



### A two-stage FiberFlex™ selected for maximum flexibility in a tight retrofit and high recovery application

**APPLICATION:** Municipal Drinking Water

**CAPACITY:** 38 000 m<sup>3</sup>/d (10 MGD or 38 MLD)

**LOCATION:** Innisfil, Ontario, Canada

**COMMISSIONED:** September 2018

### CHALLENGE

The Town of Innisfil, located on the western shore of Lake Simcoe immediately south of Barrie and approximately 80 kilometres north of Toronto, has experienced a significant increase in growth and water demand over the recent years. The Town was looking to upgrade their water treatment facility by replacing its conventional clarifier and media filter treatment units. The retrofit required a compact footprint, high recovery, cold water compatibility to handle Canadian winters and minimal disruption to the existing plant's treatment operations. Treated water quality requirements included a maximum turbidity of less than 0.1 NTU, 95% of the time, a minimum LRV score from daily Membrane Integrity Tests of 4.0 log for the primary membrane system, and virus removal of at least 0.5 log.

### SOLUTION

After an evaluation of 4 bids conducted by CH2MHill and the Owner, a two-stage FiberFlex™ membrane system was selected due to its ability to fit in the small footprint available in this retrofit environment as well as affording the owner technical and commercial flexibility for this new facility. The modular aspect of the UF treatment trains also lend themselves perfectly to a staged and methodical construction process that allowed the Town's Lakeshore WTP to be retrofitted while fully maintaining treatment operations.

The system was designed to handle a present-day flow of 10 MGD (38 MLD) using four primary and two secondary UF trains, with phased expansion to accommodate up to 22.5 MGD (85 MLD) in the future.

Raw water from Lake Simcoe can be characterized as a cold water supply with low color, moderate TOC and a low turbidity averaging less than 5 NTU outside of storm events which can reach xx NTU.

Raw water first undergoes coarse screening and pumping at the Town's low lift station and is then transferred to its treatment plant where it passes through automatic strainers followed by UV disinfection. From there, water is filtered through a two-stage UF membrane system. Backwash water that is generated from the first stage is collected and equalized and then pumped to the second stage to achieve over 99.5% recovery. Following the UF membranes, the filtered water is conveyed through granular activated carbon contactors for taste and odor treatment and enhanced organics removal. Water is then chlorinated for final disinfection and then pumped to the Town's distribution system.



Old Conventional System before retrofit



Innisfil - New UF Valve Rack



### BUILT WITH FIBERFLEX™

The FiberFlex™ UF system supplied for the Town of Innisfil is a universal membrane system designed to fit several different modules from membrane manufacturers. This gives the Town ultimate flexibility and negotiating power in the future when the time comes for membrane replacement.

The skidded UF membrane racks and control systems were fully factory assembled and tested at H2O Innovation's manufacturing facility to ensure minimal installation labor and time required on-site for system start-up and commissioning. Once the racks were brought into position and connected, the Toray HFU-2020N membrane modules were installed, flushed and integrity tested.

The supporting ancillary equipment was designed and selected to not only handle future expansion capacity, but also to accommodate a different supplier of membrane elements in the future should the owner elect to do so. In this case, operating parameters such as air scour rates, backpulse flows, system cleaning volumes and various chemical recipes are simply changed by the operator at the HMI without requiring additional programming when modules are changed. For maximum reliability these FiberFlex™ trains are equipped with high performance valves for all the high-cycle applications along with vane actuators rated for several million cycles for all pneumatic valves.

### RESULTS

The FiberFlex™ plant was commissioned in late summer 2018 and since then has provided superior filtered water quality that meets and exceeds the most stringent regulatory requirements. The combined recovery from the two-stage membrane system is greater than 99%. All sequences are fully automatic for easy operation.



Innisfil - New UF Membrane Train