

Plett Lagoon Estate

Erf 6503, Plettenberg Bay, Western Cape



Civil Engineering Services Report

Revision: B (*July 2023*)

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1. Executive Summary

VITA Consulting Engineers has been appointed by Plett Lagoon Estate (Pty) Ltd as the Civil Engineering Consultants for the proposed development on Erf 6503, Plettenberg Bay.

The proposed rezoning is for a split-zoning, consisting of the following:

- Residential Zone I: 2.27ha
- Residential Zone II: 2.67ha
- Residential Zone IV: 0.79ha
- Open Space Zone II: 0.70ha
- Open Space Zone III: 10.57ha

The proposed development is classified as a Greenfields Development, consisting of the following amenities:

- Single Residential: 37 Erven
- General Apartments: 40 Units
- Guardhouse, refuse room, etc.

The objective of this report is to address all civil engineering issues generated by the proposed development and to provide sufficient information to the local and provincial authorities in terms of the required roads- and civil engineering infrastructure for the proposed residential development.

The following documents and guidelines have been used in the civil services infrastructure design and management implementation of this development:

- The Topographical Survey compiled by VPM Surveys (*7 February 2023*)
- TIA completed by UDS (*25 May 2023*)
- The Site Development plan compiled by BAC Architects (*June 2022*)
- Municipal Services Capacity Analysis Report compiled by GLS Consulting (*27 February 2023*)
- Guidelines for Human Settlement Planning and Design (*CSIR "Red Book"*)
- The South African National Roads Agency Limited: Drainage Manual

2. Locality

The development site is situated on Erf 6503, Plettenberg Bay. The site is approximately 19.11 hectares in extent and is situated on the north-eastern outskirts of Plettenberg Bay, approximately 1.5km from the CBD. The development is located within the Bitou Municipal district.

The site has an irregular polygonal shape and is bordered by Portion 52 of Farm 444 (*northern boundary*), the Keurbooms river estuary (*eastern boundary*), undeveloped Erf 6504 (*southern boundary*) and Plettenberg Bay Primary School (*western boundary*). Access to the site is gained via Beacon Way, off the School/Checkers access road (Erf 7996) on the south-western corner of the site.



Figure 2-1: Locality - Portion 38 of Farm 444, Plettenberg Bay (*Cape Farm Mapper*)

3. Pre-Development Conditions

The pre-development site is mostly undeveloped, with an existing residential dwelling and outbuildings located near the northern corner of the site.

3.1 Site Topography

The topographical survey indicates that the property has a varying topography with fairly flat slopes along the north-western boundary to steep slopes situated along a north/south axis through the centre of the property. The highest portion of the property is situated near the south-western corner of the site with an approximate level of 18 msl. The lowest portion of the site is situated on the eastern boundary (estuary) of the site, with an approximate level of 1 msl.

The residential portion of the development will be situated on the fairly flat portion of the property, along the western boundary up to the north/south ridge. The steep slopes for this portion of the property vary between 6% (maximum) and 2.5% (minimum).

The Open Space III portion has fairly flat slopes towards the Keurbooms estuary and is situated below the 5m contour.

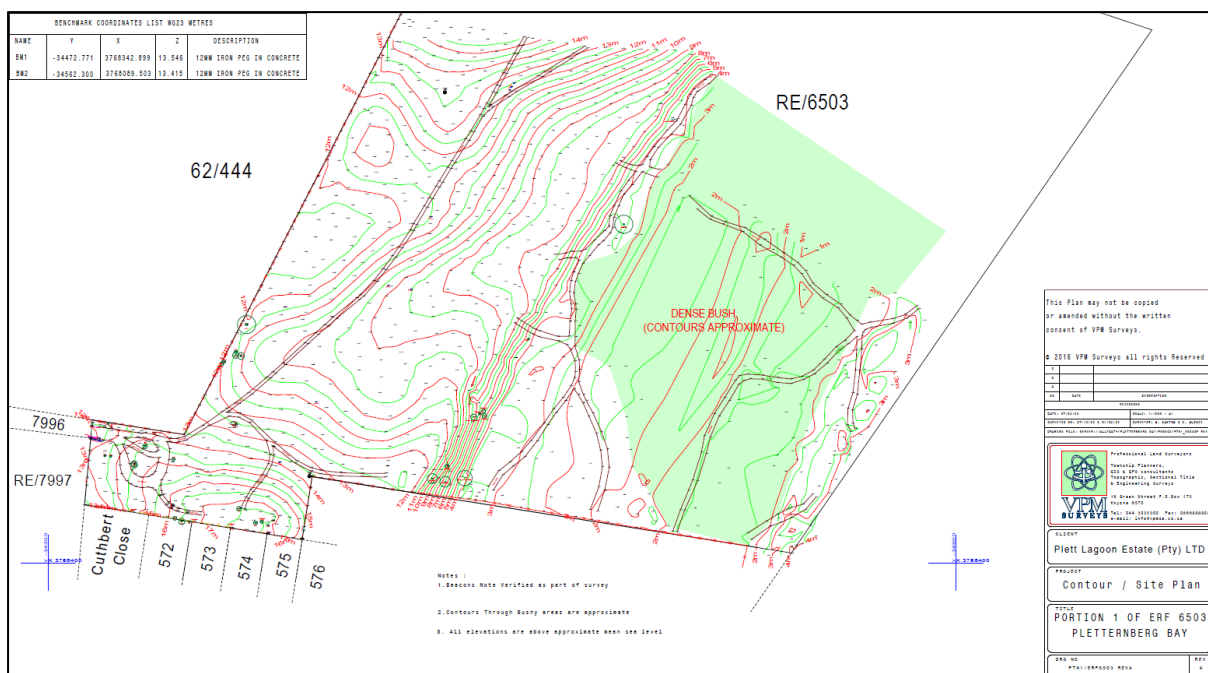


Figure 3-1: Topographical Contours (VPM Surveys - February 2023) - Appendix A

3.2 Site Vegetation

The western portion of the site is covered by short grass and weeds, while the eastern portion of the site is covered by dense vegetation/thicket, including indigenous fynbos, milkwoods and shrubs. A biodiversity investigation was compiled to determine the extent of the environmental sensitive areas on site. The biodiversity sensitivity map was used to determine the proposed cadastral layout to ensure that the erven and roads/civil services infrastructure do not encroach into environmentally sensitive areas.



Figure 2-2: Environmental Sensitive Areas (east of green line)



Figure 3-3: Environmental Sensitive Vegetation towards Keurbooms River

3.3 Site Geology

The site is situated on the Kirkwood Formation (*Uitenhage Group*). The insitu materials on site is characterized by a relatively consistent soils profile. The site is underlain by Quaternary aeolian sands of several meters thick. These aeolion sands are overlain by medium dense, fine silty sand. A dense root-bed with organic rich topsoil of approximately 0mm-300mm thickness make up the top portion of the natural soil profile.

The soils on site are classified as "Soft Excavation" in terms of the SABS 1200 DM specifications. The sands are classified as non-plastic, with an estimated friction angle of approximately 30°, with no apparent cohesion.

The sands have an expected bearing capacity of approximately 100-125kPA, which will/must be confirmed by a suitable structural engineer for each individual units' foundations.

The sands have a very high permeability, which is estimated to be 10^{-3} mm/s or 86mm/day.

4. Description of the Proposed Development

The proposed development will consist of Residential Zone I (9 x *single residential erven*), Residential Zone II (28 x *single residential erven*), Residential Zone IV (40 x *apartments*), Open Space Zone II (*amenities*) and Open Space Zone III (*private nature reserve*).

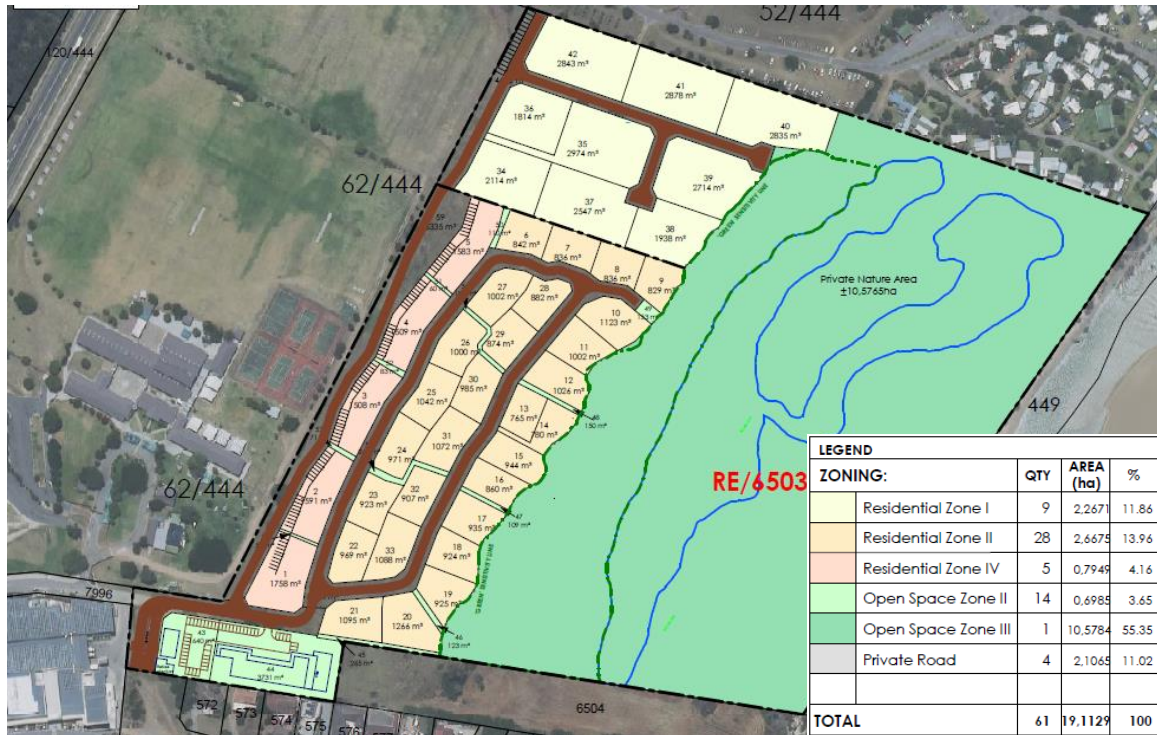


Figure 4-1: Proposed Zoning Layout (Marike Vreken Urban and Environmental Planners) - Appendix B

The “Open Space III” (10.58ha) portion of the development will serve as a “private nature reserve” which will be managed and owned by the development’s Body Corporate.



Figure 4-2: Proposed SDP Layout (BAC Architects)

5. Site Clearance

All road reserves and services corridors (*situated outside the environmentally sensitive areas*) will be cleared of vegetation and the top 0 - 300mm of organic rich topsoil will be stripped and stockpiled for re-use as part of the landscaping.

All existing structures which do not form part of the new development (*i.e. residential dwelling and outbuildings*) will be demolished and rubble will be removed from site.

Due to the environmentally sensitive natural vegetation on site, care will/must be taken to not disturb any areas outside of the required civil works footprint.

6. Roads and Parking Areas

6.1 External Roads

UDS (Pty) Ltd was commissioned to compile a traffic impact statement for the proposed development and their findings were included in a report (*refer to Appendix B*). The Traffic Statement, along with the findings and recommendations were submitted to- and discussed with Bitou Municipality (*20 June 2023*).

The UDS Traffic Statement originally proposed that the access to the development should be off the existing School & Checkers Yard Access Road (*Erf 7996*).



Figure 6-1: Beacon Way/School & Checkers Yard Access Road Intersection

Bitou municipality stated that although they would consider the findings of the traffic statement, they would prefer that access to the development be provided through the southern boundary onto the Susan Road reserve. The reasoning behind this request was the congestion caused at the Beacon Way/School road intersection by the school traffic.

Three alternative access points were identified (*refer Fig 6-2*) at the 20 June 2023 meeting with Bitou Municipality. The preferred access was identified to be the western access (*alternate access 1 - Fig 6-2*) as the other two accesses would encroach upon high sensitivity areas as identified in the NEMA Planning Report.

Traffic will therefore travel via Susan-, Plato- and Zenon Street to reach Beacon Way where vehicles will have access to the wider road network.

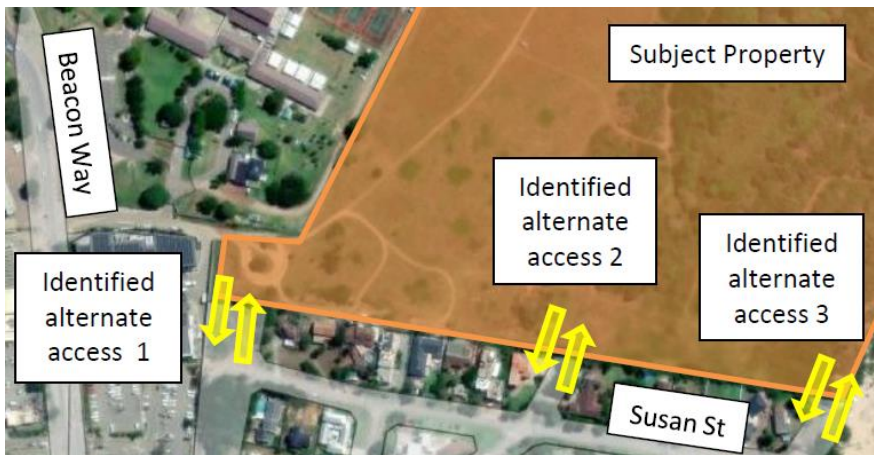


Figure 6-2: Access through the southern boundary onto Susan Street

The UDS Traffic Statement concluded that the development should be endorsed on the following conditions:

- Sufficient stacking space (*at least 23-metres*) must be provided at the entrance
- A minimum entry lane width of 4 metres must be provided at the entrance.
- Sufficient sight distance must be allowed for in the placement of trees (*internal roads*)
- Sufficient space must be provided for vehicles reversing out of driveways
- Traffic calming measures must be implemented along roads within the development longer than 100-metres.
- Traffic calming be considered along Plato Road (*with appropriate spacing*)
- A pedestrian gate be considered on the western boundary of the development, providing access to the school and retail areas.

6.2 Internal Roads and Parking Areas

The design philosophy for the proposed internal road network will be similar to that of a typical urban road network, which includes a minimum 2.0% crossfall and 0.5% longitudinal slope. This road network will consist out of 5.5m wide brick paved roads with formal kerbs/edgings, roadside channels and a stormwater drainage network.

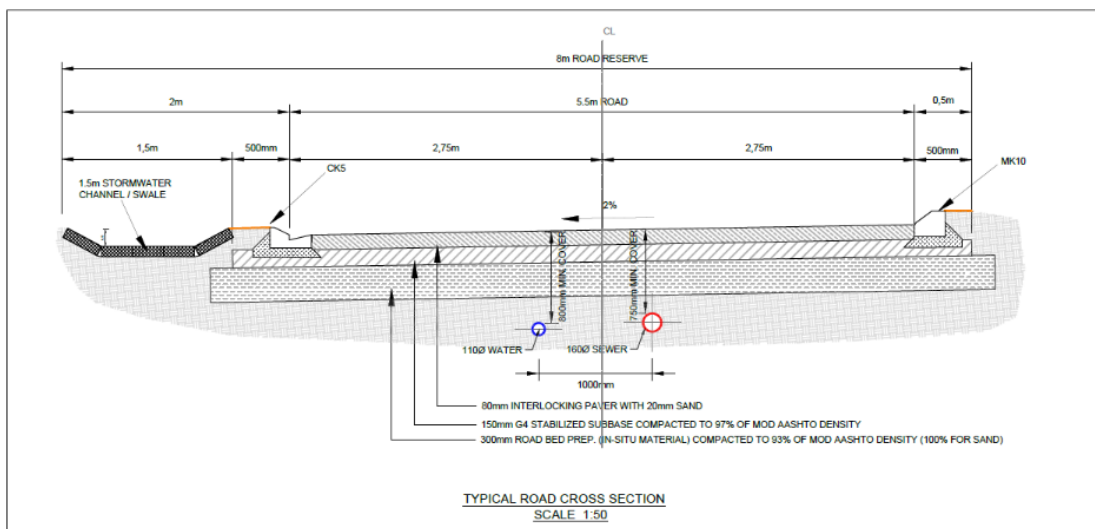


Figure 6-3: Road Cross Section

The internal roads/parking areas have been designed for low heavy vehicle traffic (*construction vehicles, furniture removal and refuse trucks*) and makes allowance for the insitu subgrade conditions.

- Road Category C/D (TRH4) or UC (UTG)
- Pavement Class ES 0.1 (TRH4).
- Structural design period 20 years
- Surface finish: Concrete Paving

Each single residential unit will have a double garage and two additional parking bays in front of the garage. Allowance will be made for at least 1.5 parking bays for each retirement village unit.

7. Stormwater Drainage

7.1 Existing Municipal Stormwater Network

The pre-development site drains from the higher laying western boundary towards the lower laying eastern boundary.



Figure 7-1: Overland drainage patterns

There is no formal bulk municipal stormwater infrastructure in the vicinity of the site. The high permeability of the insitu sands ensures that all stormwater run-off permeates into the subsoil layers and a formalised bulk stormwater connection for the development is not required.

The residential dwellings, roads- and civil infrastructure has been positioned to fall above the pre-scribed 5m contour.

7.2 Hydrological Data

The nearest SAWB weather station to the development site is Plettenberg Bay (POL).

Weather Service Station		Plettenberg Bay (POL)				
Weather Station Number		0014633W				
Mean Annual Precipitation		647mm				
Coordinates (<i>Longitude and Latitude</i>)		Long: 34°3' Lat: 23°22'				
Return Period	1:2yr	1:5yr	1:10yr	1:20yr	1:50yr	1:100yr
1 Day	56mm	83mm	104mm	128mm	163mm	194mm

Table 1: SAWB 0014633W: Plettenberg Bay (*Lat: 34° 3' Long: 23° 22'*)

The hydrological rainfall data of rainfall station, Plettenberg Bay (POL), was used for all stormwater run-off calculations.

