Old Crosscut Canal
North Side of Salt River
Phoenix
Maricopa County
Arizona

HAER No. AZ-21

PHOTOGRAPHS

WRITTEN HISTORICAL AND DESCRIPTIVE DATA

Historic American Engineering Record
National Park Service
Western Region
Department of Interior
San Francisco, California 94102

HISTORIC AMERICAN ENGINEERING RECORD

OLD CROSSCUT CANAL
HAER NO. AZ-21

Location:	North side of the Salt River, Phoenix, Maricopa County, Arizona.
	UTM Head: 12157480N, 1342680E (feet)
	UTM Foot: 12138758N, 1340358.8E (feet)
Dates of Construction	Original construction, 1889; Conversion to Flood Control Structure, 1971-75.
Engineers	Original construction, unknown; reconstruction directed by City of Phoenix, Chief Engineer James E. Attebery, and Flood Control District of Maricopa County, Chief Engineer Herbert P. Donald.
Present Owner	U.S. Government, operated by Flood Control District of Maricopa County.
Present Use:	Flood Control and Drainage of East Phoenix.
Significance:	The Old Crosscut unified the northside irrigation system in the 1890s and has contributed to flood control in its area.
Historian:	Fred Andersen, Salt River Project Research Archives.

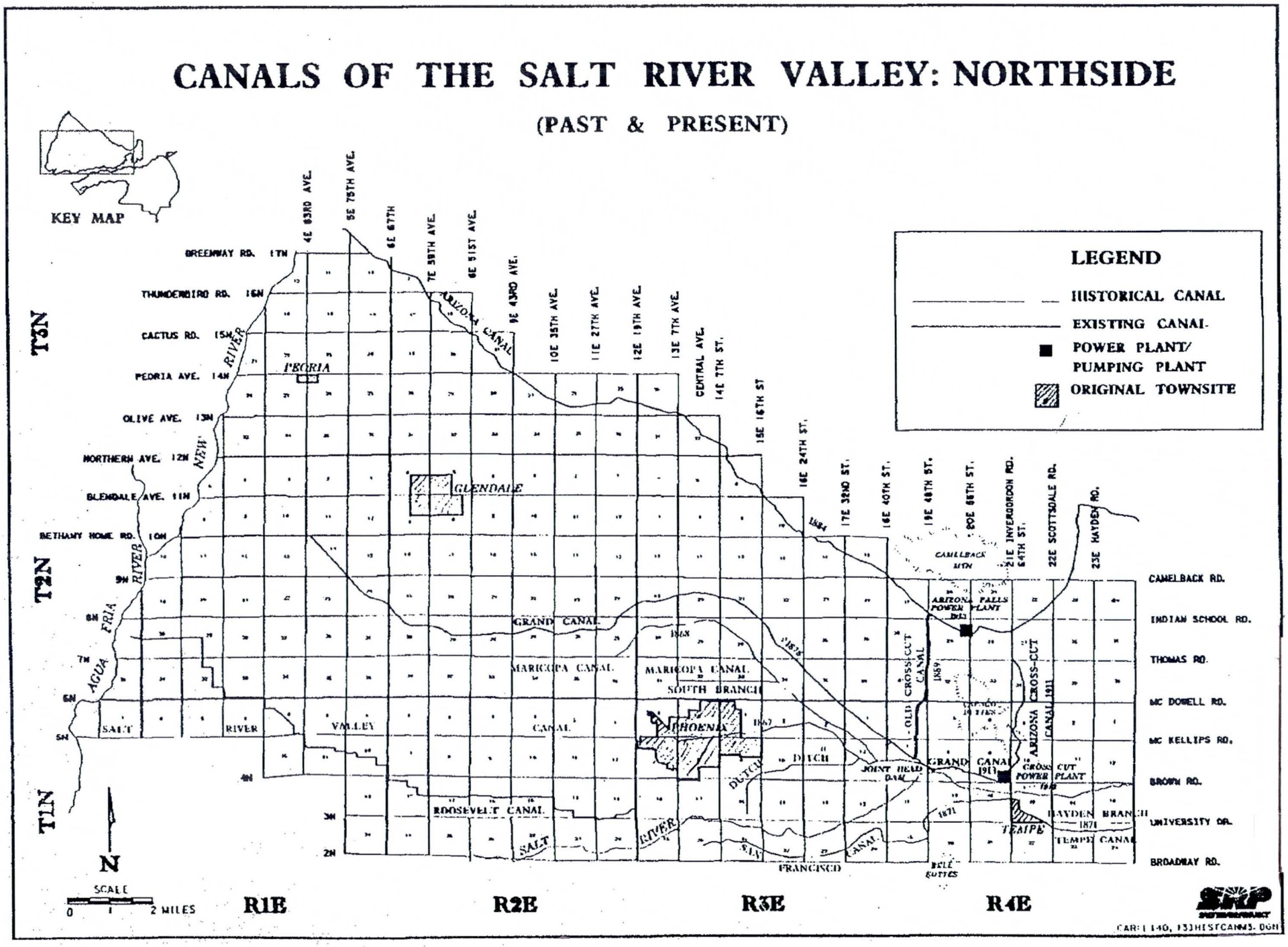
CANALS OF THE SALT RIVER VALLEY: NORTHSIDE
(PAST & PRESENT)
KEY MAP
LEGEND
HISTORICAL CANAL
EXISTING CANAL
POWER PLANT/ PUMPING PLANT
ORIGINAL TOWNSITE
T3N
T2N
T1N
R1E
R2E
R3E
R4E
N
SCALE
0 1 2 MILES
GREENWAY RD. 17N
THUNDERBIRD RD. 16N
CACTUS RD. 15N
PEORIA AVE. 14N
OLIVE AVE. 13N
NORTHERN AVE. 12N
GLENDALE AVE. 11N
BETHANY HOME RD. 10N
9N
8N
7N
6N
5N
4N
3N
2N
4E 63RD AVE.
5E 75TH AVE.
6E 67TH
7E 59TH AVE.
6E 51ST AVE.
9E 43RD AVE.
10E 35TH AVE.
11E 27TH AVE.
12E 19TH AVE.
13E 7TH AVE.
CENTRAL AVE.
14E 7TH ST.
15E 16TH ST
16E 24TH ST.
17E 32ND ST.
16E 40TH ST.
19E 48TH ST.
20E 56TH ST.
21E INVERGORDON RD.
64TH ST.
22E SCOTTSDALE RD.
23E HAYDEN RD.
CAMELBACK RD.
INDIAN SCHOOL RD.
THOMAS RD.
MC DOWELL RD.
MC KELLIPS RD.
BROWN RD.
UNIVERSITY DR.
BROADWAY RD.
PEORIA
GLENDALE
PHOENIX
TEMPE
NEW RIVER
AGUA FRIA RIVER
SALT RIVER VALLEY CANAL
ARIZONA CANAL
GRAND CANAL
MARICOPA CANAL
MARICOPA CANAL SOUTH BRANCH
ROOSEVELT CANAL
DUTCH
SAN FRANCISCO CANAL
OLD CROSS-CUT CANAL
ARIZONA CROSS-CUT CANAL
JOINT HEAD DAM
CAMELBACK MTN
ARIZONA FALLS POWER PLANT
CROSS CUT POWER PLANT
HAYDEN BRANCH
TEMPE CANAL
BELL BUTTES
1884
1868
1878
1867
1889
1911
1871
CAR: 1140, 133HISTCANM3.DGN

