

ANNEXURE H:

**EXTERNAL CIVIL ENGINEERING SERVICES REPORT:
DE MOND HOLIDAY RESORT, PORTION OF ERF 4831
AND PORTION OF ERF 5327, HERMANUS**

15 MAY 2019



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1. INTRODUCTION

DECA Consulting Engineers were appointed to compile an External Civil Engineering Services Report for the provision of engineering services required for the proposed De Mond Holiday Resort on Portion of Erf 4831 and Portion of Erf 5327, Hermanus. The proposed development will, for the purpose of this report hereinafter, be referred to as "the site".

The proposed development will comprise of the following:

Land Use	Count	Storeys	GLA Area / Unit	Total GLA
Residential Units				
Mini Villas (1 Bed)	12	1	50 m ²	600 m ²
Mini Villas (2 Bed)	4	2	100 m ²	400 m ²
Villas (2 Bed)	34	1	150 m ²	5100 m ²
Cabanas	76	1	80 m ²	6080 m ²
Hotel	120 Keys	2	5000 m ²	5000 m ²
Klein River Cabin (1 Bed)	11	1	44 m ²	484 m ²
Klein River Cabin (2 Beds)	7	2	80 m ²	560 m ²
Log Cabin (1 Bed)	3	1	23 m ²	69 m ²
Log Cabin (2 Beds)	3	1	59 m ²	177 m ²
Flashpackers	45	1	28.9 m ²	1300 m ²
Camp Sites	15	NA	NA	NA
Manor House	8 Keys	2	40 m ² / Key	400 m ²
Commercial Node				
Retail	1	1	1500 m ²	1500 m ²
Offices	1	1	600 m ²	600 m ²
Resort Functions				
Crown Grant Restaurant	1	1	400 m ²	400 m ²
De Vette Mossel Restaurant	1	1	337 m ²	337 m ²
Conferencing	100 PAX	1	400 m ²	400 m ²
Clubhouse Functions	1	1	500 m ²	500 m ²
Gate Houses	2	1	38 m ²	76 m ²
Boat House (Storage)	1	1	63 m ²	63 m ²
Gatehouse Kiosk	1	1	200 m ²	200 m ²

2. AVAILABLE INFORMATION

The following information was made available to DECA:

- 1:10 000 Orthophoto maps of the study area;
- Site Development Plan for the proposed development by *Boogertman Partners* dated 11 April 2019, Rev E;
- Existing cadastral information of the study area;
- Tender No.: SC 1618 / 2015, Development of De Mond Public Resort, Stage 2: Request for Proposals, Procurement Document (February 2016);
- Existing and required civil engineering services information of the study area from GLS Consulting Engineers;
- Aerial photographs of the study area obtained via Google Earth.

3. SITE DESCRIPTION

The site is situated on the eastern border of Hermanus (Voëlklip) and is bordered by the R43 to the north and the Klein River to the south.

Please find the locality plan of the site attached hereto as **Annexure A** and the Land Use Plan of the proposed development as **Annexure B**.

The site drains in a south and south-eastern direction towards the Klein River Lagoon with a generally flat slope of less than 25%. The site has a natural embankment along the southern boundary along the Klein River Lagoon with a slope steeper than 25%. The embankment elevates the majority of the site to above the 5m contour line.

4. GEOTECHNICAL INFORMATION

The soils of the De Mond Public Resort development site comprise a variable thickness of colluvium comprising acidic sand, hill wash talus material comprising small angular rocks of varying sizes lying on the quartzitic sandstones of the Table Mountain Group. These are exposed along the western estuary margin (e.g. between Prawn Flats and Voëlklip).

Rock outcrops occur on the lowest portions of the site. No outcrops were noticed within the top gently south-sloping part of the site but scattered outcrops were noted on the steeper slopes towards the south-end of the site. It is possible that the bedrock is shallow throughout the area to be investigated with the more prominent outcrops occurring among the stands of Milkwood trees. Residual soils are normally absent but may be poorly developed in areas of impeded drainage.

A full Geotechnical Investigation was not undertaken and would have to be done once the full extent of the development is known, and prior to the construction of buildings. Existing infrastructure and buildings were previously erected on the site and suitable founding conditions are expected.

Source: 1:250 000 geological map, Sheet 3319 Worcester & "Geotechnical Investigation Proposal - Geotechnics Africa, May 2009

5. SERVICES

The design of services will be in accordance with the "Guidelines for the provision of Engineering Services for Residential Townships" (Blue book), the UTG7 publication "Geometric Design of Urban Local Residential Streets", the TRH4, and the specific standards of the Local Authority. Information with regards to the water-, sewer- and electrical engineering services are based on the attached **Annexure E** (extract from Tender No.: SC 1618/2015 procurement document)

5.1 WATER RETICULATION

5.1.1 Water Demand

Table 1 indicates the design criteria will be applicable to the envisaged water reticulation system:

Table 1: Water Demand for Proposed Development

Land Use	Units / GLA (m ²)	AADD	Total AADD (l/day)
Residential Units			
Villas	50	650 l / unit / day	32 500
Cabanas	76	650 l / unit / day	49 400
Hotel	120 Keys	150 l / unit / day	18 000
Klein River Cabin (1 Bed)	11	500 l / unit / day	5 500
Klein River Cabin (2 Beds)	7	650 l / unit / day	4 550
Log Cabin (1 Bed)	3	500 l / unit / day	1 500
Log Cabin (2 Beds)	3	650 l / unit / day	1 950
Flashpackers	45	150 l / unit / day	6 750
Camp Sites	15	150 l / unit / day	2 250
Manor House	8 Keys	150 l / unit / day	1 200
Commercial Node			
Retail	1500 m ²	400 l / 100 m ² GFA	6 000
Offices	600 m ²	400 l / 100 m ² GFA	2 400
Resort Functions			
Crown Grant Restaurant	400 m ²	400 l / 100 m ² GFA	1 600
De Vette Mossel Restaurant	337 m ²	400 l / 100 m ² GFA	1 348
Conferencing	400 m ²	400 l / 100 m ² GFA	1 600
Clubhouse Functions	500 m ²	400 l / 100 m ² GFA	2 000
Gate Houses	38 m ²	0	0
Boat House (Storage)	63 m ²	0	0
Gatehouse Kiosk	200 m ²	400 l / 100 m ² GFA	800
Total:			139 348
Equivalent Units			139
Fire Flow Requirement (Low Risk)			15 l / s

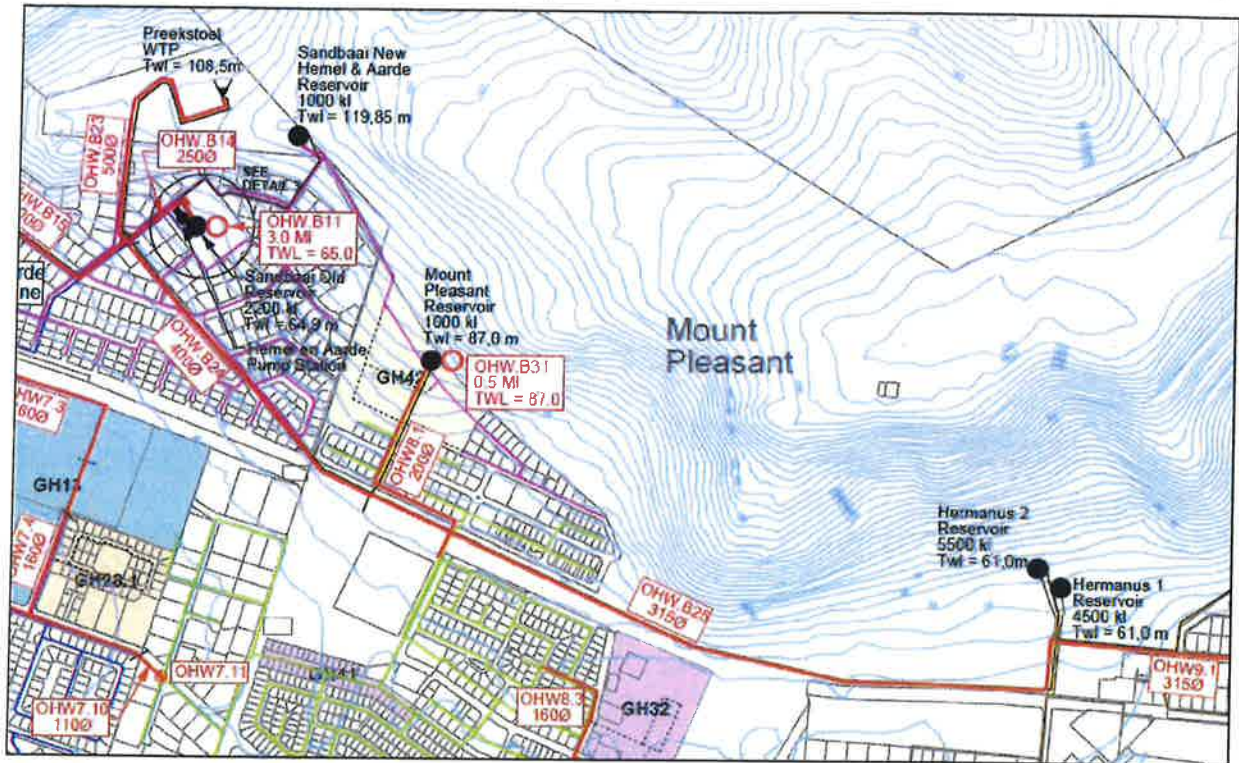
The estimated average daily water demand of the De Mond Resort Development based on the above development scenario and full occupancy is 139 kℓ/day, which compares well with the 133.3 kℓ/day original water analysis for this area as included in the Overstrand Water Supply Master Plan. The development can be described as a low risk in terms of fire flow provision with a demand of 15 ℓ/s.

5.1.2 Existing Reservoir and Bulk Water Supply Pipelines

The master planning analysis indicates that the proposed De Mond Resort development should be accommodated in the existing Voëlklip lower reservoir zone and that the existing low level Voëlklip water reservoir has sufficient capacity to serve the proposed De Mond Resort Development. The capacity of this reservoir is 4 500kℓ and was sized to provide 48h water storage. The connections to the existing system should be done as indicated on the attached **Annexure C**.

The Voëlklip reservoir is supplied with water from the recently upgraded Preekstoel Water Treatment Works (WTW). At this stage, the WTW and the supply pipelines have sufficient capacity to supply water for the De Mond Resort Development. Should other developments coincide with the development of the De Mond Resort, the capacity available in the supply pipelines could be exceeded and additional pipelines would be required. These additional pipelines include items OHW.B23, OHW.B24 and OHW.B25 as indicated in **Figure 1**.

Figure 1: Additional Master Plan Items OHW.B23, OHW.B24 and OHW.B25 Possibly Required



5.1.3 Proposed Water Network

It is proposed that the De Mond Development connect to the existing 75mm diameter pipe along 17th Avenue as indicated on the attached **Annexure C**. This pipeline should however be upgraded to a 160mm diameter pipe to accommodate the proposed development.

The cost of this upgrade will be approximately: R 385 000.00 excl. VAT.

Should additional developments necessitate the upgrading of master plan items OHW.B23, OHW.B24 and OHW.B25, the cost of these upgrades will be:

R 8 250 000.00 excl. VAT

Currently the site is partially serviced by 75mm diameter asbestos cement pipes. These pipes should be abandoned. The new internal reticulation system should consist of HDPE or PVC-U PN12 pipes.

A flow meter complying with the municipal standards must be installed at the main connection point on the western side of the development in 17th Avenue.

5.2 SEWERAGE RETICULATION

5.2.1 Existing Sewerage Reticulation

The De Mond site is currently partially serviced with ablution facilities which drain towards two sewage pumping stations. These pumping stations also currently pump sewage from

approximately 20 temporary homes to the Scout Camp municipal sewage pump station from where it is conveyed to the Hermanus WWTW.

5.2.2 Sewerage Demand

Table 2 indicates the design criteria which will be applicable to the envisaged sewerage reticulation system requirements for the proposed development. The expected sewerage flow was taken as 70% of the water demand for the respective components of the development.

Table 2: Sewage Flow from Proposed Development

Land Use	Units / GLA (m ²)	ADDWF	Total ADDWF (l/day)
Residential Units			
Villas	50	455 l / unit / day	22 750
Cabanas	76	455 l / unit / day	34 580
Hotel	120 Keys	105 l / unit / day	12 600
Klein River Cabin (1 Bed)	11	350 l / unit / day	3 850
Klein River Cabin (2 Beds)	7	455 l / unit / day	3 185
Log Cabin (1 Bed)	3	350 l / unit / day	1 050
Log Cabin (2 Beds)	3	455 l / unit / day	1 365
Flashpackers	45	105 l / unit / day	4 725
Camp Sites	15	105 l / unit / day	1 575
Manor House	8 Keys	105 / unit / day	840
Commercial Node			
Retail	1500 m ²	280 l / 100 m ² GFA	4 200
Offices	600 m ²	280 l / 100 m ² GFA	1 680
Resort Functions			
Crown Grant Restaurant	400 m ²	280 l / 100 m ² GFA	1 120
De Vette Mossel Restaurant	337 m ²	280 l / 100 m ² GFA	944
Conferencing	400 m ²	280 l / 100 m ² GFA	1 120
Clubhouse Functions	500 m ²	280 l / 100 m ² GFA	1 400
Gate Houses	38 m ²	0	0
Boat House (Storage)	63 m ²	0	0
Gatehouse Kiosk	200 m ²	280 l / 100 m ² GFA	560
Total:			97 544

The estimated average dry weather flow from the development is 98kl/day. This is in line with the ADDWF as calculated by Messers GLS Consulting. The peak dry weather flow will be approximately 5 l/s and the peak wet weather flow approximately 8 l/s.

