



## PROJECT CASE STUDY

*"you'll like working with us!"*

July 2004



**CUSTOMER:** The City of Adrian  
Wastewater Treatment Plant



**LOCATION:** Adrian, Michigan

**CATEGORY:** Wastewater, Municipal



**PRODUCT(S):** (3) FlexRake® units, Full Penetration

**INSTALL DATE :** December 1997 (1), and  
April 1999 (2)

The City of Adrian Wastewater Treatment Plant purchased three Duperon FlexRakes under a development program that tested the FlexRake's no-maintenance design objectives

***"Maintenance free!"***

***"No lower sprocket..."***

***"Confined space entries are gone..."***

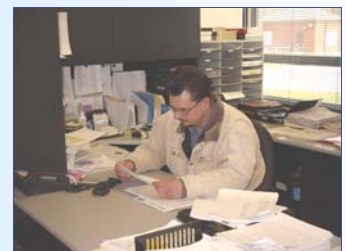
***"Easy to install..."***

***"Ability to handle a lot more debris..."***

***"Easy to work with...It doesn't get any better!"***



The Duperon FlexRakes are simply designed, with no lower sprocket to wear out, no complex controls, they are easy to install and energy efficient



Ken Wesley,  
Plant Superintendent,  
The City of Adrian  
Wastewater Treatment Plant

Prepared by:  
Ursula Rozanski, Marketing Director  
Duperon Corporation



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Duperon is a registered trademark of Duperon Corporation

FlexRake is a registered trademark of Duperon Corporation

**Trademarks:**

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## OVERVIEW

This municipal wastewater industry case study provides a look at one customer's experience with Duperon Corporation. Ken Wesley is the Plant Superintendent for the City of Adrian Wastewater Treatment Plant, which is located in Adrian, Michigan. He's been an employee of the City of Adrian for over 6 years.

This Duperon installation project was a replacement for three existing pieces of equipment, which were located in two physically separate locations in the City of Adrian (both of which support the City of Adrian Wastewater Treatment facility). One FlexRake unit was installed at the main plant and two others were installed at the Broadstreet facility about a mile away. All three FlexRakes were full-penetration units.

The three FlexRakes in this case study were installed as two separate projects. The two projects were unique due to the maintenance approach being utilized. The pilot FlexRake unit, installed at the main plant, was tested to see how long it could function without having any maintenance work done by the City of Adrian. As of April 2004, the FlexRake units at the two locations have had virtually no maintenance (main plant for almost 7 years, and the two Broadstreet FlexRakes for 5 years) performed on them.

In late April of 2004, Ken directed the maintenance crew to setup a regular maintenance schedule (change the oil, check the couplings) for the FlexRakes, which would be the first time that the FlexRakes were incorporated into a normal maintenance schedule since the original pilot installations. This was done not because the FlexRake units were having problems, but as part of the plant's normal maintenance procedures for such equipment and components.

Ken Wesley expressed his satisfaction with Duperon's products and level of service with the comment that "...it doesn't get any better..."

## THE ENVIRONMENT

Over 120 years ago, the City of Adrian began providing water and sewer services to local residents. Steadily, the systems providing these services have expanded to meet the city's growth. Equipment has been upgraded, and modernized, resulting in a sophisticated and complex operation that serves the needs of a sizeable population. Major upgrades and improvements are currently underway to continue meeting the needs of this developing area.

The City of Adrian provides water and sewer services within the City's limits, and only a small number of water customers are located outside of the City's limits. In addition, treatment is provided for sewer flows from Adrian Charter Township, Madison Charter Township and Raisin Township. Overall, nearly 6,500 customers are served for water, and 26,000 for wastewater.

To provide these water and wastewater treatment services, the City operates a 10 million gallon per day water treatment plant, and a 7.0 million gallon per day wastewater treatment plant. In addition, the City maintains 75 miles of water mains, 85 miles of sewer collection pipes, 8 sewer lift stations, 2 elevated water storage tanks and a water booster station.

