ANNEXURE “S”: LETTER FROM HERITAGE WESTERN CAPE

Our Ref: HM /GARDEN ROUTE / GEORGE / PORTION 22 OF FARM KRAAIBOSCH AND ERF 23333 (NOW DESCRIBED AS PORTION 8 OF ERF 28005)
Case No: 28176SB0414
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iLifa leMveli leNtshona Koloni
Erfenis Wes-Kaap
Heritage Western Cape

Applicants/Consultant details: Dupre Lombaard

RESPONSE TO NOTIFICATION OF INTENT TO DEVELOP: FINAL COMMENT
In terms of Section 38(8) of the National Heritage Resources Act (Act 25 of 1999) and the Western Cape Provincial Gazette 6061, Notice 298 of 2003

NOTIFICATION OF INTENT TO DEVELOP: PROPOSED PART 2 AMENDMENT OF THE ENVIRONMENTAL AUTHORISATION (EA) AND REZONING OF ERF 28005, GEORGE FROM BUSINESS ZONE I TO RESIDENTIAL USE, INCLUDING TRANSFER OF DEVELOPMENT RIGHTS TO A NEW DEVELOPER. THE PROPOSAL SHIFTS FROM AN APPROVED MIXED-USE/BUSINESS DEVELOPMENT TO PURELY RESIDENTIAL DEVELOPMENT, SUBMITTED IN TERMS OF SECTION 38(1) OF THE NATIONAL HERITAGE RESOURCES ACT (ACT 25 OF 1999)

The matter above has reference.

Heritage Western Cape is in receipt of the above matter received. This matter was discussed at the Heritage Officers meeting held on 28 April 2026.

You are hereby notified that, since there is no reason to believe that the proposed Part 2 Amendment of the Environmental Authorisation (EA) and rezoning of Erf 28005, George from Business Zone I to residential use, including transfer of development rights to a new developer. The proposal shifts from an approved mixed-use/business development to purely residential development, no further action under Section 38 of the National Heritage Resources Act (Act 25 of 1999) is required. HWC Chance Finds and Accidental Finds Procedures to be included in the EMPr and Environmental Authorization.

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

This letter does not exonerate the applicant from obtaining any necessary approval from any other applicable statutory authority.

HWC reserves the right to request additional information as required.

Should you have any further queries, please contact the official above and quote the case number.

.....
Waseefa Dhansay
Assistant Director: Professional Services

Heritage Western Cape
Erfenis Wes-Kaap
ILifa leMveli leNtshona Koloni

04 May 2026

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ANNEXURE "T": VISUAL IMPACT REPORT

Report:

Visual impact assessment for the proposed development of erf 28005, George

Reference: CPD13072026

Prepared for: **Century Property Developments**

Revision: 2

17 July 2026

Report details

Document prepared by:

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Document control				
Report title		Visual impact assessment for the proposed development of erf 28005, George		
Report status		Final	**Report number**	CPD13072026
Client		Century Property Developments	**Client contact**	Japie Vos
Rev	**Date**	**Author**		
2	**17 July 2026**	Paul Buchholz		

To prepare this report, the author utilised only the documents and information provided.. The project deliverables, including the reported results, comments, recommendations, and conclusions, are based on the author's professional knowledge as well as available information. This report is based on survey and assessment techniques which are limited by time and budgetary constraints relevant to the type and level of investigation undertaken. The author reserves the right to modify aspects of the report including the recommendations when new information may become available from ongoing research or further work in this field or about this investigation. Although the greatest care has been taken to ensure that the data used for the various maps in the report is up to date and spatially accurate, Paul-Werner Buchholz gives no warranty, express or implied, as to the accuracy, reliability, utility, or completeness of this information. Users of the data in this report assume all responsibility and risk for use of the data. This report must not be altered or added to without the prior written consent of the author. This also refers to electronic copies of this report which are supplied for the purposes of inclusion as part of other reports. Similarly, any recommendations, statements or conclusions drawn from or based on this report must make reference to this report. If this report is used as part of a main report, the report in its entirety must be included as an appendix or a separate section to the main report.

Author

Paul Buchholz is a visual impact assessment, geographic information science (GIS) and environmental specialist with more than 20 years of experience working on multidisciplinary environmental and engineering projects. He worked as a geographic information science and environmental specialist for two international multi-disciplinary engineering firms (Aurecon & Haskoning). He is currently an independent visual impact assessment, environmental and geographic information science consultant servicing a wide range of clients through consulting and project management support.

Paul has provided specialist input and project management support on projects in South Africa, Nigeria, Tanzania, Lesotho, Kenya, Malawi, Zimbabwe, Mauritius and Mozambique. He holds a master's degree in environmental management from the University of Stellenbosch and is a registered Professional Geographical Information Science Practitioner with The South African Geomatics Council (PGP 1323).

Selected projects

- Visual impact assessment report for the proposed development of erf 2063, Wilderness, South Africa (Simon van Deventer Family Trust).
- Visual impact assessment report for the proposed development of portion 14 of farm 195, Victoria Bay, George. South Africa (Adante Property Development (Pty) Ltd).
- Visual impact assessment report for the proposed development of portions 278 and 282 of the farm Kraaibosch 195, George, South Africa (Oilcon Construction).
- Visual impact assessment report for the proposed development of erf 1058, Hoekwil, George, South Africa (Wealth Spring (Pty) Ltd).
- Visual impact assessment for the proposed Ebenheazer mixed-use development, Plettenberg Bay, South Africa (Bitou Municipality).
- Visual impact assessment for the proposed Green Valley mixed-use development, Plettenberg Bay, South Africa (Bitou Municipality).
- Visual impact assessment for Kao Diamond Mine, Lesotho (Kao Diamond Mine)
- Visual impact assessment for a run of the river hydropower facility with a maximum capacity of 30 MW on the banks of the Orange River. South Africa.
- Visual impact assessment for the development of the proposed 960 MW coal-fired power station, Lamu County, Kenya (Amu Power).
- Visual impact assessment for the proposed Garden Route Dam development, George, South Africa. (George Municipality).
- Visual impact assessment report for the proposed development on the remainder of Portion 47 (A Portion of Portion 1) of the Farm Ganse Vallei No 444 of portions 278 and 282 of the farm Kraaibosch 195, Plettenberg Bay, South Africa (Saper Investments (Pty) Ltd).

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GLOSSARY

Aesthetics	Relates to the pleasurable characteristics of a physical environment as perceived through the five senses of sight, sound, smell, taste, and touch.
Adverse visual impact	Any modification in landforms, water bodies, vegetation or any introduction of structures which negatively impacts the visual character of the landscape and disrupts the harmony of the basic elements (i.e. form, line, colour and texture).
Basic elements	The four design elements (form, line, colour and texture) which determine how the character of a landscape is perceived.
Contrast	Opposition or unlikeness of different forms, lines, colours or textures in a landscape and therefore the degree to which project components visually differs from its landscape setting.
Colour	The property of reflecting light of a particular intensity and wavelength (or a mixture of wavelengths) to which the eye is sensitive. It is the major visual property of surfaces.
Form	The mass or shape of an object(s) which appears unified, such as a vegetative opening in a forest, a cliff formation or a water tank.
Integration	The degree to which a development component can be blended into the existing landscape without necessarily being screened from view.
Interfluve	The area of higher ground which separates two rivers/watercourses which flow into the same drainage system
Key viewing locations	One or more points on a travel route, use area or a potential use area, where the view of a management activity would be most revealing.
Landscape character	The arrangement of a particular landscape as formed by the variety and intensity of the landscape features and the four basic elements of form, line, colour and texture. These factors give the area a distinctive quality which distinguishes it from its immediate surroundings.
Landscape features	Land and water form, vegetation and structures which compose the characteristic landscape.
Line	The path (real or imagined) that the eye follows when perceiving abrupt differences in form, colour or texture. Within landscapes, lines may be found as ridges, skylines, structures, changes in vegetative types or individual trees and branches.
Micro-topography	Small scale variations in the height and roughness of the ground surface; in the context of this report the definition includes structures such as buildings and larger-sized vegetation that can restrict views
Mitigation measures	Methods or procedures designed to reduce or lessen the adverse impacts caused by management activities.
Mountain, hill or ridge	Is a physical landscape feature, elevated above the surrounding landscape. It includes the foot/base, slopes and crest of the mountain, hill or ridge
Rehabilitation	A management alternative and/or practice which restores landscapes to a desired scenic quality.
Ridgelines	Ridgelines are defined as the line formed by the meeting of the tops of sloping surfaces of land. Significant ridgelines are ridgelines which, in general, are highly visible and dominate the landscape.

Scale	The proportionate size relationship between an object and the surroundings in which the object is placed.
Sense of place	The unique quality or character of a place, whether natural, rural or urban and relates to uniqueness, distinctiveness or strong identity. It is also sometimes referred to as genius loci meaning 'spirit of the place.
Texture	The visual manifestations of the interplay of light and shadow created by the variations in the surface of an object or landscape.
Visual modification	A measure of the visual interaction between a development and the landscape setting within which it is located.
Viewshed	The creation of a computer generated probable viewshed to define the extent to which the planned infrastructure is visible from key viewing locations.
Visual Sensitivity	The degree to which a change to the landscape will be perceived adversely.
Visual Impact	A measure of joint consideration of both visual sensitivity and visual modification

1. INTRODUCTION

1.1 General

Visual impact assessments should not be an obstacle in the approval process of a proposed development. Visual input, especially at the early concept stage of the project, can play an important role in helping to formulate design alternatives, as well as minimising impacts, and possibly even costs, of the project

It is in the nature of visual and scenic resources to include abstract qualities and connotations that are by their nature difficult to assess or quantify as they often have cultural or symbolic meaning. An implication of this is that impact ratings cannot simply be added together. Instead, the assessment relies on the evaluation of a wide range of considerations, both objective and subjective, including the context of the proposed project within the surrounding area.

The analysis of the interaction between the existing visual environment and the planned infrastructure provides the basis for determining visual impacts and mitigation strategies. This visual impact assessment provides an overview of the landscape character of the locality and assesses the degree to which the proposed development would be visually appropriate.

1.2 Methodology

1.2.1 The sequence of work employed in this study

A desktop survey using 1:50,000 topographical survey maps, Google Earth, and ArcMap (Esri, ArcGIS software) was undertaken. Following the desktop information gathering process, a site visit was conducted to test the conclusions of the terrain analysis, identify receptors and appraise the local landscape.

The methodology employed by this visual assessment is based on the following methodologies:

- The United States Department of Agriculture: Forestry Service - *Landscape Aesthetics*;
- The United States Bureau of Land Management Visual Resources Management;
- The Landscape Institute and the Institute of Environmental Management & Assessment - Guidelines for Landscape and Visual Impact Assessment; and
- The Provincial Government of the Western Cape's Guideline for involving visual and aesthetic specialists in EIA processes and the Guidelines for Landscape

1.2.2 Written and drawn material was made available

- Architectural drawings and 3D models
- Site development plan
- Specialist reports

1.2.3 Receiving site

The receiving site was assessed, and areas of the locality from where the development appeared to be likely visible, adjacent lands, and local roads.

This study was conducted in July 2026. The weather on the days of the site visit was clear and open. A photographic survey of the site and surrounding areas was carried out.

The visual assessment was undertaken using standard criteria such as geographic view-sheds and viewing distances as well as qualitative criteria such as compatibility with the existing landscape character and settlement pattern. Potentially sensitive areas were assessed, and mitigation measures were evaluated.

1.3 Assumptions and limitations

It should be noted that the 'experiencing' of visual impacts is subjective and largely based on the perception of the viewer or receptor. The presence of a receptor in an area potentially affected by the proposed development does not thus necessarily mean that a visual impact would be experienced.

Value can be placed in a landscape in terms of its aesthetic quality, or in terms of its sense of identity or sense of place with which it is associated. If no such values are held with respect to a landscape, there is less likely to be a perception of a visual impact if the landscape becomes subject to visual alteration. Development within a landscape may not be perceived negatively at all if the development is associated with progress or upliftment of the human condition.

The perception of visual impacts is thus highly subjective and involves 'value judgements' on behalf of the receptor. The context of the landscape character, the scenic/aesthetic value of an area, and the types of land use practised tend to affect the perception of whether landscape change (through development) would be considered an unwelcome intrusion.

The abovementioned landscape values can be interlinked, but can also be conflicting, e.g. amenity values associated with a landscape held by a certain group of people as described above may conflict with economic values associated with the market or development possibility of the landscape that is held by others. It is in this context that visual impact associated with a potential development often arises as an issue in environmental impact assessments.

1.3.1 Data

The best currently and readily available datasets were utilized for the visual impact assessment. It is important to note that variations in the quality, format and scale of available datasets could limit the scientific confidence levels of the visual impact assessment outcomes.

1.3.2 Visualisation

It must be remembered that any visualisation (3D models, photomontages, photos and maps) of complex natural and man-made elements produce perceptions, interpretations and value judgements that are not always consistent with those that would be produced by actual encounters with the elements represented. Visualisations should, therefore, be considered an approximation of the three-dimensional visual experiences that an observer would receive in the field and must be subjected to subsequent field testing and verification

Photomontage is the superimposition of an image onto a photograph to create a realistic representation of proposed or potential changes to any view. The overall aim of photography and photomontage is to represent the landscape context under consideration and the proposed development, both as accurately as is practical. It must be kept in mind that the human eye sees differently than a camera lens, both optically and figuratively.

The focusing mechanisms of human eyes and camera lenses are different. Human vision is binocular, and dynamic compared to a camera that tends to flatten an image.

2. APPLICABLE POLICIES AND GUIDELINES

Several government policies and plans, guidelines, environmental management instruments and other decision-making instruments are relevant to the site and development and have been reviewed. These include:

2.1 The Western Cape Provincial Spatial Development Framework (PSDF)

Makes provision for:

- the protection and sustainable use of Landscape and Scenic Resources,
- the protection, management and enhancement of the provinces Sense of Place, Heritage and Cultural Landscape

2.2 The George Municipality Spatial Development Framework

The George Spatial Development Framework (GSDF) states that the impact of developments on visual landscapes and corridors must be minimized.

The GSDF recognizes the following:

- Valuable view corridors, undeveloped ridgelines, cultural landscape assets and existing vistas should not be compromised by any development proposal or cumulative impact of development proposals. The proportion of urban development up the slope of a prominent hill or mountain should not degrade its aesthetics/visual value
- Developments higher than the 280m contour line or on slopes steeper than 1:4 must be prevented
- Scenic routes provide public access to the enjoyment of the landscapes located in the municipal area. The routes and the land use alongside these routes should be managed in such a way as to not compromise the views offered but to mark and celebrate the landscapes and the origins or nature of their significance.

2.3 The George Municipality Landscape Characterisation Visual Resources Management Analysis

The George Municipality's Landscape Characterisation Visual Resource Management Analysis (2009) determines visually sensitive areas in the George landscape and must be applied to manage the visual impacts of development.

The George Municipality's Landscape Characterisation Visual Resource Management Analysis states the following:

- Significant view corridors add value to George's sense of place and create a perception of space by focussing on views outside of the built-up envelope.
- The road systems in the Garden Route are a vital component of the tourism economy as they create scenic view corridors. View corridors are linear geographic areas that are visible to users of the route, usually situated along movement routes such as the Seven Passes road to Knysna.
- A Class I Visual Resource Management is assigned to those areas where a management or specialist decision has been made to maintain a natural landscape. Significant ridgelines within the George municipal area have been allocated a Class 1 rating.

2.4 The Garden Route Environmental Framework

This document provides baseline data on the Topographical, Visual and 'Sense of Place' aspects in the Garden Route, the sensitivity, constraints and development guidelines for the area assist in informing decision-making.

Management Guidelines are provided for Ecologically Sensitive Geographical Areas. Of particular reference to this report are the guidelines for development in:

- Topographically Sensitive Geographical Areas;
- Conservation and Protected Areas; and
- Visually Sensitive Landscape Geographical Areas.

Risks include:

- Erosion of steep slopes;
- The potential for visual and light pollution;
- Destruction of visual topographical quality;
- Development impact of sensitive topographical features and landscapes;
- Inappropriate large-scale development;
- Sprawling urbanization; and
- Large-scale change of land use developments outside of the urban edge.

Objectives include:

- Maintain the integrity of the Garden Route Landscape;
- Limit development on steep slopes;
- Enhance and protect the topographical landscape backdrop to the Garden Route;
- Manage development on steep slopes, discouraging development;
- Limit development densities
- Retain the 'sense of place' of villages and hamlets;
- Enforce building control and aesthetics;
- Protect the 'sense of place' of the Garden Route;
- Protect and enhance the visual quality of prominent tourism routes, meanders and nodes;
- Protect the visual integrity of the South African National Park asset, as well as provincial nature reserves; and
- Limit and prohibit development on prominent visually sensitive and exposed features.

2.5 Heritage and Scenic Resources: Inventory and Policy Framework for the Western Cape

The study provides input on cultural and scenic resources and provides a guide for the identification and conservation of these resources. The report focuses on the broader regional scale rather than the local landscapes or individual site scales and is, therefore, an overview rather than a detailed inventory of cultural and scenic resources.

2.6 DEA&DP Guideline for Management of Development on Mountains, Hills & Ridgelines

Key decision-making criteria regarding development on mountains, hills and ridges, relevant to this visual impact assessments, are:

- to avoid inappropriate development (i.e. intrusive and consumptive development) on mountains, hills and ridges taking into account the character of the existing environment;
- to ensure that where development does take place, that its layout and design take account of sensitive features and environmental constraints, thereby promoting environmentally sensitive development of projects on mountains, hills and ridges where development is authorized;

- to preserve landform features through ensuring that the siting of facilities is related to environmental resilience and visual screening capabilities of the landscape;
- to ensure that the scale, density and nature of the developments are harmonious and in keeping with the sense of place and character of the area.

Environmental characteristics such as steep slopes (steeper than 1:4) and development on the crest of a mountain, hill or ridge will serve as key indicators of environmental sensitivity.

3. PROJECT DESCRIPTION

3.1 Project location

The proposed development will be located on erf 28005 just outside George wedged between Knysna and the N2 road (**Figure 1**).

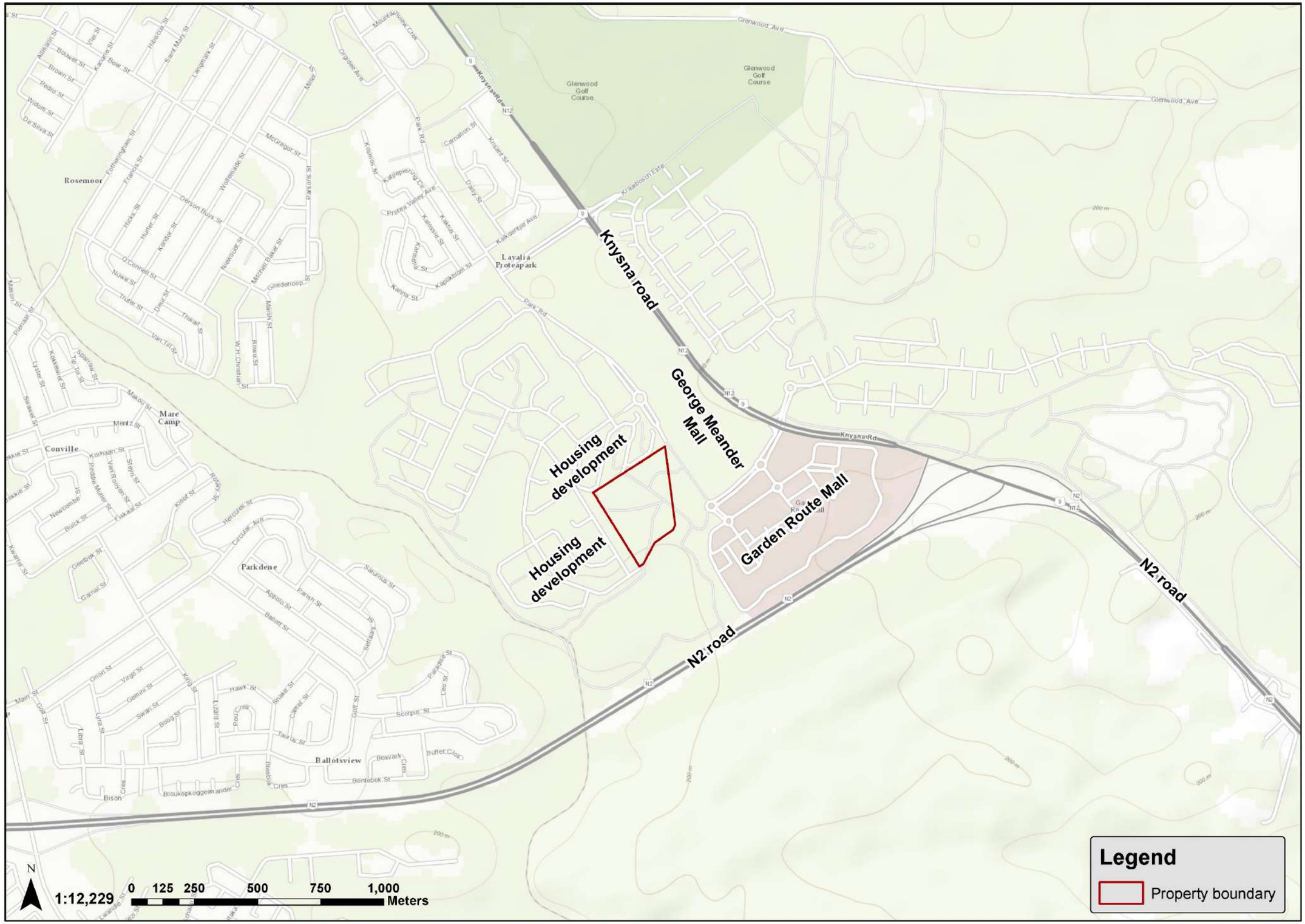

Figure 1: Project location

3.2 Development description

The proposed development will consist of the following components (**Figure 2**):

- 28-unit 3 storey buildings (1 building)
- 36-unit 4 storey buildings (9 buildings)
- 40-unit 4 storey buildings (7 buildings)
- 48-unit 4 storey buildings (1 buiding)
- Gymnasium
- Clubhouse
- Maintenance building
- Gatehouse
- Covered parking

The site is currently zoned Business 1, which permits a maximum site coverage of 100% and a maximum building height of 15 m. The application proposes to rezone the site to Residential 4, which retains the 15 m height allowance but limits site coverage to a maximum of 60%. The proposed development has an estimated site coverage of 39.6%.

Figure 2: Site development plan

4. METHODOLOGY

It is in the nature of visual and scenic resources to include abstract qualities and connotations that are by their nature difficult to assess or quantify as they often have cultural or symbolic meaning. It is necessary therefore to include both quantitative criteria (such as viewing distances), and qualitative criteria (such as sense of place), in visual impact assessments.

An implication of this is that impact ratings cannot simply be added together. Instead, the assessment relies on the evaluation of a wide range of considerations, both objective and subjective, including the context of the proposed project within the surrounding area. The phrase “beauty is in the eye of the beholder” is often quoted to emphasize the subjectivity in undertaking a visual impact assessment

The analysis of the interaction between the existing visual environment (landscape character and sense of place) and the planned infrastructure provides the basis for determining visual impacts and mitigation strategies. This is completed by defining the visual effect of the planned infrastructure and visual sensitivity of viewing locations to determine impact.

The evaluation of the existing visual environment consists of the assessment of both the landscape setting and key viewing locations within it. The landscape setting can be defined in terms topography, vegetation, hydrology and land-use features. These elements define the existing visual character of the landscape with which the planned infrastructure interacts.

The use of the basic elements of form, line, colour and textures has become the standard in describing and evaluating landscapes. Modifications in a landscape which repeat the landscape’s basic design elements are said to be in harmony with their surroundings. Modifications which do not harmonize, often look out of place and are said to contrast or stand out in unpleasing ways.

Value can be placed in a landscape in terms of its aesthetic quality, or in terms of its sense of identity or sense of place with which it is associated. If no such values are held with respect to a landscape, there is less likely to be a perception of a visual impact if the landscape becomes subject to visual alteration. Development within a landscape may not be perceived negatively at all if the development is associated with progress or upliftment of the human condition.

The perception of visual impacts is thus highly subjective and thus involves ‘value judgements’ on behalf of the receptor. The context of the landscape character, the scenic / aesthetic value of an area, and the types of land use practised tend to affect the perception of whether landscape change (through development) would be considered to be an unwelcome intrusion. Sensitivity to visual impacts is typically most pronounced in areas set aside for the conservation of the natural environment (such as protected natural areas or conservancies), or in areas in which the natural character or scenic beauty of the area acts as a drawcard for visitors (tourists) to visit an area, and accordingly where amenity and utilitarian ecological values are associated with the landscape.

When landscapes have a highly natural or scenic character, amenity values are typically associated with such a landscape. Structural features such as power lines and other electricity transmission developments and related infrastructure are not a feature of the natural environment but are rather representative of human (anthropogenic) change to a landscape.

Thus, when placed in a largely natural landscape, such structural features can be perceived to be highly incongruous in the context of the setting, especially if they affect or change the visual quality of a landscape. It is in this context of incongruity with a natural setting that new developments are often perceived to be a source of visual impact.

4.1 Observer locations

Observer locations (views from communities, major roads, conservation areas etc.) are those areas where people (receptors) are likely to obtain a view of the planned infrastructure. These viewing locations have different significance based on numerous factors, collectively evaluated though land use and viewing distance to the planned infrastructure.

The selection of the key viewing locations is based on their location within the defined view-shed where they would have a clear view of the planned infrastructure.

Factors that will be considered in selecting the key viewing locations are:

- **The angle of observation** - The apparent size of a project is directly related to the angle between the viewer's line-of-sight and the slope upon which the planned infrastructure is to take place. As this angle nears 90 degrees (vertical and horizontal), the maximum area is viewable.
- **Numbers of viewers** - Areas seen and used by large numbers of people are potentially more sensitive. Protection of visual values usually becomes more important as the number of viewers increase.
- **Length of time the project is in view** - If the viewer has only a brief glimpse of the planned infrastructure, the contrast may not be of great concern. If, however, the planned infrastructure is subject to view for a long period, as from an overlook, the contrast may be very significant.
- **Distance from the project** - The greater the viewing distances, the lower the visual sensitivity. The visual modification of a development is assumed to be the highest when the observer is very close to it and has a direct line of sight. The visual modification then decreases with distance and is also known as distance decay (Hull & Bishop, 1988).
- **Field of vision** - The visual impact of a development can be quantified to the degree of influence on a person's field of vision both horizontally and vertically. The visual impact of a development will vary according to the proportion in which a development impacts on the central field of vision. Within the central field of vision images are sharp, depth perception occurs and colour discrimination is possible. Developments, which take up less than 5% of the central field of vision, are usually insignificant in most landscapes (Human Dimension and Design, 1979).
- **Visibility** - Viewed by the human eye 1.8 m from the ground across a "flat" surface such as the sea, the horizon will be of the order of 6 km distant, due to the curvature of the earth. Viewed at an elevation of 60 m, the horizon will be of the order of 32 km distant and from the top of a 1000 m mountain, the horizon will be at a distance of approximately 113 km. A tall structure standing above the horizon would, of course, increase these distances significantly; for example, for an observer at 1.8 m who is viewing a man-made structure 50 m tall, the effective distance to the horizon is 34 km and for a 100 m structure the distance is 46 km (Miller & Morrice, no date). In addition, mist, haze or other atmospheric conditions may significantly affect visibility (Hill et al, 2001).

4.2 Visual sensitivity

Visual sensitivity is a measure of how critically a change to the existing landscape is viewed by people from different land-use areas in the vicinity of a development.

The degree of visual sensitivity of an area is closely related to the aesthetic quality of the area, as well as to the value placed in the aesthetic quality of the landscape but is also related to the area's socio-economic profile. In this regard, residential, tourist and/or recreation areas generally have a higher visual sensitivity than other land-use areas (e.g. industrial, agricultural or transport corridors), because they use the scenic amenity values of the surrounding landscape and may be used as part of a leisure experience and often over extended viewing periods.

It is important to note that the presence of natural / perceived natural and rural elements or areas within the landscape as viewed from the surrounds of the project area can engender perceptions of aesthetic quality or

value to the landscape. Many studies of landscape conservation have highlighted the value placed by people in rural or natural landscapes. A rural landscape can be defined as an area where an interaction between humans and nature over time has led to the development of a landscape that has its characteristics, and which is a middle ground between an urban landscape and wilderness, consisting of human activities that are related to the natural environment, such as agriculture and pastoral activities (Mazehan et al, 2013). A natural landscape, as defined in this report is close in appearance to how the landscape would appear without human alteration – i.e. mimicking or closely resembling that of a wilderness.

Placing value in a landscape is a psychological and cultural practice; values and meanings are not intrinsic to the landscape, but rather they are phenomena created by humans through their cultural practices (Pun, 2004). It is thus important to note that perceptions of a landscape may not be universally shared, and different individuals or groups of people may perceive or treat the same landscape differently, in turn ascribing different values and meanings to it (Pun, 2004). Values and meanings ascribed by local people may not be evident to an outsider.

There are different types of values that can be placed on a landscape; i.e. economic values (e.g. the relevance of the landscape for business enterprises, or the market possibility of products from the landscape), amenity values (values related to the non-material benefits associated with it) and security values (Pun, 2004). Amenity values can be subdivided into different sub-categories; "intrinsic" ecological value, scientific and educational value, aesthetical and recreational value, and orientational and identity value.

Landscapes and the viewing of landscapes have also been shown to have positive psychological and health benefits; Velarde et al (2007), have shown through an examination of various environmental psychology studies that visual exposure to natural landscapes (e.g. by means of viewing natural landscapes during a walk, or viewing from a window) generally has a beneficial impact on human health (e.g. reduced stress, facilitating recovery from illness, and behavioural changes that improve mood and general well-being).

Landscape as a source of beauty is prevalent within the arts and is a strong drawcard for recreational activities. In addition, the landscape is an element in the ability of people to orient themselves and is strongly related to people's cultural identity and sense of place. It is in this context that value is placed in natural or rural landscapes, and it follows that such value would be placed on views in an area such as the study area which is largely natural, and which has high aesthetic value by virtue of its scenic nature.

The above values can be interlinked, but can also be conflicting, e.g. amenity values associated with a landscape held by a certain group of people as described above may conflict with economic values associated with the market or development possibility of the landscape that is held by others. It is in this context that visual impact associated with a potential development often arises as an issue in environmental impact assessments.

The latter three sub-categories of amenity value described above – aesthetic, identity and psychological health value are typically involved in the perception of visual impact and constitute the elements of the 'visual sensitivity' associated with that landscape, as development within a landscape can change the landscape to the degree to which the amenity value associated with a landscape would be considered to be degraded or no longer present.

Visual sensitivity may range from high to low, depending on the following additional factors:

- **The visual absorption capacity** - The potential of the landscape to conceal the proposed project will reduce or increase visual sensitivity.
- **Viewing distance** – The greater the viewing distance, the lower the visual sensitivity. The visual modification of a development is assumed to be the highest when the observer is very close to it and has a direct line of sight. The visual modification decreases with distance and is also known as distance decay (Hull & Bishop 1988).

- **Length of time** the project is in view - If the viewer has only a brief glimpse of the planned infrastructure, the contrast may not be of great concern and the visual sensitivity low. If, however, the planned infrastructure is subject to view for a long period, as from an overlook, the contrast may be very significant.
- **General orientation** - General orientation of residences to landscape areas affected by a project. Residential, tourist and/or recreation areas with a strong visual orientation towards the planned infrastructure (i.e. those with areas such as living rooms and/or verandas orientated towards it), will have a higher visual sensitivity than those not orientated towards the planned infrastructure.
- **Relative planned infrastructure size** - The contrast created by the project is directly related to its size and scale as compared to the surroundings in which it is placed.
- **Type of users** - Visual sensitivity will vary with the type of users. Recreational sightseers may be highly sensitive to any changes in visual quality, whereas workers who pass through the area regularly may not be as sensitive to change.
- **Numbers of viewers** - Areas seen and used by large numbers of people are potentially more sensitive. Protection of visual values usually becomes more important as the number of viewers increases.
- **Adjacent land uses** - The inter-relationship with land uses in adjacent lands can affect the visual sensitivity of an area. For example, an area within the view-shed of a residential area may be very sensitive, whereas an area surrounded by commercially developed lands may not be visually sensitive.
- **Special areas** - Management objectives for special areas such as natural areas, wilderness areas, conservation areas, scenic areas, scenic roads or trails frequently require special consideration for the protection of the visual values. This does not necessarily mean that these areas are scenic, but rather that one of the management objectives may be to preserve the natural landscape setting. The management objectives for these areas may be used as a basis for assigning sensitivity levels.

Landscapes are subdivided into three (3) distanced zones based on relative visibility from travel routes or observation points (receptors). The three zones are:

- Foreground-Middle ground Zone - This is the area that can be seen from each travel route for a distance of 0 to 5 kilometres where management activities might be viewed in detail. The outer boundary of this distance zone is defined as the point where the texture and form of individual plants are no longer apparent in the landscape. In some areas, atmospheric conditions can reduce visibility and shorten the distance normally covered by each zone.
- Background Zone - This is the remaining area which can be seen from each travel route to approximately 24 kilometres but does not include areas in the background which are so far distant that the only thing discernible is the form or outline. To be included within this distance zone, vegetation should be visible at least as patterns of light and dark.
- Seldom-Seen Zone - These are areas that are not visible within the foreground-middle ground and background zones and areas beyond the background zones.

Land-use areas are generally characterised in terms of low, moderate or high visual sensitivity, as follows:

- Low visual sensitivity - industrial areas, local roads, mining and degraded areas.
- Moderate visual sensitivity - tourist roads, major roads, sporting or recreational areas and places of work.
- High visual sensitivity - rural residences, recreation areas, conservation areas, scenic routes or trails.

4.3 Visual modification

Visual modification is a measure of the level of visual contrast and integration of the planned infrastructure with the existing landscape. An existing landscape has certain visual characteristics expressed through the visual elements of form, shape, line colour and texture. A development that has different visual characteristics than the existing landscape will create contrast with the existing landscape. If similar infrastructure already forms part

of the existing landscape, the visual effects of the planned infrastructure will borrow visual character from these operations, reducing visual modification.

The degree to which the visual characteristics of the planned infrastructure contrast with the existing landscape will determine the level of visual modification. For example, a newly created mine will have high visual modification due to strong contrast. An extension of operations in an existing mine will have lesser visual modification. A successfully rehabilitated mine area will also have a lower visual modification due to limited contrast with the existing landscape.

Similarly, a project is said to be integrated with the existing landscape based on issues of scale, position in the landscape and contrast. High visual integration is achieved if a development is dominated by the existing landscape and is of small scale and/or limited contrast.

The level of visual modification generally decreases with distance and is categorised as follows:

- **Negligible (or very low) level of visual modification** – where the development is distant and/or relates to a small proportion of the overall view-shed.
- **Low level of visual modification** - where there are minimal visual contrast and a high level of integration of form, line, shape, pattern, colour or texture values between the development and the landscape. In this situation, the development may be noticeable but does not markedly contrast with the landscape.
- **Moderate level of visual modification** - where a component of the development is visible and contrasts with the landscape, while at the same time achieving a level of integration. This occurs where surrounding topography, vegetation or existing modified landscape provide some measure of visual integration or screening.
- **High level of visual modification** - where the major components of the development contrast strongly with the existing landscape and demand attention.

The following factors must be considered when applying visual modification categories:

- **Length of time the project is in view** - If the viewer has only a brief glimpse of the project, the contrast may not be of great concern. If, however, the project is subject to view for a long period, from a viewing location, the contrast may be very significant.
- **Relative size or scale** - The contrast created by the project is directly related to its size and scale as compared to the surroundings in which it is placed.
- **Recovery time** - The amount of time required for successful re-vegetation should be considered. Recovery usually takes several years and goes through several phases (e.g. bare ground to grasses, to shrubs, to trees, etc.). It may be necessary to conduct contrast ratings for each of the phases that extend over long time periods. Those conducting contrast ratings should verify the probability and timing of vegetative recovery.
- **Atmospheric conditions** - The visibility of planned infrastructure due to atmospheric conditions, such as air pollution or natural haze, should be considered
- **Motion** - Movement such as waterfalls, vehicles or plumes draw attention to a project.
- **Form** - Contrast in form results from changes in the shape and mass of landforms or structures. The degree of change depends on how dissimilar the introduced forms are to those continuing to exist in the landscape.
- **Line** - Contrasts in line result from changes in edge types and interruption or the introduction of edges, bands, and silhouette lines. New lines may differ in their sub-elements (boldness, complexity, and orientation) from existing lines.
- **Colour** - Changes in value and hue tend to create the greatest contrast. Other factors such as chroma, reflectivity and colour temperature, also increase the contrast.

- **Texture** - Noticeable contrast in texture usually stems from differences in the grain, density and internal contrast. Other factors such as irregularity and directional patterns of texture should also be considered.

5. VISUAL ASSESSMENT OF THE SITE AND PROPOSED DEVELOPMENT

The DEA&DP Guideline for involving visual & aesthetic specialists in EIA processes document provides a number of criteria that relate specifically to Visual Impact Assessments namely:

- Visibility of the project
- Visual exposure
- Visual sensitivity of the area
- Visual sensitivity of receptors
- Visual Absorption Capacity
- Visual Intrusion.

It is recommended that the proposed project should be assessed against these criteria before attempting to assess the visual impact of the proposed development.

5.1 Description of the affected area and the scenic resources

The development is situated in the Garden Route, in the southeastern extent of the Western Cape (**Figure 1**). The area is a scenic, coastal area with a rich, visual diversity. This diverse and beautiful coastal area is a landscape formed over millions of years and numerous sea-level changes. The Outeniqua Mountain, which consists of hard and folded Table Mountain Quartzite, forms a majestic backdrop to a coastal platform, in the north (**Figure 3**).

Figure 3: A view of the undulating coastal platform and Outeniqua mountains in the Garden Route

From: The Garden Route Environmental Framework (2010)

"The landscape of the Garden Route comprises an intricate mosaic of landforms, which further supports its diverse ecological features. These features extend from coastal features, through to the lake system, framed by the backdrop of the high Outeniqua mountains. The area is similarly dissected by numerous rivers draining the highlands to the coast. The coastal landscape is characterised by sensitive foredune systems which are prone to erosion, and which perform critical ecological functions, and which similarly are sought after for residential property development. The area is characterised by cover sands on steep slopes surrounding the lakes and estuaries, which are unstable and unsuitable for development activity.

and

The Garden Route has been named as such due to the visual and aesthetic quality attached to the region. Similarly, the region is considered as one of the most scenic in the country, attracting significant numbers of domestic and international tourist throughout the year. This asset is, unfortunately, one of the regions limiting factors. Due to the perceived high - quality of life associated with the region underpinned by scenic topography, quaint villages and hamlets, large tracts of natural open space systems supported by an extensive national park system (Garden Route National Park); the Garden Route has become the ideal location of retired individuals from the larger cities, as well as a growing international interest. This insatiable demand for development land for residential and tourism use is limited by the biophysical, physical and aesthetic constraints of the area. It is indeed the case of the "exact reasons for the attraction could become its downfall".

The proposed development is located along a section of the N2 and Knysna roads that are fully developed with shopping centers, housing and other businesses.

5.2 Surrounding land uses

The proposed development site is surrounded by two shopping malls, residential housing developments, and other commercial businesses along the N2 and Knysna Road corridor. No sensitive visual receptors such as conservation areas or formally designated scenic lookouts are located within the immediate surrounds of the site. The existing built character of the surrounding area creates a precedent for development of a commercial and residential nature at the site (**Figure 4**).

5.3 Topography

The proposed development site is located on a flat area with no significant topographic variation. The surrounding land uses similar flat terrain. The site is not located on or near a ridgeline, elevated slope, or prominent topographic feature. Consequently, topography does not serve as a major visual screening mechanism at this site, nor does it represent a sensitive visual resource in the immediate locality.

5.4 Local vegetation

The proposed project site supports natural vegetation (Garden Route Granite Fynbos, South African National Biodiversity Institute 2024 Final Vegetation Map of South Africa, Lesotho and Swaziland) however, this vegetation occurs as an isolated island within a substantially transformed urban environment, surrounded by existing commercial and residential developments on nearly all sides. The site is connected to the broader open space system only by a narrow strip of natural area linking it toward the N2 road, which limits both its ecological continuity and its contribution to a larger visually intact landscape unit.

As a result, although the vegetation contributes some local green character and visual softening, it does not form part of a broad, continuous natural landscape and has a reduced scenic and visual resource value in the context of the surrounding developed corridor. The proposed development will replace this isolated patch of vegetation within the development footprint with built form, resulting in a localised change in visual character from a vegetated enclave to an urban residential development

5.5 Protected landscapes

The proposed development site lies within the Garden Route Biosphere Reserve buffer zone. However, the site is surrounded by existing commercial and residential developments and does not constitute an ecologically or visually intact portion of the Biosphere Reserve. The broader designation requires that development be sensitive to the scenic and ecological values of the region, and appropriate mitigation measures must therefore be incorporated.

Figure 4: Surrounding land use

6. PROBABLE VIEW CATCHMENT

6.1 Probable view catchment

Slope and aspect are very important in the context of views. Topography expressed in the form of slope and aspect can perform an important role in limiting views or 'focusing' views in a certain direction. Viewers located low down within an enclosed valley would experience a limited visual envelope or viewshed, as the rising topography around them would prevent wider views of the surrounding terrain beyond the immediate valley.

Similarly, an object placed lower down in such an enclosed valley would have a limited viewshed, being shielded or partly shielded by the terrain surrounding it. A viewer located on a hill slope with a certain aspect would only be able to view the surrounding tertian in the direction of the aspect of the slope. Conversely, a viewer on a higher-lying interfluve will be exposed to potentially wide-ranging views over the surrounding terrain, and large objects placed in these terrain settings could similarly be visible from a wide area.

The micro-topography within the landscape setting in which the viewer and object are located is also important. The presence of micro-topographical features and objects such as buildings or vegetation that would screen views from a receptor position to an object can remove any visual impact factor associated with it.

Fischer (1995) analysed the effects of data errors on viewsheds (view catchment) calculated by Geographic Information Systems and has shown that the calculations are extremely sensitive to small errors in the data and the resolution of the data and the errors in viewer location and elevation. Other studies have also shown that a viewshed calculated using the same data but with eight different Geographic Information Systems can produce eight different results.

Hankinson (1999) also states that viewshed are never accurate, and they contain several sources of error and may not always be feasible to separate these errors or to estimate their size and potential effects. It is, therefore, better to describe a viewshed analysis as a probable view catchment that must be subjected to subsequent field testing and verification.

A probable view catchment can be based on topography only and shows areas that will be screened by intervening hills, mountains etc. A probable topographic (digital terrain relief model) view catchment does not consider heterogeneous and complex natural and man-made elements in the surrounding landscape. A digital terrain model (DTM) can be created from existing contour data. A view catchment based on a digital surface model (DSM) does consider intervening vegetation, buildings or small variations in topography, such as road cuttings. Digital surface models are expensive and not a viable option for small projects.

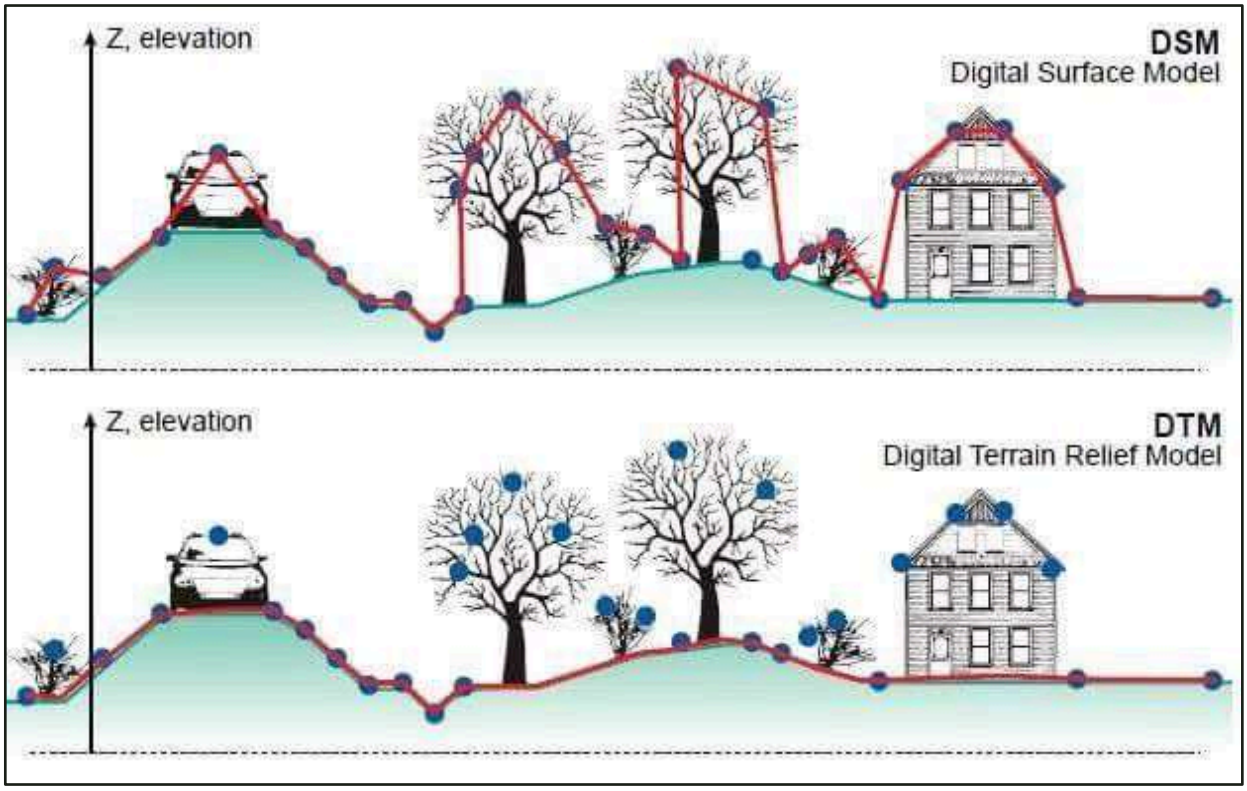

Figure 5: Terrain models

Therefore, a probable catchment is a conservative assessment of those areas that may be visually impacted by the planned infrastructure. Increasing the sophistication/accuracy of the probable viewshed by the addition of data (DSM) on complex natural and man-made elements in the landscape is desirable, but it will introduce further errors of detail and interpretation in the view catchment analysis.

7. VISIBILITY OF THE PROPOSED DEVELOPMENT

7.1 Zone of visual influence

The geographical area from which the proposed development will theoretically be visible, or probable view catchment, is dictated by topography. Theoretically, the development site could be seen from all surrounding areas. However, distance, developments, houses and vegetation will reduce the actual view catchment that the proposed development site will have, to a much smaller area (zone of visual influence).

Based on the information gathered from the various observer locations the zone of visual influence was determined for the development (**Figure 6**). It spans an area of approximately 0.5 km south, 0.3 km west, 0.9 km north and 0.6 km to the east. According to the specific criteria for visual impact assessments, the visibility of the site is **local**, being visible from an area less than 5km away.

7.2 Receptors

The level of visual impact considered acceptable is dependent on the type of receptors. The following receptor sensitivity ratings were considered:

- High sensitivity – e.g. residential areas, nature reserves and scenic routes or trails
- Moderate sensitivity – e.g. sporting or recreational areas, or places of work
- Low sensitivity – e.g. industrial, or degraded areas

The following receptor sensitivity ratings have been applied to the identified observer locations and receptor groups within the Zone of Visual Influence (ZVI) of the proposed development on erf 28005, George.

High sensitivity receptors are the residential properties directly adjacent to the development (Observer location C). The single-storey residential properties located on the southern and western boundary of the proposed development site are classified as high sensitivity receptors. These receptors are permanent, long-term residents who occupy their properties on a daily basis and who have a vested interest in the character and quality of their immediate visual environment. Unlike road users who experience views briefly and from a distance, residents at this location are static viewers at close range, with direct lines of sight toward the proposed development. Their existing outlook is oriented toward the Outeniqua Mountains to the north, and the proposed multi-storey apartment blocks introduce a significant change in scale and massing at close range relative to the prevailing single-storey residential character. The sensitivity of these receptors is further elevated by the potential for shadow effects from the taller buildings and the partial obstruction of mountain views. For the purposes of this assessment, the directly adjacent residential receptors on the southern and western boundary are therefore assigned a high sensitivity rating.

Observer location A is located adjacent to the N2 National Road, to the east of the development site. National roads carry a high volume of road users and are therefore classified as movement corridors with moderate receptor sensitivity in terms of the applicable guidelines. However, it is noted that this section of the N2 at the location of the proposed development is urban and commercial in character and does not qualify as a route of high or medium scenic significance under the applicable guidelines. Road users travelling along the N2 are in motion at highway speed, limiting the duration of any views, and the development site lies approximately 500 m to the west, with intervening commercial buildings and established vegetation providing substantial screening. Despite the high volume of road users, the receptor sensitivity rating for Observer location A is appropriately classified as moderate, consistent with its function as a movement corridor rather than a scenic or amenity route.

Observer location B is located on Knysna Road, to the north of the development site, at the traffic circle between the George Meander Mall and the Toyota garage. This public road is likewise classified as a movement corridor with moderate receptor sensitivity, given the relatively high volume of road users who pass along this section of Knysna Road. Pedestrians along the road verge are also classified as moderate sensitivity receptors at this location, as they are in transit rather than occupying static viewpoints. As with Observer location A, the surrounding environment is characterised by commercial and retail land uses and does not constitute a scenic or high-amenity route. The receptor sensitivity for Observer location B is accordingly assessed as moderate.

Commercial properties, retail centres (including the George Meander Mall and Garden Route Mall), and places of work within the broader ZVI are classified as moderate sensitivity receptors in accordance with the guidelines, which specifically identify places of work and sporting or recreational areas in this category. These receptors are accustomed to a dynamic, commercially active urban environment and have a lower expectation of visual amenity than residential or natural areas.

No receptors within the delineated ZVI have been identified as falling squarely within the low sensitivity category, which typically applies to industrial or significantly degraded landscapes. While the broader commercial corridor along Knysna Road and the N2 exhibits a level of visual complexity and built-up character that reduces overall visual sensitivity, it does not constitute an industrial or degraded landscape to a degree that would warrant a low sensitivity classification.

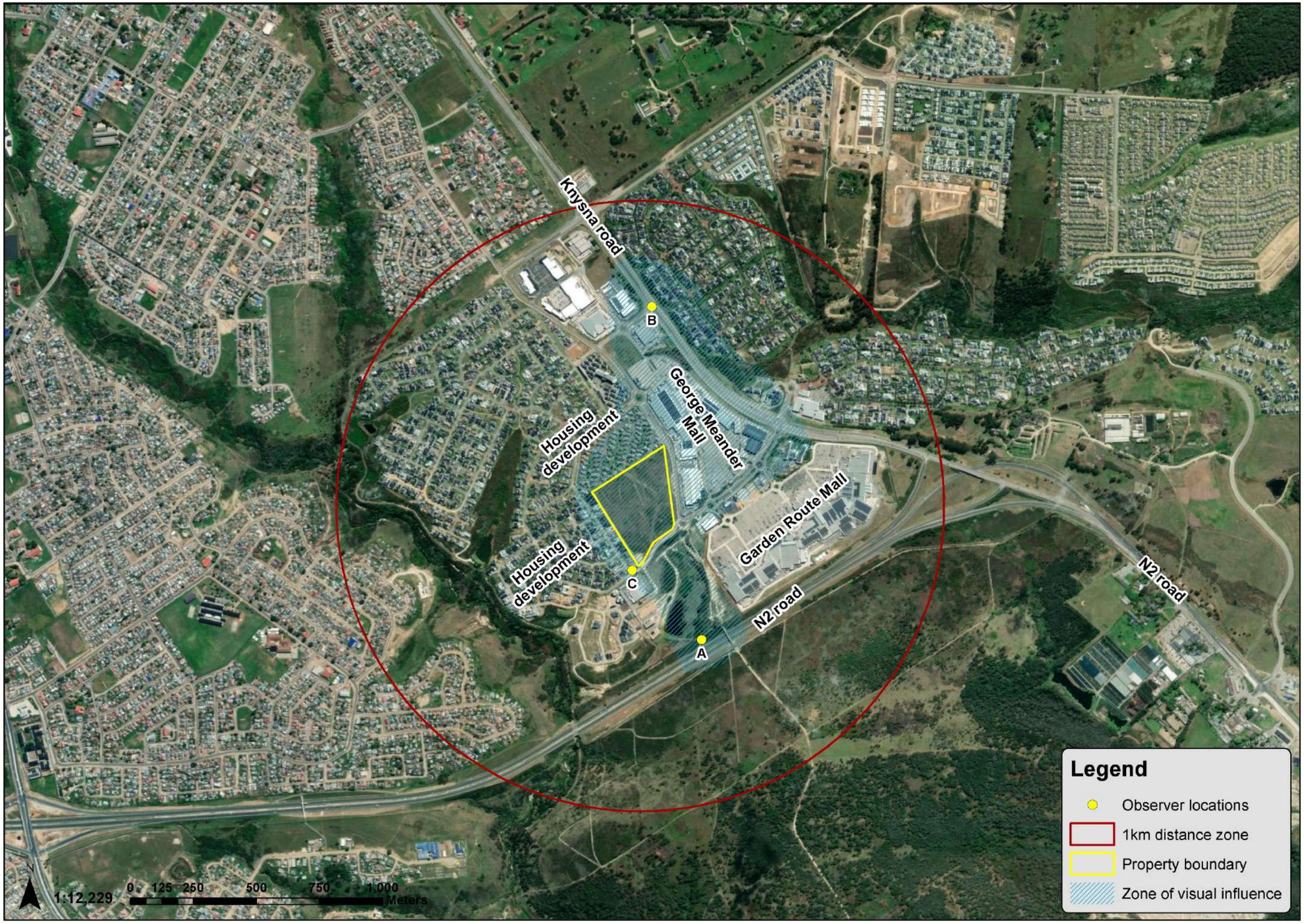

Figure 6: Observer locations

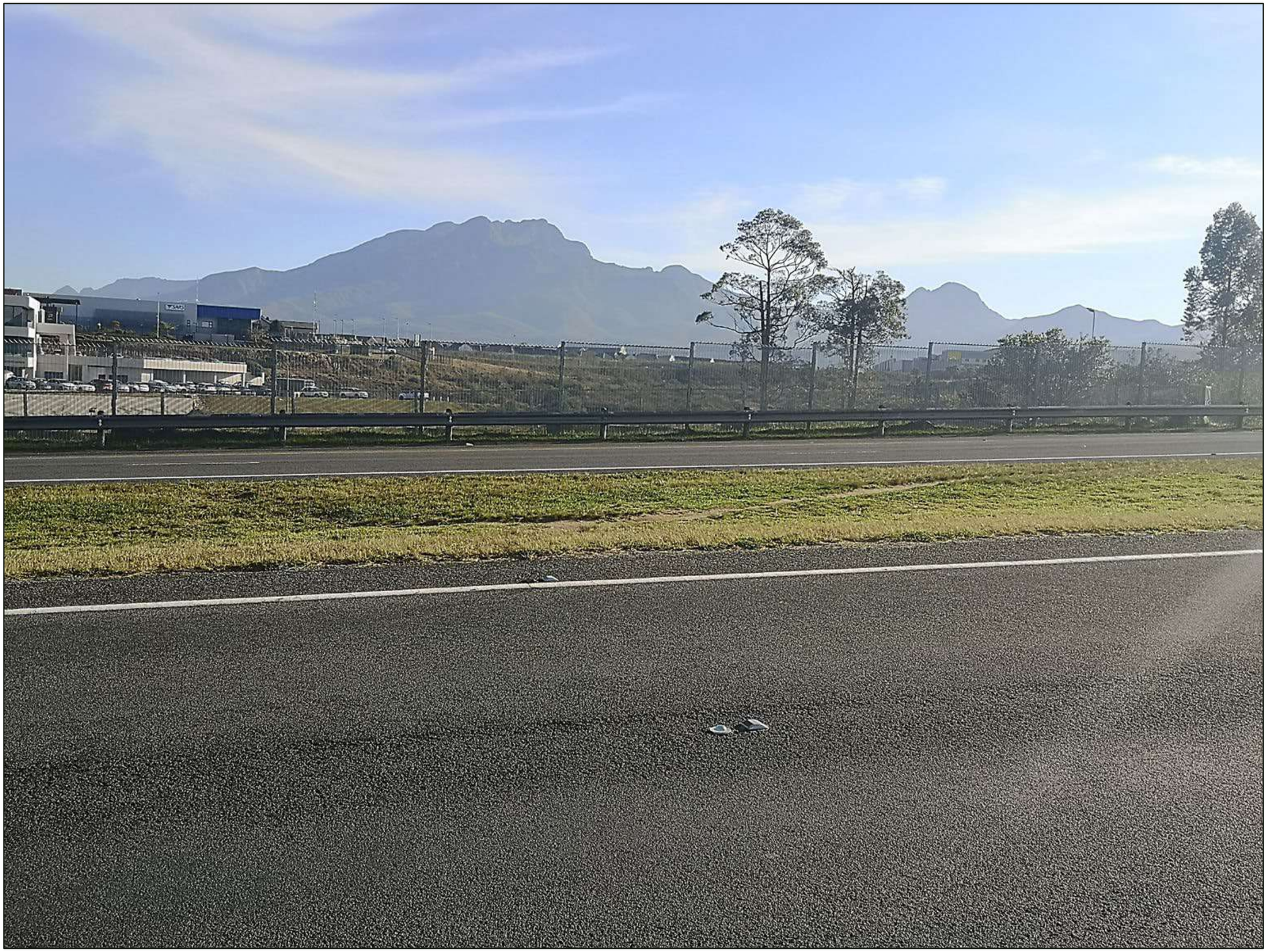

Figure 7: Observer location A

Figure 8: Observer location B

Figure 9: Observer location C

7.3 Visual exposure

The visual impact of a development diminishes at an exponential rate as the distance between the observer and the object increases. Relative humidity and fog in the area directly influence the effect. Increased humidity also causes the air to appear greyer which diminishes detail. Thus, the impact at 1 km would be 25% of the impact as viewed from 500 m. At 2km, it would be 10% of the impact at 500 m. The inverse relationship between distance and visual impact is well-recognised in visual analysis literature (Hull and Bishop, 1998) and was used as important criterion for this study.

