Jannie KoegelenbergDirector: Civil Engineering Services
E-mail: jkoegelenberg@george.gov.za
Tel: +27 (0)44 801 1567

Reference number: Erf 19374, George (Urban Country Estate Internal Services)Collab no: 2705250
Date: 2023-08-23

Enquiries: **R Fivaz**
044 801 1573

CHEL Building & Civil Services (Pty) LtdNo 141 Chip Close,
Le Grand Estate,George,
6534

082 881 5456

Attention: Mr. Henco Scholtz

Per email: henco.chel@gmail.com

URBAN COUNTRY ESTATE - CIVIL ENGINEERING DRAWINGS FOR

APPROVALREMARKS/COMMENTS

Herewith confirmation of receipt of drawing for Urban Country Estate services. Please note the following comments on the drawings listed, and subject to the following conditions:

Plans received, listed below:

1. PC22024-CIV-2101-0C-Combined Services Layout & Detail
2. PC22024-CIV-2301-0C- Water Reticulation Layout
3. PC22024-CIV-2302-0C- Water Reticulation Long Section (Sheet 1 of 2)
4. PC22024-CIV-2303-0C- Water Reticulation Long Section (Sheet 2 of 2)
5. PC22024-CIV-2401-0C- Sewer Reticulation Layout
6. PC22024-CIV-2402-0C- Sewer Long Section (Sheet 1 of 2)
7. PC22024-CIV-2403-0C- Sewer Long Section (Sheet 2 of 2)
8. PC22024-CIV-2501-0C- Urban Country Estate SWMP
9. PC22024-CIV-2502-0C- Stormwater Drainage Layout
10. PC22024-CIV-2503-0C- Stormwater Long Section (Sheet 1 of 2)
11. PC22024-CIV-2504-0C- Stormwater Long Section (Sheet 1 of 2)
12. PC22024-CIV-2601-0C- Internal Road Layout
13. PC22024-CIV-2602-0C- Internal Roads Long Section (Sheet 1 of 2)
14. PC22024-CIV-2603-0C- Internal Roads Long Section (Sheet 1 of 2) Traffic circle setting out.
15. Typical sewer detail
16. Cover page-combined (2)(1)
17. Cover page-combined (2)

Remarks/Comments

Water

1. Location of existing service to be confirmed on site before commencing with anyconstruction works.
2. All design details must be in accordance with the relevant municipal standards and specifications and must be submitted for approval prior to construction commencing.
3. All water mains to be minimum 75mm Ø UPVC class 12.
4. The Directorate CES (Water section) is to be consulted, prior to installation, regarding therequired specifications associated with the type of connection (bulk meter versus individual meters) required.
5. Should a bulk meter be required, the water meter should be installed in a water tied chamber, accessible to the Municipality of contractor representing the Municipality. The chamber access should be secured with lockable lid (Preferable a Smart lock or similar approved)
6. All saddles, pipe and pipe fitting used must be Class 16 SABS approved.
7. All water house connections to be minimum 20mm Ø class 12.
8. All fire hydrants outlets shall be London Round thread with loose cap and securing chain and shall be clockwise opening / left hand closing, and the installation should conform to SANS 10400-T:2020 Edition 4 (4.35.4) & SANS 10400 W:2011.
9. Water mains not included within the ring feed network must be equip with fire hydrants, which shall act as a scour valve.
10. All valves shall be AVK seal type valve or similar approved, clockwise opening / left hand closing.
11. Fire hydrant chambers to be constructed in line with the Fire departments standards.
12. Valve chambers to be constructed with minimum 160mm Ø pipe section and valve chamber.
13. Drawing: PC22024-CIV-2301-0C- Water Reticulation Layout
    I. No water connection indicated for erf 37,
    II. Proposed water network indicated on erf 74 is regarded as private and will not betaken over by the George Municipality. Only a single connection points will be allowed.
14. All thrust block details to be in accordance with applicable SANS standards.
15. Individual water meter to be installed to George Municipality standards. Meter applicationsto be addressed to Dept: Finances.
16. No Municipal water connections for irrigation purposes are allowed.
17. A minimum three (3) meter wide servitude is to be registered along water mains located outside building lines. No structure or large plant or any other physical obstacle may be placed within a minimum of one and a half (1,5) meters from the edge of the pipeline.
18. Prior to any connection to the exiting Municipal water network, approval with regards to thedate and construction method to be followed, must be requested from Operation water department.
19. Developer to obtain the required way leave approval from the applicable servicesauthority before commencing with any construction within the road reserve.

Sewer

1. Location of existing services to be confirmed on site before commencing with construction.
2. All design details must be in accordance with the relevant specification and must be submitted for approval.
3. All sewer pipes to be heavy duty solid wall type.
4. All sewer house connections to be 110mm Ø minimum.
5. All sewer mains to be 160mm Ø minimum.
6. All design slope of gravity mains must be in line with applicable design standards.

7. All design flow velocities must be in line with applicable design standards.
8. Manhole cover tbe Polymer Concrete or similar approved with lockable lid (Preferable a Smart lock or similar approved)
9. Manhole piping to be flush with manhole internal walls.
10. Manholes to waterproof with al joints sealed to supplier specifications. Waterproof testsshould be submitted with as built information.
11. Stepping within Manhole to align with the manhole access opening.
12. Manhole Benching must be Dolomitic aggregates and low alkali sulphate resisting cementto SABS 471.
13. Drawing: PC22024-CIV-2401-0C- Sewer Reticulation Layout
    I. Proposed sewer network indicated on erf 74 is regarded as private and will not be taken over by the George Municipality. Only a single connection points will be allowed.
14. The proposed sewer main from the development that must be accommodated across another erf must be negotiated between the developer and the owner of the relevant erf. Any costs resulting from the accommodation of such services or the incorporation of theseservices into the network of another development are to be determined by the developer and the owner of the other erf.
15. Where the development connects to the existing sewer main and/or pumpstation, manholes benching must be treated with a protective Sikaguard 720 Epocem or similar approved as protection against aggressive sewer gasses at the discharge point into the Municipal system.
16. Property manholes to be constructed as part of top structure development.
17. All brick-built chambers to be plastered on the inside.
18. All sewers in low lying areas to have sufficient protection against erosion.
19. Developer to obtain the required way leave approval from the applicable servicesauthority before commencing with any construction within the road reserve.
20. A minimum three (3) meter wide servitude is to be registered along water mains located outside building lines. No structure or large plant or any other physical obstacle may be placed within a minimum of one and a half (1,5) meters from the edge of the pipeline.
21. Design velocity not indicated on plan, but the velocity must be within red book parameters.
22. Any municipal service situated on a private erf must be indicated in the title deed.
23. Prior to any connection to the exiting Municipal sewer network, approval with regards to the date and construction method to be followed, must be requested from Operation sewerdepartment.

Stormwater

1. All design details must be in accordance with the relevant specification and must be submitted for approval. Consulting Engineer will have to verify the capacity of the exitingstormwater system with the Municipal appointed. Any upgrade required must be indicatedon plan and submitted for approval.
2. Drawing PC22024-CIV-2502-0C- Stormwater Drainage Layout
    I. No stormwater detail supplied. Stormwater detail to be in accordance withMunicipal standards.
    II. Design to ensure stormwater inlet detail to have 1:4 concrete benching to channel stormwater towards stormwater pipe.
    III. Stormwater outlets/discharge to have sufficient energy dissipating measuresto minimize possible erosion.
    IV. Where applicable stormwater outlets/discharge points to be effectively protected against erosion and ensure that erosion at outlet point is minimized.As far as is possible discharge velocities should be less than erosion velocities. Any filling may not create or lead to any ponding or alteration to a natural water course.
    V. Stormwater discharge must comply with regulation R1.

3. No Municipal stormwater pipe may be smaller than the minimum allowable of 450mm Ø 100D.
4. Proposed stormwater pipeline must be relocated, and a suitable servitude registered overthe new proposed stormwater location, if the pipeline is not located within the proposed road reserve.
5. All design details must be in accordance with the relevant municipal standards and specifications and must be submitted for approval prior to any construction work taking place.
6. All brick-built chambers to be plastered on the inside and outside.
7. Developer to obtain the required way leave approval from the applicable servicesauthority before commencing with any construction within the road reserve.

Road:

1. Road layer to be design to standards as define within the applicable UTG design criteria.
2. Drawings PC22024-CIV-2602-0C- Internal Roads Long Section (Sheet 1 & 2)
3. Road Gradient to be amended to comply to normal design standards.
4. Allowance for suitable turning facilities must be made available on site to accommodatesolid waste removal, should the provision for the removal of solid waste not be allowed within the development. The public road reserve is not to be used for this purpose.
5. Construction vehicles access should be managed to minimize their impact on normaltraffic, with offloading of construction material to be accommodated on site.
6. Internal and external sidewalks to be constructed to Universal Accessible standards.

Please note:

Where details have not been provided on engineering plans, or where no specific reference hasbeen made to details in the ensuing comments by this department, the developer is still responsible for the installation of all services, as well as materials used, in accordance with SABS1200, or relevant SANS specification.

All drawings and plans must also be submitted to the Directorate: Civil Engineering Services in an electronic format. All work is to be carried out under the supervision of a registered consulting engineer who is to provide the Dir: Civil Engineering Services with a certificate of completion, and as-built plans in electronic format. All costs will be for the developer. The George Municipality reserves the right to withhold the approval of transfers if these conditions are not complied with.

