C O P Y.

Reservoir
Blue Canon.

Navajo
Fort Defiance

Albuquerque, N. M., December 29, 1910.

Mr. W. H. Code, Chief Engineer,
526 Federal Building,
Los Angeles, Cal.

Dear Sir:

About three miles above Fort Defiance is a small Canon, known as Blue Canon, in which a small stream flows a portion of the year, and at times there is a large flood discharge. The present supply of water for irrigation of the school and agency farm is small, and it was thought that a dam in this canon would conserve a portion, at least, of the flood waters to augment the supply.

I therefore had a survey made with the following results.

At the point best suited for the construction of a dam the sides of the canon are about perpindicular, and the distance between the walls is 60 feet. Under the conditions obtaining, a dam with a maximum height of about 32 feet above the present stream bed would be about as high as a dam could be economically constructed, although one to a greater height could be built. The measurements as to the capacity of the propose reservoir were based on that height.

The walls of the canon are solid rock. The bottom, at the proposed dam site, is filled to an unknown depth with sand and gravel. A test pit was put down some eight feet, but owing to the presence of water could go no deeper, and no borings were made.

There is no way to construct a spillway, with reasonable expense, and all excess of water will have to pass over the top of the dam.

Type of Dam. It would be possible to build a solid rock or concrete dam, gravity section, if a good foundation can be found at a reasonable depth. A hollow, buttressed dam (say of the Ambursen type), would be good construction, but the cheapest type would be a log crib, rock filled dam, in four steps on the down stream side, and with a batter of ½ to 1 on the upper. This would give a base of about 48 feet and a height from foundation of 40 feet (assuming that 8 feet below the present bottom would give a good bearing). The decks to be covered with 2" plank, and two rows of sheet piling to be driven if found necessary. Below the lower apron a large mass of loose rock to be placed.

Superintendent Paquette has offered to furnish all of the lumber needed for the work, from the government sawmill, and to deliver it on the ground free of charge to the Irrigation Department.

The cost without the sawed timber is estimated at $6,000.

The capacity of the reservoir would be as follows:

98' contour,	0.00	acre feet.
100' "	.07	" "
110' "	11.17	" "
120' "	47.17	" "
130' "	144.47	" "

On the above basis of storage capacity and cost, the cost per acre foot of the water stored, filling the reservoir once each year, would be about $41.

If the duty of water is 2½ acre feet, as I have assumed, about 58 acres would be served, if used on new land, at a cost of $104. per acre.

The silt problem must be taken into consideration. I am informed that the water coming down this canon, which is a branch of Canon Bonito, carries about as much silt as the latter.

Volumetric measurements made by the writer in 1904 of the flood waters of Canon Bonito showed that there was about 13% of solids carried in the larger floods. If this applies to Blue Canon, assuming that this amount of silt was deposited with each filling of the reservoir, its life would be less than 8 years, or the same number of fillings.

The value of the water in this very arid region might affect the high cost of construction, but without further investigations of the silt problem, I could not recommend the construction of the reservoir.

Very respectfully,

H. F. Robinson,

Superintendent of Irrigation.

Map of canon enclosed.