FIGURE 1

The Old Crosscut Canal was originally built to connect the Arizona Canal with the other northside canals (see map, Figure 1). It served this function to some degree until 1913, when it was replaced by the New Crosscut some two miles east. The Old Crosscut remained, but has not been used for irrigation since. Beginning in the 1920s it was used to help drain waterlogged farmlands in the area south of the Arizona Canal. In the 1970s control of the canal passed to the Flood Control District of Maricopa County, which renovated the structure for use as a flood control wasteway to the Salt River. Also at that time, the recreational use of the canal banks began to increase as it was included in a bike path system, and became a favorite route of joggers. In 1989, the lower part of the canal was relocated to make way for the East Papago-Hohokam freeway. As this report was being written, it was anticipated that the upper end of the canal would eventually by piped, its right of way becoming a city park.

Thus the canal has been part of the landscape of the east side of Phoenix since long before urbanization began. Because the canal was essentially abandoned as an irrigation canal by 1906, and did not become a part of the Flood Control District until 1975, neither the Salt River Project nor any other agency did much work on it or had much concern with it.

The lack of concern of official agencies with the canal for so many years is reflected in the meager documentary and photographic recording of the canal before the 1970s.

Operation of the Crosscut Canal for Irrigation

The first northside canals, the Salt River Valley and Maricopa canals, were built before 1870. A few years later, and heading a few miles upstream, the Grand Canal was built. The dams for these canals consisted of rock and brush levees thrown part way across the river bed (which could be a mile wide or more) to guide the stream into a headgate. These dams were built with the native materials close at hand, and they neither sealed off seepage nor withstood large floods, so their efficiency was low and the need for repairs was constant.

In 1883, the Arizona Canal was built along the highest possible line between the river and the Phoenix Mountains to the north. This canal headed far upriver at the Arizona Dam, an excellent permanent damsite near Granite Reef. The construction of the dam and the claim by the owners of the Arizona Canal to 50,000 miners' inches of water, diverted above all existing dams, was opposed by the owners of the Grand, Salt River and Maricopa canals. In 1887 they filed

suit to assert their prior claims to the water, but the suit was obviated for the northside canal companies when the Arizona Improvement Company bought controlling interest in all of them (some of the southside canal companies continued the suit).

The Arizona Improvement Company was formed by W.J. Murphy, William Christy and Clark Churchill to develop the entire north side of the valley and to make a profit from the sale of land and the carrying charges on water. Though the Improvement Company bought controlling shares in the Arizona, Salt River Valley, Maricopa, and Grand canals, each canal company continued to operate independently, and farmer-shareholders under the lower canals sometimes questioned if their interests were being subordinated to those of the Improvement Company and the Arizona Canal. One of the first projects undertaken by the Improvement Company was the unification of the northside canal system by construction of the Crosscut. This would save water lost by seepage in the long stretch of river bed between the Arizona Dam and the dams of the lower canals. At the 25th mile of the Arizona Canal (SW 1/4 of Section 20, T2N-R4E), the four-mile-long crosscut was turned out and run nearly due south to a point where it spilled into the Grand Canal several miles below the head of the latter. The Crosscut had a bed width of 22 feet, and a capacity of 15,000 miner's inches. It contained 23 checks or falls of four to 5.5 feet (a total fall over the length of the canal of 125 feet). It was anticipated that there would be possibilities for hydropower development in the future. Under the combined system, 76,000 acres were irrigated under the Arizona Canal, and 50,000 acres under the lower canals through the Crosscut.[1] The canal ran through the extensive Pueblo Grande archaeological site and its digging probably disturbed or destroyed part of the site (see Photo AZ-21-2).[2]