7.3 Run-off Factors

The pre-development topography, soil conditions and undergrowth were used to calculate the following pre-development run-off factors:

$$C_{pre} = (C_s + C_p + C_v) \times D_F \times F_t$$

Return Period	1:2yr	1:5yr	1:10yr	1:20yr	1:50yr	1:100yr
Run-off factor C	0.111	0.122	0.133	0.149	0.184	0.222

Table 2: Pre-development Run-off Coefficient

The development will not add substantial hard/impermeable surfaces to the catchment area (*less than 10%*) and will therefore have little impact on the run-off coefficients. The post-development run-off coefficients were calculated to be:

$$C_{post} = (C_{lawn} + C_{Residential} + C_{industry} + C_{business}) \times F_t$$

Return Period	1:2yr	1:5yr	1:10yr	1:20yr	1:50yr	1:100yr
Run-off factor C	0.134	0.147	0.161	0.179	0.222	0.268

Table 3: Post-development Run-off Coefficients

7.4 Peak Flows

The pre- and post-development peak flows were calculated to be:

$$Q = \frac{C \times I \times A}{3600}$$

Return Period	1:2yr	1:5yr	1:10yr	1:20yr	1:50yr	1:100yr
Pre-development (19.11ha)	0.284	0.528	0.753	1.039	1.611	2.236
Post-development (19.11ha)	0.343	0.636	0.908	1.253	1.943	2.697

Table 4: Peak Flow rates in m³/s

7.5 Internal Stormwater Network

The standard stormwater design principle, as set out in section 1 will be implemented in the planning and design of the internal stormwater system.

The following minimum design specifications will be implemented:

- Minimum pipe specification: Class 75 D Concrete spigot & socket pipes
- Minimum pipe diameter: 375mm Nominal diameter
- Minimum design flow: 1.0m/s inside a half-full pipe
- Maximum spacing between manholes/inlets: 80m

An open swale stormwater network will be designed to have sufficient capacity to adequately manage and convey up to a 1:5year rainfall event. The open swales network will follow the road network and will have inlet structures and pipe culverts at road crossings. For rainfall events with a return period larger than 1:5 year, the internal roadways will act as overland flow routes which will convey stormwater run-off towards the lower lying eastern portion of the site, where it will follow the existing natural drainage routes and permeate through the insitu soils in to the subsurface water reserves.

The cohesion of the dune sands is very poor and will therefore be very susceptible to erosion. The following erosion preventative measures will be incorporated in the detail stormwater design:

- Concentration of stormwater will be minimised to prevent high volume/flow rates
- Hard surface run-off (*driveways*) will be routed into swales via the internal roadways
- Sheetflow into open swales will be promoted to maximise contact time with permeable dune sands
- All channels with an internal velocity higher than 1m/s will be formalised (*armorflex*)
- All unlined channels will be landscaped with appropriate vegetation
- Energy dissipation structures will be installed at high energy discharge points

Due to the likely occurrence of a seasonal perched ground water table, provision will be made for a subsoil drainage network beneath the roads. The subsoil drainage network will consist of a 110mm diameter perforated pipe network installed 800mm below the final road level.

7.6 Attenuation and Treatment

The secondary purpose of the open swale network will be to attenuate peak flows to pre-development rates and treat stormwater run-off.

The attenuation requirement, reducing the post-development peak flows to pre-development flow rates, were calculated using the ABT & GRIGG formula:

$$V_{st} = 60 \left(\frac{1+m}{2} \right) q_p a t_{ca} (1-a)^2$$

	1:2yr	1:5yr	1:10yr	1:20yr	1:50yr
Attenuation Required	9.01	16.72	23.87	32.93	51.07

Table 5: Attenuation Requirement in m³

The internal stormwater network makes allowance for the required attenuation volumes through the detention capacity and percolation rate of the stormwater swales. The gradient inside the swales will be less than the pre-development crossfalls, allowing stormwater run-off to accumulate inside the swales, providing more contact time with the permeable insitu dune sands. The percolation rate of the insitu dune sands is estimated at 10⁻³ mm/s or 86mm/day.

$$A_{fb} = \frac{WQ_v \times d_{fb}}{k \times (h_{fb} + d_{fb})t_{fb}}$$

	Wetted Perimeter	Catchment Area	1:50yr Attenuation Volume	Drainage Time
Western/ Central Roadside Swale	1,380m ²	31,485m ²	8.41m ³	55 minutes
Eastern Swale parallel to estuary	620m ²	24,530m ²	6.56m ³	1h 36min
Swale: Northern Erven	410m ²	27,840m ²	7.44m ³	2h 45min

Table 6: Attenuation and Treatment Potential of Internal Stormwater Swales in m³

8. Sanitation

8.1 Existing Municipal Foul Sewer

GLS Consulting was commissioned to undertake a re-analysis of the bulk municipal sewer infrastructure capacity and the impact of the proposed development in the existing network. GLS formalised their findings in a report (27 February 2023) which was presented to Bitou Municipality for approval.

The GLS report concluded the following:

- The master plan indicated that the proposed development should be accommodated within the existing Plettenberg Bay Pumping Station (PS1) drainage area.
- There is sufficient capacity in the existing Plettenberg Bay sewer reticulation system to accommodate the proposed development.
- The recommended position for the sewer connection for the proposed development is to the existing 150 mm diameter outfall sewer in Susan Street, as shown on Figure 4.

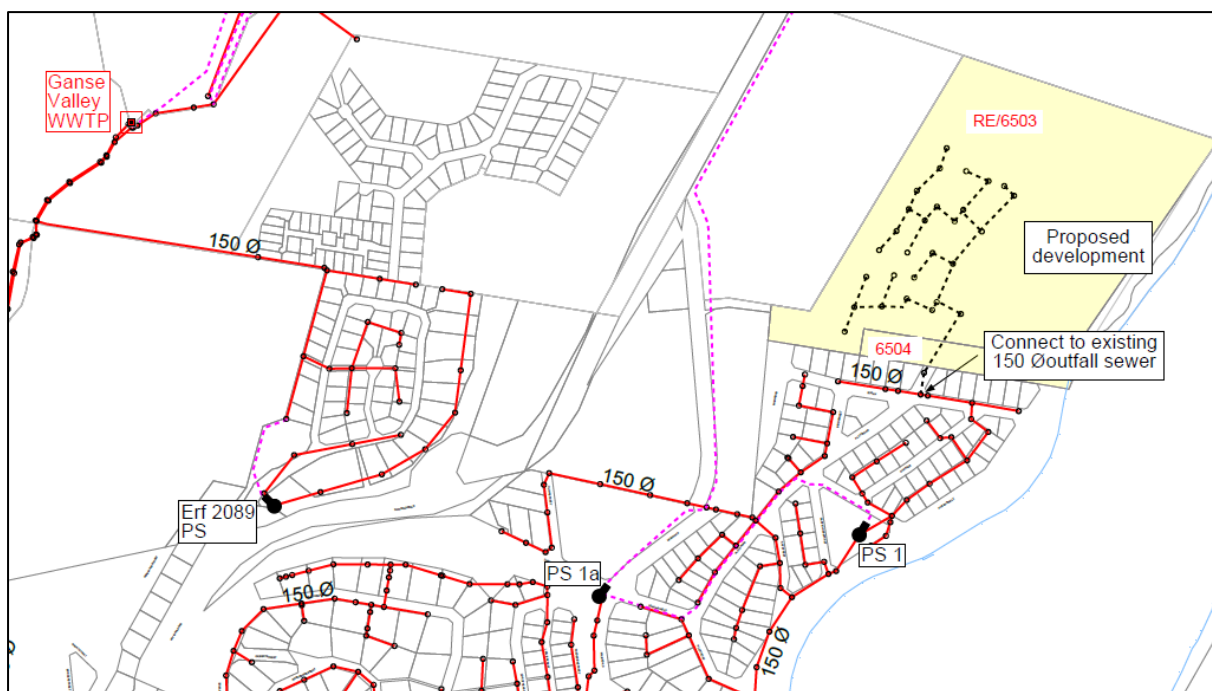


Figure 8-1: Extract from GLS Consulting (Feb 2023) Figure 4: External Sewer Masterplan

8.2 Internal Sewage Network

The estimated sewage yield generated from the proposed development will be:

- Annual Average Daily Sewage Yield: 38.5m³ per day
- Peak Daily Wet Weather Sewage Yield (Peak Factor - 3.5): 2.2 l/s

The internal sewage infrastructure will consist of a 160mm diameter uPVC Class 34 gravity pipe network and round precast concrete ring manholes in the road reserves. The internal

infrastructure will drain towards a new foul sewer pumpstation. The pumpstation will be situated inside the road reserve and will not encroach into the environmentally sensitive area.

The pumpstation will convey all sewage from the development via a 75mm rising main towards an existing 160mm underground pipe and manholes network inside the Susan Road reserves (as per GLS Report) on the southern boundary of the site.

The underground gravity network will adhere to the following requirements:

- Minimum self-cleansing velocity inside a half full pipe - 0.7m/s
- Maximum full-bore velocity - 3.5m/s
- Maximum spacing between manholes - 90m
- The bedding and blanket material for the internal sewage pipe trenches will adhere to SABS 1200 regulations for Class C bedding and blanket.

The underground pumpstation will have the following minimum requirements:

- The pumpstation will be equipped with duty- and standby pumpsets
- The pumpstation will have back-up power (*genset or inverter/batteries*)
- The pumpstation sump will have an emergency back-up volume equal to the 4-hour peak flow

9. Water Reticulation

9.1 Existing Bulk Municipal Network

The master planning analysis undertaken by GLS Consulting concluded the following:

- The master plan indicated that the proposed development should be accommodated within the existing Goose Valley reservoir zone.
- The proposed connection to the existing water system is to the existing 250 mm diameter supply pipeline from the Goose Valley reservoir in Beacon as shown on Figure 1.
- Link services items BPW14.1 is required to connect the internal reticulation network of the proposed development to the existing municipal water network.
- The bulk water system to the Goose Valley, Wittedrift and Matjiesfontein reservoirs is at capacity and should be upgraded according to the master plan before additional developments within the reservoir supply areas can be accommodated.
- The minimum upgrades required to improve the existing bulk supply system (in order to accommodate the proposed development in the existing system), are:
 - Master plan item 2 (3,6 km x 400 mm Ø replace existing 300 mm Ø abandoned AC pipe)
 - Master plan item BPW.B39 (0,9 km x 400 mm Ø replace existing 150 mm Ø bulk pipe).
 - Portion of master plan item BPW.B67 (1,0 km x 355 mm Ø replace existing 150 mm Ø bulk pipe).

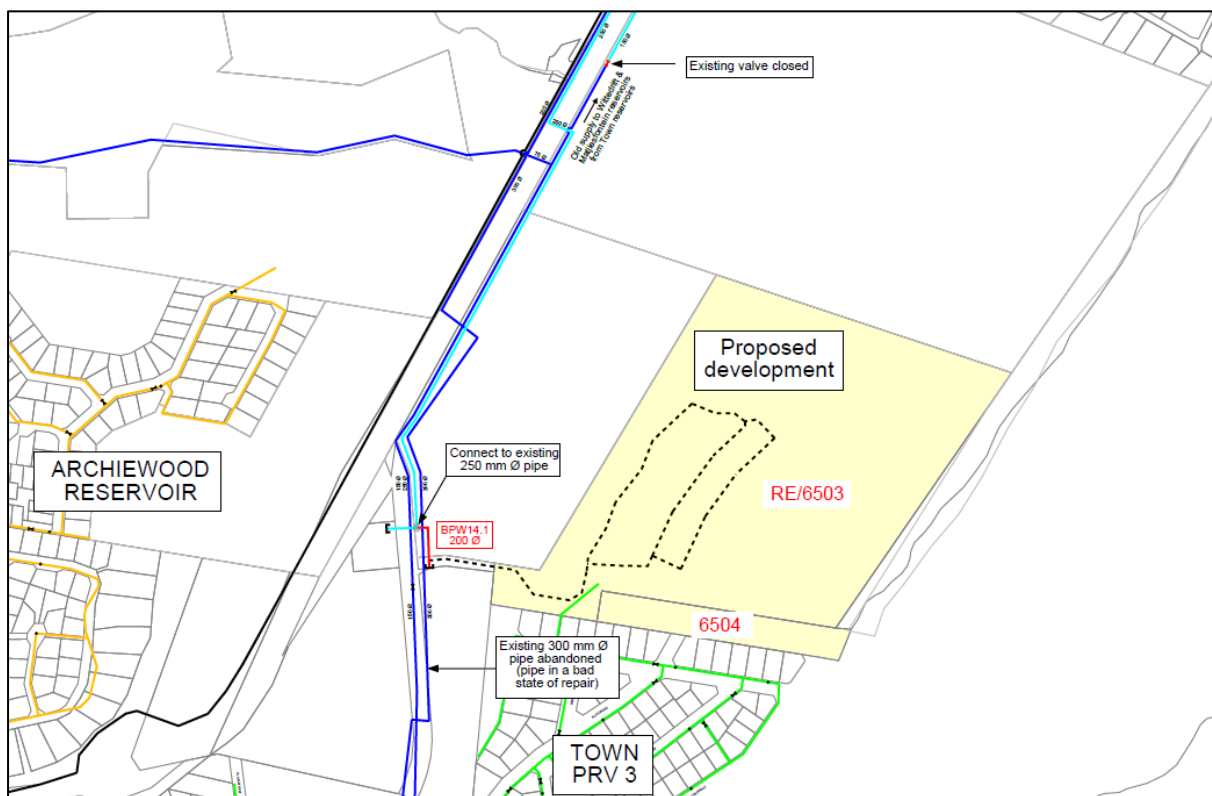


Figure 9-1: Extract from GLS Consulting (February 2023) Figure 1: External Watermain Link Upgrades

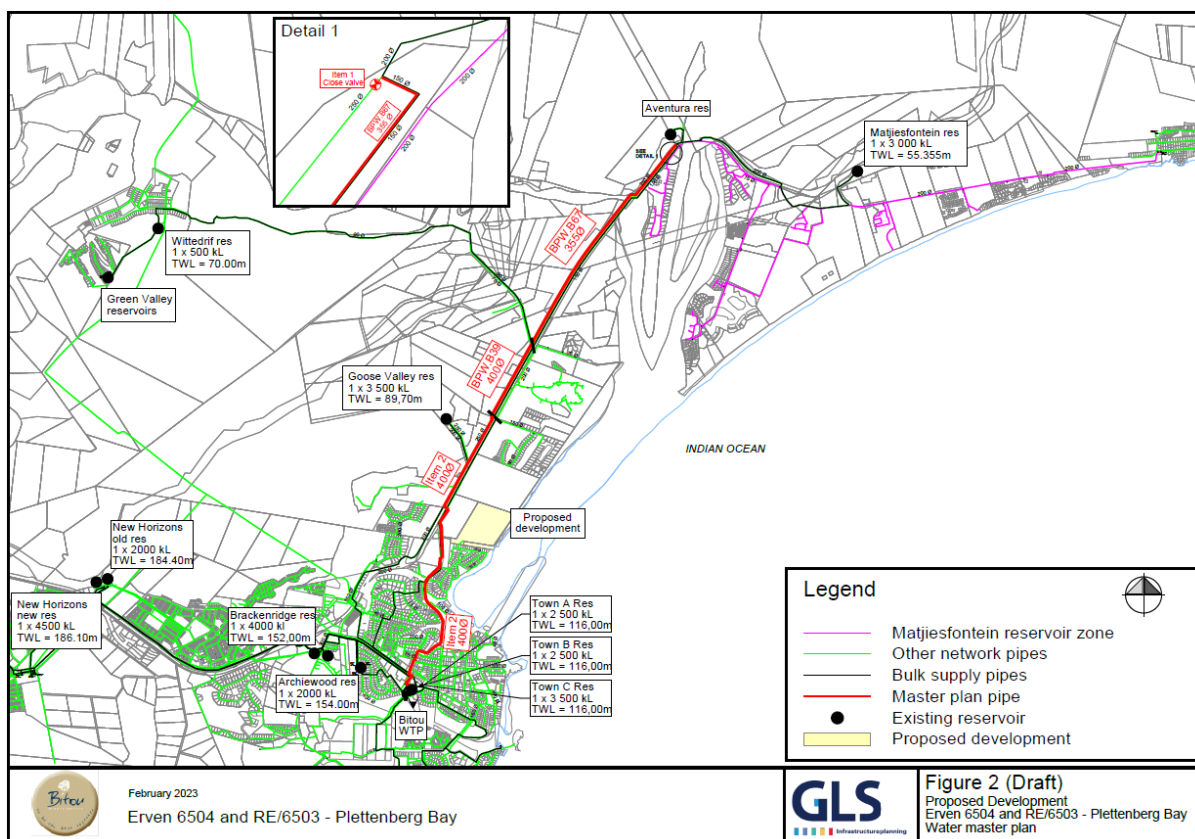


Figure 9-2: External Bulk Supply Upgrades – GLS Consulting (February 2023)

GLS estimated the costs for the design and installation of Item 2, BPW.B39 and BPW.B67 to be R42 million.

Various meetings with GLS and Bitou Municipality was held to discuss a proposed interim solution to increase the bulk supply to the Goose Valley Reservoir. GLS provided the following temporary solution:

- Installation of an additional 160mm bulk main off the existing 160mm distribution main in the N2 road reserve (*refer figure 5*) which will free up an additional 860kl/day.
- There is sufficient capacity in the 860kl/day to accommodate the developments on Farm 444/38, Farm 304/32 and erf 6503.

