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CITY OF FONTANA

and

"SPHERE OF INLFUENCE"

MASTER STORM DRAINAGE PLAN STUDY

SUMMARY REPORT OF VOLUME I AND VOLUME IA

JUNE, 1992

PREPARED BY:

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and

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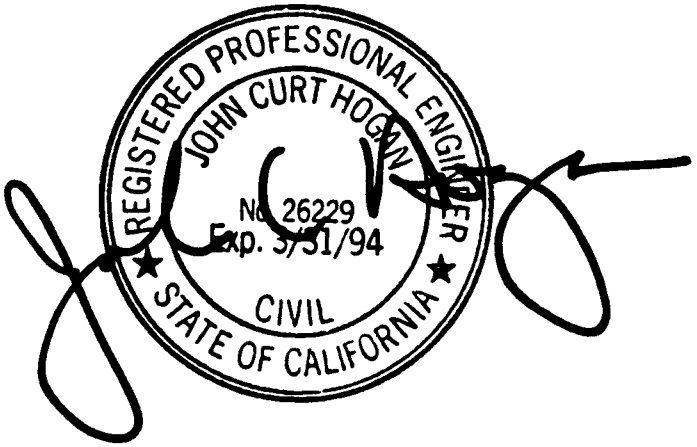
JOB #4042/Reports/Storm



Hall & Foreman, Inc.
Civil Engineering • Planning • Surveying • Public Works

June 22, 1992

Job #4042-L1

City of Fontana
8353 Sierra Ave.
Fontana, CA 92335

Attention: Gregory J. Bucknell, P.E
Principal Engineer - Special Projects

Regarding: Master Storm Drainage Plan

Transmitted herewith is the Summary Report of the City of Fontana and "Sphere of Influence" - Master Storm Drainage Plan Study, Summary Report of Volumes I and IA, dated June, 1992.

The purpose of the report is to provide planning for the major drainage facilities within the City of Fontana, and within the City of Fontana's sphere of influence that are necessary to provide flood protection in 100-year storms. Another objective of the study is to determine the cost to design and construct the Master Storm Drainage Plan facilities. The report will provide the basis for adopting a fee ordinance to provide funds for design and construction of the Master Storm Drainage Plan facilities.

This study was initiated by the City of Fontana by approval of a contract with Hall and Foreman, Inc. to provide conceptual engineering and cost estimates for the Master Storm Drainage Plan facilities in the north Fontana area. The study was subsequently expanded to include the south Fontana area and areas within the City's sphere of influence. The enclosed report summarizes the work on both the north Fontana study area and the south Fontana study area.

This study is part of a coordinated effort by the City of Fontana's Engineering Division, other agencies and consultants to adopt a Master Storm Drainage Fee Ordinance Program for the City of Fontana and Fontana's sphere of influence. In particular, this study has been fully coordinated with a companion study, prepared by Flory, Olson, and Van Osdel, Inc., directed at adoption of a fee ordinance program.

The attached Engineer's Report-Volume I, along with Volumes IA and Volumes II through V, are the culmination of the entire engineering study to establish the Master Storm Drainage Plan and determine the cost to design and construct the system. The Master Storm Drainage Plan facilities are shown on the Exhibit Map enclosed in Volume I. Separate hydrology maps for the north Fontana area and the south Fontana area (and contiguous areas within Fontana's sphere of influence) are also enclosed in Volume I.

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The contents of the separate volumes in this study are summarized as follows:

Volume	Contents
I	Summary report, detention basin criteria, detailed cost estimates, profiles of the drainage plan facilities, Exhibit Map and hydrology maps.
IA	Summary report and cost estimates for the Hawker-Crawford drainage system and facilities.
II & III	Hydrology calculations for the north Fontana area and contiguous areas within the City's sphere of influence.
IV & V	Hydrology calculations for the south Fontana area and contiguous areas within the City's sphere of influence.

In addition to the Master Storm Drainage Plan facilities, it will be necessary for the San Bernardino County Flood Control District to implement improvements on the San Sevaine Channel and the Etiwanda Channel. Additionally, it will be necessary to provide supplemental flood protection facilities to individual development projects and localized areas. The cost of Etiwanda and San Sevaine Channel improvements and specific local drainage improvements are not included in this report. However, the cost of intercepting local drainage along the alignment of the Master Storm Drainage Plan facilities is included.

In accordance with the goals of the study, Volume I outlines the Master Storm Drainage Plan facilities and the estimated cost to construct the planned facilities. It is recommended that the City adopt this Master Storm Drainage Plan and adopt the associated Fee Ordinance Program. Adoption of the master plan and the ordinance recommended above along with the continued efforts of the City of Fontana's engineering and planning staffs, the Planning Commission, and the City Council will culminate in the fulfillment of providing flood protection in 100-year storms within the City and the City's sphere of influence. Continued cooperation and efforts by the San Bernardino County Flood Control District on the San Sevaine Channel, Etiwanda Channel and other facilities where joint efforts are necessary, are also essential to the success of the overall flood control program.

We are appreciative of this opportunity to work with the City of Fontana in conducting this study and in working toward fulfillment of the goals of implementing the necessary flood control facilities. In particular, we thank the staff of the City of Fontana's Engineering Division for their cooperation and their efforts to coordinate this study with other collateral flood control efforts.

HALL & FOREMAN, INC.

John C. Hogan, P.E.
Project Director/Associate

CITY OF FONTANA
MASTER STORM DRAINAGE PLAN
SUMMARY REPORT AND VOLUME I
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APPENDIX

SEPARATE VOLUMES

* NOTE THAT ITEMS WITH (*) ARE IN VOLUME I, BUT NOT IN THE SUMMARY REPORT.

** NOTE THAT ITEMS WITH (**) ARE SEPARATE VOLUMES.

MASTER STORM DRAINAGE PLAN
REFERENCE INDEX
(ALL VOLUMES)

Volume I - Engineer's Report

Summary Report
Detention Basin Policy and Design Criteria
Cost Estimates
Exhibit Map
Storm Drain Profiles

Volume IA - Hawker-Crawford Channel and Rich Basin Drainage Analysis

Discussion
Calculations
Recommendations
Cost Estimates

Volume II

A, B, C and D Systems
Hydrology Calculations

Volume III

Lines T-1 to T-8 and West Fontana Channel (East of Hemlock)
Hydrology Calculations
Street Capacity Charts

Volume V

Lines DZ-4 thru DZ-16, Lines M1 thru M8 and the I-10 Channel System
Hydrology Calculations
Lines SS2 thru SS11, Lines T1C through T4C,
and West Fontana Channel
Hydrology Calculations
Street Capacity Calculations

CONCLUSIONS AND RECOMMENDATIONS

Based on the study, the following conclusions and recommendations are presented:

1. It is recommended that the City of Fontana implement the recommendations in this Master Storm Drainage Plan and the collateral funding and financing report.

2. It is recommended that the City of Fontana implement an ordinance to collect drainage fees to finance the construction of the Master Storm Drainage Plan facilities.

3. When right-of-way will be needed for future construction, the City should require dedications and/or reservations of right-of-way.

4. When development projects file tentative maps or preliminary plans, the City should require as much of the Master Storm Drainage Plan facilities to be constructed as possible.

5. It is recommended that the City implement an Assessment District to provide the funds necessary to construct the more critical elements of the Master Storm Drainage Plan facilities that otherwise could not be constructed for many years.

6. The proposed Master Storm Drainage Plan facilities will provide the backbone drainage system to provide 100-year storm protection for the City. The proposed Master Storm Drainage Plan facilities, in conjunction with proposed improvements to the San Bernardino County Flood Control Facilities, improvements outlined in referenced documents in the Project 3-3 and 3-4 areas, and construction of a multitude of local drainage facilities will provide the necessary 100-year flood protection to the City.

7. Additional drainage facilities will be necessary to rectify local drainage deficiencies and provide adequate drainage for local areas. Details for local drainage improvements are not within the scope of this study.

8. The San Bernardino County Flood Control District is planning improvements on the San Sevaine Channel and the Etiwanda Channel. These improvements are not included in the Master Storm Drainage Plan facilities and financing of the Etiwanda Channel and San Sevaine Channel improvements and appurtenances are not included in the cost summary for the Master Storm Drainage Plan facilities.

9. For the sake of economy, some of the Master Storm Drainage Plan facilities are planned for 25-year storms. However, in all cases, the combination of the storm drainage facilities and the street drainage capacity will provide the required 100-year flood protection.

10. Two additional studies involve areas within the sphere of influence of the City of Fontana:

- Comprehensive Storm Drain Plan, Project 3-3, Rialto Channel Drainage Area, dated April, 1988, by James M. Montgomery Consulting Engineers, Inc. and Bill Mann and Associates. This report covers the area east of Sierra Avenue that lies within the Rialto Channel drainage area.

- Local Area Drainage Plan, Project 3-4, Engineer's Report, dated June, 1992, by the San Bernardino County Flood Control District. This report covers the area in the southeast corner of the City's sphere of influence.

11. For areas within the City of Fontana's sphere of influence, located easterly of Sierra Avenue, located in the Project 3-3, Rialto Channel Drainage Area; the criteria for sizing the storm drains differed from the criteria used in this study. Therefore, the facilities recommended in the Project 3-3 report were reviewed, resized and the cost data was modified to make the design criteria for the Project 3-3 area coincide with the criteria utilized throughout this study.

12. The size alignment and configuration of storm drains shown in this Master Storm Drainage Plan are conceptual. Individual storm drains will require detailed design based on actual conditions at the time they are initiated. In addition, the design effort will require preliminary surveys, detailed hydrology and hydraulic calculations, coordination with utility companies, and other agencies that could be involved or be affected by the planned storm drain construction. Detailed plan and profile drawings will be needed for construction of all facilities outlined in this report.

13. The total estimated cost of the Master Storm Drainage Plan facilities is $217,747,654 including a 15% construction contingency. This cost includes the Hawker-Crawford and Rich Basin facilities and storm drains in the Project 3-3, Rialto study area. The total estimated cost of the Master Storm Drainage Plan facilities includes the construction contingency noted above plus 20% for engineering, surveys, staking, inspection and administration. A cost factor of 3% is shown for right-of-way acquisition.

14. The cost of laterals for catch basins is included in the unit cost of the main line storm drain pipe. The range of sizes for typical catch basin laterals is 18 to 24 inches in diameter.

This study was commissioned by the City of Fontana to establish an orderly plan for development of storm drain facilities in the City. This report serves three primary purposes: 1) Calculate storm water runoff based on the current land use policy per the City's General Plan; 2) Establish sizes and locations of drainage facilities needed to convey storm water to appropriate regional facilities; and 3) Estimate the cost of these facilities to establish project budgets and adequate funding programs. This study is directed at establishing a guide for planning and implementation of a system of major storm drain facilities that will convey storm water from the local areas and local drainage systems to the regional facilities. The objective of this drainage study is to establish a guide for planning, financing and construction of drainage systems to provide 100-year flood protection in the City of Fontana and the City of Fontana's sphere of influence. The goal of the study is to determine the cost of the Master Storm Drainage Plan facilities for adoption of a fee ordinance.

This report does not include analysis of regional facilities such as the San Sevaine Channel. In addition, this study does not include analysis, and recommendations for drainage facilities of less than 36-inch pipe. Additional drainage facilities of less than 36" diameter will be needed to provide adequate drainage of local areas. However, such facilities are too detailed to be considered in a master storm drainage study.

Volume I summarizes the Master Storm Drainage Plan and includes a map of the Master Storm Drainage Plan, detailed cost estimates, and the Detention Basin Policy and Design Criteria. Detailed hydrologies for the individual study areas and profiles of the drainage facilities are in Volumes 2 through 5. Volume IA of this report contains the analysis recommendations and cost estimates of the Hawker Crawford Channel and Rich Basin. Volume IA was prepared by Bill Mann & Associates as part of the Master Storm Drainage Plan.

The Master Storm Drainage Plan facilities recommended in this report do not include any new local detention basins. Use of any type of permanent or interim drainage basins currently is not allowed by the General Plan of the City of Fontana, except in major flood control facilities. In addition to construction of master planned facilities, construction of local facilities will be necessary to serve local areas and developments.

The various types of facilities discussed in this report are defined as follows:

1. Local Area Surface Drainage and Local Area Storm Drain Systems

These systems include street flow, gutters, culverts, catch basins and storm drains that serve local areas. Even though these facilities will frequently serve multiple properties, they are not defined as "Master Storm Drainage Plan Facilities" because they are too detailed to be included in the scope of a master plan study. There are undoubtedly many local drainage problems need to be rectified, but are not addressed in this report because they fall into the classification of local drainage.

2. Master Plan (Interceptor) Drains

The master plan storm drains are the storm drain systems that collect runoff from the local areas and drainage systems, and discharge to the major drainage facilities. The Master Plan interceptor storm drains generally serve drainage areas larger than 40 acres. However, the actual area served may begin at the threshold ranging between 20 acres to 40 acres, depending on specific circumstances. The size of the interceptor drains is dependent on both the quantity of runoff that will ultimately get to the drain and hydraulic parameters for the storm drain. The master plan interceptor drains are the primary focus of attention of this study and report.

3. Major Master Storm Drainage Plan Facilities

Major master plan facilities include the following:

Hawker Crawford Channel including Rich Basin
I-15 Channel
I-30 Channel (Highland Boulevard)
West Fontana Channel including Hickory Basin and Banana Basin
East Fontana Channel
I-10 Channel (Caltrans)
DeClez Flood Control Drainage Facilities including DeClez Basin

The West Fontana Channel, East Fontana Channel and the Hawker-Crawford Channel will be constructed with funds from the City of Fontana fee ordinance program, but will be owned and operated by the San Bernardino County Flood Control District. The DeClez Flood Control Drainage Facilities are owned and operated by the San Bernardino County Flood Control District. The I-10 Channel will be owned and maintained by Caltrans, but upgrading of the channel will be funded by the City of Fontana's fee ordinance program.

4. Regional Facilities

The regional facilities are defined as those facilities that are the point of disposal of the Master Planned Storm Drainage Facilities. The regional facilities include the San Sevaine Channel and the Etiwanda Channel. Those channels are owned and operated by the San Bernardino County Flood Control District.

Both of these facilities are located in the vicinity of the westerly boundary of the City of Fontana. The San Sevaine Channel is the receiving facility for approximately 88% of the runoff from the City of Fontana and the tributary area that lies northerly of the City. These facilities are discussed in greater detail in the Regional Flood Control Channels section of this report.

5. Retention/Detention Basins

Retention/detention basins are either permanent or temporary flood control facilities. The purpose of the retention/detention basins is to hold or delay the discharge of storm water to the downstream drainage facilities. The primary benefit of the retention/detention basins is to reduce the peak flow rate in the downstream drainage channels. The disadvantages of the retention/detention basins are that they require a significant amount of costly annual maintenance, they require a large amount of land to be committed solely to flood control purposes, and they remove land from the tax roles that would otherwise create significant tax revenue for the local agencies.

It will be to the City's advantage to reduce dependance on retention/detention basins. Accordingly, the City does not want to create any new retention/detention basins, unless they are in accordance with the goals and policies of the City's General Plan.

6. Debris Basins

Debris basins are holding basins that are designed to intercept the flow in unimproved drainage courses. Rocks, gravel, tree limbs, and other materials that are swept down the drainage course with the storm water are held in check at the debris basins and the storm water is allowed to pass to the downstream facilities. These basins are located at the upstream end of the drainage systems to intercept debris, etc. where the natural drainage course joins an improved channel.

This study covers the entire area of the City of Fontana and the Fontana sphere of influence. The study was divided into several areas with additional subdrainage areas. The division of the study areas is based on separate work authorizations and existing studies.

Area North of I-15

The area north of the I-15 Freeway is a mountainous region that transitions to a broad alluvial plane. The drainage area is bounded on the east by the east ridge of Duncan Canyon. Lytle Creek flows southeasterly away from the northeast corner of the study area. The west boundary of this area is the east ridge of San Sevaine Canyon. The southerly boundary is the I-15 Freeway. Elevations in this drainage area range from about 1,350-feet to about 4,200-feet in the mountains.

Analysis of this drainage area and recommendations for proposed drainage systems is in Volume IA, Hawker-Crawford Channel and Rich Basin Drainage Analysis, by Bill Mann and Associates, Inc., dated August, 1991. Runoff from Duncan Canyon and the smaller canyons located between Duncan Canyon and San Sevaine Canyon all drain to the Hawker-Crawford Channel and Rich Basin. All drainage from this area ultimately drains to the San Sevaine Channel.

The soil type in this area is predominately rocks, gravel and sand.

North Fontana

The North Fontana study area is generally located between the West fontana Channel and the I-15 Freeway with some tributary drainage from north of the I-15 Freeway. The southerly boundary of this drainage area is the West Fontana Channel. Note that hydrology calculations for the area between Boulevard and the West Fontana Channel, and from the west City limit to Hemlock Avenue is included in the data for the south Fontana study area. From Hemlock Avenue easterly to Juniper Avenue, the West Fontana Channel (located at the ATSF Railroad tracks) is the southerly boundary of this drainage area.

Additional storm water drains into this area from the mountain canyons that lie between the east ridge of Duncan Canyon and the west ridge of Lytle Creek Canyon. Drainage from this tributary area passes under the I-15 Freeway via several culverts that carry storm water under the I-15 Freeway to the I-15 Channel (Line A4).

The topography of this area is characterized by a uniform slope ranging from about 2.0 to 2.8 percent, descending generally southwest. Ground elevations within the area range from approximately 1,200 feet in the lower reaches located in the southwest portion of the study area to 1,900 feet in the northeast portion of the study area. The highest elevations are located at the I-15 Freeway and the easterly City limits.

The soil type in this area is predominately gravel, sand and silty soils.

All drainage from this area will be conveyed westerly to the San Sevaine Channel by reinforced concrete pipes and boxes in Duncan Canyon Road, Summit Avenue, Base Line Avenue and Foothill boulevard, in addition to the Highland Channel and the West Fontana Channel. Runoff is intercepted by the master planned storm drains at locations where the rate of runoff exceeds the capacity of the streets to convey storm water.

South Fontana

This drainage area is located southerly of the West Fontana Channel, and northerly of the ridge line of the Jurupa Mountains. This area all drains to the San Sevaine Channel via the I-10 Channel and the DeClez Channel and major storm drains in Randall Avenue, San Bernardino Avenue and Valley Boulevard. Several smaller storm drains join the San Sevaine Channel directly.

The topography of the northerly part of this drainage area is characterized by a southwesterly slope of approximately 1.5% sloping to south where the street runoff is intercepted by the master plan storm drains. I-10 channel flows west, discharging to the San Sevaine Channel. South of the I-10 Freeway, the topography continues to slope southwesterly at approximately 1.5% to the DeClez Channel. A series of master plan interceptor drains pick-up the street flow, conveying the storm water south to the DeClez Channel. South of the DeClez Channel, the topography is primarily mountainous ranging from elevation 800 to as much as 1,800 feet. The DeClez Channel generally follows the base of the Jurupa Mountains on the north slope. The DeClez Channel is fully improved and discharges to the San Sevaine Channel approximately one mile south of the City of Fontana, in Riverside County.

Soils in the area are predominately gravel and sand with some sandy-loam soils in more southerly portions of the drainage area.

Project 3-3 Study Area

A portion of the City of Fontana's sphere of influence extends easterly into an unincorporated area adjoining the City of Rialto. This area is identified on the enclosed Exhibit Map as the Rialto Study Area. This area was included in the Comprehensive Storm Drain Plan, Project 3-3, Rialto Channel Drainage Area, however the design criteria for the Rialto study was different than for the Fontana Master Plan study. The design criteria is discussed elsewhere in this report.

The boundaries of this area are Base Line Avenue on the north and the I-10 Freeway on the south. The westerly boundary is in the area of Sierra Avenue, and the easterly boundary is the sphere of influence line (future City limit) on the east.

The topography in this area slopes to the southeast at approximately 1.5%. A portion of the runoff from this area drains to the East Fontana Channel and a portion drains to the I-10 Channel (east sloping element). All drainage from this area ultimately drains to the Rialto Channel. The East Fontana Channel is owned and maintained by the and San Bernardino County Flood Control District. The I-10 channel is owned and maintained by Caltrans.

Soils in this area are predominately gravel and sand.

Project 3-4 Study Area

A portion of the City's sphere of influence extends into an area that was part of another drainage study area, the San Bernardino County Flood Control District's Master Plan of Drainage for Project 3-4. This area is bounded by Jurupa Avenue on the north and the City's sphere of influence (future City limit) on the east. The westerly and southerly boundaries are the ridge lines of the hills in the Jurupa Mountains. The Project 3-4 area storm drain goes easterly, existing the study area, then goes southeasterly to the Santa Ana River.

Soil type in this area range from gravel and sand to sandy-loam.

The purpose of this Master Storm Drainage Plan is to establish guidance for development of drainage systems that will ultimately provide the means to protect the City of Fontana from flooding in 100-year storms. Since passage of the National Flood Insurance Act of 1968, it is necessary to protect new habitable structures from flooding in 100-year storms.

The major drains in the Master Storm Drainage Plan system are designed for the full 100-year storm runoff. However, for the sake of economy, it is preferable to limit some drains to 25-year capacity where the streets can hold the difference between the 25-year and the 100-year runoff. Therefore, both 25-year and 100-year storms were used to size various elements of the system. The design criteria for each line is shown on the Exhibit Map.

