



2018 CANADIAN CONSULTING
ENGINEERING AWARDS

Sanitary Grit
Treatment and
Recovery Facility at
Gold Bar Wastewater
Treatment Plant

Category C - Water Resources





Sanitary Grit Treatment and Recovery Facility at Gold Bar Wastewater Treatment Plant

Disposing of odorous debris (i.e., sanitary grit), collected from Edmonton's wastewater sewer system at the Kennedale Works Yard was deemed unsustainable and required an alternative solution. Stantec, in collaboration with EPCOR Water Canada, designed a state-of-the-art, purpose-built Sanitary Grit Treatment and Recovery Facility at the Gold Bar Wastewater Treatment Plant. It is the first of its kind in North America and capable of processing and washing up to 3m³/hour of sanitary grit suitable for reuse.



Project Highlights

Q.1 INNOVATION

EPCOR Water Canada (EPCOR) has a vested interest in implementing sustainable practices at the Gold Bar Wastewater Treatment Plant (GBWWTP) that provide fiscal responsibility to rate payers, regulatory compliance, protection of environment and public health, effective and efficient treatment practices, and resource recovery.

The EPCOR Drainage Services Department (previously the City of Edmonton Utility Services) removes sanitary grit material from lift stations and combined sewer sand traps using hydrovac trucks. Previously, the odorous residual waste was disposed of at the Kennedale Works Yard— a practice recently discontinued due to odours and the negative impact on the surrounding yard. Land treatment of wastewater grit slurry was also not an option. EPCOR Drainage decided to dispose of the wastewater grit slurry at the Clover Bar lagoons until a more environmentally sound practice could be implemented.

Stantec completed an alternatives evaluation and conceptual design for a new sanitary grit facility in 2014 that recommended a grit removal and washing system using HUBER Technology. Stantec visited similar European installations, as well as HUBER's manufacturing facility, to understand the system performance and reliability. With favourable results, the Stantec/EPCOR team, developed a design of the first, purpose-built, standalone sanitary grit treatment facility of its kind in North America at the GBWWTP. Engineering services were provided by Stantec and the facility was constructed by PCL Construction Management Inc. by October 2017.

The facility is capable of processing 3.0 m³ of solids per hour and can accommodate up to ten hydrovac trucks per day. Special attention was paid to air handling systems to effectively reduce odour, and noise modelling was completed to attenuate noise emanating from the facility.

The washed grit is separated into coarse and fine material. The fine grit material is washed and dewatered and can be reused for applications, such as road construction or trench backfill, and eliminates landfill disposal. The fine material will have a maximum organic content of 3% or less for reuse options. All water is reused— treated effluent from GBWWTP is used in the facility to wash the odorous and sanitary grit material without using any potable water. The final effluent used to wash the coarse and fine material is then sent back to the headworks of GBWWTP for full treatment.

This project is aligned with the City of Edmonton's strategic plan "The Way Ahead" and EPCOR's commitment to cost-effective and practicable solutions with attention to integrated resource recovery (IRR).



Q.2 COMPLEXITY

Located in Edmonton's River Valley, the plant site boundaries are defined with no opportunities to expand. Ability to tie to final effluent wash water supply, discharge the reject water, provide an access path for hydrovac trucks, and consider future expansion were considered when selecting the facility site.

Close proximity to neighbouring residential communities and Gold Bar Park meant adherence to strict noise bylaws requiring maximum noise of 65 dBA during the day and 50 dBA outside of that. Stantec worked with equipment manufacturers to meet noise control requirements. Screen walls were used to provide a buffer between the facility and the adjacent properties.

Stantec implemented an odour control system to reduce odours to less than 5 Odour Units (OU), and 2 parts per billion (ppb) of H₂S at the fence line. The odour control system was designed and implemented to scrub and 'clean' peak and average odour concentrations at 99% and 95% H₂S and total odour removals, respectively.

During the commissioning stage, Stantec led the odour, noise and grit sampling and testing program to ensure that the system was operating as intended to meet the targets outlined in the design criteria and bylaw requirements. Stantec installed portable H₂S monitors within the facility and along the outside fence line. Additionally, OUs were tested for by collecting air samples and sending them to an olfactometer laboratory. Based on the laboratory results provided, the OU levels are below the maximum levels outlined by EPCOR.

Q.3 SOCIAL AND/OR ECONOMIC BENEFITS

“Wastewater” can be a misleading term as it contains many valuable resources. Opportunities for possible resource recovery from wastewater treatment, the cost of process additions, and the value and market for the product were actively considered as part of future upgrades and expansions at GBWWTP.

The Sanitary Grit Treatment and Recovery Facility (SGTRF) at GBWWTP is a state-of-the-art facility that utilizes a technology that provides a reusable and marketable product from sanitary waste. There are numerous grit treatment and washing technologies on the market being used throughout North America; however, the HUBER technology is the first of its kind that can effectively remove up to 70% of 100 micron material from the sanitary waste stream, while also effectively reducing the organics content to less than 3%. The other technologies on the market can accomplish one or the other, but not both.

The grit treatment and washing system requires a high volume of water (142 m³/hour of wash water for the entire process) to wash the grit material to ensure that the system can meet the less than 3% organics target. Potable water was reviewed as a source of water for this system; however, this is a costly and valuable resource that would have an impact on GBWWTP and the neighboring community’s potable water flows. GBWWTP’s treated effluent that is discharged to the river is of a high-water quality that can be used as a reusable resource for this facility.



Q.4 ENVIRONMENTAL BENEFITS

The practice of disposing odorous sanitary grit slurry at the Kennedale Works Yard was recently discontinued due to odours and the negative impact on impending developments surrounding the yard. Discontinuing the disposal of wastewater grit slurry at the yard necessitated EPCOR to find other methods to manage this material.

The SGTRF provides an environmentally sound, safe, and clean method of disposal. Several IRR procedures were implemented as part of this project to align with the core principles to reuse, recover, and recycle.

The use of GBWWTP's treated effluent for wash water allowed the facility to use a high volume of water, without using potable water. This high water-quality effluent, that is discharged to the rivers, provides a clean and reusable source of water for the facility.

The wash water used to clean the grit material becomes saturated with organics and other waste material. To provide a safe and environmentally clean method of disposal, the reject water is sent to the headend of the treatment process to recover nutrients to be used in the treatment process. The process recovers all 142 m³/hr of water and eliminates any disposal to the environment.

The primary purpose of the facility is to recover fine grit material that can be reused as a marketable product. The fine grit material discharged from the grit washers resembles a sand that can be used for construction in installations such as trench backfill or road construction, as is currently taking place in Europe with the washed grit material.





Q.5 MEETING CLIENTS NEEDS

This project was delivered on schedule and on budget, while meeting the needs of EPCOR and its stakeholders. It was fully commissioned in October 2017.

The key to delivering this project successfully was the project team's philosophy of collaboration from beginning to end. This approach facilitated timely and effective communications between all parties to realize the project in the most time-efficient and cost-effective manner. The project progressed into the detailed design stage with all contributors working as a unified team. The project was designed with commissioning in mind from the very beginning, allowing for performance specifications to be prepared early in the project for equipment procurement purposes.

In consideration of EPCOR's business interests and alignment with a progressive vision for wastewater treatment at GBWWTP, IRR principles were included. That is, a broader view of wastewater as a renewal resource and a more comprehensive framework to maximize potential recapture of valued end products.

The project delivery method for this project managed the overall design and construction risk by proceeding with a construction management at risk (CMAR) method. This allowed the contractor to become fully engaged during the design process to address construction related issues, while also expediting the overall project schedule.







