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PRE-CONSTRUCTION, CONSTRUCTION AND POST-CONSTRUCTION PHASE

AMENDED ENVIRONMENTAL MANAGEMENT PROGRAMME

FOR THE

Proposed Development of Herolds Bay Country Estate on a Portion of Portion 7 Farm Buffelsfontein No. 204, Herolds Bay, Western Cape

APPLICANT:	Long Island Trading 44 (Pty) Ltd Contact: Mr Abraham Jacobus Cronje
ENVIRONMENTAL CONSULTANT:	Sharples Environmental Services cc Primary Author: Betsy Ditcham Secondary Author: John Sharples
DEA & DP PROJECT REFERENCE:	16/3/3/1/D2/29/0008/20
SES REFERENCE NUMBER:	CT04/06_DEMPr_11
DATE:	April 2023

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NOTE: CHANGES TO THE EMPR HAVE BEEN HIGHLIGHTED IN YELLOW FOR EASE OF REFERENCE

DOCUMENT DETAILS

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Sharples Environmental Services cc Since 1998, SES has been actively engaged in the fields of environmental planning, assessment and management. We advise private, corporate and public enterprises on a variety of differing land use applications ranging from large-scale residential estates and resorts to golf courses, municipal service infrastructure installations and the planning of major arterials. Our consultants have over 20+ years of combined experience and we operate in the Southern, Eastern and Western Cape regions.

BETSY DITCHAM (**Environmental Assessment Practitioner** – **Cape Town Officer Manager**) - Betsy has a Bachelor of Science Honours Degree in Wildlife Management from the University of Pretoria and a Bachelor of Science Degree (Zoology and Ecology) obtained from the University of Cape Town in 2005. She has 9 years' experience in the environmental field, including environmental assessments, legal compliance, on-site compliance monitoring, cleaner production and business greening and sustainability (carbon and environmental footprinting). In her time as a consultant, she has compiled a number of environment assessments and management plans for both private and governmental clients.

LLOYD BARNES (**Environmental Assessment Practitioner**)- Lloyd has recently obtained his National Diploma and Bachelor of Technology in Environmental Management from the Cape Peninsula University of Technology. He has gained experience in on-site compliance monitoring, sustainable development, conservation and report writing. In his time as a consultant, he has compiled multiple management plans.

JOHN SHARPLES (**Managing Director**) - John started Sharples Environmental Services in 1998 and has overseen the company's growth and development since then. John also started the Cape Town office in 2010. John holds a Masters in Environmental Management from the University of the Free State as well as a Bachelor's degree in Conservation. He has consulted for 19 years running a team of highly trained and qualified consultants and prior to this gained 12 years of experience working for environmental organizations. John is registered with EAPASA as a certified Environmental Practitioner.

1. Introduction

Sharples Environmental Services cc (SES) was appointed by *Long Island Trading 44 (Pty) Ltd* (the proponent) to compile the Environmental Management Programme for the proposed development of Herolds Bay Country Estate on a Portion of Portion 7 Farm Buffelsfontein No. 204, Herolds Bay, Western Cape.

2. About this EMPr

This document is intended to serve as a guideline to be used by *Long Island Trading 44 (Pty) Ltd* (as the Implementing Agent) and any person/s acting on *Long Island Trading 44 (Pty) Ltd's* behalf, during the pre-construction, construction, post-construction rehabilitation and operational (maintenance) phases of the proposed development. This document provides measures that must be implemented to ensure that any environmental degradation that may be associated with the development is avoided, or where such impacts cannot be avoided entirely, are minimised and mitigated appropriately.

This EMPr has been prepared in accordance with the requirements of an EMPr as specified in the Environmental Impact Assessment Regulations, 2014 (as amended), and with reference to the "Guidelines for Environmental Management Programmes" published by the Department of Environmental Affairs and Development Planning (2005).

It is important to note that not only is the EMPr designed to manage the physical establishment of the development *per se*, but also as a tool which can be used to manage the environmental *impacts* of the development.

The rehabilitation, mitigation, management and monitoring measures prescribed in this EMPr must be seen as binding to the *Long Island Trading 44 (Pty) Ltd*, and any person acting on its behalf, including but not limited to agents, employees, associates, guests or any person rendering a service to the development site.

2.1 Important caveat to the report

In the past, some developments have had a devastating impact on the environment even though they have had Environmental Management Programmes in place, while other developments have had a low impact even though no management plans have been compiled.

The Implementing Agent and the attitude of the construction team play an integral role in determining the impact that the development will have on the environment. The ECO needs to ensure that the all role-players are aware of the constraints that the EMPr places on the development and construction team and are prepared to be actively involved in enforcing these constraints. The end result relies on cooperation and mutual respect and understanding of all parties involved.

3. How to use this document

It is essential that this EMPr be carefully studied, understood, implemented and adhered to as far as reasonably possible, throughout all phases of the proposed development. *Long Island Trading 44 (Pty) Ltd* must retain a copy of this EMPr, and an additional copy must be kept on site at all times during the pre-construction, construction and post-construction rehabilitation phases of the development.

This EMPr must be included in all contracts compiled for contractors and subcontractors employed by *Long Island Trading 44 (Pty) Ltd*, as this EMPr identifies and specifies the procedures to be followed by

engineers and other contractors to ensure that the adverse impacts of construction and maintenance activities are either avoided or reduced. Appointed contractors must make adequate financial provision to implement the environmental management measures specified in this document.

This EMPr must be seen as a working document, which may be amended as and when needed, in order to accommodate changing circumstances on site or in the surrounding environment, or in order to accommodate requests/ conditions issued by the competent authority, the Department of Environmental Affairs & Development Planning (DEADP). Amendments to this EMPr must first be approved by the competent authority, in writing, before being implemented.

4. Description of the Activity

Long Island Trading 44 (Pty) Ltd proposes to construct a mixed-use development which entails combining residential, recreational and agricultural land uses. It is proposed that the development will include single residential erven, group housing units, a filling station with convenience shop, an ancillary neighbourhood centre with commercial and office space (see Appendix 4) and three package plants for onsite treatment of sewerage. The proposed developed will take place on a Portion of Portion 7 of Farm Buffelsfontein No. 204 situated in Herolds Bay, Western Cape.

Herolds Bay is a coastal village situated along the Garden Route and located approximately 12.5km south-west of George. The proposed site is located north of the town centre, and west of the popular Oubaai Golf Estate. The site is bounded to the north and west by farmland. The size of the total development footprint (land to be disturbed for the mixed-use development) is approximately 19.264Ha.

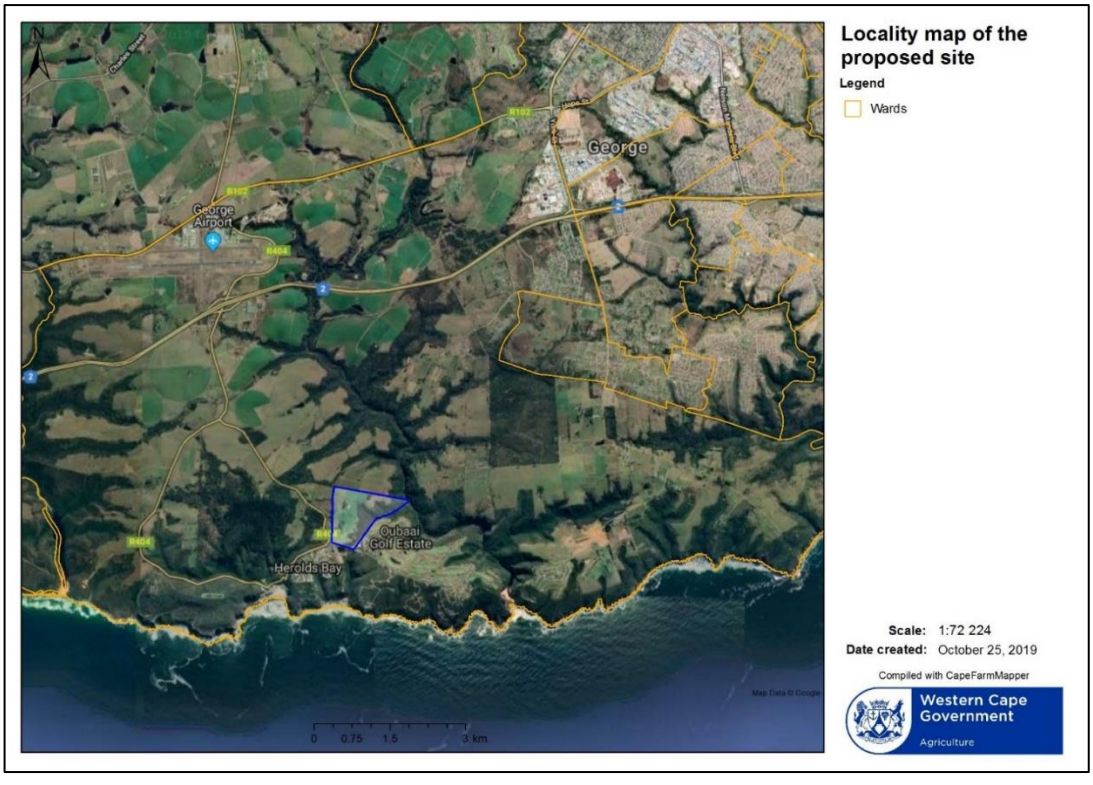


Figure 1: The proposed site for Herolds Bay Country Estate (blue border).

It is being proposed that 102 single residential erven, 68 group housing units, a filling station with convenience centre and restaurant and an office complex be developed. In addition, there will be private open space, an internal road network and three on-site package plants for the treatment of

sewerage. The residential portion of the proposed development is aimed towards holiday makers and tourists to the area, the business zones are aimed towards small business and business professionals located in the region.

The total size of the development footprint for the mixed-use development is approximately 19.264Ha. Refer to the Figure 2 below which shows the proposed layout plan for the Portion of Portion 7 Farm Buffelsfontein No. 204, as well as Table 1 below which outlines the different types of developments proposed and their relative sizes.

Table 1: Size and number of each respective aspect proposed.

Zoning	Ptn No's	Land Use	Number	Area (ha)	%
Residential Zone I	1 - 102	Single Dwelling *	102	± 9,019 *	47
General Residentail Zone II	103, 104 & 105	Group Housing * *	3	± 3,613	19
Business Zone II Business Zone IV * * * *	106	Shop * * * Office (300 m² floor space) * * * *	1	± 0,958	5
Open Space II	107, 108 & 109	Private Open Space	3	± 1,334	7
Transport Zone III	110	Private Road	1	± 3,209	16
Transport Zone II	111	Public Street	1	± 1,283	6
Total			111	± 19,264	100

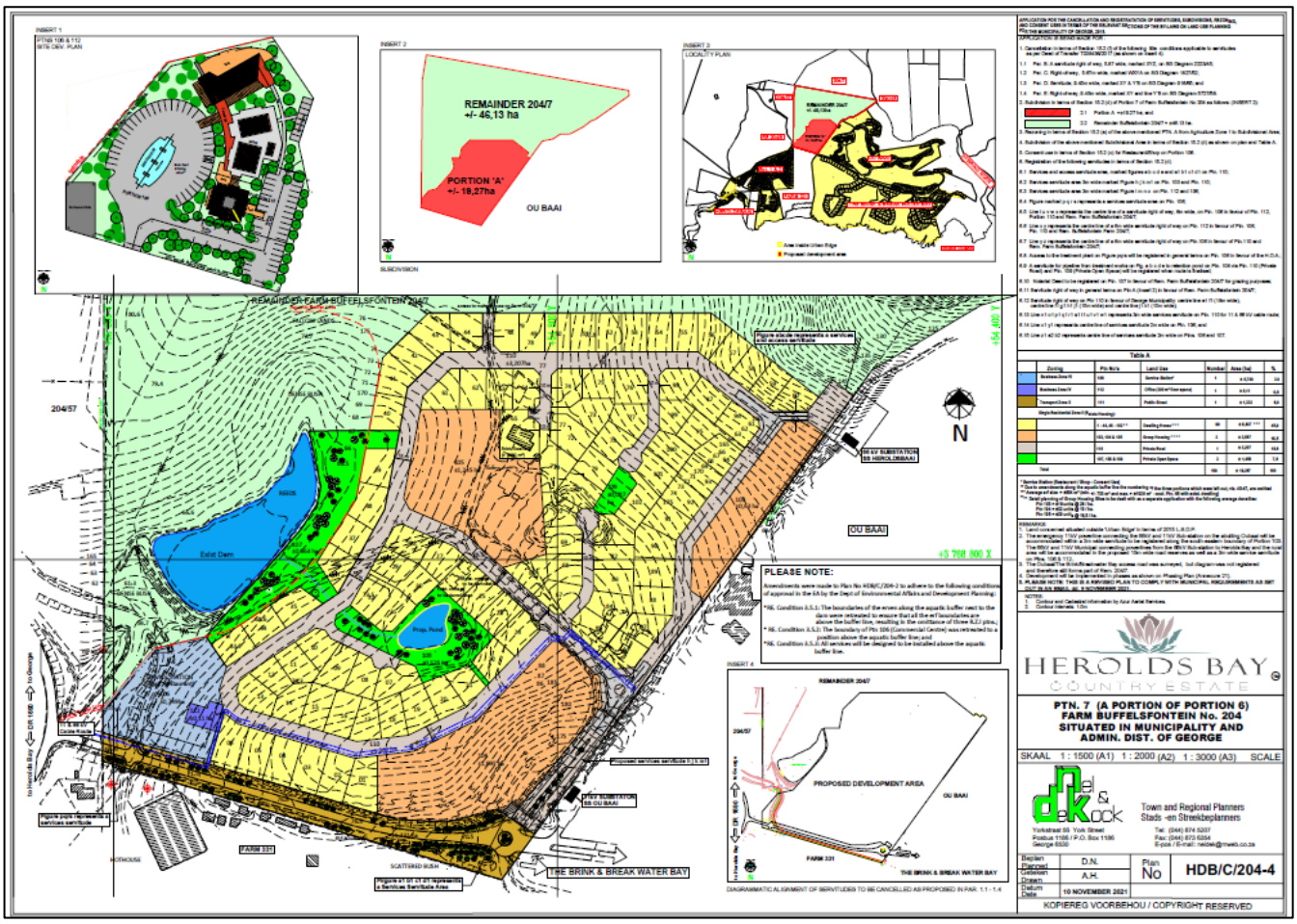


Figure 2: Layout Plan for the Proposed Herolds Bay Country Estate in Heralds Bay.

Table 2: Summary Table: Site and Farm Details

Province	Western Cape		
District Municipality	Garden Route		
Local Municipality	George		
Ward number(s)	Ward No 23		
Nearest town(s)	Herolds Bay – directly adjacent south		
SG Code	C02700000000020400008		
Co-ordinates of the farm boundaries:	**A**	34° 2' 18.13"S	22° 24' 9.8"E
	B	34° 2' 46.29"S	22° 24' 8.87"E
	C	34° 2' 49.37"S	22° 24' 20.92"E
	D	34° 2' 34.26"S	22° 24' 34.67"E
	E	34° 2' 25.3"S	22° 24' 54.45"E

5. Description of Environmental Setting

5.1 Vegetation

5.1.1 Vegetation description

A Botanical survey of the Portion of the Farm Buffelsfontein 204/7 at Herolds Bay was completed Mark Berry Environmental Consultants (2019) to define the biophysical characteristics of the proposed site.

The proposed site is located in a coastal fynbos-forest environment on the Southern Cape coastal plain. The indigenous species recorded on site are typical forest and coastal thicket species, such as *Cassine peragua, Rapanea melanophloeos, Podocarpus cf. latifolius* and *Searsia lucida*. The Vegetation Map of South Africa (Mucina & Rutherford 2006) classifies the main vegetation type found in the area as Garden Route Granite Fynbos (see Figure 3). This vegetation unit occurs as three blocks from Botterberg (south of Robinson Pass) in the west to Hoogekraal Pass (west of Karatara) in the east (Mucina & Rutherford 2006). The site occurs in the largest block between Groot Brak and Wilderness. Due to its transformed state, Garden Route Granite Fynbos is listed as Endangered in the National List of Threatened Ecosystems, with

only 30% still left (DEA 2011). In CapeNature's 2016 threat status assessment its status has been elevated to Critically Endangered (Pool-Stanvliet et al. 2017).

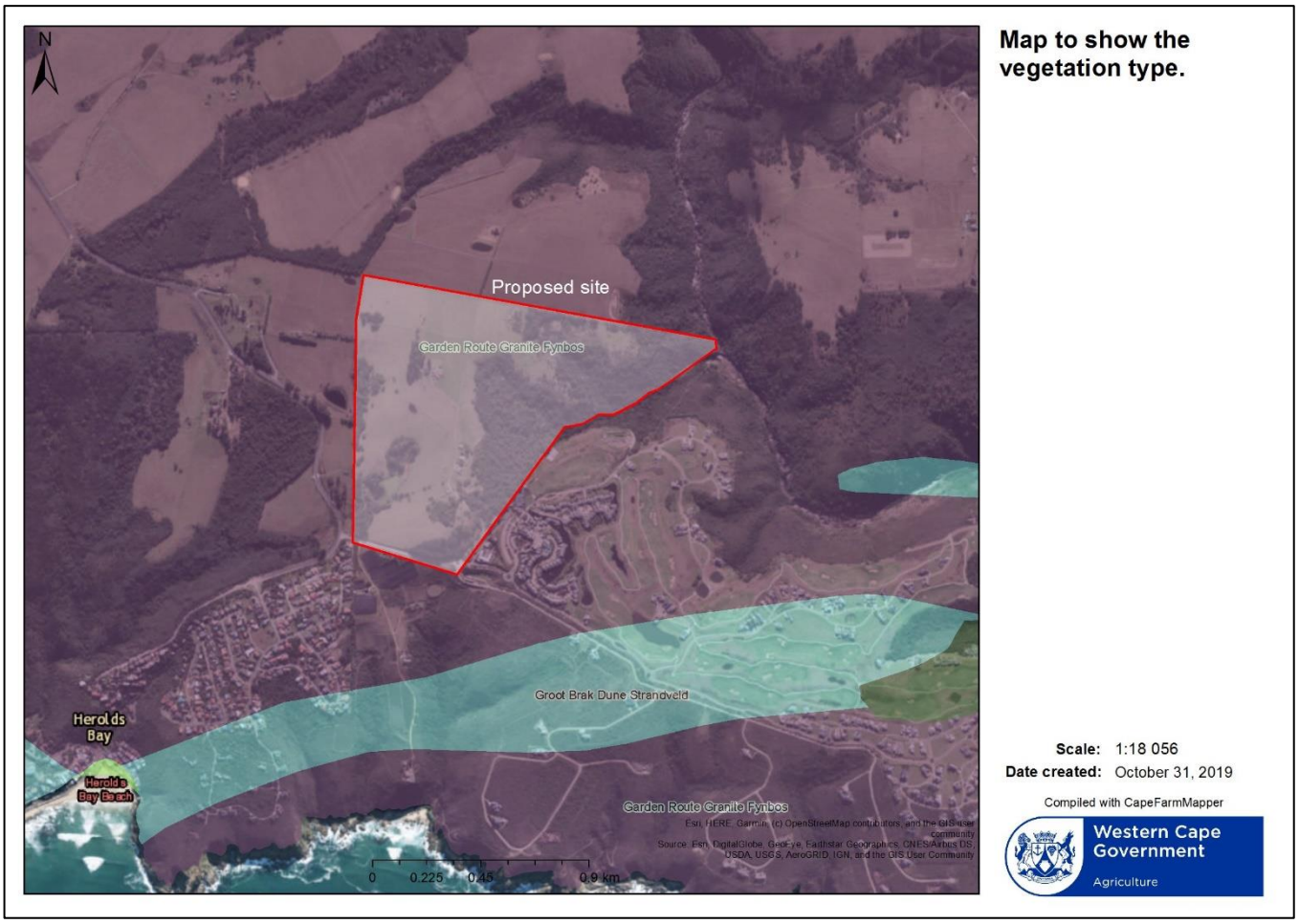


Figure 3: Map to show the vegetation type present on site (CapeFarmMapper accessed on 31/10/2019).

Figure 3 indicates that Southern Afrotemperate Forest (Green polygon to the east) and Groot Brak Dune Strandveld (light blue polygon to the south) are also found in the general area.

The Botanical survey noted that the former does in fact enter the property from the eastern side along the small valley. Southern Afrotemperate Forest typically comprises tall evergreen tree species, including Yellowwoods, Saffron, Candlewood, Ironwood, False Ironwood, etc. It is mainly found in the Western and Eastern Cape Provinces, with the largest complex found in the Southern Cape between Mossel Bay in the west and Humansdorp in the east (Mucina & Rutherford 2006). It grows on sheltered (fire-protected) slopes, plateaux, coastal scarps and valleys. Southern Afrotemperate Forest is still well represented in the larger area, with about 97% remaining (Mucina & Rutherford 2006).

5.1.2 Botanical Sensitivity

The Botanical survey completed by Mark Berry Environmental Consultants (2019) noted that the study site is largely transformed, with the proposed development footprints entirely transformed or invaded by woody aliens and therefore the recorded vegetation biodiversity presents no constraints to the proposed development (Figure 5).

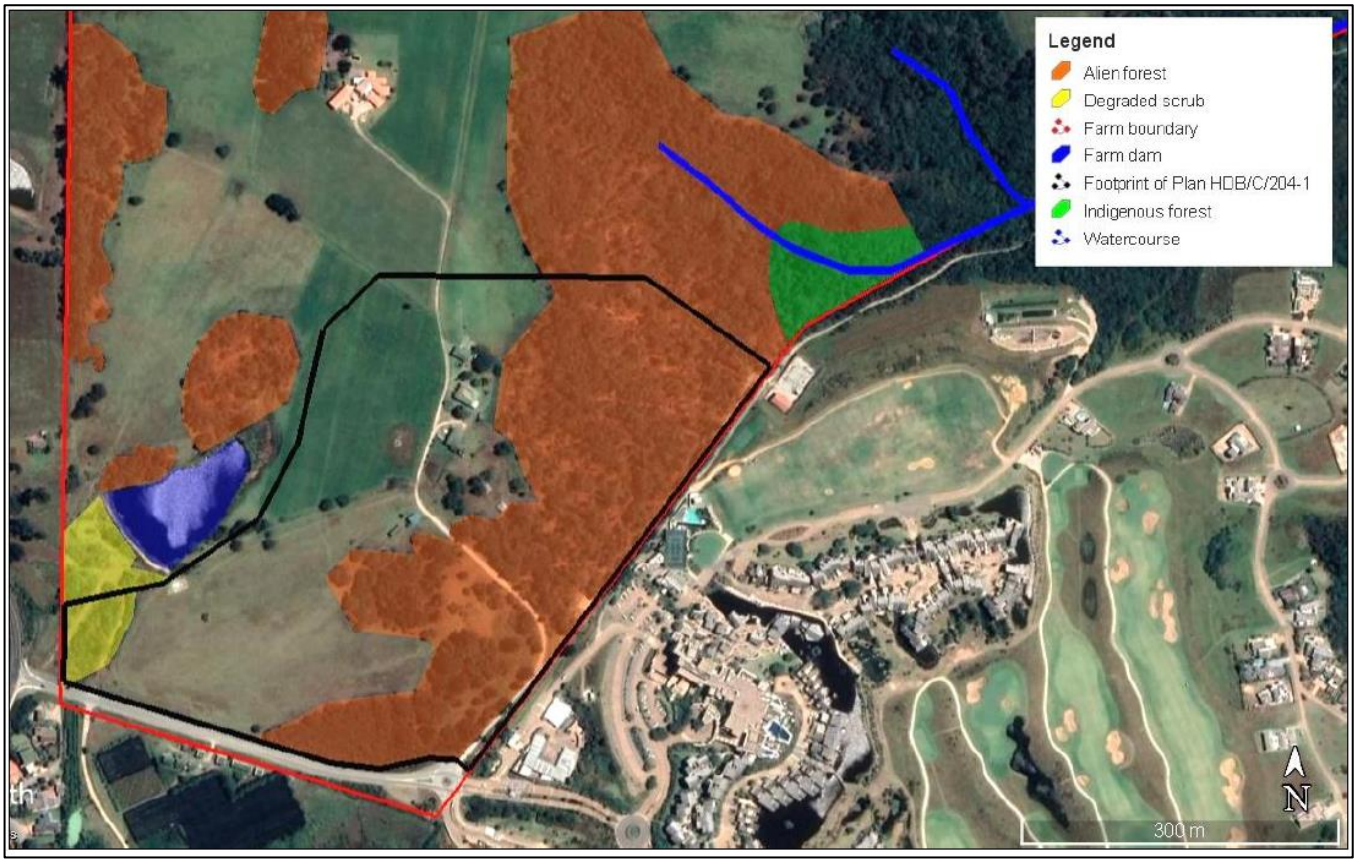


Figure 4: Satellite photo showing the botanical features of the site.

5.1.3 Critical Biodiversity Areas

Figure 5 below shows that the proposed development footprint intrudes into an area mapped as degraded CBA: Forest (north-eastern area of the proposed footprint). The Botanical survey completed Mark Berry Environmental Consultants (2019) noted that this area comprises an alien forest, dominated by black wattle and southern blue gum, and has virtually no merit to serve or function as a CBA. It is unlikely that this area was ever an indigenous forest or thicket.

The CBA's in the larger area appear to coincide with the forest areas (whether alien or not), the Gwaing River itself, and remaining tracts of fynbos next to the Oubaai Golf Estate. Ecological Support Areas (ESA's), which are associated with the main drainage courses, extend further along the drainage courses from the above CBA's. Only the tip of an ESA in the western corner of the site will be affected by the development. It must be noted that all the ESA's in the area are significantly degraded or transformed, but still possibly function as drainage corridors. With the recommendations above, the impact of the proposed development on the biodiversity network is expected to be minimal.

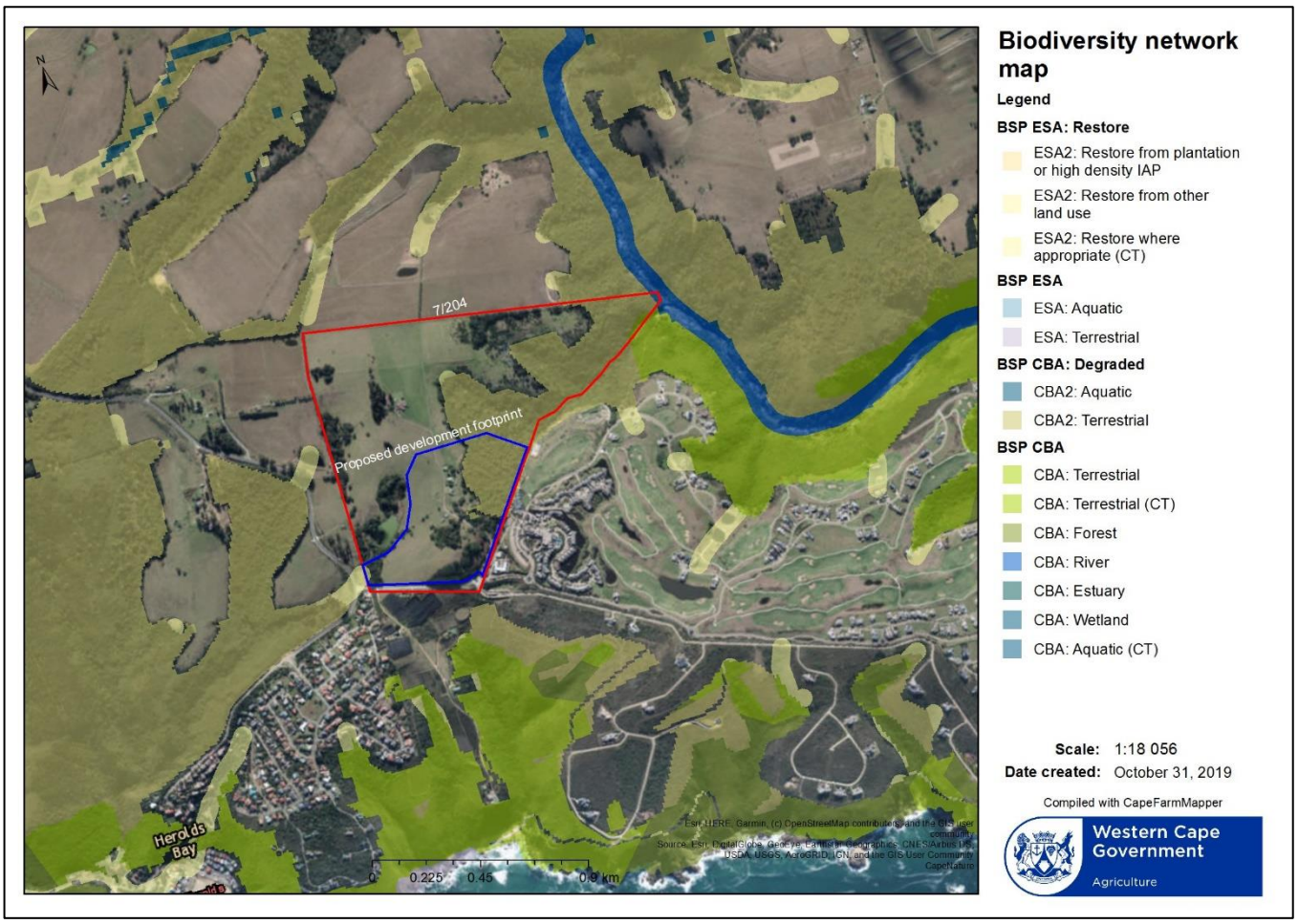


Figure 5: Biodiversity network on and around the proposed site (CapeFarmMapper accessed on 31/10/2019)

5.2 Freshwater features

5.2.1 The Aquatic Environment

The proposed Herolds Bay Country Estate Development site falls within the Quaternary catchment- K30B. The Freshwater Habitat Impact Assessment Completed by Sharples Environmental Services cc (2019) stated that several watercourses were identified within the regulated area, with three in close proximity or within the property (Figure 6). However, the watercourse located to the south of the site has been physically disconnected by a road. Therefore, it is only the watercourse in the west of the property (named Stream A for the purposes of this study) and the watercourse to the north east (named Stream B), that will be impacted by the development.

Stream A is a non-perennial stream (although flowing at the time of study) and originates within the property boundary, where it has been dammed, and then flows in a south westerly direction, past Herold's Bay town, and to the popular Herold's Bay beach itself. The reach assessed, above the tar road, is surrounded by irrigated pasture for livestock farming. Agriculture has encroached in the riparian area and there is limited thicket vegetation remaining. Historical imagery from 1957 shows that the agricultural activities in the area were already established. However, the dam had not yet been constructed. Downstream of the dam the stream has eroded slightly into a single, straight channel (with sandy substrate) and passes through a narrow road culvert into another, smaller dam.

Stream B originates near the north eastern corner of the proposed development boundary. It is a steeply sloped, small tributary to the Gwaiing River. It is currently dry and likely to flow only intermittently during

high rainfall events. The channel bed is approximately 1.5 m in width and consists of sandy loam sediments. The banks are stable, at 1 m in height, and there is no evidence of erosion in the system. The riparian zone is dominated by indigenous Southern Afrotemperate Forest with only a few black wattle (*Acacia mearnsii*) and blue gum (*Eucalyptus grandis*) individuals having encroached. However, beyond this area on the surrounding slopes where previous anthropogenic disturbance has occurred, the vegetation becomes entirely dominated by black wattle and soil instability is noticeable.

***Figure 6:* The proposed site and study area in relation to the identified aquatic habitat**

5.2.2 Habitat Integrity, Ecological Importance & Sensitivity

The Freshwater Habitat Impact Assessment Completed by Sharples Environmental Services CC (2019) discusses the Habitat Integrity, Ecological Importance and Sensitivity of stream A and stream B.

When analysing stream A, it was determined that due to large modifications to the hydrological regime, water quality, geomorphology, and vegetation the Present Ecological State (PES) of the stream is within the 'D' category (Poor health). It was found that a large loss of natural habitat, biota and basic ecosystem functions has occurred.

The ecological importance and sensitivity (EIS) category of Stream A was determined as being 'Low' (D category). It has been significantly modified and limited natural habitat remains. The longitudinal connectivity is interrupted in several locations along the system and the non-perennial nature results in less refuge for biota. It is likely these waters are already subjected to significant water quality changes from the natural condition that has resulted in the dominance of disturbance tolerate species and thus the species/taxon richness is not expected to be significant at any scale. The dam is likely to provide some

refuge to certain biota during times of environmental stress, at a local scale. There are no rare/endangered, vulnerable or sensitive species expected and the area is not important for the conservation of ecological diversity on any scale. However, the dam on the stream does provide significant direct benefits to society through its use for water storage and irrigation.

When analysing the Habitat Integrity, Ecological Importance and Sensitivity of stream B, it was determined that the stream is largely natural with few modifications. It obtained a 'B' habitat integrity PES category as a small change in natural habitats and biota may have taken place, but the ecosystem functions are essentially unchanged. The exposure of bare soils due to the farming and alien trees in the catchment may have increased sediment inputs but it was found that there is no discernible sedimentation within the stream. There are no road crossings or erosion causing any significant bed modification. Regarding the hydrology, the invasive trees will have altered the catchment hydrology however at the time of the assessment (March 2019), the hydrological regime of the stream is close to the perceived natural condition. Overall, the modification is limited to very few localities and the impact on habitat quality, diversity, size and variability are also very small.

The ecological importance and sensitivity (EIS) category of Stream B was determined as being 'Low' (D category). It does not provide significant diversity in habitat as it has a uniform substrate and flows intermittently. It is not overly sensitive to water quantity and quality changes and no biota will depend on it for their entire life cycle. It is highly unlikely to provide habitat for any rare or endangered species and is not conserved in any way. Additionally, it does not currently provide any direct services to society. It does however act as a small corridor to the Gwaiing River downstream, which is of High ecological importance and sensitivity, and thus must be managed accordingly.

4.1.3.3. Aquatic Critical Biodiversity Areas & the Western Cape Biodiversity Spatial Plan

Critical Biodiversity Areas are areas required to meet biodiversity targets for ecosystems, species and ecological processes, as identified in a systematic biodiversity plan. Ecological Support Areas are not essential for meeting biodiversity targets but play an important role in supporting the ecological functioning of Critical Biodiversity Areas and/or in delivering ecosystem services.

Cape Farm Mapper (accessed October 2019) shows that the nearest Aquatic Critical Biodiversity Area is located near the north-eastern corner of the property, approximately 700 meters away from the proposed development footprint. The Aquatic Critical Biodiversity Area identified represents the Gwaing river.

The Western Cape Biodiversity Spatial Plan Handbook (2017) mentions various land use guidelines that have been identified to promote the effective management of biodiversity as required in Section 41(a) of the NEM:BA and in terms of the NEMA. The guidelines provide advice on which land uses and activities are most compatible with maintaining the ecological integrity of CBAs and ESAs, and other parts of the landscape, based on the Desired Management Objectives for the land, and the anticipated impact of each land use activity on biodiversity patterns and ecological processes. Figure 6 shows that the only CBA and ESA areas present on site and within the proposed development footprint are;

- CBA2: Terrestrial
- ESA2: Restore from other land use

The Western Cape Biodiversity Spatial Plan Handbook (2017) states that the desired management objective would be to maintain the area in a functional, natural or near-natural state, with no further loss of natural habitat. These areas should be rehabilitated. However, the Botanical Survey completed Mark Berry Environmental Consultants (2019) notes that this area comprises an alien forest, dominated by black

wattle and southern blue gum, and has virtually no merit to serve or function as a CBA. It is unlikely that this area was ever an indigenous forest or thicket.

The Western Cape Biodiversity Spatial Plan Handbook (2017) states that best practice should apply in areas where land uses other than conservation are present within a ESA2.

5.2.3 National Freshwater Ecosystem Priority Areas (NFEPA's)

The National Aquatic Ecosystem Priority Areas (NFEPA) map provides strategic spatial priorities for conserving South Africa's aquatic ecosystems and supporting sustainable use of water resources.

FEPAs were identified based on a range of criteria dealing with the maintenance of key ecological processes and the conservation of ecosystem types and species associated with rivers, wetlands and estuaries (Driver et al. 2011). The NFEPA project did not identify any rivers or wetlands within this study area.

6. Legal Framework

6.1 The NEMA, Act No 107 of 1998, as Amended, and the EIA Regulations (2014)

The National Environmental Management Act (NEMA; No. 107 of 1998, as amended) gives effect to the Constitution of the Republic of South Africa by providing a framework for co-operative environmental governance and environmental principles that enable and facilitate decision-making on matters affecting the environment. NEMA requires that an environmental authorisation be issued by a competent authority (CA) before the commencement of an activity listed in Environmental Impact Assessment Regulations Listing Notices G.N. 324, 325, 326 & 327 published on the 7th April 2017.

Due to the fact that this development proposal is an activity listed in the EIA Regulations, a Basic Assessment Process is required and the respective reports must be submitted to the Department of Environmental Affairs and Development Planning (DEADP) before they issue Long Island Trading 44 (Pty) Ltd with an Environmental Authorisation. The Environmental Authorisation has been attached as appendix 6.

Table 3: Listed Activities in terms of the NEMA Environmental Impact Assessment Regulations (2014), as amended, that are proposed to be triggered and therefore require an application for Environmental Authorisation to be submitted to the DEA & DP

Activity #	Listing notice 1. Description of Activity as per GN No. R 327
12	The development of— (i) dams or weirs, where the dam or weir, including infrastructure and water surface area, exceeds 100 square metres; or (ii) infrastructure or structures with a physical footprint of 100 square metres or more; where such development occurs— (a) within a watercourse; (b) in front of a development setback; or (c) if no development setback exists, within 32 metres of a watercourse, measured from the edge of a watercourse; — excluding— (aa) the development of infrastructure or structures within existing ports or harbours that will not increase the development footprint of the port or harbour; (bb) where such development activities are related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies; (cc) activities listed in activity 14 in Listing Notice 2 of 2014 or activity 14 in Listing

	Notice 3 of 2014, in which case that activity applies; (dd) where such development occurs within an urban area; (ee) where such development occurs within existing roads, road reserves or railway line reserves; or (ff) the development of temporary infrastructure or structures where such infrastructure or structures will be removed within 6 weeks of the commencement of development and where indigenous vegetation will not be cleared.
19	The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse; but excluding where such infilling, depositing, dredging, excavation, removal or moving— (a) will occur behind a development setback; (b) is for maintenance purposes undertaken in accordance with a maintenance management plan; (c) falls within the ambit of activity 21 in this Notice, in which case that activity applies; (d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour; or (e) where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.
24	The development of a road— (i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or (ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres; but excluding a road— (a) which is identified and included in activity 27 in Listing Notice 2 of 2014; (b) where the entire road falls within an urban area; or (c) which is 1 kilometre or shorter.
28	Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development: (i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or (ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare; excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.
Activity #	**Listing notice 3. Description of Activity as per GN No. R 324**
10	The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres. i. Western Cape i. Areas zoned for use as public open space or equivalent zoning; ii. All areas outside urban areas; or

	iii. Inside urban areas: (aa) Areas seawards of the development setback line or within 200 metres from the high-water mark of the sea if no such development setback line is determined; (bb) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined; or (cc) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined.
Activity #	**Listing notice 2. (GN No. R325): Scoping & Environmental Impact Reporting**
	N/A

Therefore, in summary, the following activities will be applied for:

- Listing Notice 1: Activity No: 12, 19, 24 and 28;
- Listing Notice 2: None;
- Listing Notice 3: Activity No: 10

6.2 Other applicable legislation

Long Island Trading 44 (Pty) Ltd is responsible for ensuring that all contractors, labourers and any other appointed person/entity acting on their behalf, remain compliant with the conditions of the received authorisations, as well as the provisions of all other applicable legislation and guidelines, including *inter alia*:

- National Environmental Management Act (NEMA) (Act No 107 of 1998, as amended);
- National Environmental Management Biodiversity Act (Act 10 of 2004);
- National Environmental Management: Waste Act (Act 59 of 2008);
- National Water Act (Act 36 of 1998)
- National Forest Act (Act No 84 of 1998);
- National Heritage Resources Act (Act No 25 of 1999);
- Occupational Health and Safety Act (Act 85 of 1993);
- Subdivision of Agricultural Land (Act No. 70 of 1970)
- Guideline for emp's for state-subsidised housing: Considerations to be taken into account in preparation of EMPs for state-subsidised housing (February 2019)

The above listed legislation have general applicability to most development applications, and it is the responsibility of *Long Island Trading 44 (Pty) Ltd* to ensure that all contractors and employees are aware of their obligations in terms of these Acts. This EMPr does not detract from any other legal requirements.

The proposed development activity will take place through various phases. Each phase has specific impacts or issues unique to that phase of the development activity. These phases of the development are listed below and the impacts associated with each phase as identified through the environmental impact assessment process are identified and given a brief description. Brief management statements are provided, as well as a description of the desirable impact management outcomes. .

6.3 Conditions of the EA, dated 07/04/2021, ref: 16/3/3/1/D2/29/0008/20, and the addendum thereof, dated 06/03/2023, ref: 16/3/3/5/D2/29/0011/22

E. CONDITIONS OF AUTHORISATION

Scope and Validity Period of authorisation

1. This Environmental Authorisation is granted for the period from date of issue until **30 April 2041**, the date on which all the listed activities, including post construction rehabilitation and monitoring requirements and operation aspects, will be deemed to be concluded at the site.

   Further to the above, the Environmental Authorisation is subject to the following:

   1.1. The non-operational component (i.e. installation of bulk services and top structures and construction of the filling station) is subject to the following:

      1.1.1. The holder must start with the physical implementation and exceed the threshold of all the authorised listed activities on the site by 30 April 2026.

      1.1.2. The development of the facility for the storage and handling of dangerous goods (filling station) must commence by the 30 April 2026 and be concluded by 30 April 2028; and

      1.1.3. Rehabilitation and monitoring must be finalised at the site within a period of 3-months from the date the construction activities (construction phase) are concluded; but by no later than 31 January 2031.

   1.2. The operational aspects of this Environmental Authorisation are granted until 30 April 2041, during which period all operational aspects, rehabilitation and monitoring requirements as well as the final environmental auditing and reporting must be finalised.

   Failing which, this Environmental Authorisation shall lapse, unless the environmental authorisation is amended in accordance with the relevant process contemplated in the Environmental Impact Assessment Regulations promulgated under the National Environmental Management Act, 1998 (Act no. 107 of 1998).

2. The Holder is authorised to undertake the listed activities specified in Section B above in accordance with a part of the Preferred Alternative described in the FBAR dated November 2020 on the site as described in Section C above.

The development is limited to the area *behind the defined development setback line along the non-perennial stream as depicted in the plan in Annexure 2 of this Environmental Authorisation*:

The proposal entails the development of a residential estate and business zone on a portion of Portion 7 of the Farm Buffelsfontein 204, Herold's Bay, George. The area where the development will take place is approximately 19 370 square metres in extent and the development will comprise of the following:

- A residential area consisting of 102 single residential erven (Single Residential Zone I) and 68 general residential erven (General Residential Zone II);
- A commercial area comprising of two erven for:
  - a filling station for the storage and handling of a dangerous good (Business Zone II);
  - a convenience centre (Business Zone II);
  - a restaurant (Business Zone II); and
  - office block (Business Zone IV).

- One open space area (Open Space Zone II) which includes the aquatic buffer;
- An erf for private road(s) (Transport Zone III);
- An erf for public streets (Transport Zone II;
- Servitudes registered for the sewerage package plants.

This will require the clearance of more than 1-hectare (but less than 20-hectares) of indigenous vegetation. Also, more than 300 square metres of an area mapped as Endangered Garden Route Granite Fynbos will be cleared of indigenous vegetation for this purpose but approximately 18.04 ha.

In addition, hereto the following associated infrastructure will be constructed:

- An internal road network with roads of 10 to 26 metres wide.
- Installation of 3 gravity fed package plants for the treatment of sewage and will be situated in three (3) drainage zones.
- The internal sewer network will consist of 160mm pipes with a 110mm connection to each erf.
- The internal water reticulation system will consist of pipes varying in size between 63 mm and 90 mm diameter with the necessary provision made for isolating valves, pressure reducing valves, fire hydrants, as required and erf connections;
- Electricity reticulation, substations and street lighting, and
- Stormwater drainage structures and stormwater pipelines.

The development will be implemented behind the defined development setback line along the non-perennial stream as depicted in the plan in Annexure 2 of this Environmental Authorisation.

3. The holder must adopt and implement the following development restrictions and measures to the proposed development:
   3.1. No development may take place on the watercourse side of the development setback which has been defined by the competent authority;
   3.2. The erf boundaries of all erven (i.e. residential; business; and transport zones) must be setback above the development setback;
   3.3. All service infrastructure including servitudes, must be set back above the development setback;
   3.4. The area on the watercourse side of the development setback must form part of the opens space system; and

3.5. A revised proposal and layout plan reflecting the above restrictions must be submitted to the competent authority for approval prior to site preparation or construction activities commencing on site. The proposed development layout plan must be amended to address the following:

3.5.1. The retreat of the erven in the aquatic buffer.

3.5.2. The retreat of the service station footprint in the aquatic buffer.

3.5.3. All services must be installed directly adjacent to erf boundaries and not encroach the aquatic buffer.

4. This Environmental Authorisation may only be implemented in accordance with an approved Environmental Management Programme ("EMPr").

5. The Holder shall be responsible for ensuring compliance with the conditions by any person acting on his/her behalf, including an agent, sub-contractor, employee or any person rendering a service to the Holder.

6. Any changes to, or deviations from the scope of the alternative described in section B above must be accepted or approved, in writing, by the Competent Authority before such changes or deviations may be implemented. In assessing whether to grant such acceptance/approval or not, the Competent Authority may request information in order to evaluate the significance and impacts of such changes or deviations, and it may be necessary for the Holder to apply for further authorisation in terms of the applicable legislation.

Notification and administration of appeal

7. The Holder must in writing, within 14 (fourteen) calendar days of the date of this decision–

7.1. notify all registered Interested and Affected Parties ("I&APs") of –
- 7.1.1. the decision reached on the application;
- 7.1.2. the reasons for the decision as included in Annexure 3;
- 7.1.3. the date of the decision; and
- 7.1.4. the date when the decision was issued.

7.2. draw the attention of all registered I&APs to the fact that an appeal may be lodged against the decision in terms of the National Appeal Regulations, 2014 (as amended) detailed in Section G below;

7.3. draw the attention of all registered I&APs to the manner in which they may access the decision;

7.4. provide the registered I&APs with the:
- 7.4.1. name of the Holder (entity) of this Environmental Authorisation,
- 7.4.2. name of the responsible person for this Environmental Authorisation,
- 7.4.3. postal address of the Holder,
- 7.4.4. telephonic and fax details of the Holder,
- 7.4.5. e-mail address, if any, of the Holder,
- 7.4.6. contact details (postal and/or physical address, contact number, facsimile and e-mail address) of the decision-maker and all registered I&APs in the event that an appeal is lodged in terms of the 2014 National Appeals Regulations (as amended).

7.5. The listed activities, including site preparation, must not commence within 20 (twenty) calendar days from the date the applicant notified the registered I&APs of this decision.

7.6. In the event that an appeal is lodged with the Appeal Authority, the effect of this Environmental Authorisation is suspended until the appeal is decided i.e. the listed activities, including site preparation, must not commence until the appeal is decided.

Written notice to the Competent Authority

8. Seven calendar days' notice, in writing, must be given to the Competent Authority before commencement of any activities.

8.1. The notice must make clear reference to the site details and EIA Reference number given above.

8.2. The notice must also include proof of compliance with the following conditions described herein: **Conditions no.: 3, 7, 10 and 12.**

9. Seven calendar days' notice, in writing, must be given to the Competent Authority on completion of the construction activities of the—

9.1. bulk internal service infrastructure (i.e. internal roads; water-, sewer-, electricity reticulation and bulk storm water); and

9.2. final phase of the mixed/residential development.

Management of activity

10. The draft or Environmental Management Programme ("EMPr") submitted as part of the application for Environmental Authorisation must be amended and submitted for approval, subject to the following requirements:

10.1. The EMPr must be amended to incorporate the following —

10.1.1. Environmental Control Officer compliance reports must be submitted monthly to this Directorate.

10.1.2. Incorporate all the conditions contained in this Environmental Authorisation; The section dealing with the management and demarcation of the No-Go area's (including the open space areas) must clearly state how the areas will be demarcated prior to any earthworks / commencement of construction;

10.1.3. Incorporate a map showing the fire breaks as required and an implementation plan for effective fire management.

10.1.4. The revised Site Development Plan must be included in the EMPr;

10.1.5. A detailed Site Development Plan for the filling station, which also depicts *inter alia*:

(a) tank installations and auxiliary infrastructure for the handling of the dangerous goods;

(b) a site-specific stormwater management / drainage system and separation and or treatment devices;

(c) monitoring points including monitoring boreholes;

10.1.6. Incorporate an Operational Phase Environmental Management Plan that will deal with the operational aspects including the filling station and must include:

(a) Include the implementation plan with clear management outcomes.

(b) An indication of the persons who will be responsible for the implementation of the impact management actions.

(c) Include all the mitigation measures as described in the Geotechnical Impact Assessment that deals with the filling station and the design measures that were recommended.

(d) Include the requirements on the comments provided by the WCG: Department of Environmental Affairs and Development Planning – Pollution and Chemicals Management
(e) Include emergency procedures and actions to be undertaken for emergency spills or malfunctioning of tanks.
(f) Detail the environmental auditing programme.

10.2. The amended EMPr must be submitted to the Competent Authority and be approved, prior to the construction activities commencing on site.

Note: The revised EMPr should be submitted to the Competent Authority at least 90-days prior to the construction activities commencing on site to ensure the competent authority is able to process / review the revised EMPr prior to the intended date of commencement.

11. The EMPr must be included in all contract documentation for all phases of implementation.

Monitoring

12. The Holder must appoint a suitably experienced Environmental Control Officer ("ECO"), for the duration of the construction and rehabilitation phases of implementation contained herein.

13. The ECO must–

13.1. be appointed prior to commencement of any works (i.e. removal and movement of soil and / or rubble or construction activities commencing;

13.2. ensure compliance with the EMPr and the conditions contained herein;

13.3. keep record of all activities on the site; problems identified; transgressions noted and a task schedule of tasks undertaken by the ECO;

13.4. remain employed until all development activities are concluded, and the post construction rehabilitation and monitoring requirements are finalised.

14. A monitoring programme for the filling station must be developed and implemented which must include the following:
a) The development of the facility and infrastructure for the storage and handling of a dangerous good (i.e., construction of the filling station) and must detail the requirements of the fuel containment area, forecourt area, the installation of the underground storage tanks, pipelines;
b) Leak detection and monitoring thereof;
c) The location of the monitoring boreholes
d) Detail the Recordkeeping and Reporting protocol.

15. A monitoring programme for the treatment of sewage and disposal of effluent must be developed and implemented which must include the following:
a) The sampling frequency of groundwater to detect possible contamination;

b) Location of sampling areas;
c) Standards that water samples are measured against; and
d) Detail the Recordkeeping and Reporting protocol.

16. A copy of the Environmental Authorisation, EMPr, any independent assessments of financial provision for rehabilitation and environmental liability, closure plans, audit reports and compliance monitoring reports must be kept at the site of the authorised activities and be made available to anyone on request, and where the Holder has website, such documents must be made available on such publicly accessible website.

17. Access to the site referred to in Section C must be granted, and the environmental reports mentioned above must be produced, to any authorised official representing the Competent Authority who requests to see it for the purposes of assessing and/or monitoring compliance with the conditions contained herein.

Auditing

18. The Holder must, for the period during which the environmental authorisation and EMPr remain valid ensure the compliance with the conditions of the environmental authorisation and the EMPr, is audited;

19. The frequency of auditing of compliance with the conditions of the environmental authorisation and of compliance with the EMPr, must adhere to the following programme:

    19.1. During the period which the activities have been commenced with on site until the construction of the bulk internal service infrastructure (i.e. internal roads; water-, sewer-, electricity reticulation and bulk storm water) has been completed on site, the Holder must undertake annual environmental audit(s) and submit the Environmental Audit Report(s) to the Competent Authority.

    A final Environmental Audit Report must be submitted to the Competent Authority within **three (3)** months of completion of the construction of bulk internal services and the post construction rehabilitation and monitoring requirements thereof.

    19.2. During the period the development of the mixed/residential phases (i.e. construction of top structures) is undertaken, the Holder must ensure that environmental audit(s) are performed regularly and submit these Environmental Audit Report(s) to the Competent Authority.

    During this phase of the development, the frequency of the auditing of compliance with the conditions of the environmental authorisation and of compliance with the EMPr **may not exceed intervals of 5-years**.

    A final Environmental Audit Report must be submitted to the Competent Authority within **three (3)** months of completion of the mixed/residential development and the post construction rehabilitation and monitoring requirements thereof, but by no later than 31 January 2031;

    Note: The final auditing requirements should be completed at least three months prior to expiry of the validity period of the environmental authorisation to ensure the Holder is able to comply with all the environmental auditing and reporting requirements and for the competent authority to be able to process it timeously.

19.3. During the period the development of the facility or infrastructure for the storage and handling of a dangerous good (i.e. construction of the filling station) is undertaken, the Holder must undertake annual environmental audit(s) and submit the Environmental Audit Report(s) to the Competent Authority.

A final Environmental Audit Report must be submitted to the Competent Authority within **three (3)** months of completion of the construction of the filling station component of the development and the post construction rehabilitation requirements thereof, but by no later than 30 July 2028.

During related operation of the facility or infrastructure for the storage and handling of a dangerous good at the filling station, the frequency of the auditing of compliance with the conditions of the environmental authorisation and of compliance with the EMPr **may not exceed intervals of 5-years.**

Note: The compilation and submission of the environmental audits can be coordinated so that they can be compiled and submitted simultaneously to the Competent Authority.

20. The Environmental Audit Report(s), must –

20.1. be prepared and submitted to the Competent Authority, by an independent person with the relevant environmental auditing expertise. Such person may not be the ECO or EAP who conducted the EIA process;

20.2. provide verifiable findings, in a structured and systematic manner, on–

20.2.1. the level of compliance with the conditions of the environmental authorisation and the EMPr and whether this is sufficient or not; and

20.2.2. the ability of the measures contained in the EMPr to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity.

20.3. identify and assess any new impacts and risks as a result of undertaking the activity;

20.4. evaluate the effectiveness of the EMPr;

20.5. identify shortcomings in the EMPr;

20.6. identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMPr;

20.7. indicate the date on which the construction work was commenced with and completed or in the case where the development is incomplete, the progress of the development and rehabilitation;

20.8. indicate the date on which the operational phase was commenced with and the progress of the rehabilitation;

20.9. include a photographic record of the site applicable to the audit; and

20.10. be informed by the ECO reports.

21. The Holder must, within 7 calendar days of the submission of the audit report to the Competent Authority, notify all potential and registered I&APs of the submission and make the report available to anyone on request and on a publicly accessible website (if applicable).

Specific Conditions

22. Three (3) groundwater monitoring boreholes must be established downgradient of the filling station in order to detect any potential contamination. The positions of the monitoring boreholes must be indicated on the layout plan, once the final design has been confirmed. The monitoring borehole must be established at least 3 months, prior to the installation of the tanks and baseline data must collected and recorded during this period.

23. A Site-Specific Stormwater Management Plan must be developed for the filling station site and must detail effective pollution and erosion control measures, as well as stormwater management. This must be submitted and approved by this Department as part of the EMPr, prior to commencement of construction activities.

24. The area on the watercourse side of the development setback must be demarcated as a no-go area and managed for a conservation use.

25. The area where treated effluent will be irrigated may only occur on existing and currently used fields as indicated in Annexure 2.

26. The security fencing must be aligned to the perimeter of the development footprint area. The security fencing may not be installed within or around the conservation area, unless approved by the Competent Authority.

27. Should any heritage remains be exposed during excavations or any other actions on the site, these must immediately be reported to the Provincial Heritage Resources Authority of the Western Cape, Heritage Western Cape. Heritage remains uncovered or disturbed during earthworks must not be further disturbed until the necessary approval has been obtained from Heritage Western Cape. Heritage remains may only be disturbed by a suitably qualified heritage specialist working under a directive from the relevant Heritage Resources Authority.

    Heritage remains include: meteorites, archaeological and/or paleontological remains (including fossil shells and trace fossils); coins; indigenous and/or colonial ceramics; any articles of value or antiquity; marine shell heaps; stone artefacts and bone remains; structures and other built features with heritage significance; rock art and rock engravings; shipwrecks; and/or graves or unmarked human burials including grave goods and/or associated burial material.

F. GENERAL MATTERS

1. Notwithstanding this Environmental Authorisation, the Holder must comply with any other statutory requirements that may be applicable when undertaking the listed activities.

Amendment of Environmental Authorisation and EMPr

2. If the Holder does not start with all listed activities and exceed the threshold of each listed activity within the period referred to in Section G, this Environmental Authorisation shall lapse for that activity, and a new application for Environmental Authorisation must be submitted to the relevant Competent Authority.

    Where a validity period has been specified for operational aspects, such as for the development and related operation of the facilities or infrastructure for the storage and handling of a dangerous good,

the onus is on the Holder to ensure the facility is operating at all times in terms of a valid environmental authorisation.

If the Holder wishes to extend a validity period specified in the Environmental Authorisation, an application for amendment in this regard must be made to the relevant Competent Authority prior to the expiry date of such a period.

Note:

(a) Failure to lodge an application for amendment prior to the expiry of the validity period of the Environmental Authorisation will result in the lapsing of the Environmental Authorisation.
(b) It is an offence in terms of Section 49A(1)(a) of NEMA for a person to commence with a listed activity if the competent authority has not granted an Environmental Authorisation for the undertaking of the activity.
(c) An environmental authorisation may be amended where it relates to a change of ownership or transfer of rights and obligations.
(d) On application, if the competent authority decides to grant environmental authorisation, the competent authority may issue a single environmental authorisation or multiple environmental authorisations in the name of the same or different applicants covering all aspects for which authorisation is granted.

3. The Holder is required to notify the Competent Authority where any detail with respect to the Environmental Authorisation must be amended, added, substituted, corrected, removed or updated.

   In assessing whether to amend or correct the EA, the Competent Authority may request information to evaluate the significance and impacts of such changes or deviations, and it may be necessary for the Holder to apply for further authorisation in terms of the applicable legislation.

   The onus is on the Holder to verify whether such changes to the environmental authorisation must be approved in writing by the relevant competent authority prior to the implementation thereof.

   Note: An environmental authorisation may be amended or replaced without following a procedural requirement contained in the Regulations if the purpose is to correct an error and the correction does not change the rights and duties of any person materially

4. The manner and frequency for updating the EMPr is as follows:

   (a) Any further amendments to the EMPr, other than those mentioned above, must be approved in writing by the relevant competent authority.

   (b) An application for amendment to the EMPr must be submitted to the Competent Authority if any amendments are to be made to the impact management outcomes of the EMPr. Such amendment(s) may only be implemented once the amended EMPr has been approved by the competent authority.

   The onus is however on the Holder to confirm the legislative process requirements for the above scenarios at that time.

5. Where an amendment to the impact management outcomes of an EMPr is required before an environmental audit is required in terms of the environmental authorisation, an EMPr may be amended on application by the Holder of the environmental authorisation.

Compliance with Environmental Authorisation and EMPr

6. Non-compliance with a condition of this environmental authorisation or EMPr is an offence in terms of Section 49A(1)(c) of the National Environmental Management Act, 1998 (Act no. 107 of 1998, as amended).

7. This Environmental Authorisation is granted for a set period from date of issue, during which period all the listed activities must be commenced with and concluded, including the post-construction rehabilitation; monitoring requirements and environmental auditing requirements which must be concluded.

   The validity period and conditions of the environmental authorisation has been structured to promote the effective administration of the environmental authorisation and guidance has been provided to ensure the compliance thereof within the validity period, for example:

   - Failure to submit the revised EMPr to the Competent Authority at least 90-days prior to the construction activities commencing on site, may result in the competent authority not being able to process / review the revised EMPr prior to the intended date of commencement.

   - Failure to complete the post construction rehabilitation and monitoring requirements at least six months prior to expiry of the validity period of an environmental authorisation may result in the Holder not being able to comply with the environmental auditing requirements in time.

   - Failure to complete the auditing requirements at least three months prior to expiry of the validity period of the environmental authorisation may result in the Holder not being able to comply with all the environmental auditing and reporting requirements and may result in the competent authority not being able to process the audit timeously.

8. This Environmental Authorisation is subject to compliance with all the peremptory conditions (i.e. 3; 7, 8; 10 and 12). Failure to comply with all the peremptory conditions prior to the physical implementation of the activities (including site preparation) will render the entire EA null and void. Such physical activities shall be regarded to fall outside the scope of the Environmental Authorisation and shall be viewed as an offence in terms of Section 49A(1)(a) of NEMA.

9. In the event that the Environmental Authorisation should lapse, it is an offence in terms of Section 49A(1)(a) of NEMA for a person to commence with a listed activity, unless the competent authority has granted an Environmental Authorisation for the undertaking of the activity.

10. Offences in terms of the NEMA and the Environmental Impact Assessment Regulations, 2014, will render the offender liable for criminal prosecution.

7. Scope of this EMPr

This EMPr describes the measures that must be implemented in order to avoid, minimise, manage and monitor the potential environmental impacts of the development, during all phases of the project life cycle, namely:

- Planning and Design Phase
- Pre-construction Phase
- Construction Phase

- Post-Construction Rehabilitation
- Operational Phase

General environmental management measures that must be applied throughout the project lifecycle (as and where applicable) are described in Chapter 9 below. Additional management measures that must be implemented to address specific impacts that may arise during each phase are provided in **Chapters 9-12** of this EMPr.

8. General Environmental Management

The following general management measures are intended to protect environmental resources from pollution and degradation during all phases of the project life cycle. These measures should be implemented as and where applicable, reasonable and practicable during the pre-construction, construction and post-construction rehabilitation and operational (maintenance) phases of the proposed development.

Code of Conduct
The purpose of the Code of Conduct (CoC) is to minimise the impact of the activities associated with the construction phase on the environment. The rules and regulations prescribed in this CoC are intended to ensure that the impacts on the environment are not prejudiced by the construction activities. Failure to adhere to or any breach of this CoC will result in a fine being levied against the offending or defaulting party / individual.

Labourers during the construction phase should conserve the natural environment, endorsing the principles of sustainable use and minimum impact. They should also be sensitive to the impact of their operation on the environment within which they work and minimise any adverse impacts.

This EMPr forms an integral part of the activities during the construction phase and as such, is legally enforceable. In addition to the restrictions and controls provided for in this EMPr, the environmental controls comprise the following:

Engineers
- Unless otherwise stated by the holder, only a registered engineer must be appointed for the construction phase of the development.
- The engineer shall provide work or services of a quality and scope, and to a level, which are commensurate with accepted standards and practices.
- The engineer shall be impartial in decision-making, provision of advice and judgement.

Contractors and sub-contractors
- Unless otherwise determined, only appropriately registered contractors shall be appointed.
- It shall be the responsibility of the holder / engineer to ensure that the contractors abide by and comply with the rules and regulations of the Code of Conduct.
- Contractors shall at all times be responsible for their sub-contractors and employees whilst they are on the development property.

Rules and Regulations
It is of vital importance that engineers and contractors understand and acknowledge that they are working on an environmentally sensitive development and agree to conform to all environmental controls specified in this EMPr and any additional input by the ECO.

In addition to the EMPr, the environmental controls comprise the following:

- **Building Plan Controls**
  - A copy of the approved and signed building plans must be available on site during the construction phase of the development.
  - Variations of the building plans must be approved by the engineer / holder prior to being implemented.
  - Prior to commencing building, the contractor must remove all topsoil and store it in a berm of not more the 2m high, away from construction activities.

- **Site tidiness**
  - The contractor must keep the appearance of his building site neat and tidy at all times. Building rubble must be removed from site at regular intervals, and litter must be removed from the site on a daily basis. Refuse drums must be available on site which waste can be placed in. The drums must be emptied on a regular basis and the waste taken to a licenced local waste disposal facility.
- **Safety**
  - The contractor shall comply with the Health and Safety Act (Act No. 85 of 1993), as amended, together with such regulations promulgated thereunder.

8.1 Site access and traffic management

Access to the development is proposed along Oubaai Main Rd. The Oubaai Main Rd provides greater connectivity to the surrounding area and is connected to the R404, which leads to the N2.

All construction vehicles need to adhere to traffic laws and regulations. The speed of construction vehicles and other heavy vehicles must be strictly controlled to avoid dangerous conditions for other road users. As far as possible, care should be taken to ensure that the local traffic flow pattern is not significantly disrupted and vehicle operators therefore need to be educated in terms of "best-practice" operation in order to minimise unnecessary traffic congestion or dangers. These practices include, but are not limited to, not unnecessarily obstructing the access point or traffic lanes used to access the site; considering the load carrying capacity of road surfaces and adhering to all other prescriptive regulations regarding the use of public roads by construction vehicles. Delivery trucks should be appropriately covered to deter the spilling of material along the route to the site.

