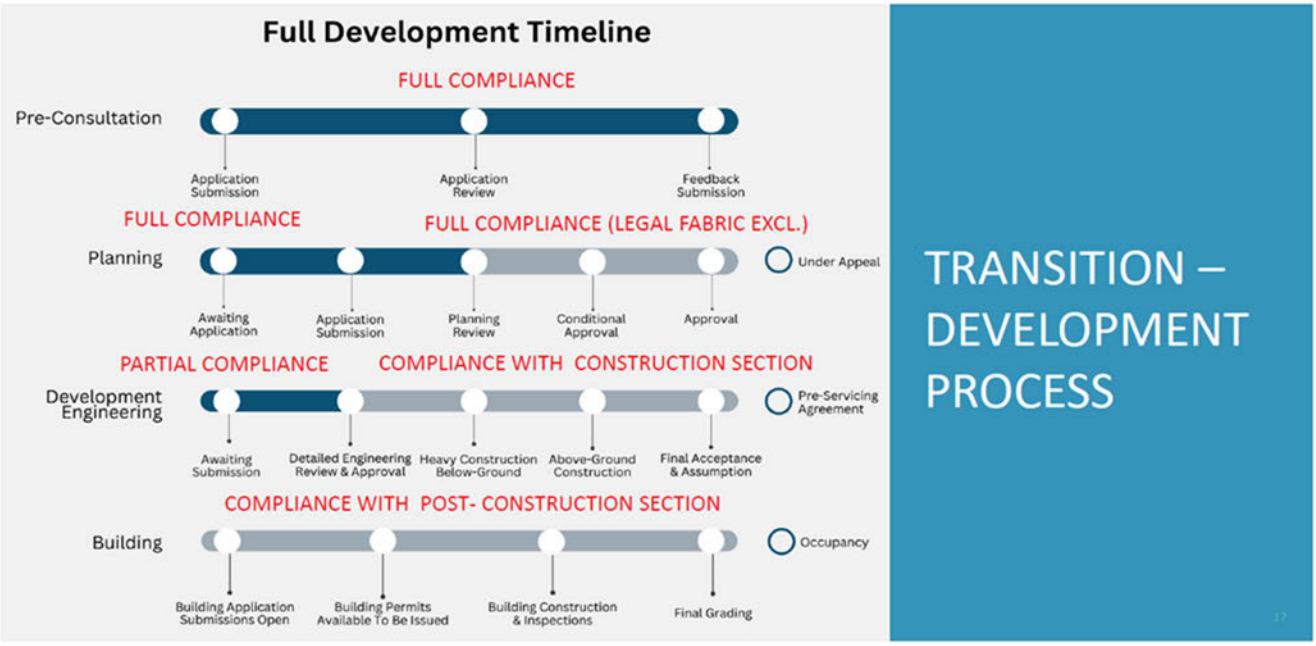
Carrie Fairley

Subject: FW: Georgian Woodlands Draft Plan Extension Deputation Materials (0196-5928)

Hello Corrina,

Further to the email correspondence with Andrew Pascuzzo earlier today we would like to include the attached Sanitary Servicing memo prepared and circulated to Town in November 2024 which I will speak to as part of my delegation. In summary, while we support the extension of the Draft Plan we do not support the additional Draft Plan conditions the Town has proposed to be inserted which preclude the use of a low pressure forcemain system to service the subject development for the following reasons:

- The proposed detailed design for the Georgian Woodlands subdivision was initiated, submitted for review and commented on by TOBM in advance of the 2023 TOBM Engineering Standard updates. As such, the applicable design standards for this development are the 2009 TOBM Engineering Design Standards which do not preclude the use of low pressure forcemain systems.
- The implementation of a Sewage Pumping Station as suggested by the Town would require the addition of a Sewage Pumping Station Block which was not contemplated in the original Draft Plan and is not consistent with the transitional policies of the 2023 Engineering Standards (transitional matrix included below for reference).
- Re-design of the site to move away from a low pressure forcemain solution to a sewage pumping station solution has significant increased costs from both a capital and life cycle operations perspective.
- Design of a low pressure forcemain system will reduce the amount of inflow and infiltration into the Town sanitary sewer network.
- Solutions have been proposed to address the maintenance and operations concerns raised by the Town's operations department to date.



All of the above is reviewed and examined in detail in the attached Sanitary Servicing Memo and will form the basis of my delegation.

Respectfully submitted,

Jon

Jon Proctor, P.Eng. | Partner
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MEMO

DATE November 1, 2024 **PROJECT NO.** 196-5928
RE Georgian Woodlands Sanitary Servicing

TO Brian Worsley, P. Eng., Manager of Development Engineering
FROM George Cooper, P. Eng. & Jon Proctor, P. Eng.
CC Alexander Fleming

1.0 Introduction

This memorandum has been prepared in support of the proposed sanitary servicing strategy for the Georgian Woodlands Phase IV Stage 3 Residential Development. The second detailed design submission, prepared by C.F. Crozier and Associates (Crozier) dated January 26, 2024 proposed a low pressure sanitary forcemain with individual grinder pumps located within each of the 37 lots. Based on discussions with Town staff and the comments issued by the Town, dated June 3, 2024, we understand that the Town's preference for sanitary servicing would be via gravity sewer and sewage pumping station (SPS). Based on discussions with Town staff, our office is aware of the challenges the Town has encountered with low-pressure systems (LPS) in existing developments and the Town's concerns about expanding the use of these systems for future residential developments.

Our office has consulted with suppliers of grinder pumps/low pressure forcemains and the Developer to investigate options to mitigate the issues that the Town has experienced in other developments, which are summarized in the following sections. A detailed comparison of the capital and life cycle costs have also been prepared to demonstrate the differences between the two options (LPS and SPS).

2.0 Background

Since the 1960's, the Developer has completed previous phases of Georgian Woodlands which include Interlaken Court, Nipissing Crescent, Blueski George Crescent, Cortina Crescent, Davos Drive, Aspen Way, Chamonix Crescent, St. Moritz Crescent, and Kitzbuhl Crescent. These phases are located to the southeast of the Phase IV development lands. Georgian Woodlands Phases 1 to 4 are serviced by municipal water and sanitary sewer.

Draft Plan Approval was granted for the Plan of Subdivision of Georgian Woodlands Phase IV on June 8, 2010. The Draft Plan detailed a total of 249 units to be developed; 101 single-family residential lots and 148 multiple residential lots for future development. The 101 single-family residential lots, and associated infrastructure were to be completed in multiple stages. Stage 1 (5 lots) and Stage 2 (58 lots) have since been constructed and are now occupied. Of note, 13 units built in Stage 2 are serviced with a Low-Pressure System on Interlaken Court, as shown in the enclosed IFC drawing 110.

In 2021, the Developer initiated work to support approvals for Stage 3 (37 lots) and retained Crozier to prepare the civil servicing design drawings. Prior to initiating design, Crozier completed a pre-consultation meeting with the Town's Development Engineering Department to inform them of the intent to move forward with the next stage of development and to discuss the proposed servicing strategy. Given the natural topography of the site, it was noted that a low-pressure system would likely be required, similar to what had been incorporated in Stage 2, in order to connect to the existing sanitary sewer on Arrowhead Road. As the detailed design progressed, it became evident that a gravity sewer connection to Arrowhead Road could not feasibly service any of the lots due to the elevation of the road in relation to the site. A 1st Detailed Design Submission was issued to the Town on May 31, 2022 and featured a low pressure system servicing all 37 lots within the proposed development.

Following the Town's review of the 1st Submission, comments were issued on August 10, 2022 which noted that the Town had a preference for a sewage pumping station over a low pressure system (See Comment #2 in the enclosed document). After reviewing the 1st Submission comments, our office attended multiple meetings with the Town's Development Engineering and Operations departments to discuss the sanitary servicing strategy. During these meetings, the Town's Operations department noted several issues that were being experienced within another residential subdivision which was serviced via a low-pressure system. See **Section 3** for details.

On May 29, 2023, the Town issued updated Engineering Standards which included a section on low pressure sanitary sewer systems (Section 4.6.7), which is enclosed with this memo. The standard states the following:

"A low-pressure sanitary sewer system (LPSS) may be considered by the Town for sanitary sewer extensions only, where gravity sewer design and pumping stations/forcemains are not feasible from a technical or economic perspective in the opinion of the Town.

Low Pressure Sanitary Sewage Systems will not be considered for new development.

Where a low-pressure sewage system is contemplated, the Engineer is to contact the Town prior to design to gain approval for the installation and to determine what design factors the Engineer should consider. Low pressure sewage sewer must be approved by both the Director of Planning and Director of Operations.

All LPSS's shall be designed to the MECP Guidelines and the Town's Engineering Standards indicated herein."

The Town issued a Transition Process with the updated 2023 Engineering for developments that had been initiated prior to the new standards coming into effect. The Transition Process in enclosed within the memo and notes the following:

- Development applications with at least one detailed design submission are only required to comply with the construction section of the 2023 Engineering Standards and may continue to follow the 2009 Engineering Standards for design.

- Changes to legal fabric were excluded from the 2023 Engineering Standards (i.e. if the new standard impacted lot fabric, the development would continue to follow the 2009 Engineering Standards).

Since a detailed design submission had been issued to the Town prior to the 2023 Engineering Standards came into effect, it was understood that Stage 3 would still be subject to the 2009 Engineering Standards which do not exclude the use of low pressure sanitary systems. Our office prepared a 2nd Detailed Design Submission, which continued to propose a low pressure system. A deviation form was also prepared, highlighting the rationale for proposing the low pressure system. The rationale focused on the higher capital / life cycle costs of a sewage pumping station and potential maintenance issues as a result of hydrogen sulfide caused by infrequent pumping due to the low flows / seasonal nature of the residents. It was also noted that incorporating a sewage pumping station would impact the lot fabric of the Draft Plan that was approved through the Ontario Land Tribunal (OLT) process and may result in the loss of a unit. The 2nd Submission was issued to the Town on January 26, 2024, refer to the Plan and Profile Drawings enclosed within this memo.