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A staff of 40 employees, consisting of managers, administrators, licensed operators, mechanics and technicians support these expansive operations. Each treatment plant is continuously staffed, and the on-call staff responds to emergency situations. The wastewater treatment plant supports primary, secondary and tertiary (sand filters) treatment processes.

The City's goals are to provide water and water treatment services, while meeting all state and federal standards, with affordable rates and services that achieve a high level of customer satisfaction.

Additional detailed information about this facility can be found on the Internet at <http://www.ci.adrian.mi.us/index.asp?NID=27>

**FACILITY MGD RATING:** 7.0 MGD, Peak flows up to 21 MGD, average daily flow up to 5.5 MGD

**BUYER:** City of Adrian, Michigan

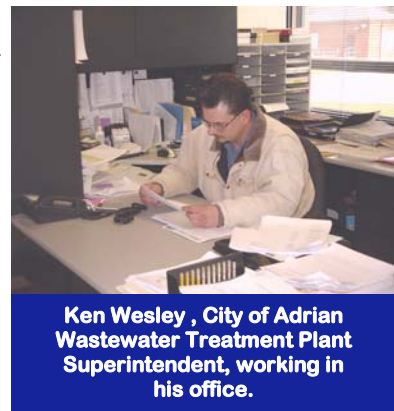
**USER:** City of Adrian, Michigan

**INSTALLATION SITE:** Two physically separate locations, one at the main plant, which has one FlexRake unit and the Broadstreet location, which has two. Both locations are in the City of Adrian, Michigan.

#### Q & A:

*Question: How is the facility managed and operated?*

**Ken:** "The facility is owned by the City of Adrian. The City provides water and sewer services to the City's residents, with a limited number of water customers being located outside of the City's limits. In addition, sewer treatment is provided for sewer flows from Adrian Charter Township, Madison Charter Township and Raisin Township. Overall, nearly 6,500 customers are provided water services, and 26,000 are provided wastewater services. This facility is an 8% combined sewer operation...The Broadstreet location (with two FlexRakes) sees it all before it gets to the plant. Our (water treatment) processes include primary, secondary and tertiary (sand filter) steps."



## THE ISSUES

The existing screening equipment at the main plant and at the Broadstreet location needed to be replaced. At 20+ years the equipment was driving the cost of ownership higher, due to the continuous need for maintenance.

**Q & A:**

*Question: What was the reason for the purchase of new bar screen equipment?*

**Ken:** “The previous equipment was 20+ years old and needed to be replaced. Pins would get sheared in the upper sprockets, the debris would bind up in the bars and pins had to be changed every day. The lower sprockets needed to be changed frequently as well. At the end (just before replacement of the existing equipment) we were doing confined space entries due to age of the equipment at both locations (main plant and Broadstreet) using a minimum of three individuals (for each entry). (We also needed)...Hot work permits due to the torches, and of course regular permits... needed to replace the (existing) bar screen equipment because of all the problems.”

*Question: What kinds of debris were you seeing at the main plant and Broadstreet sites?*

**Ken:** “Both sites can get heavy debris...rags, applicators, grease, sticks, rocks, leaves (many), coffee cans, some limbs, ...we do have grit and even toys... We do get grease and rag attacks....a high influx of rain will cause a high influx of debris.”



**The Main Plant Location  
Duperon FlexRake**

**THE SOLUTION**

As the Plant Supervisor, Ken Wesley wanted to replace the existing mechanical bar screen equipment at the Broadstreet location with new equipment that would have an immediate impact on the cost and amount of maintenance services presently being expended. Duperon Corporation had already installed one FlexRake unit at the main plant which was over a year old and virtually maintenance free.

The main plant FlexRake unit had been installed by Ron Reed—City of Adrian Maintenance Representative, Royce Deline—City of Adrian, and Duperon Corporation as a joint development project to fully test the FlexRake’s no-maintenance design objectives. The development project intention was to install the FlexRake unit in a wastewater application environment, and benchmark how long the unit could operate without any maintenance support services being provided.



