

Small footprint retrofit solution reduces installation / construction / energy costs.

## Retrofit vs. New Construction

In wastewater treatment projects, **costs resulting from construction**, permitting, financing, and civil design work can be as much as **75% of total project costs**. With equipment costs of only 25%, maximizing the use of existing structures can significantly lower overall project costs. When plant space is at a premium one of the best options for many plants is to use existing tankage for alternative uses. In these cases, process technology is evaluated by its ability to fit within reusable tanks or fit within available plant space. Grit removal systems are no exception.

As many plants look to upgrade their grit removal process, reusing existing tanks or aerated grit chambers for retrofit with the HeadCell® system is an excellent option. Using stacked, conically shaped trays allows a significant increase in settling surface area. Increasing surface area allows higher hydraulic capacity in a given footprint while also targeting finer grit particles. Depending on the system configuration, grit particles as fine as 75 micron ( $\mu\text{m}$ ) can be effectively removed in the same space as the original aerated grit chamber with improved performance and much lower energy costs.

## HeadCell Retrofit Benefits

- Small footprint saves valuable plant space
- Uses existing structures and channels
- Reduces concrete and construction costs
- Reduces energy consumption and odors
- Improves grit capture, protects expensive downstream processes

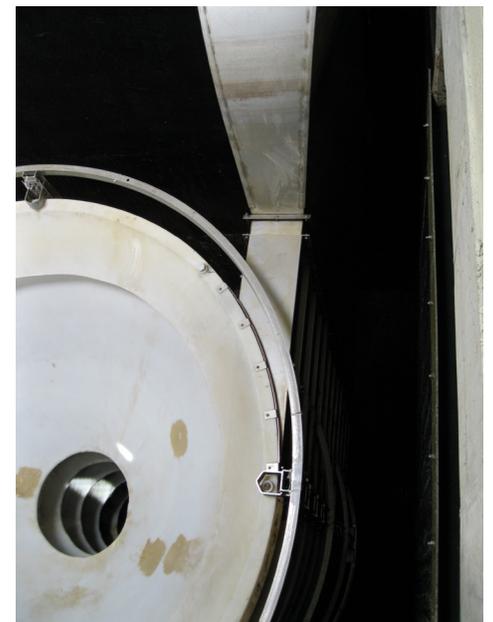
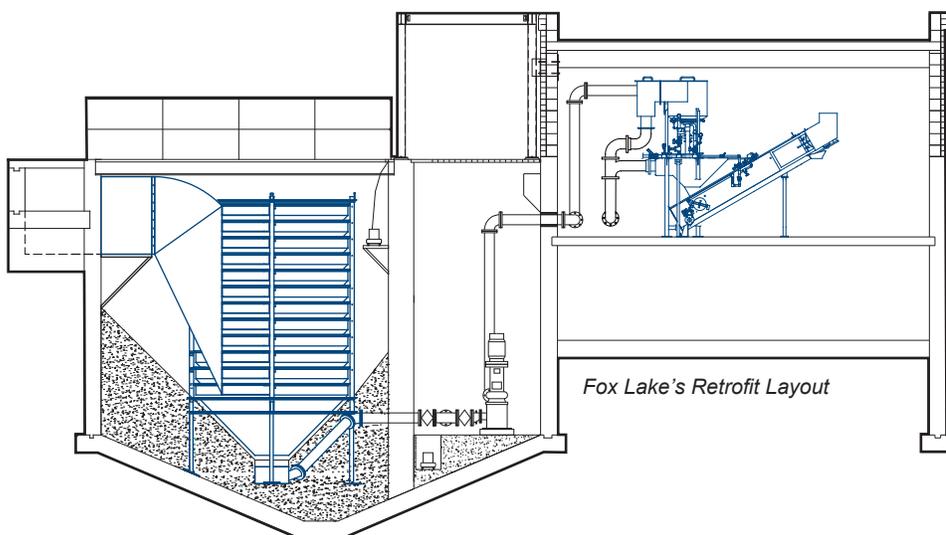
### HeadCell Design is Ideal for Retrofit

The unique stacked tray configuration of the HeadCell makes it the ideal technology for retrofitting into existing structures to significantly increase performance.

