is recommended that an efficient surface water drainage system be installed around the structure to ensure that moisture contents in the soils near foundations are kept stable. Water seepage and ponding will result in differential movement of the structure.

- Please note that the recommendations and findings are based on limited site investigation information and data in the form of point source trial pits. It is essential that the site be inspected during bulk earthworks by a qualified engineering geologist or geotechnical engineer prior to the construction of the foundations, to confirm soil conditions encountered in this investigation and / or identify any differences.

4 SOLAR FARM INVESTIGATION

4.1 Trial Pit Profiling

A total of eight (8) trial pits, numbered SF 1 to SF 8 were excavated utilising a CAT 426 4x4 TLB-type excavator on the 5th , 8th and the 18th of February 2025 with pit positions indicated in the figure below. Test pits were generally excavated to a depth of 3.00 mbgl or refusal. Profiling of the trial pits were conducted according to the Guidelines for Soil and Rock Profiling in South Africa (Sept 2008).

Detailed trial pit profiles are included as Appendix C-1.

Figure 8: Solar Farm – Trail Pit Layout

4.2 Generalised soil profile

The following generalised soil conditions can be expected based on limited point source test pit information obtained from test pits.

The site is generally covered by fill / spoil material that is likely related to previous construction. The imported soil material is generally composed of silty sand to sandy clay with frequent to abundant gravel, bricks and cobbles. This imported soil horizon was found to highly variable in composition and highly collapsible with sidewall collapse/ overbreak observed in most test pits. The material has a thickness of

up to 1.70 m as encountered in test pit SF 1.

The transported soil material is underlain by residual siltstone material generally composed of silty clay to sandy clay with scattered to abundant angular gravel and cobbles. The material exhibits a micro-shattered to an intact (relic) soil structure with a firm to dense consistency. The residual siltstone material has a thickness up to and potentially in excess of 1.10 m in portions of the site.

Siltstone bedrock was encountered in 7 of the 8 test pits. The bedrock material is highly to moderately weathered, very fine grained, thinly jointed and highly fractured with a soft rock to hard rock hardness. The bedrock material was encountered from a depth of 1.10 to 1.70 mbgl (mean 1.51 mbgl).

Detailed test pit logs and photographs are attached in Appendix C-1. The generalised soil profile the site is indicated in the Figure below.

Photo 3: Site conditions - Solar Farm

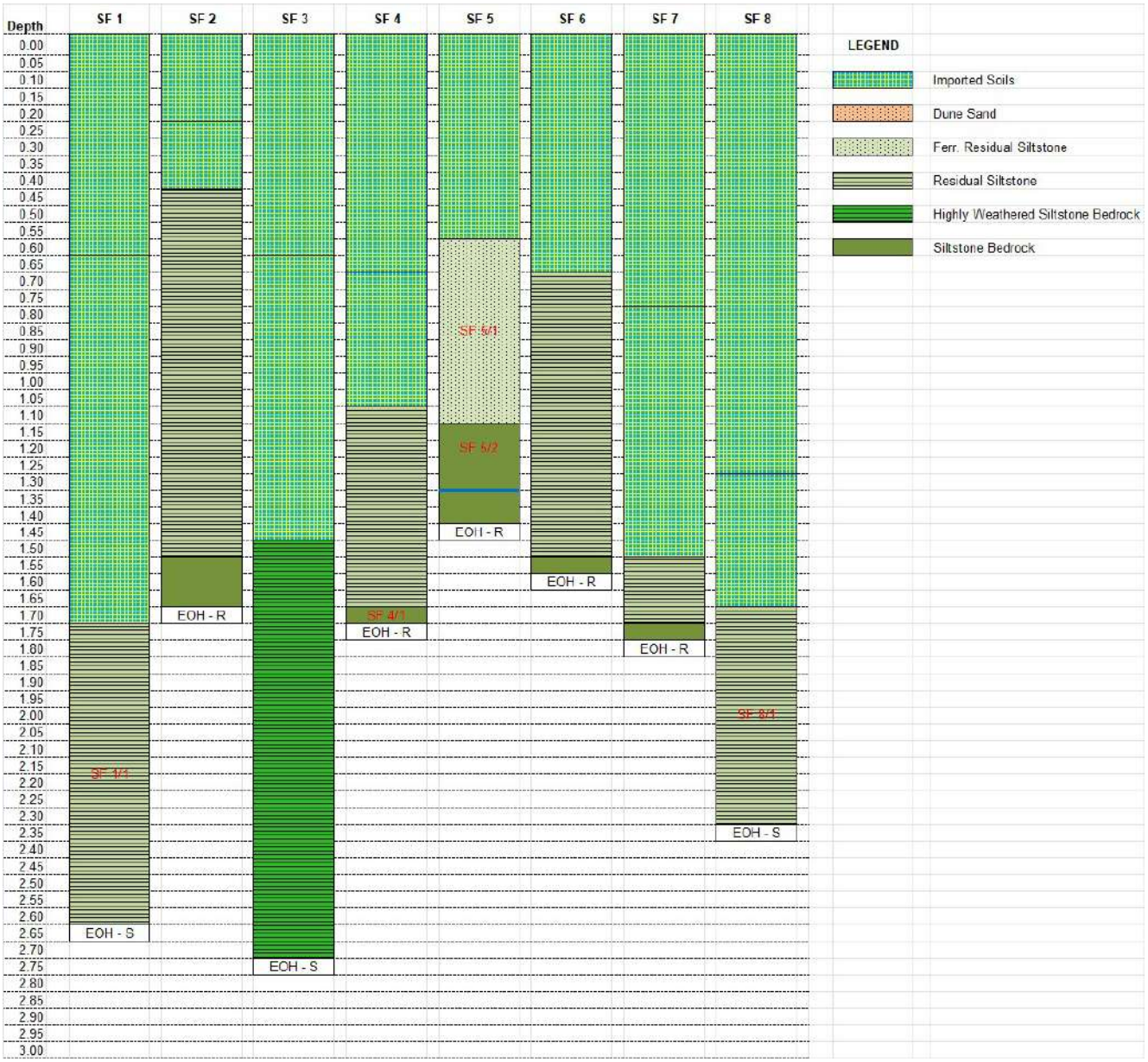


Figure 9: Conceptual Soil Profile – Solar Farm Area

4.3 Excavatability

It was possible to excavate trial pits by TLB to a depth between 1.40 and 2.70 mbgl (mean 1.95 mbgl) after which excavation refused on siltstone bedrock material or excavation was stopped as the required excavation depth was reached.

Table 5: Excavation Summary – Solar Farm

Test Pit No:	Coordinates		Excavation Depth	Depth to Bedrock	E.O.H Comment(Refused/S topped)	G/W Seepage	Materials Encountered				
	Latitude	Longitude					Imported Soils	Hillwash	Residual Siltstone	H/W Siltstone Bedrock	Siltstone Bedrock
SF 1	-33.029040	27.907110	2.60	1.70	Stopped	1.80	0,00 - 1,70	–	1,70 - 2,60	–	2,60 - 2,65
SF 2	-33.029290	27.907140	1.65	1.50	Refused		0,00 - 0,40	–	0,40 - 1,50	–	1,50 - 1,65
SF 3	-33.029080	27.907470	2.70	1.45	Stopped	2.10	0,00 - 1,45	–	–	1,45 - 2,70	–
SF 4	-33.029290	27.907410	1.70	1.65	Refused		0,00 - 1,05	–	1,05 - 1,65	–	1,65 - 1,70
SF 5	-33.029125	27.907815	1.40	1.10	Refused	1.30	0,00 - 0,55	–	0,55 - 1,10	–	1,10 - 1,45
SF 6	-33.029310	27.907890	1.55	1.50	Refused		0,00 - 0,65	–	0,65 - 1,50	–	1,50 - 1,55
SF 7	-33.029270	27.908210	1.70	1.65	Refused		0,00 - 1,50	–	1,50 - 1,65	–	1,65 - 1,70
SF 8	-33.029380	27.908650	2.30	–	Stopped	2.30	0,00 - 1,65	–	1,65 - 2,30	–	–

4.4 Sidewall Stability

The sidewalls of the trial pits remained stable to moderately stable during profiling with little to no collapse or overbreak occurring. It is recommended that all excavations with a depth in excess of 1.0 m must be shored and/or battered back to safe angles to prevent any slope instability.

4.5 Groundwater Occurrences

Slight to moderate groundwater seepage was encountered in 4 of the 8 test pits from a depth between 1.30 to 2.30 mbgl (mean 1.88 mbgl).

The occurrence of seasonal groundwater seepage conditions is likely to occur across the proposed solar farm position.

4.6 Dynamic Cone Penetrometer Testing

A total of 9 DCP tests were conducted as part of the investigation. The tests were conducted at surface adjacent to each of the trial pits and at the bottom of test pits where possible.

The DCP testing does not give an accurate estimation on the expected excavation conditions and in-situ bearing capacity of the soil materials, as only the UCS of the material is determined. The testing is however useful to get a basic estimation of existing in-situ conditions.

Please note the calculated DCP values does not incorporate any factor of safety and is only applicable to soil moisture contents during investigation. Processed DCP results are attached in Appendix B-3.

4.7 Laboratory Testing

Selected samples were taken of the prominent soil horizons identified during the site investigation for detailed laboratory analysis. The samples were submitted to Messrs. Labco (Pty) Ltd, Civil engineering materials and geotechnical laboratory in East London on the 6th of February 2025. Results were received on the 24th of March 2025. Materials were generally tested for the following:

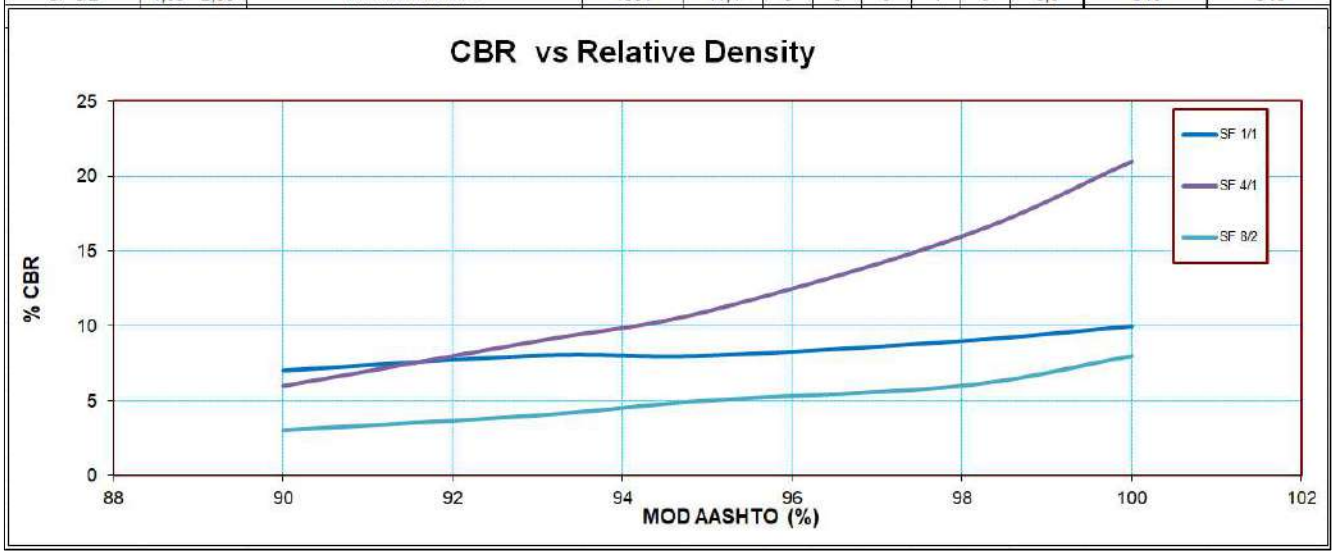
- Sieve Analysis including Hydrometer to determine % clay.
- Atterberg Limits
- Foundation Indicators
- Maximum Dry Density
- Optimum Moisture Content
- CBR vs MOD AASHTO density
- % Swell
- TRH14 / COLTO Classification

Processed laboratory results are summarised in the Tables below. Analysis certificates are attached in Appendix D for reference.

Table 6: Summarised lab results - Solar Farm

SAMPLE INFORMATION			GRADING ANALYSES				ATTERBERG LIMITS			LS	Moisture	UNIFIED (ASTM D2487)
Number	Depth (m - m)	Material Origin	Gravel %	Sand %	Silt %	Clay %	LL %	PI	PI'	%	%	Soil Classification
SF 1/1	1,70 - 2,60	Residual Siltstone / H/w Siltstone Bedrock	60	13	18	9	31	9	3,2	4,0	10,10	GC: Clayey gravel
SF 8/1	1,65 - 2,30	Residual Siltstone	23	40	23	14	26	7	5,3	3,5	17,50	SC - SM: Silty, clayey sand with gravel

Sample Number	Depth	Origin	MOD. AASHTO		CBR at % MOD.AASHTO					Swell	TRH14 Class	Colto
			MDD Kg/m^3	OMC %	100	98	95	93	90			
SF 1/1	1,70 - 2,60	Residual Siltstone / H/w Siltstone Bedrock	1811	15,1	10	9	8	8	7	0,6	G10	G9
SF 4/1	1,65 - 1,70	Siltstone Bedrock	2013	10,4	21	16	11	9	6	0,4	G10	G9
SF 8/2	1,65 - 2,30	Residual Siltstone	1934	11,4	8	6	5	4	3	0,6	G10	G10



4.8 Geotechnical Properties of Materials

Based on the site investigation results and laboratory data the following adverse geotechnical conditions can be expected and should be allowed for in the foundation design.

- The transported and residual materials are potentially moderately to highly compressible / collapsible with a combined settlement in excess of 10 mm expected.
- The materials are not potentially expansive.
- The materials are potentially highly erodible and dispersive.

4.9 Material Utilisation

None of the sampled materials have good TRH14 classifications with low maximum CBR's. The materials are therefore not suitable for use in any engineered fills and not suitable for use during construction. Potential application of the materials can be discussed.

4.10 Foundation Conditions & Recommendations

In the light of the results of this investigation the site is deemed to be SUITABLE for the placement of the proposed solar farm with the implementation of special precautionary measures, giving due cognizance to the following aspects.

- The moderately hard rock siltstone bedrock material on which excavation by TLB refused on 5 of the 8 test pits from a depth of 1.10 to 1.65 mbgl (mean 1.48 mbgl) is a suitable competent horizon for foundations.

- The residual siltstone materials are deemed to highly compressible / collapsible with a calculated collapse / consolidation settlement greatly in excess of 10 mm.

- The soil materials are not expansive.

- The following foundation options can be considered for the proposed solar farm.:
  - The fill / imported soil materials have to be stripped to spoil.
  - Foundations on competent siltstone bedrock material at average depth 1.59 mbgl, with an estimated safe bearing capacity exceeding 200 kPa.
  - The following foundation options that can be considered for portions with deeper soils.
    - Deep strip foundations on competent horizon.
    - Pier foundations excavated up to competent horizon.
    - Rockfill mattress utilising imported materials (G5 and better) and incorporation of geotextiles depending on design requirements.
    - Raft foundations.

- It is recommended that an efficient surface water drainage system be installed around the structure to ensure that moisture contents in the soils near foundations are kept stable. Water seepage and ponding will result in differential movement of the structure.

- Please note that the recommendations and findings are based on limited site investigation information and data in the form of point source trial pits. It is essential that the site be inspected during bulk earthworks by a qualified engineering geologist or geotechnical engineer prior to the construction of the foundations, to confirm soil conditions encountered in this investigation and / or identify any difference.

5 SUMMARY AND RECOMMENDATIONS

- AGES Omega (Pty) Ltd was appointed by the Sunwater East London Joint Venture (Pty) Ltd to conduct detailed engineering geological investigations in support of the feasibility study for the proposed 0.5 MLD solar-powered seawater desalination plant and related infrastructure i.e. solar farm, desalination plant and 1 ML reservoir, at the port of East London.

- The investigation was requested by Mr. Patrice Boyer of the firm Impact Water Solutions (Pty) Ltd and Mr. Jarl Heurlin of the firm Norland Construction, on behalf of the Sunwater East London Joint Venture (Pty) Ltd.

- The investigation was conducted at the proposed Solar Farm area, Desalination Plant are and proposed 1 ML reservoir.

- According to the 1: 250 000 geological map 3326 GRAHAMSTOWN and the 1:50 000 geological map 3327 BB EAST LONDON; the project area is underlain by the rocks of the Middleton and Balfour Formation (Pa) that forms part of the Adelaide Subgroup of the Karoo Supergroup sequence of rocks. The lithology of the formations comprise of mudstone, sandstone, locally overlain by soil >1m thick. The Formation dips to the northwest at approximately 5 degrees. The geology maps do not indicate any prominent geological structures such as fault zones and/or lineaments derived from LANDSAT imagery that intersect the project area. The area does not reflect any risk for the formation of sinkholes or subsidence caused by the presence of water-soluble rocks.

- Site investigation was conducted as follow:
    - Desalination Plant: A total of four (4) trial pits, numbered DS 1 to DS 4 were excavated utilising a CAT 426 4x4 TLB-type excavator on the 4th of February 2025.
    - Reservoir Site: A total of three (3) trial pits, numbered RS 1 to RS 3 were excavated utilising a CAT 426 4x4 TLB-type excavator on the 5th of February 2025.
    - Solar Farm Area: A total of eight (8) trial pits, numbered SF 1 to SF 8 were excavated utilising a CAT 426 4x4 TLB-type excavator on the 5th, 8th and the 18th of February 2025.

- Selected samples were taken of the prominent soil horizons identified during the site investigation for detailed laboratory analysis. The samples were submitted to Messrs. Labco (Pty) Ltd, Civil engineering materials and geotechnical laboratory in East London on the 6th of February 2025. Results were received on the 24th of March 2025.

- The materials are generally highly collapsible / compressible and prone to differential collapse / consolidation settlement. The material is also highly erodible. The materials are not potentially expansive due to low clay contents and weighted plasticity indexes.

- The materials are generally not suitable for use during construction due to very low CBR values and general THR14 classifications of G10 or poorer.

