July 1983

Future Role of Coyote-Alamitos Canal

Santa Clara Valley Water District

SANTA CLARA VALLEY WATER DISTRICT

FUTURE ROLE

OF

COYOTE-ALAMITOS CANAL

Prepared

Under the direction of

Valentine Miller, P.E.
Division Engineer
Water Supply Planning Division

John T. O'Halloran
General Manager

David K. Gill, P.E.
Water Supply Manager

JULY 1983

Analysis and research done by:

John H. Clarke, P.E.	Civil Engineer

With Assistance From:

Albert T. Henley	General Counsel
Thomas I. Iwamura, C.E.G.	Engineering Geologist
Robert E. Tepel, C.E.G.	Engineering Geologist
Vincent I. Lico	Real Estate Agent
Janet Line	Engineering Aide II
James D. Cooper	Associate Civil Engineer
Lorance Wilson	Water Operations Supervisor

Ackowledgements:

Drafting Section	- Under the Supervision of William E. Tucker
Secretarial Services	- Under the Supervision of Shirley M. Leister
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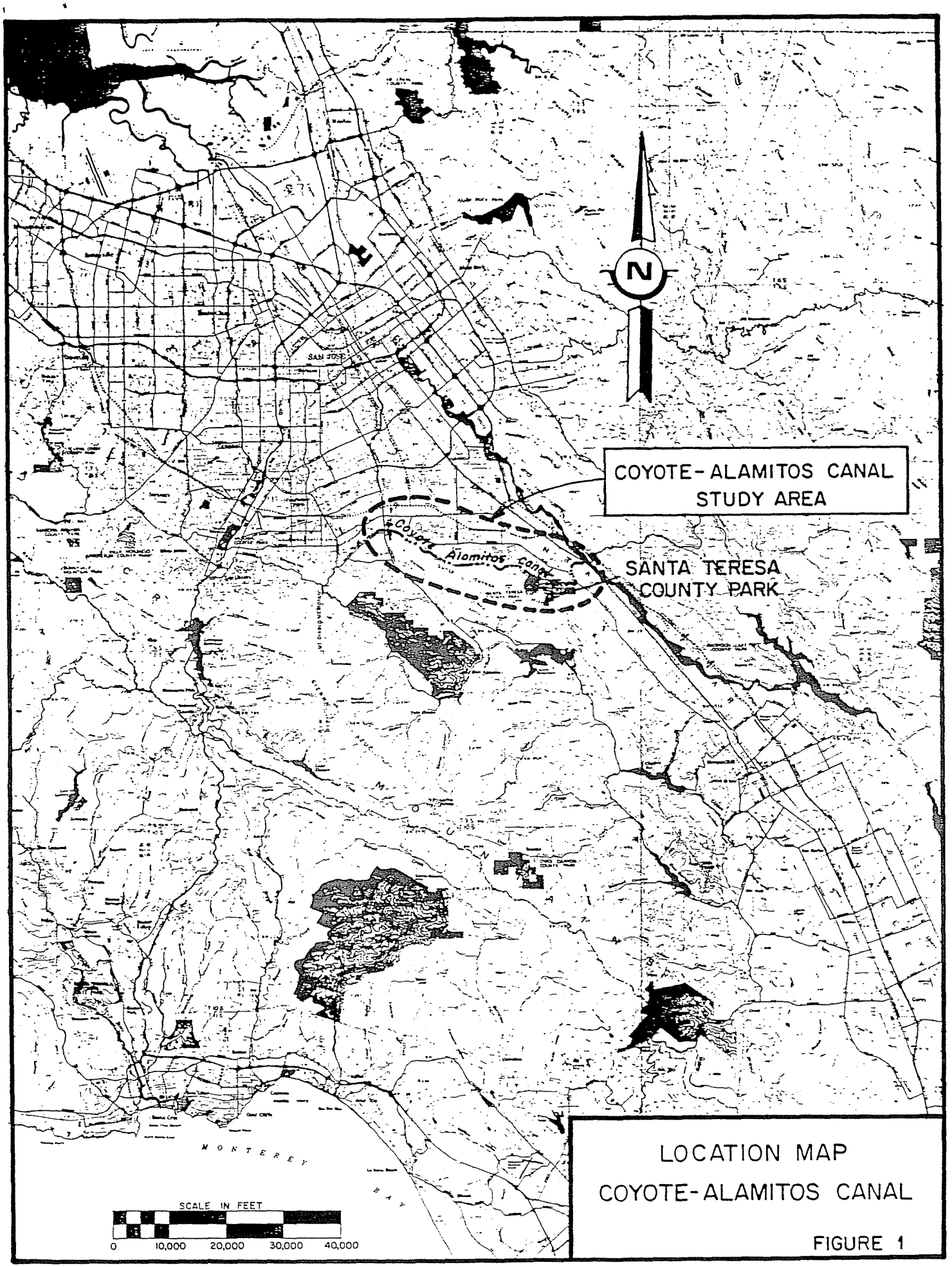
INTRODUCTION

Purpose of Report

Analysis in the 1970's in conjunction with the development of the Master Plan for the District's In-County Water Distribution System showed that it was more economical to utilize the proposed Cross Valley and Almaden Valley Pipelines than the Coyote-Alamitos Canal to convey either San Felipe or Anderson water to recharge sites along the Guadalupe River. This conclusion was recently confirmed when analyzed with respect to recent changes in the Master Plan, particularly the inclusion of the Santa Teresa Water Treatment Plant. Thus, when construction of the Cross Valley and Almaden Valley Pipelines is completed, the purpose for which the canal was constructed will no longer exist. This report evaluates various alternative future uses of the Coyote-Alamitos Canal and its right of way based on current and future operational considerations and costs.

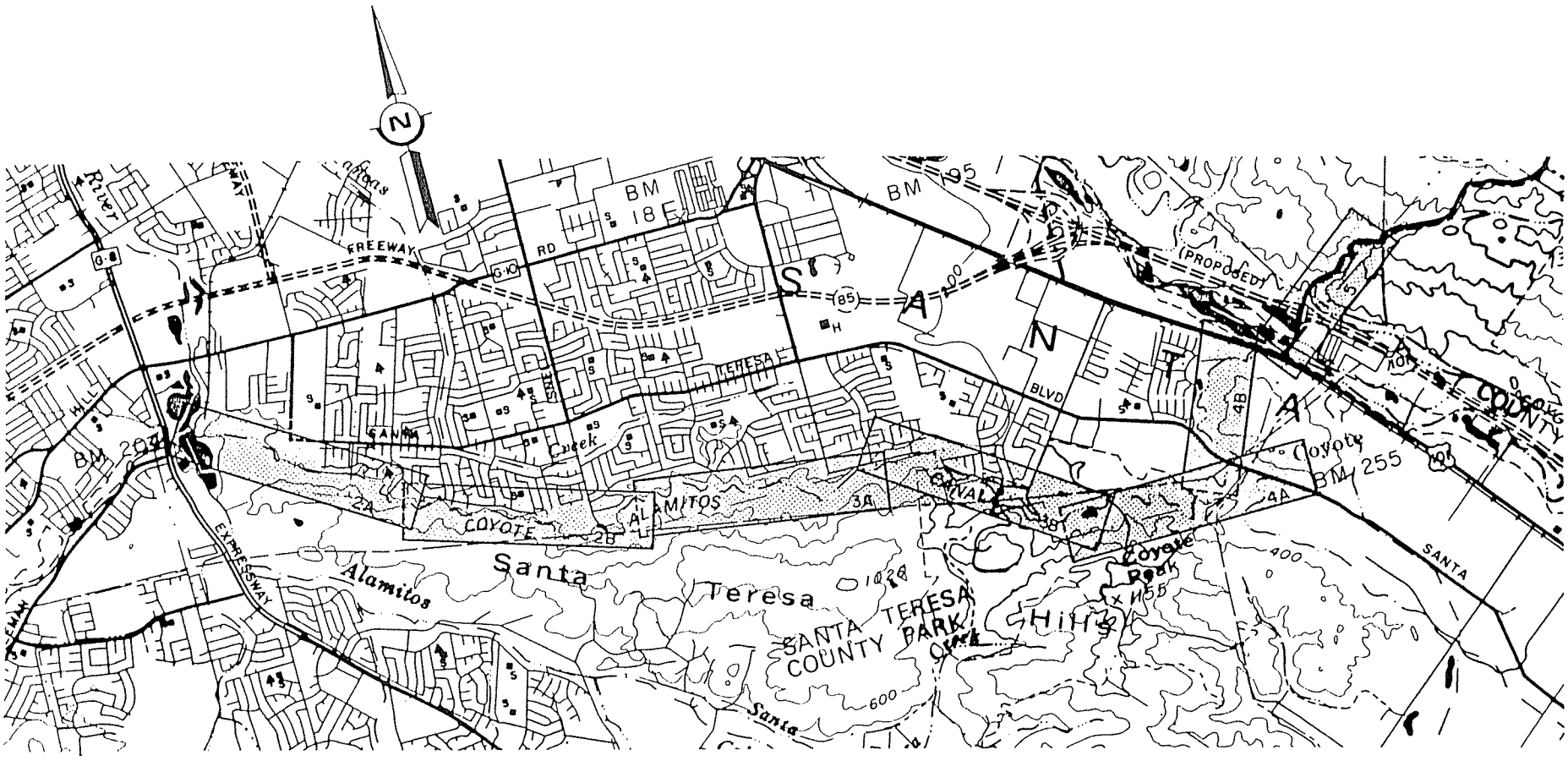
Study Area

As shown in Figures 1 and 2, the Coyote-Alamitos Canal is located along the northern edge of the Santa Teresa Hills extending from the Coyote Canal Extension at Metcalf Road on the east to Guadalupe Creek just upstream of its confluence with Alamitos Creek on the west.



LOCATION MAP
COYOTE-ALAMITOS CANAL

FIGURE 1



REVISIONS	
DATE	SUBJECT

NOTES

Photomosaics based on aerial photographs flown April, 1975

Santa Clara Valley Water District

DATE: 11/82

DESIGN J. Clarke

DRAWN: B. Tucker

INDEX FOR PLAN OF COYOTE-ALAMITOS CANAL

SCALE
NONE

FIGURE
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PAGE 3

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NOTES:
Photomosaics based on aerial photographs flown April, 1975

