

Draining and pumping,	1 50
A single tunnel per lineal foot,	116 41
	2
Two single tunnels per lineal foot,	\$232 82

The first is the instance applied in the estimates. The second would cause an increase in the estimate of \$294,192 00. The third would require a subtraction from the estimate of \$1,694,196 00. A single tunnel is now being constructed on the Chesapeake and Ohio Canal route—of that tunnel the Chief Engineer of the work says:—

“We have done no masonry in this tunnel. Our observations lead us to suppose that \$150 per lineal foot would be the cost of a single tunnel requiring to be arched throughout, on materials such as we have in the Paw Paw bends, in addition to \$100 per foot in depth, the double shaft.” Our estimates therefore, made independent of this information (with the exceptions of the shafts) appear to agree very nearly with the experience of this particular case.

In estimating the cost of feeders the same principles have generally governed us as in the canal.

The prices of excavation are less; the width of feeder being small compared with the width of canal, the excavations will be proportionably shallow and will therefore more rarely penetrate to the solid rock. In the deep cuts solid rock has been estimated as on the canal at 10 feet from the surface.

On the perfection of the feeders will mainly depend the faithful supply of the necessary water—I have therefore estimated the puddling necessary on all doubtful places to amount to one-half of their lengths, puddled on sides and bottom. The dimensions are 12 feet at surface of water, 8 feet at bottom and 3 feet in depth. At two feet above the surface water in the cutting berms are left on either side, of four feet in width. On the embankments, at two feet above the surface of the water, either terra or back is 6 feet in width. The inside slopes are supposed to be paved throughout, and to prevent the action of the water on the puddling of the bottom, a layer of loose stones or rubble of some six inches in thickness should intervene.

The feeder tunnel through the Unity Ridge being of small dimensions is supposed not to require arching; the dimensions of the tunnel however and therefore the amount of excavation from it, has been estimated large enough to admit of arching. These dimensions being small (10x10) the difficulty of excavating the rock is much increased,—it has been estimated at \$7 00 per cubic yard. The embankments or dams of the reservoirs I have supposed to be constructed on the plan of the large dam of the compensation reservoir of Glenn-cross near Edinburgh, connected with the Edinburg water works and constructed by James Jardine of that city. This dam is admirably faithful in all its parts and perfectly water tight.