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URBAN COUNTRY ESTATE:

REMAINDER ERF 6182; ERF 6179; ERF 6156 of LAPSED ERF 19374

Heather Park, near Blanco,
George,
Western Cape

ENGINEERING SERVICES DEVELOPMENT REPORT

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Heather Park, near Blanco,
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ENGINEERING SERVICES DEVELOPMENT REPORT

1. Introduction.

CHEL Building & Civil Services was appointed by the Developer, Urban Country Estate (Pty) Ltd. to prepare a bulk engineering service, feasibility report for the proposed Development of the Urban Country Estate in Heather Park, near Blanco, George.

The bulk engineering services, feasibility report is required for the EIA and rezoning applications and to obtain confirmation from George Municipality that the bulk services are available for the proposed development.

Urban Country Estate (Pty) Ltd has acquired remainder portion ERF 6182; ERF 6179; ERF 6156 of LAPSED ERF 19374 and is planning a private gated development with seventy-seven (77) freehold units and forty (40) complex rental units on this property.

This report sets out the proposed engineering bulk infrastructure which will be necessary to support this proposed development of 117 units which is envisioned to be constructed in four (4) phases.
See **Annexure B** for the Preliminary Site development Plan.

2. Site Description

2.1 Location

Heather Park, near Blanco falls under the jurisdiction of the George Local Municipality and is part of the Garden Route District. The town of George is 429 km East of Cape Town and 324km West of Port Elizabeth/ Gqeberha, via the N2.

The geographical position is approximately 33° 45′ latitude and 22° 50′ longitude.

Access to the site is gained via a black topped collector road, named Plantation Road that is accessed from the black topped national road N12 CJ Langenhoven Road that routes to Oudtshoorn, Northeast past the planned development site.

The exact location of the Erfs on which the development is planned is shown on the locality plan included in this report as **Annexure A.**

2.2 The Site

Remainder portion of ERF 6182; ERF 6179; ERF 6156 of LAPSED ERF 19374 forms the Development footprint that is 5.63418 Ha with green/park spaces taking up approximately 0.85 Ha. The proposed development is bounded on the south-eastern side by the suburb of Heather Park off from Plantation and Candlewood drive. On the western side of the site the Malgas River separates the development that falls within the Heather Park suburb from the Blanco suburb.

The development will have a grand dual entrance/ exit facility with 24-hour security and automated access control. The green/ parks will contain indigenous botanic gardens with seating/picnic arrangements in tranquil garden settings.

The Site is characterised by a gentle sloping landscape across the site that is surrounded by tree forest on the northern eastern, western and southwestern sides of the site. The site consists of mostly grass land and small brush, with isolated small trees scattered across the site. A steep drop-off slope is found along the Southwestern side of the site that slopes towards the Malgas River that is approximately 40m West of the Site boundary line. This slope provides access to a lower elevation area. The slopes will require small to moderate slope stabilization and is planned in the form of terraced platforms with staggered stabilized slopes and retaining structures. The retaining structures will be a combination of Timber logs and columns to gabion baskets and sections of Terraforce walls.

A Bulk Municipal water line crosses the site and will be incorporated as far as possible within the planned Site Development Plan layout. Relocation could be needed but will first be discussed with the Development and Infrastructure Planning department of the George Municipality. The cost thereof to be discussed with George Municipality in the form of an offset against the Development Contribution Levies.

A very large eucalyptus tree is located within the perimeter of the property, near the south, eastern side of the development that borders onto the existing Heather Park suburb. There is also an incomplete dwelling found approximately 35m south of the large eucalyptus tree. This incomplete dwelling will be demolished and removed from site. The Tree will also need to be felled by suitably qualified tree fellers under instruction of an Arborist under the approval of the Department Environmental Affairs and Development Planning.

The site falls from the Highest point of 242.0 m above Mean Sea Level to an elevation of 236.0 m on the Southern tip of the site that adjoins onto Homewood Street. The average slope of the site is 1.02%. There does not seem to be elevation problems that could be encountered. Suitable allowances will be made in the design and construction for the slope angles required for the services.

2.3 Geology

A detailed geotechnical investigation was conducted by Outeniqua Geotechnical Services. Testing and sampling were done in accordance with the Generic Specifications GFSH-2 for Geotechnical Site Investigations for Housing Developments as published by the National Department of Housing and the Site Investigation Code of practice as published by the geotechnical Division of SAICE and further to SANS-634, Geotechnical Investigations for Township Development.

The study conducted eight (8) data points randomly spaced and selected over the 5.63418 Ha site. The testing that was conducted consisted of six (6) foundation indicator tests, four (4) MOD AASHTO/ CBR/ Indicator tests as well as in situ cone penetrator (DCP) tests. All testing was conducted at a SANAS-Accredited soils laboratory (Outeniqua Lab) in accordance with SANS 3001 and ASTM methods.

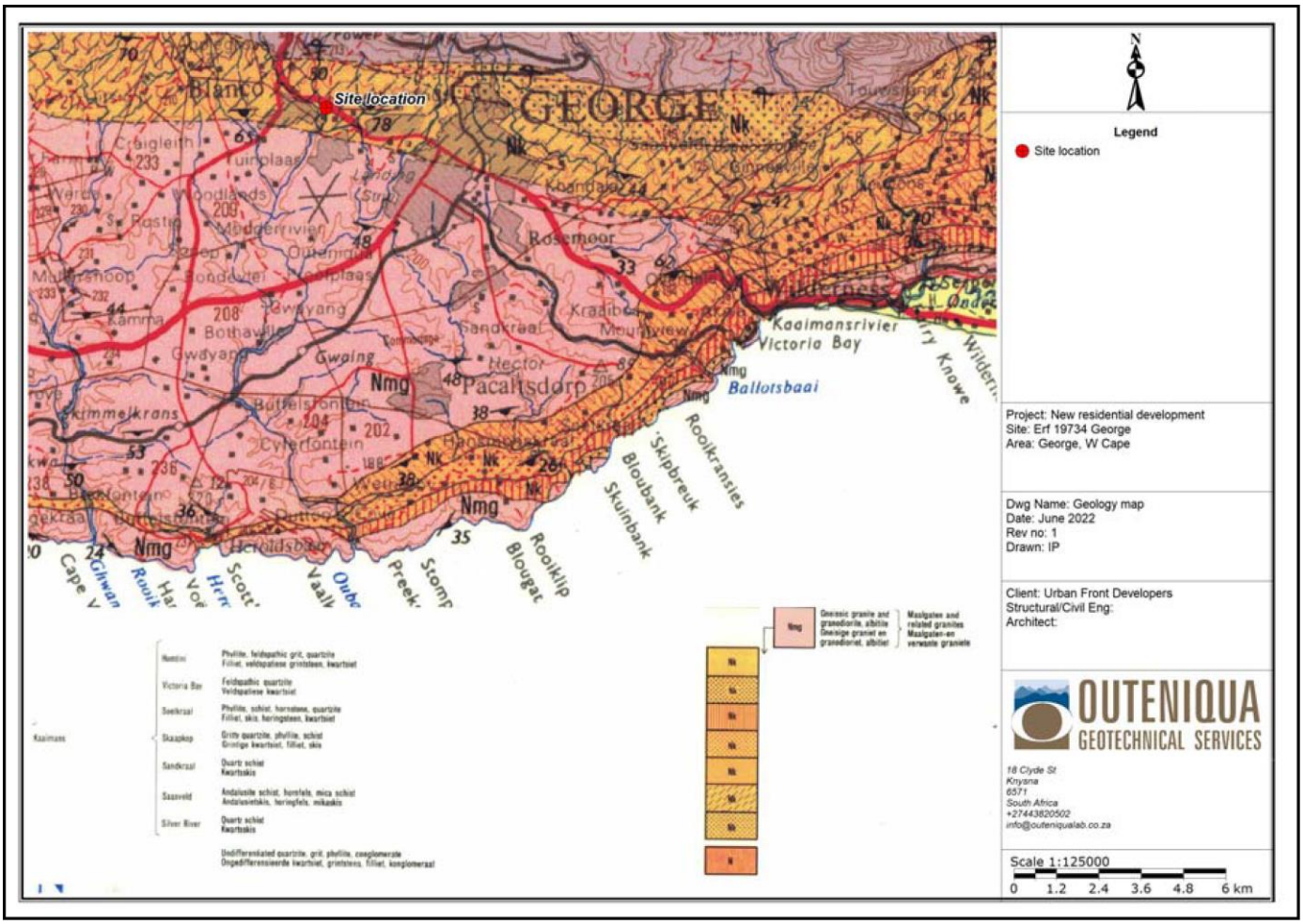

Figure 1: Geological Map of the site.

