

Installing a pipeline into a pond which contains water

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Research and Extension

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I have helped a number of producers install lines through their ponds. The process is normally in preparation to install a livestock watering tanks and exclusion fences.

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The first step is to **test the depth** of the pond itself to see if it justifies the time and cost to develop the pond.

Second is to **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. (I use a 6 ft differential as a standard but have put lines through ponds with as little as 4 ft difference)

Find a contractor with **equipment that is large** enough to do the job. The mini-excavators are most often not large enough because the slope of the bottom of the pond is too flat. Large track-hoes are most frequently what we use. However Back-hoe tractors were what we used when we started.

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 or 2 Inch). Often I make the riser 6 ft. long, placing 3/8 inch holes every 3 inches through both sides of the pipe from the top to about 2 ft. from the bottom. Then the pipe can be rotated 90 degrees and another set of holes are put into the pipeline between the other set of holes. The 2 ft. length feet are glued into the opposite ends on one of the PVC tee's. A short piece (3 to 4 inch) PVC pipe 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 set vertical, check it for close to plumb.



- series of 3/8 inch holes
- 3 inch centers
- alternate around the pipe
- start 2 ft above bottom of pond
- 6-8 ft tall (not above normal pool level)
- 1 ½ inch or 2 inch PVC
- PVC cap on legs and top

NOTE: drill a 3/8 hole in the top of each foot to allow water to enter the riser system.

Slide the riser into position with a line coming to shore where the line is to go through the pond dam. Typically I use a 2 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 ft. long in order to get the riser into the deepest portion of the pond.

The **freeboard of the pond is removed** down to about 2 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 on any soil.

A trench is created from as far out into the pond water to the shore plus a few feet into the dam itself. It is ideally if the trench can be 3 to 4 ft deep as it reaches the shore line and end of this trench segment. The end of the trench in the dam should be as vertical as possible. When the trench is clean of clods and mud, the pipeline is placed into the trench. (a rope or strap is placed around the pipe to insure that we can find the pipe in the trench later) A plug made of a short piece of gasket pipe (the taper end) and a cap which will be placed into the bell-end of the pipeline with the riser.

Align the pipeline and riser over the trench. The pipeline can be caused to float over the trench by pulling the pipeline onto the shore about ½ length of the pipeline and inserting the plug (tapered pipe and cap) and then pushing the riser back into place. When the pipeline aligns with the underwater trench, remove the plug, the line will slowly fill with water and sink into place into the bottom of her trench. Allow the pipe to fill with water and place the plug into the end of the pipeline one last time, (it will be difficult to drive in as it the pipeline is now full of water), An 8 ft. 2x4 with two 16d nails placed in one end spaced so to hold to the

pipeline is good to guide the pipeline to the bottom and hold it in place while the contractor begins to build the seal and coffer dam.

Now to **seal the pond back!** 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 shore line of the pond. The process of packing and sealing, packing and sealing and packing and sealing the pond takes a few minutes.

I do not worry about covering the entire pipeline out into the pond; the main area of concern is the area within 3 or 4 ft of the previous shore line. Basically you are building the coffer dam and pipeline seal in one step.

Once the contractor feels they have sealed the coffer dam and pipeline, the remaining water in the trench can be dipped out and/or pumped out.

Find the **end of the pipeline.** Sometimes it requires a lot of manual digging, other times the contractor can get the seal without much flowing over the end of pipe which must be removed from the trench. The rope on the end of the pipe is a guide to finding the pipe with out damage.

After the pipe has been found, I check the trench to **make certain the trench is sealed.** If I believe the trench is sealed, the contractor is allowed to trench the remaining distance through the pond dam. The contractor can dig the trench all the way to the waterer or to where the valve in the main line at the back of the pond dam is to be installed.

The pipeline assembly is built to the proper length to include the shutoff valve. Some gasket joints are very difficult to insert, it is wise to check this in advance of the day of installation. The gasket pipe joint lubricant is always recommended.

Place the **pipeline with the valve in to the trench** (with the valve in the open position). With one person stationed to assist pushing the pipes together, the plug is removed from the pipeline through the dam with the riser and the pipe with the valve is inserted. Now the **pipeline with the valve is pushed into the gasket-end of the riser pipe.** Allow the water to run enough that the pipe until it flows full. SLOWLY close the valve otherwise the inertia (or water hammer) will push the gasket joints apart!!!).

If anti-seep collar are desired or required, they can be installed in place immediately behind the gasket fit junction, and fit over the pipe immediately before the two pipes are connected. An alternative is to place a bed of bentonite clay under and over the pipeline for about 10 linear ft. 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 10 linear ft. of bentonite clay bedded pipe. The bentonite clay is added to the trench until the level is above primary spillway level.

If the line is terminated at the valve, a 50 to 10 ft. 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 and a marker should be placed from the end of the pipe to the surface to mark where the end of the pipeline can found

A valve protection well, similar to a meter well is placed over the valve to allow access from the surface. Test the valve a time or two to make sure it turns on and off completely and freely. Care should be taken that the valve well is centered over the valve and in a relatively vertically plumb position.

The remainder of the trench can be re-packed and the top of the dam reconstructed. It is common to need additional materials to rebuild the dam.

The process requires about 4 hours of contractor time to complete.

Feel free to call me for a clarification of any of this process.

I tell producers we will not lose more than 100 gallon of water during the process.

Parts list:

- 2 – Tee
- 4 – Caps
- 1 – ¼ turn valve
- 1 – valve protection well casing
- 1 – lid or cap for valve protection well
- 40 ft. Gasket fit pipe (2 joints, I am assuming 20 ft. joints)
(If gasket fit is not available you can substitute one more 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) and I consider that unacceptable.

Optional materials for the pond sealant:

- 8 or 10 – bags of Bentonite clay to use for a seal
- or
- 1 – anti-seep collar

Equipment needed:

- 1 - valve key (to turn on and off the water after the valve well is set)
- 1 – drill with 3/8 inch drill bit
- 1 – tape measure
- 1 – Sharpie marker
- 1 – saw to cut pipe
- 1 – gasket joint pipe lubricant
- 1 – PVC glue and PVC cleaner and/or primer
- 1 – rope (small size at least 10 ft. long)
- 1 – 8 ft. 2x4 with nails or screws in place to hold pipe to bottom of trench
- 1 – round point shovels or more
- 1 – transfer pump with suction and discharge hoses
- 1 – container for water (to prime pump)
- 1 – mud boots
- 1 - extra set of clothing for when changing into when finished

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