

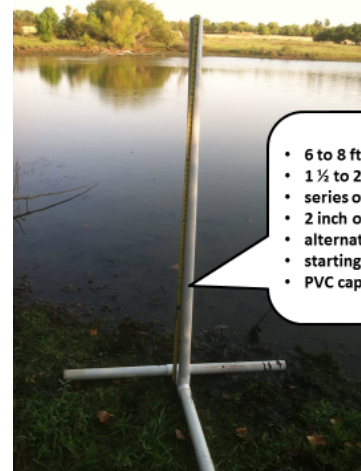
This process is normally in preparation to install livestock watering tanks and exclusion fences. Please see the last page of this document for a list of parts and equipment needed for installation.

Before beginning any work, **test the depth** of the pond itself to see if it justifies the time and cost to develop the pond. **Measure the elevations** of the water surface, primary spillway, and emergency spillways. Compare those elevations with the possible site for a waterer below the pond. (A six-foot differential is standard, but it is possible to install lines through ponds with as little as a four-foot difference.) Finally, **locate a contractor** with proper equipment. Mini-excavators are most often not large enough to complete the installation because bottom slope of the pond is too flat. Large trackhoes are most frequently used. Backhoe tractors can also be used for this work.

If the decision is to develop the pond, first **prepare a riser** (with holes) to be slid into the deepest part of the pond, leaving room for sediment accumulation below the lowest holes in the riser. Typically, the riser is made of the same PVC pipeline as the remainder of the pipe (1 ½ – 2 inch). Typically, the riser measures six feet, with $\frac{3}{8}$ inch holes every two inches through both sides of the pipe from the top to about two feet from the bottom. Then the pipe can be rotated 90 degrees and another set of holes put into the pipeline between the other set of holes. The “feet” (measuring two feet long) are glued into the opposite ends on one of the PVC tees. A short piece of PVC pipe (three inches) is glued into the third leg of the tee. The bottom end of the riser pipe can be glued into the third leg of the other PVC tee. The riser tee and the foot tee can be glued together so the riser will sit vertically; be sure to check it for close to plumb.

(NOTE: drill a $\frac{3}{8}$ hole in the top of each foot to allow water to enter the riser system, without it, the pipe is difficult to sink into the water.)

Slide the riser into position with a line coming to shore where the line is to go through the pond dam. Use a two-inch “bell end” PVC pipe for this portion of the pipeline system. The final joint of pipe is ideally “gasket fit” pipe with the bell end toward the shore. These pipelines can be 40, 60 or 80 feet long in order to get the riser into the deepest portion of the pond. If desired, the pipeline can be floated over the trench by pulling about half the pipeline’s length onto the shore and inserting the plug (tapered end of gasketed pipe with cap) and then pushing the riser back into place.



- 6 to 8 ft tall (not above normal pool level)
- 1 ½ to 2 inch PVC
- series of $\frac{3}{8}$ inch holes
- 2 inch on centers
- alternating around the pipe
- starting 2 ft. from bottom
- PVC cap on legs and top

Remove the freeboard of the pond down to about two inches above the pond water level. The slot through the freeboard of the pond dam needs to be wide enough that the excavator can rotate without hitting any soil.

Create a trench from the shore to as far out into the pond water as the contractor can reach, plus a few feet into the dam itself. It is ideal if the trench can be three to four feet deep as it reaches the shoreline and the trench segment into the dam. The end of the trench in the dam should be as vertical as possible.

Align the pipeline and riser over the trench when the trench is clean of clods and mud. A rope or strap is placed around the pipe so the pipe does not get lost or buried in the trench. When the pipeline aligns with the underwater trench, remove the plug from the end of the pipeline, and allow the pipeline to slowly fill with water. Replace the plug in the end of the pipeline one last time (it will be difficult to drive in as it the pipeline is now full of water) and sink it into place at the bottom of the trench. A 2x4 with two 16d nails placed in one end spaced to straddle the pipeline is a good tool to guide the pipeline to the bottom and hold it in place while the contractor begins to build the seal and coffer dam.

