

Non-official

Submitted

Property of
Flood Control District of MC Library

Please Return to
2801 W. ...
Phoenix, AZ 85009

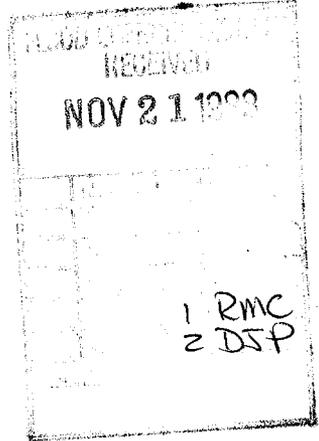
11/22/88

PRELIMINARY MASTER DRAINAGE REPORT
FOR
SUN VALLEY
MARICOPA COUNTY, ARIZONA

A211.305



Collar, Williams & White Engineering



PRELIMINARY MASTER DRAINAGE REPORT
FOR
SUN VALLEY
MARICOPA COUNTY, ARIZONA

PRELIMINARY MASTER DRAINAGE REPORT
FOR
SUN VALLEY
MARICOPA COUNTY, ARIZONA

Prepared for
THE ADAMS GROUP
4520 N. CENTRAL AVE, SUITE 500
PHOENIX, AZ 85012

by
COLLAR, WILLIAMS & WHITE ENG., INC.
2702 N. 44th STREET, SUITE 205-B
PHOENIX, AZ 85008

MAY 30, 1986

INTRODUCTION

This preliminary drainage report is for the 28,000 acres proposed for the master planned community of Sun Valley, Arizona. Collar, Williams & White was contracted by the Adams Group to do preliminary engineering design for the proposed development, including this drainage study.

This report is preliminary in nature and will be followed up by more detailed study as required pending the review and recommendations of county staff and finalization of proposed development plans. This master plan for the 28,000 acres does not address drainage requirements related to the proposed parkway access road being designed beyond the limits of the property, nor is it intended to provide site specific design data.

C O N T E N T S

- I. Introduction
- II. Description of Area and Major Drainage Features
- III. Proposed Drainage System and Flood Protection Measures
- IV. Analysis Procedures
- V. Summary and Recommendations

APPENDIX

Exhibit 1 - Hydrologic Vicinity Map

Exhibit 2 - Master Drainage Plan

DESCRIPTION OF AREA AND MAJOR DRAINAGE FEATURES

The 28,000 acre area is located in Townships 3 through 5 North and Range 4 West, of Maricopa County. The site lays North and West of the White Tank Mountains between the mountains and the Hassayampa River. (See Exhibit 1 the Hydrologic Vicinity Map.) The proposed extension of Bell Road from the East and Palo Verde Road from the South bisects the property with their intersection located in the central core of the proposed development.

Wagner Wash is the main internal hydrologic feature in the project area. It is the largest continuous wash on the property, aside from the Hassayampa River. Wagner Wash runs diagonally through the site from Northeast to the Southwest and empties directly into the Hassayampa River a mile and a half from the West edge of the property. The very large Hassayampa River borders or flows through the West edge of the property. The property actually borders the rivers natural floodplain and includes portions of the River channel itself for a total of approximately seven miles of the river.

A little more than half of the property is located on the lower alluvial fan slopes of the rugged White Tank Mountains. The property on these slopes is dissected by numerous parallel running washes in a variety of sizes which drain West and Northwest directly into either the Hassayampa River or Wagner Wash. Wagner Wash separates two of the three major hydrologic regions that comprise the area. South and East of Wagner Wash are the dissected alluvial fan slopes draining the White Tank Mountains. The second hydrologic region is the area North of Wagner Wash which drains due South on a relatively gentle, flat remnant surface (probably an old Hassayampa River fan slope). The third hydrologic region is the steep highly dissected river breaks along the Hassayampa River which drain West directly into the river including the river channel itself. See the Hydrologic Vicinity Map which shows the location of these three regions and the major watershed divides and washes.

The major man-made improvement in the area affecting drainage is the Central Arizona Project Canal. The canal cuts through the property and across the Northern end of Wagner Wash after it crosses the Hassayampa River and continues East from the Hassayampa Pumping Plant. The C.A.P. has two overchutes which pass flows from the upper Wagner Wash tributaries across the canal to the main wash.