On June 3, 2024 the Town issued comments on the 2nd Submission which noted that the low pressure system was not accepted by the Town. Refer to the comments enclosed with this memo.

3.0 Low Pressure System - Problem Identification

The Town's Operations Department has noted that they have experienced issues with low pressure systems in other residential subdivisions. The example provided by the Town was the Delphi Subdivision located north of the Georgian Peaks Ski Club. The Delphi Subdivision features a mix of single detached and townhome units, which are primarily serviced by a low pressure sanitary system and conveys wastewater directly to the Town's existing sewage pumping station on Highway 26. The issues raised by the Town include the following:

1. The low pressure system has encountered blockages within the valves and required frequent flushing to continue operation. It is understood that the issue is a result of incorrect grinder pumps being installed during home construction. The low pressure system was designed based on the assumption that positive displacement pumps (i.e. E-One Grinder Pumps) would be installed, but some homes used centrifugal pumps instead which do not operate with the same amount of force.

2. Due to the seasonal / recreational nature of the area, some residents are only living in the homes on weekend. Therefore, wastewater may sit within the grinder pump basins between visits and become septic before it enters the municipal system. Hydrogen sulfide is produced when the sewage is stagnant and can cause pumps or other components in the Town's sewage pumping station to require more frequent replacement.

In addition to the above, the Town noted that there have been issues when it comes to responses to service calls to the supplier / service technician.

The following section will identify the measures that are proposed for the Georgian Woodland Phase IV Stage 3 to mitigate the issues experienced at the Delphi Subdivision.

4.0 Low Pressure System – Proposed Mitigation Measures

Crozier is committed to working with the Town to learn from past experiences with the low pressure system in the Delphi Subdivision and implement measures that prevent similar issues with the Georgian Woodlands development.

The primary cause of the issues at the Delphi Subdivision was related to the lack of controls in place to ensure that residents installed the correct pumps and the periods of time where the pumps are inactive due to the seasonal nature of the community.

The proposed mitigation measures are outlined in the following sections.

Homeowner Requirements for Pump Installation

In consultation with the Owner, our office is suggesting that all Offers of Purchase and Sale Agreements include a clause requiring that homeowners purchase and install a positive displacement pump (I.e. E-One system), which meets the design specifications of the system. The positive displacement pumps have been chosen for this development as they provide the more reliable performance and reduced maintenance compared to centrifugal pumps. Their ability to handle solids and maintain a consistent flow helps prevent blockages, making it a more effective choice for sewage systems where debris and varying pressures are concerns.

The requirement for these clauses in the Purchase and Sale Agreement would be agreed to by the Owner in the Subdivision Agreement. In addition, we would also suggest that inspections completed by the Town's Building Department include verification that the correct pumps have been installed prior to granting occupancy.

Automatic Flushing System

The Georgian Woodlands Subdivision is located within a seasonal community, so it is likely that some residents may only be present on weekends during certain parts of the year. To reduce the issues caused by hydrogen sulfide resulting from sewage sitting in pump basins for an extended period before being discharged to the municipal collection system, an automatic flushing system may be incorporated into the home's plumbing which would ensure that positive displacement pumps will run when homes are vacant. This can be achieved through the installation of a small water pump complete with a valve and backflow prevention, on a timer. It is assumed that the automatic flushing would occur twice a week and pump enough water to fill the grinder pump basin, ensuring that the pumps run while homes are vacant and preventing the build up of hydrogen sulfide. The volume of the typical grinder pump basin is approximately 70 gallons (0.26 m^3), which would be equivalent to approximately 1,000 m^3/year for the entire subdivision (37 units).

Benefits of the automatic flushing system are summarized below:

1. Prevention of Stagnant Sewage: Regular flushing helps maintain a continuous flow of wastewater through the system, reducing the chances of sewage sitting idle and potentially causing odors or blockages.

2. Mitigation of Blockages: By periodically introducing water into the system, the pump helps to clear any debris that might accumulate, thereby reducing the likelihood of blockages and maintaining smooth operation.

3. Adaptability: This system is particularly useful during periods when the home is unoccupied or when the sewer system might otherwise remain dormant, ensuring that the system remains functional and clean.

Installation of the automatic flushing system may be included as a requirement in the Offer of Purchase and Sale and may be enforced through inspections completed by the Town's Building Department. Should this option be of interest to the Town, our office

will work with staff to further develop the preferred method for providing automatic flushing and the frequency with which it should operate.

Back-Up Power

Based on discussions with Town staff, it is understood that there are also concerns when it comes to dealing with potential issues such as power outages and pump failures to prevent the risk of the wastewater back-ups. Although our office is not aware of any instances where wastewater back-ups have occurred in the existing low-pressure systems in the Town of The Blue Mountains, there are options to reduce risks of this happening in the Georgian Woodlands Subdivision. In consultation with the Owner, the provision of back-up power may be included in the Offers of Purchase and Sale which would be agreed to in the Subdivision Agreement, to the Town's satisfaction.

Availability of Service Technicians

Our office has learned that a new E-One service firm (District Septic) has recently taken over for the Georgian Bay Area (including Town of The Blue Mountains). District Septic is based in Collingwood and has an emergency number for services required outside of business hours. This new service provider will offer valuable support to both the Town and homeowners, ensuring prompt assistance and expertise for any issues that may arise with the pumps or the system. It is noted that E-one's Pressure System Owner's Guide states that the individual pump basins can provide adequate storage for up to 24 hours based on typical water usage.

5.0 LPS vs. SPS Cost Comparison

All the roads and services within the Georgian Woodlands development are intended to be public infrastructure and will ultimately be assumed by the Town after it has been installed by the Developer. It is also important to note that if the development is serviced by a low pressure system, the Developer will be responsible for installing the low pressure forcemain complete with flushing connections and service laterals to the lots but the future homeowners will be responsible for costs associated with supplying / installing the individual grinder pumps. Following assumption of the infrastructure by the Town, the grinder pumps would continue to be owned and maintained by the homeowner.

For the Town's consideration, this memo will compare the capital costs and 20-year life cycle costs between the LPS and SPS options and will focus only on the cost of infrastructure that will be assumed by the Town (excludes individual grinder pumps).

5.1 Low-Pressure System Capital Costs

The capital costs associated with the low-pressure system that will ultimately be owned and operated by the Town are based on the latest detailed design submission and include the following:

- 50mm diameter LPS Pressure Pipe
- 75mm diameter LPS Pressure Pipe
- Flushing connections and clean-outs
- Sanitary service laterals
- Installation of a new manhole on Arrowhead Road

As noted above, the capital costs associated with the grinder pumps will be the responsibility of the homeowner and are not included in the capital cost estimate prepared for this memo. Our office has prepared an Opinion of Probable Costs (OPC) for the low pressure system based on the current design (enclosed). Factoring in a 20% contingency the estimated capital cost (in 2024 dollars) is approximately **$410,160.00** (excluding HST), which would be the responsibility of the Developer.

5.2 Low-Pressure System 20-Year Life Cycle Costs

Our office prepared a 20-year life-cycle cost estimate for the low pressure system based on the 2018 tender results associated with flushing the low pressure system in the Georgian Woodlands Phase IV Stage 2 development. To reflect 2024 costs, an annual inflation rate of 2% has been applied to the 2018 unit rates. We have assumed the system will be flushed twice a year for the entire 20-year lifecycle. Additionally, an annual allowance of $1,000/year has been allocated for reactive system maintenance (i.e. valve replacement, main repairs, etc.).

It should be noted that the electrical costs to operate the pumps, pump maintenance, and pump replacement will be the responsibility of the homeowner and the costs associated with pump maintenance are not reflected in the 20-year lifecycle costs.

Based on the above, the anticipated operating costs in year 1 is approximately $7,840.00 (based on 2024 dollars). Note that this estimate is subject to further discussion with the Town and can be confirmed / adjusted based on their operating expenses with existing low pressure systems.

Factoring in 2% for inflation, the total 20-year life cycle cost for the low pressure system is approximately **$190,000.00**, which would be the responsibility of the Town. Since the life expectancy for the low pressure forcemain exceeds 20 years, replacement costs were not included in the 20-year life cycle cost.

5.3 Sewage Pumping Station Capital Costs

Our office has prepared the detailed designs for multiple sewage pumping stations in the Town of the Blue Mountains and are familiar with the design criteria required for approval. Since a design has not been completed for a sewage pumping station that could service the Georgian Woodlands development, assumptions have been made when estimating the capital costs based on similar projects. See the OPC enclosed for details.

The capital cost estimate for the infrastructure required to service the proposed development via sewage pumping station include the following:

- 200mm diameter Gravity Pipe
- Standard 1200mm diameter Manholes
- Property Service Laterals Connections
- Sewage Pumping Station
    - Pre-fabricated fiberglass SPS with wet well, valve chamber and pumps
    - Back-up generator
    - Electrical components and control panel
    - Site works (i.e. parking, fencing and landscaping)
- 100mm diameter PVC forcemain

The estimated capital costs for the gravity sewer system and sanitary pump station to service the proposed 37-unit development is approximately **$3,127,440.00** (excluding HST), based on 2024 dollars and a 20% contingency.

It should be noted that these costs are based on the assumption that a pre-fabricated fiberglass SPS is acceptable. Should the Town request a concrete wet well, the capital costs may increase.

5.4 Sewage Pumping Station 20-Year Life Cycle Costs

When considering the 20-year life cycle costs for this scenario, our office has considered both the conveyance system (i.e. gravity sanitary sewer and forcemain) and the actual pumping station itself. Similar to the low-pressure system, annual flushing costs of the sanitary conveyance system have been accounted for in the life cycle costing. We have assumed that the flushing costs for the gravity sewers and the low-pressure forcemain are equivalent, therefore, the operation and maintenance costs for the collection system have been estimated based on the 2018 tender results ($6/m) to flush the Georgian Woodlands Phase IV, Stage 2 low pressure system, with an annual 2% inflation rate applied to all costs. We have assumed that the gravity sewers and forcemain will be flushed once a year for the entire 20-year lifecycle. Based on the above, we have assumed that year one operating costs of the conveyance system will be approximately $8,840.00. Note that this estimate is subject to further discussion with the Town and can be confirmed / adjusted based on their operating expenses with existing gravity sewers and sanitary pumping stations.