This temporary solution was discussed with Bitou Municipality on 9 March 2023, who stated that they will except the temporary solution on the following conditions:

- Design, installation, etc. costs for the temporary solution will be the responsibility of the developer/developers and will not be deductible from the Augmentation Levee's
- The temporary solution is not a permanent solution and Augmentation Levee's for Water and Sewage will be used towards the permanent solution.
- The proposed pro-rata contribution towards the temporary solution must be resolved between the developers of the different properties.
- A Service Level Agreement must be drafted for the development.

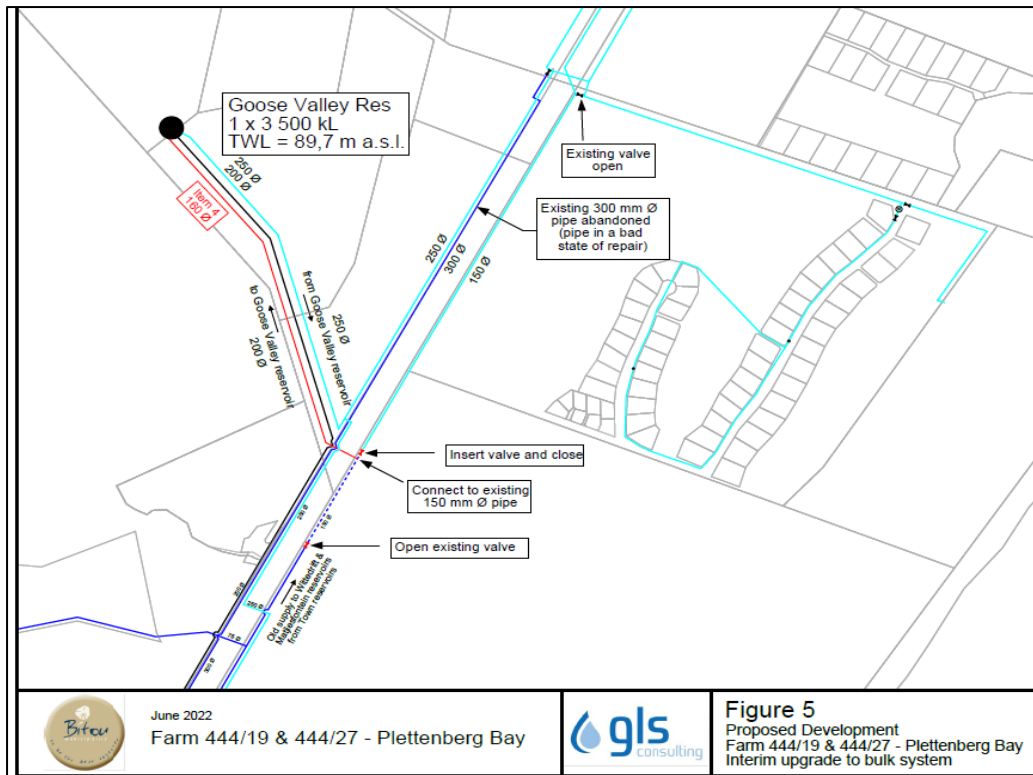


Figure 9-3: External Bulk Supply Interim Solution - GLS Consulting (October 2022)

The implementation of the temporary solution will be done by the developer of Portion 19 and 27 of Farm 444, as this development will be the first to have a civil contractor on site. The pro-rata contributions (*Farm 444/38, Farm 304/32 and Erf 6503*) for the installation of the pipe will be paid directly to the developer of Portion 19 and 27 of Farm 444.

9.2 Internal Water Reticulation

The potable water demand for the development will be:

- Gross Annual Average Daily Demand: 61m³ per day
- Instantaneous Peak Demand (*Peak Factor - 10*): 7.06 l/s
- Fire flow criteria (*low risk*): 15l/s @ 10m

The proposed internal metered water reticulation network will consist of a combined domestic and fire water reticulation network consisting of a 75mm diameter uPVC Class 12 potable water main. Allowance will be made for individual water meters to be located 1m inside the erf boundaries for every property.

The water reticulation network will adhere to the following design requirements:

- Minimum pipe size - 75mm diameter
- Minimum pipe class - uPVC Class 12 / HDPE PE100 Class 12.5
- Specials & Fittings - As per Bitou Municipal Engineering Standards
- The bedding and blanket material will comply with SABS 1200 regulations for Class C bedding and blanket
- Fire hydrants will be spaced for low-risk areas

9.3 Irrigation Network

Each homeowner will be responsible for the irrigation of their own property. Irrigation to individual gardens and road verge landscaping will be done from the potable water network. The irrigation schedule will fall outside of the normal operating peak hours and will therefore not have an adverse effect on the water supply.

Rainwater harvesting tanks, which collect stormwater run-off from roofs and hardened surfaces, will be prescribed as part of the estates building guidelines and will be confirmed by the homeowners association.

10. Solid Waste

The minimum requirements for domestic waste collection (as per the *National Domestic Collection Standards, 2011*) will be applicable to this development. The proposed development will generate approximately 20kg of solid waste per household per week.

The development's homeowner's association will administrate the collection of the domestic waste from each individual property towards a communal refuse storage facility located at the entrance to the proposed development. The refuse storage area will be adequately sized to accommodate the correct amount of 240l refuse bins for organic waste as well as make allowance for waste separation bins for temporary storage of recycling. Recycled waste to be collected by a registered Bitou Municipality service provider. A minimum target of 50% diversion of organic waste to be implemented by the homeowner's association.

Allowance will be made for adequate turning space at the entrance to the proposed development to accommodate the turning movement of a standard refuse truck.

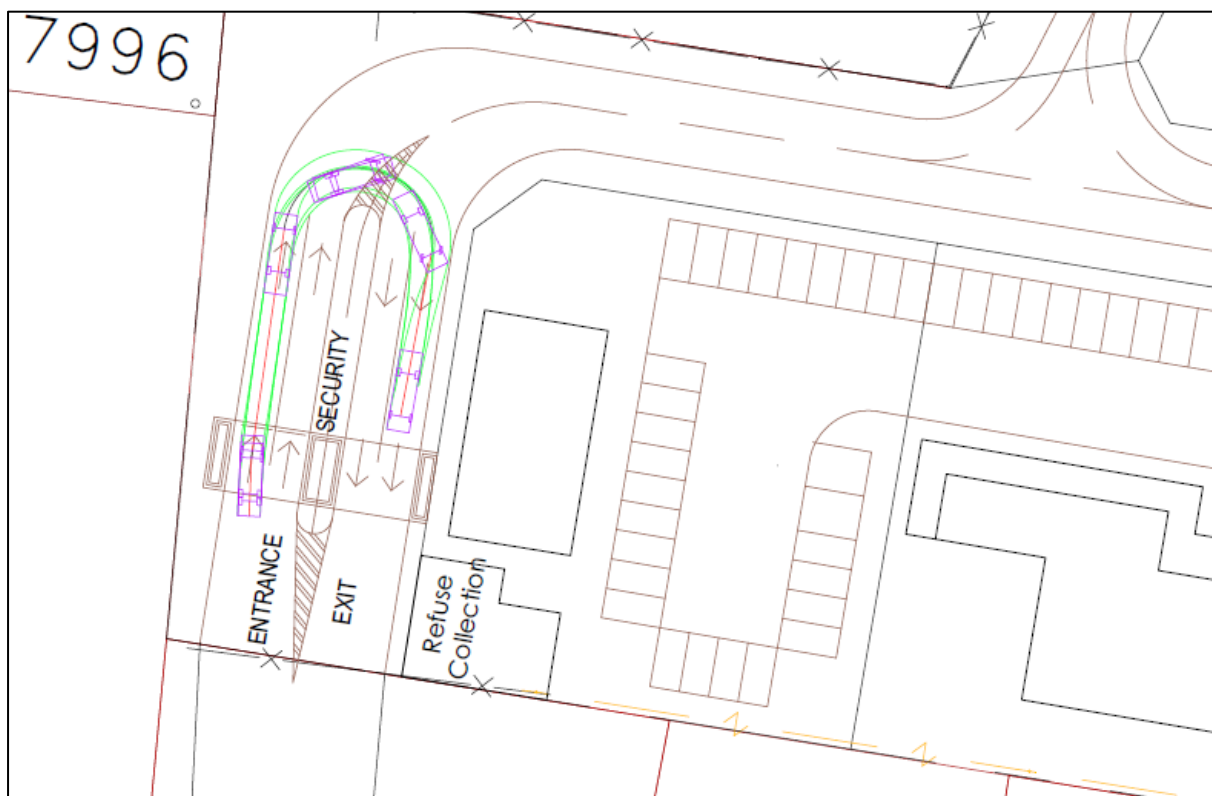


Figure 10-1: Refuse Vehicle Turning Circle at Entrance Facility

11. Maintenance for Roads and Civil Services Infrastructure

The completed development will be handed over to a Homeowner's Association/Body Corporate, who will except responsibility for the daily operations and maintenance of all civil infrastructure within the development.

The maintenance of the civil infrastructure will be explained to the HOA and they will be furnished with engineering maintenance manuals (*pumpstation*) and checklists (*weekly and monthly*).

It is advised that a professional engineer inspect and assess the civil services infrastructure on a yearly basis to ensure that the structural integrity and functionality of the civil amenities are intact.

Provision must be made for at least 2.5% of the total initial capital expenditure for the installation of the civil and roads infrastructure to be allocated for maintenance purposes.

All maintenance works must be carried out in accordance with all provisions of the Occupational Health and Safety Act (*Act 85 of 1993*). Maintenance staff must be well educated on the operation of the civil services network as a whole and potential safety hazards should be identified before any maintenance/remedial works are carried out. All maintenance personnel must always be equipped with the necessary protective gear (*PPE*).

12. Conclusion

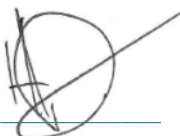
The findings of this Civil Engineering Services Report provide sufficient evidence to **support** the application for

"The rezoning of Erf 6503 Plettenberg Bay to 'Residential Zone I' (2.27 ha) & 'Residential Zone II' (2.67 ha) & 'Residential Zone IV' (0.74 ha) & 'Open Space Zone II' (0.66 ha) & 'Open Space Zone III' (10.44 ha) & 'Private Road' (2.39 ha) in terms of Section 15(2)(a) of the Bitou Municipality Land Use Planning Bylaw, 2015"

A Services Level Agreement, between the Developer and Bitou Municipality, must be compiled to address the upgrading of the external engineering infrastructure (*i.e. potable water and sewer networks*) required for this development.

The Service Level Agreement must clearly stipulate the following:

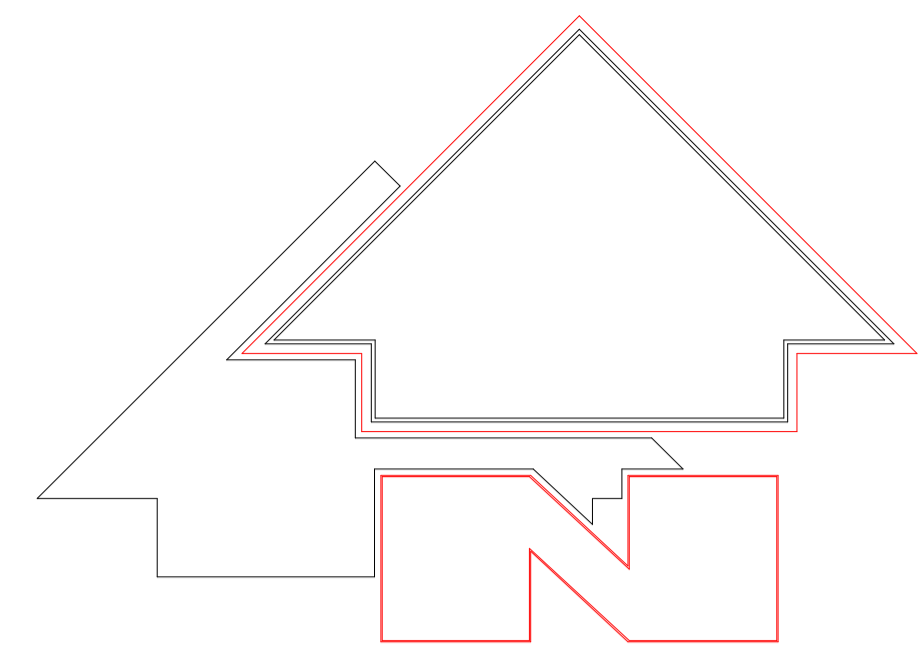
- The phasing of the proposed development
- The extent of the external upgrades required for each phase.
- Augmentation Levee's payable for each phase of the development
- Responsibility for external upgrades
- Application of Augmentation Levee's for external upgrades in lieu of direct payment to Bitou Municipality.



Riaan van Dyk (*Pr Eng 20150503*)
for Vita Consulting Engineers

Appendix A: Topographical Survey

52/444



WG23
Scale 1:1000 - A1

BENCHMARK COORDINATES LIST WG23 METRES				
NAME	Y	X	Z	DESCRIPTION
BM1	-34472.771	3768342.899	13.546	12MM IRON PEG IN CONCRETE
BM2	-34562.300	3768089.503	13.415	12MM IRON PEG IN CONCRETE

62/444

RE/6503

DENSE BUSH
(CONTOURS APPROXIMATE)

7996

RE/7997

Cuthbert
Close

572

573

574

575

576

- Notes :
1. Beacons Note Verified as part of survey
 2. Contours Through Bushy areas are approximate
 3. All elevations are above approximate mean sea level

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NO	DATE	DESCRIPTION
REVISIONS		
DATE: 07/02/23	SCALE: 1:1000 - A1	
SURVEYED ON: 07/12/22 & 01/02/23	SURVEYOR: M. BANTOW & B. MLONZI	
DRAWING FILE: SERVER://ALLOYDATA/PLETTERNBERG BAY/PR6503/PTN1_6503CP_REV B		



Professional Land Surveyors
Township Planners,
GIS & GPS consultants
Topographic, Sectional Title
& Engineering Surveys

16 Green Street P.O.Box 173
Knysna 6570
Tel: 044 3022300 Fax: 0866898908
e-mail: info@vpm.co.za

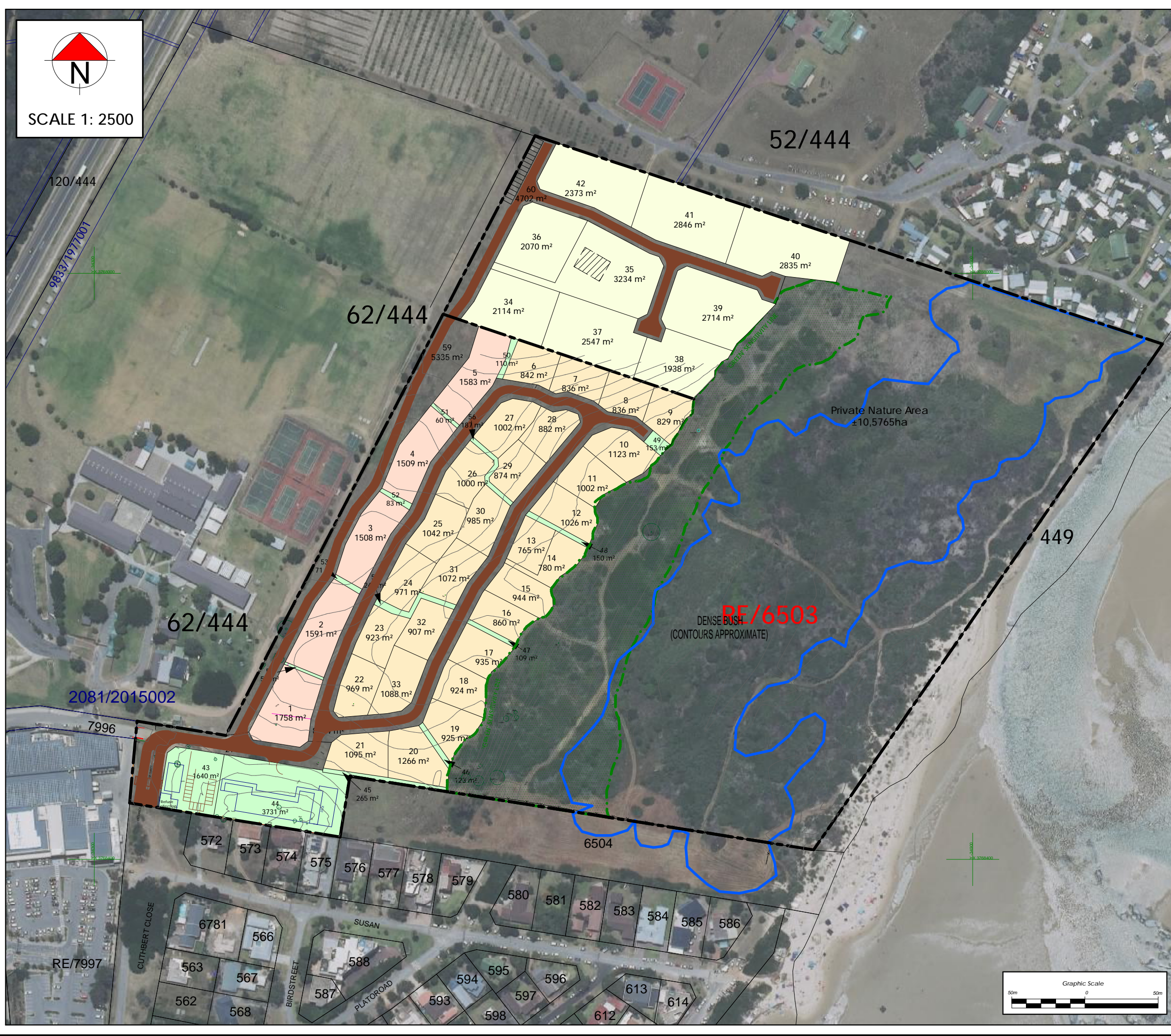
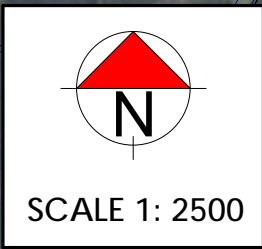
CLIENT
Plett Lagoon Estate (Pty) LTD

PROJECT
Contour / Site Plan

TITLE
PORTION 1 OF ERF 6503
PLETTERNBERG BAY

DRG NO PTN1/ERF6503 REVA	REV A
-----------------------------	----------

Appendix B: Sub-Division Layout



PLAN 4

PLETTENBERG BAY
ERF 6503

ALTERNATIVE 1 PREFERRED PROPOSAL

LEGEND				
ZONING:	QTY	AREA (ha)	%	
Residential Zone I	9	2,2671	11.86	
Residential Zone II	28	2,6675	13.96	
Residential Zone IV	5	0,7949	4.16	
Open Space Zone II	14	0,6985	3.65	
Open Space Zone III	1	10,5784	55.35	
Private Road	4	2,1065	11.02	
TOTAL	61	19,1129	100	

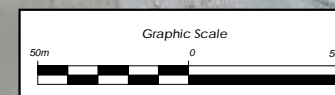
- NOTES**
- Sizes and dimensions are approximate and subject to final survey
 - For Property details, refer to SG 8205/1996
 - 0.5m Contour intervals, surveyed by VPM Surveys

DRAWN:	MV	CHECKED:	MV
PLAN NO:	Pr2309PB6503L05		
PLAN DATE:	25 July 2023		
STORED:	z:\drawings\App\Pr2309PB6503L05.dwg		

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APPROVED IN TERMS OF SECTION 23(1) OF THE BITOU MUNICIPALITY'S BY-LAW ON MUNICIPAL PLANNING AS PUBLISHED IN P.N. 273/2015 ON 12 AUGUST 2015

MUNICIPAL MANAGER
DATE: _____



Marike Vreken
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086 459 2987
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www.vreken.co.za

Appendix C: Traffic Impact Statement (UDS)

Date: 28 July 2023

Our Ref: UDS627/Reports/

51 Lourensford Estate
Somerset West
7130

Attention: Mr. Riaan van Dyk

Dear Sir

**TRAFFIC IMPACT STATEMENT FOR THE PROPOSED DEVELOPMENT ON RE 6503 AND 6504,
PLETTENBERG BAY**

This company was appointed to prepare a Traffic Impact Statement (TIS) for a proposed development on RE 6503 and 6504 in Plettenberg Bay as part of the NEMA process.

