

Managing Aircraft Deicing Impacts

One of the most significant responsibilities for Edmonton International Airport (EIA) is the treatment of spent glycol from aircraft deicing. Some of the deicing fluid is recovered from the deicing pads; however, accumulated snow and deicing fluid is also directed toward the main Stormwater Collection and Containment System (SCCS).



System Components

Glycol contaminated stormwater and runoff is collected in the SCCS that includes the main stormwater ditch and four ponds and is treated in our state of the art Subsurface Aerated Biofilter Treatment Facility (SABTF). The treated water is discharged to a tributary of the nearby Whitemud Creek under an EPEA Approval from Alberta Environment & Parks. Figure 1 shows the overall layout of the EIA SCCS and SABTF while Figure 2 depicts the major components of the SABTF.

Deicing Activities

Growth at EIA has increased deicing fluid use from just over 500,000 liters of deicing fluid in 2006 to between 2.5 and 3.5 million litres from 2014 to 2018. This increase in use drove the need for EIA to increase stormwater containment capacity in the SCCS and treatment capacity in the SABTF.



Figure 1: Overall site layout

SABTF - Treatment Facility

From 2000 through 2011, EIA successfully used a natural wetland system to treat glycol contaminated stormwater. With growth in aircraft operations the treatment capacity of the system was challenged. In 2011, EIA upgraded the system to an engineered treatment facility that increased treatment capacity, decreased time to treat, and provided the opportunity for future expansion with a much smaller environmental footprint than the original system.

Some of those features, as shown in Figure 2, include:

- Reusing existing infrastructure including treatment cells and influent lift station
- Hydraulic upgrades that positively affect treatment capacity and discharge quality
- Enhanced system controls that allow for fine adjustments, ensuring treatment targets are met
- A robust aeration system that was installed in the primary and secondary cells that includes four 56 kW blowers and a total of 26,000 linear metres of aeration tubing

EIA's SABTF used to treat glycol laden stormwater is the first of its kind in Canada and has also been implemented successfully in the U.S. and U.K. Innovative design features include flow control and distribution, aeration, nutrient feed addition and recirculation system, as well as repurposing the existing facility and the flexibility for future expansion, all of which are keys to the success of the treatment facility. The system was further upgraded in 2015 to include two additional treatment trains to the south that mirrored the existing system components.

Spring Odour Challenge

Once snow starts to melt in the spring, we segregate the more contaminated stormwater from the main collection ditch into the South Retention Pond (SRP), which feeds the SABTF for treatment. If required, the North Retention Pond (NRP) can be filled as well. Since the SABTF will not operate efficiently until warmer night time temperatures are reached in mid-May, the pond(s) sit and various chemical reactions start to naturally occur. Some of those reactions create odours that are not harmful but can be unpleasant. Strong winds can exacerbate the distribution of odour, which can range in smell from almost sweet (deicing fluid) to sour (like vinegar). The odour is reduced as EIA starts to treat the stormwater and as warmer temperatures accelerate chemical reactions. Your patience and understanding is appreciated during that time.

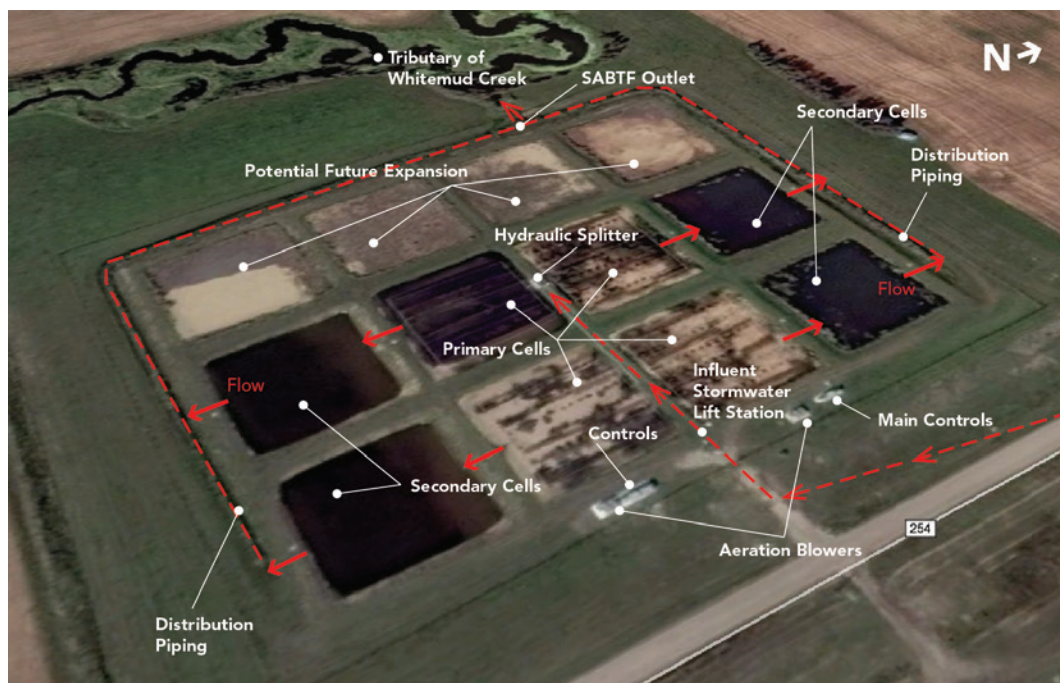


Figure 2: Subsurface Aerated Biotreatment Treatment Facility