Adequate signage that is both informative and cautionary to passing traffic (motorists and pedestrians) warning them of the construction activities should be implemented. Signage would need to be clearly visible and include, amongst others, the following:

- Identifying working area as a construction site;
- Cautioning against relevant construction activities;
- Prohibiting access to construction site;
- Clearly specifying possible detour routes and / or delay periods;
- Possible indications of time frames attached to the construction activities, and;
- Listings of which contractors are working on the site.

Other mitigation measures include:

- No construction to take place over or during the December holiday period without prior permission from the relevant authorities.
- ECO to do awareness training with the contractor and labourers and to highlight the traffic related risks before construction commences.

- Ensure appropriate behaviour of operators of construction vehicles.

8.1.1 Operational phase management measures

The necessary road markings, traffic signage, speed limits and early warning systems will need to be developed as per the requirements of the relevant roads-authority. Paved sidewalks should be provided in support of the development that will generate high numbers of public transport commuters.

8.2 Site demarcation

The working areas should be clearly demarcated on site during the pre-construction or construction phases of the development, as appropriate.

8.2.1 Construction working area

Prior to the commencement of any land-clearing or construction activities, the outer boundary of the development area must be surveyed and pegged. If practical, the demarcation boundary should typically allow a working area of no more than 2.5m around the development footprint unless otherwise agreed with the ECO. This demarcation boundary is to ensure that land clearing and construction activities are restricted to only that area strictly required for the proposed development, and to prevent unnecessary disturbance of soil surfaces and vegetation outside of the development footprint.

If desired or deemed necessary by the ECO, the outer boundary of the working area can be enclosed with orange barrier netting fencing, shade netting, droppers & wire/ danger tape, or similar – as feasible and practical. The fencing should be retained and maintained for the duration of the construction period, and should not be moved during construction unless agreed otherwise with the ECO.

8.2.2 No-go areas

Prior to the commencement of any land-clearing or construction activities, all sensitive areas (as identified by the ECO), must be demarcated and must not be disturbed during the construction phase. It is recommended that the No-Go areas be demarcated with a two strand wire fence with no go signs (A4 laminated notice) every 50 meters attached to the wire fence. Danger tape flagging (pieces of danger tape tied to twine or rope) may be utilised, or danger tape strung between poles or stakes maybe used however the use of only danger tape is not recommended for long-term demarcation as this will easily become untidy and blown away by the wind resulting in pollution. In other words if danger tape is used it will have to be replaced frequently.

Aquatic buffer zones are designed to act as barriers between human activities and sensitive water resources in order to protect them from adverse negative impacts. Buffer zones associated with water resources have been shown to perform a wide range of functions and have therefore been adopted as a standard measure to protect water resources and associated biodiversity.

The Freshwater Habitat Assessment Report compiled by Sharples Environmental Services (2019) recommends a 32 m buffer zone from the boundary of the riparian areas. An important component of these buffers is that they represent minimum setbacks from the riparian zone. Functions such as stormwater attenuation, sewage lines, water lines, roads and pathways must lie outside of this setback area. This buffer area has been mapped (see Appendix 2) and should be adhered to by the contractor at all times during construction.

The Botanical survey completed by Mark Berry Environmental Consultants (2019) explains that the indigenous forest which is located lower down in the valley outside of the development area should be protected and suitably buffered from the development by means of a 30m fire belt, with the surrounding

aliens cleared. This fire belt would act as a buffer and should be demarcated and treated as a no-go area.

No-go areas could also include areas with slopes of 1:4 and steeper, greenbelt / corridor areas, public open spaces, pastures, drainage lines, streams and/or other wetlands outside of the approved development area. No-go areas outside the approved development area must be off-limits to all construction workers, vehicles and machinery during all phases of the development. No vegetation may be cleared from within the no-go areas, and no dumping of any material (waste, topsoil, subsoil etc.) may occur in these areas.

Construction workers must be informed of the no-go areas, and if necessary appropriate signage can be used to enforce the demarcation. Any interaction with no-go areas should be consulted between the contractor and ECO prior to any actions. All temporary toilets and solid waste skips should be located at the furthest point from the edge of the watercourse. These facilities should be serviced regularly by a reputable service provider and managed appropriately to prevent any spills or leakages.

Earth-moving construction activities adjacent to, or within the vicinity of, the freshwater features should, as far as possible, take place in the dry season to reduce the risk of contaminated runoff from construction activities washing into the watercourse or permeating into the soil and groundwater.

The re-fuelling, handling of hydrocarbon products or maintenance and servicing of heavy earth-moving vehicles must not take place within buffer areas, delineated aquatic habitats or over bare soil on-site, to prevent potential soil and groundwater contamination.

8.2.3 Demarcation of the site camp

The area chosen for the site camp and associated facilities must be the minimum area reasonably required to accommodate the site camp facilities, and which will involve the least disturbance to the environment. It is recommended that easily accessible, transformed areas must be used for the site camp, at least 100m away from any no-go areas. Site selection must be done in consultation with the ECO.

8.3 Site camp and associated facilities

The following general management measures pertaining to the set-up, operation and closure of a site camp should be applied where appropriate, reasonable and practicable:

8.3.1 Fencing & Security

The site camp area must be secured to prevent any un-authorised individuals from entering the site camp and possibly getting injured or posing a safety and/or security risk. Adequate signage must be displayed, designating the site office / camp as a restricted area to non-personnel. If required, the site camp and associated areas may be fenced off along the demarcated boundaries of these areas, preferably with 2m high fence and shade netting or similar.

8.3.2 Fire Fighting Equipment

No less than 2 fire extinguishers must be present in the site camp. The extinguishers must be in a working condition and within their service period. A fire extinguisher must always be present wherever any "hot works" (e.g. welding, grinding etc.) are taking place. It is recommended that all construction workers receive basic training in fire prevention and basic fire-fighting techniques, and are informed of the emergency procedure to follow in the event of accidental fires. No open fires may be made on the construction site during any phase of the project. Construction workers may make small contained fires (e.g. for warming or cooking purposes), within the site camp provided the small fire is encircled by a corrugated iron structure, drum or similar, to prevent wind-blown cinders from causing fires elsewhere.

Such fires may not be left unattended and must be thoroughly extinguished after use. No smoking must be allowed on the construction site. In the case of accidental fires the contractor must (if required) alert the Local Authority's Fire Department as soon as a fire starts prior to the fire becoming uncontrollable.

8.3.3 Waste Storage Area

Sufficient bins for the temporary storage of construction related waste must be provided inside the site camp and/or at the working area. Sufficient signage and awareness should be created to ensure that these bins are properly used.

8.3.4 Hazardous Substances Storage Area

Fuels, chemicals, lubricants and other hazardous substances must be stored in a demarcated, secured and clearly sign-posted area within the site camp away from the watercourses on site. Sufficient signage and awareness should be created to ensure that these bins are properly used.

8.3.5 Potable Water

An adequate supply of potable water must be provided to construction workers at the site camp.

8.3.6 Ablution Facilities

Chemical toilets should be kept at the site camp, on a level surface and secured from blowing over and located in such a way that the toilets will not cause any form of pollution . As per the SANS10400 requirement, one ablution facility for every 8 male workers and 2 ablution facilities for every 8 female workers will be provided.

Chemical toilets should be kept at the site camp, on a level surface and secured from blowing over. The chemical toilets must be regularly emptied and the waste disposed of at an appropriate waste water disposal/ treatment site. The ablution facilities must not be linked to the river system in any way. Toilets must be serviced regularly and kept in an orderly state. The contractor must ensure that no spillage occurs when the toilets are cleaned, serviced or moved. Performing ablutions outside of the provided toilet facilities is strictly prohibited and the ECO would need to regularly inspect the state of the chemical toilets to ensure compliance.

8.3.7 Eating Area & Rest Area

A dedicated area within which construction workers can rest and eat during breaks must be provided within the site camp. Seating and shade should be provided.

8.3.8 Vehicle & Equipment Maintenance Yard

Where possible, construction vehicles and equipment that require repair must be removed from site and taken to a workshop for servicing. If emergency repairs and/or basic maintenance of construction vehicles or equipment are necessary on site, such repair work must be undertaken within the designated maintenance yard area away from any watercourses. Repairs must be conducted on an impermeable surface, and/or a tarpaulin and/or drip trays must be laid down prior to emergency repairs taking place, in order to prevent any fuel, oil, lubricant or other spillages from contaminating the surrounding environment.

8.3.9 House-keeping

The site camp and related site camp facilities must be kept neat and orderly at all times, in order to prevent potential safety risks and to reduce the visual impact of the site during construction.

8.4 Indigenous vegetation clearing

Where indigenous vegetation must be cleared for the development the following measures must be implemented:

- Where feasible vegetation must simply be trimmed to facilitate access/ construction, rather than being completely cleared or removed.
- Vegetation clearing/trimming must be cleared by hand (i.e. brush cut) and stockpiled for use as mulch/ brush-packing during rehabilitation of the site. Any alien vegetation that is cleared must be disposed of in consultation with the ECO, unless the cleared alien vegetation does not contain seeds in which case it may be retained for use in site rehabilitation.
- Only the areas required to accommodate the construction and access to the construction site must be cleared/trimmed of vegetation.
- After any clearing is completed, an appropriate cover crop should be planted where any weeds or exotic species are removed from disturbed areas timeously.
- Vegetation outside of the construction footprint and within any no-go areas must not be cleared.
- Clearing should take place in a phased approach, so that cleared areas are kept small and manageable.
- The indigenous forest which is located lower down in the valley should be protected and suitably buffered from the development by means of a fire belt, with the surrounding aliens cleared.

8.5 Topsoil and subsoil management

It is recommended that topsoil be removed from any area where physical disturbance of the surface will occur, including within the footprint of the development site (working area) and possibly within the site camp, ablution area, vehicle maintenance yard, refuelling area and temporary waste storage area. Topsoil removal and stockpiling must be undertaken only after consultation with the ECO.

- Removed topsoil and subsoil must be stockpiled for the duration of the active construction period, and utilised for the final landscaping and rehabilitation of disturbed areas on site.
- The removed topsoil must be stockpiled in a berm, in a demarcated area as agreed with the ECO.
- The topsoil berm may be a few meters wide but must ideally not be more than 2m high to allow light and air penetration.
- Removed subsoil must be stockpiled separately from topsoil.
- The topsoil & subsoil storage area must be located on a level area outside of any surface drainage channels outside the riparian zone, and at a location where it can be protected from disturbance and river flow/floods during construction and where it will not interfere with construction activities.
- Topsoil and subsoil stockpiles must be adequately protected from being blown away or eroded by storm water. If necessary, shade cloth or other suitable measures must be used to stabilise and protect the stockpile from wind/water erosion. Topsoil stockpiles must not be covered with tarpaulin, as this may smother and decrease the virility of topsoil.
- Handling of topsoil must be minimised as much as possible, and the location of the topsoil berm must be chosen carefully to avoid needing to relocate the topsoil berm at a later date.
- Ideally, topsoil is to be handled twice only, once to strip and stockpile, and once to replace, level, shape and scarify.
- Stockpiles must not be located within 50 metres of watercourses. The furthest threshold must be adhered to.
- If soil stockpiles will be stored for an extended period of time, the stockpiles must be kept clear of weeds and alien vegetation growth by regular weeding, (or application of herbicides if agreed with the ECO).
- Soil material that will not be re-utilised on site may be removed from site and taken to an appropriate site for re-use or disposal.

- Topsoil removed from fynbos areas to be reused in rehabilitation areas, e.g. open space areas. Where possible, topsoil from fynbos areas, containing indigenous plant seeds, should be transferred immediately to rehabilitation areas rather than being stockpiled, as stockpiling kills important fungi, microbes, seeds and soil fauna. Topsoil stockpiles of this kind must not exceed 0.5 m in height and must not be compacted.
- Note that the topsoil must be the final layer applied to a rehabilitated/ re-landscaped site, after subsoil/ spoil material has been placed and shaped on the site.

8.6 Integrated waste management approach

It is recommended that an integrated waste management system is adopted on site. The system must be based on waste minimisation and must incorporate reduction, recycling, re-use and disposal where appropriate. Weather and animal proof waste bins for the different categories of recyclable waste (i.e. paper, plastic, metal). These bins must be emptied and the waste taken to a registered recycling facility. The receipts from the facility must be kept on file and must be available on request. A Waste Management Plan is to be developed in order to formalise waste control methods and to provide a structure for waste management.

The non-recyclable and non-reusable waste (e.g. builder's rubble, etc.) generated on site must be stored in animal and weather proof bins and disposed of at a landfill site licensed in terms of the applicable legislation. The receipts from the facility must be kept on file and must be available on request.

8.7 Hazardous substances and fuels

If hazardous substances and fuels such as diesel, oil, lubricant, detergents etc. are to be stored on site for construction purposes, a designated area must be set aside for this within the site camp.

- All hazardous substances must be stored in the designated area within the site camp in animal and weather proof bins/ storage units.
- The area selected for storage of hazardous fuels must be located on a level area, at least 100m from any water courses, water bodies or surface drainage channels.
- The designated area must be clearly demarcated and secured by use of fencing and/or cages, to prevent access by un-authorised persons and/or animals.
- Soil contaminated by hazardous substances must be excavated and disposed of as hazardous waste.
- Access to the hazardous material storage area must be restricted to authorised personnel only and must be treated as a no-go zone to unauthorised personnel.
- Appropriate hazard signage indicating the nature of the stored materials shall be prominently displayed at the storage area.
- Spoil or waste material should not be dumped within 50 m of natural areas, it should be discarded at a licensed dump site.
- Those persons tasked with handling any hazardous substances must be equipped with the knowledge, equipment and safety gear necessary to handle the substance/s safely.
- Material Safety Data Sheets (MSDSs) must be available on site for all hazardous chemicals and hazardous substances to be used on site. Where possible and available, MSDSs must additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases or escapes.
- Storage vessels of hazardous substances must be situated in an impermeable bunded area large enough to accommodate at least 110% of the capacity of the vessel in question. If plastic sheeting is used to line the bunded area, care must be taken to ensure it is not punctured in any way during the course of the construction period.

- All waste, hazardous as well as general, which result from the proposed activities must be disposed of appropriately at a licensed Waste Disposal Facility (WDF).
- Fuel tanks must ideally be elevated so that leaks can easily be detected.
- No smoking may be permitted at or surrounding the area where fuels and hazardous substances are stored.
- Drip trays must be utilised during decanting of hazardous substances and when refilling chemical/ fuel storage tanks.
- Refuelling of vehicles/ machinery may only take place at the site camp or vehicle maintenance yard. Where refuelling must occur, drip trays should be utilised to catch potential spills/ drips.
- Drip trays must be placed under generators (if used on site) water pumps and any other machinery on site that utilises fuel/ lubricant, or where there is risk of leakage/spillage.
- Firefighting equipment must be located in close proximity to the storage area.

In the event of a significant spill or leak of hazardous substances (petrol and diesel), such incident(s) must be reported to all relevant authorities, including the D: PCM, in accordance with Section 30 (5) of the National Environmental Management Act (NEMA) (Act 107 of 1998), pertaining to the control of emergency incidents.

8.8 Cement and concrete batching

Cement and concrete batching will be permitted on site, but may only take place on designated impermeable, bunded surfaces, as agreed with the ECO.

- Cement/ concrete may not be mixed on bare ground.
- The impermeable/ bunded area must be established in such a way that cement slurry, runoff and cement water will be contained and will not flow into the surrounding environment, the river/ riparian zone or contaminate the soil.
- Cement run-off and excess cement slurry must be collected in the designated impermeable area, allowed to dry and then disposed of at an appropriate facility. Alternately, the contaminated water can be collected in sealed tanks and transported to an appropriate disposal site.
- Unused cement bags must be stored in such a way that they will be protected from rain.
- Washing of excess cement/concrete into the ground is not allowed. All excess concrete/ cement must be removed from site and disposed of at an appropriate location.
- Empty cement bags must be disposed of in the hazardous waste bins on site.

8.9 Erosion control and stormwater management

Appropriate measures must be implemented to control the flow of stormwater across the construction site, in order to prevent possible flooding, soil loss and dispersion of pollutants. All exposed earth surfaces must also be protected from wind and water erosion. Stripped areas must not remain uncovered for extended periods of time and must be provided with a suitable cover (vegetation, mulch, brush-packing) as soon as possible.

The scale and nature of the erosion and stormwater control measures implemented on site must be appropriate to the conditions on site, and sufficient to achieve the desired outcomes (soil preservation, prevention of flooding, stormwater control) to the satisfaction of the ECO and consulting engineer.

It may be necessary to implement small-scale erosion protection measures at the construction site, to prevent soil erosion. These measures must be established to reflect the natural slope of the surface and located at the natural ground level and must be located within the development footprint and not encroach into the buffer areas. Such measures may include the use of shade netting, grease traps/oil separators, geo-fabric, brush-packing or similar barriers in areas susceptible to erosion and along exposed

slopes. Stormwater managed by the development is to be discharged into porous channels / swales ('infiltration channels or basins') running near parallel or parallel to contours within and along the edge of the development. Areas must be rehabilitated and a suitable cover crop planted once specific phases of construction is completed.

8.10 Excavations and Earthworks

Any major earthworks with bulldozers and heavy machinery must be under constant supervision and operators are to be aware of all the environmental obligations, as there is always the potential to inflict damage to the sensitive areas. Any unnecessary or excessive heavy machinery movement must be kept to a minimum i.e. only what is absolutely necessary. Areas to be excavated must be clearly demarcated. Areas, which have already been excavated and entail fairly significant earthworks, must be similarly demarcated to avoid the spreading of construction activities into more sensitive areas.

All excavated material must be stored on a flat surface away from any drainage line or area susceptible to erosion. The location must be decided upon in consultation with the ECO. Stored material must be protected from wind and water erosion and this may entail covering the material with suitable shade cloth material or similar (if and when necessary). The shade cloth may need to be weighed down in such a manner that any stream flow is directed away from the stockpile, reducing the risk of erosion.

In the event that any heritage resources (human remains, grave stones, stone tools, artefacts, old coins and pottery, fossil shell middens, rock art and engravings, remains of old built structures etc.) are encountered during construction, the finding should be protected from further disturbance (ideally left in situ) and the ECO and relevant Heritage Authority should be notified. The finding should be handled and/or removed from site as per instructions issued by the Heritage Authority or delegated heritage specialist.

8.11 Heritage Resources

Should any heritage resources, including evidence of graves and human burials, archaeological material and paleontological material be discovered during the execution of the activities, all works must be stopped immediately and Heritage Western Cape must be notified without delay.

Heritage Western Cape:
T: 021 483 5059
E: hwc.hwc@westerncape.gov.za

8.12 Site closure and rehabilitation

Upon completion of the construction phase, and after each maintenance event, all disturbed areas, including the working area (disturbance corridor), temporary access road, and all areas utilised for the site camp and associated site camp facilities will require rehabilitation as follows:

- On completion of the construction operations, the site camp area must be cleared of all site camp facilities, ablution facilities, fencing, signage, waste and surplus material.
- All areas within the working area and site camp that have become devoid of vegetation or where soils have been compacted due to construction activities must be scarified or ripped to improve filtration and reduce run-off.
- Alien plants must be removed from the site as per NEMBA requirements.
- A suitable weed management strategy to be implemented in construction and operation phases to eradicate and control regeneration.
- All demarcation fencing, including all droppers, wires, netting and barrier tape must be removed from site and taken to an appropriate site for re-use or disposal.

- Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the ECO. Any soil contaminated with hydrocarbons (oil, fuel, etc) or other hazardous substance must be collected and disposed of as hazardous waste to a licenced disposal facility.
- All construction waste is to be removed from the site and disposed of at an appropriate facility. Burying or burning of waste or rubble on site is strictly prohibited.
- Topsoil that was removed and stockpiled before construction, must be replaced by spreading it evenly over the areas from which it was removed. This topsoil (and the seedbank it contains) will facilitate the re-vegetation of the site.
- Disturbed areas, especially areas where excavations have taken place, must be shaped as appropriate (original topography must be restored where possible), and covered with a layer of stockpiled topsoil as soon as possible.
- Any topsoil, subsoil or other excavated material that cannot be utilised during site rehabilitation must be removed from the site and disposed of at an appropriate disposal site.
- The disturbed, newly rehabilitated surfaces (particularly steeper slopes and areas recently covered with topsoil) must be protected from wind & water erosion using mulch, brush packing or other appropriate erosion protection measures. Brush-packing/ mulching is done by covering the exposed surface with organic plant material such as branches, plant cuttings and leafy material. Ideally the vegetation removed from site at the start of the construction must be utilised. Brush-packing/ mulching plays a valuable role in erosion control, while also promoting re-vegetation of the site by retaining moisture in the soil, introducing seeds and/or trapping wind-blown seeds and providing organic material (compost) to promote new plant growth.
- Final landscaping and rehabilitation of the site must be done to the satisfaction of the ECO, and must adhere to all conditions/ requirements of the Environmental Authorisation.
- Erosion features that have developed due to construction within the aquatic habitat due to the project are required to be stabilised. This may also include the need to deactivate any erosion headcuts/rills/gullies that may have developed.

9. Environmental Impact Management: Planning and Design Phase

No direct environmental impacts are associated with the planning and design phase. However, poor planning or inappropriate design decisions in this phase may result in environmental impacts arising during subsequent phases of the project.

Planning and design activities must therefore take into account the environmental constraints and opportunities identified during the Environmental Impact Assessment process, in order to avoid or minimise the potential future impacts of the development. Proper planning is also essential to ensure that adequate provision is made to implement the environmental requirements of this EMPr, and to ensure that the development is compliant with an additional conditions which may be included in the Environmental Authorisation.

The environmental management objectives (goals) during this phase are to:

- Appoint an Environmental Control Officer.
- Complete the detailed design of the structures and detailed site layout plan.
- Update the EMPr (if necessary).

These environmental management objectives, as well as the management actions that must be implemented in order to achieve the desired objective and avoid/minimise potential impacts are discussed in more detail below.

9.1 OBJECTIVE 1: APPOINTMENT OF AN ENVIRONMENTAL CONTROL OFFICER

***Impact Management Objective:* To appoint a suitably qualified and experienced Environmental Control Officer.**		
Potential impact to avoid	Failure to appoint an ECO will result in non-compliance with the requirements of the EMPr.	
Impact Management Outcome	The requirements of the EMPr are implemented and monitored during all phases of the development, which will promote sound environmental management on site.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• A suitably qualified and experienced Environmental Control Officer must be appointed before any activities commence on site. • The appointed ECO must adhere to the requirements stated in Chapter 15 and any other requirements specified in the Environmental Authorisation. • The appointed ECO must be advised of the construction start date, before any activities commence on site so that the ECO can perform a pre-commencement inspection and plan for environmental awareness training of construction workers.	Long Island Trading 44 (Pty) Ltd	During design phase

Performance Indicator	A qualified ECO is appointed prior to the commencement of any construction activities (including pre-construction set-up activities) on site.

9.2 OBJECTIVE 2: DETAILED DESIGN AND SITE LAYOUT PLAN

Impact Management Objective: ***To compile a detailed design and site layout plan that adheres to the recommendations of the EIA Report and any additional conditions which may be included in the Environmental Authorisation.***		
Potential impact to avoid	Substantial deviation from the conceptual layout plan may result in: • Non-compliance with the Environmental Authorisation during construction. • Triggering of additional listed activities not authorised in the Environmental Authorisation. • An increase in the severity of the impacts identified and assessed in the EIA or may result in new impacts not previously assessed and not provided for in the EMPr, resulting in environmental degradation.	
Impact Management Outcome	Development is compliant with recommendations of the EIA and the EMPr.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• The final detailed design & layout must adhere to the conceptual layout assessed in the Environmental Impact Assessment (EIA) process. • The final detailed design & layout must adhere to any conditions of the Environmental Authorisation (EA). • If the final detailed design differs significantly from that assessed during the EIA, the revised layout must be assessed by an Environmental Consultant and the received EA must be amended by the Competent Authority before proceeding. • Interested & Affected Parties may need to be provided with an opportunity to comment on any proposed amendment to the EA depending on the significance of the changes. • It is recommended that the stormwater management plan be developed with appropriate ecological input and be developed based on Sustainable Drainage Systems (SUDS). • All stormwater infrastructure, must be located within the development footprint and not encroach into the buffer areas. • The following mitigation measures recommended by the Freshwater Specialist should be considered during detailed design: • Soft infrastructure must be considered where practical. For example, permeable surfaces can be done via permeable concrete block pavers (such as Amorflex), brick pavers, stone chip, and gravel and may contribute to slowing surface flows (especially if maintained).	Long Island Trading 44 (Pty) Ltd / Consulting Engineer	During design phase

• Stormwater managed by the development could be discharged into porous channels / swales ('infiltration channels or basins') running near parallel or parallel to contours within and along the edge of the development. This will provide for some filtration and removal of urban pollutants (e.g. oils and hydrocarbons), provide some attenuation by increasing the time runoff takes to reach low points, and reduce the energy of storm water flows within the stormwater system through increased roughness when compared with pipes and concrete V-drains. • Frequent stormwater outlets must be designed to prevent erosion at discharge points. All erosion protection measures (e.g. Reno-mattresses) must be established to reflect the natural slope of the surface and located at the natural ground level. All stormwater infrastructure, such as reno mattresses at pipe outlets, must be located within the development footprint and not encroach into the buffer areas. • Stormwater exit points must include a best management practice approach to trap any additional suspended solids and pollutants originating from the proposed development. Also include the placement of stormwater grates (or similar). • The use of grease traps/oil separators to prevent pollutants from entering the environment from stormwater is mandatory. To ensure the efficiency of these, they must be regularly maintained. Key maintenance will include litter and sediment clearing and the servicing and maintenance of key collection points like catch pits, detention tanks etc. Such maintenance should be the responsibility of the relevant owners/estate associations and budgeted for.		
Performance Indicator	Detailed designs and site layout plans that adhere to the conditions of the EA and EMPr are finalised prior to the commencement of construction.	

10. Environmental Impact Management: Pre-construction Phase

Proper set-up during the pre-construction phase can set the foundation for good environmental management during the active construction phase to follow, and can avoid potential impacts from arising at a later date.

The Impact Management Objectives for this phase of the project relate to:

- Demarcation of no-go areas and working areas.
- Establishment of site camp and associated site facilities.
- Pre-construction ECO visit.

10.1 OBJECTIVE 1: IDENTIFY & DEMARCATE NO-GO AND WORKING AREAS

Impact Management Objective: ***Identify and demarcate no-go areas, working areas and site facilities.***		
Potential impact to avoid	• No-Go areas include aquatic habitats and public open space to remain natural. • Insensitive location of working areas and site facilities may result in environmental impacts during the construction phase. • Failure to accurately demarcate working areas may result in an increased disturbance footprint. • Failure to demarcate no-go areas may result in disturbances to these areas during construction.	
Impact Management Outcome	Future construction activities will be restricted to within the designated areas & environmentally sensitive areas (no-go areas) will be protected from disturbance.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• The environmentally sensitive areas must be identified and be designated as no-go areas. • Demarcation of working area and no-go areas must be done in accordance with Section 8.2 of this EMPr. • Site camp facilities must be situated as far away from the No-Go areas as possible.	Contractor	Pre-construction phase (prior to arrival of construction equipment, machinery, or workers on site)
Performance Indicator	No-go areas, working areas and areas for site camp facilities have been identified and appropriately demarcated to the satisfaction of the ECO, before construction activities commences on site.	

10.2 OBJECTIVE 2: ESTABLISH ENVIRONMENTALLY SENSITIVE SITE CAMP & SITE FACILITES

Impact Management Objective: ***To set up and equip the site camp and associated site facilities in a manner that will promote good environmental management.***		
Potential impact to avoid	• Inappropriate siting of site camp facilities may result in impacts to sensitive resources • Failure to properly demarcate and set up site facilities may result in disorganised construction activities and unnecessary disturbance to the site. • Failure to provide the necessary site facilities and/or failure to equip these facilities with the necessary equipment/materials may impede good environmental management & compromise ability to respond to emergencies.	
Impact Management Outcome	Site camp facilities do not impact significantly on environment. The equipment required to implement the provisions of the EMPr are provided on site.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period

• The site camp and site facilities described in Section 8.3 of this EMPr must be provided on site. • The site camp and associated site facilities must be set-up and managed in accordance with the general environmental management measures specified in Chapter 8 of this EMPr. • The site camp must be strategically set up, away from freshwater resources, in a manner that will promote good environmental management during construction/ demolition, and to respond to potential emergencies (including fires, spillage of hazardous substances etc.) that may arise. • The No-Go boundary must be demarcated, and no disturbance may occur past this point during any stage. • The site camp, storage facilities, stockpiles, waste bins, and any other temporary structures on site should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. • Frequent stormwater outlets must be designed to prevent erosion at discharge points. • It is recommended that the stormwater management plan be developed with appropriate ecological input and be developed based on Sustainable Drainage Systems (SUDS). • The contractor shall plan his activities so that materials excavated from borrow pits and cuttings, in so far as possible, can be transported direct to and placed at the point where it is to be used. • Top soil and other top material such as boulders must be stored at a stockpile location agreed to by the ECO. Ensure the stock pile does not exceed the maximum height agreed upon.	Contractor / Developer	Pre-construction phase (prior to start of construction activities)
Performance Indicator	Appropriate, well organised and properly equipped site facilities are available on site prior to commencement of construction activities. The location and set up of the facilities does not impact on the natural resources.	

10.3 OBJECTIVE 3: PRE-CONSTRUCTION ECO INSPECTION

It is essential that the appointed ECO be advised of the intended construction start date before construction activities commence on site, in order for the ECO to conduct an initial site inspection to assess the pre-commencement condition of the site. The ECO can also advise on the appropriate siting and demarcation of the site facilities, and the identification and demarcation of the no-go areas. The ECO may also conduct the first round of environmental awareness training at this stage, if the construction workers are present on site.

Impact Management Objective: ***Environmental Control Officer to conduct an inspection prior to the commencement of construction activities on site.***	
Potential impact to avoid	• Failure to appoint ECO or to notify ECO of commencement prior to commencement may result in non-compliance with the EA. • If a pre-commencement ECO inspection is not performed, the Construction Contractor may be held liable for environmental degradation that took place prior to the Contractor commencing work on site.
Impact Management Outcome	• Good environmental management is promoted and enforced by the ECO during the full pre-construction and construction phases. • Site facilities are appropriately located on site.

	• Construction workers receive environmental awareness training before commencing work on site.		
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
• The appointed ECO must be advised of the construction start date, before any activities commence on site so that the ECO can perform a pre-commencement inspection and plan for environmental awareness training of construction workers.		Contractor	Start of construction phase
Performance Indicator	A pre-commencement site inspection is conducted by the appointed ECO before construction activities commence on site.		

11. Environmental Impact Management: Construction Phase

A number of potential environmental impacts may arise during the construction phase of the development. These impacts have been identified and assessed during the Environmental Impact Assessment process. Environmental Management objectives and actions that will prevent the identified potential impacts from arising – or where avoidance is not possible, that will minimise and mitigate the impacts – are provided in this section.

The environmental management actions and mitigation measures prescribed in this section must be implemented throughout the construction phase, and must be implemented in conjunction with the general management measures specified in Chapter 8 of this EMPr, as well as any other conditions which may be stated in the Environmental Authorisation. The Environmental Control Officer must monitor and enforce the implementation of the relevant environmental management measures, and may provide guidance on the implementation of these environmental management measures as and when required.

The environmental management objectives (goals) for the Construction phase are:

- Prevent soil erosion
- Minimise disruption to natural river flow
- Prevent alien invasive plant species establishment
- Prevent pollution and surface water contamination
- Protection of aquatic ecosystems
- Protection of terrestrial ecosystems (fauna and vegetation)
- Job creation
- Agricultural management
- Noise impact management
- Visual impact management
- Dust impact management
- Community Safety

The environmental management actions that must be implemented in order to achieve the desired objectives and avoid/minimise potential impacts are discussed in more detail in the sections below.

11.1 OBJECTIVE 1: PREVENT SOIL EROSION

Impact Management Objective: ***To prevent soil loss on site and prevent increased turbidity / sediment load in watercourses.***	
Potential impact to avoid	• Areas disturbed and/or cleared of vegetation (work corridor) during construction may be vulnerable to increased water and wind erosion. • Stockpiles of soil (topsoil/subsoil) at the site may be vulnerable to wind/water erosion.

Impact Management Outcome	Soil erosion at the water courses are kept to a minimum and the aquatic systems are not impacted significantly as a result of soil erosion.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• Designated areas for stockpiling of raw materials must be identified before material is brought onto site. No stockpiling is to occur on or near slopes. All stockpiling areas must be approved by the ECO before stockpiling occurs. • Stockpiles must not be located within 50 metres of watercourses. The furthest threshold must be adhered to. • Stockpiles should not be placed in vegetated areas that will not be cleared. • It is advised that an Environmental Control Officer visit the construction site before construction occurs within any of the watercourses and possibly during construction within the watercourses. • Soil surfaces must not be left open for lengthy periods to prevent erosion. • If site development does not occur soon after preparation of the site, a suitable cover crop to be established as a temporary measure. • Erosion control measures including silt fences, low soil berms and/or shutter boards must be put in place around the stockpiles to limit sediment runoff from stockpiles. Alternatively, the exposed slopes must drain into small temporary stormwater and silt traps/ponds. • The SuDS Stormwater management and drainage system should inform the stormwater design of developed areas. • The storm water management plan should adhere to the principles of sound storm water management. The storm water management system must be implemented on site and must be properly maintained. • The stormwater flows must enter the riparian buffer areas in a diffuse flow pattern without pollutants. • Clean and contaminated storm water must be kept separate. Contaminated run-off from the construction site must be prevented from flowing into the streams. • The working area and site camp must be clearly demarcated during the pre-construction phase. Land clearing and construction activities must be restricted to within the demarcated working area to prevent unnecessary disturbance, exposure or compacting of surrounding areas. • Only the area required to accommodate construction activities within the working area should be cleared of surface covering. Unnecessary clearing/ disturbance of land and exposure of soil must be avoided. • Land clearing, earth moving and construction activities should not take place during heavy rains, or windy conditions.	Contractor	Construction phase

• Cleared areas and any other area susceptible to erosion should be provided with a suitable cover and stabilised as soon as possible via the implementation of appropriate erosion control measures. This may include use of cut-off drains, temporary/permanent drainage channels, brush-packing, mulching, planting or sodding, use of environmentally benign soil binders, use of geo-textile or other coverings. The appropriate measures should be selected by the contractor in consultation with the Engineer & ECO. • Stockpiles of topsoil & spoil material must be protected from wind & water erosion. • Stockpiles of earth material may not be located within any storm-water drainage pathways and must be outside of the reach of potential flood waters. • Any erosion runnels/ gulleys/ channels that form on site must be infilled with appropriate material, compacted, rehabilitated as needed and appropriate erosion control measures put in place to prevent recurrent erosion at that site. Rehabilitation of erosion channels should be ongoing during the construction phase and not left until the end of the construction period.		
Performance Indicator	The water courses are not significantly impacted as a result of soil erosion.	

11.2 OBJECTIVE 2: PREVENT POLLUTION AND SOIL/ WATER CONTAMINATION

***Impact Management Objective:* To prevent environmental pollution and contamination of soil and water resources**		
Potential impact to avoid	• Fuel, oil, lubricant or other pollutants may leak from vehicles/ machinery and contaminate soil, surface water and/or ground water. • Spills of hazardous substances may contaminate environment. • Chemical toilets may leak. • Contaminated run-off from site or site camp facilities may pollute soil or water resources. • Waste (solid or liquid) from the construction site may be blown or washed into surrounding environment. • Contamination of soil or water may impact surrounding and downstream land/water users, biota and livestock.	
Impact Management Outcome	The environment (including soil, surface water and groundwater) is not contaminated.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• It is recommended that the stormwater management plan be developed with appropriate ecological input and be developed based on Sustainable Drainage Systems (SUDS). • A Waste Management Plan is to be developed in order to formalise waste control methods and to provide a structure for waste management. • All erosion protection measures (e.g. Reno-mattresses) must be established to reflect the natural slope of the surface and located at the natural ground level.	Contractor	Construction phase

• All stormwater infrastructure, such as reno mattresses at pipe outlets, must be located within the development footprint and not encroach into the buffer areas. • Stormwater exit points must include a best management practice approach to trap any additional suspended solids and pollutants originating from the proposed development. Also include the placement of stormwater grates (or similar). • Erosion control measures including silt fences, low soil berms and/or shutter boards must be put in place around the stockpiles to limit sediment runoff from stockpiles. **General Pollution Management:** • No pollution of surface water or ground water resources may occur due to any activity on the site. • No storm water runoff from any premises containing waste, or water containing waste emanating from construction activities may be discharged into the environment. Polluted stormwater must be contained on the site. • Stormwater managed by the development is to be discharged into porous channels / swales ('infiltration channels or basins') running near parallel or parallel to contours within and along the edge of the development • Frequent stormwater outlets must be designed to prevent erosion at discharge points. **General Waste Management:** • Dedicated waste bins or skips must be provided on site and kept in a demarcated area on an impermeable surface. • Separate waste bins/skips must be provided for recyclable waste, general waste and hazardous waste. Recovered builder's rubble & green waste may be stockpiled on the ground within the site camp, or in separate skips until removal. • Waste must be placed in the appropriate waste bins/skips/ stockpiles. • Hazardous waste bins must be kept on an impermeable bunded surface capable of holding at least 110% of the volume of the bins. • Skips/ bins must be provided with secure lids or covering that will prevent scavenging and windblown waste or dust. • Waste bins/skips must be regularly emptied and must not be allowed to overflow. • Construction workers must be instructed not to litter and to place all waste in the appropriate waste bins provided on site. • The Contractor must ensure that all workers on site are familiar with the correct waste disposal procedures to be followed.		

• Waste generated on site must be classified and managed in accordance with the National Environmental Management: Waste Act – Waste Classification and Management Regulations (GN No. R. 634 of August 2013). • Disposal of waste to landfill must be undertaken in accordance with the National Environmental Management: Waste Act – National Norms and Standard for the Assessment of Waste for Landfill Disposal (GN No. R. 635 of August 2013). • All waste, hazardous as well as general, resulting from the proposed activities must be disposed of appropriately at a licensed Waste Disposal Facility (WDF). **Pollution Management – hydrocarbons (oil, fuel etc.)** • Vehicles and machinery must be in good working order and must be regularly inspected for leaks. • If a vehicle or machinery is leaking pollutants it must, as soon as possible, be taken to an appropriate location for repair. The ECO has the authority to request that any vehicle or piece of equipment that is contaminating the environment be removed from the site until it has been satisfactorily repaired. • Repairs to vehicles/ machinery may take place on site, within a designated maintenance area at the site camp. Drip trays, tarpaulin or other impermeable layer must be laid down prior to undertaking repairs. • Refuelling of vehicles/ machinery may only take place at the site camp or vehicle maintenance yard. Where refuelling must occur, drip trays should be utilised to catch potential spills/ drips. • Drip trays must be utilised during decanting of hazardous substances and when refilling chemical/ fuel storage tanks. • Drip trays must be placed under generators (if used on site) water pumps and any other machinery on site that utilises fuel/ lubricant, or where there is risk of leakage/spillage. • Where feasible, fuel tanks should be elevated so that leaks are easily detected. • A spill kit to neutralise/treat spills of fuel/ oil/ lubricants must be available on site, and workers must be educated on how to utilise the spill kit. • Soil contaminated by hazardous substances must be excavated and disposed of as hazardous waste. • Spoil or waste material should not be dumped within 50 m of natural areas, it should be discareded at a licensed dump site. • The use of grease traps/oil separators to prevent pollutants from entering the environment from stormwater is recommended. **Pollution Management – Ablution facilities** • Chemical toilets must be kept at the site camp, on a level surface and secured from blowing over.		

• Toilets must be located well outside of any storm water drainage lines ,and may not be linked to the storm water drainage system in any way. • Chemical toilets must be regularly emptied and the waste disposed of at an appropriate waste water disposal/ treatment site. Care must be taken to prevent spillages when moving or servicing chemical toilets. **Pollution Management – Hazardous Substances** • Any hazardous substances (materials, fuels, other chemicals etc.) that may be required on site must be stored according to the manufacturers' product-storage requirements, which may include a covered, waterproof bunded housing structure. • Material Safety Data Sheets (MSDSs) shall be readily available on site for all chemicals and hazardous substances to be used on site. Where possible and available, MSDSs should additionally include information on ecological impacts and measures to minimise negative environmental impacts during accidental releases. • Hazardous chemicals and fuels should be stored on bunded, impermeable surfaces with sufficient capacity to hold at least 110% of the capacity of the storage tanks. **Cement Batching** • Cement batching must take place on an impermeable surface large enough to retain any slurry or cement water run-off. If necessary, plastic/ bidem lined detention ponds (or similar) should be constructed to catch the run-off from batching areas. Once the water content of the cement water/ slurry has evaporated the dried cement should be scraped out of the detention pond and disposed of at an appropriate disposal facility authorised to deal with such waste • Cement batching should take place on already transformed areas within the footprint of the facility. • Unused cement bags must be stored in such a way that they will be protected from rain. Empty cement bags must not be left lying on the ground and must be disposed of in the appropriate waste bin. • Washing of excess cement/concrete into the ground is not allowed. All excess concrete/ cement must be removed from site and disposed of at an appropriate location. • Construction works must preferably take place in drier months of the year when runoff from the construction site will be minimal, to limit potential dispersal of pollutants. <u>Installation of the proposed underground storage tanks (USTs) and construction of the filling station</u> • <u>All liquid chemicals and fuel must be stored in a bunded area with a capacity of at least 110% of the maximum allowable volume. The storage area should be fenced and all access controlled.</u> • <u>Corrosion resistant tanks, -pipes and -detectors must be used and must conform to the relevant SANS codes.</u>		

• The tanks must be fitted with an overfill protection device. • Shear-off valves must be anchored below fuel dispensers so that no spillage occurs if the dispenser is accidently knocked over. There must also be breakaway couplings on the hoses in case a vehicle pulls away from pump dispenser while the nozzle is still in the filler. • During fuel tank delivery, the tanker driver must be present at all times during product offloading. An emergency cut-off switch must be installed to immediately stop fuel delivery should an accident occur. • The surfaces of all refuelling areas must be constructed from concrete to form an impervious layer, which must be sloped towards the spillage containment areas. • Stock reconciliation must be undertaken regularly to ensure effective stock monitoring, recording and regular auditing for early identification of possible leaks and such leakage records must be produced on demand. • Fire-fighting equipment, regularly serviced, must be present on site and staff training in emergency firefighting must have been completed. • Training of all staff must be given to prevent the risk of environmental pollution. • Appropriate management (handling, storage, transportation and disposal) of waste and chemicals must be implemented. All hazardous wastes must be stored in an enclosed and surfaced area prior to disposal at a registered waste management facility		
Performance Indicator	The natural flows of the watercourses are not impeded during the construction phase.	

11.3 OBJECTIVE 4: PROTECTION OF TERRESTRIAL ECOSYSTEM (FAUNA AND VEGETATION)

***Impact Management Objective:* To ensure that the terrestrial ecosystem is not significantly impacted on.**		
Potential impact to avoid	• Potential disturbance to terrestrial fauna during land clearing or construction activities. • The clearing/trimming of vegetation will result in loss/ disturbance of indigenous vegetation and may reduce habitat heterogeneity.	
Impact Management Outcome	The terrestrial ecosystem is not significantly impacted on as a result of the construction activities.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• An awareness program is to be run by the ECO in order to prevent the labour force from intentionally killing any faunal species • Great care will be taken if cement is to be mixed on site, especially in the proximity of vegetation and watercourses. It will be mixed on thick plastic sheets or in large buckets and not allowed to spill onto bare ground. Any spillage will be cleaned up immediately. Cement water will also be	Contractor	Construction phase

contained in the above manner and allowed to dry out and then removed from site. Cement water, which is highly alkaline, poses a definite threat to the soil and seed banks. • Blanket clearing of vegetation must be limited to the approved development footprint, and the area to be cleared must be demarcated before any clearing and grubbing commences. • No clearing outside of development and infrastructure footprint area to take place. • An Environmental Control Officer will oversee compliance with all the prescribed environmental requirements and mitigation measures listed here and will be on site regularly. • Construction workers must be sensitised to the fact that fauna (including mammals, snakes, birds, tortoises etc.) may be encountered on site, and they must exercise due caution to ensure that their actions/movements do not impact fauna. • Any fauna encountered on site must be allowed to passively vacate the area. Active relocation of fauna like snakes must be a last resort, and must only be performed by a person skilled/ experienced enough to do so without endangering him/herself or the animal/bird. • If animals are discovered on site during site preparation they are to be relocated or allowed to move off the area that is required to be disturbed without harm; • Construction workers may not feed, hunt, trap, poison or shoot fauna on site or in the immediately surrounding areas.		
Performance Indicator	• Construction team limit disturbance to the terrestrial ecosystem as far as possible for the duration of the construction phase. • There are no significant or long-term impacts to terrestrial vegetation or fauna.	

11.4 OBJECTIVE 5: ALIEN CLEARING

Impact Management Objective: ***To create habitat free of alien vegetation***		
Potential impact to avoid	• The proliferation of alien vegetation once construction has been completed.	
Impact Management Outcome	The level of alien infestation decreases over time.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• The ECO must be informed in advance of any vegetation that will be removed, irrespective of whether or not the vegetation is alien or indigenous. • Alien vegetation on public open space should be eradicated. • Alien plants must be removed from the site as per NEMBA requirements. • The alien forests should be cleared of all alien trees.	Long Island Trading 44 (Pty) Ltd	Construction phase

• The indigenous forest which is located lower down in the valley should be protected and suitably buffered from the development by means of a fire belt, with the surrounding aliens cleared. • Alien clearing must be done in such a way as not to cause damage to indigenous vegetation. • Regular follow-up clearing of aliens is required in order to achieve rehabilitation successfully. It is assumed that the responsibility of alien clearing will rest with the local authority. If not, an alien clearing contractor must be employed to conduct alien clearing. • A suitable weed management strategy to be implemented in construction and operation phases to eradicate and control regeneration. • After any clearing is completed, an appropriate cover crop should be planted where any weeds or exotic species are removed from disturbed areas timeously.		
Performance Indicator	No alien invasive species are observed in areas that have been disturbed.	

11.5 OBJECTIVE 6: JOB CREATION

***Impact Management Objective:* To create employment opportunities with potential for skills transfer, for members of the local community.**		
Potential impact to be promoted	• A number of job opportunities will be created during the construction phase of the development. • There may be opportunities to transfer skills from more experienced workers to less experienced workers.	
Impact Management Outcome	Job creation: It is expected that 543 man-years of labour will be generated directly on site during the construction of the project. The indirect impact on local business will see a further 1 027 man-years of labour being generated in the regional economy. The total impact on employment, when including direct, indirect, and induced impacts, is expected to be 2 029 man-years of labour. That is, 2 029 man-years of labour will be generated in the regional economy during the period of construction. The majority of work during the construction phase is likely to be undertaken by local contractors and builders. The proposed development will therefore represent a positive benefit for the local construction and building sector in the area. The majority of the building materials associated with the construction phase will be sourced from locally based suppliers from the greater Cape Town area.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• No mitigation required for this positive benefit, however certain enhancements are recommended. • The Long Island Trading 44 (Pty) Ltd should inform local community leaders, organizations and councillors of the project and the potential job opportunities for local builders and contractors. • The Long Island Trading 44 (Pty) Ltd should establish a database of local construction companies in the area, specifically SMME's owned and run by HDI's, prior to the commencement of the tender process for the development. These companies should be notified of the tender process and invited to bid for project related work.	Long Island Trading 44 (Pty) Ltd / Contractor	Construction phase

• The Long Island Trading 44 (Pty) Ltd in consultation with the appointed contractor/s should seek to ensure that a percentage of the labour required for the construction phase is sourced from local area in order to maximize opportunities for members from the local HD communities. • The developer in consultation with the appointed contractor/s will look to employ a percentage of the labour required for the construction phase from local area in order to maximize opportunities for members from the local HD communities. • Ideally locally produced or occurring building materials will be identified and sourced		
Performance Indicator	The majority of the construction team is from the local community, with preference given to historically disadvantaged individuals. Skills transfer from experienced to less experienced workers is actively encouraged on site.	

11.6 OBJECTIVE 8: NOISE IMPACT MANAGEMENT

Impact Management Objective: ***To control avoidable noise impacts to the surrounding areas***		
Potential impact to avoid	Avoidable noise generated during the undertaking of construction activities, which may present a nuisance to surrounding community.	
Impact Management Outcome	Avoidable noise impacts are managed efficiently.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• A noise complaints register should be opened. • Excavations and earth-moving activities must be restricted to normal construction working hours (7:30 – 17:30) as far as possible. • Work on site must be well-planned and should proceed efficiently so as to limit the duration of the disturbance. • Vehicles and equipment must be kept in good working condition. If deemed necessary, machinery and equipment should be fitted with mufflers/ exhaust silencers. No unnecessary disturbances should be allowed to emanate from the construction site. • Due to the location of the proposed development site to residents, noise levels must be kept to a minimum at all times. If excessive noise is expected on the boundary of the residential erven bordering the site they must be informed in advance of when the high noise levels will occur and for how long they will occur. • Workers should be educated on how to control noise-generating activities that have the potential to become disturbances, particularly over an extended period of time. • Noise levels must comply with the relevant health & safety regulations and SANS codes and should be monitored by the Health & Safety Officer as necessary and appropriate.	Contractor	Construction phase

• Affected parties must be informed of the excessive noise factors. • The noise management and monitoring measures prescribed in the EMPr must be adhered to. • The appointed Environmental Control Officer (ECO) must undertake a site inspection once per week, for the duration of the construction phase, and to produce a short monthly ECO monitoring audit report, auditing on the compliance of the property developer with the conditions of the Environmental Authorisation and the approved EMP. The monthly Monitoring Report must be submitted to the Directorate (DEADP) each month.		
Performance Indicator	Noise levels on site remain within acceptable standards. No valid noise complaints are received.	

11.7 OBJECTIVE 9: VISUAL IMPACT MANAGEMENT

Impact Management Objective: ***To prevent the site from presenting an unnecessary visual impact to the surrounding public.***		
Potential impact to avoid	During construction the site may appear disturbed or disorganised and may present visual impact to observers of the site.	
Impact Management Outcome	The site does not present a significant visual impact.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• Consult with the ECO when determining the appropriate site for the site camp. • During the bulk infrastructure (sewer lines, electrical cables, water pipes and roads) installation phase – one site laydown and site offices should be located in a suitable area north of the eastern access so that it will be screened by existing vegetation from both Oubaai Golf Estate and the residential area within the "bowl". Security lighting should not shine outwards from the site camp. The suppression of dust by regular wetting down of dirt roads will reduce the visual nuisance. The cladding of fences around the site camp area with shade netting will screen the visual clutter of these areas. Create berms, where appropriate, to screen views onto the site using topsoil stripped from roads and platforms. • The site camp must be kept neat and tidy and free of litter at all times. • Waste must be managed according to this EMPr and the mitigation measures listed above in terms of waste management. Good housekeeping practices on site must be maintained to ensure the site is kept neat and tidy. • The site camp, storage facilities, stockpiles, waste bins, and any other temporary structures on site should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. • Work on site must be well-planned and well-managed so that work proceeds quickly and efficiently, thus minimizing the disturbance time.	Contractor	Construction phase

• The site camp, storage facilities, stockpiles, waste bins, elevated tanks and any other temporary structures on site should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. • The site camp may require visual screening via shade cloth or other suitable material. • Special attention should be given to the screening of highly reflective material. • Use of lighting (if required) should take into account surrounding residents and land users and should present little or no nuisance. Downward facing, spill-off type lighting is recommended. • Construction vehicles must enter and leave the site during working hours. • Delivery trucks should be appropriately covered to deter the spilling of material along the route to the site. • Working areas, storage facilities, stockpiles, waste bins, elevated tanks and any other temporary structures on site should be located in such a way that they will present as little visual impact to surrounding residents and road users as possible. • No clearing of land to take place outside the demarcated footprint. • Clearing should take place in a phased approach, so that cleared areas are kept small and manageable. • No workers are allowed to be housed on the site. • Development on Ridges o The ridgelines are the highest landform edge which encloses the proposed Development. These are the most visible landforms of the site. The roof lines of the houses should be kept low on either side so as not to form a new higher ridge of structures. The no build area along the ridges should vary between 24 and 30 metres wide. • Space around the Dam o Residential buildings should be built well away from the full supply level (FSL) of the dam to allow for a riparian vegetation zone on the moist ground and for public access around the Dams perimeter. The Dam is the focal area of the Development and due to its narrowness, it will require the extra space to provide better visual access to it from the surrounding development. The line from the full supply should vary from 10 to 20 metres depending on the wetness of the soil and to allow for a boardwalk where necessary. • Vary roof lines of adjacent attached units particularly those near the ridgeline o This will provide a more organic line in the setting when combined with tree and large shrub planting. • Retain indigenous trees and vegetation groupings of shrub, trees and aloes		

o Connect these groupings by planting additional indigenous mixed vegetation to provide corridors for integrating the existing vegetation so that populations of insects, birds and small mammals can be attracted to the gardnes of the Development. • Retain selected large existing trees o These large trees provide a visual scale and connection with the original cultural landscape. The trees can provide visual relief in form where buildings do appear along the horizon. To ensure the survival of these trees there must be no ground level change within the drip line of the branches and selected branches should be removed. • Avoid bright contrasting colours for roofs and buildings o Subdued and complimentary shades and tints blend easily into a landscape setting. • Roads and Pathways o Roads and pathways paved with a durable brick of brown/sand colour. The light brown colour is a similar colour to existing gravel roads in the area. The light colour will also not generate high surface temperatures as an asphalt surface would. • Provide spaces between group housing large enough to present views beyond. • Step down slope building heights to provide views over units below. Step building heights as units' progress down slope. • The cut slope along the road on the Southern boundary should be re- graded to a flatter slope and planted with indigenous shrubs and groundcover. The objective is to provide a privacy screen for the existing housing on the southern property as well as for new residences. • Keep surface drainage ways open and arrange residential units along and around these open space corridors to provide visual connection with the Dam. These areas will provide pedestrian access, as well as facilities for managing surface water runoff from roads and buildings. • The placement of units near the northern and eastern ridgeline should not be that tall or close to the ridge that views north and north-west obstruct or obscure large portions of the base of the mountains in view, to a great extent. The space between buildings that form an horizon to views of residents in Herolds Bay extension 1 and 2 should be linked by tree and shrub planting. These buildings should present preferably one storey above the natural horizon line from that view area. • Consideration should be given to the placement of the main collector road or open space on the ridgelines for the following visual reasons: o Residential units are then located off the highest most visible part of the site. o Through traffic along the mid-slope and between residential unit groupings is eliminated as well as their visual disturbance.		

○ The pedestrian ring pathways and tree and shrub planting can be accommodated along the higher ground and views both towards the mountains and the sea are possible. ○ The tree and shrub planting will assist in visually integrating the roof lines into the horizon line. ○ The combination of the road and adjacent pedestrian circular route will free up the area in the mid slope to enable visual integration of the residential buildings into the landscape at a detail level. • Retain some large existing trees on the eastern property boundary to partially screen views of the Oubaai Hotel, Recreation centre and nearby houses. In addition, mound and plant a dense indigenous grouping along the south eastern boundary with Oubaai to screen the service area and related buildings. • Consideration should be given to the retention of the existing homestead and adjacent building. This will provide a visual and cultural link to the previous land use. The Development should incorporate these buildings into the layout and provide a visual connection to the open space systems and the dam. • Lighting ○ Street and other lighting such as signage, park and office / commercial precinct will increase the visual impact of the project at night. All lighting therefore should be carefully considered with regard to the extent of illumination, the intensity and colour of lights and the luminaire. ○ It is recommended that lighting is designed by a lighting engineer in collaboration with the landscape architect for the project. The aspects of the lighting solution should include the following: ○ Light fittings should have shields to eliminate sight of the light source from sensitive nearby land uses. ○ Down lighting of areas is preferrable to up lighting; ○ Perimeter lights to be directed downwards and inwards; ○ Emitted light colour to be softer than sodium (yellow) or mercury halide (blue-white). Florescent lights provide a softer visual effect, ○ Do not flood light the entire main structure but incorporate concealed lights high on a structure to shine downwards. Darker areas on the building elevations will provide a less visually noticeable structure; ○ No light fittings should spill light upwards or be directed upwards from a distance towards the area or building to be illuminated;		

○ The lighting plan should strive to maximise the light energy use. This should include a hierarchy of lights that are essential to those that are switched on only when needed. • Lighting Colour ○ Should also be considered with knowledge of what colour will attract insects. It is important that a colour type and spread of light will not cause insects to be attracted to it and in so doing deplete the insect diversity of the region. For this purpose an entomologist should be consulted.		
Performance Indicator	• Good "housekeeping" is evident on site. • The site does not pose a visual impact to surrounding community.	

11.8 OBJECTIVE 10: DUST IMPACT MANAGEMENT

***Impact Management Objective:* To prevent the generation of significant dust.**			
Potential impact to avoid	• Dust and wind-blown sand may arise from site during earth-moving and other construction activities. • Dust may be generated from cement batching activities. • Dust may be generated from stockpiles of earth material. • Dust may smother surrounding vegetation, and may pose a nuisance to nearby land occupants or land users.		
Impact Management Outcome	The surrounding environment, land users, residents do not experience significant dust-related impacts.		
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
• Land clearing and earthmoving activities should not be undertaken during strong winds, where possible. • Cleared areas should be provided with a suitable cover as soon as possible, and not left exposed for extended periods of time. • Stockpiles of topsoil, spoil material and other material that may generate dust must be protected from wind erosion (e.g. covered with netting, tarpaulin or other appropriate measures. Note that topsoil should not be covered with tarpaulin as this may kill the seedbank). • The location of stockpiles must take into account the prevailing wind direction and should be situated so as to have the least possible dust impact to surrounding residents, road-users and other land-users. • Speed limits must be enforced in all areas, including public roads and private property to limit the levels of dust pollution. • The speed limit should be set at 20-40km/h.		Contractor	Construction phase

• Dust must be suppressed on access roads and the construction site during dry periods by the regular application of non-potable water or a biodegradable soil stabilisation agent. Water used for this purpose must be used in quantities that will not result in the generation of excessive run off. • Dust suppression measures such as the wetting down of sand heaps as well as exposed areas around the site must be implemented especially on windy days. • The use of straw worked into the sandy areas may also help and the ECO must advise when this is necessary. • If dust appears to be a continuous problem the option of using shade cloth to cover open areas may be necessary or the erecting of shade netting above the fenced off are may need to be explored. • All vehicles transporting sand need to have tarpaulins covering their loads which will assist in any windblown sand occurring off the trucks. • Work on site must be well-planned and should proceed efficiently so as to minimise the handling of dust generating material. • Material loads should be properly covered during transportation. • Dust levels specified in the National Dust Control Regulations (GN 827 of November 2013) may not be exceeded. i.e. dust fall in residential areas may not exceed 600mg/m2/day, measured using reference method ASTM D1739; • A Complaints Register must be available at the site office for inspection by the ECO of dust complaints that may have been received.		
Performance Indicator	• Excessive dust does not arise from the site. • No dust complaints are received from any member of the public. • There is no evidence that vegetation surrounding the site is being smothered by dust.	

12. Environmental Impact Management: Post Construction Rehabilitation Phase & Operational Phase

After all construction activities have ceased, the sites must be cleared of all construction related equipment, materials, facilities and waste. In addition all disturbed surfaces – including disturbed areas around the structures and all areas utilised for site facilities – must be stabilised, rehabilitated and provided with a suitable cover. All temporary access roads constructed must be rehabilitated and access must be restricted from the public.

The environmental management objectives (goals) for this phase are:

- Rehabilitate & stabilise disturbed areas, and ensure environmentally sensitive closure of the construction sites.

- No establishment of alien vegetation on the site.
- Minimal loss of Aquatic Habitat and Associated Biota
- No impairment of surface water quality as a result of the development.
- Reduced erosion and scouring.
- Creation of Business and Employment Opportunities.

12.1 OBJECTIVE 1: SITE CLOSURE & REHABILITION

Impact Management Objective: ***To rehabilitate all areas disturbed by construction activities in an environmentally sensitive manner.***		
Potential impact to avoid	• Failure to remove all construction related waste and materials may result in environmental pollution. • Failure to remove all construction related equipment, machinery and site facilities may pose an impact to the natural environment specifically the watercourses. • Failure to stabilise disturbed surfaces may result in soil erosion and increased storm water run-off, which may limit successful revegetation of the site.	
Impact Management Outcome	• The site is neat and tidy and all exposed surfaces are suitably covered/ stabilised. • There is no construction-related waste or pollution remaining on site.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• On completion of the construction operations, the site camp area must be cleared of all site camp facilities, ablution facilities, fencing, signage, waste and surplus material. • Surfaces are to be checked for waste products from activities such as concreting or asphalting and cleared in a manner approved by the ECO. • Any contaminated soil must be collected and disposed of as hazardous waste. • All construction waste, litter and rubble are to be removed from the site and re-used elsewhere, or recycled/disposed of at an appropriate facility. • Burying or burning of waste or rubble on site is prohibited. • All areas within the working area and site camp that have become devoid of vegetation or where soils have been compacted due to construction activities should be scarified or ripped. • Topsoil removed during the establishment of the site camp and the working area must be spread evenly over the entire site camp area and all other disturbed/ exposed areas after those areas have been ripped, scarified, shaped and contoured (as required). • Where necessary seeding and planting of vegetation can take place after the replacement of the topsoil. Hardy, drought tolerant, non-invasive plant species must be selected. If needed, a layer of mulch can be applied to the newly shaped/ landscaped and topsoiled areas. The mulch will serve	Contractor / Long Island Trading 44 (Pty) Ltd	Rehabilitation phase

to limit erosion and will promote the re-vegetation of the site by retaining moisture in the soil and providing organic material (compost) for new plant growth. • Erosion features that have developed due to construction within the aquatic habitat due to the project are required to be stabilised. This may also include the need to deactivate any erosion headcuts/rills/gullies that may have developed. • All exposed soils and recently topsoiled areas are to be re-vegetated or stabilised to the satisfaction of the ECO, to protect these areas from wind and water erosion. No areas are to be left exposed to erosive forces. Erosion protection measures that can be applied include mulching (described above), the placement of geotextile, onion bags filled with wood chips, brush-packing or other similar measures. • Any topsoil, subsoil or other excavated material that cannot be utilised during site rehabilitation must be removed from the site and reused elsewhere on the property or disposed of at an appropriate disposal site. • Disturbed soils must be revegetated with the local indigenous vegetation such as that which occurs at the site ,or provided with other suitable cover. • Erosion features that have developed due to construction within the aquatic habitat due to the project are required to be stabilised. • It is recommended that follow-up alien clearing be conducted 6 months after construction is complete and thereafter annually for 3 years (or longer is alien recruitment is still evident on site). • The following mitigation measures proposed by the Freshwater Specialist should be implemented: o The area must be maintained through alien invasive plant species removal (which is the landowner's responsibility regardless of mitigation associated with this project) and the establishment of indigenous vegetation cover to filter run-off before it enters the freshwater habitat. o The solid domestic waste must be removed and disposed of offsite. All post-construction building material and waste must be cleared in accordance with the EMPr. o Removal of vegetation must only be when essential for the continuation of the project. Do not allow any disturbance to the adjoining natural vegetation cover or soils. o Erosion features that have developed due to construction within the aquatic habitat due to the project are required to be stabilised. This may also include the need to deactivate any erosion headcuts/rills/gullies that may have developed. o It is the contractor's responsibility to continuously monitor the area for newly established alien species during the contract and establishment period, which if present must be removed. Removal of these species shall be undertaken in a way which prevents any		

damage to the remaining indigenous species and inhibits the re-infestation of the cleaned areas. o Alien/ invasive species shall not be stockpiled, they should be removed from site and dumped at an approved site. o Any use of herbicides in removing alien plant species is required to be investigated by the ECO before use, for the necessity, type proposed to be used, effectiveness and impacts of the product on aquatic biota. o A monitoring programme shall be in place, not only to ensure compliance with the EMPr throughout the construction phase, but also to monitor any post-construction environmental issues and impacts such as increased surface runoff. The monitoring should be regular and additional visits must be taken when there is potential risk to watercourses. o The stormwater management infrastructure must be designed to ensure the runoff from the development is not highly concentrated before entering the buffer area. The volume and velocity of water must be reduced through discharging the surface flow at multiple locations surrounding the development, preventing erosion. o Any evidence of erosion from this stormwater system must be rehabilitated and the volume/velocity of the water reduced through further structures and/or energy dissipaters. These structures must be incorporated within the layout area. o The recommended use and maintenance of grease traps/oil separators to prevent pollutants from entering the environment from stormwater. o Appropriate waste water infrastructure must be designed to prevent any such water from entering the surrounding environment. o Maintenance of the freshwater habitat and buffer area must be implemented for it to remain effective. Apart from erosion control and alien invasive plant eradication, the encroachment of any further infrastructure or vehicles must be prevented. o Engage with the homeowners to explain the reasons why the buffer and the water resources are protected and what human activities are allowed. Encourage recreational activities within the buffer area that are not in conflict with water resource management. The community could be involved in the monitoring e.g. the packaging plant effluent.		