Thus, visual exposure is an expression of how close receptors are expected to get to the proposed development regularly. For this assessment, close-range views (equating to a high level of visual exposure) are views over a distance of 500 m or less, medium-range views (equating to a moderate/medium level of visual exposure) are views of 500 m to 2 km, and long-range views are over distances greater than 2 km (low levels of visual exposure).

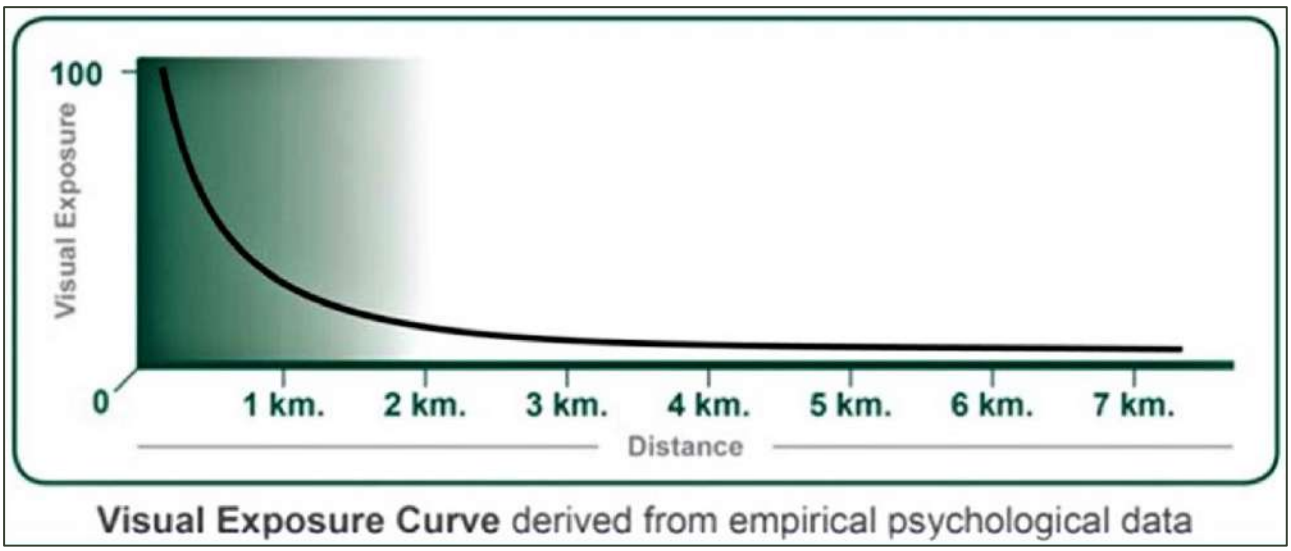

Figure 10: Visual exposure graph

Within the Zone of Visual Influence view corridors, viewpoints and receptors will experience "Visual Exposure" to the proposed development. The following visual exposure classes were considered during the assessment:

- High exposure – dominant or clearly noticeable
- Moderate exposure – recognisable to the viewer
- Low exposure – not particularly noticeable to the viewer

7.3.1 View corridors

7.3.1.1 Observer location A view corridor

Observer location A is located adjacent to the N2 road, to the east of the development site, and is classified as a movement corridor with moderate receptor sensitivity. Although the N2 carries a high volume of road users, the character of this section of the road is urban and commercial rather than scenic, with the western side of the N2 at this location occupied by the Garden Route Mall and associated commercial structures, and residential developments. The proposed development therefore does not occupy an open or undeveloped landscape setting when viewed from this corridor instead, it is located within an already substantially built-up urban node.

The proposed development is set back approximately 500 m from the N2. Between the N2 and the site, the western roadside is occupied by the Garden Route Mall, George Meander Mall, Builders Warehouse, and associated commercial structures, which act as a near-continuous physical screen along this side of the road. As a result, direct views from the N2 towards the site are largely obstructed, and only a single narrow gap between these intervening commercial structures provides any opportunity for glimpsed views of the proposed development. The combination of set-back distance and intervening built fabric means that any visible portion of the development is anticipated to be limited to the uppermost one to two floors above the rooflines of the intervening structures and would occupy a small and peripheral part of the road user's field of vision.

The visual exposure of road users at this location is further reduced by the nature of observation from a moving vehicle. Vehicles travel at speed along the N2, and occupants are seated at a relatively low position within their vehicles, both of which reduce the proportion of any development that falls within the functional field of view and limit the duration of any view to a matter of seconds. Where the development occupies less than approximately five percent of the central field of vision, the degree of visual modification is considered insignificant in terms of established methodology.

The directional orientation of traffic also materially influences exposure. Vehicles travelling from Cape Town towards George may obtain brief, forward-facing glimpses of the proposed development through the narrow view gap where the site is not fully screened. By contrast, vehicles travelling from Knysna towards Cape Town will generally have the proposed development behind or to the side of them along this section of the N2 and will experience little to no meaningful visual exposure. This directional asymmetry means that a significant proportion of road users at Observer location A will not have any effective view of the site at all.

Although the N2 falls within the broader Garden Route scenic corridor policy designation, the practical scenic significance of this specific section is low, given that the roadside environment is dominated by approved built development, with the principal remaining scenic element being the distant Outeniqua mountain backdrop rather than the immediate roadside setting. Visual exposure from Observer location A is therefore assessed as **low**, notwithstanding the high volume of road users along this corridor.

7.3.1.2 Observer location B view corridor

Observer location B is located on Knysna Road, to the north of the development site, and is classified as a public road with moderate receptor sensitivity, where road users experience the surrounding environment in passing rather than from a static viewing position.

Knysna road is fully developed on both sides along this section, with commercial buildings, retail infrastructure, and trees planted alongside the road forming a near-continuous built edge that screens most direct views towards the proposed development. The George Meander Mall occupies the southern frontage of Knysna Road at this location, and a Toyota garage and associated commercial structures occupy the opposite side, such that the road corridor is enclosed by existing built development on both sides.

A traffic circle at this location provides vehicular access between Knysna Road and the various businesses and the George Meander Mall. The gap created by this access road and the turning area between the commercial buildings introduces a narrow view corridor through which intermittent and brief glimpsed views towards the proposed development are possible. However, this corridor is limited in angular width and is oriented obliquely rather than directly towards the site, which reduces the proportion of the development visible, and the degree of visual modification experienced by passing road users.

Where views through this gap are possible, they will be partial and of short duration. The proposed development is set back approximately 500 m from Knysna Road, and only the uppermost one to two floors of

the four-storey apartment blocks are anticipated to be visible above the rooflines of the intervening George Meander Mall and associated structures. At this distance, and with the field of view constrained by the width of the gap between buildings, the visible portion of the development will occupy a small fraction of the road user's central field of vision, which is a key factor in determining the degree of visual modification.

As with all movement-corridor observer locations, visual exposure for vehicle occupants at Observer location B is further reduced by the speed of travel and the low seated position of occupants, both of which limit the effective field of view and restrict the duration of any view to a matter of seconds. Road users travelling in the direction away from the development will have no meaningful views at all, as the site will be largely behind them along this section of Knysna Road.

Although Knysna road is a public road, pedestrian activity along this section is limited, and the number of people walking alongside the road is low. Pedestrians moving along the road would in principle have a higher eye level and a slower pace than vehicle occupants, allowing a marginally greater opportunity for views through gaps in the built fabric. However, given the low number of pedestrians and the fact that screening conditions along the road are largely the same as those experienced by vehicle occupants, the overall contribution of pedestrian receptors to visual exposure at this location is negligible.

A residential development is located on the northern side of Knysna Road, opposite the commercial frontage. A soil berm with established mature vegetation runs along the road boundary of this development and largely screens views from the first row of houses towards the proposed development. The second row of houses is in turn screened by the first row, further reducing any visual exposure to the site from within the residential development. As a result, residents on the northern side of Knysna Road are unlikely to experience meaningful or sustained views of the proposed development, and this receptor group does not materially alter the overall visual exposure assessment at Observer location B.

7.3.1.3 Observer location C view corridor

Observer location C is located next to the residential development situated on the southern boundary of the proposed development site. Unlike the movement-corridor observer locations assessed at the N2 and Knysna Road, receptors at this location are static, long-term residents who occupy their properties on a permanent basis and therefore have a higher degree of sensitivity to changes in their immediate visual environment. The receptor sensitivity at Observer location C is accordingly assessed as **moderate to high**, reflecting the residential nature of the viewing population and the proximity of these receptors to the proposed development.

The existing single-storey houses along the southern and western boundary currently enjoy relatively open views towards the Outeniqua mountain range, which forms a prominent and visually significant backdrop to the north and northwest of George. This mountain backdrop represents the principal scenic resource of value at this observer location, and any development that introduces built form into the mid-ground of these views has the potential to partially interrupt or reduce the quality of the mountain panorama currently experienced by these residents. Although the proposed apartment blocks at four storeys will not reach the elevation of the mountain skyline, the introduction of multi-storey built form into what is currently an open vegetated setting will reduce the horizontal extent of unobstructed mountain views available from ground level within adjacent single-storey properties.

The degree of visual modification experienced by residents at Observer location C will vary depending on the proximity of individual properties to the shared boundary. Properties immediately adjacent to the development boundary will experience the most direct and sustained views of the proposed apartment blocks, with the upper floors and roofline of the nearest buildings likely to dominate a portion of the forward field of vision from ground-floor windows and private outdoor spaces. The apparent scale and massing of the proposed

development, relative to the existing single-storey character of the surrounding residential fabric, will be a noticeable change for these immediately adjacent residents, even though the broader landscape context remains of low to moderate visual sensitivity.

In addition to the visual intrusion of built form, residents on the southern and western boundary may be affected by shadow cast from the proposed multi-storey apartment blocks, particularly during morning and late afternoon hours when the sun angle is low. Given the height of the proposed buildings relative to the single-storey houses on the boundary, shadow effects could extend into adjacent private outdoor spaces and gardens, reducing the amenity of these areas during parts of the day. The significance of this effect will depend on the precise orientation of individual properties relative to the nearest apartment blocks and the seasonal variation in sun angle.

The proposed development site is the last remaining undeveloped parcel within an otherwise established urban node, and that the George Municipality has approved several multi-storey residential developments within the broader town area. The introduction of four-storey development at this location therefore represents an incremental intensification of an already developed urban area rather than a fundamental transformation of a natural or rural landscape. Nonetheless, for the immediately adjacent single-storey residential receptors at Observer location C, the change in scale, massing, and outlook at close range is real and constitutes the most significant visual impact associated with the proposed development.

Visual exposure from Observer location C is assessed as **moderate**, with the most significant effects confined to the immediately adjacent properties on the southern and western boundary where views of the proposed apartment blocks will be direct and sustained. Appropriate design mitigation measures, including landscaped boundary buffers, stepped massing at the residential interface, and a considered building colour scheme are recommended to reduce the visual dominance of the proposed development as experienced from this observer location.

7.4 Visual sensitivity

The inherent visibility of a project site's landscape is usually determined by a combination of topography, landform, vegetation cover, settlement pattern and special features. This translates into visual sensitivity. The following visual sensitivity classes were considered during the assessment:

- High visual sensitivity – highly visible and potentially sensitive areas in the landscape,
- Moderate visual sensitivity – moderately visible areas in the landscape,
- Low visual sensitivity – minimally visible areas in the landscape

The visual sensitivity is a measure of how critically a change to the existing landscape is viewed by people from different land-use areas in the vicinity of a development. The degree of visual sensitivity of an area is closely related to the aesthetic quality of the area, the value placed in that quality, and the area's socio-economic profile. Residential, tourist, and recreational areas generally have a higher visual sensitivity than other land-use areas such as industrial zones, major roads, or transport corridors, because these receptors use the scenic amenity values of the surrounding landscape over extended viewing periods.

The inherent visual sensitivity of the development site and its surrounding landscape is determined by a combination of topography, vegetation cover, settlement pattern, land use, and special features. For erf 28005 and its surroundings, these factors must be assessed within their correct context: the site is located within an established and commercially active urban node situated behind the Garden Route and George Meander Mall and is set back approximately 500 m from both the N2 and Knysna Road. The surrounding environment is substantially transformed, with commercial malls, retail infrastructure, business premises, and residential development occupying land on all sides of the site. In this context, the visual sensitivity of the site and its broader Zone of Visual Influence is assessed as low to moderate, reflecting the already modified urban

character of the area while recognising that sensitivity varies between different receptor types within the zone.

7.5 Visual absorption capacity

The visual absorption capacity (VAC) of a landscape refers to its potential to conceal or absorb a proposed development within its existing visual character. A landscape with a high VAC that is achieved through topography, vegetation cover, existing development, or landscape fragmentation is better able to screen and integrate a new development, thereby reducing the degree of visual modification experienced by observers. Conversely, a landscape with a low VAC, such as an open, flat, or pristine environment, offers little concealment and any new development will stand out with greater contrast. The following visual absorption classes were considered during the assessment:

- High VAC – effective screening is provided by topography, vegetation and existing infrastructure
- Moderate VAC - partial screening is provided by topography, vegetation and existing infrastructure
- Low VAC - little screening is provided by topography, vegetation and existing infrastructure

The proposed development site is essentially flat and sits at the same general elevation as the surrounding road infrastructure and adjacent commercial and residential developments. The site is positioned within a contained urban node, set back behind the Garden Route Mall and the George Meander Mall, which function as the primary built mass between the site and the external road corridors. From the N2 road corridor (Observer location A), the section of the N2 that contains the narrow view corridor towards the site sits at a lower elevation relative to the development. This relative elevation difference means that any portion of the proposed apartment blocks that may be glimpsed through the narrow view corridor would be seen from below, with the buildings appearing against the backdrop of the existing urban fabric rather than prominently against the open sky. Beyond this narrow view corridor, the Garden Route Mall effectively closes all further views of the development from the N2, with no meaningful sightlines remaining as road users continue along the corridor.

From Knysna Road (Observer location B), the flat and uniform topography provides no elevation-based screening but also introduces no topographic amplification of the proposed development's visual presence. The site and road are at comparable elevations, and any views that exist are limited by the intervening built structures rather than by changes in ground level.

From the immediately adjacent residential properties on the southern and western boundary (Observer location C), the flat topography provides no concealment of the proposed development. The proposed four-storey apartment blocks will be seen at close range above the existing single-storey built fabric, with no meaningful change in ground level to reduce effective building height or break sightlines.

The topographic contribution to Visual Absorption Capacity (VAC) is therefore assessed as negligible to low from the road corridors, where the lower-lying position of the N2 at the narrow view corridor slightly reduces the effective height of the proposed development as seen against the sky, but where built screening by the Garden Route Mall renders topography largely irrelevant beyond that point. From the adjacent residential receptors on the southern and western boundary, the flat topography provides no concealment whatsoever, and the topographic contribution to VAC is assessed as negligible.

The most significant contributor to the VAC at this location is the existing surrounding built environment. The site is enclosed on its northern boundary by the George Meander Mall and associated commercial structures, and on its western side by the Garden Route Mall and further retail and commercial development. These existing structures form a near-continuous physical screen between the site and the N2 and Knysna Road corridors, restricting views towards the development to a narrow and intermittent corridor. The development is set back approximately 500 m from both road corridors, and at this distance the intervening commercial

structures are tall enough to screen most direct lines of sight, with only the uppermost one to two floors of the proposed apartment blocks likely to be visible above the existing rooflines. On the opposite side of Knysna Road, a soil berm with established mature vegetation further reduces visual exposure from the adjacent residential development. The contribution of existing built development to the VAC is assessed as **high** from public road corridors and **moderate** from properties immediately north of Knysna Road.

The proposed development site currently supports natural vegetation that forms an isolated patch within the surrounding urban fabric, connected to the broader open space system only by a narrow strip of natural area linking it toward the N2. While this vegetation contributes some localised visual softening and green character in the current baseline condition, it does not form part of a broad or continuous natural landscape and has a reduced scenic and visual resource value in the context of the surrounding developed corridor. The contribution of the existing vegetation to the overall VAC is therefore assessed as low.

All existing vegetation on the site will be removed during construction to accommodate the proposed development footprint. During the construction phase, the removal of vegetation will temporarily reduce the VAC at this location, as the visual softening and screening currently provided by the existing plant cover will be absent and the development will be more exposed to view from adjacent receptors. This represents the period of greatest visual modification, and the VAC during construction is assessed as **low**. Following construction, a landscape plan will be implemented across the development. The establishment of landscaping, including boundary planting, street trees, and soft landscaping within the development will progressively restore a degree of visual softening and contribute to the integration of the built form with the surrounding environment. As landscaping matures over time, it will increasingly screen and soften the lower portions of the apartment blocks when viewed from adjacent properties and road corridors and will improve the overall visual compatibility of the development with its surroundings. The contribution of vegetation to the VAC is therefore expected to increase progressively from low during and immediately after construction to low to moderate as the landscape plan matures.

The VAC of a landscape is also influenced by the degree to which the surrounding land use context is already modified, as existing development of similar character reduces the visual contrast that a new development would introduce. In this respect, the visual character of the surroundings of erf 28005 is that of an established commercial and residential urban node, with structures of varying heights, massing, and materials already present across the immediate area. The proposed four-storey residential development, while taller than the majority of adjacent structures, does not represent a fundamental departure from the built character of the broader node, particularly given that the George Meander Mall and sections of the Garden Route Mall already include structures exceeding single-storey height. Modifications to a landscape that repeat or broadly reflect the landscape's existing design elements are more readily absorbed and less likely to create strong visual contrast. In this context, the visual character of the surrounding area contributes a moderate VAC, as the site is not located within a high-quality, pristine, or scenically sensitive environment.

Taking all four factors together, the moderately varied topography, the significant screening provided by intervening commercial development, the limited and declining contribution of existing vegetation, and the already modified urban visual character of the area the overall VAC of the site and its surroundings is assessed as moderate to high from public road corridors and low to moderate from the immediately adjacent residential properties on the southern and western boundary. This assessment supports the conclusion that the proposed development will be visually absorbed to a considerable degree when viewed from the N2 and Knysna Road, while acknowledging that the VAC is more limited for the closest residential receptors who will experience the development at close range and without the benefit of significant intervening screening.

7.6 Visual intrusion

Visual intrusion is defined as the level of compatibility or congruence of the project with the particular qualities of the area, or its sense of place. This is related to the idea of context and maintaining the integrity of the

landscape or townscape. The assessment of visual intrusion takes into account the height, massing, and scale of the proposed development relative to its surroundings, the distance and orientation of affected receptors, and the degree of screening provided by intervening structures, vegetation, and topographyThe following visual intrusion classes were considered during the assessment:

- High visual intrusion – the proposed development results in a noticeable change or is discordant with the surroundings
- Moderate visual intrusion – the proposed development partially fits into the surroundings but is clearly noticeable
- Low visual intrusion – the proposed development creates minimal change or blends in well with the surroundings

Visual intrusion from the N2 road corridor is assessed as **low**. The proposed development is set back approximately 500 m from the N2, and the intervening built environment including the Garden Route Mall and associated commercial structures forms a near-continuous physical screen between the road and the site. Where a narrow view gap exists, only the uppermost one to two floors of the proposed four-storey apartment blocks are likely to be visible above the existing rooflines. At this distance and through this limited aperture, the proposed development will occupy a small fraction of the road user's central field of vision, below the approximate five percent threshold at which visual modification is generally considered insignificant. The commercial and retail character of the N2 corridor at this location further reduces the perception of intrusion, as the existing visual context is already dominated by large-format built structures. The degree of visual intrusion experienced by road users on the N2 is therefore negligible to low.

Visual intrusion from Knysna Road is similarly assessed as **low**. Knysna Road is fully developed on both sides along this section, with the George Meander Mall and associated commercial structures occupying the southern frontage. The narrow view corridor created by the traffic circle gap between these structures provides only oblique and intermittent glimpsed views towards the proposed development. At a set-back distance of approximately 500 m, the proposed development will recede significantly in the visual field, and the visible portion limited to glimpsed roofline elements above the surrounding commercial structures will not constitute a dominant or intrusive presence in the viewshed experienced by-passing road users. The residential development on the northern side of Knysna Road is further protected from visual intrusion by a soil berm with established mature vegetation along the road boundary, and the second row of houses is screened by the first row, such that intrusion into this residential setting is limited.

The most significant visual intrusion associated with the proposed development will be experienced by the single-storey residential properties located directly along the southern and western boundary of the site. These properties are in close proximity to the development footprint and currently enjoy views across the open vegetated site towards the Outeniqua mountain backdrop to the north. The introduction of 18 apartment blocks at close range will constitute a clear and direct visual intrusion for these immediately adjacent properties. The proposed buildings will be noticeably taller than the existing single-storey residential fabric, and the upper floors and rooflines of the nearest apartment blocks will dominate a portion of the forward field of vision from ground-floor windows, living areas, and private outdoor spaces of properties on the shared boundary.

The degree of visual intrusion will vary with proximity. Properties directly adjacent to the development boundary will experience the greatest intrusion, as the proposed buildings will be prominent in their immediate view and will partially interrupt views of the Outeniqua mountains previously unobstructed by built form. Properties further from the boundary will experience a reduced but still noticeable change in their visual environment, as the proposed development introduces a new mid-rise built edge into what is currently an open, vegetated setting. In addition to the direct visual intrusion of built form, the proposed multi-storey apartment blocks have the potential to cast shadow onto adjacent private outdoor spaces and gardens during parts of the day, particularly during morning and late afternoon hours when sun angles are low. The

significance of this effect will depend on the orientation of individual properties relative to the nearest apartment blocks.

The proposed development constitutes an incremental intensification of an already developing urban node, and that the George Municipality has approved multi-storey residential developments within the broader town area. The introduction of four-storey development at this location therefore does not represent the intrusion of urban development into a natural or rural landscape, but rather a change in scale and massing within an established urban context. Nonetheless, for the immediately adjacent single-storey residential receptors, the visual intrusion is real and constitutes the most significant visual impact associated with the proposed development. Appropriate mitigation in the form of landscaped boundary buffers, stepped massing at the residential interface, and a considered building colour scheme is recommended to reduce the visual prominence of the development as experienced from these properties.

8. POTENTIAL VISUAL IMPACTS OF THE PROPOSED DEVELOPMENT

The assessment of visual impacts is based on a synthesis of criteria including nature of impact, extent, duration of the impact, intensity, probability of occurrence, reversibility, irreplaceable loss of resources, cumulative effect and level of significance.

8.1 Nature of the impact

The nature of the visual impacts will be the visual effect the activity would have on the receiving environment. The nature of the visual impact of the proposed development on erf 28005 arises primarily from the change in land use and built character of the site. The site is currently zoned Business 1, which permits a maximum site coverage of 100% and a maximum building height of 15 m. The application proposes to rezone the site to Residential 4, which permits the same maximum building height of 15 m but a reduced maximum site coverage of 60%. The proposed development, comprising 18 apartment blocks of up to four storeys, has an estimated site coverage of 39.6% that is substantially below both the 100% permitted under the existing Business 1 rights and the 60% permitted under the proposed Residential 4 rights. The nature of the visual impact is therefore one of urban intensification within an existing commercial and residential node, rather than the introduction of urban development into a natural or undisturbed landscape.'

The proposed development will alter the visual character of the site from a natural, vegetated setting to a built residential environment, clearly visible from the immediately adjacent properties and from oblique viewpoints along Knysna Road and, to a lesser extent, the N2. The change will introduce new form, line, massing, colour, and texture elements into the existing visual environment and will alter the skyline profile experienced by neighbouring residential receptors. The primary visual impact is one of increased built mass and scale at close range, most acutely experienced by the directly adjacent single-storey residential properties on the southern and western boundaries of the site. These visual impacts will be:

Pre-construction phase:

- Removal of some vegetation will be required for earthworks. Some vegetation would also be cleared for building thereby increasing the visibility of the site and resulting in a loss of the vegetation visual resource.

Construction phase:

- During construction, earthworks, cleared surfaces, construction materials, and temporary structures will increase the visual prominence of the site from adjacent receptors and will represent the period of greatest visual modification and lowest visual absorption capacity.

Operational phase:

- The completed development will change the visual character of the site from an open, vegetated urban enclave to a mid-rise residential built environment. The most significant permanent visual impact will be experienced by the immediately adjacent single-storey residential properties on the southern and western boundary, where the proposed four-storey apartment blocks will be visible at close range and without the benefit of significant intervening screening. From public road corridors on the N2 and Knysna Road, views will be limited to intermittent glimpsed views of the uppermost floors above the rooflines of the intervening commercial structures, given a set-back distance of approximately 500 m and the near-continuous screening provided by the Garden Route Mall, George Meander Mall, and associated commercial structures.

8.2 Impact assessment criteria

The assessment of visual impacts is based on a synthesis of criteria including nature of impact, extent, duration of the impact, intensity, probability of occurrence, reversibility, irreplaceable loss of resources, cumulative effect and level of significance.

8.2.1.1 The extent of the impact

Extent refers to the geographical area or spatial distribution over which a visual impact will be experienced. It describes how far from the proposed development the visual impact will be noticeable.

The extent of the visual impact for the proposed development pre- and post-mitigation is **local**, being visible from an area less than 5 km away and limited to the immediate surroundings of the site. The Zone of Visual Influence spans approximately 0.5 km to the south, 0.3 km to the west, 0.9 km to the north, and 0.6 km to the east. The Outeniqua Mountain backdrop will remain the dominant visual element in the wider landscape and the development does not alter views from regional or national viewpoints. The extent is assessed as **local** both before and after mitigation.

8.2.1.2 Duration of the project

The duration measures the time period over which the visual impact will persist.

The duration of the construction phase impact is assessed as **short-term** (0–5 years), corresponding to the construction period, after which construction-phase effects will cease. The operational impact, associated with the permanent introduction of the residential built form, is assessed as **permanent**, as the development constitutes a lasting change in the character of the site. The contribution of the landscape plan to progressively softening the visual impact will be realised over the medium term (5–10 years) as boundary planting and screen vegetation mature.

8.2.1.3 The intensity of the impact

The Intensity of the proposed project describes the degree or severity of alteration to the visual character, landscape quality, or viewing experience. It reflects how noticeably and dramatically the development changes what viewers see and experience.

The proposed development site coverage is 39.6%, which is substantially below both the 100% permitted under the current Business 1 zoning and the 60% permitted under the proposed Residential 4 zoning, resulting in a lower ground-level building footprint than either the existing or proposed zoning would otherwise allow.

The proposed development will have a **low pre-mitigation** visual impact intensity that creates a visible moderate but not fundamental change to the visual character. The **post-mitigation** visual impact intensity will

be **very low.** A design-based mitigation approach that includes setbacks, vegetation screening, and architecture will create minimal residual visual impact becomes minimal and well-integrated.

The intensity of the visual impact varies by receptor type. For the immediately adjacent single-storey residential properties on the southern and western boundary, where the proposed apartment blocks will be viewed at close range without significant intervening screening, the pre-mitigation intensity is assessed as **high**, reflecting a clearly visible and materially significant change in scale and massing relative to the existing single-storey residential character. For road corridor receptors on the N2 and Knysna Road, where the development is substantially screened by intervening commercial structures and is visible only through narrow view gaps, the pre-mitigation intensity is assessed as **low**. Post-mitigation, with the implementation of landscaped boundary buffers, massing reductions at the residential interface, and a considered colour scheme, the intensity for adjacent residential receptors is expected to reduce to **medium** and for road corridor receptors to **low to negligible**.

8.2.1.4 The probability of the impact

Probability describes the likelihood that a predicted visual impact will actually occur. It accounts for uncertainty, design flexibility, and management factors that may prevent or reduce the anticipated impact.

The probability of the visual impact occurring is assessed as **definite** for the operational phase. The proposed four-storey apartment blocks will be visible from the identified observer locations once constructed, regardless of mitigation. The construction phase impact is similarly rated as **definite** for the duration of the construction period. With the comprehensive implementation of mitigation measures, including screening vegetation, architectural design, colour treatment, and landscape integration, the probability of the impact being experienced at a significant level of intensity is substantially reduced, but the occurrence of some degree of visual impact remains certain.

8.2.1.5 Reversibility

Reversibility describes the degree to which the visual impact can be undone or the landscape restored to its original condition (or similar character) after the activity ceases or is modified.

The operational impact of the proposed development, involving the permanent replacement of natural vegetation with a multi-storey built residential environment, is assessed as **irreversible** in practical terms, as the change cannot be reversed without the full demolition of the development. The construction phase impact is **partially reversible**, as the site will take on its final developed character upon completion. The progressive maturation of the proposed landscape plan will partially offset the loss of visual softening associated with the removal of the existing vegetation but will not restore the pre-development character of the site.

8.2.1.6 Irreplaceable loss of resources

This criterion addresses whether the visual impact results in permanent loss of unique, rare, or irreplaceable visual resources. It measures the significance of what is lost and whether that loss is recoverable or represents genuine diminishment of visual resources.

The proposed development will result in a **minor** loss of visual resources. The natural fynbos vegetation on the site, while of ecological value, is not classified as a unique or regionally irreplaceable visual resource in the context of the surrounding urban node, occurring as an isolated patch within a substantially developed urban environment. The primary loss of local visual amenity is the partially unobstructed views of the Outeniqua mountain backdrop currently enjoyed by immediately adjacent residential properties, which will be partially interrupted by the introduction of the proposed apartment blocks. This represents a minor to moderate loss of local scenic amenity for the closest receptors but does not constitute a regional or national loss of visual heritage. Irreplaceable loss remains **minor** pre-and post-mitigation.

8.2.1.7 Cumulative effect

Cumulative effect describes the combined or additive visual impact of a proposed development in combination with existing developments, past activities, and reasonably foreseeable future developments in the area. It addresses whether the development contributes to broader landscape degradation or fragmentation.

The proposed development has a **low** cumulative visual impact. The landscape contains existing developments, and the proposed development will contribute incrementally to visual change or fragmentation, but the cumulative effect is localized and not substantially altering the broader landscape character. The proposed development does not occur in isolation and should be considered in the context of the broader pattern of urban intensification in the George urban node.

The cumulative visual impact is assessed as **low**, as the landscape already contains significant existing commercial and residential development of varying heights and massing, and the proposed development will contribute incrementally to visual change within an already substantially modified urban context. Nonetheless, it is noted that the cumulative impact of multiple developments of this scale and type, located across the urban edge without adequate visual management, has the potential to progressively erode the scenic character of George, particularly in areas with high foreground visual exposure to the N2 scenic corridor. The George Municipal SDF acknowledges this risk and emphasises the importance of maintaining the Garden City character of George.

8.2.1.8 Significance

Significance is the overall, synthesized assessment of whether a visual impact is minor, moderate or high. Significance is determined by integrating the above criteria (extent, duration, intensity, probability, reversibility, irreplaceable loss, cumulative effect) into a final judgment.

The proposed development has a **low** significance before and after mitigation. The visual impact is minor and localized. While the impact is noticeable, it is well-contained within a limited area and does not substantially alter landscape character or affect significant visual resources.

The overall significance of the visual impact varies by receptor and phase. For the immediately adjacent single-storey residential receptors on the southern and western boundary of the site, the pre-mitigation significance is assessed as **high**, given the close-range proximity, the direct and sustained nature of views, and the degree to which the proposed apartment blocks will alter the existing outlook and partially interrupt views of the Outeniqua mountain backdrop. For road corridor receptors on the N2 and Knysna Road, the significance is assessed as **low** pre-mitigation, reflecting the limited, screened, and intermittent nature of any views of the proposed development. Following the implementation of recommended mitigation measures — including a detailed landscape plan, landscaped boundary buffers, stepped massing at the residential interface, a considered colour and materials scheme, and appropriate lighting management the residual significance is expected to reduce to **medium** for adjacent residential receptors and **low to negligible** for road corridor receptors.

8.3 Conclusion

The proposed development involves the construction of 18 residential apartment buildings on erf 28005, George. The site is located within the existing urban edge, immediately west of the N2 and south of Knysna Road, in an established commercial node that includes the Garden Route Mall, George Meander Mall, Builders Warehouse, and associated commercial developments. The site is currently undeveloped and covered by natural fynbos vegetation, giving it a distinctive open and green character within an otherwise heavily developed urban commercial precinct. The site is currently zoned Business 1 (100% site coverage, 15m height limit) and the application seeks to rezone it to Residential 4 (60% site coverage, 15 m height

limit); the proposed development's estimated site coverage of 39.6% is well within both the existing and proposed limits.

This Visual Impact Assessment examined the proposed development from three observer locations, namely the N2 road corridor, Knysna Road, and the directly adjacent residential neighbourhood to the south and west, as well as from the broader George and Garden Route landscape context, and the findings differ significantly depending on who is looking and from where. Considering first the N2 road corridor at observer location A, the N2 carries a high volume of traffic, but its visual character at this location is already dominated by large-format commercial buildings, including the Garden Route Mall, that sit between the road and the development site and substantially screen the proposed development from approaching vehicles. Only a narrow gap in the built-up commercial frontage provides any view toward the site, and even then, views are fleeting due to vehicle speed, the seated position of road users, and the oblique angle of approach. Traffic approaching from Knysna will have the development behind them and will experience no meaningful view at all. The visual impact from the N2 is therefore assessed as low, both before and after mitigation.

Turning to Knysna Road at observer location B, the road provides somewhat more direct access to views of the site, as the proposed development's northern and eastern elevations will be visible from the road over and around existing commercial structures. However, this is also a movement corridor with moderate receptor sensitivity, occupied by pedestrians, cyclists, and passing vehicle occupants who are oriented toward the road itself rather than the broader landscape. Views will be of a built residential development within an established urban commercial context, which does not represent a jarring or incongruous visual intrusion in this setting. The visual impact from Knysna Road is assessed as low to medium before mitigation and low after the implementation of mitigation measures.

The most significant visual impact of the proposed development is experienced from the adjacent residential properties at observer location C. The residential properties along the southern and western boundary of erf 28005 are single-storey dwellings classified as high-sensitivity receptors, and residents of these homes will look directly at four-storey buildings from distances of only a few metres. This will fundamentally alter the visual outlook from these properties, partially blocking views of the Outeniqua mountain backdrop that currently give this neighbourhood much of its visual amenity and sense of place.

Before mitigation, the intensity of visual impact from these properties is high and the significance is high. Mitigation measures, including a landscape buffer of indigenous screening vegetation along the shared boundary, stepped massing and architectural articulation of the building facades facing the residential boundary, a considered colour scheme using earthy non-reflective tones, and a detailed landscape plan, can reduce contrast and improve visual integration over time, but cannot remove the impact. A four-storey building remains a four-storey building. After mitigation, the residual intensity is medium and the residual significance is medium for these receptors, representing a permanent and irreversible change to the visual environment of these neighbouring properties.

In terms of the wider landscape context, the proposed development is located within the George urban node and well within the urban edge defined by the George Municipal Spatial Development Framework. The site does not fall on or near a ridgeline, mountain, or topographically prominent features, and does not intrude into the skyline as seen from the N2 scenic corridor or from any heritage or conservation area. The Outeniqua mountains will remain the dominant visual backdrop in all views and will not be obscured by the proposed development from any public viewing location. The wider visual character of this part of George is that of an established urban commercial and residential node, and in this context the proposed residential development represents an intensification of urban land use consistent with the commercial character of the surrounding area and consistent with the type of development that the GSDF and the Garden Route Environmental Framework seek to accommodate within the urban edge.

The proposed development on erf 28005 is visually acceptable from the perspective of the wider George urban landscape, the N2 scenic corridor, and the Garden Route regional context, with a low visual impact on public road users and the broader townscape consistent with the urban commercial character of the surrounding node. The development does not threaten any heritage, conservation, or regionally significant scenic resource. The visual impact on the directly adjacent single-storey residential neighbours is, however, significant and permanent. With carefully designed, specific, and enforceable mitigation conditions focused on the boundary interface with the residential properties to the south and west, the residual visual impact can be reduced to a medium level.

9. VISUAL CONSTRAINTS & MITIGATION

Visual Garden Route Environmental Management Framework (GREMF) has identified the inappropriate placement of development infrastructure on prominent and exposed topographical features such as ridgelines as a risk to the visual landscape of the Garden Route. While the proposed development on erf 28005 is not located on a ridgeline or topographically sensitive feature, the introduction of 18 multi-storey residential buildings within a predominantly single-storey residential and commercial context nevertheless requires a clearly defined mitigation framework to reduce visual impact, in particular on the directly adjacent residential properties to the south and west.

The GREMF states that proposed developments within areas of outstanding natural beauty, scenic drives and panoramic views must be sensitive to natural beauty and consider the following aspects when planning the development:

- Infrastructure should be visually unobtrusive
- Materials and colours used for the development should blend into the surrounding landscape
- Infrastructure should be grouped in clusters with open spaces between clusters
- Infrastructure should not interfere with the skyline (ridgelines), landmarks, major views and vistas
- The development should not increase light, noise or effluent pollution
- The development should correspond to the historical, architectural and landscape style of surrounding layout and buildings

9.1 Visual mitigation measures

General visual mitigation principles to reduce visual impact can be categorised as:

- On-site treatments to reduce visual effects; and
- Treatments at viewer locations to reduce visual sensitivity.

On-site treatments involve rehabilitation of landforms and land cover, while viewer location treatments involve a range of treatments to screen views, filter views and/or re-orientate primary views.

On-site treatments might include:

- Visual and ecological planting patterns of indigenous vegetation to achieve landscape patterns that emulate in part existing mixes of tree and grass cover in the surrounding landscape.
- Minimising exposure of work areas to sensitive receptors.
- Preparing an internal landscape plan for rehabilitation areas.

At viewer location treatments include:

- Landscape design and plantings for affected locations. This will require an appropriately qualified person to visit the affected locations and develop a landscape plan to screen or filter views of the project areas.

Design fundamentals are general design principles that can be used for all forms of activity or development, regardless of the resource value being addressed. Applying the following three fundamentals will assist with mitigation measures:

- Proper siting or location.
- Reducing unnecessary disturbance.
- Repeating the elements of form, line, colour and texture of the surrounding landscape.

Design strategies are more specific activities that can be applied to address visual design problems. The following strategies will not necessarily apply to every proposed activity or project:

- Colour selection
- Earthwork
- Vegetative manipulation
- Structures
- Reclamation/Restoration
- Linear alignment design considerations

The fundamentals and strategies mentioned above are all interconnected, and when used together, can help resolve visual impacts from proposed activities or developments.

9.1.1 Massing and building design at the residential interface

The most significant and irreversible visual impact identified in this assessment is the introduction of four-storey apartment blocks directly adjacent to single-storey residential properties on the southern and western boundary of the site. Architectural design responses at this interface are the most effective available mitigation for this impact.

The following measures are required at the residential interface:

The buildings positioned along the southern and western boundary must incorporate a stepped massing profile, whereby the uppermost storey is set back from the boundary-facing elevation. This stepping reduces the apparent vertical mass of the buildings as seen from adjacent single-storey properties and introduces a degree of visual graduation between the proposed four-storey development and the existing single-storey residential fabric.

Horizontal articulation of the building facades facing the southern and western boundary must be incorporated into the architectural design. Facades should avoid presenting a single unbroken wall plane to adjacent properties. The use of recessed sections, balcony variations, projecting architectural elements, and varied roofline profiles will break the perceived massing and reduce the visual monotony of the boundary-facing elevations.

A minimum building setback of 5 m from the shared southern and western boundary is recommended. This setback, combined with the proposed boundary planting buffer, will create a spatial separation between the built form and adjacent residential properties that marginally reduces the perceived height and mass of the apartment blocks as seen from within those properties.

Flat or low-pitched roof profiles with non-reflective, matte finishes are required on all buildings. Complex roof forms with multiple planes are preferred over simple pitched roofs, as they break up the apparent mass of the building when viewed from below and reduce the sharpness of the silhouette as seen against the sky.

9.1.2 Colour and material selection

The selection of exterior colours and materials for the proposed apartment blocks is the most cost-effective measure available for reducing the visual contrast between the development and its surroundings.

Exterior wall colours must be selected from an earthy, muted palette that references the natural tones of the Garden Route landscape. Warm greys, sandy beiges, ochres, and soft terracottas are appropriate. Bright white, stark grey, and high-contrast colour combinations must be avoided, as they increase the visibility of the development from surrounding roads and residential properties and create strong contrast against the natural and built context. All exterior wall finishes must be low sheen or matte. Glossy or semi-gloss finishes reflect sunlight and increase the visual prominence of the buildings from distance viewpoints, including the N2 and Knysna Road corridors. This is particularly important for the upper floors of the apartment blocks, which are the portions most likely to be visible above the rooflines of the intervening commercial buildings from public roads.

Exterior glass must be specified with diffuse rather than reflective properties. Large arrays of mirror-glass windows on the upper floors of the buildings facing the N2 or Knysna Road must be avoided, as these create visible glare from distance viewpoints and draw attention to the development. Deep eaves, overhangs, and louvred screens should be used to shade glazed elevations and reduce reflected light.

Building materials should be selected for their visual compatibility with the surrounding residential and commercial context. The use of textured render, face brick in appropriate tones, and natural stone elements at the lower floors and boundary-facing elevations will provide visual warmth and texture that reduces the starkness of the built form as seen from adjacent residential properties.

9.1.3 Boundary landscaping and vegetation management

Landscaping at the southern and western boundary is the primary long-term mitigation measure for the visual impact on adjacent residential properties. While vegetation cannot eliminate the visual impact of four-storey buildings, a well-designed and well-maintained boundary planting buffer will progressively soften the interface between the proposed development and the existing residential fabric and will, over time, screen the lower floors of the apartment blocks from within adjacent properties.

A detailed landscaping plan prepared by a registered landscape architect must be submitted as part of the building plan application. The plan must specifically address the southern and western boundary interface and must include a combination of fast-growing pioneer screening species, medium-growth indigenous shrubs and trees, and slower-growing canopy trees that will provide long-term height and screening.

All boundary planting must consist exclusively of indigenous plant species appropriate to the Garden Route. The boundary planting buffer must be a minimum of 3 m wide on the development side of the boundary, to allow for healthy root development, canopy spread, and long-term survival of the screening vegetation. A landscape management plan covering a minimum period of five years post-installation must be prepared and implemented, with annual assessment and replacement of failed planting.

Internal landscaping throughout the development must include a generous provision of canopy trees between and around the apartment blocks. The combination of boundary planting and internal soft landscaping will

progressively green the development and contribute to the visual integration of the built form with the surrounding environment. Lawn alone is insufficient and a mix of lawn, indigenous groundcovers, shrubs, and trees must be specified.

9.1.4 Lightning design

Outdoor lighting for the proposed development must be designed and specified to minimise light spill beyond the development boundary and to prevent visible light pollution from adjacent residential properties and from the N2 and Knysna Road corridors.

All external lighting along roads, pathways, and parking areas within the development must be of the bollard or downward-facing type, with full cut-off shielded fixtures that prevent light from projecting upward or sideways. Only the illuminated ground surface should be visible from outside the development, not the light source itself. Security lighting at the perimeter of the development must be movement-activated and must not remain on continuously throughout the night. No floodlighting is permitted at the entrance gatehouse. No building facade uplighting or roof illumination is permitted on any of the apartment blocks.

Interior lighting within the apartment units must be designed to prevent the buildings from creating a mass light effect visible from surrounding residential properties. This is particularly relevant for the upper floors of the apartment blocks facing the southern and western boundary, which will be in the direct field of view of adjacent single-storey residents. Window coverings must be specified or encouraged to be closed during evening hours.

9.1.5 Construction management

The construction phase represents the period of greatest visual modification, as all existing vegetation on the site will be removed and replaced by construction activity, earthworks, and building materials. The following measures must be implemented during construction to minimise the visual impact on adjacent residential properties and road corridor receptors.

The construction site must be enclosed on its southern and western perimeter with solid hoarding of a minimum height of 2 m, painted in neutral, non-reflective tones. This hoarding will provide immediate screening of construction activity from adjacent residential properties and reduce the visual intrusion of construction equipment and materials. Construction material storage, equipment parking, and site office facilities must be located on the northern portion of the site, away from the residential boundary, so as to minimise the visual intrusion of construction activity on adjacent residential receptors.

On completion of each phase of construction, disturbed ground surfaces not immediately built upon must be covered with temporary seeding or erosion control matting to prevent bare soil exposure and the associated visual scarring and dust generation.

9.1.6 Glint and Glare

Glint and glare from reflective surfaces on the proposed apartment blocks represent a potential visual impact on both the adjacent residential receptors to the south and west and on road corridor receptors using the N2 and Knysna Road. Glint refers to a momentary, bright flash of reflected light caused by a moving light source or observer angle, while glare refers to a sustained bright reflection that causes visual discomfort or impairs vision. Both effects increase the visual prominence of a development and can cause significant irritation to both stationary and moving viewers.

The primary sources of glint and glare on a multi-storey residential development of this type are large, glazed window surfaces on upper floor elevations, polished metal cladding, aluminium fascia boards and flashings, glass balustrades and balcony panels, and any glazed or polished roof elements. Given that the upper floors of the apartment blocks will be the most visible portions of the development from the N2, Knysna Road, and from within adjacent residential properties, the management of reflective surfaces at upper floor level is of particular importance.

All glazing on the upper floor elevations of the apartment blocks, and in particular on the northern elevations facing the N2 and Knysna Road and the southern and western elevations facing the residential boundary, must be specified with a low-reflectance coating or tinted glass with a visible light reflectance value not exceeding 20%. Standard clear float glass, which can have a visible light reflectance of 8 to 15%, is acceptable provided it is set within deep reveals, overhangs, or louvred screens that prevent direct solar reflection toward road users or adjacent properties during peak sun angles. Mirror glass and high-reflectance solar control glass must not be used on any elevation visible from a public road or from adjacent residential properties.

Metal cladding, aluminium window frames, fascia boards, gutters, and roof flashings must be specified in powder-coated or anodised matte finishes in dark or mid-tone colours. Bright mill-finish aluminium and polished stainless-steel elements must not be used on any external surface. Where metal balustrades are specified for balconies on the upper floors, these must be of a vertical blade or mesh profile in powder-coated matte steel rather than glass panel balustrades, which create large reflective surfaces visible from distance viewpoints.

Glass balustrades, where used on balconies facing the residential boundary or the road corridors, must be of a frosted or acid-etched finish rather than clear glass, to diffuse rather than reflect incident light. Frameless clear glass balustrades at height, when viewed from below or at an oblique angle from road level, create both glint and glare effects that increase the visual prominence of upper floor elevations and must therefore be avoided on all boundary-facing and road-facing elevations.

No polished, glazed, or metallic roof finishes are permitted. Roof surfaces must be finished in matte, low-reflectance materials such as dark-toned concrete roof tiles, matte fibre cement sheeting, or a membrane roof finish in a non-reflective dark colour. Where photovoltaic panels are installed on roof surfaces, they must be oriented and tilted to minimise glare toward adjacent residential properties and road corridors, and anti-reflective coated panels must be specified.

9.1.7 Fencing

Perimeter fencing on the southern and western boundary must be of a visually permeable design such as palisade or tubular steel, painted in dark, non-reflective tones (charcoal or dark grey) that recede visually rather than drawing attention to the boundary edge. Solid masonry or brick boundary walls are not recommended at the residential interface, as they create a harsh visual edge and prevent the growth of boundary planting through the fence line. Where masonry retaining structures are required, they must be finished in natural stone cladding or textured render in tones matching the boundary landscape palette.

9.2 Monitoring program

A monitoring program A monitoring programme must be implemented to ensure that the visual mitigation measures described in this section are properly implemented and maintained throughout the construction and operational phases of the development.

During the construction phase, monitoring must confirm that construction hoarding is in place and maintained along the southern and western boundary, that topsoil is being retained and stockpiled correctly, that construction waste and materials are not stored within the view of adjacent residential properties, and

that the construction programme is progressing in a manner consistent with minimising the duration of visual disruption.

Prior to occupancy, a visual inspection must be conducted by the visual specialist to confirm that the boundary planting has been installed in accordance with the approved landscaping plan, that all exterior colours and materials are consistent with the approved palette, that all lighting fixtures are of the specified full cut-off type and correctly aimed, and that the building facades at the residential interface incorporate the required stepped massing and horizontal articulation.

During the operational phase, the landscape management plan must be implemented over a minimum five-year period, with annual inspections to assess the establishment and health of the boundary planting. Failed or unhealthy planting must be replaced within one growing season of identification. Visual impact assessments should be conducted from the key receptor locations identified in this report. The southern and western boundary residential properties and the N2 and Knysna Road corridors at year one and year five post-construction, to verify that mitigation measures are performing as intended and to identify any areas where additional screening or design refinements may be required.

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ANNEXURE "U": TRAFFIC IMPACT ASSESSMENT

Erf 28005

Transport Impact Assessment

Eden Meander Precinct, George, Western Cape

April 2026

5th Floor

Imperial Terraces

Carl Cronje Drive

Tyger Waterfront

Bellville, 7530

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SUMMARY SHEET

Report Type	Transport Impact Assessment
Title	Erf 28005
Location	Eden Meander Precinct, George, Western Cape
Client	Century Property Developments
Reference Number	ITS 4976
Project Team	Christoff Krogscheepers
	Inge van Tonder
	Marie-Louse Schreve
Contact Details	Tel: 021 914 6211
Date	April 2026
Report Status	First Draft
File Name	G:\4976 TIA Erf 28005 Eden Meander George\12 Reports\Issued\4976 TIA Erf 28005 Eden Meander George Draft Report_IvT_2026-04-14.docx

It is herewith certified that this Traffic Impact Assessment has been prepared according to the requirements of the South African Traffic Impact and Site Traffic Assessment Manual (TMH 16 and 17).

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REPORT - SUMMARY TABLE

This transport impact assessment is reported only in a summary table format instead of a traditional report to assist review and interpretation of the results. This summary table includes all the relevant information. It should be sufficient for the review and interpretation of the expected transport impacts as well as the comprehension of the required measures to mitigate the transport impact. If any more detail is required, please contact the authors.

ANNEXURES

Annexure A: Figures
Annexure B: Tables
Annexure C: Queueing Analysis

ABBREVIATIONS

COTO	Committee of Transport Officials
Ha	Hectare
HCM	Highway Capacity Manual
LOS	Level of Service
NMT	Non-motorised Transport
SQM	Square Meters (m^2)
TIA	Transport Impact Assessment
V/C	Volume to Capacity Ratio
WCG	Western Cape Government

Transport Impact Assessment

Erf 28005, Eden Meander Precinct, George, Western Cape

1 Background	The Eden Meander development has matured over the last 15 years, and several transport studies were conducted for the larger precinct. The first was in January 2010, by Innovative Transport Solution (Pty) Ltd, and this was for a total of ±240 000m^2 GLA. This study was refined in February 2012 and was based on four distinct phases, of which the most critical phase was Phase 4, which included development up to 145 000m^2 GLA. The 2012 study identified major improvements that were thought to be required for the full development of Eden Meander. The study for the larger Eden Meander was updated (ITS, July 2023) to reflect the actual trip generation and traffic growth that had occurred over the last 13 years. The transport impacts of the larger precinct are significantly lower than expected in the 2012 study, specifically due to lower trip generation rates and lower background growth, which were, among other factors, related to lower economic growth and the possible impact of the Go George bus service. In July 2023, a separate study was done for Erf 28005 for a Makro development. It was previously proposed to do a 12 500 m^2 GLA Makro development on the current vacant site. This report serves as an update to the Traffic Impact Assessment that was done in 2023, but it will replace the proposed Makro development with a residential development.
2 Purpose of Study	The purpose of this study is to determine the transport impacts of the proposed 680 residential development on Erf 28005 within the larger Eden Meander precinct. The assessment is done by considering all the completed developments within Eden Meander, and all the latent developments in the area. It also considers the existing transport system as improved over recent years.
3 Locality	The proposed development is in the larger Eden Meander Precinct adjacent to the Garden Route Mall and Blue Mountain Village in George, Western Cape. Park Road borders the site to the east, Platinum Drive to the south and Blue Mountain Village and Gardens to the north and west. Refer to **Figure 1** for the locality map.

