RIVERSIDE COUNTY FLOOD CONTROL AND
WATER CONSERVATION DISTRICT
RIVERSIDE, CALIFORNIA

MASTER DRAINAGE PLAN

FOR THE

WINCHESTER AREA

ZONE FOUR

NOVEMBER 1987

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PURPOSE

The purpose of this report is to investigate and evaluate the drainage problems of the Winchester area and to develop an economical drainage plan which provides flood protection for both existing and future development.

This Master Drainage Plan is located south of Green Acres. It is roughly bounded by State Highway 74 to the north, California Avenue to the east, and Olive Avenue to the south. State Highway 79 bisects the Plan from north to south.

The Plan presented herein will provide flood protection to the area when implemented, and will be used as a guide for the long term construction scheduling of the primary drainage facilities. The Plan will also act as a planning guide for locating and sizing local drainage facilities to be constructed by developers and others within the area.

It should be noted by the reader that this report is a master plan, and therefore, should be read and used with this in mind. Simply stated, this Plan is an overview; a study of the drainage problems that exist in a specific geographical area, and a conceptual solution to those problems. As stated elsewhere in this report, the selection of the facilities presented in this Plan is based on engineering and economic considerations and is by no means the only solution.

The alignment and location of the facilities proposed in this Master Drainage Plan are general; precise facility locations will be dictated by conditions and other factors existing at the time of design. Similarly, the sizing information shown on the enclosed map is preliminary. A more detailed analysis performed at the design stage will determine final sizing.

SCOPE

The Winchester area is divided into separate drainage networks by reason of the existing physical terrain. Runoff from the area enters the Hemet and Salt Creek Channels at various points.

The drainage area receives inflows from the Green Acres area located to the north and which is the subject of a report prepared by the Riverside County Flood Control and Water Conservation District of Riverside, California, entitled "Report on Master Drainage Plan for the Green Acres Area, Zone Four, Kenneth L. Edwards, Chief Engineer", dated July 1981.

The drainage area covered by this Plan consists of approximately 10.9 square miles, and ranges from flat valley terrain to foothills with steep slopes. The extent of the studies establishing this Master Plan include:

1. Preparation of a drainage area map.

2. Determination of the quantity and points of concentration of storm runoff in the area.

3. Determination of the location and size of the proposed drainage facilities.

4. Investigation of alternative routes and methods as a basis for selecting the most economically and engineeringly sound plan.

5. Preparation of preliminary design plans and supporting cost estimates.

GENERAL DISCUSSION

This report provides a Master Drainage Plan for the Winchester area. The Plan consists of a system of open channels and underground storm drains. The proposed facilities will carry storm runoff through this area, outletting into the Hemet Channel and Salt Creek Channel.

One of the main goals of this Master Plan is to properly collect the 100 year storm flows from Green Acres and convey them safely through the Winchester area, outletting them into the Hemet Channel. Additionally, local urbanized runoff is also addressed.

Presently the runoff from the hills north of the community of Winchester, from low intensity storms, generally accumulates along the north side of the railroad tracks and then flows westerly to undeveloped areas and then under the railroad tracks through a wood frame structure and thence southerly across open fields toward the Salt Creek Channel. However, runoff from high intensity storms overflows the railroad tracks into the downtown commercial areas of Winchester causing deeper local flooding and, additionally, interference to traffic on State Highway 79.

This Master Drainage Plan presents, what is believed to be, the most economical plan for providing drainage for storms of an intensity which occur on an average of once every 100 years within the Winchester area and environs to the east and north including inflows from the Green Acres area.

For purposes of the Master Drainage Plan, ultimate improvements to the Hemet and Salt Creek Channels, the Green Acres Dam and Cortrite Dam proposed in the Green Acres Master Drainage Plan, are assumed to be in place. Obviously then, the protection offered by some of the facilities proposed by this Plan will not be fully realized until construction of these facilities is complete.