Storm drain facilities aligned in the north-south streets are generally sized using a 25-year storm. The difference between the 100-year and 25-year storm runoff rates will be conveyed in the streets to the main line storm drains located in the east-west streets. The main lines in the east-west streets were sized using the 100-year storm with the exception of lines "D" and "H".

Lines "D" and "H", located in Base Line Avenue and Foothill Boulevard, respectively; were sized for a 25-year storm frequency. The difference between the 100-year and 25-year storms will be picked up by the T-lines and conveyed to the West Fontana Channel. The T-lines west of Hemlock Avenue are shown on the South Fontana Master Storm Drain Plan Map and the T-lines on Hemlock Avenue and easterly are shown on the North Fontana Master Storm Drain Plan Map, located in Volumes IV and II, respectively.

The storm drain facilities are planned to provide for vehicular travel on arterial streets during a 25-year storm. During the 100-year storm these streets will contain considerable water, but will not prevent passage of emergency vehicles. The 100-year events can in some cases cause flooding in the street to the top of the curb or even the property line. However, the center crown portion of the streets will be high enough to allow for passage of emergency vehicles. Refer to Exhibit A, Criteria for Design of Flood Control Facilities. However, Cherry Avenue is an exception in that it has been planned to carry a large flow in 100-year storms, which will be deeper than the typical depth shown on Exhibit A.

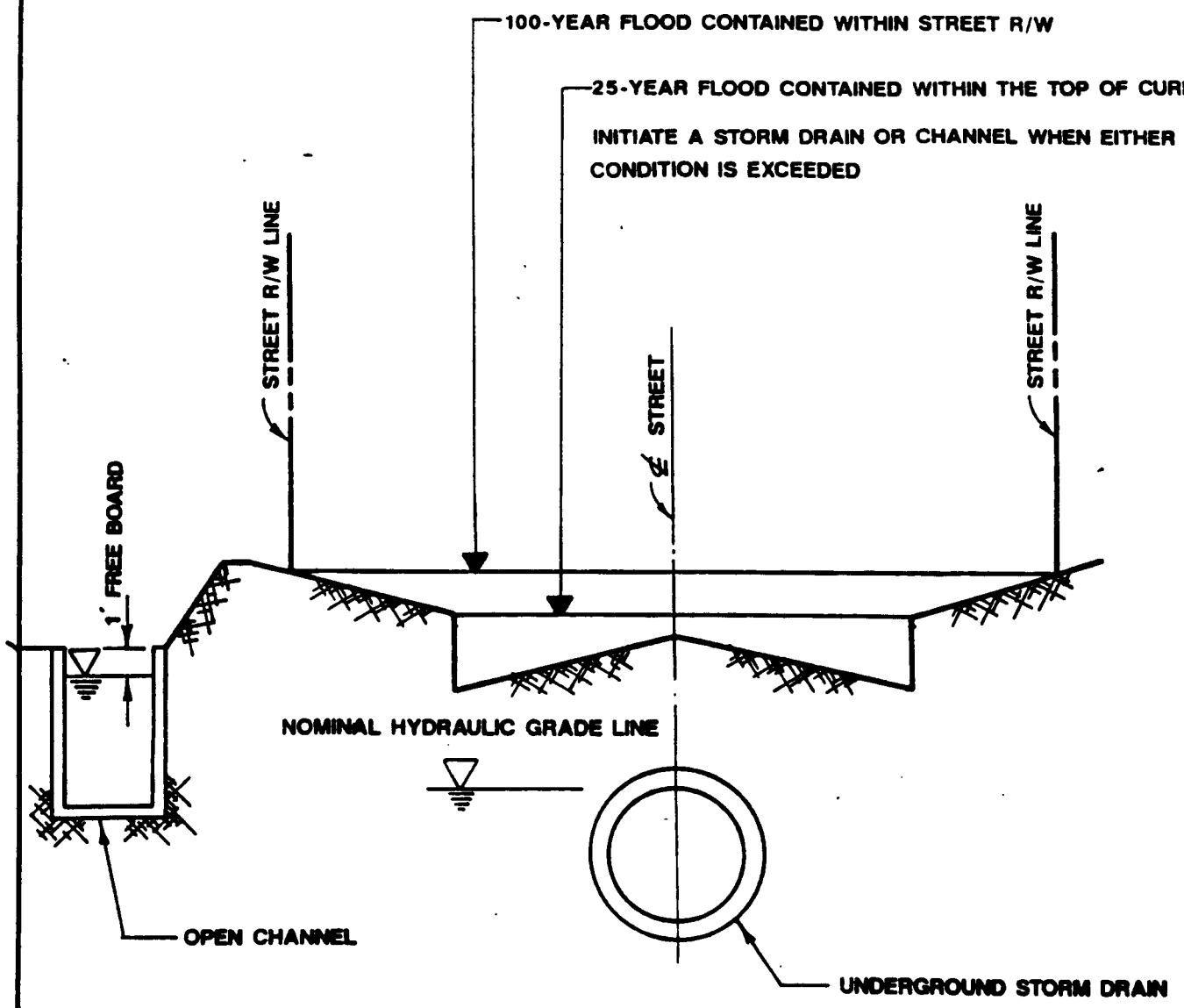


EXHIBIT A

CITY OF FONTANA

MASTER STORM DRAINAGE FACILITIES

Hall & Foreman, Inc.

3170 REDHILL AVENUE COSTA MESA, CA 92626-3498

CIVIL ENGINEERING • LAND PLANNING • LAND SURVEYING

CRITERIA FOR DESIGN

OF FLOOD CONTROL FACILITIES

HYDROLOGY

Based on the San Bernardino County Flood Control Manual, the climate characteristics of the City of Fontana are classified as "valley". Most of the surface soils in the upper parts of the study area are course and absorbent, whereas soils in the lower reaches of the study area and in established stream beds consist of finer material of less permeability.

The climate of the area is semi-arid with an average annual rainfall of about 19.63 inches, ranging from a low of 5.69 inches in the water year 1960-61 to a high of 37.25 inches in the water year 1915-16. The majority of rainfall occurs during the months of October through April. The average monthly temperature ranges from 54 degrees in January to 79 degrees in August. Temperature extremes range from below freezing in the wintertime to above 100 degrees during the summer.

The hydrology calculations were performed using the AES software based on the 1986 San Bernardino County Flood Control District Hydrology Manual.

1. North Fontana

The "County of San Bernardino Hydrology" manual, dated August, 1986 was used as the basis of the methodology in this report. Hydrology calculations for the North Fontana area are by the rational method utilizing computer software prepared by "Advanced Engineering Software", version 4.1C.

2. South Fontana

The South Fontana portion of the study was commissioned considerably later than the North Fontana study. The "County of San Bernardino Hydrology" manual, dated August, 1986 was used as a basis of the methodology in the South Fontana area. Hydrology calculations for the South Fontana area are by the rational method utilizing computer software prepared by "Advanced Engineering Software", version 5.2A.

Hydraulic calculations for this study are conceptual level hydraulic analysis. Detailed hydraulic calculations will have to be performed for the final design of each line. The pipe and box storm drains are sized to flow full, but not under pressure in most cases.

Refer to Volume IÃ regarding hydraulic design of the Hawker-Crawford Channel. The West Fontana Channel and the I-10 Channel heights are based on providing 1-foot of freeboard above the normal water depth. Wall height will have to be increased where the final design calculations indicate that additional height is needed for superelevation and backwater effects.

High velocities in the range that can cause damage to pipes are not expected to occur in any of the facilities because of the relatively small slope gradients that will occur on virtually all of the drains. Excessive velocities will certainly not be a problem in the east-west lines because of the minimal gradient of the facilities. Velocities in the north-south lines will be higher than in the east-west lines, but they are still not expected to be over acceptable levels.

Proposed Master Storm Drainage Plan facilities are primarily underground RCP and RCB's to allow for construction of the drainage facilities within street right-of-ways, eliminating the need for additional right-of-way. Master Storm Drainage Plan facilities that are proposed to be open channels include the I-15 Channel, the Highland Channel (future Route 30 Channel), the West Fontana Channel, the East Fontana Channel, the I-10 Channel, and the Hawker-Crawford Channel. In these cases open channels are preferable to underground systems because of the volume of storm water they will have to carry.

The proposed pipe sizes and locations outlined in this report are purely schematic in nature and must be fully engineered prior to construction.

There are relatively few fully improved drainage facilities in the study area. The Village of Heritage and Empire Center are two major development projects that are currently constructing additional Master Storm Drainage Plan facilities in the City of Fontana at this time.

The following facilities are existing:

DeClez Channel and DeClez Basin

The DeClez Channel and DeClez Basin are existing facilities with 100-year capacity. Approximately 50% of the laterals from the DeClez Channel are existing. These laterals and the proposed Master Storm Drainage Plan facilities have capacity for the 25-year runoff. Excess runoff gets to the DeClez Channel by street flow.

I-10 Channel

The I-10 Channel is an existing facility, owned and maintained by Caltrans. The reach between the San Sevaine Channel and Hemlock Avenue will require reconstruction to provide additional depth and capacity for additional runoff planned to drain to this facility in the Master Storm Drainage Plan.

Hawker-Crawford Channel and Rich Basin

The Hawker-Crawford Channel is an existing drainage facility that originates at the outlet of Duncan Canyon, and ultimately discharges to Basin 3 of the San Sevaine Basins at Cherry Avenue. The Hawker-Crawford Channel intercepts runoff from the canyons and alluvial plain between San Sevaine Canyon and Duncan Canyon. The Hawker-Crawford Channel has concrete lining from Cherry Avenue to 2,000-feet upstream of Cherry Avenue. Otherwise, the Hawker-Crawford Channel is an unlined earth channel. Rich Basin is an integral part of the Hawker-Crawford Channel system. Rich Basin is improved to only a portion of its potential capacity. Proposed improvements to the Hawker-Crawford Channel are outlined in Volume IA, Hawker-Crawford Channel and Rich Basin Drainage Analysis.

Village of Heritage

The Village of Heritage development is located between the San Sevaine Channel and Hemlock Avenue, and between Foothill Boulevard on the south and Base Line Avenue on the north. The Heritage drains are denoted on the Exhibit Map as the H-lines. The existing storm drainage infrastructure includes the double RCB and pipe located in Foothill Boulevard, west of Hemlock Avenue to the San Sevaine Channel. Also,the double RCB on Base Line Avenue from approximately 2,000 feet west of Cherry Avenue to the San Sevaine Channel is existing. Lines H-1 to H-14 between Foothill Boulevard. and Base Line Avenue are also part of the Heritage Village development. Even though these storm drains are existing, these lines are shown as proposed in the cost estimates because the cost data is based on the preliminary engineering cost estimates rather than the actual construction cost, which has not been compiled at the time this report is being finalized.

Empire Center

Storm drains in the Empire Center development are denoted by the DZ-1 through DZ-2A labels on the maps. These drains are shown on the Master Plan as proposed for the same reasons noted for the Village of Heritage storm drains.

Miscellaneous Drains

There are existing drains at various locations as shown on the Exhibit Map.

There are several regional flood control facilities within the City of Fontana study area. These facilities are maintained and operated by the San Bernardino County Flood Control District and Caltrans. All of the master planned drainage facilities discharge to one of the following regional facilities:

Etiwanda Channel

The Etiwanda Channel originates north of the I-15 Freeway at the base of the San Gabriel Mountains. From the origin, Etiwanda Channel flows southerly via a partially improved channel to a location approximately 2,500 feet upstream of Victoria Basin where the Etiwanda Channel and the San Sevaine Channels meet, but do not merge. From there, they go under the I-15 via a box culvert. South of the I-15 Freeway, Etiwanda Channel is fully improved to Foothill Boulevard where the channel leaves the study area.

In the section where the Etiwanda Channel is within the Fontana City boundaries, it is a fully improved channel that contains the Etiwanda flows and the San Sevaine flows in adjacent, parallel channels. The channels are contained by a single structural section with a wall between the channels to prevent commingling of water between the two systems.

At Foothill Boulevard, the Etiwanda Channel veers to the southwest, leaving the City of Fontana and departing the adjoining channel alignment shared with the San Sevaine Channel.

Based on the plan for the ultimate improvements of the Etiwanda Channel and the San Sevaine Channel, the channels will be combined into a single channel from their current point of common alignment at Foothill Boulevard, southerly through the City of Fontana and into Riverside County.

The Etiwanda Channel intercepts a relatively small portion of the runoff from the study area, totalling approximately 0.5% of the area within the City of Fontana and its sphere of influence. Etiwanda Channel is within the study area for a reach of approximately 2 miles, running diagonally across the northwesterly edge of the City.

Etiwanda Channel is owned and maintained by the San Bernardino County Flood Control District. None of the proposed Master Storm Drainage Plan Facilities discharges to Etiwanda Channel, except for Line H9 which drains the area on the northwest side of the Etiwanda Channel. No improvements are planned on the Etiwanda Channel in the Fontana Master Storm Drainage Plan.

San Sevaine Channel and Jurupa Basin

The San Sevaine Channel originates at the base of the San Gabriel Mountains where canyon flows are directed with levees to the San Sevaine Spreading Grounds and San Sevaine Regional Basins. The San Sevaine Channel flows southwesterly to join Etiwanda Creek approximately 2,500 feet north of Victoria Avenue.

The San Sevaine Channel is unimproved with the exception of box culverts at several road crossings, which have been constructed to the ultimate planned configuration and capacity. The existing channel has been lined in most reaches consisting of wire and rock revetment, grouted rock and steel anchor posts. In the reach south of Foothill Boulevard to the Riverside County line, the channel is a trapezoidal cross-section with rock armor in some sections, however some sections have no armor at all. The existing channel does not have capacity for the design flows, therefore the channel needs to be enlarged and improved. Analysis and cost estimates for improvements needed on the San Sevaine Channel are not included in this study.

The Jurupa Basin is an integral part of the San Sevaine Channel drainage system. At high flows in the San Sevaine Channel, excess flows spill into the Jurupa Basin via a side outlet weir on the San Sevaine Channel. The intent is to limit the discharge in the San Sevaine to a maximum of 12,100 cfs in the San Sevaine Channel downstream of the Jurupa Basin. Upstream of the Jurupa Basin, the channel flows range to over 23,000 cfs, based on a drainage study prepared in 1983, titled Day, Etiwanda and San Sevaine Creeks System Drainage Plan, prepared by Bill Mann and Associates. The capacity of the San Sevaine Channel downstream of the Riverside County Line is limited to 12,600 cfs.

Box culverts with capacity for the ultimate planned discharge and appropriate configuration have been constructed on the San Sevaine Channel at the following street crossings: Marlay Avenue, Jurupa Avenue, Slover Avenue, Arrow Boulevard, Whittram Avenue and at the ATSF railroad crossing.

The San Sevaine Channel is owned and maintained by the San Bernardino County Flood Control District. The San Sevaine Channel intercepts drainage from all storm drains in the City of Fontana, except for the drains in the Area 3-3, Rialto Study Area, the County 3-4 Area, and Line H9. Funding of improvements on the San Sevaine Channel will come from separate development fees which have been established to finance improvements on the San Sevaine Channel system. No funding is shown for the San Sevaine Channel drainage system in this study.

Hawker-Crawford Channel, Rich Basin and Laterals

The Hawker-Crawford Channel is described in Volume IA. The Hawker-Crawford Channel and associated facilities will be financed by the Fontana Master Storm Drainage Plan development fees. Upon completion, the Hawker-Crawford Channel will be owned and operated by the San Bernardino County Flood Control District. The Hawker-Crawford drainage system receives runoff from approximately 6% of the total Fontana drainage area.

The Hawker-Crawford Channel is an unimproved earth channel, except that it has been improved between where the channel joins the San Sevaine Basins to Rich Basin. The existing concrete-lined channel between the San Sevaine Basins and Summit Avenue does not have sufficient capacity for the 100-year flood flows.

Rich Basin is an integral part of the Hawker-Crawford Channel system. Current plans Rich Basin call for increasing the capacity of Rich Basin to enhance its function as a detention basin. However, the ultimate function, operation, capacity and ancillary uses of Rich Basin have not yet been established at this time.

The Hawker-Crawford Channel will have several laterals with debris basins at their upstream ends to intercept debris before it enters any of the main Hawker-Crawford storm drainage facilities.

Details of proposed improvements and cost estimates for proposed improvements on the Hawker-Crawford Channel and laterals are in Volume IA of this Master Storm Drainage Plan.

West Fontana Channel

The West Fontana Channel is an existing earth-lined channel that conveys water from Juniper Avenue, west to the San Sevaine Channel. The West Fontana Channel parallels the north side of the right-of-way of the ATSF Railroad. Prior to discharging to the San Sevaine Channel, the West Fontana Channel passes through the Banana Basin and the Hickory Basin. The Banana Basin is a detention basin that the West Fontana Channel flows directly through. Hickory Basin is effectively a low capacity retention basin with an overflow weir to the San Sevaine Channel. The Hickory Basin is primarily intended to be a percolation basin for storm water to allow storm water to percolate into the ground water basin.

Proposed improvements of the West Fontana Channel will include construction of concrete channel lining to stabilize the existing channel, increase the capacity, and provide for more economical maintenance. Construction of the West Fontana Channel will be financed by the proposed Master Storm Drain Plan fee ordinance. Ultimately, the improved channel will be owned and operated by the San Bernardino County Flood Control District.

The West Fontana Channel drains approximately 15% of the City of Fontana.

East Fontana Channel

The East Fontana Channel is located in the easterly sector of the City and its sphere of influence. The East Fontana Channel parallels the ATSF Railroad beginning at Palmetto Avenue, flowing easterly. The East Fontana Channel will be improved in accordance with the Project 3-3, Rialto Channel Drainage Area Report. The East Fontana Channel is owned and maintained by the San Bernardino County Flood Control District. Drainage from the East Fontana Channel drains to the Rialto Channel in the City of Rialto. Approximately 10% of the total Fontana drainage area drains to the East Fontana Channel.

I-10 Channel

The I-10 Channel is an existing concrete-lined trapezoidal channel which flows east and west from the high point at Sierra Avenue. The I-10 Channel is on Caltrans' right-of-way running along the north boundary of I-10 Freeway. The I-10 channel was originally designed by Caltrans, and is under Caltrans' jurisdiction. Improvement of the I-10 channel will be necessary from Hemlock Avenue westerly to the San Sevaine Channel to increase the required capacity of the facility. No modifications are needed on the rest of the I-10 Channel. Improvement of the I-10 Channel is necessary to provide additional capacity and to provide an outlet for drains that will have to be constructed lower than the existing channel invert to allow the drains to be constructed under the existing MWD water transmission main.

The cost of the proposed improvements on the I-10 Channel will be financed by the proposed Master Storm Drainage Plan development fee ordinance, but Caltrans will continue to own and maintain the I-10 channel after completion of the improvements. The cost of the proposed channel improvements are included in this study. The I-10 Channel will receive runoff from approximately 7% of the City and the City's sphere of influence.

The DeClez Channel and DeClez Basin

The DeClez Channel is an existing concrete-lined channel which originates as a City owned and maintained box culvert flowing westerly along Jurupa Avenue. At Oleander Avenue, it turns southward and runs generally parallel to Jurupa Avenue as a concrete-lined channel. The DeClez Channel follows an alignment at the base of the Jurupa Mountains from Elm Avenue westerly to Redwood Avenue. At Redwood Avenue, the alignment turns to the southwest and flows out of the City of Fontana into Riverside County. South of the City of Fontana, the DeClez Channel flows to the DeClez Basin, and then ultimately joins the San Sevaine Channel approximately one mile south of the City limits.

The DeClez Channel is owned and maintained by the San Bernardino County Flood Control District from Oleander Avenue, west to the junction with the San Sevaine Channel. The DeClez Channel is the primary collector channel for approximately 22% of the City of Fontana and the sphere of influence.

NORTH FONTANA

Drainage System A

The A system is designed to intercept drainage from some of the area north of the I-15 Freeway and the area south of the I-15 Freeway southerly to Duncan Canyon Road. The drainage area includes the area south of I-15 Freeway between the I-15 Freeway on the west and the Fontana City Limits on the east. Line A4 (The I-15 Channel) is located south of the I-15 Freeway and will convey storm water from three existing RCB's and one large RCP that cross under the I-15 Freeway. These existing RCB's and RCP convey runoff from several small canyons located between, but not including Duncan Canyon and Lytle Creek Canyon. The I-15 Channel, Line A4, is a trapezoidal channel and is designed for a 25-year storm frequency. The existing culverts under the freeway will drain directly to the I-15 Channel. Lines A1-A3 run in the north-south direction and are designed for the 25-year storm.

Line A will be located in Duncan Canyon Road. It is designed for a 100-year storm and picks up the 25-year drainage from lines A1-A4. Additional runoff from the 100-year overflow will be conveyed in the north-south streets and will be picked up in catch basins located in Duncan Canyon Road. Even though there is an existing 10' x 8' RCB for Line A under this freeway, a new double 10' x 8' RCB will have to be constructed from the confluence of Line A4 and Main Line A, under the I-15 Freeway to the Hawker-Crawford Channel. The existing RCB does not have capacity for the required flow. The cost of constructing a new RCB under the Freeway will be substantial due to the cost of traffic control, temporary detours and constructing the box in short segments to accommodate detours on the freeway. In the final design, a cost comparison study should be conducted to determine the most economical method of constructing improvements that will provide sufficient capacity to convey the required flow of storm water under the existing freeway.

