NARACOOPA MINERAL SANDS PTY LTD

EXPLORATION LICENCE 25/2007

ANNUAL REPORT

REPORTING PERIOD: 1 JULY 2018 TO 3 APRIL 2021

Datum: GDA94

Publication Date: 30 June 2021

Van Diemen CONSULTING PO BOX 1 NEW TOWN TAS 7008

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Revision	Author	Reviewer and Organisation	Date
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2	R Barnes C McCoull	Naracoopa Mineral Sands Pty Ltd	7-7-2021

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STATEMENT BY OPERATOR

This Annual Report 2018 – 2021 for EL 25/2007 has been prepared by Van Diemen Consulting Pty Ltd on behalf of Naracoopa Mineral Sands Pty Ltd (NMS).

It covers the period 1 July 2018 to 3 April 2021.

Naracoopa Mineral Sands Pty Ltd acknowledge the contents of this Report are true and correct to the best of their knowledge.

Name M. I. M. ALI Date 07-07-2021

Position Director

Signature

Name K-H Kin Tsoi Date 11.07.2021

Position Director

Signature

DEFINITION OF TERMS/ABBREVIATIONS

DPIPWE	Department of Primary Industries, Parks, Water and Environment
EL	Exploration Licence
EMPCA	*Environmental Management and Pollution Control Act 1994*
EPA	Environment Protection Authority
EPG(s)	Environment Protection Guidelines provided in Appendix A of the report NARACOOPA MINERAL SANDS PTY LTD, EL 25/2007 DRILLING PROGRAM 2018-19, ENVIRONMENTAL MITIGATION MEASURES, 26 MARCH 2018
ML	Mining Lease
MRDA	*Mineral Resources Development Act 1995*
MRT	Mineral Resources Tasmania

TERMS

Annual Report	The document 'Naracoopa Mineral Sands Pty Ltd – Exploration Licence 25/2007 Annual Report 2018 – 2021'
(the) Code	Mineral Exploration Code of Practice (Fifth Edition - 2012).
Exploration Program	The exploration program approved by MRT on 3 October 2018 - Reference Number: WPA18/30. Land Tenure: Authority Land, Conservation Area, Crown Land, Private Parcel, Public Reserve, Ramsar Wetlands, State Reserve.
EL25/2007	Exploration Licence 25/2007
Lines	The drill lines identified in Figure 4 of Attachment 1
Reporting Guidelines	Reporting Guidelines - Guidelines for the production and submission of reports on mineral tenements, Department of State Growth, March 2020

PREFACE

THE EXPLORER AND EXPLORATION LICENCE

The exploration licence (EL 25/2007, the EL) is held by NARACOOPA MINERAL SANDS PTY LTD (ACN 129 964 343) which also holds Mining Leases 2103P/M and 2M/2017.

EL 25/2007 covers an area of 77 square kilometres between the Naracoopa Sand Mine Northern and Southern Deposits of ML 2103P/M, and also overlaps a large area of Sea Elephant Bay (Figure 1). Some of the land proposed for land based drilling is owned by the Crown (see Figure 2), with the remainder being privately owned.

THE EXPLORATION PROGRAM

An Exploration Program was developed using recommended drill line locations identified from a Geophysical Works Program completed in 2017. The Exploration Program proposed the drilling of 682 holes on 27 drill lines and was approved by MRT.

REPORTING GUIDELINES

The purpose of the Reporting Guidelines is to assist the holders of licences and leases in Tasmania with the preparation and submission of reports on exploration and or mining activity in accordance with reporting requirements detailed in the *Mineral Resources Development Act 1995* (the Act).

The requirements for the submission of reports are in place so that exploration and mining activities can be effectively monitored, assessed, and all data obtained can be captured.

STRUCTURE OF THE ANNUAL REPORT

The Annual Report contains the following components –

Part A *Introduction* to the exploration program including the exploration rationale (objective), lease and/or licence number, name, and location, reporting period, tenement holder, ownership of the licence/lease, including joint venture details and title transfers.

Part B *Review of previous work* including exploration conducted during the life of the licence or lease.

Part C *Exploration completed during the reporting period* including regional exploration activities and prospect-based exploration activities.

Part D *Discussion of results* including drilling.

Part E *Conclusions* including recommendations.

Part F *Further exploration* including the proposed work program for the following year.

Part G *Environmental Management* proposed for the activity to avoid or mitigate potential environmental impacts from the activity.

Part H *Expenditure* associated with the implementation of the exploration program.

Part I *References* cited in the Annual Report.

Part J *Attachments* referenced in the Annual Report including maps.

PART A - INTRODUCTION

A.1 LOCATION OF EXPLORATION LICENCE

Exploration licence EL 25/2007 (the EL) covers an area of 77 square kilometres between the Naracoopa Sand Mine Northern and Southern Deposits in ML 2103P/M, and also overlaps a large area of Sea Elephant Bay (Figure 1).

Some of the land proposed for land based drilling is owned by the Crown (see Figure 2), with the remainder being privately owned.

The northern-most tip of the exploration licence covers part of the Lavinia State Reserve. The Lavinia Point-Cowper Point dune system and the Sea Elephant Conservation Area inytersect the northern part of the EL. The Eldorado Conservation Area overlaps the central portion of the EL; the Naracoopa Blowhole Geoconservation Area and the coastline along the bay is a Public Reserve.

The sea-based EL starts at Fraser Bluff, extending northward past Naracoopa towards (but not including) Cowper Point and Councillor Island, and extends 3 nautical miles (within State waters) off the coast of King Island, from Fraser Beach and over Sea Elephant Bay.

A.2 EXPLORATION LICENCE HOLDER

The holder of the Exploration Licence is –

NARACOOPA MINERAL SANDS PTY LTD (ACN 129 964 343)

LEVEL 14, 140 WILLIAM STREET

MELBOURNE VIC 3000

A.3 REPORTING PERIOD

The reporting period is 1 July 2018 to 3 April 2021.

A.4 REPORTING DATUM

GDA94 is the datum used in this report.

A.5 EXPLORATION OBJECTIVE

A.5.1 Background

The heavy mineral sand deposits at Naracoopa can be attributed to three different sea levels forming: Lanherne Beach (11m), Milford Beach (2m) and the present-day Sea Beach (0m). The deposits appear to have been derived from the Precambrian metamorphics and igneous intrusives which are the basement rocks for most of the area drained by the Fraser and Sea Elephant Rivers, with a gabbro, southwest of Naracoopa, the probable source of the chromite and ilmenite which are usually sparse in metamorphic rocks.

The resultant heavy minerals carried by the Fraser and Sea Elephant Rivers have been distributed and deposited by ocean tides and currents.

Heavy mineral deposits of a concentration suited to mineral extraction in EL25/2007 are likely to occur in sand dunes which -

1. mainly consist of light well sorted quartz bodies and associated heavy mineral concentrated patches;
2. layers along buried beach strand lines and dunes.

A geophysical exploration program to identify areas of sufficient magnetic anomaly (geophysics) to warrant further investigation by invasive means (i.e., drilling) was approved in 2017 by MRT. The geophysical exploratory works program was conducted, and report prepared (Gamage *et al.* 2018). The report contained as an output a recommended drilling program to explore those areas where buried heavy minerals may occur in commercially viable quantities for extraction, based on the interpretation of geophysical magnetic anomaly.

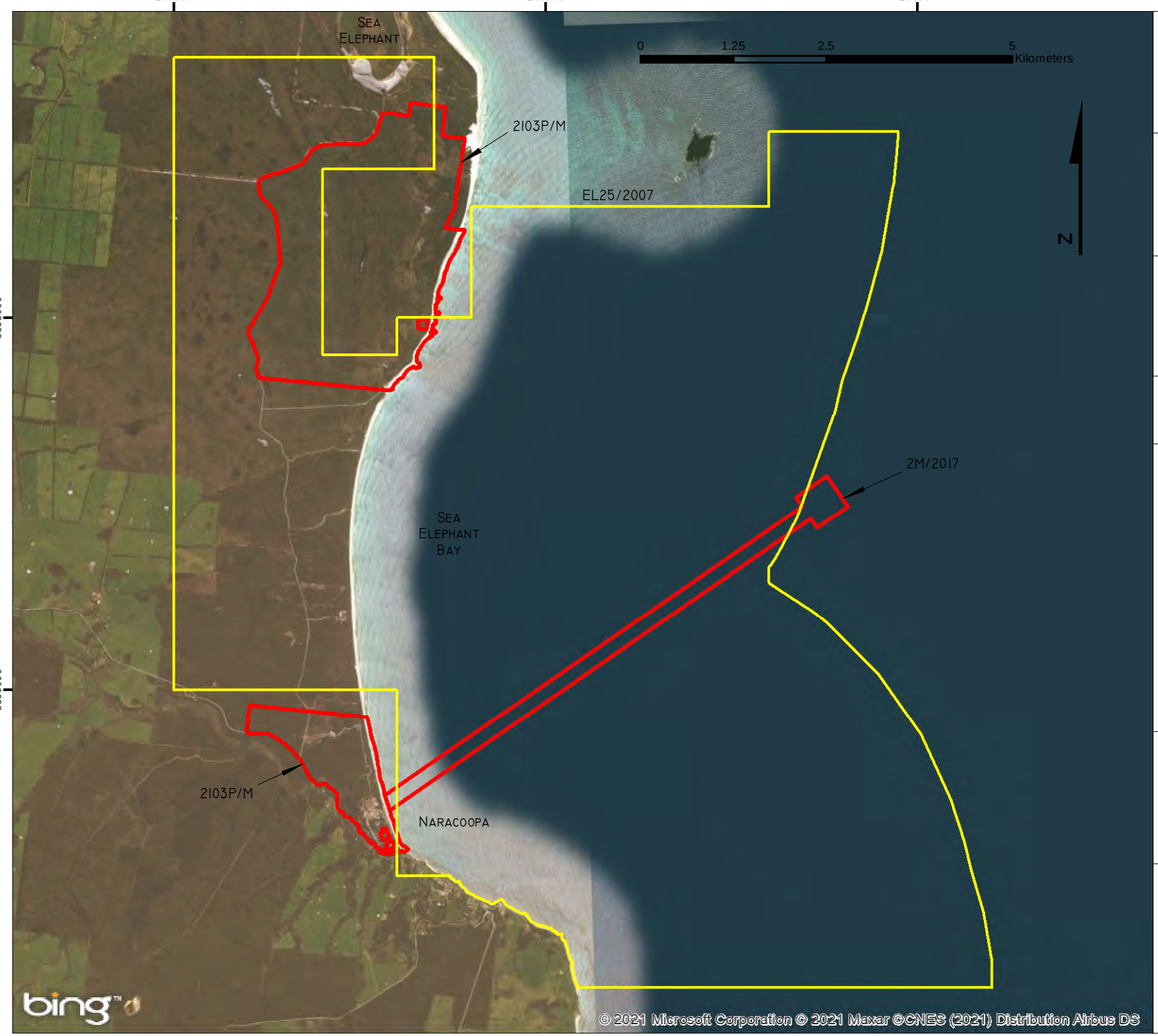
A.5.2 Approved Exploration Program

An Exploration Program was submitted to and subsequently approved by MRT on 3 October 2018 with conditions (see Attachment 1). The program was based on the recommended drilling program of Gamage *et al.* (2018). Until this approval, and the implementation of Exploration Program, there had been no ground-disturbance exploration works conducted in EL25/2007 by the current tenement holder.

A.5.3 Implementation of the Exploration Program

The Exploration program (primarily the drilling component) was scheduled for 2018 – start date of April – May 2018.

The timeline of the program and the tasks associated with each is provided in Attachment 3.



NARACOOPA MINERAL SANDS (PTY) LTD

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FIGURE 1: LOCATION OF EL25/2007 RELATIVE TO EXISTING MINING LEASES

TASMAP:	LGA:
NA	KING ISLAND

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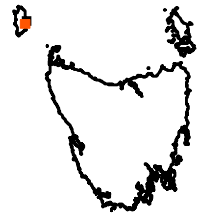
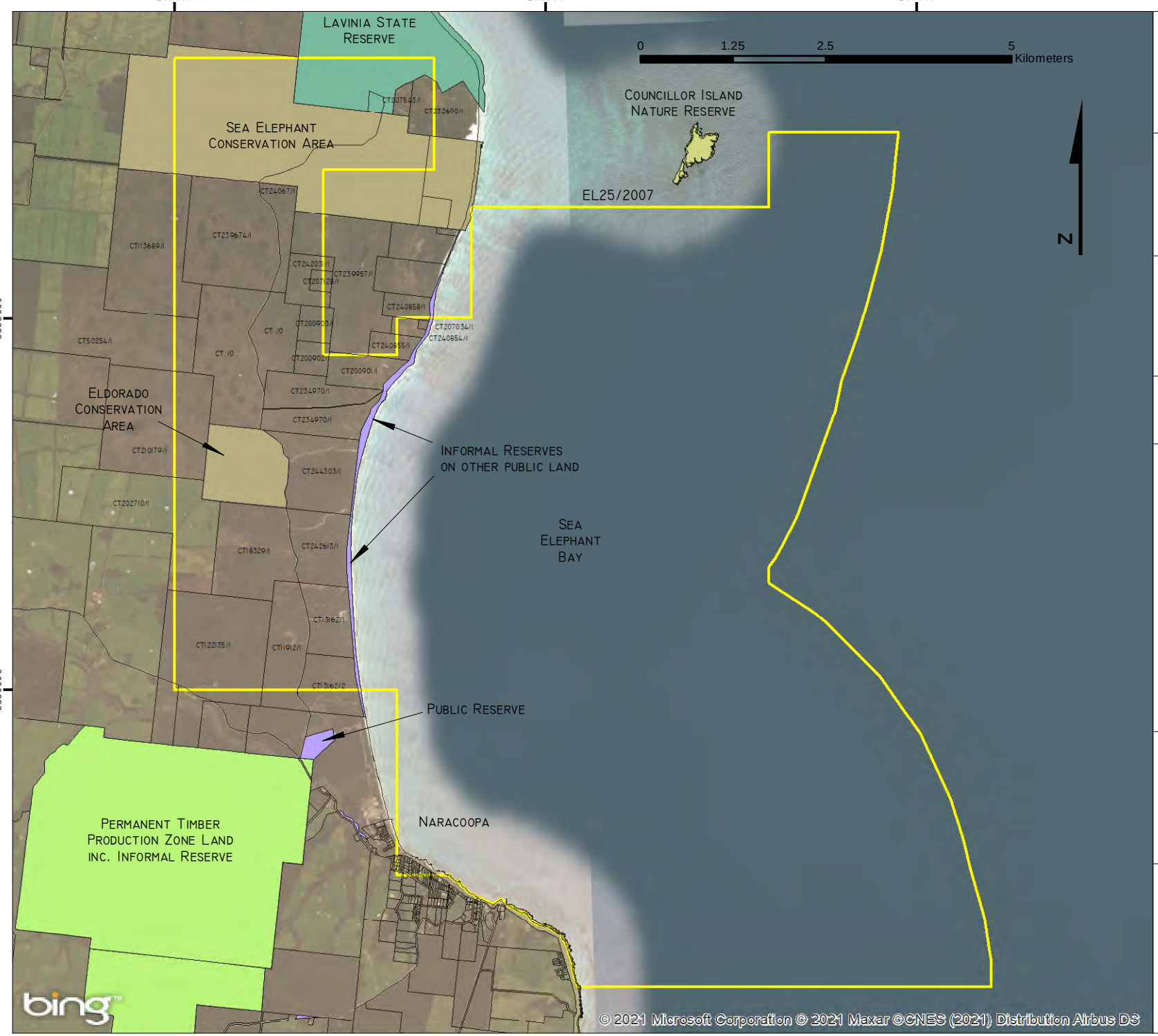


DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A4 - NA

CLIENT: NARACOOPA MINERAL SANDS (PTY) LTD

DATE: 28 JUNE 2021



NARACOOPA MINERAL SANDS (PTY) LTD

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FIGURE 2: LOCATION OF EL25/2007 AND LAND TENURE

TASMAP:	LGA:
NA	KING ISLAND

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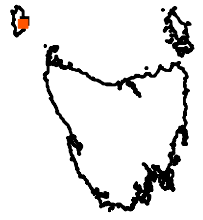
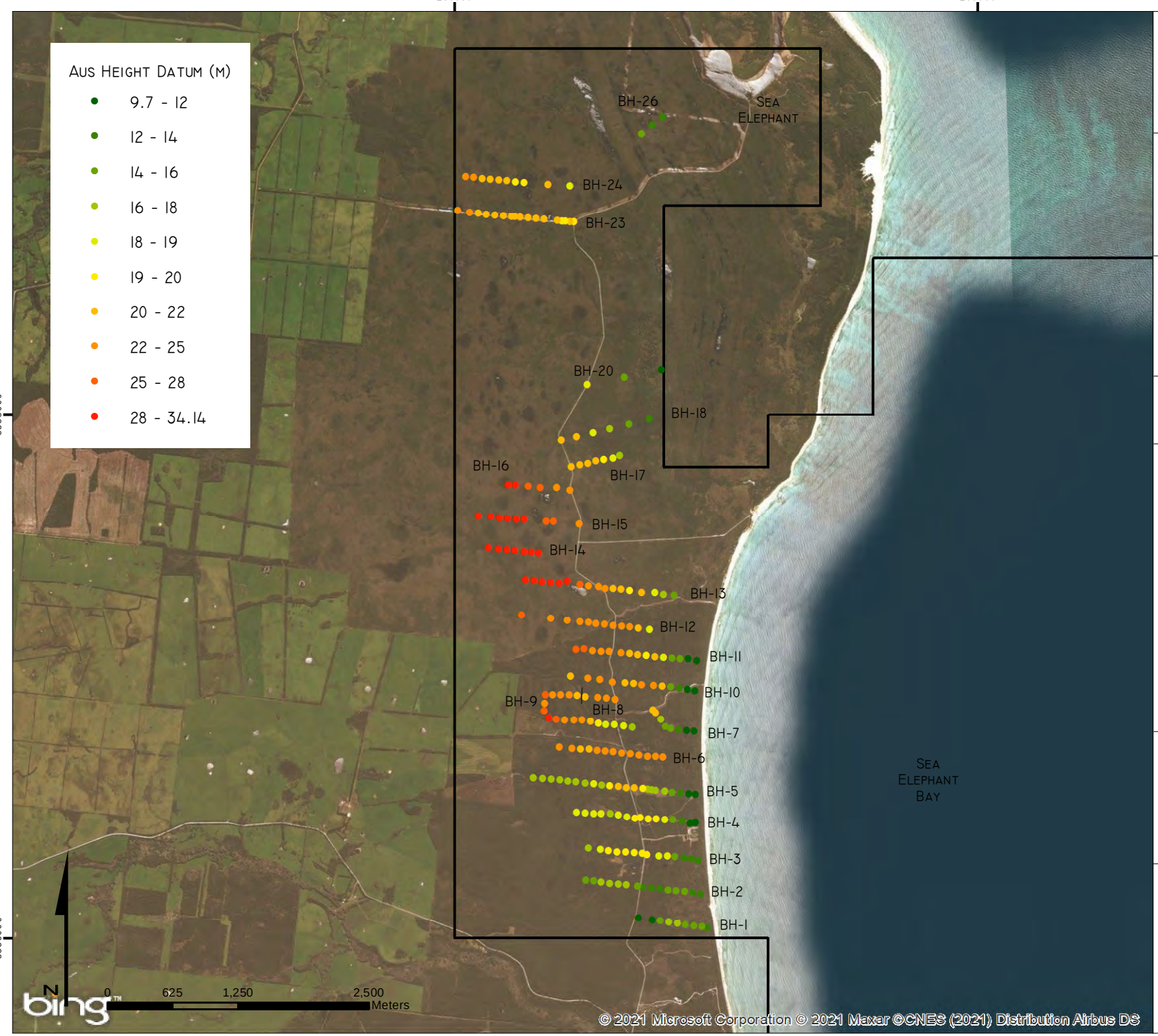


DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A4 - NA

CLIENT: NARACOOPA MINERAL SANDS (PTY) LTD

DATE: 30 SEPT 2019



Naracoopa Mineral Sands (Pty) Ltd

Annual Report 2018-2021

Figure 3: Location of drill holes sampled

TASMAP:	LGA:
NA	KING ISLAND

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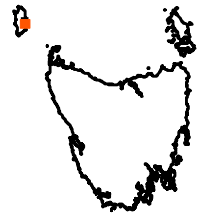


DATUM: GDA94
GRID: MGA ZONE 55
SCALE: @A4 - NA

CLIENT: Naracoopa Mineral Sands (Pty) Ltd

DATE: 28 JUNE 2021

PART B - REVIEW OF PREVIOUS WORK

Owen (1988) provides detailed documentation of the historical exploratory works conducted in the heavy mineral sand deposits associated with the dune series between the Sea Elephant River estuary and Naracoopa township on the east coast of King Island. Therefore, a summary will not be duplicated here.

More recently, there was some broad-scale sampling conducted by Australian Titanium Minerals Ltd, the company that originally held Mining Lease 1673P/M. The most recent work was the geophysical exploration program by Gamage *et al.* (2018) which led to the drilling program of the Exploration Program.

PART C - EXPLORATION COMPLETED DURING THE REPORTING PERIOD

C.1 LANDOWNER NOTIFICATION AND PROPERTY ACCESS

Eight private freehold properties were included in the exploration program with each of the landowners formally notified in writing (see Attachment 7) of the need to enter land and the access point to be used. The map in Attachment 7 shows the ownership of the land covered by the Lines included in the Exploration Program.

During the establishment of Lines, several landowners were present on their properties or on the island, so the opportunity was taken to discuss access options.

Fences were re-established where they previously existed, particularly along Sea Elephant Road.

For some properties where access to the Line was not already existing to Sea Elephant Road, a 10 m vegetation strip was kept on the edge of Sea Elephant Road **if** the Line could be accessed from an alternative route. For example, several properties had a formal access, such as a driveway to a house or derelict building, from Sea Elephant Road which gained access to the Lines from **within** that property so when the Lines were cleared towards the Sea Elephant Road a vegetation strip was kept roadside to –

1. avoid creating an access that would then need to be fenced or physically closed to prevent unauthorised access; and
2. avoid the creation of visual incursions into the vegetation adjacent to Sea Elephant Road.

The images below show the use of slash to block vehicular access to Lines from Sea Elephant Road where access did not previously exist – this was especially the case for Crown land and NMS Pty Ltd owned land for the Lines north of Blowhole Creek Road.

C.2 DRILL LINE ESTABLISHMENT

C.2.1 Use of existing infrastructure

Where possible, existing access roads, tracks and old exploration gridlines were used to minimise the need for vegetation clearance, track development and drainage works. Overhanging vegetation was cut along existing access tracks, logs restricting access were cut and removed, old drainage structures re-opened, and additional drainage provided, as necessary. In some cases, such as the Line at the edge of the Eldorado Conservation Area, the existing fenceline and firebreak on the reserve side of the Line was used to gain access to Line 10.

The images below show examples of how pre-existing infrastructure (mainly firebreaks and old tracks) were used to gain access to areas, or to instate a cutline in an area already disturbed to minimise the impact.

Property boundaries (including boundaries between formal reserves and private property) were ideal opportunities to utilise existing infrastructure, or to reclear previous infrastructure including tracks and firebreaks without impacting on existing fencelines.

An overgrown firebreak/track adjacent to an existing fence was used to gain access to Line 5

An overgrown track adjacent to an existing fence was used to gain access to Line 10

An existing track (some overgrowth vegetation) was used to access part of Line 4

The existing firebreak/track south of the was used to gain access to Line 23, and to establish connections to Lines 22, 23 and 24

The existing firebreak between two private properties (properties each owned by A Walker and S Helbig) was used to gain access to Line 2 from tracks on the Walker property

C.2.2 New drill lines

There were locations where there was no existing, even derelict, or overgrown, infrastructure to reinstate to gain access to Lines. This was particularly the case in the northern section of the EL – such as Lines 13 to 20. For most of these Lines access had to be gained from Sea Elephant Road, with some cross-connecting cuts put in to gain access to the adjacent Line.

Images of cutlines established in heath and light scrub vegetation are provided below as examples of the type of clearing in these vegetation types. Very little coarse woody debris was generated, and the soil surface (and root mass) was largely left intact. Importantly, species in the genera *Melaleuca* and *Leptospermum* where present were simply broken at the base at or near ground level which meant the root stock present could quickly recover without the need for active rehabilitation works.

Tall scrub (4-8m tall) was often encountered on better quality deeper soils or low-lying drainage areas where water accumulates promoting longer growing periods. Images of cutlines established in tall and/or dense scrub vegetation are provided below which show the higher volume of coarse woody debris generated by Line establishment in these vegetation types. The woody debris was swept to the side of the Line to enable vehicular access along each Line; the soil surface (and root mass) was largely left intact.

C.2.3 Seasonally wet areas

In some locations the Lines occurred near waterways, swamps, and drains or crossed watercourses. Lines were generally located to avoid crossing watercourses (natural) and drains however some could not be avoided. There are also a few wet areas within otherwise dry heathland and scrub that will require the use of cut slash (tea-tree and paperbark sourced from the drill line clearing/slashing) to ensure that organic rich soils are protected whilst machinery use the drill line track.

These seasonally wet areas were identified in the and management measures applied through the following –

- EPG 4: Working near wet areas and watercourses, and
- EPG 5: Erosion, sedimentation and surface run-off

The images below show some examples of seasonally wet areas (winter-spring wet) that were dry when the Lines were established, and drilling conducted. Of note is the lack of major soil surface disturbance to the organic rich clays, especially in swampy areas where water and organic matter has accumulated.

The images below show how low-lying areas on some exploration lines that filled with water during winter – spring from typical rainfall patterns. The retention of the soil surface, in a largely intact state, and surface vegetation/coarse woody debris prevented soil erosion and scouring. A low-lying topography generates a low velocity water environment which also aided the lack of erosion.

C.3 DRILLING

Drilling operations were carried out as a combination of Hand augers, Continuous Flight augers and Reverse Air Circulation Drilling method.

The drilling methods used in the exploration program are described in Attachment 4.

C.3.2 Drillhole Number

The exploration program proposed to drill 682 holes along 27 drill lines with a hole spacing of 30 m. However, as a first step, it was decided to drill holes every 60 m and to then drill holes between (to achieve the 30 m spacing) if mineralisation worth pursuing was detected by testing. It became apparent by the testing of 244 drillhole samples that there was no significant amount of Heavy Mineral content present, so the decision was made at that time to not drill the 'skipped' drillhole locations.

A total of 244 drillholes were carried out along 22 drill lines per Table 1.

Table 1. Number of holes and meters drilled per drilling type used for the exploration program

Drilling Type	Number of Holes	Number of meters drilled (m)
Hand Drilling	03	5.2
Continuous Flight Auger Drilling	27	104
Reverse Air Circulation Drilling	214	1823

Digital data, including collar locations, are provided in the appropriate format in Attachment 8.