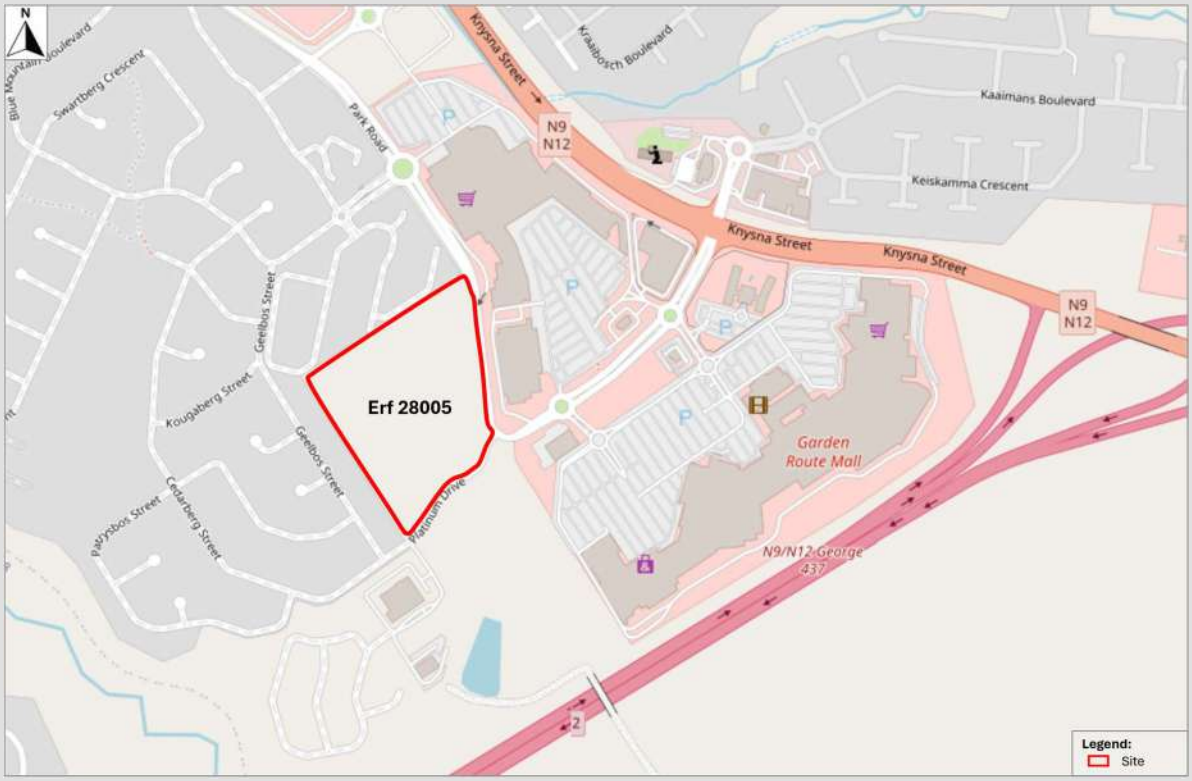


Figure 1: Locality Plan

4 Land Use	**Existing Land Use:** Currently, Erf 28005 is vacant. **Proposed Land Use:** The planned development will include the following: • The development of 680 residential units is proposed on Erf 28005. Refer to **Figure A1** in Annexure A for the Site Development Plan (SDP).
5 Existing access	There is currently a driveway providing access to the erf approximately 100m from Park Road.
6 Existing Roadways	The existing roadways in the site vicinity are described below. The road classification is based on the George Comprehensive Integrated Transport Plan (CITP) 2023-2028 (George Municipality, August 2024). Refer to **Figure 2** for the road classification of George. **N2**: Class 1 Freeway. Two lanes per direction, 120km/h speed limit, with a median, no on-street parking and no sidewalks. **Knysna Road (TR210)**: Class 2 Major Arterial. Two lanes per direction, 80km/h speed limit, no on-street parking, with a median and sidewalks on both sides of the road for most of its length. Sidewalks are absent for a section between Saint George's Road and Madiba Drive.

	Saint George's Road west of Knysna Road: Class 5 collector road. Two lanes per direction, 60km/h speed limit, no on-street parking and sidewalks on both sides of the road. **Park Drive**: Class 5 local road. Single lane per direction, 60km/h speed limit, no on-street parking, no median and sidewalks on both sides of the road. Park Drive splits into a dual carriageway with a median for 150m northwest and southeast of the roundabout access to the Garden Route Mall. **Garden Route Mall Access Road**: Class 5 local road. It comprises of a dual carriageway road with two lanes per direction, 60km/h speed limit, no on-street parking and sidewalks on both sides of the road **Platinum Drive**: Class 5 Collector Road. Single lane per direction, 60km/h speed limit, no on-street parking, no median and sidewalks on both sides of the road.

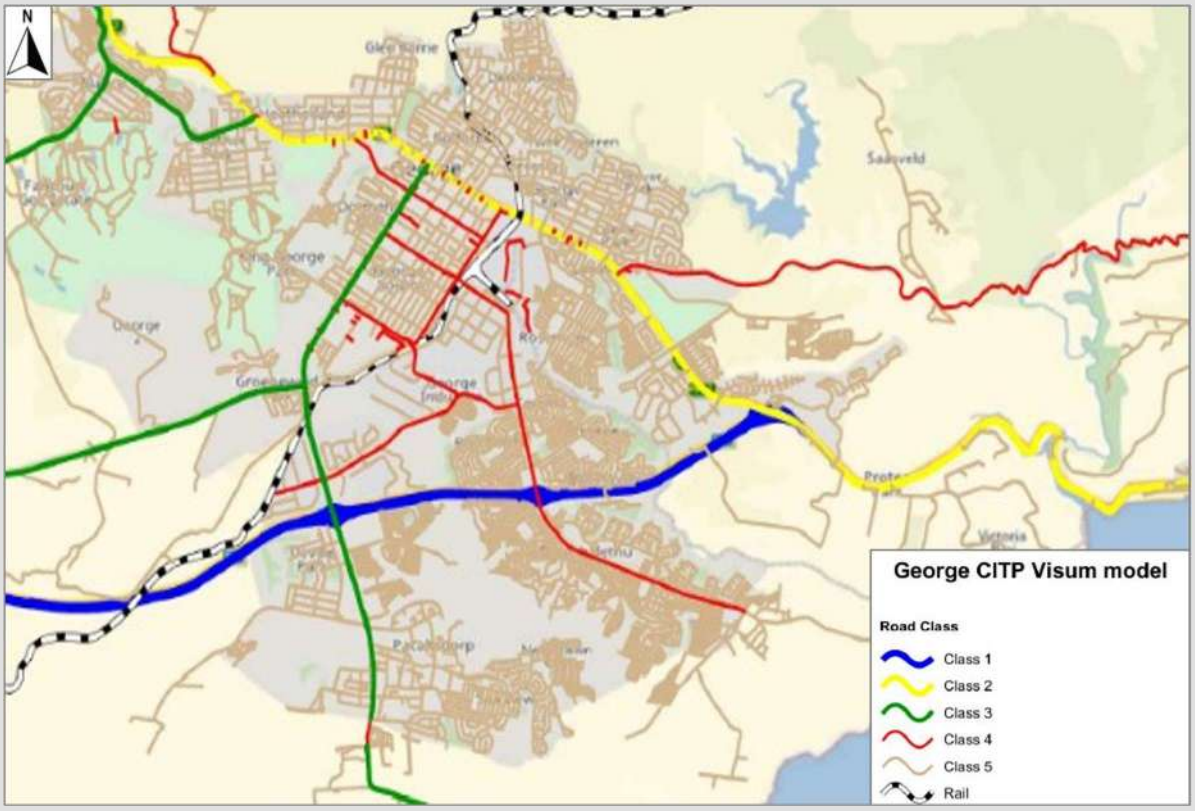


Figure 2: Road Hierarchy for George, as used in the Base Year of the Transportation Model (George CITP, 2024)

7 Analyses Hours	The following peak hours were included as part of this investigation: • Weekday a.m. peak hour (07:00 - 09:00) • Weekday p.m. peak period (16:30 – 17:30)
8 Scenarios Analysed	The following traffic scenarios were analysed: • **Scenario 1**: 2026 Existing Traffic Conditions – Based on existing 2025 counted traffic volumes. • **Scenario 2**: 2031 Background Traffic Conditions – *Based on Scenario 1 traffic volumes PLUS the expected trips from the future land uses and latent developments. Further discussed in section 11. No background growth was applied.* • **Scenario 3**: 2031 Total Traffic Conditions – *Based on Scenario 2 traffic volumes PLUS the expected trips from the residential development on Erf 28005.*
9 Study Intersections	The following intersections were evaluated: **Intersection 1:** Knysna Road/St George's Road - Signalised Intersection **Intersection 2:** Knysna Road/Partial Mall Access - Partial Intersection **Intersection 3:** Knysna Road/Park Road (Mall Access) - Signalised Intersection **Intersection 4:** Knysna Road/N2 Off-Ramp - Priority Control **Intersection 5:** Knysna Road/N2 On-Ramp - Priority Control **Intersection 6:** St George's Road/Park Road – Priority Control **Intersection 7:** Park Drive/ Blue Mountain Village Construction Road - Priority Control **Intersection 8:** Park Drive/Blue Mountain Village Access - Roundabout **Intersection 9:** Park Drive/ Platinum Drive – Future roundabout **Intersection 10:** Platinum Drive/Development Access (Future intersection) - Access to Residential Development Refer to **Figure 3** for the location of the study intersections. Refer to Annexure A, **Figure A2,** for the lane configurations and controls of the study intersections.

Figure 3: Intersection Count Locations

10 Existing Intersection Operations	The 2026 Existing Traffic conditions are based on existing intersection geometries, controls and counted traffic volumes. Historical traffic counts were used and adjusted based on the latest Kraaibosch Roads Master Plan and Cost Apportionment Model (SMEC, December 2025). Refer to **Figure A2** for the existing lane configurations and controls. Refer to **Figures A3** and **A4** for the existing a.m. and p.m. peak hour traffic volumes and operations, respectively. Based on the Existing Traffic capacity analysis results as well as on-site observations, the following can be concluded: All the study intersections currently operate at acceptable Levels-Of-Service (LOS), and therefore, no upgrades are proposed from a capacity analysis point of view.
11 Approved Developments/ Latent Rights	There are several in-process and planned developments in the immediate vicinity. These developments are: • Garden Route Mall • Meulenzicht Estate • Oude Meulen • Sweetpea • George Campus

- Greater Kraaibosch Area
- Open Erven in Eden Meander Precinct

The in-process development which will have the most significant impact on the traffic operations around Eden Meander is the development of the Greater Kraaibosch Area and the George Campus. All the above planned and in-process developments were added as background trips for Scenario 2. The trips for the Kraaibosch, George Campus and Sweetpea were obtained from the Kraaibosch Roads Master Plan and Cost Apportionment Model (SMEC, 2025) and the Meulenzicht Estate and Oude Meulen trips were obtained from Innovative Transport Solutions (Pty) LTD (Project No. 4730, 2025).

The following trips were included as part of the Background Scenario:

Table 1: Background Development Trips

	AM Peak Hour Trips		PM Peak Hour Trips	
Development	**In**	**Out**	**In**	**Out**
Meulenzicht	57	170	159	68
Oude Meulen	120	348	324	140
Sweetpea	18	51	48	21
Kraaibosch	1 087	2 307	2 307	1 087
George Campus	1 119	361	1 117	1 593
Open Erven Eden Meander including Proposed Hospital	396	231	521	549
Residential	23	54	54	23
Offices	49	12	49	12
TOTAL	2 869	3 534	4 579	3 683

12 Future Road Network

The Georgy Municipality Roads Master Plan, showing the proposed future links, is provided in **Figure 4**. The following planned roads were included as part of this study:

- The northward extension of St George's Road to link to Madiba Drive.
- The extension of the Mall Access Road into the Kraaibosch/Glenwood area to link to Madiba Road.
- The extension of Welgelegen Road across the Modderrug River to link into the Kraaibosch area.

However, at the time of this report, the timeline for the construction of these roads is unknown.

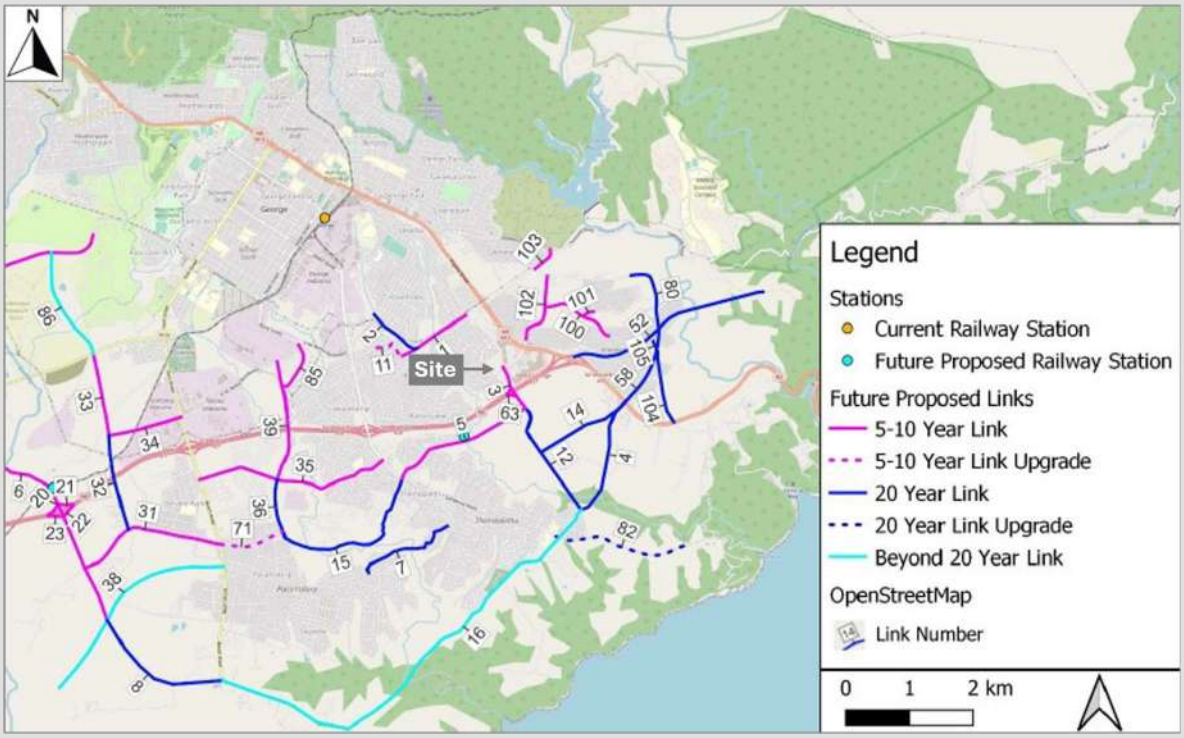


Figure 4: George Municipality Roads Master Plan 2023 - Time Horizons (CITP, George, 2024)

13 Background Traffic Conditions	The 2031 Background Traffic volumes were calculated by adding the anticipated trips from the future developments planned in the immediate site vicinity to the Existing Scenario. Refer to **Figure A2** for the existing lane configurations and controls used for the Background traffic analysis. Refer to **Figures A5** and **A6** for the background AM, PM and Saturday midday peak hour traffic volumes and operations. Based on the Background Traffic capacity analysis results, it is expected that all study intersections will continue to operate at acceptable levels-of-service and delay, except the following intersections: • **Int. 1 Knysna Road/Saint George's Road:** This intersection is operating unacceptably during the AM peak hour. It is recommended to add a protected right-turn phase on the north and south approaches. It is also recommended to change the southbound through to a shared through and right turn lane from the Kraaibosch area side. • **Int. 3 Knysna Road/Park Road:** It is recommended to add protected right turn phases on the east, west approach and on the south approach. As well as to remove the northbound protected phase during the pm peak hour. • **Int. 4 N2 Off-Ramp/Knysna Road**: It is proposed to have two lanes along Knysna Road (N12) eastbound through this intersection.

<table>
<tr><td></td><td>It is important to note that the upgrades provided above will be due to the background developments and not as part of the development on Erf 28005. The recommended upgrades are also in line with the Kraaibosch Roads Master Plan and Cost Apportionment Model (SMEC, 2025) report. Refer to Figure A7 for the proposed upgrades for this scenario. Refer to Figures A8 and A9 for the expected intersection operations after the proposed upgrades are in place.</td></tr>
<tr><td>14 Trip Generation Rates and Development Trips</td><td>The trip generation rates and resulting development trips were derived from the South African Traffic Impact and Site Traffic Assessment Manual prepared by the Committee of Transport Officials (COTO, 2020). The trip rates and the corresponding estimated trips for the proposed development are presented below. Table 2 summarises the trip generation rates applied in this assessment.

Table 2: Trip Generation Rates
<table>
<tr><th>Land Use</th><th>Code</th><th>AM peak</th><th>PM peak</th></tr>
<tr><td>Apartments and Flats</td><td>CoTO 220</td><td>0.65</td><td>0.65</td></tr>
</table>
Refer to Table B1 and Table B2, Annexure B, for more details on the trip generation. Refer to Table 3 for the expected development trips.

Table 3: Expected Development Trips
<table>
<tr><th>Peak Hour</th><th>In</th><th>Out</th><th>Total</th></tr>
<tr><td>AM Peak Hour</td><td>111</td><td>332</td><td>442</td></tr>
<tr><td>PM Peak Hour</td><td>287</td><td>1155</td><td>442</td></tr>
</table>
See Figures A10 and A11 for the expected trip generation for the AM and PM peak hours distributed on the network.</td></tr>
<tr><td>15 Trip Distribution</td><td>The expected trip distribution of new development trips is based on existing traffic volumes and patterns along Frankie Fredericks Street. Based on these existing traffic patterns, the following split was used to calculate the trip distribution of new development trips:

• 40% of trips to/from the site along Knysna Road to George CBD
• 10% of trips to/from the N2 towards Knysna Road
• 10% of trips to/from the north along Park Road
• 15% of trips to/from the N2 towards Mossel Bay
• 25% of trips to/from the Eden Meander Precinct

Refer to Figures A10 and A11, Annexure A, for the distribution of the new development trips through the study intersections.</td></tr>
</table>

16 Site Access and Access Control	The main access is proposed off Platinum Drive, approximately 100m southwest of the Platinum Drive/Park Road intersection. The following access lanes will be provided at the gatehouses: • Main Gatehouse: Two entry and one exit lanes Refer to Annexure C for the gatehouse queueing analysis. Sufficient storage capacity will be provided at the gates.
17 Total Traffic Conditions	Refer to **Figure A7** for the background lane configurations and controls used for the total traffic analysis. Refer to **Figures A12** and **A13** for the total a.m. and p.m. peak hour traffic volumes and operations. Based on the Total Traffic capacity analysis results, it is expected that all study intersections will continue to operate at acceptable levels-of-service and delay. The following recommendations are provided for the intersections: • **Int. 1 Knysna Road/Saint George's Road:** This intersection is expected to operate unacceptably during both peak hours. For this scenario, the protected right-turn phases along Knysna Road are not required. • **Int. 3 Knysna Road/Park Road:** It is recommended to have a separate left and through lane on the north approach. • **Int. 4 N2 O2-Ramp/Knysna Road**: This intersection is expected to operate at longer delays, resulting in a LOS F for both peak hours. No upgrades are proposed. The right turn lane turning towards the N2 has been lengthened to approximately 200 m. The storage length is sufficient to accommodate the 95th percentile queue length at this intersection for both the a.m. and p.m peak hours. The following upgrades are recommended as part of the development on Erf 28005: • **Int. 9 Platinum Drive/Park Road:** It is proposed to upgrade this intersection to a single circulating roundabout with two approach lanes on the north and east approach. • It is also recommended to dual Park Road between Platinum Drive and Blue Mountain Boulevard. Refer to **Figure A14** for the proposed upgrades for this scenario. Refer to **Figures A15** and **A16** for the expected intersection operations after the proposed upgrades are in place. The right turn lane warrants were checked for both the a.m. and p.m. peak hours. No right-turn lanes are required at the access to the development.
18 Pedestrians and Cyclists	There are sidewalks along all Platinum Drive and Park Road in the vicinity of the site. No upgrades are proposed for pedestrians and cyclists.

19 Public Transport

Based on the George Municipal Spatial Development Framework Parking Areas map (George CITP, 2024), the site is located within a PT1 area. The Go George bus service has a major terminal along the Mall Access Road as well as a PTI (public transport interchange) for minibus taxis. These facilities are all within ~400m walking distance from the access of the proposed development.

The site vicinity is serviced by six Go George routes that travel either along Park Road, Knysna Road or the N2 to and from the terminal point along the Mall Access Road. The Go George routes and the minibus taxi routes are provided in **Figure 5**. No additional public transport facilities are required.

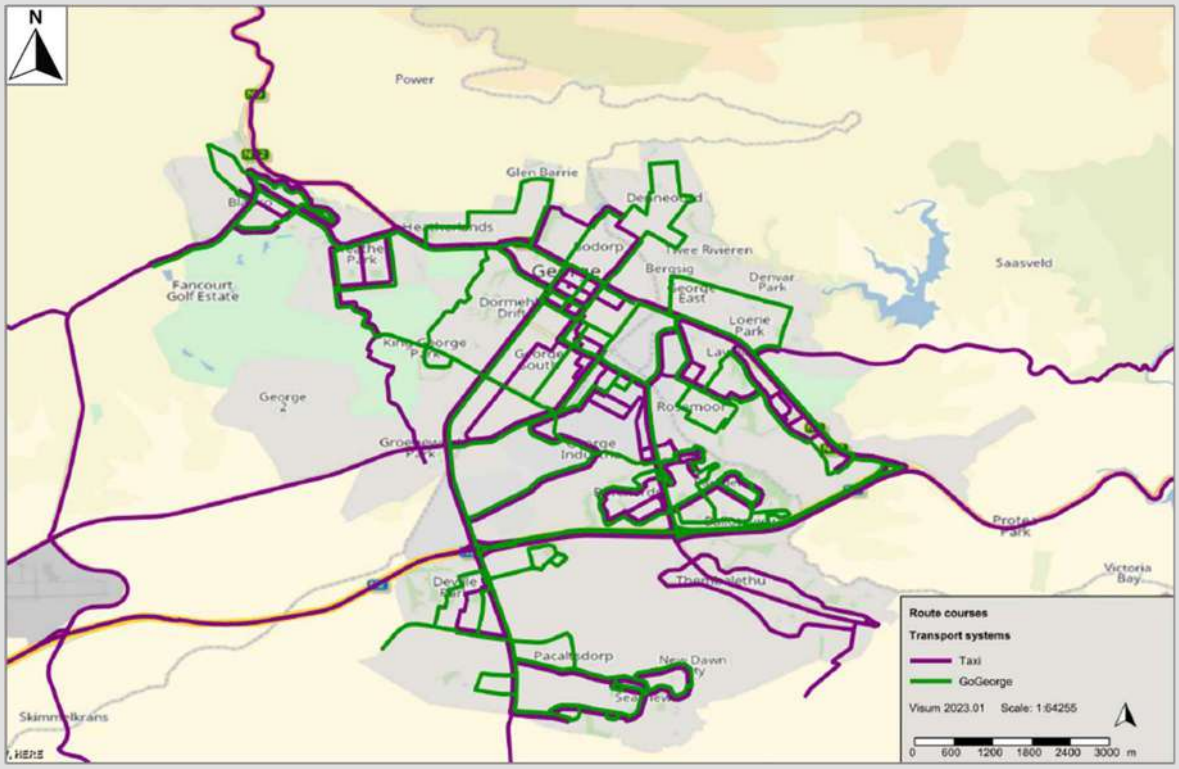


Figure 5: Public Transport Routes for the GO GEORGE and Minibus Taxi Transport Systems (Zoomed In). (Source: George CITP, 2024)

20 Parking

Based on the George Integrated Zoning Scheme By-Law (2023), the following parking rates are proposed for apartments and flats within the normal area and PT1 area:

Table 4: Parking Requirements

Land Use	Normal Areas	PT1 Areas
Apartments and Flats	- 1.25 bays per dwelling unit with 2 habitable rooms or less - 1.75 bays per dwelling unit with 3 or more habitable rooms - 0.25 bays per unit for visitors	- 1 bay per dwelling unit with 2 habitable rooms or less - 1.25 bays per dwelling unit with 3 or more habitable rooms - 0.25 bays per unit for visitors

The site falls in a PT1 zone and is only 400m away from the major bus mall next to the Garden Route mall. Based on the By-Law, the parking requirements for Erf 28005 (PT1 Zone) are summarised in the table below for the proposed land uses:

Table 5: Parking Calculation

Unit Type	No. of Units	Parking Required for Residents	Parking Required for Visitors	Total Parking Required
2 bed or less	516	516 bays (1 bay/du)	129 bays (0.25 bay/du)	645 bays
3 bed or more	136	170 (1.25 bays/du)	34 (0.25 bays/du)	204 bays
			TOTAL	**849 bays**

Based on the SDP, the following parking bays are currently provided for the development of Erf 28005 (refer to the site development plan):

Table 6: Parking Provision for Erf 28005

Number of Units	680 units
Parking Bays Provided	870 bays
Parking Rate	1.28 bays/unit

Based on the calculations in **Table 5** and the parking provision summarised in **Table 6**, more than sufficient parking is provided on site.

To confirm the sufficiency of the parking provision, parking demand surveys were undertaken at comparable residential developments, namely Crowthorne Luxury Apartments and Carlswald Luxury Apartments. Both of which are similar in nature and scale. The observed parking rates are summarised as follows:

Table 7: Parking Survey Summary

		Rate		
Development	**No. of units occupied**	**Maximum**	**Average**	**85th Percentile**
Crowthorne Luxury Apartments	200	1.59	1.03	1.25
Carlswald Luxury Apartments	464	1.35	0.90	1.24

Based on the above parking survey summary, the following can be concluded for the proposed parking rate of 1.28 bays/unit for Erf 28005:

- exceeds the observed average demand at similar developments,
- meets or exceeds the 85th percentile rate.

It is concluded that the number of parking bays as indicated on the SDP meets and exceeds the parking requirements based on the relevant bylaw. The parking provision is also in line with comparable completed developments, and is also consistent with the reduced parking requirements applicable to PT1 areas (refer to **Table 4**).

21 Conclusion & Recommen-dations	The transport impact assessment reviewed the expected transport-related impacts of the proposed residential development on Erf 28005, within the large Eden Meander precinct.
	
	Based on the analysis outlined in this study, the following findings, conclusions and recommendations are relevant:
	
	• **Existing and Background Conditions:** All study intersections are currently operating at acceptable Levels of Service under existing conditions. Under future background conditions, certain intersections are expected to experience increased delays; however, these impacts are primarily attributable to approved and latent developments in the broader area and not the proposed development. Upgrades were also provided in accordance with the Kraaibosch Roads Master Plan and Cost Apportionment (SMEC, 2025).
	
	• **Expected Development Trips:** The proposed development is expected to generate approximately 442 vehicle trips during both the a.m. and p.m. peak hours.
	
	• **Total Traffic Conditions:** Under total traffic conditions, including the proposed development, the road network is expected to continue operating at acceptable levels, subject to the implementation of the proposed mitigation measures as well as the following upgrades:
	  ○ Upgrading the Platinum Drive/Park Road intersection (Int. 9) to a roundabout.
	  ○ Dualling of Park Road between Platinum Drive and Blue Mountain Boulevard.
	
	• **Site Access and Circulation:** The proposed access will be from Platinum Drive, approximately 10m from Park Road. Adequate storage length is provided at the gatehouse. No right-turn lanes are warranted.
	
	• **Public Transport and NMT:** The site is well located in relation to existing public transport infrastructure. The Go George bus network and minibus taxi facilities are within approximately 400 m walking distance of the site. No additional facilities are required.
	
	• **Parking:** It is recommended that the proposed parking provision of 1.28 bays per unit for the development on Erf 28005 be supported. Although this rate is lower than the standard By-Law requirements, it is considered adequate and appropriate based on the following:
	  ○ It exceeds the observed average parking demand at comparable developments,
	  ○ It meets or exceeds the 85th percentile demand at comparable developments,

	○ It aligns with the reduced parking standards applicable to PT1 areas, ○ It is supported by the site's proximity to public transport, which reduces reliance on private vehicles. • Accordingly, the proposed parking supply is sufficient to accommodate both typical and higher-demand conditions and is therefore acceptable from a transport planning perspective. It is concluded that the additional traffic from the proposed development can be accommodated on the transport network with minor mitigation requirements. It is recommended that the proposed development be approved from a transportation point of view, provided that the required mitigation, as defined in this study, is in place.

REFERENCES

1. Current Routes, Go George, gogeorge.org.za/current-routes/, Accessed June 2023
2. Comprehensive Integrated Transport Plan, George Municipality, 2024
3. Highway Capacity Manual (HCM), Transportation Research Board, 2000
4. Kraaibosch Roads Master Plan and Cost Apportionment, SMEC, April 2025
5. South African Traffic Impact and Site Traffic Assessment Manual, TMH16, Volume 1, COTO, August 2012
6. South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual, TMH16, Volume 2, COTO, February 2014
7. South African Trip Data Manual, TMH17, Version 1.1, COTO, September 2013
8. Transport Impact Assessment, Eden Meander, Innovative Transport Solutions (Pty) Ltd, July 2023
9. Transportation Impact Study, Garden Route East, Innovative Transport Solutions (Pty) Ltd, January 2010
10. Transport Impact Study, Garden Route East/Eden Meander Development, Innovative Transport Solutions (Pty) Ltd, February 2012

ANNEXURE A

Figures

GEORGE ERF 28005

RIVERSIDE VIEW EXTENSION 41 - ERF 5916 (PARK)

BUILDING	LEVEL	AREA DESCRIPTION	AREA(TFA)		COVERAGE
Clubhouse	0-lvl	Usable Space	322	m²	322 m²
		Walkways - covered	126	m²	126 m²
		Entrance - covered	32	m²	32 m²
		Sub-Total	480	m²	480 m²
	1-lvl	Usable Space	164	m²	
		Patio Uncovered	(42	m²)	
		Sub-Total	164	m²	
Total area per Clubhouse		(max 1000m² allowed)	644	m²	480 m²

BUILDING	LEVEL	AREA DESCRIPTION	AREA(TFA)		COVERAGE
Gymnasium	0-lvl	Usable Space	293	m²	293 m²
		Walkways - covered	60	m²	60 m²
		Entrance - covered	38	m²	38 m²
		Sub-Total	391	m²	391 m²
	1-lvl	Usable Space	206	m²	
		Walkways - uncovered	(58	m²)	
		Sub-Total	206	m²	
Total area per Gym		(max 600m² alllowed)	597	m²	391 m²

BUILDING	LEVEL	AREA DESCRIPTION	AREA(TFA)		COVERAGE
Maintenance Building	0-lvl	Usable Space	135	m²	135 m²
		Sub-Total	135	m²	135 m²
	1-lvl	Usable Space	135	m²	
		Sub-Total	135	m²	
Total area per Maintenance Build			270	m²	135 m²

BUILDING	LEVEL	AREA DESCRIPTION	AREA(TFA)		COVERAGE
Apartment 28 Unit	0-lvl	Units	570	m²	570 m²
		Balconies - covered	38	m²	38 m²
		Walkways - covered	50	m²	50 m²
		Staircase	19	m²	19 m²
		Sub-Total	677	m²	677 m²
	1-lvl	Units	570	m²	
		Balconies - covered	38	m²	
		Walkways - covered	50	m²	
		Sub-Total	658	m²	
	2-lvl	Units	554	m²	
		Balconies - covered	38	m²	
		Walkways - covered	60	m²	
		Sub-Total	652	m²	
Total area per Block			1987	m²	677 m²
Total area for Development		Amount of blocks - 1	1987	m²	677 m²
Number of Units		28			

BUILDING	LEVEL	AREA DESCRIPTION	AREA(TFA)		COVERAGE
Apartment 36 Unit	0-lvl	Units	570	m²	570 m²
		Balconies - covered	38	m²	38 m²
		Walkways - covered	50	m²	50 m²
		Staircase	19	m²	19 m²
		Sub-Total	677	m²	677 m²
	1-lvl	Units	570	m²	
		Balconies - covered	38	m²	
		Walkways - covered	50	m²	
		Sub-Total	658	m²	
	2-lvl	Units	554	m²	
		Balconies - covered	38	m²	
		Walkways - covered	65	m²	
		Sub-Total	657	m²	
	3-lvl	Units	406	m²	
		Balconies - covered	26	m²	
		Walkways - covered	53	m²	
		Sub-Total	485	m²	
Total area per Block			2477	m²	677 m²
Total area for Development		Amount of blocks - 9	22293	m²	6093 m²
Number of Units		324			

BUILDING	LEVEL	AREA DESCRIPTION	AREA(TFA)		COVERAGE
Apartment 40 Unit	0-lvl	Units	570	m²	570 m²
		Balconies - covered	38	m²	38 m²
		Walkways - covered	50	m²	50 m²
		Staircase	19	m²	19 m²
		Sub-Total	677	m²	677 m²
	1-lvl	Units	570	m²	
		Balconies - covered	38	m²	
		Walkways - covered	50	m²	
		Sub-Total	658	m²	
	2-lvl	Units	554	m²	
		Balconies - covered	38	m²	
		Walkways - covered	65	m²	
		Sub-Total	657	m²	
	3-lvl	Units	554	m²	
		Balconies - covered	38	m²	
		Walkways - covered	60	m²	
		Sub-Total	652	m²	
Total area per Block			2644	m²	677 m²
Total area for Development		Amount of blocks - 7	18508	m²	4739 m²
Number of Units		280			

BUILDING	LEVEL	AREA DESCRIPTION	AREA(TFA)		COVERAGE
Apartment 48 Unit	0-lvl	Units	698	m²	698 m²
		Balconies - covered	58	m²	58 m²
		Walkways - covered	73	m²	73 m²
		Staircase	30	m²	30 m²
		Sub-Total	859	m²	859 m²
	1-lvl	Units	698	m²	
		Balconies - covered	58	m²	
		Walkways - covered	73	m²	
		Sub-Total	829	m²	
	2-lvl	Units	682	m²	
		Balconies - covered	58	m²	
		Walkways - covered	88	m²	
		Sub-Total	828	m²	
	3-lvl	Units	682	m²	
		Balconies - covered	58	m²	
		Walkways - covered	88	m²	
		Sub-Total	828	m²	
Total area per Block			3344	m²	859 m²
Total area for Development		Amount of blocks - 1	3344	m²	859 m²
Number of Units		48			

BUILDING	LEVEL	AREA DESCRIPTION	AREA(TFA)		COVERAGE
Braai	0-lvl	Usable space	16	m²	16 m²
		Sub-Total	16	m²	16 m²
Total area per Braai			16	m²	16 m²
Total area for Development		Amount of braais 5	80	m²	80 m²

BUILDING	LEVEL	AREA DESCRIPTION	AREA(TFA)		COVERAGE
Cov Parkings	0-lvl	Cov parking (single)	0	m²	13 m²
		Sub-Total	0	m²	13 m²
Total area per parking			0	m²	13 m²
Total area for Development		Amount of Parkings 720	0	m²	9000 m²

BUILDING	LEVEL	AREA DESCRIPTION	AREA(TFA)		COVERAGE
Gatehouse	0-lvl	Usable Space	85	m²	85 m²
		Sub-Total	85	m²	85 m²
	1-lvl	Usable Space	195	m²	
		Sub-Total	195	m²	
Total area per Gatehouse			280	m²	85 m²

ERF SIZE	56987	m²		
TOTAL PROPOSED UNITS	680	Du		
TOTAL PROPOSED AREA		48003 0,8	m²	22539 39,6%
TOTAL ALLOWED UNITS	680	Du		
TOTAL ALLOWED AREA		113974 2	m²	34192 60,00%

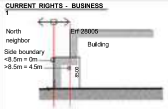
BUILDING	LEVEL	AREA DESCRIPTION	AREA(TFA)	COVERAGE

PARKING CALCULATIONS

BUILDING	UNIT COUNT PB FOR UNIT	UNIT COUNT PB VISITORS	PARKING COUNT Parking req	QTY OF BUILDINGS	TOTAL PB REQ
36 Unit - 4 Storey	36	9	45	10	450
40 Unit - 4 Storey	40	10	50	8	400
				TOTAL PARKINGS REQUIRED	850
				TOTAL PARKINGS PROVIDED	870

1 PB PER UNIT + 0,25 PB PER UNIT FOR VISITORS

CURRENT RIGHTS - BUSINESS 1

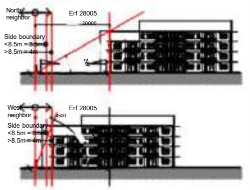


CURRENT RIGHTS UNDER BUSINESS 1
Max Coverage - 100%
Max FAR - 3
Street Building lines
- Street 0m building line
- Street 8m from public street centre line (requested)

Side Building line
- <8.5m = 0m building line
- >8.5m = 4.5m building line

Max Height - 15m to top of roof

PROPOSED RESIDENTIAL 4

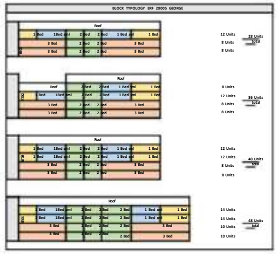


PROPOSED RIGHTS UNDER RES4
Max Coverage - 60%
Max FAR - 2
Street Building lines
- Street 5m building line

Side Building line
- <8.5m = 3m building line
- >8.5m = 4.5m building line

Max Height - 15m to top of roof

BLOCK TYPOLOGY ERF 28005 GEORGE



SITE PLAN
Scale 1:750 @ A0

SCHEDULE OF RIGHTS ERF 28005, GEORGE

ERF	28005	SITE AREA	56 987 m²
TOWNSHIP	Erf 28005, Portion of erf 28004, GEORGE	TITLE DEED	T
TOWN PLANNING SCHEME	GEORGE TPS 2023	AMENDMENT SCHEME NO	
USE ZONE		ANNEXURE NO	

PERMISSIBLE	CONTROL	PROPOSED
4 STOREY	HEIGHT	4 STOREY
15 METRE	HEIGHT OF BUILDING	15 METRE
60%	COVERAGE	39,6%
34192	COVERAGE	22539
2	FAR	0,8
113974	FAR	48003
680	NO.OF UNITS	680
850	PARKINGS	870

Locality plan
N.t.s

NOTES

PAGE SIZE - A0

The design on this drawing is copyright and remains the property of Century Property Developments.
All work to be carried out in strict accordance with local authority requirements, SANS 10400, and the S.A.B.S standards.
This drawings may not be scaled. Only figured dimensions and levels may be used.
All relevant details, levels, dimensions must be checked on site before commencement of work. Any discrepancies to be reported to the Architects office immediately.
New drainage:
Soil pipes: 110 diamenter PVC pipes to 1:60 fall.
Waste pipes: 40 diameter PVC pipes to 1:60 fall.
No bends or junctions under building.
All drains under building to be encased in concrete.
All bends and junctions to be fitted with IE's.
All waste fittings to be fully accessible throughout their entire length.
All waste fittings to be provided with anti-vac traps with integral vent valves.
All IE's underground to have marked covers.

RE's to be provided at all changes in direction.
All stormwater details to Civil Engineer's specification.
All concrete foundations to Structural Engineer's specification.
Concrete surface bed specification as per Structural engineer's specification and in accordance to SANS 10400
Boundary walls to be low maintenance
Stair notes: Refer to Floor Plans and Stair details.
All balustrades to be minimum 1000mm high with openings of maximum 100mm as per SANS 10400.
Roof notes: Refer to Sections and Elevations. Roof design and detail to be done by specialist
All building work to be in accordance with SANS 10400 and to comply to local municipal regulations and bylaws
All levels, heights and dimensions to be verified on site.
Any errors, discrepancies or omissions are to be reported immediately to the Architects department.

FIRE NOTES:
- ALL WORK TO COMPLY WITH SABS 0400-1990 OCCUPANCY CLASSIFICATION (AS INDICATED IN SCHEME)
- FIRE EXTINGUISHER TO LOCATION AND TYPE AS PER RATIONAL DESIGN BY SPECIALIST
- PORTABLE FIRE EXTINGUISHER BE HUNG ON PURPOSE MADE BOARDS AND LOCATED IN SECURE POSITION.
- FIRE HOSE REELS TO BE INSTALLED AS INDICATED ON PLAN AND TO COMPLY WITH SABS WITH 30m x 20mm HOSE AS PER SPECIALIST DESCRIPTION.
- FIRE HYDRANT TO BE INSTALLED AS INDICATED ON PLAN AND WILL INCLUDE 65mm PILLAR WITH
- ESCAPE DOORS NOT BE FITTED WITH LOCKING DEVICES AS APPROVED BY THE LOCAL AUTHORITY. THESE DOORS ARE INDICATED ON PLAN WITH A (E) FLOOR COVERING TO COMPLY WITH TT14.
- SMOKE CONTROL IS TO COMPLY WITH THE RATIONAL DESIGN AND ONLY NECESSARY IF REQUIRED IF SPECIFIED BY SPECIALIST.
- STRUCTURAL ELEMENTS AND COMPONENTS TO COMPLY WITH TT7
- STRUCTURAL ELEMENTS AND COMPONENTS TO COMPLY WITH TT7 AND HAVE A FIRE STABILITY OF AT LEAST 120MIN.

- SMOKE DETECTION TO BE INSTALLED TO ALL SHOPS LARGER THAN 250SQM IF APPLICABLE
- EMERGENCY LIGHTING TO BE PROVIDED TO ALL SHOPS GREATER THAN 500SQM AND ESCAPE ROUTES IN ACCORDANCE WITH TT19 TOGETHER WITH DEDICATED SUPPLY OF POWER FOR 60MIN.
- AIR CONDITIONING PLANTS TO INCORPORATE A SMOKE DETECTION SIGNAL TO SWITCH IN CASE OF A FIRE. A FIRE DAMPER WILL BE INSTALLED IF A FIRE WALL IS PENETRATED WITH AN AIR CONDITIONING DUCT
- PHOTOLUMINESCENCE SYMBOLIC SIGNS FOR ESCAPE ROUTES, ESCAPE DOORS AND FIRE FIGHTING EQUIPMENT WILL BE INSTALLED AND TO COMPLY WITH SABS STANDARDS.
- UPON COMPLETION OF THE BUILDING A FINAL INSPECTION WILL BE ARRANGED WITH THE FIRE PREVENTION DEPARTMENT TO OBTAIN A CLEARANCE CERTIFICATE.
- CEILINGS WILL BE OF NON COMBUSTIBLE MATERIAL AND COMPLY WITH TT13. THE CEILING VOIDS ARE TO BE DIVIDED BY FIRE WALLS AS INDICATED Y PLAN IN AREAS NOT GREATER THAN 300SQM
- ROOF COVERING WILL BE NON COMBUSTIBLE.
- TRAVEL DISTANCES TO ESCAPE ROUTES AND ESCAPE WIDTHS WILL COMPLY WITH RATIONAL DESIGN.
- ALL SERVICES WILL BE SEALED WHERE A FIRE WALL IS PENETRATED TO MAINTAIN THE SAME FIRE RESISTANCE AS REQUIRED FOR THE FIRE WALL.

STATUS:
FOR INFORMATION

REVISIONS

REV	DATE	DESCRIPTION
A	2026-03-20	FOR INFO

CONSULTANT:

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century@century.co.za
www.century.co.za

CLIENT:
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CLIDET 69 (PTY) LTD
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BRYANSTON, 2021

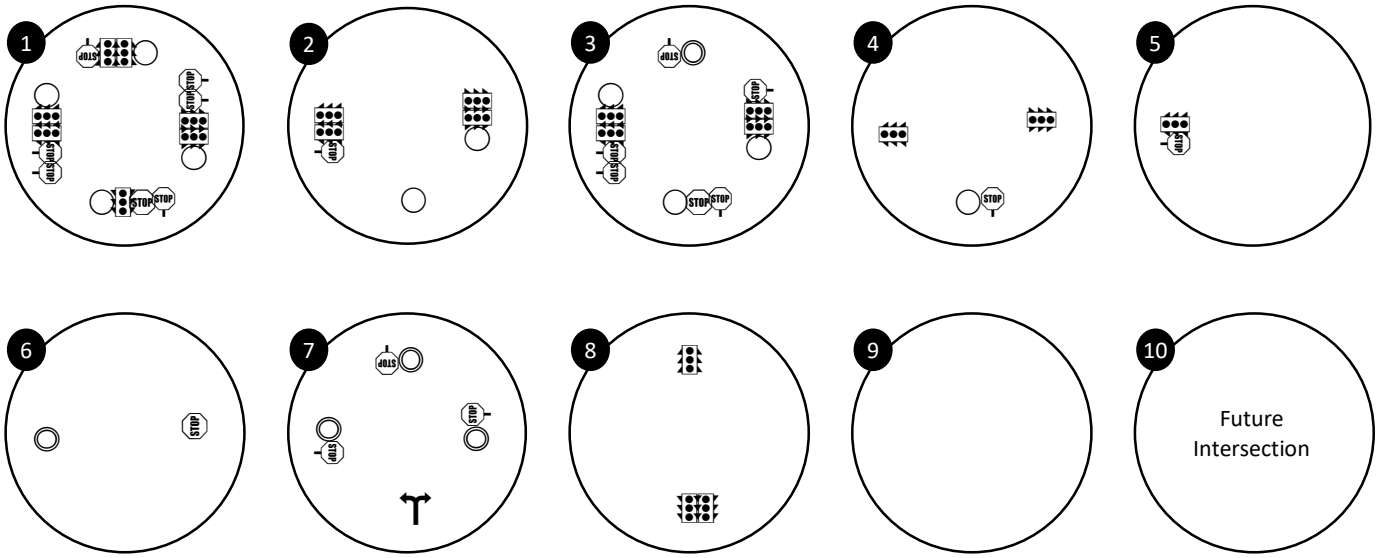
PROPERTY DESCIPTION :
ERF 28005 PORTION OF ERF 28004 GEORGE

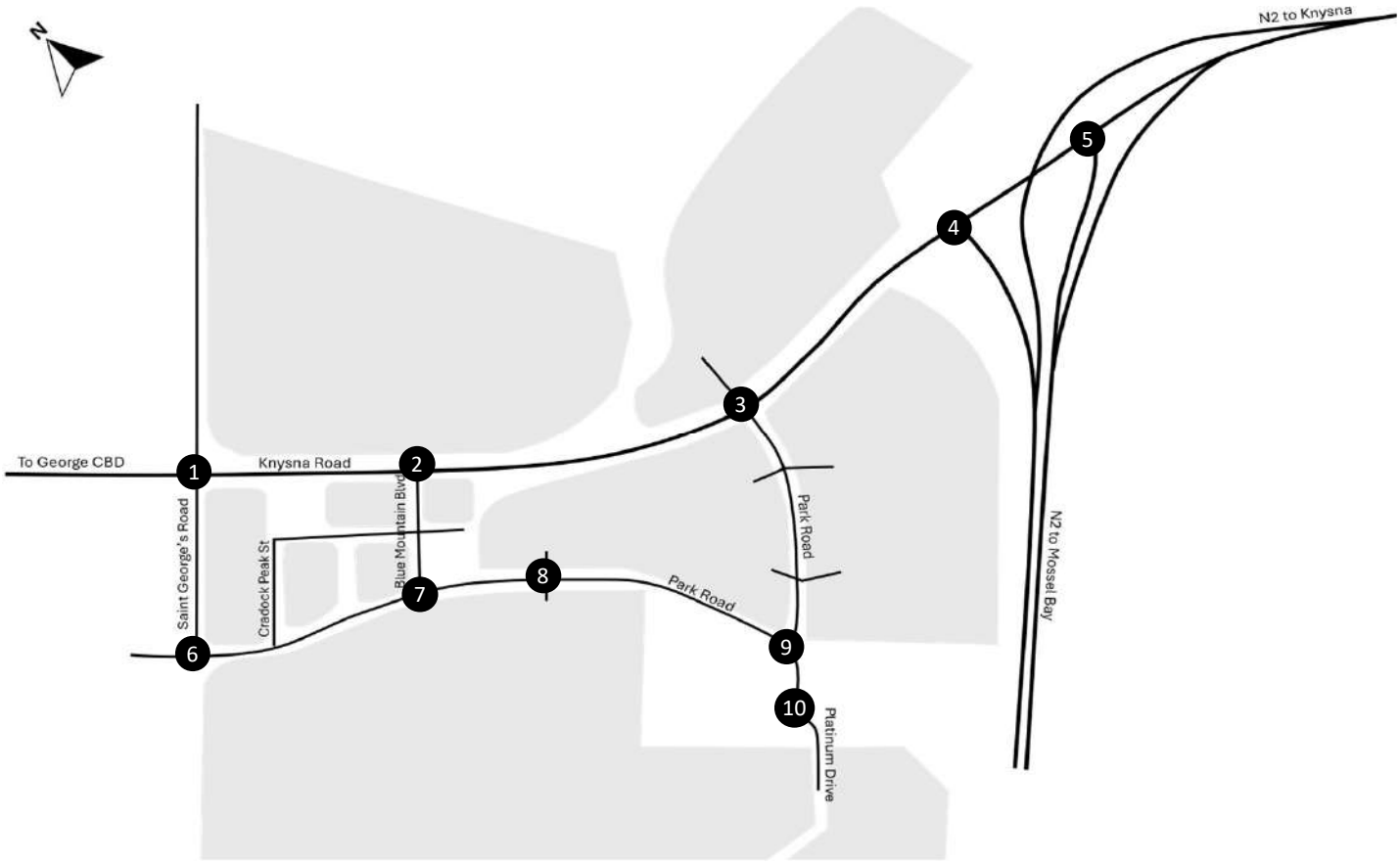
PROJ TITLE: **GEORGE 28005**

DRAWING TITLE: **SITE DEVELOPMENT PLAN**

SCALE	DATE	DRAWN	CHECKED
AS SHOWN	2025-09-24	RVN	JC
PROJ. NO. 2600	DWG. NO. 1000-SDP		REV: A

CENTURY PROPERTY DEVELOPMENTS 2016 c



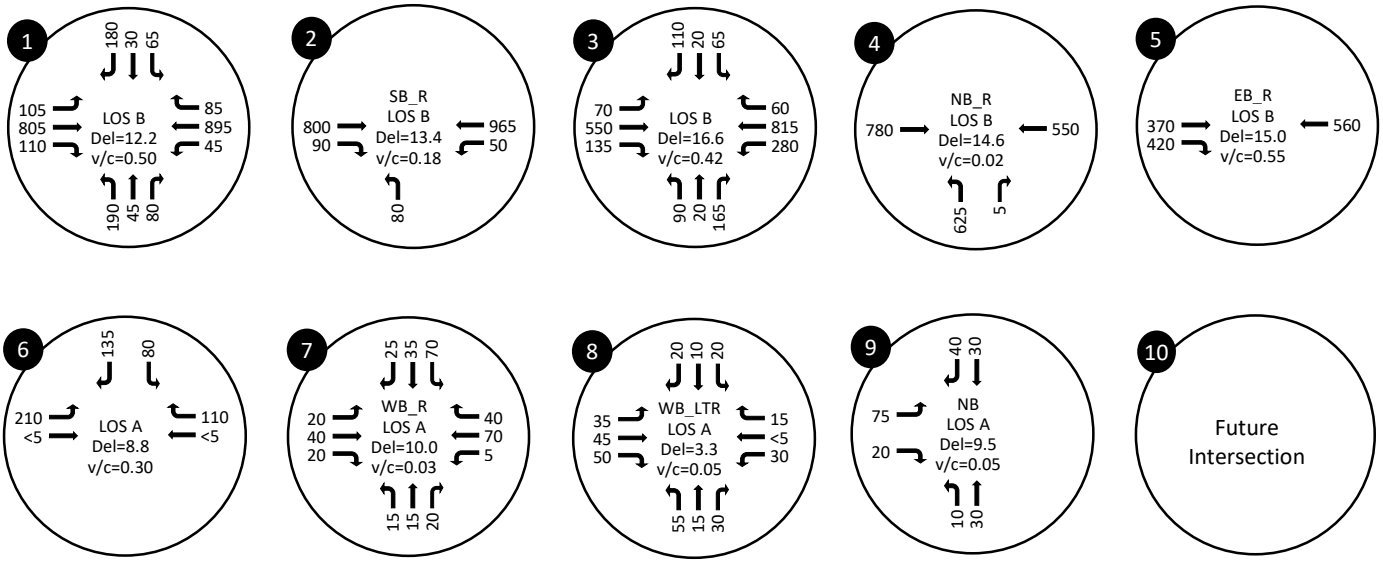


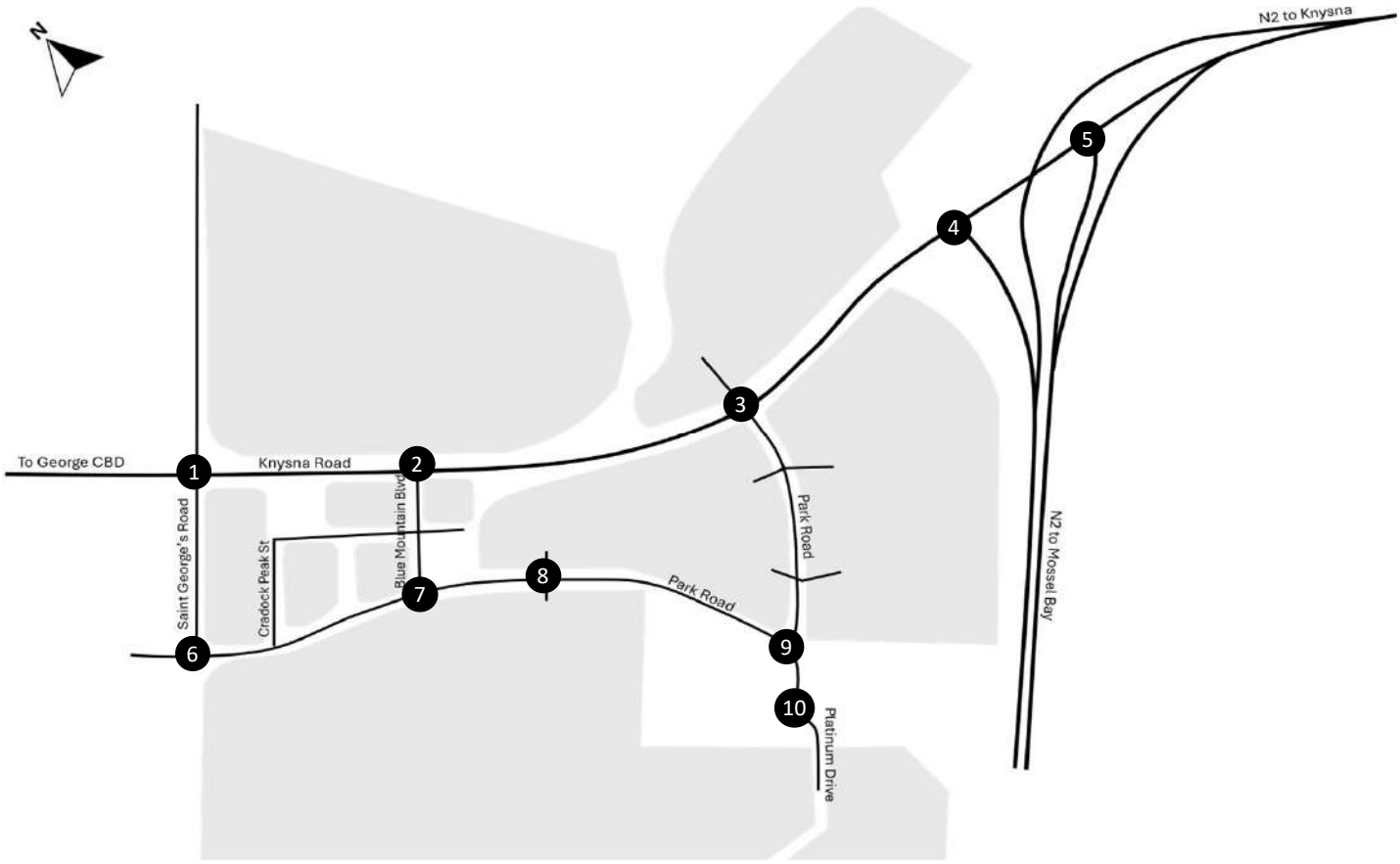
Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Existing Traffic Conditions** **Lane Configurations and Control**	**Figure:** **A2**