The handling of the numerous falls (which never were used for power generation) was the most interesting feature of the early Crosscut. As described in the Annual Report of the U.S. Geological Survey, the fall consisted of a wooden flume from 18 to 21 feet wide resting on sheet piling, with wing walls at each end protecting the banks of the canal (see Figure 2 and photo AZ-21-1).[3]

The Crosscut continued to operate through the 1890s and early 1900s. In 1891, a flood washed out the Arizona Dam, which was rebuilt. This flood also washed out the head of the Grand Canal, and it was not replaced. In 1897 the Arizona Improvement Company went bankrupt, and its assets were acquired by the Arizona Water Company. Financial problems did not interrupt the flow of water, but 1897 also saw the beginning of a drought on the Salt and Verde river watershed which lasted until 1904. When the drought was

finally broken in July of the latter year, the farmers under the northside system discovered that they received little water due to the condition of the Arizona Canal, which was "largely filled with sand, silt, debris, weeds and brush."[4] Furthermore, many of the farmers under the lower canals felt that the capacity of the Arizona and Crosscut canals was not sufficient to supply all the canals. In August, many of these farmers formed the Appropriators' Canal Company, for the purpose of renovating the abandoned head of the Grand Canal in order to catch flows of water at that point to supplement their supply.[5]

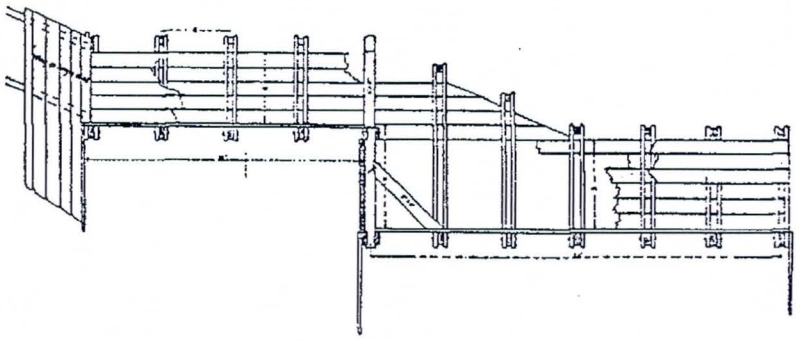

FIG. 104.—Arizona canal cross-cut. Cross sections of fall.

FIGURE 2: CROSS SECTION OF FALL
(Source: 13th Annual Report of the USGS, 1891-92)

The digging of the Appropriators' Canal began immediately. By the Spring of 1905, the work had proceeded six miles from the head to a point just east of where the Crosscut emptied into the Grand. In order to join the Grand, the Appropriators' would have to cross the right of way of the Crosscut (The Grand was located too close to the river bed to approach it from the south).[6]

In April, a large flood came down the Salt and destroyed the Arizona Dam. This essentially ended the use of the Crosscut for the carriage of irrigation water, and made the new head of the Appropriators' the chief supply for the lower canals.

In May, the Appropriators' Company built a flume across the Crosscut which was twenty-five feet wide and three feet deep, and joined the Grand just below. There was a brief legal wrangle about the use of the right of way, and the Arizona Water Company threatened to tear out the flume once the Arizona Dam was repaired. Before that happened both canals were bought by the federal government.[7]

The Sale of the Crosscut Canal

In 1903 the Salt River Valley Water Users' Association was formed to represent all the farmers of the valley who would come under the federal reclamation development known as the Salt River Project. The Project initially consisted of the Tonto storage dam (later named for Theodore Roosevelt), but by the time the project was finished it included a concrete diversion dam at Granite Reef and government ownership of all the major canals. The Project was built by the U.S. Reclamation Service, and ownership of the dams, canals and other features remains with the U.S. But the operation of the Project was turned over to the Water Users' Association upon completion of major construction in 1917.

The April 1905 flood which destroyed the Arizona Dam occurred at a time when the Arizona Water Company was in receivership and in the process of being sold to the federal government. In March 1906 the sale of the canals to the government was approved by the shareholders of all the northside canals; the value of the Crosscut Canal was placed at $15,730.[8] The Justice Department found problems with the title to the Crosscut Canal. The deed for the canal had been accepted from the Water Power Canal Company, which had executed a lease of the canal to another party. The Water Power Canal Company was one-third owned by the Arizona Water Company, one-third by the Grand Canal Company, and the Salt River Valley and Maricopa companies split the other third. Investigation revealed that the canal had been constructed by the Arizona Improvement Company, and never legally transferred to the Water Power Canal Company. Once this technicality was cleared up, the sale was completed.[9]

As construction of the irrigation project continued, the Reclamation Service realized the advantages of greater hydropower development both to help pay for the irrigation facilities and to provide water through pumping. There were several significant hydropower sites on the project canals, including the drop between the Arizona and the Grand Canals (approximately 125 feet through the Old Crosscut). In a meeting with a delegation from the U.S. Senate Irrigation Committee in November 1909, a witness stated that the falls on the Crosscut were capable of developing 4000 horsepower, and that the expenditure of $600,000 for a power plant would

result in an annual revenue of at least $200,000. Others at the meeting opposed the expenditure of money on power generating facilities, at least until the irrigation works were completed.[10]