It is noteworthy to point out that the site is underlain by schist and hornfels of the Saasveld formation of the Kaaimans Group, which had been intruded by granite of the George pluton to the south of the site (Figure 1). The risk of seismic activity in the area is low. The geology of the site was generally considered suitable for urban development purposes with due consideration to local geotechnical constraints.

Test pits revealed variable soil profiles but was generally described as an assembly of fine grained, colluvial soils, including clayey silts and fine sand with sporadic gravel, overlying a sporadic pedogenic horizon (ferricrete nodules in clayey sandy matrix), which was then underlain by clayey sandy gravelly residual soil derived from the complete weathering of the underlying feldspathic sandstone or hornfels.

The underlying rock was only encountered in a few of the pits. The general soil profile was recorded as follows:

- 0-500mm: Moist to very moist, dark brown, soft to firm, intact, clayey silt with abundant roots (topsoil).
- 500-900mm: Moist, light brown, medium dense, intact, silty fine sand, colluvium.
- 900-1100mm: dark red orange, medium dense, pin holed & voided, clay & sandy gravel (ferricrete), pedogenic.
- 1100-2000mm: Moist, mottled light brown & dark red orange, stiff, micro shattered & slicken sided, silty clay with scattered gravel & cobbles, residual (completely weathered feldspathic sandstone – see Figure 2).
- >2000mm: Blotched grey & red orange, highly to completely weathered, highly fractured, soft rock, feldspathic sandstone/hornfels.

Figure 2: Active residual clay extracted from the test pits.

No Significant ground water tables were encountered in any of the test pits. Slight water seepage was encountered in Test Pit 5. TP 5 happens to be near the 450mm diameter Bulk Municipal water supply line that crosses the site. It is recommended that the area surrounding the pipe be investigated for any possible leakages.

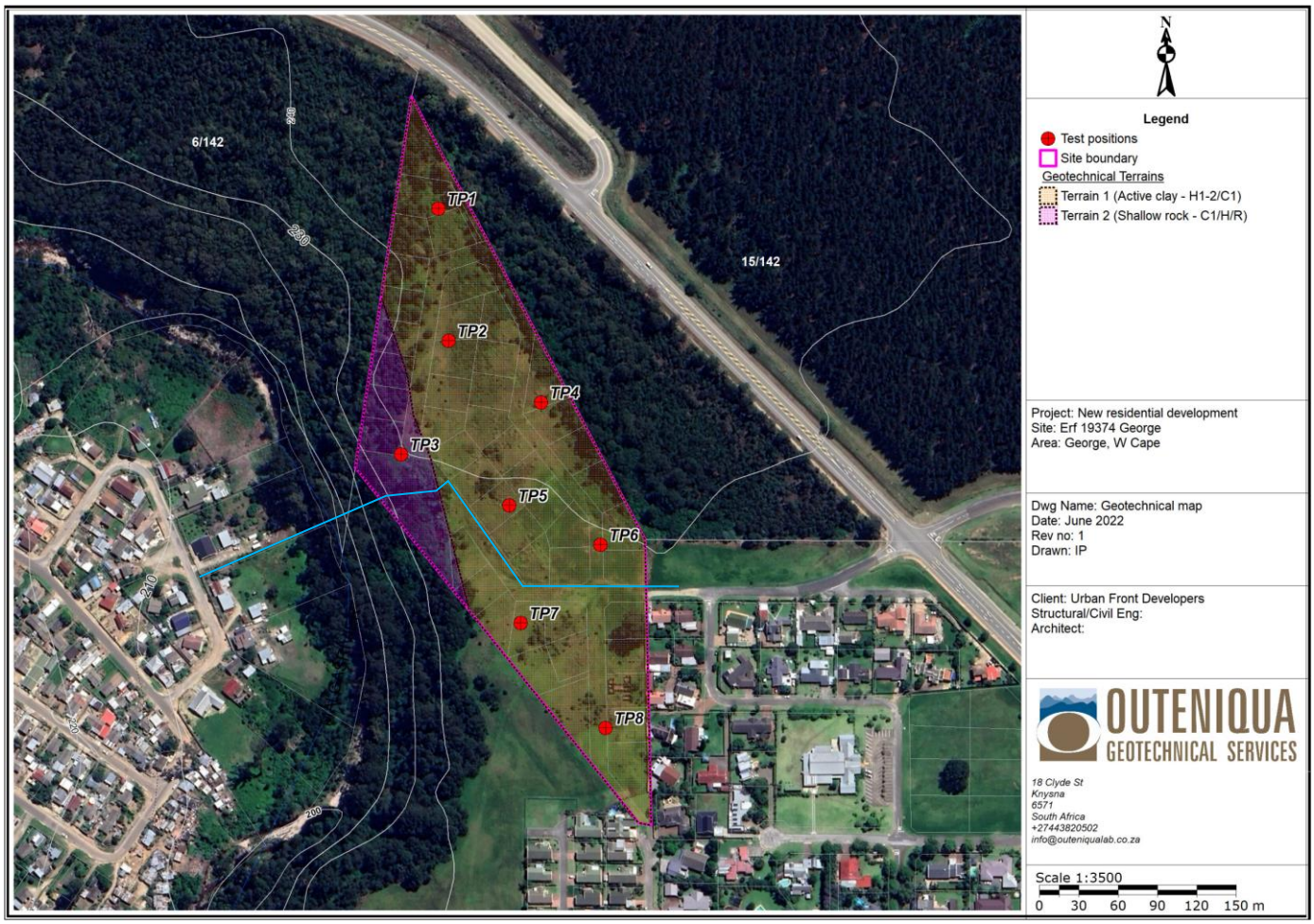

Figure 3: Soil Investigation Test Pit locations. **BLUE** line represents the 450mm dia Municipal water Supply line across the development site.

The DCP tests indicated a generally loose/soft soils in the upper 0.8m, which broadly correlated to the transported horizons, but the tests consistently improved below this depth to medium dense or dense consistency. The tests indicated allowable bearing capacities in the range of 125-150kPa below a nominal founding depth of 0.8m, with less than 10mm anticipated settlement (immediate or collapse-induced). The entire site was classified according to SANS 10400-H as C1.

For access roads and parking areas, it is recommended that allowance is made for importation of selected subgrade material of at least G7 quality to improve the road subgrade, below the conventional road layer works (subbase/base layers).

The site is generally suitable for the proposed development in terms of the geology but there are some geotechnical constraints which may have an effect the engineering. The constraints will be overcome by making allowance for it in the design and construction of the development.

2.4 Climate

George in the Garden Route is the oldest and central city as well as industrial hub of the South African Garden Route. George is approximately 15km inland and lies in close proximity to the majestic Outeniqua Mountains. The mountain tends to affect weather patterns and humidity levels. Suburbs close to the mountain experience more humid conditions than those further away. In general George temperatures are slightly lower than neighbouring towns Knysna or Mossel Bay. The close proximity to the mountain, which tends to bank cloud formations also affects temperature and rainfall. The effect of the mountain and close proximity to the coast tends to alter weather patterns pretty rapidly

The town has a Mediterranean maritime climate, with moderately hot summers, with mild to chilly winters. George boasts one of the richest rainfall areas in South Africa. Rains usually occur during the winter months, which are brought on by the humid sea-winds from the Indian ocean. As a general rule the Southern Cape & Garden Route's temperate weather falls between two climatic regions of summer and winter rainfall, which results in rain falling mostly at night, which tends to keep the area perennially green.

- Spring usually can be felt toward the end of August into September. October tends to experience a drop in temperature before full summer sets in. General 10-19ºC
- Summer is considered to be between the months of November to March, which are warmer, with December to February seeing mid-summer with daily temperatures ranging between 24-30ºC. February - March usually sees strong berg winds, which on odd days reach a peak where temperatures rise to as much as 38ºC.
- Autumn is commonly persistent pleasant weather and temperatures start cooling from about April, however the pleasant conditions may last until June. General 14-22ºC
- Winter runs through June, July and August. Temperatures usually fluctuate between 8-17ºC. In general, the barometer seldom drops below 10ºC. Most days are warm with evenings colder.