- Detailed results and recommendations are discussed in Chapter 2, 3 and 4 of the report regarding the site conditions and recommendations for the Desalination Plant, Reservoir and Solar Farm respectively.

- Please note that the recommendations and findings are based on limited site investigation information and data in the form of point source trial pits. It is essential that the site be inspected during bulk earthworks by a AGES prior to the construction of the foundations, to confirm soil conditions encountered in this investigation and / or identify any difference.

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APPENDIXES

APPENDIX A 1 – DESALINATION PLANT TESTPIT LOGS & PHOTOS

PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	DS 1
CLIENT:	IWS	LATITUDE:	-33.02554	LOGGED BY:	Makwande Busakuxo
CONTRACTOR:	Blacktronics	LONGITUDE:	27.40656	DATE EXCAVATED:	04 February 2025
MACHINE TYPE:	CAT 426 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	04 February 2025

Depth	Lithology	Description	Sampling
0–100		ASPHALT	
100–600		Abundant, densely packed angular gravel(crushed stone) in a sandy gravel matrix. Dense overall consistency. BASE.	
600–2000		Moist to wet, dark grey, in profile dark grey blotched dark brown, firm to soft, highly collapsible, clayey sand with scattered to frequent angular cobbles and boulders. IMPORTED SOILS.	
2000–2400		Wet, dark grey, in profile dark grey, soft, intact, clayey sand. HILLWASH.	DS 1/1
2400–3100		Wet, yellowish brown, in profile orange brown blotched brown, firm, micro-shattered, micro-shattered to shattered, sandy clay with scattered to frequent sub angular to angular gravel and cobbles. RESIDUAL SILTSTONE	DS 1/2 DS 1/2
3100–4000		Excavation was stopped on RESIDUAL SILTSTONE with a firm consistency.	

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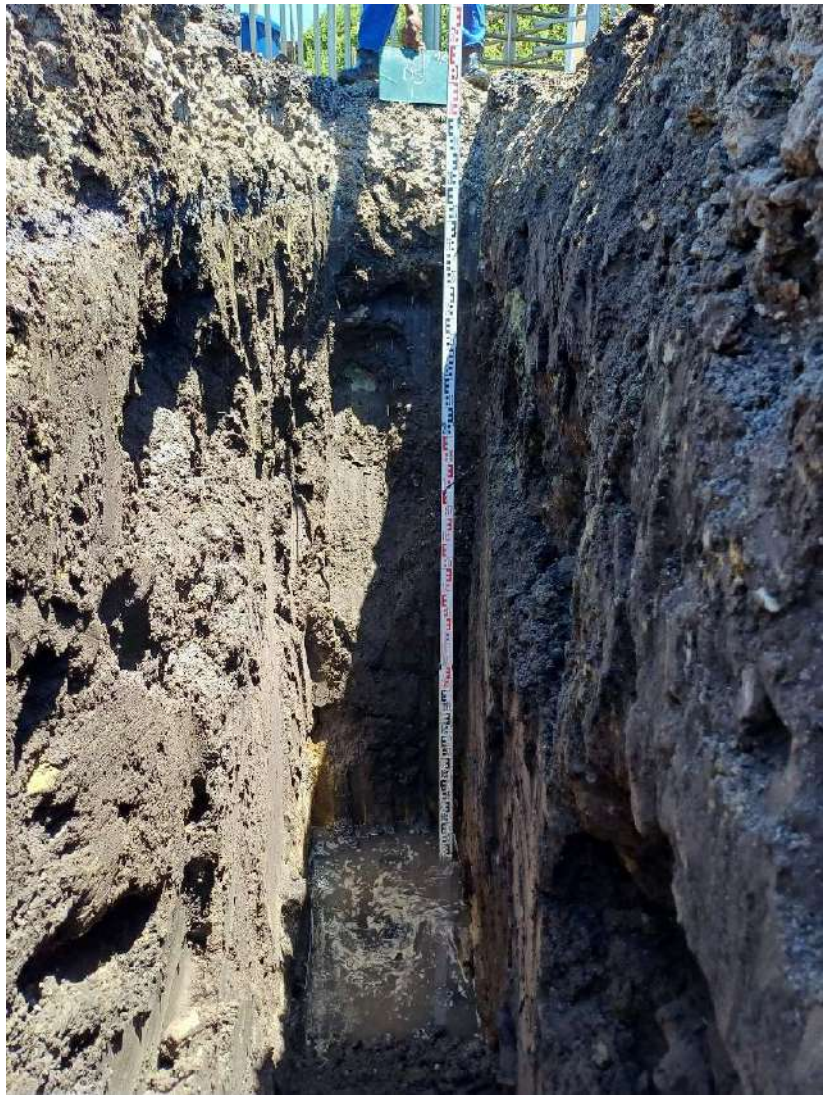
Notes:

- Slight g/w seepage @ 2.40 & 3.10 mbgl
- Poor sidewall stability
- 2 disturbed and 1 bulk sample taken
- Highly collapsible fill material

DS 1



PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	DS 2
CLIENT:	IWS	LATITUDE:	-33.02871	LOGGED BY:	Mahwande Busakwe
CONTRACTOR:	Blacktronics	LONGITUDE:	27.90671	DATE EXCAVATED:	04 February 2025
MACHINE TYPE:	CAT 426 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	04 February 2025

Depth	Lithology	Description	Sampling
0–100		Moist, dark brown, soft, clayey sand. Roots. IMPORTED SOILS.	
100–400		Moderately densely packed gravel and bricksin a dusky brown, silty sand matrix. FILL/IMPORTED SOILS.	DS 2/1
400–2400		Moist, brown, micro-shattered, firm, highly collapsible, clayey sand with frequent grvael and boulders. IMPORTED SOILS.	
2400–3000		Very moist, dark brown, soft, clayey sand with scattered gravel and boulders. IMPORTED SOILS.	
3000–4000		Excavation was stopped on IMPORTED SOILS with a soft consistency.	

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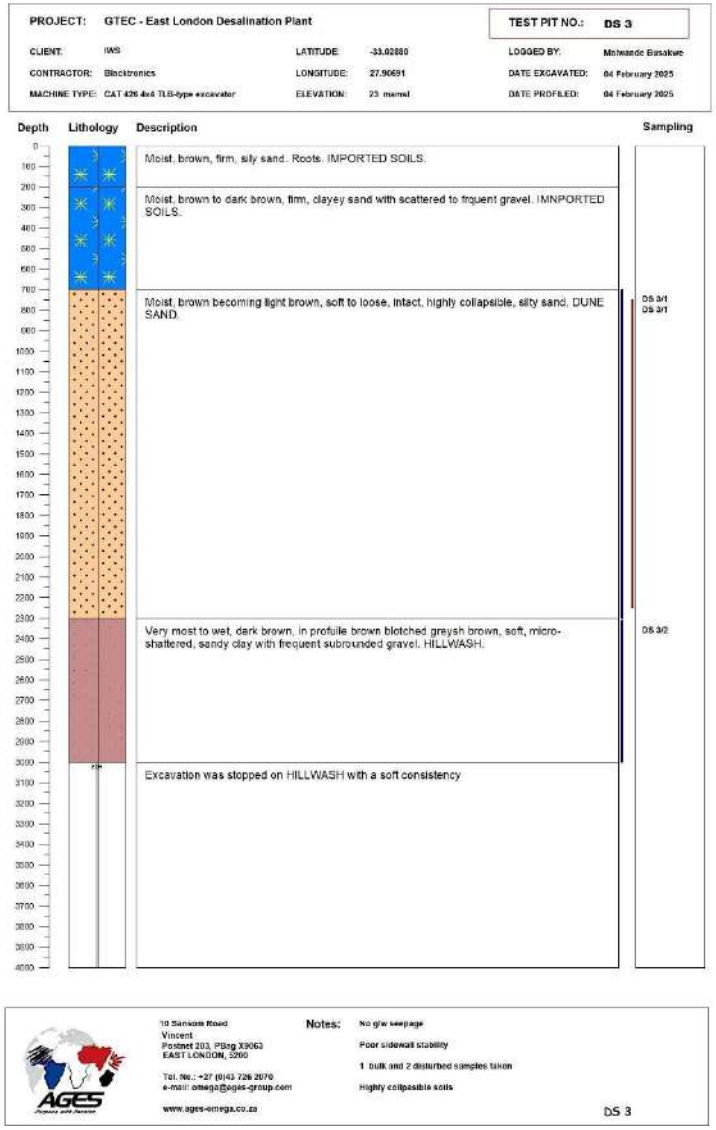
Notes:
- No g/w seepage
- Poor sidewall stability
- 1 bulk sample taken
- Highly collpasible soils

DS 2



PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	DS 3
CLIENT:	IWS	LATITUDE:	-33.02880	LOGGED BY:	Mahwande Busakwe
CONTRACTOR:	Blacktronics	LONGITUDE:	27.90691	DATE EXCAVATED:	04 February 2025
MACHINE TYPE:	CAT 426 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	04 February 2025

Depth	Lithology	Description	Sampling
0 – 700		Moist, brown, firm, silty sand. Roots. IMPORTED SOILS.	
700 – 1000		Moist, brown to dark brown, firm, clayey sand with scattered to frquent gravel. IMNPORTED SOILS.	
1000 – 2300		Moist, brown becoming light brown, soft to loose, intact, highly collapsible, silty sand. DUNE SAND.	DS 3/1 DS 3/1
2300 – 3000		Very most to wet, dark brown, in profuile brown blotched greysh brown, soft, micro-shattered, sandy clay with frequent subrounded gravel. HILLWASH.	DS 3/2
3000 – 4000		Excavation was stopped on HILLWASH with a soft consistency	

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Notes:
- No g/w seepage
- Poor sidewall stability
- 1 bulk and 2 disturbed samples taken
- Highly collpasible soils

DS 3

PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	DS 4
CLIENT:	IWS	LATITUDE:	-33.02889	LOGGED BY:	Mahwande Busakwe
CONTRACTOR:	Blacktronics	LONGITUDE:	27.90741	DATE EXCAVATED:	04 February 2025
MACHINE TYPE:	CAT 426 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	04 February 2025

Depth	Lithology	Description	Sampling
0 – 1700		Moist, brown, firm, clayey sand with frequent gravel and rubbles. IMPORTED SOILS.	
1700 – 2000		Moist, light brown, moderately dense, clayey sand with frequent gravel. IMPORTED SOILS.	
2000 – 2700		Moist to very moist, light brown, in profile blotched brown, dense, clayey sand with scattered gravel. DUNE SAND.	
2700 – 3000		Very moist, brownish grey, in profile dark grey, firm, micro-shattered, clayey sand with frequent boulders. HILLWASH.	
3000 – 3400		Abundant, angular cobbles and boulders moderately densely packed in a matrix of Moist, yellowish brown, sandy clay. Overall consistency is very dense. RESIDUAL SILTSTONE.	DS 4/1
3400 – 3500		Abundant angular boulders densely packed in a silty sand matrix. Overall consistency is very dense. RESIDUAL SILTSTONE / HIGHLY WEATHERED SILTSTONE BEDROCK.	
3500 – 4000		Excavation was stopped on RESIDUAL SILTSTONE / HIGHLY WEATHERED SILTSTONE BEDROCK with a very dense consistency.	

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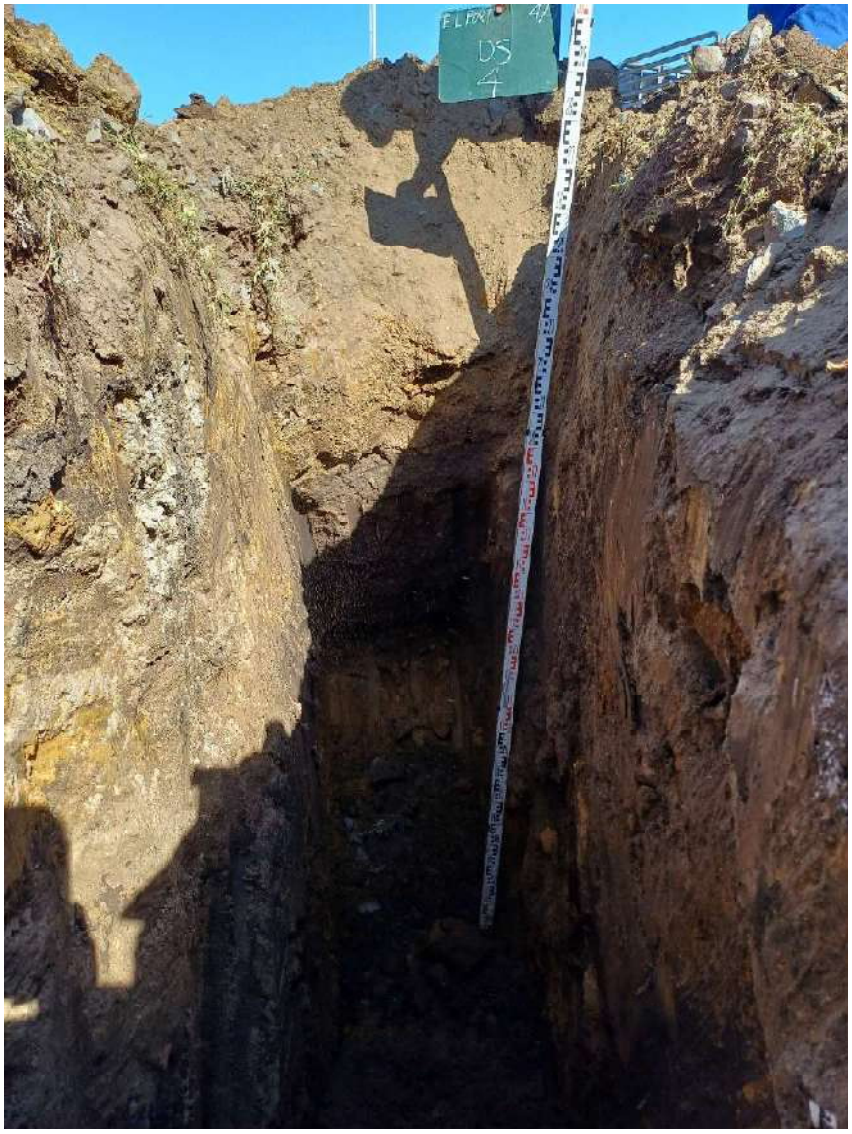
Notes:
- No g/w seepage
- Poor sidewall stability
- 1 disturbed sample taken
- Highly collpasible soils

DS 4



APPENDIX A 2 – DASALINATION PLANT DYNAMIC CONE PENETROMETER DATA

ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	DS 1				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	20	0	0,0		
5	415	-395	79,0	25	2
10	554	-534	27,8	77	6
15	656	-636	20,4	108	9
20	745	-725	17,8	126	11
25	820	-800	15,0	152	13
30	890	-870	14,0	163	14
35	950	-930	12,0	193	17
40	1000	-980	10,0	236	22
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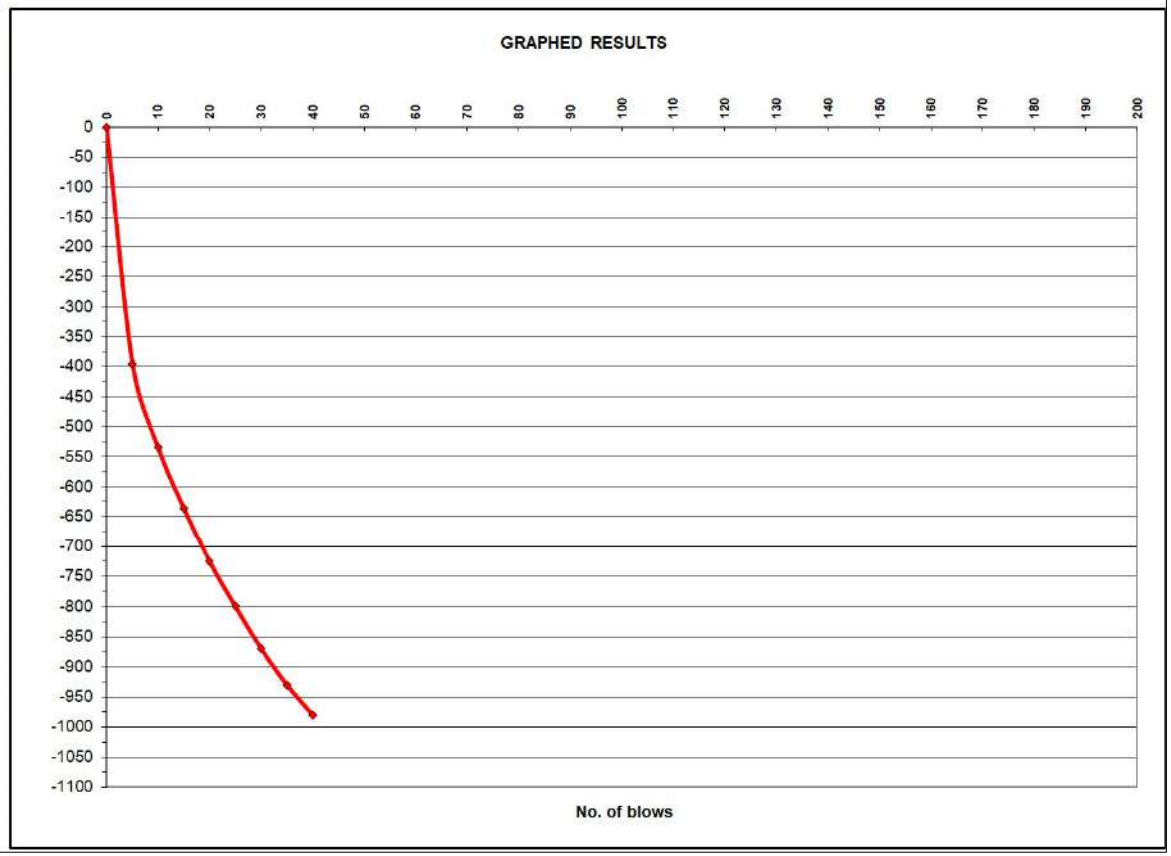

ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	DS 2				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	No DCP Data				
5	Highly Collapsible				
10					
15					
20					
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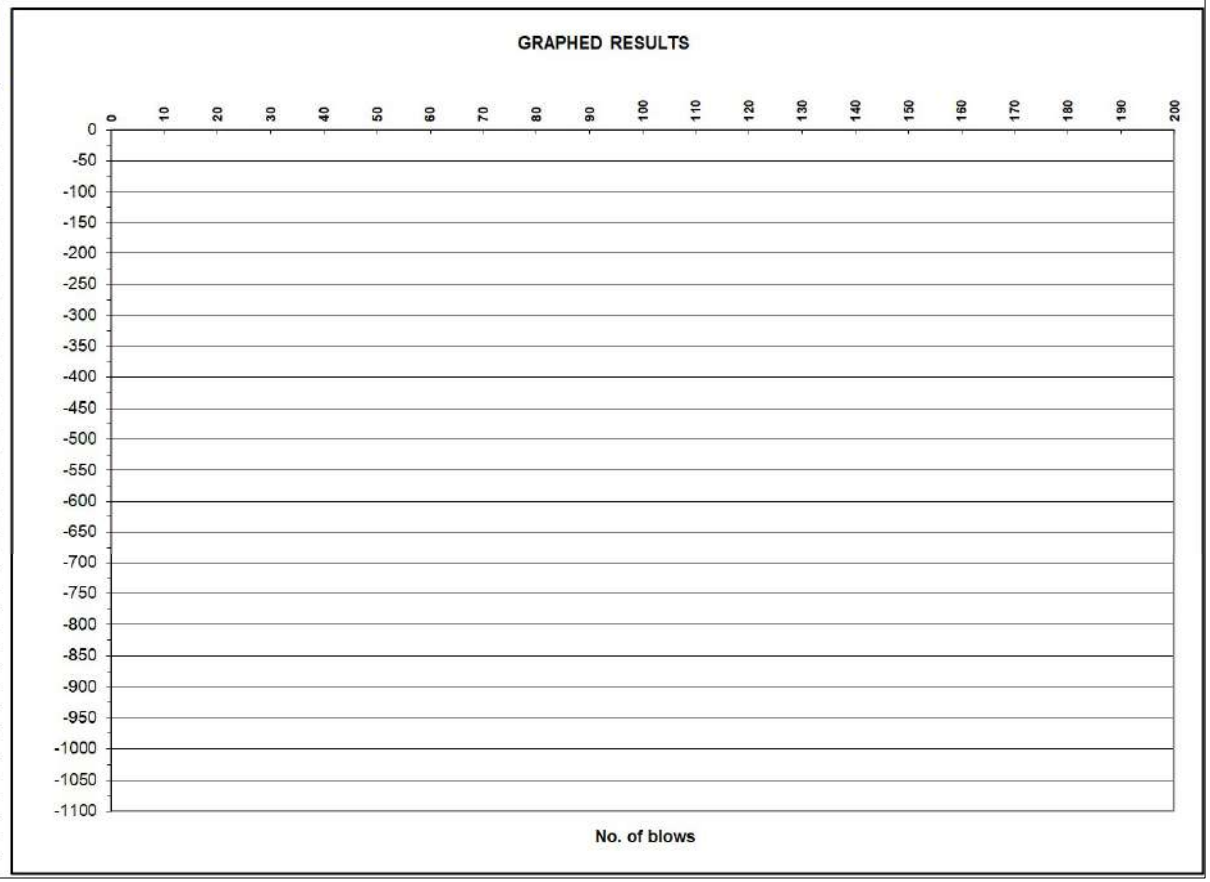

ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	DS 3				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	15	0	0,0		
5	260	-245	49,0	42	3
10	340	-325	16,0	141	12
15	415	-400	15,0	152	13
20	615	-600	40,0	52	4
25	665	-650	10,0	236	22
30	1000	-985	67,0	30	2
35					
40	1450	-1450	290,0	6	0
45	2050	-2050	120,0	16	1
50	2405	-2405	71,0	28	2
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200					

ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	DS 4				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	85	0	0,0		
5	222	-137	27,4	79	6
10	360	-275	27,6	78	6
15	490	-405	26,0	83	7
20	570	-485	16,0	141	12
25	584	-499	2,8	944	111
30	595	-510	2,2	1228	151
35	600	-515	1,0	2900	410
40					
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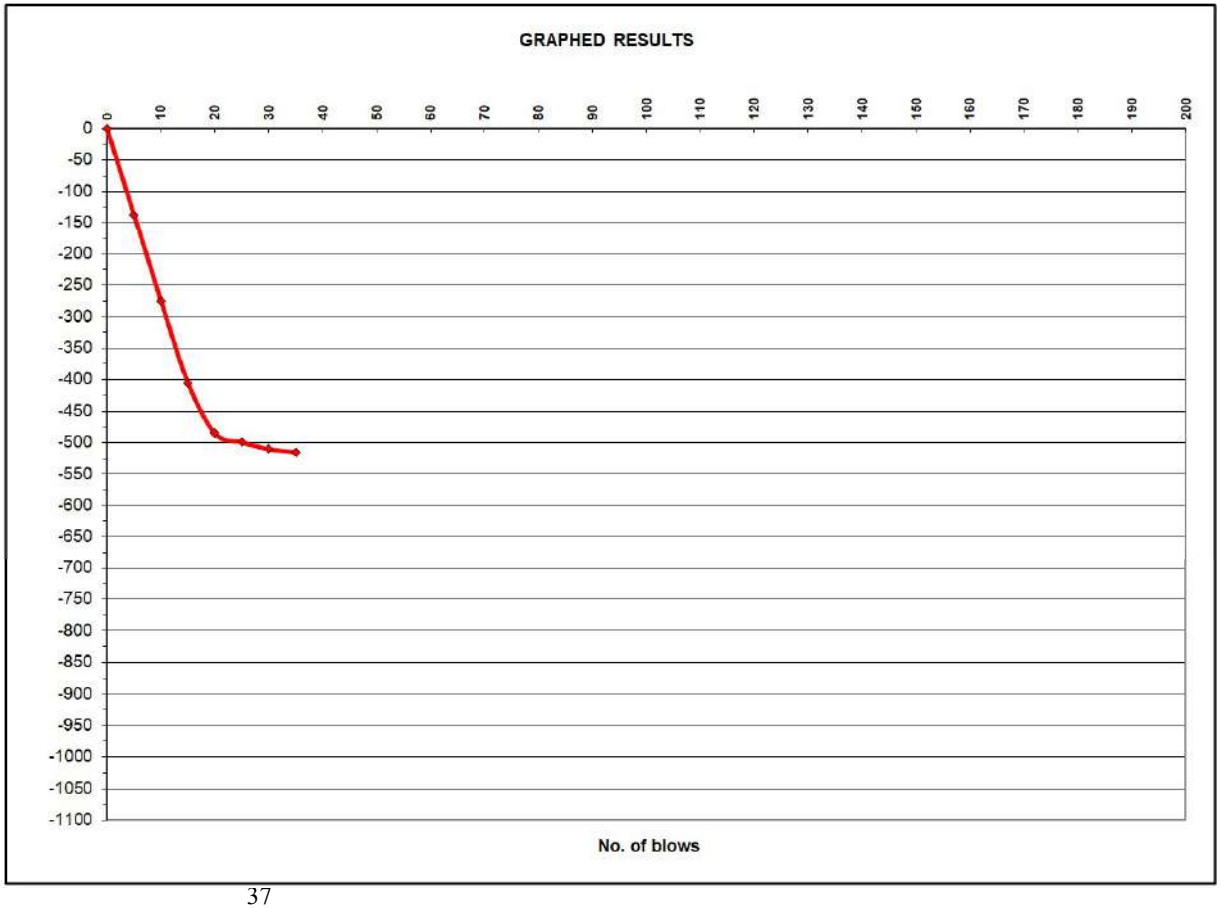

APPENDIX B 1 –RESERVOIR TESTPIT LOGS & PHOTOS

PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	RS 1
CLIENT:	IWS	LATITUDE:	-33.02922	LOGGED BY:	Mahwande Busakwe
CONTRACTOR:	Blacktronics	LONGITUDE:	27.90663	DATE EXCAVATED:	05 February 2025
MACHINE TYPE:	CAT 426 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	05 February 2025

Depth	Lithology	Description	Sampling
0 – 700		Moist, dark brown, firm, clayey sand with frequent rubbles. Roots. IMPORTED SOILS.	
700 – 800		very moist, brown, firm to loose, intact, silty sand. Roots. IMPORTED SOILS.	
800 – 1200		Moist, dark greyish brown, in profile dark greyish brown, firm, micro-shattered, sandy clay. Roots. HILLWASH.	RS 1/1
1200 – 2600		Frequent to abundant, angular cobbles and boulders in a matrix of Very moist, yellowish brown, sandy clay. Dense overall consistency. RESIDUAL SILTSTONE.	RS 1/2
2600 – 2700		Khaki, highly weathered, fine grained, medium jointed, soft to moderately hard rock. Joints are wided with silty clay infilling. HIGHLY WEATHERED SILTSTONE BEDROCK	
2700 – 4000		Excavation was stopped on moderately hard HIGHLY WEATHERED SILTSTONE BEDROCK	

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Notes:
- Slight g/w seepage @ 2.60 mbgl
- Poor sidewall stability
- 2 disturbed and 1 bulk samples taken
- Highly collpasible soils

RS 1

PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	RS 2
CLIENT:	IWS	LATITUDE:	-33.02689	LOGGED BY:	Mahwande Busakwe
CONTRACTOR:	Blacktronics	LONGITUDE:	27.90680	DATE EXCAVATED:	05 February 2025
MACHINE TYPE:	CAT 426 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	05 February 2025

Depth	Lithology	Description	Sampling
0 – 1100		Very moist, dark brown, in profile dark brown, firm, clayey sand with frequent gravel and bricks. Roots. IMPORTED SOILS.	
1100 – 1200		Very moist to wet, brown, intact, clayey sand with scattered gravel. IMPORTED SOILS.	
1200 – 1600		Wet, dark grey, in profile dark grey, soft, intact, clayey sand. HILLWASH.	
1600 – 2200		Very moist to wet, yellowish brown, in profile yellowish orange brown blotched grey, firm, shattered, sandy clay with frequent gravel. Roots. RESIDUAL SILTSTONE.	
2200 – 3000		Abundant angular gravel, cobbles and boulders densely packed in a matrix of Moist, of Moist, yellowish brown, silty clay. Overall consistency is dense. RESIDUAL SILTSTONE / HIGHLY WEATHERED SILTSTONE BEDROCK.	
3000	EOH	Excavation was stopped on RESIDUAL SILTSTONE / HIGHLY WEATHERED SILTSTONE BEDROCK with a dense overall consistency..	

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Notes: Slightly gw seepage @ 1.90 mbgl
Moderate sidewall stability
No sample taken

RS 2

PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	RS 3
CLIENT:	IWS	LATITUDE:	-33.02920	LOGGED BY:	Mahwande Busakwe
CONTRACTOR:	Blastronics	LONGITUDE:	27.90695	DATE EXCAVATED:	05 February 2025
MACHINE TYPE:	CAT 426 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	05 February 2025

Depth	Lithology	Description	Sampling
0 – 1500		Moist, dark brown, in profile dark brown, firm, sandy clay. Roots. HILLWASH.	
400 – 1200		Moist, yellowish brown, in profile orange brown blotched greyish brown, firm, micro-shattered, silty clay with scattered to frequent angular gravel and cobbles. RESIDUAL SILTSTONE.	RS 3/1
1200 – 1500		Khaki, highly weathered to moderately weathered, fine grained, medium jointed, moderately hard rock to hard rock. SILTSTONE BEDROCK.	RS 3/2
1500 – 4000		Excavation refused on hard rock SILTSTONE BEDROCK	

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Notes:
- No g/w seepage
- Moderate sidewall stability
- 1 disturbed and 1 undisturbed sample taken

RS 3

APPENDIX B 2 – RESERVOIR DYNAMIC CONE PENETROMETER DATA

ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	RS 1				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	5	0	0,0		
5	162	-157	31,4	68	5
10	272	-267	22,0	100	8
15	405	-400	26,6	81	6
20	525	-520	24,0	91	7
25	635	-630	22,0	100	8
30	770	-765	27,0	80	6
35	895	-890	25,0	87	7
40	900	-895	1,0	2900	410
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ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	RS 2				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	20	0	0,0		
5	475	-455	91,0	21	1
10	632	-612	31,4	68	5
15	725	-705	18,6	120	10
20	780	-760	11,0	212	20
25	885	-865	21,0	105	9
30	890	-870	1,0	2900	410
35	912	-892	4,4	577	62
40	960	-940	9,6	246	23
45	1000	-980	8,0	301	29
50					
55	2250	-2250	450,0	4	0
60	2370	-2370	24,0	91	7
65	2515	-2515	29,0	74	6
70	2655	-2655	28,0	77	6
75	2740	-2740	17,0	132	11
80	2805	-2805	13,0	177	16
85	2892	-2892	17,4	129	11
90	2912	-2912	4,0	640	70
95	2930	-2930	3,6	718	81
100	2942	-2942	2,4	1117	135
105	2950	-2950	1,6	1737	226
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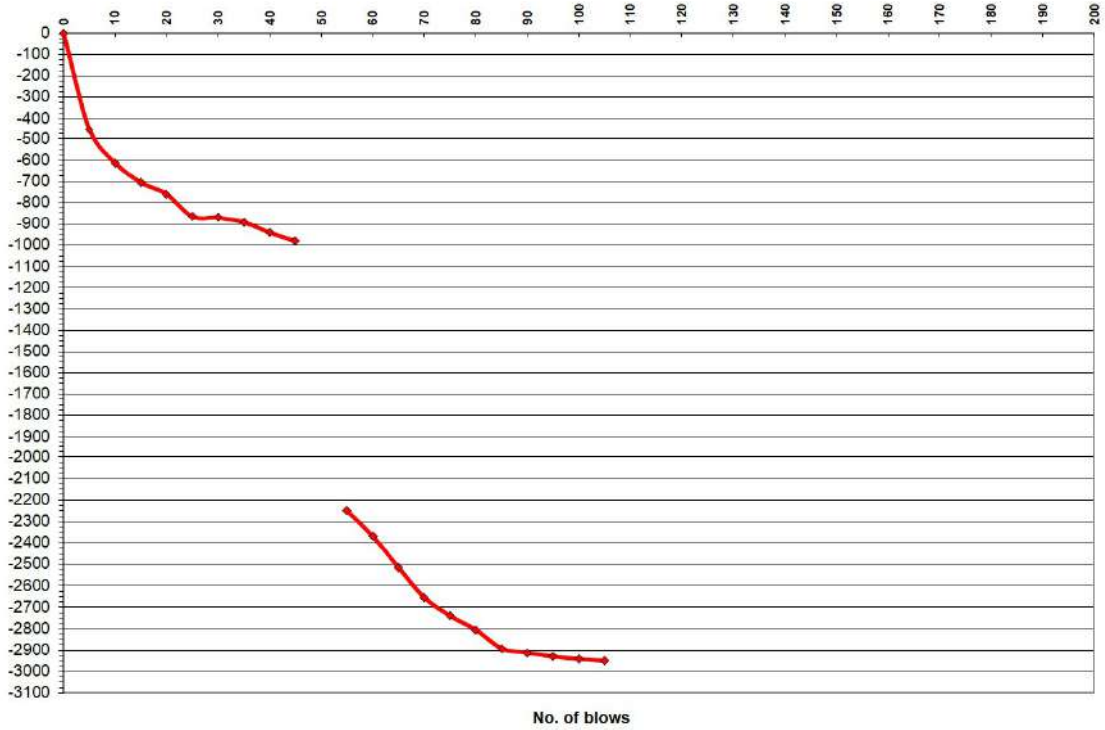
GRAPHED RESULTS



ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	RS 1				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	25	0	0,0		
5	200	-175	35,0	60	4
10	345	-320	29,0	74	6
15	390	-365	9,0	264	25
20	480	-455	18,0	124	10
25	550	-525	14,0	163	14
30	670	-645	24,0	91	7
35	780	-755	22,0	100	8
40	885	-840	17,0	132	11
45	915	-890	10,0	236	22
50	980	-955	13,0	177	16
55	1010	-985	6,0	411	42
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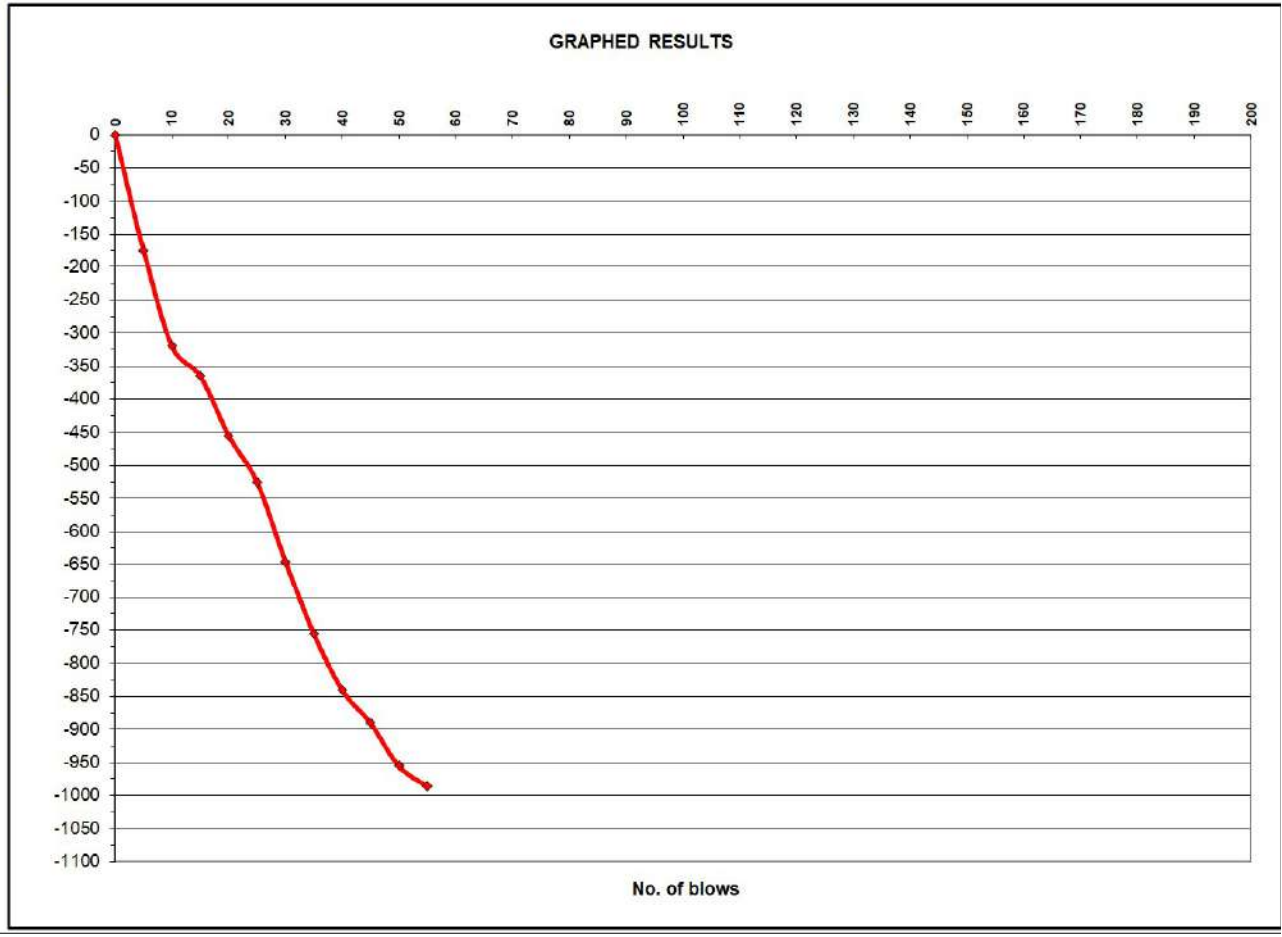