In May 1910 the Water Users' Association proposed to the Reclamation Service that the Association would finance and build two new canal hydropower plants, one of which would be on a new crosscut canal approximately two miles east of the Old Crosscut. This site had been on a list of potential power sites identified by the Project Engineer in January 1909. The reason for building the new canal was to carry the water on a higher line to a point south of the Papago Buttes, where there was a 112 foot drop into the Grand Canal. The power plant to be constructed here would generate a maximum of 6000 horsepower. Work on the New Crosscut began in the spring of 1912, and the canal and power plant were completed two years later.[11]

Since water run through the New Crosscut created power revenues, the use of the Old Crosscut for irrigation was largely ended, except perhaps in periods where the new canal was shut down for repair. Table 1 shows the relative importance of the Old Crosscut in the irrigation supply system in selected years

TABLE 1
NORTHSIDE WATER FLOW, SELECTED YEARS
(acre-feet)

	1921	1931	1939	1943
Arizona Canal at Granite Reef	664,640	593,760	425,294	510,825
Grand Canal Above Old Crosscut	114,323	180,322	122,697	202,162
Old Crosscut, Ariz. to Grand	0	9,817	3,579	5,641

SOURCE: Annual History of SRP: 1921, 1931, 1939, 1943.

The Old Crosscut as a Drainage Ditch

Granite Reef Dam, a concrete diversion dam which diverted the entire (non-flood) flow of the Salt and Verde rivers,

was completed in 1908. Roosevelt Dam, which stored 1.28 million acre feet on the Salt, was completed in 1911. One result was the increase of irrigated acreage in the valley, and the amount of water from the Salt and Verde rivers diverted for agriculture. Soon, ironically, the threat of drought was replaced by the threat of waterlogging, as irrigation caused the water table in large areas to rise to within a few feet of the land surface. In October 1918, a survey of the project estimated that of 180,000 acres in the Project, 67,000 were in danger of waterlogging, with a depth to groundwater of ten feet or less.[12]

One of the areas judged to be in need of immediate relief was the area under the Arizona Canal near the Old Crosscut. The board of engineers which studied the drainage problem recommended the installation of pumping plants in some areas of the Project to draw down the groundwater. However, in the Old Crosscut area it appeared that wells might be ineffective because of an impervious layer or layers of hardpan, and the board of engineers advised that in this area, the best solution would be a deep tile drain which would collect groundwater perched in the loose fill area above the hardpan and conduct it into the Old Crosscut. The drain was to run down the middle of Section 29 (T2N-R4E) to empty into the Crosscut (See map, Figure 3). The deep tile drain was estimated to cost $8000 per mile, compared to a well with electrical motor and equipment which was expected to average $7000 each. [13]

Specifications for the Drainage Ditch

The Crosscut drain was completed in 1921. It was 5500 feet long, and the average depth was 10 feet. It was made of concrete pipe twelve inches in diameter. Capacity was determined by grade, and increased from 1.5 cfs at the upper end, and 3.0 cfs at the lower end (see photo AZ-21-6). [14]

Specifications for the work called for the trench to be at least six inches wider than the outside diameter of the pipe, to allow for compacted filling on the sides. The trench was to be dug as close as possible to grade, and rounded on the bottom to support the pipe and to avoid filling under the pipe, except where artificial foundations were required. Where there was fill under the pipe it was to be compacted gravel. In soft earth an artificial foundation of compacted gravel or a wooden cradle was to support the pipe.