The site falls within the Temperate/ moderate coastal climate region of South Africa. The George climate is generally classified as mild and generally warm and temperate. There is significant rainfall throughout the year in George. Even the driest month still has a significant amount of rainfall. This location is classified as Cfb by Köppen and Geiger.

The average temperature in George is 16.7 °C. The total rainfall for the area in a year is around 657 mm. The least amount of rainfall occurs in June and July. The average in this month is 43 mm. Most precipitation falls in November, with an average of 75 mm. The number of thunderstorms in the area ranges between 5 to 10 no per annum. The month with the highest number of rainy days is November (10.23 days). The month with the lowest number of rainy days is May (7.0 days).

George Climate Summary

	January	February	March	April	May	June	July	August	September	October	November	December
Ave Temperature ˚C	20,2	20,4	19,4	17,5	15,7	13,7	13,2	13,5	14,3	16,0	17,2	19,1
Min Temperature ˚C	16,9	17,2	16,1	14,0	12,1	9,8	9,3	9,6	10,6	12,4	13,7	15,8
Max Temperature ˚C	24,0	24,2	23,3	21,5	20,0	18,1	17,6	17,9	18,6	20,0	21,0	22,9
Precipitation/ Rainfall (mm)	55	48	60	60	48	43	43	56	48	67	75	54
Humidity (%)	76	77	76	75	72	69	69	71	72	74	74	75
Rainy Days (d)	6	7	7	6	5	5	6	7	7	7	7	8
Ave Sun Hours (hours)	8,7	8,2	7,8	7,7	7,7	7,4	7,4	7,8	8	8,3	8,9	9,1
Ave Wind Speed (km/hrs)	12,23	11,75	10,94	10,62	11,43	12,55	12,71	12,39	12,39	12,39	12,55	12,39

Table 1: Climate summary for George

The temperatures are highest on average in February, at around 20.4 °C. In July, the average temperature is 13.2 °C. It is the lowest average temperature of the whole year. The month with the highest relative humidity is February (76.74 %). The month with the lowest relative humidity is July (69.05 %).

The month with the most hours of sunshine is December with an average of 9.09 hrs of sunshine. In total there is 281.81 hrs of sunshine throughout December. The month with the fewest daily hours of sunshine in George is January with an average of 9.09 hours of sunshine a day. In total there are 281.81 hours of sunshine in January.

Around 2952.62 hours of sunshine are counted in George throughout the year. On average there are 97.07 hours of sunshine per month. It is therefore favourable for the incorporation of Solar Renewable Energy solutions into the planned development.

There is marked seasonality in wind trajectories. In winter, the wind blows from west to southwest, driven by the northward trajectory of the westerly belt, and in summer it blows easterly to southeast, when atmospheric circulation is dominated by the tropical easterlies. The windier parts of the year are from May through to February with an average wind speed of 11.75km/hr. The windiest month is July with an average Wind Speed of 12.7km/hr

The Development Infrastructure will be designed for both 1:20 year and 1:50 year floods, with an interval of 1: 5 years occurrence.

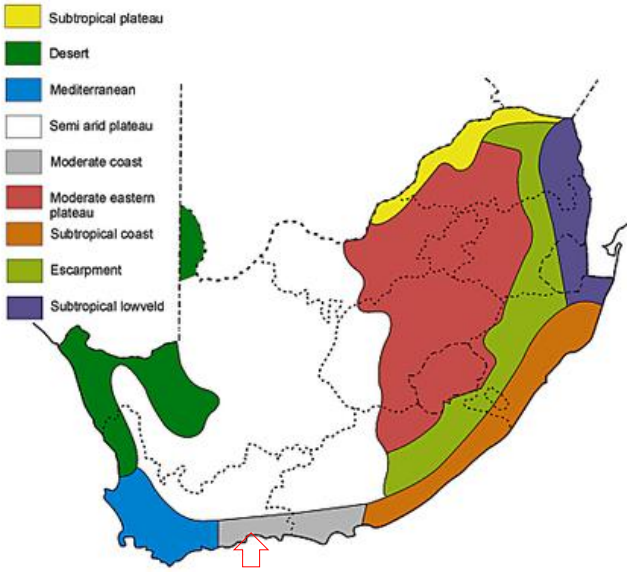

Figure 4: Climate zones of South Africa.

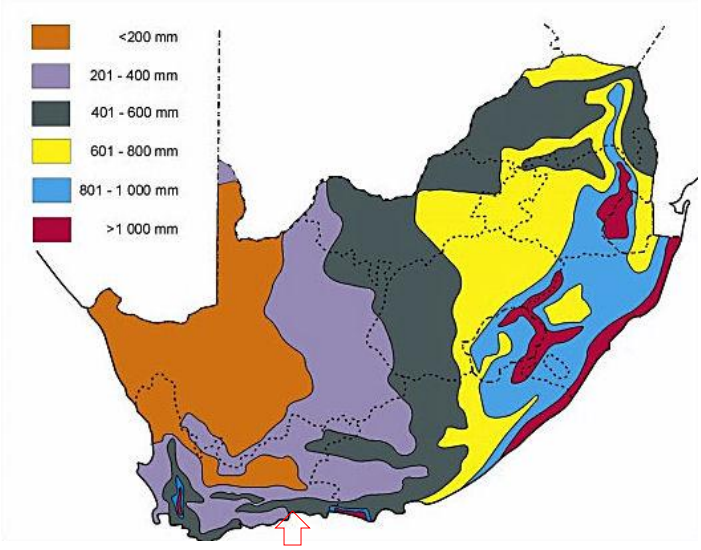

Figure 5: Rainfall zones of South Africa.

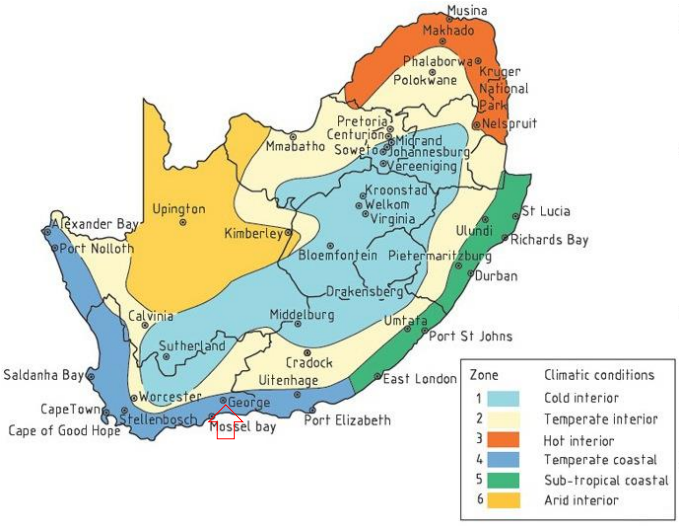

Figure 6: Climate conditions of South Africa.

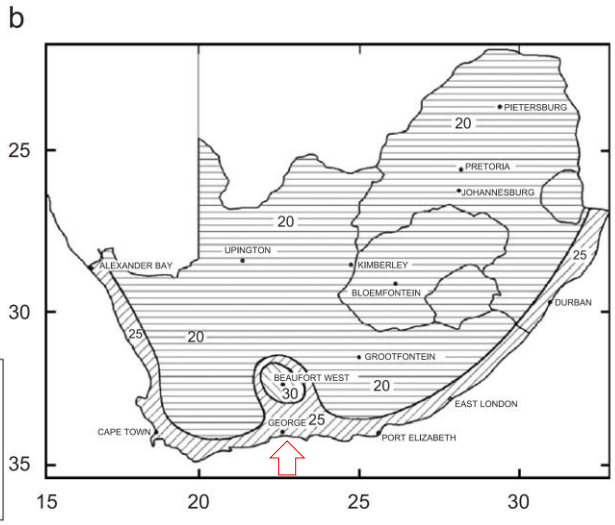

Figure 7: Maximum mean hourly wind speed – 50-year return period.

3. Existing Services

Existing services layouts for the George area directly opposite the site was obtained from the offices of GLS Consulting Engineers in Stellenbosch, with approval from Land Development Manager for Civil Engineering Services of the George Municipality.

Bulk Water supply Line.