Our office has obtained 2024 monthly operating expenses for a similar sized pump station that is operated by Ontario Clean Water Agency (OCWA). Based on the monthly operating expenses of the pump station, the total monthly cost associated with operating a pump station is approximately $4,200.00 (i.e. $50,000/year). The operating fees include operator costs, telecom, hydro, snow removal, etc. This estimate is subject to further discussion with the Town and can be confirmed / adjusted based on their operating expenses with existing pumping stations.

Additionally, there are components within the sewage pumping station that require replacement within the 20-year lifecycle. Therefore, the following assumptions have been made regarding the useful life expectancy of various components:

- Instrumentation & Controls (10 year life expectancy)
- Ventilation, Lighting and HVAC (10 year life expectancy)
- Flygt Pumps (20 year life expectancy)
- Process Piping (20 year life expectancy)
- Standby Generator (20 year life expectancy)

Factoring in 2% for inflation, the total 20-year life cycle cost for the sewage pumping station is approximately **$1,680,00.00** (excluding HST), which would be the responsibility of the Town.

Although not directly related to the life cycle costing of the sewage pumping station, it is also worth noting that the gravity sanitary sewer which would be installed as part of this scenario would introduce additional wastewater flows due to inflow and infiltration. Due to the airtight nature of a low pressure forcemain system, inflow & infiltration is generally not accounted for when estimating the design flows for wastewater. Based on the Town's design criteria for calculating inflow and infiltration rate (0.28 L/s/ha) it is anticipated that a gravity sanitary sewer system would produce an additional 80,732 m^3/year of sewage for the entire subdivision. This additional wastewater would impact the available capacity within the municipality's downstream sanitary infrastructure (i.e. sewers and pumping stations) and at the Craigleith wastewater treatment plant.

As previously noted, the requirement for an automatic flushing system within the interior plumbing of future home may be considered as part of the low-pressure system alternative, to prevent the build up of hydrogen sulfide. The anticipated volume of additional wastewater discharging to the Municipal system under that scenario was estimated as approximately 1,000 m^3/year, which would still be less than the volume of inflow and infiltration from the gravity system alternative.

5.5 Life-Cycle Cost Comparison

Table 1 below summarizes and compares the total capital and 20-year life cycle costs for each of the sanitary servicing strategies described above. Note that the capital costs will be the responsibility of the Owner and the 20-year life cycle costs will be the responsibility of the Town following assumption of the infrastructure.

Table 1 – Life Cycle Cost Comparison

Servicing Strategy	Capital Costs (Developer)	20-year Life Cycle Costs (Town)
Low Pressure System	$410,000.00	$220,000.00
Gravity Sewer & Pump Station	$3,130,000.00	$1,680,000.00

The life cycle cost-benefit analysis in Table 1 indicates that the capital and 20-year life cycle costs for the low-pressure system will be significantly lower than those for a pump station. For a detailed breakdown of the costs for each system, refer to the cost estimates enclosed with this memo.

6.0 Conclusion

Based on the foregoing, our office concludes the following:

- Based on the Town's transitional policy, it is understood that the Georgian Woodlands development is subject to the 2009 Town Engineering Design Standards, which permit the use of low pressure forcemain systems.
- A low pressure system is preferred as a sewage pumping station would impact the Draft Plan which was approved through the OLT.
- Through the implementation of additional requirements within the purchase and sale agreements, and verification during the final inspections completed by the Town Building Department, there can be measures in place to ensure future home owners are installing grinder pumps which are consistent with the servicing design.
- Installation of an automatic flushing system within the plumbing of the future homes may be considered to reduce the risk of hydrogen sulfide damage to municipal infrastructure. Further discussions are recommended with Town staff to explore this option.
- The capital and 20-year life cycle costs are significantly greater for the sewage pumping station, compared to the low pressure system.

- A low pressure system would reduce the expected volumes of inflow and infiltration to the downstream Municipal wastewater system.

It is our recommendation that the low pressure system option be implemented to service the Georgian Woodlands developments. Following the Town's review of this memo, we request that a meeting be scheduled with Town staff to discuss the proposed servicing strategy.

Please contact the undersigned if you have any questions. Thank you.

Sincerely,

C.F. CROZIER & ASSOCIATES INC.

[redacted]

Jonathon Kerschbaumer, P. Eng.
Project Engineer

C.F. CROZIER & ASSOCIATES INC.

[redacted]

George Cooper, P. Eng.
Project Manager

C.F. CROZIER & ASSOCIATES INC.

[redacted]

Jon Proctor, P. Eng.
Director, Land Development

Enclosure
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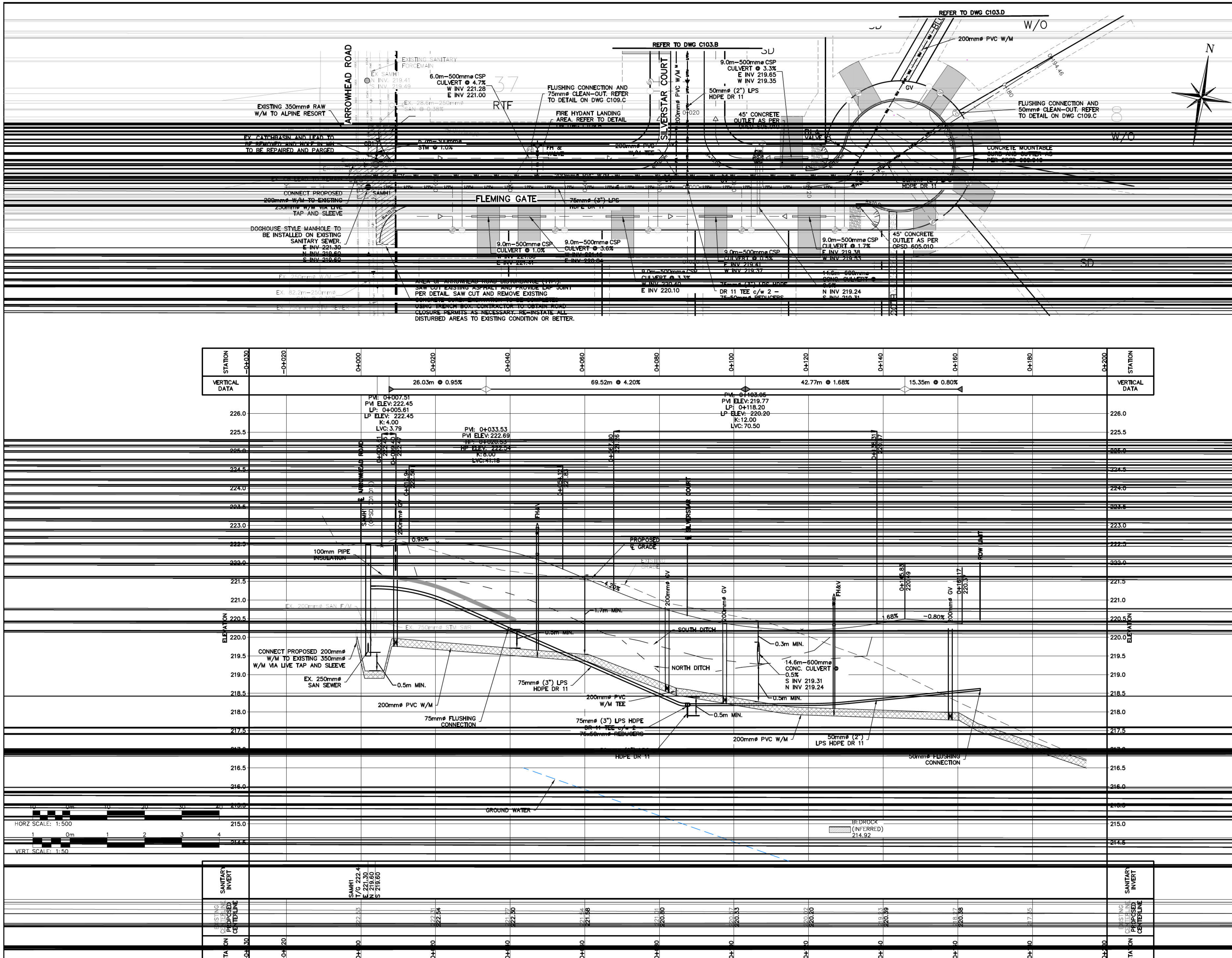
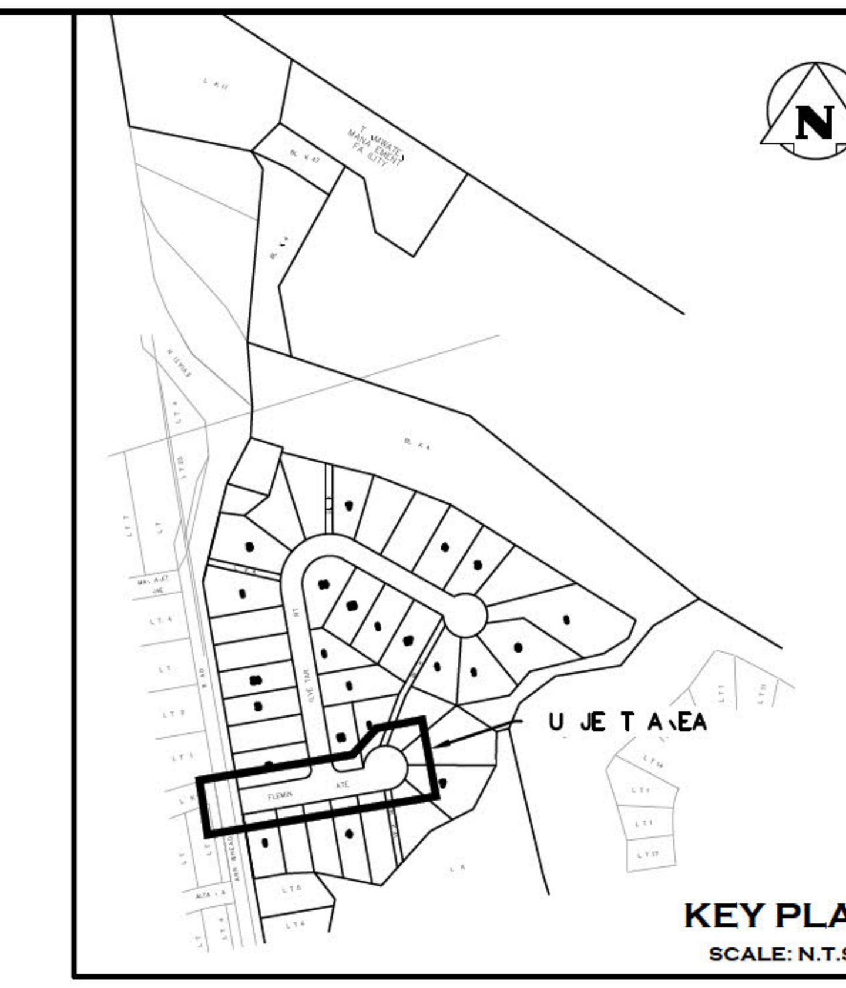
Enclosures

