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FINAL
WILLIAMS-CHANDLER WATERSHED
ARIZONA
SUPPLEMENTAL WATERSHED PLAN AGREEMENT NO. 2
AND
SUPPLEMENTAL WATERSHED PLAN NO. 2

JUNE 1978

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SUPPLEMENTAL WATERSHED PLAN AGREEMENT NO. 2

between the

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

BOARD OF SUPERVISORS OF PINAL COUNTY

EAST MARICOPA NATURAL RESOURCE CONSERVATION DISTRICT

(Referred to herein as Sponsors)

State of Arizona

and the

SOIL CONSERVATION SERVICE

United States Department of Agriculture

(Hereinafter referred to as SCS)

Whereas, the Watershed Plan Agreement for the Williams-Chandler Watershed, State of Arizona, executed by the Sponsors named therein and the SCS, became effective on the 11th day of October 1963; and

Whereas, a Supplemental Watershed Plan agreement for the Williams-Chandler Watershed, State of Arizona, executed by the Sponsors named therein and SCS, modifying said Watershed Plan Agreement became effective on the 15th day of June 1967; and

Whereas, in order to carry out the watershed plan for said watershed, it has become necessary to modify said Watershed Plan Agreement, as supplemented; and

Whereas, the State of Arizona, by legislative action of Senate Bill 1053, dated March 24, 1972, changed the names of the Soil Conservation Districts under its jurisdiction to Natural Resource Conservation Districts; and

Whereas, the Congress in establishing the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646) has placed further responsibilities upon the Sponsors and SCS; and

Whereas, it has been found necessary to modify the watershed plan by deleting the irrigation features and changing the capacity and length of the Roosevelt Water Conservation District Floodway; and

Whereas, the application for assistance for the Williams-Chandler Watershed has been amended to delete areas that have been found to be in adjacent watersheds and to add other areas that are now considered to be in the Williams-Chandler Watershed; and

Whereas, a supplemental watershed plan which modifies the watershed plan, dated January 1963, for said watershed has been developed through the cooperative efforts of the Sponsors and SCS; which plan is annexed to and made a part of this agreement:

Now, therefore, the Sponsors and SCS hereby agree upon the following modifications of the terms, conditions, and stipulations of said watershed plan agreement, as supplemented:

1. The name of the East Maricopa Soil Conservation District is changed to East Maricopa Natural Resource Conservation District.
2. Paragraph number 1 is modified to read as follows:
The Sponsors will acquire, with other than P.L. 566 funds, such land rights as will be needed in connection with the works of improvement (estimated cost \$3,669,600).
3. Paragraph number 3 is modified to read as follows:
The total construction cost will be borne by SCS (estimated cost \$14,209,300).
4. Paragraph number 4 is modified to read as follows:
The total engineering cost will be borne by SCS (estimated cost \$1,383,600).

5. Paragraph number 5 is modified to read as follows:
The Sponsors and SCS will each bear the cost of Project Administration which it incurs (estimated cost \$148,600 and \$2,654,000 respectively).

6. Paragraph number 12 is modified to read as follows:
This plan may be amended, revised, or terminated only by mutual agreement of the parties hereto, except that SCS may terminate financial and other assistance in whole, or in part, at any time it determines that the Sponsors have failed to comply with the conditions of this agreement. In this case, SCS shall promptly notify the Sponsors in writing of the determination and the reasons for the termination, together with the effective date. Payments made to the Sponsors or recoveries by SCS under the projects terminated shall be in accord with the legal rights and liabilities of the parties. An amendment to incorporate changes affecting a specific measure may be made by mutual agreement between the SCS and the sponsor(s) having specific responsibilities for the particular structural measure involved.

7. A paragraph number 15 is added as follows:
The Sponsors assure that comparable replacement dwellings will be available for individuals and persons displaced from dwellings, and will provide relocation assistance advisory services and relocation assistance, make the relocation payments to displaced persons, and otherwise comply with the real property acquisition policies contained in the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (Public Law 91-646, 84 Stat. 1894) effective as of January 2, 1971, and the Regulations issued by the Secretary of Agriculture pursuant thereto. The costs of relocation payments will be shared by the Sponsors and the SCS as follows:

	<u>Sponsors</u> (Percent)	<u>SCS</u> (Percent)	<u>Estimated Relocation Payment Costs</u> (Dollars)
Relocation Payments:	23.1	76.9	2,000

8. A paragraph number 16 is added as follows:
The Maricopa County Board of Supervisors recently approved changes to the subdivision regulations that require detention facilities be included in all new subdivision plats to detain a 100-year, two-hour storm. The Board of Supervisors will enforce these regulations in such a manner that the volume of storm water to be stored, for the area between the system of floodwater retarding structures and the Roosevelt Water Conservation District Floodway will equal or exceed one (1) inch over the newly developed area.
9. A paragraph number 17 is added as follows:
The program conducted will be in compliance with all requirements respecting nondiscrimination as contained in the Civil Rights Act of 1964, as amended, and the regulations of the Secretary of Agriculture (7 CFR 15.1-15.12), which provide that no person in the United States shall, on the ground of race, color, or national origin, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any activity receiving federal financial assistance.

The Sponsors and SCS further agree to all other terms, conditions, and stipulations of said Watershed Plan Agreement, as supplemented, not modified herein.

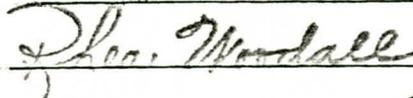
Flood Control District of Maricopa County
3335 W. Durango Street
Phoenix, Arizona 85009



Title CHAIRMAN, BOARD OF DIRECTORS

Date MAR 29 1979

The signing of this agreement was authorized by a motion of the governing body of the Flood Control District of Maricopa County adopted at a meeting held on MAR 26 1979

Clerk 

Date MAR 30 1979

Board of Supervisors of Pinal County
P. O. Box 827
Florence, Arizona 85232

By Jimmie B. Kern
Chairman
Title BOARD OF SUPERVISORS
PINAL COUNTY, ARIZONA
Date 4-9-79

The signing of this agreement was authorized by a motion of the governing
body of the Board of Supervisors of Pinal County adopted at a meeting
held on April 9, 1979

Clerk Jay Peterson Date 4-9-79
East Maricopa

Natural Resource Conservation District
110 North Oregon
Chandler, Arizona 85224

By Jim Miller
Title Chairman
Date 3-13-1979

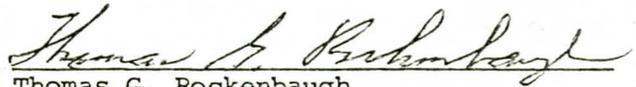
The signing of this agreement was authorized by a motion of the governing
body of the East Maricopa Natural Resource Conservation District adopted
at a meeting held on MARCH 13, 1979

Clerk Mark W. Johnson Date 3/13/79

Appropriate and careful consideration has been given to the environmental statement prepared for this project and to the environmental aspects thereof.