There is a 450mm dia GRP water pipeline that runs across the proposed development site that was installed within the road reserves of the LAPSED ERF 19374 site development layout.
(Refer to Picture 5 below)

The site development plan has been adjusted to accommodate the pipe alignment along the main entrance road and have minimal impact on the estate and the planned sites.

It is recommended that this pipeline be accommodated within the road reserves as far as possible. As far as practically possible and as required, extra supporting filling or cover protection will be provided to clearly demarcate this pipe service. The pipe will be crossing the estate roads in

The pipe will be opened by hand in designated areas to allow visual contact with the pipe to instil an awareness for the pipe with the contracting team throughout the Civil Infrastructure construction process.

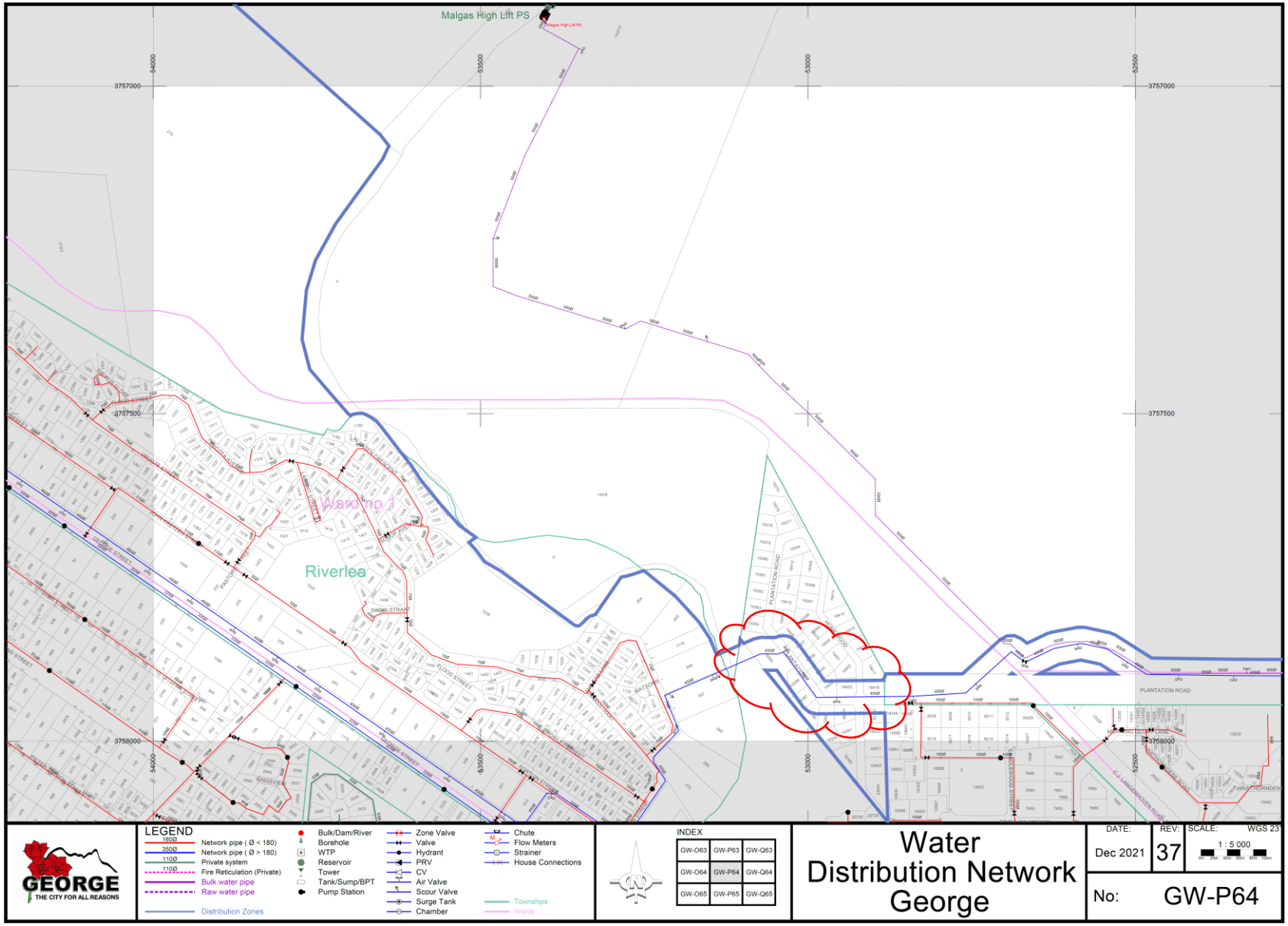

Figure 8: 450mm dia Municipal Bulk Supply GRP Pipe that runs through the planned development site.

Proposed Water Connections

As indicated by GLS Consulting Engineers, there are two (2) water points that can be connected into. This will allow for a ring feed within the planned development. This will ensure equal pressure within the network. The first connection point is near the planned entrance along the Plantation Road, while the second connection point is to a midblock water supply line, with a pump station in the neighbouring Heather Park, Homewood Development, Tommy Joubert Laan, that is near the South-eastern end of the planned development. These water lines are of 110mm and 90mm diameter uPVC respectively. *(Refer to Picture 6 below)*

Bulk connections to these water services would be required from Council. Details of the connection would be as per Council's requirements and specifications.

Proposed Sewerage Connections

As indicated by GLS Consulting Engineers, there are two (2) Sewer points that can be connected into. This is required in order to accommodate the lower, south-eastern part of the planned estate to the connection point in the neighbouring Heather Park, Homewood Development, Tommy Joubert Laan. This connection is a 110mm diameter sewer main. As confirmed with GLS Consulting Engineers the connection of the planned phase one (1) of the development consisting of twenty-two (22) units will not exceed the hydraulic flow of this network system.

The 2nd connection that will connect the planned phase two (2), three (3) and four (4) and is located along the Candlewood Street, off from Plantation Road. This connection is a 160mm diameter pipe. Again, as confirmed the hydraulic flow of this network would not be exceeded with the connection of the estate to this part of the network. *(Refer to Picture 7 below)*

Bulk connections to these water services would be required from Council. Details of the connection would be as per Council's requirements and specifications.

Stormwater

There is no existing stormwater system within the perimeter of the site, nor the Plantation Road. Only a shallow earth dish drain is found along the northern side of the Plantation Road that seems to create a pool of water near the Candlewood Street intersection with Plantation Road.

Storm water would need to be attenuated within the boundaries of the development and released at low velocities into the Malgas River. The stormwater release from the attenuation ponds would be done in a controlled manner through a system of energy breaking structures down the steep slope within the identified green public open space, to a lower elevated stormwater attenuation pond system from where it will be released into the Malgas River.

This system would be designed as per Council's requirements and specifications for their approval.