Georgian Woodlands Second Submission Plan & Profile Drawings

Drawing C103.A – Fleming Gate Plan & Profile (STA 0+000 – 0+166)
Drawing C103.B – Silverstar Court Plan & Profile (STA 0+000 – 0+220)
Drawing C103.C – Silverstar Court Plan & Profile (STA 0+220 – 0+402)





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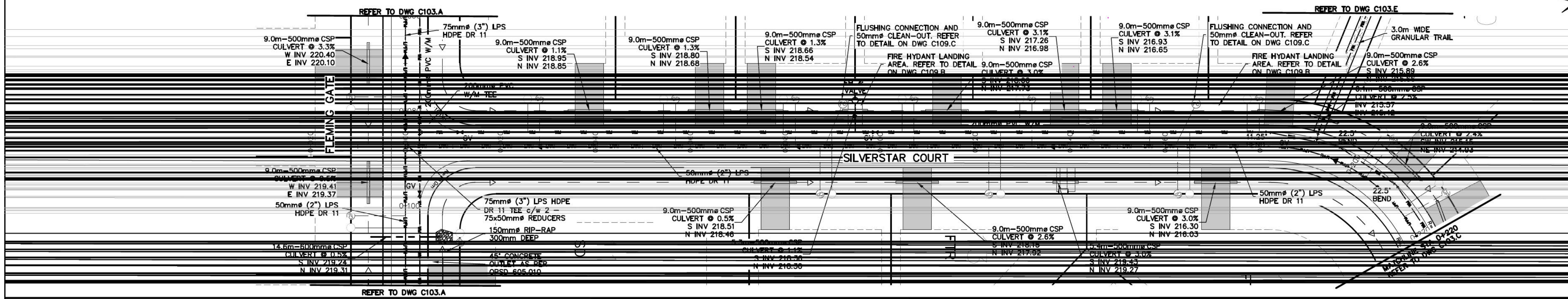

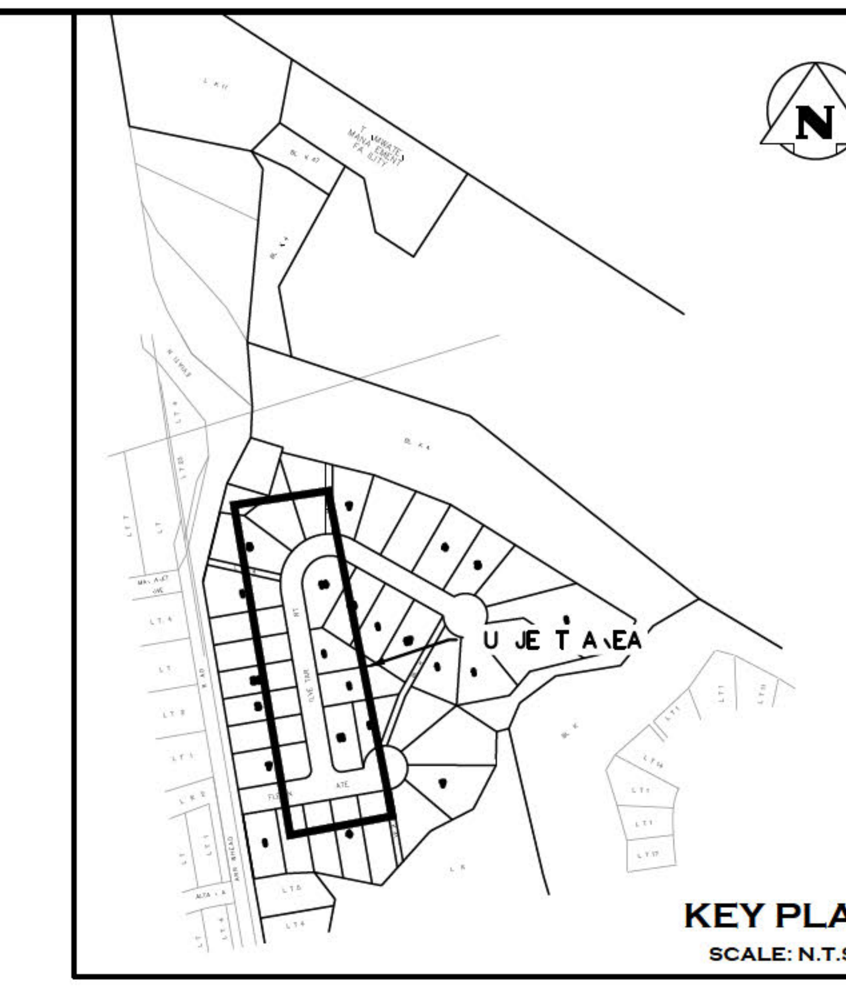

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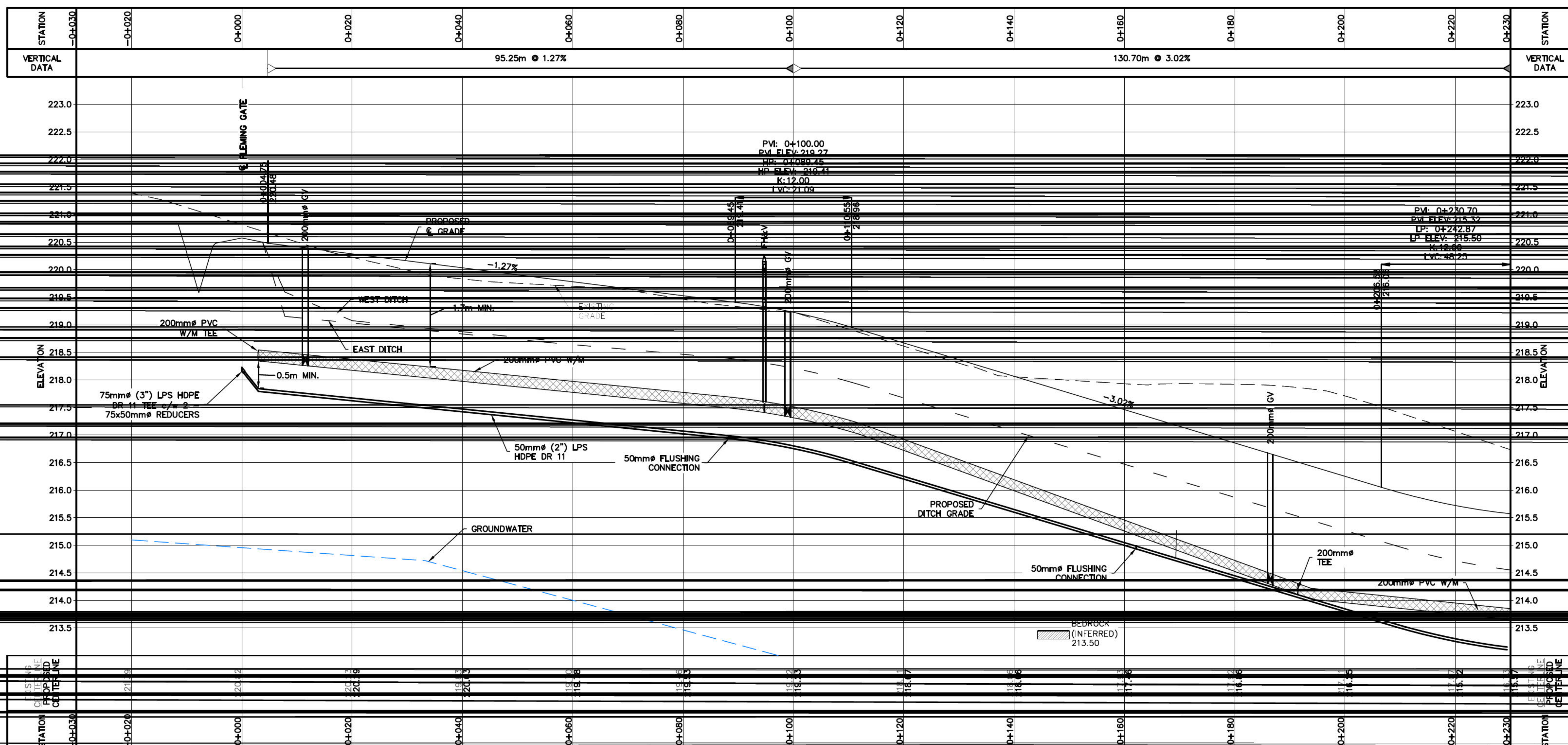