**The Broadstreet Location  
Duperon FlexRakes**

Duperon also used this as an opportunity to refine the design of the equipment in the best of all possible test environments, a 24 x 7 production operation. The development project also presented a benefit to the City of Adrian in that the cost of the equipment has been discounted to reflect the design-development status of the equipment. Thus making it a more attractive investment from the City’s perspective.

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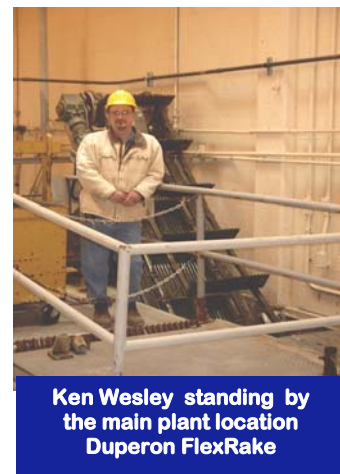
**INSTALLATION DATE AND TYPE:**

- Main Plant, one FlexRake, December 1997
- Broadstreet, two FlexRakes, April 1999

**PRODUCT INFORMATION SUMMARY:**

For more detailed information, please see the "SITE SPECIFIC FLEXRAKE CONFIGURATION INFORMATION" section elsewhere in this document.

- Quantity of three (3), FlexRakes, Full Penetration
  - Main plant—One unit
  - Broadstreet—Two units
- No controls configured
- Shipping Configuration :
  - Main Plant—Shipped fully assembled
  - Broadstreet—Each (of two) unit shipped in two pieces
- Installation angle:
  - Main plant 45 degrees
  - Broadstreet 17 degrees
- Designed for 21 MGD
- Dimensions and scraper count:
  - Main Plant—Height 15 ft. 1 in. by width 2 ft. 6 in , 18 scrapers
  - Broadstreet—Height 17 ft. 6 in. by width 2 ft. 3 in , 22 scrapers



**Q & A:**

*Question: How did you proceed to purchase the new bar screen equipment?*

*Ken: "Duperon's was the best bid by far, due to the pilot. The price was discounted in the development partnership."*

*Question: Were you looking for a self-cleaning unit?*

*Ken: "Yes"*

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*Question: Did you have any operational cost considerations or requirements?*

*Ken:* "No, but we were going to spend the extra money this time to get the additional wear, ...25 years versus 15...and maintenance-free. The (Duperon FlexRake) units (at the Broadstreet location) were designed as a 1 inch bar, I believe that we could easily go with 3/4 or 1/2 inch bars. With this (Duperon) equipment it would not be a problem, due to the torque that you have to do the job. You get a clean sweep with every pass, so you don't get the jamming, and we run a 24 by 7 operation. "

*Question: Was this a standalone project or part of a larger project?*

*Ken:* "Standalone."

*Question: What kind of purchase was this, replacement, expansion, upgrade, or new acquisition?*

*Ken:* "Replacement"

*Question: How did the installation process go?*

*Ken:* "We installed all three units ourselves. They were easy to install as compared to other equipment. The main plant FlexRake was installed manually without using any cranes. It was lighter and not as wide as the Broadstreet units. We had limited room to work in the Broadstreet building, and the units were manufactured in two pieces. It was a matter of bolting the FlexRakes together and lowering them into the channel. We don't like to do confined space entries...We then "demoed" the upper channel...(We) let debris fall into the channel and the FlexRakes pulled out large chunks of concrete, about 8 inches in diameter with no problems. (In total )...it took about one month to complete the demolition, (and prep the space) then we installed the rakes...(We) fabricated lift equipment, to work inside the Broadstreet building,...room to work with was very constricted."