CRITERIA

The facilities proposed in this Plan are intended primarily to collect and control storm flows emanating from the Green Acres area and local foothills and convey them safely through the lower valley area outletting them into the Hemet Channel and Salt Creek Channel. Additionally, local urbanized runoff is also addressed.

Open channels are generally considered the only economically feasible means of transporting large flood flows for any appreciable distance and are used where possible. In addition to their role as flow conveyors, open channels provide an outlet for the underground facilities proposed in this Plan as well as local drainage facilities to be built by developers and others. All of the open channels proposed in this report are intended to carry the runoff from a 100 year frequency storm.

The underground facilities shown in this Plan are proposed only where the application of open channels is not feasible, either because of topographic constraints or existing development. Most of the underground facilities are sized to carry the runoff generated by a 10 year storm event. During a 100 year storm event, the excess flow is expected to be carried in the street section above the facility. In some cases where this is not possible or where dictated by other reasons, underground facilities are sized to convey the 100 year storm runoff. Where possible, the underground storm drains proposed in this Plan are located in existing or future street rights of way.

The alignments of all channels and underground storm drains are based on hydraulic efficiency, engineering judgment, and economics.

HYDROLOGY

Two methods of hydrology were used in this Plan to determine design discharges. For smaller tributary areas, up to 500 acres in size, the Modified Rational Hydrology Method was used. The Synthetic Unit Hydrograph Method was used for larger areas. The design discharges used in sizing all future appurtenant facilities in the study area should be determined by one of these two methods.

Methodology and supportive data for the rational and synthetic hydrology can be found in the "Riverside County Flood Control and Water Conservation District Hydrology Manual", dated April 1978.

The Winchester Community falls within the land use potential of the Perris Valley Land Use Planning area in the Riverside County Comprehensive Plan. The SCAG-82 population forecast estimates this area will approximately double in population from 1980 to 2000 (37,160 to 72,000). We can infer a similar rate of growth for the Winchester Community.

Developing trends indicate residential expansion from the core of Winchester and southerly from Green Acres (east of Homeland) with a corresponding loss of agricultural land uses.

The County initiated General Plan Amendment Number 32 defines slopes exceeding 20 percent as "Mountainous", restricting the development of lots no smaller than 10 acres. There are some lands in the northwestern area which fall into this category.

The projected land use map does not indicate sites for potential park and/or school acquisition. It must be assumed, however, that as development increases, the demand for these uses will also increase. Currently Valley-Wide Park and Recreation District is considering land acquisition adjacent to Winchester Elementary School for a community park.

RECOMMENDED IMPROVEMENTS

The improvements proposed in this Plan are shown on the enclosed map found at the back of this report. Supporting data for all proposed facilities is available at the Riverside County Flood Control and Water Conservation District's office. Costs shown on the enclosed map include construction, right of way and 31% for engineering, administration and contingencies (see Table I, Cost Summary). This map not only shows proposed alignments, but pertinent preliminary size information as well as design flow rates.

The open channels proposed in this Plan consist of two types, lined and unlined. In general, a lined channel is a trapezoidal shaped facility with concrete paving on the sides and bottom. The sides slope upward from the bottom at a rate of one foot vertically for every 1.5 feet horizontally. The lined channels in this Plan range in size from a bottom width of 2 feet to 30 feet and in depth from 3.5 feet to 9 feet.

Unlined facilities are similarly shaped, except for the exclusion of the concrete paving. Also, the unlined channels have flatter sideslopes running 3 feet horizontally for every 1 foot of rise. Usually, an unlined channel is less costly to construct, but District policy restricts the ultimate use of an unlined section to instances where flow velocities are found to be non-erosive. Also, the District limits the ultimate use of an unlined section for large channels only. Small unlined channels are found to bear significant long term upkeep costs. In this Plan, only a portion of Line B, from El Callado Road to East Grand Avenue, is proposed to be unlined. In addition, the channel right of way required will accommodate the channel as well as one or two maintenance roads.

