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Appendix G8: GLS Bulk Services Report – Electrical

10 October 2024

The Director: Services and Infrastructure
Bitou Local Municipality
Private Bag X1002
Plettenberg Bay
6600

Attention: Ms. Asiphe Mgoqi

Dear Mam,

ELECTRICITY CAPACITY INVESTIGATION FOR THE FYNBOSRANT HOUSING DEVELOPMENT AT ERF 2074 IN PLETTENBERG BAY: CAPACITY ANALYSIS OF THE BULK ELECTRICAL SERVICES

The request by Mr. Rob Hall of De Villiers and Moore Consulting Engineers for GLS Consulting to investigate and comment on the bulk electricity services for the proposed housing development project on a portion of Erf 2074, Plettenberg Bay, refers.

This document should inter alia be read in conjunction with the Electrical Master Plan (performed for the Bitou Municipality) dated December 2022.

The proposed housing development on Erf 2074 was not taken into consideration in the December 2022 Master Plans for the existing and future electrical networks. This document should inter alia be read in conjunction with the following documents:

- Site Plan – FYNBOS - UNITS PRES SP3
- Map – *DIAGRAM 1-Locality Map*
- Electrical Master Plan and Bitou LM Electrical Infrastructure Condition Assessment and Asset Verification Report 2022.
- (performed by GLS Consulting for the Bitou Local Municipality) dated December 2022
- NRS 034-1 (2007) /SANS 507 (2007): Electricity distribution — Guidelines for the provision of electricity distribution networks in residential areas
- NRS 048-2: Quality of Supply.
- Geo-based Load Forecast Standard – Eskom Group Technology Guideline Document
- Information document no. 1: Bitou Local Municipality zoning scheme by-law November 2016 Bitou Local Municipality Development Charges Policy
- Latest electrical network diagrams for Bitou Local Municipality from Lyners and Partners:
  - *20076E-003 – Plettenberg Bay SLD (Existing)*
  - *3-601-DIAG-REV S - Sept 2019*

The estimated demand requirement of the proposed development on Erf 2074 was provided by De Villiers and Moore Consulting Engineers on behalf of the developers via email. The proposed housing development will be situated on Erf 2074, which is situated along Marine Way next to Thulana Hills. Provision was made in the December 2022 Electrical Master Plan for the additional load from this development on this erf as a single residential 500 landuse with 120 units, however, the development type and demand requirement recorded in the master plan was understated. This requires a re-evaluation of the impact of the anticipated demand for the development on the MV infrastructure. The site plans provided indicate that the erven will be used for residential purposes, and therefore can be classified under a residential zone and land use.

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1. HIGH AND MEDIUM VOLTAGE DISTRIBUTION SYSTEM

1.1. Distribution Zone

The proposed development is located along Marine Way within Plettenberg Bay. The area falls within SS-1 Main (Ferdinand) distribution zone with switching performed at SS-Kloof. Supply to the proposed development area should be accommodated within the SS-1 distribution zone. SS-1 currently has two incoming feeders from the Eskom Plett Main Substation supplying the substation at 11kV.

The substation is currently shared with Eskom, the portion belonging to BLM is the 11kV switching section. The installed capacity of the substation is 20MVA with 2x10MVA transformers belonging to Eskom supplying the substation. The Notified Maximum Demand (NMD) for the substation is 15.5 MVA.

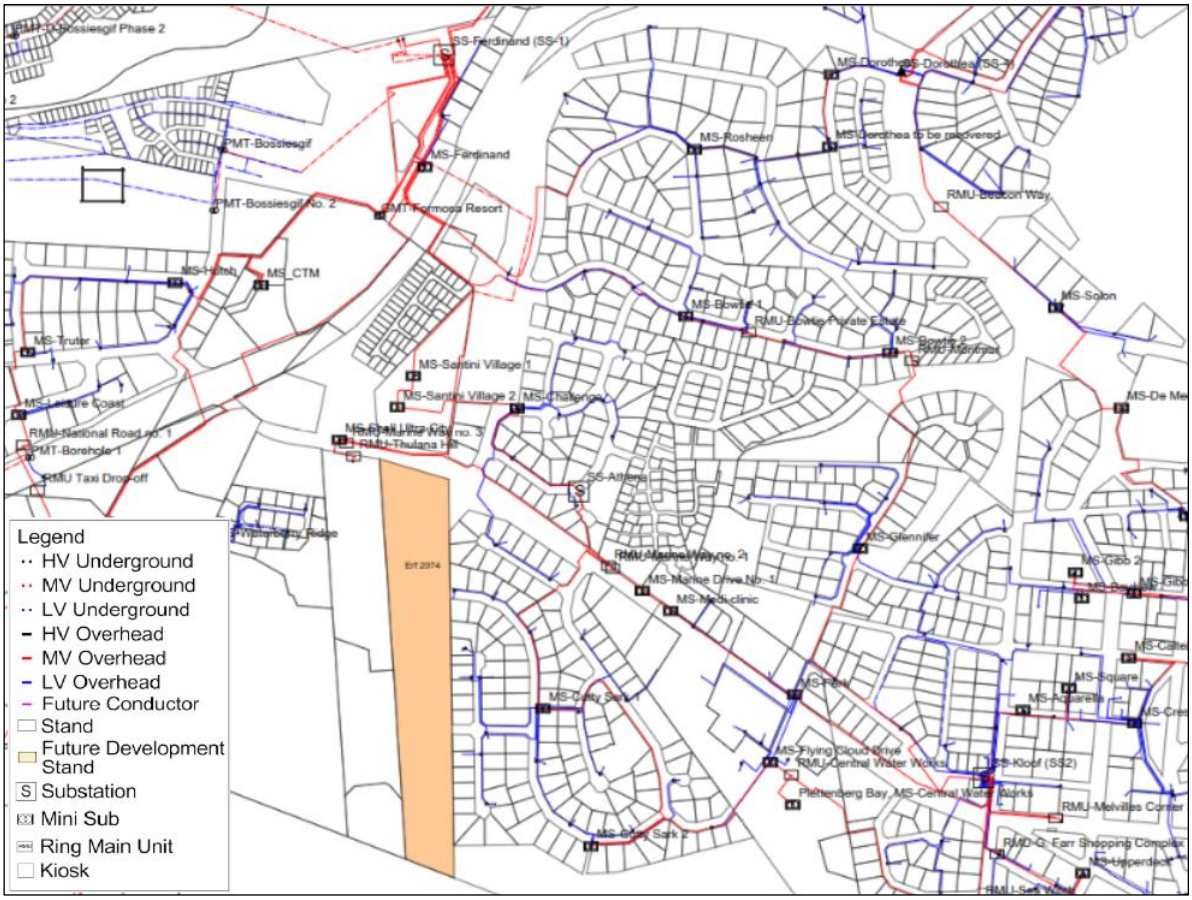


Figure 1: Distribution network of SS-1 Main (Ferdinand)

As per the latest MV reticulation diagrams created by Lyners and Partners, SS-1 receives the incoming 11kV and distributes the power through 11 outgoing feeders. The incoming feeders are 11 kV 183mm^2 Cu XLPE conductors from Eskom's Plett Main Substation. The outgoing feeders from the substation are either 11kV 95mm^2 and 70mm^2 Aluminium PILC underground cables. The substation provides electricity to the Plettenberg Bay CBD, a portion of Bossiesgif, Piesang Valley, Signal Hill and all the way north past Goose Valley along Keurbooms river. Of the 11 outgoing feeders from SS-1 Main, one of which is a 11kV 95mm^2 Cu PILC conductor backbone conductor running towards MS Shell Ultra City supplying the areas surrounding the development. Currently, there is no MV conductor running directly onto Erf 2074.

1.2. Electrical Demand

In the demand forecast conducted for BLM in 2022 as part of the Electrical Masterplan, an anticipated demand of 240kVA for 120 units at an ADMD of 2kVA for each unit. Having been provided the more details on the nature of the development, an adjustment is made to the anticipated demand is required. This study therefore investigates this adjusted supply capacity at the development. For this re-analysis study, an estimated maximum demand of 500kVA for the proposed housing development was calculated by De Villiers and Moore Consulting Engineers on the behalf of the developers. The maximum demand for the proposed development is shown in Table 1.

Table 1: Demand calculation using required circuit breaker capacity

Project	Units	Estimated Demand [kVA]
Erf 2074	**228**	**500**

Due to the location of the proposed development and its proposed landuse, there is no high possibility of backyard dwellers occupying this development erf. It was also confirmed that no expansions are expected on the development leading to an increased demand. Therefore, there is no anticipated increase in demand due to additional unregistered electricity users occupying this erf. For this report, a demand of 500kVA will be used to investigate the capability of the existing MV electricity infrastructure to supply this additional load.

The load profile allocated to this erf was taken from the 2022 electrical master plan for residential flats within the SS-1 Main (Ferdinand) distribution zone. Figure 2 displays the daily load profile within the SS-1 Main distribution zone.