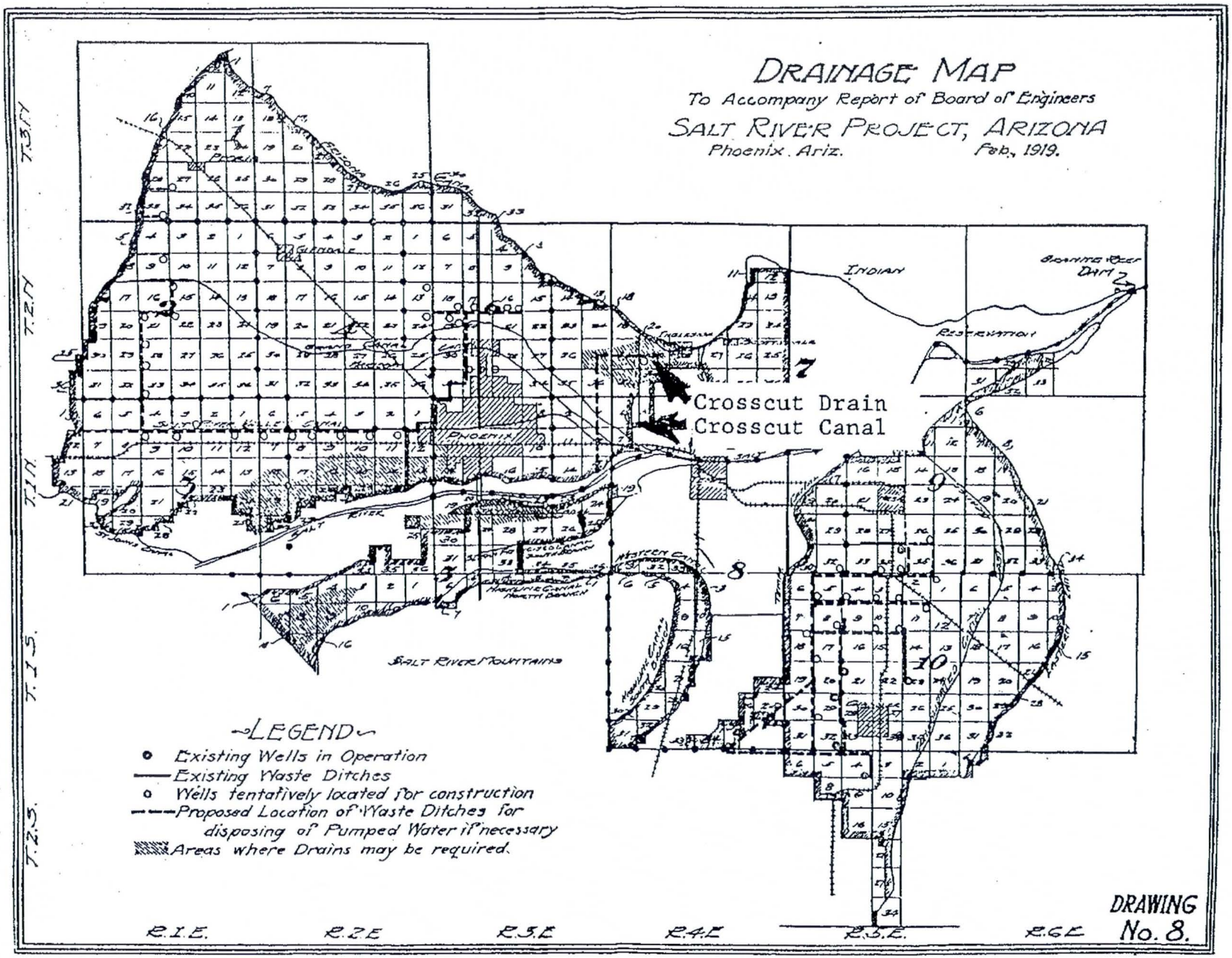

FIGURE 3: DRAINAGE MAP (Source: SRVWUA 1919 "Drainage Report.")

The tile was to be laid true to alignment and with the ends as close together as possible "to reduce the size of the openings to a minimum and lessen the chance for earth being washed into the drain." The upper two thirds of the joint was to be covered with a double layer of tar paper or burlap saturated with asphaltum not less than four inches wide. Then the sides and top of the pipe, to a height of at least two inches over the top, were to be filled with compacted gravel. In tamping the gravel, care was to be taken not to disturb the alignment of the pipe or the joint covers. The trench was to be handfilled the next eighteen inches with earth, which could be compacted with water "where available." However, care was to be taken not to allow water to flow into the pipe. Trap boxes were to be placed at least every thousand feet of line, and at all angle points and grade changes.[15]

Operation as a Drainage Ditch

Two deep drainage wells (150 and 205 feet) were also installed in the Northeast quarter of Section 30 (T2N-R4E). These wells had a combined capacity of 2.3 cfs, which probably emptied into the Crosscut. At that time there was a very strong prejudice among Project farmers against the use of groundwater for irrigation, with the result that much of the drainage water produced was wasted into the river or sold for use off-Project. However, most of the drainage water from the area north of Phoenix was conveyed to the Grand Canal, mixed with river water, and used for irrigation under the Grand.[16]

Within a year it was determined that the operation of the Old Crosscut Drain was not satisfactory. To improve drainage, the Crosscut was deepened to ten feet between the northernmost pumping plant and McDowell Road. In addition, a second tile drain was built in Section 29, one quarter mile north of the first one, and the Crosscut was further deepened. Cost of these projects was $23,000.[17]

By 1923, the "economic success" of the drainage program on the Project was "definitely established." The number of drainage and irrigation pumps on the Project had increased from 9 in 1918 to 87 in 1923, and in the latter year 152,500 acre feet of water were pumped out of Project lands. The area threatened by waterlogging had been reduced from 60,000 acres to 17,700 acres. However, poor drainage still threatened the area around the Old Crosscut Drain.[18]

By 1928, drainage had ceased to be a problem on the Project or in the Salt River Valley generally. The prejudice against groundwater had to a large extent been overcome, and large amounts of groundwater were used for irrigation both

within and outside the Project boundaries. By October 1928, the Project area with groundwater less than 10 feet below the surface had been reduced to 1800 acres. In that year the Project pumped 358,550 acre feet of groundwater. Of that amount 215,540 acre feet were used for irrigation on the Project, and 82,450 acre feet were bought by the Roosevelt Irrigation District just west of the Project. However, Section 29 and the area around the north end of the Old Crosscut continued to have a very high water table, confirming the problems foreseen by the Board of Engineers in 1919.[19]

By the 1940s, the water table in the area was still high and the tile drains were still important for drainage. In 1945, tree roots blocked one of the drains causing a rise in the water table: "water raised in some of the basements in the area." When cleaned out, the flow in the drains increased from 150 to 350 gallons per minute (.33 to .77 cfs). It was noted that the drains usually began running water into the Crosscut in February, but some years they ran all year. One factor which seemed to have a positive effect on the high water was the lining of the Arizona Canal in the mid-forties, which lowered the water table a few feet.[20]

In 1991, the tile drains are still in use and still maintained by SRP.

The Old Crosscut as a Flood Control Ditch

In later years, the primary function of the Crosscut has been as a flood control ditch, auxiliary to the Arizona Canal. From the time of its construction the Arizona Canal was beset by flooding problems because it blocked the natural flow of water from Paradise Valley to the Salt River through washes such as Indian Bend, Cudia and Dreamy Draw. In times of heavy rain, the gates of the Old Crosscut would be opened wide to take as much pressure as possible off the Arizona Canal as the flood waters began to flow over the north bank and into the canal. The excess carried to the Grand Canal could then be released into the Salt River bed through the Joint Head Drain, which is located about .75 miles east of the junction of the Old Crosscut and the Grand.