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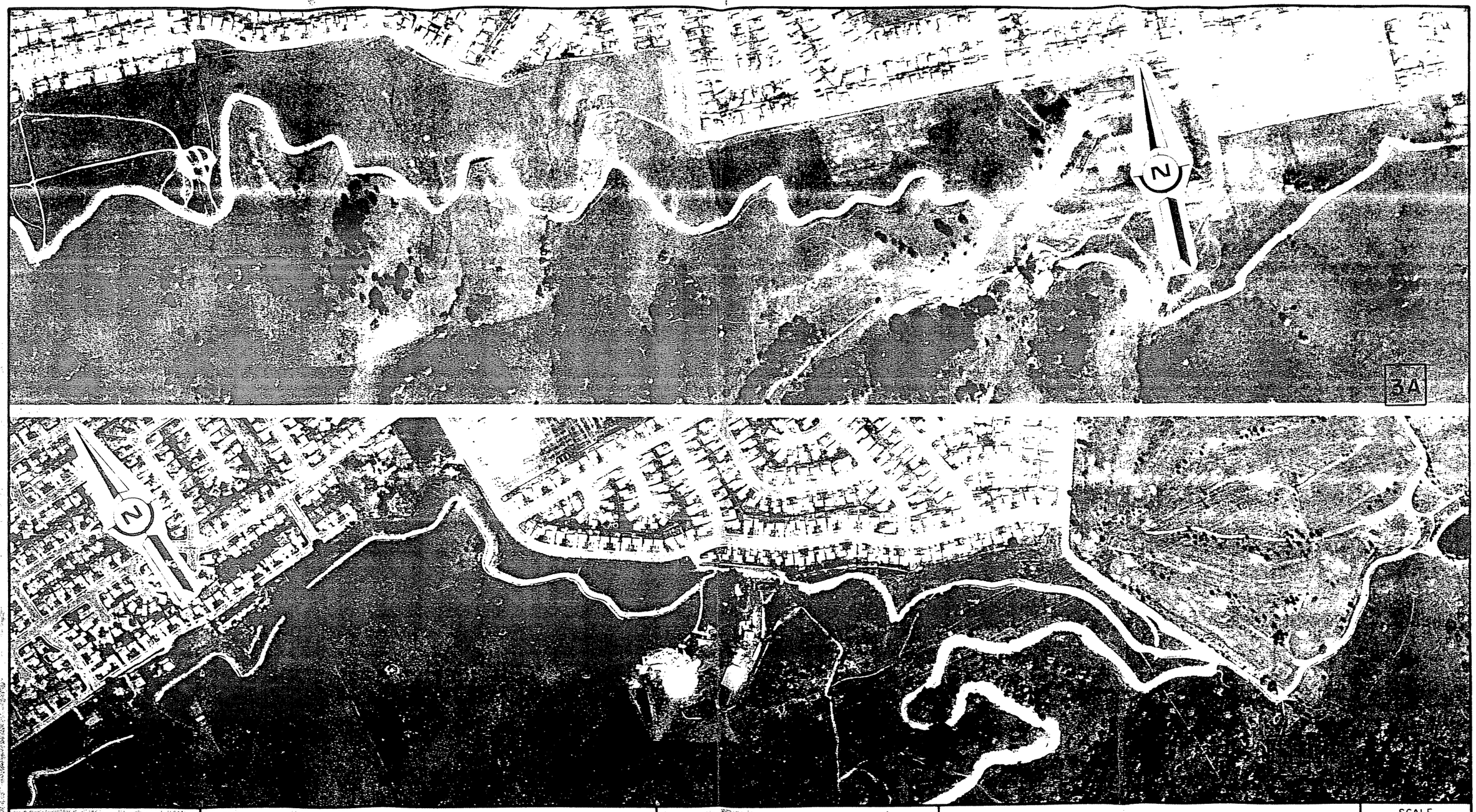
PLAN OF
COYOTE-ALAMITOS CANAL

SCALE
1" ≈ 500'

FIGURE
2
PAGE 3

Sheet 2 of 5



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PLAN OF COYOTE-ALAMITOS CANAL

SCALE
1" ≈ 500'

FIGURE
2
PAGE 3

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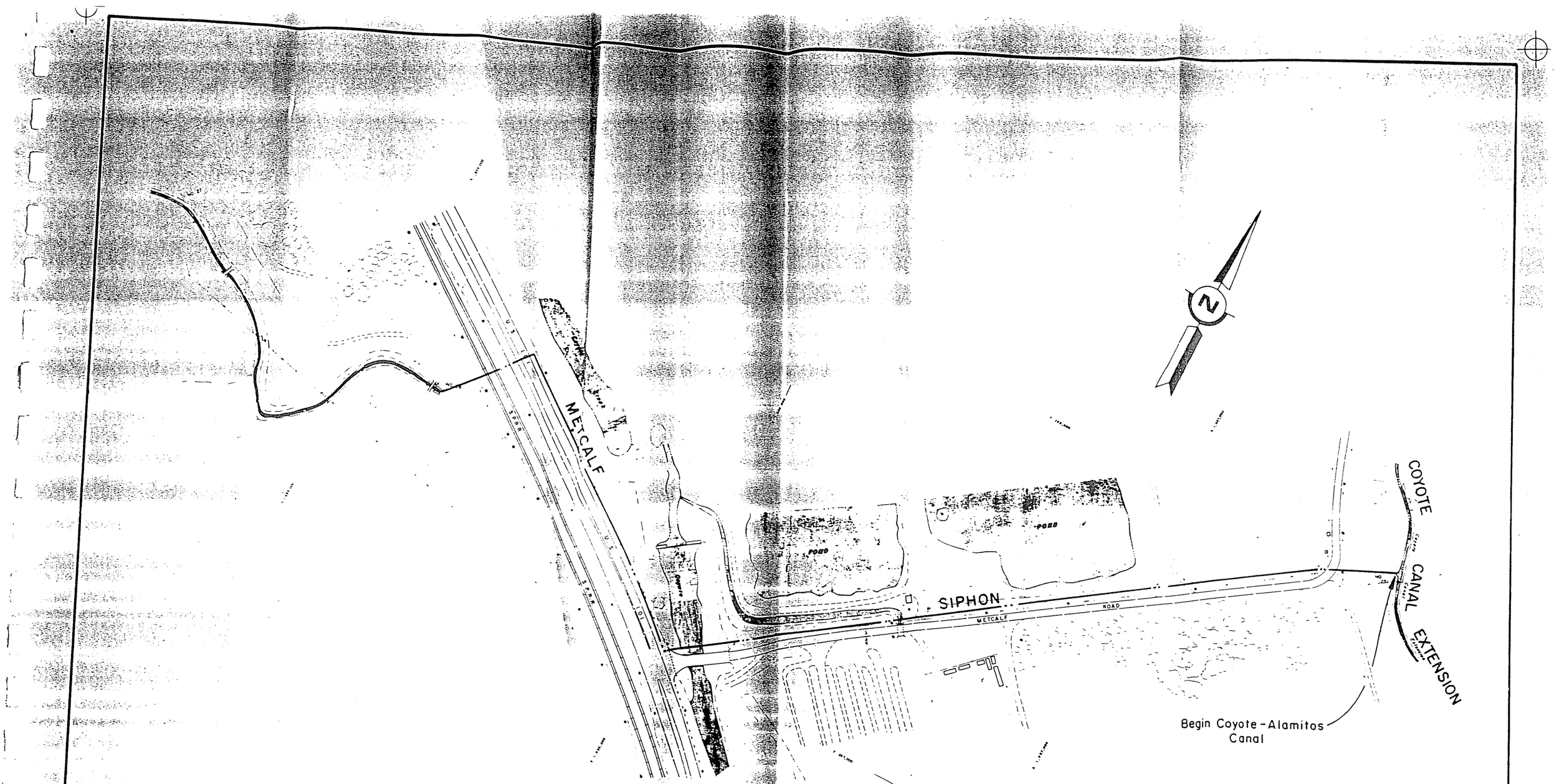
PLAN OF COYOTE-ALAMITOS CANAL

SCALE 1"≈500'

FIGURE 2
PAGE 3

Sheet 4 of 5



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PLAN OF
COYOTE-ALAMITOS CANAL

SCALE
NONE

FIGURE
2
PAGE 3

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CHAPTER II

HISTORY

Background

During the planning stages of the District's local water conservation program (in the early 1930's) it was realized that the region of most abundant natural water supply is not coincident with the region of most acute water demand. Nearly half of the total local water supply available for conservation originates in the upper Coyote Creek watershed with a drainage area of 193 square miles, 44% of the total area tributary to Santa Clara Valley. Since the greatest drop in groundwater levels had occurred on the west side of the North Santa Clara Valley, it was imperative that considerable amounts of Coyote watershed surplus water be transported to the west side. In 1953 the Coyote-Alamitos Canal was constructed as one of the links of the system proposed to carry water westward.

Purpose of Canal

The Coyote-Alamitos Canal was constructed to carry water stored in Anderson and Coyote Reservoirs from the Coyote watershed west to the Guadalupe Creek for release to groundwater recharge facilities. Coyote Reservoir is located upstream of and releases water into Anderson Reservoir. Water destined for the canal is released from Anderson Reservoir into the Coyote Canal and then into the Coyote Canal Extension. At a point near Metcalf Road some of the flow in the Coyote Canal Extension is diverted into the Coyote-Alamitos Canal to be conveyed to the confluence of Alamitos and Guadalupe Creeks. The canal was not intended to be used during the winter months when local runoff from the Guadalupe and Alamitos Creek watersheds was sufficient to supply all recharge areas along those creeks. The canal's physical relationship to the District's In-County Water Distribution System is shown in Figure 3.