Please contact Mr Ricus Fivaz if you have any further queries.

Yours faithfully,
JANNIE KOEGELENBERG
DIRECTOR: CIVIL ENGINEERING SERVICES

/CES_Data/Shared Documents/General/04_Land_Matters/4.2_Developments/Erf19374_UCE/Correspondence/2023-08-23Erf19374,George-internalServices.docx

Date: 06 June 2025
CHEL File: CHEL-UCE-George-BESDR-002
CHEL Building & Civil Services
Client File: UCE-George- Engineering Design Report

George Municipality
No 71 York Street
Po Box 19
George
Western Cape
6530

Phone: 044 801 9111
Email: lwaring@george.gov.za

Attention: The Director Human Settlements, Planning and Development - Ms Lauren Waring

Dear Sir's

RE: ENGINEERING DESIGN REPORT – URBAN COUNTRY ESTATE ON ERF 19374 – HEATHER PARK; GEORGE:

With reference to the following attached documentation:

- *Bulk Services Engineering Design Report. CHEL-UCE-George-PDR-002*
- *Combined Services layout drawing: PC22024-CIV-2100-0F-Combined Services Layout 2025-06-03*
- *Water Reticulation Layout: PC22024-CIV-2301-0C- Water Reticulation Layout 2023-07-10*
- *Water Reticulation Long Section Sheet 1 of 2: PC22024-CIV-2302-0C- Water Reticulation Long Section 2023-07-10*
- *Water Reticulation Long Section Sheet 2 of 2: PC22024-CIV-2303-0C- Water Reticulation Long Section 2023-07-10*
- *Sewer Reticulation Layout: PC22024-CIV-2401-0F- UCE Sewer Reticulation Layout 2025-06-03*
- *Sewer Reticulation Long Section Sheet 1 of 2: PC22024-CIV-2303-0E- Sewer Long Section 2025-06-03*
- *Sewer Reticulation Long Section Sheet 2 of 2: PC22024-CIV-2403-0E- Sewer Long Section 2025-06-03*
- *Stormwater Drainage Layout: PC22024-CIV-2301-0G- Stormwater Drainage Layout 2025-06-03*
- *Stormwater Long Section Sheet 1 of 2: PC22024-CIV-2503-0C- Stormwater Long Section 2023-07-10*
- *Stormwater Long Section Sheet 2 of 2: PC22024-CIV-2504-0C- Stormwater Long Section 2023-07-10*
- *Internal Road Layout: PC22024-CIV-2601-0C- Internal Road Layout 2023-07-10*
- *Internal Road Layout: PC22024-CIV-2601-0C- Internal Road Layout 2023-07-10 Cable Sleeves*
- *Internal Roads Long Section Sheet 1 of 2: PC22024-CIV-2602-0C- Internal Roads Long Section 2023-07-10*
- *Internal Roads Long Section Sheet 2 of 2: PC22024-CIV-2603-0C- Internal Roads Long Section 2023-07-10*

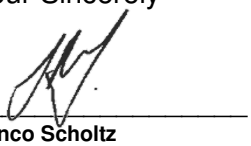
We hereby submit, on behalf of our Client, our Engineering Services Design Report for your review and approval.

We thank you for the support that have been received to date for this very exciting new development in Heather Park, George. We trust that the report is clear, please feel free to contact us, should you have any questions.

CHEL Building & Civil Services (Pty) Ltd. Reg No. 2022/274155/07
No 141 Chip Close; Le Grand Estate; George; 6534
Director: HC Scholtz Tel: 082 881 5456 Email: henco.chel@gmail.com

We avail ourselves for further discussions and assistance.

Your Sincerely



Henco Scholtz
Director
Cell: 082 881 5456
Email: henco.chel@gmail.com

Cc. **Ricus Fivaz (George)** **Melanie Geyer (George)** **Ernest Claassens (George)**
Shaun Gomez (Urban) **Willem van Niekerk (Bisiwe)** **Marlize de Bruyn (MDBP)**
Andre le Roux (Delmar) **Conrad Swart (Delmar)**
Louis Fourie (Newground) **Wesley Jevon (Newground)**

CHEL Building & Civil Services (Pty) Ltd. Reg No. 2022/274155/07
No 141 Chip Close; Le Grand Estate; George; 6534
Director: HC Scholtz Tel: 082 881 5456 Email: henco.chel@gmail.com

J Koegelenberg
Director: Civil Engineering Services
Directorate: Civil Engineering Services
E-mail: jkoegelenberg@george.gov.za
Tel: +27 (0)44 801 9278

Reference number: Erf 19374
Date: 10 March 2025

Enquiries: M Geyer
044 801 9268

ATTENTION: MR H SCHOLTZ

CHEL Building and Civil Services (Pty) Ltd
George
6530

ERF 19374: PROPOSED DEVELOPMENT

AVAILABILITY OF BULK WATER AND SEWER INFRASTRUCTURE & ASSOCIATED COSTS AND CHARGES

Your request dated 27 January 2023 to accommodate the proposed development in the George Municipal water and sewer system and your subsequent request of 29 January 2025 of an update on the accommodation of the proposed development refers.

For ease of reference, changes from the original letters commissioning or completion of infrastructure upgrades are indicated in red text.

The George Municipality confirms that the proposed development is included in the general growth and development infrastructure planning of the George Municipality. This pertains to water (raw water and potable), sewage and roads infrastructure.

A technical report was prepared by GLS dated 24 February 2023 and revised on 20 March 2023, attached to the letter dated 04 April 2023.

Proposed Development
The proposed implementation plan of the development, received as part of the technical report, is as per table 1 below received during February/March 2023.

Table 1: Proposed implementation plan of development (February / March 2023)

Phase	Short Description	
1	T2: Single Storey residential	13 of 11 units
	T3: Single Storey residential	3 of 21 units
	T4: Double storey residential	5 of 21 units
2	T2: Single Storey residential	4 of 23 units
	T3: Single Storey residential	19 of 23 units
3	T2: Single Storey residential	13 of 29 units
	T3: Single Storey residential	9 of 29 units
	T4: Double storey residential	7 of 29 units

Phase	Short Description	
4	T1: 2-bedroom flats	40 of 40 units

Water and Sewer Bulk Infrastructure Capacity

Phase 1

a) Wastewater Treatment

- The Gwaing Wastewater Treatment works 3.5Ml/day capacity upgrade is completed.
- At present, the treatment works has sufficient capacity for phase 1 of the development and will therefore be permitted to connect to the Municipal sewer system.
    - The above is subject to the confirmation of the revised sewer flows and implementation plan for this phase.

b) Water Treatment:

- The Water Treatment Works (new) is currently operating under constraint.
- A ±4.5Ml/day capacity upgrade of the old treatment works is completed.
- A 20Ml/day capacity upgrade of the new treatment works is in progress with an estimated completion date in the first quarter of 2025.
- The treatment works will have sufficient capacity for the development in its entirety once the ±20Ml/day capacity upgrade is commissioned.

Phase 2 to 4:

In line with general growth and demand, new supporting bulk infrastructure must be constructed, and existing infrastructure upgraded where necessary to accommodate the services demand of all new developments in George.

The capacity of the treatment works is discussed below.

c) Wastewater Treatment:

- The Gwaing Wastewater Treatment works is currently operating under constraint.
- The treatment works however continues to operate under constraint and will only have sufficient capacity for phase 2 to 4 of the development once a 10Ml/day capacity upgrade is commissioned. The implementation date is currently unknown. The upgrade is currently within the design stage and undergoing the required environmental processes.

As a result of the above, the following alternative methods are proposed to allow the development to continue beyond phase 1 in the absence of the available capacity in the municipal sewer system at the time of implementation of these further phases. These alternatives are discussed below.

Alternative Proposal 1 – (not necessarily applicable to entire development):

The developer will be permitted to construct a conservancy tank, where practically possible, to service parts/phases of the development, in lieu of a connection to the Municipal network, and a discharge permit shall be issued permitting discharge of sewage at the Outeniqua WWTW. The developer will be fully responsible for the removal of the sewage, and cost thereof, to the WWTW.

Due to the extent of the development the proposal is not practical for all future phases but could be considered for very limited parts of the development, subject to the approval of the Municipality and the Developers capacity to service the conservancy tanks.

Alternative Proposal 2:

Alternatively, design, implement, operate and maintain an on-site wastewater treatment package plant.

The Developer should however note the requirements in terms of the National Water Act and registration as a Water Services Intermediary with the Municipality for compliance monitoring.

The Developer should note that this proposal includes the added advantage of treated effluent that could potentially be used for non-potable use that will reduce the potable water demand and associated development charges etc.

For this alternative the developer will have to indicate whether this is a temporary arrangement, or if the longer-term intention will be to connect to the municipal sewer system once capacity becomes available at the Gwaing WWTW.

d) Water Treatment:
- The Water Treatment Works (new) is currently operating under constraint.
- A ±4.5Ml/day capacity upgrade of the old treatment works is completed.
- A 20Ml/day capacity upgrade of the new treatment works is in progress with an estimated completion date in the first quarter of 2025.
- The treatment works will have sufficient capacity for the development in its entirety once the ±20Ml/day capacity upgrade is commissioned.

Commencement of Development

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 and treatment capacity at the time of the development implementation, or if developed in phases before the commencement of each phase.

A development/implementation programme 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 programme 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 (a portion thereof or an erf) may connect to the municipal water and sewer system unless the required bulk and link infrastructure is available.