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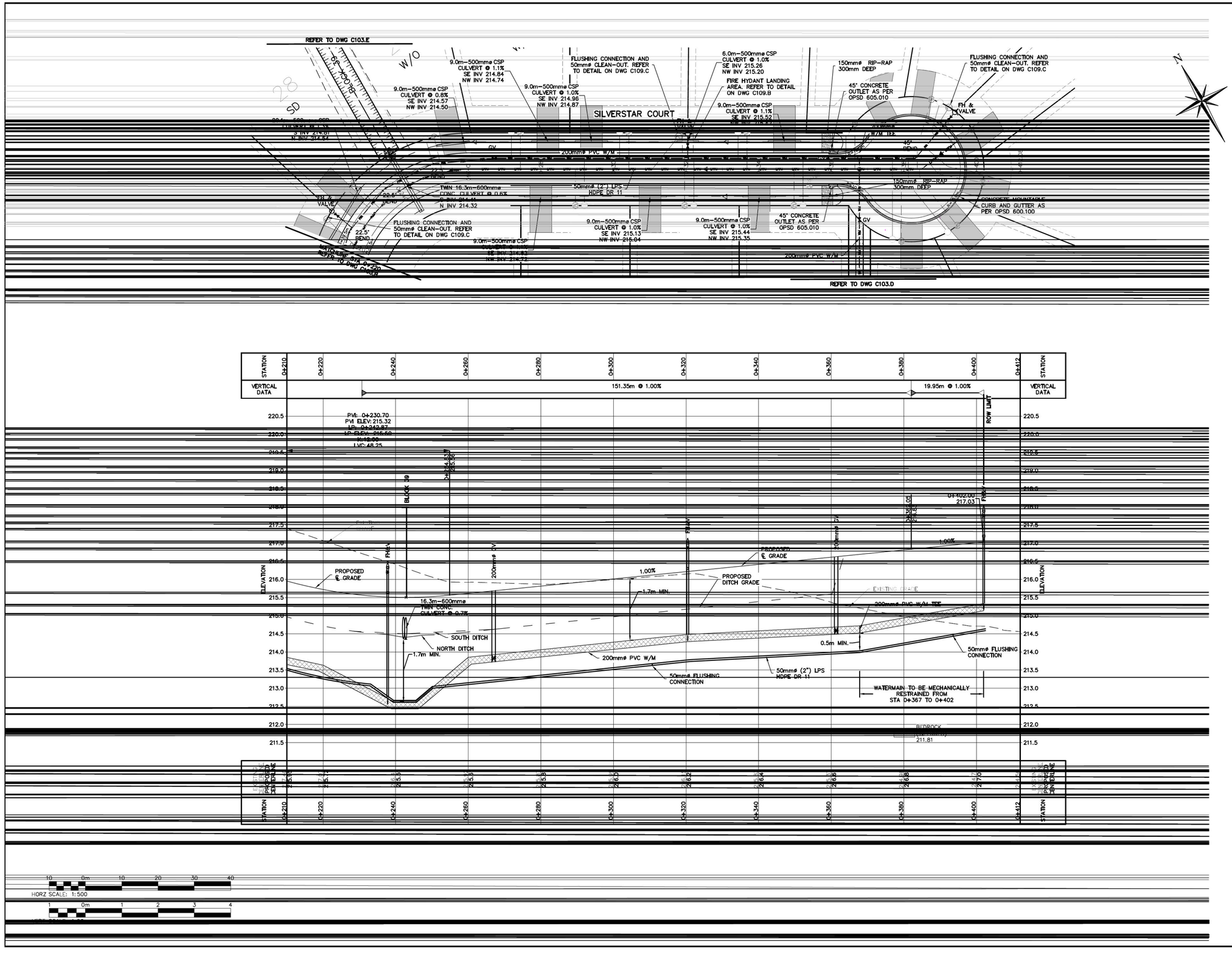

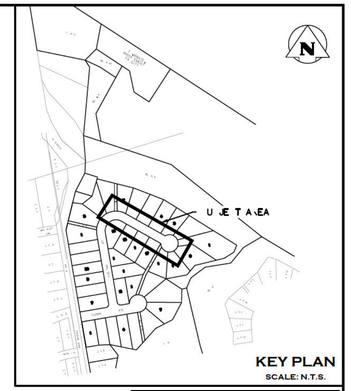

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Engineer

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CROZIER
CONSULTING ENGINEERS
ADMIRAL BUILDING
1 FIRST STREET, SUITE 200
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705-446-3520 F
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INFO@CFCROZIER.CA

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Town of The Blue Mountains Development Engineering Comments

Georgian Woodlands Phase 4 Stage 3 First Submission Comments (August 10, 2022)
Georgian Woodlands Phase 4 Stage 3 Second Submission Comments (June 3, 2024)

Development Engineering Comments

32 Mill Street, Box 310, Thornbury ON, N0H 2P0
Phone: 519-599-3131 – Fax: 519-599-7723
https://www.thebluemountains.ca
developmentengineering@thebluemountains.ca

PROJECT: **Georgian Woodlands Phase 4 Stage 3**

Submission #: **1**

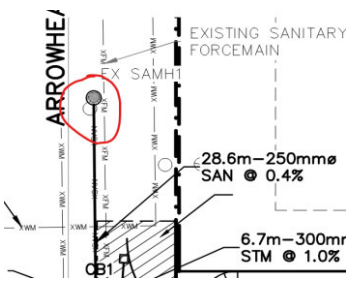
PREPARED BY: **Evan Hancock, Development Engineering Reviewer**

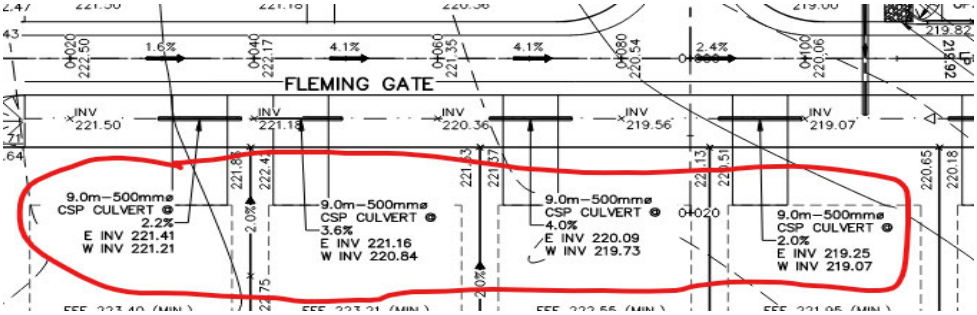
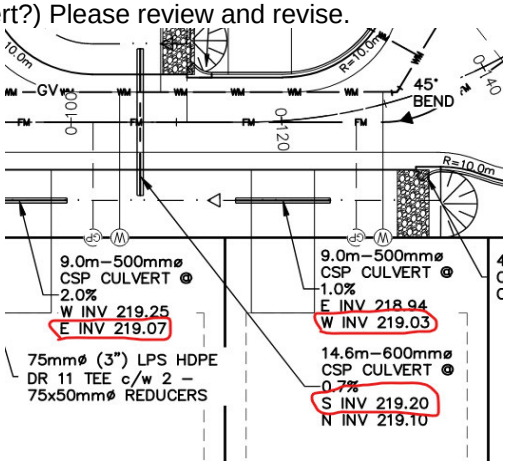
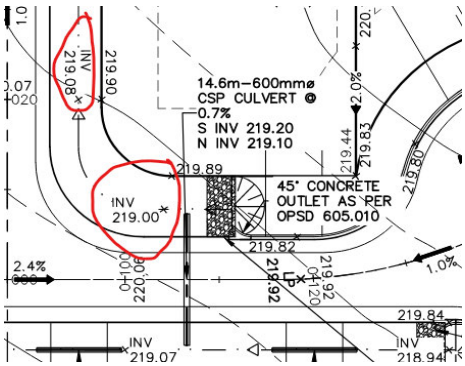
APPROVED BY: **Deanna Vickery, Development Engineering Suspervisor**

DATE OF DISTRIBUTION: **August 10, 2022**

Please note 4th and subsequent submissions are subject to additional review fees as outlined in Town Fee Bylaw 2021-17 and as amended.

REVIEW COMMENTS:	
Comments not addressed in the Pre-Consultation	
1	Please provide a geotechnical report with the next submission. We understand the Town is looking into acess for this work.
2	If gravity sewer is not feasible, The town prefers a municipal sewage pumping solution over a low-pressure sanitary system. Please review comment on possible public SPS locations.
3	Please include a tree preservation and landscaping plan in the engineering drawings
4	Please indicate how the following services are being managed - mail delivery. Please show community mailbox on drawings.
5	Slope Stability Assessment - to address surficial and circular slip and provide recommendations to protect the slope stability of the ridge and any provisions required to safe-guard infrastructure. Peer review may be required.
6	Construction Traffic Route - per the draft conditions, required prior to approval of engineering drawings. Please provide a plan.
7	Please consider providing two watermain connection points on Arrowhead Road to provide a well looped network. (Through block 40)
8	The Town's Sanitary Needs Study by Cole Engineering in 2020 identified capacity issues under existing wet weather condition, and future dry weather conditions, at the Craigleith Main Lift Station. Further discussion will be required with the Town to confirm impacts to this development and whether external improvements are required.
9	Hydraulic boundary conditions for the site can be obtained from the Town's water model, through coordination with Development Engineering (for a fee)
Functional Servicing Report:	
10	Driveway culverts / driveways in the Towns ROW to be installed by the Developer and shown on engineering drawings.