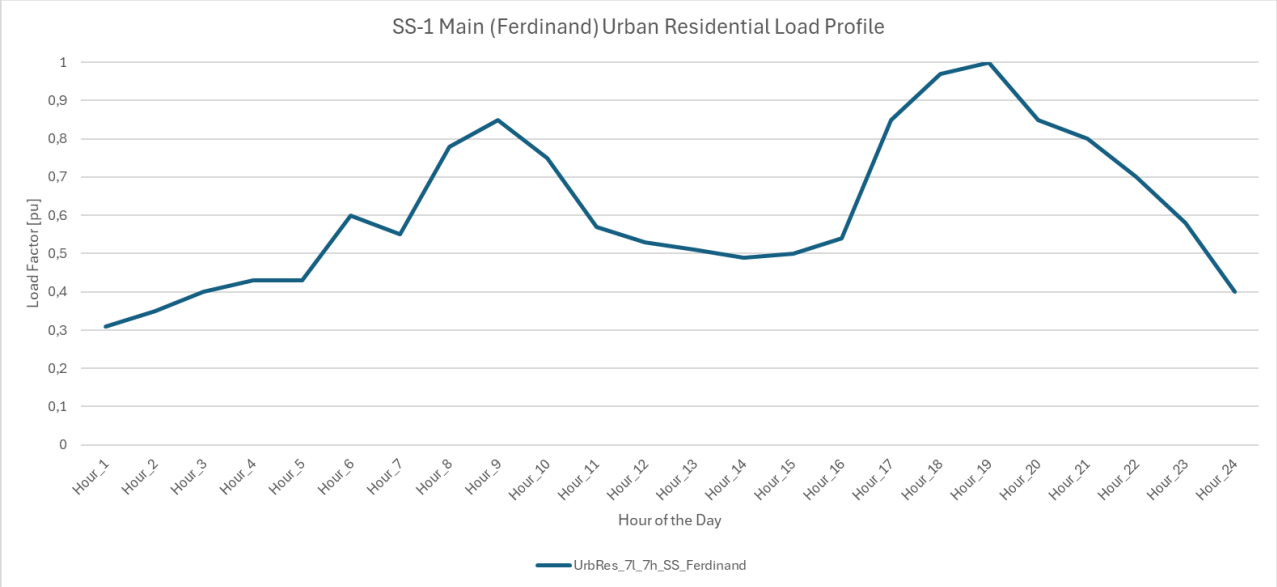


Figure 2: UrbRes_7l_7h_SS_Ferdinand load profile

1.3. Present Situation

1.3.1. Reticulation Network

The Fynbosrant proposed housing development is located on Erf 2074, this area is supplied from SS-1 Main. The network is mainly configured with interconnected rings made up of underground conductors. The supply area is mainly residential with ring main units switching power supply of the MV reticulation and miniature substations stepping down the 11 kV supply to a 400 V three phase

supply that is either directly supplying customers, or in most cases, has the phases further split to provide 230 V low voltage supply to the residents.

Erf 2074: The proposed development is located along Marine Way in Plettenberg Bay. The area has quite a number of electrical infrastructure located within the proximity of the proposed development, namely, RMU Marine Way No.3, RMU Thulana Hill, MS Shell Ultra City (500kVA) which are installed alongside Marine Way, MS Cutty Sark 1 (500kVA) near Cutty Sark Avenue, MS Cutty Sark 1 (500kVA) and MS Waterberry Ridge (500kVA) located within Waterberry Ridge estate. MS Waterberry however, is supplying power to the exclusively to Waterberry Ridge Estate, and cannot be used as a potential supply point for the proposed development.

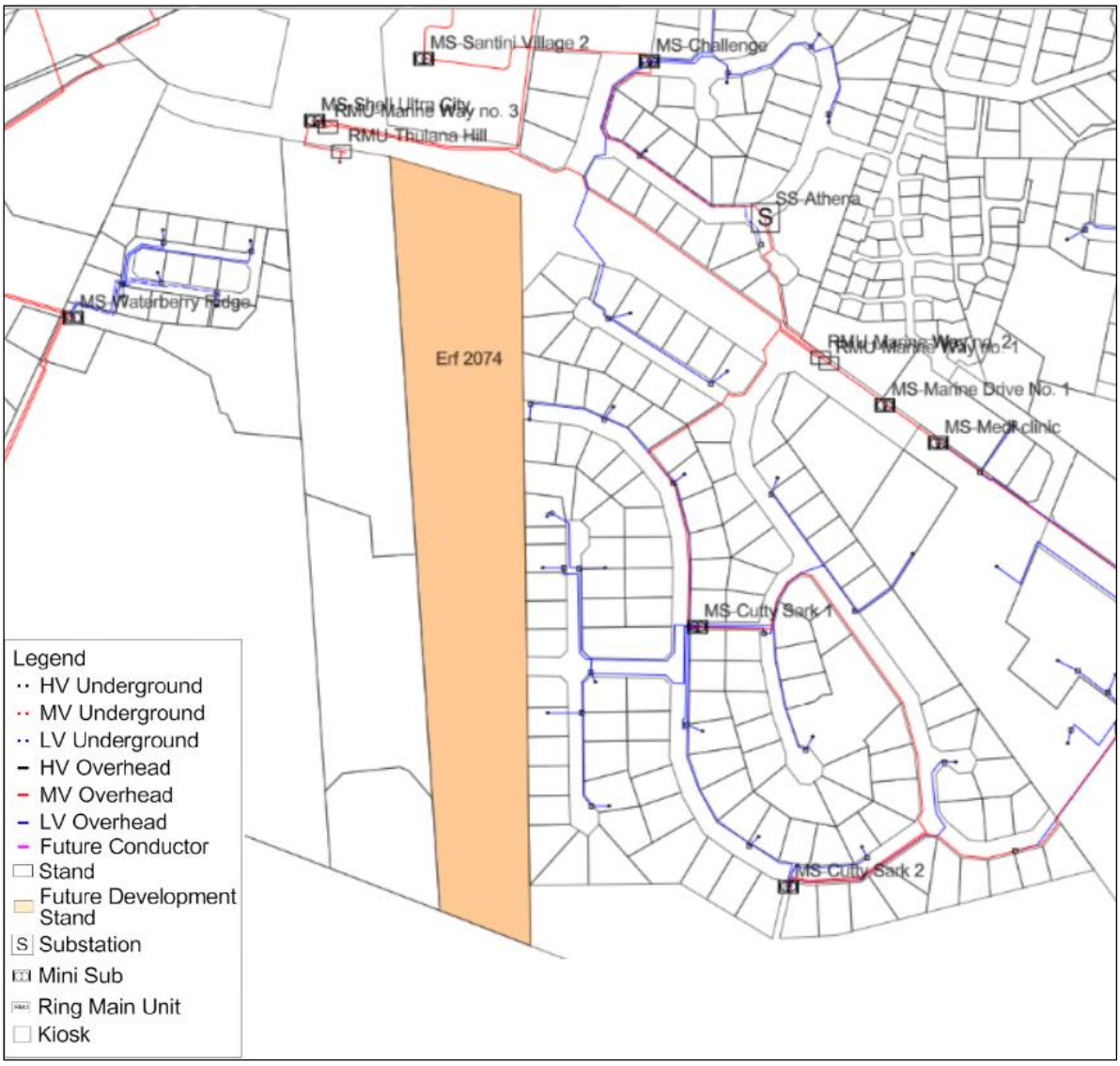


Figure 3: Map Diagram of Erf 2074's surrounding electrical network

The total installed capacity of the transformers within proximity of the proposed development area is 1 000kVA. The estimated electrical maximum demand for development is 500kVA. The existing installed capacity of the infrastructure caters for the surrounding filling station, residential homes, flats, commercial properties and holiday accommodations. The planning criteria documented in the December 2022 Electrical Master Plan advises that under normal operating conditions, the thermal loading of the transformer should not exceed the nominal manufacturers name plate rating, whilst

under contingency conditions, the transformer should not exceed the nominal manufacturers name plate by 20%. Where more than one customer is supplied from a transformer, a project should be initiated when the distribution transformer reaches 80% of its capacity.

A condition assessment was conducted by Lyners and Partners as part of the December 2022 Electrical Master Plan, where the condition of distribution equipment was visually inspected and reported on. Below are the results of the assets from condition assessment conducted on the transformers within the proximity of the proposed development that were allocated a rating of below 3 and require attention from the municipality's side:

Table 2: SS-1 Main Condition assessment

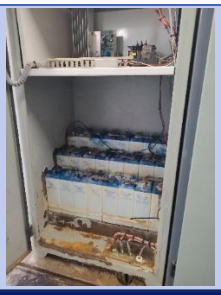
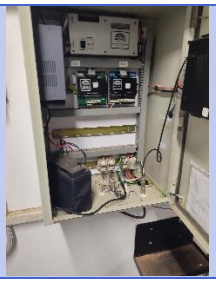
Asset ID	Description	Rating/Type	Location	Comment
32029	SS-Ferdinand (SS-1) Batteries 01		Plettenberg Bay	BTUs and batteries in poor condition. Some batteries standing loose in building on floor.
Images				
				
Asset ID	**Description**	**Rating/Type**	**Location**	**Comment**
?	SS-Ferdinand (SS-1) Switchgears	11kV Oil Circuit Breakers	Plettenberg Bay	Several loose circuit breakers in building (Laying around)
Images				
				
Asset ID	**Description**	**Rating/Type**	**Location**	**Comment**
32034	SS-Ferdinand (SS-1) Telemetry		Plettenberg Bay	various telemetry equipment installed. Not sure if working properly
Images				
				

Table 3: SS-1 Main Yard Condition Assessment

Asset ID	Description	Rating/Type	Location	Comment
32041	SS-Ferdinand (SS-1) Yardstone	Outdoor Substation	Plettenberg Bay	Outdoor equipment appears to not be in use. Vegetation within the yard
Images				
				

Table 4: MS Cutty Sark 1 Condition assessment

Asset ID	Description	Rating/Type	Location	Comment
16439	MS Cuttysark 1	500 kVA	Plettenberg Bay	Oil leaks and corrosion. Very loud, could possibly be overloaded.
Images				
				

Table 5: MS Shell Ultra City

Asset ID	Description	Rating/Type	Location	Comment
16438	MS Shell Ultra City	500 kVA	Plettenberg Bay	Corrosion, aged unit
Images				
				

Table 6: RMU Marine Way No.3

Asset ID	Description	Rating/Type	Location	Comment
1	RMU Thulana Hills	500 kVA	Plettenberg Bay	Oil leaks and corrosion. Very loud, could possibly be overloaded.
Images				
				

Table 7: RMU Thulana Hill

Asset ID	Description	Rating/Type	Location	Comment
16439	MS Cuttysark 1	500 kVA	Plettenberg Bay	Oil leaks and corrosion. Very loud, could possibly be overloaded.
Images				
				

Overall, the transformers within the proximity of the proposed housing development are in fair to good condition, and do not require urgent intervention. Continuous monitoring and maintenance needs to be performed by the municipality to ensure the longevity of the assets, and further inspections for any sudden changes in condition ratings due to vandalism, faults, environmental impacts etc.