The proposed underground storm drains generally consist of reinforced concrete pipe (RCP) ranging in size from 33 inches to 66 inches in diameter. The cost of the drains shown in Table I includes manholes and catch basins in addition to the cost of the pipe installed. Manholes are located as necessary with a maximum

spacing of 500 feet. Catch basins are not specifically located but the total number of lineal feet is computed and costed.

The design engineer should be aware that during preparation of preliminary plan and profile drawings, a detailed utility search was not completed. This means that, while major known facilities were dealt with, a more thorough search may reveal utilities that will necessitate minor alignment or size changes, or utility relocations.

ALTERNATIVE STUDIES

In developing this Master Drainage Plan a number of alternatives were developed and studied for their hydraulic and economic feasibility.

An alternate alignment for Line B was explored (see Figure 1, Page 8). A preliminary study indicates that this alternative is undesirable because of severe right of way restrictions due to existing developments. Relocation of existing homes may be required.

Consideration was also given to changing the designations of Lines A, B, B-1, C, D & D-1 from open channels to underground facilities. Preliminary cost estimates indicate that placing these facilities underground is not justifiable, given the current availability of rights of way and the extreme increase in construction costs.

Another alternative involves the changing of Line E from an underground pipe to an open channel. This change of facility designation would result in a slight decrease in the cost of the facility. However, due to topographic constraints and anticipated adverse redirection of flows, this alternative was disregarded.

A number of other smaller alternatives were pursued and eventually disregarded as being too costly or not providing adequate protection.

CONCLUSIONS

Based on the studies and investigations made for this report, it is concluded that:

1. The Winchester area has experienced serious flooding problems in the past. As this area continues to urbanize these damages are expected to increase. A more orderly growth pattern can safely occur with the construction of these proposed facilities.

2. A drainage system is required to safely convey storm runoff through the area with the least interruption to public services. The Master Drainage Plan presented in this report is such a system and is the most feasible of the alternatives studied.

3. The proposed Plan lends itself to stage construction as funds become available.

4. The total cost of the recommended improvements, including construction, rights of way, engineering, administration and contingencies, is estimated to be $7,394,000.

RECOMMENDATIONS

It is recommended that:

1. The Master Drainage Plan, as set forth herein, be adopted by the Riverside County Flood Control and Water Conservation District's Board of Supervisors as part of the overall master plan for the County of Riverside.

2. The Master Drainage Plan, as set forth herein, be used as a guide for all future developments in the study area and that such developments be required to conform to the Plan insofar as possible.

3. The rights of way required for the Plan be protected from encroachment.

TABLE I

WINCHESTER MASTER DRAINAGE PLAN

COST SUMMARY

FACILITY	CONSTRUCTION	RIGHT OF WAY	TOTAL COST
Line A	$ 335,000	$ 12,000	$ 347,000
Line B	2,158,000	273,000	2,431,000
B-1	604,000	56,000	660,000
B-1A	50,000	1,000	51,000
B-2	224,000	- - -	224,000
B-3	115,000	- - -	115,000
B-4	105,000	13,000	118,000
Line C	648,000	62,000	710,000
Line D	215,000	42,000	257,000
D-1	258,000	- - -	258,000
D-1A	34,000	- - -	34,000
D-1B	61,000	- - -	61,000
D-1C	64,000	- - -	64,000
D-2	36,000	- - -	36,000
D-2A	29,000	- - -	29,000
D-3	386,000	13,000	399,000
D-3A	64,000	- - -	64,000
D-3B	30,000	- - -	30,000
Line E	384,000	- - -	384,000
Line F	837,000	- - -	837,000
Line G	285,000	- - -	285,000
TOTALS	$6,922,000	$472,000	$7,394,000