One such incident occurred on the morning of August 3, 1943, when heavy rains in the north half of the valley sent a flood of water pushing south. At 7:20 a.m. 1000 miners' inches (25 cfs) was reported flowing off the Squaw Peak Area toward the Arizona Canal. In less than an hour, the flow of Indian Bend Wash (which crosses the Arizona Canal near Hayden Road in Scottsdale) increased from 200 inches to 5000 inches. By 9:30 a.m. spillway gates on the Arizona Canal at

Indian Bend Wash were wasting 25,000 inches of water (625 cfs) down the wash, and still the level of the canal was rising uncontrollably. At the same time water was running into the Arizona off the Camelback and Phoenix Mountain slopes. At 7:35, 7000 inches of water was turned out of the Arizona into the Old Crosscut. The New Crosscut was also being used to help drain the Arizona. Before noon the flow through the Old Crosscut peaked at about 18,000 inches (450 cfs).[21]

The flood hazard associated with the Arizona Canal has been lessened by the construction of flood control works such as the Cave Creek Dam, Dreamy Draw Dam and Indian Bend Wash floodway (the Arizona Canal was siphoned under the wash). However the Project has maintained its interest in the Old Crosscut specifically as a protection for the Arizona Canal.

In 1959 the Maricopa County Flood Control District was created and the entire county was included in the district. Very soon the county proposed that the Old Crosscut be included in its system. In 1966, the Flood Control District sought to pass a bond issue for various projects. SRP General Manager R.J. McMullin stated that one of the projects to be included in the work under the bond issue was the piping and covering of the Old Crosscut Canal, in which SRP would participate in the cost and planning. However, the bond issue was soundly defeated.[22]

With the Flood Control District unable to participate in a significant way, in 1967 SRP and the City of Phoenix cooperated in the construction of waste gates in the Grand Canal at the point where the Old Crosscut enters it. This addition increased the usefulness of the Old Crosscut as an emergency flood channel. In 1973 these gates were motorized and added to the SRP irrigation telemetry for remote control operation (see photo AZ-21-5 and drawings AZ-21-32 and AZ-21-33).[23] In 1973 SRP also installed new radial gates from the Arizona Canal into the Old Crosscut which had a capacity of 1000 cfs and were remote controlled (see photo AZ-21-8 and drawings AZ-21-28 through AZ-21-30.[24]

Redesign and Reconstruction

In 1975 SRP, the Flood Control District and the City of Phoenix concluded a joint "Agreement for Reconstruction of the Old Cross Cut Canal to a Flood Control and Drainage Channel." By this agreement SRP conveyed to the District and the City an easement along its 100-foot-wide canal right of way (owned by the United States). The District reimbursed SRP for its expenses for the new Grand Canal waste gates, and took over SRP's interest. The City would furnish engineering, design and specifications for the

building or rebuilding of culverts, bridges and other structures necessary for the conversion of use. The City would use its own forces for the work or let it by contract. The District and the City would split the cost of the work. SRP retained the right to the first 1000 cfs of capacity in the canal, and the City had the right to connect storm drainage facilities up to a capacity of 1000 cfs (see Figure 4 and drawings AZ-21-21 through AZ-21-27).[25] November 14, 1977 the Bureau of Reclamation approved an easement to the City and District on the Old Crosscut right of way.

The Corps of Engineers initially included the Crosscut in its Phoenix Urban Study, but the canal was deleted from plans after a ruling in 1978 that the Corps could only participate in projects associated with natural waterways. By 1983 these criteria had changed and further study was done on the canal. In that year the Crosscut was described as a "deeply incised," largely unimproved channel crossing major streets through culverts of varied shapes and sizes and limited capacity. It received local storm drainage from the east through overland flow and storm sewers, and from the west through storm sewers. Occasional flood flows, the near constant trickle of seepage water, and lack of maintenance had turned the canal into a deep, rugged gorge (see photo AZ-21-9 for an example) which was dammed by children to form swimming holes. One of the most noticeable changes brought about by the conversion to a flood channel was the rechannelling of the canal below Osborn Rd (see photo AZ-21-12).

With other projects completed or under construction, the last urban area north of the Arizona Canal left unprotected was the area from 40th Street to 68th Street. While these were not the destructive flows associated with the major washes, a study by the Flood Control District described how a heavy storm on June 22, 1972 created flood depths of one to three feet ponding against the north bank of the Arizona Canal.[26]

In 1987 a drainage plan for the area was approved which planned to drain the Camelback-Arcadia area north of the Arizona Canal. This plan, known as the Full Lafayette alternative, would collect storm water through street drains from 44th Street and Stanford south and east along Lafayette Boulevard to 48th Street, and from 68th Street along Lafayette west to 48th Street. At that point the collected water would be piped south under 48th Street and siphoned under the Arizona Canal, emptying into the Old Crosscut. To handle a "25-year flow" in this area, the design capacity of the Crosscut was to be increased to 3000 cfs from its head to Thomas Road, increasing to 3800 cfs at that point, to 4100 cfs at McDowell Road, and 4900 cfs at its outlet. In 1989 the Corps of Engineers declined to participate, and the

Full Lafayette storm drainage project was put on hold.[27]

In 1990 the Flood Control District, the City, SRP and the Arizona Department of Transportation signed an agreement for a redesign, expansion and reconstruction of the canal between McDowell Road and the Salt River. The work was to be done by the Department of Transportation as part of its construction of the Papago and Hohokam freeways. This work was to include construction of a 300 cfs diversion facility for SRP, since the redesigned canal no longer emptied into the Grand Canal, but siphoned under it. The Flood Control District and the City of Phoenix were to split the cost of increasing the capacity of the canal to the capacities mentioned above at McDowell Road and the outlet.[28]