Performance Indicator	• All construction-related materials, equipment, facilities, waste and contaminated soils have been removed from the site. • Compacted soils have been scarified/ ripped and stabilised. • All disturbed/exposed surfaces have been provided with a suitable covering and/or stabilised. • No alien vegetation is evident on site.

12.2 OBJECTIVE 2: MAINTENANCE OF ENVIRONMENTAL INTEGRITY DURING THE OPERATIONAL PHASE

Impact Management Objective: ***To maintain the integrity of the environment.***		
Potential impact to avoid	• Degradation of onsite watercourses. • Excessive alien vegetation growth • Negative impacts on the environ	
Impact Management Outcome	• The integrity of the environment is maintained throughout the operational phase. • The environmentally sensitive areas on site are maintained and conserved. • Environmental sensitivities and aspects become an attribute of the estate.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• Storm water infrastructure must be serviced regularly. • Cover crop that was planted where any weeds or exotic species were removed is to be maintained. • Any erosion runnels/ gulleys/ channels that form on site must be infilled with appropriate material, compacted, rehabilitated as needed and appropriate erosion control measures put in place to prevent recurrent erosion at that site. • The stormwater management infrastructure must be designed to ensure the runoff from the development is not highly concentrated before entering the buffer area. The volume and velocity of water must be reduced through discharging the surface flow at multiple locations surrounding the development, preventing erosion. • Any evidence of erosion from this stormwater system must be rehabilitated and the volume/velocity of the water reduced through further structures and/or energy dissipaters. These structures must be incorporated within the layout area. • The recommended use and maintenance of grease traps/oil separators to prevent pollutants from entering the environment from stormwater. • Appropriate waste water infrastructure must be designed to prevent any such water from entering the surrounding environment.	Long Island Trading 44 (Pty) Ltd	Operational phase

• Maintenance of the freshwater habitat and buffer area must be implemented for it to remain effective. Apart from erosion control and alien invasive plant eradication, the encroachment of any further infrastructure or vehicles must be prevented. • Engage with the homeowners to explain the reasons why the buffer and the water resources are protected and what human activities are allowed. Encourage recreational activities within the buffer area that are not in conflict with water resource management. The community could be involved in the monitoring e.g. the packaging plant effluent. • At least three groundwater monitoring boreholes should be installed in order to detect any potential contamination, downgradient of the filling station. • The monitoring boreholes should be appropriately designed and constructed – that is the depth of the monitoring boreholes should be deeper than the bottom of the USTs and seated within the intact granite (just beyond the weathered zone), and below the water table. • Groundwater monitoring programme to be compiled based on the recommendations in the Groundwater Impact Assessment. • The findings and results of this monitoring programme must be made available to the relevant authorities, including this Directorate, on request. • A rapid response plan must be developed should any hydrocarbon spillages or leakages be detected. • See Appendix 7 Package Plant • Treated effluent emanating from the plants is regularly tested. • A water quality monitoring plan is compiled and followed, with testing carried out by a competent person. • Records kept of the results of monitoring and made available to the relevant authorities on request. • Contingency Plan compiled and followed, in the event of spillage or malfunction.		
Performance Indicator	• The integrity and condition of the surrounding environment is maintained at an acceptable level. • All previously disturbed/exposed surfaces have been provided with a suitable covering and/or stabilised.	

12.3 OBJECTIVE 2: DISCOURAGE ALIEN VEGETATION

Impact Management Objective: Discourage establishment of alien vegetation & reduce fire risk (directly associated with alien vegetation)	
Potential impact to avoid	• Alien vegetation may establish as a result of land disturbance. • Of particular concern is the establishment of alien vegetation in the area disturbed for the route of the bulk services infrastructure within the stream channels.

Impact Management Outcome	• No establishment of alien vegetation on the site.		
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
• An Environmental Control Officer will oversee compliance with all the prescribed environmental requirements and mitigation measures listed here, and will be on site regularly. • Alien plants must be removed from the site as per NEMBA requirements. • A suitable weed management strategy to be implemented in construction and operation phases to eradicate and control regeneration. • After any clearing is completed, an appropriate cover crop should be planted where any weeds or exotic species are removed from disturbed areas timeously.		Developer	Operational phase
Performance Indicator	• No alien vegetation is evident on site.		

12.4 OBJECTIVE 3: REDUCED LOSS OF ECOLOGICAL CONNECTIVITY

Impact Management Objective: Reduced Loss of Ecological Connectivity			
Potential impact to avoid	• The main impact is likely to be the fragmentation of the current ecological connectivity across the surrounding area.		
Impact Management Outcome	• Maintenance of ecological connectivity		
IMPACT MANAGEMENT ACTIONS			
Mitigation measure		Responsible party	Time period
• Alien vegetation on public open space should be eradicated. • Public Open spaces should remain as natural as possible if they are to be utilised as conservation areas. Where Public Open Spaces are not utilised as conservation areas, they should be used as multi-use areas. • Indigenous drought resistant vegetation should be used for landscaping purposes.		Developer / consulting engineer	Operational phase
Performance Indicator	• Minimal alien vegetation.		

12.5 OBJECTIVE 4: CREATION OF BUSINESS AND EMPLOYMENT OPPORTUNITIES

Impact Management Objective: Creation of Business and Employment Opportunities	
Potential impact to avoid	• The establishment of businesses will create employment opportunities in addition to those from the industrial and business facilities. • The housing component of the development may create employment opportunities for domestic workers. • The operational phase of the residential development will also create opportunities for local businesses, such as local maintenance and building companies, garden services, security and catering companies and the local taxi industry.
Impact Management Outcome	• Creation of Business and Employment Opportunities.

IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• The developer should inform local community leaders, organisations and councillors of the potential job opportunities associated with the different components associated with the operational phase of the development.	Developer	Operational phase
Performance Indicator	• Increase in employment of local residents.	

12.6 OBJECTIVE 5: TRAFFIC & SAFETY IMPACT

Impact Management Objective: Reduced negative impact caused by increased traffic		
Potential impact to avoid	• Traffic congestion on the existing road networks. • An unsafe and non-user-friendly transport network.	
Impact Management Outcome	• Ensure the safety of vehicular and pedestrian traffic during the operational phase of the development.	
IMPACT MANAGEMENT ACTIONS		
Mitigation measure	Responsible party	Time period
• The necessary road markings, traffic signage, speed limits and early warning systems will need to be developed as per the requirements of the relevant roads-authority. • Paved sidewalks should be provided in support of the development that will generate high numbers of public transport commuters.	Developer	Operational phase
Performance Indicator	• Increase in employment of local residents.	

13. Emergency Preparedness

13.1 Emergency response procedures

The potential environmental risks that may arise as a result of construction activities, or during the maintenance of the structures must be identified, and appropriate emergency response procedures must be compiled for each emergency scenario. Potential environmental emergencies that require an emergency response include, but are not limited to, unplanned fires, sewage spills, spills of hazardous chemicals, snake bites etc.

- The construction contractor is responsible for identifying potential significant environmental risks that may arise as a result of pre-construction, construction and rehabilitation activities, and the contractor must formulate emergency response procedures for these potential incidents.
- The ECO, the contractor and the Holder are responsible for ensuring that all construction workers are aware of the emergency procedures, and are properly trained on how to identify and respond to an emergency incident during construction.
- An emergency procedure must clearly indicate who will take charge during an emergency, and the roles and responsibilities of workers and authorities during an emergency.
- The construction contractor is responsible for ensuring that the requirements of the Occupational Health & Safety Act (OHSA) are adhered to during the construction phase. The Holder is responsible for ensuring compliance with the OHSA during the undertaking of maintenance activities.

13.2 Emergency preparedness

The following measures must be implemented, as appropriate, to ensure effective responses to emergencies:

- All workers on site during the construction and operational phase must be properly educated about possible emergency incidents that may arise, how to avoid such incidents and how to respond in the event of an incident. "Refresher" training sessions on emergency procedures must be held if needed.
- All workers must ideally be given basic fire-awareness training, and advised on basic firefighting and safety techniques. Fire-fighting equipment must be available on site during construction and maintenance activities (see section 8.3).
- All workers must be trained on how to respond in the event of a spill of a hazardous substance (fuel, chemicals etc.), if hazardous substances are to be used on site.
- A spill kit for containing and/or neutralising spills of hazardous substances (e.g. hydrocarbons) must be available on site at all times, when hazardous substances are present.
- Any incidents of pollution or spillage of hazardous materials during construction must be reported to the ECO as soon as possible. The ECO must then (depending on the nature of the spill) notify the relevant authorities, if needed. During the operational phase of the development, the Holder is responsible for notifying the relevant authorities of any pollution incidents that arise as a result of maintenance activities.
- A first aid kit must be available on site at all times.
- Emergency contact numbers (including the fire department, police and ambulance) must be prominently displayed on site at all times and regularly updated.
- All emergency incidents must be recorded in a site incident log. The cause of the incident, the measures taken in response to the incident and the efficacy of those measures must also be recorded. This information must be used to inform future emergency preparedness planning, and to avoid prevent similar incidents from arising again.

14. Method statements

The Competent Authority and/or the ECO may require the Holder or Construction Contractor to submit Method Statements for one or more construction-related activity, or any aspect of the management of the site, before the activity is undertaken or during the performance of the activity, if the activity is causing or may cause significant environmental damage, or pose a health and safety risk.

Method Statements need not be complex and lengthy, but must clearly state **how**, **when** and **where** the activity concerned will be undertaken, and must specify **who** will be responsible for undertaking each component of that activity. Method Statements must be prepared by the Construction Contractor and submitted to the ECO for approval before undertaking the activity concerned.

The ECO and / or Competent Authority have the authority to request method statements for activities, including but not limited to:

- Establishment of site camp and stockpile area.
- Cement/ concrete batching, disposal and emergency contingencies.
- Topsoil and sub-soil storage/ stockpiling.
- Storage of fuels and hazardous chemicals and emergency contingencies.
- Waste management system.
- Storm water management and control.
- Fire Control & Fire Emergency Plan.
- Emergency preparedness plan / emergency response procedure (see Chapter 14).
- Post-construction rehabilitation.

The ECO has the authority to prevent activities from being undertaken until such time as a satisfactory Method Statement has been submitted to the ECO and approved by the ECO.

15. Roles and Responsibilities

This EMPr, once approved by the competent authority (DEA&DP), must be seen as binding to the Holder, and any person acting on the Holder's behalf, including but not limited to agents, employees, associates, contractors and service providers.

The Holder and all other persons who may be directly involved in the development are also bound by their general Duty of Care, as stated in Section 28 of the National Environmental Management Act, 1998:

> ***Duty of Care:***
> *"Every person who causes, has caused, or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm cannot reasonably be avoided or stopped, to minimize and rectify such pollution or degradation of the environment"*

15.1 Duties and Responsibilities of the Holder

The Holder is ultimately responsible for ensuring that the environmental management measures specified in this EMPr, as well as any other conditions specified by the competent authority, are implemented and

adhered to during the construction and operational phase (maintenance activities) of the proposed development.

The Holder or delegated party is responsible for monitoring and maintenance during the operational phase. The Holder must ensure that all appointed service providers, contractors and maintenance workers are capable of complying with all statutory requirements of this EMPr and the conditions of the Environmental Authorisation. The Holder is responsible for ensuring that this EMPr and the conditions of the Environmental Authorisation are implemented and adhered to during construction.

The Holder or appointed consultant is responsible for identifying emergency situations that may arise during operational and maintenance activities, and must formulate appropriate emergency response procedures for these emergency scenarios.

15.2 Duties and Responsibilities of the Contractor

The "Construction Contractor" is the entity responsible for undertaking the physical construction of the residential development. The construction contractor is responsible for ensuring that all environmental management measures specified in this EMPr and in the EA are implemented during the pre-construction, construction and post-construction rehabilitation phases, unless agreed otherwise with the Holder. The contractor will be responsible for all costs incurred in the rehabilitation of the site and for ensuring effective environmental management during construction. The contractor must therefore make adequate financial provision for the implementation of all prescribed measures.

It is strongly recommended that the Construction Contractor appoint an Environmental Site Officer (ESO), who will act as the Contractor's representative to monitor and enforce compliance with the conditions of this EMPr, throughout all phases of construction.

In addition to the above, the Construction Contractor is responsible for the following:

- Identify emergency situations that may arise as a result of construction activities, and formulate appropriate emergency response procedures.
- Ensure that all construction workers, including sub-consultants and service providers, undergo environmental awareness training prior to commencing work on site, or as soon as possible thereafter.
- Compile the required method statements, which must be to the satisfaction of the ECO, before commencing with the activity to be governed by the method statement.
- Respond to concerns or issues identified by the ECO, as relates to environmental management, and implement the appropriate management or remediation measures, at the Contractor's own expense (unless agreed otherwise)
- Should third parties be called to the site to perform clean up and rehabilitation procedures, the Construction Contractor will be responsible for all associated costs.

Note that failure to comply with the requirements and conditions of this EMPr and the Environmental Authorisation may result in fines or other penalties being levied against the Construction Contractor by the Competent Authority.

15.3 Duties and Responsibilities of the ECO

The appointed Environmental Control Officer (ECO) is responsible for undertaking regular site visits to monitor and report on the implementation of the EMPr and adherence to the conditions of the Environmental Authorisation during the pre-construction, construction and post-construction

rehabilitation phases. The ECO is not required to monitor the site during the operational (maintenance) phase of the development.

15.3.1 Competency of the ECO

The ECO must be independent of the Holder, Engineer, Construction Contractor and their service providers. The appointed ECO must be suitably qualified and experienced, and must be able to demonstrate that he / she is of sufficient competency to undertake the required task. The ECO must preferably be a resident in close proximity to the development area to ensure quick response if required. The ECO must work in close co-operation with the Construction Contractor, resident engineer or ESO (where applicable) and all contractors in order to identify potential problems before they occur, and provide suitable guidance as to how the identified problems (environmental impacts) can be avoided.

15.3.2 Duties of the ECO

The duties of the ECO include, but are not limited to:

- Conduct a pre-construction site inspection to ascertain the pre-commencement condition of the site (i.e. the status quo);
- Conduct environmental awareness training;
- Undertake regular site visits to monitor compliance with all mitigation, monitoring and management measures contained in the EMPr and the Environmental Authorisation, during the pre-construction, construction and rehabilitation phases of the development;
- Evaluate the achievement of the performance indicators associated with each impact management objective specified in this EMPr;
- Liaise with site contractors, engineers and other members of the development team with regard to the requirements of the EMPr;
- Provide guidance as and when required regarding the implementation of the environmental management measures contained in the EMPr and EA, so as to assist the Holder and contractor in remaining compliant with these measures;
- Assist in finding environmentally acceptable solutions to construction problems;
- Ensure that the working areas, site camp facilities, access roads and no-go areas are properly demarcated;
- Ensure that proper topsoil management practices are adhered to on site;
- Ensure that proper waste management & pollution prevention strategies are practised on site;
- Examine method statements, where required;
- Recommend additional environmental protection measures, should this be necessary;
- Furnish contractors with verbal warnings in case of contravention of the EMPr;
- Recommend that the competent authority furnish errant contractors with predetermined fines, when verbal and / or written warnings are ignored;
- Ensure satisfactory rehabilitation of disturbed areas on site, after construction is complete;
- Keep detailed records of all site activities that may pertain to the environment, and produce compliance-monitoring reports (ECO Reports) for submission to the Holder, and the Competent Authority at regular intervals during the construction phase;
- Submit a final post-construction inspection report, within 6 months of completion of the construction phase. The audit report must detail the rehabilitation measures undertaken, describe all major incidents or issues of non-compliance and any issues or aspects that require attention or follow-up.
- All ECO Reports and Inspection Reports must be submitted to the Holder and Competent Authority.

15.3.3 Frequency of ECO visits

The ECO must conduct weekly site visits during the construction phase, in addition to the start-up and closure inspections.

The ECO has the discretion to undertake additional visits if he / she feels this is justified due to the actions of the contractors, and to make *ad hoc* visits in order to ensure compliance.

The ECO must also undertake a final inspection (audit) 6 months after completion of construction activities. The purpose of this final inspection is to ensure that the rehabilitation measures applied at the conclusion of the construction phase have been sufficient to promote the successful rehabilitation of the site, and to identify any further issues that require attention or follow-up.

15.3.4 Authority of the ECO

The ECO has the authority to recommend to the authorities that they suspend all works (or part thereof) occurring on site, should any action being undertaken on site not comply with the environmental requirements, and where such actions pose a serious threat to any element of the surrounding environment.

The ECO has the authority to issue instructions to the Construction Contractor and/or Holder, regarding measures that must be implemented on site in order to ensure compliance with the EMPr and Environmental Authorisation, and/or to prevent environmental degradation or pollution from occurring.

The ECO has the authority to issue verbal and written warnings to contractors. Should verbal and written instructions and/or warnings be ignored, the ECO has the authority to request the Competent Authority to issue pre-determined fines or other penalties.

The ECO has the authority to report incidents of non-compliance to the Competent Authority at any time.

16. Environmental Awareness Plan

Environmental Awareness Training must be conducted prior to the commencement of construction activities. It is the holder's responsibility to familiarise himself/herself with the content and requirements of this EMPr. The holder is also responsible to ensure that the contractor and all labourers working on site during the construction phase are familiar with the content of this EMPr.

The following actions must be taken to ensure that all relevant parties are aware of their environmental role and duties:

1. This EMPr must be kept on site at all times.
2. The provisions of this EMPr and the conditions of the Environmental Authorisation must be explained in detail to all staff during Awareness Training.
3. Training booklets will be handed out to all labourers and must be explained to them.
4. Weekly checks to be done by the Holder's environmental representative who must be on site at all times.
5. The ECO to conduct frequent site visits.
6. Monthly monitoring reports to be compiled by the ECO. These reports will be circulated to all parties involved (including the holder, contractor and the competent authority).

The Construction Contractor must make allowance for all construction site staff, including all subcontractors that will be working at the site, to attend environmental awareness training sessions (undertaken by the ECO) before commencing any work on site. During this training, the ECO will explain the EMPr and the conditions contained therein. Attention will be given to the construction process and how the EMPr fits into this process. Other items relating to sound environmental management which must be discussed and explained during the environmental awareness training sessions include:

- The demarcated "No-Go" areas;
- General do's and don'ts of the site;
- Making of fires;
- Waste management, use of waste receptacles and littering;
- Use of the toilets provided;
- Use and control of construction materials and equipment etc.;
- Control, maintenance and refuelling of vehicles;
- Methods for cleaning up any spillage;
- Access and road safety;
- Emergency procedures (e.g. in case of fire, spillage etc.)
- General "best practice" principles, with regards to the protection of environmental resources.

Environmental awareness training and education must be ongoing throughout the construction phase, and must be undertaken regularly if deemed necessary (especially if it becomes apparent that there are repeat contraventions of the conditions of the EMPr), or as new workers come to site. Translators must be utilised where needed.

17. Monitoring, Record Keeping and Reporting

17.1 Environmental Auditing

In accordance with the requirements of the Environmental Impact Assessment Regulations, 2014 (as amended), the holder of the Environmental Authorisation must, for the period that the Environmental Authorisation is valid, appoint a suitably qualified independent person to conduct an environmental audit to audit compliance with the conditions of the Environmental Authorisation and the EMPr.

The holder is responsible for appointing, managing and remunerating the appointed auditor. The auditor may not be the appointed Environmental Control Officer (ECO), or the EAP.

The appointed auditor must undertake regular environmental audits, at a recommended frequency of every 6 months. Following each audit the environmental auditor must submit an audit report to the Competent Authority (in this instance the DEA&DP).

- Environmental auditing and environmental audit reports must adhere to the requirements of the amended 2014 Environmental Impact Assessment Regulations, in particular Section 34 (*Auditing of Compliance with Environmental Authorisation, Environmental Management Programme*) and (*Objective and Content of Environmental Audit Report*)
- The audit report must provide verifiable findings on the level of compliance with the provisions/ conditions of the Environmental Authorisation and the EMPr, and must also comment on the ability of the measures contained in this EMPr to sufficiently avoid, manage and mitigate environmental impacts.

- Where the findings of the audit report indicate that the impact management measures stated in the EMPr are insufficient to adequately address environmental impacts, recommendations as to how the EMPr must be amended so as to address the identified shortcomings must be made and submitted to the competent authority together with the audit report.

17.2 Construction phase monitoring, reporting and record keeping

The appointed Environmental Control Officer (ECO) is responsible for monitoring the site at regular intervals during the construction phase, in order to ensure that the provisions of this EMPr and the Environmental Authorisation are adhered to and that sound environmental management is ensuing on site.

The ECO must compile a monthly ECO report detailing the ECO's observations on site, any instances of non-compliance and any issues or aspects that require attention, follow-up or remedial action. The ECO reports must be submitted to the Holder and to the Competent Authority is so requested by that authority. The ECO inspection reports must include both photographic and written records.

17.2.1 ECO Inspections - Photographic Records

The condition of the surrounding natural environment must be monitored regularly in order to ensure that construction and management activities are not impacting negatively on the condition of the landscape and any sensitive ecosystems. The most effective way to achieve this is by means of a detailed photographic record. In this way, a record of any shift in ecosystem condition can be maintained and potential impacts be detected at an early stage. It is thus recommended that fixed-point photo-monitoring sites could be set up, and photographs must be taken at these sites during each ECO inspection. Where necessary, the entire working area must be well documented and photographed.

17.2.2 ECO Inspections - Written Records

The following record-keeping during the pre-construction, construction and rehabilitation phases of the development is recommended:

- The ECO must complete an ECO Checklist after each ECO site visit.
- The ECO must compile an ECO monitoring report and submit this to the Holder, the Contractor and the Competent Authority (the latter only if required by the Competent Authority). The monthly reports must be a summary of the ECO inspections from the preceding month, and must highlight the key concerns/ issues on site, instances of non- compliance with the EA and EMPr, all instructions issued to the contractor, actions taken and aspects that still require attention.
- All ECO reports and ECO instructions must be retained on file at least for the duration of the construction period (retaining reports for a period of at least 5 years is recommended, in the event that the Competent Authority must request information).
- A record (minutes) of construction site meetings, liaison site meetings between the ECO and resident engineer or contractor, monitoring reports, ECO instructions and ECO observations must be clearly documented and filed on a master file off-site for safe keeping.
- It is recommended that a site register (incident register) be kept on site at the site office for the recording of any environmental incidents (e.g. fires, spills etc.), observations which are contrary to the stipulations within the EMPr and any other contravention deemed necessary for the attention of the resident engineer. Actions taken to remedy the incidents must also be recorded.
- A complaints register must be kept on site in which complaints by any member of the public must be logged.

- The ECO must compile a final post-construction audit report, within 6 months of completion of each construction phase. The audit report must detail the rehabilitation measures undertaken, describe all major incidents or issues of non-compliance and any issues or aspects that require attention or follow-up.

17.2.3 Construction Phase Record Keeping

A copy of the approved EMPr, the Environmental Authorisation and any relevant construction method statements must be kept on site at all times during pre-construction, construction and rehabilitation activities. The ECO Reports must be retained by the Holder for a period of at least 5 years, and must be provided to the Competent Authority upon request. Attached as Appendix 6 find the Environmental Authorisation.

18. Penalties, Claims and Damages

The contractor will be responsible for all costs incurred in the rehabilitation of the site and for ensuring that all procedures required to rehabilitate the site are implemented. If third parties are called to the site to perform clean up and rehabilitation procedures, the contractor will be responsible for all costs. The competent authority may impose penalties on the Holder or any of the contractors if conditions contained in this EMPr are contravened. This would be based on an agreement or contract between the Holder and the contractor.

Penalties could be imposed In terms of Chapter 11 of the Western Cape Bill on Planning and Development as published in the Extraordinary Provincial Gazette No 5183, 3 October 1997, and would be applicable for any action which leads to damage to the natural environment. Please note that the payment of any fines in terms of the contract shall not absolve the offender from being liable from prosecution in terms of any law.

In cases where severe environmental damage occurs, the competent authority law enforcement division may take legal action against the responsible parties. The reasons for this could include, among others:

- Not implementing the conditions of the EMPr;
- Spillage that result in environmental damage;
- Incorrect handling and storage of construction materials and chemicals;
- Sensitive areas that are not clearly demarcated;
- Performing ablutions in areas other than facilities provided for such actions; and
- Occurrence of unattended and out of control fire.

With specific regard to the excavations through the forested area the following will apply. The contractor will be responsible to pay the following penalties should indigenous trees or vegetation which are in no go areas or being protected by barrier or danger tape be damaged by anyone under his/her employ.

The Contractor shall comply with the environmental specifications and requirements on an ongoing basis and any failure on his part to do so will entitle the ECO to issue the contractor with penalty / fine as described in the following section.

The following fine structure shall apply:

Any vehicles, plant, or thing related to the Contractors operations within the designated boundaries of a "no-go" area	**R 1,000.00**

Any vehicle being driven, and items of plant or materials being parked or store outside the demarcated boundaries of the site	**R 1,000.00**
Persons walking outside the demarcated boundaries of the site	**R 100.00**
Persistent and un-repaired oil leaks from machinery. The use of inappropriate methods of refuelling such as the use of a funnel rather than a pump	**R 1,000.00**
Littering of site by individuals	**R 250.00**
Deliberate lighting of illegal fires on site	**R 1,000.00**
The eating of meals on site outside the defined eating area. Individual not making use of the site ablution facilities	**R 250.00**
No on-site implementation of waste management system.	**R 1000.00**
Waste not collected and contained immediately.	**R 1000.00**
No recycling of waste.	**R 1000.00**
Burning, burying or disposing of waste other than as prescribed.	**R 1000.00**
Waste not disposed of at an approved landfill.	**R 1000.00**
Chemicals and / or waste spilled on ground.	**R 250.00**
Use of other areas for toilet purposes and / or disposal of chemicals / waste.	**R 250.00**
Stockpiling of soil in an unspecified area.	**R 2500.00**
Stockpiles not located and aligned so as to minimise impacts.	**R 2500.00**
Spilling of soil or construction material into water body or stream.	**R 1000.00**

Table 4:Offences that may constitute a fine.

The above does not absolve the transgressor from being prosecuted in terms of the ***National Environmental Management Act (Act 107 of 1998)*** which may result in further penalties and other actions by State Departments.

19. Conclusion

The recommendations and mitigation measures prescribed in this EMPr have been formulated with the intention of addressing potential pre-construction, construction and operational phase impacts on the environment. It is likely that if the conditions, requirements and recommendations of the above EMPr are implemented as described and the relevant stakeholders adhere to the various mitigation measures, then the project will be completed without unforeseen negative environmental impacts.

Familiarity with the contents of this EMPr by the contractors and other individuals involved in the development project will assist in achieving "environmental best-practice", which ultimately ensures that the project arrives at a sustainable outcome.

FIGURE 1: BOREHOLE PLACEMENT FOR THE FILLING STATION, HEROLDS BAY COUNTRY ESTATE ON PORTION 7 OF THE FARM. BUFFELSFONTEIN 204, WESTERN CAPE

N

Prevailing wind:
Summer: Southeast
Winter: Northwest

GPS Coordinates:
Latitude: 34° 2'44.39"S
Longitude: 22°24'15.31"E

Prepared for:
Herolds Bay Country Estate

Date:
June 2022

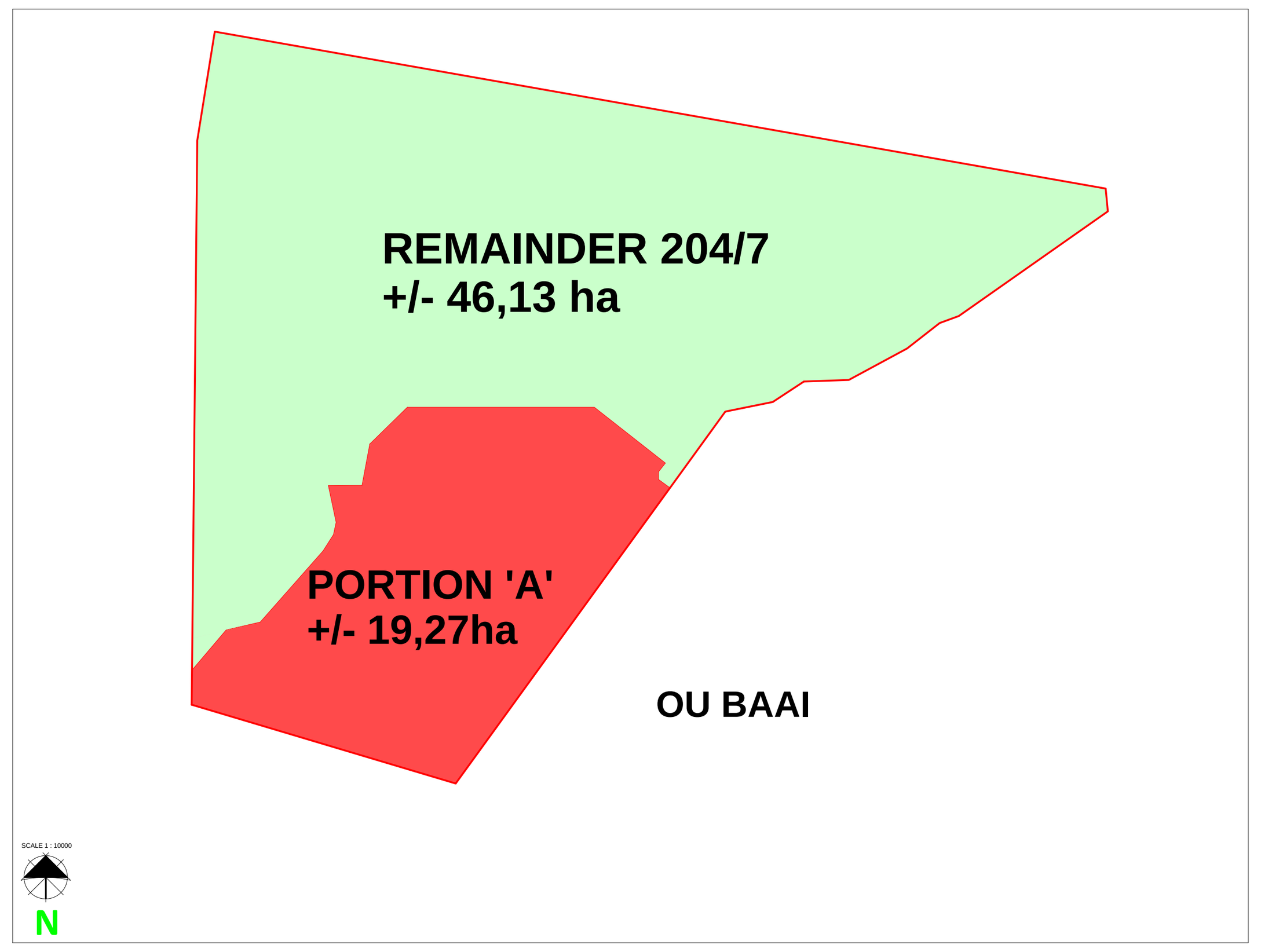
FIGURE 2: BOREHOLE PLACEMENT FOR THE FILLING STATION, HEROLDS BAY COUNTRY ESTATE ON PORTION 7 OF THE FARM. BUFFELSFONTEIN 204, WESTERN CAPE

FIGURE 3: BOREHOLE PLACEMENT FOR THE FILLING STATION, HEROLDS BAY COUNTRY ESTATE ON PORTION 7 OF THE FARM. BUFFELSFONTEIN 204, WESTERN CAPE

FIGURE 4: CLOSE-UP BOREHOLE PLACEMENT FOR THE FILLING STATION, HEROLDS BAY COUNTRY ESTATE ON PORTION 7 OF THE FARM. BUFFELSFONTEIN 204, WESTERN CAPE

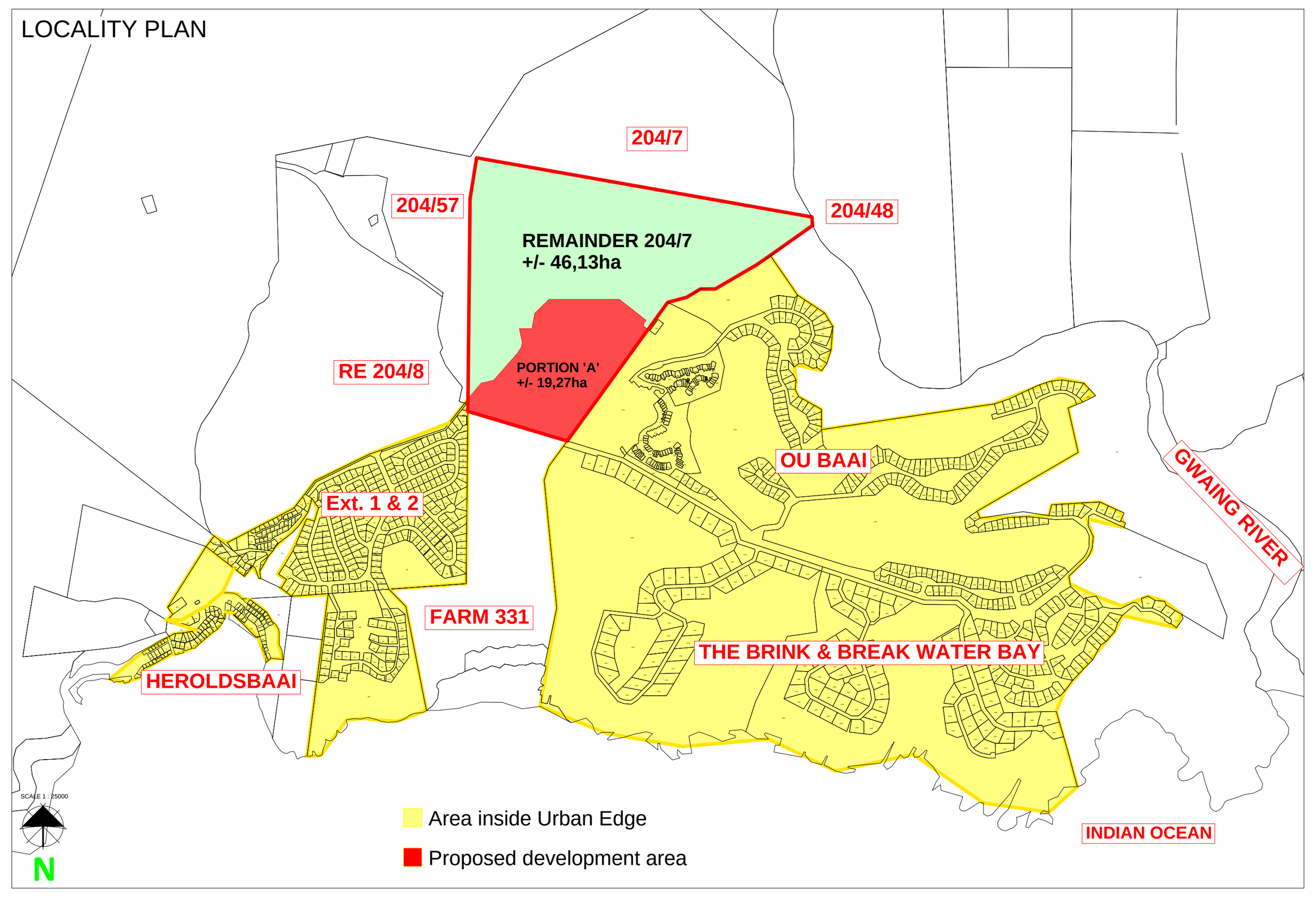
INSERT 1

INSERT 2



SUBDIVISION

INSERT 3



PLEASE NOTE:

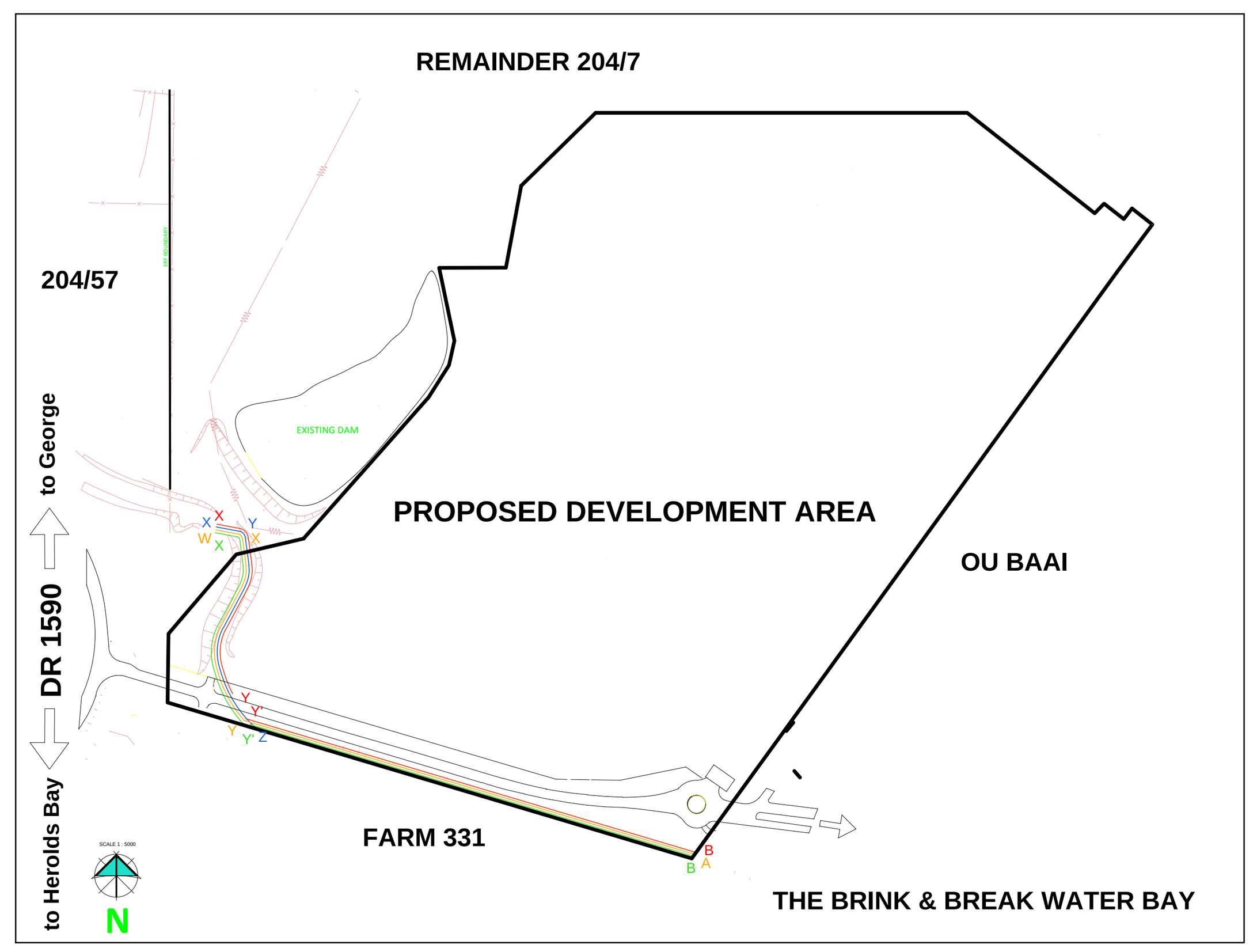
Amendments were made to Plan No HDB/C/204-2 to adhere to the following conditions of approval in the EA by the Dept of Environmental Affairs and Development Planning:

*RE. Condition 3.5.1: The boundaries of the erven along the aquatic buffer next to the dam were retreated to ensure that all the erf boundaries are above the buffer line, resulting in the omittance of three R.Z.I ptns.;

* RE. Condition 3.5.2: The boundary of Ptn 106 (Commercial Centre) was retreated to a position above the aquatic buffer line; and

*RE. Condition 3.5.3: All services will be designed to be installed above the aquatic buffer line.

INSERT 4



DIAGRAMMATIC ALIGNMENT OF SERVITUDES TO BE CANCELLED AS PROPOSED IN PAR. 1.1 - 1.4

APPLICATION FOR THE CANCELLATION AND REGISTRATATION OF SERVITUDES, SUBDIVISIONS, REZONING, AND CONSENT USES IN TERMS OF THE RELEVANT SECTIONS OF THE BY-LAWS ON LAND USE PLANNING FOR THE MUNICIPALITY OF GEORGE, 2015.

APPLICATION IS BEING MADE FOR :

1. Cancellation in terms of Section 15.2 (f) of the following title conditions applicable to servitudes as per Deed of Transfer T038436/2017 (as shown on Insert 4):

1.1 Par. B: A servitude right of way, 5.87 wide, marked XYZ, on SG Diagram 2223/45;

1.2 Par. C: Right-of-way, 5.67m wide, marked WXYA on SG Diagram 1827/52;

1.3 Par. D: Servitude, 9.45m wide, marked XY & Y'B on SG Diagram 916/65; and

1.4 Par. E: Right-of-way, 9.45m wide, marked XY and line Y'B on SG Diagram 5727/58.

2. Subdivision in terms of Section 15.2 (d) of Portion 7 of Farm Buffelsfontein No 204 as follows: (INSERT 2):

2.1 Portion A =±19.27 ha; and

2.2 Remainder Buffelsfontein 204/7 = ±46.13 ha.

3. Rezoning in terms of Section 15.2 (a) of the above mentioned PTN. A from Agriculture Zone 1 to Subdivisional Area;

4. Subdivision of the above mentioned Subdivisional Area in terms of Section 15.2 (d) as shown on plan and Table A.

5. Consent use in terms of Section 15.2 (o) for Restaurant/Shop on Portion 106.

6. Registration of the following servitudes in terms of Section 15.2 (d)

6.1 Services and access servitude area, marked figures a b c d e and a1 b1 c1 d1 on Ptn. 110;

6.2 Services servitude area 3m wide marked Figure h j k m1 on Ptn. 103 and Ptn. 110;

6.3 Services servitude area 3m wide marked Figure l m n o on Ptn. 112 and 106;

6.4 Figure marked p q r s represents a services servitude area on Ptn. 106;

6.5 Line t u v w x represents the centre line of a servitude right of way, 6m wide, on Ptn. 106 in favour of Ptn. 112, Portion 110 and Rem. Farm Buffelsfontein 204/7;

6.6 Line x y represents the centre line of a 6m wide servitude right of way on Ptn. 112 in favour of Ptn. 106, Ptn. 110 and Rem. Buffelsfontein Farm 204/7;

6.7 Line y z represents the centre line of a 6m wide servitude right of way on Ptn.106 in favour of Ptn.110 and Rem. Farm Buffelsfontein 204/7;

6.8 Access to the treatment plant on Figure pqrs will be registered in general terms on Ptn. 106 in favour of the H.O.A.;

6.9 A servitude for pipeline from treatment works on Fig. a b c d e to retention pond on Ptn. 108 via Ptn. 110 (Private Road) and Ptn. 109 (Private Open Space) will be registered when route is finalised;

6.10 Notarial Deed to be registered on Ptn. 107 in favour of Rem. Farm Buffelsfontein 204/7 for grazing purposes;

6.11 Servitude right of way in general terms on Ptn A (Insert 2) in favour of Rem. Farm Buffelsfontein 204/7;

6.12 Servitude right of way on Ptn 110 in favour of George Municipality: centre line e1 f1 (18m wide), centre line f1 g1 h1 j1 (15m wide) and centre line j1 k1 (10m wide);

6.13 Line n1 o1 p1 q1 r1 s1 t1 u1 v1 w1 represents 3m wide services servitude on Ptn. 110 for 11 & 66 kV cable route;

6.14 Line x1 y1 represents centre line of services servitude 2m wide on Ptn. 106; and

6.15 Line z1 a2 b2 represents centre line of services servitude 2m wide on Ptns. 106 and 107.

Table A

	Zoning	Ptn No's	Land Use	Number	Area (ha)	%
	Business Zone VI	106	Service Station*	1	± 0,749	3.9
	Business Zone IV	112	Office (300 m² floor space)	1	± 0,11	0,6
	Transport Zone II	111	Public Street	1	± 1,332	6,9
	Single Residential Zone II (Estate Housing):					
		1 - 44, 48 - 102 * *	Dwelling House * * *	99	± 8,847 * * *	45,9
		103, 104 & 105	Group Housing * * * *	3	± 3,567	18,5
		110	Private Road	1	± 3,207	16,6
		107, 108 & 109	Private Open Space	3	± 1,456	7,6
	Total			109	± 19,267	100

* Service Station (Restaurant / Shop - Consent Use)
** Due to amendments along the aquatic buffer line the numbering of the three portions which were left out, viz. 45-47, are omitted
*** Average erf size = ±894 m² (min. +/- 733 m² and max. = ±1020 m² - excl. Ptn. 65 with exist. dwelling)
**** Detail planning of Group Housing Sites to be dealt with as a separate application with the following average densities:
Ptn 103 = ±16 units @ 26 / ha.
Ptn 104 = ±32 units @ 19 / ha.
Ptn 105 = ±20 units @ 16,5 / ha.

REMARKS:
1. Land concerned situated outside 'Urban Edge' in terms of 2015 L.S.D.P.
2. The emergency 11kV powerline connecting the 66kV and 11kV Sub-station on the abutting Oubaai will be accommodated within a 3m wide servitude to be registered along the south-eastern boundary of Portion 103. The 66kV and 11kV Municipal connecting powerlines from the 66kV Sub-station to Herolds Bay and the rural area will be accommodated in the proposed 15m wide road reserves as well as a 3m wide service servitude on Ptns. 106 & 112..
3. The Oubaai/The Brink/Breakwater Bay access road was surveyed, but diagram was not registered and therefore still forms part of Rem. 204/7.
4. Development will be implemented in phases as shown on Phasing Plan (Annexure 21).
5. PLEASE NOTE: THIS IS A REVISED PLAN TO COMPLY WITH MUNICIPAL REQUIREMENTS AS SET OUT IN AN EMAIL dd. 9 NOVEMBER 2021.

NOTES:
1. Contour and Cadastral information by Azur Aerial Services.
2. Contour intervals: 1.0m

HEROLDS BAY
COUNTRY ESTATE ™

PTN. 7 (A PORTION OF PORTION 6) FARM BUFFELSFONTEIN No. 204 SITUATED IN MUNICIPALITY AND ADMIN. DIST. OF GEORGE

SKAAL 1 : 1500 (A1) 1 : 2000 (A2) 1 : 3000 (A3) SCALE

Nel & deKock
Town and Regional Planners
Stads -en Streekbeplanners
Yorkstraat 56 York Street
Posbus 1186 / P.O. Box 1186
George 6530
Tel: (044) 874 5207
Fax: (044) 873 6354
E-pos / E-mail: neldek@mweb.co.za

Beplan Planned	D.N.	Plan No	HDB/C/204-4
Geteken Drawn	A.H.		
Datum Date	10 NOVEMBER 2021		

PHYSIOGRAPHY
- The site slope from south-east to north-west.
- Average slope 1 in 6:7.
- Site slopes to be followed but filled.

ORIENTATION
- Solar orientation is positive due to north and west orientation.
- The retail facilities have views towards the Outeniqua mountains and ocean.
- Retail facilities are favorably orientated in relation to prevailing winds.

DEVELOPMENT COVENANTS
The property comprises portions 106 and 112.
- ZONING:
  - Portion 106: Business Zone II: Shop = Restaurant, service station, supermarket.
  - Portion 112: Business Zone IV: Office (2 floors) 300m²
- SITE AREA:
  - Portion 106: 7490m² - Building area: 1303.8m²
  - Portion 112: 1100m² - Building area: 246.6m²
- COVERAGE:
  - Portion 106: (Actual = 17.4%)
  - Portion 112: 60% (Actual = 22.6%)
- FLOOR FACTOR:
  - Portion 106: 3 (Actual = 0.17)
  - Portion 112: <1 (Actual = 0.44)
- GROSS FLOOR AREA:
  - Portion 106:
  - Portion 112
- PARKING:
  - Portion 106 Shop/Supermarket: 4 bays/100m² GLA in normal areas.
    - Service station - 8 bays plus 4 bays/100m² GLA in normal areas: Provided - 32 (required 12) - 2 for disabled
  - Portion 112 Office: 4 bays/100m² GLA in normal areas.
    - Service station - 8 bays plus 4 bays/100m² GLA in normal areas: Provided - 32 (required 12) - 2 for disabled
- ACCESS:
  - Access to portion 106 is from portion 111 (public street – public street i.e. the existing road connecting DR1590 and Oubaai, the Brink and Breakwater Bay.
  - Access to portion 112 is via a servitude over portion 106.
- HEIGHT:
  - Portion 106: allowable 15m. Actual = 12m
  - Portion 112: allowable 11m. Actual = 8.5m
- BUILDING LINES:
  - Portion 106:
    - side and rear = 0m
    - street = 0m
    - parking not closer than 10m from street boundary.
  - Portion 112:
    - side and rear = 3m
    - street = 6.5m
    - side and
- UTILITY AREAS:
  - Portion 106:
    - Delivery area
    - Refuse area to facility at main entrance.
  - Portion 112:
    - Loading bay
    - Refuse area to facility and main entrance.
- CIRCULATION:
  - The surface of the commercial site will be asphalt for all circulation and parking areas. The service station forecourt apron will be concrete.
- DEVELOPMENT PLANNING:
  - Portion 106 to be developed before portion 112.

SERVICES
WATER SUPPLY:
Bulk water for the commercial development is obtained from the municipal 200mm uPVC bulk water line along Oubaai Main road along the southern boundary of the site where the connection point will also be.
The Average Annual Daily Demand (AADD) for the commercial development will be 7kl/d.
A suitable internal water reticulation network will be provided in accordance with all legislative and municipal requirements.
ELECTRICITY:
Power to be supplied from a municipal mini-sub (first phase 100kVA) via an underground cable to a kiosk with service connections.
The Developer plans a future solar farm for the whole development to supply renewable energy.
SEWAGE:
A package plant is planned for the site.
STORMWATER:
The commercial development (drainage zone A3) drains towards a general west-north-western direction towards Herolds Bay and will discharge into the unnamed drainage line to the west of the development crossing underneath the DR1590 in an existing culvert.
Energy dissipation will be performed at this outlet with a gabion mattress design.
A suitable internal stormwater drainage network will be provided in accordance with all legislative and municipal requirements.
FIRE HYDRANTS:
Fire hydrants will be provided on the internal water network in accordance with all relevant legislative and municipal requirements.
SOLID WASTE:
A formal solid waste collection area will be provided.
Refuse will be collected on a weekly basis and a formal arrangement for the removal of solid waste will be entered into with the George Municipality.
FUEL STORAGE:
A petrochemical plan has been compiled.
There are 3x double-walled petrochemical underground tanks with pipework in compliance with standards and legislation.
All required safety and fire equipment to be provided.
Space for maneuverability of a 22m fuel delivery vehicle is planned.
3 fuel pump islands provided.
ENVIRONMENT:
The environmental authorization has been obtained and requirements are addressed in the EMP. In particular stormwater and sewage.
GEOTECHNICAL:
The in-situ materials found on site are adequate for the construction of engineering services and foundations for low-level commercial development.
No natural slope instability is present.
No ground water and/or perched water are evident. A low to moderate water retention rate is expected.
Lateral movement of stormwater will be moderate due to the flat to undulating gradient.
Reinforced strip footings will be adequate for the development.

LIGHTING
- The visual impact of accent and functional lighting will be reduced by the use of reflective rather than direct lighting.
- Advertising signage and associated lighting will be in accordance with municipal requirements.

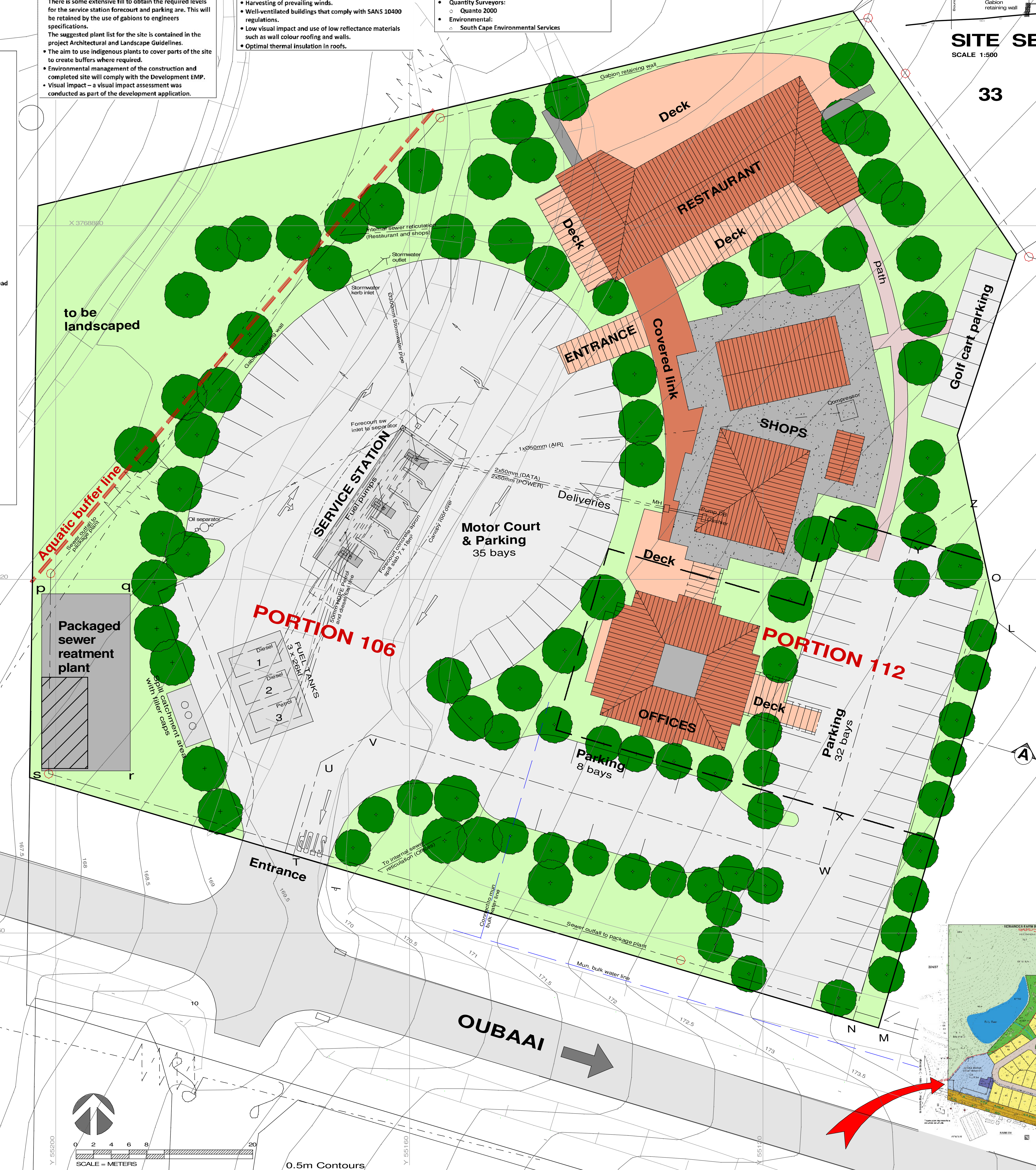
BUILDING STYLE AND DETAIL
Building forms are determined by the following variables:
- Form-following function
- Site slope
- Commercial requirements
- Local vernacular
- Compliance with height regulations

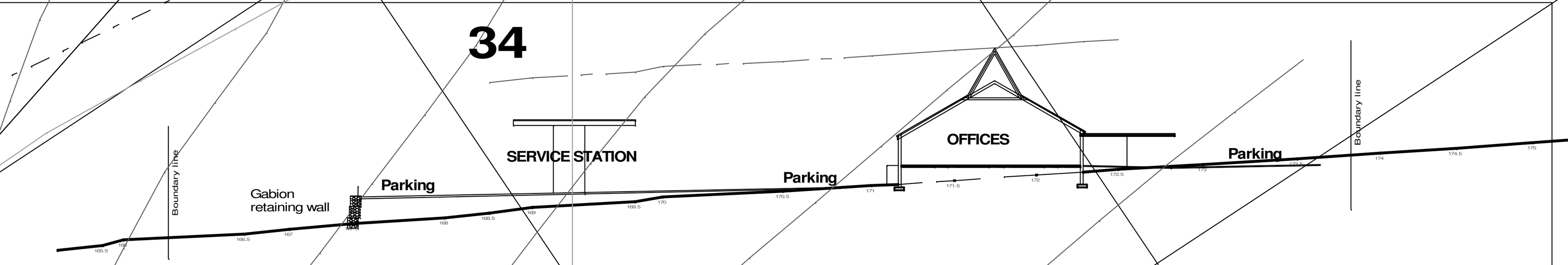
As the residential component of the development overlooks the commercial it is important that elements outlined in the Herolds Bay Country Estate Architectural and Landscape Guidelines be followed like matt-coloured Zinzalume roof sheeting, plastered walls and some use of natural stone as an accent.
Colours are muted.
The use of steel and hardwood pergolas and screens provide interesting functional detail.

LANDSCAPE
- The existing landscape has been covered for many years in alien Black Wattle and used as agricultural land. These aliens are to be removed and indigenous species established.
- During construction a system of temporary haul roads will be used and all topsoil temporarily stored for re-use. There is some extensive fill to obtain the required levels for the service station forecourt and parking are. This will be retained by the use of gabions to engineers specifications. The suggested plant list for the site is contained in the project Architectural and Landscape Guidelines.
- The aim to use indigenous plants to cover parts of the site to create buffers where required.
- Environmental management of the construction and completed site will comply with the Development EMP.
- Visual impact – a visual impact assessment was conducted as part of the development application.

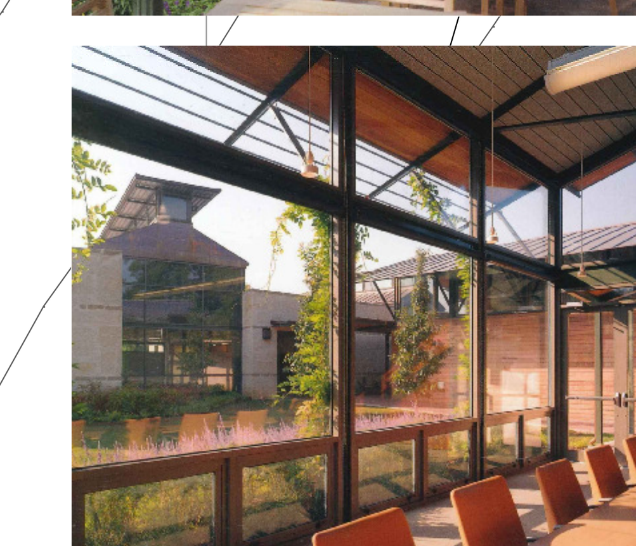
GREEN BUILDING CONSIDERATIONS
The development is planned to incorporate the following building technologies:
- Rainwater harvesting.
- Harvesting of roof stormwater to be used for irrigation and cleaning of paving.
- Provision of electricity from an estate photo-voltaic farm.
- Harvesting of prevailing winds.
- Well-ventilated buildings that comply with SANS 10400 regulations.
- Low visual impact and use of low reflectance materials such as wall colour roofing and walls.
- Optimal thermal insulation in roofs.

PROFESSIONAL TEAM
- Architects and Landscape Architects:
  - Brink Stokes Mkhize (Pty) Ltd
- Civil and Structural Engineers:
  - Element Consulting Engineers (Pty) Ltd
- Electrical Engineers:
  - BDE Consulting Engineers (Pty) Ltd
- Quantity Surveyors:
  - Quanto 2000
- Environmental:
  - South Cape Environmental Services





SITE SECTION A
SCALE 1:500



BRINK STOKES MKHIZE
architects + landscape architects
50B Victoria Street PO Box 1691 George 6530
T 044 874 5054 / 044 874 5067 E george@bsmmdesign.com
W www.bsmmdesign.com

PROJECT

HEROLDS BAY™
COUNTRY ESTATE

HEROLDS BAY COUNTRY ESTATE: COMMERCIAL DEVELOPMENT
for Long Island Trading 44 (pty) ltd.

Portion no.106 + no.112
A Portion of Portion 7 of the Farm Buffelsfontein no.204
GEORGE

SITE DEVELOPMENT PLAN

SCALE	PROJECT NUMBER	
1:250	G493	
DRAWING NUMBER	REVISION	
S03	.	
PRINT ISSUED	DRAWN	CHECKED
	Vic	
	14 Jun 2022	

\\bsmmserver\projects\Herolds Bay Country Estate_Buffelsfontein\Petrol staion & shops\s03-fillingstation-sdp.drw

Western Cape Government

Department of Environmental Affairs and Development Planning
Directorate: Development Management, Region 3
Jessica Christie
Jessica.Christie@westerncape.gov.za | 044 814 2013
Private Bag X6509, George, 6530
4th Floor, York Park Building, 93 York Street, George
DEADPEIAAdmin.George@westerncape.gov.za

REFERENCE: 16/3/3/5/D2/29/0011/22
NEAS REF.: WCP/EIA/AMEND/0000704/2023
DATE OF ISSUE: 06 March 2023

ADDENDUM TO ENVIRONMENTAL AUTHORISATION

APPLICATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 OF 1998) FOR THE AMENDMENT OF THE ENVIRONMENTAL AUTHORISATION ISSUED ON 7 APRIL 2021 (DEA&DP REF NO. 16/3/3/1/D2/29/0008/20) FOR THE PROPOSED DEVELOPMENT OF HEROLD'S BAY COUNTRY ESTATE ON A PORTION OF PORTION 7 OF THE FARM BUFFELSFONTEIN NO. 204, HEROLD'S BAY, GEORGE

With reference to your application for the abovementioned, find below the decision with respect to the application (submitted 11 November 2022) for the amendment to the Environmental Authorisation issued on 7 April 2021 under DEA&DP Ref. No. 16/3/3/1/D2/29/0008/20 (hereinafter referred to as an "Environmental Authorisation").

A. DECISION

By virtue of the powers conferred on it by the National Environmental Management Act, 1998 (Act No. 107 of 1998, as amended) and the Environmental Impact Assessment Regulations, 2010, ("NEMA EIA Regulations") the competent authority herewith **grants** the amendment of the Environmental Authorisation issued on 7 April 2021.

The Environmental Authorisation is amended as set out below:

1. **Condition 10.1.6 in Section E is substituted with the following**:

"*Incorporate an Operational Phase Environmental Management Plan that will deal with the operational aspects including the filling station and must include:*

(a) Include the implementation plan with clear management outcomes.
(b) An indication of the persons who will be responsible for the implementation of the impact management actions.
(c) Include all the mitigation measures as described in the Geotechnical Impact Assessment that deals with the filling station and the design measures that were recommended.
(d) Include the requirements on the comments provided by the WCG: Department of Environmental Affairs and Development Planning – Pollution and Chemicals Management
(e) Include emergency procedures and actions to be undertaken for emergency spills or malfunctioning of tanks.
(f) Detail the environmental auditing programme.

B. REASONS FOR THE DECISION

In reaching its decision, the Department took, *inter alia,* the following into consideration:

1. Consultation with the Fuel Retailers Association (FRA) was conducted in order to obtain their input on the groundwater monitoring during the operational phase of the filling station. The FRA however stated that they only give their requirements once membership (which is entirely voluntary) takes place. The FRA did not lodge an objection to the removal of condition 10.1.6 (c) of the EA issued on 7 April 2021.

2. The environment and the rights and interests of other parties are not likely to be adversely affected by this decision to amend the Environmental Authorisation.

C. CONDITIONS

1. The holder must in writing, within 14 (fourteen) calendar days of the date of this decision–
   - 1.1 notify all registered I&APs[1] of –
     - 1.1.1 the outcome of the application;
     - 1.1.2 the reasons for the decision as included in Section B;
     - 1.1.3 the date of the decision; and
     - 1.1.4 the date when the decision was issued.
   - 1.2 draw the attention of all registered I&APs to the fact that an appeal may be lodged against the decision in terms of National Appeals Regulations, 2014 detailed in Section D below;
   - 1.3 draw the attention of all registered I&APs to the manner in which they may access the decision;
   - 1.4 provide the registered I&APs with:
     - 1.4.1 the name of the holder (entity) of this Environmental Authorisation;
     - 1.4.2 name of the responsible person for this Environmental Authorisation;
     - 1.4.3 postal address of the holder;
     - 1.4.4 telephonic and fax details of the holder;
     - 1.4.5 e-mail address, if any, of the holder; and
     - 1.4.6 the contact details (postal and/or physical address, contact number, facsimile and e-mail address) of the decision-maker and all registered I&APs in the event that an appeal is lodged in terms of the 2014 National Appeals Regulations.

2. One week's notice must be given to the Directorate: Development Management (Region 3) before commencement of construction activities. The said notice must also include proof of compliance with Condition 1 described in Section C of this Addendum to the Environmental Authorisation.

3. The conditions contained in the Environmental Authorisation issued on 7 April 2021 under DEA&DP Ref. No. 16/3/3/1/D2/29/0008/20, remain in force.

1 This includes I&APs registered for the application for Environmental Authorisation as issued on 7 April 2021 under DEA&DP Ref. No. 16/3/3/1/D2/29/0008/20.