C.3.3 Drillhole Number

The exploration program proposed to drill 682 holes along 27 drill lines with a hole spacing of 30 m.

The images below are sample box photos of samples collected on Line 23 to illustrate the types of sand and clay layers intersected by drilling or caused the termination of drilling at a hole. For most samples, the profile is typically an organic sandy surface layer overlaying bleached to grey sands which then terminates at a clay layer or coarse clay with some pebbles. Hole 15 intersected a distinctly yellow clay layer that contained rounded pebbles overlaying a white clay layer.

Hole 1

Depth

0-1.7m

Hole 2

Depth

0-2m

Hole 3

Depth

0-0.9

Hole 4

Depth

0-1m

Hole 5

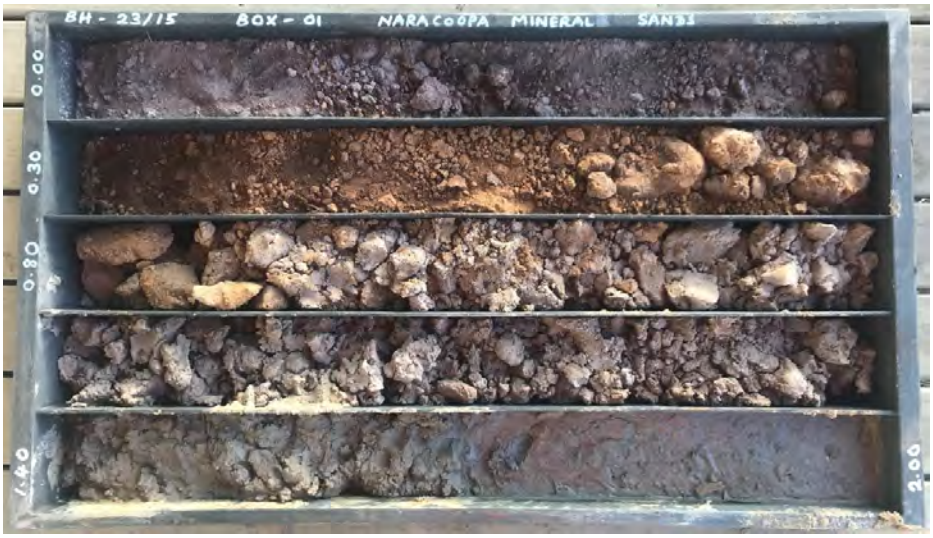
Depth

0-0.8m

Hole 15

Depth

0-2m



C.4 LABORATORY PROCEDURES

C.4.1 Laboratory

NMS established a small laboratory at the company premises (mine site) at Naracoopa. There was sufficient space and infrastructure within the existing building to accommodate a laboratory to store and analyse the samples collected by the exploration program. The on-site laboratory enabled rapid results to be obtained for samples such that the results guided the in-field drillhole sampling decisions of the exploration geologist.

To validate the results achieved on-site, selected bulk samples were sent to a NATA accredited third-party laboratory for determination of heavy mineral content; these tests were performed by ALS Metallurgy Services, Balcatta, Western Australia.

C.4.2 Rapid Heavy Mineral Determination Procedure

Samples assayed for heavy minerals in the NMS Laboratory used the procedure in Attachment 5. The test results were recorded as a % by weight and are provided in Attachment 10 (file: EL252007_202007_02_AssayValues).

C.4.3 Bulk Samples tested at NATA accredited laboratory

Based on internal laboratory test results, 90 samples were selected and sent to a NATA accredited third-party laboratory for determination of heavy mineral content. The determination of heavy minerals was performed by ALS Metallurgy Services, Balcatta, Western Australia.

The testing methodology was heavy liquid separation which utilises the heavy liquids tetrabromoethane (TBE), diiodomethane, and Clerici's solution (Thallium Malonate Formate). This technique separates a sample into a wide range of specific gravity intervals from 1.00 through to 4.05.

The test procedure is similar to the Rapid Heavy Mineral Determination Procedure described in Attachment 5.

C.5 QUANTITATIVE ANALYSES

C.5.1 % HMS Results

The results of the heavy mineral sand content were recorded as a % by weight and are provided in Attachment 10 (file: EL252007_202007_02_AssayValues).

Only 5 individual samples were found to contain an HMS content of more than 1%[1] (see Attachment 10 (file: EL252007_202007_02_AssayValues)). The cut-off for extraction to viable is 2.5%.

The data for the *Rapid Heavy Mineral Determination Procedure* and *Bulk Samples tested at NATA accredited laboratory* are both provided in Attachment 10. There was high congruence between the results from the NATA accredited laboratory (ALS) and those determined at the on-site mine laboratory.

Table 2 provides an extract of the 90 samples tested at ALS to demonstrate the similarity of test results from the two different laboratories. The ALS results in effect validated those achieved at the on-site mine laboratory so these can be used with confidence.

Table 2. Selected Heavy Mineral Content readings from NMS and ALS determined laboratory tests

Hole_ID	Sample _ID	From (m)	To (m)	% Heavy Mineral Content NMS laboratory	% Heavy Mineral Content ALS
BH-16/04	S160404	3.0	4.0	1.52	1.46
BH-02/19	S021903	2.0	3.0	0.94	0.98
BH-01/13	S011301	0.0	0.5	0.78	0.70
BH-03/07	S030704	3.0	4.0	0.74	0.69
BH-17/09	S170903	2.0	3.0	0.63	0.69
BH-02/09	S020907	6.0	7.0	0.52	0.61
BH-07/05	S070501	0.0	1.0	0.55	0.51
BH-12/17	S121703	2.0	3.0	0.59	0.48
BH-07/01	S070102	1.0	2.0	0.58	0.42
BH-08/03	S080304	3.0	4.0	0.42	0.36
BH-01/03	S010309	8.0	9.0	0.36	0.33
BH-16/01	S160105	4.0	5.0	0.28	0.33

[1] BH-06/17, BH-16/04, BH-06/25, BH-06/13, BH-14/13

BH-05/14	S051402	1.0	2.0	0.38	0.31
BH-12/15	S121502	1.0	2.0	0.28	0.31
BH-10/01	S100102	1.0	2.0	0.36	0.30
BH-02/27	S022705	4.0	5.0	0.32	0.28
BH-06/11	S061103	2.0	3.0	0.30	0.28
BH-15/01	S150101	0.0	1.0	0.32	0.28
BH-01/01	S010104	3.0	4.0	0.34	0.27
BH-05/09	S050906	5.0	6.0	0.30	0.27
BH-06/23	S062303	2.0	3.0	0.30	0.27
BH-03/05	S030503	2.0	3.0	0.18	0.23
BH-16/08	S160802	1.0	2.0	0.11	0.21
BH-01/05	S010517	16.0	17.0	0.17	0.18
BH-10/07	S100714	13.0	14.0	0.16	0.18
BH-16/14	S161403	2.0	3.0	0.14	0.18
BH-02/01	S020102	1.0	2.0	0.19	0.17
BH-03/15	S031505	4.0	5.0	0.19	0.17
BH-16/16	S161605	4.0	5.0	0.16	0.17
BH-09/25	S092501	0.0	1.5	0.00	0.16
BH-04/01	S040104	3.0	4.0	0.19	0.15
BH-01/05	S010505	4.0	5.0	0.14	0.12
BH-14/05	S140502	1.0	2.0	0.00	0.11
BH-15/20	S152002	1.0	2.0	0.12	0.11
BH-08/05	S080501	0.0	1.0	0.09	0.10
BH-06/27	S062710	9.0	10.0	0.10	0.09
BH-08/01	S080101	0.0	1.0	0.07	0.09
BH-10/16	S101601	0.0	1.0	0.09	0.07
BH-13/09	S130901	0.0	1.0	0.00	0.05
BH-03/09	S030901	0.0	1.0	0.00	0.03
BH-03/21	S032103	2.0	3.0	0.00	0.03
BH-05/16	S051601	0.0	1.0	0.00	0.03

C.5.2 Line cross sections

The percentage HMS per drillhole along each of the Lines are shown in the cross sections in Attachment 6.

C.5.3 Resource Estimation

Estimates of resources were to be made based on data obtained from the drilling, sample testing and mineralogical work programs. These resource estimates were to be prepared in accordance the Australasian Code for Reporting of Identified Mineral Resources and Ore Reserves.

Given the % HMS results are well below that which would make extraction viable (2.5%) a resource estimation was not conducted.

PART D - DISCUSSION

The Exploration Program proposed to drill 682 holes along 27 drill lines with a hole spacing of 30 m.

All 27 Lines were established on-ground as cut lines which preferentially utilised existing or derelict infrastructure such as tracks, roads, historical cutlines and existing property accesses. Landowners were notified in accordance with statutory requirements, with no objections to access. Environmental management measures were applied when establishing cutlines through EPG's and other practices that are in accordance with the Exploration Code of Practice.

When drilling commenced, as a first step, it was decided to drill holes every 60 m and to then drill holes between (to achieve the 30 m spacing) if mineralisation worth pursuing was detected by testing. This approach led to a total of 244 drillholes being sampled along 22 Lines.

Drilling works were conducted in accordance with the Exploration Code of Practice.

NMS established a small laboratory at the company premises (mine site) at Naracoopa to provide rapid results for samples such that the results guided the in-field drillhole sampling decisions of the exploration geologist. Selected bulk samples were sent to a NATA accredited third-party laboratory[2]for determination of heavy mineral content to validate on-site achieved results. A high level of congruence was achieved between mine and ALS test results, providing confidence to the results of the on-site laboratory technique.

Only 5 individual samples were found to contain an HMS content of more than 1%[3] (see Attachment 10 (file: EL252007_202007_02_AssayValues)). The cut-off for extraction to viable is 2.5%. Given the % HMS results were well below that which would make extraction viable (2.5%) a resource estimation was not conducted.

No commercially viable deposits of HMS were detected from the Exploration Program.

[2] ALS Metallurgy Services, Balcatta, Western Australia

[3] Drillhole samples - BH-06/17, BH-16/04, BH-06/25, BH-06/13, BH-14/13

PART E - CONCLUSIONS

The Exploration Program was conducted with 244 drillholes sampled along 22 Lines.

No commercially viable deposits of HMS were detected from the sampling.

Minor additional exploratory works (additional augering of about 50 holes) will be conducted to in-fill some areas where additional information is sought. The samples were tested at the on-site mine laboratory and the results were comparable to those from at a NATA-accredited laboratory (ALS).

PART F – FURTHER EXPLORATION

Minor additional drill holes are to be drilled (up to 50) in the 2021-22 exploration year - a renewal for the EL has been sought from MRT.

PART G – ENVIRONMENTAL MANAGEMENT

Several ecological studies/surveys were conducted of proposed tracks and cut-lines to perform the land-based EL Program.

A report was prepared – 'NARACOOPA MINERAL SANDS PTY LTD, EL 25/2007 DRILLING PROGRAM 2018-19, ENVIRONMENTAL MITIGATION MEASURES, 26 MARCH 2018' – to document the environmental management measures to be applied during the exploration works in addition to those relevant actions described in the Mineral Exploration Code of Practice.

The report provided Environment Protection Guidelines (EPG's) to assist the exploration team in identifying and managing environmental impacts in an appropriate manner.

G.1 EXISTING CONDITIONS

The majority of the exploration area is situated over natural dune landscape with remnant or partly cleared and disturbed native vegetation, bisected by several roadways, tracks and fencelines.

Several cleared/cropped or pasture areas occur along the south-eastern boundary of the EL. Historical line clearing grids exist near the southern boundary of the EL, which are only faintly visible on a recent aerial photograph and appear to have successfully rehabilitated naturally. The land is expected to be used primarily for agricultural purposes, in particular grazing, with some enriched pasture being created to the southwest of the EL. The low density of dams, tracks, and any other man-made modifications over the EL area suggests that much of the EL is not being extensively or actively used.

G.2 EXPLORATION CODE OF PRACTICE

The exploration works were undertaken in accordance with the Mineral Exploration Code of Practice (Fifth Edition - 2012), specifically as the drill program relates to -

- Construction and use of drill lines and sites.
- Exploration activities (measures to minimise potential impacts on sensitive areas, and the introduction and/or spread of weeds, plant, and frog diseases).
- Rehabilitation of access tracks and drill sites.

The report – 'NARACOOPA MINERAL SANDS PTY LTD, EL 25/2007 DRILLING PROGRAM 2018-19, ENVIRONMENTAL MITIGATION MEASURES, 26 MARCH 2018' – provided Environment Protection Guidelines (EPG's) to assist the exploration team in identifying and managing environmental impacts in an appropriate manner.

G.3 THREATENED SPECIES PERMIT

Several threatened flora species are known to occur near or on the Lines proposed for drilling as part of the Exploration Program.

Figure 6 in Attachment shows areas where specific measures needed to be applied because of the

G.4 THREATENED SPECIES PERMIT

The ML and EL area have been the subject of extensive surveys by Van Diemen Consulting Pty Ltd. Several threatened flora species were found to occur near or on the Lines proposed for drilling as part of the Exploration Program.

Figure 6 in Attachment 9 shows areas where specific measures needed to be applied because of the proximity of threatened flora species.

A permit to take listed species (Attachment 9) was sought from the Department of Primary Industries, Parks, Water and Environment to take a few plants of the following species - *Utricularia tenella, Stylidium despectum, S. beaugleholei, Caladenia pusilla* and *Hypolepis muelleri*. The Permit was closed-out by the submission of a Final Permit Report Form to DPIPWE (see Attachment 9).

G.5 WEED MANAGEMENT

Weeds are uncommon in the Sea Elephant Road area, but there are several known and large infestations of declared and environmental weeds around the Naracoopa township and along Fraser Road.

Weed control measures were applied to the Exploration program via section 4 of the document *EL Environmental Management Measures 2018 Exploration Program*. No weeds were observed during the follow-up visits to the Lines selected to monitor rehabilitation.

G.6 REHABILITATION

A passive approach was taken to the rehabilitation of the Lines. Most Lines are within native vegetation, principally *Leptospermum – Melaleuca* forest, tall to low scrub and heathland.

As expected, the approach to minimising the impact to the soil surface (retaining the root mass and organic soil profile) meant that rootstock could quickly reshoot after the loss of above ground biomass (i.e., slashing. Trampling, crushing of the main part of the plant).

Melaleuca (mainly *M. squarrosa*) and *Leptospermum* (mainly *L. scoparium, L. glaucescens*) species within 6 months were reshooting from rootstock and the base of the stem which retained connection to the root mass.

The images below show prolific reshooting of *M. squarrosa* 6 months post-drilling works and seed recruitment in *Leptospermum scoparium* (bottom left) and *M. squarrosa* (bottom right).




Open heathland areas were recovering within 6 months of completing the drilling works because this community supports many heaths, sedge and lily species which were only partially trampled/compacted by the use of the dozer to establish Lines and the subsequent traversing of the Line by the drill rig (the rig in most cases only traversed Lines once when going in and then coming back out). The images below show within **6 months** the rehabilitation of vegetation.


The images below show within **18 months** the typical extent of rehabilitation of heathland vegetation.


Scrub and the piles of slash placed alongside Lines also showed within **6 months** the recruitment of seedlings and prolific regrowth of plants which retained rootstock.



The below images show the establishment of a 'green carpet' of native grasses, herbs, scrub species and some notable recruits – eucalypt seedlings, blueberry ash (*Elaeocarpus reticulatus*; a rare species) and orchids (mainly *Pterostylis* species). Note in the top left image the reinstated wire fence on Sea Elephant Road that was cut to access the Line.




blueberry ash (*Elaeocarpus reticulatus*)

Pterostylis species leaves

PART H - REFERENCES

Owen, T (1988). Exploration Licence 28/85. King Island, Tasmania Annual Report. Year Ended 30th January 1988.

Gamage S., Barnes R. and McCoull, C. (Van Diemen Consulting) (2018). NARACOOPA MINERAL SANDS PTY LTD, EXPLORATION PROGRAM 2017, GEOPHYSICAL SURVEY REPORT. 2018.

PART I - EXPENDITURE

The expenditure associated with the implementation of the exploration program is outlined in Table 3 and Attachment 2.

Table 3. Expenditure for the Reporting Period (incl GST)

GEOLOGY		**$26,702.07**
Geology	Staff – Geologist	$23,806.05
	Staff – Assistance	$2,896.02
GEOCHEMISTRY		**$30,796.82**
Geochemistry	Laboratory Staff	$18,532.50
	Staff Assistant	$3,466.32
	External laboratory tests	$8,798.00
DRILLING AND GRIDDING		**$119,841.34**
Track Marking	Consultants	$16,121.86
Drillers	Spaulding	$92,135.40
	Staff – Geologist	$11,584.08
LAND ACCESS		**$420.00**
Negotiation and liaison with landowners	Consultants	$420.00
REHABILITATION		**$10,650.00**
Exploration Line Assessments	Consultants	$10,650.00
OTHER		**$98,383.91**
Track Construction	Equipment/Machinery Hire	$7,529.50
Laboratory Equipment	Purchase by NMS	$10,237.71
Annual land Tax	Government fees	$80,616.70
ADMINISTRATION		**$13,460.00**
Office consumables and staff	Purchase by NMS	$1,280.00
Documentation work	Staff of NMS	$12,180.00
TOTAL EXPLORATION COSTS		**$300,254.14**

Attachment 4 Drilling Methods

ATTACHMENT 4

DRILLING PROCEDURES

Drilling operations were carried out as a combination of Hand augers, Continuous Flight augurs and Reverse Air Circulation Drilling method.

The exploration program proposed to drill 682 holes along 27 drill lines with a hole spacing of 30 m. However, as a first step, it was decided to drill holes every 60 m and to then drill holes between (to achieve the 30 m spacing) if mineralisation worth pursuing was detected by testing. It became apparent through the testing of 244 drillhole samples that there was no significant amount of Heavy Mineral content present on any exploration line, so the decision was made to not drill the 'skipped' drillhole locations.

A total of 244 drillholes were carried out along 22 drill lines per Table 4-1.

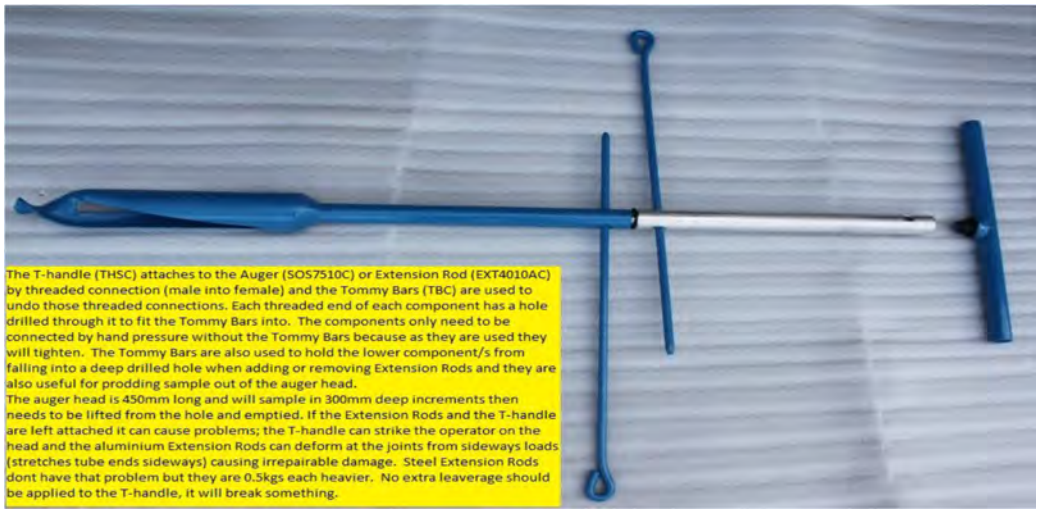
Table 4-1. Number of holes and meters drilled per drilling type used for the exploration program

Drilling Type	Number of Holes	Number of meters drilled (m)
Hand Drilling	03	5.2
Continuous Flight Auger Drilling	27	104
Reverse Air Circulation Drilling	214	1823

Hand Drilling

Hand augering was carried out by using a heavy-duty sand auger (see Figure 4-1) with an outer diameter of 100mm (4") along with 1.0m and 1.5m extension rods. Only 3 boreholes were carried out using this method on Line 23. All drilling was terminated at thick clay layers. This method accurately identified layer changing depths however it was hard to penetrate pebble/thick clay layers and was time consuming.

Figure 4-1: Heavy-duty sand auger



Continuous Flight Auger Drilling

A continuous flight auger mounted to a conventional rotary hydraulic drilling rig was used in this method. The diameter of each spiral augur was 80mm and the length of one specimen was 1.20 m. Augers were extended using hex joiners and D-clips as shown in Figure 4-2.

Augers were driven into the ground with rotary motion to a specific depth and driven back to the ground and samples bagged. The auger was able to penetrate stiff clay layers. However, drilling was terminated where we found clay because our aim was to determine the properties of underlying sand layers.

Figure 4-2: Hex joiners and D-clips used to extend the auger

Figure 4-3: Conventional rotary hydraulic drilling rig used to drive the auger

Reverse Circulation Drilling

Reverse circulation drilling was carried out on Lines 01 to 20 using a rig mounted on a truck (Figure 4-4).

The hole size was 85 mm and drill rod lengths 3 meters. The advantage of this type of drilling compared to hand augering and continuous flight auger method is greater depth penetration and clay/gravel layers can also be penetrated. An average of 10 holes were drilled with this method each day.

All drilling terminated at the rock basement (limestone) or thick clay. Samples were taken at 1.00 m intervals from the beginning of each drill hole with samples collected in plastic bags through a cyclone (Figure 4-5).

Nearly 88% of the drill holes sampled in the exploration program were carried out with this method.

Figure 4-4: Reverse Air Circulation Drilling Rig

Figure 4-5: Samples were collected into plastic bags through a cyclone

Attachment 5 Laboratory Testing Procedures

ATTACHMENT 5

LABOROTORY TESTING

A laboratory was established at the mine site to conduct the testing of heavy mineral content of samples collected through the exploration program. The on-site laboratory enabled rapid results to be obtained for samples such that the results guided the in-field drillhole sampling decisions of the exploration geologist.

Heavy Mineral Determination Procedure

Samples assayed for heavy minerals in the NMS Laboratory used the procedure outlined below:

1. The sand sample was taken and mixed well.
2. Using Cone and Quartering method takes the required weight of sample.
3. Dry Sample and record the dry weight.
4. Screen on a 2 mm coarse to break up lumps.
5. Riffle split approximately 100 g working sample.
6. Re-pack balance sample.
7. Weigh working sample.
8. Screen on 1000 micron sieve and weight plus 1000 micron fraction.
9. Wash the sample using 2% NaOH solution, aggregate and allow sand to settle.
    i) Decant NaOH solution, wash and decant with clean water in repeated steps until all NaOH removed.
    ii) Dry washed sample.
    iii) Weight washed and dried sample and calculate the percentage lost during washing.
10. Using concentrated sodium polytungstate (Na6[H2W12O40].H2O, density 2.9 g/cm3) , Separate heavy minerals.
11. Pour sample into sodium polytungstate solution and stir thoroughly in order to wet all particles and disperse air bubbles.
12. Allow particle to settle; stir periodically so that particles will not adhere to funnel wall.
13. When heavy mineral have settled to bottom of separatory funnel, open pinch-cock and allow heavy mineral particles to drop on to filter paper in lower set up funnel. Close pinch-cock so that minerals floating in remaining heavy liquid will remain in the separatory funnel.
14. After heavy liquid has drained from filter paper, remove paper and place upside down in porcelain dish. Use plastic squeeze bottle filled with water to wash into the dish any particles which adhere to the filter paper.
15. Dry heavy mineral fraction, record weight.