In 1991, the Flood Control District, City and SRP entered another agreement to reconstruct the canal north of McDowell Road, to increase its capacities to allow for future upstream flood control and storm drainage connections. Phoenix also desired to improve transportation and recreation facilities in the corridor. The project was supposed to pipe the canal at least from Indian School Road to Thomas Road, while preserving all its drainage functions, including the outfall of the Crosscut tile drains. Phoenix planned to build a "linear" park over the piped canal.[29]

The Old Crosscut Canal, built in 1889, served its original purpose as an irrigation feeder ditch for only a few years. Its uses thereafter were based almost entirely on the fact that it was already in existence and could convey waste, flood and drain water to the Grand Canal. It also presented a traffic barrier which had to be crossed with bridges and culverts, but it was of so little use that it received very little other maintenance or construction. It is perhaps not too surprising that the Corps of Engineers almost got involved in a project on the canal on the basis that it was a natural waterway, for that is essentially what it had become until the 1975 reconstruction agreement. However, in recent years, the canal has been relocated and rechanneled at its lower end, affirming its continued usefulness as a flood control structure. And if a park is built over its upper section, it will very likely be a permanent and well known feature in the area.

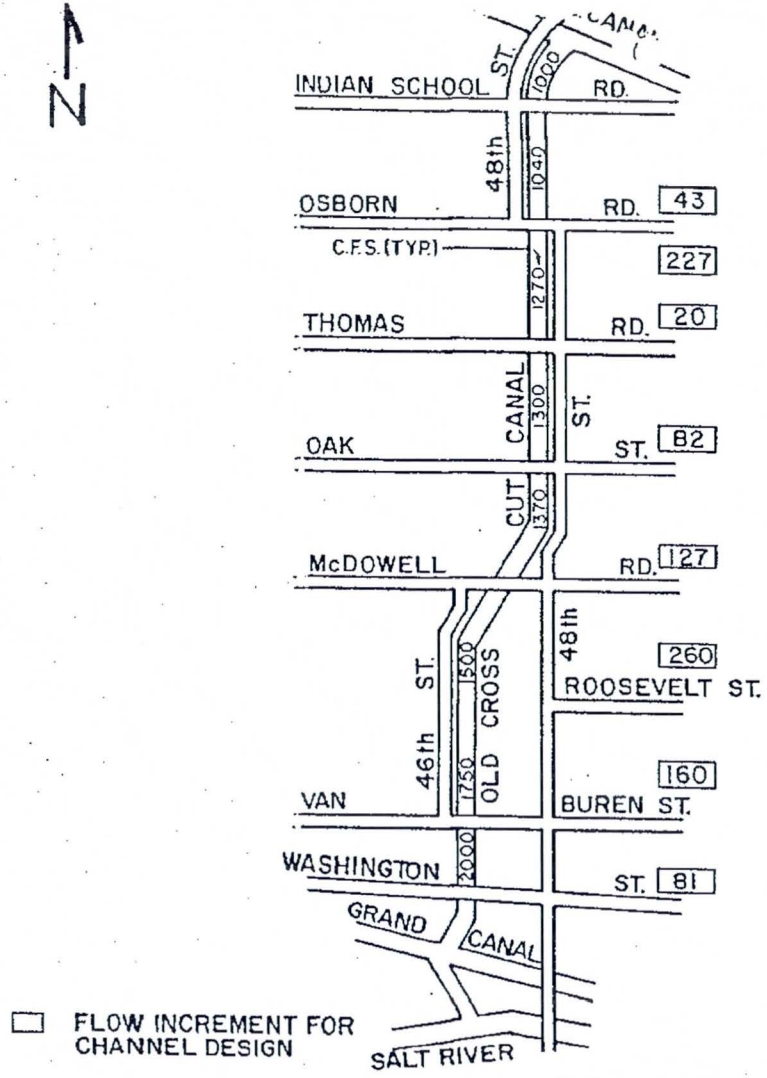

FIGURE 4 (Source: 1975 Inter-government Agreement).

