KANTEY & TEMPLER
CONSULTING ENGINEERS
ESTABLISHED 1953

66 Victoria Street
P O Box 458
George
6530

Tel: +27 44 874 2177
Fax: +27 44 874 1364

07 December 2023

Our Ref: G5215BA
Your Ref:

Pieterkoen Development Company (Pty) Limited
PO Box 92
George
6530

Attention: Justin Branford PER e-mail: justin.branford@igen.co.za

Dear Sir

APPLICATION FOR REZONING AND SUBDIVISION OF THE FARM PIETER KOEN (KRAAIBOSCH 195/21), GEORGE: EIA AND TOWN PLANNING – AVAILABILITY OF CIVIL SERVICES FOR PROPOSED RESIDENTIAL DEVELOPMENT REV 1

On behalf of the developer, we have prepared a services report highlighting the available civil services for this development based on the Architects layout - SUB/003 (6 December 2023). It is envisaged that the development implementation will be phased over a period of six years commencing in 2024. The service requirements are estimated as follows.

- Portion 1&2 (Townhouse and Flats):
  - 44 Townhouse units – 114,5 m² - 2 bedroom
  - 9 Flats (74m²) - 2 bedroom
  - 22 Flats (68m²) – 2 bedroom
  - 22 Flats (72m²) - 2 bedroom
  - 22 Flats (68m²) - 2 bedroom
  - 9 Flats (48m²) - 1 bedroom
- Portion 6 (Business & Flats):
  - Supermarket @ 560m²
  - Line shops @ 340m²
  - Creche @ 225m²
  - Flats on first Floor: 9 x 2 Bedroom @ 720m² total
- Portion 7 (Hotel):
  - Restaurant, coffee shop and small meeting rooms @ 500m²
  - Gym and Spa @ 420m²
  - Existing house (offices, lounges) @ 320m²
  - Existing store (Meeting and storage) @ 240m²

-	Portion 8	Group Housing (Cottages):	18
		Group Housing:	40
		Single Residential Erven:	33
-	Portion 9	Single Residential Erven:	28
-	Portion 10	Group Housing:	5
-	Portion 11	Group Housing (Cottages):	18
		Group Housing:	24
		Single Residential Erven:	18
	Total Residential Opportunities:		321

1. Water

Water demand for the proposed housing units with an average annual daily consumption of 800 l/unit/day for the 3-bedroom units, 560 l/unit/day for the 2-bedroom units, 400 l/unit/day for the 1-

bedroom units and the flats at 400 l/unit/day is 170,58 kℓ/day. George Municipality have confirmed that they will have sufficient supply of treated potable water to provide this proposed development with an on-site connection, considering the implementation program of six years commencing in 2024 - letter attached as Annexure A. The bulk and link service upgrades required is as per the attached GLS report. Final requirements will have to be recorded in a Services Agreement to be concluded between the developer and the Local Authority.

The developer will be responsible to connect to the existing municipal network which is in close proximity to the proposed development (to the south of the site).

2. Sewage disposal

The sewage master plan of the Local Authority does allow for this development in terms of bulk disposal and treatment of the sewage outfall. The Local Authority has confirmed the availability of this service - letter attached as Annexure A. The bulk and link service upgrades required is as per the attached GLS report. Final requirements will have to be recorded in a Services Agreement to be concluded between the developer and the Local Authority.

The estimated sewerage effluent quantity produced for the development and based on the water demand will be 136,46 kl/day. This equates to a peak flow of 4,90 l/s. The developer will be responsible to deliver sewage by gravity or by pumping to an existing outfall sewer which is in close proximity to the proposed development (to the west and east of the site).

Two temporary pumpstations will be required to pump effluent from the east to the west side of the development – see attached Annexure B - G5215BA-CE-101-A. These temporary measures will be constructed and maintained by the developer. Once the developments to the east have been implemented the temporary measures will be substituted by connecting the pump stations to the gravity system to the east - see attached Annexure B - G5215BA-CE-102-A. This gravity system will be transferred to and maintained by the Local Authority.

3. Road Access

Road access will be provided via the existing roads network within the Kraaibosch development area. The development fall within the Kraaibosch Roads Cost Model area (C1736 Kraaibosch Cost Model Rev 5.2 20220413) and road contributions will be calculated/negotiated according to the model.

The development form part of the Kraaibosch Roads Cost Model and a revision of the TIA information has been done, considering the current usage and trip generations. This could/will affect the cost contribution for roads, of this development, but will not have major implications for access which will still be from Glenwood Avenue.

The width of internal roads will be 5,5m average. The roads will have concrete block paving as the final wearing surface with gravel layerworks beneath.

4. Telkom

The developer will install cable ducts and junction boxes to all properties. Erf connections will be installed by a service provider who will be appointed at a later stage.