APPENDIX C 1 – SOLAR FARM
TESTPIT LOGS & PHOTOS

PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	SF 1
CLIENT:	IWS	LATITUDE:	-33.02804	LOGGED BY:	Mahwande Busakwe
CONTRACTOR:	Blacktronics	LONGITUDE:	27.90771	DATE EXCAVATED:	05 February 2025
MACHINE TYPE:	CAT 426 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	05 February 2025

Depth	Lithology	Description	Sampling
0 – 1700		Moist, dark brown, in profile dark brown, firm, micro-shattered, sandy clay with plastics, gravel. IMPORTED SOILS.	
1700 – 1800		Moist, yellowish brown, in profile yellowish orange brown blotched greyish orange, firm, micro-shattered, sandy clay with frequent to abundant cobbles and grave and also electrical cables. IMPORTED SOILS.	
1800 – 2600		Abundant angular cobbles and boulders moderately densely packed to densely packed in a matrix of Moist to wet, yellowish brown, sandy clay. Overall consistency is dense to very dense. RESIDUAL SILTSTONE / HIGHLY WEATHERED SILTSTONE BEDROCK	SF 1/1 SF 1/1
2600		Excavation was stopped on RESIDUAL SILTSTONE / HIGHLY WEATHERED SILTSTONE BEDROCK with a very dense consistency.	

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Notes: Slight g/w seepage @ 1.66 mbgl

Poor sidewall stability

1 disturbed and 1 bulk sample taken

SF 1

PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	SF 2
CLIENT:	IWS	LATITUDE:	-33.02929	LOGGED BY:	Mahwande Busakwe
CONTRACTOR:	Blacktronics	LONGITUDE:	27.90714	DATE EXCAVATED:	05 February 2025
MACHINE TYPE:	CAT 426 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	05 February 2025

Depth	Lithology	Description	Sampling
0–1600		Moist, dark brown, in profile dark brown, firm, sandy clay with scattered gravel. IMPORTED SOILS.	
		Moist, yellowish brown, in profile yellowish brown blotched orange brown, firm, micro-shattered, silty clay. Roots. IMPORTED SOILS.	
		Moist, brownish orange, in profile brownish orange streaked grey and blotched brown, firm, intact, silty clay with scattered to frequent gravel and cobbles at depth. RESIDUAL SILTSTONE.	
1600		Greyish orange, highly weathered, fine grained, medium jointed, moderately hard rock. SILTSTONE BEDROCK.	
1700		Excavation refused on hard rock SILTSTONE BEDROCK.	

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Notes:
No g/w seepage
Moderate sidewall stability
No sample taken

SF 2

PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	SF 3
CLIENT:	IWS	LATITUDE:	-33.02608	LOGGED BY:	Mahwande Busakwe
CONTRACTOR:	Blacktronics	LONGITUDE:	27.90747	DATE EXCAVATED:	05 February 2025
MACHINE TYPE:	CAT 426 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	05 February 2025

Depth	Lithology	Description	Sampling
0 – 700		Moist, dark brown, in profile dark brown, soft, clayey sand. Roots. IMPORTED SOILS.	
700 – 1500		Moist, yellowish orange brown, firm, micro-shattered, sandy clay with scattered to frequent gravel and cobbles and also old pipes. IMPORTED SOILS.	
1500 – 2700		Khaki orange, highly weathered, fine grained, medium jointed to thinly jointed, soft rock to moderately hard rock. Joints are wide with clay infilling. HIGHLY WEATHERED SILTSTONE BEDROCK.	
2700 – 4000		Excavation was stopped on moderately hard HIGHLY WEATHERED SILTSTONE BEDROCK.	

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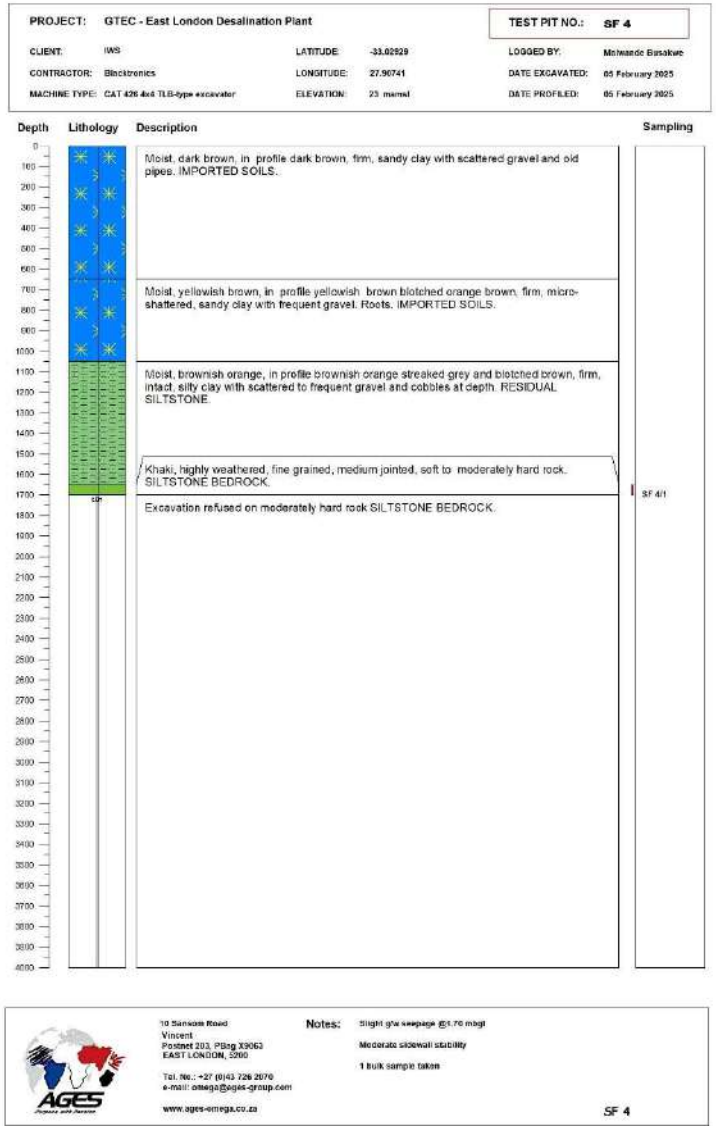
Notes:
- Slight g/w seepage @ 2.10 mbgl
- Poor sidewall stability
- No sample taken

SF 3



PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	SF 4
CLIENT:	IWS	LATITUDE:	-33.02929	LOGGED BY:	Mahwede Busakwe
CONTRACTOR:	Blacktronics	LONGITUDE:	27.90741	DATE EXCAVATED:	05 February 2025
MACHINE TYPE:	CAT 426 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	05 February 2025

Depth	Lithology	Description	Sampling
0 – 1700		Moist, dark brown, in profile dark brown, firm, sandy clay with scattered gravel and old pipes. IMPORTED SOILS.	
700 – 1100		Moist, yellowish brown, in profile yellowish brown blotched orange brown, firm, micro-shattered, sandy clay with frequent gravel. Roots. IMPORTED SOILS.	
1100 – 1600		Moist, brownish orange, in profile brownish orange streaked grey and blotched brown, firm, intact, silty clay with scattered to frequent gravel and cobbles at depth. RESIDUAL SILTSTONE.	
1600 – 1700		Khaki, highly weathered, fine grained, medium jointed, soft to moderately hard rock. SILTSTONE BEDROCK.	SF 4/1
1700		Excavation refused on moderately hard rock SILTSTONE BEDROCK.	

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Notes:
- Slight gw seepage @1.70 magl
- Moderate sidewall stability
- 1 bulk sample taken

SF 4

PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	SF 5
CLIENT:	IWS	LATITUDE:	-33.02514	LOGGED BY:	Mahwande Busakwe
CONTRACTOR:	Plus Plant Hire	LONGITUDE:	27.90744	DATE EXCAVATED:	18 February 2025
MACHINE TYPE:	CAT 428 F2 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	18 February 2025

Depth	Lithology	Description	Sampling
0 – 600		Moist, banded dark brown and light brown, firm, clayey sand with old pipes. Roots. IMPORTED SOIL.	
600 – 1200		Moist to very moist, yellowish brown, in profile brown blotched yellowish orange brown, dense, micro-shattered to intact, sandy clay with scattered to frequent angular gravel and also scattered ferricrete nodules. Roots. SLIGHTLY FERRUGINISED RESIDUAL SILTSTONE.	SF S1
1200 – 1400		Orange brown, highly weathered to moderately weathered, fine grained, medium jointed, soft to moderately hard rock. SILTSTONE BEDROCK.	SF S2
1400		Excavation refused on moderately hard rock SILTSTONE BEDROCK.	

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Notes: Slight g/w seepage @1.30 mbgl
Moderate sidewall stability
1 undisturbed and 1 disturbed sample taken

SF 5

PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	SF 6
CLIENT:	IWS	LATITUDE:	-33.02931	LOGGED BY:	Mahwede Busakwe
CONTRACTOR:	Plus Plant Hire	LONGITUDE:	27.90789	DATE EXCAVATED:	18 February 2025
MACHINE TYPE:	CAT 428 F2 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	18 February 2025

Depth	Lithology	Description	Sampling
0 – 1500		Moist, banded dark brown and light brown, firm, highly collapsible, clayey sand. Roots. IMPORTED SOIL.	
1500 – 1600		Moist, orange yellowish brown, in profile orange yellowish brown, firm to stiff, micro-shattered to intact, silty clay with scattered to frequent angular gravel. Roots. RESIDUAL SILTSTONE.	
1600	EOH	Orange brown, highly weathered to moderately weathered, fine grained, medium jointed, soft to moderately hard rock. SILTSTONE BEDROCK.	
		Excavation refused on moderately hard rock SILTSTONE BEDROCK.	

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Notes:
- No g/w seepage
- Moderate sidewall stability
- No sample taken

SF 6

PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	SF 7
CLIENT:	IWS	LATITUDE:	-33.02627	LOGGED BY:	Mahwande Busakwe
CONTRACTOR:	Plus Plant Hire	LONGITUDE:	27.90821	DATE EXCAVATED:	18 February 2025
MACHINE TYPE:	CAT 428 F2 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	18 February 2025

Depth	Lithology	Description	Sampling
0 – 1700		Moist, banded dark brown and light brown, firm, highly collapsible, clayey sand with frequent to abundant gravel and cobbles. Roots. IMPORTED SOIL.	
1700 – 1800		Moist, dark brown speckled yellowish brown, firm, clayey sand. Roots. IMPORTED SOIL.	
1800 – 1900		Moist, yellowish brown, in profile orange yellowish brown, firm, micro-shattered to intact, silty clay. RESIDUAL SILTSTONE.	
1900 – 2000	EOH	Orange brown, moderately weathered, fine grained, medium jointed, soft to moderately hard rock. SILTSTONE BEDROCK.	
2000		Excavation refused on moderately hard rock SILTSTONE BEDROCK.	

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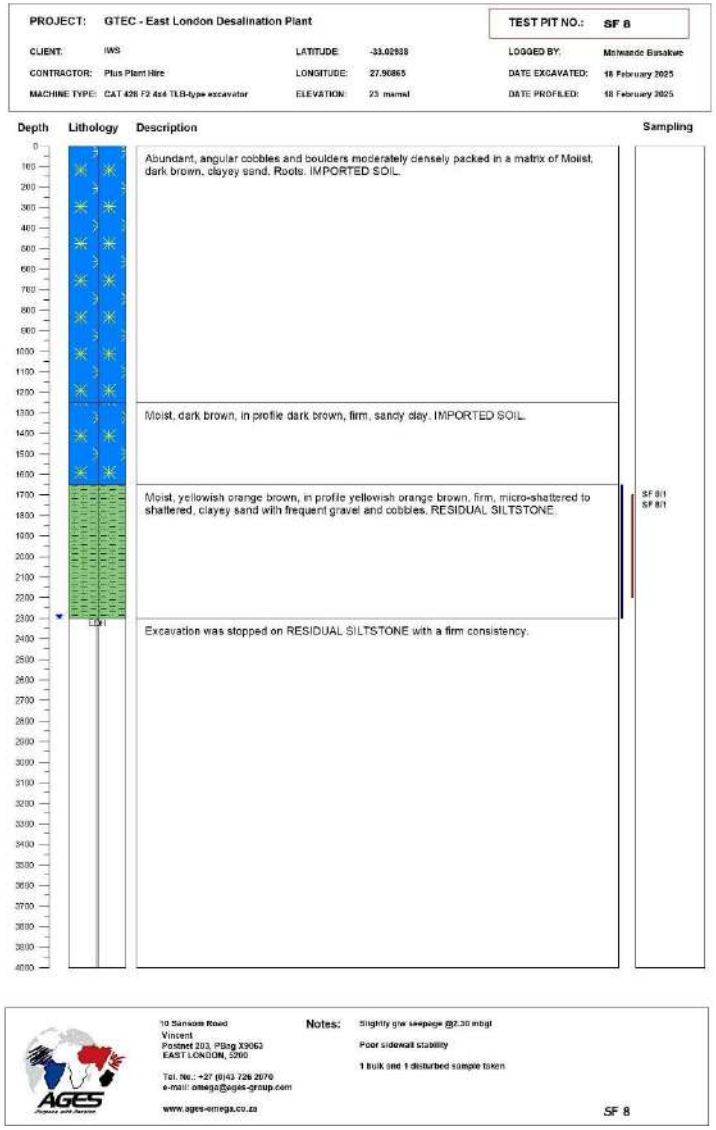
Notes:
- No g/w seepage
- Poor sidewall stability
- No sample taken

SF 7



PROJECT:	GTEC - East London Desalination Plant			TEST PIT NO.:	SF 8
CLIENT:	IWS	LATITUDE:	-33.02938	LOGGED BY:	Mahwande Busakwe
CONTRACTOR:	Plus Plant Hire	LONGITUDE:	27.90865	DATE EXCAVATED:	18 February 2025
MACHINE TYPE:	CAT 428 F2 4x4 TLB-type excavator	ELEVATION:	23 mamsl	DATE PROFILED:	18 February 2025

Depth	Lithology	Description	Sampling
0 – 1700		Abundant, angular cobbles and boulders moderately densely packed in a matrix of Moist, dark brown, clayey sand. Roots. IMPORTED SOIL.	
1700 – 2000		Moist, dark brown, in profile dark brown, firm, sandy clay. IMPORTED SOIL.	
2000 – 2300		Moist, yellowish orange brown, in profile yellowish orange brown, firm, micro-shattered to shattered, clayey sand with frequent gravel and cobbles. RESIDUAL SILTSTONE.	SF 8/1 SF 8/1
2300 – 4000		Excavation was stopped on RESIDUAL SILTSTONE with a firm consistency.	