Drainage System B

Main Line B is a RCB culvert located in Summit Avenue from Sierra Avenue to the Hawker Crawford Channel. This line has been designed for 100-year storm frequency. Lines B1-B6 are designed for the 25-year storm and Lines B1, B2, B3, and B5 connect to Main Line B in Summit Avenue. Lines B4 and B6 join Lines B3 and B5, respectively. Additional runoff from the difference in the 25-year design and the 100-year storm will be conveyed in the north-south streets and picked up in catch basins located in Summit Avenue.

An existing 10' x 5' RCB culvert carries water from the southeast side of the I-15 Freeway to the Hawker Crawford Channel. Due to increased runoff being conveyed in Main Line B, a new double 10' x 5' RCB culvert will have to be constructed under the I-15 Freeway. The cost of the larger box culvert will be substantial due to the cost of traffic control, detours and construction in short segments to accommodate detours on the freeway. As in the case of Main Line A, a cost comparison study should be conducted to determine the most economical means of providing required drainage capacity under the existing freeway. All of the B lines except B4 and B6 will involve crossing the existing MWD Rialto Water transmission main.

Drainage System C

Main Line C is a trapezoidal channel draining westerly running adjacent to the proposed Route 30 Freeway from Sierra Avenue to east of the I-15 Freeway. The trapezoidal channel then heads south parallel to the I-15 Freeway to discharge to the San Sevaine Channel. Main Line C is designed for a 100 year storm frequency. Lines C1-C5 are designed for the 25 year storm and connect into Main Line C at Highland Avenue. Line C6 is a trapezoidal channel designed for the 25 year storm and outlets into Main Line C where Main Line C veers southwest to join the San Sevaine Channel. Additional runoff from the difference in the 25 year design and the 100 year storm in Lines C1-C6 will be conveyed in the north-south streets and picked up in catch basins joining Main Line C.

Design of Main Line C will have to involve close coordination with the design of the planned Route 30 Freeway. The future Route 30 Freeway will be constructed on the same general alignment as Main Line C. Main Line C and Line C5 will involve crossing the MWD Rialto water transmission main.

Drainage System D

Main Line D is a RCP running in Base Line Avenue from Juniper Avenue to Citrus Avenue and is a double RCB from Citrus Avenue to the San Sevaine Channel. This line is designed for the 25 year storm. Overflow from the D Drainage System beyond the 25-year capacity drains south in the north-south streets to the T-lines.

Line D7 is located in Victoria Avenue and flows directly into the San Sevaine Channel at the same location as Main Line C. Line D7 is designed for the 100 year storm frequency. Line DA is designed for the 100 year storm because the overflow cannot be picked up by the T lines. Line DA connects into Main Line D at the intersection of Base Line Avenue and Juniper Avenue. The 100-year flow from Line Da remains in Main Line D to the point of discharge to the San Sevaine Channel.

The overflow from the difference in runoff between the 25 year and 100 year storms in lines D1-D6 and Main Line D will be carried in the north-south streets to the T lines, and to the H lines in Heritage Village area. The H and the T lines intercept the street flow so that the water in the street will not exceed the elevation of the property line.

Drainage System H

Drainage System H was designed for development of the Village of Heritage. Main Line H is located in Foothill Boulevard, and is a RCB from Almond Avenue to the San Sevaine Channel. The H lines are designed for a 25-year storm with the overflow being picked up by the T lines of the West Fontana Channel.

Drainage System T (Hemlock and easterly)

Lines T1-T8 are planned to pick up the overflow from the D lines and carry the 100-year runoff from the area south of Base Line Avenue. The overflow from the D-Lines and H-Lines from the difference between the 100-year and 25-year storms will be picked up in the West Fontana Channel. Line T1 has existing sections of RCP adjacent to the West Fontana Channel. These facilities will be difficult to upgrade due to utility conflicts. Construction Costs will be higher in lines T-1, T-2, T-3, T-4, T-5, T-7 and T-8 because the pipe will have to go under the existing Southern Pacific Railroad tracks. The pipe will have to be jacked under the railroad.

SOUTH FONTANA

Drainage System T (west of Hemlock Avenue)

The South Fontana T-lines are located west of Hemlock Avenue to the San Sevaine Channel and north of the West Fontana Channel to Foothill Boulevard. Lines T-1C, T-1B, T-2A, T-3C, T-4C and T-4B are planned for the 100-year storm. Line T-2A is planned to pick up 663 cfs of overflow in Cherry Avenue at Foothill Boulevard. Line T-4B picks up 207 cfs of overflow in Mulberry Avenue at Foothill Boulevard.

The remainder of overflow from the Village of Heritage will be conveyed in the north-south streets to the West Fontana Channel. The overflow from the difference in the 100-year and 25-year storms in Lines T-1A, T-3A, T-3B, and T-4A will be carried in the north-south streets to the West Fontana Channel.

Drainage System M

Lines M1, M2, M3, M4, M5A, M5C, M5D, M5F, M5G, M6A, M6B, M7A, M7B and M7C are planned to be 25-year facilities. Lines M5, M5B, M5E, M5G, M6, and M7, are planned to be 100-year facilities.

The M Lines all discharge to the I-10 Channel. Lines M5, M5G, M6, M6B, M7 and M7A will have to cross under the MWD Upper Feeder transmission main. Considerable expense should be expected for complications involved to cross under the MWD facilities.

Drainage System SS

Lines SS-2, 2A, 2B, 2C, 5A, 5B, 6, 7, 8, 10 and 11 are all planned for the 100-year storm and all outlet directly to the San Sevaine Channel. Lines SS2D, 6, 7 and 11 extend to Etiwanda Avenue to intercept street runoff. Line SS-2C will involve a complex structure where it joins the San Sevaine Channel in the vicinity of the junction of the I-10 Channel with the San Sevaine Channel.

Drainage System DZ

Lines DZ-1, 2, 3, and 2A are being constructed with the development of the Empire Center. Lines DZ-2 and DZ-2A are designed for the 25-year storm with the 100-year overflow being collected at the intersection of Sierra Avenue and 700' north of Jurupa Avenue in the existing Sierra Avenue storm drain.

Line DZ-5 is designed for the 100-year storm from the intersection of Cypress Avenue and Santa Ana Avenue west to Oleander Avenue and south to the junction with the DeClez Channel. The remainder of the DZ lines, DZ-4 through DZ-16, are designed for the 25-year storm with the 100-year overflow being carried by the north-south streets to the DeClez Channel. All of the Master Storm Drainage Plan lines will join existing laterals on the DeClez Channel.

West Fontana Channel

The West Fontana Channel is an existing earth trapezoidal channel which will be improved to a rectangular concrete lined channel. The channel improvement from Hemlock Avenue to the Hickory Basin are part of the south Fontana area, and the West Fontana Channel east of Hemlock Avenue are included in the north Fontana area.

I-10 Channel

The I-10 Channel is an existing concrete-lined trapezoidal channel that is located adjacent to the north side of the I-10 Freeway. The I-10 Channel was constructed in conjunction with construction of the I-10 Freeway. The I-10 channel drains westerly from Mango Avenue, draining to the San Sevaine Channel. From Mango Avenue easterly, the I-10 Channel drains east into the City of Rialto. The I-10 channel will be reconstructed as part of the Master Storm Drainage Plan facilities. The proposed improvements included reconstruction of the channel as a larger rectangular channel from the San Sevaine Channel to Hemlock Avenue, to provide additional capacity and depth for runoff that is anticipated to drain to this facility.

Project 3-3 Study Area

An area within the Fontana sphere of influence adjacent to the City of Rialto is in the Project 3-3 Rialto Channel Drainage Area study. New development within this area will be assessed a fee based upon the master plan facilities planned within the benefit area in the Project 3-3 Rialto Channel Drainage Area study. However, pipes located in the north-south streets must be upsized to meet the City of Fontana's design criteria which is more stringent that the design criteria than was the basis of sizing drains in the Project 3-3 Rialto Channel Drainage Area study.

The design criteria used in the Project 3-3, Rialto Channel Drainage Area study required that storm drains pick up runoff at the point where the street section cannot adequately convey the 10-year flow. This is not as stringent as the City of Fontana's criteria which requires that drain lines will be initiated in the streets to intercept runoff at the point the street section cannot adequately convey the 25-year flow. Therefore, some of the storm drains are longer and larger size in this report than was shown in the Project 3-3 report, to meet Fontana's more stringent criteria. The cost estimates for the larger storm drains in this area have been modified accordingly.

The E-lines, F-lines G-Lines and J-lines all fall within the Rialto Channel Drainage Area study. Note that the lines identified as J-lines in this report are identified as H-lines in the Project 3-3 study. The designation has been changed to avoid confusion with the Fontana H-Lines.

Project 3-4 Study Area

An area within the City of Fontana's sphere of influence lies in the drainage area covered in the Project 3-4 study area. Only one line is planned in this area. There are no proposed modifications in the criteria for this facility.

The scope of the Master Storm Drainage Plan does not include planning of details to intercept surface drainage and it does not include extension storm drains of less than 36 inches in diameter. Although there will be a need for small storm drains and other local drainage facilities, planning for such local systems is too detailed for a conceptual planning study such as has been conducted for this report. Therefore, this study does not include specific cost factors for drains of less than 36 inches in diameter. However, the cost estimates do include a specific number of catch basins for local drainage and the unit costs of the main line storm drains include a factor to provide for extensions and local drainage.

In the process of preparing detailed plans for individual elements of the Master Storm Drainage Plan facilities outlined in this report, the designers should include provisions for intercepting all local drainage along the alignment of the master plan facility. The cost estimates for the master planned facilities include cost factors to provide for such local drainage facilities, as noted above.

In addition to the local drainage that is encountered along the alignment of the Master Storm Drainage Plan facilities, it will be necessary to review the upstream conditions to be certain that local drainage patterns are in conformance with assumptions made in this drainage study and no significant charges have occurred in the drainage pattern. Designers should check to be sure that the proposed alignment, configuration and design of the proposed facility will allow for intercepting drainage from all upstream areas that drain to the planned facility by the most efficient method.

The unit costs for reinforce concrete pipe, reinforced concrete box and other pertinent construction items are based on an analysis of construction bids for similar work in public streets under contracts administered by public agencies.

Virtually all of the master planned facilities will be constructed in existing public streets, which will add significantly to the cost of the construction, with respect to the cost of construction in open, undeveloped tracts. Work in existing streets will have to include the additional cost to cut and remove existing pavement, traffic control, closing trenches at night, construction of pipe in segments to accommodate traffic control, additional cost to avoid existing utilities, and to resurface the street upon completion of the storm drain construction.

A 15% contingency has been added to the cost estimates for construction contingencies. The unit costs for RCP and RCB includes earthwork, shoring and pavement removal, traffic control and replacement of the pavement. Manholes and/or junction structures are assumed to be spaced at a maximum of every 400' on main line pipe. The cost estimates include the cost of catch basins needed for local drainage to eliminate street flooding and to keep intersections free of storm from water along the alignment of the master planned facility.

Final engineering, surveying, contract administration and inspection are estimated at 20% of the construction cost. In addition, a 3% cost factor is shown for right-of-way acquisition.

The unit cost for the main line pipes includes the cost of lateral pipes and minor junction structures necessary to intercept local drainage along the alignment of the master planned drainage facility.

Cost Summary

Hawker-Crawford Study Area	*$ 15,098,491
North Fontana Study Area	97,129,672
South Fontana Study Area	89,310,666
Project 3-3 Study Area, Rialto Channel Drainage Area	$ 16,208,825
Total	**$217,747,654

* Note: The cost of the Hawker-Crawford drainage facilities shown in the Volume IA report has been adjusted by a factor of 1.38/1.25 to arrive at a cost with overhead factors consistent with the remainder of the Fontana Master Storm Drainage Plan facilities.

** Note: This amount does not include the cost of storm drains in the County Project 3-4 Drainage Study.

LINE A	$ 8,601,523
LINE B	1,549,021
LINE C	1,151,250
LINE D	963,250
LINE E	721,250
LINE F	352,750
LINE G	337,125

SUBTOTAL * FROM THE VOLUME IA REPORT $13,676,169
(includes a 25% cost factor for construction contingencies, etc.)

Amount of adjustment (1.38/1.25) = 1.104

ADJUSTED TOTAL ESTIMATED COST **
(Adjusted to a cost factor of 38%) $15,098,491

* A cost factor of 25% is included in estimated cost of facilities outlined in the Volume IA report.

** In order to make the Hawker-Crawford costs conform to the 38% cost factor used for the rest of the Master Plan Study, the estimated cost has been adjusted by a factor of 1.38/1.25.

NORTH FONTANA MASTER PLAN FACILITIES

A LINES	$ 6,029,150
B LINES	6,985,795
C LINES	8,743,005
D LINES	17,881,780
LINE T1	696,300
LINE T2	1,957,050
LINE T3	1,357,200
LINE T4	1,429,850
LINE T5	2,017,200
LINE T6	516,760
LINE T7	2,162,920
LINE T8	1,431,850
WEST FONTANA CHANNEL	3,639,440
* H LINES	15,535,520
SUBTOTAL	$ 70,383,820
CONTINGENCIES 15%	10,557,573
	$ 80,941,393
RIGHT-OF-WAY 3%	2,111,515
INSPECTION, ADMINISTRATION, ENGINEERING & SURVEYING 20%	14,076,764
TOTAL	$ 97,129,672

* COST ESTIMATE TAKEN FROM VILLAGE OF HERITAGE CFD ESTIMATES. INCLUDES LINES H1-H15 AND EXISTING LINES IN BASELINE AVENUE AND FOOTHILL BOULEVARD.

SOUTH FONTANA MASTER PLAN FACILITIES

LINES "DZ-1" TO "DZ-16"	$ 9,994,125
LINES "M-1" TO "M-4"	1,105,500
LINE "M-5"	15,308,725
LINE "M-6"	2,290,800
LINE "M-7"	2,440,850
LINE P1-P3	1,408,000
LINE "SS-2 - "SS-20""	6,256,100
LINE "SS-5" TO "SS-11"	2,521,350
LINE "T-1A" TO "T-4C"	5,889,350
WEST FONTANA CHANNEL (WEST OF HEMLOCK TO THE SAN SEVAINE CHANNEL)	5,964,000
I-10 CHANNEL	11,539,074
SUBTOTAL	64,717,874
CONTINGENCIES 15%	9,707,681
SUBTOTAL	74,425,555
RIGHT-OF-WAY 3%	1,941,536
INSPECTION, ADMINISTRATION, ENGINEERING & SURVEYING 20%	12,943,575
TOTAL	$89,310,666

PROJECT 3-3 (RIALTO STUDY AREA)

E LINES	3,003,960
F LINES	3,283,950
G LINES	3,615,020
J LINES	1,842,595
SUBTOTAL	11,745,525
CONTINGENCIES 15%	1,761,829
SUBTOTAL	13,507,354
INSPECTION, ADMINISTRATION, ENGINEERING & SURVEYING 20%	2,349,105
RIGHT-OF-WAY 3%	352,366
TOTAL	$16,208,825

APPENDIX A
DETENTION BASIN POLICY AND DESIGN CRITERIA

DETENTION BASIN POLICY AND DESIGN CRITERIA

A. DETENTION BASIN POLICY

1. GENERAL

New development may increase flood hazards to downstream properties unless adequate drainage facilities are provided to mitigate potential drainage problems. The most desirable mitigation of potential drainage problems is the construction of street improvements and/or permanent drainage facilities to convey the increased drainage flows generated by the development.

The drainage facilities and/or street system should be connected to an ultimate drainage system and, if possible, the drainage system should be designed and constructed as part of the City's comprehensive storm drain plan.

Detention basins are often used as a part of the regional flood control system or as a temporary part of the local, ultimate drainage system. A regional detention facility is normally used to decrease and/or regulate downstream drainage flows, decrease the size of downstream drainage systems, or to provide for water conservation. Regional detention basin are normally constructed as a part of the San Bernardino County Flood Control District system or are basins that can be incorporated into the Flood Control's District's existing or proposed drainage system.

Except for regional detention basins and water conservation basins, detention basins will not normally be permitted as a permanent part of the ultimate drainage system. This is due to the relatively high maintenance factors, nuisance factors, potential safety hazards, and the general lack of equipment and expertise of the City in maintaining such basins.

Except for joint use basins, at locations where such joint use is practical and desirable, and regional basins are described above, the use of permanent detention basins will not normally be permitted. The use of interim, local detention basins is discussed below and conditions for the use of the basins are provided.

Definitions of regional, local, interim and joint use basins are provided in B,1, "Detention Basin Design Criteria."

2. USE OF INTERIM, LOCAL DETENTION BASINS

In the event it is shown to be uneconomical or otherwise impractical to connect to an existing portion of the ultimate drainage or flood control system, the use of interim, local detention basins will be permitted. Local detention basins are difficult to monitor, expensive to maintain, any may become a public nuisance. Therefore, interim detention basins shall only be used when the following conditions are met:

a. In the opinion of the City Engineer, the construction of an ultimate drainage system to serve the development is not economically feasible or practical.

b. The interim basins can be demonstrated to adequately mitigate downstream drainage flows.

c. Sufficient detailed data to ensure their feasibility shall be provided prior to Planning Commission approval.

d. A maintenance and inspection program for the detention basins shall be established for each development. Funding shall be assured until such time as the ultimate drainage system can be constructed.

e. Sufficient design information and details shall be provided to show that the interim basins can be removed in the future and the development drainage system can be integrated into the ultimate drainage system unless this condition is waived by the City Engineer.

3. USE OF JOINT USE DETENTION BASINS

Joint use basins shall be utilized only in those conditions where it is shown to be uneconomical or otherwise impractical to construct or connect to an existing portion of the ultimate drainage system, and a beneficial joint use for the facility can be demonstrated.

The same general conditions listed in Section A,2 above shall be met. If the joint use basin is to be considered a permanent facility, Section A,2,e, will not be necessary.

The basin shall be site specific and shall be approved by all agencies involved.

B. DETENTION BASIN DESIGN CRITERIA

The following design parameters and criteria are provided as guidelines to ensure proper detention basin design, construction and operation. When absolutely necessary and dependent upon site conditions, these guidelines may be modified if approved in writing by the City Engineer. An engineering report will be necessary to justify and support any modifications.

1. DEFINITIONS

a. Regional Detention Basin

1) A basin which can be incorporated into the Flood Control District's existing or proposed drainage system,

2) Basin owned and operated by the Flood Control District, although it may be joint use, and

3) A basin which will reduce the downstream peak flow rate and the necessary downstream storm drain size.

b. Local Detention Basin

1) A basin which will not be incorporated into the Flood Control District's existing or proposed drainage system,

2) A basin owned by an individual or organization other than the Flood Control District, and

3) A basin which will reduce the downstream peak flow rate, but will not be considered in downsizing future downstream storm drains.

c. Joint Use Detention Basin

A regional or local detention basin which has an additional use such as football field, parking lot, golf course, lake, etc.

d. Temporary Detention Basin

1) A local detention basin used to reduce downstream peak flow rates until ultimate storm drain facilities can be constructed as part of a phased development, and

2) Generally, the life of the basin shall not exceed 10 years.

e. Design Criteria

Regional detention basins are assumed to be a part of the regional drainage system and, therefore, will be incorporated into the District drainage system.

All regional detention basins will be designed in accordance with the San Bernardino County Flood Control District's "Detention Basin Design Criteria."

Local, temporary and joint use basins shall be designed in accordance with these standards.

2. BASIN CAPACITY AND OUTLET DRAIN

a. When a basin is to be used to mitigate downstream impacts due to increased flows generated by a development, the basin capacity and outlet size shall be such that the post-development peak flow rate generated by the development shall be less than or equal to 90% of the pre-development peak flow rate from the site for all frequency storms up to and including 100-year.

1) Only 2, 10, 25 and 100-year storms need to be analyzed.

2) Additional studies shall be submitted where there exists more than one basin in the drainage area under review. The studies shall address the timing of the peak flow rates from the basins to ensure downstream flow rates are not increased.

b. When a basin (generally regional or regional joint use) is to be used to reduce the size of a master planned downstream drainage facility, the basin capacity and outlet size shall be such that the 100-year basin peak overflow rate is not greater than the downstream facility's design capacity.

1) If the basin outlets into a Flood Control District channel, open channel design capacities shall be per the San Bernardino County Flood Control District criteria and policy. A permit from the Flood Control District will be required.

2) Pressure flow closed conduits shall be designed such that the hydraulic grade line is below the ground or street surface. In those reaches where no surface flow will be

intercepted (now or in the future), a hydraulic grade line which encroaches on or is slightly higher than the ground or street surface will be acceptable.

3) Non-pressure flow closed conduit capacities shall be based on a flow depth no greater than 0.8 times the conduit diameter or height.

c. Where downstream erosion is a major concern, the duration of erosive flow velocities for all frequency storms shall not be substantially increased unless other forms of mitigation are provided. This can be accomplished by reducing the peak flow rate further than that required above. Refer to "Handbook of Hydraulics" by Horace Williams King and Earnest F. Brater; and "Open Channel Hydraulics" by Ven Te Chow, Ph.d., for erosive flow velocities. In cases such as this, special studies and design may be required.

d. When there exists a potential for debris entering the basin, the basin capacity shall be increased or a desilting basin provided to accommodate the debris production generated from a 100-year storm four years after a burn (over the entire watershed), plus 20% due to maintenance uncertainties.