The two overchutes pick up flows from approximately seven separate washes draining the gentle remnant slope hydrologic region above the C.A.P.. The concentrated flows from the eastern overchute discharge directly into the main Wagner Wash channel. The other overchute further west discharges into one of the existing tributaries to Wagner Wash. The canal has enhanced the developability of the downstream lands below the C.A.P. as long as a channel easement is provided below the western overchute so that concentrated flows are safely conveyed to Wagner Wash.

A small portion of the property at the very Eastern edge of property immediately North and South of the C.A.P. drains East into the Trilby Wash watershed. This area is the only portion of the property which does not drain West into the Hassayampa River.

PROPOSED DRAINAGE SYSTEM AND FLOOD PROTECTION MEASURES

The proposed drainage systems discussed below have been grouped by the previously described hydrologic regions (shown on Exhibit 1 the Hydrologic Vicinity Map). Wagner Wash's natural floodplain has been delineated on the master drainage plan along with several other major washes. These washes are proposed to be left in their natural condition as open space and as greenbelt areas.

These natural channels will continue then to function as the major drainage collector channels for conveying offsite flows through the property as well as providing outlets for local onsite drainage.

Hassayampa River Breaks Area

The river break area in and along the Hassayampa River has been separated into the natural river floodplain and the breaks or side slopes above the active floodplain. The natural geomorphic floodplain has been delineated and at this stage of planning is proposed to be left as open space with development taking place only on the side slopes well above the floodplain. As site specific plans are developed in this area it is recommended that development not encroach within this floodplain area, however, if necessary or desirable to do so, at that time the actual 100 year floodplain limits would need to be established and standard FEMA, FIA and County development restrictions adhered to.

To the best of our knowledge the 100 year floodplain of the Hassayampa River in this area has not been previously mapped by FEMA or the Flood Control District of Maricopa County.

Gentle Remnant Fan Slope Area

In the gentle remnant fan area North of Wagner Wash a normal rectangular street and drainage system is possible. A system of North-South running collector channels North of the C.A.P. can be discharged behind the C.A.P. and over the two overchutes into Wagner Wash. For the area below the C.A.P. a designated North-South drainage easement below the Western overchute to Wagner Wash is needed. The remainder of the area will only have onsite surface sheet flow which can be collected in a normal rectangular street system outletting directly into Wagner Wash.

The most dense concentration of development is proposed in this area North of Wagner Wash and below the C.A.P.. Since this area does not have offsite upstream flows to accomodate and onsite generated flows have a positive and gentle outlet directly to Wagner Wash, it is an ideal location for the proposed high density development. This area is the most well protected area in the 28,000 acres and any offsite impacts would be minimal because of the close proximity of Wagner Wash.

The White Tank Alluvial Fan Slope Area

This area contains the largest number of active channels and except for the steep river break slopes has the highest density of channels and washes. Active washes, braided split flow channels and relatively heavy sediment loads dominate these steep fan slopes draining the Western slopes of the White Tank Mountains.

Almost all of the property within this area has a positive outfall directly to the Hassayampa River or Wagner Wash. This has allowed the channels which radiate out from the mountain to run relatively straight and for the most part to become incised with well defined stable ridges in between. There are several areas where channel braiding or splitting of flow does occur and channels are relatively unstable and unpredictable. In these areas flows will probably have to be collected and channelized with upstream diversion structures and properly designed and protected flood channels. Special design consideration during final design will also have to be given to several of the major washes in which flows split upstream offsite of the property. For the onsite split flow situations it is proposed that reinforced bank protection levees be used in several locations to prevent flow from splitting out unpredictably into smaller uncontrolled overflow channels. Drainage collection along the proposed parkway can help eliminate some of the split flow and sheet flow problem areas by collecting flows on the upstream side and confining and directing them to the larger main channels. This would only be done where the flow originated in and/or ends up in the same channel further downstream.

To minimize drainage problems in this area it recommended that a radial street and drainage pattern be used. Streets and channels could run from the mountains running straight and parallel to the natural flow direction of the washes and on the ridges. Cross streets would curve around on the contour, crossing the

washes perpendicular to direction of flow. This would blend in well with natural flow patterns and allow dip crossing of washes for the cross streets with main collector streets running off from the proposed parkway high and dry on the ridges.

Retention

In general, onsite retention requirements should be minimal or able to be waived entirely because of the close proximity of positive outfalls to Wagner Wash and the Hassayampa River. The only area of the property which discharges runoff onto potentially developable offsite properties is the Southern most three miles of the proposed development area. Even then it is only a mile and a half or less to the Hassayampa River. Because Wagner Wash bisects the property almost all drainage is internal to the center of the property where it is drained off via Wagner Wash into the Hassayampa River a mile and a half downstream of the property.