5. Stormwater Disposal and Management Plan

Stormwater infrastructure is envisaged to be provided by the developer – see drawing G5215BA-CE-102-A, G5215BA-CE-110-A and G5215BA-CE-111-A. All necessary precautions will be taken to prevent erosion.

Design Philosophy

Stormwater management will be according to recommendations contained in the Red Book i.e., Guidelines for Human Settlement Planning and Design as compiled by the CSIR. The principals of SuDS will further be considered to minimise the amount and impact of stormwater leaving the site.

A dual drainage system will be adopted. Source control of the minor flood with 1:5 year or less recurrence intervals will be provided by the utilisation of roof water collection rainwater tanks to collect runoff from roofs for later use in irrigation of gardens etc. Local control will be facilitated by the use of catchment structures and will, where possible, be constructed per erf pockets as required. This will to some extent facilitate infiltration of water at source.

The major flood with 1:50 year recurrence interval will be carried in the streets and the formal system (as per Guidelines) and only where the above minor system's capacity is exceeded, then in overland open or piped channels to the natural watercourses.

During the detail design phase, storm runoff from catchment areas will be calculated and catchpit inlets will be positioned and sized to match runoff volumes. The capacity of road kerbs will also be checked against major runoff volumes. Stormwater servitudes will be provided between erven where necessary to accommodate overland open channels with sufficient capacity to carry major storm runoff from the edge of the road to the nearest natural watercourse.

Specific Considerations

Runoff from the land will increase because of the development, but this will be accommodated in the design of the minor and major stormwater system. The increased runoff will not affect any existing or proposed properties, since all properties are well above the 1:100 year flood lines for the major natural watercourse (Swart River).

Increased overland flow velocities

Various measures will be incorporated to mitigate increased flow velocities like:

- Energy dissipaters and stilling basins at stormwater pipe outlets. Reno mattress aprons with stilling basins where appropriate will be provided at all culvert outlets. Large rocks will be effective as energy dissipaters and will contribute to the landscaping.
- Lining of open channels with grass (swales) and or stone pitching where required.
- Utilisation of invader tree logs to act as flow speed calming structures placed across flow paths and anchored properly.
- Utilisation of Gabion type structures to act as flow speed calming elements placed across flow paths and anchored properly.

Quality of water

Long term contamination of stormwater run-off is not a concern as the development consists mostly of commercial and housing development. In line with the SuDS principals pipe culvert outlets will be provided with Gabion and Reno mattress structures to facilitate slowing of minor storm flows and to provide infiltration areas to augment subsurface flow. Possible pollutants will be trapped in these structures and can be cleaned out as part of a regular maintenance schedule.

The site is most vulnerable during the construction phase, and it will be necessary to utilize silt screens and onion bags to trap silt before the run-off joins the natural watercourses. Once vegetation in all the disturbed areas of the development is well established and ground surfaces have consolidated, no further measures will be required. These measures will be the subject of the Environmental Management Plan (EMP) which will be issued to the contractor at construction stage. The Environmental Control Officer (ECO) will be responsible for enforcing the EMP.

Protection of slopes that occur on the property

Natural slopes that have been disturbed and where sheet flow occurs will be landscaped and re-vegetated. Where flow is concentrated, measures will be incorporated as proposed above.

Where stormwater is channelled towards the river and tributary streams, outlets have been spaced at intervals along the stream edge to avoid concentration of large flows. Stormwater will thus be fed into the streams and river system along a wide front allowing dissipated flow and seepage to all areas.

Watercourse/River Crossings

It is not anticipated at this stage to have any road river crossings constructed.

Preliminary High level Flow Estimation

The figures provided below should be considered as estimated quantities only.

Flow estimation has been done according to the Rational Method for the 1:5 years return period nl. stormwater accommodated in the underground piped system and stormwater accommodated as overland sheet flow per the existing topography. Flow is indicated for the east side contributing to the existing stream as follows.

Pre-development flows:

- 202,63 l/s

Post-development flows:

- 399,18 l/s

As can be seen the expected increase in flow is 196,55 l/s.

6. Solid Waste disposal

The Local Authority will dispose of the solid waste. Collection of the waste will be by mutual agreement between the Developer and the Local Authority.

We trust you find the above in order. Please let us know if anything is unclear or if you require further information.

Yours faithfully
KANTEY & TEMPLER

C G AGENBAG Pr Eng

Z:\G5215-Dev Koen\Admin\Let-Pieter Koen Kraaibosch Civil Services Report rev 2.docx

Annexure A – Municipal Services Available

Annexure B

Drawings:

G5215BA-CE-101-A
G5215BA-CE-102-A
G5215BA-CE-110-A
G5215BA-CE-111-A
G5215BA-CE-112-A