1) For all basins where a significant amount of debris accumulation is anticipated, a debris disposal area or areas may be required.

2) "A New Method of Estimating Debris-Storage Requirements for Debris Basin" by Fred E. Tatum of the U.S. Army Corps of Engineers shall be used for determining the 100-year debris volume.

3) The basin capacity for local detention basins fed by natural drainage courses or earth channels with undeveloped watershed less than 0.5 square mile shall be enlarged to handle an additional five years of accumulated annual debris based on the attached Figure 1. For basins fed by natural drainage courses with watersheds larger than 0.5 square mile, a special debris study may be necessary, or a regional detention basin shall be utilized.

4) The basin capacity for detention basins located in watersheds known to have a high risk of burning shall be increased as determined by the City Engineer.

e. **Outlet Drain**

1) The outlet pipe for all basins except temporary basins shall be a minimum 24-inch RCP (1,350 D minimum) for local basins. The outlet pipe or conduit shall be encased with cutoff collars per the "Los Angeles County Flood Control Design Manual - Debris Dams and Basins," or designed per "Section 242, Cut-and-Cover Conduit Detail" of the Bureau of Reclamation's publication "Design of Small Dams."

2) Reinforced concrete collars generally from 2 to 3 feet high, 12 to 18 inches wide, and spaced from 7 to 10 times their height shall be provided.

3) All joints for pipes not encased shall be rubber gasketed.

4) The pipe shall be capable of withstanding H_2O live loads plus the applicable dead loads.

5) Erosion control measures shall be provided at the outlet of the basin outlet pipe.

6) Temporary basin outlet pipes may be a minimum 24-inch CMP, 12-gauge with seep rings. Design considerations shall be as stated above.

7) A metered outlet structure may be necessary to provide the necessary flow attenuation for all frequency storms. "V" shaped weirs and notched weirs are preferred over other alternates because they do not plug with debris and trash as easily as other designs. This condition may be waived on a case-by-case basis by the City Engineer, depending upon severity of drainage problems.

8) All detention basin outlets should be sized so the basin will drain within 24 hours after the basin reaches its 100-year peak depth/volume. If the basin does not drain in 24 hours, further studies using longer duration storms will be necessary. The basin storage volume (capacity) may need to be increased to accommodate subsequent storms.

9) Trash racks shall be provided at the inlet to the basin outlet structure(s).

10) Where warranted, and at the discretion of the City Engineer, a depth gauge shall be provided on the basin outlet structure in order to monitor debris deposition and basin operation.

11) Anti-vortex devices shall be provided where warranted.

f. **Analysis Methodology**

1) Pre-development and post-development peak flow rates shall be developed during the procedures outlined in the San Bernardino County Hydrology Manual, except as modified below. The input parameters (procedures) described in the manual shall be modified as follows when calculating the pre-development peak flow rates:

a) 10-year peak flow rates shall be calculated using 5-year rainfall,

b) 25-year peak flow rates shall be calculated using 10-year rainfall, and

c) 100-year peak flow rates shall be calculated using 25-year rainfall, and AMCII.

The basin outflow shall be metered to 90% of the calculated pre-development peak flow rates. The post-development peak flow rates to the basin shall be calculated in accordance with the County Hydrology Manual.

2) Basin inflow hydrographs shall be developed using the procedures outlined in the San Bernardino County Hydrology Manual, as modified.

3) Basin outflow hydrograph routing shall be developed by the Modified Puls Method.

4) Channel hydrograph routing shall be calculated by the convex channel routing methods or by moving the hydrograph utilizing travel time.

3. WATER SURFACE ELEVATION AND DEPTH

a. Local and Temporary Basins

1) Generally, no more than 50% of the basin's 100-year storage depth should be above existing ground, i.e., 50% or more of the 100-year minimum storage depth must be below the lowest ground outside basin. When feasible, the 100-year design water surface elevation should be at or below existing natural ground.

2) The basin's maximum water depth for 100-year design should be 8 feet or less. Reference is made to 3,a(3) and 3,b,(2) below.

3) When site conditions warrant and safety can be assured, the above depth requirements may be modified if the following conditions are met:

a) The detention basin is designed in accordance with the Los Angeles County Flood Control District's "Design Manual - Debris Dams and Basins."

b) The basin embankment is designed and constructed of material or has a solid core which does not allow seepage or piping to occur due to rodent holes.

b. Regional Basins

1) Depths shall be as approved by the Flood Control District and the basin shall be designed in accordance with District Detention Basin Design Criteria.

2) Basins with embankment heights greater than or equal to 25 feet and capacity greater than or equal to 15 acre-feet, or a capacity greater than or equal to 50 acre-feet and a height greater than or equal to 6 feet, shall be reviewed and approved by the State Division of Safety of Dams. (See Figure 2)

c. Joint Use Basins

1) Depths should be shallow and compatible with the secondary use.

2) The allowable depth in most cases will be site specific and shall be approved by all agencies involved.

4. EMERGENCY SPILLWAY

a. All detention basin spillways shall be designed to pass the fully developed 1,000-year peak flow rate ($Q = 1.35\ Q_{100} = 2.11\ Q_{10}$).

b. Spillway outflows shall be adequately conveyed to a storm drain, drainage channel, street or an established watercourse.

c. Generally, all spillway structures shall be constructed of reinforced concrete. For temporary detention basins, the spillway may be constructed with grouted rock or other forms of approved protection designed to resist maximum design velocities. The spillway may be waived for small temporary basins at the discretion of the City Engineer.

d. When the spillway crest is more than 3 feet above the flowline of the facility the spillway outlets into, the spillway shall be constructed of reinforced concrete.

e. Generally, the spillway crest shall be at or above the basin's design 100-year high water line (HWL).

5. FREEBOARD TO THE TOP OF EMBANKMENT

a. Local and temporary basins shall have a minimum 1-foot of freeboard above the 1,000-year HWL on the emergency spillway of 2 feet of freeboard above the 100-year HWL in the basin, whichever is more stringent.

b. Joint use basins shall conform to the applicable local or regional freeboard requirements.

6. BASIN EMBANKMENT

a. Basin side slopes should be 3:1 or flatter on the wet side and 2:1 or flatter on the dry side. Steeper slopes may be acceptable on a case-by-case basis if rock lined and recommended in the soils and geotechnical report.

b. Top Width of Levee

1) Regional and local basins - 15 feet minimum*

2) Joint Use - site specific

3) Refer to Section 9.c

* It may be possible to deviate from minimum for Temporary Detention Basins.

c. For design of the embankment abutments and adjacent slopes, a soils and geotechnical report shall be prepared by a soils and geotechnical engineer with a demonstrated expertise in earth fill

dam design. The report shall include:

1) Site geology, including bedding, foliation, fracture, joint, fault, and landslide plan attitudes.

2) Seismic conditions, including fault locations and potential seismic surface movements respective loadings and parameters of seismic shaking.

3) Potential impact of reservoir loading on geologic structure should be evaluated.

4) Detailed descriptions, locations and logs of all field explorations.

5) Field and laboratory tests and analysis descriptions and results.

6) Groundwater table elevation and analysis of near surface groundwater movement.

7) Recommended design parameters including, but not limited to, the following for the dam and its natural abutments and slopes adjacent to reservoir areas:

   a) Lateral earth loadings

   b) Shear strengths

   c) Bearing capacities

   d) Permeability

   e) Slope stability analysis when saturated and during rapid drawdown conditions

   f) Sieve analysis

   g) Sand equivalents

   h) Liquefaction analysis and, if appropriate, mitigation

   i) Seismic Seiche analysis

   j) UBC Chapter 70

8) Special design and construction recommendations including, but not limited to, the following:

a) Foundation preparation requirements

b) Suitability of materials for embankments (gradation, sand equivalent, etc.) and abutments

c) Compaction methods and minimum requirements

d) Seepage and piping control provisions

e) Potential for settlement

f) Seismic considerations

g) Minimum design factors of safety are:

	Without Seismic	With Seismic
Embankment, Abutment & Adjacent Slope Stability	1.5	1.1
Seepage - Piping	1.5	--

h) Necessity of impervious core or shear key

i) Erosion control of abutments

d. Basins not meeting the depth and side slope requirements set forth previously shall be designed in accordance with the Los Angeles County Flood Control District's "Design Manual - Debris Dams and Basins."

7. BASIN FLOOR

a. A low flow channel shall be provided from the basin inlet(s) to the basin outlet.

1) Where basin slopes exceed 2% or produce erosive flow velocities, the low flow channel should be protected from erosion with reinforced concrete, rock lining, or other form of approved erosion protection.

2) Joint Use Basins

a) A low flow channel or conduit should be provided to conduct minor flows around the dual use facilities wherever possible. Low flow channels may not be necessary for parking lot basins or other similar joint uses.

b) Low flow channel may be grass lined if there exists a maintenance program which included mowing and maintenance of turf in good condition, and velocities of flow through the various stages of discharge are low enough to be nonerosive.

b. Earth basin floors shall slope at a minimum 0.5% grade to the low flow channel.

c. Earth basin floors shall have a minimum grade of 0.5% from the inlet to the outlet unless waived by the City Engineer.

8. INLET STRUCTURE

a. Where storm drains enter the basin, energy dissipators and/or erosion protection shall be provided.

b. Where natural drainage courses or channels enter the basin, some form of invert stabilization, such as reinforced concrete or grouted stone spillway, shall be provided.

c. Energy dissipators may be required when the inletting flow velocities exceed 5 fps.

d. Inletting storm drains shall be a minimum 24-inch RCP (1,350 D).

9. ACCESS

a. Access to the detention basin area shall be provided by a roadway from a public street or public access to the parcel upon which the basin is constructed. The roadway shall have a minimum width of 15 feet.

b. Access shall be maintained under all weather conditions.

c. If the basin is isolated or not located adjacent to roadways, a 15-foot wide roadway shall be provided along the top of

embankment. The intent of this criteria is to have continuous access around and to the basin for maintenance purposes. Under certain circumstances where it can be shown the recommended top width is not necessary for structural safety and maintenance, the criteria may be modified.

1) If access across the spillway is not provided, turnarounds or other adequate access as necessary for maintenance shall be provided on both sides of the spillway.

2) If there exists adequate access for maintenance, this requirement may be amended.

d. A 15-foot wide access ramp shall be provided to the basin floor. The width may be reduced to 10 feet for temporary detention basins.

e. The maximum roadway or access ramp slope shall be 10% unless the roadway is paved. If the roadway or access ramp is paved, the maximum slope shall be 12%. The ramp slope may be between 10% and 15% for temporary detention basins.

10. FENCING

a. All basins shall be fenced with 6-foot chain link fencing per Caltrans standards or other approved barrier unless otherwise approved by the Engineering Department. Joint use basin fencing will be site specific and must meet the needs of all agencies utilizing the basin.

b. Access to the basins shall be gated and locked.

11. RIGHTS-OF-WAY

a. Sufficient rights-of-way shall be provided for the construction and economical maintenance of the basin(s), including all fill and cut slopes, and shall include sufficient area to provide for an access road from a dedicated public street to the basin.

b. Regional basins shall be dedicated to the District or other appropriate agency in fee title.

c. Local, temporary, and joint use basins shall be covered by an adequate drainage easement.

12. REFERENCES TO BE USED IN DESIGN

"A New Method of Estimating Debris - Storage Requirements for Debris Basins," Tatum, U.S. Army Engineer District, Los Angeles, CA, 1963

"Design of Small Dams," U.S. Bureau of Reclamation, 1977

"Handbook of Hydraulics," King and Brater, McGraw Hill Book Company,, Latest Edition

"Los Angeles County Flood Control Manual - Debris Dams and Basins," Los Angeles County Flood Control District

"Open-Channel Hydraulics," Ven Te Chow, Ph.d., 1959

"San Bernardino County Hydrology Manual," San Bernardino County, 1986

"San Bernardino County Standards and Specifications," San Bernardino County Department of Transportation/Flood Control/Airports

C. DETENTION BASIN MAINTENANCE FINANCING MECHANISM AND POLICY

1. GENERAL

Maintenance responsibilities and related financing mechanism for detention basins, including joint use facilities, must be contained in the conditions of approval of each development. Detailed requirements must be included which would indicate the procedure to be followed, identification of responsible entity, and funding requirements for facilities construction, operation and maintenance. The joint use of detention basins is recommended where compatible uses and adequate maintenance can be assured. However, the approval of any joint use activity within detention basins must be contingent upon obtaining funding for ongoing operation and maintenance.

The lack of adequate maintenance is considered the most significant problem in the use of detention basins. Detention basins characteristically require more maintenance than do other storm drainage or flood control facilities. The proper functioning of the facility is also much more sensitive to proper maintenance. Adequate maintenance, including periodic inspection, debris removal, weed control, rodent and vector control and repairs, is essential to the successful use of the basins.

Maintenance costs for basins are variable and can be relatively high. Therefore, adequate funding dedicated solely for basin maintenance is important.

There are a number of methods available for generating funds necessary to pay for operation and maintenance of detention basins. Projects can be financed by some combination of resources and funding techniques. Following is a list of general funding mechanisms and techniques that can be used for the operation and maintenance of detention basins.

It is assumed all regional detention basins that area part of the San Bernardino County Flood Control District's channel system will be maintained by the District. Therefore, the basin maintenance mechanism discussed herein is for local detention basins.

2. MAINTENANCE AND OPERATION FUNDING MECHANISMS

a. Developer Cash Deposit

The developer would establish a maintenance fund with a lump sum cash deposit. The maintenance fund to be established should be based on the rate of return on investment and the rate of inflation as established annually. The fund would be equal to the present worth of the annual maintenance cost for economic life of the facilities. The present worth of the inflated cost of each annual maintenance cost will be treated as a single payment in determining the amount of the fund. The following presents the procedure for establishing the detention basins maintenance fund:

1) Estimate average annual maintenance costs at current year value.

2) Determine maintenance cost for each year in the future for the 50-year economic life of the project. Maintenance cost will be increased each year by the adopted rate of inflation.

3) Determine the present worth of each year's maintenance cost at the established rate for return on investment.

4) The value of the maintenance fund will equal the sum of the present worth of each of the maintenance costs. The maintenance fund to be established for drainage should be based on the rate of return on investment and the rate of

inflation as established annually by the State of California, Department of Water Resources, in the preparation of their annual project update bulletin titled "Management of the California State Water Project."

b. Mello-Roos (Community Facilities Act of 1982)

A Mello-Roos Special Tax District can be established by two-thirds vote of the landowners (when there are 12 or fewer registered voters) to construct and maintain detention basins. The annual tax rate is established for a given period of time necessary to pay off bonded indebtedness for the cost of constructing the detention basin and maintaining it for the life of the tax/bonds. The life of the tax is usually no more than 20-25 years. The tax rate can be reduced, but not increased.

Mello-Roos provides for establishment of a special tax which may be levied on the area within the district for the purpose of supporting the issuance of bonds or to otherwise pay the project costs as they are increased. If there are more than 12 registered voters, the election will be by voters.

c. Homeowners Association

Homeowners Association and other private ownerships are methods often used to maintain facilities after initial construction. This technique is used often for large, open space areas or recreational facilities for residential development where the common areas of the facilities are owned and maintained by the Association. Local governments, however, often express dissatisfaction with the level of expenditures and effort set forth by Homeowners Associations. The concern over the performance of a Homeowners Association to adequately provide required maintenance is especially true in the maintenance of detention basins. The basins are generally not a prominent feature of the common areas and the maintenance is capital intensive and technically complicated.

d. Assessment District

Assessment district financing utilizing a combination of 1911/1913/1915 processes can be used to construct the detention basin and also to operate and maintain the basin through the life of the bond payoff which is normally limited to 20 years. Maintenance can only be paid for by this method if an

assessment district is formed to fund the cost of construction. The formation of the district is approved by the City. The district will be denied if there is a majority protest of the property owners to be assessed at a public hearing. The cost of constructing and maintaining the basin is added as an annual charge to the owner's property tax bill. This method will not increase the initial price of the single family home, commercial building, etc. An alternative method would have to be established to take effect after pay off of the bonds. There is no administrative agency (such as with a service area of improvement zone) to deal with the operation and maintenance of facilities constructed by the assessment district process. The maintenance process would have to be established at the time of selling the bonds by a contractual agreement to ensure maintenance of the facilities for the bonding period. There would be limited flexibility to accommodate changes in conditions over the length of the bond payoff. An assessment district cannot be used to finance the maintenance and operation of parks and recreation facilities.

3. DETENTION BASIN MAINTENANCE POLICY

a. Local Basins - Private Ownership

The design of the private basin shall be done such that it will not be subject to failure and the design shall be reviewed and approved by the City in accordance with its standards and policy.

Those basins which are an integral part of a private development, such as a parking lot, athletic field or a park, shall be owned and maintenance by the private property owners.

It will be necessary for the City to inspect the construction, annually inspect the facility, and inspect the facility after storm events to ensure it is being properly maintained.

The private property owner shall be responsible for constructing the basin(s) and operating and maintaining the basin(s) thereafter. Funding for the facility maintenance shall be insured through a case trust fund in the name of the City with yearly interest less inspection fee provided to the Homeowners Association or the property owner, either of which will be responsible for the maintenance.

A drainage maintenance district or other acceptable public financing shall be established to operate and maintain the joint

use facility. Public financing shall be implemented only in the event the cash trust is exhausted due to unforeseen costs.

b. Local Basins - Public Ownership

Any local basin that is not an integral part of a private development will be owned and operated by the City. A cash trust to create a sinking fund shall be provided by the development and held by the City for the maintenance and inspection of the basin.

A drainage maintenance district or other acceptable public financing to the City shall be established to operate and maintain the facility. Public financing shall be implemented only in the event the cash trust is exhausted due to unforeseen costs.

c. Regional Basins

Regional flood control detention basins will be owned and operated by the Flood Control District.

It may be necessary to fund the operation, maintenance and inspection of new regional basins by either method listed above under public ownership of local basins.

The operation, maintenance and inspection of new regional basins shall be accomplished by coordination and negotiation with the Flood Control District.