ANALYSIS PROCEDURES

The Hassayampa River floodplain was delineated based on aerial photo interpretation of the geomorphic features of the natural historic river floodplain. The location of major washes have been identified at this time without attempting to actually plot their hydraulic floodplain boundary. Detailed contour maps are in the process of being made for the 28,000 acra area and will be available, with one foot contour intervals, for detailed floodplain mapping as needed.

Watershed areas and major washes are delineated on the Preliminary Master Drainage Plan-a 1:24,000 scale photo-topo map specially prepared for this study by overlaying an enlarged U.S.G.S. White Tank Quadrangle map onto 1972 Orthophoto Quads obtained from the State Land Department. Watershed boundaries and channel locations were also confirmed with 1985 aerial photography at a scale of 1 inch equals 1000 feet.

Peak discharges were determined at washes entering and leaving the property and at a key concentration points along the proposed parkway for the 100 year runoff event. Discharges were calculated using the Corps of Engineers HEC-1 Computer Program using the SCS runoff curve number, and dimensionless unit hydrograph options. Drainage area boundaries, flow concentrations and peak discharge values are shown on Exhibit 2. The Master Drainage Plan and hydrologic watershed data is summarized on the Hydrologic Data Summary.

SUMMARY AND RECOMMENDATIONS

There are three distinct hydrologic areas which have different drainage characteristics which need to be recognized in designing onsite drainage systems in these areas. The Hassayampa River and Wagner Wash Floodplains are recommended to be left as open space to function as natural floodplains wherever possible.

Once preliminary zoning and planning decisions are made and the more detailed topographic mapping is available, detailed hydrologic analysis of drainage areas and hydraulic analysis of channels and floodplains can be made.

Culvert sizing and road drainage design associated with the proposed parkway is being done under separate contract for the roadway design.