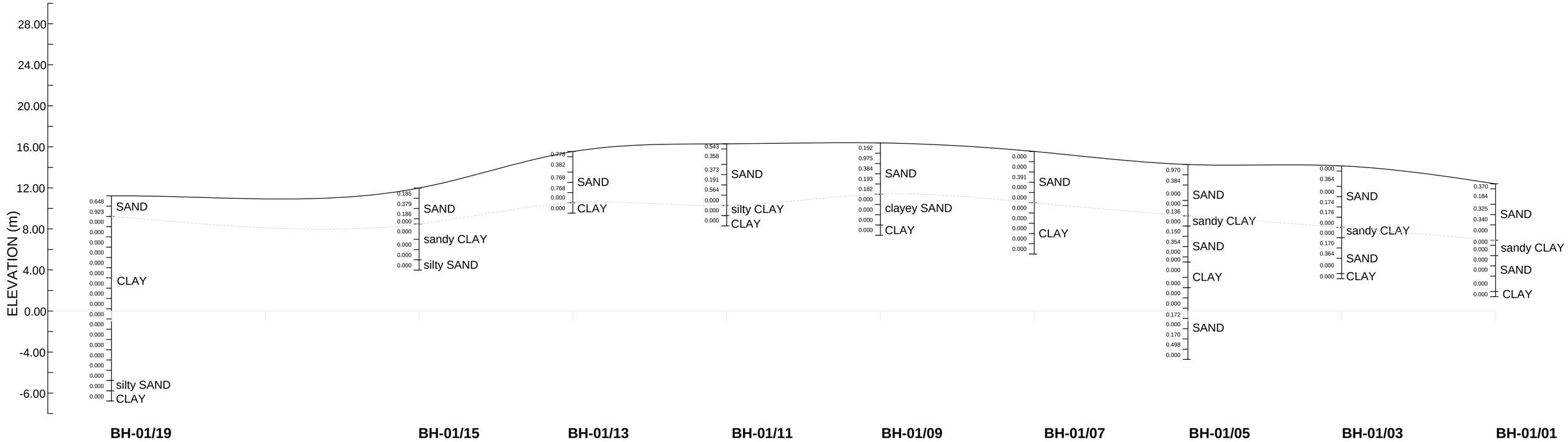
16. Using the same apparatus set-up, drain the remaining heavy liquid through filter paper. The light minerals will collect on the filter paper. Use water to wash particles that adhere to the side of the separatory funnel.
17. Using the same procedure collect, dry, and record the weight of the retain light mineral fraction.
18. Calculate the heavy minerals as a percentage of the sample weighed in step 7.
19. Record results for :
    - Dry weight of the sample used in step 3
    - Weight % of +1 mm material
    - Weight of the heavy mineral fraction
    - Weight % heavy minerals

Heavy Mineral Determination – NATA accredited laboratory testing

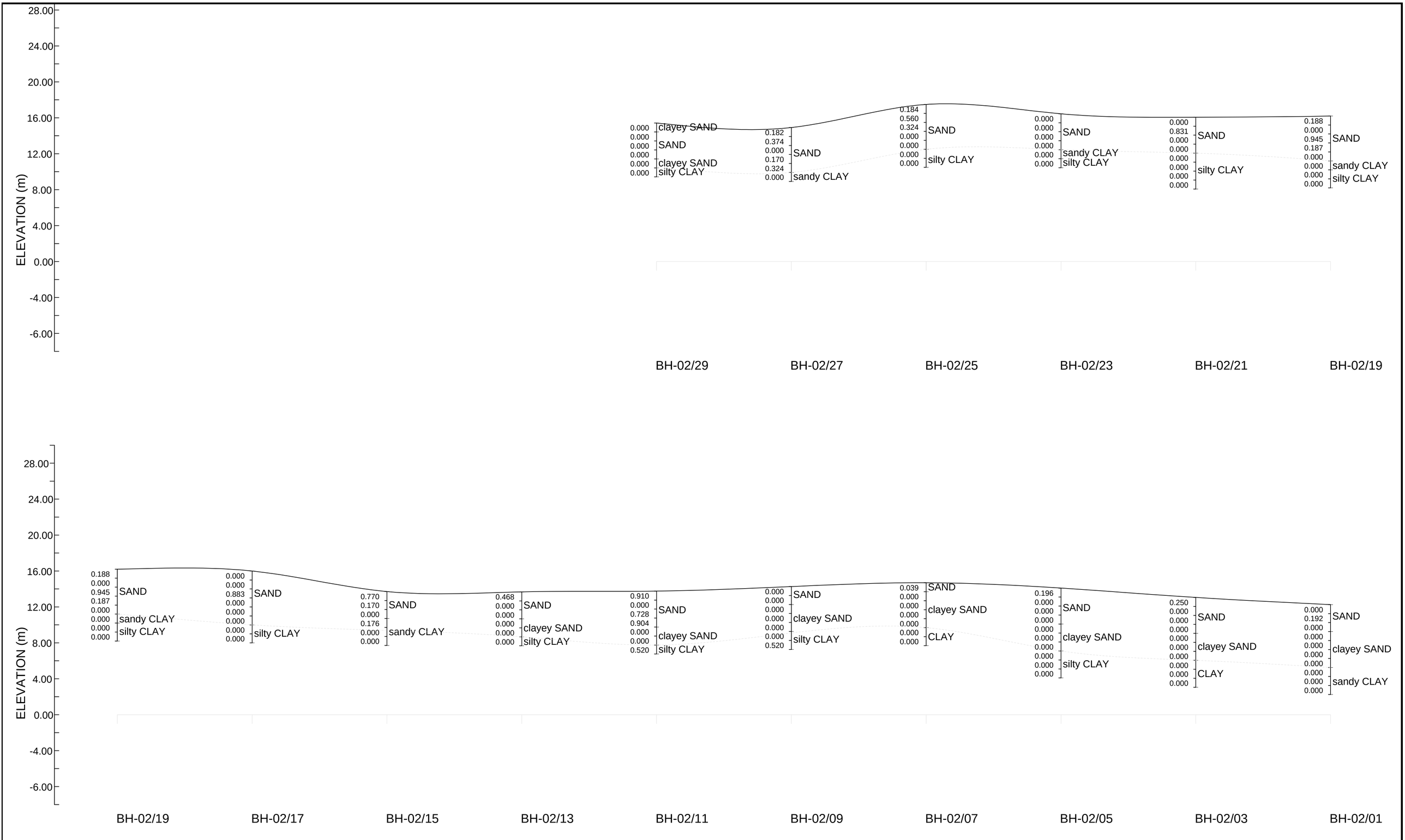
Based on internal laboratory test results, 90 samples were selected and sent to a NATA accredited third-party laboratory for determination of heavy mineral content. The determination of heavy minerals was performed by ALS Metallurgy Services, Balcatta, Western Australia.

The methodology used was heavy liquid separation. Using heavy liquids tetrabromoethane (TBE), diiodomethane, and Clerici's solution (Thallium Malonate Formate), separate samples into a wide range of specific gravity intervals from 1.00 through to 4.05. The test procedure is similar to the one mentioned above and the final results were recorded in % by weight.

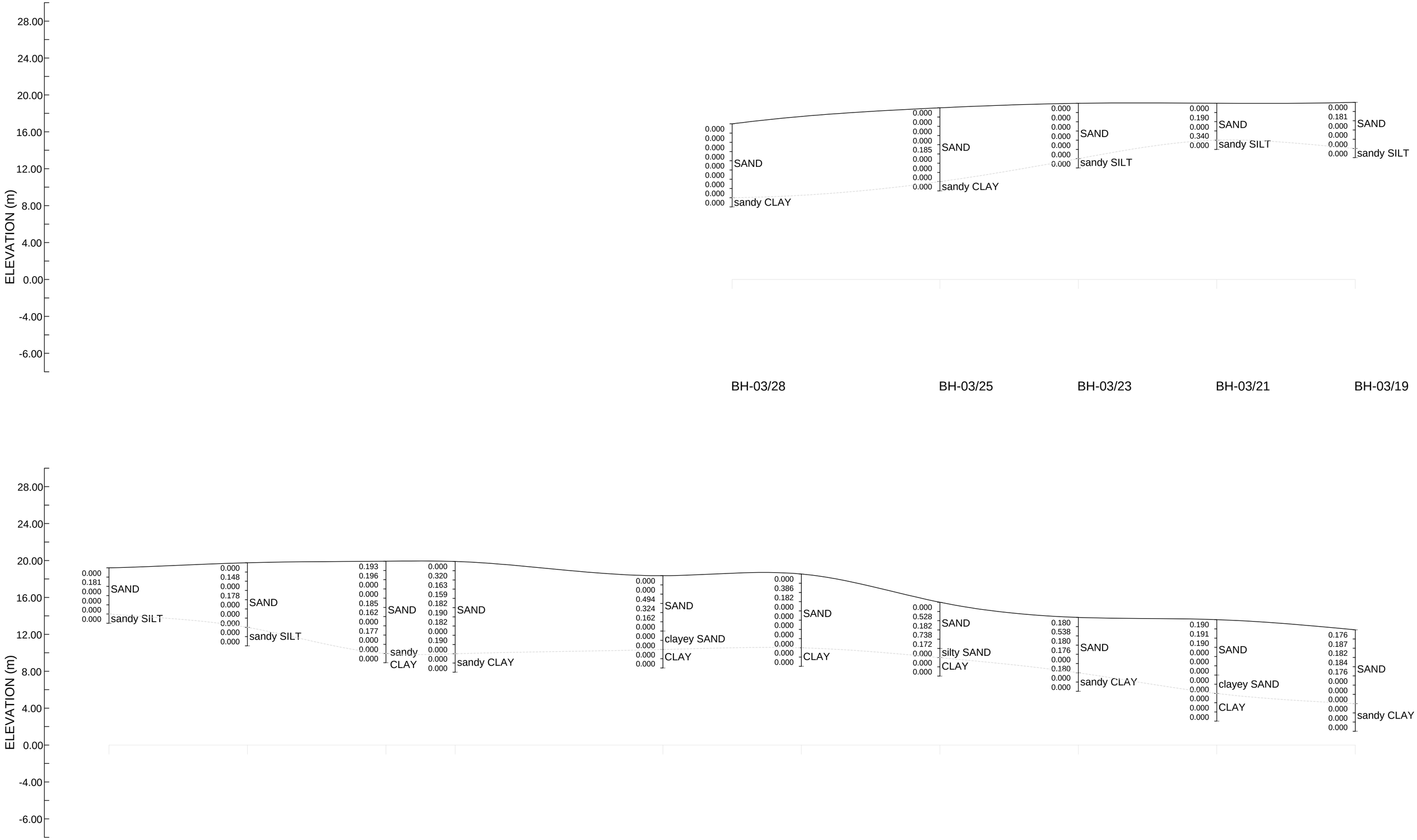
Attachment 6 Cross sections of exploration lines



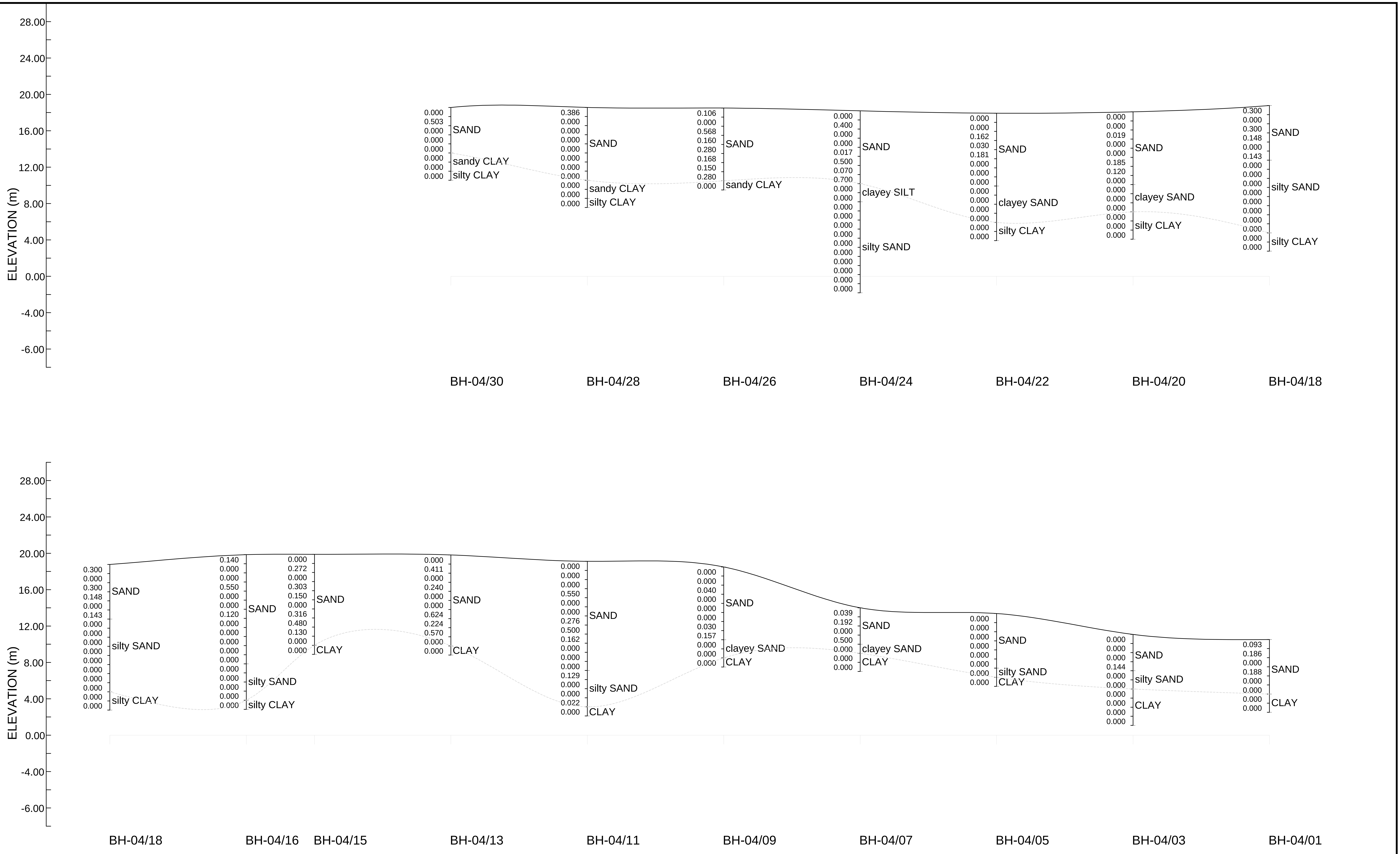
NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 3.8mm = 1000mm	HEAVY MINERAL CONTENT (%): 0.185, 0.379, 0.186, 0.000 (x4) — SAND; sandy CLAY; silty SAND — SOIL TYPE
CROSS SECTIONS			
LINE 01		**HORIZONTAL SCALE**: 3.8mm = 4000mm	
FIGURE: 02			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			



NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 3.8mm = 1000mm	HEAVY MINERAL CONTENT (%): 0.185, 0.379, 0.186, 0.000, 0.000, 0.000, 0.000, 0.000
CROSS SECTIONS		**HORIZONTAL SCALE**: 3.8mm = 4000mm	SOIL TYPE: SAND; sandy CLAY; silty SAND
LINE 02			
FIGURE: 03			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			



NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 3.8mm = 1000mm	HEAVY MINERAL CONTENT (%): 0.185 0.379 0.186 0.000 0.000 0.000 0.000 0.000 0.000 — SAND; sandy CLAY; silty SAND — SOIL TYPE
CROSS SECTIONS		**HORIZONTAL SCALE**: 3.8mm = 4000mm	
LINE 03			
FIGURE: 04			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			



NARACOOPA MINERAL SANDS (PVT) LTD

EL25/2007

CROSS SECTIONS

LINE 04

FIGURE: 05

DATE: 29.07.2020

AUTHOR: INESHKA W.S.S.

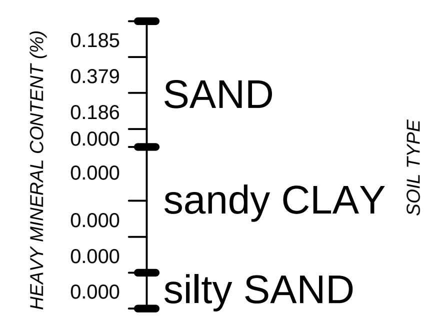
COMMENTS

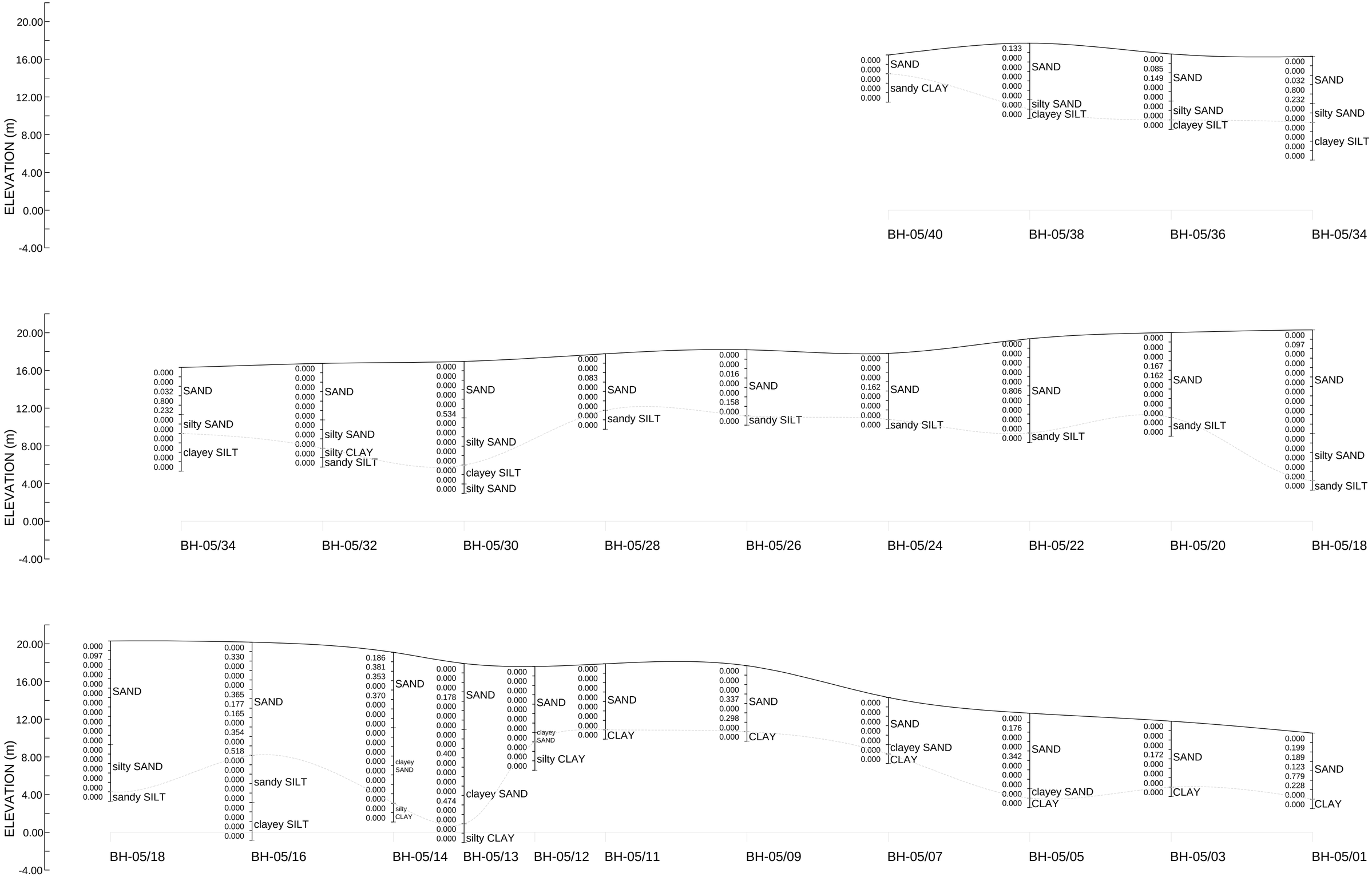
SCALE

VERTICAL SCALE:
3.8mm = 1000mm

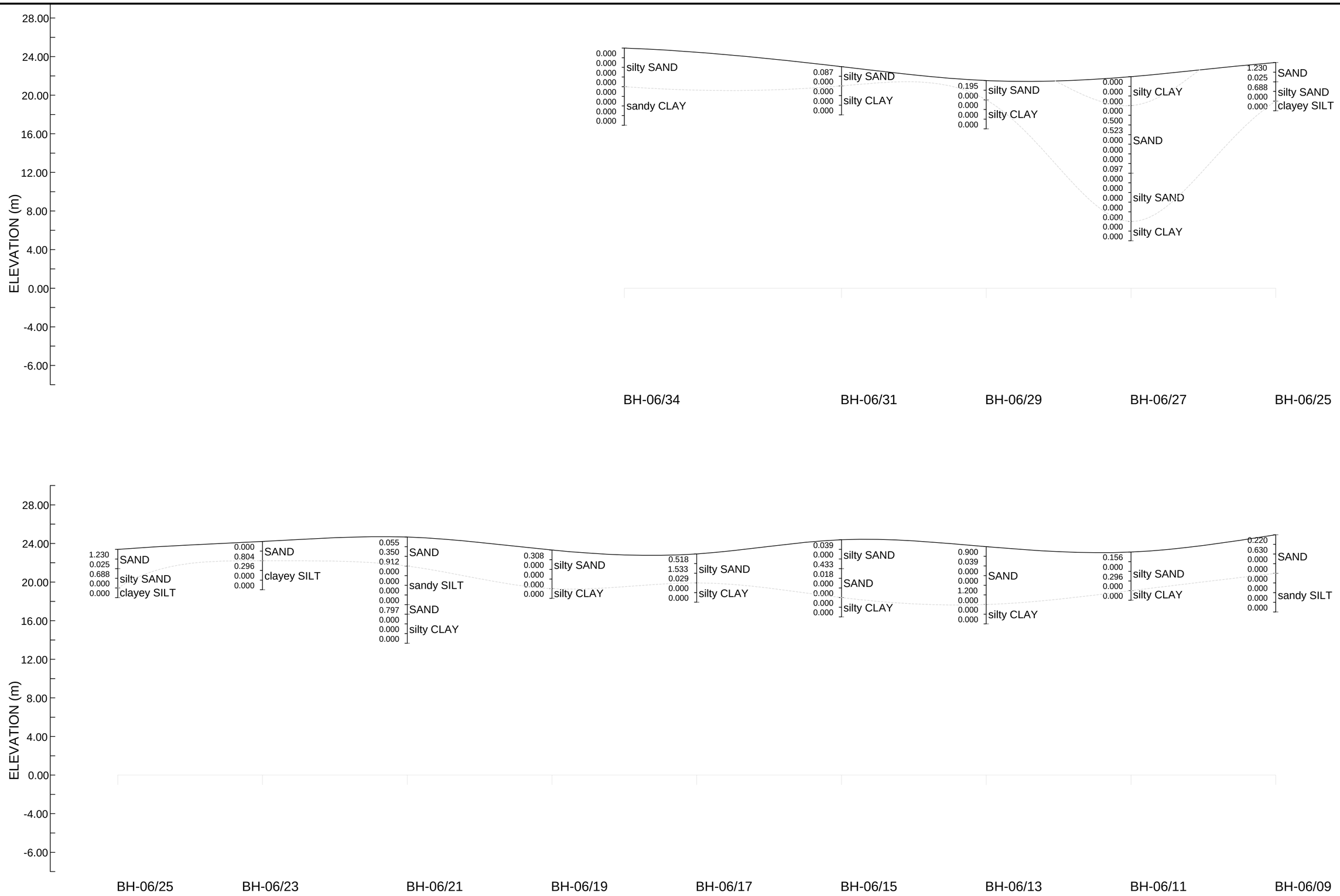
HORIZONTAL SCALE:
3.8mm = 4000mm

LEGEND

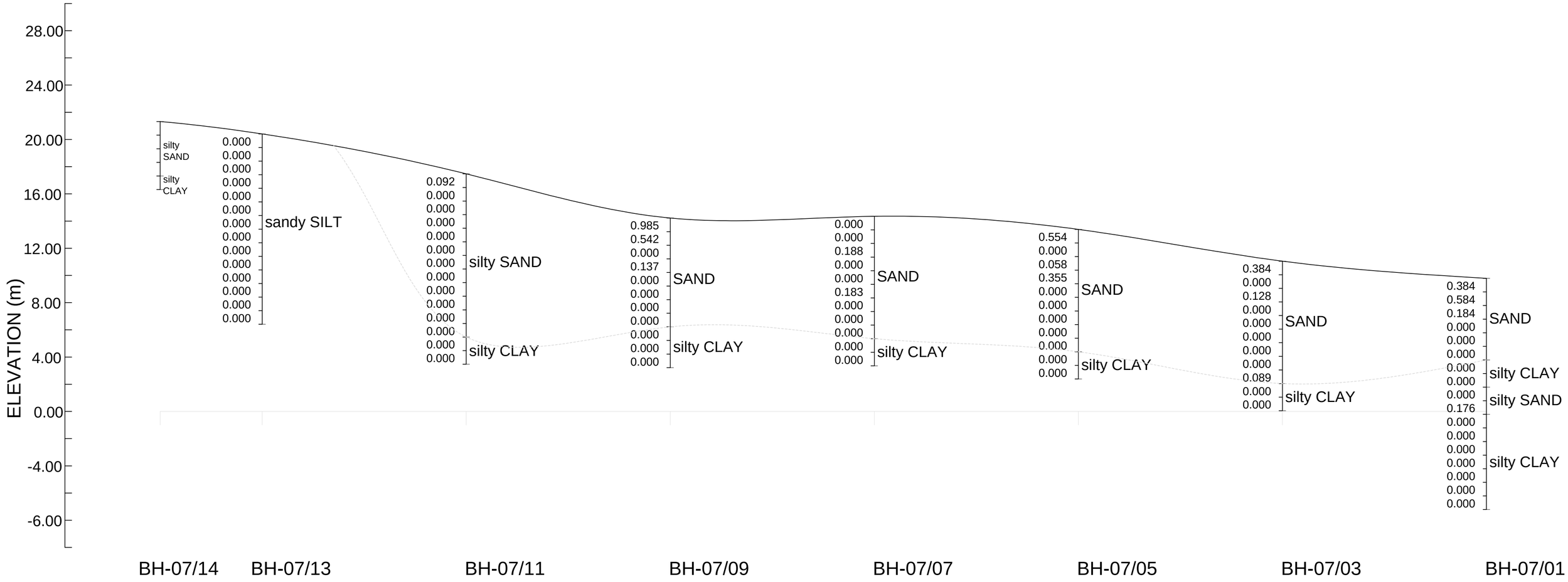




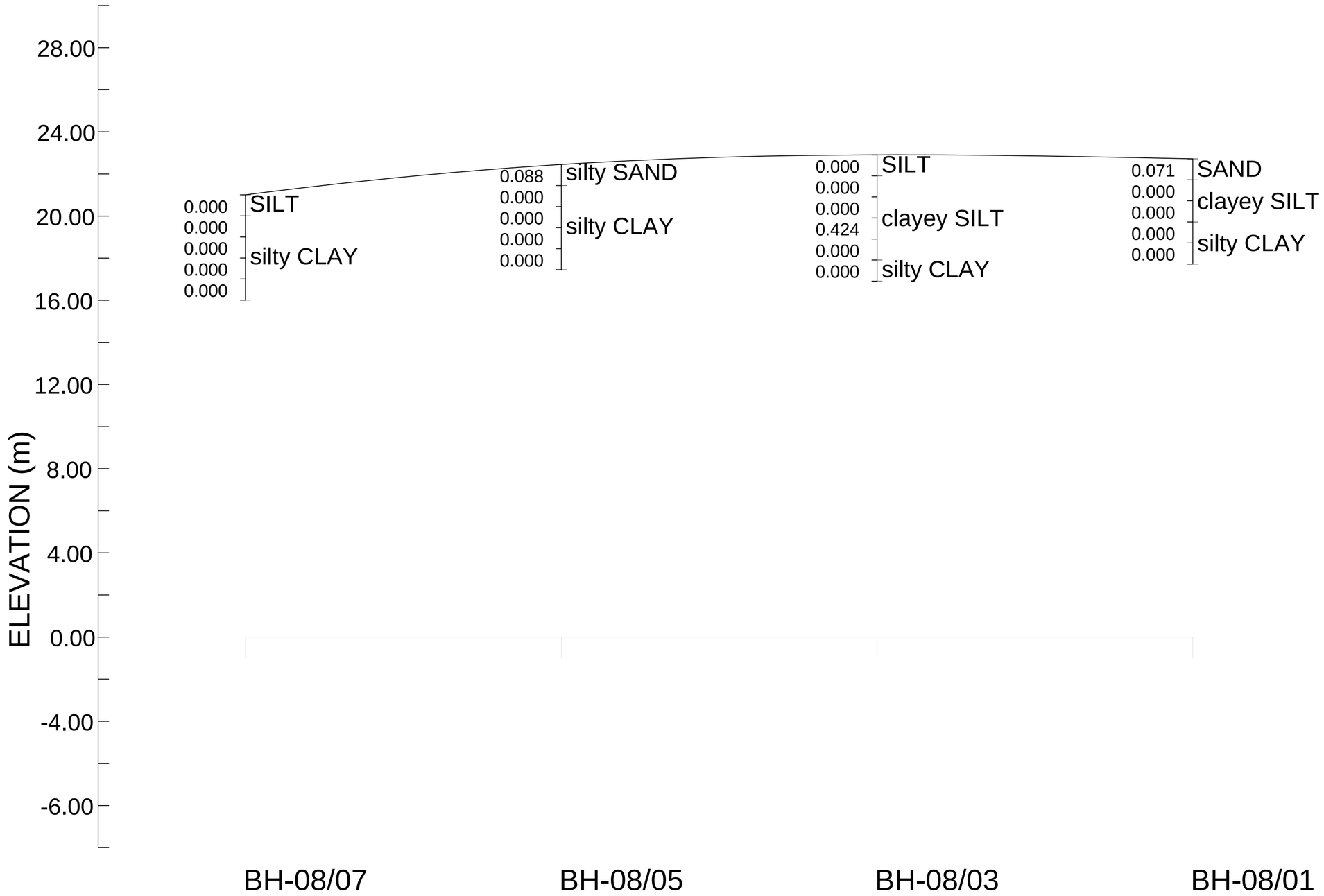
NARACOOPA MINERAL SANDS (PVT) LTD	**COMMENTS**	**SCALE**	**LEGEND**
EL25/2007		**VERTICAL SCALE**: 3.8mm = 1000mm	HEAVY MINERAL CONTENT (%) 0.185 0.379 0.186 0.000 0.000 0.000 0.000 0.000 SAND sandy CLAY silty SAND SOIL TYPE
CROSS SECTIONS		**HORIZONTAL SCALE**: 3.8mm = 4000mm	
LINE 05			
FIGURE: 06			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			