5.2.3 Proposed Sewerage Reticulation

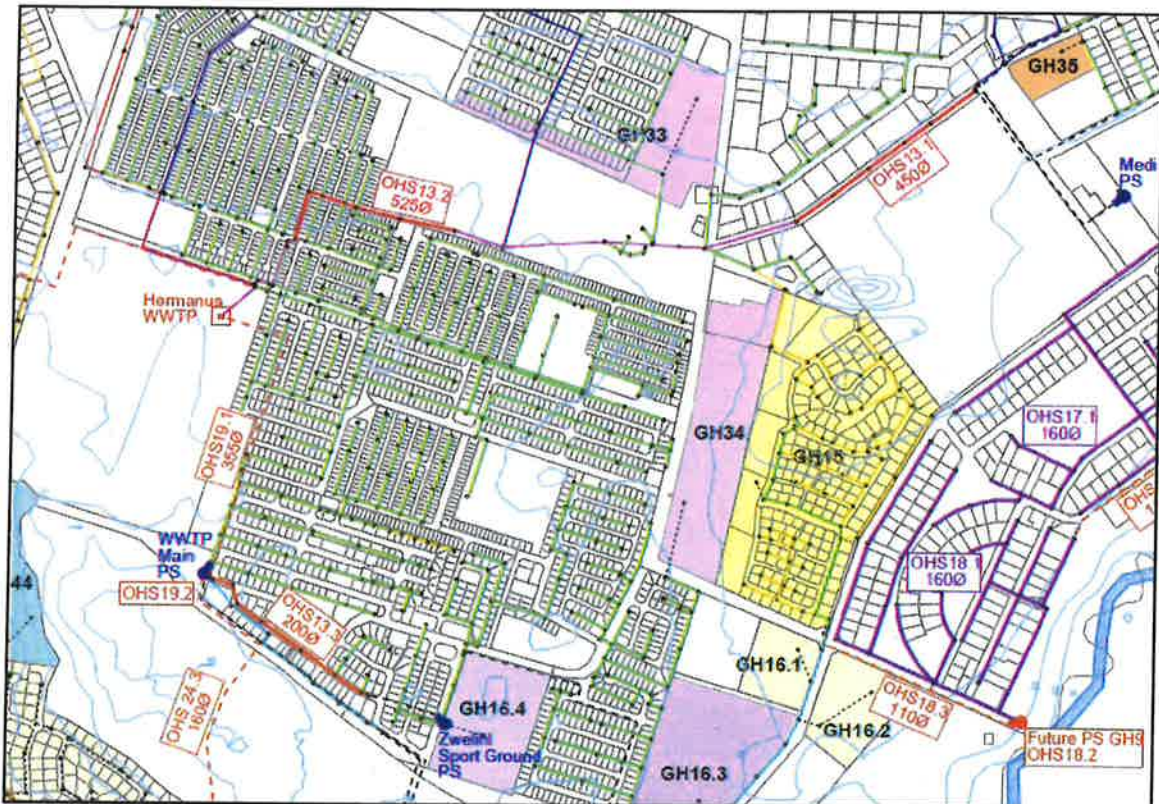
The sewage from the proposed development will drain to the Scout Camp PS from where it will be pumped through an existing 200mm diameter rising main to the Mossel River PS. Sewage is pumped from the Mossel River PS to the Hermanus Wastewater Treatment Works (WWTW). The recommended position for the sewer connection for the proposed developments are at the existing 200 mm diameter outfall sewer in 17th Avenue as shown on the attached **Annexure D**.

The independent investigation undertaken by GLS Consulting Engineers has indicated that the existing sewer network will require certain upgrades in order to meet the demand of the De Mond Resort Development. The Scout Camp PS has sufficient capacity to accommodate the development, but requires refurbishment and upgrading.

The analysis further indicated that there is sufficient capacity in the existing 315 mm

diameter and 355 mm diameter sewers gravitating towards the Mossel River PS in order to accommodate the proposed development, but given the combined peak flow, the Mossel River PS should be upgraded to accommodate additional developments. The existing 200 mm and 450 mm diameter bulk sewer pipelines gravitating towards the Hermanus WWTP also have insufficient capacity and should be upgraded to accommodate additional developments (Master Plan Items OHS13.1 and OHS13.2). The routes of the proposed pipelines are schematically shown in **Figure 2**.

Figure 2: Additional Master Plan Items OHS13.1 and OHS 13.2 Required



The approximate costs of upgrading the sewer items as indicated above are as follow:

- Refurbishment of the Scout Camp PS: R 1 100 000 excl. VAT
- Upgrading of the Mossel River PS to a duty point of 75ℓ/s: R 4 730 000 excl. VAT
- Master plan items OHS13.1 and OHS13.2: R 3 380 000 excl. VAT

A new sewage reticulation system consisting of 160mm PVC class 34 heavy duty sewer pipelines must be constructed to service all the units and individual 110mm diameter chalet connections must be provided. Pending the final development proposal and considering the topography of the site, the sewer reticulation system will probably have to drain towards three new sewage pumping stations on the site. Any sewage pumping station on the site must be provided with at least 4 hours of emergency storage and sufficient emergency electricity supply through on-site diesel generators. A new sewage rising main must be constructed to convey sewage to the Scout Camp PS or the 200mm dia sewer which feeds into the pumping station. The sewer reticulation must also provide for a connection for the existing Lakeview units.

There is sufficient treatment capacity at the WWTW for the envisioned additional sewage.

5.3 STORMWATER RETICULATION

5.3.1 Calculations

Hydrological calculations were executed with the PCSWMM software package. The software has proven itself by providing consistent peak run-off results similar to various approved methods (Rational, SCS and Time Area Methods).

5.3.2 Risks cost estimate and design flood frequencies

Although run-off calculations are performed with great care, it is still possible that the capacity of a system could be exceeded because of non-hydrological reasons. There has to be a limit to the elimination of probabilities as costs could become unrealistically high in comparison with the benefit of lower risks.

Although the relationship between function, risk, original cost and maintenance cost plays a major role in determining the design flood frequency, it is assumed in general that the flood frequencies, as discussed in **Table 3** below, should be provided for under normal circumstances.

The applicable analysis; assessment and design standard will be those given in table 6.1 and 6.2 of the "Red Book" and are as follows:

Table 3: Typical Storm water analysis requirements based on land uses

LAND USE	DESIGN STORM RETURN PERIOD (MAJOR STORM EVENTS)
Residential	50 years
Institutional (e.g.) schools	50 years
General Commercial and Industrial	50 years
High Value Central Business Districts	50 - 100 years
LAND USE	DESIGN STORM RETURN PERIOD (MINOR STORM EVENTS)
Residential	1 - 5 years
Institutional (e.g.) schools	2 - 5 years
General Commercial and Industrial	5 years
High Value Central Business Districts	5 - 10 years

In the light of the general application and support of the above-mentioned guidelines, it is accepted as minimum acceptable standards for stormwater drainage. Any deviation from these standards should be justified on the basis of economical and risk analysis.

For the purpose of this report these guidelines will thus apply throughout as reference and any deviation from that will be motivated.

5.3.3 Climate

The study area is situated in the winter rainfall region of the Western Cape. No extreme rainfall intensities occur.

5.3.4 Storm Rainfall

The "Design Rainfall Estimation in South Africa" computer programme which accompanies the Water Research Commission Report titled "Design Rainfall and Flood Estimation in South Africa" by JC Smithers and RE Schiltze, was used to complete a rainfall station search and to obtain storm rainfall depth data.

A summary of the rainfall station search and related storm rainfall data is given in the **Table 4**.

Table 4: Rainfall records from nearby weather stations

	STATION NAME						ACCEPTED VALUE
	LAKEVIEW	HERMANUS (MUN)	TUSSENBEID E	STANFORD (SKL)	GANSBAAI	FISH' NS HAVEN	
SAWA STATION NO	0006534_W	0006415_W	0006527_W	0006836_W	0001605_W	0006232_W	
LATITUDE	34°24'	34°25'	34°17'	34°26'	34°35'	34°22'	
LONGITUDE	19°18'	19°18'	19°52'	19°27'	19°21'	19°08'	
MAP* (mm)	662	626	519	558	543	556	577
ALTITUDE	518	24	183	24	17	18	
DISTANCE FROM CATCHMENT CENTROID (KM)	1.8	7.2	14.4	16.3	18.8	18.8	
LENGTH OF RECORDS (YRS)	48	64	81	71	72	27	
RAINFALL RETURN PERIOD	RAINFALL DEPTH (mm)						
1 IN 2 YEAR	42.6	48.2	45.5	38.4	38.3	50.1	43.9
1 IN 5 YEAR	62.5	67.8	64.1	54.1	53.9	70.6	62.2
1 IN 10 YEAR	78.1	83.0	78.4	66.2	65.9	86.4	76.3
1 IN 20 YEAR	95.0	99.3	93.8	79.2	78.9	103.4	91.6
1 IN 50 YEAR	120.4	123.6	116.7	98.6	98.1	128.6	114.3
1 IN 100 YEAR	142.2	144.3	136.3	115.1	114.6	150.1	133.8

5.3.5 Pre-and Post-Development Peak Flow Runoff

The characteristics of the catchment area can be described as follows:

Catchment Area	=	10.7 ha
Average Surface Slope	=	8.5%
Pre-Dev Imperv	=	10%
Post-Dev Imperv	=	60%

The development area was modelled with the PCSWMM software as indicated to determine peak flow runoff volumes for the pre- and post-development scenarios for each of the Return Interval (RI) storm events.

The **pre- and post-development** stormwater run-off from the catchment area during the various recurrence interval storm events are expected to be as follows:

Recurrence Interval Storm Event	Pre-Development Runoff (m³/s)	Post-Development Runoff (m³/s)
2	0.13	0.69
5	0.19	1.02
10	0.23	1.27
20	0.27	1.54
50	0.34	1.95
100	0.40	2.3

No stormwater quantity- (attenuation) or quality control measures are proposed.

5.3.6 Existing System and Drainage

The De Mond site currently drains towards the South and West to a storm water stream along the western edge of the caravan park where a minor stormwater pipe daylights and also drains directly into the Estuary. The R43 and side channels provide a cut-off drain for stormwater from the higher lying areas, diverting the stormwater to the Prawn Flats portion of the site.

5.3.7 Proposed Storm Water System

The stormwater runoff expected during the 1:2 year RI storm event is proposed to be discharged via an underground interlocking joint Class 100D concrete pipe reticulation system, which will follow the gradient of the proposed roads and discharge into the Klein River Lagoon.

The roads are proposed to be graded to ensure that the stormwater runoff expected during the 1:50 year RI storm event and larger can be discharged via these roads and overland escape routes (where necessary) to the Klein River Lagoon.

5.4 ROADS

The site will retain the current accesses from the R43 and 17th Avenue.

Please refer to the Traffic Impact Assessment by Deca Consulting Engineers.

5.4.1 Structural Design

It is proposed that the internal roads be constructed according to the following specifications (to be confirmed subsequent a geotechnical investigation):

For asphalt surfacing:

SURFACE	ASPHALT	30mm
BASE	G4	125mm
SUBBASE	G5	150mm
SUBGRADE	To be confirmed subsequent to tests	150mm

For block paving:

SURFACE	INTERLOCKING PAVING WITH 20mm SAND	80mm
BASE	G4	125mm
SUBBASE	G7	150mm
SUBGRADE	To be confirmed subsequent to tests	150mm

5.5 ELECTRICAL ENGINEERING SERVICES

The design of new electrical infrastructure for the proposed development must be done in close liaison with the electricity department of Overstrand Municipality and must be based on the latest municipal guidelines on electricity supplies.

All information provided below was discussed with the electricity department located at the offices of Overstrand Municipality in Onrus.

5.5.1 Estimated Electricity Demand

The maximum electricity demand for the total development, based on the anticipated scope of the development is estimated at 850 kVA. This demand does not include the

existing Scout Camp sewage pumpstation, which will have to be serviced outside of this development.

It is important to take note that any significant deviation from the anticipated scope of the development as provided above shall necessitate the re-calculation of this estimated maximum demand. Furthermore, the maximum demand is calculated by assuming full occupancy of the development.