## Case Study - Fox Lake, IL - Aerated Grit Retrofit

In 2003 the Fox Lake NRWRF located in Fox Lake, IL recognized that the existing aerated grit chamber was ineffective at protecting the plant from deposition and abrasive wear removing only 10% of incoming grit. An investigation into their grit characteristics determined that approximately 90% of the grit would be removed by a system designed to remove 106  $\mu\text{m}$  grit particles. They faced a challenge in finding a technology that would not only remove 106  $\mu\text{m}$  grit but also accomplish this within the existing concrete basin. Limited available plant space prevented the design team from building an entirely new grit structure. Familiarity with inclined plate settlers gave plant personnel confidence that the HeadCell stacked tray technology would work for them.

The plant upgrade called for a peak flow rate of 25 Mgal/d (1095 L/s) with the existing aerated grit chamber measuring 26' x 26' (8 x 8 m). The design team was able to fit two HeadCell® Grit Concentrators into this space along with a newly formed dry pit for the grit pumps. The SlurryCup™ and Grit Snail® were selected to wash and dewater the removed grit and were able to fit into the space occupied by the existing liquid cyclone/screw classifier. The system was put into operation in 2005 with performance testing conducted shortly thereafter. The HeadCell® was proven to capture 95% of the grit and the total combined efficiency of the Hydro system (grit collection, washing and dewatering) was at 88%. Output grit is over 60% dry solids with <15% volatile solids.



## Case Study - Council Bluffs, IA - Retrofits for Increased Performance

The city of Council Bluffs, IA faced a situation similar to Fox Lake's. A 2003 upgrade to an activated sludge process did not include changes to their grit removal systems. Fine grit that passed through the grit removal system accumulated in digesters, causing excessive wear on the centrifuge dewatering system which was costing the city over **\$40,000 each year in replacement parts**. After evaluating several options, a HeadCell® retrofit in the existing aerated grit chambers was selected. The HeadCell was chosen because it not only fit in the existing basins but also provided the fine grit (75 µm) removal that the plant required to protect its downstream processes. Four (4) 12' (3.7 m) diameter units were installed to give the plant a peak capacity of 30.5 Mgal/d (1336 L/s). The SlurryCup™ and Grit Snail® washing and dewatering system was used for washing and dewatering the captured grit. The system was commissioned in 2004 and performance has been excellent. 95% capture of 75 µm grit and output solids that are over 60% dry solids with < 7% volatile solids.



HeadCell® Units Retrofitted into an Aerated Grit Basin at the Council Bluffs, IA Plant



Grit Clogged Diffusers Resulting from Ineffective Upstream Grit Removal System

## Case Study - Saginaw, MI - Retrofit with Tight Space Limitations

The Saginaw Wastewater Treatment Facility was reliant on technology used when the plant was originally designed in the 1950s. Some of the technology was so outdated, that the plant had to fabricate custom replacement parts, as some items were no longer manufactured. The plant's capacity was being tested even further once the city began using it to treat CSO flows, which were previously allowed to discharge directly into a nearby river. Low flows were around 9 Mgal/d (394 L/s), but the peak CSO flows could increase treatment needs to 100 Mgal/d (4381 L/s) during strong wet weather events. The plant needed a major upgrade in grit removal system performance, but had very little room available to build new facilities. The retrofit allowed the plant to use existing channels and structures to **minimize construction costs** and dramatically increase their grit removal performance. The new system went on line in June 2007, the four (4) 12' (3.7 m) diameter 11 tray units successfully **handle the high grit volumes during strong wet weather** events removing grit 106 micron and larger in flows up to 88 Mgal/d (3856 L/s). Efficiency drops slightly, to 125 µm, on the rare occasion that flows hit the peak design of 100 Mgal/d (4381 L/s). The SlurryCup™ and Grit Snail® are used for washing and dewatering the captured grit.



## Learn more

To learn more about retrofitting HeadCell technology into your Aerated Grit Basin visit [hydro-int.com](http://hydro-int.com), or contact us:

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