1.3.2. Main Substation Capacity

The existing Plettenberg Bay town area is part of an 11 kV distribution network and is supplied from two 11 kV MV network feeders from Eskom with adequate capacity.

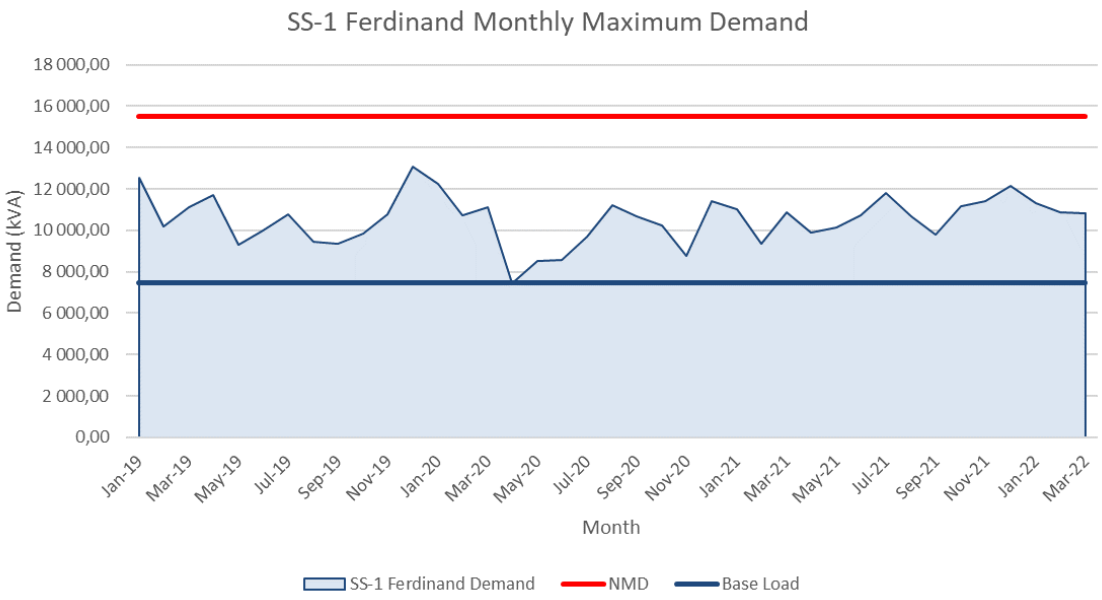


Figure 4: SS-1 Main monthly maximum demand trend

As mentioned previously, currently SS-1 Main has 2x10 MVA 66/11 kV transformers on Eskom portion of the substation. BLM receives its power through two double circuit 185mm^2 XLPE Cu conductors. As illustrated in Figure 4, the loading of the substation is approximately only 48% of the NMD. The NMD of the substation is 15.5 MVA with a base load of 7.4MVA and a maximum demand of around 13MVA as at 2022 that occurred around December 2019 within its distribution zones.

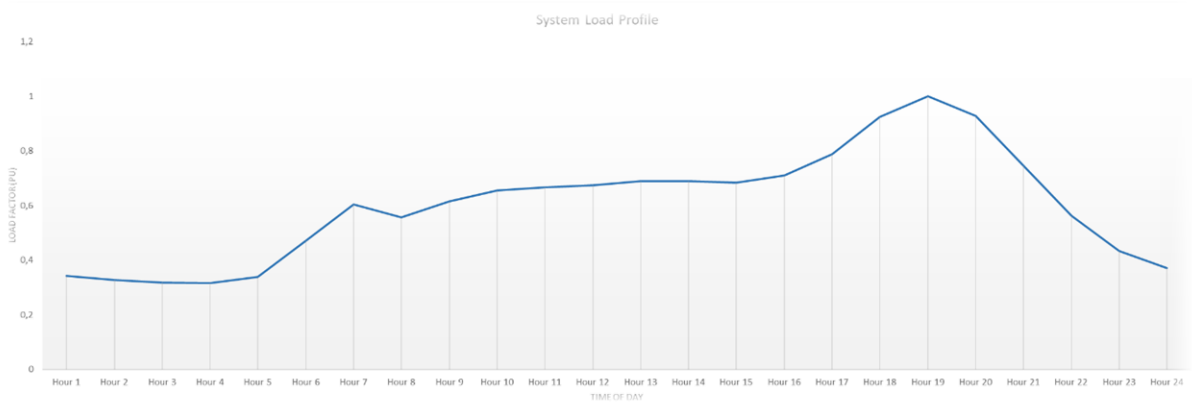


Figure 5: SS-1 Main typical load profile

The NMD is currently sufficient enough to cater for current and future additional load demands brought from developments listed in the master plan have not all come to fruition, and this has delayed the need for an NMD increase. The intake feeders from Eskom's portion of the substation are two double circuit 185mm^2 XLPE Cu conductors. Table *8* shows the installed capacity of the intake feeders.

Table 8: SS-1 Main Intake Feeders Carrying Capacity

Intake Feeder	Conductor Type	Material	Size (mm²)	Voltage (V)	Ampacity	MVA
Feeder 1 (Eskom)	XLPE	Copper	185	11 000	410	**7.81**
Feeder 2 (Eskom)	XLPE	Copper	185	11 000	410	**7.81**
Total Installed Capacity						**15.62**
Total Installed Capacity (Double Circuit)						**31.25**

The carrying capacity of the incoming feeders supplying SS-1 Main is 31.25 MVA with N-1 contingency provision of 15.62 MVA. Feeders are double circuit, however, the total installed capacity of the double circuit feeders does not take into consideration any derating. The incoming feeders from Eskom's substation is a double circuit and dedicated to SS-1 Main. Of the ten outgoing feeders from SS-1 Main, six are 95mm^2 Aluminium PILC underground cables, two are 70mm^2 Copper XLPE underground cables whilst the remaining two are 70mm^2 Aluminium PILC underground cables. There is one backbone feeder mainly supplying the connected load along Marine Way which ends at SS-Kloof. Table 9 shows the carrying capacity of these outgoing feeders supplying the electrical infrastructure surrounding Erf 2074.

Table 9: SS-1 Carrying Capacity of the Main substation Outgoing Feeders supplying the proposed housing development

Outgoing Feeder	Conductor Type	Material	Area (mm²)	Voltage (V)	Ampacity	MVA
Feeder 3 (MS Shell Ultra City)	PILC	Copper	95	11000	245	**4.67**
Feeder 2 (MS Ferdinand)	PILC	Copper	95	11000	245	**4.67**
Total Installed Feeder Capacity						**9.34**

1.3.3. MV Reticulation Carrying Capacity

The proposed housing development lies between SS-1 Main and SS-Kloof located near the corner of Kloof and High Street. The connecting feeder supplies Marine Way and the neighbouring areas. There are currently 1x315kVA and 3x500 kVA 11/0.4 kV transformers along Marine Way and 3x RMUs the local suburbs. The MV bus sections of SS-1 Main and SS-Kloof acts as a switching points for the MV reticulation forming a loop supply for the areas where the proposed development is situated. Table 10 shows the carrying capacity of the feeder forming a ring between SS-Kloof and SS-Main supplying the proposed development and its surrounding area.

Table 10: Carrying Capacity of the SS-Kloof Incoming and Outgoing Feeder towards the proposed development

Outgoing Feeder	Conductor Type	Material	Area (mm²)	Voltage (V)	Ampacity	MVA
Feeder 1 (MS Park)	XLPE	Copper	70	11000	240	**4.57**
Feeder 2 (MS Glennifer)	XLPE	Copper	70	11000	240	**4.57**
Total Installed Feeder Capacity						**9.15**

1.3.4. Existing Network POC (Point of Connection) Capacity

There is a residential property on the Erf currently supplied at 60A LV supply from a 2-Core 16mm^2 Copper PVC cable. There is an LV kiosk within the proximity of the property along Cutty Sark Avenue and supplied by MS Cutty Sark.