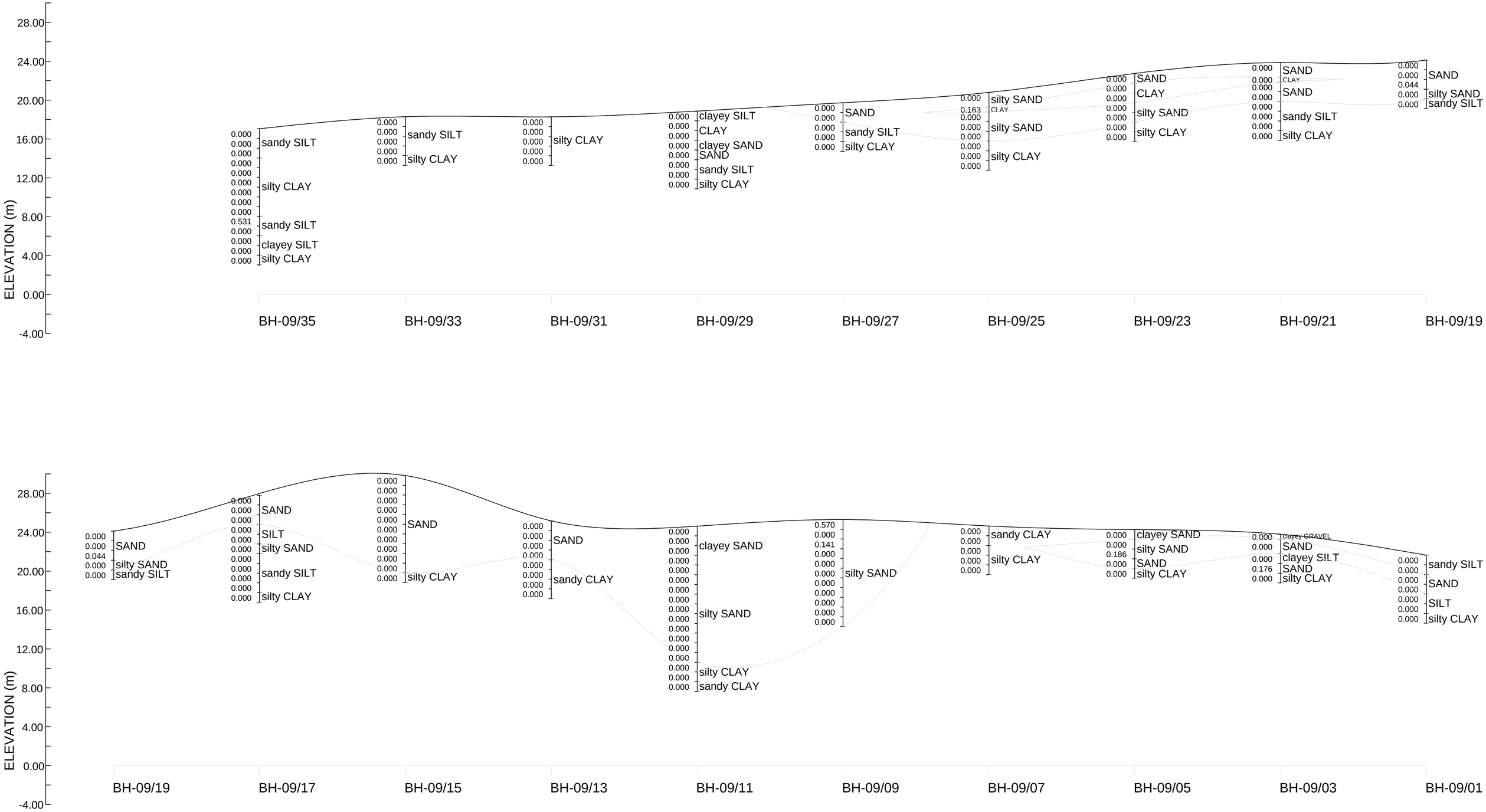
NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 3.8mm = 1000mm	HEAVY MINERAL CONTENT (%): 0.185 0.379 0.186 0.000 0.000 0.000 0.000 0.000 — SAND; sandy CLAY; silty SAND — SOIL TYPE
CROSS SECTIONS		**HORIZONTAL SCALE**: 3.8mm = 4000mm	
LINE 06			
FIGURE: 07			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			



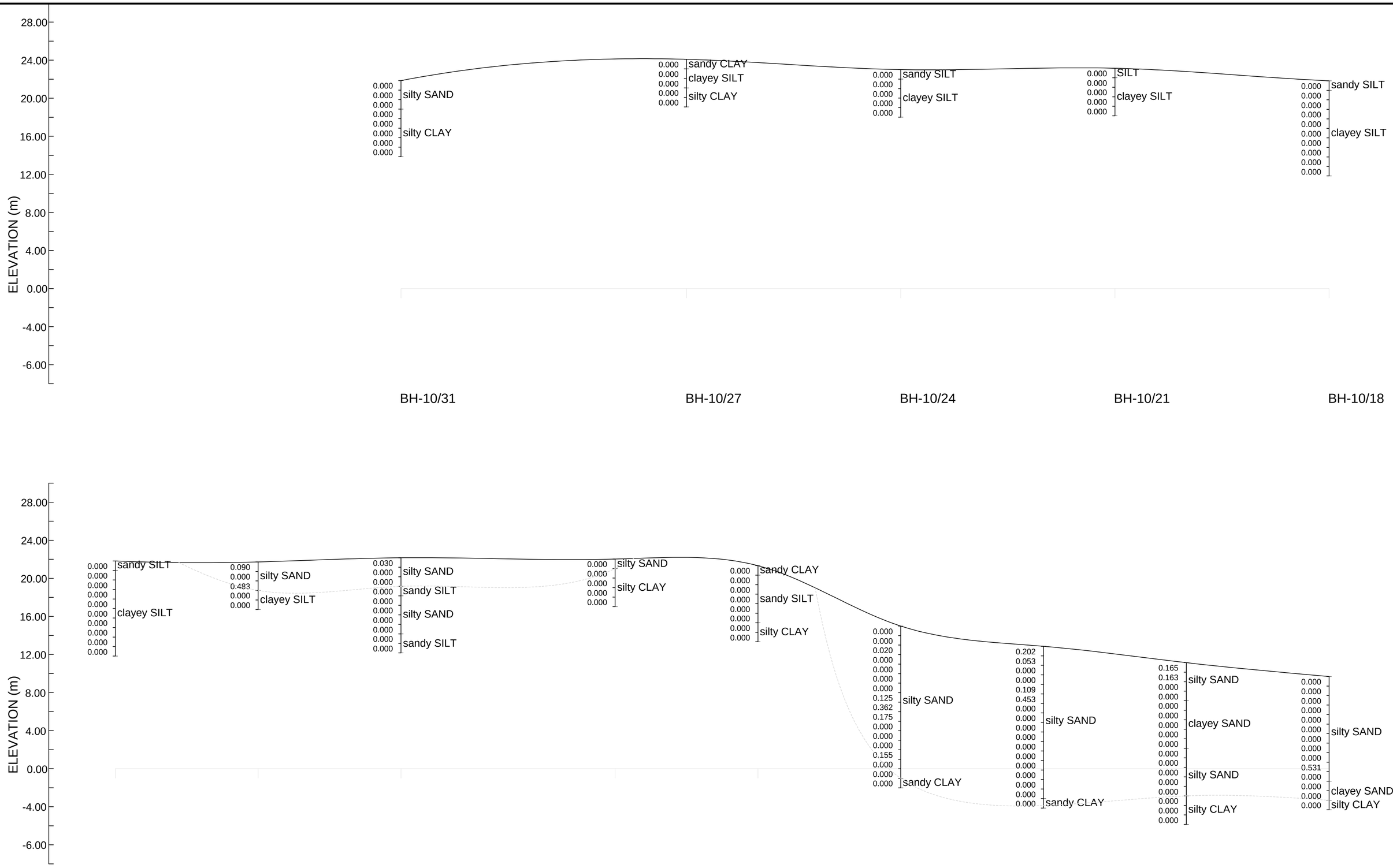
NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 5.0mm = 1000mm	HEAVY MINERAL CONTENT (%): 0.185 0.379 0.186 0.000 0.000 0.000 0.000 0.000 — SOIL TYPE: SAND, sandy CLAY, silty SAND
CROSS SECTIONS			
LINE 07		**HORIZONTAL SCALE**: 5.0mm = 4000mm	
FIGURE: 08			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			



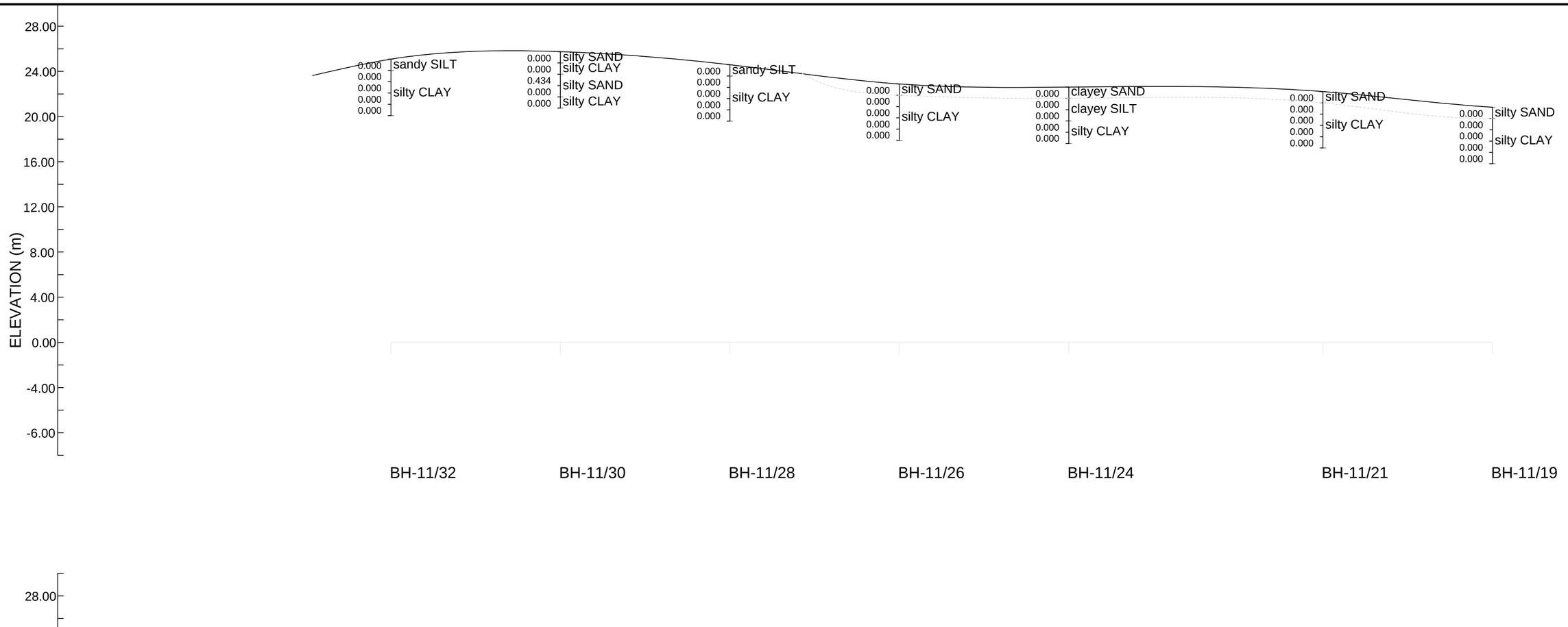
NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 7.0mm = 1000mm	HEAVY MINERAL CONTENT (%) 0.185 0.379 0.186 0.000 0.000 0.000 0.000 0.000 SAND sandy CLAY silty SAND SOIL TYPE
CROSS SECTIONS			
LINE 08			
FIGURE: 09		**HORIZONTAL SCALE**: 7.0mm = 4000mm	
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			



NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 7.0mm = 1000mm	HEAVY MINERAL CONTENT (%) 0.185 SAND 0.379 0.186 0.000 sandy CLAY 0.000 0.000 0.000 0.000 silty SAND SOIL TYPE
CROSS SECTIONS		**HORIZONTAL SCALE**: 7.0mm = 4000mm	
LINE 09			
FIGURE: 10			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			



NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 7.0mm = 1000mm	HEAVY MINERAL CONTENT (%): 0.185 0.379 0.186 0.000 — SAND; 0.000 0.000 0.000 0.000 — sandy CLAY; 0.000 — silty SAND. SOIL TYPE
CROSS SECTIONS		**HORIZONTAL SCALE**: 7.0mm = 4000mm	
LINE 10			
FIGURE: 11			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			



NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
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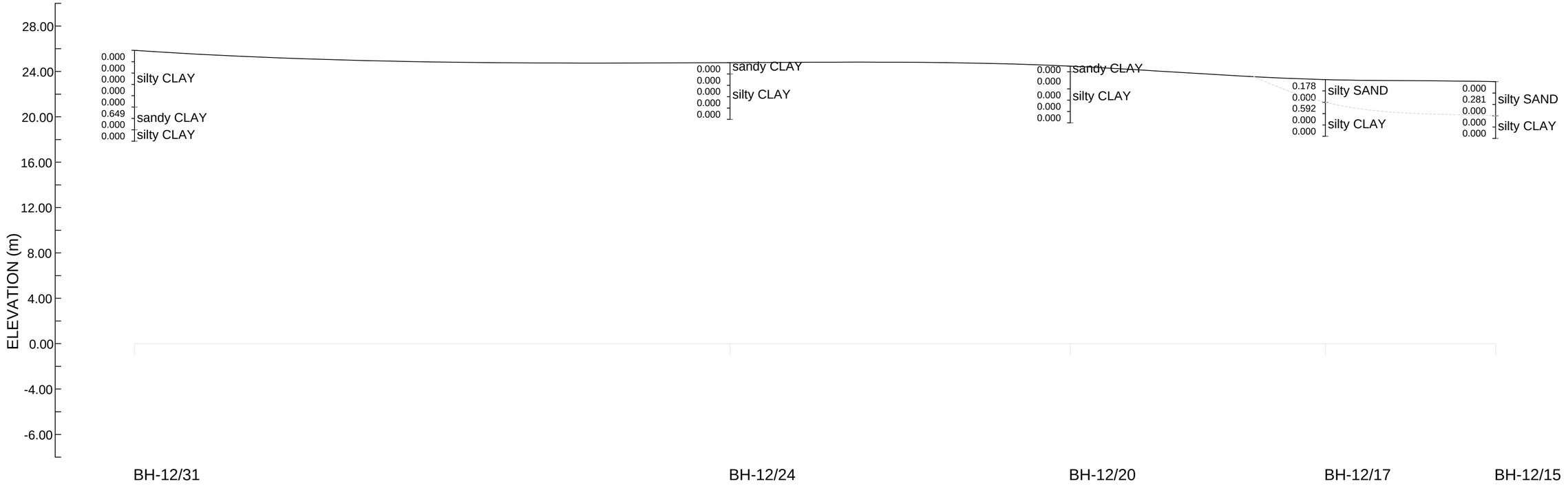
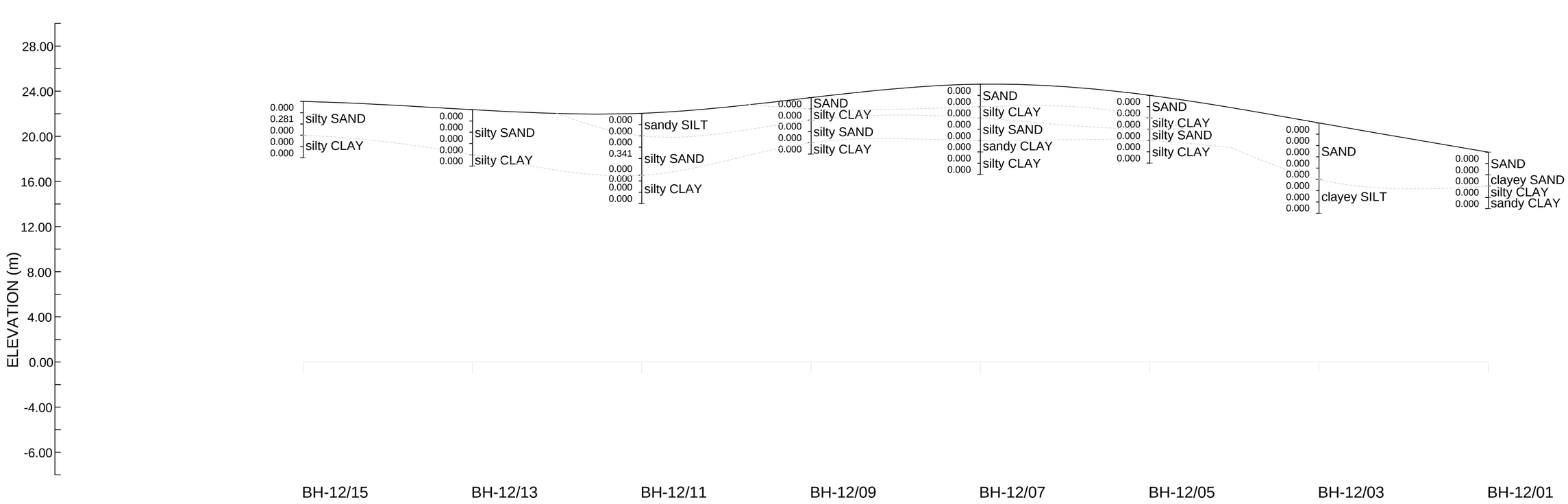
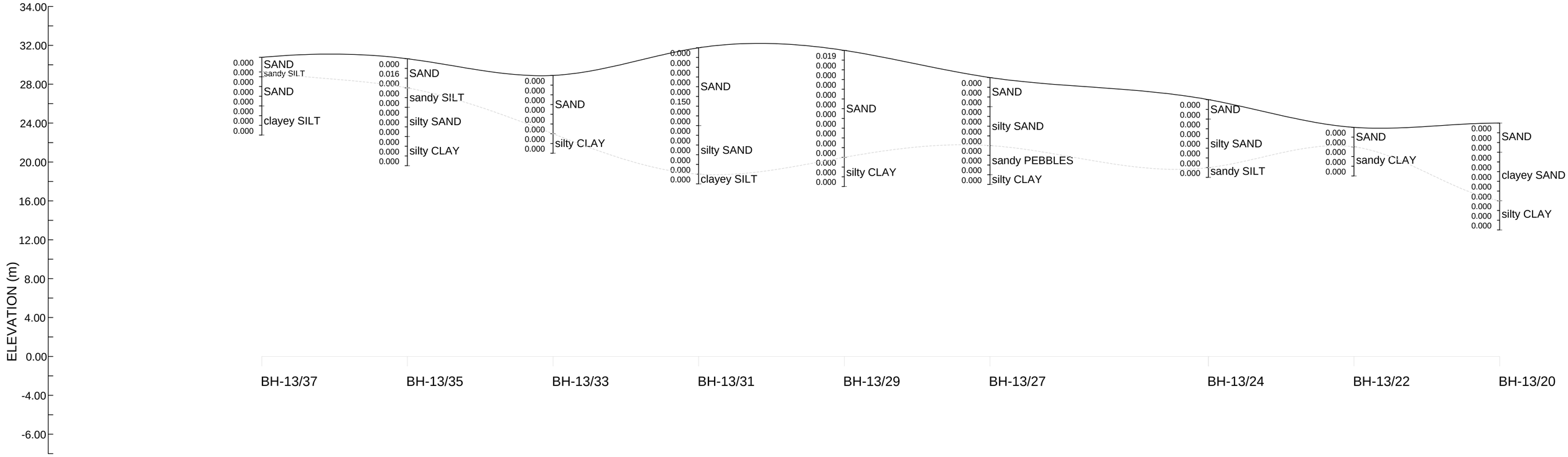
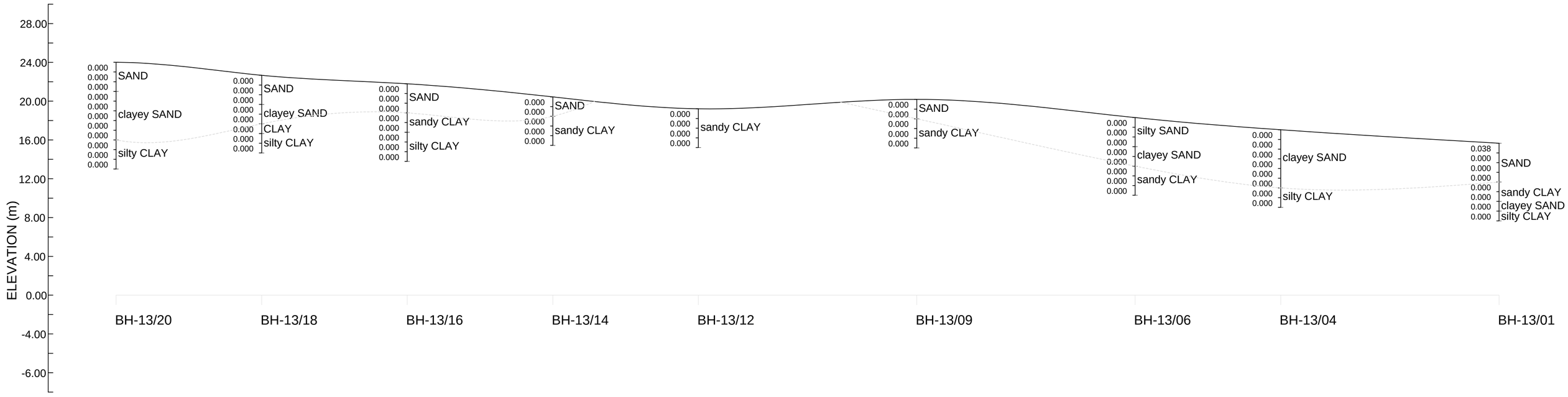
CROSS SECTIONS		**HORIZONTAL SCALE**: 3.8mm = 4000mm	
LINE 11			
FIGURE: 12			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			



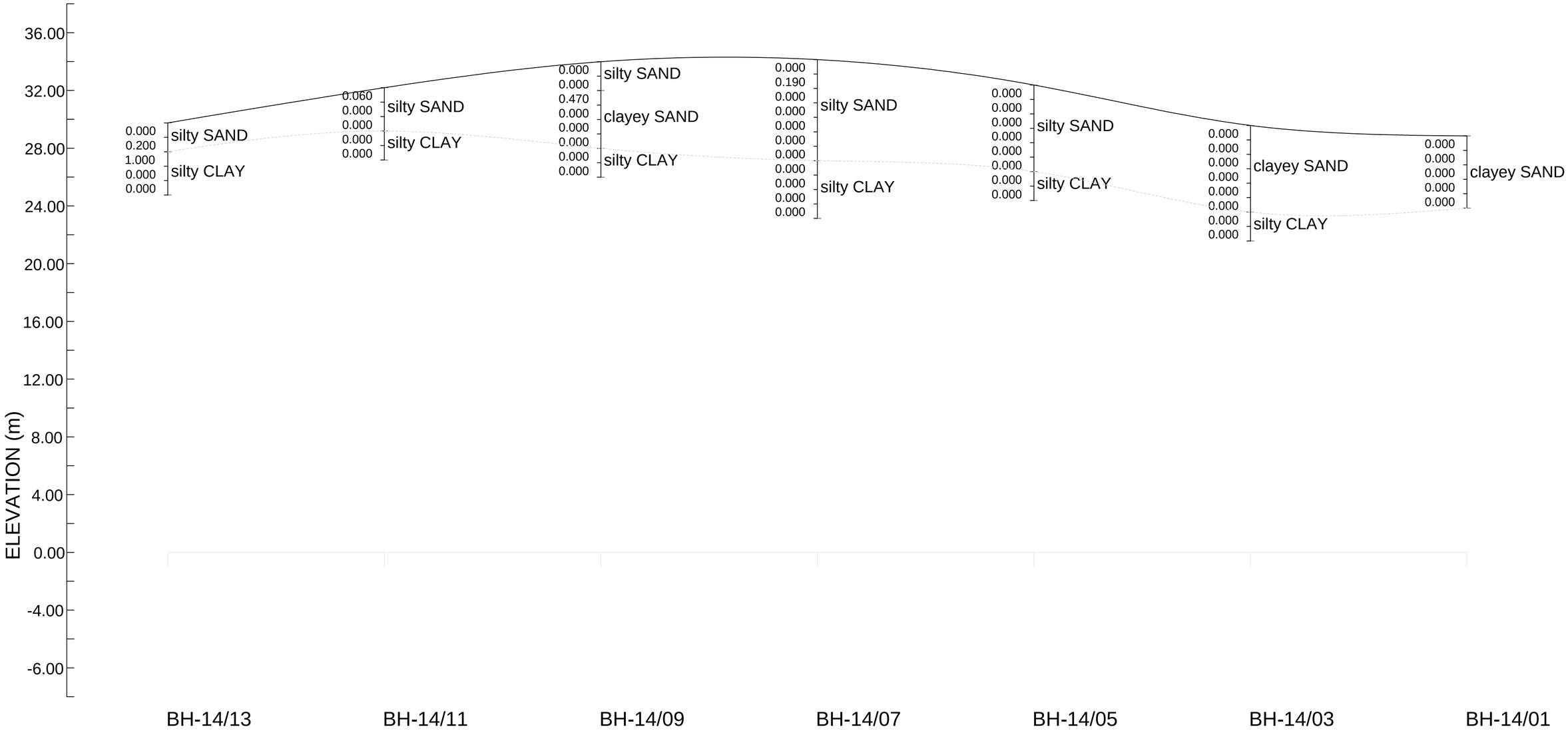


NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 3.8mm = 1000mm	HEAVY MINERAL CONTENT (%) 0.185 0.379 0.186 0.000 SAND; 0.000 0.000 0.000 0.000 sandy CLAY; 0.000 silty SAND — SOIL TYPE
CROSS SECTIONS		**HORIZONTAL SCALE**: 3.8mm = 4000mm	
LINE 12			
FIGURE: 13			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			