Soil Conservation Service
United States Department of Agriculture

Approved by:



Thomas G. Rockenbaugh
State Conservationist

4-18-73

Date

FINAL

SUPPLEMENTAL WATERSHED PLAN NO. 2

WILLIAMS-CHANDLER WATERSHED

Maricopa and Pinal Counties, Arizona

INTRODUCTION

This plan supplement is developed to (1) reflect a Sponsor's name change from the East Maricopa Soil Conservation District to the East Maricopa Natural Resource Conservation District, (2) implement the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, (3) eliminate the planned irrigation features, and (4) reflect modification of the Roosevelt Water Conservation District (RWCD) Floodway.

The status of the land treatment program was assessed. The land treatment measures planned are essentially installed. No changes in the land treatment program are made in this supplement.

The Williams-Chandler Watershed Plan was approved for operations on October 11, 1963, and supplemented on June 15, 1967.

Of the five structures that were proposed in the work plan, four have been constructed. They are the Rittenhouse and Vineyard Road Floodwater Retarding Structures and two outlet floodways. The RWCD Floodway remains to be constructed.

The RWCD Floodway is to be extended across the Gila River Indian Reservation and outlets into the Gila River. The floodway capacity is to be increased over that shown in the plan, and the design is predicated on: (1) projected land use to the year 2000; (2) future urban developments providing that the volume of storm water be stored for the area between the system of floodwater retarding structures and the floodway to equal or exceed one inch; (3) constructing structures as proposed in the Buckhorn-Mesa Watershed; (4) constructing structures within the Lower Queen Creek Watershed and achieving 100-year level of control; and (5) enlarging the capacity of the floodway to convey floodwaters resulting from a storm occurring on the average of once every 100 years.

Until the proposed floodwater retarding structures in the Lower Queen Creek Watershed are constructed, the planned capacity of the floodway will be limited to controlling floods expected to recur on the average of once in 30 years downstream of the confluence of Queen Creek. The local Sponsors are encouraged to carry out local implementation of land use regulations or building ordinances as they deem appropriate.

WORKS OF IMPROVEMENT TO BE INSTALLED

The RWCD Floodway is an interrelated flood control feature of the Buckhorn-Mesa, Apache Junction-Gilbert, and Williams-Chandler Watersheds. This floodway will convey flood flows for about 27 miles through these watersheds.

This supplement modifies the RWCD Floodway within the Williams-Chandler Watershed. The Apache Junction-Gilbert Watershed is also being supplemented. The Buckhorn-Mesa Watershed has been supplemented.

The modification of the RWCD Floodway in the Williams-Chandler Watershed will include enlarging and deepening of about nine miles of existing floodway and installing about nine miles of floodway where an inadequate or no defined channel now exists. The improvement of the existing floodway extends from Ray Road, the northern boundary of the watershed, to Hunt Highway, which is the northern boundary of the Gila River Indian Reservation. A new floodway will extend from here to the Gila River. The RWCD Floodway alignment is located on the revised project map.

From Ray Road to Hunt Highway, the existing floodway has an average depth of ten feet and a bottom width of about 110 feet. Soils that are found in this reach are stratified deposits of silt, silty or clayey sands, and some gravel. Older alluvial fan deposits are somewhat consolidated and slightly to well cemented.

From the Hunt Highway to the Gila River, the floodway has a new alignment. Soils in this reach can be broken into two generalized reaches. The first reach is from Hunt Highway to Gilbert Road where alluvial fan deposits of variably cemented silty and clayey sands are present. Also, intermittent coarse sand and gravel deposits occur in the fan deposits and become dominant at higher elevations. The second reach is from Gilbert Road to the Gila River. Soils in this reach consist primarily of unconsolidated clay and silt with some sand and silty sand lenses. Interfingering and overlapping lenticular deposits of loose sand and unconsolidated or weakly consolidated clay and silt are present throughout the remainder of the portion that is underlain by the Gila River deposits.

This floodway is to be constructed primarily as a trapezoidal earthen channel and will have a maintenance road on each side of the floodway. The floodway will be seeded to native grass species. Areas seeded to native grass species will not be irrigated. Pertinent data can be seen in Tables 3A (Revised) and 3B. It is designed to convey floodwaters resulting from a storm occurring on the average of once every 100 years. During construction when pockets of soil are encountered that cannot withstand the design velocity, they will be over-excavated and replaced with compacted soils that can withstand the design velocity.

To provide channel stability at least cost, it was determined the floodway will be concrete lined from Ray Road to the vicinity of Williams Field Road. In the vicinity of Citrus Heights Road, a four-foot high concrete drop structure is planned. A reach of concrete lined floodway is proposed to be constructed about a mile upstream of Gilbert Road. At the confluence of the floodway with the Gila River, an outlet structure will be installed.

To allow runoff from urban and agricultural lands to enter the floodway, pipe inlets will be placed intermittently along the length of the channel and through the upslope dike which serves as a maintenance road. A collector ditch will convey floodwaters to these pipe inlets. Lined sections of the upslope channel bank will be constructed to allow overland runoff to flow into the floodway. Entrance conditions of large washes into the floodway will be transitional, and where needed, junction structures will be provided. At points where sediment will enter the floodway, sediment traps will be constructed. These structures are planned to collect the annual bedload material before it gets into the main channel. Floodwaters will flow through these structures and on into the floodway. Sediment from large contributing areas will be either deposited in the floodway or in a contributing drainageway. The floodway will be maintained to its designed capacity.

In the reach between Ray Road and the Gila River, there are an estimated 604 acres required for construction. Of this total, 142 acres are at present being used for the existing floodway, 181 acres are being used for agricultural purposes, 132 acres have desert shrub vegetation, and 149 acres have desert riparian vegetation.

