

The principal dimensions of the dam and reservoir are:

Greatest height above bottom of valley.....	57 ft.
Greatest height above bottom of sheet piling curtain.....	127 ft.
Length of crest of dam	1017 ft.
Greatest depth of cut-off trench	31 ft.
Top width of dam	15 ft.
Width of spillway	50 ft.
Depth of spillway below high-water level	10 ft.
Upstream slope of dam	3 to 1



The Intake Tower in Forebay Reservoir.

Downstream slope of dam	2½ to 1
Total volume of dam (embankment measurement)	148,390 cu. yds.
Capacity of reservoir above outlet gates with high-water level 5 ft. below crest of dam	320,000,000 cu. ft.
Area of reservoir at high-water level.....	284 acres
Drainage area above dam (approximate).....	8 sq. miles

In prospecting the site of the dam to determine the nature of the underlying material, a trench 16 to 20 feet in depth was excavated along the entire length of the dam axis, and following the top of the bed-rock as far as the depth of the trench would safely permit. Test holes were put down in the bottom of the trench by driving 3-inch pipe casing to the bed-rock. The casing was sunk with churn drills operated inside the casing, the material being removed with a water jet.

The formation was found generally to consist of a stratum of top soil from two to three feet in thickness, underlying which was a mass of heavy gravel and boulders. At a depth of from 12 to 16 feet the boulders diminished in size, and gave way to coarse, partly cemented gravel, hard enough to offer considerable resistance in removal with picks, below which, and at a depth of about 20 feet, alternating layers of loose sand and gravel carrying water extended to the bed-rock.

With these foundation conditions determined, and in order to provide not only a square foundation for the initial structure 55 feet in height, but for an ultimate structure which would raise the water level 70 feet above the floor of the valley, and double the capacity of the impounding basin, it was decided to install a curtain of steel sheet piling extending to the bed-rock.

After thoroughly prospecting both slopes of the valley, a sufficient amount of suitable material for building the embankment was found on the north side, directly opposite the dam, and distant about 400 feet from the north end of the dam axis. The material consisted of the hard-pan common to the district, gravel and sand mixed with clay, favorably proportioned for sluicing from place into the fill. The borrow pits were 150 to 250 feet in elevation above the valley floor, and afforded a working face or bank 8 to 18 feet high.

Clearing the timber from the dam site and the adjacent areas was begun as soon as men and equipment could be placed on the work. Powder and donkey engines were used extensively in removing stumps and piling the timber and debris for burning. A single acre in the dam site was found to contain 240 stumps of a size to require blasting for removal. The flowage area was not cleared beyond the immediate vicinity of the dam where clearing was required for construction purposes.

After the clearing was finished, and the stumps removed, the forest floor, consisting of partly decomposed vegetation, rotten wood and smaller roots, was removed to a depth of one to two feet from the area to be occupied by the base of the dam. Thirty acres of ground were cleared in all, 10.1 acres of which were stumped, and 4.1 acres stripped.

A cut-off trench, 6 feet wide at the bottom, 10 to 31 feet deep, with side slopes about ¾ to 1, was excavated parallel to the axis of the dam, the centre line of the trench being directly under the downstream edge of the crest of the embankment. The material excavated from the trench consisted of heavy boulders, gravel and sand. Steam and hand-derricks with skips were used in the dryer parts of the trench, while the section under water near the stream bed was removed with an hydraulic elevator. The total volume of material removed was 8,675 cubic yards.

Interlocking steel sheet piling—Carnegie 12-inch 40-lb. section—was driven in the bottom of the cut-off trench to the slate bed-rock. Two pile drivers with 2,000-pound drop hammers were used, the driving gangs working night and day. The piles were furnished in lengths of 50 feet and less, the first shipment arriving at the site August 6th, 1911. Hard driving was encountered on the north side of the creek, but no pile was left until it reached bed-rock as indicated by the test holes. The piles were driven along the centre line of the cut-off trench, and from 4 to 6 feet were left projecting above the bottom. The trench was thoroughly cleaned before sluicing was started.

Total number of steel sheet piles driven.....	616
Total length of steel cut-off.....	580.5 feet
Net length cut-off per pile	about 11½ in.
Maximum penetration of pile below bottom of cut-off trench	68.5 feet
Average penetration of pile below bottom of cut-off trench	about 46.3 feet
Maximum penetration of pile below original ground surface	87.0 feet
Total piling driven	28,509.0 feet
Total weight of piling	570 tons