5.5.2 Existing Infrastructure

Two (2) existing 11 kV cables, one entering the development from 17th Avenue and another exiting the development along the same route, is currently feeding a 500 kVA miniature substation on the site. From this miniature substation, via a secondary 11 kV ring main unit, an 11 kV cable is currently feeding the "See en Sand" area. This cable operates as a "T-off" from the main 11 kV cable ring, and must be retained in the future proposed network for the De Mond development.

From the mentioned miniature substation some existing low voltage overhead lines are reticulating the site. The condition of these overhead lines is however in such a dilapidated state that the re-use thereof is strongly discouraged. Some old distribution boxes are present on site but can also be regarded as non-usable.

5.5.3 Proposed Supply Point

The bulk supply point for the development will be at the entrance to the site from 17th Avenue. A new 11kV metering point as per the municipal guidelines, with an 11kV circuit breaker complete with minimum overcurrent and earth fault protection, must be installed at this point. The internal 11kV network will remain the responsibility of the development for which a competent person in terms of the Occupational Health and Safety Act ("OHSA"), 85 of 1993 must be appointed.

The bulk 11 kV network feeding the area wherein this development is situated currently does not have any surplus capacity to accommodate the additional load, and the following up-stream upgrading needs to be done for the account of the developer:

- Installation of a new 185mm² primary 11kV feeder cable from Kwaiiwater switching station to the De Mond Resort Development.
- Upgrading in the existing Kwaiiwater 11kV switching station to accommodate the new primary feeder cable.

5.5.4 Proposed Internal Services

Although the internal 11 kV and low voltage networks shall remain the responsibility of the development, it is still a requirement that all designs for these services be based on the latest guidelines of the electricity department of Overstrand Municipality. All new services shall be underground, with miniature substations, low voltage kiosks and streetlights to comply with the minimum pre-requisites of the Municipality.

The mentioned existing 11 kV supply to the "See en Sand" area must be incorporated into the design of the new infrastructure.

A new supply to the Scout Camp sewage pump station, which is situated outside the development but currently fed from inside the development, must be designed and installed.

5.5.5 Metering

As mentioned, a bulk electricity meter shall be installed at the entrance to the site from 17th Avenue. Metering shall be done at 11 kV level, and appropriate equipment and protection devices must be accordingly installed at this metering point. All internal networks, 11 kV and low voltage, shall stay private and will be the responsibility of the development to maintain and operate.

Internal metering might be done on a pre-payment methodology, for which a third part as "vending agent" can be employed if required.

6. CONCLUSION/SUMMARY

From the above, the following can be concluded:

- That the proposed internal water reticulation system will consist of an uPVC water reticulation system to be connected to the existing external water reticulation. Upgrades will be required as proposed by Messers. GLS Consulting;
- That the proposed internal sewerage reticulation system will consist of a gravity uPVC piped system, which will be connected to the existing external sewerage reticulation system. Upgrades will be required as proposed by Messers. GLS Consulting;
- The stormwater runoff expected during the 1:2 year RI storm event is proposed to be discharged via an underground interlocking joint Class 100D concrete pipe reticulation system, which will follow the gradient of the proposed roads. The system will discharge into the Klein River Lagoon;
- The roads are proposed to be graded to ensure that the stormwater runoff expected during the 1:50 year RI storm event and larger can be discharged via these roads;
- That access and intersection control to the development be provided according to the TIA by DECA Consulting Engineers.

We trust that you find the above in order, however please do not hesitate to contact the undersigned for any additional information in this regard.



Douw Louwrens B.Eng Civil
On behalf of: DECA

ANNEXURE A
LOCALITY PLAN

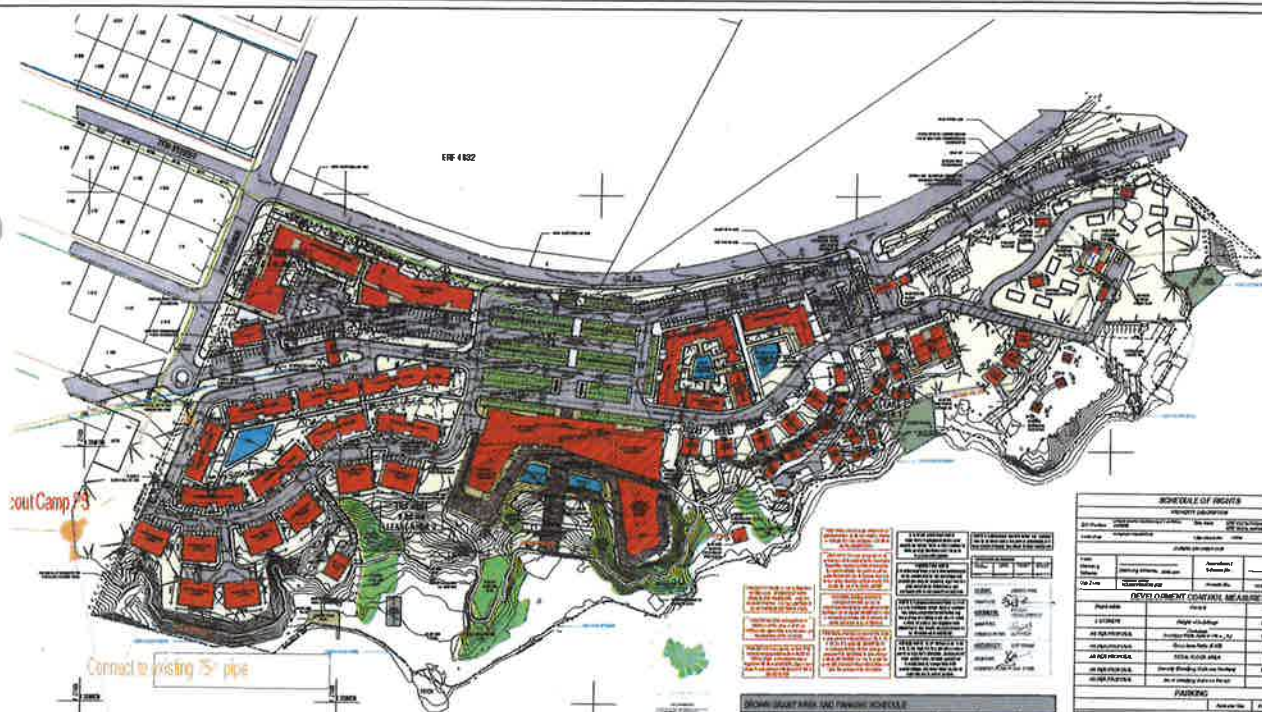


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DE MOND HOLIDAY RESORT DEVELOPMENT
PORTION OF ERVEN 4831 & 5327
HERMANUS

SCALE
1:16 000 (A4)
ANNEXURE A

ANNEXURE B
SITE DEVELOPMENT PLAN

[illegible][illegible]

MEMORANDUM FOR AGENTS			
MEMORANDUM INFORMATION			
2-1 (Number)	2-2 (Classification)	2-3 (Date)	2-4 (Priority)
2-5 (Subject)	2-6 (Classification)	2-7 (Date)	2-8 (Priority)
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2-41 (Subject)	2-42 (Classification)	2-43 (Date)	2-44 (Priority)
2-45 (Subject)	2-46 (Classification)	2-47 (Date)	2-48 (Priority)
2-49 (Subject)	2-50 (Classification)	2-51 (Date)	2-52 (Priority)
2-53 (Subject)	2-54 (Classification)	2-55 (Date)	2-56 (Priority)
2-57 (Subject)	2-58 (Classification)	2-59 (Date)	2-60 (Priority)
2-61 (Subject)	2-62 (Classification)	2-63 (Date)	2-64 (Priority)
2-65 (Subject)	2-66 (Classification)	2-67 (Date)	2-68 (Priority)
2-69 (Subject)	2-70 (Classification)	2-71 (Date)	2-72 (Priority)
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ANNEXURE C
EXTERNAL WATER RETICULATION

DE MOND HOLIDAY RESORT
PORTION OF ERF 4831 AND 5327, HERMANUS
WATER RETICULATION

SCALE
1:10 000 (A4)
PLAN NUMBER
ANNEXURE C



ANNEXURE D
EXTERNAL SEWER RETICULATION



ENGINEER

CONSULTING ENGINEERS

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DE MOND HOLIDAY RESORT

PORTION OF ERF 4831 AND 5327, HERMANUS

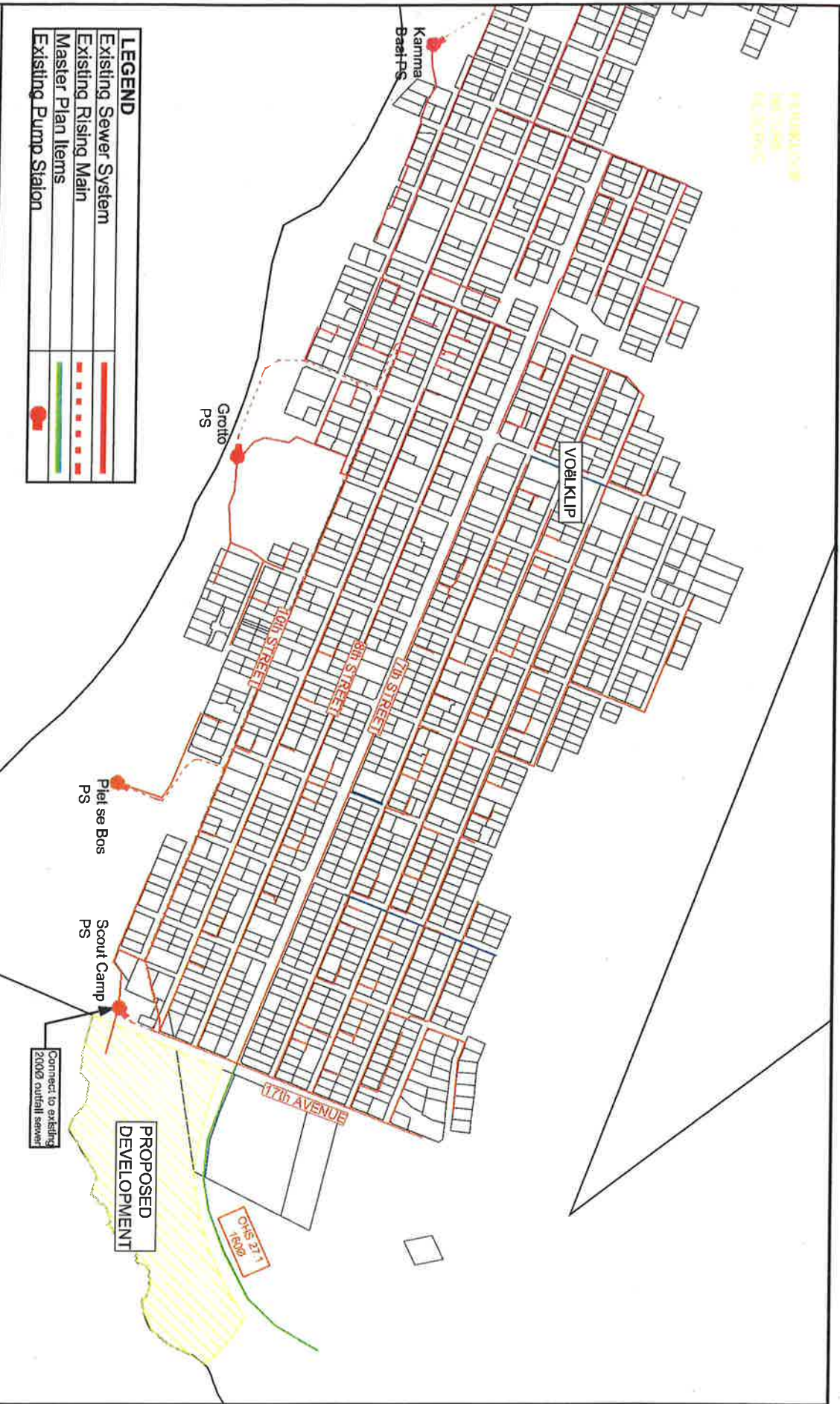
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ANNEXURE D



LEGEND	
Existing Sewer System	
Existing Rising Main	
Master Plan Items	
Existing Pump Station	

ANNEXURE E
ENGINEERING SERVICES INFORMATION



7 ENGINEERING SERVICES

The discussion below is based on a Preliminary Technical Services Information Report done by Lyners Consulting Engineers with inputs from GLS Consulting (Pty) Ltd in respect of the bulk water and sewer services. It intends to reduce uncertainty surrounding possible restrictions and enable the calculation of financial bulk development contributions for the required bulk services upgrades as well as clarification of possible conditions by other authorities.

7.1 EXISTING SERVICES INFRASTRUCTURE

The existing water, sewage and electricity services infrastructure on the development site (of which the bulk is an existing albeit vacant caravan park) is old and/or basic, mostly in a poor condition in need of upgrading thus not much of it would be usable in its current condition.