Where possible and feasible, excavated material from the floodway will be used for such purposes as: leveling irrigated fields, extending runways at the Williams Air Force Base, raising road fills, filling abandoned gravel pits, and by subdividers for shaping subdivisions and raising pads for housing. There have been indications made at public meetings and by individuals that a substantial portion of the excavated material will be used in these ways. Arrangements for use of the material on individual properties will be made immediately before construction of any segment of the floodway.

That portion of the excavated material that cannot be put to a useful purpose will be placed in designated disposal areas. Depth of material placed will be 10 feet above ground. The disposal areas will be shaped for moisture retention. These areas then will be seeded to native grass species at the end of each construction season. Areas seeded to native grass species will not be irrigated. Tree and shrub plantings will follow where necessary or desirable and will be irrigated for two growing seasons or less depending on the species' ability to become established.

Spoil disposal areas are to be mutually agreed to by the Service and the Sponsors. When spoil material excavated from the floodway is to be disposed of outside of agreed to areas, the additional cost of overhaul will be borne by the Sponsors.

The local Sponsors will obtain an easement for placement of the spoil in the designated disposal areas. In these cases, development of the land will be at the discretion of the landowner. Where the land is purchased by the Sponsors, the land may be made available for public or private use or may be sold at the option of the local Sponsors. The Soil Conservation Service and the Sponsors will jointly develop a spoil disposal plan for the project as required for each reach of construction.

About 415 acres are needed for disposal areas in the reach from Ray Road to the Gila River. In this reach, the six disposal areas that are needed range in size from 35 to 90 acres. Some 320 acres of the total in this reach are in desert shrub, and 95 acres are in riparian vegetation.

Desert riparian vegetation lost will be mitigated. Mitigation of the loss of wildlife habitat due to construction of the floodway will be accomplished by planting desert riparian vegetation within the right-of-way of the floodway and upslope of the collector ditch. This would consist of planting paloverde and ironwood, and seeding to native grass species on 50 acres of land. Trees and shrubs will be irrigated for two growing seasons or less depending on the species' ability to become established. The remaining mitigation of the loss of wildlife habitat can be satisfied by acquiring and fencing 280 acres of comparable habitat by the Flood Control District of Maricopa County. Offsite mitigation requiring the purchase and fencing of 280 acres of land will be concluded prior to the construction of the floodway upstream of Gilbert Road.

Offsite mitigation requiring the purchase of 280 acres of land will be concluded prior to the construction of the floodway upstream of Gilbert Road.

All road crossings will be landscaped on the upslope side of the floodway in the reach from Ray Road to Hunt Highway. In this reach there is not sufficient area available to landscape the downslope side because the RWCD Irrigation Canal is adjacent to the floodway. In the reach from Hunt Highway to the Gila River, where it is found desirable, road crossings will be landscaped on both sides of the floodway. Approximately 100 feet on each side of the road will be landscaped. The area will be seeded to native grass species and planted to native trees and shrubs. Trees and shrubs will be irrigated for two growing seasons or less depending on the species' ability to become established.

The construction of this 18 mile floodway will require the purchase of or the easement on about 604 acres of land together with the relocation of 6 county road bridges, two county roads, 1 railroad, 2,400 feet of railroad tracks, 1,500 feet of water pipelines, 4,800 feet of telephone lines, 10,300 feet of electric lines, 1,500 feet of gas pipelines, 400 feet of irrigation pipeline, 600 feet of telephone cable, 1 mobile home, 2 tailwater recovery ponds, and 1.7 miles of irrigation lateral. Also, 2 dedicated state highways and 1 railroad will be bridged.

Land subsidence and earth fissures have created no problems relative to the function and operation of the existing floodway and water distribution systems. No problems are foreseen for the proposed floodway; however, earth fissures may occur in the future. Surveying monuments will be installed during construction. These monuments together with existing monuments will be checked periodically by the Soil Conservation Service and the Sponsors to determine changes in elevations. Also, periodic field checks will be made during the effective economic life of the floodway to determine the extent of development of earth fissures in the area.

Soil Conservation Service policy requires that care be exercised during construction to preserve and protect the natural landscape and to minimize soil erosion, water, air, and noise pollution. All construction work will be done in conformance with this policy. Plans may include watering haul roads and earth fills to suppress dust, reducing erosion by mulching of exposed areas, and burying unsalvageable material. State and federal laws and regulations will be observed in minimizing air and noise pollution.

The Soil Conservation Service will work with the Sponsors and qualified archeologists before and during the construction of the floodway to protect cultural resources. The Soil Conservation Service will comply with its procedures as outlined in the Federal Register (Vol. 42, No. 137, July 18, 1977). Compliance includes consulting with the State Historic Preservation Officer, making archeological reconnaissance surveys, developing a mitigation plan and having it reviewed by the Advisory Council on Historic Preservation. Archeological excavation of sites will be necessary. Surface collection and monitoring during construction will be required on other sites.

Public use will be controlled by the Flood Control District of Maricopa County. If future use is of such a magnitude as to damage the structure or create health and safety problems, the District will limit public access.

EXPLANATION OF INSTALLATION COSTS

Land treatment measures are as contained in the watershed plan. They include construction and management-type practices normally planned, installed, and maintained by individuals or groups of landusers to efficiently use and protect the land and water resources. The land treatment cost summary is in Table 1 (Revised).

The estimated monetary costs for installing structural measures are shown on Table 2 (Revised). As built costs were used for the Rittenhouse and Vineyard Road Floodwater Retarding Structures and Floodways. Cost estimates for the RWCD Floodway are based on 1977 unit prices for similar work.

The construction costs are estimated at \$14,209,300, to be borne by P.L. 566 funds. The estimated remaining construction costs of \$13,356,000 for the RWCD Floodway include the cost of landscaping, establishment of vegetation, and modification of existing irrigation facilities made necessary by the RWCD Floodway. The estimated construction cost includes a contingency factor of 15 percent.

The watershed plan, as supplemented, included installation services costs and administration of contracts costs. This supplement modifies the plan, as supplemented, by deleting the cost breakdown for installation services and administration of contracts and establishing a new cost breakdown for engineering services, relocation payments, and project administration.