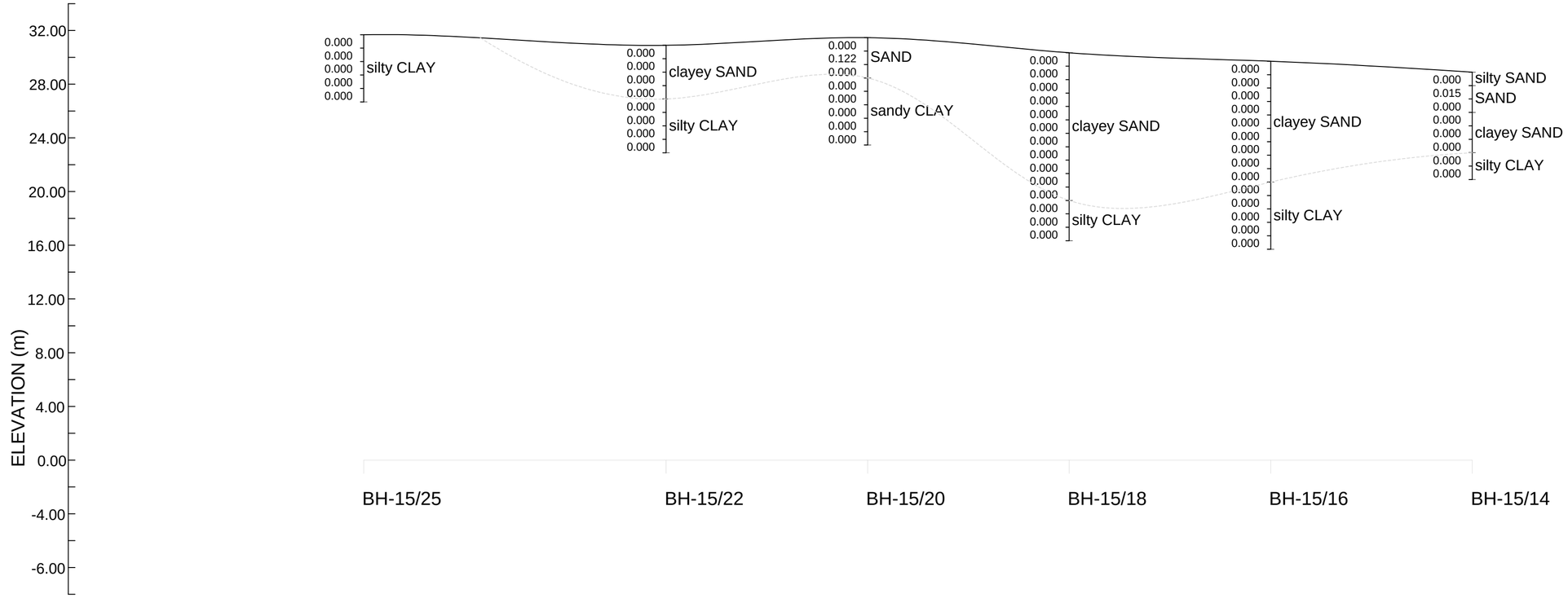


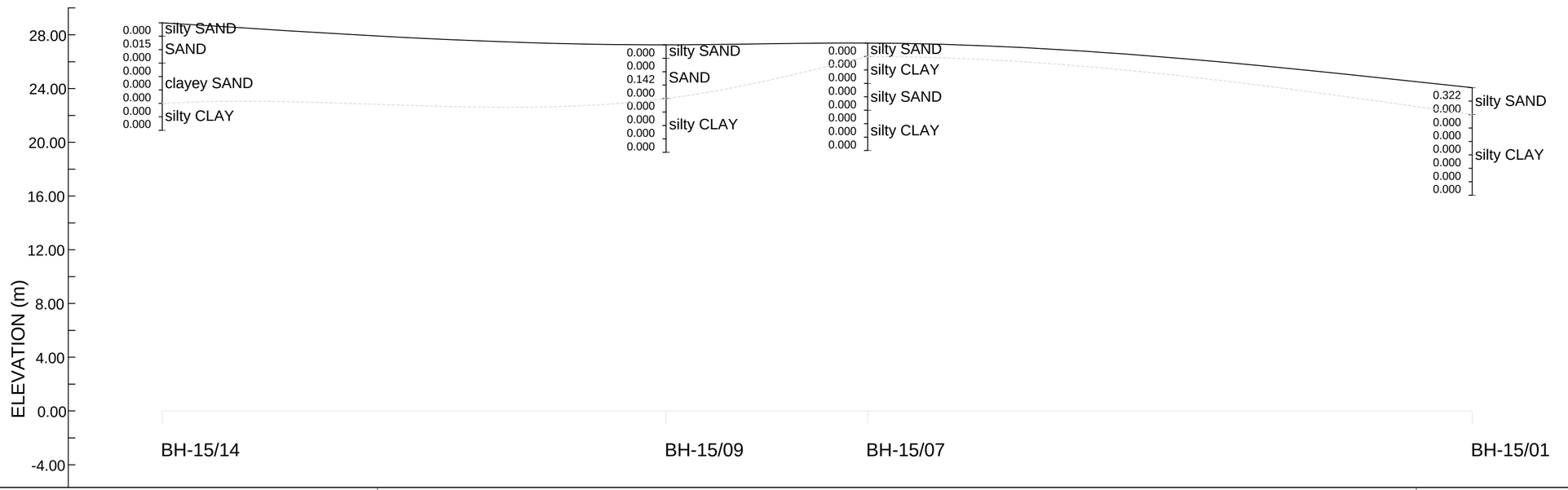


NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 3.6mm = 1000mm	HEAVY MINERAL CONTENT (%) 0.185 SAND 0.379 0.186 sandy CLAY 0.000 silty SAND SOIL TYPE
CROSS SECTIONS			
LINE 13		**HORIZONTAL SCALE**: 3.6mm = 4000mm	
FIGURE: 14			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			

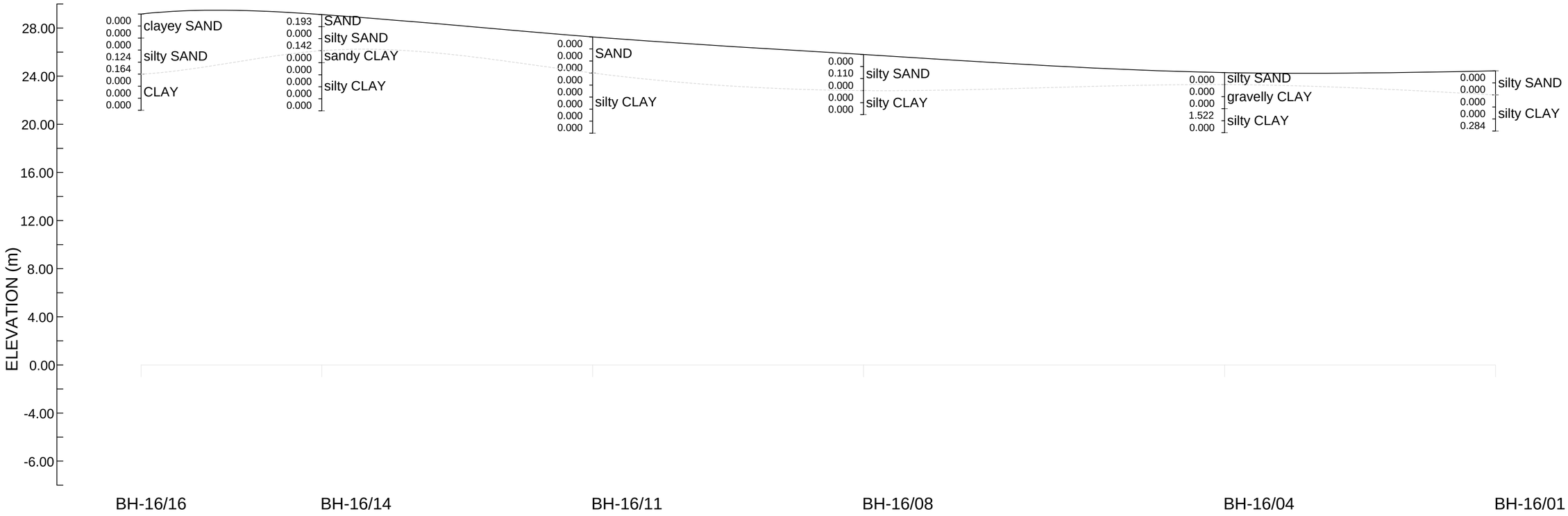


NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 5.0mm = 1000mm	HEAVY MINERAL CONTENT (%): 0.185, 0.379, 0.186 — SAND; 0.000, 0.000, 0.000, 0.000 — sandy CLAY; 0.000 — silty SAND. SOIL TYPE
CROSS SECTIONS		**HORIZONTAL SCALE**: 5.0mm = 4000mm	
LINE 14			
FIGURE: 15			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			

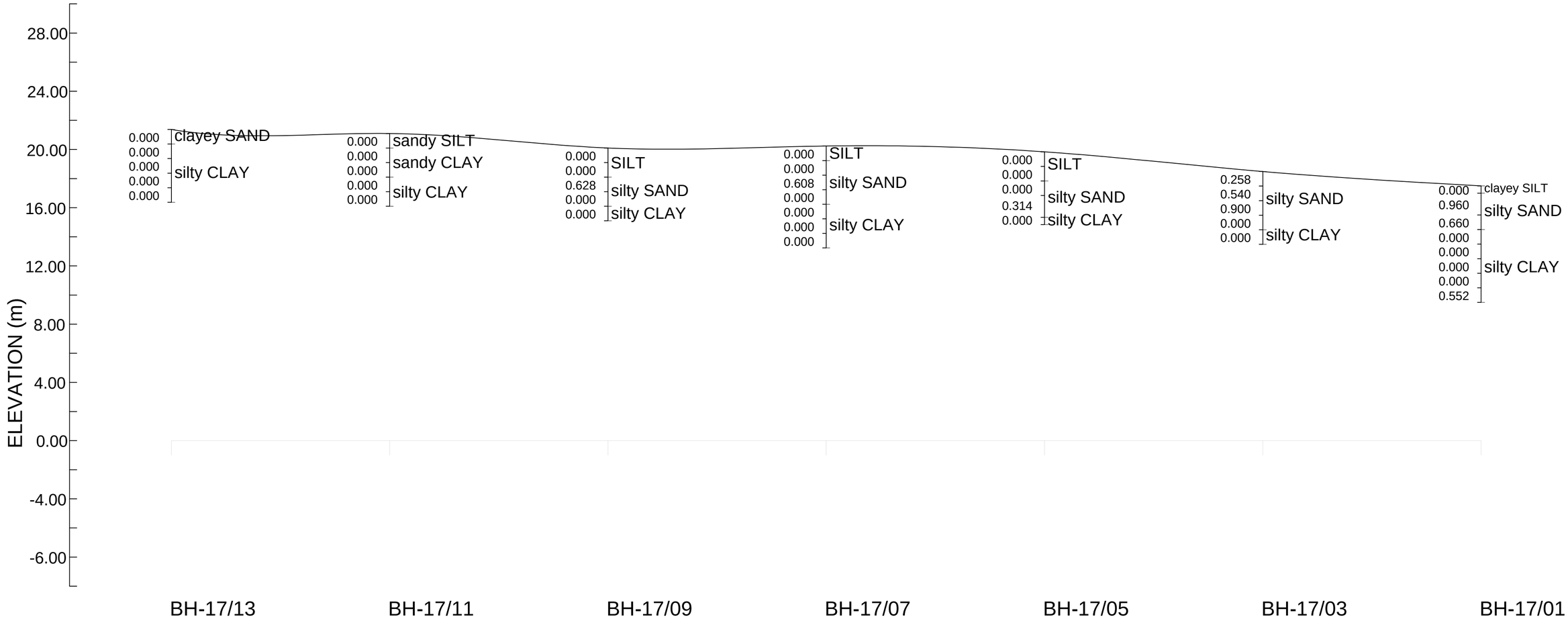




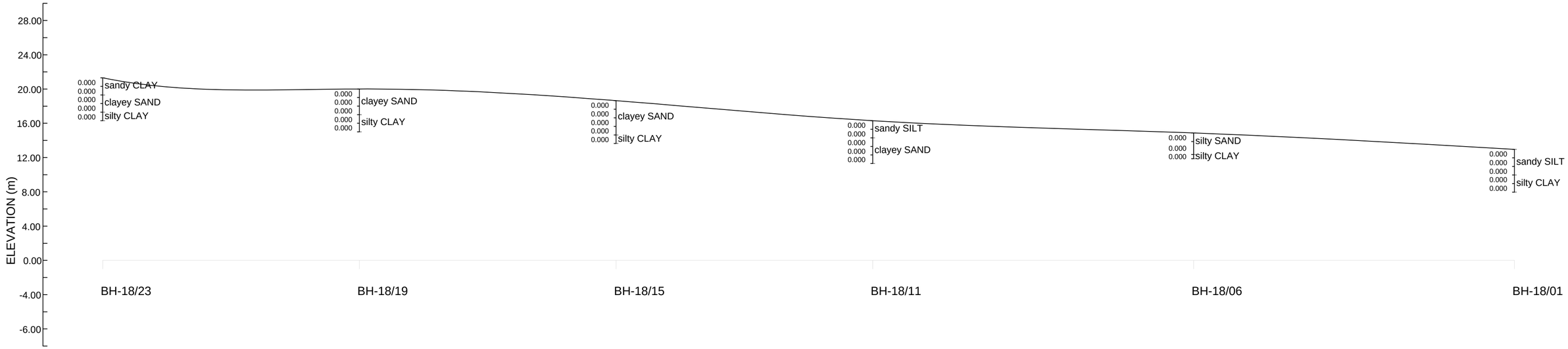
NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 3.8mm = 1000mm	HEAVY MINERAL CONTENT (%) 0.185 0.379 0.186 0.000 0.000 0.000 0.000 0.000 SAND sandy CLAY silty SAND SOIL TYPE
CROSS SECTIONS			
LINE 15		**HORIZONTAL SCALE**: 3.8mm = 4000mm	
FIGURE: 16			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			



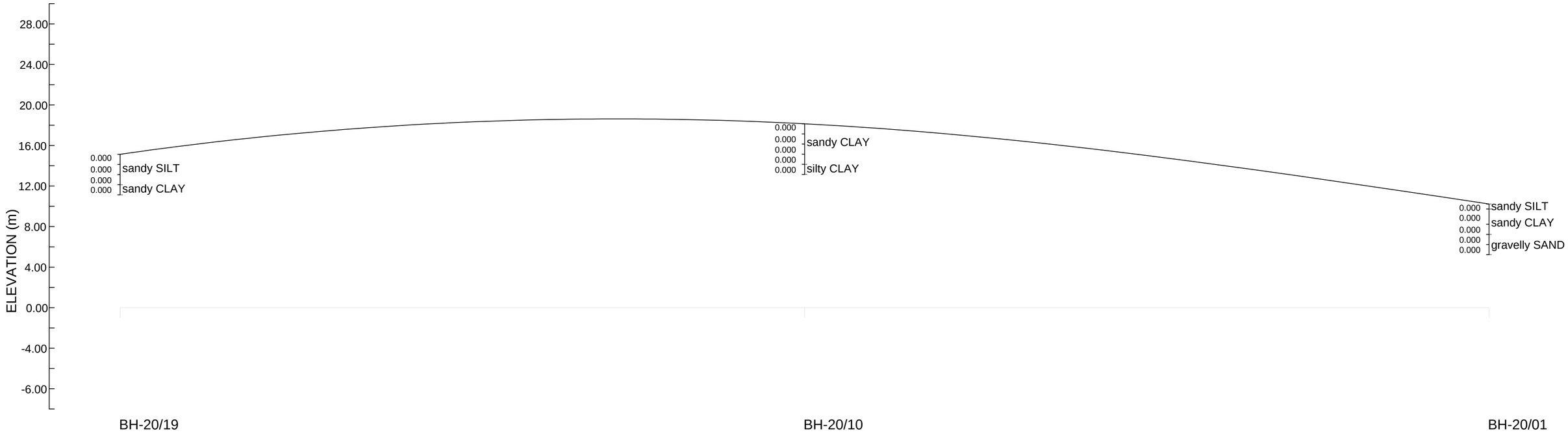
NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 4.0mm = 1000mm	HEAVY MINERAL CONTENT (%) 0.185 0.379 SAND 0.186 0.000 0.000 sandy CLAY 0.000 0.000 silty SAND SOIL TYPE
CROSS SECTIONS		**HORIZONTAL SCALE**: 4.0mm = 4000mm	
LINE 16			
FIGURE: 17			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			



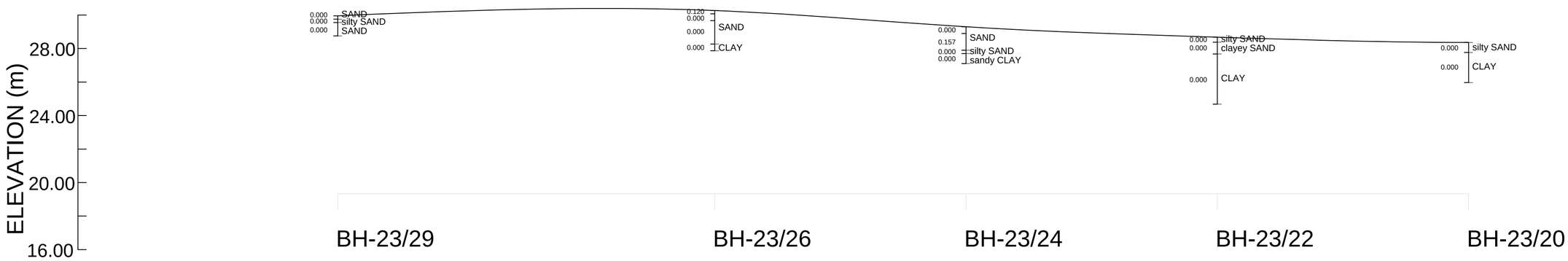
NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 5.0mm = 1000mm	HEAVY MINERAL CONTENT (%): 0.185, 0.379, 0.186, 0.000 — SAND; 0.000, 0.000, 0.000, 0.000 — sandy CLAY; 0.000 — silty SAND. SOIL TYPE
CROSS SECTIONS			
LINE 17			
FIGURE: 18			
DATE: 29.07.2020		**HORIZONTAL SCALE**: 5.0mm = 4000mm	
AUTHOR: INESHKA W.S.S.			

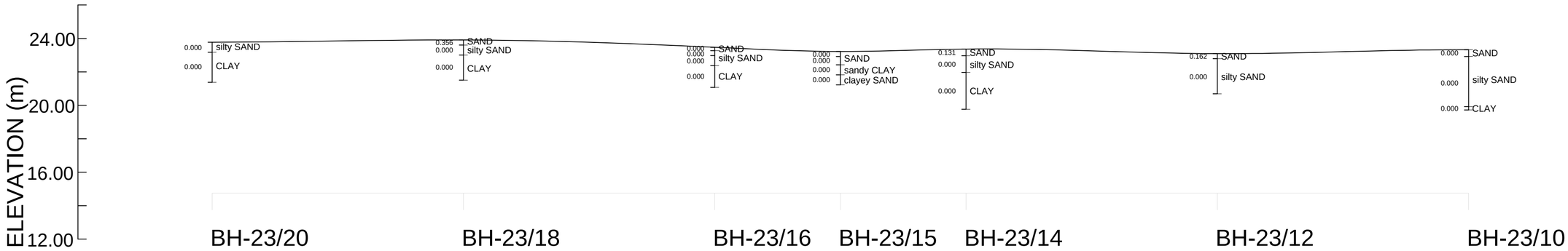


NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 3.0mm = 1000mm	HEAVY MINERAL CONTENT (%) 0.185 0.379 0.186 0.000 SAND; 0.000 0.000 0.000 0.000 sandy CLAY; 0.000 silty SAND — SOIL TYPE
CROSS SECTIONS			
LINE 18			
FIGURE: 19			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.		**HORIZONTAL SCALE**: 3.0mm = 4000mm	

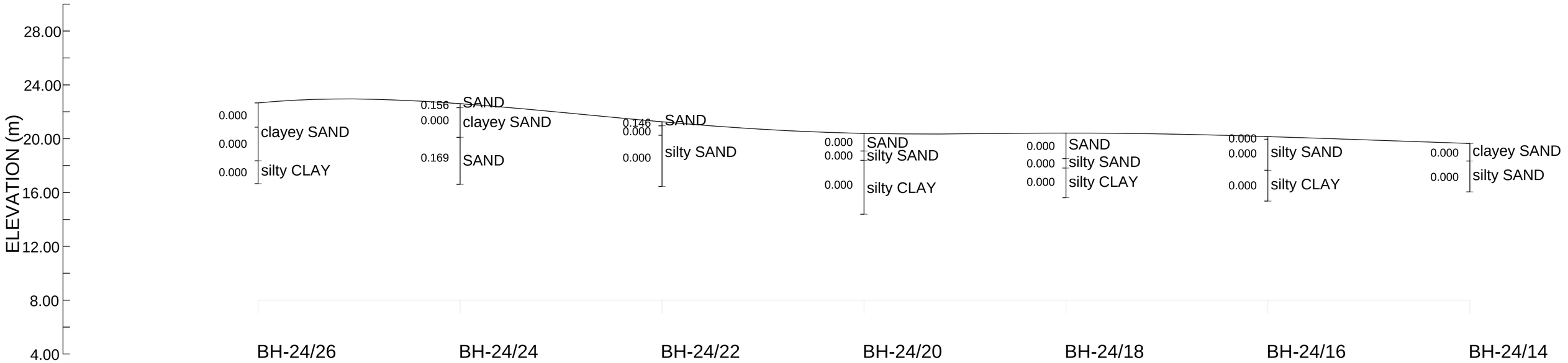


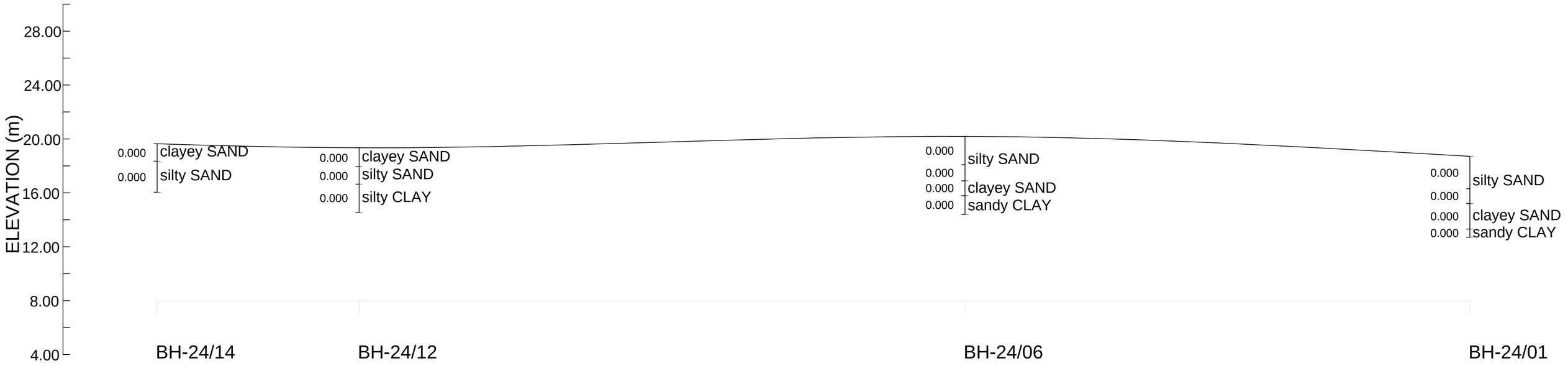
NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 3.6mm = 1000mm	HEAVY MINERAL CONTENT (%) 0.185 0.379 SAND 0.186 0.000 0.000 sandy CLAY 0.000 0.000 0.000 silty SAND SOIL TYPE
CROSS SECTIONS		**HORIZONTAL SCALE**: 3.6mm = 4000mm	
LINE 20			
FIGURE: 20			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			



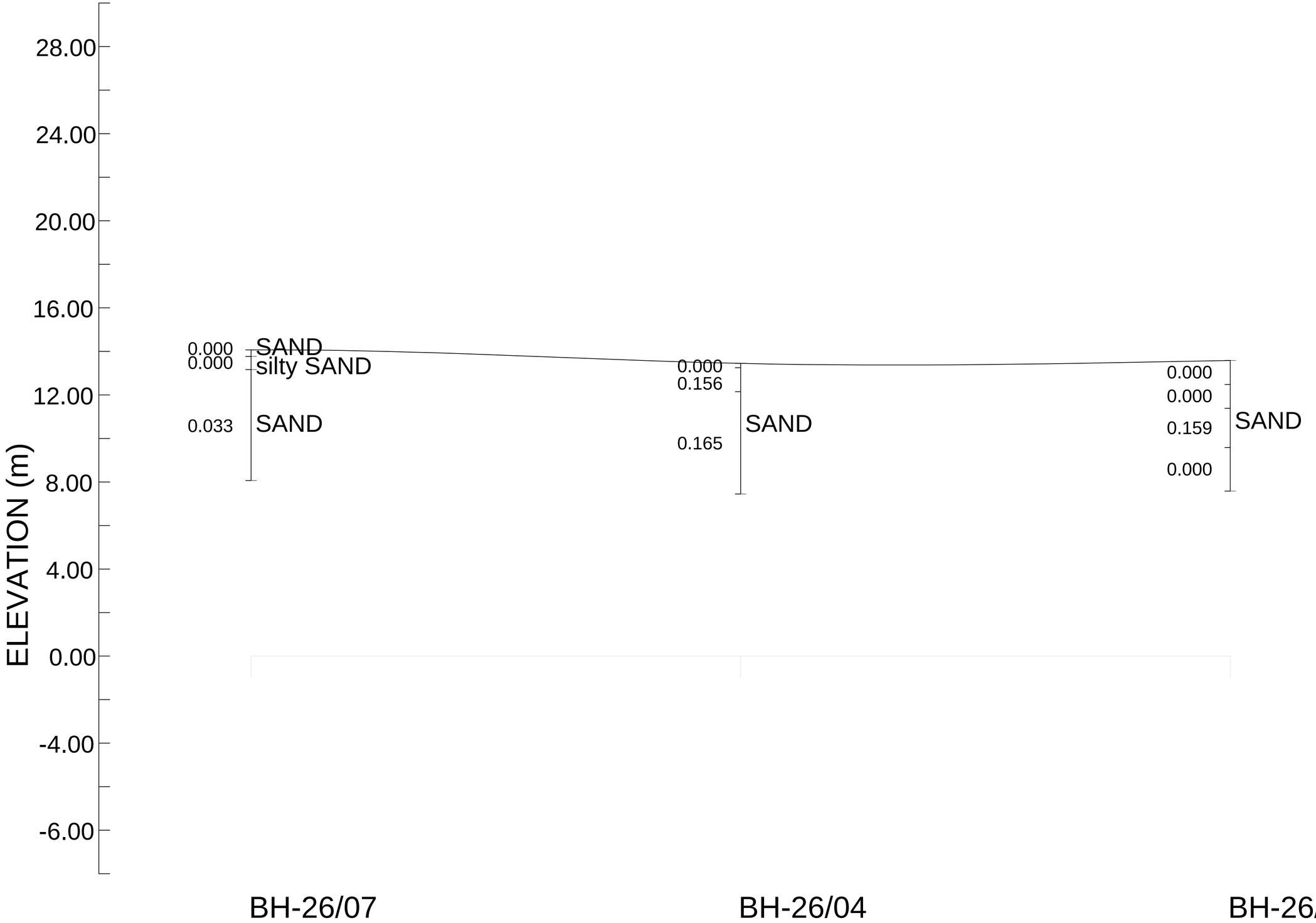


NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 5.3mm = 1000mm	HEAVY MINERAL CONTENT (%) 0.185 SAND 0.379 0.186 0.000 sandy CLAY 0.000 0.000 0.000 silty SAND SOIL TYPE
CROSS SECTIONS		**HORIZONTAL SCALE**: 5.3mm = 4000mm	
LINE 23			
FIGURE: 21			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			





NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 5.0mm = 1000mm	HEAVY MINERAL CONTENT (%) 0.185 0.379 SAND 0.186 0.000 0.000 sandy CLAY 0.000 0.000 0.000 silty SAND SOIL TYPE
CROSS SECTIONS		**HORIZONTAL SCALE**: 5.0mm = 4000mm	
LINE 24			
FIGURE: 22			
DATE: 29.07.2020			
AUTHOR: INESHKA W.S.S.			