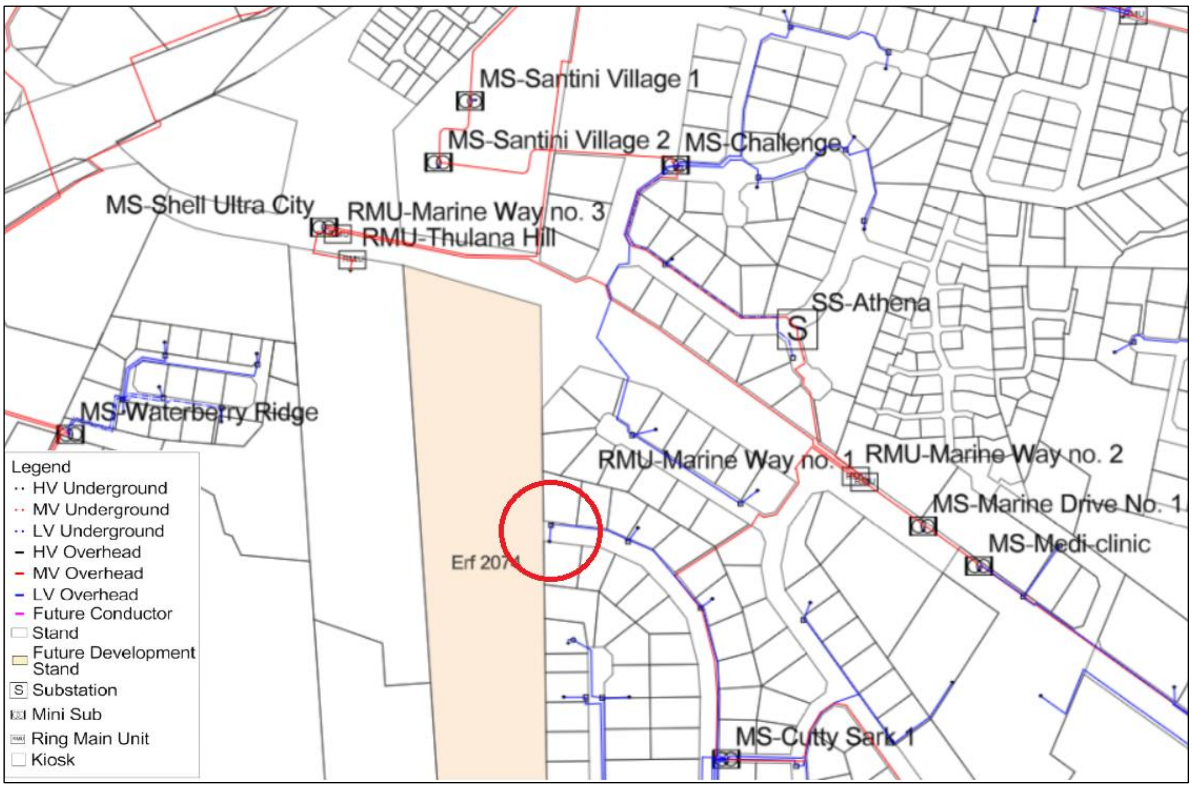


Figure 6: Existing POC for the residential property on Erf 2074

Figure 7: Existing residential property on Erf 2074 highlighted with the Red Circle

For a Large Power User (LPU), a dedicated POC is preferred and recommended for ease of NMD change and load flexibility. BLMs tariff book [1] states that "*The Bulk Supply tariff is for Consumers with a notified maximum demand of 60kVA or more or who require a supply greater than a 100Amp*

three phase circuit breaker size." Since the proposed housing development has an anticipated maximum demand of 500kVA, well above 60kVA, it is anticipated that the development will become a bulk meter customer. This allows the LPU to install the required equipment through a transformer or electrical room for transformation and control. The development does not necessarily require its own dedicated MV supply point, however, this investigation will look at the possibility of connecting this required capacity on either the MV or the LV network.

1.3.5. Existing POC MV Network Feeder Capacity

As mentioned previously in 1.3.3, there are MV feeders supplying MS Shell Ultra City, RMU Marine Way No.3 and RMU Thulana Hill that are located near the proposed housing development. This is mainly comprised of; 95mm^2 Aluminium 4 Core underground conductors running along Marine Way, and a 25mm^2 Copper 4 Core underground conductor between the RMU Marine Way No.3 and RMU Thulana Hill. The capacities of the lines are presented in Table 11.

Table 11: Carrying Capacity of the MV Reticulation Feeders between SS-1 Main, MS Shell Ultra City, RMU Marine Way and RMU Thulana Hill

Feeder	Conductor Type	Material	Size (mm^2)	Voltage (V)	Ampacity	MVA
SS-1 Main to MS Shell Ultra City	PILC	Copper	95	11 000	245	**4.67**
MS Shell Ultra City to RMU Marine Way No.3	PILC	Copper	95	11 000	245	**4.67**
RMU Marine Way No.3 to RMU Thulana Hill	PILC	Copper	25	11 000	104	**1.98**
Total Installed Feeder Capacity						**11.32**

For this study, the LV reticulation will be assessed at a high level and bulked as 3-phase. Currently the LV feeders do have sufficient capacity to carry the existing demand in the area. However, when considering the carrying capacity of the LV feeders from MS Cutty Sark 1 to the kiosks supplying the loads along Cutty Sark Avenue and the existing residential property on Erf 2074 in Table 12, there is not sufficient carrying capacity to handle the additional anticipated maximum demand presented by the proposed housing development.

Table 12: Carrying Capacity of the LV Reticulation Feeders between MS Cutty Sark 1 and the proposed housing development

Feeder	Conductor Type	Material	Size (mm^2)	Voltage (V)	Ampacity	MVA
MS Cutty Sark 1 to Kiosk 1, 2	PVC	Aluminium	95	400	192	**4.67**
Kiosk 2 to Kiosk supplying the Proposed Housing Development	PVC	Copper	16	400	115	**4.67**
Total Installed Feeder Capacity						**0.21**

The above implies that upgrades to the LV cables would be required to cater for the proposed housing development. LV feeders that can carry 500kVA demand will be required. It is not only the LV feeders that would need to be upgraded, MS Cutty Sark 1 would require upgrading to meet not only the capacity requirement of the development, but BLMs planning criteria discussed in the above sections (*Reticulation Network*) to continue supplying the existing load and supply the proposed development at LV. If this is not the case, and additional MS would need to be installed along with the LV feeder upgrades, one with a capacity higher than 800kVA, to meet the BLM planning criteria requirements.

1.4. MV Supply Point Analysis

The proposed development on Erf 2074 requires a supply point from Bitou Local Municipality to cater for the following load points:

- 63x 2-Bed Units with garages
- 165x 3-Bed Units with garages
- Refuse Room
- Security Office
- Reservoir
- Public Space
- 305 Parking Spaces

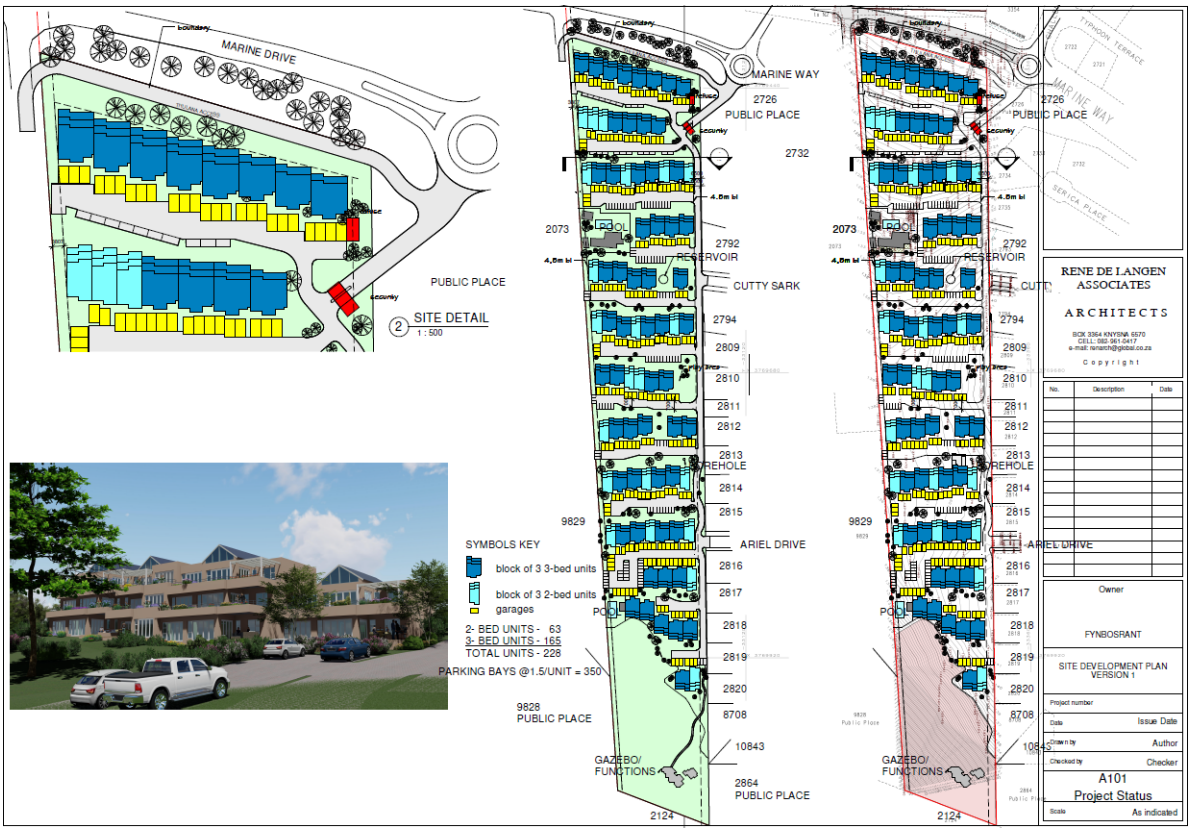


Figure 8: Fynbosrant Proposed Housing Development Site Plan [2]

The above stated amenities are included in the 500kVA provided by De Villiers and Moore Consulting Engineers. The simulation of the existing and anticipated load will be conducted at the proposed development estimated peak time of the day. The proposed development is a residential development, with this in mind, the appropriate load profile is allocated based on its landuse type and location.

As part of the electrical masterplan conducted for Bitou Local Municipality, customized load profiles were created based on billed consumptions and the customer consumption patterns, and these were compared to the Eskom standard Geospatial Load Forecast profiles [3]. Figure 9 displays the load profile assigned to the proposed development overlayed on the standard residential profile.