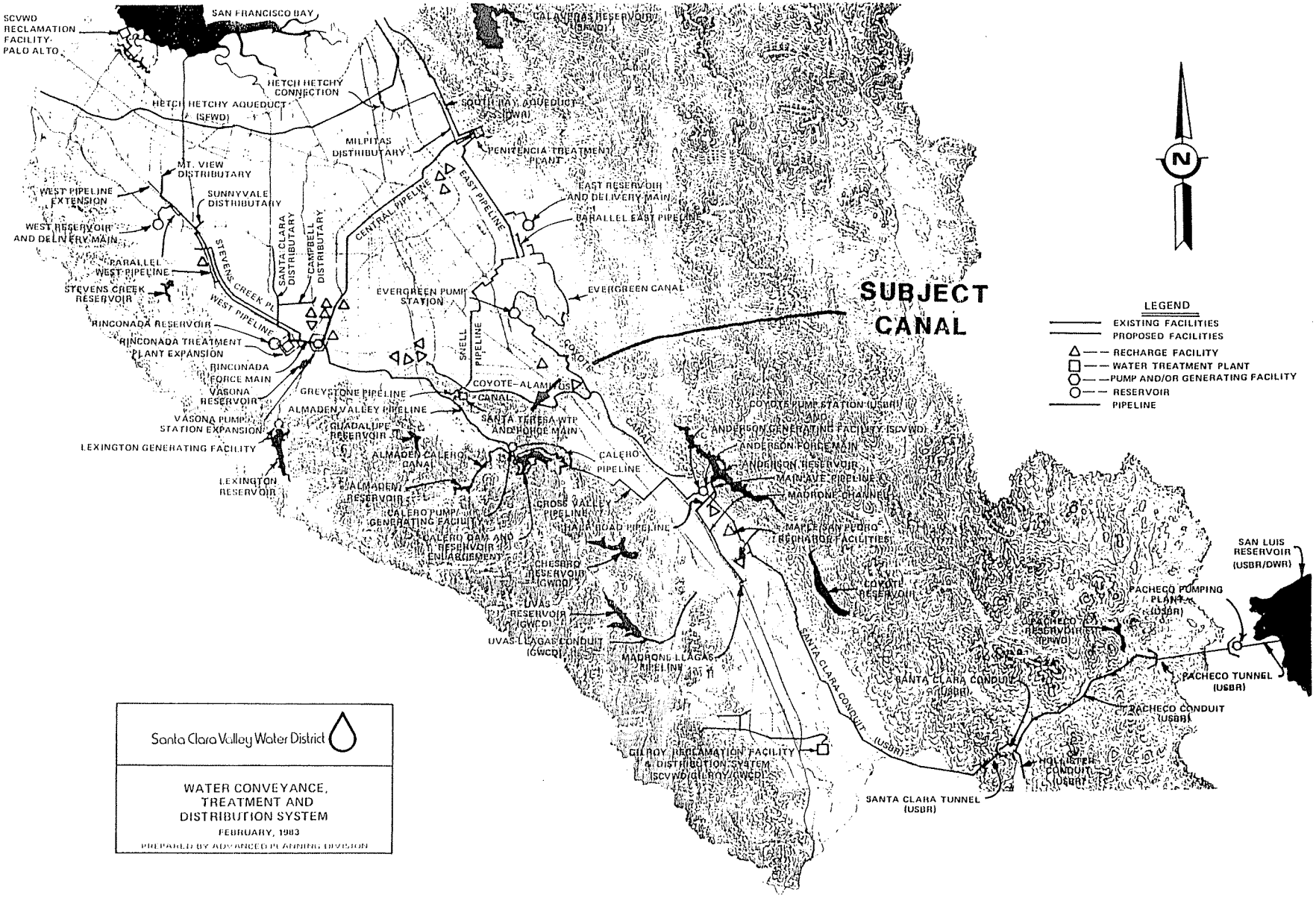

SCVWD RECLAMATION FACILITY PALO ALTO
SAN FRANCISCO BAY
HETCH HETCHY CONNECTION
HETCH HETCHY AQUEDUCT (SFWD)
CALAVERAS RESERVOIR (SFWD)
SOUTH BAY AQUEDUCT (DWR)
PENITENCIA TREATMENT PLANT
MILPITAS DISTRIBUTARY
MT. VIEW DISTRIBUTARY
SUNNYVALE DISTRIBUTARY
WEST PIPELINE EXTENSION
WEST RESERVOIR AND DELIVERY MAIN
PARALLEL WEST PIPELINE
STEVENS CREEK RESERVOIR
STEVENS CREEK PL
WEST PIPELINE
SANTA CLARA DISTRIBUTARY
CAMPBELL DISTRIBUTARY
CENTRAL PIPELINE
EAST PIPELINE
EAST RESERVOIR AND DELIVERY MAIN
PARALLEL EAST PIPELINE
EVERGREEN PUMP STATION
EVERGREEN CANAL
SUBJECT CANAL
RINCONADA RESERVOIR
RINCONADA TREATMENT PLANT EXPANSION
RINCONADA FORCE MAIN
VASONA RESERVOIR
VASONA PUMP STATION EXPANSION
LEXINGTON GENERATING FACILITY
LEXINGTON RESERVOIR
SNELL PIPELINE
COYOTE CANAL
GREYSTONE PIPELINE
COYOTE-ALAMITOS CANAL
ALMADEN VALLEY PIPELINE
GUADALUPE RESERVOIR
SANTA TERESA WTP AND FORCE MAIN
ALMADEN CALERO CANAL
ALMADEN RESERVOIR
CALERO PUMP/GENERATING FACILITY
CALERO DAM AND RESERVOIR ENLARGEMENT
CALERO PIPELINE
GROSS VALLEY PIPELINE
HALE ROAD PIPELINE
CHESBRO RESERVOIR (GWCD)
UVAS RESERVOIR (GWCD)
UVAS-LLAGAS CONDUIT (GWCD)
MADRONE-LLAGAS PIPELINE
COYOTE PUMP STATION (USBR)
AND
ANDERSON GENERATING FACILITY (SCVWD)
ANDERSON FORCE MAIN
ANDERSON RESERVOIR
MAIN AVE. PIPELINE
MADRONE CHANNEL
MAPLE/SAN PEDRO RECHARGE FACILITIES
COYOTE RESERVOIR
SANTA CLARA CONDUIT (USBR)
GILROY RECLAMATION FACILITY & DISTRIBUTION SYSTEM (SCVWD/GILROY/GWCD)
SANTA CLARA TUNNEL (USBR)
HOLLISTER CONDUIT (USBR)
SAN LUIS RESERVOIR (USBR/DWR)
PACHECO PUMPING PLANT (USBR)
PACHECO RESERVOIR (SFWD)
SANTA CLARA CONDUIT (USBR)
PACHECO TUNNEL (USBR)
PACHECO CONDUIT (USBR)
N
LEGEND
EXISTING FACILITIES
PROPOSED FACILITIES
RECHARGE FACILITY
WATER TREATMENT PLANT
PUMP AND/OR GENERATING FACILITY
RESERVOIR
PIPELINE
Santa Clara Valley Water District
WATER CONVEYANCE, TREATMENT AND DISTRIBUTION SYSTEM
FEBRUARY, 1983
PREPARED BY ADVANCED PLANNING DIVISION

FIGURE 3-1

The water released from the western terminus of the canal is one source of water for the Alamitos and Guadalupe Percolation Ponds and the portion of Guadalupe Creek downstream of its confluence with Alamitos Creek. The other sources of supply for these facilities are waters stored in the Almaden, Guadalupe, and Calero Reservoirs and releases from the Almaden Valley Pipeline. The existing capacity of the recharge facilities supplied by the canal is 43 acre-feet per day in the summer and 13 acre-feet per day in the winter. In an average year, the maximum recharge possible in these facilities is about 11,200 acre-feet.

Canal Development

The canal was originally designed and constructed as an earth channel with seven inverted siphons each having a design capacity of 50 c.f.s. Its total length is 11 miles. Enough right of way was obtained for the siphons such that parallel conduits could be installed at a later date to double the capacity to 100 c.f.s.; however, parallel siphons were never installed. In 1957, the canal was gunite-lined in order to reduce the losses of water from leakages and to bring the canal capacity up to 100 c.f.s. Many of the leaks caused both damage to neighboring agricultural land and instability to the canal and road embankment. Since the siphons were never paralleled, the present capacity of the canal, as a whole, is 50 c.f.s.

Table 1 shows the locations of the various segments of the canal, as well as the present capacities. The right of way widths vary between 50 and 100 feet.

Since the canal was not intended to be used during the winter months, 25 wasteways were constructed when the canal was originally built to safely convey local runoff that entered the canal in to small water courses below the canal. In the winter of 1975-76, additional wasteways were installed downstream of those locations where significant hillside runoff entered the canal to release winter flows into local storm drains. In addition, the District built spillways at several locations along the canal to convey the flow in mall streams over the canal. The District maintains these facilities

TABLE 1

DATA ON COYOTE-ALAMITOS CANAL

Station	Conduit	Capacity Q (cfs)
0+00		
	Metcalf Siphon - 34" Steel Pipe	50
29+86		
	Canal*	100
80+00		
	Gross Siphon - 34" Steel Pipe	50
88+75		
	Canal*	100
173+50		
	Fitzgerald Siphon - 33" Reinf. Conc. Pipe	50
183+00		
	Canal*	100
222+00		
	Johnson Siphon - 33" Reinf. Conc. Pipe	50
229+51		
	Canal*	100
255+71		
	Joice Siphon No. 1 - 33" Reinf. Conc. Pipe	50
259+30		
	Canal*	100
269+50		
	Joice Siphon No. 2 - 33" Reinf. Conc. Pipe	50
271+65		
	Canal*	100
300+29		
	O'Connell Siphon - 33" Reinf. Conc. Pipe	50
305+23		
	Canal*	100
552+75		
	Pipeline - 48" Reinf. Conc. Pipe	125
572+05		

* Canal is gunite-lined. S = 0.000284

and keeps the inlets free of debris. When residential developments were proposed along the base of the Santa Teresa Hills, the District requested that the City of San Jose (a) not permit the developers to consider the canal as a local drainage facility and (b) require the developers to build structures to collect runoff from above the canal and convey it into local storm drains in the developed areas. Structures to accomplish this second goal were built; however, the District has assumed no responsibility to keep the inlets of these structures free of debris.

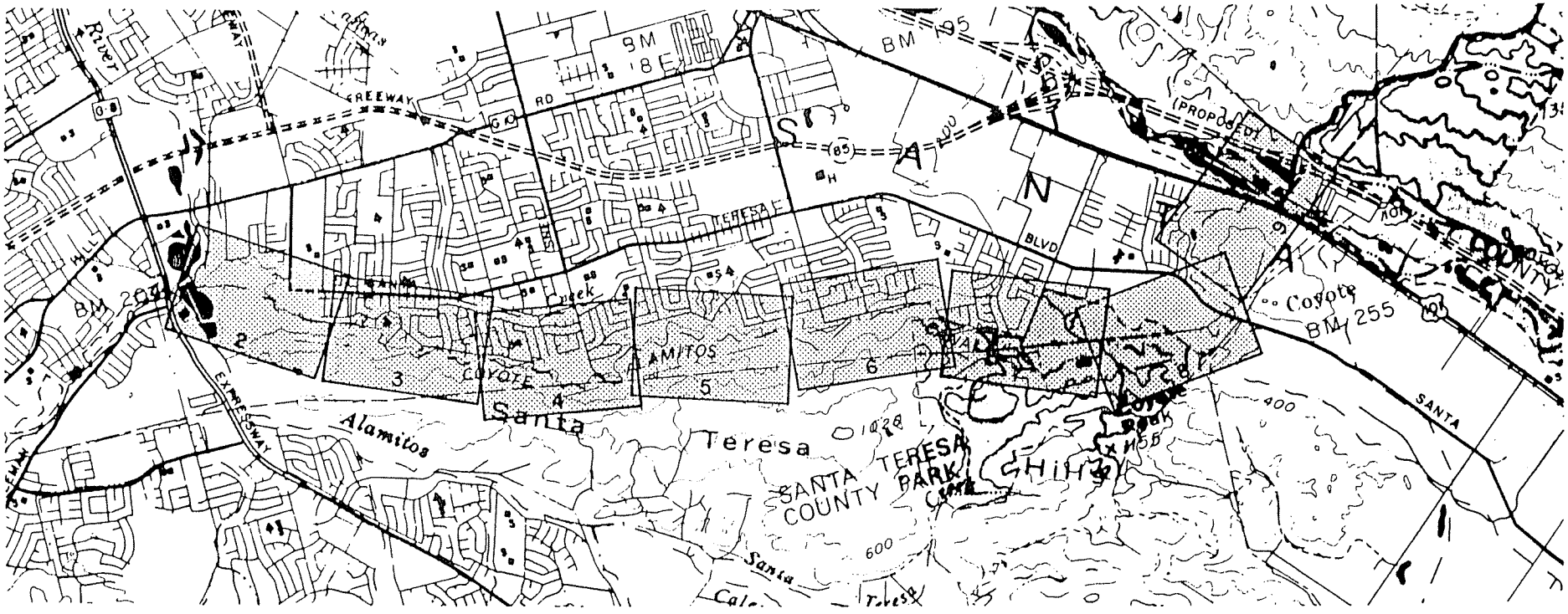
Acquisition of Right of Way

Initially, all of the right of way was obtained in the form of easements for a water conveyance facility. As adjacent lands were developed, the District accepted the dedication of land underlying or adjacent to the canal in some areas.

Where certain reaches of the canal were found to exist outside of the rights of way, exchanges or acquisition of required lands have been made. Furthermore, on some lands located below the canal where it would be unwise to permit residential development, these lands were either acquired by or dedicated to the District. Access easements serving the canal have also been acquired.

At the present time, the District has fee title to approximately 30 percent of the rights of way associated with the canal while the remainder are still in easement form. Of the land overlain by the canal and maintenance road, the District owns about nine percent in fee and has easements on the rest.

Figure 4 is a map showing all of the rights of way pertaining to the Coyote-Alamitos Canal. Table 2 is a listing of the right of way parcels as contained in File #9247.



