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Geology Zion Nat. Park ②

ZION NATIONAL PARK STUDY & REPORT

ON

POSSIBILITIES FOR ADDITIONAL WATER SUPPLY

SOUTH ENTRANCE

BY

A. E. COWELL

ZION NATIONAL PARK
STUDY AND REPORT
ON
POSSIBILITIES FOR ADDITIONAL WATER SUPPLY
SOUTH ENTRANCE

By
A. E. Cowell
Park Engineer

Branch of Engineering,
San Francisco, Calif.,
November 8, 1935.

Studies of springs and measurement of their flow were made in Zion National Park during 1935 for the purpose of determining possibilities of additional water supply for the South Entrance Area.

For the purpose of identification, the springs have been numbered from one to fifteen inclusive, the locations of which are shown on the attached sketch plat. Springs nos. 1 to 7 inclusive are in Oak Creek, Nos. 8 to 9 are on the east talus, and the remainder are in the Birch Creek Area.

Springs No. 1, 2, 3, and 4, are now the source of supply for the new South Entrance water system, Springs No. 5 is high in the talus, but is quite small as compared with the length of pipe required to bring its waters into the system, therefore is of little importance.

Spring No. 6 is not a well defined spring, the measurement of flow being taken in the creek which has gathered the waters from numerous seepages from the rock base of cliff over a distance of several hundred feet, and the water would be difficult to gather where it could be protected from pollution. Spring No. 7 can be developed in the same area as No. 6. They can be connected with the existing supply near Sta. 34 plus 47.00 Should all additional waters in Oak Creek with the exception of that appropriated by the Town of Springdale be gathered, the total would not exceed 13,000 gallons.

Spring No. 8 is now the water supply for the Headquarters and Upper Residential Areas. There is a surplus in this flow of perhaps 9,000 gallons per 24-hour day.

Spring No. 9 at the top of the talus is unappropriated and is available to be connected into the main should one be laid from Birch Creek.

Springs Nos. 10, 11, 13 and 14 are all flowing from the ground near the Birch Creek Trail and can be readily diverted into the water system and sealed to make sanitary.

Nos. 12 and 15 were measured in the creek beds, but these may be gathered at their sources and sealed. Spring No. 15 is under a recent rock slide and some difficulty may be encountered in reaching the original spring. The intake could be sealed at some point under the slide to make sanitary.

A portion of the water from Springs Nos. 12 and 15 should be left flowing to keep this area well watered.

Elevation of Springs No. 10, the lowest point on the Birch Creek system, is 57 feet above the top of the Oak Creek Reservoir, and a main connecting with the existing Oak Creek distribution system in the Plaza Area would permit surplus water to flow into this storage.

Preliminary studies were made to determine possibility of a low head gravity flow using low pressure pipe from Birch Creek to the Headquarters Area, then to the South Entrance Area through high pressure pipe. Due to slides this location is not practical.

It is believed further study will result in determining that the best installation will be to lay a low pressure line from Spring No. 10 down Birch Creek as far as such line will be practical, then using higher pressure pipe crossing beneath the river to the west side of the highway, thence down the river under or along the Bridle Path to a point a short distance above the Headquarters Area, and crossing the river, thence through the Headquarters Area, and continuing and connecting into the existing six-inch main in the Plaza Area. All springs in the Birch Creek Area and in the main canyon can be readily connected therein, including the existing Headquarters and Upper Residence Area Water Supply, where good fire protection will be provided.

Additional storage could be provided in Birch Creek or at some point along the upper end of the line. The existing storage will still be usable, and other storage could be installed on a lower elevation decreasing the 110-lb. pressure of the existing Plaza Area main.

The flow of these spring was measured at various periods during the summer with slight variation. These measurements should be continued, that a proven water supply will be available at such time as extension to the existing system is designed.

Flow of Spring No. 1, 2, 3, and 4 showed a flow of 34,000 gallons per 24 hours in September, 1935. These measurements were made in the creeks below the springs before their development. The average flow of these springs through the season of 1935 did not exceed 35,000 fallong per 24 hours.

Consumption, exclusive of irrigation, of water from this system during the late spring and early summer of 1935 was the entire flow of the springs. Meters have now been installed in distribution lines to the two CCC Camps, and it is expected that the daily consumption can be reduced.

Additional water is desirable for irrigation of small planting in Plaza and Residential Areas and will be necessary when the South Entrance Camp Grounds are in full operation.

Estimated Available Euture Supply:

Springs Nos. 1, 2, 3, and 4 now connected in Oak Creek.....	25,500	g.p	24 hrs.
Spring No. 8 - existing supply of Headquarters Area.....	17,000	"	" "
Springs No. 9 excluding 3000.....	12,000	"	" "
Springs Nos. 10, 13, 12, and 14, excluding 5300...	75,000	"	" "
Springs Nos. 12 and 15 excluding 27,000,.....	150,000	"	" "
Estimated available total to Birch Creek and Virgin Canyon.....	254,000	"	" "
Estimated Total.....	279,500	"	" "

Pipe sizes of existing system and approximate sizes required for extensions there to are shown in the drawing, together with elevation and flow of the springs and lengths of pipes.

ZION NATIONAL PARK

**Report
on**

Temple of Sinawava Water System

By

**A. E. Gowell,
Park Engineer.**

**Branch of Engineering,
San Francisco, Calif.,
November 8, 1935.**

Line and profile has been run from the upper spring along the Narrows Trail, flowing 55 gallons per minute, to the comfort station at the Temple of Sinawava.

A survey was made of spring in the little Grotto at the East Cliff of the Temple Area, and little water was found in the grotto. Seven gallons per minute was flowing in the grotto just north of the little Grotto, and this water can be collected in a small tank without detriment to the points of interest.

This is at an elevation of 35 feet above the comfort station, and will require 770 feet of one and one-half inch pipe.

**Preliminary Study
of
Zion National Park Water Supply.**

Spring	Gal. P. 24 hrs.	Elevation.
1 -----	20,500 -----	4680
2 -----	2,500 -----	4480
3 -----	1,000 -----	4440
4 -----	1,000 -----	4440
5 -----	3,800 -----	4900
6 -----	6,200 -----	4480
7 -----	3800 -----	4470 *
8 -----	17,000 -----	4480 *
9 -----	15,000 -----	4700
10 -----	62,000 -----	4287
11 -----	16,000 -----	4580
12 -----	141,000 -----	4764
13 -----	15,000 -----	4554
14 -----	1,000 -----	4554
15 -----	56,000 -----	4500.

* Approximate.

HIGH CREEK WATER SYSTEM

ELEVATIONS

	Gallons per day.	Elevation.
Spring "A"	220,000	4453.0*
Spring "B"	24,000	4441.0
Spring "C"	17,085	4442.0
Spring "D"	65,000	4287.0
Spring "E"	24,000	4585.0*
Spring "F"	14,000	4585.0*

*Springs that are to be utilized at Present.

Catch basin site	4903.0
Virgin River crossing near U. P. utility area.	4222.0
Where waterline goes on to horse-trail.	4243.0
Virgin River bridge crossing.	4034.0
Road crossing near reservoir.	4008.0
Reservoir site.	4127.0
Cafeteria	3995.0
South Entrance Campground	3950.0