Seal the pond. From assessing the pond materials, often the best material to initially place on the pipe in the trench is from the dam face along the shoreline of the pond. The best material is saturated and formed like modeling clay. **NO dry or loose material should be used in the coffer dam!** The repeated process of packing and sealing the pond takes a few minutes. Do not worry about covering the entire pipeline out into the pond; the main area of concern is the area within three or four feet of the previous shoreline. Basically, the coffer dam and pipeline seal are being built in one step. Once the contractor has the seal to above the water level, the remaining water in the trench can be dipped and/or pumped out. The coffer dam construction can continue and inspected for leaks.

Find the end of the pipeline. If well-formed saturated soils are used, the pipeline may be easily seen when the trench is pumped. If loose materials are used to build the coffer dam, it requires a lot of manual digging because the mud seals flowing over the end of pipe must be removed from the trench. The rope on the end of the pipe is a guide to finding the pipe without damage.

Make certain the trench is sealed after finding the pipe. Often additional packing and sealing is needed. If the trench is sealed, the contractor can now trench the remaining distance through the pond dam. The contractor can dig the trench all the way to where the valve in the main line at the back of the pond dam is to be installed.

A section of pipeline is now assembled to the proper length to include the shutoff valve.

Place the assembled pipeline with the valve in to the trench (with the valve in the open

position). The gasket pipe joint lubricant is always recommended on the sharpened end of the pipeline. With at least one additional person stationed to assist pushing the pipes together, remove the plug from the pipeline through the dam with the riser (water will begin flowing) and promptly insert the pipe with the valve completely. **Now insert the pipeline with the valve into the gasket end of the riser pipe.** Allow the water to run through the pipe until it flows full. Slowly close the valve, otherwise the inertia (or water hammer) will push the gasket joints apart.

If an anti-seep collar is desired or required, it can be installed immediately behind the gasket fit junction. An alternative is to place a bed of bentonite clay under and over the pipeline for about 10 linear feet immediately after the pipe connection. Additional bentonite is added to the trench edges and bottom as the fill material is being added directly about the section of bentonite clay bedded pipe. The bentonite clay is added into the trench until the level is above primary spillway level.

If the pipeline is to be terminated at the valve, a five to 10 foot length of pipe should be glued onto the valve for connection later. The end of the pipeline can be capped – but not glued – to prevent dirt from getting into the line. Place a marker from the end of the pipe to the surface to mark where the end of the pipeline is located.

Place a valve protection well, similar to a meter well, over the valve to allow access from the surface. Test the valve once or twice to make sure it turns on and off completely and freely. Take care that the valve well is centered over the valve and in a relatively plumb position. The remainder of the trench can be re-packed and the top of the dam reconstructed.

The process often requires about 4 hours of contractor time to complete. Typically, not more than 100 gallons of water is lost during this process.

Parts list

tee (2)

caps (4)

¼ turn valve

valve protection well casing

lid or cap for valve protection well

40 ft. gasket fit pipe (2 joints, assuming 20 ft. joints)

(If gasket fit is not available, substitute a ¼ turn valve to replace the plug process)

Additional pipe

The length of pipe to be submerged in the pond water must be bell end, glue fit pipe.

The remainder of the pipe may be bell end glue fit pipe or gasket fit pipe.

CAUTION: if the pipe is purchased for a hardware store and has couplers to be glued on each end of the pipe, it may be labeled D&W (drain and waste) which is not acceptable.

Optional materials for the pond sealant:

8 or 10 bags of Bentonite clay to use for a

seal or

anti-seep collar (1)

Equipment needed:

valve key (to turn on and off the water after the valve well is set)

drill with $\frac{3}{8}$ inch drill bit

tape measure

Sharpie marker

saw to cut pipe

gasket joint pipe lubricant

PVC glue and PVC cleaner and/or primer

rope (small size at least 10 ft. long)

8 ft. 2x4 with nails or screws in place to hold pipe to bottom of trench

round point shovels or more

transfer pump with suction and discharge hoses

container for water (to prime pump)

mud boots

extra set of clothing for when changing into when finished

For questions about this project, please contact [Herschel George](#), K-State Watershed Specialist for Southeast Kansas.