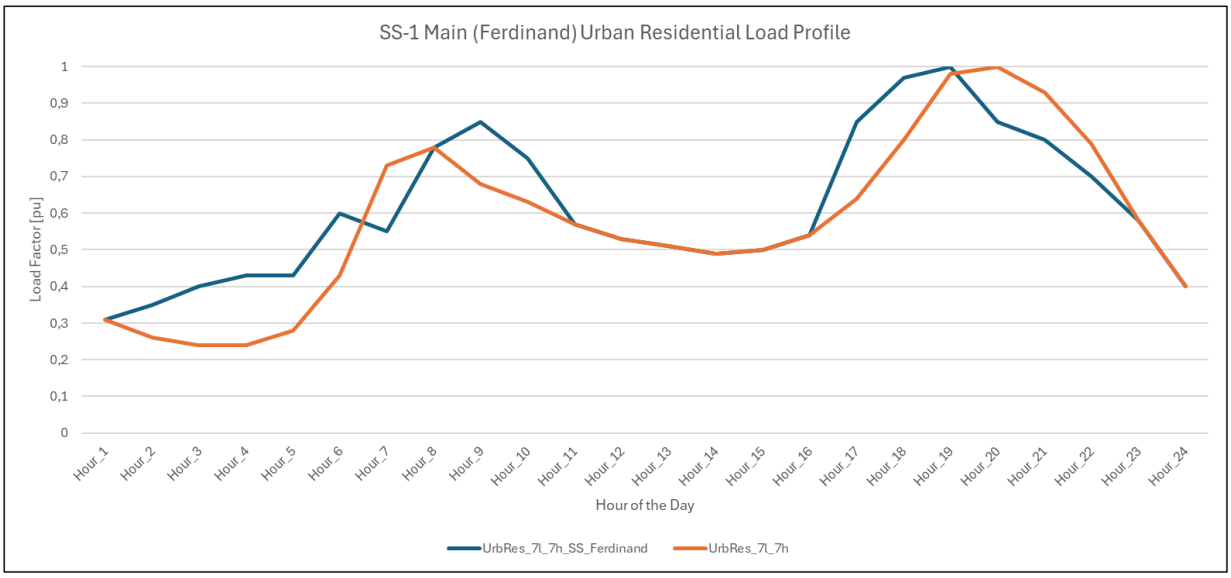


Figure 9: SS-1 Main (Ferdinand) residential flats load profile

The daily load profile for the UrbRes_7l_7h_SS_Ferdinand was computed in the SS-1 Main distribution zone. The peak hour is 19:00 in the evening.

The most preferred POC to supply electricity to the proposed development on Erf 2074 is from a MV Bulk metering point located near the proposed development along Marine Way as highlighted with a red circle on the network diagrams as shown in Figure 10 and Figure 11.

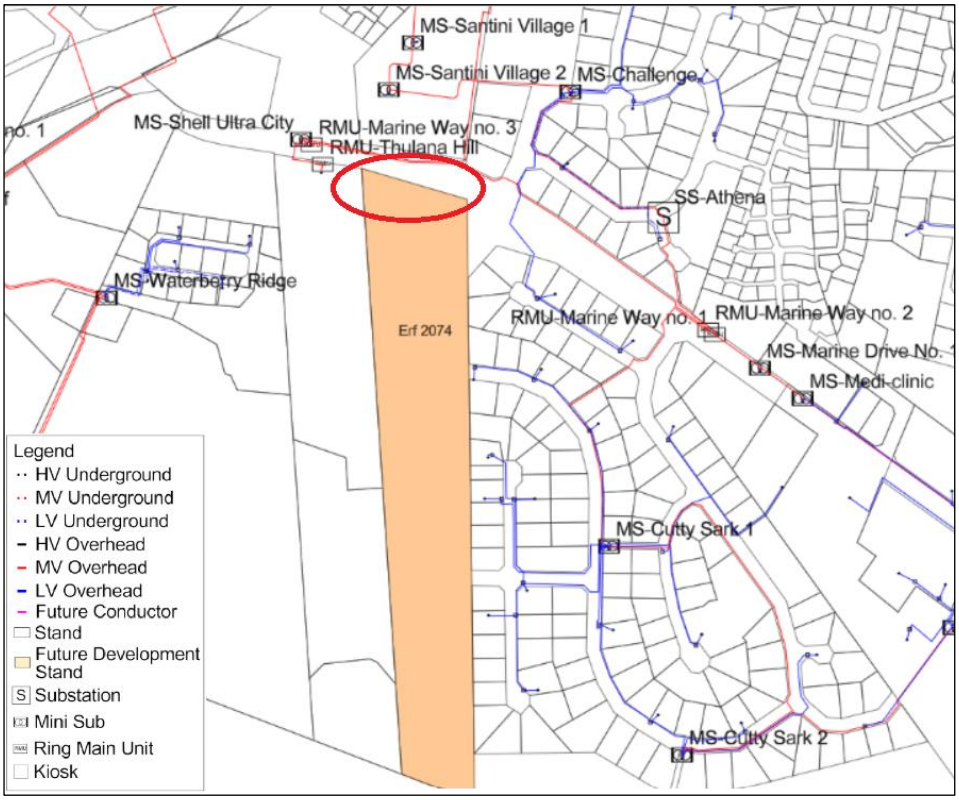


Figure 10: Preferred POC for the proposed housing development

Figure 11: Preferred POC for the proposed housing development

Based on the existing feeders within SS-1 Main, the proposed development can be supplied electricity from two routes. The first being its normal operation supply via MS Shell Ultra City, the other under N-1, when there is an outage resulting from damage or fault on any point of the feeder between SS-1 Main and RMU Marine Way No.3. To assess the performance of the existing network state within the study area, GLS analysed the network via loadflow simulations using Edisan power systems simulation software. Based on the feeder route, the following Table 13 shows the loading and voltage results for the different portions of the feeder:

Table 13: Existing MV Feeder simulation results

From	To	Conductor Type	Length (m)	Nominal Voltage (kV)	Current Rating (A)	Current Loading (A)	Conductor Loading (%)	Voltage (p.u)
SS-1 Main	**Cable Joint**	95mm² Cu PILC	607.87	11	245	123.91	51%	1.00
Cable Joint	**MS Shell Ultra City**	95mm² Cu PILC	333.21	11	245	124.09	51%	0.99
MS Shell Ultra City	**RMU Marine Way No.3**	95mm² Cu PILC	12.33	11	245	110.48	45%	0.99
RMU Marine Way No.3	**RMU Thulana Hill**	25mm² Cu PILC	66.67	11	104	4.32	4%	0.99

Based on the results, the MV conductors (from SS-1 Main through MS Shell Ultra City towards the proposed development) are loaded well below 80%. This means there is sufficient feeder capacity to supply the proposed development on Erf 156. According to NRS 048-2, the acceptable voltage per unit (p.u) for an 11 kV rated system should be between 0.95 p.u. to 1.05 p.u. under normal operating conditions. The feeder voltage (for the segments) is within the stipulated limits. This also confirms that the feeder is neither constrained nor compromised to cater for proposed load. Based on the results under Table 13, the proposed development can be connected along this feeder. The next section details customer connection methodology and results.

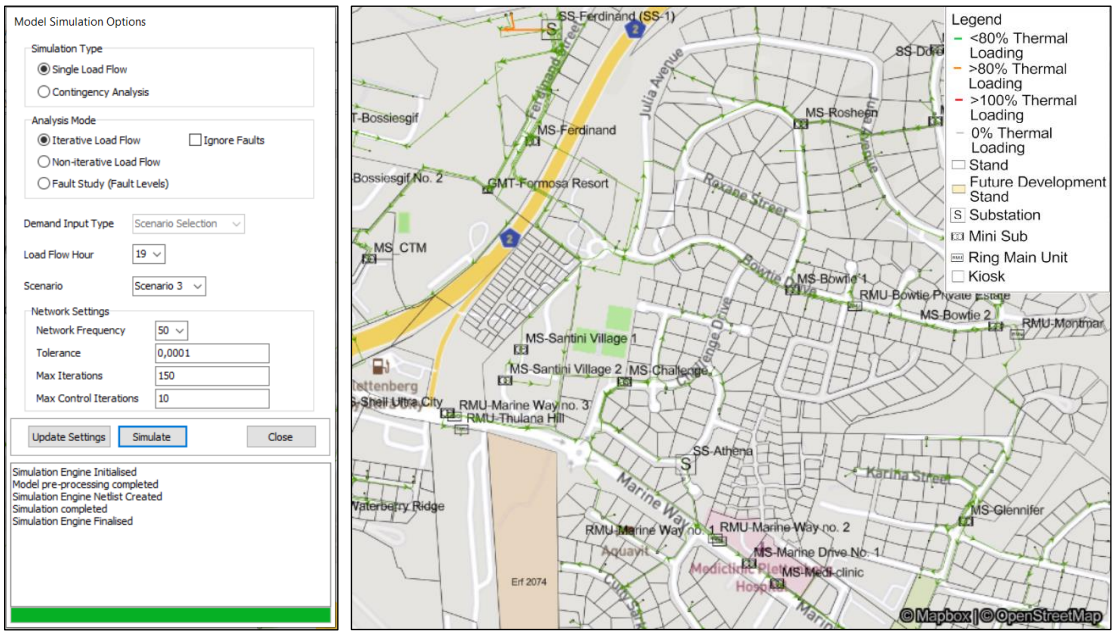


Figure 12: Existing Feeder Thermal Loading Loadflow Simulation

Scenario Simulations

The estimated load size at Erf 2074 is 500kVA being requested and thus falling around the bulk metering requirements. There appears to be an existing LV connection point on the Erf which is allocated to residential property, this LV connection point is not sufficient enough to supply the required demand. The proposed connection scenarios were formulated for simulation as described below:

- Scenario 1- MV Supply from RMU Thulana Hill
- Scenario 2- MV Supply from a new RMU connected via RMU Thulana Hill

For all the connection scenarios, the municipality has full access to the Point of Connection (POC).

1.4.1.1. Scenario 1: MV Supply from RMU Thulana Hill

Figure 13: Scenario 1 RMU Thulana Hill Supply Point

In Scenario 1, the proposed development's load is supplied from RMU Thulana Hill along Marine Way. The municipality will provide electricity to the customer via the third remaining connection on RMU Thulana Hill. The additional demand provided by the proposed development was added to the existing demand onto the RMU to simulate the impact on the conductors supplying the area.