Connection points

Sanitation:

At present, only phase 1 of the development is permitted to connect to the Municipal sewer network through the connection options discussed below. The remainder of the development (phases 2 to 4) is subject to the requirements and conditions stated above.

The George Municipality is of the opinion that the entire development may not be possible to drain to point B, and two connection points must be considered for this development in draining the Northern and Southern parts [A] of the development successfully.

a. Point B: Connection point by the George Municipality (costing included in Table 2 for this connection point)
b. Point A and Point A interim: The Southern portion of the development shall drain through either of these connection points. (Costing for Point A included in table 2 for connection point)

[A] All properties below the entrance to the development via Plantation Road.

Water:

a. Point A: Preferred connection point by the George Municipality (costing included in Table 2 for this connection point)

The Developer must kindly consider the water and sanitation connection points and consult with the Municipality on the final connection points during detail design stage and drafting of the services agreement.

Conclusion

The purpose of this letter serves to confirm the availability of capacity within the water and sanitation network at the time of request.

With the absence of a formal land use approval process, the availability of capacity of a municipal service for the development is not reserved and the confirmation/verification of available capacity within the water and/or sewer system can change at any time.

In conclusion:

- The existing sewer infrastructure can accommodate phase 1 of the development only, subject to the requirements listed. This confirmation of availability is valid for a period of 6 months from date of letter, after which the developer must again request confirmation from the Municipality.
- The developer may continue with the development of phases 2 to 4, subject to design, implementation and approval of the proposed alternative solutions to development, or until such time that the bulk sewerage system (wastewater treatment works) as described above have been implemented. The developer is therefore permitted to consider the implementation of alternative solutions in order to develop but will be required to obtain the necessary approval from all organs of state.

Water and Sewer Bulk Infrastructure Upgrades

The summary of the technical report concludes that the total pro-rata cost for water and sewer infrastructure upgrades in support of the development amounts to R 3 345 000.00 excluding VAT.

Table 2: Summary of General and Development Specific Upgrade to the Water and Sewer System

Description	Water (excl. VAT)	Sewer (excl. VAT)	Total (excl. VAT)
General: Bulk water system	R 937 000.00	R 1 143 000.00	R 2 080 000.00
Development specific: Bulk water system	R 0.00	R 0.00	R 0.00
General: Distribution / Conveyance	R 0.00	R 0.00	R 0.00
Development specific: Distribution / Conveyance	R 394 000.00	R 957 000.00[B]	R 1 351 000.00
Total	**R 1 331 000.00**	**R 2 100 000.00**	**R 3 431 000.00**

[B] Sum of Section 4.4.2 and 4.4.3 of the GLS technical report.

Reimbursement of expenditure

In term of section 66(4) of the Planning By-law, the Developer will be required to make a proportional contribution to municipal public expenditure according to the normal need arising from the approval. The Developer will be reimbursed for the actual expenditure incurred for any services provided by the Developer above the normal need, up to the maximum value equal to the applicable Development Charges calculated for the services as per the approval, subject to normal escalation. The developer is to consult with the Municipality prior to incurring any expenditure for the Municipality to verify that the costs are in line with current construction costs for similar works.

For this development, the development specific items required are confirmed in sections 3.5.2 for water and 4.3.2 for sanitation of the technical report.

The Bulk water and sewer system items are currently being addressed, i.e., the extension of the capacity of the Water Treatment Works. Development Contributions payable by the Developer will cover the cost of the pro-rated development contribution.

However, the remaining items (referred to as general items in the technical report) must be addressed to accommodate the development and are to be constructed by the Developer. The pro-rata amount more than the development specific demand will be credited against the Development Contributions payable. The Developer's appointed registered Engineer will be required to submit a motivational report, indicating the quantum of services provided.

Table 3: Items to be addressed by the Developer for which credits may be applicable

Description	Estimated Cost	Estimated Pro-rata Cost	Pro-rata %	DC Credit % of actual cost
Water (refer to section 3.5.2)				
General items to address existing problems in the bulk water system	R 360 721 000	R 937 000	0.26%	99.74%
Development Specific items required in the water distribution system (incl fire flow)	R 848 000	R 394 000	46.46%	N/A
Sewer (refer to section 4.4.2)				
General items required to alleviate problems in the bulk sewer system	R 206 851 000	R 1 143 000	0.55%	99.45%
Development Specific items required in the existing sewer system (point A and B)	R 1 807 000	R 957 000	52.96%	N/A

Note that the above costs are indicative only and will vary according to actual cost of construction.

Link services requirements
The developer will not be entitled for any reimbursement relating to the provision of any link and/or internal services.

The Developer is requested to confirm the connection point for the water network from the two options as indicated in figure 1 of the technical report.

Development Charges
The current total development charges relating to Civil Engineering Services in line with the water demand and sewer return flows as included in the technical report, and in accordance with the current guidelines, for the proposed development were calculated on 07 March 2023 and amount to R 5 535 911.64 excluding VAT. This amount includes for water, sanitation, and road development contributions applicable at the time of preparing this letter.

The Developer is reminded of the following Clause relating to the calculation of development charges:
"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 charges and the amendment of these conditions of approval or the imposition of other relevant conditions of approval."

In addition, the amount is subject to amendment based on annual escalation and applicable at the time that development contributions are due for payment. The Council is in the process of finalizing a Development Contributions Policy for implementation on final approval by Council.

Kindly confirm your acceptance of the above in writing.

Yours faithfully,

Jannie Koegelenberg
Director: Civil Engineering Services

J Koegelenberg
Director: Civil Engineering Services
E-mail: jkoegelenberg@george.gov.za
Tel: +27 (0)44 801 9278

Reference number: Erf 19374
Date: 06 April 2023

Enquiries: M Geyer
044 801 9268

ATTENTION: MR H SCHOLTZ

CHEL Building and Civil Services (Pty) Ltd
George
6530

ERF 19374: PROPOSED DEVELOPMENT

AVAILABILITY OF BULK WATER AND SEWER INFRASTRUCTURE & ASSOCIATED COSTS AND CHARGES

Your request dated 27 January 2023 to accommodate the proposed development in the George Municipal water and sewer system refers.

The George Municipality confirms that the proposed development is included in the general growth and development infrastructure planning of the George Municipality. This pertains to water (raw water and potable), sewage and roads infrastructure.

A technical report was prepared by GLS dated 24 February 2023 and revised on 20 March 2023, attached to this letter as annexure A, B and C.

Proposed Development
The proposed implementation plan of the development, received as part of the technical report, is as follows:

Table 1: Proposed implementation plan of development

Phase	Short Description		Implementation Date / Connection Date
1	T2: Single Storey residential	17 of 31 units	26 April 2024
	T4: Double storey residential	5 of 18 units	
2	T2: Single Storey residential	25 of 31 units (cumulative)	30 November 2024
	T3: Single Storey residential	19 of 28 units (cumulative)	
3	T2: Single Storey residential	31 of 31 units (cumulative)	30 May 2025
	T3: Single Storey residential	28 of 28 units (cumulative)	
	T4: Double storey residential	18 of 18 units (cumulative)	
4	T1: 2-bedroom flats	40 of 40 units	01 December 2025

Water and Sewer Bulk Infrastructure Capacity
In line with general growth and demand, new supporting bulk infrastructure must be constructed, and existing infrastructure upgraded where necessary to accommodate the services demand of all new developments in George.

The capacity of the treatment works is discussed below.

a) Wastewater Treatment:
- The Gwaiing Wastewater Treatment works is currently operating under constraint.
- Upgrades are currently underway at the treatment works, a ±3.5Ml/day capacity upgrade of the treatment works is in progress with an estimated completion date of August 2023.
- The treatment works will have sufficient capacity for the development in its entirety once the ±3.5Ml/day capacity upgrade is commissioned.

b) Water Treatment:
- The Water Treatment Works (old and new) is currently operating under constraint.
- A ±4.5Ml/day capacity upgrade of the old treatment works is in progress with an estimated completion date of August 2023.
- The treatment works will have sufficient capacity for the development in its entirety once the ±4.5Ml/day capacity upgrade is commissioned.

Commencement of Development

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 and treatment capacity at the time of the development implementation, or if developed in phases before the commencement of each phase.

A development/implementation programme 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 programme 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 (a portion thereof or an erf) may connect to the municipal water and sewer system unless the required bulk and link infrastructure is available.

Connection points

Sanitation:

The George Municipality is of the opinion that the entire development may not be possible to drain to point B, and two connection points must be considered for this development in draining the Northern and Southern parts [A] of the development successfully.

a. Point B: Connection point by the George Municipality (costing included in Table 2 for this connection point)
b. Point A and Point A interim: The Southern portion of the development shall drain through either of these connection points. (Costing for Point A included in table 2 for connection point)

[A] All properties below the entrance to the development via Plantation Road.

Water:

a. Point A: Preferred connection point by the George Municipality (costing included in Table 2 for this connection point)

The Developer must kindly consider the water and sanitation connection points and consult with the Municipality on the final connection points during detail design stage and drafting of the services agreement.

Water and Sewer Bulk Infrastructure Upgrades

The summary of the technical report concludes that the total pro-rata cost for water and sewer infrastructure upgrades in support of the development amounts to R 3 345 000.00 excluding VAT.