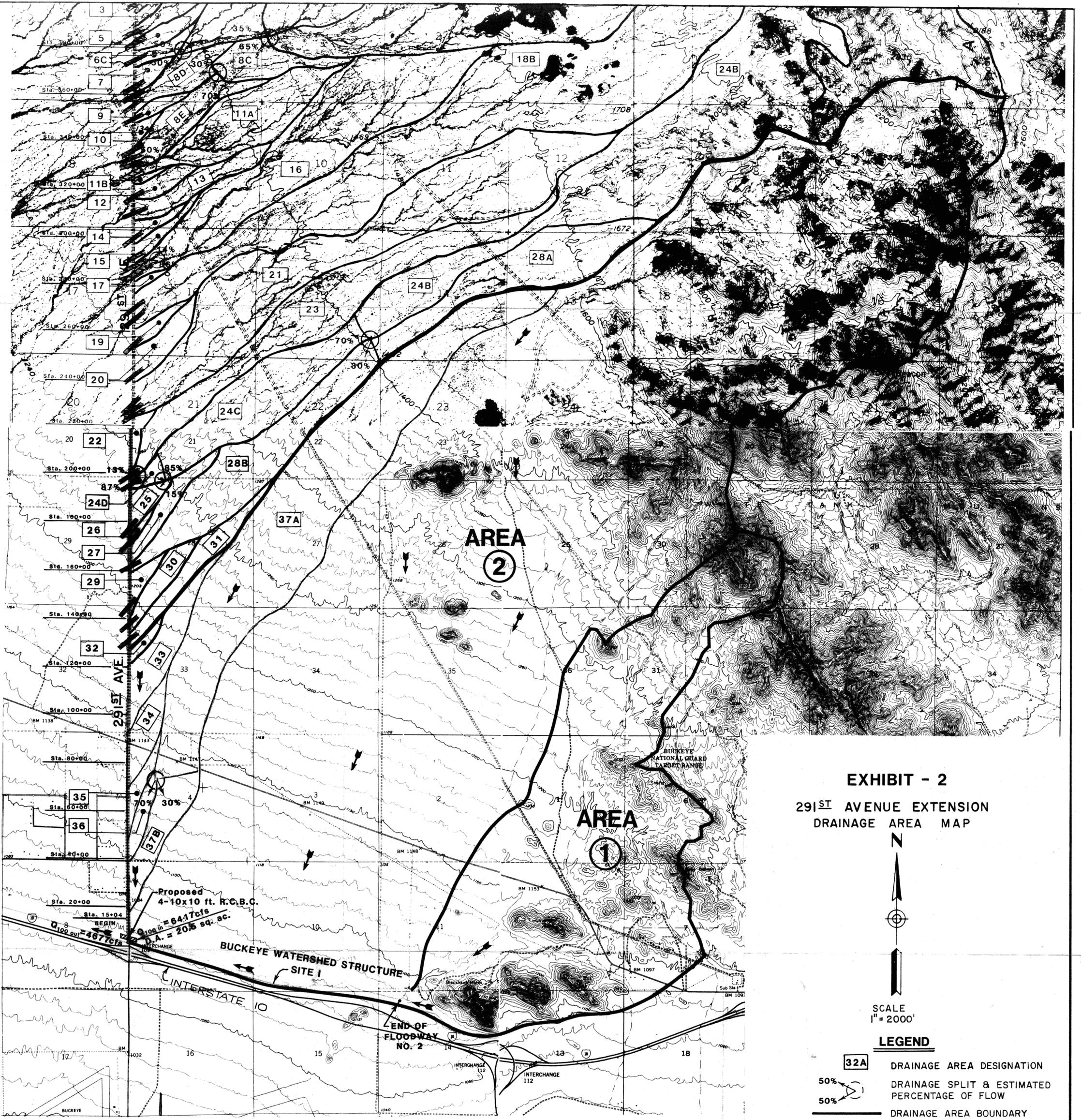


EXHIBIT - 2
291ST AVENUE EXTENSION
DRAINAGE AREA MAP



SCALE
 1" = 2000'

LEGEND

- 32A DRAINAGE AREA DESIGNATION
- DRAINAGE SPLIT & ESTIMATED PERCENTAGE OF FLOW
- DRAINAGE AREA BOUNDARY
- PROPOSED 291ST AVE PARKWAY