D. APPEALS

1. An appellant (if the holder of the decision) must, within 20 (twenty) calendar days from the date the notification of the decision was sent to the holder by the Competent Authority –
   1.1. Submit an appeal in accordance with Regulation 4 of the National Appeal Regulations 2014 (as amended) to the Appeal Administrator; and
   1.2. Submit a copy of the appeal to any registered I&APs including any Organ of State with interest in the matter; and
   1.3. Submit a copy of the appeal to the decision-maker (i.e. the Competent Authority that issued the decision) at:
   Zaahir.Toefy@westerncape.gov.za and copied to
   DEADPEIAadmin.George@westerncape.gov.za
   Gavin.Benjamin@westerncape.gov.za

2. An appellant (if NOT the holder of the decision) must, within 20 (twenty) calendar days from the date the holder of the decision sent notification of the decision to the registered I&APs–
   2.1. Submit an appeal in accordance with Regulation 4 of the National Appeal Regulations 2014 (as amended) to the Appeal Administrator; and
   2.2 Submit a copy of the appeal to the holder of the decision and any registered I&AP including any Organ of State with an interest in the matter; and
   2.3 Submit a copy of the appeal to the decision-maker (i.e. the Competent Authority that issued the decision) at:
   Zaahir.Toefy@westerncape.gov.za and copied to
   DEADPEIAadmin.George@westerncape.gov.za
   Gavin.Benjamin@westerncape.gov.za

3. The holder of the decision (if not the appellant), the decision-maker that issued the decision, the registered I&AP and the Organ of State must submit their responding statements, if any, to the appeal authority and the appellant within 20 (twenty) calendar days from the date of receipt of the appeal submission.

4. The appeal and the responding statement must be submitted to the Appeal Administrator at the address listed below:

   By post: Western Cape Ministry of Local Government, Environmental Affairs and Development Planning
   Private Bag X9186
   CAPE TOWN
   8000

   By facsimile: (021) 483 4174; or

   By hand: Appeal Administrator
   Attention: Mr Marius Venter (Tel: 021 483 3721)
   Room 809
   8th Floor Utilitas Building, 1 Dorp Street, Cape Town, 8001

   Note: For purposes of electronic database management, you are also requested to submit electronic copies (Microsoft Word format) of the appeal, responding statement and any supporting documents to the Appeal Authority to the address listed above and/ or via e-mail to DEADP.Appeals@westerncape.gov.za.

5. A prescribed appeal form as well as assistance regarding the appeal processes is obtainable from the Appeal Administrator at: Tel. (021) 483 3721, E-mail DEADP.Appeals@westerncape.gov.za or URL http://www.westerncape.gov.za/eadp.

E. DISCLAIMER

The Western Cape Government, the Local Authority, committees or any other public authority or organisation appointed in terms of the conditions of this Addendum to the Environmental Authorisation shall not be responsible for any damages or losses suffered by the holder, developer or his/her successor in any instance where construction or operation subsequent to construction is temporarily or permanently stopped for reasons of non-compliance with the conditions as set out herein or any other subsequent document or legal action emanating from this decision.
Your interest in the future of our environment is appreciated.

Yours faithfully

Zaahir Toefy

Digitally signed by Zaahir Toefy
Date: 2023.03.06 09:09:12 +02'00'

DIRECTOR: DEVELOPMENT MANAGEMENT
DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING
WESTERN CAPE GOVERNMENT

DATE OF DECISION: 06 MARCH 2023

FOR OFFICIAL USE ONLY:

EIA REFERENCE NUMBER:	**16/3/3/1/D2/29/0008/20**
NEAS REFERENCE NUMBER:	**WCP/EIA/0000776/2020**
DATE OF ISSUE:	**7 APRIL 2021**
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DATE OF ISSUE:	Date of issue of this Decision

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EIA REFERENCE NUMBER: 16/3/3/1/D2/29/0008/20
NEAS REFERENCE: WCP/EIA/0000776/2020
ENQUIRIES: Ms Jessica Christie
DATE OF ISSUE: **2021/04/07**

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Dear Sir

NOTICE OF DECISION: APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 OF 1998) AND THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014: PROPOSED DEVELOPMENT OF HEROLD'S BAY COUNTRY ESTATE ON A PORTION OF PORTION 7 OF THE FARM BUFFELSFONTEIN NO. 204, HEROLD'S BAY, GEORGE

1. With reference to the aforementioned application, the Department hereby notifies you of its decision to **grant Environmental Authorisation in respect of part of activity applied for**, attached herewith together with the reasons for the decision.

2. In terms of Regulation 4 of the Environmental Impact Assessment Regulations, 2014, you are instructed to ensure, within 14 days of the date of the Environmental Authorisation, that all registered interested and affected parties ("I&APs") are provided with access to and reasons for the decision, and that all registered I&APs are notified of their right to appeal.

3. Your attention is drawn to Chapter 2 of the Appeal Regulations, 2014, which prescribes the appeal procedure to be followed. This procedure is summarized in the attached refusal of Environmental Authorisation.

Yours faithfully

DIRECTOR: DEVELOPMENT MANAGEMENT (REGION 3)
DEPARTMENT OF ENVIRONMENTAL AFFAIRS AND DEVELOPMENT PLANNING

Copied to: Ms Betsy Ditcham (EAP) E-mail: betsy@sescc.net

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EIA REFERENCE NUMBER: 16/3/3/1/D2/29/0008/20
NEAS REFERENCE: WCP/EIA/0000776/2020
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ENVIRONMENTAL AUTHORISATION

APPLICATION FOR ENVIRONMENTAL AUTHORISATION IN TERMS OF THE NATIONAL ENVIRONMENTAL MANAGEMENT ACT, 1998 (ACT 107 OF 1998) AND THE ENVIRONMENTAL IMPACT ASSESSMENT REGULATIONS, 2014: PROPOSED DEVELOPMENT OF HEROLD'S BAY COUNTRY ESTATE ON A PORTION OF PORTION 7 OF THE FARM BUFFELSFONTEIN NO. 204, HEROLD'S BAY, GEORGE

With reference to your application for the abovementioned, find below the outcome with respect to this application.

DECISION

By virtue of the powers conferred on it by the National Environmental Management Act, 1998 (Act No. 107 of 1998) ("NEMA") and the Environmental Impact Assessment ("EIA") Regulations, 2014, the Competent Authority herewith—

(a) **grants Environmental Authorisation** to the applicant to undertake the listed activities specified in section B below with respect to ***a part of the Preferred Alternative***, described in the Final Basic Assessment Report ("FBAR"), dated November 2020 as prepared and submitted by *Sharples Environmental Services,* the appointed environmental assessment practitioner ("EAP"); and

(b) **defines a development setback,** represented by the line described in the Freshwater Habitat Impact Assessment (compiled by Ms Debbie Fordham from Sharples Environmental Services dated 19 March 2019) as an aquatic buffer and which is depicted on the plan in Annexure 2 of this Environmental Authorisation, and no development may take place on the watercourse side of this line.

The applicant for this Environmental Authorisation is required to comply with the conditions set out in section E below.

A. DETAILS OF THE APPLICANT FOR THIS ENVIRONMENTAL AUTHORISATION

Long Island Trading 44 (Pty) Ltd.
Mr. Abraham Jacobus Cronje
Postnet Suite 194
Private Bag X 6950
GEORGE
6530

Tel: 082 804 9710
E-mail: jacques@gfaholdings.co.za

The abovementioned applicant is the holder of this Environmental Authorisation (hereinafter referred to as "**the Holder**").

B. LIST OF ACTIVITIES AUTHORISED

Listed Activities	Activity/Project Description
Environmental Impact Assessment Regulations Listing Notice 1 of 2014, Government Notice No. 983 of 4 December 2014	
Activity Number: ***19*** *Activity Description:* *The infilling or depositing of any material of more than 10 cubic metres into, or the dredging, excavation, removal or moving of soil, sand, shells, shell grit, pebbles or rock of more than 10 cubic metres from a watercourse;* *but excluding where such infilling, depositing, dredging, excavation, removal or moving—* *(a) will occur behind a development setback;* *(b) is for maintenance purposes undertaken in accordance with a maintenance management plan;* *(c) falls within the ambit of activity 21 in this Notice, in which case that activity applies;* *(d) occurs within existing ports or harbours that will not increase the development footprint of the port or harbour;* *(e) or where such development is related to the development of a port or harbour, in which case activity 26 in Listing Notice 2 of 2014 applies.*	The development of a minor stream which is proposed to join the internal detention pond will require excavation and removal of soil of more than 10 cubic metres from a watercourse.
Activity Number: ***24*** *Activity Description:* *The development of a road—* *(i) for which an environmental authorisation was obtained for the route determination in terms of activity 5 in Government Notice 387 of 2006 or activity 18 in Government Notice 545 of 2010; or* *(ii) with a reserve wider than 13,5 meters, or where no reserve exists where the road is wider than 8 metres;* *but excluding a road—* *(a) which is identified and included in activity 27 in Listing Notice 2 of 2014;* *(b) where the entire road falls within an urban area; or* *which is 1 kilometre or shorter.*	The construction of internal roads within the development of between 10 and 26 metres wide.

Activity Number: ***27*** *Activity Description:* *The clearance of an area of 1 hectare or more, but less than 20 hectares of indigenous vegetation, except where such clearance of indigenous vegetation is required for—* *(i) the undertaking of a linear activity; or* *(ii) maintenance purposes undertaken in accordance with a maintenance management plan.*	The clearance of an area of approximately 18.04 ha of indigenous vegetation for the establishment of the residential development.
Activity Number: ***28*** *Activity Description:* *Residential, mixed, retail, commercial, industrial or institutional developments where such land was used for agriculture, game farming, equestrian purposes or afforestation on or after 01 April 1998 and where such development:* *(i) will occur inside an urban area, where the total land to be developed is bigger than 5 hectares; or* *(ii) will occur outside an urban area, where the total land to be developed is bigger than 1 hectare;* *excluding where such land has already been developed for residential, mixed, retail, commercial, industrial or institutional purposes.*	The development of a residential and mixed development consisting of land developed for use as residential, business and open space areas. The total area of the development is approximately 19.37 ha, single residential erven, group housing units, a filling station, convenience centre, a restaurant and an office block. A total of approximately 30 ha of agricultural land will be irrigated with treated effluent.
Environmental Impact Assessment Regulations Listing Notice 3 of 2014, Government Notice No. 985 of 4 December 2014	
Activity Number: ***4*** *Activity Description:* *The development of a road wider than 4 metres with a reserve less than 13,5 metres.* ***i. Western Cape*** *(a) Areas zoned for use as public open space or equivalent zoning;* *(b) Areas outside urban areas;* *(aa) Areas containing indigenous vegetation;* *(bb) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined; or* *(c) Inside urban areas:* *(aa) Areas zoned for conservation use; or* *(bb) Areas designated for conservation use in Spatial Development Frameworks adopted by the competent authority.*	The construction of roads for the proposed development will be between 10 and 26 metres wide.
Activity Number: ***10*** *Activity Description:* *The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.* ***i. Western Cape*** *i. Areas zoned for use as public open space or equivalent zoning;* *ii. All areas outside urban areas; or* *iii. Inside urban areas:* *(aa) Areas seawards of the development setback line or within 200 metres from the high-water mark of the sea if no such development setback line is determined;*	The construction and related operation of a filling station with combined storage tank size of 69 cubic metres.

(bb) Areas on the watercourse side of the development setback line or within 100 metres from the edge of a watercourse where no such setback line has been determined; or *(cc) Areas on the estuary side of the development setback line or in an estuarine functional zone where no such setback line has been determined.*	
Activity Number: **12** *Activity Description:* *The clearance of an area of 300 square metres or more of indigenous vegetation except where such clearance of indigenous vegetation is required for maintenance purposes undertaken in accordance with a maintenance management plan* ***i. Western Cape*** *i. Within any critically endangered or endangered ecosystem listed in terms of section 52 of the NEMBA or prior to the publication of such a list, within an area that has been identified as critically endangered in the National Spatial Biodiversity Assessment 2004;* *ii. Within critical biodiversity areas identified in bioregional plans;* *iii. Within the littoral active zone or 100 metres inland from high water mark of the sea or an estuarine functional zone, whichever distance is the greater, excluding where such removal will occur behind the development setback line on erven in urban areas;* *iv. On land, where, at the time of the coming into effect of this Notice or thereafter such land was zoned open space, conservation or had an equivalent zoning; or* *v. On land designated for protection or conservation purposes in an Environmental Management Framework adopted in the prescribed manner, or a Spatial Development Framework adopted by the MEC or Minister.*	The clearance of more than 300m^2 of *Endangered* Garden Route Granite Fynbos (approximately 18.04 ha).

The abovementioned list is hereinafter referred to as "**the listed activities**".

The Holder is herein authorised to undertake the following alternative that includes the listed activities as it relates to the development and development footprint area behind the defined development setback line along the non-perennial stream as depicted in the plan in Annexure 2 of this Environmental Authorisation:

The proposal entails the development of a residential estate and business zone on a portion of Portion 7 of the Farm Buffelsfontein 204, Herold's Bay, George. The area where the development will take place is approximately 19 370 square metres in extent and the development will comprise of the following:

- A residential area consisting of 102 single residential erven (Single Residential Zone I) and 68 general residential erven (General Residential Zone II);
- A commercial area comprising of two erven for:
  - a filling station for the storage and handling of a dangerous good (Business Zone II);
  - a convenience centre (Business Zone II);
  - a restaurant (Business Zone II); and
  - office block (Business Zone IV).
- One open space area (Open Space Zone II) which includes the aquatic buffer;
- An erf for private road(s) (Transport Zone III);
- An erf for public streets (Transport Zone II;

- ❖ Servitudes registered for the sewerage package plants.

This will require the clearance of more than 1-hectare (but less than 20-hectares) of indigenous vegetation. Also, more than 300 square metres of an area mapped as Endangered Garden Route Granite Fynbos will be cleared of indigenous vegetation for this purpose but approximately 18.04 ha.

In addition, hereto the following associated infrastructure will be constructed:

- ❖ An internal road network with roads of 10 to 26 metres wide.
- ❖ Installation of 3 gravity fed package plants for the treatment of sewage and will be situated in three (3) drainage zones.
- ❖ The internal sewer network will consist of 160mm pipes with a 110mm connection to each erf.
- ❖ The internal water reticulation system will consist of pipes varying in size between 63 mm and 90 mm diameter with the necessary provision made for isolating valves, pressure reducing valves, fire hydrants, as required and erf connections;
- ❖ Electricity reticulation, substations and street lighting, and
- ❖ Stormwater drainage structures and stormwater pipelines.

The development will be implemented behind the defined development setback line along the non-perennial stream as depicted in the plan in Annexure 2 of this Environmental Authorisation.

C. SITE DESCRIPTION AND LOCATION

The proposed mixed development will be located on a portion of Portion 7 of the Farm Buffelsfontein No. 024, Herold's Bay. The site is located directly north-east of the existing Herold's Bay township and directly west of the existing Oubaai Golf Estate. The site is situated on the southern portion of the Farm Buffelsfontein No. 204 and is bounded to the north and west by farmland.

The coordinates of the centre of the proposed development footprint site:

Latitude (S)				Longitude (E)			
34°	02'	42.66"	South	22°	24'	19.94"	East

A development setback has been defined along the non-perennial unnamed tributary / stream referred to as stream A which flows into the existing dam. The development setback provides a 32-metre buffer from the edge of the watercourse as depicted in the plan in Annexure 2 of this Environmental Authorisation.

The proposed filling station is envisioned to be positioned in the south western corner of the development footprint area, adjacent to the Oubaai Main Road.

The proposed package plants will be located approximate to the positions indicated in the drawing number 1701561/C/003 drawn by Element Consulting Engineers and appended to the Final basic Assessment Report as Appendix B2, except the proposed package plant in the south eastern corner that must be positioned outside of the aquatic buffer.

The area envisioned to be used as irrigation area with the treated effluent is indicated as Annexure 2 of this environmental authorisation.

SG digit code: Erf 2839: C02700000000020400007

Refer to Annexure 1: Locality Plan, Annexure 2: Development Setback line and Annexure 3: Irrigation area of this Environmental Authorisation.

The above is hereinafter referred to as "**the site**".

D. DETAILS OF THE ENVIRONMENTAL ASSESSMENT PRACTITIONER (EAP)

SHARPLES ENVIRONMENTAL SERVICES CC
% Ms Betsy Ditcham
P.O. Box 443
MILNERTON
7441

Tel: 021 554 5195
Fax: 086 575 2869
E-mail: betsy@sescc.net
Website: www.sescc.net

E. CONDITIONS OF AUTHORISATION

Scope and Validity Period of authorisation

1. This Environmental Authorisation is granted for the period from date of issue until **30 April 2041**, the date on which all the listed activities, including post construction rehabilitation and monitoring requirements and operation aspects, will be deemed to be concluded at the site.

   Further to the above, the Environmental Authorisation is subject to the following:

   1.1. The non-operational component (i.e. installation of bulk services and top structures and construction of the filling station) is subject to the following:

      1.1.1. The holder must start with the physical implementation and exceed the threshold of all the authorised listed activities on the site by 30 April 2026.

      1.1.2. The development of the facility for the storage and handling of dangerous goods (filling station) must commence by the 30 April 2026 and be concluded by 30 April 2028; and

      1.1.3. Rehabilitation and monitoring must be finalised at the site within a period of 3-months from the date the construction activities (construction phase) are concluded; but by no later than 31 January 2031.

   1.2. The operational aspects of this Environmental Authorisation are granted until 30 April 2041, during which period all operational aspects, rehabilitation and monitoring requirements as well as the final environmental auditing and reporting must be finalised.

   Failing which, this Environmental Authorisation shall lapse, unless the environmental authorisation is amended in accordance with the relevant process contemplated in the Environmental Impact Assessment Regulations promulgated under the National Environmental Management Act, 1998 (Act no. 107 of 1998).

2. The Holder is authorised to undertake the listed activities specified in Section B above in accordance with a part of the Preferred Alternative described in the FBAR dated November 2020 on the site as described in Section C above.

The development is limited to the area *behind the defined development setback line along the non-perennial stream as depicted in the plan in Annexure 2 of this Environmental Authorisation*:

The proposal entails the development of a residential estate and business zone on a portion of Portion 7 of the Farm Buffelsfontein 204, Herold's Bay, George. The area where the development will take place is approximately 19 370 square metres in extent and the development will comprise of the following:

- A residential area consisting of 102 single residential erven (Single Residential Zone I) and 68 general residential erven (General Residential Zone II);
- A commercial area comprising of two erven for:
    - a filling station for the storage and handling of a dangerous good (Business Zone II);
    - a convenience centre (Business Zone II);
    - a restaurant (Business Zone II); and
    - office block (Business Zone IV).
- One open space area (Open Space Zone II) which includes the aquatic buffer;
- An erf for private road(s) (Transport Zone III);
- An erf for public streets (Transport Zone II;
- Servitudes registered for the sewerage package plants.

This will require the clearance of more than 1-hectare (but less than 20-hectares) of indigenous vegetation. Also, more than 300 square metres of an area mapped as Endangered Garden Route Granite Fynbos will be cleared of indigenous vegetation for this purpose but approximately 18.04 ha.

In addition, hereto the following associated infrastructure will be constructed:

- An internal road network with roads of 10 to 26 metres wide.
- Installation of 3 gravity fed package plants for the treatment of sewage and will be situated in three (3) drainage zones.
- The internal sewer network will consist of 160mm pipes with a 110mm connection to each erf.
- The internal water reticulation system will consist of pipes varying in size between 63 mm and 90 mm diameter with the necessary provision made for isolating valves, pressure reducing valves, fire hydrants, as required and erf connections;
- Electricity reticulation, substations and street lighting, and
- Stormwater drainage structures and stormwater pipelines.

The development will be implemented behind the defined development setback line along the non-perennial stream as depicted in the plan in Annexure 2 of this Environmental Authorisation.

3. The holder must adopt and implement the following development restrictions and measures to the proposed development:
    3.1. No development may take place on the watercourse side of the development setback which has been defined by the competent authority;

    3.2. The erf boundaries of all erven (i.e. residential; business; and transport zones) must be setback above the development setback;

    3.3. All service infrastructure including servitudes, must be set back above the development setback;

    3.4. The area on the watercourse side of the development setback must form part of the opens space system; and

3.5. A revised proposal and layout plan reflecting the above restrictions must be submitted to the competent authority for approval prior to site preparation or construction activities commencing on site. The proposed development layout plan must be amended to address the following:

3.5.1. The retreat of the erven in the aquatic buffer.

3.5.2. The retreat of the service station footprint in the aquatic buffer.

3.5.3. All services must be installed directly adjacent to erf boundaries and not encroach the aquatic buffer.

4. This Environmental Authorisation may only be implemented in accordance with an approved Environmental Management Programme ("EMPr").

5. The Holder shall be responsible for ensuring compliance with the conditions by any person acting on his/her behalf, including an agent, sub-contractor, employee or any person rendering a service to the Holder.

6. Any changes to, or deviations from the scope of the alternative described in section B above must be accepted or approved, in writing, by the Competent Authority before such changes or deviations may be implemented. In assessing whether to grant such acceptance/approval or not, the Competent Authority may request information in order to evaluate the significance and impacts of such changes or deviations, and it may be necessary for the Holder to apply for further authorisation in terms of the applicable legislation.

Notification and administration of appeal

7. The Holder must in writing, within 14 (fourteen) calendar days of the date of this decision–

7.1. notify all registered Interested and Affected Parties ("I&APs") of –
7.1.1. the decision reached on the application;
7.1.2. the reasons for the decision as included in Annexure 3;
7.1.3. the date of the decision; and
7.1.4. the date when the decision was issued.

7.2. draw the attention of all registered I&APs to the fact that an appeal may be lodged against the decision in terms of the National Appeal Regulations, 2014 (as amended) detailed in Section G below;

7.3. draw the attention of all registered I&APs to the manner in which they may access the decision;

7.4. provide the registered I&APs with the:
7.4.1. name of the Holder (entity) of this Environmental Authorisation,
7.4.2. name of the responsible person for this Environmental Authorisation,
7.4.3. postal address of the Holder,
7.4.4. telephonic and fax details of the Holder,
7.4.5. e-mail address, if any, of the Holder,
7.4.6. contact details (postal and/or physical address, contact number, facsimile and e-mail address) of the decision-maker and all registered I&APs in the event that an appeal is lodged in terms of the 2014 National Appeals Regulations (as amended).

7.5. The listed activities, including site preparation, must not commence within 20 (twenty) calendar days from the date the applicant notified the registered I&APs of this decision.

7.6. In the event that an appeal is lodged with the Appeal Authority, the effect of this Environmental Authorisation is suspended until the appeal is decided i.e. the listed activities, including site preparation, must not commence until the appeal is decided.

Written notice to the Competent Authority

8. Seven calendar days' notice, in writing, must be given to the Competent Authority before commencement of any activities.

   8.1. The notice must make clear reference to the site details and EIA Reference number given above.

   8.2. The notice must also include proof of compliance with the following conditions described herein: **Conditions no.: 3, 7, 10 and 12.**

9. Seven calendar days' notice, in writing, must be given to the Competent Authority on completion of the construction activities of the—

   9.1. bulk internal service infrastructure (i.e. internal roads; water-, sewer-, electricity reticulation and bulk storm water); and

   9.2. final phase of the mixed/residential development.

Management of activity

10. The draft or Environmental Management Programme ("EMPr") submitted as part of the application for Environmental Authorisation must be amended and submitted for approval, subject to the following requirements:

    10.1. The EMPr must be amended to incorporate the following —

        10.1.1. Environmental Control Officer compliance reports must be submitted monthly to this Directorate.

        10.1.2. Incorporate all the conditions contained in this Environmental Authorisation; The section dealing with the management and demarcation of the No-Go area's (including the open space areas) must clearly state how the areas will be demarcated prior to any earthworks / commencement of construction;

        10.1.3. Incorporate a map showing the fire breaks as required and an implementation plan for effective fire management.

        10.1.4. The revised Site Development Plan must be included in the EMPr;

        10.1.5. A detailed Site Development Plan for the filling station, which also depicts *inter alia*:

            (a) tank installations and auxiliary infrastructure for the handling of the dangerous goods;

            (b) a site-specific stormwater management / drainage system and separation and or treatment devices;

            (c) monitoring points including monitoring boreholes;

        10.1.6. Incorporate an Operational Phase Environmental Management Plan that will deal with the operational aspects including the filling station and must include:

            (a) Include the implementation plan with clear impact management outcomes;

            (b) An indication of the persons who will be responsible for the implementation of the impact management actions.

(c) Include all the conditions and monitoring aspects associated with the groundwater monitoring activities and requirements of the Fuel Retailers Association;

(d) Include all the mitigation measures as described in the Geotechnical Impact Assessment that deals with the filling station and the design measures that were recommended

(e) Include the requirements in the comments provided by WCG: Department of Environmental Affairs and Development Planning – Pollution and Chemicals Management

(f) Include emergency procedures and actions to be undertaken for emergency spills or malfunctioning of tanks.

(g) Detail the environmental auditing programme.

10.2. The amended EMPr must be submitted to the Competent Authority and be approved, prior to the construction activities commencing on site.

Note: The revised EMPr should be submitted to the Competent Authority at least 90-days prior to the construction activities commencing on site to ensure the competent authority is able to process / review the revised EMPr prior to the intended date of commencement.

11. The EMPr must be included in all contract documentation for all phases of implementation.

Monitoring

12. The Holder must appoint a suitably experienced Environmental Control Officer ("ECO"), for the duration of the construction and rehabilitation phases of implementation contained herein.

13. The ECO must–

13.1. be appointed prior to commencement of any works (i.e. removal and movement of soil and / or rubble or construction activities commencing;

13.2. ensure compliance with the EMPr and the conditions contained herein;

13.3. keep record of all activities on the site; problems identified; transgressions noted and a task schedule of tasks undertaken by the ECO;

13.4. remain employed until all development activities are concluded, and the post construction rehabilitation and monitoring requirements are finalised.

14. A monitoring programme for the filling station must be developed and implemented which must include the following:
a) The development of the facility and infrastructure for the storage and handling of a dangerous good (i.e., construction of the filling station) and must detail the requirements of the fuel containment area, forecourt area, the installation of the underground storage tanks, pipelines;
b) Leak detection and monitoring thereof;
c) The location of the monitoring boreholes
d) Detail the Recordkeeping and Reporting protocol.

15. A monitoring programme for the treatment of sewage and disposal of effluent must be developed and implemented which must include the following:
a) The sampling frequency of groundwater to detect possible contamination;

b) Location of sampling areas;
c) Standards that water samples are measured against; and
d) Detail the Recordkeeping and Reporting protocol.

16. A copy of the Environmental Authorisation, EMPr, any independent assessments of financial provision for rehabilitation and environmental liability, closure plans, audit reports and compliance monitoring reports must be kept at the site of the authorised activities and be made available to anyone on request, and where the Holder has website, such documents must be made available on such publicly accessible website.

17. Access to the site referred to in Section C must be granted, and the environmental reports mentioned above must be produced, to any authorised official representing the Competent Authority who requests to see it for the purposes of assessing and/or monitoring compliance with the conditions contained herein.

Auditing

18. The Holder must, for the period during which the environmental authorisation and EMPr remain valid ensure the compliance with the conditions of the environmental authorisation and the EMPr, is audited;

19. The frequency of auditing of compliance with the conditions of the environmental authorisation and of compliance with the EMPr, must adhere to the following programme:

19.1. During the period which the activities have been commenced with on site until the construction of the bulk internal service infrastructure (i.e. internal roads; water-, sewer-, electricity reticulation and bulk storm water) has been completed on site, the Holder must undertake annual environmental audit(s) and submit the Environmental Audit Report(s) to the Competent Authority.

A final Environmental Audit Report must be submitted to the Competent Authority within **three (3)** months of completion of the construction of bulk internal services and the post construction rehabilitation and monitoring requirements thereof.

19.2. During the period the development of the mixed/residential phases (i.e. construction of top structures) is undertaken, the Holder must ensure that environmental audit(s) are performed regularly and submit these Environmental Audit Report(s) to the Competent Authority.

During this phase of the development, the frequency of the auditing of compliance with the conditions of the environmental authorisation and of compliance with the EMPr **may not exceed intervals of 5-years**.

A final Environmental Audit Report must be submitted to the Competent Authority within **three (3)** months of completion of the mixed/residential development and the post construction rehabilitation and monitoring requirements thereof, but by no later than 31 January 2031;

Note: The final auditing requirements should be completed at least three months prior to expiry of the validity period of the environmental authorisation to ensure the Holder is able to comply with all the environmental auditing and reporting requirements and for the competent authority to be able to process it timeously.

19.3. During the period the development of the facility or infrastructure for the storage and handling of a dangerous good (i.e. construction of the filling station) is undertaken, the Holder must undertake annual environmental audit(s) and submit the Environmental Audit Report(s) to the Competent Authority.

A final Environmental Audit Report must be submitted to the Competent Authority within **three (3)** months of completion of the construction of the filling station component of the development and the post construction rehabilitation requirements thereof, but by no later than 30 July 2028.

During related operation of the facility or infrastructure for the storage and handling of a dangerous good at the filling station, the frequency of the auditing of compliance with the conditions of the environmental authorisation and of compliance with the EMPr **may not exceed intervals of 5-years**.

Note: The compilation and submission of the environmental audits can be coordinated so that they can be compiled and submitted simultaneously to the Competent Authority.

20. The Environmental Audit Report(s), must –

20.1. be prepared and submitted to the Competent Authority, by an independent person with the relevant environmental auditing expertise. Such person may not be the ECO or EAP who conducted the EIA process;

20.2. provide verifiable findings, in a structured and systematic manner, on–

20.2.1. the level of compliance with the conditions of the environmental authorisation and the EMPr and whether this is sufficient or not; and

20.2.2. the ability of the measures contained in the EMPr to sufficiently provide for the avoidance, management and mitigation of environmental impacts associated with the undertaking of the activity.

20.3. identify and assess any new impacts and risks as a result of undertaking the activity;

20.4. evaluate the effectiveness of the EMPr;

20.5. identify shortcomings in the EMPr;

20.6. identify the need for any changes to the avoidance, management and mitigation measures provided for in the EMPr;

20.7. indicate the date on which the construction work was commenced with and completed or in the case where the development is incomplete, the progress of the development and rehabilitation;

20.8. indicate the date on which the operational phase was commenced with and the progress of the rehabilitation;

20.9. include a photographic record of the site applicable to the audit; and

20.10. be informed by the ECO reports.

21. The Holder must, within 7 calendar days of the submission of the audit report to the Competent Authority, notify all potential and registered I&APs of the submission and make the report available to anyone on request and on a publicly accessible website (if applicable).

Specific Conditions

22. Three (3) groundwater monitoring boreholes must be established downgradient of the filling station in order to detect any potential contamination. The positions of the monitoring boreholes must be indicated on the layout plan, once the final design has been confirmed. The monitoring borehole must be established at least 3 months, prior to the installation of the tanks and baseline data must collected and recorded during this period.

23. A Site-Specific Stormwater Management Plan must be developed for the filling station site and must detail effective pollution and erosion control measures, as well as stormwater management. This must be submitted and approved by this Department as part of the EMPr, prior to commencement of construction activities.

24. The area on the watercourse side of the development setback must be demarcated as a no-go area and managed for a conservation use.

25. The area where treated effluent will be irrigated may only occur on existing and currently used fields as indicated in Annexure 2.

26. The security fencing must be aligned to the perimeter of the development footprint area. The security fencing may not be installed within or around the conservation area, unless approved by the Competent Authority.

27. Should any heritage remains be exposed during excavations or any other actions on the site, these must immediately be reported to the Provincial Heritage Resources Authority of the Western Cape, Heritage Western Cape. Heritage remains uncovered or disturbed during earthworks must not be further disturbed until the necessary approval has been obtained from Heritage Western Cape. Heritage remains may only be disturbed by a suitably qualified heritage specialist working under a directive from the relevant Heritage Resources Authority.

    Heritage remains include: meteorites, archaeological and/or paleontological remains (including fossil shells and trace fossils); coins; indigenous and/or colonial ceramics; any articles of value or antiquity; marine shell heaps; stone artefacts and bone remains; structures and other built features with heritage significance; rock art and rock engravings; shipwrecks; and/or graves or unmarked human burials including grave goods and/or associated burial material.

F. GENERAL MATTERS

1. Notwithstanding this Environmental Authorisation, the Holder must comply with any other statutory requirements that may be applicable when undertaking the listed activities.

Amendment of Environmental Authorisation and EMPr

2. If the Holder does not start with all listed activities and exceed the threshold of each listed activity within the period referred to in Section G, this Environmental Authorisation shall lapse for that activity, and a new application for Environmental Authorisation must be submitted to the relevant Competent Authority.

    Where a validity period has been specified for operational aspects, such as for the development and related operation of the facilities or infrastructure for the storage and handling of a dangerous good,

the onus is on the Holder to ensure the facility is operating at all times in terms of a valid environmental authorisation.

If the Holder wishes to extend a validity period specified in the Environmental Authorisation, an application for amendment in this regard must be made to the relevant Competent Authority prior to the expiry date of such a period.

Note:

(a) Failure to lodge an application for amendment prior to the expiry of the validity period of the Environmental Authorisation will result in the lapsing of the Environmental Authorisation.

(b) It is an offence in terms of Section 49A(1)(a) of NEMA for a person to commence with a listed activity if the competent authority has not granted an Environmental Authorisation for the undertaking of the activity.

(c) An environmental authorisation may be amended where it relates to a change of ownership or transfer of rights and obligations.

(d) On application, if the competent authority decides to grant environmental authorisation, the competent authority may issue a single environmental authorisation or multiple environmental authorisations in the name of the same or different applicants covering all aspects for which authorisation is granted.

3. The Holder is required to notify the Competent Authority where any detail with respect to the Environmental Authorisation must be amended, added, substituted, corrected, removed or updated.

   In assessing whether to amend or correct the EA, the Competent Authority may request information to evaluate the significance and impacts of such changes or deviations, and it may be necessary for the Holder to apply for further authorisation in terms of the applicable legislation.

   The onus is on the Holder to verify whether such changes to the environmental authorisation must be approved in writing by the relevant competent authority prior to the implementation thereof.

   Note: An environmental authorisation may be amended or replaced without following a procedural requirement contained in the Regulations if the purpose is to correct an error and the correction does not change the rights and duties of any person materially

4. The manner and frequency for updating the EMPr is as follows:

   (a) Any further amendments to the EMPr, other than those mentioned above, must be approved in writing by the relevant competent authority.

   (b) An application for amendment to the EMPr must be submitted to the Competent Authority if any amendments are to be made to the impact management outcomes of the EMPr. Such amendment(s) may only be implemented once the amended EMPr has been approved by the competent authority.

   The onus is however on the Holder to confirm the legislative process requirements for the above scenarios at that time.

5. Where an amendment to the impact management outcomes of an EMPr is required before an environmental audit is required in terms of the environmental authorisation, an EMPr may be amended on application by the Holder of the environmental authorisation.

Compliance with Environmental Authorisation and EMPr

6. Non-compliance with a condition of this environmental authorisation or EMPr is an offence in terms of Section 49A(1)(c) of the National Environmental Management Act, 1998 (Act no. 107 of 1998, as amended).

7. This Environmental Authorisation is granted for a set period from date of issue, during which period all the listed activities must be commenced with and concluded, including the post-construction rehabilitation; monitoring requirements and environmental auditing requirements which must be concluded.

   The validity period and conditions of the environmental authorisation has been structured to promote the effective administration of the environmental authorisation and guidance has been provided to ensure the compliance thereof within the validity period, for example:

   - Failure to submit the revised EMPr to the Competent Authority at least 90-days prior to the construction activities commencing on site, may result in the competent authority not being able to process / review the revised EMPr prior to the intended date of commencement.

   - Failure to complete the post construction rehabilitation and monitoring requirements at least six months prior to expiry of the validity period of an environmental authorisation may result in the Holder not being able to comply with the environmental auditing requirements in time.

   - Failure to complete the auditing requirements at least three months prior to expiry of the validity period of the environmental authorisation may result in the Holder not being able to comply with all the environmental auditing and reporting requirements and may result in the competent authority not being able to process the audit timeously.

8. This Environmental Authorisation is subject to compliance with all the peremptory conditions (i.e. 3; 7, 8; 10 and 12). Failure to comply with all the peremptory conditions prior to the physical implementation of the activities (including site preparation) will render the entire EA null and void. Such physical activities shall be regarded to fall outside the scope of the Environmental Authorisation and shall be viewed as an offence in terms of Section 49A(1)(a) of NEMA.

9. In the event that the Environmental Authorisation should lapse, it is an offence in terms of Section 49A(1)(a) of NEMA for a person to commence with a listed activity, unless the competent authority has granted an Environmental Authorisation for the undertaking of the activity.

10. Offences in terms of the NEMA and the Environmental Impact Assessment Regulations, 2014, will render the offender liable for criminal prosecution.

G. APPEALS

1. An appellant (if the holder of the decision) must, within 20 (twenty) calendar days from the date the notification of the decision was sent to the holder by the Competent Authority –
   1.1. Submit an appeal in accordance with Regulation 4 of the National Appeal Regulations 2014 (as amended) to the Appeal Administrator; and
   1.2. Submit a copy of the appeal to any registered I&APs, any Organ of State with interest in the matter and the decision-maker i.e. the Competent Authority that issued the decision.

2. An appellant (if NOT the holder of the decision) must, within 20 (twenty) calendar days from the date the holder of the decision sent notification of the decision to the registered I&APs–
   2.1. Submit an appeal in accordance with Regulation 4 of the National Appeal Regulations 2014 (as amended) to the Appeal Administrator; and
   2.2 Submit a copy of the appeal to the holder of the decision, any registered I&AP, any Organ of State with interest in the matter and the decision-maker i.e. the Competent Authority that issued the decision.

3. The holder of the decision (if not the appellant), the decision-maker that issued the decision, the registered I&AP and the Organ of State must submit their responding statements, if any, to the appeal authority and the appellant within 20 (twenty) calendar days from the date of receipt of the appeal submission.

4. The appeal and the responding statement must be submitted to the Appeal Administrator at the address listed below:

   By post: Western Cape Ministry of Local Government, Environmental Affairs and Development Planning
   Private Bag X9186
   CAPE TOWN
   8000

   By facsimile: (021) 483 4174; or

   By hand: Appeal Administrator
   Attention: Mr Marius Venter (Tel: 021 483 3721)
   Room 809
   8th Floor Utilitas Building, 1 Dorp Street, Cape Town, 8001

   Note: For purposes of electronic database management, you are also requested to submit electronic copies (Microsoft Word format) of the appeal, responding statement and any supporting documents to the Appeal Authority to the address listed above and/ or via e-mail to DEADP.Appeals@westerncape.gov.za.

5. A prescribed appeal form as well as assistance regarding the appeal processes is obtainable from the Appeal Administrator at: Tel. (021) 483 3721, E-mail DEADP.Appeals@westerncape.gov.za or URL http://www.westerncape.gov.za/eadp.

H. DISCLAIMER

The Western Cape Government, the Local Authority, committees or any other public authority or organisation appointed in terms of the conditions of this Environmental Authorisation shall not be responsible for any damages or losses suffered by the Holder, developer or his/her successor in any instance where construction or operation subsequent to construction is temporarily or permanently stopped for reasons of non-compliance with the conditions as set out herein or any other subsequent document or legal action emanating from this decision.

Your interest in the future of our environment is appreciated.

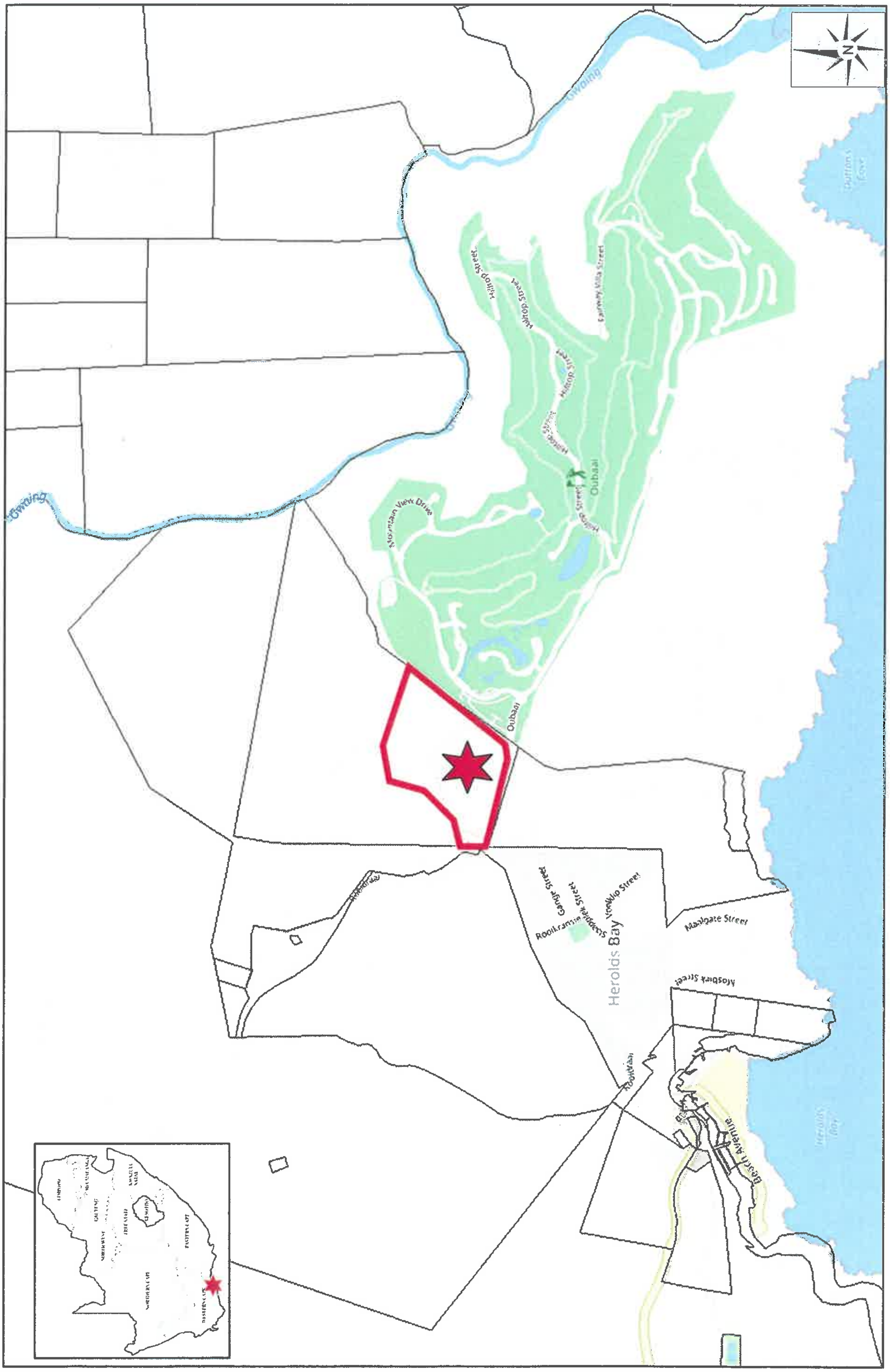
Yours faithfully

MR. GAVIN BENJAMIN
DIRECTOR: DEVELOPMENT MANAGEMENT (REGION3)

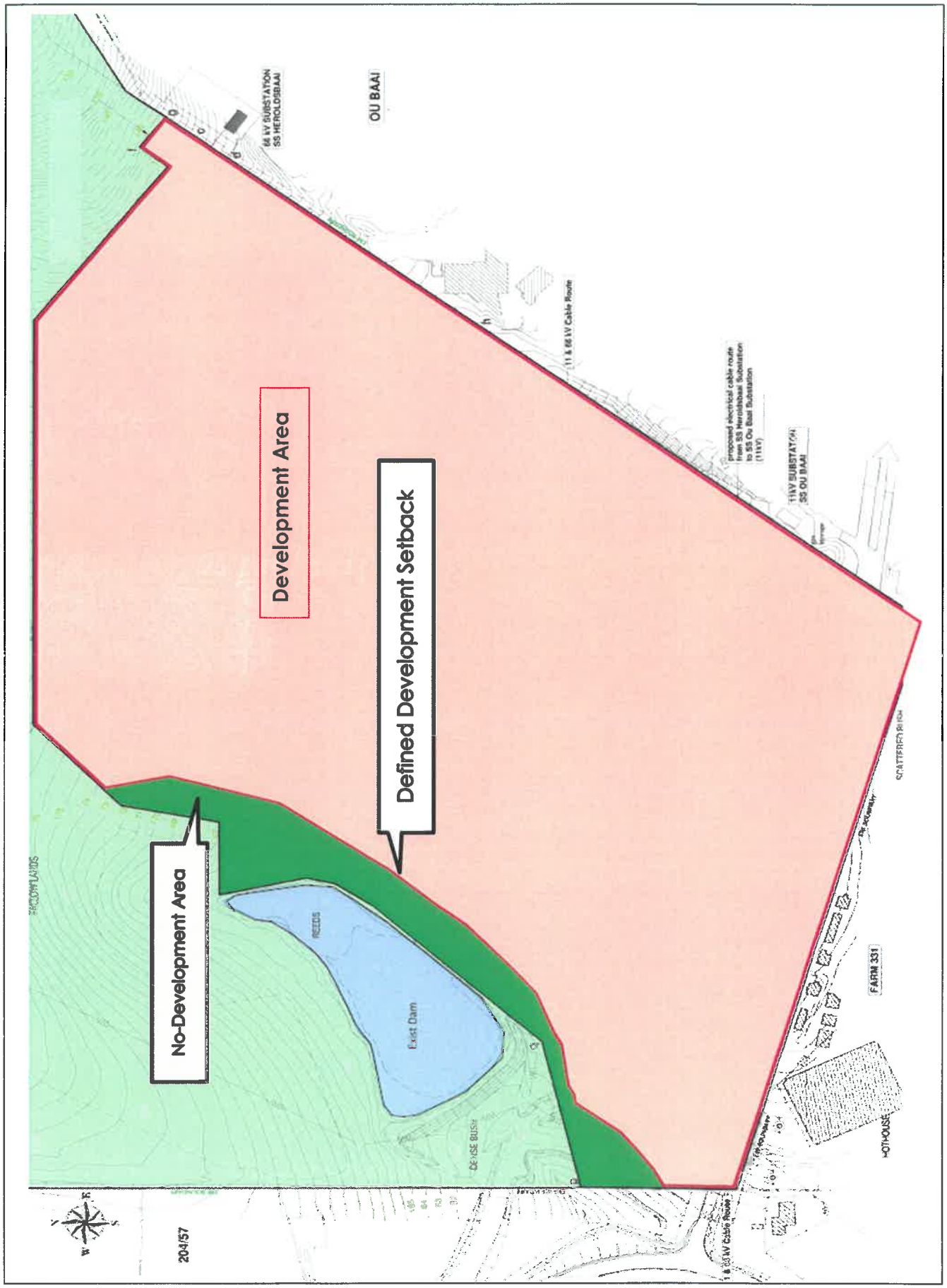
DATE OF DECISION: 06/04/2021

FOR OFFICIAL USE ONLY:
EIA REFERENCE NUMBER: 16/3/3/1/D2/29/0008/20
NEAS REFERENCE: WCP/EIA/0000776/2020

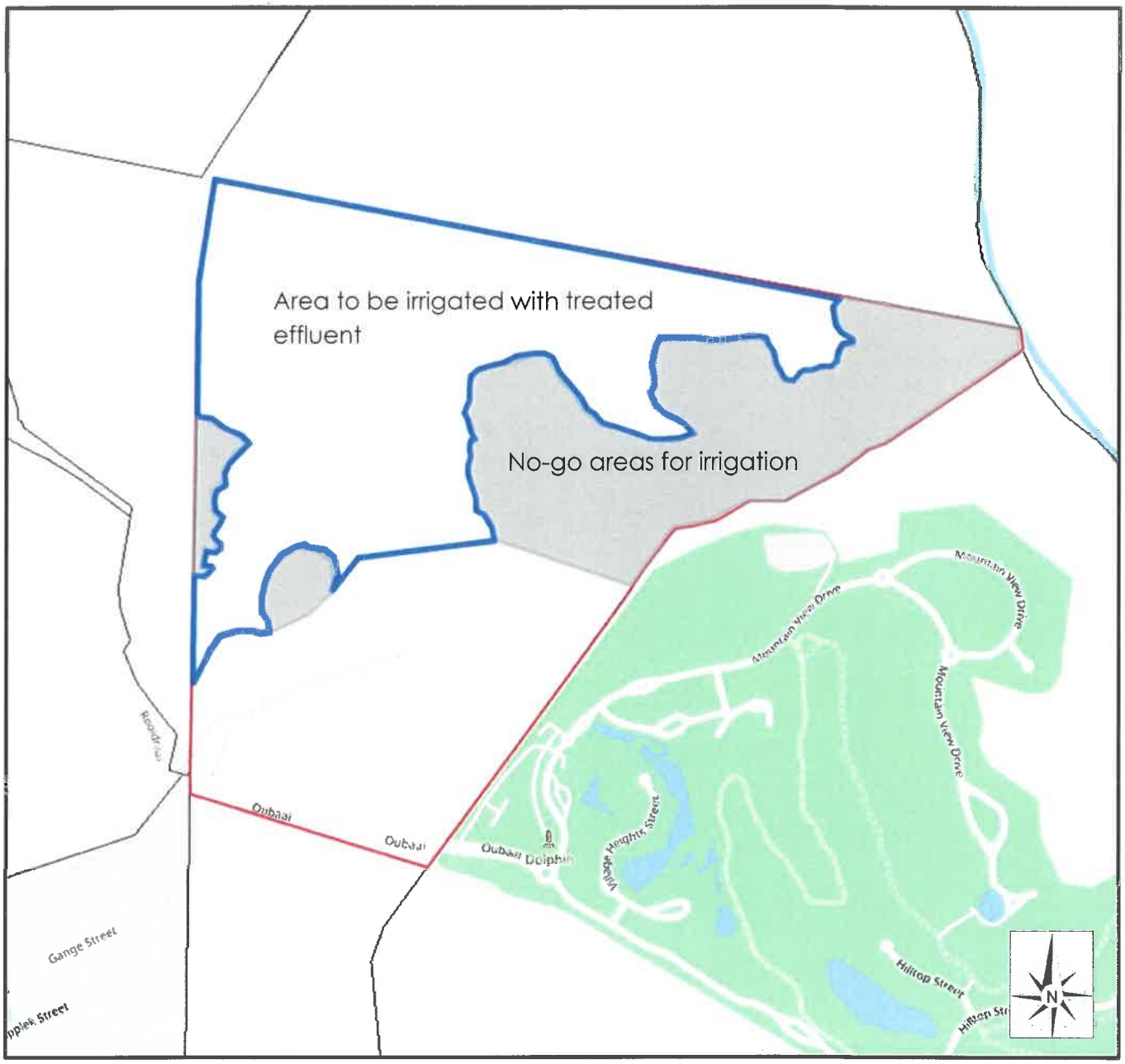
ANNEXURE 1: LOCALITY MAP



ANNEXURE 2: DEVELOPMENT SETBACK LINE



ANNEXURE 3: AREA WHERE TREATED EFFLUENT MAY BE IRRIGATED



ANNEXURE 4: REASONS FOR THE DECISION

In reaching its decision, the Competent Authority considered, *inter alia*, the following:

a) The information contained in the Application Form received on 24 August 2020, the Final Basic Assessment Report (FBAR) and EMPr submitted together with the FBAR on 23 November 2020;

b) Relevant information contained in the Departmental information base, including the Guidelines on Public Participation, Alternatives (dated March 2013);

c) The objectives and requirements of relevant legislation, policies and guidelines, including section 2 of the National Environmental Management Act, 1998 (Act No. 107 of 1998);

d) The comments received from I&APs and responses to these, included in the FBAR dated November 2020;

e) The balancing of negative and positive impacts and proposed mitigation measures; and

f) Appropriate information was made available in the report to understand the environmental and spatial context and the case officer is familiar with the area.

All information presented to the Competent Authority was taken into account in the consideration of the application for Environmental Authorisation. A summary of the issues that were considered to be the most significant for the decision is set out below.

1. Legislative Requirements

Activity 12 of Listing Notice 1 (GN No. R983 of 4 December 2014, as amended) was included in the application for Environmental Authorisation, however, this activity is not approved as a development setback line has been defined by this Department and as such, no infrastructure or structures will be constructed within a watercourse or within 32 metres from the edge of a watercourse.

2. Public Participation

A sufficient public participation process was undertaken, and the applicant has satisfied the minimum requirements as prescribed in the EIA Regulation 2014 for public involvement. The public participation process included:

- identification of and engagement with interested and affected parties (I&APs) including organs of state which have jurisdiction in respect of the activity to which the application relates;
- fixing a notice board at the site in January 2020;
- giving written notice to the owners and occupiers of land adjacent to the site and any alternative site where the listed activities are to be undertaken, the municipality and ward councillor, and the various organs of state having jurisdiction in respect of any aspect of the listed activities on 17 October 2019;
- the placing of a newspaper advertisement in the '*George Herald*' on 16 January 2020; and
- making the draft Basic Assessment Report available to I&APs for public review from 17 January 2020 till 17 February 2020.

The following Organs of State provided comment on the proposal:

- *Breede Gouritz Catchment Management Agency*
- *CapeNature*
- *George Municipality*
- *Department of Environment, Forestry and Fisheries – Forestry Division*
- *WCG: Department of Transport and Public Works – Road Network Management*
- *Heritage Western Cape*

- *General Public / Interested & Affected Parties (I&APs) included:*
    - *Rate Payers Association of Herold's Bay*
    - *Denneseerus (Pty) Ltd.*
    - *Oubaai Home Owners Association*

Further consultation was instituted with the BGCMA in terms of the Water Use Licence application for clarification and clarification was received.

All other comments and issues raised by the respective *Organs of State and I & APs* that were captured in the Basic Assessment Report were responded to by the EAP.

3. Alternatives

Layout Alternatives:

Part of the Preferred Layout Alternative (Herewith Approved):

The proposal entails the development of a residential estate and business zone on a portion of Portion 7 of the Farm Buffelsfontein 204, Herold's Bay, George. The area where the development will take place is approximately 19 370 square metres in extent and the development will comprise of the following:

- A residential area consisting of 102 single residential erven (Single Residential Zone I) and 68 general residential erven (General Residential Zone II);
- A commercial area comprising of two erven for:
    - a filling station for the storage and handling of a dangerous good (Business Zone II);
    - a convenience centre (Business Zone II);
    - a restaurant (Business Zone II); and
    - office block (Business Zone IV).
- One open space area (Open Space Zone II) which includes the aquatic buffer
- An erf for private road(s) (Transport Zone III);
- An erf for public streets (Transport Zone II;
- Servitudes registered for the sewerage package plants.

This will require the clearance of more than 1-hectare (but less than 20-hectares) of indigenous vegetation. Also, more than 300 square metres of an area mapped as Endangered Garden Route Granite Fynbos will be cleared of indigenous vegetation for this purpose but approximately 18.04 ha.

In addition, hereto the following associated infrastructure will be constructed:

- An internal road network with roads of 10 to 26 metres wide.
- Installation of 3 gravity fed package plants for the treatment of sewage and will be situated in three (3) drainage zones.
- The internal sewer network will consist of 160mm pipes with a 110mm connection to each erf.
- The internal water reticulation system will consist of pipes varying in size between 63 mm and 90 mm diameter with the necessary provision made for isolating valves, pressure reducing valves, fire hydrants, as required and erf connections;
- Electricity reticulation, substations and street lighting, and
- Stormwater drainage structures and stormwater pipelines.

The development will be implemented behind the defined development setback line along the non-perennial stream as depicted in the plan in Annexure 2 of this Environmental Authorisation.

The need for an adequate aquatic buffer has been emphasised in the Freshwater Habitat Impact Assessment Report and this Department has encouraged the applicant to investigate a new alternative; however, the final proposals submitted in the application have failed to adequately address/describe this aspect in an appropriate alternative. The competent authority has defined a development setback to address this aspect and conditions in support thereof have been included in this environmental authorisation.

Layout Alternative A

The proposal entails the development of a residential estate on a portion of Portion 7 of the Farm Buffelsfontein 204, Herold's Bay, George. The development site is 12 200 square metres in extent and will comprise the following:

- 65 Single Residential Erven
- 32 General Residential Zone II erven;
- Business Zone of 0.495 ha.
- No open space

Layout Alternative B

The proposal entails the development of a residential estate on a portion of Portion 7 of the Farm Buffelsfontein 204, Herold's Bay, George. The development site is 25 755 square metres in extent and will comprise the following:

- 151 Single Residential Erven
- More than 32 General Residential Zone II erven;
- Business Zone of 0.823 ha.
- Open Space erf of 3.391 ha

Alternative A was not deemed preferred as less erven could be developed and the number of group housing units would be considerably less than the preferred alternative (Alternative C). Alternative B was not considered feasible as it would encroach onto the agricultural land to the north of the dam and in turn resulting in the loss of even more viable agricultural land as opposed to Alternative C.

Layout Alternative C (Applicant's Preferred Alternative)

The proposal entails the development of a residential estate on a portion of Portion 7 of the Farm Buffelsfontein 204, Herold's Bay, George. The development site is 19 370 square metres in extent and will comprise the following:

- 102 Single Residential Erven
- 68 General Residential Zone II erven;
- 1 Business Zone II and IV erf comprising a filling station, a convenience centre, a restaurant and an office block.
- 1 Open Space Zone II erf
- 1 Transport Zone III erf
- 1 Transport Zone II erf
- Servitudes registered for the sewerage package plants

This will require the clearance of more than 1-hectare (but less than 20-hectares) of indigenous vegetation. Also, more than 300 square metres of an area mapped as Endangered Garden Route Granite Fynbos will be cleared of indigenous vegetation for this purpose.

In addition, hereto the following associated infrastructure will be constructed:

- An internal road network with roads of 10 to 26 metres wide.
- Installation of 3 gravity fed package plants in three (3) drainage zones.
- The internal sewerage network will consist of 160mm pipes with a 110mm connection to each erf.
- The internal water reticulation system will consist of pipes varying in size between 63 mm and 90 mm diameter with the necessary provision made for isolating valves, pressure reducing valves, fire hydrants, as required and erf connections;
- Electricity reticulation, substations and street lighting, and
- Stormwater drainage structures and stormwater pipelines.

Technological Alternatives:

Three technological alternatives were investigated:

Element Consulting Engineers conducted various site visits and meetings with the Oubaai Estate and the George Municipality to determine the feasibility of the sewage treatment options.

1. Alternative connection point (east of development):

The proposed development is located directly adjacent to the Oubaai Golf Estate. Discussions have been ongoing with Oubaai Golf Estate to accept the sewage generated from this development into their Oubaai WWTW. The Oubaai WWTW is located to the north-east of this proposed development, adjacent to the common boundary with this development. A new bulk outfall line could be constructed from the north-eastern extremity of the proposed development, following the contour, to the Oubaai WWTW. A letter confirming the desirousness of the Oubaai Golf Estate Homeowners Association to receive this effluent was received. The design of the Oubaai WWTW was studied. It had been determined that this WWTW has sufficient surplus capacity to accommodate the additional flow generated from this proposed development. Officials from Oubaai have also confirmed that this WWTW has sufficient spare capacity to accommodate the additional flow.

The developers of the Herold's Bay Estate are desirous to obtain the treated effluent as irrigation water and the Oubaai WWTW alternative is hence not a desirous one for the developer as discussed on the report. Notwithstanding the above, in this scenario, wastewater from the development will have to be pumped over two watersheds to the eastern drainage zone, which will constitute the risk of two wastewater pump stations on the proposed development.

2. Alternative connection point (west of development)
The western portion of the development drains towards Herold's Bay. A 160mm diameter uPVC gravity sewer line is available on the northern extreme of the existing Herold's Bay township. Preliminary discussions with municipal officials indicated that this existing 160mm diameter sewer gravity line and subsequent network does not have surplus capacity to accommodate the flow from the development.

This network drains into the Herold's Bay wastewater treatment works (WWTW) which also does not have any surplus capacity as indicated by the municipality. A letter confirming the lack of capacity in the network and WWTW, has been obtained from the George Municipality.

The option of connecting into the municipal sewer network is not viable form a technical and cost perspective. Notwithstanding the above, in this scenario, wastewater from the development will have to be pumped over two watersheds to the western drainage zone, which will constitute the risk of two wastewater pumpstations on the proposed development.

3. Development of a new WWTW:
The development of a new WWTW is not captured on the George Municipality's services development plan for Herold's Bay. A new WWTW will have a 500m development exclusion zone. A 500m exclusion zone will render most of the developable land undevelopable and is not a viable option for the purposes of this application.

Notwithstanding the above, in this scenario, wastewater from the development will have to be pumped over several watersheds to the relevant developed drainage zone, which will constitute the risk of a number of wastewater pump stations on the proposed development.

Based on the assessment of these alternatives, the three (3) package plants were considered feasible. Furthermore, the George Municipality is aware that in terms of Section 152 the Constitution and Section 73 of the Local Government: Municipal Systems Act, 2000 (Act no. 32 of 2000), the general duties and functions of local government are described, which require *inter alia* that the local government must provide basic services. The Local Government: Municipal Systems Act, 2000 does however allow for the provision of such a municipal service in its area or part of its area, through an external mechanism by entering into a *service delivery agreement* with an entity or person legally competent to operate a business activity. As such the George Municipality must enter into a Service Level Agreement with the developer / Home Owners Association.

"No-Go" Alternative
The option of not implementing the activity means that development will be established and none of the impacts, positive or negative, associated with the construction and operation of the development will be experienced.

4. Impact Assessment and Mitigation Measures

4.1 Activity need and desirability

The Applicant has motivated that from an engineering bulk services perspective, the proposed development is classified as an infill development with infill taking place between the existing Herold's Bay township and Oubaai Golf Estate. Furthermore, that infill-development is desirous from a bulk engineering services perspective as all or most bulk municipal services are normally already available and in place. Such infill development will improve the holistic financial sustainability of the local municipality due to additional rates and taxes being generated without the burden of additional capital outlay. The Department does not necessarily agree that this constitutes infill development, especially in light of the sewage being treated and disposed of on site. It is however expected that the development will connect to the municipal bulk sewage network as soon as this becomes available in future so as to prevent and mitigate any potential pollution of surface and groundwater sources.

The proposed development will subsequently not trigger unaffordable capital cost burdens to the local municipality but will in fact strengthen the financial sustainability of the municipality in both the short- and longer term.

In terms on environmental sensitivities, as confirmed by the Botanical Assessment, due to the transformed state of the site (for both proposed development footprints), there will be no direct impact on biodiversity. A buffer area has been allocated around the freshwater feature on site, and, as such, impacts on this would be manageable.

The location of the proposed development is one that is described by the Socio-Economic Impact Assessment completed by Urban Econ (2018) as a scenic sea-side town with a high demand for units that are affordable. Therefore, the low agricultural potential and lack of environmentally protected

areas, coupled by the need for affordable units which may attract foreign investment and drive the local economy, further indicates that this location favours the land use proposed.

4.2 Biophysical Impacts

Impacts on the biophysical environment of the preferred location or property are anticipated. The expected impact on the biophysical environment through the lifecycle of the proposed development is considered to fall within acceptable levels as the establishment of housing on the property could be seen as inevitable. Further to this, the construction phase of the proposed development will require earthworks for the installations of services, construction of internal roads and residential units. The required vegetation clearing will expose soil to wind and erosion, which could potentially result in soil erosion. These activities will increase storm water runoff and potential sedimentation in the watercourse. The risks and impacts associated with the construction can be mitigated to acceptable levels through the implementation of the EMPr construction phase management requirements as well as adhering to the aquatic buffer as indicated by the Freshwater Specialist.

4.3 Biodiversity

Due to the transformed state of the majority of the site, the direct impacts on biodiversity from the proposed development are limited. No significant fynbos or forest elements remain on site and although the proposed development encroaches onto an area mapped as CBA II (aka ###), it is not expected to significantly impact on the CBA network.

A description of the biodiversity issues and risks that were identified during the environmental impact assessment process, as well as an assessment of the significance of each issue and risk, cumulative impacts of the proposed development and levels of acceptable change have been considered.

4.4 Defining a development setback:

According to the Freshwater habitat Impact Assessment Report, aquatic buffers zones are designed to act as barriers between human activities and sensitive water resources to protect them from negative adverse impacts. The freshwater specialist developed an aquatic buffer for this development to achieve the abovementioned outcome. The specialist report also emphasises that an important component of these buffers is that they represent minimum setbacks from the riparian zone and infrastructure such as storm water attenuation, sewage infrastructure, water pipelines and roads, etc. must lie outside of this setback area.

Furthermore, this specialist indicated that the preferred alternative, prior to the buffer being developed, recommended that the footprint be set further back from the dam and the watercourse. Once the buffer was developed, the layout was not adapted to reflect the buffer and recommendation of the specialist to set back the development.

This is a key factor in the decision to adopt a development setback line on this portion of the property.

4.5 Heritage / Archaeological Aspects

An existing Heritage ROD (record of decision) was issued in 2007 whereby Heritage Western Cape agreed that development can proceed under the following conditions:

- A professional archaeologist must monitor earthmoving activities;
- In the event that human burials or archaeological resources are uncovered or exposed during earthworks or excavations, it must be reported to the South African Heritage Resources Agency and Heritage Western Cape.

