



FAIRMOUNT
WATER SOLUTIONS

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MACROLITE®

CASE STUDY

Fifth Wheel Truck Stop



The Fifth Wheel Truck Stop in Dorchester, Ontario, now operates its waste treatment system well within strict discharge limits—thanks to an upgrade to Macrolite® Engineered Ceramic Media.

One of six locations in the Fifth Wheel chain, the Dorchester facility serves truck and auto traffic on King's Highway 401, also known as the Macdonald-Cartier Freeway. Stretching from the Quebec border to Windsor, Ontario, Highway 401 is a major transportation artery that serves half of Canada's population. Up to 500,000 vehicles use the route every day, and the Fifth Wheel facility keeps busy supplying travelers with fuel, food, and accommodations.

The Fifth Wheel location at Dorchester is not served by a municipal sewer system, so the facility has relied on its own wastewater treatment facility. Originally constructed in 2001, the wastewater treatment system was designed to handle an average effluent load of 12,000 gallons per day from the truck stop's restrooms, showers, laundry, restaurant and motel services. Peak design flow was 17,000 gallons per day. The system used a Sequential Batch Reactor for biological digestion, chemical treatment for phosphorous and residual solids removal, upflow sand filtration, and UV sterilization prior to discharge to the natural environment.

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THE CHALLENGE:

The original sand filtration system did not allow the plant to meet its regulatory discharge limits of 20 mg/L TSS (Total Suspended Solids) and 0.3 mg/L of total phosphorous, per its Ontario Ministry of Environment Certificate of Approval.

Says Bob Little, the Dorchester facility system operator, "We had a small plant receiving a lot of water. It was originally designed for 24 hour per day operation, but the system often ran over its rated capacity during our 16 busiest business hours of the day. The upflow design of the sand filter was troublesome and didn't allow effective backwashing. Even with high doses of alum, we couldn't make the filter run reliably."



"Being able to consistently get effluent readings that are well under operating limits has kept regulatory headaches away. I'm glad we're using Macrolite® media. I give it an A+"

BOB LITTLE, DORCHESTER
WASTEWATER SYSTEM OPERATOR

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THE SOLUTION:

In 2005, Fifth Wheel called on H2FLOW EQUIPMENT, INC. of Concord, Ontario, to design a solution to get the system into compliance. H2FLOW added 11,000 gallons of buffering wastewater storage capacity, reconfigured the sand filter's design and operation, and replaced the sand with Macrolite® Engineered Ceramic Media.

H2FLOW completely reconfigured the filter box with new controls and internal plumbing. They installed Johnson direct retention underdrains with air scour connections, and switched operating flow from upflow to downflow. The upgraded system operates with automatic air scour and backwash.

The filter box presented a challenge; its short wall height and low backwash trough height allowed an installed media depth of only 12 inches. After piloting, H2FLOW determined that a mono bed of Macrolite® M4 (20 to 50 mesh) would achieve the desired flow rates and effluent quality, while reducing backwash requirements.

The Macrolite® media solved a backwashing problem, because it can be backwashed with lower flow rates and energy. The Sequential Batch Reactor treatment plant uses raw decant water to backwash; the supply of this water is limited, so there was a need to optimize backwashing performance. Macrolite® media provides the necessary performance boost: Following a three minute air scour, the new media bed can be fully fluidized and expanded approximately 70% at a backwash flow rate of just 12.0 gpm/ft².

*Do GOOD.
do well.*

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RESULTS:

The upgraded waste treatment plant immediately went into regulatory compliance, and it has stayed that way for five years (see the table below). Chemical dosing requirements were initially cut by almost 50%, compared to the prior sand filter system. The Macrolite® media has never required cleaning or topping up.

Says Fifth Wheel's Bob Little, "We were delighted that the upgraded plant got us into compliance as soon as it went online. Being able to consistently get effluent readings that are well under operating limits has kept regulatory headaches away, and we have confidence we can handle unexpected load swings. From a maintenance standpoint, it's worked exceptionally well for us. I'm glad we're using Macrolite® media. I give it an A+."

The Fifth Wheel facility highlights a key benefit of Macrolite® Engineered Ceramic Media. When system operators need to improve filtration capacity where space is limited, Macrolite® media offers a performance edge that can avoid costly filter bed expansions.

Operating Results for Dorchester Fifth Wheel Truck Stop Wastewater Treatment Facility

Parameter	Ontario Ministry of Environment Certificate of Approval Operating Limit	Actual Performance Since Retrofit
Total Suspended Solids (TSS)	20 mg/L	3-10 mg/L (5 mg/L typical)
Biochemical Oxygen Demand (BOD)	20 mg/L	<2 mg/L
Total Phosphorous	0.3 mg/L	<0.05 mg/L



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