Table 14 shows the simulation results for Scenario 1:

Table 14: MV Feeder Loading Results for Scenario 1

From	To	Conductor Type	Length (m)	Nominal Voltage (kV)	Current Rating (A)	Current Loading (A)	Conductor Loading (%)	Voltage (p.u)
SS-1 Main	**Cable Joint**	95mm² Cu PILC	607.87	11	245	143.32	58%	1.00
Cable Joint	**MS Shell Ultra City**	95mm² Cu PILC	333.21	11	245	143.48	59%	0.99
MS Shell Ultra City	**RMU Marine Way No.3**	95mm² Cu PILC	12.33	11	245	129.66	53%	0.99
RMU Marine Way No.3	**RMU Thulana Hill**	25mm² Cu PILC	66.67	11	104	30.77	30%	0.99

After the simulation, the thermal loading on all the conductors has increased in comparison to Table 13. Despite the increase in current flow in the network, the MV reticulation can easily carry this additional load presented by the proposed development as all the conductors' voltages and thermal loading fall within the prescribed limits.

Next the feeder linking SS-Main and MS Shell Ultra City is taken out of service to simulate a N-1 contingency, where alternative supply via SS-Kloof is required. Table 15 displays the results of the contingency simulation.

Table 15: MV Feeder Loading Results for Scenario 1 under N-1 Contingency

From	To	Conductor Type	Length (m)	Nominal Voltage (kV)	Current Rating (A)	Current Loading (A)	Conductor Loading (%)	Voltage (p.u)
SS-1 Main	**MS Ferdinand**	95mm² Cu PILC	209.34	11	245	243.01	99%	1.00
MS Ferdinand	**MS Bowtie 1**	95mm² Cu PILC	669.83	11	245	235.94	96%	0.99
MS Bowtie 1	**Cable Joint**	70mm² Cu XLPE	94.26	11	240	228.86	95%	0.99
Cable Joint	**RMU Bowtie Private Estate**	95mm² Cu PILC	13.22	11	245	228.88	93%	0.99
RMU Bowtie Private Estate	**MS Bowtie 2**	70mm² Cu XLPE	232.50	11	240	228.69	95%	0.99
MS Bowtie 2	**RMU Montmar**	70mm² Cu XLPE	48.12	11	240	226.66	94%	0.98
RMU Montmar	**MS Glennifer**	70mm² Cu XLPE	365.19	11	240	226.54	94%	0.97
MS Glennifer	**SS-Kloof**	70mm² Cu XLPE	606.07	11	240	217.89	91%	0.97
SS-Kloof	**MS Park**	70mm² Cu XLPE	418.73	11	240	72.78	30%	0.96
MS Park	**MS Medi-Clinic**	70mm² Cu PILC	240.43	11	207	68.94	33%	0.96
MS Medi-Clinic	**MS Marine Drive No.1**	70mm² Cu PILC	55.85	11	207	63.68	31%	0.96
MS Marine Drive No.1	**RMU Marine Way No.2**	70mm² Cu PILC	59.56	11	207	60.05	29%	0.96
RMU Marine Way No.2	**RMU Marine Way No.1**	95mm² Cu PILC	8.39	11	245	60.06	25%	0.96
RMU Marine Way No.1	**RMU Marine Way No.3**	95mm² Cu PILC	484.74	11	245	45.86	19%	0.96
RMU Marine Way No.3	**RMU Thulana Hill**	25mm² Cu PILC	66.67	11	104	31.76	31%	0.96

When assessing the MV conductor thermal loadings and voltage levels under N-1 contingency. The impact of the additional loading is that all the voltages and thermal loading remain within limits. This is despite the decrease in voltage regulation to 0.96 p.u which is within the prescribed limits and under an abnormal operating condition.

1.4.1.2. Scenario 2: MV Supply from a new RMU connected via RMU Thulana Hill

The proposed housing development's load is connected to a newly installed RMU supplied connected to RMU Thulana Hill. This scenario should yield similar results as scenario 1, however, it presents the opportunity to test a new MV conductor connection for the development.

Figure 14: Scenario 2 a newly installed RMU connected via RMU Thulana Hill

Table 16 shows the simulation results for Scenario 2:

Table 16: MV Feeder Loading Results for Scenario 2

From	To	Conductor Type	Length (m)	Nominal Voltage (kV)	Current Rating (A)	Current Loading (A)	Conductor Loading (%)	Voltage (p.u)
SS-1 Main	**Cable Joint**	95mm² Cu PILC	607.87	11	245	136.32	56%	1.00
Cable Joint	**MS Shell Ultra City**	95mm² Cu PILC	333.21	11	245	136.48	56%	0.99
MS Shell Ultra City	**RMU Marine Way No.3**	95mm² Cu PILC	12.33	11	245	122.64	50%	0.99
RMU Marine Way No.3	**RMU Thulana Hill**	25mm² Cu PILC	66.67	11	104	30.77	30%	0.99
RMU Thulana Hill	**New RMU Fynbosrant**	25mm² Cu PILC	97.92	11	104	26.46	25%	0.99

The connection of proposed development to a newly installed RMU via RMU Thulana Hill along Marine Way has not changed the current loading much on the feeders much as expected. The connection neither constrains nor causes any significant voltage drop on the surrounding feeders.

Table 17: MV Feeder Loading Results for Scenario 2 under Contingency

From	To	Conductor Type	Length (m)	Nominal Voltage (kV)	Current Rating (A)	Current Loading (A)	Conductor Loading (%)	Voltage (p.u)
SS-1 Main	**MS Ferdinand**	95mm² Cu PILC	209.34	11	245	243.35	99%	1.00

From	To	Conductor Type	Length (m)	Nominal Voltage (kV)	Current Rating (A)	Current Loading (A)	Conductor Loading (%)	Voltage (p.u)
MS Ferdinand	**MS Bowtie 1**	95mm² Cu PILC	669.83	11	245	236.28	99%	0.99
MS Bowtie 1	**Cable Joint**	70mm² Cu XLPE	94.26	11	240	229.20	96%	0.99
Cable Joint	**RMU Bowtie Private Estate**	95mm² Cu PILC	13.22	11	245	229.22	96%	0.99
RMU Bowtie Private Estate	**MS Bowtie 2**	70mm² Cu XLPE	232.50	11	240	229.04	94%	0.99
MS Bowtie 2	**RMU Montmar**	70mm² Cu XLPE	48.12	11	240	227.01	95%	0.98
RMU Montmar	**MS Glennifer**	70mm² Cu XLPE	365.19	11	240	226.82	95%	0.98
MS Glennifer	**SS-Kloof**	70mm² Cu XLPE	606.07	11	240	218.18	95%	0.98
SS-Kloof	**MS Park**	70mm² Cu XLPE	418.73	11	240	72.51	91%	0.97
MS Park	**MS Medi-Clinic**	70mm² Cu PILC	240.43	11	207	68.67	30%	0.97
MS Medi-Clinic	**MS Marine Drive No.1**	70mm² Cu PILC	55.85	11	207	63.43	33%	0.97
MS Marine Drive No.1	**RMU Marine Way No.2**	70mm² Cu PILC	59.56	11	207	59.82	31%	0.97
RMU Marine Way No.2	**RMU Marine Way No.1**	95mm² Cu PILC	8.39	11	245	59.82	29%	0.97
RMU Marine Way No.1	**RMU Marine Way No.3**	95mm² Cu PILC	484.74	11	245	45.64	24%	0.97
RMU Marine Way No.3	**RMU Thulana Hill**	25mm² Cu PILC	66.67	11	104	31.61	19%	0.97
RMU Thulana Hill	**New RMU Fynbosrant**	25mm² Cu PILC	97.92	11	245	27.19	30%	0.97

As anticipated, there is not big of a difference between the contingency results of Scenario 1 and 2, however, we do see an improved voltage regulation in Scenario 2. All of the voltages are within limits.

1.5. Recommended Scenario

The connection of the proposed housing development load to the remaining feeder within the existing RMU Thulana Hill presents little variance to the current normal operating conditions. The simulation shows us the thermal loadings and voltage dops are within the prescribed limits in all scenarios.

Both Scenario 1 and Scenario 2 are the most feasible supply points to supply Erf 2074 as they are near to the load. The proposed housing development will still require their own MS or transformer to step-down the MV supply to LV for reticulation within the development.

1.6. Implementation of Master Plan

As per Bitou Network Master Plan, the following upgrades to the existing bulk supply system from the SS-1 Main upgrade have been considered and analysed:

Bulk supply upgrades

- SS-1 Main: Completion of the additional 66/11kV 20MVA power transformer to add firm capacity.

This was proposed to accommodate future development areas within the existing distribution zone where the proposed development is situated and offer firm capacity to ensure reliability.

MV reticulation upgrades

- SS-1 Main to SS-Kloof backbone conductor: The feeder is anticipated to have a thermal loading of 87.99% in 2025 and is set to exceed its thermal capacity of 103.78% during a contingency in 2027 with the future additional load. Upgrades will be required in phases to cater for this thermal loading exceedances.

  Option 1:

  - Year 2025: Upgrade 95mm² Cu PILC cable from SS-1 to MS Ultra City to maintain capacity during contingency with a 185mm2 Cu XLPE cable (±950m)
  - Year 2025: Upgrade 70mm² Cu XLPE cable from RMU Marine Way 3 to SS-2 Kloof with 95mm² Cu XLPE cable (±776m)

  Option 2:

  - Year 2025: Install additional feeder of 300mm² Al PILCA cable from SS-1 Ferdinand to SS-2 Kloof (±2060m) to alleviate the strain on the feeders to MS Ultra City and MS Santini when either feeder is lost during contingency.

- SS-1 Main to MS Santini Feeder: The 70mm^2 Cu PILC line is anticipated to have a thermal loading of 82.3% in 2025 during contingency and is set to near exceeding its thermal loading at 99.14% during a contingency in 2026. Upgrades will be required in phases to cater for this thermal loading exceedances.

  Option 1:

  - Year 2025: Upgrade feeder to MS Santini Village from 70mm² Cu PILC to 185mm² Cu XLPE cable (±203m).