REVISIONS	
DATE	SUBJECT

NOTES
Photomosaics based on aerial photographs flown April, 1975

Santa Clara Valley Water District

DATE 2/83
DESIGN J.Clarke
DRAWN S.Wing

INDEX FOR RIGHT-OF-WAY MAP OF COYOTE-ALAMITOS CANAL

SCALE
NONE

FIGURE
4
PAGE 9

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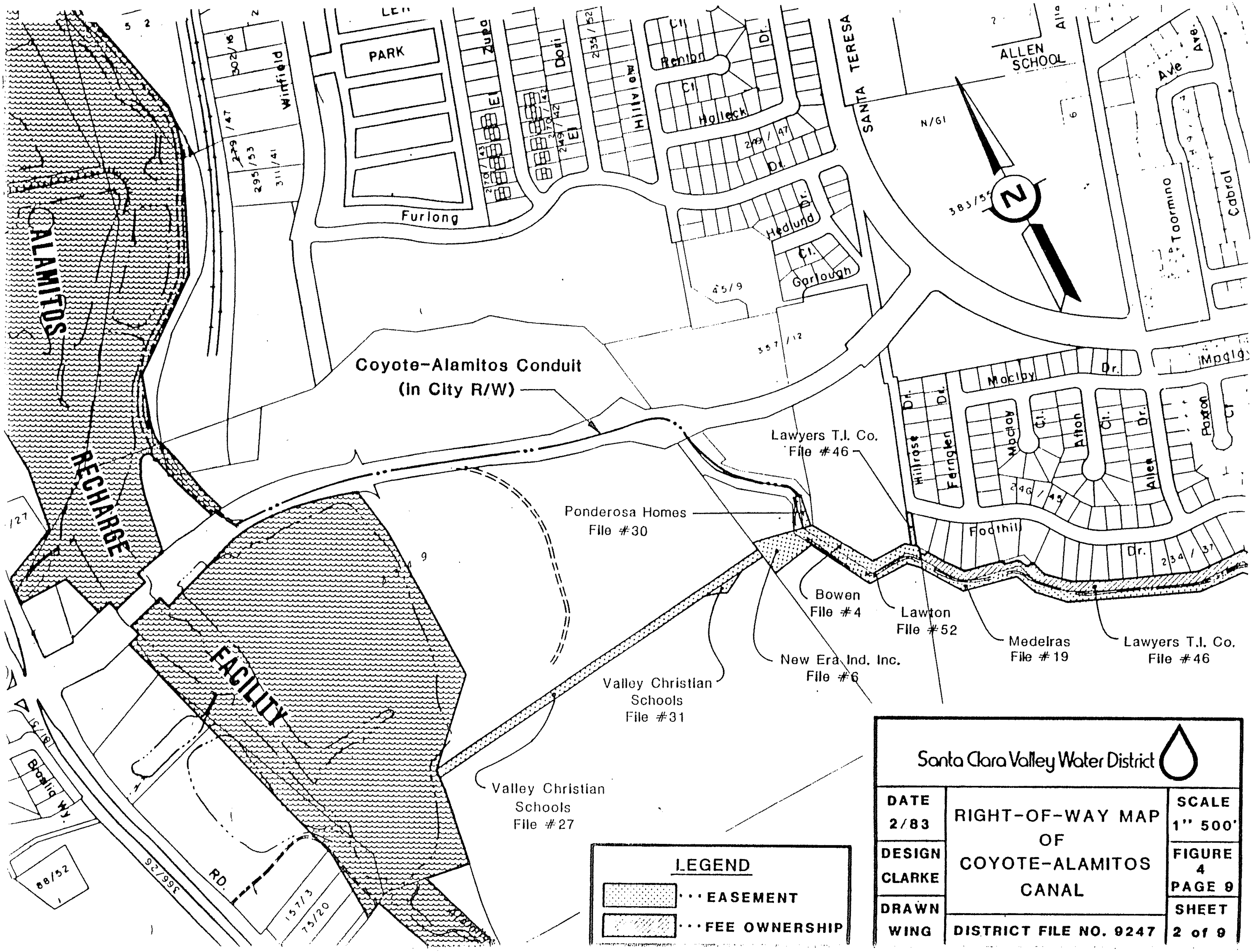
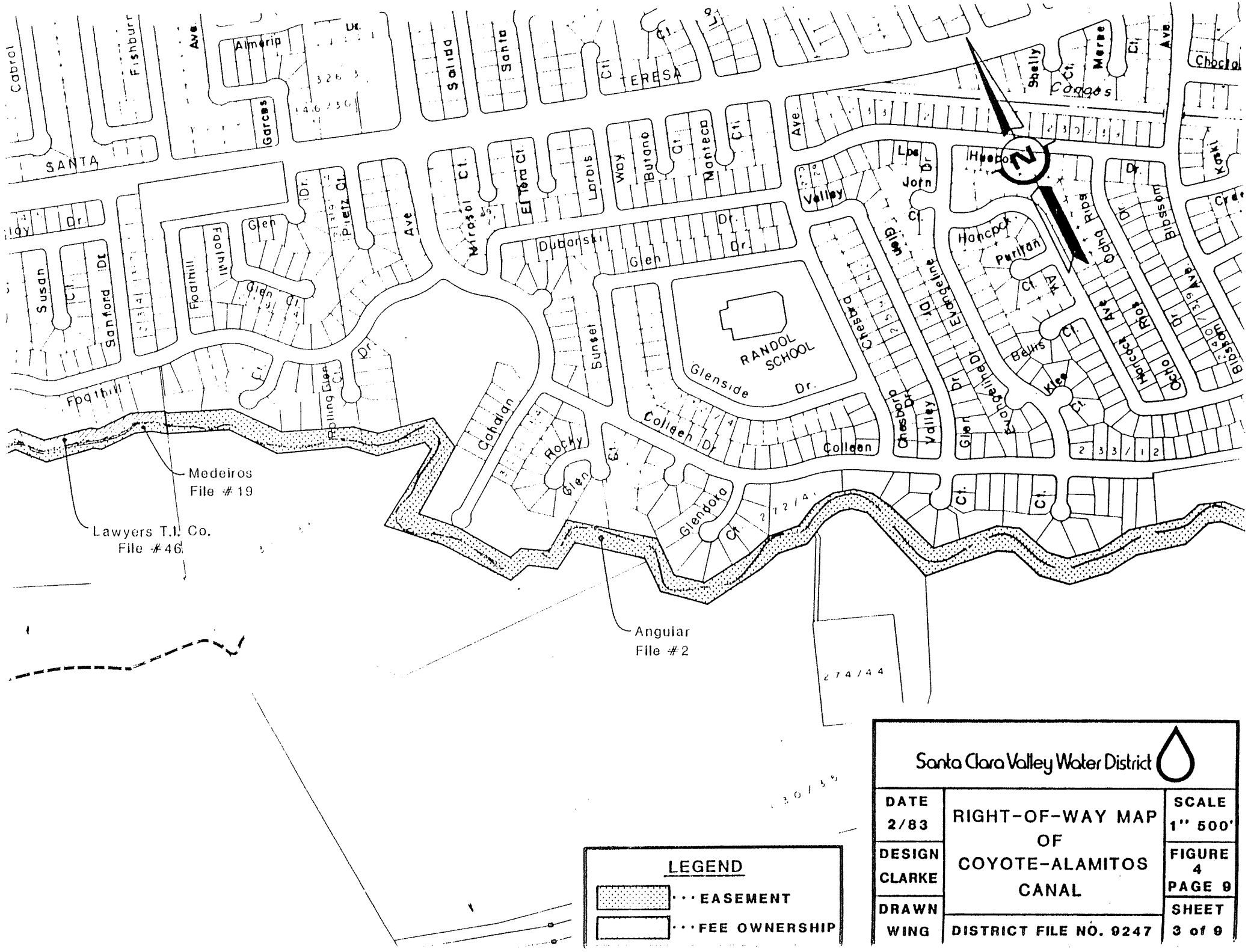
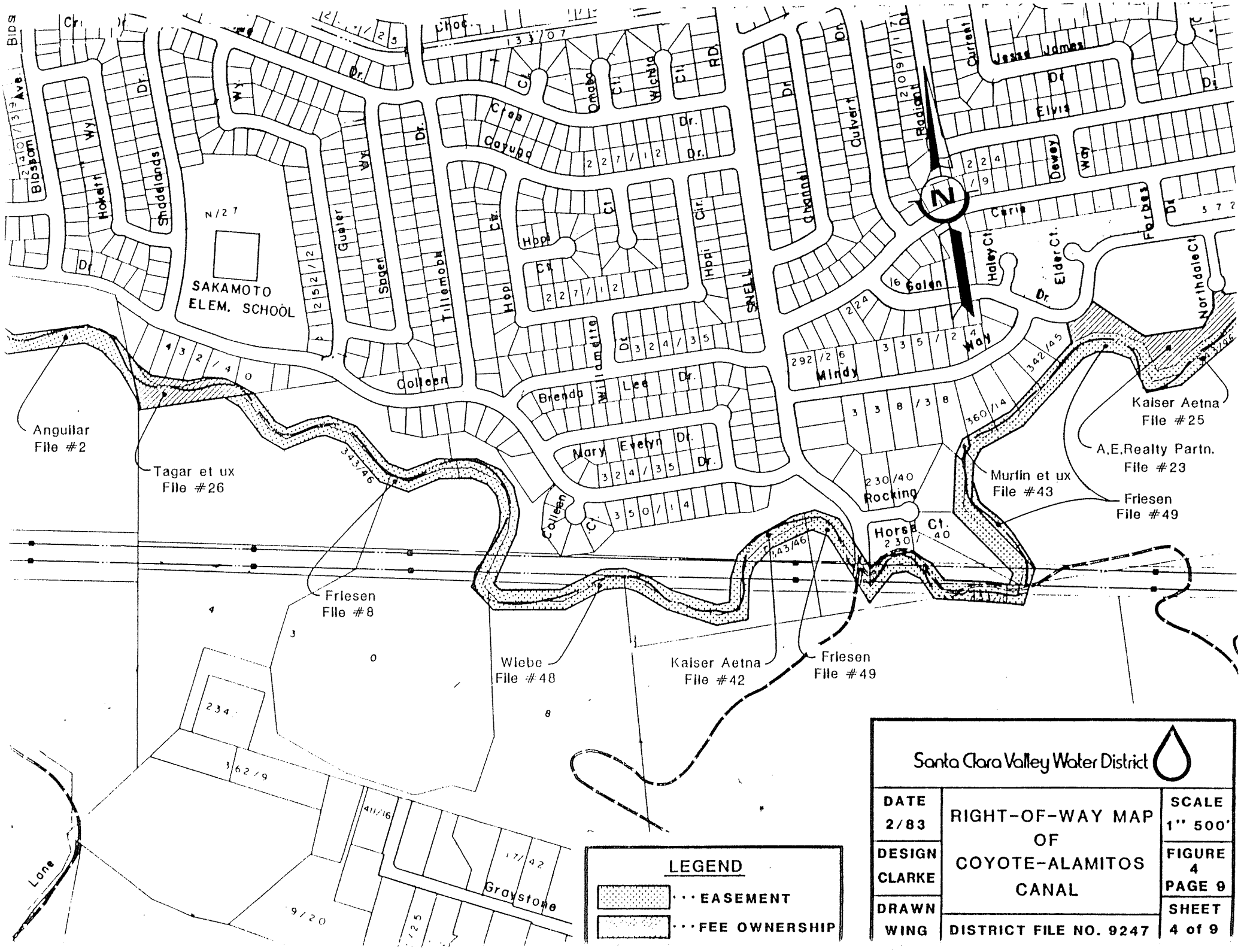


Santa Clara Valley Water District		
DATE 2/83	RIGHT-OF-WAY MAP OF COYOTE-ALAMITOS CANAL	SCALE 1" 500'
DESIGN CLARKE		FIGURE 4 PAGE 9
DRAWN WING	DISTRICT FILE NO. 9247	SHEET 2 of 9



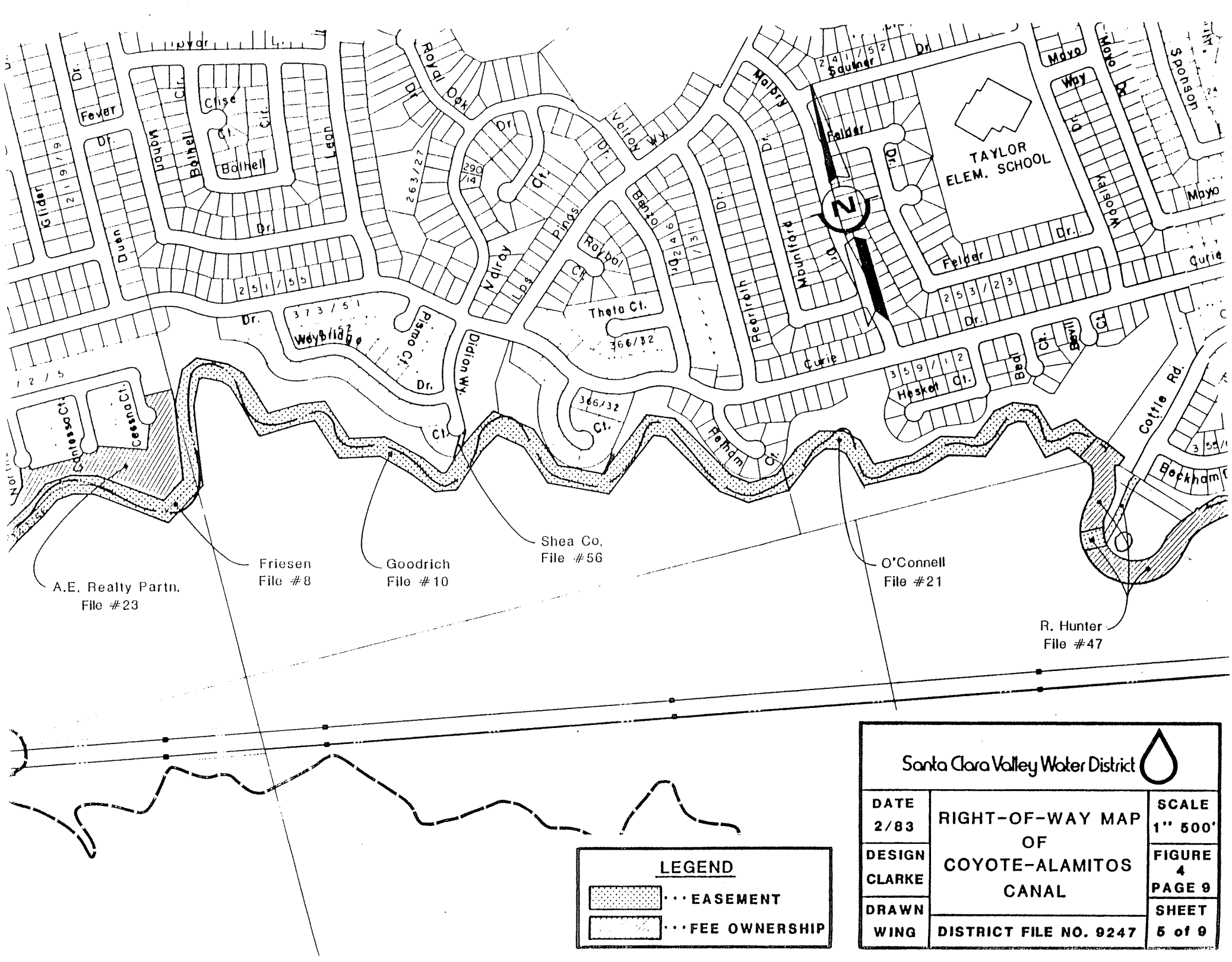
Santa Clara Valley Water District

DATE 2/83	RIGHT-OF-WAY MAP OF COYOTE-ALAMITOS CANAL	SCALE 1" 500'
DESIGN CLARKE		FIGURE 4 PAGE 9
DRAWN WING	DISTRICT FILE NO. 9247	SHEET 3 of 9