Scenario: Ex AM, Run:Fri Mar 13 12:47:34 2026



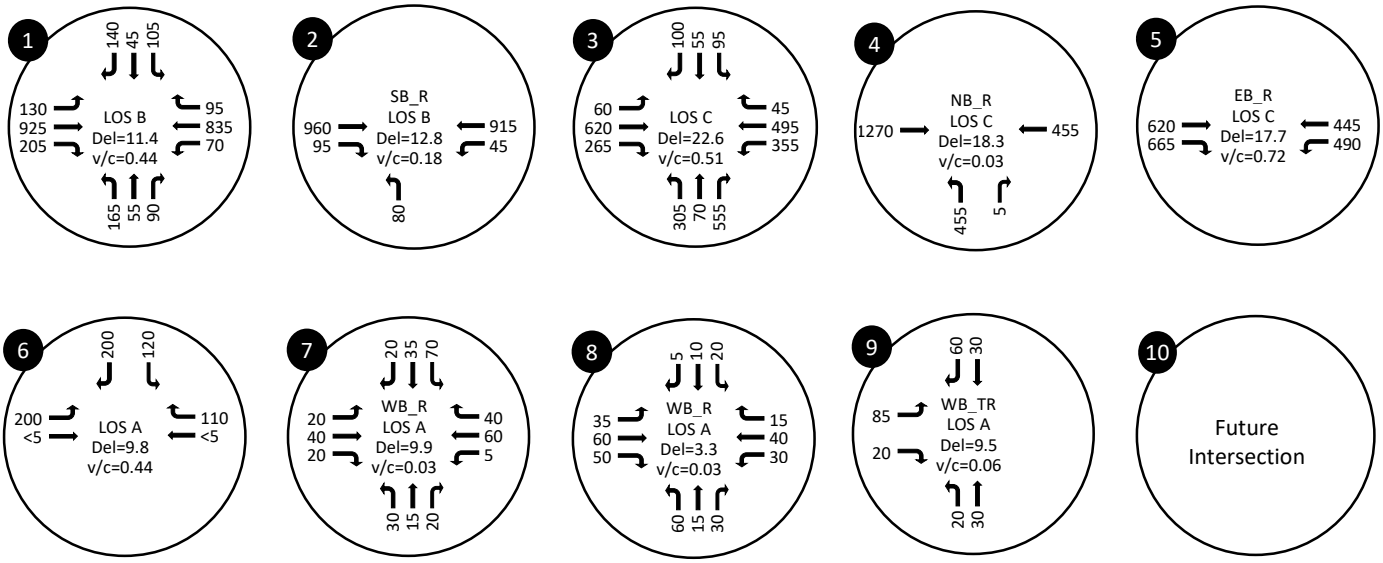


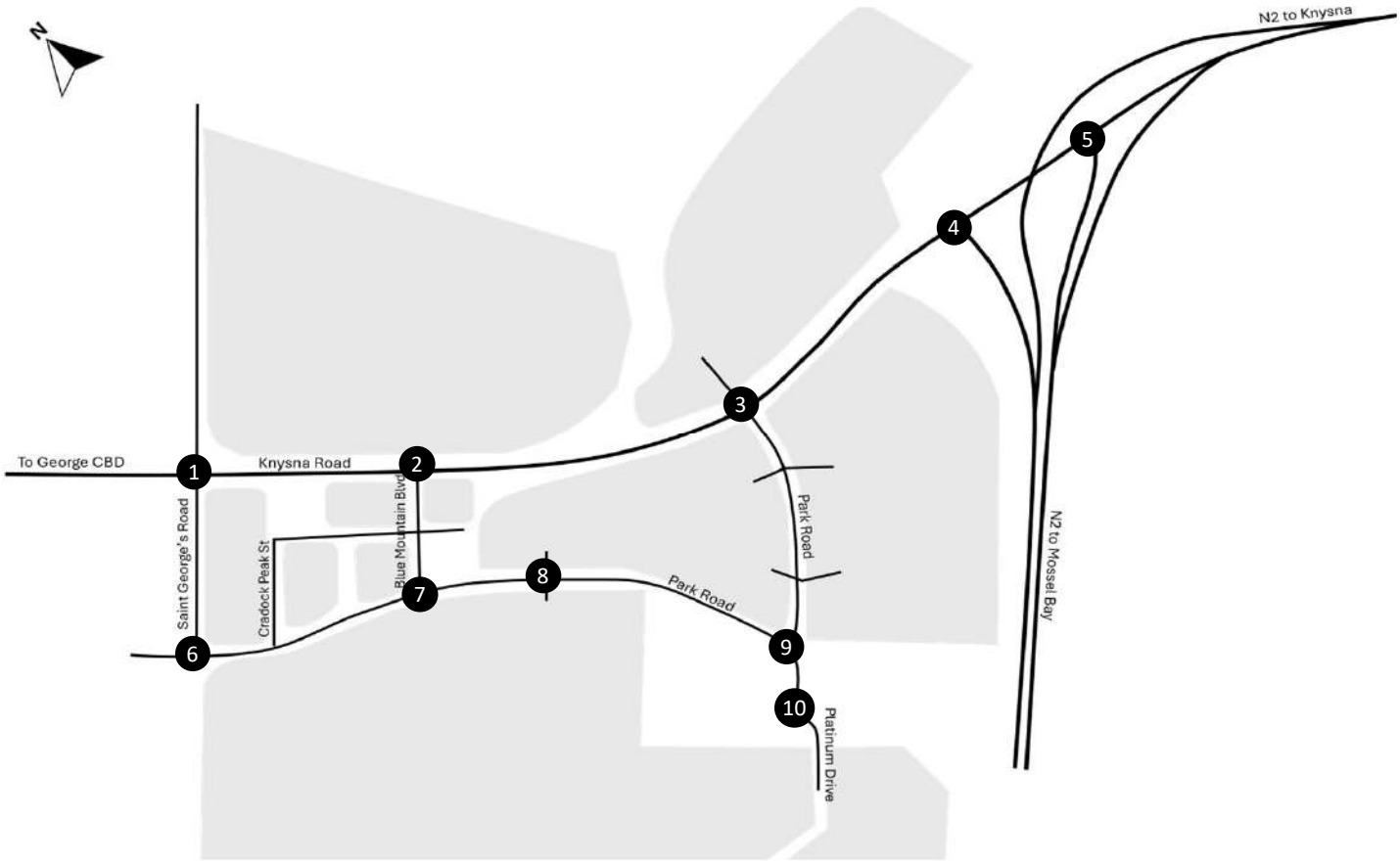
Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Existing Traffic Conditions** **AM Peak Hour**	**Figure:** **A3**

Scenario: Ex AM, Run:Fri Mar 13 12:47:34 2026



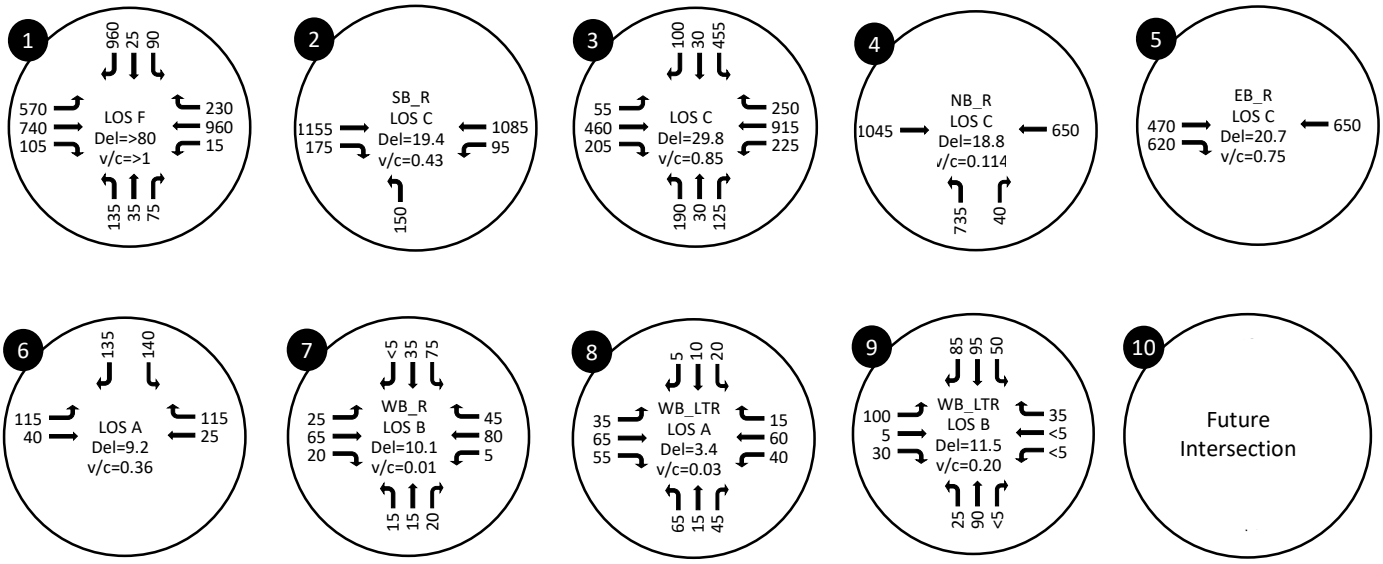


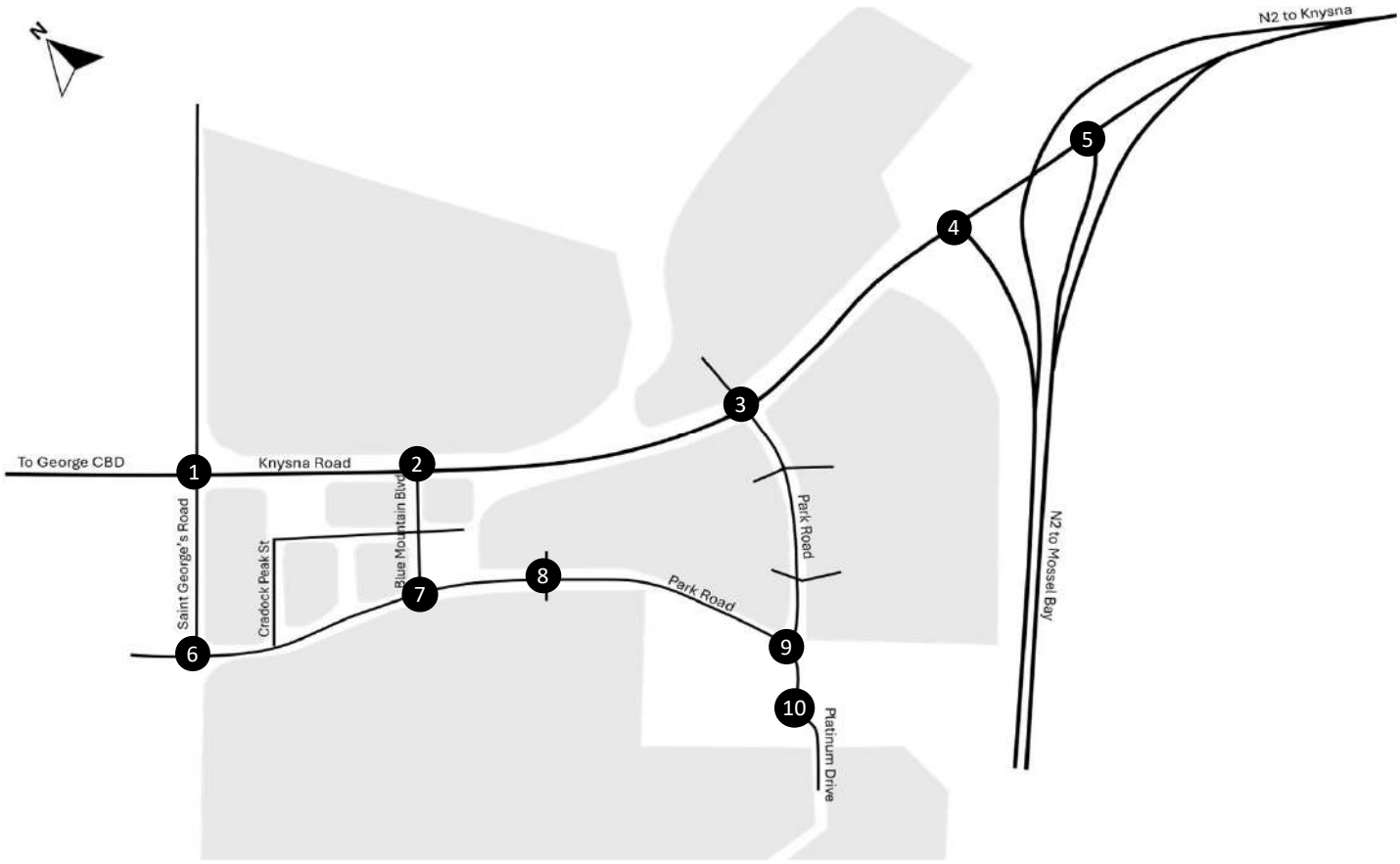
Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Existing Traffic Conditions** **PM Peak Hour**	**Figure:** **A4**

Scenario: Ex PM, Run:Fri Mar 13 13:39:08 2026



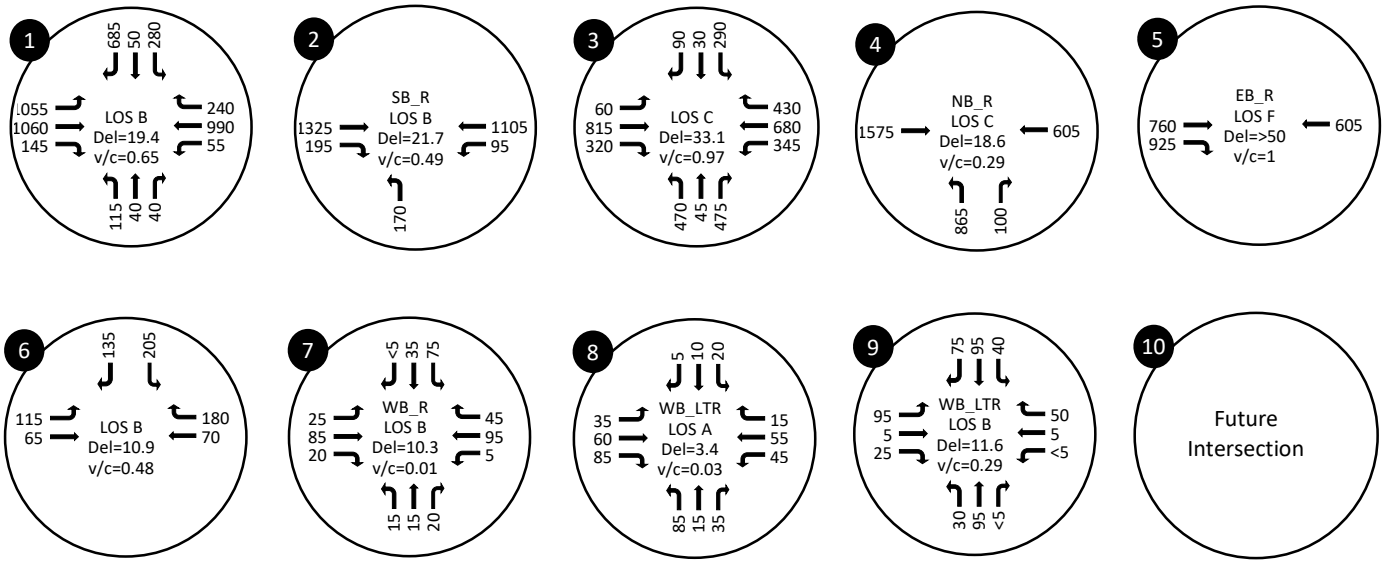


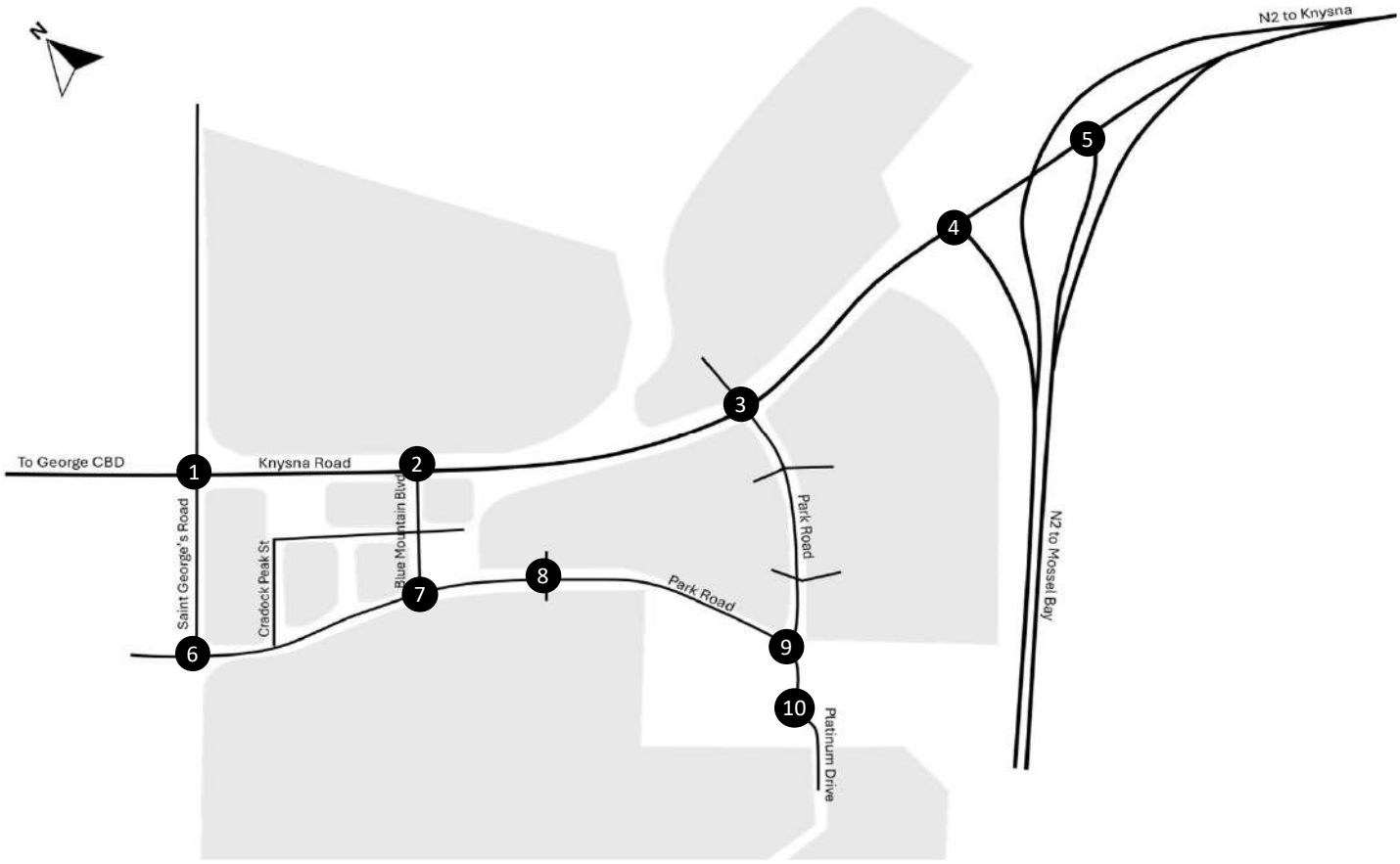
Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Background Traffic Conditions** **AM Peak Hour**	**Figure:** **A5**

Scenario: *BG AM, Run:Sun Mar 29 16:44:47 2026*



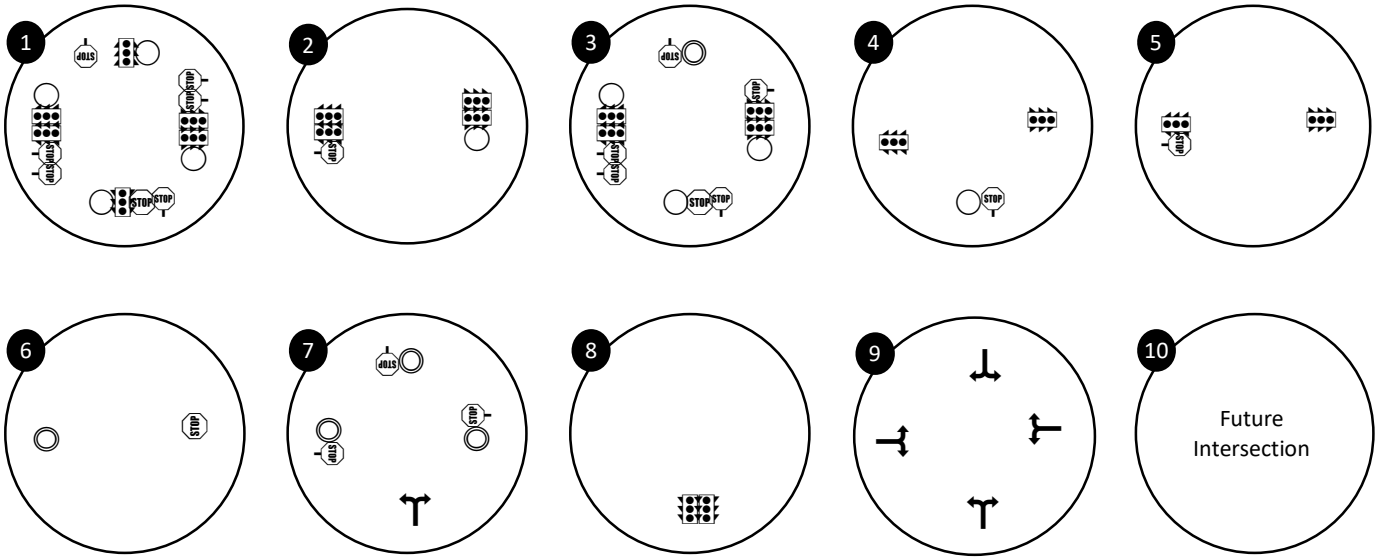


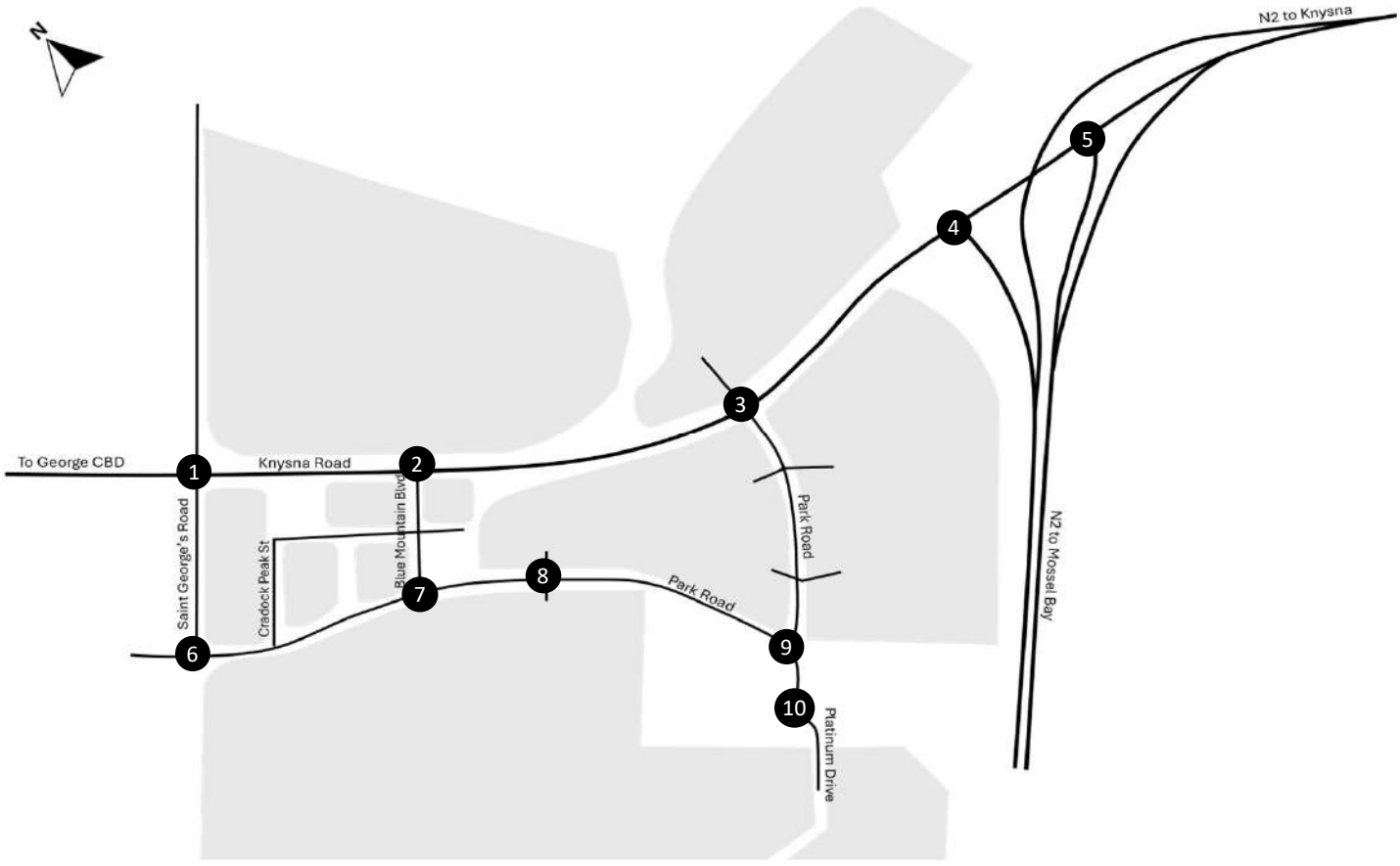
Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Background Traffic Conditions** **PM Peak Hour**	**Figure:** **A6**

Scenario: BG PM, Run:Sun Mar 29 16:46:10 2026



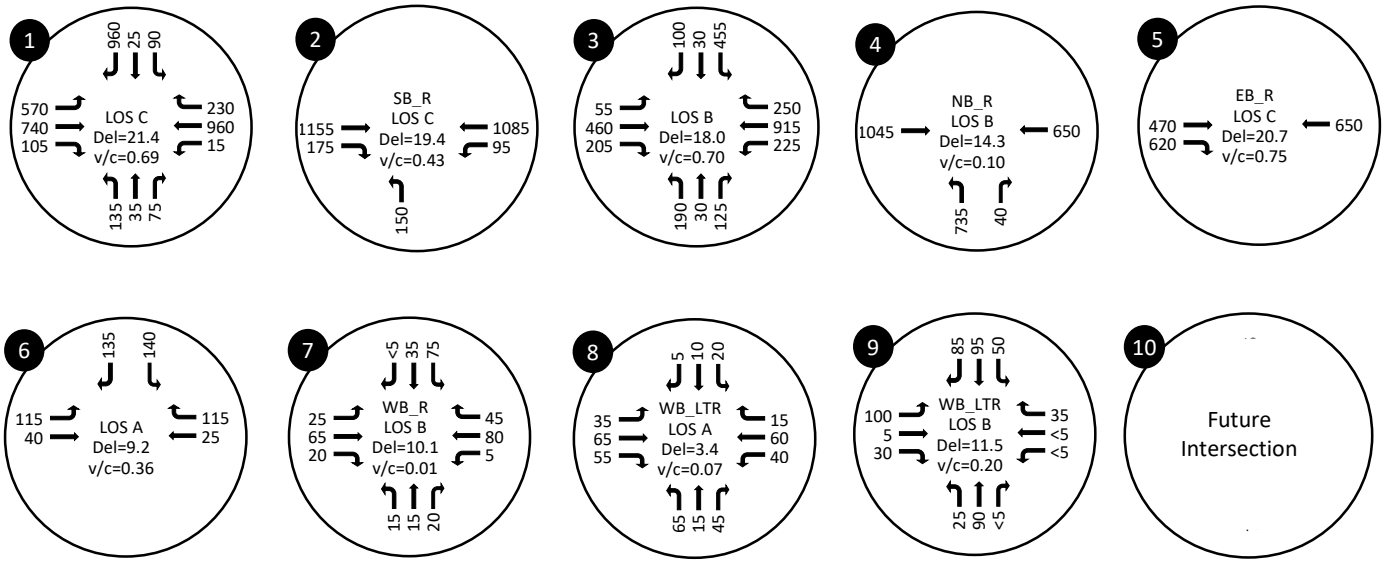


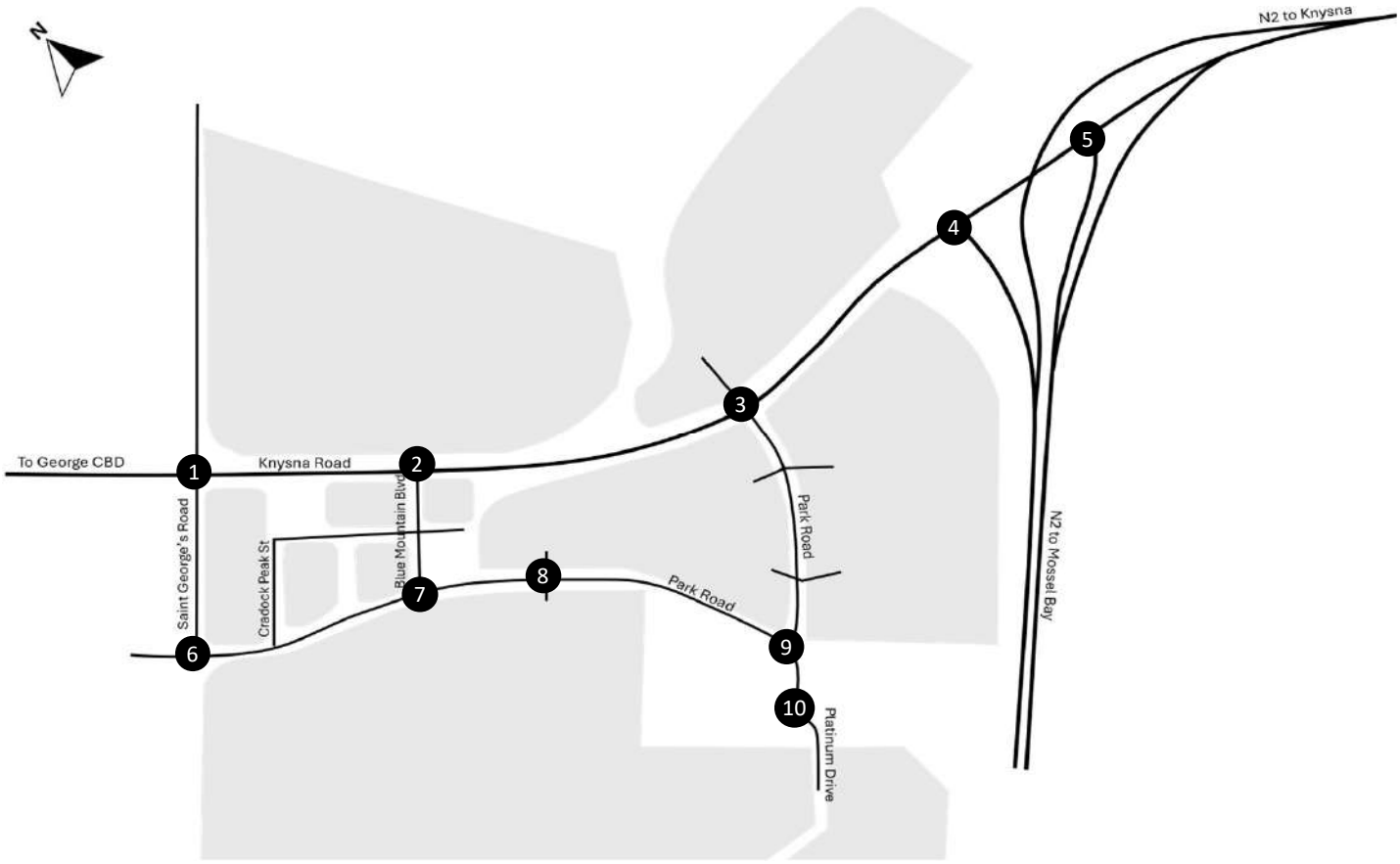
Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Background Conditions Proposed Upgrades** **Lane Configurations and Control**	**Figure:** **A7**

Scenario: BG AM, Run:Sun Mar 29 15:13:21 2026



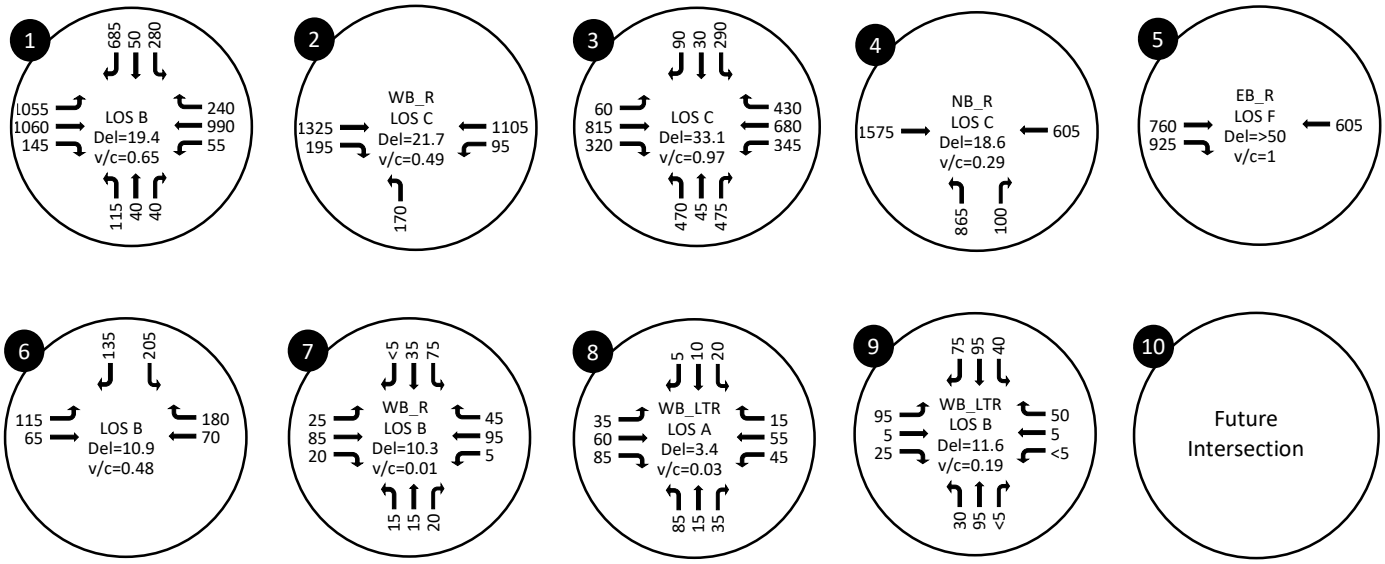


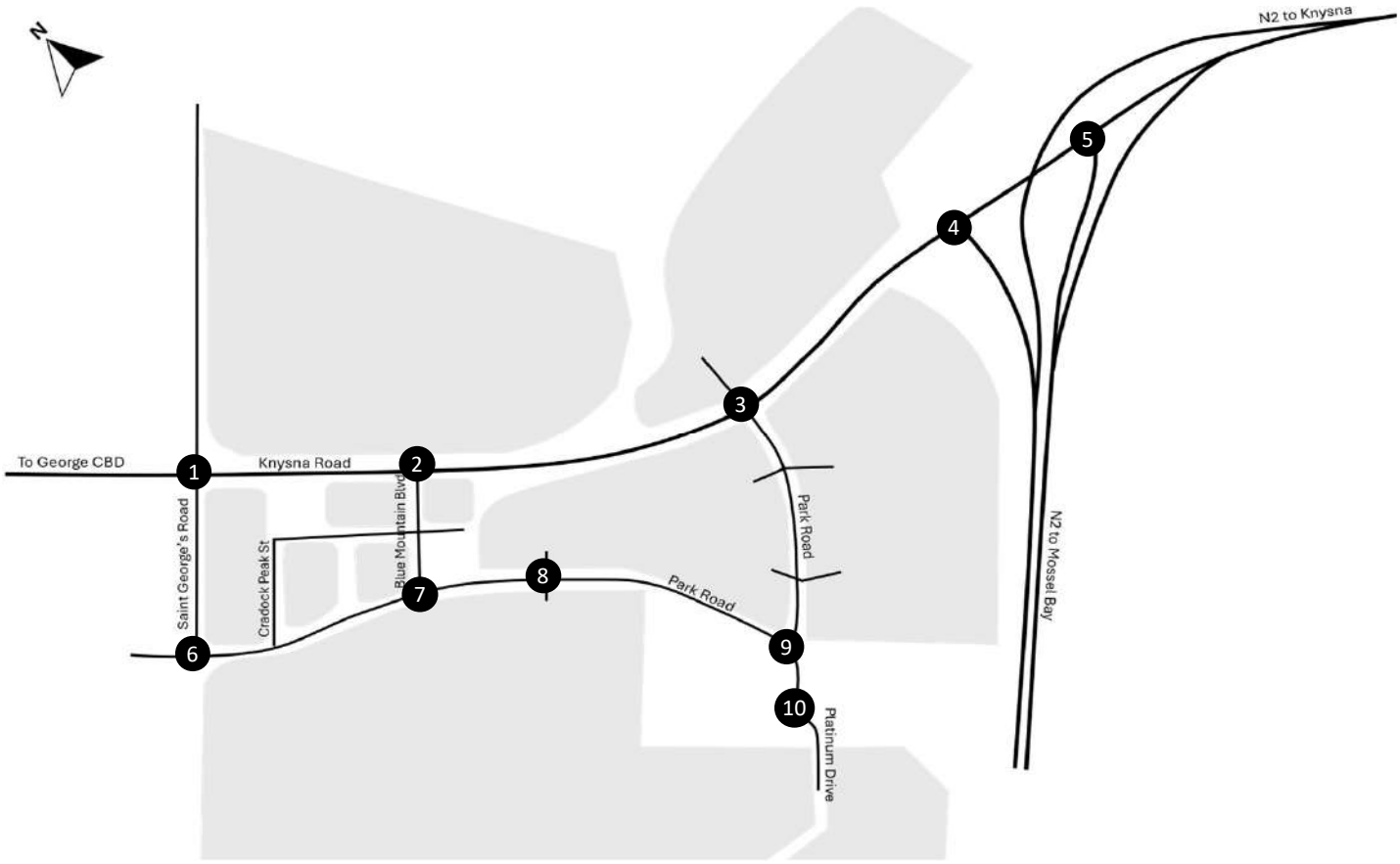
Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Background Traffic Conditions with Upgrades** **AM Peak Hour**	**Figure:** **A8**

Scenario: *BG AM, Run:Sun Mar 29 16:56:11 2026*



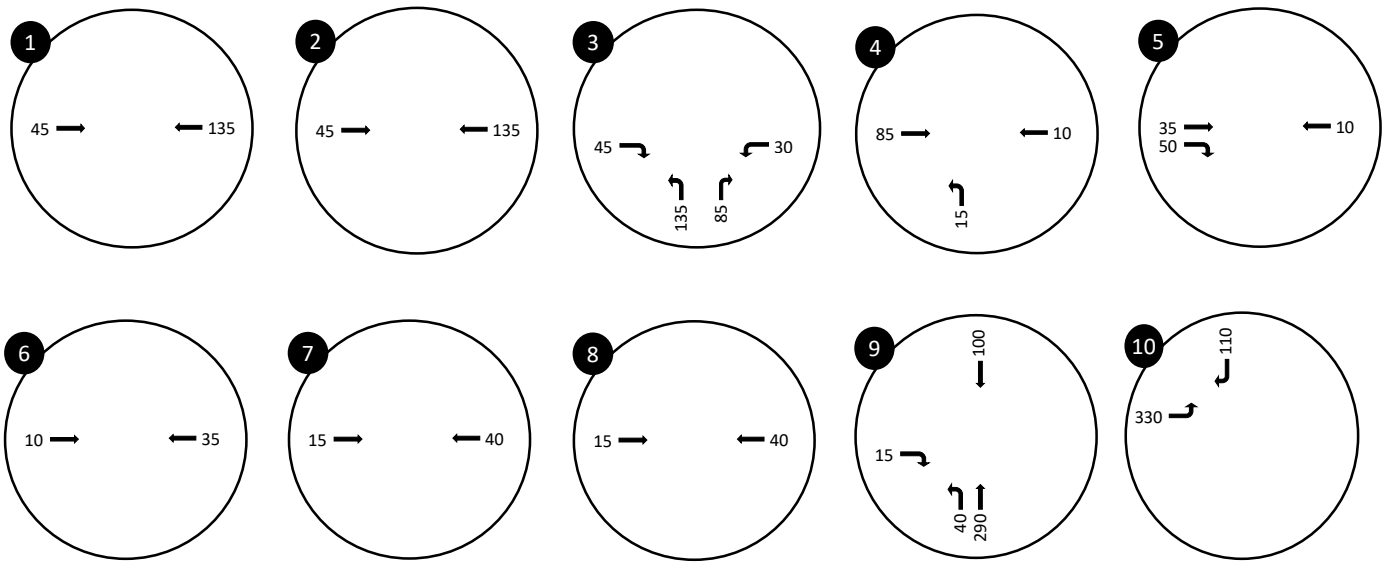


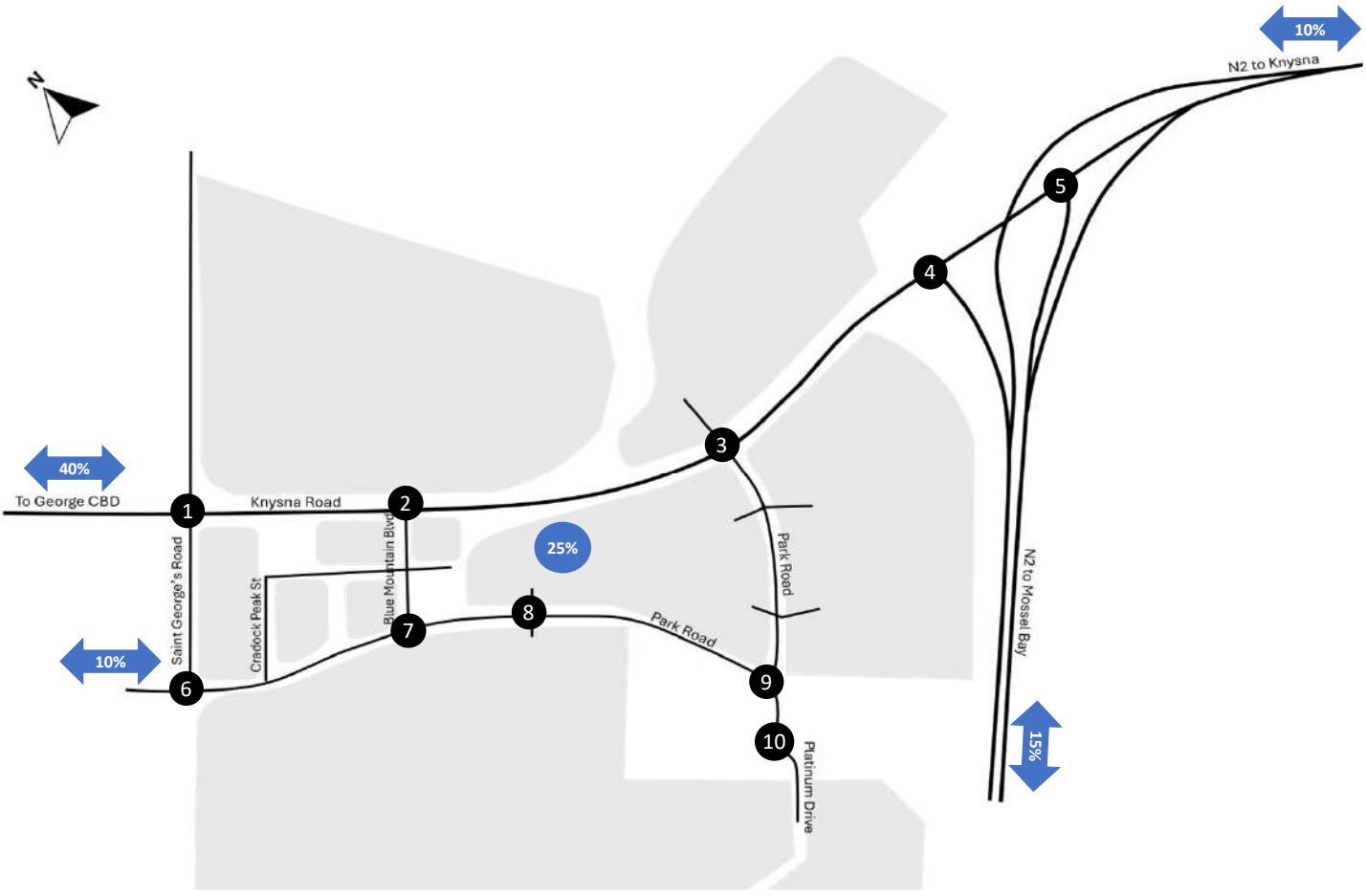
Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Background Traffic Conditions with Upgrades** **PM Peak Hour**	**Figure:** **A9**

Scenario: BG PM, Run:Sun Mar 29 16:59:36 2026



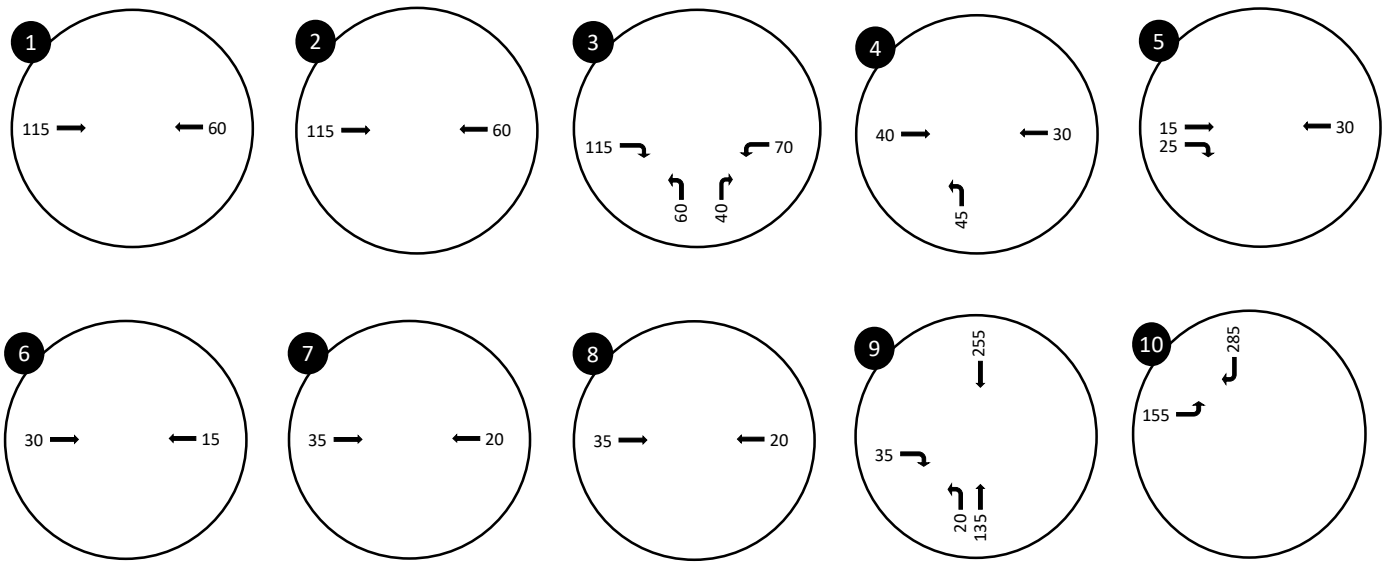


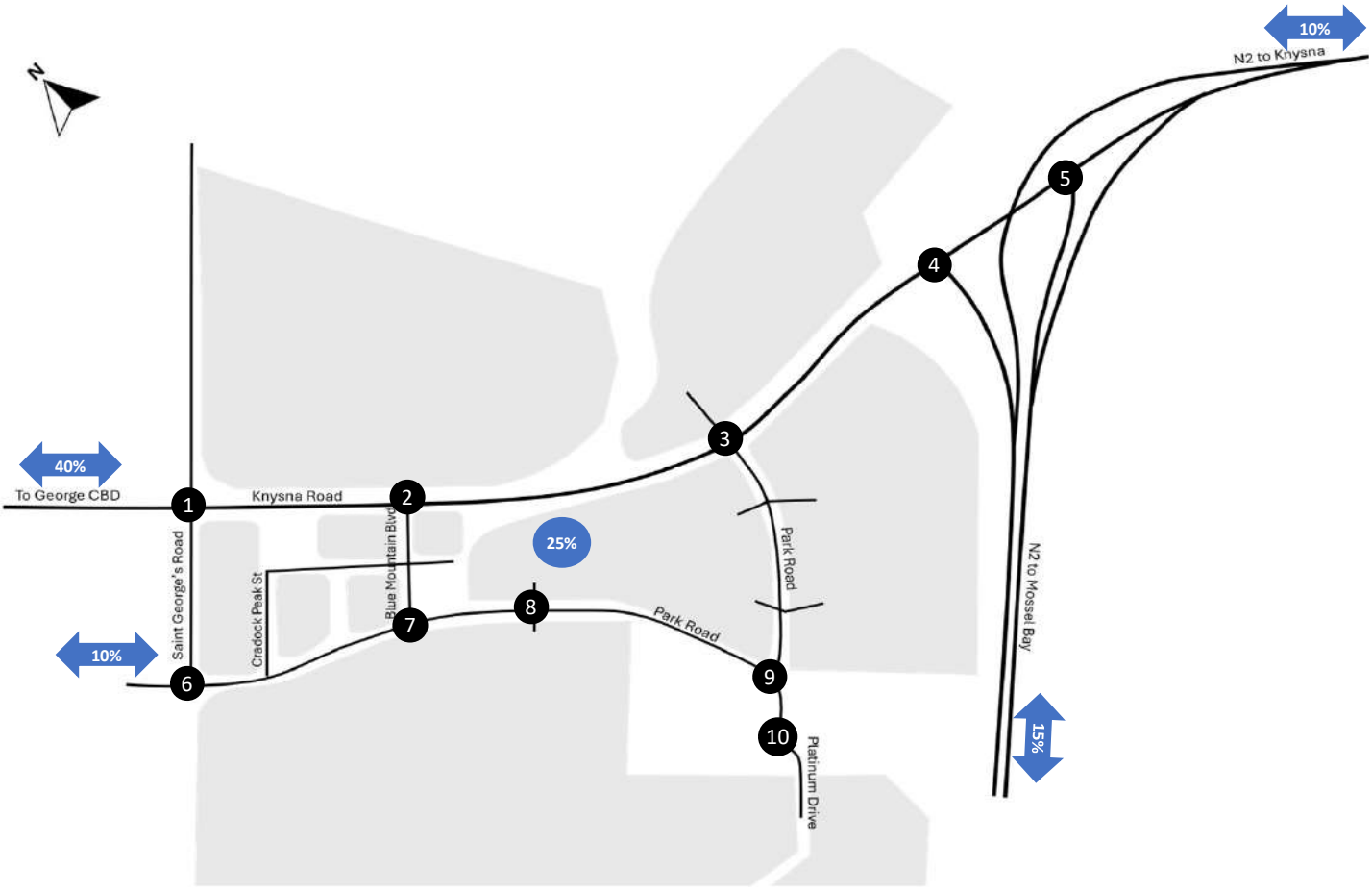
Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Expected Development Trips** **AM Peak Hour**	**Figure:** **A10**

