

## You're Invited!

Join us for an Open House to discuss the proposed  
Gantahaz Water Treatment Plant

### WHEN?

Tuesday, July 16, 2024  
6:30 pm to 7:30 pm

### WHERE?

Recreation Centre – Callahan Room – 400 Skeena Drive

If you know someone who did not receive a copy of this invitation but would like to attend, please feel free to extend the invitation and share the open house details with them.

### QUESTIONS?

Answers to questions received and anticipated are attached to this invitation for your advance review. If you are unable to attend the Open House, an updated "Questions and Information" document as attached will be uploaded to the District of Mackenzie website for further information.

If you have any questions or concerns that you would like to have addressed prior to the Open House, please contact Luke McDonald before July 12, 2024, at:

Luke McDonald, ASCT, PMP  
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Owners Representative – Gantahaz Water Treatment Facility  
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## Questions and Information

### Why do we need this Project:

- The Project is to design and install a Potable Water Treatment Facility to address issues of iron and manganese in the source water and establish residual chlorination in the water distribution system.
- Due to recent changes to the guidelines for drinking water quality from Health Canada, the water in the Gantahaz subdivision no longer meets the requirements outlined in the Canadian Drinking Water Guidelines.
- The Northern Health Authority has directed the District of Mackenzie to address the issue.
- Historical and current chemical analysis of the Gantahaz source water shows that levels of manganese and iron are nearly three times higher than the maximum acceptable concentration.
- Manganese may be harmful to health, especially in children. Both manganese and iron cause discoloration of water, making it look dirty.

### How is this Project organized and managed?

- This is a Design-Build project. The Contractor is responsible for the design and construction of the facility.
- Canadian Western Mechanical (CWM) is the Prime Contractor.
- True Consulting is the Engineer of Record and sub-consultant to CWM.
- L&M Engineering Limited is the District of Mackenzie's representative. L&M is not the Engineer for this Project. L&M's role in this Project is to ensure quality and represent the District and your interests.

### How was the treatment system type determined?

- The District performed a Request for Proposal (RFP) process to solicit bids for the supply and construction of a water treatment system.
- The RFP process was developed and administered by L&M Engineering Limited.
- The RFP allowed proponents to propose and describe the type of treatment system to be used.
- The District evaluated the received proposals and proposed treatment solutions based on the following criteria:
  - Proposal price.
  - Experience of proponent team.
  - Effectiveness and reliability of treatment.
  - Long- and short-term costs for operation and maintenance.
  - The complexity of operation and training requirements for district staff.

### **How does the treatment process work?**

The proposed concept for the treatment process is generally described as follows:

- Groundwater is pumped from the aquifer and piped to the treatment facility.
- An initial pre-filtration process removes background turbidity.
- The water enters the primary filtration units. Within the primary units, an oxidizing process causes the iron and manganese to precipitate out of solution and become insoluble. The insoluble particles are filtered out by a filtration media (Filox-R Filtration Media).
- After leaving primary filtration, the water passes through a final 5-micron polishing filtration process.
- The water then undergoes residual chlorine injection to achieve a target residual level of 0.2 mg/L.
- The treatment facility periodically will perform a backwash operation to clean the filtration systems. Untreated water is pumped through the filters and directed to a ground infiltration disposal system.
- Periodically, depending on water usage rates, the filter media in the three filtration processes needs to be changed.

### **Are there any other options for treating the water?**

- Standard methods for iron and manganese removal are:
  - Reverse Osmosis filtration processes (R.O.).
  - Ion exchange process (as found in typical home water softeners).
  - Oxidation Filtration processes (chosen process).
- Oxidation Filtration systems best serve a facility of this size.
- The benefits of Oxidation Filtration are simplicity of operations, reduced maintenance complexity, lower operating costs and reduced initial investment.

### **Why isn't an extension of the townsite water system to the Gantahaz Subdivision not considered an option?**

An option for extension of the townsite water system to Gantahaz was evaluated by L&M Engineering in 2011. New construction and permitting requirements of the Northern Health Authority would likely trigger a requirement for residual chlorination and the project would require the installation of 6km of a new water main, a water reservoir, and a treatment system. The cost for an extension is prohibitive and only justifiable if further development was to occur along the extension corridor.

### **Have any other similar systems been installed elsewhere, and what was their experience?**

- Generally, Oxidation Filtration processes are widely used and are established, proven water treatment methods.
- Specifically, the proposed Filox Oxidation/Filtration treatment system was installed last year for BC Parks in their large Mount Robson Campground communities.
- This BC Parks project had very similar variables for size and water chemistry.
- L&M oversaw the BC Parks project and confirmed to the district that this treatment process worked as required.