The water pipes are old asbestos pipes and need to be abandoned. The conservancy tanks and sewage pumping stations should be replaced and additional sewage pumping stations will be required and the rocky embankment and topography of the site creates difficulty for sewer services. The bulk electricity network feeding the development site must be upgraded. The existing low voltage overhead lines reticulating the site are so dilapidated that further use thereof is strongly discouraged.

The current access roads would need to be upgraded and the current surfaced ring road in De Mond is also in a poor condition. The stormwater system must be completely redesigned.

7.2 DEVELOPABLE SPACE AND OPPORTUNITIES

The top part of the development site has a gentle slope towards the estuary and is suitable for development and all engineering services. The top part of the site is also mostly above 10m MSL and provides excellent views over the estuary. The embankment in certain areas creates a steep slope with no development opportunities, but in other areas some terraces were formed which could be engineered further to create special locations for chalets with exceptional views. Figures 14 and 15, (Plans 12, 13.1 & 13.2), indicate the developable and undevelopable areas.

Figures 16 and 17 (Plans 14 & 15), indicate medium slope opportunities with Figure 17 showing the opportunity to use retaining walls to increase developable space.

Some of the developable areas are in close proximity to an unnamed stream which starts at the outlet of a stormwater pipe and crosses part of the site and the redevelopment of this area, if considered, must be included in the Basic Assessment as discussed in par. 6.

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Figure 14: Developable Areas (Plan 12)

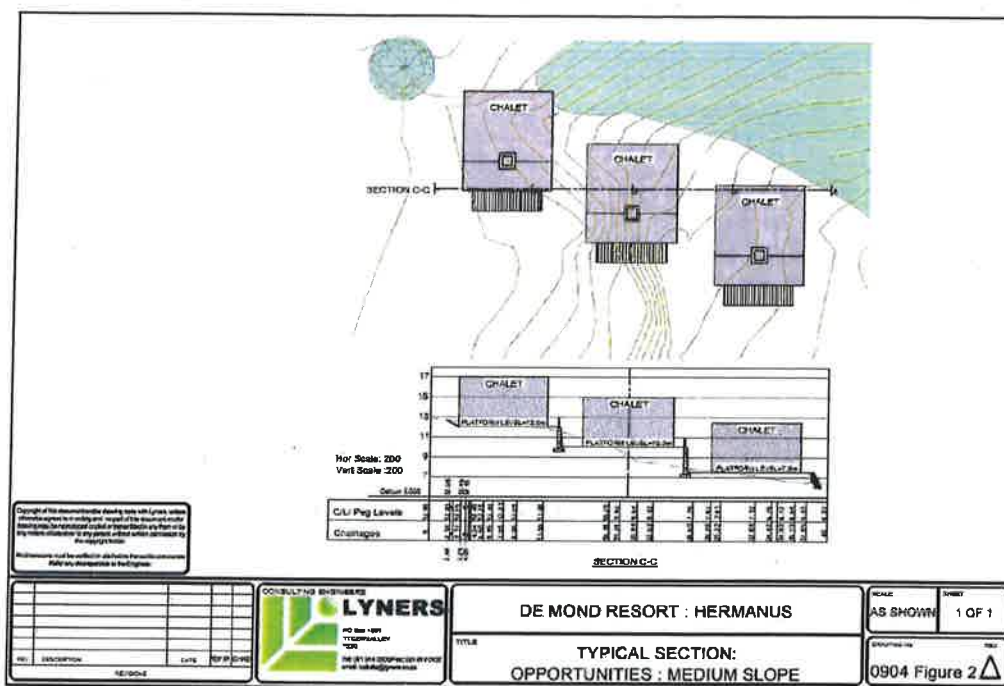
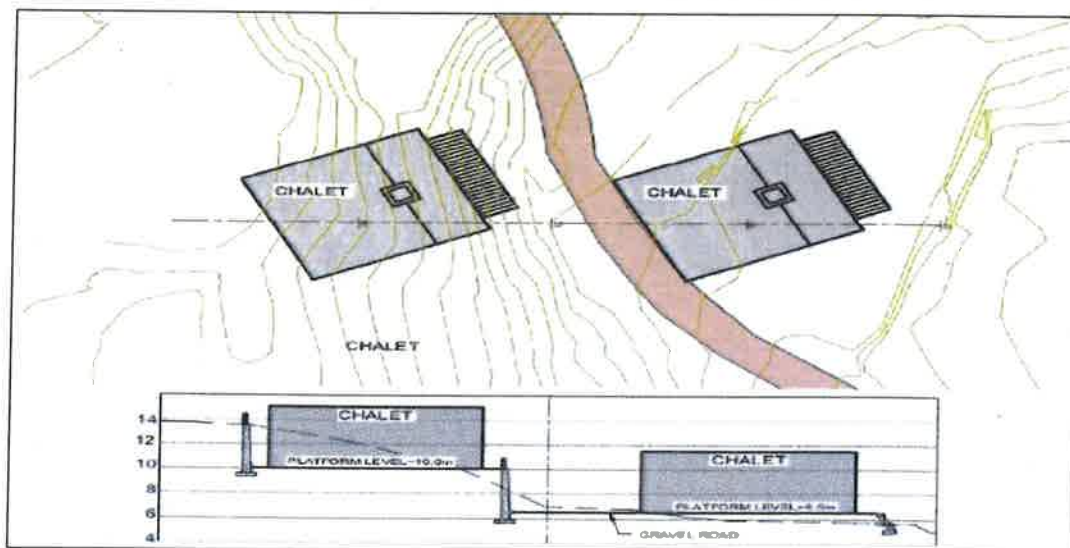


Figure 15: Undevelopable Areas (Plan 13)



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Figure 16: Medium Slope Opportunities for Development (Plan 14)

Figure 17: Medium Slope Opportunities:
Using Retaining Walls to increase Developable Space (Plan 15)

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7.3 DEVELOPMENT SCENARIO

In accordance with the development objectives and in line with the development criteria/parameters applicable to the development site, including possible consent uses and the environmental due diligence analysis, **the following redevelopment scenario was assumed** to determine the availability of existing services and the required upgrade and extension of engineering infrastructure:

- 240 Chalets/self-catering units, i.e. in the form of 120 structures containing two units or a combination of one to three or more units per structure;
- A guest lodge/hotel consisting of 50 rooms and which could include conference facilities;
- Resort facilities such as gift shops, lecture rooms, conference facilities, restaurants, an entrance gatehouse, a reception area to the resort, a parking area, water features and recreational activities such as squash and tennis courts, swimming pools, etc.

It should be noted that the above development profile is not prescriptive and is only one of many combinations of possible development scenarios but it provides a departure point for indicating the availability of services and available capacities in these services. Thus, should a development with higher density and increased demand on services be considered, the development will need to be re-modelled to confirm the sufficiency of the services.

7.4 CIVIL ENGINEERING SERVICES

The All civil engineering design and investigation work is based on the Guidelines for Human Settlement Planning and Design (commonly referred to as the "Red Book") and must comply with the standards set forth by the Civil Engineering Department of Overstrand Municipality. A copy of the Municipality's minimum standards is available on request.

7.4.1 ACCESS AND ROADS

7.4.1.1 SITE ACCESS AND PARKING

The site is accessible from 10th Street and from 17th Avenue. 17th Avenue provides direct access from the R43 (7th Street). It is assumed that the current access to the De Mond site will be retained. The access should be upgraded to allow access for tour buses, fire-fighting, emergency and refuse removal vehicles, if necessary. The site is large enough to allow convenient on-site turning for tour buses and ample parking for visitors to the proposed resort. A separate service entrance from 17th Avenue could be considered.

In addition the current public access to Prawn flats and the slipway/boat ramps must be maintained. This access is directly from the R43 and could be a controlled access, in which case sufficient stacking distances for vehicles with trailers must be provided. A Traffic Impact Assessment ("TIA") will be required to verify the effect of the proposed development on the existing road infrastructure. This study can however only be undertaken when the final development parameters are determined and fixed. Although only minor upgrading is foreseen, a provisional amount is included in the costs estimates.

7.4.1.2 INTERNAL ROADS FOR THE DEVELOPMENT

The internal roads must allow for:

- Turning and parking areas for tour busses;
- Access for the fire-fighting emergency vehicles; and
- Refuse collection vehicles only if the refuse is not prior to municipal removal, internally collected and temporarily stored at a refuse collection area at the service entrance to the development.

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According to the Standard By-Law Relating to Community Fire Safety (Provincial Notice P.N227/2066 of 14 July 2006), the minimum width of fire lanes shall be 4m and these lanes must provide a vehicle access to a location within 45m of each chalet. The layout of the fire lanes must be confirmed with Overstrand Municipality and must comply with this By-Law.

The layer works design of the roads can only proceed once the geotechnical investigation is completed. The pavement design must be done in terms of the applicable Technical Recommendations for Highways ("THR") guidelines, the Red Book and any specific design requirements of Overstrand Municipality.

The quality of the in situ material will have an impact on the pavement structure finally adopted. The design could further be modified depending on the outcome of the geotechnical investigation and should be designed using Mechanistic Design approaches.

Considering the possible larger vehicles such as tour buses, the level of service, the possible perched water table and the turning frequency, the selective use of interlocking pavers is provisionally foreseen.

It is also foreseen that all roads will be provided with subsoil drainage. In addition, considering the locality and sensitive environmental area, overland stormwater drainage should be allowed for. The latter design should, as far as possible, include limited stormwater pipes. Should open water features form part of the development, the stormwater could be directed to pond systems which could aid in the treatment of stormwater.

The strategy and design philosophy will have to be discussed and agreed with Overstrand Municipality.

7.4.2 WATER SUPPLY

7.4.2.1 WATER DEMAND

The estimated average daily water demand of the De Mond Resort Development based on the above development scenario and full occupancy is 140kℓ/day which compares well with the 133,3 kℓ/day original water analysis for this area as included in the Overstrand Water Supply Master Plan. This value includes some provision for irrigation purposes.

The development is classified in terms of fire water provision as low risk with a fire water demand of 15ℓ/s. Limited provision was made for irrigation purposes and should a significant irrigation water demand be foreseen the development of boreholes should be included.

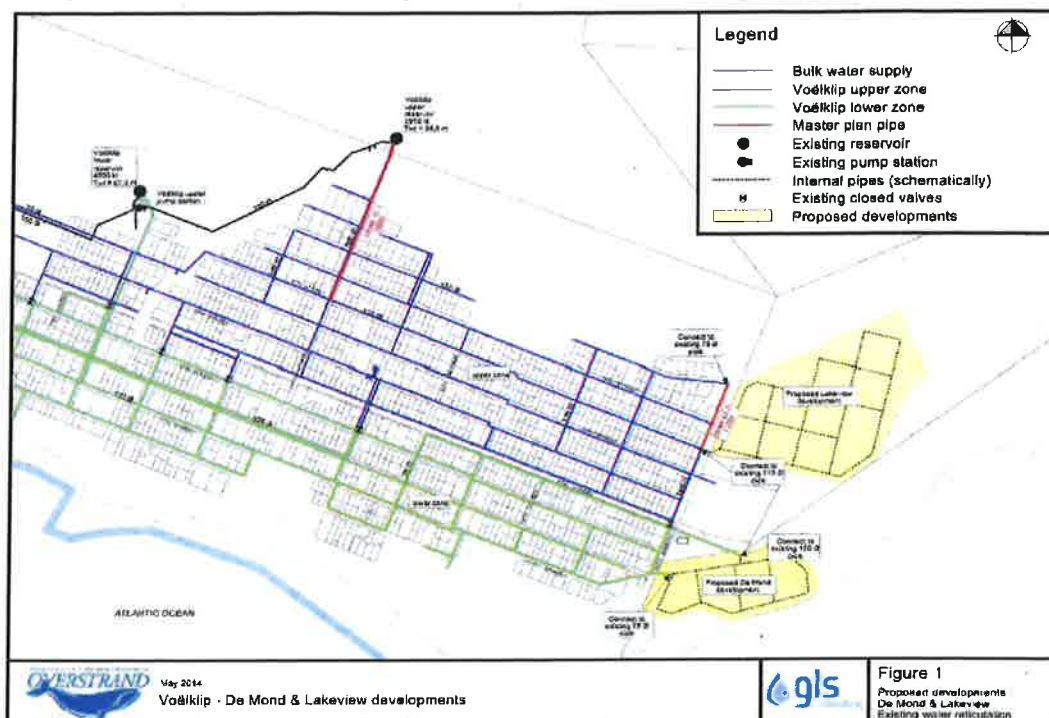
7.4.2.2 EXISTING BULK SERVICES: RESERVOIR AND BULK WATER SUPPLY PIPELINES

The master planning analysis indicates that the proposed De Mond development on a portion of Erf 4831 should be accommodated in the existing Voëlklip lower reservoir zone and that the existing low level Voëlklip water reservoir has sufficient capacity to serve the proposed De Mond Resort Development. The capacity of this reservoir is 4 500kℓ and was sized to provide 48h water storage. The connections to the existing system should be done on the existing reticulation network as shown on **Figure 18, (Plan 16)**.