1. LOCALITY AND BACKGROUND

The subject property is located in Plettenberg Bay east of the N2 (National Route 2) and is currently accessed via Beacon Way as shown in **Diagram 1** below and the attached **Locality Plan**.



Diagram 1: Location of Subject Property



head office

Unit 8, Time Square Building,
9 Electron Street, Techno Park,
Stellenbosch

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V&A Waterfront
8002

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Elmarie Els 021 880 0443

managing member

A Khan PrEng

associates

JW Wessels PrEng
P v Blerk PrEng
JN Louw PrCPM

offices

Clanwilliam, Stellenbosch,
Somerset West

Reg no. 2003/043709/23

urban development solutions



2. PROPOSED DEVELOPMENT

The development is proposed to have 77 residential units. Of the 77 units, 37 units are proposed to be single residential units and 40 units will be apartments with the possibility of being developed as retirement units. The proposed estate will be access-controlled with access via a new road constructed along the southern boundary of the property to Susan Street. This will be further discussed in *Section 4*.

Please see the proposed layout on the attached **Alternative 1 Preferred Proposal** prepared by *Marike Vreken Urban and Environmental Planners*.

3. TRAFFIC IMPACT

3.1 Existing Traffic

Traffic counts were performed on Monday, the 22nd May 2023 during the AM (06:00 – 09:00) and PM (15:30 – 18:30) at the following intersections which were agreed upon with the Bitou Municipality:

1. N2 / Beacon Way intersection
2. Beacon Way / School Access Road intersection
3. Beacon Way / Checkers / Market Square intersection
4. Beacon Way / Zenon Street

The 2023 peak hour traffic volumes are as indicated in the attached **Figure 1**. The peak hours were found to be 07:15 – 08:15 and 16:15 – 17:15, which coincides with the morning and evening commuter peak periods.

3.2 Traffic Generated

The South African Trip Data Manual TMH17 was used to estimate the trips expected to be generated by the proposed development. TMH17 suggests a trip generation rate of 1 trip per single residential unit and 0.35 trips per retirement unit. However, as there exists the possibility that the apartments will not be developed as retirement units, a trip generation rate of 0.65 was units for the 40 apartment units. The proposed development is thus expected to generate peak hour trips as indicated below.

Single Residential Units				
Number of Units	37			
Trip Generation Rate / Unit	Weekday AM		Weekday PM	
	1		1	
Trips Generated	37		37	
Directional Split & Vehicular Trips	Weekday AM		Weekday PM	
	IN	OUT	IN	OUT
	25%	75%	70%	30%
	9	28	26	11

Apartments				
Number of Units	40			
Trip Generation Rate / Unit	Weekday AM		Weekday PM	
	0.65		0.65	
Trips Generated	26		26	
Directional Split & Vehicular Trips	Weekday AM		Weekday PM	
	IN	OUT	IN	OUT
	25%	75%	70%	30%
	7	20	18	8
TOTAL	16	47	44	19

Therefore, 63 trips are expected during the peak hours with 16 IN / 47 OUT during the AM peak hour and in the 44 IN / 19 OUT.

3.3 Traffic Distribution and Growth

The South African Trip Data Manual (TMH17) suggests an annual growth rate of 0 – 3% for low growth areas and 3 – 4% for average growth areas. As the area around Beacon Way is mostly built up, low growth is expected, however, to err on the side of caution an annual growth rate of 3% was used. The existing traffic was projected to 2028 to evaluate a 5-year future scenario both with and without the proposed development in order to establish whether the road network can accommodate the projected growth. See **Figure 2** for the *Projected 2028 AM/PM Peak Hour Traffic Volumes*.

The expected trip distribution is as indicated in the attached **Figure 3**. As far as possible, the background traffic was used to model the trip distribution. It should be noted that the access from the property was modelled via the new proposed access on the southern boundary of the property, rather than the existing roadway which provides access to the adjacent school. This will be discussed further in *Section 4*.

Figure 4 shows the estimated 2028 AM/PM peak hour traffic volumes, including the traffic generated by the proposed development as well as a 3% annual growth rate.

3.3 Traffic Impact

The existing traffic was analysed using SIDRA Intersection Analysis 9.1. Service levels A to D (up to 35 seconds of delay) are considered acceptable, where a level of service (LOS) below D and a degree of saturation above 0.85 is considered unacceptable.

N2 / Beacon Way Intersection

The N2 / Beacon Way intersection is a priority-controlled T-junction with a stop control on Beacon Way. There are turning lanes on each approach as shown in **Diagram 2**. It should be noted that according to the local municipality, the intersection is planned to be upgraded to a roundabout in the near future.



Diagram 2: N2 / Beacon Way intersection

The existing 2023 traffic volumes along with the existing lane layout was analysed and the intersection is experiencing an overall delay of approximately 7.8 seconds in the AM peak hour and 211.2 seconds in the PM peak hour. The worst delay, in both peak hours, is experienced on the right-turning movement along Beacon Way which experiences a LOS E with a delay of 42.7 seconds in the AM peak hour and a LOS F with delays exceeding 1000 seconds in the PM peak hour.

In 2028, after applying a 3% growth rate p.a., the intersection is expected to experience an average delay of 27.2 seconds in the AM peak hour and 477.6 seconds in the PM peak hour. The worst delay, in both peak hours, is experienced on the right-turning movement along Beacon Way which experiences a LOS F with unacceptable delays in the AM and PM peak hour. However, according to the Bitou Municipality, the N2 / Beacon Way intersection will be upgraded to a roundabout in the near future. Using the proposed roundabout, an overall LOS A is expected to be experienced in the AM (5.8 second delay) and PM (6.8 second delay) peak hour. The worst delay is expected to be experienced on the right-turning movement along Beacon Way with 10.3 seconds delay in the AM peak hour and 10.4 seconds delay in the PM peak hour.

After the subject development's traffic is added to the network, the upgraded intersection is still expected to experience an overall delay of 5.8 seconds in the AM peak hour and 6.8 seconds in the PM peak hour. The worst delay is expected to be maintained with the right-turning movement along Beacon Way, which experiences a LOS B in both the AM (10.3 seconds). The worst delay in the PM peak hour is expected on the right-turning movement along the southern south-western approach of the N2 with a delay of 11.4 seconds.

No further upgrades above and beyond the aforementioned roundabout are required to accommodate the development.

Beacon Way / School Access Road / Filling Station Intersection

The Beacon Way / School Access Road / Filling Station intersection is currently priority-controlled with a stop control on the side streets as shown in **Diagram 3** below. There is one lane per direction on all approaches.



Diagram 3: Beacon Way / Filling Station / School Access Road intersection

The existing 2023 traffic volumes along with the existing lane layout were analysed and the intersection is expected to experience an overall average delay of approximately 6.6 seconds in the AM peak hour and 2.2 seconds in the PM peak hour. The worst delay, in both peak hours, is experienced on the right-turning movement along the school access road on the eastern approach which experiences a LOS C with a delay of 16.8 seconds in the AM peak hour and 20.7 seconds in the PM peak hour.

In 2028, after applying a 3% growth rate p.a., the intersection is expected to experience an average delay of 7.6 seconds in the AM peak hour and 2.2 seconds in the PM peak hour. The worst delay, in both peak hours, is experienced on the right-turning movement along the school access road on the eastern

approach which experiences a LOS C with a delay of 21.4 seconds in the AM peak hour and a LOS D in the PM peak hour with a delay of 26.5 seconds.

After the subject development's traffic is added to the network, the intersection is expected to experience an average delay of 7.6 seconds in the AM peak hour and 2.7 seconds in the PM peak hour. The worst delay is experienced on the right-turning movement along the school access road on the eastern approach which experiences a LOS C with a delay of 22.9 seconds in the AM peak hour. The worst movement in the PM peak hour is expected to be experienced on the right-turning movement from the western approach with a LOS D and a delay of 31.2 seconds. It is expected that in all the scenarios above, the early afternoon peak would experience congestion at the end of the school day.

It should be noted that it was initially proposed to allow access via this servitude, however, after the municipality expressed concerns, the access was relocated to the preferred access along the southern boundary as currently shown on the attached **Alternative 1 Preferred Proposal**. No upgrades are required at this intersection due to the development.

Beacon Way / Checkers / The Market Square Intersection

The Beacon Way / Checkers / The Market Square intersection is a full signalized intersection as shown below in **Diagram 4**. There are turning lanes on each approach.



Diagram 4: Beacon Way / Checkers / The Market Square intersection

The existing 2023 traffic volumes along with the existing lane layout was analysed and the intersection is expected to experience an overall average delay of approximately 23.7 seconds in the AM peak hour and 29.3 seconds in the PM peak hour. The worst delay, in both peak hours, is experienced on the right-turning movement along Beacon Way northern approach which experiences a LOS D with a delay of 35.3 seconds in the AM peak hour and 36.1 seconds in the PM peak hour.

In 2028, after applying a 3% growth rate p.a., the intersection is expected to experience an average delay of 24.4 seconds in the AM peak hour and 32.3 seconds in the PM peak hour. The worst delay, in both peak hours, is experienced on the right-turning movement along Beacon Way northern approach which experiences a LOS D with a delay of 38.4 seconds in the AM and PM peak hour.

After the subject development's traffic is added to the network, the intersection is expected to experience an overall delay of 28.4 seconds in the AM peak hour and 36.1 seconds in the PM peak hour. The worst delay, in both peak hours, is expected to be experienced on the right-turning movement along Beacon Way northern approach which experiences a LOS D with a delay of 45.0 seconds in the AM peak hour and 49.6 seconds in the PM peak hour.

No upgrades are required due to the development.

Beacon Way / Zenon Street Intersection

The Beacon Way / Zenon Street intersection is a roundabout as shown below in **Diagram 5**. The intersection will provide access between the proposed development and the larger road network. This will be further discussed in *Section 4*.



Diagram 5: Beacon Way / Zenon Street intersection

The existing 2023 traffic volumes along with the existing lane layout was analysed and the intersection is expected to experience an overall average delay of approximately 5.0 seconds in the AM peak hour and 5.3 seconds in the PM peak hour. All movements experience a LOS A or B.

In 2028, after applying a 3% growth rate p.a., the intersection is expected to experience an average delay of 5.1 seconds in the AM peak hour and 5.3 seconds in the PM peak hour. All movements are still expected to experience a LOS A or B.

After the subject development's traffic is added to the network, the intersection is expected to experience an overall delay of 5.3 seconds in the AM peak hour and 5.6 seconds in the PM peak hour. As above, the intersection is expected to experience a LOS A or B on all movements.

No upgrades are required at this intersection due to the introduction of the development.

4. GEOMETRY

The proposed development is in a region accessed via the N2 / Beacon Way intersection. The N2 is a National Route (NR00208) and as previously mentioned, the intersection is planned to be upgraded to a roundabout in the near future.

Beacon Way is a two-lane road. The Beacon Way / Filling Station / School Access Road intersection is a priority-controlled intersection with no turning lanes. It should be noted that the School Access Road provides access to the adjacent school, Checkers' delivery yard and was initially proposed to provide access to the subject property.

The Bitou Municipality expressed a concern regarding increasing the number of vehicles travelling along the school access road due to the congestion caused by the school. After a meeting with the Bitou Municipality, three access alternatives were identified as indicated below in **Diagram 6**. The preferred access was identified to be the western access (Identified alternate access 1) as the other two accesses would encroach upon the "very high" sensitivity area as identified in the NEMA Planning Report. Traffic will travel via Susan Street, Plato Street and Zenon Street to reach Beacon Way where vehicles will have access to the wider road network.

It should be noted that it seems as though vehicles have travelled along the access road, past the school and delivery yard and informally used part of the subject property to turn around. This area will fall away as it would be developed as part of the gatehouse area.



Diagram 6: Access route for subject property

The Minimum Standards for Civil Engineering Services in Townships (2007) states that a minimum of 6-metres stacking distance is required for less than 15 residential units and 12-metres stacking distance is required for 40 units. There are no stipulated requirements for developments larger than 40-units, however, based on the data available and assuming a best fit trendline, the recommended stacking for 77 units should be between 18- and 23-metres. The layout of the gatehouse has not been confirmed, therefore, sufficient stacking distance should be provided during further design stages. Based on the available layout, 50+ metres are available for stacking in each lane, which equates to 100+ metres in the two entry lanes. This is considered sufficient.

In addition to this, it should be ensured that one of the entry lanes are at least 4.0 metres wide to accommodate emergency vehicles.

The internal roads are a minimum of 5.5-metres wide with road reserves ranging between 10- and 12-metres. It should be ensured that vehicles parked in driveways and garages have sufficient space to reverse. It is also recommended that sight-distance be considered in the placement of trees.

It is anticipated that refuse collection will be at the gatehouse.

Plato Road is approximately 525-metres long and it is suggested that it be considered that speed humps be provided along the straight lengths with appropriate spacing between them.

5. NON-MOTORISED AND PUBLIC TRANSPORT

A sidewalk exists along at least one side of Beacon Way. There are no formal sidewalks along Plato Road, however there is sufficient space for residents to walk on the unpaved sidewalk. As previously mentioned, it is suggested that traffic calming be considered along Plato Road to increase pedestrian safety. In addition to this, it is suggested that a pedestrian gate be considered along the western boundary allowing residents access to the school and retail areas.

It is not expected that additional public transport infrastructure would be required as result of the proposed development.

6. PARKING

The Bitou Municipality Zoning Scheme recommends 2 bays per unit for single residential units and 1.25 bays per apartment. However, as the client would like the option of developing retirement units, 2 bays per unit with an additional 0.25 bays per unit for visitors is required for the 40 apartments. Therefore, a total of 90 off-street parking bays (2.25 bays x 40 units) are required to accommodate the retirement units.

According to the civil engineer, each single residential unit has been designed to accommodate two parking bays and a garage. 80 bays will be provided in front of the retirement units with an additional 42 bays will be available for visitors at the clubhouse. While this is considered sufficient, it is recommended that a minimum of three parking bays are available for disabled users as per the Bitou Municipality Zoning Scheme.

Parking spaces should also be provided in accordance with normal parking standards, i.e. 2.5 by 5.0 metre bays and 3.7 by 5.0 metre bays for disabled users with 7.5 metre aisle widths as per the Bitou Municipality Zoning Scheme.

7. CONCLUSIONS

It can therefore be concluded that:

- This subject property (RE 6503 and 6504) is located to the east of the N2, currently accessed via Beacon Way.
- The municipality suggested alternate access be investigated due to possible congestion issues along Beacon Way.
- The proposed development will accommodate 77 units, of which 37 are proposed to be single residential units and 40 units will be retirement units.