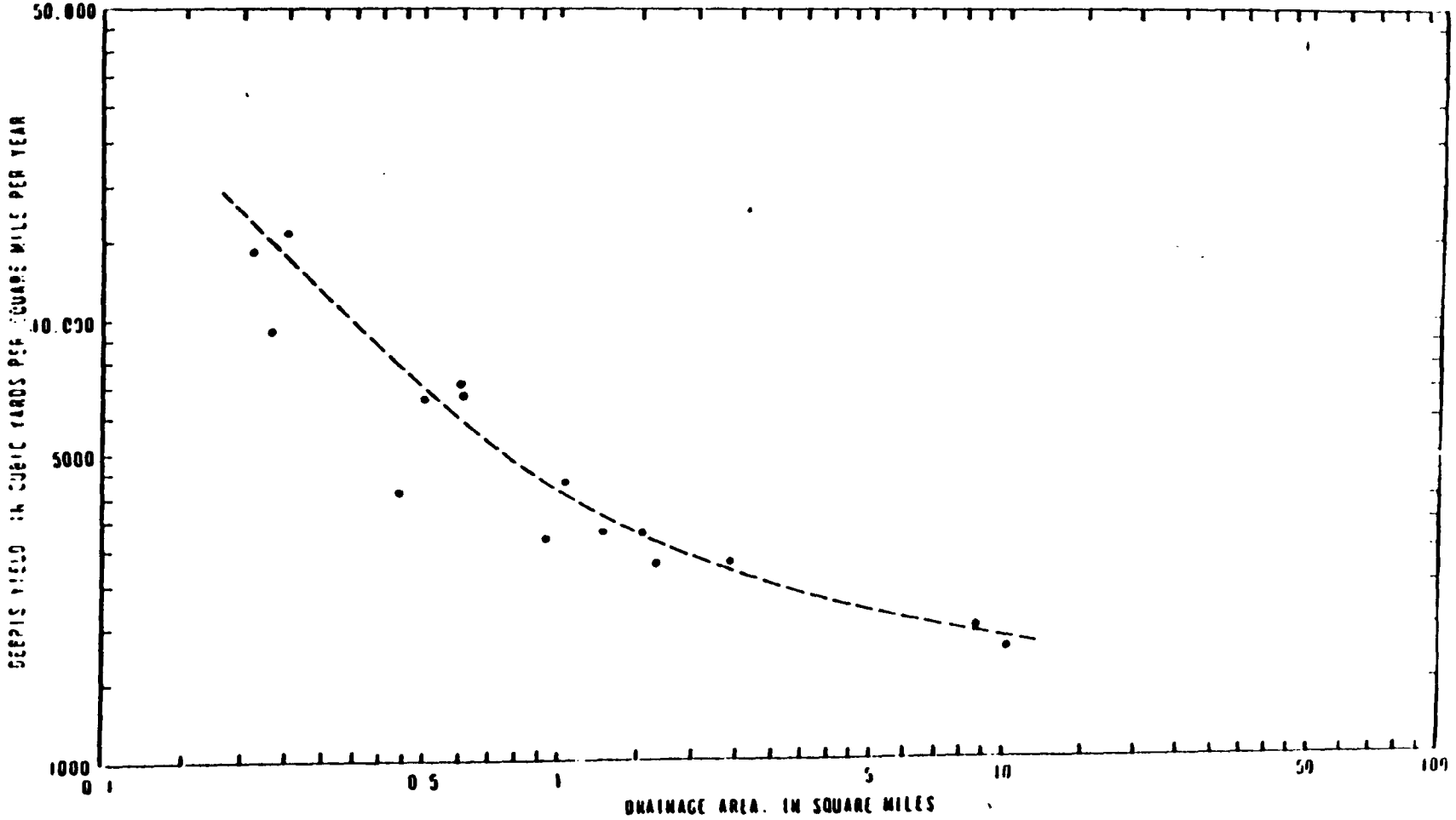
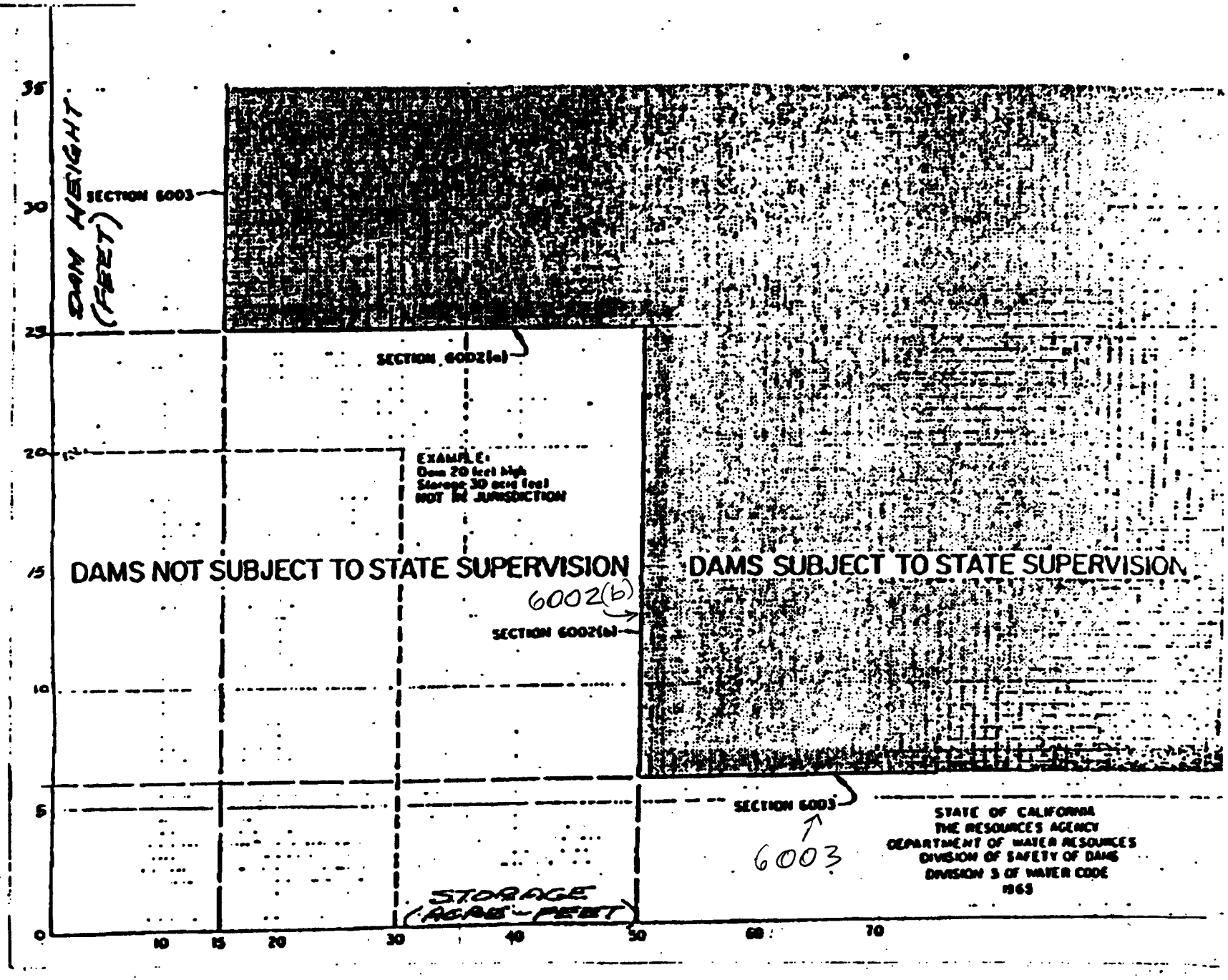


FIGURE 1 .--Long-term sediment yields at selected sites in Los Angeles County, California.


DAM HEIGHT (FEET)
35
30
25
20
15
10
5
0
SECTION 6003
SECTION 6002(a)
EXAMPLE:
Dam 20 feet High
Storage 30 acre feet
NOT IN JURISDICTION
DAMS NOT SUBJECT TO STATE SUPERVISION
6002(b)
SECTION 6002(a)
DAMS SUBJECT TO STATE SUPERVISION
SECTION 6003
6003
STATE OF CALIFORNIA
THE RESOURCES AGENCY
DEPARTMENT OF WATER RESOURCES
DIVISION OF SAFETY OF DAMS
DIVISION 3 OF WATER CODE
1963
STORAGE (ACRE-FEET)
10
15
20
30
40
50
60
70

APPENDIX B
COST ESTIMATES - NORTH FONTANA

HALL & FOREMAN, INC.
Civil Engineering-Land Planning-Land Surveying
13821 Newport Avenue, Suite 200
Tustin, California 92680
Telephone (714) 544-3404

**** CONSTRUCTION COST ESTIMATE ****

Job: 3547A
MASTER PLAN/STORM DRAIN ONLY LINE "A"

Estimate date:
By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total	
*** STORM DRAINAGE ***				
Main Lines:				
Const. 102" RCP.....	7500 LF	288.00	2,160,000.00	c
Const. 60" RCP.....	1300 LF	162.00	210,600.00	c
Const. 48" RCP.....	2600 LF	126.00	327,600.00	c
Const. 45" RCP.....	1300 LF	117.00	152,100.00	c
Const. 42" RCP.....	1250 LF	108.00	135,000.00	c
Const. 36" RCP.....	400 LF	90.00	36,000.00	c
Const. Junction Structure No. 3....	4 EA	4,000.00	16,000.00	c
Main Lines subtotal:			3,037,300.00	
Catch Basins:				
Const. Catch Basin L=9'.....	44 EA	3,400.00	149,600.00	c
Catch Basins subtotal:			**149,600.00**	
Manholes:				
Standard Manhole.....	40 EA	2,500.00	100,000.00	
Manholes subtotal:			100,000.00	
Miscellaneous:				
CONST. CONC. TRAP. CHNL. (6'X3.75')	1665 CY	275.00	457,875.00	
CONST. CONC. TRAP. CHNL. (6'X4')	1325 CY	275.00	364,375.00	
CONST. RC BOX (10'X9.5')	3975 CY	400.00	1,590,000.00	
JUNCTION STRUCTURE.....	1 EA	10,000.00	10,000.00	
CHANNEL ENTRY.....	1 EA	20,000.00	20,000.00	
JACKING RCB UNDER FREEWAY.....	250 LF	1,200.00	300,000.00	
Miscellaneous subtotal:			2,742,250.00	
STORM DRAINAGE subtotal:			6,029,150.00	
Contingencies:			904,372.50	
STORM DRAINAGE total:			6,933,522.50	

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	6,029,150.00
TOTAL COST WITHOUT CONTINGENCIES:	6,029,150.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	6,029,150.00
CONTINGENCIES @ 15%:	904,372.50
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	6,933,522.50

HALL & FOREMAN, INC.
Civil Engineering-Land Planning-Land Surveying
13821 Newport Avenue, Suite 200
Tustin, California 92680
Telephone (714) 544-3404

**** CONSTRUCTION COST ESTIMATE ****

Job: 3547B — Estimate date:
MASTER PLAN/STORM DRAIN ONLY LINE "B" — By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 69" RCP.....	2600 LF	189.00	491,400.00
Const. 63" RCP.....	1300 LF	171.00	222,300.00
Const. 57" RCP.....	3350 LF	153.00	512,550.00
Const. 54" RCP.....	5060 LF	144.00	728,640.00
Const. 48" RCP.....	180 LF	126.00	22,680.00
Const. 42" RCP.....	2525 LF	108.00	272,700.00
Const. 39" RCP.....	3175 LF	99.00	314,325.00
Const. 36" RCP.....	1400 LF	90.00	126,000.00
Const. Junction Structure No. 3....	5 EA	4,000.00	20,000.00
		Main Lines subtotal:	2,710,595.00
Catch Basins:			
Const. Catch Basin L=9'.....	70 EA	3,400.00	238,000.00
		Catch Basins subtotal:	238,000.00
Manholes:			
Standard Manhole.....	68 EA	2,500.00	170,000.00
		Manholes subtotal:	170,000.00
Miscellaneous:			
CONST. RC BOX (9'X8').....	5045 CY	400.00	2,018,000.00
CONST. RC BOX (9.5'X 8').....	1300 CY	400.00	520,000.00
CONST. RC BOX (9.5'X 9').....	1370 CY	400.00	548,000.00
CONST. RC BOX (10'X 9').....	3 CY	400.00	1,200.00

	Quantity	Unit Cost	Item Total
CONST. RC BOX (10'X 5').....	400 CY	400.00	160,000.00
CONSTRUCT CHANNEL ENTRY.....	1 EA	20,000.00	20,000.00
JACK RCB UNDER FREEWAY.....	500 LF	1,200.00	600,000.00
		Miscellaneous subtotal:	3,867,200.00
		STORM DRAINAGE subtotal:	6,985,795.00
		Contingencies:	1,047,869.25
		STORM DRAINAGE total:	8,033,664.25

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	6,985,795.00
TOTAL COST WITHOUT CONTINGENCIES:	6,985,795.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	6,985,795.00
CONTINGENCIES @ 15%:	1,047,869.25
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	8,033,664.25

HALL & FOREMAN, INC.
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Tustin, California 92680
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**** CONSTRUCTION COST ESTIMATE ****

Job: 3547C
MASTER PLAN/STORM DRAIN ONLY LINE "C"
Estimate date:
By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 63" RCP.....	2650 LF	171.00	453,150.00
Const. 57" RCP.....	5300 LF	153.00	810,900.00
Const. 54" RCP.....	5300 LF	144.00	763,200.00
Const. 51" RCP.....	1925 LF	135.00	259,875.00
Const. 48" RCP.....	2650 LF	126.00	333,900.00
Const. 45" RCP.....	300 LF	117.00	35,100.00
Const. 42" RCP.....	650 LF	108.00	70,200.00
Const. 39" RCP.....	1970 LF	99.00	195,030.00
Const. 30" RCP.....	625 LF	72.00	45,000.00
Const. Junction Structure	6 EA	4,000.00	24,000.00
	Main Lines subtotal:		2,990,355.00
Catch Basins:			
Const. Catch Basin L=9'.....	76 EA	3,400.00	258,400.00
	Catch Basins subtotal:		258,400.00
Manholes:			
Standard Manhole.....	70 EA	2,500.00	175,000.00
	Manholes subtotal:		175,000.00
Miscellaneous:			
CONST. CONC. TRAP. CHNL. (4'X 2.5')	1035 CY	275.00	284,625.00
CONST. CONC. TRAP.. CHNL. (8'X 5.5')	3690 CY	275.00	1,014,750.00
CONST. CONC. TRAP. CHNL. (8'X 6.5')	2055 CY	275.00	565,125.00

	Quantity	Unit Cost	Item Total
CONST. CONC. TRAP. CHNL. (8'X 7')..	3270 CY	275.00	899,250.00
CONST. CONC. TRAP. CHNL. (8'X 7.5')	1160 CY	275.00	319,000.00
CONST. CONC. TRAP. CHNL. (8'X 8')..	1250 CY	275.00	343,750.00
CONST. CONC. TRAP. CHNL. (8'X 8.5')	6810 CY	275.00	1,872,750.00
CONSTRUCT CHANNEL ENTRY	1 EA	20,000.00	20,000.00
		Miscellaneous subtotal:	5,319,250.00
		STORM DRAINAGE subtotal:	8,743,005.00
		Contingencies:	1,311,450.75
		STORM DRAINAGE total:	10,054,455.75

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	8,743,005.00
TOTAL COST WITHOUT CONTINGENCIES:	8,743,005.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	8,743,005.00
CONTINGENCIES @ 15%:	1,311,450.75
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	10,054,455.75

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**** CONSTRUCTION COST ESTIMATE ****

Job: 3547D
MASTER PLAN/STORM DRAIN ONLY LINE "D"

Estimate date:
By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 102" RCP.....	3950 LF	288.00	1,137,600.00
Const. 93" RCP.....	2600 LF	261.00	678,600.00
Const. 69" RCP.....	2000 LF	189.00	378,000.00
Const. 66" RCP.....	1300 LF	180.00	234,000.00
Const. 63" RCP.....	5380 LF	171.00	919,980.00
Const. 60" RCP.....	1350 LF	162.00	218,700.00
Const. 57" RCP.....	5250 LF	153.00	803,250.00
Const. 54" RCP.....	8480 LF	144.00	1,221,120.00
Const. 51" RCP.....	1750 LF	135.00	236,250.00
Const. 48" RCP.....	2610 LF	126.00	328,860.00
Const. 45" RCP.....	4740 LF	117.00	554,580.00
Const. 42" RCP.....	1280 LF	108.00	138,240.00
Const. 39" RCP.....	1700 LF	99.00	168,300.00
Const. 36" RCP.....	350 LF	90.00	31,500.00
Const. 30" RCP.....	300 LF	72.00	21,600.00
Const. Junction Structure	6 EA	4,000.00	24,000.00
		Main Lines subtotal:	7,094,580.00
Catch Basins:			
Const. Catch Basin L=9'.....	128 EA	3,400.00	435,200.00
		Catch Basins subtotal:	435,200.00
Manholes:			
Standard Manhole.....	148 EA	2,500.00	370,000.00
		Manholes subtotal:	370,000.00

	Quantity	Unit Cost	Item Total
Miscellaneous:			
CONST. DBL. RC BOX (2-8'X 6').....	6580 CY	400.00	2,632,000.00
CONST. DBL. RC BOX (2-9'X 6').....	4000 CY	400.00	1,600,000.00
CONST. DBL. RC BOX (2-10'X 6').....	4400 CY	400.00	1,760,000.00
CONST. DBL. RC BOX (2-10'X 8').....	9925 CY	400.00	3,970,000.00
CONSTRUCT CHANNEL ENTRY.....	1 EA	20,000.00	20,000.00
		Miscellaneous subtotal:	9,982,000.00
		STORM DRAINAGE subtotal:	17,881,780.00
		Contingencies:	2,682,267.00
		STORM DRAINAGE total:	20,564,047.00

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	17,881,780.00
TOTAL COST WITHOUT CONTINGENCIES:	17,881,780.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	17,881,780.00
CONTINGENCIES @ 15%:	2,682,267.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	20,564,047.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: 3547T1
MASTER PLAN/STORM DRAIN ONLY

Estimate date:
By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 51" RCP.....	1450 LF	135.00	195,750.00
Const. 45" RCP.....	1300 LF	117.00	152,100.00
Const. 42" RCP.....	2000 LF	108.00	216,000.00
JACK RCP UNDER RAILROAD.....	75 LF	450.00	33,750.00
		Main Lines subtotal:	597,600.00
Catch Basins:			
Const. Catch Basin L=9'.....	18 EA	3,400.00	61,200.00
		Catch Basins subtotal:	61,200.00
Manholes:			
Standard Manhole.....	15 EA	2,500.00	37,500.00
		Manholes subtotal:	37,500.00
		STORM DRAINAGE subtotal:	696,300.0
		Contingencies:	69,630.0
		STORM DRAINAGE total:	765,930.0

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	696,300.00
TOTAL COST WITHOUT CONTINGENCIES:	696,300.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	696,300.00
CONTINGENCIES @ 10%:	69,630.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	765,930.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: 3547T2 Estimate date:
MASTER PLAN/STORM DRAIN ONLY - LINE T2 By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 72" RCP.....	1400 LF	198.00	277,200.00
Const. 69" RCP.....	2700 LF	189.00	510,300.00
Const. 63" RCP.....	5000 LF	171.00	855,000.00
Const. 54" RCP.....	300 LF	144.00	43,200.00
Const. 42" RCP.....	600 LF	108.00	64,800.00
Const. Junction Structure	1 EA	4,000.00	4,000.00
JACK RCP UNDER RAILROAD ...	75 LF	450.00	33,750.00
		Main Lines subtotal:	1,788,250.00
Catch Basins:			
Const. Catch Basin L=9'.....	32 EA	3,400.00	108,800.00
		Catch Basins subtotal:	108,800.00
Manholes:			
Standard Manhole.....	24 EA	2,500.00	60,000.00
		Manholes subtotal:	60,000.00
		STORM DRAINAGE subtotal:	1,957,050.00
		Contingencies:	293,557.50
		STORM DRAINAGE total:	2,250,607.50

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	1,957,050.00
TOTAL COST WITHOUT CONTINGENCIES:	1,957,050.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	1,957,050.00
CONTINGENCIES @ 15%:	293,557.50
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	2,250,607.50

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**** CONSTRUCTION COST ESTIMATE ****

Job: 3547T3 Estimate date:
MASTER PLAN/STORM DRAIN ONLY - LINE T3 By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 66" RCP.....	1500 LF	180.00	270,000.00
Const. 63" RCP.....	1500 LF	171.00	256,500.00
Const. 57" RCP.....	950 LF	153.00	145,350.00
Const. 51" RCP.....	2700 LF	135.00	364,500.00
Const. 42" RCP.....	1300 LF	108.00	140,400.00
Const. Junction Structure	1 EA	4,000.00	4,000.00
JACK RCP UNDER RAILROAD	75 LF	450.00	33,750.00
Main Lines subtotal:			1,214,500.00
Catch Basins:			
Const. Catch Basin L=9'.....	28 EA	3,400.00	95,200.00
Catch Basins subtotal:			95,200.00
Manholes:			
Standard Manhole.....	19 EA	2,500.00	47,500.00
Manholes subtotal:			47,500.00
STORM DRAINAGE subtotal:			1,357,200.00
Contingencies:			203,580.00
STORM DRAINAGE total:			1,560,780.00

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	1,357,200.00
TOTAL COST WITHOUT CONTINGENCIES:	1,357,200.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	1,357,200.00
CONTINGENCIES @ 15%:	203,580.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	1,560,780.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: 3547T4 Estimate date:
MASTER PLAN/STORM DRAIN ONLY - LINE T4 By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 66" RCP.....	750 LF	180.00	135,000.00
Const. 60" RCP.....	1850 LF	162.00	299,700.00
Const. 57" RCP.....	1850 LF	153.00	283,050.00
Const. 51" RCP.....	2650 LF	135.00	357,750.00
Const. 42" RCP.....	1600 LF	108.00	172,800.00
Const. Junction Structure	1 EA	4,000.00	4,000.00
JACK RCP UNDER RAILROAD	75 LF	450.00	33,750.00
Main Lines subtotal:			1,286,050.00
Catch Basins:			
Const. Catch Basin L=9'.....	32 EA	3,400.00	108,800.00
Catch Basins subtotal:			108,800.00
Manholes:			
Standard Manhole.....	14 EA	2,500.00	35,000.00
Manholes subtotal:			35,000.00
STORM DRAINAGE subtotal:			1,429,850.00
Contingencies:			214,477.50
STORM DRAINAGE total:			1,644,327.50

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	1,429,850.00
TOTAL COST WITHOUT CONTINGENCIES:	1,429,850.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	1,429,850.00
CONTINGENCIES @ 15%:	214,477.50
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	1,644,327.50

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**** CONSTRUCTION COST ESTIMATE ****

Job: 3547T5
MASTER PLAN/STORM DRAIN ONLY - LINE T5

Estimate date:
By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 81" RCP.....	4000 LF	225.00	900,000.00 c
Const. 75" RCP.....	900 LF	207.00	186,300.00 c
Const. 57" RCP.....	2700 LF	153.00	413,100.00 c
Const. 54" RCP.....	650 LF	144.00	93,600.00 c
Const. 48" RCP.....	650 LF	126.00	81,900.00 c
Const. 39" RCP.....	650 LF	99.00	64,350.00 c
Const. 36" RCP.....	650 LF	90.00	58,500.00 c
Const. Junction Structure	1 EA	4,000.00	4,000.00 c
JACK RCP UNDER RAILROAD	75 LF	450.00	33,750.00 c
		Main Lines subtotal:	1,835,500.00
Catch Basins:			
Const. Catch Basin L=9'.....	38 EA	3,400.00	129,200.00 c
		Catch Basins subtotal:	129,200.00
Manholes:			
Standard Manhole.....	21 EA	2,500.00	52,500.00 c
		Manholes subtotal:	52,500.00
		STORM DRAINAGE subtotal:	2,017,200.00
		Contingencies:	302,580.00
		STORM DRAINAGE total:	2,319,780.00