Table 2: Summary of General and Development Specific Upgrade to the Water and Sewer System

Description	Water (excl. VAT)	Sewer (excl. VAT)	Total (excl. VAT)
General: Bulk water system	R 937 000.00	R 1 143 000.00	R 2 080 000.00
Development specific: Bulk water system	R 0.00	R 0.00	R 0.00

Description	Water (excl. VAT)	Sewer (excl. VAT)	Total (excl. VAT)
General: Distribution / Conveyance	R 0.00	R 0.00	R 0.00
Development specific: Distribution / Conveyance	R 394 000.00	R 957 000.00[B]	R 1 351 000.00
Total	**R 1 331 000.00**	**R 2 100 000.00**	**R 3 431 000.00**

[B] Sum of Section 4.4.2 and 4.4.3 of the GLS technical report.

Reimbursement of expenditure

In term of section 66(4) of the Planning By-law, the Developer will be required to make a proportional contribution to municipal public expenditure according to the normal need arising from the approval. The Developer will be reimbursed for the actual expenditure incurred for any services provided by the Developer above the normal need, up to the maximum value equal to the applicable Development Charges calculated for the services as per the approval, subject to normal escalation. The developer is to consult with the Municipality prior to incurring any expenditure for the Municipality to verify that the costs are in line with current construction costs for similar works.

For this development, the development specific items required are confirmed in sections 3.5.2 for water and 4.3.2 for sanitation of the technical report.

The Bulk water and sewer system items are currently being addressed, i.e., the extension of the capacity of the Water Treatment Works and the Gwaing Wastewater Treatment Works. Development Contributions payable by the Developer will cover the cost of the pro-rated development contribution.

However, the remaining items (referred to as general items in the technical report) must be addressed to accommodate the development and are to be constructed by the Developer. The pro-rata amount more than the development specific demand will be credited against the Development Contributions payable. The Developer's appointed registered Engineer will be required to submit a motivational report, indicating the quantum of services provided.

Table 3: Items to be addressed by the Developer for which credits may be applicable

Description	Estimated Cost	Estimated Pro-rata Cost	Pro-rata %	DC Credit % of actual cost
Water (refer to section 3.5.2)				
General items to address existing problems in the bulk water system	R 360 721 000	R 937 000	0.26%	99.74%
Development Specific items required in the water distribution system (incl fire flow)	R 848 000	R 394 000	46.46%	N/A
Sewer (refer to section 4.4.2)				
General items required to alleviate problems in the bulk sewer system	R 206 851 000	R 1 143 000	0.55%	99.45%
Development Specific items required in the existing sewer system (point A and B)	R 1 807 000	R 957 000	52.96%	N/A

Note that the above costs are indicative only and will vary according to actual cost of construction.

Link services requirements

The developer will not be entitled for any reimbursement relating to the provision of any link and/or internal services.

The Developer is requested to confirm the connection point for the water network from the two options as indicated in figure 1 of the technical report.

Development Charges

The current total development charges relating to Civil Engineering Services in line with the water demand and sewer return flows as included in the technical report, and in accordance with the current guidelines, for the proposed development were calculated on 07 March 2023 and amount to R 5 535 911.64 excluding VAT. This amount includes for water, sanitation, and road development contributions applicable at the time of preparing this letter.

The Developer is reminded of the following Clause relating to the calculation of development charges:
"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 charges and the amendment of these conditions of approval or the imposition of other relevant conditions of approval."

In addition, the amount is subject to amendment based on annual escalation and applicable at the time that development contributions are due for payment. The Council is in the process of finalizing a Development Contributions Policy for implementation on final approval by Council.

Kindly confirm your acceptance of the above in writing.

Yours faithfully,

Jannie Koegelenberg
Director: Civil Engineering Services

ANNEXURES

A Technical report by GLS (20 March 2023)
B Figure 1 Required works - Water: George Erf 19374
C Figure 2 Required works - Sewer: George Erf 19374

Annexure A

20 March 2023

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 19374 (URBAN COUNTRY ESTATE)

The request from CHEL Building & Civil Services (Pty) Ltd. dated 27 January 2023 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

T +27 21 880 0388
E info@gls.co.za
W gls.co.za

Stellenpark, Block D North
Cnr R44 and School Road
Stellenbosch, 7600

Walker Creek Office Park
90 Florence Ribeiro Ave
Brooklyn, Pretoria, 0181

PO Box 814
Stellenbosch, 7599
South Africa

Directors: RL Pole, AG Hingeston, AN Umichand

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 m2022-12 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 2022/23 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***
2023/02/24	Draft	1	Issued for comments and approval
2023/03/20	Revision	1	Add water and sewer alternatives
	Final		

2 WATER DEMAND & SEWER FLOWS

2.1 *Impact of the proposed development*

The proposed development was taken into consideration in the master plan as part of the George Erf 19374 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)
Phase 1			**Estimated Start Date: 01-Aug-23**		**Estimated Occupation Date: 26-Apr-24**		
T 2	Single Storey Residential (309m² Ave Erf size)	unit	17	0.556	70%	9.44	6.61
T 4	Double Storey Residential (452m² Ave Erf size)	unit	5	0.833	55%	4.17	2.29
Sub-Total			**22**			**13.61**	**8.90**
Phase 2			**Estimated Start Date: 23-Jan-24**		**Estimated Occupation Date: 30-Nov-24**		
T 2	Single Storey Residential (309m² Ave Erf size)	unit	8	0.556	70%	4.44	3.11
T 3	Single Storey Residential (415m² Ave Erf size)	unit	19	0.722	60%	13.72	8.23
Sub-Total			**27**			**18.17**	**11.34**
Phase 3			**Estimated Start Date: 01-Jul-24**		**Estimated Occupation Date: 30-May-25**		
T 2	Single Storey Residential (309m² Ave Erf size)	unit	6	0.556	70%	3.33	2.33
T 3	Single Storey Residential (415m² Ave Erf size)	unit	9	0.722	60%	6.50	3.90
T 4	Double Storey Residential (452m² Ave Erf size)	unit	13	0.833	55%	10.83	5.96
Sub-Total			**28**			**20.67**	**12.19**
Phase 4			**Estimated Start Date: 13-Jan-25**		**Estimated Occupation Date: 01-Dec-25**		
T 1	2 Bedroom Flats (70m² Ave Floor size)	unit	40	0.278	90%	11.11	10.00
Sub-Total			**40**			**11.11**	**10.00**
Total			**117**			**63.6**	**42.4**

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 52.3 kL/d (theoretical demand).

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 63.6 kL/d.

- Peak flow using a zone peak hour factor of 3.6‡ = 2.65 L/s
- Fire flow (Cluster housing > 30 units/ha) using a peak hour factor of 2.0 = 20 L/s @ 10 m
  (Note: Flow provided at 1 fire hydrant)

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

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 42.7 kL/d (theoretical flow).

The revised PDDWF (excluding infiltration) calculated for the proposed development and used in the re-analysis of the sewer system is 42.4 kL/d. The design flow, or instantaneous peak wet weather flow (IPWWF), is 1.22 L/s.