**Don Reed, City of Adrian Maintenance Representative inspects one of the Broadstreet FlexRakes**

*Question: How had Duperon performed during the evaluation (bid) process?*

*Ken:* "Very responsive, absolutely...this would be a plus for someone considering a purchase."

*Question: How had Duperon performed during the purchase process but before the installation process?*

*Ken:* "The same, very responsive, good support and service."



"you'll like working with us!"

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Question: How had Duperon performed during the warranty process?



The Broadstreet FlexRake in the channel

Ken: "I haven't had any warranty issues...immediate support on development issues. The issues were taken care of quickly and responsively as part of the development agreement that we had...Duperon is easy to work with."

Question: Operationally—What are some Duperon benefits?

Ken: "If the FlexRake is shut down for a period of time, it starts up, without shearing a pin, ...no overload, it operates smoothly after being shut down for a while...we don't need to manually clean our rakes anymore, we had to do that for the previous equipment....."

Question: What are some miscellaneous Duperon benefits? (Construction materials, off the shelf parts, service)

Ken: "Maintenance free! The first unit was stainless, I love the design of the (FlexLink™) chain, ...there's no lower sprocket, confined space entries are gone, (we) can lift the unit completely out, ...you have full penetration of the rake to get a good cleaning...ability to handle a lot more debris. Need less maintenance personnel to maintain, no confined space entry, no lower sprocket (to maintain). It's a simple piece of equipment that doesn't need maintenance, doesn't need a lot of energy, and no fancy controls. It moves so slowly that the wear and tear is nominal. It doesn't get any better...haven't had to replace anything."

Question: Would you be a reference site for Duperon prospect visits?

Ken: "I have been since it was installed..."

COST OF OWNERSHIP IMPACT

Detailed cost information for the previous equipment was not available at the time of the interview.

FIRST YEAR DUPERON EQUIPMENT MAINTENANCE EXPENDITURES TOTAL: \$0

The cost of ownership impact information is presented here in terms of reductions in tangible aspects of ownership that were the result of replacing the previous screening equipment with the Duperon FlexRake equipment:



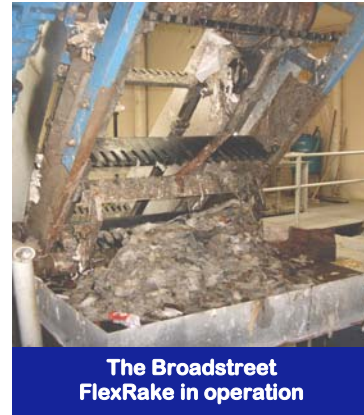
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**LABOR:**

- Eliminate manual removal of debris from (previous) rake surfaces
- Eliminate confined space entries
- No maintenance
- Easy installation
- Eliminate need to install heavy frame

**EQUIPMENT DESIGN:**

- Simple design
- Eliminate chronic sprocket replacement
- Eliminate pin replacement due to shearing
- Reduce the cost and number of replacement parts



**EQUIPMENT AVAILABILITY (Case study is a 24 x 7 operational environment):**

- High reliability
- High availability (High Mean-time Between Failure—MTBF)
- High resilience

**PRODUCTIVITY GAINS:**

- Eliminate complicated controls
- Reduce preventative maintenance
- Remove more debris
- Low energy consumption
- Highly responsive Duperon service and support

**CONTACT INFORMATION**

Please direct any questions or comments regarding this case study to the contacts noted in this section. Thank you!

