

## Match Existing?

Today retrofit of existing water and wastewater treatment facilities is more important than ever. Compared to years gone by, fewer water and wastewater treatment facilities are being constructed on greenfield sites as Owners seek to maintain their existing treatment capacity or squeeze more out of existing infrastructure. When dealing with rehabilitation of existing facilities, a key question that should be addressed is the desirability of matching the infrastructure already in place at the facility – “match existing”. Is match existing always in the best interests of the Owner?

There are clear advantages when it comes to matching existing infrastructure including:

- Consistent Layout Geometry – Having a facility layout that is consistent from phase to phase is aesthetically pleasing. An operations staff can move comfortably from one phase to another without having to account for quirks that are unique to one phase or another.
- Operating Characteristics – When you match existing, facility operations can be consistent from one phase to another. For example, different headloss characteristics or different pumps mean that a facility will operate at a different point on a pump curve yielding different results. At best, the result is operational inefficiency.
- Operator Familiarity – With match existing, operators only need to be aware of the operating characteristics of a single piece of equipment rather than two. They need to understand how to service only one piece of equipment so operations and maintenance efforts are more efficient.
- Probability of Success and Reliability – Matching existing equipment that has operated successfully leads to an expectation that the new matching equipment will experience similar success. The operational mindset is that the existing equipment has performed reliably so we can expect similarly reliable performance in the future.
- Serviceability – Typically an operations staff comes to understand how a piece of equipment functions and what is required to service that equipment so that its operational performance is maintained. Installing new equipment in a facility means that the staff has to learn that new equipment and be prepared to service two pieces of equipment rather than one.
- Spare Parts Inventory - Matching equipment means that less spare parts inventory must be maintained. Spare parts are only needed for a single piece of equipment rather than having to warehouse parts needed to service two pieces of equipment that perform the same function.

- Special Tooling – If any special tools are required for installing or maintaining equipment then another set of tools will be required if a different piece of equipment is installed in a facility.

When the topic is specifically underdrain systems for granular media filters, do all of these arguments for matching existing infrastructure add up to a compelling case? If the filter underdrains in question are AWI Phoenix Underdrains versus some of the alternatives, likely not for the following reasons:

- Consistent Layout Geometry – AWI Underdrains have been developed based upon a vast majority of applications being in retrofit situations replacing filter underdrains provided by others. As a result, AWI Underdrains can be adapted to essentially any filter geometry. For a retrofit into existing filters, there will be no discernable difference between existing filters and those with retrofitted AWI Underdrains once the media is in place.
- Operating Characteristics – A key job of filter underdrains is even distribution of backwash flow insuring thorough media cleaning and avoiding excessive media transport within a filter. A higher than average backwash flow in one area will result in short circuiting in that area while low backwash flow will allow media to pile up and mudballs to form. Most filter underdrain systems rely upon having a large distribution conduit for backwash water and small distribution orifices with relatively high headloss to achieve reasonably even distribution of backwash flow. AWI Underdrains are hydraulically tailored for the project with variable diameter primary and secondary orifices custom sized for the underdrain lateral's position in the filter. The result is the lowest possible system headloss while still achieving even distribution of backwash flow. Additional headloss can readily be built into the custom sized primary and secondary orifices so that the headloss characteristics of an AWI Underdrain System matches the characteristics of an existing underdrain system. Operationally, they will appear the same.
- Operator Familiarity – If a filter underdrain system is doing its job properly, it will be buried under several feet of filter media just prior to filter start-up and not seen again for 25 to 40 years. Essentially, there is nothing with which an operator could ever have to become familiar.
- Probability of Success and Reliability – In the case of most filter underdrains, notably those that must be grouted into place as a means of insuring structural integrity, past performance is a poor indicator of future expectations. Proper installation is a key to success and the capabilities of the installing contractor depend upon the outcome of the bidding process to see who the installing contractor will be. Grouted in place filter underdrains almost always survive a one year warranty period because it takes some time and numerous backwash cycles for grout to work its way loose allowing media into the underdrain system resulting ultimately in underdrain system failure. To see the

degree to which filter underdrain failures are commonplace, open an internet browser to [www.google.com](http://www.google.com), type in the words “Filter Underdrain Failure”, and search for results. Those results are worth considering.

AWI’s response is to not rely upon the structural integrity of grout at all in its design. As a result, no specialized expertise is required for underdrain installation - any construction crew with instruction from an AWI Installation Supervisor can get the job done in bulletproof fashion.

Because of the dependence of filter underdrains upon proper installation and the fact that problems can take some time to manifest themselves, AWI has elected to offer a complete five (5) year filter underdrain warranty covering both the filter underdrain system and its installation. The warranty goes into effect as soon as the AWI Installation Supervisor signs off on an AWI Underdrain Installation certifying that it is ready to be placed into operation. The warranty includes:

- Removal of filter media
- Repair or replacement of the filter underdrains
- Any required demolition (not needed for AWI Underdrains)
- Reinstallation of repaired or replaced filter underdrains
- Placement of media back in the filter
- Filter start-up

AWI would be pleased to provide the full terms of its five (5) year comprehensive warranty for review.

- Serviceability – This point is not relevant in the case of a grouted in place filter underdrain system because it cannot be serviced. If a significant problem with a grouted in place filter underdrain system manifests itself, the underdrain system must be jackhammered out of the filter and a new system installed. In contrast, any problem, large or small, occurring in filters using an AWI Underdrain System whether caused by the underdrain system or not can be addressed by disassembling and reinstalling the underdrain laterals, an outcome that is hardly consequential compared to jackhammering out a grouted in place underdrain system.
- Replacement Parts Inventory – The sale of replacement parts is a key business element for most companies providing equipment in the water and wastewater industry. In the case of a grouted in place underdrain system failure, replacement parts would consist of ordering all new underdrains for the compromised filter or filters and re-installing them with new grout. Unfortunately for AWI, we have no profitable replacement parts business because we have no replacement parts business at all. On the very rare occasions when an AWI Underdrain System required attention, the matter was resolved with hand tools and, at worst, some gasket material.

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- Special Tooling – None required. In the very unlikely event an AWI Underdrain System ever needed attention, anything that needs to be done can be done with commonly available hand tools – a crescent wrench and a torque wrench.

While matching existing infrastructure very often makes a great deal of sense when retrofitting and upgrading existing facilities, filter underdrains for granular media filters should be a significant exception to that rule.



*AWI...Leaders in Filter Optimization*