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Figure 18: Existing Water Reticulation (Plan 16)

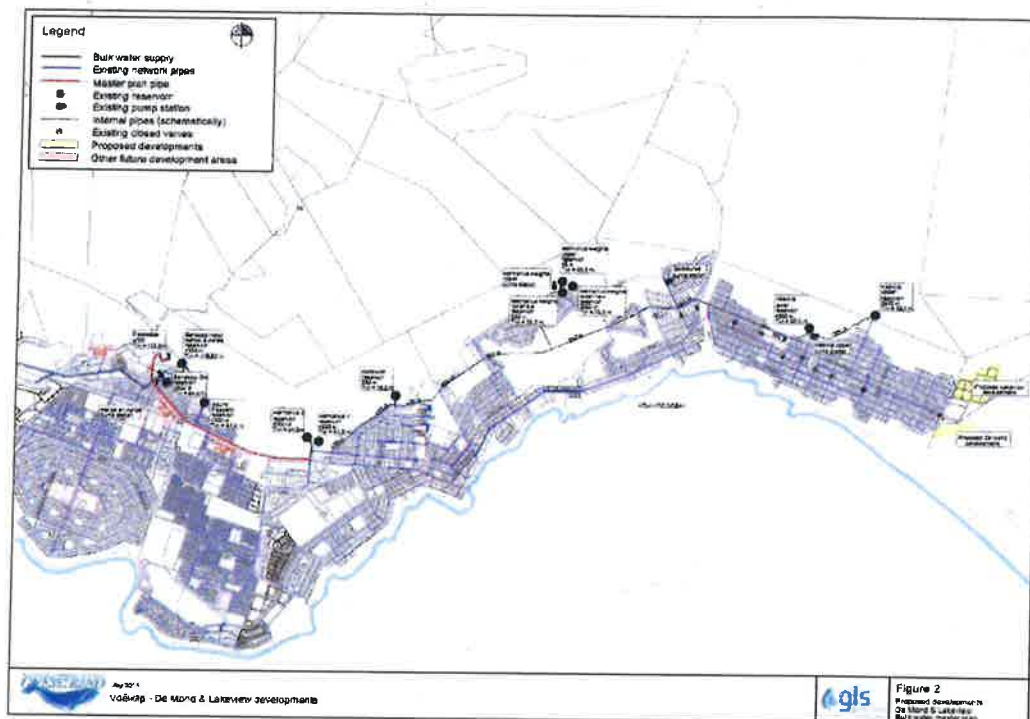


The Voëlklip reservoir is supplied with water from the recently upgraded and extended Preekstoel Water Treatment Works ("WTW") through bulk pipelines. The WTW and the bulk pipelines, at this stage, have sufficient capacity to supply water for the De Mond Resort Development. The timing of the De Mond Resort Development, however, is uncertain and should other future developments coincide with the development of the De Mond Resort, the spare capacity available in the bulk pipelines could be exceeded and additional pipelines from the Preekstoel WTW would be required. These pipelines are masterplan items OHW.B23 to OHW.B25 and are indicated in **Figure 19** albeit the routes of the proposed pipelines as schematically shown on **Figures 18 & 19 (Plans 16 & 17)** must still be finalised subsequent to detail pipeline route investigations.

A provisional amount is included in the cost estimate for a pro-rata contribution for the additional pipelines.

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Figure 19: Bulk Water Master Plan (Plan 17)



7.4.2.3 EXISTING VOËLKLIP WATER NETWORK

The GLS study also included an analysis of the Hermanus internal water network. A water connection for the De Mond Resort Development is available in 17th Avenue, but the existing 75mm diameter water pipe in this Avenue must be upgrade to a 160mm diameter pipe. This upgrade can be undertaken by means of pipe bursting techniques which are the preferred method for upgrading the network.

7.4.2.4 PROPOSED INTERNAL DISTRIBUTION SYSTEM

The site is currently partially serviced by 75mm diameter asbestos cement pipes and small diameter pipes installed on an ad hoc basis over the years. These pipes must be abandoned.

The internal distribution network must consist primarily of HDPE or PVC-U PN12 pipes, with individual unit connections branching off. A basic network of larger diameter pipes to fulfil the fire requirements with smaller diameter pipes to supply the normal domestic demand must be provided.

7.4.2.5 METERING

A flow meter complying with the municipal standards must be installed at the main feed water line on the western side of the development in 17th Avenue. Individual water meters could be installed per unit dwelling to gauge the domestic usage of water, but it is not a Municipal requirement.

7.4.3 SEWAGE DISPOSAL AND SEWER NETWORK

The De Mond and Lakeview developments fall within the existing Scout Camp PS ("PS") drainage area. (Note: Lakeview is a development across the R43 from the De Mond Resort Development. It has no relation to the latter and must not be construed as such).

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7.4.3.1 DESIGN FLOW

The estimated average dry weather flow from the development is 90kl/day for the assumed development scenario. The peak dry weather flow will be approximately 5l/s and the peak wet weather flow approximately 8l/s. This is in line with the original sewer master plan in terms of which the peak day dry weather flow (PDDWF) for future development area GH18 (the proposed De Mond development area) was calculated at 94,7 kl/d.

7.4.3.2 DRAINAGE AREA AND SEWERAGE UPGRADES

The sewage from the proposed development must drain to the Scout Camp PS from where it will be pumped through an existing 200mm diameter rising main to the Mossel River PS drainage area. Sewage is pumped from the Mossel River PS to the Hermanus Wastewater Treatment Works ("WWTW") drainage area from where it gravitates to the WWTW. The route of the proposed pipeline is schematically shown on **Figure 20, (Plan 18)**, but has to be finalised subsequent to a detail pipeline route investigation. The recommended positions for the sewer connections for the proposed developments are at the existing 200 mm diameter outfall sewer in 17th Avenue as shown on Figure 20.

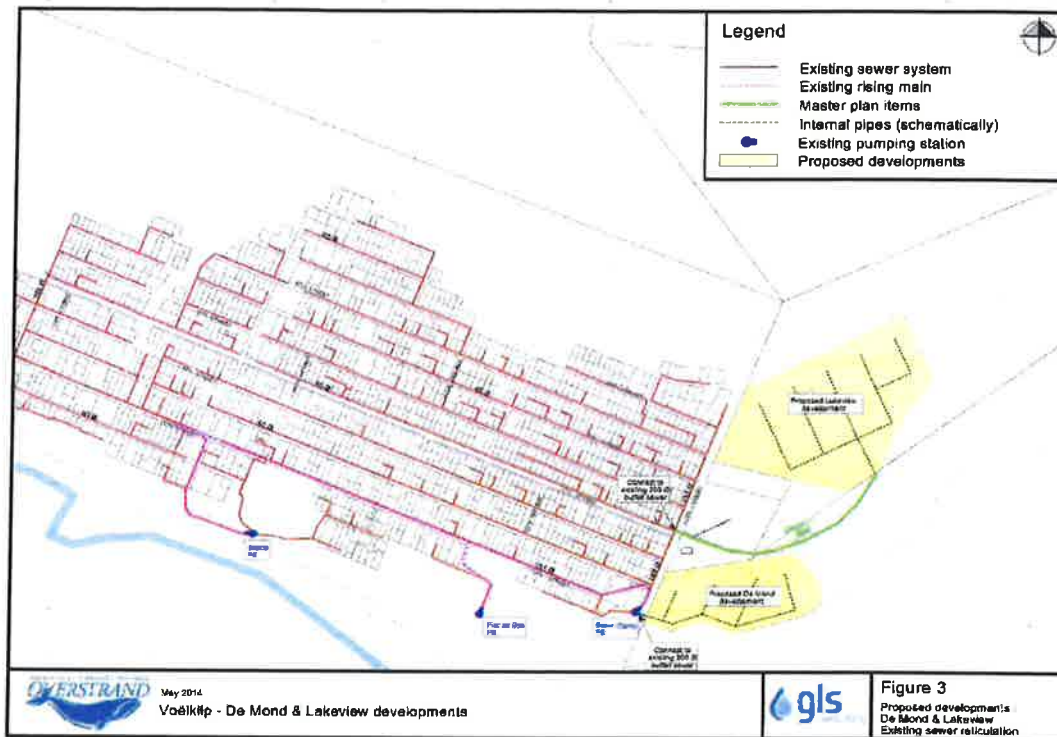
The independent investigation undertaken by GLS Consulting Engineers has shown that the existing sewer network will require certain upgrades in order to meet the demand of the De Mond Resort Development. The Scout Camp PS has sufficient capacity to accommodate the development, but requires refurbishment and upgrading.

The analysis further showed that there is sufficient capacity in the existing 315 mm diameter and 355 mm diameter sewers gravitating towards the Mossel River PS in order to accommodate the proposed developments but given the combined peak flow that can arrive at the Mossel River PS, the Mossel River PS has insufficient capacity to accommodate any additional developments. There is also insufficient capacity in sections of the downstream 200 mm and 450 mm diameter bulk sewer gravitating towards the Hermanus WWTP. Upgrading of the Mossel River PS and the existing 200 mm and 450 mm diameter bulk sewer are therefore required in order to accommodate any additional developments served by the Mossel River and Hermanus 4 pumping stations.

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Figure 20: Existing Sewer Reticulation (Plan 18)



The routes of the proposed pipelines are schematically shown on **Figure 21, (Plan 19)**, but have to be finalised subsequent to detail pipeline route investigations.

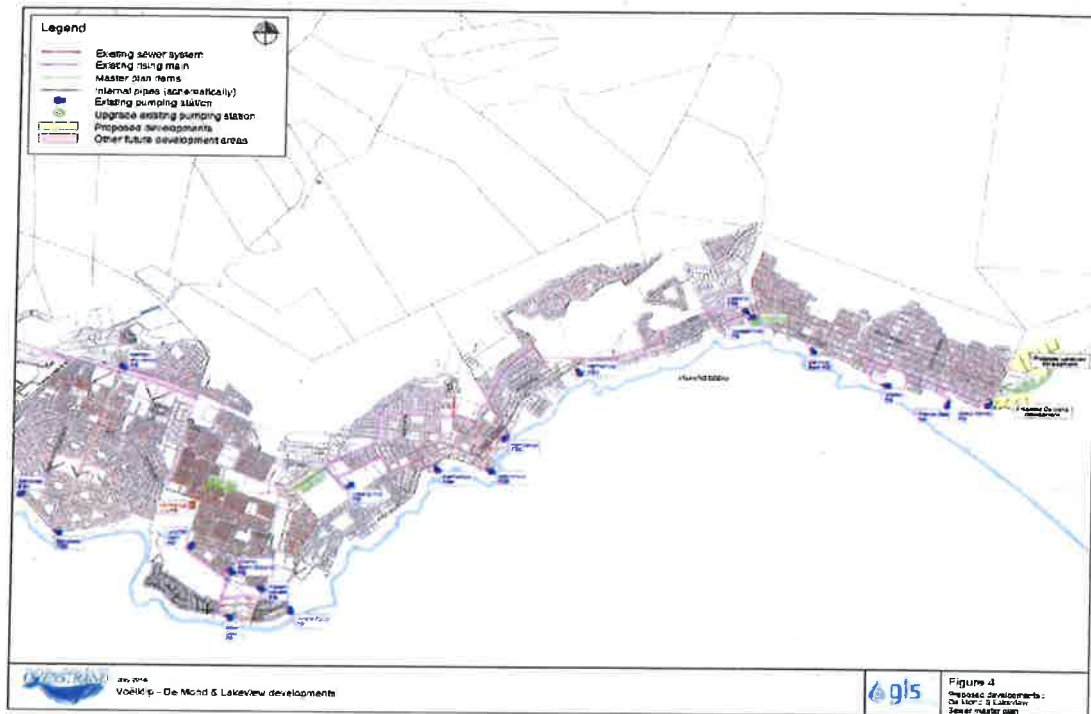
There is sufficient capacity in the existing water system to accommodate the proposed development. However, the following upgrades to the sewer system are required:

- The Mossel River PS will require upgrading to a duty point of 75t/s,
- Master plan items OHS13.1 and OHS13.2 which include additional sewer pipes in the Hermanus industrial area and Zwelihle respectively; and
- Refurbishment of the Scout Camp PS.

Both the Scout Camp- and Mossel River sewage PSs are located in environmentally sensitive areas. There is sufficient treatment capacity at the WWTW for the envisioned additional sewage.

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Figure 21: Sewer Master Plan (Plan 19)



The developer of the De Mond Resort will be liable for the Bulk Services Levy (as calculated by the Overstrand Municipality) as a contribution towards water infrastructure and the Bulk Services Levy (as calculated by the Overstrand Municipality) as a contribution towards sewer infrastructure. (Refer to Cost Estimate below).

7.4.3.3 EXISTING SEWERAGE

The De Mond site is currently partially serviced with ablution facilities which drain towards two sewage pumping stations. These pumping stations also currently pump sewage from KRLP (comprising of approximately 20 "gypsy" homes) by rising main to the Scout Camp municipal sewage pump station from where it is conveyed to the Hermanus WWTW.

