

THIRD REPORT

TO THE

TRUSTEES OF WATER WORKS,

OF THE

CITY OF CLEVELAND,

BY

THEODORE R. SCOWDEN, ENGINEER.

PUBLISHED BY ORDER OF THE CITY COUNCIL.

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1855.

ENGINEER'S REPORT.

OFFICE OF WATER WORKS, }
APRIL 1ST, 1855. }

the Trustees of Water Works :

GENTLEMEN:—Pursuant to instructions, I herewith submit Report on the construction of Water Works for the city of Cleveland, relative to the purchase and cost of real estate, tracts let, and prices paid, commencement of work, and progress made; the amount expended on the work done, showing balance to be paid to complete the same; together with comparative cost of constructing the Works in progress, with estimates of cost previously submitted.

The first work done towards the construction of Cleveland Water Works, was the earth filling over the Marsh of old River Bed, extending from Kentucky street to the Engine House to cover and prepare the wet surface of lot for the reception of materials required in the construction of Engine use.

The contract to build the Engine House foundations, was awarded to A. Omistan, Jr., the lowest bidder, at the aggregate cost of \$22,171,50, for doing and completing the work, the 1st day of April, 1855. From the many difficulties at-

tending the work, and consequent delays, it was found impossible to finish the job at the time specified, in consideration of which, the contract, by consent, was transferred to B. Northop, Esq., at original prices, and the time extended to the 1st of June, 1855.

The work of erecting Engine House foundations, was commenced under the supervision of Messrs. Wigman and Omisttan, with a force of hands employed to excavate the wet grounds for stone foundations on the 10th of August, 1854.— But the excessive hot weather and sickness prevailed to such an extent, that but little progress was made. On the 5th day of October, the first timber under the foundations was laid, and the whole of the timbering and concrete work were finished on the 29th of same month. The first stone for foundations was laid to place on the timbering and concrete, on the 31st day of same month. Up to the 2nd day of December following, not quite two courses of stone were laid, when freezing weather set in, and the work was suspended.

The new contractor, B. Northop, Esq., re-commenced the work on the foundations at the earliest day practicable on the opening of Spring, and from the satisfactory manner in which the work under his supervision is progressing, affords a fair prospect of having the job completed during the month of June next.

The next work started was the Dock at the shore of the Engine House lot, on old River Bed, built for the convenience of landing materials for constructing Engine House, Pumping Engines, (as per contracts made,) and for the delivery of coal

d in generating steam after the Water Works are put in operation.

The Dock was commenced by Mr George Smith, who was lowest bidder, on the 17th day of Sept., 1854. During the progress of the work, Mr. S. was taken sick, and died, in consequence of which, the job was transferred to James Gloyd, and finished the same month at a cost of \$1,700,00, to complete the work.

After various examinations and surveys were made in search of an elevated spot for the construction of an earth Embankment Reservoir, in close proximity, and affording direct communication with the Engine House for laying down the Pump, and with a view of obtaining a supply of pure water, from the discharges of Cuyahoga River, and town drains; the present grounds for Reservoir, on the south-east corner of Franklin and Kentucky streets, west of Cuyahoga River, were chosen by the Board, as the most suitable locality for the intended purpose.

Several lots forming the Reservoir grounds, about seven acres in all, were purchased from different owners at an aggregate cost of \$20,833,62.

The contract to construct the Reservoir was awarded to Messrs Camp & Co., the lowest bidders, at a cost of \$36,906,00, for doing and completing the work; all the materials to be furnished within one mile of the Reservoir. Subsequently the contract by consent was transferred, at original prices, to Messrs L. & E. D. Delamater, who commenced the job on the 1st day of September, 1854. By applying a strong force of men and machinery, the Reservoir was pressed forward by the Contractors

with untiring energy and perseverance, so that solid embankment was raised to its full height, (21 ft.,) and 4 ft. of the retaining embankments forming the Reservoir basin, were laid on the solid Embankment by the 2d day of December, same year, before the freezing weather set in, and stopped the work.