Scenario: *TL AM, Run:Fri Apr 10 09:45:19 2026*



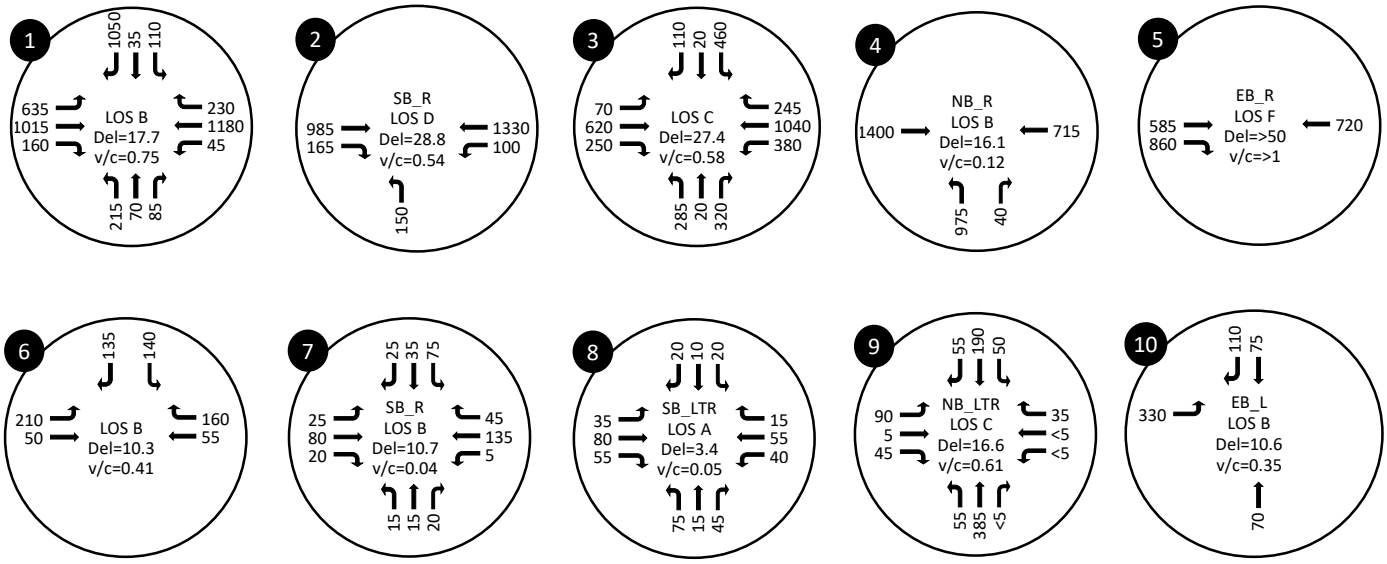


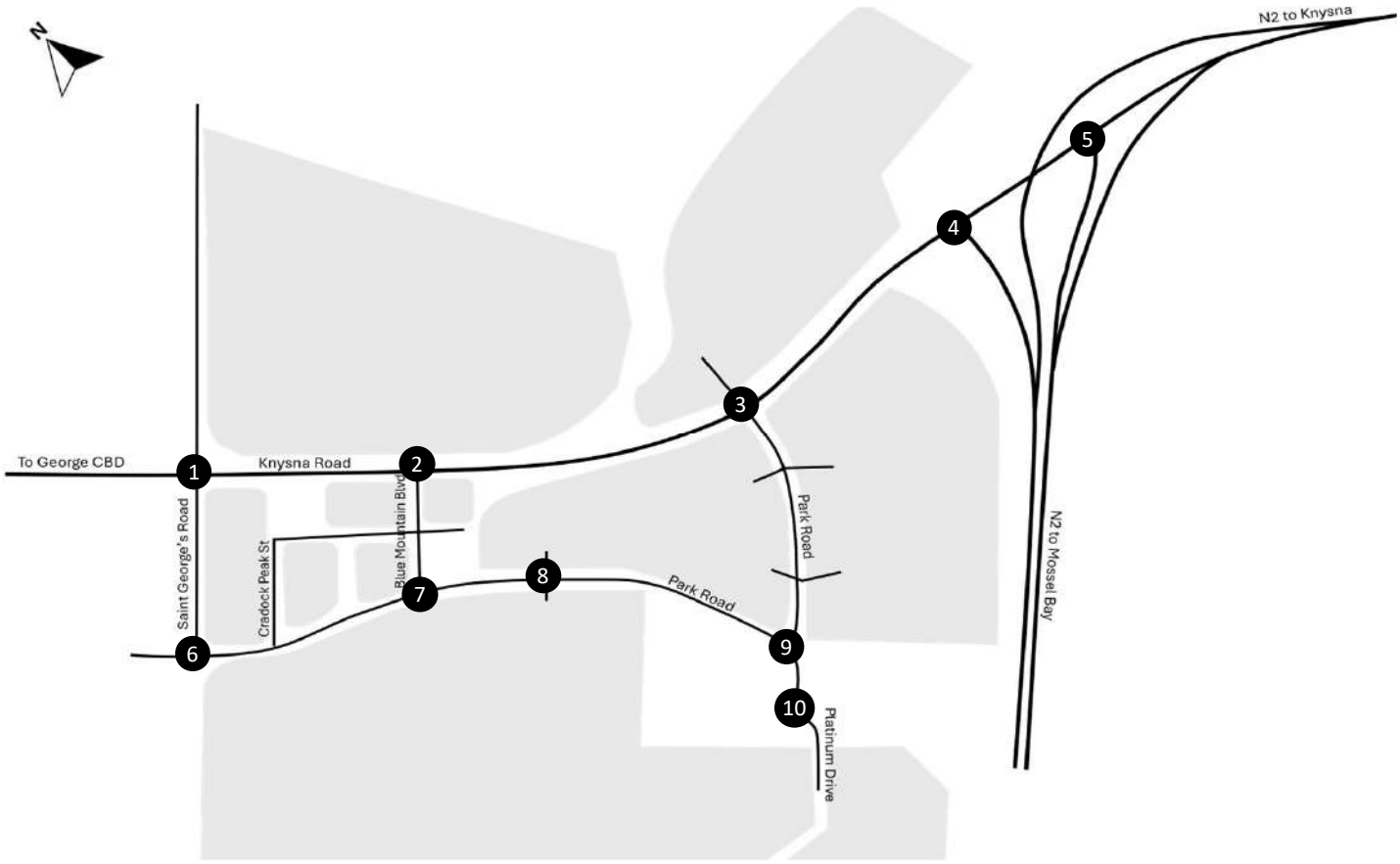
Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Expected Development Trips** **PM Peak Hour**	**Figure:** **A11**

Scenario: *TL PM, Run:Fri Apr 10 09:46:39 2026*



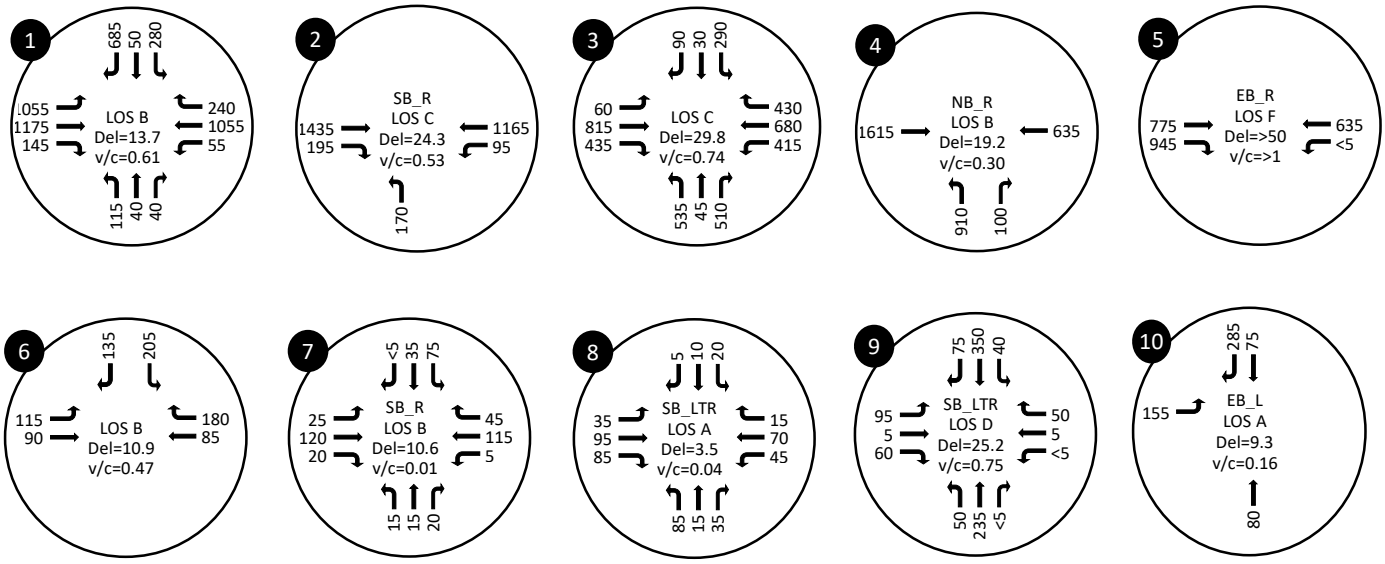


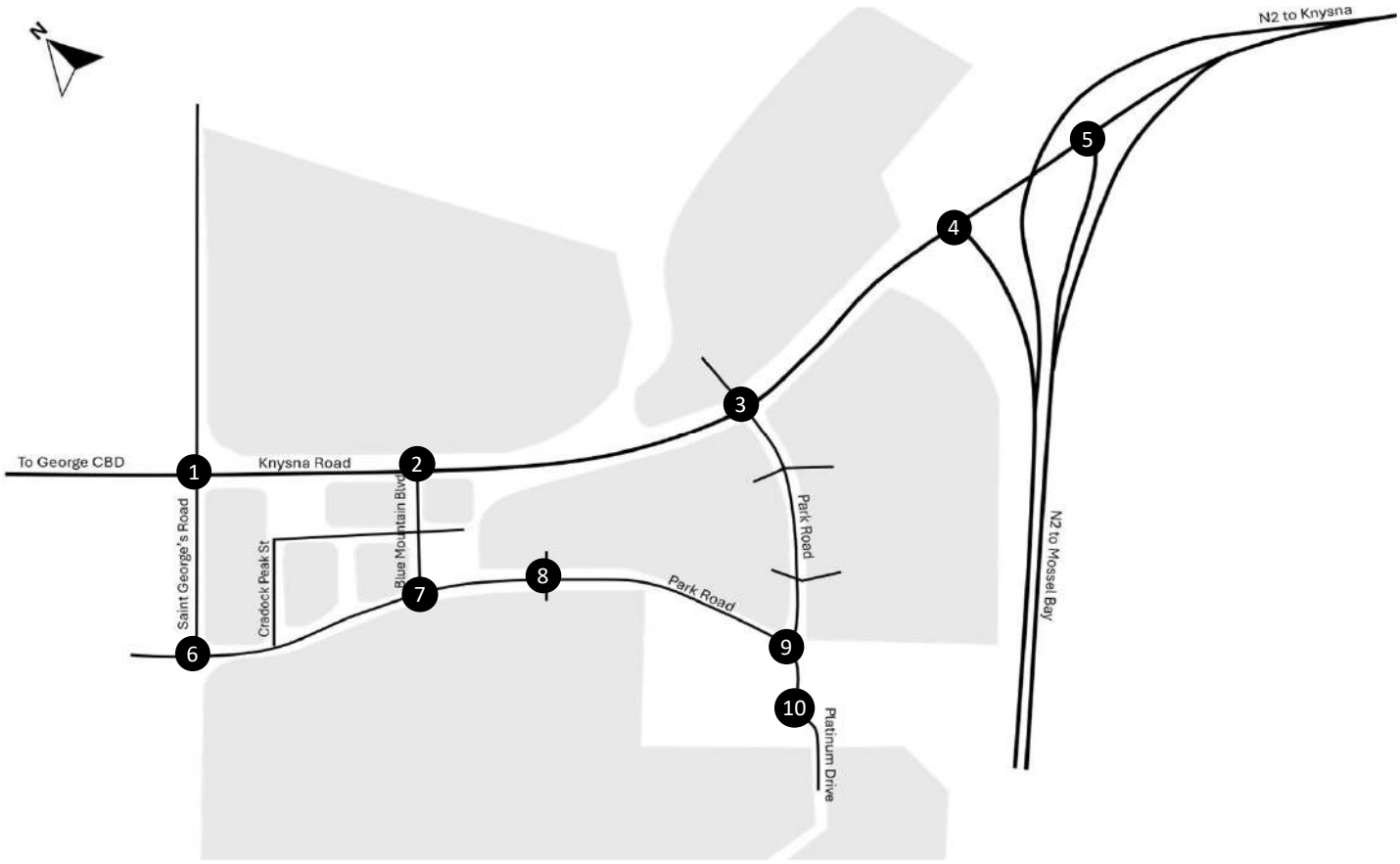
Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Future Traffic Conditions** **AM Peak Hour**	**Figure:** **A12**

Scenario: TL AM, Run:Fri Apr 10 09:27:50 2026



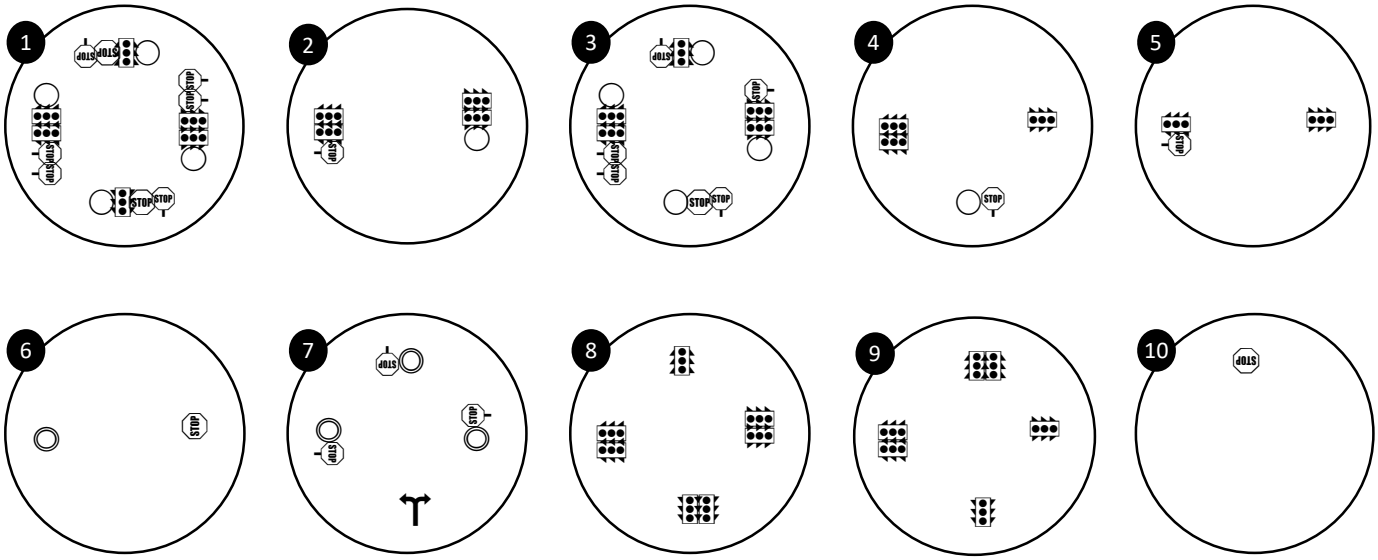


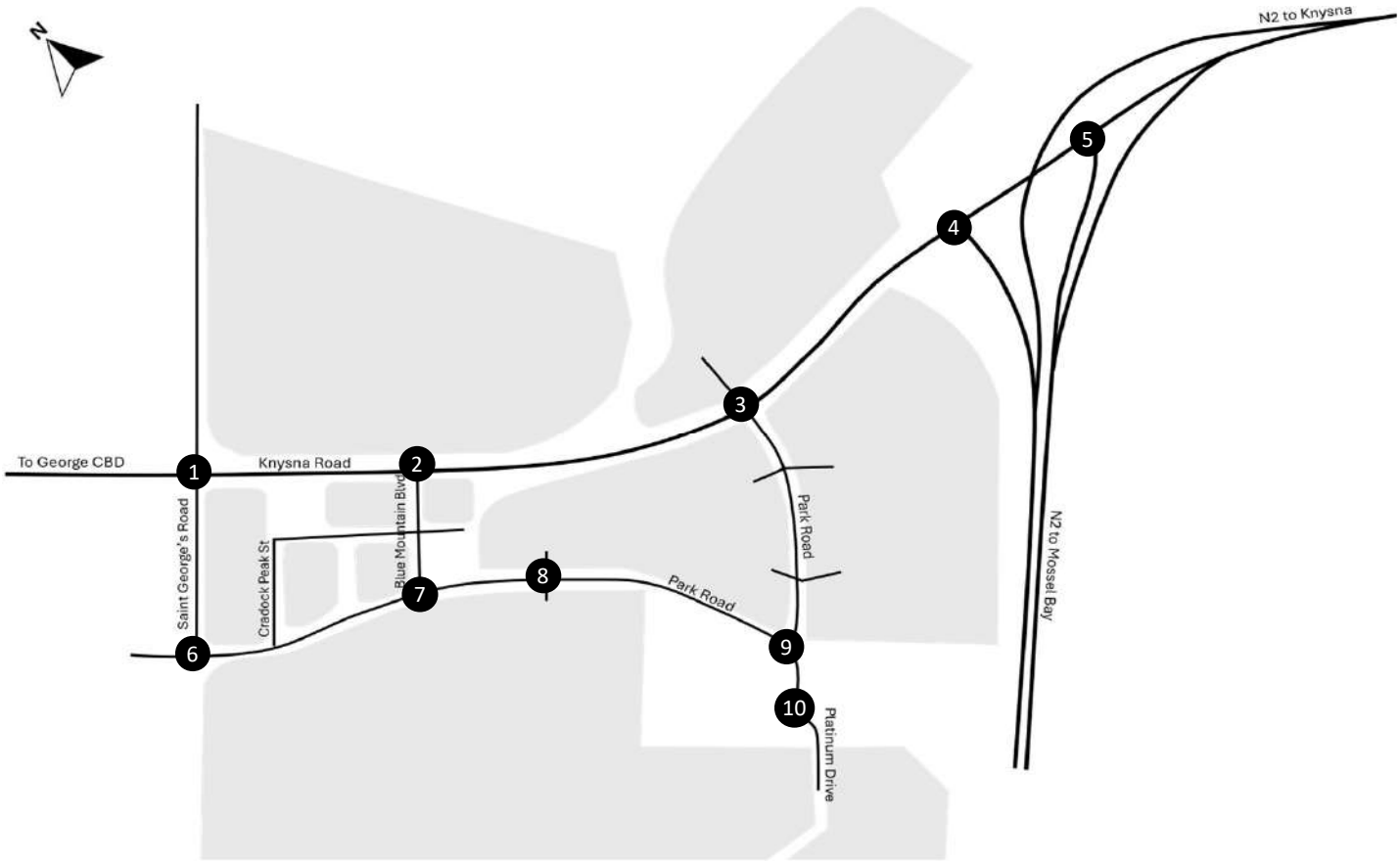
Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Future Traffic Conditions** **PM Peak Hour**	**Figure:** **A13**

Scenario: *TL PM, Run:Fri Apr 10 09:16:53 2026*

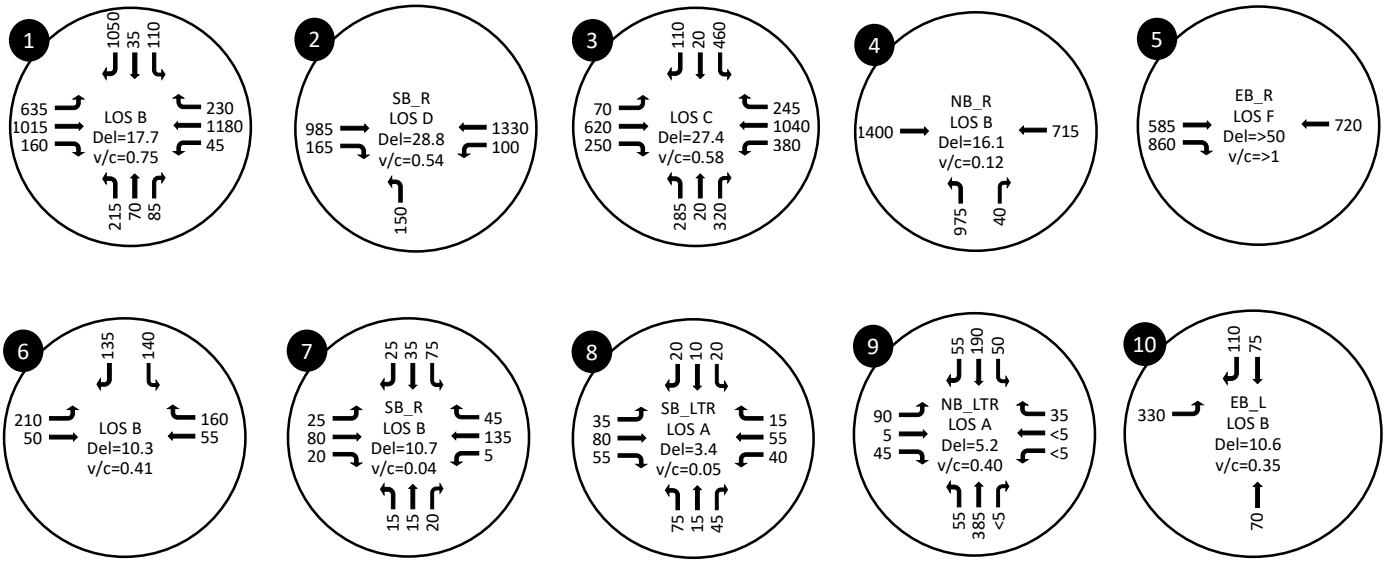


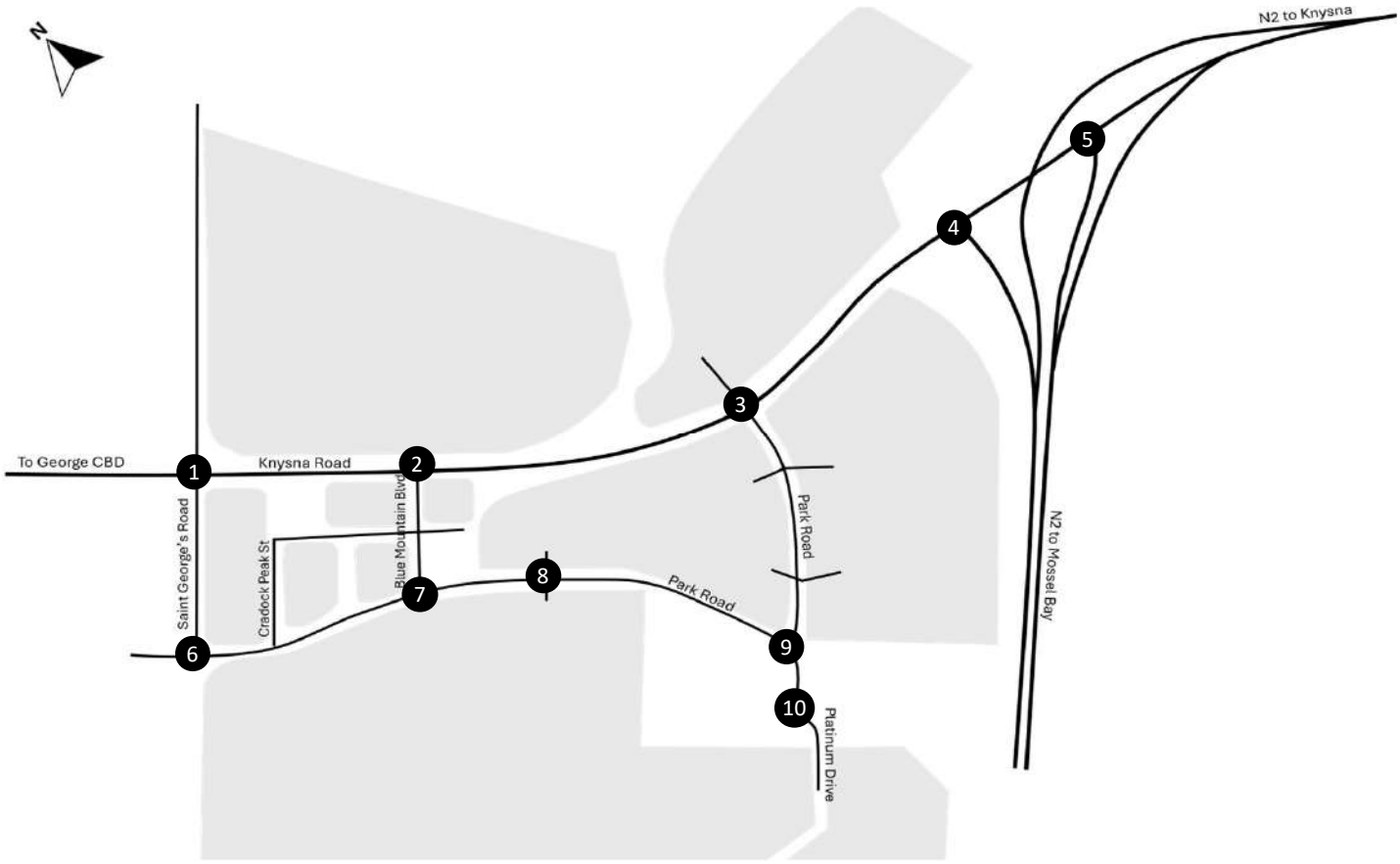


Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Total Conditions Proposed Upgrades** **Lane Configurations and Control**	**Figure:** **A14**



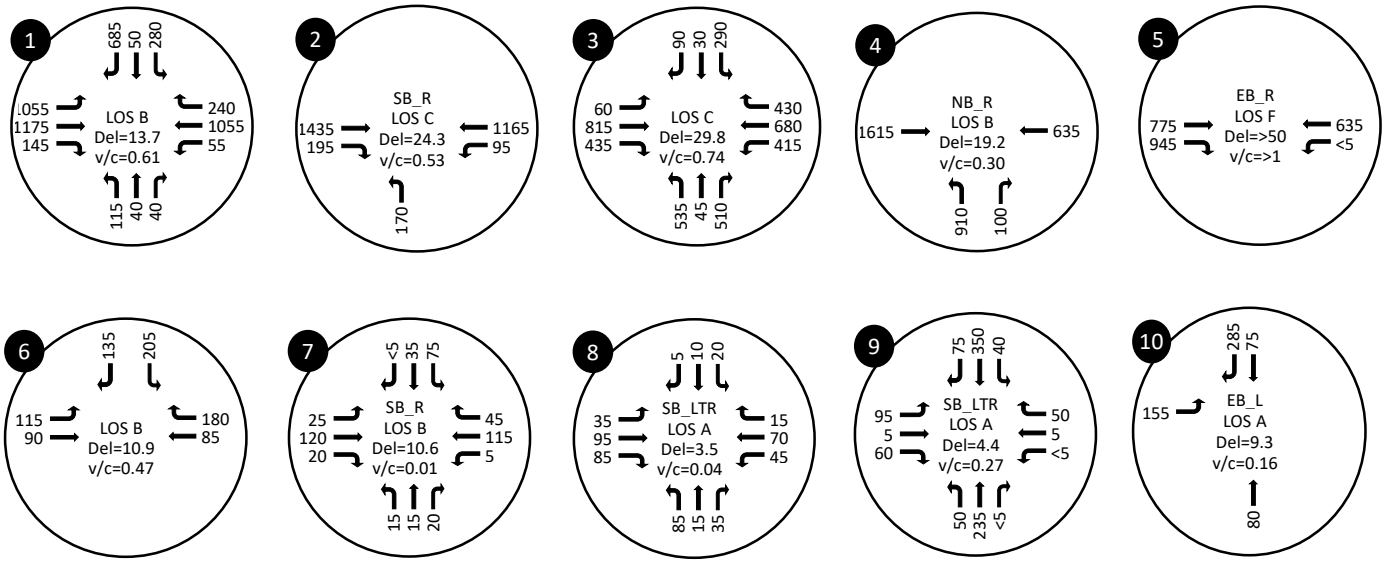


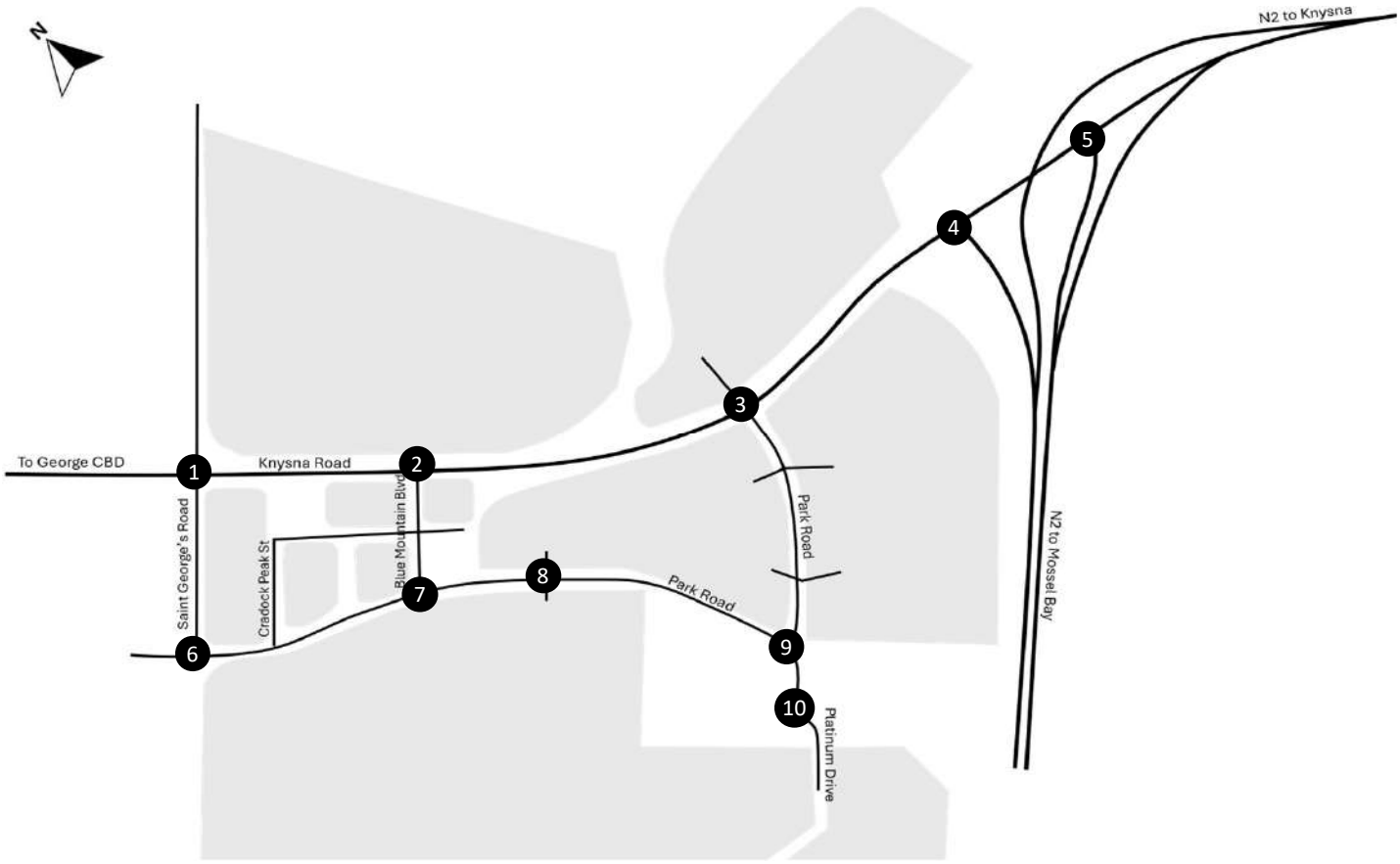
Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Future Traffic Conditions with Upgrades** **AM Peak Hour**	**Figure:** **A15**

Scenario: TL AM, Run:Fri Apr 10 09:27:50 2026





Turning lanes and turning movements
Stop Control
Traffic Signal Control
Roundabout (Yield Control)

Diagramatic / Not to Scale

its INNOVATIVE TRANSPORT SOLUTIONS	**Erf 28005, Eden Meander, George**	**Future Traffic Conditions with Upgrades** **PM Peak Hour**	**Figure:** **A16**

Scenario: *TL PM, Run:Fri Apr 10 09:16:53 2026*

ANNEXURE B

Tables

Table B1: Trip Generation

Erf 28005						Weekday AM Peak Hour			Weekday PM Peak Hour	
Land Use	**Extent**	**Units**	**Source**	**Unit**	**Rate**	**In**	**Out**	**Rate**	**In**	**Out**
Apartment and Flats	680	dwelling units	CoTO 220	du	0.65	25%	75%	0.65	65%	35%
TOTAL	**680**									

Table B2: Expected New Trips

Land Use	Weekday AM Peak Hour			Weekday PM Peak Hour		
	In	**Out**	**Total**	**In**	**Out**	**Total**
Apartment and Flats	111	332	442	287	155	442
TOTAL	**111**	**332**	**442**	**287**	**155**	**442**

ANNEXURE C

Queuing Analysis

Erf 28005, George

Project #: 4976

Access Control Queuing Analysis - DRAFT

10-Apr-26

Base Information

Boom Control (Service Flow Rates)			
Manual Recording (visitors)	80	veh/hr	(visitor completes form. Assumed 45 seconds per vehicle)
Automatic tag detection system	450	veh/hr	(ultimate measure - automatic detection within 5m/remote gates. Assumed 8 seconds per vehicle)
Vehicle length (in queue)	7	m	(stacking length of a single vehicle in a queue - this is typically between 6 and 7.5m depending on the environment, grades, and vehicle servicing type)

Concept

Concept Source: Century Property Developmets

Lane	Description
1	Inbound - Tags only lane
2	Inbound - Shared lane for tags and visitors

Lane	Proportion Traffic (assumed)
1	50%
2 tags	45%
2 visitors	5%
	N/A

Development Trips

Weekday PM Trip Generation

Type	Source	Units	Rate (trips/hr)	Split (inbound)	Trips (veh/hour)
Apartments and Flats	CoTO 220	680	0.65	50%	221
Total					221

Queuing Analysis

Scenario A - even split					
Total volume (per direction - veh/hr)	177				
Lane Number	1	2			
Vehicle Type	Tags	Tags	Visitors	Total	
Proportion per lane	50%	45%	5%	50%	
Total volume per lane (veh/hr)	88	80	9	88	
Peak Hour Factor	0.80	0.80	0.80		
Service Flow Rate (veh/hr)	**450**	**450**	**80**		
Traffic Ratio	**25**	**22**	**14**	**36**	
Channels (10 veh limit)	1	1	1	1	
90th% queue length (veh)	2	1	1	2	
90th% queue length (m)	**14**	7	7	**14**	

Findings and Recommendations

n/a

Notes:

Trip generation source: Committee of Transport Officials (COTO). TMH 17 South African Trip Data Manual. Version 1.01. September 2013.

Methodology source: Committee of Transport Officials (COTO). TMH 16 South African Traffic Impact and Site Traffic Assessment Standards and Requirements Manual - Volume 2. Version 1.01. February 2014.

ANNEXURE "V": BULK ENGINEERING SERVICES REPORT

CENTURY PROPERTY DEVELOPMENTS

Proposed Development of Meander Lifestyle Apartments on Erf 28005, Platinum Drive George

Bulk Engineering Services Report

Revision 1

April 2026

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Reviewed By:	…….. Jako Fourie PrEng MEng	…….. Date

Revision	Description	Date Issued	Revision By:
0	Draft for Comment	Jun 2023	HL
1	Revised SDP	Apr 2026	HL

DISTRIBUTION LIST

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Proposed Development of Meander Lifestyle Apartments on Erf 28005, Platinum Drive George

Bulk Engineering Services Report (Revision 1)

CONTENTS

1 INTRODUCTION AND BACKGROUND

Element Consulting Engineers have been appointed by Century Property Developments for the compilation of the external and bulk engineering services report for the proposed development of the new Meander Lifestyle Apartments on Erf 28005, George.

Erf 28005 is part of the larger Eden Meander precinct of which a significant percentage of development has successfully been completed over the past decade.

The project proposes the development of 680 residential apartments (@120 units/ha), complete with a gatehouse and leasing office, clubhouse, gym facility, multi-purpose sports fields, parklands and communal laundry.

A number of pre-application meetings have been held with officials of the local municipality to discuss the development as well as the requirements for the application submission.

This report will detail and discuss the results of the investigation and discussions held in terms of the external and bulk engineering services for the proposed development.

All the solutions provided are based on preliminary discussions and are subject to final approval by the George Municipality's Civil and Electrical Departments as well as further project detail design development.

2 PROPOSED LAND USE

The project proposes the development of 680 residential apartments (@120 units/ha), complete with a gatehouse and leasing office, clubhouse, gym facility, multi-purpose sports fields, parklands and communal laundry.

The proposed Site Development Plan (SDP) is shown in the diagram below.

Figure 1: Site Development Plan (SDP)

3 LOCALITY

The proposed development is located on Erf 28005, George. The site is bound to the south by Platinum Drive, to the east by Park Road and to the north and west by existing residential development. Access to the proposed development is obtained from the south from Platinum Drive.

The locality of the site is depicted on the diagram below:

Figure 2: Locality plan

4 BULK ENGINEERING SERVICES

This chapter will discuss the external and bulk engineering services design of the proposed development. A set of bulk and external engineering services drawings is available for reference and discussion purposes and should be consulted in parallel to the discussions below.

4.1 Existing services agreement

The proposed development will be performed in line with an existing services agreement with the George Municipality in terms of the external and bulk services. The existing services agreement is available upon request. All external and bulk services discussed in this report are- or will be provided and designed in line with the services agreement.

4.2 Infill development

The proposed development is classified from an engineering bulk services perspective as an infill development. Infill development is desirous from a bulk engineering services perspective as all, or most bulk municipal services are normally already available and in place. Such infill development will improve the holistic financial sustainability of the local municipality due to additional rates and taxes being generated without the burden of additional capital outlay. The proposed infill development will subsequently not trigger unaffordable capital cost burdens to the local municipality but will in fact strengthen the financial sustainability of the municipality in both the short- and longer term.

4.3 Water

4.3.1 Water Demand

The Average Annual Daily Demand (AADD) for this proposed development in line with accepted design consumptions, assumptions, criteria and standards, is calculated and estimated at approximately 127.5kl/day. Peak factors will be considered during the detail design stage of the project.

4.3.2 Bulk Availability

Bulk water is available for this development in accordance with the existing services agreement and new discussions with the local municipality. Letters of confirmation from George Municipality, as well as GLS, are attached as addendum.

4.3.3 Connection Point

An existing municipal bulk water connection for this erf has been provided on Platinum Drive on the southern boundary of the site on the existing 160mm uPVC class 12 bulk

line. The locality of this existing bulk water connection in relation to the proposed development site is indicated in the diagram below.

Figure 3: Existing bulk water network servicing the site

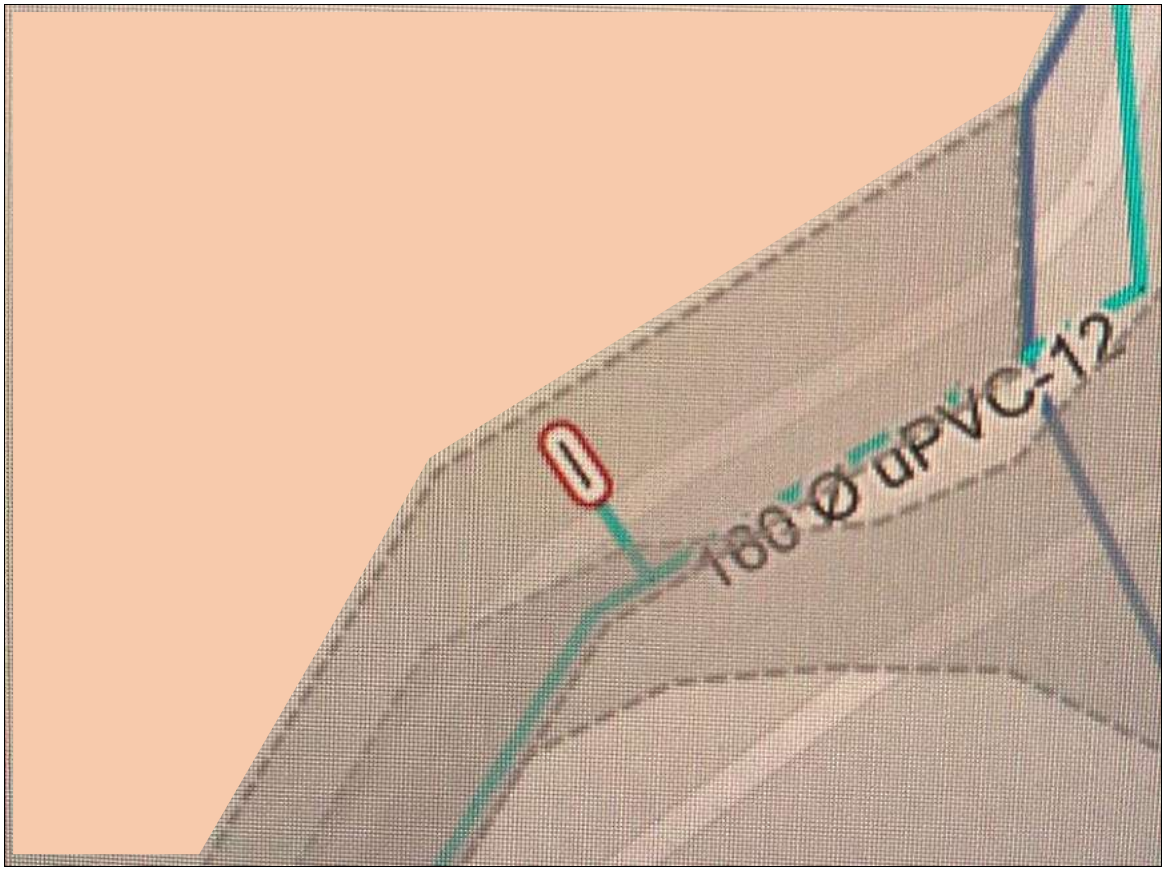


Figure 4: Existing bulk water connection servicing the site

4.3.4 Design Criteria and Standard of Engineering Services

- Design consumption: 127.5kl/day
- Peak factors as prescribed.
- Minimum pressures for the network are calculated for a fire flow 30l/sec and peak demand at the point of lowest pressure under peak conditions.
- Maximum of 4 valves to isolate a pipe section.
- Maximum length of 600m of main pipe per isolated section.
- Air valves to be provided where applicable.
- Minimum cover to pipes to be 900mm.
- Pipe type and class to be uPVC class 6 to 12, depending on existing network pressure.
- Fire hydrants to be provided in accordance with relevant guidelines and legislation.

4.3.5 Preliminary design

The preliminary design is presented in the following diagram and is attached as addendum to the report.

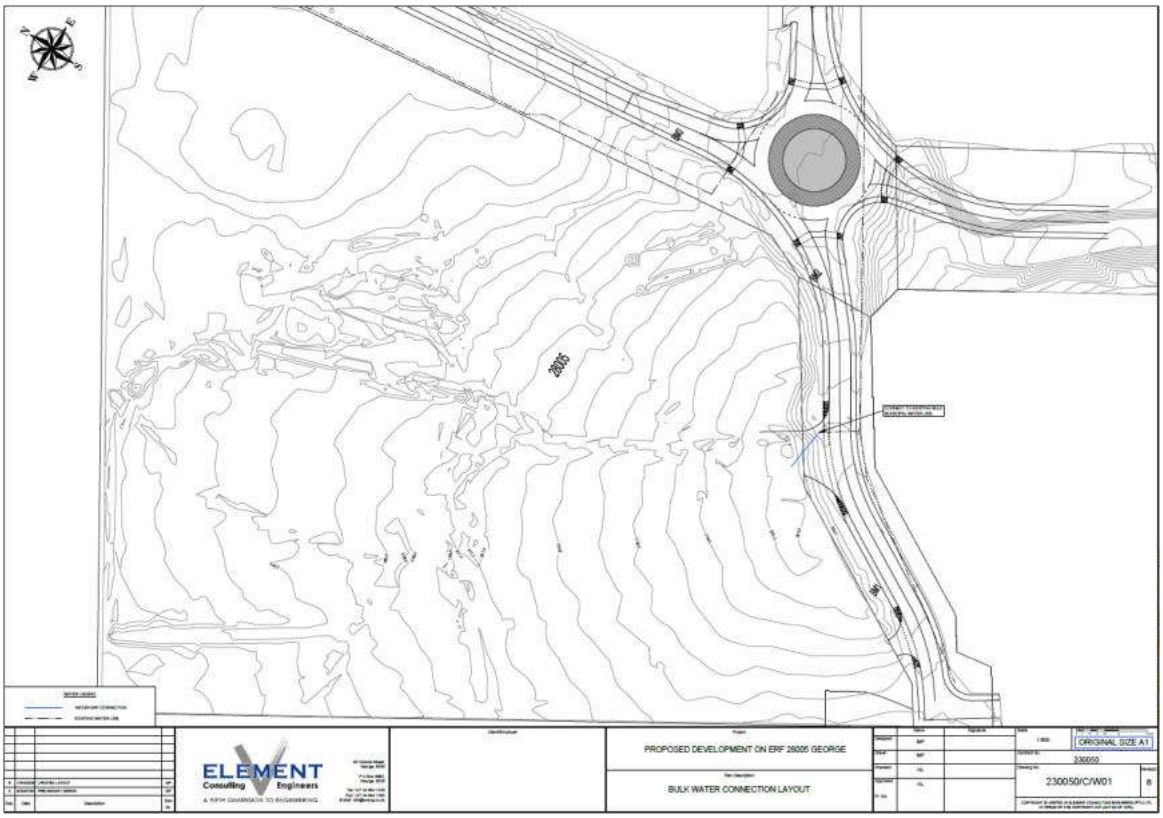


Figure 5: Preliminary design drawing: Bulk water connection

4.3.6 Upgrades required to municipal bulk water network

No upgrades will be required to the municipal bulk water network, as confirmed in the letters of both George Municipality and GLS.

4.4 Sewer

4.4.1 Site layout considerations

The proposed development site drains to the middle of the southern boundary on Platinum Drive. The drainage is indicated diagrammatically on the figure below:

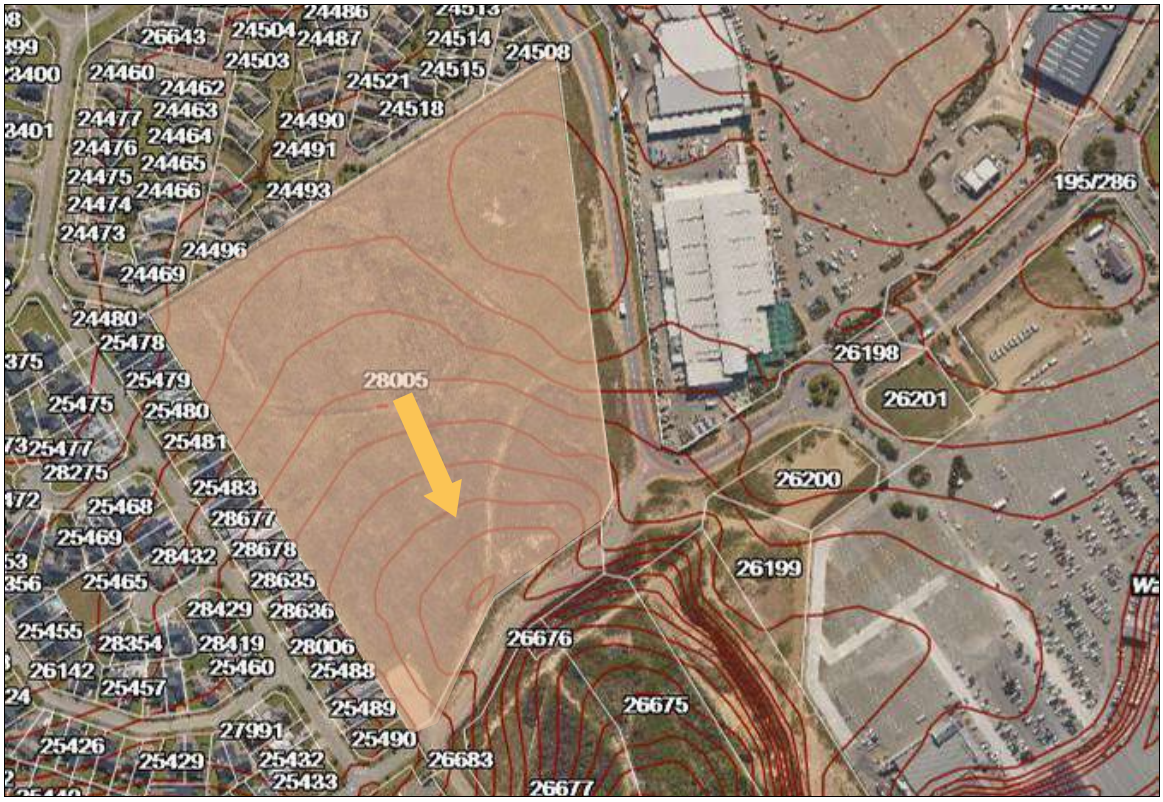


Figure 6: Sewer drainage

4.4.2 Design flow

The Average Dry Weather Flow (ADWF) of the development, in line with accepted design criteria and standards, can be calculated and estimated as 102.0kl/day. The design peak flow, inclusive of a specified peak factor of 3.5 and 15% extraneous flow, will be calculated during detail design stage.

4.4.3 Bulk Capacity

Bulk WWTW treatment capacity is available for this development in accordance with the existing services agreement and new discussions with the local municipality. Capacity in the bulk network is mostly available; a number of upgrades are required and specified in the approval letters. Letters of confirmation from George Municipality, as well as GLS, are attached as addendum.

4.4.4 Connection point

The site is serviced by an existing 160mm municipal sewer connection on the lowest point of the erf on the southern boundary of the site on Platinum Drive.

The locality of this existing sewer connection in relation to the proposed development site is indicated in the diagram below.

Figure 7: Existing bulk sewer network and erf connection servicing the site

4.4.5 Design Criteria and Standards of Engineering Services

- Design flow: 102.0kl/day
- Specified peak factor of 3.5
- Allowance for 15% extraneous flow
- Conventional waterborne sewerage system.
- Minimum flow velocities of 0.7m/s.
- Minimum cover to all pipes to be 800mm.
- Pipe diameters of generally 110mm for all service connections and minor lines and 160mm and above for main lines, as required per the detailed designs.
- Minimum design gradients to be as follows:

Dwelling Units	Grade
1 (House connection)	1:60
1-5	1:80
6-10	1:100
11-80	1:120
81-110	1:150
>110	1:180

- Precast concrete rings manholes with concrete floor and premanufactured concrete lid.
- Manhole covers and frames to be Polymer Concrete.
- Manholes to be central over main pipe on downstream side.
- Manhole spacing to be maximum 80m.
- All concrete, mortar or screed used with manholes to be from dolomite aggregate and low alkali sulphate resistant cement to SABS 471.
- Pipelines to be uPVC class 34 and to be laid on Class C bedding.

4.4.6 Preliminary design

The preliminary design is presented in the following diagram and is attached as addendum to the report.

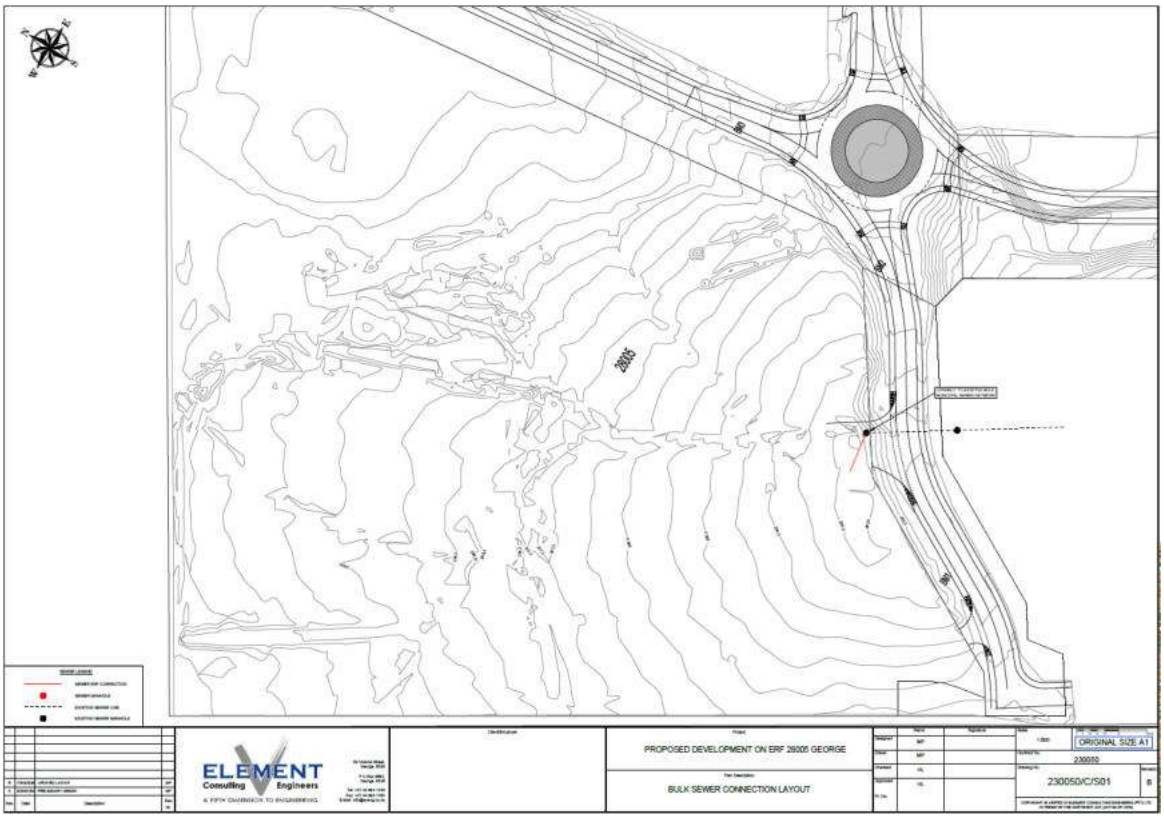


Figure 8: Preliminary design drawing: Bulk sewer

4.4.7 Upgrades required to municipal bulk sewer network

The following upgrades will be required to the municipal bulk sewer network, as per the letters from the George Municipality and GLS:

Bulk pipelines and pump stations:

The following upgrades are required in the bulk sanitation conveyancing system to support the development (extract from municipal approval letter):

Items OT_09.01 to OT_09.04:

- The Developer will be required to upgrade the pipeline from the Schaapkop pump station (point X on figure) across, and just east of, Nelson Mandela Boulevard (point Y on figure 2) to a 1,050mm diameter pipeline (Refer to figure below).
- The Developer will be required to construct the above-mentioned items to service the development.
- The cost will be offset against Development Contribution's (DC's) payable by the developer.