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	2,017,200.00
TOTAL COST WITHOUT CONTINGENCIES:	2,017,200.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	2,017,200.00
CONTINGENCIES @ 15%:	302,580.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	2,319,780.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: 3547T6 Estimate date:
MASTER PLAN/STORM DRAIN ONLY - LINE T6 By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 51" RCP.....	2400 LF	135.00	324,000.00
Const. 45" RCP.....	630 LF	117.00	73,710.00
Const. 36" RCP.....	575 LF	90.00	51,750.00
Const. Junction Structure	1 EA	4,000.00	4,000.00
Main Lines subtotal:			453,460.00
Catch Basins:			
Const. Catch Basin L=9'.....	12 EA	3,400.00	40,800.00
Catch Basins subtotal:			40,800.00
Manholes:			
Standard Manhole.....	9 EA	2,500.00	22,500.00
Manholes subtotal:			22,500.00
STORM DRAINAGE subtotal:			516,760.00
Contingencies:			77,514.00
STORM DRAINAGE total:			594,274.00

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	516,760.00
TOTAL COST WITHOUT CONTINGENCIES:	516,760.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	516,760.00
CONTINGENCIES @ 15%:	77,514.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	594,274.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: 3547T7 Estimate date:
MASTER PLAN/STORM DRAIN ONLY - LINE T7 By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total	
*** STORM DRAINAGE ***				
Main Lines:				
Const. 78" RCP.....	1700 LF	216.00	367,200.00	c
Const. 69" RCP.....	3350 LF	189.00	633,150.00	c
Const. 66" RCP.....	1350 LF	180.00	243,000.00	c
Const. 48" RCP.....	4170 LF	126.00	525,420.00	c
Const. 42" RCP.....	1300 LF	108.00	140,400.00	c
Const. Junction Structure	1 EA	4,000.00	4,000.00	c
JACK RCP UNDER RAILROAD	75 LF	450.00	33,750.00	c
		Main Lines subtotal:	1,946,920.00	
Catch Basins:				
Const. Catch Basin L=9'.....	40 EA	3,400.00	136,000.00	
		Catch Basins subtotal:	136,000.00	
Manholes:				
Standard Manhole.....	32 EA	2,500.00	80,000.00	c
		Manholes subtotal:	80,000.00	
		STORM DRAINAGE subtotal:	2,162,920.00	
		Contingencies:	324,438.00	
		STORM DRAINAGE total:	2,487,358.00	

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	2,162,920.00
TOTAL COST WITHOUT CONTINGENCIES:	2,162,920.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	2,162,920.00
CONTINGENCIES @ 15%:	324,438.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	2,487,358.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: 3547T8 Estimate date:
MASTER PLAN/ST. DRAIN ONLY - LINE T8 By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 69" RCP.....	4800 LF	138.00	662,400.00
Const. 66" RCP.....	1000 LF	135.00	135,000.00
Const. 60" RCP.....	2720 LF	120.00	326,400.00
Const. 57" RCP.....	630 LF	114.00	71,820.00
Const. 39" RCP.....	630 LF	82.00	51,660.00
Junction Structures.....	1 EA	4,000.00	4,000.00
JACK RCP UNDER RAILROAD	75 LF	450.00	33,750.00
Main Lines subtotal:			1,285,030.00
Catch Basins:			
Const. Catch Basin L=9'.....	32 EA	2,635.00	84,320.00
Catch Basins subtotal:			84,320.00
Manholes:			
Standard Manhole.....	25 EA	2,500.00	62,500.00
Manholes subtotal:			62,500.00
STORM DRAINAGE subtotal:			1,431,850.00
Contingencies:			214,777.50
STORM DRAINAGE total:			1,646,627.50

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	1,431,850.00
TOTAL COST WITHOUT CONTINGENCIES:	1,431,850.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	1,431,850.00
CONTINGENCIES @ 15%:	214,777.50
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	1,646,627.50

HALL & FOREMAN, INC.
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Telephone (714) 641-8777

**** CONSTRUCTION COST ESTIMATE ****

Job: 3547WF
N. FONTANA S.D. W. FONTANA CHNL. E. OF HEMLOCK

Estimate date:
By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total	
*** STORM DRAINAGE ***				
Main Lines:				
Const. 102" RCP.....	630 LF	288.00	181,440.00	c
Main Lines subtotal:			181,440.00	
Miscellaneous:				
CONST. CONC. RECT. CHNL. (20'X 5').	460 CY	350.00	161,000.00	c
CONST. CONC. RECT. CHNL. (25'X 5').	1510 CY	350.00	528,500.00	c
CONST. CONC. RECT. CHNL. (35'X 5').	695 CY	350.00	243,250.00	c
CONST. CONC. RECT. CHNL. (35'X5.5')	3015 CY	350.00	1,055,250.00	c
CONST. CONC. RECT. CHNL. (40'X 6').	4200 CY	350.00	1,470,000.00	c
Miscellaneous subtotal:			3,458,000.00	
STORM DRAINAGE subtotal:			3,639,440.00	
Contingencies:			545,916.00	
STORM DRAINAGE total:			4,185,356.00	

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

- STORM DRAINAGE:	3,639,440.00
TOTAL COST WITHOUT CONTINGENCIES:	3,639,440.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	3,639,440.00
CONTINGENCIES @ 15%:	545,916.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	4,185,356.00

APPENDIX C
COST ESTIMATES - SOUTH FONTANA

HALL & FOREMAN, INC.
Civil Engineering-Land Planning-Land Surveying
3170 Redhill Avenue
Costa Mesa, California 92626-3428
Telephone (714) 641-8777

**** CONSTRUCTION COST ESTIMATE ****

Job: SFDZ1 — Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ-1 — By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 102" RCP.....	1340 LF	288.00	385,920.00
Const. 93" RCP.....	455 LF	261.00	118,755.00
Const. 87" RCP.....	440 LF	243.00	106,920.00
Const. 84" RCP.....	590 LF	234.00	138,060.00
Const. 75" RCP.....	620 LF	207.00	128,340.00
Const. 63" RCP.....	180 LF	171.00	30,780.00
Const. 57" RCP.....	830 LF	153.00	126,990.00
Const. 54" RCP.....	900 LF	144.00	129,600.00
Const. 39" RCP.....	160 LF	99.00	15,840.00
Const. 36" RCP.....	830 LF	90.00	74,700.00
Const. Junction Structure.....	8 EA	4,000.00	32,000.00
	Main Lines subtotal:		1,287,905.00
Catch Basins:			
Const. Catch Basin L=9'.....	22 EA	3,400.00	74,800.00
	Catch Basins subtotal:		74,800.00
Manholes:			
Standard Manhole.....	12 EA	2,500.00	30,000.00
	Manholes subtotal:		30,000.00
	STORM DRAINAGE total:		1,392,705.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	1,392,705.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	1,392,705.00
CONTINGENCIES @ 15%:	208,905.75
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	1,601,610.75

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Telephone (714) 641-8777

****** CONSTRUCTION COST ESTIMATE ******

Job: SFDZ2 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ-2 By: LARRY

	Quantity	Unit Cost	Item Total
***** STORM DRAINAGE *****			
Main Lines:			
Const. 87" RCP.....	290 LF	243.00	70,470.00
Const. 84" RCP.....	1035 LF	234.00	242,190.00
Const. 81" RCP.....	145 LF	225.00	32,625.00
Const. 78" RCP.....	590 LF	216.00	127,440.00
Const. 42" RCP.....	1060 LF	108.00	114,480.00
Const. 39" RCP.....	330 LF	99.00	32,670.00
Const. Junction Structure.....	2 EA	4,000.00	8,000.00
		Main Lines subtotal:	627,875.00
Catch Basins:			
Const. Catch Basin L=9'.....	4 EA	3,400.00	13,600.00
		Catch Basins subtotal:	13,600.00
Manholes:			
Standard Manhole.....	6 EA	2,500.00	15,000.00
		Manholes subtotal:	15,000.00
		STORM DRAINAGE total:	656,475.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	656,475.00

*** SUMMARY: -

CONSTRUCTION COST TOTAL:	656,475.00
CONTINGENCIES @ 15%:	98,471.25
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	754,946.25

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFDZ2A — Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ-2A By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 63" RCP.....	555 LF	171.00	94,905.00
Const. 60" RCP.....	890 LF	162.00	144,180.00
Const. 42" RCP.....	460 LF	108.00	49,680.00
Const. 39" RCP.....	770 LF	99.00	76,230.00
Const. Junction Structure.....	2 EA	4,000.00	8,000.00
		Main Lines subtotal:	372,995.00
Catch Basins:			
Const. Catch Basin L=9'.....	6 EA	3,400.00	20,400.00
		Catch Basins subtotal:	20,400.00
Manholes:			
Standard Manhole.....	6 EA	2,500.00	15,000.00
		Manholes subtotal:	15,000.00
		STORM DRAINAGE total:	408,395.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	408,395.00

*** SUMMARY: -

CONSTRUCTION COST TOTAL:	408,395.00
CONTINGENCIES @ 15%:	61,259.25
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	469,654.25

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFDZ4
SOUTH FONTANA MASTER STORM DRAIN PLAN - LINE DZ4 Estimate date: By: LARRY

	Quantity	Unit Cost	Item Total
***** STORM DRAINAGE *****			
Main Lines:			
Const. 42" RCP.....	700 LF	108.00	75,600.00
Const. 36" RCP.....	700 LF	90.00	63,000.00
		Main Lines subtotal:	138,600.00
Catch Basins:			
Const. Catch Basin L=9'.....	6 EA	3,400.00	20,400.00
		Catch Basins subtotal:	20,400.00
Manholes:			
Standard Manhole.....	4 EA	2,500.00	10,000.00
		Manholes subtotal:	10,000.00
		STORM DRAINAGE total:	169,000.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	169,000.00

*** SUMMARY:-

CONSTRUCTION COST TOTAL:	169,000.00
CONTINGENCIES @ 15%:	25,350.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	194,350.00

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFDZ5 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ-5 By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 102" RCP.....	950 LF	288.00	273,600.00
Const. 84" RCP.....	4050 LF	234.00	947,700.00
Const. 51" RCP.....	1350 LF	135.00	182,250.00
Const. 39" RCP.....	1650 LF	99.00	163,350.00
		Main Lines subtotal:	1,566,900.00
Catch Basins:			
Const. Catch Basin L=9'.....	10 EA	3,400.00	34,000.00
		Catch Basins subtotal:	34,000.00
Manholes:			
Standard Manhole.....	8 EA	2,500.00	20,000.00
		Manholes subtotal:	20,000.00
		STORM DRAINAGE total:	1,620,900.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	1,620,900.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	1,620,900.00
CONTINGENCIES @ 15%:	243,135.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	1,864,035.00

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFDZ6 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ-6 By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 39" RCP.....	1650 LF	99.00	163,350.00
Main Lines subtotal:			163,350.00
Catch Basins:			
Const. Catch Basin L=9'.....	6 EA	3,400.00	20,400.00
Catch Basins subtotal:			20,400.00
Manholes:			
Standard Manhole.....	5 EA	2,500.00	12,500.00
Manholes subtotal:			12,500.00
STORM DRAINAGE total:			196,250.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	196,250.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	196,250.00
CONTINGENCIES @ 15%:	29,437.50
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	225,687.50

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFDZ7 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ-7 By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 42" RCP.....	1650 LF	108.00	178,200.00
Main Lines subtotal:			178,200.00
Catch Basins:			
Const. Catch Basin L=9'.....	6 EA	3,400.00	20,400.00
Catch Basins subtotal:			20,400.00
Manholes:			
Standard Manhole.....	6 EA	2,500.00	15,000.00
Manholes subtotal:			15,000.00
STORM DRAINAGE total:			213,600.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	213,600.00

*** SUMMARY: -

CONSTRUCTION COST TOTAL:	213,600.00
CONTINGENCIES @ 15%:	32,040.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	245,640.00

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFDZ8 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ-8 By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 48" RCP.....	2750 LF	126.00	346,500.00
Const. 39" RCP.....	1500 LF	99.00	148,500.00
		Main Lines subtotal:	495,000.00
Catch Basins:			
Const. Catch Basin L=9'.....	12 EA	3,400.00	40,800.00
		Catch Basins subtotal:	40,800.00
Manholes:			
Standard Manhole.....	11 EA	2,500.00	27,500.00
		Manholes subtotal:	27,500.00
		STORM DRAINAGE total:	563,300.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	563,300.00

*** SUMMARY:_

CONSTRUCTION COST TOTAL:	563,300.00
CONTINGENCIES @ 15%:	84,495.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	647,795.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFDZ9 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ-9 By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 51" RCP.....	2750 LF	135.00	371,250.00
Const. 42" RCP.....	1500 LF	108.00	162,000.00
		Main Lines subtotal:	533,250.00
Catch Basins:			
Const. Catch Basin L=9'.....	12 EA	3,400.00	40,800.00
		Catch Basins subtotal:	40,800.00
Manholes:			
Standard Manhole.....	11 EA	2,500.00	27,500.00
		Manholes subtotal:	27,500.00
		STORM DRAINAGE total:	601,550.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	601,550.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	601,550.00
CONTINGENCIES @ 15%:	90,232.50
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	691,782.50

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFDZ10 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ-10 By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 51" RCP.....	2750 LF	135.00	371,250.00
Const. 42" RCP.....	1650 LF	108.00	178,200.00
Const. 36" RCP.....	1100 LF	90.00	99,000.00
		Main Lines subtotal:	648,450.00
Catch Basins:			
Const. Catch Basin L=9'.....	12 EA	3,400.00	40,800.00
		Catch Basins subtotal:	40,800.00
Manholes:			
Standard Manhole.....	15 EA	2,500.00	37,500.00
		Manholes subtotal:	37,500.00
		STORM DRAINAGE total:	726,750.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	726,750.00

*** SUMMARY:_

CONSTRUCTION COST TOTAL:	726,750.00
CONTINGENCIES @ 15%:	109,012.50
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	835,762.50

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFDZ11 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ11 By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 45" RCP.....	3200 LF	117.00	374,400.00
Const. 39" RCP.....	1200 LF	99.00	118,800.00
Main Lines subtotal:			493,200.00
Catch Basins:			
Const. Catch Basin L=9'.....	12 EA	3,400.00	40,800.00
Catch Basins subtotal:			40,800.00
Manholes:			
Standard Manhole.....	12 EA	2,500.00	30,000.00
Manholes subtotal:			30,000.00
STORM DRAINAGE total:			564,000.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	564,000.00

*** SUMMARY:-

CONSTRUCTION COST TOTAL:	564,000.00
CONTINGENCIES @ 15%:	84,600.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	648,600.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFDZ12 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ-12 By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 45" RCP.....	2700 LF	117.00	315,900.00
Const. 39" RCP.....	1700 LF	99.00	168,300.00
	Main Lines subtotal:		484,200.00
Catch Basins:			
Const. Catch Basin L=9'.....	12 EA	3,400.00	40,800.00
	Catch Basins subtotal:		40,800.00
Manholes:			
Standard Manhole.....	13 EA	2,500.00	32,500.00
	Manholes subtotal:		32,500.00
	STORM DRAINAGE total:		557,500.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	557,500.00

*** SUMMARY:-

CONSTRUCTION COST TOTAL:	557,500.00
CONTINGENCIES @ 15%:	83,625.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	641,125.00

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFDZ13 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ-13 By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 45" RCP.....	2700 LF	117.00	315,900.00
Const. 39" RCP.....	1700 LF	99.00	168,300.00
		Main Lines subtotal:	484,200.00
Catch Basins:			
Const. Catch Basin L=9'.....	12 EA	3,400.00	40,800.00
		Catch Basins subtotal:	40,800.00
Manholes:			
Standard Manhole.....	12 EA	2,500.00	30,000.00
		Manholes subtotal:	30,000.00
		STORM DRAINAGE total:	555,000.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	555,000.00

*** SUMMARY:-

CONSTRUCTION COST TOTAL:	555,000.00
CONTINGENCIES @ 15%:	83,250.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	638,250.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFDZ14 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ-14 By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 48" RCP.....	2700 LF	126.00	340,200.00
Const. 36" RCP.....	1700 LF	90.00	153,000.00
Main Lines subtotal:			493,200.00
Catch Basins:			
Const. Catch Basin L=9'.....	12 EA	3,400.00	40,800.00
Catch Basins subtotal:			40,800.00
Manholes:			
Standard Manhole.....	12 EA	2,500.00	30,000.00
Manholes subtotal:			30,000.00
STORM DRAINAGE total:			564,000.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	564,000.00

*** SUMMARY:-

CONSTRUCTION COST TOTAL:	564,000.00
CONTINGENCIES @ 15%:	84,600.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	648,600.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFDZ15 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ-15 By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 51" RCP.....	2700 LF	135.00	364,500.00
Const. 42" RCP.....	1700 LF	108.00	183,600.00
	Main Lines subtotal:		548,100.00
Catch Basins:			
Const. Catch Basin L=9'.....	12 EA	3,400.00	40,800.00
	Catch Basins subtotal:		40,800.00
Manholes:			
Standard Manhole.....	12 EA	2,500.00	30,000.00
	Manholes subtotal:		30,000.00
	STORM DRAINAGE total:		618,900.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	618,900.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	618,900.00
CONTINGENCIES @ 15%:	92,835.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	711,735.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFDZ16 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE DZ-17 By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 51" RCP.....	2700 LF	135.00	364,500.00
Const. 36" RCP.....	1700 LF	90.00	153,000.00
	Main Lines subtotal:		517,500.00
Catch Basins:			
Const. Catch Basin L=9'.....	12 EA	3,400.00	40,800.00
	Catch Basins subtotal:		40,800.00
Manholes:			
Standard Manhole.....	11 EA	2,500.00	27,500.00
	Manholes subtotal:		27,500.00
	STORM DRAINAGE total:		585,800.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	585,800.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	585,800.00
CONTINGENCIES @ 15%:	87,870.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	673,670.00

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFM1
SOUTH FONTANA MASTER STORM DRAIN PLAN LINE M-1 Estimate date: By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 36" RCP.....	1300 LF	90.00	117,000.00
Const. Junction Structure.....	1 EA	4,000.00	4,000.00
Main Lines subtotal:			121,000.00
Catch Basins:			
Const. Catch Basin L=9'.....	6 EA	3,400.00	20,400.00
Catch Basins subtotal:			20,400.00
Manholes:			
Standard Manhole.....	5 EA	2,500.00	12,500.00
Manholes subtotal:			12,500.00
STORM DRAINAGE total:			153,900.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	153,900.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	153,900.00
CONTINGENCIES @ 15%:	23,085.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	176,985.00

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFM2
SOUTH FONTANA MASTER STORM DRAIN PLAN

Estimate date:
LINE M-2 By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 45" RCP.....	1000 LF	117.00	117,000.00
Const. 39" RCP.....	1500 LF	99.00	148,500.00
Const. Junction Structure.....	1 EA	4,000.00	4,000.00
	Main Lines subtotal:		269,500.00
Catch Basins:			
Const. Catch Basin L=9'.....	8 EA	3,400.00	27,200.00
	Catch Basins subtotal:		27,200.00
Manholes:			
Standard Manhole.....	7 EA	2,500.00	17,500.00
	Manholes subtotal:		17,500.00
	STORM DRAINAGE total:		314,200.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	314,200.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	314,200.00
CONTINGENCIES @ 15%:	47,130.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	361,330.00

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFM3 — Estimate date: 99
SOUTH FONTANA MASTER STORM DRAIN PLAN LINE M-3 — By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 45" RCP.....	1000 LF	117.00	117,000.00
Const. 42" RCP.....	750 LF	108.00	81,000.00
Const. 36" RCP.....	650 LF	90.00	58,500.00
Const. Junction Structure.....	1 EA	4,000.00	4,000.00
		Main Lines subtotal:	260,500.00
Catch Basins:			
Const. Catch Basin L=9'.....	8 EA	3,400.00	27,200.00
		Catch Basins subtotal:	27,200.00
Manholes:			
Standard Manhole.....	7 EA	2,500.00	17,500.00
		Manholes subtotal:	17,500.00
		STORM DRAINAGE total:	305,200.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	305,200.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	305,200.00
CONTINGENCIES @ 15%:	45,780.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	350,980.00
AVERAGE COST PER LOT (15 LOTS):	23,398.67

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFM4
SOUTH FONTANA MASTER STORM DRAIN PLAN

Estimate date:
LINE M-4 By: LARRY

	Quantity	Unit Cost	Item Total
***** STORM DRAINAGE *****			
Main Lines:			
Const. 48" RCP.....	1000 LF	126.00	126,000.00
Const. 42" RCP.....	750 LF	108.00	81,000.00
Const. 36" RCP.....	850 LF	90.00	76,500.00
Const. Junction Structure.....	1 EA	4,000.00	4,000.00
Main Lines subtotal:			287,500.00
Catch Basins:			
Const. Catch Basin L=9'.....	8 EA	3,400.00	27,200.00
Catch Basins subtotal:			27,200.00
Manholes:			
Standard Manhole.....	7 EA	2,500.00	17,500.00
Manholes subtotal:			17,500.00
STORM DRAINAGE total:			332,200.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFM5 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE M-5 By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 93" RCP.....	3250 LF	261.00	848,250.00
Const. 90" RCP.....	4100 LF	252.00	1,033,200.00
Const. 81" RCP.....	2700 LF	225.00	607,500.00
Const. 78" RCP.....	1350 LF	216.00	291,600.00
Const. 66" RCP.....	1350 LF	180.00	243,000.00
Const. 63" RCP.....	4025 LF	171.00	688,275.00
Const. 60" RCP.....	3200 LF	162.00	518,400.00
Const. 57" RCP.....	3400 LF	153.00	520,200.00
Const. 48" RCP.....	5350 LF	126.00	674,100.00
Const. 45" RCP.....	3300 LF	117.00	386,100.00
Const. 39" RCP.....	1400 LF	99.00	138,600.00
Const. 36" RCP.....	6750 LF	90.00	607,500.00
CONST. RC BOX (7'X8').....	1100 CY	400.00	440,000.00
CONST. RC BOX (8'X8').....	1700 CY	400.00	680,000.00
CONST. RC BOX (8.5'X8').....	1225 CY	400.00	490,000.00
CONST. RC BOX (9'X8').....	1250 CY	400.00	500,000.00
CONST. RC BOX (12'X6.5').....	1950 CY	400.00	780,000.00
CONST. RC BOX (12'X8').....	2125 CY	400.00	850,000.00
CONST. RC BOX (2-14'X6.5').....	3325 CY	400.00	1,330,000.00
CONST. RC BOX (2-14'X7').....	5350 CY	400.00	2,140,000.00
CONST. RC BOX (2-8'X6').....	1600 CY	400.00	640,000.00
Junction Structure Into Channel....	2 EA	10,000.00	20,000.00
Junction Structue	5 EA	7,000.00	35,000.00
Extra Depth Trenching.....	4800 LF	20.00	96,000.00
		Main Lines subtotal:	14,557,725.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	332,200.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	332,200.00
CONTINGENCIES @ 15%:	49,830.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	382,030.00