In considering the above, the view is held that the applicant has adequately considered the heritage and archaeological aspects and that the proposed development will not result in significant negative impact on the on these. The competent authority is satisfied that the evaluation fulfils the requirements of the relevant heritage resources authority in terms of the National Heritage Resources Act, 1999 and the comments and recommendations of the relevant heritage resources authority with regard to the proposed development have been taken into account.

4.6 Other Impacts

No other impacts of significance are anticipated.

5. *Scope and Validity Period of authorisation*

This environmental authorisation defines specific operational aspects. The applicant has indicated that the construction activities (non-operational aspects) should be completed within a period of 10 years. The environmental authorisation's validity period has been granted for a period of ten years (10) years, (which excludes the operation of the filling station) during which period the construction activities must commence and be concluded, including the post-construction rehabilitation and monitoring, and submission of the final environmental audit. In light of the proposed implementation programme, the monitoring and post-construction rehabilitation can be adequately incorporated in the construction phase. The Holder is required to substantially implement the proposal within a period of 5-years after the environmental authorisation is issued. Where the activity has been commenced with, the EIA Regulations, 2014 allow that (upon application) the period for which the environmental authorisation is granted may be extended for a further period of 5-years. the operational aspects (operation of filling station) of this Environmental Authorisation are granted until 31 April 2041 and during which period the operation, all rehabilitation and monitoring requirements and final environmental auditing and reporting must be finalised.

6. National Environmental Management Act Principles

The National Environmental Management Principles (set out in section 2 of the NEMA, which apply to the actions of all organs of state, serve as guidelines by reference to which any organ of state must exercise any function when taking any decision, and which must guide the interpretation, administration and implementation of any other law concerned with the protection or management of the environment), *inter alia*, provides for:

- the effects of decisions on all aspects of the environment to be taken into account;
- the consideration, assessment and evaluation of the social, economic and environmental impacts of activities (disadvantages and benefits), and for decisions to be appropriate in the light of such consideration and assessment;
- the co-ordination and harmonisation of policies, legislation and actions relating to the environment;
- the resolving of actual or potential conflicts of interest between organs of state through conflict resolution procedures; and
- the selection of the best practicable environmental option.

7. Conclusion

After consideration of the information and factors listed above, the Department made the following findings:

(a) The identification and assessment of impacts are detailed in the FBAR dated 6 July 2020 and sufficient assessment of the key identified issued and impacts have been completed.
(b) The procedure followed for the impact assessment is adequate for the decision-making process.
(c) The proposed mitigation of impacts identified and assessed, curtails the identified negative impacts.

(d) The EMPr proposed mitigation measures for the pre-construction, construction and rehabilitation phases of the development and were included in the FBAR. The mitigation measures will be implemented to manage the identified environmental impact during the construction phase.

In view of the above, the NEMA principles, compliance with the conditions stipulated in this Environmental Authorisation, and compliance with an approved EMPr, the Competent Authority is satisfied that the proposed listed activities will not conflict with the general objectives of integrated environmental management stipulated in Chapter 5 of the National Environmental Management Act, 1998 (Act No. 107 of 1998) and that any potentially detrimental environmental impacts resulting from the listed activities can be mitigated to acceptable levels.

---------- **END** ----------

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REC SERVICES
ENVIRONMENTAL CONSULTANTS

SERVICE STATION LOCATED ON PORTION 112 OF THE FARM BUFFELSFONEIN 204/7 AS PART OF THE FUTURE HEROLDS BAY COUNTRY ESTATE, GARDEN ROUTE MUNICIPALITY, WESTERN CAPE PROVINCE

ENVIRONMENTAL MANAGEMENT PLAN

IN TERMS OF THE PETROLEUM PRODUCT SITE LICENSE ACT NO 120 OF 1977 UNDER THE REGULATIONS REGARDING PETROLEUM RETAIL & SITE LICENCES

(NO. R. 287 OF 27 MARCH 2006)

Prepared for: Mr. JACQUES CRONJE
GFA HOLDINGS
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Author: Rowan van Tonder & Pieter van Der Merwe

Date: 24 June 2022

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LIST OF FIGURES

1. GENERAL

1.1 Environmental Management Plan (EMP) requirements

Definition of an "Environmental Management Plan": A plan or programme that seeks to achieve a required final state and describes how activities that have or could have an adverse impact on the environment, will be mitigated, controlled, and monitored. No standard format exists for compiling an Environmental Management Plan (EMP). It is therefore easy to adopt the EMP to fit its proposed circumstances and to meet its requirements. Additionally, the level of detail in an EMP varies depending on the size of the project as well as the magnitude of environmental impacts. An EMP is a very important tool in the sound environmental management of projects, provided that the specifications are implemented, and the user understands the contents of the report, and the reasons for the implementation of certain specifications.

It should be noted that this EMP is a document under the Petroleum Product Site License Act and does not form part of any EIA process. No Environmental Impact Assessment (EIA) process is needed for the installation of the tanks as the combined capacity will not exceed 80 000 litres, which would be a listed activity and require environmental authorization.

Secondly, the project does trigger the following listed activities as stipulated under listing notice 3 of the EIA regulations:
Environmental impact Assessment Regulations Listing Notice 3, Government Notice No. 324 of 7 April 2017:
Activity Number: 10
Activity Description: The development and related operation of facilities or infrastructure for the storage, or storage and handling of a dangerous good, where such storage occurs in containers with a combined capacity of 30 but not exceeding 80 cubic metres.

i. Western Cape

i. Areas zoned for use as public open space or equivalent zoning;
ii. All areas outside urban areas; or
iii. inside urban areas:
(aa) Areas seawards of the development setback line or within 200 metres from the high-water mark of the sea if no such development setback line is determined;
(bb) Areas on the watercourse side of the development setback
(cc) Areas on the estuary side of the development setback line or line or within 100 metres from the edge of a watercourse where no such setback line has been determined; or in an estuarine functional zone where no such setback line has been determined.

This listing therefore does apply. In this scenario, the combined capacity of the tanks will not require authorisation, but other EIA activities will be triggered.

1.2 The EMP has the following goals:

- Specifications for the installation of fuel tanks
- Identifying those construction and operational activities that may have a detrimental impact on the environment;
- Detailing the mitigation measures that will need to be taken, and the procedures for their implementation;
- Establishing the reporting system to be undertaken during the construction and operating phases.

The EMP also serves to highlight specific requirements that will be monitored during the development and should the environmental impacts not have been satisfactory prevented or mitigated; corrective action will have to be taken. The document should, therefore, be seen as a guideline that will assist in minimising the potential environmental impact of activities.

The EMP also defines the arrangements that will be put in place to ensure that mitigation measures are implemented. This is achieved by including recommendations towards the roles and responsibilities of the project proponent, environmental management team and contractors.

1.3 EMP in Context

This EMP will form part of the project implementation. The EMP is associated with a formal environmental application as it falls within the implementation thresholds of the EIA regulations of 2014 as amended.

It is with certainty that we assume that they will also require authorization (which was the case) in terms of the National Environmental Management Act 107 of 1998 (NEMA), listing activities. Section 28 of NEMA do require Duty of Care and reads as follows:

> *"Every person who causes, has caused or may cause significant pollution or degradation of the environment must take reasonable measures to prevent such pollution or degradation from occurring, continuing or recurring, or, in so far as such harm to the environment is authorised by law or cannot reasonably be avoided or stopped, to minimise and rectify such pollution or degradation of the environment."*

This EMP in context will aim at adhering to the principle of Section 28 and will ensure that Duty of Care is taken.

1.4 Flexibility

The EMP is a flexible document subject to review and updating. During the implementation of a project there is always the possibility that unforeseen issues could arise, this EMP should therefore be revised where necessary to mitigate and include measures for unanticipated impacts.

1.5 Time frame of the EMP

The EMP will focus on the construction and operational phases of the underground storage tanks. The timing of these activities will correspond with the completion of final plans and approvals. It is noted that this country estate is in need of this filling station to help supplement the lack of nearby fuel filling station options.

1.6 Monitoring

All the issues described and discussed in this document will require monitoring, and it will be the responsibility of the owner and or associated appointed parties to implement monitoring.

2. DETAILS OF THE (EAP)

REC Services (Pty) Ltd was commissioned by the applicant to prepare an environmental management plan that seeks to comply with environmental legislation.

In fulfilment of this requirement, provided below are the details of REC and specifically the EAP:

REC SERVICES (PTY) LTD	ENVIRONMENTAL ASSESSMENT PRACTITIONER
Rubenstein office Park 566 Rubenstein Drive, 2nd Floor Moreleta Park 0044 P. O. Box 40541, Moreleta Park, 0044 Telephone: 012 997 4742 Email: info@recservices.co.za / rowan@recservices.co.za	**Rowan van Tonder** Rowan is the principal author of this report and works under the supervision of Mr. Pieter van der Merwe. Rowan undertook his studies at the University of Limpopo and obtained a M.Sc. degree in Botany (focus on Conservation Management) in 2007. Before this, he obtained his B. Hons degree in Physical Geography (focus on Environmental Management) at the University of Pretoria and B.Sc. in Environmental Science at the University of Pretoria. He has been part of Rock Environmental Consulting (Pty) Ltd. for 15 years (for extended details, See Appendix 6 – EAP CV). SACNASP (Pri.Sci.Nat) Reg. No.: 119204. EAPASA reg.: Submitted (Pending)

2.1 Expertise of REC services (Pty) Ltd

REC Services specializes in Environmental Impact Assessments and Management during the planning and development stages of a range of development projects. REC Services (Pty) Ltd, is a streamlined firm with an integrated approach to environmental impact assessments, networking with expertise where necessary, while always keeping a holistic view on assignments.

Our almost 30-year experience is across a broad range of development projects and clients involved in assignments in the urban and rural environments. Our main client base includes private land developers, local authorities, farmers, industrial developers, and mining enterprises where we form part of the project team which usually consist of Civil Engineers, land surveyors, Town and Regional Planners, Property Developers, and Architects etc.

Our services include processes in terms of various environmental acts and include: Basic Environmental Assessments, Environmental Scoping Reports, Environmental Impact Assessment Reports, Environmental management Plans, and Environmental Monitoring Reports and Water use licensing. REC has also undertaken various mining right and mining permit applications.

3. ENVIRONMENTAL MANAGEMENT PLAN IN CONTEXT

3.1 Purpose of the EMP and the EMP in Practice

The purpose of the EMP finds its origin from the Constitution (1996), National Environmental Management Act (1998), sectoral environmental legislation and the intergovernmental Relation Framework Act (2005) through providing a platform for Co-operative environmental governance. To achieve such co-operative environmental governance mechanisms such as EMPs and EIP (environmental implementation plans).

3.2 In Practice

The careful implementation and management of activities on site, during the entire process of project construction and operation, is vitally important. Focus should be placed on the activities to occur on the site; however, consideration of the adjacent environment (socially and ecologically) is equally important. The mitigation measures represented in this EMP should not be seen as static measures, but rather as methodologies that can be updated and improved during implementation, as and when site conditions become clearer. However, this EMP sufficiently serves to provide the most practicable methods to promote sound environmental management during the operational phases of the development.

This section of the report provides recommendations on matters relating to the impact of the development on the physical environment, the biological environment and the social environment of the site and study area by describing mitigation measures that are to be implemented.

3.3 Failure to comply with the EMP

Outlined below are a number of steps, relating to increasing severity of environmental problems, which will be implemented. The principle is to keep as many issues within the first few steps as possible.

Step 1: The Environmental Control Officer (ECO) discusses the problem with the applicant and the contractor or guilty party, and they work out a solution together. The ECO records the discussion and the solution implemented. This detection together with the solution will be included in the monthly monitoring report.

Step 2: The ECO observes a more serious infringement, and notifies the guilty party in writing, with a deadline by which the problem must be rectified. All costs will be borne by the contractor. This incident will be included in the monthly monitoring report

Step 3: The ECO may after discussions with the applicant, order the contractor to suspend part, or all, the works. The suspension will be enforced until such time as the offending party(ies), procedure or equipment is corrected, and/or remedial measures put in place if required. No extension of time will be granted for such delays and all cost will be borne by the contractor. The applicant shall be involved, and penalties will be allocated. In this time the department can decide to submit a pre-compliance notice and has authority to stop activities.

3.4 Significance assessment summary of potential impacts

3.4.1 Impact Significance Methodology

The following significance impact rating was used to evaluate the impacts of this project:

The **Significance** of Environmental Impacts is to be assessed by means of the following method: **Significance is the product of probability** and **severity. Probability** describes the likelihood of the impact occurring, and is rated as follows:			
•	Improbable	-	**Low possibility of impact to occur either because of design or historic experience.** **Rating = 2**
•	Probable	-	**Prominent possibility that impact will occur.** **Rating = 3**
•	Highly probable	-	**Most likely that impact will occur.** **Rating = 4**
•	Definite	-	**Impact will occur regardless of any prevention measures** **Rating = 5**
The **severity rating** is calculated from the *factors* given to intensity and duration. Intensity and duration factors are awarded to each impact, as described below. **The Intensity factor is awarded to each impact according to the following method:**			
•	Low intensity	-	Nature and/or man-made functions not affected, and a minor impact may occur. **Factor 1**
•	Moderate intensity	-	Environment affected but natural functions and processes can continue though often in a slightly altered manner. **Factor 2**
•	High intensity	-	Environment affected to the extent that natural functions are altered to the extent that it will temporarily or permanently cease. **Factor 3**

Duration is assessed, and a *factor* awarded in accordance with the following:			
•	Short term	-	≤ 1 to 5 years- **Factor 1**
•	Moderate term	-	5 – 15 years- **Factor 2**
•	Long term	-	Impact will only cease after the operational life of the activity, either because of natural process or by human intervention. **Factor 3**
•	Permanent	-	Mitigation, either by natural process or by human intervention, will not occur in such a way or in such a time span that the impact can be considered transient. **Factor 4**
The **severity rating** is obtained from calculating a severity factor, and comparing the severity factor to the rating in the table below, for example:			
The Severity factor e.g.: Intensity factor X Duration factor: 2 X 3 = 6			

A Severity factor of 6 (six) equals a Severity Rating of Moderate severity (Rating 3) as per table below:

Severity Ratings:	Factors
Low Severity (Rating 2)	Calculated values 2 to 4
Moderate Severity (Rating 3)	Calculated values 5 to 8
High Severity (Rating 4)	Calculated values 9 to 12
Very High Severity (Rating 5)	Calculated values 13 to 16 and more
Severity factors below 3 indicate no impact	

A Significance Rating is calculated by multiplying the Severity Rating with the Probability Rating:

The significance rating should influence the development project as described below:

Low significance (calculated Significance Rating 2 to 4)

- Positive impact and negative impacts of low significance should have no influence on the proposed development project

Moderate significance (calculated Significance Rating 5 to 8)

- Positive impact: Should indicate that the proposed project should be approved
- Negative impact: Should be mitigated or mitigation measures should be formulated before the proposed project can be approved

High significance (calculated Significance Rating 9 to 12)

- Positive impact: Should points towards a decision for the project to be approved and should be enhanced in final design
- Negative impact: Should weigh towards a decision to terminate proposal, or mitigation should be formulated and performed to reduce significance to at least low significance rating.

Very High Severity Rating (calculated Significance Rating of 13 and more)

- Positive Impact: Mo Positive Impacts are foreseen in the event of the proposed project having a severity rating of 13 or more.
- Negative impact: Before a decision can be made on the progress or proceeding of the project, all mitigation measures should be implemented, thereafter a decision can be made based on the significance rating of the findings.

The evaluation of the severity (or significance) of the identified impacts is done according to a set and objective Significance Rating Methodology, which uses both quantitative and subjective measures as set out above.

3.4.2 Evaluation of impacts in terms of significance Rating

The identified impacts are rated in terms of their significance during the constructional and operational phase of the proposed tanks. The identified impacts on the physical, ecological and social components of the site are discussed in terms of:

- Subsurface soil quality;
- Surface water run-off (quality);
- Air quality (due to dust generation);
- Ambient noise levels;
- Social environment (of adjacent community);
- Traffic safety aspects (safety of the community);
- Visual and aesthetic quality; and

It should be noted that the impact significance rating is given presuming that **no mitigation measures** are to be implemented **during the operational phase** of the project (this would imply a worst-case scenario). There after the significance rating is given when mitigation measures are implemented during the operational phase.

4. ENVIRONMENTAL DESCRIPTION

4.1 Site location

The site is located on a portion of Portion 7 of the Farm Buffelsfontein 204, Herold's Bay, George. The site is located directly north-east of the existing Herold's Bay township and directly west of the existing Oubaai Golf Estate. The site is situated on the southern portion of the Farm Buffelsfontein No. 204 and is bounded to the north and west by farmland.

The coordinates of the centre of the proposed development footprint site:

Latitude (S): 34° 02' 42.66"; Longitude (E): 22° 24' 19.94"

The project scope will include the following:

The proposal entails the development of a residential estate and business zone on a portion of Portion 7 of the Farm Buffelsfontein 204, Herold's Boy, George. The area where the development will take place is approximately 19 370 square metres in extent and the development will comprise of the following:

- A residential area consisting of 102 single residential erven (Single Residential Zone I) and 68 general residential erven (General Residential Zone II);
- A commercial area comprising of two erven for:
    - a filling station for the storage and handling of a dangerous good (Business Zone II);
    - a convenience centre (Business Zone II):
    - a restaurant (Business Zone II); and
    - office block (Business Zone IV).
- One open space area (Open Space Zone II) which includes the aquatic buffer;
- An erf for private road(s) (Transport Zone III);
- An erf for public streets (Transport Zone ll);
- Servitudes registered for the sewerage package plants.

This will require the clearance of more than l-hectare (but less than 20-hectares) of indigenous vegetation. Also, more than 300 square meters of an area mapped as Endangered Garden Route Granite Fynbos will be cleared of indigenous vegetation for this purpose but approximately 18.04 ha.

In addition, hereto the following associated infrastructure will be constructed:

- An internal road network with roads of 10 to 26 meters wide.
- Installation of 3 gravity fed package plants for the treatment of sewage and will be situated in three (3) drainage zones.

- The internal sewer network will consist of 160mm pipes with a 110mm connection to each erf.
- The internal water reticulation system will consist of pipes varying in size between 63 mm and 90 mm diameter with the necessary provision made for isolating valves, pressure reducing valves, fire hydrants, as required and erf connections;
- Electricity reticulation, substations and street lighting, and
- Stormwater drainage structures and stormwater pipelines.

The proposed filling station is envisioned to be positioned in the southwestern corner of the development footprint area, adjacent to the Oubaai Main Road. A total of 69m^3 storage capacity of fuel can be installed into 3 tanks, i.e., this will be split into 2 x 23 000l tanks for Diesel and 1 x 23 000l tank for Petrol.

The filling station area (footprint), in total, is approximately 1.5Ha.

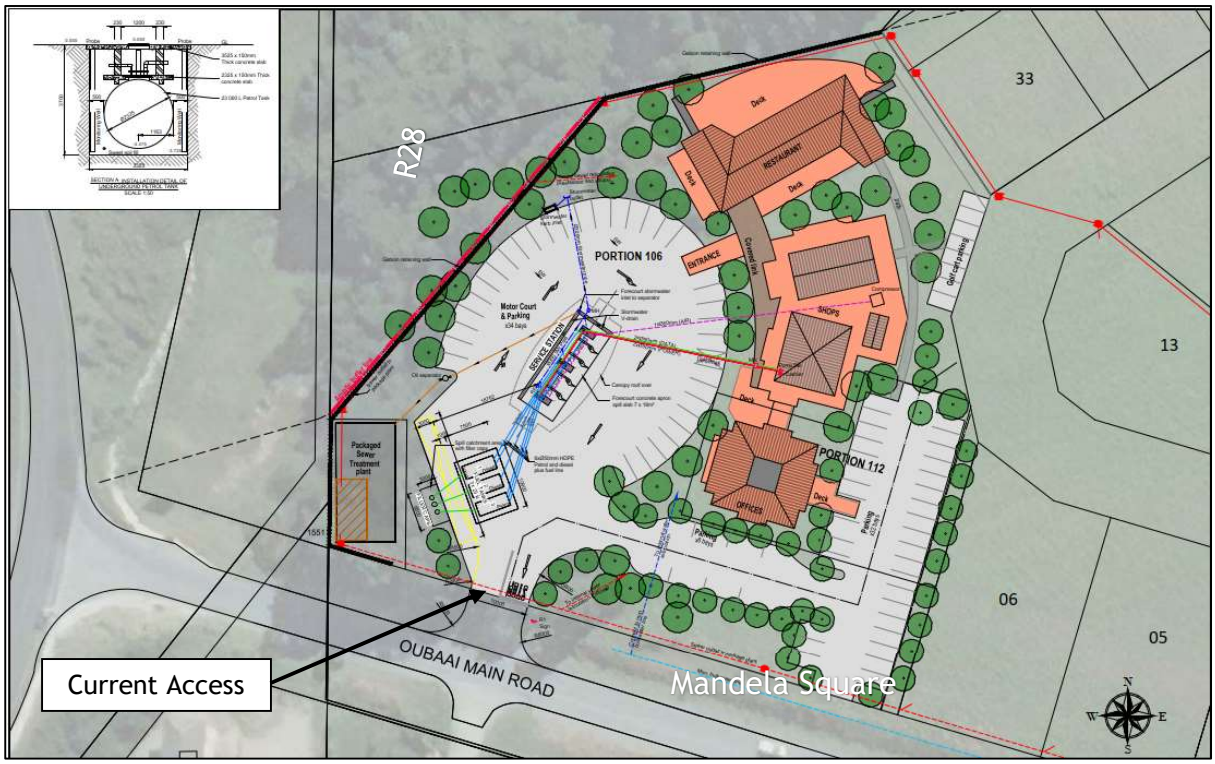


Figure 1: Site position in Herold's Bay Country Estate.

4.1.1 Site Layout

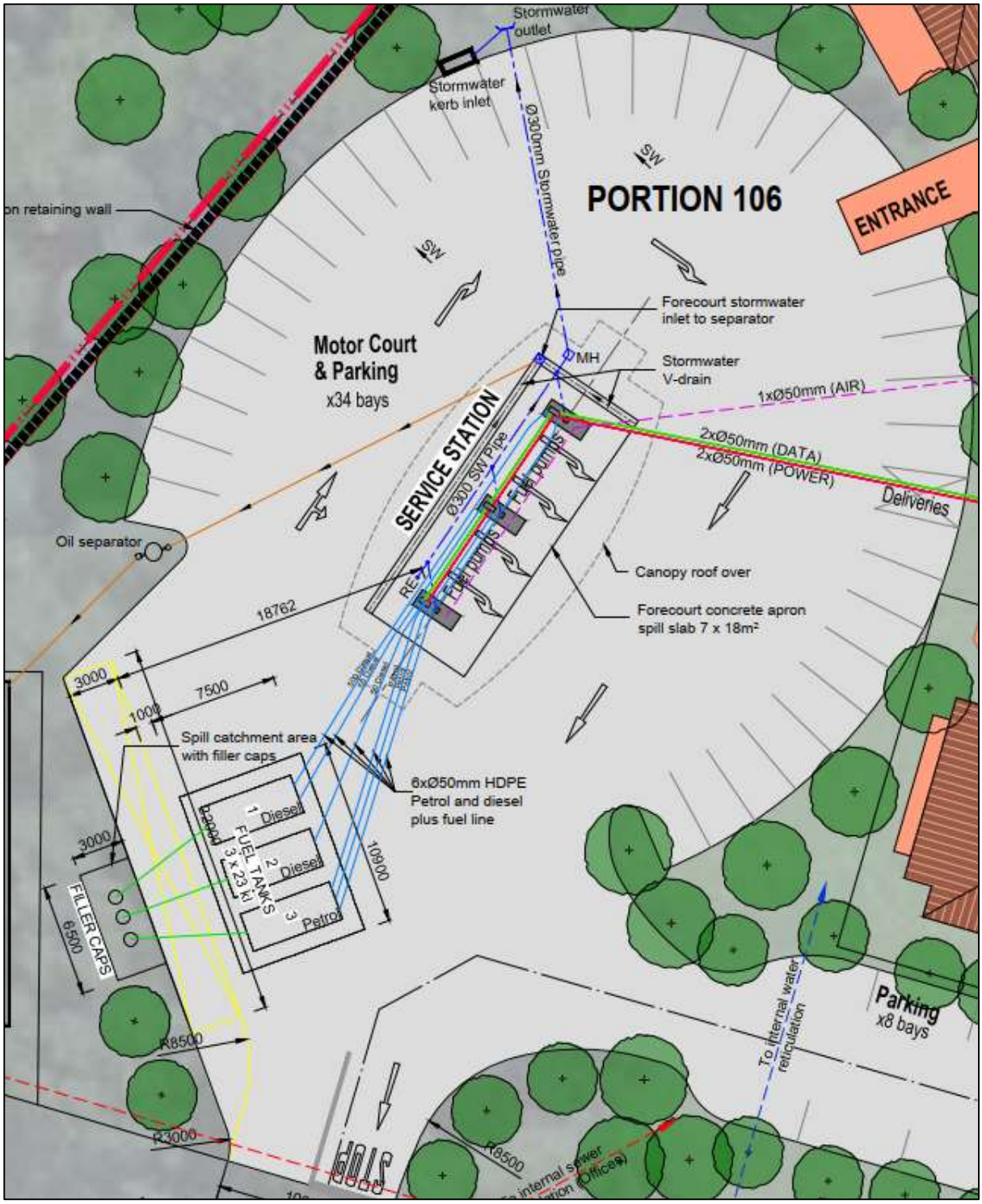


Figure 2: Site layout.

The coordinates of the site are as follow: -34.045954° (Latitude) 22.402361° (Longitude)

This filling station position did necessitate for a Geotechnical input, as well as a Traffic impact assessment.

The following photos illustrate the site and its surrounding area in.

4.2 Bio-Physical characters of the regional area

The following section describes the general biophysical and social environmental components of the study area. This description serves as background environmental information. Information was adopted from Munica & Rutherford, 2010 (CD set).

4.2.1 Vegetation

The site is located within the Garden Route Granite Fynbos vegetation type. Distribution: Western Cape Province: Garden Route—three main blocks south of the Outeniqua Mountains on the coastal

plain from Botterberg west of Brandwaghoogte (south of Robinson Pass) to Groot Brak River; the largest block from Groot Brak River to Woodfield near the Wilderness (with a few strips along the coast from Bothastrand to the Wilderness); lastly, north of the lakes from Woodville to Hoogekraal Pass, west of Karatara. Altitude 0–300 m.

4.2.2 Climate

Winter-rainfall region (MAP 350–880 mm (mean: 600 mm)). Mean daily maximum and minimum temperatures 27.8°C and 6.8°C for January–February and July, respectively. Frost incidence 2 or 3 days per year.

4.2.3 Landscape

Moderately undulating plains and undulating hills on the coastal forelands. Dense proteoid and ericoid shrubby grassland. Proteoid and graminoid fynbos are dominant with ericaceous fynbos in seeps. In the west, most remnants of this type are dominated by proteas. Eastwards graminoid and ericaceous fynbos are dominant on the flat plateaus, with proteas confined to the steep slopes.

4.2.4 Geology, land types and soil conditions

George Batholith of the Cape Granite Suite. Deep, prismacutanic- and pedocutanic-dominated soils typical of Db land types (mainly).

4.2.5 Conservation

Endangered. Target 23%. Only about 1% conserved in the proposed Garden Route National Park. About 70% has been transformed for cultivation (56%), pine plantations (7%) and by urban development (6%). Remnants are largely confined to isolated pockets on steeper slopes. Erosion moderate and high. Very few patches of this type remain in a pristine condition as most of it has been converted to pasture by liming, bush-cutting and frequent burning, and augmented with pasture grasses. Western remnants suggest that proteoid fynbos might have been dominant historically. It is easily converted to graminoid fynbos by regular fires and augmentation with pasture grasses.

5 ASSESSMENTS OF THE POTENTIAL IMPACTS

5.1 Assessment on the Environment as a whole

The environmental legislation and processes have provided for a more streamlined approached to assist in the decision-making process. The EMP honed-in on specific environmental issues that has been investigated in more detail. This approached ensures that the EMP focuses on the core issues (positive & negative).

This section provides a description and evaluation of the anticipated issues and impacts associated with the construction and operation of the underground tanks. Some of the issues/impacts are localised in their effects, whilst others are more generally applicable. The identification and brief description of the relevant physical and biological issues was conducted under:

- Environmental aspects: defined as those actions on site that may potentially cause an environmental impact;
- Environmental component to be impacted upon;
- Nature and description of the impact (including the relevant stage: construction or operation).

An impact significance rating for the listed aspects was given in table 2 below. The identified and anticipated impacts listed below will take effect into the operational stage.

5.1.1 Impacts and Issues Identified

The description and identification of anticipated impacts is based on the listing of so-called environmental aspects, which is the term used to describe the actions during the construction and operational stages of the project that may have a degree of impact on one or several of the environmental components listed.

The environmental aspects listed can be effective during the constructional and operational phase. Operational stage is considered as when the fuel retailer and its additional structures like pumps are fully operational. The following table provides a list of activities (environmental aspects) that will occur on site, and it provides an outline of the potential impacts that these actions will have on the environment (especially on the soil surfaces of the site). As well as the anticipated effects on the visual character being, biophysical and also social aspects.

Table 1: List of activities (environmental aspects) that will occur on site, the potential impacts that these activities may have on the environment and a description of the nature of the impact.

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT	NATURE AND DESCRIPTION OF THE IMPACT
FILLING STATION SITE		
NEW FILLING STATION AND TANK INSTALLATION- CONSTRUCTION PHASE		
Preparation of the site, including the clearance of vegetation	Vegetation, soil, groundwater	The clearing of the site for the filling station, as well as the excavation for the placement of the tanks can lead to loss of potential important vegetation. The removal of vegetation cover, such that the soil surface is exposed, may lead to increased soil erosion in certain areas. Where the removal of surface vegetation is of a temporary nature only, the establishment of weed species is a threat. The topsoil layer is required to rehabilitate the vegetation in these areas.
Excavations for the establishment of foundations	Vegetation, soil, groundwater	The excavation of soil can lead to erosion and higher possibility of soil contamination. The existing vegetation will be permanently removed to accommodate the filling station foundations, which will be approximately the size of the built footprint.
Pit preparation	Soil, groundwater	Preparing the pits for the tanks will include construction of a concrete slab. Concrete will need to be mixed. River sand will need to be transported and dumped close to the installation area.
Installation of the tanks	Soil, groundwater, traffic	A truck will be needed to lift the tank into place. The tank will be mounted to the correct position. Composite bonded tanks to be installed. If not correctly installed there is the potential, though limited, to contaminate the soil and groundwater resources.
Fuel storage tanks on site	Soil, water	Faulty/leaky fuel storage tanks will contaminate the soil and groundwater resources of the study area. **Precautionary measures to be implemented.**
Generation of construction waste	Soil, vegetation, aesthetic quality of the site and surface water run-off.	Polluted surface water run-off may pollute the water resources (both the underground resources and dam areas in the vicinity). Construction waste that is not removed from site will also be an eye sore in the area and will promote the growth of unwanted weed species.
Movement of construction vehicles on the main road and/or other adjacent and local road networks.	Air quality due to dust generation and traffic safety aspects.	The movement of heavy vehicles (transporting building material) on tar roads and especially busy main roads adjacent to the site, can impact on traffic safety, due to accidental soiling of the road surface and/or speeds driven by construction vehicles.
Maintenance of construction vehicles	Possible soil contamination, which	Soil contamination during construction vehicle maintenance is easily prevented. But in the event of such an occurrence, the impact will be of a temporary nature only, as spills can and should immediately be cleaned up.

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT	NATURE AND DESCRIPTION OF THE IMPACT
	in turn will affect surface water run-off.	The quality of surface water may temporarily be negatively affected.
Noise generation by operating air compressors, excavators, and other heavy machinery	Adjacent residential areas due to ambient noise levels.	As construction will occur within close proximity to residential areas, it is possible that the noise generated by the proposed development will cause discomfort to those around the development. Due to the size of the site and the type of development it is probable that this Environmental Management Plan would be sufficient in ensuring that noise does not inconvenience the local populous.
Sanitation provision to workers during the working day.	Possible contamination of subsurface soil and surface water quality.	Possible contamination as a result of this activity will be of a localised, temporary nature.
NEW FILLING STATION AND TANK INSTALLATION-OPERATIONAL PHASE		
Operation of the filling station and its additional components i.e. daily delivering and transfer of commodities (food, fuel, and other goods)	Traffic, noise, nuisance, soil, social environment and local economy.	The delivery of fuel can disrupt the flow of traffic within the area. The physical offloading of fuel can potentially cause spills into the soils. Leaks in the tanks can lead to soil erosion and potential groundwater pollution. The provision of fuel and other goods and services is beneficial to road user, mainly from the surrounding and local residential areas. Therefore, the convenience provided by the filling station has a positive impact on the users of the filling station. Furthermore, the opening and running of a filling station will result in job creation, thereby supporting the local economy.
Impact on prevailing ambient noise levels	Adjacent areas	Noise will be generated by the movement of vehicles utilising the filling station and its associated components.
Impact on storm water quality during the operation of the tank and in the event of accidental spillage	Storm water run-off, natural drainage courses and areas in the vicinity of the study area.	This is a common risk associated with hydrocarbon tanks. The highest risk is obviously during the transfer of fuel from the mobile fuel tanker to the underground fuel storage facilities. Should surface water run-off be contaminated it may run through the storm water systems into the natural drainage course. **This will occur under circumstances where no anti-pollution measures are designed and installed**. The design of the storm water system, to drain the premises, must be such that it prevents the risk of storm water pollution or abnormal soil erosion at its outlets.
Impact on soil in terms of leaking suction line-generator feeder pipe	Soil	The generator feeder pipe will be installed 500m below the surface and connect the fuel tank with the generator. This feeder pipe can potentially leak and impact soil quality.
Waste disposal and handling of solid waste and sewage associated with general	The aesthetic quality of the site, social impacts (health of	The proposed development is likely to generate waste (gaseous, liquid, and solid) during the construction and operational phases of the proposed development. Impacts associated with waste management have been included in this EMP.

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT	NATURE AND DESCRIPTION OF THE IMPACT
trading and waste disposal by consumers	consumers and adjacent communities within the study area), possible surface water run-off and groundwater resource contamination, as well as air pollution.	
Cleaning and maintenance of surfaces	Surface water run-off (into the storm-water system) and water quality within the study area.	Chemicals used in the routine cleaning of surfaces (and possible oil and fuel spill clean-ups) can result in polluted surface water run-off, which enters the storm-water systems, thereby affecting the quality of the stormwater that may eventually end up contaminating the natural drainage system (dams in the area).
Production of possible take-away fast foods	Social environment and local economy.	Positive impacts are anticipated as a result of fast-food production at the filling station, in the form of job creation and convenience to road users and adjacent landowners utilising this aspect of the filling station.
Impact of illumination produced at night by the forecourt and parking area of the filling station	Visual and aesthetic quality, social environment of adjacent community.	Visibility is an important requirement of filling stations; therefore, night illumination will be required. The light produced could cause a disturbance to adjacent residential areas. However, light illumination is usually not a problem associated with filling stations. Light orientation will be important in this regard.
Impact of the proposed filling station on existing filling stations within the study area.	Commercial impacts on existing filing stations.	A new filling station within the study area is not anticipated to detract business from other filling stations within a 6 km radius of the proposed filling station. However, this is a commercial issue which cannot be resolved in environmental terms.
Biodiversity Impact	Vegetation / habitat	The proposed site can be considered a natural area and currently does positively contribute to the biodiversity of the area. The site therefore has moderate biodiversity value. It is necessary to request any biodiversity assessments for the site due to its natural/indigenous nature and its proximity to built-up areas.
Vapor Recovery	The site	The materials to be handled on site can be considered volatile which results in the presence of toxic vapour when the substance is transferred from vessel to vessel. This vapour can be considered a loss of hydrocarbons as well as a potential threat to the environment. In order to ensure that this filling station does not harm the health of patrons or the environment and minimises the loss of hydrocarbons, a vapour recovery plan/system must be put in place.

ENVIRONMENTAL ASPECT AND PROJECT STAGE	ENVIRONMENTAL COMPONENT	NATURE AND DESCRIPTION OF THE IMPACT
Health and safety issues	Surrounding environment	The proposed construction of a filling station could potentially pose a health and safety risk to surrounding inhabitants and patrons of the proposed structure. Fires, spills and other mishaps could cause significant injury to people on or near the proposed site as well as result in significant environmental degradation.

Significance rating of the anticipated impacts

ENVIRONMENTAL AND OTHER COMPONENTS TO BE AFFECTED C = relevant to construction stage O = relevant to operational phase	Probability value	Intensity value	Duration value	Severity value	Significance rating
Impact on the vegetation component of the site	C: 3 O: 2	2 1	2 3	2 2	6: Moderate (negative) 4: Low (negative)
Impact on soil (surface stability)	C: 3 O: 2	2 1	2 3	2 2	6: Low (negative) 4: Low (negative)
Impact on soil (topsoil layer - disturbance and compaction)	C: 3 O: 2	2 1	2 4	2 2	6: Low (negative) 4: Low (negative)
Impact on subsurface soil quality	C: 2 O: 2	2 2	2 4	2 3	4: Low (negative) 6: Low (negative)
Impact on topography	C: 2 O: 2	2 2	2 4	2 3	4: Low (negative) 6: Low (negative)
Impact on surface drainage and existing water bodies	C: 3 O: 2	2 2	2 4	2 3	6: Low (negative) 6: Low (negative)
Impact on surface water run-off quality	C: 3 O: 4	2 2	2 4	2 3	6: Low (negative) 12: Moderate (negative)
Impact on groundwater resources	C: 3 O: 4	2 2	2 4	2 3	6: Low (negative) 12: Moderate (negative)
Impact on air quality	C: 4 O: 2	2 2	2 4	2 3	8: Moderate (negative) 6: Low (negative)
Impact on ambient noise levels	C: 4 O: 4	2 2	2 4	2 3	8: Moderate (negative) 12: Moderate (negative)
Impact on the social environment of the adjacent community	C: 4 O: 4	2 2	2 4	2 3	8: Moderate (negative) 12: Moderate (negative)

Impact on the social environment of the filling station users	C: 4 O: 4	2 2	2 4	2 3	8: Moderate (positive) 12: Moderate (positive)
Impact on traffic safety aspects	C: 4 O: 4	2 2	2 4	2 3	8: Moderate (negative) 12: Moderate (negative)
Impact on land use & agricultural potential	C: 3 O: 3	2 2	1 4	2 3	6: Low (negative) 9: Moderate (negative)
Impact on visual and aesthetic quality	C: 3 O: 4	2 2	2 4	2 3	6: Low (negative) 12: Moderate (negative)
Impact on local economy (due to job creation)	C: 4 O: 4	2 2	2 4	2 3	8: Moderate (positive) 12: Moderate (positive)
Impact on health and safety	C: 3 O: 4	2 2	2 4	2 3	6: Low (negative) 12: Moderate (negative)
Impact on heritage resources	None	None	None	None	None

5.2 Impact mitigation during the construction phase- Installation of new tanks

The construction stage of the proposed activity will cause minor impacts on the biophysical and social environment. The site area was already impacted by historical activity of the area.

Although these impacts are short-term and low significance in nature, it still is essential to address them as sufficiently as possible. The following recommendations are proposed to assist as basic environmental management steps and to be implemented during the construction phase of the project:

- The locality of stockpile areas must be confirmed and discussed with the appointed contractor/Resident Engineer before construction activities commences.

- Specified areas of access and movement by construction vehicles during the construction period are essential. No additional or random routes should be developed in the vicinity of the construction area. It is imperative that limited disturbances to the surrounding area takes place.

5.2.1 Management of impacts on vegetation cover and faunal habitats

- Clearing/removal of the existing vegetation for the proposed work will be necessary; however, due to the size of the site, the significance of this impact is rated as moderate. The visible vegetation on site is of an indigenous nature.

- The propagation of exotic species and weeds will need to be controlled during the construction phase, as there are many activities on site that could lead to the establishment of weeds - including compaction of the soil by heavy machinery, construction waste, stockpile areas etc.

- Weed species should be removed on a four-week basis. Much of the site will be paved. It is recommended that only indigenous species be used in the landscaping process.

- Innovative landscaping of the site towards the end of the construction stage will contribute significantly to the visual and aesthetic attractiveness of the site and will also solve the problems associated with the removal of vegetation cover, including soil erosion, dust generation and the flourishing of weeds and/or other unwanted exotic species in the long term.

Implementation responsibility: The main contractor/municipality will be responsible for the implementation of the above measures as an on-going process during construction phase.

5.2.2 Soil stability

If construction is to take place during the summer months, the terrain could be susceptible to sheet and gully erosion as a result of the often-sandy texture of the bare topsoil layer. Aspects that typically impact on soil conditions are excavations, establishment of stockpile areas, removal and/or clearance of vegetation, movement of construction vehicles, and maintenance of construction vehicles and sanitation provision to workers during the construction period. Therefore, the following recommendations pertaining to soil conservation practices are made:

- Topsoil must be stripped from all areas, where construction activities are going to take place, to be re-used in landscaping the site.
- Any excess overburden material that is generated may not be dumped in a random manner. Dumping sites should be predefined, agreed upon and adhered to.
- All erosion channels developing during the construction period or during the operational and maintenance period should be backfilled and consolidated immediately.
- Soil contamination during construction vehicle maintenance or as a result of fuel storage on site is easily prevented, but in the event of such an accident, the spill should immediately be cleaned up by absorbing the worst of the fluid with saw dust and then disposing of the saw dust and the first bit of the soil layer at a hazardous waste disposal site. The other option is to have spill kits available on site.
- Seepage may result in the destabilizing of the soils above the seepage and special precautions may be required. The contractor is responsible for the implementation of suitably designed support systems. Embankments should be adequately compacted and protected from erosion.
- In addition to the above, the following restrictions will be enforced:
    - No borrow pit or quarry will be opened on site. All imported material will be obtained from commercial borrow pits or quarries.
    - The footprint of the various structures will be staked out prior to commencement of construction activities.
    - No moving or removal of stones, plants or any other natural specimens will be allowed outside the staked construction area.
- Trenches will only be as deep as required and be backfilled as soon as possible.
- All open trenches will be demarcated clearly with danger tape, or as otherwise instructed by the Engineer.

Implementation responsibility: The main contractor and project engineer will be responsible for the implementation of the above measures as an on-going process during construction phase.

5.2.3 Stockpiles and general storage of building material and equipment

Special care must be exercised when selecting the location of temporary material storage areas.

- Any excess soil or overburden material must be stockpiled to reduce visibility.
- Excess material that is not used during construction activities should be removed from the site to be used by other users in the construction industry.
- It is essential to place enough sandbags along the toe line of any loose material stockpiled and for the storage of building material.
- In the event of soil and overburden being removed from its locality, it must be suitably stockpiled away from any drainage ways.
- Overburden soil can alternatively be re-used in landscaping depending on the need.
- No material must in any event be dumped in any place in the surrounding region. Written proof of disposal at a waste disposal site must be given to the applicant and site manager on every load of construction waste removed from the site.

Implementation responsibility: The main contractor/Resident Engineer/ Project Manager will be responsible for the implementation of the above measures as an on-going process during construction phase.

5.2.4 Community or public safety

Large construction vehicles, including trucks and other heavy machinery, will impact on road safety circumstances on the roads they use, and it is the duty of the contractor to ensure that safety measures are implemented and adhered to.

The safety of the community throughout the construction period is of utmost importance. As road safety awareness is imperative, the following important actions must be noted that will assist in the management of safety during the construction phase where necessary:

- Adequate and correct caution signage and road marking during construction in accordance with the requirements of the South African Road Traffic Signs Manual and the CSRA / CUTA Road Signs Note 13. (Workers with red flags, visible workers and vehicles etc.)
- Names and identification numbers of each worker housed on-site must be provided by the contractor.

Implementation responsibility: The main contractor/resident engineer/ project manager will be responsible for the implementation of the above measures as an on-going process during construction phase

5.2.5 Waste disposal and management

It is crucial to implement strict and effective waste control and waste management procedures during the construction phase.

- No littering by any personnel is permissible.
- The site manager/contractor should conduct regular site clean-ups to keep the site litter free – as litter is not only aesthetically displeasing, but it is also harmful to the environment.
- All domestic solid waste produced must be disposed of in waste bins situated on site. The bins should be emptied into a covered skip (for storage) on a regular basis, until its collection and removal to a municipal waste disposal site (preferably on a weekly or bi-weekly basis).
- No liquid waste material should be disposed of on or near the site during construction, or in any non-designated areas.
- In the event of accidental spillage of liquid substances, like paints and resins, it is important to implement the correct emergency procedures and cleaning-up operations. Pollution of surfaces should be limited at all costs.
- The generation of construction waste occurs at every site under development and construction. Due to the costs involved in the disposal of this material at municipal or other licensed waste sites, the contractor or sub-contractor may be tempted to illegally dump waste at concealed locations to save on costs. Therefore, strict control is required from the project manager or landowner, to control this issue.
- Proof of disposal of waste material at a registered waste disposal site must be shown after off-loading of each waste load, which should then be logged or registered for control purposes.
- Control measures in terms of the National Building Regulations and standard requirements laid down by the local authority, with regards to spillage and waste disposal, must strictly be adhered to.
- General waste disposal management involves the collection of construction waste at a central collection facility, which should be pre-arranged and implemented. This should include making points available for solid as well as liquid waste – including mechanical fluids disposed of during vehicle maintenance.

Implementation responsibility: The resident engineer and contractor will be responsible for the implementation of the above measures as an on-going process during construction phase. Removal of waste from the terrain will be the responsibility of a certified waste contractor.

5.2.6 Noise

Another important aspect is the control of noise pollution. This is achieved by implementing the following measures:

- Ensuring that machinery and trucks are well-oiled and maintained; this will make less noise than poorly serviced construction equipment.
- Lastly, construction hours should be confined to daylight hours of a normal working day, specifically from 7 am to 5 pm in the summer and 7.30 am to 5 pm in the winter.
- No construction activities should take place on Saturdays after 14:00 and no actions must take place on Sundays.

Implementation responsibility: The main contractor/ project manager will be responsible for the implementation of the above measures as an on-going process during construction phase.

5.2.7 General rehabilitation

It is important that rehabilitation will commence as soon as feasible on each of the construction areas to run concurrently with the construction phase and not to be left until completion of the works. This will increase the chances of successful rehabilitation.

All areas disturbed by development activities will be rehabilitated on completion of the construction phase. The following general procedure will be followed:

- Removal of all remaining construction materials and equipment from the site, cleaning up of any remaining oil or other spills and removal of all construction waste from site;
- Shaping of the disturbed areas to blend with the surrounding landscape;
- Placing of topsoil on all disturbed areas (minimum depth 150 mm);

Implementation responsibility: The main contractor / project manager will be responsible for the implementation of the above measures as an on-going process during construction phase.

Final recommendations applicable to the construction stage.

This stage represents the period immediately after site hand over. The contractor must be made aware of the contents of the EMP, even if there are sections in the tender documentation which referred to environmental impact management measures to be budged for and implemented.

The following "rules" must be implemented to make the document relevant and handy on site:

- The EMP shall not be removed from the site office
- The EMP shall be updated when necessary
- The EMP shall be readily available to the Resident Engineer/Project Manager, and the site manager
- The EMP shall be available on site to any Interested and affected party but shall not be removed or copied to such a party or person.

5.3 General mitigation measures in the operational phase – Filling station and its tank installation

5.3.1 Contamination of surface water/soil through storm water run-off from hard surfaces.

- Other precautions to be implemented in order to prevent storm water pollution are:
  - Cover any waste that are likely to wash away with rain;
  - Build a bund around waste storage area to stop overflow into storm water channels;
  - Storm water outflows will not be allowed into a drainage line;
  - Natural storm water must not be piped other than in areas where it runs perpendicularly cross a roadway.

Implementation responsibility: The operational manager will be responsible for the implementation of the above measures as an on-going process during operational phase.

5.3.2 Contamination of soil and groundwater due to leaking fuel tanks

The risk of soil and groundwater contamination, as a result of faulty/leaky underground fuel storage tanks, can be limited through precautionary measures.

- It is recommended that the tanks should be placed on a solid concrete base or foundation as part of the concrete containment.
- The storage tanks must conform to SABS 1535 standards and must be manufactured by approved manufacturers (for example by approved suppliers to SANS 15).
- All the requirements pertaining to tanks design specifications and installation are set out in SABS codes of practice reports, which have to be adhered to by the petroleum company.

- The tanks must be manufactured according to composite bonded specifications (to prevent rusting and possible leaks).

Implementation responsibility: The operational manager will be responsible for the implementation of the above measures as an on-going process during operational phase.

5.3.3 Waste management

All hazardous waste must be stored in sealed and suitably marked containers for removal to a hazardous waste landfill site by the contractor on a bi-weekly basis. Hazardous waste could include used oils and contaminated gravel.

5.3.3.1 Liquid effluent

Liquid effluent will potentially be generated by the washing and cleaning of all paved surfaces. Waste management in this regard is important and includes the management of all cleaning operations:

- It should be a firm rule that no outdoor paved surfaces be cleaned with non-biodegradable detergents, so as to reduce the risk of contamination of natural drainage through the storm water management system.
- Alternatives regarding the manner in which the contaminated water can be handled should be considered. For example, water can be intercepted in a concrete lined evaporation pond. The site engineer can determine the placing, design and extent of the pond required.
- The management of other liquid effluent, like sewage produced during the operation of the filling station's bathroom facilities, will be handled through municipal sewage system.

5.3.3.2 Solid waste

Waste generated during the operation of the filing station must be collected in waste bins that are emptied on a regular basis into a central waste collection facility, which in turn is to be collected on a regular basis to be emptied at the nearest municipal solid waste disposal site. The products that will typically be generated by filling stations include empty oil cans, paper rolls (wastepaper from window cleaning and the wiping of dipsticks), empty bottles and cans, paper and cardboard boxes, cool drink tins, food wrappers and plastic.

5.4 Emergency events

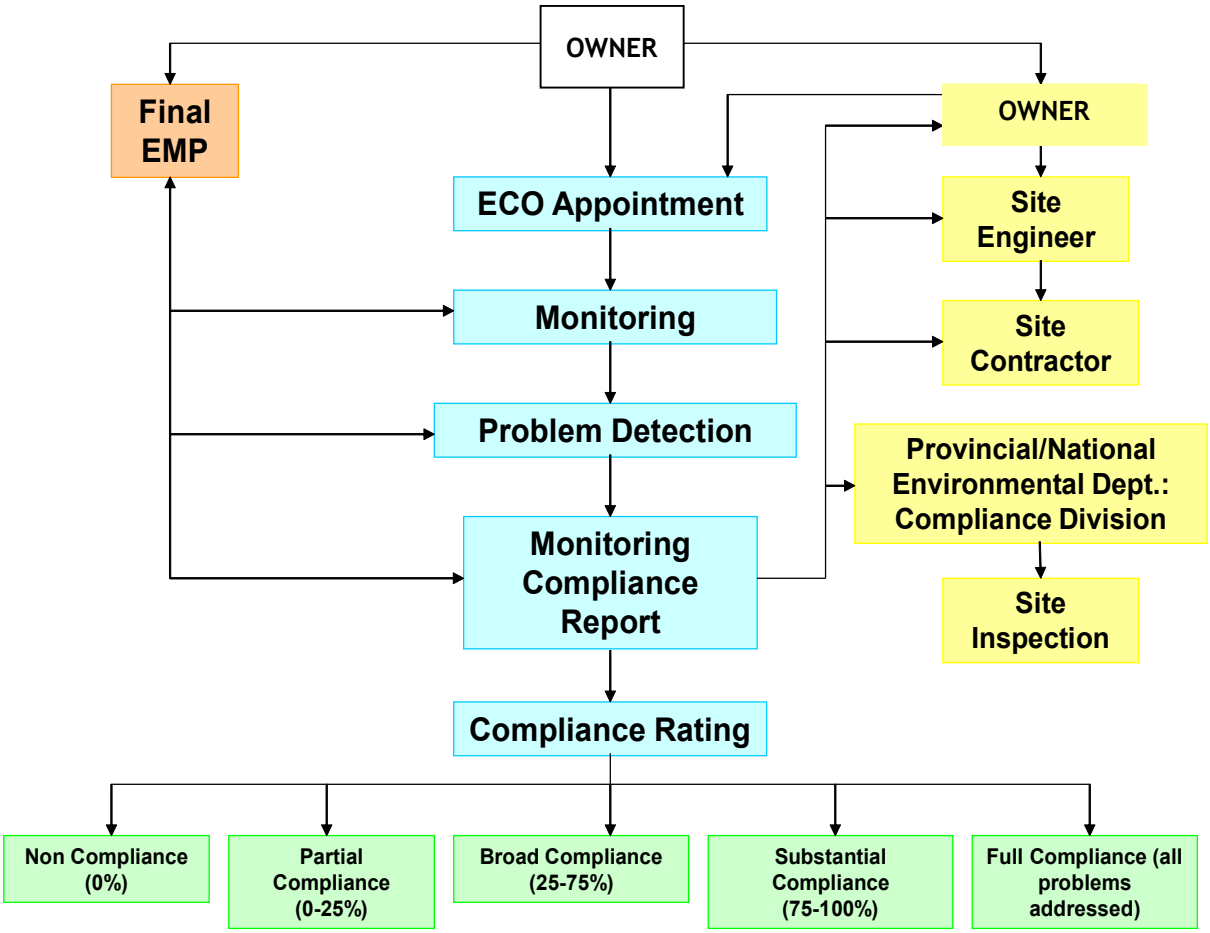
Emergency event	Mitigation	Responsible parties
1. Spillage of oil, fuel or solvents on pavement or on soil surfaces.	Prompt placement of suitable absorbent material e.g. wood shavings or fine sand. Mopping up of the surface. In case of significant spillage on open soil surface of grassy areas, the contaminated soil cover must be removed to a depth of 20cm and disposed of at the nearest hazardous waste disposal site. Paving should be cleaned with biodegradable substances. In the unlikely event of any type of spillage or soil contamination within 20m from a drainage line, sandbags must be placed between the stream course and the area of spill while cleaning up is taking place. If spill events occur, polluting surface drainage, such contaminated surface water will be pumped into containers and removed from the site to be disposed of at the nearest hazardous waste disposal site. The name and contact details of such a contractor must be kept in the site office at all times.	The project manager and the contractor responsible of that particular part of the site actions.
2.Fire occurrences	• Shut of the main shut off valve • Implement the fire safety measures as determined by internal health and safety procedures	Operational manager
	In the event of fire on the terrain, the Fire Department must be called in. It is also important that local firefighting equipment be ready and available at the site office. Such equipment includes a water cart and booster pipe and hose to fight minor veldt fires of fires at equipment or buildings. The contact details of the local fire brigade and emergency services will be kept available at the site office at all times.	Operational manager

5.5 Financial Provision/Quantum Calculation

See Annexure C

5.6 Planned monitoring and performance assessment of the EMP

Environmental monitoring will take place in accordance with the illustration below:



5.7 Closure of the site

Closure of the site will include the following:

- removal of fuel tanks
- removal of infrastructure
- removal of pump
- Ripping or ploughing of all compacted surfaced. Demolition of building structures, removal of all building rubble from the site
- Covering the site with 150mm layer of topsoil

5.8 Environmental objectives

- To operate the study site with limited environmental impacts.
- Address all fuel spillage incidents with sufficiency in time and effectiveness.
- Handle all waste activities in such a manner that environmental impact will be minimized to as low as possible.
- Strive for full out environmental due diligence and responsibility.
- Show environmental responsibility throughout the operation all phases of the project.

6. COMMENTS, RECOMMENDATIONS AND MITIGATION MEASURES FROM SPECIALISTS

6.1 The conditions and monitoring aspects associated with the groundwater monitoring activities

Prior to the construction phase the applicant will have a discussion with the Fuel Retailers Association to get and include their conditions and monitoring aspects associated with the groundwater monitoring activities and requirements.

6.2 Geotechnical Impact Assessment mitigation measures

Foundation Recommendations and Solutions

Below are typical recommendations for structures of this nature, taking into account the geotechnical characteristics of the investigated site:

Reinforced strip and/or pad foundation systems should be utilized. Foundations should be placed below the organic alluvium (transported horizon).

To reduce the risk of collapsibility potential, hydro compaction could be performed. This is the process where the collapsible horizon is saturated and then compacted to artificially break the collapsible grain structure.

It is recommended that EITHER of the following foundation designs be used in the development (According to the NHBRC guidelines):

Site Class C1/S:

1. Deep Strip Foundations:

▫ Reinforced strip footings placed at a depth of 0.8 m.

▫ Articulated joints at some internal and all external doors.

▫ Light reinforcement in masonry.

▫ Site drainage and plumbing/service precautions.

2. Limited Soil Raft:

▫ Remove in situ material to 0.8 m depth and 1.0 m beyond the perimeter of the structure and replace with competent material, compacted to 93% MOD AASHTO density at -1% to +2% of optimum moisture content.

▫ Construct a 500 mm soil raft.

▫ Reinforce the foundations and stiffen foundation brickwork

▫ Articulation of superstructure

▫ Moisture barriers around the perimeter of the structure

▫ Site drainage and plumbing/service precautions

It must be noted that differential settlement is assumed to equal 75 % of the total settlement. The relaxation of some of these requirements, e.g. the reduction or omission of steel or articulation joints, may result in a Category 2 level of expected damage.

Good Construction Practices

An important factor in the promotion of a stable site is the control and removal of both surface and ground water from the site. It is important that the design of the storm water management system allow for the drainage of accumulated surface water.

Surface Drainage

It is recommended that an efficient surface drainage system be installed around all structures and along all roads throughout the study area in order to:

▫ prevent the ponding of water next to structures directly after heavy precipitation events, this may lead to differential settlement as the saturated material undergoes densification.

▫ prevent large-scale changes in soil moisture beneath the structures on a seasonal basis.

▫ prevent the possible lateral movement of liquids within the upper soil horizons.

The precautionary measures should ideally include:

▫ the sealing of open ground surfaces by means of either of the following:

▫ the cultivation of a natural soil cover (e.g.: grass)

▫ compaction of the soil surface

▫ bitumen or concrete paving

▫ the removal of surface water to a distance of at least 1 m beyond structures by means of watertight paving.

▫ the removal of surface run-off by means of an efficient surface drainage system.

▫ roads should preferably be constructed parallel to the natural surface elevation contours rather than perpendicular to it, in order to reduce run-off velocities

Sub Surface Drainage

Adequate drainage should be implemented to avoid large scale moisture changes in the loadbearing strata.

Earthworks

It is recommended that all earthworks be carried out in accordance with SABS 1200 (current version). The fill should be placed in layers not exceeding 200 mm loose thickness and compacted to a minimum of 95% Modified AASHTO maximum dry density.

All fill operations should be observed by a competent professional and tested periodically to confirm compaction is achieved.

6.3 The requirements by WCG: Department of Environmental Affairs and Development Planning — Pollution and Chemicals Management

The D: PCM notes that effective management, protection and monitoring are required on site in order to avoid and mitigate contamination risk and any potential water, soil and groundwater impacts. The following mitigation measures are recommended with respect to the installation of the proposed underground storage tanks (USTs) and construction of the filling station, including, inter alia:

1. All liquid chemicals and fuel must be stored in a bunded area with a capacity of at least 110% of the maximum allowable volume. The storage area should be fenced, and all access controlled.

2. Corrosion resistant tanks, -pipes and -detectors must be used and must conform to the relevant SANS codes.

3. The tanks must be fitted with an overfill protection device.

4. Shear-off valves must be anchored below fuel dispensers so that no spillage occurs if the dispenser is accidently knocked over. There must also be breakaway couplings on the hoses in case a vehicle pulls away from pump dispenser while the nozzle is still in the filler.

5. During fuel tank delivery, the tanker driver must be present at all times during product offloading. An emergency cut-off switch must be installed to immediately stop fuel delivery should an accident occur.

6. The surfaces of all refuelling areas must be constructed from concrete to form an impervious layer, which must be sloped towards the spillage containment areas.

7. Stock reconciliation must be undertaken regularly to ensure effective stock monitoring, recording and regular auditing for early identification of possible leaks and such leakage records must be produced on demand.

8. Fire-fighting equipment, regularly serviced, must be present on site and staff training in emergency firefighting must have been completed.

9. Training of all staff must be given to prevent the risk of environmental pollution.

10. Appropriate management (handling, storage, transportation and disposal) of waste and chemicals must be implemented. All hazardous wastes must be stored in an enclosed and surfaced area prior to disposal at a registered waste management facility.

APPENDIX A: UNDERTAKING BY THE ENVIRONMENTAL ASSESSMENT PRACTITIONER

I, **Mr Rowan van Tonder** from REC Services (Pty) Ltd. hereby confirm that I'm the EAP that has overseen the compilation of the Environmental Management Plan and that the information I have provided is accurate to my knowledge.

Rowan van Tonder

23 June 2022

APPENDIX B: UNDERTAKING BY THE APPLICANT TO EXECUTE THE EMP.

Undertaking by the Applicant to execute the EMP.

I, AJ Cronje from Long Island Trading (company) hereby undertake to execute the Environmental Management Plan as it is set out in the documentation of which this section forms part.

AJ Cronje (Name)


(signature)

23 June 2022 (Date)

ANNEXURE C: QUANTUM CALCULATION & REHABILITATION COSTS FOR FINANCIAL PROVISION BY TANK CONTRACTORS

The Financial Provision for the rehabilitation of the tanks after closure of the filling station facility will be based on the quantum calculation. It is currently in progress and will be provided as soon as available. Applicant will make provision for the rehabilitation.

PC PUMP & TANK (PTY)LTD

"A Partnership that Works"

Quotation

Address: 22 Van Riebeeck Ave

Alberton North

Alberton , 1449

011 869 7859

072 185 1492

086 660 5154

Reg No: 2012/165386/07

Vat No: 4890261557

pcpump.tank@telkomsa.net

Quotation No: QUO008619

Date: 23/06/2022

Attn: Rowan

Email: rowan@recservices.co.za

Herolds Bay Country Estate

SCOPE OF WORK:

Site Decommission

Description	Unit	QTY	Amount	Total
1) Degas tanks (U/G tanks) & pump last 150L fuel out	No	3	R 9 500.00	R 28 500.00
2) Remove of pumps (estemed)	No	3	R 3 000.00	R 9 000.00
3) Make safe electrical	All	1	R 25 000.00	R 25 000.00
4) Remove tar - paving or concrete over tanks & cart away	m2	1200	R 250.00	R 300 000.00
6) Excavate & remove back bund wall	m3	550	R 2 350.00	R 1 292 500.00
7) Clean site	m3	100	R 955.00	R 95 500.00
8) P's & G's	Sum	1	R 125 000.00	R 125 000.00
Total excl Vat				**R 1 895 500.00**
Vat 15%				**R 284 325.00**
Total incl Vat				**R 2 179 825.00**

Please note this quotation is valid for 30 days.

Reminder: Please include Quotation number as reference.

Payment Terms:

70% Deposit - 30% On Completion

Sign: _____

BANKING DETAILS

NAME: PC Pump and Tank Pty Ltd

BANK: Standard Bank

BRANCH: Alberton 012342

ACCOUNT: 300734247

ANNEXURE D: LOCALITY MAP AND TECNICAL LAYOUT / SDP

Locality Map

SERVICE STATION LOCATED ON PORTION 112 OF THE FARM BUFFELSFONEIN 204/7 AS PART OF THE FUTURE HEROLDS BAY COUNTRY ESTATE, GARDEN ROUTE MUNICIPALITY, WESTERN CAPE PROVINCE

Legend

Fill St Site

GEORGE CENTRAL

GEORGE SOUTH

George

R102

R102

R404

2

2

2

THEMBALETHU

PACALTSDORP

R404

Filling station Site

Oubaai Golf Estate

Herolds Bay

Google Earth

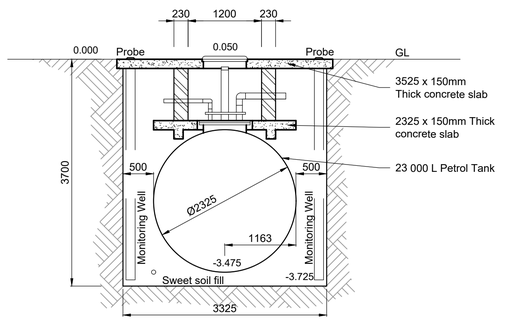
Image © 2022 CNES / Airbus

Data SIO, NOAA, U.S. Navy, NGA, GEBCO

Image © 2022 Maxar Technologies

N

4 km



SECTION A: INSTALLATION DETAIL OF
UNDERGROUND PETROL TANK
SCALE 1:50

Gabion retaining wall
Deck
RESTAURANT
Deck
Deck
Internal sewer reticulation (Restaurant and shops)
Stormwater outlet
Stormwater kerb inlet
Ø300mm Stormwater pipe
SW
MH
PORTION 106
ENTRANCE
Covered link
path
Golf cart parking
Gabion retaining wall
SW
MH
Motor Court
& Parking
x34 bays
Forecourt stormwater inlet to separator
MH
Stormwater V-drain
SHOPS
Compressor
1xØ50mm (AIR)
2xØ50mm (DATA)
2xØ50mm (POWER)
SERVICE STATION
Ø300 SW Pipe
Fuel pumps
Fuel pumps
Deliveries
MH
Pump DB
Cashier
Aquatic buffer line
Sewer outfall to package plant
Oil separator
Canopy roof over
Forecourt concrete apron spill slab 7 x 18m²
Deck
18762
3000
1000
7500
Spill catchment area with filler caps
6xØ50mm HDPE Petrol and diesel plus fuel line
PORTION 112
Packaged Sewer Treatment plant
1 Diesel
2 Diesel
3 Petrol
FUEL TANKS
22600 x 2.5 W
10900
3000
FILLER CAPS
6500
OFFICES
Deck
Parking
x8 bays
Parking
x32 bays
1551
R8500
R3000
R6000
10000
R8500
To internal water reticulation
To internal sewer reticulation (Offices)
R1
Sign
R6000
Connect to mun bulk water line
Sewer outfall to package plant
Mun. bulk water line
OUBAAI MAIN ROAD
33
13
06
05
N
W
E
S

Rev.	Date	Description	Rev. by
A	05/05/2022	PRELIMINARY DESIGN	MP

ELEMENT Consulting Engineers
A FIFTH DIMENSION TO ENGINEERING

82 Victoria Street,
George, 6530

P O Box 9962,
George, 6529

Tel: +27 44 884 1138
Fax: +27 44 884 1185
E-Mail: info@eceng.co.za

Client/Employer

HEROLDS BAY
COUNTRY ESTATE

Project

HEROLDS BAY ESTATE

Plan Description

FILL STATION
SITE DEVELOPMENT PLAN

	Name	Signature
Designed	MP	
Drawn	MP	
Checked	HL	
Approved	HL	
Pr. No.		