11	For our records, please justify why the municipal class EA schedule C activity is not triggered for the proposed SWM flow split and diversion of flows from watercourses 18 to 19.
12	A Fluvial Geomorphological study should be conducted to support the detailed design of channel down the ridge.
13	GSCA input will be required for the watercourse crossings.
14	Section 8.1 please remove, "It was determined that servicing the subject development through the Margaret Drive SPS is preferred to the construction of a new sanitary trunk sewer down the Nipissing Ridge and decommissioning of the Margaret Drive SPS." This is not how the Town recalled this discussion.
15	How is the storm water quality and quantity for catchment 19B being achieved or over controlled elsewhere?
SWM Pond:	
16	The Town prefers an orifice plate be installed on the upstream side of the control MH so it is easier to access.
17	Please provide a hydrogeological report for the berm to the North to ensure it can withhold the hydrostatic load.
18	Please provide additional grades for the spillway.
19	Is there a plan to stop Phragmites being the pond isn't deep.
20	Rip rap is shown going over the asphalt on the access road of the Stormwater Management pond. Rip rap can be on both sides of the access road at the spillway, but the Town prefers road surface remains asphalt. Please revise.
Water System:	
21	Fire Hydrant Valves on PP drawings appear to be proposed within the driveway culverts, please revise to be consistent with the detail drawings.
22	Watermain and Gate Valve exceeds the maximum depth as per the Towns standards at station 0+010. (Fleming Gate) please revise.
23	Hydrant radii appear to have quite a bit of overlap. Can they be spaced out more to minimize the number of hydrants? (with consideration of maintaining hydrants at high points).
24	The existing watermain on Arrowhead road is 350mm please revise drawings.
25	Please update the fire flow calc with the FUS 2020 version.
26	Please provide a hydraulic analysis to support the watermain size and demand.
27	The Town is ok without the water valves on Silverstar Ct at the following locations: 0+100 and 0+270,
Sanitary System:	
28	Please show the proposed invert for the existing maintenance hole connection on Arrowhead Road.
29	Is the Sanitary main being replaced on Arrowhead road? (There is inconsistency on the drawings). If so, the Town prefers a new Sanitary Maintenance hole structure rather than a doghouse style maintenance hole.
30	Why are there two sanitary maintenance holes side by side on Arrowhead Road? See below. 

Stormwater Management System / Drainage:	
31	Please revise inverts for DCBMH1 and DCBMH 2 (DCBMH 1 should only have 1 invert)
32	Culvert inverts are draining away from the road crossing culvert on the grading plan. Please revise. 
33	Please show inverts, diameter, length and material of the proposed culverts at stations 0+050 (Fleming Gate), 0+320 (Silverstar Court), 0+170 (Silverstar Court), 0+240 (Silverstar court).
34	Driveway Culverts for lot 4 and 5 have a lower invert then the road crossing culvert (how will the water drain into the road crossing culvert?) Please review and revise. 
Grading:	
35	Ponding concern in the ditch at station 0+010 on the east side of Silverstar Court please address. 
36	Entire site to be rough graded to ensure all design grades are met. Are there any trees identified for preservation that this would impact?
Roads:	
37	Please include filter cloth with the limestone screenings as apart of the trail makeup.
38	The SWM Pond access road note states this is a temporary access road to the pond, how will the pond be accessed in the future?

39	Please provide more grades for the mountable curb in the cul de sacs, as the Town is worried there is not enough fall and freezing could occur on the curb.
Traffic Signage:	
40	Will there be no exit signs? Please provide standalone signage/pavement marking drawing.
Streetlighting / Utilities:	
41	Composite utility plan required for next submission.
Sedimentation and Erosion Controls:	
42	Silt fence boundaries should be the entire site limits not just the road, please revise.
Landscaping / Tree Preservation:	
43	Landscaping plans and a tree preservation plan is required for next submission.
General / Miscellaneous:	
44	Please provide chain link fence on both sides of blocks 38,39 and 41.
45	What is the purpose of the swale in block 38? Could it be replaced with side yard swales?
46	Please provide a drawing that shows the drainage path, details and grades from Block 39 to the SWM Pond.
47	Subject area on key plan is incorrect on C103.D P&P.
48	Please provide a drawing called "Coordination Plan" included in the Engineering set that will be referenced by the schedules of the Development Agreement. This plan is to serve as a conceptual plan to show Construction haul route and any special requirements to coordinate the construction of this development (ie: maintaining EMS access, access to existing community mailboxes if any, signage, etc).
49	Please provide a written "Communication Plan" that will be referenced by the schedules of the Development Agreement. This written plan shall indicate how the Town and existing residents will be notified throughout construction. Minimum requirements are available upon request.
50	Should the developer be considering winter construction, please note external works on Town roads will not be permitted until the Town's Winter Control period has expired (Nov 1st to April 15th). Additionally, Town roads may be half-loaded in winter and could pose interruptions to access/haul routes.
51	Please provide signed Engineering Submission Requirements checklist and all required submittals with each submission. The checklist is available on the Town Development Engineering webpage under Quick Links.
52	Please provide comment response matrix with each submission to explain how each comment above and from other agencies have been or are being addressed.

Development Engineering Comments

32 Mill Street, Box 310, Thornbury ON, N0H 2P0
Phone: 519-599-3131 – Fax: 519-599-7723
https://www.thebluemountains.ca
developmentengineering@thebluemountains.ca

PROJECT: **Georgian Woodlands Phase 4 Stage 3**

Submission #: **2**

PREPARED BY: **Larissa Pinkney, Development Engineering Reviewer**

APPROVED BY: **Brian Worsley, Manager of Development Engineering**

DATE OF DISTRIBUTION: **June 3, 2024**

Please note 4th and subsequent submissions are subject to additional review fees as outlined in Town Fee Bylaw 2021-17 and as amended.

REVIEW COMMENTS:	
Comments not addressed in the Pre-Consultation	
1	Follow up to 1st submission comment #2 - The Town will not accept the proposed LPS. Design deviation rejected by Operations department.
2	Follow up to 1st submission comment #4 - Please send Canada Post's sign off on the mailbox location once received
3	Follow up to1st submission Comment #5 - Peer review will be required. We are working on sending out peer review requests.
4	Follow up to 1st submission Comment # 8 - The Town will not be able to sign CLI-ECA documents or issue AFC drawings until such a time that the Town has greater certainty of the time of the required upgrading projects.
Functional Servicing Report:	
5	Follow up to 1st submission Comment # 11 - further discussion between the Town, GSCA and Crozier required.
6	Follow up to 1st submission Comment # 12 - the 100 year storm quantity of 1.28m3/s should be verified against Tatham numbers for the area on a l/s,ha basis. Additionally the monitoring plan should include triggers and actions should any issues arise.
7	Follow up to 1st submission comment # 15 - We require clarification on how is the storm water quality and quantity for catchment 19B is going to be achieved or over controlled in the future phases as if this cannot be achieved in the future phases measures need to be implemented into the current phase to ensure adequate storm water quality and quantity. water cannot drain directly to watercourse 19 without a form of quantity or quality control.
SWM Pond:	

8	Follow up to 1st submission Comment #16 - comment states that 120mm orifice plate was is proposed but drawing states it was 170mm orifice plate please confirm that 170mm as indicated on the drawing Is correct. Additionally, a shield is required to protect the orifice from blockage.
9	Follow up to 1st submission Comment #17 - the hydrogeological report for the berm will be included in the peer review with the Slope stability report.
10	Follow up to 1st submission Comment #19 - verification of material quality will be required prior to
11	Follow up to 1st submission Comment #20 - granular material have to potential to wash out. Please revise to have the spillway designed with a hard surface. i.e. asphalt or cable matts.
Water System:	
12	Follow up to 1st submission Comment #27 Please remove the water valves on Silverstar Ct at 0+100.
Stormwater Management System / Drainage:	
13	Further comments from operations are still to come
Grading:	
14	Follow up to 1st submission Comment # 36 - Need to demonstrate the ultimate grading can be achieved irrespective of the order the lots are developed in. At minimum regrading to the breakpoint of the lots may be required. Could not locate the rough grading drawing is this just the grading plans? please include or identify which drawing.
Roads:	
15	Follow up to 1st submission Comment # 38 - If the intent is to have this subdivision assumed prior to the future phases proceeding a permanent road way to the pond will be required.
Streetlighting / Utilities:	
16	Follow up to st submission Comment #41 - CUP does not meet section 3.4.9 of the Town standards. Additionally please provide the photometric reading at ROW limit.
Sedimentation and Erosion Controls:	
17	Follow up to 1st submission Comment #42 - we require silt fence at the boundary of the site regardless of if parts of the site are to be left undisturbed.
Landscaping / Tree Preservation:	
18	Follow up to 1st submission Comment # 43 - Tree preservation plan is showing trees on lots are protect. a Tree preservation plan should show the Trees that are to be protected for the duration of construction and will not require removal for home construction, it should also outline the trees that are to be removed in order to complet construction works. Please update the tree preservation plan.
Building Department:	
19	The building envelope area for each lot as shown on the C101.C Site Plan should be copied and placed on C102.B Site Grading Plan. Including the location of the building envelope area on the grading plan. This helps the designer, homeowners and contractors site the building on the property correctly. It also helps the Building Division when determining the rear yards and side yards for irregularshaped lots. Examples include lots 14 and 21.
General / Miscellaneous:	
20	Follow up to 1st submission Comment # 48 - separate drawing it likely to be required to be resolved upon resolution of gradings works.

Georgian Woodlands Phase IV Stage 2 Issued for Construction Drawings

Drawing 110 – Interlaken Court Plan & Profile (STA 0+000 – 0+300)

STATION	0+000	0+020	0+040	0+060	0+080	0+100	0+120	0+140	0+160	0+180	0+200
ELEVATION	221.89	222.20	222.10	222.00	221.89	221.79	221.76	222.00	222.28	222.56	222.84

STATION	0+200	0+220	0+240	0+260	0+280	0+300
ELEVATION	222.84	223.17	223.81	224.77	225.73	226.44

TOWN OF THE BLUE MOUNTAINS
PLANNING & DEVELOPMENT SERVICES
ACCEPTED FOR CONSTRUCTION

MAY 0 4 2015 04/24/15

[redacted]

SIGNATURE

1. THIS DRAWING IS THE EXCLUSIVE PROPERTY OF C.F. CROZIER & ASSOCIATES INC. AND THE REPRODUCTION OF ANY PART WITHOUT PRIOR WRITTEN CONSENT OF THIS OFFICE IS STRICTLY PROHIBITED.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, LEVELS, AND DATUMS ON SITE AND REPORT ANY DISCREPANCIES OR OMISSIONS TO THIS OFFICE PRIOR TO CONSTRUCTION.
3. THIS DRAWING IS TO BE READ AND UNDERSTOOD IN CONJUNCTION WITH ALL OTHER PLANS AND DOCUMENTS APPLICABLE TO THIS PROJECT.
4. DO NOT SCALE THE DRAWINGS.
5. ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

GEODETIC BENCHMARK
TABLET 72U306 ELEV. 183.160m
CONCRETE CULVERT UNDER HWY 26, 90m NW OF CRAIGLEITH PROV. PARK ENTRANCE, 18cm NE OF SW END OF CULVERT BELOW ROAD LEVEL.