	Quantity	Unit Cost	Item Total	
Catch Basins:				
Const. Catch Basin L=9'.....	140 EA	3,400.00	476,000.00	C
Catch Basins subtotal:			476,000.00	
Manholes:				
Standard Manhole.....	110 EA	2,500.00	275,000.00	C
Manholes subtotal:			275,000.00	
STORM DRAINAGE subtotal:			15,308,725.00	
Contingencies:			2,296,308.75	
STORM DRAINAGE total:			17,605,033.75	

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	15,308,725.00
TOTAL COST WITHOUT CONTINGENCIES:	15,308,725.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	15,308,725.00
CONTINGENCIES @ 15%:	2,296,308.75
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	17,605,033.75

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFM6 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE M-6 By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total	
*** STORM DRAINAGE ***				
Main Lines:				
Const. 87" RCP.....	1400 LF	243.00	340,200.00	c
Const. 81" RCP.....	2600 LF	225.00	585,000.00	c
Const. 66" RCP.....	2650 LF	180.00	477,000.00	c
Const. 51" RCP.....	2700 LF	135.00	364,500.00	c
Const. 48" RCP.....	1300 LF	126.00	163,800.00	c
Const. 39" RCP.....	1400 LF	99.00	138,600.00	c
EXTRA DEPTH TRENCHING.....	1000 LF	20.00	20,000.00	c
Junction Structure Into Channel....	1 EA	5,000.00	5,000.00	c
		Main Lines subtotal:	2,094,100.00	
Catch Basins:				
Const. Catch Basin L=9'.....	38 EA	3,400.00	129,200.00	c
		Catch Basins subtotal:	129,200.00	
Manholes:				
Standard Manhole.....	27 EA	2,500.00	67,500.00	c
		Manholes subtotal:	67,500.00	
		STORM DRAINAGE subtotal:	2,290,800.00	
		Contingencies:	343,620.00	
		STORM DRAINAGE total:	2,634,420.00	

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	2,290,800.00
TOTAL COST WITHOUT CONTINGENCIES:	2,290,800.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	2,290,800.00
CONTINGENCIES @ 15%:	343,620.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	2,634,420.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFM7 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE M-7 By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total	
*** STORM DRAINAGE ***				
Main Lines:				
Const. 84" RCP.....	1300 LF	234.00	304,200.00	c
Const. 78" RCP.....	2750 LF	216.00	594,000.00	c
Const. 63" RCP.....	2650 LF	171.00	453,150.00	c
Const. 51" RCP.....	4050 LF	135.00	546,750.00	c
Const. 45" RCP.....	1350 LF	117.00	157,950.00	c
Const. 36" RCP.....	1300 LF	90.00	117,000.00	c
Extra Depth Trenching...	2000 LF	20.00	40,000.00	c
Junction Structure Into Channel....	1 EA	5,000.00	5,000.00	c
		Main Lines subtotal:	2,218,050.00	
Catch Basins:				
Const. Catch Basin L=9'.....	42 EA	3,400.00	142,800.00	c
		Catch Basins subtotal:	142,800.00	
Manholes:				
Standard Manhole.....	32 EA	2,500.00	80,000.00	c
		Manholes subtotal:	80,000.00	
		STORM DRAINAGE subtotal:	2,440,850.00	
		Contingencies:	244,085.00	
		STORM DRAINAGE total:	2,684,935.00	

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	2,440,850.00
TOTAL COST WITHOUT CONTINGENCIES:	2,440,850.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	2,440,850.00
CONTINGENCIES @ 10%:	244,085.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	2,684,935.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFP
SOUTH FONTANA MASTER S.D. PLAN-LINES P1-P3

Estimate date:
By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total	
*** STORM DRAINAGE ***				
Main Lines:				
Const. 96" RCP.....	600 LF	270.00	162,000.00	c
Const. 90" RCP.....	2400 LF	252.00	604,800.00	c
Const. 54" RCP.....	1300 LF	144.00	187,200.00	c
Const. 48" RCP.....	1300 LF	126.00	163,800.00	c
Const. 39" RCP.....	900 LF	99.00	89,100.00	c
Const. 36" RCP.....	800 LF	90.00	72,000.00	c
Main Lines subtotal:			1,278,900.00	
Catch Basins:				
Const. Catch Basin L=9'.....	24 EA	3,400.00	81,600.00	c
Catch Basins subtotal:			81,600.00	
Manholes:				
Standard Manhole.....	19 EA	2,500.00	47,500.00	c
Manholes subtotal:			47,500.00	
STORM DRAINAGE subtotal:			1,408,000.00	
Contingencies:			211,200.00	
STORM DRAINAGE total:			1,619,200.00	

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	1,408,000.00
TOTAL COST WITHOUT CONTINGENCIES:	1,408,000.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	1,408,000.00
CONTINGENCIES @ 15%:	211,200.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	1,619,200.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFSS2 Estimate date:
SOUTH FONTANT MASTER STORM DRAIN PLAN- LINE SS-2 By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 69" RCP.....	550 LF	189.00	103,950.00
Const. 57" RCP.....	550 LF	153.00	84,150.00
Const. 45" RCP.....	450 LF	117.00	52,650.00
Const. Junction Structure.....	1 EA	400.00	400.00
Main Lines subtotal:			241,150.00
Catch Basins:			
Const. Catch Basin L=9'.....	6 EA	3,400.00	20,400.00
Catch Basins subtotal:			20,400.00
Manholes:			
Standard Manhole.....	5 EA	2,500.00	12,500.00
Manholes subtotal:			12,500.00
STORM DRAINAGE subtotal:			274,050.00
Contingencies:			41,107.50
STORM DRAINAGE total:			315,157.50

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	274,050.00
TOTAL COST WITHOUT CONTINGENCIES:	274,050.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	274,050.00
CONTINGENCIES @ 15%:	41,107.50
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	315,157.50

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFSS2A
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE SS-2A

Estimate date:
By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 108" RCP.....	2600 LF	306.00	795,600.00
Const. 87" RCP.....	1150 LF	243.00	279,450.00
Const. 84" RCP.....	1300 LF	234.00	304,200.00
Const. 63" RCP.....	1000 LF	171.00	171,000.00
Junction Structure Into Channel....	1 EA	5,000.00	5,000.00
Main Lines subtotal:			1,555,250.00
Catch Basins:			
Const. Catch Basin L=9'.....	18 EA	3,400.00	61,200.00
Catch Basins subtotal:			61,200.00
Manholes:			
Standard Manhole.....	15 EA	2,500.00	37,500.00
Manholes subtotal:			37,500.00
STORM DRAINAGE subtotal:			1,653,950.00
Contingencies:			248,092.50
STORM DRAINAGE total:			1,902,042.50

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	1,653,950.00
TOTAL COST WITHOUT CONTINGENCIES:	1,653,950.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	1,653,950.00
CONTINGENCIES @ 15%:	248,092.50
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	1,902,042.50

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFSS2B Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE SS-2B By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 108" RCP.....	2600 LF	306.00	795,600.00
Const. 93" RCP.....	1400 LF	261.00	365,400.00
Const. 81" RCP.....	1300 LF	225.00	292,500.00
Const. 66" RCP.....	1300 LF	180.00	234,000.00
Junction Structure Into Channel....	1 EA	5,000.00	5,000.00
		Main Lines subtotal:	1,692,500.00
Catch Basins:			
Const. Catch Basin L=9'.....	18 EA	3,400.00	61,200.00
		Catch Basins subtotal:	61,200.00
Manholes:			
Standard Manhole.....	15 EA	2,500.00	37,500.00
		Manholes subtotal:	37,500.00
		STORM DRAINAGE subtotal:	1,791,200.00
		Contingencies:	268,680.00
		STORM DRAINAGE total:	2,059,880.00

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	1,791,200.00
TOTAL COST WITHOUT CONTINGENCIES:	1,791,200.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	1,791,200.00
CONTINGENCIES @ 15%:	268,680.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	2,059,880.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFSS2C Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE SS-2C By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 87" RCP.....	2500 LF	243.00	607,500.00
Const. 84" RCP.....	1350 LF	234.00	315,900.00
Const. 75" RCP.....	1350 LF	207.00	279,450.00
Const. 63" RCP.....	1350 LF	171.00	230,850.00
Junction Structure Into Channel....	1 EA	5,000.00	5,000.00
		Main Lines subtotal:	1,438,700.00
Catch Basins:			
Const. Catch Basin L=9'.....	18 EA	3,400.00	61,200.00
		Catch Basins subtotal:	61,200.00
Manholes:			
Standard Manhole.....	15 EA	2,500.00	37,500.00
		Manholes subtotal:	37,500.00
		STORM DRAINAGE subtotal:	1,537,400.00
		Contingencies:	230,610.00
		STORM DRAINAGE total:	1,768,010.00

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	1,537,400.00
TOTAL COST WITHOUT CONTINGENCIES:	1,537,400.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	1,537,400.00
CONTINGENCIES @ 15%:	230,610.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	1,768,010.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFSS2D Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE SS-2D By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. RC Box (10' x 8').....	2370 CY	400.00	948,000.00
Junction Structure Into Channel....	1 EA	5,000.00	5,000.00
Main Lines subtotal:			953,000.00
Catch Basins:			
Const. Catch Basin L=9'.....	10 EA	3,400.00	34,000.00
Catch Basins subtotal:			34,000.00
Manholes:			
Standard Manhole.....	5 EA	2,500.00	12,500.00
Manholes subtotal:			12,500.00
STORM DRAINAGE subtotal:			999,500.00
Contingencies:			149,925.00
STORM DRAINAGE total:			1,149,425.00

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	999,500.00
TOTAL COST WITHOUT CONTINGENCIES:	999,500.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	999,500.00
CONTINGENCIES @ 15%:	149,925.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	1,149,425.00

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFSS5A — Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE SS-5 — By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 42" RCP.....	800 LF	108.00	86,400.00
Const. 39" RCP.....	700 LF	99.00	69,300.00
Main Lines subtotal:			155,700.00
Catch Basins:			
Const. Catch Basin L=9'.....	6 EA	3,400.00	20,400.00
Catch Basins subtotal:			20,400.00
Manholes:			
Standard Manhole.....	4 EA	2,500.00	10,000.00
Manholes subtotal:			10,000.00
STORM DRAINAGE total:			186,100.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	186,100.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	186,100.00
CONTINGENCIES @ 15%:	27,915.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	214,015.00

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFSS5B — Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE SS-5B By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 42" RCP.....	800 LF	108.00	86,400.00
Const. 39" RCP.....	700 LF	99.00	69,300.00
Main Lines subtotal:			155,700.00
Catch Basins:			
Const. Catch Basin L=9'.....	6 EA	3,400.00	20,400.00
Catch Basins subtotal:			20,400.00
Manholes:			
Standard Manhole.....	4 EA	2,500.00	10,000.00
Manholes subtotal:			10,000.00
STORM DRAINAGE total:			186,100.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	186,100.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	186,100.00
CONTINGENCIES @ 15%:	27,915.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	214,015.00

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFSS6 — Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE SS-6 — By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 78" RCP.....	800 LF	216.00	172,800.00
Const. 72" RCP.....	1200 LF	198.00	237,600.00
Const. 48" RCP.....	300 LF	126.00	37,800.00
Const. 42" RCP.....	300 LF	108.00	32,400.00
		Main Lines subtotal:	480,600.00
Catch Basins:			
Const. Catch Basin L=9'.....	10 EA	3,400.00	34,000.00
		Catch Basins subtotal:	34,000.00
Manholes:			
Standard Manhole.....	8 EA	2,500.00	20,000.00
		Manholes subtotal:	20,000.00
		STORM DRAINAGE total:	534,600.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	534,600.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	534,600.00
CONTINGENCIES @ 15%:	80,190.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	614,790.00

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFSS7 **Estimate date:**
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE SS-7 By: LARRY

	Quantity	Unit Cost	Item Total
***** STORM DRAINAGE *****			
Main Lines:			
Const. 57" RCP.....	800 LF	153.00	122,400.00
Const. 51" RCP.....	1200 LF	135.00	162,000.00
Const. 42" RCP.....	300 LF	108.00	32,400.00
Const. 36" RCP.....	300 LF	90.00	27,000.00
		Main Lines subtotal:	343,800.00
Catch Basins:			
Const. Catch Basin L=9'.....	10 EA	3,400.00	34,000.00
		Catch Basins subtotal:	34,000.00
Manholes:			
Standard Manhole.....	8 EA	2,500.00	20,000.00
		Manholes subtotal:	20,000.00
		STORM DRAINAGE total:	397,800.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	397,800.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	397,800.00
CONTINGENCIES @ 15%:	59,670.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	457,470.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFSS8 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE SS-8 By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 45" RCP.....	1650 LF	117.00	193,050.00
Const. 39" RCP.....	500 LF	99.00	49,500.00
Main Lines subtotal:			242,550.00
Catch Basins:			
Const. Catch Basin L=9'.....	8 EA	3,400.00	27,200.00
Catch Basins subtotal:			27,200.00
Manholes:			
Standard Manhole.....	5 EA	2,500.00	12,500.00
Manholes subtotal:			12,500.00
STORM DRAINAGE total:			282,250.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	282,250.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	282,250.00
CONTINGENCIES @ 15%:	42,337.50
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	324,587.50

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFSS10 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE SS-10 By: LARRY

	Quantity	Unit Cost	Item Total
***** STORM DRAINAGE *****			
Main Lines:			
Const. 60" RCP.....	2000 LF	162.00	324,000.00
Const. 48" RCP.....	300 LF	126.00	37,800.00
Const. 39" RCP.....	300 LF	99.00	29,700.00
Main Lines subtotal:			391,500.00
Catch Basins:			
Const. Catch Basin L=9'.....	8 EA	3,400.00	27,200.00
Catch Basins subtotal:			27,200.00
Manholes:			
Standard Manhole.....	7 EA	2,500.00	17,500.00
Manholes subtotal:			17,500.00
STORM DRAINAGE total:			436,200.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	436,200.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	436,200.00
CONTINGENCIES @ 15%:	65,430.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	501,630.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFSS11 Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE SS-11 By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 69" RCP.....	2000 LF	189.00	378,000.00
Const. 54" RCP.....	300 LF	144.00	43,200.00
Const. 42" RCP.....	300 LF	108.00	32,400.00
Main Lines subtotal:			453,600.00
Catch Basins:			
Const. Catch Basin L=9'.....	8 EA	3,400.00	27,200.00
Catch Basins subtotal:			27,200.00
Manholes:			
Standard Manhole.....	7 EA	2,500.00	17,500.00
Manholes subtotal:			17,500.00
STORM DRAINAGE subtotal:			498,300.00
Contingencies:			74,745.00
STORM DRAINAGE total:			573,045.00

Construction Cost Estimate - SFSS11

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	498,300.00
TOTAL COST WITHOUT CONTINGENCIES:	498,300.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	498,300.00
CONTINGENCIES @ 15%:	74,745.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	573,045.00

HALL & FOREMAN, INC.
Civil Engineering-Land Planning-Land Surveying
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Costa Mesa, California 92626-3428
Telephone (714) 641-8777

**** CONSTRUCTION COST ESTIMATE ****

Job: SFT1C — Estimate date:
S. FONTANA MASTER S.D. PLAN: LINE T-1Cto T-1B — By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 66" RCP.....	400 LF	180.00	72,000.00
Const. 63" RCP.....	1300 LF	171.00	222,300.00
Const. 51" RCP.....	1300 LF	135.00	175,500.00
Const. 48" RCP.....	1500 LF	126.00	189,000.00
Const. 45" RCP.....	600 LF	117.00	70,200.00
Const. 42" RCP.....	1650 LF	108.00	178,200.00
Const. 39" RCP.....	500 LF	99.00	49,500.00
Const. 36" RCP.....	1100 LF	90.00	99,000.00
Const. Junction Structure.....	5 EA	4,000.00	20,000.00
		Main Lines subtotal:	1,075,700.00
Catch Basins:			
Const. Catch Basin L=9'.....	22 EA	3,400.00	74,800.00
		Catch Basins subtotal:	74,800.00
Manholes:			
Standard Manhole.....	21 EA	2,500.00	52,500.00
		Manholes subtotal:	52,500.00
		STORM DRAINAGE total:	1,203,000.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	1,203,000.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	1,203,000.00
CONTINGENCIES @ 15%:	180,450.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	1,383,450.00

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFT2C — Estimate date:
SOUTH FONTANA MASTER STORM DRAIN PLAN-LINE T-2C — By: LARRY

	Quantity	Unit Cost	Item Total
***** STORM DRAINAGE *****			
Main Lines:			
Const. 87" RCP.....	1100 LF	243.00	267,300.00
Const. 78" RCP.....	400 LF	216.00	86,400.00
Const. 42" RCP.....	675 LF	108.00	72,900.00
Const. 36" RCP.....	675 LF	90.00	60,750.00
Const. Junction Structure.....	3 EA	4,000.00	12,000.00
		Main Lines subtotal:	499,350.00
Catch Basins:			
Const. Catch Basin L=9'.....	16 EA	3,400.00	54,400.00
		Catch Basins subtotal:	54,400.00
Manholes:			
Standard Manhole.....	14 EA	2,500.00	35,000.00
		Manholes subtotal:	35,000.00
Miscellaneous:			
CONST. REINF. CONC. BOX (9.5'X 8').	2450 CY	400.00	980,000.00
CONST. REINF. CONC. BOX (10' X 8').	965 CY	400.00	386,000.00
		Miscellaneous subtotal:	1,366,000.00
		STORM DRAINAGE total:	1,954,750.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	1,954,750.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	1,954,750.00
CONTINGENCIES @ 15%:	293,212.50
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	2,247,962.50

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFT3C — Estimate date:
S. FONTANA MASTER S.D. PLAN: LINE T-3C to T-3B — By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 96" RCP.....	350 LF	270.00	94,500.00
Const. 75" RCP.....	2000 LF	207.00	414,000.00
Const. 57" RCP.....	1350 LF	153.00	206,550.00
Const. 48" RCP.....	550 LF	126.00	69,300.00
Const. 45" RCP.....	600 LF	117.00	70,200.00
Const. 36" RCP.....	1900 LF	90.00	171,000.00
Const. Junction Structure.....	4 EA	4,000.00	16,000.00
		Main Lines subtotal:	1,041,550.00
Catch Basins:			
Const. Catch Basin L=9'.....	18 EA	3,400.00	61,200.00
		Catch Basins subtotal:	61,200.00
Manholes:			
Standard Manhole.....	17 EA	2,500.00	42,500.00
		Manholes subtotal:	42,500.00
		STORM DRAINAGE total:	1,145,250.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	1,145,250.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	1,145,250.00
CONTINGENCIES @ 15%:	171,787.50
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	1,317,037.50

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFT4C — Estimate date:
S. FONTANA MASTER S.D. PLAN - LINE T-4 & T-4A — By: LARRY

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 87" RCP.....	3550 LF	243.00	862,650.00
Const. 54" RCP.....	2650 LF	144.00	381,600.00
Const. 51" RCP.....	600 LF	135.00	81,000.00
Const. 42" RCP.....	1200 LF	108.00	129,600.00
Const. Junction Structure.....	4 EA	4,000.00	16,000.00
		Main Lines subtotal:	1,470,850.00
Catch Basins:			
Const. Catch Basin L=9'.....	20 EA	3,400.00	68,000.00
		Catch Basins subtotal:	68,000.00
Manholes:			
Standard Manhole.....	19 EA	2,500.00	47,500.00
		Manholes subtotal:	47,500.00
		STORM DRAINAGE total:	1,586,350.00

*** MAJOR CATEGORY TOTALS (without contingencies):

STORM DRAINAGE:	1,586,350.00

*** SUMMARY:

CONSTRUCTION COST TOTAL:	1,586,350.00
CONTINGENCIES @ 15%:	237,952.50
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	1,824,302.50

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****** CONSTRUCTION COST ESTIMATE ******

Job: SFWF — Estimate date:
S. FONTANA S.D. W. FONTANA CHNL. W. OF HEMLOCK — By: LARRY