7.4.3.4 PROPOSED SEWER RETICULATION AND PUMPING STATIONS ON THE SITE

A new sewage reticulation system consisting of 160mm PVC class 34 heavy duty sewer pipelines must be constructed to service all the units and individual 110mm dia chalet connections must be provided. Pending the final development proposal and considering the topography of the site, the sewer reticulation system will probably have to drain towards three new sewage pumping stations on the site. Any sewage pumping station on the site must be provided with at least 4 hours of emergency storage and sufficient emergency electricity supply through on-site diesel generators. A new sewage rising main must be constructed to convey sewage to the Scout Camp PS or the 200mm dia sewer which feeds into the pumping station. The sewer reticulation must also provide for a connection for the existing Lakeview units.

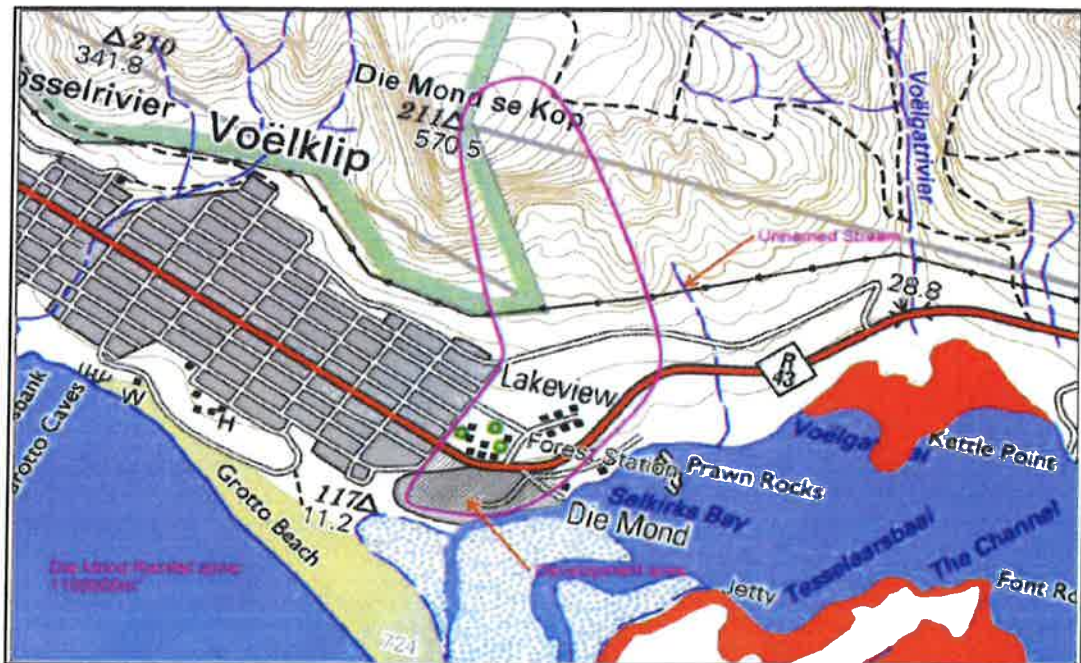
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7.4.4 STORM WATER MANAGEMENT

7.4.4.1 EXISTING SYSTEM AND DRAINAGE

The De Mond site currently drains towards the South and West to a storm water stream along the western edge of the caravan park where a minor stormwater pipe daylights and also drains directly into the Estuary. The R43 road and side channels provide a cut-off drain for stormwater from the higher lying areas and the mountain and divert the stormwater to the Prawn Flats portion of the site. The area above the site from where stormwater drains towards the cut-off drains is approximately 100ha and is indicated in **Figure 22**.

Figure 22: Stormwater Drainage above the Site



A minor stream flows from the mountain on the eastern side and further east is the Voëlgat River. Both these two drainage areas do not form part of the site. The setback line (also referred to as the erosion line and is provisionally the 5m contour line) is set high above the Mossel River and much higher than previously observed flood levels.

7.4.4.2 PROPOSED STORM WATER SYSTEM

Stormwater should flow primarily in shallow open channels. Catch pits, manholes and limited concrete underground piping could also be installed. All stormwater should be directed towards Mossel River and retention ponds will not be required. A Stormwater Management Plan ("SWMP") will however have to be prepared and should be included in the Environmental Approval application.

7.4.4.3 OVERLAND ESCAPE ROUTES

The overland stormwater escape routes must be provided in strategic locations to ensure controlled flow of stormwater run-off into the Klein River estuary during high rainfall events.

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7.4.5 REFUSE REMOVAL

The Overstrand Municipality will collect the refuse from the development as it is located along an existing municipal refuse collection route. A dedicated refuse storage area that complies with the Overstrand Municipality's Integrated Waste Management By-law, 2013 should be constructed at the service entrance to the development to facilitate the removal of the refuse. Refuse collected will be disposed of at a licensed municipal waste disposal facility which has sufficient capacity for the development.

7.5 ELECTRICAL ENGINEERING SERVICES

The design of new electrical infrastructure for the proposed development must be done in close liaison with the electricity department of Overstrand Municipality and must be based on the latest municipal guidelines on electricity supplies.

All information provided below was discussed with the electricity department located at the offices of Overstrand Municipality in Onrus.

7.5.1 ESTIMATED ELECTRICITY DEMAND

The maximum electricity demand for the total development, based on the anticipated scope of the development is estimated at 850 kVA. This demand does not include the existing Scout Camp sewage pumpstation, which will have to be serviced outside of this development.

It is important to take note that any significant deviation from the anticipated scope of the development as provided above shall necessitate the re-calculation of this estimated maximum demand. Furthermore, the maximum demand is calculated by assuming full occupancy of the development.

7.5.2 EXISTING INFRASTRUCTURE

Two (2) existing 11 kV cables, one entering the development from 17th Avenue and another exiting the development along the same route, is currently feeding a 500 kVA miniature substation on the site. From this miniature substation, via a secondary 11 kV ring main unit, an 11 kV cable is currently feeding the "See en Sand" area. This cable operates as a "T-off" from the main 11 kV cable ring, and must be retained in the future proposed network for the De Mond development.

From the mentioned miniature substation some existing low voltage overhead lines are reticulating the site. The condition of these overhead lines is however in such a dilapidated state that the re-use thereof is strongly discouraged. Some old distribution boxes are present on site but can also be regarded as non-usable.

7.5.3 PROPOSED SUPPLY POINT

The bulk supply point for the development will be at the entrance to the site from 17th Avenue. A new 11kV metering point as per the municipal guidelines, with an 11kV circuit breaker complete with minimum overcurrent and earth fault protection, must be installed at this point. The internal 11kV network will remain the responsibility of the development for which a competent person in terms of the Occupational Health and Safety Act ("OHSA"), 85 of 1993 must be appointed.

The bulk 11 kV network feeding the area wherein this development is situated currently does not have any surplus capacity to accommodate the additional load, and the following up-stream upgrading needs to be done for the account of the developer:

- Installation of a new 185mm² primary 11kV feeder cable from Kwaaiwater switching station to the De Mond Resort Development.

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- Upgrading in the existing Kwaaiwater 11kV switching station to accommodate the new primary feeder cable.

7.5.4 PROPOSED INTERNAL SERVICES

Although the internal 11 kV and low voltage networks shall remain the responsibility of the development, it is still a requirement that all designs for these services be based on the latest guidelines of the electricity department of Overstrand Municipality. All new services shall be underground, with miniature substations, low voltage kiosks and streetlights to comply with the minimum pre-requisites of the Municipality.

The mentioned existing 11 kV supply to the "See en Sand" area must be incorporated into the design of the new infrastructure.

A new supply to the Scout Camp sewage pumpstation, which is situated outside the development but currently fed from inside the development, must be designed and installed.

7.5.5 METERING

As mentioned, a bulk electricity meter shall be installed at the entrance to the site from 17th Avenue. Metering shall be done at 11 kV level, and appropriate equipment and protection devices must be accordingly installed at this metering point. All internal networks, 11 kV and low voltage, shall stay private and will be the responsibility of the development to maintain and operate.

Internal metering might be done on a pre-payment methodology, for which a third part as "vending agent" can be employed if required.

7.6 COST ESTIMATE

During the RFP phase it will be required from the shortlisted bidders to include the following budget for external services which only allows for a part contribution towards the provision of off-site bulk and link services. All other on-site services and cost thereof will be the responsibility of and for the cost of the Developer.

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ANNEXURE I:

Contact Person: *Liezl du Plooy (Tel: 082 338 6466)*
Your Ref: De Mond TIA
Our Ref: D328
Date: 15 May 2019

Overstrand Municipality
Project Management and Development Control
P.O. Box 20
Hermanus
7200

For attention: Dennis Hendriks

Sir

TRANSPORT IMPACT ASSESSMENT FOR THE PROPOSED DE MOND HOLIDAY RESORT DEVELOPMENT ON PORTION OF ERF 4831 AND PORTION OF ERF 5327, HERMANUS

This transport impact assessment accompanies the development application for the above mentioned property.

1. BACKGROUND

Deca Consulting Engineers were appointed by POHL Property Development Group to investigate the transport impact of the proposed De Mond Holiday Resort development on Portion of Erf 4831 and Portion of Erf 5327, Hermanus. The proposed development is situated east of Voëlklip residential area (east of central Hermanus), south of the R43 (MR00028). The development is bordered by 17th Avenue to the west, the R43 to the north and prawn flats, which is vacant natural land to the east. The location is shown in the attached **Figure 1**.

2. DEVELOPMENT PROPOSAL

The proposed development will consist of a number of public holiday facilities, to cater for large tourist groups and commercial interest. All units will gain access either off the R43 (existing Prawn Flats access), approximately 353 metres from the R43 / 17th Avenue intersection or off 17th Avenue (existing De Mond Caravan Park access) approximately 120 meters from the R43 / 17th Avenue intersection. The site is approximately 10.96 hectares in size.

VILLIERSDORP OFFICE 26 Graaff Street, Villiersdorp 6848 PO Box 359, Villiersdorp 6848 TEL +27 (0)28 340 2366 FAX +27 (0)86 524 5723 E-MAIL liezl@d-e-c-a.co.za	HERMANUS OFFICE 7 Paterson St, Hermanus, 7200 PO Box 1273, Hermanus, 7200 TEL +27 (0)28 312 2292 FAX +27 (0)28 312 2325 E-MAIL pieter@d-e-c-a.co.za
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CONSULTING SERVICES CIVIL ENGINEERING | TRAFFIC ENGINEERING | TRANSPORT ENGINEERING | PROJECT MANAGEMENT

MEMBERS: L. DU PLOOY PR. ENG | P. ENGELBRECHT PR. TECH. ENG • REG NO: 98/10478/23

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The proposed development consists of the following:

Land use	GLA Area (m ²)	Units
Retail	1 500	
Offices	600	
Restaurants	737	
Wedding and Conference facility (seats)	400	100
Self catering apartments	13 470	150
Flashpackers (beds)	1 300	45
Caravan Park (stands)		15
Manor House (rooms)	400	8
Hotel (rooms)	5 000	120
Clubhouse	500	
Total	23 907	438

Please see the attached **Site Development Plan** by *Boogertman Partners* dated 11 April 2019, Rev E.

The development will gain access off the R43, approximately 353 metres from the R43 / 17th Avenue intersection. This complies with the 270-metre spacing requirement between unsignalised intersections off Class 2 roads in an intermediate environment. Access will also be gained off 17th Avenue, approximately 120 metres from the R43 / 17th Avenue intersection. This complies with the 115-meter spacing requirement between unsignalised intersection and high volume driveways off Class 4b road (South African Classification and Access Management Manual).

3. EXISTING ROADS AND PROPOSED UPGRADING

Roads that will be affected most by the proposed development include the R43 (MR00028), 17th Avenue and 10th Street. According to the South African Classification and Access Management Manual (RCAMM) document the R43 can be classified as a Major Arterial (Class 2) and 17th Avenue and 10th Street can be classified as Residential Collector Streets (Class 4b).

The R43 is planned to go under reconstruction early 2019. The reconstruction is planned between Hermanus (km 6.2) and Stanford (km 24). The De Mond development falls into this reconstruction zone and the new layout and longitudinal section can be seen in the attached **Upgrading of trunk road 28 section 2 between Hermanus (km6.2) and Stanford (km24), Longitudinal section 6000 – 7000**, by EFG Engineers.

The Western Cape Geometric Design Manual stipulates that a 7.5 metre wide road with a 60km/h speed limit should have a shoulder sight distance of approximately 120 metres for passenger vehicles. Both intersections have adequate shoulder sight distance to the east and the west as required.

4. EXISTING TRAFFIC AND SERVICE LEVELS

The intersections expected to be affected the most by the proposed development are the R43 / 17th Avenue and R43 / Prawn Flats Entrance intersections.