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Notes:
- Slightly grw seepage @2.30 mbgl
- Poor sidewall stability
- 1 bulk and 1 disturbed sample taken

SF 8

APPENDIX C 2 – SOLAR FARM
DYNAMIC CONE PENETROMETER DATA

ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	SF 1				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	5	0	0,0		
5	225	-220	44,0	47	3
10	489	-484	52,8	38	3
15	680	-675	38,2	55	4
20	830	-825	30,0	71	5
25	965	-960	27,0	80	6
30	1000	-995	7,0	348	35
35					
40	1020	-1020	204,0	9	0
45	1245	-1245	45,0	46	3
50	1385	-1385	28,0	77	6
55	1495	-1495	22,0	100	8
60	1580	-1580	17,0	132	11
65	1620	-1620	8,0	301	29
70	1652	-1652	6,4	383	39
75	1660	-1660	1,6	1737	226
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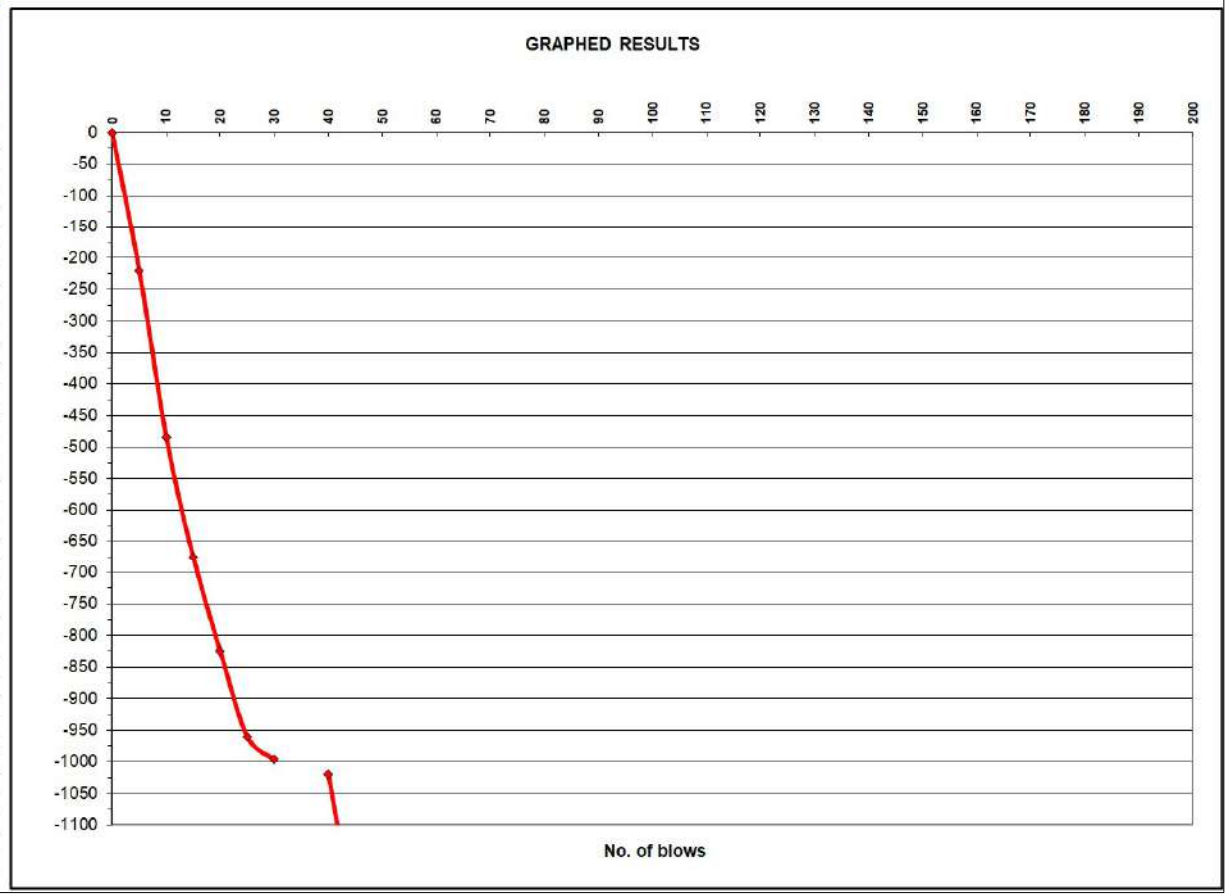

ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	SF 2				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	50	0	0,0		
5	400	-350	70,0	28	2
10	532	-482	26,4	82	6
15	646	-596	22,8	96	8
20	734	-684	17,6	127	11
25	810	-760	15,2	149	13
30	860	-810	10,0	236	22
35	890	-840	6,0	411	42
40	920	-870	6,0	411	42
45	965	-915	9,0	264	25
50	1010	-960	9,0	264	25
55					
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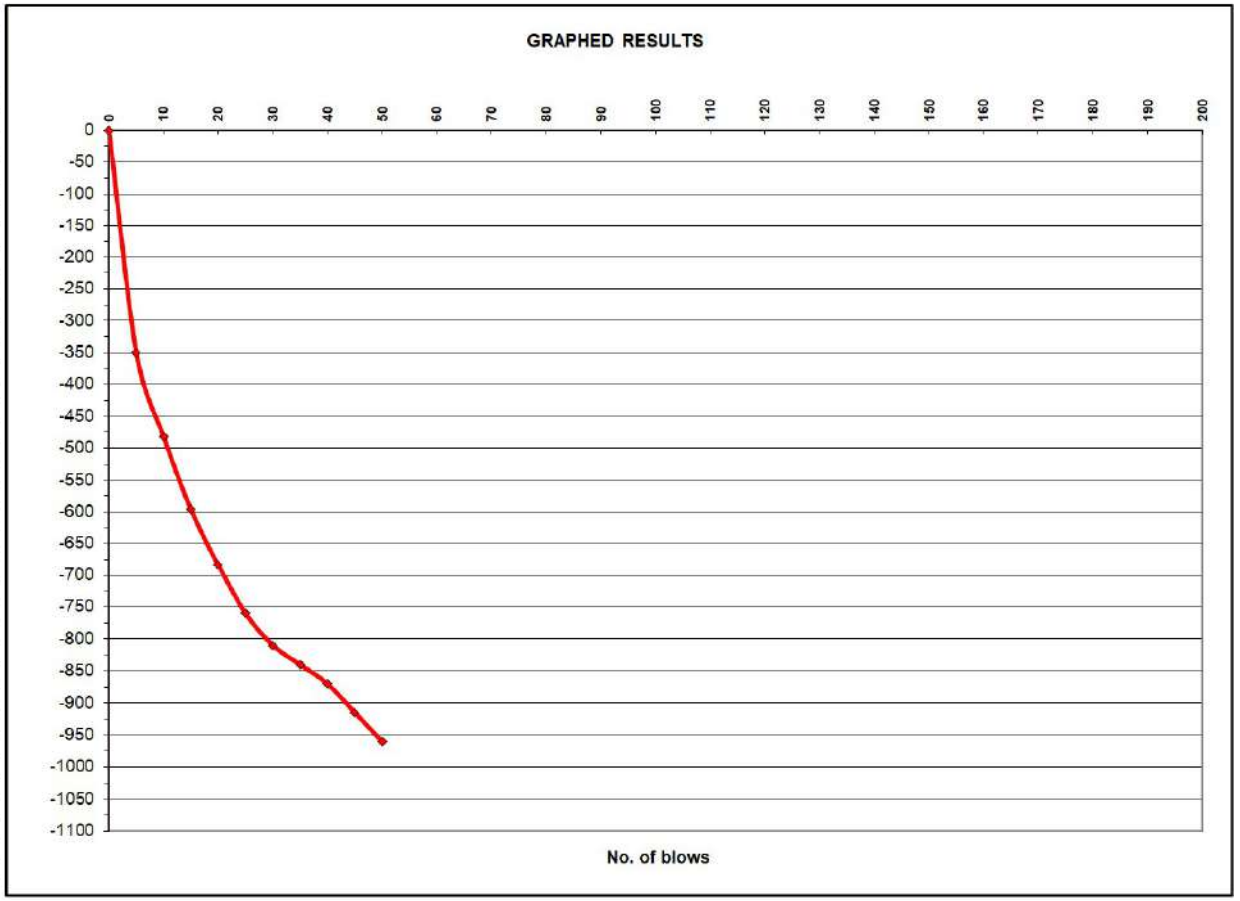

ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	SF 3				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	45	0	0,0		
5	280	-235	47,0	44	3
10	330	-285	10,0	236	22
15	410	-365	16,0	141	12
20	552	-507	28,4	76	6
25	570	-525	3,6	718	81
30					
35	2742	-2742	548,4	3	0
40	2960	-2960	43,6	47	3
45	3100	-3100	28,0	77	6
50	3142	-3142	8,4	285	27
55	3270	-3270	25,6	85	7
60	3340	-3340	14,0	163	14
65	3400	-3400	12,0	193	17
70	3450	-3450	10,0	236	22
75	3485	-3485	7,0	348	35
80	3540	-3540	11,0	212	20
85	3590	-3590	10,0	236	22
90	3591	-3591	0,2	16760	3166
95					
100					
105					
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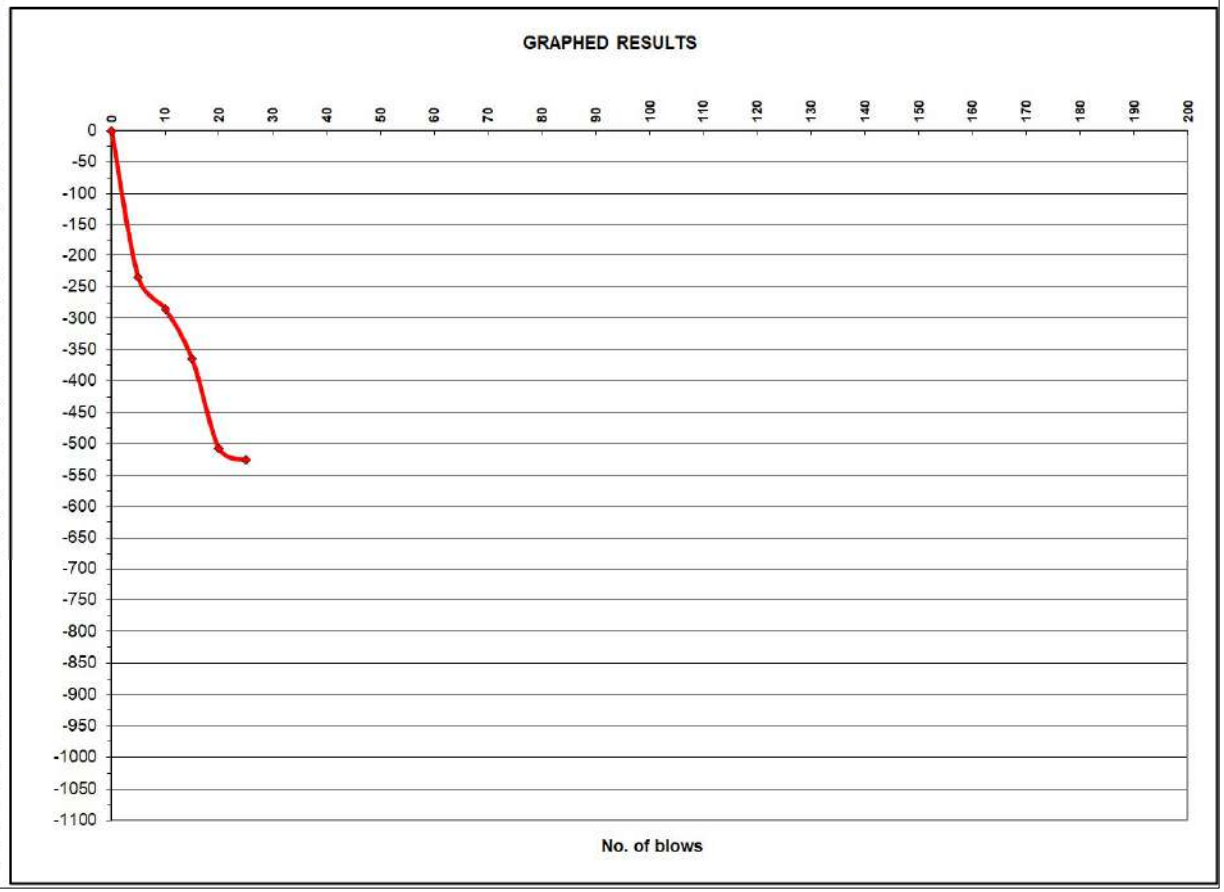

ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** Surface **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	SF 4				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	20	0	0,0		
5	115	-95	19,0	117	10
10	285	-265	34,0	62	5
15	360	-340	15,0	152	13
20	440	-420	16,0	141	12
25	495	-475	11,0	212	20
30	575	-555	16,0	141	12
35	600	-580	5,0	502	53
40	690	-670	18,0	124	10
45	740	-720	10,0	236	22
50	755	-735	3,0	876	102
55	763	-743	1,6	1737	226
60	773	-753	2,0	1362	170
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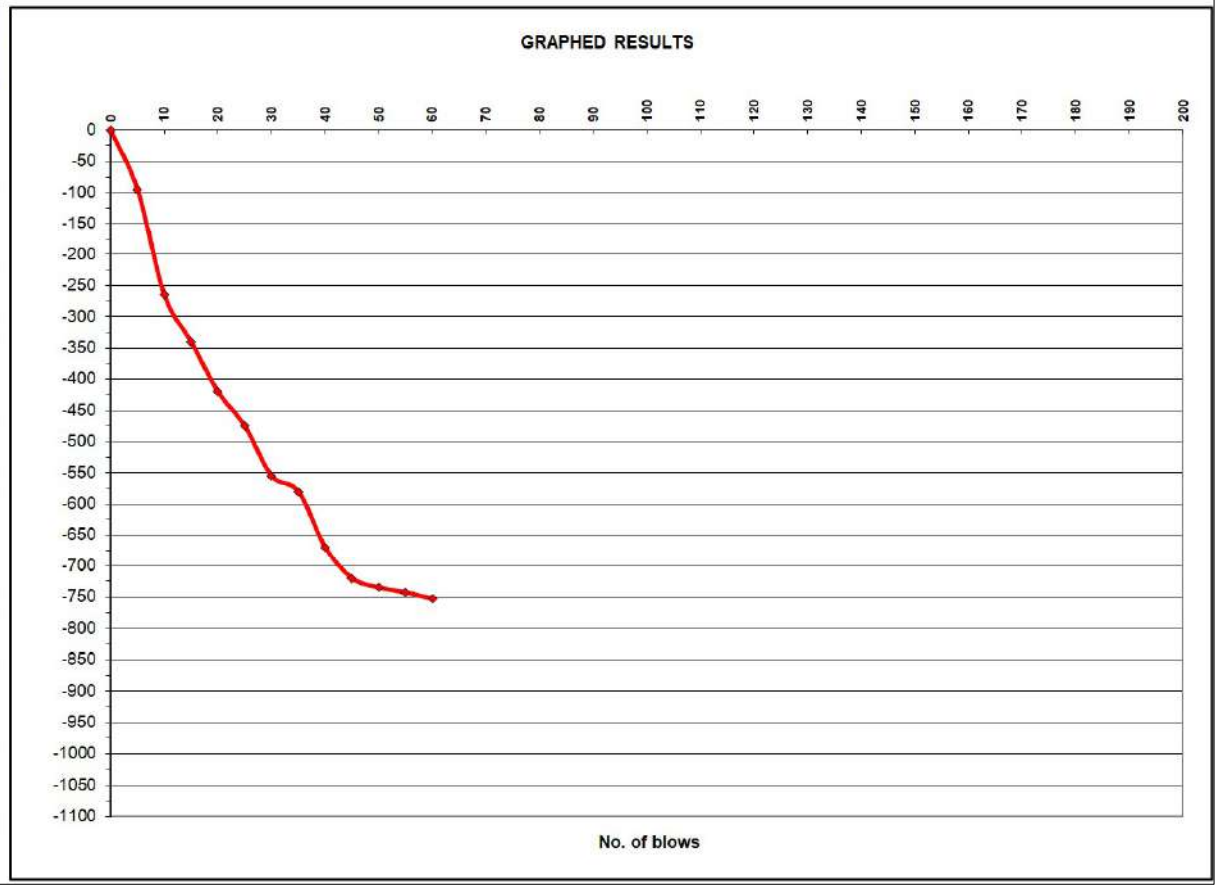

ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** Surface **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	SF 5				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	6	0	0,0		
5	240	-234	46,8	44	3
10	410	-404	34,0	62	5
15	542	-536	26,4	82	6
20	575	-569	6,6	371	37
25	620	-614	9,0	264	25
30	705	-699	17,0	132	11
35	810	-804	21,0	105	9
40	910	-904	20,0	111	9
45	960	-954	10,0	236	22
50	985	-979	5,0	502	53
55	1000	-994	3,0	876	102
60					
65					
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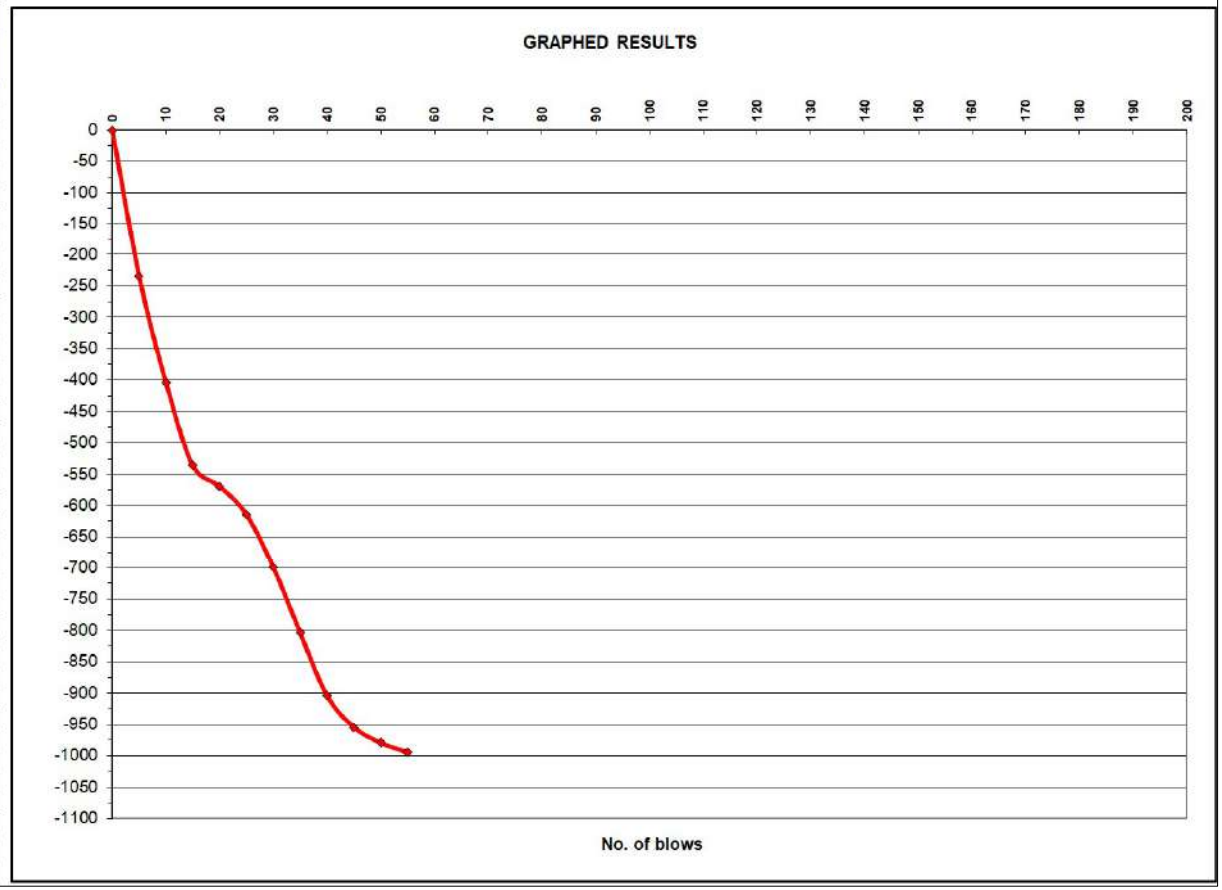

ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** Surface **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	SF 6				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	10	0	0,0		
5	212	-202	40,4	51	4
10	390	-380	35,6	59	4
15	520	-510	26,0	83	7
20	650	-640	26,0	83	7
25	700	-690	10,0	236	22
30	815	-805	23,0	95	8
35	960	-950	29,0	74	6
40	1010	-1000	10,0	236	22
45					
50					
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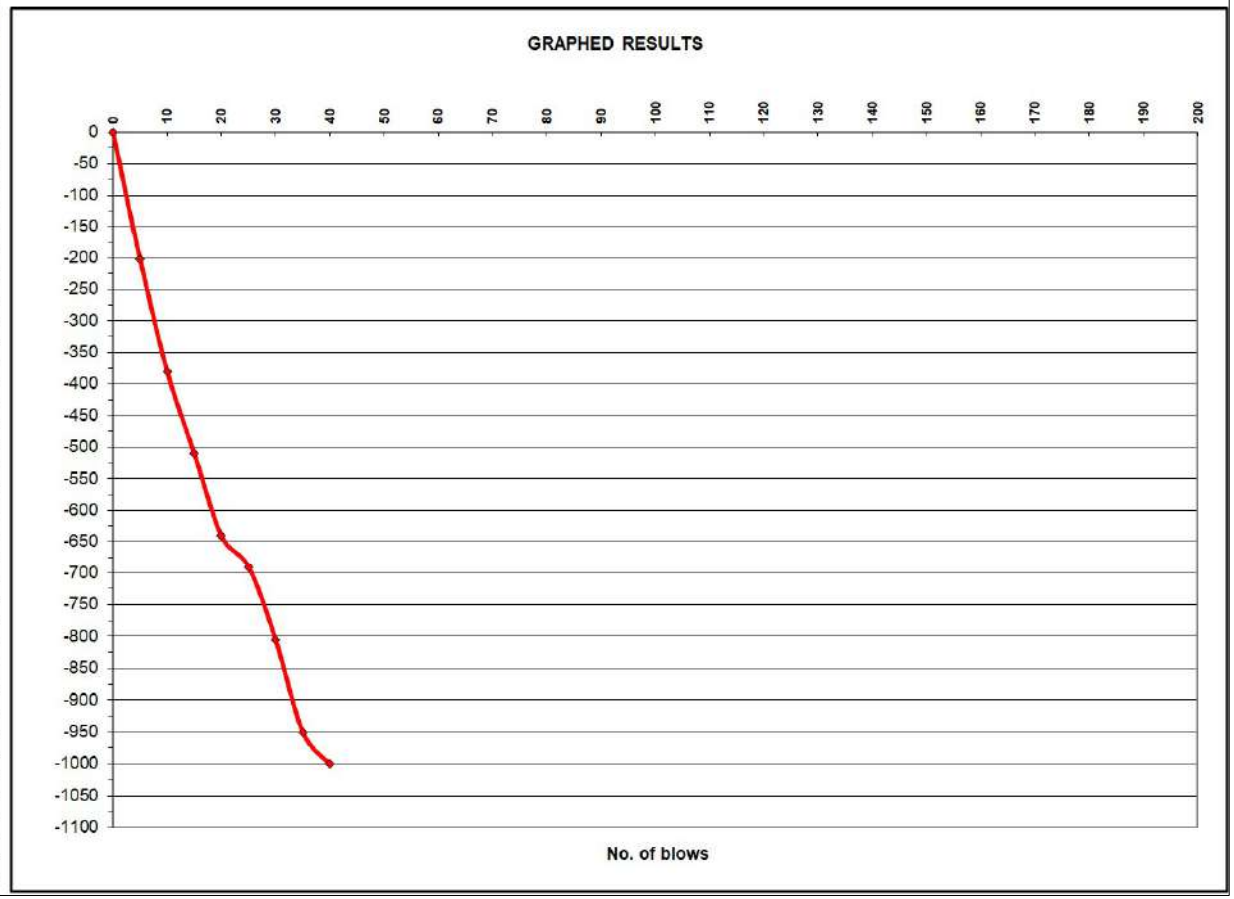

ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** Surface **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	SF 7				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	5	0	0,0		
5	130	-125	25,0	87	7
10	198	-193	13,6	169	15
15	218	-213	4,0	640	70
20	240	-235	4,4	577	62
25	270	-265	6,0	411	42
30	305	-300	7,0	348	35
35	330	-325	5,0	502	53
40	345	-340	3,0	876	102
45	355	-350	2,0	1362	170
50	370	-365	3,0	876	102
55	382	-377	2,4	1117	135
60	402	-397	4,0	640	70
65	430	-425	5,6	443	46
70	455	-450	5,0	502	53
75	490	-485	7,0	348	35
80	530	-525	8,0	301	29
85	548	-543	3,6	718	81
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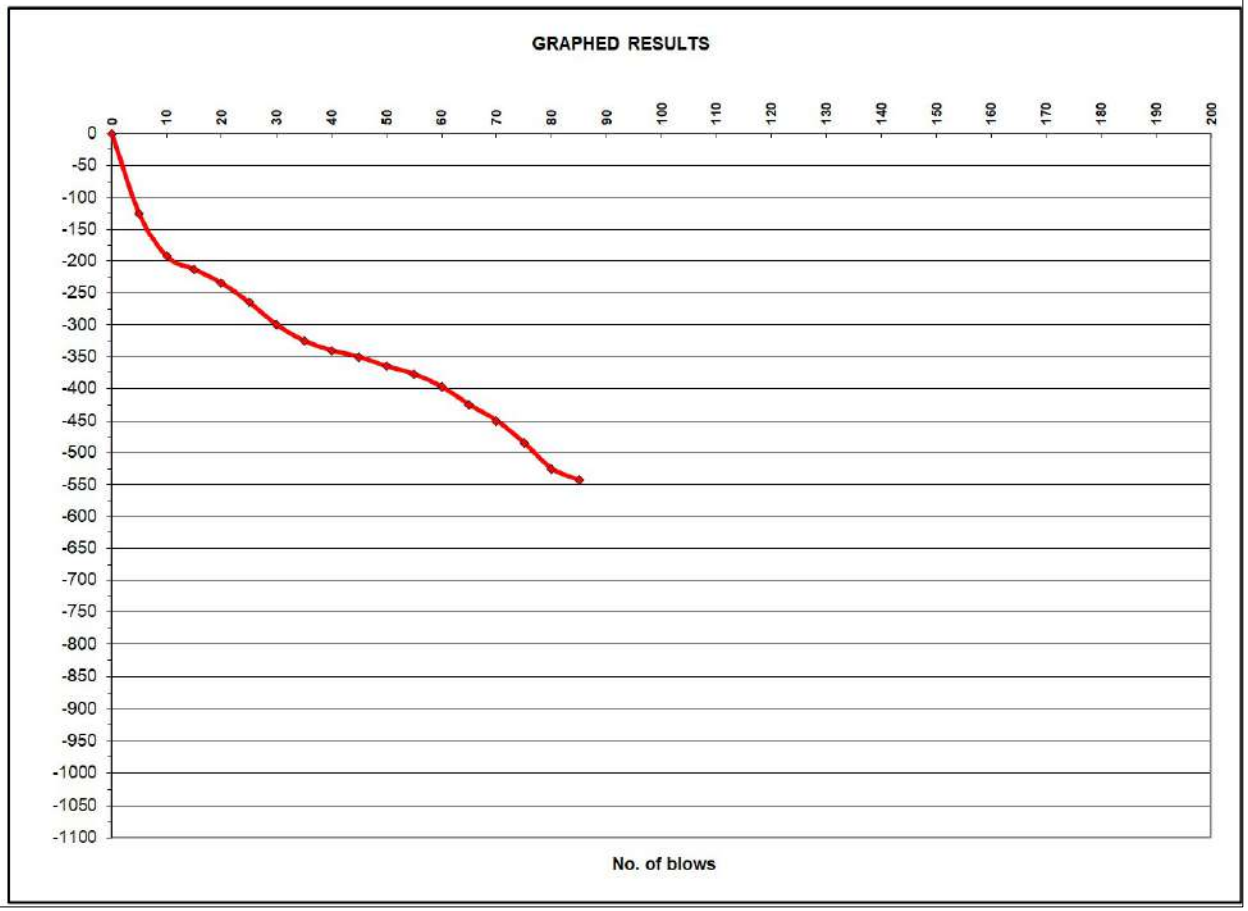

ANALYSES OF DYNAMIC CONE PENETRATION TEST RESULTS

PROJECT: GTEC - East London Port **DEPTH:** Surface **CONDUCTED ON:** Tuesday, 04 February 2025

NO. OF BLOWS	SF 8				
	Values (mm)	Cumulative penetration (mm)	mm/blow	UCS (kPa)	CBR
0	50	0	0,0		
5	100	-50	10,0	236	22
10	150	-100	10,0	236	22
15	210	-160	12,0	193	17
20	285	-235	15,0	152	13
25	400	-350	23,0	95	8
30	514	-464	22,8	96	8
35	640	-590	25,2	86	7
40	748	-698	21,6	102	8
45	771	-721	4,6	550	59
50	865	-835	22,8	96	8
55	925	-875	8,0	301	29
60	985	-935	12,0	193	17
65					
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APPENDIX D – LABORATORY TESTING CERTIFICATES

Labco Southern Africa (Pty) Ltd
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East London Branch – Unit 5 Evergreen Park, C/o B Road & Main Road, Beacon Bay
sanas T0787

MATERIALS TEST REPORT

Client	:	Ages Omega (Pty) Ltd	**Client Reference**	:	GTEC E24-091 DSP
Address	:	10 Sansom Road	**Order No.**	:	E24-091 DSP
	:	Vincent	**Report Status**	:	Complete
	:	East London	**Date Received**	:	06.02.2025 & 24.02.2025
	:	-	**Date Tested**	:	25.02.2025 - 17.03.2025
Attention	:	Malwande Busakwe	**Date Reported**	:	17.03.2025
E-mail	:	mbusakwe@ages-group.com	**Page**	:	1 of 8
Project	:	GTEC E24-091 DSP			
Job Card	:	E3017 \44382			9
Sampling Procedure(s):		SAMPLES COLLECTED BUT NOT SAMPLED			

Herewith please find the test report(s) pertaining to the above project. All tests were conducted in accordance with prescribed test method(s). Information herein consists of the following:

Test(s) conducted / Item(s) measured	Test Method(s)
Sieve Analysis	SANS 3001 - GR1
Hydrometer Analysis	SANS 3001 - GR3
Atterberg Limits	SANS 3001 - GR10
California Bearing Ratio	SANS 3001-GR40
Maximum Dry Density & Optimum Moisture Content	SANS 3001- GR30

Any test results contained in this report and marked with * in the table above are "not SANAS accredited" and are not included in the schedule of accreditation for this laboratory.

Any information contained in this test report pertain only to the areas and/or samples tested. Documents may only be reproduced or published in their full context.

While every care is taken to ensure that all tests are carried out in accordance with recognised standards, neither Labco Southern Africa (Pty) Ltd nor its employees shall be liable in any way whatsoever for any error made in the execution or reporting of tests or any erroneous conclusions drawn therefrom or for any consequences thereof.

All interpretations, Interpolations, Opinions and/or Classifications contained in this report falls outside our scope of accreditation.

The following parameters, where applicable, were excluded from the classification procedure: Chemical modifications, Additional fines, Fractured Faces, Soluble Salts, pH, Conductivity, Coarse Sand Ratio, Durability (COLTO: G4-G9).

The following parameters, where applicable, were assumed: Rock types were assumed to be of an Arenaceous nature with Siliceous cementing material.

Unless otherwise requested or stated, all samples will be discarded after a period of 3 months.

Sta

Any information gained by the laboratory prior, during or after the test process will be treated as confidential and will not be reproduced or disclosed to any person or organisation, unless required to do so by law.

Where the sample has been supplied by the customer the results apply to the sample as received.

**All results are authorized by technical signatories.

viat

Justin Tarr
Technical Signatory.

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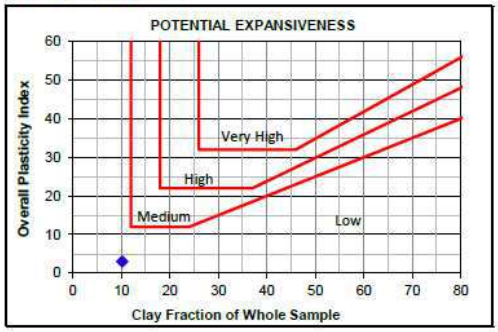
East London ■ Unit 5 Evergreen Park, Holmhill, c/o Main Road & B Road, Beacon Bay ■ PO Box 10114 Linton Grange 6015

Client:	Ages Omgea (Pty) Ltd	Date Received:	24.02.2025
Project:	GTEC E24-091 DSP	Date Reported:	17.03.2025
Job Card No:	E3017	Page No.:	2 of 9

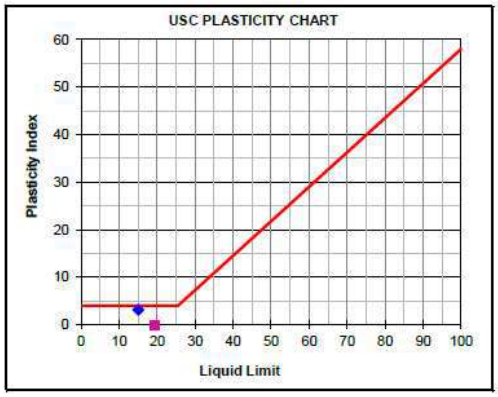
FOUNDATION INDICATOR

Laboratory Number		E3017/1 ◆	E3017/2 ■
Field Number		-	-
Client Reference		DS 1/1	DS 3/1
Depth (m)		-	-
Position		DS 1/1	DS 3/1
Coordinates	X		
	Y		
Visual Description		Dark Brown Silty Sand	Dark Brown Sand
Classification Description		Silty sand \ Silt-Clay Materials	Poorly graded sand \ silty sand \ Silt-Clay Materials
Stabilizing Agent			



Moisture Content & Relative Density

Moisture Content (%)	17.1	15.9
Relative Density (S.G.)		



Sieve Analysis (Wet Prep)

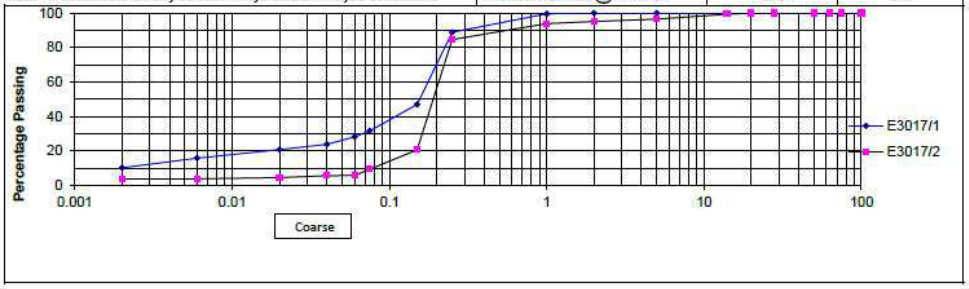
Percentage Passing	100 mm		
	75 mm		
	63 mm		
	50 mm		
	37.5 mm		
	28 mm		
	20 mm		100
	14 mm		99
	5 mm		96
	2 mm		95
	0.425 mm	100	94
	0.250 mm	89	85
	0.150 mm	47	21
	0.075 mm	32	9
Grading Modulus		0.69	1.02

Hydrometer Analysis

		-2.00 mm	-2.00 mm
Percentage Passing	0.060 mm	28	6
	0.040 mm	24	6
	0.020 mm	21	5
	0.006 mm	16	4
	0.002 mm	10	4
Gravel	%	0	5
Sand	%	72	89
Silt	%	18	2
Clay	%	10	4

Note: An assumed S.G. may be used in Hydrometer Analysis calculations

Laboratory Number		E3017/1 ◆	E3017/2 ■
Atterberg Limits			
Liquid Limit	%	15	19
Plasticity Index	%	3	NP
Linear Shrinkage	%	1.5	0.0
Overall PI	%	3	
Classifications			
HRB (AASHTO)		A-2-4(0)	A-3(0)
Unified (ASTM D2487)		SM	SP-SM
Weston Swell @ 1 kPa		0.0	0.1



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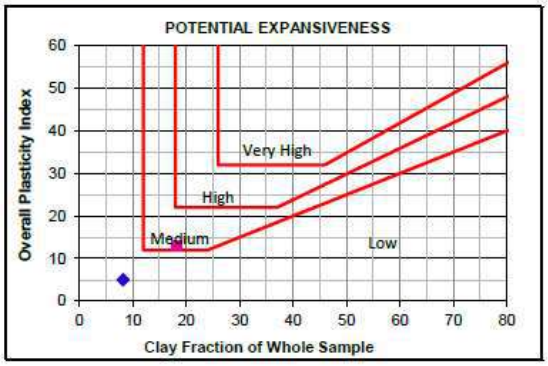
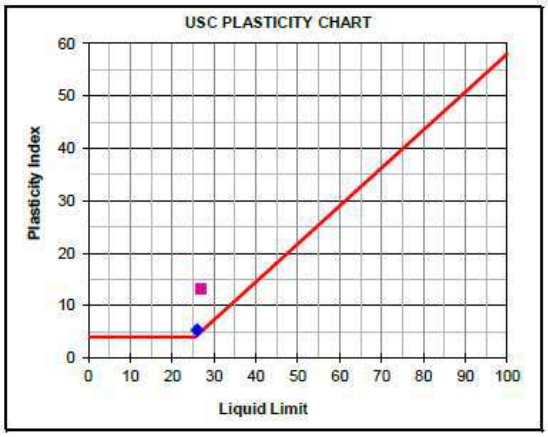
Client:	Ages Omgea (Pty) Ltd	Date Received:	24.02.2025
Project:	GTEC E24-091 DSP	Date Reported:	17.03.2025
Job Card No:	E3017	Page No.:	3 of 9