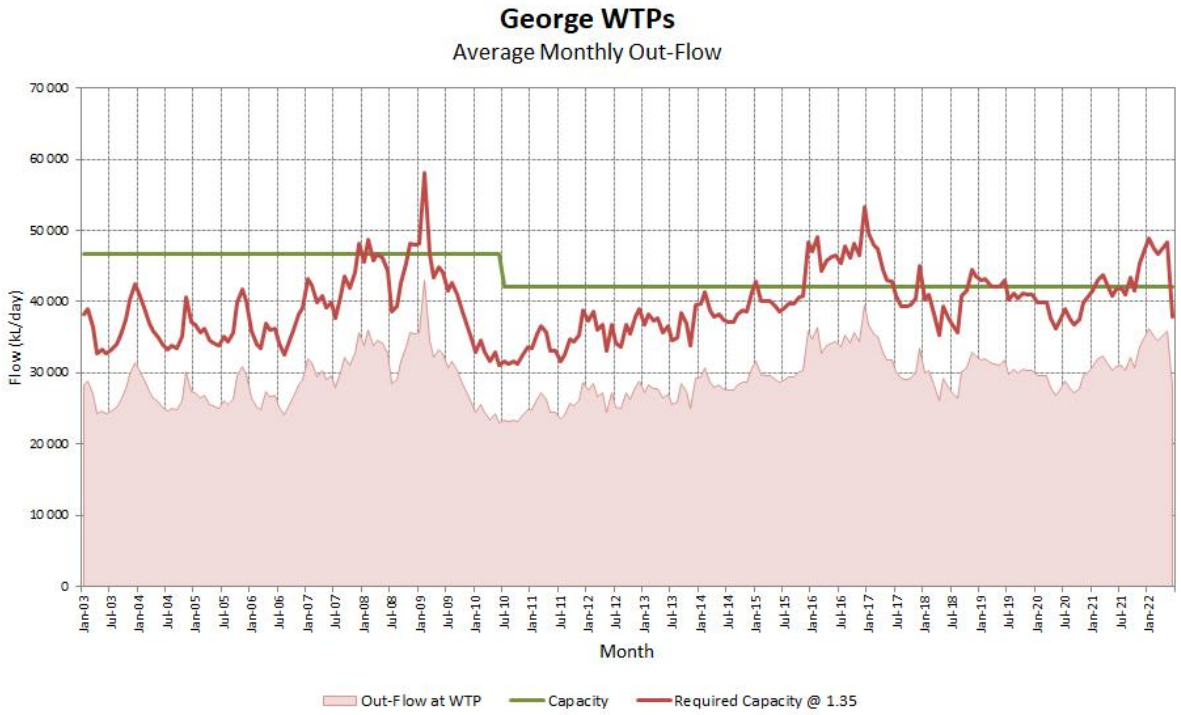
3 WATER DISTRIBUTION NETWORK

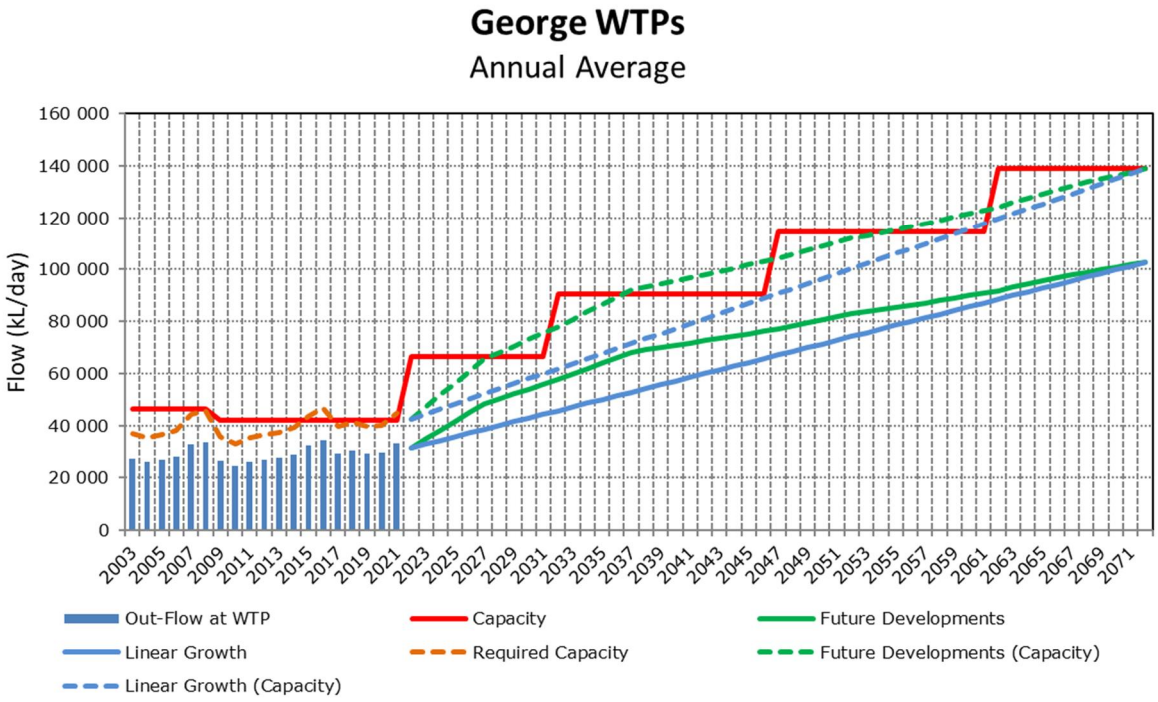
3.1 *Water Resources*

Water Treatment Plant capacity

The master plan indicates that the proposed development falls in the George Main zone and supplied from the Old and New George WTPs.

The two graphs (below and) overleaf shows that the design capacity of the Old and New 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	42 200 kL/d	Design capacity 46 700 kL/d
Measured Flow (incl. 1.35 factor)		
Annual Average (2003-2022)	46 894 kL/d	Maximum 2016/17
	-4 694 kL/d	No spare capacity available
Annual Average (2021/22)	44 806 kL/d	Average for 2021/22
	-2 606 kL/d	No spare capacity available
Monthly Average (2003-2022)	58 176 kL/d	February 2009
	-15 976 kL/d	No spare capacity available
Monthly Average (2020/21)	48 955 kL/d	January 2022
	-6 755 kL/d	No spare capacity available
Modelled Flow (incl. 10% water loss and 1.35 factor)		
T_AADD (existing)	42 784 kL/d	m2022-12 MP
	-584 kL/d	No spare capacity available
3yr Projection	56 487 kL/d	
	-14 287 kL/d	No spare capacity available
5yr Projection	65 623 kL/d	
	-23 423 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 Blanco Main zone as shown in **Figure 1 (Water)** attached.

An alternative connection was investigated to accommodate the proposed development in the exiting water system as indicated below.

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 10% 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 10% 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.

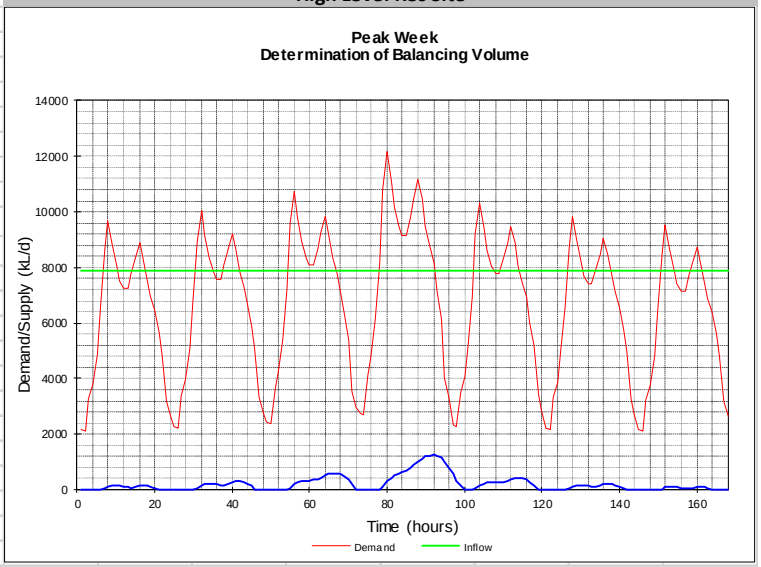
Reservoir capacity assessment (Theoretical Current Demand)

The current Blanco Main zone AADD plus 10% UAW (Theoretical Current Demand) in the m2022-12 water model is 3 947 kL/d. The capacity of the existing Blanco Main Reservoirs is 6 460 kL. The FCV is set at 91 L/s. Using these three input variables in a reservoir sizing analysis, it shows that the remaining spare capacity is 1 858 kL.

DETERMINATION OF RESERVOIR BALANCING VOLUME and/or REQUIRED SUPPLY RATE (Theoretical Current Demand)

Type in values in shaded cells					
Full zone	3 947	kL/d			
Direct zone	3 352	kL/d			
AADD	**3 947**	kL/d			
PDF	**2.00**	* AADD			
PWF	**1.70**	* AADD			
P3DF	1.84	* AADD			
Supply	**2.00**	* AADD			
=	7 894	kL/d			
=	91	L/s	Pipe @ 1.8 m/s		
			254	mm	
Bal.Vol.	1 249	kL/d			
=	7.6	h*AADD			
			%		
Pattern 1	Large zone	Large	**84.9%**		
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.	**15.1%**		
Must add up to 100 --> check			100.0%		

High Level Res Site



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

Capacity	**6 460**	kL	=	46.2	h x AADD
Required balancing	1 249	kL	=	8.9	h x AADD
Available volume	5 211	kL	=	37.3	h x AADD
Required emergency	3 352	kL	=	**24.0**	h x AADD
Spare capacity	1 858	kL	=	13.3	h x AADD

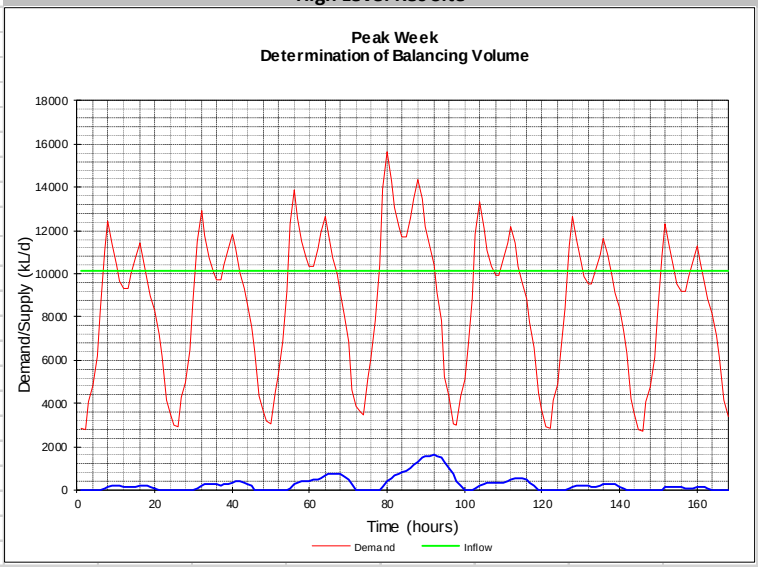
Reservoir capacity assessment (Theoretical Fully Occupied Demand)

The current Blanco Main zone AADD plus 10% UAW (Theoretical Fully Occupied Demand) in the m2022-12 water model is 5 071 kL/d. The capacity of the existing Blanco Main Reservoirs is 6 460 kL. The FCV is set at 117 L/s. Using these three input variables in a reservoir sizing analysis, it shows that the remaining spare capacity of 473 kL is sufficient to cater for the proposed development.