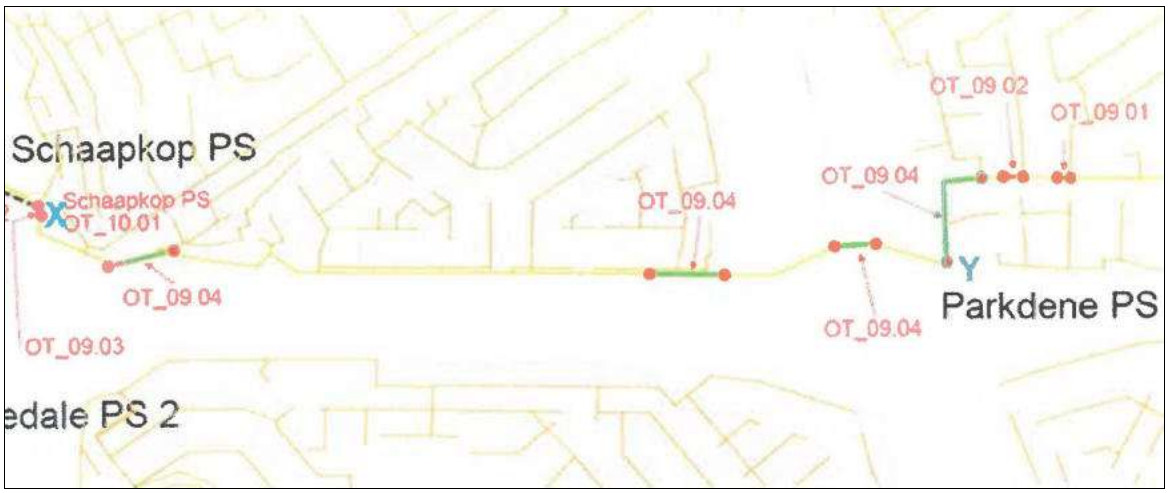


Figure 9: Upgrading required: OT_09.01 to OT_09.04

Reticulation system:

The following upgrades are required in the municipal reticulation system to support the development (extract from municipal approval letter):

Item OT_V06.05:

- Upgrade the gravity sewer as indicated from point A to E from a 160mm diameter to a 200mm diameter as per the figure below.
- The transfer structure located at point A in the figure requires repositioning (currently within a residential property driveway) and revised design to ensure the structure is operating adequately.

Figure 10: Upgrading required: OT_V06.05

Item OT_26.01 and OT_47.01:

- Upgrade both pump stations to 11l/s each.
- The upgrades of the pump stations are not a requirement or need of the Municipality, and the full cost shall be borne by the Developer with no off setting against Development Contributions.

4.5 Roads and access

4.5.1 Traffic Impact Assessment

An updated Traffic Impact Assessment (TIA) has been performed by ITS (ITS – April 2026) and shall be studied in parallel to this report. Conclusions concerning access- and other road network upgrades are based on this TIA.

4.5.2 Access

Access to the development is proposed from the south from Platinum Drive. The access point is indicated on the SDP.

Sight distances at the proposed access point are satisfactory for development purposes in both the vertical and horizontal alignments. An array of photographs below indicates sight distances at the access point.

Figure 11: Eastern view along Platinum Drive at the proposed access point.

Figure 12: Western view along Platinum Drive at the proposed access point.

4.5.3 Access configuration

In accordance with the TIA, the access configuration for the access on Platinum Drive shall be a full access with stop control from the development. The concept design below depicts the access configuration and is also provided as addendum.

4.5.4 Park Road upgrades and traffic circle

In accordance with the TIA, Park Road shall be upgraded with a single land traffic circle at the intersection of Park Road and Platinum Drive. The current intersection provides for a substandard T-junction from Platinum Drive onto Park Road (photograph below). The concept design below provides a layout drawing of the proposed upgrades. The design of the traffic circle shall accommodate a future second lane in the circle and future dual lanes in all approaches and departures.

Figure 13: Existing intersection of Platinum Drive and Park Road, future traffic circle

4.5.5 Standards and Design Criteria

Standards and design criteria for the access point and other road upgrades required are as follows:

- Lane widths of between 2.6m and 3.7m, depending on road class
- External roads: Asphalt surfacing 30mm;
- Internal roads: Block paving 60mm;

- Pavement structural materials to be imported from commercial sources;
- Pavement structural design in line with municipal requirements and to be finalised during detail design stage;
- External roads: Minimum radii at bellmouths to be 12m;
- Internal Roads: Minimum radii at bellmouths to be 7m;
- Minimum road grade of 0.4% and camber of 2%.
- Road design life of 20 years.
- Delivery truck and emergency vehicle manoeuvres to be accommodated into access gate layout and internal roads design.

4.5.6 Concept design

The concept design is presented in the following diagram and is attached as addendum to the report. All designs will be workshopped with the municipality up to approval.

Figure 14: Concept design drawing: Roads and access

4.5.7 Parking

As discussed in the TIA, based on the George Integrated Zoning Scheme By-Law (2023), the following parking rates are proposed for apartments and flats:

Land Use	Normal Areas	PT1 Areas
Apartments and Flats	- 1.25 bays per dwelling unit with 2 habitable rooms or less - 1.75 bays per dwelling unit with 3 or more habitable rooms - 0.25 bays per unit for visitors	- 1 bay per dwelling unit with 2 habitable rooms or less - 1.25 bays per dwelling unit with 3 or more habitable rooms - 0.25 bays per unit for visitors

Figure 15: Parking requirements

The site falls in a PT1 zone and is only 400m away from the major bus stop next to the Garden Route mall. Based on the By-Law, the parking requirements for Erf 28005 (PT1 Zone) are summarised in the table below for the proposed land uses:

Unit Type	No. of Units	Parking Required for Residents	Parking Required for Visitors	Total Parking Required
2 bed or less	516	516 bays (1 bay/du)	129 bays (0.25 bay/du)	645 bays
3 bed or more	136	170 (1.25 bays/du)	34 (0.25 bays/du)	204 bays
			TOTAL	**849 bays**

Figure 16: Parking required

A total of 870 parking bays is provided on the SDP and hence exceeds the parking required.

4.6 Public transport & non-motorized transport facilities

The Go George bus service has a major terminal along the Mall Access Road. This terminal is serviced by six bus routes. No additional public transport facilities are required for the proposed development.

The proposed development shall allow for safe and dedicated external pedestrian walkways from the proposed development to link to the bus terminal at the Mall Access Road. Both Platinum Drive and Park Road have existing pedestrian walkways on both sides. This shall be replicated in the new traffic circle.

4.7 Stormwater

4.7.1 Stormwater management plan

An existing municipal stormwater management plan is in existence for the precinct. The proposed development will be performed in line with the existing stormwater

management plan. All stormwater bulk services will be provided and designed in line with the stormwater management plan.

4.7.2 Site layout considerations

The proposed development site drains to the middle of the southern boundary on Platinum Drive. The drainage is indicated diagrammatically on the figure below:

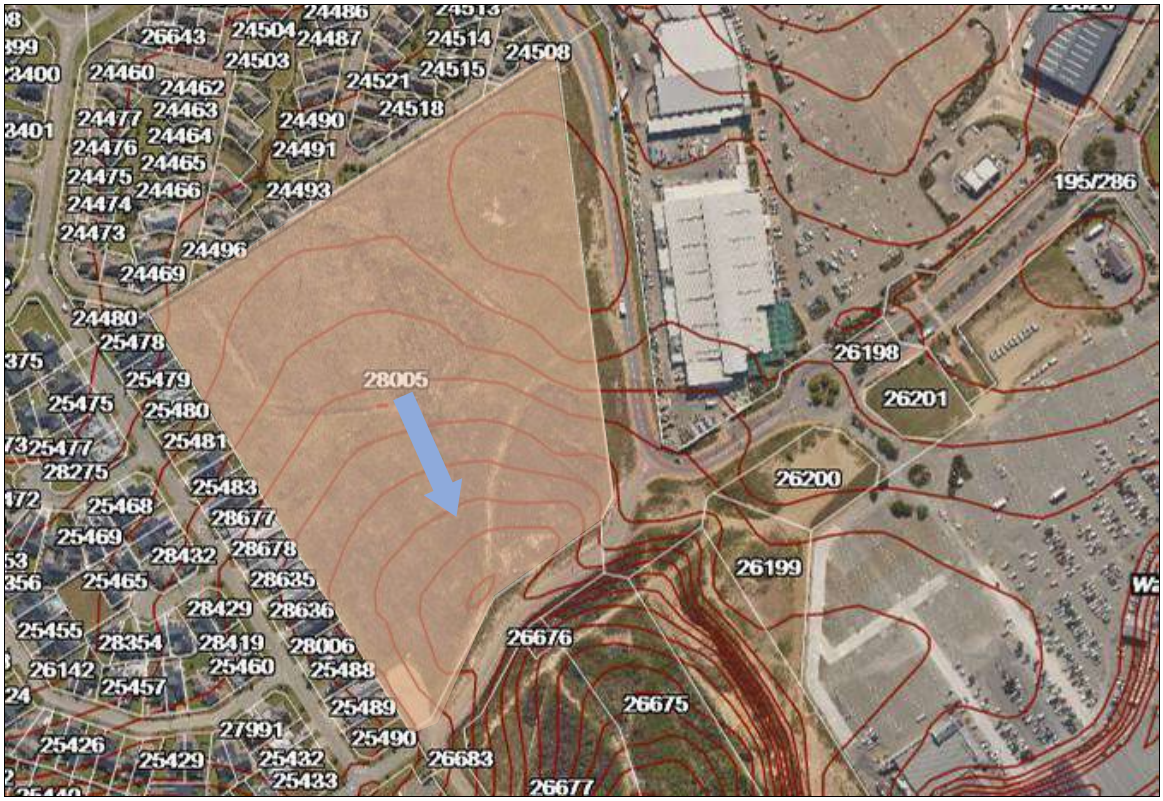


Figure 17: Stormwater drainage

4.7.3 External stormwater drainage

An existing 1250mm pipe culvert has been provided at the lowest point under Platinum Drive. Drainage from the development site will be through this culvert from where it will follow the municipal drainage line (erf 26675) as per the municipal stormwater management plan for the precinct. Drainage will be accumulated into the existing attenuation pond at the bottom of erf 26675. Drainage from the attenuation pond will be into the Meul River.

Figure 18: External stormwater drainage

4.7.4 Design background, standards and criteria

A formal stormwater reticulation system will be required and will be provided by a combination of surfaced parking areas, roadways, kerbs, channels, cut-off drains, strormwater pipes and various minor structures. Energy dissipation will be performed as standard practice with gabion mattresses at all outlets. All pipe outlets will be standard concrete headwalls.

The integrated stormwater and road system form an integral part of layout planning. The system rests on three legs, namely the minor system, the major system and the emergency system. Minor storms and normal flowoff are catered for in the normal road prism and piped system. Major storms are routed through a linked system of road prisms and public open spaces, using attenuation techniques. The emergency system recognizes failure of the minor and major systems and provides for emergency runoff by providing continuous overland flow routes to minimize flooding of residential areas.

The following standards and design criteria are envisaged:

- Minor system designed for 2-year return period and conveyed in a combination of maximum 200m aboveground in the road prism and underground piped system.
- Major system designed for 50-year return period. Difference between the 50 year and 2-year flood to be conveyed in the road prism with depths not exceeding 150mm and into designated public open spaces, using attenuation techniques.
- Minimum gradients for pipelines to allow minimum flow speeds of 0.7m/s at full flow.
- Maximum pipeline flow velocities to be 3.5m/s.

- Stormwater pipes to be 100D as required by specific loadings or installation conditions.
- Bedding to be Class C.
- Minimum cover on pipes to be 800mm.
- Minimum pipe diameter to be 450mm.
- Gabion mattresses to be provided at all outlets for energy dissipation.
- Outlets to be standard concrete headwalls.

All designs will be confirmed with the municipality during the detail design stage.

4.7.5 Concept design

The concept design is presented in the following diagram and is attached as addendum to the report.

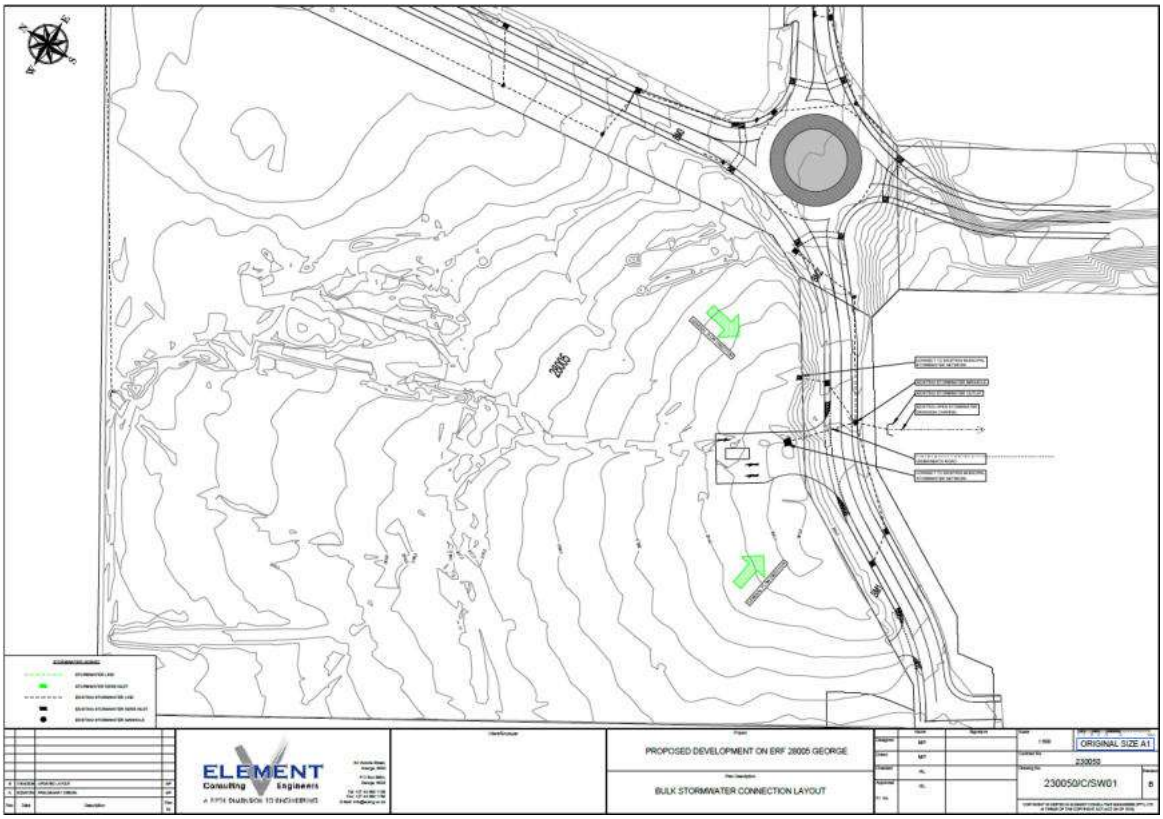


Figure 19: Concept design drawing: Stormwater

4.8 Solid Waste

A formal solid waste collection area is provided on the SDP in line with municipal technical- and public health guidelines. Solid waste will be removed by the George Municipality in line with the services agreement.

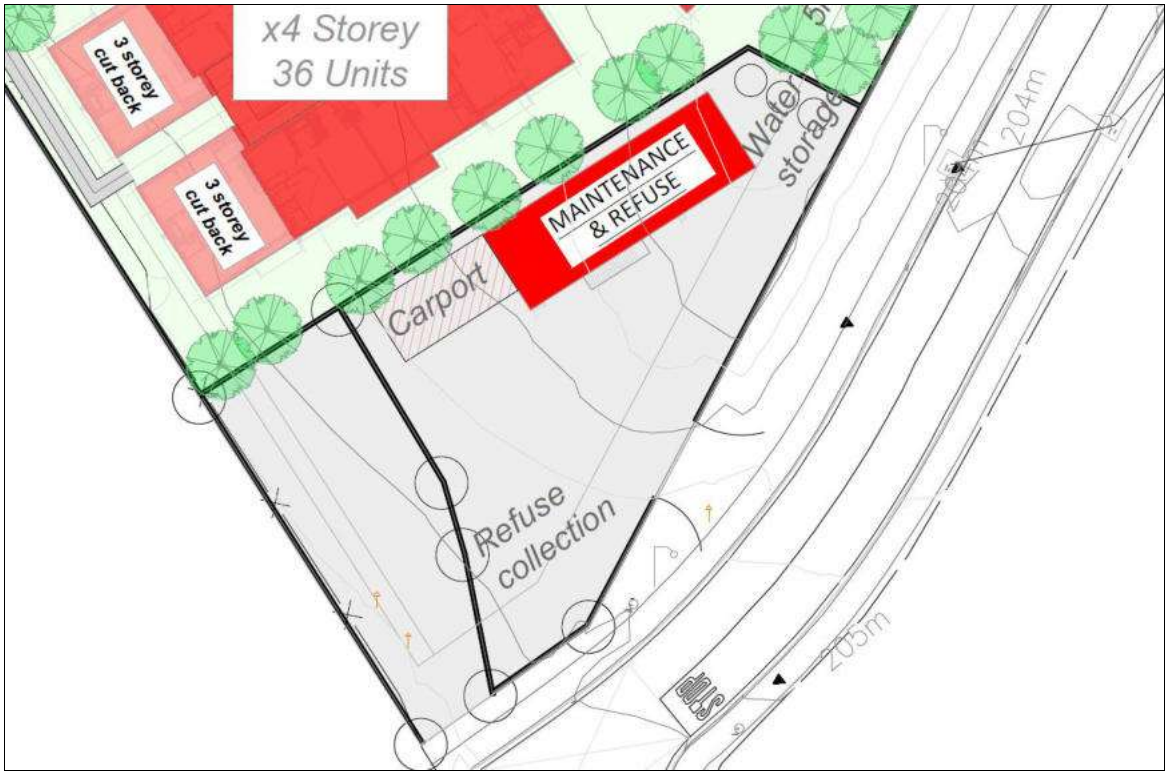


Figure 20: Solid waste collection area

4.9 Bulk Electrical Supply

4.9.1 Existing Electrical Infrastructure

Investigations on site and discussions with the George Municipality indicated that the property will be supplied from the existing 11kV electrical reticulation network, installed on the northern side of Park Road and west of Platinum Drive, between R/S Eden Meander 1 (Ring-Main-Unit) and MS Park Road 3 (minisub). As can be seen from the Network Diagram (presented in the figure below), the existing infrastructure consists of an 11kV, 300mm^2, PILC, Aluminium underground cable (rated for 335A, 6.4 MVA @11kV).

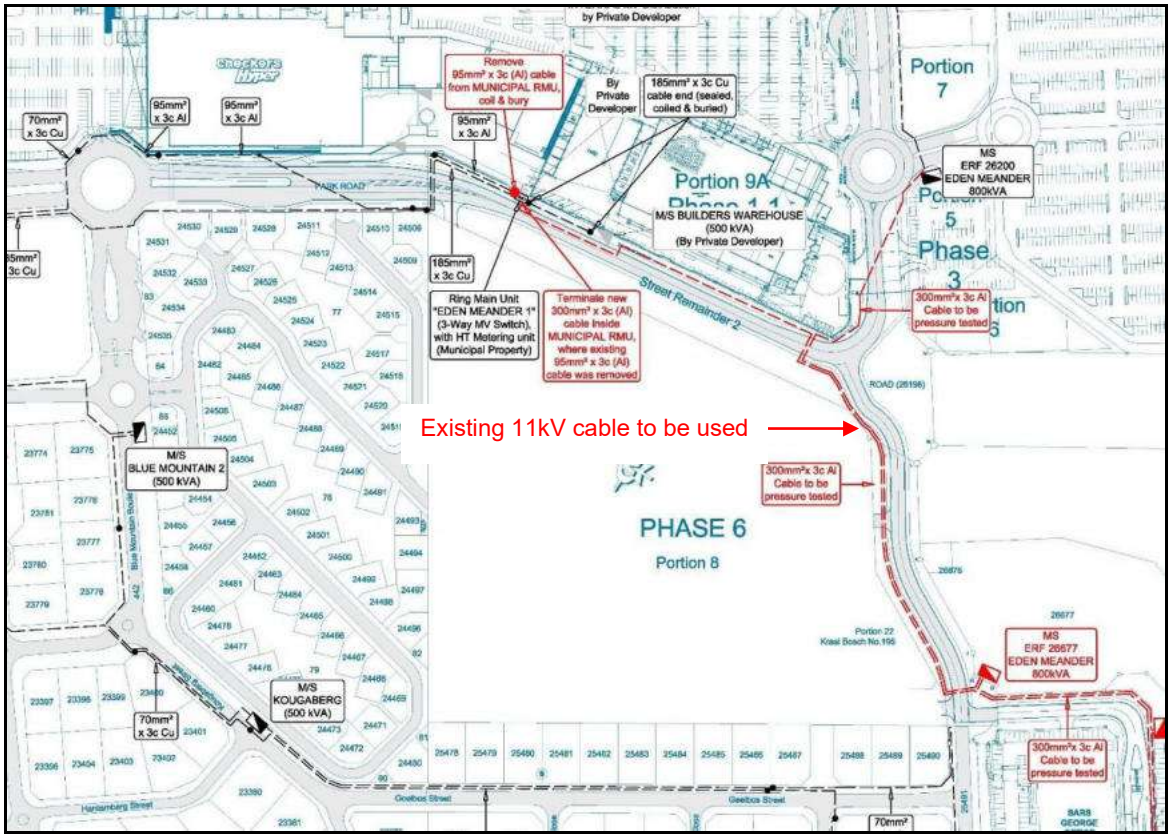


Figure 21: Geographical Layout of Electrical Network in Area

Discussions with municipal officials indicated that the existing medium voltage (MV) infrastructure would be able to accommodate the additional demand of the new development, from a capacity perspective, and that no network strengthening will be required at the supply substation or on the existing MV underground cable network. This statement was confirmed by GLS Infrastructure Planning as documented in their Bulk Power Capacity Assessment Report (see Addendum 3).

A Single Line Diagram of the applicable portion of the electrical network infrastructure has been included in the figure below to indicate how the development will be supplied. The new RMU and minisub, which will be installed as part of the new development, will

tie into the existing 11kV ring network between M/S Platinum Drive 1 (800kVA) and M/S Platinum Drive 2 (800kVA).

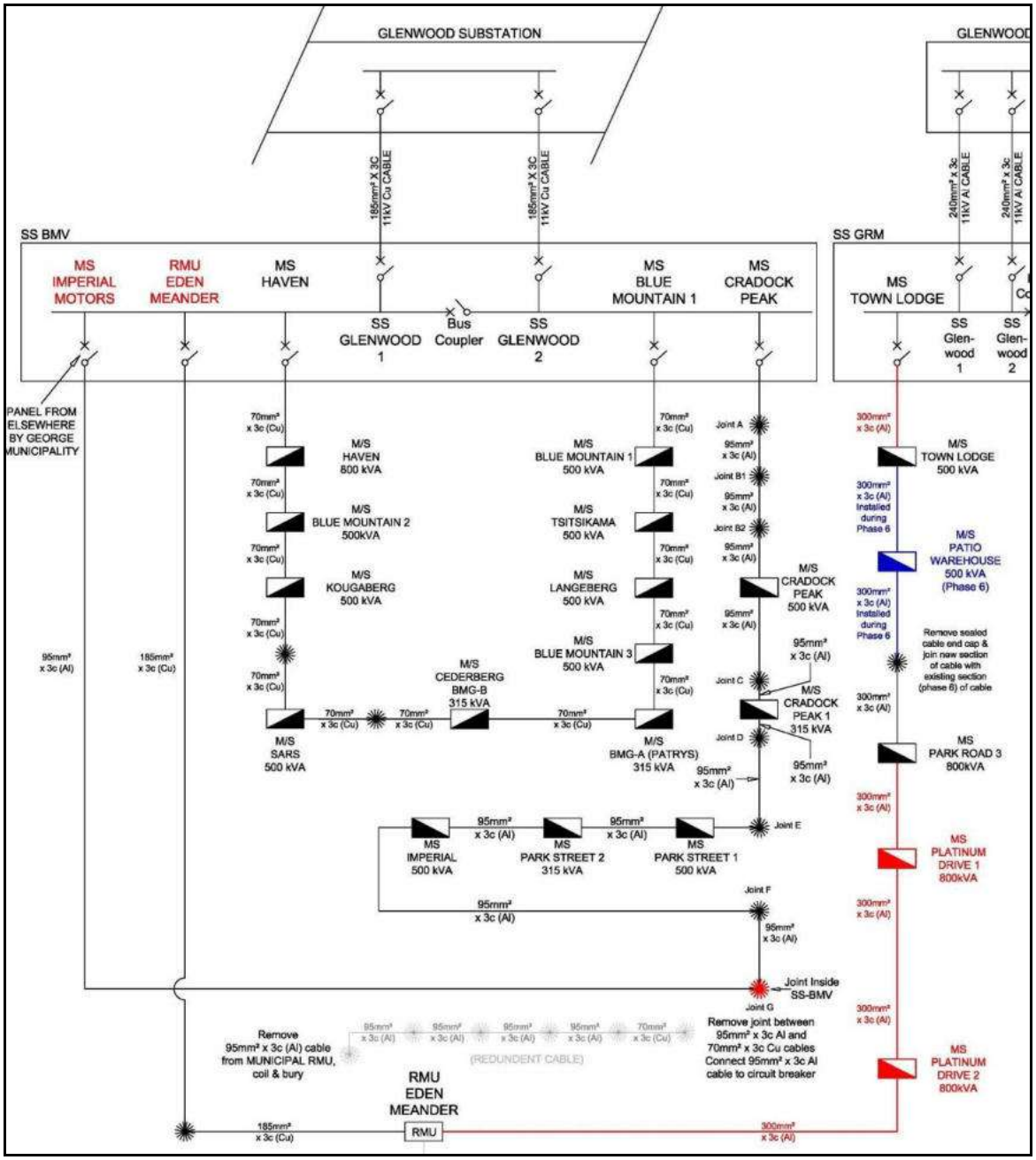


Figure 22: Electrical Network Single Line Diagram

4.9.2 Load Forecast

Based on the proposed Site Development Plan, the following table provides an estimate of the number of units as well as the estimated load per category, based on the area allocated.

The proposed development envisages the development of 680 apartments. Based on load estimates used for other similar developments, the demand for each of the apartments is estimated to be 1.25 kVA/unit. It is very important to note that the

proposed residential development will include a fully incorporated rooftop PV solar and battery energy storage system, as well as an energy efficient design, which will result in these lower than expected energy demand values.

By adding the estimated load for the public facilities, the After Diversification Maximum Demand (ADMD) for the overall development is calculated to be 935 kVA.

Description	No. of Units	Load/unit (kVA)	Total Load (kVA)
High Density Apartments	680	1.25	850
Open Space (Parklands)	1	2	2
Gatehouse & Offices	1	15	15
Clubhouse & Gym	1	50	50
Swimming Pool	1	3	3
Laundry	1	15	15
TOTAL			**935**

Table 4-1: Estimated Load per Category

4.9.3 Medium Voltage (MV) Equipment

Based on the electrical load calculations (as calculated in the previous paragraph), it is estimated that an ADMD of 935 kVA will be required for this development. Since this connection is greater than 500 kVA for a single point load, it qualifies as a Bulk MV Connection Point with the George Municipality and would require the installation of a new 11kV RMU (CCMV configuration). A typical RMU arrangement that will be required is shown in the figure below.

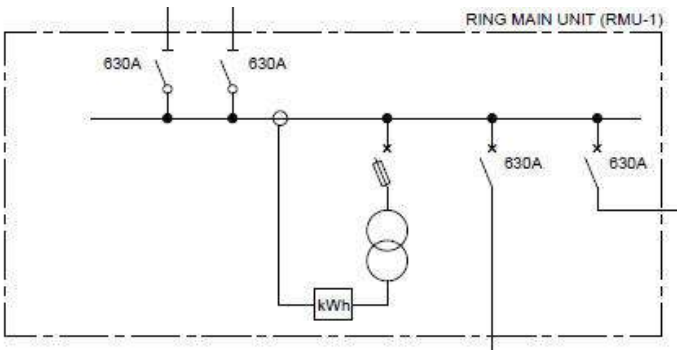


Figure 23: Typical RMU Arrangement (CCMVV)

The proposed new 11kV Ring Main Unit (RMU) for the Meander Lifestyle Apartments development will have to be installed on the boundary of the development with easy access to municipal maintenance personnel. The geographical location of the RMU (relative to the overall development) and other electrical infrastructure will have to be agreed with the Client, to ensure that it provides an optimal solution in terms of the rest of the Site Development Plan.

As can be seen from Figure 23 above, it is important to note that the existing 11kV, 300mm^2, underground cable is installed on the western side of Platinum Drive, which means that if the new RMU for the Meander Lifestyle Apartments will be positioned on the same side of the road no road-drilling and crossing would be required. If the minisub, however, is positioned along the southern side of Park Road, a road crossing and 11kV cable extension (in-out arrangement) will be required, as the existing cable is installed along the northern side of the road.

4.9.4 Battery Limits

The “battery limits” in terms of responsibility will be the outgoing terminals of the 11kV circuit breaker inside the RMU. The new 11kV cable from the RMU into the development, as well as the 1000 kVA, 11/0.4 kV step-down transformer will form part of the internal electrical works and is not seen as part of the Bulk MV Connection from the municipality.

The developer will be responsible for all costs, inter alia:

1. Engineering, supply, installation and commissioning of the complete electrical network as per the agreed Bulk Services Report.
2. Capital contributions and deposits are payable by the developer as per the George Guidelines.
3. Any, and all, costs directly related to the development remain the developers’ responsibility.

Once fully installed and commissioned, the new 11kV RMU and associated 11kV cables will be taken over by the George Municipality’s Electrical Department (as part of their MV network infrastructure) for operation and maintenance purposes. All downstream MV and LV infrastructure, will remain the property and responsibility of the Client (Meander Lifestyle Apartments).

4.9.5 Installation and Earthing

The RMU will have to be installed on a brick-built plinth, complying with George Municipality standards. An equipotential platform earthing arrangement will be required at the RMU as per the details provided below.

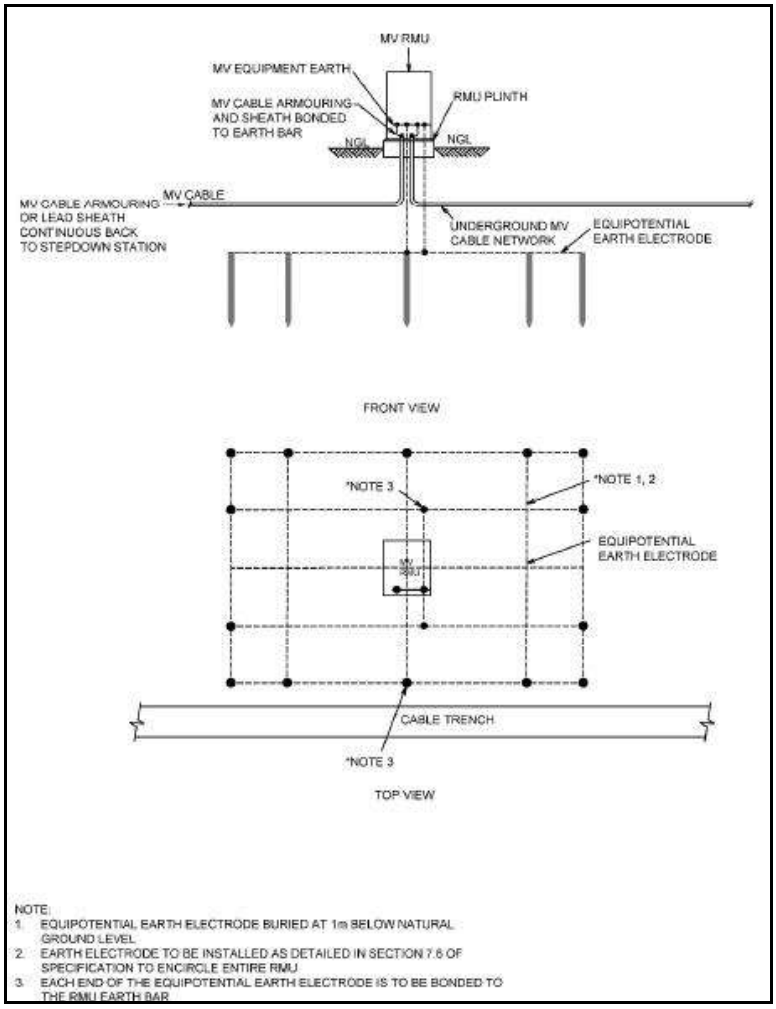


Figure 24: Earthing of RMU

4.9.6 Metering Equipment

A 4-quadrant, 4-wire energy meter (as per the municipality's standards) will be installed as part of the RMU's metering compartment, complete with AMR functionality. Metering CTs used shall be multi-ratio, with an accuracy class of 0.2 and a secondary rating of 5A.

The costs associated with the supply and installation of this meter will be carried by the Developer. Based on the load requirements, the new development will be treated as a Bulk MV Customer and a TOU Tariff structure will be applied.

4.9.7 Small Scale Embedded Generation

It should be noted that the George Municipality has an SSEG Policy that is strictly enforced, should the developer consider the installation of any form of own generation, such as PV Solar and/or Battery Energy Storage on site. A separate application and approval process will have to be completed as part of this installation.

4.9.8 Municipal Approval

The proposed project was presented to the George Municipality's Electrical Department and their Pre-Tech Planning Meeting. During this meeting all of the high-level planning concepts for the electrical supply to the project were discussed and agreed upon. Discussions with municipal officials indicated that the existing medium voltage (MV) infrastructure would be able to accommodate the additional demand of the new development, from a capacity perspective, and that no network strengthening will be required at the supply substation or on the existing MV underground cable network. This statement was confirmed by GLS Infrastructure Planning as documented in their Bulk Power Capacity Assessment Report (see Addendum).

The outcome of this meeting concluded that the George Municipality's Electrical Department agrees that the required capacity is available on their existing MV network infrastructure and that no additional network strengthening would be required to accommodate this development.

A copy of this Bulk Services Report will need to be submitted to the Municipality's Electrical Department for formal approval.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1 Conclusions

The following conclusions can be reached from the bulk engineering services report for the proposed development of the new Meander Lifestyle Apartments on Erf 28005, George:

1. Erf 28005 is part of the larger Eden Meander precinct of which a significant percentage of development has successfully been completed over the past decade.
2. The project proposes the development of 680 residential apartments, complete with a gatehouse and leasing office, clubhouse, gym facility, multi-purpose sports fields, parklands and communal laundry.
3. The proposed development is located on Erf 28005, George. The site is bound to the south by Platinum Drive, to the east by Park Road and to the north and west by existing residential development. Access to the proposed development is obtained from the south from Platinum Drive.
4. The proposed development will be performed in line with an existing services agreement with the George Municipality in terms of the external and bulk services. All external and bulk services is or will be provided and designed in line with the services agreement.
5. Water:
    a. The Average Annual Daily Demand (AADD) for this proposed development is estimated at approximately 127.5kl/day. Peak factors will be considered during the detail design stage of the project.
    b. Bulk water is available for this development in accordance with the existing services agreement and new discussions with the local municipality. Letters of confirmation from George Municipality, as well as GLS, are attached as addendum.
    c. An existing municipal bulk water connection for this erf has been provided on Platinum Drive on the southern boundary of the site on the existing 160mm uPVC class 12 bulk line.
    d. No upgrades will be required to the municipal bulk water network, as confirmed in the letters of both George Municipality and GLS.
6. Sewer:
    a. The proposed development site drains to the middle of the southern boundary on Platinum Drive.
    b. The Average Dry Weather Flow (ADWF) of the development, in line with accepted design criteria and standards, can be calculated and estimated as 102.0kl/day. The design peak flow, inclusive of a specified peak factor

of 3.5 and 15% extraneous flow, will be calculated during detail design stage.

c. Bulk WWTW treatment capacity is available for this development in accordance with the existing services agreement and new discussions with the local municipality.
d. Capacity in the bulk network is mostly available; a number of upgrades are required and specified in the approval letters (and discussed in the report). Letters of confirmation from George Municipality, as well as GLS, are attached as addendum.
e. The site is serviced by an existing 160mm municipal sewer connection on the lowest point of the erf on the southern boundary of the site on Platinum Drive.

7. Roads & access
    a. An updated Traffic Impact Assessment (TIA) has been performed by ITS (ITS – April 2026) and shall be studied in parallel to this report. Conclusions concerning access- and other road network upgrades are based on this TIA.
    b. Access to the development is proposed from the south from Platinum Drive. The access point is indicated on the SDP.
    c. Sight distances at the proposed access point are satisfactory for development purposes in both the vertical and horizontal alignments.
    d. A single lane traffic circle shall be provided at the intersection of Park Road and Platinum Drive. The design of the traffic circle shall accommodate a future second lane in the circle and future dual lanes in all approaches and departures.
    e. The site falls in a PT1 zone and is only 400m away from the major bus stop next to the Garden Route Mall. Based on the By-Law, the parking requirements for Erf 28005 (PT1 Zone) amount to 849 bays. A total of 870 parking bays is provided on the SDP and hence exceeds the parking required.
    f. The Go George bus service has a major terminal along the Mall Access Road. This terminal is serviced by six bus routes. No additional public transport facilities are required for the proposed development.
    g. The proposed development shall allow for safe and dedicated external pedestrian walkways from the proposed development to link to the bus terminal at the Mall Access Road. Both Platinum Drive and Park Road have existing pedestrian walkways on both sides. This shall be replicated in the new traffic circle.
8. Stormwater:
    a. An existing municipal stormwater management plan is in existence for the precinct. The proposed development will be performed in line with the existing stormwater management plan. All stormwater bulk services will be provided and designed in line with the stormwater management plan.

b. The proposed development site drains to the middle of the southern boundary on Platinum Drive.
c. An existing 1250mm pipe culvert has been provided at the lowest point under Platinum Drive. Drainage from the development site will be through this culvert from where it will follow the municipal drainage line (erf 26675) as per the municipal stormwater management plan for the precinct. Drainage will be accumulated into the existing detention pond at the bottom of erf 26675. Drainage from the detention pond will be into the Meul River.

9. Solid Waste:
    a. A formal solid waste collection area is provided on the SDP in line with municipal technical- and public health guidelines. Solid waste will be removed by the George Municipality in line with the services agreement.
10. Bulk Electrical Supply
    a. It has been confirmed with the George Municipality's Electrical Department that sufficient capacity is available on the existing 11kV reticulation network infrastructure from the George Municipality to supply the estimated load of 935 kVA demand for the Meander Lifestyle Apartments development.
    b. A new 11kV Ring Main Unit and bulk energy metering unit will have to be provided on the erf boundary and will be dedicated for this development. The new RMU will be cut into the existing 11kV cable network, running along the northern side of Park Road.
    c. All of the required new bulk infrastructure will be for the developer's cost but will be taken over by the George Municipality, after the completion of the project, to form part of their existing MV infrastructure in terms of future operations and maintenance. For this reason, the design of the electrical network equipment will be such that it complies with the standards and specifications prescribed by the George Municipality.

With reference to all of the conclusions above, it can holistically be concluded that the proposed development can be designed and constructed to acceptable specifications and standards from an external and bulk engineering services design perspective.

5.2 Recommendations

With reference to the conclusions above, the following are recommended:

1. That all conceptual and preliminary design specifications and standards be accepted and approved.
2. That all detail designs be performed to the satisfaction of the local municipality in line with the proposals contained in the report.
3. That all designs be performed, supervised and signed off by a suitably qualified, experienced and registered professional engineer.

It is the holistic recommendation that the proposed development be approved from an external and bulk engineering services design perspective.

6 ADDENDA

6.1 Addendum 1 – Site Development Plan

6.2 Addendum 2 – Concept design drawings

6.3 Addendum 3 – Bulk Water & Sewer Letter (GLS)

6.4 Addendum 4 – Bulk Power Capacity Assessment Report (GLS)

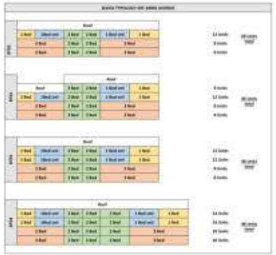
6.5 Addendum 5 – Confirmation Letters: George Municipality

ADDENDUM 1

SITE DEVELOPMENT PLAN

GEORGE ERF 28005

RIVERSIDE VIEW EXTENSION 41 - ERF 5924 (PHASE)



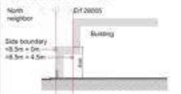
SITE PLAN
Scale 1:750 @ A0

PARKING CALCULATIONS

BUILDING	UNIT COUNT PB FOR UNIT	UNIT COUNT PB VISITORS	PARKING COUNT Parking req	QTY OF BUILDINGS	TOTAL PB REQ
36 Unit - 4 Storey	36	9	45	10	450
40 Unit - 4 Storey	40	10	50	8	400
				TOTAL PARKINGS REQUIRED	850
				TOTAL PARKINGS PROVIDED	870

1 PB PER UNIT + 0.25 PB PER UNIT FOR VISITORS

CURRENT RIGHTS - BUSINESS 1

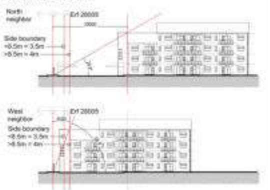


CURRENT RIGHTS UNDER BUSINESS 1
Max Coverage - 100%
Max FAR - 3
Street Building lines
- Street 0m building line
- Street 8m from public street centre line (requested)

Side Building line
- <8.5m = 0m building line
- >8.5m = 4.5m building line

Max Height - 15m to top of roof

PROPOSED RESIDENTIAL 4



PROPOSED RIGHTS UNDER RES4
Max Coverage - 60%
Max FAR - 2
Street Building lines
- Street 5m building line

Side Building line
- <8.5m = 3m building line
- >8.5m = 4.5m building line

Max Height - 15m to top of roof

SCHEDULE OF RIGHTS ERF 28005, GEORGE

ERF	28005	SITE AREA	[illegible] m²
TOWNSHIP	Erf 28005, Portion of erf 28004, GEORGE	TITLE DEED	[illegible]
TOWN PLANNING SCHEME	GEORGE IZS 2023	AMENDMENT SCHEME NO	
USE ZONE		ANNEXURE NO	

PERMISSIBLE	CONTROL	PROPOSED
4 STOREYS	HEIGHT	4 STOREY
15 METER	HEIGHT OF BUILDING	15 METER
60%	COVERAGE	[illegible]
[illegible]		[illegible]
2	FAR	[illegible]
[illegible]		[illegible]
[illegible]	NO.OF UNITS	[illegible]
[illegible]	PARKINGS	[illegible]

Locality plan
N.t.s

NOTES

PAGE SIZE - A0

FOR INFORMATION

REVISIONS

REV	DATE	DESCRIPTION
A	2026-03-20	FOR INFO

CONSULTANT

CLIENT
CENTURY PROPERTY DEVELOPMENTS

PROPERTY DESCRIPTION
ERF 28005 PORTION OF ERF 28004
GEORGE

PROJECT TITLE
GEORGE 28005

DRAWING TITLE
SITE DEVELOPMENT PLAN

SCALE	DATE	DRAWN	CHECKED
AS SHOWN	2025-09-24	RVN	JC
PROJ. NO.	DWG. NO.		REV
2600	1000-SDP		A

ADDENDUM 2

CONCEPT DESIGN DRAWINGS

Rev.	Date	Description	Rev. by
D	17/04/2026	UPDATED LAYOUT	MP
C	2023/12/08	REVISED ACCESS LAYOUT ON PARK DRIVE	MP
B	2023/12/05	ADDRESSED COMMENTS FOR SUBMISSION	MP
A	2023/07/10	PRELIMINARY DESIGN	MP

ELEMENT Consulting Engineers
A FIFTH DIMENSION TO ENGINEERING
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George, 6529
Tel: +27 44 884 1138
Fax: +27 44 884 1185
E-Mail: info@eceng.co.za

Client/Employer

Project

PROPOSED DEVELOPMENT ON ERF 28005 GEORGE

Plan Description

ROADS AND ACCESS LAYOUT

	Name	Signature
Designed	MP	
Drawn	MP	
Checked	HL	
Approved	HL	
Pr. No.		

Scale 1:750

ORIGINAL SIZE A1

Contract No. 230050

Drawing No. 230050/C/R01

Revision D

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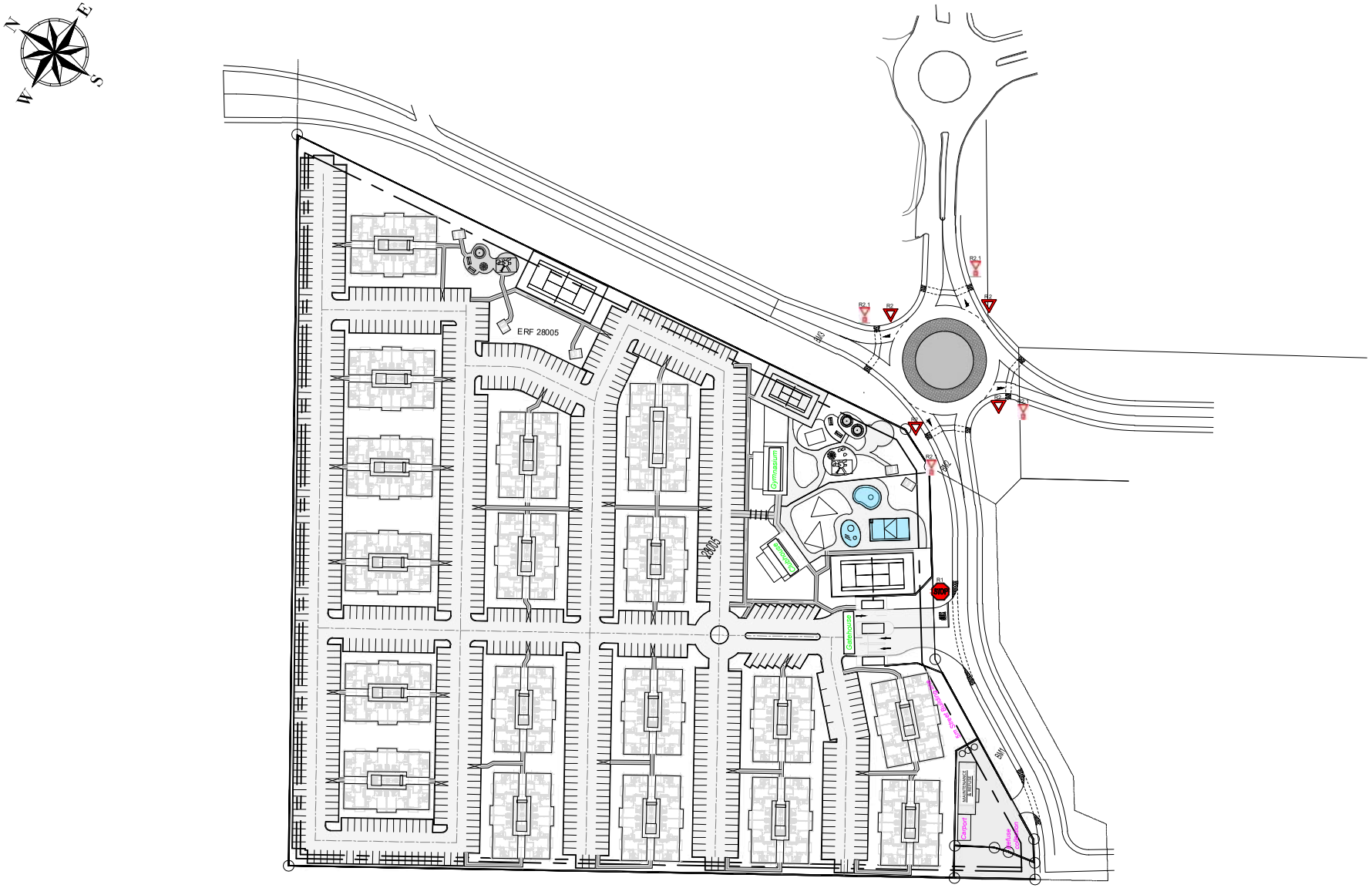

Rev.	Date	Description	Rev by
C	17/04/2026	UPDATED LAYOUT	WVDM
B	2023/12/08	REVISED ACCESS LAYOUT ON PARK DRIVE	MP
A	2023/12/05	FOR APPROVAL	MP

ELEMENT Consulting Engineers
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Fax: +27 44 884 1185
E-Mail: info@eceng.co.za

Client/Employer

Project

MAKRO GEORGE

Plan Description

ROAD SIGNAGE LAYOUT

	Name	Signature
Designed	MP	
Drawn	MP	
Checked	HL	
Approved	HL	
Pr. No.		

Scale: 1:750

ORIGINAL SIZE A1

Contract No.: 230050

Drawing No.: 230050/C/R02

Revision: C

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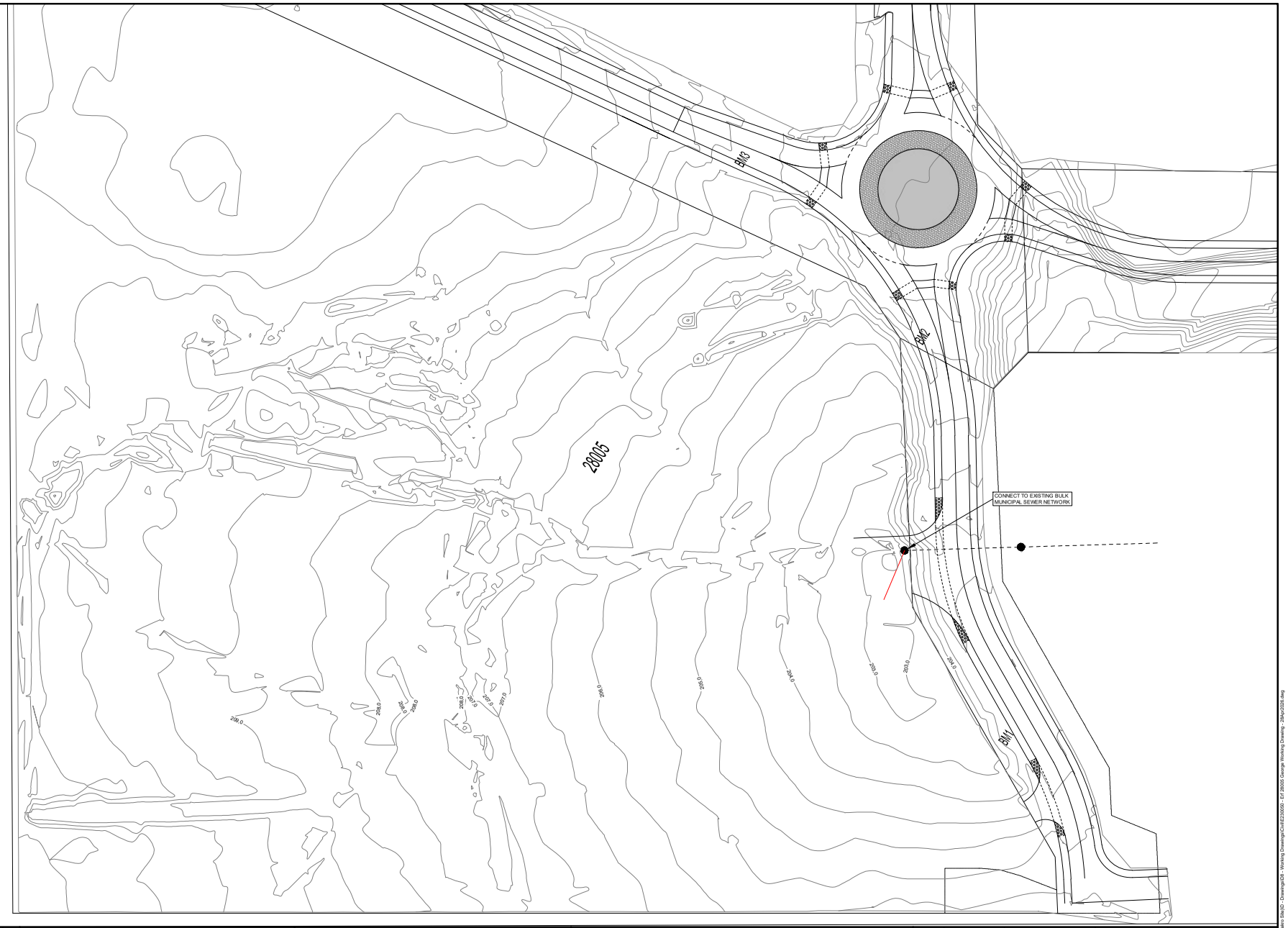

SEWER LEGEND

- SEWER ERF CONNECTION
- SEWER MANHOLE
- EXISTING SEWER LINE
- EXISTING SEWER MANHOLE

Rev.	Date	Description	Rev. by
B	17/04/2026	UPDATED LAYOUT	MP
A	2023/07/04	PRELIMINARY DESIGN	MP

ELEMENT Consulting Engineers
A FIFTH DIMENSION TO ENGINEERING

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Fax: +27 44 884 1185
E-Mail: info@eceng.co.za

Client/Employer

Project

PROPOSED DEVELOPMENT ON ERF 28005 GEORGE

Plan Description

BULK SEWER CONNECTION LAYOUT

	Name	Signature
Designed	MP	
Drawn	MP	
Checked	HL	
Approved	HL	
Pr. No.		