FOUNDATION INDICATOR

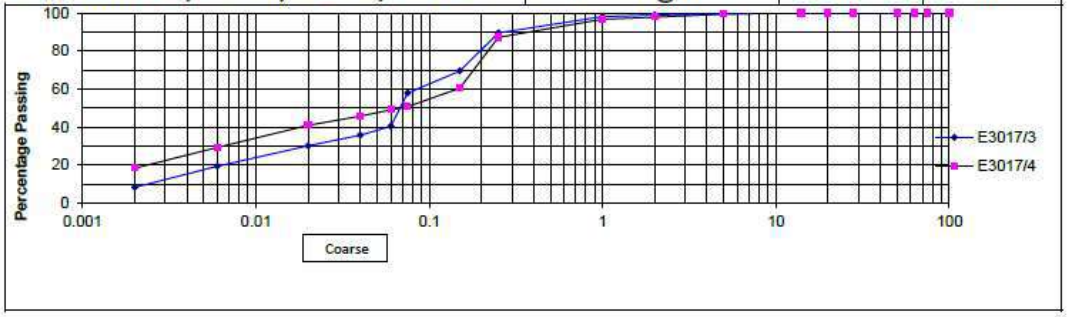
		E3017/3 ◆	E3017/4 ■
Laboratory Number		E3017/3 ◆	E3017/4 ■
Field Number		-	-
Client Reference		DS 4/1	RS 1/1
Depth (m)		-	-
Position		DS 4/1	RS 1/1
Coordinates	X		
	Y		
Visual Description		Dark Brown Silty Sand	Dark Brown Silty Sand
Classification Description		Clay of low plasticity \ silt \ Silt-Clay Materials	Clay of low plasticity \ Silt-Clay Materials
Stabilizing Agent			
Moisture Content & Relative Density			
Moisture Content (%)		16.0	11.9
Relative Density (S.G.)			
Sieve Analysis (Wet Prep)			
Percentage Passing	100 mm		
	75 mm		
	63 mm		
	50 mm		
	37.5 mm		
	28 mm		
	20 mm		
	14 mm		
	5 mm	100	100
	2 mm	99	98
	0.425 mm	98	97
	0.250 mm	90	87
	0.150 mm	70	60
	0.075 mm	58	51
Grading Modulus		0.45	0.55
Hydrometer Analysis		-2.00 mm	-2.00 mm
Percentage Passing	0.060 mm	40	49
	0.040 mm	36	46
	0.020 mm	30	41
	0.006 mm	19	29
	0.002 mm	8	18
Gravel	%	1	2
Sand	%	59	49
Silt	%	32	31
Clay	%	8	18

Note: An assumed S.G. may be used in Hydrometer Analysis calculations





Laboratory Number		E3017/3 ◆	E3017/4 ■
Atterberg Limits			
Liquid Limit	%	26	27
Plasticity Index	%	5	13
Linear Shrinkage	%	2.5	7.0
Overall PI	%	5	13
Classifications			
HRB (AASHTO)		A-4(1)	A-6(3)
Unified (ASTM D2487)		CL-ML	CL
Weston Swell @ 1 kPa		0.5	1.0



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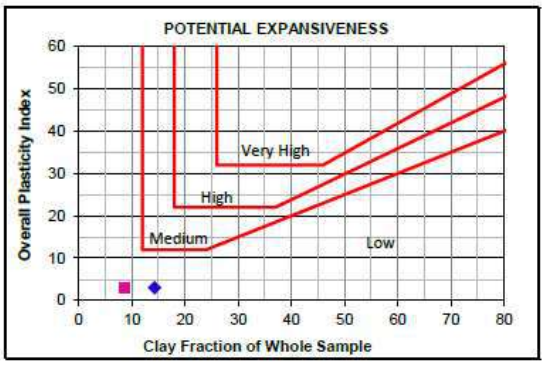
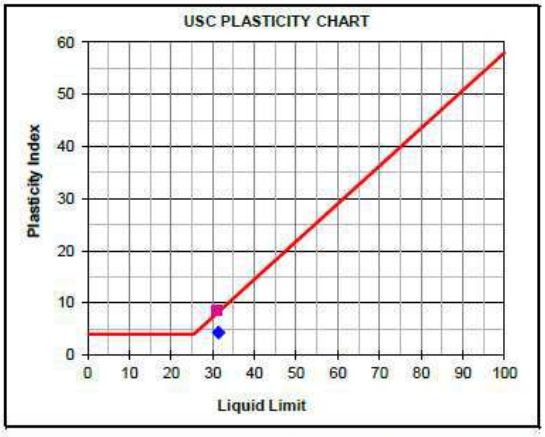
Client:	Ages Omgea (Pty) Ltd	Date Received:	24.02.2025
Project:	GTEC E24-091 DSP	Date Reported:	17.03.2025
Job Card No:	E3017	Page No.:	4 of 9

FOUNDATION INDICATOR

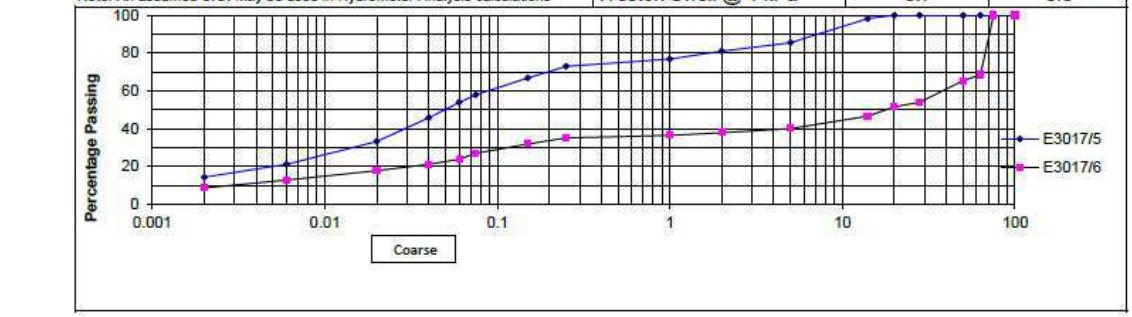
Laboratory Number		E3017/5 ◆	E3017/6 ■
Field Number		-	-
Client Reference		RS 3/1	SF 1/1
Depth (m)		-	-
Position		RS 3/1	SF 1/1
Coordinates	X		
	Y		
Visual Description		Yellow Orange Clayish Sand	Dark Brown Silty Sand
Classification Description		Silt \ Silt-Clay Materials	Clayey gravel \ Silt-Clay Materials
Stabilizing Agent			
Moisture Content & Relative Density			
Moisture Content (%)		12.4	10.1
Relative Density (S.G.)			
Sieve Analysis (Wet Prep)			
Percentage Passing	100 mm		
	75 mm		100
	63 mm		69
	50 mm		65
	37.5 mm		59
	28 mm		54
	20 mm	100	52
	14 mm	98	47
	5 mm	85	40
	2 mm	81	38
	0.425 mm	77	36
	0.250 mm	73	35
	0.150 mm	67	32
	0.075 mm	58	27
Grading Modulus		0.84	1.99
Hydrometer Analysis		-2.00 mm	-2.00 mm
Percentage Passing	0.060 mm	54	24
	0.040 mm	46	21
	0.020 mm	33	18
	0.006 mm	21	13
	0.002 mm	14	9
Gravel	%	19	62
Sand	%	27	14
Silt	%	40	15
Clay	%	14	9

Note: An assumed S.G. may be used in Hydrometer Analysis calculations





Laboratory Number		E3017/5 ◆	E3017/6 ■
Atterberg Limits			
Liquid Limit	%	31	31
Plasticity Index	%	4	9
Linear Shrinkage	%	2.0	4.0
Overall PI	%	3	3
Classifications			
HRB (AASHTO)		A-4(1)	A-2-4(0)
Unified (ASTM D2487)		ML	GC
Weston Swell @ 1 kPa		0.7	0.0



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Client:	Ages Omgea (Pty) Ltd	Date Received:	24.02.2025
Project:	GTEC E24-091 DSP	Date Reported:	17.03.2025
Job Card No:	E3017	Page No.:	5 of 9

FOUNDATION INDICATOR

Laboratory Number		E3017/7 ◆
Field Number		-
Client Reference		SF 8/1
Depth (m)		-
Position		SF 8/1
Coordinates	X	
	Y	
Visual Description		Light Brown Clayey Sand
Classification Description		Clayey sand \ Silt-Clay Materials
Stabilizing Agent		

Moisture Content & Relative Density

Moisture Content (%)	17.5
Relative Density (S.G.)	

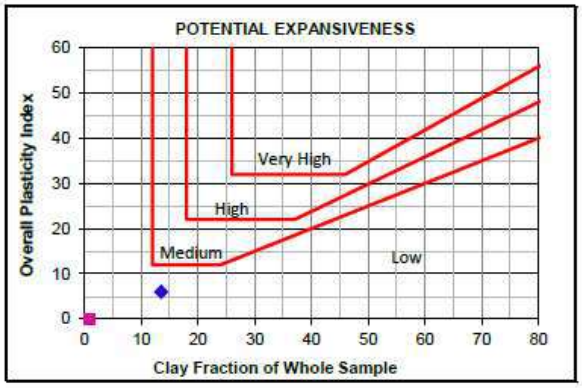
Sieve Analysis (Wet Prep)

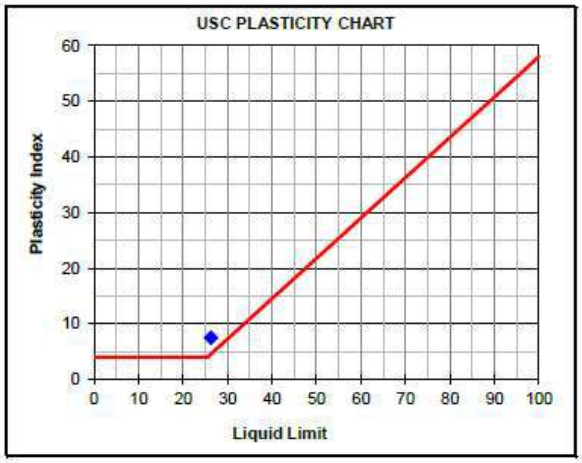
Percentage Passing	100 mm	
	75 mm	
	63 mm	
	50 mm	100
	37.5 mm	90
	28 mm	84
	20 mm	79
	14 mm	79
	5 mm	77
	2 mm	77
	0.425 mm	76
	0.250 mm	69
	0.150 mm	49
	0.075 mm	37
Grading Modulus		1.10

Hydrometer Analysis -2.00 mm -2.00 mm

Percentage Passing	0.060 mm	36
	0.040 mm	31
	0.020 mm	27
	0.006 mm	20
	0.002 mm	14
Gravel	%	23
Sand	%	41
Silt	%	22
Clay	%	14

Note: An assumed S.G. may be used in Hydrometer Analysis calculations

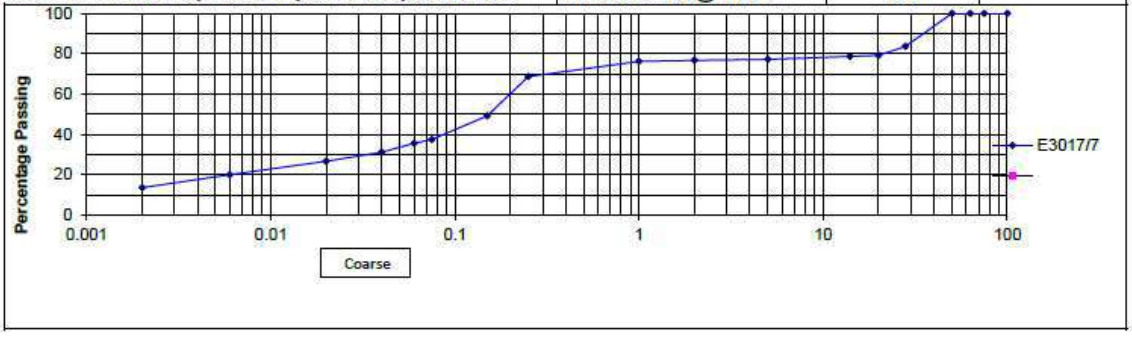




Laboratory Number		E3017/7 ◆	
Atterberg Limits			
Liquid Limit	%	26	
Plasticity Index	%	7	
Linear Shrinkage	%	3.5	
Overall PI	%	6	0

Classifications

HRB (AASHTO)	A-4(0)
Unified (ASTM D2487)	SC
Weston Swell @ 1 kPa	0.1



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East London ■ Unit 5 Evergreen Park, Holmhill, c/o Main Road & B Road, Beacon Bay ■ PO Box 10114 Linton Grange 6015

Client	: Ages Omega (Pty) Ltd	Date Received :	06.02.2025
Project	: GTEC E24-091 DSP	Date Reported :	17.03.2025
Job Card No:	E3017	Page No. :	6 of 1

CALIFORNIA BEARING RATIO (CBR) & ROAD INDICATOR REPORT

Laboratory No.		E3017/2 ◆	E3017/6 ■
Field Number		-	-
Client Reference		DS 3/1	SF 1/1
Depth (m)			
Position		DS 3/1	SF 1/1
Coordinates	X		
	Y		
Description		Dark Brown Sand	Dark Brown Silty Sand
Additional information			
Calcrete/Crushed			
Stabilizing Agent			

Sieve Analysis (Wet preparation)

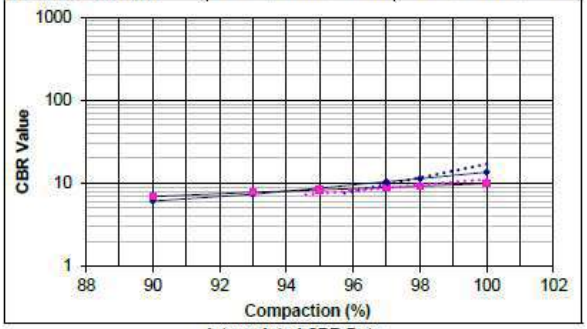
Percentage Passing	100 mm		
	75 mm		100
	63 mm		69
	50 mm		65
	37.5 mm		59
	28 mm		54
	20 mm	100	52
	14 mm	99	47
	5 mm	96	40
	2 mm	95	38
	1 mm	95	38
	0.425 mm	94	36
	0.075 mm	9	27
Grading Modulus		1.02	1.99

Soil Mortar Analysis

Coarse Sand	1	4
Coarse Fine Sand	10	4
Medium Fine Sand	67	8
Fine Fine Sand	12	13
Silt and Clay	10	71

Atterberg Limits	<0.425mm	<0.425mm
Liquid Limit (%)	19	31
Plasticity Index (%)	NP	9
Linear Shrinkage (%)	0.0	4.0

Laboratory No.		E3017/2 ◆			E3017/6 ■		
Maximum Dry Density & Optimum Moisture Content							
MDD	kg/m³	1863			1811		
OMC	%	12.6			15.2		
California Bearing Ratio							
Compaction Data							
Moisture	%	12.4			15.1		
Dry Density	kg/m³	1875	1792	1714	1816	1717	1627
Compaction	%	100.0	95.5	91.4	100.0	94.6	89.6
Penetration Data							
CBR at	2.50 mm	17	7	6	11	7	7
	5.00 mm	23	10	8	11	8	6
	7.50 mm	27	16	9	11	8	7
Swell @ 96hrs (%)		0.0	0.0	0.0	0.4	0.5	0.6
Final Moisture (%)		15.3	16.7	18.0	24.7	27.8	32.7

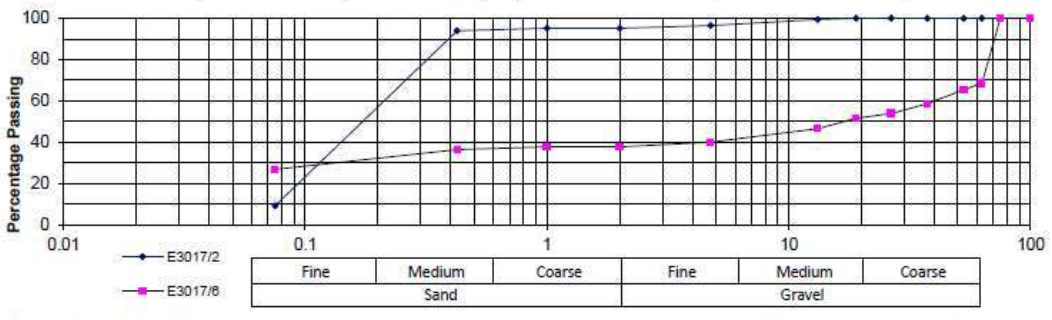


Interpolated CBR Data

CBR	@ 100%	Mod. AASHTO	14	10
	@ 98%		11	9
	@ 97%		10	9
	@ 95%		9	8
	@ 93%		7	8
	@ 90%		6	7
	@ SANS3001 Midpoint		11	9

Classifications

HRB (AASHTO)	A-3(0)	A-2-4(0)
COLTO*	G9	G9
TRH14*	G10	G10



*The Colto / TRH 14 Classifications are only based on the above results. Further testing may be required

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Client	: Ages Omega (Pty) Ltd	Date Received :	06.02.2025
Project	: GTEC E24-091 DSP	Date Reported :	17.03.2025
Job Card No:	E3017	Page No. :	7 of 1

CALIFORNIA BEARING RATIO (CBR) & ROAD INDICATOR REPORT

Laboratory No.		E3017/8 ◆	E3017/9 ■
Field Number		-	-
Client Reference		DS 1/2	RS 1/2
Depth (m)			
Position		DS 1/2	RS 1/2
Coordinates	X		
	Y		
Description		Light Brown Clayish Sand	Light Brown Clayish Sand
Additional information			
Calcrete/Crushed			
Stabilizing Agent			

Sieve Analysis (Wet preparation)

Percentage Passing	100 mm	100	100
	75 mm	91	100
	63 mm	86	97
	50 mm	80	87
	37.5 mm	80	82
	28 mm	79	73
	20 mm	79	70
	14 mm	78	65
	5 mm	77	53
	2 mm	76	50
	1 mm	76	50
	0.425 mm	76	48
	0.075 mm	29	35
Grading Modulus		1.19	1.67