DETERMINATION OF RESERVOIR BALANCING VOLUME and/or REQUIRED SUPPLY RATE (Theoretical Fully Occupied Demand)

Type in values in shaded cells					
Full zone	5 071	kL/d			
Direct zone	4 377	kL/d			
AADD	**5 071**	kL/d			
PDF	**2.00**	* AADD			
PWF	**1.70**	* AADD			
P3DF	1.84	* AADD			
Supply	2.00	* AADD			
=	10 141	kL/d			
=	117	L/s	Pipe @ 1.8 m/s		
			288	mm	
Bal.Vol.	1 611	kL/d			
=	7.6	h*AADD			
			%		
Pattern 1	Large zone	Large	**86.3%**		
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.	**13.7%**		
Must add up to 100 --> check			100.0%		

High Level Res Site



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

Capacity	**6 460**	kL	=	35.4	h x AADD
Required balancing	1 611	kL	=	8.8	h x AADD
Available volume	4 849	kL	=	26.6	h x AADD
Required emergency	4 377	kL	=	**24.0**	h x AADD
Spare capacity	473	kL	=	2.6	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		MP Type	Description	Extent	Size	Cost	Pro-rata Cost	
Existing WTPs (Old WTP and New WTP)								
GMR_B15.01	#[1]	MP	Water Treatment Facility to install: Old WTP	4 500 m³/d @	306 m EGL	R 78 959 000	R 205 000	0.26%
GMR_B01.01		MP	Water Treatment Facility to install: New WTP	20 000 m³/d @	254 m EGL	R 279 600 000	R 726 000	0.26%
GMR_B01.06		MP	Pipe to install	7 m x	500 mm Ø	R 630 000	R 2 000	0.26%
GMR_B01.07		MP	Pump Only to install: New WTP PS	160 L/s @	50 m	R 1 532 000	R 4 000	0.26%
					Total	**R 360 721 000**	**R 937 000**	

Notes: #[1] Refurbish WTP to original design capacity of 25 000 m³/d.

3.4.2 Accommodation of the proposed development in the bulk water system

Development specific items required in the bulk water system:

Item No	MP Type	Description	Extent	Size	Cost	Pro-rata Cost
None						
				Total	**R -**	**R -**

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:

Item No		MP Type	Description	Extent	Size	Cost	Pro-rata Cost	
Existing external system								
BMR_31.01a	#[2]	MP	Pipe with meter to install	1 x	400 mm Ø	R 780 000	R -	0.0%
BMR_31.01b	#[2]	MP	Valve to insert and close	1 x	450 mm Ø	R -	R -	0.0%
					Total	**R 780 000**	**R -**	

Notes: #[2] Implement / upgrade existing Blanco meter zone, install new zone meter.

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):

Item No		MP Type	Description	Extent	Size	Cost	Pro-rata Cost	
Existing external system (from development to connection Point A)								
BMR_16.01		MP	Pipe to install	8 m x	200 mm Ø	R 74 000	R 7 000	8.2%
BMR_16.02		MP	Future connection	21 m x	200 mm Ø	n.a.	n.a.	
BMR_38.01	#³	MP	Pipe to install	27 m x	160 mm Ø	R 83 000	R 25 000	29.5%
BMR_38.02	#³	MP	Pipe to install	25 m x	160 mm Ø	R 161 000	R 48 000	29.5%
BMR_38.03	#³	MP	Pipe to install	167 m x	160 mm Ø	R 307 000	R 91 000	29.5%
					Sub-Total	**R 625 000**	**R 171 000**	
Future external system								
BMR_F13.01	#³	FM	Pipe to install	28 m x	160 mm Ø	R 84 000	R 84 000	100.0%
					Sub-Total	**R 84 000**	**R 84 000**	
Future internal system								
BMR_F13.02	#³	FM	Pipe to install	62 m x	160 mm Ø	R 139 000	R 139 000	100.0%
					Sub-Total	**R 139 000**	**R 139 000**	
					Total	**R 848 000**	**R 394 000**	

Notes: #³ Minimum diameter required for fire flow requirements.

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

3.5.3 Accommodation of the proposed development in the water reticulation system (alternative)

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

Item No		MP Type	Description	Extent	Size	Cost	Pro-rata Cost	
Future external system (from development to connection Point B)								
BMR_39.00	#³	MP	Pipe to install (link to 2 x 110 mm Ø)	34 m x	160 mm Ø	R 94 000	R 94 000	100.0%
					Sub-Total	**R 94 000**	**R 94 000**	
Future external system (from development to connection Point C)								
BMR_F13.04	#³	FA	Pipe to install	41 m x	160 mm Ø	R 105 000	R 105 000	100.0%
					Sub-Total	**R 105 000**	**R 105 000**	
Future internal system								
BMR_F13.03	#³	FM	Pipe to install	209 m x	160 mm Ø	R 374 000	R 374 000	100.0%
					Sub-Total	**R 374 000**	**R 374 000**	
					Total	**R 479 000**	**R 479 000**	

The proposed connection point B and C 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.)
Future system							
Point A	306.1	69.1	284.2	47.2	287.5	50.5	237.0
Point B (Alternative)	306.1	67.3	280.6	41.8	273.8	35.0	238.8
Point C (Alternative)	306.1	68.5	280.1	42.5	282.2	44.6	237.6

4 SEWER CONVEYANCE NETWORK

4.1 *Sewer Drainage Area*

The master plan indicates that the proposed development falls in the Gwaiing PS and Rooiriver PS drainage areas as shown in **Figure 2 (Sewer)** attached. This drainage areas drains to the Gwaiing WWTW.

The proposed connections are based on the internal network design as received from the developer.

An interim option was investigated to accommodate the proposed development in the exiting sewer system as indicated below.

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.

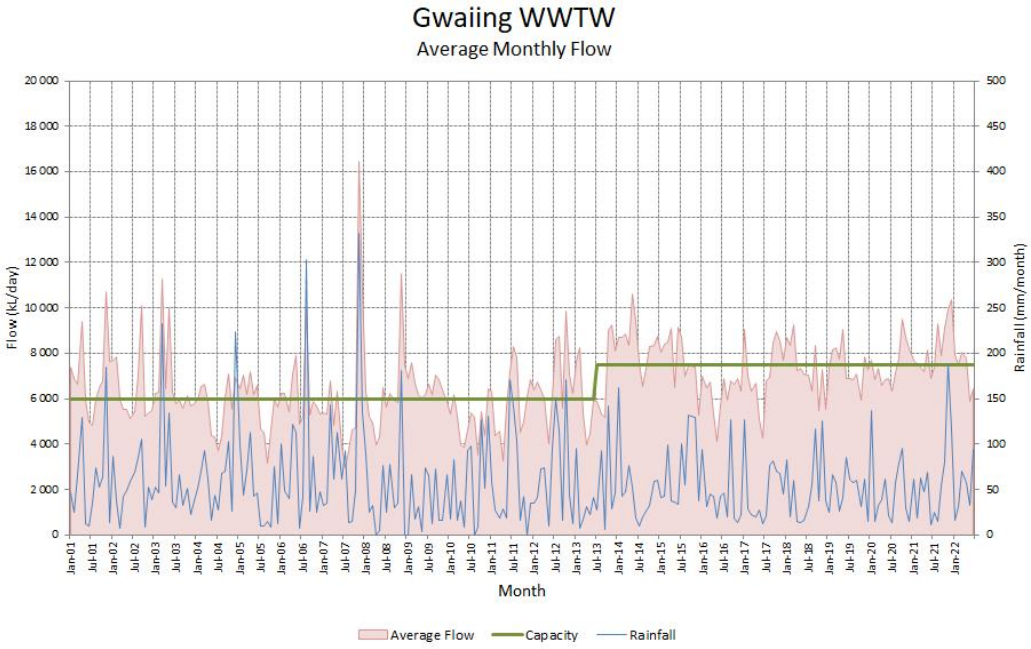
***It is important to note that all proposed items are schematic in nature, final size and location is subject to a complete design by a suitably qualified engineer. The final locality in particular is subject to legislative requirements including but not limited to pipes not crossing private stands,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

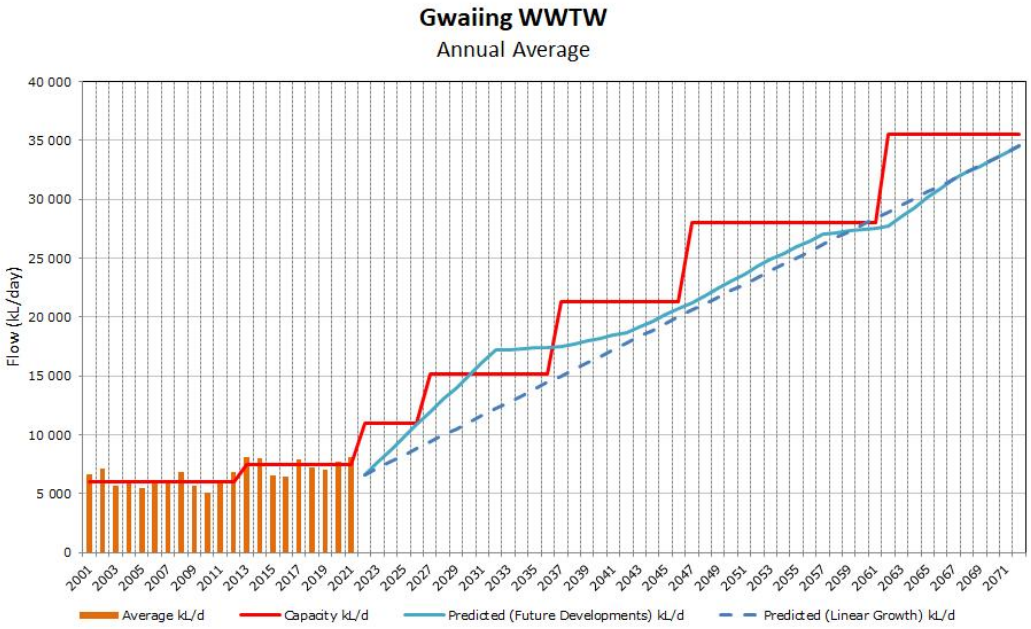
4.3 Bulk Sewer Drainage

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 graphs below shows that the design capacity of the Gwaiing WWTW (green line) has been exceeded by the Average Monthly Flow (light red shaded area) a few times in the last decade. The WWTW is 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:

Gwaiing WWTW	Capacity	Comment
Existing Capacity	7 500 kL/d	Design capacity 11 000 kL/d
Measured Flow		
Annual Average (2001-2022)	8 128 kL/d	Maximum 2021/22
	-628 kL/d	No spare capacity available
Annual Dry Average (2021/22)	6 801 kL/d	Average for 4 driest months 2021/22
	699 kL/d	Spare capacity available
Monthly Average (2001-2022)	16 467 kL/d	November 2007
	-8 967 kL/d	No spare capacity available
Monthly Average (2021/22)	10 358 kL/d	December 2022
	-2 858 kL/d	No spare capacity available
Modelled Flow		
T_PDDWF (existing)	6 455 kL/d	m2022-12 MP
	1 045 kL/d	Spare capacity available
3yr Projection	9 665 kL/d	
	-2 165 kL/d	No spare capacity available
5yr Projection	11 806 kL/d	
	-4 306 kL/d	No 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:

Item No	MP Type	Description	Existing Diam (mm)	New Diam (mm)	Length (m)	Design Flow	Cost	Pro-rata Cost	
Existing bulk system (from connection Point A via Gwaiing PS and connection Point B via Rooirivier PS to Gwaiing WWTW)									
GW_06.01 #[2]	MPi	Downsize existing Pumps (Investigate first): Gwaiing PS	-	-	-	98.7 L/s	R 1 170 000	R 4 000	0.32%
GW_11.01 #[3]	MP	Downsize existing Pumps: Rooiriver PS	-	-	-	108.7 L/s	R 1 313 000	R 11 000	0.83%
						Sub-Total	**R 2 483 000**	**R 15 000**	
Existing WWTW (Gwaiing WWTW)									
GW_17.00 #[1]	MP	Upgrade existing Treatment Plant: Gwaiing WWTW	-	-	-	3.50 ML/d	R 93 851 000	R 518 000	0.55%
GW_17.01a	MP	Upgrade existing Flow Diversion	-	-	-	845.1 L/s	R 690 000	R 4 000	0.55%
GW_17.01b	MP	New Gravity	-	355	21	101.4 L/s	R 161 000	R 1 000	0.55%
GW_17.01c	MP	New Treatment Plant: Gwaiing WWTW	-	-	-	4.20 ML/d	R 109 666 000	R 605 000	0.55%
						Sub-Total	**R 204 368 000**	**R 1 128 000**	
						Total	**R 206 851 000**	**R 1 143 000**	

Notes: #[1] Refurbish WWTW to original design capacity of 11.0 ML/d.
#[2] In the master plan an investigation of this pump station is proposed implying that not all information on capacity, pump settings etc. was available. The pump station should therefore first be investigated through field inspections and flow measurement to verify that upgrading is in fact required.
#[3] The downsize of pump capacity is only required if the gravity pipe downstream of the rising main overflows during operation.

4.3.2 Accommodation of the proposed development in the bulk sewer system

Development specific items required in the bulk sewer system:

Item No	MP Type	Description	Existing Diam (mm)	New Diam (mm)	Length (m)	Design Flow	Cost	Pro-rata Cost
None								
						Total	**R -**	**R -**

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
None								
						Total	**R -**	**R -**

4.4.2 Accommodation of the proposed development in the sewer reticulation system

Development specific items required in the existing sewer system:

Item No	MP Type	Description	Existing Diam (mm)	New Diam (mm)	Length (m)	Design Flow	Cost	Pro-rata Cost	
Future collector system (from proposed development to connection Point A)									
GW_F03.01 #[4]	FM	New Gravity	-	160	106	0.3 L/s	R 270 000	R 270 000	100.00%
GW_F03.02 #[4]	FM	New Gravity	-	160	212	1.1 L/s	R 488 000	R 148 000	30.19%
GW_F03.03 #[4]	FM	New Gravity	-	160	120	2.2 L/s	R 300 000	R 45 000	14.88%
						Sub-Total	**R 1 058 000**	**R 463 000**	
Future collector system (from proposed development to connection Point B)									
GW_F37.01	FM	New Gravity	-	160	49	0.9 L/s	R 153 000	R 153 000	100.00%
GW_F37.02 #[5]	FM	New Gravity	-	160	265	2.1 L/s	R 596 000	R 255 000	42.65%
						Sub-Total	**R 749 000**	**R 408 000**	
						Total	**R 1 807 000**	**R 871 000**	

Note: #[4] Refer to paragraph 4.4.3 for interim connection prior to the development of George Erf 19001.
#[5] Refer to paragraph 4.4.4 for alternative connection.

The proposed connection points to the existing sewer system are shown in **Figure 2 (Sewer)**.

4.4.3 *Accommodation of the proposed development in the sewer reticulation system (interim period)*

Development specific items required in the existing sewer system for the interim connection prior to the development of George Erf 19001:

Item No	MP Type	Description	Existing Diam (mm)	New Diam (mm)	Length (m)	Design Flow	Cost	Pro-rata Cost	
Future collector system (from proposed development to interim connection Point A)									
GW_F03.04	FA	Future Flow Diversion to Item GW_F03.01 (Alternative)	-	-	-	0.3 L/s	R -	R -	100.00%
GW_F03.05	FA	New Gravity (Alternative)	-	160	16	0.3 L/s	R 86 000	R 86 000	100.00%
						Total	**R 86 000**	**R 86 000**	

This interim connection is on a 110mmØ sewer pipe, which hydraulically would work, but would require your approval.

4.4.4 *Accommodation of the proposed development in the sewer reticulation system (alternative)*

Development specific items required in the existing sewer system:

Item No	MP Type	Description	Existing Diam (mm)	New Diam (mm)	Length (m)	Design Flow	Cost	Pro-rata Cost	
Future collector system (from proposed development to interim connection Point A)									
GW_F37.03 #[5]	FA	New Gravity (Alternative)	-	160	40	2.1 L/s	R 135 000	R 58 000	42.65%
						Total	**R 135 000**	**R 58 000**	

Note: #[5] Alternative to Item GW_F37.02. The connection is not recommended as it connects to a midblock sewer.

4.5 *Internal Reticulation*

The internal network design on the property of the proposed development is beyond the scope of this report.

The proposed connection points to the existing sewer system are shown in **Figure 2 (Sewer)**.

Connection Point	Design Flow (L/s)
Point A	0.32
Point B / C	0.90

In **Figure 2 (Sewer)** pipes in future development areas are indicated schematically.

As the Design Flow already accommodates stormwater ingress, the pipes can be designed to flow 100% full with the Design Flows provided above.

5 SUMMARY

Water supply:

Summary of costing:	Cost	Pro-rata Cost
General items required to alleviate existing problems in the bulk water system	R 360 721 000	R 937 000
Development specific items required in the bulk water system	R -	R -
General items required to alleviate existing problems in the water distribution system	R 780 000	R -
Development specific items required in the water distribution system (including fire flow requirements)	R 848 000	R 394 000
Total	**R 362 349 000**	**R 1 331 000**

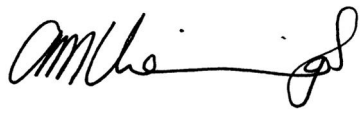
Note: Excluded cost for the alternative option

Sewer drainage:

Summary of costing	Cost	Pro-rata Cost
General items required to alleviate problems in the bulk sewer system:	R 206 851 000	R 1 143 000
Development specific items required in the bulk sewer system:	R -	R -
General items required to alleviate problems in the existing sewer system:	R -	R -
Development specific items required in the existing sewer system:	R 1 807 000	R 871 000
Total	**R 208 658 000**	**R 2 014 000**

Note: Excluded cost for the interim and alternative options

Yours sincerely,



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Per: A Vienings (Pr. Eng.)
GLS Consulting

(Report done by: JJ van der Merwe)

REQUEST FROM CONSULTANT TO GLS

Reply | Reply All | Forward | ...

Fri 27/01/2023 09:02

HS

Henco Scholtz <henco.chel@gmail.com>
To Jurie Van Der Merwe
Cc Ricus Fivaz; Melanie Geyer; shaun@urbanfront.co.za

You replied to this message on 01/02/2023 15:37.

UrbanCountryEstate-BulkServicesEngineeringReport-15-11-2022-Rev2-combined.pdf
.pdf File

Good Morning Jurie.

I trust that you are well.
A very blessed and prosperous new year to you and your family.

Please find attached the Bulk Services Engineering Report for your perusal.
As discussed with Ricus Fivas this morning, from George Municipality.
Please can you review our proposed bulk service connections to the municipal network and indicate if there are any potential system conflicts or restrictions hindering these connections?
Please could you provide us with written confirmation of the acceptance hereof in order for us to move forward?