- CULVERT CROSSING

SUN VALLEY PARKWAY
291st. AVE. (I-10 to Northern Ave.)

DRAINAGE AREA MAP

SHEET
1 OF 1

DESIGN PROJECT NO. 550340-7
 SURVEY PROJECT NO.

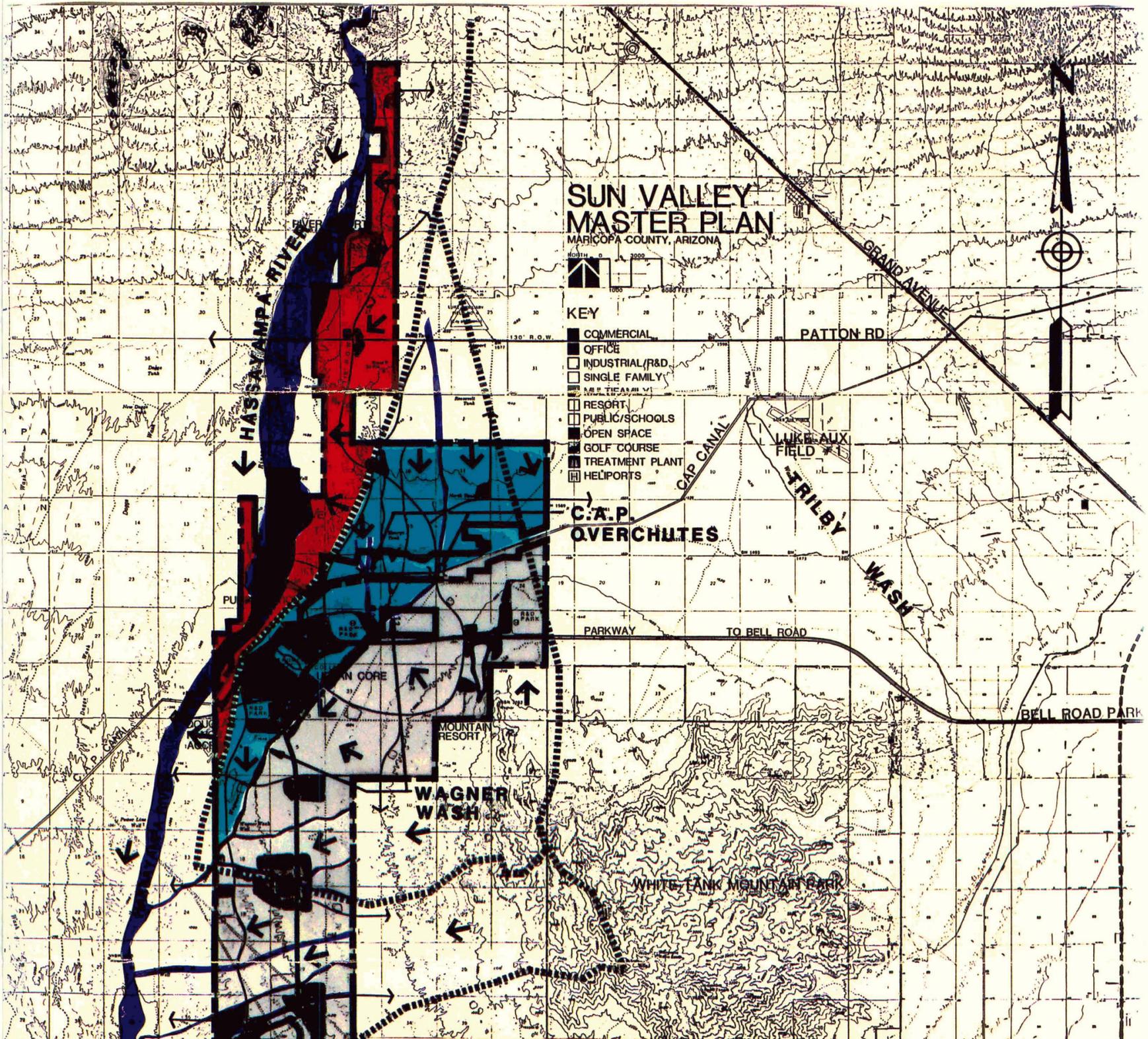
DESIGNED R.A.D.
 DRAWN T.A.
 CHECKED C.J.L.
 DATE 1/14/87
 SCALE: 1" = 2000'