### **Why does chlorine need to be added to the water?**

- In order to ensure the water remains free of pathogens following treatment, a minimum level of 0.2 mg/L chlorine must be maintained in the distribution piping of a potable water network.
- This is a requirement of the Northern Health Authority.
- Distribution lines and service lines can be at risk of pathogen contamination. Common sources include:
  - Onsite septic systems or sanitary waste infrastructure.
  - Water connections exposed to high potential environments. Such as yard hydrants, hoses, barns and outbuildings.
  - Plumbing connections to dishwashers and other appliances with waste streams.
  - Natural biological growth in water infrastructure.

### **Is Chlorinated drinking water safe?**

- Yes, residual-level chlorine is safe for human consumption.
- De-chlorination of water may be recommended before use in aquariums or other applications sensitive to residual chlorine levels.
- Residual chlorine levels will naturally dissipate in water exposed to the atmosphere.

### **Will chlorinated water damage infrastructure?**

- The residual levels of chlorine that the treatment facility targets will not damage potable water infrastructure or household appliances.
- Onsite septic disposal systems and their biological processes are generally unaffected by residual chlorine levels.
- Typical residential waste streams will naturally neutralize the residual chlorine before entry into the septic systems.

### **What are the allowable chemical concentrations in drinking water?**

- The Canadian Drinking Water Standards and the Northern Health Authority define Maximum Allowable Concentrations (MAC) of chemicals in potable water. The standard also define an Aesthetic Objective (AO).
- This Project is generally concerned with treatment to achieve compliance with the following chemical concentrations:
  - Total Iron      MAC:  $\leq 0.3$  mg/L   AO:  $\leq 0.1$  mg
  - Total Manganese   MAC:  $\leq 0.12$  mg/L / AO: 0.02mg/L

### **What is the timeline for the Project?**

- Design of the system in the summer of 2024.
- Construction of the facility through the Fall and Winter.
- Commissioning in the Spring of 2025.

### **Will this Project deal with the subdivision's turbidity and cloudy water issues?**

- Manganese and iron are sources of turbidity in untreated water.
  - Manganese and iron in untreated water naturally deposit in mains, service lines and home plumbing.
  - Changes to water usage and pressures in the water system mobilize this deposition and cause it to enter the homes.
  - The district flushes the lines to reduce this potential, but that has limited effectiveness.
  - Manganese and iron turbidity ranges in colour from red to brown to black.
- This Project only addresses turbidity caused by the source water, not other potential sources of turbidity.
- Other sources of turbidity may exist in the subdivision. For example, it can be caused by water main breaks or leakage. Or from certain pipe materials used in home plumbing.
- Manganese and iron deposits are already in the water mains and will remain following the completion of the Project.
- This existing build up of material may continue to mobilize after the treatment facility is completed. This will reduce with time.
- The District will perform additional flushing of the mains to reduce this potential.

### **Will this Project help with my water pressure?**

- This Project only addresses the treatment of the source water.
- Water pressures will remain as they are now.

### **Will any water lines be replaced?**

- This Project only addresses the treatment of the source water.
- This Project will not replace water distribution or service lines.

### **Why is this Project not fixing the other problems with the system?**

- The treatment facility project must maintain a specific scope per the terms of the funding agreements in place with federal and provincial agencies.
- L&M Engineering is completing a separate, parallel project to evaluate the condition of the distribution system.

### **What will the water be like following the completion of the facility?**

- Opinions on water aesthetics can be subjective.
- Most people will notice the taste of the residual chlorine in the water.
- Chlorine taste/smell in the water may vary due to the following anticipated variables.
  - Personal preference and subjective taste.
  - Initially, while the chlorine dosage system is calibrated
  - During times of non-typical usage or heavy demands on the system.
  - Proximity to the treatment facility.

- Some people may notice a subtle change in the "taste" of the water.
  - Removing metals from the source water also removes elements that contribute to the taste of the water.
  - For example, the iron that the treatment facility will remove from the water can provide a subtle flavour profile that residents are currently used to.
  - Again, the taste of water can be subjective. But most people will likely describe the treated water as having "less taste".
- With their more sensitive sense of smell, some animals and pets may need to adjust to the residual chlorine smell in their water and may initially reject it. Leaving water out for a few hours will let the chlorine naturally dissipate.

We look forward to hearing from you at the open house and discussing the above information further.

Sincerely,



Luke McDonald, PMP, ASCT

**Principal,  
L&M Engineering Limited.**

Owners Representative – Gantahaz Water Treatment Facility.