  Option 2:

  - Year 2025: Instead of separate upgrades, install additional feeder of 300mm² Al PILCA cable from SS-1 Ferdinand to SS-2 Kloof (±2060m) to alleviate the strain on the feeders to MS Ultra City and MS Santini when either feeder is lost during contingency.

This was proposed to accommodate future development areas within the existing distribution zone where the proposed development is situated and offer firm capacity to ensure reliability. The Capital Cost Schedule extracted from the 2022 Electrical Masterplan is displayed in Appendix C.

1.7. Development Schedule

An estimate draft quotation for the augmentation fees payable by the developer will need to be provided. The fee for this proposed development will need to be based on an amended maximum demand of 500kVA. The stand already has an existing 60A LV connection; however, the existing cables will not be sufficient to carry the anticipated maximum demand of the proposed housing development. GLS estimates the augmentation fee for maximum demand to be established as per the calculation below. It is important to note that the final quotation and amount for an augmentation fee will be provided by the municipality once the application has been made to the Project Management Unit (PMU) department. A formal costing will also be provided by the municipality for infrastructure upgrades.

Parameters:

- New Notified Demand = 500kVA
- ERU = 10.35 kVA
- N.F = 0.5
- D.F = 0.3

- Augmentation Fees (ERU) = R1 903 542.67 (Price from BLM Tariff Book as at December 2023 [1])

$$Augmentation\ fee = \frac{\text{Required kVAxN. F x Augmentation Fee (ERU)}}{\text{ERU x D. F}} = \frac{(500)\text{x}0.5\text{x}23\ 642.00}{10.35\text{x}0.3}$$

$$Augmentation\ fee = \text{R1 903 542.67 VAT exclusive}$$

Equation 1: Augmentation fee calculation

This cost naturally does not include the infrastructure required to create the supply point for the proposed development. The quotation will be clear in noting that the applicant's electrician must supply all material and labour required for the complete installation of the service, including, where needed a mini-substation, metering unit, RMU cabling etc.

The proposed development is planned on Erf 2074 with a total site area of 1253m^2. The zoning and landuse is classed as Residential. The development will consist of 63 2-Bed units, 165 3-Bed units, 350 Parking Bays, security office, public space and a Refuse Room. Total estimated demand for this entire development is sighted at 500kVA. A request is being made by the developer to Expedite the service connection, as the development is behind schedule.

The proposed development currently does not have plans to install small-scale embedded generation (SSEG) technology as an additional alternative source. Should this status change, the developer is aware of the current SSEG policy and should ensure that the SSEG installation is registered with the municipality. The system will abide by the necessary technical criteria before the installation commences. This SSEG installation will reduce the likelihood of any additional loading on the existing network infrastructure.

2. CONCLUSION

The erven identified for the development is situated on land within the Marine area. The network around the erven is currently mainly supplied by SS-1 Main (Ferdinand), which is the substation supplying electricity to Plettenberg Bay town area. SS-1 Main currently has enough capacity to carry the additional 500kVA maximum demand brought by the proposed development on Erf 2074. The MV feeders supplying the surrounding area have sufficient capacity to carry the additional demand at the proposed development.

The recommended solution is to supply electricity at the proposed development on Erf 2074 is through a connection to RMU Thulana Hill. The proposed development can be connected to the RMU with sufficient N-1 contingency. A metering unit needs to be installed before the proposed point of delivery at the development area.

Capital project recommended in the Electrical Masterplan conducted in 2022 are recommended to ensure reliable provision of services to customers in Bitou Local Municipality residing within the study area.

In the event of installation of small-scale embedded generation (SSEG) at the development, the SSEG system should be registered with the municipality, and the metering unit should include a bi-directional meter.

The developer will bear the costs of connecting the existing LV connections and necessary Augmentation Fees. The network supplying the proposed area has not been experiencing major trips, recurring failures, or power interruptions due to overloading.

The developer of Erf 2074 in Plettenberg Bay will be liable for the payment of a Development Contribution (as calculated by Bitou Local Municipality) for bulk electricity infrastructure as per Council

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

We trust you find this of value.

Yours sincerely

GLS CONSULTING (PTY) LTD

REG. NO.: 2007/003039/07

Per: T.K. MOKOENA

cc. De Villiers and Moore Consulting Engineers
39 Victoria Street
George
6529

Attention: Mr Rob Hall

APPENDIX A: General Notes from Bitou Local Municipality attached to GLS Bulk Electricity 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 any network upgrades, etc, presented 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.

APPENDIX B: Planning Criteria extract from Bitou Local Municipality Electrical Master Plan

The Bitou Local Municipality Electrical Master plan lists a set of planning criteria which are guided by the standard electricity network installations and the relevant guidelines. These guidelines include The Network Code within the South African Grid Code; The Electricity Regulations Act and the Distribution Code. The NRS 048-2 also provides utilities with compatibility levels for reporting power quality. The planning criteria are used to assess network capacity and determine the need for and timing of network expansion, reinforcement or re-configuration. It also was noted that there are non-negotiable regulations that all electricity users and distributors shall comply with. The following items from the planning criteria was extracted for which this proposed development will abide by:

- Equipment Loading
- Voltage regulation and selection
- Network Protection
- Network Fault Level

Equipment Loading

No electrical equipment shall be loaded above its designed rating under normal network configurations. Exception can be made for temporary abnormal conditions.

Transformers

Under normal conditions, the thermal loading of the transformers should not exceed the nominal manufacturer's name plate rating. In the case where more than one customer is supplied from a transformer, a project should be initiated when the distribution transformer reaches 80% of its capacity. For cases where the distribution supplies a single customer, the planner should inform the customer when the transformer reaches 80% of its capacity.

For each class of transformer, general limitations on current and temperature are recommended as listed in IEC354 Loading Guide for Oil-Immersed Transformers. These values provide a broad "operating envelope" which may be greatly affected by the following:

- Load Profile (Duration and Peak)
- Ambient Conditions
- Assumption of transformer thermal characteristics
- Voltage limitations
- Capability of transformer accessories

It is thus recommended that the nameplate thermal rating is used for planning purposes. Once a specific transformer approaches its nameplate thermal loading limits, an informed decision, backed by physical measurements and sample tests, should be made with regard to the upgrade strategy.

Switchgear

Normal manufacturer's name plate rating.

Overhead Lines

Under normal operating condition, the thermal loading of the overhead line should not exceed the nominal manufacturer's name plate rating. The overhead line rating based ambient temperature under normal conditions is 75 °C and 90 °C under contingency conditions. The planner should initiate a project when the thermal loading on the line reaches 100% of its normal condition rating.

Under contingencies (emergency), the overhead line rating based ambient temperature is 90 °C. The

thermal loading of the overhead line should not exceed its emergency rating. For high temperature conductors, the temperature under contingency conditions is 180 °C.

Cables

Normal cyclic rating, with maximum operating temperatures of 90 °C for XLPE cables; 70 °C for 11kV paper insulated cables.

Under normal operating conditions, the thermal loading of the cable should not exceed the nominal manufacturer's name plate rating. The planner should initiate a project when the thermal loading on the line reaches 100% of its normal condition rating.

Under contingencies (emergency), the thermal loading of the overhead line should not exceed its emergency rating.

Voltage Regulation and Selection

The steady-state criteria apply to the normal continuous behavior of a network and cover post – disturbance behavior once the network has settled. When planning a network, it is necessary to access the reactive power requirements under light and heavy load to ensure that the reactive demand placed on supply infrastructure, be it to absorb or generate reactive power, and does not exceed the capability of the supply source.

As per the section 3.4, the NRS 048 – Quality of Supply provides us with the voltage regulation as below:

- For voltages <500 V the standard voltage is 400 V three phase or 230 V single phase.
- For voltages >500 V the standard voltage is the declared voltage.

For all LV supplies <500 V Bitou LM needs to provide a standard voltage of 400/230 V, with a maximum variation ±5%. Older 380/220 V contracts are no longer valid and do not need to be enforced.

For any system voltage ≥ 500 V, the supply voltage shall not deviate from the declared voltage by more than 5% for any period longer than 10 consecutive minutes, the network shall be designed to achieve a continuous network voltage at a user's connection not exceeding the design limit 105% of nominal and falling below 95% of nominal voltage during normal and maintenance conditions.

For any system voltage < 500 V, the supply voltage shall not deviate from declared voltage by more than 10% for any period longer than 10 consecutive minutes.

Table 18: Steady-State Voltage Regulation Limits

Voltage Level [V]	Compatibility Level [%]
Voltage < 500V	±10%
Voltage ≥ 500V	±5%

Network Protection

The network shall be adequately protected via standard protection philosophies to protect equipment as well as personal safety of staff.

Network Fault Level

For safety reasons, the fault rating of any equipment shall not be less than the fault level in that part

of the network at any time and for any normal network configuration. The maximum fault levels on Bitou Local Municipality networks depend on the network and substation configuration and the upstream fault level.

Table 19: Fault Levels Limits

Voltage Level [kV]	Fault Level Limits [kA]
66	25
22	25
11	25

Equipment owned by the Bitou Local Municipality are designed to withstand these fault levels for 1 second. Depending on the new configuration of the network the above fault levels might change. A fault level analysis check should be done to re-adjust the fault level. Projects should be initiated where the fault current level exceeds 90% of the fault current level rating of equipment.