The Inlet and Outlet pipes connected with the Reservoir, are about being laid to place, when the earth work of Reservoir will be resumed by the Contractors, who are anxious to re-commence a vigorous prosecution of the work, with a view of completing the job before the return of freezing weather next winter.

Conditional upon the contract let to James McCammon & Co., the lowest bidders, to make and deliver at their foundry, (to be built at the city of Cleveland,) 2008 gross tons of water pipes and attachments, at \$62,50 per ton, the Company have erected with new and suitable facilities for doing work, a handsome and substantial brick foundry, in every respect, admirably adapted to the purpose of pipe casting.

On the 6th of February last, this enterprising Company had matured their arrangements for melting iron, and cast the first pipe on end, as required by the contract. Up to the 1st day of this month about 100 gross tons of water pipes and attachments for Cleveland Water Works were cast.

Next in the order of contracts let, were the Pumping Engines, constructed on the purely Cornish principle, awarded to the Allaire Works, New York, the lowest bidders, at \$67,600,00, to completely build and erect the engines, at the city of Cleveland, the Trustees of Water Works to defray the expense of transportation.

The engines are now nearly finished and ready for shipment. The character of the work done, for strength, durability and beauty of finish, reflects great credit upon the builders for their faithful performance of their contract, as neither pains nor expense has been spared to bring the work to the highest state of mechanical perfection. The constant aim on their part has been to construct, irrespective of cost, a pair of Pumping Engines for Cleveland Water Works unsurpassed by any other of the kind in the world. The work speaks for itself.

The remaining portions of the work of construction not yet commenced, are the Inlet-pipe and Tower, placed in the Lake, the Engine House, Stand-pipe, River-pipe and Aqueduct, a part of which work is now advertised to let, and the whole of which will be put under contract during this and next month, and will be completely finished in course of the coming Fall.

The work-shop for making the Stop-valves, and doing general repairs about Water Works, has been equipped with necessary tools, and a complement of hands employed, which, together with the street force, to lay pipes, hired by the day, are immediately within the Engineering Department. These resources are composed of experienced men, to insure the faithful execution of the important work trusted to their hands. By the middle of June, every part of the construction of Cleveland Water Works will be under way.

Should the Board be fortunate in making contracts with reliable and energetic parties, who will use reasonable exertion towards prosecuting the work undertaken, I confidently expect that the entire Works will be completely finished, and the water let on the city by the 4th of July, 1856.

The cost of real estate, the various sums expended on different portions of the work in progress, the amount remaining to be paid to complete the same, with estimated cost of work not yet contracted for to finish the Water Works, are summed up as follows:

RESERVOIR AND GROUNDS.

Real estate, Reservoir Grounds...	paid	\$20,833	62
Constructing Reservoir; work done at contract price.....	paid	14,766	10
Constructing Reservoir; work to be done at contract price....	unpaid	22,139	90
Earth to construct Reservoir; damages.....	paid	1,000	00
Puddle material to line Reservoir. "		600	00
Haul of puddle.....	"	5,337	00
Remains to be paid	unpaid	1,000	00
Reservoir machinery and Iron fence "		5,500	00
		<hr/>	
Total cost of Reservoir.....		\$71,176	62

ENGINE HOUSE AND GROUNDS.

Real estate, Engine House lot....	paid	\$12,763	33
Constructing Engine House foundations at contract price.....	paid	4,866	22
Constructing Engine House foundations to be done at contract price.	unpaid	17,305	28
For grading lot, Dock, and brick delivered to construct Engine House.	paid	9,150	48
Estimated cost of Engine House and Stand-pipe.....	unpaid	11,708	74
Est'd cost of additional improvements to lot.....	paid	2,500	00
		<hr/>	
		\$58,294	05
		<hr/>	
		\$129,470	67

Amount brought over \$129,470 67

PUMPING ENGINES AND TRANSPORTATION.

In construction of two Cornish Engines, expended.	\$50,000 00
Remains to be paid	17,600 00
“ “ “ not included in the contract	2,500 00
For transportation of Pumping Engines, say 400 tons, at 75 cents per 100 lbs.	6,720 00
For furnaces and Chimney stacks; estimated cost.	3,500 00
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	\$80,320 00 209,790 67

WATER PIPES.