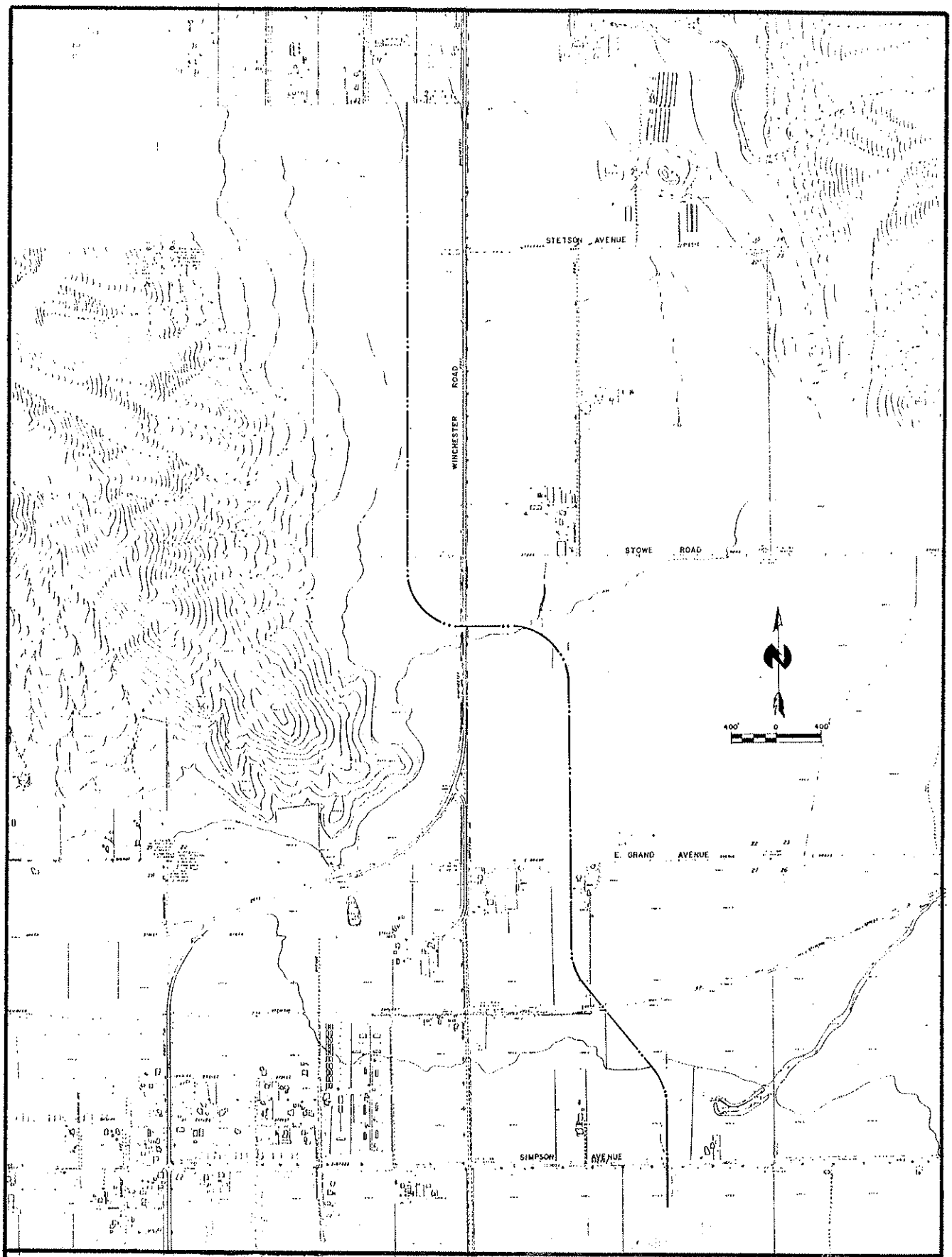

FIGURE 1 – ALTERNATE ALIGNMENT FOR LINE B