	Quantity	Unit Cost	Item Total
***** STORM DRAINAGE *****			
Miscellaneous:			
CONST. CONC. LINED CHNL. (40' X 6')	1750 CY	350.00	612,500.00
CONST. CONC. LINED CHNL. (42' X 6')	3620 CY	350.00	1,267,000.00
CONST. CONC. LINED CHNL. (45' X 6')	7650 CY	350.00	2,677,500.00
CONST. CONC. LINED CHNL. (47' X 6')	4020 CY	350.00	1,407,000.00
		Miscellaneous subtotal:	5,964,000.00
		STORM DRAINAGE total:	5,964,000.00

***** MAJOR CATEGORY TOTALS (without contingencies):**

STORM DRAINAGE:	5,964,000.00

***** SUMMARY:**

CONSTRUCTION COST TOTAL:	5,964,000.00
CONTINGENCIES @ 15%:	894,600.00
OTHER COSTS:	0.00
TOTAL ESTIMATED COST:	6,858,600.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: SFM — Estimate date:
SOUTH FONTANA MASTER S.D. PLAN-I-10 CHANNEL — By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total	
*** SITE PREPARATION & GRADING ***				
Demolition/Removal:				
Demolish Exist Conc. Trap. Channel.	538670 SF	0.20	107,734.00	c
Demolish Exist Conc. Box Culvert...	890 SF	10.00	8,900.00	c
Demolition/Removal subtotal:			116,634.00	
Rough Grading:				
Mass Excavation.....	172900 CY	1.10	190,190.00	c
Export Material.....	172900 CY	2.50	432,250.00	c
Rough Grading subtotal:			622,440.00	
SITE PREPARATION & GRADING subtotal:			739,074.00	
Contingencies:			110,861.10	
SITE PREPARATION & GRADING total:			849,935.10	
*** STORM DRAINAGE ***				
Main Lines:				
Const. Conc. Rect. Chnl.(51' x 10')	700 CY	350.00	245,000.00	c
Const. Conc. Rect. Chnl.(51' x 8').	18500 CY	350.00	6,475,000.00	c
Const. Conc. Rect. Chnl.(40' x 8').	8700 CY	350.00	3,045,000.00	c
Const. Quad. RC Box (12' x 8.5')...	1550 CY	400.00	620,000.00	c
Main Lines subtotal:			10,385,000.00	
Miscellaneous:				
Shoring @ Cherry Ave.....	12000 SF	20.00	240,000.00	
Detour @ Cherry Ave.....	LS		75,000.00	

	Quantity	Unit Cost	Item Total	
Remove & Replace Pvmt @ Cherry Ave.	LS		100,000.00	c
		Miscellaneous subtotal:	415,000.00	
		STORM DRAINAGE subtotal:	10,800,000.00	
		Contingencies:	1,620,000.00	
		STORM DRAINAGE total:	12,420,000.00	

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

SITE PREPARATION & GRADING:	739,074.00
STORM DRAINAGE:	10,800,000.00
TOTAL COST WITHOUT CONTINGENCIES:	11,539,074.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	11,539,074.00
CONTINGENCIES @ 15%:	1,730,861.10
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	13,269,935.10

APPENDIX D
COST ESTIMATES - FONTANA - EAST

HALL & FOREMAN, INC.
Civil Engineering-Land Planning-Land Surveying
13821 Newport Avenue, Suite 200
Tustin, California 92680
Telephone (714) 544-3404

**** CONSTRUCTION COST ESTIMATE ****

Job: RIALTE
E. FONTANA AREA OF RIALTO MASTER S.D. PLAN-LINEE

Estimate date:
By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 96" RCP.....	2720 LF	270.00	734,400.00
Const. 78" RCP.....	1320 LF	216.00	285,120.00
Const. 72" RCP.....	2450 LF	198.00	485,100.00
Const. 66" RCP.....	1320 LF	180.00	237,600.00
Const. 42" RCP.....	8580 LF	108.00	926,640.00
		Main Lines subtotal:	2,668,860.00
Catch Basins:			
Const. Catch Basin L=9'.....	64 EA	3,400.00	217,600.00
		Catch Basins subtotal:	217,600.00
Manholes:			
Standard Manhole.....	47 EA	2,500.00	117,500.00
		Manholes subtotal:	117,500.00
		STORM DRAINAGE subtotal:	3,003,960.00
		Contingencies:	450,594.00
		STORM DRAINAGE total:	3,454,554.00

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	3,003,960.00
TOTAL COST WITHOUT CONTINGENCIES:	3,003,960.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	3,003,960.00
CONTINGENCIES @ 15%:	450,594.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	3,454,554.00

HALL & FOREMAN, INC.
Civil Engineering-Land Planning-Land Surveying
3170 Redhill Avenue
Costa Mesa, California 92626-3428
Telephone (714) 641-8777

**** CONSTRUCTION COST ESTIMATE ****

Job: RIALTF Estimate date:
E. FONTANA AREA OF RIALTO MASTER S.D. PLAN-LINEF By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 51" RCP.....	2700 LF	135.00	364,500.00
Const. 48" RCP.....	1300 LF	126.00	163,800.00
Const. 45" RCP.....	1350 LF	117.00	157,950.00
Const. 42" RCP.....	4300 LF	108.00	464,400.00
Const. 39" RCP.....	1500 LF	99.00	148,500.00
		Main Lines subtotal:	1,299,150.00
Catch Basins:			
Const. Catch Basin L=9'.....	32 EA	3,400.00	108,800.00
		Catch Basins subtotal:	108,800.00
Manholes:			
Standard Manhole.....	29 EA	2,500.00	72,500.00
		Manholes subtotal:	72,500.00
Miscellaneous:			
CONST CONC TRAP CHNL (12'X 8.5')...	1335 CY	275.00	367,125.00
CONST CONC TRAP CHNL (12'X 8.0')...	1280 CY	275.00	352,000.00
CONST CONC TRAP CHNL (12'X 7.5')...	1225 CY	275.00	336,875.00
CONST CONC TRAP CHNL (12'X 6.5')...	1115 CY	275.00	306,625.00
CONST CONC TRAP CHNL (12'X 6.0')...	1065 CY	275.00	292,875.00
CONST RC BOX (2-10'X 7.0').....	105 CY	400.00	42,000.00
CONST RC BOX (2-10'X 6.5').....	100 CY	400.00	40,000.00
CONST RC BOX (2- 9'X 5.5').....	90 CY	400.00	36,000.00

	Quantity	Unit Cost	Item Total
CONST RC BOX (1-14'X 5.0').....	75 CY	400.00	30,000.00
		Miscellaneous subtotal:	1,803,500.00
		STORM DRAINAGE subtotal:	3,283,950.00
		Contingencies:	492,592.50
		STORM DRAINAGE total:	3,776,542.50

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	3,283,950.00
TOTAL COST WITHOUT CONTINGENCIES:	3,283,950.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	3,283,950.00
CONTINGENCIES @ 15%:	492,592.50
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	3,776,542.50

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**** CONSTRUCTION COST ESTIMATE ****

Job: RIALTG Estimate date:
E. FONTANA AREA OF RIALTO MASTER S.D. PLAN-LINEG By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 120" RCP.....	1640 LF	342.00	560,880.00
Const. 108" RCP.....	1320 LF	306.00	403,920.00
Const. 102" RCP.....	1320 LF	288.00	380,160.00
Const. 90" RCP.....	1320 LF	252.00	332,640.00
Const. 72" RCP.....	2640 LF	198.00	522,720.00
Const. 45" RCP.....	1400 LF	117.00	163,800.00
Const. 42" RCP.....	2800 LF	108.00	302,400.00
Const. 39" RCP.....	5600 LF	99.00	554,400.00
		Main Lines subtotal:	3,220,920.00
Catch Basins:			
Const. Catch Basin L=9'.....	74 EA	3,400.00	251,600.00
		Catch Basins subtotal:	251,600.00
Manholes:			
Standard Manhole.....	57 EA	2,500.00	142,500.00
		Manholes subtotal:	142,500.00
		STORM DRAINAGE subtotal:	3,615,020.00
		Contingencies:	542,253.00
		STORM DRAINAGE total:	4,157,273.00

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	3,615,020.00
TOTAL COST WITHOUT CONTINGENCIES:	3,615,020.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	3,615,020.00
CONTINGENCIES @ 15%:	542,253.00
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	4,157,273.00

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**** CONSTRUCTION COST ESTIMATE ****

Job: RIALTH
E. FONTANA AREA OF RIALTO MASTER S.D. PLAN-LINE J
Estimate date:
By: LARRY

NOTE: 'c' after Item Dollar Amount Indicates Contingency Item.

	Quantity	Unit Cost	Item Total
*** STORM DRAINAGE ***			
Main Lines:			
Const. 63" RCP.....	2320 LF	171.00	396,720.00
Const. 57" RCP.....	2560 LF	153.00	391,680.00
Const. 51" RCP.....	2025 LF	135.00	273,375.00
Const. 42" RCP.....	2560 LF	108.00	276,480.00
Const. 39" RCP.....	2560 LF	99.00	253,440.00
Junction Structure.....	3 EA	4,000.00	12,000.00
		Main Lines subtotal:	1,603,695.00
Catch Basins:			
Const. Catch Basin L=9'.....	46 EA	3,400.00	156,400.00
		Catch Basins subtotal:	156,400.00
Manholes:			
Standard Manhole.....	33 EA	2,500.00	82,500.00
		Manholes subtotal:	82,500.00
		STORM DRAINAGE subtotal:	1,842,595.00
		Contingencies:	276,389.25
		STORM DRAINAGE total:	2,118,984.25

*** MAJOR CATEGORY TOTALS (Does Not Include Contingency Costs):

STORM DRAINAGE:	1,842,595.00
TOTAL COST WITHOUT CONTINGENCIES:	1,842,595.00

*** SUMMARY (Including Contingency Costs):

TOTAL OF COSTS SUBJECT TO CONTINGENCY:	1,842,595.00
CONTINGENCIES @ 15%:	276,389.25
TOTAL OF COSTS NOT SUBJECT TO CONTINGENCY:	0.00
TOTAL ESTIMATED CONSTRUCTION COST:	2,118,984.25

APPENDIX E
COST ESTIMATES - HAWKER-CRAWFORD

HAWKER-CRAWFORD CHANNEL SYSTEM

Cost Estimate Summary *

Duncan Canyon Debris Basin		300,000
Hawker-Crawford Channel (Above Rich Basin)		2,471,523
	Sub-Total	$2,771,523
Line B1		1,066,946
Line B2		482,075
Line C1		910,625
Line C2		133,750
Line C3		106,875
Line D1		793,250
Line D2		170,000
Line E		721,250
Line F		352,750
Line G		337,125
	TOTAL	$7,846,167

* Includes 25% Contingency -
Does not include Hawker-Crawford
Channel below Rich Basin

DUNCAN CANYON DEBRIS BASIN

Preliminary Cost Estimate

1)	Spillway	L.S.	$ 75,000
2)	Ex. & Emb.	L.S.	65,000
3)	Basin Drain & Structure	L.S.	50,000
4)	Fence	L.S.	15,000
5)	Misc.	L.S.	30,000
		Sub-Total	$235,000
		Contingency (25%)	58,750
		ESTIMATED TOTAL	$293,750
		USE	$300,000

HAWKER-CRAWFORD CHANNEL SYSTEM
(Duncan Canyon to Rich Basin)

Preliminary
Cost Estimate

	Item	Unit	Quantity	Unit Cost	Cost
1)	Excavation	C.Y.	10,636	3.00	$ 31,908
2)	Clearing & Grubbing	---	L.S.	---	30,000
3)	Concrete (Trap. Channel)	C.Y.	6,239	250.00	1,559,750
4)	6' Fence (C.L.)	L.F.	14,630	12.00	175,560
5)	Basin Inlet	---	L.S.	---	30,000
6)	Misc. (Structure)		L.S.	---	100,000
7)	Miscellaneous		L.S.	---	50,000
					$1,977,218
				Duncan Canyon Debris Basin	235,000
				Sub-Total	$2,212,218
				25% Contingency	553,055
				TOTAL	$2,765,272

Line B2

Preliminary Cost Estimate

	Item	Unit	Quantity	Unit Cost	Cost
1)	Clearing & Grubbing	L.S.	---	L.S.	$ 7,500
2)	Excavation	C.Y.	3,120	3.00	9,360
3)	(Trap. Channel) Concrete	C.Y.	660	250.00	165,000
4)	6' Fence	L.F.	2,400	12.00	28,800
5)	Inlet	L.S.	---	L.S.	60,000
6)	Connection to B1	L.S.	---	L.S.	5,000
7)	Debris Basin	L.S.	---	L.S.	100,000
8)	Miscellaneous	L.S.	---	L.S.	10,000
				Sub-Total	$ 385,660
				Contingency (25%)	96,415
				TOTAL	$ 482,075

Line C1

Preliminary Cost Estimate

	Item	Unit	Quantity	Unit Cost	Cost
1)	42" RCP	L.F.	500	$105	$ 52,500
2)	60" RCP	L.F.	1100	150	165,000
3)	72" RCP	L.F.	1700	180	306,000
4)	Junc. Structure	EA	2	8,000	16,000
5)	Manhole	EA	6	4,000	24,000
6)	Inlet	L.S.	---	L.S.	20,000
7)	Outlet	L.S.	---	L.S.	20,000
8)	Debris Basin	L.S.	---	L.S.	100,000
9)	Misc.	L.S.	---	L.S.	25,000
					$ 728,500
				Contingency (25%)	182,125
				TOTAL	$ 910,625

Line C2 - **Preliminary Cost Estimate**

	Item	Unit	Quantity	Unit Cost	Cost
1)	48" RCP	L.F.	700	$120	$ 84,000
2)	Manhole	EA	2	4,000	8,000
3)	Inlet	L.S.	---	L.S.	5,000
4)	Misc.	L.S.	---	L.S.	10,000
				Sub-Total	$ 107,000
				Contingency (25%)	26,750
				TOTAL	$ 133,750

Line C3 - **Preliminary Cost Estimate**

	Item	Unit	Quantity	Unit Cost	Cost
1)	30" RCP	L.F.	700	$ 75	$ 52,500
2)	Manholes	EA	2	4,000	8,000
3)	Inlet	L.S.	---	L.S.	15,000
4)	Misc.	L.S.	---	L.S.	10,000
				Sub-Total	$ 85,500
				Contingency (25%)	21,375
				TOTAL	$ 106,875

Line D1

Preliminary Cost Estimate

	Item	Unit	Quantity	Unit Cost	Cost
1)	48" RCP	L.F.	300	$120	$ 36,000
2)	54" RCP	L.F.	1000	135	135,000
3)	63" RCP	L.F.	1700	158	268,600
4)	Junc. Structure	EA	2	8,000	16,000
5)	Manhole	EA	6	4,000	24,000
6)	Inlet/Basin	L.S.	L.S.	L.S.	25,000
7)	Outlet	L.S.	---	L.S.	5,000
8)	Debris Basin	L.S.	---	L.S.	100,000
9)	Misc.	L.S.	---	L.S.	25,000
					$ 634,600
				Contingency (25%)	158,650
				TOTAL	$ 793,250

Line D2 - **Preliminary Cost Estimate**

	Item	Unit	Quantity	Unit Cost	Cost
1)	48" RCP	L.F.	600	$120	$ 72,000
2)	Manhole	EA	1	4,000	4,000
3)	Inlet	L.S.	L.S.	L.S.	40,000
4)	Misc.	L.S.	L.S.	L.S.	20,000
				Sub-Total	$ 136,000
				Contingency (25%)	34,000
				TOTAL	$ 170,000

Line E

Preliminary Cost Estimate

	Item	Unit	Quantity	Unit Cost	Cost
1)	36" RCP	L.F.	400	$ 90	$ 36,000
2)	60" RCP	L.F.	2000	150	300,000
3)	Junc. Structure	EA	2	8,000	16,000
4)	Manhole	EA	5	4,000	20,000
5)	Inlet/Basin	L.S.	L.S.	L.S.	30,000
6)	Inlet/Pipe	L.S.	---	L.S.	30,000
7)	Connection to Channel	L.S.	---	L.S.	15,000
8)	Debris Basin	L.S.	---	L.S.	100,000
9)	Misc.	L.S.	---	L.S.	30,000
					$ 577,000
				Contingency (25%)	144,250
				TOTAL	$ 721,250

Line F

Preliminary Cost Estimate

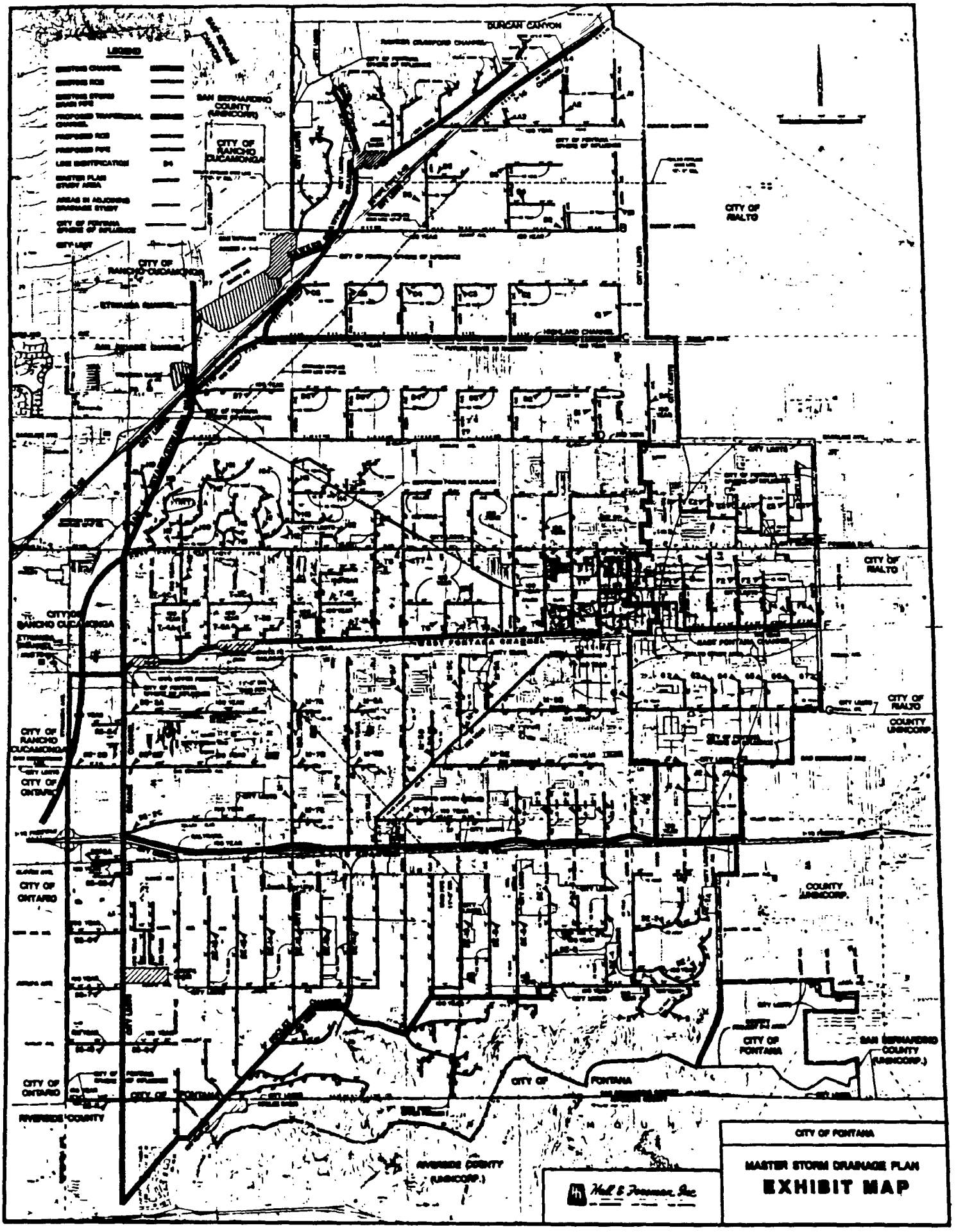
	Item	Unit	Quantity	Unit Cost	Cost
1)	42" RCP	L.F.	600	$105	$ 63,000
2)	51" RCP	L.F.	400	128	51,200
3)	Manhole	EA	2	4,000	8,000
4)	Inlet/Basin	L.S.	L.S.	L.S.	30,000
5)	Connection to Channel	L.S.	L.S.	L.S.	5,000
6)	Debris Basin	L.S.	---	L.S.	100,000
7)	Misc.	L.S.	---	L.S.	25,000
					$ 282,200
				Contingency (25%)	70,550
				TOTAL	$ 352,750

Line G

Preliminary Cost Estimate

	Item	Unit	Quantity	Unit Cost	Cost
1)	45" RCP	L.F.	900	$113	$ 101,700
2)	Manhole	EA	2	4,000	8,000
3)	Inlet/Basin	L.S.	---	L.S.	30,000
4)	Channel Connection	L.S.	---	L.S.	5,000
5)	Misc.	L.S.	---	L.S.	25,000
6)	Debris Basin	L.S.	---	L.S.	100,000
					$ 269,700
				Contingency (25%)	67,425
				TOTAL	$ 337,125

APPENDIX F
MASTER STORM DRAINAGE PLAN EXHIBIT MAP



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