NARACOOPA MINERAL SANDS (PVT) LTD	COMMENTS	SCALE	LEGEND
EL25/2007		**VERTICAL SCALE**: 8.0mm = 1000mm	HEAVY MINERAL CONTENT (%): 0.185, 0.379, 0.186 — SAND; 0.000, 0.000, 0.000, 0.000 — sandy CLAY; 0.000 — silty SAND. SOIL TYPE
CROSS SECTIONS			
LINE 26			
FIGURE: 23			
DATE: 29.07.2020		**HORIZONTAL SCALE**: 8.0mm = 4000mm	
AUTHOR: INESHKA W.S.S.			

NARACOOPA MINERAL SANDS PTY LTD

EL 25/2007 DRILLING PROGRAM 2018-19
ENVIRONMENTAL MITIGATION MEASURES
26 MARCH 2018

Van Diemen CONSULTING PO BOX 1 NEW TOWN TAS 7008

This document has been prepared in accordance with the scope of services agreed upon between Van Diemen Consulting (VDC) and the Client.

To the best of VDC's knowledge, the report presented herein represents the Client's intentions at the time of completing the document. However, the passage of time, manifestation of latent conditions or impacts of future events may result in changes to matters that are otherwise described in this document. In preparing this document VDC has relied upon data, surveys, analysis, designs, plans and other information provided by the client, and other individuals and organisations referenced herein. Except as otherwise stated in this document, VDC has not verified the accuracy or completeness of such data, surveys, analysis, designs, plans and other information.

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Document Status

Revision	Author	Reviewer and Organisation	Date
1	R Barnes C McCoull	R Barnes, VDC	26-3-2018
1	R Barnes C McCoull	Vishwa Welagedara, NMS	26-3-2018

CONTENTS

1. INTRODUCTION

1.1 LOCATION

The exploration works are proposed for areas covered by exploration licence EL25/2007.

The exploration licence (EL) extends between the existing Naracoopa Sand Mine Northern and Southern Deposit mining leases and overlaps a large area of Sea Elephant Bay. The EL area is 77 square kilometres / blocks, of which approximately 52 km2 overlaps the seabed in the bay (refer to Figure 1 and Figure 2).

The northern-most tip of the exploration licence includes a portion of the Lavinia State Reserve, which is a listed Ramsar wetland. The Lavinia Point-Cowper Point dune system also overlaps the northern extent of the EL. This dune system is an important coastal landform/relic. The Sea Elephant Conservation Area overlaps these two areas as well as the northern portion of the EL (Figure 3). The Eldorado Conservation Area overlaps the central portion of the EL; the Naracoopa Blowhole Geoconservation Area and the coastline along the bay is a Public Reserve.

Most of the exploration area on land is situated over natural dune landscape with remnant or partly cleared and disturbed native vegetation, bisected by several roadways, tracks and fencelines.

Several cleared/cropped or pasture areas occur along the south-eastern boundary of the EL. Historical line clearing grids exist near the southern boundary of the EL, which are only faintly visible on a recent aerial photograph and appear to have successfully rehabilitated naturally.

The purpose of this plan was to conduct flora and fauna surveys to identify the most appropriate access routes to drill sample locations for mineral sand sampling as part of the Naracoopa Mineral Sands Mine on King Island.

1.2 EXPLORATION DRILLING PROGRAM

A Geophysical Works Program conducted in 2017 provided the opportunity to refine the areas for drill-based sampling.

The drilling program is scheduled for 2018 – start date of April – May 2018.

Figure 4 shows the exploration drill line locations on the land portion of the EL – there are 27 lines proposed to be drilled. The rational for selecting these lines is discussed within the exploration report prepared for the geophysical works.

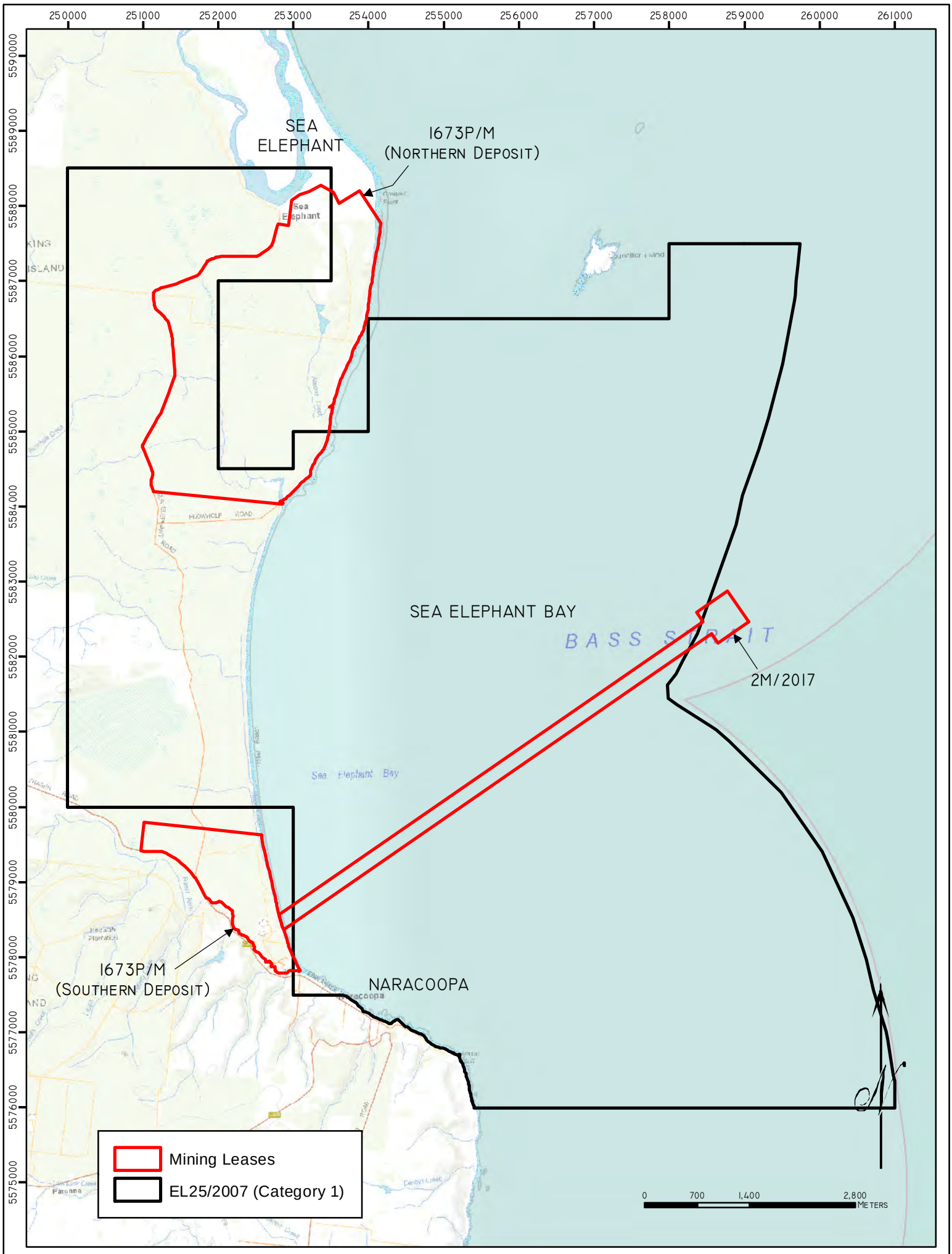
Where possible, existing access roads, tracks and old exploration gridlines will be used to minimise the need for vegetation clearance, track development and drainage works. Any overhanging vegetation will be cut along existing access tracks, any logs restricting access will be cut and removed, old drainage will be re-opened and additional drainage provided as necessary.

This report documents the environmental management measures to be applied during the exploration works in addition to those relevant actions described in the *Mineral Exploration Code of Practice (Fifth Edition - 2012)*.

This document provides Environment protection Guidelines to assist the exploration team in identifying and managing environmental impacts in an appropriate manner.

1.3 ACRONYMS

DPIPWE	Department of Primary Industries, Parks, Water and Environment
EL	Exploration Licence
GIS	Geographic Information System
NVA	Natural Values Atlas (database maintained by DPIPWE)



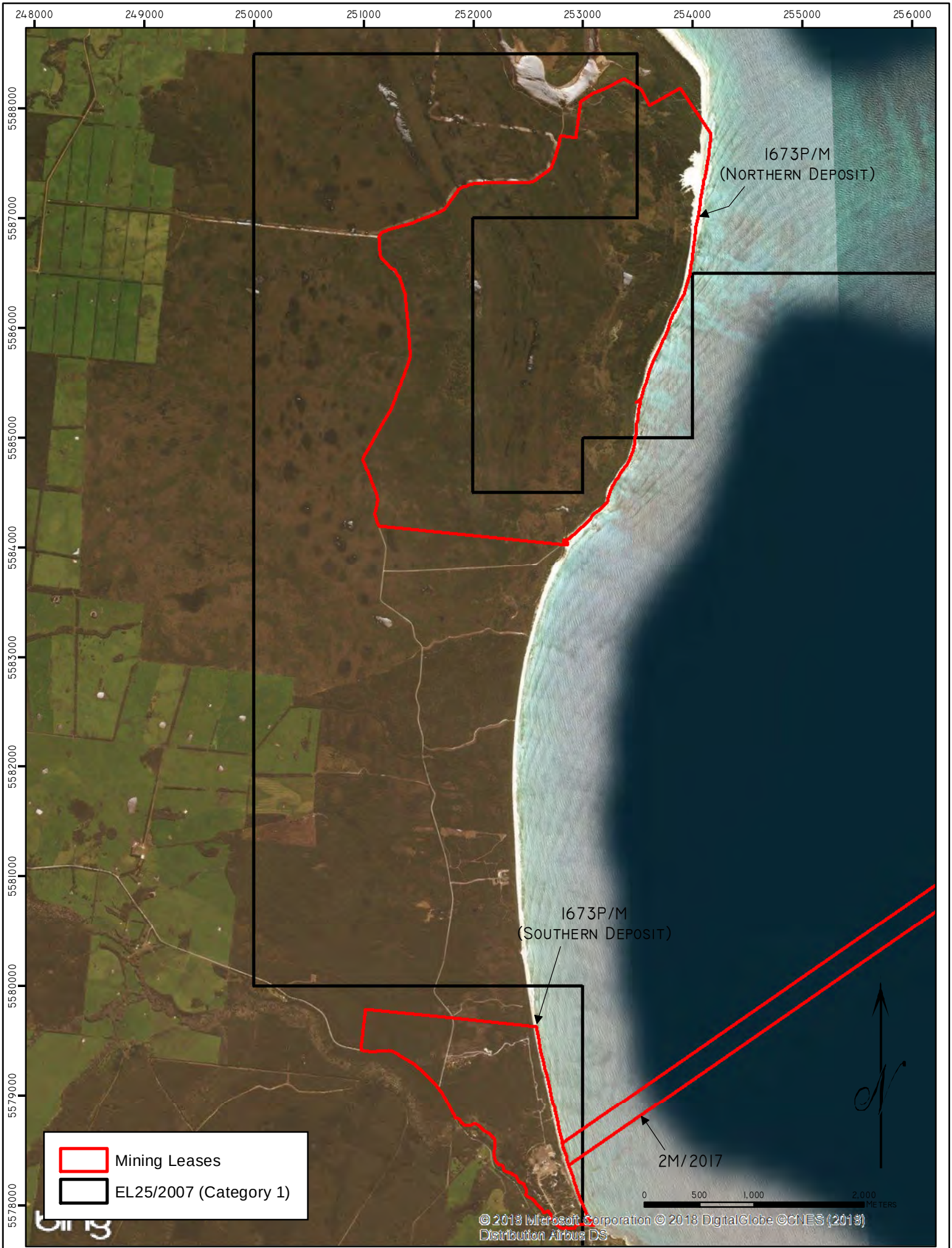
NARACOOPA MINERAL SANDS MINE
EL WORKS PROGRAM 2018 - DRILLING
FIGURE 1: EXPLORATION LICENCE LOCATION

Van Diemen CONSULTING
PO Box 1 New Town TAS 7008

DATUM: GDA94
GRID: MGA ZONE 55
TASMAP: SEA ELEPHANT
NARACOOPA

CLIENT: NARACOOPA MINERAL SANDS PTY. LTD.

DATE: 25TH MAR 2018



Naracoopa Mineral Sands Mine
EL Works Program 2018 - Drilling
Figure 2: Exploration Licence (Terrestrial) (over Aerial Photo)

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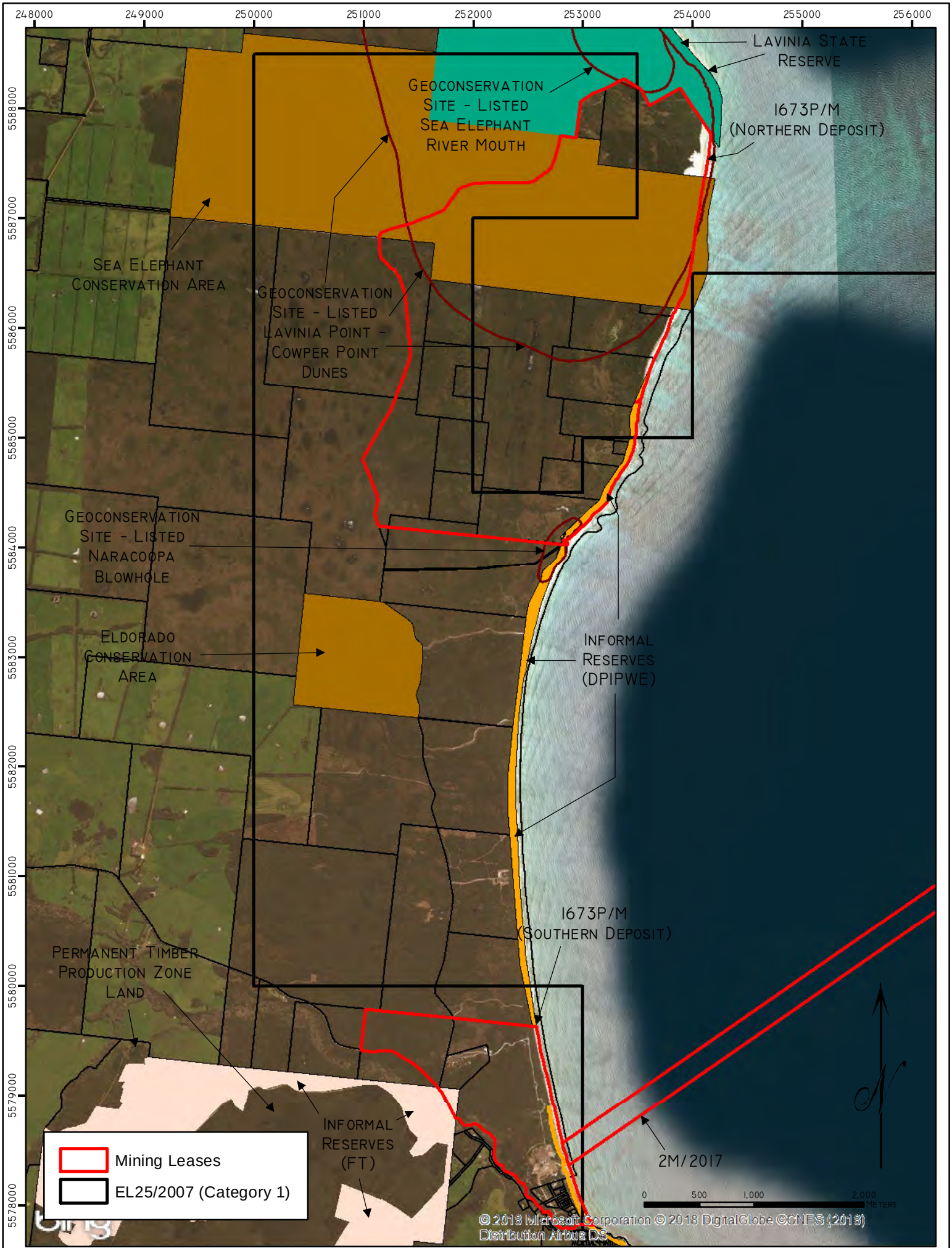
DATUM: GDA94
GRID: MGA ZONE 55
TASMAP: SEA ELEPHANT
NARACOOPA

CLIENT: NARACOOPA MINERAL SANDS PTY. LTD.

DATE: 25th Mar 2018



NARACOOPA MINERAL SANDS MINE
EL WORKS PROGRAM 2018 - DRILLING
FIGURE 3: CONSTRAINTS

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DATUM: GDA94
GRID: MGA ZONE 55
TASMAP: SEA ELEPHANT
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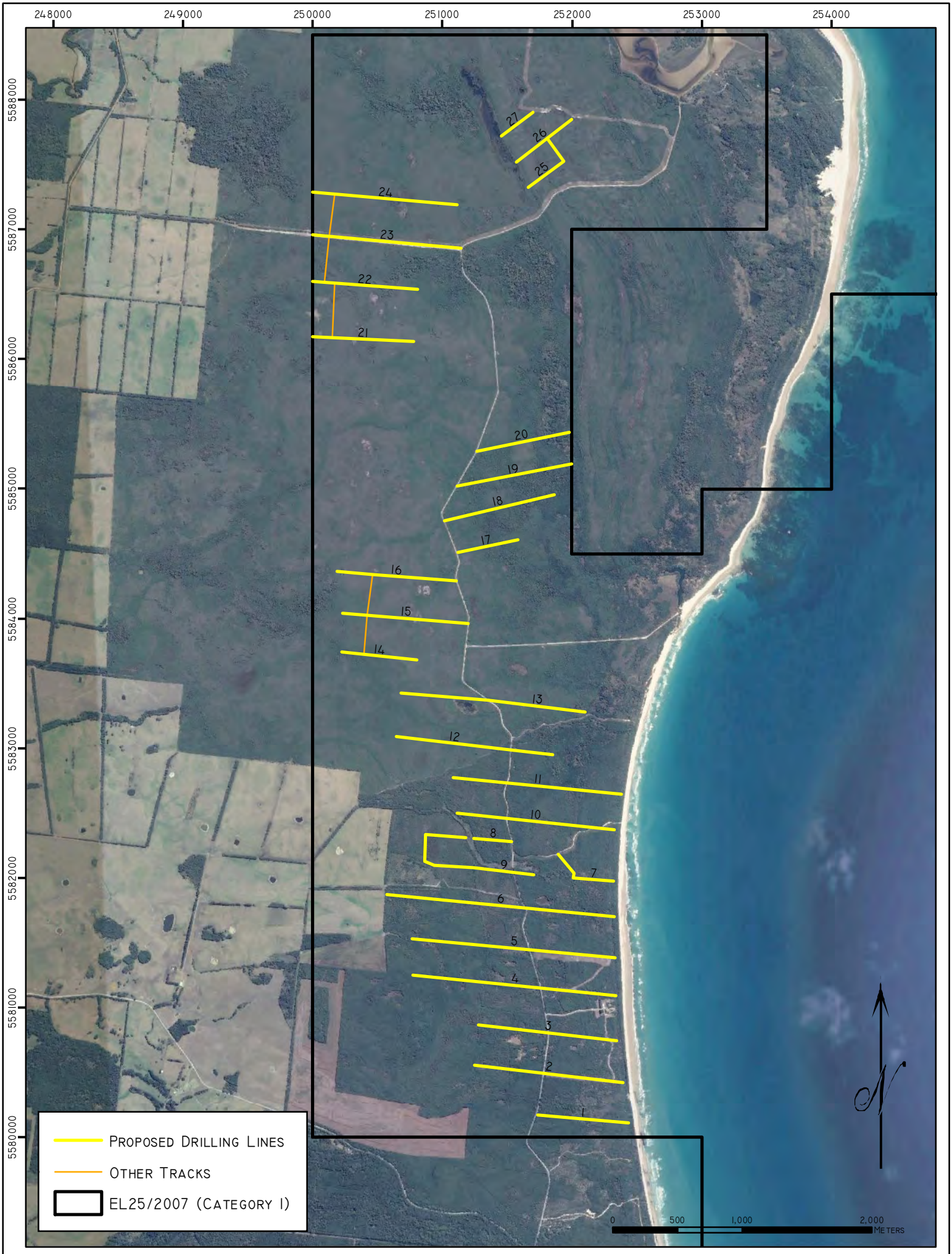
CLIENT: NARACOOPA MINERAL SANDS PTY. LTD.

DATE: 25TH MAR 2018



NARACOOPA MINERAL SANDS MINE
EL WORKS PROGRAM 2018 - DRILLING

FIGURE 4: PROPOSED DRILLING LINES FOR FUTURE DRILLING

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DATUM: GDA94
GRID: MGA ZONE 55
TASMAP: SEA ELEPHANT
NARACOOPA

CLIENT: NARACOOPA MINERAL SANDS PTY. LTD.

DATE: 25TH MAR 2018

2. FLORA

2.1 Vegetation

A list of vegetation communities that occur within the EL is provided in Table 1.

Most threatened vegetation communities can be avoided by the drill lines.

One community, King Island eucalypt woodland (DKG), is unlikely to be avoid in all cases due to its occurrence on sandy ridgelines that extend for considerable distances parallel to the beach (ie old dune series).

Table 1 - Vegetation and other land use categories observed on or near the survey lines

TASVEG community (code)	Threatened native vegetation community[#]	Impact Management Approach
Eucalyptus brookeriana wet forest (WBR)	Yes	Avoid
Eucalyptus globulus King Island forest (WGK)	Yes	Avoid
Freshwater aquatic herbland (AHF)	Yes	Avoid
King Island eucalypt woodland (DKG)	Yes	Avoid or minimise eucalypt removal
Melaleuca ericifolia swamp forest (NME)	Yes	Avoid or minimise tree removal, traverse in dry conditions
Coastal heathland (SCH)	No	Minimise clearing width of track
Coastal scrub (SSC)	No	Minimise clearing width of track
Leptospermum scoparium – Acacia mucronata forest (NLA)	No	Minimise clearing width of track
Leptospermum scoparium – Melaleuca squarrosa swamp forest (NLM)	No	Minimise clearing width of track
Wet heathland (SHW)	No	Minimise clearing width of track
Acacia longifolia coastal scrub (SAC)	No	Minimise clearing width of track
Pteridium esculentum fernland (FPE)	No	None
Extra-urban miscellaneous (FUM)	No	None
Agricultural land (FAG)	No	None

Threatened native vegetation communities are those listed in Schedule 3A of the *Nature Conservation Act* 2002

2.2 Threatened Flora Species

The ML and EL area have been the subject of extensive surveys by Van Diemen Consulting Pty Ltd, some of the records within the NVA are those of the authoprs of this report.

A search of data in the Natural Values Atlas identified several threatened flora species have been recorded within EL25/2007. These includes orchids and other herbaceous plants being located within the EL area (*Caladenia pusilla, Utricularia tenella, Solanum opacum, Hypolepis muelleri, Elaeocarpus reticulatus* and *Cyrtostylis robusta*).

The map series in Figure 6 shows those areas where specific measures need to be applied because of the proximity of threatened flora species.

A permit to take listed species will need to be sought from the Department of Primary Industries, Parks, Water and Environment to take a few plants of the following species - *Utricularia tenella, Stylidium despectum, S. beaugleholei, Caldenia pusilla and Hypolepis muelleri*.

No flora species listed on the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 have been recorded near drill lines.

2.3 Weeds and Exotic Species

No plant species listed as a Weed of National Significance on the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 have been recorded near drill lines.

Management actions have been identified to manage the risk of spreading weeds and other pathogens in the area from the exploration works (see section 4).

2.4 *Phytophthora cinnamomi* (PC)

Root-rot fungus (*Phytophthora cinnamomi, PC*) is a soil borne pathogen that causes death in a wide range of native plant species often leading to floristic and structural changes in susceptible plant communities.

PC evolved in tropical areas and requires warm, as well as moist, soils for at least some time of the year to produce sporangia and release zoospores. Only those areas of the State that are below an altitude of about 700m above sea level have soils sufficiently warm for this to occur. Vegetation types below 700m elevation may not be wholly or partly susceptible if closed canopies keep soil temperatures cool during the summer months, such as tall wet eucalypt forests over rainforest species, or rainforest communities.

PC can be spread through the movement of infected soil or plant material by people or animals and can even be transported by water percolating through soil or via surface water, such as in creeks and other drainage lines. Transport of PC to new areas is usually through soil/dirt adhering to vehicles and machinery. Transport into non-roaded areas of high human usage is mainly via bushwalking items such as tents or footwear but can also occur by bird activity.