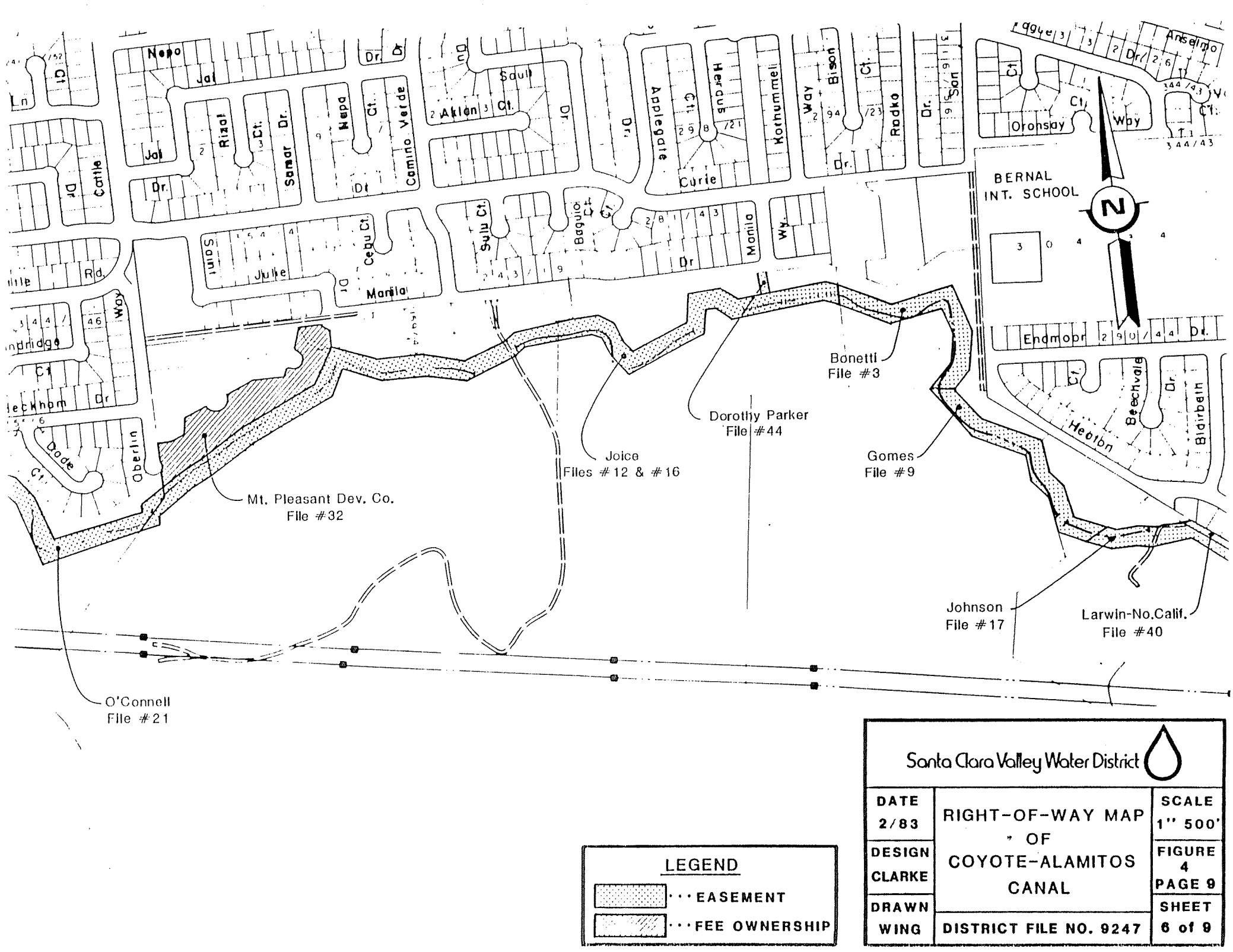
Santa Clara Valley Water District

DATE 2/83	RIGHT-OF-WAY MAP OF COYOTE-ALAMITOS CANAL	SCALE 1" 500'
DESIGN CLARKE		FIGURE 4 PAGE 9
DRAWN WING	DISTRICT FILE NO. 9247	SHEET 4 of 9



Santa Clara Valley Water District

DATE 2/83	RIGHT-OF-WAY MAP OF COYOTE-ALAMITOS CANAL	SCALE 1" 500'
DESIGN CLARKE		FIGURE 4 PAGE 9
DRAWN WING	DISTRICT FILE NO. 9247	SHEET 5 of 9



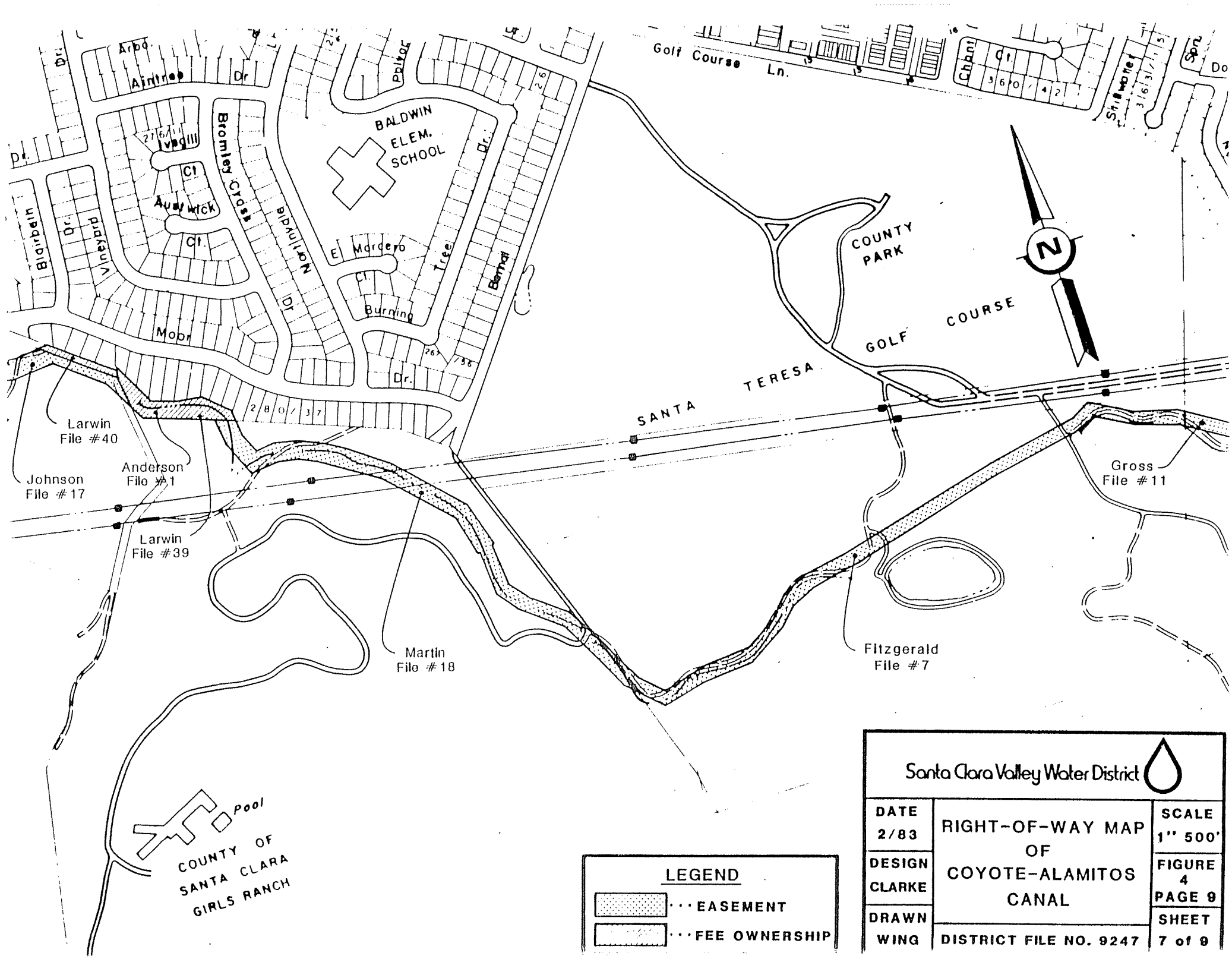
LEGEND

EASEMENT

FEE OWNERSHIP

Santa Clara Valley Water District

DATE 2/83	RIGHT-OF-WAY MAP OF COYOTE-ALAMITOS CANAL	SCALE 1" 500'
DESIGN CLARKE		FIGURE 4 PAGE 9
DRAWN WING	DISTRICT FILE NO. 9247	SHEET 6 of 9