REVISIONS		
NO	DATE	APP. DESCRIPTION
1	4/23/87	Added Drainage Areas ① & ②
2	8/3/87	Revised Q ₁₀₀ Discharge

Collar, Williams & White Engineering, Inc.
 Consulting Engineers

2702 N. 44TH STREET, SUITE 205-B
 PHOENIX, ARIZONA 85008
 (602) 967-3380

2922 NORTH 70TH STREET
 SCOTTSDALE, ARIZONA 85261
 (602) 947-8433



HYDROLOGIC VICINITY MAP

- RIVERS & MAJOR WASHES
- MAJOR WATERSHED DIVIDES

MAJOR HYDROLOGIC REGIONS

- GENTLE REMNANT FAN SLOPE
- WHITE TANKS ALLUVIAL FAN SLOPES
- STEEP DISSECTED RIVER BREAKS
- FLOW DIRECTION

DATE - JUNE, 1986
SCALE - 1/2" = 1 MILE

Collar, Williams & White Engineering, Inc.
 Consulting Engineers and Land Surveyors
 2922 NORTH 70TH STREET
 SCOTTSDALE, ARIZONA 85251
 PHONE: 947-2432

JOB NO. 850840

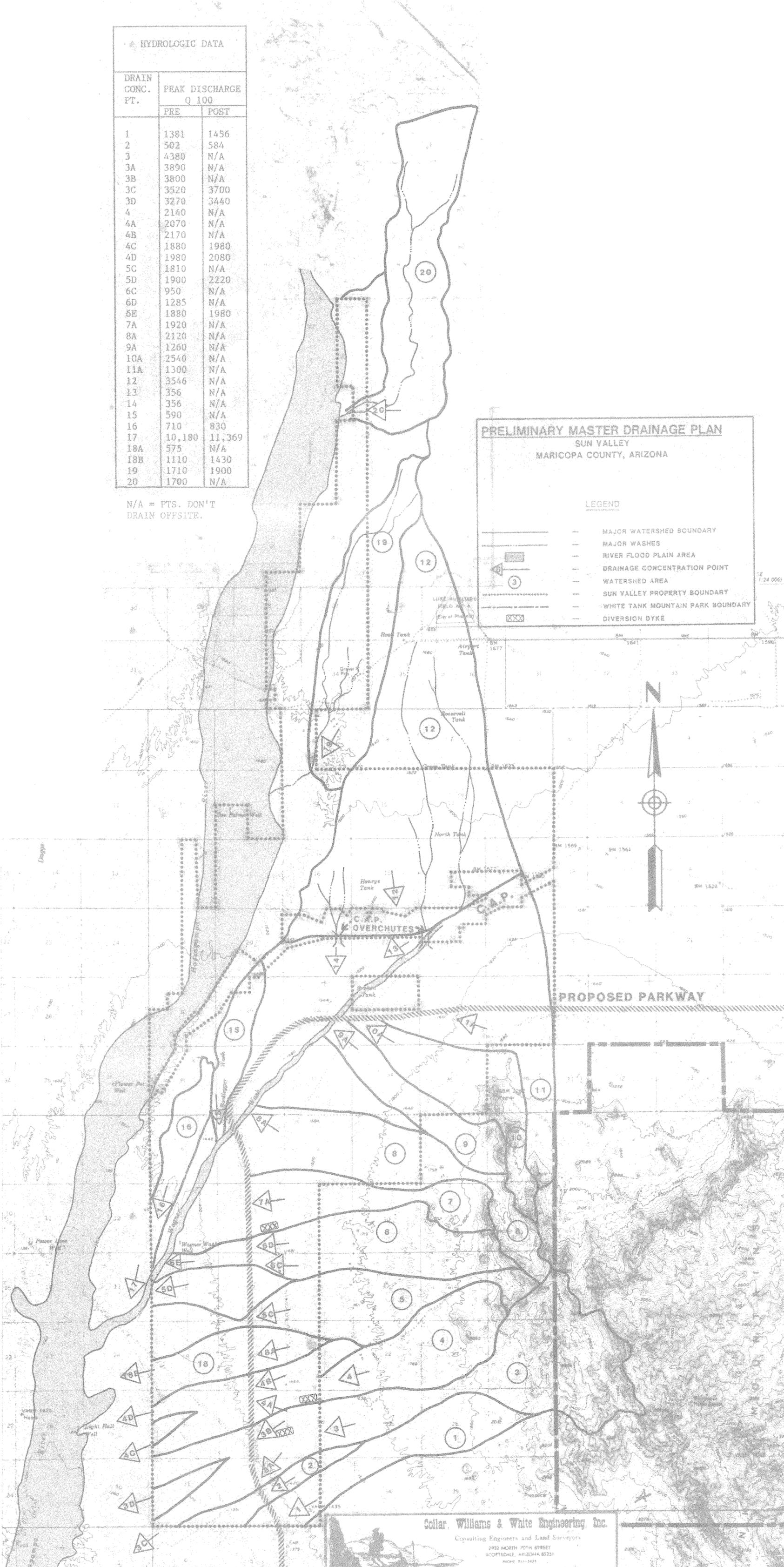
HYDROLOGIC DATA		
DRAIN CONC. PT.	PEAK DISCHARGE Q 100	
	PRE	POST
1	1381	1456
2	502	584
3	4380	N/A
3A	3890	N/A
3B	3800	N/A
3C	3520	3700
3D	3270	3440
4	2140	N/A
4A	2070	N/A
4B	2170	N/A
4C	1880	1980
4D	1980	2080
5C	1810	N/A
5D	1900	2220
6C	950	N/A
6D	1285	N/A
6E	1880	1980
7A	1920	N/A
8A	2120	N/A
9A	1260	N/A
10A	2540	N/A
11A	1300	N/A
12	3546	N/A
13	356	N/A
14	356	N/A
15	590	N/A
16	710	830
17	10,180	11,369
18A	575	N/A
18B	1110	1430
19	1710	1900
20	1700	N/A

N/A = PTS. DON'T DRAIN OFFSITE.

PRELIMINARY MASTER DRAINAGE PLAN
 SUN VALLEY
 MARICOPA COUNTY, ARIZONA

LEGEND

- MAJOR WATERSHED BOUNDARY
- MAJOR WASHES
- RIVER FLOOD PLAIN AREA
- ▲ DRAINAGE CONCENTRATION POINT
- WATERSHED AREA
- SUN VALLEY PROPERTY BOUNDARY
- WHITE TANK MOUNTAIN PARK BOUNDARY
- XXX DIVERSION DYKE



Collar, Williams & White Engineering, Inc.
 Consulting Engineers and Land Surveyors
 7922 NORTH 70TH STREET
 SCOTTSDALE, ARIZONA 85231
 PHONE 924-1421

DATE: JUNE, 1986
 SCALE - 1" = 1 MILE

EXHIBIT 2 JOB NO. 850840