Engineering services costs estimated at \$1,383,600 are to be borne by P.L. 566 funds. This includes the direct cost of engineers and other technicians for surveys, investigations, design, and preparation of plans and specifications for structural measures, including the vegetative work associated with these measures. It does not include the cost of similar services for land rights or for project administration.

Relocation payments are estimated to be \$2,000 and include costs for the necessity of relocating residents of one mobile home. The cost of relocation payments will be shared by the Sponsors and SCS based on the ratio of P.L. 566 funds to the total project cost excluding relocation payments of this supplement. The percentages to be used are 23.1 percent other funds, and 76.9 percent P.L. 566 funds.

Project administration costs include administrative costs associated with the installation of planned measures, including the cost of contract administration, relocation assistance advisory services, administrative functions connected with relocation payments, review of engineering plans prepared by others, government representatives, and necessary inspection service during installation to insure that project measures are installed in accordance with plans and specifications.

The Sponsors and SCS will each bear the cost of project administration which it incurs, estimated at \$148,600 and \$2,654,000, respectively. These costs are based on experience in administering similar projects. Project administration costs borne by Sponsor funds include review of engineering plans, contract administration, all relocation assistance advisory services, and other administrative costs of the Sponsors associated with the project. The SCS costs for project administration include the cost for necessary inspection services during construction and administrative costs related to the project.

Land rights costs estimated at \$3,669,600 are to be borne by other funds. The separation of estimated land rights costs by structural measures is shown in Table 2 (Revised).

Cultural resources protection costs are estimated at \$40,000 to be borne by other funds. These costs include archeological surveys, recovery, protection and other activities authorized under P.L. 93-291 (as amended). The funding may be requested from funds available to the Heritage Conservation and Recreation Service - Interagency Archeological Services.

EFFECTS OF WORKS OF IMPROVEMENT

The floodway will provide an adequate outlet to the Gila River for one floodwater retarding structure proposed for the Buckhorn-Mesa Watershed and structures installed in the Apache Junction-Gilbert and Williams-Chandler Watersheds, thus assuring the damage reduction planned for these watersheds. The level of protection in the project area is not changed by this Supplement. The floodway will intercept and divert floodwaters and also provide an outlet for flood prevention measures being planned for the Lower Queen Creek Watershed.

If the anticipated control of Queen Creek is not attained the reach of floodway downstream of the junction with Queen Creek will be subject to overtopping. Overtopping can be expected from flood flows recurring on the average of once in 30 years. On the Gila River Indian Reservation the floodway will reduce the area flooded by the 100-year event from 33,200 acres to 10,280 acres.

The areas directly disturbed by construction activities include an estimated 604 acres committed to the construction of the floodway and maintenance roads, and 415 acres to be used as spoil disposal areas. In the reach of floodway between Ray Road and the Gila River there is an estimated 142 acres at present being used for the existing floodway, 181 acres are being used for agricultural purposes, 132 acres have desert vegetation, and 149 acres have riparian vegetation.

The excavated material coming from the construction of this floodway will be placed in six disposal areas ranging in size from 35 acres to 90 acres and totaling about 415 acres. Some 320 acres of the total is in desert shrub and 95 acres are in riparian vegetation.

The disturbed areas will be seeded to native grass species. Tree and shrub plantings will follow where necessary or desirable. Approximately 50 acres within the floodway right-of-way will be planted to desert riparian vegetation including paloverde and ironwood. These plantings mitigate wildlife habitat losses from floodway and spoil disposal areas disturbed during construction.

Wildlife populations that depend on habitat destroyed during construction will be lost. These populations are expected to be reestablished when planted vegetation becomes sufficiently mature to satisfy food, cover, and nesting requirements.

The mitigating measure to offset the wildlife losses resulting from the diversion of flows from lands on the Gila River Indian Reservation is to purchase lands with comparable habitat values. A site with comparable existing vegetation suitable to support the kind of habitat adversely affected by the new alignment of the RWCD Floodway was selected. The purchase of 280 acres of land will compensate for wildlife habitat losses due to the diversion of flows under existing conditions.

Fourteen archeological sites have been identified, and items of significance will be salvaged before and during construction. If additional sites are unearthed during construction, work will be suspended; and the Interagency Archeological Services and the State Historic Preservation Officer will be notified. There are no Federal Register properties that will be affected by this project.

The floodway and associated maintenance roads will have a visual impact on the rapidly developing area. The reaches most affected will be where the channel has a wide bottom width and is parallel to roads, at road crossings, and where it is in proximity to urban areas.

The landscape plan is designed to minimize the visual impact of the floodway. A visual resource analysis has been performed that identifies the landscape quality and also gives guidelines for landscape designs. Specifically, it has been determined that the areas with the greatest visual impact will receive the maximum landscape treatment. Landscaping will include seeding native grass species and planting native trees and shrubs along the upslope side of the floodway on both sides of the roads. As the trees grow they will block the view of the floodway from most viewers.

Disposal areas will also have a visual impact. To lessen this impact, these areas will be planted to native vegetation. However, the Sponsors could dispose of the spoil elsewhere, thus the visual impact of these disposal areas could diminish in time.

Air pollution in the form of dust will occur during the construction period. Noise levels and traffic disruption around construction sites will increase.

There will be no closures of dedicated or accepted roads and bridges resulting from the project. Six county road bridges, 2 county roads and 1 railroad will be relocated. Two state highways and 1 railroad will be bridged. Travel time to any point in the project area will not be significantly influenced.

Utility services will be interrupted for short periods of time during construction. About 1,500 feet of water pipelines, 4,800 feet of telephone lines, 10,300 feet of electric lines, 1,500 feet of gas pipelines, and 600 feet of telephone cable will be relocated. Interruptions will be held to a minimum. There is one relocation of a family in this watershed.

Irrigation facilities will be relocated. These include 400 feet of irrigation pipeline, two tailwater ponds, and 1.7 miles of irrigation lateral. These relocations will be made so that interference with irrigation schedules will be minimal.

The construction of the Roosevelt Water Conservation District Floodway can minimize the chance of floodwaters breaching the RWCD Irrigation Canal. The interruption of irrigation waters can stop normal surface irrigation flows to cropland within the watershed. Delays of irrigation can directly reduce crop yields.