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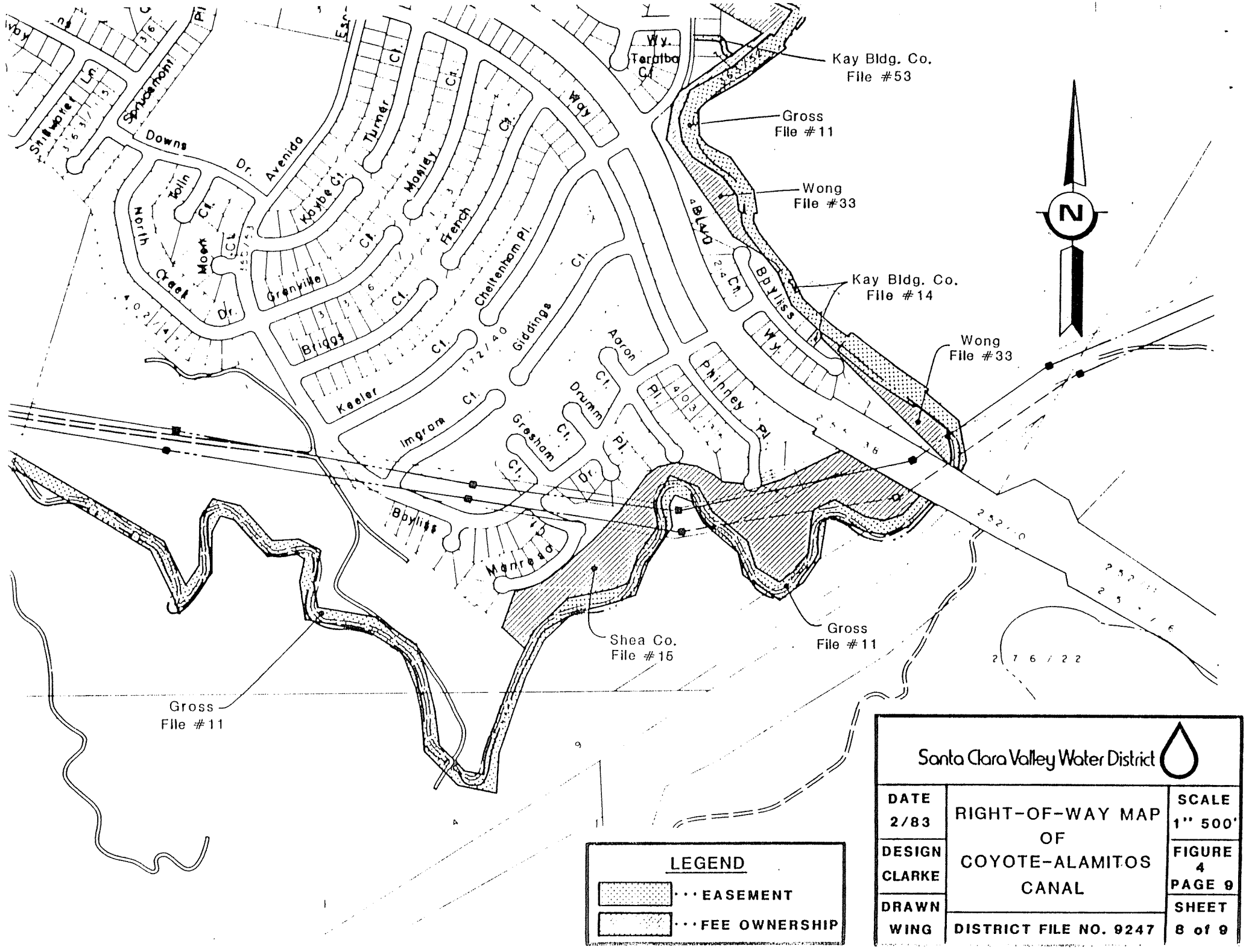
DATE 2/83	RIGHT-OF-WAY MAP OF COYOTE-ALAMITOS CANAL	SCALE 1" 500'
DESIGN CLARKE		FIGURE 4 PAGE 9
DRAWN WING	DISTRICT FILE NO. 9247	SHEET 7 of 9



LEGEND

EASEMENT

FEE OWNERSHIP

Santa Clara Valley Water District

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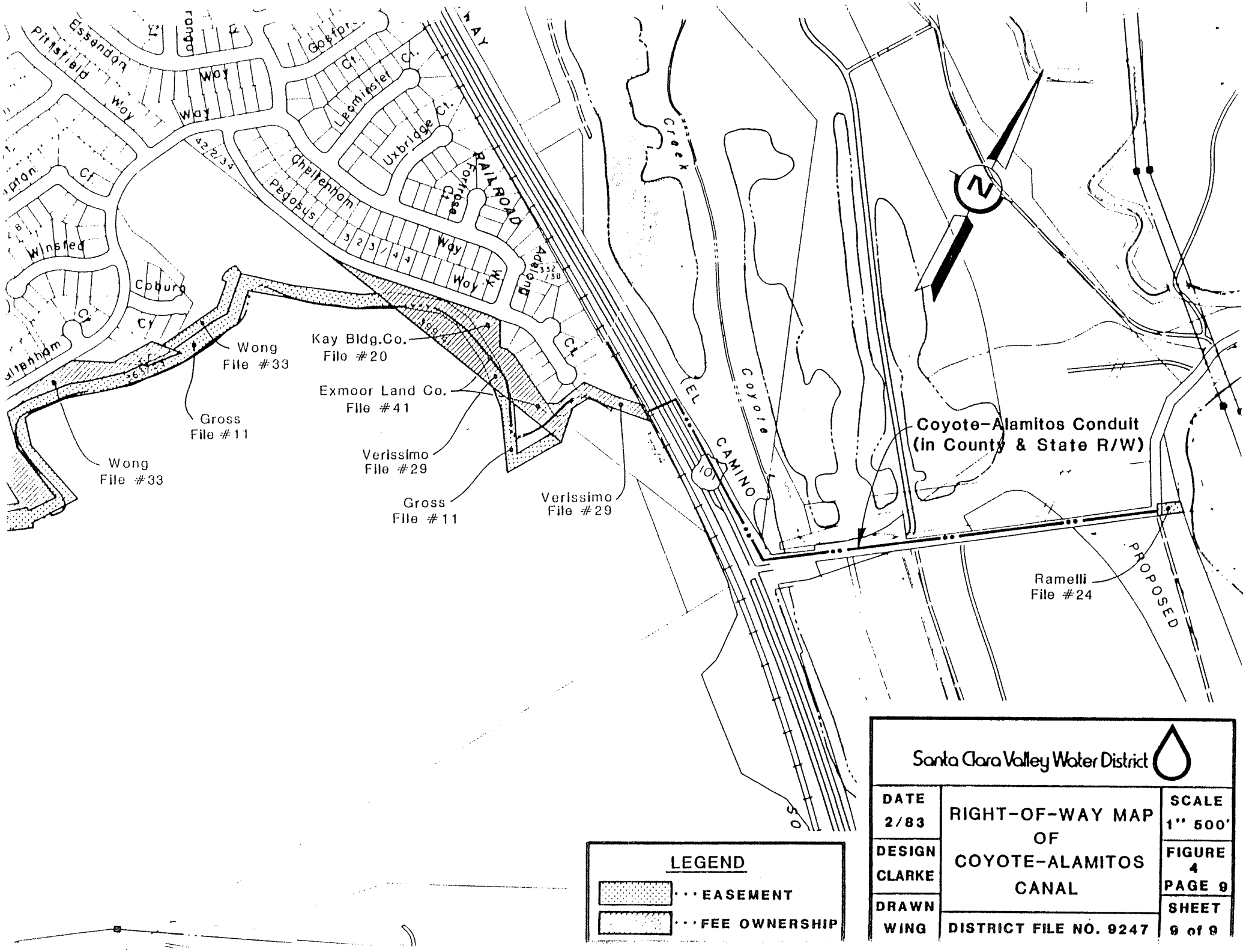
DESIGN CLARKE		FIGURE 4 PAGE 9
DRAWN WING	DISTRICT FILE NO. 9247	SHEET 8 of 9



Santa Clara Valley Water District

DATE 2/83	RIGHT-OF-WAY MAP OF COYOTE-ALAMITOS CANAL	SCALE 1" 500'
DESIGN CLARKE		FIGURE 4 PAGE 9
DRAWN WING	DISTRICT FILE NO. 9247	SHEET 9 of 9

TABLE 2

COYOTE-ALAMITOS CANAL RIGHTS OF WAY

File No.	Grantor	Title	Date	Book	Page	Acres
9247-01	Anderson, C., et ux.	EO	11/09/53	2754	471	0.960
02	Anguiar, Joe, et ux.	EP	11/28/56	3670	557	12.020
03	Bonetti, James, et ux.	EP	02/03/56	3405	583	1.720
04	Bowen, Louise C.	EP	10/16/58	4202	476	3.130
04.01	Lawton, George H., et ux.	EX	09/15/75	B611	450	0.080
04.02	New Era Industries, Inc.	EX	11/15/78	E096	504	1.818
04.03	Ponderosa Homes	EX	04/01/80	F240	380	0.319
06	New Era Industries, Inc.	EM	08/15/78	D888	137	0.481
07	Fitzgerald, Thomas J.	EP	11/10/54	3006	542	5.410
08	Friesen, Ed, et ux.	EP	01/03/56	3376	199	15.080
08.01	Canoas Valley Properties	EX	12/15/78	E167	102	14.156
09	Gomes, Manuel M., et ux.	EP	01/15/54	2794	619	1.860
10	Goodrich, Lorena L.	EP	11/19/57	3940	304	7.060
11	Gross, E. B. Trust	EP	08/16/62	5686	13	16.100
12	Joice, Alora P.	EP	08/15/58	4150	361	3.810
12.01	Joice, Patrick	EX	07/21/81	G226	606	0.445
13.01	Piazza Properties Ltd.	EX	11/15/78	E096	516	4.040
14	Kay Bldg. Co.	EO	09/08/77	D128	556	0.030
14	Kay Bldg. Co.	FO	09/08/77	D128	556	0.142
15	Shea, J. F. Co., Inc.	FM	06/30/78	D783	137	10.862
16	Joice, Alora P.	EP	08/15/58	4150	332	2.630
17	Johnson, Mary E., et vir.	EP	08/21/53	2707	399	1.240
18	County of Santa Clara (formerly Martin)	EP	07/17/62	5648	595	3.800
9247-19	Medeiros, Anthony F., et ux.	EP	02/23/54	2819	272	3.990
20	Kay Bldg. Co.	FE	09/22/78	D970	402	2.657
20.01	White Star Investment Co.	FX	07/09/81	G204	248	0.444
21	O'Connell, M. J., et ux.	EP	02/13/58	4004	595	6.110
21.01	Hunter, Richard A., et ux.	EX	01/25/78	D427	470	0.810
23	A. E. Realty Partners	FO	09/12/78	D944	370	6.073
24	Ramelli, Dora, et al.	EP	05/02/61	5154	422	0.093
25	Kaiser-Aetna	EE	12/15/78	E167	120	1.824
26	Tager, Robert C., et ux.	FO	10/20/78	E040	683	1.111
27	Valley Christian Schools	EM	08/15/78	D888	141	1.948
29	Verissimo, Joseph, et ux.	FP	08/21/53	2707	394	1.580
30	Ponderosa Homes	EE	04/01/80	F240	388	0.022
31	Valley Christian Schools	EO	09/08/80	F567	437	0.079
32	Mt. Pleasant Dev. Co., Inc.	FO	07/21/81	G226	614	4.184
32.01	P.T.&T.	EX	02/01/82	G582	396	0.049
33	Wong, Lok Keu, et al.	EO	07/09/81	G204	252	0.468
33	Wong, Lok Keu, et al.	FO	07/09/81	G204	252	8.276
39	Larwin-No. Calif., Inc.	FO	03/29/71	9270	396	0.895
40	Larwin-No. Calif., Inc.	FO	11/10/71	9584	722	0.097
41	Exmoor Land Co.	FO	05/11/73	0361	77	1.580
41.01	Miller, Richard E., et ux.	EX	09/25/78	D973	569	0.014
42	Kaiser-Aetna, et al.	EE	12/15/78	E167	114	5.286
43	Murfin, Frank B., et ux.	FO	12/29/75	B794	238	0.076
44	Parker, Dorothy I.	EP	06/07/74	0934	185	0.023
9247-46	Lawyers T.I. Corp (Arcadia)	FP	04/16/76	B975	103	1.928
46.01	Chrusciel, Gerald T., et ux.	FX	10/20/78	E040	693	0.007
47	Hunter, Richard A., et ux.	FO	06/18/75	B469	262	2.162
48	Wiebe, Betty	EE	12/15/78	E167	117	1.089
49	Friesen, Ed, et ux.	EE	12/15/78	E167	122	3.944
52	Lawton, George H., et ux.	EP	09/15/75	B611	454	0.080
53	Kay Bldg. Co.	EO	09/17/75	B616	329	0.098
56	Shea, J. F. Co. Inc.	EO	02/09/76	B859	640	0.051

Right of Way Totals

Title	Acres	Title	Acres
FP- Fee Purchased	1.928	EP- Easement Purchased	85.736
FO- Fee-Ordinance Dedication	24.596	EO- Easement-Ordinance Dedication	1.686
FM- Fee-Miscellaneous Dedication	10.862	EM- Easement-Miscellaneous Dedication	2.429
FE- Fee Exchange	2.657	EE- Easement Exchange	12.165
FX- Fee Deeded Out (less)	0.451	EX- Easement Deeded Out (Less)	21.894
TOTAL ALL FEE	39.592	TOTAL ALL EASEMENT	80.122

Limitations on Use of Land and Easements

The District is subject to some limitations on what can be done with its land and easements.

Limitations on Fee Ownership

All of the land owned in fee by the District along the canal right of way was acquired by the District because the land was not developable. The limit on development resulted from the fact that the land either underlay the canal or was just downslope of the canal in an area where development could cause the canal or the underlying land to slide. As long as the canal or a similar structure exists on the hillside, these restrictions on land use will persist and the land will have, therefore, very little value.