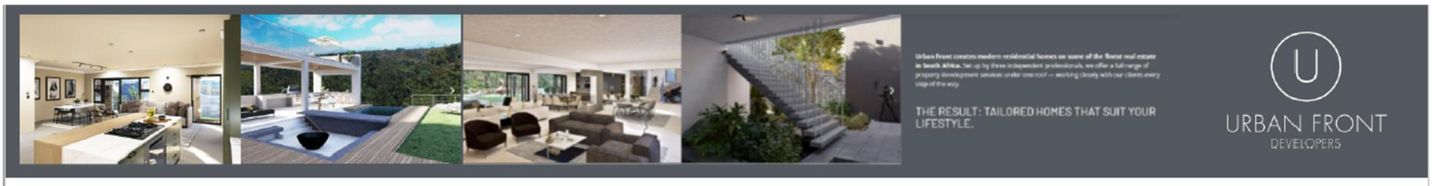
Please feel free to contact me should there be any questions?

Thank You & Kind Regards

Henco Scholtz
Director
CHEL Building & Civil Services (Pty) Ltd.
George
South Africa
+27 82 881 5456
henco.chel@gmail.com
"Lord Jesus Christ, my Life and my work will be a Living Worship unto You"

DEVELOPMENT ROLL OUT - SUMMARY

Section	Civil Infrastructure (Start)	Building Construction (Start)	No Units	Occupation Date.
Phase 1	1st August 2023	20th November 2023	22	26th April 2024
Phase 2	23rd January 2024	29th May 2024	27	30th November 2023
Phase 3	01st July 2024	21st November 2024	28	30th May 2025
Phase 4	13th January 2025	19th May 2025	40	01st December 2025



PRELIMINARY COMBINED SERVICES LAYOUT

17 November 2022

Annexure B

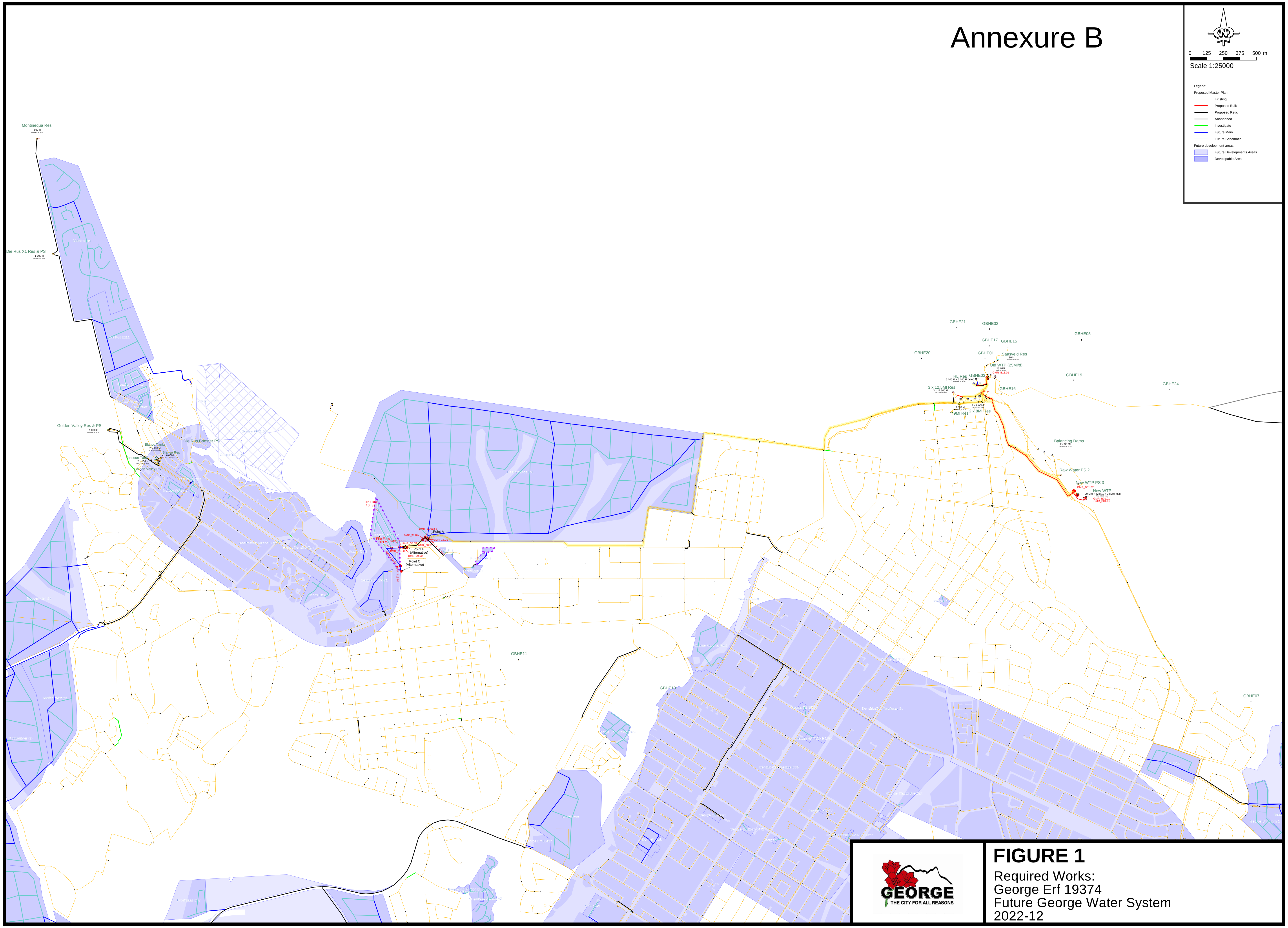


FIGURE 1

Required Works:
George Erf 19374
Future George Water System
2022-12

Annexure C

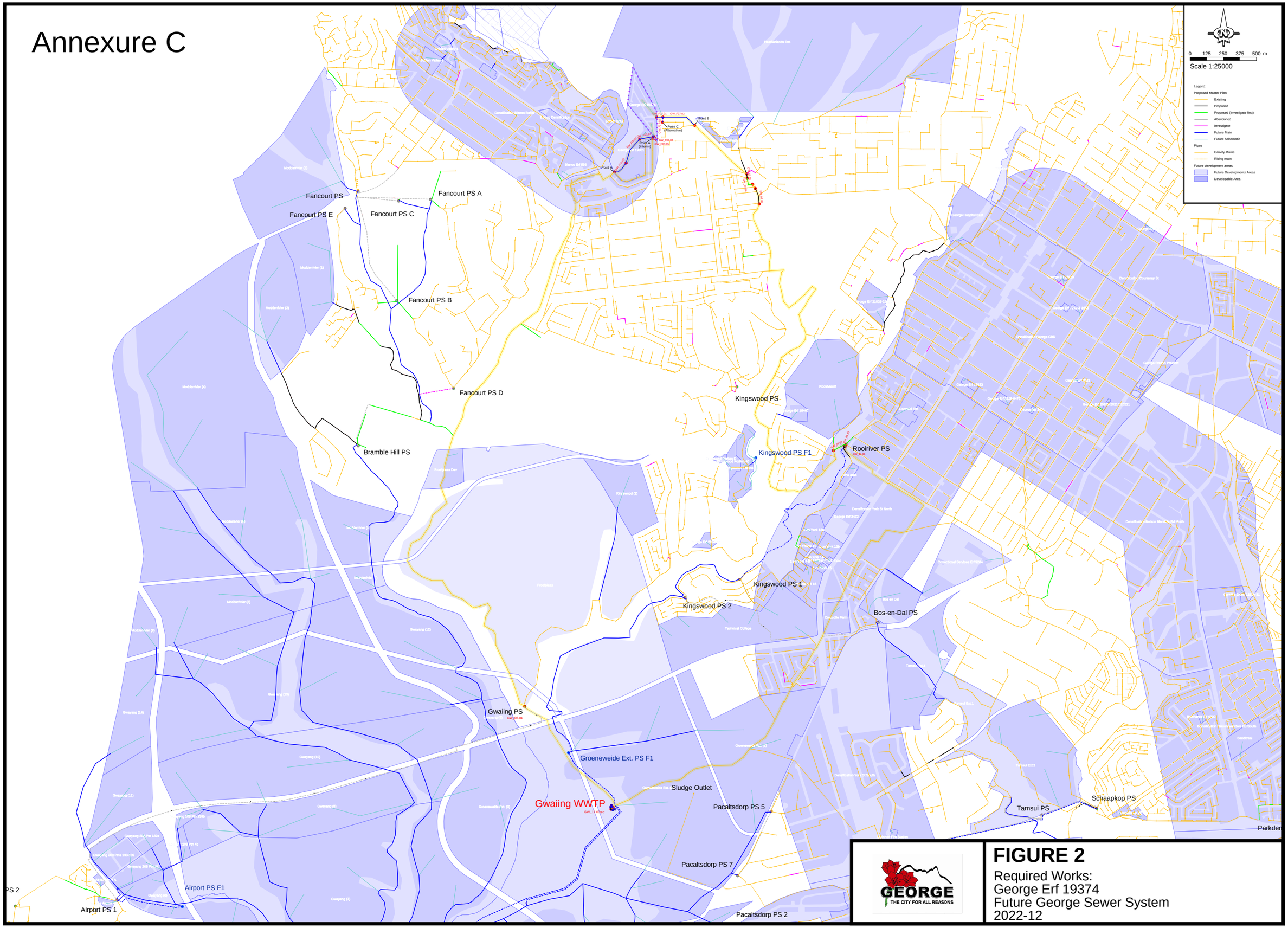


FIGURE 2

Required Works:
George Erf 19374
Future George Sewer System
2022-12