Three-hour traffic counts were carried out during the morning and afternoon on Friday 16 November 2018 at the R43 / 17th Avenue and R43 / Prawn Flat Entrance intersections. The AM peak hour was observed between 07:15 and 08:15 and the PM peak hour between 15:00 and 16:00 for both these intersections.

The traffic volumes were used to analyse the intersections with the SIDRA computer programme to obtain existing service levels. Service levels give an indication of the delays experienced at an intersection. A level of service A represents a short delay, while a level of service F represents unacceptably long delays. A level of service D is generally used as the lowest acceptable standard for overall intersection operation. The results of the SIDRA analysis are discussed below. Existing (2018) traffic volumes and service levels are shown in **Figure 2**.

R43 / 17th Avenue intersection: This 4-legged intersection with stop control on 17th Avenue and free-flow on the R43 was analysed with existing traffic volumes. The analysis shows that all movements operate at a level of service A during the AM and PM peak hours.

R43 / Prawn Flats Entrance intersection: This T-intersection has stop control on the Prawn Flat Entrance and free flow on the R43 approaches. The SIDRA analysis indicates that the intersection operates at a level of service A during the AM and PM peak hours.

5. BACKGROUND TRAFFIC

The proposed development is expected to be completed by 2023. Existing traffic volumes were increased by 7% per annum (obtained from the average growth between 2009 and 2013 and 2013 and 2018 traffic counts at the R43 / 17th Avenue) to obtain expected 2023 traffic volumes.

The intersections around the De Mond development were analysed with SIDRA to determine the baseline traffic situation against which the impact of the development could be measured. The results of the analysis are discussed below. Year 2023 background traffic volumes and levels of service are shown in **Figure 3**.

R43 / 17th Avenue Intersection: The analysis of this stop controlled intersection with Year 2023 background traffic volumes indicate that all movements will continue to operate at a level of service A during the AM and PM peak hours.

R43 / Prawn Flats Entrance intersection: The analysis of this stop controlled intersection with Year 2023 background traffic volumes indicate that all movements will continue to operate at a level of service A during the AM and PM peak hours.

6. TRIP GENERATION

The De Mond development has a wide variety of land uses and will generate a variety of trips. The South African COTO TMH17 trip generation document was used to obtain the trips generated during the AM and PM peak hours. **Table 1** indicates the Trip Generation Rate (TGR) with the in:out split for each land use. The property will have the potential to generate 183 trips (127 in, 56 out) in the morning peak hour and 299 trips (118 in, 181 out) during the afternoon peak hour.

Table 1 indicates the trip generation potential of the proposed development during the AM and PM peak hours.

Table 1: Trip Generation Potential of the proposed development

Land use	Unit	Unit Total	Trip generation rate	% trips in	% trips out	Total trips	Trips in	Trips out
Morning peak hour								
Retail	100m ² GLA	15	0.6	85	35	9	6	3
Offices	100m ² GLA	6	2.1	85	15	13	11	2
Restaurants	100m ² GLA	7.37	0.75	70	30	6	4	2
Conference Centre	Seats	100	0.5	90	10	50	45	5
Self catering units	Unit	150	0.3	60	40	45	27	18
Flashpackers	Room	45	0.3	60	40	14	8	5
Caravan Park	Unit	15	0.3	60	40	5	3	2
Manor House	Unit	8	0.85	25	75	7	2	5
Hotel	Unit	120	0.3	60	40	36	22	14
Total						183	127	56
Afternoon peak hour								
Retail	100m ² GLA	15	3.4	50	50	11	5	5
Offices	100m ² GLA	6	2.1	20	80	13	3	10
Restaurants	100m ² GLA	7.37	11.8	40	60	87	35	52
Conference Centre	Seats	100	0.5	10	90	50	5	45
Self catering units	Unit	150	0.4	50	50	60	30	30
Flashpackers	Room	45	0.4	50	50	18	9	9
Caravan Park	Unit	15	0.4	50	50	6	3	3
Manor House	Unit	8	0.85	70	30	7	5	2
Hotel	Unit	120	0.4	50	50	48	24	24
Total						299	118	181

7. TRIP DISTRIBUTION

The trips generated by the proposed development were distributed between the two entrances (one off the R43 and one off 17th Avenue). From there the generated trips were distributed onto the surrounding road network according to existing directional splits. The trip distribution is shown in **Figure 4**.

8. TRAFFIC IMPACT

The trips generated by the proposed development were added to the background traffic volumes to determine the expected total number of trips on the affected intersections of the road network after completion of the proposed development. The affected intersections were again analysed with the SIDRA computer programme to determine the expected service levels. Please see attached **Figure 5** for expected total traffic volumes and levels of service of 2023.

R43 / 17th Avenue Intersection: The analysis of this stop controlled intersection with total 2023 traffic volumes indicates that all movements will continue to operate at a level of service B or better during the AM and PM peak hours.

R43 / Prawn Flats Entrance Intersection: The SIDRA analysis of this stop controlled T-intersection with total 2023 traffic volumes and existing layout indicates that all movements will continue to operate at a level of service A during the AM and PM peak hours. According to the Provincial Road Access Guidelines document however, the expected number of approaching and turning vehicles at the intersection warrants a right-turn lane for vehicles approaching from the west for safety reasons.

Despite the size of the development, the trips generated will be distributed between two intersections with sufficient capacity, with the effect that the proposed development will have a moderate impact on the surrounding road network.

9. PARKING AND INTERNAL ROADS

The minimum off-street parking ratio for the proposed development as indicated by The Overstrand Municipality Zoning Scheme June 2013 document are listed in **Table 2**.

Table 2: Parking requirements for the proposed development

Land use	Number / GLA (m ²)	Parking requirement	Total parking required
Office	600 m ²	6 bays / 100 m ² GLA	36
Retail	1700 m ²	6 bays / 100 m ² GLA	102
Restaurants	737 m ²	6 bays / 100 m ² GLA	44
Flashpackers	45 bedrooms	1 bay / bedroom	45
Self-Catering	206 bedrooms	1 bay / bedroom	206
Conference Centre	100 seats	0.5 bays / seat	50
Hotel	120 bedrooms	1 bay / bedroom	120
Club House	500 m ²	10 bays / 100 m ²	50
Total:			653

The SDP shows the provision of a total of 636 parking bays, yielding a shortfall of 17 parking bays.

Where more than one land use share a common parking area it may be possible to reduce the amount of parking that would have been required to serve the independent uses. This is because the peak parking demand periods for the various land uses differ.

Table 3 indicates the hourly distribution of parking demands for the proposed development based on office, retail and residential land uses (Provincial Road Access Guidelines document). If the required bays as indicated in **Table 2** are categorised according to the three land uses, the total number of bays required for each are as follow: Office: 36 bays; Retail: 102 bays and residential: 45 + 206 + 120 = 371 bays (36 + 102 + 371 = 509 total). Other land uses such as the restaurants and conference centre were not included in this calculation and are expected to require their full amount of required parking bays.

Table 3: Hourly distribution of Parking Demands (percentage of peak demand for parking bays)

Time	Office		Retail		Residential		Total
	Demand (%)	Bays Required (36 total)	Retail (%)	Bays Required (102 total)	Residential (%)	Bays Required (371 total)	
06:00	0	0	0	0	100	371	371
07:00	20	7	5	5	90	334	346
08:00	60	22	25	26	80	297	345
09:00	90	32	40	41	60	223	296
10:00	100	36	65	66	40	148	250
11:00	100	36	95	97	30	111	244
12:00	90	32	100	102	30	111	245
13:00	90	32	100	102	40	148	282
14:00	90	32	100	102	40	148	282
15:00	100	36	90	92	30	111	239
16:00	75	27	70	71	40	148	246
17:00	50	18	35	36	75	278	332
18:00	20	7	5	5	90	334	346
19:00	15	5	0	0	95	352	357
20:00	10	5	0	0	100	371	376
21:00	5	2	0	0	100	371	373
22:00	0	0	0	0	100	371	371

Based on the above, the peak parking demand for the three land uses are 376 parking bays. This results in a reduction of $509 - 376 = 133$ bays which results in a total peak parking demand (development as a whole) of $653 - 133 = 520$ bays. The provided 636 bays are therefore deemed adequate.

Parking for the physically disabled should be provided as per the Overstrand Zoning Scheme regulations document e.g. 8 disabled bays for 151-200 normal parking bays plus 2 additional disabled bays for every 100 additional normal bays. A total of $8 + 9 = 19$ bays for the physically disabled should therefore be provided.

The sizes of all parking bays should be in accordance with the latest edition of the South African Road Traffic Signs Manual.

The internal road widths and bellmouth radii have been workshopped with the relevant stakeholders and are deemed adequate as indicated on the attached **SDP**.

According to the City of Cape Town Minimum Standard for Civil Engineering Services in Townships document the minimum stacking space in front of an access gate to a development is 12 meters. The De Mond development access gate 1 (situated at the western side of the site) has a stacking distance of 27 metres inbound and access gate 2 (situated at the north eastern side of the site) has a stacking distance of 15 metres inbound. Both access gates comply with the minimum requirement.

10. PUBLIC TRANSPORT AND NON-MOTORISED TRANSPORT

The proposed development is situated in a high income area on the outskirts of Hermanus. The proposed development concentrates on catering for tourists especially larger groups. It is expected that a large number of trips generated by the proposed development will be public transport trips by means of busses or tuk-tuk taxis (the local Hermanus tourist transportation service) a small number of public transport trips will also be generated by means of minibus taxis. The Hermanus taxi rank is situated in the block bordered by the

R43, Royal Street and Long Street and is 6.7km (8 minutes drive) from the proposed development.

The development is expected to generate a small number of non-motorised trips. The non-motorised trips that will be generated will consist mostly of tourists walking along the cliff path all along the ocean. The cliff path is currently 11km long.

11. INTERNAL NON-MOTORISED TRANSPORT

A central parking area is situated west of the proposed gatehouse 2. It is assumed that most lodgers will park at the central parking bay and walk inside the resort therefore adequate pedestrian links to all facilities must be constructed and clearly marked.

12. CONCLUSIONS

It can be concluded that the proposed De Mond Public Resort development on Portion of Erf 4831 and Portion of Erf 5327, Hermanus will have a moderate transport impact. Other conclusions drawn from the transport impact assessment may be summarised as follows:

- The proposed development is situated east of Voëlklip residential area of Hermanus, south of the R43 (MR00028) The development is bordered by 17th Avenue to the west, the R43 to the north and prawn flats, which is vacant natural land to the east;
- The development will consist of a number of public holiday facilities, to cater for large tourist groups and commercial interest including: self-catering units, a flashpacker, hotel, caravan park, two restaurants, retail and office space and a conference centre;
- The development will gain access off the R43 and 17th Avenue. This complies with the requirements of the Western Cape Provincial Road Access Guidelines 2016;
- The intersections expected to be affected the most by the proposed development are the R43 / 17th Avenue and R43 / Prawn Flat Entrance intersections;
- All the affected intersections currently operates at acceptable levels of service;
- The proposed development is expected to be completed by 2023. Existing traffic volumes were increased by 7% per annum to obtain expected 2023 traffic volumes. The analysis of the affected intersections with background 2023 traffic volumes indicate that the affected intersections will operate at acceptable level of services;
- The proposed development has the potential to generate 183 trips during the AM peak hour (127 in, 56 out) and 299 trips during the PM peak hour (118 in, 181 out);
- The trips generated by the proposed development were distributed according to existing directional splits;
- The analysis of affected intersections with the De Mond development trips added indicates that all movements at all intersections will continue to operate at acceptable levels of service;
- The provision of 636 off-street parking bays will be sufficient for the proposed development;
- It is expected that a large number of trips generated by the development will be public transport trips due to the tourism orientated nature of the development. The small number of non-motorised trips generated by the development will walk along the cliff path adjacent to the ocean.

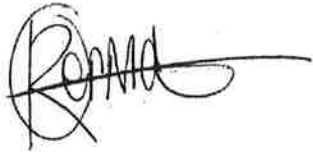
13. RECOMMENDATIONS

The recommendations made in the transport impact assessment may be summarised as follows:

- Parking bay dimensions should be in accordance with the latest edition of the South African Road Traffic Signs Manual;
- It is proposed that an exclusive right turning lane be implanted at the R43 / Prawn Flats Entrance for safety purposes;
- A 12 meter minimum stacking space is required at each access gate.

We trust that you will find this transport impact assessment in order. Please contact the undersigned should there be any queries.