Scale 1:250

ORIGINAL SIZE A1

Contract No. 1701561

Drawing No. 1701561/C/G100

Revision A

P:\2017\1701561 - Herolds Bay Estate\D - Drawings\06 - Working Drawings\2022\1701561-C-A-Filling Station_Site Development Plan - 06May2022.dwg

ANNEXURE E: SPILL/EMERGENCY RESPONSE PLAN

INCIDENT MANAGEMENT PLAN:

VAPOUR RECOVERY, EMERGENCY/FIRE AND SPILL RESPONSE PLAN FOR FILLING STATIONS.

CONTENTS

1. BACKGROUND

1.1. PROJECT AIM/OBJECTIVE

To compile an Incident Management Plan for the establishment of a filling station on a portion of Portion 7 of the Farm Buffelsfontein 204, Herold's Bay, George. The information is sought to fulfill the requirements of the Basic Assessment Report (BAR) in reporting on Vapour Recovery Plan, Emergency/Fire and Spill Response Plan for integration into a Basic Assessment Report (BAR) as well as for an Environmental Management Plan for DME, to be compiled by REC Services Pty (Ltd).

Petrol and diesel are complex mixtures of hydrocarbons that release organic vapour into the environment if not adequately controlled. The individual chemicals in the mixture release vapours at different rates, attributed to the vapour pressures. The hydrocarbons emitted during petrol storage and distributions are broadly classified as Volatile Organic Compounds (VOCs) and are among the most common air pollutants. VOCs adversely affect air quality and can also have a negative impact on human health due to its toxicity. It is therefore essential to capture the petrol vapour that would normally escape into the atmosphere, and recover into the liquid state through the concept of Vapour Recovery to prevent detrimental health effects, and creation of an explosive atmosphere on the forecourt area.

The storage of hazardous substances on premises is controlled by the Regulations of Hazardous Chemical Substances. South Africa does not have air quality standards for most types of air pollutants. Those assessed have no standards and the Department of Environmental Affairs and Tourism utilizes a fraction of the Occupational Exposure Limit 1/100, if pollutant is carcinogenic (cancer producing substance) or 1/50, if pollutant is not carcinogenic. Therefore control measures are implemented for the filling station site in order to prevent catastrophic and fatal occurrences.

1.2. ASSUMPTIONS AND LIMITATIONS

The following assumptions and limitations are identified for the study:

- The Environmental Assessment Practitioner's (EAP) experience in similar projects is relevant and appropriate for reaching logical and scientifically based conclusions in the study;
- The Incident Management Plan has not been drawn up by a qualified risk consultant;
- The study does not account for future construction of another filling station in close proximity (within 20m) to the proposed site;
- The health of the petrol attendants has not been verified on site due to the site not being operational, and the state of health of the workers is also unknown; and
- The impact of the surrounding traffic on the air quality is beyond the scope of the investigation, therefore will not be investigated into detail, rather on a generic level.

2. VAPOUR RECOVERY PHENOMENON

2.1 EVAPORATIVE EMISSIONS

According to a study compiled by Cornelia Venter in Recovery of Petrol Vapour at a bulk storage facility (2003), maintains that evaporative emissions fall into four (4) types, viz:

1. Displacement emissions
   - These emissions occur from fixed storage facilities (bulk storage tanks) and underground storage tanks, and are due to vapour displacement by incoming petrol; and
   - It accounts for 0.16% of the total emissions losses from petrol storage and distribution systems.

2. Breathing and withdrawal emissions
   - These are caused by variations in tank contents, temperature change in barometric pressure that causes expansion and contraction of the liquid and vapour in the tank;
   - Withdrawal emissions occur when the petrol is pumped out of a storage tank resulting in the intake of air through pressure/vacuum relief valves or vents; and
   - Breathing and withdrawal emissions from service station storage tanks accounts for 0,01% of total emission losses.

3. Filling emissions
   - Petrol transfer from storage tanks to road tankers.

4. Emissions from vehicle refueling
   - During vehicle refueling at service station, the incoming petrol displaces the petrol vapour in the fuel tank, causing it to escape into the atmosphere.

2.2 SITE ENVIRONS

The following site environs were identified which could exacerbate or reduce the impact of petrol vapours when combined with the impact of the proposed filling station.

- The absence of confining structures or high rise buildings that could prevent the free flow and/or circulation of air on- and off-site;
- Tree buffers to aid as wind breakers and absorb air contaminants;
- The absence of similar filling stations and other total petroleum products (e.g. paraffin, benzene, oil etc) within 500m of the site to reduce the cumulative effect;
- The site's location relative to passer-by vehicular traffic associated with the emission of carbon monoxide; and
- The predominant northeasterly wind which blows away from the nearest sensitive receptors (about 400m to the northeast).

When taking the above factors into account coupled with site sampling the level of air contaminants present on site as a result of the storage of petroleum products and the filling thereof would be determined, and corrective measures would be implemented to remain within acceptable exposure limits.

3. PROPOSED FILLING STATION AND VAPOUR RECOVERY PLAN

Vapour recovery is a process where petrol vapour, which would normally escape into the atmosphere, is recaptured and recovered into the liquid state.

3.1 Vapour collection methods:

3.1.1 During road tanker unloading at service station

- Modifications involve closing vents on a road tanker and underground storage tank (UST);
- Use rubber seals on the road tanker's dispensing pipe to the underground storage tanks; and
- Addition of piping and equipment to allow for vapour collection/re-routing.

3.1.2 During vehicle refueling

- Return of vapour to the filling station UST when refueling by using specially modified petrol filling nozzle or must be rubber sealed (**see figure 1: modified petrol nozzle**);
- On-board refueling Vapour Recovery units; and
- Use dispensing pipes with a rubber seal and automatic switch-valve to cut supply when tank is full to reduce the dispersal of VOC's.

Figure 1: Petrol nozzle adapted for vapour collection

3.2 Vapour recovery plan, installation and reporting

The following plan is recommended for the proposed filling station site:

- Emissions are estimated at about 0,16% of the volume throughput of the site, therefore this concentration will not expose sensitive receptors to substantial pollutant concentrations;
- The vapours dissipate from site within 5m of the forecourt and exposure by petrol attendants is below the national occupational limit;
- Limit the electrical energy in circuits and equipment to levels that are too low to ignite the most easily ignitable mixture of gas or vapour;
- All electrical equipments must be installed in accordance with the SABS Code 0142 - Code of Practices for the wiring of premises, and SABS 0108 as well as Occupational Health and Safety Act, 85 of 1993;
- Provide for leak detection on the tank gauge system together with stock reconciliation;

- Clean spillages of petrol, diesel and/or oil immediately;
- Implement good housekeeping measures in the presence vehicular traffic along R55;
- Air contaminants from spillages and bulk tank vents and other sources, are continuously being released into the environment. If a spillage occurs, these levels increase until the spillage is cleaned or the petrol evaporates. Therefore reduce or control the amount of air contaminants generated into the air from the garage activities, through the following means –
    - All open containers or open surfaces containing petrol and/or diesel, should be kept closed; and
    - All spillage should be removed or neutralized immediately.

- The bulk storage tank vents must be located above the apex roof of the building to improve dispersal;
- Site the filling station such that there is very minimal confining structures to improve air dispersal from the site's forecourt;
- Implement SABS standards that advocate breather pipes on the storage tanks; and
- Implement the following minimum design standards for a filling station:

Table 1: Minimum standards for filling station installations

Area of concern	Minimum standard (Technical level)
Underground tanks monitoring	▪ Composite steel/glass fibre tanks with a documented and auditable continual leak monitoring system; ▪ Single wall tanks.
Tank overfill protection	Install overfill protection device to all storage tanks.
Tank fill points	Provision of leak containment and collection features.
Off-set fill/remove pipe work	Single wall pipe work (self draining to tanks).
Suction pipe work (underground)	▪ Single wall pipe work; ▪ Check valve must be installed at the pump end of the line (self draining to tanks).
Pressure pipe work (underground)	▪ Double wall pipe work with interstitial monitoring alarm system; ▪ Fit under dispenser shear valves.
Fuel system monitoring	▪ Subject all tanks and pipes to testing every 5 to 10 years.

Source: Sasol Oil manual

4. INCIDENT MANAGEMENT PLAN

An incident management plan entails the assessment of potential incidents likely to occur in the operation of a filling station site and measures to be implemented in mitigating the potential detrimental impacts thereof.

The following incident management plan is provided:

4.1 Fire hazard on the filling station site
When a fire is noticed, the following **procedure** must be **followed**:

- Activate the emergency fire alarm of the filling station. The supervisor in charge has to ensure that he or she is familiar with the position of the fire alarm. If you don't know where the alarm is situated, get the attention of any worker of the filling station and instruct him to activate the alarm;
- Guide people away from the danger area;
- Determine the following:
    - The exact location of the fire?
    - What is burning?
    - Is there a possibility of a spill/pollution?
    - Are there any injuries?

IF YES:
- How many?
- How serious?

- Try to move injured people outside the danger area without endangering your own life
- ▫ Instruct and assist customers to remove their vehicles from danger area, if possible, without endangering your own life
- Evacuate to a safe distance (follow the example of fellow employees who know the site evacuation areas, close doors and windows where possible)
- Establish who the Emergency Controller is and inform him or her of:
    - The exact location of the fire
    - What is burning
    - Any injuries and seriousness thereof
    - Any spillage/pollution
    - Inform the Petroleum Company depot of the incident
    - Await further instructions from the Emergency Controller.

The Emergency Controller is responsible for reporting the incident to authorities, e.g.
DWA (spill/pollution) CAPCO Air pollution and within 24 hours to the SABS Manager:

- Biological Environmental and Timber.

If spillage/pollution exist/is possible, the Emergency Team for handling of spillage must be contacted, and they will either use the Drizit trailer or if needed help contact the Department of Water and Sanitation and Environmental Consultants/Contractors.

Hand fire fighting over to Fire Department on arrival and assist if necessary.

Contain product as far as possible by using soil, sandbags etc. Action plans must be in conjunction with Fire Department and Emergency Controller.

Can you get the situation under control; follow procedures for **"YES"** answer

- If trained, try to extinguish the fire without endangering your own life
- If trained, apply first aid to the injured

- Try to help customers remove their vehicles from the danger, if possible, without endangering your own life.

If you cannot get the situation under control, follow procedures for **"NO"** answer.

- Inform the Emergency Controller of:
  - exact location of fire
  - what is burning
  - any injuries and seriousness thereof
  - is there a spill/pollution or possibility thereof
  - action taken

- Inform the Petroleum Company depot of the incident.
- Await further instruction from the Emergency Controller.

4.2 Procedure for general fire fighting

4.2.1 Size up the fire

When first noting the existence of a fire ,whether it be by seeing smoke or being alerted to it by a co-worker, try to establish the size by judging the amount of smoke etc. If you will not be able to extinguish the fire yourself by means of handheld extinguishers or the emergency equipment available on the forecourt, the local Fire Department must be informed and the fire alarm must be sounded. If the size is within limits proceed to stage 2.

4.2.2 Evaluate the situation

Determine possible threats and dangers. Establish the safety/stability of the situation before commencing with fire-fighting. If the situation seems unstable or unsafe (e.g. Containers present that may explode or not enough fresh air present to guarantee a safe operation) do not attempt to extinguish it yourself. Rather sound the alarm and assist the appointed fire-fighting squad by giving background info (type of fuel, size of fire etc.) and directions. If the fire does seem out of control or the situation too hazardous then proceed to stage 3.

4.2.3 Remove the source of fire

Where a fire is situated in a dangerous environment (e.g. in the tank farm where ignition of tanks will probably result in fatal injury and enormous damages) there might not be sufficient time to remove the fuel first. In such cases, provided that the right type of extinguisher is at hand it is advisable to extinguish the fire without delay.

4.3 Evacuation procedure in the event of an emergency

4.3.1 Evacuation communication

In the event of an evacuation the Emergency Controller will give instructions to evacuate.
The instructions will be given via the internal communication system in language predominantly used at the filling station site.

Security must in all instances be notified of the evacuation so that necessary actions can be taken.

The following must be kept in mind should the premises have to be evacuated:
a) The protection of human life receives priority

b) Equipment (e.g. vehicles, computers, etc.) may only be removed should circumstances allow it, always keeping personal safety in mind.

The evacuation instructions must be kept clear and to the point with relevant information: "ATTENTION, PERSONNEL ARE REQUESTED TO EVACUATE THE PREMISES IMMEDIATELY. AN EMERGENCY SITUATION EMERGED BECAUSE OF ....." then the emergency procedure must be explained.

4.3.2 Vehicles
a) Wait for instructions from Emergency Controller.
b) Adhere to directions given by emergency controller.
c) Remove vehicles (if accessible without endangering own life)
d) With arrival at assemble point remain there, with vehicle, until further notice.

4.3.3 Supervisor on forecourt
a) Immediately switch off the emergency shut off valve
b) Control traffic in and out of the forecourt
c) Adhere to directions given by emergency controller
d) Provide the necessary firefighting equipment to extinguish the fire.

4.4 Implement an Emergency Plan
As discussed in the following section.

5. ON SITE EMERGENCY PLAN

5.1 FUEL SPILL – NO FIRE:
▫ Stop Pumps – Hit Site Emergency Button
This action should stop all pumps on site and switch off the electrics of dispensers. Not all sites have an emergency button, and the electrical distribution board must be readily accessible. Where emergency buttons do exist, ensure that this button does not also switch off the forecourt lights that might plunge the place into darkness and increase any panic. The lights are well above the hazardous zone created by the fuel vapours. The button/distribution board's location should be known to all personnel and should be regularly tested, with a vehicle being filled and using different dispensers.

▫ Shut off fuel from Tanker
This may need to be done by service stations personnel, as the tanker driver may be absent from his post (hence the spill) or incapacitated. The staff must therefore be shown how to do this on a delivery truck. There is an emergency button on most of these vehicles, which, when hit will shut all of the bottom valves of the individual compartments. The individual compartments' valves can also be shut using the buttons in the Alfons Haar box. Arrange with the delivery company that your staff be shown and can practice this.

▫ Evacuate all people on site (On foot)
Your staff will have to come charging out onto the forecourt shouting something like this.
"Massive petrol spill; might catch alight; run for your life!" They must stop people running towards their cars to evacuate. Ensure that staff in other sections of the service station are evacuating as well. If at all possible, get people to move upwind and to get as far away as practicable. It should be noted that should the vapour cloud of a large spill be ignited, there would unlikely be a massive explosion, as most sites are uncluttered.

▫ Prevent starting or entry of vehicles
Prevent people from starting their cars on the forecourt by shouting at them. “That might set it alight” Post people at entrances or mount barricades to stop them from entering the site, being unaware of the incident. You may need to give a stern warning to people who want to disobey such instructions, that they can be charged with culpable homicide and/or arson if their action starts a fire.

▫ Summon Emergency Services – Phone 112 (cell 0 or …….*)
This is an area where it is known to be a problem at certain sites where there is no phone accessible to the service station staff after hours, due to misuse/abuse of the phones at some time. It is essential that it will be possible to contact the emergency response services speedily, and you should not rely on the fact that a member of the public may be at hand with a cell phone. Provide a telephone but control its use. There are several ways of doing this now. *Ensure that the number of the local services is displayed and has not faded or changed. Phone it occasionally to check if it is still the right one. Ensure that they receive a clear description of the location of your site.

▫ Warn Vulnerable Neighbours
Send someone running to all of your neighbours who may become involved, being downwind or downhill, to warn them of the potential for disaster and to take steps to mitigate against it (close windows; douse and braai; etc). They might also be able to help with the problem, especially if they have been included in the practice, (which is advised).

▫ Prevent spread of Fuel (Use sand buckets)
Use the sand in the buckets to dam up or soak up the spilt fuel and prevent its outward spread to areas not under your control. A spill should always be kept as localized as possible.

▫ Take Fire Extinguishers & Dry Powder Units to a Safe Place
Remove the extinguishers from their mounting points on the forecourt, and wheel the large DP units to an unwind location. You may need them later.

▫ Do not flush fuel into drains
This is an admonition aimed at persons whose first action on encountering a spill is to try to spread it as far away as possible by flushing it down the drain. Persons 3 kilometers from a spill have been seriously burnt by such action.

▫ Contact Petroleum Company Emergency – Toll-Free
Every Petroleum Company has emergency teams on standby, who will be mobilised on receipt of a message that there is a serious problem somewhere. They may also give advice over the phone. It is therefore important to give details of the site to the 24 hour emergency controller.

▫ Further action dictated by circumstances.
The above actions are the immediate and high priority actions needed to render the situation as safe as can be under the circumstances. There will always be other things needed to control a given situation but these are not generic in nature and will be dictated by the situation. They cannot be forecast and planned for. Hopefully the person in charge will be able to cope with the situation and act according to the circumstances.

5.2 FUEL SPILL – WITH FIRE:
▫ Stop Pumps – Hit Emergency Button
See above

▫ Evacuate People & Vehicles – Allow to drive off
Because the spill has already caught alight there is no need to take ignition precautions.
You would want to clear the site of as many vehicles as possible as they will add to the amount of fuel present on the site and vulnerable to the fire. Fuel tanks of vehicles could also rupture/explode spreading the fire and creating extra for fire fighters.

▫ Shut off fuel supply
If you can. See above.

▫ Summon Emergency Services – Phone 112 (cell or……..*)
See above.

▫ Tackle the Fire Extinguishers & Dry Powder Units
If a fire is attacked early on, before steel has had a chance to heat up, etc. there is a good chance of extinguishing it. Dry powder (if the right material) has very good extinguishing potential and large fires can be knocked down with it. The use of extinguishers takes some practice, though, and, needs confidence. Both are enhanced by giving staff a chance to use them at (say) your local fire brigade's training ground.

▫ Warn Neighbours
Ensure that ALL of your neighbours are warned about this fire. It may spread before the fire brigade arrives. Rather have them aware of the fire than find out too late.

▫ Contact Petroleum Company Emergency – Toll-Free
See above.

6. CONCLUSION AND RECOMMENDATIONS
From the discussions contained in the report, the emissions as a result of evaporation are likely to create a hazardous environment if not controlled. Therefore, the layout of the forecourt and the filling station itself, provision of vent stacks above the forecourt and outside of confined space will prevent the creation of an explosive atmosphere on the forecourt. The vapour on the forecourt will disperse within 5 to 20m of the property. The absence of confining structures in the immediate boundary of the property, the impact of fuel vapours will disperse with ease into the atmosphere. However, the presence of traversing roads will contribute significantly to the elevated levels of vapours on site and on the adjoining properties. The significance of the impact is considered low in the absence of sensitive receptors in close proximity.

Cumulative impacts associated with the presence of similar land uses, could contribute towards elevated levels of vapour, which will dissipate in the atmosphere in the absence of confining structures/buildings, the effect of northeasterly winds predominant in the project area as well as spatial separateness or geographical location.

Once the filling station operator implements an incidence management plan, potential impact on the general environment will be within acceptable limits and/or mitigated to levels that comply with the EIA legislation and other applicable health and safety legislations. The existing

road infrastructure shall ensure that Emergency vehicles can easily access the property and any potential fire hazard can be extinguished with ease before it becomes fatal.

7. REFERENCES

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Terra Geotechnical

Where Engineering Meets Earth

Engineering Geological Investigation in support of the township establishment at

Harolds Bay Country Estate

Harolds Bay

Western Cape

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The information presented in this document is based on the information supplied by the Client prior to the commencement of the investigation. All care and diligence have been taken in rendering services and preparing these documents.

Table of Contents

1. Introduction

This report describes the results of a geotechnical site investigation in support of the proposed township establishment known as Herolds Bay Country Estate, on Portion 7 of the Farm Buffelsfontein 204. The development entails the construction of various residential units and associated internal roads network.

1.1. Terms of Reference

Terra Geotechnical was appointed in April 2022 by Mr Hannes Lourens (representing Element Consulting Engineers), to conduct this geotechnical investigation. The area of the investigation was defined and approved before the commencement of the investigation. The distribution of testing locations and the associated sampling were done where physically possible and to best model the geotechnical character of the site for this specific development. Testing frequency was discussed and approved by the engineer during the quotation phase and were guided by the standards provided by the *SANS 634: "Geotechnical Investigations for Township Development"*.

The quantity and nature of samples were governed by the nature of the proposed development and the in-situ characteristics of the material excavated across the site.

1.2. Sources of Information

The following sources of information were utilized:

- Remote Sensing Information:
- Google Earth Pro TM
- Elevation Heat Map; Online Resource
- Planet GIS
- Previous Report by Mr N Paxton of GEOSS South Africa (Pty) Ltd
    - *Groundwater Impact Assessment for a proposed development near Herolds Bay, Western Cape*. GEOSS Report No.: 2020/07-14.

1.3. Objectives

The investigation had the following aims:

- identify potential hazards
- to determine and evaluate the mechanical properties of the soil material occurring within the boundaries of the study area regarding the construction of low load bearing buildings
- define the ground conditions and classify the conditions through detailed soil profile descriptions and groundwater occurrences within the zone of influence of foundations
- to determine the reusability of the natural soil materials during the construction phase
- to evaluate site excavatability
- to recommend measures to be implemented during design and development of the area

The development potential of the study area is assessed based on the following premises:

- Construction of low load bearing residential structures incorporating shallow foundations.

It must be noted that this investigation was conducted to assist with the design and construction phases.

2. General Location and Description of Site

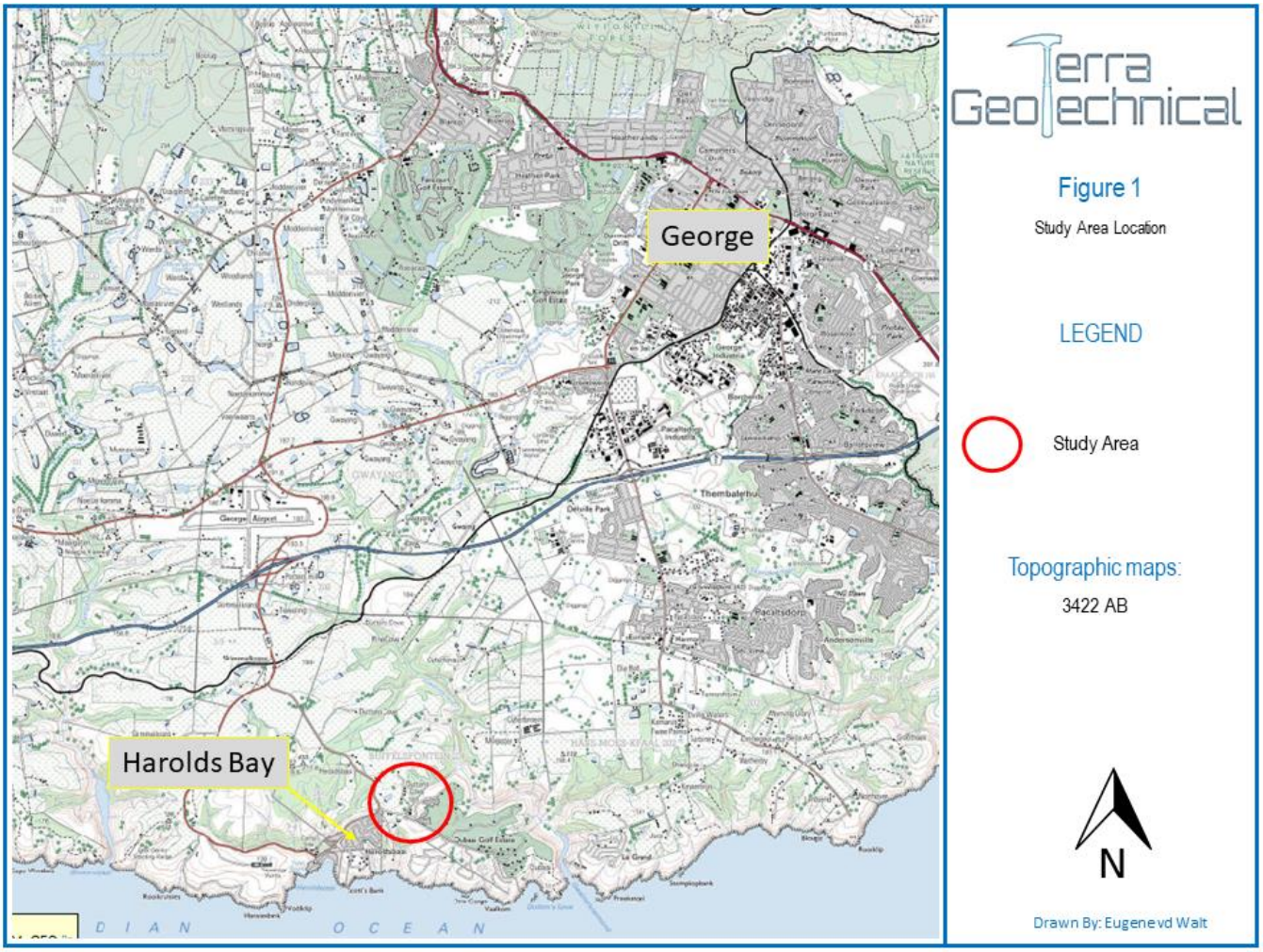
2.1. Location

The study area for this investigation is located approximately 10 km south west of the city of George and just north of Harolds Bay, forming part of the George Local Municipality within the south eastern portion of the Western Cape Province.

Figure 1 graphically depicts the location of the study area.

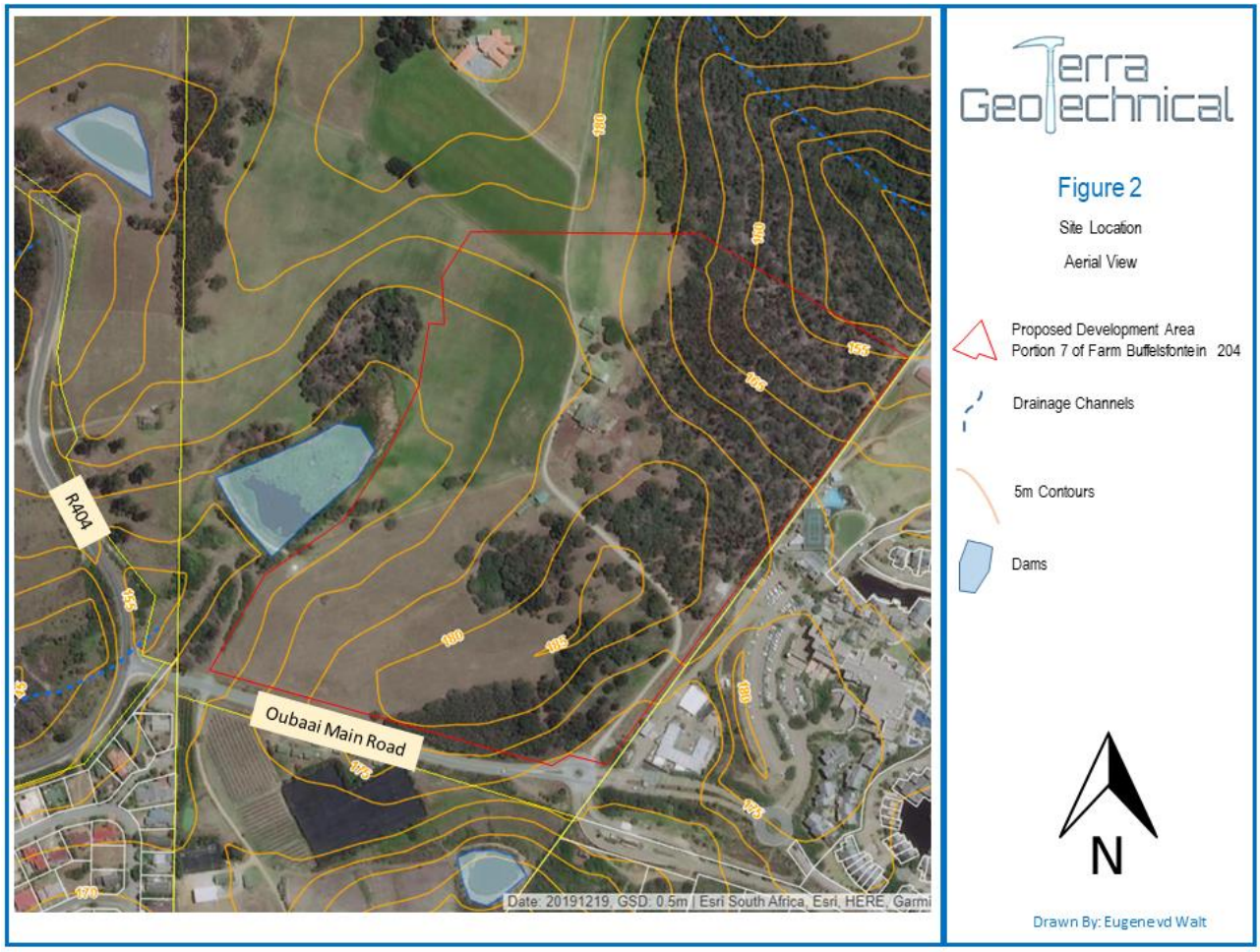
The site is located roughly at the following coordinates:

Latitude: 34.044043° S Longitude: 22.405375° E



The site is further located on Portion 7 of the Farm Buffelsfontein 204. The site is an irregularly shaped parcel of land and covers a total surface area of approximately 18 ha. The eastern boundary is defined by the Oubaai Golf Estate and the southern boundary by the Oubaai Main Road.

Figure 2 graphically depicts the location of the site

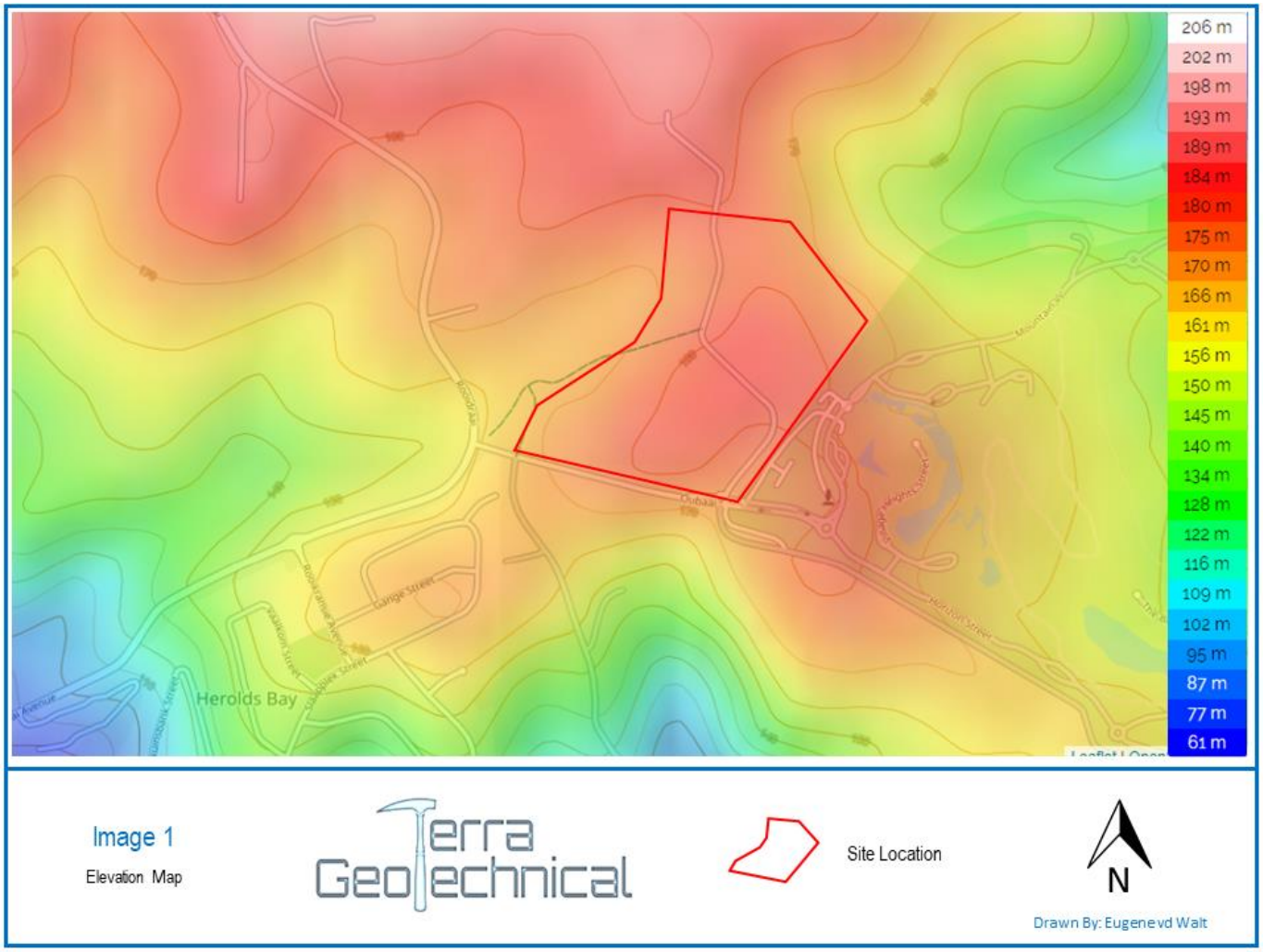


2.2. Topography

The site is defined by a ridge type structure located within the south eastern portion of the site. This ridge structure is approximately 180 m above mean sea level. The remainder of the site is then characterized by gentle to moderate sloping side slopes, decreasing in elevation radially from the ridge. The site slopes are generally gently sloping (between 2 and 8°) across most of the site with isolated moderate slopes (up to 12°) in the south eastern corner.

The colour coded image below depicts the topographic nature of the study area, with the higher lying ridge type structures depicted by the red/white and the lower lying side slopes and valley structures depicted by the yellow/green colours. The site is located at an elevation of approximately 185 m above mean sea level.

Image 1: Topography and elevation



2.3. Drainage

The study area is located in the Breede-Gouritz Water Management Area, with the area falling within Quaternary Catchment Area K30A.

The study area is drained mainly by means of surface run-off (i.e.: sheetwash), with storm water following the topography of the site. A dam is located immediately west of the site. The available data as well as the site investigation provide no evidence of any natural feeding system into the dam. This dam is deemed to be supplied with water by means of an artificial pumping system, bringing water from a nearby drainage to this dam. This dam water is then utilized for irrigation during day-to-day farming activities. It is also evident that shallow lateral groundwater flow drains towards the dam.

2.4. Climate

The climatic N-value (Weinert, 1980) of the area is deemed to be less than 5; therefore, chemical decomposition rather than mechanical disintegration, of the parent rocks is deemed the principal mode of weathering.

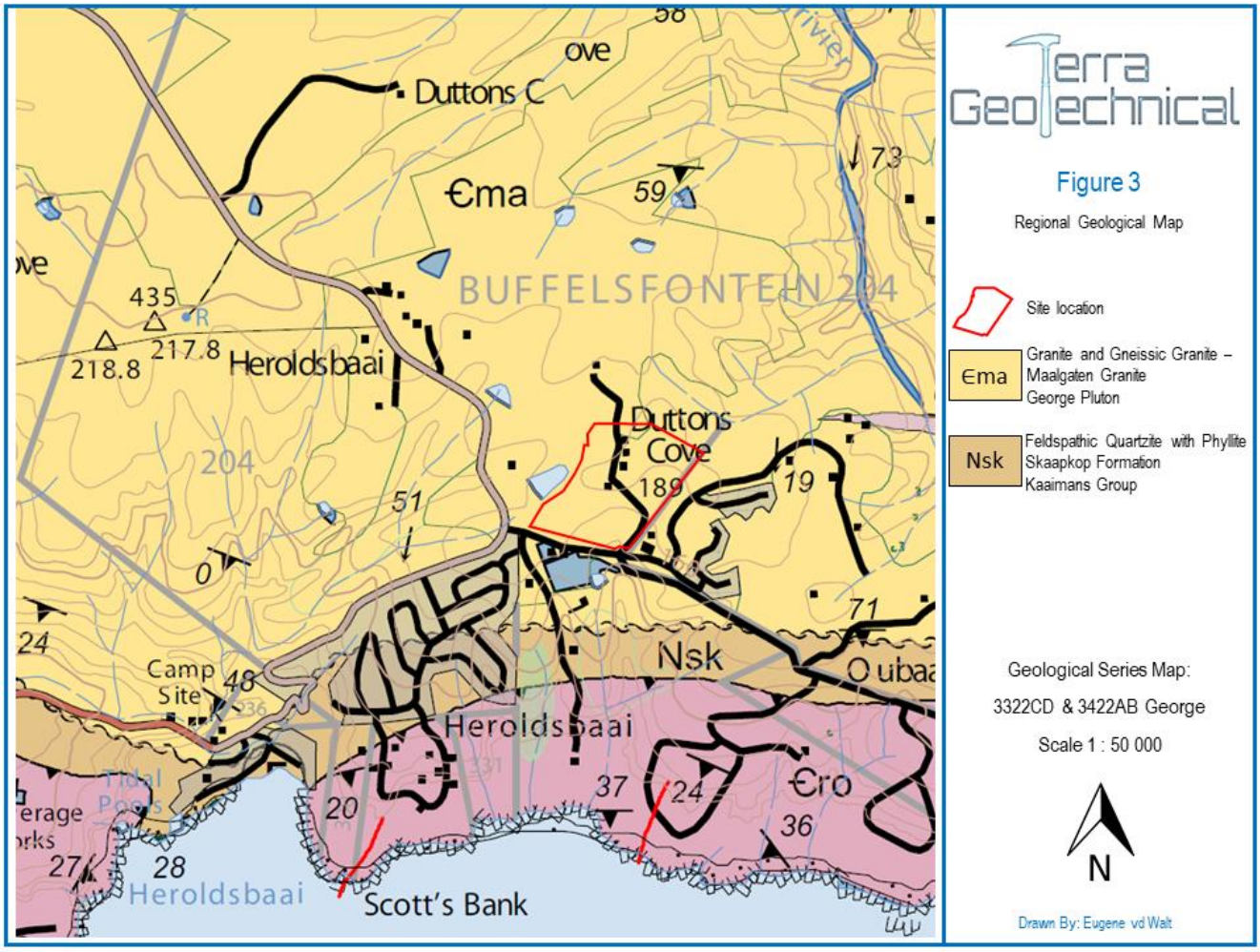
3. Geological Setting

3.1. Regional Geological Setting

The study area is located on bedrock deemed to form part of the George Pluton. The George Pluton is subdivided into the Maalgaten, Kleinfontein, Rooiklip and Modderkloof subunits (Gresse, 1976). According to Scheepers and Schoch (2006), the site is underlain by Granite and Gneissic Granite of the Maalgaten Granite.

The regional geological setting of the study area (minus the surficial soil cover) is illustrated by Figure 3.

The study area does not reflect any risk for the formation of sinkholes or subsidence caused by the presence of water-soluble rocks (dolomite or limestone), and as such is not deemed “dolomitic land



3.2. Prominent Geological Structures

The available geological information does not indicate the presence of any geological structures traversing the site.

4. Geotechnical Field Investigation and Laboratory Testing

4.1. Reconnaissance Study

The investigation commenced with the conducting of the following actions:

- The collation and evaluation of available geological, geo-hydrological and geotechnical information, with specific reference to previous geotechnical investigations undertaken within the vicinity.
- The compilation of a base map showing the regional geological setting

4.2. Site Investigation

The field work phase was conducted by Terra Geotechnical during April 2022. Test pits were placed throughout the study area in such a way as to accurately describe the general soil conditions occurring within the boundaries of the study area.

The placement of the test pits was conducted in unisons with the project engineer, in order to obtain the general subsoil conditions across the site. The investigation and associated sampling further followed the industry standard guidelines as set out by **SANS 634: Geotechnical Investigations for Township Development**.

The succession of soil and rock layers exposed within the test pits were logged according to the industry-standard method proposed by Jennings et al (1973), and a series of detailed photographs were taken of the different soil layers, and samples were taken of the soil- and rock material deemed to be important to the proposed development.

4.3. Laboratory Testing

The following tests were conducted on soil samples taken during the field work phase:

- Standard foundation indicator tests were conducted on disturbed soil samples in order to determine its composition (i.e.: the relative percentages of gravel, sand, silt and clay present within each sample). The following tests were conducted:
  - Atterberg Limits (Liquid Limit and Plasticity Index) and Linear Shrinkage
  - Particle-size distribution
- Standard road indicator tests were conducted on bulk soil samples in order to determine its composition, and to evaluate the suitability of the materials for use in the construction of access roads and parking areas. These tests were conducted:
  - Maximum Dry Density versus Optimum Moisture Content
  - Californian Bearing Ratio versus Compaction Effort (MOD AASHTO method)
- Specialised Geotechnical testing on undisturbed samples were conducted in order to determine the in-situ properties of the material present across the site. The following tests were conducted:
  - Consolidation test (Single Oedometer)
  - Swell Potential.

5. Geotechnical Setting

5.1. Trenching

5.1.1. Excavation of test pits

During the site investigation, a total of 13 test pits, numbered TP1 to TP13, were excavated across the site, by means of a TLB-type light mechanical excavator, at which time the exposed soil layers were profiled and samples extracted.

Figure 4 below depicts the test pit layout across the site. The red locations indicate the 13 test pits excavated during the investigation of Terra Geotechnical. Two additional test pits (in blue) are depicted. These are test pits performed during the prior investigation of GEOSS. These are purely utilized as additional data points.

5.1.2. DCP results

DCP tests were conducted adjacent to each of the excavated test pits to at locations across the site. These tests started at the surface and were advanced to maximum depths of 2.0 m below ground level. This was to determine the consistency of the material encountered within the subsoils.

The test results indicate the upper sandy alluvial material (upper 300 mm) generally displayed loose to moderately dense consistency with DCP results in excess of 25 mm per blow.

From below this upper alluvial horizon, an increase in material consistency is noted within the lower alluvium and residuum, with DCP results of less than 15 mm per blow, which correlate to the soil exhibiting a consistency ranging between stiff and very stiff. The DCP results. Generally, the material displayed a significant increase in consistency with depth due to the very stiff reworked residuum encountered at depth.

TP13 is the only exception, with a reduction in consistency from a depth of approximately 1800 mm, due to the occurrence of loose, wet, silty sand. This test pit is the only test pit where alluvial material was encountered for the entire depth of the profile.

DCP9, 10, 11 and 12 experienced refusal at shallow depth and as such the tests were not completed. The cause of the shallow refusal is deemed to be roots within the upper soil horizons.

Detailed DCP results are included as Appendix C.

5.1.3. Generalised engineering geological parameters

The following general engineering geological characteristics were noted:

- **Site Excavatability**

Across the site, the TLB-type light mechanical excavator experienced only localized difficulty to a depth of 2.5 m. This difficulty in excavation was encountered at a depth of 2.2 m due to the presence of a very dense/very stiff residual material at the base of test pit TP9.

No problems are foreseen during the excavation of **shallow foundations,** with **localized difficulty** expected during the excavation of **deep service trenches** to a depth of at least 2.5 m below the existing ground level, through the use of a TLB-type light mechanical excavator.

- **Rock- and/or pedocrete outcrops**

Bedrock or pedocrete outcrops were not encountered within the investigated area.

- **Sidewall stability**

With the exception of TP13, the sidewalls of all test pits generally remained stable for at least 1 hour. TP 13 had strong water seepage at the base of the test pit. This water seepage caused instability in the loose alluvial material at depth within this test pit. This instability caused collapse of the sidewalls of this test pit. **Image 2** on the following page depicts the conditions encountered at TP13.

- **Groundwater seepage**

Strong groundwater seepage was only encountered at depth in test pit TP13 (**Image 2** on the following page depicts the conditions encountered at TP13). However, pedogenic material (ferricrete nodules) was identified across the site, indicating the occurrence of a fluctuating water table or soil moisture evaporation. This pedogenic material was seen to occur from a shallow depth.

There is the possibility that localized saturation of the upper sandy soil material overlying less permeable reworked residual clayey material occurring throughout the site, during and directly after the rainfall season, especially after heavy precipitation events (i.e.: perched water tables).

Full Profile of TP13

Base of TP13 depicting water seepage and subsequent sidewall instability

Image 2

Test pit TP13

Terra Geotechnical

Drawn By: Eugene vd Walt

5.1.4. Generalised soil profile

Note: this description is based on field observations, and does not reflect the results of any laboratory tests

The results of the trenching phase indicate that the whole site is covered by a relatively homogeneous succession of soil layers. Typically, the site was covered by a silty sandy alluvium of which the upper parts hosting abundant root structures. Underlying this silty sandy alluvial horizon, the residuum was encountered.

Alluvium:

The Alluvium was found to cover the site and was generally present as a light brown, loose, intact silty sand. This layer was found to be between 400 and 1500 mm. The upper 300-500 mm of this horizon was found to host abundant root structures.

Residual Granite:

These are derived from the weathering of the underlying rock and have not moved from the place of origin as with the transported soils. The residual soil horizon can be divided into two sub-horizons.

1) A reworked residual horizon where macro structure (joints, bedding) and micro structure (mineral grain boundaries) have been destroyed by biotic action.

   These soils typically occur immediately below the alluvial horizon and consist predominantly of clayey silt. The reworked residual granite was profiled as having a stiff to very stiff consistency. The upper portion of this horizon is impregnated with abundant ferricrete nodules. This horizon is found to occur to depths of between 900 and 2000 mm.

2) A residual horizon where the macro and micro structure inherited from the parent rock remains intact and visible. The residual granite was profiled as clayey/silty sand with scattered gravels with a firm/dense consistency. The clayey portions of the horizons exhibit signs of slickensides, indicating the material being sensitive to moisture changes. This horizon is found to occur to final excavation depth of at least 2200 mm.

TP13 is the only test pit where alluvial material was encountered for the entire depth of the profile. Strong groundwater seepage was encountered at its base. The origin of this water is not known whether it is due to broken services in the area, or if this is a paleo drainage channel.

Detailed test pit profiles are included in Appendix A.

6. Geotechnical Evaluation

6.1. Engineering- and material characteristics

6.1.1. Sampling

The following samples were taken:

Disturbed samples	:	2 x Alluvium
	:	6 x Residuum
Bulk samples	:	1 x Alluvium
	:	1 x Residuum
Undisturbed Sample	:	1 x Residuum

Detailed soil test results are included as in Appendix B.

It should be noted that when saturated and loaded, the soils will undergo loss of strength with the soil grains being forced into a denser state of packing and a reduction in void ratio (decrease in volume). The result of which is varying degrees of consolidation and/collapse settlement. For this reason, the assessment and quantification of both the degree and nature of consolidation, under planned foundation loads, will form the basis of the mechanical assessment of the sites' subsoils to follow.

6.1.2. Soil Test Results: Alluvium

In the light of the soil test results and visual observations, the **Alluvium** sampled across the site can be summarised as follows:

- The material has a fines fraction (passing the 0.425m sieve) of between 88 and 98%, with the clay fraction constituting between 4 and 15% of the sample.
- This **plasticity** of the fines fraction of the material is tested to a maximum of **2**.
- According to the Unified Soil Classification System the material classifies as a silty sand **(SM)** with a **Grading Modulus** of between **0.76** and **0.93**
- According the to the ***van der Merwe*** method of determining **Potential expansiveness**, this material classifies as a **low risk** for potential expansiveness.
- This material is deemed to be **Potentially Compressible and/or Collapsible.**
- According to the USCS classification system, SM-type material exhibits an inferred cohesion and friction angle of 0 kPa and 34° respectively.

The results of road indicator tests conducted on the bulk samples of this material can be

summarized as follows:

- This material classifies as a **G8-type** material (COLTO classification system)**.**

6.1.3. Soil Test Results: Residuum (Reworked- and Residual Granite)

In the light of the soil test results and visual observations, the **Alluvium** sampled across the site can be summarised as follows:

- The material has a fines fraction (passing the 0.425m sieve) of between 90 and 99%, with the clay fraction constituting between 8.3 and 11.1% of the sample.
- This **plasticity** of the fines fraction of the material is tested to between **4** and **13**.
- According to the Unified Soil Classification System the material classifies as a silty sand **(SM)** and/or clayey sand **(SC)** with a **Grading Modulus** of between **0.58** and **0.85.**
- According the to the ***van der Merwe*** method of determining **Potential expansiveness**, this material classifies as a **low risk** for potential expansiveness.
- This material is deemed to be **Potentially Compressible and/or Collapsible.**
- According to the USCS classification system, SM/SC-type material exhibits an inferred cohesion and friction angle of 0 kPa and 32° respectively.

The results of road indicator tests conducted on the bulk samples of this material can be summarized as follows:

This material classifies as a **G9-type** material (COLTO classification system)**.**

Detailed soil test results are included as in Appendix B.

The table on the next page provides a summary of the lab results of the on-site material.

Soil Profile Make-up and Associated Sampling		Material Characteristics- Laboratory Assessment																	
Test Pit nr & Material Description	Sample Depth (mm below ground level)	Soil Composition						USCS Classification			Fines Analysis (measured from material passing the 0.425 mm sieve)			Activity		Material Compaction Characteristics			
		Sieve Analysis (cumulative percentage passing)					Grading Modulus (GM)	USCS Classification	Inferred Shear Strenght Properties		Plasticity Index (PI)	Linear Shrinkage (LS)	Weighted PI (PI of whole sample) (WPI)	Potential Expansiveness (according to van der Merwe)	Swell Percentage	COLTO Classification	Measured CBR Values (percentage compaction of MOD AASTHO; CBR of 13.344 kN)		
		5,0 mm	2,0 mm	0,425 mm	0,075 mm	0,002 mm			Cohesion (kPa)	Friction Angle (°)							90%	93%	95%
Portion 7 Farm Buffelsfontein 204																			
TP1 Residual Granite	1000-3200	100	100	98	26	9,6	0,76	SM & SC	0	32	4	1,6	4	Low	0,00%	>G9	2	2	3
TP2 Alluvium	400-900	93	92	88	27	15	0,93	SM	0	34	2	0,6	2	Low	0,00%	-			
TP3 Alluvium	400-1500	99	99	98	27	4,3	0,76	SM	0	34	NP	-	-	Low	0,00%	G8	10	13	16
TP5 Residual Granite	1400-2800	100	100	99	40	10,2	0,61	SM & SC	0	32	7	2,7	7	Low	0,00%	Inferred >G9, due to low GM			
TP6 Residual Granite	1600-2500	96	95	94	31	8,3	0,8	SM & SC	0	32	6	2,6	6	Low	0,00%	-			
TP11 Reworked Residual	900-1700	98	98	96	35	11,1	0,71	SC	0	32	10	3,6	10	Low	0,00%	Inferred >G9, due to low GM			
TP12 Residual Granite	1200-1600	99	99	97	45	9,3	0,58	SC	0	32	13	5,1	13	Low	0,00%	Inferred >G9, due to low GM			
TP13 Reworked Residual	1000-1500	97	94	90	32	8,7	0,85	SC	0	32	9	3,8	8	Low	0,00%	-			

6.1.4. Heave Characteristics of In-Situ Soils:

Soil heave is the process of the change in volume correlating to a change in moisture content. This phenomenon is prominent in soils containing a high content of active clays.

Swell Potential tests conducted on an undisturbed sample of the residuum proved this material is not potentially expansive.

The material encountered across the site displayed **low plastic** values and hosts a **low percentage of clay materials**. As such, this material is interpreted to undergo **negligible heave**.

According to van der Merwe, the material across the site also classifies as a **Low potential for heave.**

6.1.5. Standard Consolidation of In-Situ Soils:

There are three components to settlement namely immediate settlement (also referred to as elastic settlement), primary consolidation settlement and secondary consolidation (also referred to as creep).

Immediate settlement takes place as a load is exerted on the soil mainly due to distortion of the soil. As pore water begins to flow out of the soil a time dependant decrease in volume occurs which is termed consolidation settlement. This settlement will continue until a condition of constant effective stress is reached. This primary consolidation settlement takes place generally in fine grained materials (high percentage of clay or silt).

Secondary consolidation settlement is not considered a concern as this type of settlement usually occurs in soft organic clays where plastic flow within the soil mass results in displacement of the soil particles.

Based on the consolidation tests performed on samples extracted from the subsoils, it is noted that low amounts of settlement are expected when exposed to various different loads. The results assume a foundation with of 0.6 m and a factor of safety of 1.5.

Bearing Load (kPa)		25	50	100
Void Ratio	In-situ (e^0)	0,551		
	Loaded	0,550	0,540	0,524
a		0,0004	0,0004	0,0003
Mv		0,2705	0,2588	0,2247
Oedometer Settlement		3,35	6,41	11,12
*Settlement Range (mm)	Lower	3	5	8
	Upper	4	7	12

Preconsolidation State	
Pressure (kPa)	Void Ratio
133,3	0,520
Overconsolidated	

Factor of Safety	1,5
Foundation Width (m)	0,6

The residuum is classified as being overconsolidated with the soils being exposed to a past effective stress in excess of 100 kPa. At the anticipated foundation loads of between 50 and 100 kPa, settlements of between 5 and 12 mm can be expected.

Detailed results are included in Appendix B.

6.1.6. Collapse Settlement Characteristics of the In-Situ Soils

Collapse settlement is defined as the sudden loss of volume of a material once saturated, as compared to the more gradual settlement related to standard consolidation. As such, these soils typical undergo low settlement in the dry state (apparent strength), with a sharp increase in settlement upon saturation.

A marked characteristic of the collapsible grain structure of the residual granites is that it appears to be confined to slopes where the soils are well drained. The collapsible grain structure develops as a result of leaching out of soluble and colloidal matter from the residual soils, and conditions of advanced decomposition, relatively high annual rainfall and good internal drainage are therefore prerequisite conditions. There are indications that the potential collapse decreases with depth in the soil profile which leads to the conclusion that the foundation design could be based on permissible tolerable settlement rather than on permissible bearing capacity.

This horizon is considered to have a collapsible grain structure. Such a structure consists of sand grains bridged by clay particles. When dry the soil appears to have a fairly high strength. However, when subjected simultaneous loading and saturation the clay bridges often and abruptly lose strength resulting in sudden and often catastrophic settlement.

The material is **deemed to undergo a degree of collapse settlement.**

6.2. Material usage

The alluvial material encountered across the site displayed a non-cohesive nature and typically tests as a G8-type material. Due to the tested low GM values of the alluvium, it is recommended that the material be stockpiled and re-tested for use in layer works.

The residuum (reworked and residual granite) underlying the site reacted poorly to compaction and combined with low GM values yielded poor results under the COLTO-Classification System, with material testing as worse than G9.

It is not recommended that any of the material be utilized in any load bearing layer works during the construction phase.

6.3. Bearing Capacity

Observations during the field work phase indicates that the soils encountered across the site exhibits a consistency of at least stiff/dense consistency, typically increasing to very stiff/very dense with depth.

By using the equation of Terzaghi combined with general material characteristics as presented by the Unified Soil Classification System (USCS), the allowable bearing capacity of the soil on site can be calculated. The calculations are based on the following assumptions;

- USCS Soil classification – Material tested as SM/SC type material.
- SM/SC type material typically have soil friction angles of at least 32° (according to USCS)
- Soil density is tested to 19 kN/m^3
- It is assumed that foundations will be 0.8 m wide and placed at 0.6 m depth

Allowable bearing capacity (incorporating a factor of safety of 3) is calculated to 150 kPa.

Ultimate bearing capacity is not deemed the major problem on this site for the housing units. Differential settlement and/or collapse are the biggest conditions that have to be designed for.

The effect that an increase in moisture content has on the strength of the material can clearly be seen by comparing the laboratory tested CBR results. The reason for these poor CBR results are that the **lab specimen** is tested under **saturated** conditions. This proves that should the soil on site become saturated, it will undergo a reduction in strength.

6.4. Retaining Structures

Should any significant temporary cuts be made during the construction phase, the following should be adhered to. Where the batter within the residuum cannot be restricted to a maximum of 1:2 due to space restrictions, cut and fill slopes must be supported by a suitably designed retaining structures. The lateral support should incorporate adequate drainage behind, above and through the structure and be suitably damp proofed. The following conservative soil shear strength parameters are recommended for use in retaining wall design;

Angle of internal friction (ϕ) - 32°

Soil cohesion (c) - 0 kPa.

7. Geotechnical Site Classification

7.1. General

The results of this study reveal that the site exhibits geotechnical characteristics that may require the implementation of specific design and precautionary measures to reduce the risk of structural damage due to adverse geotechnical conditions.

The following constraints needs to be considered;

- The results of this investigation reveal that the soils covering the site may undergo a degree of **consolidation and/or collapse** (i.e. loss of volume) under loading or when saturated; requiring that structures be adequately strengthened to prevent structural damage due to **differential settlement** beneath foundations.
- Occurrence of potentially compressible material across the site, with an estimated **settlement** of less than **10 mm** assuming a foundation pressure of **50 kPa**.
- Occurrence of potentially collapsible material across the site, with an estimated **collapse settlement** of up to **10 mm**.
- Presence of ferruginized material indicating the presence of a seasonal **fluctuating groundwater table** or excessive soil moisture movement.
- **Isolated moderate slopes** in excess of 6 degrees across the south eastern portion of the site.
- Due to its variable and organic nature, it is recommended that the **topsoil** across the site be removed beyond the perimeter of the proposed developments.

However, these characteristics do not disqualify the site from being used for the proposed development, but rather require the implementation of site-specific precautionary measures.

7.2. Groundwater Occurrence

Strong groundwater seepage was only encountered at depth in test pit TP13. However, pedogenic material (ferricrete nodules) was identified across the site, indicating the occurrence of a fluctuating water table or soil moisture evaporation. This pedogenic material was seen to occur from a shallow depth.

There is the possibility that localized saturation of the upper sandy soil material overlying less permeable reworked residual clayey material occurring throughout the site, during and directly after the rainfall season, especially after heavy precipitation events (i.e.: perched water tables).

7.3. Soil Excavatability

Across the site, the TLB-type light mechanical excavator experienced only localized difficulty to a depth of 2.5 m. This difficulty in excavation was encountered at a depth of 2.2 m due to the presence of a very dense residual material at the base of test pit TP9.

No problems are foreseen during the excavation of **shallow foundations,** with **localized difficulty** expected during the excavation of **deep service trenches** to a depth of at least 2.5 m below the existing ground level, through the use of a TLB-type light mechanical excavator.

The following additional comments on excavation of service trenches apply:

- sidewalls of deep excavations should be shored to prevent injury or death due to side wall failure (according to standard construction practices)
- Trenches will have to be dewatered after heavy precipitation events

7.4. Slope Stability

Although the slopes composed of residual granites are generally stable when dry, these soils tend to pose stability problems when the materials become saturated, particularly if prevailing stress conditions are changed.

Should significant bulk earthworks be required to create a level platform due to the sloping terrain, temporary excavation in slopes less than 2m high will be generally stable at near-vertical angles for short periods of time, but the engineer should inspect deep excavations. The upper 0.5m of the profile which is potentially unstable should be trimmed back on temporary slopes. Permanent slopes should be cut back to less than 1:2, or retained using suitable retaining methods as per the engineer's design.

Care should be taken that excess surface water is removed from the opened excavations during construction, as to limit the infiltration of water into the exposed strata which could potentially weaken the strata.

Note that water present within the slope, along with destabilising pore pressures, are often the main cause of slope instability. Therefore, adequate drainage measures need to be implemented.

7.5. Site Classification

In the light of the results of this study, the site can be subdivided into a SINGLE geotechnical entity/development potential zone**.** This classification is based on placing foundations below the hillwash horizon. The site carries a dual class, due to both consolidation and collapse expected under loads.

Development Potential Zone	NHBRC Site Classification	Partridge, Wood and Brink (1993) Classification	Excavation Class	Slope Stability
Zone A	C1/S	2A- Collapse Horizon >750mm thick 2B- Fluctuating moisture conditions less than 1.5 m below ground 2D- Moderate soil Compressibility 2I- Localized Slopes of between 6 and 12°	No Problems with excavation to a depth of at least 2,5 m	Stable slopes as long as it is kept in a dry state

8. Foundation Recommendations and Solutions

Below are **typical recommendations** for structures of this nature, taking into account the geotechnical characteristics of the investigated site:

Reinforced strip and/or pad foundation systems should be utilized. Foundations should be placed below the organic alluvium (transported horizon).

To reduce the risk of collapsibility potential, hydro compaction could be performed. This is the process where the collapsible horizon is saturated and then compacted to artificially break the collapsible grain structure.

It is recommended that EITHER of the following foundation designs be used in the development (According to the NHBRC guidelines):

Site Class C1/S

1. **Deep Strip Foundations:**
    - Reinforced strip footings placed at a depth of 0.8 m.
    - Articulated joints at some internal and all external doors.
    - Light reinforcement in masonry.
    - Site drainage and plumbing/service precautions.
2. **Limited Soil Raft:**
    - Remove in situ material to 0.8 m depth and 1.0 m beyond the perimeter of the structure and replace with competent material, compacted to 93% MOD AASHTO density at -1% to +2% of optimum moisture content.
    - Construct a 500 mm soil raft.
    - Reinforce the foundations and stiffen foundation brickwork
    - Articulation of superstructure
    - Moisture barriers around the perimeter of the structure
    - Site drainage and plumbing/service precautions

It must be noted that differential settlement is assumed to equal 75 % of the total settlement. The relaxation of some of these requirements, e.g. the reduction or omission of steel or articulation joints, may result in a Category 2 level of expected damage.

9. Good Construction Practices

An important factor in the promotion of a stable site is the control and removal of both surface and ground water from the site. It is important that the design of the storm water management system allow for the drainage of accumulated surface water.

9.1. Surface Drainage

It is recommended that an efficient surface drainage system be installed around all structures and along all roads throughout the study area in order to:

- prevent the ponding of water next to structures directly after heavy precipitation events, this may lead to differential settlement as the saturated material undergoes densification.
- prevent large-scale changes in soil moisture beneath the structures on a seasonal basis
- prevent the possible lateral movement of liquids within the upper soil horizons

The precautionary measures should ideally include:

- the sealing of open ground surfaces by means of either of the following:
- the cultivation of a natural soil cover (e.g.: grass)
- compaction of the soil surface
- bitumen or concrete paving
- the removal of surface water to a distance of at least 1 m beyond structures by means of watertight paving.
- the removal of surface run-off by means of an efficient surface drainage system.
- roads should preferably be constructed parallel to the natural surface elevation contours rather than perpendicular to it, in order to reduce run-off velocities

9.2. Sub Surface Drainage

Adequate drainage should be implemented to avoid large scale moisture changes in the loadbearing strata.

9.3. Earthworks

It is recommended that all earthworks be carried out in accordance with SABS 1200 (current version). The fill should be placed in layers not exceeding 200 mm loose thickness and compacted to a minimum of 95% Modified AASHTO maximum dry density.

All fill operations should be observed by a competent professional and tested periodically to confirm compaction is achieved

10. Limitations

The extent of the investigations undertaken is deemed adequate, within the time and budget constraints, to present an overview of the geotechnical conditions across the investigation site.

It must be borne in mind that the overall interpretation of geotechnical conditions is based upon point information derived from the respective test positions and that conditions intermediate to these have been inferred by interpolation, extrapolation and professional judgement.

It is recommended the author be appointed to inspect the earthworks and foundation excavations during the development of the site to confirm founding depths and validate the recommendations provided in this report.

