

AquaBlok®

Installation Summary

Objective: Basin Rehabilitation/Anti-Seep

Location: Napoleon, Ohio

Setting: Residential Pond

Project Status: Completed May 2009



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Photo 1. Significant water flow/leakage due to piping around a PVC line associated with a geothermal loop system adjacent to a residential pond (basin 6' to left; residence 50' to right)

Project Objective: Cut-off chronic and sustained seepage around two adjacent geothermal lines (2"-diameter PVC) associated with a loop system installed into a residential pond.

Background: Any subsurface utility pipe is intended to serve as a conduit. However, water not only travels on the inside of a pipe but also can migrate along the outside of the conduit, particularly with head pressure. Over time, seepage can remove fine-grained soils leading to increased porosity and increased seepage, creating a condition referred to as "piping." This process can gradually (and sometimes rapidly) undermine the stability of the backfill surrounding the pipe. The water loss associated with this installation built up over time. Despite the fact that (a) the geothermal system associated with the pipes had been installed for more than ten years, (b) the pipes were small (2" diameter), (c) the pipes were relatively shallow (~40" below top of berm), and (d) the surrounding soils were a very tight and typically reliable clay, water loss compounded to the point that the sump pump in the adjacent residence (approximately 50' from the basin) ran 24-hours per day for over a year until a remedy was identified.

Technical Challenges: The first obstacle in any addressing any leaking basin is isolating the source of the problem. Often what appears to be a basin-wide issue is actually confined to a localized vulnerability. This application is a classic example. By simply boring a 6" diameter hole adjacent to the underground utilities, significant water loss could be confirmed. Traditional methods of repair would typically involve drawdown to reduce head pressure and careful compaction of local clays (if available) and/or amendment materials (e.g. granular bentonite) into a broad trench. Achieving consistent compaction without causing damage to the utility is a familiar and delicate balancing act.

AquaBlok Solution: Two cubic yards (2 bulk bags or 4,800-lbs) of AquaBlok® 2080FW#8 (PONDSEAL™) were placed to fully encircle the two 2"-diameter PVC pipes and to fill the trench that extended approximately 6' in either direction of the pipes. The overall trench dimension was approximately 12'L x 4.5'D x 1'W. Product was added to the trench without drawdown to the pond. Water entering the trench was not problematic. In fact, it served to hydrate the newly applied AquaBlok and jump-start the seal.

Equipment Used: Compact excavator (with 12" bucket) for trench excavation and product placement from shipping units (2,400-lb bulk bags); hand spade, garden hose with nozzle, and trash pump to carefully remove 12" of soil from all sides of the PVC pipe and to maintain good visibility during trench excavation.

Timeline: Trench excavation took approximately one hour; AquaBlok placement took less than 30 minutes; the entire project was completed in a morning and the drainage associated with the seepage stopped within 48 hours.

Results: Evidence of immediate expansion of the bentonite coating was visually apparent as the contractor forced AquaBlok into the cavities created by the piping and subsidence (to stem the flow of water into the trench to aid excavation). Seepage rates reduced within a matter of hours – as observed by reduced sump pump activity in the adjacent basement – and stopped within 48 hours of application. No changes have been observed since.



Photo 2. Trench excavation directly adjacent to the pond (left) starting at the top of the berm. Geothermal lines (2" diameter PVC) lie ~3' beneath bucket, running perpendicular to trench



Photo 3. Compact excavator with 12" bucket continues excavation of trench. The overall trench dimension was approximately 12'L x 4.5'D x 1'W



Photo 4. Evidence of subsidence associated with piping around the exterior of the pipe. Note highly plastic properties of surrounding clay



Photo 5. A 2,400lb (1 cubic yard) bulk bag of AquaBlok suspended by lifting straps from the excavator



Photo 6. AquaBlok placement from the bulk bag via the discharge snout – note the water in the trench



Photo 7. AquaBlok in trench just prior to placement of surface topsoil/sod



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Last Revised: May 2016