The fungus is not always evident in the landscape as it attacks root systems of susceptible species, usually causing death in new growth or the yellowing of leaves followed by loss of vigour and, in most cases, death. The fungus can inhabit the root systems of resistant species without any visible signs of infection within the host plant.

PC samples were not taken for analysis as numerous susceptible species (e.g. *Banksia marginata, Sprengelia incarnata, Epacris obtusifolia*) were observed in the Survey Area to exhibit 'classic' signs of infection (e.g. yellowing or withering of new growth). Indeed, no areas within wet heathland and coastal heathland communities (susceptible communities) were observed to be free of this pathogen.

3. FAUNA

No fauna species listed on the Commonwealth *Environment Protection and Biodiversity Conservation Act* 1999 or the Tasmanian *Threatened Species Protection Act* 1995 have been recorded near the drill program lines during surveys for the broader NMS project.

Notes are provided below on each of the fauna species of relevance to the exploration works.

Green and gold frog or Growling grass frog (*Litoria raniformis*)

Green and golden frogs are active during both day and night throughout the warmer months and can sometimes be seen basking out of the water amongst vegetation or on rocks and logs, the only Tasmanian frog to exhibit this behaviour. All Access routes avoid wetland habitat that may be used by this species.

Striped marsh frog (*Limnodynastes peroni*)

Drill lines and locations can avoid wetland and swamp paperbark forest habitat that may be used by this species.

King Island green rosella (*Platycercus caledonicus brownii*)

No nesting hollows are present (coastal scrub without hollow forming trees). No trees with suitably sized nesting hollows are present along the Access routes and drill sample locations. The removal of large living *Banksia marginata* trees (potential foraging resource) in the heathland and scrub habitats in the northern area of the EL will be avoided.

King Island brown thornbill (*Acanthiza pusilla archibaldi*)

From the scant information available for this cryptic species, it mainly inhabits tall scrub dominated by wet sclerophyll shrub and tea-tree species and eucalypt dominated wet forests. These habitats have been avoided by the Access routes and drill sample locations.

White bellied sea eagle (*Haliaeetus leucogaster*)

No known nests occur within 500m or 1km line of sight of the Access routes or drill sample locations.

Southern hairy red snail (*Austrochloritis victoriae*)

There is no wet to damp eucalypt forest with a leaf litter – organic soil layer along the Access routes or near the drill sample locations.

Orange-bellied parrot (*Neophema chrysogaster*)

There is no saltmarsh, wetland or other suitable foraging habitat for this species along the Access routes or near the drill sample locations.

Tussock skink (*Pseudemoia pagenstecheri*)

There are no grasslands dominated by *Poa* along the Access routes or near the drill sample locations.

4. EXPLORATION LINE MANAGEMENT

4.1 LOCATION

There are 27 drill lines proposed for the drilling program (Figure 4).

4.2 ENVIRONMENTAL MANAGEMENT MEASURES

The project operator is committed to achieving high quality environmental outcomes through the implementation of environmental management systems to protect the natural environment.

A series of Environment Protection Guidelines (EPG's) have been developed which specifically outline environmental protection requirements for this project.

The following Environment Protection Guidelines are included:

- EPG 1: Disturbance to terrestrial and aquatic flora and fauna
- EPG 2: Working near eucalypt trees
- EPG 3: Working near large remnant Banksia trees that are alive
- EPG 4: Working near wet areas and watercourses
- EPG 5: Erosion, sedimentation and surface run-off

4.3 CONTROL MEASURES FOR WEED AND PATHOGEN CONTROL

Weed and pathogen management actions will need to be applied across the exploration program regardless of the drill line location.

These are described below.

- Vehicles, machinery and equipment involved in clearing of vegetation, excavation and drilling activities will be washed prior to their entry into site.
- The washing down of vehicles, machinery and equipment will occur in an appropriate location, such as a hardstand associated with a works area or industrial wash bay located at the mine site.
- The following process should be applied in washing down vehicles, machinery and equipment (Note: Do NOT apply water to equipment that may be damaged by water)
    - Locate washdown site and prepare the surface or construct bunding as required.
    - Safely park the vehicle free of any hazards (e.g. electrical), ensure the engine is off and the vehicle is immobilised.
    - Look over the vehicle/machine/equipment, inside and out, for where dirt, plant material including seeds are lodged. Pay attention to the underside of the vehicle, radiators, spare tyres, foot wells and bumper bars.
    - Remove any guards, covers or plates if required being careful of any parts that may cause injury.
    - Knock off large clods of mud, use a crow bar if required and sweep out the cabin.
    - Use a vacuum or compressed air where available for removing dried plant material like weed seeds and chaff in radiators and other small spaces where this material lodges. Brush off dry material if no other facilities are available.
    - Clean down with a high-pressure hose (using potable drinking water) and stiff brush/crowbar.

- Start with the underside of the vehicle, wheel arches, wheels (including spare). Next do the sides, radiator, tray, bumper bars etc and finally upper body. Some vehicles may need to be moved during washdown to facilitate washing eg tracked machinery.
- Clean associated implements, eg buckets.
- Check there is no loose soil or plant material that could be readily dislodged or removed.
- Wash effluent away from the machinery and do not drive through wash effluent.

4.2.2 Waterways, wetlands ans swampy areas

Figures 5a, b and c illustrate the general locations of watercourses, wetlands and swampy areas where surface water or wet ground may be encourntered.

EPG's 4 and 5 need to be applied where relevant.

4.2.3 Threatened Flora

Figures 6a-i, a-ii, b-i, b-ii and c-i and c-ii illustrate the NVA recorded locations of threatened flora species.

EPG 1 will need to be applied where relevant.

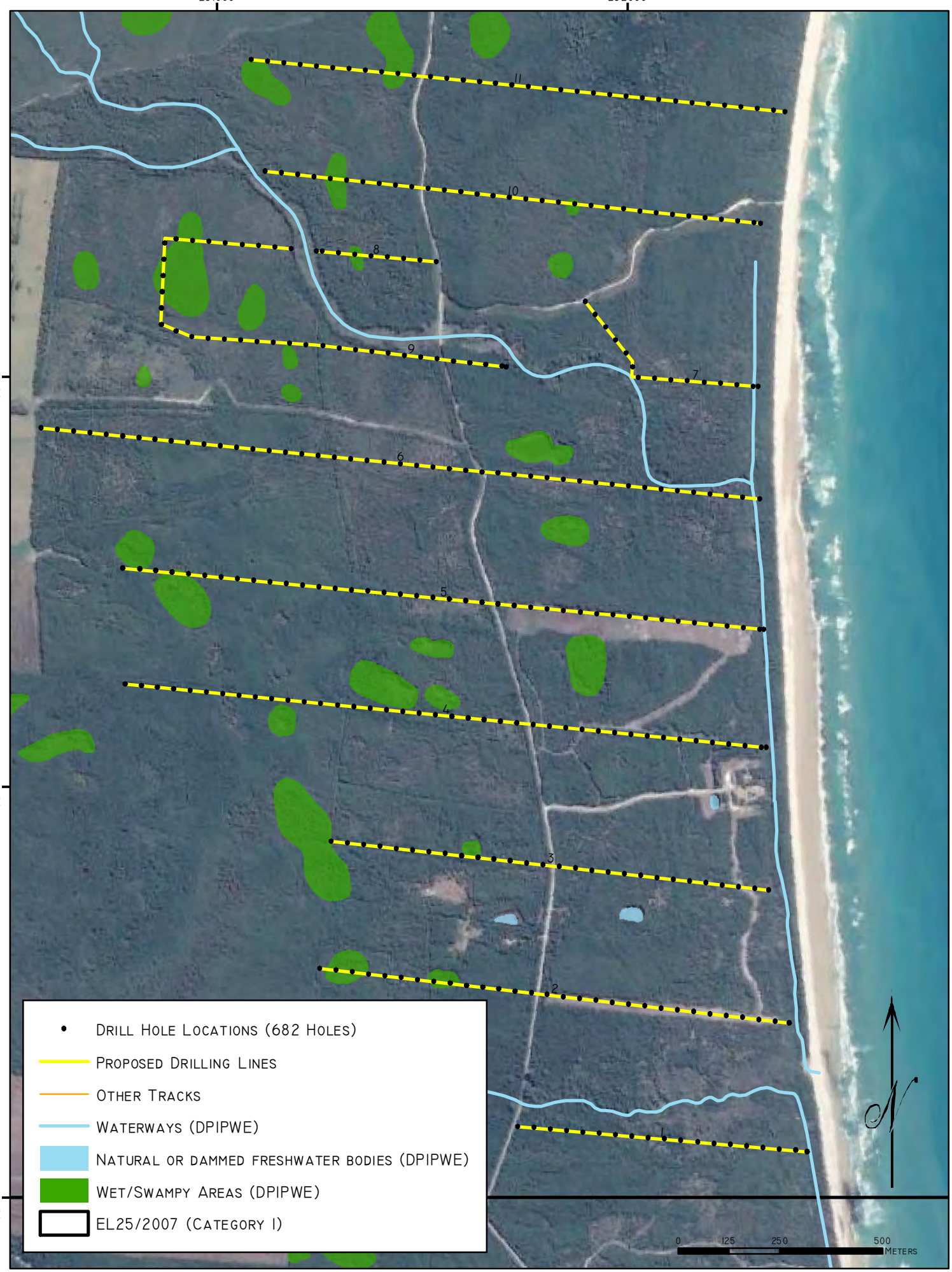
A permit to take listed species will need to be sought from the Department of Primary Industries, Parks, Water and Environment to take a few plants of the following species - *Utricularia tenella, Stylidium despectum, S. beaugleholei, Caldenia pusilla and Hypolepis muelleri*. Plants of these species may be affected by the exploration works, especially where the drill lines will be accessed from Sea Elephant Road (many of the small ephemeral species occur within the roadside drain).

Additional measures will need to be applied if stipulated in a permit issued by the DPIPWE.

4.2.4 Threatened Fauna

Figure 7 illustrates the NVA recorded locations of threatened flora species.

EPG 1 will need to be applied where relevant.



NARACOOPA MINERAL SANDS MINE
EL Works Program 2018 - Drilling

Figure 5a: Hydrology on the Drilling Lines

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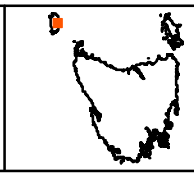
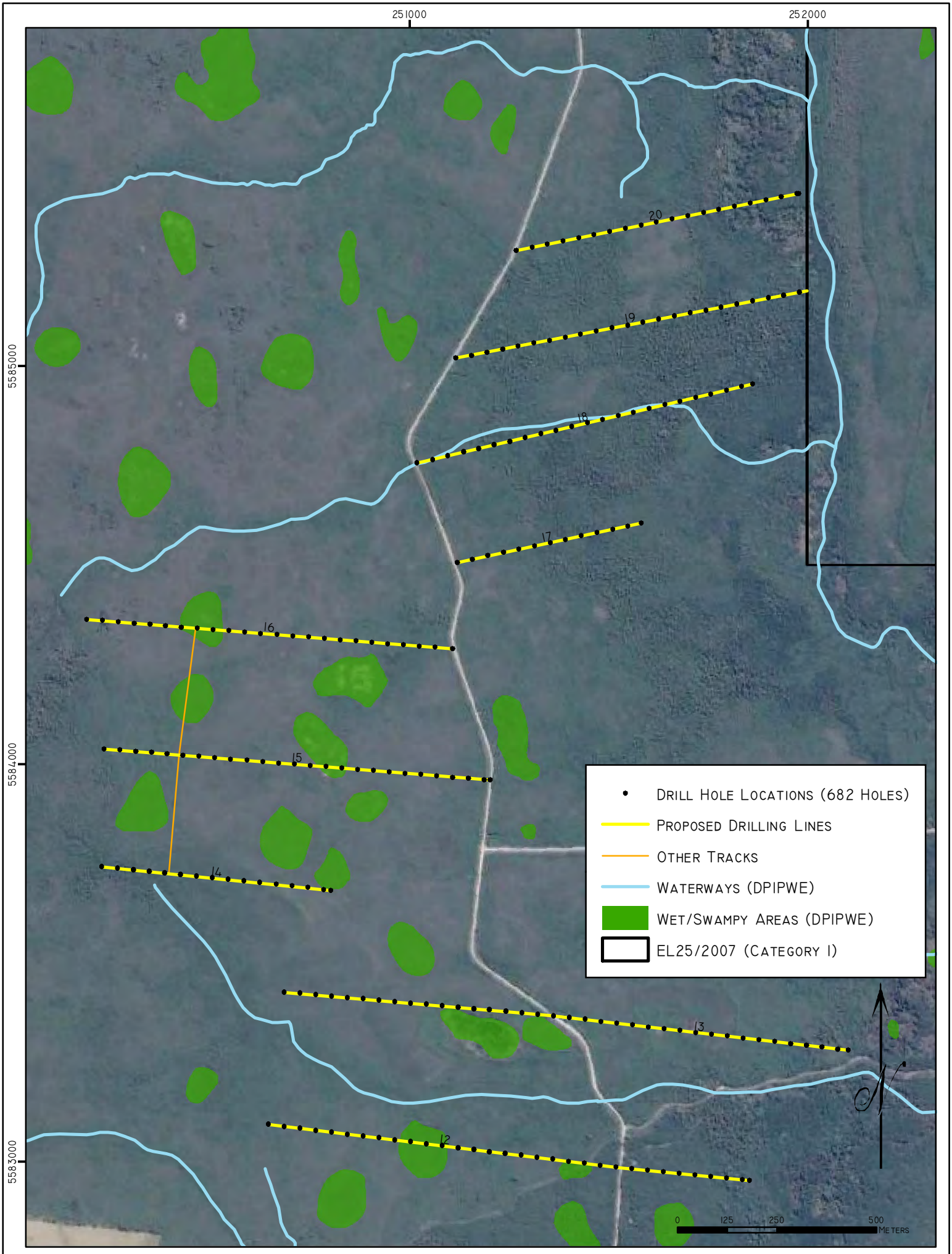


DATUM: GDA94
GRID: MGA ZONE 55
TASMAP: SEA ELEPHANT
NARACOOPA

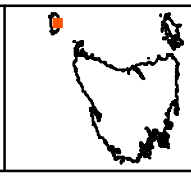
CLIENT: NARACOOPA MINERAL SANDS PTY. LTD.

DATE: 25th Mar 2018



NARACOOPA MINERAL SANDS MINE
EL Works Program 2018 - Drilling
Figure 5b: Hydrology on the Drilling Lines

Van Diemen Consulting
PO Box 1 New Town TAS 7008



DATUM: GDA94
GRID: MGA ZONE 55
TASMAP: SEA ELEPHANT
NARACOOPA

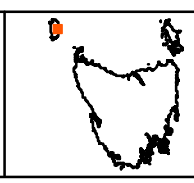
CLIENT: NARACOOPA MINERAL SANDS PTY. LTD.

DATE: 25th Mar 2018

NARACOOPA MINERAL SANDS MINE
EL Works Program 2018 - Drilling

Figure 5c: Hydrology on the Drilling Lines

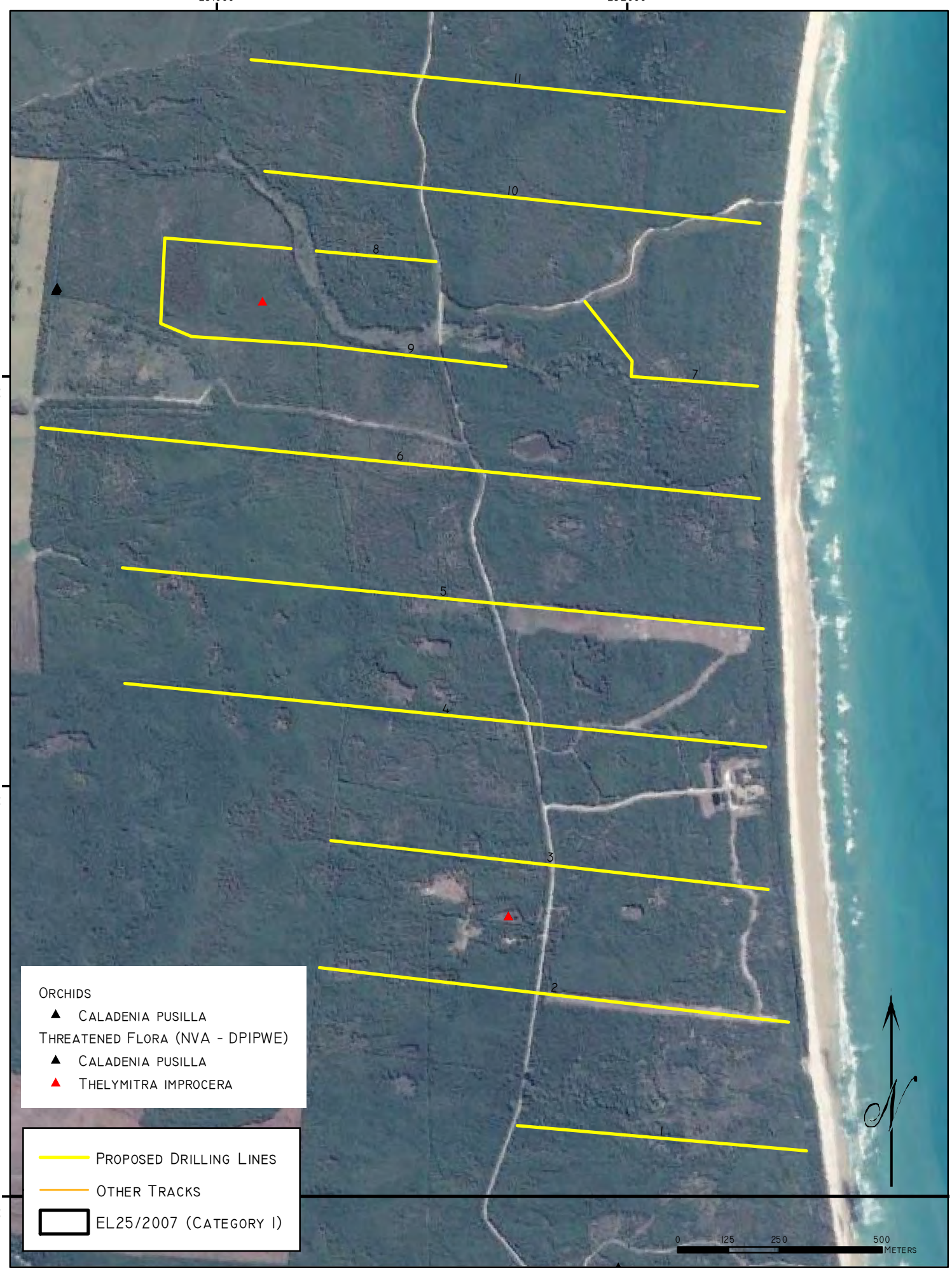
Van Diemen Consulting
PO Box 1 New Town TAS 7008



DATUM: GDA94
GRID: MGA ZONE 55
TASMAP: SEA ELEPHANT
NARACOOPA

CLIENT: NARACOOPA MINERAL SANDS PTY. LTD.

DATE: 25th Mar 2018



Naracoopa Mineral Sands Mine
EL Works Program 2018 - Drilling
Figure 6a-1: Observed and Known Threatened Flora on the Drilling Lines

Van Diemen Consulting
PO Box 1 New Town TAS 7008

Datum: GDA94
Grid: MGA zone 55
TASMAP: Sea Elephant
Naracoopa

Client: Naracoopa Mineral Sands Pty. Ltd.

Date: 25th Mar 2018

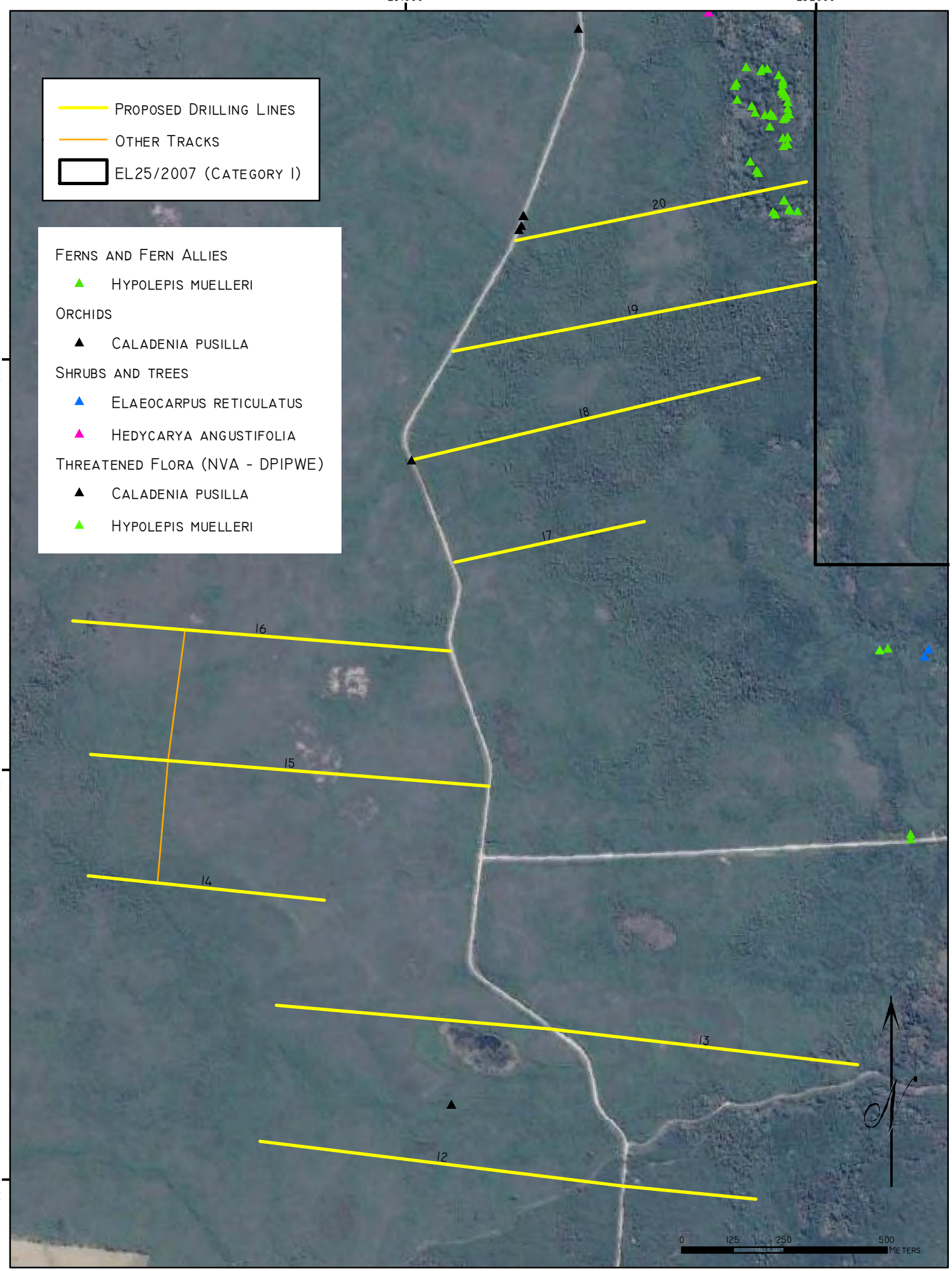
NARACOOPA MINERAL SANDS MINE
EL WORKS PROGRAM 2018 - DRILLING
FIGURE 6A-11: OBSERVED AND KNOWN THREATENED FLORA ON THE DRILLING LINES

Van Diemen CONSULTING
PO Box 1 New Town TAS 7008

DATUM: GDA94
GRID: MGA ZONE 55
TASMAP: SEA ELEPHANT
NARACOOPA

CLIENT: NARACOOPA MINERAL SANDS PTY. LTD.

DATE: 25TH MAR 2018



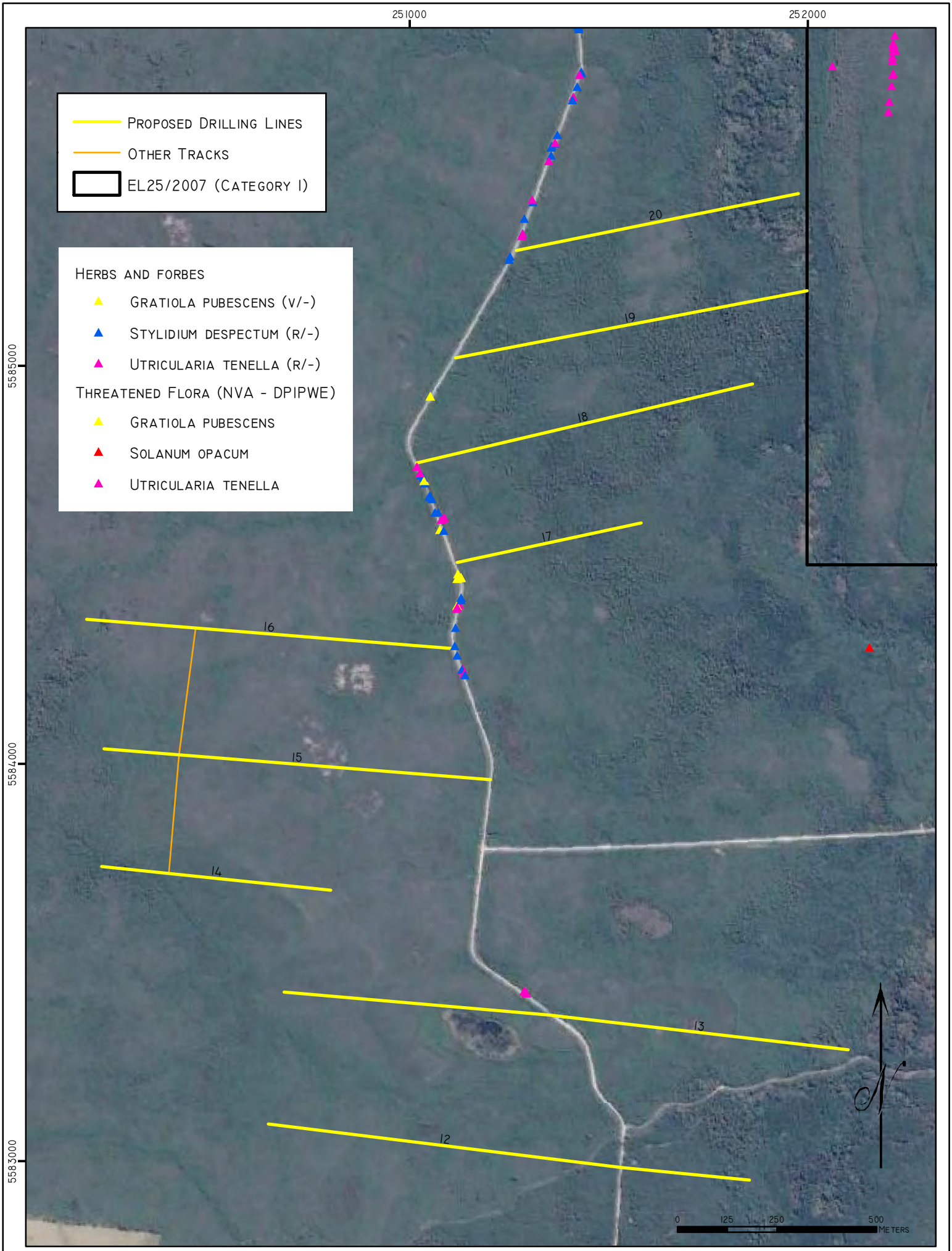
Naracoopa Mineral Sands Mine
EL Works Program 2018 - Drilling
Figure 6b-1: Observed and Known Threatened Flora on the Drilling Lines

Van Diemen Consulting
PO Box 1 New Town TAS 7008

Datum: GDA94
Grid: MGA zone 55
TASMAP: Sea Elephant
Naracoopa

Client: Naracoopa Mineral Sands Pty. Ltd.