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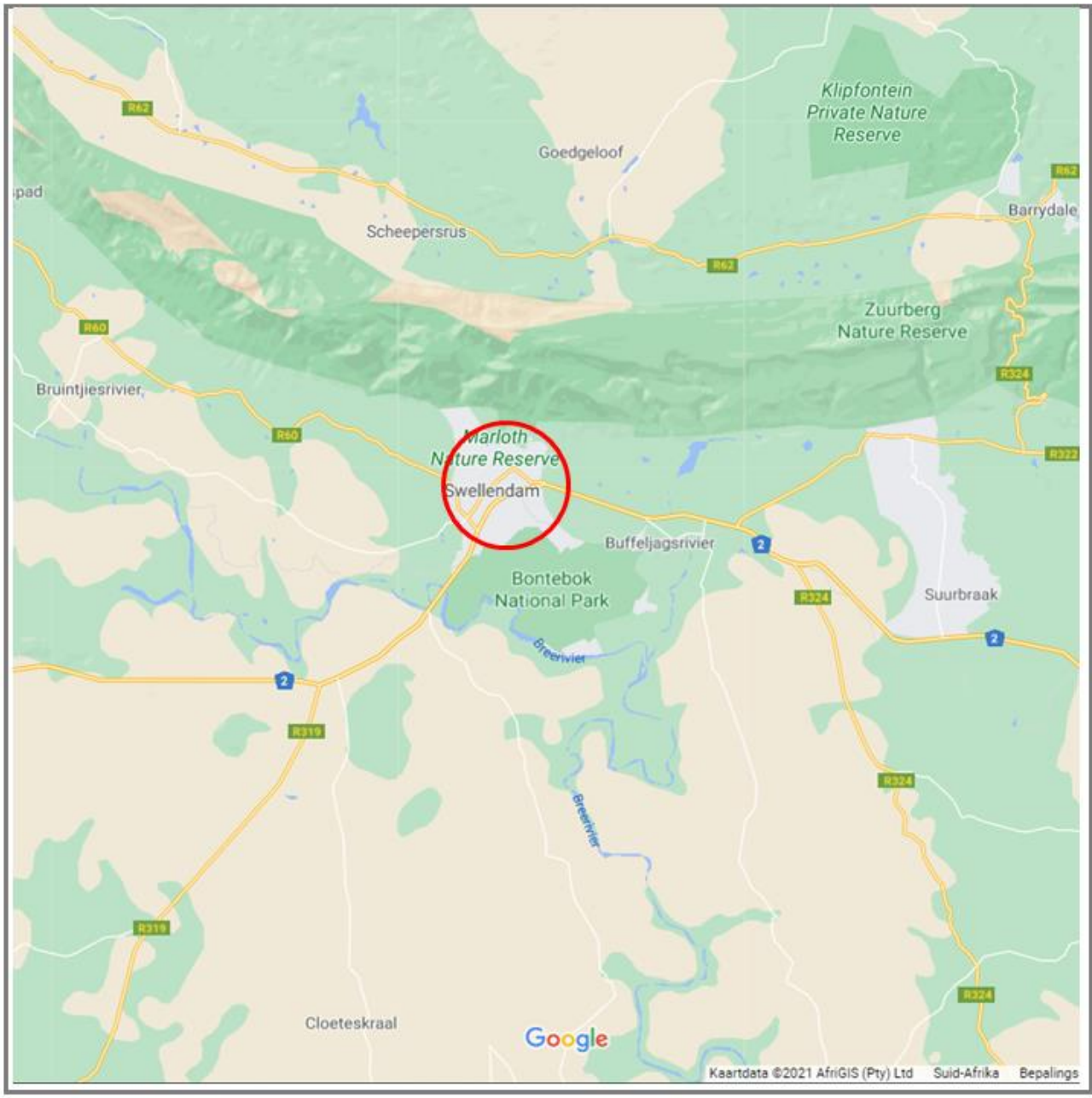
MAPS



Terra Geotechnical

Figure 1

Study Area Location

Legend

Study Area

N

Drawn By: Eugene vd Walt

Terra Geotechnical

Figure 2

Site Location

Erf 2780

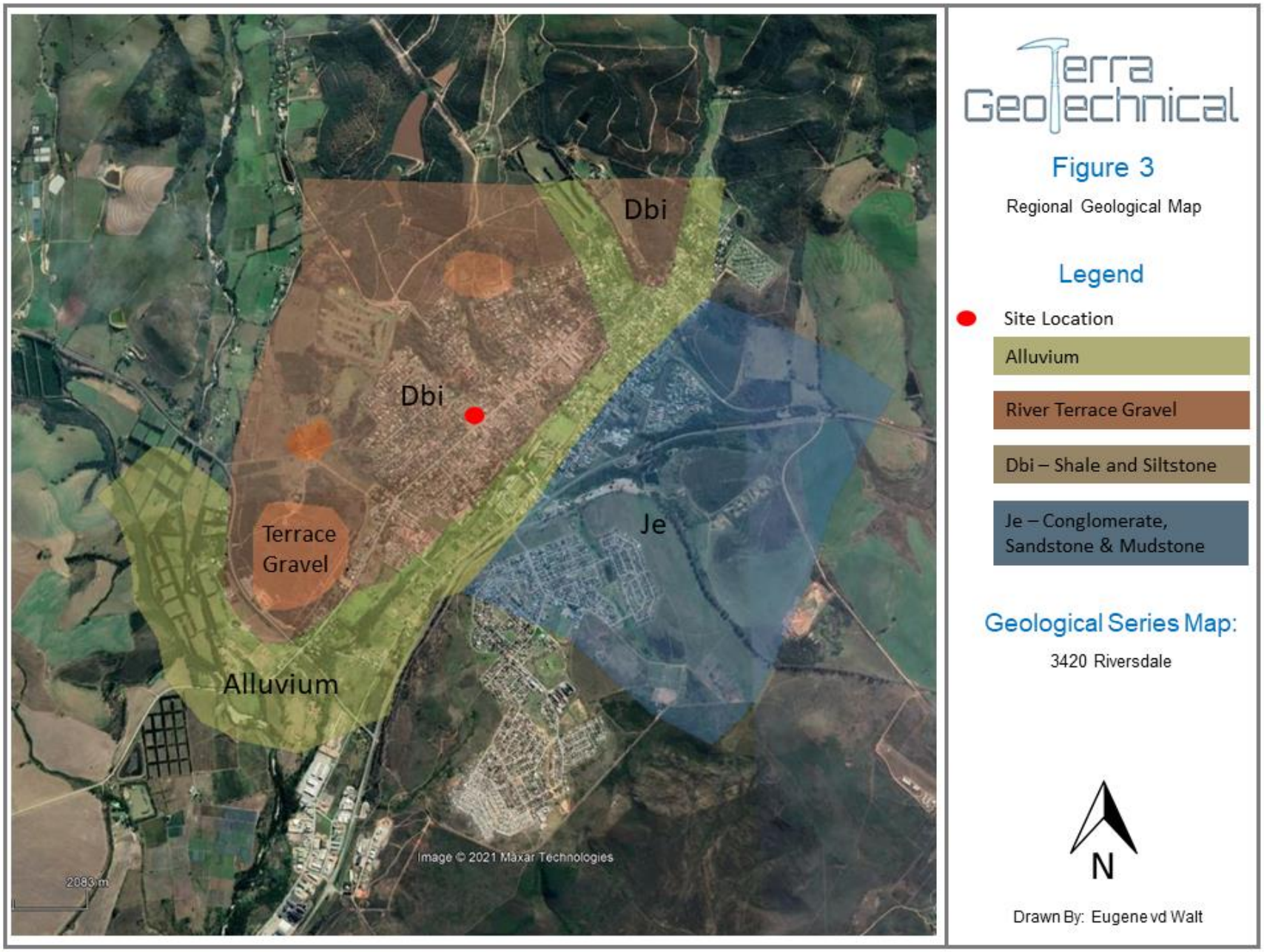
Erf 843

Erf 842

Drainage

N

Drawn By: Eugene vd Walt


Dbi
Dbi
Terrace
Gravel
Je
Alluvium
Image © 2021 Maxar Technologies
2083 m
Terra
GeoTechnical
Figure 3
Regional Geological Map
Legend
Site Location
Alluvium
River Terrace Gravel
Dbi – Shale and Siltstone
Je – Conglomerate,
Sandstone & Mudstone
Geological Series Map:
3420 Riversdale
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Drawn By: Eugene vd Walt

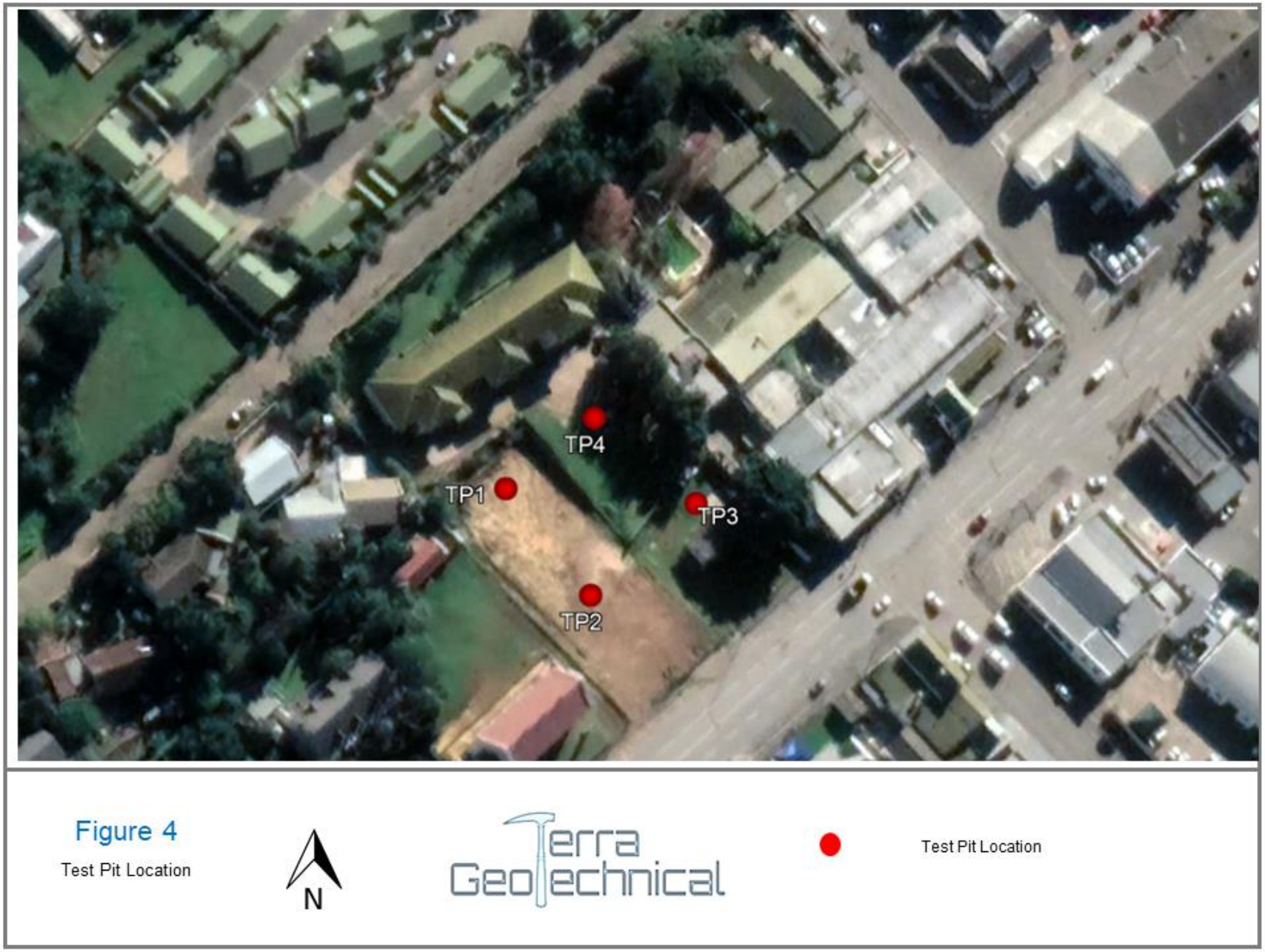


Figure 4

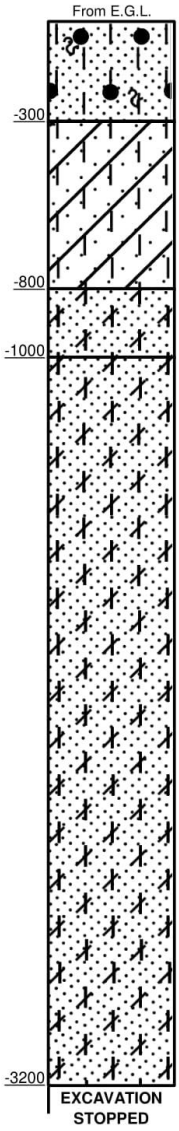
Test Pit Location

APPENDIX A

A.1
Test Pit Profiles

Terra Geotechnical	**Site:**	Harolds Bay Country Estate
	Location:	Harolds Bay
	Client:	Element Consulting Engineers (PTY) LTD

Soil Profile for Test Pit TP1



slightly moist; light brown; loose; intact; silty sand; alluvium; frequent roots; Not Sampled.

slightly moist; light brown; loose; intact; silty sand; alluvium; Not Sampled.

moist; dark brown speckled black red; very dense; intact; silty sand with frequent ferricrete nodules; nodular ferricrete; Not Sampled.

slightly moist; orange brown patched red grey; firm; mostly intact with clay rich areas being slightly slickensided; clayey silty sand; residual; Bulk Sample No. TP1.

Test Pit Notes

Coordinates:	34,046086°S 22,402863°E
Method of Excavation:	TLB Type Light Mechanical Excavator- JCB 3CX
Excavation Character:	Excavation Stopped due to maximum reach
Date Excavated:	29/04/2022
Date Profiled:	29/04/2022
Groundwater Seepage:	Not Encountered
Samples Extracted:	1 Bulk Sample
Notes:	N/A
Profiled by:	Eugene van der Walt (Pri.Sci.Nat)

Terra Geotechnical Harolds Bay Country Estate

Soil Profile Photo of Test Pit TP1

Terra Geotechnical Harolds Bay Country Estate

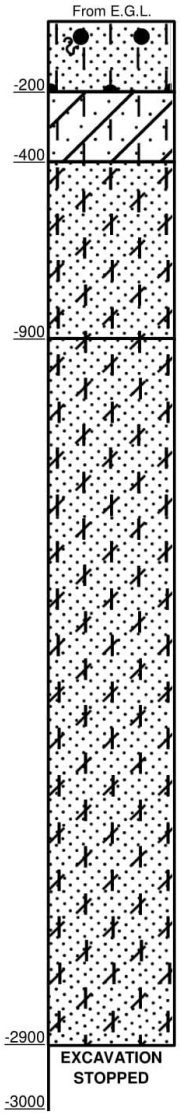
Material Present in Test Pit TP1

Terra Geotechnical Harolds Bay Country Estate

Surroundings of Test Pit TP1

Terra Geotechnical	**Site:**	Harolds Bay Country Estate
	Location:	Harolds Bay
	Client:	Element Consulting Engineers (PTY) LTD

Soil Profile for Test Pit TP2



slightly moist; light brown; loose; intact; silty sand; alluvium; frequent roots; Not Sampled.

slightly moist; light brown; loose; intact; silty sand; alluvium; Not Sampled.

slightly moist; dark brown mottled red orange; stiff; intact; clayey silt; reworked residual; fine rootlets; Disturbed Sample No. TP2.

slightly moist; orange brown patched red grey and white; firm; mostly intact with clay rich areas being slightly slickensided; clayey silty sand; residual; Not Sampled.

Test Pit Notes

Coordinates:	34,046477°S 22,403738°E
Method of Excavation:	TLB Type Light Mechanical Excavator- JCB 3CX
Excavation Character:	Excavation Stopped due to maximum reach
Date Excavated:	29/04/2022
Date Profiled:	29/04/2022
Groundwater Seepage:	Not Encountered
Samples Extracted:	1 Disturbed Sample
Notes:	N/A
Profiled by:	Eugene van der Walt (Pri.Sci.Nat)

Terra Geotechnical Harolds Bay Country Estate

Soil Profile Photo of Test Pit TP2

Terra Geotechnical Harolds Bay Country Estate

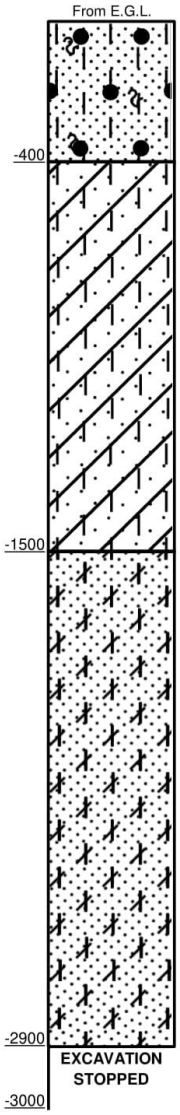
Material Present in Test Pit TP2

Terra Geotechnical Harolds Bay Country Estate

Surroundings of Test Pit TP2

Terra Geotechnical	**Site:**	Harolds Bay Country Estate
	Location:	Harolds Bay
	Client:	Element Consulting Engineers (PTY) LTD

Soil Profile for Test Pit TP3



slightly moist; light brown; loose; intact; silty sand; alluvium; frequent roots; Not Sampled.

dry; light brown; moderately dense; intact; silty sand; alluvium; Not Sampled.

slightly moist; orange brown patched red; moderately dense; intact; clayey silty sand; residual; Disturbed Sample No. TP2.

Test Pit Notes

Coordinates:	34,046084°S 22,405169°E
Method of Excavation:	TLB Type Light Mechanical Excavator- JCB 3CX
Excavation Character:	Excavation Stopped due to maximum reach
Date Excavated:	29/04/2022
Date Profiled:	29/04/2022
Groundwater Seepage:	Not Encountered
Samples Extracted:	1 Disturbed Sample
Notes:	N/A
Profiled by:	Eugene van der Walt (Pri.Sci.Nat)

Terra Geotechnical Harolds Bay Country Estate

Soil Profile Photo of Test Pit TP3

Terra Geotechnical Harolds Bay Country Estate

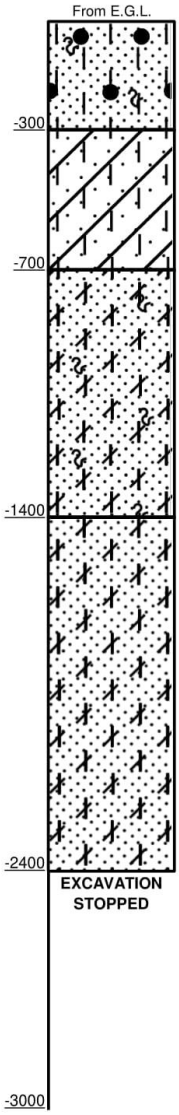
Material Present in Test Pit TP3

Terra Geotechnical Harolds Bay Country Estate

Surroundings of Test Pit TP3

Terra Geotechnical	**Site:**	Harolds Bay Country Estate
	Location:	Harolds Bay
	Client:	Element Consulting Engineers (PTY) LTD

Soil Profile for Test Pit TP4



slightly moist; light brown; loose; intact; silty sand; alluvium; frequent roots; Not Sampled.

slightly moist; light brown; loose; intact; silty sand; alluvium; Not Sampled.

slightly moist; dark orange brown mottled red orange; stiff; intact slickensided and shattered; clayey silt; reworked residual; decomposed roots; Not Sampled.

slightly moist; orange brown patched red grey; firm; mostly intact with clay rich areas being slightly slickensided; clayey silty sand; residual; Not Sampled.

Test Pit Notes

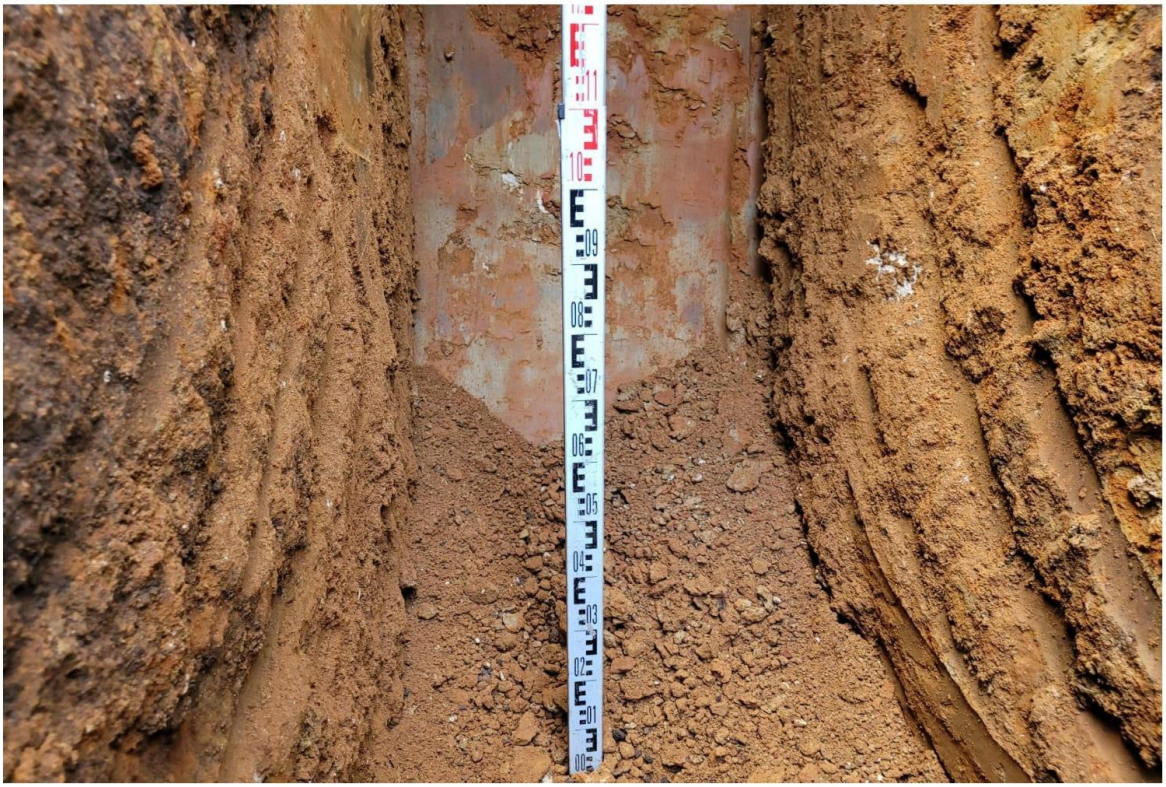
Coordinates:	34,046687°S 22,405485°E
Method of Excavation:	TLB Type Light Mechanical Excavator- JCB 3CX
Excavation Character:	Excavation Stopped due to maximum reach
Date Excavated:	29/04/2022
Date Profiled:	29/04/2022
Groundwater Seepage:	Not Encountered
Samples Extracted:	N/A
Notes:	N/A
Profiled by:	Eugene van der Walt (Pri.Sci.Nat)

Terra Geotechnical Harolds Bay Country Estate

Soil Profile Photo of Test Pit TP4

Terra Geotechnical Harolds Bay Country Estate

Material Present in Test Pit TP4

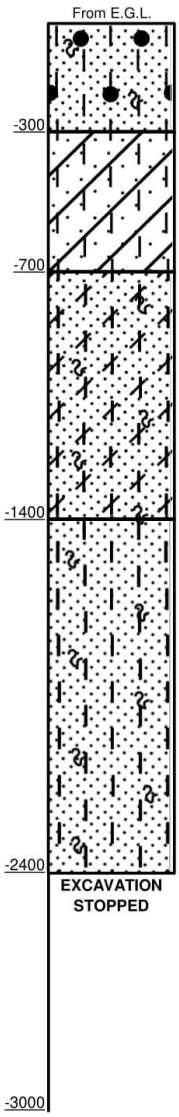


Terra Geotechnical Harolds Bay Country Estate

Surroundings of Test Pit TP4

Terra Geotechnical	**Site:**	Harolds Bay Country Estate
	Location:	Harolds Bay
	Client:	Element Consulting Engineers (PTY) LTD

Soil Profile for Test Pit TP5



slightly moist; light brown; loose; intact; silty sand; alluvium; frequent roots; Not Sampled.

slightly moist; light brown; loose; intact; silty sand; alluvium; Not Sampled.

slightly moist; dark orange brown mottled red orange; stiff; intact with slickensided and shattered areas; clayey silt; reworked residual; decomposed roots; Not Sampled.

slightly moist; orange brown patched red grey; firm; mostly intact with clay rich areas being slightly slickensided; clayey silty sand; residual; Disturbed Sample No. TP5.

Test Pit Notes

Coordinates:	34,046072°S 22,406541°E
Method of Excavation:	TLB Type Light Mechanical Excavator- JCB 3CX
Excavation Character:	Excavation Stopped due to maximum reach
Date Excavated:	29/04/2022
Date Profiled:	29/04/2022
Groundwater Seepage:	Not Encountered
Samples Extracted:	1 Disturbed Sample
Notes:	N/A
Profiled by:	Eugene van der Walt (Pri.Sci.Nat)

Terra Geotechnical Harolds Bay Country Estate

Soil Profile Photo of Test Pit TP5

Terra Geotechnical Harolds Bay Country Estate

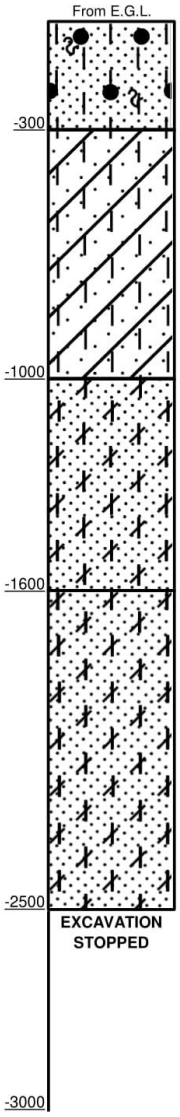
Material Present in Test Pit TP5

Terra Geotechnical Harolds Bay Country Estate

Surroundings of Test Pit TP5

Terra Geotechnical	**Site:**	Harolds Bay Country Estate
	Location:	Harolds Bay
	Client:	Element Consulting Engineers (PTY) LTD

Soil Profile for Test Pit TP6



slightly moist; light brown; loose; intact; silty sand; alluvium; frequent roots; Not Sampled.

dry; light brown; moderately dense; intact; silty sand; alluvium; Not Sampled.

slightly moist; dark orange brown mottled red orange; stiff; intact; clayey silt with ferricrete nodules; reworked ferrugenized residual; Not Sampled.

slightly moist; orange brown patched red grey; firm; mostly intact with clay rich areas being slightly slickensided; clayey silty sand; residual; Disturbed Sample No. TP6.

Test Pit Notes

Coordinates:	34,044912°S 22,40529°E
Method of Excavation:	TLB Type Light Mechanical Excavator- JCB 3CX
Excavation Character:	Excavation Stopped due to maximum reach
Date Excavated:	29/04/2022
Date Profiled:	29/04/2022
Groundwater Seepage:	Not Encountered
Samples Extracted:	1 Disturbed Sample
Notes:	N/A
Profiled by:	Eugene van der Walt (Pri.Sci.Nat)

Terra Geotechnical Harolds Bay Country Estate

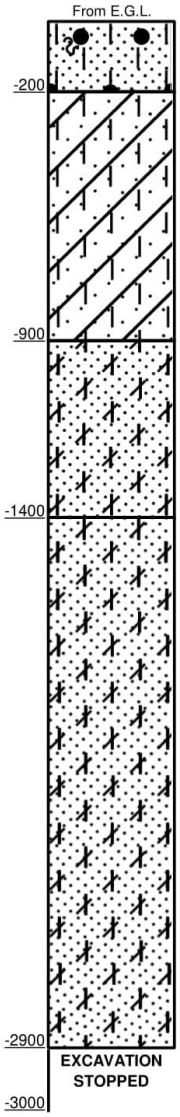
Soil Profile Photo of Test Pit TP6

Terra Geotechnical Harolds Bay Country Estate

Surroundings of Test Pit TP6

Terra Geotechnical	**Site:**	Harolds Bay Country Estate
	Location:	Harolds Bay
	Client:	Element Consulting Engineers (PTY) LTD

Soil Profile for Test Pit TP7



slightly moist; light brown; loose; intact; silty sand; alluvium; frequent roots; Not Sampled.

dry; light brown; moderately dense; intact; silty sand; alluvium; Not Sampled.

slightly moist; dark orange brown mottled red orange; stiff; intact; clayey silt with ferricrete nodules; reworked ferrugenized residual; Not Sampled.

slightly moist; orange brown patched red grey; firm; mostly intact with clay rich areas being slightly slickensided; clayey silty sand; residual; Not Sampled.

Test Pit Notes

Coordinates:	34,045766°S 22,404058°E
Method of Excavation:	TLB Type Light Mechanical Excavator- JCB 3CX
Excavation Character:	Excavation Stopped due to maximum reach
Date Excavated:	29/04/2022
Date Profiled:	29/04/2022
Groundwater Seepage:	Not Encountered
Samples Extracted:	N/A
Notes:	N/A
Profiled by:	Eugene van der Walt (Pri.Sci.Nat)

Terra Geotechnical Harolds Bay Country Estate

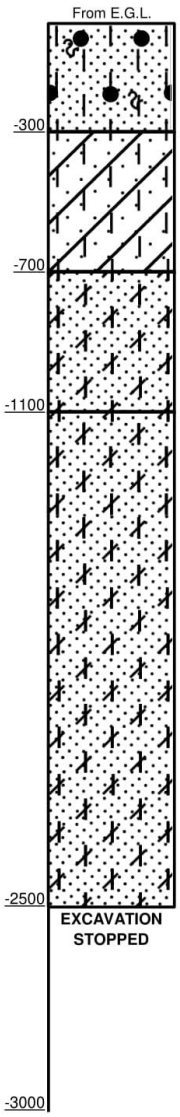
Material Present in Test Pit TP7

Terra Geotechnical Harolds Bay Country Estate

Surroundings of Test Pit TP7

Terra Geotechnical	**Site:**	Harolds Bay Country Estate
	Location:	Harolds Bay
	Client:	Element Consulting Engineers (PTY) LTD

Soil Profile for Test Pit TP8



slightly moist; light brown; loose; intact; silty sand; alluvium; frequent roots; Not Sampled.

dry; light brown; moderately dense; intact; silty sand; alluvium; Not Sampled.

slightly moist; dark orange brown mottled red orange; stiff; intact; clayey silt; reworked residual; Not Sampled.

slightly moist; orange brown patched red grey; firm; mostly intact with clay rich areas being slightly slickensided; clayey silty sand; residual; Not Sampled.

Test Pit Notes

Coordinates:	34,044043°S 22,405375°E
Method of Excavation:	TLB Type Light Mechanical Excavator- JCB 3CX
Excavation Character:	Excavation Stopped due to maximum reach
Date Excavated:	29/04/2022
Date Profiled:	29/04/2022
Groundwater Seepage:	Not Encountered
Samples Extracted:	N/A
Notes:	N/A
Profiled by:	Eugene van der Walt (Pri.Sci.Nat)

Terra Geotechnical Harolds Bay Country Estate

Soil Profile Photo of Test Pit TP8

Terra Geotechnical Harolds Bay Country Estate

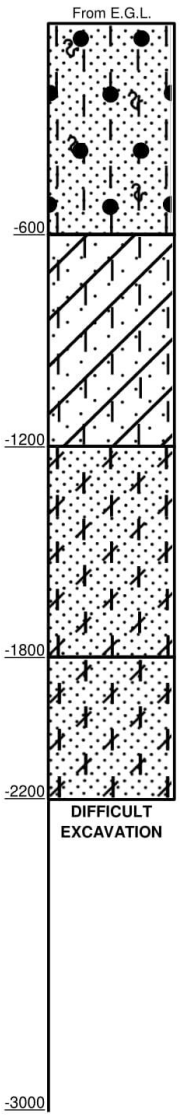
Material Present in Test Pit TP8

Terra Geotechnical Harolds Bay Country Estate

Surroundings of Test Pit TP8

Terra Geotechnical	**Site:**	Harolds Bay Country Estate
	Location:	Harolds Bay
	Client:	Element Consulting Engineers (PTY) LTD

Soil Profile for Test Pit TP9



slightly moist; light brown; loose; intact; silty sand; alluvium; frequent roots; Not Sampled.

dry; light brown; moderately dense; intact; silty sand with ferricrete nodules at base; ferruginized alluvium; Not Sampled.

slightly moist; dark orange brown mottled red orange; stiff; intact; clayey silt; reworked residual; Not Sampled.

slightly moist; orange brown patched red grey; very stiff; mostly intact with clay rich areas being slightly slickensided; clayey silty sand; residual; Not Sampled.

Test Pit Notes

Coordinates:	34,045226°S 22,407423°E
Method of Excavation:	TLB Type Light Mechanical Excavator- JCB 3CX
Excavation Character:	Difficult Excavation in Residual at 2,2 m below existing ground level
Date Excavated:	29/04/2022
Date Profiled:	29/04/2022
Groundwater Seepage:	Not Encountered
Samples Extracted:	N/A
Notes:	N/A
Profiled by:	Eugene van der Walt (Pri.Sci.Nat)

Terra Geotechnical Harolds Bay Country Estate

Soil Profile Photo of Test Pit TP9

Terra Geotechnical Harolds Bay Country Estate

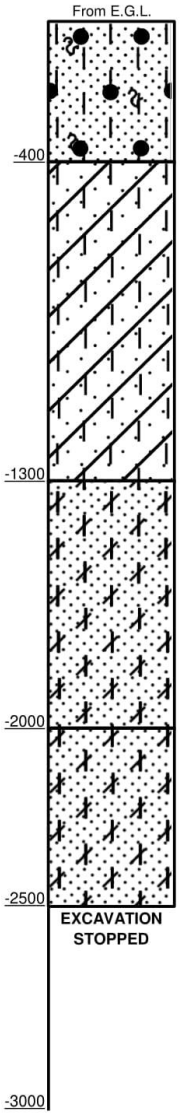
Material Present in Test Pit TP9

Terra Geotechnical Harolds Bay Country Estate

Surroundings of Test Pit TP9

Terra Geotechnical	**Site:**	Harolds Bay Country Estate
	Location:	Harolds Bay
	Client:	Element Consulting Engineers (PTY) LTD

Soil Profile for Test Pit TP10



slightly moist; light brown; loose; intact; silty sand; alluvium; frequent roots; Not Sampled.

dry; light brown; moderately dense; intact; silty sand; alluvium; Not Sampled.

slightly moist; dark orange brown mottled red orange; stiff; intact; clay with ferricrete nodules; reworked ferruginized residual; Not Sampled.

slightly moist; orange brown patched red grey; firm; mostly intact with clay rich areas being slightly slickensided; clayey silty sand; residual; Not Sampled.

Test Pit Notes

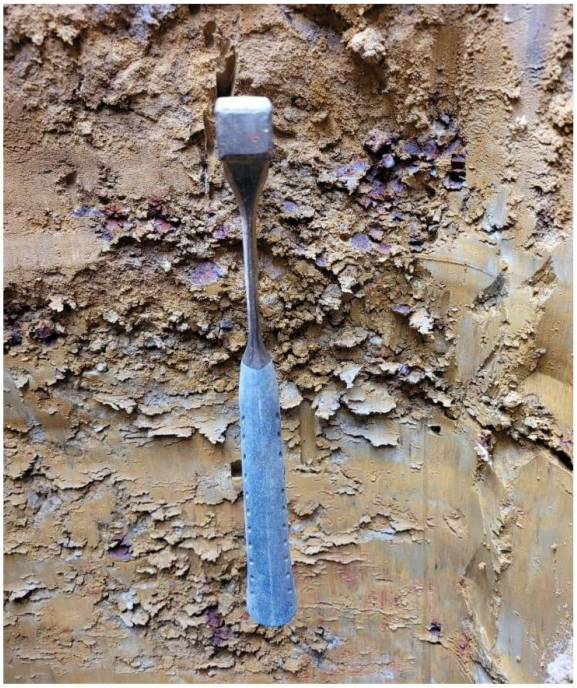
Coordinates:	34,044156°S 22,408167°E
Method of Excavation:	TLB Type Light Mechanical Excavator- JCB 3CX
Excavation Character:	Excavation Stopped due to maximum reach
Date Excavated:	29/04/2022
Date Profiled:	29/04/2022
Groundwater Seepage:	Not Encountered
Samples Extracted:	N/A
Notes:	N/A
Profiled by:	Eugene van der Walt (Pri.Sci.Nat)

Terra Geotechnical Harolds Bay Country Estate

Soil Profile Photo of Test Pit TP10

Terra Geotechnical Harolds Bay Country Estate

Material Present in Test Pit TP10

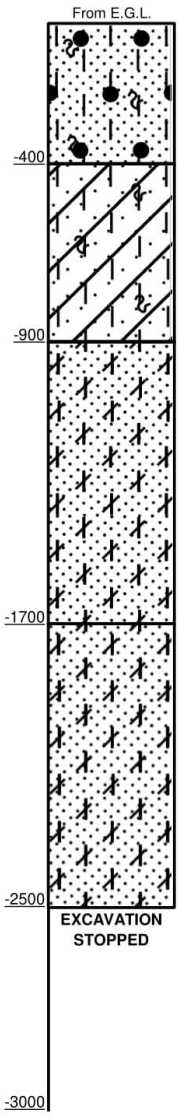


Terra Geotechnical Harolds Bay Country Estate

Surroundings of Test Pit TP10

Terra Geotechnical	**Site:**	Harolds Bay Country Estate
	Location:	Harolds Bay
	Client:	Element Consulting Engineers (PTY) LTD

Soil Profile for Test Pit TP11



slightly moist; light brown; loose; intact; silty sand; alluvium; frequent roots; Not Sampled.

dry; light brown; moderately dense; intact; silty sand; alluvium; frequent roots; Not Sampled.

slightly moist; dark orange brown mottled red orange; stiff; intact; clayey silt; reworked residual; Disturbed Sample No. TP11.

slightly moist; orange brown patched red grey; firm; mostly intact with clay rich areas being slightly slickensided; clayey silty sand; residual; Not Sampled.

Test Pit Notes

Coordinates:	34,044445°S 22,406775°E
Method of Excavation:	TLB Type Light Mechanical Excavator- JCB 3CX
Excavation Character:	Excavation Stopped due to maximum reach
Date Excavated:	29/04/2022
Date Profiled:	29/04/2022
Groundwater Seepage:	Not Encountered
Samples Extracted:	1 Disturbed Sample
Notes:	N/A
Profiled by:	Eugene van der Walt (Pri.Sci.Nat)

Terra Geotechnical Harolds Bay Country Estate

Soil Profile Photo of Test Pit TP11

Terra Geotechnical Harolds Bay Country Estate

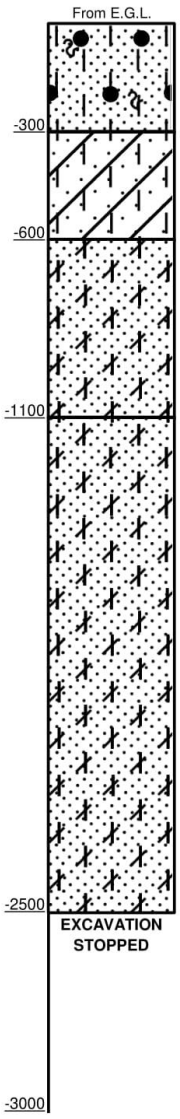
Material Present in Test Pit TP11

Terra Geotechnical Harolds Bay Country Estate

Surroundings of Test Pit TP11

Terra Geotechnical	**Site:**	Harolds Bay Country Estate
	Location:	Harolds Bay
	Client:	Element Consulting Engineers (PTY) LTD

Soil Profile for Test Pit TP12



slightly moist; light brown; loose; intact; silty sand; alluvium; frequent roots; Not Sampled.

dry; light brown; moderately dense; intact; silty sand; alluvium; Not Sampled.

slightly moist; dark orange brown mottled red orange; stiff; intact; clayey silt; reworked residual; Not Sampled.

slightly moist; orange brown patched red grey; firm; mostly intact with clay rich areas being slightly slickensided; clayey silty sand; residual; Undisturbed sample taken at 1200-1600mm; Undisturbed Sample No. TP12.

Test Pit Notes

Coordinates:	34,043127°S 22,406834°E
Method of Excavation:	TLB Type Light Mechanical Excavator- JCB 3CX
Excavation Character:	Excavation Stopped due to maximum reach
Date Excavated:	29/04/2022
Date Profiled:	29/04/2022
Groundwater Seepage:	Not Encountered
Samples Extracted:	1 Undisturbed Sample
Notes:	N/A
Profiled by:	Eugene van der Walt (Pri.Sci.Nat)

Terra Geotechnical Harolds Bay Country Estate

Soil Profile Photo of Test Pit TP12

Terra Geotechnical Harolds Bay Country Estate

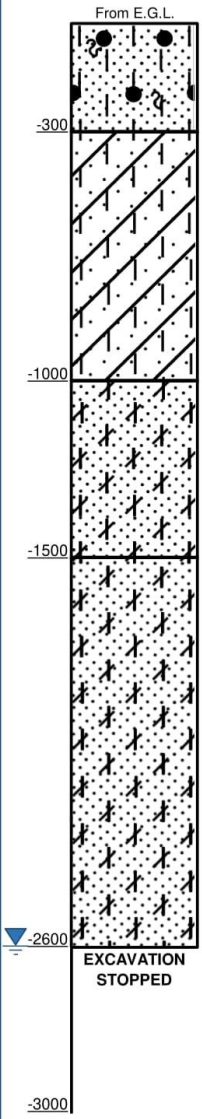
Material Present in Test Pit TP12

Terra Geotechnical Harolds Bay Country Estate

Surroundings of Test Pit TP12

Terra Geotechnical	**Site:**	Harolds Bay Country Estate
	Location:	Harolds Bay
	Client:	Element Consulting Engineers (PTY) LTD

Soil Profile for Test Pit TP13



slightly moist; light brown; loose; intact; silty sand; alluvium; frequent roots; Not Sampled.

dry; light brown; moderately dense; intact; silty sand; alluvium; Not Sampled.

slightly moist; dark orange brown mottled red orange; stiff; intact; clay with ferricrete nodules; ferruginized alluvium; Disturbed Sample No. TP13.

wet; light yellow brown; loose; intact; silty sand; alluvium; side wall collapse due to strong water seepage; Not Sampled.

Test Pit Notes

Coordinates:	34,043265°S 22,405201°E
Method of Excavation:	TLB Type Light Mechanical Excavator- JCB 3CX
Excavation Character:	Excavation Stopped due to maximum reach
Date Excavated:	29/04/2022
Date Profiled:	29/04/2022
Groundwater Seepage:	Strong Water Seepage at base of test pit
Samples Extracted:	1 Disturbed Sample
Notes:	N/A
Profiled by:	Eugene van der Walt (Pri.Sci.Nat)

Terra Geotechnical Harolds Bay Country Estate

Soil Profile Photo of Test Pit TP13

Terra Geotechnical Harolds Bay Country Estate

Material Present in Test Pit TP13

Terra Geotechnical Harolds Bay Country Estate

Surroundings of Test Pit TP13

APPENDIX B

B.1 Laboratory Test Results

ROADLAB™

Roadlab laboratories (PTY) Ltd
7 Bally Crescent, Voorbaai
P.O Box 35 Hartenbos
Tel: 067 418 4529 Fax:
Email: elizabeth@roadlab.co.za
Web:

Job Request No.: RM14879
Terra Geotechnical
Andre Nel Building
C/O Fynbos & Perdekuil Avenue, Stilbaai
6674
Attention : Eugene van der walt

Date Reported : 2022/05/17

Project : Herolds Bay Estate

Full Classification SANS 3001 - GR40/GR41

SAMPLE INFORMATION AND PROPERTIES

SAMPLE NO.		8849	8851		
HOLE NO./ Km / CHAINAGE		TP1	TP3		
ROAD NO./ NAME Line 1 ROAD NO./ NAME Line 2		N/S	N/S		
LAYER TESTED/SAMPLED		N/S	N/S		
SAMPLE DEPTH		1000-3200mm	400-1500mm		
DATE SAMPLED		2022/04/29	2022/04/29		
COLOUR OF SAMPLE		Dark Brown	Light Brown		
TYPE OF SAMPLE		Silty Clayey Gravel	Silty Sand		
SIEVE ANALYSIS - % PASSING SIEVES *(SANS 3001-GR1:2010, SANS 3001-GR2:2010)					
SIEVE ANALYSIS (GR 1) % PASSING	100.0 mm				
	75.0 mm				
	63.0 mm				
	50.0 mm				
	37.5 mm				
	28.0 mm				
	20.0 mm				
	14.0 mm		100		
	5.0 mm		99		
	2.0 mm	100	99		
	0.425 mm	98	98		
	0.075 mm	26	27		
GM %		0.80	0.80		
SOIL MORTAR ANALYSIS (SANS 3001-PR5:2011)					
COARSE SAND	2.000 - 0.425	1	1		
COARSE FINE SAND	0.425 - 0.250	23	5		
MEDIUM FINE SAND	0.250 - 0.150	40	38		
FINE FINE SAND	0.150 - 0.075	10	28		
SILT CLAY	0.075	26	27		
ATTERBERG LIMITS ANALYSIS - *(SANS 3001-GR10:2010)					
ATTERBERG LIMITS (%) SANS GR10,GR11	LIQUID LIMIT				
	PLASTICITY INDEX	SP	NP		
	LINEAR SHRINKAGE	1.5	0.0		
CLASSIFICATION	H.R.B.	A-2-4(0)	A-2-4(0)		
	COLTO	-	G8		
	TRH 14	-	G8		
CALIFORNIA BEARING RATIO - *(SANS 3001-GR30:2010, SANS 3001-GR40:2010)					
SANS GR30 MAX. DRY DENSITY	OMC %	13.6	8.6		
	MDD (kg/m³)	1926	1768		
	COMP MC %	13.4	8.7		
SWELL % @	MOD | NRB | PRO	1.51 | 1.34 | 0.87	0.00 | 0.00 | 0.00		
C.B.R. SANS GR40	100 %	5	24		
	98 %	4	20		
	97 %	4	19		
	95 %	3	16		
	93 %	2	13		
	90 %	2	10		
STABILISER IN LAB					
TEST TYPE		CBR	CBR		
SAMPLING METHOD		TMH5	TMH5		
WEATHER WHEN SAMPLED		Sunny	Sunny		

Deviation from Test Method : Samples & delivered by client.
Remarks and Notes : None.

Opinions and interpretations are not included in our schedule of accreditation. (T0947)
The samples were subjected to analysis according to (SANS)(TMH5)(DOT)(ASTM)
The test results reported relate to the samples tested.
Further use of the above information is not the responsibility or liability of Roadlab.
Document may only be reproduced of published in their full context.
Report compiled by : Jessica Myburgh

sanas Testing Laboratory
Accreditation No.
Prog.ver 10.7 (2019/11/07)

Elizabeth Roux
Technical Signatory

2

ROADLAB™

Roadlab laboratories (PTY) Ltd
7 Bally Crescent, Voorbaai
P.O Box 35 Hartenbos
Tel: 067 418 4529 Fax:
Email: elizabeth@roadlab.co.za
Web:

Job Request No.: RM14879
Terra Geotechnical
Andre Nel Building
C/O Fynbos & Perdekuil Avenue, Stilbaai
6674
Attention : Eugene van der Walt

Date Reported : 2022/05/17

Project : Herolds Bay Estate

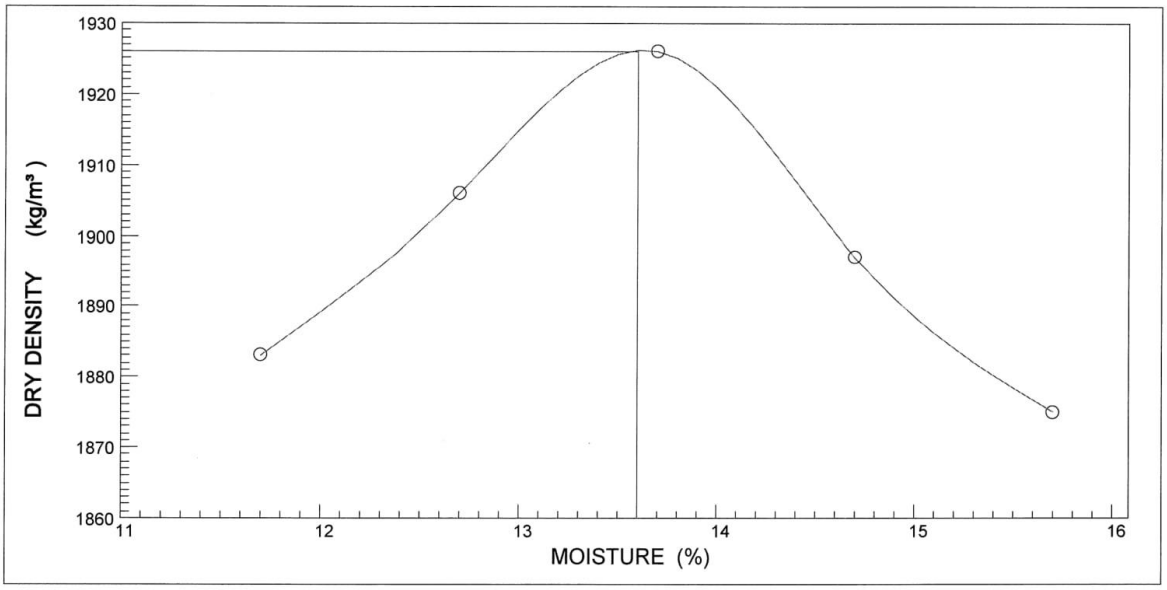
Test Report: MDD & OMC

SANS 3001 - GR30

SAMPLE NO.	8849
CONTAINER FOR SAMPLING	Sampling Bag
SIZE / APPROX. MASS OF SAMPLE	84400g
MOISTURE CONDITION OF SAMPLE	Slightly Moist
LAYER TESTED / SAMPLED FROM	1000-3200mm
MATERIAL DESCRIPTION	Clayey Silty Gravel
HOLE NO./ km / CHAINAGE	TP 1
ROAD NO.	N/S
DATE RECEIVED	2022/04/29
DATE SAMPLED	2022/04/29
CLIENT MARKING	None
COLOUR AND TYPE	Dark Brown

POINT NO.	1	2	3	4	5			
DRY DENSITY (kg/m³)	1883	1906	1926	1897	1875			
MOISTURE (%)	11.7	12.7	13.7	14.7	15.7			

MAXIMUM DRY DENSITY (kg/m³) : 1926	OPTIMUM MOISTURE CONTENT (%) : 13.6



Deviation from Test Method : Sampled & Delivered by client.
Remarks and Notes : None.

Opinions and interpretations are not included in our schedule of accreditation. (T0947)
The samples were subjected to analysis according to (SANS)(TMH5)(DOT)(ASTM)
The test results reported relate to the samples tested.
Further use of the above information is not the responsibility or liability of Roadlab.
Document may only be reproduced of published in their full context.
Report compiled by : Jessica Myburgh

sanas Testing Laboratory
Accreditation No.
Prog.ver 10.7 (2019/11/07)

Elizabeth Roux
Technical Signatory

3

ROADLAB

Roadlab laboratories (PTY) Ltd
7 Bally Crescent, Voorbaai
P.O Box 35 Hartenbos
Tel: 067 418 4529 Fax:
Email: elizabeth@roadlab.co.za
Web:

Job Request No.: RM14879
Terra Geotechnical
Andre Nel Building
C/O Fynbos & Perdekuil Avenue, Stilbaai
6674
Attention : Eugene van der Walt

Date Reported : 2022/05/17

Project : Herolds Bay Estate

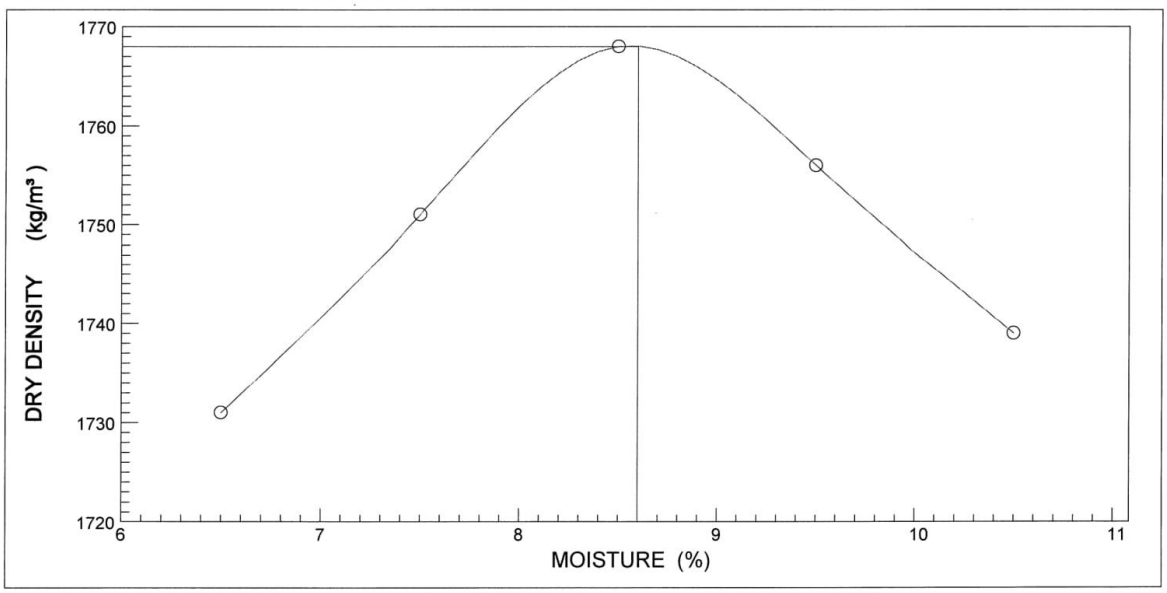
Test Report: MDD & OMC

SANS 3001 - GR30

SAMPLE NO.	8851
CONTAINER FOR SAMPLING	Sampling Bag
SIZE / APPROX. MASS OF SAMPLE	90900g
MOISTURE CONDITION OF SAMPLE	Slightly Moist
LAYER TESTED / SAMPLED FROM	400-1500mm
MATERIAL DESCRIPTION	Silty Sand
HOLE NO./ km / CHAINAGE	TP 3
ROAD NO.	N/S
DATE RECEIVED	2022/04/29
DATE SAMPLED	2022/04/29
CLIENT MARKING	None
COLOUR AND TYPE	Light Brown

POINT NO.	1	2	3	4	5			
DRY DENSITY (kg/m³)	1731	1751	1768	1756	1739			
MOISTURE (%)	6.5	7.5	8.5	9.5	10.5			

MAXIMUM DRY DENSITY (kg/m³) : 1768	OPTIMUM MOISTURE CONTENT (%) : 8.6



Deviation from Test Method : Sampled & Delivered by client.
Remarks and Notes : None.

Opinions and interpretations are not included in our schedule of accreditation. (T0947)
The samples were subjected to analysis according to (SANS)(TMH5)(DOT)(ASTM)
The test results reported relate to the samples tested.
Further use of the above information is not the responsibility or liability of Roadlab.
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Report compiled by : Jessica Myburgh

sanas Testing Laboratory
Accreditation No.
Prog.ver 10.7 (2019/11/07)

Elizabeth Roux
Technical Signatory

4

Terra Geotechnical

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BBBEE Level 1 Contributor
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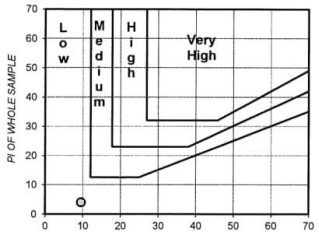
OUR REF : RM14879
CLIENT : Terra Geotechnical
PROJECT : Herolds Bay Estate

DATE RECEIVED : 2022.04.29
POSITION : TP1
LAYER : 1000-3200mm
SAMPLE No. : 8849
SAMPLE DESCRIPTION : Dark Brown Clayey Silty Gravel Sand

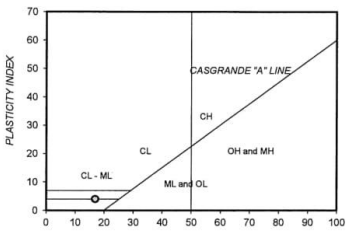
FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI		**3.9**
Sieve analysis Cumulative percentage passing (mm)	100.0	100
	75.0	100
	63.0	100
	50.0	100
	37.5	100
	28.0	100
	20.0	100
	14.0	100
	5.00	100
	2.000	100
	0.425	98
	0.250	76
	0.150	36
	0.075	26
	50 µm	16
	5 µm	12
	2 µm	9.6
Soil Mortar Analysis % < 2.00mm	2.000 - 0.425	1
	0.425 - 0.250	23
	0.250 - 0.150	40
	0.150 - 0.075	10
	< 0.075	26
Effective size		0.002
Uniformity Coefficient		84.7
Curvature Coefficient		20.2
Oversize Index		0.0
Shrinkage Product		161.4
Grading Coefficient		0.3
Grading modulus		0.76
Alter-berg Limits	Liquid Limit	17
	Plasticity Index	4
	Linear Shrinkage	1.6
	PI < 0.075	-
Unified Soil Classification		SM & SC
U.S. Highway Classification		A-2-4 (0)

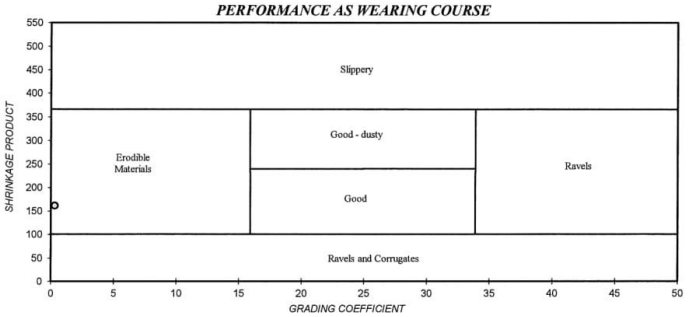
POTENTIAL EXPANSIVENES



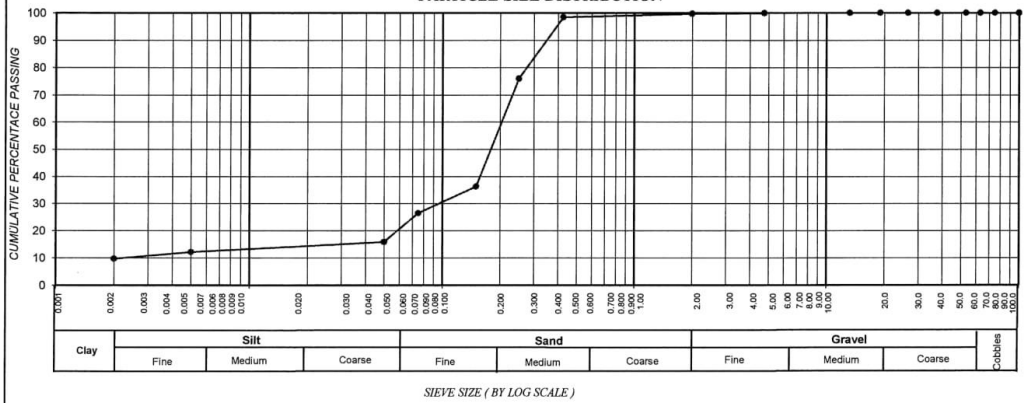
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
9.6	8.9	81.2	0.3

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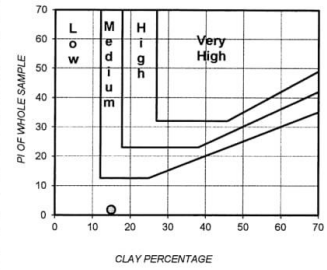
OUR REF : RM14879
CLIENT : Terra Geotechnical
PROJECT : Herolds Bay Estate

DATE RECEIVED : 2022.04.29
POSITION : TP2
LAYER : 400-900mm
SAMPLE No. : 8850
SAMPLE DESCRIPTION : Dark Brown Sandy Silty Gravel Clayey Sand

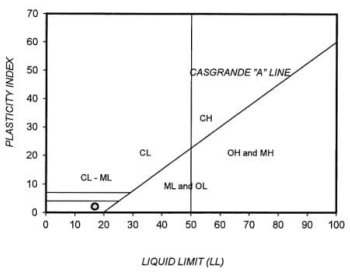
FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI		**1.8**
Sieve analysis Cumulative percentage passing (mm)	100.0	100
	75.0	100
	63.0	100
	50.0	100
	37.5	100
	28.0	100
	20.0	100
	14.0	99
	5.00	93
	2.000	92
	0.425	88
	0.250	68
	0.150	38
	0.075	27
	50 µm	22
	5 µm	19
	2 µm	15.0
Soil Mortar Analysis % < 2.00mm	2.000 - 0.425	4
	0.425 - 0.250	21
	0.250 - 0.150	33
	0.150 - 0.075	12
	< 0.075	29
Effective size		0.002
Uniformity Coefficient		111.4
Curvature Coefficient		21.3
Oversize Index		0.0
Shrinkage Product		48.4
Grading Coefficient		7.4
Grading modulus		0.93
Atter-berg Limits	Liquid Limit	17
	Plasticity Index	2
	Linear Shrinkage	0.6
	PI < 0.075	-
Unified Soil Classification		SM
U.S. Highway Classification		A-2-4 (0)

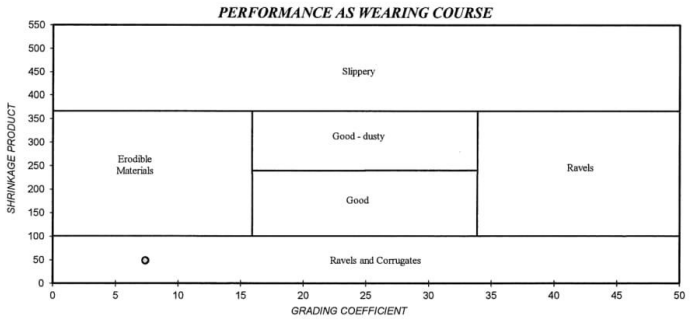
POTENTIAL EXPANSIVENES



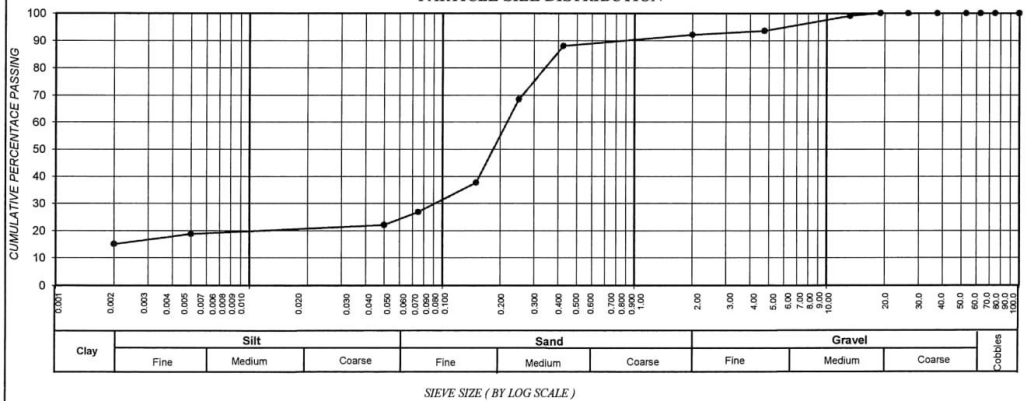
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
15.0	8.7	68.4	7.9

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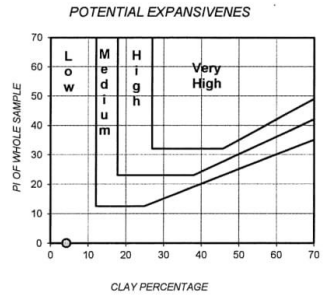
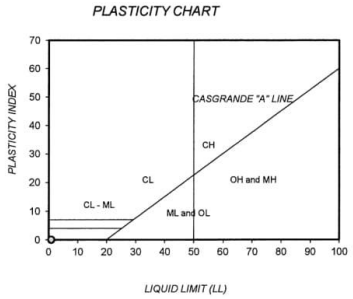
OUR REF : RM14879
CLIENT : Terra Geotechnical
PROJECT : Herolds Bay Estate

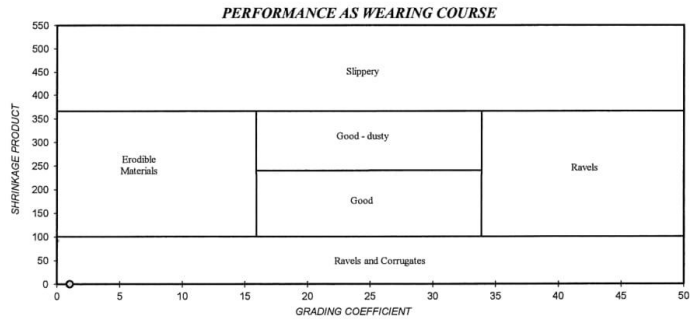
DATE RECEIVED : 2022.04.29
POSITION : TP3
LAYER : 400-1500mm
SAMPLE No. : 8851
SAMPLE DESCRIPTION : Light Brown Silty Sand Sand