Scale: 1:500

ORIGINAL SIZE A1

Contract No.: 230050

Drawing No.: 230050/C/S01

Revision: B

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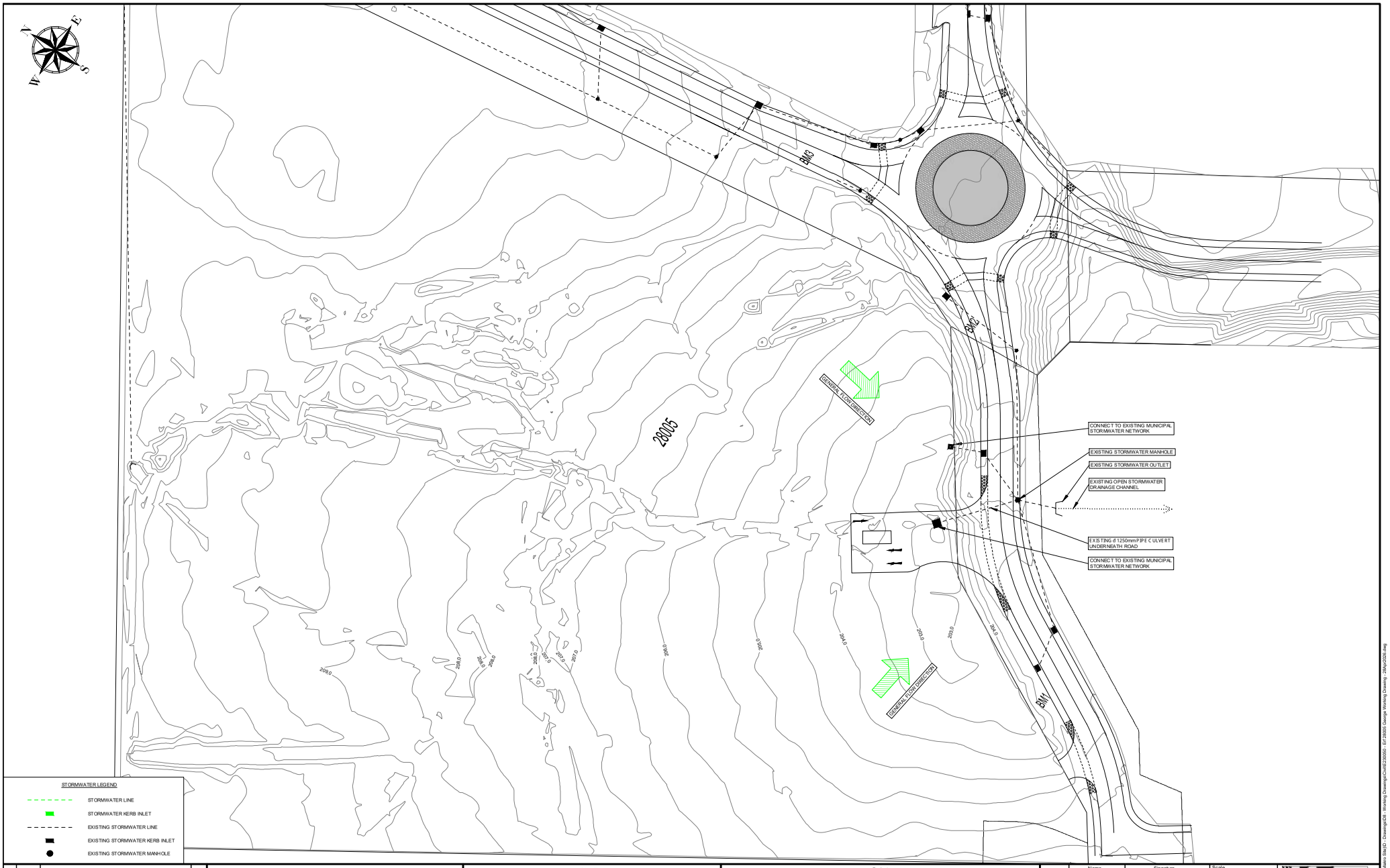
D:\ECE\E230050 - Erf 28005 Century George, Old Metro Site\2D - Drawings\Civil\E230050 - Erf 28005 George Working Drawing - 230x210.dwg



STORMWATER LEGEND

- STORMWATER LINE
- STORMWATER KERB INLET
- EXISTING STORMWATER LINE
- EXISTING STORMWATER KERB INLET
- EXISTING STORMWATER MANHOLE

Rev.	Date	Description	Rev by
B	17/04/2026	UPDATED LAYOUT	MP
A	2023/07/04	PRELIMINARY DESIGN	MP

ELEMENT Consulting Engineers
A FIFTH DIMENSION TO ENGINEERING

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P O Box 9962, George, 6529
Tel: +27 44 884 1138
Fax: +27 44 884 1185
E-Mail: info@eceng.co.za

Client/Employer

Project

PROPOSED DEVELOPMENT ON ERF 28005 GEORGE

Plan Description

BULK STORMWATER CONNECTION LAYOUT

	Name	Signature
Designed	MP	
Drawn	MP	
Checked	HL	
Approved	HL	
Pr. No.		

Scale: 1:500

ORIGINAL SIZE A1

Contract No.: 230050

Drawing No.: 230050/C/SW01

Revision: B

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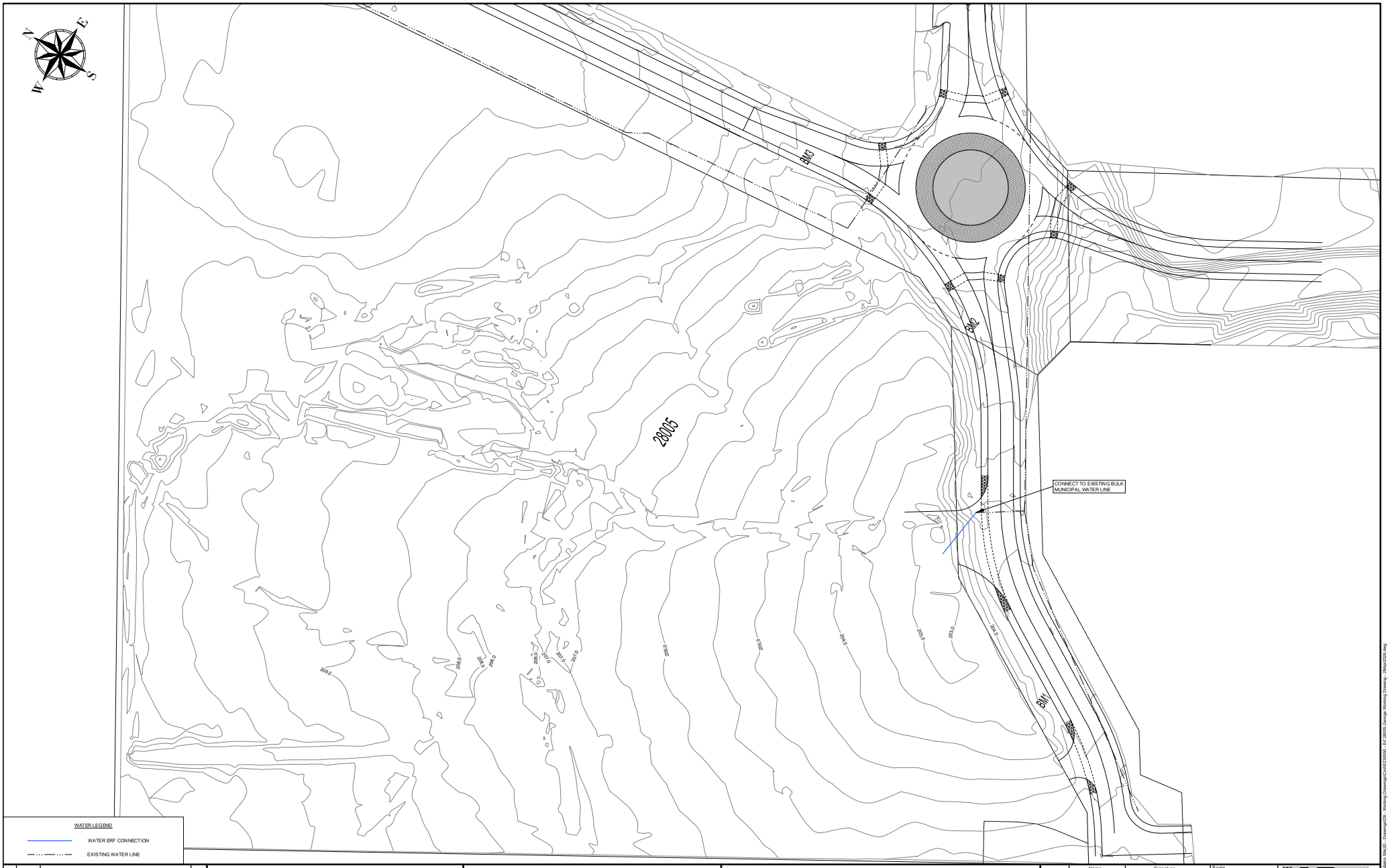
P:\230050\230050 - Erf 28005 Century Georgia (Old Metro Site)\3 - Drawings\3A - Working Drawings\Civil\230050 - Erf 28005 George Working Drawing - 24Apr2026.dwg



WATER LEGEND

WATER ERF CONNECTION

EXISTING WATER LINE

Rev.	Date	Description	Rev. by
B	17/04/2026	UPDATED LAYOUT	MP
A	2023/07/04	PRELIMINARY DESIGN	MP

ELEMENT Consulting Engineers
A FIFTH DIMENSION TO ENGINEERING

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Client/Employer

Project

PROPOSED DEVELOPMENT ON ERF 28005 GEORGE

Plan Description

BULK WATER CONNECTION LAYOUT

	Name	Signature
Designed	MP	
Drawn	MP	
Checked	HL	
Approved	HL	
Pr. No.		

Scale 1:500

ORIGINAL SIZE A1

Contract No. 230050

Drawing No. 230050/C/W01

Revision B

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P:\230050\230050 - Erf 28005 Century George, Old Metro Site\2D - Drawings\Civil\230050 - Erf 28005 George Working Drawing - 230x210.dwg

ADDENDUM 3

BULK WATER & SEWER LETTER (GLS)

Infrastructure planning

19 November 2025

Director: Civil and Technical Services
George Municipality
PO Box 19
GEORGE
6530

ATTENTION: Ms Lindsay Mooiman

Ma'am,

WATER AND SEWER MASTER PLANS: DEVELOPMENT OF PROPOSED TOWNSHIP/REZONING – GEORGE ERF 28005

The request from Element Consulting Engineers (Hannes Lourens) dated 10 June 2025 with regards to accommodating the proposed development in the George water and sewer systems has reference.

This report is a technical report stating upgrades required in the water and sewer networks in the vicinity of the proposed development. The George Municipal engineering professional (yourself) will make a final decision on works to be implemented by the proposed development.

GLS Consulting (Pty) Ltd
Reg no: 2007/003039/07

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Head office: 15 Termo Lane, Techno Park, Stellenbosch, 7600, ZA | PO Box 814, Stellenbosch, 7599, ZA
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Directors: P.C. du Plessis, T. Mokoena

1 INTRODUCTION

1.1 Brief

This report is a technical report stating upgrades required in the water and/or sewer networks in the vicinity of the proposed development. The George Municipal engineering professional (yourself) will make a final decision on works to be implemented by the proposed development.

The latest master plans used in this analysis were the m2025-06 master plans.

1.2 Disclaimer

The investigation has been performed, and this report has been compiled based on the information made available to GLS. All efforts, within budget constraints, have been made during the gathering of information to ensure the highest degree of data integrity. The information supplied to GLS by George Municipality and other Consultants at the outset of this assessment is assumed to be the most accurate representation of the existing system up to date hereof.

GLS hereby confirms that any contributions of the developer to the required construction of infrastructure and/or the upgrading of existing infrastructure, whether it be in the form of a capital contribution or in the form of constructing sections of new infrastructure, is a matter to be discussed and agreed upon between the developer and the George Municipality.

All costs shown in this report are year 2024/25 Rand value **estimates** and **include** 50% surcharge for P&Gs, contingencies and fees but **exclude** VAT

1.3 Version control

Issue Date	***Type***	***Version***	***Remarks***
2025/10/22	Draft	1	Issued for comments and approval
2025/11/19	Revision	2	Removed bulk pump for water. Added a scenario for sewer bulk.

2 WATER DEMAND & SEWER FLOWS

2.1 *Impact of the proposed development*

The proposed development was taken into consideration in the water master plan as part of the Blue Mountain Village A future development area.

The water demand and sewer return flow contribution of the proposed development is outlined in the table below:

Land Use	Unit of measure (No/100m2/ha…)	No. Units (No/100m2/ha…)	UWD/unit (kL/unit/d)	Sewer ratio (% x UWD)	AADD Inc. UAW (kL/d)	PDDWF Excl. Infilt. (kL/d)
Flats (George & Wilderness) - Very High density Flat units up to 50 m² (Footprint=0.6 and Storeys=2)	unit	680	0.188	80%	127.50	102.00

2.2 *Revised Water Demand*

The combined AADD for the proposed development as originally calculated and used in the analysis of the water distribution network in the master plan was 56,3 kL/d.

The revised AADD, peak flow and fire flow calculated for the proposed development and used in this re-analysis of the water distribution network is 127,5 kL/d.

- Peak flow using a zone peak hour factor of: 3,0‡ = 4,4 L/s
- Fire flow for type: Moderate Risk 1: High rise flats ≥ four storeys[1] = 50 L/s @ 10 m

2.3 *Revised Sewer Flow*

The combined peak day dry weather flow (PDDWF) for the proposed development as originally calculated and used in the analysis of the sewer system in the master plan was 51,9 kL/d.

The revised PDDWF (excluding infiltration) calculated for the proposed development and used in the re-analysis of the sewer system is 102,0 kL/d. The design flow, or instantaneous peak wet weather flow (IPWWF), is 2,8 L/s.

‡ Higher peak flow factors might be applicable for internal networks.

[1] As per Table J17 from Section J – Water Supply of "The Neighbourhood Planning Design Guide" (so called "Red Book").

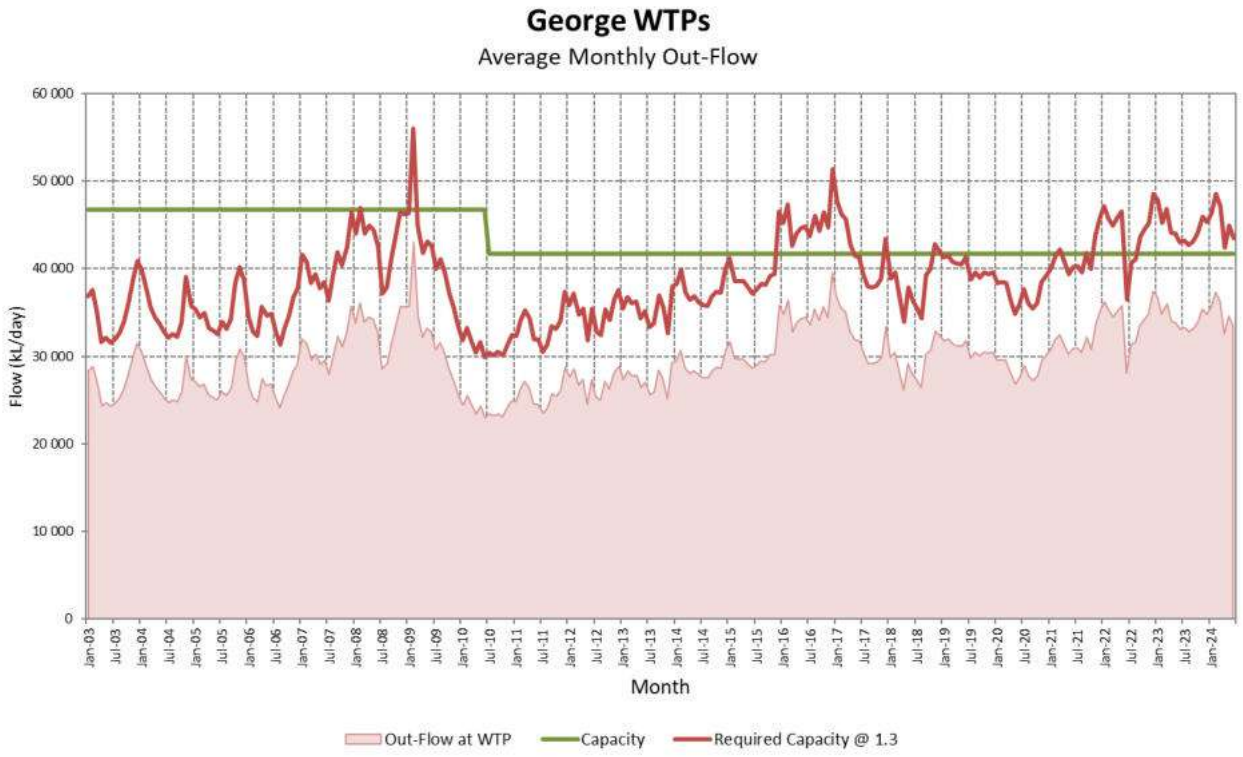
3 WATER DISTRIBUTION NETWORK

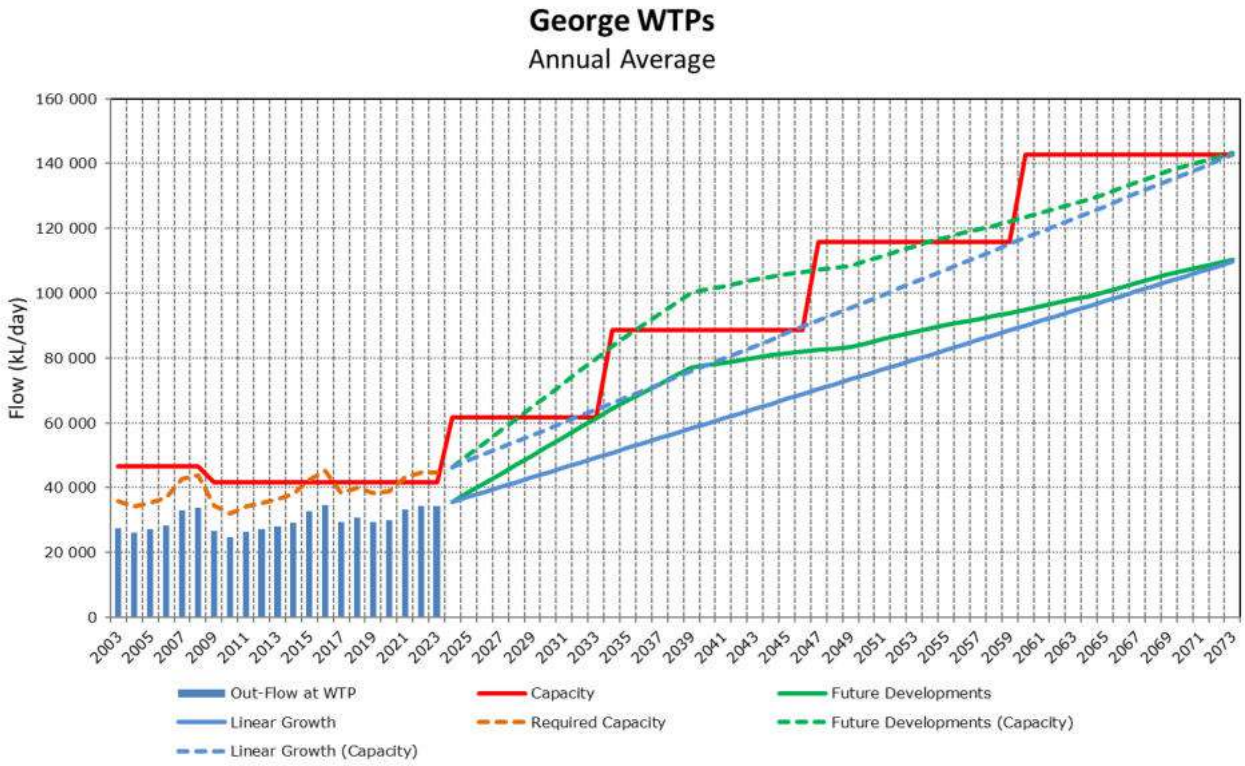
3.1 Water Resources

Water Treatment Plant capacity

The master plan indicates that the proposed development falls in the George Old WTP reservoirs (George Main) zone and supplied from the George WTPs.

The two graph overleaf shows that the design capacity of the George WTPs (green line) has been exceeded by the average monthly required capacity (dark red line) a few times in the last decade. The WTPs are thus operating at risk and needs to be extended.





Based on available information the capacity, present flow and projected short-term flow are as follows:

George WTPs	Capacity	Comment
Existing Capacity	41 700 kL/d	Design capacity 41 700 kL/d
Measured Flow (incl. 1.3 factor)		
Annual Average (2003-2024)	45 158 kL/d	Maximum 2016/17
	-3 458 kL/d	No spare capacity available
Annual Average (2023/24)	44 778 kL/d	Average for 2023/24
	-3 078 kL/d	No spare capacity available
Monthly Average (2003-2024)	56 022 kL/d	February 2009
	-14 322 kL/d	No spare capacity available
Monthly Average (2023/24)	48 556 kL/d	February 2024
	-6 856 kL/d	No spare capacity available
Modelled Flow (incl. 20% water loss and 1.3 factor)		
T_AADD (existing)	46 422 kL/d	m2025-06 MP
	-4 722 kL/d	No spare capacity available
3yr Projection	57 492 kL/d	
	-15 792 kL/d	No spare capacity available
5yr Projection	64 871 kL/d	
	-23 171 kL/d	No spare capacity available

Note: T_AADD: Theoretical Annual Average Daily Demand
The flow projections include all stands that are presently vacant but expected to be occupied over the next 5 years as well as all future areas likely to develop within the next 5 years

3.2 Distribution Zone

The master plan indicates that the proposed development falls in the George Old WTP reservoirs (George Main) zone as shown in **Figure 1 (Water)** attached.

3.3 Categorisation of required upgrades

The items are categorised as follows:

- General system specific MP Items – required to address capacity issues and backlogs in the bulk and reticulation systems serving the proposed development, but not specifically required for the development per sé.
- Development specific MP Items – new additions to (or deviations from) the existing Master Plan, required specifically for the proposed development, as a result of more accurate information relative to the original estimate of future development.

It is important to note that all proposed items are schematic in nature, final size and location is subject to a complete design by a suitably qualified engineer. The final locality in particular is subject to legislative requirements including but not limited to pipes not crossing private stands, no servitudes registered in private stands and no pipes in stands with an area less than 400m².

3.4 Bulk Water Supply

Reservoir storage capacity

One of the main considerations in bulk water supply is reservoir storage capacity and in the assessment of storage capacity, two demand scenarios are considered.

The first (Theoretical Current Demand) scenario represents the demand in the system as it is currently experienced, i.e. it only includes the demand for stands that are developed (vacant stands are ignored), and only due to land use rights currently being exercised. An allowance for 20% water losses is also included in the scenario.

The second (Theoretical Fully Occupied Demand) scenario is the planning scenario and represents the demand of all the existing stands, irrespective of whether they are developed or vacant. Most importantly, the demand is based on the zoning of each stand i.e. the maximum demand allowed for under existing land use rights (known as zoning rights). Ideally the existing system should have sufficient capacity for this scenario which represents all existing development rights. An allowance for 20% water losses is also included in this scenario.

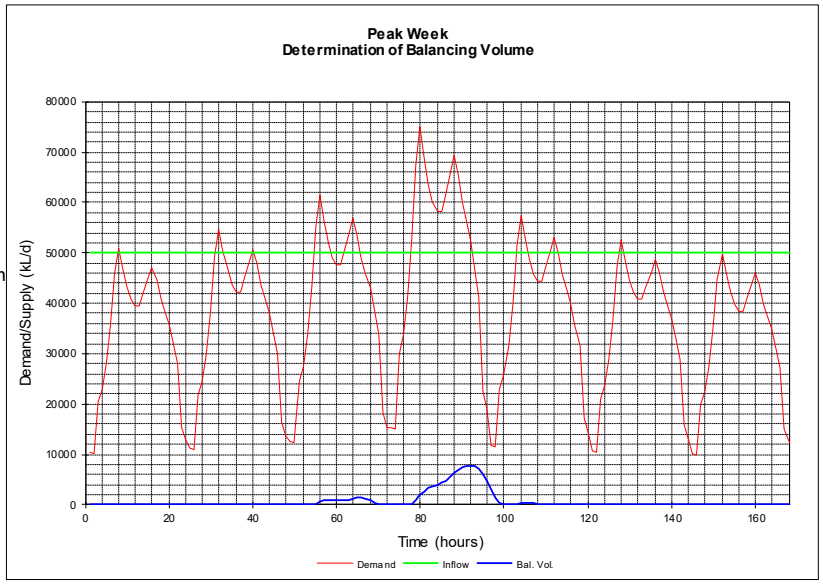
The difference between the two demand scenarios becomes relevant when there is “perceived” spare storage capacity in the Theoretical Current Demand scenario and no storage capacity in the Theoretical Fully Occupied Demand scenario. This means that the storage capacity allotted to all existing stands (in the Theoretical Fully Occupied Demand scenario) is currently not utilised in the Theoretical Current Demand scenario, it is however still committed to the water demands derived from the zoning rights.

Reservoir capacity assessment (Theoretical Current Demand)

The current George Old WTP reservoirs zone AADD plus UAW (Theoretical Current Demand) in the m2025-06 water model is 29 412 kL/d. The capacity of the existing George Old WTP reservoirs is 36 120 kL. The existing FCV The existing FCV has a required flow rate of 579 L/s. Using these three input variables in a reservoir sizing analysis, it shows that the remaining spare capacity is 6 317 kL.

Type in values in shaded cells			
Full zone	29 412	kL/d	
Direct zone	22 082	kL/d	
AADD	**29 412**	kL/d	
PDF	**1.70**	* AADD	
PWF	**1.30**	* AADD	
P3DF	1.42	* AADD	
Supply	**1.70**	* AADD	
=	50 001	kL/d	
=	579	L/s	Pipe @ 1.8m/s
			640 mm
Bal.Vol.	7 720	kL/d	
=	6.3	h*AADD	
			%
Pattern 1	Large zone	Large	**75.1%**
Pattern 2	Small zone	Medium	**0.0%**
Pattern 3	LC Housing	Small	**0.0%**
Pattern 4			**0.0%**
Pattern 5			**0.0%**
Pattern 6			**0.0%**
Pattern 7	Even	To a res.	**24.9%**
Must add up to 100 --> check			100.0%

Res @ Old WTP Site



VOLUME ANALYSIS (applies only to area directly supplied, I.e. not to the Pattern 7 supply)

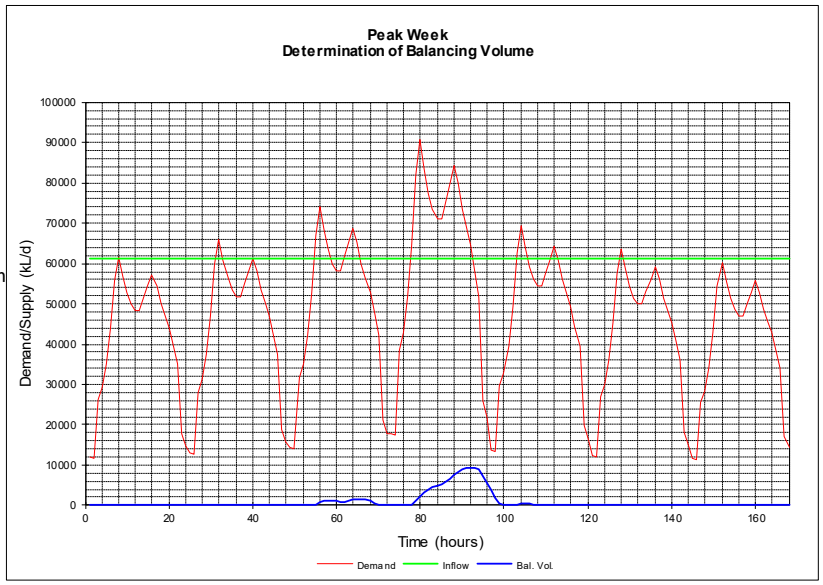
Capacity	**36 120**	kL	=	39.3 h x AADD
Required balancing	7 720	kL	=	8.4 h x AADD
Available volume	28 400	kL	=	30.9 h x AADD
Required emergency	22 082	kL	=	**24.00** h x AADD
Spare capacity	6 317	kL	=	6.9 h x AADD

Reservoir capacity assessment (Theoretical Fully Occupied Demand)

The current George Old WTP reservoirs AADD (Theoretical Fully Occupied Demand) in the m2025-06 water model is 35 947 kL/d. The capacity of the existing George Old WTP reservoirs is 36 120 kL. The existing FCV The existing FCV has a required flow rate of 707 L/s. Using these three input variables in a reservoir sizing analysis, it shows that the remaining spare capacity of 1 269 kL is sufficient to cater for the proposed development.

Type in values in shaded cells			
Full zone	35 947	kL/d	
Direct zone	25 513	kL/d	
AADD	**35 947**	kL/d	
PDF	**1.70**	* AADD	
PWF	**1.30**	* AADD	
P3DF	1.42	* AADD	
Supply	**1.70**	* AADD	
=	61 111	kL/d	
=	707	L/s	Pipe @ 1.8m/s
			707 mm
Bal.Vol.	9 338	kL/d	
=	6.2	h*AADD	
			%
Pattern 1	Large zone	Large	**71.0%**
Pattern 2	Small zone	Medium	**0.0%**
Pattern 3	LC Housing	Small	**0.0%**
Pattern 4			**0.0%**
Pattern 5			**0.0%**
Pattern 6			**0.0%**
Pattern 7	Even	To a res.	**29.0%**
Must add up to 100 --> check			100.0%

Res @ Old WTP Site



VOLUME ANALYSIS (applies only to area directly supplied, I.e. not to the Pattern 7 supply)

Capacity	**36 120**	kL	=	34.0 h x AADD
Required balancing	9 338	kL	=	8.8 h x AADD
Available volume	26 782	kL	=	25.2 h x AADD
Required emergency	25 513	kL	=	**24.00** h x AADD
Spare capacity	1 269	kL	=	1.2 h x AADD

3.4.1 *Existing bulk water system considerations*

Items presented here are for the attention of the George Municipal engineering professional (yourself) so as to highlight existing shortfalls or the imminent potential thereof.

General items required to alleviate existing problems in the bulk water system:

Item No	Description	Extent	Size	Cost	Pro-rata Cost
GMR_B01.01	Water Treatment Facility to construct: New WTP	20 000 m³/d @	254 m EGL	R 304 416 000	R 1 940 652 0.64%
GMR_B01.06	Outflow pipe to install	7 m x	500 mm Ø	R 656 000	R 4 182 0.64%
~~GMR_B01.07d~~	~~Pump Only to install: New WTP PS~~	~~225 L/s @~~	~~55 m~~	R -	R -
			Total	**R 305 072 000**	**R 1 944 834**

George municipal staff have confirmed that there is sufficient pump capacity and an additional pump at the George New WTP bulk pump station is not required.

3.4.2 *Accommodation of the proposed development in the bulk water system*

Development specific items required in the bulk water system:

None

3.5 *Water Reticulation System*

Accommodation of the proposed development, with its revised AADD, requires implementation of the following additions and adjustments to the *existing* water system as indicated in **Figure 1 (Water)**.

3.5.1 *Existing water reticulation system considerations*

Items presented here are for the attention of the George Municipal engineering professional (yourself) so as to highlight existing shortfalls or the imminent potential thereof.

General items required to alleviate existing problems in the water distribution system:

None

3.5.2 *Accommodation of the proposed development in the water reticulation system*

Development specific items required in the water distribution system (**including** fire flow requirements):

None

The proposed connection point to the existing water distribution system is shown in **Figure 1 (Water)**.

3.6 *Internal Reticulation*

The internal network design on the property of the proposed development is beyond the scope of this report. However, the consulting engineer for the development is required to allow for the fire flow demand as listed in 2.2 above on the internal networks.

For internal network design purposes, the water distribution network provides the following energy gradelines (EGLs) at the proposed connection point (see **Figure 1 (Water)**).

Connection Point	Static		Residual		Fire Flow		Ground Level
	EGL (m a.s.l.)	Head (m)	EGL (m a.s.l.)	Head (m)	EGL (m a.s.l.)	Head (m)	(m a.s.l.)
Existing system							
Point A	295.0	91.2	285.4	81.6	274.0	70.2	203.8

3.7 *Adjustments to the Master Plan*

The revised AADD of the proposed development and/or existing issues require the following additions and adjustments to the *master plan*:

3.7.1 Bulk Items

Adjustments to the Master plan:

None

3.7.2 Reticulation Items

Adjustments to the Master plan (**excluding** fire flow):

None

Adjustments to the Master plan (**including** fire flow):

None

4 SEWER CONVEYANCE NETWORK

4.1 Sewer Drainage Area

The master plan indicates that the proposed development falls in the Blue Mountain 1 PS drainage area as shown in **Figure 2 (Sewer)** attached. This drainage area drains to the Outeniqua WWTW.

4.2 Categorisation of required upgrades

The items are categorised as follows:

- General system specific MP Items – required to address capacity issues and backlogs in the bulk and reticulation systems serving the proposed development, but not specifically required for the development per sé.
- Development specific MP Items – new additions to (or deviations from) the existing Master Plan, required specifically for the proposed development, as a result of more accurate information relative to the original estimate of future development.

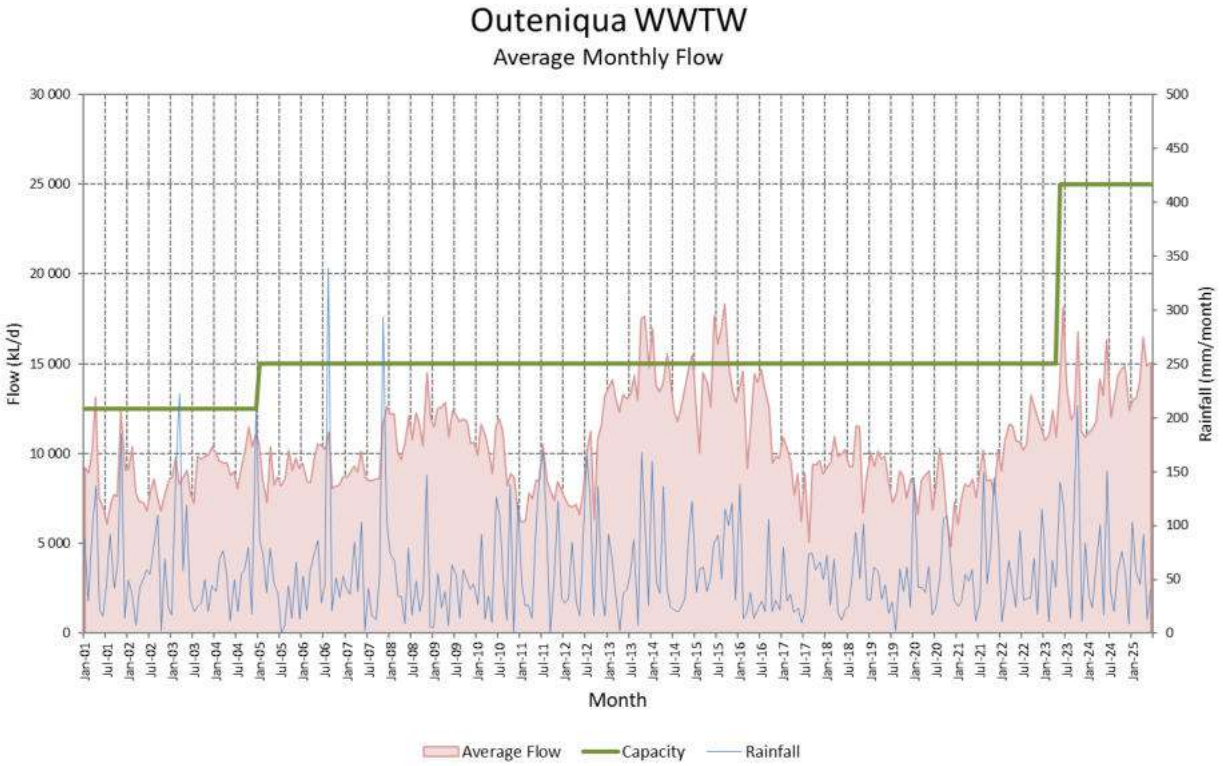
It is important to note that all proposed items are schematic in nature, final size and location is subject to a complete design by a suitably qualified engineer. The final locality in particular is subject to legislative requirements including but not limited to pipes not crossing private stands, no servitudes registered in private stands and no pipes in stands with an area less than 400m^2.

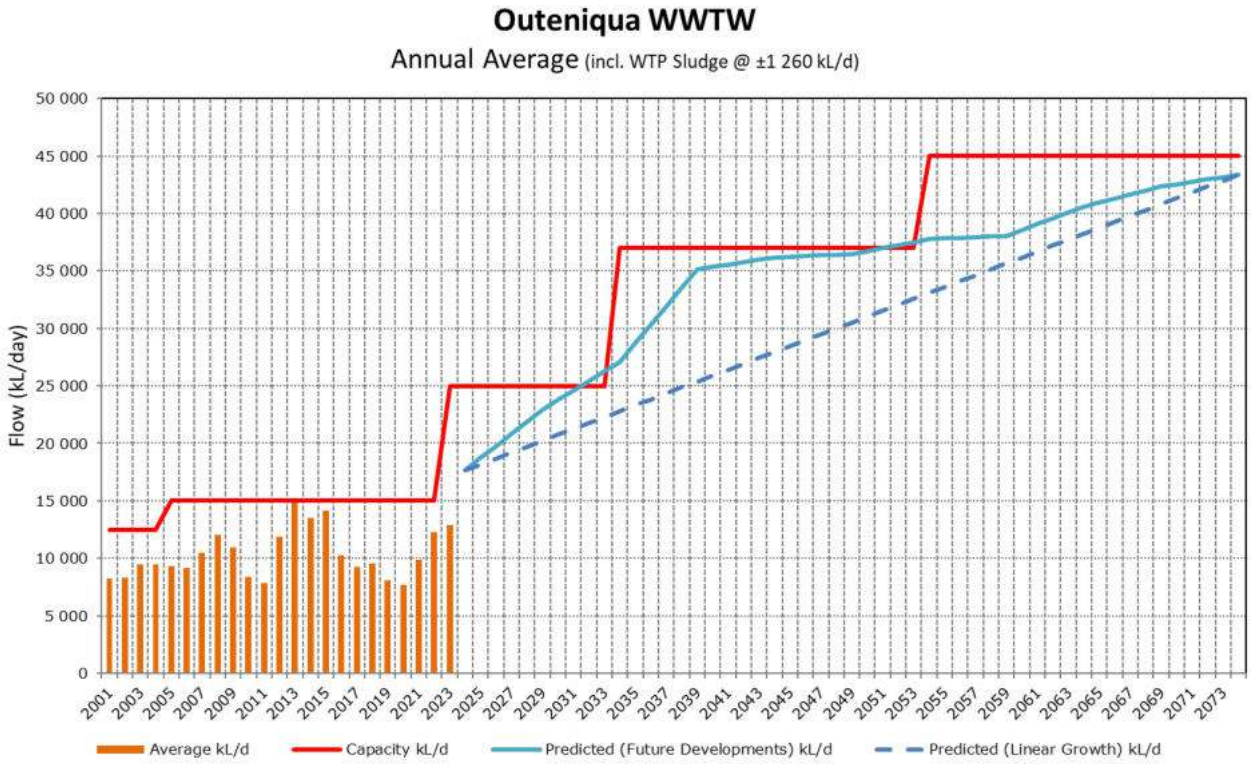
4.3 Bulk Sewer Drainage

Accommodation of the proposed development, with its revised PDDWF, requires implementation of the following additions and adjustments to the existing sewer system as indicated in **Figure 2 (Sewer)**.

Wastewater Treatment Works capacity

The graph overleaf shows that the design capacity of the Outeniqua WWTW (green line) has been exceeded by the Average Monthly Flow (light red shaded area) a few times in the last decade but has since been upgraded. The WWTW is thus not operating at risk and can accommodate the proposed development.


Outeniqua WWTW
Average Monthly Flow
Flow (kL/d)
Rainfall (mm/month)
Month
Average Flow
Capacity
Rainfall


Outeniqua WWTW
Annual Average (incl. WTP Sludge @ ±1 260 kL/d)
Flow (kL/day)
Average kL/d
Capacity kL/d
Predicted (Future Developments) kL/d
Predicted (Linear Growth) kL/d

Based on available information the capacity, present flow and projected short-term flow are as follows:

Outeniqua WWTW	Capacity		Comment
Existing Capacity	25 000	kL/d	Design capacity 25 000 kL/d
Measured Flow			
Annual Average (2001-2025)	14 846	kL/d	Maximum 2013/14
	10 154	kL/d	Spare capacity available
Annual Dry Average (2024/25)	12 635	kL/d	Average for 4 driest months 2024/25
	12 365	kL/d	Spare capacity available
Monthly Average (2001-2025)	18 333	kL/d	September 2015
	6 667	kL/d	Spare capacity available
Monthly Average (2024/25)	16 469	kL/d	April 2025
	8 531	kL/d	Spare capacity available
Modelled Flow			
T_PDDWF (existing)	17 659	kL/d	m2025-09 MP - Incl. WTP sludge flow = 1 260 kL/d
	7 341	kL/d	Spare capacity available
3yr Projection	19 203	kL/d	
	5 797	kL/d	Spare capacity available
5yr Projection	20 232	kL/d	
	4 768	kL/d	Spare capacity available

Note: T_PDDWF: Theoretical Peak Daily Dry Weather Flow (Total Wastewater Flow, Peak day in week)
The flow projections include all stands that are presently vacant but expected to be occupied over the next 5 years as well as all future areas likely to develop within the next 5 years

4.3.1 Existing bulk sewer system considerations

Items presented here are for the attention of the George Municipal engineering professional (yourself) so as to highlight existing shortfalls or the imminent potential thereof.

General items required to alleviate existing problems in the bulk sewer system:

It should be noted that planning is under way to decommission and by-pass three pumping systems that discharge into the Schaapkop outfall system. Which will ease capacity requirements in the interim. The items presented in the table below reflect this scenario.

Item No	MP Type	Description	Existing Diam (mm)	New Diam (mm)	Length (m)	Design Flow	Cost	Pro-rata Cost	
Existing bulk system (from Meul PS to Outeniqua WWTW)									
OT_09.01	MPi	Upgrade existing Gravity (Investigate first)	700	1 050	18	537.8 L/s	R 997 000	R 5 182	0.52%
OT_09.02	MPi	Upgrade existing Gravity (Investigate first)	700	1 050	26	538.3 L/s	R 1 203 000	R 6 246	0.52%
OT_09.04	MPi	Upgrade existing Gravity (Investigate first)	700	900	161	544.3 L/s	R 3 921 000	R 20 134	0.51%
OT_09.03	MPi	Upgrade existing Gravity (Investigate first)	600	1 050	14	630.6 L/s	R 897 000	R 3 976	0.44%
OT_10.01	MP	Upgrade existing Pump Station: Schaapkop PS	-	-	-	649.9 L/s	R 13 937 000	R 59 938	0.43%
OT_10.02	MP	Upgrade existing Rising	500	700	154	649.9 L/s	R 5 862 000	R 25 210	0.43%
OT_10.03	MPi	Investigate existing Gravity	999	1 050	316	651.2 L/s	R -	R -	0.43%
OT_10.04	MPi	Investigate existing Gravity	999	1 050	32	894.9 L/s	R -	R -	0.31%
OT_10.05	MPi	Investigate existing Gravity	999	1 050	9	1 585.7 L/s	R -	R -	0.18%
						Total	**R 26 817 000**	**R 120 687**	

Considering the alternative where the project to decommission these pumping systems is delayed for an interim period, the following items would need to be considered.

Item No	MP Type	Description	Existing Diam (mm)	New Diam (mm)	Length (m)	Design Flow	Cost	Pro-rata Cost	
Existing bulk system (from Meul PS to Outeniqua WWTW)									
OT_09.01	MPi	Upgrade existing Gravity (Investigate first)	700	1 050	18	537.8 L/s	R 997 000	R 5 182	0.52%
OT_09.02	MPi	Upgrade existing Gravity (Investigate first)	700	1 050	26	538.3 L/s	R 1 203 000	R 6 246	0.52%
OT_09.04	MPi	Upgrade existing Gravity (Investigate first)	700	1 050	406	544.3 L/s	R 11 201 000	R 57 518	0.51%
OT_09.03	MPi	Upgrade existing Gravity (Investigate first)	600	1 050	14	630.6 L/s	R 897 000	R 3 976	0.44%
OT_10.01	MP	Upgrade existing Pump Station: Schaapkop PS	-	-	-	649.9 L/s	R 13 937 000	R 59 938	0.43%
OT_10.02	MP	Upgrade existing Rising	500	700	154	649.9 L/s	R 5 862 000	R 25 210	0.43%
OT_10.03	MPi	Investigate existing Gravity	999	1 050	316	651.2 L/s	R -	R -	0.43%
OT_10.04	MPi	Investigate existing Gravity	999	1 050	32	894.9 L/s	R -	R -	0.31%
OT_10.05	MPi	Investigate existing Gravity	999	1 050	9	1 585.7 L/s	R -	R -	0.18%
						Total	**R 34 097 000**	**R 158 070**	

4.3.2 *Accommodation of the proposed development in the bulk sewer system.*

Development specific items required in the bulk sewer system:

None

4.4 *Sewer reticulation system*

Accommodation of the proposed development, with its revised PDDWF, requires implementation of the following additions and adjustments to the *existing* sewer system as indicated in **Figure 2 (Sewer)**.

4.4.1 *Existing sewer reticulation system considerations.*

Items presented here are for the attention of the George Municipal engineering professional (yourself) so as to highlight existing shortfalls or the imminent potential thereof.

General items required to alleviate existing problems in the existing sewer system:

Item No	MP Type	Description	Existing Diam (mm)	New Diam (mm)	Length (m)	Design Flow	Cost	Pro-rata Cost
OT_V06.05	MPi	Upgrade existing Gravity (Investigate first)	160	200	17	11.3 L/s	R 219 000	R 54 169 24.73%
OT_26.01	MP	Upgrade existing Pump Station: Blue Mountain PS 2	-	-	-	10.5 L/s	R 1 692 000	R 450 394 26.62%
OT_47.01	MP	Upgrade existing Pump Station: Blue Mountain PS 1	-	-	-	10.3 L/s	R 1 685 000	R 457 240 27.14%
						Total	**R 3 596 000**	**R 961 803**

4.4.2 *Accommodation of the proposed development in the sewer reticulation system.*

Development specific items required in the existing sewer system:

None

The proposed connection point to the existing sewer system is shown in **Figure 2 (Sewer)**.
In **Figure 2 (Sewer)** pipes in future development areas are indicated schematically.

4.5 *Adjustments to the Master Plan*

The revised PDDWF of the proposed development and/or existing issues require the following additions and adjustments to the *master plan* as indicated in **Figure 2 (Sewer)**.

4.5.1 *Bulk Items*

Adjustments to the Master plan:

None

4.5.2 Reticulation Items

Adjustments to the Master plan:

None

5 SUMMARY

Development water supply

Addressing existing issues (as per section 3.4.1 and 3.5.1) and accommodation of the proposed development area (as per section 3.4.2 and 3.5.2) requires the implementation of upgrades to the George New WTP and George New WTP pump station.

Major works required includes the following:

- 20 000 kL/d, additional capacity at George New WTP.
- ~~225 L/s @ 55m, additional pump set at the George New WTP pump station~~, not required.

Summary of costing:	Cost	Pro-rata Cost
General items required to alleviate existing problems in the bulk water system	R 305 072 000	R 1 944 834
Development specific items required in the bulk water system	R -	R -
General items required to alleviate existing problems in the water distribution system	R -	R -
Development specific items required in the water distribution system (including fire flow requirements)	R -	R -
Total	**R 305 072 000**	**R 1 944 834**

Development sewer drainage

Addressing existing issues (as per section 4.3.1 and 4.4.1) and accommodation of the proposed development area (as per section 4.3.2 and 4.4.2) requires the upgrading of the Schaapkop PS and rising main, sections of the Schaapkop outfall sewer and investigation and upgrading of Blue Mountain PSs 1 & 2.

Major works required includes the following:

- 650 L/s Shcaapkop PS and 155 m x 700 mmØ Schaapkop PS rising main.
- 464m x 1050 mmØ Schaapkop outfall sewers.
- 10,3 L/s Blue Mountain 1 PS and 10,5 L/s Blue Mountain 2 PS.

Summary of costing	Cost	Pro-rata Cost
General items required to alleviate problems in the bulk sewer system:	R 34 097 000	R 158 070
Development specific items required in the bulk sewer system:	R -	R -
General items required to alleviate problems in the existing sewer system:	R 3 596 000	R 961 803
Development specific items required in the existing sewer system:	R -	R -
Total	**R 37 693 000**	**R 1 119 873**

Yours sincerely,

_____

Per: P.C. du Plessis (Pr. Eng.)
GLS Consulting

6 ANNEXURE A

REQUEST FROM CONSULTANT TO GLS

FW: Erf 28005, Platinum Drive, Blue Mountain: Sewer and water capacity allocation

Reply | Reply All | Forward

HL Hannes Lourens <hlourens@eceng.co.za>

To Johann Rudolph

Cc Mareé Pio; Lu-Anne Venter; Hannes Lourens

Tue 2025/06/10 14:58

You replied to this message on 2025/06/10 15:15.

E230050 George Makro External Engineering Services Report rev 0 Jun 2023 with addenda.pdf 5 MB

Translate message to: English | Never translate from: Afrikaans | Translation preferences

Johann,

Goeie middag. Ek vertrou dit gaan goed. Ons telefoongesprek asook onderstaande reeks korrespondensie verwys. Soos bespreek is ons die konsultante op die ontwikkeling van Erf 28005, Platinum Drive, Blue Mountain, George. Ons kliënt oorweeg dit om die grondgebruik te verander na 680 hoë-digtheid woonstelle in plaas van die kommersiële ontwikkeling wat daar beplan was. Sien asseblief aangeheg die vorige diensteverslag wat ons vir die Makro gedoen het, net vir agtergrond (die verslag is nie meer relevant nie).

Ons sal ongeveer 'n Average Dry Weather Flow (ADWF) riool toewysing van 250 kl/dag benodig. Water ongeveer 270kl/dag. Kan jy asseblief bevestig of hierdie kapasiteit op die netwerk beskikbaar is? Indien wel, sal ons ons verslag opdateer en aan die munisipaliteit voorlê vir 'n amptelike toewysingsbrief. Indien nie, watter opgraderings sal benodig word?

Kontak my gerus indien jy enige verdere inligting of duidelikheid benodig. Vertrou om binnekort van jou te hoor.

Hartlike Groete / Warm Regards

Hannes Lourens PrEng MEng PrCPM
Director
E: hlourens@eceng.co.za
T: +27 44 884 1138
C: +27 82 775 4264
82 Victoria Street, George, 6529
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W: www.eceng.co.za

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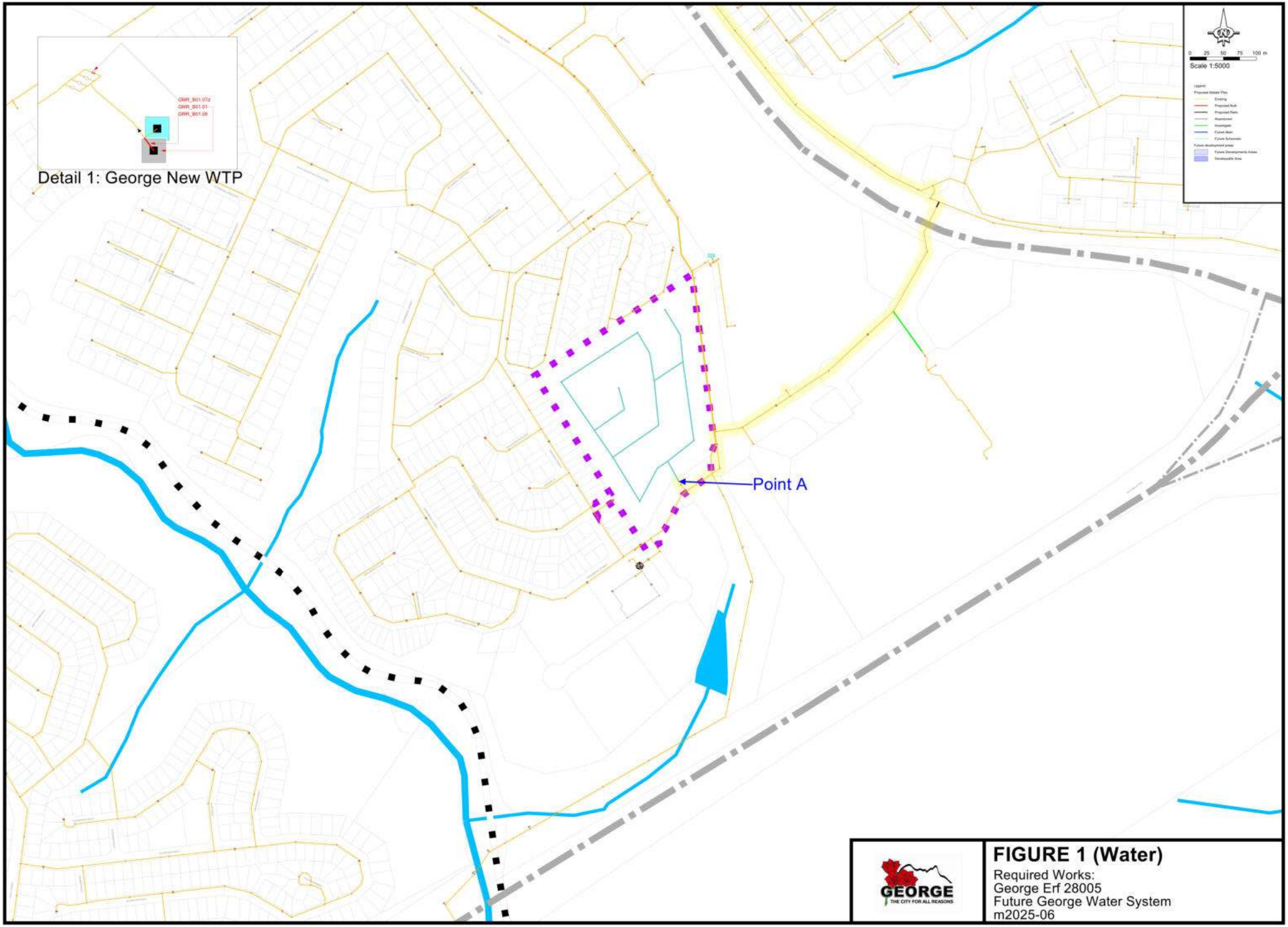
Detail 1: George New WTP
Point A
Scale 1:5000
GEORGE
THE CITY FOR ALL REASONS
FIGURE 1 (Water)
Required Works:
George Erf 28005
Future George Water System
m2025-06

Detail 1: Schaapkop PS

0 60 120 180 240 m
Scale 1:12000

FIGURE 2 (Sewer)

Required Works:
George Erf 28005
Future George Sewer System
2025-06

ADDENDUM 4

BULK POWER CAPACITY ASSESSMENT REPORT (GLS)

24 November 2025

Mr. Jako Fourie
Element Consulting
82 Victoria Street, George, 6529
PO Box 9962, George, 6530
+27 83 650 2365

RE: Bulk Power Capacity Assessment for the Proposed Blue Mountain Village A Development (Erf 28005), George

This Bulk Power Capacity Study evaluates the impact of the proposed Blue Mountain Village A (Erf 28005) development on the Glenwood 11 kV distribution network. The development forms part of the larger Blue Mountain residential expansion and introduces a saturated diversified demand of approximately 1.23 MVA to the area.