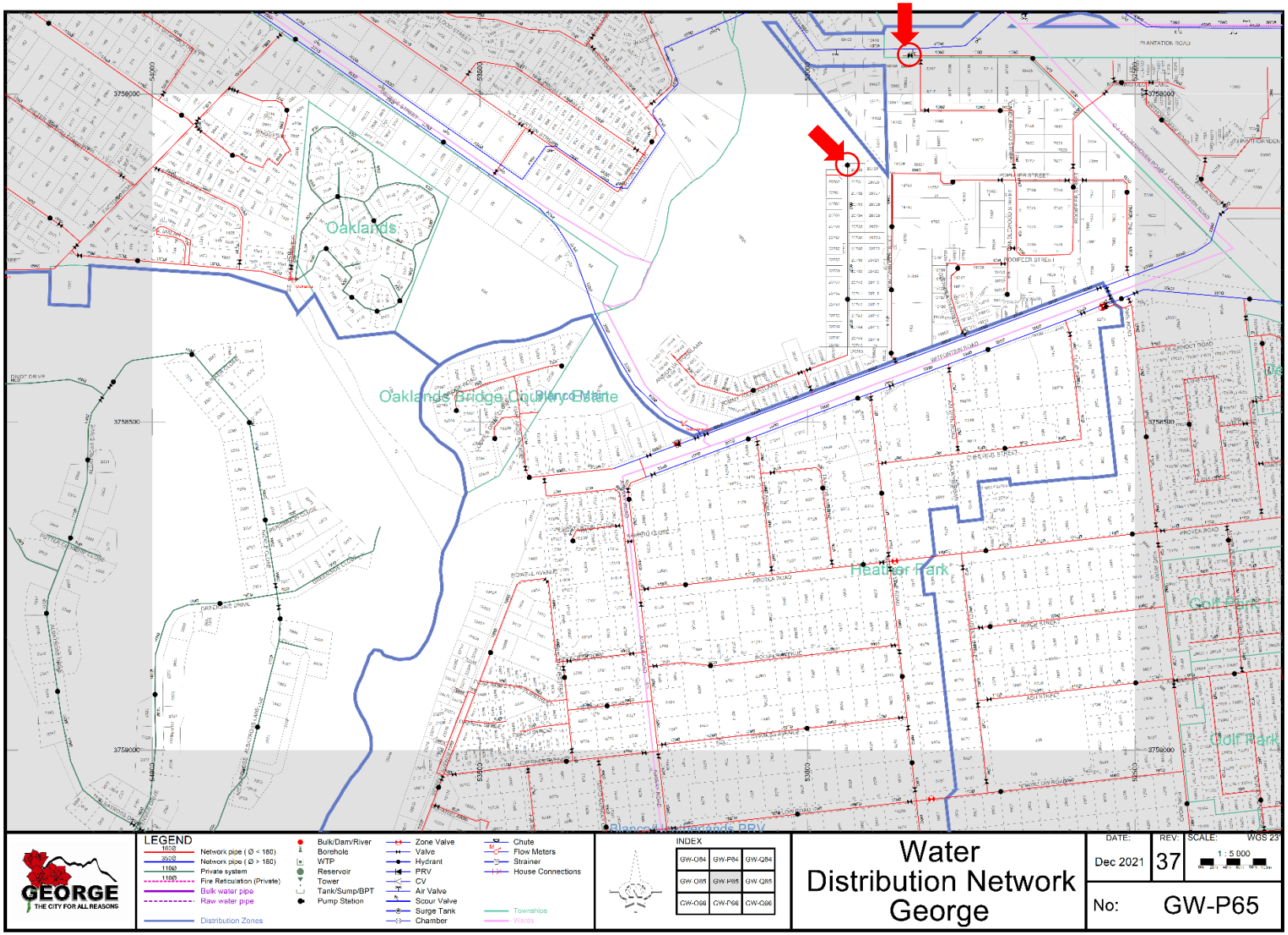

Figure 9: Proposed Water Connection Points – as pointed out by GLS Consulting Engineers.

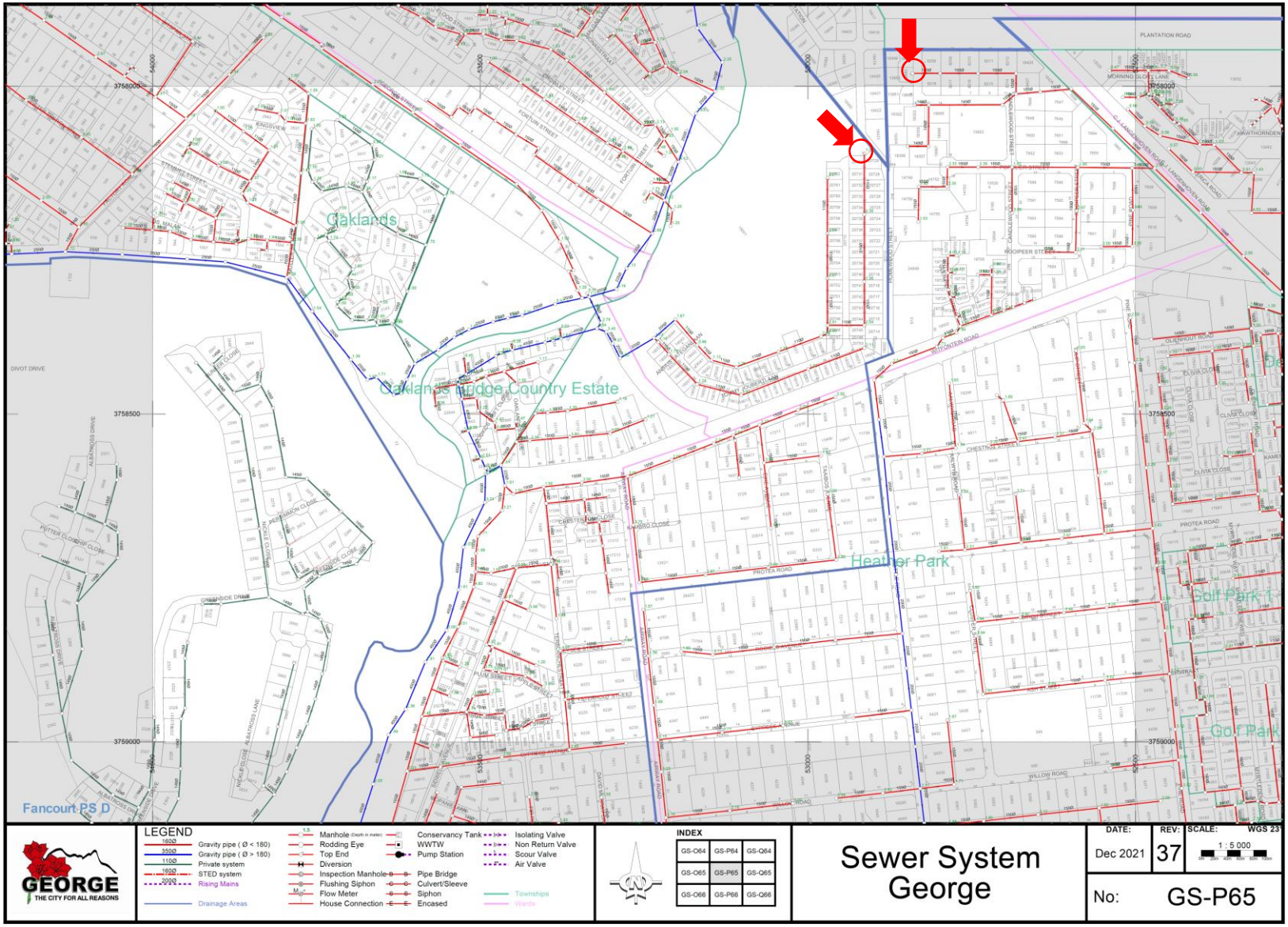

Figure 10: Proposed Sewer Connection Points – as pointed out by GLS Consulting Engineers.

4. Proposed Development

The proposed development is a private, gated residential estate consisting of seventy-seven (77) freehold units and forty (40) complex rental units on this property, subject to the necessary approvals for rezoning and subdivision obtained from the George Municipality and further consents from other governmental departments. The development is a Full Title Development. See **Annexure B**

All erven will be provided with services to full acceptable municipal standards and bulk infrastructure supporting the development has been described in the following sections. See **Annexure C**

The planned development will consist of the following residential units and in mix relationship:

Item	Unit Description	Ave ERF Size	Ave FLOOR Size	No of Units	Ownership
1	2 Bedroom – 1 Bathroom Semi-detached Flat Units	-	70 m²	40	Rental Units
2	Single Storey Residential Homes with 2 to 3 Bedrooms and 2 Bathrooms	309 m²	135 m²	31	Freehold Title
3	Single Storey Residential Homes with 2 to 3 Bedrooms and 2 Bathrooms	415 m²	150 m²	28	Freehold Title
4	Double Storey Residential Homes with 3 to 4 Bedrooms and 2.5 Bathrooms	452 m²	200 m²	18	Freehold Title
				117	

Table 2: Development unit distribution summary.

The average occupational density will be around 2.8 people per unit, lower than the national average of households. The development would cater for the medium income group and will fall within the development category 3 & 4 for services due to the lower-than-average occupational density per household. The average erf size is 381m²

5. Engineering Services

5.1 General Level of Services

Services will ultimately be provided to full municipal standards as prescribed in the Guidelines for Human Settlement planning and Design compiled by the CSIR Building and Construction Technology.

These shall broadly include surfaced roads with an acceptable stormwater collection and disposal system that fits the theme of the development, waterborne sewerage as well as potable water. Underground electrical and telecommunication connections to each erf/ unit. The Development will implement renewable power solutions for the rental units and will encourage owners of the freehold units to install solar. Investigations are underway for a private electrical microgrid within the Estate to accommodate PV Solar renewable energy within the development with a single bulk SSEG electrical connection to Municipal Electrical grid.