APPENDIX C: Electrical Masterplan Capital Cost Schedule:

Table 20: Estimate Network Development Capital Cost from the 2022 Electrical Master Plan

Priority	Substation Area	Project Description	Type	Category	Project Details	Total Cost (xR1000)
2023	Plettenberg Bay	Replace Battery Units	Substation Batteries	Refurbishment	Refurbish the protection back up battery storage units in SS-1 Ferdinand	**547,18**
2024	Plettenberg Bay	Replace Transformer	Transformer	Reliability	Replace the auxiliary transformer in SS-2 Kloof with a new 500 kVA transformer	**681,04**
2025	Plettenberg Bay	Replace Miniature Substation	Mini Substation	Reliability	Replace MS Beacon Isle Crescent with a new 1 MVA MS (Corrosion, oil leaks, door broken off hinges)	**910,71**
2025	Plettenberg Bay	Replace Miniature Substation	Mini Substation	Reliability	Replace MS Bowtie 1 with a new 200 kVA MS (Aged unit, minor corrosion, paint faded away)	**771,83**
2025	Plettenberg Bay	Replace Miniature Substation	Mini Substation	Reliability	Replace MS Santini Village 1 with a new 315 kVA MS (Minor corrosion, major oil leaks on radiator, paint chipped off)	**771,83**
2025	Plettenberg Bay	Replace Ring Main Unit	RMU	Reliability	Replace RMU Bowtie Private Estate with a new 11kV 3-Way RMU with a metering unit (severe corrosion, severe oil leaks)	**468,62**
2025	Plettenberg Bay	Replace Ring Main Unit	RMU	Reliability	Replace RMU Marine Way No.1 with a new 11kV 3-Way RMU with a metering unit (oil leaks)	**468,62**
2025	Plettenberg Bay	Replace Ring Main Unit	RMU	Reliability	Replace RMU Marine Way No.2 with a new 11kV 3-Way RMU with a metering unit (Severe oil leaks, enclosure door does not fit the unit)	**468,62**
2025	Plettenberg Bay	SS-1 Ferdinand	Install Switchgear	Switchgear	New 11kV circuit breakers at SS-Ferdinand (SS-1).	**1 613,93**
2024	Plettenberg Bay	SS-1 Ferdinand	Install Switchgear	Switchgear	New 11kV circuit breaker at SS-Kloof	**3 227,87**
2026	Plettenberg Bay	SS-1 Ferdinand	Replace Doors	Substation	Replace the existing SS-2 (Kloof) wooden door and lourves with new steel door and lourves.	**80,00**
2026	Plettenberg Bay	SS-1 Ferdinand	Replace Doors	Substation	Repaint SS-2 (Kloof) internal wall and re-apply epoxy coating to the floors.	**40,00**
2026	Plettenberg Bay	SS-1 Ferdinand	Install Switchgear	Switchgear	Replace existing 5 x 11kV oil type circuit breakers with new 5x 11kV SF6/vacuum type circuit breakers.	**4 034,84**
2027	Plettenberg Bay	SS-1 Ferdinand	Install Switchgear	Switchgear	Upgrading 800A rated busbars of 9 x 11kV circuit breakers to 1200A rated busbars (SS-1)	**7 262,70**
2025	Plettenberg Bay	SS-1 Ferdinand	Upgrade Cable	Cable	Upgrade 95mm² Cu PILC cable from SS-1 to MS Ultra City to maintain capacity during contingency in 2024 with 185mm2 Cu XLPE cable (1429.37m)	**1 875,95**
2025	Plettenberg Bay	SS-1 Ferdinand	Upgrade Cable	Cable	Upgrade 70mm² Cu XLPE cable from RMU Marine Way 1 to MS Park with 95mm² Cu XLPE cable in 2024 (778.523m)	**369,29**
2025	Plettenberg Bay	SS-1 Ferdinand	Upgrade Cable	Cable	Upgrade feeder to Santini Village from 70mm² Cu PILC to 185mm² Cu XLPE cable in 2024 (202.52m)	**262,37**
2026	Plettenberg Bay	SS-1 Ferdinand	Additional Transformer	Transformer	Install additional 20MVA 66/11kV transformer in 2025	**10 646,36**
2027	Plettenberg Bay	SS-1 Ferdinand	Increase NMD	Substation	Increase the substation NMD to 20MVA in 2026	**-**

(* 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 cost)

de villiers & moore
CONSULTING ENGINEERS
Electrical, Mechanical, Fire

Our Ref: E5297L/L003 Your Ref:
Date: 2024-10-16

Planning Space Town and Regional Planners
23 Bowtie Drive
PLETTENBERG BAY
6600

Attention: Ms L Botha

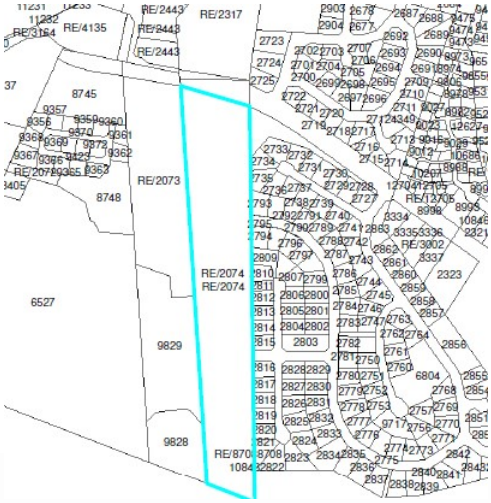
Madam

PLETTENBERG BAY: ERF 2074: FYNBOSRAND
PROPOSED HOUSING DEVELOPMENT
ELECTRICAL RETICULATION BULK SERVICES: REV 000

This report has been compiled by de Villiers & Moore Consulting Engineers, having been instructed our Client, Mr G de Vos, with purpose of informing the team of the extent of the electrical bulk services required to be put into place to provide the electrical supply to the Development.

LOCATION

The Development is situated on erf 2074 in the administrative district of Bitou Municipality.



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SUPPLY AUTHORITY
The Development is situated in the electrical supply area of Bitou Municipality.

DRAWINGS AND REPORTS
Attached to this report is the report received from GLS Consultants dated 2024-10-10.
Also attached is the Architect's SDP Version 1, reference A101, which was used to determine the electrical capacity required.

EXISTING ELECTRICAL DISTRIBUTION NETWORK
There are existing 11kV cables in the area as well as an existing RMU, RMU-Thulana, which has a spare feeder isolator. GLS Consultants confirmed in their report that there is capacity on the network to supply the required demand from this point of supply.

DEMAND REQUIREMENTS
The demand calculated for the Development is estimated on the load calculation document hereunder and was taken into account when calculating the Development Charges as well as the capacity on the existing network.

PLETTENBERG BAY
FYNBOSRANT HOUSING DEVELOPMENT
ELECTRICAL MAIN SUPPLY LOAD SCHEDULE ESTIMATE

Type	Number	ADMD	TOTAL
2 Bedroom Units	63	2,00	126
3 Bedroom Units	165	2,50	413
Communal Lighting	1	10,00	10
Area Lighting	1	5,00	5
TOTAL ADMD			554

ESTIMATED LOAD REQUIRED = 500kVA (will be limited to this)

PROPOSED ELECTRICAL MV DISTRIBUTION NETWORK
The medium voltage network currently in place is sufficient to supply the intended Development.

Points of Connection and Supply
There is an existing ring main unit, RMU-Thalana, indicated above, which has a spare feeder isolator. This isolator will be used as the Point of Connection to the Development.
A new 25mm^2 (Cu) PILC 11kV medium voltage cable will be installed from this isolator to a Medium Voltage Bulk Metering Unit (MVBMU) which will be situated at the entrance to the Development. This is the Point of Supply to the Development.
From this MVBMU a 25mm^2 (Cu) PILC 11kV medium voltage cable will supply a new 500kVA mini-substation at the approximate load centre of the Development.
Low voltage 1000/600V PVC SWA PVC cables will be installed in a distribution network to each individual apartment.

METERING AND RESPONSIBILITY

On completion of the installation and after the one year guarantee period, the responsibilities will be as follows:

The Bitou Municipality will be responsible for the maintenance of the network from RMU-Thulana up to and including the MVBMU.
Metering of the Development by Bitou Municipality will done at the meter in the MVBMU.

The Developer/HOA will be responsible for the maintenance of the network from the downstream side of the meter in the MVBMU including the link MV cables, mini-substation and associated low voltage network.
Internal metering and collection of the revenue within the Development will be the responsibility of the Developer/HOA.
To this end there are private metering companies which can assist with this service.

ENERGY SAVING MEASURES

The use of the following equipment will be made mandatory
Water and sewage pumps to be supplied with energy efficient motors and vsd motor control.
Water heating to be done using gas or heat pumps.
Lighting to make use of LED lamps only.
Use of motion sensor lighting control.
Photovoltaic Systems will be encouraged.

COST ESTIMATE AND ELECTRICAL DEVELOPMENT CHARGES

The Developer will be responsible for all costs associated with the supply and installation of the electrical infrastructure required to service the Development.
A detailed design of the proposed medium voltage, low voltage, street lighting and earthing will be submitted to Bitou Municipality for approval prior to construction commencing on site.
A Service Level Agreement (SLA) will be compiled and signed off by both the Developer and the Municipality.
A detailed cost estimate will be submitted as part of a different process.

The estimated Electrical Development Contributions for the current financial year has been calculated using the current SDP and are based on the current published tariffs and applicable formulae.
The Development Charges amount to R1 903 542-00 + Vat.

It is noted that the amount is adjusted each year at the end of June in line with the tariff increases for that year.

IMPACT

1. Impact on Existing Electricity Consumers
   The development will have no detrimental effect on the quality of supply to the existing consumers due to the fact that the development will be supplied by its own substation which in turn will be supplied from the 11kV system.

2) Impact on Distribution Authority Operating Costs
   The development will have no negative effect on the electrical costs of the distribution authority, due to the fact that the complete electrical infrastructure required for the development will be supplied and installed by the Developer.

3) Impact on the Environment
   Services will be located within the road reserves to prevent additional disturbances of vegetation.
   The internal electrical infrastructure design will take into account energy saving technologies which may include load control, the use of energy efficient lighting, the use of alternative means of water heating and inverter type HVAC equipment

CONCLUSION

We trust the information provided is of sufficient detail to allow for an informed decision to be made. Please do not hesitate to contact the undersigned should additional information be required.

Yours faithfully

R G HALL Pr Eng
DE VILLIERS & MOORE (PTY) LTD