Date: 25th Mar 2018



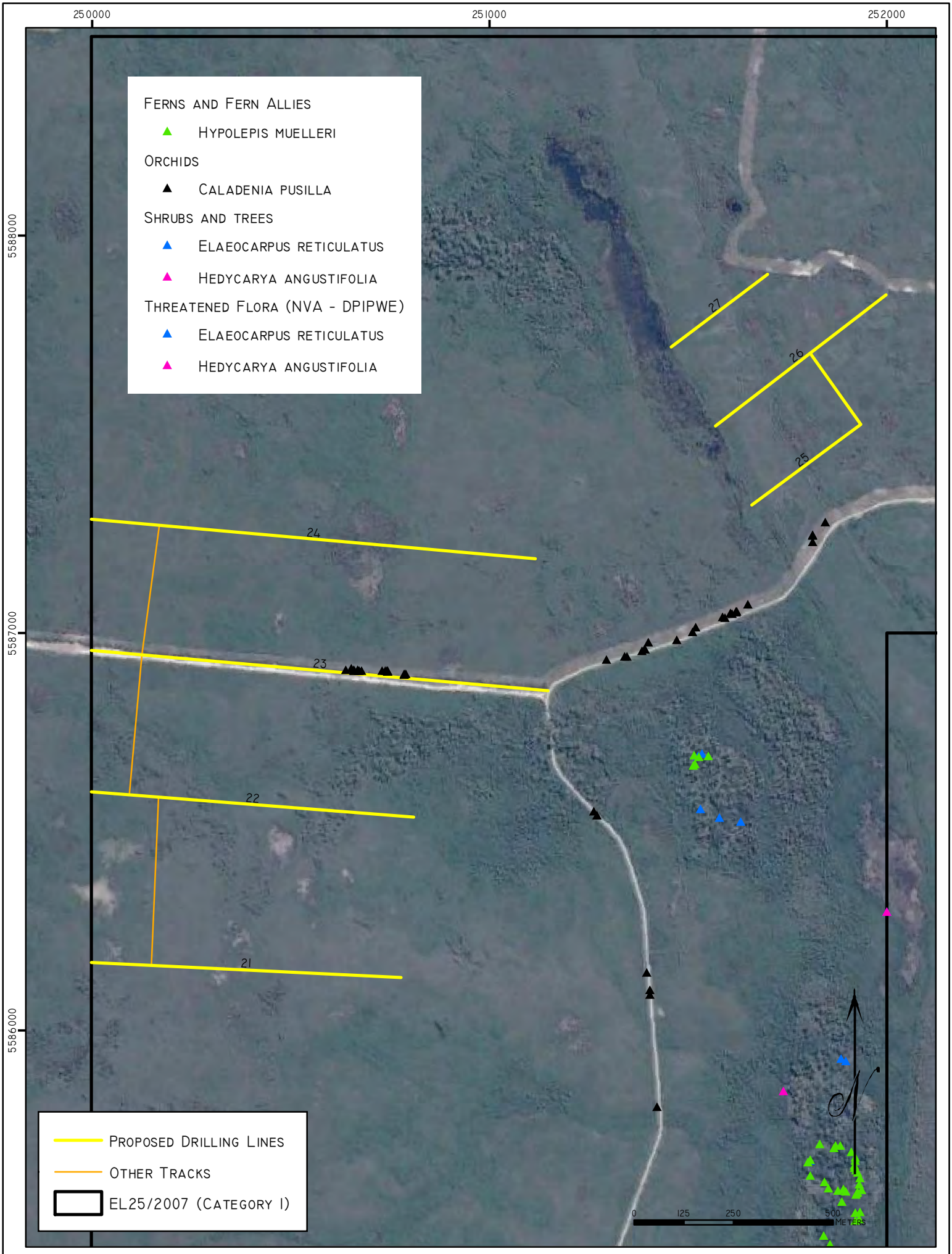
NARACOOPA MINERAL SANDS MINE
EL WORKS PROGRAM 2018 - DRILLING
FIGURE 6B-11: OBSERVED AND KNOWN THREATENED FLORA ON THE DRILLING LINES

Van Diemen Consulting
PO Box 1 New Town TAS 7008

DATUM: GDA94
GRID: MGA ZONE 55
TASMAP: SEA ELEPHANT
NARACOOPA

CLIENT: NARACOOPA MINERAL SANDS PTY. LTD.

DATE: 25th MAR 2018



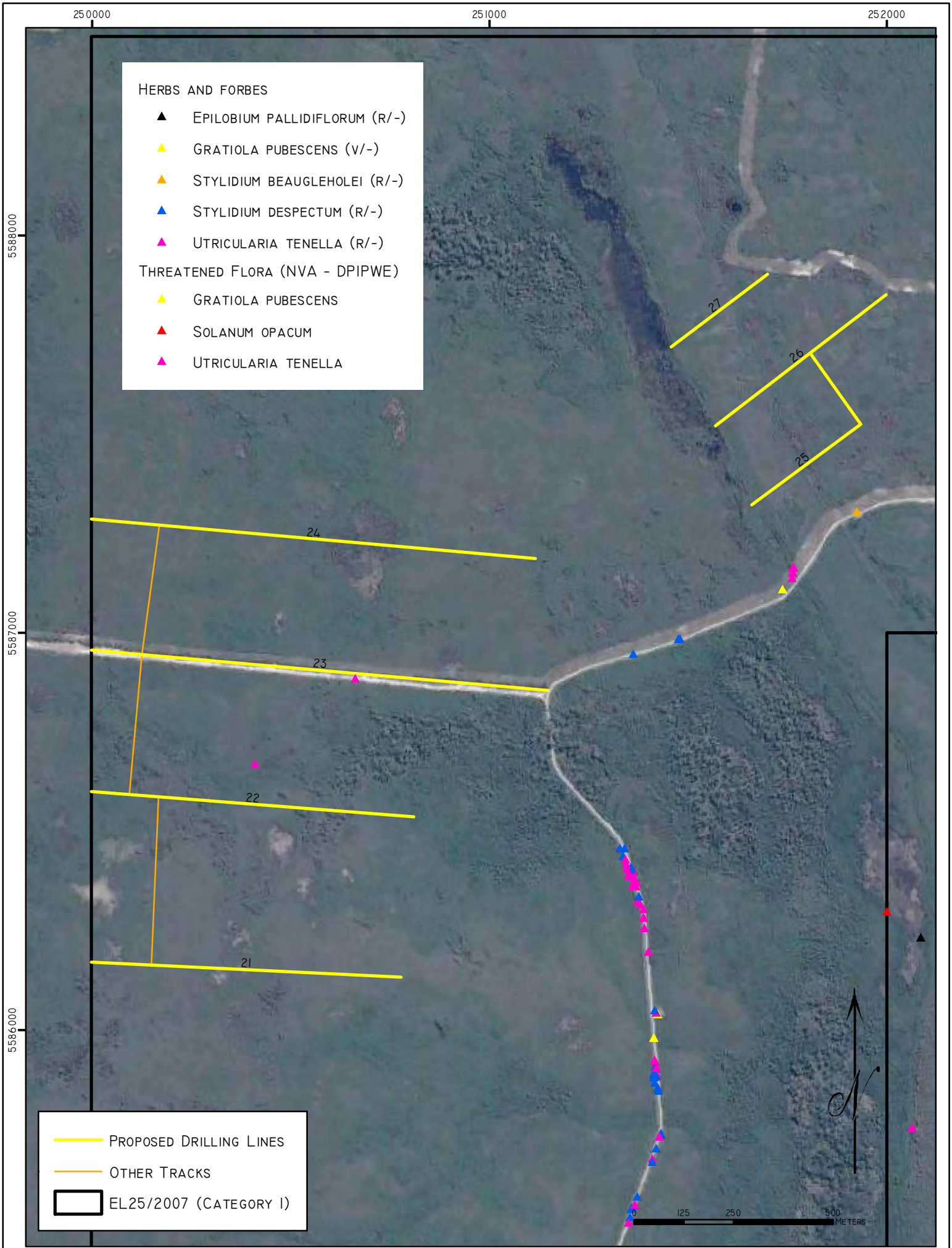
NARACOOPA MINERAL SANDS MINE
EL WORKS PROGRAM 2018 - DRILLING
FIGURE 6C-1: OBSERVED AND KNOWN THREATENED FLORA ON THE DRILLING LINES

Van Diemen Consulting
PO Box 1 New Town TAS 7008

DATUM: GDA94
GRID: MGA ZONE 55
TASMAP: SEA ELEPHANT
NARACOOPA

CLIENT: NARACOOPA MINERAL SANDS PTY. LTD.

DATE: 25th MAR 2018



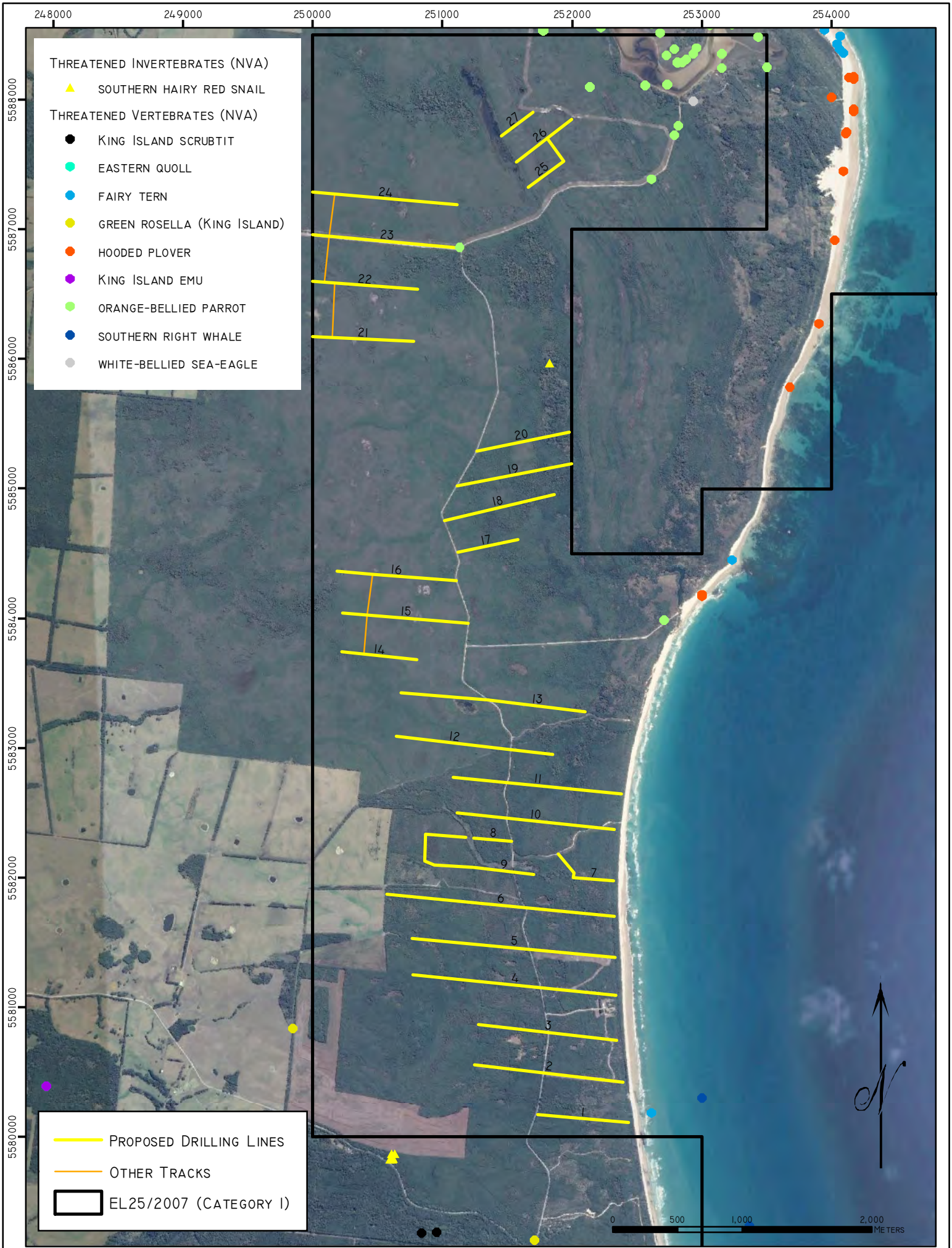
NARACOOPA MINERAL SANDS MINE
EL WORKS PROGRAM 2018 - DRILLING
FIGURE 6C-II: OBSERVED AND KNOWN THREATENED FLORA ON THE DRILLING LINES

Van Diemen CONSULTING
PO Box 1 New Town TAS 7008

DATUM: GDA94
GRID: MGA ZONE 55
TASMAP: SEA ELEPHANT
NARACOOPA

CLIENT: NARACOOPA MINERAL SANDS PTY. LTD.

DATE: 25TH MAR 2018



NARACOOPA MINERAL SANDS MINE
EL Works Program 2018 - Drilling
Figure 7: Known (NVA) Threatened Fauna

Van Diemen Consulting
PO Box 1 New Town TAS 7008

DATUM: GDA94
GRID: MGA ZONE 55
TASMAP: SEA ELEPHANT
NARACOOPA

CLIENT: NARACOOPA MINERAL SANDS PTY. LTD.

DATE: 25th Mar 2018

5. REHABILITATION AND MONITORING

5.1 REHABILITATION

The drill lines created by the exploration works should naturally regenerate to their pre-exploration works condition over time due to the type of vegetation present (scrub, heathland etc) so seeding the areas is not required. Scrub, heathland and tea-tree forests are resilient community types and should quickly and easily regenerate in the absence of disturbance.

In some cases, due to the low nature of the vegetation vehicles and machinery may be able to traverse some areas without needing to cut or clear the standing vegetation. Such areas include open dry heathland and short regenerating scrub in the northern sections of the EL.

Slash created from the pruning and/or partial clearing of vegetation can be placed onto the disturbed areas created by route construction and drill sampling to enable some protection to the soil surface and provide an extra source of seed for regeneration. Canopy stored seed in adjacent vegetation and that which may already be present in the soil (soil 'seed bank') should otherwise be sufficient to facilitate regeneration.

5.2 MONITORING

The early detection of Declared Weeds that enter the drill line locations is important to ensure that any control or eradication program has the highest likelihood of success.

A survey to identify any Declared Weeds associated with the drill lines created by the exploration program should be conducted at regular intervals for at least 3 years after the completion of the exploration works. This approach should enable the early detection of weed species before they reach an extent where control and eradication is very costly and/or difficult to achieve.

Surveys should ideally be conducted during peak growth seasons (September to April) to maximise the detectability of some plants, especially those with brightly coloured or distinctive flowers and growth habits.

The following monitoring regime will be applied for the project:

1. Surveys and assessments by a suitably qualified person will be made at no more than 6 monthly intervals to –
    a. identify, record and map any new weed species not previously recorded;
    b. assess and map the extent of known weed infestations to determine if they are becoming larger and/or more significant such that control measures can be modified; and
    c. review/assess the weed control works that have been conducted and to provide advice, where necessary, on the management of weeds.
2. Areas where weed control/eradication works have occurred (eg spraying) will be assessed no more 12 months after the treatment occurred to determine if the measures implemented were successful. Where measures have proved unsuccessful, repetition and/or modification of the weed control technique(s) will be employed.

Appendix A: Environmental Protection Guidelines

ENVIRONMENT PROTECTION GUIDELINES

NARACOOPA MINERAL SANDS MINE EXPLORATION PROJECT
DRILL PROGRAM 2018-19

ENVIRONMENTAL OBJECTIVES

The NMSEP is committed to achieving high quality environmental outcomes through the implementation of environmental management systems that are beneficial to the community and the natural environment.

ENVIRONMENT PROTECTION GUIDELINES (EPG)

A series of Environment Protection Guidelines (EPG's) have been developed which specifically outline environmental protection requirements for this project.

The following Environment Protection Guidelines are included:

- **EPG 1:** Disturbance to terrestrial and aquatic flora and fauna
- **EPG 2**: Working near eucalypt trees
- **EPG 3**: Working near large remnant *Banksia* trees that are alive
- **EPG 4:** Working near wet areas and watercourses
- **EPG 5**: Erosion, sedimentation and surface run-off

ENVIRONMENTAL PROTECTION GUIDELINE *Disturbance to Terrestrial and Aquatic Flora and Fauna*	*Document No.* ***EPG 1***

Objective

To minimise the effect of the mineral exploration activities on local flora and fauna, particularly endangered and protected species.

Control Methods

General

- Ensure all site workers are familiar with the conditions of the permits and environmental aspects of the project at the project induction;
- No refuelling of equipment, machines or vehicles is to occur within 50 m of a natural watercourse, waterbody or human constructed drain/watercourse;
- Bunding will be installed around storage areas for fuels and oils to prevent the spillage of fuels, oils or other hazardous substances into the water;
- Any activities that are likely to cause sediment to run-off into a watercourse/waterbody should not be carried out during wet weather;
- Exploration activities will be limited to day time to avoid impacts on nocturnal fauna; and
- Provide sealed bins for waste to discourage animal pests.

Access Routes and Drill Sample Locations

- The clearing of native vegetation along each drill line will be kept to a maximum of 4 m wide.
- Slash and other vegetative material accumulated through the clearing process will not be pushed or placed onto the native vegetation outside the 4 m buffer. Vegetation can be stockpiled within the 5 m wide buffer associated with the line marked by pink flagging tape.
- Slash resulting from clearing the access route and drill sample location will not be burnt.

ENVIRONMENTAL PROTECTION GUIDELINE ***Working near eucalypts***	***Document No.*** ***EPG 2***

Objective

To minimise damage to eucalypt trees along the drill lines and near drill sample locations.

Background

While eucalypts are uncommon on the eastern side of King Island near Naracoopa they provide an important food resource to local fauna, especially conservation significant birds (eg green rosella, swift parrot).

The occurrence of blue gum and Brooker's gum is in the areas surveyed was limited to wet areas that rarely burn during wildfire or steeply incised gullies where they may be protected from fire. White gums are more common than either blue or Brooker's gums near Naracoopa but even these are restricted to small patches where fire frequency has been low enough to avoid them being burnt out of an area. White gums tend to occur on sandy ridgelines that are old strandlines.

Woodland with occasional white gums cannot be avoided for all drill lines.

Medium-sized multi-stemmed white gums may occur on some drill lines.

Lopping of limbs should minimise the long-term effect of the exploration program to these trees.

ENVIRONMENTAL PROTECTION GUIDELINE Working near eucalypts	Document No. EPG 2

Most white gums that occur along or near the drill lines are small and multi-stemmed. Pruning of branches will enable vehicle access in most cases.

Control Methods

- Eucalypts should only be pruned or branches lopped (with chainsaw, loppers or similar) to enable safe passage of machinery and vehicles along a drill line;
- Eucalypts should not be completely removed such that they would have no ability to regenerate from either lopped branches or the retained basal stems;
- Only if **absolutely necessary** should all of the branches from a eucalypt be removed by pruning or lopping. In such cases, the branches should be cut at least 25 mm above the root-ball at a 45 degree angle to prevent rotting/fungal infection of the cut surfaces; and
- Lopped and pruned branches should be returned to the drill line once the machinery has left the area as some branches may contain seed capsules which would aid regeneration of eucalypts along the ground-disturbed route.

ENVIRONMENTAL PROTECTION GUIDELINE *Working near large remnant* **Banksia** *that are alive*	*Document No.* ***EPG 3***

Objective

To minimise damage to large remnant Banksia trees that are **alive** on drill lines.

This EPG **does not apply** to small regrowth Banksia shrubs (<2 m) or regenerating saplings along any drill line.

Background

Banksia or honeysuckle (*Banksia marginata*) is a relatively common shrub to small tree on the eastern side of King Island near Naracoopa. Banksia trees have large flowers that often produce lots of nectar that provides an important food resource to local fauna, especially conservation significant birds (eg green rosella, swift parrot). Banksia trees are regenerating from seed in areas of heathland burnt by the 2011 wildfires in the northern section of the EL. It will be several years before they flower and again provide a food resource to local fauna. If another fire burns the northern area of the EL before the regenerating Banksia set seed then there is a possibility that some areas may 'lose' Banksia trees altogether.

The images below show the large Banksia trees over heathland and scrub that were unburnt by the 2011 King Island bushfires (left) and the burnt remnants of a Banksia from the 2011 fires (right).

Control Methods

- Large living Banksia trees should not be completely removed or felled by the clearing of drill lines or Drill Sample locations;
- Large living Banksia trees should only be pruned, or branches lopped (with chainsaw, loppers or similar) to enable safe passage of machinery and vehicles along drill lines;
- No more than 50% of the branches on any single Banksia should be removed by pruning or lopping;
- Branches when pruned/lopped should be cut at a 45-degree angle to the ground to prevent rotting/fungal infection of the cut surfaces; and
- Lopped and pruned branches should be returned to the drill line once the machinery has left the area as some branches may contain cones which would aid regeneration of Banksia along the ground-disturbed route.

ENVIRONMENTAL PROTECTION GUIDELINE *Working near wet areas and watercourses*	*Document No.* ***EPG 4***

Objective

To minimise the potential impact on swamps, waterways, watercourses and wet areas from the exploration activities such as the damage to wet soils, swamps and watercourses.

Background

In some locations the drill lines may occur near waterways, swamps and drains or crosses watercourses. Drill lines have generally been located to avoid crossing watercourses (natural) and drains however some could not be avoided. There are also a few wet areas within otherwise dry heathland and scrub that will require the use of cut slash (tea-tree and paperbark sourced from the drill line clearing/slashing) to ensure that organic rich soils are protected whilst machinery use the drill line track.

A wet area dominated by scented paperbark that has organic rich sandy to peat soils. Slash should be used to enable machinery and vehicles to cross these areas without damaging the soil profile. Slash should be removed (spread along the route) when exploration works for that drill line have been completed.

Control Measures

The following control measures are to be established and monitored during the whole exploration program period for the relevant drill line.

- For shallow watercourse crossings, cut slash can be used to build-up the ground-level to enable traction for machinery and vehicles. All slash placed into or across a drain or watercourse must be removed after the exploration works have been completed.
- For man-made drains or large watercourse crossings a culvert may need to be used in conjunction with slash to allow safe passage of machinery and vehicles. Advice should be sought from a suitably qualified person on the required size of the culvert relative to the watercourse size and flow. Culvert and slash watercourse crossings can remain in situ after the exploration works have been completed.

ENVIRONMENTAL PROTECTION GUIDELINE *Erosion, Sedimentation and Surface Run-off*	*Document No.* ***EPG 5***

Objective

To minimise the potential for erosion on steep and/or erosive surfaces and to avoid sedimentation in waterways, swamps and drains.

Background

In some locations steep sandy rises, eroded tracks and washouts have the potential to become highly erosive and hence a source of sediment that may impact on nearby waterways and drains.

The erosion and sedimentation controls must:

- Prevent sediment laden run-off entering adjoining waterways, swamps and drains;
- Prevent soil loss from disturbed areas through wind and water erosion; and
- Undertake clean-up and remediation on completion of exploration works;

Control Measures

The following control measures are to be established and monitored during the whole exploration program period.

The erosion and sedimentation controls will include:

- Sediment control equipment (applicable to the soil texture) will be installed to minimise the suspension of sediment and subsequent contamination to any waterways or drainages;
- Sediment netting may be used at the low end of small soaks that drain into channels or swampy area to create an effective barrier to the movement of sediment. The netting will be checked weekly during the construction period and replaced as necessary. Straw and hay bales should be avoided as they may introduce weeds into areas that are otherwise weed-free;
- If construction intersects shallow groundwater then appropriate control methods will be implemented to ensure environmental disturbance is minimised and that any intersected water is prevented from directly entering drains or waterways. This may be achieved by the **temporary** diversion of water into existing vegetation or the digging of a **temporary** small detention pond. All temporary structures must be in-filled or removed after the exploration works have been completed;
- Wastes will not to be deposited into, hosed down or swept into any waterway or soak;
- Work likely to result in sediment run-off into drains and waterways will be avoided during wet weather;
- Refuelling of equipment, machines or vehicles is to occur at least 50 m away from a watercourse/drain; and
- A spill kit will be maintained on site near the source of fuel/oil and other chemicals. Multiple spill kits may be needed when there are multiple sources of fuel, oil or other chemicals needed for the construction process.

Monitoring of erosion control measures

- Inspect erosion and sediment control devices regularly to ensure correct functioning and placement and that the available volume capacity is adequate; and

- Devices should be cleaned and/or replaced as required to ensure that they are functional.

Emergency Response

In the event of a significant failure of an erosion/sediment control device the following will be implemented:

- The Contractor will reinstate the erosion and sediment controls as soon as practicable.
- The Contractor will determine whether the failure constitutes a threat to any adjoining waterway or drain; advice may need to be sought from an ecologist or suitably qualified person as to the potential impact a sedimentation event may have on aquatic and semi-aquatic biota.
    - If not considered a threat to waterways, procedures are to be reviewed and the Mine Superintendent is to be advised of, and approve, any alterations or installation of additional and/or more effective erosion control devices.
    - If the failure constitutes a threat to any adjoining waterway or drain, the Exploration Superintendent is to be notified as soon as practicable and within 24 hours. The following may need to be applied -
        - additional and more effective erosion control devices should be installed as soon as practicable; and
        - any instructions provided by the Exploration Superintendent must be implemented as soon as practicable.

Attachment 10	• Drilling summary (.txt and Excel spreadsheet formats) • Downhole geochemical sampling (.txt and Excel spreadsheet formats) • Assay Values (.txt and Excel spreadsheet formats) • Collar locations (.txt and Excel spreadsheet formats)