Limited calculations to determine the demand for the various services were prepared to obtain preliminary designs for the bulk services. The actual sizes of the bulk services will be determined through a final design process required for the Service Agreement and to be signed between the Developer and the George Municipality.

5.2 Road Network and Stormwater.

Access to the development is to be gained from the municipal Plantation Road, which is off from the N12 CJ Langenhoven Road, as recommended by SMEC South Africa in the Traffic Impact Assessment Report.

The estate entrance road will be an 8m wide road leading from Plantation Road that splits into the estate entrance area with an overall width of 13.8m wide that will accommodate two (2) lanes into the Estate and one (1) lane out of the Estate. The entrance lanes and exit lanes will be separated by a security access control building. See **Annexure C**

The internal roads are Class 5 roads and will be set in road servitudes that varies between 7 and 9m wide provided throughout the development. The total road network measures **1380 meters** and its layout have been dictated by the township layout and defined according to the topography so as to achieve a horizontal and vertical alignment that conforms to acceptable standards.

A 30km per hour design speed is laid down within the development and the road profile will be designed accordingly. The road pavement design will be a flexible pavement design covered by a concrete road surface.

The road surfaces width would be sloped to form a shallow V-drain shape with varying widths between 4m wide for one-way traffic and 6m wide for dual-way traffic with suitable provision for stormwater control in the centre of the road, using heavy duty grid inlets. The stormwater pipes are minimum 375mm diameter in size, laid at a minimum grade of 1:400 to ensure self-cleaning. The road and minor stormwater infrastructure are designed for a 1:5-year recurrence interval with the major system being designed for a 1:50 year recurrence interval.

The George Municipal Councill bulk services contribution fees for **2022/2023** are stipulated as additional trips and equates to 386.75trips with a unit cost of **R 1 870.84** exclusive of 15% VAT for roads and storm water.

The Roads and Stormwater Development Contribution Fee is calculated to **R 832 080.29** (Eight hundred and thirty-two thousand, and eighty rand and twenty-nine cents.) Inclusive of 15% VAT

5.3 Water Supply.

The potable water requirements for the development have been determined according to the guidelines for Human Settlement Planning and Design and George Municipality Guidelines and Standards for the Design of Water Supply and SABS 1200 DB1989 Earthworks and Pipe Trenches, for similar developments.

Rainwater harvesting will be standard at each home and throughout the estate. Each Home would be fitted with two (2) five thousand (5000) litre water tank, or a single ten thousand (10000) litre tank. Owners would be encouraged to install water filters and pressurization pumps to connect the tanks within the homes, water reticulation system. An investigation is presently underway by the Client to determine the feasibility of a central water storage facility at the Flat units. The investigation further is to determine the feasibility of a treatment plant to treat the rainwater to potable standards for self-consumption within the Flat units. A further study is underway to determine the feasibility of recycling the stormwater collected within the estate and the treatment thereof to potables standards for self-consumption within the development. This will reduce the normal residential water demand.

The developer will schedule a meeting with the Municipality at an appropriate time to discuss the various options and the

A piped water reticulation system with individual water meters will be provide at each erf and unit.

Item	Unit Description	Floor Size	No of Units	Average Consumption Data	Total Average Daily Consumption
1	2 Bedroom – 1 Bathroom Semi-detached Flat Units	70 m²	40	450 l/day	18.00 kl/day
2	Single Storey Residential Homes with 2 to 3 Bedrooms and 2 Bathrooms	135 m²	31	500 l/day	15.50 kl/day
3	Single Storey Residential Homes with 2 to 3 Bedrooms and 2 Bathrooms	150 m²	28	600 l/day	16.80 kl/ day
4	Double Storey Residential Homes with 3 to 4 Bedrooms and 2.5 Bathrooms	200 m²	18	750 l/day	13.50 kl/day
		14 785m²	117		63.80 kl/day

Table 3: Water Usage summary.

Design Limits that would be conformed to:

- Maximum residual Pressure designed for will be 90m (under static conditions)
- Minimum residual Pressure designed for will be 15m (under peak conditions)
- Summer Peak demand: 1.5 x AAD
- Instantaneous Peak (Over 10min period): 3.2 x AADD
- Single House connections will be 20mm diameter.
- Double House connections will be 32mm diameter.

The total average daily water demand (ADWD) for potable water for the development of 117 units, is calculated to be:

- 76.56 kl per day (0.886 l/s) this includes for an estimated 20% losses.
- Using a 1.5 peak summer factor, increases this demand to 114.84 kl (1.329 l/s)
- The instantaneous peak flow is 244 99 kl. (2.836 l/s)

Fire Fighting Requirements:

- The development can be classified as a Low Fire Risk Group 2 Area
- Spacing of Fire Hydrants is 150m.
- 1 Hour Fire duration.
- 500 l/min flow rate (8.3 l/s)

The Connection to the estate would have a total flow of 11.136 l/s.

- Instantaneous flow: 2.836 l/s
- Firefighting: 8.3 l/s

It is proposed that the Development be connected to the existing water network in two (2) locations to ensure suitable flow within the estate. The 1st connection would be to the main water pipe along Plantation Road which is a 100mm Ø uPVC Class 9 pipe. The 2nd connection would be to the main water pipe at the northern end of Tommy Joubert Laan Road which is a 90mm Ø uPVC Class 9 pipe.

The George Municipal Councill bulk services contribution fees for **2022/2023** are stipulated as a water demand of 37.26 kl /day and is costed at **R 38 860.00/ kl** exclusive of 15% VAT.

This equates to a Bulk Development Contribution Fee of **R 1 665 067.45** (One million, six hundred and sixty-five thousand, and sixty-seven rand and forty-five cents) inclusive of 15% VAT.

5.4 Sewerage.

The proposed development will be provided with a conventional waterborne sanitation system. The system will consist of separate connectors to individual erven. The reticulation network will gravitate to the lowest suitable connection location onto the existing Municipal network. It is proposed that the development connects onto the gravity sewerage line in two locations.

The 1st connection would be to the gravity sewer line along Candle Wood Street which is a 150mm Ø uPVC Class 34 pipe. This would connect approximately 95 units to the Municipal sewer network in this location. The 2nd connection would be to the gravity sewer line at the northern end of Tommy Joubert Laan Road which is a 90mm Ø uPVC Class 34 pipe. This would connect approximately 22 units to the Municipal sewer network in this location.

As confirmed with GLS Consulting Engineers neither of the hydraulic flows within the network systems as either of the planned connection points will be exceed.

It is assumed, based on recorded data, for low to medium income units ranging from 64m² to 200m² units that the expected outflow equates to approximately 70% of the water consumption.

Item	Unit Description	Floor Size	No of Units	ADWF	People / Erf	Harmon Peak Factor	PWWF / Erf
1	2 Bedroom – 1 Bathroom Semi-detached Flat Units	70 m²	40	315 l/day	2	3.8	0.0352 l/s/e
2	Single Storey Residential Homes with 2 to 3 Bedrooms and 2 Bathrooms	135 m²	31	375 l/day	3	3.8	0.0352 l/s/e
3	Single Storey Residential Homes with 2 to 3 Bedrooms and 2 Bathrooms	150 m²	28	450 l/day	3	3.8	0.0352 l/s/e
4	Double Storey Residential Homes with 3 to 4 Bedrooms and 2.5 Bathrooms	200 m²	18	563 l/day	4	3.8	0.0352 l/s/e

Table 4: Wastewater outflow summary.

Design Limits that would be conformed to:

- Assumed Sewage Flow = 70% of the water consumption excluding the losses.
- Peak Factor 2.5
- Percentage allowed for extraneous flow = 15 %
- Minimum sewer size 100mm diameter
- Minimum Pipe class 34
- Maximum Flow velocity 2.5 l/s

The maximum total daily outflow is expected to be 46,959 kl (0.543 l/s) with a peak factor of 117.398 kl (1.359 l/s) and Harman peak factor of 178.444 kl. (2.065 l/s)

The George Municipal Councill bulk services contribution fees for **2022/2023** are stipulated as a sewer demand of 37.12 kl /day and is costed at **R 38 810.00/ kl** exclusive of 15% VAT.

This equates to a Bulk Development Contribution Fee of **R 1 656 721.28** (One million, six hundred and fifty-Six thousand, seven hundred and twenty-one rand and twenty-eight cents) inclusive of 15% VAT.