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**SITE SPECIFIC FLEXRAKE CONFIGURATION INFORMATION—  
 Main Plant**

<b>FlexRake Data</b>
Model: Wastewater (WW)
No. of Units: 1 unit
Overall Dimensions: Width: 2 ft. 6in. Height: 15 ft. 1 in.
No. of FlexLinks™: 36 Links
No. of Scrapers: 18 Scrapers
Scraper Dimensions: Thickness: .75 in. Width: 27 in. Depth: 4 in.
Distance between Scrapers: 21 in. every 2 <sup>nd</sup> Link
Scraper Material, config: UHMW, serrated for WW
Support Angle, Accessories: None
Drive Characteristics: Standard 1/3 hp, 3/60/230/460 volt, elec Sumitomo BBB gear motor, explosion proof.
Controls: None included.
Spare Parts: (1) Std Package with (1) Snap Ring Tool
Coating: Standard Duperon P-001 3 coat, moisture-cured urethane. Color: SAFETY BLUE
<b>Accessories</b>
Strippers: WW Debris
Brushes: N/A
Other: N/A
<b>Barscreen</b>
Barscreen Material: 304 Stainless Steel
Barscreen Coating: N/A
Angle from Vertical: 45 degrees

<b>Barscreen Data</b>
Site Dimensions: Width: 2 ft. 8 in. Height to Deck: 9 ft. 8 in.
Clearance: 1 in per side
Bar Size: Width: 1/4 in Depth: 2 in. Height: 83 in.
Bar Openings: 1 in. clear opening 1-1/4 in. on center
Deadplate dimensions: Thickness: 1/4 in Width: 27 1/2 in. Height: 72 in.
Discharge height: 3 ft. 6 3/4 in.
<b>Barscreen Accessories</b>
FlexRake Mounting: Material: 304 Stainless Steel:
Return Guides: Assembled on Screen Material: 304 Stainless Steel
Chain Slides: Not Applicable
Chain Slide Mountings: Not Applicable
<b>Technical Assistance</b>
Technical Assistance Dates: As requested.
<b>Warranty</b>
Standard Warranty Term: 1 year Equipment Owner: City of Adrian
Installation Date: December 1997



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**SITE SPECIFIC FLEXRAKE™ CONFIGURATION INFORMATION—  
 Broadstreet Location**

<b>FlexRake Data</b>
Model: Wastewater (WW)
No. of Units: 2 units
Overall Dimensions: Width: 2 ft. 3in. Height: 17 ft. 6 in.
No. of FlexLinks™: 88 Links
No. of Scrapers: 22 Scrapers
Scraper Dimensions: Thickness: 1 in. Width: 27 in. Depth: 7 in.
Distance between Scrapers: 21 in. every 2 <sup>nd</sup> Link
Scraper Material, config: UHMW, serrated for WW
Support Angle, Accessories: None
Drive Characteristics: Standard 1/3 hp, 3/60/230/460 volt, elec Sumitomo BBB gear motor, explosion proof.
Controls: None included.
Spare Parts: (1) Std Package with (1) Snap Ring Tool
Coating: Standard Duperon P-001 3 coat, moisture-cured urethane. Color: SAFETY BLUE
<b>Accessories</b>
Strippers: WW Debris
Brushes: N/A
Other: N/A
<b>Barscreen</b>
Barscreen Material: 304 Stainless Steel
Barscreen Coating: N/A
Angle from Vertical: 30 degrees

<b>Barscreen Data</b>
Site Dimensions: Width: 2 ft. 8 in. Height to Deck: 9 ft. 8 in.
Clearance: 1 in per side
Bar Size: Width: 3/8 in Depth: 2 in. Height: 120 in.
Bar Openings: 1 in. clear opening 1-3/8 in. on center
Deadplate dimensions: Thickness: 1/4 in Width: 30 in. Height: 50 in.
Discharge height: 3 ft. 6 3/4 in.
<b>Barscreen Accessories</b>
Flex-Rake Mounting: Material: 304 Stainless Steel
Return Guides: Assembled on Screen Material: 304 Stainless Steel
Chain Slides: Not Applicable
Chain Slide Mountings: Not Applicable
<b>Technical Assistance</b>
Technical Assistance Dates: As requested.
<b>Warranty</b>
Standard Warranty Term: 1 year Equipment Owner: City of Adrian
Installation Date: April 1999



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*Duperon Corporation's new headquarters location  
as of May 1, 2004*

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