

Tunnels.

Total length east and west tunnels, 392.0 feet.

Material.

Crushed rock	\$ 174.24	\$.44
Dynamite and caps	75.00	.19
Wall tile for lining	724.66	1.84
Tools, etc.	125.00	.32
Cement	160.30	.41
Repairs	50.00	.12
Lumber	50.00	.12
Drain tile	42.14	.11
Power and lights	75.00	.19
Miscellaneous material	40.00	.10

Total\$1,516.34 \$ 3.87

Labor.

Supervision and foreman	\$ 473.91	\$ 1.21
Excavating	1,260.28	3.22
Drilling	104.00	.27
Blasting	84.75	.22
Bracing	229.13	.58
Laying tracks	142.20	.36
Excavating for drain tile	72.75	.19
Backfilling	375.63	.96
Laying drains	69.25	.18
Excavat'g for lining wall foundat'n	90.50	.23
Lining tunnel with tile, walls and arch	604.19	1.54
Concreting wall foundations	344.00	.88
Hauling materials	401.36	1.02

Total\$4,251.95 \$10.84

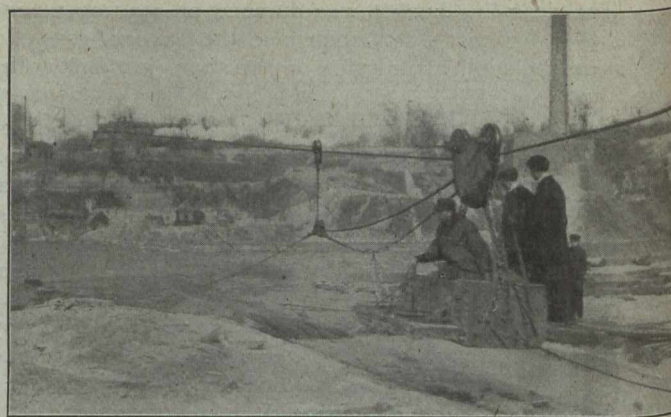
Total cost, labor and material. \$5,768.29 \$14.71

Detail Cost of River Crossing—48-inch Distribution Main.

Total length of crossing, 1,526 ft.; channel portion, 868 ft.; tunnel and shaft portions, 658 ft.

Material.	Amount.	Per ft. in Channel	Per ft. of Crossing.
1,523 ft. of 48" x 1/2" and 48" x 3/8" riveted steel pipe ...	\$16,591.85	....	\$10.87
48" gate and air valves	1,537.69	....	1.01
Lead, cast iron pipe & specials	287.27	....	.19
Fittings & incidental supplies	204.55	....	.13
Bolts, pins, steel and iron ...	1,001.47	....	.65
Timber, blocking and lumber	2,041.64	....	1.33
Cement for bag anchorage and shore wall	800.16	.94	.52
Sand for above, and for filling trench and coffer-dam	647.34	.77	.42
Burlap bags for anchorage ...	1,021.31	1.19	.67
Paint and coating material ...	66.36	....	.04
Cable	371.00	....	.24
Electric power for lights and pumping	48.77	....	.03
Coal for engine and shanty use	1,184.94	....	.77
Oil, gasoline, candles, waste	742.26	....	.48
Dynamite and leads	383.14	.45	.25
Tools, rope, derrick, repairs, etc.	1,001.33	....	.65
Transporting machinery	194.55	....	.12
Repairs and parts	387.23	....	.25
Miscellaneous material	139.83	....	.09

Total\$28,652.69 \$18.77

**Drag Line Bucket Used for Filling Concrete Over Pipe.**

Labor.	Amount.	Per ft. in Channel.	Per ft. of Crossing.
Excavating and dumping dredged material	\$ 2,215.79	....	\$ 1.45
Timbering, sheathing, etc. ...	1,358.84	....	.89
Hauling pipe and specials ...	728.79	....	.48
Hauling supplies and equipm't	3,210.90	....	2.10
Rigging up engines, cableways, etc.	4,062.04	4.79	2.66
Foreman and supervision ...	2,888.45	....	1.89
Building cribs, etc.	1,598.21	1.88	1.05
Transporting and setting cribs	315.95	.37	.21
Dredging with shovel	2,416.09	2.84	1.58
Dredging with drag line ...	4,801.61	5.67	3.15
Watchmen on engines & camp	1,473.20	....	.97
Boiler work on steel pipe ...	4,193.53	....	2.75
Blacksmith, tool work and repairs	1,203.61	....	.79
Cutting pipe	287.88	....	.19
Scraping, cleaning, re-cleaning and painting pipe	481.31	....	.32
Setting 48-in. gate and expansion joints	121.50	....	....
Setting air valves	7.50	....	....
*Laying and erecting pipe in tunnel and shaft	898.68	....	.59
Anchor'g pipe with filled bags	1,490.86	2.20	.98
Unwatering coffer-dam	497.70	.59	.33
Concreting east shore	298.05	....	.20
Pulling pipe into channel ...	691.43	.82	.45
Moving materials	223.56	....	.15
Miscellaneous work	688.83	....	.45
Total	\$36,154.31	....	\$23.69
Total cost, labor and material	\$64,807.00	....	\$42.46

*Unit cost for laying and erecting pipe in tunnel and shaft was \$1.37 per foot.

Detail Cost of 48-inch River Crossing, Pipe, Shafts and Tunnels.*Material and Labor.*

Length of crossing, 1,526 feet; channel portion, 868 feet; tunnel and shaft portion, 658 feet.

Vertical feet of shafts, 149.7. Length of tunnels, 392.0 ft.

Total cost of pipe and crossing	\$64,807.36
Total cost of shafts	6,637.50
Total cost of tunnels	5,768.29

Total\$77,213.15

Cost per foot of pipe in crossing \$50.60