- Traffic counts were performed on Monday, 22nd May 2023 at the N2/Beacon Way intersection, Beacon Way / Filling Station / School Access intersection, Beacon Way / Market Square / Checkers intersection, Beacon Way / Zenon Street.
- Using TMH17, 63 trips are expected during the peak hours with 16 IN / 47 OUT during the AM peak hour and 44 IN / 19 OUT during the PM peak hour.
- A 3% annual growth rate was used to project the traffic to 2028 to evaluate a 5-year future scenario.
- SIDRA 9.1 results were as follows:
 - N2 / Beacon Way Intersection:
 - Existing (2023 traffic): Average delay of 7.8 seconds (AM peak hour) and 211.2 seconds (PM peak hour). The worst delay is experienced on the right-turning movement along Beacon Way which experiences a LOS F and unacceptable delays.
 - Projected 2028 traffic: Average delay of 27.2 seconds (AM peak hour) and 477 seconds (PM peak hour). The worst delay is expected to be experienced on the right-turning movement along Beacon Way which experiences a LOS F and unacceptable delays.
 - The local municipality has confirmed that the N2/Beacon Way intersection will be upgraded to a roundabout. The Projected 2028 traffic was therefore analysed using the approved roundabout. An average delay of 5.8 seconds (AM peak hour) and 6.8 seconds (PM peak hour) is expected with the upgrade. The worst delay is expected to be experienced on the right-turning movement along Beacon Way which experiences a 10.4 second delay in the PM peak hour.
 - Estimated (2028 + Subject Development): Using the upgraded intersection, the average delays were maintained after the development traffic was added.
 - No further upgrades above and beyond the aforementioned roundabout is required.
 - Beacon Way / Filling Station / School Access Intersection:
 - Existing (2023 traffic): Average delay of 6.6 seconds (AM peak hour) and 2.2 seconds (PM peak hour). The worst delay is expected to be experienced on the right-turning movement along the school access which experiences a 20.7 second delay in the PM peak hour.
 - Projected 2028 traffic: Average delay of 7.6 seconds (AM peak hour) and 2.2 seconds (PM peak hour). The worst delay is expected to be experienced on the right-turning movement along the school access which experiences a 26.5 second delay in the PM peak hour.
 - Projected (2028 + Subject Development): Average delay of 7.6 seconds (AM peak hour) and 2.7 seconds (PM peak hour). The worst delay is expected to be experienced on the right-turning movement along the school access which experiences a 31.2 second delay in the PM peak hour.

- No additional lanes are required.
 - Beacon Way / The Market Square / Checkers Intersection
 - Existing (2023 traffic): Average delay of 23.7 seconds (AM peak hour) and 29.3 seconds (PM peak hour). The worst delay is expected to be experienced on the right-turning movement along Beacon Way which experiences a 36.1 second delay in the PM peak hour.
 - Projected 2028 traffic: Average delay of 24.4 seconds (AM peak hour) and 32.3 seconds (PM peak hour). The worst delay is expected to be experienced on the right-turning movement along Beacon Way which experiences a 38.4 second delay in the PM peak hour.
 - Projected (2028 + Subject Development): Average delay of 28.4 seconds (AM peak hour) and 36.1 seconds (PM peak hour). The worst delay is expected to be experienced on the right-turning movement along Beacon Way which experiences a 49.6 second delay in the PM peak hour.
 - No additional lanes are required.
 - Beacon Way / Zenon Street
 - Existing (2023 traffic): Average delay of 5.0 seconds (AM peak hour) and 5.3 seconds (PM peak hour). All movements are expected to experience a LOS A or B.
 - Projected 2028 traffic: Average delay of 5.1 seconds (AM peak hour) and 5.3 seconds (PM peak hour). All movements are expected to experience a LOS A or B.
 - Projected (2028 + Subject Development): Average delay of 5.3 seconds (AM peak hour) and 5.6 seconds (PM peak hour). All movements are expected to experience a LOS A or B.
 - The intersection was modelled as the main access to the wider road network and was able to accommodate all 63 trips. No upgrades are required.
- As mentioned, the N2 / Beacon Way intersection is planned to be upgraded to a roundabout in the near future.
- Access to the subject property is proposed to be gated, however the details for the guard house has not been confirmed. The Minimum Standards for Civil Engineering Services in Townships (2007) only stipulates specifications up to 40 units, however, using the ratios provided, stacking distance should be provided between 18- and 23-metres. Based on the available information, sufficient space is available.
- An entry lane of minimum 4.0 metres should be provided for emergency vehicles.
- Internal roads are 5.5-metres wide with road reserve widths ranging from 10.0- to 12.0-metres.
- It is anticipated that refuse collection will occur at the gatehouse.
- Each single residential unit will include a garage and space for 2 parked cars outside the garage. 80 bays are provided outside the retirement units with an additional 42 bays for visitors at the clubhouse.

8. RECOMMENDATIONS

The development be recommended on condition that:

- Sufficient stacking space exceeding 23-metres be provided.
- A minimum entry lane of 4.0-metres be provided.
- Sufficient sight distance be ensured in the placement of trees along the internal roads.
- It should be ensured that there is sufficient space for vehicles reversing out of driveways.
- Traffic calming be considered along roads within the development longer than 100-metres.
- Traffic calming be considered along Plato Road with appropriate spacing between them.
- A pedestrian gate be considered on the western boundary of the subject erf, providing access to the school and retail areas.

Trust the above is sufficient for the purpose of the investigation. More information can be provided upon request.

Yours faithfully,





Compiled by: Shameez Patel Papathanasiou (MScEng)

Approved by Piet van Blerk (PrEng)

UDS AFRICA



ATTACHMENTS

Locality Plan

Alternative 1 Preferred Proposal

Figure 1 - Existing AM/PM Peak Hour Traffic Volumes (22 May 2023)

Figure 2 - Projected 2028 AM/PM Peak Hour Traffic Volumes
(Using a 3% growth rate p.a.)

Figure 3 – Distribution of Traffic Generated by the Development

Figure 4 – Estimated 2028 AM/PM Peak Hour Traffic Volumes (Incl. Proposed Development
as well as a 3% growth rate p.a.)

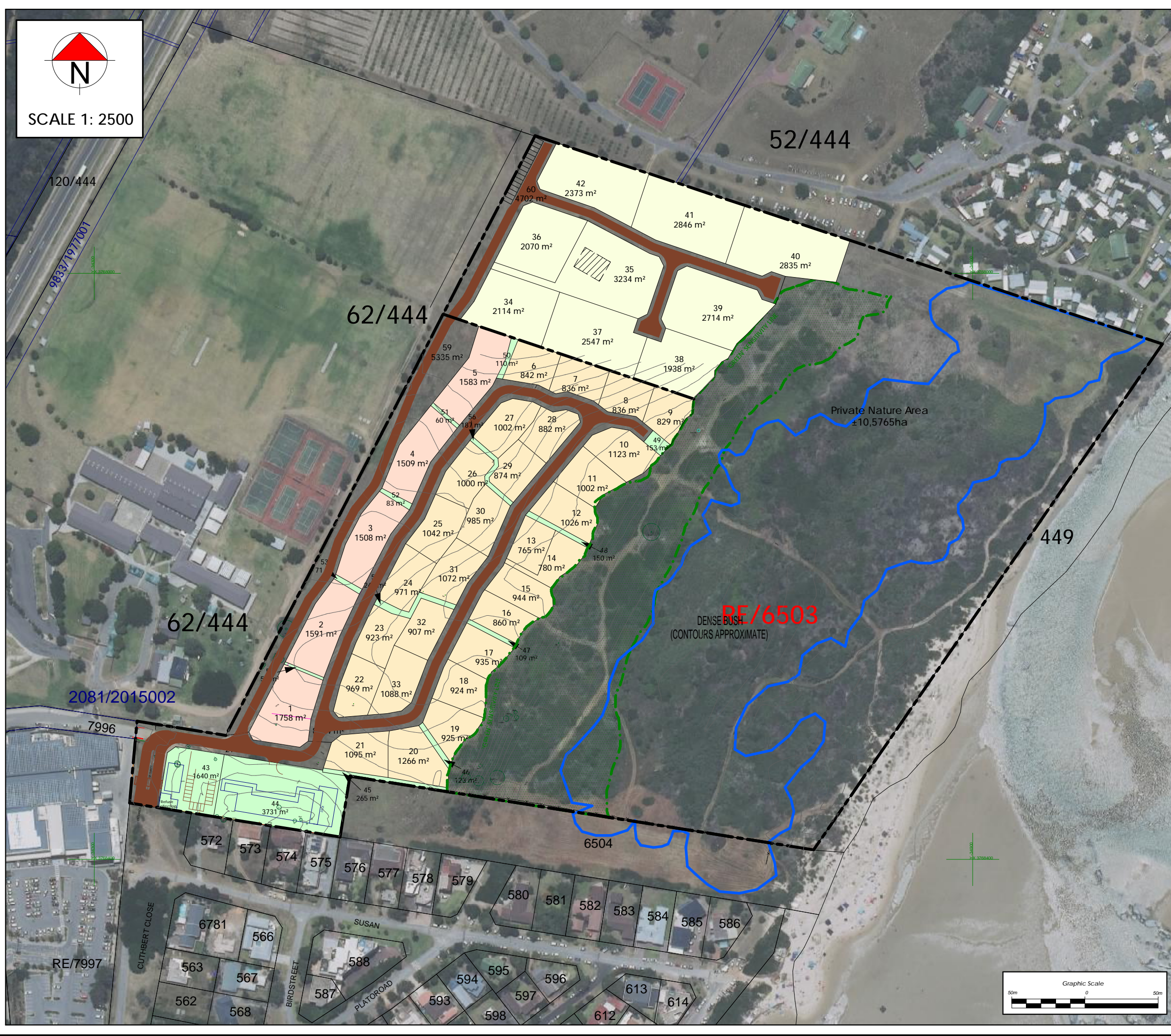
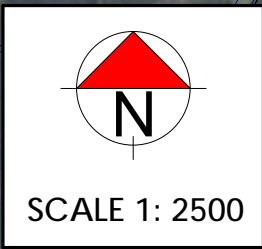


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Locality Plan



PLAN 4

PLETTENBERG BAY
ERF 6503

ALTERNATIVE 1 PREFERRED PROPOSAL

LEGEND				
ZONING:	QTY	AREA (ha)	%	
Residential Zone I	9	2,2671	11.86	
Residential Zone II	28	2,6675	13.96	
Residential Zone IV	5	0,7949	4.16	
Open Space Zone II	14	0,6985	3.65	
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TOTAL	61	19,1129	100	

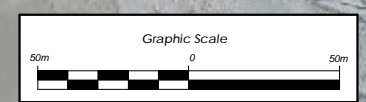
- NOTES**
- Sizes and dimensions are approximate and subject to final survey
 - For Property details, refer to SG 8205/1996
 - 0.5m Contour intervals, surveyed by VPM Surveys

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PLAN NO:	Pr2309PB6503L05		
PLAN DATE:	25 July 2023		
STORED:	z:\drawings\App\Pr2309PB6503L05.dwg		

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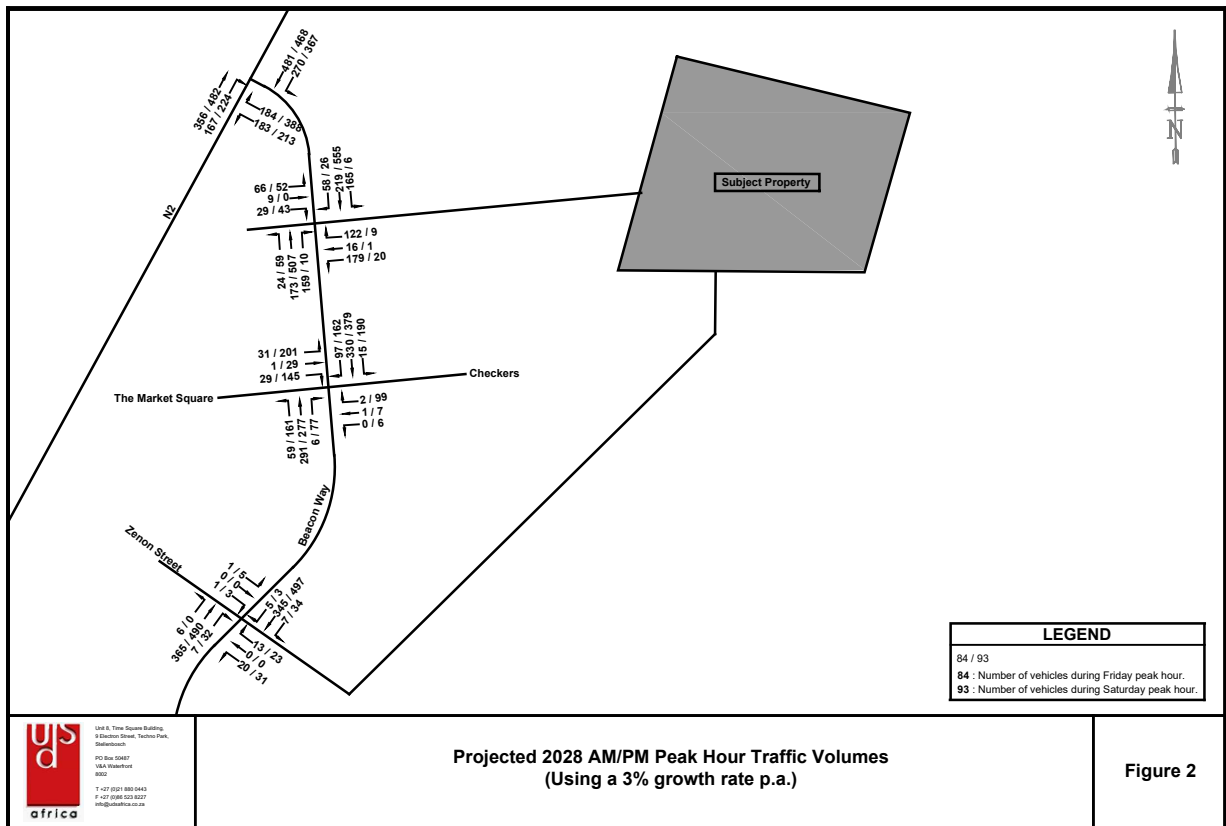
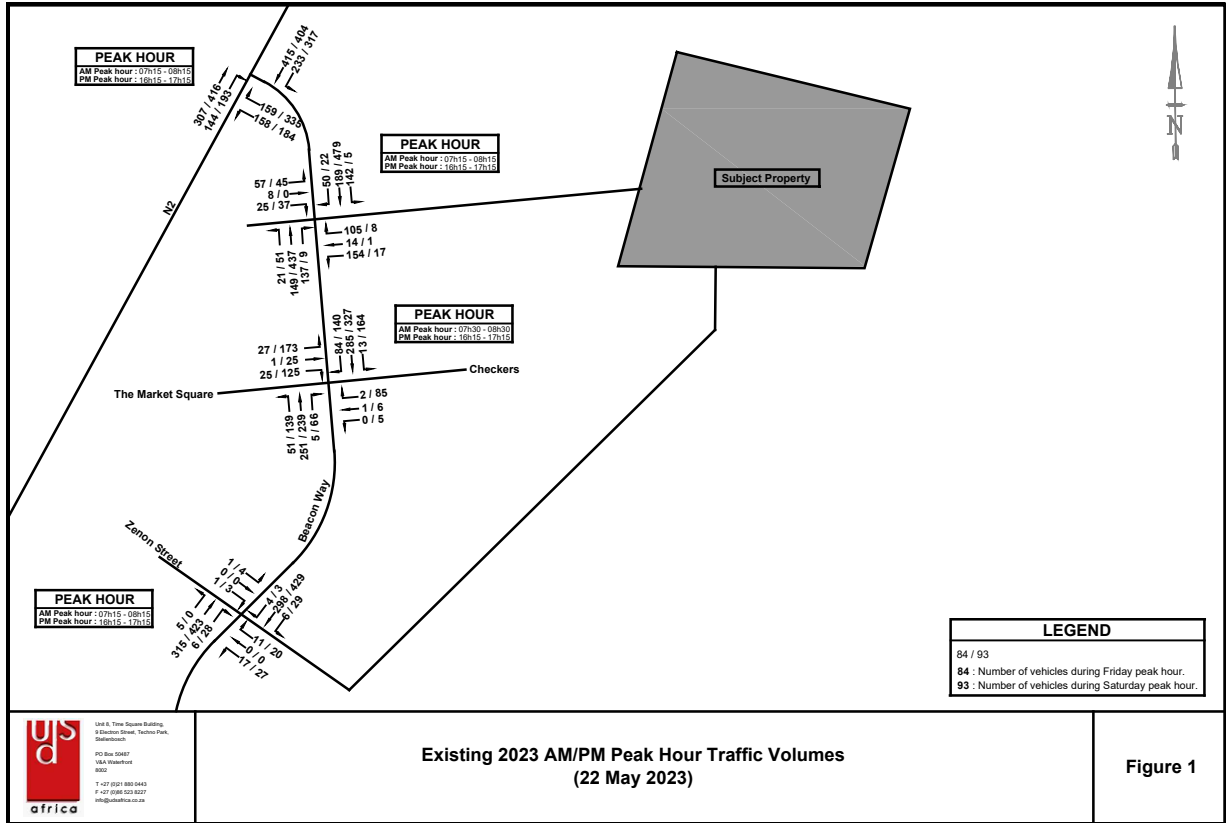
APPROVED IN TERMS OF SECTION 23(1) OF THE BITOU MUNICIPALITY'S BY-LAW ON MUNICIPAL PLANNING AS PUBLISHED IN P.N. 273/2015 ON 12 AUGUST 2015