Erosion and flood plain scour will be reduced in the areas protected from flooding. These problems will be materially reduced. In areas protected, it will not be necessary to fill and relevel yards and fields after flooding. Topsoil will be protected, and the fields will be more productive.

Flood control will aid in stabilizing the agricultural industry in the immediate area. It will also reduce the frequency and amount of flooding on agricultural lands. Impacts of agriculture on water quality are the additions of nutrients from fertilizers and animal wastes and from pesticides applied to crops and livestock. With this project, these impacts will be reduced.

PROJECT BENEFITS

Table 5 (Revised) reflects the values of agricultural products converted to current normalized prices while agricultural and non-agricultural property values are current prices.

The residential and commercial damageable values found in the plan are adjusted to reflect increases in future damageable values throughout the evaluation period. Adjustments are based on expected increases in the per capita personal income and personal income expenditures that are estimated by the Bureau of Economic Analysis, Department of Commerce, and the Economic Research Service, U. S. Department of Agriculture. These are for the Gila-Salt Water Resource Planning Subarea.

COMPARISON OF BENEFITS AND COSTS

The structural measures described in this supplement are economically feasible. The total average annual benefits to accrue from the installation of the proposed structural measures are estimated to be \$951,180. The average annual cost of installing the structural works is estimated to be \$718,740 and cost of operation, maintenance and replacement is estimated to be \$61,620 annually. The total average annual cost is estimated to be \$780,360. The ratio of average annual benefits to average annual cost is 1.2 to 1.0. Secondary benefits were not evaluated.

PROJECT INSTALLATION

Responsibilities for installation of project measures are as listed in the watershed work plan unless otherwise noted below.

Structural Measures

The Flood Control District of Maricopa County will assume the responsibility for the operation and maintenance of the RWCD Floodway and spoil disposal areas.

The installation schedule proposed for the RWCD Floodway is as follows:

- First Year - Gila River to Gilbert Road
- Second Year - Gilbert Road to Hunt Highway
- Third Year - Hunt Highway to Rittenhouse Road
- Fourth Year - Rittenhouse Road to Ray Road

The Sponsors, as part of project administration, will (1) provide personally or by first class mail written notice of displacement and appropriate application forms to each displaced person, (2) assist in filing applications, (3) review and take action on applications for relocation assistance, (4) review and process grievances in connection with displacements, and (5) make relocation payments. These functions will be performed by the Flood Control District of Maricopa County.

Prior to entering into agreements that obligate funds of the Soil Conservation Service, the Flood Control District of Maricopa County will develop a code of conduct governing the performance of its officers, employees, or agents in contracting with or expending P.L. 566 funds; and a financial management system for control, accountability, and disclosure of P.L. 566 funds received and for control and accountability for property and other assets purchased with P.L. 566 funds.

Program income earned during the grant period will be reported on the Sponsor's request for advance or reimbursement from the Soil Conservation Service.

OPERATION AND MAINTENANCE

The Flood Control District of Maricopa County will be responsible for operation and maintenance of the RWCD Floodway. The District will obtain all necessary funds for operation, maintenance, and replacement from taxes or assessments levied by the Sponsors.

Operation and maintenance costs are estimated to average \$61,620 annually and includes \$58,920 for the RWCD Floodway. They include the cost or the fair market value of materials, equipment, services, and facilities needed to operate the project and to make repairs and replacements necessary to maintain structural measures in sound operating condition during the evaluated life of the project.

An operation and maintenance agreement will be entered into between the Sponsors and the Soil Conservation Service prior to the signing of a project agreement. An operation and maintenance plan will be prepared for the floodway. All phases of operation and maintenance of the floodway will comply with applicable local, state, and federal regulations. Guidelines regarding operation and maintenance procedures are given in the Arizona Watershed Operation and Maintenance Handbook. Sponsors of the project have copies of the handbook on file.

The Sponsors' responsibility for operation and maintenance begins when a part of or all of the work of installing the floodway, related appurtenances, and vegetative work are completed and accepted or are determined complete by the Soil Conservation Service. The responsibility shall continue until the expiration of the evaluated life of all the installed project measures. This does not relieve the Sponsors' liability which continues throughout the life of the measure or until the measure is modified to remove potential loss of life or property.

It is planned that the landscaped areas adjacent to road crossings and trees and shrubs will be irrigated for two growing seasons or less depending on the species' ability to become established. Areas seeded to native grass species will not be irrigated.

The responsible Sponsors' representative will inspect the floodway at least annually and after each storm or after the occurrence of any unusual condition that might adversely affect the floodway. The Soil Conservation Service will make inspections to determine whether or not project measures are operating properly, and that all operation and maintenance is performed in a timely manner and in compliance with the operation and maintenance agreement. A written report will be made of each inspection. A copy of each report will be provided by the inspecting party to the other party within ten days of the date on which the inspection was made. The report will describe the conditions found and list any corrective action needed with a time frame to complete each action.

Representatives of the federal, state, and county governments will have access at all times to the floodway for official activities.

Surveying monuments installed during construction together with existing monuments will be checked periodically by the Soil Conservation Service and the Sponsors to determine changes in elevations in the vicinity of the floodway.

From experience, the Sponsors have determined that vandalism occurs frequently and is prevalent on most existing flood control structures. Plant life, fences, irrigation systems, and concrete and rock structures are often severely damaged. This may occur throughout the life of the structure and is, therefore, a very costly and time consuming problem for the Sponsors. The design and construction of the floodway will take into consideration features to minimize vandalism.

The Soil Conservation Service will work with the Sponsors to ensure that the design of the floodway considers the most efficient and economical maintenance practices.

If the Sponsor, the Secretary of the Interior and the Arizona Game and Fish Department find that it would be in the public interest for the offsite mitigation area to be managed for fish and wildlife purposes, the Arizona Game and Fish Department will be asked to assume operation and maintenance responsibilities. Under the authority of the Fish and Wildlife Coordination Act (48 Stat. 401, as amended; 16 U.S.C. 661 et. seq.), the Secretary of the Interior, the Soil Conservation Service, the Arizona Game and Fish Department, and the Flood Control District of Maricopa County will develop and agree on a general agreement for use of the area for wildlife conservation and management. Operation will include periodic checks to assure that the area is not being grazed by domestic livestock and that woodcutting is controlled.