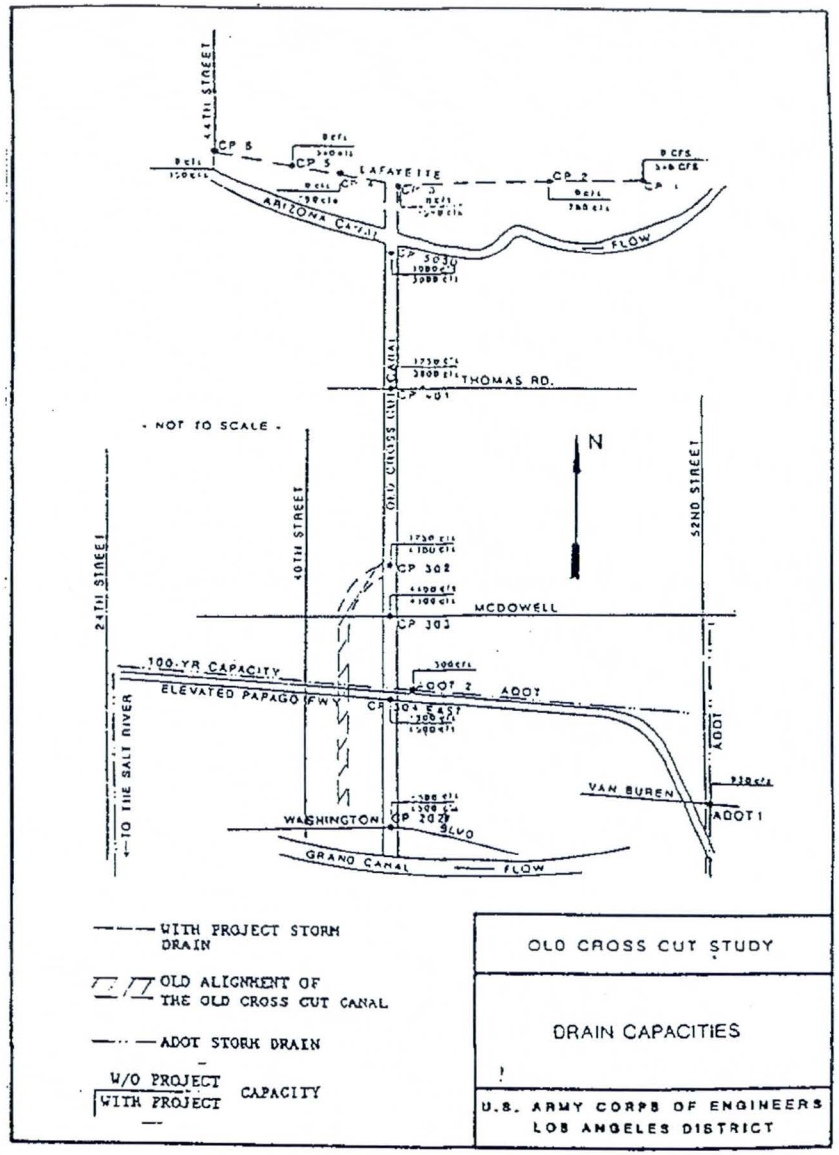

FIGURE 5 (Source: 1989 COE Technical Oocumentation).

NOTES

1. Phoenix Daily Herald, December 18, 1888; "Irrigation in Arizona," Arizona Agricultural Experiment Station, Bulletin No. 8, 1891 (Tucson, University of Arizona), p. 6.

2."The Old Arizona Cross-cut Canal Project: An Archaeological Assessment," by William S. Marmaduke and Vera Morgan, Corps of Engineers, Los Angeles District, August 1986.

3.13th Annual Report of the U.S. Geological Survey (Washington: G.P.O., 1893), Part III, pp. 251-252.

4.Arizona Republican, July 28, 1904.

5.Earl Zarbin, Roosevelt Dam: a History to 1911 (Phoenix: Salt River Project, 1984), p. 92.

6.Arizona Republican, April 23, 1905.

7.Arizona Republican, June 9, 1905.

8."History of Acquisition of Right of Way of Main Canals Salt River Project," SRP Microfilm.

9.Frank L. Campbell to Secretary of the Interior, February 4, 1907 (SRP Archives).

10.Minutes of Meeting between the U.S. Senate Committee and the Water Users' Association of the Salt River Valley, November 16, 1909 (Sherman Library, Corona Del Mar, Kibbey File).

11."Crosscut Hydro Plant," Historic American Engineering Record Report No. AZ-30, by Fred Andersen and Carol Noland, 1990, p. 6; "History of Irrigation Canals to 1916," compiled by Bernice Burgess, 1923 (SRP Archives) p. 40.

12."Drainage Report, Salt River Valley Water Users' Assoc., 1919, by Board of Engineers, W.R. Elliott, D.W. Murphy, W.H. Code (SRP Archives), p. 4.

13.Ibid., p. 12.

14.F.A. Reid to A.P. Davis, January 9, 1922 (SRP Archives).

15."History of the Salt River Project 1920-21" (SRP Archives), pp. 109-111.

16.Ibid., p. 113; "History . . . 1923-24," chapter on drainage (no page no.)

17."History of the Salt River Project 1921-22," pp. 81-82.

18."History of the Salt River Project 1922-23," pp. 134-36.

19."History of the Salt River Project 1927-28," chapter on drainage (no p. no.).

20.Engineering Report, September 1945, March 1944, July 1944 (SRP Archives).

21.A.R. Cartwright to R.A. Simmons, August 4, 1943; C.E. Solveson to Simmons, August 6, 1943 (SRP Archives).

22.Arizona Republic, March 9, 1966; letter from R.J. McMullin, July 27, 1966 (SRP Archives).

23.D.L. Weesner to L.J. Richmond, July 25, 1973 (SRP Archives).

24.J.C Lowry to Board of Directors, December 13, 1972 (SRP Archives).

25."Agreement for Reconstruction of the Old Cross Cut Canal to a Flood Control and Drainage Channel," December 8, 1975 (SRP Archives).

26."Summary Report: Phoenix Urban Study Final Report," U.S. Army Engineer District, Los Angeles, 1981, p. VI-10, and Plan Formulation Appendix, p. VIII-7; "Old Cross Cut Canal Project," Flood Control District of Maricopa County, 1983.

27."Technical Documentation Report: Old Crosscut Canal;" "Feasibility Report, Old Crosscut Canal," both U.S. Army Corps of Engineers, Los Angeles District, April 1989.

28. Intergovernmental Agreement among the State of Arizona, the Flood Control District of Maricopa County, Salt River Project Agricultural Improvement and Power District, the City of Phoenix and the U.S. Department of Interior Bureau of Reclamation, June 13, 1990.

29.Intergovernmental Agreement for the Design and Reconstruction of the Old Cross Cut Canal, North of McDowell Road to the Arizona Canal, February 26, 1991 (filed with Maricopa County Recorder); Arizona Republic, July 2, 1990.