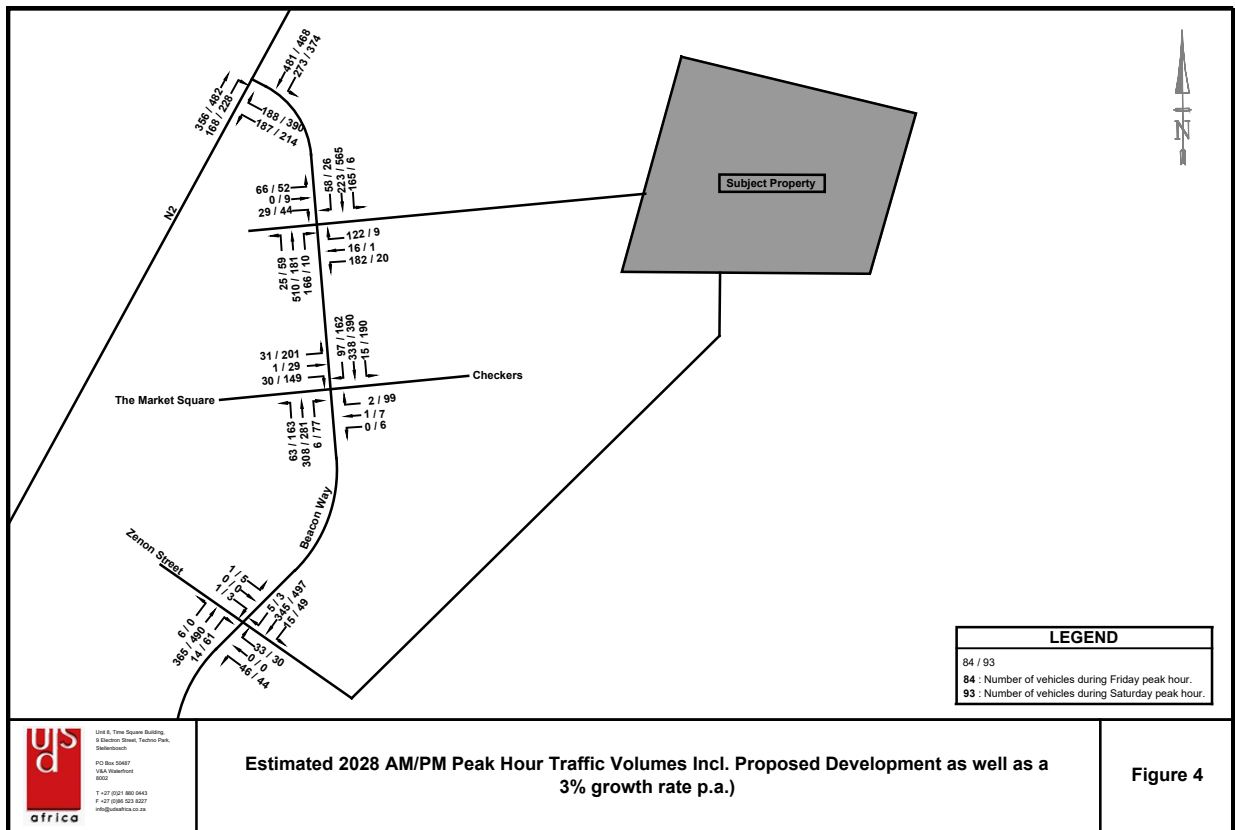
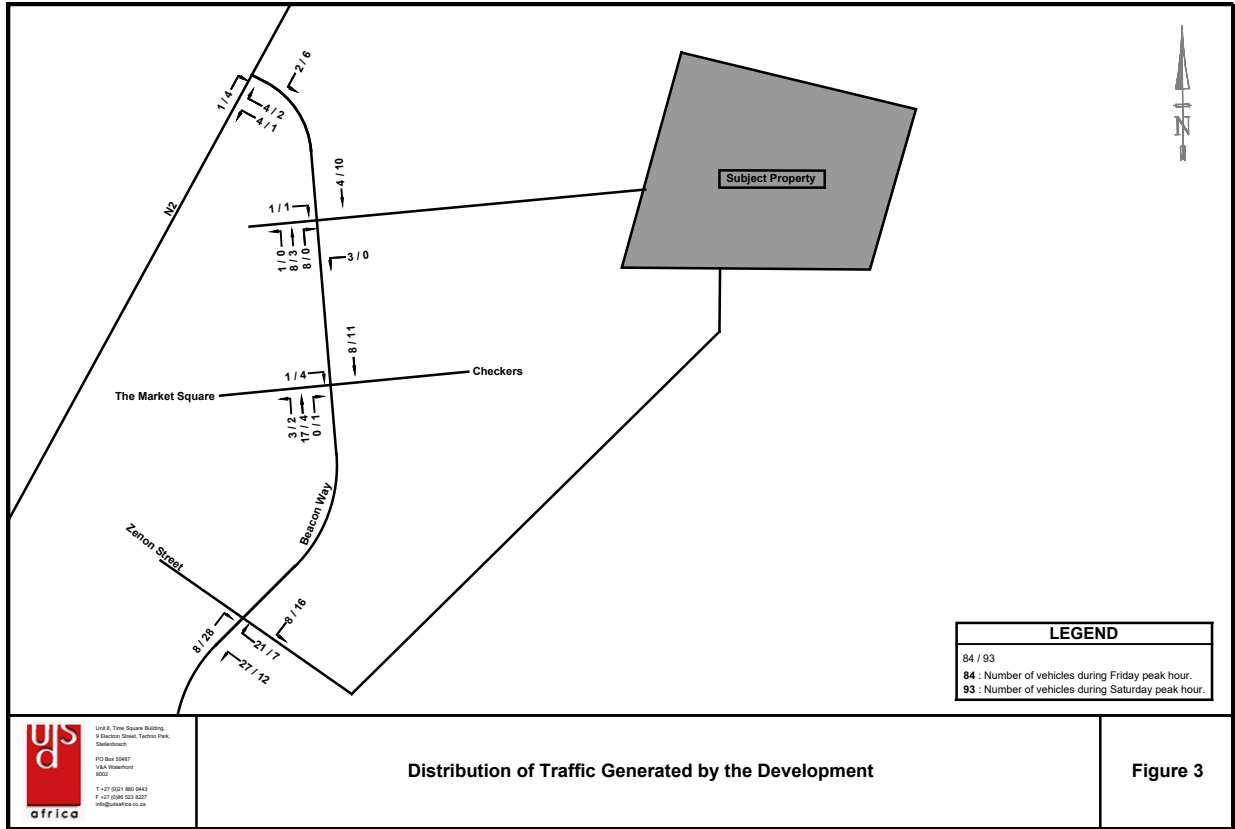
MUNICIPAL MANAGER
DATE: _____



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KNYSNA 6570

(044) 382 0420
086 459 2987
e-mail: marika@vreken.co.za
www.vreken.co.za





Appendix D: Municipal Services Capacity Analysis (GLS Consulting)

Draft report

27 February 2023

The Director: Engineering Services
Bitou Municipality
Private Bag X1002
Plettenberg Bay
6600

Attention: Ms Asiphe Mgoqi

Dear Madam,

PROPOSED RESIDENTIAL DEVELOPMENT ON ERF 6504 AND THE REMAINDER OF ERF 6503, PLETTENBERG BAY: CAPACITY ANALYSIS OF THE BULK WATER & SEWER SERVICES

The request by Mr Riaan van Dyk of Vita Consulting Engineers for GLS Consulting to investigate and comment on the bulk water supply and sewer discharge of the proposed development (retirement village development on portion 53 of Farm 444, Plettenberg Bay), refers.

This document should inter alia be read in conjunction with the Water Master Plan (performed for the Bitou Municipality) dated June 2020 and the Sewer Master Plan dated June 2020.

The proposed development was not taken into consideration for the master plans for the water and sewer networks.

1 WATER DISTRIBUTION SYSTEM

1.1 Distribution zone

For this re-analysis of the water master plan it is proposed that the development area should be accommodated in the existing Goose Valley reservoir zone. The proposed connection to the existing water system is to the existing 250 mm diameter supply pipeline from the Goose Valley reservoir in Beacon Way, as shown on Figure 1 attached.

The proposed development is situated inside the water priority area.

1.2 Water demand

No provision was made in the original water analysis for the master plan for development on Erf 6504 and the remainder of Erf 6503 in Plettenberg Bay .

For this re-analysis, the total annual average daily demand (AADD) and fire flow for the proposed development were calculated and classified as follows:

- 40 x retirement units @ 0,6 kL/d/unit = 24,0 kL/d
- 31 x Single residential units @ 1,0 kL/d/unit = 31,0 kL/d
- TOTAL = 55,0 kL/d *

* As per Table J.2 from Section J – Water Supply of “The Neighbourhood Planning and Design Guide” (so called “Red book”).

- Fire flow criteria (Low risk) = 15 L/s @ 10 m

1.3 Present situation

1.3.1 Reticulation network

It is recommended that the proposed development is accommodated within the existing Goose Valley reservoir water distribution zone and not within the Town PRV no. 3 zone.

The Goose Valley water distribution zone is supplied with water from the Goose Valley reservoir (Top Water Level (TWL) of 89.7 m above mean sea level (m a.s.l.)) through a 250 mm Ø main supply pipe under gravity. The existing water reticulation system also supplies bulk water to the Wittedrift and Matjiesfontein reservoirs (through the reticulation network, see section 1.3.3 further on in the report) and has consequently insufficient capacity to accommodate the domestic water demand of the proposed development in order to comply with the pressure and fire flow criteria as set out in the master plan.

Link services items BPW14.1 will be required to connect the internal reticulation network of the proposed development to the existing municipal water network.

Link services

- BPW14.1 : 70 m x 200 mm Ø new pipe = R 284 000 *

(* Including P & G, Contingencies and Fees, but excluding VAT - Year 2022/23 Rand Value. This is a rough estimate, which does not include major unforeseen costs).

The route of link services item BPW14.1 is schematically shown on Figure 1, but has to be finalised subsequent to a detailed pipeline route investigation.

1.3.2 Reservoir capacity

Bulk water is currently supplied from the Goose Valley reservoir to the Matjiesfontein and Wittedrift reservoirs, which has a negative effect on the available reservoir storage capacity available for the Goose Valley reservoir supply area (this is discussed in section 1.3.3 of this report further on).

The Matjiesfontein reservoir is the main supply reservoir for the areas east of the Keurbooms River and the Wittedrift reservoir is the main supply reservoir for Wittedrift and Green Valley.

The Goose Valley reservoir has consequently insufficient spare capacity to accommodate any additional developments.

Note: The Goose Valley reservoir will have sufficient spare capacity available to accommodate the development if the Wittedrift and Matjiesfontein reservoirs are supplied with water directly from the Town reservoirs through a dedicated bulk system, as discussed in paragraph 1.4.1 further on in the report.

1.3.3 Bulk supply

The Plettenberg Bay bulk water system was designed to supply the Wittedrift and Matjiesfontein reservoirs with bulk water from the Town reservoirs, located on the Plettenberg Bay Water Treatment Plant (WTP) site, and the Goose Valley reservoir with bulk water through the Goose Valley PS, also located at the Plettenberg Bay WTP site.

The Matjiesfontein reservoir was supplied with water through a 150 mm diameter dedicated pipeline between the Town reservoirs and the Matjiesfontein reservoir, and the Wittedrift reservoir through a 90 mm diameter pipe that connects to the Town/Matjiesfontein pipeline.

The 150 mm supply pipe to the Matjiesfontein and Wittedrift reservoirs is however at capacity (capacity of pipeline is $\pm 1,0$ ML/d and peak demand of the supply system is currently $\pm 2,3$ ML/d) and bulk supply to the Matjiesfontein and Wittedrift reservoirs is therefore currently supplied from the Goose Valley reservoir through the network of the Goose Valley water distribution zone. The Goose Valley reticulation network connects to the Matjiesfontein bulk pipeline before the bridge over the Keurbooms River.

The system is therefore currently not operated as it was designed for. The current operation consequently puts pressure on the available spare capacity of the Goose Valley system and is also not economically the best solution for the longer term (water that could have gravitated to the Matjiesfontein reservoir is currently pumped via the Goose Valley system).

The Goose Valley reservoir is supplied with water through a 200 mm diameter dedicated pipe between the Goose Valley PS and reservoir.

The capacity of the existing Goose Valley PS and accompanying 200 mm supply pipeline is 40 L/s (3,4 ML/d if pumped 24 hours a day). Peak demand from the Plettenberg Bay WTP to the Goose Valley reservoir is calculated at 2,7 ML/d (based on bulk water readings of the Goose Valley PS supplied by Bitou Municipality from July 2020 to March 2022). This implies that during peak demand conditions (December holiday) the Goose Valley PS should be operational 19 hours a day in order to supply the demand.

Bitou Municipality has indicated that their Goose Valley bulk system is under pressure during peak demand conditions and that the larger bulk system (supply to Matjiesfontein reservoir) should be upgraded according to the master plan before additional developments can be accommodated within the existing Goose Valley reservoir supply area.

1.4 Implementation of the master plan

1.4.1 Bulk supply

In the water master plan the following upgrades are proposed in order to augment the existing bulk supply system between the Town reservoirs at the WTP site and the Matjiesfontein reservoir on the eastern side of the Keurbooms River:

Bulk supply augmentation

• BPW.B39	: 930 m x 400 mm Ø new bulk pipe (replace 150 mm Ø)	= R	6 108 000 *
• BPW.B67	: 2 670 m x 355 mm Ø new bulk pipe (replace 150 mm Ø)	= R	13 813 000 *
• Item 1	: Close existing isolating valve	= R	No cost
		Total = R	19 921 000 *

In the Water Master Plan item DPW.B40 was proposed to connect an existing 300 mm Ø pipeline from the Town reservoir zone to the existing 150 mm Ø Matjiesfontein bulk pipeline (at the intersection of the N2 National Road and the service road towards the Goose Valley reservoir), in order to augment bulk water supply to the Matjiesfontein and Wittedrift reservoirs.

Bitou Municipality has however indicated that this 300 mm Ø pipeline (3,6 km asbestos cement pipeline from the Town reservoirs) is in a poor condition, has been abandoned and can not be utilised to augment the bulk water supply system. The master plan should therefore be amended to reflect this.

It is therefore proposed that the following master plan item is included in the water master plan in the place of the existing 300 mm Ø AC pipeline.

- Item 2 : 3 600 m x 400 mm Ø new bulk pipe (replace 300 mm Ø) = R 22 631 000 *

These upgrades will solve the existing backlog of bulk supply to the Matjiesfontein reservoir as well as provide spare capacity for potential future development areas, as documented in the water master plan.

(* Including P & G, Contingencies and Fees, but excluding VAT - Year 2022/23 Rand Value. This is a rough estimate, which does not include major unforeseen costs).

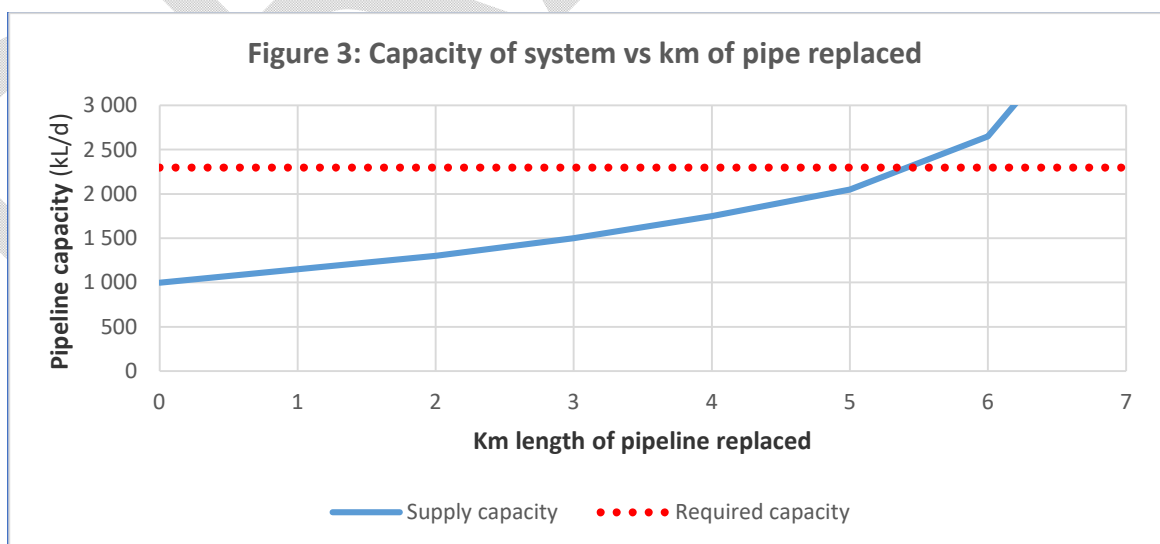
Take note that the routes of the proposed pipelines are schematically shown on Figure 2 attached, but have to be finalised subsequent to detail pipeline route investigations.

1.5 Minimum upgrades required to bulk system

The capacity of the existing bulk supply system from the Town reservoirs to the Matjiesfontein reservoir is calculated at 1,0 ML/d. The required supply to the Matjiesfontein reservoir during peak holiday periods is calculated at 2,3 ML/d (refer to paragraph 1.3.3).

It is therefore proposed that the existing 150 mm Ø pipeline between the Town reservoirs and the bridge over the Keurbooms River is replaced and isolated from the existing Goose Valley network as proposed in the water master plan in order to augment supply to the Matjiesfontein reservoir. This will then alleviate pressure that currently exist on the supply to the Goose Valley reservoir in order to accommodate future developments within the reservoir supply area.

Figure 3 below shows how supply to the Matjiesfontein reservoir will improve as sections of master plan items 2, BPW.B39 and BPW.B67 are implemented (from the Town reservoir towards the Keurbooms River):



Roughly 5,5 km of the existing 7,7 km x 150 mm Ø bulk pipeline between the Town reservoirs and the Keurbooms River should be upgraded in order to supply the Matjiesfontein reservoir from the Town reservoirs under gravity (no augmentation of bulk supply from the Goose Valley reservoir will then be required).

The minimum upgrades required to improve the existing bulk supply system in order to accommodate the proposed development in the existing system are:

- Master plan item 2 (3,6 km x 400 mm Ø replace existing 300 mm Ø abandoned AC pipe).
- Master plan item BPW.B39 (0,9 km x 400 mm Ø replace existing 150 mm Ø bulk pipe).
- Portion of master plan item BPW.B67 (1,0 km x 355 mm Ø replace existing 150 mm Ø bulk pipe).