TABLE 1 - ESTIMATED INSTALLATION COST (Revised)
Williams-Chandler Watershed, Arizona

Installation Cost Item	Unit	Number Non- Federal Land	Estimated Cost (Dollars) 1/				
			P.L.566 Funds		Other Funds		
			SCS 2/	NPS 2/	SCS 2/	Total	TOTAL
<u>LAND TREATMENT</u>							
Cropland	3/	3/			1,461,880	1,461,880	1,461,880
Technical Assistance			23,610		95,680	95,680	119,290
TOTAL LAND TREATMENT			23,610		1,557,560	1,557,560	1,581,170
<u>STRUCTURAL MEASURES</u>							
Floodwater Retarding Structures	No.	2	885,200		64,800	64,800	950,000
Channel Work (M) 4/	Mi.	9.5	9,338,600		1,600,200	1,600,200	10,938,800
(O) 4/	Mi.	9.7	5,370,600	40,000	2,067,500	2,107,500	7,478,100
SUBTOTAL Structural Costs			15,594,400	40,000	3,732,500	3,772,500	19,366,900
<u>PROJECT ADMINISTRATION</u>							
Construction Inspection			1,983,900				1,983,900
Other			670,100		148,500	148,500	818,600
Relocation Assistance Advisory Services					100	100	100
SUBTOTAL Administration for Structural Measures			2,654,000		148,600	148,600	2,802,600
TOTAL STRUCTURAL MEASURES			18,248,400	40,000	3,881,100	3,921,100	22,169,500
TOTAL PROJECT			18,272,010	40,000	5,438,660	5,478,660	23,750,670

1/ Price base land treatment at 1962 prices, as built costs for the Rittenhouse and Vineyard Road structural measures and 1977 prices for the RWCD Floodway.

2/ Federal agency responsible for assisting installation of works of improvement: NPS - National Park Service; SCS - Soil Conservation Service.

3/ Land treatment individual practices, units or costs are to be found in the 1963 Watershed Plan. The land treatment program is not modified by this supplement and has been essentially installed.

4/ Type of channel before project: (M) - manmade ditch or previously modified channel; (O) - none or practically no defined channel.

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TABLE 2 - ESTIMATED COST DISTRIBUTION (Revised)

Williams-Chandler Watershed, Arizona

(Dollars) ^{1/}

Item	Installation Cost - P.L. 566 Funds				Installation Cost - Other Funds				Total Installation Cost	
	Construction	Engineering	Relocation Payments	Total P.L.566	Land Rights	Water Rights	Cultural Resources Protection	Relocation Payments		Total Other
STRUCTURAL MEASURES										
Floodwater Retarding Structures										
Rittenhouse	372,300	20,900		393,200	500 ^{2/}	20,700 ^{3/}			21,200	414,400
Vineyard Road	465,800	26,200		492,000	1,900 ^{4/}	41,700 ^{5/}			43,600	535,600
Channel Work (Floodways)										
Rittenhouse (0) ^{6/}	10,500	600		11,100						11,100
Vineyard Road (0) ^{6/}	4,700	300		5,000						5,000
RWCD 494+40-996+00(M) ^{6/}	8,488,300	848,800	1,500	9,338,600	1,599,700 ^{8/}			500	1,600,200	10,938,800
996+00-1464+00(0) ^{6/}	4,867,700	486,800		5,354,500	2,067,500 ^{9/}		40,000 ^{10/}		2,107,500	7,462,000
SUBTOTAL - Structural	14,209,300	1,383,600	1,500	15,594,400	3,669,600	62,400	40,000	500	3,772,500	19,366,900
PROJECT ADMINISTRATION	xxx	xxx	xxx	2,654,000	xxx	xxx	xxx	xxx	148,600	2,802,600
GRAND TOTAL	14,209,300	1,383,600	1,500	18,248,400	3,669,600	62,400	40,000	500	3,921,100	22,169,500

- ^{1/} Price base as built costs for the Rittenhouse and Vineyard Road Structural Measures and 1977 prices for the RWCD Floodway.
- ^{2/} Rights-of-way provided by the Arizona State Land Department and includes \$500 for relocation of fences.
- ^{3/} Includes \$20,700 for pipe installed through the floodwater retarding structure to furnish stockwater.
- ^{4/} Rights-of-way provided by the Arizona State Land Department and includes \$1,000 for relocation of fences and \$900 for relocation of telephone lines.
- ^{5/} Includes \$41,700 for pipe installed through the floodwater retarding structure to furnish stockwater.
- ^{6/} Type of channel before project (M) manmade ditch or previously modified channel; (0) none - or practically no defined channel.
- ^{7/} Rights-of-way provided by the Arizona State Land Department.
- ^{8/} Includes \$822,400 for rights-of-way, \$510,000 for six dedicated county roads, \$57,700 for relocation of two powerlines, \$23,100 for relocation of one telephone line, \$173,000 for all ballast, rails, ties, telegraph lines, powerlines, signal systems, temporary rerouting of traffic, providing flagmen, or other features not directly associated with the structural stability of bridges or approaches for a main line railroad track, and \$13,500 for survey, legal fees, and other costs.
- ^{9/} Includes \$819,800 for rights-of-way of channel, spoil disposal and lateral 9-49, \$70,000 for rights-of-way of countervailing measures to offset the wildlife losses resulting from the diversion of flows, \$340,000 for two dedicated county roads, \$712,800 for State Highways 87 and 93, \$10,900 for relocation of one telephone line, \$98,000 for all ballast, rails, ties, telegraph lines, powerlines, signal systems, temporary rerouting of traffic, providing flagmen, or other features not directly associated with the structural stability of bridges or approaches for a branch line railroad tract, and \$16,000 for survey, legal fees, and other costs.
- ^{10/} Includes \$40,000 for archeological surveys, recovery, protection, and other activities authorized under P.L. 93-291 (as amended) to be performed by the National Park Service.
- ^{11/} Includes \$6,400 for State of Arizona dam filing fees.