The main limitation on the sale of the land is that the District must give the public entities responsible for parks or public housing within whose jurisdiction the property lies the opportunity to purchase the property for fair market value before it is offered for sale on the open market. In the case of the Coyote-Alamitos Canal, the property would have to be offered to the City of San Jose, Santa Clara County, any regional park authority covering the area and the State Resources Agency.

If a parcel of land purchased from the District includes some of the canal structure and the purchaser is aware of this fact, then the liability associated with the existence of the canal structure becomes the responsibility of the purchaser.

Limitation on Easement

According to a typical Grant of Easement upon lands underlying the canal, the District may . . . "construct, install, repair, reconstruct, maintain and operate a canal and pipeline for the transmission of water . . ". Those are the only purposes to which the land may be put under that grant. The land could not be used, for example, to dispose of fill, for public recreation or for transmission of substances other than water. In the Grant of Easement, the District also agrees to hold the grantor landowner free from liability for damage resulting from the existence of the canal.

If the District sold the easement, the purchaser would be bound by the same limits and subject to the same promise to indemnify the underlying landowner as the District now is. Therefore, it is unlikely that the District would be able to sell the easement to anyone except perhaps San Jose Water Company or Great Oaks Water Company for potable water pipelines or to the City of San Jose for collection and transmission of local runoff.

If the District wishes to abandon the easement, it can quitclaim its rights to the owner of the underlying land if the owner will accept it. However, since the easement protects the landowner from liability because of the existence of the canal, landowners probably will not accept a quitclaim while the canal structures still exist. Therefore, abandoning the easement requires, as a practical matter, that the canal and appurtenances be removed.

While the law does not require it, the District has historically, as a matter of courtesy, notified the county and the city in which the easement is located of its intention before abandoning or quitclaiming its easement. This notification affords the local agency the opportunity to buy the land upon which the easement exists.

CHAPTER III

GEOLOGICAL SETTING

Geology

The geological formations along the canal consist of Franciscan units of sandstone, shale, greenstone, and chert. Also included are other units such as silica-carbonate, serpentine, and alluvium. Greenstone and chert units are encountered at random locations. The sandstones are generally hard, but in some locations intensely fractured and sheared. Depth of weathering varies. The shale is generally weak and highly fractured. The greenstone is fragmental while the chert is well bedded, hard, resists weathering, and forms bold outcrops. Serpentine has intruded as linear zones into the Franciscan Group. Local occurrences of serpentine are found along the canal and it also comprises most of Tulare Hill near the east end of the study area. The serpentine is generally sheared and weathered. Shales, associated with sandstone, are found at the higher elevations of the Santa Teresa Hills. The shales are dark gray and thinly bedded. The canal only encounters this formation at one location, but colluvium derived in part from this formation is encountered in the west end of the study area. Silica-carbonate, formed by hydrothermal alteration of serpentine, is found as "vein like" zones at locations along the canal. This rock unit forms bold outcrops. Alluvium is comprised of unconsolidated gravel, silt and clay.

The Franciscan units have been arranged into folds with an eastward trend. Attitudes generally show a southerly dip along the western portion of the alignment while the eastern portion dips northerly.

The Coyote-Alamitos Canal is located along the northern margin of a major structural feature called the Santa Teresa Block. The Shannon Fault separates this structural block from the Los Capitancillos Block to the south. The Shannon Fault is at the closest point about 1.5 miles south of the canal. Active fault zones are located several miles both to the east and west of the study area. These include the

San Andreas, Hayward, Calaveras, and Sargent Faults. None is located close to the canal alignment.

Description of Landslides Along Coyote-Alamitos Canal

A large number of landslides are present along the alignment. Most of these, formed by natural processes such as erosion and mass wasting, would be classed as old and inactive. Construction of the canal and other grading have caused a portion of some slides to become active. In general, the active slides are classed as shallow debris slides and occur in old slide debris and the residual soil zone. Some of the older slide debris are classed as rotational. Active creep conditions exist along the steeper slopes adjacent to the canal.

The active slides generally show movement only during the winter months, and for the most part, cause only minor maintenance problems. However, since the advent of residential development in proximity to the canal and the resulting difficult access to the area downslope from the canal, the consequences of sliding have become serious.

Conditions Influencing Slope Stability

Factors contributing to landslides along the Coyote-Alamitos Canal are geologic structure, saturation, cut slopes, seismic activity, and drainage. Failure along weak bedding planes or along joints within the formations contributes to landslide development, especially along the eastern portion of the alignment. Saturation, either from rainfall, leakage from the canal, or irrigation of slopes by landowners above and below the canal also could be a principal contributor to the development of landslides. In addition, if urban development without a sewerage system is allowed upslope from the canal, septic tank leach fields could place large volumes of water into the subsurface resulting in saturated conditions throughout the year. Modification of drainage by altering surface runoff and concentrating flows could result in ponding and increased saturation.

The grading required to construct the canal resulted in oversteepening slopes that were already just stable. This resulted in accelerated creep and, in zones of old landslides, slope failure. The embankment zone of the canal, because of steep slopes and inadequate compaction according to today's standards, is especially subject to erosion and mudflows.

Periodic seismic activity occurs along the active faults in the region. While seismic events have affected the study area in the past, neither cut slope nor embankment failures have been noted. However, very strong shaking could result in extensive sliding.

Summary

Based on historical evidence and knowledge of the local geological conditions along the canal, it can be stated that slides into the canal and erosion of the canal's service road embankment will continue.

CHAPTER IV

PRESENT USE

Operation

The first day of operation of the Coyote-Alamitos Canal was May 15, 1954. To date some 70,700 acre-feet of water from the Coyote Watershed has been conveyed through the canal. As shown in Table 3, the annual quantities have varied as to the need and availability of supply from 13,665 acre-feet to no flow. However, since the 1975-76 water year, the only diversions were for irrigation of the adjacent Santa Teresa County Park. During this time imported water from the South Bay Aqueduct satisfied the needs previously furnished by the Coyote-Alamitos Canal. Since the County Park is no longer dependent upon this water, the only purpose of the canal at present is emergency use in the event of a shut down of other elements of the In-County Water Distribution System.

When the decision was made to build the Almaden Valley and Cross Valley Pipelines, the District determined that it would be significantly less expensive to the District to deliver water to the Alamitos Creek and Guadalupe Creek recharge areas via those pipelines than via the canal. For this report, a reanalysis was made of the costs of delivering water via pipelines versus the Coyote-Alamitos Canal for the year 2020. The year 2020 was selected because it represented the year of full development of the system, maximizing both delivery opportunities through the canal and power savings at the Bureau of Reclamation's proposed Coyote Pumping Plant. Costs were based on the present worth of expected future costs in order to reflect the fact that energy costs are expected to increase at a rate greater than the overall rate of inflation.

Considering that the pipelines are being constructed to carry the required flow, the results of the reanalysis showed that, in the year 2020, the cost to the District to use the canal would be a minimum of $22 per acre-foot versus no significant net cost to use the pipelines.

TABLE 3

WATER DIVERTED THROUGH COYOTE-ALAMITOS CANAL

YEAR	QUANTITY (AC. FT.)	MAX. FLOW RATE (CFS)
1953-54*	442	10
1954-55	3,570	27
1955-56	0	0
1956-57	5,022	23
1957-58	4,303	47
1958-59	2,788	26
1959-60	13,665	42
1960-61	4,840	33
1961-62	1,059	30
1962-63	1,400	10
1963-64	3,107	27
1964-65	1,104	6
1965-66	1,308	18
1966-67	1,165	8
1967-68	3,278	16
1968-69	902	10
1969-70	4,645	38
1970-71	591	6
1971-72	5,654	49
1972-73	974	11
1973-74	5,801	49
1974-75	2,292	20
1975-76	2,374	27
1976-77	0	0
1977-78	226	1
1978-79	186	2
1979-80	0	0
1980-81	0	0
1981-82	0	0
TOTAL	70,696	

* First day of flow on May 15, 1954.

Use of the Coyote-Alamitos canal would reduce the power used at the Covote Pumping Plant slightly saving the Bureau of Reclamation the amount that it would cost to pump the water through the Cross Valley Pipeline. This amounts to about $10 per acre-foot, based on projections from current WAPA energy rates. This confirms earlier studies that use of the canal as an operating part of the In-County Water Distribution System is more costly to the District and to the "nation as a whole."

Present Condition of Canal

Since the 1978-79 water year, no water has been conveyed through the canal. Because the canal is not used and is expensive to maintain, it has not been kept ready for water transmission. Furthermore, a large section of the Metcalf Siphon at Coyote Creek was destroyed during the April 1982 floods and has not been replaced. It has been estimated that the cost of replacing the broken section of siphon and bringing the canal up to a reasonable standard for operation would be at least $300,000 in 1983 dollars. Once in service, based on historical costs, estimated annual operation and maintenance costs would be $100,000.

Runoff Protection

The Coyote-Alamitos Canal intercepts some sheet flow from the Santa Teresa Hills. The sheet flow and the erosion products it carries collect in the canal and are prevented from reaching the homes located at the base of the hills. The flow intercepted is local drainage which is discharged from the canal into local storm drains through existing wasteways. Its control is not a responsibility of the District.

The canal was not intended to collect local drainage and has not been operated by the District for this purpose. The fact that some of the sheet flow is intercepted may be of some minor benefit to the owners of property at the base of the hill. However, the collection of the sheet runoff in the canal also creates a significant hazard in that the collected water, if inadvertently released, could cause substantial damage. Inadvertent

releases can be caused by such things as vandalism, blockages in the canal, collapse of the canal embankment, movement of the hillside or slides that enter the canal prism.

In summary, the canal may reduce the annoyance resulting from sheet runoff entering some properties at the toe of the hill; however, it accomplishes this in a manner that results in the potential for significant damage if the collected runoff escapes from the canal. There is no legal bar to removing the canal and returning the hill to its original contour. As long as the canal exists, releases of water collected in it could subject homeowners to damage and the District to potential liability.

Costs

From 1976 thru 1982, the District has spent an average of $30,000 per year (March 1983 dollars) to provide minimal maintenance for the canal. In addition, including estimates of damages in fiscal year 1982-83, the District has paid or will pay damages of between $11,000 and $22,500 per year to persons who experienced some injury resulting from the canal ($10,000 was used in this analysis).

CHAPTER V

ALTERNATIVE USES

Introduction

In late 1984 or early 1985, construction of the Almaden Valley, Cross Valley and Anderson Force Main Pipelines of the In-County Water Distribution System will be completed. The functions the Coyote-Alamitos Canal was designed to perform then will be served by the new system. At that time, the District can take one of three approaches to the canal; continue present operations, upgrade as a standby facility or abandon or transfer the canal.

Alternative 1 - Continue Present Level of Maintenance

This alternative assumes that money would be budgeted and spent on the canal in the future only as necessary to correct the effects of slides that could endanger downslope properties or block the channel. The canal would not be returned to a condition where it could be used for water supply purposes. Based on District experience over the last seven years, the cost of this level maintenance would be $30,000 per year. The liability is estimated to average $10,000 per year.

The only benefit to the District of this alternative is that there is no initial cost. Because the canal would remain inoperable, this alternative provides no water supply benefits.

The disadvantages of this alternative are that it would maintain in existence an obsolete, inoperable District facility that would be a continuing source of maintenance expenses and potential liability to the District.

Alternative 2 - Restore to Use for Standby Operation

In this alternative, the canal would be restored to a condition where it could be used to supply water for groundwater recharge to the Alamitos and Guadalupe Ponds if, in an emergency, the Cross Valley and Almaden Valley Pipelines could not be used.

Based on District experience with the Central Pipeline, these pipelines would be out of service for a maximum of about five days (on the average) once every 30 months. Initially, the canal will require extensive restoration work to make it operable. It is estimated that the cost of replacing a broken section of the Metcalf Siphon and work to restore the canal to operational condition would be at least $300,000 (1983 dollars). This alternative would not involve upgrading the geological stability of the canal and adjacent service road. Based on past experience, annual maintenance costs are estimated to be $100,000. The operation costs for a five-day period are estimated to be minimal. Because the canal would be better maintained, the liability would be less than in Alternative 1; it was assumed to be $5,000 per year.