For East side of Cuyahoga River, including Pump main. From Engine House to Reservoir, a 24 inch Pump main.	3,000 ft. long.
From Reservoir to Erie, a 20 inch supply main extends.	9,500 “
On Erie st. a 16 inch main extends from Prospect to Superior st.	1,450 “
On South and West side of Public Square, a 6 inch main extends from Euclid st. to Superior st.	850 “
On Ontario st. an 8 inch main extends from 20 inch main to Huron st.	1,300 “
On Pittsburgh st. an 8 inch main extends from Huron st. to Eagle st.	1,050 “
On Eagle st. a 4 inch pipe extends from Pittsburgh st. to Erie st.	1,050 “
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	18,200 ft.

Amount brought over.....	18,200 ft
On Erie st. a collateral 4 inch line extends from Eagle to Lake st.....	3,700 "
On Prospect st. a 10 inch main extends from Ontario st. to Perry st.....	4,900 "
On Euclid st. a collateral 6 inch main extends from Public Square to Perry st....	4,800 "
On Perry st. a 4 inch pipe extends from Eu- clid st. to Prospect st.....	500 "
On Ontario st. an 8 inch main extends from Public Square to Lake st.....	1,600 "
On Bond st. a 4 inch pipe extends from Supe- rior st. to St. Clair st.....	700 "
On Wood st. a 4 inch pipe extends from St. Clair st. to Lake st.....	700 "
On Seneca st. a 4 inch pipe extends from Su- perior st. to Lake st.....	1,400 "
On Bank st. a 4 inch pipe extends from Supe- rior st. to Lake st.....	1,400 "
On Water st. a 6 inch main extends from Su- perior st. to Lake st.....	1,400 "
On River st. a 4 inch pipe extends from Supe- rior st. to Front st.....	2,400 "
On Lake st. a 4 inch pipe extends from Water st to Muirson st.....	4,100 "
On St. Clair st. a 4 inch pipe extends from Water st. to Muirson st.....	4,100 "
On Muirson st. a 4 inch pipe extends from Lake st. to Superior st.....	700 "
On Vineyard st. a 4 inch pipe extends from Superior st. to Division st ..	1,000 "

 51,600 ft.

Amount brought over.....	51,600 feet
On Division st. a 4 inch pipe extends from Vineyard st. to Merwin st.....	800 "
On Merwin st. a 4 inch pipe extends from Di- vision st. to Superior st.....	1,000 "
On Superior st. a collateral 4 inch line extends from River to Erie st.	4,700 "
Total.....	<u>58,100 ft.</u>

58,100 feet equals 11 miles and 20 ft. of water pipes.

Weight of water pipes for East side of Cuyahoga River,
1740 gross tons, 1128 lbs., at \$62,50=\$108,781 58.

Amount paid on work done.....\$ 9,631 59

To be paid, to complete the contract..99,149 99

\$108,781 58

Lead for laying 11 miles and 20 feet of water pipes, 166,178 lbs., at 6 cts..	\$ 9,970 68
Excavating 58,100 ft. of pipe trench, ma- king joints, &c., at 40 cts. lineal...	23,240 00

\$33,210 68

STOP VALVES AND FIRE HYDRANTS.

Three Stop Valves, 24 inch water way at \$450.....	\$ 1,350 00
Nine Stop Valves 20 inch water way at \$300.....	2,700 00
Two Stop Valves, 16 inch water way at \$225.....	450 00
Twenty Stop Valves, 10 inch water way at \$60.....	1,200 00
Sixteen Stop Valves, 8 inch water way at \$45.....	720 00

\$141,992 26

Amount brought over	\$141,992 26
Fifty-two Stop Valves, 6 inch water way at \$30	1,560 00
Ninety-five Stop Valves, 4 in water way at \$20	1,900 00
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Paid on large Stop Valves embraced in above list	\$ 5,687 86
Remains to be paid	4,192 14
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	\$9,880 00
For 194 Wood Boxes and Iron Covers for Stop Valves at \$ 5	\$ 970 00
For 75 Fire Hydrants at 30	5,250 00
For hauling 1741 tons of water pipes at 65 cts	1,131 65
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	\$7,351 65

INCIDENTAL EXPENSES.