TABLE 3A - STRUCTURAL DATA (Revised)

CHANNEL WORK

Williams-Chandler Watershed, Arizona

Channel Reach Name and Sta.	Drainage Area sq.mi.	100 Yr. Frequency Design Discharge cfs	Water Surface Elevation Feet msl	Hydraulic Gradient ft./ft.	Channel Dimensions			Side Slopes	"n" Value		Velocities		Excavation Volume cu.yds.	3/ Type of Work	4/ Existing Channel Type	5/ Present Flow Condition
					Bottom Gradient ft./ft.	Width ft.	Elevation ft.msl		Aged	As Built	1/ ft/sec	2/ ft/sec				
RWCD Floodway																
494+40	100.1		1325.5	-	-	1316.4	Conc. Transition	2:1	.014	.014	5.5	3.9	4,800	IIL	M	E
495+90	100.1	6500	1324.1	0.0011	0.0009	1315.3	50	2:1	.014	.014	11.0	7.0	172,500	IIL	M	E
548+55	100.1	6500	1318.5	-	-	1310.6	Rock Transition	2-3:1	.037	.037	12.5	6.3	20,800	IIL	M	E
552+05	100.1	6500	1319.2	0.00028	0.000154	1310.6	200	3:1	.027	.024	3.3	1.9	435,200	II	M	E
595+00	122.1	6900	1318.0	0.00040	0.000154	1309.9	200	3:1	.027	.024	3.8	2.1	310,700	II	M	E
635+00	131.8	6900	1316.4	-	-	1309.3	Earth Transition	3:1	.027	.024	4.3	2.6	7,400	II	M	E
636+13	131.8	6900	1316.2	0.00088	0.00097	1309.1	150	3:1	.027	.024	5.7	3.4	843,500	II	M	E
765+00	131.8	6900	1304.8	-	-	1296.6	Earth Transition	3:1	.027	.024	4.9	2.9	25,300	II	M	E
767+25	131.8	6900	1304.9	0.00022	0.00021	1296.6	250	3:1	.027	.024	3.0	1.8	973,000	II	M	E
853+80	131.8	6900	1303.0	-	-	1294.8	Rock Transition	3:1	.037	.037	3.6	2.3	9,800	II	M	E
857+00	238.1	8100	1300.2	-	-	1294.7	Conc. Drop Structure		.014	.014	13.4	8.4	30,100	II	M	E
857+55	238.1	8100	1298.9	-	-	1290.7	Rock Transition	3:1	.037	.037	9.0	4.6	31,500	II	M	E
860+75	238.1	8100	1298.8	0.0003	0.0003	1290.6	250	3:1	.027	.024	3.6	2.2	1,331,300	II	M	E
996+00	251.9	8700	1294.9	0.0003	0.0003	1286.6	250	3:1	.027	.024	3.8	2.2	943,900	I	O	E
1124+97	256.9	8700	1291.2	-	-	1282.7	Rock Transition	3:1	.037	.037	4.4	2.9	400	I	O	E
1125+27	256.9	8700	1290.8	-	-	1282.7	Conc. Transition	3-0:1	.014	.014	9.2	5.6	800	I	O	E
1125+85	256.9	8700	1288.0	0.0357	0.0458	1282.7	65	0:1	.014	.014	12.9	8.0	2,100	I	O	E
1127+39	256.9	8700	1282.5	0.0105	0.0098	1275.6	65	0:1	.014	.014	27.3	10.2	41,200	I	O	E
1157+80	256.9	8700	1250.7	-	-	1245.8	SAF Basin	0:1	.014	.014	27.3	10.2	2,600	I	O	E
1159+72	256.9	8700	1248.6	-	-	1243.9	Conc. Transition	0-3:1	.014	.014	12.3	7.8	800	I	O	E
1160+29	257.4	8700	1245.4	0.00155	0.00155	1239.5	200	3:1	.027	.024	6.8	3.9	1,400,600	I	O	E
1458+23	257.9	8700	1199.3	-	-	1193.3	Rock Transition	3:1	.037	.037	6.7	4.2	3,700	I	O	E
1459+00	257.9	8700	1197.6	0.0000	0.0000	1193.2	166	3-0:1	.014	.014	11.9	7.3	600	I	O	E
1459+12	257.9	8700	1197.6	-	-	1193.2	Conc. Drop Structure		.014	.014	11.9	7.5	1,800	I	O	E
1459+49	257.9	8700	1194.0	0.0000	0.00155	1186.5	Outlet Channel to Gila River		-	-	-	-	21,400	I	O	E
1464+00	257.9		1194.0			1186.0										

- 1/ Velocity associated with design discharge.
 2/ Velocity associated with 10-year frequency discharge in unlined channel.
 3/ I - Establishment of new channel including necessary stabilization measures.
 II - Enlargement of realignment of existing channel.
 L - Concrete lined.
 4/ M - Man-made ditch or previously modified channel.
 O - None or practically no defined channel.
 5/ E - Ephemeral - flows only during periods of surface runoff, otherwise dry.

TABLE 3B - STRUCTURAL DATA

GRADE STABILIZATION STRUCTURES

Williams-Chandler Watershed, Arizona

Station	Drainage Area (Sq. Mi.)	Design Capacity Principal Spillway (CFS)	Associated Frequency and Duration of Storm (% chance & hrs.)	Drop (Ft.)	Volume of Concrete (Cu.Yds.)	Type of Structure
848+00	238.1	8,100	1% and 24 hours	5.5	315	Drop Structure

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TABLE 4 - ANNUAL COST (Revised)
 Williams-Chandler Watershed, Arizona
 (Dollars) 1/

Evaluation Unit	Amortization of Installation Cost <u>2/</u>	Operation Maintenance and Replacement Cost	Total
Floodwater Retarding Structures and Channel Work	628,160	61,620	689,780
Project Administration	90,580	xxx	90,580
GRAND TOTAL	718,740	61,620	780,360

1/ Price base as built costs for the Rittenhouse and Vineyard Road structural measures and 1977 prices for the RWCD Floodway.

2/ Amortized at 2-7/8 percent interest for 100 years.