Yours truly,



Renette Opperman (B. Eng Civil)
On behalf of: Deca



Liezl du Plooy (M.Eng Pr.Eng)



NOTES:
1. ALL DEVELOPMENT SHALL BE IN ACCORDANCE WITH THE WESTERN CAPE DEVELOPMENT ACT (ACT 36 OF 2003) AND THE WESTERN CAPE MUNICIPALITY DEVELOPMENT REGULATIONS (REGULATIONS 10 OF 2005).
2. THE DEVELOPER SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY PERMITS AND APPROVALS FROM THE RELEVANT AUTHORITIES.
3. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING NATURAL AND CULTURAL HERITAGE.
4. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING INFRASTRUCTURE.
5. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING SERVICES.
6. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING UTILITIES.
7. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING LANDSCAPE.
8. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING PLANT AND ANIMAL LIFE.
9. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING SOIL AND WATER RESOURCES.
10. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING AIR QUALITY.
11. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING CLIMATE.
12. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING SOCIAL AND ECONOMIC CONDITIONS.
13. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING CULTURAL AND HERITAGE VALUES.
14. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING HISTORICAL AND ARCHITECTURAL VALUES.
15. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING ART AND CRAFTSMANSHIP VALUES.
16. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING SCIENTIFIC AND TECHNICAL VALUES.
17. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING MEDICAL AND HEALTH VALUES.
18. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING EDUCATIONAL AND RESEARCH VALUES.
19. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING RECREATIONAL AND LEISURE VALUES.
20. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING RELIGIOUS AND SPIRITUAL VALUES.
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30. THE DEVELOPER SHALL BE RESPONSIBLE FOR THE PROTECTION AND PRESERVATION OF ALL EXISTING SCIENTIFIC AND TECHNICAL VALUES.

RESIDENTIAL UNITS AND PARKING SCHEDULE									
UNIT TYPE	NO. OF UNITS	GROSS AREA (m²)	TOTAL AREA (m²)	PARKING SPACES	STREET LIGHTS	LANDSCAPING	WATER SUPPLY	SEWERAGE	POWER SUPPLY
1-BEDROOM	10	100	1000	10	10	10	10	10	10
2-BEDROOM	20	200	2000	20	20	20	20	20	20
3-BEDROOM	30	300	3000	30	30	30	30	30	30
4-BEDROOM	40	400	4000	40	40	40	40	40	40
5-BEDROOM	50	500	5000	50	50	50	50	50	50
6-BEDROOM	60	600	6000	60	60	60	60	60	60
7-BEDROOM	70	700	7000	70	70	70	70	70	70
8-BEDROOM	80	800	8000	80	80	80	80	80	80
9-BEDROOM	90	900	9000	90	90	90	90	90	90
10-BEDROOM	100	1000	10000	100	100	100	100	100	100
TOTAL	400	4000	40000	400	400	400	400	400	400

SCHEDULE OF RIGHTS			
PROPERTY	RIGHTS	RESTRICTIONS	NOTES
1. SITE	RESIDENTIAL	MINIMUM 10% OPEN SPACE	
2. SITE	RESIDENTIAL	MINIMUM 10% OPEN SPACE	
3. SITE	RESIDENTIAL	MINIMUM 10% OPEN SPACE	
4. SITE	RESIDENTIAL	MINIMUM 10% OPEN SPACE	
5. SITE	RESIDENTIAL	MINIMUM 10% OPEN SPACE	
6. SITE	RESIDENTIAL	MINIMUM 10% OPEN SPACE	
7. SITE	RESIDENTIAL	MINIMUM 10% OPEN SPACE	
8. SITE	RESIDENTIAL	MINIMUM 10% OPEN SPACE	
9. SITE	RESIDENTIAL	MINIMUM 10% OPEN SPACE	
10. SITE	RESIDENTIAL	MINIMUM 10% OPEN SPACE	

CIRCULATION			
ROUTE	LENGTH (m)	WIDTH (m)	NOTES
1. SITE	100	10	
2. SITE	200	20	
3. SITE	300	30	
4. SITE	400	40	
5. SITE	500	50	
6. SITE	600	60	
7. SITE	700	70	
8. SITE	800	80	
9. SITE	900	90	
10. SITE	1000	100	

POHL

CROWN GRANT

Partners

WESTERN CAPE

1 SITE PLAN

170

ENGINEER

deca

PO Box 1273
 Frenchburg, Virginia
 22520

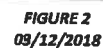
Tel: 078 312 2262
 Fax: 078 312 2265
 E-mail: info@deca.co.uk

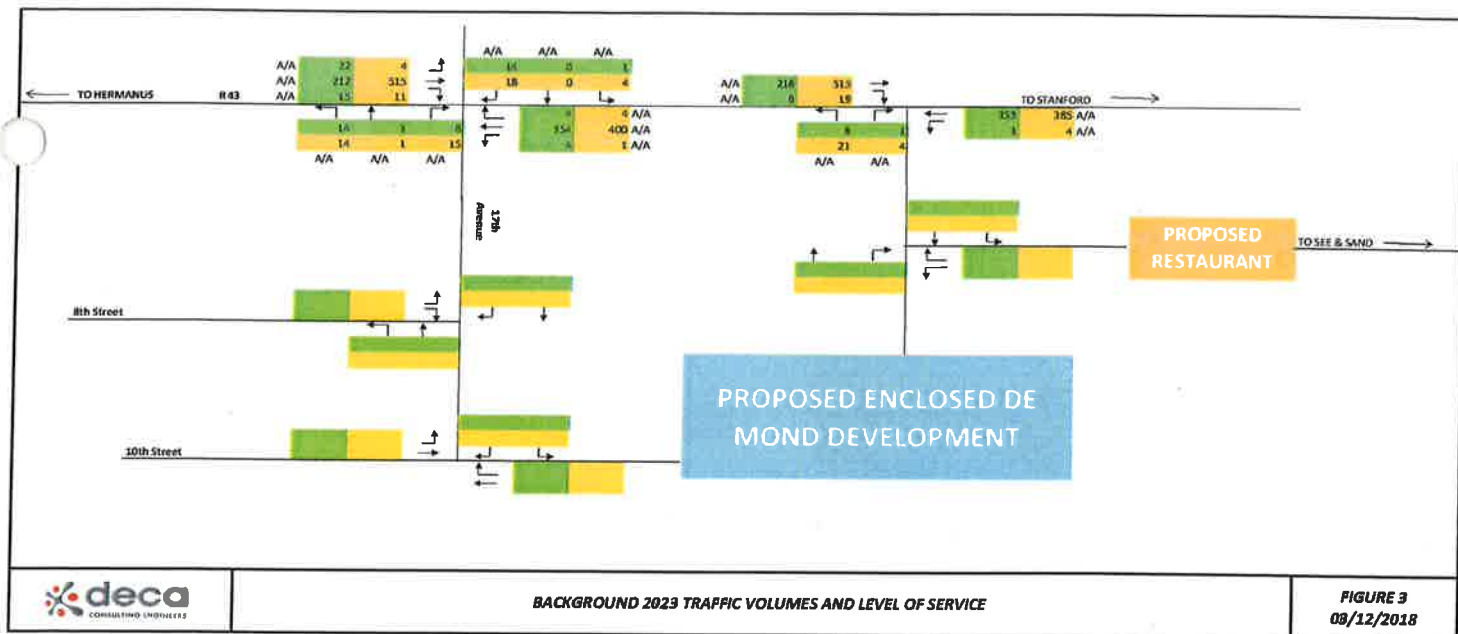
DE MOND HOLIDAY RESORT DEVELOPMENT
 PORTION OF ERVEN 4831 & 5327
 HERMANUS

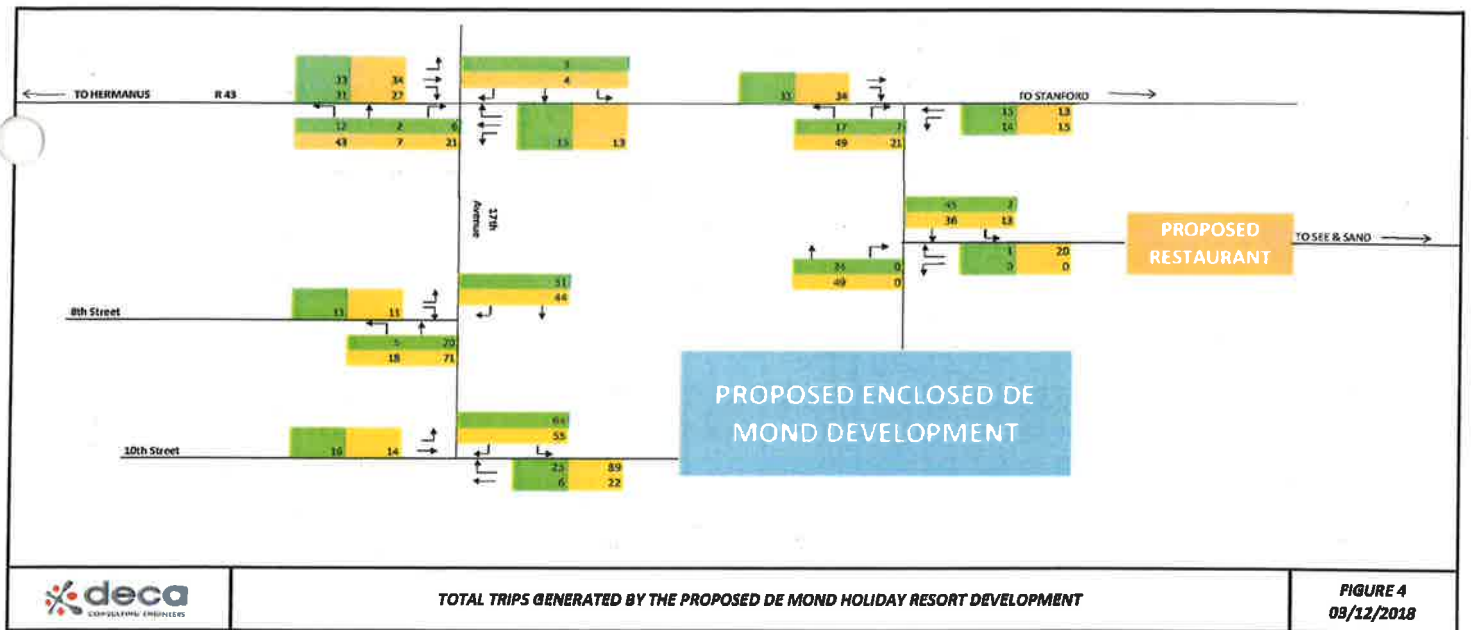
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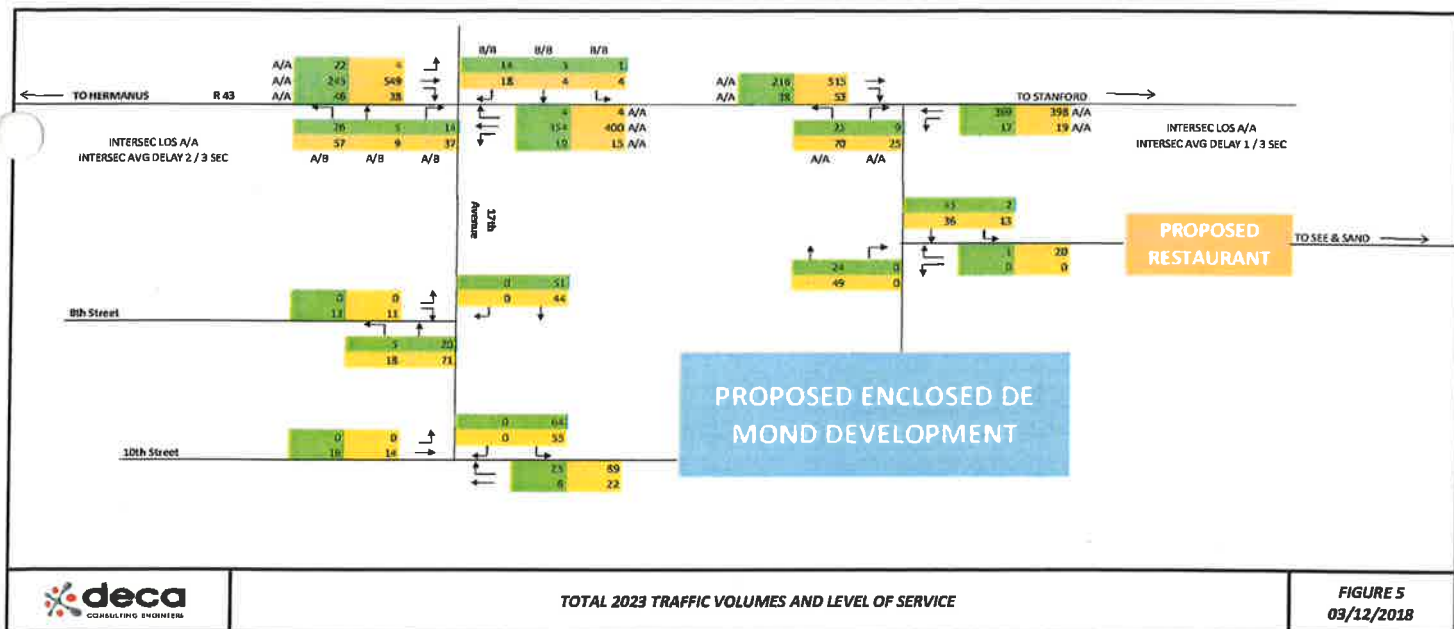
PLAN NUMBER
 FIGURE 1











ANNEXURE J: