

# NEW GRIT RECOVERY SYSTEM INSTALLED AT EDMONTON'S GOLD BAR WWTP

By **Nick Szoke**

For most people, the term “wastewater” can be misleading. Think of water that’s been spent, not water that is waste. In fact, wastewater contains many valuable resources that, if recovered, can be repurposed. Integrated resource recovery (IRR) offers a comprehensive framework for maximizing the recapture of valued end products.

In 2014, EPCOR Water Services Inc. was faced with a challenge in Edmonton, Alberta. They had previously been treating the City’s wastewater grit slurry at Kennedale Works Yard, but the site was discontinued to facilitate new housing developments. Since land treatment of grit slurry was not considered a viable option, EPCOR needed to find other means to manage this material. Until a better solution could be realized, they temporarily disposed of the grit slurry at the Cloverbar Biosolids Storage Lagoons.

EPCOR retained Stantec to review grit slurry characteristics, its hauled volume and mass, and disposal frequency. Stantec also developed site options and offered estimates of probable costs for informed decision-making purposes.

The purpose was to answer two main questions. How could EPCOR recover grit from wastewater to produce a reusable and marketable product? How could they feasibly accomplish it without negatively impacting the environment or nearby communities?

Stantec reviewed candidate equipment suppliers and found that HUBER Technology was well suited to receive and process the type and quantity of wastewater slurry collected from Edmonton’s wastewater sewer system. There were no facilities in North America that used HUBER technology for this purpose. Therefore, Stantec deemed it prudent to visit facilities in Europe to review their operating history and understand the nuances of the overall system, as well as reliability, robustness, equipment layout, and other



*HUBER's grit removal system.*

considerations.

They also took the opportunity to engage in dialogue with plant representatives to gather knowledge and specific technical information useful in the design of such a facility. Finally, the team visited HUBER’s manufacturing facility to learn

about the stringent quality control and testing.

EPCOR engaged Stantec and PCL to engineer and construct the grit treatment recovery facility (GTRF) at the Gold Bar Wastewater Treatment Plant (GBWWTP). Its purpose is to accept and treat settled

solids collected from the City's wastewater sewers and pump stations. There are several IRR projects operating in North America, but this is the first purpose-built facility of its kind solely incorporating HUBER grit processing technology. The technology can effectively remove at least 70% of the inert solids from the grit slurry and at the same time reduce organic content to less than 3%.

Stantec reviewed the design criteria and basis of design with HUBER to confirm equipment selection and process requirements. The GTRF was to be capable of processing 3.0 m<sup>3</sup> of treated solids per hour. Hydrovac trucks owned and operated by EPCOR dispose of odorous material at this facility, which has been designed to accommodate up to 10 trucks per day, each with a payload up to 6.1 m<sup>3</sup> of grit slurry.

The current design is based on one truck bay, one receiving hopper, one drum washer, and two grit washers working in parallel. Provisions have been made to expand the facility to add a second truck

bay, a second receiving hopper, and a second drum washer.

While coarse material from the drum washer is conveyed to a disposal bin, clean grit is conveyed to a 6 m<sup>3</sup> bin for reuse. The current design and future expansion have the same wash water demand of 142 m<sup>3</sup> per hour (~40 L/s). Disinfected final effluent was deemed a good wash water source. The cleaning process was configured so that the reject water could be paced at the same rate as the wash water was supplied. Any excess water in the grit slurry could be handled by buffer storage in the wet wells. Reject water from the washing of the grit is then pumped back to the head-end of GBWWTP for full treatment.

The GTRF was developed within the existing limits of the GBWWTP, which provided several challenges for construction teams on site.

#### SITE LOCATION

The GBWWTP is set in Edmonton's river valley, adjacent to Gold Bar Park. The plant site has defined prop-

erty boundaries, with very constrained opportunities to expand the treatment processes.

This presented a significant challenge when determining a location on-site that met the following criteria:

- Tied to the plant's final effluent to provide a wash water supply.
- Able to convey the reject water back to the headend of the plant for full treatment.
- Allows clear access and sufficient area for hydrovac trucks to maneuver to dispose of the sanitary waste in the GTRF.
- Considers future expansion of the plant.

Based on the criteria outlined, a location at the east end of the plant was selected as the preferred site. Due to the proximity of the proposed GTRF to an actively used City walking trail, additional design challenges for noise and odour mitigation for surrounding communities had to be factored into the design and operation.

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## NOISE CONTROL

Due to how close GBWWTP is to neighbouring residential communities and Gold Bar Park, EPCOR must adhere to strict noise regulations as outlined in the City of Edmonton's by-law requirements. The by-law states that the maximum noise emitted from the facility cannot exceed 65 decibels during daytime hours and 50 decibels during all other times.

Two major sources of noise at the GTRF are the HVAC supply air unit and odour control units. Overall noise is further increased by the sound emitted from the hydrovac trucks regularly accessing the facility, as well as the operation of the treatment process.

Stantec worked closely with equipment manufacturers to ensure that noise control requirements were met. For equipment that produced elevated noise levels, they used screen walls to provide a buffer between the facility and adjacent walking trail.

## ODOUR CONTROL

Special attention was paid to air handling systems to effectively reduce odour from the disposal of the sanitary grit. Similar to the reasoning for strict noise requirements, GBWWTP has implemented a strict odour mitigation program.

Stantec designed an odour control system to reduce odours to less than 5 odour units (OU) and 2 parts per billion (ppb) of H<sub>2</sub>S 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% H<sub>2</sub>S and total odour removals, respectively.

## IRR AND SUSTAINABILITY

The GTRF is aligned with Edmonton's strategic plan "The Way Ahead" and demonstrates EPCOR's commitment to providing cost-effective and practical solutions with attention to IRR and sustainability. The implementation of the GTRF at GBWWTP follows the principles set forth in IRR and sustainability.

These include: use of final effluent to clean wastewater grit slurry; grit recovery for potential beneficial reuse; and full treatment of reject water through the GBWWTP.

Ultimately, the GTRF separates the fine and coarse material and results in the fine material consisting of less than 3% organics. Recovered grit can then be beneficially reused as road construction material, trench backfill, and in other similar ways.

The grit treatment recovery facility was fully commissioned in October 2017. EPCOR is continuing to review and implement new and innovative technologies at the GBWWTP, while also moving in a direction that embodies integrated resource recovery principles. There are many other opportunities for possible resource recovery from wastewater treatment. ■

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