TEMPORARY BENCHMARKS
TBM#1–RAILROAD SPIKE LOCATED IN HYDRO POLE @ SW CORNER OF SLEEPY HOLLOW/STREET 'A' INTERSECTION. ELEV. 232.49m
TBM#2–TOP NUT OF FIRE HYDRANT @ NE CORNER OF BLUE SKI GEORGE CRES./DAVOS DR INTERSECTION. ELEV. 223.07m
TBM#3–RAILROAD SPIKE LOCATED IN HYDRO POLE ON THE EAST SIDE OF ARROWHEAD RD. APPROX. 85m NORTH OF STREET 'B'/ARROWHEAD RD. INTERSECTION. ELEV. 226.54m
TBM#4–TOP NUT OF FIRE HYDRANT @ NW CORNER OF ALTA RD./ARROWHEAD RD. INTERSECTION. ELEV. 224.03m

Town

No.	ISSUE / REVISION	DATE: MM/DD/YYYY
1	REVISED PER TOWN COMMENTS (2nd Sub'm)	10/16/2012
2	REVISED PER TOWN COMMENTS (3rd Sub'm)	06/10/2013
3	ISSUED FOR ECA APPLICATION	06/14/2013
4	ISSUED FOR PRE-SERVICING (4th Sub'm)	08/09/2013
5	ISSUED FOR FINAL APPROVAL	12/17/2014
6	ISSUED FOR CANADA POST APPROVAL	02/26/2015
7	RE-ISSUED FOR FINAL APPROVAL	03/13/2015

Engineer: LICENSED PROFESSIONAL ENGINEER — 03/13/2015 — C.F. CROZIER — PROVINCE OF ONTARIO

Engineer: LICENSED PROFESSIONAL ENGINEER — J.M. PROCTOR 100117314 — 03/13/2015 — PROVINCE OF ONTARIO

Project: GEORGIAN WOODLANDS
PHASE IV–STAGE 2
TOWN OF THE BLUE MOUNTAINS

Drawing: PLAN & PROFILE
INTERLAKEN COURT (STA 0+000 – 0+300)

CROZIER & ASSOCIATES Consulting Engineers
THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3
705-446-3510 T 705-446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA

Drawn By	I.T.M.	Design By	I.T.M.	Project	196–2631
Scale	V = 1:50 H = 1:500	Date	06/01/2010	Check By	C.F.C.	Drawing	110

Town of The Blue Mountains 2023 Engineering Standards Excerpt

Compliance Approval (CLI-ECA) and the requirements in this section. For sewage forcemain in open cut OPSS.MUNI.412 shall be utilized. For sewage forcemain installed by Horizontal Directional Drilling OPSD.MUNI.450 shall be utilized.

In locations where forcemains are inaccessible either seasonally or due to natural features (i.e. river crossings), an additional redundant forcemain shall be required.

The sizing of the forcemain will be that required to meet the required flow velocities. The minimum diameter of forcemain shall be 75 mm for systems with grinder pumps upstream and 100mm for all other scenarios.

Forcemain sizing shall be coordinated with pump station design and forcemain length to minimize stagnation, maximize flushing velocity and system efficiency.

4.6.6.7. Velocity and Transient Analysis

Minimum and maximum velocities shall be in accordance with MECP Design Guidelines. A transient analysis will be required for all forcemain and must be submitted along with the design brief.

4.6.6.8. Location

The location of the sanitary forcemain shall be determined in consultation with the Town and considered on a project-by-project basis.

4.6.6.9. Depth of Cover

The minimum depth of cover shall be 1.9 m from finished grade to the top of the forcemain to minimize conflicts with other utilities. Where this criterion cannot be achieved, the forcemain may be insulated to avoid freezing as approved by the Town. The maximum allowable depth of forcemain is 2.8 m.

4.6.6.10. Connection to Gravity System

Forcemain shall discharge to the gravity sewer system at a sanitary maintenance hole. The point of connection shall be no more than 200 mm above the flow line of the receiving maintenance hole. Where the forcemain connects to the maintenance hole the connection shall include a cored opening with an approved watertight mechanical connector (flexible “boot style” pipe to MH connector). Discharge must be directed downward towards the benching.

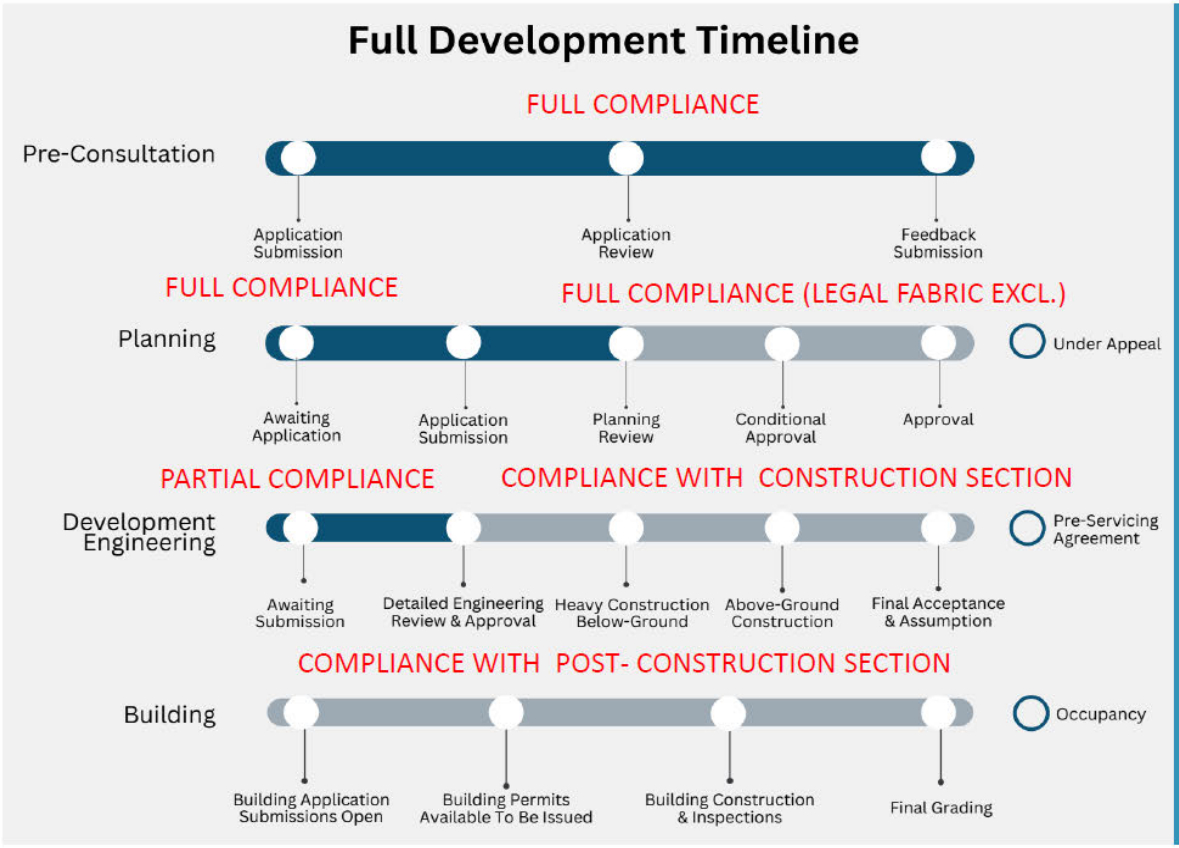
4.6.7. Low Pressure Sanitary Sewer Systems

A low-pressure sanitary sewer system (LPSS) may be considered by the Town for sanitary sewer extensions only, where gravity sewer design and pumping stations/forcemains are not feasible from a technical or economic perspective in the opinion of the Town.

Low Pressure Sanitary Sewage Systems will not be considered for new development.

Where a low-pressure sewage system is contemplated, the Engineer is to contact the Town prior to design to gain approval for the installation and to determine what design factors the Engineer should consider. Low pressure sewage sewer must be approved by both the Director of Planning and Director of Operations.

Town of The Blue Mountains 2023 Engineering Standards Transitional Policy



TRANSITION – DEVELOPMENT PROCESS

Low Pressure System Capital and 20-Year Lifecycle Costs

CROZIER
CONSULTING ENGINEERS

Project No.: 196-5928
Date: 2024.11.01
Completed by: CB
Checked by: JK

GEORGIAN WOODLANDS - PHASE IV STAGE 3
OPINION OF PROBABLE COSTS - LOW PRESSURE FORCEMAIN - CAPITAL COSTS

Notes:

1) This OPC has been prepared based on the Georgian Woodlands Phase 4 Stage 3 Second Submission Detailed Design Drawings (Crozier, January 2024). This OPC is subject to change based on the detailed design process and agency comments.
2) Estimated costs are subject to change based on any geotechnical and hydrgeological findings/recommendations.
3) Estimate excludes mobilization/demobilization costs.
4) This cost estimate is only for sanitary servicing. Does not include roadworks, watermain, storm sewers, or utility servicing (hydro, gas and communications).
5) Estimates account for sanitary sewer within the Municipal ROW and excludes the cost of Grinder Pumps as they will be the responsibility of the homeowner.
6) It has been assumed that native material can be used for backfilling of trenches. If this material is not acceptable, it may be necessary to import material, i.e. clean, granular material, Type 3 or Granular C.
7) Unit Prices based on recent Crozier tender results (2023/2024) for similar residential developments. Prices will fluctuate and are subject to change depending on when the work is completed.
8) Dewatering has not been accounted for in this estimate.
9) The material enclosed reflects best judgment in light of the information available at the time of preparation. Any use which a third party makes of this information, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Crozier Consulting Engineers accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this material.

ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT	ESTIMATED UNIT PRICE	TOTAL
	SCHEDULE A - Sanitary Sewer				
A1	Supply & Install Low Pressure Forcemain c/w All Associated Appurtenances				
a)	50mm dia. HDPE DR-11	470	m	$ 300.00	$ 141,000.00
b)	75mm dia. HDPE DR-11	86	m	$ 350.00	$ 30,100.00
A2	Supply & Install Low Pressure Sanitary Services	37	Each	$ 2,500.00	$ 92,500.00
A3	Supply & Install Flushing Connections and 50mm dia. Clean-Out	7	Each	$ 5,000.00	$ 35,000.00
A4	Locate & Connect to Existing 250mm dia. Sanitary Sewer via. Doghouse Maintenance Hole Connection	1	L.S.	$ 40,000.00	$ 40,000.00
A5	Supply & Install 100mm Rigid Insulation above Low-Pressure Forcemain	80	m^2	$ 40.00	$ 3,200.00
				Subtotal	**$ 341,800.00**

SUMMARY OF CONTRACT PRICES

SCHEDULE A - Sanitary Sewer	$	341,800.00
Subtotal	**$**	**341,800.00**
Contingency (20%)	$	68,360.00
SubTotal	**$**	**410,160.00**
H.S.T.	$	53,320.80
Total	**$**	**463,480.80**

CROZIER
CONSULTING ENGINEERS

Project No.: 196-5928

Date: 2024.11.01

Completed by: CB

Checked by: JK

GEORGIAN WOODLANDS - PHASE IV STAGE 3

OPINION OF PROBABLE COSTS - LOW PRESSURE FORCEMAIN - LIFECYCLE COSTS

Notes:

1) This OPC has been prepared based on the Georgian Woodlands Phase 4 Stage 3 Second Submission Detailed Design Drawings (Crozier, January 2024). This OPC is subject to change based on the detailed design process and agency comments.

2) Estimates account for sanitary sewer within the Municipal ROW and excludes the cost of Grinder Pumps and electrical power supply as they will be the responsibility of the homeowner.

3) Operating expenses are based on 2018 tender results ($6/m) for flushing the low-pressure system for the Georgian Woodlands Phase IV Stage 2 development, with a 2% annual inflation rate applied. Additionally, an allowance of $1,000 per year has been included for reactive maintenance on the system.

4) Inflation has been applied annually to each expense at an assumed rate of 2%.

5) The material enclosed reflects best judgment in light of the information available at the time of preparation. Any use which a third party makes of this information, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Crozier Consulting Engineers accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this material.

Year	Operating Expense	
1	$	8,840.00
2	$	9,016.80
3	$	9,197.14
4	$	9,381.08
5	$	9,568.70
6	$	9,760.07
7	$	9,955.28
8	$	10,154.38
9	$	10,357.47
10	$	10,564.62
11	$	10,775.91
12	$	10,991.43
13	$	11,211.26
14	$	11,435.48
15	$	11,664.19
16	$	11,897.48
17	$	12,135.43
18	$	12,378.13
19	$	12,625.70
20	$	12,878.21
TOTAL	**$**	**214,788.75**

Sanitary Pump Station Capital and 20-Year Lifecycle Costs

CROZIER
CONSULTING ENGINEERS

Project No.: 196-5928
Date: 2024.11.01
Completed by: CB
Checked by: JK

GEORGIAN WOODLANDS - PHASE IV STAGE 3
OPINION OF PROBABLE COSTS - SANITARY PUMP STATION CAPITAL COSTS

Notes:

1) This OPC has been prepared based on a conceptual design of a gravity system to required service the Georgian Woodlands Phase 4 Stage 3 Development. The depth and alignment of the sanitary sewers are preliminary and are subject to change.

2) Location of the proposed Sewage Pumping Station is assumed to be central to the site, between lots 13 and 14. This estimate assumes a Pre-Fabricated Fiberglass Pump Station will be acceptable to the Municipality. Please note that this estimate has been prepared in the absence of conceptual pumping station drawings and is based on recent tenders for similar sized pump stations. Actual costs are subject to detailed design if this option is selected to proceed.

3) Estimated costs are subject to change based on any geotechnical and hydrgeological findings/recommendations.

4) Estimate excludes mobilization/demobilization costs.

5) This cost estimate is only for sanitary servicing. Does not include roadworks, watermain, storm sewers, or utility servicing (hydro, gas and communications).

6) It has been assumed that native material can be used for backfilling of trenches. If this material is not acceptable, it may be necessary to import material, i.e. clean, granular material, Type 3 or Granular C.

7) Unit Prices based on recent Crozier tender results (2023/2024) for similar residential developments and sanitary pump stations. Prices will fluctuate and are subject to change depending on when the work is completed.

8) Dewatering has not been accounted for in this estimate.

9) The material enclosed reflects best judgment in light of the information available at the time of preparation. Any use which a third party makes of this information, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Crozier Consulting Engineers accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this material.

ITEM	DESCRIPTION	ESTIMATED QUANTITY	UNIT	ESTIMATED UNIT PRICE	TOTAL
	SCHEDULE A - Sanitary Sewer				
A1	Supply & Install 200mm dia. PVC Sanitary Sewers c/w all associated appurtenances	530	m	$ 290.00	$ 153,700.00
A2	Supply & Install Sanitary Sewer Services	37	Each	$ 2,500.00	$ 92,500.00
A3	Supply & Install 100mm dia. PVC Sanitary Forcemain c/w all associated appurtenances	240	m	$ 400.00	$ 96,000.00
A4	Supply & Install Combination Air Valve c/w Chamber on Forcemain	1	Each	$ 30,000.00	$ 30,000.00
A5	Supply & Install 1200 mm dia. Maintenance Hole (OPSD 701.010) c/w Frame & Grate	12	Each	$ 17,000.00	$ 204,000.00
A6	Locate & Connect to Existing 2500mm dia. Sanitary Sewer via. Doghouse Maintenance Hole Connection	1	Each	$ 40,000.00	$ 40,000.00
A7	Supply & Install Fibreglass Pre-Fabricated Sanitary Pumping Station c/w all associated appurtenances and site works	1	Each	$ 1,990,000.00	$ 1,990,000.00
				Subtotal	**$ 2,606,200.00**

SUMMARY OF CONTRACT PRICES

SCHEDULE A - Sanitary Sewer	$ 2,606,200.00
Subtotal	**$ 2,606,200.00**
Contingency (20%)	$ 521,240.00
SubTotal	**$ 3,127,440.00**
H.S.T.	$ 406,567.20
Total	**$ 3,534,007.20**

CROZIER
CONSULTING ENGINEERS

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GEORGIAN WOODLANDS - PHASE IV STAGE 3
OPINION OF PROBABLE COSTS - SANITARY PUMP STATION - LIFECYCLE COSTS

Notes:

1) This OPC has been prepared based on a conceptual design of a gravity system to required service the Georgian Woodlands Phase 4 Stage 3 Development. The depth and alignment of the sanitary sewers are preliminary and are subject to change.

2) Location of the proposed Sewage Pumping Station is assumed to be central to the site, between lots 13 and 14. This estimate assumes a Pre-Fabricated Fiberglass Pump Station will be acceptable to the Municipality.

3) Operating expenses are based on the annual operating costs for a similar sized sanitary pump station in another Municipality. Operating expenses include power, general maintenance, generator fuel swap, snow removal, etc., subject to confirmation from the Town.

4) We have assumed that flushing the gravity sewers and the low-pressure forcemain costs are equivalent, therefore, flushing costs are based on 2018 tender results ($6/m) for flushing the low-pressure system for the Georgian Woodlands Phase IV Stage 2 development, with a 2% annual inflation rate applied.

5) Inflation has been applied annually to each expense at an assumed rate of 2%.

6) The material enclosed reflects best judgment in light of the information available at the time of preparation. Any use which a third party makes of this information, or any reliance on or decisions made based on it, are the responsibilities of such third parties. Crozier Consulting Engineers accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this material.

	Operation Costs			Replacement Costs						
Year	Operating Expense (SPS)	Gravity Sewer Flushing	Forcemain Flushing	Pump Replacement	Process Pipe & Valve Replacements	Odour Control Unit Replacement Cost	Instrumentation & Control Replacement Cost	Ventilation, Lighting and HVAC Replacement Cost	Standby Generator Replacement	Total Cost
1	$ 50,000.00	$ 3,710.00	$ 3,400.00							$ 57,110.00
2	$ 51,000.00	$ 3,784.20	$ 3,468.00							$ 58,252.20
3	$ 52,020.00	$ 3,859.88	$ 3,537.36							$ 59,417.24
4	$ 53,060.40	$ 3,937.08	$ 3,608.11							$ 60,605.59
5	$ 54,121.61	$ 4,015.82	$ 3,680.27							$ 61,817.70
6	$ 55,204.04	$ 4,096.14	$ 3,753.87							$ 63,054.05
7	$ 56,308.12	$ 4,178.06	$ 3,828.95							$ 64,315.14
8	$ 57,434.28	$ 4,261.62	$ 3,905.53							$ 65,601.44
9	$ 58,582.97	$ 4,346.86	$ 3,983.64							$ 66,913.47
10	$ 59,754.63	$ 4,433.79	$ 4,063.31				$ 12,000.00	$ 12,000.00		$ 92,251.74
11	$ 60,949.72	$ 4,522.47	$ 4,144.58							$ 69,616.77
12	$ 62,168.72	$ 4,612.92	$ 4,227.47							$ 71,009.11
13	$ 63,412.09	$ 4,705.18	$ 4,312.02							$ 72,429.29
14	$ 64,680.33	$ 4,799.28	$ 4,398.26							$ 73,877.87
15	$ 65,973.94	$ 4,895.27	$ 4,486.23							$ 75,355.43
16	$ 67,293.42	$ 4,993.17	$ 4,575.95							$ 76,862.54
17	$ 68,639.29	$ 5,093.03	$ 4,667.47							$ 78,399.79
18	$ 70,012.07	$ 5,194.90	$ 4,760.82							$ 79,967.79
19	$ 71,412.31	$ 5,298.79	$ 4,856.04							$ 81,567.14
20	$ 72,840.56	$ 5,404.77	$ 4,953.16	$ 75,000.00	$ 45,000.00		$ 15,000.00	$ 15,000.00	$ 115,000.00	$ 348,198.49
									SUM	**$ 1,676,622.79**