5.5 Electricity supply.

The electrical reticulation will comprise of underground 11kV cables, which will be located within the road reserves and connect to the one internal miniature substation to the Bulk Electrical network.

The residential units and infrastructure components will each be provided with a separate metered underground electrical service, which will be connected to the internal substation.

Appropriate roadway and area lighting will be installed to meet the requirements of the development and will be designed to comply to SABS Code 098:1990.

The Developer is investigating a Grid Tied PV Solar solution that would see the carports be covered in PV Solar panels that feeds the power to a Central Inverter and Battery Storage facility with back-up generation capabilities. From here the power would be routed back to the units where each unit will be fitted with a Smart Prepaid meter system.

A Detailed Report will be submitted separately by the Appointed Electrical consultant appointed by the Developer.

5.6 Telecommunication services.

The internal telecommunication reticulation network will comprise of an underground conduit network, which will be designed and installed in accordance with national telecommunication standards.

Telecommunication service providers will install and operate the cables within the underground conduits which will be located within the road reserves and will be connect the internal telecommunication distribution points to their national Telecommunication service network.

Each residential unit will be provided with separate metered underground fibre communication connectivity to the IOT that will allow for Smart Home accessibility and management. This will also be linked to the security system of each individual residential unit and the umbrella estate security network system.

The system would comprise of 110mm diameter Telkom type cable sleeves at minimum 600mm cover depth at all road crossings. All communication manholes would be purpose-built HDPE type manholes conforming to SANS standards.

5.7 Solid Waste Handling.

The Developer wishes to engage with George Municipal Solid Waste department to collect the refuse within the estate on a weekly basis as per the Municipal collection time schedule for the Heather Park suburb.

The estate roads have been designed to accommodate the smaller Municipal waste compactor trucks as illustrated in picture 8 below. The size of the truck cannot exceed 12m³ in size and have more than a single axle and/ or exceed the over length of 8.40m

The Estate will enter into a service contract with the George Municipality for the removal and disposal of all solid waste. The estimated volume of solid waste is estimated at 0.085m³/ household per week with a total estimated volume for the development at 10m³ per week.

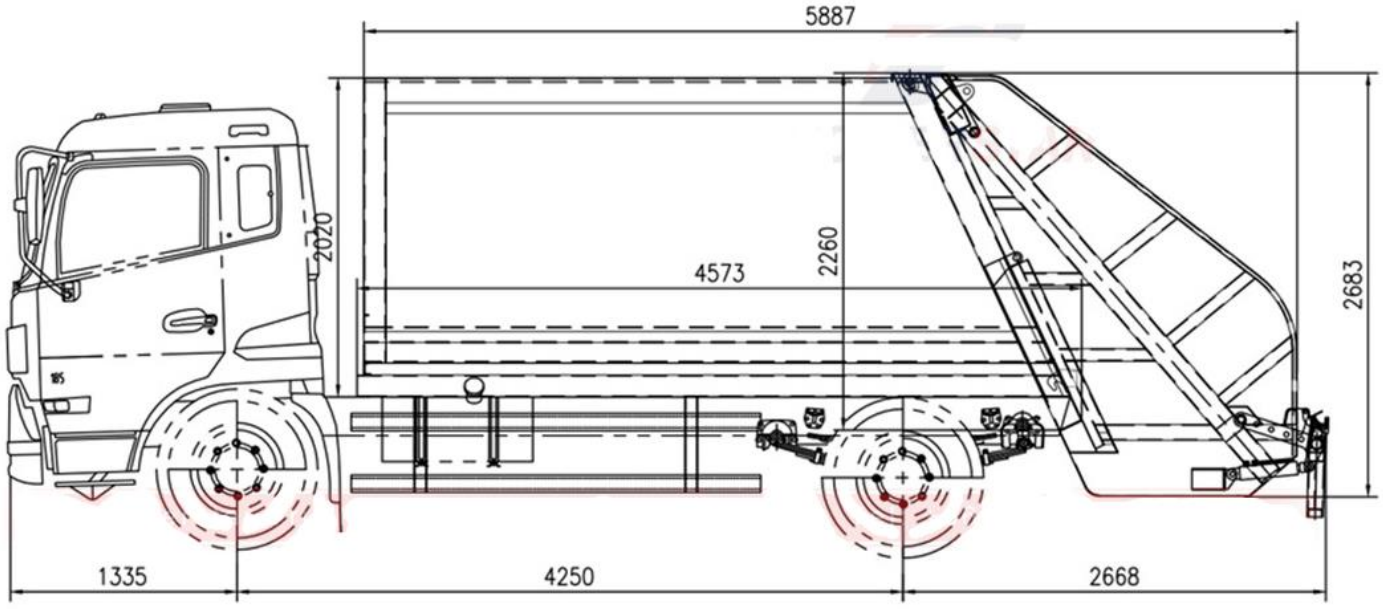

Figure 11: Typical Dimensions of a 12m² waste compactor truck.

The George Municipal Council do not have Development Contribution fees for Solid Waste handling and or Public Open Spaces. There is therefore no charge for this. Each Owner would be billed a Monthly Levey for the collection of their solid waste.

5.8 Summary of the Development Contribution Fees:

Development Contribution Fees due for this development:

Water	R 1 665 067.45
Sanitation	R 1 656 721.28
Roads & Stormwater	R 832 080.29
Total Amount excluding Electricity (incl VAT)	**R 4 153 869.02**

Should improvements to infrastructure be required as part of the Development approval these the allocated development contribution fees are to be credited for the specific upgrades. These would be drafted in a Service Level Agreement between the Developer and the George Municipality.

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2. ***Guidelines for Human Settlement Planning and Design – Volume 2:***
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   ISBN 0-7988-5498-7

3. Climate description for George area with average rainfall and temperature data tables used.
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   https://weatherspark.com/y/87789/Average-Weather-in-George-South-Africa-Year-Round

4. Table 1: Climate Summary for George
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5. Figure 1 to 3: *These are extracts from the* ***Geotechnical Report for the Proposed Residential Development on the Subdivision of ERF 19374 George,*** *report number Ref No: 2022\Urban Front\Erf19374 George\Report\ Geotechnical Report 1.7.2022 Rev 0, dated 1st July 2022, prepared by Outeniqua Geotechnical services, drafted by Iain Paton*

6. Figure 4: *South African climate condition map*
   https://www.south-africa-tours-and-travel.com/images/map-south-africa-climate-2-geography.png

7. Figure 5: *South African climate zone map*
   https://aeroliteinsulation.co.za/wp-content/uploads/2013/03/Climate-zones-map.jpg

8. Figure 6: *South African rainfall zone map*
   https://www.south-africa-tours-and-travel.com/images/xmap-south-africa-climate-1-rainfall.jpg.pagespeed.ic.51J4wtdh6z.webp

9. Figure 7: *South African mean wind speed distribution map*
   https://www.researchgate.net/profile/Gerrit-Basson/publication/348326602/figure/fig4/AS:977638684360707@1610098634485/7a-Mean-hourly-wind-speed-distribution-in-South-Africa-with-a-150-year-occurrence.jpg

10. Figure 8 to 10: *Drawings as received from GLS Consulting Engineers, located in Stellenbosch, and contracted by George Municipality as the Engineering Company responsible for planning and updating of infrastructure services within the Municipal district. Received via email from Mr. Jurie van der Merwe, dated 30th May 2022 at 16H35 <Jurie.vdMerwe@gls.co.za>*

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This report was drafted by HC Scholtz (N- Dip Civils *with 25-year experience*)
For CHEL Building and Civil Services.
This report was reviewed and approved by L. Fourie (Pr. Eng)
For New Ground Projects.