1.6 *Additional development planned in the short-term for Goose Valley reservoir zone*

Although GLS Consulting cannot comment on the implementation timeframes of proposed developments, it should be noted that capacity analyses for the following developments (that should be supplied with water from the Goose Valley/Matjiesfontein/Wittedrift bulk supply system) have been performed in the last 3 years:

- Portion 32 of Farm 304 (Final report dated 15 September 2022, estimated water demand of 9,6 kL/d).
- Portion 38 of Farm 444 (Final report dated 3 October 2022, estimated water demand of 10,2 kL/d).
- Erf 155, Keurboomstrand (Final report dated 7 December 2022, estimated water demand of 3,0 kL/d).
- Portions 19 & 27 of Farm 444 (Final report dated 7 December 2022, estimated water demand of 234,9 kL/d).
- Portion 53 of Farm 444 (Final report dated 7 December 2022, estimated water demand of 101,9 kL/d).
- Portion 7 of Farm 306, Wittedrift (Final report dated 9 December 2022, estimated water demand of 60,0 kL/d).
- Erven 103 & 104, Wittedrift (Final report dated 9 December 2022, estimated water demand of 36,0 kL/d).
- Erf 342, Wittedrift (Final report dated 9 December 2022, estimated water demand of 4,7 kL/d).
- Portion 91 of Farm 304 (Draft report dated 27 February 2023, estimated water demand of 43,8 kL/d).

The scope of the report does not cover the cumulative effect of the proposed developments. However, it should be noted that the simultaneous development of the proposed developments will accelerate the need for the master plan to be implemented.

2 SEWER NETWORK

2.1 Drainage area

It is proposed that sewage from the proposed development is accommodated within the existing Plettenberg Bay Pumping Station (PS) 1 drainage area.

The proposed connection point for the internal sewer reticulation network of the development to the existing municipal sewer system is to the existing 150 mm diameter outfall sewer in Susan Street, as shown on Figure 4 attached.

From PS no. 1 sewage is pumped through a 160 mm diameter rising main directly towards the Plettenberg Bay PS no. 1a.

Sewage is pumped from the Plettenberg Bay PS 1a through a 355 mm diameter dedicated rising main to the Ganse Valley Wastewater Treatment Plant (WWTP).

The proposed development is situated inside the sewer priority area.

2.2 Sewer flow

No provision was made in the original sewer master plan for development on Erf 6504 and the remainder of Erf 6503.

For this re-analysis, the peak daily dry weather flow (PDDWF) for the proposed development was calculated at 38,5 kL/d.

2.3 Present situation

The existing gravity sewer system between the proposed development gravitating towards the Plettenberg Bay PS 1 and the pumping system from the Plettenberg PS 1 to Plettenberg Bay PS1a have sufficient capacity to accommodate the proposed development.

The Plettenberg Bay PS 1a and accompanying 355 mm diameter rising main also have sufficient spare capacity to accommodate the proposed development.

3 CONCLUSION

The developer of Erf 6504 and the remainder of Erf 6503 in Plettenberg Bay may be liable for the payment of a Development Contribution (as calculated by Bitou Municipality) for bulk water and sewer infrastructure as per Council Policy.

The master plan indicated that the proposed development area should be accommodated in the existing Goose Valley reservoir zone. The proposed connection to the existing water system is to the existing 250 mm diameter supply pipeline from the Goose Valley reservoir in Beacon Way, as shown on Figure 1. Link services items BPW14.1 is required to connect the internal reticulation network of the proposed development to the existing municipal water network.

The bulk water system to the Goose Valley, Wittedrift and Matjiesfontein reservoirs is at capacity and should be upgraded according to the master plan before additional developments within the reservoir supply areas can be accommodated.

The minimum upgrades required to improve the existing bulk supply system (in order to accommodate the proposed development together with other potential development areas within the existing supply areas of the Goose Valley, Wittedrift and Matjiesfontein reservoirs), are:

- Master plan item 2 (3,6 km x 400 mm Ø replace existing 300 mm Ø abandoned AC pipe).
- Master plan item BPW.B39 (0,9 km x 400 mm Ø replace existing 150 mm Ø bulk pipe).
- Portion of master plan item BPW.B67 (1,0 km x 355 mm Ø replace existing 150 mm Ø bulk pipe).

There is sufficient capacity in the existing Plettenberg Bay sewer reticulation system to accommodate the proposed development. The recommended position for the sewer connection for the proposed development is to the existing 150 mm diameter outfall sewer in Susan Street, as shown on Figure 4 attached.

Also, find attached hereto Appendix A which includes general notes from Bitou Local Municipality regarding development approvals and conditions.

We trust that you find this of value.

Yours sincerely,

GLS CONSULTING (PTY) LTD
REG. NO.: 2007/003039/07



Per: PC DU PLESSIS

cc. Vita Consulting Engineers
51 Lourensford Estate
Somerset West
7130

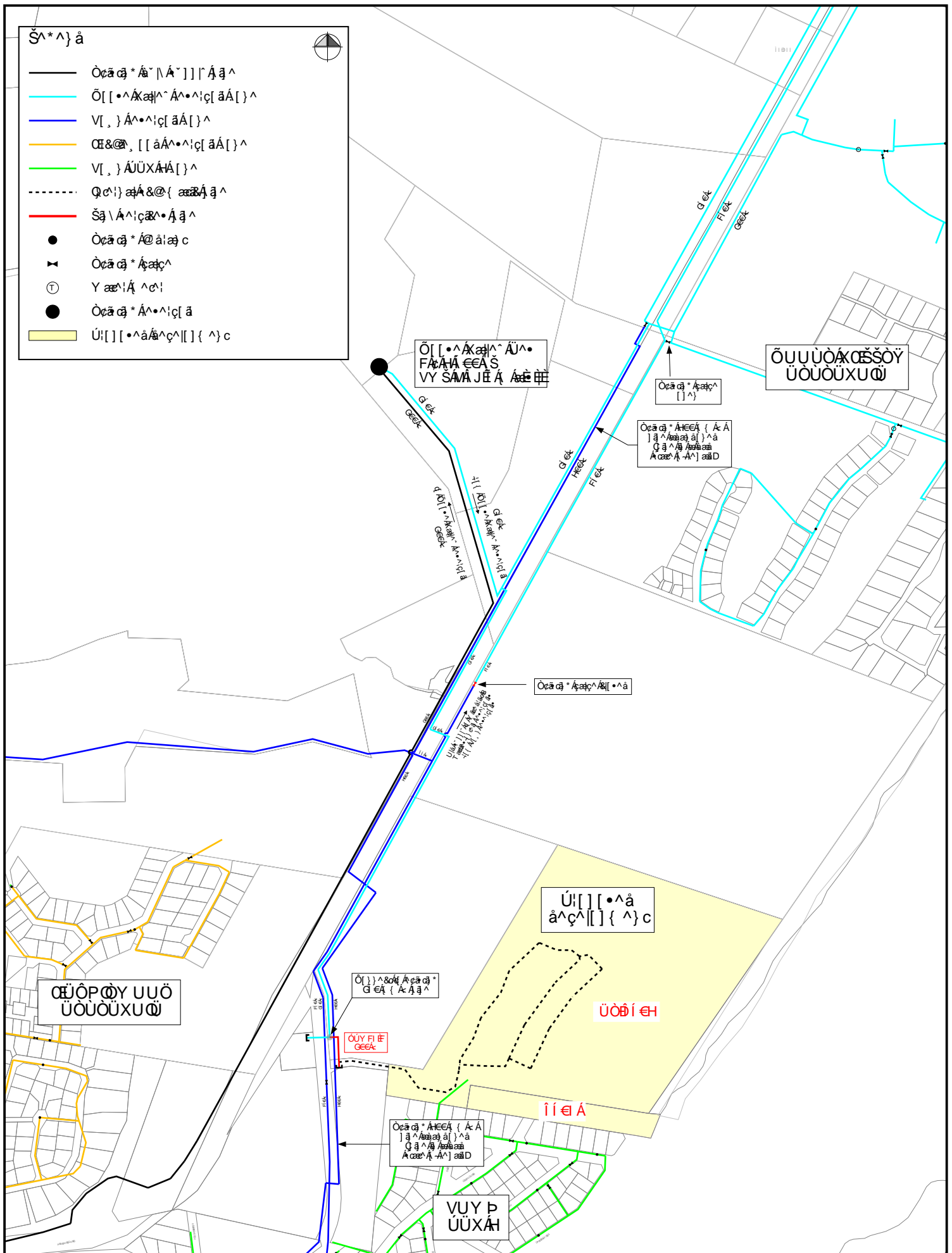
Attention: Mr Riaan van Dyk

GENERAL NOTES FROM BITOU LOCAL MUNICIPALITY ATTACHED TO GLS BULK WATER AND SEWER SERVICES CAPACITY REPORT

1. The GLS report is a services capacity report and the costs estimated in this report are only approximate values applicable at the time of the study.
2. Should the development be approved by Council the approval will be linked to certain development conditions. These conditions will be the official conditions applicable to the project and will take precedence over this report. Once approval is granted, Council will enter into a formal services agreement with the developer.
3. Costs for network upgrades, etc. As mentioned in the GLS report could change from time to time due to escalation, new tariff structures, additional requirements etc.
4. The Developer may be liable to pay a Development Contribution as per Council policy. The value payable will be calculated using Bitou Local Municipality's Development Contribution Calculator.
5. The Development Contribution monies are calculated according to the approved Council Policy at the time of payment.
6. The Development Contribution monies are payable before the approval of the building plan certificate or final approval of the subdivision for the transfer of units will be issued, as applicable for the type of development.
7. Where servitudes are required, all the costs and arrangements therefore will be for the developer's account.
8. The developer will be solely responsible for the cost of the link services as identified in the GLS report. The developer will also be responsible for the costs of upgrading to the minimum requirements of the services as identified in the GLS report. These costs may however be offset against the Development Contribution monies payable.
9. The above conditions are subject to any approved Council policies, which may be amended from time to time.

Σημειώσεις

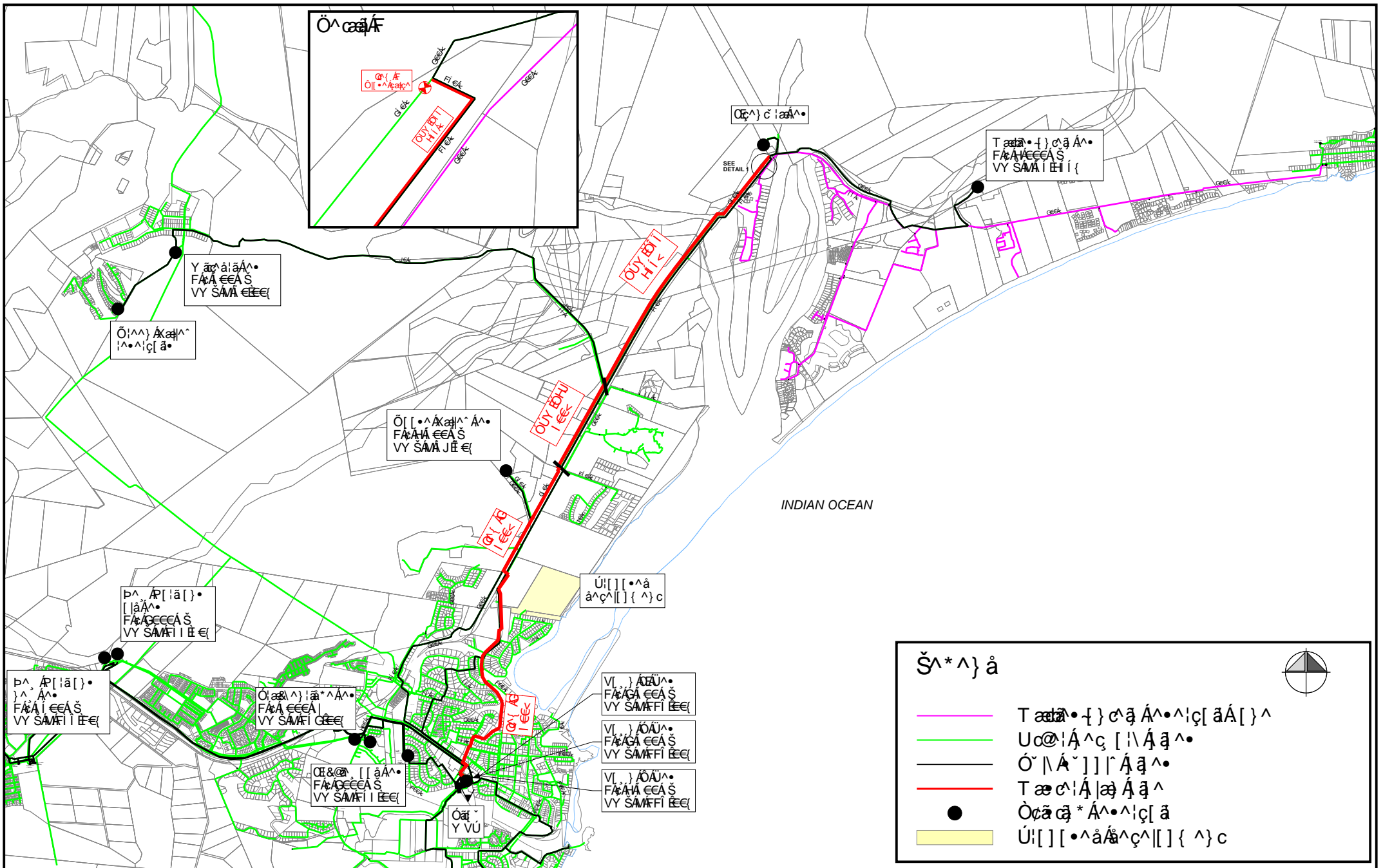
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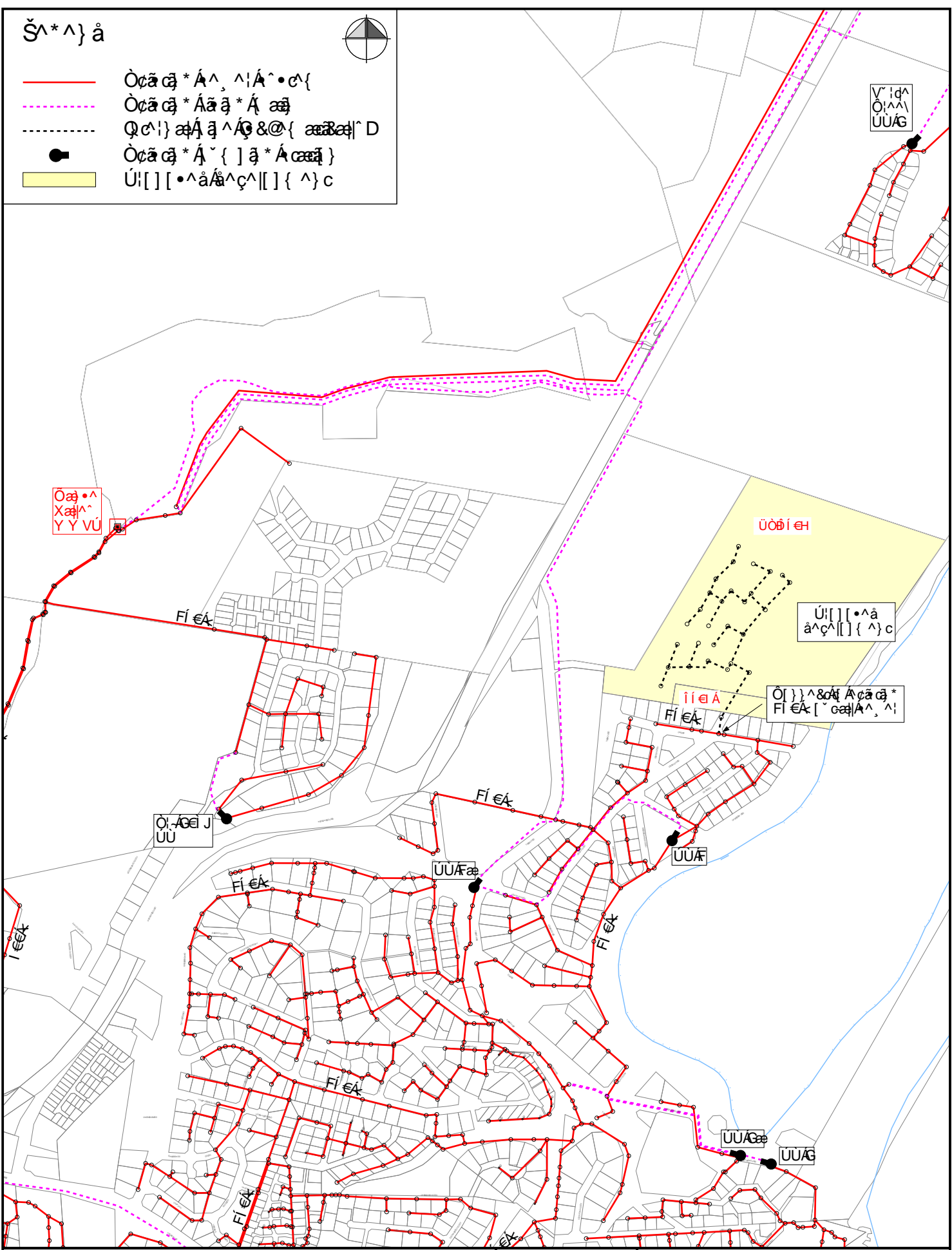


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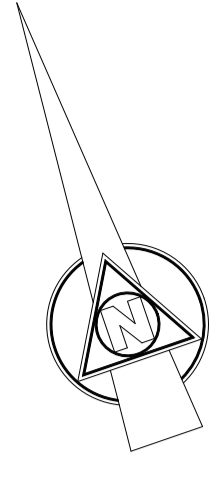


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Appendix E: Civil Engineering Services Layouts (VITA Consulting)

CIVIL ENGINEERING SERVICES LEGEND

- 160mm Ø FOUL SEWER (uPVC Heavy Duty class 34)
SLOPE AND LENGTH SHOWN
- FS9 FOUL SEWER MANHOLE COVER AND INVERT LEVEL SHOWN
- FOUL SEWER RISING MAIN
- POTABLE WATER SIZES AS SHOWN (uPVC CLASS 12)
- FH GATE VALVE AND FIRE HYDRANT (TYPE 4)
- DOUBLE AND SINGLE ERF CONNECTIONS
- W2 WATER SETTING OUT NODES
- 1500mm WIDE STORMWATER CHANNEL
- STORMWATER LINE (SPIGOT & SOCKET CLASS 75D)
375mm Ø (UNLESS OTHERWISE SHOWN)
- SW 1 SW MANHOLE
- STORMWATER IN/OUTLET STRUCTURE
- GENERAL SLEEVES (uPVC CLASS 6)
SIZE AND NUMBER SHOWN



621444

- GENERAL NOTES**
1. ALL WORK MUST BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATION (SAS 100) AND THE GENERAL CONDITIONS OF CONTRACT FOR THE CONSTRUCTION OF CIVIL ENGINEERING WORKS.
 2. CO-ORDINATES ARE BASED ON THE W.G.S.84 SYSTEM.
 3. THE CONTRACTOR HAS TO CHECK ALL SETTING OUT INFORMATION ON SITE AND NOTIFY THE ENGINEER OF ANY IRREGULARITIES PRIOR TO CONSTRUCTION.
 4. ALL MODIFICATIONS TO EXISTING SERVICES AND DEVIATIONS FROM THE DESIGN TO BE AS PER INSTRUCTION FROM THE ENGINEER ONLY.
 5. THE ENGINEER'S DRAWINGS SHALL BE READ IN CONJUNCTION WITH ALL RELEVANT ARCHITECT'S, CONSULTANTS AND SPECIALISTS' DRAWINGS. ANY DISCREPANCIES SHALL BE REFERRED TO THE ENGINEER PRIOR TO CONSTRUCTION.
 6. COVER LEVELS TO CONFORM TO THE FOLLOWING:
 - 6.1. TOP OF ROAD LEVELS INSIDE ROAD RESERVES.
 - 6.2. 75mm ABOVE NATURAL GROUND LEVEL IN UNDEVELOPED AREAS.
 - 6.3. THE CONTRACTOR HAS TO ENSURE THAT THE COVER LEVELS TIES IN WITH THE SURROUNDING LEVELS AND NOTIFY THE ENGINEER OF ANY IRREGULARITIES.
 7. ERF CONNECTIONS:
 - 7.1. POTABLE WATER AND ELECTRICAL CONNECTIONS MAY BE MADE TO AVOID HORIZONTAL CLASHES WITH SHALLOW SERVICES.
 - 7.2. FOUL SEWER MUST BE VERTICALLY REALIGNED TO AVOID HORIZONTAL CLASHES.
 - 7.3. CONNECTIONS MAY BE SHIFTED TO AVOID VERTICAL CLASHES.