This alternative has the benefits that it would provide a facility that would allow deliveries of water to the Guadalupe and Alamitos Recharge Facilities to continue even if the Almaden Valley Pipeline or the Cross Valley Pipeline were out of service. However, this benefit is minor. The Guadalupe and Alamitos Ponds also could be supplied in an emergency by increased releases from Guadalupe, Almaden and Calero Reservoirs if the canal did not exist. In addition, if a supply interruption occurred, recharge would continue for several days simply because there would be water in the ponds. Finally, if an earthquake or similar catastrophic event occurred which was severe enough to cause extensive damage to the Cross Valley or Almaden Valley Pipelines, the canal probably would be rendered useless as well, given the geological conditions of the hillside upon which it is located. Therefore, there is probably no benefit to be gained from rehabilitating the canal for uses in a severe emergency.

This alternative has several disadvantages. The canal would be empty more than 99 percent of the time. As in Alternative 1, the canal would continue as a possible danger to adjacent properties would be a physical hazard to local residents and would be a continuing source of claims against the District. This alternative also has both high initial costs and the highest ongoing maintenance costs.

Alternative 3 - Abandon or Transfer Canal Rights to Others

In this alternative, the District would dispose of the canal and associated easements and landholdings in such a way as to eliminate further District responsibility. This transfer can be done in three ways, each of which is treated in this report as a subalternative:

- Alternative 3A - Transfer the canal as is to another public agency for drainage control;
- Alternative 3B - Transfer the canal properties to another public agency for use as park/park trail;
- Alternative 3C - Remove canal, restore canal right of way to original condition and dispose of the property rights to underlying or adjacent landowners.

For each alternative above the east portion of the canal right of way, the Metcalf Siphon, could be converted to a wasteway for the Coyote Canal Extension to Coyote Creek at nominal cost. The west portion of the siphon could be used by the City of San Jose or other public agency to convey storm drainage under the Southern Pacific Railroad right of way and Monterey Highway to Coyote Creek.

In each of these alternatives the maintenance and liability costs are estimated to be zero.

Alternative 3A: Transfer to Other Public Agency for Drainage Control

In this alternative, ownership of the canal and associated easements and land would be transferred to the City of San Jose. The City then could alter the canal by adding structures periodically along its length to convey all runoff collected by the canal into the City's storm drain system. In this way, the runoff still would be collected and would not reach homes at the base of the slopes. However, the water would quickly be conveyed into the storm drain system by the new drain structures and the hazard posed by having a structure upslope of houses storing large amounts of water would be eliminated. The City of San Jose is the appropriate local jurisdiction because the area is

within the City's Sphere of Influence. Since the canal would continue to exist, no development would be permitted on the land the District owns and the value of the land and its sales price would be very low.

This alternative has the advantage that runoff from the hills is collected and prevented from reaching the properties at the toe of the hills without creating the present hazard of sudden flows of large amounts of water. In addition, the District would end its responsibility for the canal at no cost to itself.

The main disadvantage is that the City may not wish to provide this service.

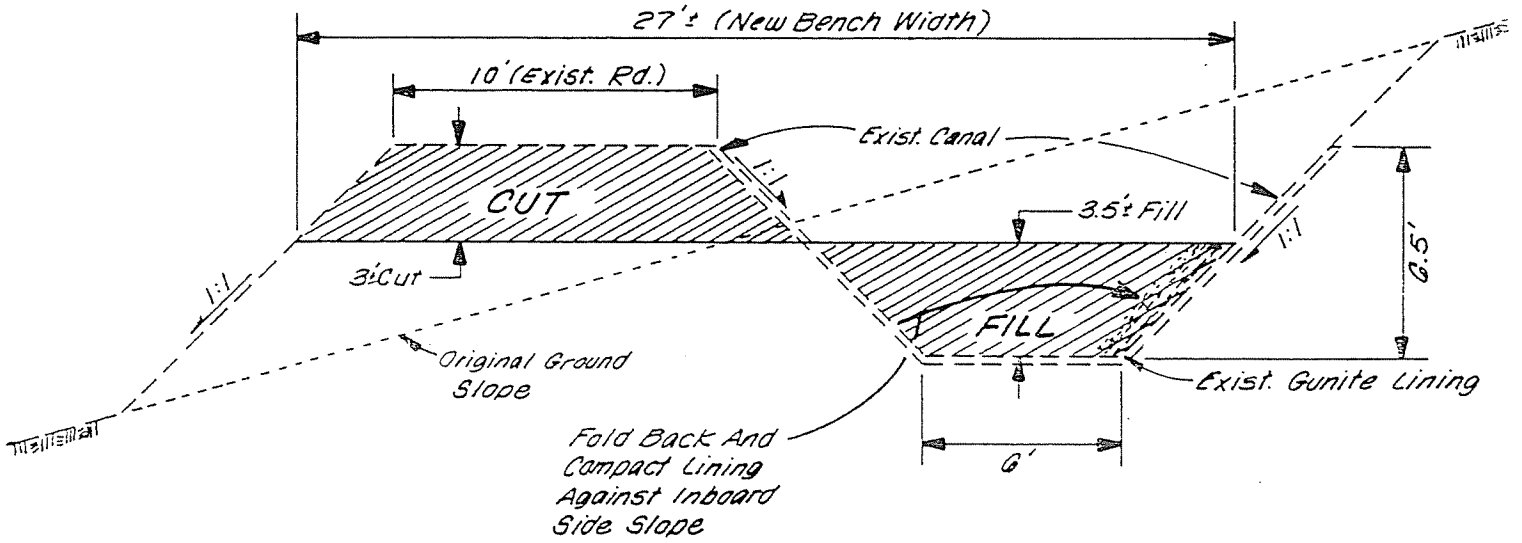
Alternative 3B: Transfer to Other Public Agency for Park Purposes

In this alternative, the responsibility would be transferred to a public agency which would use the canal route and road as a park or park trail to connect parks along the north side of the Santa Teresa Hills.

The City of San Jose, Santa Clara County, the Mid-Peninsula Regional Open Space District and the State Resources Agency all could be interested in using the canal route for park or trail purposes. A trail could easily be constructed by destroying the canal lining and regrading part of the maintenance road into the canal prism as shown in Figure 5; some form of runoff collection system would still be needed to protect the regraded bench from eroding. The agency that wants to use the canal route for park purposes would have to acquire the land upon which the District has easements from the underlying owner and buy the land the District owns from the District. The District would then quitclaim its easements to the public agency. The money the District received from the sale of land it owns would be minimal because the canal or similar structures would continue to exist.

This alternative has the advantage that the District would no longer be responsible for the canal. There are no disadvantages for the District. However, it may be difficult to convince another agency to acquire the canal for park purposes.

BENCH GRADING
OF
COYOTE-ALAMITOS CANAL



CANAL CROSS SECTION
Not To Scale

FIGURE 5

Because the City of San Jose could use the canal both to control local drainage and for park purpose, it is the public agency most likely to take over the canal.

Alternative 3C - Transfer to Underlying Landowner

In this alternative, the canal lining would be destroyed and spoil along the canal route would be moved, regraded and compacted to restore the contours of the canal right of way to as close to their original state as is possible. The easements would then be quitclaimed to the underlying owners and the District would sell the land it owns on the open market. Before the District could undertake the action it would be required to offer the land it owns in fee to other public agencies. The District also would have to prepare an engineer's report detailing how the work would be accomplished and an environmental impact report.

The construction work required to restore the hillside contours would include the following tasks:

- Dispose of the gunite canal lining. For the purposes of cost estimating, the method of disposal was assumed to involve crushing the gunite, folding the lining in thirds longitudinally and anchoring it to the slope of channel prism closest to the hill. Care would have to be taken to insure that the gunite is broken up into as small pieces as possible and well mixed with dirt before compacting.
- Move, regrade and compact the approximately 300,000 cubic yards of material underlying the maintenance road to restore the hills to as close to their original contours as possible.
- Revegetate the regraded area with natural grasses.
- Plug both ends of the six siphons (not the siphon under Coyote Creek) with about one cubic yard of concrete per plug.

The cost of this work is presented in Table 4.

TABLE 4

ESTIMATED COST (1983 DOLLARS) TO REMOVE
COYOTE-ALAMITOS CANAL AND RESTORE ORIGINAL CONTOURS OF HILLS

Mobilization (lump sum)	$ 60,000
Crush and fold nine miles of gunite lining (lump sum)	25,000
Move and regrade fill (300,000/cy x $2.50/cy)	750,000
Plug siphons (lump sum)	1,000
Revegetate (lump sum)	1,000
Contingencies (15%)	126,000
Total Construction Cost	963,000
Engineering and Inspection (15%)	145,000
Total Cost	$1,108,000

Once the hillside contours had been restored the District would attempt to sell the 39.6 acres it owns in fee. Much of this acreage consists of long narrow strips of land that are either landlocked or are not capable of independent development. However, these strips may have some limited plottage value to adjacent owners of residential property. There also may be some potential for development of a few residential building sites on portions of this land that have greater depth if geologic and access problems can be resolved. Based on these factors, the sale value of the land the District owns in fee is about $450,000.

Prospective buyers would be made aware of the existence of the abandoned appurtenances since any future liability would become their responsibility. The present owners of the adjacent lands from which the canal right of way the District owns in fee was obtained could be given first opportunity to acquire the respective parcels of land.

The advantages of this alternative are that the District disposes of the responsibility of the canal. The disadvantage is the large initial cost and the bad public relations and perhaps lawsuits that could result if homeowners at the base of the slope attribute flooding on their land to removal of the canal.

CHAPTER VI

EVALUATION OF ALTERNATIVES

The alternatives presented in the previous chapter are compared in this chapter based on both economic and non-economic factors and a course of action is recommended.

Economic Comparison

The economic costs and benefits of each alterantive are summarized in Table 5. The present worth of the initial and annual cost of each alternative is based on twenty years with average interest rates equal to inflation.

As can be seen from Table 5, Alternatives 3A and 3B are economically the most favorable to the District because they have no ongoing maintenance costs and no initial costs. In Alternative 3C, some of the initial cost will be balanced by revenue from land sales depending on how much of the land is usable.

TABLE 5

Summary of Economic Costs of Alternatives

	Alternative Description	Initial Cost ($1000)	Annual Cost ($1000/yr)	Possible Revenue ($1000)	Present Worth of Total Cost* ($1000)
1.	Do Nothing	0	40*	0	800
2.	Improve canal for standby use	300	105*	0	2,310
3A. or 3B.	Transfer to another agency	0	0	0	0
3C.	Return land to pre-canal contours	1,108	0	450	658

*Includes costs both for operation and maintenance and for payment of damage claims.

Non-Economic Comparison

The non-economic advantages of each alternative are summarized in Table 6. Both Alternatives 3A and 3B have the major advantage that the District eventually would cease to have responsibility for the canal. Alternative 3A has the advantage that homeowners at the base of the Santa Teresa Hills would be protected from annoyances caused by runoff from the hills. Alternative 2 has the advantage that a backup system exists for the Cross Valley and Almaden Valley Pipelines; however, this benefit is very minor.

Alternative 3A has the most advantages and, therefore, is favored in the non-economic comparison. All alternatives involving disposal of the canal have more non-economic advantages that Alternatives 1 or 2.

Recommendation

Because it is both less costly and most advantageous for the District, it is recommended that the District dispose of the canal by transfer to another public agency.

If no public agency will accept the canal, then the District should plan and implement a project which removes the structure and restores the hills to their original contours.

TABLE 6

SUMMARY OF NON-ECONOMIC ADVANTAGES OF ALTERNATIVES

Alternative	Description	ADVANTAGES		
		Protects Homeowners at Base of Hill from Runoff	District No Longer Has Responsibility	Backup System for Pipelines Exists
1	Continue present level of maintenance	-	-	-
2	Upgrade canal for standby	-	-	X*
3A	Transfer canal to public agency for drainage control	X	X	-
3B	Transfer canal to public agency for park use	-	X	-
3C	Restore contours of land and dispose of ownership	-	X	-

* Minor benefit