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TABLE 5 - ESTIMATED AVERAGE ANNUAL FLOOD DAMAGE REDUCTION BENEFITS
(Revised)

Williams-Chandler Watershed, Arizona

(Dollars) 1/

Item	Estimated Average Annual Damage		Damage Reduction Benefits
	Without Project	With Project	
Floodwater			
Crop and Pasture	409,020	78,430	330,590
Other Agricultural	148,400	35,730	112,670
Nonagricultural (Residential, retail-commercial, roads, etc.)	610,080	176,890	433,190
Subtotal	1,167,500	291,050	876,450
Sediment			
Crop and Pasture	74,270	17,870	56,400
Other Agricultural	66,770	16,080	50,690
Nonagricultural	75,310	21,830	53,480
Subtotal	216,350	55,780	160,570
Erosion			
Flood Plain Scour	7,420	1,780	5,640
Subtotal	7,420	1,780	5,640
Indirect	144,400	48,690	95,710
Total in this watershed	1,535,670	397,300	1,138,370
Benefits accruing to measures in Apache Junction-Gilbert Watershed <u>2/</u>			
	xxx	xxx	169,850
Damage Reduction Benefits from measures in this watershed			
	xxx	xxx	968,520

1/ Current normalized prices for agricultural products and current prices for agricultural and nonagricultural properties.

2/ Benefits from damage reductions in this watershed but accruing to measures in the Apache Junction-Gilbert Watershed.

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TABLE 6 - COMPARISON OF BENEFITS AND COSTS (Revised)

Williams-Chandler Watershed, Arizona

(Dollars)

Evaluation Unit	Average Annual		Benefit Cost Ratio
	Damage Reduction Benefits <u>1/</u>	Cost <u>2/</u>	
Floodwater Retarding Structures and Channel Work	951,180	689,780	1.4:1.0
Project Administration	xxx	90,580	xxx
GRAND TOTAL	951,180	780,360	1.2:1.0

1/ In addition, land treatment measures will provide an estimated flood damage reduction benefit of \$17,340 annually.

2/ From Table 4.

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R.10E.

T.1N.

R.9E.

Tonto National Forest

R.8E.

T.1S.

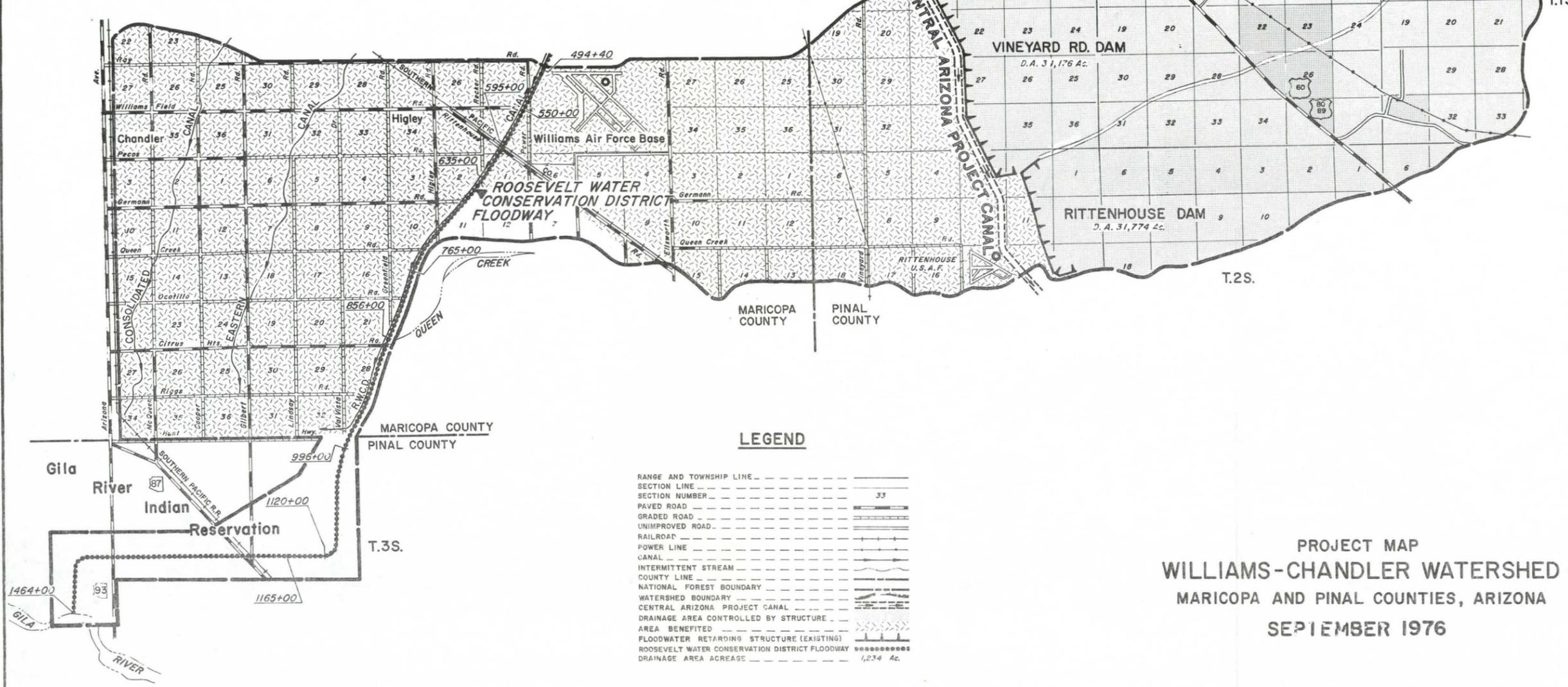
WILLIAMS-CHANDLER WATERSHED ARIZONA

LOCATION MAP

R.5E.

R.6E.

R.7E.



LEGEND

- RANGE AND TOWNSHIP LINE
- SECTION LINE
- SECTION NUMBER
- PAVED ROAD
- GRADED ROAD
- UNIMPROVED ROAD
- RAILROAD
- POWER LINE
- CANAL
- INTERMITTENT STREAM
- COUNTY LINE
- NATIONAL FOREST BOUNDARY
- WATERSHED BOUNDARY
- CENTRAL ARIZONA PROJECT CANAL
- DRAINAGE AREA CONTROLLED BY STRUCTURE
- AREA BENEFITED
- FLOODWATER RETARDING STRUCTURE (EXISTING)
- ROOSEVELT WATER CONSERVATION DISTRICT FLOODWAY
- DRAINAGE AREA ACREAGE 1,234 Ac.

PROJECT MAP
 WILLIAMS-CHANDLER WATERSHED
 MARICOPA AND PINAL COUNTIES, ARIZONA
 SEPTEMBER 1976