CONSULTING ENGINEER:

VITA CONSULTING ENGINEERS

Plot 15, Lovers Rest Estate, Somerset Road, 7150
Tel: +27 87 22 3233 Email: info@vita.co.za

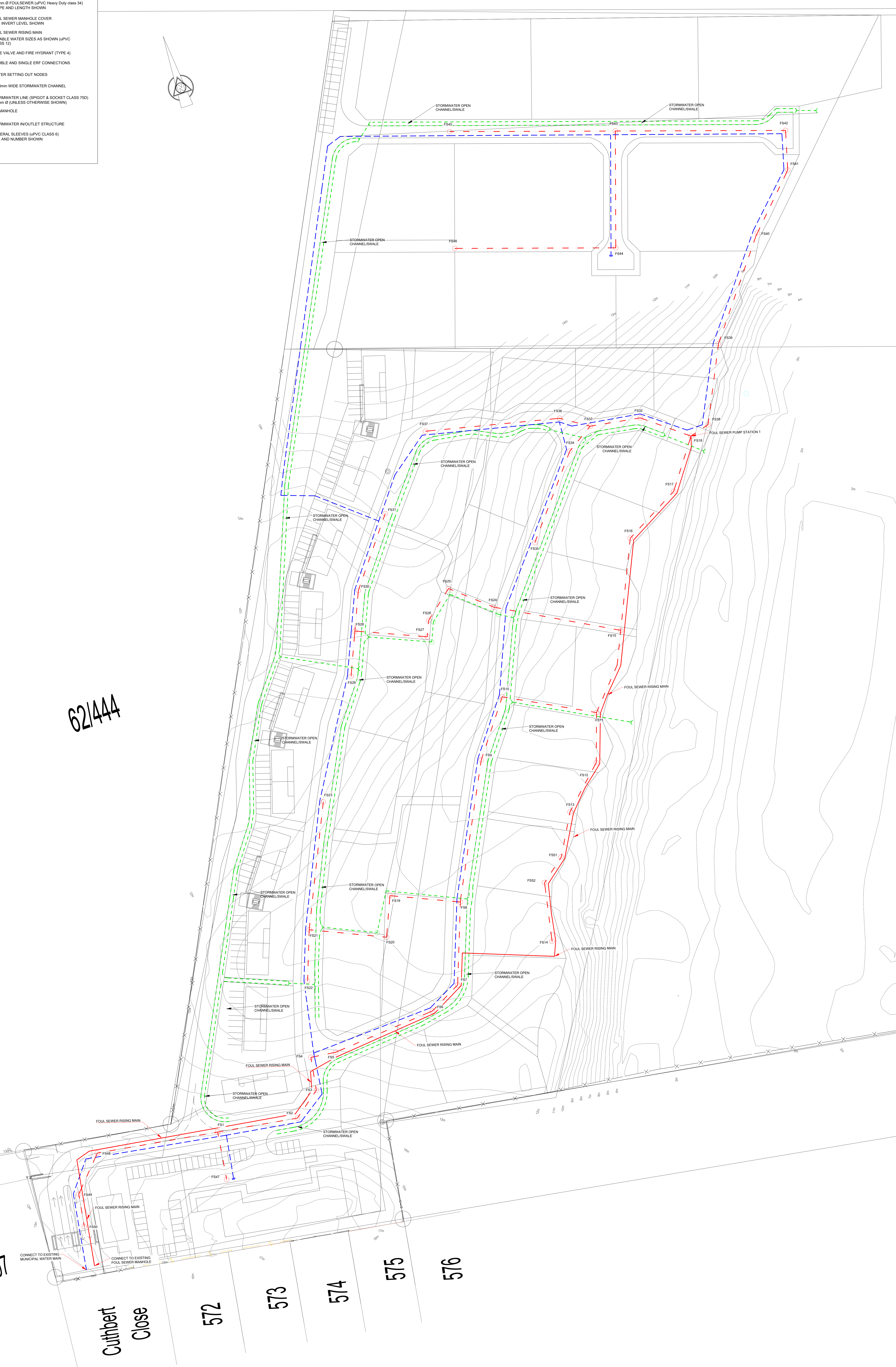
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PROJECT NAME:
PLETT LAGOON, PORTION 1 of ERF 6503 - PLETTENBERG BAY

DRAWING TITLE:
COMBINED SERVICES LAYOUT

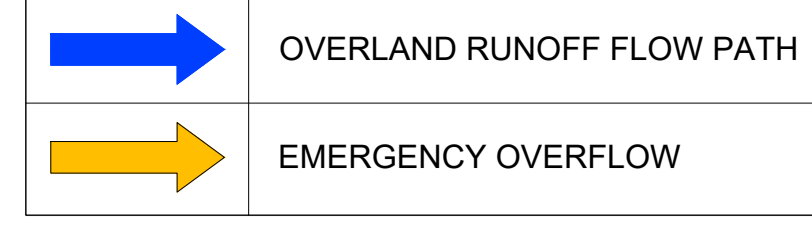
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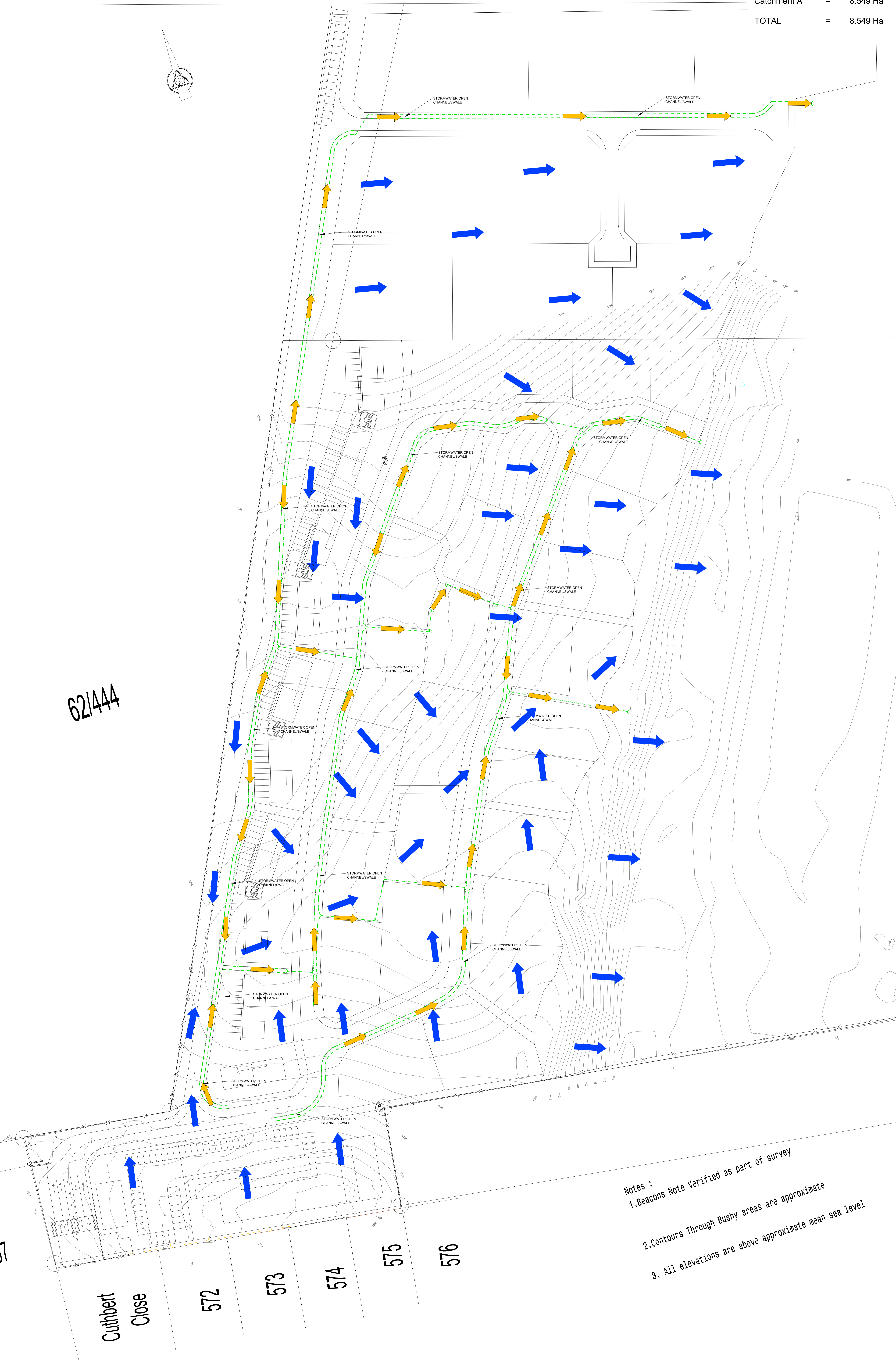
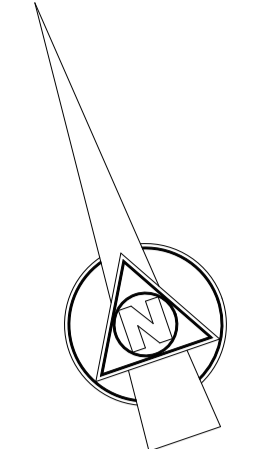


Cuthbert Close

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CATCHMENT AREAS	
Catchment A	= 8.549 Ha
TOTAL	= 8.549 Ha



621444

- GENERAL NOTES**
1. ALL WORK MUST BE DONE IN ACCORDANCE WITH THE STANDARD SPECIFICATION (SAS 100) AND THE GENERAL CONDITIONS OF CONTRACT FOR THE CONSTRUCTION OF CIVIL ENGINEERING WORKS.
 2. CO-ORDINATES ARE BASED ON THE W.G.S.84 SYSTEM.
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 4. ALL MODIFICATIONS TO EXISTING SERVICES AND DEVIATIONS FROM THE DESIGN TO BE AS PER INSTRUCTION FROM THE ENGINEER ONLY.
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 7. ERE CONNECTIONS:
 - 7.1. POTABLE WATER AND ELECTRICAL CONNECTIONS MAY BE MADE TO AVOID HORIZONTAL CLASHES WITH SHALLOW SERVICES.
 - 7.2. FOUL SEWER MUST BE VERTICALLY REALIGNED TO AVOID HORIZONTAL CLASHES.
 - 7.3. CONNECTIONS MAY BE SHIFTED TO AVOID VERTICAL CLASHES.

CONSULTING ENGINEER

VITA CONSULTING ENGINEERS

Plot 11, Lighthouse Estate, Somerset Road, 7130
Tel: +27 82 323 3233 Email: info@vita.co.za

REV	DATE	DESCRIPTION	CHECKED
A	20/06/2023	ISSUED FOR INFORMATION	GS
B	20/06/2023	ISSUED FOR INFORMATION	GS

PROJECT NAME
PLETT LAGOON, PORTION 1 of ERF 6503 - PLETTENBERG BAY

DRAWING TITLE
STORMWATER CATCHMENT AREA LAYOUT

APPROVAL	DATE	SCALE	SIZE
SIGNATURE	22/06/2023	1:500	A0

DRAWING NO.	REV
22051_SWC_01	B

- Notes :**
1. Beacons Note Verified as part of survey
 2. Contours Through Bushy areas are approximate
 3. All elevations are above approximate mean sea level

Cuthbert Close
572
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Appendix F: Minutes of Bitou Engineering Department Meeting - 9
March 2023

Riaan van Dyk

From: Riaan van Dyk <riaan@vitaeng.co.za>
Sent: Monday, March 13, 2023 8:10 AM
To: 'Asiphe Masivuye Mgoqi'; 'Edward Charles Oosthuizen'
Cc: 'Lwamkelo Mapasa'
Subject: Plettenberg Bay Developments
Attachments: Portions 19 & 27 of Farm 444 - Figure 5(Draft).pdf; Portions 19 & 27 of Farm 444 - Figure 2(Draft).pdf

Good morning Asiphe/Eddie,

Thank you very much for taking time to meet on Thursday

I hereby wish to confirm the following items discussed during our meeting:

1) Appointment letters

- a. Bitou stated that they have had previous discussions with other consulting engineers regarding the developments on Farm 444/38 and Farm 304/32. RvD will submit appointment letters to Bitou to confirm his appointment as civil engineering consultant on the aforementioned developments.

2) Temporary water solution (refer figure 5)

- a. GLS provided a temporary solution (*installation of an additional 160mm bulk main off the existing 160mm distribution main in the N2 road reserve – refer figure 5*) which will free up an additional 860kl/day.
- b. This temporary solution formed the basis for the approval of the development on Farm 444/19 & 27, with specific conditions incorporated in the Service Level Agreement for the permanent solution.
- c. There is sufficient capacity in the 860kl/day to accommodate the developments on Farm 444/38, Farm 304/32 and erf 6503.
- d. The temporary solution should form the basis for the approval of the aforementioned developments, with the similar conditions to be included in the SLA:
 - i. Design, installation, etc. costs for the temporary solution will be the responsibility of the developer/developers and will not be deductible from the Augmentation Levee's
 - ii. The temporary solution is not a permanent solution and Augmentation Levee's for Water and Sewage will be used towards the permanent solution.
 - iii. The proposed pro-rata contribution towards the temporary solution must be resolved between the developers of the different properties.

3) Permanent water solution (refer figure 2)

- a. The permanent water solution entails the construction of a new 400mm/355mm watermain from the Bitou WTP to the Aventura Reservoir, with the costs estimated by GLS to be approximately R36m.
- b. The route, design, application and approval process for the pipeline will take approximately 18months.
- c. Bitou will liaise with their designated appointed consulting engineers to start the process as soon as possible.
- d. Augmentation Levees (*water and sewerage*) from each development will be used for the installation of a portion of the pipeline.
- e. A Service Level Agreement must be drafted for each development.
- f. Bitou's designated appointed consulting engineers will be responsible for professional services for phases 1-3 (*feasibility, approval and detail design*) of the pipeline and consulting engineers from each development will be responsible for phases 4-6 (*procurement, construction and close-out*)

- g. The Augmentation Levee's for each development (*and/or phase of the development*) will be re-calculated according to the specific year in which the levee's are paid.
- 4) Confirm capacity and connections with GLS
- a. Vita must set up a meeting with GLS to confirm the position and capacity of each development's connection into the bulk municipal network.
- 5) Possible off-grid solutions
- a. Bitou stated that they are willing to approve off-grid water and sewage solutions, on condition that specific requirements are met, with special conditions included in the SLA
 - i. The developer is responsible to obtain all the necessary environmental and regulatory approvals (*including GA or WULA*)
 - ii. All electrical equipment (*borehole, booster pumps, etc.*) must have a back-up electrical supply (*generator, inverter and battery pack or solar*)
 - iii. Potable water must adhere to SANS 241 Class 1 water parameters.
 - iv. Wastewater must be treated to Department of Water Affairs (DWA) General Limits parameters.
 - v. Water and treated effluent samples must be collected, analyzed by an independent laboratory and submitted to Bitou council on a monthly basis for the first year and quarterly basis for the second year.
 - vi. Should the water samples not adhere to the required standards, the developer/homeowners association will be liable for the costs to install the required potable water and foul sewer connections (*as proposed in the GLS capacity reports*).
 - vii. Augmentation levee's for potable water will not be applicable if the development adheres to the off grid requirements, but foul sewer levee's will still be applicable

I trust that you find the above a fair reflection of our meeting – I will forward the relevant documents (*appointments letters, draft Services Reports, proposed SLA wording, etc.*) as soon as possible.

Regards,

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