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ANNEXURE A

1: 50 000 Locality Map of the Site

ANNEXURE B

Preliminary Site Development Plan

ANNEXURE C

Preliminary Site Development Plan with Combined services layouts

PROPOSED URBAN COUNTRY ESTATE DEVELOPMENT

CHEL Building & Civil Services

No 141, Chip Close,
LE GRAND Estate,
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6534

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Email: henco.chel@gmail.com

Title:
URBAN COUNTRY ESTATE DEVELOPMENT

Sub Title: LOCALITY PLAN

Scale: 1 : 50 000

Drwg No.: CHEL/ UCE-2022/ GEN/ 01

CapeFarmMapper ver 2.6.10

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Title: **URBAN COUNTRY ESTATE DEVELOPMENT**

Sub Title: LOCALITY PLAN

Scale: 1 : 9028

Drwg No.: CHEL/ UCE-2022/ GEN/ 02

PROPOSED URBAN COUNTRY ESTATE DEVELOPMENT
Lapsed ERF 19374

N9 – Cl Langenhoven Road

Plantation Road

Blanco

Heather Park

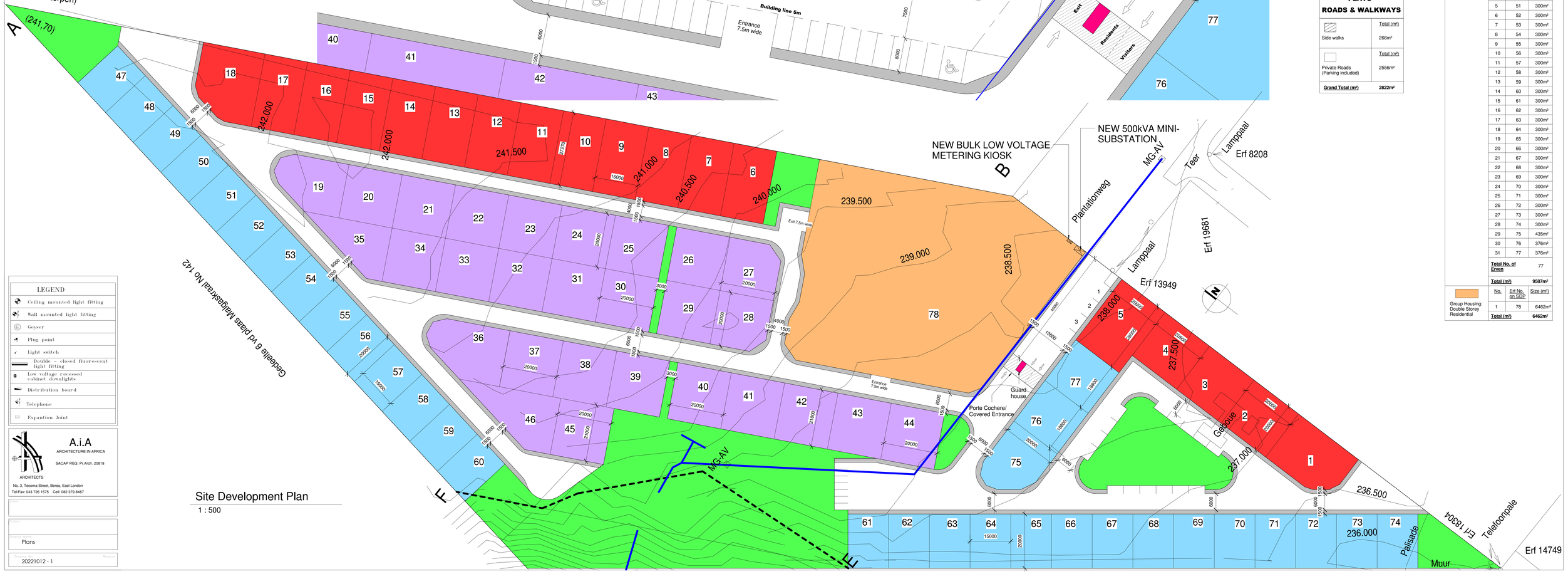
Blanco

Dormehls Drift

Date: 20191219, GSD: 0.5m | Maxar | Esri South Africa, Esri, HERE, Garm

Double Storey Residential - Site Development Plan

1 : 200



Site Development Plan

1 : 500

LEGEND
Ceiling mounted light fitting
Wall mounted light fitting
Geyser
Plug point
Light switch
Double - closed fluorescent light fitting
Low voltage recessed cabinet downlights
Distribution board
Telephone
Expantion Joint

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Project:

Drawing: Plans

Drawing No: 20221012 - 1 Revision:

LEGEND 1

	No.	Size (m²)	Total (m²)
Group Housing: Double Storey Residential	Site 1	528m²	528m²
	Site 2 upto 4	412m²	1236m²
	Site 5	560m²	560m²
	Site 6 upto 17	436m²	5232m²
	Site 18	577m²	577m²
	Grand Total (m²)		**8133m²**
Group Housing: Single Storey Residential	Site 19	449m²	449m²
	Site 20 upto 26	400m²	2800m²
	Site 27 upto 28	387m²	774m²
	Site 29 upto 34	400m²	2400m²
	Site 35	389m²	389m²
	Site 36	532m²	532m²
	Site 37 upto 45	420m²	3780m²
	Site 46	500m²	500m²
	Grand Total (m²)		**11624m²**
Group Housing: Single Storey Residential	Site 47 upto 74	300m²	8400m²
	Site 75	435m²	435m²
	Site 76 upto 77	376m²	752m²
	Grand Total (m²)		**9587m²**
Flats: Double Storey Apartments	Orange Site	6462m²	6462m²
	Grand Total (m²)		**6462m²**
Private Space		8500m²	8500m²
	Grand Total (m²)		**8500m²**
Private Roads & Side walks		12030m²	12030m²
	Grand Total (m²)		**12030m²**
Total ERF Area			**56336m²**

S.D.P
ROADS & WALKWAYS

	Total (m²)
Side walks	3048m²
Private Roads (Parking included)	8982m²
Grand Total (m²)	**12030m²**

FLATS
ROADS & WALKWAYS

	Total (m²)
Side walks	266m²
Private Roads (Parking included)	2556m²
Grand Total (m²)	**2822m²**

LEGEND 2

	No.	Erf No. on SDP	Size (m²)
Group Housing: Double Storey Residential	1	1	528m²
	2	2	412m²
	3	3	412m²
	4	4	412m²
	5	5	560m²
	6	6	436m²
	7	7	436m²
	8	8	436m²
	9	9	436m²
	10	10	436m²
	11	11	436m²
	12	12	436m²
	13	13	436m²
	14	14	436m²
	15	15	436m²
	16	16	436m²
	17	17	436m²
	18	18	577m²
	Total (m²)		**8133m²**
Group Housing: Single Storey Residential	1	19	449m²
	2	20	400m²
	3	21	400m²
	4	22	400m²
	5	23	400m²
	6	24	400m²
	7	25	400m²
	8	26	400m²
	9	27	387m²
	10	28	387m²
	11	29	400m²
	12	30	400m²
	13	31	400m²
	14	32	400m²
	15	33	400m²
	16	34	400m²
	17	35	389m²
	18	36	532m²
	19	37	420m²
	20	38	420m²
	21	39	420m²
	22	40	420m²
	23	41	420m²
	24	42	420m²
	25	43	420m²
	26	44	420m²
	27	45	420m²
	28	46	500m²
	Total (m²)		**11624m²**
Group Housing: Single Storey Residential	1	47	300m²
	2	48	300m²
	3	49	300m²
	4	50	300m²
	5	51	300m²
	6	52	300m²
	7	53	300m²
	8	54	300m²
	9	55	300m²
	10	56	300m²
	11	57	300m²
	12	58	300m²
	13	59	300m²
	14	60	300m²
	15	61	300m²
	16	62	300m²
	17	63	300m²
	18	64	300m²
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	20	66	300m²
	21	67	300m²
	22	68	300m²
	23	69	300m²
	24	70	300m²
	25	71	300m²
	26	72	300m²
	27	73	300m²
	28	74	300m²
	29	75	435m²
	30	76	376m²
	31	77	376m²
	Total No. of Erven		77
	Total (m²)		**9587m²**
Group Housing: Double Storey Residential	No.	Erf No. on SDP	Size (m²)
	1	78	6462m²
	Total (m²)		**6462m²**

LEGEND:

- Ø100mm uPVC CLASS 9 WATER PIPE
- Ø160mm uPVC CLASS 34 SEWER PIPE
- Ø375mm AND Ø450mm CONCRETE CLASS 100D STORMWATER PIPE
- STORMWATER CATCH PIT
- SEWER MANHOLE
- RODDING EYE
- WATER PIPE END CAP
- PREPOSED SEWER HOUSE CONNECTION
- PREPOSED WATER HOUSE CONNECTION

PROJECT NUMBER: PC22024

PROJECT NAME: URBAN COUNTRY ESTATE

CLIENT: URBAN COUNTRY ESTATE (Pty) Ltd.

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REVIEWER: L FOURIE	DATE: 21 NOVEMBER 2022

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