Existing Network Capacity

The Blue Mountain / Platinum Drive cluster is supplied from SS Glenwood (66/11 kV) via a combination of:

- Newer 6.35/11 kV 300 mm² Al PILC feeders in the local area, and
- Legacy 185 mm² Cu PILC municipal backbone feeders between SS Glenwood and SS Blue Mountain Village.

Under current loading conditions (2025):

- Local feeders operate between 7–79%, with some segments approaching 86% under certain load transfers.
- The Glenwood – Blue Mountain backbone feeder reaches 80%, placing it in the upper Green band.
- Voltage levels remain between 1.00–1.01 pu, fully compliant with NRS 048-2.

Development Impact

The development's full diversified load of ~1.23 MVA cannot be connected to MS Builders Warehouse, as this minisub does not have sufficient spare capacity. However, MS Builders Warehouse was used as a modelling placeholder to assess how the surrounding MV feeders respond to the additional load.

Load-flow results show:

- Under normal operating conditions, feeder utilisation increases slightly (up to ~92% on some local sections) but remains within allowable limits.
- Upstream backbone feeders increase to ~84.7% by 2043, still thermally acceptable under N conditions.
- Voltages remain stable and compliant across the network.

A new dedicated minisub will therefore be required to supply the development.

N–1 Network Performance

The network remains N–1 compliant up to approximately 2035. However, from 2040 onward, the remaining municipal backbone feeders supplying the area via the Garden Route corridor:

- SS Glenwood – SS Garden Route FD2, and
- SS Glenwood – SS Garden Route FD4

exceed **113–119%** loading under contingency conditions.

These overloads represent a loss of N–1 compliance but are not caused by the Erf 28005 development, they result from cumulative regional growth (Glenwood, Blue Mountain, Garden Route Mall, and surrounding developments).

Voltages remain acceptable (~1.00 pu), but thermal limits are exceeded on the long-term backbone.

Upgrade Requirements

To supply the development safely:

Install a new 1600 kVA minisub, or

2 × 800 kVA transformers operating in parallel,

located between the existing MV rings near the Blue Mountain / Platinum Drive interface.

No short-term reinforcement of existing MV feeders is required.

Long-Term Masterplan Considerations

To restore N–1 compliance beyond 2040, the municipality will need to implement strategic upgrades to the Glenwood – Garden Route backbone (FD2 and FD4). These reinforcements form part of the broader network strengthening strategy and are not triggered by this development.

Overall Conclusion

The Glenwood 11 kV network can accommodate the Blue Mountain Village A development, provided that a new dedicated 1600 kVA (or 2 × 800 kVA) minisub is installed. The development does not trigger immediate feeder upgrades, and the only long-term constraints relate to regional backbone utilisation, which must be addressed through future Masterplan-driven reinforcement projects.

Document Control

Rev	Date	Author(s)	Reviewer	Description
01	Nov 2025	T. Malemela J. Davids	T. Mokoena	Draft Issue
02	Nov 2025	T. Malemela J. Davids	T. Mokoena	Final

1. Introduction

1.1 Purpose and Scope

The purpose of this Electrical Capacity Study is to evaluate the ability of the existing George municipal 11 kV distribution network to accommodate the proposed **Blue Mountain Village A (Erf 28005)** development located within the Glenwood supply area.

The study determines:

- Whether sufficient spare capacity exists on nearby MV infrastructure,
- Whether thermal and voltage performance remains within NRS 048–2 limits,
- The most appropriate Point of Connection (PoC),
- The expected impact of the development's load on the surrounding feeders and switching stations.

The assessment evaluates **existing** and **future** network conditions, considers municipal load-growth trends sourced from the 2025 George MV Network Master Plan, and incorporates the calibrated ADMD values applicable to **UrbTwn_7l_8h** residential land-use within the Glenwood zone.

1.2 Objectives:

The specific objectives of the study are to:

1. **Capacity Verification**
   Determine whether the Glenwood 11 kV network has sufficient spare thermal and voltage capacity to supply the proposed development on Erf 28005.

2. **Development Demand Verification**
   Confirm the load estimate for the development using calibrated ADMD values from the Masterplan and the updated load-class correction (UrbTwn_7l_8h).

3. **Point of Connection Identification**
   Evaluate and compare the suitability of the following candidate PoCs:
   - MS BMG B
   - MS Blue Mountain Village
   - MS Platinum Drive 1
   - MS Builders Warehouse

   The evaluation includes feeder loading, voltage performance, and N-1 availability.

4. **Network Performance Assessment**
   Assess:
   - Voltage regulation,
   - Thermal loading of cables and overhead lines,
   - Transformer utilisation and feeder margin,
   - Compliance with NRS 048-2 voltage limits and municipal planning standards.

5. **Long-Term Network Readiness**
   Review forecasted growth trends in the Glenwood supply area to ensure the development's load does not compound future constraints. Masterplan projections show Glenwood growing from 16.52 MVA (2023) to 41.26 MVA (2042).

1.3 Study Area and Description of the Proposed Development

The proposed development, Blue Mountain Village A (Erf 28005), is located within the Glenwood 11 kV supply area of the George municipal distribution network as seen on Figure 1-1 below. The development lies approximately 0.43 km west of Garden Route Mall and falls within an established urban growth corridor characterised by medium-to-high-density residential expansion.

1.3.1 Surrounding Electrical Network

The supply to the area is derived from SS Glenwood (66/11 kV, 2 × 20 MVA), which distributes power via a combination of PILC underground feeders and overhead Mullberry conductors routed through intermediate switching stations. These include:

- SS Blue Mountain Village Switching Station
- MS BMG B
- MS Blue Mountain Village
- MS Platinum Drive 1
- MS Builders Warehouse

The Glenwood network in this area consists predominantly of legacy 11 kV PILC underground cables, many of which are operating below modern thermal ratings and have increased susceptibility to ageing, moisture ingress, and insulation degradation.

Figure 1-1: Geospatial Network Model of Bluemountain Feeder Zone, Glenwood Supply Area

As such, the use of PILC infrastructure influences the thermal margins, allowable loading, and the long-term security-of-supply for new developments. These characteristics are considered in the scenario modelling and capacity assessment sections of this report.

1.3.2 Development Description

The proposed development consists of:

- **680 × 2-bedroom residential units**
- **Land use:** Group Housing / High-Density Cluster Housing
- **Load Class:** *Corrected to* **UrbTwn_7l_8h**
- **Estimated ADMD (per unit):** 2.0–2.5 kVA, consistent with Glenwood residential calibration
- **Estimated total diversified load:** Additional 1227kVA
- **Connection voltage:** 11 kV

The development was previously inaccurately categorised under the **Township_5_6** load class along with lower number of units at 150, which understated the expected demand (≈1.5 kVA/unit). This study rectifies the load classification and updates the forecast based on the correct urban townhouse density class and number of units for the Glenwood zone.

2. Methodology

The methodology for this Electrical Capacity Study is designed to thoroughly evaluate the effects of the future loads of the proposed development on the existing electrical network. The study involves data collection, simulation and modelling, and analysis of the electrical network.

The following steps outline the detailed approach used in this study:

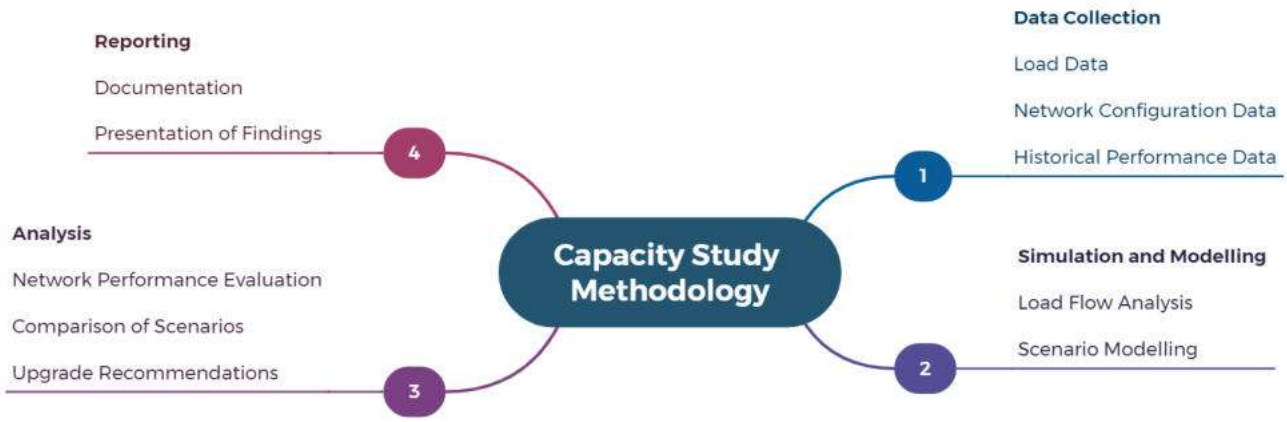

Figure 2-1: Capacity Investigation Methodology

2.1 Data Collection

2.1.1 Glenwood Load Data

- Gather detailed specifications and operational data for the development.
- Obtain current and historical load profiles to understand peak and average demand patterns.

2.1.2 Network Configuration Data

- Collect network diagrams, including the layout of the SS-Glenwood, and the main and ring feed supply routes.
- Gather details on existing network components such as transformers, switchgear, and conductors.

2.1.3 Historical Performance Data

- Retrieve historical performance data of the electrical network, including voltage levels, power quality metrics, and incident reports.

- Analyse past instances of bottlenecks or reliability issues.

2.2 Simulation and Modelling

2.2.1 Load Flow Analysis

- Identify potential point of delivery (POD).
- Utilize advanced load flow analysis software to model the electrical network.
- Input the collected data, including load profiles and network configuration, into the simulation tool.

2.2.2 Scenario Modelling

- Scenario 1: Existing Installation (All Feeders):
  Model the current load conditions with a combined approximate demand at the point of delivery.
  Simulate the load impact on both the main and/or ring feed supplies.
- Scenario 2: Future Installation (All feeder ±additional 1227kVA Future Load):
  Model the future load conditions with a combined load of approximately 1230kVA for the proposed development.
  Simulate the future load impact on the electrical network.
- Scenario 3: N-1 Contingency analysis (Existing Load)
  Model the current load conditions with a combined approximate demand at the point of delivery under N-1.
  Simulate the load impact on both the main and/or ring feed supplies.
- Scenario 4: N-1 Contingency analysis (Future Load)
  Model the future load conditions at the point of delivery under N-1.
  Simulate the load impact on both the main and/or ring feed supplies.

2.3 Analysis

2.3.1 Network Performance Evaluation

- Assess the impact of the future loads on network performance metrics, including voltage levels, power losses, and reliability.
- Identify any existing or potential bottlenecks, shortcomings, and areas requiring immediate attention or upgrades.

2.3.2 Technical Assessment Criteria: Limits and Regulation

Voltage

- The study assesses the system voltage profiles as per NRS 048-2, see Table 2-1 below.

Table 2-1: Voltage Limits

Voltage Range	Limits	Description
Voltages >500 V	0.95 p.u < V < 1.05 p.u	Municipal voltages must be between 95% and 105%
Voltages < 500 V	0.9 p.u < V < 1.1 p.u	Customer voltages must be between 90% and 110%

- For 500 V and above (e.g., HV and MV systems):
  Voltage must be within ±5% of the nominal voltage, or between 0.95 p.u. and 1.05 p.u.
- For below 500 V (e.g., LV systems):
  Voltage must be within ±10% of the nominal voltage, or between 0.9 p.u. and 1.1 p.u.

Thermal Loading

- Thermal ratings of equipment should not be exceeded. The study assesses the thermal loading of transformers and conductors in the system with a limit of 100%.

- Table 2-2 uses colour coding to highlight constrained networks requiring strengthening under normal conditions.

Table 2-2: The distribution network constraints

Criteria	Red	Orange	Green
MV Voltage	≤ 90% and > 105%	> 90% and < 95%	≥ 95% and < 105%
Maximum thermal line loading	≥ 100%	> 80% and < 100%	< 80%

- Red indicates that the voltage and/or thermal limits have been violated and that no additional load can be connected on these networks.
- Orange indicates that a limited amount of load can be connected before limits are reached, however measures need to be put in place to avoid the limits being violated.
- Green indicates that the network is capable of supplying load and that the limits have not been reached.

2.3.3 Comparison of Scenarios:

- Compare the results of the load flow analysis for the existing and future load scenarios.
- Evaluate the differences in network performance and identify the additional strain imposed by the increased load.

2.3.4 Upgrade Recommendations:

- Based on the analysis, determine the necessary upgrading measures for both the main and ring feed supplies.
- Prioritize the recommended upgrades and improvements to ensure a reliable and high-quality supply of electricity to the POD.

2.4 Reporting

2.4.1 Documentation:

- Compile the findings, analysis, and recommendations into a comprehensive report.
- Include detailed simulation results, network diagrams, and supporting data in the appendices.

2.4.2 Presentation of Findings:

- Present the results and recommendations to relevant stakeholders, including the Municipality and other concerned parties.
- Provide a clear and concise summary of the impact study and the proposed solutions to address any identified issues.

This methodology ensures a thorough and accurate assessment of the impact of proposed new development on the electrical network, facilitating informed decision-making for future upgrades and improvements.

3. Existing Network Analysis

3.1 Overview of the Existing 11 kV Network

The development area is supplied from SS Glenwood (66/11 kV, 2 × 20 MVA) via the Blue Mountain / Platinum Drive / Park Road feeder cluster. Power is distributed predominantly through 11 kV PILC underground feeders, with:

- Newer 6.35/11 kV 3C PILC PVC SWA PVC Al 300 mm² cables on the lower parts of the network (Platinum Drive / Park Road / Patio Warehouse area); and
- Legacy 11 kV 185 mm² Cu PILC 3-core cables on the municipal backbone sections between SS Glenwood – SS Blue Mountain Village FD1 – RS Eden Meander.

The closest minisub to Erf 28005 is the Builders Warehouse minisub. Although this minisub may currently operate as a dedicated supply point to Builders Warehouse, the development's demand is modelled on this minisub for interim capacity assessment, consistent with the approach used in the George MV Master Plan for this area.

3.2 Existing Feeder Loading (2025)

Table 3-1 summarises the relevant feeder segments in the Blue Mountain / Platinum Drive / Park Road cluster supplying the area around MS Builders Warehouse.

Table 3-1: Existing feeder loading (2025)

Name	Current Type	Inom [kA]	Length [km]	Loading (%) 2025
MS PATIO WAREHOUSE - MS TOWN LODGE	6.35/11kV 3C PILC PVC SWA PVC Al 300	0.345	0.308	**7**
MS PARK RD3 - MS PATIO WAREHOUSE	6.35/11kV 3C PILC PVC SWA PVC Al 300	0.345	0.286	**15**
MS PLATINUM DRIVE 1 - MS PLATINUM DRIVE	6.35/11kV 3C PILC PVC SWA PVC Al 300	0.345	0.124	**29**
MS PLATINUM DRIVE 1 - MS PARK RD3	6.35/11kV 3C PILC PVC SWA PVC Al 300	0.345	0.374	**22**
MS PLATINUM DRIVE 2 - MS PLATINUM DRIVE	6.35/11kV 3C PILC PVC SWA PVC Al 300	0.345	0.136	**36**
RS EDEN MEANDE - MS PLATINUM DRIVE 3	6.35/11kV 3C PILC PVC SWA PVC Al 300	0.345	0.683	**43**
SS BLUE MOUNTAIN - RS EDEN MEANDOR	11 kV 185mm2 Cu PILC 3Core (Eskom) Under	0.400	0.6875	**74**
SS BLUE MOUNTAIN - RS EDEN MEANDOR S1	11 kV 185mm2 Cu PILC 3Core (Eskom) Under	0.400	0.012	**74**
SS GLENWOOD - SS BLUE MOUNTAIN VILL FD1	11 kV 185mm2 Cu PILC 3Core (Eskom) Under	0.400	0.791	**80**

3.3 Interpretation of Feeder Conditions

3.3.1 New 300 mm² Al PILC Sections (Platinum / Park / Patio Cluster)

- These feeders remain well below thermal limits, with utilisation between 7-43%.
- They continue to operate firmly in the Green (<80%) loading band.
- Likely as a result of their recent installation ensures good thermal performance and low degradation risk. Thus, these feeders have ample spare capacity.

3.3.2 Legacy 185 mm² Cu PILC Municipal Backbone (SS Glenwood – Blue Mountain Village)

- Backbone loading now reaches 74-80% under 2025 conditions.
- These feeders operate in the upper Green / approaching Orange band.
- While still acceptable, they represent the most constrained elements in the supply corridor.
- These backbone feeders should be monitored, particularly under future N-1 conditions or high-growth scenarios.

3.4 Voltage Performance

Voltage results across the Glenwood / Blue Mountain feeder cluster show stable and compliant MV voltage conditions, with all nodes operating between 1.00 and 1.01 pu under existing (2025) loading.

Table 3-2: Voltage Results (2025)

Name	Busbar	Vnom [kV]	Voltage [p.u] 2025
SS GLENWOOD	11_BB2	11	**1.01**
MS BLUE MOUNTAIN 2	MS BLUE MOUNTAIN 2 11_BB	11	**1.01**
MS BMG A	MS BMG A 11_BB	11	**1.01**
MS BMG B	MS BMG B 11_BB	11	**1.01**
MS BUILDERS WAREHOUSE	MS BUILDERS WAREHOUSE 11_BB	11	**1.00**
MS HAVEN	MS HAVEN 11_BB	11	**1.01**
MS IMPERIAL	MS IMPERIAL 11_BB	11	**1.00**
MS KOUGABERG	MS KOUGABERG 11_BB	11	**1.01**
MS LARITZA	MS LARITZA 11_BB	11	**1.00**
MS PARK RD3	MS PARK RD3_11_BB	11	**1.00**
MS PATIO WAREHOUSE	MS PATIO WAREHOUSE_11_BB	11	**1.00**
MS PLATINUM DRIVE 1	MS PLATINUM DRIVE 1_11_BB	11	**1.00**
MS PLATINUM DRIVE 2	MS PLATINUM DRIVE 2_11_BB	11	**1.00**
MS PLATINUM DRIVE 3	MS PLATINUM DRIVE 3_11_BB	11	**1.00**
MS TOWN LODGE	MS TOWN LODGE_11_BB	11	**1.00**
SS BLUE MOUNTAIN VILLAGE	SS BLUE MOUNTAIN VILLAGE 11 BB2	11	**1.01**

3.5 Interpretation of Voltage Results

- The entire MV network in the study area operates between 1.00-1.01 pu, well within the NRS 048-2 limit of 0.95 - 1.05 pu.
- MS Builders Warehouse, the nearest minisub to Erf 28005 and the interim PoC for this assessment, operates at 1.00 pu, indicating no voltage depression at the local level.
- The upstream SS Blue Mountain Village and SS Glenwood nodes maintain strong voltage support at 1.01 pu, confirming robust primary supply.
- The consistent 1.00 - 1.01 pu voltage spread indicates:
    - low impedance paths,
    - minimal voltage drop,
    - healthy headroom before reaching lower allowable voltage limits,
    - no immediate need for voltage reinforcement.

3.6 Constraint Summary (Existing Network)

Table 3-3: Constraint summary Table

Component	Status	Comment
New 300 mm² Al PILC feeders	**Green (7–43%)**	Very healthy utilisation, no constraints.

Component	Status	Comment
RS Eden Meander 185 mm² Cu PILC	**Upper Green (74%)**	Approaching Orange, monitor long-term.
SS Glenwood – Blue Mountain FD1 185 mm² Cu PILC	**80%**	Upper Green / borderline Orange, most constrained segment.

4. Load Forecast and Development Demand

4.1 Development Demand Calculation

The proposed Blue Mountain Village A (Erf 28005) development consists of 680 residential units classified under UrbTwn_7l_8h, which aligns with medium-to-high-density townhouse/cluster housing.

The calibrated ADMD value for this load class in the Glenwood supply zone is:

- **ADMD per unit: 2.12 kVA/unit**

Using this value:

- **Saturation Load Calculation**

$$\mathbf{680\ units \times 2.12\ kVA/unit = 1441.6\ kVA}$$

However, after applying diversity, coincidence factors, and the municipal residential saturation methodology used in the Masterplan:

Calculated Saturation Load for Erf 28005:

$$\boxed{1227\ \text{kVA}}$$

This 1227 kVA value represents the expected peak diversified demand once the development reaches full occupancy.

4.2 Integration With Existing Base Load

The Builders Warehouse minisub currently has a base load of 3.80 kVA (2023), indicating minimal local residential loading and strong headroom for expansion.

Once the development is added, the MS demand increases significantly, as shown in the forecast table.

4.3 Demand Growth Forecast (2023–2042)

The table below presents the projected load growth on MS Builders Warehouse, incorporating the development's 1227 kVA demand and the Glenwood-area growth factors from the George Master Plan.

Table 4-1: Demand Growth Table

Year	Total Demand (kVA)
2023	3.33
2024	829.58
2025	1224

Year	Total Demand (kVA)
2026	1229
2027–2042	1230 (stabilises)

Interpretation:

- Demand rises sharply between 2024–2025 due to development build-out.
- After reaching ≈1230 kVA, demand remains stable, which is typical for saturated residential areas.

4.4 Capacity Assessment With 500 kVA Mini-Substation

- Mini-sub rating: **500 kVA**
- Forecast demand (peak): **~1230 kVA**

4.4.1 Utilisation Ratio

$$\frac{1230}{500} = 2.46 \Rightarrow 246\%$$

This is within the **Red zone (≥100%)**.

4.4.2 Conclusion:

Although MS Builders Warehouse was used as the interim Point of Connection for modelling purposes, this minisub does not have sufficient spare capacity to supply the full diversified load of the proposed development. Its use in the simulations served only as a convenient placeholder to evaluate the behaviour and loading of the upstream feeder network under the expected development demand.

To supply the development safely and reliably, a new transformer or minisub will be required within the Blue Mountain/Platinum Drive area. The recommended installation capacity is:

- 1 × 1600 kVA, or
- 2 × 800 kVA units operating in parallel,

Installed between the existing MV rings to provide adequate capacity, redundancy, and future growth allowance.

4.5 Alignment With Glenwood Growth Forecast

The Glenwood supply area is expected to grow from:

- 16.52 MVA (2023) – 41.26 MVA (2042)

The addition of ~1230 kVA to the Builders Warehouse cluster aligns well with the Masterplan's load allocation for the Blue Mountain expansion corridor and reflects the expected residential densification trend.

4.6 Summary of Development Demand

Table 4-2:Summary of Development Demand

Item	Value
Number of units	680
ADMD	2.12 kVA/unit
Calculated Saturation Load	1227 kVA
Mini-substation capacity	500 kVA
Forecast Max Demand	1230 kVA
Utilisation (2042)	≈246%

Item	Value
Capacity Status	Red – Inadequate capacity available

5. Scenario Modelling and results

Scenario modelling was performed using the Glenwood MV network model, focusing on the feeder path supplying MS Builders Warehouse, the interim PoC for Erf 28005. The results reflect base year (2025) loading and future demand growth for 2035, 2040 and 2043.

All simulations include the proposed 1230 kVA diversified development load.

5.1 Thermal Loading Results

5.1.1 Lower Network (Newer 300 mm² Al PILC)

Name	Inom [kA]	Length [km]	Loading (%)			
			2025	2035	2040	2043
MS PATIO WAREHOUSE - MS TOWN LODGE	0.345	0.308	**7**	**7.3**	**7.3**	**7.3**
MS PARK RD3 - MS PATIO WAREHOUSE	0.345	0.286	**15**	**14.5**	**14.6**	**14.7**
MS PLATINUM DRIVE 1 - MS PLATINUM DRIVE	0.345	0.124	**29**	**29.1**	**29.2**	**29.3**
MS PLATINUM DRIVE 1 - MS PARK RD3	0.345	0.374	**22**	**21.8**	**21.9**	**22**
MS PLATINUM DRIVE 2 - MS PLATINUM DRIVE	0.345	0.136	**36**	**36.3**	**36.5**	**36.7**
RS EDEN MEANDE - MS PLATINUM DRIVE 3	0.345	0.683	**43**	**43.6**	**43.8**	**44**
SS BLUE MOUNTAIN - RS EDEN MEANDOR	0.400	0.6875	**74**	**75.6**	**76.2**	**76.9**
SS BLUE MOUNTAIN - RS EDEN MEANDOR S1	0.400	0.012	**74**	**75.6**	**76.2**	**76.9**
SS GLENWOOD - SS BLUE MOUNTAIN VILL FD1	0.400	0.791	**80**	**82.8**	**83.8**	**84.7**

Interpretation:

Scenario 1

Under normal operating conditions in 2025:

- Local 300 mm² Al PILC feeders operate at 7–43%, well within thermal limits.
- The intermediate Blue Mountain backbone feeders operate at 74%.
- The SS Glenwood – SS Blue Mountain Village FD1 backbone operates at 80%.
- Status: Green (acceptable but approaching Orange on the backbone).

Scenario 2 – Existing Network + Development Load

- The development load increases upstream utilisation as follows:
- Local Al PILC feeders increase slightly to 7 - 44% across the horizon.
- Blue Mountain backbone feeders increase from 74% – 76.9% by 2043.
- SS Glenwood – SS Blue Mountain FD1 increases from 80% – 84.7% by 2043.

5.2 Voltage Results

Name	Busbar	Vnom [kV]	Voltage [p.u]			
			2025	2035	2040	2043
SS GLENWOOD	11_BB2	11	**1.01**	**1.02**	**1.02**	**1.01**
MS BLUE MOUNTAIN 2	MS BLUE MOUNTAIN 2 11_BB	11	**1.01**	**1.02**	**1.01**	**1.01**
MS BMG A	MS BMG A 11_BB	11	**1.01**	**1.01**	**1.01**	**1.01**

Name	Busbar	Vnom [kV]	Voltage [p.u]			
			2025	2035	2040	2043
MS BMG B	MS BMG B 11_BB	11	**1.01**	**1.01**	**1.01**	**1.01**
MS BUILDERS WAREHOUSE	MS BUILDERS WAREHOUSE 11_BB	11	**1.00**	**1.01**	**1.01**	**1.00**
MS HAVEN	MS HAVEN 11_BB	11	**1.01**	**1.02**	**1.01**	**1.01**
MS IMPERIAL	MS IMPERIAL 11_BB	11	**1.00**	**1.01**	**1.01**	**1.00**
MS KOUGABERG	MS KOUGABERG 11_BB	11	**1.01**	**1.01**	**1.01**	**1.01**
MS LARITZA	MS LARITZA 11_BB	11	**1.00**	**1.01**	**1.01**	**1.00**
MS PARK RD3	MS PARK RD3_11_BB	11	**1.00**	**1.01**	**1.00**	**1.00**
MS PATIO WAREHOUSE	MS PATIO WAREHOUSE_11_BB	11	**1.00**	**1.01**	**1.00**	**1.00**
MS PLATINUM DRIVE 1	MS PLATINUM DRIVE 1_11_BB	11	**1.00**	**1.01**	**1.00**	**1.00**
MS PLATINUM DRIVE 2	MS PLATINUM DRIVE 2_11_BB	11	**1.00**	**1.01**	**1.00**	**1.00**
MS PLATINUM DRIVE 3	MS PLATINUM DRIVE 3_11_BB	11	**1.00**	**1.01**	**1.01**	**1.00**
MS TOWN LODGE	MS TOWN LODGE_11_BB	11	**1.00**	**1.01**	**1.00**	**1.00**
SS BLUE MOUNTAIN VILLAGE	SS BLUE MOUNTAIN VILLAGE 11 BB2	11	**1.01**	**1.02**	**1.01**	**1.01**

Interpretation:

- Voltages remain extremely healthy across all years.
- All nodes are between 1.00–1.02 pu, far above the NRS 048-2 minimum (0.95 pu).
- The development load has no material impact on voltage quality.
- Even in 2043, MS Builders Warehouse sits at 1.00 pu, indicating strong voltage support.

5.3 N–1 Contingency Analysis

5.3.1 Interpretation of N-1 Scenarios:

Scenario 3 – N-1 (Base Case)

(Loss of SS Glenwood – SS Blue Mountain Village FD1)

The load is transferred to:

SS Glenwood – SS Garden Route FD2 and FD4.

Under this condition:

- Local feeder loading ranges from 50–93%.
- Several 300 mm² Al PILC segments exceed 80%, entering the Orange band.
- FD2 and FD4 remain below 65% until 2035.

Status: Green/Orange (acceptable short term). Voltage remains around 1.00 pu.

Scenario 4 – N–1 + Development Load

This is the most critical case.

With the development load included:

- Local feeder utilisation ranges between 50–93%.
- MS Town Lodge – SS Garden Route Mall reaches 99.5%.
- FD2 and FD4 increase from 61% – 113–119% by 2040–2043.

Short-term (2025–2035):

- All feeders remain below 85% under N–1 – acceptable.

Long-term (2040–2043):

- FD2 and FD4 exceed 113–119% – thermal overload under N–1.

Status: Green (2025–2035) – Red (2040–2043).

Voltage remains acceptable (~1.00 pu) but thermal overload dominates.

These XLPE backbone circuits pick up the diverted load.

5.3.2 Thermal Performance Under N–1

Below is the actual N-1 feeder loading:

Name	Inom [kA]	Length [km]	Loading (%)			
			2025	2035	2040	2043
MS PATIO WAREHOUSE - MS TOWN LODGE	0.345	0.308	**86.1**	**88.4**	**91**	**92.2**
MS TOWN LODGE - SS GARDEN ROUTE MALL	0.345	0.022	**93.3**	**95.6**	**98.3**	**99.5**
MS PARK RD3 - MS PATIO WAREHOUSE	0.345	0.286	**78.9**	**81.2**	**83.7**	**84.8**
MS PLATINUM DRIVE 1 - MS PLATINUM DRIVE	0.345	0.124	**64.5**	**66.7**	**69**	**70**
MS PLATINUM DRIVE 1 - MS PARK RD3	0.345	0.374	**71.7**	**73.9**	**76.3**	**77.4**
MS PLATINUM DRIVE 2 - MS PLATINUM DRIVE	0.345	0.136	**57.2**	**59.4**	**61.6**	**62.6**
RS EDEN MEANDE - MS PLATINUM DRIVE 3	0.345	0.683	**50**	**52.2**	**54.3**	**55.2**
SS GLENWOOD - SS GARDEN ROUTE FD4	0.37	1.27	**61.6**	**63.1**	**113.6**	**119.4**
SS GLENWOOD - SS GARDEN ROUTE FD2	0.37	1.277	**61.3**	**62.8**	**113**	**118.7**

5.3.3 N–1 Conclusion

Under N–1 conditions, specifically the loss of the SS Glenwood – SS Blue Mountain Village FD1 backbone feeder, supply to the Blue Mountain / Platinum Drive / Garden Route Mall cluster is routed through the SS Glenwood – SS Garden Route FD2 and FD4 11 kV backbone feeders.

The N–1 results indicate the following:

Short Term (2025–2035)

Local 300 mm² Al PILC feeder segments operate between 50-88%, remaining within acceptable thermal limits.

- FD2 and FD4 operate below 65%, indicating adequate redundancy.
- All MV voltages remain around 1.00 pu, fully compliant with NRS 048-2.

- The network is N–1 compliant in the short to medium term.

Long Term (2040–2043)

- Local feeder loading increases only modestly (up to ~92%), but remains below 100%.
- FD2 and FD4 exceed 113–119% loading, violating thermal limits and operating outside acceptable design conditions.
- Voltages remain acceptable (~1.00 pu), but thermal overloads dominate the constraint.
- The network is not N–1 compliant from 2040 onward due to backbone feeder overloading.

Key Takeaway

- The long-term N–1 constraint is not caused by the Erf 28005 development. It results from cumulative Glenwood, Blue Mountain, Garden Route Mall, and regional load growth projected in the Masterplan.
- The development contributes only marginally to this overload, and the network would exceed N–1 limits even without this project.

5.4 Scenario Summary

Scenario	Thermal Loading	Voltage Performance	Overall Status
Scenario 1 Existing Network (Base Case)	• Local feeders: 7-79% • Backbone (SS Glenwood – SS Blue Mtn FD1): 80% (upper Green)	1.00–1.01 pu, NRS-compliant	**Green** (Monitor backbone loading)
Scenario 2 Existing + Development Load	• Local feeders: 7-92% • Backbone rises to 84.7% by 2043	≈1.00 pu, stable	**Orange** (Acceptable, monitor long term)
Scenario 3 N–1 (Base Case)	• Local feeders: 50-93% (several in Orange) • FD2 & FD4: <65% up to 2035	≈1.00 pu, compliant	**Green/Orange** (N–1 compliant to 2035)
Scenario 4 N–1 + Development Load	• Local feeders: 50-93% (similar to base) • FD2 & FD4: 113–119% by 2040–2043 (exceeds thermal limit)	≈1.00 pu, compliant	**Green (2025–2035)** **Red (2040–2043)** N–1 non-compliant

5.5 Overall Conclusion from Scenario Modelling

- The development load can be accommodated under normal conditions with no immediate thermal or voltage violations.
- The network remains N-1 compliant up to approximately 2035.
- Long-term (2040+), the area becomes N-1 non-compliant due to regional backbone loading, not because of the Erf 28005 development.

6. Upgrade Recommendations & Preferred Point of Connection

This section summarises the required network reinforcements (if any) and identifies the most suitable Point of Connection (PoC) for the proposed development on Erf 28005 (Blue Mountain Village A), based on the thermal, voltage and long-term performance results.

6.1 Preferred Point of Connection (PoC)

Although MS Builders Warehouse was used as the nearest electrical node for modelling purposes, this minisub does not have sufficient spare capacity to supply the development. Its utilisation in the simulations served solely to evaluate how the surrounding feeder network responds to the expected additional demand.

To support the development safely and reliably, a new minisub must be provided within the Blue Mountain / Platinum Drive area. The recommended transformer capacity is:

- 1 × 1600 kVA, or
- 2 × 800 kVA operating in parallel,

installed at a suitable point between the existing 11 kV rings. This will ensure adequate firm capacity for the development and provide allowance for future growth.

Figure 6-1 below represents breaking the cable between MS PLATINUM DRIVE 1 - MS PARK RD3 to install a suitable Minisub to supply the development.

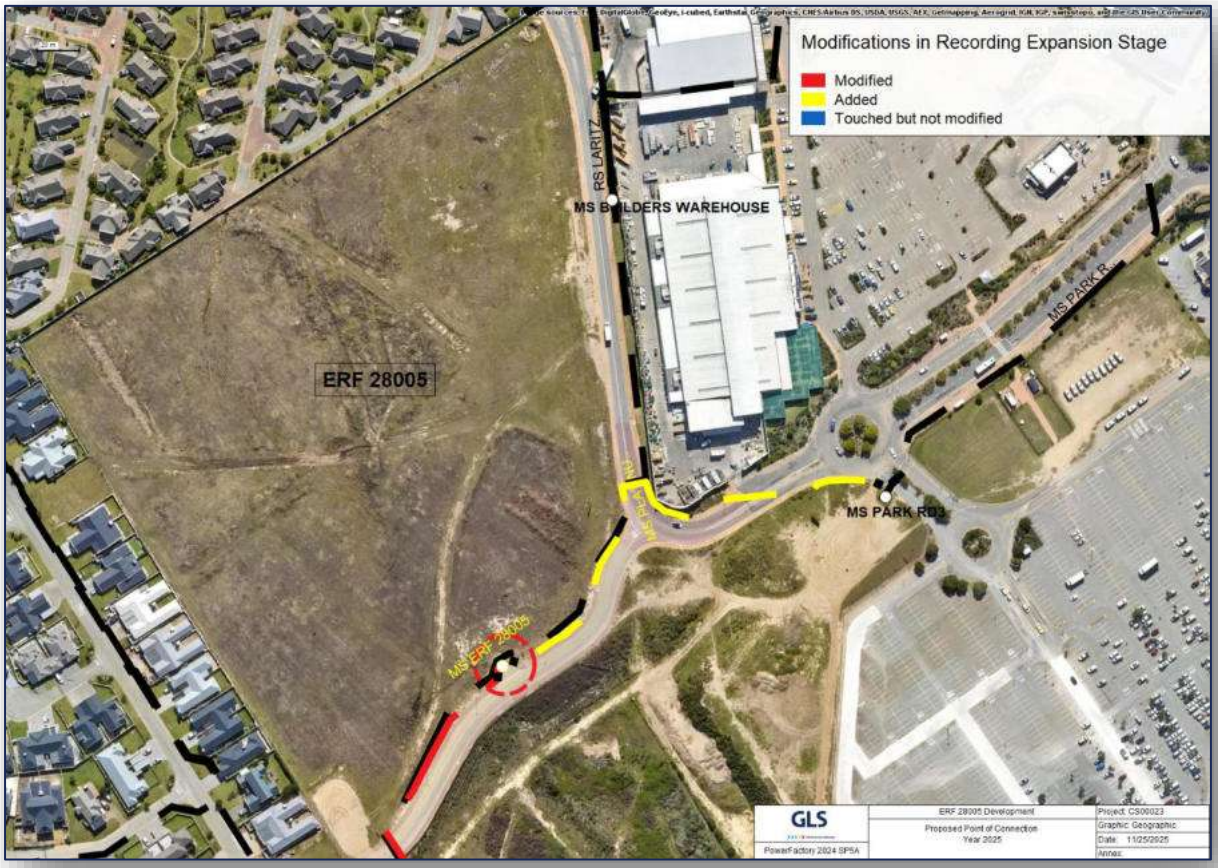

Figure 6-1: Proposed PoC

This PoC provides the most practical, shortest and most electrically favourable connection point for the development.

6.2 Short-Term (0–5 Year) Upgrade Requirements

No immediate reinforcement of the existing MV feeder infrastructure is required in the short term. This is supported by:

- Local 300 mm² Al PILC feeder utilisation remaining below 93%, and mainly between 50–80% under both normal and N–1 operations.
- The Glenwood – Blue Mountain backbone feeder loading remaining below 85% under normal conditions.
- Voltage performance remaining between 1.00–1.01 pu, compliant with NRS 048-2.

Short-term conclusion:

- No MV feeder upgrades required immediately.
- Only the new dedicated Minisub for the development is required.

6.3 Medium-Term (5–10 Year) Considerations

By 2035–2040:

- Local feeder loading increases slightly but remains below 95%, still acceptable for modern PILC construction.
- The Glenwood – Blue Mountain FD1 feeder approaches 85%, entering the Orange planning band.
- Under N–1, several local feeders enter the 70–90% range but remain below firm capacity.

Medium-term conclusion:

- No mandatory upgrades triggered by the development.
- Continue monitoring backbone utilisation as it approaches planning thresholds.

6.4 Long-Term (10–20 Year) Considerations

The N–1 analysis shows that from 2040 onward, the municipal backbone feeders:

- SS Glenwood – SS Garden Route FD2, and
- SS Glenwood – SS Garden Route FD4

exceed 113–119% loading under contingency conditions.

This thermal overload indicates loss of N–1 compliance on the Glenwood/Garden Route supply corridor.

It is important to note:

This constraint is NOT caused by the proposed Erf 28005 development.

It is driven by cumulative Glenwood, Blue Mountain, Garden Route Mall, and surrounding load growth identified in the Masterplan.

6.5 Long-Term Reinforcement Requirements

To restore N–1 compliance beyond 2040, the following strategic reinforcements will be required by the municipality:

1. Backbone strengthening of the Glenwood – Garden Route corridor, including reconductoring or upgrading FD2 and FD4.
2. Additional 11 kV feeder capacity towards Blue Mountain Village / Platinum Drive to reduce dependency on the existing dual-backbone configuration.
3. Potential future looping or sectionalisation to improve flexibility and load sharing in the Platinum Drive and Garden Route Mall zone.

These upgrades fall under long-term Masterplan implementation and are not development-triggered.

6.6 Overall Recommendations

The following actions are recommended:

Required for the Development

- Install a new 1600 kVA (or 2 × 800 kVA) minisub to supply Blue Mountain Village A.
- Connect the new MS between the existing MV rings feeding the Blue Mountain/Platinum Drive cluster.

Not Required (Short Term)

- No reinforcement of existing feeders is required to accommodate the development.

Required (Long Term, Masterplan-Driven)

- Strengthen the Glenwood backbone by 2040 to address regional N–1 overloads (113–119%).

7. Conclusions and Recommendations

This Bulk Power Capacity Study assessed the impact of the proposed Blue Mountain Village A (Erf 28005) development on the Glenwood 11 kV network. The assessment incorporated updated feeder loadings, development demand forecasts, and both normal and N–1 operating conditions, aligned with the latest George Electricity Masterplan assumptions.

The development introduces a saturated diversified load of approximately 1.23 MVA, which cannot be accommodated by the existing MS Builders Warehouse minisub. This minisub was therefore used only as a modelling placeholder to evaluate the loading behaviour of the surrounding feeders. The study confirms that a new dedicated minisub is required to supply the development.

Network Performance Under Normal Conditions

Under normal operating conditions, the existing 11 kV feeders supplying the Blue Mountain / Platinum Drive area operate within acceptable thermal and voltage limits. Local 300 mm² Al PILC feeders remain below 93%, and backbone feeders remain below 85% through 2043. Voltage performance stays between 1.00–1.01 pu, fully compliant with NRS 048-2.

N–1 Contingency Conditions

The network remains N–1 compliant up to approximately 2035. However, from 2040 onward, the municipal backbone feeders SS Glenwood – SS Garden Route FD2 and FD4 exceed 113–119% loading under contingency. This results in loss of N–1 compliance on the Glenwood/Garden Route supply corridor. Importantly, this constraint is not caused by the proposed development, but by cumulative regional load growth.

Development Trigger Requirements

To accommodate the development safely:

- A new 1600 kVA transformer, or
- 2 × 800 kVA transformers operating in parallel,

must be installed as a new minisub positioned between the existing Blue Mountain / Platinum Drive MV rings.

No additional feeder upgrades are required in the short or medium term.

Long-Term Considerations

Long-term reinforcement of the Glenwood backbone is required by 2040–2043 to restore full N–1 compliance. These upgrades form part of the municipality’s broader network strengthening strategy and are not triggered by this development.

Overall Conclusion

The Glenwood 11 kV network can accommodate the proposed Blue Mountain Village A (Erf 28005) development provided that a new 1600 kVA (or 2 × 800 kVA) minisub is installed. With this supply point in place, the development can be connected without immediate reinforcement of the existing MV feeders, and voltage and thermal performance remain compliant. Long-term N–1 constraint relate to regional growth and must be addressed through Masterplan-driven backbone upgrades in future planning cycles.

Yours sincerely,

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

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ADDENDUM 5

CONFIRMATION LETTERS: GEORGE MUNICIPALITY

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Date: 12 December 2025

Enquiries: M Geyer
Tel: 044 801 9268

Element Consulting Engineers
82 Victoria Street
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6529

Attention: Mr Hannes Lourens

ERF 28005, GEORGE: WATER AND SANITATION CAPACITY FOR PROPOSED DEVELOPMENT

The accommodation of the proposed development in the George Municipal water and sanitation system refers.

The Civil Engineering Services (CES) Directorate confirms that the proposed development was taken into consideration in the future development area of the Blue Mountain Village as part of the water and sanitation master plans.

The water demand and sewer outflow for the proposed development as originally calculated and included in the master plan as 56.3kL/d and 51.9 kL/d respectively. The revised water demand and sewer outflow was determined for the proposed development, and the details are included in section 1.2.

Upon conclusion of the above, the appointed master planning consultant, GLS, provided the required technical details to confirm the water and sanitation system upgrades required and the associated estimated costs to support the development in the existing water and sewer network.

1. DEVELOPMENT

1.1. Development footprint

The proposed development is situated at Erf 28005, positioned along Park Road and Platinum Drive, George. The proposed development is surrounded by the Garden Route Mall and the Blue Mountain Residential Village. Refer to figure 1 below for the locality map.

The proposed development will consist of 680 units, very high-density flats.

1.2. Demand

The proposed development places the following demand on the water and sanitation system as captured in table 1 below.

Figure 1: Locality of Erf 28005, George

Table 1: Theoretically revised calculated water demand and sewer flow contribution

Land use	AADD incl UAW (kL/day)	Water level of service	ADWF (kL/day)	Sewer level of service
High density residential flats	127.50	Municipal connection with a meter	102.00	Municipal connection

The above figures were incorporated into the water and sewer masterplan to verify capacity within the existing bulk and reticulation water and sewer networks.

2. BULK INFRASTRUCTURE CAPACITY

2.1. TREATMENT CAPACITY

a) Water Treatment

- The proposed development falls within the George Water Treatment Works (WTW) service area.
- The WTW has sufficient capacity to service this development.

b) Wastewater Treatment

- The proposed development falls within the Outeniqua Wastewater Treatment works (WWTW) drainage area.
- The WWTW has sufficient capacity to support the development.

2.2. BULK PIPELINES AND PUMP STATIONS

a) Water

- The proposed development falls within the George Main Zone (George Old WTW reservoir) supply area.
- The reservoirs have sufficient capacity to service the proposed development.

b) Sanitation

The following upgrades are required in the bulk sanitation conveyancing system to support the development:

- Items OT_09.01 to OT_09.04:
  - Portions of the gravity sewer draining to the Schaapkop pump station is operating at capacity.
  - The Developer will be required to upgrade the pipeline from the Schaapkop pump station (point X on figure 2) across, and just east of, Nelson Mandela Boulevard (point Y on figure 2) to a 1 050mm diameter pipeline. Refer to figure 2 below.
  - The Developer will be required to construct the above-mentioned items to service the development. The cost, over and above the pro-rata cost contribution to service the development, will be offset against Development Contribution's (DC's) payable by the developer. Refer to section 4.2.

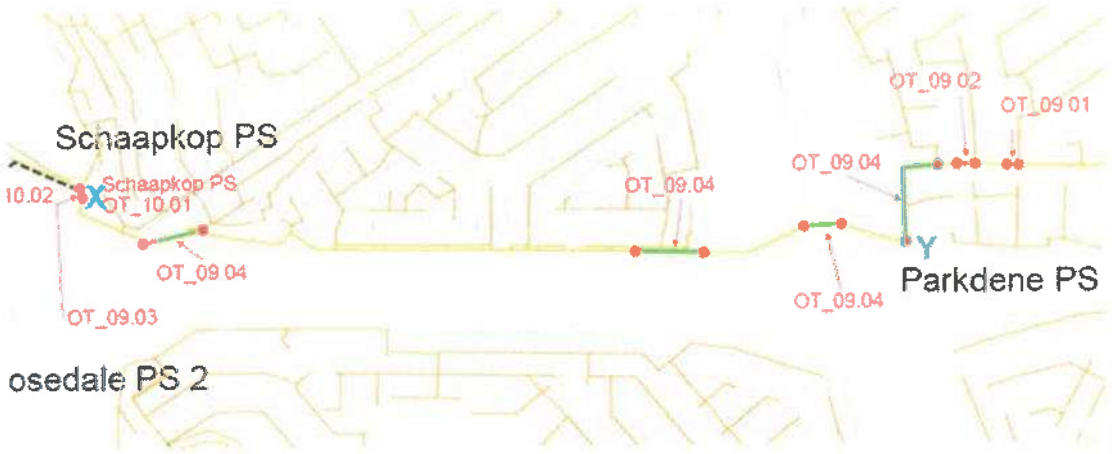

Figure 2: Upgrading of bulk gravity sewer

- Items OT 10.01 and OT_10.02: These upgrades are underway and are estimated to be completed by June 2026. The infrastructure will have sufficient capacity to service the development once completed.
- Items OT_10.03 to OT_10.05: These items are earmarked for an upgrade in the short to medium term. The infrastructure currently has sufficient capacity to service the development.

2.3. RETICULATION SYSTEM

a) Water

- No upgrades are envisaged to the existing water reticulation network to service this development.

b) Sanitation

The following upgrades are required in the bulk sanitation conveyancing system to support the development:

- Item OT_V06.05:
  - Upgrade the gravity sewer as indicated from point A to E from a 160mm diameter to a 200mm diameter as per figure 3 below.
  - The transfer structure located at point A in figure 3 requires repositioning (currently within a residential property driveway) and revised design to ensure the structure is operating adequately.

Figure 2: Upgrading of gravity sewers

- Item OT_26.01 and OT_47.01:
  - Upgrade both pump stations to 11l/s each.
  - The Developer will be required to construct the above-mentioned items to service the development.
  - The upgrade of the pump stations is not a requirement or need of the Municipality, and the full cost shall be borne by the Developer with no off setting against Development Contributions.

3. CONCLUSION

In conclusion, the existing water infrastructure can accommodate the proposed development, but the existing sanitation infrastructure cannot accommodate the development and the infrastructure as listed under section 2 requires implementation to service the development.

4. COST

4.1. Cost Contribution

The estimated cost (excluding VAT) for water and sanitation infrastructure upgrades in addition to that stated in section 2 in support of the development is captured in table 2 below.

Table 2: Associated cost of water and sewer services

Description	Bulk System	Reticulation System	Total
Water (pro-rata cost)	R1 944 834.00	R0	**R1 944 834.00**
Sewer (pro-rata cost)	R96 576.00	R0	**R96 576.00**
Sewer (full cost)	R12 098 000.00 [4.2]	R3 596 000.00	**R15 694 000.00**
Total (excluding VAT)			**R17 735 410.00**

Notes:
1. It should be noted that the unit cost for the water and sanitation infrastructure included in the water and sanitation master plan is under review. The cost and pro-rata cost indicated by GLS and captured in this letter are therefore subject to change and is furthermore subject to change based on actual construction cost.
2. All off-set calculations will be determined in drafting the Services Agreement, an example of a typical off-set is included in section 4.2.
3. [4.2] refer to section 4.2 for offsetting example.

4.2. Development Specific Infrastructure

General:

All infrastructure beyond the extent of the current infrastructure (bulk and link services) as well as the reticulation internal to the development is considered development specific and is for the full cost of the developer (design and implementation and associated environmental cost, etc.).

All such required link and internal infrastructure will require the necessary maintenance and operation by the Developer or subsequent HOA/POA and utility company, except where agreed/stated otherwise.

Bulk services over and above the requirements of the development:

The alignment of these services will have to be coordinated and agreed to between the Developer and the George Municipality.

The Services Agreement should include these costs and services for the offsetting of development contributions as applicable.

Explanation of principle of setting off cost against Development Contributions: The cost for the upgrading of the bulk gravity sewer required to service the development over and above the Developer's pro-rata contribution, can be off set against the Development Contributions payable for sewer services, resulting in a balance of R6 440 126.84 excluding VAT as a contribution due by the George Municipality, subject to any other off set that may also be applicable. Refer to table 3 below.

Table 3: Off-set of Development Contributions example

Item	**Amount (excluding VAT)**
(A) Estimated total cost to upgrade:	
a. Bulk gravity sewer (item OT_09.03 & 09.04)	R12 098 000.00
(B) Pro-rata contribution to upgrade:	
a. Bulk gravity sewer (item OT_09.03 & 09.04)	R61 494.00
Balance (A – B)	**R12 036 506.00**
Development contributions: Sewer services only (see section 5)	R5 596 379.16
Balance (contribution by the George Municipality)	**R6 440 126.84**

Note:
- Estimated and subject to annual escalation.
- The above is an example of such a scenario and does not provide a full indication of the costs that could be offset against Development Contributions. This will be resolved as part of the drafting of the Services Agreement.

5. DEVELOPMENT CONTRIBUTIONS

The current total Development Contributions (DC's) relating to Civil Engineering Services, and in accordance with the current guidelines, for the proposed development were calculated on 10 December 2025 for water and sanitation services, only based on the site development plan, and amounts to R11 296 019.86, excluding VAT.

The above amount is made up as follows:

- Water: R5 699 640.70
- Sewer: R5 596 379.16

The Developer is reminded of the following Clause relating to the calculation of Development Contributions:
"Any amendments or additions to the proposed development which is not contained within the calculation sheet as stated in clause 2 above which might lead to an increase in the proportional contribution to municipal public expenditure, will result in the recalculation of the Development Contributions and the amendment of these conditions of approval or the imposition of other relevant conditions of approval."

The DC's included in this letter is an indication of the contributions due and are not confirmed as the final amount payable.

In addition, the DC's amount is subject to amendment based on annual escalation and applicable at the time that development contributions are due for payment. The Council has an approved Development Contributions Policy and guidelines for the calculation of DC's.

6. BULK INFRASTRUCTURE IMPLEMENTATION

The Developer will be required to perform the necessary project management services from commencement to close out for implementation of the bulk infrastructure.

The deliverables per stage shall be submitted to the Civil Engineering Services Directorate for approval and who shall be invited to attend all construction progress meetings.

7. COMMENCEMENT OF DEVELOPMENT

This letter confirms the status of the infrastructure at the time of writing this letter. Capacity is not reserved for any development. Confirmation of availability of services is valid for a **period of 6 months** from the date of letter, after which the Developer must again request confirmation from the Municipality.

The development, in its entirety or in phases, is subject to confirmation by the Director: Civil Engineering Services regarding the availability of water supply & treatment capacity and sanitation bulk conveyance & treatment capacity at the time of the development implementation, or if developed in phases before the commencement of each phase.

A development/implementation program is to be provided by the Developer when requesting confirmation of the capacity from the Director: Civil Engineering Services. If the Developer does not adhere to the program provided and approved by the Director: Civil Engineering Services, the Director: Civil Engineering Services will be entitled to revise the availability of such bulk capacity.

No development may connect to the municipal water and sewer system unless the required bulk and link infrastructure is available, and a Services Agreement/Memorandum of agreement (if applicable) is signed between the Developer and the Municipality.

Yours faithfully,

LINDSAY MOOIMAN
DEPUTY DIRECTOR: INFRASTRUCTURE PLANNING & PROJECT MANAGEMENT

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Date: 11 December 2025

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Element Consulting Engineers
82 Victoria Street
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6530

By E-Mail

Attention: Mr. Jako Fourie

ERF 28005 GEORGE: PROPOSED DEVELOPMENT OF RESIDENTIAL APARTMENTS: ELECTRICAL SUPPLY

Your email request on 26 November 2025 for confirmation of capacity has reference.

We hereby take note of the specialist technical report and the estimated demand to the proposed development. The technical details of the installation will be determined once an approved Site Development Plan is finalised and the Services Agreement is compiled.

We can confirm that there is adequate spare capacity available on the George Municipal network to accommodate the proposed development.

The Development will, however, have to make a contribution for the additional capacity of approximately 1200kVA required. This will be finalised during the final approval process.

We trust that the above information is sufficient for the statutory approval process to be concluded.

Yours faithfully

_____
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