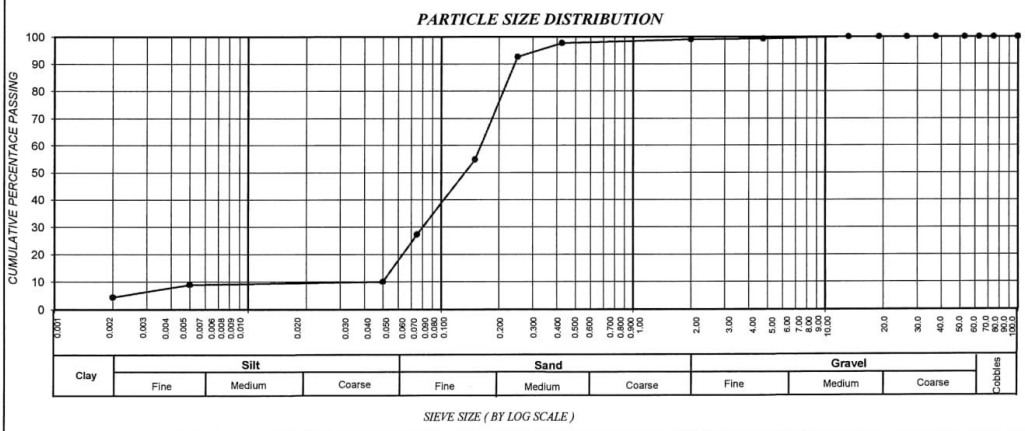
FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI		-
Sieve analysis Cumulative percentage passing (mm)	100.0	100
	75.0	100
	63.0	100
	50.0	100
	37.5	100
	28.0	100
	20.0	100
	14.0	100
	5.00	99
	2.000	99
	0.425	98
	0.250	93
	0.150	55
	0.075	27
	50 µm	10
	5 µm	9
	2 µm	4.3
Soil Mortar Analysis % < 2.00mm	2.000 - 0.425	1
	0.425 - 0.250	5
	0.250 - 0.150	38
	0.150 - 0.075	28
	< 0.075	28
Effective size		0.050
Uniformity Coefficient		3.3
Curvature Coefficient		0.8
Oversize Index		0.0
Shrinkage Product		0
Grading Coefficient		1.0
Grading modulus		0.76
Atter-berg Limits	Liquid Limit	-
	Plasticity Index	NP
	Linear Shrinkage	-
	PI < 0.075	-
Unified Soil Classification		SM
U.S. Highway Classification		A-2-4 (0)









CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
4.3	9.1	85.6	1.0

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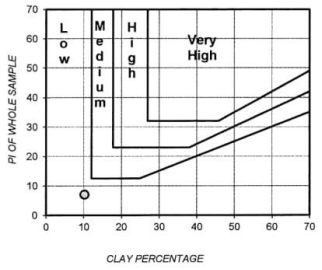
PROJECT : Herolds Bay Estate

DATE RECEIVED : 2022.04.29
POSITION : TP5
LAYER : 1400-2800mm
SAMPLE No. : 8852
SAMPLE DESCRIPTION : Reddish brown Clayey + Silty Gravel
Clayey Silty Sand

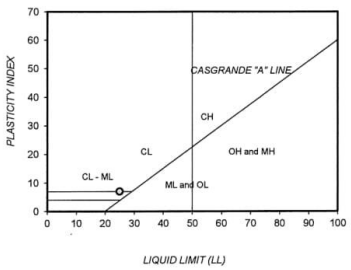
FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI		**7.0**
Sieve analysis Cumulative percentage passing (mm)	100.0	100
	75.0	100
	63.0	100
	50.0	100
	37.5	100
	28.0	100
	20.0	100
	14.0	100
	5.00	100
	2.000	100
	0.425	99
	0.250	98
	0.150	70
	0.075	40
	50 µm	19
	5 µm	15
	2 µm	10.2
Soil Mortar Analysis % < 2.00mm	2.000 - 0.425	0
	0.425 - 0.250	1
	0.250 - 0.150	28
	0.150 - 0.075	31
	< 0.075	40
Effective size		0.002
Uniformity Coefficient		62.4
Curvature Coefficient		16.2
Oversize Index		0.0
Shrinkage Product		271.1
Grading Coefficient		0.4
Grading modulus		0.61
Atter-berg Limits	Liquid Limit	25
	Plasticity Index	7
	Linear Shrinkage	2.7
	PI < 0.075	-
Unified Soil Classification		SM & SC
U.S. Highway Classification		A-4 (0)

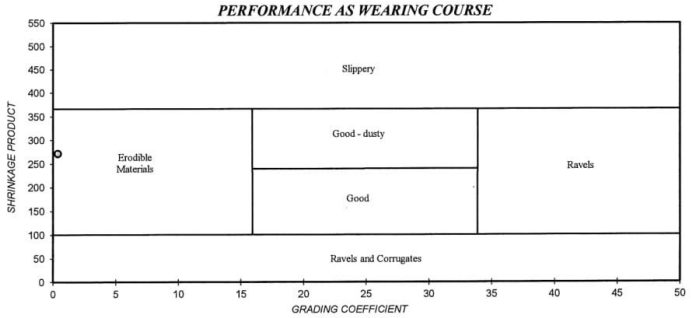
POTENTIAL EXPANSIVENES



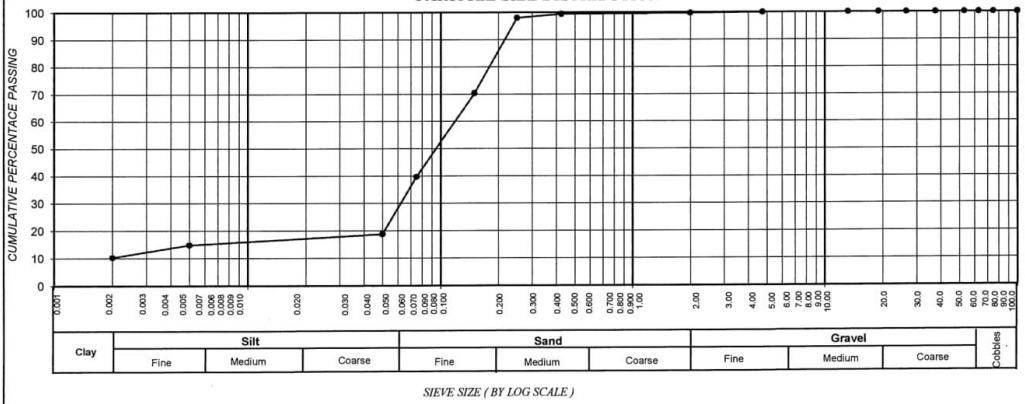
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
10.2	14.2	75.2	0.4

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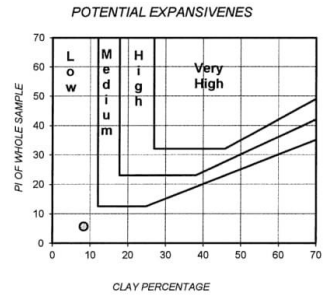
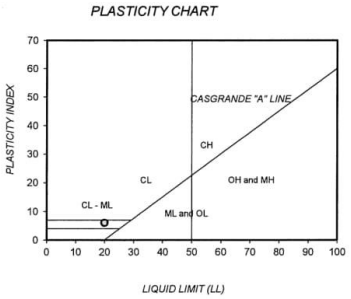
PROJECT : Herolds Bay Estate

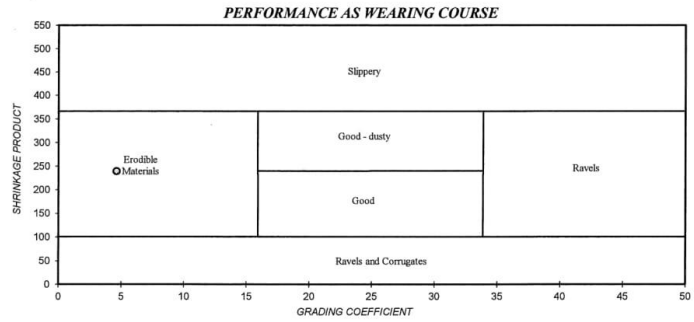
DATE RECEIVED : 2022.04.29
POSITION : TP6
LAYER : 1600-2500mm
SAMPLE No. : 8853
SAMPLE DESCRIPTION : Light Brown Reddish Silty Clayey Silty Sand

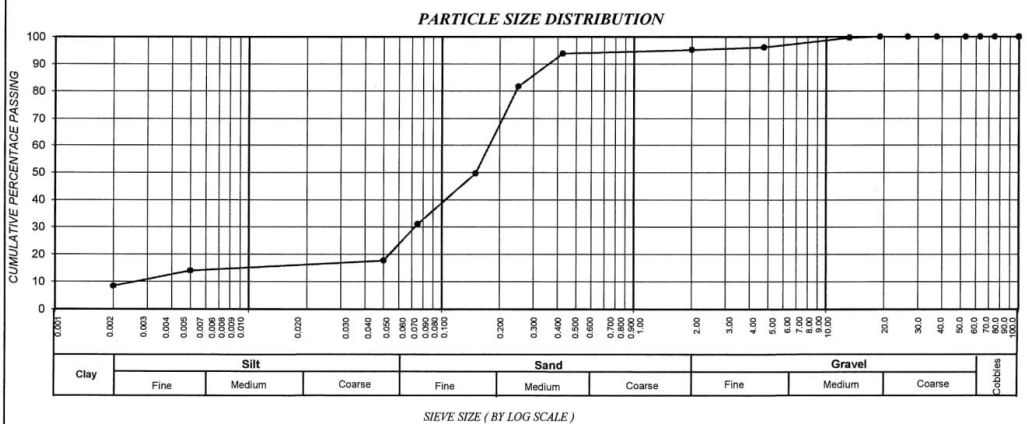
FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI		**5.6**
Sieve analysis Cumulative percentage passing (mm)	100.0	100
	75.0	100
	63.0	100
	50.0	100
	37.5	100
	28.0	100
	20.0	100
	14.0	100
	5.00	96
	2.000	95
	0.425	94
	0.250	82
	0.150	50
	0.075	31
	50 µm	18
	5 µm	14
	2 µm	8.3
Soil Mortar Analysis % < 2.00mm	2.000 - 0.425	1
	0.425 - 0.250	13
	0.250 - 0.150	34
	0.150 - 0.075	20
	< 0.075	33
Effective size		0.003
Uniformity Coefficient		62.7
Curvature Coefficient		10.0
Oversize Index		0.0
Shrinkage Product		239.1
Grading Coefficient		4.6
Grading modulus		0.80
Atter-berg Limits	Liquid Limit	20
	Plasticity Index	6
	Linear Shrinkage	2.6
	PI < 0.075	-
Unified Soil Classification		SM & SC
U.S. Highway Classification		A-2-4 (0)









CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
8.3	13.1	73.8	4.8

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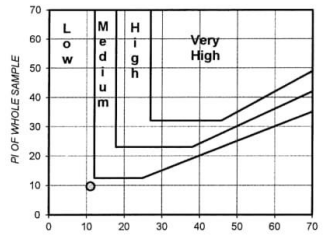
CLIENT : Terra Geotechnical
PROJECT : Herolds Bay Estate

DATE RECEIVED : 2022.04.29
POSITION : TP11
LAYER : 900-1700mm
SAMPLE No. : 8854
SAMPLE DESCRIPTION : Dark Brown Reddish Clayey Silt
Clayey Silty Sand

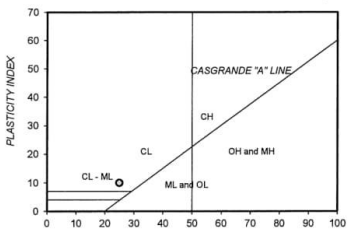
FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI		**9.6**
Sieve analysis Cumulative percentage passing (mm)	100.0	100
	75.0	100
	63.0	100
	50.0	100
	37.5	100
	28.0	100
	20.0	100
	14.0	100
	5.00	98
	2.000	98
	0.425	96
	0.250	87
	0.150	59
	0.075	35
	50 µm	18
	5 µm	15
	2 µm	11.1
Soil Mortar Analysis % < 2.00mm	2.000 - 0.425	2
	0.425 - 0.250	10
	0.250 - 0.150	29
	0.150 - 0.075	24
	< 0.075	36
Effective size		0.002
Uniformity Coefficient		77.1
Curvature Coefficient		14.6
Oversize Index		0.0
Shrinkage Product		345.2
Grading Coefficient		2.2
Grading modulus		0.71
Atter-berg Limits	Liquid Limit	25
	Plasticity Index	10
	Linear Shrinkage	3.6
	PI < 0.075	-
Unified Soil Classification		SC
U.S. Highway Classification		A-2-4 (0)

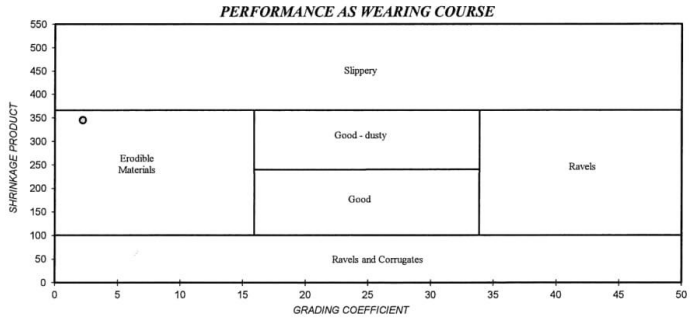
POTENTIAL EXPANSIVENES



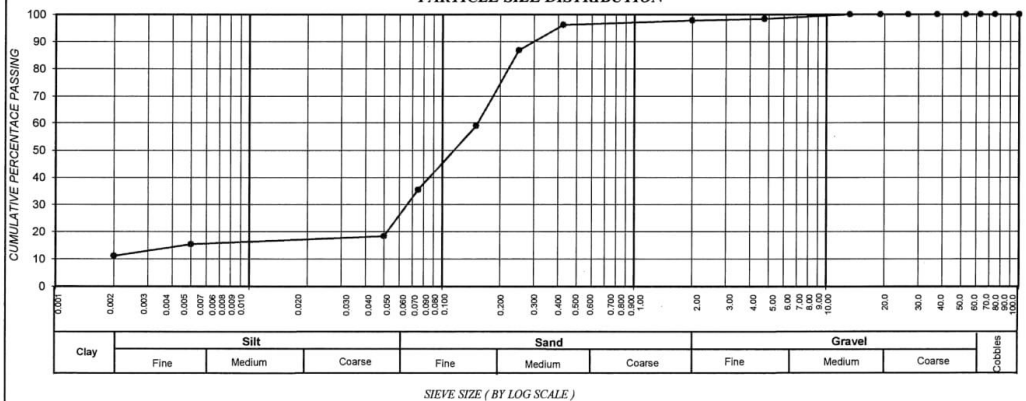
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
11.1	11.7	75.0	2.3

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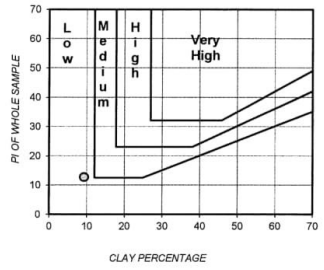
OUR REF : RM14879
CLIENT : Terra Geotechnical
PROJECT : Herolds Bay Estate

DATE RECEIVED : 2022.04.29
POSITION : TP12
LAYER : 1200-1600mm
SAMPLE No. : 8855
SAMPLE DESCRIPTION : Light Brown Olive Silty Clayey Silty Sand

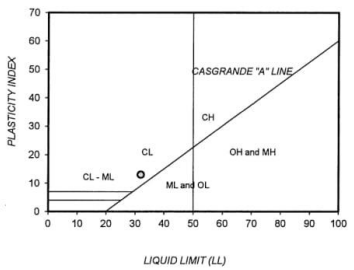
FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI		**12.7**
Sieve analysis Cumulative percentage passing (mm)	100.0	100
	75.0	100
	63.0	100
	50.0	100
	37.5	100
	28.0	100
	20.0	100
	14.0	100
	5.00	99
	2.000	99
	0.425	97
	0.250	87
	0.150	62
	0.075	45
	50 µm	19
	5 µm	15
	2 µm	9.3
Soil Mortar Analysis % < 2.00mm	2.000 - 0.425	2
	0.425 - 0.250	10
	0.250 - 0.150	26
	0.150 - 0.075	17
	< 0.075	45
Effective size		0.002
Uniformity Coefficient		59.3
Curvature Coefficient		10.7
Oversize Index		0.0
Shrinkage Product		496.4
Grading Coefficient		0.8
Grading modulus		0.58
Atter-berg Limits	Liquid Limit	32
	Plasticity Index	13
	Linear Shrinkage	5.1
	PI < 0.075	-
Unified Soil Classification		SC
U.S. Highway Classification		A-6 (3)

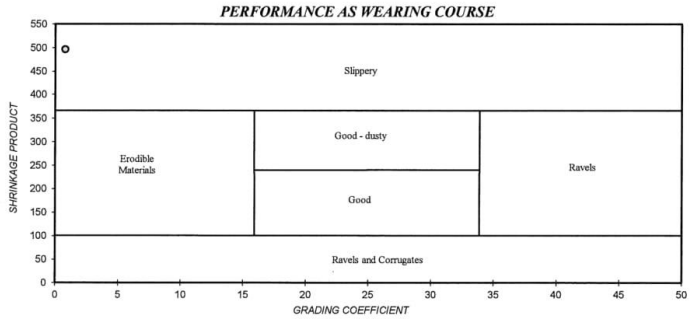
POTENTIAL EXPANSIVENES



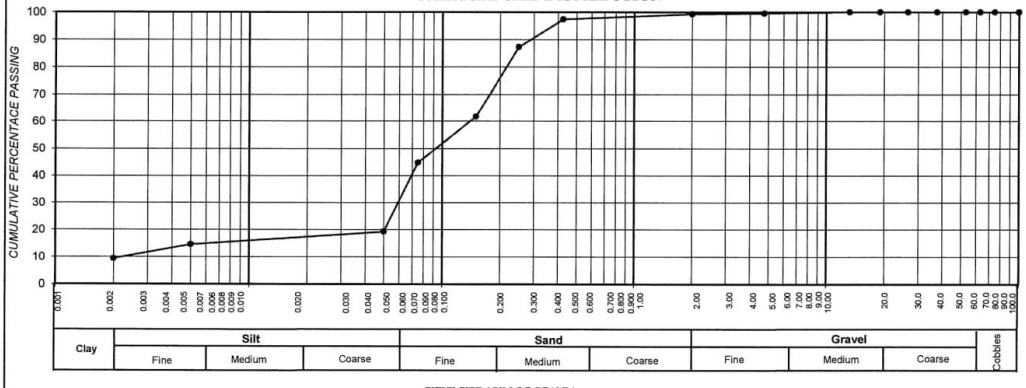
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
9.3	17.2	72.7	0.8

ROADLAB™

Roadlab Laboratories (Pty) Ltd

Civil Materials Testing
BBBEE Level 1 Contributor
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7 Bally Crescent, Voorbaai, Mosselbay, Western Cape

› material Passion.
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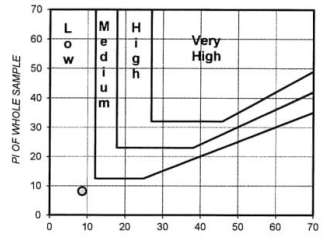
OUR REF : RM14879
CLIENT : Terra Geotechnical
PROJECT : Herolds Bay Estate

DATE RECEIVED : 2022.04.29
POSITION : TP13
LAYER : 1000-1500mm
SAMPLE No. : 8856
SAMPLE DESCRIPTION : Dark Brown Reddish Clayey + Silty Sand Silty Sand

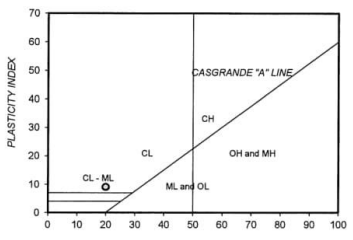
FOUNDATION INDICATOR - (SANS 3001-GR1, SANS 3001-GR10) & (ASTM Method D422)

Weighted PI		**8.1**
Sieve analysis Cumulative percentage passing (mm)	100.0	100
	75.0	100
	63.0	100
	50.0	100
	37.5	100
	28.0	100
	20.0	100
	14.0	100
	5.00	97
	2.000	94
	0.425	90
	0.250	69
	0.150	41
	0.075	32
	50 µm	20
	5 µm	15
	2 µm	8.7
Soil Mortar Analysis % < 2.00mm	2.000 - 0.425	4
	0.425 - 0.250	22
	0.250 - 0.150	29
	0.150 - 0.075	10
	< 0.075	34
Effective size		0.003
Uniformity Coefficient		83.0
Curvature Coefficient		8.7
Oversize Index		0.0
Shrinkage Product		337.1
Grading Coefficient		6.2
Grading modulus		0.85
Atter-berg Limits	Liquid Limit	20
	Plasticity Index	9
	Linear Shrinkage	3.8
	PI < 0.075	-
Unified Soil Classification		SC
U.S. Highway Classification		A-2-4 (0)

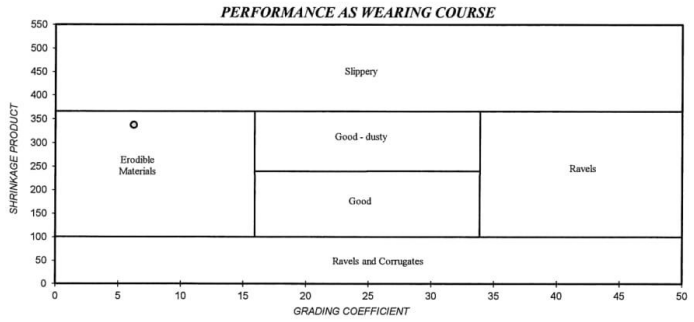
POTENTIAL EXPANSIVENES



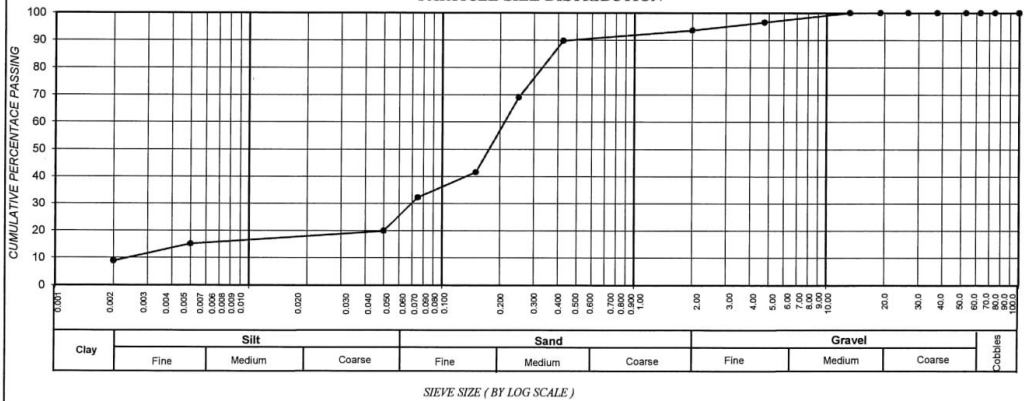
PLASTICITY CHART



PERFORMANCE AS WEARING COURSE



PARTICLE SIZE DISTRIBUTION



SIEVE SIZE (BY LOG SCALE)

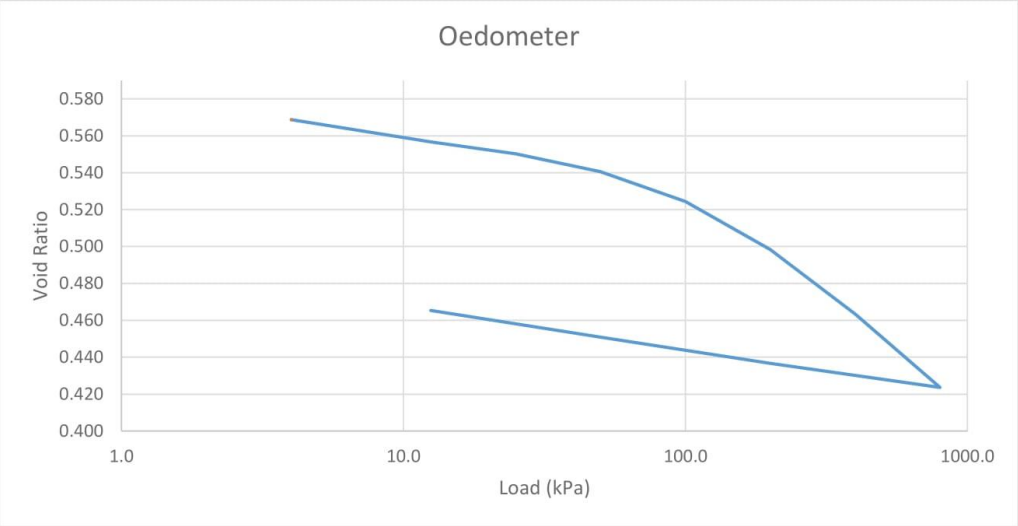
CLAY (%) (0.001-0.002)	SILT (%) (0.002-0.060)	SAND (%) (0.060-2.00)	GRAVEL (%) (2.00-60.0)
8.7	14.6	70.2	6.5

Oedometer Swell Test

Sample Detail		Initial	Final
Height	(mm)	20.3	19.0
Diameter	(mm)	63.5	63.5
Weight	(g)	126.4	132.2
Moisture	(%)	15.5	22.0
Dry Density	(Mg/m^3)	1.70	1.81
Bulk Density	(Mg/m^3)	1.97	2.20
Void Ratio		0.569	0.465
Particle Density	(Mg/m^3)	2.67	
Disturbed/Undisturbed		Undisturbed	
Remoulded Density	(Mg/m^3)	-	

Load (kPa)	Height (mm)	Void Ratio
4.0	20.300	0.569
4.0	20.301	0.569
12.5	20.145	0.557
25	20.061	0.550
50	19.935	0.540
100	19.727	0.524
200	19.391	0.498
400	18.937	0.463
800	18.423	0.424
200	18.591	0.437
50	18.776	0.451
12.5	18.963	0.465

Swell Results		
Swell Percentage	0.0	%
Swell Pressure	0	kPa



STEYN-WILSON GEOTECHNICAL

sanas Testing Laboratory

Project	Harolds Baai		
Sample	TP12		
Client	Terra Geotechnical	Test Method	BS1377 - 5: 1990
Jobfile	SWG00342	Test Date	25/05/2022

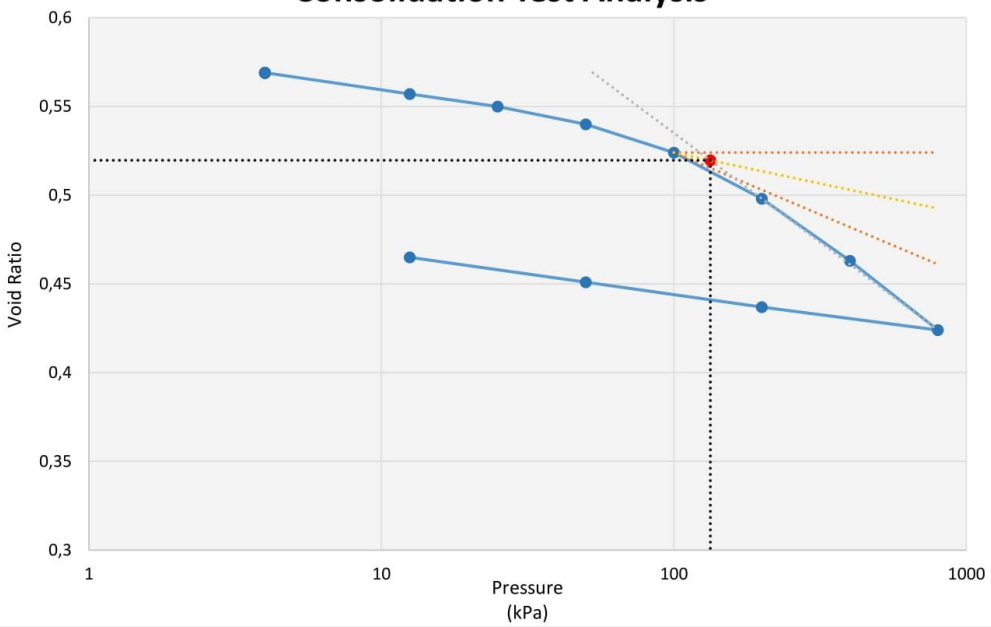
01/02/2021 Rev2 TR/GEO-SW0009 Compiled: M. Steyn Approved: R. Wilson

Single Oedometer "Consolidation" Test

Undisturbed Sample UNTP12

Load Increment (kPa)		4	12,5	25	50	100	200	400	800
Void Ratio	Loading	0,569	0,557	0,550	0,540	0,524	0,498	0,463	0,424
	Unloading	-	0,465	-	0,451	-	0,437	-	-

Horizons	H1	H2	H3	H4	H5	H6	Inferred In-situ Overburden (kPa)
Final Depth (m)	1,2						
Moisture Content (%)	15,5						
Dry Density (kg/m^3)	1700						
Bulk Density (kg/m^3)	1970						
Overburden (kPa)	23,167						**23,2**



Bearing Load (kPa)		25	50	100
Void Ratio	In-situ (e^0)	0,551		
	Loaded	0,550	0,540	0,524
a		0,0004	0,0004	0,0003
Mv		0,2705	0,2588	0,2247
Oedometer Settlement		3,35	6,41	11,12
*Settlement Range (mm)	Lower	3	5	8
	Upper	4	7	12

Preconsolidation State	
Pressure (kPa)	Void Ratio
133,3	0,520
Overconsolidated	

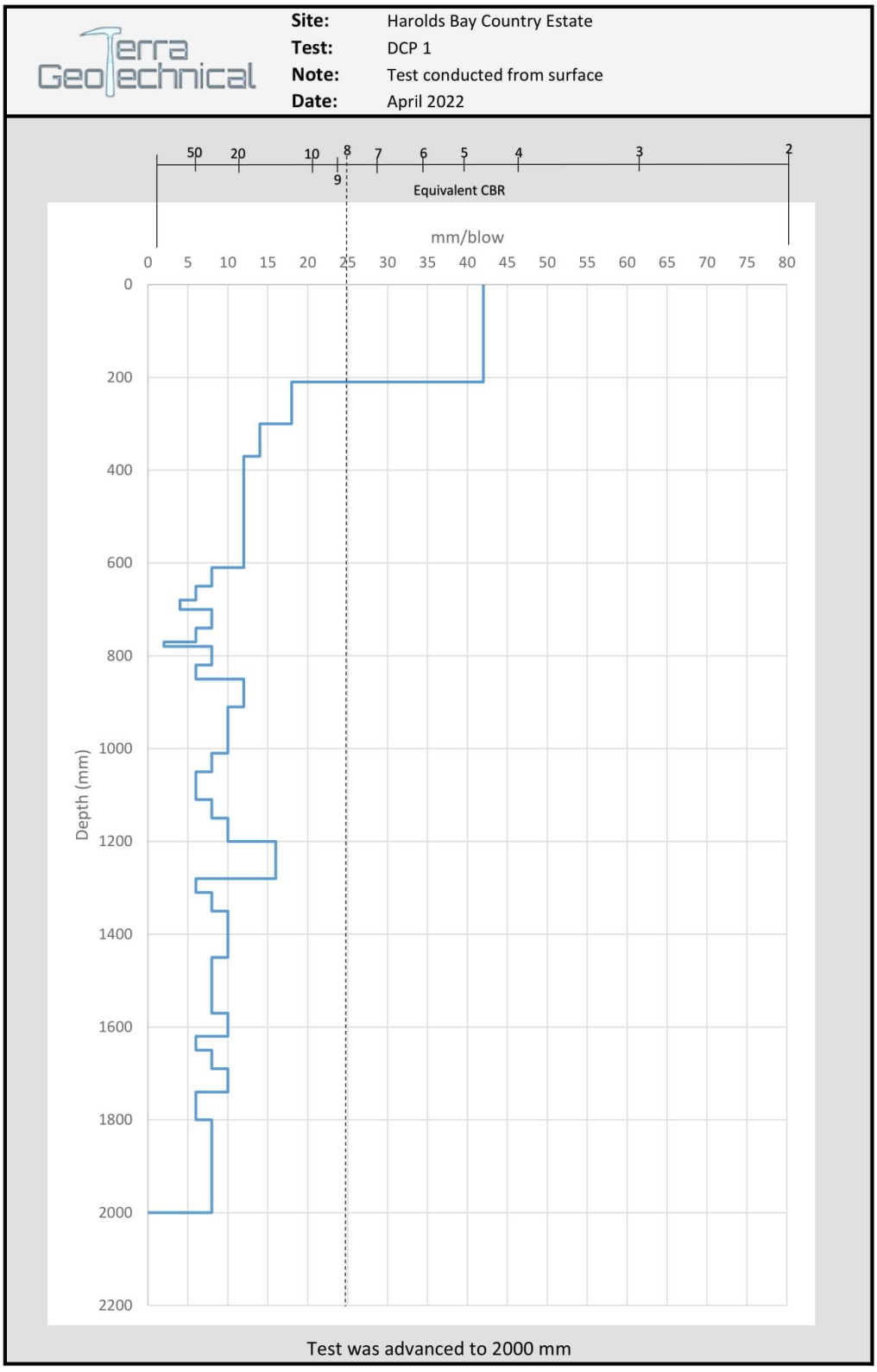
Factor of Safety	1,5

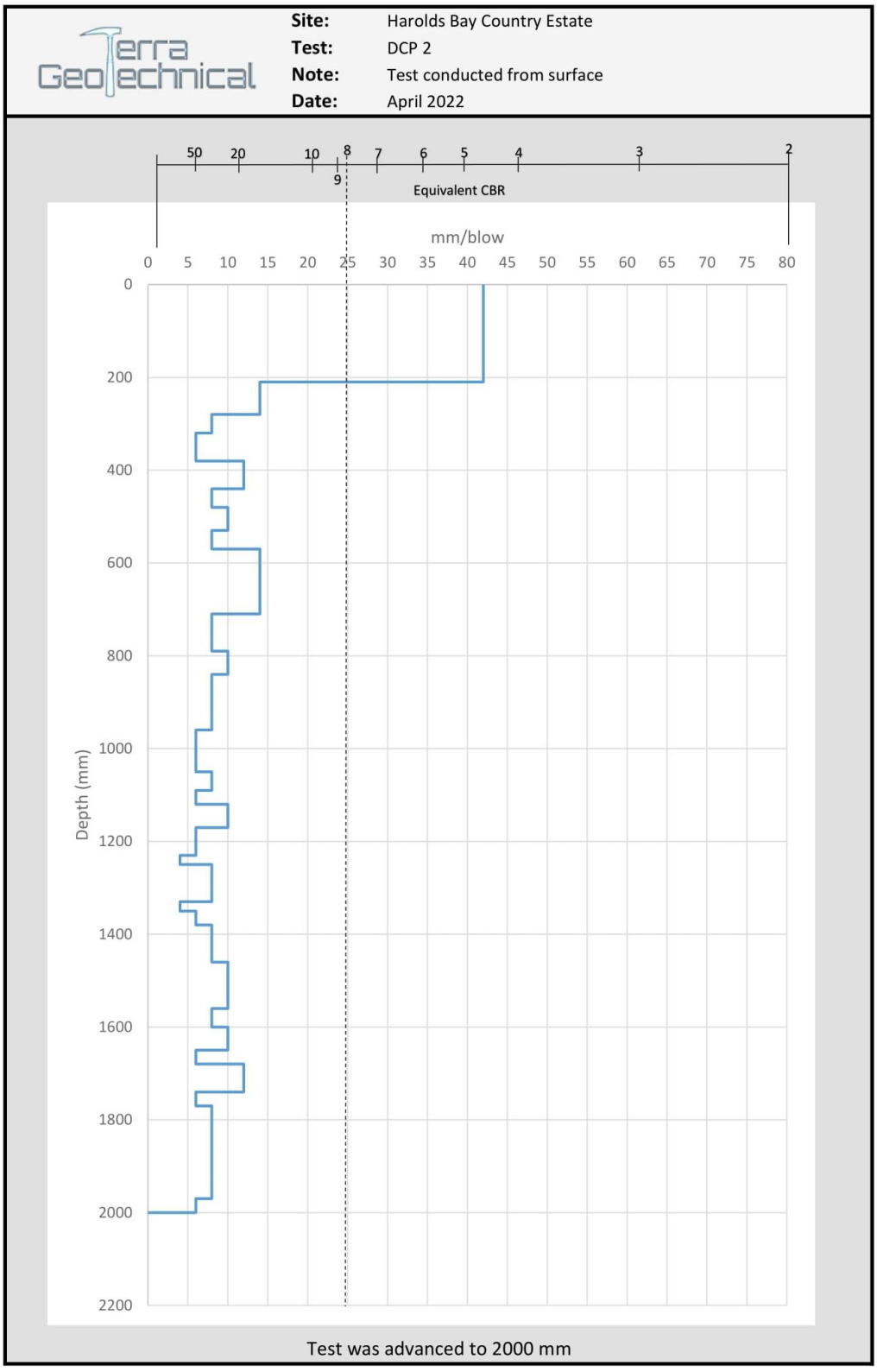
Foundation Width (m)	0,6

** the settlement range presented above assumes a **depth of influence** factor of 1.5 times the presented foundation width (below the foundation level)*

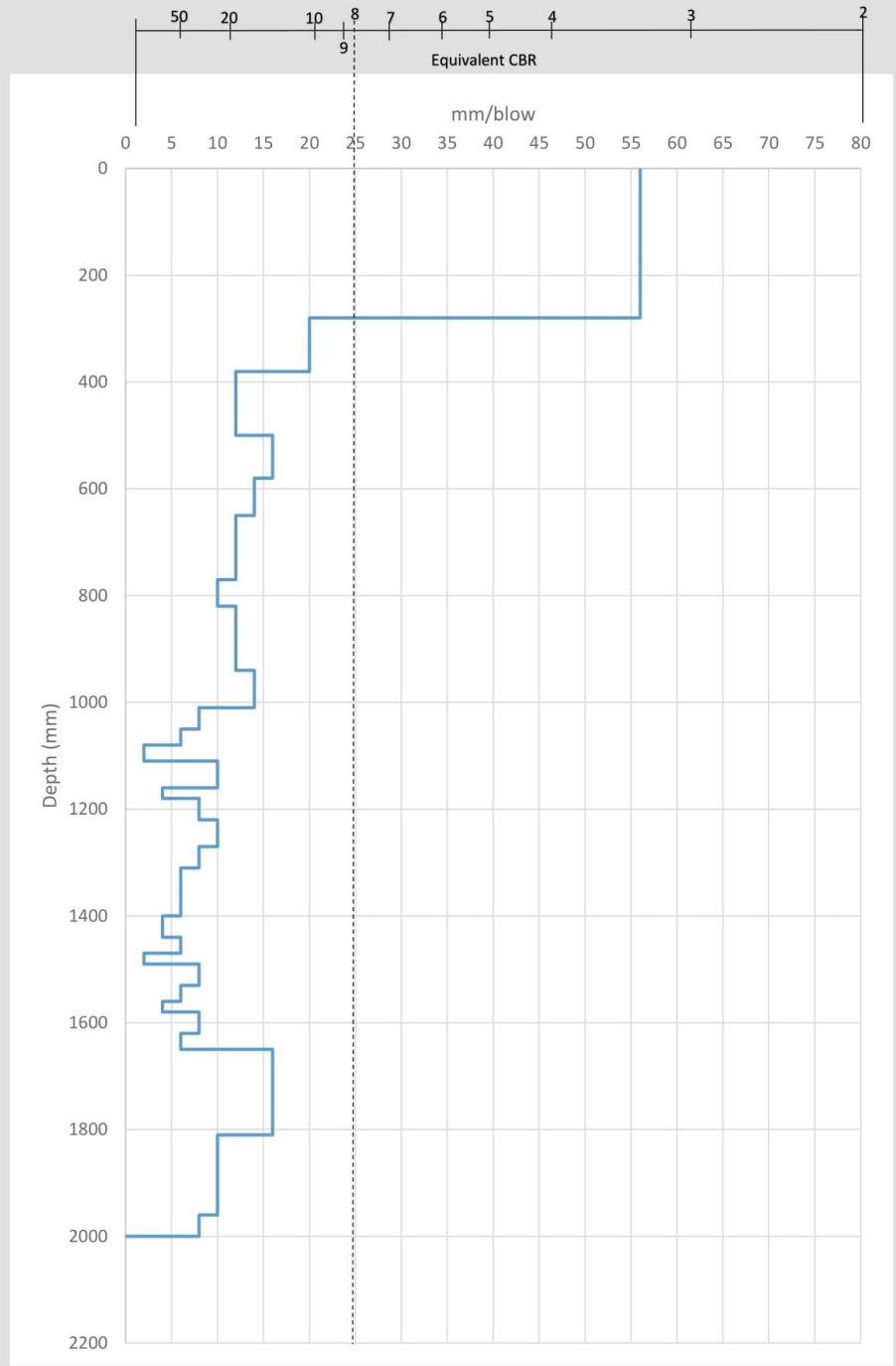
APPENDIX C

C.1
DCP Test Results


Site: Harolds Bay Country Estate
Test: DCP 1
Note: Test conducted from surface
Date: April 2022
Equivalent CBR
50 20 10 9 8 7 6 5 4 3 2
mm/blow
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
Depth (mm)
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200
Test was advanced to 2000 mm

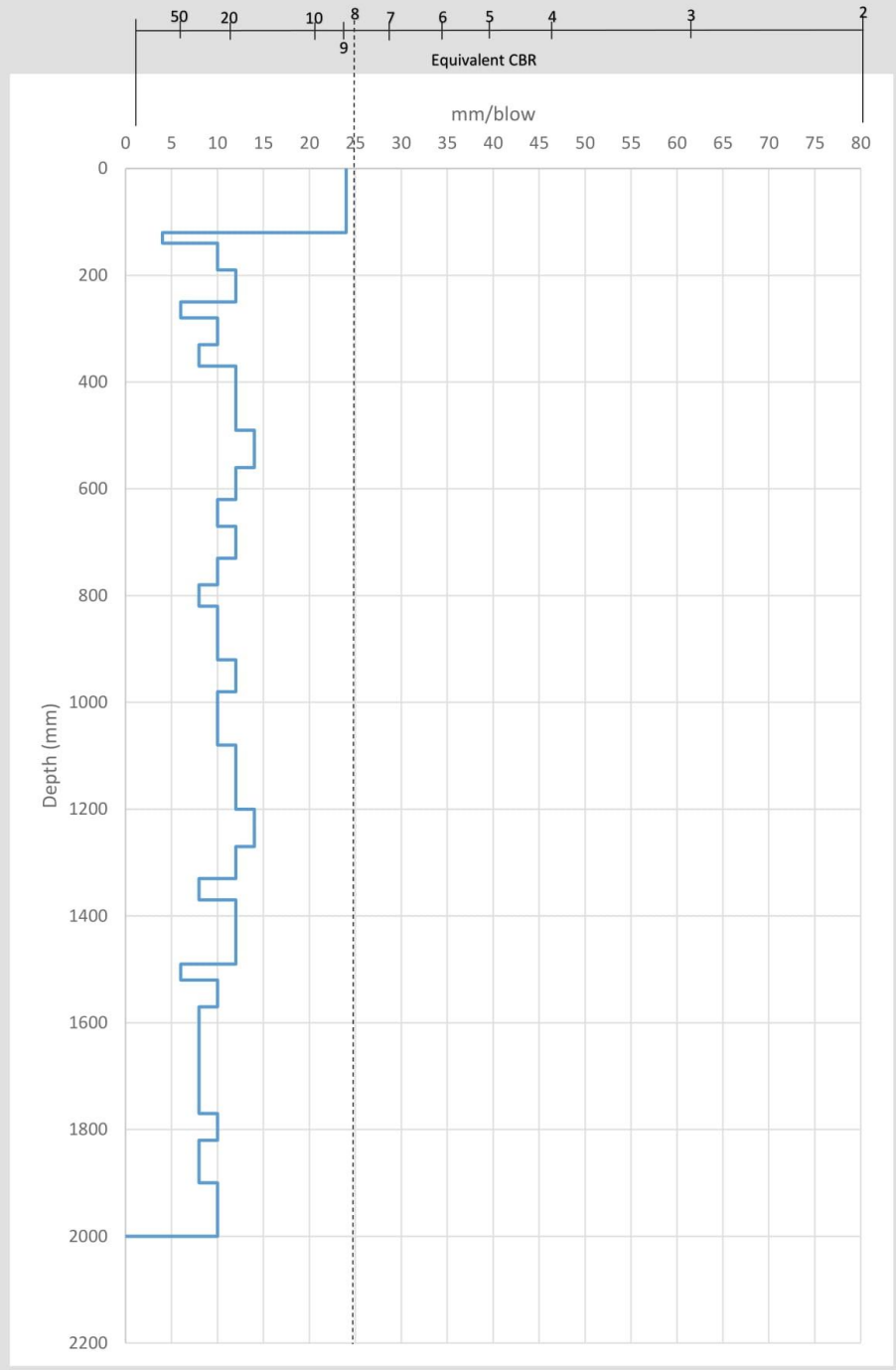

Site: Harolds Bay Country Estate
Test: DCP 2
Note: Test conducted from surface
Date: April 2022
Equivalent CBR
50 20 10 9 8 7 6 5 4 3 2
mm/blow
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
Depth (mm)
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200
Test was advanced to 2000 mm

Site: Harolds Bay Country Estate
Test: DCP 3
Note: Test conducted from surface
Date: April 2022



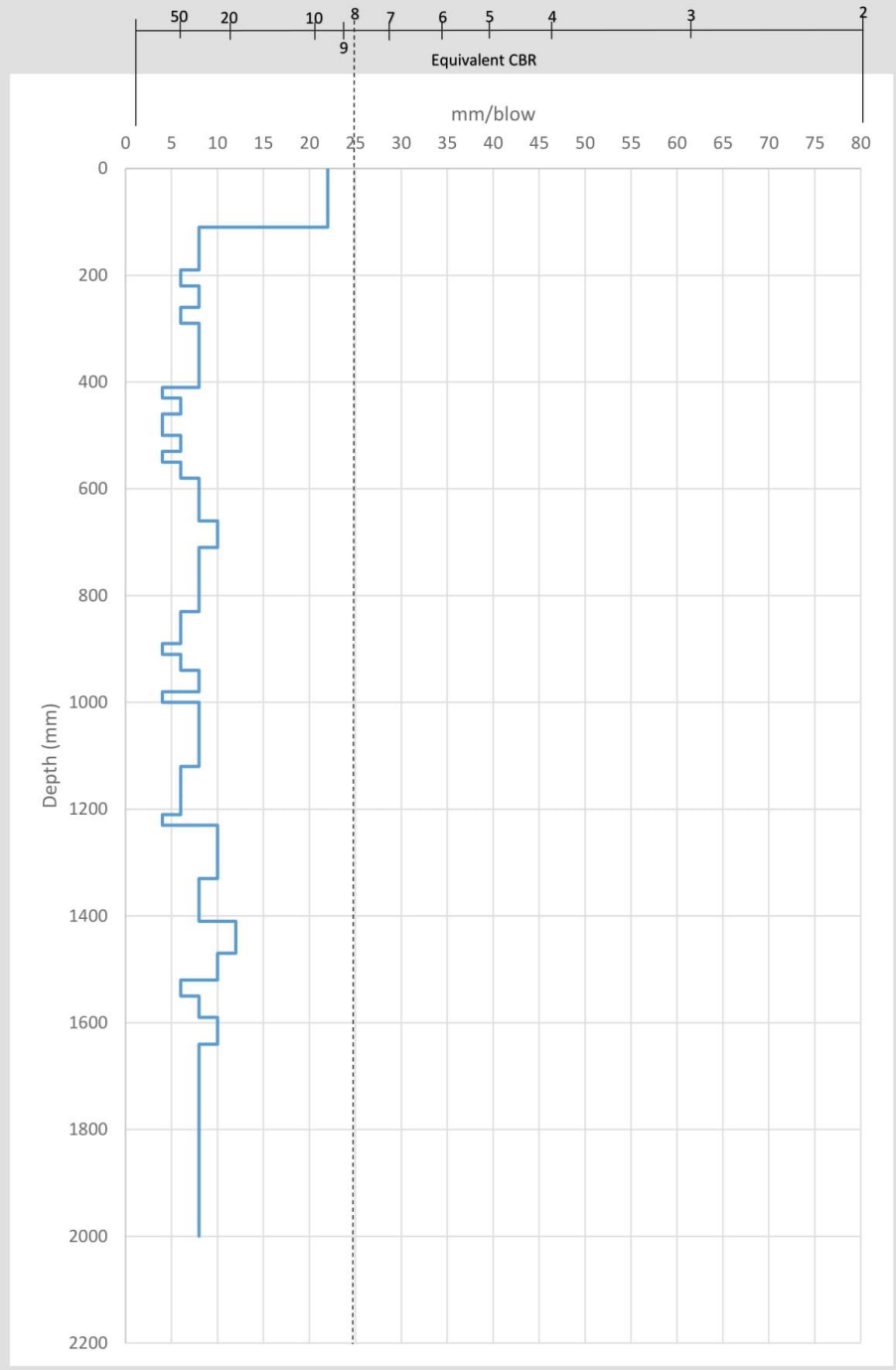
Test was advanced to 2000 mm

Site: Harolds Bay Country Estate
Test: DCP 4
Note: Test conducted from surface
Date: April 2022

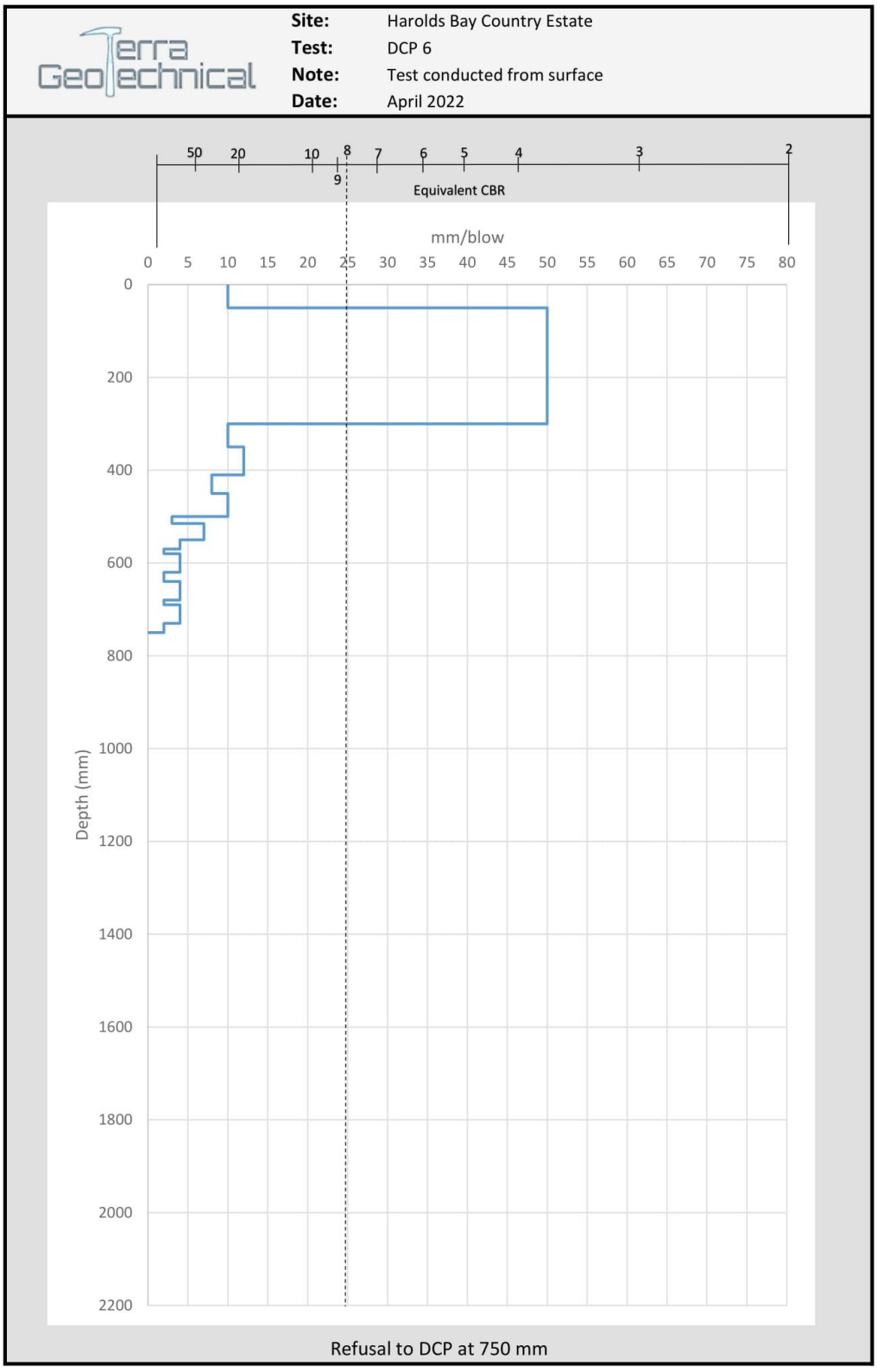


Test was advanced to 2000 mm

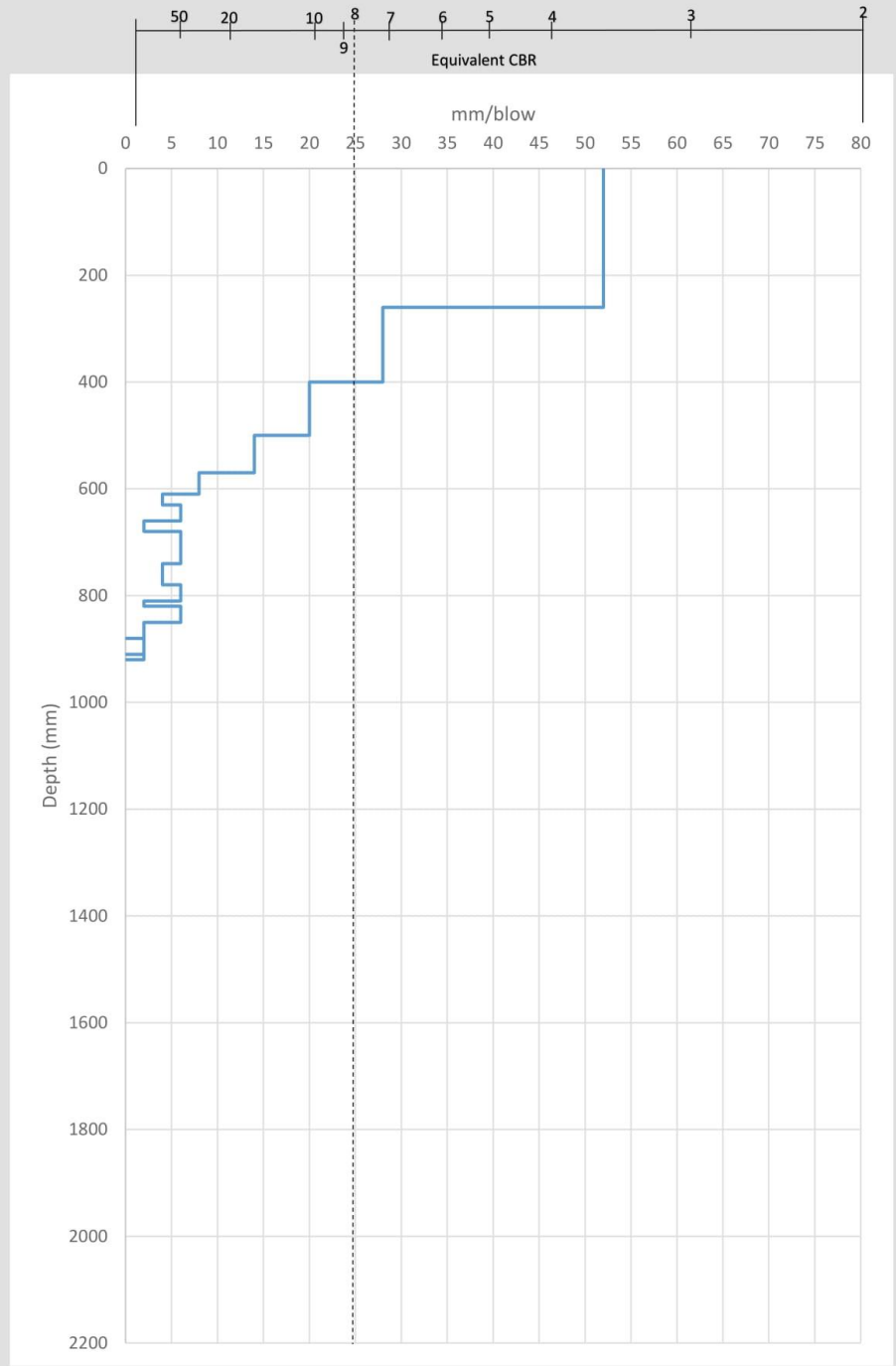
Site: Harolds Bay Country Estate
Test: DCP 5
Note: Test conducted from surface
Date: April 2022



Test was advanced to 2000 mm

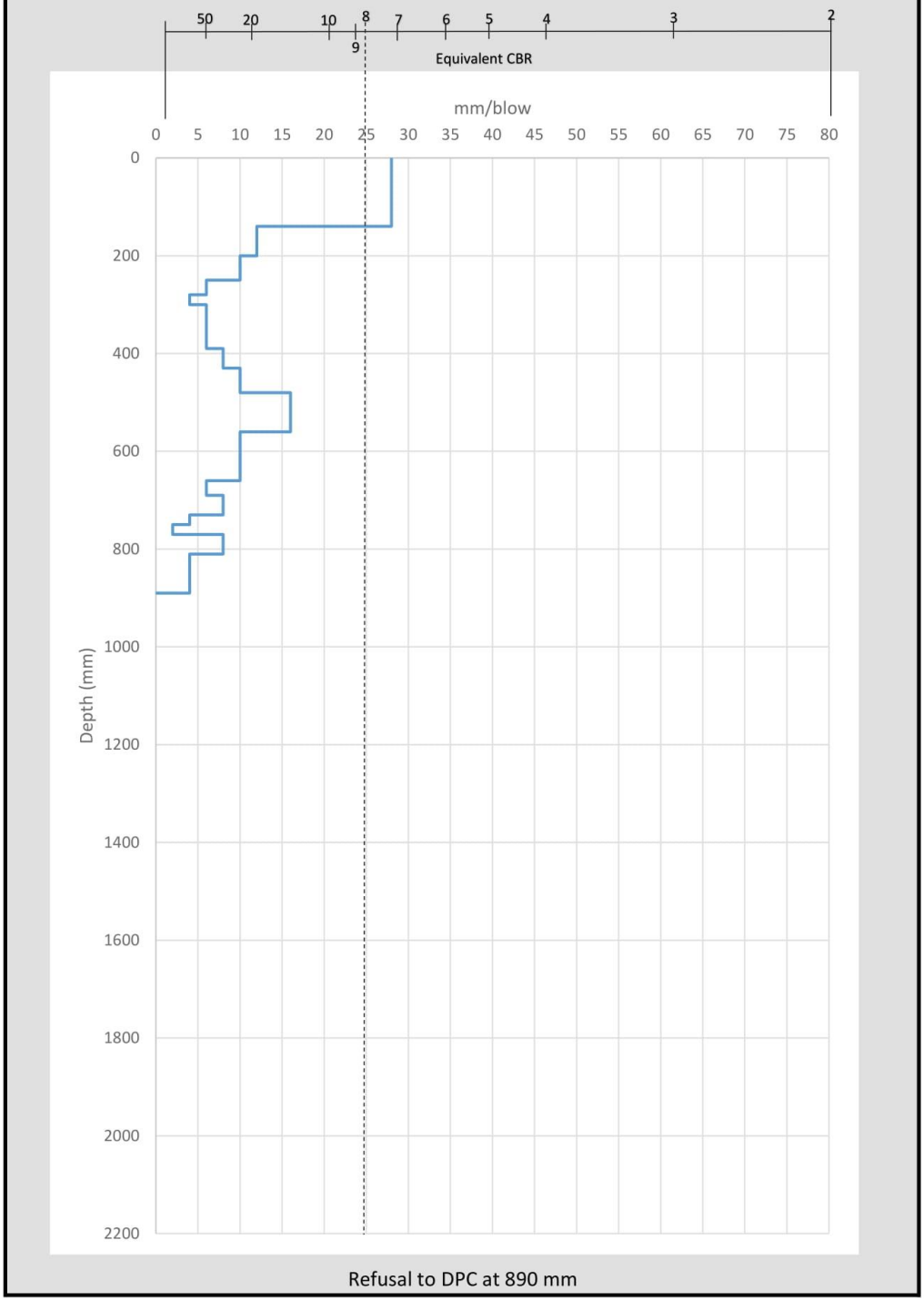

Site: Harolds Bay Country Estate
Test: DCP 6
Note: Test conducted from surface
Date: April 2022
Equivalent CBR
50 20 10 9 8 7 6 5 4 3 2
mm/blow
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
Depth (mm)
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200
Refusal to DCP at 750 mm

Site: Harolds Bay Country Estate
Test: DCP 7
Note: Test conducted from surface
Date: April 2022

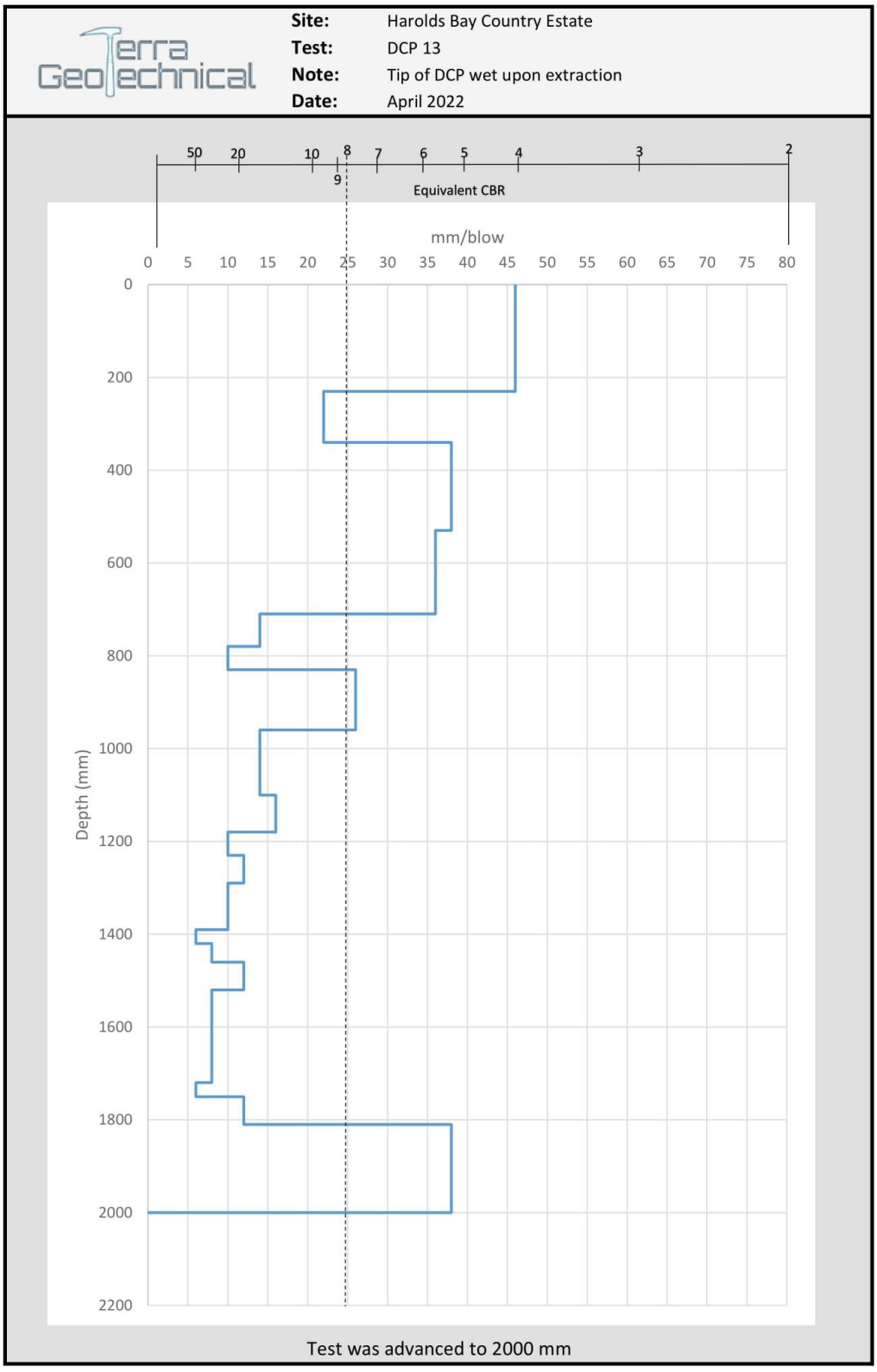


Refusal to DCP at 920 mm

Site: Harolds Bay Country Estate
Test: DCP 8
Note: Test conducted from surface
Date: April 2022



Refusal to DPC at 890 mm


Site: Harolds Bay Country Estate
Test: DCP 13
Note: Tip of DCP wet upon extraction
Date: April 2022
Equivalent CBR
50 20 10 9 8 7 6 5 4 3 2
mm/blow
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80
Depth (mm)
0 200 400 600 800 1000 1200 1400 1600 1800 2000 2200
Test was advanced to 2000 mm