Filtration for Jobsite Dewatering

By Lindsey Thorp

Filtration methods for meeting Clean Water Act regulations

A well-thought-out dewatering plan is important to the success of any jobsite. Dewatering pumps often are necessary to remove groundwater and rainwater in order to perform work safely, but it is crucial to abide by the applicable laws and regulations and consider how selected dewatering methods will affect the environment. Each site has its own dewatering challenges, and it is important to consider all options, especially regarding discharge of water on a jobsite.

Careful attention should be directed to where the pumped water is being discharged to determine whether any filtering or processing will be required. If discharges are being released into a navigable waterway, the U.S. Environmental Protection Agency (EPA) requires filtration under the Clean Water Act.

Common methods of filtration include filter bags, sediment tanks and active treatment systems. The water quality at the source should be assessed to select the best filtration method and estimate the discharge flow rate and volume to select the proper pump. Trash pumps are most commonly used for dewatering on jobsites, because they allow for solids to pass through without clogging the pump and can handle flows appropriately.

Filtration Methods

Filter bags are made of durable geotextile fabric that allows water to pass through while solids, such as sediment and other particles, remain trapped inside the bag, thus preventing pollution at the discharge site. The filter bag can be attached to the discharge hose of most dewatering or bypass pumps, and groundwater is pumped into the filter bag, trapping solids in suspension and allowing the sediment-free water to gently discharge into a nearby stream or other body of water without polluting it or causing erosion. Capacity varies depending on the size of the filter bag—it is full when it can no longer efficiently filter sediment or pass water at a reasonable rate. Disposal of the filter bag should be directed by the site engineer.

A sediment tank is a portable container separated into compartments by weirs. Water is pumped into one end of the container, which is designed to allow the sediment-laden water to flow over and under a series of weirs while unwanted materials fall to the bottom. The clear water is discharged out of the opposite end. Portable sediment tanks are commonly used on jobsites lacking sufficient space and requiring water being removed from the jobsite to be free of sediment before being discharged into a stream or storm drainage system.

Jobsites involving dewatering of groundwater that contains contaminants such as oil or gas may require further filtration through a stripping system. After the water is removed from the ground using a wellpoint system, it is pumped into the weir tank to separate the solids, and then moves from the weir tank to the stripping system. The stripping system separates the contaminants from the water, discharging clear water.

Active treatment systems such as chitosan-enhanced sand filtration are used to regulate pH and reduce the turbidity of water being removed from a jobsite to an acceptable level for discharge. Chitosan is derived from the shells of crustaceans and works as a natural coagulant, binding the sediment particles, heavy minerals and oils together, making it feasible to remove them from water. In this filtration process, water is pumped from the source into a weir tank, where chitosan

Above: Two different views of wellpoint dewatering systems with filter bags, which trap suspended solids, allowing clean water to discharge into the environment
Opposite: A pump and stripping system, often used for applications such as groundwater containing oil or gas

is introduced to the water. The chitosan binds itself to the sediment particles and becomes trapped in the sand filter, allowing only clear water to be discharged. Electric-powered portable pumps are the best option for a job involving an active treatment system, because the treatment system requires portable power that the pump also can utilize, thereby reducing fuel costs and extending pump run time.

When discharging offsite is not an option, water needs to be retained on site. Retained water is stored in tanks and is disposed of in several ways: It evaporates, is infiltrated back into the soil or is reused on site for dust control, irrigation or other purposes.

Best Management Practices

Water-related best management practices (BMPs) focus on water quality issues caused by land development. In addition to filtration on the jobsite, there are numerous BMPs to keep in mind when designing a dewatering plan. BMP options include:

- Vegetative buffers: Established vegetation or installed vegetative buffers along water bodies that slow runoff and prevent soil erosion;
- Silt fencing: A low-cost method to temporarily control sediment and runoff on jobsites. Geotextile fabric is stretched between wooden stakes, creating a fence on a downhill grade, trapping sediment and allowing water to run through;
- Berms: A temporary ridge composed of gravel, stone or crushed rock that slows and filters runoff to prevent erosion and divert water to a predetermined path; and
- Retention basins: Structures designed to temporarily store runoff and prevent localized flooding and detain sediment-laden runoff from disturbed areas long enough for sediments to settle out.

BMPs change often because the field of storm water management is constantly changing. Always refer to EPA and check with your local agency for the most up-to-date regulations, permit requirements and BMPs when developing a site dewatering plan. *wqp*

Lindsey Thorp is marketing manager for Thompson Pump. Thorp can be reached at lthorp@thompsonpump.com or 386.767.7310.

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