There has been paid for Salaries, Draftsmen, Engineering, Office expenses and Contingencies, Rent, traveling expenses, and for various jobs by the day, and for which no satisfactory bids were obtained, the sum of

There has been paid for Salaries, Draftsmen, Engineering, Office expenses and Contingencies, Rent, traveling expenses, and for various jobs by the day, and for which no satisfactory bids were obtained, the sum of	\$12,485 33
To be paid, estimated	7,500 00
Work Shop paid	741 00
One small Worthington pump	1,400 00
Aqueduct	172 00
Pipe laying	609 00
Hauling	79 88
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	\$22,987 21
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	\$182,211 12

Amount brought over.....\$182,211 12

INLET PIPE, RIVER PIPE AND AQUEDUCT.

Estimated cost of Inlet Pipe and Aqueduct.....	\$20,470 00	
Estimated cost of River Pipe, and laying it under Cuyahoga River.....	2,500 00	
		\$22,970 00
For contingencies applying to work of construction not contracted for, say.....	\$10,000 00	
For draying and handling	5,000 00	
		\$15,000 00
Amount brought over from page 9.....	\$209,790 67	
Total cost of work of construction.....	\$429,971 79	

Additional cost of constructing Water Works from extension of water pipes and attachments since consolidation of the two former cities, for supplying with water that portion of the city lying west of Cuyahoga river.

WATER PIPES.

Réservoir Outlet 20 inch diameter, reduced to 16 inch diameter.....	350 ft.
On Franklin st. a 16 inch main extends from Réservoir to Franklin Place.....	1,200 "
On Franklin st. a 6 inch collateral extends from Réservoir to Pearl st.....	2,200 "
On Detroit st. a 6 inch main extends from Terrice st. to Duane st.....	2,100 "
On Pearl st. a 6 inch main extends from Franklin st. to Detroit st.....	1,250 "
On Duane st. a 4 inch pipe extends from Detroit st. to Clinton st.....	450 "
	<u>7,550 ft.</u>

Amount brought over.....	7,55	ft.
On Clinton a 4 inch pipe extends from Hanover st. to Kentucky st.....	1,600	"
On Kentucky st. a 4 inch pipe extends from Clinton st. to Franklin st.....	400	"
On Kentucky st. an 8 inch main extends from Wash- ington st. to Reservoir.....	2,400	"
On Hanover st. a 4 inch pipe extends from Franklin st. to Clinton st.....	450	"
Total.....	<u>12,400</u>	ft.

12,400 feet equals 2 miles and 184 feet of water pipes.

Weight of water pipes for west side of Cuyahoga river, 267 tons, 1,112, lbs. at \$62,50 per ton.....	\$16,718	63
Labor to lay 12,400 feet of water pipes at 40 cents lineal.....	4,960	00
Lead to lay 12,400 feet of water pipes, 20,000 lbs., at 6 cts.....	1,200	00
Hauling 268 tons of water pipes at 65 cts.....	<u>174</u>	20
		<u>\$23,052</u> 83

STOP VALVES AND FIRE HYDRANTS.

3 Stop Valves, 20 inch water way, at \$300..	\$900	00
2 " " 16 " " " " 225..	450	00
4 " " 8 " " " " 65..	260	00
8 " " 6 " " " " 40..	320	00
15 " " 4 " " " " 30..	450	00
32 wood boxes and iron covers for Stop Valves, at \$5.....	160	00
25 Fire Hydrants at \$30.....	<u>750</u>	00
		<u>\$ 3,290</u> 00
		<u>\$26,342</u> 83

Amount brought over.....	\$26,342 83
or contingencies, handling and drayage.....	\$ 5,000 00
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Cost of extending Water Works.....	\$31,342 83
Cost of Works on First Plan.....	\$429,971 79
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Total cost of Water Works extended	461,314 62

Respectfully submitted.

THEO. R. SCOWDEN,

Engineer.