Soil Mortar Analysis

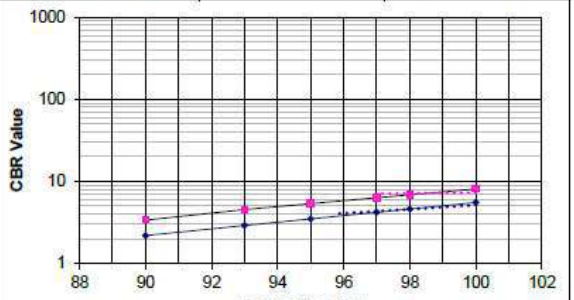
Coarse Sand	1	5
Coarse Fine Sand	13	4
Medium Fine Sand	39	11
Fine Fine Sand	11	10
Silt and Clay	38	70

Atterberg Limits	<0.425mm	<0.425mm
Liquid Limit (%)	22	26
Plasticity Index (%)	9	8
Linear Shrinkage (%)	4.0	4.0

Laboratory No.		E3017/8 ◆	E3017/9 ■
Maximum Dry Density & Optimum Moisture Content			
MDD	kg/m³	1997	2009
OMC	%	11.2	10.0

California Bearing Ratio

Compaction Data							
Moisture	%	11.3			9.9		
Dry Density	kg/m³	1984	1900	1798	2018	1960	1867
Compaction	%	100.0	95.8	90.6	100.0	97.1	92.5
Penetration Data							
CBR at	2.50 mm	5	4	2	7	7	4
	5.00 mm	5	4	2	9	8	4
	7.50 mm	5	4	2	10	8	4
Swell @ 96hrs (%)		0.5	0.5	0.6	0.4	0.6	0.6
Final Moisture (%)		14.5	17.3	19.8	12.3	14.5	15.8

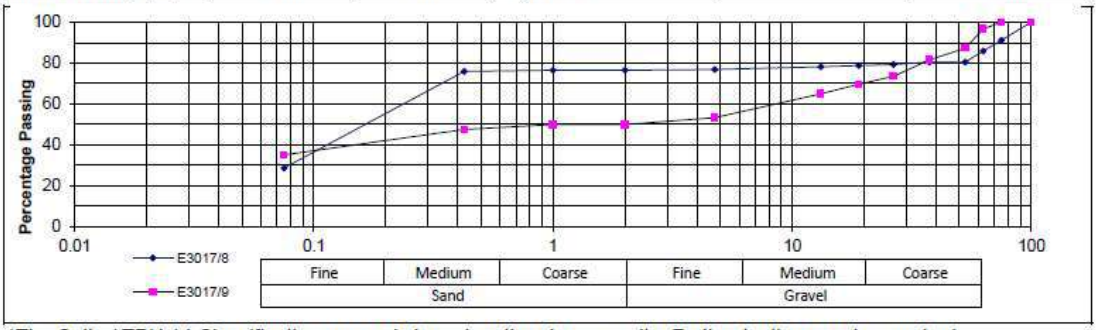


Interpolated CBR Data

CBR Mod. AASHTO			
@	100%	6	8
@	98%	5	7
@	97%	4	6
@	95%	3	5
@	93%	3	5
@	90%	2	3
@	SANS3001 Midpoint	5	7

Classifications

HRB (AASHTO)	A-2-4(0)	A-4(0)
COLTO*		
TRH14*		G10



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Project	: GTEC E24-091 DSP	Date Reported :	17.03.2025
Job Card No:	E3017	Page No. :	8 of 1

CALIFORNIA BEARING RATIO (CBR) & ROAD INDICATOR REPORT

Laboratory No.		E3017/10 ◆	E3017/11 ■
Field Number		-	-
Client Reference		SF 4/1	SF 8/2
Depth (m)			
Position		SF 4/1	SF 8/2
Coordinates	X		
	Y		
Description		Yellow Orange Clayish Sand	Yellow Brown Clayish Sand
Additional information			
Calcrete/Crushed			
Stabilizing Agent			

Sieve Analysis (Wet preparation)

Percentage Passing	100 mm	100	
	75 mm	76	
	63 mm	73	100
	50 mm	59	98
	37.5 mm	53	94
	28 mm	44	89
	20 mm	39	80
	14 mm	36	74
	5 mm	28	62
	2 mm	26	59
	1 mm	26	59
	0.425 mm	24	58
	0.075 mm	17	49
Grading Modulus		2.33	1.33

Soil Mortar Analysis

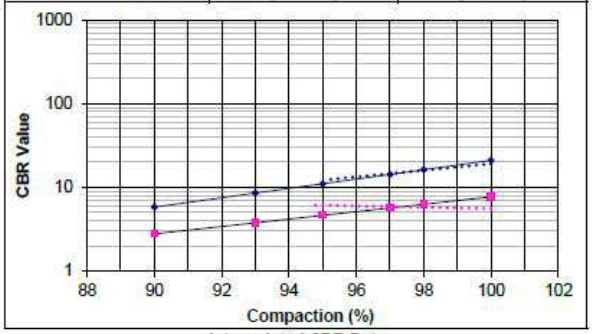
Coarse Sand	5	2
Coarse Fine Sand	5	1
Medium Fine Sand	13	4
Fine Fine Sand	11	11
Silt and Clay	66	83

Atterberg Limits	<0.425mm	<0.425mm
Liquid Limit (%)	27	32
Plasticity Index (%)	6	6
Linear Shrinkage (%)	3.0	3.0

Laboratory No.		E3017/10 ◆	E3017/11 ■
Maximum Dry Density & Optimum Moisture Content			
MDD	kg/m^3	2013	1934
OMC	%	10.4	11.4

California Bearing Ratio

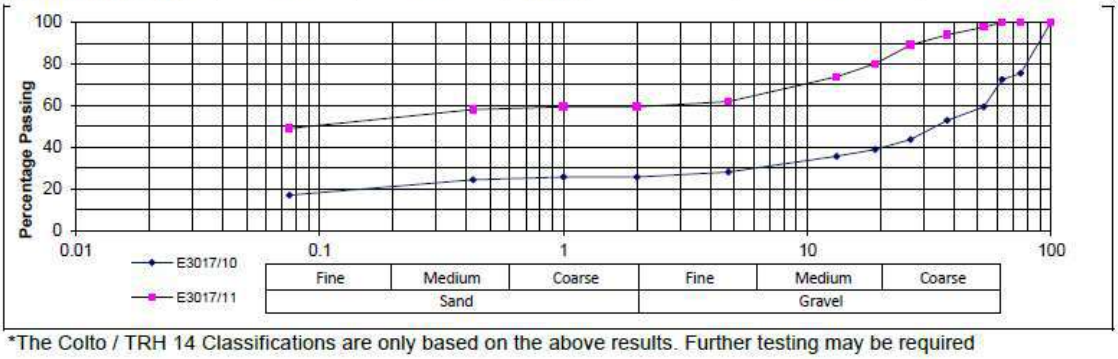
Compaction Data							
Moisture	%	10.3			11.4		
Dry Density	kg/m^3	2016	1918	1816	1937	1833	1742
Compaction	%	100.0	95.1	90.1	100.0	94.6	89.9
Penetration Data							
CBR at	2.50 mm	19	12	6	6	6	3
	5.00 mm	25	15	7	7	7	3
	7.50 mm	27	15	7	8	8	3
Swell @ 96hrs (%)		0.5	0.5	0.4	0.6	0.5	0.6
Final Moisture (%)		14.6	16.9	18.6	15.5	16.8	18.2



Interpolated CBR Data

CBR	@ 100%	Mod. AASHTO	21	8
	@ 98%		16	6
	@ 97%		14	6
	@ 95%		11	5
	@ 93%		9	4
	@ 90%		6	3
	@ SANS3001 Midpoint		15	6

Classifications		
HRB (AASHTO)	A-2-4(0)	A-4(1)
COLTO*	G9	
TRH14*	G10	G10



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forestry, fisheries
& the environment

Department:
Forestry, Fisheries and the Environment
REPUBLIC OF SOUTH AFRICA

Private Bag X447, Pretoria, 0001, Environment House, 473 Steve Biko Road, Pretoria, 0002 Tel: +27 12 399 9000, Fax: +27 86 625 1042

SPECIALIST DECLARATION FORM – AUGUST 2023

Specialist Declaration form for assessments undertaken for application for authorisation in terms of the National Environmental Management Act, Act No. 107 of 1998, as amended and the Environmental Impact Assessment (EIA) Regulations, 2014, as amended (the Regulations)

REPORT TITLE

Geotechnical investigation in support of feasibility study for the proposed Solar Powered Desalination plant and related infrastructure at the East London Harbour, Buffalo City Metropolitan Municipality, Eastern Cape

Kindly note the following:

1. This form must always be used for assessment that are in support of applications that must be subjected to Basic Assessment or Scoping & Environmental Impact Reporting, where this Department is the Competent Authority.
2. This form is current as of August 2023. It is the responsibility of the Applicant / Environmental Assessment Practitioner (EAP) to ascertain whether subsequent versions of the form have been published or produced by the Competent Authority. The latest available Departmental templates are available at https://www.dffe.gov.za/documents/forms.
3. An electronic copy of the signed declaration form must be appended to all Draft and Final Reports submitted to the department for consideration.
4. The specialist must be aware of and comply with *'the Procedures for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the act, when applying for environmental authorisation - GN 320/2020)'*, where applicable.

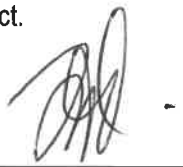
1. SPECIALIST INFORMATION

Title of Specialist Assessment	Geotechnical investigation
Specialist Company Name	AGES Omega (Pty) Ltd
Specialist Name	Mr. Frederick De Jager
Specialist Identity Number	7703225098088
Specialist Qualifications:	BSc Honors Engineering Geology
Professional affiliation/registration:	Pr.Sci.Nat; Member of SAIEG
Physical address:	10 Sansom Road, Berea, East London
Postal address:	Postnet 203; PBag X9063, East London
Postal address	5200
Telephone	0437262070
Cell phone	Click or tap here to enter text.
E-mail	omega@ages-group.com

2. DECLARATION BY THE SPECIALIST

I, Mr. Frederick De Jager declare that –

- I act as the independent specialist in this application;
- I am aware of the procedures and requirements for the assessment and minimum criteria for reporting on identified environmental themes in terms of sections 24(5)(a) and (h) and 44 of the National Environmental Management Act (NEMA), 1998, as amended, when applying for environmental authorisation which were promulgated in Government Notice No. 320 of 20 March 2020 (i.e. "the Protocols") and in Government Notice No. 1150 of 30 October 2020.
- I will perform the work relating to the application in an objective manner, even if this results in views and findings that are not favourable to the applicant;
- I declare that there are no circumstances that may compromise my objectivity in performing such work;
- I have expertise in conducting the specialist report relevant to this application, including knowledge of the Act, Regulations and any guidelines that have relevance to the proposed activity;
- I will comply with the Act, Regulations and all other applicable legislation;
- I have no, and will not engage in, conflicting interests in the undertaking of the activity;
- I undertake to disclose to the applicant and the competent authority all material information in my possession that reasonably has or may have the potential of influencing –
    - any decision to be taken with respect to the application by the competent authority; and;
    - the objectivity of any report, plan or document to be prepared by myself for submission to the competent authority;
- All the particulars furnished by me in this form are true and correct; and
- I realise that a false declaration is an offence in terms of Regulation 48 and is punishable in terms of section 24F of the NEMA Act.



Signature of the Specialist

AGES Omega (Pty) Ltd

Name of Company:

22 May 2025

Date

3. UNDERTAKING UNDER OATH/ AFFIRMATION

I, _ Mr. Frederick De Jager_____, swear under oath / affirm that all the information submitted or to be submitted for the purposes of this application is true and correct.

Signature of the Specialist

AGES Omega (Pty) Ltd

Name of Company

22 May 2025

Date

CERTIFIED TRUE COPY OF THE ORIGINAL
THERE ARE NO INDICATIONS THAT THE ORIGINAL DOCUMENT HAS BEEN ALTERED BY UNAUTHORISED PERSONS
NOLUBABALO HANNAH NTUNZI
COMMISSIONER OF OATHS
ENVIRONMENTAL SCIENTIST - AGES OMEGA (PTY) LTD
18 SAUNDERS AVENUE, EAST LONDON, 5247
DATE: 22/05/2025

Click or tap here to enter text.

Signature of the Commissioner of Oaths

22 May 2025

Date

AGES Omega (Pty) Ltd

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Tel: +27 43 726 2070 | Email: omega@ages-group.com

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***LEVEL 2 B-BBEE* | Value-Adding Supplier**
CIDB 6CE

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130 Adelaide Thambo Drive,
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AGES Group Offices: *North West Eastern Cape Western Cape Limpopo Gauteng KwaZulu-Natal Northern Cape*

AGES
Purpose with Passion

CURRICULUM VITAE

FREDERICK NIKOLAAS DE JAGER

NAME OF STAFF MEMBER	: FREDERICK NIKOLAAS DE JAGER
IDENTITY NUMBER	: 7703225098088
PROFESSION	: PRINCIPAL ENGINEERING & ENVIRONMENTAL GEOLOGIST
POSITION IN FIRM	: DIRECTOR AGES OMEGA (PTY) LTD
DATE OF BIRTH	: 22 MARCH 1977
YEARS WITH FIRM	: 24 YEARS
YRS RELEVANT EXPERIENCE	: 25 YEARS
DRIVERS LICENCE	: CODE EB & CODE A
NATIONALITY	: SOUTH AFRICAN

MEMBERSHIP(S) IN PROFESSIONAL SOCIETIES

- South African Council for Natural Scientific Professions (SACNASP - 4001 77/06)
- South African Institute for Engineering Geologists (SAIEG – 09/240)
- National Home Builders Registration Council (NHBRC – 3000154338)
- Member of the Eastern Cape Groundwater Division of the Geological Society South-Africa

Frederick Nikolaas De Jager is a registered Professional Natural Scientist with the South African Council of Natural Scientific Professions, with 25 years' experience in geotechnical, geohydrological and geo-environmental investigations within South Africa. He specializes in Engineering Geology and Environmental Geology, comprising both geotechnical and geohydrological inputs. Mr. De Jager is one of the directors of the AGES Omega office.

Mr. De Jager has been based in the Eastern Cape Province for the last 24 years and has extensive experience on all geological conditions encountered within the province, obtained from geotechnical projects ranging from feasibility studies and preliminary investigations, reserve and desktop studies, geological and groundwater exploration and development, geotechnical investigations, groundwater water quality management, water and sanitation projects, roads, landfill and waste sites etc. He was and is also actively involved in RDP housing projects, detailed civil structures, shopping centres, dams, bridges and many more.

DETAILED TASKS ASSIGNED

- Project definition, management & co-ordination
- Conduct geotechnical investigations
- Conduct geo-environmental investigations
- Conduct forensic geotechnical investigations
- Conduct slope stability assessment & monitoring
- Construction Supervision
- Pre-construction consultation
- On-site hazard & risk assessments with mitigation recommendations
- Contractor training and supervision
- Mentoring of young professionals in AGES Omega and on applicable projects
- Data analyses, interpretation, and verification
- Comprehensive and Concise Report writing
- Manager of the Geotechnical Unit in AGES Omega
- Financial Director at AGES Omega

KEY QUALIFICATIONS

- Engineering Geology
- Environmental Geology
- Hydrogeological Studies & Investigations
- Geotechnical site investigations for low-cost housing in urban and rural environments – GFSH-2 & SANS 634:2012 Preliminary Investigations, Phase 1 Investigations and Phase 2 Investigations.
- Geographic Information Systems (GIS) data management & map compilation
- Geo-environmental investigations for potential of contamination to soils and groundwater
- Groundwater feasibility studies & potential determination - Eastern Cape Aquifers
- Geotechnical inputs for sanitation investigations – regional and site-specific approaches
- Geo-Environmental assessments at proposed cemetery sites, Wastewater treatment works, landfill sites, etc.
- Feasibility studies for developments on geotechnical, geohydrological and geo-environmental aspects.
- Geotechnical site investigations for large structures and developments e.g. shopping malls, bridges, reservoirs, dams, hard rock quarries, roads, multi-storey structures, water reticulation and storage etc.
- Project management & Administration
- Hydrogeological & Geotechnical project planning and management

EDUCATION

B.Sc Hons (Engineering Geology)	University of Pretoria	2000
B.Sc (Environmental & Engineering Geology)	University of Pretoria	1999

LATEST COURSES ATTENDED	: SAIEG – 2 Day Workshop on Engineering Geology in Practice 2023
	: SAIEG – 2 Day Workshop on Site Investigation, In-Situ Testing and Laboratory Assessments 2022
	: Multiple short courses for SACNASP Accreditation
	: Slope & Foundation Design Workshop, Global Prospectus
GEOLOGICAL SOFTWARE	: Dips 8; ArcView 3.2; PLANET GIS, SURFER, LOGPLOT,
MICROSOFT PACKAGE	: Microsoft Office 365

EMPLOYMENT RECORD

DATE	ORGANISATION	POSITION
2004 TO DATE	AGES OMEGA (PTY) LTD	PRINCIPAL ENGINEERING GEOLOGIST & DIRECTOR
2001 TO 2003	SA GeoConsultants (PTY) LTD	PROJECT ENGINEERING GEOLOGIST
2000	GEOTECH AFRICA – NAMIBIA	QUALIFIED ENGINEERING GEOLOGIST
1998 TO 2000	UNIVERSITY OF PRETORIA- DEPT OF GEOLOGY	PART-TIME GEOTECHNICAL FIELD ASSISTANT

LANGUAGE PROFICIENCY

	SPEAK	READ	WRITE
AFRIKAANS	EXCELLENT	EXCELLENT	EXCELLENT
ENGLISH	EXCELLENT	EXCELLENT	EXCELLENT

CERTIFICATION

I, the undersigned, certify that to the best of my knowledge and belief, this information provided correctly describes me, my qualifications, and my experience. I also certify that I have only given permission for my CV to be included in the tender submission.

.....

Mr F N De Jager (Pr.Sci.Nat